



THE LICHENS OF ITALY

A second annotated catalogue

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Pier Luigi Nimis



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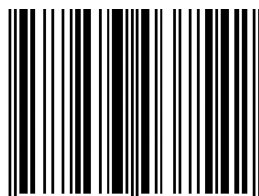
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Pier Luigi Nimis



Author's address:
Prof. P.L. Nimis
Department of Life Sciences
University of Trieste
Via L. Giorgieri 10
I – 34127 Trieste
nimis@units.it

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Introduction

This checklist summarises 23 years of lichenological research in Italy, starting from the first annotated catalogue by Nimis (1993). In this period, a new generation of Italian lichenologists grew up, and several non-Italian lichenologists published many new records from Italy: more than 1200 papers appeared after 1993, which contain at least one lichen record from the country. An updated, non-annotated list of accepted taxa was published by Nimis & Martellos (2003), followed by a further nomenclatural updating available online since the end of 2007 in ITALIC, the Information System on Italian Lichens (see Nimis & Martellos 2002).

In order to facilitate comparisons with the first checklist (Nimis 1993), also the present work includes: a) all of the lichenised taxa known from Italy, b) non-lichenised taxa belonging to genera with lichenised representatives, c) a selection of non-lichenised fungi which were traditionally treated by lichenologists. A complete checklist of lichenicolous fungi is in preparation by W. von Brackel, and a preliminary list, including 492 infrageneric taxa, is being published more or less at the same time as the present book (Brackel 2016).

The present checklist includes 2704 accepted infrageneric taxa, 2565 of which are lichenised. The increase in the number of taxa from 1993 to 2016 is summarised in Tab. 1.

Region	Nimis 1993	Nimis & Martellos 2003	Nimis 2016
Venezia Giulia (VG)	431	459	517
Friuli (Frl)	638	912	1051
Veneto (Ven)	900	1012	1174
Trentino-Alto Adige (TAA)	1272	1301	1582
Lombardia (Lomb)	1055	1095	1296
Piemonte (Piem)	898	1125	1296
Valle d'Aosta (VA)	503	688	800
Emilia-Romagna (Emil)	562	654	775
Liguria (Lig)	790	977	1091
Toscana (Tosc)	921	1005	1208
Marche (Marc)	187	501	542
Umbria (Umb)	47	502	556
Lazio (Laz)	557	650	762
Abruzzo (Abr)	335	603	705
Molise (Mol)	0	354	490
Sardegna (Sar)	1002	1110	1232
Campania (Camp)	501	667	846
Puglia (Pugl)	383	570	630
Basilicata (Bas)	216	468	642
Calabria (Cal)	629	900	979
Sicilia (Si)	726	846	960
Total	2145	2345	2704

Tab. 1 - Progress in the lichenological exploration of Italy from 1993 to 2016.

The increase is obviously highest in the previously least explored regions, but on the whole it is consistent throughout the country, which is presently much more homogeneously studied than in

1993. On the contrary, the study of different lichen biota within Italy was much less homogeneous. Epiphytic lichens were studied more intensively than those growing on other substrata, mainly because of the very high number of biomonitoring studies carried out in Italy in the last decades, first in disturbed environments, and more recently in forests. Saxicolous and terricolous lichens were studied much less, with the exception of saxicolous species on monuments. Among the areas which are still poorly investigated, the following may be cited: 1) The central Apennines, especially the siliceous Monti della Laga and the mountains of Lazio in central Italy, 2) the northern Apennines in the Emilia-Romagna and Marche regions, 3) the coastal mountains of Campania, 4) the low-elevation deep valleys along the Adriatic side of the Peninsula, 5) the calcareous canyons of Puglia called *gravine*, 6) the gypsum outcrops of Sicilia, 7) the *Astragalus*-formations of the high Mediterranean mountains (Calabria, Sicilia and Sardegna, see Nimis 1981). Despite the relatively high number of known species, the Italian Alps as well are worthy of a more intense lichenological exploration.

Most of the records derive from published sources. It is obvious that not all of them could be accepted uncritically: the circumscription of taxa may differ among authors, recent taxonomic revisions might have demonstrated that a given taxon actually includes several taxa of the corresponding rank, some authors may be more reliable than others, etc. The author of a checklist is often forced to make difficult decisions, since in most cases it is not possible to check directly all identifications cited in the literature. Identifications in the Iberian literature were checked by Giralt (1997) for two genera: *Ochrolechia* and *Rinodina*: the number of misidentifications, even by “trustworthy” authors, proved to be very high. In the present checklist, a pragmatic approach was taken: the list of records is the result of a series of “educated guesses” for which the author takes full responsibility. Not all of the published records were accepted: particularly dubious ones are mentioned in the notes, but are not attributed to the respective regions. Eventually, however, it will be up to the reader to judge the reliability of literature data.

The selection of sources is a delicate task as well: should only properly published records be accepted, or should unpublished sources and “grey literature”, such as theses, private reports, excursion guides, herbaria etc., also be taken into consideration? In the present case, the only cogent criterion was that the material on which the records are based must be retrievable. Unpublished theses may often contain extremely valuable information, provided that vouchers are deposited in the herbarium of the institution at which the thesis was carried out. If such information is considered as important and valid, it is included in the checklist. Records deriving from non-published Herbarium specimens were included only when they are new to Italy and/or to an administrative region, and when their metadata, especially concerning the locality, are available online (e.g. those from B, M, UPS, TSB, Herb. Vondrák, etc.). In a very few cases I have included records deriving from personal observations, when it was not possible to collect the material: typical is the case of *Acarospora moenium* observed on the private wall of a house near Trieste, which, for obvious reasons, could not be collected.

One could wonder whether it has a sense to cite every single report of widespread and common species, such as *Lecidella elaeochroma* or *Xanthoria parietina*, which are certainly occurring throughout the country. The reason is that the number of literature records is in itself an important datum, which was used to estimate the commonness/rarity of each species in different biogeographic subdivisions of the country (see later).

For obvious reasons of space, in the notes to genera and species I have tried, as far as possible, to avoid repeating literature citations already reported in the first annotated checklist (Nimis 1993). The comments to species should be considered as a complement, rather than a substitution, of those published in the previous checklist. In particular, many comments to genera try to briefly highlight the most recent changes in their delimitation and taxonomy, in order to provide name-users a means for understanding the reasons for the increasing number of nomenclatural changes.

Checklists are also expected to be a reference for nomenclatural matters, at least for some years. In this respect, however, the present one will likely fail. After the nomenclatural updating by

Nimis & Martellos (2003) many names have already changed, and many are likely to change in the future. This is mainly due to two facts: 1) The explosion of molecular phylogeny, which is bringing about a true revolution in the taxonomy of lichenised fungi, 2) The unfortunate fact that in the current binomial system the genus rank, contrary to all other supraspecific ranks, is an integral part of the names we give to organisms (Nimis 2001, 2005). Names, which should intrinsically remain stable, are thus changing continuously, depending on the ever-changing hypotheses on phylogenetic affinities. I have tried to follow the most recent taxonomic proposals, including several which I have accepted with hesitation, like those concerning the Teloschistaceae and the difficult genus *Aspicilia*: molecular data are lacking for many species, and these still have to stay in the old “container genera” such as *Caloplaca s.lat.* and *Aspicilia s.lat.* The molecular revision of species and higher taxa is far from being completed: many cryptic species are being described, and many genera will undergo further splitting in the next future.

In any case, checklists may be valuable tools for retrieving and accessing the enormous amount of information which has accumulated during centuries of biological research. They offer an indispensable basis for specimen revision, for the critical reappraisal of poorly-known taxa, and for the further exploration of under-investigated areas. In this sense, checklists may and should be catalysts for new, more intensive investigations. The best criterion for a checklist to have accomplished its task as a facility to the scientific community is the speed of its becoming outdated, which is what I paradoxically wish for the present volume.

A brief history of lichenology in Italy

Lichens were collected and illustrated by many authors during the Italian Renaissance, *e.g.* by Ferrante Imperato (1525-1615, Roca & Nimis 1997), Fabio Colonna (1567-1640, Roca & al. 1998), Paolo Boccone (1633-1704, Roca & Nimis 2002), and Federico Cesi (1585-1630, Nimis & Zucconi 2006). The latter, who for the first time used the microscope constructed by Galileo Galilei, published the first clear illustration of soredia, paving the way to Pier Antonio Micheli (1679-1737), who is considered by many as the founder of scientific Mycology, and perhaps the true “Father of Lichenology”. Born into a poor family in Florence, Micheli was apprenticed to a bookseller in Florence at an early age and was not able to afford a formal education, although he was able to teach himself Latin and study Botany. In spite of his lack of a degree, in 1706 he was appointed to a position as a botanist to Grand Duke Cosimo III de' Medici, Duke of Tuscany, with the responsibility for the public gardens of Florence. Micheli was influential in founding, in 1716, the Società Botanica Fiorentina, most likely the world's first botanical society. His major work, *Nova Plantarum Genera Juxta Tournafortii Methodum Disposita* (Micheli 1729) dealt with about 1900 species, including some 900 fungi and lichens, illustrated on 73 plates. Micheli was the first to observe and describe fungal spores as reproductive bodies, to describe asci, and to culture fungi from spores.

After Micheli, there was no significant contribution to Lichenology by Italian authors until the first half of the XIX Century. However, towards the middle of the XIX century, immediately before the unification of Italy, the study of “cryptogams”, especially lichens, underwent a sudden moment of blooming. This phenomenon affects, more or less at the same time, most of the countries of northern and central Europe; in Italy, however, it took on an unusual extent. In a period of about 15 years, from 1846 (the year of publication of the *Frammenti Lichenografici* by G. De Notaris) to 1860 (death of A. Massalongo), Italy became the main center of Lichenology worldwide, a position perhaps never achieved by this country in the field of Botany.

After the period of the Napoleonic wars, the economic situation of most of Europe, including northern Italy, underwent a marked improvement, due to the progressive expansion of the industrial revolution. Enlightenment considered Natural Sciences as an indispensable element of the culture of any person: many encyclopedists cultivated botanical studies as part of their cultural interests, and the scientific culture was expanding under the impetus of the political and

economic upheavals of the French Revolution and the subsequent Napoleonic campaigns. The revolutions of 1848 were the expression of the inadequacy of the old political-economic system compared to the new needs of the rising bourgeoisie. In Italy these developments were hampered by the persistence of the old humanistic literary tradition: they were felt mainly in the North of the country, that was closest to the political and cultural developments in the rest of Europe (Poelt 1991). Moreover, in the first half of the XIX century Botany was an integral part of the curriculum of studies of physicians and pharmacists, by themselves emblematic representatives of the increasingly prosperous middle class. No wonder that in this period many of the greatest botanists were physicians, pharmacists, priests, or offsprings from noble families. However, the sudden bloom of cryptogamic studies cannot be attributed only to cultural or economic causes. In particular, it is difficult to explain on this basis alone the leading position assumed by Italy, an area that, in both economic and cultural terms, was lagging behind other European countries. In fact, the main reason lies elsewhere: the sudden flourishing of cryptogamic studies in Italy around the middle of the XIX Century is mainly due to technical developments.

The first important lichenological system, that of the Swedish lichenologist E. Acharius (1757-1819), was mainly based on macroscopic characters, and with hindsight very artificial. It was only in the 1840s that microscopical characters, especially those regarding spore colour and septation, were increasingly adopted as paramountly important taxonomic criteria; the new emphasis on spores resulted in a revolution of previous taxonomic schemes, exactly as it is happening today with molecular data. The technical development which revealed a wealth of new characters for defining more natural groups was the invention of a new microscope with acromatic lenses by Giovanni Battista Amici (1786-1862), which allowed a much more detailed investigation of microscopical characters (Nimis 1988, 1993, Nimis & Bartoli 1992). Amici was the foremost Italian optical scientific instrument maker of the 19th century and one of the leading figures of this period at the international level. He applied the hemispherical front lens to the microscope object-glass (1838), and introduced the technique of immersion in water (1847) and in various types of oil (1855). Between 1857 and 1860 he invented the direct vision prism which continues to be used in spectroscopy and still bears his name. A very first version of the new microscope was produced in 1827, and the instrument was available on the Italian market between 1830 and 1840. Italian botanists were the first to have the opportunity to acquire it, which opened a new world ripe for exploration by the astute observer.

That all species of a natural genus should have the same type of spores had already been stated in 1837 by the eminent French cryptogamist A.L.P. Feé (1789-1874). Many of Feé's contemporaries in lichenology, however, objected to this thesis as with the microscopes then generally available the observation of spore characters was considered too difficult for practical use. Feé soon abandoned lichenology for pteridology. Starting from 1846, however, there was a true explosion of lichenological studies by Italian botanists, where the use of the microscope played a major role. The Italians G. De Notaris (1805-1877), and A.B. Massalongo (1824-1860), both now recognised as of world stature in lichenology, worked with Amici's microscope. In conclusion, the prominent position briefly taken by Italy was due to the fact that fundamental technical progress was first achieved in this country. This explanation does not want to detract from the merit of Italian scholars of that time, but emphasizes the fact that the history of science cannot be reduced to a mere sequence of individual stories.

The main protagonists of the "Golden Period" of Italian Lichenology were Giuseppe De Notaris (1805-1877), Abramo Bartolomeo Massalongo (1824-1860), Martino Anzi (1812-1881), Vittore Trevisan di San Leon (1818-1897), and Francesco Baglietto (1826-1916). De Notaris, Massalongo and Trevisan were primarily interested in Systematics: the old classification schemes dating back to Acharius, based on macroscopical characters, were completely revolutionised by the use of microscopical characters, such as shape, colour and size of the spores, and the microstructure of ascocarps. The international importance of these studies was remarkable, and caused a series of often fierce discussions, which involved the major lichenologist of the time.

The figure of De Notaris has a clear position as a pioneer and forerunner: already in 1867 in his *History of Lichenology*, Krempelhuber (1867) subdivided it into six major periods, of which the fifth (1801-1845) was called *from Acharius to De Notaris*, thereby stressing the revolutionary character of the work of the great Italian botanist. De Notaris can be considered as the founder of a new period in the history of ascomycete classification as a whole, and not only of the lichen-forming species. In his vast scientific production, articles on lichens are a numerically small portion. The same De Notaris said, with his usual modesty, that he used to deal with Lichenology “in the hours of leisure” (Nimis & Bartoli 1992). His lichenological work consists in a dozen publications, only one of which (De Notaris 1846) would have sufficed to grant him a key place in the development of lichenology. Referring to the statements of Fée on the importance of sporological characters for a natural classification of lichens, De Notaris analysed and accurately described the anatomy of sixty species. Starting from the observation that similar species are found in most genera which appear clearly distinguished on the basis of macroscopic characters, he came to the conclusion that those genera which are macroscopically similar, but substantially different in sporological characters are not natural. Therefore, he suggested the possibility of creating a much more natural classificatory system by utilizing, in order of importance: (a) spore characters; (b) structure of the ascomata; and (c) thallus morphology. De Notaris' papers had an enormous influence throughout Europe, and his basic ideas were applied and developed with extraordinary intensity by A. Massalongo, certainly the most outstanding of all Italian lichenologists.

In just eleven years, Massalongo produced an impressive series of papers, some issued posthumously, where the taxonomy of lichens was drastically altered on the basis of microscopical characters, chiefly, but not only, those of the spores (Poelt 1991). A typical example is his interest in the so-called “blastiospore lichens”, *i.e.* those with widely different growth-forms and appearance, which share the typical polar-diblastic spores of what is today recognised as the family Teloschistaceae. The *Synopsis Lichenum Blastiosporum* (Massalongo 1852) was a bold attempt to recognise the affinity of these lichens and to arrange them into more natural genera, most of which were almost completely forgotten after Massalongo's death, when hundreds of species were placed into three main, very artificial genera, mainly defined by growth-form: *Caloplaca* (crustose), *Xanthoria* (foliose) and *Teloschistes* (fruticose). Today the molecular taxonomy of Teloschistaceae is in full swing, and the recent treatment by Arup & al. (2013), where 39 genera are recognised, has resurrected from oblivion some Massalongian generic names, such as *Blastenia*, *Gyalolechia*, *Pyrenodesmia*, and *Xanthocarpia*.

During his short life, Massalongo had to fight to defend his ideas, especially against Nylander, but also against other Italian lichenologists - including Vittore Trevisan di San Leon. While Trevisan accepted the taxonomic importance of spore characters, he was often in conflict with Massalongo in the application of such principles and simultaneously investigated the taxonomical arrangement of several groups.

The greatest part of the lichenological papers of Trevisan was published between 1853 and 1869. The publication of Massalongo's fundamental *Ricerche sull'Autonomia dei Licheni Crostosi* (Massalongo 1852) was probably the main stimulus to Trevisan's concentration on lichenological papers in the early 1850s. In the following months, Trevisan hastily published 7 lichenological papers. It is difficult to understand the effect that Massalongo's papers produced on Trevisan, without knowing that in the previous years he had intensively worked on a new synopsis of lichenised genera, in which the new sporological ideas were taken up. The publication of Massalongo's work, whose importance he could not deny, anticipated some of the new genera he wanted to describe, and compelled him to revise his previous ideas, to adopt a critical position against several of Massalongo's concepts, and above all to publish as soon as possible what he had worked out until that time, without having the possibility of rounding up the whole, as he probably had wished. This situation led to serious misunderstandings between the two lichenologists (Nimis & Hawksworth 1995).

During 1853 and 1854, Massalongo's lichenological activity exploded in a series of important papers which brought about a true revolution in the generic arrangement of lichenised fungi. In the introduction to one of these fundamental contributions, the *Memorie Lichenografche*, Massalongo (1853) provided a detailed response to Trevisan's former criticism. First, he expressed his disagreement on the relative importance of characters for taxonomic purposes: according to Massalongo, Trevisan underestimated the importance of thalline characters, the size of spores, and the structure and genesis of the apothecia. These considerations were illustrated by means of a decided defence of some Massalongian genera that had not been accepted by Trevisan. Finally, Massalongo tried to demolish many genera proposed by Trevisan, either because they were very poorly characterised, or because they were too heterogeneous. It must be recognised that much of Massalongo's criticism seems to be fully justified today. The Veronese lichenologist was a much more acute scientist than his Paduan colleague; Trevisan continuously strove towards a synthesis, but had the misfortune to live in a period in which analytical work was much more important and productive.

In 1860, the year of Massalongo's demise, Trevisan published what is perhaps the most important of his works today, a general conspectus of pyrenocarpic lichens, which also deals rather fully with the lichenicolous species known at that time. The *Conspectus Verrucarinarum* (Trevisan 1860) is a typical example of Trevisan's style: the text is extremely concise, being limited to the presentation of a taxonomic conspectus with the main characters of the accepted taxa, the main synonymies, nomenclatural information, and numerous telegraphically presented new combinations. Hidden in the dense smaller-typed text are nomenclatural details all too frequently overlooked.

Massalongo and Trevisan followed similar principles and were members of the same school. However, their scientific attitudes were quite different. Massalongo was a powerful analytical spirit, whereas Trevisan had a clear tendency towards synthesis and the correction of the historical record. Almost all his lichenological papers show a continuous effort to bring about clarity in a period characterised by a confusing flow of new information deriving from the developments of the sporological school. From carefully examining his lichenological papers one has the impression that his contribution to Lichenology would have been much greater if he could have published his ideas a few years before the "Massalongian" period of 1852-1860, and if he had not become so preoccupied with what he perceived as putting the past into order (Nimis & Hawksworth 1995). Unfortunately for him, the activity of Massalongo thwarted his plans, and his concept of an all-embracing classificatory system was reduced to a scattered series of hastily published fragments in need of continuous re-building and adjusting after the appearance of every Massalongian paper. Nevertheless, Trevisan's system, although published in a fragmentary form, constitutes one of the last examples of a general taxonomic arrangement of lichenised and lichenicolous fungi based on microscopical characters which appeared in the last century.

After the death of Massalongo, the interests of the main Italian lichenologists moved toward the floristic study of the territory, with the important studies of M. Anzi, F. Baglietto and A. Carestia (1825-1908). The excellent work of these lichenologists aroused some international attention mainly because of the distribution, in exsiccata, of the many new species that were gradually described, but this was not comparable to that caused by the publications of De Notaris, Massalongo and Trevisan. During the second half of the Century, the crisis sharpened quickly: already at the turn of the XX century Lichenology in Italy was virtually extinct (Nimis 1988). The life of the *Società Crittogamologica Italiana* was short-lived: the publication of the *Atti* ceased in 1868, while in 1872 the distribution of the *Erbario Crittogamico* ceased as well. The attempt to revive the Association, in 1878, failed, and in 1885 it was again virtually extinguished. Towards the end of the XIX century Italian Lichenology was represented mainly by Antonio Jatta (1853-1912), a wealthy landowner from southern Italy who began a meritorious work of synthesis that culminated in the publication of the part devoted to lichens in *Flora Italica Cryptogama* (Jatta 1900-1909). This work is undoubtedly laudable, but would have required lasting improvement by a

new generation of lichenologist. Unfortunately, at that time, Lichenology could be considered as extinct in Italian universities.

The rapid decline of Lichenology in Italy cannot be attributed solely to the disappearance of three outstanding personalities such as De Notaris, Massalongo and Trevisan. It is evident that it was decisively influenced by the unification of Italy, and the resulting profound changes in university policy of the new Governments (Nimis 1993). The new State had to face a series of difficult economic problems, including the restructuring of the agricultural system. Frequent outbreaks of pathogenic fungi in the second half of the XIX century further aggravated the situation. Botany was increasingly seen as an applied science, following the developments of late XIX Century positivism, which was increasingly influenced by the impressive progress of the industrial sector. Taxonomy, in particular, started to be seen as a “science of the second category”, something comparable to the activity of petulant stamp collectors, and appeared as obsolete and of little use when compared to the progress of plant physiology and the need to acquire detailed information on the biology of pathogens. After the unification of Italy, the university system underwent drastic reform. Botany, in particular, previously included in the Faculty of Medicine, was generally transferred to the Faculty of Sciences, with the creation of several new positions of full professor (Nimis 1988). The results of the new policy were disastrous for the Italian lichenological school: only De Notaris managed to become full professor, but only at a very old age, and his last years at the University of Rome were rather bitter for him. He was honoured as a great Master of Botany, but remained substantially isolated from the scientific world, and was left without means for carrying out his researches (Nimis & Bartoli 1992).

Very different was the fate of another prominent Italian cryptogamologist, a contemporary of De Notaris, Santo Garovaglio (1805-1882). He worked thoroughly in Lichenology before the publication of the works of De Notaris and Massalongo, but after the unification of the country, in 1869, he launched the idea of establishing a laboratory in Pavia specialised in fighting diseases caused by parasitic fungi. This captivated the confidence of the Ministry of Agriculture and of the administrative authorities of Pavia, and the Laboratory, which had a long period of deserved glory, was founded in 1871 (Nimis 1993). The last important work by Garovaglio devoted to lichens, the distribution of the *Lichenes Langobardiae Exsiccati*, dates back to 1864. In Rome, something similar happened a few years after the death of De Notaris: his student Giuseppe Cuboni (1852-1920), in the new cultural atmosphere, was appointed as director of the Royal Experimental Station of Plant Pathology of Rome, with the creation of a large experimental field, while the new Botanical Garden of Panisperna, promised to poor De Notaris for years, failed to see the light due to some gardeners that the authorities were unable, or unwilling, to dislodge from the ground that should host it (Graniti 1989). The political misfortunes of Taxonomy meant that none of the great Italian lichenologists honorably managed to fit in the new university system: some of them, being nobles or priests, were entirely unrelated to the academic environment, while those who had already entered into universities, as F. Zanfognini in Modena and F. Baglietto, who was assistant to De Notaris in Genoa, were unable to advance in their careers, leaving no school. The *Flora Italica Cryptogama* (Jatta 1909-1911) appears today not as a new starting point, but as a conclusive work, a sort of gravestone lying on the “Golden Period” of Italian Lichenology, which was brought to almost complete extinction over a very short time as a result of a changed political, economic and cultural climate.

From a screening of the lichenological literature of the first half of the XX century, one is impressed by the high number of authors who published a few articles on lichens at the beginning of their careers, and suddenly abandoned this field. This is probably a consequence of the disappearance of a true lichenological school, and of the difficulties found by young botanists to pursue their lichenological studies. The decadence of Italian Lichenology is evident in the scarcity of really important figures throughout this period. Four main lichenologists can be mentioned: Eva Mameli Calvino (1886-1978), Maria Cengia-Sambo (1888-1939), Camillo Sbarbaro (1888-1967) and Ruggero Tommaselli (1920-1982). The only threads connecting the old lichenological

tradition with the more recent years can be identified in the fact that Sbarbaro was introduced to lichenology by G. Gresino (1859-1946), a priest who was himself in contact with Baglietto, who died in 1916 at the age of 90 years, while Eva Mameli-Calvino, in the first part of her career, worked at the *Laboratorio Crittogamico* of the University of Pavia founded in 1871 by Garovaglio.

Eva Mameli Calvino, who incidentally was the mother of the famous writer Italo Calvino, was the first Italian woman to become university professor, first at the University of Catania then at that of Cagliari in her native Sardegna. She was introduced to Lichenology at the Cryptogamic Laboratory of the University of Pavia, where she worked as assistant to the Director Giovanni Briosi (1846-1919). In the first part of her career she published a dozen papers devoted to lichens, not only from various parts of Italy, but also from the new Italian colonies in northern Africa and Eritrea, after which she switched her interests to genetics and phytopathology applied to ornamental plants.

Maria Cengia-Sambo was a school teacher who soon became involved in the study of lichens: she was working first at Urbino, later in Florence, and collected extensively, especially in the Italian Alps; in the last years she also published some papers on extra-European lichens. The main weak point of Cengia-Sambo was probably her isolation: she was completely alone, as a lichenologist, within the Italian academic world, and had the misfortune to produce much of her work in the very difficult period following the I World War; she also never succeeded in obtaining a position within a university, which made still more difficult the contact with prominent foreign lichenologists. She had a keen interest in lichen ecology, and many of her numerous papers contain interesting observations; some of her lichen records, however, appear rather dubious.

Camillo Sbarbaro as well was completely isolated from the academic world, and, as with Cengia-Sambo, he left no school. Sbarbaro was a very interesting personality, and presently is considered among the classics of modern Italian poetry; his interest in lichens was mainly aesthetic, and some of his prose writings devoted to these organisms would be worthy of being translated into other languages (see *e.g.* Knowles 2000). Although not a specialist, he had a very keen eye, and assembled an important herbarium, which, for lack of money, he was forced to sell, at least in part, to foreign institutions. Unlike Cengia-Sambo, however, Sbarbaro was in close contact with several foreign lichenologists, to whom he sent most of his material for identification. For this reason, the lichens collected by him are among the few Italian collections of the first half of the XX Century which are cited in modern monographs. The few scientific papers published by Sbarbaro, which summarize the results of his investigations, mainly in Liguria and in northern Tuscany, are the best floristic contributions concerning Italy which appeared in this period.

Until the '80s, the only lichenological activity carried out within a university was that of Ruggero Tomaselli, an eminent, very versatile botanist, who for a period was also President of the Italian Botanical Society. The lichenological production of Tomaselli, however, cannot be considered as important for the progress of this discipline. He published very little on lichen floristics, and left no relevant school in Lichenology; during the last years of his life, Lichenology was virtually extinguished in the Italian universities.

Abroad, however, the situation was very different, and, starting from the end of the II World War, Lichenology experienced an extraordinarily intense growth in several European countries. The effects of this situation were also felt in Italian Universities, and in the 70's several young Italian botanists started to get involved in the study of lichens. A first course of Lichenology was organised at Trieste in 1986, attended by 30 persons from all parts of Italy. On that occasion, it was decided to found an Italian Lichen Society (*Società Lichenologica Italiana*), whose first meeting was held at Trieste in 1987. A great interest was aroused, at the national level, by the activities of the Society in the fields of air pollution monitoring with lichens, and of lichens and monuments (see *e.g.* Nimis 1991). Presently, the Society continues an intense activity including courses, excursions, and the publication of a *Notiziario*.

The latest developments are too recent to be treated here under a historical perspective. They are somehow summarised in the list of references of this book, which mostly covers the period between 1993 and 2016. More than 1000 papers were produced in this period by Italian lichenologists, devoted to widely different aspects of lichen biology, with a high number of papers in international journals, especially in the fields of lichen ecology and physiology.

A brief outline of Italy and its lichen biota

Due to its considerable latitudinal extension and its rugged morphology, Italy encompasses a wide spectrum of different biomes. The main biogeographic subdivisions of the country are briefly discussed in the following.

The Alps - The Alpine chain hosts two peculiar biomes: 1) the Alpine biome (above treeline); 2) the subalpine-oroboreal biome (near treeline, dominated by *Larix-Rhododendron*, also including natural, closed *Picea abies* forests). In Italy, the limit of most arctic-alpine/oroboreal vascular vegetation lies somewhere in the northern Apennines, with the relevant exception of the Gran Sasso-Majella Massives in the central Apennines, which host a truly Alpine flora above treeline (but no well-developed oroboreal belt). Of particular interest are also some internal Alpine valleys with a continental climate, which host several “steppic” species. The terms “arctic-alpine” and “boreal-montane” are often used both for vascular plants and for lichens. In the former case its meaning is relatively clear, as it refers to plants occurring *e.g.* both in the Arctic zone and in the Alpine belt of mountains of the Temperate zone, and absent from mountain systems of more southern latitudes. In the case of lichens, the term “arctic-alpine” is much less clear: many “arctic-alpine” lichens do also occur in mountains of the subtropical or tropical zone, and several of them even show a bipolar distribution including parts of Antarctica, while *e.g.* the mountains of Calabria and even those of Sicily do still host several so-called “boreal-montane” lichens. Comparing the lichens of Greenland, the Alps and the Central Asiatic Mountains, Nimis (1997) suggested a relatively high affinity among the three biota, with a gradient of decreasing richness from south to north which might well correspond to a relatively recent colonization of formerly ice-covered areas by more “southern” lichens already adapted to the cold-dry conditions of mountain habitats. This suggests that the term “arctic-alpine”, as applied to lichens, might prove to be deceiving. Pending further research, however, in this book this term will be adopted in a very broad sense, for all lichens occurring in and above the subalpine and alpine belts of the Italian mountains, and in the Arctic zone, irrespectively of their occurrence elsewhere. On the whole, the lichen biota of the Alps seems to hold an intermediate position between those of the Arctic and of the Himalayas: the Alps were less subject to glaciation than the Arctic zone at large, and this ensured the persistence there of several “Alpine” species which are widespread in widely distant mountain systems of the Northern, and sometimes even of the Southern Hemisphere. Any hypothesis on the ancient origin of this peculiar element is premature: we still need reliable data from several mountain systems worldwide. A lichen checklist of the Alps is presently in preparation (Bilovitz & al. 2013).

The high Mediterranean mountains host the Oromediterranean biome (above treeline outside the Alps and Abruzzi). The highest peaks of the Mediterranean mountains do neither have a truly Mediterranean climate, nor do they host a sclerophyllous vegetation. However, they are biogeographically so peculiar that the existence of an “Oromediterranean” vegetation belt is accepted by most authors, albeit under different denominations. In southern and insular Italy only a few mountains attain treeline. Some of them (*e.g.* the recent Etna Volcano in Sicilia, and the much older Gennargentu Massif in Sardegna) host a peculiar vegetation, dominated by thorny-shrubs of the genus *Astragalus*, *Tragacantha*-section. The thorny-shrubs formations of the Mediterranean mountains have an old history, perhaps dating back to the Messinian period, when the Mediterranean was a semi-desert, biogeographically connected with the Iranian-Turanian region (see Nimis 1981). The lichen biota of the few truly Oromediterranean peaks of Mediterranean

Italy, while probably species-poor, could prove to be of high biogeographic interest, but still await exploration.

The montane beech forests. Beech (*Fagus sylvatica*) is often the dominant tree in the mountains of Italy. In the Alps it forms pure to mixed forests (with *Abies alba* in cool-humid situations), with a broad altitudinal range, from ca. 600 m, in contact with the submediterranean belt, to ca. 1800 m, in contact with the oroboreal belt. Along the Apennines, down to Sicily, albeit twarved and shrub-like, beech marks treeline, but it does not occur in Sardegna. During the glacial periods, beech forests and their flora were confined to refugial areas in southern Europe, especially in the Balkan and Italian peninsulas, and later expanded northwards, the present vascular flora of beech forests becoming progressively poorer from southern Europe to southern Scandinavia (Nimis & Bolognini 1993). What may now appear to be a typical example of central European vegetation, such as a German beech forest, is in reality a very much impoverished version of a biome that has its roots, and maintains its maximum diversity in the mountains of the Mediterranean Region. This holds true for vascular plants and for lichens alike. Many species of the deciduous forest belt, “central European” or “submediterranean” species, as they are often called, have colonised central and northern Europe from the south. The beech forests of Italy differ very much in their lichen component, depending on the degree of air humidity: some of them host an unusually rich, interesting, luxuriant lichen vegetation (e.g. with Mediterranean-montane species such as *Melanelixia laciniatula*, *Physconia venusta* and *Ochrolechia balcanica*), others - even those located in rainy areas (e.g. parts of Liguria and Friuli) - are almost a lichen desert. The balance between air humidity and precipitation in the liquid form can perhaps explain these dramatic differences.

The submediterranean deciduous forests (dominated by deciduous trees other than *Fagus*) occupy a wide area lying between the montane and the Mediterranean belts, covering most of the lowlands and hills of Italy. The potential vegetation is dominated by deciduous trees, especially *Quercus* and *Carpinus*, most forests having been substituted by coppices dominated by *Ostrya* and *Fraxinus ornus*, urban areas and cultivations. The glacial and post-glacial history of submediterranean forests is similar to that of beech forests, with a difference related to the thermic requirements of the dominant trees, which survived in warmer sites, mostly in lowland areas, especially in southern Italy. The vascular flora is richer in the South, poorer in the North (see Bolognini & Nimis 1993), while lichen richness, also in this case, mainly depends on air humidity and human disturbance. Before Roman colonisation, most of the Po-plain was covered by dense deciduous forests. Presently, it is an agricultural, industrial or densely urbanised area. The plains of the North, plus a narrow strip along the eastern side of peninsular Italy, are among the most densely populated parts of the country, where several lichen species do not occur because of pollution and/or almost total deforestation. In many textbooks, Italy is still being subdivided into three major parts; northern, central and southern. This subdivision, which is familiar to every Italian, is mostly based on historical premises. Biogeography, however, suggests that the Italian Peninsula, instead of being split from north to south, could be split from west to east. The term “Tyrrhenian Italy”, used for defining a biogeographic region, first appeared in a paper by Nimis & Tretiach (1995): a multivariate classification of 20 regions of Italy and of the percent incidence of biogeographic elements in their lichen biota, separated the regions facing the Tyrrhenian sea (from Liguria to Sicilia, incl. Sardegna) into a distinct cluster, characterised by many suboceanic to oceanic, sometimes subtropical lichens. The western part of the Italian Peninsula has a mild-humid climate generated by Tyrrhenian maritime air masses, while the Adriatic coast, on the lee-side of the Apennines, is subject to cold-dry winds from Eurasia during winter. The inland extent of maritime influence differs according to the presence-absence of high mountains stretching parallel to the coasts, being more pronounced in Tuscany and Latium, where the humid Tyrrhenian air masses can reach the watershed of the Apennines.

Mediterranean Italy: this is the part of the country which would be potentially dominated by evergreen broad-leaved forests. This biome, apart from small enclaves in the Insubrian District and

along the Trieste coast, is mainly present along the coasts of Liguria, the Peninsula and the islands, with a notable difference between the Adriatic and the Tyrrhenian sides of Peninsular Italy: along the Adriatic side, truly Mediterranean vegetation is almost absent or very localised north of Puglia, whereas along the Tyrrhenian side it reaches north to the coasts of Liguria, with wide inland penetrations *e.g.* in Tuscany. Due to the rugged morphology, truly Mediterranean vegetation is surprisingly reduced to a narrow coastal strip in some southern areas such as western Calabria. Contrary to the Iberian Peninsula - almost a small continent in itself - the narrow Italian Peninsula and its islands, bathed from all sides by the Mediterranean Sea, rarely experience extreme climates. There are, however, a few parts of Italy which have a really dry-Mediterranean climate. These are mostly located in southern Sicilia, southeastern Sardegna, and in parts of Puglia. In the lichenological literature the term "Mediterranean" has often been used exactly as far vascular plants. Many authors (*e.g.* Nimis & Poelt 1987) implicitly assumed the existence of a "Mediterranean element" in lichens, whose distribution patterns would be consistent with those of steno- or eurimediterranean vascular plants. Barreno (1991) was one of the first to question this assumption, suggesting that examples of truly "Mediterranean" distribution are far less frequent in lichens than in vascular plants. She pointed out that many terricolous "Mediterranean" lichens are distributed far beyond the Mediterranean Region, some of them extending throughout the Mediterranean, Irano-Turanian and Saharo-Arabian biogeographic provinces. The "Mediterranean" lichen element is difficult to define and quite heterogeneous, as it includes: (a) several, often not very well-known, coastal species restricted to the Mediterranean Region, (b) species with a Macaronesian-Mediterranean distribution which are not bound to a particularly humid climate, (c) a few species extending into other parts of the world with a Mediterranean climate, especially California, (d) some species restricted to the humid montane belt of the Mediterranean mountains. On the whole, there is a sharp contrast between the richness of the Mediterranean vascular flora, and the scarcity of truly Mediterranean lichens. The puzzling paucity, among lichens, of cases of truly "Mediterranean" distribution patterns was confirmed by the bioclimatic analysis of the Italian lichen biota by Nimis (1993) and Nimis & Tretiach (1995). For example, steno- plus eurimediterranean species account for 28.5% of the vascular flora of Sicily (Nimis 1984), whereas the corresponding figure for lichens is only 8 % (Nimis & Tretiach 1995). Perhaps the richest habitat for truly "Mediterranean" lichens are humid rock outcrops, both siliceous and calcareous, along the coasts, which host peculiar and often geographically differentiated biota (see *e.g.* Roux 1991). The epiphytic vegetation, on the contrary, is much more homogeneous throughout the Mediterranean Region.

Summarising, the high diversity of lichens in Italy is mainly due to the presence of some biogeographic groups of species with different ecological requirements (Nimis & Tretiach 1995). The main ones are:

A) A mainly temperate group of lichens without particular suboceanic affinities which is well represented in all regions and is most frequent in the deciduous forest belts.

B) A suboceanic to oceanic group with subtropical affinities, bound to humid climates, which is most frequent along the western side of the Peninsula, in Liguria and in Sardegna, *i.e.* in Tyrrhenian Italy.

C) A "northern" group with arctic-boreal affinities, restricted to the highest mountains, most frequent on the Alps on acid substrata and becoming progressively rarer southwards.

D) A rather poorly defined set of species whose hitherto known distribution is limited to the southern European mountains, which in Italy is mostly found on calcareous substrata in the alpine belt of the Alps.

E) Another poorly defined element restricted to the lowlands and lower mountains of the Mediterranean Region, sometimes extending to Macaronesia and to other Mediterranean areas of the world, which in Italy has a mainly Tyrrhenian distribution and the highest diversity in the Mediterranean belt.

F) A small set of widespread xerophytic species, occurring in the most arid parts of Mediterranean Italy (Sardegna, Sicilia) and in the driest parts of the central and western Alps.

This picture reflects fairly well the climatic diversity of the country, from cold-alpine to warm suboceanic climates, with a prevalence of warm-temperate, moderately humid climates, and with an overall scarcity of truly arid climate-types, despite the summer drought period of some regions of the South.

Structure of the checklist

The outline of the checklist follows a structure that will permit a rapid transformation of the text into a database which will substitute the current version of ITALIC (see Nimis & Martellos 2001, 2002, 2003).

Nomenclature

- accepted name,
- reference to the accepted name, basionym and its reference,
- list of synonyms.

In the accepted names, I prefer to omit all authors coming before “*ex*”: this information, an unnecessary complication for name-users, is however provided immediately after the name. Thanks to P. Kirk (Kew), I have checked all names (accepted names, basionyms and synonyms) against those of *Index Fungorum*, which has resulted in several corrections on both sides. I am however aware that much remains to do here.

Geographic Distribution

Records are given for each administrative region (Fig. 1), with 21 Operational Geographic Units (OGUs); the Karst area near Trieste is separated from Friuli because of its different biogeographic features. For each region, literature references are limited to papers not cited by Nimis (1993). The regions are arranged in three artificial groups: Northern (“N”), Central (“C”) and Southern (“S”). The sequence of regions is as follows (see Fig. 1). **Northern Italy (N):** **VG** (Venezia Giulia), **Frl** (Friuli), **Ven** (Veneto), **TAA** (Trentino-Alto Adige), **Lomb** (Lombardia), **Piem** (Piemonte), **VA** (Valle d’Aosta), **Emil** (Emilia-Romagna), **Lig** (Liguria). **Central Italy (C):** **Tosc** (Toscana), **Marc** (Marche), **Umb** (Umbria), **Laz** (Lazio), **Abr** (Abruzzo), **Mol** (Molise), **Sar** (Sardegna). **Southern Italy (S):** **Camp** (Campania), **Pugl** (Puglia), **Bas** (Basilicata), **Cal** (Calabria), **Si** (Sicilia).

Other data associated to each infrageneric taxon

A few morpho-anatomical characters are included, plus info on the ecology of each species, expressed in such a way as to be searchable online in ITALIC. A much richer set of morphological data, included in the database of Project *Dryades* (see Martellos & Nimis 2015), is being used to generate interactive identification keys, and is not presented in this book. The additional data are arranged into 9 fields, separated by “/”, as follows:

i) Growth form

- F** - non-lichenised, non-lichenicolous fungus
- LF** - lichenicolous fungus (from genera with lichenised representatives)
- Cr** - crustose
- Cr.end** - crustose endolithic
- Cr.pl** - crustose placodiomorph
- Lepr** - leprose
- Sq** - squamulose
- Fol** - foliose
- Fol.b** - foliose broad-lobed (*Parmelia*-type)



Fig. 1 - The 21 administrative subdivisions of Italy (abbreviations as in the main text and in Tab.1)

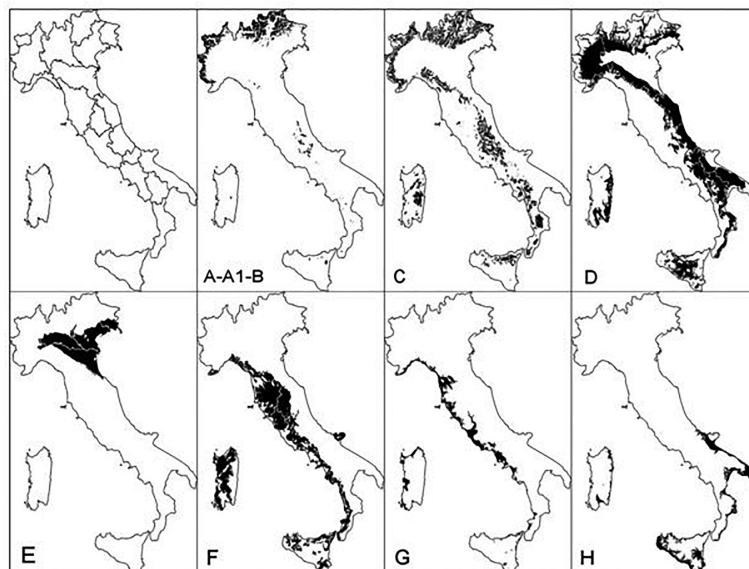


Fig. 2 - Subdivision of Italy into 9 bioclimatic areas. A: Alp, A1: Salp, B: Orom, C: Mon, D: SmedD, E: Pad, F: SmedH, G: MedH, H: MedD (for abbreviations see main text)

Fol.n - foliose narrow-lobed (*Physcia*-type)
Fol.u - umbilicate
Frut - fruticose
Frut.f - fruticose filamentous.

ii) Photobiont

Ch - green algae other than *Trentepohlia*
Tr - *Trentepohlia* **Cy.h** - cyanobacteria, filamentous (*e.g. Nostoc, Scytonema*)
Cy.c - cyanobacteria, coccaceous (*e.g. Gloeocapsa*).

iii) Reproductive strategy

S - mainly sexual
A.s - mainly asexual, by soredia, or soredia-like structures (*e.g. blastidia*)
A.i - mainly asexual, by isidia, or isidia-like structures (*e.g. schizidia*)
A.f - mainly asexual, by thallus fragmentation.

iv) Substrata

Epiph - bark
Sax - rocks
Lign - lignum
Terr - soil, terricolous mosses, and plant debris
Foliic - living leaves.

More detailed types of substrata can be obtained online in ITALIC using the ecological indicator values (see later). For example, for retrieving lichens on calcareous rocks the parameter “pH” should be set at “basic”, on basalt at “subneutral” and on quartzite at “acid”.

v) Commonness-rarity in bioclimatic subdivisions of Italy

Nine bioclimatic areas (OGUs) were distinguished, based on several thematic maps (elevation, precipitation etc.), and also taking into account the difference between the Tyrrhenian (humid) and Adriatic (dry) part of the Peninsula, which is relevant in influencing lichen distribution in Italy (Nimis & Tretiach 1995b, 2004, Nimis & Martellos 2002). The 9 subdivisions (Fig. 2) are:

Alp - Alpine (above treeline in the Alps and in Abruzzo)
Salp - subalpine (near treeline in the Alps, oroboreal belt)
Orom - oromediterranean (above treeline outside the Alps except Abruzzo)
Mont - montane (beech forests)
SmedD - dry submediterranean (deciduous oaks, excluding SmedH)
Pad - padanian (the plains of the North): this is the only OGU which was not separated on the basis of climatical-biogeographical characters; it is the most heavily anthropised part of Italy, where several species do not occur because of pollution and/or almost total deforestation
SmedH - humid submediterranean (as SmedD, but restricted to areas with a warm-humid climate, mostly Tyrrhenian)
MedH - humid Mediterranean (mostly Tyrrhenian)
MedD - dry Mediterranean.

A commonness-rarity value (see later) was assigned to each species for each of the 9 OGUs. The related concepts of “commonness” and “rarity” are difficult to define, and hence intrinsically fuzzy ones. A given species might be fairly “common” in a narrow area, while it may be extremely rare when the area is made broader. For example, *Cetraria islandica* is fairly common in the Alps, rare along the Apennines,

extremely rare in the mountains of Sicily, and certainly absent in the Po-Plain. There is obviously no sense in specifying its “commonness” nationwide. In this book, commonness-rarity - as a first approximation - was calculated separately for each of the 9 phytoclimatic areas, on the basis of three main criteria: a) number of samples in the TSB lichen herbarium (% on the total for each phytoclimatic area), b) number of citations in the literature, c) an expert judgement used in particular cases (*e.g.* that of recently-described taxa for which few literature records are available, or taking into account the overrepresentation of epiphytic lichens in urban/industrial areas).

Commonness-rarity is expressed on a 8-class scale, as follows:

er: extremely rare

vr: very rare

r: rare

rr: rather rare

rc: rather common

c: common

vc: very common

ec: extremely common.

The “er” class was adopted for lichens which are known from less than five stations, and/or were not found in recent times, excluding most recently-described species, and taxonomically very poorly known taxa.

vi) *Altitudinal distribution (vegetation belts)*

The main altitudinal belts are:

1 - eu-Mediterranean belt (potential vegetation: evergreen *Quercus ilex* forest)

2 - submediterranean belt (deciduous *Quercus-Carpinus* forests)

3 - montane belt (*Fagus* forests, marking treeline in the Apennines)

4 - subalpine and oroboreal belts of the Alps (natural *Picea abies*, and *Larix-Pinus cembra* stands)

5 - above treeline (both Alpine and oromediterranean)

6 - nival belt of the Alps.

For Sardegna, which hosts a very peculiar vegetation somehow resembling that of parts of the Iberian peninsula, where the beech belt is missing, the altitudinal subdivision was adjusted to the local situation (see Nimis 1996).

vii) *Ecological indicator values*

Ecological indicator values are “expert assessments” that qualitatively express the ecological range of species with respect to different factors (see *e.g.* Wirth 2001, 2010, Nimis & Martellos 2001). The ecological indicator values included in this book specify, for each factor and for each species, a range on a 5-class ordinal scale, as follows

pH of the substratum (pH)

1 - on very acid substrata, such as lignum and conifer bark

2 - on acid substrata, such on non-eutrophicated bark of *Quercus*

3 - on subacid to subneutral substrata such as the bark of *Sambucus*)

4 - on slightly basic substrata, such as dust-covered bark

5 - on basic substrata, such as pure limestone

Light (solar irradiation - L)

1 - in very shaded situations, such as in deep gorges and closed evergreen forests

2 - in shaded situations, such as on the northern side of boles in close-canopied deciduous forests

- 3 - in sites with plenty of diffuse light but scarce direct solar irradiation, such as in rather open-canopied deciduous woodlands
- 4 - in sun-exposed sites, but avoiding extreme solar irradiation
- 5 - in sites with very high direct solar irradiation, such as on the southern side of isolated boles

Xerophytism (aridity - X)

- 1 - hydro- and hygrophytic, in aquatic or marine situations, or in sites with a very high frequency of fog
- 2 - rather hygrophytic, intermediate between 1 and 2
- 3 - mesophytic
- 4 - xerophytic, but absent from extremely arid stands
- 5 - very xerophytic

Eutrophication (E - including deposition of dust and nitrogen compounds)

- 1 - not resistant to eutrophication
- 2 - resistant to a very weak eutrophication
- 3 - resistant to a weak eutrophication
- 4 - occurring in rather eutrophicated situations
- 5 - occurring in highly eutrophicated situations

The predictivity of these values was subjected to testing (Nimis & Martellos 2001), and proved to be high. However, predictivity may vary considerably among species, depending on the degree of knowledge on their ecology. For poorly known species the values are tentative, and mostly based on information available in the literature or, for species known only from the type collection, the info contained in the protologue or on the envelope of the type material. The interpretation, limitations and use of the ecological indicator values proposed in this book will be detailed in a forthcoming paper.

viii) Poleotolerance (PT)

This value points to the tendency of a lichen to occur in areas with different degrees of human disturbance. It is expressed on 4 classes, as follows

- 3 - species occurring also in heavily disturbed areas, incl. large towns
- 2 - species occurring also in moderately disturbed areas (agricultural areas, small settlements etc.).
- 1 - species mostly occurring in natural or semi-natural habitats
- 0 - species which exclusively occur on old trees in ancient, undisturbed forests.

Contrary to the other values, this one has been assigned to epiphytic species only, since it is useful to point out indicators of long ecological continuity of forests.

ix) Other information

This optional field includes information which is assigned to some taxa only.

Phytoclimatic range

- oc** - restricted to humid-warm, oceanic areas
- suboc** - most common in areas with a humid-warm climate (*e.g.* most of Tyrrhenian Italy)
- subc** - subcontinental: restricted to areas with a dry-subcontinental climate (*e.g.* dry Alpine valleys, parts of Mediterranean Italy)

Parasitic or parasymbiotic, with specification of the host(s)

paras

Taxon bound to maritime-coastal situations

coast

Special requirements for water

u - in underhangs rarely wetted by rain

w - on otherwise dry surfaces with short periods of water seepage after rain

l - periodically submerged (e.g. in creeks)

Species of metal-rich rocks

m

Pioneer species

p

Poorly known taxon in need of further study

#

Nomenclatural changes

In general, I refrained from formally proposing new combinations in groups which are presently under study by other colleagues. In these cases, I often made use of the provisional placement in another genus allowed by Art. 36.1b of the Code, just to have these species filed under the correct genus in the alphabetical order. In a few cases, in collaboration with other authors, a new combination or a new name has been proposed. All authors of the new combinations listed below have explicitly agreed to contribute to the present book in publishing them here (ICN Art. 46.5).

Collemopsidium halodytes (Nyl.) Grube & B.D. Ryan *comb. nov.* (MB 817885). Bas.: *Verrucaria halodytes* Nyl., Mémoires de la Société impériale des Sciences naturelles de Cherbourg, 5: 142, 1858 ("1857").

Gyalolechia flavorubescens (Huds.) Søchting, Frödén & Arup var. *quercina* (Flagey) Nimis *comb. nov.* (MB 817884). Bas.: *Caloplaca quercina* Flagey, Rev. Mycol., 13: 114, 1891.

Lobothallia hydrocharis (Poelt & Nimis) Sohrabi & Nimis *comb. nov.* (MB 817888). Bas.: *Aspicilia hydrocharis* Poelt & Nimis, in Nimis & Poelt, Studia Geobotanica, 7, suppl. 1: 44, 1987.

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Myriolecis agardhiana (Ach.) Śliwa, Zhao Xin & Lumbsch subsp. *catalaunica* (Cl. Roux) Nimis & Cl. Roux *comb. nov.* (MB 817871). Bas.: *Lecanora agardhiana* subsp. *catalaunica* Clauzade & Cl. Roux *ex* Cl. Roux, Bulletin de la Société linnéenne de Provence, 54: 120, 2003.

Myriolecis agardhiana (Ach.) Śliwa, Zhao Xin & Lumbsch subsp. *sapaudica* (Clauzade & Cl. Roux *ex* Cl. Roux) Nimis & Cl. Roux *comb. nov.* (MB 817872). Bas.: *Lecanora agardhiana* subsp. *sapaudica* Cl. Roux, Bulletin de la Société linnéenne de Provence, 54: 120, 2003

Myriolecis bandolensis (B. de Lesd.) M. Bertrand, Cl. Roux & Nimis *comb. nov.* (MB 817862). Bas.: *Lecanora bandolensis* B. de Lesd., Bulletin de la Société botanique de France, 101, 5-6: 223, 1954.

Myriolecis congesta (Clauzade & Vězda) M. Bertrand & Cl. Roux *comb. nov.* (MB 817863). Bas. *Lecanora congesta* Clauzade & Vězda, Portugaliae Acta Biologica, sér. B, 9, 3-4: 331, 1969.

Myriolecis latzelii (Zahlbr.) Cl. Roux *comb. nov.* (MB 817864). Bas.: *Lecanora latzelii* Zahlbr., Österreichische botanische Zeitschrift, 60, 1: 13, 1910.

Myriolecis liguriensis (B. de Lesd.) Cl. Roux *comb. nov.* (MB 817865). Bas.: *Lecanora liguriensis* B. de Lesd., Bulletin de la Société botanique de France, 96, 7-9: 175, 1949.

Myriolecis oyensis (M. Bertrand & Cl. Roux) M. Bertrand & Cl. Roux *comb. nov.* (MB 817866). Bas.: *Lecanora oyensis* M. Bertrand & Cl. Roux, Bulletin d'Information de l'Association française de Lichénologie, 36, 2: 108, 2011.

- Myriolecis prominens*** (Clauzade & Vězda) Cl. Roux & Nimis *comb. nov.* (MB 817869). Bas.:
Lecanora prominens Clauzade & Vězda, Rev. Fac. Ciências Lisboa, sér. 2C, 14, 1: 49, 1966 (MB 817868).
- Myriolecis prophetae-eliae*** (Sipman) Sipman & Cl. Roux *comb. nov.* (MB 817867). Bas.:
Lecanora prophetae-eliae Sipman, Bibliotheca Lichenologica, 96: 275, 2007.
- Physcia mediterranea*** Nimis *nom. nov.* (MB 817876) *pro Physcia scopulorum* (Lambinon & Vězda) Poelt & Nimis *non* (Ach.) DC. Bas.: *Physcia aipolia* subsp. *scopulorum* Lambinon & Vězda in Vězda, Schedae ad Lichenes Selecti Exsiccati, 35: 6 (nr. 871), 1970.
- Protoparmeliopsis graeca*** (J. Steiner) Sipman & Cl. Roux *comb. nov.* (MB 817859). Bas.:
Lecanora graeca J. Steiner, Verhandlungen der zoologisch-botanischen Gesellschaft Wien, 69: 80, 1919.
- Protoparmeliopsis vaenskaei*** (Cl. Roux & C. Coste) Cl. Roux *comb. nov.* (MB 817860). Bas.:
Lecanora vaenskaei Cl. Roux & C. Coste, Canadian Journal of Botany, 71, 12: 1660, 1994.

Systematic arrangement of genera

The taxonomy of fungi, including lichenised species, has been subjected to many important changes in the last decades, especially thanks to developments in molecular systematics. This process is far from being completed, and several taxonomical changes are to be expected in the near future. In the present checklist, accepted taxa are listed alphabetically. Upon suggestion of Th. Lumbsch, in order to provide a help for those interested in the phylogeny of lichenised fungi occurring in Italy, I add here an updated taxonomical scheme that follows, with some minor changes, the *Syllabus of Plant Families* (Jaklitsch & al. 2016), limited to genera occurring in Italy, with the approximate total number of worldwide known species specified in brackets after the genus name.

Phylum: Ascomycota Caval-Sm.

Subphylum Pezizomycotina O.E.Erikss. & Winka

Class **Arthoniomycetes** O.E. Erikss. & Winka

Order **Arthoniales** Henssen *ex* D. Hawksw. & O.E. Erikss.

Arthoniaceae Rchb. *ex* Rchb. - *Arthonia* (c. 500), *Arthothelium* (10), *Coniocarpon* (5), *Inoderma* (1), *Pachnolepia* (1), *Reichlingia* (1), *Sporodophoron* (4).

Chrysotrichaceae Zahlbr. - *Chrysothrix* (incl. *Alysphaeria* Turpin; 17).

Lecanographaceae Ertz, Tehler, G. Thor & Frisch - *Alyxoria* (5), *Lecanographa* (38), *Phacographa* (2), *Zwackhia* (1).

Opegraphaceae Körb. *ex* Stizenb. - *Cresponea* (17), *Opegrapha* (incl. *Diplogramma* Müll. Arg.; c. 300), *Paralecanographa* (1), *Sparria* (2).

Roccellaceae Chevall. - *Dendrographa* (6), *Dirina* (13), *Diromma* (1), *Enterographa* (53), *Gyrographa* (2), *Lecanactis* (incl. *Sagenidium* Stirt.; c. 25), *Ocellomma* (1), *Pseudoschismatomma* (1), *Psoronactis* (1), *Roccella* (incl. *Roccellodea* Darb.; 40), *Schismatomma* (10), *Syncesia* (21).

Roccellographaceae Ertz & Tehler - *Roccellographa* (incl. *Peterjamesia* D. Hawksw.; 3).

Arthoniales *gen. inc. sed.*

Bactrospora (30), *Bryostigma* (2), *Phacothecium* (1).

Class **Coniocybomycetes** M. Prieto & Wedin

Order **Coniocybales** M. Prieto & Wedin

Coniocybaceae Rchb. - *Chaenotheca* (25), *Sclerophora* (6).

Class **Dothideomycetes** sensu O.E. Erikss. & Winka

Order **Asterinales** M.E. Barr *ex* D. Hawksw. & O.E. Erikss.

Asterinaceae Hansf. - *Labrocarpon* (1), *Melaspileella* (1).

Order **Capnodiales** Woron.

Racodiaceae Link - *Cystocoleus* (1), *Racodium* (1).

Order **Eremithallales** Lücking & Lumbsch

Melaspileaceae Walt. Watson - *Encephalographa* (1), *Melaspilea* (1?).

Order **Lichenotheliales** K. Knudsen, Muggia & K.D. Hyde

Lichenotheliaceae Henssen - *Lichenothelia* (25).

Order **Monoblastiales** Lücking, M.P. Nelsen & K.D. Hyde

Monoblastiaceae Walt. Watson - *Acrocordia* (10), *Anisomeridium* (c. 200).

Order **Pleosporales** Luttrell *ex* M.E. Barr

Arthopyreniaceae W. Watson - *Arthopyrenia* (5), *Mycomicrothelia* (10).

Dacampiaceae Koerb. - *Dacampia* (8).

Mycoporaceae Zahlbr. - *Mycoporum* (25).

Naetrocymbaceae Höhnelt *ex* R.C. Harris - *Leptorhaphis* (12), *Naetrocymbe* (12), *Tomasellia* (incl. *Athrismidium* Trevis.; 5).

Order **Strigulales** Lücking, M.P. Nelsen & K.D. Hyde

Strigulaceae Zahlbr. - *Strigula* (70).

Dothideomycetes *fam. inc. sed.*

Xanthopyreniaceae Zahlbr. - *Collemopsidium* (c. 18).

Dothideomycetes *gen. inc. sed.*

Cyrtidula (30), *Nigropuncta* (1).

Class **Eurotiomycetes** O.E. Erikss. & Winka

Subclass **Chaetothyriomycetidae** Dowell

Order **Pyrenulales** Fink *ex* D. Hawksw. & O.E. Erikss.

Celotheliaceae Lücking, Aptroot & Sipman - *Celothelium* (8).

Pyrenulaceae Rabenh. - *Blastodesmia* (1), *Eopyrenula* (6), *Lithothelium* (28), *Pyrenula* (170).

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Order **Verrucariales** Mattick *ex* D. Hawksw. & O.E. Erikss.

Verrucariaceae Zenker - *Agonimia* (10), *Anthracoarpon* (3), *Atla* (9), *Bagliettoa* (20), *Catapyrenium* (6), *Clavascidium* (5), *Dermatocarpon* (20), *Endocarpon* (70), *Henrica* (4), *Heteroplacidium* (9), *Hydropunctaria* (8), *Involucropyrenium* (6), *Neocatapyrenium* (5), *Normandina* (2), *Parabagliettoa* (3), *Phylloblastia* (incl. *Pocsia* Vězda; 12), *Placidiopsis* (20), *Placidium* (28), *Placocarpus* (3), *Placopyrenium* (22), *Polyblastia* (120), *Psoroglaena* (15), *Sporodictyon* (5), *Staurothele* (40), *Thelidium* (100), *Verrucaria* (c. 200), *Verrucula* (30), *Verruculopsis* (4).

Verrucariales *gen. inc. sed.*

Botryolepraria (2).

Subclass **Mycocaliciomycetidae** Tibell

Order **Mycocaliciales** Tibell & Wedin

Sphinctrinaceae M. Choisy - *Chaenothecopsis* (60), *Mycocalicium* (12), *Phaeocalicium* (17), *Pyrgidium* (3), *Sphinctrina* (5), *Stenocybe* (10).

Class **Lecanoromycetes** O.E. Erikss. & Winka

Subclass **Acarosporomycetidae** Reeb, Lutzoni & Cl. Roux

Order **Acarosporales** Reeb, Lutzoni & Cl. Roux

Acarosporaceae Zahlbr. - *Acarospora* (200), *Eiglera* (2), *Glypholecia* (1), *Myriospora* (c. 10), *Pleopsidium* (3), *Polysporina* (10), *Sarcogyne* (28), *Timdalia* (1).

Subclass **Candelariomycetidae** (ined.)
Order **Candelariales** Miadl., Lutzoni & Lumbsch

Candelariaceae Hakul. - *Candelaria* (7), *Candelariella* (50).
Pycnoraceae Bendiksby & Timdal - *Pycnora* (3).

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Subclass **Lecanoromycetidae** P.M. Kirk, P.F. Cannon, J.C. David & al.
Order **Caliciales** Bessey

Caliciaceae Chevall. - *Acolium* (c. 5), *Amandinea* (35), *Buellia* (300), *Calicium* (34), *Dimelaena* (8), *Diploicia* (4), *Diplolemma* (30), *Endohyalina* (5), *Monerolechia* (1), *Pseudothelomma* (2), *Pyxine* (70), *Tetramelas* (16), *Thelomma* (5).
Physciaceae Zahlbr. - *Anaptychia* (15), *Coscinocladium* (1), *Heterodermia* (72), *Hyperphyscia* (9), *Leucodermia* (10), *Phaeophyscia* (30), *Phaeorrhiza* (2), *Physcia* (80), *Physciella* (4), *Physconia* (25), *Polyblastidium* (18), *Rinodina* (300), *Rinodinella* (6), *Tornabea* (1).

Order **Lecanorales** Nannf.

Biatorrellaceae M. Choisy ex Hafellner - *Biatorrella* (c. 30).
Carbonicolaceae Bendiksby & Timdal - *Carbonicola* (3).
Catillariaceae Hafellner - *Catillaria* (c. 150), *Placolecis* (1), ?*Solenopsora* (c. 20).
Cladoniaceae Zenker - *Cladonia* (470), *Pilophorus* (11), *Pycnothelia* (2).
Haematommataceae Hafellner - *Haematomma* (c. 50).
Lecanoraceae Körb. - *Bryodina* (1), *Bryonora* (11), *Carbonea* (18), *Clauzadeana* (1), *Frutidella* (2), *Japewiella* (5), *Lecanora* (c. 500), *Lecidella* (c. 80), ?*Miriquidica* (c. 30), *Myriolecis* (c. 25), *Protoparmeliopsis* (c. 50), *Psorinia* (2), *Pyrrhospora* (1), *Rhizoplaca* (c. 20).
Parmeliaceae Zenker - *Alectoria* (incl. *Gowardia*; 9), *Allantoparmelia* (3), *Allocetraria* (9), *Arctoparmelia* (5), *Brodooa* (3), *Bryoria* (c. 50), *Cetraria* (15), *Cetrelia* (18), *Cetrariella* (4), *Cornicularia* (1), *Crespoa* (4), *Dactylina* (2), *Evernia* (10), *Flavocetraria* (3), *Flavoparmelia* (32), *Flavopunctelia* (5), *Hypogymnia* (90), *Hypotrachyna* (260), *Imshaugia* (7), *Letharia* (6), *Lethariella* (1), *Melanelia* (c. 6), *Melanelixia* (15), *Melanohalea* (22), *Menegazzia* (c. 70), *Montanelia* (5), *Nephromopsis* (c. 20), *Parmelia* (c. 50), *Parmelina* (15), *Parmeliopsis* (3), *Parmotrema* (c. 300), *Platismatia* (11), *Pleurosticta* (2), *Protoparmelia* (incl. *Maronina* Hafellner & R.W. Rogers; c. 25), *Pseudephebe* (2), *Pseudevernia* (4), *Punctelia* (c. 45), *Usnea* (c. 350), *Usnocetraria* (1), *Vulpicida* (4), *Xanthoparmelia* (820).
Pilocarpaceae Zahlbr. - *Byssoloma* (43), *Fellhanera* (70), *Fellhaneropsis* (7), *Micarea* (100).
Psilolechiaceae S. Stenroos, Miadl. & Lutzoni - *Psilolechia* (4).
Psoraceae Zahlbr. - *Brianaria* (4), *Glyphopeltis* (1), *Protoblastenia* (14), ?*Protomicarea* (1), *Psora* (35), ?*Psorula*.
Ramalinaceae C. Agardh - *Adelolecia* (4), *Arthrosporium* (1), *Bacidia* (c. 250), *Bacidina* (25), *Bilimbia* (6), *Biatora* (42), *Catinarina* (2), *Cliostomum* (c. 20), *Frutidella* (2), *Japewia* (3), *Lecania* (50), *Megalaria* (29), *Phyllopsora* (95), *Ramalina* (c. 250), *Schadonia* (3), *Toninia* (85), *Waynea* (7).
Ramboldiaceae S. Stenroos, Miadl. & Lutzoni - *Ramboldia* (c. 30).
Scoliciosporaceae Hafellner - *Scoliciosporum* (c. 15).
Sphaerophoraceae Fr. - *Bunodophoron* (24), *Sphaerophorus* (8).
Stereocaulaceae Chevall. - *Hertelidea* (6), *Lepraria* (c. 80), *Stereocaulon* (c. 140), *Squamarina* (c. 25).
Tephromelataceae Hafellner - *Calvitimela* (10), *Mycoblastus* (10), *Tephromela* (30), *Violella* (2).

Lecanorales gen. inc. sed.

Puttea (3).

Order **Lecideales** Vain.

Arthrorhaphidaceae Poelt & Hafellner - *Arthrorhaphis* (13).

Helocarpaceae Hafellner - *Helocarpon* (3).

Lecideaceae Chevall. - *Amygdalaria* (10), *Bellemerea* (8), *Bryobilimbia* (5), *Cecidonia* (2), *Clauzadea* (4), *Farnoldia* (6), *Immersaria* (7), *Koerberiella* (2), *Lecidea* (c. 100), *Lecidoma* (1), *Melanolecia* (1), *Mycobilimbia* (5), *Porpidia* (c. 30), *Porpidinia* (1), *?Pseudopannaria* (1), *Romjularia* (1), *Stenhammarella* (1).

Order **Leprocaulales** Lendemer & B.P. Hodk.

Leprocaulaceae Lendemer & B.P. Hodk. - *Halecania* (12), *Leprocaulon* (c. 12)

Order **Peltigerales** Walt. Watson
Suborder **Collematineae** Miadl. & Lutzoni

Coccocarpiaceae (Mont. ex Müll. Arg.) Henssen - *Spilonema* (4).

Collemataceae Zenker - *Blennohallia* (4), *Callome* (1), *Collema* (c. 40), *Enchylum* (9), *Lathagrium* (10), *Leptogium* (c. 72), *Paracollema* (2), *Pseudoleptogium* (1), *Rostania* (7), *Scytinium* (46).

Pannariaceae Tuck. - *Fuscopannaria* (incl. *Moelleropsis* Gyeln.; c. 50), *Nevesia* (1), *Pannaria* (c. 50), *Parmeliella* (c. 90), *Pectenaria* (2), *Physma* (12), *Protopannaria* (7), *Psoroma* (c. 60), *Psoromidium*, (2), *Siphulastrum* (4), *Staurolemma* (3).

Placynthiaceae E. Dahl - *Placynthium* (c. 25).

Suborder **Peltigerineae** Miadl. & Lutzoni

Koerberiaceae T. Sprib. & Muggia - *Koerberia* (1), *Vestergrenopsis* (3).

Lobariaceae Chevall. - *Crocodia* (5), *Lobaria* (c. 60), *Lobarina* (15), *Ricasolia* (15), *Sticta* (200).

Massalongiaceae Wedin, P.M. Jørg. & Wiklund - *Leptochidium* (2), *Massalongia* (2), *Polychidium* (1).

Nephromataceae Wetm. ex J.C. David & D. Hawksw. - *Nephroma* (36).

Peltigeraceae Dumort. - *Peltigera* (100), *Solorina* (10).

Vahliellaceae Wedin, P.M. Jørg. & S. Ekman - *Vahliella* (8).

Order **Rhizocarpales** (ined.)

Rhizocarpaceae M. Choisy ex Hafellner - *Catolechia* (1), *?Epilichen* (1), *Poeltinula* (2), *Rhizocarpon* (c. 225).

Sporastatiaceae Bendiksby & Timdal - *Sporastatia* (4).

Order **Teloschistales** D. Hawks. & O.E. Erikss.

Megalosporaceae Vězda ex Hafellner & Bellem. - *Megalospora* (33).

Teloschistaceae Zahlbr., Subfam. **Caloplacoideae** (ined.) - *Blastenia* (10), *Bryoplaca* (3), *Caloplaca* (s.str.: c. 20, s.lat. c. 350), *Gyalolechia* (c. 30), *Huneckia* (2), *Leproplaca* (6), *Pyrenodesmia* (6), *Rufoplaca* (6), *Seirophora* (11), *Usnochroma* (2), *Variospora* (12), *Xanthocarpia* (20). Subfam. **Teloschistoideae** Arup, Söchting & Frödén - *Teloschistes* (20). Subfam. **Xanthorioideae** (ined.) - *Athallia* (9), *Calogaya* (11), *Cerothallia* (3), *Flavoplaca* (26), *Parvoplaca* (4), *Polycauliona* (25), *Rusavskia* (10), *Solitaria* (1), *Squamulea* (5), *Xanthocarpia* (13), *Xanthomendoza* (incl. *Gallowayella*; *Golubkovia*; *Honeggeria*; *Jesmurraya*; *Oxneria*; c. 20), *Xanthoria* (c. 10).

Lecanoromycetidae fam. inc. sed.

Lopadiaceae Hafellner - *Lopadium* (5).

Lecanoromycetidae gen. inc. sed.

Cheiromycina (4).

Lecanoromycetes gen. inc. sed.

Biatoridium (3), *Cephalophysia* (1), *Piccolia* (7).

Subclass **Ostropomycetidae** Reeb, Lutzoni & Cl. Roux
Order **Arctomiales** S.Stenroos, Miadl. & Lutzoni

Arctomiaceae Th.Fr. - *Gabura* (1).

Order **Baeomycetales** Lumbsch, Huhndorf & Lutzoni

Baeomycetaceae Dumort. - *Ainoa* (2). - *Baeomyces* (9), ? *Parainoa* (1).

Order **Hymeneliales** S. Stenroos, Miadl. & Lutzoni

Hymeneliaceae Körb. - *Hymenelia* (c. 25), *Ionaspis* (7), *Tremolecia* (1).

Order **Ostropales** Nannf.

Coenogoniaceae (Fr.) Stizenb. - *Coenogonium* (c. 90).

Gomphillaceae Walt. Watson - *Gomphillus* (6), *Gyalectidium* (52), *Gyalidea* (50), *Gyalideopsis* (c. 100), *Jamesiella* (4)

Graphidaceae Dumort. - *Diploschistella* (4), *Diploschistes* (31), *Graphis* (c. 450), *Phaeographis* (c. 180), *Thelotrema* (c. 110), *Xalocoa* (1).

Gyalectaceae (A. Massal.) Stizenb. - *Cryptolechia* (11), *Gyalecta* (50), *Petractis* (3), *Ramonia* (24).

Phlyctidaceae Poelt & Vězda ex J.C. David & D. Hawksw. - *Phlyctis* (20).

Porinaceae Rchb. - *Porina* (c. 140), *Pseudosagedia* (80).

Protothelenellaceae Vězda, H. Mayrhofer & Poelt - *Protothelenella* (11).

Sagiolechiaceae Baloch, Lücking, Lumbsch & al. - *Sagiolechia* (3).

Stictidaceae Fr. - *Absoconditella* (12), ?*Thelopsis* (9), ?*Topelia* (10).

Thelenellaceae O.E. Erikss. ex H. Mayrhofer - ?*Julella* (c. 15), *Thelenella* (33).

Thrombiaceae Poelt & Vězda ex J.C. David & D. Hawksw. - *Thrombium* (5).

Order **Pertusariales** M. Choisy ex D. Hawksw. & O.E. Erikss.

Icmadophilaceae Triebel - *Dibaeis* (13), *Icmadophila* (3), *Thamnolia* (4).

Megasporaceae Lumbsch, Feige & K. Schmitz - *Aspicilia* (c. 200), *Circinaria* (c. 25), *Lobothallia* (9), *Megaspora* (2), *Sagedia* (3).

Microcaliciaceae Tibell - *Microcalicium* (4).

Ochrolechiaceae R.C. Harris ex Lumbsch & I. Schmitt - *Ochrolechia* (c. 60), *Varicellaria* (7).

Pertusariaceae Körb. ex Körb. - *Pertusaria* (c. 400).

Order **Sarrameanales** B.P. Hodk. & Lendemer

Sarrameanaceae Hafellner - *Loxospora* (9).

Schaereriaceae Hafellner - *Schaereria* (16).

Order **Trapeliales** B.P. Hodk. & Lendemer

Trapeliaceae M. Choisy ex Hertel - *Amylora* (1), *Lambiella* (2), *Lithographa* (10), *Placopsis* (c. 60), *Placynthiella* (7), *Rimularia* (10), ?*Sarea* (2), *Trapelia* (13), *Trapeliopsis* (20), *Xylographa* (20).

Ostropomycetidae gen. inc. sed.

Anzina (1), *Aspilidea* (1).

Subclass **Umbilicariomycetidae** Bendiksby, Hestmark & Timdal
Order **Umbilicariales** Lumbsch, Hestmark & Lutzoni

Elixaceae Lumbsch - *Elixia* (2).

Fuscideaceae Hafellner - *Fuscidea* (c. 35), *Maronea*. (13), ?*Orphniospora* (3).
Ophioparmaceae R.W. Rogers & Hafellner - *Hypocenomyce* (3), *Ophioparma* (8).
Ropalosporaceae Hafellner - *Ropalospora* (7).
Umbilicariaceae Chevall. - *Lasallia* (17), *Umbilicaria* (70), *Xylopsora* (2).

Class **Leotiomycetes** O.E. Erikss. & Winka

Mniaecia lineage - *Mniaecia* (3).

Class **Lichinomycetes** Reeb, Lutzoni & Cl. Roux
Order **Lichinales** Henssen & Büdel

Gloeoheppiaceae Henssen - *Gloeoheppia* (5).
Lichinaceae Nyl. - *Anema* (c. 5), *Ephebe* (13), ?*Euopsis* (2), *Gyrocollema* (2), ?*Harpidium* (3), *Heppia* (7),
Lemmopsis (3), *Lempholemma* (35), *Lichina* (9), *Lichinella* (30), *Paulia* (14), *Peccania* (15), *Phylliscum*
(8), *Porocyphus* (8), *Psorotichia* (c. 50), *Pterygiopsis* (17), *Pyrenocarpon* (2). *Pyrenopsis* (c. 40),
Synalissa (5), *Thelignya* (2), *Thermutis* (1), *Thyrea* (c. 13), *Zahlbrucknerella* (10).
Peltulaceae Büdel - *Peltula* (c. 40).

Pezizomycotina ord. inc. sed.

Order **Thelocarpales** Lücking & Lumbsch

Thelocarpaceae Zukul - ?*Sarcosagium* (1), *Thelocarpon* (c. 25).

Order **Veizdaeales** Lumbsch & Lücking

Veizdaeaceae Poelt & Vězda ex J.C. David & D. Hawksw. - *Veizdaea* (13).

Pezizomycotina fam. inc. sed.

Aphanopsidaceae Printzen & Rambold - *Aphanopsis* (2).
Epigloeaceae Zahlbr. - *Epigloea* (12).
Strangosporaceae S. Stenroos, Miadl. & Lutzoni - *Strangospora* (10).

Phylum: Basidiomycota R.T. Moore

Lichenomphalia (c. 8), *Multiclavula* (c. 13).

Absconditella Vězda

Preslia, 37: 224, 1965.

A rather small genus of the Stictidaceae with 12, usually rare, inconspicuous species, usually occurring on strongly acid, humid substrata. Keys to European species were provided by Bielczyk & Kiszka (2001) and van den Boom & al. (2015). The genus is poorly known in Italy: the following species, known from neighbouring countries, should be looked for in the Italian Alps: *A. delutula* (Nyl.) Coppins & H. Kiliyas, *A. pauxilla* Vězda & Vivant, *A. sphagnorum* Vězda & Poelt, and *A. trivialis* (Willey ex Tuck.) Vězda. Type: *A. sphagnorum* Vězda & Poelt

Absconditella annexa (Arnold) Vězda

Preslia, 37: 244, 1965 - *Secoliga annexa* Arnold, Verh. zool.-bot. Ges. Wien, 25: 256, 1875.

Syn.: *Gyalecta annexa* (Arnold) H. Olivier

N - Frl (Tretiach & Hafellner 2000).

Cr/ Ch/ S/ Terr/ pH: 1, L: 3-4, X: 2, E: 1/ Alt: 4-5/ Alp: r, Salp: vr/ PT: 1/ p/ Note: a probably arctic-alpine, ephemeral lichen found on muribund bryophytes and organic soil on siliceous substrata, with optimum near and above treeline. Easily overlooked, it is perhaps more widespread in the Alps.

Absconditella lignicola Vězda & Pišút

Nova Hedwigia, 40: 344, 1985 (1984).

N - TAA (Thor & Nascimbene 2007).

Cr/ Ch/ S/ Lign/ pH: 1, L: 3-4, X: 1-2, E: 1/ Alt: 4-5/ Alp: r, Salp: vr/ PT: 1/ p/ Note: a boreal-montane, ephemeral lichen, mostly found on horizontal surfaces of stumps and logs, mostly of conifers, with optimum in the subalpine belt. Easily overlooked, it might be more widespread in the Alps.

Acarospora A. Massal.

Ric. Auton. Lich. Crost.: 27, 1852.

A large, cosmopolitan genus of mainly saxicolous species, still insufficiently known in Italy. The genus was restricted by Crewe & al. (2006) to a monophyletic group of taxa related to the type species, *A. schleicheri*, while the *A. smaragdula* group and *A. badiofusca* were excluded from the genus in a strict sense. After the separation of *Pleopsidium*, the species of the *A. smaragdula* group have been recently segregated into the genus *Myriospora* (Arcadia & Knudsen 2012, see also Roux & Navarro-Rosinés 2011, and Westberg & al. 2011), while *A. heppii* is now included into the genus *Caeruleum*, while the *A. badiofusca* group is likely to be segregated into its own genus. The molecular study of Acarosporaceae by Westberg & al. (2015) showed that the occurrence of strongly black-pigmented (carbonised or melanised) ascospores has arisen secondarily and independently numerous times in the evolution of the group, so that the genera *Sarcogyne* and *Polysporina* are distinctly non-monophyletic, and the latter could prove to be even a synonym of *Acarospora*. Type: *A. schleicheri* (Ach.) A. Massal.

Acarospora anomala H. Magn.

Göteb. Vetensk.-och Vitter.-Handl., ser. 4, 28, 2: 133, 1924.

N - TAA (Nascimbene & al. 2007b).

Cr/ Ch/ S/ Lign/ pH: 3, L: 4, X: 4, E: 4-5/ Alt: 3-4/ Salp: er, Mont: er/ PT: 1-2/ #/ Note: a poorly known species of eutrophicated, dry and hard lignum, closely related to, and possibly a synonym of other saxicolous species of the *A. nitrophila* complex. Hitherto reported from Scandinavia and the Alps. A dubious record from Campania by Garofalo & al. (1999) is not accepted here.

Acarospora badiofusca (Nyl.) Th. Fr. subsp. ***badiofusca***

N. Acta Reg. Soc. Sci. Upsal., ser. 3, 3: 190, 1861 - *Lecanora badiofusca* Nyl., Herb. Mus. Fenn.: 110, 1859.

¶ Syn.: *Acarospora anziana* H. Magn., *Sarcogyne acarosporoides* Anzi

N - Frl, TAA, Lomb, Piem (TSB 33659), **VA** (Valcuvia 2000, Matteucci & al. 2015c), **Emil, Lig** (TSB 33384). **C - Sar** (Hafellner 1993, Rizzi & al. 2011, Cossu & al. 2015).

Cr/ Ch/ S/ Sax/ pH: 3-4, L: 3-5, X: 3, E: 2-3/ Alt: 3-5/ Alp: rr, Salp: rc, Orom: vr, Mont: vr/ PT: 1-2/ Note: an arctic-alpine to boreal-montane, circumpolar species of base-rich or lime-containing siliceous rocks, such as mica-schists and calciferous sandstone, on faces wetted by rain, incl. stones near the ground in grasslands. Frequent only in the Alps, with optimum in the subalpine belt. The species does not belong to *Acarospora s.str.* (Westberg & al. 2015).

Acarospora badiofusca subsp. ***badiorubra*** Clauzade & Cl. Roux

Bull. Mus. Hist. Nat. Marseille, 41: 86, 1981.

N - Frl, VA (Matteucci & al. 2013, 2015c). **C - Tosc** (Tretiach & al. 2008). **S - Si**.

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4-5, X: 3-4, E: 1-2/ Alt: 3-4/ Salp: r, Orom: vr, Mont: vr/ PT: 1/ #/ Note: less calcicolous and more thermophilous than the typical subspecies. Certainly more widespread in the Alps. This

taxon does not belong to *Acarospora s.str.* (Westberg & al. 2015), and some samples could belong to *A. irregularis*.

Acarospora bullata Anzi

Atti Soc. Ital. Sc. Nat. Milano, 11: 165, 1868.

N - Lomb, Piem (Reeb & al. 2007), **VA** (HAL-18600).

Cr/ Ch/ S/ Sax/ pH: 3-4, L: 4-5, X: 4, E: 2-3/ Alt: 3-5/ Alp: r, Salp: vr, Mont: er/ PT: 1/ subc/ Note: on steeply inclined faces of base-rich, weakly calciferous siliceous rocks in upland areas. Probably more widespread in the Alps. Closely related to the *A. peliscypha* complex (Knudsen & al. 2010), this species is worthy of further study.

Acarospora cervina A. Massal.

Ric. Auton. Lich. Crost.: 28, 1852.

Syn.: *Acarospora algerica* J. Steiner, *Acarospora cervina* f. *depauperata* Körb. Clauzade & Cl. Roux, *Acarospora cervina* f. *determinata* (H. Magn.) H. Magn., *Acarospora cervina* f. *leucopsora* A. Massal., *Acarospora cervina* f. *percaena* A. Massal., *Acarospora cervina* f. *sarcogynoides* (Vain.) Clauzade & Cl. Roux, *Acarospora cervina* var. *conspersa* (Th. Fr.) Clauzade & Cl. Roux, *Acarospora cervina* f. *normalis* A. Massal., *Acarospora cervina* var. *pruinosa* A. Massal., *Acarospora cervina* var. *percaena* (Fr.) A. Massal., *Acarospora cesatiana* Jatta, *Acarospora glaucocarpa* var. *farinosa* Anzi, *Acarospora glaucocarpa* var. *istriana* (Zahlbr.) Szatala?, *Acarospora glaucocarpa* var. *cervina* (A. Massal.) Cl. Roux, *Acarospora percaena* (Fr.) J. Steiner, *Acarospora theobromina* Hue p.p., *Acarospora velana* A. Massal.

N - Frl (TSB 4488), **Ven** (Caniglia & al. 1999, Lazzarin 2000b, Thor & Nascimbene 2007, Nascimbene & Marini 2007, Watson 2014), **TAA** (Matzer & Pelzmann 1991, Calatayud & Triebel 2003, Nascimbene 2008b, Spitale & Nascimbene 2012), **Lomb, Piem** (Clerc & al. 1999, Morisi 2005, Favero-Longo & al. 2009b), **VA** (Piervittori & Isocrono 1999), **Emil, Lig** (Valcuvia & al. 2000). **C - Tosc, Marc** (Nimis & Tretiach 1999), **Umb** (Nimis & Tretiach 1999, Panfili 2000, Ravera & al. 2006), **Laz, Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach, 1999, 2001, Caporale & al. 2008, Ravera & al. 2009), **Sar** (Rizzi & al. 2011). **S - Camp** (Garofalo & al. 1999, 2010, Aprile & al. 2003, 2003b), **Pugl** (Garofalo & al. 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Grillo 1998, Brackel 2008b, 2008c).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 4-5, X: 4-5, E: 3-4/ Alt: 1-5/ Alp: r, Salp: rr, Orom: c, Mont: vc, SmedD: rc, Pad: er, SmedH: r, MedH: vr, MedD: vr/ PT: 1/ Note: a widespread, probably holarctic species found on the top of exposed, more or less calcareous boulders in natural habitats, especially common in upland areas along the eastern side of the Peninsula and in dry-continental Alpine areas, but with a wide altitudinal range. According to Westberg (*in litt.*) *A. cervina* and *A. glaucocarpa* are certainly distinct. The nomenclature of this species should be studied further: to me, Massalongo was not describing a species, but proposing a new combination.

Acarospora chrysocardia Poelt & M. Steiner

Ann. naturhist. Mus. Wien, 75: 163, 1971.

Syn.: *Evicentia chrysocardia* (Poelt & M. Steiner) Barreno *comb. inval.*

N - Piem (Obermayer 2002), **VA** (Piervittori & Isocrono 1999, Matteucci & Vanacore Falco 2015).

Cr/ Ch/ S/ Sax/ pH: 3, L: 4, X: 4, E: 1-2/ Alt: 2-3/ Mont: er, SmedD: er/ PT: 1/ subc, paras *Diploschistes scruposus*/ Note: on base-rich siliceous rocks in dry-warm Alpine valleys, growing on the thalli of *Diploschistes scruposus* below the subalpine belt. Hitherto known only from the western Alps and Catalonia (Roux *in litt.*), and certainly worthy of protection.

Acarospora cinerascens J. Steiner

in Arnold, Lich. Exs.: nr. 1500, 1890.

Syn.: *Acarospora alboatra* H. Magn.

N - TAA (Knudsen & al. 2015), **VA** (Piervittori & Isocrono 1999, Knudsen & al. 2015).

Cr/ Ch/ S/ Sax/ pH: 3, L: 4-5, X: 4-5, E: 3-4/ Alt: 2-4/ Salp: vr, Mont: vr, SmedD: er/ PT: 1/ subc/ Note: on weathered base-rich siliceous rocks, restricted to dry-warm Alpine valleys with a continental climate. Superficially similar to *A. versicolor*, but a different species (Knudsen & al. 2015).

Acarospora complanata H. Magn.

Svensk Bot. Tidskr., 18: 332, 1924.

N - Piem (TSB 35331), **Lig, C - Tosc.**

Cr/ Ch/ S/ Sax/ pH: 3-4, L: 4-5, X: 3-4, E: 3-4/ Alt: 1-2 / SmedD: r, SmedH: r, MedH: r/ PT: 1-2/ p/ Note: this species was described from France, on basaltic rocks, and has a southern distribution in Europe, extending to North Africa; it has been also reported from North America. It belongs to a difficult complex of closely related taxa, which is in need of revision. Its ecology is poorly understood as well; the species is most frequent on base-rich siliceous rocks. See also note on *A. veronensis*.

Acarospora epithallina H. Magn.

K. Svenska Vetensk.-Akad. Handl., ser. 3, 7, 4: 72, 1929.

C - Sar, S - Si.

Cr/ Ch/ S/ Sax/ pH: 1, L: 5, X: 5, E: 1/ Alt: 1/ MedD: vr/ PT: 1/ u, paras *Acarospora hilaris*/ Note: on steeply inclined, sunny surfaces of hard siliceous rocks, especially quartzite, on the thalli of *A. hilaris*. The

species, reported from Macaronesia to Turkey, in Italy is much less frequent than its host, being restricted to the driest parts of the Mediterranean Region.

Acarospora freyi H. Magn.

Svensk Bot. Tidskr., 18: 334, 1924.

Syn.: *Acarospora discreta sensu* Bagl. & Carestia non (Ach.) Th.Fr., *Acarospora impressula* var. *freyi* (H. Magn.) Clauzade & Cl. Roux, *Acarospora smaragdula* var. *foveolata* Bagl. & Carestia

N - **Lomb** (Anzi, Lich. rar. Langob. exs. 563), **Piem** (Morisi & Sereno 1995, Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999). **C** - **Tosc**.

Cr/ Ch/ S/ Sax/ pH: 3-4, L: 4-5, X: 4, E: 2/ Alt: 3-5/ Alp: r, Salp: r, Mont: vr/ PT: 1/ p, paras *Aspicilia candida* and *A. polychroma*/ Note: probably overlooked and more widespread, both in the Alps and in the northern Apennines, with optimum near and above treeline, this lichen starts the life-cycle on *Aspicilia candida* and *A. polychroma* on calciferous rocks which are at least partly decalcified on the surface.

Acarospora fuscata (Schrad.) Arnold

Flora, 53: 469, 1870 - *Lichen fuscatus* Schrad., Spicil. Fl. Germ., 1: 83, 1794 *nom. cons. prop.*

Syn.: *Acarospora fuscata* var. *minutissima* Bagl., *Acarospora monacensis* H. Magn.?, *Acarospora nigrocastanea* Hue, *Acarospora photina* A. Massal., *Acarospora rufoalutacea* Harm. ex H. Magn.?, *Acarospora smaragdula sensu* A. Massal. *et auct. ital. p.p.*, *Acarospora squamulosa* (Schrad.) Trevis. *non sensu* Th. Fr., *Lecanora cervina* var. *squamulosa* (Schrad.) Willey

N - **VG, Frl** (Tretlach & Hafellner 2000), **Ven** (Lazzarin 2000b), **TAA** (Caniglia & al. 2002, Nascimbene 2003, 2008b, Thor & Nascimbene 2007), **Lomb** (Brackel 2010, 2013), **Piem** (Morisi & Sereno 1995, Isocrono & Falletti 1999, Isocrono & al. 2003, 2004, 2006, Favero-Longo & al. 2006b, Isocrono & Piervittori 2008, Giordani & al. 2014), **VA** (Piervittori & Isocrono 1999, Valcuvia 2000, Matteucci & al. 2015c), **Emil** (Dalle Vedove & al. 2002, Tretlach & al. 2008), **Lig** (Watson 2014). **C** - **Tosc** (Tretlach & al. 2008, Brackel 2015), **Marc, Laz, Sar** (Monte 1993, Nöske 2000, Rizzi & al. 2011, Giordani & al. 2013). **S** - **Camp** (Ricciardi & al. 2000), **Pugl, Bas, Cal** (Puntillo 1996), **Si** (Ottonello & Romano 1997, Poli & al. 1997, Grillo 1998, Grillo & Caniglia 2004, Brackel 2008b, Ottonello & al. 2011).

Cr/ Ch/ S/ Sax/ pH: 1-3, L: 4-5, X: 3-4, E: 2-3/ Alt: 2-5/ Alp: rr, Salp: rr, Orom: r, Mont: r, SmedD: vr/ PT: 1-2/ Note: a holarctic species of acid siliceous rocks wetted by rain, sometimes growing on other lichens, with a wide altitudinal range. Several records, especially those from southern Italy, need confirmation, but the species is certainly widespread throughout the country.

Acarospora gallica H. Magn.

K. Svenska Vetensk.-Akad. Handl., ser. 3, 7, 4: 282, 1929.

Syn.: *Acarospora gallica* var. *devastata* (Eitner) H. Magn., *Acarospora hungarica* H. Magn.

N - **VG** (Castello 2002, Martellos & Castello 2004), **Piem** (TSB 34247), **Emil** (Nimis & al. 1996), **Lig** (Giordani & al. 2016). **C** - **Tosc**.

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 3-5, X: 4, E: 3-4/ Alt: 1-3/ Mont: vr, SmedD: r, SmedH: rr, MedH: r/ PT: 1-2/ Note: a probably holarctic species of base-rich, weakly calciferous siliceous substrata, such as calcareous sandstone, brick, and roofing tiles, usually at relatively low elevations; much overlooked or confused with other species and certainly more widespread in Italy. For further details see Knudsen & Kocourková (2012).

Acarospora glaucocarpa (Ach.) Körb.

Parerga Lichenol., 1: 57, 1859 - *Parmelia glaucocarpa* Ach., Meth. Lich.: 182, 1803.

Syn.: *Acarospora castanea* (DC.) Körb., *Acarospora cervina* var. *glaucocarpa* (Ach.) Körb., *Acarospora theobromina* Hue *p.p.*, *Urceolaria castanea* DC.

N - **Frl** (TSB 4597), **Ven** (Nascimbene & Caniglia 2003c, Nascimbene 2005c, 2008c), **TAA** (Nascimbene 2003, 2008b, Nascimbene 2005b, Nascimbene & al. 2005, 2006, Spitale & Nascimbene 2012), **Lomb, Piem** (Isocrono & al. 2003, Isocrono & Piervittori 2008), **Lig, C** - **Tosc, Marc, Umb** (Ravera & al. 2006), **Abr, Mol** (Nimis & Tretlach 2004, Caporale & al. 2008), **Sar, S** - **Camp** (Altieri & al. 2000, Roccardi & Ricci 2006, Garofalo & al. 2010), **Pugl, Bas** (TSB 22126), **Cal** (Puntillo 2011), **Si** (Grillo & Caniglia 2004).

Cr/ Ch/ S/ Sax/ pH: 3-5, L: 3-4, X: 4-5, E: 3-4/ Alt: 1-5/ Alp: r, Salp: rr, Orom: c, Mont: vc, SmedD: rc, Pad: er, SmedH: r, MedH: vr, MedD: vr/ PT: 1/ Note: a widespread, probably holarctic species found on the top of more or less calcareous boulders in natural habitats, sometimes overgrowing other crustose lichens, with a wide altitudinal range but most common in upland areas; closely related to *A. cervina*, perhaps more frequent in less exposed situations. See also note on *A. cervina*.

Acarospora hellbomii H. Magn.

Bot. Not.: 232, 1926.

Syn.: *Acarospora marcii* H. Magn.

N - **TAA** (B 189317), **VA** (B-189320). **C** - **Sar**.

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4-5, X: 3-4, E: 4-5/ Alt: 3-5/ Alp: vr, Salp: vr, Orom: vr, Mont: vr/ PT: 1/ m/ Note: on exposed surfaces of iron-rich siliceous rocks in eutrophicated situations. A poorly-known taxon based on a type from extra-alpine Europe (Scandinavia), perhaps identical with *A. peliscypha*; all Italian records were as *A. marcii*, also based on a type from extra-alpine Europe (SW Europe), but the synonymy is uncertain.

Acarospora helvetica H. Magn.

Svensk Bot. Tidskr., 18: 336, 1924.

Incl: *Acarospora austriaca* H. Magn., *Acarospora intermedia* H. Magn., *Acarospora franconica* H. Magn., *Acarospora obscura* H. Magn.

N - VG, Lig. C - Laz. Sar.

Cr/ Ch/ S/ Sax/ pH: 1-3, L: 3-5, X: 3-4, E: 3-4/ Alt: 2-3/ Mont: r, SmedH: r/ PT: 1-2/ p, #/ Note: according to Roux & coll. (2014) this rather poorly known silicicolous species is distinct from *A. complanata*.

Acarospora heufleriana Körb.

Parerga Lichenol.: 57, 1859.

Syn.: *Acarospora heufleriana* var. *massiliensis* Harm., *Acarospora massiliensis* (Harm.) H. Magn., *Acarospora perpulchra* Hue

N - TAA, Piem (Clerc & al. 1999), **VA** (Pierivittori & Isocrono 1999), **Lig. C - Sar. S - Camp** (Garofalo & al. 1999, Aprile & al. 2002), **Pugl** (Garofalo & al. 1999).

Cr/ Ch/ S/ Sax/ pH: 3-4, L: 4-5, X: 4-5, E: 3-4/ Alt: 1-3/ Mont: vr, SmedD: er, SmedH: vr, MedH: vr, MedD: vr/ PT: 1/ subc, paras crustose lichens/ Note: on horizontal to gently sloping faces of base-rich or weakly calciferous siliceous rocks near the ground in open habitats, especially in grasslands, sometimes starting the life-cycle on other crustose lichens, especially *Lecanora valesiaca*. Restricted to dry-continental areas, both in the Alps and in the Mediterranean Region. See also note on *A. lavicola*.

Acarospora hilaris (Nyl.) Hue

Nouv. Arch. Mus. Hist. Nat., sér. 5 1: 113, 1909 - *Lecanora hilaris* Dufour ex Nyl., Not. Sällsk. Fauna Fl. Fenn. Förh., 5: 177, 1861.

Syn.: *Placodium chlorophanum* var. *hilare* (Dufour) Boistel

C - Tosc (Tretiach 1993), **Sar** (Tretiach 1993), **S - Cal** (Puntillo 1996), **Si** (Nimis & al. 1996b, Grillo & Caniglia 2004).

Cr.p/ Ch/ S/ Sax/ pH: 1, L: 5, X: 5, E: 1/ Alt: 1/ MedH: er, MedD: vr/ PT: 1/ subc, u/ Note: a xeric subtropical species found on vertical to underhanging faces of hard siliceous rocks which are rarely wetted by rain, restricted to the driest parts of Mediterranean Italy. Chemically heterogeneous (epanorin or rhizocarpic acid).

Acarospora hospitans H. Magn.

Göteb. Vetensk.-och Vitter.-Handl., ser. 4, 28, 2: 111, 1924.

Syn.: *Acarospora impressula* var. *hospitans* (H. Magn.) Clauzade & Cl. Roux

N - TAA (Pl. Graec. Lich. 182), **Piem** (TSB 34163), **Emil. C - Sar. S - Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Poli & al. 1995, Nimis & al. 1996b, Grillo & Caniglia 2004, Brackel 2008c).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4-5, X: 3-4, E: 2-3/ Alt: 2-5/ Alp: r, Salp: rr, Orom: vr, Mont: r, SmedD: er/ PT: 1/ paras *Aspicilia* spp., #/ Note: on siliceous rocks, growing on the thalli of other crustose lichens, according to Roux (*in litt.*) exclusively on *Aspicilia* spp. Much overlooked, and in need of further study, this species, which is related to *A. impressula*, does not belong to *Acarospora s.str.* (Westberg & al. 2015).

Acarospora imbricatula H. Magn.

Mitt. bot. Staatss. München, 9/10: 435, 1954.

N - TAA, VA (Pierivittori & Isocrono 1999).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 5, X: 4-5, E: 2-3/ Alt: 2-5/ Alp: er, Salp: vr, Mont: vr, SmedD: er/ PT: 1/ subc/ Note: hitherto known only from dry-continental Alpine valleys, on south-facing surfaces of siliceous rocks, where it is locally common.

Acarospora impressula Th. Fr.

Lichenogr. Scand., 1, 1: 214, 1871.

Syn.: *Acarospora atrata* Hue, *Acarospora hospitans* f. *insolita* Asta & Cl. Roux *nom. inval.*

N - Frl (Tretiach & Hafellner 2000), **TAA** (Nascimbene 2003), **Piem** (Giordani & al. 2014, Favero-Longo & al. 2015), **VA** (Pierivittori & al. 2004, Isocrono & al. 2008, Favero-Longo & Pierivittori 2009, Matteucci & al. 2015c).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4-5, X: 3-4, E: 2/ Alt: 3-5/ Alp: r, Salp: vr, Mont: vr/ PT: 1-2/ m, paras crustose lichens especially *Aspicilia polychroma*/ Note: an arctic-alpine to boreal-montane, probably circumpolar species found on metal-rich rocks and roofing slates, more rarely on weakly calciferous siliceous rocks, usually in upland areas, with optimum above treeline. Probably overlooked and more widespread in the Alps. The record from Sicilia by Grillo & Caniglia (2004), being dubious, is not accepted here. The species does not belong to *Acarospora s.str.* (Westberg & al. 2015).

Acarospora insolata H. Magn.

Göteb. Vetensk.-och Vitter.-Handl., ser. 4, 28, 2: 112, 1924.

N - Ven, Piem (LD -1549228), **Emil. C - Tosc, Sar** (Rizzi & al. 2011), **S - Bas** (Nimis & Tretiach 1999).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4-5, X: 3-4, E: 2-3/ Alt: 2-5/ Alp: rr, Salp: r, Orom: vr, Mont: vr, SmedH: er/ PT: 1/ subc, paras *Immersaria* and *Rhizocarpon* spp./ Note: on inclined faces of siliceous rocks wetted by rain. Probably more widespread in the mountains, especially in the Alps. The species does not belong to *Acarospora s.str.* (Westberg & al. 2015).

Acarospora irregularis H. Magn.

K. Svenska Vetensk.-Akad. Handl., ser. 3, 7, 4: 229, 1929.

Syn.: *Acarospora nitrophila* var. *suzai* (H. Magn.) Clauzade & Cl. Roux, *Acarospora suzai* H. Magn.

C - Sar (Knudsen & al. 2014).

Sq/ Ch/ S/ Sax/ pH: 3-4, L: 3-5, X: 3, E: 2-3/ Alt: 1-2/ SmedH: vr, MedH: vr, MedD: vr/ PT: 1/ Note: a species known from central Europe (Czech Republic, Hungary and Slovakia), as well as Austria, Greece and Sardinia, which was considered as a synonym of either *A. badiofusca* or of *A. nitrophila*. It differs from *A. badiofusca* in having a squamulose thallus, an interrupted algal layer, and a usually higher hymenium. For further details see Knudsen & al. (2014).

Acarospora laqueata Stizenb.

in Flagey, Herbor. Lich. Envir. Constantine: 131, 1888.

Syn.: *Acarospora caesiocinerea* B. de Lesd.?, *Acarospora cervina* f. *larvata* (Müll. Arg.) H. Magn.?, *Acarospora pitardii* B. de Lesd.?, *Lecanora laqueata* (Stizenb.) Stizenb.

N - Lomb. C - Mol (Nimis & Tretiach 1999, Caporale & al. 2008). **S - Camp** (Aprile & al. 2003b).

Cr.pl/ Ch/ S/ Sax/ pH: 4-5, L: 4-5, X: 4-5, E: 3-4/ Alt: 1-3/ Mont: er, SmedD: er, MedD: er, MedD: er/ PT: 1/ subc/ Note: on hard calcareous rocks, both on vertical faces and at the top of birds' perching sites in dry-continental areas (eastern side of the Peninsula, continental Alpine valleys), below the subalpine belt.

Acarospora lavicola J. Steiner

Denkschr. math.-naturw. Cl. K. Akad. Wiss. Wien, 71: 95, 1902.

C - Sar. S - Si.

Cr/ Ch/ S/ Sax/ pH: 3, L: 5, X: 4-5, E: 1-2/ Alt: 1/ MedH: er, MedD: er/ PT: 1/ subc/ Note: a xeric subtropical species of igneous rocks in dry-warm areas, ranging from Macaronesia through southern Europe to Arabia. The species could be confused with forms of *A. heufleriana* which are poor in norstictic acid, previously treated as *A. heufleriana* var. *massiliensis* (Roux *in litt.*).

Acarospora macrospora (Hepp) Bagl.

A. Massal. *ex* Bagl., Mem. R. Acc. Sc. Torino, ser. 2, 17: 397, 1857 - *Myriospora macrospora* Hepp, Flecht. Eur.: nr. 58, 1853.

Syn.: *Acarospora macrospora* var. *incusa* (Körb.) H. Magn., *Acarospora squamulosa sensu* Th. Fr. *non* (Schrad.) Trevis., *Acarospora squamulosa* f. *albomarginata* (Cromb.) A.L. Sm., *Acarospora squamulosa* var. *incusa* (Körb.) Zahlbr., *Lecanora cervina* var. *irrorata* Clemente

N - Frl, Ven (Nimis 1994), **TAA, Lomb, Piem** (Isocrono & Falletti 1999, Isocrono & al. 2003), **Lig. C - Tosc, Marc** (Nimis & Tretiach 1999), **Umb** (Ravera & al. 2006), **Abr** (Nimis & Tretiach 1999), **Sar** (Rizzi & al. 2011, Giordani & al. 2013). **S - Camp** (Garofalo & al. 2010), **Pugl, Cal** (Puntillo 1996).

Cr/ Ch/ S/ Sax/ pH: 5, L: 4-5, X: 4, E: 3-4/ Alt: 3-5/ Alp: er, Salp: rr, Orom: vr, Mont: r/ PT: 1/ Note: on steeply inclined faces of fissured calcareous rocks in upland areas, with optimum near treeline. Most frequent in the Alps. The record from Venezia Giulia reported by Nimis (1993: 55) is excluded, being from Slovenia.

Acarospora microcarpa (Nyl.) Wedd.

Bull. Soc. Bot. France, 21: 343, 1874 - *Lecanora schleicheri* var. *microcarpa* Nyl., Act. Soc. Linn. Bordeaux, 21: 327, 1857.

Syn.: *Acarospora kordofanica sensu* Nimis & Poelt *non* Zahlbr. *ex* H. Magn., *Acarospora tersa* (Fr.) J. Steiner

N - TAA, Piem (TSB *s.n.*). **C - Tosc, Laz** (Tretiach 2004), **Sar** (Rizzi & al. 2011). **S - Camp, Si** (Nimis & al. 1996b, Cataldo & Cannavò 2014).

Cr/ Ch/ S/ Sax/ pH: 3, L: 4-5, X: 3-4, E: 1-2/ Alt: 1-2/ SmedD: er, SmedH: vr, MedH: rr, MedD: er/ PT: 1/ paras/ Note: a mainly Mediterranean-Atlantic species, with optimum in coastal Tyrrhenian Italy, on base-rich siliceous rocks wetted by rain, growing on the thalli of *Diploschistes* spp., *Acarospora* spp., *Dimelaena* and *Protoparmelia* spp. The species also occurs in the dry-continental Alpine valleys.

Acarospora modenensis H. Magn.

K. Svenska Vetensk.-Akad. Handl., ser. 3, 7, 4: 259, 1929.

Syn.: *Acarospora engadinensis* H. Magn.?

N - VG, Piem (TSB 33339), **Emil, Lig. C - Tosc** (TSB 34209), **Sar. S - Camp** (Nimis & Tretiach 2004).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4-5, X: 3-4, E: 3/ Alt: 1-3/ Mont: vr, SmedD: r, Pad: vr, SmedH: r, MedH: vr/ PT: 1-2/ p/ Note: a mild-temperate species of siliceous rocks, often found on walls below the subalpine belt, probably overlooked and more widespread.

Acarospora moenium (Vain.) Räsänen

Lich. Fenn. Exs.: 306, 1936 - *Endocarpon moenium* Vain., Acta Soc. Fauna. Fl. Fenn., 49, 2: 83, 1921.

Syn.: *Aspicilia excavata* G. Thor & Tindal, *Aspicilia moenium* (Vain.) G. Thor & Tindal

N - VG (!), Frl, TAA (Thor & Nascimbene 2007), **Lomb** (Zhurbenko 2008).

Cr/ Ch/ A.s/ Sax/ pH: 4-5, L: 3-4, X: 3, E: 2-3/ Alt: 2-3/ Mont: vr, SmedD: vr/ PT: 2/ p/ Note: a mainly temperate, inconspicuous lichen, certainly more widespread in northern Italy on steeply inclined faces of man-made substrata (mortar, concrete, etc.), more rarely on calciferous schists; very much overlooked. For

further details see Nordin & al. (2009). The record from Venezia Giulia is from the wall of a private house in the village of S. Lorenzo near Trieste (*vidi sed non legi!*).

Acarospora murorum A. Massal.

Mem. Lichenogr.: 130, 1853.

Syn.: *Acarospora dolophana* (Nyl.) H. Magn., *Acarospora glaucocarpa* var. *distans* Bagl. & Carestia?, *Acarospora macrospora* subsp. *murorum* (A. Massal.) Clauzade & Cl. Roux, *Acarospora macrospora* var. *murorum* (A. Massal.) Anzi, *Acarospora truncata* (A. Massal.) A. Massal., *Biatorella truncata* A. Massal.

N - VG, Frl. Ven (Lazzarin 2000b), **TAA, Lomb, Piem** (Isocrono & al. 2003), **Emil, Lig** (Valcuvia & al. 2000, Watson 2014). **C - Tosc, Umb** (Genovesi & Ravera 2001, Ravera & al. 2006), **Laz** (Roccardi 2003), **Abr** (Nimis & Tretiach 1999), **Mol** (Ravera & Genovesi 2012, Genovesi & Ravera 2014), **S - Si**.

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 4-5, X: 3-4, E: 4/ Alt: 1-3/ Mont: er, SmedD: r, Pad: vr, SmedH: r, MedH: vr/ PT: 2/ Note: a mild-temperate species, most frequent on walls, gravestones, and monuments below the subalpine belt. Related to *A. macrospora*, but with a different ecology and altitudinal distribution. The correct name may prove to be *A. truncata* (A. Massal.) A. Massal.

Acarospora nitrophila H. Magn.

Göteborg. Vetensk.-och Vitter.-Handl., ser. 4, 28, 2: 74, 1924.

Syn.: *Acarospora aequatula* H. Magn., *Acarospora degenerans* H. Magn., *Acarospora inaequalis* H. Magn., *Acarospora muddii* H. Magn., *Acarospora nitrophila* var. *inaequalis* (H. Magn.) Clauzade & Cl. Roux, *Acarospora nitrophila* var. *irrigata* H. Magn., *Acarospora nitrophila* var. *praeruptorum* (H. Magn.) Clauzade & Cl. Roux, *Acarospora nitrophila* var. *pruinosa* H. Magn., *Acarospora nitrophila* var. *tirolensis* (H. Magn.) Clauzade & Cl. Roux, *Acarospora opaca* H. Magn., *Acarospora praeruptorum* H. Magn., *Acarospora praeruptorum* var. *aequatula* (H. Magn.) H. Magn., *Acarospora praeruptorum* var. *koerberi* H. Magn.

N - TAA (Nascimbene 2004), **Lomb, Piem** (Morisi & Sereno 1995, Matteucci & al. 2013, Giordani & al. 2014), **VA** (Piervittori & Isocrono 1999, Isocrono & al. 2008, Favero-Longo & Piervittori 2009, Matteucci & al. 2015c), **Lig, C - Tosc, Marc** (Nimis & Tretiach 1999). **S - Bas** (Nimis & Tretiach 1999), **Si** (Nimis & al. 1996b, Grillo & Caniglia 2004).

Cr/ Ch/ S/ Sax/ pH: 3-4, L: 4-5, X: 3-4, E: 3-4/ Alt: 2-4/ Salp: vr, Mont: vr, SmedD: vr, Pad: er, SmedH: vr/ PT: 1-2/ p, u/ Note: a widespread lichen of steeply inclined to underhanging faces of basic siliceous rocks, usually in species-poor communities, mostly near settlements.

Acarospora nodulosa (Dufour) Hue var. *nodulosa*

Nouv. Arch. Mus. Hist. Nat. Paris, 5 sér., 1: 160, 1909 - *Parmelia nodulosa* Dufour in Fries, Lich. Eur. Ref.: 185, 1831.

Syn.: *Lecanora nodulosa* (Dufour) Colmeiro nom. illegit. non Stirt., *Urceolaria nodulosa* (Dufour) Schaer.

N - Emil (Nimis & al. 1996).

Cr/ Ch/ S/ Sax-Terr/ pH: 3-4, L: 4-5, X: 4-5, E: 1-2/ Alt: 1-2/ SmedD: er/ PT: 1/ subc, paras *Diploschistes diacapsis*/ Note: a xeric subtropical species of weathered gypsum in open habitats, usually below the montane belt. To be looked for in other gypsum outcrops (e.g. in Sicilia).

Acarospora nodulosa var. *reagens* (Zahlbr.) Clauzade & Cl. Roux

Bull. Mus. Hist. Nat. Marseille, 41: 61, 1981 - *Acarospora reagens* Zahlbr., Beih. Bot. Centralblatt, 8: 162, 1902.

Syn.: *Acarospora granatensis* Samp.?, *Acarospora zahlbruckneri* Samp.

N - Emil (Nimis & al. 1996). **S - Cal** (Nimis & Puntillo 2003, Puntillo 2011).

Cr/ Ch/ S/ Sax-Terr/ pH: 3-4, L: 4-5, X: 4-5, E: 1-2/ Alt: 1-2/ SmedD: er, MedD: er/ PT: 1/ subc, paras *Diploschistes diacapsis*/ Note: a xeric subtropical lichen found on gypsum in exposed situations below the montane belt; to be looked for in other gypsum outcrops of southern Italy (e.g. in Sicilia). The type material is from western North America.

Acarospora oligospora (Nyl.) Arnold

Flora, 53: 469, 1870 - *Lecanora oligospora* Nyl., Bot. Not.: 162, 1853.

Syn.: *Acarospora glebosa* (Flot.) Körb.

N - VG (Castello 2002, Martellos & Castello 2004), **Ven, TAA, Lomb, Piem** (Isocrono & Ferrarese 2008), **Emil, C - Tosc, S - Camp** (Aprile & al. 2002), **Bas** (Nimis & Tretiach 1999).

Cr/ Ch/ S/ Sax/ pH: 3-4, L: 4-5, X: 3-4, E: 3-4/ Alt: 1-3/ Mont: er, SmedD: vr, Pad: er, SmedH: vr, MedH: vr/ PT: 1-2/ p/ Note: a holarctic-temperate species found on basic siliceous rocks (e.g. calciferous sandstone and schist), usually on pebbles, but also on walls, roofing tiles, etc., below the subalpine belt; probably overlooked in Italy, but certainly not common.

Acarospora peliscypha Th. Fr.

N. Acta Reg. Soc. Sci. Upsal., ser. 3, 3: 189, 1860.

Syn.: *Acarospora chalcophila* H. Magn., *Acarospora fuscata* var. *peliscypha* (Th. Fr.) Nyl., *Acarospora montana* H. Magn., *Acarospora nitrophila* var. *chalcophila* (H. Magn.) Clauzade & Cl. Roux, *Acarospora rugulosa* Körb.?

N - TAA, Lomb, Piem (Matteucci & al. 2015b), **VA** (Piervittori & Isocrono 1999, Matteucci & Vanacore Falco 2015). **C - Sar.**

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4-5, X: 3-4, E: 4-5/ Alt: 3-5/ Alp: vr, Salp: r, Orom: er, Mont: er/ PT: 1/ m/ Note: an arctic-alpine to boreal-montane, probably circumpolar species found on siliceous, often iron-rich substrata, on exposed birds' perching rocks (e.g. windy ridges, isolated boulders), with optimum near or above treeline. See also note on *A. bullata*.

Acarospora placodiiformis H. Magn.

Göteb. K. Vetensk. Samh. Handl., Ser. B, Math. Naturv. Skr., 6, 17: 18, 1956.

N - Emil (Nimis & al. 1996).

Cr.pl/ Ch/ S/ Sax-Terr/ pH: 4-5, L: 4-5, X: 4-5, E: 1-2/ Alt: 1-2/ SmedD: er, MedD: er/ PT: 1/ subc, paras *Diploschistes*/ Note: a xeric subtropical species found on weathered gypsum in open situations, mostly below the montane belt. To be looked for in gypsum outcrops of southern Italy (e.g. in Sicilia).

Acarospora rosulata (Th. Fr.) H. Magn.

Göteb. Vetensk.-och Vitter.-Handl., ser. 4, 28, 2: 121, 1924 - *Acarospora discreta* f. *rosulata* Th. Fr., Lichenogr. Scand., 1, 1: 218, 1871.

N - Lomb (Anzi, Lich. Lang. 532: S-L29559).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 3-4, X: 3-4, E: 2-3/ Alt: 3-5/ Alp: er, Salp: er, Mont: er/ PT: 1/ subc/ Note: this species, described from Norway where it is rare, is known from western North America, Asia (Mongolia) and the French Alps. It grows on sun-exposed siliceous rocks, with optimum in dry, subcontinental areas, near or above treeline.

Acarospora schleicheri (Ach.) A. Massal.

Ric. Auton. Lich. Crost.: 27, 1852 - *Urceolaria schleicheri* Ach., Lichenogr. Univ.: 332, 1810.

Syn.: *Acarospora transtagatana* (Harm.) Hue, *Lecanora transtagatana* Welw.

C - Sar. S - Cal (Puntillo & Puntillo 2004), **Si** (Otonello & al. 1994).

Cr/ Ch/ S/ Terr/ pH: 3, L: 4, X: 4-5, E: 1-2/ Alt: 1-2/ SmedD: er, MedH: er, MedD: vr/ PT: 1/ subc, paras *Diploschistes neutrophilus*/ Note: a xeric subtropical species found on subneutral clay soil, decalcified ground over calcareous substrata, and weathered gypsum in open dry grasslands, common only in dry-continental areas, with optimum below the montane belt. To be looked for in dry-warm Alpine valleys.

Acarospora scotica Hue

Nouv. Arch. Mus. Hist. Nat., Paris, 5, sér. 1: 147, 1909.

N - Lomb (S-F99329, De Vita & Valcuvia 2004), **Piem** (Valcuvia 2002, 2002b), **Emil** (TSB 35572). **C - Tosc, Laz, Sar** (Rizzi & al. 2011, Giordani & al. 2013).

Cr/ Ch/ S/ Sax/ pH: 1-3, L: 4-5, X: 3-4, E: 2-3/ Alt: 1-3/ SmedD: er, SmedH: er, MedH: er, MedD: vr/ PT: 1/ Note: a probably Mediterranean-Atlantic species of siliceous rocks wetted by rain, reaching the montane belt in dry-continental areas (e.g. in the Alps).

Acarospora similis H. Magn.

K. Svenska Vetensk.-Akad. Handl., ser. 3, 7, 4: 175, 1929.

N - TAA (B-8504 Leg. H. Sipman).

Cr/ Ch/ S/ Lign/ pH: 1-3, L: 3-4, X: 3-4, E: 2-4/ Alt: 2-4/ Salp: vr, Mont: vr, SmedD: vr/ PT: 2-3/ #/ Note: a lignicolous species, often found on woody roofing tiles; the Italian material was collected on a horizontal wood fence in a vineyard near Merano, at c. 500 m

Acarospora sinopica (Wahlenb.) Körb.

Syst. Lich. Germ.: 156, 1855 - *Endocarpon sinopicum* Wahlenb. in Ach., Meth. Lich. Suppl.: 30, 1803.\

Syn.: *Acarospora sinopica* var. *ferruginea* Körb., *Acarospora smaragdula* var. *sinopica* (Wahlenb.) A. Massal., *Polysporinopsis sinopica* (Wahlenb.) Vězda, *Zeora sinopica* (Wahlenb.) Flot.

N - Frl (Tretiach & Hafellner 2000), **TAA, Lomb** (Dalle Vedove & al. 2004, Nascimbene 2006), **Piem** (Isocrono & al. 2003, 2004, 2006, Isocrono & Piervittori 2008), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Piervittori & al. 2001, Matteucci & al. 2015c). **C - Tosc** (Giordani & al. 2009).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 3-5, X: 3-4, E: 1/ Alt: 2-5/ Alp: er, Salp: vr, Mont: vr, SmedD: er/ PT: 1-2/ m/ Note: a probably holarctic species of iron-rich rocks and mine-spoil heaps in exposed situations. Widespread, but local, throughout the Alps; also reported from the northern Apennines.

Acarospora sphaerospora H. Magn.

Svensk Bot. Tidskr., 18: 338, 1924.

Syn.: *Acarospora firmiensis* B. de Lesd.

C - Sar.

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4, X: 3-4, E: 2-3/ Alt: 1-2/ SmedH: vr, MedH: vr/ PT: 1/ paras *Aspicilia cupreoglauca*?/ Note: on basic siliceous rocks wetted by rain, mostly below the montane belt, perhaps a parasite of *Aspicilia*, at least when young. Described from Southern France, and known from a few localities in the Mediterranean area.

Acarospora subrufula (Nyl.) H. Olivier

Exp. Syst. Descr. Lich. Ouest Fr., 2: 21, 1900 - *Lecanora subrufula* Nyl., Flora, 62: 355, 1879.

C - Sar.

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 4-5, X: 3-4, E: 2-3/ Alt: 1/ MedH: er/ PT: 1/ oc, coast/ Note: on hard siliceous rocks, especially granite, near the coast. A Mediterranean-Atlantic European species, reported from a few localities, from the British Isles to Portugal, and also known from the Aegean Islands.

Acarospora sulphurata var. ***rubescens*** Buschardt

in Leuckert & Buschardt, Nova Hedwigia, 30: 802, 1978.

N - TAA.

Cr.pl/ Ch/ S/ Sax/ pH: 3, L: 5, X: 4-5, E: 1-3/ Alt: 2-3/ Mont: er, SmedD: er/ PT: 1/ subc, #/ Note: perhaps this is just a chemical strain, hitherto known only from the Alps, which deserves further study.

Acarospora sulphurata (Arnold) Arnold var. ***sulphurata***

Verh. zool.-bot. Ges. Wien, 36: 63, 1886 - *Acarospora heufleriana* v. *sulphurata* Arnold, Verh. zool.-bot. Ges. Wien, 22: 290, 1872.

N - TAA, Piem (Isocrono & al. 2003), **VA** (Piervittori & Isocrono 1999). **S - Camp** (Aprile & al. 2002), **Cal** (Puntillo 1996), **Si** (Grillo & Caniglia 2004).

Cr.pl/ Ch/ S/ Sax/ pH: 3, L: 4-5, X: 4-5, E: 1-2/ Alt: 1-3/ Mont: vr, SmedD: vr, SmedH: er, MedH: er, MedD: vr/ PT: 1/ subc/ Note: a species of dry-continental areas found on basic siliceous rocks, often on steeply inclined to underhanging surfaces near the ground, in dry grasslands, both in dry Mediterranean areas and in continental Alpine valleys below the subalpine belt.

Acarospora tominiana H. Magn.

K. Svenska Vetensk.-Akad. Handl., ser. 3, 7, 4: 216, 1929.

C - Sar.

Cr.pl/ Ch/ S/ Sax/ pH: 4-5, L: 5, X: 5, E: 3/ Alt: 2/ SmedD: er/ PT: 1/ subc, paras *Aspicilia* spp./ Note: a xeric subtropical species described from Central Asia, only known from a single station in Italy, on limestone in a very sunny and dry situation. The Italian record - the only one from Europe - needs reconfirmation.

Acarospora tongletii (Hue) Hue

in Tonglet, Bull. Soc. R. Bot. Belg., 37: 29, 30, 1898 - *Lecanora tongletii* Hue, Bull. Soc. Bot. France, 64: 427, 1897.

Syn.: *Acarospora paupera* H. Magn., *Acarospora rehmi* H. Magn., *Acarospora tongletii* f. *rehmi* (H. Magn.) Clauzade & Cl. Roux, *Acarospora tongletii* f. *variegata* (H. Magn.) Clauzade & Cl. Roux, *Acarospora tongletii* var. *paupera* (H. Magn.) Clauzade & Cl. Roux, *Acarospora variegata* H. Magn.

N - VG, Lig.

Cr/ Ch/ S/ Sax/ pH: 3-4, L: 4, X: 4, E: 3-4/ Alt: 2-4/ Salp: er, Mont: vr, SmedD: vr, Pad: er, SmedH: vr/ PT: 2/ Note: a temperate to boreal-montane, probably circumpolar species, in Italy most frequent on base-rich sandstone walls, but much overlooked.

Acarospora trachytica Jatta

N. Giorn. Bot. Ital., 14: 127, 1882.

S - Camp (Ricciardi & al. 2000, Knudsen & Nordin 2015).

Cr/ Ch/ S/ Sax/ pH: 3-4, L: 4-5, X: 3-4, E: 3-4/ Alt: 1-2/ SmedH: er, MedH: er, MedD: vr/ PT: 1-2/ Note: the lectotype in UPS is on light trachyte pigmented with a red mineral, and the second syntype is on calcareous tufa (Jatta 1882). The species is currently known only from coastal Italy in the region of Naples. For a detailed description of this long-forgotten, but well-distinct species see Knudsen & Nordin (2015).

Acarospora umblicata Bagl.

Mem. R. Acc. Sc. Torino, ser. 2, 17: 397, 1857.

Syn.: *Acarospora percaenoides* (Nyl.) Flagey, *Acarospora rufidulocinerea* Hue, *Acarospora vesuviana* Licop., *Acarospora vulcanica* Jatta, *Heppia cavalierii* Werner, *Lecanora percaenoides* Nyl.

N - VG, TAA, Piem, VA (Piervittori & Isocrono 1999), **Lig** (Roccardi 2006). **C - Tosc, Umb** (Genovesi 2003b, 2011, Ravera & al. 2006), **Laz** (Bartoli 1997b, Genovesi & al. 2011), **Mol** (Garofalo & al. 1999, Caporale & al. 2008), **Sar** (Rizzi & al. 2011, Giordani & al. 2013). **S - Camp** (Garofalo & al. 1999, Ricciardi & al. 2000, Aprile & al. 2002, Nimis & Tretiach 2004), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1996b, Ottonello & Puntillo 1995, Ottonello & Romano 1997, Grillo 1998, Grillo & Caniglia 2004, Ottonello & al. 2011).

Cr/ Ch/ S/ Sax/ pH: 3-4, L: 4-5, X: 3-4, E: 3-4/ Alt: 1-3/ Mont: er, SmedD: r, Pad: er, SmedH: c, MedH: rc, MedD: vr/ PT: 1-2/ Note: a mild-temperate, mainly Mediterranean-Atlantic lichen found on steeply inclined, sunny faces of basic siliceous substrata, on roofing tiles and brick. Most common in Tyrrhenian Italy (e.g. on monuments and walls around Rome), below the montane belt.

Acarospora veronensis A. Massal.

Ric. Auton. Lich. Crost.: 29, 1852.

Syn.: *Acarospora africana* B. de Lesd., *Acarospora silicicola* B. de Lesd., *Acarospora smaragdula* var. *veronensis* (A. Massal.) Anzi

N - VG (Castello 2002, Martellos & Castello 2004), **Frl, Ven** (Lazzarin 2000b), **TAA, Lomb, Piem** (Favero-Longo & al. 2015), **VA** (Piervittori & Isocrono 1999, Matteucci & al. 2015c), **Emil** (S-F104428), **Lig, C - Tosc, Umb** (Genovesi & Ravera 2001, Ravera & al. 2006, 2011, Genovesi 2011), **Laz** (Genovesi & al. 2011), **Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **Sar** (Rizzi & al. 2011, Cossu & al. 2015), **S - Camp** (Nimis & Tretiach 2004), **Pugl** (Nimis & Tretiach 1999), **Si** (Ottonello & Salone 1994, Grillo & Caniglia 2004).

Cr/ Ch/ S/ Sax/ pH: 3-4, L: 4-5, X: 3-4, E: 3-4/ Alt: 1-5/ Alp: er, Salp: vr, Orom: er, Mont: vr, SmedD: r, Pad: er, SmedH: rr, MedH: rr, MedD: er/ PT: 1-2/ p/ Note: a holarctic early coloniser of base- rich siliceous pebbles, roofing tiles, walls, sometimes also found on soil and lignum, also in small settlements: occasionally overgrowing other crustose lichens, with a wide altitudinal range.

Acarospora versicolor Bagl. & Carestia

Comm. Soc. Critt. Ital., 1, 5: 440, 1864.

Syn.: *Acarospora cineracea* (Nyl.) Hue, *Acarospora miskolensis* H. Magn.

N - TAA, Lomb (Nascimbene 2006), **Piem** (Isocrono & al. 2003), **Lig, C - Sar** (Knudsen & al. 2015), **S - Camp** (Jatta 1909-1911), **Pugl** (Jatta 1909-1911), **Si** (Grillo 1998, Poli & al. 1998).

Cr/ Ch/ S/ Sax/ pH: 3, L: 4-5, X: 4-5, E: 3-4/ Alt: 1-3/ Mont: er, SmedD: vr, SmedH: er, MedH: vr, MedD: r/ PT: 1/ subc/ Note: on basic siliceous rocks, also on walls in Alpine villages, and on thin soil layers, probably more widespread in dry-warm Alpine valleys below the montane belt. For further details see Knudsen & al. (2015).

Acolium (Ach.) Gray

Nat. Arr. Brit. Pl. I: 482, 1821 - *Calicium* subdiv. *Acolium* Ach., K. Vetensk-Acad. Nya Handl., 29: 277, 1808.

One of the consequences of the multigene phylogeny of the Physciaceae-Caliciaceae clade by Prieto & Wedin (2016) was the resurrection of the genus *Acolium*, a small group of *c.* 5 species formerly included in *Cyphelium*, which mainly grow on bark or wood. *Acolium* is characterised by a dark excipulum that is strongly thickened at the base, a distinct grey-brown thallus (absent in lichenicolous species), sessile to somewhat immersed ascomata, and often a grey pruina on the rim of the excipulum. A synopsis of the species occurring in Italy was published by Puntillo & Puntillo (2009). Type: *Acolium inquinans* (Sm.) A. Massal.

Acolium inquinans (Sm.) A. Massal.

Mem. Lichenogr.: 150, 1853 - *Lichen inquinans* Sm. in Smith & Sowerby, Engl. Bot., 12: 810, 1801.

Syn.: *Acolium neesii* (Flot.) Körb., *Acolium tympanellum* (Ach.) Gray, *Calicium cembrinum* Ach., *Calicium neesii* Flot., *Calicium tympanellum* Ach., *Cyphelium cembrinum* (Ach.) Ach., *Cyphelium inquinans* (Sm.) Trevis., *Cyphelium inquinans* f. *ollare* Trevis., *Cyphelium neesii* (Flot.) Trevis., *Cyphelium ollare* Ach., *Cyphelium pileatum* Ach., *Cyphelium subsimile* (Nyl.) Trevis., *Cyphelium tympanellum* (Ach.) Ach.

N - Ven (Puntillo & Puntillo 2009, Watson 2014), **TAA** (Nascimbene & Caniglia 2002c, Nascimbene & al. 2006e, 2007b, 2008c, 2009, 2010, Puntillo & Puntillo 2009, Nascimbene 2014, Nascimbene & Marini 2015, Nimis & al. 2015), **Lomb** (Nascimbene & al. 2006e, Valcuvia & Truzzi 2007b, Puntillo & Puntillo 2009), **Piem** (Isocrono & al. 2004, Puntillo & Puntillo 2009), **Emil** (Brunialti & al. 2001), **C - Tosc** (Puntillo & Puntillo 2009), **Sar** (Rizzi & al. 2011), **S - Bas** (Puntillo & Puntillo 2009, Puntillo & al. 2012), **Cal** (Puntillo 1994, Lich. Graec. 46: Obermayer 1996, Puntillo 1996, Vězda Lich. Rar. Exs. 328, Puntillo & Puntillo 2009).

Cr/ Ch/ S/ Epiph-Lign/ pH: 1-2, L: 3, X: 3, E: 1/ Alt: 2-4/ Salp: er, Mont: vr, SmedD: er, SmedH: er/ PT: 1/ Note: a temperate to southern boreal-montane, circumpolar lichen found on old conifer stumps, more rarely on lignum of broad-leaved deciduous trees (especially *Quercus* and *Castanea*), and on wooden fence-posts, with optimum in upland areas. It is included in the Italian red list of epiphytic lichens as “Vulnerable” (Nascimbene & al. 2013c).

Acolium karelicum (Vain.) M. Prieto & Wedin

Fungal Divers., 2016 (MB 817532) - *Cyphelium lucidum* var. *karelicum* Vain., Acta Soc. Fauna Fl. Fenn., 57, 1: 20, 1927.

Syn.: *Cyphelium karelicum* (Vain.) Räsänen

N - TAA (Thor & Nascimbene 2007, Nascimbene & al. 2008c, 2009, 2010, Nimis & al. 2015), **S - Bas** (Puntillo & Puntillo 2009, Puntillo & al. 2012), **Cal** (Puntillo 1994, 1996, Puntillo & Puntillo 2009).

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 3, X: 2, E: 1/ Alt: 3/ Mont: vr/ PT: 0/ suboc/ Note: a mainly cool-temperate to southern boreal-montane lichen found on ancient boles of conifers in semi-natural montane forests, often on basal parts of trunks, mostly on old *Abies*, much more rarely on lignum; to be looked for further in the Alps. It is included in the Italian red list of epiphytic lichens as “Endangered” (Nascimbene & al. 2013c).

Acolium marcianum (B. de Lesd.) M. Prieto & Wedin

Fungal Divers., 2016 (MB 817533) - *Cyphelium marcianum* B. de Lesd., Bull. Soc. Bot. France, 55: 420, 1908.

N - Lig (Puntillo & Puntillo 2009, Brackel 2016), **C - Tosc** (Loppi & al. 1997c, Tretiach & al. 2008, Puntillo & Puntillo 2009, Brackel 2016), **Sar** (Puntillo & Puntillo 2009, Brackel 2016).

Cr/ Ch/ S/ Sax/ pH: 3, L: 3-4, X: 2, E: 1-2/ Alt: 1-2/ SmedH: er, MedH: er/ PT: 1/ suboc, paras *Pertusaria* spp./ Note: a rare lichen growing on silicolous *Pertusaria*-species, especially. *P. microstictica*, to be looked for further in other parts of Tyrrhenian Italy.

Acolium sessile (Pers.) Arnold

Flora, 68: 49, 1885 - *Calicium sessile* Pers., Tent. Disp. Meth. Fung., Suppl.: 59, 1797.

Syn.: *Cyphelium sessile* (Pers.) Trevis

N - **Lomb** (Puntillo & Puntillo 2009, Brackel 2016), **Emil** (Puntillo & Puntillo 2009, Brackel 2016), **Lig** (Brunialti & al. 2001, Brackel 2016). **C** - **Tosc** (Puntillo & Puntillo 2009, Brackel 2016), **Umb** (Ravera 2000, Ravera & al. 2006, Brackel 2016), **Abr** (Corona & al. 2016, Brackel 2016). **S** - **Pugl** (Thüs & Licht 2006, Brackel 2016), **Cal** (Puntillo 1994, 1996, Puntillo & Puntillo 2009, Brackel & Puntillo 2016, Brackel 2016).

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 3, X: 2, E: 1/ Alt: 2/ SmedD: er, SmedH: er/ PT: 0/ suboc, paras *Pertusaria* spp./ Note: a species with a grey thallus forming insular patches on the thalli of epiphytic *Pertusaria*-species (especially *P. pertusa*, *P. coccodes* and *P. coronata*), found on very old oaks; also known from North America, it is most common in western Europe: records from the Alps have a fairly different ecology and conspecificity is therefore in need of confirmation.

Acrocordia A. Massal.

Geneac. Lich.: 17, 1874.

A small, well-characterised genus of c. 10 tropical to temperate lichens, occurring both on rock and bark, usually in humid-shaded situations. The genus belongs to the Monoblastidiales, a small order with a single family of chiefly tropical pyrenocarpous lichens (Dothideomycetes), with the highest diversity in tropical rain forests and periodically dry ecosystems of South America. Type: *A. conoidea* (Fr.) Körb.

Acrocordia cavata (Ach.) R.C. Harris

in Vězda, Sched. ad Lich. Sel. Exs., 50: 2 (nr. 1229), 1974 - *Verrucaria cavata* Ach., Syn. Meth. Lich.: 91, 1814.

Syn.: *Arthopyrenia cavata* (Ach.) R.C. Harris

N - **Frl**, **TAA** (Thor & Nascimbene 2007, Nimis & al. 2015). **C** - **Umb** (Ravera 1998, Ravera & al. 2006), **Laz** (Ravera 2001, Stofer 2006), **Sar** (Zedda 2002, 2002b). **S** - **Pugl** (Nimis & Tretiach 1999), **Bas** (Puntillo & al. 2012), **Cal** (Puntillo 1995, 1996).

Cr/ Tr/ S/ Epiph/ pH: 2-3, L: 2-3, X: 2, E: 1/ Alt: 1-3/ Mont: r, SmedD: er, SmedH: vr, MedH: er/ PT: 0/ suboc/ Note: a mild-temperate, incompletely holarctic species of smooth bark in humid deciduous forests. Rare throughout the country, but most frequent in Tyrrhenian Italy.

Acrocordia conoidea (Fr.) Körb. var. *conoidea*

Syst. Lich. Germ.: 358, 1855 - *Verrucaria conoidea* Fr., Lichenogr. Eur. Ref.: 432, 1831.

Syn.: *Acrocordia epipolaea* (Borrer) A.L. Sm., *Acrocordia garovaglii* A. Massal., *Acrocordia garovaglii* f. *cuprea* A. Massal., *Acrocordia ligustica* A. Massal., *Acrocordia ligustica* var. *purpurascens* Jatta, *Arthopyrenia conoidea* (Fr.) Zahlbr., *Arthopyrenia epipolaea* (Borrer) A. Massal., *Arthopyrenia ligustica* (A. Massal.) Zahlbr., *Leiophloea conoidea* (Fr.) Trevis., *Leiophloea ligustica* (A. Massal.) Trevis., *Verrucaria conoidea* var. *atrata* Garov., *Verrucaria conoidea* var. *subsquamacea* Garov., *Verrucaria conoidea* var. *titanophila* Garov., *Verrucaria conoidea* var. *vulgaris* Garov.

N - **VG** (Nimis & Tretiach 1995, Tretiach & Pecchiari 1995, Geletti 1997, Pinna & al. 1998, Tretiach & Modenesi 1999, Crisafulli & al. 2006, Piervittori & al. 2006, Bertuzzi & al. 2007, Tretiach & al. 2007b, 2008b, 2010, 2012, Favero-Longo & al. 2011), **Frl** (Breuss 2008, Tretiach 2015), **Ven**, **TAA**, **Lomb** (Lazzarin 2000b), **Emil**, **Piem** (Isocrono & al. 2003), **VA** (Piervittori & Isocrono 1999), **Lig** (Lazzarin 2000b, Watson 2014). **C** - **Tosc** (Benespero 2006, Tretiach & al. 2008), **Marc** (Nimis & Tretiach 1999), **Umb** (Genovesi & Ravera 2001, Ravera & al. 2006, Panfili 2007), **Laz** (Nimis & Tretiach 2004), **Abr** (Nimis & Tretiach 1999, Tretiach & Modenesi 1999), **Mol** (Garofalo & al. 1999, Nimis & Tretiach, 1999, 2004, Caporale & al. 2008, Genovesi & Ravera 2014), **Sar** (Zedda 2002). **S** - **Camp** (Garofalo & al. 1999, 2010, Aprile & al. 2003, 2003b, Nimis & Tretiach 2004, Catalano & al. 2016), **Pugl** (Garofalo & al. 1999, Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999, Potenza 2006), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994, Ottonello & al. 1994, Caniglia & Grillo 2005, 2006).

Cr.end/ Tr/ S/ Sax/ pH: 4-5, L: 1-2, X: 1-2, E: 1/ Alt: 1-4/ Salp: er, Orom: vr, Mont: rr, SmedD: c, SmedH: vc, MedH: rc, MedD: vr/ PT: 1/ u/ Note: a mild-temperate species of compact limestone and dolomite, mostly in woodlands, on sheltered faces seldom wetted by rain, with optimum in submediterranean areas, but reaching near treeline in the Apennines. The forma *carnea* Arnold, with pale perithecia, has been reported from the Julian Pre-Alps (Tretiach 2015).

Acrocordia conoidea var. *glacialis* (Bagl. & Carestia) Vězda

Lich. Sel. Exs., 59: 9, 1977 - *Acrocordia glacialis* Bagl. & Carestia, Comm. Soc. Critt. Ital., 2, 2: 421, 1867.

Syn.: *Verrucaria glacialis* (Bagl. & Carestia) Stizenb.

N - **VA**.

Cr.end/ Tr/ S/ Sax/ pH: 4-5, L: 1-2, X: 1-2, E: 1/ Alt: 4-5/ Alp: er, Salp: er/ PT: 1/ u, #/ Note: a taxon characterised by the small spores; only known from the type locality in the Italian Alps, where it was found on fissures of marble.

Acrocordia gemmata (Ach.) A. Massal. var. ***gemmata***

Geneac. Lich.: 17, 1854 - *Lichen gemmatus* Ach., Lichenogr. Suec. Prodr.: 17, 1799.

Syn.: *Acrocordia alba* (Schrad.) B. de Lesd., *Acrocordia gemmata* var. *rubescens* Jatta, *Acrocordia sphaeroides* auct. non (Wallr.) Arnold, *Arthopyrenia alba* (Schrad.) Zahlbr., *Arthopyrenia gemmata* (Ach.) A. Massal., *Arthopyrenia sphaeroides* auct. non (Wallr.) Zahlbr., *Arthopyrenia tersa* auct., *Leiophloea gemmata* var. *glauca* (Körb.) Trevis., *Leiophloea tersa* (Kremp.) Trevis., *Melanopsamma petrucciana* (Caldesi & De Not.) Sacc., *Sphaeria petrucciana* Caldesi & De Not., *Verrucaria gemmata* (Ach.) Ach., *Verrucaria gemmata* var. *cinerea* Garov., *Verrucaria gemmata* var. *minor* Garov.

N - VG (Tretiach & Carvalho 1995, Carvalho 1997), **Frl, Ven** (Lazzarin 2000b, Nascimbene & al. 2005b, Nascimbene & Marini 2010), **TAA** (Nascimbene & al. 2007b, Nimis & al. 2015), **Lomb, Piem** (Matteucci & al. 2013), **Emil** (Nimis & al. 1996, Salles 2003, Benesperi 2009), **Lig** (Brunialti & al. 1999, Giordani & Incerti 2008). **C - Tosc** (Tretiach & Nimis 1994, Loppi & Putortì 1995, Loppi & al. 1995, 1996b, 1997, 1998, 1998b, 2002c, 2003, Loppi 1996, Loppi & De Dominicis 1996, Putortì & al. 1998, Bacci & al. 2000, Loppi & Frati 2006, Benesperi & al. 2007, Paoli & Loppi 2008, Loppi & Nascimbene 2010, Benesperi 2011, Brunialti & al. 2012b), **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera 1998, Ravera & al. 2006), **Laz** (Bartoli & al. 1997, Massari & Ravera 2002), **Abr** (Nimis & Tretiach 1999, Caporale & al. 2016, Corona & al. 2016), **Mol** (Ravera & Genovesi 2010, Ravera & al. 2010, Paoli & al. 2015), **Sar** (Zedda 1995, 2002b, Zedda & al. 2001, Rizzi & al. 2011). **S - Camp** (Aprile & al. 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010, Blasi & al. 2010, Brunialti & al. 2013, Ravera & Brunialti 2013, Catalano & al. 2016), **Pugl** (Nimis & Tretiach 1999, Durini & Medagli 2004), **Bas** (Bartoli & Puntillo 1998, Nimis & Tretiach 1999, Potenza 2006, Potenza & al. 2010), **Cal** (Puntillo 1996, Sérusiaux 1998, Puntillo & Puntillo 2004, 2012, Incerti & Nimis 2006, Stofer 2006), **Si** (Nimis & al. 1994).

Cr/ Tr/ S/ Epiph/ pH: 2-3, L: 2-3, X: 2, E: 1/ Alt: 1-3/ Mont: vr, SmedD: r, SmedH: rr, MedH: vr/ PT: 1/ suboc/ Note: a mild-temperate lichen found on the rough bark of mature broad-leaved trees (both deciduous and evergreen) in open woodlands, with optimum in the submediterranean belt; almost extinct in the lowlands of the North. The recently-described var. *rhododendri* Hinter. should be looked for in the subalpine belt of the Alps.

Acrocordia macrospora A. Massal.

Symmicta Lich.: 82, 1855.

Syn.: *Acrocordia conoidea* var. *macrospora* (A. Massal.) B. de Lesd.

N - VG, Ven, Lomb, Lig (Lazzarin 2000b). **C - Tosc, Laz** (TSB 17641), **Sar** (Rizzi & al. 2011). **S - Camp** (Aprile & al. 2002, Catalano & al. 2016), **Pugl, Cal** (Puntillo 1996, Sérusiaux 1998), **Si**.

Cr/ Tr/ S/ Sax/ pH: 3-4, L: 1-2, X: 1-2, E: 1/ Alt: 1-2/ SmedD: er, SmedH: er, MedH: vr/ PT: 1/ suboc/ Note: an apparently Mediterranean-Atlantic, mild-temperate species ranging from Macaronesia to Norway, found on base-rich or weakly calciferous siliceous rocks in sheltered situations below the montane belt. Certainly rare in Italy.

Acrocordia salweyi (Nyl.) A.L. Sm.

Monogr. Brit. Lich., 2: 315, 1911 - *Verrucaria salweyi* Nyl., Act. Soc. linn. Bordeaux, 21: 435, 1856.

Syn.: *Arthopyrenia salweyi* (Nyl.) Zahlbr., *Leiophloea salweyi* (Nyl.) Trevis.

N - TAA (Nascimbene 2008b), **Lig** (Giordani & al. 2016). **C - Tosc, S - Camp** (Aprile & al. 2003b), **Cal** (Puntillo 1996), **Si** (Otonello & Salone 1994).

Cr/ Tr/ S/ Sax/ pH: 5, L: 2-3, X: 2, E: 1-2/ Alt: 1-2/ SmedD: er, SmedH: vr, MedH: vr/ PT: 1-2/ suboc/ Note: an apparently Mediterranean-Atlantic, mild-temperate species ranging from Macaronesia to Norway, but also known from central Europe, found on soft calcareous substrata (mortar, calciferous sandstone) in warm-humid areas below the montane belt. Mostly Tyrrhenian in Italy, but also reported from the Alps.

Adelolecia Hertel & Hafellner
in Hafellner, Beih. Nova Hedwigia, 79: 260, 1984.

A small genus of 4 species segregated from *Lecidea s.lat.* and presently included into the Ramalinaceae. The three species occurring in Italy grow on acid substrata (siliceous rocks or bark) in upland areas. For further information see Hertel & Rambold (1995). Type: *A. pilati* (Hepp) Hertel & Hafellner

Adelolecia kolaensis (Nyl.) Hertel & Rambold

Bibl. Lichenol., 57: 214, 1995 - *Lecidea kolaensis* Nyl., Flora, 46: 306, 1863.

Syn.: *Catillaria tavastiana* H. Magn., *Lecidea conferenda* Nyl., *Lecidea dolosula* (Nyl.) Vain., *Lecidea migratoria* Lyngé, *Lecidea umbratilis* (Arnold) Th. Fr., *Lecidella umbratilis* Arnold

N - TAA (Hertel & Rambold 1995), **Piem** (Isocrono & al. 2003), **VA** (Piervittori & Isocrono 1997, 1999, Piervittori & al. 2004, Isocrono & al. 2008, Favero-Longo & Piervittori 2009).

Cr/ Ch/ S/ Sax/ pH: 2-4, L: 3-4, X: 3-4, E: 1/ Alt: 4-5/ Alp: r, Salp: rr/ PT: 1/ u/ Note: an arctic-alpine, probably circumpolar species of basic to weakly calciferous siliceous rocks in exposed situations, with optimum above treeline. For further details see Hertel & Rambold (1995). Earlier records of *Lecidea conferenda* from Liguria, Toscana and Sardegna (see Nimis 1993: 380), being dubious, are not accepted here.

Adelolecia pilati (Hepp) Hertel & Hafellner

in Hafellner, Beih. Nova Hedwigia, 79: 260, 1984 - *Biatora pilati* Hepp, Flecht. Eur.: nr. 261, 1857.

Syn.: *Buellia modicula* (Nyl.) Dalla Torre & Sarnth., *Lecidea auriculata* var. *hardangeriana* Vain., *Lecidea chrysotheicha* Nyl., *Lecidea lyngeana* Zahlbr., *Lecidea modicula* Nyl., *Lecidea pilati* (Hepp) Körb., *Lecidea proludens* Nyl., *Lecidea subauriculata* Lynge nom. illegit. non B. de Lesd., *Lecidea tirolica* Vain., *Lecidella botryosa* Hepp ex Arnold, *Lecidella proludens* (Nyl.) Arnold

N - Frl (Tretiac & Hafellner 2000), **Ven, TAA** (Arnold Lich. Exs. 805b, type of *L. tirolica*: Hertel & Rambold 1995, Caniglia & al. 2002, Hafellner 2006), **Lomb** (Hertel & Rambold 1995), **Piem** (Isocrono & al. 2003), **VA** (Piervittori & Isocrono 1999), **Lig** (TSB 33433). **C - Tosc. S - Cal** (Hertel & Rambold 1995, Puntillo 1996).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 3-4, X: 3-4, E: 1/ Alt: 3-6/ Alp: rr, Salp: r, Orom: vr, Mont: er/ PT: 1/ u, m/ Note: an arctic-alpine, circumpolar species of steeply inclined to underhanging surfaces of weathered, metal-rich metamorphic rocks seldom wetted by rain, from the subalpine to the nival belt; widespread in the Alps and also occurring in the high Mediterranean mountains. For further details see Hertel & Rambold (1995).

Adelolecia rhododendrina (Nyl.) Hafellner & Türk

Printzen ex Hafellner & Türk, Stapfia, 76: 149, 2001 - *Lecidea rhododendrina* Nyl., Flora, 54: 308, 1876.

N - Frl (Hinteregger 1994, Austria, near the border).

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 3-4, X: 3, E: 1-2/ Alt: 3-4/ Salp: r, Mont: vr/ PT: 1/ Note: on twigs of subalpine shrubs, especially *Rhododendron ferrugineum*. Probably more widespread in the Alps.

Agonimia Zahlbr.

Österr. bot. Z., 59: 351, 1909.

This is one of the few genera in the Verrucariaceae having dark-pigmented perithecia with multilayered walls, lacking an involucrellum, and with colourless muriform ascospores. It includes a dozen species that grow in shaded, moist places as epiphytes, or on mosses at the base of trees, on roots, rocks and various types of soil or plant debris (see e.g. Hafellner 2014b). The genus is poorly known in Italy: *A. vouauxii* (B. de Lesd.) M. Brand & Diederich, known from neighbouring countries, should be looked for in the Alps. Good descriptions and a key to the British species are in Orange (2013b). Type: *A. tristicula* (Nyl.) Zahlbr.

Agonimia allobata (Stizenb.) P. James

in Coppins & al., Lichenologist, 24: 366, 1992 - *Verrucaria allobata* Stizenb., Ber. naturw. Ges. St. Gallen: 501, 1882 (1880-1881).

Syn.: *Amphoroblastia allobata* (Stizenb.) Servít, *Polyblastia allobata* (Stizenb.) Zschacke

N - VG (Tretiac & Carvalho 1993, Carvalho 1997), **Ven** (Nascimbene 2008, Nascimbene & al. 2008e, 2012, 2015, Muggia & al. 2009, 2010, Nascimbene & Marini 2010), **Emil** (Nimis & al. 1996). **S - Camp** (Ravera & Brunialti 2013).

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 2-3, X: 2, E: 1-2/ Alt: 2/ SmedD: vr, SmedH: vr/ PT: 0/ suboc/ Note: a mild-temperate species with subtropical affinities found on ancient deciduous trees, in crevices or amongst mosses, often at the base of trunks, in undisturbed forests or in deep gorges of the submediterranean belt; to be looked for further in Tyrrhenian Italy. The species is included in the Italian red list of epiphytic lichens as "Vulnerable" (Nascimbene & al. 2013c).

Agonimia gelatinosa (Ach.) M. Brand & Diederich

in Sérusiaux & al., Lejeunia, 162: 6, 1999 - *Verrucaria gelatinosa* Ach., Lichenogr. Univ.: 283, 1810.

Syn.: *Endocarpon gelatinosum* (Ach.) Müll. Arg., *Polyblastia gelatinosa* (Ach.) Th. Fr., *Verrucaria nigrata* Nyl., *Polyblastia caliginosa* Norman

N - Frl (Hafellner 2014b), **TAA** (Hafellner 2014b). **C - Abr** (Tretiac 2015n).

Cr/ Ch/ S/ Terr/ pH: 3-4, L: 4-5, X: 4, E: 1-2/ Alt: 3-5/ Alp: er, Salp: vr, Mont: er/ PT: 1/ Note: a species growing on plant debris and mosses in dry calcareous grasslands, with optimum near treeline; perhaps more widespread in Italy.

Agonimia globulifera M. Brand & Diederich

in Sérusiaux & al., Lejeunia, 162: 8, 1999.

C - Laz (Sérusiaux & al. 1999). **S - Bas** (Hafellner 2014b)

Cr/ Ch/ S/ Terr/ pH: 3-4, L: 4-5, X: 4, E: 1-2/ Alt: 2-3/ Mont: vr, SmedH: vr/ PT: 1/ Note: a species growing on soil, plant debris and mosses in dry calcareous grasslands, mostly below the subalpine belt; perhaps more widespread in Italy. The sterile glossy black globules are diagnostic, while ascomata are rare and dull black.

Agonimia octospora Coppins & P. James

Lichenologist, 10: 181, 1978.

C - Tosc, Mol (Ravera & Genovesi 2012), **Sar** (Zedda & Sipman 2001, Zedda & al. 2001, Zedda 2002, Cossu 2013).

Sq/ Ch/ S/ Epiph/ pH: 2-3, L: 3-4, X: 1-2, E: 1/ Alt: 1-2/ SmedD: er, SmedH: er, MedH: er/ PT: 0/ suboc/ Note: a mild-temperate species with subtropical affinities found on basal parts of old broad-leaved trees, on bark or amongst mosses, in rather open, humid woodlands, mostly below the montane belt; to be looked for further in Tyrrhenian Italy. The species is included in the Italian red list of epiphytic lichens as "Data Deficient" (Nascimbene & al. 2013c).

Agonimia opuntiella (Buschardt & Poelt) Vězda

Sched. ad Lich. Rar. Exs., 330: 4, 1997 - *Physcia opuntiella* Buschardt & Poelt in Poelt, Flora, 169: 24, 1980.

Syn.: *Phaeophyscia opuntiella* (Poelt & Buschardt) Hafellner

N - VG, Frl, TAA (Nascimbene & al. 2007b, 2014, Nascimbene 2014), **Lomb** (Hafellner 2014b), **Emil** (Nimis & al. 1996). **C - Tosc** (Brackel 2015), **Umb** (Genovesi & al. 2002, Ravera & al. 2006), **Laz** (Ravera 2001, Munzi & al. 2007, Ravera & Genovesi 2008).

Sq/ Ch/ S/ Epiph-Terr/ pH: 3-4, L: 3-4, X: 3, E: 1-3/ Alt: 1-3/ Mont: er, SmedD: vr, SmedH: vr, MedH: er/ PT: 1/ Note: a mild-temperate species found on terricolous mosses and plant debris over calcareous substrata, sometimes amongst mosses on basal parts of old trees, with optimum in the submediterranean belt. Probably overlooked and more widespread, but not common. The species is included in the Italian red list of epiphytic lichens under the “Least Concern” category (Nascimbene & al. 2013c).

Agonimia tristicula (Nyl.) Zahlbr.

Österr. bot. Z., 59: 351, 1909 - *Verrucaria tristicula* Nyl., Flora, 48: 356, 1865.

Syn.: *Endocarpion uvulare* Norman, *Polyblastia tristicula* (Nyl.) Arnold, *Sporodictyon tristiculum* (Nyl.) Dalla Torre & Sarnth.

N - VG, Frl (Breuss 2008, Hafellner 2014b), **Ven** (Nascimbene & Caniglia 2000, 2003c, Thor & Nascimbene 2007, Nascimbene 2008, 2008c, Brackel 2013, Hafellner 2014b), **TAA** (Nascimbene 2003, 2008b, Thor & Nascimbene 2007, Nascimbene & al. 2008c, Brackel 2013, Hafellner 2014b), **Lomb** (UPS-L166803), **Piem** (Hafellner 2014b), **VA** (Hafellner 2014b), **Emil** (TSB 20403), **Lig** (TSB 33299). **C - Tosc** (Brackel 2015), **Marc** (Nimis & Tretiach 1999), **Umb** (Genovesi & al. 2001, Ravera & al. 2006, Brackel 2015), **Laz** (Nimis & Tretiach 2004, Brackel 2015), **Abr** (Nimis & Tretiach 1999, Brackel 2015), **Mol** (Nimis & Tretiach, 1999, 2004, Caporale & al. 2008, Paoli & al. 2015), **Sar** (Hafellner 2014b). **S - Camp** (Aprile & al. 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010), **Pugl** (Nimis & Tretiach 1999), **Bas** (Bartoli & Puntillo 1998, Nimis & Tretiach 1999, Brackel 2011), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994, Ottonello 1996, Ottonello & al. 1994).

Sq/ Ch/ S/ Terr/ pH: 3-5, L: 3-4, X: 2-3, E: 1-2/ Alt: 1-5/ Alp: vr, Salp: r, Orom: rr, Mont: c, SmedD: rc, Pad: er, SmedH: rc, MedH: rr, MedD: er/ PT: 1-2/ Note: a probably holarctic species with a wide altitudinal and latitudinal range, found on terricolous mosses, but also - albeit rarely - on basal parts of old trunks in calcareous areas.

A i n o a Lumbsch & I. Schmitt

in Lumbsch & al., Mycol. Res., 105: 272, 2001.

This genus of the Baeomycetaceae, dedicated to Aino Henssen, includes 2 species, one occurring on soil, the other on siliceous rocks, was segregated from *Trapelia* on the basis of both molecular and morphological evidence. The terricolous *A. geochroa* (Körb.) Lumbsch & I. Schmitt, known from Austria and Switzerland, should be looked for in the Italian Alps. Type: *A. geochroa* (Körb.) Lumbsch & I. Schmitt

Ainoa mooreana (Carroll) Lumbsch & I. Schmitt

Mycol. Res., 105: 273, 2002 - *Lecidea mooreana* Carroll, Nat. Hist. Rev., 6: 529, 1859.

Syn.: *Biatora brujeriana* (Schaer. ex D. Dietr.) Arnold, *Biatora lopadioides* Th. Fr., *Biatora torellii* Anzi, *Lecidea brujeriana* (Schaer. ex D. Dietr.) Leight., *Lecidea coarctata* var. *brujeriana* Schaer. ex D. Dietr., *Lecidea lopadioides* (Th. Fr.) Grunmann, *Lecidea oblita* Bagl. & Carestia, *Lecidea torellii* (Anzi) Nyl., *Trapelia mooreana* (Carroll) P. James, *Trapelia torellii* (Anzi) Hertel

N - Frl (Tretiach & Hafellner 2000), **Ven, TAA, Lomb, Piem** (Isocrono & al. 2003), **VA** (Piervittori & Isocrono 1999). **C - Tosc, S - Camp** (Ricciardi & al. 2000).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 3-4, X: 2-3, E: 1-3/ Alt: 3-5/ Alp: r, Salp: rr, Orom: vr, Mont: er/ PT: 1-2/ p/ Note: a circumboreal-montane early coloniser of weathered siliceous rocks, also known from the Southern Hemisphere, mostly found on pebbles, or on large boulders near the soil surface in rather disturbed habitats (e.g. on track sides, in clearings of light forests, etc.), with optimum near treeline.

A l e c t o r i a Ach.

in Luyken, Tent. Hist. Lich.: 95, 1809.

This is a small genus of the Parmeliaceae (c. 9 species) with a mainly arctic-alpine to boreal-montane distribution. The genus *Gowardia* was described for *Alectoria nigricans* and a newly described closely related taxon by Halonen & al. (2009), but here I follow Lumbsch & Huhndorf (2010) in treating *Gowardia* as a synonym of *Alectoria*. Type: *A. sarmentosa* (Ach.) Ach.

Alectoria nigricans (Ach.) Nyl.

Lich. Scand.: 71, 1861 - *Cornicularia ochroleuca* var. *nigricans* Ach., Lichenogr. Univ.: 615, 1810.

Syn.: *Alectoria thulensis* (Th. Fr.) Nyl., *Gowardia nigricans* (Ach.) Halonen, Myllys, Velmala & Hyvärinen

N - Frl, Ven (Tretiach 1993), **TAA** (Brackel 2013), **Lomb, Piem** (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999).

Frut./ Ch/ A.f/ Terr-Sax/ pH: 1-2, L: 4-5, X: 3-4, E: 1/ Alt: 4-6/ Alp: rr, Salp: er/ PT: 1/ Note: an arctic-alpine, circumpolar species found on bare ground or on siliceous rocks in wind-exposed ridges, mostly in moss-lichen heaths above treeline. Restricted to the Alps in Italy.

Alectoria ochroleuca (Hoffm.) A. Massal.

Sched. Crit., 2: 47, 1856 - *Usnea ochroleuca* Hoffm., Descr. Adumbr. Pl. Crypt. Lich., 2, 1: 7 1794.

Syn.: *Alectoria ochroleuca* var. *rigida* (Fr.) Th. Fr., *Alectoria rigida* (Fr.) Dalla Torre & Sarnth., *Alectoria variegata* (Samp.) Tav., *Bryopogon ochroleucus* (Hoffm.) Link, *Cornicularia ochroleuca* (Hoffm.) DC.

N - Frl (Tretiach & Hafellner 2000), **Ven** (Nimis 1994, Nascimbene & Caniglia 1997, Caniglia & al. 1999), **TAA** (Caniglia & al. 2002, Nascimbene 2001b, 2008b, Lang 2009, Watson 2014), **Lomb, Piem** (Isocrono & al. 2004, Morisi 2005), **VA** (Pierivittori & Isocrono 1997, 1999, Pierivittori & al. 2004), **Emil**.

Frut./ Ch/ A.f/ Terr/ pH: 1-3, L: 4-5, X: 2-4, E: 1-2/ Alt: 4-6/ Alp: rc, Salp: vr/ PT: 1/ Note: an arctic-alpine, circumpolar species found on windy ridges in moss-lichens heaths, more frequent on siliceous substrata, but sometimes also occurring in areas with dolomite, with optimum above treeline. Restricted to the Alps and the northern Apennines in Italy.

Alectoria sarmentosa (Ach.) Ach.

Lichenogr. Univ.: 595, 1810 - *Lichen sarmentosus* Ach. in Liljeblad, Utkast Svensk Flora: 427, 1792.

Syn.: *Alectoria cincinnata* (Fr.) Lyngge, *Alectoria luteola* Mont. ex De Not., *Alectoria sarmentosa* var. *cincinnata* (Fr.) Nyl., *Alectoria sarmentosa* var. *genuina* Flagey, *Alectoria sarmentosa* var. *sorediosa* (K.G.W. Lång ex Räsänen) Du Rietz, *Alectoria sarmentosa* var. *tortilis* Sambo

N - Frl, Ven (Caniglia & al. 1999, Nascimbene & Caniglia 2002c, 2003c, Nascimbene & al. 2006e), **TAA** (Nascimbene & al. 2007b, 2014, Nascimbene 2013, 2014, Nimis & al. 2015), **Lomb** (Dalle Vedove & al. 2004), **Piem** (Isocrono & al. 2004), **VA** (Borlandelli & al. 1996, Pierivittori & Isocrono 1997, 1999, Isocrono & al. 2008), **Emil. C - Tosc, Umb** (Panfili 2000, Ravera & al. 2006), **Abr** (Ravera 2002b). **S - Camp** (Aprile & al. 2002, 2003b), **Bas** (Puntillo & al. 2012), **Cal** (Puntillo 1996), **Si**.

Frut./ Ch/ A.f/ Epiph/ pH: 1-2, L: 3-5, X: 1-2, E: 1/ Alt: 3-4/ Salp: er, Mont: vr/ PT: 0/ suboc/ Note: a cool-temperate to boreal-montane, probably circumpolar species found on branches, more rarely on trunks of (mainly) conifers in forests with frequent fog, with optimum in the montane belt. More common in the past, it is presently confined to upland areas and is certainly declining, being very sensitive to air pollution and forest management. The species is included in the Italian red list of epiphytic lichens as "Near-threatened" (Nascimbene & al. 2013c).

Allantoparmelia (Vain.) Essl.

Mycotaxon, 7: 46, 1978 - *Parmelia* subgen. *Allantoparmelia* Vain., Ark. Bot., 8. 4: 30, 1909.

A genus of the Parmeliaceae with 3 species occurring on hard siliceous rocks in exposed situations, in more or less arctic-alpine habitats of both Hemispheres. For further details see Thell & al. (2012). Type: *A. alpicola* (Th. Fr.) Essl.

Allantoparmelia alpicola (Th. Fr.) Essl.

Mycotaxon, 7: 46, 1978 - *Parmelia alpicola* Th. Fr., N. Acta Reg. Soc. Sci. Upsal., ser. 3, 3: 57, 1861.

Syn.: *Hypogymnia alpicola* (Th. Fr.) Hav., *Parmelia encausta* var. *alpicola* (Th. Fr.) Nyl., *Parmelia jinretienii* Gyeln., *Parmelia nigrita* (Flot.) Hillmann

N - TAA, Lomb.

Fol. b/ Ch/ S/ Sax/ pH: 1-2, L: 4-5, X: 4, E: 1-3/ Alt: 4-5/ Alp: vr, Salp: er/ PT: 1/ Note: an arctic-alpine, circumpolar species found on hard siliceous rocks, often on quartz, in wind-exposed ridges near or above treeline, restricted to the Alps in Italy.

Allocetraria Kurok. & M. J. Lai

Bull. Nat. Sci. Mus. Tokyo, Ser. B, 17: 60, 1991.

A monophyletic genus of the Parmeliaceae containing 9 species mainly occurring at high altitudes, seven of them being endemic to the Himalayas. The genus is characterised by unusually long and narrow conidia which are slightly thickened at one end, and its phylogenetic position is close to *Vulpicida* (see Thell & al. 2009, 2012). Type: *A. stracheyi* (Bab.) Kurok. & M.J. Lai

Allocetraria madreporiformis (Ach.) Kärnefelt & A. Thell

Nova Hedwigia, 62: 508, 1996 - *Dufourea madreporiformis* Ach., Lichenogr. Univ.: 525, 1810.

Syn.: *Dactylina madreporiformis* (Ach.) Tuck., *Evernia madreporiformis* (Ach.) Fr.

N - Frl, TAA (Bilovitz & al. 2014b), **Lomb, Piem** (LD-1060365), **VA** (Pierivittori & Isocrono 1999). **C - Abr** (Nimis & Tretiach 1999).

Frut./ Ch/ A.f/ Terr/ pH: 3-5, L: 4-5, X: 4, E: 1-2/ Alt: 4-5/ Alp: rr, Salp: er/ PT: 1/ Note: an arctic-alpine species found in open grasslands and in wind-exposed ridges above treeline, in areas with calciferous substrata; probably widespread throughout the Italian Alps. The record from Abruzzo (central Apennines) is the southernmost one in Europe.

Alyxoria Gray

Ach. ex Gray, Nat. Arrang. Brit. Pl., 1: 504, 1821.

Ertz & Tehler (2011) proposed a new phylogeny of several groups within the Arthoniales based on molecular data, together with important taxonomic implications, among which was the resurrection of the genus *Alyxoria*, to accommodate several species formerly included in *Opegrapha* and presently assigned to the family Lecanographaceae. The molecular-based distinction between *Alyxoria* and *Zwackhia* is also supported by differences in the formation of the excipulum (Hillmann & al. 2016). Type: *A. diaphora* (Ach.) Gray

Alyxoria culmigena (Lib.) Ertz

in Diederich & al., Bull. soc. nat. Luxemb., 113: 105, 2012 - *Opegrapha culmigena* Lib., Plantae Cryptogamae quas in Arduenna coll., fasc. 1: nr. 15, 1830.

Syn.: *Opegrapha atrorimalis* Nyl., *Opegrapha betulina* Sm. non Pers., *Opegrapha herbarum* Mont., *Opegrapha prosiliens* Stirt. non Mont. & Bosch, *Opegrapha protuberans* Zahlbr., *Opegrapha turneri* Leight., *Opegrapha varia* var. *herbarum* (Mont.) Källsten comb. inval.

N - **Lig** (Brunialti & al. 1999). **C** - **Tosc** (Senese & Critelli 2000, Loppi & al. 2004, 2004c, Loppi & Frati 2006), **Umb** (Ravera & al. 2011), **Abr** (Giordani & al. 2009). **S** - **Pugl** (Nimis & Tretiach 1999).

Cr/ Tr/ S/ Terr-Epiph/ pH: 2-3, L: 2-3, X: 1-3, E: 1-2/ Alt: 1-2/ SmedD: er, SmedH: er, MedH: vr/ PT: 1/ suboc/ Note: on bark and plant debris, rarely also on wood, in areas with mild winters below the montane belt; mostly Tyrrhenian in Italy. Earlier records from Trentino (see Nimis 1993: 459) and Piemonte (Caniglia & al. 1992, Griselli & al. 2003), being dubious, are not accepted here.

Alyxoria mougeotii (A. Massal.) Ertz, Frisch & G. Thor

Taxon, 63: 740, 2014 - *Opegrapha mougeotii* A. Massal., Mem. Lichenogr.: 103, 1853.

Syn.: *Opegrapha leightonii* Cromb. ex Nyl., *Opegrapha mougeotii* var. *pisana* Bagl. ex Jatta, *Opegrapha mougeotii* var. *tiburtina* Jatta

N - **VG** (TSB 20399), **Ven** (Lazzarin 2000b), **Piem. Lig. C** - **Tosc. Marc** (Jatta 1909-1911), **Laz** (Genovesi 2003, Genovesi & al. 2012), **Sar. S** - **Camp** (Garofalo & al. 1999, Aprile & al. 2003b), **Pugl** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994).

Cr/ Tr/ S/ Sax/ pH: 3-5, L: 2-3, X: 2, E: 1-2/ Alt: 1-2/ SmedD: vr, Pad: er, SmedH: r, MedH: vr, MedD: er/ PT: 1/ suboc, #/ Note: a critical taxon found on steeply inclined surfaces of calcareous or base-rich siliceous substrata (limestone, calcareous sandstone, roofing tiles), in areas with mild winters below the montane belt; related to *A. varia*.

Alyxoria ochrocheila (Nyl.) Ertz & Tehler

Fungal Divers., 49: 50, 2011 - *Opegrapha ochrocheila* Nyl., Flora, 48: 212, 1865.

Syn.: *Opegrapha atricolor* Stirt., *Opegrapha rubescens* Sandst.

C - **Tosc** (TSB 35226), **Sar** (Nimis & Poelt 1987). **S** - **Camp** (Brunialti & al. 2013, Ravera & Brunialti 2013), **Pugl** (Nimis & Tretiach 1999).

Cr/ Tr/ S/ Epiph-Lign/ pH: 2-3, L: 2-3, X: 2, E: 1-2/ Alt: 1/ MedH: vr/ PT: 1/ suboc/ Note: a Mediterranean-Atlantic species found on the smooth bark of evergreen broad-leaved trees and shrubs, more rarely on lignum. It was listed under the dubious records by Nimis (1993: 464), but material from Sardegna was revised by Egea & Torrente (TSB), and the identification by Nimis & Poelt (1987) proved to be correct. Specimens from Toscana and Puglia comply with those from Sardegna. The species is included in the Italian red list of epiphytic lichens as "Endangered" (Nascimbene & al. 2013c).

Alyxoria ochrocincta (Werner) Ertz

in Diederich & al., Bull. soc. nat. Luxemb., 113: 105, 2012 - *Opegrapha ochrocincta* Werner, Bull. Soc. Sc. Nat. Maroc, 19, 1: 46, 1939.

Syn.: *Opegrapha diaphoroides* auct. non Nyl.

N - **Lig. C** - **Tosc** (Putorti & Loppi 1999), **Laz. Sar. S** - **Pugl** (Nimis & Tretiach 1999, Durini & Medagli 2004), **Bas** (Nimis & Tretiach 1999), **Cal** (Nimis & Puntillo 2003, Puntillo 2011), **Si** (Nimis & al. 1994).

Cr/ Tr/ S/ Epiph/ pH: 2-3, L: 2-4, X: 2, E: 1-2/ Alt: 1/ MedH: r, MedD: er/ PT: 1/ suboc/ Note: a Mediterranean species growing on shrubs and twigs of young trees in Mediterranean maquis, more rarely on trunks, in rather shaded and humid situations, most frequent in Tyrrhenian Italy.

Alyxoria subelevata (Nyl.) Ertz & Tehler

Fungal Divers., 49: 50, 2011 - *Opegrapha subelevata* Nyl., Lich. Nov. Zeland.: 148, 1888.

N - **Lig. C** - **Tosc. Laz** (Genovesi & al. 2011), **Abr** (Nimis & Tretiach 1999), **Sar. S** - **Camp** (Nimis & Tretiach 2004, Garofalo & al. 2010), **Bas** (Bartoli & Puntillo 1998), **Cal** (Puntillo 1996), **Si** (Otonello & Salone 1994, Grillo & al. 2009).

Cr/ Tr/ S/ Sax/ pH: 3-5, L: 2-4, X: 2-3, E: 1-3/ Alt: 1-2/ SmedD: vr, SmedH: rr, MedH: vr/ PT: 1-2/ suboc/ Note: a mild-temperate lichen found on calcareous or basic siliceous rocks (incl. lava), sometimes on mortar walls, mostly near the coast, mainly Tyrrhenian in Italy.

Alyxoria varia (Pers.) Ertz & Tehler

Fungal Divers., 49: 53, 2011 - *Opegrapha varia* Pers., Ann. Bot. (Usteri), 1: 30, 1794.

Syn.: *Opegrapha chlorina* Pers., *Opegrapha cymbiformis* Flörke, *Opegrapha diaphora* Ach., *Opegrapha lichenoides* Pers., *Opegrapha lichenoides* var. *chlorina* (Pers.) Redinger, *Opegrapha lichenoides* var. *nigrocaesia* Chevall., *Opegrapha maroccana* Müll. Arg., *Opegrapha pitardi* var. *viridans* Maheu & Werner, *Opegrapha pollinii* A. Massal., *Opegrapha pulicaris* auct. p.p. non Pers. ex Fr., *Opegrapha rimalis* Pers., *Opegrapha signata* (Ach.) Ach., *Opegrapha varia* f. *subericola* Jatta, *Opegrapha varia* var. *confluens* A. Massal., *Opegrapha varia* var. *diaphora* (Ach.) Fr., *Opegrapha varia* var. *fagicola* A. Massal., *Opegrapha varia* var. *juglandis* A. Massal., *Opegrapha violatra* A. Massal., *Opegrapha vulvella* Ach.

N - **VG** (Castello 1996), **Frl** (Bernini & al. 2010), **Ven** (Lazzarin 2000b, Nascimbene & al. 2005b, 2006c, Nascimbene 2008, 2008c), **TAA** (Nascimbene & al. 2007b, 2014, Nascimbene 2014, Nimis & al. 2015), **Lomb** (Zocchi & al. 1997, Arosio & al. 2003, Furlanetto 2010), **Piem** (Arosio & al. 1998, Piervittori 2003, Isocrono & al. 2004, 2007, Griselli & al. 2003, Isocrono & Piervittori 2008), **VA** (Piervittori & Isocrono 1999), **Emil** (Nimis & al. 1996, Sallase 2003, Tretiach & al. 2008), **Lig** (Valcuvia & al. 2000). **C** - **Tosc** (Tretiach & Nimis 1994, Putorti & al. 1998, Loppi & al. 2002c, 2004c, Loppi & Frati 2006, Frati & al. 2006b, 2008, Brunialti & Frati 2010, Loppi & Nascimbene 2010, Benesperi 2011, Brackel 2015), **Marc** (Nimis & Tretiach 1999, Frati & Brunialti 2006), **Umb** (Ravera 1998, Panfilii 2000b, Ravera & al. 2006), **Laz** (Bartoli & al. 1997, Ravera & al. 1999, Ravera 2002, Massari & Ravera 2002, Nimis & Tretiach 2004, Ruisi & al. 2005, Stofer 2006, Munzi & al. 2007, Ravera & Genovesi 2008, Zucconi & al. 2013), **Abr** (Recchia & al. 1993, Olivieri & al. 1997, 1997b, Loppi & al. 1999, Nimis & Tretiach 1999, Catalano & al. 2016, Corona & al. 2016), **Mol** (Garofalo & al. 1999, Nimis & Tretiach 1999, Caporale & al. 2008, Ravera & al. 2010), **Sar** (Zedda 1995, 2002, Loi & al. 2000, Zedda & al. 2001, Rizzi & al. 2011, Cossu 2013). **S** - **Camp** (Garofalo & al. 1999, 2010, 2002b, Ricciardi & al. 2000, Aprile & al. 2002, 2003b, Blasi & al. 2010, Brunialti & al. 2013, Ravera & Brunialti 2013, Catalano & al. 2016), **Pugl** (Garofalo & al. 1999, Nimis & Tretiach 1999, Brackel 2011), **Bas** (Bartoli & Puntillo 1998, Nimis & Tretiach 1999, Potenza 2006, Potenza & al. 2010), **Cal** (Puntillo 1995, 1996, Stofer 2006, Puntillo & Puntillo 2012), **Si** (Grillo & Cristaudo 1995, Grillo & Caniglia 2004, Caniglia & Grillo 2006b).

Cr/ Tr/ S/ Epiph/ pH: 2-3, L: 2-3, X: 2-3, E: 1-2/ Alt: 1-4/ Salp: er, Mont: vr, SmedD: r, Pad: er, SmedH: rr, MedH: r/ PT: 1-2/ Note: a mainly temperate lichen found on old trees in humid but rather open forests, occasionally on basic siliceous rocks in humid and shaded situations. The delimitation of this species is still an open problem: here it is still treated as a collective taxon.

Alyxoria variiformis (Anzi) Ertz

in Diederich & al., Bull. soc. nat. Luxemb., 113: 105, 2012 - *Opegrapha variaeformis* Anzi, Comm. Soc. Critt. Ital., 1, 3: 160, 1862.

Syn.: *Opegrapha rosea* B. de Lesd.

C - **Tosc**, **Mol** (Nimis & Tretiach 2004, Caporale & al. 2008), **Sar** (TSB 13045). **S** - **Pugl** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (TSB 17355).

Cr/ Tr/ S/ Sax/ pH: 4-5, L: 2-3, X: 2, E: 1/ Alt: 1/ MedH: r, MedD: er/ PT: 1/ suboc, coast/ Note: a mild-temperate to Mediterranean-Atlantic species found on steeply inclined faces of calciferous rocks near the coast, in rather shaded and humid situations. The record from Molise, in the mountains, is exceptional.

Amandinea Choisy ex Scheid. & H. Mayrhofer

in Scheid., Lichenologist, 25: 341, 1993.

A subcosmopolitan genus of c. 30 species, most of which were formerly treated as members of *Buellia*. The genus, which belongs to the Caliciaceae (see e.g. Helms & al. 2003), is very heterogeneous and probably polyphyletic; furthermore, several species, especially *A. punctata* s.lat., await further study. Type: *A. conioips* (Ach.) Scheidegger & H. Mayrhofer

Amandinea maritima Giralt, van den Boom & Elix

in Lumbsch & al., Phytotaxa, 18: 13, 2011.

C - **Sar** (Lumbsch & al. 2011).

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 4-5, X: 2-4, E: 2-3/ Alt: 1/ MedH: er/ PT: 0/ Note: this species is known from coastal areas only, from the western Mediterranean Region to the Atlantic coast of southern Portugal and of the Canary Islands. It grows in coastal-dune areas, mainly on *Juniperus*, accompanied by other, typically maritime Mediterranean-Atlantic-Macaronesian lichens.

Amandinea oleicola (Nyl.) Giralt & van den Boom

in van den Boom & Giralt, Sydowia, 64: 152, 2012 - *Lecidea oleicola* Nyl., Bull. Soc. linn. Normandie, 6: 312, 1873.

C - **Tosc** (TSB 5587).

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 3-4, X: 3-4, E: 1-2/ Alt: 1/ MedH: vr/ PT: 1/ suboc, coast/ Note: a recently resurrected epiphytic species, also known from Portugal and the Canary Islands, probably more common in the warmest parts of Mediterranean Italy.

Amandinea pelidna (Ach.) Fryday & Arcadia

Graphis Scripta, 24: 42, 2012 - *Lecidea pelidna* Ach., Lichenogr. Univ. 158, 1810.

Syn.: *Amandinea lecideina* (H. Mayrhofer & Poelt) Scheid. & H. Mayrhofer, *Buellia litoralis* Zahlbr., *Buellia prospersa* (Nyl.) Riddle, *Buellia punctata* f. *crassior* (Erichsen) Zahlbr., *Buellia myriocarpa* f. *litoralis* Erichsen,

Lecidea prospersa Nyl., *Rinodina biatorina* var. *buellioides* C.A. Berg non *Rinodina buellioides* Metzler, *Rinodina lecideina* H. Mayrhofer & Poelt

N - TAA (M-0041700). C - Sar (Bungartz & al. 2004).

Cr/ Ch/ S/ Sax/ pH: 1-3, L: 3-4, X: 2-3, E: 1-2/ Alt: 1-2/ SmedD: vr, SmedH: vr, MedH: vr/ PT: 1/ suboc, coast/ Note: a widespread species of siliceous rocks and pebbles in open habitats. For further details see Bungartz & al. (2004).

Amandinea punctata (Hoffm.) Coppins & Scheid.

in Scheid., *Lichenologist*, 25: 343, 1993 - *Verrucaria punctata* Hoffm., *Deutschl. Fl.*: 192, 1796.

Syn.: *Buellia cupreola* Müll. Arg., *Buellia myriocarpa* (DC.) De Not., *Buellia myriocarpa* var. *chloropolia* (Fr.) Th. Fr., *Buellia myriocarpa* var. *punctiformis* (DC.) Mudd, *Buellia myriocarpa* var. *stigmatea* (Körb.) H. Olivier, *Buellia ocellata* f. *depauperata* Anzi ex Arnold, *Buellia punctata* (Hoffm.) A. Massal., *Buellia punctata* f. *capitata* (Bagl.) Jatta, *Buellia punctata* f. *fuliginosa* (Hepp) Jatta, *Buellia punctata* f. *lignicola* Anzi ex Arnold, *Buellia punctata* f. *musciicola* (Hepp) Körb.?, *Buellia punctata* var. *chloropolia* (Fr.) Körb., *Buellia punctata* var. *punctiformis* (DC.) Oxner, *Buellia punctata* var. *tumidula* (A. Massal.) Jatta, *Buellia punctiformis* (DC.) A. Massal., *Buellia stigmatea* (Schaer.) Körb., *Buellia vagans* Müll. Arg.?, *Lecidea myriocarpa* (DC.) Röhl., *Lecidea parasema* var. *punctata* (Hoffm.) Ach., *Lecidea parasema* var. *punctiformis* (DC.) Wahlenb., *Lecidea punctata* (Hoffm.) Flörke

N - VG (Castello 1996, Castello 2002, Martellos & Castello 2004, Castello & Skert 2005), Frl (Badin & Nimis 1996, Tretiach & Hafellner 2000), Ven (Lazzarin 1997, 2000b, Caniglia & al. 1999, Nascimbene & Caniglia 2002c, Nascimbene & al. 2006e, 2009), TAA (Nascimbene 2003, 2008b, 2014, Gottardini & al. 2004, Nascimbene & al. 2005, 2006, 2006e, 2007b, 2014, Thor & Nascimbene 2007, Zarabska & al. 2009, Bilovitz & al. 2014, Nimis & al. 2015), Lomb (Arosio & Rinaldi 1995, Brusoni & al. 1997, Zocchi & al. 1997, Roella 1999, Brusoni & Valcuvia 2000, Arosio & al. 2000, 2003, Valcuvia & al. 2003, De Vita & Valcuvia 2004, Nascimbene & al. 2006e, Gheza & al. 2015), Piem (Caniglia & al. 1992, Arosio & al. 1998, Piervittori 1998, 2003, Bari & al. 2000, Castino 2004, Isocrono & al. 2004, 2005b, 2006, 2007, 2009, Isocrono & Piervittori 2008, Furlanetto 2010, Matteucci & al. 2010, Giordani & Malaspina 2016), VA (Piervittori & Maffei 1996, 2001, Piervittori & Isocrono 1999, Piervittori & al. 2001, Matteucci & al. 2008c, 2015c, Isocrono & al. 2008), Emil (Bassi 1995, Nimis & al. 1996, Valcuvia & Grieco 1995, Gasparo & Tretiach 1996, Dalle Vedove & al. 2002, Sallese 2003, Morselli & Regazzi 2006, Tretiach & al. 2008, Cioffi 2009, Benesperi 2009), Lig (Castello & al. 1994, Putorti & al. 1999b, Giordani & al. 2002, 2016, Brunialti & Giordani 2003, Giordani 2006, Giordani & Incerti 2008). C - Tose (Loppi & Putorti 1995, 1995b, Loppi & al. 1995, 1996b, 1996c, 1997b, 1998, 2002, 2002b, 2002c, 2003, 2006, Loppi 1996b, Monaci & al. 1997, Putorti & al. 1998, Putorti & Loppi 1999, Benesperi 2000a, 2011, Helms & al. 2003, Loppi & Frati 2004, Frati & al. 2007, 2008, Benesperi & al. 2007, Paoli & Loppi 2008, Brunialti & Frati 2010, Loppi & Nascimbene 2010, Nascimbene & al. 2012, 2015, Brunialti & al. 2012b, Paoli & al. 2012, 2012b, 2013, 2015d, Brackel 2015), Marc (Nimis & Tretiach 1999, Frati & Brunialti 2006), Abr (Nimis & Tretiach 1999, Stofer 2006, Caporale & al. 2016), Umb (Ravera 1998, Panfili 2000b, Ravera & al. 2006, Brackel 2015), Laz (Bartoli 1997b, Ravera & al. 1999, Diederich & Etayo 2000, Massari & Ravera 2002, Ruisi & al. 2005, Munzi & al. 2007, Ravera 2008b, Ravera & Genovesi 2008, Genovesi & al. 2011, Zucconi & al. 2013, Brackel 2015), Mol (Garofalo & al. 1999, Nimis & Tretiach 1999, Caporale & al. 2008, Genovesi & Ravera 2014, Paoli & al. 2015), Sar (Zedda 2002, Rizzi & al. 2011, Cossu 2013, Cossu & al. 2015). S - Camp (Garofalo & al. 1999, 2010, Ricciardi & al. 2000, Aprile & al. 2002, 2003b, 2011, Catalano & al. 2012, 2016, Brunialti & al. 2013, Ravera & Brunialti 2013), Pugl (Garofalo & al. 1999, Nimis & Tretiach 1999), Bas (Nimis & Tretiach 1999, Paoli & al. 2006, Brackel 2011), Cal (Puntillo 1996, Puntillo & Puntillo 2004), Si (Nimis & al. 1994, 1995, Grillo & al. 1996, 2002, Ottonello & Romano 1997, Grillo 1998, Poli & Grillo 2000, Grillo & Caniglia 2004, 2006, Caniglia & Grillo 2006b, Stofer 2006, Brackel 2008c, Ottonello & al. 2011, Cataldo & Cannavò 2014).

Cr/ Ch/ S/ Sax-Epiph-Lign/ pH: 1-3, L: 4-5, X: 3-4, E: 2-4/ Alt: 1-4/ Salp: er, Orom: er, Mont: r, SmedD: rc, Pad: vr, SmedH: c, MedH: rc, MedD: er/ PT: 1-3/ #/ Note: a very poorly understood taxon; in its present circumscription, an almost cosmopolitan lichen found on a wide variety of substrata, including bark, lignum, siliceous rocks, roofing tiles and brick. The Italian material is very heterogeneous and in need of revision.

Amygdalaria Norman Nytt Mag. Naturvid., 7: 230, 1853 (1852).

A genus of c. 10 silicicolous species, confined to humid climates in mostly arctic to temperate regions of the Northern Hemisphere and in the high mountains of the tropics. The genus is the "aspicilioid" counterpart of *Porpidia*, and the relationships with the latter genus deserve further study. Type: *A. pelobotryon* (Wahlenb.) Norman

Amygdalaria panaeola (Ach.) Hertel & Brodo

in Brodo & Hertel, *Herzogia*, 7: 510, 1987 - *Lecidea panaeola* Ach., *K. Vetensk.-Akad. Nya Handl.*: 267, 1808.

Syn.: *Huilia panaeola* (Ach.) Hertel, *Lecidea panaeola* var. *vulgaris* Th. Fr., *Psora panaeola* (Ach.) Anzi

N - TAA, Lomb, Piem (Isocrono & al. 2004), VA (Piervittori & Isocrono 1999).

Cr/ Ch-Cy. h/ S/ Sax/ pH: 2-3, L: 3-4, X: 2, E: 1/ Alt: 3-5/ Alp: vr, Salp: er, Mont: er/ PT: 1/ Note: an arctic-alpine to boreal-montane, incompletely circumpolar species of weathered, mineral-rich siliceous rocks close to the ground, in areas with late snow-lie, with optimum above treeline. Probably restricted to the Alps in Italy.

Amylora Rambold
Bull. Soc. linn. Provence, 45: 344, 1994.

A monotypic genus of the Trapeliaceae including a species formerly treated as an *Aspicilia*, but differing in important chemical and morphological characters, especially the ascus type, occurring on steeply inclined to vertical surfaces of siliceous rocks, hitherto reported only from the Alps. For further details see Rambold (1994). Type: *A. cervinocuprea* (Arnold) Rambold

Amylora cervinocuprea (Arnold) Rambold

Bull. Soc. linn. Provence, 45: 344, 1994 - *Aspicilia cervinocuprea* Arnold, Verh. zool.-bot. Ges. Wien, 26: 357, 1876.

Syn.: *Aspicilia olivacea* f. *cervinocuprea* (Arnold) Arnold, *Lecanora cervinocuprea* (Arnold) Mig., *Semilecanora cervinocuprea* (Arnold) Motyka

N - **TAA** (Rambold 1994).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4-5, X: 4, E: 1/ Alt: 5/ Alp: vr/ PT: 1/ u/ Note: on vertical to overhanging faces of gneissic rocks above treeline; perhaps more widespread in the Alps, but not common.

Anaptychia Körb.
Grundr. Krypt.-Kunde: 197, 1848.

This genus of the Physciaceae, characterised by brown, thin-walled, 1-septate spores of *Physconia* type and a prosoplectenchymatous upper cortex, includes c. 15 species worldwide. It is a sister group to the genus *Physconia* and appears to be monophyletic. For further details see Esslinger (2007) and Lohtander & al. (2008). Type: *A. ciliaris* (L.) A. Massal.

Anaptychia bryorum Poelt

Bryologist, 74: 154, 1971.

Syn.: *Anaptychia aquila* var. *stippaea* sensu Dalla Torre & Saroth., *Anaptychia fusca* var. *stippaea* auct., *Anaptychia stippaea* (Ach.) Nádov sensu Nádov.

N - **Frl** (Tretiach & Hafellner 2000), **Ven** (Nascimbene 2003b), **TAA**, **Lomb**, **Piem** (TSB 32957), **VA**. **C - Sar** (ASU 504620 det R. Moberg).

Frut/ Ch/ S/ Terr/ pH: 3-4, L: 4, X: 3, E: 2-3/ Alt: 4-5/ Alp: vr, Salp: vr, Orom: er/ PT: 1/ Note: an arctic-alpine to boreal-montane, probably circumpolar species found amongst mosses and muribund plants on base-rich siliceous substrata in the alpine and subalpine belts.

Anaptychia ciliaris (L.) A. Massal.

Körb. ex A. Massal., Mem. Lichenogr.: 35, 1853 - *Lichen ciliaris* L., Sp. Pl., 2: 1144, 1753.

Syn.: *Anaptychia ciliaris* subsp. *mammillata* (Taylor) D. Hawksw. & P. James, *Anaptychia ciliaris* var. *melanosticta* (Ach.) Boistel, *Anaptychia ciliaris* var. *schultzkorhii* Szatala, *Anaptychia ciliaris* var. *vulgaris* Körb., *Anaptychia melanosticta* (Ach.) Trass, *Borreria ciliaris* (L.) Ach., *Borreria ciliaris* var. *verrucosa* Ach., *Borreria solenaria* Duby, *Hagenia ciliaris* (L.) W. Mann, *Parmelia ciliaris* (L.) Ach., *Parmelia ciliaris* var. *solenaria* (Duby) Anzi, *Physcia ciliaris* (L.) DC., *Physcia ciliaris* var. *melanosticta* (Ach.) Th. Fr., *Physcia ciliaris* var. *vulgaris* (Körb.) Syd.

N - **VG** (Tretiach 1993, Castello 1996), **Frl** (Tretiach 1993, 1996), **Ven** (Tretiach 1993, Nascimbene & Caniglia 1997, 2000b, 2003c, Caniglia & al. 1999, Nascimbene 2008c, Nascimbene & al. 2009c, 2010b), **TAA** (Tretiach 1993, Nascimbene 2003, Nascimbene & Caniglia 2000b, Nascimbene & al. 2005, 2006, 2007b, Nimis & al. 2015), **Lomb** (Valcuvia & al. 2003, De Vita & Valcuvia 2004), **Piem** (Morisi & Sereno 1995, Arosio & al. 1998, Isocrono & al. 2003, Piervittori 2003, Morisi 2005), **VA** (Piervittori & Maffei 1996, Piervittori & Isocrono 1997, 1999, Isocrono & Piervittori 2008), **Emil** (Tretiach 1993, Tretiach & al. 2008, Benesperi 2009, Brackel 2015), **Lig** (Tretiach 1993, Brunialti & al. 1999, Brunialti & Giordani 2000, Giordani & al. 2002, Brunialti & Giordani 2003, Giordani & Incerti 2008, Brackel 2015). **C - Tosc** (Tretiach 1993, Tretiach & Nimis 1994, Loppi 1996, Loppi & De Dominicis 1996, Loppi & al. 1997, 1997b, 1998, 1998b, 2002, 2002c, Monaci & al. 1997, Putortì & al. 1998, Loppi & Nascimbene 1998, 2010, Loppi & Pirintosos 2000, Frati & al. 2006b, Benesperi & al. 2007, Benesperi & Lastrucci 2007, Lastrucci & al. 2009, Brunialti & Frati 2010, Benesperi 2011, Brackel 2015), **Marc** (Nimis & Tretiach 1999, Putortì & Loppi 1999b, Frati & Brunialti 2006, Brackel 2015), **Umb** (Ravera 1998, 1999, Nimis & Tretiach 1999, Panfili 2000b, 2007, Ravera & al. 2006, Ciotti & al. 2009, Brackel 2015), **Laz** (Tretiach 1993, Massari & Ravera 2002, Nimis & Tretiach 2004, Ruisi & al. 2005, Ravera & Genovesi 2008, Zucconi & al. 2013, Brackel 2015), **Abr** (Tretiach 1993, Recchia & al. 1993, Olivieri & Pacioni 1996, Olivieri & al. 1997, 1997b, Loppi & al. 1998d, 1999, Nimis & Tretiach 1999, Caporale & al. 2016, Corona & al. 2016), **Mol** (Garofalo & al. 1999, Nimis & Tretiach 1999, Caporale & al. 2008, Ravera & al. 2010, Genovesi & Ravera 2014, Paoli & al. 2015), **Sar** (Tretiach 1993, Zedda 1995, 2002, 2002b, Loi & al. 2000, Nöske 2000, Zedda & Sipman 2001, Zedda & al. 2001, Rizzi & al. 2011, Kodnik & al. 2011, Cossu 2013). **S - Camp** (Tretiach 1993, Garofalo & al. 1999, 2010, Aprile & al. 2002, 2003, 2003b, 2011, Nascimbene & al. 2010b, Brunialti & al. 2013, Ravera & Brunialti 2013, Catalano & al. 2016), **Pugl** (Nimis & Tretiach 1999), **Bas** (Tretiach 1993, Nimis & Tretiach 1999, Potenza 2006, Potenza & Fascetti 2010, Brackel 2011), **Cal** (Tretiach 1993, Puntillo 1995, 1996, Puntillo & Puntillo 2004, Brackel & Puntillo 2016), **Si** (Tretiach 1993, Czezuga & al. 1994, Nimis & al. 1994, Ottonello & Salone 1994, Ottonello & al. 1994, 2011, Grillo & Cristaudo 1995, Ottonello 1996, Ottonello & Romano 1997, Merlo 2004, 2004b, Grillo & Caniglia 2004, 2006, Brackel 2008b, 2008c, Falco Scampatelli 2005, Liistro & Cataldo 2011).

Frut/ Ch/ S/ Epiph/ pH: 2-3, L: 4-5, X: 3, E: 2-3/ Alt: 1-3/ Mont: rc, SmedD: r, SmedH: r, MedH: vr/ PT: 1-2/ Note: a temperate species found on bark of more or less isolated trees, sometimes also on rock and

amongst terricolous mosses in open situations. Formerly more common and widespread, it is presently very rare in northern Italy, but still locally abundant in the Apennines and in the Islands. Narrow-lobed forms on plant debris reach the oromediterranean belt and the subalpine belt of the Alps. See also note on *A. crinalis*.

Anaptychia crinalis (Schaer.) J. Nowak

Vězda *ex* J. Nowak *in* Kochman & al., Flora Polska, Porosty, VI, 3: 128, 1993 - *Borrera crinalis* Schleich. *ex* Schaer., Lich. Helv. Spicil.: 488, 1840.

Syn.: *Anaptychia ciliaris* f. *angusta* A. Massal., *Anaptychia ciliaris* var. *crinalis* (Schaer.) Rabenh., *Physcia ciliaris* var. *crinalis* Schleich. *nom.nud.*

N - Frl, Ven (Lazzarin 1997, 2000, Caniglia & al. 1999, Nascimbene 2011, Brackel 2013), **TAA** (Lich. Graec. 222: Obermayer 2003, Nascimbene & al. 2005, 2006, Esslinger 2007, Nimis & al. 2015), **Lomb, Piem, Emil. C - Abr** (Sabatini & al. 2016), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **Sar. S - Camp** (Aprile & al. 2003b), **Bas**.

Frut/ Ch/ S/ Epiph/ pH: 2-3, L: 3, X: 2, E: 1-2/ Alt: 3/ Mont: er/ PT: 1/ suboc/ Note: confined to beech forests in rather open but humid situations. Perhaps just a morphotype of *A. ciliaris* (intermediate morphs are common): a molecular study could solve the problem. The species is included in the Italian red list of epiphytic lichens as “Vulnerable” (Nascimbene & al. 2013c).

Anaptychia runcinata (With.) J.R. Laundon

Lichenologist, 16: 225, 1984 - *Lichen runcinatus* With., Bot. Arrang. Veget. Gr. Brit.: 712, 1776.

Syn.: *Anaptychia aquila* (Ach.) A. Massal., *Anaptychia fusca* (Huds.) Vain., *Parmelia aquila* (Ach.) Ach., *Physcia aquila* (Ach.) Nyl., *Physcia fusca* (Huds.) A.L. Sm., *Pseudophyscia aquila* (Ach.) Hue

N - Lig (Tretiach 1993), **C - Tosc** (Tretiach 1993, Pišút 1997, Lastrucci & al. 2009, Helms & al. 2003), **Laz** (TSB 17739), **Sar** (Monte 1993, Tretiach 1993, Nöske 2000), **S - Camp** (Aprile & al. 2002), **Cal** (Tretiach 1993, Puntillo 1996), **Si** (Ottonello & Romano 1997, Merlo 2004, Ottonello & al. 2011).

Fol. n/ Ch/ S/ Sax/ pH: 2-3, L: 3-4, X: 2, E: 2-3/ Alt: 1-3/ Mont: er, SmedH: er, MedH: rc/ PT: 1/ suboc/ Note: a Mediterranean-Atlantic, European species found in rather shaded situations with frequent humid winds on hard siliceous boulders, sometimes overgrowing epilithic mosses; most common along the Tyrrhenian coast, but also found in the montane belt of the Tyrrhenian mountains (*e.g.* M. Amiata in Toscana).

A n e m a Forssell

Nyl. *ex* Forssell., N. Acta Reg. Soc. Sci. Upsal., ser. 3, 13: 91, 1885, *nom. cons.*

This genus of the Lichinaceae includes *c.* 6 species somewhat resembling *Psorotichia*, but with different ascomata and a better developed and organised thallus. The genus is still rather poorly known in Italy. Type: *A. decipiens* (A. Massal.) Forssell. The name is conserved against *Omphalaria* A. Massal. (1855).

Anema decipiens (A. Massal.) Forssell

N. Acta Reg. Soc. Sci. Upsal., ser. 3, 13: 92, 1885 - *Omphalaria decipiens* A. Massal., Framm. Lichenogr.: 14, 1855.

Syn.: *Collema decipiens* (A. Massal.) Nyl., *Thyrea decipiens* (A. Massal.) A. Massal.

N - VG (Tretiach 1993), **Ven** (Lazzarin 2000b), **TAA, Lomb, Piem** (Isocrono & al. 2004), **Lig** (S-F145460), **C - Marc** (TSB 33889), **Abr** (Jatta 1909-1911), **S - Camp** (Nimis & Tretiach 2004, Garofalo & al. 2010), **Pugl, Si** (Nimis & al. 1994, 1995).

Cr/ Cy.c/ S/ Sax/ pH: 3-5, L: 4-5, X: 4-5, E: 1-2/ Alt: 1-3/ Mont: r, SmedD: rc, Pad: er, SmedH: rr, MedH: rr, MedD: rr/ PT: 1/ w/ Note: on steeply inclined, sunny surfaces of calcareous rocks (mainly limestone, but also calciferous schists and sandstone) with periodical water seepage after rain, below the subalpine belt. Probably widespread throughout the country.

Anema moedlingense Zahlbr.

Cat. Lich. Univ., 2: 801, 1902.

N - Frl. C - Abr (TSB 30590), **Mol** (Caporale & al. 2008).

Cr/ Cy.c/ S/ Sax/ pH: 4-5, L: 4-5, X: 4-5, E: 1-2/ Alt: 1-3/ Mont: r, SmedD: rc, Pad: er, SmedH: rr, MedH: rr, MedD: rr/ PT: 1/ w/ Note: on steeply inclined, sunny surfaces of calcareous rocks with periodical water seepage after rain. Italian material, congruent with two specimens from STU identified by A. Henssen (Marburg) was referred by Nimis & Tretiach (1999) to *A. moedlingense* Zahlbr., a variously interpreted taxon (see *e.g.* Henssen & Jørgensen 1990, Moreno & Egea 1992, Hafellner & Türk 2001), which lacks the characteristic spherical outgrowths of *A. tumidulum* (see also Zahlbruckner 1898). The suberect, deeply sulcate squamules with reticulate surface are diagnostic.

Anema nummularium (Durieu & Mont.) Forssell

Nyl. *ex* Forssell, N. Acta Reg. Soc. Sci. Upsal., ser. 3, 13, 6: 93, 1885 - *Collema nummularium* Dufour *ex* Durieu & Mont. *in* Durieu, Expl. Sci. Algérie., 1: 200, 1846.

Syn.: *Anema notarisii* (A. Massal.) Forssell, *Anema nummulariellum* Nyl., *Omphalaria frustillata* Nyl., *Omphalaria notarisii* A. Massal., *Tyrea nummularia* (Durieu & Mont.) Zahlbr.

N - VG, Frl, Ven (Lazzarin 2000b), **TAA, Lomb** (Lazzarin 2000b, Brackel 2013), **Piem** (Matteucci & al. 2013), **VA** (Gazzano & al. 2009, 2009b), **Lig** (Lazzarin 2000b, Watson 2014). **C - Tosc, Marc** (Nimis & Tretiach 1999), **Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **Sar, S - Camp** (Aprile & al. 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010), **Pugl, Bas** (Bartoli & Puntillo 1998), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994, Ottonello & al. 1994).

Cr/ Cy.c/ S/ Sax/ pH: 4-5, L: 5, X: 4-5, E: 1-3/ Alt: 1-3/ Mont: rr, SmedD: c, SmedH: rc, MedH: rr, MedD: rc/ PT: 1/ w/ Note: on steeply inclined surfaces of limestone and dolomite with periodical water seepage after rain, below the subalpine belt. Some older records could refer to *A. moedligense*.

Anema prodigulum (Nyl.) Henssen

in Henssen & Jørgensen., Lichenologist, 22: 139, 1990 - *Omphalaria prodigula* Nyl., Flora, 62: 353, 1879.

Syn.: *Thyrea prodigula* (Nyl.) Zahlbr.

N - Frl (TSB 20352). **S - Si** (Nimis & al. 1994).

Cr/ Cy.c/ S/ Sax/ pH: 4-5, L: 4-5, X: 4-5, E: 1-3/ Alt: 1-2/ SmedD: vr, SmedH: vr, MedH: vr/ PT: 1/ w/ Note: on sunny seepage tracks of calcareous rocks, mostly below the montane belt.

Anema suffruticosum P.P. Moreno & Egea

Acta Bot. Barcinon., 41: 26, 1992.

N - TAA (Nascimbene 2002). **C - Abr** (TSB 30609). **S - Camp** (Nimis & Tretiach 2004).

Cr/ Cy.c/ S/ Sax/ pH: 3-5, L: 4-5, X: 4-5, E: 1-3/ Alt: 1-2/ SmedD: vr, MedH: vr / PT: 1/ w/ Note: on sunny seepage tracks of calciferous rocks, not common, but perhaps more widespread below the montane belt.

Anema tumidulum P.M. Jørg., M. Schultz & Guttová

Henssen ex P.M. Jørg., M. Schultz & Guttová, Herzogia, 26: 2, 2013.

N - Frl, Lomb (Jørgensen & al. 2013), **VA** (Matteucci & al. 2013). **C - Tosc** (Tretiach & al. 2008), **Abr** (Caporale & al. 2016).

Cr/ Cy.c/ S/ Sax/ pH: 3-5, L: 5, X: 4-5, E: 1-2/ Alt: 2-3/ Mont: rr, SmedD: r, SmedH: er/ PT: 1/ w/ Note: this species seems to be fairly common in central Europe (Jørgensen & al. 2013). It grows on steeply inclined, sunny surfaces of calcareous or basic siliceous rocks with periodical water seepage after rain, with optimum in upland areas. See also note on *Anema moedligense*.

Anisomeridium (Müll. Arg.) M. Choisy

Icon. Lich. Univ., 1, 1828, *nom. cons.* - *Arthopyrenia* sect. *Anisomeridium* Müll. Arg., Flora, 64: 290, 1883.

This is a large genus of more than 200, mostly tropical to warm-temperate species having mostly thin thalli with *Trentepohlia* photobiont, black perithecia, and 1-3-septate ascospores. The anastomosing paraphyses, the relatively broad, ovoid ascospores, and the macroconidia embedded in a gelatinous matrix separate this genus from *Strigula*. The closely related *Megalotremis* and *Musaespora* have large, rather thick-walled ascospores. The genus belongs to the Monoblastidiales, an order with a single family of chiefly tropical pyrenocarpous lichens (Dothideomycetes), with the highest diversity in tropical rain forests and periodically dry ecosystems of South America. The genus is poorly known in Italy: *A. carinthiacum* (J. Steiner) R.C. Harris and *A. viridescens* (Coppins) R.C. Harris, known from neighbouring countries, should be looked for, especially in northern Italy. Good descriptions and a key to the British species are in Orange (2013b). Type: *Arthopyrenia xylogena* Müll. Arg., a non-lichenised, saprophyte (!). The name is conserved against *Microthelia* Körb. (1855), and *Ditremis* Clem. (1909).

Anisomeridium bifforme (Schaer.) R.C. Harris

in Vězda, Sched. ad Lich. Sel. Exs., fasc. 61: 1 (nr. 1503), 1978 - *Verrucaria bifformis* Schaer. Lich. Helv. Spicil., 2: 56, 1826.

Syn.: *Acrocordia bifformis* (Schaer.) Arnold, *Acrocordia polycarpa* (Körb.) Körb., *Acrocordia scotophora* A. Massal., *Arthopyrenia bifformis* (Schaer.) A. Massal., *Arthopyrenia byssacea* (Taylor) A.L. Sm., *Arthopyrenia conformis* (Nyl.) Müll. Arg., *Ditremis bifformis* (Schaer.) R.C. Harris, *Épicymathia thallophila* (Cooke) Sacc., *Leiophloea bifformis* (Schaer.) Trevis., *Sagedia callospisma* A. Massal.?, *Verrucaria conformis* Nyl.

N - VG (TSB 16141), **Frl** (TSB 36583), **Ven** (Lazzarin 2000b, Nascimbene 2008, Nascimbene & al. 2008e, Nascimbene & Marini 2010), **Lomb** (Valcuvia & Truzzi 2007b), **Piem** (Matteucci & al. 2013). **C - Umb** (Ravera 1998, Ravera & al. 2006), **Laz, Sar, S - Camp** (Aprile & al. 2003b), **Cal** (Puntillo 1996)

Cr/ Tr/ S/ Epiph/ pH: 2-3, L: 3-4, X: 2, E: 1-2/ Alt: 1-3/ Mont: er, SmedD: er, SmedH: r, MedH: vr/ PT: 1/ suboc/ Note: a mild-temperate, probably holarctic species found on deciduous trees in open and humid woodlands, e.g. along creeks and rivers on *Fraxinus*, *Populus* and *Salix*, sometimes also on oaks.

Anisomeridium macrocarpum (Körb.) V. Wirth

Flechtenflora: 531, 1980 - *Acrocordia macrocarpa* Körb., Parerga Lichenol., 4: 347, 1863.

N - Ven.

Cr/ Tr/ S/ Epiph/ pH: 2-3, L: 3-4, X: 2, E: 1-2/ Alt: 2/ SmedD: er/ PT: 1/ Note: a mainly central European species also known from northern Spain, found on the trunks of broad-leaved deciduous trees, in woodlands, below the montane belt; certainly very rare in Italy.

Anisomeridium polypori (Ellis & Everh.) M.E. Barr

in Barr & al., Mem. New York Bot. Gard., 79: 76, 1996 - *Apiospora polypori* Ellis & Everh., North Amer. Pyrenom.: 311, 1892.

Syn.: *Anisomeridium nyssaegenum* (Ellis & Everh.) R.C. Harris, *Anisomeridium juistense* (Erichsen) R.C. Harris, *Anisomeridium willeyanum* (R.C. Harris) R.C. Harris, *Arthopyrenia willeyana* R.C. Harris, *Didymella polypori* (Ellis & Everh.) Ellis & Everh., *Ditremis nyssaegena* (Ellis & Everh.) R.C. Harris, *Melanopsamma corticola* Ellis & Everh., *Mycosphaerella hepaticarum* (Pat.) Petrak, *Sarcinulella banksiae* B. Sutton & Alcorn, *Stigmatea hepaticarum* Pat., *Thelidium juistense* Erichsen, *Zygonella nyssaegenum* Ellis & Everh.

N - **Frl** (Tretiach & Carvalho 1993), **Ven** (Thor & Nascimbene 2007), **TAA** (Thor & Nascimbene 2007, Nascimbene & al. 2014, 2015, Nascimbene 2014, Nimis & al. 2015), **Lomb** (UPS-L-166802), **Piem**, **Emil** (Nimis & al. 1996). **C** - **Tosc** (Tretiach & Carvalho 1993, Tretiach & Nimis 1994, Brunialti & Frati 2010, Benesperi 2011), **Marc** (Nimis & Tretiach 1999). **S** - **Pugl** (Nimis & Tretiach 1999), **Bas** (Bartoli & Puntillo 1996, 1998), **Cal** (Puntillo 1996).

Cr/ Tr/ S/ Epiph/ pH: 3-4, L: 2, X: 2, E: 1-2/ Alt: 1-3/ Mont: r, SmedD: rr, SmedH: rc, MedH: vr/ PT: 1/ suboc/ Note: a mild-temperate, perhaps holarctic species, mainly found on *Sambucus* along rivers and brooks. Overlooked for a long time, and certainly more widespread throughout Italy, with optimum in the submediterranean belt. For further information see Aptroot (1999).

Anthracocarpon Breuss

Ann. naturhist. Mus. Wien, Ser. B, Bot. Zool., 98 (suppl.): 40, 1996.

The thallus of this recently-described genus of the Verrucariaceae is squamulose, with an anatomy very similar to that of the genus *Placidium*, but characterised by the presence of *Endocarpon*-type pycnidia, perithecia with a black to carbonaceous exciple (at least on the top), and rhizohyphae and rhizines as attachment organs (Breuss 1996). Of the three species reported worldwide, only one occurs in Europe. Type: *A. virescens* (Zahlbr.) Breuss

Anthracocarpon virescens (Zahlbr.) Breuss

Ann. naturhist. Mus. Wien, 98B: 40, 1996 - *Dermatocarpon virescens* Zahlbr., Österr. bot. Z., 68: 69, 1919.

Syn.: *Catapyrenium virescens* (Zahlbr.) Breuss

S - **Cal** (Puntillo 1996).

Sq/ Ch/ S/ Terr/ pH: 4-5, L: 4-5, X: 4-5, E: 1/ Alt: 1-2/ SmedH: vr, MedH: r/ PT: 1/ Note: a mainly Mediterranean lichen growing in dry grasslands on calcareous substrata.

Anzina Scheid.

in Vězda, Sched. ad Lich. Sel. Exs., 73: 5 (nr. 1851), 1982.

A monotypic genus including a muscicolous, corticolous or lignicolous species occurring on acid substrata in bogs and in forests, with a mainly boreal-montane distribution. Its taxonomic position within the Ostropomycetidae is still not clear. Type: *A. carneonivea* (Anzi) Scheid.

Anzina carneonivea (Anzi) Scheid. var. *carneonivea*

in Vězda, Sched. ad Lich. Sel. Exs., 73: 5 (nr. 1815), 1982 - *Gyalolechia carneonivea* Anzi, Atti Soc. Ital. Sc. Nat., 11: 163, 1868.

Syn.: *Caloplaca carneonivea* (Anzi) Jatta, *Diphrotora carneonivea* (Anzi) Jatta, *Gyalecta carneonivea* (Anzi) Lettau, *Lecidea carneonivea* (Anzi) Arnold, *Pertusaria carneonivea* (Anzi) Vain., *Pertusaria infralaponica* Vain., *Pertusaria tauriscorum* Zahlbr., *Secoliga carneonivea* (Anzi) Arnold, *Varicellaria carneonivea* (Anzi) Erichsen

N - **VG** (TSB 17933), **Frl**, **Ven** (TSB 17934), **TAA** (Škaloud & Peksa 2008, Nascimbene & al. 2007b, Nimis & al. 2015), **Lomb**.

Cr/ Ch/ S/ Epiph-Terr-Lign/ pH: 1-2, L: 3-4, X: 2-3, E: 1/ Alt: 3-4/ Salp: rr, Mont: vr, SmedD: er/ PT: 1/ Note: on acidic substrata such as bark, especially of conifers, wood, plant debris, muribund bryophytes, in the understory of upper montane moist forest, and among shrubs in the subalpine belt of the Alps. The var. *tetraspora* Scheid., known from neighbouring countries, should be looked for in the Italian Alps.

Aphanopsis Sydow

Nyl. ex Sydow, Flecht. Deutschl.: 307, 325, 1887.

A monotypic genus of the Aphanopsidaceae, including a species occurring on disturbed humid soil, also characterised by goniocysts, *i.e.* structures resembling soredia morphologically but not functionally, which consist of a group of algae surrounded by a pseudoparenchymatic layer of fungal hyphae. For further details see Printzen & Rambold (1995) and Printzen & al. (2012). Type: *A. coenosa* (Ach.) Coppins & P. James

Aphanopsis coenosa (Ach.) Coppins & P. James

Lichenologist, 16: 248, 1984 - *Collema coenosum* Ach., Lichenogr. Univ.: 629, 1810.

Syn.: *Aphanopsis terrigena* (Ach.) Nyl ex P. Syd., *Biatora comensis* Anzi, *Lecidea comensis* (Anzi) Jatta, *Lecidea humigena* Taylor, *Lecidea praecox* Vězda, *Lecidea terrigena* Ach.

N - Lomb (Anzi E. C. I. II 1123: Printzen 1995).

Cr/ Ch/ S/ Terr/ pH: 2-3, L: 3, X: 2, E: 1/ Alt: 2-3/ Mont: vr, SmedD: er/ PT: 1-2/ Note: on humid, bare, clayey or fine-grained sandy soil on track sides or ditch margins in deciduous woodlands, with optimum in the montane belt. Easy to overlook, but certainly not common in Italy.

Arctoparmelia Hale

Mycotaxon, 25: 251, 1986.

This mainly arctic-boreal, foliose genus of 5 species is characterised by a sparse development of rhizines. Although the yellow-green thalli are reminiscent of some *Xanthoparmelia* species, morphological and molecular analyses support a position in the hypogymnioid clade of the Parmeliaceae (Wei & al. 2015). For further details see Thell & al. (2012). Type: *A. centrifuga* (L.) Hale

Arctoparmelia centrifuga (L.) Hale

Mycotaxon, 25: 252, 1986 - *Lichen centrifugus* L., Sp. Pl., 2: 1142, 1753.

Syn.: *Parmelia centrifuga* (L.) Ach.

N - Ven, Piem.

Fol.n/ Ch/ S/ Sax/ pH: 1-2, L: 3-4, X: 4, E: 1-3/ Alt: 4-5/ Alp: er, Salp: er/ PT: 1/ Note: an arctic-alpine lichen of exposed siliceous rocks near or above treeline, certainly very rare in the Alps (Austria). Italian records need confirmation (see Nimis 1993: 490).

Arctoparmelia incurva (Pers.) Hale

Mycotaxon, 25: 252, 1986 - *Lichen incurvus* Pers., Ann. Bot. (Usteri), 7: 24, 1794.

Syn.: *Imbricaria incurva* (Pers.) DC., *Parmelia incurva* (Pers.) Fr., *Xanthoparmelia incurva* (Pers.) Hale

N - Piem (Isocrono & al. 2004, Isocrono & Piervittori 2008), **Emil.**

Fol.n/ Ch/ A.s/ Sax/ pH: 1-2, L: 3-5, X: 3-4, E: 1-3/ Alt: 3-5/ Alp: er, Salp: er, Mont: er/ PT: 1-2/ Note: a circumpolar, arctic-alpine to boreal-montane species found on steeply inclined, hard, acid siliceous rocks in cold, wind-exposed mountain summits, in dry-continental parts of the Alps also found on wood and roofing tiles. Perhaps more widespread in the Alps, but never common.

Arthonia Ach.

Neues J. Bot., 1: 3, 1806, *nom. cons.*

This is a large genus in the Arthoniaceae with several hundred species, widespread in all continents (Sundin & al. 2012). Several species are non-lichenised, and live as saprophytes and parasites on other organisms, including lichens. Recent molecular revisions of the Arthoniales (Ertz & al. 2009, Ertz & Tehler 2011, Frisch & al. 2014) revealed the homoplastic nature of morphological characters traditionally used to circumscribe genera, such as exciple carbonisation and ascomatal structure. The transfer of *Opegrapha atra* and *O. calcarea* to the genus *Arthonia* allows the few sequenced species of this genus and the family Arthoniaceae to be recognised as monophyletic. After the molecular analysis of the Arthoniales by Frisch & al. (2014), some species are presently segregated into the genus *Coniocarpon*, *Arthonia impolita* belongs in *Pachnolepia*, *A. endlicheri* in *Sparria*, and *Arthonia leucopellaea* is placed into the genus *Felipes*. See also Sundin & Tehler (1998) and Sundin & al. (2012). Many or even most of the species listed below are not close to the type species and are likely to be eventually placed in other genera. Type: *A. radiata* (Pers.) Ach.

Arthonia albopulverea Nyl.

Ann. Sci. Nat. Bot., ser. 3, 20: 319, 1853.

Syn.: *Arthonia crozalsiana* B. de Lesd., *Arthothelium adriaticum* Zahlbr., *Arthothelium burolletii* B. de Lesd., *Arthothelium crozalsianum* B. de Lesd., *Arthothelium xylographoides* Müll. Arg.

C - Tosc (Grube & Giralto 1996), **Laz** (Grube & Giralto 1996), **Sar** (Grube & Giralto 1996, Zedda 2002, Rizzi & al. 2011). **S - Camp** (Garofalo & al. 2010), **Pugl** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Ottonello & al. 1994, Grube & Giralto 1996, Grillo & al. 2002, Grillo & Caniglia 2004, Cataldo & Minissale 2015).

Cr/ Tr/ S/ Epiph/ pH: 1-2, L: 3-4, X: 2-3, E: 1/ Alt: 1-2/ SmedH: er, MedH: r/ PT: 1/ suboc, p/ Note: a mild-temperate species, also known from western North America, mainly found near the coast, mostly on the smooth bark of *Pinus* in stands subject to humid maritime winds, but less bound to humid situations than *A. beccariana*. Doubtfully lichenised.

Arthonia almquistii Vain.

Meddeland. Soc. Fauna Fl. Fenn., 10: 209, 1883.

C - Tosc (Brackel 2015, 2016).

LF/ / S/ Sax-Terr/ pH: 2-3, L: 3, X: 2-3, E: 1-2/ Alt: 1-2/ SmedH: er, MedH: er / PT: 1-2/ paras crustose lichens/ Note: a widespread but not common lichenicolous fungus growing on different saxicolous crustose lichens; the sample from Tuscany was collected on *Trapelia coarctata*.

Arthonia anomorphila Coppins & P. James
in Coppins, Lichenologist, 21: 196, 1989.

C - **Abr** (Nimis & Tretiach 1999).

Cr/ Tr/ S/ Epiph/ pH: 1-2, L: 3-4, X: 2, E: 1/ Alt: 2/ SmedD: vr/ PT: 0/ u/ Note: on dry, usually rough bark near the bases of trunks of ancient oaks, more rarely on smooth bark, in long-established woodlands and parklands, certainly very rare in Italy.

Arthonia apatetica (A. Massal.) Th. Fr.

Bot. Not.: 56, 1866 - *Catillaria apatetica* A. Massal., *Symmicta* Lich.: 50, 1855.

Syn.: *Abrothallus exilis* auct. non (Flörke) A. Massal., *Allarthonia exilis* auct. non (Flörke) Sandst., *Arthonia exilis* auct., *Arthonia rugulosa* (Kremp.) Almq., *Catillaria exilis* auct., *Lecania zinaidae* Oxner, *Lecidea synochea* var. *exilis* Flörke

N - **Frl**, **Ven** (Lazzarin 2000b, Nascimbene & al. 2005b, Thor & Nascimbene 2007), **TAA** (Nascimbene & al. 2007b, Nascimbene 2014), **Lomb**, **Piem** (S-F68607). C - **Marc** (Nimis & Tretiach 1999), **Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **Sar** (Zedda 2002, Rizzi & al. 2011). S - **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (van den Boom & Khodosovtsev 2004), **Si** (Nimis & al. 1994, Grillo & Cristaudo 1995).

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 3, X: 2-3, E: 1-2/ Alt: 1-3/ Mont: r, SmedD: rr, Pad: er, SmedH: rr, MedH: r/ PT: 1/ #/ Note: a mainly temperate species found on base-rich and soft bark, especially of *Sambucus*, and on young twigs of deciduous trees in sheltered situations, with optimum in the submediterranean belt. The species is heterogeneous, and Italian material needs revision.

Arthonia apotheciorum (A. Massal.) Almq.

K. Svenska Vetensk.-Akad. Handl., 17, 6: 58, 1880 - *Sphaeria apotheciorum* A. Massal., Ric. Auton. Lich. Crost., 26, fig. 44, 1852.

Syn.: *Arthonia clemens* auct. p.p. non (Tul.) Th. Fr., *Conida apotheciorum* (A. Massal.) A. Massal.

N - **Ven** (Lazzarin 2000b, Brackel 2016). S - **Pugl** (TSB 23181 as *A. clemens*, Brackel 2016), **Si** (Nimis & al. 1994 as *A. clemens*, Brackel 2016).

LF/ / S/ Sax/ pH: 3-5, L: 3-5, X: 3-5, E: 3-4/ Alt: 1-2/ SmedD: r, Pad: r, SmedH: r, MedH: vr, MedD: er/ PT: 1-3/ paras *Myriolecis albescens*/ Note: a parasite in the apothecia of *Myriolecis albescens* and related species, certainly more widespread in Italy; often confused with other related species, especially with *A. clemens*.

Arthonia arthonioides (Ach.) A.L. Sm.

Monogr. Brit. Lich., 2: 213, 1911 - *Lecidea arthonioides* Ach., Lichenogr. Univ.: 178, 1810.

Syn.: *Arthonia aspersa* Leight., *Arthonia lecideoides* Th. Fr., *Arthonia trachylioides* Nyl., *Arthonia xylophila* V. Wirth & P. James, *Trachylia arthonioides* (Ach.) Fr.

N - **Lomb**, **S** - **Camp**, **Bas** (Puntillo & al. 2012), **Si** (Grillo & Caniglia 2004).

Cr/ Tr/ S/ Sax-Epiph/ pH: 1-2, L: 2-3, X: 2, E: 1/ Alt: 1-3/ Mont: er, SmedH: vr, MedH: vr/ PT: 0/ suboc, u/ Note: a southern species, known from Europe and North America, found on acidic rocks and exposed roots in dry underhangs, also on dry undersides of trees in sheltered, humid situations, such as in forests.

Arthonia atra (Pers.) A. Schneid.

Guide Study Lich.: 131, 1898 - *Opegrapha atra* Pers., Ann. Bot. (Usteri), 1: 30, 1794.

Syn.: *Opegrapha atra* f. *lignicola* Harm., *Opegrapha atra* f. *platanoides* Nyl., *Opegrapha atra* var. *cerasi* (Chevall.) Arnold, *Opegrapha atra* var. *denigrata* (Ach.) Schaer., *Opegrapha atra* var. *hapalaea* (Ach.) Nyl., *Opegrapha atra* var. *limitata* Opiz, *Opegrapha atra* var. *recta* Bagl., *Opegrapha atra* var. *rimosa* (DC.) Zahlbr., *Opegrapha atra* var. *stenocarpa* (Ach.) Dufour, *Opegrapha atra* var. *vulgaris* Körb., *Opegrapha bullata* auct. ital. p.max.p., *Opegrapha denigrata* Ach., *Opegrapha fuliginosa* Pers. ex Ach., *Opegrapha salicina* A. Massal., *Opegrapha stenocarpa* Ach., *Opegrapha stenocarpa* var. *abbreviata* (Chevall.) Mann, *Opegrapha taxicola* Leight.

N - **VG**, **Frl** (Badin & Nimis 1996, Bernini & al. 2010), **Ven** (Lazzarin 2000b, Valcuvia & al. 2000c, Nascimbene 2005c), **TAA** (Nascimbene & al. 2007b, 2014, Nascimbene 2014, Nimis & al. 2015), **Lomb** (Alessio & al. 1995, Grieco & Groppali 1995, Brusoni & al. 1997, Zocchi & al. 1997, Roella 1999, Brusoni & Valcuvia 2000, Anderi & al. 2005, Valcuvia & Truzzi 2007b, Furlanetto 2010), **Piem** (Caniglia & al. 1992, Arosio & al. 1998, Isocrono & al. 2003, Furlanetto 2010, Matteucci & al. 2010), **VA** (Valcuvia 2000, Valcuvia & al. 2000b), **Emil** (Nimis & al. 1996, Valcuvia & Grieco 1995, Valcuvia & Savino 2000, Benesperi 2009), **Lig** (Valcuvia & al. 2000, Giordani & al. 2002, Giordani 2006). C - **Tosc** (Tretiach & Nimis 1994, Loppi & Putorti 1995b, Putorti & Loppi 1999, Loppi & al. 2002, 2002b, 2004, Lorenzini & al. 2003, Landi & Loppi 2003, Pasquinelli & al. 2009, Brunialti & Frati 2010, Pasquinelli & Puccini 2010, Benesperi 2011, Benesperi & al. 2013, Nascimbene & al. 2015), **Umb** (Ravera 1998, Ravera & al. 2006), **Marc** (Nimis & Tretiach 1999, Frati & Brunialti 2006), **Laz** (Gigante & Petriccione 1995, Bartoli & al. 1997, Ravera 2006c), **Abr** (Nimis & Tretiach 1999, Catalano & al. 2016), **Mol** (Garofalo & al. 1999, 2010, Caporale & al. 2008, Nimis & Tretiach 1999, Paoli & al. 2015), **Sar** (Zedda 2002, Rizzi & al. 2011, Cossu 2013). S - **Camp** (Garofalo & al. 1999, Ricciardi & al. 2000, Aprile & al. 2002, 2003, 2003b, 2011, Nimis & Tretiach 2004, Catalano & al. 2010, 2016), **Pugl** (Garofalo & al. 1999, Nimis & Tretiach 1999, Durini & Medagli 2002, 2004), **Bas** (Bartoli & Puntillo 1998, Nimis & Tretiach 1999,

Potenza 2006), **Cal** (Puntillo 1995, 1996, Puntillo & Puntillo 2004), **Si** (Nimis & al. 1994, Ottonello & Salone 1994, Ottonello & al. 1994, Grillo & Cristaudo 1995, Grillo & Carfi 1997, Grillo & al. 2002, Grillo & Caniglia 2004).

Cr/ Tr/ S/ Epiph/ pH: 2-3, L: 2-4, X: 2-3, E: 1-2/ Alt: 1-3/ Mont: rr, SmedD: c, Pad: er, SmedH: vc, MedH: rr, MedD: er/ PT: 1-2/ Note: a widespread temperate lichen, one of the most common epiphytic species of the genus throughout Italy.

Arthonia beccariana (Bagl.) Stizenb.

Ber. Tätigk. St. Gall. naturw. Ges. 1889/1890: 200, 1891 - *Arthothelium beccarianum* Bagl., N. Giorn. Bot. Ital., 7: 252, t. 9, fig. 14, 1875.

Syn.: *Arthothelium beccarianum* var. *leprosum* Bagl., *Arthothelium beccarianum* var. *opegraphoides* Bagl., *Arthonia beccariana* f. *leprosa* (Bagl.) Stizenb., *Arthonia sardoa* (Bagl.) H. Olivier, *Arthothelium sardoum* Bagl., *Arthothelium pruinasces* Zahlbr.

C - Tosc, Laz, Sar (Grube & Giralt 1996), **S - Camp, Pugl** (Durini & Medagli 2004), **Cal** (Puntillo 1995, 1996, Grube & Giralt 1996), **Si** (Nimis & al. 1994, Caniglia & Grillo 2006b).

Cr/ Tr/ S/ Epiph/ pH: 1-2, L: 3-4, X: 2-4, E: 1/ Alt: 1/ MedH: vr/ PT: 1/ suboc, coast/ Note: a mild-temperate species also reported from California, found on smooth bark of broad-leaved trees in sites subject to humid maritime winds, mostly in the Mediterranean belt. Restricted to a few sites in Tyrrhenian Italy.

Arthonia biatoricola Ihlen & Owe-Larss.

in Ihlen & al., Symb. Bot. Upsal., 34, 1: 107, 2004.

N - TAA (UPS-L-166791: Brackel 2016).

LF/ / S/ Epiph-Lign/ pH: 2-3, L: 3, X: 2-3, E: 1-2/ Alt: 3-4/ Salp: r, Mont: r/ PT: 1/ paras *Biatora efflorescens*/ Note: a recently-described parasite of *Biatora efflorescens*, perhaps more widespread in the Alps.

Arthonia bueriana (J. Lahm) Zahlbr.

Cat. Lich. Univ., 2: 14, 1922 - *Coniangium buerianum* J. Lahm, Verh. zool.-bot. Ges. Wien, 23: 507, 1874.

Syn.: *Arthonia convexella* Nyl.

N - Lomb (Morisi & Sereno 1995).

F/ / S/ Epiph/ pH: 1-2, L: 3-4, X: 3, E: 1/ Alt: 3/ Mont: er/ PT: 1/ p/ Note: a rare, non-lichenised corticolous species known from a few stations in the montane belt of the Alps and in central Europe.

Arthonia caesiella Nyl.

Bot. Not.: 161, 1853.

Syn.: *Arthonia galactiformis* Flagey, *Arthonia aphthosa* Flagey, *Arthonia aphthoides* Flagey nom. superfl.

C - Sar (Sundin 1999).

Cr/ Tr/ S/ Epiph/ pH: 2-3, L: 4-5, X: 4-5, E: 1-2/ Alt: 1/ MedH: vr/ PT: 1/ p/ Note: a Mediterranean-Atlantic species found on smooth bark of deciduous and coniferous trees. Perhaps more widespread in the humid parts of Mediterranean Italy. The species is included in the Italian red list of epiphytic lichens as "Critically Endangered" (Nascimbene & al. 2013c).

Arthonia calabrella Puntillo

I Licheni di Calabria: 200, 1996.

C - Laz (Ravera 2001), **S - Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999, Potenza 2006, Potenza & al. 2010), **Cal** (Puntillo & Vězda 1994, Puntillo 1995, 1996, Grube & Giralt 1995).

Cr/ Tr/ S/ Epiph/ pH: 3, L: 3, X: 2, E: 1-2/ Alt: 1-2/ SmedH: er, MedH: vr, MedD: er/ PT: 0/ suboc/ Note: only locally abundant in humid riparian forests of central and southern Italy, mostly on the smooth, base-rich bark of broad-leaved deciduous trees (e.g. *Fraxinus*). The species is included in the Italian red list of epiphytic lichens as "Vulnerable" (Nascimbene & al. 2013c).

Arthonia calcarea (Sm.) Ertz & Diederich

in Ertz & al., Mycol. Res., 113: 146, 2009 - *Opegrapha calcarea* Turner ex Sm. in Smith & Sowerby, Engl. Bot., 25: 1790, 1807.

Syn.: *Opegrapha chevallieri* Leight., *Opegrapha conferta* auct. p.p. non Anzi, *Opegrapha confluens* auct. non (Ach.) Stizenb.

N - VG, Fri (TSB 24287), **Ven** (Caniglia & al. 1993), **TAA, Lomb, Piem** (Isocrono & al. 2004), **Lig, C - Tosc, Marc** (Nimis & Tretiach 1999), **Umb** (Nimis & Tretiach 1999, Ravera & al. 2006, Panfili 2007), **Laz** (Nimis & Tretiach 2004), **Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach, 1999, 2004, Caporale & al. 2008, Genovesi & Ravera 2014), **Sar, S - Camp** (Aprile & al. 2003, 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010), **Pugl** (Nimis & Tretiach 1999, Durini & Medagli 2002, 2004), **Bas** (Bartoli & Puntillo 1998, Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994, Grillo & al. 2002, 2009, Grillo & Caniglia 2004, Caniglia & Grillo 2005, 2006, Genco & al. 2007, Gianguzzi & al. 2009).

Cr/ Tr/ S/ Sax/ pH: 3-5, L: 1-3, X: 1-2, E: 1-3/ Alt: 1-4/ Salp: er, Orom: er, Mont: rc, SmedD: c, Pad: er, SmedH: vc, MedH: rc, MedD: r/ PT: 1-2/ Note: on limestone, brick, roofing tiles, etc. in sheltered situations, the most common calcicolous species of the genus throughout Italy, with a wide altitudinal range. According to Roux & coll. (2014) *A. trifurcata* is an independent species: some records could refer to that species.

Arthonia calcicola Nyl.

Bot. Not.: 162, 1853.

Syn.: *Allarthonia calcicola* (Nyl.) Redinger

N - VG (TSB 10023), **TAA. C - Tose, Marc** (Nimis & Tretiach 1999), **Umb** (Nimis & Tretiach 1999, Ravera & al. 2006, Panfili 2007), **Laz** (Nimis & Tretiach 2004), **Abr** (Tretiach 2015b). **S - Camp** (Aprile & al. 2003b, Nimis & Tretiach 2004), **Pugl** (Nimis & Tretiach 1999), **Si** (Caniglia & Grillo 2005, 2006).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 4-5, X: 3-4, E: 3-4/ Alt: 1-2/ SmedD: vr, Pad: er, SmedH: r, MedH: rc, MedD: rr/ PT: 1-2/ p/ Note: an early coloniser on exposed calcareous rocks below the montane belt; overlooked and probably more common, especially in the eu-Mediterranean belt. It also occurs in warm-dry Alpine valleys.

Arthonia cinereopruinosa Schaer.

Enum. Crit. Lich. Eur.: 243, 1850.

Syn.: *Arthonia lilacina* (Ach.) Körb., *Pyrenotheca stictica* Fr., *Trachylia cinereopruinosa* (Schaer.) A. Massal.

N - Frl, Ven (Nascimbene & Marini 2010), **Lomb. S - Camp, Bas.**

Cr/ Tr/ S/ Epiph/ pH: 1-2, L: 2-3, X: 1-2, E: 1/ Alt: 2-3/ Mont: er, SmedD: er, SmedH: er/ PT: 0/ Note: a mild-temperate species found on smooth bark of deciduous trees in dense humid forests. The old records from Campania and Basilicata (see Nimis 1993: 74) need re-confirmation. The species is included in the Italian red list of epiphytic lichens as “Critically Endangered” (Nascimbene & al. 2013c).

Arthonia clemens (Tul.) Th. Fr.

K. Svenska Vetensk.-Akad. Handl., n. ser. 7, 2: 46, 1867 - *Phacopsis clemens* Tul., Ann. Sc. Nat. Bot., ser. 3, 17: 124, 1852.

Syn.: *Arthonia vagans* var. *lecanorina* Almq., *Coniangium clemens* (Tul.) Stein, *Conida clemens* (Tul.) A. Massal.

N - Ven, TAA (Hafellner 1995b, Nascimbene & al. 2004), **Piem** (Isocrono & al. 2004).

LF/ / S/ Sax/ pH: 4-5, L: 4-5, X: 3-4, E: 3-4/ Alt: 2-5/ Alp: vr, Salp: vr, Mont: er, SmedD: er/ PT: 1-2/ paras *Rhizoplaca*/ Note: a holarctic lichenicolous fungus growing in the apothecia of *Rhizoplaca chrysoleuca*, very much confused with other species in Italy (see note on *A. galactinaria*). Records from other hosts than *Rhizoplaca* are not reported here.

Arthonia coronata Etayo

Bull. Soc. linn. Provence, 47: 95, 1996.

C - Tose (Etayo 2002, Svensson & Westberg 2010, Brackel 2015, 2016).

LF/ / S/ Epiph-Terr/ pH: 2-3, L: 3-4, X: 3, E: 1-3/ Alt: 2/ SmedH: vr/ PT: 1-2/ paras *Cladonia* and *Flavoparmelia*/ Note: known from several European countries and from the Canary Islands, this lichenicolous fungus grows on *Cladonia* spp. and on the soralia of *Flavoparmelia caperata*.

Arthonia cretacea Zahlbr.

Österr. bot. Z., 68: 148, 1919.

S - Si (Nimis & al. 1994).

Cr/ Tr/ S/ Sax/ pH: 5, L: 2-3, X: 1-2, E: 1/ Alt: 1/ MedH: vr/ PT: 1/ coast, u/ Note: a mainly Mediterranean species found in shaded underhangs of calcareous rocks subject to humid maritime winds.

Arthonia cytisi A. Massal.

Summa Animadv.: 10, 1853.

Syn.: *Arthonia astroidea* f. *cembrae* Arnold, *Arthonia epipasta* f. *ribis-petraei* Garov.?, *Lecideopsis cytisi* (A. Massal.) Dalla Torre & Sarnt.

N - Ven (Sundin 1999, Lazzarin 2000b), **Lomb** (Sundin 1999), **Piem** (S-F68556).

F/ / S/ Epiph/ pH: 2-3, L: 4-5, X: 3-4, E: 2-3/ Alt: 3-4/ Salp: er, Mont: vr/ PT: 1/ Note: only known from the Italian Alps, on *Laburnum*, *Fraxinus*, *Pinus cembra* and *Ribes*, this non-lichenised species is worthy of further study. It is included in the Italian red list of epiphytic lichens as “Endangered” (Nascimbene & al. 2013c).

Arthonia destruens Rabenh.

Lich. Eur. Exs.: nr. 816, 1868.

C - Marc (Brackel 2015, 2016), **Abr** (Brackel 2015, 2016). **S - Si** (Brackel 2008b, 2016).

LF/ / S/ Epiph/ pH: 2-3, L: 4-5, X: 3, E: 3-4/ Alt: 1-3/ Mont: r, SmedD: rr, Pad: er, SmedH: vr, MedH: vr/ PT: 1-3/ paras *Physcia* spp./ Note: a lichenicolous fungus whose known hosts, in the narrower concept of Grube & al. (1995), are *Physcia aipolia* and *P. stellaris*; certainly more widespread in Italy. The sample from Sicily was collected on *P. leptalea*.

Arthonia didyma Körb.

Denkschr. schles. Ges. vaterl. Kultur: 235, 1853.

Syn.: *Arthonia aspersella* Leight., *Arthonia atrofuscella* Nyl., *Arthonia pineti* Körb., *Arthonia sapineti* Nyl., *Caldesia didyma* (Körb.) Trevis.

N - Ven, **TAA** (Nascimbene & al. 2007b, 2014, Nascimbene 2014), **Lomb, Piem** (Piervittori 2003, Isocrono & al. 2004, Giordani & Malaspina 2016). **C** - **Tosc** (Stofer 2006, Brunialti & Frati 2010, Brunialti & al. 2012b), **Umb** (Ravera 1998, Ravera & al. 2006), **Laz** (Ravera 2001, 2006c, Nimis & Tretiach 2004, Stofer 2006), **Abr** (Nimis & Tretiach 1999, Corona & al. 2016), **Mol** (Caporale & al. 2008, Ravera & Genovesi 2010, Ravera & al. 2010), **Sar** (Rizzi & al. 2011, Cossu 2013). **S** - **Pugl** (Nimis & Tretiach 1999), **Bas** (Potenza 2006, Potenza & al. 2010, Potenza & Fascetti 2012), **Cal** (Puntillo 1996).

Cr/ Tr/ S/ Epiph/ pH: 1-2, L: 2-4, X: 2, E: 1-3/ Alt: 1-3/ Mont: rr, SmedD: er, SmedH: er, MedH: er/ PT: 1/ suboc/ Note: a cool-temperate species found on smooth, acid bark in humid areas, most frequent in the beech belt of Tyrrhenian Italy.

Arthonia digitatae Hafellner

Linzer biol. Beitr., 31: 508, 1999.

C - **Tosc** (Brackel 2015, 2016).

LF/ / S/ Lign-Terr/ pH: 1, L: 3, X: 2-3, E: 1/ Alt: 2-3/ Mont: vr, SmedH: er/ PT: 1/ paras *Cladonia* spp./

Note: a lichenicolous fungus growing on red-fruited *Cladonia*-species; the sample from Tuscany was collected on *Cladonia polydactyla*.

Arthonia diploiciae Calat. & Diederich

in Calatayud & al., Mycotaxon, 55: 366, 1995.

C - **Sar** (Hafellner 1995b, Rizzi & al. 2011, Brackel 2016). **S** - **Camp** (Puntillo & Brackel 2016, Brackel 2016).

LF/ / S/ Sax/ pH: 3-4, L: 3-4, X: 2-3, E: 2-3/ Alt: 1-2/ SmedH: vr, MedH: r/ PT: 1/ suboc, paras *Diploicia canescens*/ Note: a recently-described lichenicolous fungus growing on *Diploicia*, to be looked for further, especially in Tyrrhenian Italy.

Arthonia dispersa (Schrad.) Nyl.

Lichenogr. Scand.: 261, 1861 *nom. illegit.* - *Opegrapha dispersa* Schrad., N. Ann. Bot., 13: 86, 1796.

Syn.: *Arthonia astroidea* var. *anastomosans* (Ach.) Ach., *Arthonia astroidea* var. *epipasta* (Ach.) Nyl., *Arthonia astroidea* var. *epipastoides* Leight., *Arthonia ectropoma* (A. Massal.) Trevis., *Arthonia epipasta* (Ach.) Körb., *Arthonia epipasta* f. *ribis* Bagl. & Carestia, *Arthonia epipastoides* Nyl., *Arthonia minutula* (Nyl.) Arnold, *Arthopyrenia ectropoma* A. Massal., *Lichen epipastus* Ach., *Opegrapha dispersa* var. *livida* Chevall., *Opegrapha epipasta* (Ach.) Ach.

N - **VG, Frl, Ven** (Lazzarin 2000b), **TAA** (Nascimbene & al. 2007b), **Lomb, Piem** (Piervittori 2003, Isocrono & al. 2004, 2007), **VA** (S-F71847), **Emil. C** - **Tosc** (Benesperi & al. 2007), **Marc** (Nimis & Tretiach 1999), **Laz** (Ravera & al. 1999, Munzi & al. 2007), **Abr, Sar** (Zedda 2002, 2002b, Cossu 2013). **S** - **Camp** (Nimis & Tretiach 2004), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999, Potenza 2006), **Cal** (Puntillo 1996, Incerti & Nimis 2006), **Si** (Grillo 1998, Grillo & Caniglia 2004, 2006).

Cr/ Tr/ S/ Epiph/ pH: 2-3, L: 3-4, X: 2-3, E: 1/ Alt: 1-3/ Mont: rr, SmedD: rc, Pad: vr, SmedH: rc, MedH: rr, MedD: vr/ PT: 1-2/ p/ Note: a holarctic species found on smooth, nutrient-rich bark, e.g. of *Fraxinus*. It belongs to a difficult complex which still awaits elucidation.

Arthonia epiphyscia Nyl.

Flora, 58: 361, 1875.

Syn.: *Conida epiphyscia* (Nyl.) Zopf

N - **VG. C** - **Tosc** (Tretiach & al. 2008, Brackel 2016), **Abr** (Brackel 2015, 2016). **S** - **Cal** (Brackel 2016)

LF/ / S/ Epiph/ pH: 3-4, L: 4-5, X: 3-4, E: 2-3/ Alt: 1-3/ Mont: vr, SmedD: r, Pad: er, SmedH: er, MedH: er/ PT: 1-2/ paras Physciaceae/ Note: commensalistic or parasitic on Physciaceae, this non-lichenised fungus was certainly overlooked and might be more widespread, but is certainly not common in Italy.

Arthonia excentrica Th. Fr.

K. Svenska Vetensk.-Akad. Handl., 7, 2: 46, 1867.

Syn.: *Allarthonia excentrica* (Th. Fr.) Zahlbr., *Arthonia albinula* Nyl.

N - **Emil** (Tretiach & al. 2008, Brackel 2016).

LF/ / A.s/ Epiph-Sax-Lign/ pH: 1-2, L: 2-4, X: 2-4, E: 1-2/ Alt: 2/ SmedD: vr/ PT: 1/ paras *Lepraria* spp./ Note: a non-lichenised lichenicolous fungus growing on *Lepraria*-species; probably more widespread, but largely overlooked.

Arthonia excipienda (Nyl.) Leight.

Lich. Fl. Gr. Brit.: 393, 1871 - *Arthonia astroidea* var. *excipienda* Nyl., Not. Sällsk. Fauna. Fl. Fenn., 4: 252, 1859.

Syn.: *Arthonia cytisi* var. *meridionalis* Zahlbr., *Arthonia dispersa* var. *excipienda* (Nyl.) H. Olivier, *Arthonia hibernica* Nyl.

N - **TAA** (Nascimbene & al. 2007b), **Lig** (Brunialti & al. 2001). **C** - **Tosc, Umb** (Ravera 1999, Ravera & al. 2006), **Abr** (Caporale & al. 2016). **S** - **Camp** (Garofalo & al. 2010), **Bas** (Potenza & al. 2010, 2014), **Si** (Cataldo & Ravera 2013c).

Cr/ Tr/ S/ Epiph/ pH: 3, L: 2-3, X: 1-2, E: 1/ Alt: 2-3/ Mont: vr, SmedD: er, SmedH: vr/ PT: 1/ p/ Note: on the smooth bark of deciduous trees and shrubs in riparian montane woodlands; probably overlooked, or confused with *A. punctiformis*. The species is included in the Italian red list of epiphytic lichens as "Vulnerable" (Nascimbene & al. 2013c).

Arthonia fuliginosa (Turner & Borrer) Flot.

Bot. Z., 8: 569, 1850 - *Spiloma fuliginosum* Turner & Borrer in Schaer., Naturw. Anz. allg. Schweiz. Ges. Naturw., 5: 33, 1821.

N - **Frl**, **TAA** (Nascimbene & al. 2007b).

Cr/ Tr/ S/ Epiph/ pH: 1-2, L: 2-3, X: 1-2, E: 1/ Alt: 3/ Mont: er/ PT: 0/ suboc/ Note: a mild-temperate species of acid bark, especially of *Abies*, in humid montane forests. It is included in the Italian red list of epiphytic lichens as "Endangered" (Nascimbene & al. 2013c).

Arthonia fusca (A. Massal.) Hepp

Flecht. Europ.: 534, 1860 - *Catillaria fusca* A. Massal., Ric. Auton. Lich. Crost., 80, 1852.

Syn.: *Allarthonia fusca* (A. Massal.) Sandst., *Allarthonia lapidicola* auct. non (Taylor) Zahlbr., *Allarthonia lapidicola* var. *runderella* (Nyl.) B. de Lesd.?, *Arthonia lapidicola* auct. non (Taylor) Branth & Rostr., *Arthonia koerberi* (J. Lahm) Malbr., *Arthonia runderella* Nyl., *Arthonia vagans* Almq. var. *koerberi* (J. Lahm) Almq., *Catillaria ooliticola* Walt. Watson, *Coniangium fuscum* (A. Massal.) A. Massal., *Coniangium rupestre* Körb.

N - **Ven** (Nimis 1994, Lazzarin 2000b), **TAA**, **Lomb**, **Piem** (TSB 32906), **Emil** (Nimis & al. 1996), **Lig**, **C - Tosc**, **Marc** (Nimis & Tretiach 1999), **Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 2004, Caporale & al. 2008), **Sar**, **S - Camp** (Aprile & al. 2003b), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Caniglia & Grillo 2005, 2006).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 4, X: 3-4, E: 3-4/ Alt: 2-5/ Alp: vr, Salp: r, Orom: vr, Mont: rr, SmedD: er, SmedH: er/ PT: 1-2/ p/ Note: a holarctic species of calcareous rocks and mortar, most frequent on pebbles, but also on walls, roofing tiles etc.; in the eu-Mediterranean belt it is replaced by *A. calcicola*. According to Roux (*in litt.*) this species might not be lichenised, and grows on poorly developed crustose lichens.

Arthonia galactinaria Leight.

Lich.-Fl. Great Brit., 3rd ed.: 426, 1879.

N - **TAA** (Brackel 2015, 2016), **C - Tosc** (Brackel 2015, 2016), **Abr** (Brackel 2015, 2016), **S - Pugl** (Brackel 2015, 2016), **Si** (Brackel 2008c, 2016).

LF/ / S/ Sax/ pH: 4-5, L: 3-5, X: 4-5, E: 2-4/ Alt: 1-3/ Mont: r, SmedD: r, SmedH: r, MedH: r, MedD: r/ PT: 2-3/ paras *Myriolecis* spp./ Note: this species is widespread and quite common in Europe and is also known from North America, northern Africa, and New Zealand. It seems to be restricted to taxa of the *Myriolecis dispersa*-group, whereas the very similar *Arthonia lecanorina* grows on *Lecanora albella*. Collections of *Arthonia clemens* (which is restricted to *Rhizoplaca*) on epilithic *Lecanora* species were reported from several localities in Italy; they may belong to *A. galactinaria* or to *A. apotheciorum*, which grows on *Myriolecis albescens*.

Arthonia galactites (DC.) Dufour

J. Phys. Hist. Nat., 87: 203, 1818 - *Verrucaria galactites* DC. in Lamarck & de Candolle, Fl. Franç., éd. 3, 2: 315, 1805.

Syn.: *Arthonia marginella* Dufour, *Arthonia punctiformis* var. *galactina* Ach. non *Arthonia cinereopruinosa* var. *galactina* sensu A. Massal., *Arthonia galactites* var. *depuncta* Nyl., *Coniangium galactites* sensu Bagl.?

N - **VG** (Sundin 1999), **Frl** (TSB 6585), **Ven**, **TAA** (Nascimbene & al. 2007b), **Lomb**, **Piem**, **Emil**, **Lig** (Watson 2014), **C - Tosc**, **Laz**, **Abr**, **Sar**, **S - Camp**, **Pugl**, **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Otonello & al. 1994, Grillo & Carfi 1997, Grillo 1998, Grillo & Caniglia 2004).

Cr/ Tr/ S/ Epiph/ pH: 3, L: 3-4, X: 2-3, E: 2-3/ Alt: 1-2/ SmedD: er, SmedH: vr, MedH: r/ PT: 1/ suboc/ p/ Note: a mild-temperate species with optimum on the smooth bark of *Fraxinus ornus*, but also on *Populus* and even *Pistacia*, probably overlooked or/and confused with other species, but certainly not common, and perhaps mostly coastal or Tyrrhenian Italy. Most records, especially those from northern Italy, need confirmation.

Arthonia glaucella Nyl.

Mém. Soc. Imp. Sc. Nat. Cherbourg, 4: 97, 1856.

Syn.: *Arthonia astroidea* var. *galactitella* (Nyl.) H. Olivier, *Arthonia epipastoides* var. *galactitella* Nyl., *Arthonia oleandri* Rabenh. in Bagl.

C - **Sar** (Sundin 1999, Rizzi & al. 2011).

Cr/ Tr/ S/ Epiph/ pH: 3, L: 3-4, X: 3, E: 1-2/ Alt: 1-2/ SmedH: er, MedH: vr/ PT: 1/ p/ Note: a mainly Mediterranean-Atlantic, European species growing on the smooth bark of broad-leaved trees and shrubs. Perhaps non-lichenised. The synonymy with *A. griseoalba* (Nimis 1993: 82), and hence the earlier record from Lombardia, are not certain (see Sundin 1999).

Arthonia granosa B. de Lesd.

Bull. Soc. Bot. France, 53: 518, 1906.

C - **Laz** (Ravera 2002b), **Sar** (Sundin 1999, Zedda 2002, Rizzi & al. 2011), **S - Pugl** (Nimis & Tretiach 1999).

Cr/ Tr/ S/ Epiph/ pH: 2-3, L: 3-4, X: 1-2, E: 2-3/ Alt: 1/ MedH: er, MedD: er/ PT: 1/ suboc, coast/ Note: a Mediterranean-Atlantic epiphytic species restricted to coastal situations with humid maritime winds, generally on *Juniperus*, but also on *Olea* and *Quercus ilex*. Perhaps non-lichenised. It is included in the Italian red list of epiphytic lichens as "Vulnerable" (Nascimbene & al. 2013c).

Arthonia hypobela Nyl.

Flora, 59: 576, 1876.

Syn.: *Allarthonia hypobela* (Nyl.) Zahlbr.

C - Sar (Rizzi & al. 2011).

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 2-3, X: 2, E: 1-2/ Alt: 1-2/ SmedH: er, MedH: er/ PT: 1/ suboc, #/ Note: a rather poorly known, probably western species growing on acid bark, including that of conifers; the Italian material was collected on *Quercus pubescens* and *Q. suber*. The species is included in the Italian red list of epiphytic lichens as "Data Deficient" (Nascimbene & al. 2013c).

Arthonia ilicina Taylor

Fl. Hibern., 2: 105, 1836.

Syn.: *Arthothelium ilicinum* (Taylor) P. James

S - Pugl (Durini & Medagli 2002), Cal (Puntillo 1996).

Cr/ Tr/ S/ Epiph/ pH: 2-3, L: 2-3, X: 2, E: 1-2/ Alt: 3/ Mont: er/ PT: 0/ suboc/ Note: a Mediterranean-Atlantic species of humid montane woodlands, known from a few localities in southern Italy. It is included in the Italian red list of epiphytic lichens as "Endangered" (Nascimbene & al. 2013c).

Arthonia insitiva (Körb.) Clauzade, Diederich & Cl. Roux

Bull. Soc. linn. Provence, num. spéc. 1: 29, 1989 *comb. inval.* - *Celidium insitivum* Körb., Syst. Lich. Germ: 217, 1855.

Syn.: *Celidopsis insitiva* (Körb.) A. Massal.

N - TAA (Clauzade & al. 1989, Brackel 2016), Piem (Baglietto & Carestia 1880, Brackel 2016)

LF/ / S/ Epiph/ pH: 2-3, L: 3-4, X: 3, E: 1-2/ Alt: 2-4/ Salp: er, Mont: vr, SmedD: vr/ PT: 1-2/ paras *Lecanora subfusca s.lat.*/ Note: a parasite on *Lecanora subfusca s.lat.*, whose distribution in Italy is still very poorly known.

Arthonia intexta Almq.

K. Svenska Vetensk.-Akad. Handl., 17: 60, 1880.

Syn.: *Arthonia intexta* var. *pauperrima* Almq., *Arthonia parasemoides* Nyl., *Bacidia wettersteinensis* Poelt, *Conida intexta* (Almq.) Deichm.

N - Frl (Hertel 1969), Ven (Brackel 2016), TAA (Brackel 2016), Lomb (Hertel 1969, Brackel 2016). C - Tosc (Benesperi & al. 2007, Brackel 2016), Abr (Nimis & Tretiach 1999, Brackel 2016), Sar (Brackel 2016). S - Si (Brackel 2008c, 2016).

LF/ / S/ Sax/ pH: 3, L: 4-5, X: 3, E: 3-4/ Alt: 1-5/ Alp: rr, Salp: r, Orom: r, Mont: rc, SmedD: rr, SmedH: rc, MedH: r, MedD: er/ PT: 1-2/ paras *Lecidella* spp./ Note: a holarctic lichenicolous fungus growing inside the apothecia of *Lecidella*-species, especially *L. carpathica*; certainly much overlooked and ranging throughout the country.

Arthonia lepidophila (Anzi) Clauzade, Diederich & Cl. Roux

Bull. Soc. linn. Provence, n. sér., 1, 1989 *comb. inval.* - *Abrothallus lepidophilus* Anzi, Atti Soc. Ital. Sc. Nat. Milano, 11: 177, 1868.

Syn.: *Celidium lepidophilum* (Anzi) Rehm, *Buellia lepidophila* (Anzi) Jatta

N - Lomb (Brackel 2016).

LF/ / S/ Terr/ pH: 2-3, L: 3-5, X: 2-3, E: 1-2/ Alt: 4/ Salp: vr/ PT: 1/ paras *Cladonia pyxidata s.lat.*?, #/ Note: known from the type collection only, this lichenicolous fungus growing on *Cladonia*-species is worthy of further study.

Arthonia mediella Nyl.

Not. Sällsk. Fauna Fl. Fenn. Förh., ny ser. 1: 238, 1859.

Syn.: *Arthonia sordaria* Körb.

N - TAA (Nascimbene 2003, 2014, Nascimbene & al. 2006e, 2007b, 2009, 2014, Thor & Nascimbene 2007, Nimis & al. 2015), Lomb (Nascimbene 2006), Piem (Isocrono & al. 2004), Lig (TSB 33048). C - Tosc (Benesperi & al. 2007), Umb (Ravera 1999, Ravera & al. 2006), Mol (Caporale & al. 2008). S - Cal (Nimis & Puntillo 2003, Puntillo 2011).

Cr/ Tr/ S/ Epiph/ pH: 1-2, L: 3, X: 2-3, E: 1/ Alt: 3-4/ Salp: rr, Mont: vr/ PT: 1/ suboc, p/ Note: a cool-temperate to boreal-montane, probably circumpolar, early coloniser of acid bark, mostly of conifers, found both in humid *Abies-Fagus* forests and in open *Larix* stands, certainly more widespread in the subalpine belt of the Alps and extending to Calabria along the Apennines.

Arthonia medusula (Pers.) Nyl.

Mém. Soc. Imp. Sc. Nat. Cherbourg, 5: 132, 1857 - *Opegrapha medusula* Pers., Ann. Wetter. Gesellsch. Ges. Naturk., 2: 15, 1810.

N - Ven. C - Laz.

Cr/ Tr/ S/ Epiph/ pH: 1-2, L: 3-4, X: 1-2, E: 1/ Alt: 2/ SmedD: er, SmedH: er/ PT: 0/ suboc, u/ Note: a mild-temperate, suboceanic lichen found on old oaks, in dry parts of the trunks seldom wetted by rain, in parklands and open woodlands. The record from Veneto (see Nimis 1993: 80) requires confirmation. The species is included in the Italian red list of epiphytic lichens as "Critically Endangered" (Nascimbene & al. 2013c).

Arthonia melanophthalma Nyl.

Dufour ex Nyl., Mém. Soc. Sc. Nat. Cherbourg, 2: 336, 1854.

Syn.: *Arthonia coniangioides* Bagl.

C - Tosc, Laz, Sar (Rizzi & al. 2011). **S - Pugl, Cal** (Puntillo 1996), **Si** (Grillo & Carfi 1997, Grillo & Caniglia 2004).

Cr/ Tr/ S/ Epiph/ pH: 2-3, L: 2-3, X: 1-2, E: 2-3/ Alt: 1/ MedH: vr/ PT: 1/ suboc, coast/ Note: a southern species in Europe, found on smooth bark in humid, coastal situations, most often with *Dirina ceratoniae* and *Thelopsis isiaca*, mostly Tyrrhenian in Italy. It is included in the Italian red list of epiphytic lichens as “Endangered” (Nascimbene & al. 2013c).

Arthonia meridionalis Zahlbr.

Ann. Mycol., 12: 336, 1914.

C - Sar, S - Pugl (Nimis & Tretiach 1999), **Cal** (Nimis & Puntillo 2003, Puntillo 2011), **Si** (Nimis & al. 1994).

Cr/ Tr/ S/ Sax/ pH: 4-5, L: 2-3, X: 1-2, E: 1/ Alt: 1/ MedH: r/ PT: 1/ suboc, coast/ Note: a Mediterranean-Atlantic species found on soft limestone in sheltered situations, often with *Opegrapha durieui*; mainly Tyrrhenian in Italy.

Arthonia molendoi (Arnold) R. Sant.

Thunbergia, 3: 2, 1986 - *Tichothecium molendoi* Heufl. ex Arnold, Verh. zool. bot. Ges. Wien, 14: 461, 1864.

N - Frl (TSB 5100 as *A. clemens*), **TAA** (Nimis & Tretiach 1999, Brackel 2008, 2011, 2015, 2016). **C - Tosc** (Brackel 2008, 2015, 2016), **Marc** (Brackel 2015, 2016), **Umb** (Brackel 2015, 2016), **Laz** (Brackel 2015, 2016), **Abr** (Nimis & Tretiach 1999, Brackel 2015, 2016), **Sar** (Brackel 2016). **S - Bas** (Brackel 2011, 2016), **Cal** (Brackel & Puntillo 2016), **Si** (Brackel 2008b, 2008c, 2016).

LF/ / S/ Sax/ pH: 4-5, L: 4-5, X: 4, E: 4/ Alt: 2-4/ Salp: vr, Mont: r, SmedD: rc, Pad: er, SmedH: rc, MedH: rr, MedD: vr/ PT: 1/ paras *Xanthoria* spp. and *Caloplaca s.lat.* spp./ Note: a widespread, holarctic and bipolar lichenicolous fungus which in Italy is most frequent on *Xanthoria parietina*; certainly overlooked and more widespread.

Arthonia patellulata Nyl.

Bot. Not.: 95, 1853.

Syn.: *Allarthonia patellulata* (Nyl.) Zahlbr., *Arthonia betuleti* Nyl., *Coniangium krempehuberi* A. Massal., *Coniangium krempehuberi* var. *effusum* A. Massal.?

N - Ven (Lazzarin 2000b), **Lomb, Piem** (Caniglia & al. 1992). **C - Tosc** (Putortù & al. 1999c, Loppi & al. 2002). **S - Camp** (Aprile & al. 2003b), **Cal** (Puntillo 1996).

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 4, X: 3, E: 1/ Alt: 3-4/ Salp: er, Mont: vr/ PT: 1/ p/ Note: a cool-temperate to boreal-montane, probably circumpolar species found on smooth bark, mostly of *Populus tremula*. The records from Peninsular Italy require confirmation. The species is included in the Italian red list of epiphytic lichens as “Vulnerable” (Nascimbene & al. 2013c).

Arthonia peltigerina (Almq.) H. Olivier

Bull. Geogr. Bot., 27: 213, 1917 - *Arthonia vagans* var. *peltigerina* Almq., K. Svenska Vetensk.-Akad. Handl., 17, 6: 50, 1880.

N - Frl (Hafellner 1999, Brackel 2016).

LF/ / S/ Terr/ pH: 2-3, L: 2-3, X: 1-3, E: 1/ Alt: 3-5/ Alp: vr, Salp: vr, Mont: r/ PT: 1/ paras *Peltigera* spp./ Note: a lichenicolous fungus growing on the thalli of *Peltigera*-species, probably more widespread, especially in the Alps.

Arthonia phaeophysciae Grube & Matzer

Bibl. Lichenol., 68: 10, 1997.

N - Frl (Brackel 2013).

LF/ / S/ Epiph/ pH: 3-4, L: 4-5, X: 3-4, E: 3-4/ Alt: 1-3/ Mont: vr, SmedD: r, Pad: er/ PT: 1-2/ paras *Phaeophyscia* spp./ Note: a lichenicolous fungus, commensalistic or weakly parasitic on the thalli of *Phaeophyscia*-species, especially *P. orbicularis*; perhaps more widespread throughout Italy, at least in the North, below the subalpine belt; the species, however, seems to be rare south of the Alps, (von Brackel *in litt.*).

Arthonia pinastri Anzi

Comm. Soc. Critt. Ital., 1, 3: 159, 1862.

Syn.: *Arthonia dalmatica* Zahlbr., *Arthonia neglecta* Bagl. *in* Rabenh.

N - Emil, Lig (Sundin 1999, Watson 2014). **C - Tosc, Laz, Sar, S - Camp**.

Cr/ Tr/ S/ Epiph/ pH: 1-2, L: 3-4, X: 3-4, E: 1/ Alt: 1-2/ SmedD: er, SmedH: vr, MedH: vr/ PT: 1/ p/ Note: a mainly Mediterranean early coloniser of acid bark, especially on conifers, but also reported from *Ficus*, doubtfully lichenised.

Arthonia punctella Nyl.

in Carroll, Nat. Hist. Rev. Quart. J. Sci., 6: 533, 1859.

N - TAA (M: Brackel 2016)

LF/ / S/ Epiph-Sax/ pH: 3-4, L: 4-5, X: 4-5, E: 3-4/ Alt: 1-2/ SmedD: er/ PT: 1-2/ paras *Diplotomma* spp./ Note: this lichenicolous fungus that grows on various crustose lichens, especially *Diplotomma alboatrum* on rocks and walls, is clearly parasitic and has ascospores that turn brown and verrucose.

Arthonia punctiformis Ach.

K. Vetensk.-Akad. Nya Handl., 29: 130, 1808.

Syn.: *Arthonia armoricana* f. *saltelii* B. de Lesd., *Arthonia astroidea* f. *fraxinea* Bagl., *Arthonia atomaria* A. Massal., *Arthonia atomaria* var. *depressa* A. Massal., *Arthonia betulicola* A. Massal. non sensu Anzi, *Arthonia celtidis* A. Massal., *Arthonia insinuata* Stirt., *Arthonia griseoalba* Anzi?, *Arthonia populina* A. Massal., *Arthonia punctiformis* f. *oleandri* (Rabenh.) Redinger, *Arthonia punctiformis* var. *glaucescens* Ach., *Arthonia punctiformis* var. *olivacea* Ach., *Arthonia quadriseptata* (Ohlert) Lettau, *Naevia atomaria* (A. Massal.) A. Massal., *Naevia celtidis* (A. Massal.) A. Massal., *Naevia populina* (A. Massal.) A. Massal., *Opegrapha atra* var. *abbreviata* auct. hisp. p.max.p.

N - VG, Frl, Ven (Sundin & Tehler 1998, Lazzarin 2000b, Nascimbene 2005c, Nascimbene & Marini 2007), TAA (Nascimbene & al. 2007b), Lomb (Zocchi & al. 1997, Furlanetto 2010), Piem (Isocrono & al. 2004, Giordani & Malaspina 2016), Emil (Tretiach & al. 2008, Benesperi 2009), Lig (Giordani & Incerti 2008). C - Tosc (Ravera 2006b, Monaci & al. 1997, Tretiach & al. 2008, Loppi & Baragatti 2011), Marc (Nimis & Tretiach 1999, Frati & Brunialti 2006, Caporale & al. 2008), Umb (Ravera 1998, Ravera & al. 2006), Laz (Ravera & al. 1999, Nimis & Tretiach 2004, Stofer 2006, Munzi & al. 2007), Abr (Stofer 2006, Caporale & al. 2016), Mol (Caporale & al. 2008, Genovesi & Ravera 2014), Sar (Sundin 1999, Zedda 2002, Rizzi & al. 2011, Cossu 2013). S - Camp (Aprile & al. 2002, 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010, Brunialti & al. 2013, Ravera & Brunialti 2013, Catalano & al. 2016), Pugl (Nimis & Tretiach 1999), Bas (Nimis & Tretiach 1999, Potenza 2006), Cal (Puntillo 1996, Puntillo & Puntillo 2004, Stofer 2006), Si (Grillo & Carfi 1997, Grillo 1998, Grillo & al. 2002).

Cr/ Tr/ S/ Epiph/ pH: 2-3, L: 3-4, X: 3-4, E: 1/ Alt: 1-4/ Salp: vr, Orom: er, Mont: rc, SmedD: rc, Pad: er, SmedH: rc, MedH: rr, MedD: er/ PT: 1-2/ p/ Note: a temperate to boreal-montane, circumpolar early coloniser of smooth bark, especially of twigs, rare in dry areas; doubtfully lichenised.

Arthonia radiata (Pers.) Ach.

K. Vetensk.-Akad. Nya Handl., 29: 131, 1808 - *Opegrapha radiata* Pers., Ann. Bot. (Usteri), 1: 29, 1794.

Syn.: *Arthonia astroidea* Ach., *Arthonia astroidea* f. *minor* Mereschk., *Arthonia astroidea* f. *robusta* Mereschk., *Arthonia astroidea* var. *cinerascens* (Ach.) Trevis., *Arthonia astroidea* var. *parallela* (Harm.) B. de Lesd., *Arthonia astroidea* var. *subparallela* Müll. Arg., *Arthonia astroidea* var. *swartziana* (Ach.) Sacc., *Arthonia astroidea* var. *tynnocarpa* Ach., *Arthonia betulicola* sensu Anzi non A. Massal., *Arthonia montellica* A. Massal., *Arthonia opegraphina* Leight., *Arthonia sorbina* Körb., *Arthonia swartziana* Ach., *Arthonia vulgaris* Schaer., *Arthonia vulgaris* var. *astroites* (Ach.) A. Massal., *Coniangium vulgare* Fr., *Lichen astroites* Ach., *Opegrapha astroidea* var. *radiata* (Pers.) Ach., *Opegrapha atra* var. *macularis* auct. hisp.

N - VG (Castello 1996, Castello & Skert 2005), Frl (Badin & Nimis 1996, Brackel 2013), Ven (Nimis & al. 1996c, Lazzarin 1997, 2000, Sundin & Tehler 1998, Caniglia & al. 1999, Valcuvia & al. 2000c, Nascimbene 2005c, 2008, 2008c, Nascimbene & al. 2007, 2013b, 2015, Nascimbene & Marini 2010, Watson 2014), TAA (Hinteregger 1994, Nascimbene 2005b, 2008b, 2014, Nascimbene & al. 2007b, 2014, Zarabska & al. 2009, Nimis & al. 2015), Lomb (Grieco & Groppali 1995, Valcuvia & Gianatti 1995, Brusoni & al. 1997, Zocchi & al. 1997, Brusoni & Valcuvia 2000, Arosio & al. 2000, 2003, Stofer 2006, Valcuvia & Truzzi 2007b), Piem (Arosio & al. 1998, Isocrono & al. 2003, 2005b, Piervittori 2003, Castino 2004, Morisi 2005, Matteucci & al. 2010), VA (Piervittori & Isocrono 1999), Emil (Bassi 1995, Nimis & al. 1996, Tretiach & al. 2008, Cioffi 2009, Benesperi 2019), Lig (Giordani & al. 2002, Brunialti & Giordani 2003, Giordani 2006, Giordani & Incerti 2008). C - Tosc (Tretiach & Nimis 1994, Loppi & Putorti 1995, Loppi & al. 1995, 1999a, 2002, 2002b, 2004c, 2006, Monaci & al. 1997, Senese & Critelli 2000, Lorenzini & al. 2003, Loppi & Frati 2006, Benesperi 2006, 2011, Stofer 2006, Benesperi & al. 2007, Paoli & Loppi 2008, Tretiach & al. 2008, Lastrucci & al. 2009, Brunialti & Frati 2010, Nascimbene & al. 2012, Brackel 2015), Marc (Gasparo & al. 1989, Nimis & Tretiach 1999, Frati & Brunialti 2006, Brackel 2015), Umb (Ravera 1998, Panfili 2000b, 2007, Ravera & al. 2006, Brunialti & al. 2012b, Brackel 2015), Laz (Bartoli & al. 1997, Ravera 2002, 2006c, Massari & Ravera 2002, Nimis & Tretiach 2004, Ruisi & al. 2005, Stofer 2006, Munzi & al. 2007, Ravera & Genovesi 2008, Brackel 2015), Abr (Recchia & al. 1993, Olivieri & al. 1997, 1997b, Loppi & al. 1999, Nimis & Tretiach 1999, Stofer 2006, Caporale & al. 2016, Corona & al. 2016), Mol (Nimis & Tretiach 1999, Caporale & al. 2008, Ravera & al. 2010, Paoli & al. 2015), Sar (Sundin 1999, Zedda 2002, Rizzi & al. 2011, Cossu 2013). S - Camp (Aprile & al. 2002, 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010, Brunialti & al. 2010, 2013, Ravera & Brunialti 2013, Catalano & al. 2016), Pugl (Nimis & Tretiach 1999), Bas (Bartoli & Puntillo 1998, Nimis & Tretiach 1999, Potenza 2006, Potenza & al. 2010), Cal (Puntillo 1995, 1996, Puntillo & Puntillo 2004), Si (Otonello & al. 1994, Grillo & Cristaudo 1995, Grillo 1998, Grillo & al. 2002, Grillo & Caniglia 2004, 2006, Caniglia & Grillo 2006b).

Cr/ Tr/ S/ Epiph/ pH: 2-3, L: 3-4, X: 2-3, E: 1-3/ Alt: 1-4/ Salp: vr, Mont: rc, SmedD: rc, Pad: vr, SmedH: c, MedH: rr, MedD: vr/ PT: 1-3/ Note: a mainly temperate, incompletely holarctic lichen, the only *Arthonia* found in non-natural habitats such as in settlements, parks, etc., even in moderately polluted situations, exceptionally reaching the subalpine belt.

Arthonia rangiformicola Brackel & Etayo

in Brackel, Herzogia, 28: 224, 2015.

C - Marc (Brackel 2015, 2016), Abr (Brackel 2015, 2016).

LF/ / S/ Terr/ pH: 3-5, L: 4-5, X: 3, E: 1-3/ Alt: 1-3/ Mont: er, SmedD: vr/ PT: 1-2/ paras *Cladonia rangiformis*/ Note: a recently-described lichenicolous fungus known from two localities in Italy (Abruzzo and

Marche) and from two others localities in Spain (Aragón), growing on the podetia of *Cladonia rangiformis*, where it causes a bleaching of the host thallus.

Arthonia reniformis (Pers.) Röhl.

Deutschl. Fl., 3, 2: 29, 1813 - *Opegrapha reniformis* Pers., Ann. Bot. (Usteri), 7: 31, tab. II, fig. C, 1794.

Syn.: *Arthonia gyrosa* Ach., *Arthonia obscura* Ach., *Arthonia vulgaris* var. *obscura* (Ach.) Schaer., *Naevia gyrosa* (Ach.) A. Massal.

N - Ven, TAA. C - Sar (TSB 31118). **S - Cal** (Puntillo 1996), **Si** (TSB 17252).

Cr/ Tr/ S/ Epiph/ pH: 1-2, L: 2-3, X: 1-2, E: 1/ Alt: 2-3/ Mont: er, SmedD: er, SmedH: vr/ PT: 1/ Note: a mild-temperate species of smooth bark, especially of *Carpinus*, more rarely of *Fagus* and *Corylus*, in humid deciduous woodlands. It is included in the Italian red list of epiphytic lichens as “Vulnerable” (Nascimbene & al. 2013c).

Arthonia ruana A. Massal.

Ric. Auton. Lich. Crost.: 49, 1852.

Syn.: *Arthonia anastomosans* (Ach.) Nyl., *Arthonia beltraminiana* (A. Massal.) H. Olivier, *Arthonia rosacea* Anzi, *Arthoniopsis ruana* (A. Massal.) Trevis., *Arthothelium beltraminianum* A. Massal., *Arthothelium dispersum* auct. non (DC.) Mudd, *Arthothelium rosaceum* (Anzi) Zahlbr., *Arthothelium ruanideum* (Nyl.) Arnold, *Arthothelium ruanum* (A. Massal.) Körb.

N - Fri (Grube & Giralt 1996), **Ven** (Sundin & Tehler 1998, Lazzarin 2000b), **TAA** (Nascimbene & al. 2007b), **Lomb** (Valcuvia & Truzzi 2007, 2007b), **Piem. C - Tosc. S - Puagl** (Durini & Medagli 2004), **Bas** (Potenza 2006, Potenza & al. 2010, Potenza & Fascetti 2012), **Cal** (Puntillo 1996).

Cr/ Tr/ S/ Epiph/ pH: 2-3, L: 2-3, X: 2-3, E: 1-2/ Alt: 2-3/ Mont: vr, SmedD: er, SmedH: vr/ PT: 0/ suboc/ Note: a temperate-suboceanic lichen found on smooth bark of deciduous trees and shrubs (e.g. *Alnus*, *Fagus*, *Fraxinus*, *Corylus*, etc.) in humid deciduous forests, often on the basal parts of trunks. The species is included in the Italian red list of epiphytic lichens as “Near-threatened” (Nascimbene & al. 2013c).

Arthonia spadicea Leight.

Ann. Mag. Nat. Hist., ser. 2, 13: 442, 1854.

Syn.: *Arthonia lurida* Ach. non auct. ital. p.p., *Arthonia lurida* var. *spadicea* (Leight.) Nyl., *Arthonia sublurida* Anzi?, *Coniangium spadiceum* (Leight.) Arnold

N - Ven (Nascimbene & Marini 2010, Nascimbene & al. 2012, 2015), **TAA** (Nascimbene & al. 2007b, Nascimbene 2013, Nimis & al. 2015), **Lomb, Piem** (Matteucci & al. 2013), **Lig. C - Tosc, Laz** (Ravera 2006, 2006c), **Abr. S - Camp** (Brunialti & al. 2010, 2013, Ravera & Brunialti 2013), **Puagl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996, Sérusiaux 1998, Puntillo & Puntillo 2004, 2012).

Cr/ Tr/ S/ Epiph/ pH: 2-3, L: 2-3, X: 1-3, E: 1-2/ Alt: 2-3/ Mont: vr, SmedD: er, SmedH: vr/ PT: 0/ suboc/ Note: a mainly temperate lichen found on smooth bark in humid forests (e.g. on *Ilex* in the southern mountains), but also on basal parts of old oaks inside humid forests. The species is included in the Italian red list of epiphytic lichens as “Near-threatened” (Nascimbene & al. 2013c).

Arthonia squamarinae Etayo

Cryptog. Mycol., 29: 69, 2008.

C - Tosc (Brackel 2015, 2016).

LF/ / S/ Sax-Terr/ pH: 4-5, L: 3-5, X: 3-4, E: 1-3/ Alt: 1-2/ SmedH: er, MedH: er/ PT: 1/ paras *Squamarina* spp./ Note: this lichenicolous fungus was known so far only from a few localities in Spain and France, where it was found on the thallus of *Squamarina lentigera* and *S. cartilaginea*; the sample from Tuscany was on *S. gypsacea*.

Arthonia stellaris Kremp.

Denschr. kgl. bayer. bot. Ges., 4, 2: 296, 1861.

Syn.: *Arthonia armoricana* Leight.

C - Tosc (Benesperi & al. 2007), **Laz** (Stofer 2006).

Cr/ Tr/ S/ Epiph/ pH: 1-2, L: 2-3, X: 2, E: 1/ Alt: 2-3/ Mont: er, SmedH: er/ PT: 0/ suboc/ Note: a mild-temperate lichen found on smooth bark, e.g. of *Corylus*, and in *Abies-Fagus* forests; mainly Tyrrhenian in Italy. It is included in the Italian red list of epiphytic lichens as “Endangered” (Nascimbene & al. 2013c).

Arthonia stereocaulina (Ohlert) R. Sant.

Lichens and Lichenicolous Fungi of Sweden and Norway: 18, 1993 - *Arthonia nephromiaria* var. *stereocaulina* Ohlert, Schr. Phys.-Ökon. Ges. Königsberg, 11: 49, 1870.

N - TAA (Bilovitz & al. 2014, Brackel 2016).

LF/ / S/ Terr/ pH: 1-2, L: 4-5, X: 4-5, E: 1/ Alt: 4-5/ Alp: vr, Salp: vr/ PT: 1/ paras *Stereocaulon* spp./ Note: a lichenicolous fungus growing on species of *Stereocaulon*, probably more widespread in the Alps.

Arthonia subastroidea Anzi

Comm. Soc. Critt. Ital., 2, 2: 22, 1864.

Syn.: *Arthothelium subastroideum* (Anzi) Rehm

N - Lomb (Sundin 1999).

Cr/ Tr/ S/ Epiph/ pH: 1-2, L: 4, X: 4, E: 1/ Alt: 3-4/ Salp: vr, Mont: vr/ PT: 1/ p/ Note: a cool-temperate to boreal-montane early coloniser of smooth bark, e.g. of *Pinus cembra* and *Fagus* in the Alps. Perhaps non-lichenised. It is included in the Italian red list of epiphytic lichens as “Endangered” (Nascimbene & al. 2013c).

Arthonia subfuscicola (Linds.) Triebel

Mycotaxon, 42: 268, 1991 - *Microthelia subfuscicola* Linds., Quart. J. Microsc. Sci., N.S., 11: 39, 1871.

Syn.: *Arthonia glaucomaria* var. *pallidae* Rehm ex Almq., *Celidium varians* var. *pallidae* Rehm nom.nud.

N - Lomb (Anzi 1860, Brackel 2008c, 2015, 2016), **Piem** (Brackel 2015, 2016), **C - Laz** (Brackel 2015, 2016), **Abr** (Brackel 2015, 2016), **S - Pugl** (Brackel 2015, 2016), **Si** (Brackel 2008c, 2015, 2016).

LF/ / S/ Epiph/ pH: 2-4, L: 3-5, X: 3-4, E: 1-3/ Alt: 1-4/ Salp: er, Mont: vr, SmedD: r, Pad: er, SmedH: r, MedH: r, MedD: r/ PT: 1-3/ paras *Lecanora* spp./ Note: this widespread lichenicolous fungus causes dark spots on the whitish apothecia of *Lecanora carpinea*, *L. chlarotera* and *L. albella*.

Arthonia subvarians Nyl.

Flora, 51: 345, 1868.

N - TAA (Brackel 2016), **Lomb** (Brackel 2013, 2016), **Piem** (Brackel 2016), **C - Tosc** (Brackel 2016), **Pugl** (Brackel 2016).

LF/ / S/ Sax/ pH: 1-3, L: 3-5, X: 3-4, E: 1-3/ Alt: 2-6/ Alp: vr, Salp: vr, Orom: vr, Mont: vr, SmedD: er, SmedH: vr/ PT: 1-2/ paras *Lecanora* spp./ Note: a rarely recorded parasite in the hymenia of *Lecanora* species, especially of the *L. polytropa*-group. It was also reported from Toscana and Trentino-Alto Adige (as *Arthonia clemens* on *Protoparmeliopsis muralis*, Nimis & al. 1990, BSM 2006-2012), but these finds should be reinvestigated, as the hosts (*Protoparmeliopsis muralis*, *L. varia*) leave some doubts about the identity.

Arthonia tenellula Nyl.

Flora, 47: 488, 1864.

Syn.: *Allarthonia tenellula* (Nyl.) B. de Lesd.

C - Umb (Ravera 1998, 1999, Ravera & al. 2006), **Laz** (Ravera 2002b), **S - Cal** (Puntillo 1996).

Cr/ Ch/ S/ Epiph-Lign/ pH: 2-3, L: 3-4, X: 3, E: 1-2/ Alt: 2/ SmedD: vr, SmedH: vr/ PT: 1/ p, #/ Note: on smooth bark and lignum. The complex of *A. apatetica*-*A. exilis* deserves further study. This species, described from a coastal site in western France and reported from scattered localities in Europe, is included in the Italian red list of epiphytic lichens as “Vulnerable” (Nascimbene & al. 2013c).

Arthonia trifurcata (Müll. Arg.) Cl. Roux

Cat. Lich. France: 1314, 2014 - *Opegrapha trifurcata* Hepp ex Müll. Arg., Mém. Soc. Phys. Hist. nat. Genève 16, 2: 407, 1862.

Syn.: *Opegrapha calcarea* auct. p.p., *Opegrapha decandollei* (Stizenb.) Arnold, *Opegrapha koerberiana* Müll. Arg., *Opegrapha saxicola* var. *decandollei* Stizenb.

N - Ven (TSB 7983), **C - Tosc** (TSB 21202), **Laz** (TSB 8395), **Sar** (TSB 11841), **S - Cal** (TSB 10553), **Si** (TSB 17239).

Cr/ Tr/ S/ Sax/ pH: 3-5, L: 1-3, X: 1-2, E: 1-2/ Alt: 1-2/ SmedD: r, SmedH: r, MedH: r, MedD: r/ PT: 1-2/ Note: this species has been often confused with *A. calcarea*, so that its distribution in Italy is still poorly known. It grows on calcareous rocks in rather sheltered situations below the montane belt, and sometimes it starts the life-cycle on other crustose lichens.

Arthonia urceolata (Elenkin) Calat., Barreno & V.J. Rico

Bibl. Lichenol., 88: 70, 2004 - *Conida urceolata* Elenkin, Izv. Imp. St. Petersburgsk. Bot. Sada, 1, 4: 147, 152-154, 1901.

C - Tosc (Brackel 2016), **S - Camp** (Brackel 2016).

LF/ / S/ Sax/ pH: 4-5, L: 4-5, X: 4, E: 2-3/ Alt: 1-4/ Orom: vr, Mont: vr, SmedD: vr, SmedH: vr, MedH: vr, MedD: vr/ PT: 1-2/ subc, paras *Circinaria* spp./ Note: a non-lichenised parasite of *Circinaria*-species, especially of vagrant forms, widespread in Central Asia and in the central part of the Iberian Peninsula. Italian records need re-confirmation, being based on reports of *A. glaucomaria* by Jatta (1909-1911) “in thallo *Aspicilliae calcareae* L. in Etruria et in Campania”.

Arthonia varians (Davies) Nyl.

Lichenes Scand.: 260, 1861 - *Lichen varians* Davies, Trans. Linn. Soc. London, Bot., 2: 284, 1794.

Syn.: *Celidium sordidum* Anzi, *Celidium varians* (Davies) Arnold

N - Frl (Tretiach & Hafellner 2000, Brackel 2016), **Ven** (Brackel 2016), **TAA** (Brackel 2016), **Lomb** (Brackel 2016), **Piem** (TSB 33690), **VA, Emil** (Tretiach & al. 2008, Brackel 2016), **Lig** (Brunialti & al. 1999), **C - Tosc** (Brackel 2016), **Marc** (Nimis & Tretiach 1999), **Umb** (Panfili 2000, Ravera & al. 2006), **Laz** (Brackel 2016), **Mol** (Nimis & Tretiach 1999, Brackel 2016), **Sar** (Rizzi & al. 2011, Giordani & al. 2013, Brackel 2016), **S - Camp** (Brackel 2016), **Pugl** (Brackel 2016), **Bas** (Nimis & Tretiach 1999, Brackel 2016), **Cal** (Puntillo 1996, Brackel & Puntillo 2016, Brackel 2016), **Si** (Otonello & al. 1994, Brackel 2008b, 2008c, 2016).

LF/ / S/ Sax/ pH: 2-3, L: 3-4, X: 3-4, E: 2/ Alt: 1-5/ Alp: c, Salp: vc, Orom: c, Mont: rc, SmedD: er, SmedH: rr, MedH: er/ PT: 1/ paras *Lecanora rupicola* s.lat./ Note: a holarctic lichenicolous fungus with a

wide altitudinal and latitudinal range, occurring throughout the country wherever the host is present; it parasitizes the hymenium of the host.

Arthonia vinosa Leight.

Ann. Mag. Nat. Hist., ser. 2, 18: 331, 1856.

Syn.: *Arthonia lurida* auct. ital. p.p. non Ach., *Coniangium luridum* auct. non (Ach.) Fr., *Coniangium vinosum* (Leight.) A. Massal.

N - Frl, Ven (Nascimbene & al. 2005b, 2006c, 2013b, Thor & Nascimbene 2007), **TAA** (Thor & Nascimbene 2007, Nascimbene & al. 2007b, Nimis & al. 2015), **Emil** (Tretiach & al. 2008). **C - Tosc, Sar** (Cossu 2013). **S - Cal** (Puntillo 1996).

Cr/ Tr/ S/ Epiph-Lign/ pH: 1-2, L: 1-2, X: 1-2, E: 1/ Alt: 2-3/ Mont: er, SmedD: er, SmedH: er/ PT: 0/ suboc/ Note: a mild-temperate lichen found near the base of old trees, especially oaks, more rarely on lignum, in very humid and closed-canopied deciduous forests. Related to *A. spadicea*. The species is included in the Italian red list of epiphytic lichens as "Near-threatened" (Nascimbene & al. 2013c).

Arthopyrenia A. Massal.

Ric. Auton. Lich. Crost.: 165, 1852, *nom. cons.*

Arthopyrenia resembles *Anisomeridium* and *Strigula* in many aspects and differs mostly in subtle characters such as hamathecium structure and micro- and macroconidia, which are not always present. The family Arthopyreniaceae has been recently redefined within the Pleosporales, to include only a small number of non-lichenised, extratropical species. Several genera traditionally treated in Arthopyreniaceae have been excluded from this family and the bulk of tropical, lichenised species previously assigned to *Arthopyrenia* belong in Trypetheliaceae (Hyde & al. 2013, Nelsen & al. 2014), so that several nomenclatural changes are to be expected. The genus is still poorly known in Italy, and a revision of Italian material is much needed. Good descriptions and a key to the British species are in Orange (2013b). Type (conserved): *A. cerasi* (Schrad.) A. Massal.

Arthopyrenia analepta (Ach.) A. Massal.

Ric. Auton. Lich. Crost.: 165, 1852 - *Lichen analeptus* Ach., Lichenogr. Suec. Prodr.: 15, 1799.

Syn.: *Arthopyrenia analepta* f. *mespili* A. Massal., *Arthopyrenia analeptella* (Nyl.) Arnold, *Arthopyrenia arnoldii* Zahlbr.?, *Arthopyrenia fallax* (Nyl.) Arnold, *Arthopyrenia lapponina* Anzi, *Didymella fallax* (Nyl.) Vain., *Leiophloea fallax* (Nyl.) Riedl, *Pseudosagedia fallax* (Nyl.) Oxner, *Sphaerella lapponum* De Not., *Verrucaria epidermidis* var. *fallax* Nyl.

N - VG, Frl (TSB 5457), **Ven** (Lazzarin 2000b), **TAA** (Nascimbene & al. 2007b), **Lomb** (Brusoni & al. 1997, Brusoni & Valcuvia 2000, Anderi & al. 2005), **Piem** (Isocrono & al. 2004), **Emil** (Valcuvia & Grieco 1995), **Lig. C - Marc, Laz. S - Camp** (Nimis & Tretiach 2004, Garofalo & al. 2010), **Bas** (Potenza & al. 2014).

F/ / S/ Epiph/ pH: 2-3, L: 3-4, X: 3-4, E: 1/ Alt: 2-4/ Salp: er, Mont: vr, SmedD: vr, Pad: er, SmedH: r/ PT: 1/ p/ Note: a mainly temperate, perhaps holarctic early coloniser of smooth bark, found on twigs of deciduous trees, especially *Carpinus* and *Corylus*, but also on *Quercus* and *Sorbus*, facultatively, or most probably non-lichenised. For nomenclatural matters see Harris (1995).

Arthopyrenia cerasi (Schrad.) A. Massal.

Ric. Auton. Lich. Crost.: 167, 1852 - *Verrucaria cerasi* Schrad., Ann. Bot. (Usteri), 22: 87, 1797.

Syn.: *Arthopyrenia crombei* A.L. Sm., *Metasphaeria cerasi* (Schrad.) Vain., *Pseudosagedia cerasi* (Schrad.) M. Choisy, *Pyrenula cerasi* (Schrad.) Trevis., *Spermatodium cerasi* (Schrad.) Trevis., *Verrucaria epidermidis* var. *cerasi* (Schrad.) Ach.

N - VG, Frl (TSB 4157), **Ven, TAA** (Nascimbene & al. 2007b), **Lomb, Piem** (Isocrono & al. 2004, 2005b), **Emil** (Nimis & al. 1996), **Lig** (Giordani & Incerti 2008). **C - Marc** (Fрати & Brunialti 2006), **Laz** (Ravera & al. 2016b), **Abr** (Nimis & Tretiach 1999, Corona & al. 2016), **Sar** (Rizzi & al. 2011). **S - Camp** (Aprile & al. 2003b), **Pugl, Cal** (Puntillo 1996), **Si** (Nimis & al. 1994, Grillo 1998, Grillo & Caniglia 2004).

F/ / S/ Epiph/ pH: 1-2, L: 4, X: 3-4, E: 1/ Alt: 1-2/ SmedD: rr, Pad: er, SmedH: rr, MedH: vr/ PT: 1-2/ p/ Note: a temperate early coloniser of smooth bark, mostly of *Corylus* and *Prunus*, most probably non-lichenised.

Arthopyrenia cinerescens A. Massal.

Symmicta Lich.: 108, 1855.

N - Ven (Lazzarin 2000b).

F/ / S/ Epiph/ pH: 3, L: 4, X: 3-4, E: 1/ Alt: 2/ SmedD: r/ PT: 1-2/ p, #/ Note: a rather poorly known early coloniser of base-rich bark, also reported from Slovenia; most probably non-lichenised. The type material was growing on *Fraxinus*.

Arthopyrenia cinereopruinosa (Schaer.) A. Massal.

Symmicta Lich.: 117, 1855 - *Verrucaria cinereopruinosa* Schaer., Lich. Helv. Spicil., 6: 343, 1833.

Syn.: *Arthopyrenia fallax* var. *conspurcata* J. Steiner, *Arthopyrenia pinicola* (Hepp) A. Massal., *Arthopyrenia stigmatella* var. *elabens* A. Massal., *Leiophloea punctiformis* var. *cinereopruinosa* (Schaer.) Trevis., *Pyrenula punctiformis* var. *cinereopruinosa* f. *pinicola* Hepp

N - **VG**, **Frl** (TSB 5924), **Ven** (Lazzarin 2000b), **TAA** (Nascimbene & al. 2007b), **Lomb**, **Piem** (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999), **Emil**, **Lig** (Ravera & al. 2016b). **C** - **Tosc**, **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera & al. 2006, 2006b), **Laz** (Ravera & Genovesi 2008, Ravera & al. 2016b), **Abr** (Nimis & Tretiach 1999), **Mol** (Ravera & Genovesi 2010, Ravera & al. 2010), **Sar** (Rizzi & al. 2011). **S** - **Camp** (Nimis & Tretiach 2004, Garofalo & al. 2010, Catalano & al. 2016, Ravera & al. 2016b), **Pugl**, **Bas** (Bartoli & Puntillo 1998, Nimis & Tretiach 1999, Potenza 2006, Potenza & al. 2010, Ravera & al. 2016b), **Cal** (Puntillo 1996, Incerti & Nimis 2006), **Si** (Nimis & al. 1994).

F/ / S/ Epiph/ pH: 2-3, L: 4, X: 2-3, E: 1/ Alt: 1-3/ Mont: er, SmedD: vr, Pad: er, SmedH: r, MedH: vr/ PT: 1-2/ suboc, p/ Note: a temperate early coloniser of smooth bark, found especially in clearings of long-established deciduous woodlands near rivers, on young twigs of e.g. *Fraxinus* and *Corylus*; probably non-lichenised.

Arthopyrenia coppinsii Ravera

Lichenologist, 38: 22, 2006.

N - **Lig** (Ravera 2006b). **C** - **Tosc** (Ravera 2006b).

F/ / S/ Epiph/ pH: 3, L: 2-3, X: 2-3, E: 1/ Alt: 2/ SmedH: vr/ PT: 1/ suboc, p/ Note: a recently-described, probably non-lichenised species, apparently related to *A. salicis*, with which, according to Ravera (2006b) it was confused by Putorti & Loppi (1999) and Brunialti & al. (2001). It occurs on rough bark, especially of *Fraxinus excelsior*, in species-rich communities of well-preserved deciduous woodlands.

Arthopyrenia grisea (Schaer.) Körb.

Syst. Lich. Germ.: 369, 1855 - *Verrucaria epidermidis* var. *grisea* Schleich. ex Schaer., Lich. Helv. Spicil., 2: 56, 1826.

Syn.: *Arthopyrenia betulae* A. Massal., *Arthopyrenia persoonii* var. *episcia* A. Massal., *Arthopyrenia pluriseptata* auct. p.p. non (Nyl.) Arnold, *Sagedia grisea* (Schaer.) Anzi

N - **VG** (TSB 31124), **Ven** (Lazzarin 2000b), **TAA** (Nascimbene & al. 2007b), **Lomb**, **Piem** (Isocrono & al. 2004, Giordani & Malaspina 2016). **C** - **Marc** (Fрати & al. 2004, Frati & Brunialti 2006), **Sar** (E.C.I., 2, 120: S- F74453).

Cr/ Tr/ S/ Epiph/ pH: 1-2, L: 3-4, X: 3-4, E: 1/ Alt: 2-4/ Salp: er, Mont: vr, SmedD: er/ PT: 1-2/ p/ Note: an early coloniser of smooth and acid bark, especially of *Betula*, doubtfully lichenised. The type of *A. betulae* should be checked: if identical with that of the basionym, the Massalongian name would have priority. The species is included in the Italian red list of epiphytic lichens as “Endangered” (Nascimbene & al. 2013c).

Arthopyrenia persoonii A. Massal.

Symmicta Lich.: 110, 1855.

Syn.: *Arthopyrenia persoonii* f. *cytisi* A. Massal., *Arthopyrenia persoonii* f. *lentisci* Bagl., *Arthopyrenia persoonii* f. *quercicola* A. Massal., *Arthopyrenia persoonii* f. *tiliaecola* A. Massal., *Arthopyrenia persoonii* var. *alni* (A. Massal.) Arnold, *Arthopyrenia persoonii* var. *caricae* A. Massal., *Arthopyrenia persoonii* var. *mali* A. Massal., *Arthopyrenia persoonii* var. *pancina* A. Massal.

N - **Frl** (TSB 25309), **Ven** (Lazzarin 2000, 2000b). **C** - **Marc** (TSB 24121)

F/ / S/ Epiph/ pH: 2-3, L: 3-5, X: 3, E: 1-2/ Alt: 1-4/ Salp: rr, Orom: vr, Mont: rc, SmedD: c, Pad: r, SmedH: c, MedH: rr, MedD: r/ PT: 1-2/ p/ Note: a non-lichenised species, confused with *Naetrocymbe punctiformis* in the past, but apparently closely related to *A. grisea* (Foucard 1992); most common on *Fagus* in the montane belt.

Arthopyrenia platypyrenia (Nyl.) Arnold

Flora, 53: 485, 1870 - *Verrucaria platypyrenia* Nyl., Flora, 48: 358, 1865.

S - **Cal** (Puntillo 1996).

F/ / S/ Epiph/ pH: 1-2, L: 3, X: 1-2, E: 1/ Alt: 1-2/ SmedH: er/ PT: 1/ Note: a non-lichenised fungus of uncertain affinity, known from Ireland, on *Hedera*. The Italian record, confirmed by B. Coppins, is the first in this century.

Arthopyrenia pluriseptata (Nyl.) Arnold

Ber. bayer. bot. Ges., 1, Anh.: 118, 1891 - *Verrucaria pluriseptata* Nyl., Act. Soc. Linn. Bordeaux, 21: 436, 1856.

Syn.: *Arthopyrenia persoonii* var. *juglandis* A. Massal., *Arthopyrenia punctiformis* var. *juglandis* (A. Massal.) Jatta, *Mycarthopyrenia juglandis* (A. Massal.) Keissl., *Spermatodium juglandis* (A. Massal.) Trevis., *Verrucaria heppii* (Nägeli) Garov.

N - **Ven** (Lazzarin 2000b), **TAA** (Nascimbene & al. 2007b), **Lomb** (Lazzarin 2000b).

Cr/ Tr/ S/ Epiph/ pH: 3, L: 3-4, X: 2-3, E: 1/ Alt: 2-3/ Mont: vr, SmedD: vr/ PT: 1/ Note: doubtfully lichenised; considered as a synonym of *A. grisea* by Foucard (1992).

Arthopyrenia pithyophila Th. Fr. & Blomb.

Bot. Not.: 155, 1867.

N - **Lomb** (UPS- L166794).

F/ / S/ Epiph/ pH: 2-3, L: 3-5, X: 3, E: 1-2/ Alt: 3/ Mont: vr/ PT: 1-2/ p/ Note: a pioneer, non-lichenised species growing on the bark of coniferous and deciduous trees; the sample from Italy was collected by G. Thor in the Adamello Natural Park, on *Sorbus aucuparia*.

Arthopyrenia salicis A. Massal.

Ric. Auton. Lich. Crost.: 169, 1852.

Syn.: *Leiophloea salicis* (A. Massal.) Trevis., *Pyrenula salicis* (A. Massal.) Trevis.

N - Ven (Lazzarin 2000b), **TAA** (Hinteregger 1994), **Piem** (Matteucci & al. 2010, Ravera & al. 2016b), **Lig** (Brunialti & al. 2001), **C - Tosc, Marc** (Fрати & Brunialti 2006), **Umb** (Ravera 1998, Ravera & al. 2006 Ravera & al. 2016b), **Laz** (Ravera & al. 1999, 2000, Munzi & al. 2007, Ravera & Genovesi 2008, Ravera & al. 2016b), **Abr** (Caporale & Pagliani 2010), **Mol** (Caporale & al. 2008), **S - Camp** (Brunialti & al. 2013, Ravera & Brunialti 2013 Ravera & al. 2016b), **Bas** (Potenza 2006, Potenza & al. 2010, Potenza & Fascetti 2012 Ravera & al. 2016b), **Si** (Ravera & al. 2016b).

Cr/ Tr/ S/ Epiph/ pH: 2-3, L: 2-4, X: 2-3, E: 1/ Alt: 1-3/ Mont: vr, SmedD: er, SmedH: vr, MedH: er/ PT: 1/ suboc, p/ Note: a temperate coloniser of the smooth bark of deciduous trees and shrubs, especially *Carpinus* and *Corylus*, most frequent in upland areas. Thalli vary from having no detectable to abundant *Trentepohlia*. The species was probably mistaken for *A. punctiformis* and related species in the past. It is included in the Italian red list of epiphytic lichens as “Near-threatened” (Nascimbene & al. 2013c). See also note on *A. coppinsii* and *A. tuscanensis*.

Arthopyrenia subcerasi (Vain.) Zahlbr.

Cat. Lich. Univ., 1: 298, 1921 - *Verrucaria subcerasi* Vain., Meddeland. Soc. Fauna Fl. Fenn., 10: 189, 1883.

Syn.: *Arthopyrenia subalbicans* Bagl. & Carestia

N - Piem (E.C.I. 2: 722, Ravera 2014c, 2014d).

F/ / S/ Epiph/ pH: 1-2, L: 3-4, X: 3, E: 1/ Alt: 3-4/ Salp: vr, Mont: vr/ PT: 1/ p/ Note: a mainly boreal-montane, non-lichenised species occurring on the bark of *Betula*; known from Scandinavia, the United Kingdom, Galicia, and the Alps. For further details see Ravera (2014c, 2014d).

Arthopyrenia tuscanensis Coppins & Ravera

in Ravera, Lichenologist, 38: 22, 2006.

N - Piem (Ravera & al. 2016b). **C - Tosc** (Ravera 2006b).

F/ / S/ Epiph/ pH: 1-2, L: 3, X: 2-3, E: 1/ Alt: 2/ SmedD: vr, SmedH: vr/ PT: 1/ suboc, p/ Note: a recently-described, most probably non-lichenised species which grows as a pioneer on the smooth bark of twigs, especially of *Castanea*; hitherto known only from Tuscany and Piemonte, but in past perhaps confused with *A. salicis*.

Arthothelium A. Massal.

Ric. Auton Lich. Crost.: 54, 1852.

This genus of the Arthoniaceae, including c. 10 species, has the highest diversity in the tropics. Grube & Giralt (1996) in their treatment of Mediterranean species, have shown that, apart from the muriform ascospores, many species are so similar to *Arthonia* that they might belong to that genus (see also Frisch & al. 2015). In fact, several species occurring in Italy have been transferred to the genus *Arthonia*. Type: *A. scandinavicum* Th. Fr.

Arthothelium spectabile A. Massal.

Flot. ex A. Massal., Ric. Auton. Lich. Crost.: 54, 1852.

N - Ven (Grube & Giralt 1996, Lazzarin 2000b), **Lomb** (Valcuvia & Truzzi 2007, 2007b). **C - Laz, Abr, Sar** (Rizzi & al. 2011). **S - Pugl, Si**.

Cr/ Tr/ S/ Epiph/ pH: 1-2, L: 3, X: 1-2, E: 1/ Alt: 2-3/ Mont: vr, SmedD: er, SmedH: er/ PT: 0/ suboc/ Note: a temperate-suboceanic lichen found on the smooth bark of deciduous trees in ancient forests. It is included in the Italian red list of epiphytic lichens as “Vulnerable” (Nascimbene & al. 2013c).

Arthrorhaphis Poelt & Hafellner

Phyton, 17: 220, 1976.

A genus of c. 13 closely related and rather polymorphic taxa which is widely distributed in montane to alpine regions of the world. Free-living species mostly occur on or among decaying bryophytes and higher plants (or even decaying lichens) or on sandy soil (rarely on rocks). Parasitic or commensalistic species on several crustose (*Baeomyces*, *Dibaeis*), foliose (*Arctoparmelia*, *Melanelia*) or fruticose (*Cladonia*) lichen genera. The genus is currently placed into the Arthrorhaphidaceae within the Lecideales (but see Miadlikowska & al. 2014). The European species were treated by Obermayer (1994). Preliminary results of the phylogenetic analysis by Frisch & al. (2016) conform to currently accepted species concepts and show all taxa with finally autonomous lichenised thallus to be closely related. Genetically distinct clades correlated with morphology and/or geographical distribution are present both in *A. alpina* and *A. citrinella*. *Arthrorhaphis alpina* var. *jungens* and *A. vacillans* are recovered as sisters within *A. alpina* s.lat. Type: *A. citrinella* (Ach.) Poelt

Arthrorhaphis aeruginosa R. Sant. & Tønberg

Lichenologist, 26: 295, 1994.

N - TAA (Brackel 2015, 2016), Lomb (Brackel 2010, 2013), Piem (Motiejūnaitė & Grochowski 2014, Brackel 2016). C - Tosc (Brackel 2015, 2016), Umb (Brackel 2015, 2016), Laz (Brackel 2015), Abr (Brackel 2015, 2016). S - Camp (Brackel 2016), Cal (Brackel & Puntillo 2016, Brackel 2016)

LF/ / S/ Epiph-Lign-Terr/ pH: 2-3, L: 3-4, X: 2-3, E: 1-3/ Alt: 2-4/ Alp: r, Salp: rc, Orom: rr, Mont: rc, SmedD: vr/ PT: 1-2/ paras *Cladonia* spp./ Note: a lichenicolous fungus with a worldwide distribution, most common in montane and boreal forests, growing on *Cladonia*-species.

Arthrorhaphis alpina (Schaer.) R. Sant.

in Hawksworth & al., Lichenologist, 12: 106, 1980 - *Lecidea flavovirescens* var. *alpina* Schaer., Lich. Helv. Spicil.: 162, 1833.

Syn.: *Arthrorhaphis citrinella* var. *alpina* (Schaer.) Poelt, *Bacidia alpina* (Schaer.) Vain., *Bacidia citrinella* subsp. *alpina* (Schaer.) J.R. Laundon, *Bacidia flavovirescens* var. *alpina* (Schaer.) A.L. Sm.

N - Fr1 (TSB 2036), TAA (Obermayer 1994), Lomb (Anzi Lich. Ital. 262 as *Bacidia flavovirescens*: Obermayer 1994, Dalle Vedove & al. 2004, Valcuvia & Truzzi 2007), Piem (Isocrono & al. 2004), VA (Valcuvia 2000), Emil (Dalle Vedove & al. 2002). C - Tosc (Benespero 2007, Benespero & al. 2007).

Cr/ Ch/ A.s/ Terr/ pH: 2-4, L: 4-5, X: 2-3, E: 1/ Alt: 4-6/ Alp: rr, Salp: rc/ PT: 1/ paras *Baeomyces* spp./ Note: an arctic-alpine, circumpolar species found on weakly calciferous soil rich in humus near and above treeline, first parasymbiotic on *Baeomyces*, later an autonomous lichen. Restricted to the Alps and the northern Apennines in Italy.

Arthrorhaphis citrinella (Ach.) Poelt

Bestimmungsschl. Eur. Flechten: 126, 1969 - *Lichen citrinellus* Ach., K. Vetensk.-Akad. Nya Handl., 16: 135, 1795.

Syn.: *Arthrorhaphis flavovirescens* (A. Massal.) Th. Fr., *Bacidia citrinella* (Ach.) Branth & Rostr., *Bacidia flavovirescens* (A. Massal.) Anzi, *Bacidia flavovirescens* var. *citrinella* (Ach.) Vain., *Lecanactis citrinella* (Ach.) H. Olivier, *Lecidea citrinella* (Ach.) Ach., *Lecidea flavovirescens* (A. Massal.) Borrer, *Lichen flavovirescens* Dicks. non Wulfen, *Mycobacidia flavovirescens* (A. Massal.) Rehm, *Raphiospora flavovirescens* A. Massal., *Scoliciosporum flavovirescens* (A. Massal.) Jatta, *Skolekites citrinellus* (Ach.) Norman

N - Fr1 (Obermayer 1994, Tretiach & Hafellner 2000), Ven (Obermayer 1994), TAA (Obermayer 1994, Bilovitz & al. 2014), Lomb, Piem (Isocrono & al. 2004, Isocrono & Piervittori 2008), VA (Piervittori & al. 2001). S - Cal (Puntillo 1996), Si (Obermayer 1994).

Cr/ Ch/ A.s/ Terr/ pH: 1-3, L: 4-5, X: 2-3, E: 1/ Alt: 4-5/ Alp: rr, Salp: c, Orom: er/ PT: 1/ paras *Baeomyces rufus*/ Note: an arctic-alpine, circumpolar species found on mosses and acid soil rich in humus in sheltered situations near and above treeline. Older thalli are lichenised, younger ones are lichenicolous on *Baeomyces*. Most frequent in the Alps, but also present in the mountains of Calabria and Sicily. To be looked for throughout the Apennines.

Arthrorhaphis grisea Th. Fr.

N. Acta Reg. Soc. Sci. Upsal., ser. 3, 3: 304, 1861.

Syn.: *Bacidia arenicola* (Nyl. ex Mudd) H. Olivier, *Bacidia flavovirescens* var. *arenicola* (Nyl. ex Mudd) A.L. Sm., *Gongylia sabuletorum* (Fr.) Stein, *Gongylia viridis* A.L. Sm., *Lahmia fueistingii* Körb., *Mycobacidia arenicola* (Nyl. ex Mudd) Sacc. & D. Sacc., *Raphiospora arenicola* Nyl. ex Mudd, *Sagedia sabuletorum* (Fr.) A. Massal.

N - TAA.

Cr/ Ch/ S/ Terr/ pH: 1-3, L: 4-5, X: 2-3, E: 1/ Alt: 4-5/ Alp: rr, Salp: r/ PT: 1/ paras *Baeomyces* spp./ Note: an arctic-alpine species found on soil and weathered siliceous rocks near and above treeline, first parasymbiotic on *Baeomyces* (*Baeomyces carneus*, *B. rufus* and, more rarely, *B. placophyllus*), later an autonomous lichen. The species is known only from South Tyrol, but it is probably more widespread in the Alps.

Arthrorhaphis vacillans Th. Fr.

Th. Fr. & Almq. ex Th. Fr., Bot. Not.: 107, 1867.

Syn.: *Arthrorhaphis anziana* (Lynge) Poelt, *Bacidia anziana* Lynge, *Bacidia vacillans* (Th. Fr.) Rostr.

N - TAA.

Cr/ Ch/ S/ Terr/ pH: 2-4, L: 4-5, X: 2, E: 1/ Alt: 4-5/ Alp: vr, Salp: r/ PT: 1/ paras *Baeomyces placophyllus*/ Note: an arctic-alpine, circumpolar species found in humid soil near and above treeline. It starts the life-cycle as a parasite of *Baeomyces placophyllus*, later becoming autotrophic, and is the most calcium-tolerant among the *Arthrorhaphis*-species, often occurring over calcareous schists and even marmor (Obermayer *in litt.*). Probably more widespread in the Alps.

Arthrosporum A. Massal.

Mem. Lichenogr.: 127, 1853.

A monospecific genus of the Ramalinaceae including a species with more or less 3-septate spores and a *Bacidia*-ascus type, rather closely related to *Toninia*. Type: *A. populorum* A. Massal.

Arthrosporum populorum A. Massal.

Mem. Lichenogr.: 128, 1853.

Syn.: *Arthrosporum accline* (Flot.) A. Massal., *Bacidia acclinis* (Flot.) Zahlbr., *Bacidia populorum* (A. Massal.) Trevis., *Bilimbia acclinis* (Flot.) Trevis., *Bilimbia populorum* (A. Massal.) Vain., *Lecidea acclinis* Flot.

N - FrI (Badin & Nimis 1996), **Ven** (Lazzarin 2000b, Nascimbene & Marini 2010), **TAA** (Nascimbene & al. 2007b), **Lomb, Piem** (Isocrono & al. 2004), **Emil** (Bassi 1995, Nimis & al. 1996), **Lig** (Giordani & Incerti 2008, Giordani & al. 2009), **C - Tosc** (Putorti & al. 1999c, Loppi & al. 2002), **Umb** (Ravera & al. 2006, 2006b), **Laz** (Bartoli & al. 1997), **Abr, Sar, S - Pugl, Bas, Cal** (Puntillo 1996, Puntillo & Puntillo 2004), **Si** (Grillo & Carfi 1997, Grillo 1998, Grillo & Caniglia 2004).

Cr/ Ch/ S/ Epiph/ pH: 3, L: 4-5, X: 3-4, E: 2-4/ Alt: 1-2/ SmedD: vr, SmedH: r, MedH: vr, MedD: er/ PT: 1-2/ Note: a mild-temperate lichen found on smooth bark of deciduous trees and shrubs, especially *Fraxinus*, *Populus* and *Salix*, with optimum in the submediterranean belt; probably declining, especially in northern Italy.

Aspicilia A. Massal.

Ric. Auton. Lich. Crost.: 36, 1852.

A molecular revision of this large and difficult genus of the Megasporaceae was carried out by Nordin & al. (2010). Not considering the species formerly segregated into *Bellemeria*, the authors proposed a division of *Aspicilia* into five genera. The old names *Circinaria* and *Sagedia* were reintroduced for groups not including *A. cinerea*, the type species of *Aspicilia*. The small genus *Megaspora* proved to be closely related to *Circinaria*, while *Lobothallia* is the sister group of the other Megasporaceae genera. *Aspicilia recedens* and *A. farinosa* were transferred to *Lobothallia*. Species of the “*Sphaerothallia* group” proved to be nested in *Circinaria*. *Aspilidea* is not a member of Megasporaceae but seems to be more closely related to the Ochrolechiaceae. More recently, the genus *Teuvoa* was added by Sohrabi & al. (2013b) for the *Aspicilia uxoris*-group. Unfortunately, only a part of the many species present in Italy, some of which are very poorly known, were molecularly analysed, so that their generic position still awaits clarification. Here I tentatively follow the arrangement proposed by Nordin & al. (2010), provisionally leaving most of the species which were not analysed by them into *Aspicilia*. The distinction between *Aspicilia s.str.* and *Sagedia* has been questioned by several authors (see e.g. Miadlikowska & al. 2014), but, pending further study, I maintain it here also because it permits to separate *Megaspora* as an independent genus. Roux & coll. (2014), however, consider *Circinaria*, *Megaspora* and *Sagedia* as subgenera of *Aspicilia*, accepting only *Lobothallia* as an independent genus. Type: *A. cinerea* (L.) Körb.

Aspicilia aquatica (Fr.) Körb.

Syst. Lich. Germ.: 165, 1855 - *Parmelia cinerea* var. *aquatica* Fr., Lich. Eur. Ref.: 144, 1831.

Syn.: *Aspicilia eluta* (Nyl.) Hue, *Aspicilia flageyi* Hue, *Aspicilia griseopallida* (Vain.) Hue, *Lecanora amphibola sensu* Vain., *Lecanora aquatica* (Fr.) Hepp, *Lecanora flageyi* (Hue) Zahlbr., *Lecanora mazarina* (Wahlenb.) H. Magn., *Lecanora rivulorum* H. Magn., *Zeora cinerea* var. *aquatica* (Fr.) Flot.

N - TAA (Nascimbene & al. 2007b), **Lomb, Piem** (Isocrono & al. 2004), **Emil, Lig, C - Tosc, Marc, Abr, Sar, S - Camp, Bas, Cal** (Puntillo 1996).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 3-4, X: 1, E: 1/ Alt: 2-5/ Alp: vr, Salp: r, Orom: vr, Mont: rc, SmedD: er, SmedH: vr, MedH: er / PT: 1/ 1/ Note: a probably holarctic species of periodically submerged rocks, also present in montane Mediterranean rivulets which are dry during summer.

Aspicilia briconensis Hue

Nouv. Arch. Mus. Hist. Nat., Paris, 5 sér., 2: 73, 1912 (“1910”).

Syn.: *Lecanora briconensis* (Hue) Zahlbr.

N - TAA (Roux & al. 2011).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 3-5, X: 3-4, E: 3-4/ Alt: 4-5/ Alp: vr, Salp: vr/ PT: 1/ #/ Note: a poorly known, chemically variable species of siliceous rocks (see Roux & coll. 2014), reported from various localities in the southern Alps. For further details see Roux & al. (2011) and Roux & coll. (2014).

Aspicilia bunodea (A. Massal.) Maheu & A. Gillet

Lich. de l'Est de la Corse: 52, 1926 - *Pachyospora bunodea* A. Massal., *Symmicta* Lich.: 26, 1855.

Syn.: *Lecanora bunodea* (A. Massal.) Jatta

N - Ven (Lazzarin 2000b).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 3-5, X: 2-4, E: 2-5/ Alt: 2-3/ Mont: r, SmedD: vr / PT: 1/ #/ Note: a rather poorly known species, most probably related to *Circinaria contorta* (see Roux & coll. 2014). The generic position is still unsettled.

Aspicilia candida (Anzi) Hue

Nouv. Arch. Mus. Hist. Nat., Paris, 5 sér., 2: 64, 1912 (“1910”) - *Aspicilia polychroma* var. *candida* Anzi, Cat. Lich. Sondr.: 59, 1860.

Syn.: *Aspicilia candida* var. *flavoreagens* Asta & Cl. Roux nom. inval., *Aspicilia marcii* B. de Lesd., *Aspicilia rosacea* Hue, *Lecanora candida* (Anzi) Nyl.

N - FrI (TSB 17100), **TAA, Lomb, Piem** (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999, Piervittori & al. 2004), **Emil** (Tretlach & al. 2008), **Lig** (TSB 33383).

Cr/ Ch/ S/ Sax/ pH: 3-5, L: 4-5, X: 4, E: 2/ Alt: 3-6/ Alp: rr, Salp: rc, Orom: vr, Mont: vr/ PT: 1/ Note: known from Europe and North America, this lichen occurs in the Alps on weakly calciferous rocks, especially calcareous schists, mostly near or above treeline. Earlier records from southern Italy (see Nimis 1993: 98), being dubious, are not accepted here. The species is chemically variable (see *e.g.* Roux & coll. 2014).

***Aspicilia cinerea* (L.) Körb.**

Syst. Lich. Germ.: 164, 1855 - *Lichen cinereus* L., Mantissa Pl.: 132, 1767.

Syn.: *Aspicilia angelorum* B. de Lesd., *Aspicilia cinerea* var. *alba* (Schaer.) Anzi, *Aspicilia cinerea* var. *vulgaris* Schaer., *Aspicilia cinerea* var. *vulgaris* Schaer. f. *lignicola* Anzi, *Aspicilia gibbosa* var. *lignicola* (Anzi) Bagl. & Carestia, *Aspicilia depressa* (Ach.) Anzi, *Aspicilia polygonia* (Vill.) A. Massal., *Lecanora cinerea* (L.) Sommerf., *Lecanora excipularis* H. Magn. *nomen sed non planta*, *Lecanora illimata* (Wahlenb.) Ach., *Lecanora protrudens* Malme?, *Parmelia cinerea* (L.) Hepp, *Sagedia depressa* Ach., *Urceolaria cinerea* (L.) Ach.

N - **VG** (Castello 2002, Martellos & Castello 2004), **Frl**, **Ven** (Nascimbene 2005c), **TAA** (Caniglia & al. 2002, Nascimbene 2001b, 2003, 2005b, Lang 2009), **Lomb** (Dalle Vedove & al. 2004, Rico & al. 2007), **Piem** (Isocrono & al. 2003, 2004, 2006, Isocrono & Piervittori 2008, Giordani & al. 2014, Favero-Longo & al. 2015), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Piervittori & al. 1998, 2001, 2004, Matteucci & al. 2013b, 2015c), **Emil** (Dalle Vedove & al. 2002), **Lig** (Giordani & al. 2016). **C** - **Tosc** (Brackel 2014, 2015), **Marc**, **Laz** (Pietrini & al. 2008, Roccardi & al. 2014), **Sar** (Rizzi & al. 2011, Giordani & al. 2013). **S** - **Camp** (Ricciardi & al. 2000, Aprile & al. 2002, Catalano & al. 2016), **Pugl**, **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Grillo 1998, Grillo & Caniglia 2004, Brackel 2008b, 2008c).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 3-5, X: 3-4, E: 3-4/ Alt: 2-5/ Alp: vc, Salp: ec, Orom: rc, Mont: rc, SmedD: r, Pad: er, SmedH: r, MedH: vr/ PT: 1-2/ #/ Note: on acid to basic siliceous rocks wetted by rain. Taken in the broadest sense, as here, this is a holarctic and probably bipolar, extremely variable lichen, widespread from subtropical to arctic areas. Material from the Italian Alps should be also compared with *A. calcitrata* Cl. Roux & Nordin, with which the species has been frequently confused (see Roux & al. 2011, 2014), and which certainly occurs also in Italy. Records from lowland areas in the Mediterranean Region are mostly due to confusion with *A. intermutans*.

***Aspicilia cupreoglauca* B. de Lesd.**

Bull. Soc. Bot. France, 57: 32, 1910.

Syn.: *Aspicilia cinerea* var. *rubicunda* Bagl.

C - **Tosc**, **Laz**, **Sar** (Monte 1993, Nöske 2000, Rizzi & al. 2011). **S** - **Si** (Grillo & Caniglia 2004).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4, X: 3-4, E: 2-3/ Alt: 1-3/ Mont: vr, SmedH: er, MedH: r/ PT: 1/ Note: a mild-temperate to Mediterranean lichen found on base-rich siliceous rocks wetted by rain, mostly on horizontal surfaces; mainly Tyrrhenian in Italy.

***Aspicilia glomerulans* (Poelt) Poelt**

Mitt. bot. Staatss. München, 8: 202, 1970 - *Lecanora glomerulans* Poelt, Mitt. bot. Staatss. München, 4: 177, 1961.

C - **Sar**.

Cr/ Ch/ A.i/ Sax/ pH: 1-2, L: 3-4, X: 1-2, E: 1-2/ Alt: 5/ Alp: er, Orom: vr/ PT: 1/ Note: a rarely-collected lichen found on siliceous boulders along streams, mostly above treeline, described from the Central Alps; probably overlooked being often sterile with coarse, partly branched isidia.

***Aspicilia grisea* Arnold**

Ber. bayer. bot. Ges., 1: 62, 1891.

Syn.: *Aspicilia insolata* (H. Magn.) Hav., *Lecanora grisea* (Arnold) Lettau non Ach., *Lecanora griseolans* Zahlbr., *Lecanora insolata* H. Magn.

N - **Frl** (Tretiach & Hafellner 2000).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4, X: 2, E: 1-3/ Alt: 3-5/ Alp: r, Salp: rr, Mont: vr/ PT: 1/ p/ Note: a chemically variable species (see Roux & coll. 2014), found on siliceous rocks, sometimes also on pebbles, certainly more widespread in the Alps, but very much overlooked.

***Aspicilia henrici* B. de Lesd.**

Bull. Soc. Bot. France, 19: 686, 1912.

N - **VA** (Piervittori & Isocrono 1999).

Cr/ Ch/ S/ Sax/ pH: 3, L: 4, X: 3-4, E: 2/ Alt: 5/ Alp: vr/ PT: 1/ #/ Note: a very poorly known taxon described from the Aosta Valley. It is similar to *A. valpellinensis*, but it reacts K-. Indicator values are tentative.

***Aspicilia inornata* Arnold**

Verh. zool.-bot. Ges. Wien, 27: 550, 1877.

N - **Ven**, **TAA**, **VA** (Piervittori & Isocrono 1999). **C** - **Tosc** (TSB 10470), **Sar**.

Cr/ Ch/ S/ Sax/ pH: 2, L: 3-4, X: 1, E: 1/ Alt: 3-5/ Alp: vr, Salp: vr, Orom: er, Mont: vr/ PT: 1/ 1/ Note: on periodically submerged schistose rocks along brooks in upland areas; most frequent in the Alps. According to Roux & coll. (2014) records from lowland areas are due to confusion with other species.

Aspicilia intermutans (Nyl.) Arnold

Verh. zool.-bot. Ges. Wien, 37: 98, 1887 - *Lecanora intermutans* Nyl., Flora, 55: 354, 1872.

Syn.: *Aspicilia ammotropha* Hue, *Lecanora ammotropha* (Hue) Zahlbr., *Aspicilia reticulata* Kremp.?, *Aspicilia trachytiica* Flagey non (A. Massal.) Arnold, *Aspiciliella intermutans* (Nyl.) M. Choisy

N - VG (Tretiach & al. 2007b, 2012), **Ven, TAA, Lig** (Valcuvia & al. 2000). **C - Tosc, Laz** (Tretiach 2004, Genovesi & al. 2011, Roccardi & al. 2014), **Mol** (Ravera & Genovesi 2012, Genovesi & Ravera 2014), **Sar** (Nöske 2000, Rizzi & al. 2011, Giordani & al. 2013). **S - Camp** (Aprile & al. 2002, Nimis & Tretiach 2004, Catalano & al. 2016), **Bas** (Nimis & Tretiach 1999, Potenza 2006), **Cal** (Puntillo 1996, Scarciglia & al. 2012, 2012b), **Si** (Nimis & al. 1996b, Grillo & al. 1996, Ottonello & Romano 1997, Grillo 1998, Poli & Grillo 2000, Grillo & Caniglia 2004).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 3-4, X: 3-4, E: 2-3/ Alt: 1-3/ Mont: vr, SmedD: r, SmedH: vc, MedH: c, MedD: r/ PT: 1-2/ Note: on more or less base-rich siliceous rocks wetted by rain. This is one of the most frequent silicolous *Aspicilia* of Mediterranean Italy, rare or absent only along the Adriatic side of the Peninsula, mainly because of the scarcity of suitable substrata. Most of the other records from the Alps, especially those from high altitudes, are likely to refer to *Aspilidea myrinii* (Malíček *in litt.*).

Aspicilia laevata (Ach.) Arnold

Verh. zool.-bot. Ges. Wien, 37: 98, 1887 - *Sagedia laevata* Ach., K. Vetensk.-Akad. Nya Handl., 30: 164, 1809.

Syn.: *Aspicilia cinerea* var. *laevata* (Ach.) Körb., *Aspicilia gibbosa* var. *laevata* (Ach.) Stein, *Aspicilia lusca* (Nyl.) B. de Lesd., *Aspicilia sylvatica* Arnold, *Aspicilia vitrea* Anzi, *Lecanora distinguenda* Zahlbr., *Lecanora laevata* (Ach.) Nyl., *Lecanora lusca* Nyl., *Lecanora sylvatica* (Arnold) Sandst.

N - Frl (Tretiach & Hafellner 2000), **TAA, Lomb** (Isocrono & al. 2004), **Piem, Emil, C - Tosc** (Tretiach 2015c), **Sar** (Rizzi & al. 2011, Giordani & al. 2013). **S - Camp** (Nimis & Tretiach 2004), **Cal** (Puntillo 1996).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 3, X: 1-2, E: 1/ Alt: 1-5/ Alp: vr, Salp: rr, Orom: r, Mont: r, SmedD: vr, SmedH: r, MedH: er/ PT: 1/ 1/ Note: a mainly boreal-montane, circumpolar species found on periodically submerged rocks, sometimes also in humid forests. Most frequent in the Alps, but extending southwards along the Apennines to Calabria.

Aspicilia laevatoides (H. Magn.) Oxner

in Kopaczewskaja & al., Handbook Lich. U.S.S.R., 1: 159, 1971 *comb. inval.* - *Lecanora laevatoides* H. Magn., K. Svenska Vetensk.-Akad. Handl., ser. 3, 17, 5: 34, 1939.

N - TAA, Lomb (Nascimbene 2006).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 3, X: 1-2, E: 1/ Alt: 2-4/ Salp: vr, Mont: vr/ PT: 1/ 1, #/ Note: a rather poorly known species described from South Tyrol, apparently ranging from southern Scandinavia to the mountains of North Africa, on periodically submerged siliceous rocks along brooks.

Aspicilia lignicola Hue

Anzi *ex* Hue, Nouv. Arch. Mus. Hist. Nat., Sér. 5, 2: 49, 1910.

Syn.: *Aspicilia gibbosa* var. *lignicola* Anzi *nom.nud.*, *Lecanora lignicola* (Hue) Zahlbr.

N - Lomb, Piem.

Cr/ Ch/ S/ Lign/ pH: 1-2, L: 3-5, X: 2, E: 3-4/ Alt: 3-4/ Salp: rr, Mont: vr/ PT: 1/ #/ Note: a poorly known species of nutrient-enriched wood, also reported from the French and Austrian Alps.

Aspicilia lobulata (Anzi) Hue

Nouv. Arch. Mus. Hist. Nat., Paris, 5 sér., 2: 65, 1912 ("1910") - *Aspicilia calcarea* var. *concreta* f. *lobulata* Anzi, Cat. Lich. Sondr.: 58, 1860.

Syn.: *Aspicilia permutata* (Zahlbr.) Clauzade & Rondon, *Aspicilia verruculosa* auct. non Kremp., *Lecanora effigurans* Zahlbr., *Lecanora permutata* Zahlbr., *Lecanora verruculosa* auct. non (Kremp.) J.Steiner *nec* Bagl. *nec* Jatta **N - TAA** (UPS- L-535489).

Cr/ Ch/ S/ Sax/ pH: 3-4, L: 4, X: 3-4, E: 2-3/ Alt: 4-5/ Alp: vr, Salp: vr/ PT: 1/ #/ Note: a species with a bluish-grey effigurate thallus, whose differences from *A. candida* are still in need of evaluation; the type, from South Tyrol, was on serpentine, but the species was also reported from slightly calcareous schists. It might have been confused with *A. verruculosa*.

Aspicilia mashiginensis (Zahlbr.) Oxner

Nov. Sist. Niz. Rast., 9: 289, 1972 - *Lecanora mashiginensis* Zahlbr., Rep. Sci. Res. Norweg. Exped. Novaya Zemlya: 20, tab. 3, fig. 2, 1921.

Syn.: *Aspicilia bennettii* (Lynge) J.W. Thomson, *Aspicilia cinerea* f. *papillata* Arnold, *Aspicilia mastrucata* auct. *eur. merid. non* (Wahlenb.) Ach., *Lecanora bennettii* Lynge

N - Frl (Tretiach & Hafellner 2000), **TAA, Piem** (TSB 33157), **Emil** (TSB 35593).

Cr.pl/ Ch/ S/ Sax/ pH: 2-3, L: 3, X: 2, E: 1-2/ Alt: 4-6/ Alp: vr, Salp: er/ PT: 1/ Note: on basic siliceous rocks, often on weakly calciferous schists, in humid-shaded situations near and above treeline, up to the nival belt; to be looked further throughout the Alps. For further information see Tretiach & Hafellner (1998).

Aspicilia polychroma Anzi

Cat. Lich. Sondr.: 59, 1860.

Syn.: *Aspicilia polychroma* subsp. *hypertrophica* Asta & Cl. Roux?, *Aspicilia polychroma* var. *perradiata* (Nyl.) Clauzade & Cl. Roux?, *Aspicilia polychroma* var. *rubrireagens* Asta & Cl. Roux nom. inval., *Lecanora polychroma* (Anzi) Nyl., *Aspicilia polychroma* var. *ochracea* Anzi?

N - Ven, TAA (Nascimbene 2005), **Lomb, Piem** (Isocrono & al. 2004), **VA, Emil** (Tretiach & al. 2008), **Lig** (TSB 33687b). **C - Sar**.

Cr/ Ch/ S/ Sax/ pH: 2-4, L: 4-5, X: 3-4, E: 1-3/ Alt: 3-5/ Alp: rr, Salp: r, Orom: vr, Mont: er/ PT: 1/ #/
Note: a mainly arctic-alpine, perhaps circumpolar, chemically and morphologically variable species with optimum on more or less calciferous siliceous rocks, most frequent near or above treeline. For further details on the infraspecific taxa see Roux & coll. (2014). The record from Campania by Nimis & Tretiach (2004) was due to a misidentification. See also note on *A. verruculosa*.

Aspicilia prestensis Cl. Roux & Nordin

in Cl. Roux & al., Bull. Soc. linn. Provence, num. spéc. 14: 203, 2011.

N - TAA (Nascimbene 2005, as *A. epiglypta*).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 3-5, X: 3-4, E: 3-4/ Alt: 3-5/ Alp: rr, Salp: rr, Orom: rr, Mont: vr/ PT: 1/ #/
Note: a species with an areolate, non-effigurate, whitish-grey thallus reacting K+ red, often confused with *A. cinerea* (with smaller ascospores) and *A. epiglypta* (with rough apothecial discs); it grows on acidic rocks, with optimum in sunny places, with optimum near and above treeline. According to Roux & al. (2011) *Aspicilia epiglypta* is restricted to coastal areas in northern Europe, and records from elsewhere may be due to confusion with other species, especially with *A. prestensis*. Pending a revision of the whole complex in Italy, I attribute here the record of *A. epiglypta* from South Tyrol to *A. prestensis*. See also note on *A. cinerea*.

Aspicilia scutellaris A. Massal.

Ric. Auton. Lich. Crost.: 38, 1852.

Syn.: *Lecanora scutellaris* (A. Massal.) Jatta, *Patellaria scutellaris* (A. Massal.) Trevis.

N - Ven, Lig.

Cr/ Ch/ S/ Sax/ pH: 3-4, L: 4, X: 3-4, E: 2-3/ Alt: 2/ SmedD: vr/ PT: 1/ #/ Note: a very poorly known species of basaltic or calcareous rocks, also reported from France. According to Roux & coll. (2014) it does not belong to *Aspicilia s.str.*

Aspicilia subdepressa Arnold

Verh. zool.-bot Ges. Wien, 19: 611, 1869.

Syn.: *Lecanora subdepressa* (Arnold) Nyl., *Pachyospora subdepressa* (Arnold) M. Choisy

N - TAA, Piem (Morisi & Sereno 1995), **Lig** (Roux & al. 2011).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4-5, X: 3-4, E: 2-4/ Alt: 2-4/ Salp: er, Mont: r, SmedD: er/ PT: 1/ #/ Note: a silicicolous species of vertical to inclined rocks in rather dry areas, with optimum in the montane belt. For a detailed description see Roux & al. (2011).

Aspicilia subfarinosa (J. Steiner) Şenkard. & Sohrabi

Mycotaxon, 115: 101, 2011 - *Lecanora subfarinosa* J. Steiner, Ann. naturhist. Mus. Wien, 34: 38, 1921.

Syn.: *Aspicilia farinosa* var. *subopegraphoides* (Werner) S.Y. Kondr., *Aspicilia substerilis* Sipman

N - Frl (Sipman 2007). **C - Sar** (Sipman 2007).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 4-5, X: 4, E: 2-3/ Alt: 1-3/ Mont: vr, SmedD: vr, SmedH: vr, MedH: er/ PT: 1/ Note: a Mediterranean-Turanian species growing on calcareous rocks in exposed situations, probably more widespread in Italy below the subalpine belt. Superficially similar to *Lobothallia controversa*, this species differs in having only 4 spores per ascus.

Aspicilia supertegens Arnold

Verh. zool.-bot. Ges. Wien, 17: 567, 1877.

Syn.: *Aspicilia prinii* B. de Lesd., *Lecanora leucostoma* H. Magn., *Lecanora supertegens* (Arnold) Zahlbr.

N - Frl (Tretiach & Hafellner 2000), **TAA, Lomb**.

Cr/ Ch/ S/ Sax/ pH: 2-4, L: 3-4, X: 2, E: 1-2/ Alt: 3-5/ Alp: vr, Salp: r, Mont: er/ PT: 1/ Note: a boreal-montane to arctic-alpine, perhaps circumpolar, variable lichen found on lime-free but base-rich rocks, often on mica-schist in humid situations (near brooks, melting snow, etc.), with optimum near and above treeline; probably restricted to the Alps in Italy.

Aspicilia trachytica (A. Massal.) Arnold

Verh. zool.-bot. Ges. Wien, 19: 610, 1869 - *Pachyospora calcarea* var. *trachytica* A. Massal., Ric. Auton. Lich. Crost.: 44, 1852.

Syn.: *Aspicilia cinerea* var. *trachytica* (A. Massal.) Jatta, *Aspicilia polygonia* var. *trachytica* (A. Massal.) A. Massal., *Lecanora trachyticola* Zahlbr.

N - Ven (Lazzarin 2000). **S - Si** (Ottonello & Romano 1997)

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 4-5, X: 4, E: 2-3/ Alt: 1-2/ SmedD: vr, Pad: er, MedD: er/ PT: 1-2/ #/ Note: a very poorly known silicicolous species, which however has been reported from several localities in the Mediterranean area, southern central Europe and Iran. The type material is from the Euganean Hills.

Aspicilia valpellinensis B. de Lesd.

Bull. Soc. Bot. France, 59: 686, 1912.

Syn.: *Aspicilia cinerea* var. *chiodectonoides* Anzi, *Lecanora valpellinensis* (B. de Lesd.) Zahlbr.

N - Lomb, VA (Piervittori & Isocrono 1999).

Cr/ Ch/ S/ Sax/ pH: 3-4, L: 4, X: 3-4, E: 2-3/ Alt: 4-5/ Alp: vr, Salp: er/ PT: 1/ #/ Note: a very poorly known species (see Nimis 1993: 106), found on calciferous schists, only known from the Alps (Scandinavian material belongs to *A. supertegens*: Nordin *in litt.*). Indicator values are tentative.

Aspicilia verruculosa Kremp.

Denkschr. bot. Ges. Regensburg, 4, 2: 283, 1861, *non sensu* H. Magn.

Syn.: *Lecanora krempehuberi* Jatta *non* Schaer.

N - TAA, Lomb, Piem (Morisi & Sereno 1995, Isocrono & al. 2004, Morisi 2005), **Lig**.

Cr/ Ch/ S/ Sax/ pH: 3, L: 4, X: 3-4, E: 2-3/ Alt: 4-5/ Alp: r, Salp: vr/ PT: 1/ #/ Note: on weakly calciferous rocks. A critical taxon, known only from the southern European mountains (see Nimis 1993: 106), considered just as a chemotype of *A. polychroma* by Roux & coll. (2014). See also note on *A. lobulata*.

Aspilidea Hafellner

in Hafellner & Türk, Stapfia, 76: 149, 2001.

This monotypic genus segregated from *Aspicilia* is not a member of Megasporaceae, but seems to be more closely related to Ochrolechiaceae (Nordin & al. 2010). Its taxonomic position within the Ostropomycetidae is still not clear. Type: *Aspilidea myrinii* (Fr.) Hafellner

Aspilidea myrinii (Fr.) Hafellner

in Hafellner & Türk, Stapfia, 76: 149, 2001 - *Parmelia myrinii* Fr. *in* Myrin, Skandia, 6: 25, 1835.

Syn.: *Aspicilia adunans* (Nyl.) Arnold, *Aspicilia cinerea* var. *alpina* (Fr.) Körb., *Aspicilia glacialis* (Arnold) Dalla Torre & Sarnth., *Aspicilia myrinii* (Fr.) Stein, *Lecanora adunans* Nyl., *Lecanora myrinii* (Fr.) Tuck.

N - Frl (Tretiach & Hafellner 2000), **TAA, Lomb** (De Vita & Valcuvia 2004, Delucchi & Valcuvia 2004, Valcuvia & al. 2003), **Piem** (TSB 34356), **VA** (Piervittori & isocrono 1999, Matteucci & al. 2013, 2015c).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 4, X: 3-4, E: 1-2/ Alt: 3-5/ Alp: r, Salp: rr, Mont: vr/ PT: 1/ Note: a mainly arctic-alpine, circumpolar species found on crystalline schists and acid siliceous rock, mostly near and above treeline; in Italy probably restricted to, and more widespread in the Alps. For the record from South Tyrol see Nimis (1993: 103-104). Here I also place some records of *Aspicilia intermutans* from alpine-subalpine situations (see note on that species).

Athallia Arup, Frödén & Søchting

in Arup & al., Nord. J. Bot., 31: 36, 2013.

The taxonomy of the family Teloschistaceae is presently in a state of flux and high confusion, with several authors proposing different generic arrangements. The most comprehensive attempt of a re-definition of the family, and especially of the very large and heterogeneous genus *Caloplaca*, is that proposed by Arup & al. (2013) on the basis of molecular data, where 39 genera are accepted, not all of which are recognizable without a molecular analysis. One of those is *Athallia*, a genus that at the moment includes a dozen species, which shares many morphological traits with other genera segregated from *Caloplaca s.lat.*, such as *Calogaya*, *Flavoplaca*, etc. Unfortunately, only a part of the many species of *Caloplaca* present in Italy, some of which are very poorly known, were included in the analysis of Arup & al. (2013). Here I tentatively follow the arrangement proposed by these authors, provisionally leaving most of the unresolved species in *Caloplaca s.lat.* Type: *Athallia holocarpa* (Hoffm.) Arup, Frödén & Søchting

Athallia alnetorum (Giralt, Nimis & Poelt) Arup, Frödén & Søchting

in Arup & al., Nord. J. Bot., 31: 36, 2013 - *Caloplaca alnetorum* Giralt, Nimis & Poelt, Cryptogamie, Bryol. Lichénol., 13: 269, 1992.

N - Ven (Nascimbene 2005c), **TAA** (Nascimbene & al. 2006, 2007b), **Emil** (Nimis & al. 1996). **C - Tosc** (Benesperi & al. 2007), **Laz, Abr** (Nimis & Tretiach 1999), **Sar** (Zedda & Sipman 2001, Zedda 2002, Rizzi & al. 2011, Cossu 2013). **S - Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Herb. Vondrák 10856).

Cr/ Ch/ S/ Epiph/ pH: 3, L: 4, X: 3, E: 2-3/ Alt: 2-4/ Salp: er, Mont: rr, SmedD: er, SmedH: vr/ PT: 1/ Note: a temperate species growing on broad-leaved trees, most common in humid areas in the mountains; certainly more widespread in the Alps, but overlooked, or confused with other taxa. The inclusion of this species into *Athallia*, while the very similar *C. flavorubescens* is included in *Gyalolechia* (Arup & al. 2013), may appear quite surprising, but, besides molecular differences, the former has smaller ascospores, shorter and ellipsoid conidia, and lacks fragilin, a substance which is always present in *Gyalolechia* (Vondrák & al. 2016).

Athallia cerinella (Nyl.) Arup, Frödén & Søchting

in Arup & al., Nord. J. Bot., 31: 36, 2013 - *Lecanora cerinella* Nyl., Bull. Soc. Bot. France, 13: 370, 1866.

Syn.: *Callospisma cerinellum* (Nyl.) Walt. Watson, *Caloplaca cerinella* (Nyl.) Flagey, *Caloplaca perfida* Malme, *Candelariella cerinella* (Nyl.) Mig. non Zahlbr., *Placodium cerinellum* (Nyl.) Vain.

N - VG, Frl (Bernini & al. 2010), **Ven** (Nascimbene & Marini 2010), **TAA** (De Benetti & Caniglia 1993, Nascimbene & al. 2007b, 2014, Nascimbene 2014), **Lomb** (Arosio & al. 2000, 2003), **Piem** (Arosio & al. 1998, Matteucci & al. 2010, Giordani & Malaspina 2016), **Emil** (Nimis & al. 1996, Sallesse 2003, Morselli & Regazzi 2006, Benesperi 2009). **C - Tosc** (Putorti & al. 1999c, Loppi & al. 2002, Frati & al. 2007, Paoli & al. 2012b, 2013), **Marc** (Gasparo & al. 1989, Nimis & Tretiach 1999, Frati & Brunialti 2006), **Umb** (Ravera 1998, Ravera & al. 2006, Brackel 2015), **Laz** (Bartoli & al. 1997b, Ravera & al. 1999, Munzi & al. 2007, Ravera & Genovesi 2008), **Abr** (Olivieri & Pacioni 1996, Olivieri & al. 1997, 1997b, Loppi & al. 1999, Nimis & Tretiach 1999, Caporale & al. 2016), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008, Paoli & al. 2011, 2015), **Sar** (Zedda 2002, Rizzi & al. 2011, Cossu 2013). **S - Camp** (Aprile & al. 2002, 2003, 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010, Catalano & al. 2012, 2016, Brunialti & al. 2013, Ravera & Brunialti 2013), **Pugl** (Nimis & Tretiach 1999, Brackel 2011), **Bas** (Nimis & Tretiach 1999, Paoli & al. 2006, Potenza & al. 2010), **Cal** (Brackel & Puntillo 2016), **Si**.

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 4-5, X: 3-4, E: 3-4/ Alt: 1-3/ Mont: r, SmedD: rc, Pad: r, SmedH: c, MedH: rr, MedD: r/ PT: 1-2/ Note: a temperate species found on base- or nutrient-rich bark (e.g. very common on *Sambucus* or on *Juglans* in open habitats), with optimum in the submediterranean belt. See also note on *A. cerinelloides*.

Athallia cerinelloides (Erichsen) Arup, Frödén & Søchting

in Arup & al., Nord. J. Bot., 31: 36, 2013 - *Caloplaca pyracea* f. *cerinelloides* Erichsen, Verh. bot. Ver. Prov. Brandenburg, 72: 35, 1930.

Syn.: *Caloplaca cerinelloides* (Erichsen) Poelt

N - TAA (Nascimbene 2014), **Lomb** (Arosio & al. 2003), **Piem** (Arosio & al. 1998), **Emil** (B-183552). **C - Tosc** (Loppi & al. 2002b, Loppi & Frati 2006, Frati & al. 2008), **Marc** (Frati & Brunialti 2006, Brackel 2015), **Umb** (Ravera 1998, Ravera & al. 2006), **Laz** (Bartoli & al. 1997, Ravera & al. 1999, Massari & Ravera 2002, Munzi & al. 2007, Zucconi & al. 2013), **Abr** (Brackel 2015), **Mol** (Caporale & al. 2008, Paoli & al. 2011), **Sar** (Zedda 2002, 2002b, Rizzi & al. 2011, Cossu 2013). **S - Pugl** (Brackel 2011), **Bas** (Potenza 2006, Paoli & al. 2006), **Si** (Nimis & al. 1994, Grillo & Caniglia 2004, 2006, Caniglia & Grillo 2006b).

Cr/ Ch/ S/ Epiph/ pH: 3-4, L: 4-5, X: 3-4, E: 4/ Alt: 1-3/ Mont: r, SmedD: vr, Pad: er, SmedH: vr, MedH: er/ PT: 1-2/ #/ Note: superficially similar to *A. cerinella*, but with a different number of spores per ascus. Also the ecology and distribution are different: *A. cerinelloides* has a more northern distribution and usually occurs on *Populus tremula*, or even on twigs of conifers (*Vondrák in litt.*).

Athallia holocarpa (Hoffm.) Arup, Frödén & Søchting

in Arup & al., Nord. J. Bot., 31: 36, 2013 - *Verrucaria oblitterata* var. *holocarpa* Hoffm., Deutsch. Fl., 2, 179, 1796,

Syn.: *Athallia vitellinula* (Nyl.) Arup, Frödén & Søchting, *Callospisma aurantiacum* var. *holocarpum* (Ach.) A. Massal., *Caloplaca aurantiaca* var. *holocarpa* (Ach.) Th. Fr., *Caloplaca holocarpa* (Ach.) A.E. Wade, *Caloplaca pyracea* var. *holocarpa* (Ach.) Th. Fr., *Caloplaca vitellinula* (Nyl.) H. Olivier, *Lecanora vitellinula* Nyl., *Placodium aurantiacum* var. *holocarpum* (Ach.) Anzi, *Placodium pyraceum* var. *holocarpum* (Ach.) Anzi

N - Ven, TAA, VA, Lig (TSB 33408). **C - Tosc** (TSB 21532), **Marc** (TSB 24077), **Abr.** (TSB 24316), **Mol** (TSB32538), **Sar** (B-189907). **S - Camp, Bas** (TSB 29938), **Si**.

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4-5, X: 3-5, E: 2-5/ Alt: 1-5/ Alp: r, Salp: rr, Orom: rr, Mont: rr, SmedD: rr, Pad: r, SmedH: r, MedH: r, MedD: r/ PT: 1-3/ p/ Note: according to Arup (2009) this is a silicolous, rarely lignicolous species of more or less eutrophic habitats, mostly found on the top of isolated boulders. The epithet *holocarpa*, however, has been widely used for different lichens occurring both on bark and on calcareous rocks, which are mainly treated here under *Athallia pyracea* and *Flavoplaca oasis*. Due to the extreme confusion still concerning this group in southern Europe, I place here only a few records from siliceous rocks which I could check in TSB. On the synonymisation of *Athallia vitellinula* see Vondrák & al. (2016).

Athallia pyracea (Ach.) Arup, Frödén & Søchting

in Arup & al., Nord. J. Bot., 31: 36, 2013 - *Parmelia cerina* var. *pyracea* Ach., Meth. Lich.: 176, 1803.

Syn.: *Callospisma luteoalbum* var. *celtidis* A. Massal., *Callospisma luteoalbum* var. *confluens* A. Massal., *Callospisma luteoalbum* var. *cupressinum* Bagl., *Callospisma luteoalbum* var. *orbiculare* A. Massal., *Caloplaca holocarpa* auct. p.p., *Caloplaca luteoalba* auct. ital. p.p., *Caloplaca pyracea* (Ach.) Zwackh., *Placodium pyraceum* (Ach.) Anzi

N - VG (Carvalho 1997), **Frl** (Badin & Nimis 1996), **Ven** (Lazzarin 2000, 2000b, Nascimbene 2008, Nascimbene & Marini 2010), **TAA** (Nascimbene & al. 2006, 2007b, 2008c, 2014, Nascimbene 2014), **Lomb** (Zocchi & al. 1997, Arosio & al. 2000, Valcuvia & al. 2003), **Piem** (Arosio & al. 1998, Griselli & al. 2003, Castino 2004, Isocrono & al. 2004, 2005b, 2007, 2009, Isocrono & Piervittori 2008, Matteucci & al. 2010, Giordani & Malaspina 2016), **VA** (Piervittori & Maffei 1996, 2001, Matteucci & al. 2008c), **Emil** (Valcuvia & Savino 2000, Sallesse 2003, Morselli & Regazzi 2006, Gerdol & al. 2014), **Lig** (Giordani & al. 2002, Giordani 2006, Giordani & Incerti 2008). **C - Tosc** (Loppi & al. 1997b, Monaci & al. 1997, Loppi & Putorti 2001, Benesperi & al. 2007, Lastrucci & al. 2009, Benesperi 2011, Nascimbene & al. 2012, 2015, Brackel 2015), **Marc** (Nimis & Tretiach 1999, Frati & Brunialti 2006), **Umb** (Ravera 1998, Nimis & Tretiach 1999, Ravera & al. 2006, Panfili 2007), **Laz** (Massari & Ravera 2002, Munzi & al. 2007, Ravera & Genovesi 2008, Zucconi & al. 2013), **Abr** (Olivieri & al. 1997, 1997b, Loppi & al. 1999, Nimis & Tretiach 1999, Stofer 2006, Caporale & al. 2016), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008, Genovesi & Ravera 2014), **Sar** (Zedda 2002, 2002b, Zedda & Sipman 2001 Rizzi & al. 2011). **S - Camp** (Ricciardi & al. 2000, Nimis & Tretiach 2004, Brunialti & al. 2010, 2013, Garofalo & al. 2010, Catalano & al. 2012, 2016), **Pugl** (Nimis & Tretiach 1999), **Bas** (Bartoli & Puntillo 1998, Nimis & Tretiach 1999, Potenza 2006, Paoli & al. 2006), **Cal** (Puntillo 1995, 1996, Incerti & Nimis 2006), **Si**

(Grillo & Carfi 1997, Ottonello & Romano 1997, Grillo 1998, Grillo & al. 2002, Merlo 2004, Grillo & Caniglia 2004, 2006, Caniglia & Grillo 2006b, Grillo & Cataldo 2008, Liistro & Cataldo 2011).

Cr/ Ch/ S/ Epiph/ pH: 3-4, L: 4-5, X: 3-4, E: 2-4/ Alt: 1-4/ Salp: vr, Mont: rr, SmedD: vc, Pad: r, SmedH: vc, MedH: c, MedD: rr/ PT: 1-2/ Note: a temperate to boreal-montane, holarctic lichen found on nutrient-rich or eutrophicated bark of isolated trees (especially *Acer*, *Fraxinus* and *Juglans*), with a wide altitudinal range.

Athallia saxifragarum (Poelt) Arup, Frödén & Søchting

in Arup & al., Nord. J. Bot., 31: 36, 2013 - *Caloplaca saxifragarum* Poelt, Feddes Rep., 58: 176, 1955.

Syn.: *Callospisma luteoalbum* f. *microcarpum* (Anzi) Arnold, *Caloplaca pyracea* var. *microcarpa* (Anzi) Dalla Torre & Sarnth., *Caloplaca schoeferi* Poelt, *Placodium luteoalbum* f. *microcarpum* Anzi

N - Frl, Ven (Nascimbene 2002, 2008c), **TAA** (Nascimbene & al. 2006, Nascimbene 2008b), **Lomb** (Dalle Vedove & al. 2004), **Piem** (Isocrono & al. 2004), **VA** (Piervittori & al. 2004). **C - Marc** (Nimis & Tretiach 1999), **Abr** (Nimis & Tretiach 1999), **Umb** (Ravera & Di Toma 2003, Ravera & al. 2006). **S - Cal** (Ravera & al. 2016).

Cr/ Ch/ S/ Terr/ pH: 4-5, L: 4-5, X: 3-4, E: 1-2/ Alt: 4-5/ Alp: c, Salp: vc, Orom: vr/ PT: 1/ Note: a circumpolar, arctic-alpine lichen found on plant debris (especially on dead leaves of *Saxifraga*, *Dryas* and *Carex firma*), and on muribund bryophytes in open habitats over calcareous or dolomitic substrata, most common above treeline and reaching the highest mountains of southern Italy. On the synonymisation of *Caloplaca schoeferi* see Vondrák & al. (2016).

Atla Savić & Tibell

Lichenologist, 40: 273, 2008.

With molecular evidence about relationships in Verrucariaceae becoming available, many of the genera as traditionally conceived have been shown to be non-monophyletic. Several genera have thus been given new circumscriptions (e.g. *Polyblastia*), and several new genera have been proposed, among which the genus *Atla*, recognised on the basis of both molecular and morphological data to accommodate four species formerly included into *Polyblastia* (Savić & Tibell 2008). Three further species were added to the genus by Pikälä & Myllys (2016). Type: *A. alpina* Savić & Tibell

Atla alpina Savić & Tibell

Lichenologist, 40: 273, 2008.

Syn.: *Polyblastia theleodes* auct. p.p., *Polyblastia theleodes* (Sommerf.) Th. Fr. var. *inundata* Nyl. ex Th. Fr.

N - Ven (B-60 0195311), **TAA, Lomb, Piem** (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999).

Cr/ Ch/ S/ Sax/ pH: 3-5, L: 2-3, X: 2, E: 1/ Alt: 3-5/ Alp: rr, Mont: er/ PT: 1/ Note: in the central European mountains *A. alpina* grows on calcareous rocks (mesozoic limestone, marble of variable age) with at least locally increased humidity; it is widely distributed in the Alps and not at all rare: probably a considerable percentage of the records of *Henrica theleodes*, especially those upon pure limestone, refer to this species.

Atla wheldonii (Travis) Savić & Tibell

Lichenologist, 40: 280, 2008 - *Polyblastia wheldonii* Travis, North Western Naturalist, 23: 240, 1947.

N - Frl (Breuss 2008, Hafellner 2010).

Cr/ Ch/ S/ Terr/ pH: 3-4, L: 4-5, X: 3-4, E: 1-2/ Alt: 3-6/ Alp: vr, Salp: vr/ PT: 1/ Note: a rare terricolous species of base-rich soil with optimum near and above treeline, so far reported from Scandinavia, Britain, Spain, Austria and Slovenia. The record from the Julian Alps by Breuss (2008) is actually in Slovenian territory, but very close to the border.

Bacidia De Not.

Giorn. Bot. Ital., 2: 189, 1846.

The delimitation of this large genus of the Ramalinaceae including more than 200 species has been problematic for quite a long time. The molecular phylogeny published by Ekman (2001) shows that *Bacidia* might be restricted to the highly supported *B. rosella* group. Well-circumscribed genera such as *Bilimbia*, *Mycobilimbia*, *Bacidina* and *Toninia* are widely accepted. The *B. coprodes* group has been revised by Llop & Ekman (2007), the *B. rubella* group in Europe by Llop & al. (2007); the species of the Iberian Peninsula were treated by Llop (2007b). Type: *B. rosella* (Pers.) De Not.

Bacidia absistens (Nyl.) Arnold

Flora, 53: 472, 1870 - *Lecidea absistens* Nyl., Flora, 52: 295, 1869.

Syn.: *Bacidia intermissa* (Nyl.) Malme, *Lecidea intermissa* Nyl.

N - TAA (Nascimbene & al. 2010). **C - Tosc, Laz** (Ravera 2006, 2006c). **S - Camp** (Nimis & Tretiach 2004, Garofalo & al. 2010), **Bas** (Potenza & al. 2014), **Cal** (Puntillo 1995, 1996), **Si** (Nimis & al. 1994).

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 2-3, X: 1-2, E: 1/ Alt: 1-2/ SmedD: er, SmedH: er, MedH: vr/ PT: 1/ suboc/ Note: a mild-temperate to humid subtropical species found on base-rich substrata, in clearings of ancient forests, sometimes on epiphytic bryophytes; mainly Tyrrhenian, but to be looked for also in humid

parts of the Alps. It is included in the Italian red list of epiphytic lichens as “Vulnerable” (Nascimbene & al. 2013c).

Bacidia arceutina (Ach.) Rehm & Arnold

Verh. zool-bot. Ges. Wien, 19: 624, 1869 - *Lecidea luteola* var. *arceutina* Ach., Meth. Lich.: 61. 1803.

Syn.: *Bacidia coerulea* Körb., *Bacidia effusa* (Sm.) Trevis. non auct., *Bacidia leightoniana* (Larbal. ex Leight.) H. Olivier, *Bacidia luteola* var. *fuscella* Mudd, *Lecidea arceutina* (Ach.) Gray

N - Frl, TAA (Nascimbene & al. 2007b, 2014, Nascimbene 2014), **Lomb, Piem** (Isocrono & al. 2004), **Lig** (Giordani & Incerti 2008). **C - Tosc** (Brackel 2015), **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera 1998, Ravera & al. 2006), **Laz** (Ravera & al. 2003, Ravera 2006c, Munzi & al. 2007), **Abr** (Nimis & Tretiach 1999, Caporale & al. 2016), **Mol** (Ravera & Genovesi 2012, Paoli & al. 2015), **Sar** (Zedda 2002, 2002b, Zedda & al. 2001, Cossu 2013). **S - Camp** (Aprile & al. 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010, Brunialti & al. 2013, Ravera & Brunialti 2013), **Pugl** (Nimis & Tretiach 1999), **Cal** (Puntillo 1995, 1996, Puntillo & Puntillo 2004), **Si** (Nimis & al. 1994, Ottonello 1996, Grillo & Caniglia 2004 Liistro & Cataldo 2011).

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 3-4, X: 2-3, E: 1-2/ Alt: 1-3/ Mont: er, SmedD: vr, SmedH: rr, MedH: r/ PT: 1/ suboc/ Note: a mild-temperate to humid subtropical species found on bark of broad-leaved trees (especially *Acer*, *Fraxinus* and *Populus*) in open deciduous woodlands near rivers, very rarely calcicolous or muscicolous.

Bacidia auerswaldii (Stizenb.) Mig.

Krypt.-Fl. Deutschl., Deutsch-Österreich, Schweiz, 4, 2: 267, 1931 - *Lecidea auerswaldii* Hepp ex Stizenb., Ber. Thät. St. Gall. naturw. Ges. 1880-81: 416, 1882.

Syn.: *Bacidia effusella* Zahlbr., *Bilimbia effusa* Auersw. ex Rabenh., *Lecidea effusa* (Rabenh.) Stizenb.

S - Cal (Puntillo 1996).

Cr/ Ch/ S/ Epiph/ pH: 1-3, L: 3-4, X: 2, E: 1/ Alt: 2-3/ Mont: er, SmedH: er/ PT: 0/ suboc/ Note: a mild-temperate to humid subtropical, mainly subatlantic species of humid, open deciduous forests, also known from France and the Austrian Alps. It is included in the Italian red list of epiphytic lichens as “Critically Endangered” (Nascimbene & al. 2013c).

Bacidia badensis (Körb.) Zahlbr.

Cat. Lich. Univ., 4: 102, 1926 - *Bilimbia badensis* Körb., Parerga Lichenol., 2: 168, 1860.

N - Lomb.

Cr/ Ch/ S/ Lign/ pH: 1, L: 4-5, X: 3-4, E: 1-2/ Alt: 4/ Salp: vr/ PT: 1/ #/ Note: a very poorly known taxon, also reported from Germany and the Austrian Alps, found on wood in the subalpine belt.

Bacidia bagliettoana (A. Massal. & De Not.) Jatta

Syll. Lich. Ital.: 421, 1900 - *Scoliciosporum bagliettoanum* A. Massal. & De Not. in A. Massal., Mem. Lichenogr.: 126, 1853.

Syn.: *Bacidia atosanguinea* var. *argillicola* (Malbr.) H. Olivier, *Bacidia muscorum* (Ach.) Mudd, *Bacidia pezizoidea* sensu Anzi, *Lecidea muscorum* Ach. non (Th. Fr.) Dalla Torre & Sarnth.

N - Frl, Ven (Nascimbene & Marini 2007, Brackel 2013), **TAA** (Bilovitz & al. 2014b), **Lomb, Piem** (Isocrono & al. 2004), **Emil** (Nimis & al. 1996), **Lig** (Lazzarin 2000b). **C - Tosc, Marc** (Nimis & Tretiach 1999), **Umb** (Genovesi & al. 2001, Ravera & al. 2006), **Laz** (Nimis & Tretiach 2004), **Abr** (Nimis & Tretiach 1999, Brackel 2015), **Mol** (Nimis & Tretiach 2004, Caporale & al. 2008), **Sar** (Nöske 2000). **S - Camp** (Nimis & Tretiach 2004), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996).

Cr/ Ch/ S/ Terr-Sax/ pH: 3-5, L: 3-4, X: 4, E: 1-3/ Alt: 2-5/ Alp: rc, Salp: c, Orom: rc, Mont: rr, SmedD: er, SmedH: er/ PT: 1/ Note: an arctic-alpine to boreal-montane, circumpolar lichen of muribund bryophytes and plant debris in dry grasslands, or in fissures of calcareous rocks and dolomite, with optimum in upland areas. The record from Venezia Giulia (Nimis 1993: 108), being from Slovenia and far from the border, is not accepted here.

Bacidia biatorina (Körb.) Vain.

Acta Soc. Fauna Fl. Fenn., 53, 1: 178, 1922 - *Raphiospora atosanguinea* var. *biatorina* Körb., Parerga Lichenol.: 238, 1861.

Syn.: *Bacidia acerina* auct. non (Ach.) Arnold

C - Sar (Rizzi & al. 2011).

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 3-4, X: 1-2, E: 1/ Alt: 1-2/ SmedH: er, MedH: er/ PT: 0/ oc/ Note: a rare, oceanic species growing on trunks of mature deciduous trees (often oaks) in old woodlands, mostly in *Lobarion*-communities. It is included in the Italian red list of epiphytic lichens as “Data Deficient” (Nascimbene & al. 2013c).

Bacidia circumspecta (Vain.) Malme

Bot. Not.: 140, 1895 - *Lecidea bacillifera* var. *circumspecta* Nyl. ex Vain., Meddeland. Soc. Fauna Fl. Fenn., 10: 22, 1883.

Syn.: *Bacidia quercicola* (Nyl.) Vain., *Lecidea circumspecta* (Vain.) Hedl.

N - VG (Carvalho 1997), **TAA** (Nascimbene & al. 2014, Nascimbene 2014), **Lomb, Piem** (LD-1186673), **Emil** (LD-11185225). **C - Marc** (Nimis & Tretiach 1999), **Tosc, Umb** (Ravera 1999, Ravera & al. 2006), **Laz** (Ravera & al. 1999,

2000, 2002, Munzi & al. 2007), **Mol** (Ravera & al. 2010, Ravera & Genovesi 2012). **S - Camp** (Brunialti & al. 2013, Ravera & Brunialti 2013), **Pugl** (Thüs & Licht 2006), **Cal** (Puntillo 1998, Puntillo & Puntillo 2004), **Si** (Nimis & al. 1994).

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 3-4, X: 2, E: 1-3/ Alt: 1-3/ Mont: vr, SmedD: vr, SmedH: r, MedH: vr/ PT: 1/ Note: a mild-temperate lichen found on old trees in open, humid woodlands below the subalpine belt, more rarely on primarily acid, but nutrient-enriched bark.

Bacidia coprodes (Arnold) Lettau

Hedwigia, 52: 132, 1912 - *Bilimbia coprodes* Körb. ex Arnold, Flora, 41: 503, 1858.

Syn.: *Bacidia granosa* (Tuck.) Zahlbr., *Biatora trachona* auct. p.p., *Bacidia salevensis* (Müll. Arg.) Zahlbr., *Bacidia subtrachona* (Arnold) Lettau, *Bilimbia subtrachona* Arnold

N - Ven (Llop & Ekman 2007), **TAA, Lig** (Llop & Ekman 2007, Olech & Czarnota 2009). **C - Abr** (Nimis & Tretiach 1999, Llop & Ekman 2007, Ekman 2014), **Sar. S - Camp, Si** (Grillo 1998, Grillo & Caniglia 2004).

Cr/ Ch/ S/ Sax/ pH: 3-5, L: 3-4, X: 1-2, E: 1/ Alt: 1-3/ Mont: er, SmedD: er, SmedH: er, MedH: vr/ PT: 1/ u/ Note: on steeply inclined to underhanging faces of calciferous or base-rich siliceous rocks, exceptionally on bark in deep crevices at the base of trunks. All the Italian samples need revision: according to Lop & Ekman (2004) the true *Bacidia trachona* does not belong to *Bacidia* and has an oceanic distribution in Europe from Portugal to Scandinavia, whereas Mediterranean samples attributed to this taxon belong to *Bacidia coprodes*. The record from Venezia Giulia in Nimis (1993: 114) has been excluded, being from Slovenia; the record from Friuli in Llop & Ekman (2007) refers to *B. notarisiana* (see Ekman 2014).

Bacidia crozalsiana (H. Olivier) Zahlbr.

Cat. Lich. Univ., 4: 108, 1926 - *Lecania crozalsiana* H. Olivier, Bull. Acad. Intern. Géogr. Bot., 14: 205, 1905.

Syn.: *Bilimbia crozalsiana* (H. Olivier) B. de Lesd.

S - Cal (Puntillo 1996, Puntillo & Puntillo 2004).

Cr/ Ch/ S/ Epiph/ pH: 1-3, L: 4, X: 2, E: 1-2/ Alt: 1-2/ SmedH: er, MedH: er/ PT: 0/ Note: a humid subtropical lichen of more or less isolated trees in warm-humid areas, exclusively Tyrrhenian in Italy. The record from the Province of Cuneo by Piervittori (2003) appears dubious to me, and is not accepted here. The species is included in the Italian red list of epiphytic lichens as "Endangered" (Nascimbene & al. 2013c).

Bacidia fraxinea Lönnr.

Flora, 41: 612, 1858.

Syn.: *Bacidia fallax* (Körb.) Lettau, *Bacidia rubella* var. *fallax* Körb.

C - Tosc (Fрати & al. 2006b, Stofer 2006), **Marc** (Nimis & Tretiach 1999), **Laz** (Bartoli & al. 1997, Nimis & Tretiach 2004, Ravera 2006c), **Abr** (Nimis & Tretiach 1999, Caporale & al. 2016), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008, Ravera & Genovesi 2010, Ravera & al. 2010), **Sar. S - Camp** (Aprile & al. 2003b, Garofalo & al. 2010), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Otonello & Salone 1994, Grillo & al. 2002, 2007b, Grillo & Caniglia 2004, Merlo 2004b).

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 3-4, X: 2, E: 1-2/ Alt: 2-3/ Mont: vr, SmedD: er, SmedH: vr/ PT: 0/ suboc/ Note: a mild-temperate, probably Mediterranean-Atlantic lichen found on deciduous trees, especially *Acer*, in open, humid deciduous woodlands; mainly Tyrrhenian in Italy. Some earlier records from Lazio (Castelporziano, see Nimis 1993: 110) and the Island of Marettimo in Sicily (Nimis & al. 1994) refer to *B. tyrrhenica*.

Bacidia friesiana (Hepp) Körb.

Parerga Lichenol., 2: 133, 1860 - *Biatora friesiana* Hepp, Flecht. Eur.: nr. 288, 1857.

Syn.: *Lecidea norrlinii* Lamy

N - Frl, TAA (Nascimbene & al. 2007b), **Lomb, Piem** (TSB 33564b), **Lig** (Watson 2014). **C - Tosc, Marc** (Nimis & Tretiach 1999), **Laz, Sar** (Zedda 2002). **S - Camp** (Aprile & al. 2003b), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996).

Cr/ Ch/ S/ Epiph/ pH: 3, L: 3-4, X: 2-3, E: 2-3/ Alt: 1-3/ Mont: er, SmedD: vr, SmedH: r, MedH: vr/ PT: 1-2/ suboc/ Note: a mild-temperate lichen, most frequent on *Sambucus*, or near the base of trees with nutrient-rich bark, with optimum in the submediterranean belt.

Bacidia fuscoviridis (Anzi) Lettau

Hedwigia, 52: 132, 1912 - *Bilimbia fuscoviridis* Anzi, Comm. Soc. Critt. Ital., 2: 16, 1864.

Syn.: *Lecidea albidocarnea* Nyl.

N - Frl, Lomb. C - Marc (Nimis & Tretiach 1999).

Ch/ A.s/ Sax/ pH: 3-4, L: 3, X: 2, E: 3/ Alt: 2-3/ Mont: er, SmedD: er/ PT: 1/ suboc/ Note: a mild-temperate lichen found on calciferous and base-rich siliceous rocks in sheltered and humid situations below the subalpine belt; rarely collected, being often sterile.

Bacidia herbarum (Stizenb.) Arnold

Flora, 48: 596, 1865 - *Secoliga herbarum* Stizenb., N. Acta Leopoldin.-Carolin., 30, 3: 46, 1863.

Syn.: *Bacidia fraterna* Anzi

N - Frl, TAA, Lomb, Piem (TSB 33000), **Lig. C - Tosc, Umb** (Ravera & al. 2006, 2006b). **S - Cal** (Puntillo 1996).

Cr/ Ch/ S/ Terr/ pH: 3-4, L: 4, X: 4, E: 1-2/ Alt: 3-5/ Alp: rr, Salp: r, Orom: vr, Mont: vr/ PT: 1/ Note: a cool-temperate to arctic-alpine, probably circumpolar lichen found on plant remains and muribund bryophytes on calciferous ground, more rarely on bark, with optimum in upland areas; probably more widespread in Italy, also along the Apennines.

Bacidia heterochroa (Müll. Arg.) Zahlbr.

Cat. Lich. Univ., 4: 204, 1926 - *Patellaria heterochroa* Müll. Arg., Flora, 63: 280, 1880.

C - **Tosc** (Anzi, Lich. Etr. 24).

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 3-4, X: 1-2, E: 1/ Alt: 1-2/ SmedH: vr, MedH: vr/ PT: 0/ suboc/ Note: this epiphytic species was described from the surroundings of Buenos Aires, and is known from several localities in tropical areas (Ekman 1996). According to Ekman (*in litt.*), material in LD distributed by Anzi in Lich. Rar. Etruria n 24 under "*Bacidia atro-grisea, ad Quercuum juniorum cortices prope Florentiam*" belongs to this species, which in Europe was frequently confused with *B. laurocerasi*.

Bacidia iberica Aragón & I. Martínez

Bryologist, 106: 143, 2003.

C - **Tosc** (Anzi Lich. Etr. Rar. Exs. 23, see note).

Cr/ Ch/ S/ Epiph/ pH: 3, L: 3-4, X: 2, E: 1-2/ Alt: 1/ MedH: vr/ PT: 0/ Note: a Mediterranean epiphytic species, similar to *B. rubella* but differing in the squamulose thallus and other morphological characters. The sample from Tuscany is a duplicate of *B. rubella* distributed by Anzi, kept in LD (nr. 1186097), and revised by E. Llop in 2005.

Bacidia igniarii (Nyl.) Oxner

Flora Lis. Ukrajini, 2, 1: 166, 1968 - *Lecidea igniarii* Nyl., Flora, 50: 328, 1867.

Syn.: *Bacidia abbrevians* (Nyl.) Th. Fr., *Bilimbia igniarii* (Nyl.) Arnold

N - **TAA** (Nascimbene & al. 2007b), **Lomb, Piem** (Piervittori 2003). C - **Tosc, Sar** (Zedda 2002). S - **Cal** (Puntillo 1996, Puntillo & Puntillo 2004), **Si**.

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 3, X: 3, E: 1-2/ Alt: 1-3/ Mont: r, SmedD: er, SmedH: vr, MedH: er/ PT: 1/ #/ Note: a species found on smooth bark, very rarely on lignum; on the whole a critical taxon, which needs revision.

Bacidia incompta (Borrer) Anzi

Cat. Lich. Sondr.: 70, 1860 - *Lecidea incompta* Borrer in Hooker & Sowerby, Engl. Bot., Suppl. 2, tab. 2699, 1834.

Syn.: *Bacidia atrosanguinea* auct., *Bacidia viridula* Erichsen, *Lecidea atrosanguinea* auct. non (Hoffm.) Nyl., *Scoliosporum molle* A. Massal.

N - **Ven** (Lazzarin 2000b, Watson 2014), **TAA** (Dalla Torre & Sarnthein 1902), **Lomb, Piem** (Isocrono & al. 2004). C - **Tosc, Sar** (Zedda 2002, 2002b, Rizzi & al. 2011). S - **Camp** (Aprile & al. 2003b, Garofalo & al. 2010), **Pugl** (Nimis & Tretiach 1999), **Bas** (Bartoli & Puntillo 1998), **Cal** (Puntillo 1996, Puntillo & Puntillo 2004).

Cr/ Ch/ S/ Epiph-Terr/ pH: 3, L: 3-4, X: 3, E: 2-3/ Alt: 2-3/ Mont: er, SmedD: er, SmedH: vr/ PT: 1-2/ Note: a temperate species found on base-rich bark, especially of *Ulmus*, near wounds of the trunk, more rarely on plant debris and terricolous mosses, certainly declining in Italy. The generic position is not clear. The species is included in the Italian red list of epiphytic lichens as "Vulnerable" (Nascimbene & al. 2013c).

Bacidia killiasii (Hepp) D. Hawksw.

Lichenologist, 15: 22, 1983 - *Biatora killiasii* Hepp, Jahresber. Naturf. Ges. Graubündens, N.F. 6: 246, 1861.

Syn.: *Bilimbia hypnophila* f. *killiasii* (Hepp) Szatala, *Bilimbia killiasii* (Hepp) H. Olivier, *Mycobilimbia killiasii* (Hepp) Rehm

N - **TAA** (Brackel 2016).

LF/ / S/ Terr/ pH: 2-3, L: 2-3, X: 2-3, E: 1/ Alt: 2-4/ Salp: er, Mont: er, SmedD: er/ PT: 1/ paras *Peltigera* spp., #/ Note: a poorly known lichenicolous fungus growing on the thalli of *Peltigera*-species, which probably does not belong to *Bacidia s.str.*

Bacidia laurocerasi (Duby) Zahlbr.

Vain. ex Zahlbr., Cat. Lich. Univ., 4: 213, 1926 - *Patellaria laurocerasi* Delise ex Duby, Bot. Gall., 2: 653, 1830.

Syn.: *Bacidia atrogrisea* (Delise) Körb., *Bacidia elevata* Körb., *Bacidia endoleuca* auct. non (Nyl.) J. Kickx f., *Bacidia subacerina* Vain., *Bacidia subacerina* subsp. *laurocerasi* (Duby) Vain., *Bacidia violacea* (Arnold) Arnold non "(Crouan) Arnold", *Biatora atrogrisea* Delise

N - **Frl, Ven** (Thor & Nascimbene 2007, Nascimbene & al. 2013b), **TAA** (Nascimbene & al. 2007b), **Lomb, Lig** (E.C.I. 424: LD-1186694). C - **Tosc, Umb** (Ravera 2000, Ravera & al. 2006), **Laz** (Ravera 2006c), **Mol** (Ravera & Genovesi 2010, Ravera & al. 2010), **Sar** (Loi & al. 2000, Zedda 2002, 2002b, Rizzi & al. 2011, Cossu 2013). S - **Camp** (Ricciardi & al. 2000), **Cal** (Puntillo 1996, Sérusiaux 1998), **Si** (Nimis & al. 1994, Ottonello & Puntillo 2009).

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 3-4, X: 1-2, E: 1/ Alt: 1-3/ Mont: rr, SmedD: vr, SmedH: rr, MedH: r/ PT: 0/ suboc/ Note: a humid subtropical to Mediterranean-Atlantic lichen found on smooth bark of broad-leaved

trees in open humid forests; most frequent in Tyrrhenian Italy. According to Ekman (*in litt.*) the species might have been confused with *B. heterochroa* in the past (see note to *B. heterochroa*).

Bacidia notarisiana (A. Massal.) Zahlbr.

Cat. Lich. Univ., 4: 131, 1926 - *Bilimbia notarisiana* A. Massal., Framm. Lichenogr.: 21, 1855.

N - Frl (Ekman 2014), **Lig** (Lazzarin 2000b, Ekman 2014).

Cr/ Ch/ S/ Sax/ pH: 3-5, L: 3-4, X: 3, E: 4-5/ Alt: 1-2/ SmedD: r, Pad: er, SmedH: r, MedH: vr/ PT: 1-3/

Note: on calcareous rocks, sometimes in anthropogenic settings (*e.g.* on mortar and concrete); currently known only from low or moderate elevations in northern Italy, but likely to be more widespread in the Mediterranean Region (see Ekman 2014).

Bacidia parathalassica Llop & Gómez-Bolea

Mycotaxon, 72: 80, 1999.

C - Tosc (Benesperi & al. 2013), **S - Si** (Llop 2002).

Cr/ Ch/ S/ Epiph/ pH: 3, L: 3-4, X: 2, E: 1-2/ Alt: 1/ MedH: vr/ PT: 0/ suboc/ Note: a recently-described, probably Mediterranean-Atlantic species related to *B. fraxinea* and *B. rubella*, but restricted to coastal, humid situations on littoral shrubs, especially *Juniperus*. See also note on *B. fraxinea*. The species is included in the Italian red list of epiphytic lichens as “Endangered” (Nascimbene & al. 2013c).

Bacidia polychroa (Th. Fr.) Körb.

Parerga Lichenol.: 131, 1860 - *Biatora polychroa* Th. Fr., Öfvers. K. Svensk. Vetensk.-Akad. Förh., 12, 1: 17, 1855.

Syn.: *Bacidia acerina* (Ach.) Arnold *non auct.*, *Bacidia fuscorubella* (Hoffm.) Bausch, *Bacidia polysita* (Stirt.) A.L. Sm., *Lecidea acerina* (Ach.) Röhl., *Lecidea luteola* var. *fuscorubella* (Hoffm.) Ach., *Secoliga fuscorubella* (Hoffm.) Stizenb., *Verrucaria fuscorubella* Hoffm. *nom. inval.*

N - TAA (Nascimbene & al. 2007b, Nimis & al. 2015), **Lomb. C - Mol** (Paoli & al. 2015), **S - Camp** (Nimis & Tretiach 2004).

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 3-4, X: 1-2, E: 1-2/ Alt: 1-2/ SmedD: er, SmedH: er, MedH: er/ PT: 1/ suboc/ Note: a mild-temperate to tropical species found on broad-leaved trees in open, humid forests. It is included in the Italian red list of epiphytic lichens as “Endangered” (Nascimbene & al. 2013c).

Bacidia punica Llop

Bryologist, 113: 366, 2010.

C - Tosc (Llop 2010), **Marc** (Llop 2010), **Laz** (Llop 2010), **Sar** (Llop 2010), **S - Bas** (Llop 2010), **Pugl** (Llop 2010), **Si** (Llop 2010).

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 3-4, X: 2, E: 1/ Alt: 1-2/ SmedD: er, SmedH: vr, MedH: vr, MedD: er/ PT: 0/ Note: a recently-described epiphytic species, widespread but not common in Tyrrhenian Italy, mostly in shaded-humid situations, with optimum within eu-Mediterranean vegetation. It may, however, prove to be a synonym of *Bacidina phacodes* (Ekman *in litt.*).

Bacidia rosella (Pers.) De Not.

Giorn. Bot. Ital., 2, 1, 1: 190, 1846 - *Lichen rosellus* Pers., Ann. Bot. (Usteri), 7: 25, 1794.

Syn.: *Biatora alabastrina* W. Mann, *Lecidea rosella* (Pers.) Ach.

N - Ven (Nascimbene & Marini 2010), **Lomb, Piem** (Isocrono & al. 2004, Matteucci & al. 2008b), **Lig** (Giordani & Incerti 2008, Giordani & al. 2009), **C - Tosc** (Tretiach & Nimis 1994, Brunialti & Frati 2010, Benesperi 2011, Brunialti & al. 2012b), **Umb** (Panfili 2000, Ravera & al. 2006), **Laz** (Massari & Ravera 2002, Stofer 2006), **Abr** (Caporale & al. 2016), **Mol** (Caporale & al. 2008, Ravera & al. 2010), **Sar** (Loi & al. 2000, Zedda 2002, Rizzi & al. 2011, Cossu 2013), **S - Camp** (Aprile & al. 2003, 2003b, Garofalo & al. 2010, Catalano & al. 2016), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999, Potenza 2006, Potenza & al. 2010, Brackel 2011), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994, Ottonello & Salone 1994, Grillo & al. 2007).

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 3, X: 1-2, E: 1-3/ Alt: 1-3/ Mont: er, SmedD: er, SmedH: vr, MedH: er/ PT: 0/ suboc/ Note: a mild-temperate to Mediterranean-Atlantic lichen found on deciduous trees (especially *Acer* and *Fraxinus*, but also on *Quercus ilex*) in humid, open forests and in woodlands along rivers, declining and perhaps extinct in northern Italy, but still locally abundant in suitable habitats of southern Italy. The species is included in the Italian red list of epiphytic lichens as “Near-threatened” (Nascimbene & al. 2013c).

Bacidia rubella (Hoffm.) A. Massal.

Ric. Auton. Lich. Crost.: 118, 1852 - *Verrucaria rubella* Hoffm., Deutschl. Fl., 2: 174, 1796.

Syn.: *Bacidia luteola* *auct.*, *Bacidia rubella* var. *luteola* (Schrad.) Th. Fr., *Bacidia rubella* var. *porriginosa* (Turner) H. Olivier, *Bacidia rubella* var. *vulgaris* (Schaer.) Körb., *Biatora luteola* *auct.*, *Lichen luteolus* Schrad. *nom. illegit.*

N - VG (Tretiach & Carvalho 1995, Castello 1996, Carvalho 1997), **Frl, Ven, TAA** (Stofer 2006, Nascimbene & al. 2007b, Nimis & al. 2015), **Lomb** (Valcuvia & Truzzi 2007b), **Piem** (Isocrono & al. 2004, Giordani & Malaspina 2016), **Emil** (Bassi 1995, Gasparo & Tretiach 1996, Nimis & al. 1996, Benesperi 2009), **Lig** (Brunialti & al. 1999, Giordani & Incerti 2008), **C - Tosc** (Tretiach & Nimis 1994, Loppi & Putortì 1995, Loppi & al. 1995, 1997, 1998, 1998b, 2002c, Loppi 1996, Putortì & al. 1998, Putortì & Loppi 1999b, Loppi & Frati 2006, Benesperi & al. 2007, Bacci & al. 2000, Brunialti & Frati 2010, Loppi & Nascimbene 2010, Benesperi 2011, Benesperi & al. 2013), **Umb** (Ravera 1998, Ravera & al. 2006, Brackel 2015), **Marc** (Nimis & Tretiach 1999, Frati & Brunialti 2006, Brackel 2015), **Laz** (Nimis & Tretiach 2004, Ravera 2002, Massari & Ravera 2002, Ruisi & al. 2005, Munzi & al. 2007, Ravera & Genovesi 2008, Zucconi &

al. 2013, Brackel 2015), **Abr** (Recchia & al. 1993, Olivieri & Pacioni 1996, Olivieri & al. 1997, 1997b, Loppi & al. 1999, Nimis & Tretiach 1999, Stofer 2006, Brackel 2015, Caporale & al. 2016, Corona & al. 2016), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008, Paoli & al. 2015), **Sar** (Zedda & al. 2001, Zedda 2002, Stofer 2006, Rizzi & al. 2011). **S - Camp** (Aprile & al. 2003b, Catalano & al. 2012, 2016), **Pugl** (Nimis & Tretiach 1999, Brackel 2011), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996, Puntillo & Puntillo 2004, Incerti & Nimis 2006), **Si** (Nimis & al. 1994, Ottonello & Salone 1994, Ottonello & al. 1994, Grillo & Cristaudo 1995, Ottonello 1996, Grillo & al. 1996, 2007, Grillo 1998, Grillo & Caniglia 2004, 2006, Caniglia & Grillo 2006b, Brackel 2008b, Liistro & Cataldo 2011).

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 4, X: 2-3, E: 1-3/ Alt: 1-3/ Mont: er, SmedD: vr, Pad: er, SmedH: r, MedH: vr/ PT: 1-2/ Note: a temperate lichen found on old trees, especially oaks, still widespread, but probably declining, almost extinct in the Po-plain, with optimum in the submediterranean belt.

Bacidia sipmanii M. Brand, Coppins, van den Boom & Sérus.

Bibl. Lichenol., 99: 90, 2009.

N - Lig (Brand & al. 2009).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 3-4, X: 2-3, E: 2-3/ Alt: 1/ MedH: vr, MedD: vr/ PT: 1/ coast/ Note: a Mediterranean-Macaronesian species of siliceous, maritime rocks in the xeric-supralittoral zone, where it usually occurs in crevices and underhangs.

Bacidia subincompta (Nyl.) Arnold

Flora, 53: 472, 1870 - *Lecidea subincompta* Nyl., Flora, 48: 147, 1865.

Syn.: *Bacidia affinis* (Stizenb.) Vain., *Bacidia atosanguinea* var. *corticola* Th. Fr., *Bacidia intermediella* Vězda, *Bacidia hegetschweileri* (Hepp) Vain. non auct., *Bacidia separabilis* (Nyl.) Arnold, *Lecidea hegetschweileri* Hepp nom.nud., *Lecidea separabilis* Nyl.

N - Frl (Hinteregger 1994), **Ven** (Nascimbene 2004, 2008c, 2011, Nascimbene & al. 2005b, 2006c, 2013b), **TAA** (Hinteregger 1994, Nascimbene & al. 2006e, 2009, Nimis & al. 2015), **Lomb**, **Piem** (Isocrono & al. 2004), **Lig** (Brunialti & al. 1999). **C - Tosc** (Benespero & al. 2007), **Abr** (Nimis & Tretiach 1999, Caporale & al. 2016), **Mol** (Garofalo & al. 1999, Caporale & al. 2008, Nimis & Tretiach 1999), **Sar**. **S - Camp** (Garofalo & al. 1999, 2010, Aprile & al. 2003b), **Si**.

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 3, X: 2, E: 1-2/ Alt: 1-4/ Salp: vr, Mont: r, SmedD: er, SmedH: vr, MedH: er/ PT: 1/ suboc/ Note: a mainly temperate lichen found on the bark of old broad-leaved trees (especially *Fagus* and *Quercus*) in open, humid woodlands. For nomenclatural problems see Ekman (1996).

Bacidia tyrrhenica Llop

in Llop & al., Nova Hedwigia, 85: 447, 2007.

C - Laz (Llop & al. 2007), **Sar** (Llop & al. 2007). **S - Si** (Llop & al. 2007).

Cr/ Ch/ S/ Epiph/ pH: 3, L: 3-4, X: 2, E: 1-2/ Alt: 1/ MedH: vr/ PT: 0/ suboc/ Note: a recently-described, Mediterranean-Macaronesian species, related to *B. fraxinea* and *B. rubella*, bound to humid situations in forests, such as in bottoms of valleys or ravines, mostly in coastal, humid situations. In the original description the species was misspelled as “*thyrrhenica*”.

Bacidia vermifera (Nyl.) Th. Fr.

Lichenogr. Scand., 1: 363, 1874 - *Lecidea vermifera* Nyl., Bot. Not.: 98, 1853.

Syn.: *Bacidia hegetschweileri* auct. non (Hepp) Vain., *Biatora atosanguinea* f. *hegetschweileri* auct. non Hepp, *Bilimbia lecideoides* (Hanzl. ex Körb.) Th. Fr., *Scoliciosporum vermiferum* (Nyl.) Arnold

N - TAA (Nascimbene & al. 2007b), **Lomb**, **Piem** (Isocrono & al. 2004).

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 3, X: 2, E: 1-2/ Alt: 3-4/ Salp: vr, Mont: vr/ PT: 1/ Note: on the bark of broad-leaved trees in rather humid situations, more rarely on lignum. For nomenclatural problems see Ekman (1996). The species was included as “Regionally Extinct” in the Italian red list of epiphytic lichens (Nascimbene & al. 2013c).

Bacidia viridescens (A. Massal.) Th. Fr.

K. Svenska Vetensk.-Akad. Handl., ser. 2, 7: 34, 1867 - *Raphiospora viridescens* A. Massal., Alcuni Generi di Lich.: 12, 1855.

Syn.: *Scoliciosporum viridescens* (A. Massal.) Rabenh.

N - Ven (Lazzarin 2000b).

Cr/ Ch/ S/ Terr-Sax/ pH: 3-5, L: 3-4, X: 4, E: 1-3/ Alt: 2/ SmedD: vr, Pad: er/ PT: 1-2/ Note: mostly on more or less calciferous soil (mainly on bryophytes and plant debris) or directly on limestone; perhaps more widespread but easily overlooked. The species most probably belongs to *Bacidina*.

Bacidia viridifarinosa Coppins & P. James

Lichenologist, 24: 353, 1992.

S - Camp (Puntillo & Puntillo 2011).

Cr/ Ch/ A.s/ Epiph-Sax/ pH: 2-3, L: 3, X: 1-2, E: 1-3/ Alt: 1-2/ SmedH: er, MedH: er/ PT: 0/ suboc/ Note: a suboceanic species growing on shaded, smooth and not too acid siliceous rocks in oceanic humid woodlands, sometimes on smooth bark at the base of old deciduous trees; mostly sterile, with confluent soralia giving raise to yellow-green farinose soredia; the type material is from an old *Tilia* tree. It is not a *Bacidia* and belongs in the Pilocarpaceae.

Bacidina Vězda

Folia Geobot. Phytotaxon., 25: 431, 1991, *nom. cons.*

This genus of the Ramalinaceae includes easily overlooked lichens inhabiting various substrata, often with low competition from other plants. It was introduced to include a number of species previously referred to *Bacidia*, some of which were already earlier put in separate genera like *Lichingoldia* and *Woessia* because of their long, curved conidia. Although not recognised as a genus until 1991, these species had been informally treated by various authors as the "*Bacidia phacodes*-group". Until now, altogether c. 25 species have been formally named in *Bacidina*, which appears to be a monophyletic genus (see Ekman 2001). Type: *B. phacodes* (Körb.) Vězda. The name is conserved against *Lichingoldia* D. Hawksw. & Poelt (1986), and *Woessia* D. Hawksw. & Poelt (1986).

Bacidina apiahica (Müll. Arg.) Vězda

Folia Geobot. Phytotaxon., 25: 432, 1991 - *Patellaria apiahica* Müll. Arg., Lichenes Epiphylli Novi: 9, 1890.

Syn.: *Bacidia apiahica* (Müll. Arg.) Zahlbr., *Woessia apiahica* (Müll. Arg.) Sérus.

C - **Tosc** (Puntillo & Ottonello 1997, Puntillo 2000, Ravera & al. 2015b). **S** - **Camp**, **Cal** (Puntillo & Vězda 1994, Puntillo 1995, 1996, 2000).

Cr/ Ch/ S/ Foliic/ pH: 1-2, L: 2-3, X: 1, E: 1-2/ Alt: 1/ MedH: er/ PT: 0/ suboc/ Note: a foliicolous pan-tropical species, in Italy restricted to very humid and warm forests near the coast. It is included in the Italian red list of epiphytic lichens as "Endangered" (Nascimbene & al. 2013c).

Bacidina arnoldiana (Körb.) V. Wirth & Vězda

in Wirth, Stuttg. Beitr. Naturk., ser. A, 517: 62, 1994 - *Bacidia arnoldiana* Körb., Parerga Lichenol.: 134, 1860.

Syn.: *Lecidea larbalestieri* Cromb., *Woessia arnoldiana* (Körb.) Sérus. & Diederich

N - **VG**, **Frl**, **Ven** (Thor & Nascimbene 2007), **Lig**, **C** - **Tosc** (Tretiach & al. 2008), **Marc** (Nimis & Tretiach 1999), **Abr** (Nimis & Tretiach 1999). **S** - **Camp** (Ricciardi & al. 2000), **Pugl** (Nimis & Tretiach 1999), **Bas** (Potenza & al. 2014), **Cal** (Puntillo 1996).

Cr/ Ch/ A.s/ Sax/ pH: 3-5, L: 2-3, X: 2, E: 1-2/ Alt: 1-3/ Mont: er, SmedD: er, SmedH: vr, MedH: er/ PT: 1/ suboc/ Note: a mild-temperate lichen found on more or less calciferous rocks in sheltered situations, especially in open woodlands; often sterile, and much overlooked. Some epiphytic records could refer to *B. sulphurella*.

Bacidina assulata (Körb.) S. Ekman

Opera Bot., 127: 116, 1996 - *Bacidia rubella* var. *assulata* Körb., Parerga Lichenol.: 131, 1860.

Syn.: *Bacidia anomala* A. Massal., *Bacidia assulata* (Körb.) Vězda, *Bacidia effusa* auct., *Bacidia intermedia* (Hepp ex Stizenb.) Arnold *nom. illegit. non* (Hampe) A. Massal.

N - **TAA** (Nascimbene & al. 2007b), **Lomb**, **C** - **Tosc**, **Sar** (Zedda 2002). **S** - **Pugl** (Jatta 1909-1911), **Bas** (Jatta 1909-1911), **Cal** (Jatta 1909-1911), **Si**.

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 3, X: 2, E: 1/ Alt: 2/ SmedD: vr, SmedH: vr/ PT: 1/ Note: according to Ekman (1996) Italian material of this epiphytic lichen does not belong to this species, and still awaits a formal description. The species is included in the Italian red list of epiphytic lichens as "Data Deficient" (Nascimbene & al. 2013c).

Bacidina chlorotricula (Nyl.) Vězda & Poelt

in Vězda, Folia Geobot. Phytotaxon., 25: 432, 1991 - *Lecidea chlorotricula* Nyl., Flora, 60: 504, 1878.

Syn.: *Bacidia chlorotricula* (Nyl.) A.L. Sm., *Bacidia lehriana* Erichsen, *Bacidia neglecta* Vězda, *Bacidia paulula* Erichsen, *Bacidina neglecta* (Vězda) Vězda

N - **Ven** (Thor & Nascimbene 2007), **Lomb** (UPS-L166832). **S** - **Cal** (Puntillo 1996, 2000).

Cr/ Ch/ S/ Sax-Lign-Epiph-Foliic/ pH: 2-4, L: 2-3, X: 1-2, E: 2-3/ Alt: 2-4/ Salp: er, Mont: vr, SmedD: er, SmedH: vr/ PT: 1/ suboc/ Note: a mainly temperate to southern boreal species found on evergreen leaves and base-rich bark, sometimes on plant debris, calcareous stones, etc., mostly near the ground; certainly overlooked, and perhaps more widespread in Italy below the subalpine belt, including in the Alps.

Bacidina delicata (Leight.) V. Wirth & Vězda

in Wirth, Stuttg. Beitr. Naturk., ser. A, 517: 62, 1994 - *Lecidea effusa* var. *delicata* Larbal. ex Leight., Lich. Fl. Gr. Brit., 3rd ed.: 371, 1879.

Syn.: *Bacidia arceutinella* Zahlbr., *Bacidia delicata* (Leight.) Coppins, *Bilimbia arceutinoides* Anzi, *Woessia delicata* (Leight.) Sérus. & Diederich

N - **Frl** (Nascimbene & Salvadori 2008, Nascimbene & al. 2009b), **Ven** (Anzi Lich. Lang. 434: Printzen 1995, Nascimbene & Salvadori 2008), **Piem** (Matteucci & al. 2013). **C** - **Tosc** (Tretiach & Nimis 1994, Benesperi 2011), **Laz**, **Abr** (Caporale & al. 2016). **S** - **Camp** (Nimis & Tretiach 2004, Garofalo & al. 2010), **Pugl** (Nimis & Tretiach 1999).

Cr/ Ch/ S/ Epiph-Sax/ pH: 2-4, L: 3, X: 2, E: 2-4/ Alt: 1-3/ Mont: er, SmedD: er, SmedH: vr, MedH: r/ PT: 1/ suboc/ Note: a Mediterranean-Atlantic to humid subtropical species found on bark, especially of *Sambucus* and *Salix* and - but only in very humid areas - on roofing tiles and plant debris.

Bacidina egenula (Nyl.) Vězda

Folia Geobot. Phytotaxon., 25: 432, 1991 - *Lecidea egenula* Nyl., Flora, 48: 147, 1865.

Syn.: *Bacidia egenula* (Nyl.) Arnold, *Bacidia epiphylla* Wheldon & Travis, *Bacidia genuensis* B. de Lesd., *Bacidia mediterranea* B. de Lesd., *Bacidia peltigericola* Vain., *Bacidia sbarbaronis* B. de Lesd.

N - **Lomb** (UPS-L166833), **Lig. C** - **Camp** (Aprile & al. 2002), **Cal** (Puntillo 2011).

Cr/ Ch/ S/ Sax/ pH: 2, L: 3-4, X: 1-2, E: 1-2/ Alt: 1-2/ SmedD: er, SmedH: vr, MedH: er/ PT: 1/ suboc/ Note: a mild-temperate to humid subtropical species, most common on pebbles over moist ground in areas with siliceous substrata; certainly overlooked and probably more widespread in Tyrrhenian Italy, with outposts in the Insubrian District of the Alps.

Bacidina inundata (Fr.) Vězda

Folia Geobot. Phytotaxon., 25: 432, 1991 - *Biatora inundata* Fr., K. Svenska Vetensk.-Akad. Handl.: 270, 1822.

Syn.: *Bacidia arnoldiana* var. *inundata* (Fr.) Körb., *Bacidia inundata* (Fr.) Körb., *Bacidia inundata* subsp. *allecta* (Nyl.) A.L. Sm., *Bacidia subinundata* (Nyl.) Blomb. & Forssell, *Lichingoldia gyalectiformis* D. Hawksw. & Poelt, *Woessia inundata* (Fr.) Sérus. & Diederich

N - **TAA** (Nascimbene 2008b), **Lomb** (UPS-L166849), **Piem** (Isocrono & al. 2004), **C** - **Tosc. Sar. S** - **Camp** (Aprile & al. 2003b), **Bas** (Puntillo & al. 2012), **Cal** (Puntillo 1996), **Si** (Grillo 1998, Grillo & Caniglia 2004).

Cr/ Ch/ S/ Sax-Lign/ pH: 2-3, L: 3-4, X: 1-2, E: 1/ Alt: 1-4/ Salp: vr, Orom: vr, Mont: r, SmedD: er, SmedH: vr, MedH: er/ PT: 1/ 1/ Note: apparently this is a holarctic lichen, found on periodically inundated or otherwise moist siliceous rocks, more rarely on lignum, in humid-shaded situations, with a wide altitudinal range.

Bacidina phacodes (Körb.) Vězda

Folia Geobot. Phytotaxon., 25: 432, 1991 - *Bacidia phacodes* Körb., Parerga Lichenol.: 130, 1860.

Syn.: *Bacidia albescens* (Stizenb.) Bausch, *Bacidia chlorotica* (Nyl.) Sandst. non sensu Th. Fr., *Lecidea chlorotica* (Rostr.) Hue

N - **Fri** (TSB 2798), **TAA** (Nascimbene 2014, Nimis & al. 2015), **Lig. C** - **Tosc** (Tretiach & Nimis 1994, Benesperi 2011), **Marc** (Nimis & Tretiach 1999), **Laz** (Bartoli & al. 1997), **Sar** (Llop 2002, Zedda 2002, Cossu 2013), **S** - **Camp** (Aprile & al. 2002, 2003, 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010, Ravera & Brunialti 2013, Catalano & al. 2016), **Pugl** (Nimis & Tretiach 1999, Durini & Medagli 2004), **Bas** (Bartoli & Puntillo 1998, Nimis & Tretiach 1999, Potenza & al. 2010), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994, 1995).

Cr/ Ch/ S/ Epiph-Lign/ pH: 2-3, L: 3, X: 2, E: 1/ Alt: 1-4/ Salp: er, Mont: vr, SmedD: er, SmedH: r, MedH: vr/ PT: 1/ suboc, u/ Note: a mild-temperate to humid subtropical lichen found on bark of broad-leaved trees, more rarely on rock, often on dry undersides of thick branches of ancient trees; in the Mediterranean belt confined to humid evergreen forests, sometimes on silicicolous mosses. *Bacidia punica* could prove to be a synonym of this species (Ekman *in litt.*).

Bacidina sulphurella (Samp.) M. Hauck & V. Wirth

Herzogia, 23: 16, 2010 - *Bacidia sulphurella* Samp., Bol. Soc. Broter. Coimbra, sér. 2, 2: 16, 1924 (1923).

Syn.: *Woessia fusarioides* D. Hawksw., Poelt & Tscherm.-Woess

N - **Fri** (TSB 31400), **S** - **Cal** (Brand & al. 2009).

Cr/ Ch/ S/ Epiph-Lign/ pH: 2-3, L: 3, X: 2, E: 1-3/ Alt: 2-3/ Mont: er, SmedH: er/ PT: 0/ Note: on bark, especially of *Sambucus*, sometimes invading corticolous mosses, more rarely on twigs, needles and living leaves in very humid sites. Some records of epiphytic *B. arnoldiana* could refer to this species. For further details see Czarnota & Guzow-Krzeminska (2012).

Bacidina vasakii (Vězda) Vězda

Folia Geobot. Phytotaxon., 25: 432, 1991 - *Bacidia vasakii* Vězda, Folia Geobot. Phytotaxon., 18: 64, 1983.

Syn.: *Woessia vasakii* (Vězda) Sérus.

S - **Camp** (Puntillo & al. 2000, Puntillo 2000), **Bas** (Puntillo & al. 2012), **Cal** (Puntillo 1995, 1996, 2000, Puntillo & Puntillo 2004).

Cr/ Ch/ A.s/ Foliic/ pH: 2-3, L: 2-3, X: 1-2, E: 1/ Alt: 1-2/ SmedH: er, MedH: er/ PT: 0/ oc/ Note: a mild-temperate to humid pantropical species described from the Caucasus and also known from the Pyrenees, with granular to subcoralloid thallus, hemisphaerical whitish apothecia, and mostly 3-septate acicular ascospores, found in the understory of forests, mostly on twigs and leaves of *Buxus*. In Italy it is restricted to warm-humid situations and undisturbed stands of the Tyrrhenian region, mostly in the Mediterranean belt. The species is included in the Italian red list of epiphytic lichens as "Endangered" (Nascimbene & al. 2013c), but it is easy to overlook and it could be somehow more widespread.

Bactrospora A. Massal.

Ric. Auton. Lich. Crost.: 133, 1852.

This genus, characterised by cylindrical asci and acicular, multiseptate ascospores, and especially by the usual absence of hymenial gelatine, comprises several species formerly treated as members of *Lecanactis*. The

genus, which includes c. 30 species, is widely distributed in tropical, subtropical and temperate regions of both Hemispheres and is tentatively included into the Opegraphaceae. A key to all known species has been published by Sobreira & al. (2015). Type: *B. dryina* (Ach.) A. Massal.

Bactrospora dryina (Ach.) A. Massal.

Ric. Auton. Lich. Crost.: 133, 1852 - *Lichen dryinus* Ach., Lichenogr. Suec. Prodr.: 16, 1799.

Syn.: *Arthonia dryina* (Ach.) Jatta, *Lecanactis dryina* (Ach.) Vain., *Lecanactis dryophila* Lettau, *Lecidea dryina* (Ach.) Ach., *Lecidea dryina* var. *lilacina* Ach.

N - Ven, Piem, Lig (Giordani & Brunialti 2000), **C - Tosc** (Brunialti & Frati 2010, Brunialti & al. 2012b), **Laz** (Stofer 2006), **Sar** (Stofer 2006), **S - Puagl** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996).

Cr/ Tr/ S/ Epiph/ pH: 1-2, L: 2-4, X: 2, E: 1/ Alt: 1-2/ SmedD: er, SmedH: er, MedH: er/ PT: 0/ suboc, u/

Note: a mild-temperate to Mediterranean-Atlantic species found on bark of old, isolated deciduous trees, especially oaks, on faces which are seldom wetted by rain; mainly Tyrrhenian, perhaps extinct in the plains of the North, and certainly declining. It is included in the Italian red list of epiphytic lichens as "Vulnerable" (Nascimbene & al. 2013c).

Bactrospora patellarioides (Nyl.) Almq. var. ***patellarioides***

Skandin. Artern *Schismatomma*, *Opegrapha* och *Bactrospora*: 24, 1869 - *Lecidea patellarioides* Nyl., Mém. Soc. Sc. Nat. Cherbourg, 2: 333, 1854.

Syn.: *Lecanactis patellarioides* (Nyl.) Vain.

N - Piem (Giordani & Malaspina 2016), **Lig** (Giordani & al. 2002, Brunialti & Giordani 2003, Giordani & Incerti 2008), **C - Tosc** (Laganà & al. 2002, Stofer 2006), **Laz** (Bartoli & al. 1997, Stofer 2006), **Sar**, **S - Camp** (Nimis & Tretiach 2004, Garofalo & al. 2010), **Puagl** (Durini & Medagli 2002, 2004), **Cal** (Puntillo 1996, Incerti & Nimis 2006), **Si** (Nimis & al. 1994, Grillo & Carfi 1997, Grillo 1998, Grillo & al. 2002, Grillo & Caniglia 2004).

Cr/ Tr/ S/ Epiph/ pH: 1-2, L: 4-5, X: 2, E: 1-2/ Alt: 1-2/ SmedD: er, SmedH: vr, MedH: rr, MedD: er/ PT: 1-2/ suboc, u/ Note: a mild-temperate to humid subtropical, Mediterranean-Atlantic lichen found on acid bark of mature, isolated, mostly broad-leaved trees, especially *Quercus* and *Olea*, occasionally on siliceous rocks, often near the coast in Tyrrhenian Italy. Some records could refer to var. *convexa*.

Bactrospora patellarioides var. ***convexa*** (B. de Lesd.) Egea & Torrente

Lichenologist, 25: 249, 1993 - *Lecanactis patellarioides* var. *convexa* B. de Lesd., Bull. Soc. Bot. France, 20: 281, 1922.

Syn.: *Raphiospora doriae* Bagl.

N - Lig (Watson 2014), **C - Tosc** (Loppi & al. 1997c, 1999a, 2004c, Putorti & Loppi 1999, Senese & Critelli 2000), **Sar** (Jatta 1909-1911), **S - Puagl** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996).

Cr/ Tr/ S/ Epiph/ pH: 1-2, L: 4-5, X: 2-3, E: 1-2/ Alt: 1/ MedH: rr/ PT: 1-2/ suboc, u/ Note: most frequent in Tyrrhenian Italy, especially on *Olea*. I am not sure whether this variety is worthy of any taxonomic recognition.

Baeomyces Pers.

Ann. Bot. (Usteri), 1: 19, 1794: Fr.

This subcosmopolitan genus of the Baeomycetaceae, with c. 9 species, is superficially similar to *Dibaeis* (Icmadophilaceae), but differs in having coloured apothecia, an amyloid hymenium, a different ascus-ty, and a different chemistry. Type: *B. rufus* (Huds.) Rebert.

Baeomyces carneus (Retz.) Flörke

Deutschl. Flecht., 8: 16, 1821 - *Lichen ericetorum* var. *carneus* Retz., Fl. Scand. Prodr.: 224, 1779.

Syn.: *Baeomyces caprinus* (Th. Fr.) H. Magn., *Baeomyces fuscotufescens* Vain., *Baeomyces byssoides* var. *carneus* (Flörke) Hepp

N - TAA (Nascimbene 2005), **Lomb**.

Cr/ Ch/ S/ Terr/ pH: 1-2, L: 3-4, X: 2-3, E: 1/ Alt: 4-5/ Alp: er, Salp: vr/ PT: 1/ Note: a mainly boreal-montane, perhaps circumpolar lichen found on acid soils high in clay and on weathered siliceous rocks, with optimum near treeline. Certainly restricted to the Alps in Italy.

Baeomyces placophyllus Ach.

Meth. Lich.: 323, 1803.

Syn.: *Ludoviccia placophylla* (Ach.) Trevis.

N - FrI (Tretiach & Hafellner 2000), **Ven** (Tretiach 1993), **TAA** (Nascimbene 2008b), **Lomb, Piem** (Isocrono & al. 2004), **VA** (Piervittori & al. 2004).

Cr/ Ch/ S/ Terr/ pH: 1-2, L: 4, X: 2-3, E: 1-2/ Alt: 3-5/ Alp: r, Salp: rr, Mont: er/ PT: 1/ p/ Note: an arctic-alpine to boreal-montane, probably circumpolar lichen found on sandy-clay soil in open stands (e.g. montane-subalpine grasslands), often in moderately disturbed habitats, sometimes reaching the Alpine belt. Probably restricted to the Alps in Italy.

Baeomyces rufus (Huds.) Rebert.

Prodr. Flor. Neomarch.: 315, 1804 - *Lichen rufus* Huds., Fl. Angl.: 443, 1762.

Syn.: *Baeomyces byssoides* (L.) P. Gaertn., G. Mey. & Scherb., *Baeomyces caesioprinosus* (Anzi) Jatta?, *Baeomyces rufus* f. *rupestris* Harm., *Baeomyces rupestris* Pers., *Biatora byssoides* (L.) Fr., *Lichen fungiformis* Scop., *Rinodina humilis* H. Magn., *Sphyridium byssoides* (L.) Beltr., *Sphyridium fungiforme* (Scop.) Flot.

N - VG, Frl (Tretiach & Hafellner 2000), **Ven, TAA** (Hafellner 1995, Caniglia & al. 2002, Nascimbene 2006c), **Lomb** (Dalle Vedove & al. 2004), **Piem** (Isocrono & al. 2004, 2006, Morisi 2005), **VA** (Piervittori & Isocrono 1997, 1999), **Emil** (Benespero 2009), **Lig** (Brunialti & al. 1999, Watson 2014). **C - Tosc** (Tretiach & Nimis 1994, Benespero & al. 2007, Benespero 2011, Brackel 2015), **Marc** (Brackel 2015), **Laz** (Ravera 2006), **Sar, S - Camp** (Garofalo & al. 1999, Aprile & al. 2003b, Catalano & al. 2016), **Cal** (Puntillo 1995, 1996, Brackel & Puntillo 2016).

Cr/ Ch/ S/ Terr-Sax/ pH: 2-3, L: 3-4, X: 2-3, E: 1/ Alt: 1-5/ Alp: rr, Salp: rc, Orom: r, Mont: rr, SmedD: r, SmedH: rr, MedH: vr / PT: 1/ p/ Note: a holarctic early coloniser of acid soils with high clay content, also found on weathered siliceous rocks, often in rather disturbed sites such as along mountain trails, also within forests; the species is mostly sterile in upland areas. The var. *callianthus* (Lettau) Anders is known from the Austrian Alps.

Bagliettoa A. Massal.

Mem. Lichenogr.: 146, 1853.

This genus accommodates a group of species formerly treated as members of *Verrucaria*, which are characterised by a radially sulcate involucrellum (missing in some species), immersed perithecia, and an endolithic thallus with a lithocortex, that occur on limestone or on dolomite, and have a mainly southern distribution in Europe. The group has been extensively treated by Halda (2003), who does not recognise it as worthy of being treated at generic rank and accepts a few species only. A molecular study by Gueidan & al. (2007) has, however, demonstrated that the species included in *Bagliettoa* are indeed closely related, forming a well-defined lineage within the Verrucariaceae. The molecular study by Yuzon & al. (2013), which I mainly follow here, confirms that the genus is well-founded, and recognizes 12 species. Type: *B. limborioides* A. Massal.

Bagliettoa baldensis (A. Massal.) Vězda

in Poelt & Vězda, Bibl. Lichenol., 16: 363, 1981 - *Verrucaria baldensis* A. Massal., Ric. Auton. Lich. Crost.: 173, 1852.

Syn.: *Amphoridium baldense* (A. Massal.) A. Massal., *Protobagliettoa exesa* (Servít) Servít, *Protobagliettoa kutakiana* Servít, *Verrucaria bagliettoaeformis* (Hazsl.) Servít var. *istriana* Servít, *Verrucaria dalmatica* Servít, *Verrucaria inaequata* var. *triglavensis* Servít, *Verrucaria parmigera* f. *nigroaureolata* Servít, *Verrucaria sphinctrina* var. *lojkae* Servít, *Verrucaria subconcentrica* f. *genovensis* Servít

N - VG (Tretiach 1997, Tretiach & Geletti 1997, Pinna & al. 1998, Crisafulli & al. 2006, Piervittori & al. 2006, Favero-Longo & al. 2009, 2011), **Frl** (Breuss 2008), **Ven** (Lazzarin 2000b, Nascimbene & Marini 2007, Nascimbene 2008c), **TAA, Lomb, Piem** (Isocrono & al. 2004), **VA** (Matteucci & al. 2013), **Emil** (Nimis & al. 1996), **Lig** (Giordani & al. 2016). **C - Tosc, Umb** (Genovesi & Ravera 2001, Ravera & al. 2006), **Laz, Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008, Genovesi & Ravera 2014), **Sar, S - Camp** (Aprile & al. 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010), **Pugl** (Nimis & al. 1995, Nimis & Tretiach 1999), **Si** (Grillo & al. 2007, Brackel 2008b).

Cr.end/ Ch/ S/ Sax/ pH: 5, L: 1-2, X: 2-3, E: 1/ Alt: 1-4/ Salp: er, Orom: vr, Mont: rc, SmedD: ec, Pad: vr, SmedH: ec, MedH: vc, MedD: r/ PT: 1-2/ Note: a mild-temperate species of compact calcareous rocks in natural, sheltered and shaded situations, with optimum in the submediterranean belt.

Bagliettoa calciseda (DC.) Gueidan & Cl. Roux

Bull. Soc. linn. Provence, 58: 187, 2007 - *Verrucaria calciseda* DC. in Lamarck & de Candolle, Fl. Franç., éd. 3, 2: 317, 1805.

Syn.: *Amphoridium calcisedum* (DC.) Servít, *Amphoridium calcivorum* (A. Massal.) Servít, *Verrucaria calciseda* f. *interrupta* Anzi ex Arnold, *Verrucaria calciseda* f. *calcivora* A. Massal., *Verrucaria inaequata* (Servít), *Verrucaria interrupta* (Anzi ex Arnold) J. Steiner

N - VG (Cucchi & al. 2009), **Frl, Ven, Lomb, C - Umb** (Genovesi & Ravera 2001, Ravera & al. 2006), **Laz** (Nimis & Tretiach 2004), **Abr** (Cucchi & al. 2009), **Mol** (Ravera & Genovesi 2010, Ravera & al. 2009, Genovesi & Ravera 2014). **S - Camp** (Aprile & al. 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Si** (Nimis & al. 1994, Monte & Ferrari 1996, Ottonello 1996, Caniglia & Grillo 2001, 2005, 2006, Grillo & al. 2001, 2007b, 2009, Grillo & Caniglia 2004, Brackel 2008b, 2008c, Liistro & Cataldo 2011, Cataldo & Cannavò 2014).

Cr.end/ Ch/ S/ Sax/ pH: 4-5, L: 3-4, X: 3, E: 1-2/ Alt: 1-4/ Salp: vr, Mont: rr, SmedD: rc, SmedH: rr, MedH: vr, MedD: er/ PT: 1/ Note: on limestone, dolomite, and other calciferous rocks, often associated with *Circinaria calcarea*.

Bagliettoa cazzae (Zahlbr.) Vězda & Poelt

in Poelt & Vězda, Bibl. Lichenol., 16: 363, 1981 - *Verrucaria cazzae* Zahlbr., Annal. Mycol., 12: 335, 1914.

Syn.: *Protobagliettoa alocyza* (Arnold) Servít, *Protobagliettoa cazzae* (Zahlbr.) Servít, *Verrucaria subrosea* Servít ex Zschacke, *Verrucaria cazzae* var. *graeca* Servít

N - VG, Lomb. C - Umb (Genovesi & al. 2002, Ravera & al. 2006), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **Laz** (Nimis & Tretiach 2004), **Sar. S - Camp** (Aprile & al. 2003, 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010, Catalano & al. 2016), **Pugl** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994, 1995, Ottonello & Salone 1994, Ottonello & al. 1994, Ottonello 1996, Grillo & al. 2007, 2009, Gianguzzi & al. 2009).

Cr.end/ Ch/ S/ Sax/ pH: 5, L: 3-4, X: 2-3, E: 1-2/ Alt: 1-2/ SmedD: vr, SmedH: r, MedH: rr, MedD: vr/ PT: 1/ Note: a chiefly Mediterranean lichen of steeply inclined, hard calcareous rocks, absent from non-natural habitats; according to Roux (*in litt.*), contrary to *B. parmigerella*, this species does not grow on dolomite. The species is easily confused with *B. marmorea*.

Bagliettoa crassa (A. Massal.) Cl. Roux

Cat. Lich. France: 1314, 2014 - *Verrucaria crassa* A. Massal., Ric. Auton. Lich. Crost.: 174, 1852.

N - Ven (Lazzarin 2000b).

Cr.end/ Ch/ S/ Sax/ pH: 4-5, L: 3-4, X: 3, E: 1-2/ Alt: 2/ SmedD: r/ PT: 1/ #/ Note: this very poorly known calcicolous species, closely related to *B. calciseda*, was recently resuscitated by Roux & coll. (2014); ecological indicator values are tentative.

Bagliettoa limborioides A. Massal.

Mem. Lichenogr.: 147, 1853.

Syn.: *Bagliettoa sphinctrina* auct. non (Ach.) Körb., *Protobagliettoa grummannii* (Servít) Servít, *Verrucaria bosniaca* Servít, *Verrucaria ceracea* J. Steiner, *Verrucaria limborioides* (A. Massal.) Clauzade & Cl. Roux, *Verrucaria sphinctrina* auct. p.p. non Ach., *Verrucaria subconcentrica* (J. Steiner) Servít var. *euthallina* Servít f. *genovensis* Servít **N - VG** (TSB 2461), **Ven, TAA, Lig** (Lazzarin 2000b, Halda 2003). **C - Umb** (Genovesi & Ravera 2001, Ravera & al. 2006). **S - Pugl** (Nimis & Tretiach 1999), **Si** (Nimis & al. 1994, Caniglia & Grillo 2005, 2006, Grillo & al. 2007b).

Cr.end/ Ch/ S/ Sax/ pH: 5, L: 2-3, X: 3, E: 1-2/ Alt: 1-3/ Mont: vr, SmedD: r, SmedH: r, MedH: r, MedD: vr/ PT: 1/ Note: a mild-temperate to Mediterranean lichen found on steeply inclined faces of compact calcareous rocks below the subalpine belt; probably more widespread but overlooked, or confused with similar species.

Bagliettoa marmorea (Scop.) Gueidan & Cl. Roux

in Gueidan & al., Mycol. Res., 111: 1157, 2007 - *Lichen marmoreus* Scop., Fl. Carniol., 2: 367, 1772.

Syn.: *Amphoridium marmoreum* (Scop.) Baroni, *Amphoridium marmoreum* var. *roseum* (A. Massal.) Syd., *Amphoridium purpurascens* (Hoffm.) A. Massal., *Urceolaria wulfenii* Ach., *Verrucaria calciseda* var. *decipiens* Trevis., *Verrucaria marmorea* (Scop.) Arnold, *Verrucaria purpurascens* Hoffm., *Verrucaria purpurascens* var. *rosea* A. Massal.

N - VG (Nimis & Tretiach 1995, Tretiach & Pecchiari 1995, Geletti 1997, Pinna & al. 1998, Castello 2002, Martellos & Castello 2004, Crisafulli & al. 2006, Nimis & al. 2006, Piervittori & al. 2006, Bertuzzi & al. 2007, Tretiach & al. 2008b, 2010, 2012, Favero-Longo & al. 2009, 2011, Cucchi & al. 2009), **Frl** (Cucchi & al. 2009), **Ven** (Caniglia & al. 1999, Lazzarin 2000b, Nascimbene & Caniglia 2003c, Nascimbene 2005c, 2008, Nascimbene & Marini 2007), **TAA** (De Benetti & Caniglia 1993), **Lomb, Emil, Lig. C - Tosc** (Benespero 2000a, 2006), **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera & al. 2006, Panfili 2007), **Laz** (Roccardi & Ricci 2006), **Abr** (Nimis & Tretiach 1999, Cucchi & al. 2009, Caporale & al. 2016), **Mol** (Garofalo & al. 1999, Nimis & Tretiach, 1999, 2004, Caporale & al. 2008, Ravera & Genovesi 2010, Ravera & al. 2009, Genovesi & Ravera 2014), **Sar. S - Camp** (Garofalo & al. 1999, 2010, Aprile & al. 2003, 2003b, Nimis & Tretiach 2004, Watson 2014), **Pugl** (Garofalo & al. 1999), **Bas, Cal** (Puntillo 1996), **Si** (Ottonello & Salone 1994, Ottonello & al. 1994, Ottonello 1996, Grillo 1998, Grillo & Caniglia 2004, Di Martino & Stancanelli 2015).

Cr.end/ Ch/ S/ Sax/ pH: 5, L: 3-4, X: 3-4, E: 1-2/ Alt: 1-4/ Salp: er, Orom: vr, Mont: rr, SmedD: c, Pad: er, SmedH: vc, MedH: rc, MedD: rr/ PT: 1/ Note: on hard, compact limestone rocks in natural habitats, often also on blocks and stones near the ground, with optimum in the submediterranean belt, but reaching higher altitudes in southern Italy.

Bagliettoa parmigera (J. Steiner) Vězda & Poelt

in Poelt & Vězda, Bibl. Lichenol., 16: 363, 1981 - *Verrucaria parmigera* J. Steiner, Verh. zool.-bot. Ges. Wien, 61: 34, 1911.

Syn.: *Amphoridium saxivorum* (Servít) Grummann, *Protobagliettoa parmigera* (J. Steiner) Servít, *Verrucaria gylvnikii* Servít, *Verrucaria parmigera* f. *subconcentrica* J. Steiner, *Verrucaria saxivora* Servít, *Verrucaria subconcentrica* (J. Steiner) Servít

N - VG (Castello 2002, Martellos & Castello 2004, Cucchi & al. 2009b), **Frl** (Nimis & Salvadori 1998, Nascimbene & Salvadori 2008, Nascimbene & al. 2009b), **Ven** (Caniglia & al. 1999, Nascimbene & Salvadori 2008), **TAA** (De Benetti & Caniglia 1993, Nascimbene 2005b), **Lomb, Piem** (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999), **Emil, Lig** (Valcuvia & al. 2000, Giordani & al. 2016). **C - Tosc** (Brackel 2015), **Marc** (Nimis & Tretiach 1999), **Umb** (Nimis & Tretiach 1999, Ravera & al. 2006, Genovesi 2011), **Laz** (Nimis & Tretiach 2004, Brackel 2015), **Abr** (Nimis & Tretiach 1999), **Mol** (Garofalo & al. 1999, Caporale & al. 2008, Nimis & Tretiach 1999), **Sar** (Rizzi & al. 2011). **S - Camp** (Garofalo & al. 1999, 2010, Altieri & al. 2000, Aprile & al. 2003, 2003b, Nimis & Tretiach 2004, Roccardi & Ricci 2006, Bertuzzi & al. 2011, Tretiach & al. 2011c), **Pugl** (Garofalo & al. 1999, Nimis & Tretiach 1999, Durini & Medagli 2004, Brackel 2011), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994, 1995, Ottonello & Salone 1994, Ottonello & al. 1994, Monte & Ferrari 1996, Ottonello 1996, Grillo 1998, Grillo & al. 2001, 2002, 2009, Grillo & Caniglia 2004, Caniglia & Grillo 2005, 2006, Liistro & Cataldo 2011, Cataldo & Cannavò 2014).

Cr.end/ Ch/ S/ Sax/ pH: 4-5, L: 3-4, X: 2-3, E: 1-2/ Alt: 1-4/ Salp: er, Orom: r, Mont: c, SmedD: ec, Pad: r, SmedH: ec, MedH: rc, MedD: r/ PT: 1-2/ Note: a mainly mild-temperate lichen found on compact

limestone and in exposed situations, with optimum in the submediterranean belt; albeit rarely, it also occurs in disturbed habitats (e.g. on monuments in Rome).

Bagliettoa parmigerella (Zahlbr.) Vězda & Poelt

in Poelt & Vězda, *Bibl. Lichenol.*, 16: 363, 1981 - *Verrucaria parmigerella* Zahlbr., *Österr. bot. Z.*, 68: 64, 1919.

Syn.: *Protobagliettoa bagliettoaeformis* (Hazsl.) Servít, *Protobagliettoa erumpens* (Servít) Servít, *Protobagliettoa parmigerella* (Zahlbr.) Servít, *Verrucaria harrimannii sensu* Anzi, *Verrucaria pinguis* J. Steiner, *Verrucaria sphinctrinella* Zschacke, *Verrucaria sphinctrinella* var. *italica* Servít

N - VG (Cucchi & al. 2009, 2009b, Yuzon & al. 2014), **Frl** (Cucchi & al. 2009), **Ven** (Halda 2003), **TAA** (Halda 2003), **Emil, Lig** (Valcuvia & al. 2000, Halda 2003, Giordani & al. 2016). **C - Tosc** (Benesperi 2006), **Marc** (Nimis & Tretiach 1999), **Umb** (Nimis & Tretiach 1999, Ravera & al. 2006), **Laz** (Nimis & Tretiach 2004), **Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **Sar. S - Camp** (Halda 2003, Aprile & al. 2003, 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010), **Pugl** (Nimis & Tretiach 1999), **Bas, Cal** (Puntillo 1996), **Si** (Nimis & al. 1994, 1995, Ottonello & Salone 1994, Ottonello & al. 1994, Ottonello 1996, Grillo & Caniglia 2004, Caniglia & Grillo 2005, 2006).

Cr.end/ Ch/ S/ Sax/ pH: 5, L: 2-3, X: 1-3, E: 1/ Alt: 1-4/ Salp: er, Orom: r, Mont: vc, SmedD: c, Pad: vr, SmedH: c, MedH: rc, MedD: vr/ PT: 1-2/ Note: a mild-temperate lichen found on compact limestone and dolomite in sheltered situations (e.g. in forests), with optimum in submediterranean areas; in the Mediterranean belt it is confined to humid-shaded situations, reaching near treeline in the mountains of the South; forms from southern Italy with a dark grey thallus are common, and deserve further study.

Bagliettoa steineri (Kušan) Vězda

in Poelt & Vězda, *Bibl. Lichenol.*, 16: 363, 1981 - *Verrucaria steineri* Kušan, *Acta Bot. Inst. Univ. Zagreb*, 5: 28, 1930.

Syn.: *Protobagliettoa steineri* (Kušan) Servít ex J. Nowak & Tobol.

N - VG (Tretiach & Navarro-Rosinés 1996, Geletti 1997, Tretiach & Pecchiari 1995), **Frl** (Breuss 2008), **Lomb, Lig** (Giordani & al. 2016). **C - Umb** (Genovesi & Ravera 2001, Ravera & al. 2006). **S - Si** (Caniglia & Grillo 2005, 2006).

Cr.end/ Ch/ S/ Sax/ pH: 5, L: 2-3, X: 2-3, E: 1/ Alt: 1-4/ Salp: vr, Mont: r, SmedD: rr, SmedH: rr, MedH: r/ PT: 1/ Note: a rarely collected, but probably much more common, mild-temperate species found on compact calcareous rocks, especially limestone, in natural habitats; frequently confused with *B. baldensis*, it should be looked for further throughout the country.

Bellemeria Hafellner & Cl. Roux

in Clauzade & Cl. Roux, *Bull. Soc. Bot. Centre-Ouest*, n. sér. 15: 129, 1984.

This genus, segregated from *Aspicilia*, as re-defined by Calatayud & Rambold (1998) is characterised by the following combination of characters: thallus whitish, greyish, ochraceous to rusty coloured, without a distinct epinecral layer, with β -orcinol depsidones (norstictic acid chemosyndrome) in some species, asci of *Bellemeria*-type, ascospores with an amyloid inner wall layer and a distinctly halonate perispore. The genus, which includes c. 8 species, is currently placed in the Lecideaceae. Most species occur in arctic-alpine habitats, and some of them are very closely related. Type: *B. alpina* (Sommerf.) Clauzade & Cl. Roux

Bellemeria alpina (Sommerf.) Clauzade & Cl. Roux

Bull. Soc. Bot. Centre-Ouest, n. sér. 15: 129, 1984 - *Lecanora alpina* Sommerf., *Suppl. Flor. Lappon.*: 91, 1826.

Syn.: *Aspicilia alpina* (Sommerf.) Arnold, *Aspicilia cinereorufescens sensu* Körb. non (Ach.) A. Massal., *Aspicilia cinereorufescens* var. *macrocarpa* Anzi non *Aspicilia calcarea* var. *alpina* Anzi, *Lecanora alpina* var. *sulphurata* Th. Fr. **N - Frl** (Tretiach & Hafellner 2000, Ivanova & Hafellner 2002), **Ven, TAA** (Caniglia & al. 2002, Nascimbene 2003, Lang 2009), **Lomb, Piem** (Morisi & Sereno 1995, Isocrono & al. 2004, Isocrono & Piervittori 2008, Favero-Longo & al. 2015), **VA** (Piervittori & al. 2004, Isocrono & al. 2008, Favero-Longo & Piervittori 2009).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 3-4, X: 3, E: 1/ Alt: 4-6/ Alp: rc, Salp: r/ PT: 1/ Note: a mainly arctic-alpine, circumpolar lichen of hard, acid siliceous rocks wetted by rain near or above treeline; almost certainly restricted to the Alps in Italy.

Bellemeria cinereorufescens (Ach.) Clauzade & Cl. Roux

Bull. Soc. Bot. Centre-Ouest, n. sér. 15: 129, 1984 - *Urceolaria cinereorufescens* Ach., *Lichenogr. Univ.*: 677, 1810.

Syn.: *Aspicilia cinereorufescens* (Ach.) A. Massal., *Lecanora cinereorufescens* (Ach.) Hepp **N - Frl** (TSB 3781), **Ven, TAA, Lomb, Piem, VA, Emil**.

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 3-4, X: 3, E: 1/ Alt: 4-5/ Alp: r, Salp: r/ PT: 1/ m/ Note: a widespread holarctic, very variable species found on hard, often metal-rich siliceous rocks in upland areas; closely related to *B. diamarta*; records from southern Italy, being very dubious (see Nimis 1993: 123) are not accepted here.

Bellemeria diamarta (Ach.) Hafellner & Cl. Roux

in Clauzade & Cl. Roux, *Bull. Soc. Bot. Centre-Ouest*, n. sér. 15: 129, 1984 - *Urceolaria diamarta* Ach., *Meth. Lich.*: 151, 1803.

Syn.: *Aspicilia cinerea* var. *oxydata* (Flot.) Anzi, *Aspicilia diamarta* (Ach.) Boistel, *Candelariella ferruginata* (Harm.) Zahlbr., *Lecanora cinereorufescens* var. *diamarta* (Ach.) Nyl., *Lecanora diamarta* (Ach.) Vain., *Lecanora ferruginata* Harm.

N - Ven, TAA, Lomb, Piem (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999, Isocrono & al. 2008), **Emil. C - Sar. S - Si.**

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 3-4, X: 3, E: 1/ Alt: 4-5/ Alp: rc, Salp: r, Orom: er/ PT: 1/ m/ Note: an arctic-alpine, circumpolar lichen of metal-rich siliceous rocks, with optimum in the Alpine belt; somehow more hygro- and less photophytic than *B. alpina*.

Bellemerea sanguinea (Kremp.) Hafellner & Cl. Roux

in Clauzade & Cl. Roux, Bull. Soc. bot. Centre-Ouest, n. sér. 15: 129, 1984 - *Aspicilia sanguinea* Kremp., Flora, 40: 371, 1857.

Syn.: *Lecanora sanguinea* (Kremp.) Mig.

N - TAA, Lomb, Piem.

Cr/ Ch/ S/ Sax/ pH: 2-4, L: 3-4, X: 3, E: 1/ Alt: 4-6/ Alp: r, Salp: r/ PT: 1/ m/ Note: characterised by a thin, rimose, grey thallus and aspicilioid dark-red apothecia, this species occurs on siliceous rocks, especially slightly calciferous schists, near or above treeline; it is closely related to *B. diamarta*.

Bellemerea subcandida (Arnold) Hafellner & Cl. Roux

in Clauzade & Cl. Roux, Bull. Soc. Bot. Centre-Ouest, n. sér. 15: 130, 1984 - *Aspicilia cinereorufescens* f. *subcandida* Arnold, Verh. zool.-bot. Ges. Wien, 47: 223, 1897.

Syn.: *Lecanora subcandida* (Arnold) Lettau

N - Ven, TAA, Piem (TSB 33985), **Lig** (TSB 33667b).

Cr/ Ch/ S/ Sax/ pH: 3-4, L: 3-4, X: 3, E: 1-2/ Alt: 4-5/ Alp: r, Salp: er/ PT: 1/ Note: a probably overlooked and certainly more widespread, characteristic lichen of base-rich, weakly calciferous siliceous rocks in the mountains, known from southern Europe (Alps, Pyrenees); perhaps just a calcicolous morph of *B. cinereorufescens*.

Bellemerea subsorediza (Lynge) R. Sant.

in Moberg, Thunbergia, 5: 2, 1987 - *Lecidea subsorediza* Lynge in Dahl & al., Skr. om Svalbard og Ishavet, 70: 22, 1937.

Syn.: *Aspicilia alpina* subsp. *fraudans* Räsänen, *Aspicilia subsorediza* (Lynge) R. Sant.

N - Frl (Tretiaich & Hafellner 2000), **TAA** (Hertel & Schuhwerk 2010).

Cr/ Ch/ A.s/ Sax/ pH: 1-2, L: 4, X: 2-3, E: 1/ Alt: 3-5/ Alp: rr, Salp: vr, Mont: er/ PT: 1/ Note: on siliceous rocks in open lichen communities near or above treeline (*i.e.* near glaciers); probably more widespread in the Alps, but overlooked, being mostly sterile.

Biatora Fr.

Lich. Dianome Nova, Lund: 7, 1817.

In its current circumscription, this genus of the Ramalinaceae includes species developing a crustose thallus with green algal photobiont, biatorine apothecia with an exciple composed of anticlinal parallel hyphae, weakly branched, anastomosed and strongly conglutinated paraphyses, *Biatora*-type asci and simple to 3(-7)-septate, colourless ascospores. Until this modern delimitation of the genus, the species now accepted as *Biatora* were distributed over a heterogeneous group of taxa including *e.g.* *Bacidia*, *Catillaria*, and *Lecidea*. Since the second half of the XIX century, *Biatora* was treated as a subgenus of *Lecidea* until it was reinstated as a monotypic genus based on *B. vernalis*. The circumscription of the genus has changed since then and the number of species increased from 17 to 42 (Printzen 2014). Molecular studies, based on a single or two gene loci, supported the monophyly of *Biatora* and its position within Ramalinaceae; a comprehensive study based on three gene loci also showed that *Biatora* comprises at least six clades, which correspond to different morphological groups of species: the *beckhausii*-, *hertelii*-, *meiocarpa*-, *ocelliformis*-, *rufidula*- and *vernalis*-groups (Printzen 2014). A key to European species was published by Printzen & Otte (2005). Type: *B. vernalis* (L.) Fr.

Biatora beckhausii (Körb.) Tuck.

Syn. N. Amer. Lich., 2: 46, 1888 - *Bacidia beckhausii* Körb., Parerga Lichenol.: 134, 1860.

Syn.: *Bacidia beckhausii* var. *obscurior* Th. Fr., *Bacidia beckhausii* var. *poliaena* (Nyl.) Arnold, *Bacidia minuscula* Anzi, *Bacidia stenospora* (Hepp) Arnold, *Lecidea denigrata* var. *bacidiella* Vain., *Micarea beckhausii* (Körb.) Vězda, *Micarea minuscula* (Anzi) Vězda

N - Frl, TAA (Nimis & al. 2015), **Lomb, Piem** (Isocrono & al. 2004). **C - Tosc** (Loppi & al. 1994, Loppi & Putorti 2001), **Abr** (Di Santo & Ravera 2012, Corona & al. 2016), **Sar** (Zedda 2002, 2002b, Rizzi & al. 2011). **S - Cal** (Puntillo 1996, Puntillo & Puntillo 2004).

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 3-4, X: 2, E: 1-2/ Alt: 2-4/ Salp: er, Mont: vr, SmedD: er, SmedH: vr, MedH: vr/ PT: 1/ Note: a mainly mild-temperate lichen found on bark of broad-leaved trees (especially *Fraxinus*) in open, humid, mostly montane woodlands. It is included in the Italian red list of epiphytic lichens as "Near-threatened" (Nascimbene & al. 2013c).

Biatora chrysantha (Zahlbr.) Printzen

in Wirth, Stuttgarter Beitr. Naturk., A 517: 62, 1994 - *Lecidea chrysantha* Zahlbr., Ann. Mycol., 19: 236, 1921.

Syn.: *Biatora epixanthoidiza* auct. non (Nyl.) Räsänen, *Biatora gyrophorica* (Tønsberg) Coppins, *Biatora vernalis* var. *incana* (Ach. ex Sommerf.) Th. Fr., *Lecidea epixanthoidiza* auct. non Nyl., *Lecidea gyrophorica* Tønsberg, *Lecidea incana* Ach. ex Sommerf. non (L.) Ach.

N - **Frl** (GZU-524975), **Ven** (Trevisan Lichenoth. Ven. 59: Printzen 1995, Thor & Nascimbene 2007), **TAA** (Nascimbene 2005, 2014, Nascimbene & al. 2006e, 2009, 2014), **Piem** (TSB 33239), **Lig**.

Cr/ Ch/ A.s/ Epiph/ pH: 1-2, L: 2-3, X: 1-2, E: 1/ Alt: 3-4/ Salp: vr, Mont: r/ PT: 1/ Note: on epiphytic bryophytes in humid forests, mostly in upland areas.

Biatora cuprea (Sommerf.) Fr.

Lichenogr. Eur. Ref.: 265, 1831 - *Lecidea cuprea* Sommerf., Suppl. Fl. Lapp.: 165, 1826.

N - **TAA**, **Lomb**, **Piem**, **VA** (Pierivittori & Isocrono 1999).

Cr/ Ch/ S/ Terr/ pH: 1-2, L: 3-4, X: 1-2, E: 1/ Alt: 3-5/ Alp: vr, Salp: r, Mont: er/ PT: 1/ Note: most frequent on soil and plant debris on siliceous substrata in upland areas. According to Printzen (1995) this species is known with certainty only from northern Europe, and western North America, but it has been reported from several localities in the Alps (see e.g. Roux & coll. 2014). Printzen (*in litt.*), however, thinks that its presence in the Alps is dubious, and most records from this area could refer to *B. subduplex*.

Biatora efflorescens (Hedl.) Räsänen

Lich. Fenn. Exs.: nr. 133, 1935 - *Lecidea helvola* f. *efflorescens* Hedl., Bih. K. Svenska Vetensk.-Akad. Handl., afd. 3, 18, 3: 61, 1892.

Syn.: *Biatora epixanthoidiza* (Nyl.) Räsänen, *Lecidea efflorescens* (Hedl.) Erichsen, *Lecidea epixanthoidiza* Nyl.

N - **Frl**, **Ven** (Nascimbene 2003b, 2014, Thor & Nascimbene 2007), **TAA** (Thor & Nascimbene 2007, Nascimbene & al. 2009, Nimis & al. 2015), **Lomb** (Alessio & al. 1995). **C** - **Tosc** (Benesperi & al. 2007).

Cr/ Ch/ A.s/ Epiph-Lign/ pH: 1-3, L: 3, X: 2-3, E: 1-2/ Alt: 3-4/ Salp: rr, Mont: r/ PT: 1/ Note: a probably holarctic lichen found on a wide variety of trees with smooth bark, sometimes overgrowing mosses, rarely on lignum, mostly in upland areas; certainly more widespread in the Alps.

Biatora flavopunctata (Tønsberg) Hinter. & Printzen

in Hinteregger, Bibl. Lichenol., 55: 86, 1994 - *Lecanora flavopunctata* Tønsberg, Sommerfeltia, 14: 162, 1992.

N - **Frl** (Hinteregger 1994, Printzen 1995, in Austrian terr., near the border), **Piem** (TSB 33253), **Lig**.

Cr/ Ch/ A.s/ Epiph/ pH: 1-2, L: 3, X: 2-3, E: 1/ Alt: 3-4/ Salp: rc, Mont: r/ PT: 1/ Note: a recently-described, perhaps boreal-montane species found on twigs of subalpine shrubs, especially *Rhododendron ferrugineum*; certainly much more widespread in the Alps.

Biatora globulosa (Flörke) Fr.

Summa Veg. Scand.: 112, 1845 - *Lecidea globulosa* Flörke, Deutschl. Flecht., 10: 1, 1821.

Syn.: *Bacidia globulosa* (Flörke) Hafellner & V. Wirth, *Biatora hyalina* Fr., *Biatora minuta* (Schaer.) Hepp, *Biatora sylvana* Körb., *Biatorina globulosa* (Flörke) Körb., *Bacidia pinguicula* (Bagl. & Carestia) Lettau, *Bilimbia pinguicula* Bagl. & Carestia, *Bilimbia pyrenocarpoides* Anzi, *Catillaria globulosa* (Flörke) Th. Fr., *Lecania globulosa* (Flörke) van den Boom & Sérus. non Savicz, *Lecania hyalina* (Fr.) R. Sant., *Lecidea sylvana* (Körb.) Th. Fr.

N - **Frl**, **Ven**, **TAA** (Nascimbene & al. 2007b, Nascimbene 2014, 2009, Nascimbene & Marini 2015, Nimis & al. 2015), **Lomb**, **Piem** (Isocrono & al. 2004), **VA** (Pierivittori & Isocrono 1999), **Lig**. **C** - **Tosc**, **Laz**, **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008). **S** - **Camp** (Aprile & al. 2003b), **Pugl**, **Bas**, **Cal** (Puntillo 1996).

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 2-3, X: 2, E: 1-2/ Alt: 2-4/ Salp: vr, Orom: vr, Mont: rr, SmedD: vr, SmedH: r/ PT: 1/ Note: a mainly temperate, perhaps holarctic lichen found on acid and rough bark of broad-leaved trees in sheltered situations, often in fissures, and in association with calicioid lichens. According to Printzen (2014) it firmly belongs in *Biatora*.

Biatora helvola Hellb.

Körb. ex Hellb., Öfvers. K. Svensk. Vetensk.-Akad. Förh., 24: 271, 1867.

Syn.: *Lecidea vernalis* subsp. *helvola* (Hellb.) Th. Fr.

N - **Frl**, **Ven** (Nascimbene & Caniglia 2000, 2003c), **TAA** (Printzen 1995, Nascimbene & al. 2006e, 2007b, Thor & Nascimbene 2007, Nimis & al. 2015).

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 2-3, X: 2, E: 1/ Alt: 3-4/ Salp: rc, Mont: rr/ PT: 1/ Note: a mainly boreal-montane, circumpolar species found on basal parts of trees in open montane to subalpine forests, often with *Parmeliopsis hyperopta*; certainly much more widespread in the Alps.

Biatora mendax Anzi

Comm. Soc. Critt. Ital., 1, 3: 153, 1862.

Syn.: *Biatora propinquata* (Nyl.) Arnold, *Biatora subflavida* (Nyl.) Arnold, *Biatorina mendax* (Anzi) Jatta, *Catillaria mendax* (Anzi) Lettau, *Lecidea propinquata* Nyl., *Lecidea subflavida* Nyl.

N - **Frl** (Tretiach & Carvalho 1995, Printzen 1995), **TAA** (Printzen 1995), **Lomb** (Anzi Lich. Lang. 168: Printzen 1995). **S** - **Cal**.

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 2-3, X: 1-2, E: 1/ Alt: 3-4/ Salp: er, Mont: vr/ PT: 0/ Note: an epiphytic species found in shaded and humid situations, with optimum in humid beech forests with *Abies alba*. It is included in the Italian red list of epiphytic lichens as “Endangered” (Nascimbene & al. 2013c).

Biatora ocelliformis (Nyl.) Arnold

Flora, 53: 476, 1870 - *Lecidea ocelliformis* Nyl., Flora, 48: 145, 1865.

Syn.: *Biatora atroviridis* (Arnold) Hellb., *Biatorina subglobulosa* (Nyl.) Arnold, *Catillaria globulosa* var. *subglobulosa* (Nyl.) Zahlbr., *Catillaria prasina* f. *ocelliformis* (Nyl.) Erichsen, *Lecidea atroviridis* (Arnold) Th. Fr., *Lecidea atroviridis* f. *ocelliformis* (Nyl.) Blomb. & Forssell, *Lecidea ocellaris* Vain., *Lecidea subglobulosa* Nyl., *Lecidella turgidula* var. *atroviridis* Arnold

N - TAA (Printzen 1995, Thor & Nascimbene 2007, Nascimbene & al. 2007b, Nimis & al. 2015), **Piem** (Isocrono & al. 2004), **S** - Cal (Puntillo 1996).

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 3, X: 2-3, E: 1/ Alt: 3-4/ Salp: vr, Mont: vr/ PT: 1/ Note: a boreal-montane species found on the bark of deciduous and coniferous trees in montane to subalpine forests. It is included in the Italian red list of epiphytic lichens as “Endangered” (Nascimbene & al. 2013c).

Biatora pontica Printzen & Tønnsberg

Bibl. Lichenol., 86: 40, 2003.

N - Frl (Printzen & Tønnsberg 2003, Tretiach 2004), **C** - Abr (Di Santo & Ravera 2012, Corona & al. 2016).

Cr/ Ch/ A.s/ Epiph/ pH: 1-2, L: 2-3, X: 2, E: 1/ Alt: 3/ Mont: vr/ PT: 0/ suboc/ Note: recently-described from Turkey, and also known from Scandinavia, Austria, Slovenia and eastern North America, this species occurs on acid to subacid bark in shaded and humid situations within old montane forests, mainly on *Fagus* and *Abies*.

Biatora rufidula (Graewe) S. Ekman & Printzen

in Printzen, Bibl. Lichenol., 60: 115, 1995 - *Bilimbia rufidula* Graewe in Hellbom, Öfvers. K. Svensk. Vetensk.-Akad. Förh., 24: 270, 1867.

Syn.: *Bacidia rufidula* (Graewe) Zahlbr., *Lecidea rufidula* (Graewe) Stizenb.

N - TAA (Printzen 1995, Nascimbene & al. 2007b).

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 2-3, X: 3, E: 1/ Alt: 4/ Salp: vr/ PT: 1/ Note: a boreal-montane lichen, restricted to *Picea abies* in the oroboreal belt of the Alps; probably more widespread but perhaps declining. It is included in the Italian red list of epiphytic lichens as “Critically Endangered” (Nascimbene & al. 2013c).

Biatora sphaeroidiza (Vain.) Printzen & Holien

in Printzen, Bibl. Lichenol., 60: 119, 1995 - *Lecidea sphaeroidiza* Vain., Acta Soc. Fauna Fl. Fenn., 57, 2: 399, 1934.

N - Frl (Printzen 1995).

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 3, X: 2, E: 1/ Alt: 3-4/ Salp: vr, Mont: er/ PT: 1/ Note: a boreal-montane species whose ecology is not clear to me: it occurs both on conifers and deciduous trees and shrubs (e.g. *Alnus*, *Salix*, *Sorbus*, *Vaccinium*) in rather humid areas. The indicator values are tentative; the locality is in Slovenia, but very close to the Italian border.

Biatora subduplex (Nyl.) Printzen

Räsänen ex Printzen, Bibl. Lichenol., 60: 123, 1995 - *Lecidea vernalis* f. *subduplex* Nyl., Lich. Scand., 201, 1861.

Syn.: *Biatora subduplex* (Nyl.) Räsänen comb. inval., *Biatora vernalis* f. *subduplex* (Nyl.) Arnold, *Bilimbia sphaeroides* var. *subduplex* (Nyl.) Branth, *Catillaria subduplex* (Nyl.) H. Olivier, *Lecidea apochroeiza* Nyl., *Lecidea internectens* Nyl., *Lecidea subduplex* (Nyl.) Nyl.

N - Frl (Arnold Lich. Exs. 835: Printzen 1995), **TAA** (Printzen 1995, Nascimbene & al. 2007b), **Lomb** (Anzi Lich. Lang. 179: Printzen 1995), **Piem** (Isocrono & al. 2004, Matteucci & al. 2015b), **VA** (Matteucci & Vanacore Falco 2015), **Lig** (TSB 34008). **C** - Tosc (Benespero & al. 2007).

Cr/ Ch/ S/ Epiph-Terr/ pH: 1-2, L: 3-4, X: 2-3, E: 1-2/ Alt: 3-5/ Alp: rc, Salp: vc, Mont: vr/ PT: 1/ Note: one of the commonest *Biatora*-species in the Alps, especially on plant remains and on basal parts of subalpine shrubs, overlooked, and certainly more widespread in the Alps, and also known from the northern Apennines. See also notes on *B. cuprea* and *B. vernalis*.

Biatora subgilva (Arnold) Hinter.

Bibl. Lichenol., 55: 112, 1994 - *Biatora vernalis* var. *subgilva* Arnold, Verh. K. K. zool.-bot. Ges. Wien, 46: 141, 1896.

Syn.: *Biatora vernalis* f. *subgilva* (Arnold) Arnold, *Lecidea vernalis* f. *subgilva* (Arnold) Zahlbr.

N - Frl.

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 3-4, X: 3, E: 1/ Alt: 4/ Salp: vr/ PT: 1/ Note: on old, decaying branches and stems of *Rhododendron* in siliceous areas of the subalpine belt; most of the records of this little-known, but well-distinguished species are from Austria, but near the Italian border (see Printzen 1995).

Biatora vernalis (L.) Fr.

K. Svensk. Vetensk.-Akad. Handl.: 271, 1822 - *Lichen vernalis* L., Syst. Nat., 3: 234, 1768.

Syn.: *Bacidia vernalis* (L.) Clauzade & Rondon comb. inval., *Biatora sphaeroides* var. *vernalis* (L.) Rabenh., *Bilimbia vernalis* (L.) Trevis., *Lecidea vernalis* (L.) Ach., *Patellaria vernalis* (L.) Spreng., *Pyrrhospora vernalis* (L.) M. Choisy, *Secoliga vernalis* (L.) Norman

N - **Frl** (TSB 21127), **Ven** (Nascimbene & Caniglia 2003c), **TAA** (Hinteregger 1994, Nascimbene & al. 2007b, Nimis & al. 2015), **Lomb**, **Piem** (Tretiach 1997, Isocrono & al. 2003), **VA** (Piervittori & Isocrono 1997, 1999), **Lig** (Brunialti & al. 1999, Watson 2014). **C** - **Tosc** (Printzen 1995, Printzen & Palice 1999, Benesperi & al. 2007), **Laz** (Ravera 2006), **Abr**. **S** - **Camp** (Aprile & al. 2003b), **Bas**, **Cal** (Puntillo 1996).

Cr/ Ch/ S/ Epiph-Terr/ pH: 1-2, L: 3-4, X: 2-3, E: 1/ Alt: 3-4/ Salp: vr, Orom: r, Mont: er/ PT: 1/ Note: a mostly boreal-montane, circumpolar species ranging from northern Scandinavia to the Alps, Pyrenees and the Balkan mountains, becoming progressively rarer southwards. It is found on bryophytes, plant debris, acid soil and bark in upland areas. Several records could refer to *B. subduplex*.

Biatora veteranorum Coppins & Sérus.

in Sérusiaux & al., Bryologist, 113: 337, 2010.

Syn.: *Catillaria alba* Coppins & Vězda

N - **TAA** (Nascimbene 2014, Nascimbene & Marini 2015). **C** - **Tosc**.

Cr/ Ch/ S/ Lign/ pH: 1-2, L: 3-4, X: 2-3, E: 1/ Alt: 3/ Mont: er/ PT: 1/ u/ Note: a cool-temperate lichen found on decorticated trunks of old deciduous and coniferous trees protected from rain; certainly rare, but to be looked for elsewhere, especially in the Alps. For further details see Sérusiaux & al. (2010). The species is included in the Italian red list of epiphytic lichens as "Critically Endangered" (Nascimbene & al. 2013c).

Biatorella De Not. Giorn. Bot. Ital., 2: 142, 1846.

This genus, which is included in the Biatoraceae within the Lecanorales, comprises *c.* 30 species. Other species formerly included in *Biatorella* have been transferred to *Sarcosagium* (having smaller, marginate apothecia with a well-developed true exciple), *Biatoridium* (asci with a multilayered K/I+ blue outer apical dome) and *Sarea* (non-lichenised and with globose conidia). This genus was poorly collected in Italy, both for the rarity of the species, and because they are easily overlooked. Type: *B. rousselii* (Durieu & Mont.) De Not. (= *B. fossarum*).

Biatorella fossarum (Fr.) Th. Fr.

Lichenogr. Scand., 2: 397, 1874 - *Lecidea fossarum* Dufour ex Fr., Lichenogr. Eur. Ref.: 364, 1831.

Syn.: *Biatora rousselii* Durieu & Mont., *Biatorella rousselii* (Durieu & Mont.) De Not.

N - **Ven**, **TAA**, **Emil**, **Lig**. **C** - **Tosc**. **S** - **Si** (Caniglia & al. 2005).

Cr/ Ch/ S/ Terr/ pH: 3-4, L: 4, X: 3-4, E: 1-2/ Alt: 1-3/ Mont: er, SmedD: er, SmedH: vr, MedH: er/ PT: 1-2/ p/ Note: on calciferous, often slightly decalcified soil in rather disturbed habitats; chiefly southern in Europe; closely related to *B. hemisphaerica*. Most Italian records must be checked against the latter species.

Biatorella germanica Körb.

A. Massal. ex Körb., Parerga Lichenol.: 125, 1860.

N - **Frl**, **Piem** (TSB 34055).

Cr/ Ch/ S/ Sax/ pH: 5, L: 2-3, X: 2-3, E: 1-2/ Alt: 3-4/ Salp: vr, Mont: vr/ PT: 1/ Note: on sheltered calcareous rocks in upland areas; perhaps overlooked, but certainly not common.

Biatorella hemisphaerica Anzi

Cat. Lich. Sondr.: 78, 1860.

Syn.: *Biatorella fossarum* f. *hemisphaerica* (Anzi) Vain., *Biatorella fossarum* var. *rubicunda* Th. Fr.

N - **Frl**, **Ven** (Nascimbene 2002, 2003b), **TAA**, **Lomb**, **Lig**. **C** - **Tosc**.

Cr/ Ch/ S/ Terr/ pH: 3-4, L: 3-4, X: 2-3, E: 1-2/ Alt: 3-5/ Alp: er, Salp: vr, Mont: r/ PT: 1/ Note: on calciferous soil and amongst bryophytes, most often in rock fissures, mostly in upland areas; see also note on *B. fossarum*.

Biatoridium Körb.

J. Lahm ex Körb., Parerga Lichenol.: 172, 1860.

A small genus that was resurrected to accommodate 3 species differing from *Biatorella* and *Strangospora* in the clearly multilayered asci with a K/I+ blue apical dome (Hafellner 1994b). Its taxonomic position within the Lecanoromycetes is still unclear. Type: *B. monasteriense* Körb.

Biatoridium monasteriense Körb.

J. Lahm ex Körb., Parerga Lichenol.: 172, 1860.

Syn.: *Biatorella elegans* (A. Massal.) Stizenb., *Biatorella monasteriensis* ("J. Lahm") J. Lahm, *Biatoridium elegans* (A. Massal.) Reinke, *Chilospora elegans* A. Massal.

N - Frl (Tretiach & Carvalho 1993), **Ven** (Nascimbene 2008, Nascimbene & al. 2008e), **Emil** (Nimis & al. 1996). **C - Tosc** (Tretiach & Carvalho 1993), **Marc** (Candotto & Tretiach 2013), **Umb** (Ravera & al. 2006, 2006b), **Laz** (Munzi & al. 2007), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **Sar** (Rizzi & al. 2011). **S - Pugl** (Nimis & Tretiach 1999).

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 2-3, X: 1-2, E: 1-3/ Alt: 1-3/ Mont: vr, SmedD: er, SmedH: r, MedH: er/ PT: 1-2/ suboc/ Note: a mild-temperate lichen found on deciduous trees with subacid (e.g. *Quercus*) to base-rich (*Acer*, *Fraxinus*, *Sambucus*) bark; much overlooked in the past, but locally not uncommon, especially in humid situations, e.g. along brooks.

Bilimbia De Not.

Giorn. Bot. Ital., 1: 190, 1846.

This genus, widely used in the XIX century, fell into disuse because of conflict with an earlier use of the name for a genus of phanerogams (which, however, recently proved to be invalid), so that the species were subsumed into the "supergenus" *Bacidia* by Zahlbruckner. It differs from *Bacidia*, *Biatora* and *Mycobilimbia* by a slightly different tholus structure, the stout paraphyses, and the finely warted perispore, and presently includes c. 6 species. Molecular data suggest that it forms a well-supported group within the Ramalinaceae (see Reese Naesborg & al. 2007, and Miadlikowska & al. 2014). Type: *B. hexamera* De Not. (= *B. sabuletorum*).

Bilimbia accedens Arnold

Flora, 45: 391, 1862.

Syn.: *Bacidia accedens* (Arnold) Lettau, *Mycobilimbia accedens* (Arnold) V. Wirth ex Hafellner, *Myxobilimbia accedens* (Arnold) Hafellner, *Bacidia decedens* (Stizenb.) Mig.

N - VG (TSB 15457), **Frl**, **TAA**, **Lomb** (Jatta 1909-1911), **Piem**, **Emil** (Tretiach & al. 2008). **C - Tosc** (Jatta 1909-1911), **Marc** (TSB 24011), **Abr** (Jatta 1909-1911), **Mol** (Nimis & Tretiach 2004, Caporale & al. 2008). **S - Camp** (Nimis & Tretiach 2004), **Bas** (Jatta 1909-1911).

Cr/ Ch/ S/ Terr/ pH: 3-4, L: 2-4, X: 2-3, E: 1-3/ Alt: 3-5/ Alp: r, Salp: r, Mont: r/ PT: 1/ Note: on mosses overgrowing soil and rocks, with optimum on calciferous substrata in upland areas. The record from Sicilia (Nimis 1993: 442) was due to a misidentification. For synonymies see Ekman (1996).

Bilimbia lobulata (Sommerf.) Hafellner & Coppins

in Veldkamp, Lichenologist, 36: 195, 2004 - *Lecidea lobulata* Sommerf., Kungl. Norske Vidensk. Sifter, 2, 2: 54, 1827.

Syn.: *Bacidia sabulosa* (A. Massal.) Lettau, *Biatora regeliana* Hepp, *Bilimbia leucophaea* var. *perpallenscens* (Nyl.) A.L. Sm., *Bilimbia milliaria* var. *terrestris* Körb., *Bilimbia regeliana* (Hepp) Körb., *Bilimbia sabulosa* A. Massal., *Bilimbia syncomista* (Flörke) Körb., *Lecidea claudeliana* Harm., *Lecidea sabuletorum* var. *syncomista* Flörke, *Lecidea subnegans* Nyl., *Mycobilimbia lobulata* (Sommerf.) Hafellner, *Myxobilimbia lobulata* (Sommerf.) Hafellner, *Toninia claudeliana* (Harm.) H. Olivier, *Toninia lobulata* (Sommerf.) Lyng, *Toninia sabulosa* (A. Massal.) Samp., *Toninia syncomista* (Flörke) Th. Fr., *Toninia syncomista* var. *regeliana* (Hepp) Stein

N - Frl, **Ven** (Nimis 1994, Lazzarin 2000b, Nascimbene & Caniglia 2003c, Nascimbene 2005c, 2008c, Thor & Nascimbene 2007, Nascimbene & Marini 2007), **TAA** (Thor & Nascimbene 2007, Nascimbene 2008b), **Lomb** (Lazzarin 2000b), **Piem** (Isocrono & al. 2004, Hafellner & al. 2004), **VA** (Pierivittori & Isocrono 1999), **Emil**, **Lig**, **C - Tosc**, **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera & al. 2006, 2006b), **Laz** (Nimis & Tretiach 2004), **Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 2004, Caporale & al. 2008), **Sar**, **S - Camp** (Ricciardi & al. 2000, Nimis & Tretiach 2004, Garofalo & al. 2010), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Ottonello & al. 1994).

Cr/ Ch/ S/ Terr/ pH: 3-4, L: 3-4, X: 2-4, E: 1-2/ Alt: 2-5/ Alp: c, Salp: vc, Orom: rc, Mont: rr, SmedD: vr, SmedH: vr/ PT: 1/ Note: a cool-temperate to arctic-alpine, circumpolar lichen found on terricolous mosses and bare calciferous soil, most frequent in upland areas, from the Alps to the high Mediterranean mountains.

Bilimbia microcarpa (Th. Fr.) Th. Fr.

Bot. Not.: 8, 1863 - *Bilimbia obscurata* var. *microcarpa* Th. Fr., N. Acta Reg. Soc. Sci. Upsal., ser. 3, 3: 283, 1861.

Syn.: *Bacidia hypnophila* subsp. *microcarpa* (Th. Fr.) H. Olivier, *Bacidia microcarpa* (Th. Fr.) Lettau, *Lecidea meibola* Nyl., *Mycobilimbia microcarpa* (Th. Fr.) Brunnb., *Myxobilimbia microcarpa* (Th. Fr.) Hafellner

N - Frl (Tretiach & Hafellner 2000, Breuss 2008), **Ven** (Nascimbene 2003b, Thor & Nascimbene 2007, Nascimbene & Marini 2007), **TAA** (Bilovitz & al. 2014b), **Lomb** (UPS-L-160563), **Piem** (TSB 33079), **Lig** (TSB 33043). **C - Abr** (Nimis & Tretiach 1999). **S - Camp** (Aprile & al. 2003b), **Cal** (Puntillo 1996).

Cr/ Ch/ S/ Terr/ pH: 4-5, L: 3-4, X: 3-4, E: 1-2/ Alt: 3-5/ Alp: rr, Salp: rc, Orom: er, Mont: vr/ PT: 1/ Note: an arctic-alpine lichen found on mosses in dry grasslands of upland areas, sometimes on epilithic bryophytes, with optimum near or above treeline. The South Italian records should be checked, but are not excluded, since several "northern" species reach the mountains of Calabria and sometimes of Sicilia.

Bilimbia sabuletorum (Schreb.) Arnold

Verh. zool.-bot. Ges. Wien, 19: 637, 1869 - *Lichen sabuletorum* Schreb., Spicil. Fl. Lips.: 134, 1771.

Syn.: *Bacidia borborodes* (Körb.) Lettau, *Bacidia fuscorubella* var. *propinqua* (Stizenb.) Trevis., *Bacidia hypnophila* (Ach.) Zahlbr., *Bacidia metamorphea* (Nyl.) Lettau, *Bacidia propinqua* (Stizenb.) Arnold, *Bacidia sabuletorum* (Schreb.) Lettau, *Biatora propinqua* Stizenb., *Bilimbia borborodes* Körb., *Bilimbia hypnophila* (Ach.) Th.

Fr., *Bilimbia hexamera* De Not., *Lecidea hypnophila* Ach., *Lecidea sabuletorum* (Schreb.) Ach. non Fr., *Mycobilimbia sabuletorum* (Schreb.) Hafellner, *Myxobilimbia sabuletorum* (Schreb.) Hafellner

N - **VG**, **Frl** (Breuss 2008), **Ven** (Nascimbene & Caniglia 2003c, Nascimbene & Marini 2007, Brackel 2013), **TAA** (De Benetti & Caniglia 1993, Nascimbene 2003, 2005b, 2008b, Brackel 2013), **Lomb** (Rossi & al. 1998), **Piem** (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999), **Emil** (Nimis & al. 1996), **Lig. C** - **Tosc** (Tretiach & Nimis 1994, Benesperi & al. 2007, Tretiach & al. 2008, Benesperi 2011), **Marc** (Nimis & Tretiach 1999), **Umb** (Panfili 2000, Ravera & al. 2006), **Laz** (Ravera 2001, Nimis & Tretiach 2004, Brackel 2015), **Abr** (Nimis & Tretiach 1999, Corona & al. 2016), **Mol** (Nimis & Tretiach, 1999, 2004, Caporale & al. 2008), **Sar** (Zedda 2002, 2002b), **S** - **Camp** (Nimis & Tretiach 2004, Garofalo & al. 2010), **Pugl**, **Bas** (Bartoli & Puntillo 1998, Nimis & Tretiach 1999, Potenza 2006), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994, Ottonello & Salone 1994, Ottonello & al. 1994, Grillo 1998, Grillo & Caniglia 2004).

Cr/ Ch/ S/ Terr/ pH: 3-4, L: 2-4, X: 2-3, E: 2-3/ Alt: 1-5/ Alp: vr, Salp: r, Orom: er, Mont: rr, SmedD: c, Pad: rc, SmedH: c, MedH: rc, MedD: er/ PT: 1-3/ Note: a holarctic, mainly temperate lichen found on mosses overgrowing soil, calciferous rocks and tree bark, also found in urban areas (e.g. on walls), with a wide altitudinal range. For synonymies see Ekman (1996).

Blastenia A. Massal.

Synopsis *Lichenum Blastenosporum*: 573, 1852.

This genus was originally described to accommodate species with biatorine apothecia, a character that cannot however, be used as diagnostic. In the molecular revision of the Teloschistaceae by Arup & al. (2013) it forms a well-supported clade of fairly similar species characterised by a grey crustose thallus, rusty orange apothecia, and similar secondary chemistry. According to Vondrák (*in litt.*) several changes are to be expected in this genus in the near future. See also note on *Athallia*. Type: *B. ferruginea* (Huds.) A. Massal.

Blastenia ammiopila (Ach.) Arup, Søchting & Frödén

Nord. J. Bot., 31: 67, 2013 - *Lecidea ammiopila* Wahlenb. ex Ach., Meth. Lich. Suppl.: 13, 1803.

Syn.: *Blastenia ferruginea* var. *musciicola* (Schaer.) A. Massal., *Calloposma caesiorufum* var. *ammiopilum* (Ach.) Jatta, *Caloplaca ammiopila* (Ach.) H. Olivier, *Caloplaca caesiorufa sensu* Jatta *p.p.*, *Caloplaca cinnamomea* (Th. Fr.) H. Olivier, *Caloplaca discoidalis* (Vain.) Lynge, *Caloplaca ferruginea* f. *vacillans* Th. Fr., *Caloplaca ferruginea* var. *ammiopila* (Ach.) Th. Fr., *Caloplaca ferruginea* var. *cinnamomea* Th. Fr., *Caloplaca ferruginea* var. *musciicola* auct., *Caloplaca vacillans* (Th. Fr.) H. Magn.

N - **Frl** (Tretiach & Hafellner 2000), **Ven** (Caniglia & al. 1999, Nascimbene & Caniglia 2003c, Nascimbene & Marini 2007, Nascimbene 2008c), **TAA** (Nascimbene & al. 2007b, Nascimbene 2008b, Bilovitz & al. 2014, 2014b), **Lomb**, **Piem** (TSB 34121), **VA** (Piervittori & Isocrono 1997, 1999), **Emil** (Dalle Vedove & al. 2002). **C** - **Tosc** (Benesperi 2007, Benesperi & al. 2007).

Cr/ Ch/ S/ Terr-Lign-Epiph/ pH: 2-4, L: 4, 3, 2-3/ Alt: 4-5/ Alp: vc, Salp: rr/ PT: 1/ Note: a mainly arctic-alpine to boreal-montane, bipolar lichen found on terricolous mosses and plant debris, more rarely on decaying, rather soft lignum, or even on the bark of subalpine shrubs and boreal trees (Vondrák *in litt.*), most frequent above or near treeline.

Blastenia coralliza (Arup & Åkelius) Arup, Søchting & Frödén

Nord. J. Bot., 31: 67, 2013 - *Caloplaca coralliza* Arup & Åkelius, Lichenologist, 41: 471, 2009.

Syn.: *Blastenia viperæ* Zahlbr., *Caloplaca viperæ* (Zahlbr.) H. Olivier

N - **Emil** (Arup & Åkelius 2009). **C** - **Tosc** (Arup & Åkelius 2009), **Sar** (B 60 0104628). **S** - **Cal** (Herb. Vondrák 10876), **Si** (Herb. Malíček 7591).

Cr/ Ch/ A.i/ Epiph-Lign/ pH: 2-3, L: 3-4, X: 3, E: 3-4/ Alt: 1-3/ Mont: vr, SmedD: vr, SmedH: vr, MedH: vr, MedD: vr/ PT: 1-2/ Note: a recently-described species, more frequent at lower altitudes than *B. herbidella*. It might be that several samples of *B. herbidella* found outside the Alps could belong to this taxon: the Italian material badly needs revision.

Blastenia crenularia (With.) Arup, Søchting & Frödén

Nord. J. Bot., 31: 67, 2013 - *Lichen crenularius* With., Bot. Arrang. Brit. Pl., ed. 3, 4, 22: 405, tab. 31, fig. 5, 1796.

Syn.: *Blastenia ferruginea* var. *contigua* A. Massal., *Blastenia ferruginea* var. *festiva* (Ach.) A. Massal., *Blastenia ferruginea* var. *plumbea* A. Massal., *Blastenia ferruginea* var. *saxicola* A. Massal., *Blastenia festiva* (Ach.) A. Massal., *Blastenia koerberiana* A. Massal., *Calloposma ferrugineum* var. *decussatum* Bagl., *Calloposma ferrugineum* var. *inarimense* Jatta?, *Caloplaca contigua* (A. Massal.) Mig., *Caloplaca crenularia* (With.) J.R. Laundon, *Caloplaca ferruginea* var. *festiva* (Ach.) Th. Fr., *Caloplaca festiva* (Ach.) Zwackh, *Caloplaca festiva* f. *convexa* (B. de Lesd.) Zahlbr., *Caloplaca festiva* f. *fuscuscula* (Lamy) H. Olivier, *Caloplaca festiva* var. *depauperata* H. Magn., *Caloplaca sbarbaronis* B. de Lesd., *Placodium ferrugineum* var. *festivum* (Ach.) A.L. Sm.

N - **VG** (Castello 2002, Martellos & Castello 2004), **Frl**, **Ven** (Lazzarin 2000b), **TAA**, **Lomb** (De Vita & Valcuvia 2004), **Piem** (Isocrono & al. 2004, Isocrono & Piervittori 2008), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Piervittori & al. 2004, Matteucci & al. 2008c, 2015c), **Emil** (Tretiach & al. 2008), **Lig** (Brunialti & al. 1999, Valcuvia & al. 2000). **C** - **Tosc** (Pišút 1997, Benesperi 2006, Tretiach & al. 2008), **Umb** (Genovesi & al. 2002, Ravera & al. 2006, Genovesi 2011), **Laz** (Gigante & Petriccione 1995, Genovesi & al. 2011, Zucconi & al. 2013), **Abr** (Nimis & Tretiach 1999), **Mol** (Garofalo & al. 1999, Caporale & al. 2008), **Sar** (Monte 1993, Nöske 2000, Rizzi & al. 2011, Giordani & al. 2013, Cossu & al. 2015). **S** - **Camp** (Garofalo & al. 1999, Aprile & al. 2002, Nimis & Tretiach 2004), **Pugl** (Garofalo & al. 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Ottonello & al. 1994, Poli & al.

1995, Nimis & al. 1996b, Ottonello & Romano 1997, Grillo 1998, Poli & Grillo 2000, Grillo & al. 2001, Grillo & Caniglia 2004, Merlo 2004b, Brackel 2008b, Cataldo & Cannavò 2014).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 3-5, X: 3-4, E: 2-4/ Alt: 1-3/ Mont: vr, SmedD: rc, Pad: er, SmedH: ec, MedH: ec, MedD: vc/ PT: 1-2/ Note: a temperate to subtropical species found on a wide variety of siliceous rocks, on horizontal to weakly inclined faces, very heterogeneous, and in need of revision. According to Vondrák (*in litt.*), records of *B. crenularia* from (sub-)Alpine habitats belong to a still undescribed species (*B. psychrophila ined.*), which is known from Veneto, Piemonte, and Toscana (Abetone).

Blastenia ferruginea (Huds.) A. Massal.

Flora, 35: 574, 1852 - *Lichen ferrugineus* Huds., Fl. Angl.: 444, 1762.

Syn.: *Biatora ferruginea* (Huds.) Fr., *Blastenia ferruginea* var. *corticicola* (Flot.) Anzi, *Calloplisma ferrugineum* (Huds.) Trevis., *Caloplaca aurantiaca* (Lightf.) Th. Fr. *non auct.*, *Caloplaca ferruginea* (Huds.) Th. Fr., *Placodium ferrugineum* (Huds.) Hepp

N - **VG** (Castello 1996, Castello & Skert 2005), **Frl, Ven** (Nascimbene & Caniglia 1997, 2002c, 2003c, Caniglia & al. 1999, Lazzarin 2000, Nascimbene 2005c, Nascimbene & al. 2006e, Nascimbene & Marini 2007, Nascimbene & Marini 2010), **TAA** (De Benetti & Caniglia 1993, Nascimbene & Caniglia 2000b, Nascimbene 2003, 2005b, Nascimbene & al. 2006e, 2007b, Nimis & al. 2015), **Lomb** (Arosio & Rinaldi 1995, Alessio & al. 1995, 2003, Zocchi & al. 1997, Valcuvia & al. 2003), **Piem** (Piervittori 2003, Isocrono & al. 2004), **VA** (Piervittori & Maffei 1996, Piervittori & Isocrono 1999, Matteucci & al. 2008), **Emil** (Gasparo & Tretiach 1996, Nimis & al. 1996, Benesperi 2009), **Lig** (Valcuvia & al. 2010, Giordani & al. 2002, Brunialti & Giordani 2003, Giordani 2006, Giordani & Incerti 2008). **C - Tosc** (Tretiach & Nimis 1994, Loppi & al. 1996c, 1997, 1998, 1998b, 1999a, 2002, 2002b, 2002c, 2004c, Loppi & Nascimbene 1998, 2010, Putorti & al. 1998, Tretiach & Ganis 1999, Putorti & Loppi 1999b, Benesperi 2000a, 2011, Loppi & Pirintsos 2000, Paoli & Loppi 2001, Brunialti & Frati 2010, Loppi & Baragatti 2011, Paoli & al. 2012, Nascimbene & al. 2012, 2015, Brackel 2015), **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera 1998, Nimis & Tretiach 1999, Panfili 2000b, 2007, Ravera & al. 2006), **Laz** (Bartoli & al. 1997, Massari & Ravera 2002, Nimis & Tretiach 2004, Ruisi & al. 2005, Ravera & Genovesi 2008, Zucconi & al. 2013, Brackel 2015), **Abr** (Recchia & al. 1993, Olivieri & al. 1997, 1997b, Loppi & al. 1999, Nimis & Tretiach 1999, Caporale & al. 2016), **Mol** (Garofalo & al. 1999, Nimis & Tretiach 1999, Caporale & al. 2008, Paoli & al. 2011, 2015, Genovesi & Ravera 2014), **Sar** (Zedda 1995, 2002, 2002b, Zedda & Sipman 2001, Zedda & al. 2001, Rizzi & al. 2011, Cossu 2013). **S - Camp** (Garofalo & al. 1999, 2010, Ricciardi & al. 2000, Aprile & al. 2002, 2003, 2003b, 2011, Nimis & Tretiach 2004, Catalano & al. 2012, 2016, Brunialti & al. 2013, Ravera & Brunialti 2013), **Pugl** (Garofalo & al. 1999, Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999, Potenza 2006, Potenza & al. 2010, Brackel 2011), **Cal** (Puntillo 1995, 1996, Puntillo & Puntillo 2004, Incerti & Nimis 2006), **Si** (Grillo & al. 1996, Grillo 1998, Grillo & Caniglia 2004, Caniglia & Grillo 2006b, Brackel 2008b, Liistro & Cataldo 2011).

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 4-5, X: 3, E: 1-3/ Alt: 1-3/ Mont: er, SmedD: rc, Pad: er, SmedH: rc, MedH: r, MedD: er/ PT: 1-2/ Note: a mild-temperate species, with optimum on oaks in the submediterranean belt, absent from heavily disturbed areas. Several saxicolous records from Val d'Aosta, cited by Piervittori & Isocrono (1999) refer to other species. According to Vondrák (*in litt.*) three widespread species looking like "*B. ferruginea*" are known from Europe. Two of them are probably absent from Italy, most of the records being from oceanic Europe and Macaronesia. The species common in Italy (several records with DNA sequence data) has a mainly Mediterranean distribution, reaching southern England and central Europe (no recent records from Germany), and does not belong to *B. ferruginea sensu* Arup & al. (2013).

Blastenia herbidella (Hue) Servít

Hedwigia, 74: 148, 1934 - *Lecidea caesiorufa* f. *herbidella* Nyl. ex Hue, Nouv. Arch. Mus., sér. 5, 3: 151, 1913.

Syn.: *Caloplaca caesiorufa* auct. ital. p.p. *Caloplaca herbidella* (Hue) H. Magn.

N - **VG** (Castello 1996), **Frl, Ven** (Lazzarin 1997, Nascimbene & Caniglia 2002, 2003c, Nascimbene 2005c, 2008c, Nascimbene & al. 2006e, Thor & Nascimbene 2007, Nascimbene & Marini 2007), **TAA** (Nascimbene & Caniglia 2000b, Caniglia & al. 2002, Nascimbene 2003, 2005b, 2006b, 2006c, 2013, 2014, Nascimbene & al. 2005, 2006, 2006e, 2007b, 2008b, 2009, 2010, 2014, Thor & Nascimbene 2007, Arup & Åkelius 2009, Obermayer 2011, Nimis & al. 2015), **Lomb** (Dalle Vedove & al. 2004), **Piem, VA** (Matteucci & al. 2008), **Emil** (Gasparo & Tretiach 1996, Nimis & al. 1996, Tretiach & al. 2008), **Lig** (Giordani & Incerti 2008). **C - Tosc** (Tretiach & Nimis 1994, Loppi 1996, 1996b, Loppi & De Dominicis 1996, Loppi & al. 1997, 1999a, Putorti & Loppi 1999b, Loppi & Frati 2006, Benesperi & al. 2007, Benesperi 2011), **Marc** (Nimis & Tretiach 1999, Frati & al. 2004, Frati & Brunialti 2006), **Umb** (Ravera 1998, Ravera & al. 2006), **Laz** (Bartoli & al. 1997, Ravera 2001, 2002, Nimis & Tretiach 2004, Ruisi & al. 2005), **Abr** (Stofer 2006, Corona & al. 2016), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008, Ravera & al. 2010), **Sar** (Zedda 1995, 2002, 2002b, Zedda & Sipman 2001, Arup & Åkelius 2009, Rizzi & al. 2011, Cossu 2013). **S - Camp** (Ricciardi & al. 2000, Aprile & al. 2003, 2003b, 2011, Garofalo & al. 2010, Blasi & al. 2010, Brunialti & al. 2013, Ravera & Brunialti 2013, Catalano & al. 2016), **Bas** (Puntillo & al. 2012), **Pugl** (Nimis & Tretiach 1999, Arup & Åkelius 2009), **Cal** (Puntillo 1996), **Si** (Grillo 1996, Arup & Åkelius 2009).

Cr/ Ch/ A.i/ Epiph-Lign/ pH: 2-3, L: 3-4, X: 3, E: 3-4/ Alt: 1-4/ Salp: er, Mont: vr, SmedD: er, SmedH: vr, MedH: er/ PT: 1-2/ suboc/ Note: a species found on bark, especially on basal parts of trunks, more rarely on lignum. Populations from southern Italy found in the Mediterranean zone (*e.g.* on *Olea* and *Juniperus*) could prove to belong to *B. coralliza*. According to Vondrák (*in litt.*) this species has a broadly Mediterranean distribution and is absent from America, with the easternmost limit in the Caucasus and an isolated population in the Urals, while there are some other (mostly undescribed) species which are acidophilous, growing typically on conifers and lignum, some of which also occur in Italy. The species is included in the Italian red list of epiphytic lichens as "Near-threatened" (Nascimbene & al. 2013c).

Blastenia hungarica (H. Magn.) Arup, Søchting & Frödén

Nord. J. Bot., 31: 68, 2013 - *Caloplaca hungarica* H. Magn., Göteb. K. Vetensk. Vitterh. Samh. Handl., ser. B, 6, 1: 28, 1944.

Syn.: *Caloplaca depauperata* H. Magn. non (Müll. Arg.) Zahlbr., *Caloplaca ferruginea* var. *hungarica* (H. Magn.) Clauzade & Cl. Roux

N - **Fri** (TSB 3596), **Ven** (vidi!), **TAA** (Hinteregger 1994, Nascimbene & al. 2007b), **Lomb**, **Piem** (Matteucci & al. 2013), **VA** (Matteucci & Vanacore Falco 2015), **Lig** (TSB 33603). **C** - **Tosc** (Loppi & al. 1997c, 1999a), **Laz** (Bartoli & al. 1997), **Sar** (Zedda & Sipman 2001, Zedda 2002, Rizzi & al. 2011, Cossu 2013).

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 4, X: 3, E: 2-3/ Alt: 2-4/ Salp: vr, Mont: r, SmedD: vr, SmedH: r, MedH: r/ PT: 1/ Note: a temperate to boreal-montane lichen found on twigs of acid-barked trees, incl. oaks and *Larix*, perhaps overlooked, or confused with *C. ferruginea* in the past, but not common in Italy as e.g. in the Iberian Peninsula, perhaps because of its subcontinental character. According to Vondrák (*in litt.*) the species, as currently understood, is not homogeneous: morphologically identical populations growing in Mediterranean habitats at low altitudes belong to "*Blastenia xerothermica ined.*", which has a strictly Mediterranean distribution and is quite common in Italy. Several samples from lowland areas in Liguria and central-southern Italy might refer to this still undescribed taxon.

Blastodesmia A. Massal.

Ric. Auton. Lich. Crost.: 180, 1852.

A monotypic genus presently included into the Pyrenulaceae, with a doubtfully lichenised epiphytic species. For further details see Aptroot (2012). Type: *B. nitida* A. Massal.

Blastodesmia nitida A. Massal.

Ric. Auton. Lich. Crost.: 180, 1852.

Syn.: *Polyblastia nitida* (A. Massal.) Trevis., *Pyrenula circumfusa* (Nyl.) Trevis., *Verrucaria massalongii* Garov., *Verrucaria circumfusa* Nyl.

N - **VG**, **Fri**, **Ven** (Lazzarin 2000b), **TAA** (Nascimbene & al. 2007b), **Lomb**, **Emil**. **C** - **Tosc**, **Laz**, **Abr** (Nimis & Tretiach 1999, Caporale & al. 2016). **S** - **Si**.

Cr/ Tr/ S/ Epiph/ pH: 3, L: 3-4, X: 3, E: 1-2/ Alt: 1-2/ SmedD: vr, SmedH: r, MedH: vr/ PT: 1/ suboc, p/ Note: a typically submediterranean early coloniser of smooth bark, especially of *Fraxinus ornus*, doubtfully lichenised.

Blennothallia Trevis.

Caratt. tre Nuov. Gen. Collem.: 2, 1853.

A molecular study of the Collemataceae genera *Collema* and *Leptogium* by Otálora & al. (2014) has led to their re-circumscription, with six old generic names resurrected to accommodate the *Collema crispum*-group (*Blennothallia*), the *C. tenax*-group (*Enchylium*), the *C. cristatum*-group (*Lathagrium*), the *C. occultatum*-group (*Rostania*), the former small *Leptogium* species (*Scytinium*), and *L. diffractum* (*Pseudoleptogium*). In addition, two new genera were described to accommodate *Collema multipartitum* (*Callome*) and the *C. italicum*-group (*Paracollema*). *Blennothallia* includes 4 species with a worldwide distribution but predominantly occurring in temperate regions. The genus is characterised by the distinct, partially paraplectenchymatous thallus anatomy, and corresponds to the *Collema crispum*-group of earlier authors. It is more closely related to *Scytinium* than to *Collema* in the strict sense, forming a well-supported lineage together with *Scytinium* and *Lathagrium*. Type: *B. cheilea* (Ach.) Trevis. (= *B. crispa*).

Blennothallia crispa (Huds.) Otálora, P.M. Jørg. & Wedin

Fungal Divers., 64: 282, 2014 - *Lichen crispus* Huds., Fl. Angl.: 447, 1762.

Syn.: *Blennothallia cheilea* (Ach.) Trevis., *Collema anemoides* Samp.?, *Collema brutium* (Jatta) Jatta, *Collema cheileum* (Ach.) Ach., *Collema cheileum* var. *brutium* Jatta, *Collema conchilobum* (Flot.) Körb., *Collema crispum* (Huds.) F.H. Wigg., *Collema crispum* var. *metzleri* (Arnold) Degel., *Collema granulorum* Hoffm., *Collema marginale* (Huds.) Hoffm., *Collema platycarpum* Durieu & Mont., *Homodium subcuspidans* Nyl.

N - **VG**, **Fri** (Tretiach & Molaro 2007), **Ven**, **TAA**, **Lomb**, **Piem** (Isocrono & al. 2004, Isocrono & Piervittori 2008), **VA** (Piervittori & Isocrono 1999), **Emil** (Nimis & al. 1996), **Lig** (Valcuvia & al. 2000, Watson 2014, Giordani & al. 2016). **C** - **Tosc** (Brackel 2015), **Umb** (Panfili 2000, 2000b, 2007, Ravera & al. 2006), **Marc**, **Laz** (Nimis & Tretiach 2004, Brackel 2015), **Abr**, **Mol** (Ravera & Genovesi 2010), **Sar**. **S** - **Camp** (Altieri & al. 2000, Aprile & al. 2003, 2003b, Roccardi & Ricci 2006, Garofalo & al. 2010, Catalano & al. 2016), **Pugl** (Nimis & Tretiach 1999), **Bas** (Potenza 2006, Brackel 2011, Potenza & Fascetti 2012), **Cal** (Puntillo 1996, Puntillo & Puntillo 2004), **Si** (Nimis & al. 1994, 1995, Ottonello & Salone 1994, Ottonello & al. 1994, Ottonello 1996, Poli & al. 1997, Grillo 1998, Caniglia & Grillo 2001, 2005, 2006, Grillo & al. 2002, Grillo & Caniglia 2004).

Fol.b/ Cy.h/ S/ Sax-Terr/ pH: 3-4, L: 4, X: 3, E: 2-4/ Alt: 1-3/ Mont: er, SmedD: vr, SmedH: rr, MedH: rc, MedD: r/ PT: 1-2/ Note: a mainly mild-temperate lichen found both on calcareous rocks and soil, often in rather disturbed habitats such as walls in villages below the subalpine belt; most common in central and southern Italy; the mostly saxicolous, smaller var. *metzleri* - in my opinion - is hardly worth of an independent taxonomic rank.

Blennothallia furfureola (Müll. Arg.) Otálora, P.M. Jørg. & Wedin
Fungal Divers., 64: 282, 2014 - *Collema furfureolum* Müll. Arg., Flora, 72: 142, 1889.
Syn.: *Collema sublaeve* (Jatta) Zahlbr.

S - Pugl, Si.

Fol.n/ Cy.h/ Sax/ pH: 4-5, L: 4-5, X: 3, E: 1-2/ Alt: 1-2/ SmedH: er, MedH: er, MedD: er/ PT: 1/ Note: this species, related to *C. crispum*, was described from Asia. All European records derive from Degelius (1986), and - in my opinion - they require further study.

Botryolepraria Canals, Hern.-Mar., Gómez-Bolea & Llimona
Lichenologist, 29: 340, 1997.

This originally monotypic genus which now includes 2 species was segregated from *Lepraria* on the basis of the byssoid or granular, cottony thallus consisting of free hyphae crowned by subterminal photobiont cells, which are clustered in grape-like aggregations, the lack of typical soredia, and the production of the terpenoid lesdainin (Canals & al. 1997). Molecular data confirm that it is phylogenetically distant from *Lepraria s.str.* (Ekman & Tønsberg 2002), although it belongs to the Verrucariaceae (Kukwa & Pérez-Ortega 2010). Type: *B. lesdainii* (Hue) Canals, Hernández-Mariné, Gómez-Bolea & Llimona

Botryolepraria lesdainii (Hue) Canals, Hern.-Mar., Gómez-Bolea & Llimona
Lichenologist, 29: 340, 1997 - *Crocynia lesdainii* Hue, Bull. Soc. Bot. France, 71: 350, 1924.
Syn.: *Crocynia grevilleana* B. de Lesd., *Lepraria lesdainii* (Hue) R.C. Harris

N - VG (Baruffo & al. 2006), **Frl** (Baruffo & al. 2006), **Ven** (Thor & Nascimbene 2007), **Lomb** (Baruffo & al. 2006), **Emil** (Baruffo & al. 2006). **C - Tosc** (Baruffo & al. 2006), **Sar** (Kümmerling & Leuckert 1993, Baruffo & al. 2006). **S - Si** (Kümmerling & Leuckert 1993, Grillo 1998, Grillo & al. 2001, Grillo & Caniglia 2004, Baruffo & al. 2006).

Lepr/ Ch/ A.s/ Sax-Epiph/ pH: 3-5, L: 1-2, X: 2-3, E: 1/ Alt: 1-3/ Mont: r, SmedD: rr, SmedH: rr, MedH: rr, MedD: er/ PT: 1-2/ suboc, u/ Note: on limestone, calcareous sandstone, epilithic mosses and soil, sometimes on walls, especially in fissures, in sites protected from rain, certainly much more common throughout Italy below the subalpine belt. According to Baruffo & al. (2006) this is the most shade-loving among all species of *Lepraria s.lat.*

Brianaria S. Ekman & M. Svenss.
Lichenologist, 46: 292, 2014.

This recently-described genus was created to accommodate the *Micarea sylvicola* group, with so far 4 species known from the Northern Hemisphere. It is characterised by a chlorococcoid, non-micareoid photobiont, small, convex apothecia without an excipulum, asci of the *Psora*-type, 0-1-septate ascospores, dimorphic paraphyses, and immersed pycnidia containing bacilliform conidia. It forms a monophyletic group in the Psoraceae, where it is probably the sister group to *Psora* and *Protoblastenia*. For further details see Ekman & Svensson (2014). Type: *B. sylvicola* (Flot.) S. Ekman & M. Svenss.

Brianaria bauschiana (Körb.) S. Ekman & M. Svenss.
Lichenologist, 46: 292, 2014 - *Biatora bauschiana* Körb., Parerga Lichenol.: 157, 1860.

Syn.: *Biatora rusticella* (Nyl.) Walt. Watson, *Biatora semipallens* (Nyl.) Walt. Watson, *Catillaria microspora* Maslowa, *Lecidea bauschiana* (Körb.) Lettau, *Lecidea dilutiuscula* Nyl., *Lecidea infidula* Nyl., *Lecidea lynceola* Th. Fr., *Lecidea rusticella* Nyl., *Lecidea semipallens* Nyl., *Lecidea sylvicola* var. *infidula* (Nyl.) Leight., *Micarea bauschiana* (Körb.) V. Wirth & Vězda

N - Ven (Nascimbene & al. 2005b), **TAA**, **Lomb** (UPS-L-166809), **Lig. S - Cal** (Puntillo 1995, 1996).

Cr/ Ch/ S/ Sax-Epiph-Terr/ pH: 2-4, L: 2-3, X: 3, E: 1/ Alt: 2-3/ Mont: r, SmedD: vr/ PT: 1/ suboc, u/ Note: on a wide variety of substrata (rocks, exposed roots, consolidated soil) in shaded-dry situations (e.g. in underhangs), but restricted to humid areas. Probably overlooked and more widespread, especially in the Alps.

Brianaria lutulata (Nyl.) S. Ekman & M. Svenss.
Lichenologist, 46: 292, 2014 - *Lecidea lutulata* Nyl., Flora, 56: 297, 1873.

Syn.: *Biatora anthrophila* (Larbal. ex Leight.) Walt. Watson, *Lecidea anthrophila* Leight., *Lecidea laxula* Nyl., *Lecidea paucula* Nyl., *Lecidea poliodes* Nyl., *Micarea lutulata* (Nyl.) Coppins, *Micarea polioides* (Nyl.) Vězda, *Micarea umbrosa* Vězda & V. Wirth

N - Frl (Tretiač 2004), **VA** (Isocrono & al. 2008, Favero-Longo & Piervittori 2009).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 2-4, X: 2, E: 1/ Alt: 2-4/ Mont: er, SmedD: er/ PT: 1/ u, m/ Note: on siliceous, often metal-rich rocks in dry and sheltered underhangs, in humid natural habitats.

Brianaria sylvicola (Körb.) S. Ekman & M. Svenss.
Lichenologist, 46: 292, 2014 - *Lecidea sylvicola* Flot. ex Körb., Syst. Lich. Germ.: 254, 1855.

Syn.: *Biatora smaragdina* Arnold, *Biatora sylvicola* (Körb.) Müll. Arg., *Lecidea aggerata* Mudd, *Lecidea hellbomii* J. Lahm, *Lecidea hypocyanea* Vain. non Stirt., *Lecidea incincta* Nyl., *Lecidea sylvicola* var. *hellbomii* (J. Lahm.) Leight., *Lecidea vainioi* H. Magn., *Micarea sylvicola* (Körb.) Vězda & V. Wirth

N - Frl (Tretiach & Hafellner 2000), **TAA, Lomb, VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999), **Lig** (Brunialti & al. 1999). **C - Tosc.**

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 1-2, X: 2, E: 1/ Alt: 2-4/ Salp: r, Orom: vr, Mont: rr, SmedD: er, SmedH: r/ PT: 1/ u, p/ Note: on shaded, humid, underhanging surfaces of siliceous rocks, e.g. in forests; largely misunderstood and overlooked in Italy.

Brianaria tuberculata (Sommerf.) S. Ekman & M. Svenss.

Lichenologist, 46: 292, 2014 - *Lecidea tuberculata* Sommerf., Suppl. Fl. Lapp.: 160, 1826.

Syn.: *Lecidea botryocarpa* Nyl., *Lecidea latens* Taylor, *Lecidea subinfidula* Nyl., *Micarea tuberculata* (Sommerf.) R.A. Anderson

N - TAA (Nascimbene & al. 2007b).

Cr/ Ch/ S/ Sax-Epiph/ pH: 2, L: 2-3, X: 2, E: 1/ Alt: 2-5/ Alp: er, Salp: vr, Mont: vr, SmedD: er/ PT: 1/ u/ Note: on siliceous rocks in humid forests, but also on exposed roots, in underhangs.

Brodoa Goward Bryologist, 89: 222, 1986.

A genus of the Parmeliaceae including 3 species with an arctic-alpine distribution in the Northern Hemisphere, segregated from *Hypogymnia* to accommodate the species of the former section *Solidae*. Type: *B. oroarctica* (Krog) Goward

Brodoa atrofusca (Schaer.) Goward

Bryologist, 89: 222, 1986 - *Parmelia ceratophylla* var. *atrofusca* Schaer., Enum. Crit. Lich. Eur.: 42, 1850.

Syn.: *Hypogymnia atrofusca* (Schaer.) Räsänen, *Hypogymnia intestiniformis* var. *atrofusca* (Schaer.) Poelt, *Parmelia atrofusca* (Schaer.) Cromb., *Parmelia intestiniformis* var. *atrofusca* (Schaer.) Hasselrot

N - Frl (Tretiach & Hafellner 2000), **Ven, TAA, Lomb** (Nascimbene 2006), **Piem** (Morisi & Sereno 1995, Isocrono & al. 2004, 2006, Isocrono & Piervittori 2008), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Piervittori & al. 2001, 2004, Isocrono & al. 2008, Favero-Longo & Piervittori 2009). **C - Sar.**

Fol. n/ Ch/ S/ Sax/ pH: 1-2, L: 4-5, X: 4, E: 2-4/ Alt: 3-6/ Alp: rr, Salp: vr, Orom: r, Mont: er/ PT: 1/ Note: on wind-exposed surfaces of acid siliceous rocks wetted by rain near or above treeline; less bound to situations with a long snow cover than *B. intestiniformis*.

Brodoa intestiniformis (Vill.) Goward

Bryologist, 89: 222, 1986 - *Lichen intestiniformis* Vill., Hist. Pl. Dauphiné, 3: 947, 1789.

Syn.: *Hypogymnia encausta* (Sm.) Walt. Watson, *Hypogymnia intestiniformis* (Vill.) Räsänen, *Imbricaria encausta* (Sm.) DC., *Menegazzia encausta* (Sm.) Navàs, *Parmelia ceratophylla* var. *multipuncta* (Ehrh.) Schaer., *Parmelia encausta* (Sm.) Nyl., *Parmelia encausta* var. *multipuncta* (Ehrh.) Th. Fr., *Parmelia intestiniformis* (Vill.) Ach.

N - Frl (Tretiach & Hafellner 2000), **Ven, TAA** (Caniglia & al. 2002, Nascimbene & Caniglia 2002c, Nascimbene 2006c, Lang 2009), **Lomb** (Rivellini 1994, Dalle Vedove & al. 2004), **Piem** (Morisi & Sereno 1995, Isocrono & Falletti 1999, Isocrono & al. 2003, 2004, 2006, Morisi 2005, Isocrono & Piervittori 2008, Favero-Longo & al. 2015), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Isocrono & al. 2008, Watson 2014, Matteucci & al. 2015c), **Emil** (TSB 35559). **C - Sar. S - Cal** (Puntillo 1996).

Fol. n/ Ch/ S/ Sax/ pH: 1-2, L: 4, X: 3, E: 2-4/ Alt: 4-5/ Alp: rc, Salp: c, Orom: vr/ PT: 1/ Note: an arctic-alpine to boreal-montane, circumpolar lichen found in more sheltered and less wind-exposed situations than *B. atrofusca*, on faces of acid siliceous rocks with a long snow-cover, with optimum above treeline; most frequent in the Alps, but also present in the high Mediterranean mountains.

Bryobilimbia Fryday, Printzen & S. Ekman Lichenologist, 46: 29, 2014.

This recently-described genus with 5 species includes the former *Lecidea hypnorum* and some closely related taxa. It is still included in the Lecideaceae, but a phylogenetic analysis based on molecular data suggests that the genus is most closely related to a group of genera (including *Clauzadea*, *Farnoldia*, *Lecidoma* and *Romjularia*) that could be excluded from the Lecideaceae *s.str.* (Fryday & al. 2014). Type: *B. hypnorum* (Lib.) Fryday, Printzen & S. Ekman

Bryobilimbia ahlesii (Körb.) Fryday, Printzen & S. Ekman

Lichenologist, 46: 29, 2014 - *Biatora ahlesii* Körb., Parerga Lichenol.: 161, 1860.

Syn.: *Biatora valentior* (Nyl.) Walt. Watson, *Lecidea ahlesii* (Körb.) Nyl., *Lecidea valentior* Nyl.

C - Tosc.

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 2-4, X: 1-3, E: 1/ Alt: 1-2/ SmedD: er, SmedH: er, MedH: er/ PT: 1/ Note: on periodically inundated siliceous rocks in lowland areas. The record from Italy (see Nimis 1993: 377) is dubious.

Bryobilimbia hypnorum (Lib.) Fryday, Printzen & S. Ekman

Lichenologist, 46: 31, 2014 - *Lecidea hypnorum* Lib., Pl. Crypt. Arduen., 1: nr. 12, 1830.

Syn.: *Biatora atrofusca* Flot. ex Hepp, *Biatora atrofusca* var. *templetonii* (Taylor) Walt. Watson, *Biatora cartilaginea* Lönnr., *Biatora fusca* var. *atrofusca* (Hepp) Oxner, *Biatora fusca* var. *tristior* (Nyl.) Hellb., *Lecidea atrofusca* (Hepp) Mudd, *Lecidea sanguineoatra sensu* Nyl. non (Wulfen) Ach., *Lecidea sanguineoatra* var. *templetonii* (Taylor) Vain., *Lecidea templetonii* Taylor, *Mycobilimbia hypnorum* (Lib.) Kalb & Hafellner

N - **VG, Frl** (Tretiach & Hafellner 2000, Breuss 2008), **Ven** (Nimis 1994, Caniglia & al. 1999, Nascimbene & Caniglia 2003c, Nascimbene 2005c, 2008c, Thor & Nascimbene 2007, Nascimbene & Marini 2007, Brackel 2013), **TAA** (Nascimbene & al. 2006, 2007b, 2008c, Bilovitz & al. 2014, 2014b, Nimis & al. 2015), **Lomb, Piem** (Isocrono & al. 2004), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999), **Emil** (Dalle Vedove & al. 2002, Watson 2014), **Lig. C** - **Tosc** (Benesperi & al. 2007), **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera & al. 2006, 2006b), **Laz** (Ravera 2002b), **Sar** (Zedda 2002, 2002b). **S** - **Camp** (Ricciardi & al. 2000, Nimis & Tretiach 2004), **Pugl, Cal** (Puntillo 1996, Puntillo & Puntillo 2004), **Si** (Nimis & al. 1994).

Cr/ Ch/ S/ Terr-Epiph/ pH: 2-4, L: 3-4, X: 3, E: 1-3/ Alt: 2-5/ Alp: rr, Salp: rc, Orom: vr, Mont: r, SmedD: er, SmedH: er/ PT: 1/ Note: a cool-temperate to arctic-alpine, probably circumpolar lichen found on mosses, plant debris, soil, bark and lignum, especially in upland areas with calcareous substrata.

Bryobilimbia sanguineoatra (Wulfen) Fryday, Printzen & S. Ekman

Lichenologist, 46: 31, 2014 - *Lichen sanguineoater* Wulfen in Jacq., Coll. Botan., 3: 117, 1789.

Syn.: *Mycobilimbia sanguineoatra* (Wulfen) Kalb & Hafellner nom. inval.

N - **Piem** (TSB 25923). **C** - **Marc** (Nimis & Tretiach 1999), **Sar** (Zedda 2002, 2002b). **S** - **Camp** (Nimis & Tretiach 2004, Garofalo & al. 2010), **Pugl** (Nimis & Tretiach 1999).

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 2-3, X: 2-3, E: 1/ Alt: 2-3/ Mont: r, SmedD: er, SmedH: vr/ PT: 1/ Note: optimum in open humid forests, on mosses at the base of old boles, sometimes on soil.

Bryodina Hafellner

in Hafellner & Türk, Stapfia, 56: 150, 2001.

This monotypic genus of the Lecanoraceae was segregated from the similarly looking *Bryonora*; both genera share the dark lecanorine apothecia, the occurrence on bryophytes at high elevations, and the ability to produce norstictic acid (Hafellner & Türk 2001). *Bryodina*, which is considered as a subgenus of *Bryonora* by Roux & coll. (2014), is primarily distinguished by the distinctly separated hypothecium and excipulum, and by the thin-walled ascospores. Type: *B. rhypariza* (Nyl.) Hafellner & Türk

Bryodina rhypariza (Nyl.) Hafellner & Türk

Stapfia, 76: 150, 2001 - *Lecanora rhypariza* Nyl., Öfvers. K. Svensk. Vetensk.-Akad. Förh.: 296, 1860.

Syn.: *Bryonora rhypariza* (Nyl.) Poelt

N - **TAA, Lomb, Piem** (Isocrono & al. 2004, Isocrono & Piervittori 2008), **VA** (Piervittori & Isocrono 1999).

Cr/ Ch/ S/ Terr/ pH: 1-2, L: 4, X: 2, E: 1-2/ Alt: 4-5/ Alp: rr, Salp: vr/ PT: 1/ Note: a mainly arctic-alpine species found on mosses (*Andreaea*, *Grimmia*) near or above treeline, often associated with cyanobacteria (*Stigonema*); almost certainly restricted to the Alps in Italy.

Bryonora Poelt

Nova Hedwigia, 38: 74, 1983.

This genus of the Lecanoraceae was segregated from *Lecanora* on the basis of the morphology of the apothecia. It consists of c. 11 species occurring on acid substrata (soil, plant debris, mosses), mostly above treeline, and has the highest diversity in the mountains of Central Asia. Type: *B. castanea* (Hepp) Poelt

Bryonora castanea (Hepp) Poelt

Nova Hedwigia, 38: 86, 1983 - *Biatora castanea* Hepp, Flecht. Eur.: nr. 270, 1857.

Syn.: *Lecanora castanea* (Hepp) Th. Fr., *Lecanora castanea* var. *septata* Arnold

N - **Frl** (Tretiach & Hafellner 2000), **Ven, TAA** (Lang 2009), **Lomb, Piem** (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999), **Emil** (TSB 18175).

Cr/ Ch/ S/ Terr/ pH: 2-3, L: 4-5, X: 2, E: 1-2/ Alt: 4-6/ Alp: rc, Salp: rr/ PT: 1/ Note: a mainly arctic-alpine, circumpolar lichen found on soil, mosses, plant remains and on other lichens in Alpine grasslands, mostly in sites with a long snow-lie, on siliceous substrata.

Bryonora curvescens (Mudd) Poelt

Nova Hedwigia, 38: 93, 1983 - *Pannaria curvescens* Mudd, Man. Brit. Lich.: 125, 1861.

Syn.: *Biatora curvescens* Th. Fr., *Lecania curvescens* (Mudd) A.L. Sm., *Lecanora castanea* f. *curvescens* (Mudd) Th. Fr., *Lecanora curvescens* (Mudd) Nyl.

N - **TAA**.

Cr/ Ch/ S/ Terr/ pH: 1-2, L: 4-5, X: 2, E: 1-2/ Alt: 4-5/ Alp: r, Salp: vr/ PT: 1/ Note: an arctic-alpine, circumpolar lichen found on bryophytes (e.g. *Andreaea*, *Grimmia*) in sites with periodic seepage of water, with optimum above treeline on siliceous substrata.

Bryoplaca Søchting, Frödén & Arup
in Arup & al., Nord. J. Bot., 31: 68, 2013.

This is a small genus in the Teloschistaceae, with 3 species mainly growing over mosses and plant debris in regions with a cold climate, recently segregated from *Caloplaca s.lat.* It seems to be very distinct genetically and the closest relatives are not settled with certainty yet (Arup & al. 2013). A further species, *Bryoplaca livida*, here still treated as *Caloplaca livida*, will be formally added to the genus by Arup and collaborators in the near future (Arup *in litt.*). Type: *B. sinapisperma* (DC.) Søchting, Frödén & Arup

Bryoplaca jungermanniae (Vahl) Søchting, Frödén & Arup
in Arup & al., Nord. J. Bot., 31: 68, 2013 - *Lichen jungermanniae* Vahl, Icon. Pl. Daniae, 6, 18: 6, 1792.
Syn.: *Blastenia fuscolutea* (Ach.) A. Massal., *Caloplaca fuscolutea* (Ach.) Th. Fr., *Caloplaca jungermanniae* (Vahl) Th. Fr., *Placodium fuscoluteum* (Ach.) Hepp
N - Ven (Watson 2014), TAA, Lomb, Piem (Ravera & al. 2016). C - Tosc (TSB 35507).

Cr/ Ch/ S/ Terr/ pH: 3-4, L: 3-4, X: 3, E: 1-3/ Alt: 4-5/ Alp: rc, Salp: rr/ PT: 1/ Note: an arctic-alpine, circumpolar species of terricolous bryophytes and plant debris on more or less calciferous substrata near and above treeline, but less common in areas with pure limestone; probably much more widespread in the Alps.

Bryoplaca sinapisperma (DC.) Søchting, Frödén & Arup
in Arup & al., Nord. J. Bot., 31: 68, 2013 - *Patellaria sinapisperma* DC. in Lamarck & de Candolle, Fl. Franç., 3 éd., 2: 349, 1805.

Syn.: *Blastenia leucoraea* (Ach.) Th. Fr., *Blastenia sinapisperma* (DC.) A. Massal., *Caloplaca leucoraea* (Ach.) Branth, *Caloplaca sinapisperma* (DC.) Maheu & A. Gillet, *Lecanora ferruginea* f. *musciicola* Hue, *Lecidea ferruginea* var. *sinapisperma* (DC.) Schaer., *Placodium sinapispermum* (DC.) Hepp

N - Fr1, Ven (Nimis 1994, Nascimbene & Caniglia 1997, 2003c, Caniglia & al. 1999, Nascimbene 2005c, 2008c, Nascimbene & Marini 2007), TAA (Caniglia & al. 2002, Nascimbene & al. 2005, 2006, Nascimbene 2008b), Lomb (Dalle Vedove & al. 2004), Piem (Isocrono & al. 2004), VA. C - Tosc, Umb (Ravera & Di Toma 2003, Ravera & al. 2006), Abr (Nimis & Tretiach 1999).

Cr/ Ch/ S/ Terr/ pH: 3-4, L: 4, X: 3, E: 2-3/ Alt: 3-5/ Alp: rc, Salp: c, Orom: er, Mont: vr/ PT: 1/ Note: a holarctic lichen ranging from the arctic zone to the high southern mountains, found on mosses and plant debris on calcareous or base-rich siliceous substrata, with optimum near or above treeline, sometimes reaching the montane belt in open habitats; common in the Alps, restricted to the highest areas of the Apennines.

Bryoplaca tetraspora (Nyl.) Søchting, Frödén & Arup
in Arup & al., Nord. J. Bot., 31: 68, 2013 - *Lecanora tetraspora* Nyl., Acta Soc. Sci. Fenn., 7: 397, 1863.

Syn.: *Blastenia tetraspora* (Nyl.) Rehm, *Caloplaca oligospora* Th. Fr., *Caloplaca tetraspora* (Nyl.) H. Olivier

N - Fr1 (Tretiach & Hafellner 2000), TAA, Piem (TSB 33121).

Cr/ Ch/ S/ Terr/ pH: 3-4, L: 4, X: 2, E: 1-2/ Alt: 4-5/ Alp: rr, Salp: vr/ PT: 1/ Note: a boreal-montane to arctic-alpine, circumpolar species found on bryophytes and plant debris in areas with base-rich or somehow calciferous siliceous substrata, most frequent above treeline; certainly more widespread in the Alps.

Bryoria Brodo & D. Hawksw.
Opera Bot., 42: 78, 1977.

This genus of the Parmeliaceae, with c. 50 species the largest segregate of *Alectoria s.lat.*, has a mainly boreal-montane distribution and occurs in both Hemispheres. Although conspicuous and frequently collected, *Bryoria* still includes many poorly understood taxa, due to their very high morphological and chemical variability. The genus itself is heterogeneous, and in the future it might be split into different genera (see e.g. Myllys & al. 2014). A revision of Sect. *Implexae* was published by Velmala & al. (2014). Furthermore, Boluda & al. (2015) demonstrated that in Sect. *Bryoria* there is mismatch between haplo- and chemotypes, which renders non-molecular identification almost impossible. Preliminary results from the phylogenetic analysis by Myllys & al. (2016) show that sections *Americanae*, *Divaricatae*, *Implexae* and *Tortuosae* are monophyletic, while section *Bryoria*, being polyphyletic, was provisionally divided into two sections. Recently, the genus has received international attention since it has triggered the discovery of unicellular Basidiomycete yeasts in the cortex of Parmeliaceae (Spribille & al. 2016). Type: *B. trichodes* (Michx.) Brodo & D. Hawksw.

Bryoria bicolor (Ehrh.) Brodo & D. Hawksw.

Opera Bot., 42: 99, 1977 - *Lichen bicolor* Ehrh., Hannover. Mag., 22: 161, 1784.

Syn.: *Alectoria bicolor* (Ehrh.) Nyl., *Bryopogon bicolor* (Ehrh.) Elenkin, *Bryopogon jubatus* var. *bicolor* (Ehrh.) Rabenh., *Cornicularia bicolor* (Ehrh.) Ach.

N - Fr1 (TSB 5284), Ven, TAA (Nascimbene & al. 2007b), Lomb, Piem (Isocrono & al. 2004).

Frut.f/ Ch/ A.f/ Epiph/ pH: 1-2, L: 3-4, X: 1-2, E: 1/ Alt: 3-4/ Salp: r, Mont: r/ PT: 0/ suboc/ Note: a mainly boreal-montane, circumpolar lichen found on mossy trunks of old, more or less isolated trees in mountain areas with frequent fog, sometimes on mossy rocks.

Bryoria capillaris (Ach.) Brodo & D. Hawksw.

Opera Bot., 42: 115, 1977 - *Parmelia jubata* var. *capillaris* Ach., Meth. Lich.: 273, 1803.

Syn.: *Alectoria cana* (Ach.) Leight., *Alectoria capillaris* (Ach.) Cromb., *Alectoria fuscidula* auct., *Alectoria implexa* auct. p.p., *Alectoria implexa* var. *cana* (Ach.) Flagey, *Alectoria jubata* f. *rufescens* Anzi, *Alectoria setacea* (Ach.) Motyka, *Bryopogon capillaris* (Ach.) Bystrek, *Bryoria setacea* (Ach.) Brodo & D. Hawksw.

N - Frl (Tretiach & Molaro 2007), **Ven** (Nascimbene & Caniglia 1997, 2002c, 2003c, Caniglia & al. 1999, Nascimbene & al. 2006e, Nascimbene 2008c, 2011), **TAA** (Caniglia & al. 2002, Nascimbene & Caniglia 2002c, Nascimbene 2003, 2006b, 2006c, 2006e, 2008b, De Marco & al. 2003, Nascimbene & al. 2009, 2007b, 2010, Obermayer 2013, Nimis & al. 2015), **Lomb, Piem** (Morisi & Sereno 1995, Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1997, 1999, Matteucci & al. 2008), **Emil** (Dalle Vedove & al. 2002), **Lig. C - Tosc** (Benesperi & al. 2007), **Umb** (Ravera 1998, Ravera & al. 2006), **Laz, Abr, Sar** (Zedda 1995, 2002, 2002b), **S - Camp** (Aprile & al. 2003b), **Pugl** (Nimis & Tretiach 1999), **Bas** (Potenza 2006, Potenza & Fascetti 2012), **Cal** (Puntillo & Vězda 1994, Puntillo 1995, 1996, Stofer 2006), **Si**.

Frut.f/ Ch/ A.s/ Epiph/ pH: 1-2, L: 3-5, X: 1-2, E: 1/ Alt: 2-4/ Salp: r, Mont: rr, SmedD: er, SmedH: er/ PT: 1/ suboc/ Note: a temperate to boreal-montane, circumpolar lichen, with optimum in montane humid *Fagus-Abies* forests, mostly on twigs, but also on boles of isolated trees in areas with frequent fog.

Bryoria chalybeiformis (L.) Brodo & D. Hawksw.

Opera Bot., 42: 81, 1977 - *Lichen chalybeiformis* L., Sp. Pl., 2: 1153, 1753, *nom. cons.*

Syn.: *Alectoria chalybeiformis* (L.) Röhl., *Alectoria jubata* var. *chalybeiformis* (L.) Ach., *Alectoria prostratosteola* Gyeln., *Alectoria valparolae* Šambo, *Bryoria intricans* (Vain.) Brodo & D. Hawksw.

N - Ven, TAA, Lomb, Piem (Isocrono & al. 2004), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Piervittori & al. 2004), **C - Sar** (Zedda 2002), **S - Bas** (Potenza & al. 2014).

Frut.f/ Ch/ A.s/ Terr-Sax/ pH: 1-2, L: 4-5, X: 2-3, E: 2-3/ Alt: 3-5/ Alp: r, Salp: rr, Orom: er, Mont: er/ PF: 1/ Note: an arctic-alpine to boreal-montane, circumpolar lichen found on wind-exposed rocks, but also on soil, mosses and plant remains in exposed habitats with frequent fog, with optimum near and above treeline. According to Velmala & al. (2014) this is a synonym of *B. fuscescens*. However, since the latter species seems to be very heterogeneous, I prefer to still maintain *B. chalybeiformis* as a separate species.

Bryoria fremontii (Tuck.) Brodo & D. Hawksw.

Opera Bot., 42: 136, 1977 - *Alectoria fremontii* Tuck., Am. J. Arts Sc., ser. 2, 25: 422, 1858.

Syn.: *Alectoria olivacea* Räsänen, *Alectoria tortuosa* G. Merr., *Bryoria tortuosa* (G. Merr.) Brodo & D. Hawksw.

N - TAA (Nascimbene & al. 2007b), **Piem** (Isocrono & al. 2004).

Frut.f/ Ch/ A.s/ Epiph/ pH: 1-2, L: 4-5, X: 1, E: 1/ Alt: 3-4/ Salp: er, Mont: er/ PT: 0/ suboc/ Note: a cool-temperate to boreal-montane, easily recognizable species found on twigs of conifers in damp montane to subalpine forests. It is included as "Regionally Extinct" in the Italian red list of epiphytic lichens (Nascimbene & al. 2013c).

Bryoria furcellata (Fr.) Brodo & D. Hawksw.

Opera Bot., 42: 103, 1977 - *Cetraria furcellata* Fr., Syst. Orb. Veget., 1: 283, 1825.

Syn.: *Alectoria nidulifera* Norrl.

N - Frl (TSB 3581), **Ven**.

Frut.f/ Ch/ A.s/ Epiph-Lign/ pH: 1-2, L: 4-5, X: 2-3, E: 1/ Alt: 4/ Salp: r/ PT: 1/ Note: a mainly boreal-montane, circumpolar lichen found on isolated conifers near treeline, sometimes on lignum.

Bryoria fuscescens (Gyeln.) Brodo & D. Hawksw.

Opera Bot., 42: 83, 1977 - *Alectoria fuscescens* Gyeln., Nytt Mag. Naturvid., 70: 55, 1932.

Syn.: *Alectoria achariana* Gyeln.?, *Alectoria crispa* Motyka, *Alectoria haynaldii* Gyeln., *Alectoria jubata* auct. p.p., *Alectoria jubata* var. *lanestris* Ach., *Alectoria lanestris* (Ach.) Gyeln., *Alectoria positiva* (Gyeln.) Motyka?, *Bryopogon jubatus* (L.) Link, *Bryopogon lanestris* (Ach.) Gyeln., *Bryoria lanestris* (Ach.) Brodo & D. Hawksw., *Bryoria fuscescens* var. *positiva* (Gyeln.) Brodo & D. Hawksw., *Bryoria positiva* (Gyeln.) Bystrek, *Bryoria subcana* (Nyl. ex Stizenb.) Brodo & D. Hawksw., *Evernia jubata* (L.) Fr.

N - VG (vidi!), **Frl, Ven** (Nascimbene & Caniglia 1997, 2000b, 2002c, 2003c, Caniglia & al. 1999, Nascimbene 2005c, 2008c, 2011, Nascimbene & al. 2006e, 2014, 2014c, Nascimbene & Marini 2007, Thor & Nascimbene 2007, Brackel 2013), **TAA** (Nascimbene & Caniglia 2000b, 2002c, Caniglia & al. 2002, Thell & al. 2002, 2004, Nascimbene 2001b, 2003, 2006b, 2006c, 2008b, 2013, 2014, Nascimbene & al. 2005, 2006, 2006e, 2007b, 2009, 2010, 2014, Stofer 2006, Thor & Nascimbene 2007, Lang 2009, Brackel 2013, Nimis & al. 2015), **Lomb** (Valcuvia & al. 2003, Chiappetta & al. 2005, Nascimbene & al. 2006e, Brackel 2013), **Piem** (Morisi & Sereno 1995, Isocrono & al. 2004, Matteucci & al. 2013), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Piervittori & al. 2004, Matteucci & al. 2008, 2008c), **Emil** (Dalle Vedove & al. 2002), **Lig** (Giordani & Incerti 2008), **C - Tosc** (Tretiach & Nimis 1994, Stofer 2006, Benesperi & al. 2007, Benesperi 2011, Brackel 2015), **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera 1998, 1999, Ravera & al. 2006), **Abr** (Nimis & Tretiach 1999, Brackel 2015), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **Sar** (Zedda 2002, 2002b, Rizzi & al. 2011), **S - Camp** (Nascimbene & al. 2010b, Brunialti & al. 2013, Ravera & Brunialti 2013), **Pugl** (Thüs & Licht 2006), **Bas** (Potenza & Fascetti 2005, Potenza 2006, Brackel 2011, Potenza & Fascetti 2012), **Cal** (Puntillo 1995, 1996, Incerti & Nimis 2006, Brackel & Puntillo 2016), **Si** (Czezuga & al. 1994, Merlo 2004, Falco Scampatelli 2005, Iacolino & Ottonello 2006).

Frut.f/ Ch/ A.s/ Epiph-Lign-Terr/ pH: 1-3, L: 3-5, X: 1-2, E: 1-2/ Alt: 1-4/ Salp: rc, Orom: er, Mont: rr, SmedD: er, SmedH: er, MedH: er / PT: 1/ Note: a temperate to boreal-montane, circumpolar species, which is the most common species of *Bryoria* in Italy, and the one with the broadest ecological range, sometimes reaching (in humid situations) the Mediterranean belt (e.g. in Sardegna); extinct in the Po-plain and certainly declining, especially in disturbed areas. For the synonymisations of *B. lanestrus* and *B. subcana* with this species see Velmala & al. (2014).

Bryoria implexa (Hoffm.) Brodo & D. Hawksw.

Opera Bot., 42: 121, 1977 - *Usnea jubata* (unranked) *implexa* Hoffm., Deutschl. Fl., 2: 134, 1796.

Syn.: *Alectoria catharinae* Räsänen, *Alectoria implexa* (Hoffm.) Röhl. non auct., *Alectoria osteola* Gyeln., *Alectoria subachariana* Gyeln., *Alectoria zopfii* Asahina, *Bryopogon implexus* (Hoffm.) Elenkin, *Bryoria osteola* (Gyeln.) Brodo & D. Hawksw.

N - **Frl** (TSB 1363), **Ven** (Nascimbene & Caniglia 1997, 2003c, Caniglia & al. 1999, Nascimbene & al. 2006e), **TAA** (Nascimbene & Caniglia 2002c, Nascimbene & al. 2007b, 2008c, 2014, Nascimbene 2013, 2014, Nimis & al. 2015), **Lomb**, **Piem** (Morisi & Sereno 1995, Isocrono & al. 2004, Morisi 2005), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Matteucci & al. 2008, Isocrono & al. 2008), **Lig** (Brunialti & al. 1999, Watson 2014). **C** - **Marc** (Nimis & Tretiach 1999), **Laz** (Ravera 2001), **Sar** (Zedda 1995, 2002, 2002b). **S** - **Camp** (Aprile & al. 2003b), **Cal** (Puntillo 1996).

Frut.f/ Ch/ A.s/ Epiph/ pH: 1-2, L: 3-5, X: 1-2, E: 1/ Alt: 2-4/ Salp: rc, Orom: vr, Mont: r, SmedH: er/ PT: 1/ Note: a cool-temperate to boreal-montane, circumpolar, chemically heterogeneous species, most common on branches of coniferous, more rarely deciduous trees in areas with frequent fog; frequent in the Alps, much rarer in southern Italy. *Bryoria pseudofuscescens*, characterised by the presence of norstictic acid, may be a separate species, which should be looked for in the Alps.

Bryoria kuemmerleana (Gyeln.) Brodo & D. Hawksw.

Opera Bot., 42: 155, 1977 - *Alectoria kuemmerleana* Gyeln., Magyar Bot. Lapok, 30: 54, 1931.

N - **TAA** (B-5695).

Frut.f/ Ch/ A.s/ Epiph/ pH: 1-2, L: 3-4, X: 1-2, E: 1/ Alt: 4/ Salp: vr/ PT: 1/ Note: a rather poorly known species with partly pruinose thalli reacting K⁺ red, C⁻, and elongate, fusiform pseudocyphellae, found on the bark of various trees; the identification of the Italian material, collected by Grumman at Carrer Pass, should be checked.

Bryoria nadvornikiana (Gyeln.) Brodo & D. Hawksw.

Opera Bot., 42: 122, 1977 - *Alectoria nadvornikiana* Gyeln., Acta Fauna Fl. Univ., ser. 2, 1: 6, 1932.

Syn.: *Alectoria altaica* (Gyeln.) Räsänen, *Alectoria implexa* var. *nadvornikiana* (Gyeln.) Zahlbr., *Alectoria spinulosa* Ahlner nom. nud.

N - **Frl**, **Ven** (Nascimbene & Caniglia 2000, 2000b, 2002c, 2003c, Nascimbene & al. 2006e, Brackel 2013), **TAA** (Nascimbene & Caniglia 2002c, Nascimbene & al. 2006e, 2007b, 2014, Brackel 2013, Nascimbene 2013, 2014, Nimis & al. 2015), **Lomb** (Rivellini 1994, Alessio & al. 1995, Nascimbene & al. 2006e), **Piem** (Morisi & Sereno 1995). **C** - **Tosc** (Loppi & al. 1994, Benesperi & al. 2007), **Sar** (Zedda 2002, 2002b). **S** - **Cal** (Puntillo 1996).

Frut.f/ Ch/ A.s/ Epiph/ pH: 1-2, L: 3-4, X: 1-2, E: 1/ Alt: 3-4/ Salp: rr, Mont: vr/ PT: 1/ Note: a boreal-montane, circumpolar, shade-tolerant species of mixed upper montane to oroboreal forests, mostly on low, dead twigs and branches of conifers.

Bryoria simplicior (Vain.) Brodo & D. Hawksw.

Opera Bot., 42: 109, 1977 - *Alectoria nidulifera* f. *simplicior* Vain., Meddeland. Soc. Fauna Fl. Fenn., 6: 115, 1881.

Syn.: *Alectoria simplicior* (Vain.) Lyngé, *Bryopogon simplicior* f. *albidosorediosus* Gyeln.

N - **TAA** (Nascimbene & al. 2007b), **VA** (Valcuvia 2000, Matteucci & al. 2008).

Frut.f/ Ch/ A.s/ Epiph/ pH: 1-2, L: 4-5, X: 2, E: 1/ Alt: 3-4/ Salp: vr, Mont: er/ PT: 1/ Note: a boreal-montane, circumpolar lichen found on isolated conifers in the mountains, to be looked for throughout the Alps. It is included in the Italian red list of epiphytic lichens as “Endangered” (Nascimbene & al. 2013c).

Bryoria smithii (Du Rietz) Brodo & D. Hawksw.

Opera Bot., 42: 152, 1977 - *Alectoria smithii* Du Rietz, Ark. Bot., 20 A, 11: 15, 1926.

Syn.: *Alectoria berengeriana* (A. Massal. ex Stizenb.) Gyeln. var. *smithii* (Du Rietz) Gyeln.

N - **Frl**, **Ven** (Nascimbene & al. 2006e, Nascimbene 2011), **Lomb** (Alessio & al. 1995), **Piem** (Caniglia & al. 1992).

Frut.f/ Ch/ A.s/ Epiph-Sax/ pH: 1-2, L: 3-4, X: 1-2, E: 1/ Alt: 3-4/ Salp: r, Mont: vr/ PT: 1/ suboc/ Note: a temperate species found on large, more or less shaded rock walls, more rarely on bark, especially on twigs of conifers in damp montane forests.

Bryostigma Poelt & Döbbeler

Plant Syst. Evol., 131: 212, 1979.

This monotypic genus was segregated from *Arthonia* on the basis of the red or blue I staining of its hyphae, the undifferentiated excipulum, the type of asci, the small size of the fruiting bodies and the growth on moss. Its position within the Arthoniales still needs to be settled. Type: *B. muscigenum* (Th. Fr.) Frisch & G. Thor

Bryostigma muscigenum (Th. Fr.) Frisch & G. Thor

Taxon, 63: 736, 2014 - *Arthonia muscigena* Th. Fr., Bot. Not.: 182, 1865.

Syn.: *Arthonia leucodontis* (Poelt & Döbberler) Coppins, *Arthonia microsticta* auct. (foliicolous specimens), *Bryostigma leucodontis* Poelt & Döbberler, *Catillaria melanobola* f. *frullaniae* B. de Lesd.

N - Emil (B-60 0191512). C - Tosc (Puntillo & Ottonello 1997), Umb (Ravera & al. 2011). S - Cal (Puntillo & Vězda 1994, Puntillo 1995, 1996, Puntillo & Ottonello 1997, Puntillo & Puntillo 2004).

Cr/ Ch/ S/ Epiph-Foliic/ pH: 2-3, L: 3, X: 1, E: 1/ Alt: 1-4/ Salp: er, Mont: er, SmedD: er, SmedH: er, MedH: er/ PT: 1/ oc/ Note: a species with a strongly reduced thallus containing a chlorococcoid photobiont, and minute hemispherical ascospores, sometimes confused with *Arthonia apatetica*; it grows on the bark of deciduous trees, but also on epiphytic bryophytes (e.g. *Leucodon sciuroides*), and on leaves in humid forests; it is widespread, but it was probably often overlooked in Italy. All of the Italian samples are foliicolous, but the species should be looked for also on mosses, especially in the Alps. For the synonymies see Sérusiaux (1996). The species is included in the Italian red list of epiphytic lichens as "Vulnerable" (Nascimbene & al. 2013c).

Buellia De Not.

Giorn. Bot. Ital., 2: 195, 1846, nom. cons.

The cosmopolitan genus *Buellia s.lat.* is currently thought to contain c. 300 species worldwide. *Buellia s.str.* (formerly *Hafellia* Kalb, H. Mayrhofer & Scheid.) is one of the few well-delimited groups within *Buellia s.lat.* It is characterised by the *Callispora*-type ascospores, bacilliform conidia, and often by a strongly oil-inspersed hymenium. The genus *Tetramelas* (Marbach 2000) proved to constitute a well-founded segregate of *Buellia s.lat.* (Helms & al. 2003), while the separation of *Amandinea* is still controversial. The residual species of *Buellia*, which are not closely related, should be excluded from *Buellia s.str.*, but a precise generic circumscription must await the results of molecular investigations. Important nomenclatural changes are probable in the next future. The genus belongs to the Caliciaceae (see e.g. Helms & al. 2003, Nadyeina & al. 2010). Type: *B. disciformis* (Fr.) Mudd (conserved type).

Buellia abstracta (Nyl.) H. Olivier

Bull. Acad. Intern. Géogr. Bot., 12: 176, 1903 - *Lecidea abstracta* Nyl., Flora, 66: 102, 1883.

Syn.: *Buellia sequax* auct. non (Nyl.) Zahlbr.

N - TAA (B-60 0195394).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4, X: 3-4, E: 1-2/ Alt: 3/ Mont: er/ PT: 1/ Note: a much misunderstood silicicolous species, in the past frequently confused with *B. sequax* (Giralt & al. 2011). The Italian sample, collected by Buschardt and identified by H. Sipman, was collected in Vinschgau - Val Venosta, on south-facing rocky slopes NE of Tartsch, at c. 1200 m.

Buellia aethalea (Ach.) Th. Fr.

Lichenogr. Scand., 2: 604, 1874 - *Gyalecta aethalea* Ach., Lichenogr. Univ.: 669, 1810.

Syn.: *Buellia aethaleoides* (Nyl.) H. Olivier, *Buellia atropallidula* (Nyl.) J. Lahm, *Buellia baltica* Erichsen, *Buellia impressula* (Leight.) A.L. Sm., *Buellia nigerrima* (Nyl.) Arnold, *Buellia sororia* Th. Fr., *Buellia sororioides* Erichsen, *Buellia subatra* Erichsen, *Buellia verruculosa* (Sm.) Mudd non auct., *Lecidea atroalbella* auct. non (Nyl.) Nyl., *Rinodina immersata* (Nyl.) H. Olivier, *Rinodina ocellulata* Bagl. & Carestia, *Rinodina umbrinofusca* (Nyl.) H. Olivier

N - Frl (Tretsch & Hafellner 2000), TAA, Lomb (B-60 0195402), Piem (Isocrono & al. 2003, 2004, Favero-Longo & al. 2004, 2015), VA (Matteucci & al. 2015c), Lig. C - Tosc, Sar (Scheidegger 1993, Nöske 2000, Rizzi & al. 2011). S - Camp (Aprile & al. 2002), Bas (Jatta 1909-1911), Si (Grillo & Caniglia 2004).

Cr/ Ch/ S/ Sax/ pH: 1-3, L: 4-5, X: 4-5, E: 1-3/ Alt: 1-5/ Alp: rr, Salp: rc, Orom: vr, Mont: rc, SmedD: er, SmedH: er, MedH: er, MedD: er/ PT: 1-2/ p/ Note: on horizontal to weakly inclined, exposed surfaces of hard, crystalline siliceous rocks wetted by rain, mostly in species-poor stands, common only in dry areas.

Buellia arborea Coppins & Tønsberg

Sommerfeltia, 14: 111, 1992.

N - Frl.

Cr/ Ch/ A.s/ Lign/ pH: 1-2, L: 3-4, X: 3-4, E: 2-3/ Alt: 3-4/ Salp: r, Mont: rr/ PT: 1/ Note: a usually sterile species with bluish-greenish, round to elongated, and flat to concave soralia reacting K- in squash preparations; usually found on periodically dry wood of logs and old fences in upland areas; certainly more widespread in the Alps, and locally rather common.

Buellia arnoldii Servít

in Servít & Nádvořník, Věstn. Král. České Společ. Nauk, 12: 39, 1937.

Syn.: *Hafellia arnoldii* (Servít) Hafellner & Türk

N - TAA (Nascimbene & al. 2007b).

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 4, X: 2, E: 1/ Alt: 4/ Salp: r/ PT: 1/ suboc/ Note: a mild-temperate to humid subtropical species found on thin twigs of conifers in humid stands of the subalpine belt; probably overlooked in the Alps. For further details see Giralt & al. (2000).

Buellia asterella Poelt & Sulzer

Nova Hedwigia, 25: 182, 1974.

C - **Laz** (Trinkaus & Mayrhofer 2000).

Cr.pl/ Ch/ S/ Terr/ pH: 3-5, L: 4-5, X: 4-5, E: 1-2/ Alt: 2-3/ Mont: er, SmedD: er/ PT: 1/ Note: a mainly western European species growing on calciferous or gypsicolous soil in dry grasslands. According to Spribille & Wagner (2016), it is presently extinct over much of its former range: the only verifiable extant populations at present are in the Vågå region of Norway, where only two of three historical sites have been confirmed, and even these are in sharp decline.

Buellia atrocinerella (Nyl.) Scheid.

Lichenologist, 25: 345, 1993 - *Lecanora atrocinerella* Nyl., Flora, 55: 428, 1872.

Syn.: *Rinodina atrocinerella* (Nyl.) Boistel

C - **Sar** (Scheidegger 1993).

Cr/ Ch/ S/ Sax/ pH: 1-3, L: 4-5, X: 4, E: 1-2/ Alt: 1/ MedD: vr/ PT: 1/ paras crustose lichens/ Note: a Mediterranean species of hard siliceous rocks in warm-dry habitats, sometimes growing on other crustose lichens.

Buellia caldesiana Bagl.

Comm. Soc. Critt. Ital., 1, 1: 19, 1861.

N - **Lig** (Scheidegger 1993). **S - Sar**.

Cr.pl/ Ch/ S/ Sax/ pH: 2-3, L: 4-5, X: 4-5, E: 3/ Alt: 1/ MedH: vr, MedD: er/ PT: 1/ Note: a rare Mediterranean species of base-rich siliceous rocks.

Buellia caloplacivora Llimona & Egea

Bull. Inst. Cat. Hist. Nat., 51: 81, 1984.

C - **Tosc. S - Camp** (Nimis & Tretiach 2004), **Cal** (Puntillo 1996, Puntillo 2011), **Si**.

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4, X: 3-4, E: 1-2/ Alt: 1-3/ Mont: er, SmedH: vr, MedH: vr / PT: 1/ suboc, #/ Note: following Scheidegger (1993), this species growing on exposed volcanic rocks was synonymised with *B. sequax* by Nimis (1993), but it appears to be a different species (Giralt & van den Boom 2011, Giralt & al. 2011).

Buellia disciformis (Fr.) Mudd

Man. Brit. Lich.: 216, 1861 - *Lecidea parasema* var. *disciformis* Fr., Nov. Sched. Crit., 8: 9, 1826.

Syn.: *Buellia major* De Not., *Buellia major* f. *crustulata* A. Massal., *Buellia parasema* (Ach.) De Not., *Hafellia disciformis* (Fr.) Marbach & H. Mayrhofer

N - VG, Fri, Ven (Lazzarin 2000b, Nascimbene 2008c), **TAA** (Nascimbene & al. 2006e, 2007b, 2008c, Nimis & al. 2015), **Lomb, Piem** (Caniglia & al. 1992, Isocrono & al. 2004, 2006), **VA** (Valcuvia 2000, Valcuvia & al. 2000b), **Emil, Lig** (Putorti & al. 1999b, Giordani & Incerti 2008). **C - Tosc** (Loppi & al. 1999a, Putorti & Loppi 1999b, Loppi & Putorti 2001), **Umb** (Ravera 1998, Ravera & al. 2006), **Laz** (Bartoli & al. 1997, Ravera 2002, Massari & Ravera 2002), **Abr** (Caporale & al. 2016), **Mol** (Caporale & al. 2008, Genovesi & Ravera 2014), **Sar** (Loi & al. 2000, Zedda 2002). **S - Camp** (Garofalo & al. 1999, 2010, Aprile & al. 2003, 2003b, Nimis & Tretiach 2004, Blasi & al. 2010, Brunialti & al. 2013, Ravera & Brunialti 2013), **Pugl** (Nimis & Tretiach 1999), **Bas** (Bartoli & Puntillo 1998), **Cal** (Puntillo 1996, Incerti & Nimis 2006), **Si** (Stofer 2006).

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 3-4, X: 2, E: 1-2/ Alt: 1-4/ Salp: er, Mont: rr, SmedD: er, SmedH: vr, MedH: er/ PT: 1/ Note: a holarctic, humid subtropical to southern boreal-montane lichen found on smooth bark in rather humid woodlands, especially in open beech forests of the montane belt. Some forms with pluriseptate spores from coastal Tyrrhenian Italy perhaps deserve further study: they might prove to belong to a distinct taxon, corresponding to *Lecidea parasema sensu* De Not., which has a different chemistry (Giralt & al. 2000). The species is included in the Italian red list of epiphytic lichens as "Near-threatened" (Nascimbene & al. 2013c).

Buellia dispersa (A. Massal.) A. Massal.

Sched. Crit., 8: 150, 1856 - *Catolechia maritima* var. *dispersa* A. Massal., *Symmicta* Lich.: 52, 1855.

Syn.: *Buellia dispersa* var. *cinerascens* Bagl., *Buellia duartei* Samp., *Buellia italica* var. *tumida* A. Massal., *Buellia squamulata* (Nyl.) Zahlbr., *Buellia subsquamosa sensu* Buschardt non J. Steiner, *Buellia tergestina* J. Steiner & Zahlbr., *Buellia tumida* (A. Massal.) Bagl., *Lecidea squamulata* Nyl.

N - VG (Bungartz & al. 2002), **Ven, TAA, Lomb, Piem** (TSB 34632), **VA** (Piervittori & Isocrono 1999, Matteucci & al. 2015c), **Lig** (Lazzarin 2000b, Bungartz & al. 2002, Watson 2014, Giordani & al. 2016). **C - Tosc, Sar** (Scheidegger 1993). **S - Camp** (Ricciardi & al. 2000), **Si** (Grillo & Caniglia 2004).

Cr/ Ch/ S/ Sax/ pH: 3, L: 4-5, X: 4, E: 2-3/ Alt: 1-4/ Salp: vr, Orom: er, Mont: er, SmedD: er, MedD: vr/ PT: 1/ Note: a xeric subtropical to mild-temperate lichen of base-rich or slightly lime-containing siliceous rocks in warm-dry situations, present both in the Mediterranean area and in dry Alpine valleys. For further details see Bungartz & al. (2002).

Buellia elegans Poelt

in Poelt & Sulzer, Nova Hedwigia, 25: 184, 1974.

Syn.: *Buellia epigaea* var. *angustata* (Müll. Arg.) Zahlbr., *Buellia epigaea* var. *effigurata* (Schaer.) Zahlbr., *Buellia epigaea* var. *major* (Müll. Arg.) Zahlbr., *Diploicia epigaea* var. *angustata* Müll. Arg., *Diploicia epigaea* var. *effigurata* (Schaer.) Körb., *Diploicia epigaea* var. *major* Müll. Arg., *Lecidea epigaea* var. *effigurata* Schaer.

N - Lomb (Trinkaus & Mayrhofer 2000), **Piem** (Hafellner & al. 2004), **VA** (TSB 29482).

Cr./pl/ Ch/ S/ Terr/ pH: 4-5, L: 4-5, X: 4-5, E: 1-2/ Alt: 3-5/ Alp: er, Salp: vr, Mont: er/ PT: 1/ subc/ Note: a widespread steppe-species found on soil deriving from calciferous schists in open grasslands, restricted to dry-warm sites in the Alps.

Buellia epigaea (Pers.) Tuck.

Gen. Lich.: 185, 1872 - *Lichen epigaeus* Pers., Ann. Bot. (Usteri), 1: 25, 155, 1794.

Syn.: *Buellia epigaea* var. *intermedia* (Schrad.) Anzi, *Buellia nivea* (Anzi) Zahlbr., *Catolechia epigaea* (Pers.) Anzi, *Diploicia epigaea* (Pers.) A. Massal., *Diploicia epigaea* var. *intermedia* (Schrad.) Körb., *Lecidea epigaea* (Pers.) Schaer., *Psora epigaea* (Pers.) Hoffm., *Rinodina nivea* Anzi

N - TAA (Trinkaus & Mayrhofer 2000), **Lomb, Piem** (Matteucci & al. 2013), **VA** (Pievittori & Isocrono 1999, Pievittori & al. 2004). **C - Sar** (Trinkaus & Mayrhofer 2000). **S - Pugl, Si**.

Cr./pl/ Ch/ S/ Terr/ pH: 3-4, L: 5, X: 4-5, E: 1/ Alt: 1-4/ Salp: rr, Orom: er, Mont: er, SmedD: er, SmedH: er, MedH: er, MedD: er/ PT: 1/ subc/ Note: widely distributed in Europe, from submediterranean regions to Scandinavia, on base-rich mineral soil, on weathered gypsum and gypsum soil. South Italian records (Nimis 1993: 138) should be checked: they could refer to *B. asterella* Poelt & Sulzer.

Buellia erubescens Arnold

Verh. zool.-bot. Ges. Wien, 25: 493, 1875.

Syn.: *Buellia zahlbruckneri* J. Steiner non sensu T. Schauer, *Buellia jorgei* Samp.

C - Tosc (Benespero & al. 2007), **Umb** (Ravera 2000, Ravera & al. 2006), **Laz** (Ruisi & al. 2005), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008). **S - Camp** (Garofalo & al. 1999, 2010, Aprile & al. 2003b), **Cal** (Puntillo 1996, Incerti & Nimis 2006).

Cr/ Ch/ S/ Epiph/ pH: 1, L: 3, X: 2, E: 1/ Alt: 1-3/ Mont: er, SmedD: er, SmedH: vr, MedH: vr/ PT: 1/ #/ Note: on acid and smooth bark in warm-humid areas. All earlier records of this species from upland areas of the Alps and of the northern Apennines (see Nimis 1993: 138) are attributed to *Tetramelas chloroleucus* following Giralt & al. (2000); some records could refer to the recently-described *B. iberica*. The species is included in the Italian red list of epiphytic lichens as "Data Deficient" (Nascimbene & al. 2013c).

Buellia flavescens (J. Steiner) Šenkard.

Lichenologist, 42: 440, 2010 - *Buellia saxorum* var. *flavescens* J. Steiner, Verh. zool.-bot. Ges. Wien, 22: 345, 1907.

N - Lig (Šenkardšer 2010).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 3-4, X: 1-2, E: 1/ Alt: 1/ MedH: er, MedD: er/ PT: 1/ coast/ Note: a recently-resurrected saxicolous species growing on siliceous rocks at low elevations. For further details see Šenkardšer (2010).

Buellia fusca (Anzi) Kernst.

Zeitschr. Ferdinandeums, 35: 306, 1893 - *Buellia spuria* var. *fusca* Anzi, Cat. Lich. Sondr.: 87, 1860.

N - TAA, Lomb (Bungartz 2004).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4, X: 4-5, E: 1-2/ Alt: 1-3/ Mont: er, SmedD: er, MedH: er/ PT: 1/ u, #/ Note: on vertical to overhanging surfaces of siliceous rocks near the ground in warm-dry situations, such as in arid grasslands and in openings of Mediterranean garrigues; known only from the eastern Alps and the Pyrenees. Related to, and perhaps a synonym of *B. tirolensis* (see Bungartz 2004), but chemically different, this taxon needs further study.

Buellia griseosquamulata Scheid.

Lichenologist, 25: 25, 1993.

C - Sar (Scheidegger 1993).

Sq/ Ch/ S/ Sax/ pH: 1-2, L: 4, X: 4, E: 1-2/ Alt: 1/ MedH: er/ PT: 1/ coast/ Note: hitherto known only from the type collection, on granite near the coast.

Buellia griseovirens (Sm.) Almb.

Bot. Not.: 246, 1952 - *Variolaria griseovirens* Turner & Borrer ex Sm. in Smith & Sowerby, Engl. Bot., 34: tab. 2400, 1812.

Syn.: *Aplotomma turgidum* (A. Massal.) A. Massal. ex Beltr., *Buellia betulina* (Hepp) Th. Fr., *Buellia elenkinii* Tomin, *Buellia turgida* (A. Massal.) Lettau, *Diplolepta betulinum* (Hepp) Arnold, *Diplolepta turgidum* A. Massal., *Rhizocarpon betulinum* (Hepp) Zwackh, *Rhizocarpon efflorescens* Th. Fr.

N - VG (Castello 2002, Martellos & Castello 2004), **Frl, Ven** (Lazzarin 2000b, Nascimbene 2005c, 2008c, Thor & Nascimbene 2007, 2011, Nascimbene & Marini 2007, Hafellner & al. 2012, Nascimbene & al. 2013b, Brackel 2013), **TAA** (Hinteregger 1994, Nascimbene & al. 2006e, 2007b, 2008c, 2009, 2010, 2014, Thor & Nascimbene 2007, 2013, Nascimbene 2008b, 2014, Nimis & al. 2015), **Lomb, Piem** (Giordani & Malaspina 2016), **VA** (Matteucci & al. 2008, Isocrono & al. 2008), **Emil** (Nimis & al. 1996, Brunialti & al. 2001, Tretiach & al. 2008, Benespero 2009), **Lig** (Brunialti & al. 1999, Putortì & al. 1999b, Giordani & al. 2002, Giordani 2006, Giordani & Incerti 2008). **C - Tosc** (Loppi & al. 1994, 1998, 2002c, 2004c, Putortì & al. 1998, Senese & Critelli 2000, Laganà & al. 2002, Benespero & al. 2007,

Brunialti & Frati 2010, Loppi & Nascimbene 2010, Benesperi 2011, Nascimbene & al. 2012, 2015, Paoli & al. 2012, 2015d, Brackel 2015), **Marc** (Nimis & Tretiach 1999, Brackel 2015), **Umb** (Ravera 2000, Ravera & al. 2006, Panfili 2007), **Laz** (Nimis & Tretiach 2004, Ruisi & al. 2005, Brackel 2015), **Abr** (Olivieri & al. 1997, 1997b, Loppi & al. 1999, Nimis & Tretiach 1999, Corona & al. 2016), **Mol** (Caporale & al. 2008, Ravera & al. 2010, Genovesi & Ravera 2014), **Sar** (Zedda 1995, 2002, Zedda & Sipman 2001, Zedda & al. 2001, Cossu 2013). **S - Camp** (Aprile & al. 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010, Brunialti & al. 2013, Ravera & Brunialti 2013, Catalano & al. 2016), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999, Brackel 2011), **Cal** (Puntillo 1996, Incerti & Nimis 2006), **Si** (Nimis & al. 1994).

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 2-4, X: 2-3, E: 1/ Alt: 1-3/ Mont: rr, SmedD: rc, Pad: er, SmedH: c, MedH: rr/ PT: 1-2/ suboc/ Note: a probably holarctic, temperate to boreal-montane lichen found on smooth bark of deciduous trees and shrubs in rather humid, well-lit situations, more rarely on wood, with optimum above the Mediterranean belt, also occurring in heavily disturbed areas (e.g. in the Po-plain).

Buellia hyperbolica Bagl.

N. Giorn. Bot. Ital., 3: 266, 1871.

N - Lig (Putorti & al. 1999b). **C - Tosc** (Putorti & al. 1999, Giralt & al. 2000), **Sar** (Rizzi & al. 2011).

Cr/ Ch/ S/ Lign-Epiph/ pH: 1-2, L: 3-4, X: 3, E: 1-2/ Alt: 2-3/ Mont: er, SmedH: vr/ PT: 1/ #/ Note: a species with a mainly western distribution in Europe, found on trunks of old trees, especially *Castanea* and *Quercus*, and on lignum. From Toscana, besides the type, there are recent collections from the province of Lucca, on *Castanea*, by Coppins (*in litt.*). The species is included in the Italian red list of epiphytic lichens as "Endangered" (Nascimbene & al. 2013c).

Buellia iberica Giralt

in Giralt & Llimona, Mycotaxon, 75: 186, 2000.

S - Cal (van den Boom & Giralt 2002).

Cr/ Ch/ S/ Epiph-Lign/ pH: 1-2, L: 3-4, X: 3-4, E: 2-3/ Alt: 3-4/ Salp: vr, Mont: r/ PT: 1/ Note: a recently-described, perhaps western species found on acid bark and lignum in upland areas; see also note on *B. erubescens*.

Buellia imshaugii Hafellner

Beih. Nova Hedwigia, 62: 58, 1979.

N - Lig. C - Sar.

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 4-5, X: 4-5, E: 1-2/ Alt: 1-2/ SmedH: er, MedH: er, MedD: vr/ PT: 1/ subc, paras *Dimelaena oreina*/ Note: a xeric subtropical lichen of hard siliceous rocks, starting the life-cycle on *Dimelaena oreina*; described from North America, but also found in the Mediterranean Region.

Buellia jugorum (Arnold) Arnold

Flora, 67: 588, 1884 - *Buellia verruculosa* var. *jugorum* Arnold, Verh. zool.-bot. Ges. Wien, 28: 295, 1879.

N - TAA (Scheidegger 1993). **C - Sar** (Scheidegger 1993).

Cr/ Ch/ S/ Sax/ pH: 1-3, L: 4-5, X: 3-4, E: 1-2/ Alt: 4-5/ Alp: rr, Salp: er, Orom: r/ PT: 1/ Note: an arctic-alpine to boreal-montane, circumpolar species found on small siliceous pebbles in wind-exposed ridges, sometimes overgrowing other crustose lichens, mostly near and above treeline; probably more widespread in the Alps, certainly rarer in the high Mediterranean mountains.

Buellia leptoclina (Flot.) A. Massal.

Geneac. Lich.: 20, 1854 - *Lecidea leptoclina* Flot., Bot. Zeit., 8: 555, 1850.

Syn.: *Buellia gevrensis* Th. Fr., *Buellia hypopodioides* (Nyl.) Arnold, *Buellia leptoclina* var. *inarimensis* Jatta?, *Buellia leptoclina* f. *mougeotii* (Hepp ex Arnold) Th. Fr., *Lecidea hypopodioides* Nyl., *Lecidea hypopodioides* f. *ferruginascens* Nyl., *Lecidea mougeotii* Hepp

N - Fr1 (Tretiach & Hafellner 2000), **Ven, TAA** (Caniglia & al. 2002), **Lomb, Piem** (Favero-Longo & al. 2015), **Emil, Lig.**

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 3-4, X: 3, E: 1/ Alt: 3-5/ Alp: rr, Salp: r, Mont: vr/ PT: 1/ u/ Note: a mainly boreal-montane species found on steeply inclined to underhanging surfaces of hard siliceous rocks in upland areas. Earlier records (Nimis 1993: 140) from central and southern Italy, plus that from Sicily by Grillo (1998) could refer to other related species (*B. halonia*, *B. sardiniensis*, *B. saxorum*, *B. sejuncta* and *B. subdisciformis*), and are not reported here.

Buellia leptoclinoides (Nyl.) J. Steiner

Verh. zool.-bot. Ges. Wien, 57: 357, 1907 - *Lecidea leptoclinoides* Nyl., Bull. Soc. Linn. Normandie, sér. 2, 6: 311, 1872.

Syn.: *Buellia disciformis* var. *saxicola* H. Olivier, *Hafellia leptoclinoides* (Nyl.) Scheid. & H. Mayrhofer

N - Lig (Nordin & Mattsson 2001). **C - Tosc, Sar** (Scheidegger 1993). **S - Si** (Otonello & al. 2011).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 3-4, X: 1-2, E: 1/ Alt: 1/ MedH: r, MedD: er/ PT: 1/ coast/ Note: a probably humid subtropical to mild-temperate species found on steeply inclined surfaces of coastal siliceous rocks subject to humid, salt-loaden winds, more rarely on bark (Giralt & van den Boom 2011); restricted to Tyrrhenian Italy.

Buellia leptolepis Bagl. & Carestia

Comm. Soc. Critt. Ital., 2: 83, 1864.

Syn.: *Karschia leptolepis* (Bagl. & Carestia) Arnold, *Karschia saxatilis* f. *leptolepis* (Bagl. & Carestia) Kreisel

N - **Piem** (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 4, X: 3-4, E: 1/ Alt: 3-5/ Alp: vr, Salp: vr, Mont: er/ PT: 1-2/ paras *Myriolecis albescens* and other lichens/ Note: a parasite of crustose Lecanoraceae, hitherto known from the Alps and Scandinavia. Roux & coll. (2014) treat this species as a possible synonym of *B. ectolechioides*.

Buellia longispora Scheid.

Lichenologist, 25: 352, 1993.

N - **TAA** (B-180942). **C - Sar** (Scheidegger 1993).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 3-4, X: 3-4, E: 1-2/ Alt: 1-2/ SmedD: er, SmedH: vr, MedH: vr, MedD: er/ PT: 1/ Note: a mainly Mediterranean species of granitic rocks, also occurring in the Alps in warm-dry situations.

Buellia miriquidica Scheid.

Bot. Helvet., 97: 112, 1987.

C - Sar.

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 4, X: 3-4, E: 1/ Alt: 3-5/ Orom: vr, Mont: er/ PT: 1/ paras *Schaereria fuscocinerea*/ Note: a mainly arctic-alpine species found on vertical surfaces of hard granitic rocks in upland areas; almost certainly present in the Alps and to be looked for there.

Buellia myriocarpella (Nyl.) H. Olivier

Bull. Acad. Intern. Géogr. Bot. 12: 177, 1903 - *Lecidea myriocarpella* Nyl., Bull. Soc. linn. Normandie, sér. 2, 6: 313, 1872.

N - Lig.

Cr/ Ch/ S/ Sax/ pH: 1-3, L: 4-5, X: 3-4, E: 2-4/ Alt: 1-3/ Mont: vr, SmedD: vr, MedD: vr/ PT: 1-3/ #/ Note: a poorly known silicicolous species described from the Pyrenees and formerly wrongly considered to be a synonym of the American *B. vernicoma* (see Nimis 1993: 146), probably related to *Amandinea punctata* (see Nordin 1999). The record from Italy is somehow dubious and the whole complex is in need of revision.

Buellia ocellata (Flot.) Körb.

Syst. Lich. Germ.: 224, 1855 - *Lecidea petraea* var. *ocellata* Flot., Flora, 11: 691, 1828.

Syn.: *Buellia arcularum* (Harm.) Lettau, *Buellia frisiaca* Erichsen, *Buellia verruculosa* auct. non (Sm.) Mudd, *Lecanora victoris* Harm., *Lecidea arcularum* Harm., *Lecidea kaleida* Taylor, *Lecidea ocellata* subsp. *praeponens* Nyl., *Rinodina microphthalma* A. Massal., *Rinodina ocellata* (Flot.) Branth & Rostr. non (Hoffm.) Arnold, *Rinodina victoris* (Harm.) H. Olivier

N - Ven, TAA, Lomb, Piem (Isocrono & al. 2004), **Lig, C - Tosc, Abr** (Nimis & Tretiach 1999), **Sar** (Scheidegger 1993, Rizzi & al. 2011). **S - Si** (Scheidegger 1993, Grillo 1998, Grillo & Caniglia 2004).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 4, X: 3-4, E: 1-2/ Alt: 1-3/ Mont: vr, SmedD: er, SmedH: vr, MedH: er, MedD: er/ PT: 1/ p/ Note: a temperate, perhaps holarctic species found on small siliceous pebbles, but also on steeply inclined faces near the ground, below the subalpine belt.

Buellia sardiniensis J. Steiner

Verh. zool.-bot. Ges. Wien, 57: 348, 1907.

Syn.: *Buellia lusitanica* J. Steiner

C - Tosc, Sar (Scheidegger 1993). **S - Si.**

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 3-4, X: 3-4, E: 1-2/ Alt: 1-2/ SmedH: er, MedH: er, MedD: vr/ PT: 1/ Note: a mainly Mediterranean lichen found on hard siliceous rocks in warm-dry, but rather shaded situations (e.g. on north-facing surfaces), both in maritime and inland habitats; related to *B. saxorum*, but with a different chemistry.

Buellia saxorum A. Massal.

Ric. Auton. Lich. Crost.: 82, fig. 169, 1852.

Syn.: *Buellia superans* (Nyl.) Mong., *Lecidea saxorum* (A. Massal.) Hepp, *Lecidea superans* Nyl.

N - Ven (Lazzarin 2000b), **Lig, C - Tosc, Sar** (B-189700).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 3-4, X: 3-4, E: 1-2/ Alt: 1-3/ Mont: er, SmedD: er, SmedH: vr, MedD: er/ PT: 1/ Note: on steeply inclined surfaces of hard siliceous rocks, mostly not far from the coast.

Buellia schaeferi De Not.

Giorn. Bot. Ital., 2: 199, 1846.

Syn.: *Buellia destructans* (Tobler) R. Sant., *Buellia nigrifula* (Nyl.) Mudd, *Karschia destructans* Tobler, *Lecidea nigrifula* Nyl.

N - VG, Frl, Ven (Nascimbene & Caniglia 2000, 2003c, Nascimbene & al. 2006e, Nascimbene & Marini 2007), **TAA** (Nascimbene 2006b, 2006c, 2008b, 2013, 2014, Nascimbene & al. 2006, 2006e, 2007b, 2009, 2010, 2014, Stofer 2006, Nimis & al. 2015), **Lomb, Piem** (Isocrono & al. 2004), **Emil** (Nimis & al. 1996), **Lig** (TSB 33052). **C - Tosc** (Putorti & Loppi 1999, Brunialti & Frati 2010, Brunialti & al. 2012b), **Marc** (Nimis & Tretiach 1999), **Laz, Abr** (Nimis & Tretiach

1999), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008). **S - Camp** (Aprile & al. 2002, 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010), **Cal** (TSB 13945).

Cr/ Ch/ S/ Epiph-Lign/ pH: 1-2, L: 4-5, X: 3-4, E: 2-3/ Alt: 2-4/ Salp: rc, Mont: rr, SmedD: vr, SmedH: vr/ PT: 1-2/ Note: a mainly cool-temperate to boreal-montane, circumpolar species found on acid bark, especially of conifers, and on wooden poles in upland areas, to be looked for further in the mountains of southern Italy.

Buellia sequax (Nyl.) Zahlbr.

Cat. Lich. Univ., 7: 410, 1931 - *Lecidea sequax* Nyl., Flora, 58: 302, 1875.

Syn.: *Buellia excelsa* (Leight.) A.L. Sm., *Lecidea excelsa* Leight.

C - Tosc (Bungartz & al. 2004), **Sar** (Giralt & al. 2011). **S - Camp** (TSB 32280), **Si** (Bungartz & al. 2004)

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4, X: 3-4, E: 1-2/ Alt: 1-3/ Mont: er, SmedH: vr, MedH: vr/ PT: 1/ suboc, #/ Note: a mild-temperate, mainly Mediterranean-Atlantic, much misunderstood species (see Giralt & al. 2011) found on siliceous rocks in the Mediterranean area.

Buellia spuria (Schaer.) Anzi

Cat. Lich. Sondr.: 87, 1860 - *Lecidea spuria* Schaer., Lich. Helv. Spicil., Sect. 3: 127, 1828.

Syn.: *Buellia italica* A. Massal., *Buellia italica* var. *insularis* Bagl., *Buellia italica* var. *lactea* (A. Massal.) A. Massal., *Buellia italica* var. *recobarina* (A. Massal.) Körb., *Buellia lactea* (A. Massal.) Körb., *Buellia lactea* var. *olivaceofusca* Anzi, *Buellia liguriensis* B. de Lesd., *Buellia olivaceofusca* (Anzi) Zahlbr., *Buellia spuria* var. *recobarina* (A. Massal.) Jatta, *Catolechia lactea* A. Massal., *Catolechia recobarina* A. Massal.

N - VG (Scheidegger & al. 2001), **Ven** (Lazzarin 2000b), **TAA, Lomb, Piem** (Isocrono & al. 2004), **VA** (Matteucci & al. 2015c), **Emil, Lig** (Watson 2014). **C - Tosc, Abr, Sar** (Scheidegger 1993, Rizzi & al. 2011). **S - Camp** (Ricciardi & al. 2000), **Pugl, Si** (Nimis & al. 1996b).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4-5, X: 4, E: 2-3/ Alt: 1-3/ Mont: er, SmedD: vr, SmedH: r, MedH: er, MedD: er/ PT: 1-2/ Note: a mild-temperate to subtropical, chemically variable species growing on different types of siliceous rocks, often found also on walls. For a recent description see Giralt & van den Boom (2011).

Buellia stellulata (Taylor) Mudd

Man. Brit. Lich.: 216, 1861 - *Lecidea stellulata* Taylor in J. Mackay, Fl. Hibern., 2: 118, 1836.

Syn.: *Buellia maritima* (A. Massal.) Bagl., *Buellia minutula* (Hepp) Arnold, *Buellia stellulata* var. *candidella* (Nyl.) Boistel, *Buellia subalbula* var. *adriatica* Zahlbr., *Catolechia maritima* A. Massal., *Lecidea candidella* Nyl., *Lecidea microtera* Nyl.

N - TAA, Lomb, Piem (Favero-Longo & al. 2015), **VA** (Piervittori & Isocrono 1999), **Lig** (Lazzarin 2000b). **C - Tosc, Laz, Sar** (Scheidegger 1993, Rizzi & al. 2011). **S - Camp** (Nimis & Tretiach 2004, Garofalo & al. 2010), **Pugl** (TSB 7645), **Bas, Cal** (Puntillo 1996), **Si** (Grillo & Caniglia 2004).

Cr/ Ch/ S/ Sax/ pH: 3-4, L: 4-5, X: 4, E: 1-2/ Alt: 1-3/ Mont: er, SmedD: er, SmedH: vr, MedH: rr, MedD: er/ PT: 1-2/ Note: a mild-temperate to subtropical lichen found on calciferous and base-rich, hard siliceous rocks (e.g. on basalt), both near the coast in Mediterranean Italy, and in dry-warm Alpine valleys.

Buellia subdisciformis (Leight.) Jatta

Syll. Lich. Ital.: 392, 1900 - *Lecidea subdisciformis* Leight., Lich. Fl. Gr. Brit.: 308, 1871.

Syn.: *Buellia rysssolea* (Leight.) A.L. Sm., *Buellia sejuncta* J. Steiner, *Buellia subdisciformis* var. *scutariensis* J. Steiner?, *Lecidea rysssolea* Leight.

N - Lig, C - Tosc, Sar (Monte 1993, Scheidegger 1993, Nöske 2000, Rizzi & al. 2011). **S - Si** (Scheidegger 1993).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 3-4, X: 3, E: 1/ Alt: 1/ MedH: rr, MedD: vr/ PT: 1/ suboc, coast/ Note: a mild-temperate to humid subtropical species found on siliceous rocks at low elevations, chiefly Mediterranean-Atlantic in Europe and Tyrrhenian in Italy. The records from Lombardy by Valcuvia & al. (2003) and Delucchi & Valcuvia (2004) are dubious.

Buellia subsquamosa J. Steiner

Verh. zool.-bot. Ges. Wien, 57: 360, 1907.

N - TAA, C - Sar (Scheidegger 1993).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4, X: 4, E: 1-2/ Alt: 1-4/ Salp: er, Mont: er, MedH: er, MedD: er/ PT: 1/ Note: a rarely collected lichen of porous siliceous rocks rich in minerals, both in the Mediterranean area and in dry-continental Alpine valleys, where it exceptionally reaches the subalpine belt.

Buellia tesserata Körb.

Parerga Lichenol.: 189, 1860.

Syn.: *Buellia cerussata* Llimona & Werner, *Buellia fimbriata* (Tuck.) Sheard, *Rinodina radiata* var. *fimbriata* Tuck.

N - Lomb, C - Tosc, Sar (Scheidegger 1993, Nöske 2000, Rizzi & al. 2011).

Cr/ Ch/ S/ Sax/ pH: 1-3, L: 3-5, X: 3-4, E: 3-4/ Alt: 1/ MedH: vr, MedD: vr/ PT: 1/ coast/ Note: a xeric subtropical, widely distributed lichen of hard siliceous rocks, mostly near the coast; related to *Dimelaena radiata*.

Buellia tirolensis Körb.

Parerga Lichenol.: 460, 1860.

Syn.: *Buellia buellioides* (Metzler) Buschardt, *Buellia cinereomarginata* B. de Lesd., *Buellia luridula* (Nyl.) Zahlbr., *Lecidea luridula* Nyl., *Lecidea scotochroa* Nyl., *Rinodina buellioides* Metzler

N - TAA (Bungartz 2004), Lig (Bungartz 2004, Giordani & al. 2016). C - Tosc, Sar (Scheidegger 1993).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4, X: 4, E: 1-2/ Alt: 1-2/ SmedD: er, MedH: er, MedD: er/ PT: 1/ Note: on siliceous rocks in dry-warm areas, related to *B. fusca*, but chemically different, occurring both in the Mediterranean area and in dry-continental Alpine valleys.

Buellia triseptata A. Nordin

Bryologist, 102: 260, 1999.

Syn.: *Buellia triphragmia auct. non* (Nyl.) Arnold, *Buellia lauri-cassiae auct. eur. non* (Fée) Müll. Arg.

N - TAA (Nascimbene & al. 2007b), Piem, Lig (Watson 2014). S - Camp, Bas (Ravera & al. 2015d).

Cr/ Ch/ S/ Lign/ pH: 1-2, L: 4-5, X: 4, E: 2-3/ Alt: 3-4/ Salp: vr, Mont: vr/ PT: 1/ #/ Note: mainly lignicolous, more rarely on the bark of conifers in upland areas: a critical taxon, which needs further study (see Nimis 1993: 145). The species is included in the Italian red list of epiphytic lichens as "Critically Endangered" (Nascimbene & al. 2013c).

Buellia uberior Anzi

Atti Soc. Ital. Sc. Nat. Milano, 9: 252, 1866.

Syn.: *Buellia atrocinerea* (Anzi) Zahlbr., *Buellia contermina* Arnold, *Buellia lactea* var. *atrocinerea* Anzi, *Buellia malmei auct.*, *Buellia nitida* Eitner

N - Frl (Tretiach & Hafellner 2000), TAA, Ven, Lomb, VA (Piervittori & Isocrono 1999). C - Tosc, Sar (Scheidegger 1993).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 4, X: 3-4, E: 1-2/ Alt: 3-5/ Alp: r, Salp: vr, Orom: er, Mont: er/ PT: 1/ paras *Schaereria fuscocinerea*/ Note: a mainly arctic-alpine, circumpolar species found on hard, lime-free siliceous rocks, predominantly on inclined to subvertical faces wetted by rain in upland areas, with optimum above treeline; the species is most common in the Alps, rarer in the high Mediterranean mountains, and seems to be facultatively parasymbiotic.

Buellia vilis Th. Fr.

K. Svensk. Vetensk.-Akad. Handl., Ny folj. 7, 2: 44, 1867.

Syn.: *Buellia enteroleuroides* (Nyl.) Arnold, *Buellia modica* (Nyl.) Migula, *Lecidea enteroleuroides* (Nyl.) Nyl., *Lecidea modica* Nyl.

N - Frl (Tretiach & Hafellner 2000), TAA (Bungartz 2004).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 4-5, X: 3-4, E: 1/ Alt: 3-5/ Alp: r, Salp: vr, Mont: er/ PT: 1/ p/ Note: a mainly arctic-alpine, probably circumpolar early coloniser of siliceous pebbles in windy situations and of recently eroded granitic boulders, with optimum near and above treeline; more widespread in the Alps but probably overlooked.

Bunodophoron A. Massal.

Mem. I. Reale Ist. Veneto Sci., 10: 76, 1861.

A subcosmopolitan genus of c. 25 species, with the highest diversity in moist temperate areas of the Southern Hemisphere and in the mountains of the tropics (Wedin 1993). The genus is currently included in the Sphaerophoraceae within the Lecanorales. Type: *B. australe* (Laurer) A. Massal.

Bunodophoron melanocarpum (Sw.) Wedin

Mycotaxon, 55: 383, 1995 - *Lichen melanocarpus* Sw., Nov. Gen. Sp. Plant.: 147, 1788.

Syn.: *Sphaerophorus compressus* Ach., *Sphaerophorus melanocarpus* (Sw.) DC.

N - Lomb (Puntillo & Puntillo 2009), Piem (Isocrono & al. 2004, Morisi 2005, Puntillo & Puntillo 2009). C - Tosc (Puntillo & Puntillo 2009).

Frut/ Ch/ S/ Sax-Epiph/ pH: 1-2, L: 3-4, X: 1-2, E: 1/ Alt: 3/ Mont: er/ PT: 0/ suboc/ Note: a rare and declining humid subtropical to mild-temperate species found on mossy bark and rocks in very moist forests.

Byssoloma Trevis.

Spighe e Paglie: 6, 1853.

A large, mostly tropical genus of the Pilocarpaceae with c. 43 species, several of which are foliicolous. All of the Italian species are very rare and often threatened, most of them occurring in small warm-humid areas hosting several subtropical lichens with a relict character. Type: *B. leprieurii* Trevis.

Byssoloma croceum Sérus. & Puntillo

in Sérusiaux, Cryptogamie, Bryol. Lichénol., 19: 204, 1998.

S - Cal (Sérusiaux 1998, Puntillo 2000).

Cr/ Ch/ S/ Foliic/ pH: 1-2, L: 2-3, X: 1, E: 1/ Alt.: 1/ MedH: er/ PT: 0/ oc/ Note: a humid subtropical foliicolous species, hitherto known only from Macaronesia and Calabria, in evergreen humid forests. It is included in the Italian red list of epiphytic lichens as “Critically Endangered” (Nascimbene & al. 2013c).

Byssoloma kakouettae (Sérus.) Lücking & Sérus.

in Sérusiaux & al., *Lichenologist*, 34: 187, 2002 - *Bapalmuia kakouettae* Sérus., *Nord. J. Bot.*, 13: 449, 1993.

Syn.: *Byssoloma aptrootii* Sérus.

S - Camp (Puntillo & al. 2000, Puntillo 2000, Sérusiaux & al. 2002, Nimis & Tretiach 2004, Puntillo & Puntillo 2014).

Cr/ Ch/ S/ Foliic/ pH: 2-3, L: 2-3, X: 1, E: 1-2/ Alt: 1/ MedH: er/ PT: 0/ oc/ Note: a humid subtropical lichen found on leaves of evergreen trees and shrubs in very humid, warm situations, known from France, Madeira, the Canary Islands, and from a single station in Italy; for further details see Sérusiaux & al. (2002). The species is included in the Italian red list of epiphytic lichens as “Critically Endangered” (Nascimbene & al. 2013c).

Byssoloma leucoblepharum (Nyl.) Vain.

Dansk Bot. Ark., 4: 23, 1926 - *Lecidea leucoblephara* Nyl. in Triana & Planchon, *Ann. Sc. Nat. Bot.*, 4, 19: 337, 1863.

Syn.: *Calidia rhizophora* Stirt.

N - Lig (Sérusiaux 1998, Brunialti & al. 1999). **S - Camp** (Puntillo 2000), **Bas** (Bartoli & Puntillo 1998), **Cal** (Puntillo & Vězda 1994, Puntillo 1995, 1996, Vězda *Lich. Rar. Exs.* 241, Sérusiaux 1998 Puntillo & al. 2000, Puntillo 2000).

Cr/ Ch/ S/ Foliic-Epiph/ pH: 1-2, L: 3-4, X: 1, E: 1-2/ Alt: 1-2/ SmedH: er, MedH: er/ PT: 0/ oc/ Note: a pantropical foliicolous species occurring also on bark. It is included in the Italian red list of epiphytic lichens as “Vulnerable” (Nascimbene & al. 2013c).

Byssoloma llimonae Sérus., Gómez-Bolea, Longán & Lücking

Lichenologist, 34: 184, 2002.

S - Cal (Llop 2007).

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 2-3, X: 1, E: 1-2/ Alt: 3/ Mont: er/ PT: 0/ oc/ Note: a mainly corticolous species known from the Iberian Peninsula, Macaronesia and southern Italy, where is certainly extremely rare. It is included in the Italian red list of epiphytic lichens as “Critically Endangered” (Nascimbene & al. 2013c).

Byssoloma marginatum (Arnold) Sérus.

in Coppins & al., *Lichenologist*, 24: 367, 1992 - *Bilimbia marginata* Arnold, *Flora*, 47: 598, 1864.

Syn.: *Bacidia marginata* (Arnold) Lettau, *Tapellaria similis* Kalb

S - Cal (Puntillo & Vězda 1994, Sérusiaux 1996, 1998, Puntillo 1996, 2000, Nimis & Tretiach 2004).

Cr/ Ch/ S/ Epiph-Foliic/ pH: 1-2, L: 2-3, X: 1, E: 1/ Alt: 1-2/ SmedH: er, MedH: er/ PT: 0/ oc/ Note: a humid subtropical to mild-temperate lichen growing both on bark and on needles of conifers in warm-humid areas. The species is included in the Italian red list of epiphytic lichens as “Endangered” (Nascimbene & al. 2013c).

Byssoloma subdiscordans (Nyl.) P. James

Lichenologist, 5: 126, 1971 - *Chiodecton subdiscordans* Nyl., *Flora*, 62: 221, 1879.

Syn.: *Byssoloma rotuliforme* (Müll. Arg.) R. Sant., *Byssoloma tricholomum sensu* Lettau non (Mont.) Zahlbr.

S - Camp (Puntillo & al. 2000, Puntillo 2000), **Cal** (Puntillo & Vězda 1994, Puntillo 1995, 1996, 2000, Sérusiaux 1998).

Cr/ Ch/ S/ Foliic/ pH: 1-2, L: 3, X: 1, E: 1/ Alt: 1-3/ Mont: er, SmedH: er, MedH: er/ PT: 0/ suboc/ Note: a humid subtropical to tropical foliicolous species with isolated outliers in humid parts of the mild-temperate zone; in the Italian stations it was found on leaves of *Abies*, *Buxus* and *Laurus*; to be looked for in the Alps, in montane humid forests, on twigs of conifers. The species is included in the Italian red list of epiphytic lichens as “Endangered” (Nascimbene & al. 2013c).

Caeruleum K. Knudsen & Arcadia

in Arcadia & Knudsen, *Opuscula Philolich.*, 11: 24, 2012.

This genus has been recently created to accommodate two species formerly treated as members of *Acarospora*, which differ in many important morphological characters (Arcadia & Knudsen 2012). Type: *C. heppii* (Körb.) K. Knudsen & Arcadia

Caeruleum heppii (Körb.) K. Knudsen & Arcadia

in Arcadia & Knudsen, *Opuscula Philolich.*, 11: 24, 2012 - *Acarospora heppii* Nägeli ex Körb., *Parerga Lichenol.*: 61, 1865.

N - Ven (Thor & Nascimbene 2007, Nascimbene 2008, 2008c), **TAA, Lomb. C - Tosc** (Benesperi 2007), **Marc** (Nimis & Tretiach 1999).

Cr/ Ch/ S/ Sax/ pH: 3-5, L: 4-5, X: 4, E: 3-4/ Alt: 2-4/ Salp: r, Orom: vr, Mont: r, SmedD: r, Pad: er, SmedH: r/ PT: 1-2/ subc, p/ Note: an easily overlooked early coloniser of small more or less calcareous

pebbles in dry grasslands, which also occurs on concrete and mortar in small settlements, and on walls of calciferous sandstone; certainly more widespread.

Calicium Pers.

Ann. Bot. (Usteri), 7: 20, 1974.

A genus of c. 34 species, most of which grow exclusively on bark or on wood, with a worldwide distribution. The multigene phylogeny of the Physciaceae-Caliciaceae clade by Prieto & Wedin (2016) brought to the re-delimitation of several genera: *Cyphelium s.str.* was synonymised with *Calicium*. *Calicium* in this emended version includes both species with stalked (*Calicium* in the traditional sense) and sessile or immersed ascomata. The stalked species differ from *Allocalicium* in the shape of the capitulum and the colour of the stalk. Although phylogenetically very distinct, there is currently no morphological or chemical character that is unique for *Calicium* in the new sense. A key to the cyphelioid species of the Iberian Peninsula was published by Muñiz & Hladun (2007). A synopsis of the species occurring in Italy was published by Puntillo & Puntillo (2009). Type: *C. viride* Pers.

Calicium abietinum Pers.

Tent. Disp. Meth. Fung., Suppl.: 59, 1797.

Syn.: *Calicium abietinum* var. *crustiferum* Vain., *Calicium abietinum* var. *denigratum* (Vain.) Zahlbr., *Calicium abietinum* var. *fuscipes* (Nyl.) Zahlbr., *Calicium curtum* Turner & Borrer ex Sm., *Calicium minutum* Körb., *Calicium nigrum* auct. p.p.

N - Ven (Nascimbene 2008c, Puntillo & Puntillo 2009, Nascimbene & Marini 2010, Nascimbene & al. 2012), **TAA** (Nascimbene & al. 2006e, 2007b, Puntillo & Puntillo 2009, Nascimbene 2014, Nimis & al. 2015), **Lomb** (Puntillo & Puntillo 2009), **Piem** (Isocrono & al. 2004, Puntillo & Puntillo 2009), **Emil** (Puntillo & Puntillo 2009, Brunialti & al. 2001), **Lig** (Giordani & Incerti 2008, Puntillo & Puntillo 2009). **C - Tosc** (Puntillo & Puntillo 2009, Benesperi 2011), **Marc** (Nimis & Tretiach 1999, Puntillo & Puntillo 2009), **Laz** (Puntillo & Puntillo 2009), **Abr** (Nimis & Tretiach 1999, Stofer 2006, Puntillo & Puntillo 2009), **Sar** (Puntillo & Puntillo 2009, Rizzi & al. 2011). **S - Bas** (Puntillo & Puntillo 2009, Puntillo & al. 2012), **Camp** (Puntillo & Puntillo 2009, Catalano & al. 2010, 2016, Garofalo & al. 2010), **Pugl** (Puntillo & Puntillo 2009), **Cal** (Puntillo 1994, 1996, Puntillo & Puntillo 2009).

Cr/ Ch/ S/ Lign-Epiph/ pH: 1-2, L: 2-3, X: 2, E: 1/ Alt: 2-4/ Salp: vr, Mont: r, SmedD: er, SmedH: vr/ PT: 1/ u/ Note: a temperate to boreal-montane, circumpolar species found on old but hard wood of conifers, but also on bark, especially of *Abies*, much more rarely on deciduous trees (e.g. on *Castanea*) and, in humid areas, on wooden poles, with optimum in the montane belt. Old records (Nimis 1993: 148) might refer to *C. glaucellum*.

Calicium adpersum Pers.

Icon. Descript. Fungor. Minus Cognit., 2: 59, 1800.

Syn.: *Calicium diploellum* Nyl., *Calicium lenticulare sensu* Nádv., *Calicium mutabile* Ach., *Calicium roscidum* (Ach.) Ach.

N - Lomb (Puntillo & Puntillo 2009), **Piem** (Puntillo & Puntillo 2009). **C - Tosc** (Puntillo & Puntillo 2009), **Marc** (Puntillo & Puntillo 2009), **Umb** (Genovesi & al. 2001, Ravera & al. 2006, Puntillo & Puntillo 2009), **Laz** (Puntillo & Puntillo 2009), **Mol** (Caporale & al. 2008), **Sar** (Puntillo & Puntillo 2009, Zedda & Sipman 2001). **S - Camp** (Aprile & al. 2003b, Puntillo & Puntillo 2009, Garofalo & al. 2010), **Pugl** (Tretiach 1993, Puntillo & Puntillo 2009), **Bas** (Potenza 2006, Puntillo & Puntillo 2009, Potenza & Fascetti 2012), **Cal** (Tretiach 1993, Puntillo 1994, 1996, Puntillo & Puntillo 2009), **Si** (Tretiach 1993).

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 3, X: 2, E: 1/ Alt: 2-3/ Mont: vr, SmedD: er, SmedH: r/ PT: 0/ u/ Note: a holarctic, temperate species found on bark, rarely on lignum of deciduous trees, especially oaks, often in fissures of the bark, more rarely on conifers.

Calicium corynellum (Ach.) Ach.

Meth. Lich.: 94, 1803 - *Lichen corynellus* Ach., Lichenogr. Suec. Prodr.: 85, 1799.

Syn.: *Caliciella corynella* (Ach.) Vain., *Calicium paroicum* Ach. non auct., *Cyphelium chlorinum* auct. ital. non (Ach.) Kremp., *Sphinctrina paroica* (Ach.) Trevis., *Strongyleuma paroicum* (Ach.) Vain. non auct.

N - Ven (Puntillo & Puntillo 2009), **TAA** (Puntillo & Puntillo 2009), **Lomb** (Puntillo & Puntillo 2009), **Piem** (Isocrono & al. 2004, Puntillo & Puntillo 2009), **VA** (Puntillo & Puntillo 2009). **C - Tosc** (Puntillo & Puntillo 2009), **Sar** (Puntillo & Puntillo 2009). **S - Bas** (Ravera 2014b, Puntillo & Potenza 2014), **Cal** (Puntillo 1994, 1996, Puntillo & Puntillo 2009, Brackel & Puntillo 2016).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 3, X: 1-2, E: 1/ Alt: 2-3/ Mont: vr, SmedD: er, SmedH: vr/ PT: 1/ u/ Note: a temperate, probably holarctic species found on underhanging faces of hard siliceous rocks in humid areas; probably more widespread, but never common.

Calicium glaucellum Ach.

Meth. Lich.: 97, 1803.

Syn.: *Calicium discoidale* Ach.

N - Frl (Puntillo & Puntillo 2009), **Ven** (Nascimbene 2008c), **TAA** (Nascimbene 2008b, 2013, Nascimbene & al. 2009, 2010, Nimis & al. 2015), **Emil** (Benesperi 2009). **C - Tosc** (Benesperi 2007, Puntillo & Puntillo 2009), **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera 1998, Ravera & al. 2006, Puntillo & Puntillo 2009), **Laz** (Ravera 2001, Puntillo & Puntillo

2009), **Abr** (Puntillo & Puntillo 2009), **Sar** (Zedda 2002, 2002b, Puntillo & Puntillo 2009, Cossu 2013). **S - Camp** (Puntillo & Puntillo 2009), **Cal** (Puntillo 1994, 1996, Puntillo & Puntillo 2009).

Cr/ Ch/ S/ Lign-Epiph/ pH: 1-2, L: 3, X: 2, E: 1/ Alt: 2-4/ Mont: rr, SmedD: vr, SmedH: r/ PT: 0/ u/ Note: a temperate to boreal-montane, holarctic species found on lignum and on acid bark, especially on decorticated stumps of conifers, but also on broad-leaved trees, e.g. on *Castanea*, certainly widespread throughout the Alps (see note on *C. abietinum*).

Calicium lecideinum (Nyl.) M. Prieto & Wedin

Fungal Divers., 2016 (MB 817534) - *Trachylia lecideina* Nyl., Mém. Soc. Sc. Nat. Cherbourg: 3: 199, 1855.

Syn.: *Cyphelium lecideinum* (Nyl.) Trevis., *Cyphelium zahlbruckneri* Samp.

C - Tosc (Tretiach 2004, Puntillo & Puntillo 2009), **Sar** (Puntillo & Puntillo 2009).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4, X: 2, E: 1/ Alt: 1-3/ Mont: er, SmedH: er, MedH: er/ PT: 1/ suboc, u/ Note: a mild-temperate lichen found beneath overhanging surfaces of siliceous rocks in humid situations; certainly very rare and probably confined to Tyrrhenian Italy.

Calicium lenticulare Ach.

K. Vetensk.-Akad. Handl.: 262, 1816.

Syn.: *Calicium amylocaule* Lettau, *Calicium atroviride* Körb., *Calicium cladoniscum* auct., *Calicium lenticulare* var. *cladoniscum* auct. non Schaer., *Calicium quercinum* var. *lenticulare* (Ach.) Nyl., *Calicium schaeeri* sensu Nád. non De Not., *Calicium subquercinum* Asahina, *Calicium virescens* (Schaer.) Hepp

N - FrI (Puntillo & Puntillo 2009), **Ven** (Puntillo & Puntillo 2009), **TAA** (Nascimbene & al. 2007b, Puntillo & Puntillo 2009, Nimis & al. 2015), **Lomb** (Puntillo & Puntillo 2009), **Piem** (Isocrono & al. 2004, Puntillo & Puntillo 2009), **Emil** (Puntillo & Puntillo 2009), **Lig** (Puntillo & Puntillo 2009). **C - Tosc** (Puntillo & Puntillo 2009). **S - Camp** (Garofalo & al. 2010).

Cr/ Ch/ S/ Lign-Epiph/ pH: 1-2, L: 2, X: 2, E: 1/ Alt: 3-4/ Salp: vr, Mont: er/ PT: 0/ u/ Note: a mainly cool-temperate to boreal-montane, circumpolar species found on lignum of decorticated stumps and trunks of conifers in upland areas. It is included in the Italian red list of epiphytic lichens as “Critically Endangered” (Nascimbene & al. 2013c).

Calicium lucidum (Th. Fr.) M. Prieto & Wedin

Fungal Divers., 2016 (MB 817534) - *Trachylia lucida* Th. Fr., Öfvers. K. Vetensk.-Akad. Handl., 12: 18, 1855.

Syn.: *Acolium lucidum* Rabenh., *Calicium virellum* Nyl., *Cyphelium lucidum* (Th. Fr.) Th. Fr.

N - Ven (Puntillo & Puntillo 2009), **TAA** (Nascimbene & al. 2007b, Puntillo & Puntillo 2009), **Lomb** (Puntillo & Puntillo 2009).

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 3-4, X: 2, E: 1/ Alt: 3-4/ Salp: vr, Mont: er/ PT: 0/ Note: a mainly boreal-montane, circumpolar species found on old conifers in humid, open, montane to subalpine forests with frequent fog. It is included as “Regionally Extinct” in the Italian red list of epiphytic lichens (Nascimbene & al. 2013c).

Calicium montanum Tibell

Mycotaxon, 70: 432, 1999.

C - Tosc (Tibell 1999, Puntillo & Puntillo 2009).

Cr/ Ch/ S/ Lign/ pH: 1-2, L: 3, X: 2, E: 1/ Alt: 2-3/ Mont: vr, SmedH: vr/ PT: 0/ u/ Note: a recently-described, rare but widespread species with a relatively thick, pale grey thallus, short-stalked apothecia with white pruina, and ascospores with coarse irregular cracks, found on lignum, especially on decorticated stumps of *Castanea*, but also on conifers in the Alps; perhaps more common in Italy. The species is included in the Italian red list of epiphytic lichens as “Critically Endangered” (Nascimbene & al. 2013c).

Calicium notarisii (Tul.) M. Prieto & Wedin

Fungal Divers., 2016 (MB 817538) - *Acolium notarisii* Tul., Ann. Sc. Nat. Bot., ser. 3, 17: 81, 1852.

Syn.: *Cyphelium notarisii* (Tul.) Blomb. & Forssell, *Cyphelium sardoum* (De Not.) Jatta, *Cyphelium tigillare* subsp. *notarisii* (Tul.) W.A. Weber, *Embolus sardous* De Not., *Trachylia notarisii* (Tul.) Nyl.

N - Piem (TSB 32805), **VA** (Piervittori & Isocrono 1999, Matteucci & al. 2008c, Puntillo & Puntillo 2009, Watson 2014). **C - Abr** (Nimis & Tretiach 1999, Puntillo & Puntillo 2009), **Sar** (Zedda 2002, 2002b, Puntillo & Puntillo 2009, Rizzi & al. 2011).

Cr/ Ch/ S/ Lign-Epiph/ pH: 1-2, L: 4-5, X: 3-4, E: 1-2/ Alt: 3/ Mont: vr/ PT: 1/ Note: a mainly cool-temperate to southern boreal-montane lichen found on dry, weathered wood (e.g. on fences, wooden poles), but also on bark of old acid-barked trees (especially *Quercus*); perhaps more widespread in the Alps. It is included in the Italian red list of epiphytic lichens as “Vulnerable” (Nascimbene & al. 2013c).

Calicium pinastri Tibell

Mycotaxon, 70: 436, 1999.

N - TAA (Nascimbene & al. 2014, Nascimbene 2014).

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 3-4, X: 2, E: 1/ Alt: 3-4/ Salp: er, Mont: vr/ PT: 0/ Note: a species with a thin grey thallus, short-stalked, minute, epruinose apothecia, cylindrical asci, and ascospores with irregular

cracks, found on the bark of conifers (most often *Pinus sylvestris*); recently-described and still with a few records in the Alps, but probably more widespread.

Calicium pinicola (Tibell) M. Prieto & Wedin

Fungal Divers., 2016 (MB 817536) - *Cyphelium pinicola* Tibell, Svensk Bot. Tidskr., 63: 477, 1969.

N - **TAA** (Nascimbene 2005, Nascimbene & al. 2006e, 2007b, Nimis & al. 2015), **Lomb** (Puntillo & Puntillo 2009), **Piem** (Puntillo & Puntillo 2009). **S** - **Bas** (Puntillo 2015), **Cal** (Puntillo 1994, 1996, Puntillo & Puntillo 2009), **Si** (Puntillo & Puntillo 2009).

Cr/ Ch/ S/ Lign-Epiph/ pH: 1-2, L: 4-5, X: 3-4, E: 1/ Alt: 2-4/ Salp: r, Mont: vr, SmedH: er/ PT: 1/ Note: a mainly temperate to southern boreal-montane lichen found on bark of conifers, and especially of *Pinus*, near the base of trunks, less confined to high altitudes than *C. tigillare*. It is included in the Italian red list of epiphytic lichens as "Vulnerable" (Nascimbene & al. 2013c).

Calicium quercinum Pers.

Tent. Disp. Meth. Fung., Suppl.: 59, 1797.

Syn.: *Calicium curtiusculum* Nyl., *Calicium decipiens* A. Massal., *Calicium lenticulare* var. *bacillare* Ach.

N - **Lomb** (Puntillo & Puntillo 2009), **Piem** (Isocrono & al. 2004, Puntillo & Puntillo 2009), **Emil** (Tretiach & al. 2008), **Lig** (Jatta 1909-1911). **C** - **Tosc** (Tretiach & Nimis 1994, Puntillo & Puntillo 2009, Benesperi 2011), **Marc** (Puntillo & Puntillo 2009), **Abr** (Nimis & Tretiach 1999, Puntillo & Puntillo 2009), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **Sar** (Zedda 2002, 2002b, Puntillo & Puntillo 2009). **S** - **Camp** (Garofalo & al. 1999, Aprile & al. 2003b), **Pugl** (Thüs & Licht 2006), **Bas** (Nimis & Tretiach 1999, Puntillo & Puntillo 2009), **Cal** (Puntillo 1994, 1996, Puntillo & Puntillo 2009).

Cr/ Ch/ S/ Epiph-Lign/ pH: 1-2, L: 3, X: 1-2, E: 1/ Alt: 2-3/ Mont: r, SmedD: er, SmedH: vr/ PT: 0/ u/ Note: a holarctic, temperate species found on lignum and bark of deciduous trees, more rarely of conifers, especially on old oaks and *Castanea*, certainly occurring throughout the Alps.

Calicium salicinum Pers.

Ann. Bot. (Usteri), 7: 20, 1794.

Syn.: *Calicium hyperellum* var. *salicinum* (Pers.) Schaer., *Calicium lichenoides* (L.) Schumach., *Calicium salicinum* var. *xylonellum* (Ach.) Trevis., *Calicium sphaerocephalum* (L.) Ach., *Calicium sphaerocephalum* var. *xylonellum* (Ach.) Wahlenb., *Calicium trachelinum* Ach., *Calicium xylonellum* Ach.

N - **Frl** (Puntillo & Puntillo 2009), **Ven** (Nascimbene 2008c, Nascimbene & al. 2013b), **TAA** (Nascimbene & al. 2007b, Puntillo & Puntillo 2009), **Lomb** (Puntillo & Puntillo 2009), **Emil** (Nimis & al. 1996, Brunialti & al. 2001, Puntillo & Puntillo 2009, Benesperi 2009), **Lig** (Putorti & al. 1999b). **C** - **Tosc** (Tretiach & Nimis 1994, Loppi & De Dominicis 1996b, Loppi & al. 1997b, Putorti & al. 1999, Tretiach & al. 2008, Puntillo & Puntillo 2009, Benesperi 2011), **Marc** (Nimis & Tretiach 1999, Puntillo & Puntillo 2009), **Umb** (Ravera 1998, Ravera & al. 2006, Puntillo & Puntillo 2009), **Laz** (Ravera 2002b, Puntillo & Puntillo 2009), **Abr** (Puntillo & Puntillo 2009, Caporale & al. 2016), **Mol** (Caporale & al. 2008, Puntillo & Puntillo 2009), **Sar** (Zedda 2002, 2002b, Puntillo & Puntillo 2009, Cossu 2013). **S** - **Camp** (Aprile & al. 2003b, Brunialti & al. 2013, Ravera & Brunialti 2013), **Pugl** (Puntillo & Puntillo 2009), **Bas** (Puntillo & Puntillo 2009, Brackel 2011), **Cal** (Puntillo 1994, 1995, 1996, Puntillo & Puntillo 2009), **Si** (Grillo 1996, Puntillo & Puntillo 2009).

Cr/ Ch/ S/ Lign-Epiph/ pH: 1-2, L: 4, X: 2-3, E: 1/ Alt: 1-4/ Salp: vr, Mont: rr, SmedD: vr, SmedH: r, MedH: vr/ PT: 1/ u/ Note: a holarctic, temperate species, most frequent on dry parts of the boles of deciduous, acid-barked trees, but also on lignum (fence-posts, decorticated stumps), most frequent in the montane belt.

Calicium tigillare (Ach.) Pers.

Ann. Wetter. Gesellsch. Ges. Naturk., 2: 14 1811 (1810) - *Lichen tigillaris* Ach., Lichenogr. Suec. Prodr.: 67, 1799.

Syn.: *Acolium tigillare* (Ach.) Gray, *Cyphelium tigillare* (Ach.) Ach., *Cyphelium trachylioides* auct. p.p., *Cyphelium viridescens* auct. p.p., *Trachylia tigillaris* (Ach.) Fr.

N - **Frl** (Puntillo & Puntillo 2009), **Ven** (Nascimbene & Caniglia 2002c, 2003c, Nascimbene & al. 2006e, Nascimbene 2008c, Puntillo & Puntillo 2009), **TAA** (Caniglia & al. 2002, Nascimbene & al. 2005, 2006, 2006e, 2007b, 2008c, 2009, 2010, 2014, 2014c, Nascimbene 2006b, 2006c, 2008b, 2013, 2014, Thor & Nascimbene 2007, Matteucci & al. 2008c, Puntillo & Puntillo 2009, Nimis & al. 2015), **Lomb** (Nascimbene & al. 2006e, Puntillo & Puntillo 2009), **Piem** (Isocrono & al. 2004, Isocrono & Piervittori 2008, Puntillo & Puntillo 2009), **VA** (Piervittori & Isocrono 1999, Valcuvia 2000, Matteucci & al. 2008, Puntillo & Puntillo 2009), **Emil** (Puntillo & Puntillo 2009). **S** - **Cal** (Puntillo & Puntillo 2014c).

Cr/ Ch/ S/ Lign/ pH: 1-2, L: 3-5, X: 3-4, E: 1/ Alt: 3-4/ Salp: rc, Orom: er, Mont: er/ PT: 1/ Note: a mainly boreal-montane, circumpolar lichen found in upland areas on hard, dry wood, especially of conifers, on wooden fences and fence-posts, often together with *Ramboldia elabens*.

Calicium trabinellum (Ach.) Ach.

Meth. Lich. Suppl.: 14, 1803 - *Calicium xylonellum* var. *trabinellum* Ach., Meth. Lich.: 93, 1803.

Syn.: *Calicium adpersum* var. *trabinellum* (Ach.) Schaer., *Calicium incrustans* Körb., *Calicium validiusculum* Trevis.

N - **Frl** (Puntillo & Puntillo 2009), **Ven** (Nascimbene & al. 2006e, Nascimbene 2008c), **TAA** (Nascimbene 2006c, 2008b, 2013, 2014, Nascimbene & al. 2006, 2006e, 2007b, 2008c, 2014, Stofer 2006, Thor & Nascimbene 2007,

Puntillo & Puntillo 2009, Nimis & al. 2015), **Lomb** (Nascimbene & al. 2006e, Puntillo & Puntillo 2009), **Piem** (Isocrono & al. 2004, Puntillo & Puntillo 2009). **C - Sar** (Puntillo & Puntillo 2009).

Cr/ Ch/ S/ Lign/ pH: 1-2, L: 3-4, X: 2, E: 1/ Alt: 3-4/ Salp: r, Mont: vr/ PT: 0/ u/ Note: a holarctic, temperate to boreal-montane species found on hard wood, especially on old, decorticated stumps of conifers, more rarely of deciduous or even evergreen broad-leaved trees (e.g. *Quercus ilex* in montane forests), rarely on bark of conifers, to be looked for in the Apennines.

Calicium viride Pers.

Ann. Bot. (Usteri), 7: 20, 1794.

Syn.: *Calicium baliolum* Ach., *Calicium hyperellum* (Ach.) Ach., *Calicium lygodes* (Ach.) Ach., *Calicium peltatum* Ach., *Calicium proboscida* Ach., *Calicium trachelinum* var. *epiphloeum* Ach.

N - Frl (Stofer 2006, Puntillo & Puntillo 2009), **Ven** (Nascimbene & Caniglia 2002c, Nascimbene & al. 2006e, 2008c, 2013b, Puntillo & Puntillo 2009, Nascimbene 2011), **TAA** (Caniglia & al. 2002, Gottardini & al. 2004, Nascimbene 2005b, 2006b, 2006c, Stofer 2006, 2008b, 2013, 2014, Nascimbene & al. 2006e, 2007b, 2008c, 2009, 2010, 2014, Puntillo & Puntillo 2009, Watson 2014, Nimis & al. 2015), **Lomb** (Puntillo & Puntillo 2009), **Emil** (Benespero 2009). **C - Tosc** (Loppi & Putorti 1995b, Loppi & al. 1997b, Putorti & al. 1999, Puntillo & Puntillo 2009), **Laz** (Puntillo & Puntillo 2009), **Abr** (Nimis & Tretiach 1999, Puntillo & Puntillo 2009), **Sar** (Zedda 1995, Puntillo & Puntillo 2009, Rizzi & al. 2011). **S - Camp** (Aprile & al. 2003b), **Pugl** (Puntillo & Puntillo 2009), **Bas** (Potenza 2006, Puntillo & Puntillo 2009), **Cal** (Puntillo 1994, 1996, Puntillo & Puntillo 2009).

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 3, X: 2, E: 1/ Alt: 2-4/ Salp: vr, Mont: r, SmedD: er, SmedH: vr/ PT: 1/ u/ Note: a holarctic, temperate to boreal-montane lichen found on *Abies* and *Picea*, but also on the rough bark of old oaks in humid areas; certainly ranging throughout the Alps, rarer in the Apennines.

Callome Otálora & Wedin Fungal Divers., 64: 282, 2014.

A molecular study of the Collemataceae genera *Collema* and *Leptogium* by Otálora & al. (2014) has led to their re-circumscription, with six old generic names resurrected, and two new genera, including the monotypic genus *Callome*. This genus, restricted to Europe, northern Africa and North America, is sister to *Rostania* but no unique morphological, anatomical and ecological similarities are shared by these two genera. The recognition of *Callome* as separate from *Rostania* was based on thallus habitus, ecology, ascospore shape and septation. Type: *C. multipartita* (Sm.) Otálora, P.M. Jørg. & Wedin

Callome multipartita (Sm.) Otálora, P.M. Jørg. & Wedin

Fungal Divers., 64: 282, 2014 - *Collema multipartitum* Sm. in Smith & Sowerby, Engl. Bot.: 36, tab. 2582, 1814.

Syn.: *Collema multipartiens* Nyl., *Lathagrium multipartitum* (Sm.) Kremp., *Lathagrium muelleri* (Hepp) Arnold, *Lathagrium turgidum* (Körb.) A. Massal., *Synechoblastus multipartitus* (Sm.) Körb., *Parmelia turgida* ("Ach.") Schaer. non *Collema turgidum* Ach.

N - VG, Frl (Tretiach & Molaro 2007), **Ven, TAA** (Nascimbene 2008b), **Lomb, Piem** (Isocrono & al. 2004), **Emil, Lig.** **C - Tosc, Laz, Abr, Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **Sar, S - Camp** (Aprile & al. 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010), **Pugl, Cal** (Puntillo 1996), **Si** (Nimis & al. 1996b).

Fol.n/ Cy.h/ S/ Sax/ pH: 5, L: 3-4, X: 3, E: 1-2/ Alt: 2-4/ Salp: vr, Mont: r, SmedD: r, SmedH: r/ PT: 1/ Note: a mainly temperate to southern boreal-montane species found on calcareous rocks in rather sheltered situations; widespread, but never common.

Calogaya Arup, Frödén & Söchting in Arup & al., Nord. J. Bot., 31: 38, 2013.

In the molecular revision of Teloschistaceae by Arup & al. (2013), *Calogaya* forms a well-delimited clade with mainly lobate species. It is closely related to *Flavoplaca*, which, with one exception, includes purely crustose members. Most species of *Calogaya* were previously included in *Caloplaca* sect. *Gasparrinia*, which included most of the lobate species, but many species formerly treated in this section belong to other clades. The species-level taxonomy remains unclear in many cases, despite the recent attention the genus has received. Unfortunately, only a part of the many species of *Caloplaca* present in Italy, some of which are very poorly known, were included in the analysis of Arup & al. (2013), e.g. they did not include *Caloplaca saxicola*, which represents a still poorly known group of closely related taxa (see Gaya 2009, Gaya & al. 2011). Type: *C. biatorina* (A. Massal.) Arup, Frödén & Söchting

Calogaya arnoldii (Wedd.) Arup, Frödén & Söchting subsp. ***arnoldii***

in Arup & al., Nord. J. Bot., 31: 38, 2013 - *Lecanora arnoldii* Wedd., Bull. Soc. Bot. France, 23: 96, 1876.

Syn.: *Amphiloma murorum* var. *gyalolechioides* auct. ital. p.p., *Caloplaca arnoldii* (Wedd.) Zahlbr. ex Ginzbr. non auct.ital., *Caloplaca biatorina* subsp. *gyalolechioides* auct. p.p., *Caloplaca biatorinoides* (Clauzade & Cl. Roux) Gaya, Nav.Ros. & Cl. Roux, *Caloplaca saxicola* subsp. *arnoldii* (Wedd.) Clauzade & Cl. Roux non auct.ital., *Caloplaca saxicola* subsp. *biatorinoides* Clauzade & Cl. Roux, *Physcia pusilla* var. *lobulata* f. *minor* Arnold, *Placodium murorum* f. *arnoldii* (Wedd.) A.L. Sm.

N - VG, Ven. C - Tosc (TSB 34239), **Umb** (Ravera & al. 2006). **Mol** (Genovesi & Ravera 2014), **Sar**.

Cr.pl/ Ch/ S/ Sax/ pH: 4-5, L: 4-5, X: 4, E: 3-4/ Alt: 2-4/ Salp: r, Orom: vr, Mont: vr, SmedD: rr, SmedH: rr/ PT: 1/ Note: a well-distinct taxon of the extremely critical *C. saxicola* complex, found on steeply inclined surfaces of calciferous rocks (limestone, dolomite, calcareous schists) in open habitats; certainly more widespread in Italy. For further details see Gaya & al. (2001).

Calogaya arnoldii (Wedd.) Arup, Frödén & Søchting subsp. ***oblitterata*** (Pers.)

Provisionally placed here, ICN Art. 36.1b. - *Lichen oblitteratus* Pers., Ann. Bot. (Usteri), 11: 15, 1794.

Syn.: *Caloplaca arnoldii* subsp. *oblitterata* (Pers.) Gaya, *Caloplaca discernenda* (Nyl.) Zahlbr., *Caloplaca miniatula* (Nyl.) Zahlbr., *Caloplaca murorum* f. *miniatura* (Nyl.) Ozenda & Clauzade, *Caloplaca murorum* var. *oblitterata* (Pers.) Jatta, *Caloplaca pyraceoides* B. de Lesd., *Caloplaca saxicola* subsp. *oblitterata* (Pers.) Clauzade & Cl. Roux, *Lecanora discernenda* Nyl., *Lecanora miniatula* Nyl.

N - TAA (Gaya 2009), **Lomb** (Gaya 2009), **Piem** (TSB 32816), **Lig** (Gaya 2009). **C - Sar** (Herb. Vondrák 9616).

Cr.pl/ Ch/ S/ Sax/ pH: 3, L: 3-4, X: 4, E: 3-4/ Alt: 3-5/ Alp: rr, Salp: rr, Orom: vr, Mont: vr/ PT: 1/ Note: a very polymorphic taxon (see Roux & coll. 2014) with a mainly temperate to boreal distribution in Europe, also known from the southern European mountains, most frequent on base-rich siliceous rocks or on decalcified calcareous rocks, usually in nutrient-poor stands, both on vertical walls of cliffs and overhangs and on horizontal surfaces of siliceous boulders; especially the southern populations seem to prefer rather shaded conditions. The sample from Sardegna was collected in the Gennargentu Massif near Fonni, on the northern slopes of Mt. Monte Spada, at c. 1450 m. The name is often spelled “*obliterata*”, but the term “*oblitteratus*” used in the basionym is good Latin and does not need any correction.

Calogaya arnoldiiconfusa (Gaya & Nav.-Ros.) Arup, Frödén & Søchting

in Arup & al., Nord. J. Bot., 31: 38, 2013 - *Caloplaca arnoldiiconfusa* Gaya & Nav.-Ros. in Gaya, Bibl. Lichenol., 101: 54, 2009.

Syn.: *Caloplaca arnoldii* auct.ital. p.max.p.

N - Frl, Ven (Nascimbene & Caniglia 2000, 2003c, Nascimbene 2008c), **TAA** (Nascimbene & al. 2006, Nascimbene 2008b), **Piem** (TSB 33080). **C - Umb** (Ravera & al. 2011), **Abr** (Nimis & Tretiach 1999), **Sar** (ASU 235739). **S - Si** (Gaya 2009).

Cr.pl/ Ch/ S/ Sax/ pH: 5, L: 4-5, X: 4-5, E: 3-4/ Alt: 3-5/ Alp: rr, Salp: rr, Orom: rr, Mont: rr/ PT: 1/ w/ Note: in the past this species was confused with *C. arnoldii*, which substitutes in upland areas, on vertical, sun-exposed calcareous and dolomitic rocks with some seepage of water after rain. For further details see Gaya (2009) and Gaya & al. (2001).

Calogaya biatorina (A. Massal.) Arup, Frödén & Søchting

in Arup & al., Nord. J. Bot., 31: 38, 2013 - *Physcia elegans* var. *biatorina* A. Massal., Flora, 35: 565, 1852.

Syn.: *Berengeria biatorina* (A. Massal.) Trevis., *Caloplaca baumgartneri* Zahlbr., *Caloplaca biatorina* (A. Massal.) J. Steiner, *Caloplaca biatorina* var. *baumgartneri* (Zahlbr.) Poelt, *Caloplaca biatorina* var. *sympecta* J. Steiner, *Caloplaca callopiza* (Nyl.) Jatta, *Gasparrinia biatorina* (A. Massal.) Szatala, *Lecanora callopiza* Nyl., *Placodium callopizum* (Nyl.) Flagey, *Placodium biatorinum* (A. Massal.) M. Choisy

N - Frl, Ven (Lazzarin 2000b, Gaya 2009), **TAA** (Nascimbene & al. 2006), **Ven, Lomb, Piem** (Clerc & al. 1999), **VA** (Piervittori & Isocrono 1997, 1999). **C - Marc** (Nimis & Tretiach 1999), **Laz, Abr** (Recchia & Villa 1996, Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008, Genovesi & Ravera 2014), **Sar, S - Camp** (Aprile & al. 2003, 2003b), **Cal** (Puntillo 1996), **Si**.

Cr.pl/ Ch/ S/ Sax/ pH: 4-5, L: 4-5, X: 4, E: 3-4/ Alt: 3-5/ Alp: rr, Salp: rc, Orom: r, Mont: rr/ PT: 1/ Note: a holarctic species found in the mountains of southern Europe, on limestone and dolomite, more rarely on base-rich siliceous rocks, most often at the top of isolated boulders in open, nitrogen-rich situations; especially common in the central Apennines, above or near treeline. For further details see Gaya & al. (2001).

Calogaya bryochryson (Poelt) Vondrák

in Vondrák & al., Lichenologist, 48: 177, 2016 - *Caloplaca bryochryson* Poelt, Feddes Rep., 58: 175, 1955.

N - Frl, Ven (Nimis 1994, Caniglia & al. 1999), **TAA** (Nascimbene 2003), **Piem** (TSB 32512). **C - Marc** (Nimis & Tretiach 1999).

Cr/ Ch/ A.s/ Terr-Sax/ pH: 4-5, L: 4, X: 3, E: 3/ Alt: 4-5/ Alp: r, Salp: vr, Orom: er/ PT: 1/ Note: on mosses, soil and plant debris over calcareous substrata, but also directly on calcareous rocks, in sheltered but light-rich situations, with optimum above treeline. Very much overlooked, or confused with other sorediate species in the Alps, it probably occurs also in Abruzzo (Majella and Gran Sasso Massives), and should be looked for there. For further details see Vondrák & al. (2016b).

Calogaya decipiens (Arnold) Arup, Frödén & Søchting

in Arup & al., Nord. J. Bot., 31: 38, 2013 - *Physcia decipiens* Arnold, Flora, 50: 526, 1867.

Syn.: *Amphiloma decipiens* (Arnold) Bagl., *Caloplaca decipiens* (Arnold) Blomb. & Forssell, *Gasparrinia decipiens* (Arnold) Syd., *Lecanora decipiens* (Arnold) Nyl., *Placodium decipiens* (Arnold) Leight.

N - VG (vidi!), **Frl** (vidi!), **Ven, TAA** (De Benetti & Caniglia 1993), **Piem** (Gazzano & al. 2009b), **Emil** (Nimis & al. 1996), **Lig, C - Tosc** (Paoli & al. 2014b), **Marc** (Nimis & Tretiach 1999, Tretiach & Pinna 2000), **Umb** (Nimis &

Tretiach 1999, Ravera & al. 2006), **Laz, Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **Sar. S - Camp, Pugl, Bas** (Nimis & Tretiach 1999), **Si** (Otonello & al. 1994).

Cr.pl/ Ch/ A.s/ Sax/ pH: 4-5, L: 4-5, X: 4, E: 4-5/ Alt: 2-4/ Salp: vr, Mont: er, SmedD: rr, SmedH: r/ PT: 1-2/ subc/ Note: a temperate, somehow subcontinental species found on calciferous substrata, especially on mortar walls, not common in most of Italy, perhaps because of its subcontinental character, but abundant, and locally extremely abundant in some dry Alpine valleys, and along the eastern slopes of the Apennines, mostly on walls in small villages, much rarer in natural habitats. The record from Venezia Giulia is at Rocca di Monrupino near Trieste, that from Friuli in the surroundings of Tarcento (UD). For further details see Gaya & al. (2001).

Calogaya lobulata (Flörke) Arup, Frödén & Søchting

in Arup & al., Nord. J. Bot., 31: 39, 2013 - *Lecanora lobulata* Flörke, Deutsche Lich., 3: 14, 1815.

Syn.: *Caloplaca boulyi* (Zahlbr.) M. Steiner & Poelt, *Caloplaca lobulata* (Flörke) Hellb., *Parmelia parietina* var. *lobulata* (Flörke) Fr., *Xanthoria boulyi* Zahlbr., *Xanthoria lobulata* (Flörke) B. de Lesd., *Xanthoria parietina* var. *lobulata* (Flörke) Rabenh., *Xanthoria parietina* var. *turgida* (Schaer.) Arnold

N - Ven, TAA (Dalla Torre & Sarnthein 1902, Nascimbene & al. 2007b), **Lomb, Piem** (Isocrono & al. 2004), **Lig. C - Marc** (Frati & Brunialti 2006), **Abr** (Nimis & Tretiach 1999, Stofer 2006), **Mol** (Caporale & al. 2008), **Sar. S - Pugl** (LD-1042560).

Cr.pl/ Ch/ S/ Epiph/ pH: 2, L: 4, X: 3-4, E: 2-3/ Alt: 1-2/ SmedD: vr, MedD: er/ PT: 1-2/ subc/ Note: a mild-temperate, subcontinental species, which in Italy is found especially on isolated almond trees, mostly on branches, in continental areas (internal Alpine and Apenninic valleys, central Sardegna). The species is included in the Italian red list of epiphytic lichens as “Vulnerable” (Nascimbene & al. 2013c).

Calogaya pusilla (A. Massal.) Arup, Frödén & Søchting

in Arup & al., Nord. J. Bot., 31: 39, 2013 - *Physcia pusilla* A. Massal., Atti Ist. Ven., ser. 2, vol. III, append. III: 59, fig. VII, 1852.

Syn.: *Caloplaca murorum* var. *pulvinata* (A. Massal.) Jatta, *Caloplaca murorum* f. *pulvinata* (A. Massal.) Ozenda & Clauzade, *Caloplaca pusilla* (A. Massal.) Zahlbr., *Caloplaca saxicola* subsp. *pulvinata* (A. Massal.) Clauzade & Cl. Roux, *Gasparrinia pusilla* (A. Massal.) Tornab., *Physcia murorum* var. *pulvinata* A. Massal., *Physcia murorum* var. *pulvinata* f. *euphora* A. Massal., *Physcia pusilla* var. *turgida* A. Massal., *Placodium pusillum* (A. Massal.) Anzi

N - VG (Crisafulli & al. 2004, Tretiach & al. 2007b), **Frl** (Nascimbene & al. 2009b), **Ven** (Caniglia & al. 1999, Lazzarin 2000b, Nascimbene & Caniglia 2003c, Nascimbene 2004, 2005c, 2008c, Thor & Nascimbene 2007, Nascimbene & Salvadori 2008, Gaya 2009), **TAA** (Nascimbene 2003, 2004, 2008b), **Lomb** (Valcuvia & al. 2003, De Vita & Valcuvia 2004), **Piem** (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1997, 1999, Piervittori & al. 2004), **Emil** (Nimis & al. 1996, Valcuvia & Grieco 1995, Valcuvia & Savino 2000, Morselli & Regazzi 2006), **Lig. C - Tosc** (Pasquinelli & al. 2009), **Marc** (Nimis & Tretiach 1999), **Umb** (Panfili 2000b, 2007, Ravera & al. 2006, Genovesi 2011), **Laz** (Pietrini & al. 2008, Roccardi 2011, Genovesi & al. 2011), **Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach, 1999, 2004, Caporale & al. 2008, Genovesi & Ravera 2014), **Sar. S - Camp** (Nimis & Tretiach 2004, Catalano & al. 2016), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994, Poli & al. 1997, Grillo 1998, Grillo & Caniglia 2004, Brackel 2008c).

Cr.pl/ Ch/ S/ Sax/ pH: 3-5, L: 4-5, X: 4-5, E: 2-3/ Alt: 1-5/ Alp: r, Salp: rr, Orom: r, Mont: rc, SmedD: vc, Pad: rr, SmedH: vc, MedH: c, MedD: rr/ PT: 1-3/ Note: this coniophilous and ornithocoprophilous, much misunderstood species, grows mainly on walls and horizontal surfaces of calcareous rocks and has been frequently confused with *C. saxicola* in the broad sense. It is certainly much more widespread in Italy, and most of the earlier records of *C. saxicola* refer to this taxon. For further details see Gaya (2009) and Gaya & al. (2011).

Calogaya schistidii (Anzi) Arup, Frödén & Søchting

in Arup & al., Nord. J. Bot., 31: 39, 2013 - *Gyalolechia schistidii* Anzi, Cat. Lich. Sondr.: 38, 1860.

Syn.: *Candelariella schistidii* (Anzi) Lettau, *Caloplaca schistidii* (Anzi) Zahlbr., *Fulgensia schistidii* (Anzi) Poelt, *Lecidea luteoalba* var. *musciola* sensu Schaer.

N - Ven (Caniglia & al. 1999, Nascimbene 2008c), **TAA, Lomb, Piem, VA** (Piervittori & Isocrono 1999), **Emil** (Tretiach & al. 2008), **C - Tosc** (Benesperi 2006), **Marc** (Nimis & Tretiach 1999), **Umb** (Nimis & Tretiach 1999, Ravera & al. 2006), **Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach, 1999, 2004, Caporale & al. 2008), **Sar. S - Camp** (Aprile & al. 2002, 2003b, Nimis & Tretiach 2004), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Brackel 2008b).

Cr/ Ch/ S/ Terr-Sax/ pH: 3-4, L: 4-5, X: 3-4, E: 2-3/ Alt: 2-5/ Alp: vr, Salp: rr, Orom: rc, Mont: rc, SmedD: er, SmedH: vr/ PT: 1/ Note: on pulvinate epilithic mosses (especially *Grimmia anomodon* and *Schistidium apocarpum*) over calcareous substrata, most common in upland areas.

Caloplaca Th. Fr. s.str.

Lichenogr. Scand., 1: 167, 1871, *nom. cons.*

The very large and heterogenous genus *Caloplaca*, with hundreds of species as recognised until recently, has been re-defined by Arup & al. (2013) on the basis of molecular data, with the recognition of many new or resurrected genera, not all of which can be identified without a molecular analysis. Further genera have been created by Kondratyuk & al. (2013, 2014b, 2014c, 2015a). *Caloplaca* in the strict sense includes now only the members of the *C. cerina* complex, characterised by lecanorine apothecia with a grey thallus.

Unfortunately, only a part of the many species of *Caloplaca s.lat.* present in Italy, some of which are very poorly known, were included in the analysis of Arup & al. (2013). Here I tentatively follow the arrangement proposed by Arup & al. (2013), but I am forced to leave into *Caloplaca s.lat.* (exceptionally treated as a separate entry in this book) many unresolved species whose correct generic placement awaits further studies. Type: *C. cerina* (Hedw.) Th. Fr.

Caloplaca cerina (Hedw.) Th. Fr. *s.lat.*

N. Acta Reg. Soc. Sci. Upsal., ser. 3, 3: 218, 1861 - *Lichen cerinus* Hedw., Descr. Adumbr. Muscor. Frond., 2: 62, 1789.

Syn.: *Blastenia ferruginea* var. *omora* A. Massal., *Callospisma cerinum* (Hedw.) De Not., *Callospisma cerinum* var. *effusum* A. Massal., *Caloplaca cerina* f. *dispersa* H. Olivier, *Caloplaca cerina* var. *nigromarginata* (Bagl. & Carestia) Jatta, *Caloplaca gilva* (Vain.) Zahlbr., *Caloplaca gilvolutea* (Nyl.) Zahlbr., *Lecanora gilvolutea* Nyl., *Placodium cerinum* (Hedw.) Hepp, *Placodium gilvum* Vain.

N - VG (Castello 1996), **Frl, Ven** (Nimis & al. 1996c, Lazzarin 2000b, Nascimbene & Caniglia 2003c, Nascimbene 2005c, 2008, Nascimbene & Marini 2007), **TAA** (Hinteregger 1994, Nascimbene 2003, 2005b, 2008b, 2014, Nascimbene & al. 2005, 2006, 2006e, 2007b, 2014, Svensson & Thor 2007, Lang 2009, Zarabska & al. 2009, Brackel 2013, Nimis & al. 2015), **Lomb** (Valcuvia & Gianatti 1995, Zocchi & al. 1997, Arosio & al. 2003, Dalle Vedove & al. 2004, Valcuvia & Truzzi 2007b), **Piem** (Caniglia & al. 1992, Morisi & Sereno 1995, Piervittori 1998, 2003, Isocrono & al. 2003, 2005b, Griselli & al. 2003, Isocrono & Piervittori 2008), **VA** (Piervittori & Maffei 1996, 2001, Piervittori & Isocrono 1999, Piervittori & al. 2001, Matteucci & al. 2008, 2008c), **Emil** (Bassi 1995, Gasparo & Tretiach 1996, Nimis & al. 1996, Valcuvia & Savino 2000, Sallese 2003, Marconi & al. 2006, Benesperi 2009, Malvasi 2014), **Lig** (Brunialti & al. 1999, Valcuvia & al. 2000, Giordani & Incerti 2008), **C - Tosc** (Tretiach & Nimis 1994, Loppi & al. 1995, 1996b, 1997, 1998, 1998b, 2002, 2006, Loppi & Putorti 1995, Loppi 1996b, Putorti & al. 1998, Loppi & Fratini 2006, Benesperi & al. 2007, 2013, Benesperi & Lastrucci 2007, Paoli & Loppi 2008, Lastrucci & al. 2009, Brunialti & Fratini 2010, Benesperi 2011), **Marc** (Gasparo & al. 1989, Nimis & Tretiach 1999, Fratini & Brunialti 2006, Pieri & al. 2015), **Umb** (Ravera 1998, 1999, Ravera & al. 2006), **Laz** (Bartoli & al. 1997, Massari & Ravera 2002, Nimis & Tretiach 2004, Ruisi & al. 2005, Munzi & al. 2007, Ravera & Genovesi 2008), **Abr** (Recchia & al. 1993, Olivieri & Pacioni 1996, Olivieri & al. 1997, 1997b, Loppi & al. 1999, Nimis & Tretiach 1999, Brackel 2015, Caporale & al. 2016, Corona & al. 2016), **Mol** (Garofalo & al. 1999, Nimis & Tretiach 1999, Caporale & al. 2008, Paoli & al. 2011, 2015, Genovesi & Ravera 2014), **Sar** (Zedda 1995, 2002, Rizzi & al. 2011, Cossu 2013), **S - Camp** (Garofalo & al. 1999, 2010, Aprile & al. 2002, 2003, 2003b, Nimis & Tretiach 2004, Brunialti & al. 2010, 2013, Catalano & al. 2012, 2016, Ravera & Brunialti 2013), **Pugl** (Nimis & Tretiach 1999, Brackel 2011), **Bas** (Nimis & Tretiach 1999, Potenza 2006, Paoli & al. 2006, Brackel 2011), **Cal** (Puntillo 1996, Puntillo & Puntillo 2004), **Si** (Merlo 1993, 2004, Nimis & al. 1994, Ottonello & Salone 1994, Ottonello & al. 1994, Ottonello 1996, Grillo & Carfi 1997, Ottonello & Romano 1997, Grillo 1998, Grillo & al. 2002, Grillo & Caniglia 2004, 2006, Merlo 2004b, Falco Scampatelli 2005, Brackel 2008b, 2008c, Liistro & Cataldo 2011, Cataldo & Minissale 2015).

Cr/ Ch/ S/ Epiph/ pH: 3-4, L: 3-5, X: 3-4, E: 3-4/ Alt: 1-4/ Salp: vr, Mont: rr, SmedD: rc, Pad: vr, SmedH: c, MedH: rc, MedD: vr/ PT: 1-3/ Note: a holarctic, subtropical to boreal-montane lichen with optimum on smooth, mineral-rich bark (e.g. of *Acer*, *Fraxinus*, *Juglans*) but also on moderately eutrophicated bark of other trees, rare in polluted areas. In the complex of *C. cerina s.lat.* morphological differences among taxa are slight, while ecological and distributional differences are often remarkably clear. The treatment of this group is far from being complete, and it is still difficult to handle the nomenclature (see Šoun & al. 2011): at least some of the samples growing on plant debris are now segregated into *C. stillicidiorum*.

Caloplaca chlorina (Flot.) H. Olivier

Flecht. Eur., 2: 122, 1909 - *Zeora cerina* var. *chlorina* Flot., 27 Jahresber. schles. Ges. vaterl. Kultur: 126, 1849.

Syn.: *Caloplaca cerina* var. *chlorina* (Flot.) Müll. Arg., *Placodium cerinum* var. *chlorinum* (Flot.) Anzi, *Placodium cerinum* f. *cyanopolium* (Nyl.) A.L. Sm.

N - Frl (Tretiach & Hafellner 2000), **Ven** (Nimis 1994, Nascimbene 2005c, 2008c), **TAA** (Nascimbene 2002, 2003, Thor & Nascimbene 2007), **Lomb, Piem** (Isocrono & al. 2004), **VA** (Matteucci & al. 2015c), **C - Abr** (Nimis & Tretiach 1999).

Cr/ Ch/ A.i/ Sax/ pH: 2-3, L: 3-4, X: 3, E: 3-4/ Alt: 3-5/ Alp: vr, Salp: rr, Mont: r/ PT: 1/ Note: on siliceous, nutrient-enriched rocks, mostly in upland areas. The records of *C. chlorina* from the Alps reported by Nimis (1993: 159) are included partly here (silicicolous specimens), and partly under *C. isidiigera* (calcicolous specimens). See also Hafellner & Türk (2001).

Caloplaca isidiigera Vězda

Folia Geobot. Phytotaxon., 13: 417, 1978.

N - Frl (TSB 26480), **TAA** (Šoun & al. 2011), **Lomb, Piem. C - Abr** (TSB 24914).

Cr/ Ch/ A.i/ Sax/ pH: 4-5, L: 3-4, X: 3, E: 3-4/ Alt: 4-5/ Alp: vr, Salp: rr/ PT: 1/ Note: a calcicolous species of nutrient-enriched rocks in upland areas. See also note on *C. chlorina*.

Caloplaca monacensis (Leder.) Lettau

Hedwigia, 52: 240, 1912 - *Pyrenodesmia monacensis* Leder., Ber. bayer. bot. Ges., 4: 26, 1896.

Syn.: *Caloplaca cerina* var. *cyanolepra* (DC.) J. Kickx f., *Caloplaca cerina* var. *erhartii* (Schaer.) Trevis., *Placodium cerinum* f. *cyanoleprum* (DC.) Anzi

N - Frl, Ven (Šoun & al. 2011), **TAA** (Šoun & al. 2011), **Emil** (vidi!), **C - Umb** (Ravera 1999).

Cr/ Ch/ A.s/ Epiph/ pH: 3-4, L: 4-5, X: 3-4, E: 3-4/ Alt: 1-2/ SmedD: rr, Pad: er/ PT: 1-2/ Note: on isolated trees with subneutral, base-rich bark; I have observed this species several times in the plains of northeastern Italy, where it is locally common on poplars. The record of an epiphytic *C. isidiigera* by Ravera (1999) most probably refers to this species.

Caloplaca stillicidiorum (Vahl) Lyngge

Skr. Vidensk. Selsk. Christiania, Kl. I, Math.-Natur., 15: 4, 1921 - *Lichen stillicidiorum* Vahl, Icon. Plant. Dan., 6, 18: 6, 1792.

Syn.: *Caloplaca cerina* f. *chloroleuca* Sm., *Caloplaca cerina* var. *chloroleuca* (Sm.) Th. Fr., *Caloplaca cerina* var. *stillicidiorum* (Vahl) Th. Fr., *Placodium cerinum* var. *stillicidiorum* (Vahl) Hepp, *Placodium cerinum* var. *stillicidiorum* f. *chloroleucum* (Sm.) Anzi

N - **Frl** (Hafellner & al. 2008), **Ven** (Nimis 1994, Nascimbene & Caniglia 2003c, Nascimbene 2005c, 2008c, Nascimbene & Marini 2007), **TAA** (Nascimbene & al. 2006, Nascimbene 2008b, Bilovitz & al. 2014b), **Lomb** (Dalle Vedove & al. 2004), **Piem** (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999), **Emil** (TSB 35576). **C** - **Tosc**, **Marc** (Nimis & Tretiach 1999), **Umb** (Genovesi & al. 2001, Ravera & al. 2006, Panfili 2007), **Laz** (Ravera 2006, Brackel 2015), **Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 2004, Caporale & al. 2008). **S** - **Camp** (Nimis & Tretiach 2004), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996).

Cr/ Ch/ S/ Terr/ pH: 3-4, L: 3-4, X: 3, E: 2-3/ Alt: 3-5/ Alp: vc, Salp: ec, Orom: r, Mont: vr/ PT: 1/ Note: a mainly arctic-alpine, circumpolar lichen found on mosses and plant debris in tundra-like habitats, especially in areas with calcareous or basic siliceous rocks, to be looked for in the mountains of Sicilia. This is the only taxon hosting the parasite *Stigmidium cerinae*, which suggests that it is an independent species. The *Caloplaca cerina*-like lichens growing on the ground on various substrata such as bryophytes, plant debris, bark of exposed roots and chamaephytes have been molecularly analysed by Šoun & al. (2011), who found that they form four monophyletic groups and six ecotypes, which cannot be always distinguished on the basis of morphological characters. Here I place alpine-subalpine populations growing on calcareous substrata, with pale apothecial discs. See also note on *C. cerina*.

Caloplaca stillicidiorum (Vahl) Lyngge var. ***muscorum*** (A. Massal.)

Provisionally placed here, ICN Art. 36.1b. - *Callophisma cerinum* var. *muscorum* A. Massal., Symmicta Lich.: 35, 1855.

Syn.: *Caloplaca cerina* var. *muscorum* (A. Massal.) Jatta, *Caloplaca muscorum* (A. Massal.) M. Choisy & Werner

N - **Frl** (Tretiach & Hafellner 2000, Hafellner & al. 2008), **Ven** (Lazzarin 2000b, Nascimbene & Caniglia 2003c), **TAA** (Nascimbene & al. 2006, Nascimbene 2008b, Hafellner & al. 2012), **Lomb** (Valcuvia & al. 2003, Dalle Vedove & al. 2004, Ertz & al. 2015), **Piem** (Morisi & Sereno 1995, Morisi 2005, Matteucci & al. 2013), **VA** (Piervittori & Isocrono 1999, Valcuvia 2000, Piervittori & al. 2004), **Lig** (TSB 33470). **C** - **Tosc** (Benesperi 2007, Benesperi & al. 2007), **Marc** (Nimis & Tretiach 1999), **Umb** (Genovesi & al. 2002, Ravera & al. 2006), **Abr** (Nimis & Tretiach 1999), **Sar**. **S** - **Camp** (Aprile & al. 2002, 2003b), **Bas** (Puntillo & al. 2012), **Cal** (Puntillo 1996), **Si** (Caniglia & Grillo 2003).

Cr/ Ch/ S/ Terr/ pH: 3, L: 4, X: 3-4, E: 2-3/ Alt: 1-4/ Salp: er, Mont: er, SmedD: vr, SmedH: er, MedH: vr, MedD: r/ PT: 1/ subc/ Note: here I place populations growing on mosses and plant debris, below the subalpine belt and mostly in dry-continental areas, on basic siliceous substrata, with intensely orange apothecial discs. They represent an heterogeneous assemblage of ecotypes whose taxonomy has not been clarified yet (Šoun & al. 2011). See also note on the previous entry.

Caloplaca thracopontica Vondrák & Šoun

Lichenologist, 40: 381, 2008.

Syn.: *Caloplaca chlorina* auct. ital. p.p. non (Flot.) Sandst., *Caloplaca cerinoides* auct. ital. non (Anzi) Jatta

N - **Emil**, **Lig**. **C** - **Tosc**, **Laz** (Genovesi & al. 2011), **Sar** (Monte 1993). **S** - **Camp**.

Cr/ Ch/ S/ Sax/ pH: 3, L: 4, X: 3, E: 3-4/ Alt: 1-2/ SmedH: rr, MedH: r, MedD: er/ PT: 1/ Note: on base-rich siliceous rocks, especially on basalt, not uncommon at least in parts of Tyrrhenian Italy. A lichen like this, belonging to the difficult *C. cerina* complex, was often called *Caloplaca chlorina* by South European authors. The application of the epithet "*chlorina*" was very controversial until Wetmore (1996) solved the problem by examining the type material. Non-isidiate, fruiting specimens from central and southern Italy collected at low elevations on basic siliceous rocks, were provisionally called *Caloplaca cerinoides* (Anzi) Jatta by Nimis (1993: 159), but according to Vondrák (*in litt.*), who examined material of this species collected by Anzi, this is a probable synonym of *C. atroflava*. The specimens in TSB agree quite well with *C. thracopontica*, described from the Black Sea Region.

Caloplaca virescens (Sm.) Coppins

in Hawksworth & al., Lichenologist, 12: 106, 1980 - *Lepraria virescens* Sm., Engl. Bot.: 30, tab. 2149, 1810.

N - **Frl** (LD-1048288), **Piem** (TSB 33528). **C** - **Tosc** (Tretiach & Nimis 1994, Benesperi 2011), **Marc** (Nimis & Tretiach 1999, Frati & Brunialti 2006), **Umb** (Ravera & al. 2006b). **S** - **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo & Puntillo 2004).

Cr/ Ch/ A.s/ Epiph/ pH: 2-3, L: 3-4, X: 3, E: 3-4/ Alt: 2/ SmedD: vr, SmedH: r/ PT: 1/ subc/ Note: a mild-temperate lichen found on old deciduous trees, especially oaks and chestnut, often near the base of the trunks, overlooked, or confused with *C. cerina*, but certainly not common. The species seems to be morphologically and ecologically close to *C. monacensis*, but differs in the well-developed, areolate,

rarely fertile thallus with a thick layer of small granules, although molecular data suggest that it could be a sorediate-blastidiate morph of *C. monacensis* (Vondrák *in litt.*); at least some of the Italian records could refer to *C. turkuensis* (Vain.) Zahlbr. The species is included in the Italian red list of epiphytic lichens under the “Least Concern” category (Nascimbene & al. 2013c).

Caloplaca Th. Fr. *s.lat.*

Here I place all species of *Caloplaca s.lat.* which do not belong to *Caloplaca s.str.* and which were not yet formally assigned to other genera. For several of them the correct generic affiliations are known, but pending an official publication by the respective authors, I still treat them under the old generic name.

Caloplaca adelphoparasitica Nimis & Poelt

in Nimis & al., Bull. Soc. linn. Provence, 45: 250, 1994.

S - Si (Nimis & al. 1994).

Cr/ Ch/ S/ Sax/ pH: 5, L: 4, X: 2-3, E: 2/ Alt: 1/ MedH: vr/ PT: 1/ coast, paras *Caloplaca cretensis*/

Note: a well-distinguished calcicolous species also known from Turkey, to be sought for throughout the Mediterranean, in coastal situations, wherever the host is found, but certainly not common.

Caloplaca adriatica (Zahlbr.) Servít

Hedwigia, 71: 275, 1931 - *Caloplaca schaeereri* var. *adriatica* Zahlbr., Ann. naturhist. Mus. Wien, 19: 420, 1904

N - VG, Ven (Nascimbene 2003b, 2005c, Nascimbene & Marini 2007), TAA (Spitale & Nascimbene 2012), Lig (Giordani & al. 2016). C - Abr (Nimis & Tretiach 1999). S - Cal (Puntillo 1996).

Cr.end/ Ch/ S/ Sax/ pH: 5, L: 4-5, X: 4, E: 2-3/ Alt: 2-3/ Mont: vr, SmedD: er, SmedH: er/ PT: 1/ Note: a Mediterranean to mild-temperate lichen found on steeply inclined surfaces of hard limestone rocks.

Caloplaca aegatica Giralt, Nimis & Poelt

Cryptogamie, Bryol. Lichénol., 13: 263, 1992.

Syn.: *Caloplaca quercina* auct. non Flagey

C - Tosc (Loppi 1996b, Putorti & Loppi 1999, Benesperi & al. 2013), Marc (TSB 30959), Laz, Sar (Zedda 2002, 2002b). S - Camp (Catalano & al. 2012), Pugl (Nimis & Tretiach 1999, Durini & Medagli 2004), Si (Nimis & al. 1994).

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 4-5, X: 2, E: 2-3/ Alt: 1-2/ SmedH: er, MedH: r/ PT: 1/ suboc, coast/ Note: a humid subtropical to mild-temperate lichen found on trees and shrubs in open, but humid stands of Mediterranean vegetation; a typically Tyrrhenian species in Italy, mostly occurring near the coast.

Caloplaca aetnensis B. de Lesd.

Bull. Soc. Bot. France, 82: 317, 1935.

C - Tosc (TSB 18723). S - Si (Loppi & al. 1997, Ottonello & Puntillo 2009).

Cr/ Ch/ S/ Terr-Sax/ pH: 3-4, L: 4, X: 4, E: 3-4/ Alt: 1/ MedH: r, MedD: vr/ PT: 1-2/ Note: a Mediterranean lichen found on soil deriving from volcanic base-rich rocks, more rarely directly on soft rocks, common only in parts of Sicily, especially in the small volcanic islands, clearly related to *C. erythrocarpa* and to *Pyrenodesmia s.lat. sensu* Arup & al. (2013).

Caloplaca albolutescens (Nyl.) H. Olivier

Mém. Soc. Sc. Nat. Cherbourg, 37: 127, 1909 - *Lecanora albolutescens* Nyl., Flora, 64: 127, 1909.

Syn.: *Calopisma albolutescens* (Nyl.) Walt. Watson, *Placodium albolutescens* (Nyl.) A.L. Sm.

N - Frl. C - Tosc (Herb. Vondrák 8849). S - Si (Herb. Vondrák 10862).

Cr/ Ch/ A.s/ Sax/ pH: 3-4, L: 3-4, X: 3, E: 3-4/ Alt: 1-2/ SmedD: vr, SmedH: vr/ PT: 2-3/ Note: this species is ecologically and morphologically very similar to *C. teicholyta*. *C. albolutescens* has a thin leprose thallus, the cortex is absent or poorly differentiated at margins, and marginal lobes are missing, whereas *C. teicholyta* has a rather thick thallus which is sorediate in the centre, while marginal lobes are more or less present and the cortex is well-developed, at least marginally. The species is related to *Pyrenodesmia s.lat. sensu* Arup & al. (2013).

Caloplaca anularis Clauzade & Poelt

Herzogia, 2: 305, 1972.

Syn.: *Caloplaca scrobiculata* auct. eur. non H. Magn.

N - Frl, Ven (Nascimbene & Caniglia 2000, 2003c, Thor & Nascimbene 2007), TAA (Nascimbene 2008b).

Cr.pl/ Ch/ S/ Sax/ pH: 4-5, L: 4-5, X: 4-5, E: 1-3/ Alt: 4-5/ Alp: vr, Salp: er/ PT: 1/ Note: a species of the Eurasian mountains, in dry-continental areas found on steeply inclined, compact limestone and dolomite, with optimum above treeline; perhaps more frequent, but undercollected in the Alps. The species differs from *C. scrobiculata*, of which it has been sometimes considered to be a synonym (Vondrák & Mayrhofer 2013).

Caloplaca aractina (Fr.) Häyrén *s.lat.*

Acta Soc. Fauna Fl. Fenn., 39: 152, 1914 - *Parmelia aractina* Fr., Syst. Orb. Veget.: 284, 1825.

Syn.: *Caloplaca cerina* var. *aractina* (Fr.) Th. Fr., *Caloplaca fuscoatra* auct. non (Decuillé) Zahlbr., *Caloplaca viridirufa* auct. non (Ach.) Zahlbr., *Placodium fuscoatrum* auct. non (Nyl.) A.L. Sm.

N - Emil. C - Sar (Rizzi & al. 2011, Giordani & al. 2013, Vondrák 2012: Nr. 51).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 3-5, X: 3-4, E: 2-3/ Alt: 1/ MedH: rr, MedD: er/ PT: 1/ suboc, coast/ Note: according to Vondrák (*in litt.*) this species is not homogeneous and includes several taxa with different ecology and distribution; the Italian records probably refer to two different "species": that from Sardinia to a mild-temperate to subtropical lichen found on hard siliceous rocks near the coast, that from the Apennines of Emilia to another taxon with inland distribution (see also Nimis 1993: 153). According to Vondrák (*in litt.*), both are related to *Pyrenodesmia s.lat. sensu* Arup & al. (2013).

Caloplaca areolata (Zahlbr.) Clauzade

in Vězda, Sched. ad Lich. Sel. Exs., Fasc. 29: 3 (nr. 711), 1968 - *Caloplaca cerina* var. *areolata* Zahlbr., Öst. bot. Z., 53: 289, 1903.

Syn.: *Caloplaca spatatensis* auct. non Zahlbr.

N - VG (Tretiach & al. 2007b), **Lig** (Giordani & al. 2016), **C - Laz** (Nimis & Tretiach 2004), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **S - Camp** (Aprile & al. 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010), **Pugl** (Nimis & Tretiach 1999), **Si** (Nimis & al. 1996b).

Cr/ Ch/ S/ Sax/ pH: 5, L: 4-5, X: 4, E: 4-5/ Alt: 1-3/ Mont: vr, SmedD: r, SmedH: rr, MedH: r/ PT: 1/ paras crustose lichens/ Note: a mild-temperate, characteristic, but much misunderstood species found on the top of calcareous birds' perching boulders; in northern Italy is mostly found at low altitudes, in southern Italy it reaches the montane belt. This species was often synonymised with *C. spatatensis* Zahlbr., but according to Vondrák & al. (2013), the holotype of the latter species, contrary to what stated in the description, grows on siliceous rocks and has biatorine apothecia, being a poorly developed *Blastenia*. According to Vondrák (*in litt.*), the species is related to *Pyrenodesmia s.lat. sensu* Arup & al. (2013).

Caloplaca asserigena (J. Lahm) H. Olivier

Mém. Soc. Nat. Sc. Nat. Cherbourg, 37: 140, 1909 - *Callopisma asserigenum* J. Lahm, Jahresber. Westfäl. Prov.-Vereins, 11: 107, 1883.

Syn.: *Caloplaca assigena* (Arnold) Dalla Torre & Sarnth., *Blastenia assigena* Arnold

N - Frl.

Cr/ Ch/ A.s/ Lign/ pH: 1-2, L: 3-5, X: 1-3, E: 3-4/ Alt: 3-4/ Salp: vr, Mont: er/ PT: 1/ #/ Note: according to Vondrák (*in litt.*) this species is quite common in eu-oceanic habitats of Eurasia (Macaronesia, Norway, Caucasus), and also in foggy forests, usually on twigs of conifers or shrubs.

Caloplaca athrocarpa (Anzi) Jatta

Syll. Lich. Ital.: 247, 1900 - *Gyalolechia athrocarpa* Anzi, Cat. Lich. Sondr.: 38, 1860.

Syn.: *Blastenia athrocarpa* (Anzi) Arnold, *Callopisma athrocarpum* (Anzi) Bagl. & Carestia, *Lecanora ammiospiloides* Nyl.

N - Ven, TAA, Lomb, Piem (Morisi & Sereno 1995, Isocrono & al. 2004), **Emil.**

Cr/ Ch/ S/ Lign/ pH: 2-3, L: 4-5, X: 4, E: 3-4/ Alt: 4/ Salp: vr/ PT: 1/ #/ Note: on eutrophicated wood, more rarely on bark, on basal parts of isolated trees; a poorly understood taxon, which needs further study. The species is included as "Regionally Extinct" in the Italian red list of epiphytic lichens (Nascimbene & al. 2013c). Vondrák (*in litt.*) has examined material distributed by Anzi, which proved to belong to *Rufoplaca*, a genus whose taxonomy at species level is still not very clear.

Caloplaca atroflava (Turner) Mong.

Bull. Géogr. Bot., 23: 192, 1914 - *Lecidea atroflava* Turner, Trans. Linn. Soc. London, 9: 142, 1808.

Syn.: *Caloplaca atroflava* var. *submersa* (Nyl.) H. Magn., ? *Caloplaca cerinoides* (Anzi) Jatta non *sensu* Nimis, *Caloplaca ferruginea* var. *obscura* Th. Fr., *Caloplaca turneriana* (Ach.) H. Olivier, *Lecanora pyracea* f. *submersa* Nyl., ? *Placodium cerinoides* Anzi

N - Lomb, Lig, C - Sar (Rizzi & al. 2011), **S - Camp** (Nimis & Tretiach 2004), **Cal** (Puntillo 1996), **S - Si** (Caniglia & Grillo 2003, Grillo & Caniglia 2004).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 3-4, X: 1-3, E: 1-3/ Alt: 1-3/ Mont: er, SmedH: er, MedH: er/ PT: 1/ suboc, l/ Note: a Mediterranean-Atlantic species in Europe, found on base-rich or eutrophicated siliceous rocks, especially on basalt, sometimes periodically submerged in Mediterranean creeks and rivulets, or on exposed surfaces of boulders near the soil surface. According to Vondrák (*in litt.*), the species is related to *Pyrenodesmia s.lat. sensu* Arup & al. (2013).

Caloplaca cacuminum Poelt

Mitt. bot. Staatss. München, 1: 235, 1953.

Syn.: *Callopisma aurantiacum* var. *microsporum* Arnold, *Caloplaca aurantiaca* var. *microspora* (Arnold) Dalla Torre & Sarnth.

N - Frl, TAA, Piem (Matteucci & al. 2013, Favero-Longo & al. 2015), **VA** (Favero-Longo & al. 2006, Isocrono & al. 2008, Favero-Longo & Piervittori 2009), **C - Abr** (Nimis & Tretiach 1999).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 4-5, X: 4, E: 3-4/ Alt: 4-5/ Alp: vr, Salp: er/ PT: 1/ Note: a probably arctic-alpine species typical of Alpine peaks, found on limestone and dolomite in exposed habitats, often starting the life-cycle on other lichens; probably widespread throughout the Alps.

Caloplaca cecericola B. de Lesd.

Bull. Soc. Bot. France, 99: 145, 1952.

N - Lig. C - Tosc.

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4, X: 4, E: 3-4/ Alt: 1-2/ SmedD: er, SmedH: vr, MedH: vr/ PT: 1/ #/ Note: a very poorly known species growing on non-calcareous siliceous rocks in exposed habitats, perhaps belonging to *Blastenia*. According to Roux & coll. (2014) the name should be "*cecericola*" (from the type locality, Mt. Ceceri near Florence): the epithet *cecericola* was probably due to a printing error in the original description.

Caloplaca chanousiae Sambo

Ann. Lab. Chanousia, 1: 34, 1932.

Syn.: *Fulgensia chanousiae* (Sambo) Poelt

N - TAA, VA (Piervittori & Isocrono 1999).

Cr.pl/ Ch/ S/ Sax/ pH: 3-4, L: 4-5, X: 3-4, E: 2-3/ Alt: 5/ Alp: vr/ PT: 1/ #/ Note: on weakly calciferous schists; a poorly known species, a revision of the type material is needed; see also note on *Gyalolechia australis*. The species is most probably a member of *Gyalolechia*.

Caloplaca coccinea (Müll. Arg.) Poelt

Mitt. bot. Staatss. München, 12: 5, 1975 - *Blastenia coccinea* Müll. Arg., Flora, 50: 366, 1867.

Syn.: *Blastenia arnoldiana* Servít & Čern., *Caloplaca arnoldiana* (Servít & Čern.) Servít & Poelt, *Caloplaca flammea* (Anzi) Jatta, *Placodium flammeum* Anzi

N - Frl, Ven (Nascimbene & Caniglia 2000, 2003c, Nascimbene & Marini 2007), **TAA, Lomb, Emil. C - Marc** (Nimis & Tretiach 1999), **Abr** (Recchia & Villa 1996, Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 2004, Caporale & al. 2008).

Cr.end/ Ch/ S/ Sax/ pH: 4-5, L: 3-4, X: 3-4, E: 1-3/ Alt: 5-6/ Alp: rr/ PT: 1/ Note: on steeply inclined, partially shaded surfaces of calcareous rocks above treeline; known from the mountains of southern Europe, and certainly ranging throughout the Alps.

Caloplaca conciliascens (Nyl.) Zahlbr.

Cat. Lich. Univ., 7: 109, 1931 - *Lecanora conciliascens* Nyl., Flora, 63: 388, 1880.

N - Piem (TSB 33345). **C - Sar.**

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4, X: 4, E: 3-4/ Alt: 2-4/ Salp: er, Mont: er/ PT: 1/ Note: related to *C. exsecuta*, known from the *locus classicus* in Tyrol, a single locality in the French Maritime Alps (Roux & coll. 2014), and from dry-warm sites in central Sardinia and in Piemonte. The identification of the Sardinian collection is not completely certain (Nimis & Poelt 1987: 60). A detailed discussion of this species was provided by Wilk & Flakus (2006).

Caloplaca conglomerata (Bagl.) Jatta

Syll. Lich. Ital.: 255, 1900 - *Callopusma conglomeratum* Bagl., N. Giorn. Bot. Ital., 3: 243, 1871.

Syn.: *Caloplaca amabilis* (Fink) Zahlbr., *Caloplaca peludella* (Nyl.) Hasse, *Caloplaca squamulosa* (Wedd.) B. de Lesd. *non auct.*, *Lecanora peludella* Nyl.

N - TAA, Lomb (Valcuvia & al. 2003, De Vita & Valcuvia 2004, Delucchi & Valcuvia 2004, B 60 0195699), **Lig** (Giordani & al. 2016). **C - Tosc, Sar** (Nöske 2000, Rizzi & al. 2011, Giordani & al. 2013). **S - Si** (Nimis & al. 1996b, Grillo & al. 1996, Ottonello & Romano 1997, Grillo 1998, Grillo & Caniglia 2004, Ottonello & al. 2011, Cataldo & Cannavò 2014).

Cr/ Ch/ S/ Sax/ pH: 3, L: 4-5, X: 4-5, E: 2-3/ Alt: 1-2/ SmedD: er, SmedH: vr, MedH: r, MedD: rr/ PT: 1/ paras crustose lichens, w/ Note: a Mediterranean to xeric subtropical species of base-rich siliceous rocks, often growing with species of *Peltula*, and starting the life-cycle on other crustose lichens; mostly Mediterranean, but also found, although very rarely, in dry-continental Alpine valleys. For further information see Wetmore (1996). See also note on *C. furax*. The epithet *Callopusma conglomeratum* predates *Lecanora peludella* (often spelled *pellodella*). The species is related to *C. conversa* (Vondrák *in litt.*).

Caloplaca congregiens (Nyl.) Zahlbr.

Cat. Lich. Univ., 7: 110, 1930 - *Lecanora congregiens* Nyl., Flora, 66: 100, 1883.

Syn.: *Caloplaca herminica* (Samp.) Samp.

N - Lig (Plantae Graecenses, Lichenes Nr. 255). **C - Sar** (Rizzi & al. 2011, Giordani & al. 2013). **S - Si.**

Cr/ Ch/ S/ Terr-Sax/ pH: 3, L: 4-5, X: 3-4, E: 2-3/ Alt: 3-5/ Alp: er, Salp: er, Orom: er, Mont: er/ PT: 1/ suboc/ Note: a montane-subtropical to mild-temperate, mainly Mediterranean-Atlantic species found on epilithic mosses overgrowing base-rich, often volcanic, siliceous rocks. According to Vondrák (*in litt.*) this species does not belong to *Caloplaca s.str.*, being closely related to *C. phaeothamnus* and *C. grimmiae*; molecular (ITS) data show that these three species, formerly placed in their own section *Coccinodiscus* Poelt & Kalb, could belong to a still undescribed genus, the closest outgroup being formed by *C. conversa* and *C. conglomerata*.

Caloplaca conversa (Kremp.) Jatta

Syll. Lich. Ital.: 254, 1900 - *Callopusma conversum* Kremp., Denkschr. kgl. bayer. bot. Ges., 4: 162, 1861.

Syn.: *Callopisma fallax* Bagl., *Caloplaca conversa* var. *fallax* (Bagl.) Wunder, *Caloplaca fallax* (Bagl.) Jatta, *Caloplaca oreadum* (Stizenb.) Jatta, *Placodium conversum* (Kremp.) Anzi

N - Frl (TSB 2795), **TAA, Lomb, Piem, VA** (Piervittori & Isocrono 1999, Isocrono & al. 2008, Favero-Longo & Piervittori 2009, Matteucci & al. 2015c), **Emil, Lig. C - Sar** (Rizzi & al. 2011, Giordani & al. 2013). **S - Cal** (Herb. Vondrák 10812), **Si**.

Cr/ Ch/ S/ Sax/ pH: 3-5, L: 4-5, X: 4, E: 3-4/ Alt: 1-4/ Salp: er, Orom: er, Mont: vr, SmedD: er, SmedH: er, MedH: er/ PT: 1/ w/ Note: a mild-temperate to subtropical-montane lichen found on calciferous or basic siliceous rocks (especially basalt) in sunny sites with short periods of water seepage, often on colonies of cyanobacteria. An earlier record from Venezia Giulia (Nimis 1993: 162) has been excluded, being far from the Italian border. According to Vondrák (*in litt.*) the species, which is related to *C. conglomerata*, is heterogeneous, and more species are involved, some of them fully lacking anthraquinones. It does not belong to *Caloplaca s.str.*

Caloplaca cretensis (Zahlbr.) Wunder

in Vězda, Sched. ad Lich. Sel. Exs., 40: 6 (n. 996), 1971 - *Blastenia cretensis* Zahlbr., Sitzungsber. K. Akad. Wiss. Wien, math.-naturw. Kl., 115: 519, 1906.

Syn.: *Blastenia ulbensis* Zahlbr., *Caloplaca calcicola* Zahlbr.

C - Mol (Nimis & Tretiach 1999, Caporale & al. 2008). **S - Camp** (Nimis & Tretiach 2004, Garofalo & al. 2010), **Si** (Nimis & al. 1994, Grillo & al. 2007).

Cr/ Ch/ S/ Sax/ pH: 5, L: 4-5, X: 2, E: 2-3/ Alt: 1/ MedH: er, MedD: er/ PT: 1/ coast/ Note: an (apparently) eastern Mediterranean species also known from southern France (Roux & coll. 2014), found on compact limestones, mostly coastal in Italy; probably more widespread in the Mediterranean Region than the few records would suggest. According to Vondrák (*in litt.*), the species is a member of the *C. xerica*-group, which is related to *Pyrenodesmia s.lat. sensu* Arup & al. (2013).

Caloplaca demissa (Körb.) Arup & Grube

Lichenologist, 31, 5: 428, 1999 - *Placodium demissum* Körb., *Parerga Lichenol.*: 55, 1859.

Syn.: *Imbricaria demissa* Flot. *nom. inval.*, *Lecanora demissa* ("Flot.") Zahlbr., *Lecanora incusa* (Flot.) Vain., *Oleghlumia demissa* (Flot.) S.Y. Kondr., L. Lököš, J. Kim, A. S. Kondr., S.-O. Oh & J.-S. Hur *nom.inval.*, *Rinodina castanoplaca* (Nyl.) H. Olivier, *Squamaria elaeina* var. *saxicola* Beltr.

N - Ven, TAA, Lomb, Piem (Valcuvia 2002, 2002b), **VA** (Piervittori & Isocrono 1999). **C - Tosc, Laz, Sar** (Nöske 2000). **S - Si** (Herb. Vondrák 10758).

Cr.pl/ Ch/ A.s/ Sax/ pH: 3, L: 4-5, X: 4-5, E: 2-3/ Alt: 1-3/ Orom: vr, Mont: er, SmedD: er, SmedH: vr, MedH: r, MedD: rr/ PT: 1/ subc, w/ Note: a mild-temperate to xeric subtropical species found on south-facing, steeply inclined to underhanging surfaces of basic siliceous rocks, both in dry-warm Alpine valleys and in the Mediterranean belt; much less bound to water seepage than *Peltula euploca* and ecologically related species. The species, known only as sterile, earlier positioned in the Lecanoraceae, in the genera *Lecanora* and *Placolecanora*, because of its general appearance, has a quite remote position in the Teloschistaceae and it has no supported sister lineage (see *e.g.* Arup & al. 2013). It was segregated in the genus *Oleghlumia* by Kondratyuk & al. (2015), but with a wrong basionym, which makes that name illegitimate.

Caloplaca epithallina Lynge

Skr. Svalb. og Ishavet, 81: 113, 1940.

N - TAA.

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4-5, X: 4-5, E: 2-3/ Alt: 3-5/ Alp: er, Salp: vr, Mont: er/ PT: 1/ subc, paras crustose and foliose lichens/ Note: a rather continental species found on sunny surfaces of siliceous rocks, *e.g.* on isolated boulders in grasslands, restricted to dry-continental Alpine valleys in Italy.

Caloplaca erythrocarpa (Pers.) Zwackh

Flora, 45: 487, 1862 - *Patellaria erythrocarpa* Pers., *Ann. Wetter. Gesellsch. ges. Naturk.*, 2: 12, 1801.

Syn.: *Blastenia arenaria sensu* A. Massal., *Blastenia ferruginea* var. *metabasis* A. Massal., *Blastenia lallavei* (Clemente *ex* Ach.) A. Massal., *Callopisma arenarium auct.*, *Caloplaca arenaria auct. p.p. non* (Pers.) Müll. Arg., *Caloplaca erythrocarpa f. diffractoareolata* B. de Lesd., *Caloplaca lallavei* (Clemente *ex* Ach.) Flagey, *Kuettlingeria lallavei* (Clemente *ex* Ach.) Trevis., *Placodium lallavei* (Clemente *ex* Ach.) Anzi

N - VG, Frl, Ven (Lazzarin 2000b, Nascimbene 2008c), **TAA, Lomb** (Valcuvia & al. 2003), **Piem, Emil** (Valcuvia & Grieco 1995, Nimis & al. 1996, Bouvet 2008), **Lig** (Valcuvia & al. 2000, Giordani & al. 2016). **C - Tosc, Marc** (Nimis & Tretiach 1999), **Umb** (Nimis & Tretiach 1999, Ravera & al. 2006, Panfili 2007, Genovesi 2011), **Laz** (Bartoli & al. 1998), **Abr** (Nimis & Tretiach 1999, Caporale & al. 2016), **Mol** (Garofalo & al. 1999, Nimis & Tretiach 1999, Caporale & al. 2008, Ravera & al. 2009, Genovesi & Ravera 2014), **Sar. S - Camp** (Garofalo & al. 1999, 2010, Aprile & al. 2003, 2003b, Nimis & Tretiach 2004), **Pugl** (Garofalo & al. 1999, Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999, Potenza 2006), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994, 1995, Ottonello & Salone 1994, Ottonello & al. 1994, Monte & Ferrari 1996, Ottonello 1996, Grillo 1998, Poli & al. 1998, Caniglia & Grillo 2001, Grillo & al. 2001, 2002, Grillo & Caniglia 2004, Brackel 2008b, 2008c, Gianguzzi & al. 2009, Cataldo & Cannavò 2014).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 4-5, X: 4, E: 2-3/ Alt: 1-3/ Mont: rr, SmedD: vc, Pad: r, SmedH: ec, MedH: c, MedD: rc/ PT: 1-2/ paras *Circinaria calcarea* when young/ Note: a mainly Mediterranean species also occurring in warm habitats of the submediterranean belt found on limestone, dolomite, calciferous sandstone,

much more rarely mortar and brick, on horizontal to weakly inclined faces wetted by rain, with optimum in natural habitats at low elevations. The species is related to *Pyrenodesmia s.lat. sensu* Arup & al. (2013).

Caloplaca exsecuta (Nyl.) Dalla Torre & Sarnth.

Die Flechten von Tirol: 191, 1902 - *Lecanora exsecuta* Nyl., Flora, 63: 388, 1880.

Syn.: *Blastenia exsecuta* (Nyl.) Servit

N - Frl (Tretiach & Hafellner 2000), **TAA, Piem, VA** (Isocrono & al. 2008, Favero-Longo & Piervittori 2009).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4, X: 3, E: 2-3/ Alt: 4-5/ Alp: vr, Salp: er/ PT: 1/ Note: a mainly arctic-alpine, probably circumpolar lichen of basic siliceous rocks in humid, wind-protected situations above and near treeline; certainly much more widespread in the Alps.

Caloplaca festivella (Nyl.) Kieff.

Bull. Soc. Hist. Nat. Metz., 19: 66, 1895 - *Lecanora ferruginea* var. *festivella* Nyl., Flora, 56: 197, 1873.

N - Piem (Favero-Longo & al. 2015), **Lig** (LD-1011409). **C - Sar. S - Cal** (Puntillo 1996).

Cr/ Ch/ S/ Sax/ pH: 3, L: 3-4, X: 3, E: 2-3/ Alt: 3-5/ Alp: vr, Salp: vr, Orom: er, Mont: er/ PT: 1/ u/ Note: a rare, mainly oromediterranean species found especially on schists, in underhangs. According to Wetmore (1996) the records from lowland Liguria by Sbarbaro (see Nimis 1993: 167) refer to a different taxon. The species does not belong to *Caloplaca s.str.* and a new combination into *Blastenia* will be published soon (Arup *in litt.*).

Caloplaca fulvolutea (Arnold) Jatta

Syll. Lich. Ital.: 245, 1900 - *Calloplisma fulvoluteum* Arnold, Flora, 53: 469, 1870.

N - Si.

Cr/ Ch/ S/ Terr/ pH: 3, L: 4, X: 3, E: 2-3/ Alt: 4-5/ Alp: er, Salp: er, Orom: er/ PT: 1/ Note: a species with intensely yellow apothecia showing persistently protruding margins; muscicolous, almost exclusively overgrowing *Grimmia* on acidic rocks; based on a type originating from northern Finland. Most samples of this species in TSB proved to belong to *Parvoplaca chelyae*, a species described from Macaronesia whose spores have a narrower septum, so that also the records from Sicily need confirmation.

Caloplaca furax Egea & Llimona

Collect. Bot., 14: 266, 1983.

C - Sar (Nimis 1993). **S - Bas** (Nimis & Tretiach 1999), **Si** (Nimis & al. 1996b).

Cr/ Ch/ S/ Sax/ pH: 3-4, L: 4-5, X: 4, E: 2-3/ Alt: 1-2/ SmedH: vr, MedH: vr, MedD: er/ PT: 1/ paras *Aspicilia* spp./ Note: on isolated boulders of base-rich or lime-containing siliceous rocks, more rarely on compact limestone and dolomite. This taxon was included into *C. conglomerata* by Nimis (1993: 162). After having collected it in several parts of Italy, I now agree with Spanish authors in treating it as a distinct taxon, the parasitic habit and several morphological differences supporting this decision (see also Roux & coll. 2014). This is now confirmed also by molecular data (Vondrák *in litt.*), which show that the species is a member of the *C. xerica*-group, close to *Pyrenodesmia s.lat. sensu* Arup & al. (2013).

Caloplaca fuscoatroides J. Steiner

Verh. zool.-bot. Ges. Wien, 69: 69, 1919.

N - Emil, Lig (Herb. Vondrák 10799). **C - Tosc, Laz** (Genovesi & al. 2011, Roccardi & al. 2014), **Sar** (Rizzi & al. 2011). **S - Cal** (Herb. Vondrák 10762), **Si.**

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4, X: 4, E: 3/ Alt: 1/ SmedD: er, SmedH: er, MedH: vr, MedD: er/ PT: 1/ #/ Note: a widespread Mediterranean lichen found on basic siliceous rocks wetted by rain. The sample from Calabria was collected at Melito di Porto Salvo, Riace Capo, on sandstone, that from Liguria near Levanto, Vernazza. The species is a member of the *C. xerica*-group, which is close to *Pyrenodesmia s.lat. sensu* Arup & al. (2013).

Caloplaca grimmiae (Nyl.) H. Olivier

Mém. Soc. Sc. Nat. Cherbourg, 37: 119, 1909 - *Lecanora grimmiae* Nyl., Flora, 69: 97, 1886.

Syn.: *Caloplaca congregiens* auct. non (Nyl.) Zahlbr., *Caloplaca consociata* J. Steiner

N - VG (TSB 31125), **Frl, Ven** (vidi!), **TAA, Lomb** (De Vita & Valcuvia 2004), **Piem** (Favero-Longo & al. 2015), **VA** (Piervittori & Isocrono 1999), **Emil, Lig. C - Tosc, Marc** (Nimis & Tretiach 1999), **Laz, Abr** (Nimis & Tretiach 1999), **Sar** (Monte 1993, Nöske 2000, Rizzi & al. 2011, Giordani & al. 2013). **S - Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 2011), **Si** (Nimis & al. 1996b, Brackel 2008c).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4-5, X: 3-4, E: 3-4/ Alt: 1-5/ Alp: rr, Salp: rc, Orom: rc, Mont: rr, SmedD: r, SmedH: rr, MedH: er/ PT: 1-2/ paras *Candelariella vitellina*/ Note: a holarctic, temperate to boreal-montane lichen, whose ecology and distribution are narrower than those of its host. It occurs throughout the country, exceptionally also in the Mediterranean belt, sometimes on walls, but, contrary to the host, is absent from heavily disturbed habitats. According to Vondrák (*in litt.*) this species is closely related to *C. congregiens* and *C. phaeothamnus*; molecular (ITS) data show that these three species could belong to a still undescribed genus, the closest outgroup being formed by *C. conversa* and *C. conglomerata*.

Caloplaca haematites (Chaub.) Zwackh

Flora, 45: 478, 1862 - *Lecanora haematites* Chaub. in St.-Amans, Fl. Agenaise: 492, 1821.

Syn.: *Callopisma haematites* (Chaub.) A. Massal., *Placodium haematites* (Chaub.) Anzi

N - **VG**, **Ven** (Lazzarin 2000b), **TAA**, **Lomb** (S-F100879), **Piem**, **Emil**, **Lig**. **C** - **Tosc** (Loppi 1996, Loppi & De Dominicis 1996, Loppi & al. 1996b, 1997), **Marc** (Nimis & Tretiach 1999, Frati & al. 2004, Frati & Brunialti 2006), **Umb** (Ravera 1998, Ravera & al. 2006), **Laz** (Nimis & Tretiach 2004), **Abr** (Olivieri & al. 1997, 1997b, Loppi & al. 1999, Nimis & Tretiach 1999, Caporale & al. 2016), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008, Genovesi & Ravera 2014, Paoli & al. 2015), **Sar** (Zedda 2002, 2002b, Rizzi & al. 2011, Cossu 2013). **S** - **Camp** (Aprile & al. 2002, 2003, 2003b, Garofalo & al. 2010), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1995, 1996, Puntillo & Puntillo 2004), **Si** (Merlo 1993, Ottonello & Salone 1994, Ottonello & al. 1994, Grillo & Cristaudo 1995, Ottonello 1996, Liistro & Cataldo 2011).

Cr/ Ch/ S/ Epiph/ pH: 3-4, L: 4-5, X: 4-5, E: 2-3/ Alt: 1-2/ SmedD: vr, Pad: er, SmedH: rr, MedH: rc, MedD: c/ PT: 1-2/ Note: a mild-temperate to Mediterranean lichen found on smooth bark, especially common on *Ficus carica* throughout Mediterranean Italy. The species, despite its strong similarity with *C. cerina*, according to Vondrák (*in litt.*), does not belong to *Caloplaca s.str.* and is related to *Pyrenodesmia s.lat. sensu* Arup & al. (2013). The basionym's authorship is often cited "Chaub. ex St.-Amans", but in the introduction to the Flore Agenaise Saint-Amans clearly states, referring to Chaubard, that "*les lichens lui appartiennent en entiere*". See also note on *C. congregiens*.

Caloplaca inconnexa (Nyl.) Zahlbr.

Cat. Lich. Univ., 7: 145, 1931 - *Lecanora inconnexa* Nyl., Flora, 66: 100, 1883

Syn.: *Caloplaca percrocata* var. *parasitica* Jatta, *Caloplaca tenuatula* (Nyl.) Zahlbr. subsp. *inconnexa* (Nyl.) Clauzade & Cl. Roux

N - **VG** (Castello 2002, Martellos & Castello 2004), **FrI** (Nimis & Salvadori 1998, Nascimbene & al. 2009b), **Ven**, **TAA** (Spitale & Nascimbene 2012), **Lomb**, **Piem**, **VA** Matteucci & al. 2008c), **Lig** (Valcuvia & al. 2000, Giordani & al. 2016). **C** - **Tosc**, **Marc** (Nimis & Tretiach 1999), **Umb** (Nimis & Tretiach 1999, Ravera & al. 2006), **Laz** (Bartoli & al. 1998, Nimis & Tretiach 2004), **Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach, 1999, 2004, Caporale & al. 2008, Ravera & al. 2009, Genovesi & Ravera 2014), **Sar** (Rizzi & al. 2011). **S** - **Camp** (Garofalo & al. 1999, 2010, Aprile & al. 2003, 2003b, Nimis & Tretiach 2004), **Pugl** (Nimis & Tretiach, 1999, 2001), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994, 1995, Ottonello & al. 1994, Ottonello 1996, Poli & al. 1997, Grillo 1998, Caniglia & Grillo 2001, 2005, 2006, Grillo & al. 2002, Grillo & Caniglia 2004, Brackel 2008b, 2008c, Grillo & al. 2009, Gianguzzi & al. 2009, Liistro & Cataldo 2011).

Cr.pl/ Ch/ S/ Sax/ pH: 4-5, L: 4-5, X: 3-4, E: 3-4/ Alt: 1-4/ Salp: vr, Orom: rr, Mont: c, SmedD: ec, Pad: r, SmedH: ec, MedH: vc, MedD: rr/ PT: 1-2/ paras crustose lichens/ Note: a mild-temperate species found on the top of isolated calcareous boulders and rock outcrops, on calcareous rocks wetted by rain in sunny situations, especially common on *Acarospora cervina* and *Circinaria calcarea*. The species, as currently understood, certainly belongs to *Athallia* (Vondrák *in litt.*), but the type material proved to belong in *Variospora* (Vondrák & al. 2016), so that the nomenclature of this lichen is likely to change in the near future. The relationships with *C. necator* still remain to be clarified.

Caloplaca insularis Poelt

Planta, 51: 300, 1958.

N - **TAA** (LD-1042368), **Piem** (TSB 33964), **Lig** (TSB 33395).

Cr/ Ch/ S/ Sax/ pH: 3-4, L: 4-5, X: 3-4, E: 2-4/ Alt: 4-5/ Alp: r, Salp: vr/ PT: 1/ paras *Aspicilia candida* and *A. polychroma*/ Note: on calcareous schists near or above treeline; certainly more widespread in the Alps. According to Vondrák (*in litt.*) this species should be included in the genus *Pachypeltis*.

Caloplaca interna Poelt & Nimis

in Nimis & Poelt, Studia Geobot., 7, suppl. 1: 67, 1987.

N - **Piem** (TSB 34633). **C** - **Tosc**, **Sar** (Monte 1993, Rizzi & al. 2011, Giordani & al. 2013). **S** - **Camp** (Nimis & Tretiach 2004), **Si** (Nimis & al. 1996b, Ottonello & Romano 1997).

Cr/ Ch/ S/ Sax/ pH: 3, L: 5, X: 4-5, E: 2/ Alt: 1/ MedH: r, MedD: rr/ PT: 1/ paras *Aspicilia* spp., w/ Note: on south-facing, vertical surfaces of basic siliceous rocks which are, albeit seldom, wetted by water seepage after rain, often found near *Peltula*-stands (the host being mostly sterile), but somehow less bound to periodical seepage of liquid water; fairly common above the south-facing doors of Sardinian basaltic Nuraghes, and also found in dry-continental Alpine valleys.

Caloplaca ligustica B. de Lesd.

Bull. Soc. Bot. France, 93: 173, 1936.

Syn.: *Caloplaca pyrithromoides* (Nyl.) C.W. Dodge, *Chrysomma pyrithromoides* (Nyl.) M. Choisy & Werner, *Lecanora pyracea* f. *pyrithromoides* Nyl.

N - **Lig**. **C** - **Tosc**. **S** - **Cal** (Herb. Vondrák 10844).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4-5, X: 4, E: 2-4/ Alt: 1/ MedH: vr/ PT: 1/ #/ Note: on schists in open habitats, on dry surfaces with a short water flow after rain; poorly understood, but probably a good species, known from Italy, France, and the Iberian Peninsula. The type specimen (PRA-V 03097; syntype?) was morphologically appraised and belongs to *Rufoplaca* (Vondrák *in litt.*).

Caloplaca limitosa (Nyl.) H. Olivier

Mém. Soc. Sc. Nat. Cherbourg, 37: 114, 1909 - *Lecanora limitosa* Nyl., Flora, 68: 387, 1880.

Syn.: *Caloplaca festiva* var. *decussata* (Bagl.) H. Olivier

N - Lig. C - Tosc, Sar (Nöske 2000). **S - Si.**

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 3-5, X: 3-4, E: 1-3/ Alt: 1/ MedH: r, MedD: vr/ PT: 1/ coast/ Note: a mainly Mediterranean lichen found on hard siliceous rocks, from granite to basalt, usually (but not always) not far from the coast, exclusively Tyrrhenian in Italy. The species will be soon included into *Blastenia*, being the most common species of the genus in Macaronesia and in the western Mediterranean Region (Vondrák *in litt.*).

Caloplaca littorea Tav.

Rev. Fac. Cienc. Lisboa, ser. 2 C, 5: 129, 1956.

C - Sar.

Cr.pl/ Ch/ A.i/ Sax/ pH: 2-3, L: 3, X: 3, E: 2-3/ Alt: 1/ MedH: er/ PT: 1/ suboc, coast/ Note: a mainly Atlantic species confined to relatively dry, sheltered recesses in the xeric-supralittoral zone on siliceous rocks, known from a single, very peculiar station in Sardegna (Punta Falcone), hosting several other "Atlantic" lichens. According to Vondrák (*in litt.*) this species is a member of *Haloplaca*.

Caloplaca livida (Hepp) Jatta

Syll. Lich. Ital.: 247, 1900 - *Placodium lividum* Hepp, Flecht. Eur.: nr. 403, 1857.

Syn.: *Callopiisma lividum* (Hepp) Körb., *Caloplaca convexa* (Schaer.) Zahlbr.

N - TAA, Lomb, Piem (Isocrono & al. 2004), **VA** (S-F103348).

Cr/ Ch/ S/ Terr/ pH: 1-2, L: 3-4, X: 3, E: 1/ Alt: 4-5/ Alp: vr, Salp: vr/ PT: 1/ Note: an arctic-alpine species found on plant debris and bryophytes overgrowing acid siliceous rocks, with optimum near and above treeline. The species belongs to *Bryoplaca* and the new combination will be published soon (Arup *in litt.*).

Caloplaca lucifuga G. Thor

Lichenologist, 20: 175, 1988.

N - VG, Piem (TSB 33493), **Lig** (Brunialti & al. 2001). **C - Tosc, Umb** (Ravera 2000, Ravera & al. 2006), **Laz, Abr, Sar** (Zedda 1995, 2002, 2002b). **S - Pugl** (Nimis & Tretiach 1999), **Cal** (Puntillo 1995, 1996, Incerti & Nimis 2006).

Cr/ Ch/ A.s/ Epiph-Lign/ pH: 1-2, L: 3, X: 3, E: 2-3/ Alt: 2/ SmedD: er, SmedH: vr/ PT: 1/ u/ Note: a temperate species found on ancient, more or less isolated deciduous trees, especially oaks or *Castanea*, often in crevices of rough bark and on faces seldom wetted by rain. It is included in the Italian red list of epiphytic lichens under the "Least Concern" category (Nascimbene & al. 2013c).

Caloplaca microphyllina (Tuck.) Hasse

Contr. U.S. Nat. Herb., 17: 114, 1913 - *Placodium microphyllum* Tuck., Syn. North Amer. Lich., 1: 174, 1882.

N - TAA (Nascimbene & al. 2007b), **Lig** (LD-1084256).

Cr/ Ch/ A.s/ Epiph-Lign/ pH: 3-4, L: 4-5, X: 4-5, E: 3-4/ Alt: 2-3/ Mont: er, SmedD: er/ PT: 1-2/ subc/ Note: a mainly xeric subtropical to mild-temperate lichen of continental areas, found on basal parts of trunks, rarely on eutrophicated lignum, described from North America and also reported from dry Alpine valleys (see Nimis 1993: 177).

Caloplaca microstepposa Frolov, Nadyeina, Khodos. & Vondrák

in Frolov & al., Ann. Bot. Fenn, 53: 256, 2016.

N - TAA (Vondrák *in litt.*).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 3-5, X: 4, E: 2-3/ Alt: 2/ SmedD: vr/ PT: 1/ subc/ Note: a recently-described species known from inland arid and semi-arid regions of Asia and from dry inland localities throughout Europe at altitudes up to 1000 m. In central and southern Europe it usually grows on calcareous pebbles and stones, rarely on limestone outcrops or concrete, often in sunny, south-exposed screes and in rocky steppes. The sample from Italy was collected by Arnold at Margola near Predazzo, at c. 1000 m, on limestone (Vondrák *in litt.*). The species belongs to *Pyrenodesmia s.lat. sensu* Arup & al. (2013).

Caloplaca neotaurica Vondrák, Khodos., Arup & Søchting

in Vondrák & al., Lichenologist, 44: 414, 2012.

N - Lig (Herb. Vondrák 10755). **C - Sar** (Vondrák & al. 2012). **S - Cal** (Herb. Vondrák 10872), **Si** (Herb. Vondrák 10802).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4, X: 4, E: 2-3/ Alt: 1-3/ Mont: vr, SmedD: er, MedH: vr, MedD: er/ PT: 1/ #/ Note: a recently-described, mainly coastal species of siliceous rocks, related to *C. fuscoatroides*. The sample from Liguria was collected on coastal siliceous cliffs near Levanto. The identity of the samples collected by Vondrák in upland areas of Calabria and Sicilia awaits confirmation based on molecular data.

Caloplaca necator Poelt & Clauzade

Planta, 51: 302, 1958.

Syn.: *Caloplaca inconnexa* var. *nesodes* Poelt & Nimis, *Athallia nesodes* (Poelt & Nimis) Halıcı & Vondrák *comb. inval.*

N - Lig (Valcuvia & al. 2000), **C - Tosc, Laz, Sar** (Monte 1993, Nöske 2000, Rizzi & al. 2011, Giordani & al. 2013, Cossu & al. 2015), **S - Camp, Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 2011), **Si** (Nimis & al. 1996b, Grillo 1998, Grillo & Caniglia 2004).

Cr.pl/ Ch/ S/ Sax/ pH: 2-3, L: 4-5, X: 3-4, E: 2-3/ Alt: 1-3/ Mont: vr, SmedD: vr, SmedH: c, MedH: vc, MedD: rr/ PT: 1-2/ paras *Circinaria* spp./ Note: a mainly Mediterranean species found on siliceous rocks, starting the life-cycle as a parasite of *Circinaria*-species, especially *C. viridescens*. According to Roux & coll. (2014) the smaller size of spores distinguishing *C. necator* from *C. inconnexa* var. *nesodes* is due to the fact that the type material of the former is poorly developed: other specimens collected at the type locality show the same spore size range as the latter taxon. The species clearly belongs to *Athallia* (Vondrák *in litt.*), but a recombination must await the clarification of the relationships with *C. inconnexa*.

Caloplaca nivalis (Körb.) Th. Fr.

Lichenogr. Scand., 1: 191, 1871 - *Zeora nivalis* Körb., Denkschr. schles. Ber. vaterl. Kultur: 321, 1853.

Syn.: *Bacidia livida* (Bagl. & Carestia) Lettau, *Bilimbia livida* Bagl. & Carestia, *Candelariella nivalis* (Körb.) Lettau, *Gyalolechia nivalis* (Körb.) A. Massal., *Placodium nivale* (Körb.) Tuck.

N - TAA, Lomb, Piem (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999).

Cr/ Ch/ S/ Terr/ pH: 1-2, L: 4, X: 2, E: 1-2/ Alt: 4-5/ Alp: vr, Salp: er/ PT: 1/ Note: a cool-temperate to arctic-alpine, circumpolar species found on silicicolous mosses (especially *Andreaea* and *Grimmia*). The statement of Printzen (1995) that the type of *Biatora livida* is *Fulgensia schistidii* is wrong: the type material of the former species, analyzed by M. Tretiach (*pers. comm.*), clearly belongs to *Caloplaca nivalis*.

Caloplaca nubigena var. ***keissleri*** (Servít) Clauzade & Cl. Roux

Bull. Soc. linn. Provence, 30: 27, 1978 ("1977") - *Blastenia keissleri* Servít, Hedwigia 74: 149, fig. 4, 1934.

Syn.: *Caloplaca keissleri* (Servít) Poelt

C - Marc (Nimis & Tretiach 1999), **Abr** (Nimis & Tretiach 1999).

Cr.end/ Ch/ S/ Sax/ pH: 4-5, L: 4-5, X: 3-4, E: 1-3/ Alt: 3-5/ Alp: rr, Salp: rr, Orom: vr, Mont: er/ PT: 1/ paras *Clauzadea immersa*/ Note: a non-lichenicolous taxon with an endolithic thallus indicated by usually whitish patches, and sunken orange apothecia with slightly concave discs and thin parathecial margin (overall aspect recalling somewhat *Protoblastenia incrustans*); doubtfully distinct from the typical variety, it could be just a form poor in anthraquinones.

Caloplaca nubigena (Kremp.) Dalla Torre & Sarnth. var. ***nubigena***

Die Flechten von Tirol: 184, 1902 - *Calloporisma ochraceum* var. *nubigenum* Kremp., Denkschr. bot. Ges. Regensburg, 4, 2: 163, 1861.

Syn.: *Blastenia nubigena* (Kremp.) Müll. Arg.

N - Frl, Ven (Tomaselli & al. 2006), **TAA, C - Marc** (Nimis & Tretiach 1999), **Laz** (Nimis & Tretiach 2004), **Abr** (Recchia & Villa 1996, Nimis & Tretiach 1999), **Mol** (TSB 32589).

Cr.end/ Ch/ S/ Sax/ pH: 4-5, L: 4-5, X: 3-4, E: 1-3/ Alt: 3-5/ Alp: rr, Salp: rr, Orom: vr, Mont: er/ MedD: a/ PT: 1/ paras *Clauzadea immersa*/ Note: on calcareous rocks in upland areas, often near summits. Similar to *C. coccinea*, but differing in morphology, thallus colour, altitudinal distribution (not restricted to above treeline) and in its parasitism on *Clauzadea immersa*.

Caloplaca obscurella (J. Lahm) Th. Fr.

Lichenogr. Scand., 1: 182, 1871 - *Blastenia obscurella* J. Lahm *in Körb.*, Parerga Lichenol.: 130, 1860.

Syn.: *Calloporisma obscurellum* (J. Lahm) J. Lahm, *Caloplaca refellens* (Nyl.) H. Olivier, *Caloplaca sarcopisioides* (Körb.) Zahlbr., *Lecanora refellens* Nyl., *Placodium refellens* (Nyl.) A.L. Sm.

N - VG, Frl, Ven (Nascimbene & Marini 2010, Nascimbene & al. 2015), **TAA** (Nascimbene & al. 2007b), **Lomb** (Alessio & al. 1995), **Piem, VA** (Valcuvia 2000, Valcuvia & al. 2000b), **Emil** (Bassi 1995, Nimis & al. 1996), **C - Tosc** (Tretiach & Nimis 1994, Loppi & al. 1994, Loppi & Putortì 1995, Loppi & al. 1995, Brunialti & Frati 2010, Benesperi 2011, Nascimbene & al. 2012, Paoli & al. 2012), **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera 1998, 1999, Ravera & al. 2006), **Laz** (Bartoli & al. 1997, Massari & Ravera 2002, Nimis & Tretiach 2004, Zucconi & al. 2013), **Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008, Paoli & al. 2015), **Sar** (Zedda 2002, Rizzi & al. 2011), **S - Camp** (Garofalo & al. 1999, 2010, Aprile & al. 2002, 2003, 2003b, Nimis & Tretiach 2004, Brunialti & al. 2013, Ravera & Brunialti 2013), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999, Potenza 2006, Potenza & al. 2010), **Cal** (Puntillo 1996, Puntillo & Puntillo 2004), **Si** (Grillo & Caniglia 2004, 2006).

Cr/ Ch/ A.s/ Epiph/ pH: 3, L: 4, X: 3, E: 3-4/ Alt: 1-2/ SmedD: r, Pad: er, SmedH: rr, MedH: vr/ PT: 1-2/ Note: a temperate, perhaps holarctic species found on isolated deciduous trees, probably extinct in most of the Po-plain, but elsewhere not uncommon in orchards. For further details see Arvidsson & Martinsson (1993). The basionym is often cited as "J. Lahm *ex Körb.*, but Körber explicitly attributes the species to Lahm ("*Lahm in litt. ad Kbr.*").

Caloplaca oleicola (J. Steiner) van den Boom & Breuss

in van den Boom & Etayo, Mycotaxon, 56: 131, 1995 - *Blastenia oleicola* J. Steiner, Verh. zool.-bot. Ges. Wien, 61: 61-62, 1911.

N - Lig (van den Boom & Etayo 1995).

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 4-5, X: 4-5, E: 2-3/ Alt: 1/ MedH: vr/ PT: 1-2/ Note: this is one of the few black-fruited epiphytic *Caloplaca*. The type material is from Liguria. I have also seen samples from Greece and Turkey: it could be more widespread in the Mediterranean Region, but it is certainly not common in Italy. The species is included in the Italian red list of epiphytic lichens as “Data Deficient” (Nascimbene & al. 2013c).

Caloplaca percrocata (Arnold) J. Steiner

in Halacsy, Denkschr. math.-naturw. Kl., K. Akad. Wiss. Wien, 61: 523, 1894 - *Blastenia percrocata* Arnold, Flora, 67: 309, 1884.

Syn.: *Calloposma percrocatum* (Arnold) Jatta

N - Ven, TAA (Vondrák 2008, Vondrák & al. 2008), Piem (TSB 34342). Lig. C - Tosc, Sar.

Cr/ Ch/ S/ Sax/ pH: 3-4, L: 4-5, X: 4, E: 2-3/ Alt: 4-5/ Alp: vr, Salp: er, Orom: er/ PT: 1/ Note: on base-rich and lime-containing siliceous rocks above treeline. The identity of Mediterranean samples (e.g. those from Sardegna) is dubious, and all records from southern Italy reported by Nimis (1993: 180) are not accepted here. According to Vondrák (*in litt.*), the species is a member of the *C. xerica*-group, which is related to *Pyrenodesmia s.lat. sensu* Arup & al. (2013).

Caloplaca raesaenenii Bredkina

Nov. sist. Niz. Rast., 23: 170, 1986.

Syn.: *Caloplaca geophila* Räsänen *nom. illegit.*, *Caloplaca thuringiaca* Søchting & Stordeur

N - TAA (Stordeur 2003).

Cr/ Ch/ S/ Terr-Epiph/ pH: 4-5, L: 4-5, X: 4-5, E: 1-2/ Alt: 2/ SmedD: er/ PT: 1/ subc/ Note: a submediterranean-Turanic to west-Pontic species described from Germany. The Italian record is from gypsum soil and plant debris (especially at the base of *Artemisia annua* stems) in a rather dry area. The taxonomic position of this species still has to be settled (Arup *in litt.*; see also Vondrák & al. 2009, 2016).

Caloplaca rinodinae-albae Poelt & Nimis

in Nimis & Poelt, Studia Geobot., 7, suppl. 1: 72, 1987.

C - Sar.

Cr/ Ch/ S/ Sax/ pH: 2, L: 4, X: 4, E: 2/ Alt: 1/ MedH: er/ PT: 1/ paras *Rinodina alba*/ Note: hitherto known only from the type locality and from another coastal station near Santa Teresa di Gallura in northern Sardinia (Vondrák *in litt.*), this species should be looked for throughout the Mediterranean, wherever the host is present.

Caloplaca rubelliana (Ach.) Lojka

Mathem. Természett. Közlem., 11: 47, 1873 - *Lecanora rubelliana* Ach., Lichenogr. Univ.: 376, 1810.

Syn.: *Calloposma rubellianum* (Ach.) A. Massal.

N - Ven, TAA (Hafellner 2015), Lomb, Piem (Isocrono & al. 2004), VA (Piervittori & Isocrono 1999), Emil, Lig. C - Laz, Sar. S - Camp, Si (Ottonello & Puntillo 1995, Vězda Lich. Rar. Exs. 164!).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4-5, X: 4-5, E: 2-3/ Alt: 1-3/ Mont: er, SmedD: vr, SmedH: vr, MedH: r, MedD: vr/ PT: 1/ w/ Note: a warm-temperate to subtropical, widespread lichen found on steeply inclined surfaces of hard, basic siliceous rocks (especially basalt), often with species of *Peltula*. The species could belong into *Brownliella* Y. Kondr. (Arup *in litt.*).

Caloplaca rubroaurantiaca B. de Lesd.

Bull. Soc. Bot. France, 97: 169, 1950.

N - Piem (Morisi & Sereno 1995, Morisi 2005), VA (Matteucci & al. 2012, 2013, 2015, Sandrone 2014), Lig (Loppi & al. 1997).

Cr/ Ch/ S/ Sax/ pH: 3, L: 4-5, X: 4, E: 3-4/ Alt: 1-4/ Salp: vr, Mont: vr, SmedD: vr, SmedH: vr, MedH: vr/ PT: 1/ #/ Note: a poorly known silicolous species, a member of the difficult *Rufoplaca arenaria*-group characterised by the smaller spores with a thinner septum, known only from Italy, Switzerland and the French Alps (Dauphinè). The record from Valle d'Aosta (see Nimis 1993: 182) requires confirmation.

Caloplaca sarda Poelt & Nimis

in Nimis & Poelt, Studia Geobot., 7, suppl. 1: 73, 1987.

C - Sar.

Cr/ Ch/ S/ Sax/ pH: 3, L: 5, X: 4-5, E: 3-4/ Alt: 2-3/ Mont: vr, SmedD: er/ PT: 1/ Note: a very peculiar species, hitherto known only from the type locality, on basic siliceous rocks in a dry internal valley of central Sardegna.

Caloplaca soralifera Vondrák & Hrouzek

Graphis Scripta, 18: 8, 2006.

N - TAA (Thor & Nascimbene 2007).

Cr/ Ch/ A.s/ Sax/ pH: 3-4, L: 4-5, X: 4-5, E: 3-4/ Alt: 3-5/ Alp: vr, Salp: vr, Mont: vr/ PT: 1/ Note: a species of the *C. xerica* group with a grey but often whitish pruinose, areolate thallus, the areolae with marginal soralia, found on concrete, mortar or siliceous pebbles in manured sites; hitherto known especially

from eastern Europe, but probably more widespread, at least in the continental Alpine valleys. The species is a member of the *C. xerica*-group, which is related to *Pyrenodesmia s.lat. sensu* Arup & al. (2013).

Caloplaca sorocarpa (Vain.) Zahlbr.

Cat. Lich. Univ., 8: 589, 1932 - *Placodium sorocarpum* Vain., Ann. Soc. zool.-bot. Fenn., 9: 320, 1929.

N - **FrI** (vidi!), **TAA** (Hinteregger 1994).

Cr/ Ch/ A.s/ Epiph/ pH: 2-3, L: 3-4, X: 2-3, E: 2-3/ Alt: 3-4/ Salp: rr, Mont: er/ PT: 1/ Note: a usually sterile lichen with a grey thallus and concolorous, circular, often raised soralia; easily overlooked, it is one of the most common sorediate crusts growing on the branches of *Rhododendron*. The species, which is included in the Italian red list of epiphytic lichens as "Critically Endangered" (Nascimbene & al. 2013c), is closely related to *C. exsecuta* (Vondrák *in litt.*).

Caloplaca spotornonis B. de Lesd.

Bull. Soc. Bot. France, 100: 177, 1953.

Syn.: *Caloplaca savonensis* B. de Lesd.

N - **Lig**.

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4-5, X: 3-4, E: 2-4/ Alt: 1-2/ SmedD: er, SmedH: er, MedH: er, MedD: er/ PT: 1/ Note: on horizontal to subvertical surfaces of non-calciferous schists in sunny situations. This species was synonymised by Nimis & Martellos (2008) with *Rufoplaca arenaria*, but according to Roux & coll. (2014) it clearly differs in the well-developed thallus, the ochraceous yellow apothecia and the somewhat longer spores. It is hitherto known only from Liguria and southern France, and it probably belongs to *Rufoplaca*.

Caloplaca squamuloisidiata van den Boom & V.J. Rico

Lichenologist, 38: 530, 2006.

C - **Sar** (Herb. Vondrák nr. 9605).

Cr/ Ch/ A.i/ Sax/ pH: 1-2, L: 3-4, X: 3-4, E: 2-3/ Alt: 2-3/ Orom: vr, Mont: vr, SmedD: vr, SmedH: vr/ PT: 1/ Note: a recently-described species, hitherto known from the Iberian Peninsula and Sardinia, characterised by a squamulose, isidate thallus. It grows on rather shaded, steeply inclined to underhanging surfaces of siliceous rocks. The sample from Sardegna was collected in the Gennargentu Massif near Fonni, on the northern slopes of Mt. Monte Spada, at c. 1450 m. According to Vondrák (*in litt.*) the species does not belong to *Caloplaca s.str.*

Caloplaca subathallina H. Magn.

Bot. Not.: 82, 1951.

C - **Sar** (Herb. Vondrák 11881).

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 4-5, X: 2, E: 2-3/ Alt: 1/ MedH: r / PT: 1/ Note: according to Vondrák (*in litt.*) this is a good species, which will be recombined into *Blastenia*. It is known from many stations, mainly in the Mediterranean Region. The Italian sample is from S. Pantaleo near Olbia, on *Phillyrea*.

Caloplaca subochracea auct.

- non *Blastenia subochracea* (Wedd.) Arup, Søchting & Frödén, Nord. J. Bot., 31: 68, 2013 *nec Lecanora aurantiaca* var. *subochracea* Wedd., Mém. Soc. Imp. Sc. Nat. Cherbourg, 17: 363, 1873.

Syn.: *Callopisma marmoratum* Bagl. *non auct.*, *Caloplaca africana sensu* Clauzade, *Caloplaca marmorata* (Bagl.) Jatta *non auct.*, *Caloplaca subochracea* (Wedd.) Werner, *Caloplaca subochracea* f. *acrustacea* Clauzade & Cl. Roux, *Caloplaca subochracea* f. *pallida* Clauzade & Cl. Roux, *Caloplaca subochracea* var. *luteococcinea* Clauzade & Cl. Roux

C - **Tosc** (TSB 35107), **Laz** (TSB 9972), **Sar**, **S** - **Camp** (Aprile & al. (2003b), **Pugl** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994, Ottonello & Salone 1994, Ottonello & al. 1994, Grillo & al. 2002, Grillo & Caniglia 2004, Caniglia & Grillo 2005, 2006, Genco & al. 2007).

Cr/ Ch/ S/ Sax/ pH: 5, L: 3-4, X: 2-3, E: 1-2/ Alt: 1/ MedH: rc, MedD: rr/ PT: 1/ coast/ Note: a Mediterranean species found on compact limestone, locally very abundant in coastal situations, extremely rare far from the coast. The colour of the thallus, based on which several infraspecific taxa were distinguished (see e.g. Roux & coll. 2014), is variable depending on exposure to sunlight, and intermediate forms are frequent. There are open issues with the epithet of this lichen, since the type material by Weddell corresponds to a species which is not the same as that called *Caloplaca subochracea* by most recent authors (see Roux & coll. 2014). Furthermore, I have seen the type of *Callopisma marmoratum* Bagl. (MOD-TSB), which clearly belongs to this lichen and not to that which is usually called "*Caloplaca marmorata*" by most authors.

Caloplaca teicholyta (Ach.) J. Steiner

Sitzungsber. K. Akad. Wissensch. 104: 388, 1895 - *Lecanora teicholyta* Ach., Lichenogr. Univ.: 425, 1810.

Syn.: *Blastenia teicholyta* (Ach.) Bausch, *Blastenia visianica* A. Massal., *Caloplaca arenaria auct. ital. p.p. non* (Pers.) Müll. Arg., *Caloplaca erythrocarpa auct. p.p. non* (Pers.) Zwackh, *Caloplaca visianica* (A. Massal.) Jatta, *Kuettlingeria teicholyta* (Ach.) Trevis., *Kuettlingeria visianica* (A. Massal.) Trevis.

N - **VG** (Castello 2002, Martellos & Castello 2004), **FrI** (Nimis & Salvadori 1998, Nascimbene & al. 2009b), **Ven** (Lazzarin 2000b, Nascimbene & Salvadori 2008), **TAA**, **Lomb** (Valcuvia & al. 2003, De Vita & Valcuvia 2004, Florio

& al. 2004, 2006, Rigamonti & al. 2008, Di Silvestro & al. 2009, Favero-Longo & al. 2009b, Gheza & al. 2015), **Piem** (Isocrono & al. 2004), **VA** (Pierivittori & Isocrono 1997, 1999), **Emil** (Scarpa 1993, Nimis & al. 1996, Valcuvia & Savino 2000), **Lig. C - Tosc** (Tretiach & Nimis 1994, Benesperi 2011), **Marc** (Nimis & Tretiach 1999), **Umb** (Nimis & Tretiach 1999, Panfili 2000b, 2007, Ravera & al. 2006, Genovesi 2011), **Laz** (Bartoli 1997b, Bartoli & al. 1998, Roccardi 2011, Genovesi & al. 2011), **Abr** (Nimis & Tretiach 1999, Brackel 2015), **Mol** (Nimis & Tretiach, 1999, 2004, Caporale & al. 2008, Genovesi & Ravera 2014), **Sar** (Rizzi & al. 2011, Giordani & al. 2013). **S - Camp** (Garofalo & al. 1999, 2010, Altieri & al. 2000, Aprile & al. 2002, 2003, 2003b, Nimis & Tretiach 2004, Roccardi & Ricci 2006, Catalano & al. 2016), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Ottonello & Salone 1994, Ottonello & al. 1994, 2011, Ottonello 1996, Monte & Ferrari 1996, Nimis & al. 1996b, 1997, Ottonello & Romano 1997, Grillo 1998, Poli & al. 1998, Caniglia & Grillo 2001, 2006, Grillo & al. 2001, Grillo & Caniglia 2004, Cataldo & Cannavò 2014).

Cr/ Ch/ A.s/ Sax/ pH: 3-4, L: 3-4, X: 3, E: 3-4/ Alt: 1-3/ Mont: vr, SmedD: vc, Pad: rr, SmedH: ec, MedH: vc, MedD: r/ PT: 2-3/ suboc, p/ Note: a warm-temperate early coloniser of calciferous substrata (but very rare on pure limestone), often found on sandstone and mortar, mostly on man-made substrata (walls, monuments, roofing tiles, brick walls), common also in settlements. The species is related to *Pyrenodesmia s.lat. sensu* Arup & al. (2013).

Caloplaca tenuata (Nyl.) Zahlbr.

Cat. Lich. Univ., 7: 271, 1931 - *Placodium tenuatum* Nyl., Flora, 62: 202, 1877.

C - Mol (Genovesi & Ravera 2014).

Cr.end/ Ch/ S/ Sax/ pH: 4-5, L: 3, X: 2-3, E: 1-3/ Alt: 2/ SmedD: er/ PT: 1/ Note: on sunny surfaces of compact calcareous rocks, often on cyanobacterial crusts; this species was frequently confused with *Flavoplaca polycarpa*. The record from Sicilia, by Ottonello & Salone (1994) is dubious, and that from Venezia Giulia reported by Nimis (1993: 185) refers to *F. polycarpa* (*vidi!*).

Caloplaca thamnoblata Nimis & Poelt

in Vězda, Sched. ad Lich. Rar. Exs., fasc. 6: 1 (n. 51), 1993.

S - Si (Nimis & al. 1994).

Cr/ Ch/ S/ Sax/ pH: 5, L: 4, X: 3, E: 3-4/ Alt: 1/ MedH: er/ PT: 1/ coast/ Note: on weakly inclined surfaces of calcareous rocks near the coast; hitherto known only from the type locality (Lampedusa). A very characteristic and easily recognizable species, to be looked for throughout the Mediterranean Region. According to Vondrák (*in litt.*) it belongs to *Haloplaca*.

Caloplaca ulcerosa Coppins & P. James

Lichenologist, 11: 139, 1979.

N - VG, Frl (Nimis & al. 1996), **Ven** (*vidi!*), **Lomb** (*vidi!*), **Piem** (TSB 33520), **Emil** (Nimis & al. 1996), **Lig** (TSB 21798). **C - Tosc** (Tretiach & Nimis 1994, Frati & al. 2008, Benesperi 2011), **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera & Di Toma 2003, Ravera & al. 2006), **Laz**, **Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **Sar**. **S - Camp** (Nimis & Tretiach 2004, Garofalo & al. 2010), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999, Paoli & al. 2006), **Cal**, **Si** (Ottonello & Salone 1994, Grillo & Cataldo 2008).

Cr/ Ch/ A.s/ Epiph/ pH: 3-4, L: 4-5, X: 3-4, E: 3-4/ Alt: 1-2/ SmedD: rr, Pad: er, SmedH: r, MedH: vr, MedD: er/ PT: 1-2/ Note: a warm-temperate, rather misunderstood but well-distinct species, especially common on the rough bark of isolated trunks of *Ulmus* and *Populus*, often along white roads and usually not far from the coast (Vondrák & al. 2009b). The species will be soon transferred into a new genus (Vondrák *in litt.*).

Caloplaca veneris Cl. Roux & Nav.-Ros.

Bull. Soc. linn. Provence, 43: 100, 1992.

S - Pugl (Nimis & Tretiach 1999).

Cr/ Ch/ S/ Sax/ pH: 5, L: 4-5, X: 3-4, E: 3-4/ Alt: 1/ MedD: vr/ PT: 1/ coast/ Note: a recently-described species of calcareous rocks, probably more widespread along the Mediterranean coasts.

Caloplaca xerica Poelt & Vězda

in Poelt, Mitt. bot. Staatss. München, 12: 2, 1975.

Incl.: *Caloplaca xerica* var. *venostana* Poelt

N - TAA (Wetmore 1996), **Piem** (Clerc & al. 1999), **VA** (Pierivittori & Isocrono 1999). **S - Cal** (Herb. Vondrák 10756), **Si** (Herb. Vondrák 10851).

Cr/ Ch/ S/ Sax/ pH: 3, L: 4-5, X: 4-5, E: 2-3/ Alt: 2-3/ Mont: vr, SmedD: er, MedD: vr/ PT: 1/ Note: on weathered basic siliceous rocks, both in the dry Mediterranean zone and in dry-continental Alpine valleys; perhaps more widespread in Eurasia; the var. *venostana* differs in the blackish apothecial disks. The species is related to *Pyrenodesmia s.lat. sensu* Arup & al. (2013).

Calvitimela Hafellner

in Hafellner & Türk, Stapfia, 76: 151, 2001.

A genus in the Tephromelataceae with 10 species known, created to separate from *Tephromela* the *Lecidea armeniaca*-group, because of its lecideine apothecia and *Lecanora*-type asci. It seems, however, that

preliminary molecular data do not support the monophyly of either *Calvitimela* or *Tephromela* as currently circumscribed, suggesting that, whereas *C. aglaea* is closely related to *T. atra*, *C. armeniaca*, the type species of the genus, is more closely related to *Mycoblastus sanguinarius* (see e.g. Spribille & al. 2011). A recent molecular study by Bendiksby & al. (2015) confirms that the genus is paraphyletic, with four deeply divergent clades which they recognize as subgenera. Type: *C. armeniaca* (DC.) Hafellner

Calvitimela aglaea (Sommerf.) Hafellner

in Hafellner & Türk, Stapfia, 76: 151, 2001 - *Lecidea aglaea* Sommerf., Suppl. Fl. Lapp.: 144, 1826.

Syn.: *Lecidea brunneri* Nyl., *Lecidea relanderi* Räsänen, *Lecidella aglaea* (Sommerf.) Körb., *Oedemecarpus aglaeus* (Sommerf.) Trevis., *Tephromela aglaea* (Sommerf.) Hertel & Rambold

N - **Frl** (Tretiach & Hafellner 2000), **TAA**, **Lomb**, **Piem** (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999), **Emil**. **C** - **Sar** (Nöske 2000, Nöske & al. 2000).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 4, X: 3, E: 1/ Alt: 3-6/ Alp: rc, Salp: c, Orom: er, Mont: rr/ PT: 1/ Note: an arctic-alpine, circumpolar species found on inclined faces of hard siliceous rocks in upland areas.

Calvitimela armeniaca (DC.) Hafellner

in Hafellner & Türk, Stapfia, 76: 151, 2001 - *Rhizocarpon armeniacum* DC. in Lamarck & de Candolle, Fl. Franç., éd. 3, 2: 367, 1805.

Syn.: *Lecidea aglaeotera* Nyl., *Lecidea armeniaca* (DC.) Fr., *Lecidea armeniaca* f. *aglaeoides* Nyl., *Lecidea nigrita* Schaer., *Lecidea spectabilis* Flörke, *Lecidella armeniaca* (DC.) Bagl., *Lecidella spectabilis* (Flörke) Körb., *Oedemecarpus armeniacus* (DC.) Trevis., *Psora armeniaca* (DC.) A. Massal., *Psora spectabilis* (Flörke) Anzi, *Psora spectabilis* var. *armeniaca* (DC.) Anzi, *Psora spectabilis* var. *lutescens* Anzi, *Psora viridiatra* (Wulfen) Anzi, *Tephromela armeniaca* (DC.) Hertel & Rambold

N - **Frl** (Tretiach & Hafellner 2000), **Ven** (Hertel & Schuhwerk 2010), **TAA** (Grube & al. 2004, Hertel & Schuhwerk 2010), **Lomb** (Dalle Vedove & al. 2004), **Piem** (Isocrono & al. 2004, Watson 2014), **VA** (Piervittori & al. 1998, 2001, Piervittori & Isocrono 1999, Hertel & Schuhwerk 2010), **Emil** (Tretiach & al. 2008), **Lig** - **Tosc**, **Sar**.

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 4-5, X: 4, E: 1/ Alt: 4-6/ Alp: c, Salp: vr, Orom: er/ PT: 1/ Note: an arctic-alpine, circumpolar species found on hard siliceous rocks in wind-exposed situations, most common in the Alps, much rarer in the mountains of southern Italy; when young, it is a facultative parasite of *Sporastatia testudinea*. A dubious record from Campania reported by Nimis (1993: 682) and by Ricciardi & al. (2000) is not accepted here. *Calvitimela melaleuca* (Sommerf.) R. Sant. is considered as an independent species by some authors: it was reported from the Alps by Jatta (1909-1911) without indication of locality, and is also known from the Alps of Switzerland and France.

Candelaria A. Massal.

Flora, 35: 567, 1852.

A subcosmopolitan genus of the Candelariaceae with 7 species occurring on nutrient-rich or -enriched substrata, 2 of which are known from Europe. According to Westberg & al. (2007) the genus is probably polyphyletic and should possibly be restricted to comprise only polyspored species with a lower cortex. Type: *C. vulgaris* A. Massal. (= *C. concolor*).

Candelaria concolor (Dicks.) Stein

in Cohn, Krypt.-Fl. von Schlesien, 2: 84, 1879 - *Lichen concolor* Dicks., Fasc. Pl. Crypt. Brit., 3: 18, 1793.

Syn.: *Blasteniospora concolor* (Dicks.) Trevis., *Caloplaca concolor* (Dicks.) Jatta, *Candelaria concolor* var. *granulosa* (Harm.) Mereschk., *Candelaria vulgaris* A. Massal., *Lecanora laciniosa* Nyl., *Physcia concolor* (Dicks.) Bagl. & Carestia

N - **VG** (Castello 1996, 2002, Martellos & Castello 2004, Castello & Skert 2005), **Frl** (Badin & Nimis 1996, Nimis & Salvadori 1998, Castello & Skert 2005, Tretiach & Molaro 2007, Nascimbene & Salvadori 2008, Nascimbene & al. 2009b, Bernini & al. 2010, Brackel 2013), **Ven** (Philippi 1983, Nimis & al. 1996c, Nascimbene & Caniglia 1997, Caniglia & al. 1999, Lazzarin 2000, 2000b, Valcuvia & al. 2000c, Nascimbene 2005c, 2008, 2008c, Nascimbene & al. 2007, 2008e, 2010b, 2012, 2015, Nascimbene & Marini 2007, 2010, Nascimbene & Salvadori 2008, Westberg & Arup 2011), **TAA** (Philippi 1983, De Benetti & Caniglia 1993, Nascimbene 2003, 2005b, 2006c, 2014, Zieger & al. 2003, Thor & Nascimbene 2007, Nascimbene & al. 2007b, 2014, Zarabska & al. 2009, Nimis & al. 2015), **Lomb** (Philippi 1983, Arosio & Rinaldi 1995, Valcuvia & Gianatti 1995, Valcuvia & Brusoni 1996, Brusoni & al. 1997, Zocchi & al. 1997, Roella 1999, Brusoni & Valcuvia 2000, Casarini & al. 2000, Arosio & al. 2000, 2003, Dalle Vedove & al. 2004, Anderi & al. 2005, Valcuvia & Truzzi 2007b, Furlanetto 2010, Brackel 2013, Gheza & al. 2015), **Piem** (Caniglia & al. 1992, Morisi & Sereno 1995, Arosio & al. 1998, Piervittori 1998, 2003, Clerc & al. 1999, Isocrono & Falletti 1999, Griselli & al. 2000, 2003, Castino 2004, Isocrono & al. 2004, 2005b, 2006, 2007, 2009, Isocrono & Piervittori 2008, Furlanetto 2010, Matteucci & al. 2010, Giordani & Malaspina 2016), **VA** (Piervittori & Maffei 1996, 2001, Piervittori & Isocrono 1999, Valcuvia & al. 2000b, Piervittori & al. 2001), **Emil** (Bassi 1995, Gasparo & Tretiach 1996, Nimis & al. 1996, Valcuvia & Savino 2000, Sallese 2003, Marconi & al. 2006, Morselli & Regazzi 2006, Cioffi 2009, Malavasi 2014, Gerdol & al. 2014), **Lig** (Castello & al. 1994, Brunialti & al. 1999, Giordani & al. 2001, Giordani & al. 2002, Brunialti & Giordani 2003, Giordani 2006, Giordani & Incerti 2008). **C** - **Tosc** (Loppi & al. 1992, 1995, 1996, 1996b, 1996c, 1997, 1997e, 1998b, 2002, 2002b, 2002c, 2003, 2004, 2004c, 2006, Loppi & Corsini 1995, 2003, Loppi & Putorti 1995, 1995b, Loppi 1996, Loppi & De Dominicis 1996, Monaci & al. 1997, Loppi & Nascimbene 1998, 2010, Bacci & al. 2000, Benesperi 2000a, 2011, Del Guasta 2001, Lorenzini & al. 2003, Landi & Loppi 2003, Loppi & Frati 2004, Frati & al. 2006b, 2007, Stofer 2006, Nali & al. 2007, Paoli & Loppi 2008, Lastrucci & al. 2009, Brunialti & Frati

2010 Nascimbene & al. 2012, 2015, Paoli & al. 2012, 2012b, 2013, 2015d, Benesperi & al. 2013, Brackel 2015), **Umb** (Ravera 1998, Panfili 2000b, 2007, Ravera & al. 2006, Brackel 2015), **Marc** (Gasparo & al. 1989, Nimis & Tretiach 1999, Frati & Brunialti 2006, Ciotti & al. 2009, Brackel 2015), **Laz** (Bartoli & al. 1997, Ravera & al. 1999, Massari & Ravera 2002, Nimis & Tretiach 2004, Ruisi & al. 2005, Munzi & al. 2007, Ravera 2008b, Ravera & Genovesi 2008, Zucconi & al. 2013, Brackel 2015), **Abr** (Recchia & al. 1993, Olivieri & Pacioni 1996, Olivieri & al. 1997, 1997b, Loppi & al. 1999, Nimis & Tretiach 1999, Caporale & al. 2016), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008, Paoli & al. 2011, 2015), **Sar** (Zedda 1995, 2002, Rizzi & al. 2011, Cossu 2013). **S - Camp** (Garofalo & al. 1999, 2010, Aprile & al. 2002, 2003b, 2011, Nimis & Tretiach 2004, Brunialti & al. 2013, Ravera & Brunialti 2013, Catalano & al. 2016), **Pugl** (Nimis & Tretiach 1999), **Bas** (Bartoli & Puntillo 1998, Brackel 2011), **Cal** (Puntillo 1996, Puntillo & Puntillo 2004, Brackel & Puntillo 2016), **Si** (Nimis & al. 1994, Falco Scampatelli 2005).

Fol. n/ Ch/ A.s/ Epiph/ pH: 3-4, L: 4-5, X: 3-4, E: 3-5/ Alt: 1-3/ Mont: vr, SmedD: vc, Pad: c, SmedH: vc, MedH: rr, MedD: r/ PT: 1-3/ Note: a mild-temperate, probably holarctic species found on nutrient-rich or -enriched bark, more rarely on calciferous substrata, mostly on isolated trees in agricultural areas, on wayside trees, etc., below the subalpine belt; rare in the Mediterranean belt, and less common along the Adriatic side of the Peninsula. See also note on *C. pacifica*.

Candelaria pacifica M. Westb. & Arup

Bibl. Lichenol., 106: 358, 2011.

N - Frl (TSB *s.n.*), **Ven** (TSB *s.n.*).

Fol. n/ Ch/ A.s/ Epiph/ pH: 3-4, L: 4-5, X: 3-4, E: 3-5/ Alt: 2-3/ Mont: vr, SmedD: r, Pad: vr, SmedH: er/ PT: 1-3/ Note a recently-described species, which in some parts of Europe, *e.g.* in Scandinavia, is even more common than *C. concolor*. Italian material of *C. concolor* needs revision: from a rapid screening of the TSB material it seems that in Italy this species is rarer than *C. concolor*.

Candelariella Müll. Arg.

Bull. Herb. Boissier, 2, app. 1, 1: 11, 1894.

Candelariella is a well-known and commonly occurring genus of the Candelariaceae, including *c.* 50 species growing on many types of substrates, particularly in exposed and nitrogen-enriched sites. The species are a prominent component of the lichen biota on *e.g.*, road-side trees, limestone rocks and in alpine, terricolous habitats. However, the knowledge of the distribution and ecology of individual species is often still very poor. A key to North American species was provided by Westberg & al. (2011b), and a treatment of Southwest Asian species by Westberg & Sohrabi (2012). As shown by Westberg & Clerc (2012), a more intense collection and study of European specimens could be a rewarding effort, as there are many interesting discoveries to be made in this rather neglected group of lichens. Further species are likely to be present in Italy. Type: *C. vitellina* (Hoffm.) Müll. Arg.

Candelariella aurella (Hoffm.) Zahlbr.

Cat. Lich. Univ., 5: 790, 1928 - *Verrucaria aurella* Hoffm., Deutschl. Fl.: 197, 1796.

Syn.: *Caloplaca subsimilis* Th. Fr., *Candelariella aurella* f. *heidelbergensis* (Nyl.) P. James, *Candelariella aurella* f. *smaragdula* Szatala, *Candelariella dispersa* (Räsänen) Hakul., *Candelariella heidelbergensis* (Nyl.) Poelt, *Candelariella litoralis* Hakul., *Candelariella vitellina* f. *aurella* (Hoffm.) Sandst., *Candelariella vitellina* var. *aurella* (Hoffm.) A.L. Sm., *Gyalolechia aurella* (Hoffm.) Körb., *Parmelia murorum* var. *aurella* (Hoffm.) Ach., *Lecanora heidelbergensis* Nyl., *Lecanora vitellina* var. *aurella* (Hoffm.) Ach.

N - VG (Castello 2002, Martellos & Castello 2004), **Frl** (Nimis & Salvadori 1998, Nascimbene & Salvadori 2008, Nascimbene & al. 2009b), **Ven** (Caniglia & al. 1993, 1999, Nascimbene & Caniglia 2003c, Nascimbene 2005c, 2008, 2008c, Nascimbene & Salvadori 2008, Nascimbene & Salvadori 2008), **TAA** (De Benetti & Caniglia 1993, Nascimbene 2003, 2005b, 2008b, Nascimbene & al. 2005, 2006, Isocrono & Piervittori 2008, Lang 2009, Spitale & Nascimbene 2012), **Lomb** (Arosio & al. 2003, Valcuvia & al. 2003, Florio & al. 2004, 2006), **Piem** (Isocrono & Falletti 1999, Isocrono & al. 2003, Piervittori 2003, Favero-Longo & al. 2009b, Gazzano & al. 2009b Marchiaro & al. 2013, Giordani & al. 2014, Morando & al. 2016), **VA** (Piervittori & Isocrono 1999, Piervittori & al. 2001, 2004), Gazzano & al. 2009, 2009b), **Emil** (Nimis & al. 1996, Valcuvia & Savino 2000, Morselli & Regazzi 2006), **Lig** (Valcuvia & al. 2000, Gazzano & al. 2009, Giordani & al. 2016). **C - Tosc** (Benesperi 2000a, Tretiach & al. 2008), **Marc** (Nimis & Tretiach 1999, Tretiach & Pinna 2000), **Umb** (Nimis & Tretiach 1999, Panfili 2000b, 2007, Ravera & al. 2006, Genovesi 2011), **Laz** (Bartoli 1997b, Bartoli & al. 1998, Genovesi & al. 2011, Brackel 2015), **Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach, 1999, 2004, Caporale & al. 2008, Ravera & al. 2009, Genovesi & Ravera 2014), **Sar** (Nöske 2000). **S - Camp** (Garofalo & al. 1999, 2010, Ricciardi & al. 2000, Aprile & al. 2002, 2003, 2003b, Nimis & Tretiach 2004, Catalano & al. 2016), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999, Brackel 2011), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994, 1995, Ottonello & Salone 1994, Ottonello & al. 1994, 2011, Ottonello 1996, Ottonello & Romano 1997, Poli & al. 1997, Grillo 1998, Poli & al. 1998, Caniglia & Grillo 2001, 2005, 2006, Grillo & al. 2001, 2002, Grillo & Caniglia 2004, Brackel 2008b, Gianguzzi & al. 2009).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 3-5, X: 3-5, E: 2-4/ Alt: 1-5/ Alp: vc, Salp: ec, Orom: vc, Mont: ec, SmedD: ec, Pad: vc, SmedH: ec, MedH: c, MedD: rc/ PT: 1-3/ paras crustose lichens, p/ Note: a holarctic, subtropical to arctic-alpine, almost cosmopolitan species found on a wide variety of calciferous substrata, from limestone and dolomite to mortar, asbestos-cement and concrete, exceptionally on eutrophicated and dusty lignum and bark. The species is very polymorphic: further study is needed on some forms above treeline, and on the biology of other forms regularly starting the life-cycle as parasites of crustose lichens.

Candelariella commutata Otte & M. Westb.

in Otte & al., Herzogia, 26: 218, 2013.

Syn.: *Candelariella unilocularis* auct. ital. non (Elenkin) Nimis

N - Frl, Ven (Nimis 1994), **TAA** (Nascimbene 2003b, 2008b, Nascimbene & al. 2004, 2004b), **Lomb** (Nascimbene 2006), **Piem** (TSB 34530), **C - Umb** (Nimis & Tretiach 1999, Ravera & al. 2006), **Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 2004, Caporale & al. 2008).

Cr/ Ch/ S/ Terr/ pH: 4-5, L: 4-5, X: 3-4, E: 3-4/ Alt: 4-5/ Alp: rc, Salp: rr, Orom: vr/ PT: 1/ Note: I have placed here all records of *C. unilocularis* from Italy. This is an arctic-alpine species, widespread in the mountains of the southern holarctic zone; it is found on epilithic mosses on limestone and dolomite, a characteristic element of calcareous mountains, with optimum above treeline.

Candelariella coralliza (Nyl.) H. Magn.

Svensk Bot. Tidskr., 29: 122, 1935 - *Lecanora coralliza* Nyl., Flora, 58, 6: 15, 1875.

Syn.: *Candelariella pulvinata* (Malbr.) Zahlbr., *Candelariella vitellina* var. *pulvinata* (Malbr.) Mereschk., *Lecanora vitellina* var. *pulvinata* Malbr.

N - Frl, TAA (Lang 2009), **Lomb, Piem** (Morisi & Sereno 1995, Isocrono & Ferrarese 2008), **VA** (Favero-Longo & al. 2006, Isocrono & al. 2008, Favero-Longo & Piervittori 2009, Matteucci & al. 2015c, 2015d). **C - Sar** (Nöske 2000, Nöske & al. 2000, Cossu & al. 2015). **S - Si** (Brackel 2008b).

Cr/ Ch/ S/ Sax-Lign/ pH: 2-3, L: 4-5, X: 4, E: 4-5/ Alt: 3-5/ Alp: rr, Salp: c, Orom: vr, Mont: er/ PT: 1-2/ Note: a mainly boreal-montane to arctic-alpine, circumpolar species found on siliceous rocks, more rarely on lignum or even dust-covered bark in open habitats, most frequent in Alpine to subalpine pastures, on isolated boulders used as bird's perches; certainly widespread throughout the Alps, but overlooked, or subsumed under *C. vitellina* by Italian authors. The dubious records from lowland Toscana and Lazio reported by Nimis (1993: 193), are not accepted here.

Candelariella efflorescens R.C. Harris & W.R. Buck

Michigan Bot., 17: 155, 1978.

N - Frl, Ven (Thor & Nascimbene 2007, Nascimbene & Marini 2010, Nascimbene & al. 2012, 2015), **TAA** (Nascimbene & al. 2014, Nascimbene 2014), **Lomb** (UPS-L-166844). **C - Mol** (Ravera & Genovesi 2012, Genovesi & Ravera 2014). **S - Bas** (Potenza & al. 2014).

Cr/ Ch/ A.s/ Epiph/ pH: 3-4, L: 4-5, X: 3, E: 4-5/ Alt: 1-3/ Mont: er, SmedD: r, SmedH: vr, MedH: er/ PT: 1/ Note: on isolated trees, especially in orchards, certainly more widespread in the Alps. This taxon is apparently similar to *C. reflexa*, but the soredia are farinose, well-delimited, punctiform, and they never develop from a subsquamulose thallus (see Nimis 1993: 193). Both *C. efflorescens* (with many-spored asci) and *C. xanthostigmoides* (Müll. Arg.) R.W. Rogers (with 8-spored asci) were reported from Europe: due to the fact that the material is rarely fertile, and that the two species cannot be distinguished when sterile, I provisionally leave under the former name all records from Italy.

Candelariella faginea Nimis, Poelt & Puntillo

Nova Hedwigia, 49: 276, 1989.

N - Piem (Isocrono & al. 2006, 2006), **Emil. C - Tosc** (Benesperi & al. 2007), **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera & al. 2011), **Laz** (Ravera 2001, Massari & Ravera 2002, Fornasier & al. 2005, Ravera 2006), **Abr** (Nimis & Tretiach 1999, Corona & al. 2016), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008, Genovesi & Ravera 2014), **Sar** (Zedda 1995, 2002), **S - Camp** (Aprile & al. 2003, 2003b, Brunialti & al. 2010, 2013, Garofalo & al. 2010, Ravera & Brunialti 2013), **Bas** (Nimis & Tretiach 1999, Potenza 2006), **Cal** (Puntillo 1996, Aragón & Martínez 2002), **Si**.

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 3-4, X: 3, E: 2-3/ Alt: 3/ Mont: r/ PT: 1/ Note: a species with a thallus composed of minute roundish squamules, later forming granulose blastidia, and asci with a variable number (8 to 32) of ascospores, found on bark of deciduous trees (e.g. of *Fagus sylvatica*) in more or less closed forests; widespread but not common in forests of the montane belt in Mediterranean orobiomes; most frequent in beech forests of central and southern Italy.

Candelariella kuusamoënsis Räsänen

Ann. Soc. zool-bot. Fenn., 12, 1: 58, 1939.

N - Frl (Tretiach & Hafellner 2000), **Lig** (TSB 33559). **S - Cal** (Lich. Graec. 285: Obermayer 2006, Puntillo 2011).

Cr/ Ch/ S/ Lign-Terr/ pH: 2-3, L: 5, X: 4, E: 4-5/ Alt: 3-4/ Salp: r, Orom: vr/ PT: 1-2/ #/ Note: a boreal-montane, poorly understood lichen found on the top of poles and wooden fences, on plant debris and soil, more rarely on rocks in upland areas; certainly more widespread in the Alps.

Candelariella lutella (Vain.) Räsänen

Ann. Soc. Scient. Argentina, 128: 57, 1939 - *Lecanora xanthostigma* var. *lutella* Vain., Meddeland. Soc. Fauna Fl. Fenn., 3: 102, 1878.

N - Frl, Ven, TAA (Nascimbene & al. 2007b, 2014, Nascimbene 2014), **Piem** (Morisi & Sereno 1995), **Emil** (TSB 16660). **C - Marc** (Fрати & Brunialti 2006), **Abr** (Nimis & Tretiach 1999, Caporale & al. 2016). **S - Bas** (Ravera & al. 2015d).

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 3-4, X: 3, E: 2-3/ Alt: 2-4/ Salp: vr, Mont: vr, SmedD: vr/ PT: 1-2/ Note: a cool-temperate, perhaps holarctic lichen of smooth bark, especially of *Alnus*; overlooked, or confused with

similar species, but certainly not common. It is included in the Italian red list of epiphytic lichens as “Data Deficient” (Nascimbene & al. 2013c).

Candelariella medians (Nyl.) A.L. Sm.

Monogr. Brit. Lich.: 228, 1918 - *Placodium medians* Nyl., Bull. Soc. Bot. France, 9: 262, 1862.

Syn.: *Caloplaca granulata* (Schaer.) Lindau, *Caloplaca medians* (Nyl.) Flagey, *Candelaria medians* (Nyl.) Flagey, *Candelariella granulata* (Schaer.) Zahlbr., *Gasparrinia medians* (Nyl.) Syd., *Lecanora medians* (Nyl.) Nyl., *Parmelia parietina* var. *granulata* Schaer.

N - VG (Castello 2002, Martellos & Castello 2004), **Frl** (Nimis & Salvadori 1998, Nascimbene & al. 2009b), **Ven** (Caniglia & al. 1999, Nascimbene & Salvadori 2008), **TAA, Lomb** (Arosio & al. 2000, Rigamonti & al. 2008, Sunil Morgan & al. 2008), **Piem** (Morisi & Sereno 1995, Gazzano & al. 2009b), **Emil** (Nimis & al. 1996, Valcuvia & Savino 2000, Morselli & Regazzi 2006), **Lig** (Valcuvia & al. 2000). **C - Tosc** (Benespero 2011, Brackel 2015), **Marc** (Nimis & Tretiach 1999, Tretiach & Pinna 2000), **Umb** (Ravera & al. 2006, Panfili 2007), **Laz** (Bartoli 1997b, Pietrini & al. 2008), **Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008, Genovesi & Ravera 2014), **Sar, S - Camp** (Aprile & al. 2003b, Garofalo & al. 2010), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1996b, Ottonello & Salone 1994, Ottonello & al. 1994, Monte & Ferrari 1996, Ottonello 1996, Poli & al. 1996, 1997, Grillo 1998, Grillo & al. 2002, Grillo & Caniglia 2004, Gianguzzi & al. 2009).

Cr/ Ch/ A.s/ Sax/ pH: 4-5, L: 4-5, X: 4-5, E: 4-5/ Alt: 1-3/ Mont: rr, SmedD: rc, Pad: vr, SmedH: rr, MedH: vr, MedD: er/ PT: 1-2/ Note: a mild-temperate lichen found on man-made calcareous substrata (churches, other monuments, top of statues in parks and of gravestones), especially above the Mediterranean belt, but also on the top of isolated calcareous boulders in natural situations, abundant in small villages along the eastern portion of the Apennines.

Candelariella oleaginascens Rondon

in Vězda, Sched. ad Lich. Sel. Exs., 14: no. 341, 1966.

C - Marc (TSB 23532).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 4-5, X: 3-4, E: 2-4/ Alt: 1/ MedH: vr, MedD: vr/ PT: 1/ coast, #/ Note: this rather poorly known, probably Mediterranean-Macaronesian species, characterised by a grey to brown thallus and 8-spored asci, occurs on calcareous rocks, most often not far from the coast; it might have been overlooked or confused with other species in Italy.

Candelariella plumbea Poelt & Vězda

Folia Geobot. Phytotaxon., 11: 89, 1976.

N - Frl, Ven (Nimis 1994), **Piem** (Clerc & al. 1999), **VA** (TSB 29456). **C - Abr** (Nimis & Tretiach 1999).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 4, X: 3-4, E: 3-4/ Alt: 4-5/ Alp: r, Salp: rc/ PT: 1/ Note: a probably circumpolar lichen found on more or less calcareous dolomitic rocks wetted by rain in exposed habitats, often developing along small cracks, mostly near or above treeline, probably more widespread in the Alps; frequently confused, in the past, with *C. aurella*.

Candelariella reflexa (Nyl.) Lettau

Hedwigia, 52: 196, 1912 - *Lecanora vitellina* var. *reflexa* Nyl., Bull. Soc. Bot. France, 16: 241, 1866.

Syn.: *Caloplaca reflexa* (Nyl.) Flagey, *Lecanora reflexa* (Nyl.) Nyl.

N - VG (Castello 1996, 2002, Carvalho 1997, Martellos & Castello 2004, Castello & Skert 2005), **Frl** (Badin & Nimis 1996, Castello & Skert 2005, Nascimbene & al. 2009b, Bernini & al. 2010), **Ven** (Nimis & al. 1996c, Lazzarin 1997, 2000, Caniglia & al. 1999, Valcuvia & al. 2000c, Nascimbene 2005c, 2008, 2008c, Nascimbene & al. 2007, 2008e, 2012, 2015, Nascimbene & Marini 2010), **TAA** (Nascimbene 2006c, 2014, Nascimbene & al. 2007b, 2014, Lang 2009, Zarabska & al. 2009, Brackel 2013, Nimis & al. 2015), **Lomb** (Arosio & Rinaldi 1995, Valcuvia & Brusoni 1996, Brusoni & al. 1997, Zocchi & al. 1997, Roella 1999, Brusoni & Valcuvia 2000, Arosio & al. 2000, 2003, Valcuvia & al. 2003, Valcuvia & Truzzi 2007b, Furlanetto 2010, Brackel 2013), **Piem** (Arosio & al. 1998, Isocrono & Falletti 1999, Piervittori 2003, Castino 2004, Isocrono & al. 2004, 2006, 2007, Isocrono & Piervittori 2008, Furlanetto 2010, Matteucci & al. 2010, Giordani & Malaspina 2016), **VA** (Piervittori & Maffei 1996, 2001, Piervittori & Isocrono 1999, Valcuvia & al. 2000b), **Emil** (Bassi 1995, Gasparo & Tretiach 1996, Nimis & al. 1996, Sallase 2003, Marconi & al. 2006, Morselli & Regazzi 2006, Cioffi 2009, Benespero 2009, Malavasi 2014, Gerdol & al. 2014), **Lig** (Castello & al. 1994, Giordani & al. 2002, Brunialti & Giordani 2003, Giordani 2006, Giordani & Incerti 2008). **C - Tosc** (Loppi & Corsini 1995, 2003, Loppi & Putortù 1995, 1995b, 2001, Loppi & al. 1995, 1996, 1996b, 1996c, 1997, 1997b, 1997e, 1998, 2002, 2002b, 2002c, 2003, 2004, 2006, Loppi 1996, 1996b, 1999a, 1998b, Loppi & De Dominicis 1996, Monaci & al. 1997, Putortù & al. 1998, 1999, Bacci & al. 2000, Benespero 2000a, Paoli & Loppi 2001, Frati & al. 2006b, 2007, Paoli & Loppi 2008, Loppi & Nascimbene 2010, Brunialti & Frati 2010, Loppi & Baragatti 2011, Brunialti & al. 2012b, Nascimbene & al. 2012, 2015, Paoli & al. 2012, 2012b, 2013, 2015d, Brackel 2015), **Marc** (Nimis & Tretiach 1999, Frati & Brunialti 2006), **Umb** (Ravera 2000, Panfili 2000b, Ravera & al. 2006), **Laz** (Massari & Ravera 2002, Nimis & Tretiach 2004, Ruisi & al. 2005, Munzi & al. 2007, Ravera & Genovesi 2008), **Abr** (Recchia & al. 1993, Olivieri & Pacioni 1996, Recchia & Villa 1996, Olivieri & al. 1997, 1997b, Loppi & al. 1999, Stofer 2006, Brackel 2015, Caporale & al. 2016, Corona & al. 2016), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008, Genovesi & Ravera 2014, Paoli & al. 2015), **Sar** (Zedda 2002, Rizzi & al. 2011). **S - Camp** (Aprile & al. 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010, Ravera & Brunialti 2013, Catalano & al. 2016), **Pugl** (Nimis & Tretiach 1999, Brackel 2011), **Bas** (Nimis & Tretiach 1999, Paoli & al. 2006, Brackel 2011), **Cal** (Puntillo 1996, Puntillo & Puntillo 2004, Incerti & Nimis 2006), **Si** (Merlo 1993, Grillo & Caniglia 2004, 2006, Caniglia & Grillo 2006b, Brackel 2008c).

Cr/ Ch/ A.s/ Epiph/ pH: 3-4, L: 4-5, X: 3, E: 4-5/ Alt: 1-3/ Mont: r, SmedD: vc, Pad: rc, SmedH: vc, MedH: rr, MedD: er/ PT: 1-3/ Note: a mild-temperate, holarctic lichen found on isolated trees, especially

along waysides and in agricultural areas, somehow rarer along the Adriatic side of the Peninsula, and rare throughout Mediterranean Italy, very common elsewhere in the submediterranean belt.

Candelariella subdeflexa (Nyl.) Lettau

Hedwigia, 52: 196, 1912 - *Lecanora subdeflexa* Nyl., Flora, 62: 355, 1879.

N - **VG, TAA** (Nascimbene & al. 2007b), **Lomb, Piem** (TSB 33596), **VA** (Matteucci & al. 2008, Isocrono & al. 2008), **Emil** (Gasparo & Tretiach 1996). **C** - **Marc** (Nimis & Tretiach 1999, Frati & al. 2004, Frati & Brunialti 2006), **Umb** (Ravera 2000, Ravera & al. 2006), **Abr** (Nimis & Tretiach 1999, Corona & al. 2016), **Mol** (Caporale & al. 2008). **S** - **Bas** (Nimis & Tretiach 1999), **Si** (TSB 12289).

Cr/ Ch/ S/ Epiph/ pH: 3, L: 4, X: 3, E: 2-3/ Alt: 2/ SmedD: vr, SmedH: er/ PT: 1-2/ Note: a mild-temperate, perhaps holarctic lichen found on isolated trees, especially *Fraxinus*, *Populus* and *Juglans*, often near the base of the trunks, probably declining. The species is included in the Italian red list of epiphytic lichens as “Near-threatened” (Nascimbene & al. 2013c).

Candelariella superdistans (Nyl.) Malmé

Svensk Bot. Tidskr., 4: 164, 1910 - *Lecanora superdistans* Nyl., Flora, 62: 355, 1879.

N - **Fr. S** - **Cal** (Puntillo 1996).

Cr/ Ch/ S/ Epiph/ pH: 3, L: 4, X: 3, E: 1-2/ Alt: 3/ Mont: vr/ PT: 1/ suboc, paras *Lecanora populicola*

Note: a cool-temperate lichen starting the life-cycle on *Lecanora populicola*; overlooked in the past but certainly not common in Italy. It is included in the Italian red list of epiphytic lichens as “Endangered” (Nascimbene & al. 2013c).

Candelariella viae-lacteae G. Thor & V. Wirth

Stuttgarter Beitr. Naturk., ser. A, 445: 2, 1990.

N - **Emil** (Gasparo & Tretiach 1996, Tretiach 1997). **C** - **Marc** (Frati & Brunialti 2006, Panepinto & Tretiach 2014), **Umb** (Ravera & al. 2006b, Ravera & Puntillo 2014), **Mol** (Paoli & al. 2011). **S** - **Pugl** (Nimis & Tretiach 1999), **Bas** (Paoli & al. 2006), **Cal** (Tretiach 1997, Puntillo 1996, Aragón & Martínez 2002, Ravera & Puntillo 2014), **Si** (Panepinto & Tretiach 2014).

Cr/ Ch/ A.i/ Epiph/ pH: 2-3, L: 4, X: 3, E: 3-4/ Alt: 1-2/ SmedD: vr, Pad: er, SmedH: vr, MedH: vr/ PT: 2/ Note: a recently-described a mild-temperate lichen which is certainly more widespread in Italy, especially on wayside trees in small settlements. The species, which is easily overlooked being almost always sterile, is included in the Italian red list of epiphytic lichens as “Data Deficient” (Nascimbene & al. 2013c).

Candelariella vitellina (Hoffm.) Müll. Arg.

Bull. Herb. Boissier, 2: 47, 1894 - *Patellaria vitellina* Hoffm., Descr. Pl. Cl. Crypt. 2, 1: 56, 1791.

Syn.: *Callopsima vitellinum* (Hoffm.) Mudd, *Caloplaca vitellina* (Hoffm.) Th. Fr., *Candelaria vitellina* (Hoffm.) A. Massal., *Candelariella flavovirella* (Nyl.) Lettau, *Candelariella henrici* B. de Lesd., *Candelariella vitellina* var. *corrusca* (Ach.) Ozenda & Clauzade, *Gyalolechia vitellina* (Hoffm.) Anzi, *Lecanora vitellina* (Hoffm.) Ach., *Verrucaria vitellina* (Hoffm.) Hoffm., *Zeora vitellina* var. *corruscans* (Ach.) Flot., *Xanthoria vitellina* (Hoffm.) Th. Fr.

N - **VG** (Castello 1996, 2002, Martellos & Castello 2004, Castello & Skert 2005, Tretiach & al. 2007b, 2012), **Fr** (Badin & Nimis 1996, Tretiach & Hafellner 2000, Castello & Skert 2005), **Ven** (Caniglia & al. 1999, Nascimbene 2005c, 2008), **TAA** (De Benetti & Caniglia 1993, Caniglia & al. 2002, Nascimbene 2003, 2005b, 2006c, 2008b, Thor & Nascimbene 2007, Nascimbene & al. 2007b, Lang 2009), **Lomb** (Valcuvia & al. 2003, De Vita & Valcuvia 2004, Brackel 2013, Gheza & al. 2015), **Piem** (Caniglia & al. 1992, Morisi & Sereno 1995, Arosio & al. 1998, Piervittori 2003, Isocrono & al. 2003, 2005b, 2004, 2007, Favero-Longo & al. 2004, 2005, 2006b, 2009b, 2013, 2015, 2015b, Isocrono & Ferrarese 2008, Isocrono & Piervittori 2008, Accattino & al. 2012, 2013, Giordani & al. 2014), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Piervittori & al. 1998, 2001, 2004, Valcuvia 2000, Revel & al. 2001, Matteucci & al. 2008c, 2013b, 2015c, Isocrono & al. 2008, Favero-Longo & Piervittori 2009), **Emil** (Gasparo & Tretiach 1996, Nimis & al. 1996, Dalle Vedove & al. 2002, Tretiach & al. 2008, Benesperi 2009), **Lig** (Castello & al. 1994, Brunialti & al. 1999, Valcuvia & al. 2000, Brunialti & Giordani 2003, Roccardi 2006, Giordani & al. 2016). **C** - **Tosc** (Tretiach & Nimis 1994, Monaci & al. 1997, Loppi & al. 2002, 2003, 2006, Brunialti & Frati 2010, Benesperi 2011, Paoli & al. 2012, Brackel 2015), **Marc** (Nimis & Tretiach 1999, Frati & Brunialti 2006), **Umb** (Panfili 2000, 2000b, Ravera & al. 2006, Lastrucci & al. 2009), **Laz** (Bartoli 1997b Roccardi 2003, 2001, Ruisi & al. 2005, Roccardi & Ricci 2006, Pietrini & al. 2008, Genovesi & al. 2011, Zucconi & al. 2013), **Abr** (Olivieri & Pacioni 1996, Olivieri & al. 1997, 1997b, Loppi & al. 1999, Nimis & Tretiach 1999), **Mol** (Garofalo & al. 1999, Nimis & Tretiach 1999, Caporale & al. 2008, Genovesi & Ravera 2014), **Sar** (Nöske 2000, Loi & al. 2000, Zedda & Sipman 2001, Rizzi & al. 2011, Giordani & al. 2013, Cossu 2013, Cossu & al. 2015). **S** - **Camp** (Garofalo & al. 1999, 2010, Aprile & al. 2002, Nimis & Tretiach 2004, Catalano & al. 2016), **Pugl** (Garofalo & al. 1999, Nimis & Tretiach 1999), **Bas** (Bartoli & Puntillo 1998, Nimis & Tretiach 1999, Paoli & al. 2006, Brackel 2011), **Cal** (Puntillo 1995, 1996, Puntillo & Puntillo 2004, Brackel & Puntillo 2016), **Si** (Merlo 1993, 2004b, Ottonello & Salone 1994, Ottonello & al. 1994, 2011, Poli & al. 1995, 1998, Nimis & al. 1996b, Ottonello 1996, Grillo & al. 1996, Ottonello & Romano 1997, Grillo 1998, Poli & Grillo 2000, Di Benedetto & al. 2002, Grillo & Caniglia 2004, Caniglia & Grillo 2006b, Brackel 2008b, 2008c, Cataldo & Cannavò 2014, Di Martino & Stancanelli 2015).

Cr/ Ch/ S/ Sax-Lign/ pH: 1-3, L: 3-5, X: 3-4, E: 2-5/ Alt: 1-6/ Alp: ec, Salp: ec, Orom: ec, Mont: ec, SmedD: vc, Pad: rc, SmedH: vc, MedH: c, MedD: rr/ PT: 1-3/ p/ Note: a holarctic, almost cosmopolitan lichen with a wide ecological range, found on a wide variety of siliceous rocks, on roofing tiles, brick, and sometimes on bryophytes, lignum and acid bark, both in natural habitats and inside large conurbations.

Candelariella xanthostigma (Ach.) Lettau

Hedwigia, 52: 196, 1912 - *Lichen xanthostigmus* Pers. ex Ach., Lichenogr. Univ.: 403, 1810.

Syn.: *Candelariella vitellina* var. *xanthostigma* (Ach.) Elenkin, *Lecanora vitellina* var. *xanthostigma* (Ach.) Nyl.

N - VG (Castello 1996, 2002, Martellos & Castello 2004, Castello & Skert 2005), **Frl** (Badin & Nimis 1996, Castello & Skert 2005), **Ven** (Nimis & al. 1996c, Nascimbene & Caniglia 1997, 2003c, Caniglia & al. 1999, Lazzarin 2000, Valcuvia & al. 2000c Nascimbene 2005c, 2008, Nascimbene & al. 2007, 2008e, 2012, Thor & Nascimbene 2007, Nascimbene & Marini 2007, 2010, Brackel 2013), **TAA** (De Benetti & Caniglia 1993, Hinteregger 1994, Nascimbene & Caniglia 2000b, Nascimbene 2003, 2005b, 2006c, 2008b, 2014, Nascimbene & al. 2003, 2007b, 2014, 2015, Gottardini & al. 2004, Stofer 2006, Cristofolini & al. 2008, Zarabska & al. 2009, Nimis & al. 2015), **Lomb** (Grieco & Groppali 1995, Valcuvia & Brusoni 1996, Brusoni & al. 1997, Zocchi & al. 1997, Roella 1999, Brusoni & Valcuvia 2000, Arosio & al. 2000, 2003, Valcuvia & al. 2003, Anderi & al. 2005, Furlanetto 2010, Gheza & al. 2015), **Piem** (Caniglia & al. 1992, Morisi & Sereno 1995, Arosio & al. 1998, Piervittori 1998, 2003, Griselli & al. 2003, Castino 2004, Isocrono & al. 2004, 2005b, 2006, 2007, 2009, Isocrono & Piervittori 2008, Furlanetto 2010, Matteucci & al. 2010, Giordani & Malaspina 2016), **VA** (Piervittori & Maffei 1996, 2001, Piervittori & Isocrono 1999, Valcuvia & al. 2000b, Matteucci & al. 2008, 2008c, Isocrono & al. 2008), **Emil** (Bassi 1995, Gasparo & Tretiach 1996, Nimis & al. 1996, Valcuvia & Savino 2000, Sallèse 2003, Marconi & al. 2006, Morselli & Regazzi 2006, Cioffi 2009, Benesperi 2009, Brackel 2015), **Lig** (Castello & al. 1994, Valcuvia & al. 2000, Giordani & al. 2002, Giordani 2006, Giordani & Incerti 2008), **C - Tosc** (Tretiach & Nimis 1994, Loppi & Putorti 1995, 1995b, Loppi & al. 1995, 1996, 1996b, 1996c, 1997, 1997e, 1998, 1998b, 2002, 2002b, 2002c, 2003, 2004, 2004c, 2006, Loppi 1996, 1996b, Loppi & De Dominicis 1996, Monaci & al. 1997, Putorti & al. 1998, Loppi & Nascimbene 1998, 2010, Benesperi 2000a, 2011, Bettini 2001, Del Guasta 2001, Paoli & Loppi 2001, 2008, Loppi & Corsini 2003, Frati & al. 2006b, 2008, Benesperi & al. 2007, 2013, Lastrucci & al. 2009, Brunialti & Frati 2010, Loppi & Baragatti 2011, Brunialti & al. 2012b, Paoli & al. 2012, 2013, 2015d, Nascimbene & al. 2015, Brackel 2015), **Marc** (Nimis & Tretiach 1999, Frati & Brunialti 2006, Brackel 2015, Pieri & al. 2015), **Umb** (Ravera 1998, Nimis & Tretiach 1999, Ravera & al. 2006, Nascimbene & al. 2012, Brackel 2015), **Laz** (Ravera 2002, 2008b, Massari & Ravera 2002, Nimis & Tretiach 2004, Ruisi & al. 2005, Stofer 2006, Munzi & al. 2007, Zucconi & al. 2013, Ravera & Genovesi 2008, Brackel 2015), **Abr** (Recchia & al. 1993, Olivieri & Pacioni 1996, Olivieri & al. 1997, 1997b, Loppi & al. 1999, Nimis & Tretiach 1999, Stofer 2006, Brackel 2015, Caporale & al. 2016, Corona & al. 2016), **Mol** (Garofalo & al. 1999, Nimis & Tretiach 1999, Caporale & al. 2008, Paoli & al. 2011, 2015, Genovesi & Ravera 2014), **Sar** (Zedda 1995, 2002b, Zedda & al. 2001, Rizzi & al. 2011, Cossu 2013), **S - Camp** (Garofalo & al. 1999, 2010, Ricciardi & al. 2000, Aprile & al. 2002, 2003, 2003b, 2011, Nimis & Tretiach 2004, Brunialti & al. 2013, Ravera & Brunialti 2013, Catalano & al. 2016), **Pugl** (Garofalo & al. 1999, Nimis & Tretiach 1999, Brackel 2011), **Bas** (Bartoli & Puntillo 1998, Nimis & Tretiach 1999, Potenza 2006, Paoli & al. 2006, Potenza & al. 2010, Brackel 2011), **Cal** (Puntillo 1996, Puntillo & Puntillo 2004), **Si** (Grillo & Cristaudo 1995, Grillo 1998, Grillo & Caniglia 2004, Caniglia & Grillo 2006b, Falco Scampatelli 2005, Grillo & Cataldo 2008, Liistro & Cataldo 2011).

Cr/ Ch/ S/ Epiph-Lign/ pH: 2-3, L: 3-5, X: 3, E: 2-3/ Alt: 1-4/ Salp: r, Mont: rc, SmedD: vc, Pad: r, SmedH: vc, MedH: rc, MedD: vr/ PT: 1-3/ Note: a mild-temperate to cool-temperate, perhaps holarctic species found on bark of more or less isolated trees, especially oaks, but also on conifers, much more rarely on lignum, with optimum in the deciduous forest belts.

Carbonea (Hertel) Hertel

Mitt. bot. Staatss. München, 19: 441, 1983 - *Lecidea* subgen. *Carbonea* Hertel, Beih. Nova Hedwigia, 24: 101, 1967.

This genus of the Lecanoraceae, which includes c. 18 species occurring in mountain regions of both Hemispheres, is distinguished from apparently similar genera (e.g. *Lecidella*, *Micarea* etc.) by the combination of *Lecanora*-type asci, a very thin outer ascus wall, large-celled photobionts, an intense aeruginose-blue epiphymenium, and an opaque, often (but not always) black exciple. Some species are non-lichenised and grow on other lichens. Type: *C. atronivea* (Arnold) Hertel

Carbonea aggregantula (Müll. Arg.) Diederich & Triebel

Herzogia, 9: 52, 1993 - *Lecidea aggregantula* Müll. Arg. Flora, 57: 533, 1874.

Syn.: *Nesolechia aggregantula* (Müll. Arg.) Rehm

N - Frl (Tretiach & Hafellner 2000, Brackel 2016), **TAA** (Hafellner 1996, 2006, Brackel 2016).

LF/ / S/ Sax/ pH: 1-2, L: 3-4, X: 3-4, E: 1-2/ Alt: 4-5/ Alp: r, Salp: er/ PT: 1/ paras *Lecanora polytropa* s.lat. (thallus)/ Note: a lichenicolous fungus, certainly much more widespread in the Alps.

Carbonea assimilis (Körb.) Hafellner & Hertel

in Wirth, Flechten Baden-Württembergs: 511, 1987 - *Lecidella assimilis* Hampe ex Körb., Parerga Lichenol.: 202, 1861.

Syn.: *Lecidea assimilis* (Körb.) Th. Fr.

C - Sar.

Cr/ Ch/ S/ Sax/ pH: 3, L: 4-5, X: 3-4, E: 1-2/ Alt: 3-5/ Alp: vr, Salp: vr, Orom: vr, Mont: er/ PT: 1/ suboc, paras crustose lichens/ Note: a species with a thallus of minute pale brown glossy areoles which are diagnostic, found on exposed inclined rock faces of siliceous rocks, parasitic on other crustose lichens (e.g. species of *Aspicilia*, *Lecanora*, *Lecidea*, *Tephromela*); probably more widespread but not common, perhaps overlooked in Italy.

Carbonea atronivea (Arnold) Hertel

Mitt. bot. Staatss. München, 19: 375, 1983 - *Lecidea atronivea* Arnold, Flora, 53: 123, 1870.

N - Ven (Hertel 2001, Hertel & Schuhwerk 2010), **TAA**, **Piem** (TSB 33159), **VA**.

Cr/ Ch/ S/ Sax/ pH: 3-4, L: 4-5, X: 3-4, E: 2-3/ Alt: 4-5/ Alp: r, Salp: vr/ PT: 1/ paras *Lecidella* spp. when young/ Note: an arctic-alpine, circumpolar species found on lime-containing siliceous rocks (e.g. calciferous schists) near or above treeline, starting the life-cycle on *Lecidella*-species; certainly overlooked and more widespread in the Alps.

Carbonea distans (Kremp.) Hafellner & Obermayer

in Obermayer, Mitt. naturwiss. Ver. Steiermark, 123: 116, 1993 - *Lecidea distans* Kremp., Flora, 37: 71, 1855.

Syn.: *Biatora mosigiicola* Eitner, *Lecanora mosigiicola* (Eitner) Hertel & Rambold, *Lecidea straminea* Anzi

N - **Frl** (Tretsiach & Hafellner 2000), **TAA** (Hertel & Schuhwerk 2010), **Lomb**, **Piem** (TSB 35201).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 4-5, X: 4, E: 1/ Alt: 4-5/ Alp: rr, Salp: r/ PT: 1/ paras *Orphniospora mosigii*/

Note: an arctic-alpine obligate parasite on the thalli of *Orphniospora moriopsis*, found on steeply inclined, exposed faces of hard siliceous rocks near or above treeline; the species is certainly more widespread in the Alps.

Carbonea intrudens (H. Magn.) Hafellner

Fritschiana, 52: 40, 2006 - *Lecidea intrudens* H. Magn., Ark. Bot., 33, A, 1: 53, 1946.

Syn.: *Carbonea halacsyi sensu* Hafellner & Sancho non *Lecidea halacsyi* J. Steiner

N - **Frl** (Tretsiach & Hafellner 2000, Hafellner 2006, Brackel 2016), **TAA** (Hafellner 2006, Brackel 2016), **Piem** (Hafellner 2006, 2007, Hertel & Schuhwerk 2010, Brackel 2016), **Emil** (Hafellner 2006, Brackel 2016).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 3-4, X: 3-4, E: 1-2/ Alt: 4-5/ Alp: er, Salp: er/ PT: 1/ paras yellow *Rhizocarpon* species/ Note: perhaps circumpolar-alpine in distribution, this is a doubtfully lichenised, obligately lichenicolous fungus growing on *Rhizocarpon*-species near or above treeline. For further details see Hafellner (2006).

Carbonea latypizodes (Nyl.) Knoph & Rambold

in Hertel, Sendtnera, 7: 96, 2001 - *Lecidea latypizodes* Nyl., Flora, 57: 12, 1874.

Syn.: *Lecidea lacteola* Nyl., *Lecidea liguriensis* H. Magn., *Lecidella lacteola* (Nyl.) Hertel & Leuckert

N - **TAA**, **Lomb**, **VA** (Piervittori & Isocrono 1999), **Lig** (Giordani & al. 2016).

Cr/ Ch/ S/ Sax/ pH: 3-4, L: 4, X: 3-4, E: 3/ Alt: 2-4/ Salp: r, Mont: r, SmedD: vr/ PT: 1/ p/ Note: an early coloniser of small pebbles in dusty situations, especially near the ground, with a wide altitudinal range.

Carbonea supersparsa (Nyl.) Hertel

Mitt. bot. Staatss. München, 19: 375, 1983 - *Lecidea supersparsa* Nyl., Flora, 48, 1865.

Syn.: *Nesolechia vitellinaria* var. *supersparsa* (Nyl.) Keissl., *Nesolechia supersparsa* (Nyl.) Rehm

N - **Frl** (Tretsiach & Hafellner 2000, Brackel 2016), **TAA** (Hafellner 2006, Brackel 2016), **Piem** (TSB 33273, Brackel 2016). **C** - **Tosc** (Brackel 2015, 2016), **Laz** (Brackel 2016), **Sar** (Brackel 2016). **S** - **Cal** (Brackel & Puntillo 2016, Brackel 2016), **Si** (Brackel 2008c, 2016).

LF/ / S/ Sax/ pH: 1-2, L: 3-4, X: 3-4, E: 1/ Alt: 3-5/ Alp: rr, Salp: rc, Orom: er, Mont: vr/ PT: 1/ paras *Lecanora polytropha s.lat.* and *Rhizoplaca* spp./ Note: a boreal-montane to arctic-alpine, circumpolar lichenicolous fungus, certainly widespread throughout the Alps.

Carbonea vitellinaria (Nyl.) Hertel

Mitt. bot. Staatss. München, 19: 375, 1983 - *Lecidea vitellinaria* Nyl., Bot. Not.: 117, 1852.

Syn.: *Lecidea imponens* Leight., *Lecidea pitensis* Lönnr., *Lecidella vitellinaria* (Nyl.) Kremp., *Nesolechia vitellinaria* (Nyl.) Rehm

N - **Frl** (Tretsiach & Hafellner 2000, Hafellner 2006, Brackel 2016), **Ven** (Caniglia & al. 1999, Brackel 2016), **TAA** (Nascimbene 2003, 2008b, Thor & Nascimbene 2007, Brackel 2016), **Lomb** (De Vita & Valcuvia 2004, Brackel 2016), **Piem** (Isocrono & al. 2003, 2004, Hafellner 2006, Isocrono & Piervittori 2008, Giordani & al. 2014, Brackel 2016), **VA** (Piervittori & al. 1998, 2004, Piervittori & Isocrono 1999, Brackel 2016), **Lig** (Brunialti & al. 1999, Brackel 2016). **C** - **Tosc** (Tretsiach & al. 2008, Lastrucci & al. 2009, Brackel 2016), **Umb** (Panfili 2000, Ravera & al. 2006, Brackel 2016), **Laz** (Brackel 2016), **Abr** (Nimis & Tretsiach 1999, Brackel 2016), **Sar** (Nöske 2000, Rizzi & al. 2011, Giordani & al. 2013, Brackel 2016). **S** - **Camp** (Catalano & al. 2016, Brackel 2016), **Bas** (Nimis & Tretsiach 1999, Brackel 2016), **Cal** (Puntillo 1996, Brackel & Puntillo 2016), **Si** (Ottonello & Romano 1997, Brackel 2008b, 2016, Ottonello & al. 2011).

LF/ / S/ Sax/ pH: 1-2, L: 4-5, X: 3-4, E: 3-4/ Alt: 1-5/ Alp: rc, Salp: c, Orom: rr, Mont: r, SmedD: er, SmedH: vr, MedH: er/ PT: 1-2/ paras *Candelariella* spp./ Note: a holarctic, temperate to arctic lichenicolous fungus growing on *Candelariella vitellina*, especially common in upland areas, but also found in the most humid parts of the Mediterranean belt.

Carbonea vorticos (Flörke) Hertel

Mitt. bot. Staatss. München, 19: 442, 1983 - *Lecidea sabuletorum* var. *vorticos* Flörke, Mag. natf. Fr. Berlins, 2: 311, 1808.

Syn.: *Lecidea asperella* Stirt., *Lecidea kündigungiana* Müll. Arg., *Lecidea pullulans* Th. Fr., *Lecidea sublatypea* Leight. ex Cromb., *Lecidea vorticos* (Flörke) Körb.

N - **Frl** (Tretsiach & Hafellner 2000), **Ven** (Hertel & Schuhwerk 2010), **TAA** (Thor & Nascimbene 2007), **Lomb**, **Piem** (Isocrono & al. 2004, 2006, Isocrono & Piervittori 2008), **VA** (Piervittori & Isocrono 1999, Piervittori & al. 2001), **Emil**. **C** - **Sar**. **S** - **Camp** (Aprile & al. 2002), **Si**.

Cr/ Ch/ S/ Sax/ pH: 3-4, L: 4-5, X: 3-4, E: 1/ Alt: 3-6/ Alp: rc, Salp: rr, Orom: vr, Mont: er/ PT: 1/ Note: an arctic-alpine, circumpolar species found on steeply inclined faces of lime-poor sandstone, schists and gneiss, rarely on dolomite, in upland areas; common in the Alps, much rarer in southern Italy.

Carbonicola Bendiksby & Timdal

Taxon, 62: 950, 2013.

In their molecular re-assessment of genus *Hypocenomyce s.lat.*, Bendiksby & Timdal (2013) found that the genus is extremely polyphyletic and can be subdivided into seven supported clades belonging in different genera, families, orders and even subclasses, representing a remarkable example of morphological and ecological convergence. The new genus *Carbonicola*, which includes the 3 species of the *H. anthracophila* group, forms a sister clade to that consisting of the Cladoniaceae and Stereocaulaceae, and is now placed into its own family, the Carbonicolaceae. Type: *C. anthracophila* (Nyl.) Bendiksby & Timdal

Carbonicola anthracophila (Nyl.) Bendiksby & Timdal

Taxon, 62: 950, 2013 - *Lecidea anthracophila* Nyl., Flora, 48: 603, 1865.

Syn.: *Biatora anthracophila* (Nyl.) Hafellner, *Hypocenomyce anthracophila* (Nyl.) P. James & Gotth. Schneid., *Lecidea cladonioides* Th. Fr., *Lecidea cladonioides* var. *albocevina* (Räsänen) Zahlbr.

N - Piem (TSB 25768). **S - Cal** (Puntillo 1996).

Sq/ Ch/ A.s/ Lign/ pH: 1-2, L: 4-5, X: 4, E: 1/ Alt: 3-4/ Salp: er, Mont: er/ PT: 1/ Note: a circumboreal-montane lichen found on charred wood in upland areas. It is included in the Italian red list of epiphytic lichens as "Endangered" (Nascimbene & al. 2013c).

Carbonicola myrmecina (Ach.) Bendiksby & Timdal

Taxon, 62: 950, 2013 - *Lecidea scalaris* var. *myrmecina* Ach., Meth. Lich.: 78, 1803.

Syn.: *Hypocenomyce castaneocinerea* (Räsänen) Timdal, *Psora cladonioides* var. *castaneocinerea* Räsänen, *Psora myrmecina* (Ach.) Boistel

S - Camp (Aprile & al. 2003), **Cal** (Puntillo 1996).

Sq/ Ch/ A.s/ Lign/ pH: 1-2, L: 4, X: 4, E: 1/ Alt: 2-4/ Mont: er, SmedD: er, SmedH: er/ PT: 1/ Note: a cool-temperate to boreal-montane lichen found on charred wood; probably present also in the Alps, and to be looked for there. It is included in the Italian red list of epiphytic lichens as "Endangered" (Nascimbene & al. 2013c).

Catapyrenium Flot.

Bot. Ztg., 8: 361, 1850.

The genus *Catapyrenium s.lat.* in the Verrucariaceae was split into eight genera (Breuss 1996a), based on combinations of characters such as the type of pycnidium, ascus shape and arrangement of the ascospores, thallus anatomy and morphology (structure of the upper cortex and type of anchoring organs), and the presence or absence of an involucrellum. *Catapyrenium s.str.*, which includes 6 species, was submitted to a molecular phylogenetic analysis by Prieto & al. (2010), who confirmed its separation from *Placidiopsis*. The species of the Iberian Peninsula were treated by Prieto & al. (2010b). Type: *C. cinereum* (Pers.) Körb.

Catapyrenium cinereum (Pers.) Körb.

Syst. Lich. Germ.: 325, 1855 - *Endocarpon cinereum* Pers., Ann. Bot. (Usteri), 1: 28, 1794.

Syn.: *Dermatocarpon cinereum* (Pers.) Th. Fr., *Dermatocarpon hepaticum* (Ach.) Th. Fr. *non auct.*, *Dermatocarpon tephroides* (Ach.) W. Mann, *Endocarpon hepaticum* Ach. *non auct.*, *Endopyrenium cinereum* (Pers.) Oxner, *Involucrocarpon cinereum* (Pers.) Servit, *Sagedia cinerea* (Pers.) Fr., *Verrucaria polythecia* Ach., *Verrucaria tephroides* (Ach.) Nyl.

N - Frl (Tretiach & Hafellner 2000), **Ven** (Nascimbene & Caniglia 2003c, Nascimbene 2005c, 2008c), **TAA** (Nascimbene & al. 2006, Nascimbene 2008b), **Lomb, Piem** (Isocrono & al. 2004, Morisi 2005), **VA** (Piervittori & Isocrono 1999, Matteucci & al. 2015c), **Lig. C - Tosc** (Benespero & al. 2007), **Marc** (Nimis & Tretiach 1999), **Umb** (Genovesi & al. 2001, Ravera & al. 2006), **Laz** (Brackel 2015), **Abr** (Nimis & Tretiach 1999), **Sar. S - Camp** (Ricciardi & al. 2000), **Pugl, Bas, Cal** (Puntillo 1996), **Si** (Grillo 1998, Grillo & Caniglia 2004, Caniglia & Grillo 2005, 2006).

Sq/ Ch/ S/ Terr/ pH: 3-4, L: 4-5, X: 3-4, E: 1-2/ Alt: 3-6/ Alp: c, Salp: vc, Orom: r, Mont: vr/ PT: 1/ Note: a boreal-montane to arctic-alpine, circumpolar species occurring also in more southern mountains on siliceous, base-rich soil with mica, or amongst terricolous bryophytes, usually near or above treeline. Some records from low elevations in Sicily appear as dubious to me.

Catapyrenium daedaleum (Kremp.) Stein

in Cohn, Krypt.- Fl. von Schlesien, 2, 2: 312, 1879 - *Endocarpon daedaleum* Kremp., Flora, 38: 66, 1855.

Syn.: *Dermatocarpon daedaleum* (Kremp.) Th. Fr., *Endopyrenium daedaleum* (Kremp.) Körb., *Placidiopsis daedalea* (Kremp.) Creveld

N - Frl (Tretiach & Hafellner 2000), **Ven** (Nimis 1994), **TAA, Lomb, Piem** (TSB 33717), **VA** (Piervittori & Isocrono 1999), **C - Tosc** (Benespero 2007), **Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 2004, Caporale & al. 2008), **Sar. S - Camp** (Nimis & Tretiach 2004), **Cal** (Puntillo 1996), **Si**.

Sq/ Ch/ S/ Terr/ pH: 3-4, L: 4, X: 3-4, E: 1-2/ Alt: 3-5/ Alp: rc, Salp: c, Orom: vr, Mont: er/ PT: 1/ Note: a boreal-montane to arctic-alpine, circumpolar species found on plant debris, mosses and bare, humus-rich soil on calciferous ground near or above treeline; perhaps less common than *C. cinereum* in the mountains of southern Italy.

Catapyrenium psoromoides (Borrer) R. Sant.

in Hawksworth & al., Lichenologist, 12: 106, 1980 - *Verrucaria psoromoides* Borrer in Hooker & Sowerby, Engl. Bot. Suppl. 1, tab. 2612, fig. 1, 1831.

Syn.: *Dermatocarpon daedaleum* var. *corticola* H. Magn., *Dermatocarpon daedaleum* f. *pruinusum* Vain., *Dermatocarpon psoromoides* (Borrer) Dalla Torre & Sarnth., *Placocarpon psoromoides* (Borrer) Trevis., *Verrucaria psoromia* Nyl.

N - **VG** (TSB 20351), **Frl** (Tretiach & Carvalho 1995), **TAA** (Nascimbene & al. 2007b), **Lomb**, **Emil** (Gasparo & Tretiach 1996, Nimis & al. 1996), **Lig** (Brunialti & Giordani 2003), **C** - **Tosc**, **Marc** (Fрати & Brunialti 2006, Caporale & al. 2008, Brackel 2015), **Laz** (Fornasier & al. 2005), **Abr** (Recchia & al. 1993, Olivieri & al. 1997, 1997b), **Mol** (Fрати & al. 2004, Caporale & al. 2008), **Sar** (Zedda 2002b).

Sq/ Ch/ S/ Epiph/ pH: 3, L: 3-4, X: 2-3, E: 1-2/ Alt: 1-3/ Mont: er, SmedD: vr, SmedH: vr, MedH: er/ PT: 1/ Note: a mild-temperate, probably holarctic lichen found on the base of old trees, especially on rough bark in parklands and open woodlands, occasionally on epiphytic bryophytes, very rarely on epilithic mosses, with optimum in the submediterranean belt. It is included in the Italian red list of epiphytic lichens as "Near-threatened" (Nascimbene & al. 2013c).

Catillaria A. Massal.

Ric. Auton. Lich. Crost.: 78, 1852.

This genus of the Catillariaceae includes c. 150 species. *Catillaria* in the strict sense is now defined as having a crustose thallus with a chlorococcoid photobiont (but some species are non-lichenised), lecideine apothecia with a persistent margin, asci with a well-developed amyloid tholus that lacks any discernible internal structures (*Catillaria*-type), paraphyses with capitate, pigmented apices, and hyaline, non-halonate, 1-septate ascospores. Several species treated as members of *Catillaria s.lat.* by Nimis (1993) have been transferred to other genera. Type: *C. chalybeia* (Borrer) A. Massal.

Catillaria atomarioides (Müll. Arg.) H. Kiliás

Herzogia, 5: 327, 1981 - *Lecidea atomarioides* Müll. Arg., Flora, 57: 187, 1874.

Syn.: *Catillaria microcarpa* R. Sant.

C - **Tosc** (Tretiach & al. 2008), **S** - **Camp** (Garofalo & al. 2010), **Cal** (UPS-L11515), **Si** (Iacolino & Ottonello 2006).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 2-4, X: 2-3, E: 1-2/ Alt: 3-4/ Salp: vr, Orom: er, Mont: vr/ PT: 1/ p/ Note: an inconspicuous lichen found on steeply inclined surfaces of hard siliceous rocks in humid situations, mostly in upland areas; very much overlooked and certainly more widespread in Italy.

Catillaria chalybeia (Borrer) A. Massal.

Ric. Auton. Lich. Crost.: 79, 1852 - *Lecidea chalybeia* Borrer in Hooker & Sowerby, Engl. Bot. Suppl. 1: tab. 2687, 1831.

Syn.: *Biatora deplanatula* Müll. Arg., *Biatorina chalybeia* (Borrer) Mudd, *Biatorina lenticularis* var. *chalybeia* (Borrer) Anzi, *Biatorina lenticularis* var. *chloropoliza* (Nyl.) A.L. Sm., *Biatorina baliola* (Nyl.) Hellb., *Biatorina nubila* Norman, *Biatorina pleiospora* J. Steiner, *Buellia chalybeia* (Borrer) Bagl., *Catillaria chalybeia* var. *chloropoliza* (Nyl.) H. Kiliás, *Catillaria chloroscotina* (Nyl.) Arnold, *Catillaria doliocarpa* (Müll. Arg.) Arnold, *Catillaria lenticularis* var. *vulgaris* (Körb.) Th. Fr., *Catillaria nigroclavata* var. *baliola* (Nyl.) Zahlbr., *Catillaria pleiospora* (J. Steiner) J. Steiner, *Lecidea baliola* Nyl., *Lecidea deplanatula* (Müll. Arg.) Müll. Arg., *Lecidea spodoplaça* Nyl., *Microlecia chalybeia* (Borrer) M. Choisy, *Patellaria doliocarpa* Müll. Arg., *Thalloidima rechingeri* Szatala?

N - **VG** (Castello 2002, Martellos & Castello 2004), **Frl** (TSB 2894), **Ven** (Nascimbene 2008c), **TAA**, **Lomb** (De Vita & Valcuvia 2004), **Piem** (Isocrono & al. 2004, 2006, Giordani & al. 2014, Favero-Longo & al. 2015), **VA** (Matteucci & al. 2015c), **Emil**, **Lig** (Valcuvia & al. 2000, Giordani & al. 2016), **C** - **Tosc** (Putortì & al. 1998), **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera 1998, Ravera & al. 2006, Panfili 2007, Genovesi 2011), **Laz** (Ravera & al. 1999, Massari & Ravera 2002), **Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **Sar** (Nöske 2000, Zedda 2002, 2002b, Zedda & Sipman 2001, Rizzi & al. 2011, Giordani & al. 2013), **S** - **Camp** (Ricciardi & al. 2000, Aprile & al. 2002, 2003, Nimis & Tretiach 2004), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999, Potenza 2006), **Cal** (Puntillo 1996, Puntillo & Puntillo 2004), **Si** (Ottonello & al. 1994, Nimis & al. 1996b, Grillo & Caniglia 2004, Liistro & Cataldo 2011).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 2-4, X: 2-3, E: 1-3/ Alt: 1-5/ Alp: vr, Salp: vr, Orom: r, Mont: rc, SmedD: rr, Pad: er, SmedH: vc, MedH: c, MedD: vr/ PT: 1-3/ p/ Note: a holarctic, subtropical to arctic, facultatively lichenised species found on a wide range of siliceous substrata, including roofing tiles and brick, and even on gypsum, in sheltered situations and also on periodically inundated rocks, common both in natural and urban areas, especially on walls (e.g. present within the urban area of Rome). There is also a calcicolous ecotype (see Roux & coll. 2014) which is likely to occur also in Italy. The records from Toscana by Loppi & al. (1999a, 2002c), on trees, are probably erroneous.

Catillaria contristans (Nyl.) Zahlbr.

Cat. Lich. Univ., 4: 35, 1926 - *Lecidea contristans* Nyl., Flora, 48: 354, 1865.

Syn.: *Biatora hypocyanea* (Stirt.) Zahlbr., *Biatorina contristans* (Nyl.) Arnold, *Biatorina sphaeralis* (Körb.) Jatta, *Catillaria dufourii* (Ach. ex Nyl.) Vain., *Catillaria sphaeralis* Körb., *Lecidea dufourii* Ach. ex Nyl., *Lecidea hypocyanea* Stirt., *Lecidea sabuletorum* f. *simplicior* Nyl.

N - Lomb.

Cr/ Ch/ S/ Terr/ pH: 1-2, L: 3-4, X: 3, E: 1/ Alt: 3-5/ Alp: vr, Salp: vr, Mont: vr/ PT: 1/ Note: on dead bryophytes (*Andreaea*, *Grimmia*) and soil rich in humus over acid siliceous rocks in upland areas. According to Coppins (1983), it does not belong to *Catillaria*, being related to *Protomicarea limosa*.

Catillaria detractula (Nyl.) H. Olivier

Bull. Acad. Int. Géogr. Bot., 10: 129, 1901 - *Lecanora detractula* Nyl., Flora, 58: 444, 1875.

Syn.: *Lecania detractula* (Nyl.) Arnold

C - Marc. S - Camp (Aprile & al. 2003b), **Pugl** (Nimis & Tretiach 1999), **Si** (Nimis & al. 1994).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 4, X: 3, E: 1-2/ Alt: 1-3/ Mont: vr, SmedD: vr, SmedH: vr/ PT: 1/ Note: a temperate species growing on calcareous rocks in open situations at relatively low elevations. Ecology and distribution need further study, and the indicator values are tentative.

Catillaria erysiboides (Nyl.) Th. Fr.

Lichenogr. Scand., 2: 572, 1874 - *Lecidea erysiboides* Nyl., Not. Sällsk. Fauna Fl. Fenn., 4: 232, 1859.

Syn.: *Biatorina erysiboides* (Nyl.) Arnold

N - Frl, Ven (Nascimbene & al. 2005b), **TAA** (Nimis & al. 2015). **C - Tosc, Marc, Abr** (Nimis & Tretiach 1999).

Cr/ Ch/ S/ Lign/ pH: 1-2, L: 2-3, X: 2-3, E: 1/ Alt: 2-4/ Salp: vr, Orom: r, Mont: r, SmedD: vr, SmedH: vr/ PT: 1/ Note: on hard lignum, e.g. on horizontal faces of old stumps. According to Coppins (1981) the epithet "*erysiboides*" was used for widely different taxa (e.g. *Mycobilimbia carneoalbida*, *Lecania cyrtella* and related taxa, *Micarea prasina*, etc.); records from Toscana and Marche (Nimis 1993: 204) need confirmation: they could refer to *Micarea prasina* or related species. The species does not belong to *Catillaria s.str.*

Catillaria lenticularis (Ach.) Th. Fr.

Lichenogr. Scand., 2: 567, 1874 - *Lecidea lenticularis* Ach., Syn. Meth. Lich.: 28, 1814.

Syn.: *Biatora chalybeia sensu* Hepp, *Biatorina heppii* A. Massal., *Biatorina lenticularis* (Ach.) Körb., *Biatorina lenticularis* var. *erubescens* Flot., *Biatorina lojkana* J. Lahm, *Biatorina pulicaris* A. Massal., *Biatorina versicolor* (Flot.) Hellb., *Catillaria dolosa auct.*, *Catillaria lenticularis* var. *erubescens* (Flot.) Th. Fr., *Catillaria lojkana* (J. Lahm) Zahlbr., *Catillaria rhyarophaea* (Nyl.) Zahlbr., *Catillaria umbrinella* Zahlbr., *Catillaria vallotii* (Lamy) Zahlbr., *Lecania actaea* (Nyl.) B. de Lesd., *Lecidea gagei* Hook. non (Sm.) A.L. Sm. *quid est Herteliana gagei*, *Lecidea rhyarophaea* Nyl., *Lecidea umbrinella* Nyl. *nom. illegit.*, *Microlecia lenticularis* (Ach.) M. Choisy

N - VG, Frl (Nimis & Salvadori 1998), **Ven** (Lazzarin 2000b, Nascimbene & Marini 2007), **TAA, Lomb** (Sunil Morgan & al. 2008), **Piem** (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999), **Emil, Lig** (Watson 2014, Giordani & al. 2016). **C - Tosc, Marc** (Nimis & Tretiach 1999), **Umb** (Nimis & Tretiach 1999, Ravera & al. 2006, Panfili 2007), **Laz** (Bartoli & al. 1998, Nimis & Tretiach 2004), **Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008, Ravera & al. 2009), **Sar. S - Camp** (Aprile & al. 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994, 1995, Ottonello & al. 1994, Monte & Ferrari 1996, Grillo 1998, Caniglia & Grillo 2001, 2005, 2006, Grillo & al. 2001, 2002, 2009, Grillo & Caniglia 2004, Cataldo & Cannavò 2014).

Cr/ Ch/ S/ Sax/ pH: 3-5, L: 2-4, X: 2-3, E: 1-3/ Alt: 1-5/ Alp: er, Salp: vr, Orom: r, Mont: rc, SmedD: c, Pad: vr, SmedH: vc, MedH: c, MedD: r/ PT: 1-2/ Note: a mainly mild-temperate lichen found on limestone, more rarely on dolomite, sometimes on nutrient-enriched, base-rich siliceous rocks, with optimum in open woodlands but present also inside conurbations as well, and on monuments in archaeological areas, with a wide altitudinal range.

Catillaria mediterranea Hafellner

Herzogia, 6: 293, 1982.

Syn.: *Scutula pleiospora* Vouaux

C - Tosc (Brackel 2015, 2016), **Laz** (Brackel 2015), **Abr** (Brackel 2015), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008). **S - Camp** (Garofalo & al. 2010), **Bas** (Tretiach & Hafellner 1998, Nimis & Tretiach 1999, van den Boom 2002), **Cal** (Nimis & Puntillo 2003, Puntillo 2011, Brackel & Puntillo 2016), **Si** (Nimis & al. 1994, Tretiach & Hafellner 1998, Brackel 2008b).

Cr/ Ch/ S/ Epiph/ pH: 3, L: 4-5, X: 3, E: 2-3/ Alt: 1-3/ Mont: r, SmedD: vr, SmedH: r, MedH: r/ PT: 1/ paras foliose and fruticose lichens/ Note: a mainly Mediterranean lichenicolous lichen (with a very reduced thallus) growing on different foliose and fruticose lichens, e.g. *Anaptychia ciliaris*, *Parmelina* spp., *Ramalina* spp., etc. According to Tretiach & Hafellner (1998) the record from Sardegna (Nimis 1993: 205) refers to *C. servitii*.

Catillaria minuta (A. Massal.) Lettau

Hedwigia, 52: 135, 1912 - *Biatorina minuta* A. Massal., Ric. Auton. Lich. Crost.: 137, 1852.

Syn.: *Biatorina arnoldii* Kremp., *Biatorina arnoldii* var. *luteella* (Nyl.) A.L. Sm., *Catillaria arnoldii* (Kremp.) Th. Fr.

N - VG (25437), **Frl, Ven** (Watson 2014), **Lomb** (Lazzarin 2000b), **Emil. C - Tosc** (Tretiach & al. 2008), **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera & al. 2006). **S - Camp** (Nimis & Tretiach 2004), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Si** (Nimis & al. 1994, 1995).

Cr/ Ch/ S/ Sax/ pH: 5, L: 2-3, X: 2, E: 1/ Alt: 1-3/ Mont: vr, SmedD: r, SmedH: r, MedH: er/ PT: 1/ u/ Note: a mild-temperate species found on steeply inclined or underhanging faces of compact limestones in sheltered situations, e.g. in narrow gorges along creeks.

Catillaria nigroclavata (Nyl.) J. Steiner

Sitzungsber. Akad. Wiss. Wien, Math.-naturw. Kl., Abt. 1, 107: 157, 1898 - *Lecidea nigroclavata* Nyl., Bot. Not.: 160, 1853.

Syn.: *Biatorina nigroclavata* (Nyl.) Arnold, *Biatorina ilicis* (A. Massal.) Jatta, *Catillaria ilicis* A. Massal., *Lecidea ilicis* A. Massal. nom. nud., *Microlecia nigroclavata* (Nyl.) M. Choisy

N - VG (Castello 1996), **Frl** (Badin & Nimis 1996, Castello & Skert 2005), **Ven** (Nimis & al. 1996c, Valcuvia & al. 2000c, Lazzarin 2000b, Nascimbene 2008, 2008c, Nascimbene & al. 2008e, 2012, 2015, Nascimbene & Marini 2010), **TAA** (Hinteregger 1994, Nascimbene 2006c, 2014, Nascimbene & al. 2007b, 2014), **Lomb** (Valcuvia & Gianatti 1995, Arosio & al. 2003, Valcuvia & Truzzi 2007b), **Piem** (Arosio & al. 1998, Isocrono & al. 2003, 2009, Matteucci & al. 2010), **VA** (Valcuvia 2000, Valcuvia & al. 2000b, Matteucci & al. 2008), **Emil** (Nimis & al. 1996, Morselli & Regazzi 2006), **Lig** (Giordani & Incerti 2008). **C - Tosc** (Tretiach & Nimis 1994, Loppi 1996b, Loppi & al. 1998, 2004, 2006, Putorti & Loppi 1998, 1999, Paoli & Loppi 2008, Brunialti & Frati 2010, Loppi & Nascimbene 2010, Benesperi 2011, Nascimbene & al. 2012, 2015, Paoli & al. 2012, 2015d, Benesperi & al. 2013, Brackel 2015), **Marc** (Nimis & Tretiach 1999, Frati & Brunialti 2006, Brackel 2015), **Umb** (Ravera 1998, Ravera & al. 2006), **Laz** (Bartoli & al. 1997, Nimis & Tretiach 2004, Ruisi & al. 2005, Munzi & al. 2007, Brackel 2015), **Abr** (Olivieri & al. 1997, 1997b, Loppi & al. 1999, Nimis & Tretiach 1999, Brackel 2015), **Mol** (Garofalo & al. 1999, Nimis & Tretiach 1999, Caporale & al. 2008, Genovesi & Ravera 2014, Paoli & al. 2015), **Sar** (Zedda & Sipman 2001, Zedda 2002, Rizzi & al. 2011, Cossu 2013). **S - Camp** (Garofalo & al. 1999, 2010, Aprile & al. 2003b, Nimis & Tretiach 2004, Catalano & al. 2012, 2016, Brunialti & al. 2013, Ravera & Brunialti 2013), **Pugl** (Garofalo & al. 1999, Nimis & Tretiach 1999, Durini & Medagli 2004, Brackel 2011), **Bas** (Nimis & Tretiach 1999, Paoli & al. 2006, Potenza & al. 2010, Brackel 2011), **Cal** (Puntillo 1996, Incerti & Nimis 2006, Brackel & Puntillo 2016), **Si** (Nimis & al. 1994, Grillo & Cristaudo 1995, Grillo 1998, Grillo & al. 2002, Grillo & Caniglia 2004, Caniglia & Grillo 2006b, Brackel 2008c, Cataldo & Minissale 2015).

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 4, X: 3, E: 2-3/ Alt: 1-3/ Mont: rr, SmedD: rc, Pad: r, SmedH: c, MedH: r, MedD: er/ PT: 1-2/ Note: a mainly mild-temperate, holarctic species found on isolated deciduous trees, also in rather disturbed habitats, e.g. in parklands, and on wayside trees, sometimes growing as a parasite on other lichens (Brackel 2015). For the distinction towards *C. mediterranea* and *C. servitii* see Tretiach & Hafellner (1998).

Catillaria picila (A. Massal.) Coppins

Lichenologist, 21: 223, 1989 - *Biatora picila* A. Massal., Miscell. Lichenol.: 38, 1856.

Syn.: *Biatorina picila* (A. Massal.) Zahlbr., *Catillaria anomaloides auct. non* (A. Massal.) Lettau, *Lecidea anomaliza* Nyl., *Lecidea picila* (A. Massal.) Nyl.

N - Ven (Watson 2014), **TAA, Lomb, Piem** (TSB 33411), **Emil. C - Tosc, Mol** (Nimis & Tretiach 2004, Caporale & al. 2008). **S - Camp** (Garofalo & al. 2010), **Pugl**.

Cr/ Ch/ S/ Sax/ pH: 5, L: 2-3, X: 2-3, E: 1/ Alt: 2-4/ Salp: er, Mont: vr, SmedD: vr, SmedH: vr/ PT: 1/ p/ Note: a mild-temperate species found on steeply inclined to underhanging surfaces of compact calcareous rocks, especially limestone but also calciferous schists, often together with *C. minuta*.

Catillaria servitii Szatala

Denkschr. kaiserl. Akad. Wiss., math.-naturwiss. Kl., 105: 29, 1943.

Syn.: *Catillaria praedicta* Tretiach & Hafellner

C - Tosc (Tretiach & Hafellner 1998, Putorti & Loppi 1999, Munzi & al. 2011, Benesperi & al. 2013), **Sar** (Tretiach & Hafellner 1998, van den Boom 2002). **S - Pugl** (Tretiach & Hafellner 1998, Nimis & Tretiach 1999), **Si** (Tretiach & Hafellner 1998, Grillo & al. 2002, Grillo & Caniglia 2004, Ottonello & al. 2011, Cataldo & Minissale 2015).

Cr/ Ch/ S/ Epiph/ pH: 2-4, L: 3-5, X: 2, E: 3/ Alt: 1/ MedH: rr, MedD: er/ PT: 1-2/ suboc, coast/ Note: a probably Mediterranean species found on twigs and boles of smooth-barked trees and shrubs, especially along the coast in areas with humid maritime winds.

Catillaria subviridis (Nyl.) Zahlbr.

Cat. Lich. Univ., 4: 75, 1927 - *Lecidea subviridis* Nyl., Flora, 56, 19: 297, 1873.

C - Sar (Rizzi & al. 2011).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 2-4, X: 2-3, E: 3-4/ Alt: 3-5/ Orom: er, Mont: er/ PT: 1/ p/ Note: a mainly boreal to subarctic, suboceanic species growing on nutrient-enriched siliceous rocks.

Catinaria Vain.

Acta Soc. Fauna Fl. Fenn., 53, 1: 143, 1922, nom. cons.

Catinaria is a genus of the Ramalinaceae with 2, mainly epiphytic or lignicolous species with 1-septate spores, lecideine apothecia, and *Catillaria*-type asci, differing from *Megalania* and *Phyllopsora* by the halonate ascospores and the lack of differentiation of the apical tholus in the ascus. Type: *C. atropurpurea* (Schaer.) Vězda & Poelt. The name is conserved, with a conserved type, against *Biatorina* A. Massal. (1852).

Catinaria atropurpurea (Schaer.) Vězda & Poelt

in Poelt & Vězda, *Bibl. Lichenol.*, 16: 363, 1981 - *Lecidea sphaeroides* var. *atropurpurea* Schaer., *Lich. Helv. Spicil.*, 4-5: 165, 1833.

Syn.: *Biatora adpressa* Hepp, *Biatora atropurpurea* (Schaer.) Hepp, *Biatorina adpressa* (Hepp) Körb., *Biatorina arceutica* A. Massal., *Biatorina atropurpurea* (Schaer.) A. Massal., *Catillaria adpressa* (Hepp) Schuler, *Catillaria atropurpurea* (Schaer.) Th. Fr.

N - Ven, **TAA** (Nascimbene & al. 2007b), **Lomb, Lig** (Giordani & Incerti 2008). **C** - **Tosc, Marc** (Nimis & Tretiach 1999), **Umb** (Ravera 2000, Ravera & al. 2006), **Laz** (Ravera 2001, Massari & Ravera 2002), **Abr** (Nimis & Tretiach 1999), **Sar** (Zedda 2002, Rizzi & al. 2011, Cossu 2013). **S** - **Camp** (Aprile & al. 2003b), **Pugl** (Nimis & Tretiach 1999), **Bas** (Ravera & al. 2015d), **Cal** (Puntillo 1996, Incerti & Nimis 2006), **Si** (Otonello & al. 2011).

Cr/ Tr/ S/ Epiph-Lign/ pH: 2-3, L: 3-4, X: 2, E: 1-2/ Alt: 1-2/ SmedD: er, SmedH: vr, MedH: rr/ PT: 0/ suboc, u/ Note: a mild-temperate to subtropical lichen found on trunks of old broad-leaved trees, often in parts which are seldom wetted by rain, or on undersides of thick branches; locally common in some humid areas of southern Italy.

Catinaria neuschildii (Körb.) P. James

Lichenologist, 3: 97, 1965 - *Biatorina neuschildii* Körb., *Parerga Lichenol.*: 143, 1860.

Syn.: *Biatorina subpulcaris* Anzi, *Catillaria neuschildii* (Körb.) Th. Fr., *Catillaria atropurpurea* subsp. *neuschildii* (Körb.) Th. Fr., *Catillaria subpulcaris* (Anzi) Lettau

N - **Frl, Lomb, C** - **Laz**.

Cr/ Tr/ S/ Epiph/ pH: 1-2, L: 3-4, X: 2, E: 1-2/ Alt: 2-3/ Mont: er, SmedD: vr, SmedH: vr, MedH: er/ PT: 1/ suboc, u, #/ Note: a temperate lichen found on trunks of old, mostly broad-leaved trees, often on faces which are seldom wetted by rain, such as undersides of thick branches. On the whole, this is a poorly known species, related to *C. atropurpurea*, which requires further study. It is included in the Italian red list of epiphytic lichens as "Data Deficient" (Nascimbene & al. 2013c).

Catolechia Flot.

Bot. Zeit., 8: 367, 182, 1850.

This monotypic genus of the Rhizocarpaceae resembles *Epilichen* in both ascus structure and the nature of the hamathecial filaments, but differs in the squamulose, thick thallus and in the position of the apothecia. The genus is very closely related to *Rhizocarpon*, and according to Miadlikowska & al. (2014) it should be considered as synonym of the latter. Type: *C. wahlenbergii* (Ach.) Körb.

Catolechia wahlenbergii (Ach.) Körb.

Syst. Lich. Germ.: 181, 1855 - *Lecidea wahlenbergii* Flot. ex Ach., *Meth. Lich.*: 81, tab. 2, fig. 2, 1803.

Syn.: *Buellia pulchella* (A. Massal.) Tuck., *Buellia wahlenbergii* (Ach.) Sheard, *Catolechia galbula* (DC.) Anzi, *Catolechia pulchella* A. Massal., *Lecidea galbula* (DC.) Nyl., *Lichen pulchellus* Schrad. *nom. illegit.*, *Psora galbula* DC., *Toninia galbula* (DC.) Boistel

N - **Frl** (Tretiach & Hafellner 2000), **TAA** (Caniglia & al. 2002), **Lomb, Piem** (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999).

Fol. b/ Ch/ S/ Terr/ pH: 1-2, L: 3, X: 2, E: 1/ Alt: 4-5/ Alp: r, Salp: vr/ PT: 1/ Note: an arctic-alpine, probably circumpolar lichen found on acid soil rich in humus and over bryophytes in fissures of siliceous rocks in cold, perennially humid situations above or near treeline; restricted to the Alps in Italy.

Celothelium A. Massal.

Atti Reale Ist. Veneto Sc. Lett. Arti, ser. 3, 5: 332, 1860.

A genus with 8 species, most diverse in the tropics, where species are epiphytic on branches in rainforest and in coastal areas. Its status in the Celotheliaceae, as the sister group of the Pyrenulaceae, has been confirmed by molecular analyses (see e.g. Aptroot & al. 2008, Gueidan & al. 2014b). Only one species is known from Italy. Type: *C. socialis* (Zenker) A. Massal.

Celothelium ischnobelum (Nyl.) M.B. Aguirre

Bull. Brit. Mus. Nat. Hist., Bot. ser., 21: 139, 1991 - *Melanotheca ischnobela* Nyl., *Flora*, 59: 238, 1876.

Syn.: *Leptorhaphis carrollii* A.L. Sm., *Leptorhaphis ischnobela* (Nyl.) Coppins, *Tomasellia ischnobela* (Nyl.) Keissl., *Verrucaria myriospora* Leight.

C - **Tosc, S** - **Camp** (Puntillo & al. 2000).

Cr/ Tr/ S/ Epiph/ pH: 1-2, L: 3, X: 1-2, E: 1/ Alt: 1-2/ SmedH: er, MedH: er/ PT: 1/ suboc/ Note: a mild-temperate to subtropical, doubtfully lichenised species found on smooth bark, especially of *Corylus* and *Ilex* in sheltered and humid situations, with an apparently western distribution in Europe; to be looked for further in Tyrrhenian Italy. The species is included in the Italian red list of epiphytic lichens as "Endangered" (Nascimbene & al. 2013c).

Cephalophysis (Hertel) H. Kiliás

Herzogia, 7: 183, 1985 - *Lecidea* subgen. *Cephalophys* Hertel, Beih. Nova Hedwigia, 24: 107, 1967.

A monotypic genus tentatively placed in the Teloschistaceae (e.g. by Vondrák & al. 2012), which includes a species with 1-celled spores. However, according to Vondrák (*in litt.*) unpublished molecular data do not support the inclusion of this genus in the Teloschistaceae. Type: *C. leucospila* (Anzi) H. Kiliás & Scheid.

Cephalophysis leucospila (Anzi) H. Kiliás & Scheid.

in Kiliás, Herzogia, 7: 183, 1985 - *Lecidea leucospila* Anzi, Comm. Soc. Critt. Ital., 1, 3: 156, 1862.

Syn.: *Cephalophysis leucospila* var. *caelivicina* (Poelt & Hertel) H. Kiliás & Scheid., *Lecidea mashiginii* Lynge, *Lecidea subumidula* Nyl., *Lecidea ultima* Th. Fr., *Lecidea ultima* var. *caelivicina* Poelt & Hertel

N - **Frl**, **Ven** (Hertel & Schuhwerk 2010), **TAA** (Hertel & Schuhwerk 2010), **Lomb**, **C** - **Abr** (Nimis & Tretiach 1999). **S** - **Camp** (Aprile & al. 2003b, Garofalo & al. 2010).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 3-5, X: 3-4, E: 1-2/ Alt: 4-6/ Alp: r, Salp: er, Orom: er/ PT: 1/ Note: an arctic-alpine, circumpolar species found on limestone and dolomite on exposed, steeply inclined faces above treeline; probably more widespread in the Alps. The var. *caelivicina* (Poelt & Hertel) H. Kiliás & Scheid., typical of the nival belt, is known from the Austrian Alps.

Cerothallia Arup, Frödén & Söchting

in Arup & al., Nord. J. Bot., 31: 40, 2013.

This genus of the Teloschistaceae, recently segregated from *Caloplaca s.lat.*, is closely related to *Gondwania*, but also to *Xanthocarpia* and other genera, and to date includes 3 species only. The occurrence of all three species in Australia and the phylogenetic position in a Southern Hemisphere clade makes it likely that the only European and North American representative, *C. luteoalba*, may have spread from the South to the North (Arup & al. 2013). Type: *C. luteoalba* (Turner) Arup, Frödén & Söchting

Cerothallia luteoalba (Turner) Arup, Frödén & Söchting

in Arup & al., Nord. J. Bot., 31: 40, 2013 - *Lichen luteoalbus* Turner, Trans. Linn. Soc. London, 7: 92, 1803.

Syn.: *Biatorina luteoalba* (Turner) Stein, *Callopsisma luteoalbum* (Turner) A. Massal., *Caloplaca luteoalba* (Turner) Th. Fr., *Caloplaca luteoalba* var. *persooniana* (Ach.) H. Olivier, *Candelariella luteoalba* (Turner) Lettau, *Gyalecta persooniana* Ach., *Gyalolechia luteoalba* (Turner) Arnold, *Patellaria ulmicola* DC.

N - **Ven**, **Lomb**, **Piem** (Isocrono & al. 2004), **Emil**, **Lig** (Brunialti & Giordani 2003, Giordani & Incerti 2008). **C** - **Tosc** (Loppi & Frati 2006, Benesperi & al. 2013), **Mol** (Garofalo & al. 1999, Caporale & al. 2008), **Sar** (Cossu 2013). **S** - **Camp** (Garofalo & al. 1999, Aprile & al. 2003b, Garofalo & al. 2010), **Pugl** (Nimis & Tretiach 1999), **Bas**, **Cal** (Puntillo 1995, 1996), **Si** (Ottonello & al. 2011).

Cr/ Ch/ S/ Epiph/ pH: 3-4, L: 4-5, X: 2-3, E: 3-4/ Alt: 2/ SmedD: er, SmedH: er/ PT: 1-2/ Note: a mild-temperate lichen found on dust-covered bark, and in the wound tracks of injured, old trunks of deciduous trees, especially of *Ulmus*; more frequent in the past, now strongly declining and perhaps extinct in several parts of the country, especially in northern Italy. Several old records reported by Nimis (1993: 176) can refer to *Athallia pyracea*; here mostly records accompanied by specification of spore characters are accepted. The species is included in the Italian red list of epiphytic lichens as "Data Deficient" (Nascimbene & al. 2013c).

Cetraria Ach.

Meth. Lich.: 292, 1803, *nom. cons.*

The 4 species of the relatively old genus *Coelocaulon* were returned to *Cetraria* when the latter genus in a strict sense was circumscribed based on reproductive characters, because differences in thalline symmetry were considered as a character of limited taxonomic value. As circumscribed today, *Cetraria* comprises 16 species worldwide (see Thell & al. 2002) and does not appear to be monophyletic. However, the genera in the cetrarioid core group of the Parmeliaceae have been split so much, that many of them contain only a few species, while some other genera in the same family are accommodating an excessive number of species (e.g. *Xanthoparmelia* with over 800 species). If the cetrarioid core group would be accepted as a single genus, as it was not long ago, it would be perfectly monophyletic. Type: *C. islandica* (L.) Ach. The name is conserved against *Platyphyllum* Vent. (1799).

Cetraria aculeata (Schreb.) Fr.

Syst. Orb. Veget.: 239, 1825 - *Lichen aculeatus* Schreb., Spicil. Fl. Lips.: 125, 1771.

Syn.: *Cetraria aculeata* var. *campestris* Schaer., *Cetraria aculeata* var. *edentula* (Ach.) Nyl., *Cetraria aculeata* var. *sorediata* Du Rietz, *Cetraria aculeata* var. *spadicea* (Roth) Ach. ex Mong., *Cetraria bohémica* Anders, *Cetraria tenuissima* (L.) Vain., *Cetraria tenuissima* var. *campestris* (Schaer.) Erichsen, *Coelocaulon aculeatum* (Schreb.) Link, *Coelocaulon bohémicum* (Anders) Clauzade & Cl. Roux, *Cornicularia aculeata* (Schreb.) Ach., *Cornicularia aculeata* var. *acanthella* (Ach.) Ach., *Cornicularia aculeata* var. *coelocaula* Flot., *Cornicularia aculeata* var. *campestris* (Schaer.) Rabenh., *Cornicularia bohémica* (Anders) Anders, *Cornicularia spadicea* (Roth) Ach., *Cornicularia tenuissima* (L.) Zahlbr.

N - **Frl** (Tretiach & Hafellner 2000), **Ven**, **TAA** (Nascimbene 2008b), **Lomb** (Assini 2007, Gheza 2015), **Piem** (Isocrono & al. 2004, Matteucci & al. 2015b), **VA** (Piervittori & Isocrono 1999, Piervittori & al. 2001), **Emil**, **Lig** (Brunialti & al. 1999). **C** - **Tosc**, **Marc** (Nimis & Tretiach 1999), **Umb** (Nimis & Tretiach 2000, Panfili 2000, Ravera & al. 2006), **Laz** (Brackel 2015), **Abr** (Nimis & Tretiach 1999, Brackel 2015), **Mol** (Caporale & al. 2008, Genovesi & Ravera 2014), **Sar** (Nöske 2000). **S** - **Camp**, **Pugl**, **Bas** (Nimis & Tretiach 1999, Potenza 2006), **Cal** (Puntillo 1996, Potenza & al. 2011), **Si** (Ottonello & Romano 1997, Ottonello & al. 2011, Cataldo & Ravera 2014).

Frut/ Ch/ S/ Terr/ pH: 1-3, L: 4-5, X: 4, E: 1/ Alt: 2-4/ Salp: rr, Orom: rr, Mont: vr, SmedD: er, SmedH: vr, MedH: er/ PT: 1/ Note: on siliceous, often sandy mineral soil in clearings of *Calluna*-heathlands in wind-exposed situations. An earlier record from Venezia Giulia (Nimis 1993: 251) is excluded, as it was from Slovenia. The phylogenetic analysis by Lutsak & Printzen (2016) showed that African populations are strongly genetically isolated from each other and from Eurasian ones, while Eurasian populations are structured by climatic gradients from north to south.

Cetraria crespoeae (Barreno & Vázquez) Kärnefelt

Bryologist, 96: 39, 1993 - *Coelocaulon crespoeae* Barreno & Vázquez, Lazaroa, 3: 236, 1982.

C - **Sar** (Nöske 2000).

Frut/ Ch/ S/ Epiph/ pH: 1-2, L: 4-5, X: 4, E: 1-2/ Alt: 3-5/ Orom: er, Mont: er/ PT: 1/ subc/ Note: on shrubs, especially *Juniperus* in open, windy situations, known from a single station in Italy. The species is included in the Italian red list of epiphytic lichens as “Critically Endangered” (Nascimbene & al. 2013c).

Cetraria ericetorum Opiz

Seznam Rostlin Kveteny České: 173, 1852.

Syn.: *Cetraria crispa* (Ach.) Nyl., *Cetraria crispa* var. *subnigricans* Nyl., *Cetraria islandica* f. *subnigricans* (Nyl.) Dalla Torre & Sarnth., *Cetraria islandica* var. *crispa* Ach., *Cetraria islandica* var. *subtubulosa* Fr., *Cetraria islandica* var. *tenuifolia* (Retz.) Vain., *Cetraria subtubulosa* (Fr.) Zopf, *Cetraria tenuifolia* (Retz.) R. Howe

N - **Frl** (Tretiach & Hafellner 2000), **Ven** (Nascimbene & Caniglia 1997, 2003c, Caniglia & al. 1999), **TAA** (Caniglia & al. 2002, Nascimbene & al. 2005, 2006, Nascimbene 2008b, Lang 2009, Bilovitz & al. 2014, 2014b), **Lomb** (Rossi & al. 1998, Dalle Vedove & al. 2004), **Piem** (Morisi & Sereno 1995, Isocrono & al. 2004, Morisi 2005), **VA** (Verger & al. 1993, Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Valcuvia 2000, Piervittori & al. 2001, 2004, Isocrono & al. 2008). **C** - **Umb** (Genovesi & al. 2002, Ravera & al. 2006), **Abr** (Nimis & Tretiach 1999, Brackel 2015), **Mol** (Caporale & al. 2008).

Frut/ Ch/ A.f/ Terr/ pH: 1-3, L: 4-5, X: 4, E: 1/ Alt: 4-6/ Alp: vc, Salp: rr/ PT: 1/ Note: an arctic-alpine, circumpolar species, with optimum on wind-exposed ridges on siliceous substrata near or above treeline; common throughout the Alps, but much rarer than *C. islandica* in the Apennines.

Cetraria islandica (L.) Ach. subsp. *islandica*

Meth. Lich.: 293, 1803 - *Lichen islandicus* L., Sp. Pl., 2: 1145, 1753.

Syn.: *Cetraria islandica* f. *platysmoides* Sambo, *Cetraria islandica* var. *platyna* (Ach.) Ach.

N - **Frl** (Tretiach & Hafellner 2000, Tretiach & Molaro 2007, Minganti & al. 2014), **Ven** (Nimis 1994, Nascimbene & Caniglia 1997, 2003c, Caniglia & al. 1999, 2000, Nascimbene 2001b, 2005c, 2008c, Cercasov & al. 2002, Nascimbene & al. 2006e, Nascimbene & Marini 2007, Brackel 2013, Minganti & al. 2014, Giovagnoli & Tasinazzo 2014), **TAA** (Caniglia & al. 2002, Nascimbene & Caniglia 2002c, Nascimbene 2003, 2006c, 2008b, 2013, Nascimbene & al. 2005, 2006, 2006e, 2008c, Lang 2009, Bilovitz & al. 2014, 2014b), **Lomb** (Rivellini 1994, Rossi & al. 1998, Valcuvia & al. 2000d, Dalle Vedove & al. 2004, Valcuvia & Truzzi 2007b, Brackel 2013, Minganti & al. 2014, Vitalini & al. 2015), **Piem** (Morisi & Sereno 1995, Isocrono & Falletti 1999, Isocrono & al. 2003, 2004, 2006, Morisi 2005, Isocrono & Piervittori 2008, Minganti & al. 2014), **VA** (Verger & al. 1993, Siniscalco 1995, Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Valcuvia 2000, Piervittori & al. 2001, 2004, Revel & al. 2001, Matteucci & al. 2008, Minganti & al. 2014), **Emil** (Tomaselli 1991, Ferrari & al. 1994, Tomaselli & Rossi 1994, Rossi & Ferrari 1994, Dalle Vedove & al. 2002), **Lig** (Brunialti & al. 1999, Minganti & al. 2014). **C** - **Tosc** (Benesperi & al. 2007, Minganti & al. 2014, Minganti & al. 2014, Brackel 2015), **Marc** (Nimis & Tretiach 1999), **Umb** (Panfili 2000, 2007, Ravera & al. 2006), **Laz** (Brackel 2015), **Abr** (Nimis & Tretiach 1999, Minganti & al. 2014, Brackel 2015), **Mol** (Nimis & Tretiach 2004, Caporale & al. 2008). **S** - **Camp**, **Bas** (Potenza & Fascetti 2005, 2012, Potenza 2006), **Cal** (Puntillo 1996, Potenza & al. 2011, Minganti & al. 2014).

Frut/ Ch/ A.f/ Terr/ pH: 1-3, L: 3-5, X: 3-4, E: 1-2/ Alt: 3-6/ Alp: vc, Salp: ec, Orom: r, Mont: vr/ PT: 1/ Note: an arctic-alpine to boreal-montane, circumpolar lichen found on mineral and organic soil, amongst thick moss carpets, exceptionally on bark or lignum near the ground, with optimum near treeline; common and often abundant throughout the Alps, less frequent in the mountains of southern Italy. The subsp. *crispiformis* (Räsänen) Kärnefelt should be looked for in the Alps.

Cetraria muricata (Ach.) Eckfeldt

Bull. Torrey Bot. Club, 22: 240, 1895 - *Lichen muricatus* Ach., Lichenogr. Suec. Prodr.: 214, 1799.

Syn.: *Cetraria aculeata* f. *hispidula* Cromb., *Cetraria aculeata* var. *alpina* Schaer., *Cetraria stuppea* (Flot.) Zopf, *Coelocaulon aculeatum* subsp. *hispidum* (Cromb.) D. Hawksw., *Coelocaulon muricatum* (Ach.) J.R. Laundon, *Cornicularia aculeata* var. *muricata* (Ach.) Ach., *Cornicularia muricata* (Ach.) Ach., *Cornicularia aculeata* var. *alpina* (Schaer.) Rabenh., *Cornicularia tenuissima* var. *hispidula* (Cromb.) Keissl., *Cornicularia tenuissima* var. *muricata* (Ach.) Dalla Torre & Sarnth.

N - **Frl** (Tretiach & Hafellner 2000), **Ven** (Nascimbene & Caniglia 2000), **TAA** (Bilovitz & al. 2014, 2014b), **Lomb**, **Piem** (Matteucci & al. 2015b), **VA** (Piervittori & Isocrono 1997, 1999, Piervittori & al. 2004, Isocrono & al. 2008, Matteucci & al. 2015c), **Emil**, **Lig** (Jatta 1909-1911). **C** - **Tosc** (Benesperi & Lastrucci 2007, Giordani & al. 2009,

Lastrucci & al. 2009), **Abr** (Ravera 2002b), **Sar. S - Camp, Bas** (Potenza & Fascetti 2005, 2012, Potenza 2006), **Cal** (Puntillo 1996, Potenza & al. 2011), **Si** (Ottoneo & Romano 1997, Brackel 2008b, Ottoneo & al. 2011).

Frut/ Ch/ S/ Terr/ pH: 1-4, L: 4-5, X: 4, E: 1/ Alt: 2-5/ Alp: rr, Salp: rc, Orom: r, Mont: vr, SmedD: er, SmedH: er/ PT: 1/ Note: optimum on siliceous soil in wind-exposed siliceous ridges above treeline, but also found on decalcified soils on calcareous substrata. The distinction from *C. aculeata* is not always clear to me: especially in southern Italy there are specimens which are difficult to assign to either taxon.

Cetraria obtusata (Schaer.) van den Boom & Sipman

Lichenologist, 26: 106, 1994 - *Cetraria aculeata* var. *obtusata* Schaer., Lich. Helv. Spicil., 4-5: 225, 1823.

N - **TAA** (Nascimbene 2005), **Lomb** (Rabenhorst Lich. Eur. 743 and Anzi Lich. Lang. 22: van den Boom & Sipman 1994, Dalle Vedove & al. 2004), **Piem** (TSB 34556), **VA** (van den Boom & Sipman 1994).

Frut/ Ch/ A.f/ Terr/ pH: 1-2, L: 4, X: 4, E: 1/ Alt: 5-6/ Alp: vr/ PT: 1/ Note: ecologically similar to *C. ericetorum*, but much rarer, and perhaps more bound to dry-continental situations above treeline, this species should be looked for in other localities of the Central Alps.

Cetraria sepincola (Ehrh.) Ach.

Meth. Lich.: 297, 1803 - *Lichen sepincola* Ehrh., Hannover Mag., 21: 203, 1783.

Syn.: *Cetraria scutata* (Wulfen) Poetsch non auct., *Tuckermannopsis sepincola* (Ehrh.) Hale

N - **Frl, Ven** (Tretiach 1993), **TAA** (Caniglia & al. 2002, Nascimbene & al. 2006e, 2007b, 2009, Nimis & al. 2015), **Lomb, Piem** (Isocrono & al. 2004), **Lig**.

Frut/ Ch/ S/ Epiph/ pH: 1-2, L: 4-5, X: 3, E: 1/ Alt: 4/ Salp: rr/ PT: 1/ Note: a subarctic-subalpine, circumpolar species found near treeline on small twigs of shrubs and trees, especially *Betula*, *Alnus viridis*, *Rhododendron ferrugineum*, mostly near the ground and in areas with siliceous substrata; confined to the Alps in Italy and very rare in dry areas. The species might not belong to *Cetraria s.str.*

Cetrariella Kärnefelt & A. Thell

in Kärnefelt & al., Bryologist, 96, 402, 1993.

A small genus of the Parmeliaceae (4 species) segregated from *Cetraria*, characterised by broader asci and axial bodies, sublageniform conidia, and the presence of gyrophoric and hiassic acids in the medulla. The genus now includes also some species formerly treated as members of *Melanelia* (Thell & al. 2004). However, according to Thell & al. (2009) the inclusion in *Cetrariella* of the only species occurring in Italy is weakly supported, and its taxonomic position is still unresolved. Type: *C. delisei* (Schaer.) Kärnefelt & A. Thell

Cetrariella commixta (Nyl.) A. Thell & Kärnefelt

in Thell & al., Mycol. Prog., 3: 309, 2004 - *Platysma commixtum* Nyl., Syn. Meth. Lich., 1, 2: 310, 1860.

Syn.: *Cetraria commixta* (Nyl.) Th. Fr., *Cetraria fahlunensis* auct. p.p., *Imbricaria fahlunensis* (L.) DC. et auct. p.p., *Melanelia commixta* (Nyl.) A. Thell, *Parmelia fahlunensis* (L.) Ach. et auct. p.p., *Platysma fahlunense* (L.) Nyl. et auct. p.p.

N - **TAA, Lomb, Piem, VA** (Piervittori & Isocrono 1999, Matteucci & Vanacore Falco 2015).

Fol. b/ Ch/ S/ Sax/ pH: 1-2, L: 4-5, X: 3-4, E: 2-3/ Alt: 3-5/ Alp: rr, Salp: rc, Mont: vr/ PT: 1/ Note: a circumpolar, arctic-alpine lichen found on hard siliceous rocks wetted by rain in upland areas; somehow more bound to cold-humid sites than the superficially similar *Melanelia hepaticum*.

Cetrelia W.L. Culb. & C.F. Culb.

Contr. U.S. Nat. Herb., 34: 490, 1968.

This genus was traditionally regarded as “cetrarioid” based on the presence of marginal apothecia, but is now considered to belong to the “parmelioid” lichens based on inferences from molecular data (see e.g. Crespo & al. 2010). The taxonomy at species level is quite peculiar because of the treatment of chemical characters. Combining morphotypes and chemotypes, 18 species are distinguished (Mark & al. 2016b). The morphotypes are distinguished first of all by the presence/absence of soredia, isidia and lobuli. The three chemical species *C. cetrarioides*, *C. chicitae*, and *C. olivetorum*, which were not accepted by several authors, did not form a monophyletic group in the ITS-analysis carried out by Thell & al. (2002), which supports the use of chemotaxonomy within *Cetrelia*. A very useful attempt for a morphological characterisation of all taxa in central Europe was published by Obermayer & Mayrhofer (2007). These authors, from the analysis of several hundred samples in southeastern Europe, and especially in the eastern Alps, found the following percent occurrences: 2% *C. chicitae*, 13% *C. olivetorum*, 30% *C. cetrarioides*, and 55% *C. monachorum*. Type: *C. cetrarioides* (Duby) W.L. Culb. & C.F. Culb.

Cetrelia cetrarioides (Duby) W.L. Culb. & C.F. Culb.

Contr. U.S. Nat. Herb., 34: 498, 1968 - *Parmelia perlata* var. *cetrarioides* Delise ex Duby, Bot. Gall., ed. 2: 601, 1830.

N - Frl (TSB *s.n.*), **Ven** (Obermayer & Mayrhofer 2007, Nascimbene & al. 2010b), **TAA** (Dalla Torre & Sarnthein 1902, Obermayer & Mayrhofer 2007, Lang 2009, Nascimbene 2014, Nascimbene & Marini 2015), **Emil** (Tretiach & al. 2008).

Fol.b/ Ch/ A.s/ Epiph/ pH: 2-3, L: 3, X: 1-2, E: 1/ Alt: 2-3/ Mont: vr, SmedD: er, SmedH: er/ PT: 0/ suboc/ Note: a species with the perlatolic acid syndrome plus traces of imbricatic acid, found on the bark of broad-leaved trees and on epiphytic mosses, more rarely on silicicolous mosses in humid, old, mostly montane forests. It is included in the Italian red list of epiphytic lichens as “Data Deficient” (Nascimbene & al. 2013c). See also note on *Cetrelia olivetorum*.

Cetrelia chicitae (W.L. Culb.) W.L. Culb. & C.F. Culb.

Contr. U.S. Nat. Herb., 34: 504, 1968 - *Cetraria chicitae* W.L. Culb., Bryologist, 68: 95, 1965.

N - Frl (TSB 1734b).

Fol.b/ Ch/ A.s/ Epiph/ pH: 2-3, L: 3, X: 1-2, E: 1/ Alt: 3/ Mont: er/ PT: 0/ suboc/ Note: according to Obermayer & Mayrhofer (2007) this is the rarest species of *Cetrelia* in the eastern Alps. It was also mentioned as occurring in Italy by Hawksworth & al. (2008), but without details on sources and localities.

Cetrelia monachorum (Zahlbr.) W.L. Culb. & C.F. Culb.

Syst. Bot., 1: 326, 1977 (1976) - *Parmelia monachorum* Zahlbr. in Handel-Mazzetti, Symb. Sinic., 3: 180, 1930.

N - Frl (Obermayer & Mayrhofer 2007), **TAA** (Obermayer & Mayrhofer 2007, Nascimbene 2014, Nascimbene & Marini 2015).

Fol.b/ Ch/ A.s/ Epiph/ pH: 2-3, L: 3, X: 1-2, E: 1/ Alt: 2-3/ Mont: vr, SmedD: er/ PT: 0/ suboc/ Note: a species with the imbricatic acid syndrome (major) and perlatolic acid (minor), found on the bark of broad-leaved trees, more rarely on silicicolous mosses in humid, old, mostly montane forests; probably the most common species of *Cetrelia* in Italy (see comment on the genus). It is included in the Italian red list of epiphytic lichens as “Data Deficient” (Nascimbene & al. 2013c). See also note on *Cetrelia olivetorum*.

Cetrelia olivetorum (Nyl.) W.L. Culb. & C.F. Culb.

Contr. U.S. Nat. Herb., 34: 515, 1968 - *Parmelia olivetorum* Nyl., Not. Sällsk. Fauna Fl. Fenn. Förh., n. ser., 5: 180, 1866.

Syn.: *Parmelia cetrarioides* var. *rubescens* (Th. Fr.) Du Rietz, *Parmelia olivaria* f. *subvenosa* Gyeln., *Parmelia rubescens* (Th. Fr.) Vain., *Pseudoparmelia aradensis* Gyeln.

N - VG (Carvalho 1997), **Frl** (Tretiach & Molaro 2007), **Ven** (Nascimbene & Caniglia 1997, 2002, 2003c, Lazzarin 1997, Caniglia & al. 1999, Nascimbene 2005c, 2008c, 2011, Nascimbene & al. 2005b, 2006c, 2007, 2009c, 2010b, 2013b, Thor & Nascimbene 2007, Brackel 2013), **TAA** (Nascimbene & Caniglia 2000b, Nascimbene 2005b, 2006b, 2008b, Stofer 2006, Nascimbene & al. 2007b, Lang 2009, Nimis & al. 2015), **Lomb, Piem** (Griselli & al. 2003, Isocrono & al. 2004), **Emil, Lig** (Putorti & al. 1999b, Giordani & Brunialti 2000, Brunialti & al. 2001), **C - Tosc** (Brackel 2015), **Abr** (Recchia & Villa 1996, Stofer 2006), **S - Pugl** (Nimis & Tretiach 1999), **Si** (Grillo & Caniglia 2004, 2006).

Fol.b/ Ch/ A.s/ Epiph/ pH: 2-3, L: 3, X: 1-2, E: 1/ Alt: 2-3/ Mont: vr, SmedD: er, SmedH: er/ PT: 0/ suboc/ Note: a species with the olivetoric acid syndrome, found on bark of broad-leaved trees and on epiphytic, more rarely silicicolous mosses in humid, old forests, locally still locally abundant in montane *Abies-Fagus* forests, especially in the eastern Alps. Here the species, which is certainly widespread in Italy, is still treated in a broad sense: several records before 2007 could refer to the other species of the complex. The species was included in the Italian red list of epiphytic lichens as “Near-threatened” (Nascimbene & al. 2013c).

Chaenotheca (Th. Fr.) Th. Fr.

Acta Reg. Sci. Ups., 3, 3: 250, 1860 - *Calicium* b *Chaenotheca* Th. Fr., Öfv. K. Svensk. Vetensk.-Akad. Förh., 13: 128, 1856.

A subcosmopolitan genus of *c.* 25 species, with the highest diversity in cool temperate areas. Most species occur on bark or wood in sheltered situations with low light intensity and high air humidity. The genus belongs to the Coniocybaceae, a previously unrecognised lichenised lineage (Coniocybomycetes, Coniocybales) related to *Lichinomycetes*, as shown by Prieto & al. (2013). A synopsis of the species occurring in Italy was published by Puntillo & Puntillo (2009). Type: *C. trichialis* (Ach.) Th. Fr.

Chaenotheca brachypoda (Ach.) Tibell

Symb. Bot. Upsal., 27, 1: 71, 1987 - *Coniocybe brachypoda* Ach., K. Vetensk.-Akad. Nya Handl., 4: 287, 1816.

Syn.: *Chaenotheca sulphurea* (Retz.) Middelb. & Mattsson, *Coniocybe furfuracea* var. *sulphurella* (Fr.) Schaer., *Coniocybe griseola* Ach., *Coniocybe sulphurea* (Retz.) Nyl., *Coniocybe sulphurella* (Fr.) Nyl.

N - TAA (Puntillo & Puntillo 2009), **Piem** (Puntillo & Puntillo 2009), **S - Cal** (Puntillo 1994, 1996, Puntillo & Puntillo 2009).

Cr/ Ch/ S/ Epiph-Lign/ pH: 1-2, L: 2-3, X: 1-2, E: 1/ Alt: 2-3/ Mont: vr, SmedD: er, SmedH: er/ PT: 0/ u/ Note: on decorticated stumps of deciduous and coniferous trees, more rarely on bark and siliceous rocks in old humid forests, on faces slightly protected from rain. The species is included in the Italian red list of epiphytic lichens as “Endangered” (Nascimbene & al. 2013c).

Chaenotheca brunneola (Ach.) Müll. Arg.

Mém. Soc. Phys. Hist. Nat. Genève, 16: 360, 1862 - *Calicium brunneolum* Ach., K. Vetensk.-Akad. Nya Handl.: 279, 1816.

Syn.: *Calicium flexipes* Ach., *Calicium melanophaeum* var. *brunneolum* (Ach.) Schaer., *Cyphelium brunneolum* (Ach.) De Not., *Phacotium brunneolum* (Ach.) Trevis.

N - Frl (Puntillo & Puntillo 2009), **Ven** (Nascimbene 2008c, Puntillo & Puntillo 2009), **TAA** (Nascimbene & al. 2007b, Puntillo & Puntillo 2009), **Lomb** (Puntillo & Puntillo 2009), **Piem** (Puntillo & Puntillo 2009), **Lig** (TSB 33590). **C - Tosc** (Puntillo & Puntillo 2009, Nascimbene & al. 2012, 2015), **Umb** (Ravera 1998, Ravera & al. 2006, Puntillo & Puntillo 2009), **Laz** (Puntillo & Puntillo 2009), **Sar** (Zedda 2002, 2002b, Puntillo & Puntillo 2009). **S - Bas** (Puntillo & al. 2012, Ravera & al. 2015b), **Cal** (Puntillo 1994, 1995, 1996, Lich. Graec. 269: Obermayer 2004, Puntillo & Puntillo 2009).

Cr/ Ch/ S/ Lign/ pH: 1-2, L: 2-3, X: 1-2, E: 1/ Alt: 1-4/ Salp: er, Mont: vr, SmedD: er, SmedH: vr, MedH: er/ PT: 1/ Note: on relatively soft-decomposed lignum of old coniferous stumps in humid woodlands, more rarely on wood of deciduous trees or even of *Quercus ilex*, very rarely corticolous. Old records from Sicily, not validated by Puntillo & Puntillo (2009) are excluded here. The species is included in the Italian red list of epiphytic lichens as “Near-threatened” (Nascimbene & al. 2013c).

Chaenotheca chlorella (Ach.) Müll. Arg.

Mém. Soc. Phys. Hist. Nat. Genève, 16: 360, 1862 - *Calicium chlorellum* Ach., Meth. Lich.: 89, 1803.

Syn.: *Calicium phaeocephalum* var. *flavum* Harm., *Chaenotheca carthusiae* (Harm.) Lettau, *Chaenotheca suzai* Nádv.

N - Frl (Puntillo & Puntillo 2009), **Ven** (Puntillo & Puntillo 2009), **TAA** (Nascimbene 2014, Nascimbene & Marini 2015), **Lomb** (Puntillo & Puntillo 2009), **Lig** (Puntillo & Puntillo 2009). **C - Tosc** (Puntillo & Puntillo 2009), **Sar** (Puntillo & Puntillo 2009). **S - Bas** (Potenza & al. 2014), **Cal** (Puntillo 1994, 1996, Puntillo & Puntillo 2009).

Cr/ Ch/ S/ Epiph-Lign/ pH: 1-2, L: 2-3, X: 1-2, E: 1/ Alt: 2-3/ Mont: er, SmedD: vr, SmedH: vr/ PT: 0/ u/ Note: optimum on old oaks inside forests, in fissures of the bark, sometimes on decorticated trunks, also of conifers, especially on dry undersides and inside hollow trunks. The species is included in the Italian red list of epiphytic lichens as “Endangered” (Nascimbene & al. 2013c).

Chaenotheca chrysocephala (Ach.) Th. Fr.

Acta Reg. Soc. Sci. Upsal., ser. 3, 3: 250, 1860 - *Calicium chrysocephalum* Turner ex Ach., Meth. Lich. Suppl.: 15, 1803.

Syn.: *Calicium chrysocephalum* var. *filare* Ach., *Chaenotheca chrysocephala* var. *filaris* (Ach.) Dalla Torre & Sarnth., *Cyphelium chrysocephalum* (Ach.) De Not., *Phacotium chrysocephalum* (Ach.) Trevis.

N - Frl (Puntillo & Puntillo 2009), **Ven** (Nascimbene & Caniglia 1997, 2002c, 2003c, Caniglia & al. 1999, Nascimbene 2005c, 2008, 2011, Nascimbene & al. 2006e, 2013b, Nascimbene & Marini 2007, Puntillo & Puntillo 2009), **TAA** (Caniglia & al. 2002, Nascimbene & Caniglia 2002c, Nascimbene 2005b, 2006b, 2006c, 2008b, 2013, 2014, 2014c, Nascimbene & al. 2005, 2006, 2006c, 2007b, 2009, 2010, 2014, Stofer 2006, Thor & Nascimbene 2007, Puntillo & Puntillo 2009, Nascimbene & Marini 2015, Nimis & al. 2015), **Lomb** (Dalle Vedove & al. 2004, Stofer 2006, Abramini & al. 2008, Puntillo & Puntillo 2009), **Piem** (Isocrono & al. 2004, Puntillo & Puntillo 2009), **VA** (Pierivittori & Isocrono 1999, Matteucci & al. 2008, 2008c, Isocrono & al. 2008, Puntillo & Puntillo 2009), **Emil** (Brunialti & al. 2001), **Lig** (TSB 33638). **C - Tosc** (Benesperi & al. 2007, Puntillo & Puntillo 2009), **Umb** (Puntillo & Puntillo 2009), **Laz** (Puntillo & Puntillo 2009), **Abr** (Stofer 2006), **Sar** (Puntillo & Puntillo 2009). **S - Camp** (Puntillo & Puntillo 2009), **Bas** (Potenza 2006, Potenza & Fascetti 2012), **Cal** (Puntillo 1994, 1996, Puntillo & Puntillo 2009).

Cr/ Ch/ S/ Epiph-Lign/ pH: 1-2, L: 3-4, X: 2-3, E: 1/ Alt: 3-4/ Salp: c, Mont: r/ PT: 1/ u/ Note: a boreal-montane, circumpolar species found on the acid bark of both broad-leaved trees and conifers, more rarely on hard lignum, with optimum on *Larix* near treeline.

Chaenotheca cinerea (Pers.) Tibell

Symb. Bot. Upsal., 23, 1: 30, 1980 - *Calicium cinereum* Pers., Ic. Descr. Fung. Minus Cogn., 2: 58, 1800.

Syn.: *Calicium schaeereri* De Not. non auct., *Chaenotheca albida* (Körb.) Zahlbr., *Chaenotheca schaeereri* (De Not.) Zahlbr.

N - Ven (Puntillo & Puntillo 2009), **Lomb** (Anzi, Lich. Rar. Langob. Exs. Nr. 204: S-L30504).

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 3, X: 2, E: 1/ Alt: 2/ SmedD: er/ PT: 0/ u/ Note: a mild-temperate species found on the nutrient-rich bark of several trees (e.g. *Acer*, *Fraxinus*, *Populus*, *Ulmus*), in deep fissures of the bark seldom wetted by rain, with optimum at low elevations. It is included as “Regionally Extinct” in the Italian red list of epiphytic lichens (Nascimbene & al. 2013c).

Chaenotheca ferruginea (Sm.) Mig.

Kryptogamenfl. Deutschl., Deutsch-Österr., Schweiz, 4, Flechten, 2: 479, 1931 - *Calicium ferrugineum* Turner ex Sm. in Smith & Sowerby, Engl. Bot., 35: 2473, 1812.

Syn.: *Calicium melanophaeum* Ach., *Calicium roscidum* (Ach.) Flörke var. *pinastri* Ach., *Chaenotheca melanophaea* (Ach.) Zwackh, *Cyphelium melanophaeum* (Ach.) Körb., *Cyphelium melanophaeum* var. *ferrugineum* (Sm.) A. Massal., *Cyphelium melanophaeum* var. *vulgare* (Schaer.) Körb.

N - VG (Carvalho 1997), **Frl** (Puntillo & Puntillo 2009), **Ven** (Nascimbene & Caniglia 2000, Nascimbene 2005c, 2008c, Nascimbene & al. 2006e, 2013b, Nascimbene & Marini 2007), **TAA** (Nascimbene 2005b, 2006c, 2008b, 2013, 2014, Puntillo & Puntillo 2009, Nascimbene & al. 2007b, 2009, 2010, 2014, Nascimbene & Marini 2015, Nimis & al. 2015),

Lomb (Dalle Vedove & al. 2004, Puntillo & Puntillo 2009), **Piem** (Isocrono & al. 2004, Puntillo & Puntillo 2009), **Emil** (Brunialti & al. 2001, Tretiach & al. 2008), **Lig** (Puntillo & Puntillo 2009). **C - Tosc** (Loppi & Putorti 1995b, Puntillo & Puntillo 2009), **Umb** (Genovesi & al. 2001, Ravera & al. 2006, Puntillo & Puntillo 2009), **Laz** (Ravera 2001, Puntillo & Puntillo 2009), **Sar** (Rizzi & al. 2011). **S - Bas** (Puntillo & al. 2012), **Cal** (Puntillo 1994, 1996, Puntillo & Puntillo 2009).

Cr/ Ch/ S/ Epiph/ pH: 1, L: 3, X: 2, E: 1/ Alt: 2-4/ Mont: er, SmedD: er, SmedH: vr/ PT: 1/ subc, u/ Note: a cool-temperate to boreal-montane, circumboreal species found on acid bark, especially of very old oaks, *Castanea* and conifers, on faces protected from rain, sometimes on decorticated stumps and even charred wood, reported as tolerant of air pollution and expanding in northern Europe, but rare and bound to natural habitats throughout Italy.

***Chaenotheca furfuracea* (L.) Tibell**

Beih. Nova Hedwigia, 79: 664, 1984 - *Mucor furfuraceus* L., Sp. Pl.: 1185, 1753.

Syn.: *Coniocybe furfuracea* (L.) Ach.

N - VG, FrI (Tretiach & Hafellner 2000, Puntillo & Puntillo 2009), **Ven** (Nimis & al. 1996c, Lazzarin 1997, 2000, Nascimbene & al. 2006e, 2013b, Thor & Nascimbene 2007, Nascimbene & Marini 2007, Nascimbene 2008c, Puntillo & Puntillo 2009), **TAA** (Nascimbene 2005b, 2006b, 2008b, 2013, 2014, Nascimbene & al. 2006e, 2007b, 2014, Thor & Nascimbene 2007, Puntillo & Puntillo 2009, Nascimbene & Marini 2015, Nimis & al. 2015), **Lomb** (Nascimbene & al. 2006e, Puntillo & Puntillo 2009), **Piem** (Isocrono & al. 2004, Puntillo & Puntillo 2009), **VA** (Valcuvia 2000, Matteucci & al. 2008), **Emil** (Puntillo & Puntillo 2009), **Lig** (Puntillo & Puntillo 2009). **C - Tosc** (Tretiach & Nimis 1994, Loppi & Putorti 1995b, Puntillo & Puntillo 2009, Benesperi 2011), **Marc** (Nimis & Tretiach 1999, Puntillo & Puntillo 2009), **Umb** (Genovesi & al. 2001, Ravera & al. 2006), **Laz** (Puntillo & Puntillo 2009), **Abr** (Nimis & Tretiach 1999, Puntillo & Puntillo 2009), **Mol** (Garofalo & al. 1999, Nimis & Tretiach 1999, Caporale & al. 2008, Puntillo & Puntillo 2009), **Sar** (Puntillo & Puntillo 2009, Rizzi & al. 2011). **S - Camp** (Garofalo & al. 1999, 2010, Ricciardi & al. 2000, Aprile & al. 2003b, Puntillo & Puntillo 2009), **Pugl** (Nimis & Tretiach 1999, Puntillo & Puntillo 2009), **Bas** (Nimis & Tretiach 1999, Potenza 2006, Puntillo & Puntillo 2009), **Cal** (Puntillo 1994, 1995, 1996, Puntillo & Puntillo 2009), **Si** (Nimis & al. 1994, Puntillo & Puntillo 2009).

Cr/ Ch/ S/ Epiph-Terr-Lign/ pH: 1-2, L: 1-3, X: 1-2, E: 1/ Alt: 1-4/ Salp: r, Mont: c, SmedD: rr, Pad: er, SmedH: rc, MedH: rr, MedD: er/ PT: 1-2/ u/ Note: a widespread holarctic lichen found beneath overhanging faces protected from rain, especially in forests, often on exposed roots but rather indifferent to the substrata (also found on siliceous rocks and lignum); in the Mediterranean belt it is restricted to very humid forests.

***Chaenotheca gracilentia* (Ach.) Mattsson & Middelb.**

in Middelborg & Mattsson, Sommerfeltia 5: 45, 1987 - *Calicium gracilentum* Ach., Lichenogr. Univ.: 243, 1810.

Syn.: *Coniocybe gracilentia* (Ach.) Ach., *Cybebe gracilentia* (Ach.) Tibell

N - FrI (Puntillo & Puntillo 2009), **Ven** (Nascimbene 2008c), **TAA** (Nascimbene & al. 2006e, Thor & Nascimbene 2007, Puntillo & Puntillo 2009, Nascimbene 2014, Nascimbene & Marini 2015, Nimis & al. 2015), **Lomb** (Puntillo & Puntillo 2009), **Piem** (TSB 33502). **C - Tosc** (Puntillo & Puntillo 2009).

Cr/ Ch/ S/ Epiph-Lign/ pH: 1-2, L: 1-2, X: 1-2, E: 1/ Alt: 3-4/ Salp: er, Mont: vr/ PT: 0/ u/ Note: a circumboreal-montane species found on rotting wood and decaying bark, on faces protected from rain such as hollows of old stumps in ancient, humid, montane to subalpine forests. It is included in the Italian red list of epiphytic lichens as "Vulnerable" (Nascimbene & al. 2013c).

***Chaenotheca hispidula* (Ach.) Zahlbr.**

Cat. Lich. Univ., 1: 567, 1922 - *Calicium trachelinum* var. *hispidulum* Ach., Lichenogr. Univ.: 237, 1810.

Syn.: *Calicium aciculare* (Gray) Fr., *Chaenotheca acicularis* (Gray) Zwackh, *Cyphelium aciculare* (Gray) Arnold, *Cyphelium chlorelloides* Anzi, *Phacotium aciculare* (Gray) Trevis.

N - Ven (Puntillo & Puntillo 2009), **TAA** (Nascimbene & al. 2009, 2010, Nimis & al. 2015), **Lomb** (Puntillo & Puntillo 2009), **Piem** (Puntillo & Puntillo 2009), **Emil** (Puntillo & Puntillo 2009). **C - Tosc** (Puntillo & Puntillo 2009), **Marc** (Nimis & Tretiach 1999, Puntillo & Puntillo 2009), **Laz** (Ravera & al. 1999, 2000, Munzi & al. 2004, 2007, Puntillo & Puntillo 2009), **Sar** (Zedda 2002, Puntillo & Puntillo 2009). **S - Pugl** (Nimis & Tretiach 1999), **Bas** (Ravera & al. 2015d), **Cal** (Puntillo 1994, 1995, 1996, Puntillo & Puntillo 2004, Puntillo & Puntillo 2009), **Si** (Caniglia & Grillo 2006b, Puntillo & Puntillo 2009).

Cr/ Tr/ S/ Epiph-Lign/ pH: 1-2, L: 3-4, X: 1-2, E: 1/ Alt: 1-3/ Mont: vr, SmedD: er, SmedH: vr, MedH: er/ PT: 0/ u/ Note: a cool-temperate, probably holarctic lichen found in dry hollows and undersides, and on the bases of ancient trees, especially oaks, in humid deciduous forests. It is included in the Italian red list of epiphytic lichens as "Near-threatened" (Nascimbene & al. 2013c).

***Chaenotheca laevigata* Nád.**

Repert. Spec. Nov. Regni Veg., 36: 309, 1934.

N - TAA (Nascimbene & al. 2009, 2010, Nimis & al. 2015). **S - Cal** (Puntillo 1994, 1996, Puntillo & Puntillo 2009).

Cr/ Ch/ S/ Epiph-Lign/ pH: 1-2, L: 3, X: 1-2, E: 1/ Alt: 3/ Mont: vr/ PT: 0/ u/ Note: a cool-temperate to southern boreal-montane lichen found in bark fissures of acid-barked deciduous and coniferous trees in humid montane forests, more rarely on lignum; probably overlooked and more widespread, but certainly never common. It is included in the Italian red list of epiphytic lichens as "Endangered" (Nascimbene & al. 2013c).

Chaenotheca phaeocephala (Turner) Th. Fr.

N. Acta Reg. Soc. Sci. Upsal., ser. 3, 3: 251, 1860 - *Lichen phaeocephalus* Turner, Trans. Linn. Soc. London, 8: 281, 1807.

Syn.: *Calicium phaeocephalum* (Turner) Fr., *Calicium saepiculare* Ach., *Chaenotheca chlorella* auct. p.p., *Chaenotheca phaeocephala* var. *subhispidula* Nád., *Cyphelium phaeocephalum* (Turner) Körb.

N - Ven (Puntillo & Puntillo 2009), **TAA** (Nascimbene 2006c, 2013, 2014, Puntillo & Puntillo 2009, Nascimbene & al. 2007b, 2014, Nascimbene & Marini 2015). **C - Tosc** (Puntillo & Puntillo 2009), **Marc** (Puntillo & Puntillo 2009), **Umb** (Ravera 1998, Ravera & al. 2006, Puntillo & Puntillo 2009), **Laz** (Puntillo & Puntillo 2009, Zucconi & al. 2013), **Abr** (Caporale & Pagliani 2010, Caporale & al. 2016), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008, Puntillo & Puntillo 2009), **Sar** (Zedda & Sipman 2001). **S - Camp** (Aprile & al. 2003b, Puntillo & Puntillo 2009), **Bas** (Puntillo & Puntillo 2009, Puntillo & al. 2009, Puntillo & al. 2012), **Cal** (Puntillo 1994, 1996).

Cr/ Ch/ S/ Epiph-Lign/ pH: 1-2, L: 3, X: 1-2, E: 1/ Alt: 2-3/ Mont: vr, SmedD: r, SmedH: r/ PT: 1/ u/ Note: a cool-temperate, holarctic lichen found on old oaks in open woodlands, in bark fissures seldom wetted by rain; certainly more widespread in the Alps.

Chaenotheca stemonea (Ach.) Müll. Arg.

Mém. Soc. Phys. Hist. Nat. Genève, 16: 360, 1862 - *Calicium trichiale* var. *stemoneum* Ach., K. Vetensk.-Akad. Nya Handl., 29: 283, 1808.

Syn.: *Calicium stemoneum* (Ach.) Ach., *Calicium stemoneum* var. *album* Schaer., *Calicium physarellum* Ach., *Chaenotheca aeruginosa* auct. non (Turner) A.L. Sm., *Cyphelium stemoneum* (Ach.) De Not.

N - Frl (Puntillo & Puntillo 2009), **Ven** (Nascimbene & Marini 2007, Puntillo & Puntillo 2009, Nascimbene & al. 2013b), **TAA** (Nascimbene 2006c, 2008b, 2014, Puntillo & Puntillo 2009, Nascimbene & al. 2007b, 2010, 2014, Nascimbene & Marini 2015), **Lomb** (Nascimbene & al. 2006e, Puntillo & Puntillo 2009), **Piem** (Puntillo & Puntillo 2009), **Lig** (TSB 33550). **C - Marc** (Nimis & Tretiach 1999, Puntillo & Puntillo 2009), **Mol** (Puntillo & Puntillo 2009). **S - Pugl** (Puntillo & Puntillo 2009), **Cal** (Puntillo & Puntillo 2009).

Cr/ Ch/ S/ Epiph-Lign/ pH: 1-2, L: 2-3, X: 1, E: 1/ Alt: 2-3/ Mont: r, SmedD: er, SmedH: er/ PT: 1/ u/ Note: a cool-temperate to boreal-montane, circumpolar lichen found in rain-protected hollows of conifer trunks inside forests, especially near the ground, both on bark and lignum, sometimes on acid-barked deciduous trees, e.g. *Betula* and *Quercus*. It is included in the Italian red list of epiphytic lichens under the "Least Concern" category (Nascimbene & al. 2013c).

Chaenotheca subroscida (Eitner) Zahlbr.

Cat. Lich. Univ., 1: 578, 1922 - *Cyphelium subroscidum* Eitner, Jahrb. schles. Ges. vaterl. Kultur, 88: 53, 1911.

N - Ven (Nascimbene 2011), **TAA** (Nascimbene & al. 2010, 2014, Nascimbene 2014, Nascimbene & Marini 2015).

Cr/ Ch/ S/ Epiph-Lign/ pH: 1-2, L: 3, X: 2, E: 1/ Alt: 3-4/ Salp: vr, Mont: vr/ PT: 1/ u/ Note: a rare species growing on the trunks of old conifers, more rarely on *Betula*, in upland areas. It is included in the Italian red list of epiphytic lichens as "Data Deficient" (Nascimbene & al. 2013c).

Chaenotheca trichialis (Ach.) Th. Fr.

N. Acta Reg. Soc. Sci. Upsal., ser. 3, 3: 251, 1860 - *Calicium trichiale* Ach., K. Vetensk.-Akad. Nya Handl.: 283, 1808.

Syn.: *Calicium cinereum* auct., *Calicium trichiale* var. *filiforme* Schaer., *Chaenotheca aeruginosa* (Turner) A.L. Sm. non auct., *Chaenotheca brunneola* var. *elassospora* (Nyl.) A.L. Sm., *Chaenotheca trichialis* var. *caerulescens* (Turner et Borrer) Vain., *Chaenotheca trichialis* var. *valida* (Schaer.) Zahlbr., *Cyphelium trichiale* (Ach.) De Not., *Phacotium trichiale* (Ach.) Trevis.

N - Frl (Puntillo & Puntillo 2009), **Ven** (Thor & Nascimbene 2007, Nascimbene & Marini 2007, Nascimbene 2008, 2008c, 2011, Nascimbene & al. 2013b), **TAA** (Nascimbene 2006b, 2006c, 2008b, 2013, 2014, Nascimbene & al. 2006e, 2007b, 2008c, 2009, 2010, 2014, Stofer 2006, Thor & Nascimbene 2007, Puntillo & Puntillo 2009, Nascimbene & Marini 2015, Nimis & al. 2015), **Lomb** (Puntillo & Puntillo 2009), **Piem** (Isocrono & al. 2004, Puntillo & Puntillo 2009), **Emil** (Benespero 2009). **C - Tosc** (Puntillo & Puntillo 2009), **Marc** (Puntillo & Puntillo 2009), **Umb** (Genovesi & al. 2001, Ravera & al. 2006, Puntillo & Puntillo 2009), **Laz** (Puntillo & Puntillo 2009), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008, Puntillo & Puntillo 2009), **Sar** (Zedda 2002, Puntillo & Puntillo 2009). **S - Camp** (Aprile & al. 2003b), **Bas** (Puntillo & Puntillo 2009, Puntillo & al. 2009, 2012), **Cal** (Puntillo 1994, 1995, 1996, Puntillo & Puntillo 2009).

Cr/ Ch/ S/ Epiph-Lign/ pH: 1-2, L: 1-3, X: 1-2, E: 1/ Alt: 1-4/ Salp: r, Mont: rr, SmedD: er, SmedH: er, MedH: er/ PT: 1/ u/ Note: a widespread holarctic species found on acid-barked deciduous trees, conifers and lignum, sometimes even on *Quercus ilex*, in forests and woodlands; widespread in upland areas throughout the country, but most common in the Alps.

Chaenotheca xyloxena Nád.

Repert. Spec. Nov. Regni Veg., 36: 308, 1934.

Syn.: *Chaenotheca nudiuscula* (Schaer.) Nád.

N - Frl (Puntillo & Puntillo 2009), **Ven** (Thor & Nascimbene 2007, Nascimbene 2008c, Nascimbene & al. 2013b), **TAA** (Nascimbene & al. 2006e, 2007b, Puntillo & Puntillo 2009, Nascimbene 2013, Nimis & al. 2015), **Lomb** (Puntillo & Puntillo 2009). **C - Tosc** (Benespero & al. 2007), **Abr** (Ravera 2002b). **S - Bas** (Puntillo & Puntillo 2009), **Cal** (Puntillo 1994, 1996, Puntillo & Puntillo 2009).

Cr/ Ch/ S/ Epiph-Lign/ pH: 1-2, L: 3, X: 2, E: 1/ Alt: 3-4/ Salp: vr, Mont: vr/ PT: 1/ u/ Note: a cool-temperate to circumboreal-montane species found on hard and dry lignum, especially of conifers, in humid, montane to subalpine forests, more rarely on bark and lignum of deciduous trees. It is included in the Italian red list of epiphytic lichens as “Near-threatened” (Nascimbene & al. 2013c).

Cheiomycina B. Sutton & Muhr

Nord. J. Bot., 6: 834, 1986.

A small genus of 4 species, characterised by eustromatic sporochial conidiomata, a thick-walled branched conidiogenous system and holoblastic flabelliform to palmate, hyaline to pale brown, distoseptate conidia. The genus represents one of the very few known hyphomycetous lichens; its systematic position was unknown, but preliminary results by Muggia & al. (2016) show that it is placed within Lecanoromycetidae. A key to the species was provided by Printzen (2007). Type: *C. flabelliformis* B. Sutton

Cheiomycina flabelliformis B. Sutton

in Sutton & Muhr, Nord. J. Bot., 6: 834, 1986.

N - TAA (Thor & Nascimbene 2007).

Cr/ Ch/ A.s/ Epiph/ pH: 1-2, L: 2-3, X: 1-2, E: 1/ Alt: 3-4/ Salp: er, Mont: er/ PT: 0/ Note: on acid bark, more rarely on wood in humid, sheltered situations, mostly in upland areas. The Italian sample was collected on a stump of *Picea*. The species is included in the Italian red list of epiphytic lichens as “Data Deficient” (Nascimbene & al. 2013c).

Chrysothrix Mont.

Annls. Sc. Nat. (Bot.), ser. 3, 18: 312, 1952, *nom. cons.*

A genus of c. 17 species, presently included into the Arthoniales in the family Chrysothricaceae, often with a bright yellow to yellowish green, unstratified thallus (pulvinic acid derivatives), and 3-septate ascospores. Most species occur on acid substrata (bark, lignum or siliceous rocks). The genus, in its present circumscription (including *Alysphaeria*), seems to be heterogeneous. Type: *C. noli-tangere* (Mont.) Mont.

Chrysothrix caesia (Flot.) Ertz & Tehler

Fungal Divers., 49: 53, 2011 - *Coniangium caesium* Flot. in Körb., Syst. Lich. Germ.: 295, 1855.

Syn.: *Allarthonia caesia* (Flot.) Zahlbr., *Arthonia caesia* (Flot.) Körb.

N - Frl.

Cr/ Ch/ S/ Epiph/ pH: 2, L: 2-3, X: 2, E: 1/ Alt: 2/ SmedD: er/ PT: 1/ Note: a mild-temperate species also known from North America, found on the smooth bark of deciduous trees, especially *Carpinus*; often sterile and overlooked, being easily confused with species of *Lepraria*.

Chrysothrix candelaris (L.) J.R. Laundon

Lichenologist, 13: 110, 1981 - *Byssus candelaris* L., Sp. Pl., 2: 1169, 1753.

Syn.: *Chaenotheca trichialis* f. *candelaris* Dalla Torre & Sarnth., *Crocynia flava* auct., *Crocynia flavissima* B. de Lesd., *Lepra candelaris* auct. p.p., *Lepra citrina* auct. ital. p.p., *Lepraria candelaris* (L.) Fr., *Lepraria citrina* auct. p.p., *Lepra flava* auct. ital. p.p.

N - VG (Carvalho 1997), Frl, Ven (Nascimbene & Caniglia 1997, 2003c, Caniglia & al. 1999, Nascimbene 2008c, 2011), TAA (Nascimbene & Caniglia 2000b, Caniglia & al. 2002, Lich. Graec. 228: Obermayer 2003, Nascimbene 2005b, 2006b, 2008b, 2013, 2014, Thor & Nascimbene 2007, Nascimbene & al. 2007b, 2009, 2010, 2014, Lang 2009, Nascimbene & Marini 2015, Nimis & al. 2015), Lomb (Valcuvia & Truzzi 2007b, Alessio & al. 1992, Nascimbene & al. 2006e), Piem (Caniglia & al. 1992, Piervittori 2003, Matteucci & al. 2010), VA (Piervittori & Isocrono 1999), Emil (Nimis & al. 1996, Tretiach & al. 2008, Benesperi 2009), Lig (Putorti & al. 1999b, Giordani & al. 2001, 2002, Brunialti & Giordani 2003, Giordani 2006, Giordani & Incerti 2008). C - Tosc (Tretiach & Nimis 1994, Loppi & Putorti 1995b, Loppi & al. 1996b, 1997b, Putorti & al. 1999, Loppi & Frati 2006, Stofer 2006, Tretiach & al. 2008, Brunialti & Frati 2010, Pasquinelli & Puccini 2010, Benesperi 2011, Loppi & Baragatti 2011, Paoli & al. 2012, Brunialti & al. 2012b, Brackel 2015), Marc (Nimis & Tretiach 1999), Umb (Ravera 1998, Panfili 2000b, 2007, Ravera & al. 2006), Laz (Bartoli & al. 1997, Massari & Ravera 2002, Ravera 2006c, 2008b, Ruisi & al. 2005, Munzi & al. 2007, Ravera & Genovesi 2008, Zucconi & al. 2013), Abr (Olivieri & al. 1997, 1997b, Loppi & al. 1999, Nimis & Tretiach 1999, Caporale & al. 2016), Mol (Nimis & Tretiach 1999, Caporale & al. 2008, Ravera & al. 2010), Sar (Zedda 2002, Zedda & Sipman 2001, Zedda & al. 2001, Rizzi & al. 2011). S - Camp (Aprile & al. 2002, 2003, 2003b, Nimis & Tretiach 2004, Brunialti & al. 2010, 2013, Garofalo & al. 2010, Ravera & Brunialti 2013, Catalano & al. 2016), Pugl (Nimis & Tretiach 1999), Bas (Nimis & Tretiach 1999, Potenza 2006), Cal (Puntillo 1995, 1996, Puntillo & Puntillo 2004, Incerti & Nimis 2006), Si (Czeczuga & al. 1999, Caniglia & Grillo 2006b, Ottonello & al. 2011).

Lepr/ Ch/ A.s/ Epiph/ pH: 1-2, L: 3, X: 1-3, E: 1/ Alt: 1-4/ Salp: er, Mont: rc, SmedD: rr, Pad: er, SmedH: c, MedH: rr/ PT: 1-2/ u/ Note: a cool-temperate to circumboreal-montane lichen found on dry, shaded parts of trunks of deciduous and coniferous trees, on faces protected from rain, sometimes on lignum. The recent record from Tuscany by Pasquinelli & al. (2009), judging from the picture, refers to a free-living epiphytic *Trentepohlia*.

Chrysothrix chlorina (Ach.) J.R. Laundon

Lichenologist, 13: 110, 1981 - *Lichen chlorinus* Ach., Lichenogr. Suec. Prodr.: 6, 1799.

Syn.: *Calicium chlorinum* (Ach.) Schaer. non auct. p.p., *Lepra chlorina* (Ach.) DC., *Lepraria chlorina* (Ach.) Ach., *Pulveraria chlorina* (Ach.) Ach.

N - **Frl** (Tretiach & Hafellner 2000), **Ven, Lomb, Piem** (Morisi & Sereno 1995, Piervittori 2003, Isocrono & al. 2006, 2007), **VA** (Piervittori & Isocrono 1997, 1999), **C** - **Tosc** (Benespero 2006), **Sar** (Nöske 2000, Nöske & al. 2000, Rizzi & al. 2011), **S** - **Camp** (Aprile & al. 2002), **Cal** (Puntillo 1996), **Si** (Caniglia & Grillo 2003, Grillo & Caniglia 2004, 2006).

Lepr/ Ch/ S/ Sax/ pH: 1-2, L: 2-4, X: 1-3, E: 1/ Alt: 1-5/ Alp: er, Salp: er, Mont: vr, SmedD: vr, SmedH: vr, MedH: er/ PT: 1/ u/ Note: a widespread lichen found in underhangs and crevices of siliceous rocks in shaded, humid situations, limited to areas with high air humidity; widespread throughout the Alps, also occurs in the siliceous mountains of southern Italy and of Sardegna.

Chrysothrix flavovirens Tønsberg

Graphis Scripta, 6: 31, 1994.

C - **Sar** (Tretiach 1997, Zedda & Sipman 2001).

Lepr/ Ch/ A.s/ Epiph-Lign/ pH: 1-2, L: 3, X: 1-2, E: 1-2/ Alt: 1-3/ Mont: er, SmedH: er, MedH: er/ PT: 1/ suboc/ Note: a mainly western species in Europe found on bark and lignum in very humid, open forests: probably overlooked, being often sterile, but certainly rare in Italy, and restricted to warm-humid areas. Both Italian specimens were collected on *Juniperus*. The species is included in the Italian red list of epiphytic lichens as “Endangered” (Nascimbene & al. 2013c).

Circinaria Link

Neues J. Bot., 3, 1-2: 4, 1809.

A molecular revision of the large and difficult genus *Aspicilia s.lat.* was carried out by Nordin & al. (2010), who proposed a subdivision into five genera. The old name *Circinaria* was reintroduced to include the *Aspicilia contorta* and the “*Sphaerothallia*” groups within the Megasporaceae. Most species have a reduced number of relatively large and often globose or at least broadly ellipsoid spores versus eight-spored asci and generally ellipsoid spores in *Aspicilia* and *Sagedia*, and the conidia are relatively short. The so-called “manna lichens”, which mostly include vagrant forms, have been recently treated by Sohrabi & Ahti (2010), Owe-Larsson & al. (2011) and Sohrabi & al. (2013). Unfortunately, only a part of the many species present in Italy, some of which are very poorly known, were included in the analysis of Nordin & al. (2010), so that their generic position still awaits clarification. Here I tentatively follow the arrangement proposed by these authors, but, due to ongoing molecular research on several taxa, I refrain from formally proposing new combinations. Type: *C. contorta* (Hoffm.) A. Nordin, Savić & Tibell

Circinaria caesiocinerea (Malbr.) A. Nordin, Savić & Tibell

Mycologia, 102: 1341, 2010 - *Lecanora caesiocinerea* Nyl. ex Malbr., Lich. Normandie: 320, 1870.

Syn.: *Aspicilia caesiocinerea* (Malbr.) Arnold, *Aspicilia gibbosa* auct. non (Ach.) Körb., *Lecanora gibbosa* auct. non (Ach.) Nyl. p.p.

N - **VG** (Castello 2002, Martellos & Castello 2004), **Frl** (Tretiach & Hafellner 2000), **Ven, TAA** (Nascimbene 2003, 2008b), **Lomb** (Valcuvia & al. 2003, Dalle Vedove & al. 2004, De Vita & Valcuvia 2004, Rico & al. 2007, Brackel 2013, Gheza & al. 2015), **Piem** (Isocrono & al. 2003, 2004, Favero-Longo & al. 2006b, 2015, Isocrono & Ferrarese 2008, Giordani & al. 2014), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Valcuvia 2000, Piervittori & al. 2001, 2004, Favero-Longo 2006, Isocrono & al. 2008, Isocrono & Piervittori 2008, Favero-Longo & Piervittori 2009, Blisa & al. 2011, Accattino & al. 2012, Matteucci & al. 2015c), **Emil** (Benespero 2009), **Lig** (Giordani & al. 2016), **C** - **Tosc** (Brackel 2015), **Marc, Umb** (Genovesi 2003b, 2011, Ravera & al. 2006), **Laz** (Genovesi & al. 2011, Genovesi & Ravera 2014b), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008, Genovesi & Ravera 2014), **Sar** (Monte 1993, Rizzi & al. 2011, Giordani & al. 2013, Cossu & al. 2015), **S** - **Camp** (Aprile & al. 2002, Nimis & Tretiach 2004, Catalano & al. 2016), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Poli & al. 1995, 1998, Nimis & al. 1996b, Grillo 1998, Grillo & Caniglia 2004, Brackel 2008b, 2008c).

Cr/ Ch/ S/ Sax/ pH: 2-4, L: 3-5, X: 2-4, E: 2-5/ Alt: 1-5/ Alp: ec, Salp: ec, Orom: vc, Mont: c, SmedD: rr, Pad: vr, SmedH: rc, MedH: rr, MedD: vr/ PT: 1-2/ #/ Note: on siliceous rocks wetted by rain, with a wide altitudinal range. Very heterogeneous both morphologically and ecologically, and in need of revision. See also note on *Sagedia zonata*.

Circinaria calcarea (L.) A. Nordin, Savić & Tibell

Mycologia, 102: 1341, 2010 - *Lichen calcareus* L., Sp. Pl.: 1140, 1753.

Syn.: *Aspicilia calcarea* (L.) Bagl., *Aspicilia calcarea* f. *opegraphoides* (DC.) J. Kickx f., *Aspicilia calcarea* var. *concreta* (Schaer.) Hepp, *Aspicilia contorta* var. *calcarea* (L.) Körb., *Aspicilia lundensis* (Fr.) Uloth, *Lecanora calcarea* (L.) Sommerf., *Lecanora calcarea* var. *concreta* Schaer., *Lecanora lundensis* (Fr.) Zahlbr., *Pachyospora calcarea* (L.) A. Massal., *Urceolaria calcarea* (L.) Ach., *Urceolaria calcarea* var. *farinosa* Flörke non auct.

N - **VG** (Castello 2002, Martellos & Castello 2004), **Frl** (Nimis & Salvadori 1998, Nascimbene & al. 2009b), **Ven** (Caniglia & al. 1999, Nascimbene & Caniglia 2003c, Nascimbene 2005c, 2008, Thor & Nascimbene 2007, Nascimbene & Marini 2007), **TAA** (De Benetti & Caniglia 1993, Nascimbene 2003, 2008b, Spitale & Nascimbene 2012), **Lomb** (Valcuvia & al. 2003, De Vita & Valcuvia 2004), **Piem** (Isocrono & Falletti 1999, Isocrono & al. 2003, Morisi 2005, Morando & al. 2016), **VA** (Piervittori & Isocrono 1999), **Emil, Lig** (Brunialti & al. 1999, Valcuvia & al. 2000, Roccardi 2006, Giordani & al. 2016), **C** - **Tosc** (Benespero 2000a, 2006, Paoli & al. 2014b, Brackel 2015), **Marc** (Nimis &

Tretiach 1999), **Umb** (Nimis & Tretiach 1999, Panfili 2003, 2007, Ravera & al. 2006, Genovesi 2011), **Laz** (Bartoli 1997b, Bartoli & al. 1998, Nimis & Tretiach 2004, Roccardi & Ricci 2006, Roccardi 2006, 2011, Brackel 2015), **Abr** (Nimis & Tretiach 1999, Brackel 2015, Caporale & al. 2016), **Mol** (Garofalo & al. 1999, Nimis & Tretiach, 1999, 2004, Caporale & al. 2008, Ravera & al. 2009, Genovesi & Ravera 2014), **Sar** (Rizzi & al. 2011), **S - Camp** (Garofalo & al. 1999, 2010, Aprile & al. 2003, 2003b, Nimis & Tretiach 2004), **Pugl** (Nimis & Tretiach 1999, Brackel 2011), **Bas** (Bartoli & Puntillo 1998, Nimis & Tretiach 1999, Potenza 2006, Brackel 2011), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994, 1995, Ottonello & Salone 1994, Ottonello & al. 1994, Monte & Ferrari 1996, Ottonello 1996, Ottonello & Romano 1997, Poli & al. 1997, Grillo 1998, Caniglia & Grillo 2001, 2005, 2006, Grillo & al. 2001, 2002, 2009, Grillo & Caniglia 2004, Merlo 2004b, Genco & al. 2007, Brackel 2008b, 2008c, Gianguzzi & al. 2009, Liistro & Cataldo 2011, Cataldo & Cannavò 2014).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 3-5, X: 4, E: 2-3/ Alt: 1-4/ Salp: rr, Orom: rc, Mont: vc, SmedD: ec, Pad: r, SmedH: ec, MedH: ec, MedD: rc/ PT: 1-2/ Note: a mainly Mediterranean to mild-temperate species found on limestone and dolomite, sometimes also on other calciferous substrata, much rarer in heavily disturbed habitats (stunted specimens, however, may grow on ancient monuments in the centre of Rome), sometimes reaching beyond treeline, especially in the Apennines.

***Circinaria calcarea* var. *reagens* (Zahlbr.)**

Provisionally placed here, ICN Art. 36.1b. - *Lecanora calcarea* f. *reagens* Zahlbr., Österr. bot. Z., 59: 501, 1909.

Syn.: *Aspicilia calcarea* var. *reagens* (Zahlbr.) Szatala, *Aspicilia nicaeensis* B. de Lesd., *Pachyospora viridescens* var. *calcarea* A. Massal.

N - Ven. C - Umb (Genovesi & Ravera 2001, Ravera & al. 2006), **Laz, Sar. S - Camp** (Aprile & al. 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010), **Si**.

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 4-5, X: 4, E: 2-3/ Alt: 1-3/ Mont: rr, SmedD: vr, SmedH: vr, MedH: r, MedD: vr/ PT: 1/ Note: perhaps just a chemical strain with abundant norstictic acid, apparently most frequent in the mountains of central and southern Italy.

Circinaria contorta* (Hoffm.) A. Nordin, Savić & Tibell subsp. *contorta

Mycologia, 102: 1341, 2010 - *Verrucaria contorta* Hoffm., *Descr. Adumbr. Pl. Crypt. Lich.*, 1, 4: 97, 1790.

Syn.: *Aspicilia caecula* (Ach.) Anzi, *Aspicilia calcarea* f. *bullosa* (A. Massal.) Arnold, *Aspicilia calcarea* var. *contorta* (Hoffm.) Körb., *Aspicilia contorta* (Hoffm.) Körb. subsp. *contorta*, *Lecanora calcarea* var. *contorta* (Hoffm.) Hepp, *Lecanora contorta* (Hoffm.) J. Steiner, *Aspicilia contorta* var. *disseminata* (J. Steiner) Szatala?, *Aspicilia contorta* var. *glaucopis* (Flörke) Kremp.?, *Pachyospora calcarea* var. *contorta* (Hoffm.) A. Massal., *Parmelia contorta* (Hoffm.) Spreng. *non* Bory -

N - VG, Frl, Ven (Lazzarin 2000b, Nascimbene & Caniglia 2003c, Nascimbene 2005c, Nascimbene & Marini 2007), **TAA** (Nascimbene 2001b, 2003, 2005b, 2006c, 2008b, Spitale & Nascimbene 2012), **Lomb** (Valcuvia 2002, 2002b), **Piem** (Morisi & Sereno 1995, Isocrono & al. 2004, Morisi 2005, Morando & al. 2016), **VA** (Piervittori & Isocrono 1999, Piervittori & al. 2001, Revel & al. 2001, Isocrono & al. 2008, Favero-Longo & Piervittori 2009, Matteucci & al. 2015c), **Emil** (Nimis & al. 1996, Dalle Vedove & al. 2002, Tretiach & al. 2008), **Lig** (Valcuvia & al. 2000, Giordani & al. 2016). **C - Tosc** (Brackel 2015), **Umb** (Nimis & Tretiach 1999, Panfili 2000, 2007, Ravera & al. 2006), **Laz** (Bartoli 1997b), **Abr** (Nimis & Tretiach 1999), **Mol** (Garofalo & al. 1999, Nimis & Tretiach 1999, Caporale & al. 2008, Genovesi & Ravera 2014), **Sar** (Calatayud & al. 2001, Rizzi & al. 2011, Giordani & al. 2013), **S - Camp** (Garofalo & al. 1999, 2010, Aprile & al. 2002, 2003, 2003b), **Pugl** (Garofalo & al. 1999, Durini & Medagli 2004), **Si** (Nimis & al. 1994, Poli & al. 1995, 1997, 1998, Ottonello 1996, Grillo 1998, Grillo & al. 2001, 2009, Caniglia & Grillo 2001, 2005, 2006, Grillo & Caniglia 2004, Brackel 2008b, 2008c, Gianguzzi & al. 2009).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 3-5, X: 4, E: 4/ Alt: 1-5/ Alp: er, Salp: vr, Orom: r, Mont: rr, SmedD: rr, Pad: vr, SmedH: r, MedH: r, MedD: vr/ PT: 1-2/ p/ Note: a widespread lichen which in Italy is much less frequent than subsp. *hoffmanniana*, and is generally bound to less disturbed situations. I have the impression that these two taxa are worthy of being kept separate, but the complex needs a revision. Some records may refer to *C. contorta* s.lat. See also note on subsp. *hoffmanniana*.

***Circinaria contorta* subsp. *hoffmanniana* (R.Sant.) I. Zhdanov**

Nov. Syst. Plant. non Vasc., Komarov Bot. Inst., St. Petersburg, 47: 207, 2013 - *Aspicilia contorta* subsp. *hoffmanniana* S. Ekman & Fröberg ex R. Sant., *Lichens and Lichenicolous Fungi of Sweden and Norway*: 23, 1993.

Syn.: *Aspicilia caesioalba* (Le Prévost) Hue, *Aspicilia hoffmannii* auct. non (Ach.) Flagey, *Lecanora calcarea* var. *hoffmannii* (Ach.) Sommerf., *Lecanora hoffmannii* (Ach.) Müll. Arg., *Pachyospora calcarea* f. *cinereovirens* A. Massal.?

N - VG (Castello 2002, Martellos & Castello 2004, Tretiach & al. 2012), **Frl** (Nimis & Salvadori 1998, Nascimbene & Salvadori 2008, Nascimbene & al. 2009b), **Ven** (Nascimbene & Salvadori 2008) **AA, Lomb** (Valcuvia & al. 2003, De Vita & Valcuvia 2004), **Piem** (Morisi & Sereno 1995, Isocrono & al. 2004, Favero-Longo & al. 2015), **VA** (Piervittori & Isocrono 1999, Matteucci & al. 2015c), **Emil** (Nimis & al. 1996), **Lig** (Valcuvia & al. 2000, Watson 2014, Giordani & al. 2016). **C - Tosc** (Benespero 2006), **Marc** (Nimis & Tretiach 1999), **Umb** (Nimis & Tretiach 1999, Ravera & al. 2006), **Laz** (Genovesi & al. 2011), **Abr** (Nimis & Tretiach 1999, Caporale & al. 2016), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008, Ravera & al. 2009, Genovesi & Ravera 2014), **Sar** (Rizzi & al. 2011, Giordani & al. 2013), **S - Camp** (Aprile & al. 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010, Catalano & al. 2016), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994, 1995, Ottonello 1996, Ottonello & Romano 1997, Caniglia & Grillo 2001, 2005, 2006, Grillo & Caniglia 2004, Grillo & al. 2007b, 2009, Brackel 2008b, Gianguzzi & al. 2009, Liistro & Cataldo 2011, Cataldo & Cannavò 2014).

Cr/ Ch/ S/ Sax/ pH: 3-5, L: 3-5, X: 3-4, E: 3-5/ Alt: 1-4/ Salp: er, Orom: vr, Mont: rc, SmedD: ec, Pad: c, SmedH: ec, MedH: vc, MedD: rc/ PT: 1-3/ p/ Note: an early coloniser of a wide variety of calciferous or base-rich substrata, from limestone and dolomite to brick, roofing tiles and mortar walls; one of the most frequent taxa of the genus in Italy, occurring also inside large urban areas, with optimum below the montane belt. Since a molecular study of the complex is in progress, I refrain from a formal recombination. See also notes to *C. contorta* subsp. *contorta* and to *C. viridescens*.

Circinaria coronata (A. Massal.)

Provisionally placed here, ICN Art. 36.1b. - *Pachyospora coronata* A. Massal., Mem. Lichenogr.: 131, 1853.

Syn.: *Aspicilia calcarea* var. *coronata* (A. Massal.) Körb., *Aspicilia coronata* (A. Massal.) B. de Lesd., *Aspicilia coronata* var. *petkae* (Servít) Szatala?, *Aspicilia laurensii* B. de Lesd., *Lecanora coronata* (A. Massal.) Jatta, *Lecanora coronuligera* Zahlbr., *Lecanora laurensii* (B. de Lesd.) Croz.

N - Ven (Caniglia & al. 1993, Lazzarin 2000b). **C - Tosc, Marc** (Nimis & Tretiach 1999), **Umb** (Nimis & Tretiach 1999, Panfili 2000, Ravera & al. 2006), **Laz** (Nimis & Tretiach 2004), **Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008, Genovesi & Ravera 2014), **Sar. S - Camp** (Garofalo & al. 1999, 2010, Aprile & al. 2003b, Nimis & Tretiach 2004), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1996b).

Cr.end/ Ch/ S/ Sax/ pH: 4-5, L: 3-5, X: 4, E: 2-3/ Alt: 2-5/ Alp: r, Salp: rr, Orom: rc, Mont: c, SmedD: vr, SmedH: vr/ PT: 1/ Note: related to *C. contorta*, but with an endolithic to hemiendolithic thallus, this is a mainly southern lichen in Europe, most common on hard dolomite. In Italy it is most frequent in upland areas, especially in the South. According to Nordin (*in litt.*) the taxon is heterogeneous and more species might be involved, so that I refrain from a formal recombination.

Circinaria crespiana (V.J. Rico) Sohrabi & V.J. Rico

Lichenologist, 45: 358, 2013 - *Aspicilia crespiana* V.J. Rico, Lichenologist, 31, 2: 130, 1999.

C - Sar (Rico 1999).

Frut/ Ch/ S/ Sax, Terr/ pH: 2-3, L: 4, X: 4, E: 2-3/ Alt: 1-2/ SmedH: er, MedH: er/ PT: 1/ Note: this characteristic subfruticulose species growing amongst mosses on siliceous substrata is hitherto known only from central Spain and Sardegna. It occurs on mosses and on exposed, more or less horizontal surfaces of granitic rocks at low elevations.

Circinaria cupreogrisea (Th. Fr.) A. Nordin, Savić & Tibell

Mycologia, 102: 1346, 2010 - *Lecanora cupreogrisea* Th. Fr., Lichenogr. Scand., 1: 278, 1871.

Syn.: *Aspicilia cupreogrisea* (Th. Fr.) Hue, *Aspicilia mastoidea* (Wedd.) Maheu & A. Gillet

N - VA (Pierivittori & Isocrono 1999). **C - Sar** (B-36502)

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4, X: 3-4, E: 2/ Alt: 3-5/ Alp: vr, Salp: vr, Orom: er, Mont: vr/ PT: 1/ Note: on siliceous rocks in the mountains; perhaps more widespread in the Alps and especially in the high Mediterranean mountains.

Circinaria elmorei (E.D. Rudolph) Owe-Larss., A. Nordin & Sohrabi

in Owe-Larsson & al., Bibl. Lichenol., 106: 244, 2011 - *Lecanora elmorei* E.D. Rudolph, Ann. Mo. bot. Gar., 40: 65, 1953.

Syn.: *Aspicilia desertorum* auct. p.p. non (Kremp.) Mereschk., *Aspicilia esculenta* auct. p.p. non (Pall.) Flagey

C - Abr (Nimis & Tretiach 1999).

Cr/ Ch/ S/ Sax/ pH: 3-5, L: 5, X: 5, E: 2-3/ Alt: 5/ Alp: er, Orom: er/ PT: 1/ subc/ Note: a xeric subtropical lichen of steeply inclined, hard, more or less calciferous rocks and dolomite, limited to the oromediterranean belt in Italy, and probably absent from the Alps. The taxonomy of this group is still unsettled (Owe-Larsson & al. 2011): saxicolous crustose forms formerly called *Aspicilia desertorum*, including the Italian samples, belong to the *Circinaria elmorei*-complex, which is presently under revision (Sohrabi, *in litt.*).

Circinaria gibbosa (Ach.) A. Nordin, Savić & Tibell

Mycologia, 102: 1346, 2010 - *Urceolaria gibbosa* Ach., Meth. Lich.: 144, 1803.

Syn.: *Aspicilia gibbosa* (Ach.) Körb., *Lecanora gibbosa* (Ach.) Nyl.

N - TAA, Lomb, Piem.

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 3-4, X: 3-4, E: 3-4/ Alt: 3-5/ Alp: vr, Salp: r, Mont: vr/ PT: 1/ Note: on siliceous rocks wetted by rain in the mountains. The epithet "*gibbosa*" was frequently used by European authors for *C. caesiocinerea*. I have seen several old collections from Trentino-Alto Adige, Lombardia and Piemonte, which belong to this taxon, that could well prove to be a chemical strain of *C. caesiocinerea*.

Circinaria hispida (Mereschk.) A. Nordin, Savić & Tibell

Mycologia, 102: 1346, 2010 - *Aspicilia hispida* Mereschk., Excurs. Lichenol. Stepp. Kirgis.: 35, 1911.

Syn.: *Agrestia cyphellata* J.W. Thomson, *Agrestia hispida* (Mereschk.) Hale & W.L. Culb., *Lecanora hispida* (Mereschk.) Zahlbr.,

N - Piem (Hafellner & al. 2004, Sohrabi & al. 2011, 2013).

Frut/ Ch/ A.f/ Terr/ pH: 3-5, L: 4-5, X: 4-5, E: 1-2/ Alt: 4-5/ Alp: er, Salp: er/ PT: 1/ subc/ Note: a terricolous vagrant species of the steppes of Central Asia, with a disjunct distribution in the most continental parts of the Iberian Peninsula, recently found in the mountains of Greece, the Maritime Alps of France (Roux & coll. 2014), and the western Alps (Hafellner & al. 2003).

Circinaria leproscens (Sandst.) A. Nordin, Savić & Tibell

Mycologia, 102: 1346, 2010 - *Lecanora leproscens* Sandst., Verh. bot. Ver. Prov. Brandenb., 45: 131, 1904.

Syn.: *Aspicilia leproscens* (Sandst.) Hav.

C - Sar (B-189487).

Cr/ Ch/ A.s/ Sax/ pH: 2-3, L: 3-5, X: 3-4, E: 4-5/ Alt: 1/ MedH: er, MedD: er/ PT: 1/ coast/ Note: this isidiolate-sorediate species growing on siliceous rocks near the coast has been reported from several localities in the Mediterranean Region, but also from North America and East Asia, and is common along the Atlantic coasts of France and those of the North Sea (Roux *in litt.*).

Circinaria proluta (Nyl.)

Provisionally placed here, ICN Art. 36.1b. - *Lecanora caesiocinerea* f. *proluta* Nyl., Lich. Pyren. Orient. Obs. Nov.: 8, 1891.

Syn.: *Aspicilia proluta* (Nyl.) Hue, *Aspicilia submersa* (Lamy) Hue, *Lecanora proluta* (Nyl.) Zahlbr., *Lecanora subdepressa* var. *submersa* Lamy, *Lecanora submersa* (Lamy) Zahlbr.

N - Lig (UPS-L-199939).

Cr/ Ch/ S/ Sax/ pH: 1-3, L: 3-4, X: 1-3, E: 1-2/ Alt: 2-3/ Mont: vr, SmedD: vr/ PT: 1-2/ #/ Note: on periodically flooded siliceous rocks; a poorly known species of the *C. caesiocinerea* complex, described from the Pyrenees, which needs further study.

Circinaria viridescens (A. Massal.)

Provisionally placed here, ICN Art. 36.1b. - *Pachyospora viridescens* A. Massal., Ric. Auton. Lich. Crost.: 46, 1852.

Syn.: *Aspicilia viridescens* (A. Massal.) Hue

N - Ven (Massalongo 1852), TAA (Dalla Torre & Sarnthein 1902), Lig (Giordani & al. 2016), C - Laz (Nimis & Tretiach 2004), Abr (Nimis & Tretiach 1999), Mol (Nimis & Tretiach 1999, Caporale & al. 2008), Sar (Rizzi & al. 2011, Giordani & al. 2013), S - Camp (Nimis & Tretiach 2004), Pugl (Nimis & Tretiach 1999), Bas (Nimis & Tretiach 1999), Cal (Puntillo 2011), Si (Nimis & al. 1994, 1995, Ottonello & al. 1994, Ottonello & Romano 1997, Grillo & al. 2007).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 3-4, X: 3, E: 2-3/ Alt: 1-3/ Mont: vr, SmedD: r, SmedH: rc, MedH: rr, MedD: er/ PT: 1-2/ suboc/ Note: on base-rich, hard siliceous rocks (*e.g.* basalt), most frequent in southern Italy. In my opinion this is a well-distinguished species, differing from typical *A. contorta* and its subsp. *hoffmanniana*. Several south Italian records of *Aspicilia contorta* s.lat. reported by Nimis (1993: 100) could refer to this taxon, which, however, can be easily confused with grey-green morphotypes of *C. contorta* subsp. *hoffmanniana* that grow on calcareous substrata (see Roux & coll. 2014). Since a molecular study of the complex is in progress, I refrain from a formal recombination.

Cladonia P. Browne

Civ. Nat. Hist. Jamaica: 81, 1756, *nom. cons.*

Cladonia is a cosmopolitan genus of 470 species (Pino-Bodas & al. 2016) in the Cladoniaceae. In spite of the fact that they are conspicuous and frequently collected, several species still appear chemically and/or morphologically heterogeneous and are rather poorly understood. The phylogeny of the genus has been analysed by Stenroos & al. (2002), who proposed a new subgeneric classification and maintain the inclusion of *Cladina* into *Cladonia* (see also Stenroos & al. 1997, 2002b). The world distribution of several European species was treated by Litterski & Ahti (2004). Type: *C. subulata* (L.) FH. Wigg.

Cladonia acuminata (Ach.) Norrl.

in Norrlin & Nyl., Herb. Lich. Fenn, Index.: 3, nr. 57a, 1875 - *Cenomyce pityrea* f. *acuminata* Ach., Syn. Meth. Lich.: 254, 1814.

Syn.: *Cladonia acuminata* subsp. *foliata* (Arnold) Vain., *Cladonia norrlinii* Vain. *nom. illegit.*

N - Frl (Tretiach & Molaro 2007), TAA, Lomb (Rivellini 1994, Rivellini & Valcuvia 1996), Piem (Isocrono & Falletti 1999), VA (Matteucci & Vanacore Falco 2015), C - Tosc (Benesperi & al. 2007).

Frut/ Ch/ A.s/ Terr/ pH: 3-4, L: 4, X: 3, E: 1/ Alt: 3-4/ Salp: er, Mont: vr/ PT: 1/ Note: a cool-temperate to circumboreal-montane lichen found on calciferous soil rich in humus in open situations, most frequent in the mountains.

Cladonia amaurocraea (Flörke) Schaer.

Lich. Helv. Spicil., 1: 34, 1823 - *Capitularia amaurocraea* Flörke *in* Weber & Mohr, Beitr. Naturk., 2: 334, 1810.

N - Frl, Ven (Nimis 1994, Nascimbene & Caniglia 2003c), **TAA** (Caniglia & al. 2002, Nascimbene & al. 2005, 2006, Bilovitz & al. 2014b), **Lomb** (Rivellini 1994, Rivellini & Valcuvia 1996), **Piem** (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1997, 1999).

Frut/ Ch/ S/ Terr/ pH: 1-2, L: 4-5, X: 3, E: 1/ Alt: 4-5/ Alp: r, Salp: rr/ PT: 1/ Note: a circumpolar, boreal-subarctic-subalpine lichen found on acid soil and bryophytes in open habitats, mostly in sites with a long snow lie near and above treeline, probably restricted to the Alps in Italy, where it is generally not common.

Cladonia arbuscula (Wallr.) Flot.

in Wendt, Therm. Warmbrunn: 94, 1839 - *Patellaria foliacea* var. *arbuscula* Wallr., Naturgesch. Säulchen-Flecht.: 169, 1829.

Syn.: *Cladina arbuscula* (Wallr.) Hale & W.L. Culb., *Cladina arbuscula* subsp. *squarrosa* (Wallr.) Burgaz, *Cladonia arbuscula* subsp. *squarrosa* (Wallr.) Ruoss, *Cladonia sylvatica* auct., *Patellaria arbuscula* (Wallr.) Wallr., *Patellaria coccinea* var. *squarrosa* Wallr.

N - Frl (Ravera & al. 2015), **Ven** (Nimis 1994, Nascimbene & Caniglia 1997, 2003c, Caniglia & al. 1999, 2000, Nascimbene 2005c, Giovagnoli & Tasinazzo 2014, Ravera & al. 2015), **TAA** (Caniglia & al. 2002, Nascimbene 2001b, 2003, 2008b, 2013, Nascimbene & al. 2005, 2006, Brackel 2013, Bilovitz & al. 2014, Watson 2014, Ravera & al. 2015), **Lomb** (Rivellini 1994, Rivellini & Valcuvia 1996, Rossi & al. 1998, Dalle Vedove & al. 2004, Ravera & al. 2015), **Piem** (Morisi & Sereno 1995, Isocrono & al. 2004, Ravera & al. 2015), **VA** (Piervittori & Isocrono 1997, 1999, Valcuvia 2000, Piervittori & al. 2004, Ravera & al. 2015), **Lig** (Brunialti & al. 1999, Ravera & al. 2015). **C - Tosc** (Ravera & al. 2015), **Sar** (Nöske 2000).

Frut/ Ch/ A.f/ Terr/ pH: 1-3, L: 3-5, X: 3, E: 1/ Alt: 3-5/ Alp: rr, Salp: c, Orom: vr, Mont: er/ PT: 1/ Note: a circumpolar, boreal-subarctic-subalpine lichen, one of the most abundant elements of lichen-rich tundra-like vegetation on mineral soil in exposed habitats, sometimes also found on lignum. In the Nordic Lichen Flora, Ahti & Stenroos (2013) included subsp. *squarrosa*, probably the most widespread entity of the *C. arbuscula* complex in the Alps, into subsp. *arbuscula*, regarding the psoromic acid strain as a taxonomically unimportant chemotype. I follow them here, also because the species was often cited from Italy without specifying the chemistry. Subsp. *squarrosa* has been reported from Friuli (Tretiach & Hafellner 2000), Veneto (Thor & Nascimbene 2007), Trentino-Alto Adige (Bilovitz & al. 2014b), Piemonte (see Nimis 1993: 224), Valle d'Aosta (Matteucci & Vanacore Falco 2015) and Sardegna. (see Nimis 1993: 224).

Cladonia bacilliformis (Nyl.) Sarnth.

Österr. bot. Z., 46: 264, 1896 - *Cladonia carneola* var. *bacilliformis* Nyl., Syn. Meth. Lich., 1, 2: 201, 1860.

N - TAA (Dalla Torre & Sarnthein 1902).

Frut/ Ch/ A.s/ Lign-Epiph/ pH: 1-2, L: 3-4, X: 2-3, E: 1/ Alt: 3-4/ Salp: r, Mont: er/ Note: a boreal-montane, mainly lignicolous species, also known from the French, Swiss and Austrian Alps, probably more widespread also along the Italian Alps, in montane to subalpine coniferous forests.

Cladonia bellidiflora (Ach.) Schaer.

Lich. Helv. Spicil., 1, 1: 21, 1823 - *Lichen bellidiflorus* Ach., Lichenogr. Suec. Prodr.: 194, 1799.

N - Frl (Tretiach & Hafellner 2000), **Ven** (Nimis 1994), **TAA** (Caniglia & al. 2002, Lang 2009), **Lomb** (Rivellini & Valcuvia 1996), **Piem** (Isocrono & al. 2004, 2006, Isocrono & Piervittori 2008), **VA** (Piervittori & Isocrono 1999), **Emil** (Dalle Vedove & al. 2002), **Lig** (Giordani & Brunialti 2000). **C - Tosc** (Benesperi 2007, Benesperi & al. 2007).

Frut/ Ch/ S/ Terr/ pH: 1-2, L: 3-4, X: 2-3, E: 1/ Alt: 3-5/ Alp: vr, Salp: rr, Mont: r/ PT: 1/ Note: a cool-temperate to boreal-montane, circumpolar lichen found on acid soil and mossy rocks in wind-protected and humid situations (e.g. in sites with a long snow lie), most frequent near or above treeline.

Cladonia borealis S. Stenroos

Ann. Bot. Fenn., 26: 160, 1989.

N - Frl, Ven (Nascimbene & Caniglia 2000, 2003c), **TAA** (Bilovitz & al. 2014, Nascimbene 2014, Nascimbene & Marini 2015), **Lomb** (Nascimbene 2006).

Frut/ Ch/ A.s/ Terr/ pH: 1-2, L: 4, X: 3, E: 1/ Alt: 3-5/ Alp: vr, Salp: r, Mont: er/ PT: 1/ Note: on acid, mineral siliceous soil in open habitats near or above treeline; related to *C. coccifera* and with a similar ecology, and certainly more widespread in the Alps.

Cladonia botrytes (K.G. Hagen) Willd.

Fl. Berol. Prodr.: 365, 1787 - *Lichen botrytes* K.G. Hagen, Tent. Hist. Lich.: 121, tab. 2, fig. 9, 1792.

N - Frl, Ven, TAA (Nascimbene & al. 2007b, Nascimbene 2008b, Watson 2014, Nimis & al. 2015), **Lomb** (Dalle Vedove & al. 2004). **C - Sar**.

Frut/ Ch/ S/ Lign/ pH: 1-2, L: 3, X: 2-3, E: 1/ Alt: 3-4/ Salp: vr, Orom: er, Mont: er/ PT: 1/ Note: a circumpolar, boreal-montane lichen found on decaying wood, mostly on horizontal faces of stumps and fallen trunks, especially of conifers, more rarely on decaying bark, with optimum near treeline. The record from South Tyrol of *Cladonia carneola* by Nascimbene (2008b) refers to this species (Nascimbene, *in litt.*).

Cladonia caespiticia (Pers.) Flörke

Clad. Comm.: 8, 1828 - *Baeomyces caespiticius* Pers., Ann. Bot. (Usteri), 7: 155, 1793 ("1794").

Syn.: *Cladonia agariciformis* (Wulfen) Arnold

N - VG, Ven, TAA, Lomb (Rivellini & Valcuvia 1996, Zocchi & al. 1997, Stofer 2006, Abramini & al. 2008, Furlanetto 2010), **Piem** (Isocrono & al. 2004), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Valcuvia & al. 2000b), **Emil** (Nimis & al. 1996), **Lig** (Putorti & al. 1999b, Giordani & Incerti 2008). **C - Tosc** (Loppi & al. 1997b, 1999a, Putorti & al. 1999, Loppi & Putorti 2001, Brunialti & al. 2012b), **Laz** (Stofer 2006), **Sar** (HAL-7276). **S - Camp, Pugl, Cal** (Stofer 2006), **Si**.

Frut/ Ch/ S/ Terr/ pH: 2-3, L: 3-4, X: 3, E: 1/ Alt: 2-4/ Salp: er, Orom: er, Mont: vr, SmedD: er, SmedH: er/ PT: 1/ suboc/ Note: a cool-temperate to southern boreal-montane, circumpolar lichen found on mineral, generally sandy-clay soil, occasionally on rotting wood and at the base of ancient trunks in sheltered situations. The records from southern Italy (Nimis 1993: 225) need reconfirmation.

Cladonia cariosa (Ach.) Spreng.

Syst. Veget., 4, 1: 272, 1827 - *Lichen cariosus* Ach., Lichenogr. Suec. Prodr.: 198, 1799.

Syn.: *Cladonia locarnensis* Frey nom. illegit., *Cladonia stabilis* Britzelm.

N - Ven, TAA (Nascimbene 2001b, Bilovitz & al. 2014, 2014b), **Lomb** (Rivellini & Valcuvia 1996), **Piem** (Isocrono & al. 2004), **Emil, Lig, C - Tosc, Umb** (Ravera & al. 2006, 2006b), **Laz, S - Cal** (Puntillo 1996), **Si**.

Frut/ Ch/ S/ Terr/ pH: 2-3, L: 4, X: 3, E: 2-3/ Alt: 2-5/ Alp: vr, Salp: r, Orom: er, Mont: er, SmedD: er, SmedH: er/ PT: 1/ p/ Note: a cool-temperate to subarctic-subalpine, circumpolar lichen found on disturbed mineral, often sandy soil over calcareous or base-rich substrata; most frequent in the Alps. An earlier record from Venezia Giulia (Nimis 1993: 225) is excluded here as it was from Slovenian territory.

Cladonia carneola (Fr.) Fr.

Lichenogr. Eur. Ref.: 233, 1831 - *Cenomyce carneola* Fr., Sched. Crit. Lich. Suec., 3-4: 23, 1825.

N - Frl (Tretsch & Molaro 2007), **Ven** (Caniglia & al. 1999, Nascimbene & Caniglia 2003c), **TAA** (Nascimbene & al. 2007b, Watson 2014, Nimis & al. 2015), **Lomb** (Rivellini 1994, Rivellini & Valcuvia 1996, Rossi & al. 1998, Valcuvia & al. 2000d, Nascimbene & al. 2006e), **Piem** (Isocrono & al. 2004), **VA** (Valcuvia 2000), **Emil**.

Frut/ Ch/ A.s/ Terr-Lign/ pH: 1-2, L: 4, X: 2-3, E: 1/ Alt: 3-5/ Alp: rr, Salp: rc, Mont: vr/ PT: 1/ Note: a circumpolar, mainly boreal-montane to subarctic lichen found on rotting wood and soil rich in humus in open montane to subalpine woodlands, sometimes reaching the Alpine belt.

Cladonia cenotea (Ach.) Schaer.

Lich. Helv. Spicil., 1, 1: 35, 1823 - *Baeomyces cenoteus* Ach., Meth. Lich.: 345, 1803.

N - Frl, Ven (Nascimbene & Caniglia 1997, 2000b, 2002c, 2003c, Caniglia & al. 1999, Nascimbene & al. 2006e, Nascimbene & Marini 2007, Nascimbene 2008, 2008c, 2011), **TAA** (Caniglia & al. 2002, Nascimbene & Caniglia 2002c, Nascimbene 2003, 2005b, 2006b, 2006c, 2008b, 2013, 2014, Nascimbene & al. 2005, 2006, 2006e, 2007b, 2008c, Lang 2009, Nascimbene & Marini 2015, Nimis & al. 2015), **Lomb** (Rivellini 1994, Rivellini & Valcuvia 1996, Dalle Vedove & al. 2004, Nascimbene & al. 2006e), **Piem** (Isocrono & al. 2004, Isocrono & Piervittori 2008), **VA** (Valcuvia 2000), **Emil, C - Tosc, Laz** (Ravera 2002b), **Sar, S - Cal** (Puntillo 1996).

Frut/ Ch/ A.s/ Lign-Terr/ pH: 1-2, L: 3-4, X: 3, E: 1/ Alt: 1-5/ Alp: er, Salp: vr, Orom: er, Mont: r, SmedD: vr, SmedH: r, MedH: er/ PT: 1/ Note: a temperate to boreal-montane, circumpolar species found on rotting wood, mainly on old stumps, and on soil rich in humus, with a wide altitudinal range.

Cladonia cervicornis (Ach.) Flot.

Jahrb. schles. Ges. vaterl. Kultur, 27: 105, 1849 - *Lichen cervicornis* Ach., Lichenogr. Suec. Prodr.: 198, 1799.

Syn.: *Cladonia cervicornis* f. *epiphylla* (Rabenh.) Clauzade & Cl. Roux, *Cladonia cervicornis* f. *sobolifera* (Nyl.) Delise, *Cladonia sobolifera* (Delise) Nyl., *Cladonia verticillata* var. *cervicornis* (Ach.) Flörke

N - Ven, TAA, Lomb (Rivellini & Valcuvia 1996, Rossi & al. 1998, Gheza 2015), **Piem** (Isocrono & al. 2004, Gheza 2015), **VA** (Piervittori & Isocrono 1997, 1999, Valcuvia 2000), **Lig, C - Tosc** (Pišút 1997), **Laz, Sar** (Nöske 2000, Zedda & al. 2010, Cogoni & al. 2011), **S - Camp, Pugl** (Durini & Medagli 2004), **Bas** (Potenza 2006, Potenza & Fascetti 2012), **Cal** (Puntillo 1996, Puntillo & Puntillo 2004), **Si** (Otonello & Romano 1997, Merlo 2004, Caniglia & al. 2005, Brackel 2008b, Otonello & al. 2011).

Frut/ Ch/ S/ Terr/ pH: 1-2, L: 4, X: 3, E: 1/ Alt: 1-4/ Salp: er, Mont: vr, SmedD: er, SmedH: r, MedH: rc, MedD: er/ PT: 1/ suboc/ Note: a temperate to southern boreal-montane lichen found on mineral siliceous soil in open grasslands and garrigues, most frequent in Tyrrhenian Italy. See also note on *C. verticillata*.

Cladonia chlorophaea (Sommerf.) Spreng.

Syst. Veg., 4, 1: 273, 1827 - *Cenomyce chlorophaea* Flörke ex Sommerf., Suppl. Fl. Lapp.: 130, 1826.

Syn.: *Cladonia costata* Flörke, *Cladonia pyxidata* subsp. *chlorophaea* (Sommerf.) Arnold, *Cladonia pyxidata* var. *chlorophaea* (Sommerf.) Flörke

N - Frl (Tretsch & Molaro 2007, Tomasi 2007), **Ven, TAA** (Nascimbene 2014, Nascimbene & al. 2014), **Lomb** (Stofer 2006, Gheza 2015), **Piem, VA, Emil, Lig, C - Tosc** (Brackel 2015), **Laz, Abr** (Brackel 2015), **Sar** (Nöske 2000, Cossu 2013), **S - Camp** (Jatta 1909-1911), **Cal** (Stofer 2006), **Si** (Czezuga & al. 1994, Brackel 2008b).

Frut/ Ch/ A.s/ Terr-Lign-Epip/ pH: 1-3, L: 3-5, X: 2-3, E: 1-2/ Alt: 1-5/ Alp: rc, Salp: rc, Orom: rc, Mont: vc, SmedD: vc, Pad: vr, SmedH: vc, MedH: rr, MedD: rc/ PT: 1-3/ Note: this species belongs to a group of taxa containing only substances of the fumarprotocetraric acid complex. The main discriminating features are the presence of granular soredia on the outer and inner surfaces of the cups and the non-melanotic

base of podetia. The discrimination towards *C. pyxidata*, *C. fimbriata* and other species of the complex is not always easy, and most records require re-confirmation.

Cladonia ciliata Stirt.

Scottish Natur, 9: 308, 1888.

Syn.: *Cladina ciliata* (Stirt.) Trass, *Cladina ciliata* f. *tenuis* (Flörke) Ahti, *Cladina ciliata* var. *tenuis* (Flörke) Ahti & M.J. Lai, *Cladina leucophaea* (Abbeyes) Mong., *Cladina tenuis* (Flörke) B. de Lesd., *Cladonia ciliata* f. *flavicans* (Flörke) Ahti & DePriest, *Cladonia ciliata* var. *tenuis* (Flörke) Ahti, *Cladonia laxiuscula* Delise non auct., *Cladonia leucophaea* Abbeyes, *Cladonia rangiferina* var. *tenuis* Flörke, *Cladonia tenuis* (Flörke) Harm., *Cladonia tenuiformis* Ahti, *Cladonia tenuis* var. *leucophaea* (Abbeyes) Ahti

N - Ven (Lazzarin 2000b), **Lig** (Ravera & al. 2015). **C - Tosc** (Ravera & al. 2015), **Laz** (Ravera & al. 2015). **S - Cal** (Puntillo 1996, Ravera & al. 2015), **Si** (Nimis & al. 1994, Ottonello & Romano 1997, Ottonello & al. 2011, Ravera & al. 2015).

Frut/ Ch/ S/ Terr/ pH: 2-3, L: 3-4, X: 2, E: 1/ Alt: 1-3/ Mont: er, SmedD: er, SmedH: er, MedH: er/ PT: 1/ suboc/ Note: a rare temperate species found on mosses in shrublands, especially in undisturbed maquis vegetation, restricted to humid areas. The species occurs in two chemotypes which rarely grow together, the colour varying from dark brown to straw-yellow in f. *flavicans* (Flörke) Ahti & DePriest.

Cladonia coccifera (L.) Willd.

Fl. Berolin.: 361, 1787 - *Lichen cocciferus* L., Sp. Pl.: 1151, 1753.

Syn.: *Capitularia asotea* (Ach.) Flörke, *Cladonia coccifera* var. *asotea* Ach., *Cladonia coccifera* var. *stematina* (Ach.) Vain., *Cladonia frondescens* Nyl.

N - FrI (Tretiach 1996, Tretiach & Hafellner 2000), **Ven** (Nimis 1994, Nascimbene & Caniglia 1997, 2003c, Caniglia & al. 1999, Nascimbene 2008), **TAA** (Caniglia & al. 2002, Nascimbene & Caniglia 2002c, Nascimbene & al. 2005, 2006, 2006e, 2008c), **Lomb** (Rivellini & Valcuvia 1996, Dalle Vedove & al. 2004, Gheza 2015), **Piem** (Morisi & Sereno 1995, Piervittori & al. 2001, Isocrono & al. 2003, 2004, Isocrono & Piervittori 2008, Gheza 2015), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Valcuvia 2000, Matteucci & al. 2008), **Emil** (Tomaselli 1991, Rossi & Ferrari 1994, Dalle Vedove & al. 2002, Benesperi & al. 2007), **Lig**. **C - Tosc** (Benesperi & al. 2007), **Sar** (Nöske 2000). **S - Cal** (Puntillo 1996).

Frut/ Ch/ A.s/ Terr/ pH: 1-2, L: 4-5, X: 3-4, E: 1-3/ Alt: 4-6/ Alp: c, Salp: ec, Orom: er, Mont: r/ PT: 1/ Note: a cool-temperate to arctic-alpine, circumpolar lichen found on soil in open situations, such as in dry tundra-like habitats, more rarely on wood in subalpine open forests.

Cladonia coniocraea (Flörke) Spreng.

Syst. Veg., 4, 1: 272, 1827 - *Cenomyce coniocraea* Flörke, Deutsche Lich., 7: 14, 1821.

Syn.: *Cladonia apolepta* (Ach.) H.M.M. Hansen & M. Lund, *Cladonia fimbriata* var. *coniocraea* (Flörke) Nyl., *Cladonia pycnotheliza* Nyl.

N - VG (Carvalho 1997, Castello 2002, Martellos & Castello 2004), **FrI** (Tretiach 1996, Tretiach & Molaro 2007, Brackel 2013), **Ven** (Nascimbene & Caniglia 1997, 2000b, 2002c, 2003c, Caniglia & al. 1999, Valcuvia & al. 2000c, Nascimbene 2005c, 2008, 2008c, 2011, Nascimbene & al. 2005b, 2006, 2006c, 2006e, 2007, 2007b, 2009c, 2010b, 2013b, Nascimbene & Marini 2007, 2010), **TAA** (Nascimbene & Caniglia 2000b, 2002c, Caniglia & al. 2002, Nascimbene 2003, 2005, 2006b, 2006c, 2008b, 2013, 2014, Gottardini & al. 2004, Nascimbene & al. 2006e, 2008c, 2009, 2010, 2014, Lang 2009, Nascimbene & Marini 2015, Nimis & al. 2015), **Lomb** (Rossi 1991, Rivellini & Valcuvia 1996, Zocchi & al. 1997, Roella 1999, Valcuvia & al. 2003, Dalle Vedove & al. 2004, Nascimbene & al. 2006e, Stofer 2006, Brackel 2010, Furlanetto 2010, Gheza & al. 2015), **Piem** (Isocrono & al. 2003, 2004, 2006, Piervittori 2003, Isocrono & Ferrarese 2008, Isocrono & Piervittori 2008, Matteucci & al. 2010, Gheza 2015), **VA** (Piervittori & Isocrono 1999, Valcuvia 2000, Valcuvia & al. 2000b, Piervittori & al. 2001, Furlanetto 2010), **Emil** (Nimis & al. 1996, Tretiach & al. 2008, Benesperi 2009), **Lig** (Brunialti & al. 1999, Giordani & Brunialti 2000, Giordani & Incerti 2008, Watson 2014). **C - Tosc** (Loppi & al. 1994, 1997b, 2004c, 2006, Tretiach & Nimis 1994, Loppi 1996b, Loppi & De Dominicis 1996b, Tretiach & Ganis 1999, Senese & Critelli 2000, Benesperi 2006, 2011, Benesperi & al. 2007, Pasquinelli & al. 2009, 2013, Brunialti & Frati 2010, Brunialti & al. 2012b, Paoli & al. 2012, 2015d, Brackel 2015, Nascimbene & al. 2015), **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera 1998, Panfili 2000b, 2007, Ravera & al. 2006, Poponessi & al. 2014), **Laz** (Ruisi & al. 2005, Munzi & al. 2007, Zucconi & al. 2013), **Abr** (Recchia & Villa 1996, Nimis & Tretiach 1999, Corona & al. 2016), **Sar** (Zedda & al. 2010, Cogoni & al. 2011, Cossu 2013). **S - Camp** (Garofalo & al. 1999, 2010, Aprile & al. 2003, 2003b, Nimis & Tretiach 2004, Catalano & al. 2016), **Pugl** (Garofalo & al. 1999, Nimis & Tretiach 1999), **Bas** (Potenza 2006, Potenza & al. 2010, Brackel 2011, Potenza & Fascetti 2012), **Cal** (Puntillo 1995, 1996, Stofer 2006, Brackel & Puntillo 2016), **Si** (Grillo & Cristaudo 1995, Grillo 1998, Czczuga & al. 1999, Grillo & Caniglia 2004, 2006).

Frut/ Ch/ A.s/ Epiph-Lign-Terr/ pH: 2-3, L: 3-4, X: 2-3, E: 1-3/ Alt: 1-5/ Alp: er, Salp: er, Orom: vr, Mont: rr, SmedD: c, Pad: vr, SmedH: c, MedH: rc, MedD: vr/ PT: 1-2/ Note: a widespread holarctic species found on a wide variety of organic substrata, incl. bark, and then mostly on the basal parts of boles, but mostly on soil rich in humus and rotten wood, with a wide altitudinal range.

Cladonia cornuta (L.) Hoffm.

Descr. Adumbr. Pl. Crypt. Lich.: tab. 25, 1791 - *Lichen cornutus* L., Sp. Pl., 2: 1152, 1753.

N - Ven, **TAA**, **Lomb** (Rivellini 1994, Rivellini & Valcuvia 1996), **Piem** (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1997, 1999), **Emil**, **Lig** (Brunialti & al. 1999).

Frut/ Ch/ A.s/ Terr/ pH: 1-2, L: 3-4, X: 3, E: 1/ Alt: 3-5/ Alp: er, Salp: rr, Mont: er/ PT: 1/ Note: a boreal-montane to subarctic-subalpine, circumpolar species found on mineral and organic soil, but also on wood, with optimum near treeline in areas with siliceous substrata; probably restricted to the Alps in Italy.

Cladonia crispata (Ach.) Flot.

in Wendt, Therm. Warmbrunn: 93, 1839 - *Baeomyces turbinatus* var. *crispatus* Ach., Meth. Lich.: 341, 1803.

Syn.: *Cladonia crispata* var. *ceptrariiformis* (Delise) Vain., *Cladonia crispata* var. *divulsa* (Delise) Arnold, *Cladonia crispata* var. *elegans* (Delise) Vain., *Cladonia crispata* var. *dilacerata* (Schaer.) Malbr., *Cladonia crispata* var. *infundibulifera* (Schaer.) Vain., *Cladonia crispata* var. *subracemosa* Vain.

N - Frl, Ven (Nimis 1994, Caniglia & al. 1999, Nascimbene & Caniglia 2003c, Nascimbene 2008), **TAA** (Nascimbene 2006c, 2008b, Nascimbene & Caniglia 2000, Caniglia & al. 2002, Nascimbene & al. 2005, 2006, 2008c), **Lomb** (Rivellini 1994, Rivellini & Valcuvia 1996, Nascimbene 2006), **Piem** (Morisi & Sereno 1995, Isocrono & al. 2004, Isocrono & Piervittori 2008), **VA. C - Umb** (Ravera & Di Toma 2003).

Frut/ Ch/ S/ Terr/ pH: 1-2, L: 3-4, X: 3, E: 1/ Alt: 3-5/ Alp: er, Salp: rc, Mont: er/ PT: 1/ Note: a boreal-montane to subarctic-subalpine, circumpolar species found on soil, more rarely on lignum, in open habitats, in areas near treeline with siliceous substrata; restricted to the Alps in Italy.

Cladonia cryptochlorophaea Asahina

J. Jap. Bot., 16: 711, 1940.

N - Ven, Lig. C - Tosc, Laz, Sar. S - Si.

Frut/ Ch/ A.s/ Terr-Lign/ pH: 1-2, L: 3-4, X: 3, E: 1/ Alt: 1-4/ Salp: er, Mont: vr, SmedD: er, SmedH: er, MedH: er/ PT: 1/ suboc/ Note: a mainly cool-temperate, perhaps holarctic lichen found on soil rich in humus, on peat, etc., probably with a western distribution in Europe. Perhaps better treated as a chemical strain of *Cladonia grayi*.

Cladonia cyanipes (Sommerf.) Nyl.

Mém. Soc. Imp. Sc. Nat. Cherbourg, 5: 95, 1858 ("1857") - *Cenomyce carneopallida* var. *cyanipes* Sommerf., Suppl. Fl. Lapp.: 129, 1826.

N - TAA, Piem (Morisi & Sereno 1995, Isocrono & al. 2003).

Frut/ Ch/ A.s/ Terr/ pH: 1-2, L: 4, X: 3, E: 1/ Alt: 4-5/ Alp: er, Salp: er/ PT: 1/ Note: a mainly boreal-montane, perhaps circumpolar species found in open heaths and forest glades amongst bryophytes and on organic soil, much more rarely on wood, in areas with siliceous substrata near and above treeline; restricted to the Alps in Italy.

Cladonia cyathomorpha Walt. Watson

Stirt. ex Walt. Watson, J. Bot., 73: 156, 1935.

C - Sar (Zedda 2002). **S - Cal** (Puntillo 1995, Puntillo 1996).

Frut/ Ch/ A.s/ Terr/ pH: 2-3, L: 3, X: 2, E: 1/ Alt: 1-3/ Mont: vr, SmedH: vr, MedH: er/ PT: 1/ suboc/ Note: a mainly western species in Europe found on epilithic bryophytes and on mosses in the basal parts of trees in very humid areas; probably slightly more widespread, but never common, in Tyrrhenian Italy.

Cladonia decorticata (Flörke) Spreng.

Syst. Veget., 4, 1: 273, 1827 - *Capitularia decorticata* Flörke, Beitr. Naturk., 2: 297, 1810.

N - TAA (Nascimbene & al. 2007b, Nimis & al. 2015), **Lomb** (Rivellini & Valcuvia 1996), **Piem** (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1997, 1999).

Frut/ Ch/ A.s/ Terr-Lign/ pH: 1-2, L: 4, X: 3, E: 1/ Alt: 3-5/ Alp: vr, Salp: vr, Mont: er/ PT: 1/ Note: an arctic-alpine to boreal-montane, circumpolar species found on mineral, more rarely on organic soil and rotting wood in open habitats, restricted to siliceous areas in the Alps.

Cladonia deformis (L.) Hoffm.

Deutschl. Fl., 2: 120, 1796 - *Lichen deformis* L., Sp. Pl., 2: 1152, 1753.

Syn.: *Cladonia crenulata* (Ach.) Flörke

N - Frl (Tretiach & Hafellner 2000), **Ven** (Nascimbene & Caniglia 1997, 2000b, Caniglia & al. 1999, Nascimbene & al. 2006e, Giovagnoli & Tasinazzo 2014), **TAA** (Caniglia & al. 2002, Nascimbene & Caniglia 2002c, Nascimbene 2006c, Nascimbene & al. 2006e, 2007b, 2008c, Nimis & al. 2015), **Lomb** (Rivellini & Valcuvia 1996, Zocchi & al. 1997, Nascimbene & al. 2006e), **Piem** (Isocrono & al. 2004, 2006, Isocrono & Piervittori 2008), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Valcuvia 2000), **Emil. S - Cal** (Puntillo 1996).

Frut/ Ch/ A.s/ Lign-Terr/ pH: 1-2, L: 4-5, X: 3, E: 1/ Alt: 3-5/ Alp: vr, Salp: c, Orom: er, Mont: vr/ PT: 1/ Note: a mainly boreal-montane, circumpolar species found on rotting wood and organic soil in upland areas; some records could refer to *C. sulphurina*.

Cladonia digitata (L.) Hoffm.

Deutschl. Fl., 2: 124, 1796 - *Lichen digitatus* L., Sp. Pl.: 1152, 1753, *nom. cons.*

N - Frl (Tretiach & Molaro 2007, Tomasi 2007), **Ven** (Nascimbene & Caniglia 1997, 2000b, 2002c, 2003c, Caniglia & al. 1999, Nascimbene 2005c, 2008c, 2011, Nascimbene & al. 2006e, 2009c, Giovagnoli & Tasinazzo 2014), **TAA** (Nascimbene & Caniglia 2000b, 2002c, Caniglia & al. 2002, Nascimbene 2003, 2005b, 2006b, 2006c, 2008b, 2013, 2014, 2014c, Nascimbene & al. 2005, 2006, 2006e, 2007b, 2008c, 2009, 2010, Nascimbene & Marini 2007, 2015, Lang 2009, Brackel 2013, Nimis & al. 2015), **Lomb** (Rivellini 1994, Rivellini & Valcuvia 1996, Alessio & al. 1995, Dalle Vedove & al. 2004, Nascimbene & al. 2006e, Brackel 2010, Gheza & al. 2015), **Piem** (Isocrono & al. 2004, 2006), **VA** (Piervittori & Isocrono 1999, Matteucci & al. 2008), **Emil** (Nimis & al. 1996, Benesperi & al. 2007), **Lig** (Brunialti & al. 1999, Watson 2014). **C - Tosc** (Tretiach & Nimis 1994, Senese & Critelli 2000, Loppi & al. 2004c, Benesperi & al.

2007, Benesperi 2011, Brackel 2015), **Marc**, **Laz** (Ravera 2002b), **Abr** (Nimis & Tretiach 1999). **S - Bas**, **Cal** (Puntillo 1996), **Si**.

Frut/ Ch/ A.s/ Lign-Epiph/ pH: 1-2, L: 3-4, X: 2-3, E: 1/ Alt: 3-5/ Alp: vr, Salp: vc, Orom: vr, Mont: rc/ PT: 1/ Note: a cool-temperate to boreal-montane, circumpolar species found on strongly weathered lignum, mosses, on the bases of trunks, sometimes on soil rich in humus; common only in the Alps, becoming much rarer southwards.

Cladonia dimorpha S. Hammer

Mycotaxon, 37: 339, 1990.

C - Sar (Burgaz & Ahti 1994). **S - Cal** (Puntillo 1996).

Frut/ Ch/ A.s/ Terr/ pH: 1-2, L: 4, X: 3, E: 1-2/ Alt: 4-5/ Alp: vr, Salp: vr, Orom: vr, Mont: vr/ PT: 1/ #/ Note: a poorly known member of the difficult *C. pyxidata* complex, also known from North America, found on calcareous or base-rich soil, mostly in upland areas.

Cladonia diversa S. Stenroos

(*Asperges ex*) S. Stenroos, Bot. Complut., 35: 326, 2012.

N - FrI, **Ven** (TSB 7825), **TAA** (Nascimbene & Caniglia 2000). **C - Sar**, **S - Cal** (Puntillo 1996).

Frut/ Ch/ A.s/ Terr/ pH: 1-2, L: 4, X: 3, E: 1-2/ Alt: 4-5/ Alp: vr, Salp: r, Orom: er/ PT: 1/ Note: related to *C. coccifera* and *C. pleurota*, and with a similar ecology, but perhaps more bound to humid habitats, probably more widespread in the Alps near or above treeline.

Cladonia ecmocyna Leight.

Ann. Mag. Nat. Hist., ser. 3, 18: 406, 1866.

Syn.: *Cladonia elongata* var. *ecmocyna* (Leight.) Räsänen, *Cladonia gracilis* var. *ecmocyna* (Leight.) Kernst.

N - FrI (Tretiach & Hafellner 2000), **Ven** (Nascimbene & Caniglia 1997, Caniglia & al. 1999), **TAA**, **Lomb** (Rivellini 1994, Rivellini & Valcuvia 1996), **VA** (Piervittori & Isocrono 1999, Matteucci & Vanacore Falco 2015), **Emil** (Benesperi & al. 2007). **C - Tosc** (Benesperi & al. 2007).

Frut/ Ch/ S/ Terr/ pH: 1-2, L: 3, X: 2-3, E: 1/ Alt: 4-5/ Alp: er, Salp: er/ PT: 1/ Note: a mainly boreal-montane to subarctic-subalpine, circumpolar lichen found on organic soil and amongst bryophytes in cool depressions with a late snow lie near or above treeline; restricted to the Alps in Italy.

Cladonia fimbriata (L.) Fr.

Lichenogr. Eur. Ref.: 222, 1831 - *Lichen fimbriatus* L., Sp. Pl., 2: 1152, 1753.

Syn.: *Cladonia fimbriata* var. *chordalis* auct., *Cladonia major* (K.G. Hagen) Sandst., *Cladonia minor* K.G. Hagen

N - VG, **FrI** (Tretiach & Molaro 2007, Brackel 2013), **Ven** (Nascimbene & Caniglia 1997, 2002c, 2003c, Caniglia & al. 1999, Nascimbene 2005c, 2008, 2011, Nascimbene & al. 2005b, 2006, 2006c, 2006e, 2007, 2009c, 2010b, 2013b, 2015, Nascimbene & Marini 2007), **TAA** (Caniglia & al. 2002, Nascimbene & Caniglia 2002c, Nascimbene 2003, 2005b, 2006b, 2006c, 2008b, 2008c, 2013, 2014, Nascimbene & al. 2006e, 2007c, 2008c, 2014, Lang 2009, Nimis & al. 2015), **Lomb** (Rivellini 1994, Rivellini & Valcuvia 1996, Zocchi & al. 1997, Roella 1999, De Vita & Valcuvia 2004, Dalle Vedove & al. 2004, Anderi & al. 2005, Nascimbene & al. 2006e, Stofer 2006, Furlanetto 2010, Gheza & al. 2015, Gheza 2015), **Piem** (Caniglia & al. 1992, Morisi & Sereno 1995, Isocrono & al. 2003, 2004, Giordani & Malaspina 2016), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Valcuvia 2000, Piervittori & al. 2001, Matteucci & al. 2008, Furlanetto 2010), **Emil** (Nimis & al. 1996, Dalle Vedove & al. 2002, Tretiach & al. 2008, Benesperi 2009), **Lig** (Brunialti & al. 1999, Giordani 2006, Giordani & Incerti 2008). **C - Tosc** (Tretiach & Nimis 1994, Loppi & Putorti 1995b, Loppi & Nascimbene 1998, 2010, Putorti & Loppi 1999b, Benesperi 2000a, 2006, Paoli & Loppi 2001, Loppi & al. 2002c, Lorenzini & al. 2003, Loppi & Frati 2006, Benesperi & al. 2007, Lastrucci & al. 2009, Pasquinelli & al. 2009, Pasquinelli & Puccini 2010, Benesperi 2011, Brackel 2015), **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera 1998, Panfili 2000b, 2007, Ravera & al. 2006), **Laz** (Bartoli & al. 1997, Ravera & al. 1999, Ravera 2002, Massari & Ravera 2002, Ruisi & al. 2005, Munzi & al. 2007, Genovesi & al. 2011, Zucconi & al. 2013), **Abr** (Nimis & Tretiach 1999, Caporale & al. 2016), **Mol** (Garofalo & al. 1999, Caporale & al. 2008, Genovesi & Ravera 2014, Paoli & al. 2015), **Sar** (Zedda 1995, 2002, Zedda & Sipman 2001, Rizzi & al. 2011). **S - Camp** (Garofalo & al. 1999, 2010, Ricciardi & al. 2000, Aprile & al. 2003, 2003b, Nimis & Tretiach 2004, Brunialti & al. 2010, 2013, Nascimbene & al. 2010b, Ravera & Brunialti 2013, Catalano & al. 2016), **Pugl** (Garofalo & al. 1999, Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1995, 1996, Puntillo & Puntillo 2004, Incerti & Nimis 2006), **Si** (Nimis & al. 1994, Ottonello & Salone 1994, Ottonello & al. 1994, 2011, Grillo & al. 1996, Ottonello 1996, Ottonello & Romano 1997, Grillo 1998, Merlo 2004, Grillo & Caniglia 2004, 2006, Falco Scampatelli 2005, Stofer 2006, Liistro & Cataldo 2011).

Frut/ Ch/ A.s/ Terr-Lign-Epiph/ pH: 1-3, L: 3-4, X: 2-3, E: 1-3/ Alt: 1-5/ Alp: vr, Salp: rr, Orom: r, Mont: vc, SmedD: c, Pad: vr, SmedH: vc, MedH: c, MedD: er/ PT: 1-2/ Note: a widespread temperate to arctic-alpine, holarctic species found on rotten wood, soil, at the base of trunks, with a wide ecological range and a correspondingly wide altitudinal range.

Cladonia firma (Nyl.) Nyl.

Bot. Z., 1861: 352, 1861 - *Cladonia alcicornis* var. *firma* Nyl., Syn. Lich., 1: 191, 1858.

Syn.: *Cladonia foliacea* var. *firma* (Nyl.) Vain., *Cladonia nylanderii* Cout.

N - TAA, **Emil**, **Lig** (Brunialti & al. 1999). **C - Tosc**, **Laz**, **Sar** (Zedda 1995, 2002, 2002b, Nöske 2000, Zedda & al. 2010, Cogoni & al. 2011). **S - Si**.

Frut/ Ch/ S/ Terr/ pH: 2-3, L: 4-5, X: 3, E: 1/ Alt: 1-2/ SmedD: er, SmedH: rr, MedH: c, MedD: vr/ PT: 1/ suboc/ Note: a mild-temperate lichen found on mineral, often base-rich soil in open Mediterranean grasslands.

***Cladonia floerkeana* (Fr.) Flörke**

Comm. Clad.: 99, 1828 - *Cenomyce floerkeana* Fr., Sched. Crit. Lich. Suec., 1-4: 18, 1825.

Syn.: *Cladonia berghsonii* Asperges, *Cladonia floerkeana* var. *chloroides* (Flörke) Vain., *Cladonia macilenta* var. *corticata* Vain.

N - Fri (TSB 832), **TAA** (Caniglia & al. 2002, Nascimbene & al. 2006e, 2007b, Lang 2009, Nimis & al. 2015), **Lomb** (Rivellini 1994, Rivellini & Valcuvia 1996, Nascimbene 2006), **Piem** (Isocrono & al. 2004, 2006), **VA** (Matteucci & al. 2008, Isocrono & al. 2008). **C - Tosc** (Benesperi & al. 2007, Chiarucci & al. 2008), **Sar**.

Frut/ Ch/ S/ Terr-Lign/ pH: 1-2, L: 3-4, X: 3, E: 1/ Alt: 3-5/ Alp: vr, Salp: r, Orom: er, Mont: er/ PT: 1/
Note: a circumboreal-montane species found on organic soil and peat, but also on sand, more rare on lignum, with optimum in the subalpine belt.

***Cladonia foliacea* f. *convoluta* (Lam.)**

Provisionally placed here, ICN Art. 36.1b. - *Lichen convolutus* Lam., Fl. Franc., 1 (Meth. Anal.): 84, 1779.

Syn.: *Cladonia convoluta* (Lam.) Anders, *Cladonia endiviifolia* auct. p.p., *Cladonia foliacea* subsp. *convoluta* (Lam.) Cretz., *Cladonia foliacea* var. *convoluta* (Lam.) Vain.

N - VG, Fri (Tretiach 1996), **Ven** (Giovagnoli & Tasinazzo 2014), **TAA** (De Benetti & Caniglia 1993), **Lomb** (Rivellini & Valcuvia 1996), **Piem, VA** (Piervittori & Isocrono 1999), **Emil** (Scarpa 1993, Nimis & al. 1996), **Lig** (Brunialti & al. 1999, Valcuvia & al. 2000). **C - Tosc** (Putorti & Loppi 1999, Benesperi 2000a, 2006, Loppi & al. 2004b, Lastrucci & al. 2009, Pasquinelli & al. 2009, 2013, Pasquinelli & Puccini 2010, Brackel 2015), **Marc** (Nimis & Tretiach 1999, Brackel 2015), **Umb** (Nimis & Tretiach 1999, Ravera & al. 2006, Panfili 2007, Brackel 2015), **Laz** (Nimis & Tretiach 2004, Zucconi & al. 2013, Brackel 2015), **Abr** (Nimis & Tretiach 1999, Brackel 2015), **Mol** (Nimis & Tretiach, 1999, 2004, Caporale & al. 2008, Genovesi & Ravera 2014), **Sar** (Zedda & al. 2010, Rizzi & al. 2011, Cogoni & al. 2011). **S - Camp** (Garofalo & al. 1999, 2010, Ricciardi & al. 2000, Aprile & al. 2002, 2003, 2003b, Nimis & Tretiach 2004, Catalano & al. 2016), **Pugl** (Garofalo & al. 1999, Nimis & Tretiach 1999, Durini & Medagli 2002, 2004, Brackel 2011), **Bas** (Bartoli & Puntillo 1998, Nimis & Tretiach 1999, Fascetti & al. 2006, Potenza 2006, Potenza & al. 2010), **Cal** (Puntillo 1996, Brackel & Puntillo 2016), **Si** (Nimis & al. 1994, 1995, Ottonello & al. 1994, 2011, Ottonello & Salone 1994, Ottonello & Romano 1997, Grillo 1998, Czezug & al. 1999, Grillo & al. 2002, Merlo 2004, 2004b, Grillo & Caniglia 2004, 2005, 2006, Caniglia & Grillo 2005, 2006, Gianguzzi & al. 2009, Liistro & Cataldo 2011, Cataldo & Minissale 2013, 2015).

Frut/ Ch/ A.f/ Terr/ pH: 4-5, L: 4-5, X: 3-4, E: 1-2/ Alt: 1-3/ Mont: rr, SmedD: vc, Pad: er, SmedH: vc, MedH: ec, MedD: rc/ PT: 1-2/ Note: a mild-temperate lichen found on calcareous mineral soil in dry grasslands, or in intradunal depressions, also occurring in dry-continental Alpine valleys. The *C. foliacea-C. convoluta* complex was revised by Pino-Bodas & al. (2010): neither morphological characters nor phylogenetic analyses gave evidence to delimit two taxa, but since there are some ecological and distributional differences, I prefer to provisionally still treat here the calcicolous forms at the level of *forma*.

Cladonia foliacea* (Huds.) Willd. f. *foliacea

Fl. Berol.: 363, 1787 - *Lichen foliaceus* Huds., Fl. Angl.: 457, 1762.

Syn.: *Cladonia alpicornis* (Lightf.) Fr., *Cladonia foliacea* var. *alpicornis* (Lightf.) Schaer.

N - Ven, TAA, Lomb (Rivellini & Valcuvia 1996, Valcuvia & al. 2003, Assini 2007, Gheza & al. 2015, Gheza 2015), **Piem** (Isocrono & al. 2004, Gheza 2015), **VA** (Piervittori & Isocrono 1999), **Emil, Lig** (Brunialti & al. 1999). **C - Tosc** (Putorti & Loppi 1999, Pasquinelli & al. 2009, Pasquinelli & Puccini 2010, Brackel 2015), **Umb** (Panfili 2000, 2007, Ravera & al. 2006), **Laz** (Genovesi & al. 2011), **Sar** (Nöske 2000, Zedda & al. 2010, Rizzi & al. 2011, Cogoni & al. 2011). **S - Camp** (Ricciardi & al. 2000, Catalano & al. 2016), **Pugl** (Durini & Medagli 2002, 2004), **Bas** (Potenza & Fascetti 2005, 2012, Fascetti & al. 2006, Potenza 2006, Potenza & al. 2010), **Cal** (Puntillo 1996, Puntillo & Puntillo 2004, Brackel & Puntillo 2016), **Si** (Nimis & al. 1994, Ottonello & al. 1994, 2011, Ottonello & Salone 1994, Ottonello & Romano 1997, Grillo 1998, Grillo & Caniglia 2004, Brackel 2008b, 2008c).

Frut/ Ch/ S/ Terr/ pH: 2-3, L: 4-5, X: 3, E: 1-2/ Alt: 1-3/ Mont: vr, SmedD: er, SmedH: rc, MedH: c, MedD: vr/ PT: 1-2/ suboc/ Note: a mild-temperate lichen, an ecological vicariant of f. *convoluta* on more or less acid, but often base-rich ground. See also note on f. *convoluta*.

Cladonia furcata* (Huds.) Schrad. subsp. *furcata

Spicil. Fl. Germ.: 107, 1794 - *Lichen furcatus* Huds., Fl. Angl.: 458, 1762.

Syn.: *Cladonia furcata* var. *corymbosa* (Ach.) Nyl., *Cladonia furcata* var. *palamaea* (Ach.) Nyl., *Cladonia furcata* var. *pinnata* (Flörke) Vain., *Cladonia furcata* var. *racemosa* (Hoffm.) Flörke, *Cladonia racemosa* Hoffm.

N - VG (Castello 2002, Martellos & Castello 2004), **Fri** (Tretiach 1996, Tretiach & Hafellner 2000, Tretiach & Molaro 2007), **Ven** (Nascimbene & Caniglia 1997, 2003c, Caniglia & al. 1999, Lazzarin 2000b, Nascimbene 2005c, 2008, 2008c, 2011, Nascimbene & Marini 2007, Brackel 2013, Giovagnoli & Tasinazzo 2014), **TAA** (Caniglia & al. 2002, Nascimbene 2001b, 2003, 2005b, 2006c, 2008b, 2013, Nascimbene & al. 2006, 2008c, Lang 2009), **Lomb** (Rossi 1991, Rivellini 1994, Rivellini & Valcuvia 1996, Roella 1999, Valcuvia & al. 2003, Dalle Vedove & al. 2004, Morisi 2005, Assini 2007, Valcuvia & Truzzi 2007b, Gheza & al. 2015, Gheza 2015), **Piem** (Morisi & Sereno 1995, Isocrono & al. 2003, 2004, 2006, Isocrono & Ferrarese 2008), **VA** (Simiscalco 1995, Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Piervittori & al. 2001), **Emil** (Ferrari & al. 1994, Nimis & al. 1996, Dalle Vedove & al. 2002, Benesperi & al. 2007, Tretiach & al. 2008, Benesperi 2009), **Lig** (Brunialti & al. 1999, Valcuvia & al. 2000, Watson 2014). **C - Tosc** (Loppi & al. 1997b, 2004c, Putorti & al. 1999, Putorti & Loppi 1999, Benesperi 2000a, 2006, 2011, Benesperi & al. 2007, Tretiach & al. 2008, Lastrucci & al. 2009, Pasquinelli & al. 2009, Pasquinelli & Puccini 2010, Brackel 2015), **Marc, Umb** (Ravera & al. 2006, 2006b, Brackel 2015), **Laz, Abr** (Nimis & Tretiach 1999, Brackel 2015), **Mol** (Garofalo & al. 1999, Caporale & al. 2008, Genovesi & Ravera 2014), **Sar** (Nöske 2000, Zedda & al. 2010, Cogoni & al.

2011). **S - Camp** (Garofalo & al. 1999, 2010, Ricciardi & al. 2000, Aprile & al. 2003b, Catalano & al. 2016), **Pugl** (Garofalo & al. 1999, Durini & Medagli 2002, 2004, Brackel 2011), **Bas** (Potenza 2006, Potenza & Fascetti 2012), **Cal** (Puntillo 1995, Puntillo 1996, Puntillo & Puntillo 2004, Brackel & Puntillo 2016), **Si** (Nimis & al. 1994, Ottonello & al. 1994, 2011, Ottonello & Romano 1997, Merlo 2004, 2004b, Liistro & Cataldo 2011).

Frut/ Ch/ S/ Terr/ pH: 2-4, L: 3-4, X: 3, E: 1-2/ Alt: 1-5/ Alp: r, Salp: rr, Orom: er, Mont: rc, SmedD: rr, Pad: er, SmedH: c, MedH: rr/ PT: 1-2/ Note: a holarctic, temperate to boreal-montane lichen found on soil, amongst mosses, sometimes on bark and lignum, in areas with calcareous or siliceous base-rich rocks, with a wide altitudinal range; surprisingly rare along the Adriatic part of the Peninsula. The species, in the present circumscription, is heterogeneous.

***Cladonia furcata* subsp. *subrangiformis* auct. non (Sandst.) Abbayes**

Bull. Soc. Scient. Bretagne, 13, 1937 *comb. inval.* - *Cladonia subrangiformis* Sandst., Abh. Nat. Ver. Bremen, 25: 165, 1922.

N - VG, Ven (Lazzarin 2000b), **TAA** (Nascimbene 1997, 2000), **Piem, VA** (Piervittori & Isocrono 1999), **Emil** (Nimis & al. 1996), **Lig, C - Tosc** (Tretiach & Nimis 1994, Loppi & al. 2004b, Brackel 2015), **Marc** (Nimis & Tretiach 1999), **Umb** (Nimis & Tretiach 1999, Panfili 2000b, 2007, Ravera & al. 2006), **Laz** (Brackel 2015), **Abr** (Recchia & Villa 1996, Nimis & Tretiach 1999, Brackel 2015), **Mol** (Nimis & Tretiach, 1999, 2004, Caporale & al. 2008), **Sar, S - Camp** (Garofalo & al. 1999, 2010, Aprile & al. 2002, 2003, 2003b, Nimis & Tretiach 2004, Catalano & al. 2016), **Pugl** (Nimis & Tretiach 1999, Brackel 2011), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Ottonello & Salone 1994, Ottonello & al. 1994, 2011, Ottonello 1996, Ottonello & Romano 1997, Gianguzzi & al. 2009).

Frut/ Ch/ S/ Terr/ pH: 3-5, L: 3-4, X: 3-4, E: 1-3/ Alt: 1-3/ Mont: vr, SmedD: rc, Pad: er, SmedH: rc, MedH: rc, MedD: vr/ PT: 1-2/ Note: a mild-temperate lichen found on mineral calciferous soil, often amongst bryophytes. This taxon has so far no valid name at subspecific rank, and recent molecular data do not support its separation from *C. furcata* (Pino-Bodas & al. 2015) so that it could be better treated at the level of *forma* (Ahti *in litt.*), but the epithet *subrangiformis* is a later homonym for *f. subrangiformis* Vain. *ex Zahlbr.* Pending further study, I still maintain it here, albeit under an invalid name.

***Cladonia glauca* Flörke**

Clad. Comm.: 140, 1828.

Syn.: *Cladonia cenotea* var. *glauca* (Flörke) Leight.

N - Ven, TAA, Piem (Isocrono & al. 2004), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999), **Lig.**

Frut/ Ch/ A.s/ Terr-Lign/ pH: 1-2, L: 4, X: 3, E: 1/ Alt: 3-4/ Salp: er, Mont: er/ PT: 1/ Note: a cool-temperate to boreal-montane, perhaps circumpolar lichen found on acid soil in open habitats in upland areas; all Italian records need reconfirmation.

***Cladonia gracilis* (L.) Willd.**

Fl. Berol. Prodr.: 363, 1787 - *Lichen gracilis* L., Sp. Pl., 2: 1152, 1753.

Syn.: *Cladonia chordalis* (Flörke) Nyl., *Cladonia elongata* (Wulfen) Hoffm., *Cladonia gracilis* subsp. *elongata* (Wulfen) Vain., *Cladonia gracilis* subsp. *nigripes* (Nyl.) Ahti, *Cladonia gracilis* subsp. *turbinata* (Ach.) Ahti, *Cladonia gracilis* var. *aspera* Flörke, *Cladonia gracilis* var. *chordalis* (Flörke) Schaer., *Cladonia gracilis* var. *nigripes* (Nyl.) Ahti, *Cladonia nigripes* (Nyl.) Trass

N - Frl (Tretiach & Hafellner 2000), **Ven** (Nimis 1994, Nascimbene & Caniglia 1997, 2003c, Caniglia & al. 1999, Lazzarin 2000b), **TAA** (Caniglia & al. 2002, Nascimbene & al. 2008c, Brackel 2013), **Lomb** (Rivellini 1994, Rivellini & Valcuvia 1996), **Piem** (Isocrono & al. 2004, Isocrono & Piervittori 2008), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Revel & al. 2001), **Emil** (Ferrari & al. 1994, Dalle Vedove & al. 2002), **Lig** (Brunialti & al. 1999). **C - Tosc** (Benesperi & al. 2007), **Marc, Abr, S - Si.**

Frut/ Ch/ S/ Terr/ pH: 1-2, L: 3-5, X: 3, E: 1/ Alt: 3-5/ Alp: r, Salp: r, Orom: er, Mont: vr/ PT: 1/ Note: a circumpolar, cool-temperate to southern arctic lichen found on acid soil, more rarely on decaying wood in upland areas. According to Ahti (*in litt.*) its presence in Italy is dubious, and most records from the Alps could refer to *C. macroceras*. A revision of Italian material is much needed.

***Cladonia grayi* Sandst.**

G. Merr. *ex* Sandst., Clad. Exs.: nr. 1847, 1929.

Syn.: *Cladonia pyxidata* subsp. *grayi* (Sandst.) V. Wirth

N - Frl, Ven, TAA (Nascimbene & al. 2007b), **Piem** (Isocrono & al. 2004, Isocrono & Piervittori 2008), **VA** (Piervittori & Isocrono 1999, Matteucci & al. 2008c). **C - Tosc.**

Frut/ Ch/ A.s/ Terr-Lign/ pH: 1-2, L: 3-4, X: 3, E: 1/ Alt: 3-5/ Alp: r, Salp: rr, Mont: er/ PT: 1/ Note: a holarctic, rather northern representative of the *C. pyxidata-chlorophaea* complex found on soil rich in humus, peat and rotting wood in upland areas.

***Cladonia humilis* (With.) J.R. Laundon**

Lichenologist, 16: 220, 1984 - *Lichen humilis* With., Bot. Arrang. Veget. Gr. Br., 2: 721, 1776.

Syn.: *Cladonia conoidea* Ahti

N - Ven, Lomb (Gheza 2015), **Piem** (Gheza 2015), **Lig, C - Tosc, Laz** (Gigante & Petriccione 1995), **Abr, Mol** (Garofalo & al. 1999, Caporale & al. 2008), **Sar** (Zedda 2002). **S - Camp** (Garofalo & al. 1999), **Pugl, Cal** (Puntillo 1996), **Si** (Merlo 2004).

Frut/ Ch/ A.s/ Terr-Lign/ pH: 2-3, L: 3, X: 3, E: 1/ Alt: 1-2/ SmedD: er, SmedH: rr, MedH: r/ PT: 1/ suboc, p/ Note: a mild-temperate, widespread species found on disturbed, often sandy soil, more rarely on

lignum and mossy trees at low elevations; mainly Tyrrhenian. *Cladonia conista* (Nyl.) Robbins, a very similar species which contains bourgeanic acid instead of atranorin, although more frequent in northern Europe, also occurs in southern Europe and should be looked for in Italy (see Pino-Bodas & al. 2012).

Cladonia incrassata Flörke

Clad. Comm.: 21, 1828.

Syn.: *Cladonia brebissonii* (Delise) Parrique, *Cladonia coccifera* var. *incrassata* (Flörke) Laurer

N - Lomb (Rivellini & Valcuvia 1996), **Piem** (Morisi & Sereno 1995, Isocrono & al. 2006). **C - Tosc** (Brackel 2015). **S - Cal** (Puntillo 1996).

Frut/ Ch/ S/ Terr/ pH: 1, L: 4, X: 1-2, E: 1/ Alt: 2-3/ Mont: er, SmedD: er, SmedH: er/ PT: 1/ suboc/

Note: a cool-temperate to boreal-montane species with a fragmented circumpolar range, found on peaty and humus-rich soil and on strongly weathered lignum.

Cladonia macilenta Hoffm.

Deutschl. Fl., 2: 126, 1796, *nom. cons.*

Syn.: *Cladonia bacillaris* (Ach.) Gent., *Cladonia macilenta* var. *squamigera* Vain.

N - VG (TSB 12227), **Frl** (Tretiach & Hafellner 2000), **Ven** (Nascimbene & Caniglia 2000b, 2002c, 2003c, Nascimbene & al. 2006e, Nascimbene 2008c), **TAA** (Caniglia & al. 2002, Nascimbene & Caniglia 2002c, Nascimbene & al. 2005, 2006, 2006b, 2006e, 2007b, 2008b, 2008c, 2014, Nascimbene 2006c, 2014, Nimis & al. 2015), **Lomb** (Rivellini & Valcuvia 1996), **Piem** (Morisi & Sereno 1995, Piervittori 2003, Isocrono & al. 2004, 2006, Isocrono & Piervittori 2008, Matteucci & al. 2010), **VA** (Piervittori & Isocrono 1999), **Emil** (Nimis & al. 1996, Tretiach & al. 2008), **Lig. C - Tosc** (Tretiach & Nimis 1994, Loppi & De Dominicis 1996b, Loppi & al. 1997b, 2004c, Pasquinielli & al. 2009, Brunialti & Frati 2010, Benesperi 2011), **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera 1998, Ravera & al. 2006), **Laz** (Merlo 2004), **Abr** (Nimis & Tretiach 1999), **Mol** (Paoli & al. 2015), **Sar** (Rizzi & al. 2011). **S - Camp** (Ricciardi & al. 2000, Nimis & Tretiach 2004), **Cal** (Puntillo 1996), **Si**.

Frut/ Ch/ S/ Epiph-Lign-Terr/ pH: 1-2, L: 3-4, X: 2-3, E: 1-2/ Alt: 1-5/ Alp: vr, Salp: rr, Orom: r, Mont: rc, SmedD: r, SmedH: r, MedH: er/ PT: 1-2/ Note: a cool-temperate to boreal-montane, circumpolar lichen found on different organic substrata such as rotting wood, bark (mostly on basal parts of trunks) and more rarely on acid soil rich in humus; in southern Italy it is most frequent in old *Castanea* plantations, on stumps.

Cladonia macroceras (Delise) Hav.

Bergens Mus. Årbok, Naturvid. Rekke, 1927, 3: 12, 1928 - *Cenomyce gracilis* var. *macroceras* Delise in Duby, Bot. Gall., 2: 624, 1830.

Syn.: *Cladonia elongata* auct. p.p., *Cladonia gracilis* var. *macroceras* (Delise) Flot.

N - Frl (Tretiach & Hafellner 2000), **Ven** (Nimis 1994, Nascimbene & Caniglia 1997, 2003c, Caniglia & al. 1999, Nascimbene 2005c), **TAA** (Caniglia & al. 2002, Nascimbene 2001b, 2008b, 2013, Nascimbene & al. 2005, 2006, 2008c, Lang 2009, Bilovitz & al. 2014, 2014b), **Lomb** (Rivellini 1994, Rivellini & Valcuvia 1996, Rossi & al. 1998, Valcuvia & al. 2000d, Dalle Vedove & al. 2004), **Piem** (Isocrono & al. 2003, 2004, Isocrono & Piervittori 2008, Watson 2014), **VA** (Piervittori & Isocrono 1999, Valcuvia 2000, Piervittori & al. 2004), **Emil** (Dalle Vedove & al. 2002). **C - Tosc** (Benesperi & al. 2007), **Sar. S - Cal** (Puntillo 1996).

Frut/ Ch/ S/ Terr/ pH: 1-2, L: 2-4, X: 2-3, E: 1/ Alt: 4-5/ Alp: rc, Salp: ec, Orom: er/ PT: 1/ Note: a subarctic-subalpine, circumpolar lichen, one of the most abundant species in subalpine *Rhododendron* heaths throughout the Alps, mostly deeply immersed amongst mosses. See also note on *C. gracilis*.

Cladonia macrophylla (Schaer.) Stenh.

Lich. Suec. Exs., ed. 2, Fasc. 7: 3, 1865 - *Cladonia ventricosa* var. *macrophylla* Schaer., Lich. Helv. Spicil., 1(6): 316, 1833.

Syn.: *Cladonia alpicola* (Flot.) Vain.

N - TAA (Watson 2014), **Lomb** (Rivellini 1994, Rivellini & Valcuvia 1996), **Piem** (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999). **C - Tosc**.

Frut/ Ch/ S/ Terr/ pH: 1-2, L: 3-4, X: 3, E: 1/ Alt: 4-5/ Alp: r, Salp: rr, Orom: er/ PT: 1/ Note: a northern-alpine species found on organic soil and weathered siliceous rocks near or above treeline. Most Italian records, including the recent one from Basilicata by Potenza (2006), need confirmation.

Cladonia macrophyllodes Nyl.

Flora, 58: 447, 1875.

N - Frl (Tretiach & Hafellner 2000), **Ven** (TSB 7828), **TAA, Lomb** (Valcuvia & al. 2003, Delucchi & Valcuvia 2004), **Piem** (Morisi & Sereno 1995), **VA** (Valcuvia 2000), **Lig** (Watson 2014). **C - Sar** (Nöske 2000). **S - Cal** (Puntillo 1996).

Frut/ Ch/ S/ Terr/ pH: 1-3, L: 4, X: 2-3, E: 1/ Alt: 4-6/ Alp: rc, Salp: r, Orom: er/ PT: 1/ Note: an arctic-alpine, circumpolar species found on soil in open sites with a long snow-lie, optimum in the Alpine belt of the siliceous Alps. The record from Sardegna, overlooked by Nimis (1993: 237), is from Nimis & Poelt (1987: 86).

Cladonia mediterranea P.A. Duvign. & Abbayes

in Abbayes & Duvigneaud, Rev. Bryol. Lichénol., 16: 95, 1947.

Syn.: *Cladonia mediterranea* (P.A. Duvign. & Abbayes) Follmann & Hern.-Padr.

N - Lig (Ravera & al. 2015). **C - Tosc** (Putorti & al. 1999c, Senese & Critelli 2000, Loppi & al. 2004c, Ravera & al. 2015), **Umb** (Genovesi & al. 2002, Ravera & al. 2006, 2006b), **Laz** (Ravera & al. 2015), **Sar** (Ravera & al. 2015). **S -**

Camp (Ravera & al. 2015), **Si** (Nimis & al. 1994, Ottonello & Romano 1997, Merlo 2004b, Ottonello & al. 2011, Ravera & al. 2015).

Frut/ Ch/ S/ Terr/ pH: 2-3, L: 3-4, X: 2, E: 1/ Alt: 1/ MedH: er/ PT: 1/ suboc/ Note: a Mediterranean-Macaronesian lichen found in Mediterranean maquis vegetation amongst pleurocarpous mosses in sheltered situations with plenty of diffuse light; presently restricted to a few very humid sites along the Tyrrhenian coast, and perhaps in danger of extinction.

Cladonia merochlorophaea Asahina

J. Jap. Bot., 16: 713, 1940.

N - **Frl** (Tretiach & Hafellner 2000, Tretiach & Molaro 2007), **TAA** (Zarabska & al. 2009), **Lomb**, **Piem** (Morisi & Sereno 1995), **VA**, **Lig**, **C** - **Tosc** (Putorti & al. 1999c, Benesperi & al. 2007), **Marc**, **S** - **Cal** (Puntillo 1996).

Frut/ Ch/ A.s/ Terr-Lign/ pH: 1-2, L: 3-4, X: 3, E: 1/ Alt: 2-5/ Alp: vr, Salp: r, Orom: er, Mont: vr, SmedD: er, SmedH: er/ PT: 1/ suboc, #/ Note: a mainly cool-temperate, probably circumpolar lichen found on humus-rich soil. Distribution, ecology and taxonomic position of this species require further study, and the indicator values are tentative.

Cladonia mitis Sandst.

Clad. Exs.: nr. 55, 1918.

Syn.: *Cladina arbuscula* subsp. *mitis* (Sandst.) Burgaz, *Cladina mitis* (Sandst.) Mong., *Cladonia arbuscula* subsp. *mitis* (Sandst.) Ruoss, *Cladonia subsylvatica* (Stirt.) Zahlbr.

N - **Frl** (Tretiach & Hafellner 2000, Ravera & al. 2015), **Ven** (Caniglia & al. 1999, Ravera & al. 2015), **TAA** (Nascimbene & al. 2008c, Bilovitz & al. 2014, Ravera & al. 2015), **Lomb** (Rivellini 1994, Rivellini & Valcuvia 1996, Nascimbene 2006, Ravera & al. 2015), **Piem** (Morisi & Sereno 1995, Isocrono & Falletti 1999, Isocrono & al. 2003, Isocrono & Piervittori 2008, Ravera & al. 2015), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Valcuvia 2000, Ravera & al. 2015), **Emil** (Benesperi 2001, Dalle Vedove & al. 2002, Ravera & al. 2015), **Lig** (Ravera & al. 2015). **C** - **Tosc** (Benesperi 2001, Benesperi & al. 2007, Ravera & al. 2015).

Frut/ Ch/ A.f/ Terr/ pH: 1-2, L: 3-5, X: 3, E: 1/ Alt: 4-5/ Alp: r, Salp: rc/ PT: 1/ Note: a typical member of subalpine-alpine tundras, perhaps more common at higher altitudes than *C. arbuscula*.

Cladonia monomorpha Aptroot, Sipman & Herk

Lichenologist, 33: 263, 2001.

N - **Lomb** (Brackel 2010). **C** - **Tosc** (Brackel 2015), **Umb** (Brackel 2015), **Abr** (Brackel 2015). **S** - **Si** (Brackel 2008b)

Frut/ Ch/ S/ Terr-Lign-Epiph/ pH: 1-2, L: 3-5, X: 2-3, E: 1-2/ Alt: 1-5/ Alp: rc, Salp: rc, Orom: rc, Mont: vc, SmedD: vc, Pad: r, SmedH: vc, MedH: rr, MedD: rc/ PT: 1-3/ Note: only recently recognised as a distinct species in the *Cladonia pyxidata* group, and perhaps more widespread in Italy, this species should be characterised by thallus lobes with narrowly recurved margins, by the presence of discoid, bullate plates on the podetial surface and by long and sometimes branched proliferations of the scyphus margins supporting the apothecial discs. The species was described from the Netherlands, where it occurs in acid inland sand dune areas with the highest terrestrial lichen diversity, and it appears to be widespread in Europe on siliceous rocks and acid sand. However, Ahti & Stenroos (2013) did not accept this species, albeit admitting that further studies are required. According to Ahti (*in litt.*) preliminary DNA data from the type locality show that it does not differ from “normal” *C. pyxidata*, except that *C. pyxidata* is not uniform at all. However, the type of *C. pyxidata*, which comes from Italy, is morphologically different.

Cladonia norvegica Tønsberg & Holien

Nord. J. Bot., 4: 79, 1984.

N - **Frl**, **S** - **Cal** (Puntillo 1996).

Frut/ Ch/ A.s/ Lign-Epiph/ pH: 1, L: 3, X: 2, E: 1/ Alt: 3-4/ Salp: er, Mont: vr/ PT: 1/ suboc/ Note: a cool-temperate to boreal-montane lichen found on decaying trunks and stumps in moist-shaded habitats such as ancient, undisturbed woodlands and, when epiphytic, on basal parts of conifers; probably more widespread in the Alps, but very rare in southern Italy. It is included in the Italian red list of epiphytic lichens as “Endangered” (Nascimbene & al. 2013c).

Cladonia ochrochlora Flörke

Clad. Comm.: 75, 1828, *nom. cons.*

Syn.: *Cladonia fimbriata* (L.) Fr. var. *ochrochlora* (Flörke) Schaer., *Cladonia furcata* (Huds.) Schrad. var. *notabilis* Müll. Arg., *Cladonia lepidula* Kremp., *Cladonia ochrochlora* Flörke var. *pynotheliza* (Nyl.) Harm., *Cladonia ochrochlora* Flörke var. *spadicea* Müll. Arg., *Cladonia pergracilis* Kremp.

N - **VG** (TSB 17399), **Frl** (Tretiach & Molaro 2007), **Ven**, **TAA** (Watson 2014), **Lomb**, **Piem**, **VA**, **Emil**, **Lig**, **C** - **Tosc**, **Laz**, **Abr**, **S** - **Camp**, **Bas**, **Cal**, **Si**.

Frut/ Ch/ A.s/ Epiph-Lign-Terr/ pH: 2-3, L: 3-4, X: 2-3, E: 1-3/ Alt: 1-4/ Salp: vr, Orom: vr, Mont: rr, SmedD: vr, SmedH: rr, MedH: er/ PT: 1-2/ Note: very similar to *C. coniocraea* but with corticated podetia in the lower third and at the bottom of the often present scyphi, this widespread species with a centre of distribution in temperate regions is found on rotten wood and at the base of tree trunks in both deciduous and coniferous forests; in the Alps it ranges from the lowlands to the montane belt, and is rather common. The species was not always distinguished from *C. coniocraea* and most Italian records (see Nimis, 1993: 238) need re-confirmation.

Cladonia parasitica (Hoffm.) Hoffm.

Deutschl. Fl., 2: 127, 1796 - *Lichen parasiticus* Hoffm., Enum. Lich.: 39, 1784.

Syn.: *Cladonia delicata* auct.

N - **VG** (TSB 13986), **Frl**, **Ven** (Nascimbene & Caniglia 1997, Caniglia & al. 1999, Nascimbene 2005c), **TAA** (Nascimbene 2005b, 2008b, Nascimbene & al. 2007b), **Lomb** (Rivellini 1994, Rivellini & Valcuvia 1996, Zocchi & al. 1997, Roella 1999, Valcuvia & al. 2003, Valcuvia & Truzzi 2007b, Furlanetto 2010), **Piem** (Rizzio & al. 2001, Isocrono & al. 2004, 2007, Furlanetto 2010, Matteucci & al. 2010, Gheza 2015, Giordani & Malaspina 2016), **VA** (Matteucci & al. 2008, Isocrono & al. 2008), **Emil** (Nimis & al. 1996, Tretiach & al. 2008), **Lig** (Putorti & al. 1999b, Giordani 2006, Giordani & Incerti 2008). **C** - **Tosc** (Tretiach & Nimis 1994, Loppi & Putorti 1995b, Loppi & al. 1997b, 2004c, Putorti & al. 1999, Benesperi 2000a, 2009, 2011, Senese & Critelli 2000, Brackel 2015), **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera 1998, Ravera & al. 2006, Panfili 2007), **Laz**, **Abr** (Nimis & Tretiach 1999), **Sar** (Rizzi & al. 2011). **S** - **Camp** (Nimis & Tretiach 2004, Garofalo & al. 2010, Catalano & al. 2016), **Cal** (Puntillo 1996, Incerti & Nimis 2006), **Si** (Ottonello & Salone 1994, Ottonello & Romano 1997, Stofer 2006, Brackel 2008b, Ottonello & al. 2011).

Frut/ Ch/ S/ Epiph-Lign/ pH: 1-2, L: 3, X: 2-3, E: 1/ Alt: 1-3/ Mont: rr, SmedD: r, SmedH: rr, MedH: vr/ PT: 1/ Note: a mainly temperate, probably holarctic species, normally lignicolous, on stumps, sometimes on basal parts of old trunks, with optimum in old *Castanea* plantations.

Cladonia perlomera Kristinsson

in Culberson & Kristinsson, Bryologist, 72: 432, 1969.

N - **Lomb** (Rivellini & Valcuvia 1996), **Emil**. **C** - **Laz**. **S** - **Si**.

Frut/ Ch/ A.s/ Lign/ pH: 1-2, L: 3-4, X: 3, E: 1/ Alt: 1-3/ Mont: vr, SmedD: vr, SmedH: vr, MedH: vr/ PT: 1/ #/ Note: on rotting wood. The status of this species needs further study, indicator values are tentative. The species is included in the Italian red list of epiphytic lichens as "Data Deficient" (Nascimbene & al. 2013c).

Cladonia peziziformis (With.) J.R. Laundon

Lichenologist, 16: 223, 1984 - *Lichen peziziformis* With., Bot. Arrang. Veget. Gr. Brit.: 720, 1776.

Syn.: *Cladonia capitata* (Michx.) Spreng., *Cladonia leptophylla* (Ach.) Flörke, *Cladonia leptophylloides* Harm.

N - **TAA** (Watson 2014), **Lig** (Giordani & Incerti 2008).

Frut/ Ch/ S/ Terr/ pH: 1-2, L: 3-4, X: 3, E: 1/ Alt: 2-3/ Mont: er, SmedH: vr/ PT: 1/ suboc/ Note: a mainly temperate lichen found on soil in open woodlands (oak, pine), in areas with siliceous substrata, perhaps overlooked in Italy.

Cladonia phyllophora Hoffm.

Deutschl. Fl., 2: 123, 1796.

Syn.: *Cladonia degenerans* (Flörke) Spreng., *Cladonia lepidota* Nyl. non auct.

N - **Frl** (TSB 20592), **Ven** (Nascimbene & Caniglia 2003c), **TAA**, **Lomb** (Rivellini & Valcuvia 1996, Rossi & al. 1998, Valcuvia & al. 2000d), **Piem** (Isocrono & al. 2004, Isocrono & Piervittori 2008), **VA** (Piervittori & Isocrono 1999, Isocrono & al. 2008), **Lig** (Brunialti & al. 1999). **C** - **Tosc**.

Frut/ Ch/ S/ Terr/ pH: 1-2, L: 3-4, X: 3, E: 1/ Alt: 2-5/ Alp: er, Salp: r, Orom: vr, Mont: r, SmedD: er, SmedH: er/ PT: 1/ Note: a cool-temperate to boreal-montane, probably holarctic lichen found on acid mineral soil. Records from southern Italy (see Nimis 1993: 239), being dubious, are not accepted here.

Cladonia pleurota (Flörke) Schaer.

Enum. Crit. Lich. Eur.: 186, 1850 - *Capitularia pleurota* Flörke, Ges. naturf. Fr. Berlin Mag., 2: 217, 1808.

Syn.: *Cladonia coccifera* var. *pleurota* (Flörke) Schaer.

N - **Frl** (Tretiach & Hafellner 2000), **Ven** (Caniglia & al. 1999, Nascimbene & Caniglia 2000, 2003c, Nascimbene 2002, 2005c, 2008), **TAA** (Caniglia & al. 2002, Nascimbene & Caniglia 2002c, Nascimbene & al. 2005, 2006, 2006e, 2008c, Nascimbene 2008b, Lang 2009, Bilovitz & al. 2014), **Lomb** (Rivellini & Valcuvia 1996), **Piem** (Morisi & Sereno 1995, Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1997, 1999), **Emil** (Dalle Vedove & al. 2002).

Frut/ Ch/ A.s/ Terr/ pH: 1-2, L: 4-5, X: 2-3, E: 1-3/ Alt: 3-5/ Alp: rr, Salp: vc, Mont: vr/ PT: 1/ Note: an arctic-alpine to boreal-montane, circumpolar lichen found on soil, rotting wood, more rarely on basal parts of trunks in open habitats, with optimum near or above treeline.

Cladonia pocillum (Ach.) Grognot

Pl. Crypt. Saône-et-Loire: 82, 1863 - *Baeomyces pocillum* Ach., Meth. Lich.: 336, 1803.

Syn.: *Cladonia pyxidata* var. *pocillum* (Ach.) Schaer., *Cladonia pyxidata* subsp. *pocillum* (Ach.) Vain.

N - **VG**, **Frl** (Tretiach & Molaro 2007), **Ven** (Nimis 1994, Nascimbene & Caniglia 1997, 2003c, Caniglia & al. 1999, Nascimbene 2005c, 2008, Thor & Nascimbene 2007, Nascimbene & Marini 2007, Brackel 2013), **TAA** (De Benetti & Caniglia 1993, Nascimbene & al. 2006, Nascimbene 2008b, Lang 2009), **Lomb** (Rivellini & Valcuvia 1996), **Piem** (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999, Valcuvia 2000, Piervittori & al. 2004, Galvagno 2006, Galvagno & al. 2006), **Emil** (Scarpa 1993, Nimis & al. 1996), **Lig** (Valcuvia & al. 2000). **C** - **Tosc** (Brackel 2015), **Marc** (Nimis & Tretiach 1999), **Umb** (Nimis & Tretiach 1999, Ravera & al. 2006, Panfili 2007, Poponessi & al. 2014, Brackel 2015), **Laz** (Nimis & Tretiach 2004, Brackel 2015), **Abr** (Nimis & Tretiach 1999, Brackel 2015), **Mol** (Nimis & Tretiach, 1999, 2004, Caporale & al. 2008), **Sar** (Zedda 2002). **S** - **Camp** (Aprile & al. 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010, Catalano & al. 2016), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996, Brackel & Puntillo 2016), **Si** (Nimis & al. 1994, 1995, Ottonello & al. 1994, 2011, Ottonello & Salone 1994,

Ottonello 1996, Ottonello & Romano 1997, Grillo 1998, Czczuga & al. 1999, Grillo & al. 2002, 2007, Grillo & Caniglia 2004, Liistro & Cataldo 2011).

Frut/ Ch/ S/ Terr/ pH: 4-5, L: 4-5, X: 4, E: 1-3/ Alt: 1-5/ Alp: rc, Salp: vc, Orom: vc, Mont: ec, SmedD: ec, Pad: er, SmedH: ec, MedH: vc, MedD: vc/ PT: 1-2/ Note: a widespread holarctic species, found on soil and amongst bryophytes in dry, open grasslands; one of the most common Cladonias of Italy on calcareous substrata. The species, in its current circumscription, is heterogeneous.

***Cladonia polycarpoides* Nyl.**

in Zwackh, Lich. Exs.: 626, 626 bis (correction label), 1892.

Syn.: *Cladonia subcariosa* auct. non Nyl.

N - **Frl** (Tretiach & Hafellner 2000), **TAA**, **Lomb** (Rossi 1991, Rivellini & Valcuvia 1996), **VA** (Piervittori & Isocrono 1999), **Lig**, **C** - **Abr** (Nimis & Tretiach 1999), **Sar** (Nöske 2000, Nöske & al. 2000).

Frut/ Ch/ S/ Terr/ pH: 3-4, L: 4, X: 3, E: 1/ Alt: 2-3/ Mont: rr, SmedD: er/ PT: 1/ Note: a mainly temperate lichen found on calcareous mineral soil in open grasslands and on soil pockets on large isolated boulders, probably somehow overlooked in Italy and more widespread in the Alps.

***Cladonia polydactyla* (Flörke) Spreng.**

Caroli Linnaei Syst. Veget., 4: 274, 1827 - *Cenomyce polydactyla* Flörke, Deutsch. Lich., 10: 13, 1821, nom. cons.

Syn.: *Cladonia bouillenae* P.A. Duvign., *Cladonia flabelliformis* Vain.

N - **Frl** (Tretiach & Hafellner 2000), **Ven** (Nascimbene 2011), **TAA**, **Lomb** (Rivellini & Valcuvia 1996, Valcuvia & Truzzi 2007, 2007b, Brackel 2010), **Piem** (Morisi & Sereno 1995, Isocrono & al. 2004, 2006, Isocrono & Piervittori 2008), **VA** (Valcuvia 2000), **Emil** (Nimis & al. 1996, Tretiach & al. 2008). **C** - **Tosc** (Loppi & al. 1994, 1997b, Brackel 2015), **Marc** (Nimis & Tretiach 1999). **S** - **Cal** (Puntillo 1996).

Frut/ Ch/ A.s/ Lign-Terr/ pH: 1, L: 3, X: 2-3, E: 1/ Alt: 2-4/ Salp: c, Mont: rr, SmedD: er, SmedH: vr/ PT: 1/ suboc/ Note: a cool-temperate to boreal-montane, circumpolar lichen found on organic soil and rotting wood in woodlands, more rarely on bark, on the basal parts of old trunks; certainly widespread in the Alps, becoming much rarer southwards, where it is mostly confined to old *Castanea* plantations.

***Cladonia portentosa* (Dufour) Coëm.**

Bull. Acad. R. Belg., sér. 2, 19: 43, 1865 - *Cenomyce portentosa* Dufour, Ann. Gén. Sc. Phys. Bruxelles, 8: 69, 1821.

Syn.: *Cladina impexa* (Harm.) B. de Lesd., *Cladina portentosa* (Dufour) Follmann, *Cladonia impexa* Harm. nom. illegit., *Cladonia laxiuscula* auct., *Cladonia macaronesica* Ahti, *Cladonia portentosa* var. *subimpexa* (P.A. Duvign.) Ahti, *Cladonia spumosa* (Flörke) Schade, *Cladonia subimpexa* P.A. Duvign.

N - **TAA** (Lang 2009, Brackel 2013), **Lomb** (Ravera & al. 2015, Gheza & al. 2015, Gheza 2015), **Piem** (Isocrono & al. 2006, Ravera & al. 2015, Gheza 2015), **VA** (Piervittori & Isocrono 1997, 1999, Valcuvia 2000, Ravera & al. 2015), **Lig** (Watson 2014, Ravera & al. 2015). **C** - **Tosc** (Ravera & al. 2015), **Sar** (Ravera & al. 2015).

Frut/ Ch/ S/ Terr/ pH: 1-2, L: 3-4, X: 2-3, E: 1/ Alt: 2-3/ Mont: er, SmedD: vr, SmedH: er/ PT: 1/ suboc/ Note: a mainly cool-temperate, western species found on acid soil in open situations, such as in *Calluna*-heaths, probably more frequent in the past, presently extinct in many parts of the country. The record from Pantelleria by Ottonello & Romano (1997) and Ottonello & al. (2011) seems dubious to me.

***Cladonia prolifica* Ahti & S. Hammer**

Mycotaxon, 37: 342, 1990.

S - **Cal** (Puntillo 1995, 1996).

Frut/ Ch/ S/ Terr-Sax/ pH: 1-2, L: 3, X: 2, E: 1/ Alt: 3/ Mont: vr/ PT: 1/ Note: on acid soil, a recently-described species (from North America), perhaps more widespread in Europe; the indicator values are tentative.

***Cladonia pseudopityrea* Vain.**

Acta Soc. Fauna Fl. Fenn., 4: 452, 1887.

C - **Sar** (Ahti & Puntillo 1995, Nöske 2000, Zedda & Sipman 2001, Zedda 2002). **S** - **Cal** (Ahti & Puntillo 1995, Puntillo 1996).

Frut/ Ch/ S/ Lign-Terr/ pH: 1-2, L: 3, X: 2, E: 1/ Alt: 1-3/ Mont: vr, SmedH: vr, MedH: er/ PT: 1/ suboc/ Note: a Mediterranean to Mediterranean-montane species found on lignum e.g. of *Olea*, *Abies*, *Pinus*, *Fagus*, but also on soil rich in humus in forests, especially along creeks; probably more widespread in southern Italy. It is included in the Italian red list of epiphytic lichens as “Endangered” (Nascimbene & al. 2013c).

***Cladonia pyxidata* (L.) Hoffm.**

Deutschl. Fl., 2: 121, 1796 - *Lichen pyxidatus* L., Sp. Pl., 2: 1151, 1753.

Syn.: *Cladonia chlorophaea* auct. p.p., *Cladonia neglecta* (Flörke) Spreng.

N - **VG**, **Frl** (Tretiach 1996, Tretiach & Molaro 2007), **Ven** (Nimis 1994, Nascimbene & Caniglia 1997, 2002c, 2003c, Caniglia & al. 1999, Nascimbene 2002, 2005c, 2008, 2008c, 2011, Nascimbene & al. 2005b, 2006, 2006c, 2006e, 2007, 2009c, 2010b, Nascimbene & Marini 2007, Brackel 2013, Giovagnoli & Tasinazzo 2014), **TAA** (Caniglia & al. 2002, Nascimbene & Caniglia 2002c, Nascimbene 2001b, 2003, 2005b, 2006b, 2006c, 2013, 2014, Nascimbene & al. 2006e, 2007b, 2008c, 2008b, 2013b, Lang 2009, Bilovitz & al. 2014, 2014b, Nascimbene & Marini 2015, Nimis & al. 2015), **Lomb** (Rivellini 1994, Rivellini & Valcuvia 1996, Alessio & al. 1995, Rossi & al. 1998, Roella 1999, Valcuvia & al.

2000d, De Vita & Valcuvia 2004, Dalle Vedove & al. 2004, Nascimbene & al. 2006e, Furlanetto 2010, Brackel 2010, 2013, Gheza & al. 2015, Gheza 2015), **Piem** (Morisi & Sereno 1995, Piercey-Normore & De Priest 2001, Isocrono & al. 2003, 2004, 2006, Hafellner & al. 2004, Morisi 2005, Isocrono & Piervittori 2008, Gheza 2015), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Valcuvia 2000, Piervittori & al. 2001, Matteucci & al. 2008, 2008c, 2015c, Isocrono & al. 2008, Furlanetto 2010), **Emil** (Scarpa 1993, Ferrari & al. 1994, Nimis & al. 1996, Dalle Vedove & al. 2002, Tretiach & al. 2008, Benesperi 2009), **Lig** (Brunialti & al. 1999, Giordani & Incerti 2008), **C - Tosc** (Tretiach & Nimis 1994, Loppi & Putortù 1995b, 2001, Loppi & al. 1996b, 1997b, Putortù & Loppi 1999, 1999b, Putortù & al. 1999, Benesperi 2000a, 2006, 2011, Benesperi & al. 2007, Lastrucci & al. 2004c, 2009, Pasquinelli & al. 2009, 2013, Pasquinelli & Puccini 2010, Brackel 2015), **Marc** (Nimis & Tretiach 1999, Brackel 2015), **Umb** (Ravera 1998, Nimis & Tretiach 1999, Panfili 2000b, 2007, Ravera & al. 2006, Genovesi 2011), **Laz** (Massari & Ravera 2002, Nimis & Tretiach 2004, Genovesi & al. 2011, Zucconi & al. 2013, Brackel 2015), **Abr** (Nimis & Tretiach 1999, Caporale & al. 2016, Corona & al. 2016), **Mol** (Garofalo & al. 1999, Caporale & al. 2008, Nimis & Tretiach 1999, Genovesi & Ravera 2014), **Sar** (Nöske 2000, Loi & al. 2000, Zedda 2002, 2002b, Zedda & Sipman 2001, Zedda & al. 2010, Rizzi & al. 2011, Cogoni & al. 2011, Cossu 2013), **S - Camp** (Garofalo & al. 1999, 2010, Ricciardi & al. 2000, Aprile & al. 2002, 2003, 2003b, Nimis & Tretiach 2004, Catalano & Aprile 2008, Catalano & al. 2016), **Pugl** (Garofalo & al. 2016), **Nimis & Tretiach 1999, Durini & Medagli 2002, 2004, Brackel 2011), Bas** (Bartoli & Puntillo 1998, Nimis & Tretiach 1999, Potenza 2006, Fascetti & al. 2006, Potenza & al. 2010), **Cal** (Puntillo 1996, Puntillo & Puntillo 2004, Incerti & Nimis 2006, Brackel & Puntillo 2016), **Si** (Nimis & al. 1994, Ottonello & Salone 1994, Ottonello & al. 1994, 2011, Poli & al. 1995, Ottonello 1996, Grillo 1996, 1998, Ottonello & Romano 1997, Grillo & al. 2002, Merlo 2004, 2004b, Grillo & Caniglia 2004, 2006, Caniglia & al. 2005, Falco Scampatelli 2005, Gianguzzi & al. 2009, Liistro & Cataldo 2011, Cataldo & Minissale 2015).

Frut/ Ch/ S/ Terr-Lign-Epiph/ pH: 2-3, L: 3-5, X: 2-3, E: 1-3/ Alt: 1-5/ Alp: rc, Salp: ec, Orom: vc, Mont: ec, SmedD: ec, Pad: rr, SmedH: ec, MedH: ec, MedD: r/ PT: 1-3/ Note: a widespread, very polymorphic, holarctic species with a wide altitudinal-latitude range, which is common throughout in Italy. In its present circumscription, however, the species appears to be heterogeneous. The record of *Cladonia borbonica* Nyl. from Calabria by Puntillo (1995, 1996) refers to a form of the *C. pyxidata* complex (Ahti *in litt.*). See also note on *C. monomorpha*.

Cladonia ramulosa (With.) J.R. Laundon

Lichenologist, 16: 225, 1984 - *Lichen ramulosus* With., Bot. Arrang. Veget. Gr. Brit.: 723, 1776.

Syn.: *Baeomyces anomaeus* Ach., *Capitularia pityrea* Flörke, *Cladonia anomaea* (Ach.) Ahti & P. James, *Cladonia anomaea* var. *gracilior* (Nyl.) Clauzade & Cl. Roux *comb. inval.*, *Cladonia anomaea* var. *scyphifera* (Delise) Clauzade & Cl. Roux *comb. inval.*, *Cladonia anomaea* var. *subuliformis* (Vain.) Clauzade & Cl. Roux *comb. inval.*, *Cladonia degenerans* var. *anomaea* (Ach.) Cromb., *Cladonia pityrea* (Flörke) Fr.

N - Frl (Molaro 2005, Tretiach & Molaro 2007), **Ven, TAA** (Nascimbene & al. 2007b), **Lomb** (Rivellini & Valcuvia 1996), **Piem** (Isocrono & al. 2003, 2004), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, Piervittori & al. 2001), **Lig** (Brunialti & al. 1999), **C - Tosc** (Benesperi 2001), **Laz, Sar, S - Camp** (Ricciardi & al. 2000), **Cal** (Puntillo 1996), **Si** (Grillo & al. 1996, Grillo 1998, Czezug & al. 1999, Grillo & Caniglia 2004).

Frut/ Ch/ A.s/ Terr-Lign-Epiph/ pH: 1-2, L: 3-4, X: 2-3, E: 1/ Alt: 1-4/ Salp: r, Orom: er, Mont: r, SmedD: er, SmedH: vr, MedH: vr/ PT: 1/ suboc/ Note: a mainly temperate to southern boreal-montane lichen found on epilithic bryophytes, rotting wood and organic soil, most common in upland areas with siliceous substrata.

Cladonia rangiferina (L.) F.H. Wigg.

Primit. Florae Holsat.: 90, 1780 - *Lichen rangiferinus* L., Sp. Pl.: 1153, 1753.

Syn.: *Cladina alpestris* (L.) Nyl. *non auct.*, *Cladonia alpestris* (L.) Rabenh. *non auct.*, *Cladina rangiferina* (L.) Nyl., *Cladonia vicaria* R. Sant.

N - Frl (Tretiach 1996, Tretiach & Hafellner 2000, Ravera & al. 2015), **Ven** (Nimis 1994, Nascimbene & Caniglia 1997, 2003c, Caniglia & al. 1999, Giovagnoli & Tasinazzo 2014, Ravera & al. 2015), **TAA** (Caniglia & al. 2002, Nascimbene 2001b, 2003, 2006c, 2008b, 2013, Nascimbene & al. 2006, 2008c, Lang 2009, Brackel 2013, Ravera & al. 2015), **Lomb** (Rivellini 1994, Rivellini & Valcuvia 1996, Rossi & al. 1998, Valcuvia & al. 2000d, Dalle Vedove & al. 2004, Brackel 2013, Ravera & al. 2015), **Piem** (Isocrono & al. 2004, Ravera & al. 2015), **VA** (Verger & al. 1993, Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Ravera & al. 2015), **Emil** (Ferrari & al. 1994, Ravera & al. 2015), **Lig** (Brunialti & al. 1999, Ravera & al. 2015), **C - Tosc** (Benesperi & al. 2007, Ravera & al. 2015), **Marc** (Ravera & al. 2015), **Sar** (Ravera & al. 2015).

Frut/ Ch/ A.f/ Terr/ pH: 1-3, L: 4-5, X: 3, E: 1/ Alt: 3-5/ Alp: rr, Salp: vc, Orom: er, Mont: vr/ PT: 1/ Note: a circumpolar, arctic-alpine lichen, one of the most abundant elements of lichen-rich tundra-like vegetation on mineral soil in exposed habitats, common only in the Alps. The records from the Sicilian small islands by Ravera & al. (2015), being very dubious, are not accepted here.

Cladonia rangiformis Hoffm.

Deutschl. Fl., 2: 114, 1796, *nom. cons.*

Syn.: *Cladonia aberrans* (Abbayes) Klement *nom. inval.*, *Cladonia klementii* Oxner *nom. inval.*, *Cladonia muricata* (Delise) Rabenh., *Cladonia muricata* f. *euganea* A. Massal., *Cladonia rangiformis* var. *muricata* (Delise) Arnold, *Cladonia rangiformis* var. *pungens* (Ach.) Vain., *Cladonia rangiformis* var. *sorediophora* (Nyl.) Vain.

N - VG (Nimis & al. 2006), **Frl** (Tretiach 1996), **Ven** (Nascimbene & Caniglia 1997, Caniglia & al. 1999, Lazzarin 2000b, Nascimbene 2002), **TAA** (Matzer & Pelzmann 1991, De Benetti & Caniglia 1993, Nascimbene 2006c, 2008), **Lomb** (Rossi 1991, Rivellini & Valcuvia 1996, Valcuvia & al. 2003, De Vita & Valcuvia 2004, Gheza 2015), **Piem** (Isocrono & al. 2003, 2004, 2006, Isocrono & Piervittori 2008, Gheza 2015), **Emil** (Scarpa 1993, Nimis & al. 1996), **Lig** (Valcuvia & al. 2000, Watson 2014), **C - Tosc** (Tretiach & Nimis 1994, Loppi & Putortù 1995b, Pišút 1997, Loppi & al.

1997c, 2004b, Putorti & Loppi 1999, Benesperi 2000a, 2011, Benesperi & al. 2007, Obermayer 2009, Pasquinelli & al. 2009, 2013, Pasquinelli & Puccini 2010, Brackel 2015), **Marc** (Nimis & Tretiach 1999, Brackel 2015), **Umb** (Nimis & Tretiach 1999, Panfili 2000b, 2007, Ravera & al. 2006, Poponessi & al. 2014, Brackel 2015), **Laz** (Gigante & Petriccione 1995, Nimis & Tretiach 2004, Zucconi & al. 2013, Brackel 2015), **Abr** (Nimis & Tretiach 1999, Brackel 2015), **Mol** (Garofalo & al. 1999, Nimis & Tretiach 1999, Caporale & al. 2008), **Sar** (Nöske 2000, Zedda 2002, 2002b, Zedda & al. 2010, Cogoni & al. 2011), **S - Camp** (Garofalo & al. 1999, 2010, Ricciardi & al. 2000, Aprile & al. 2002, 2003, 2003b, Nimis & Tretiach 2004, Catalano & al. 2016), **Pugl** (Garofalo & al. 1999, Nimis & Tretiach 1999, Durini & Medagli 2002, 2004), **Bas** (Bartoli & Puntillo 1998, Nimis & Tretiach 1999, Fascetti & al. 2006, Potenza 2006, Potenza & al. 2010), **Cal** (Puntillo 1995, 1996, Puntillo & Puntillo 2004, Brackel & Puntillo 2016), **Si** (Nimis & al. 1994, 1995, Ottonello & Salone 1994, Ottonello & al. 1994, 2011, Poli & al. 1995, Ottonello 1996, Grillo & al. 1996, Ottonello & Romano 1997, Grillo 1998, Czezug & al. 1999, Poli & Grillo 2000, Grillo & al. 2002, Merlo 2004, 2004b, Grillo & Caniglia 2004, Caniglia & al. 2005, Brackel 2008b, Cataldo & Minissale 2013).

Frut/ Ch/ S/ Terr/ pH: 3-5, L: 4-5, X: 3, E: 1-3/ Alt: 1-4/ Salp: er, Orom: rr, Mont: c, SmedD: ec, Pad: vr, SmedH: ec, MedH: ec, MedD: ec/ PT: 1-2/ Note: a mainly temperate species found on calciferous or base-rich siliceous soil in open habitats, with optimum in dry grasslands; one of the most frequent and abundant species of *Cladonia* in Italy. Some specimens from the South, reacting P+red and with a somehow different morphology, perhaps deserve to be recognised at least at varietal level.

Cladonia rei Schaer.

Lich. Helv. Spicil., 1, 1: 34, 1823.

Syn.: *Cladonia fimbriata* var. *nemoxyna* (Ach.) Coëm., *Cladonia nemoxyna* (Ach.) Arnold

N - **VG** (Castello 2002, Martellos & Castello 2004), **Frl** (Tretiach & Molaro 2007), **Ven, TAA, Lomb** (Rivellini & Valcuvia 1996, Gheza 2015), **Piem** (Isocrono & al. 2004, Gheza 2015).

Frut/ Ch/ A.s/ Terr/ pH: 2-3, L: 3, X: 3, E: 1/ Alt: 2/ SmedD: r/ PT: 1-2/ Note: a mainly temperate, probably holarctic species described from Italy, found on mineral clay and base-rich soil, mostly in slightly disturbed habitats such as on track sides and clearings of light forests and heaths. To be looked for in central and southern Italy. For the differences towards *C. subulata* see Pino-Bodas & al. (2010b).

Cladonia scabriuscula (Delise) Nyl.

Comp. Rend. Herbd. Séan. Acad. Sci., 83: 88, 1876 - *Cenomyce scabriuscula* Delise in Duby, Bot. Gall.: 623, 1830.

Syn.: *Cladonia furcata* var. *recurva* A.L. Sm., *Cladonia furcata* var. *scabriuscula* (Delise) Coëm., *Cladonia surrecta* (Flörke) Sandst.

N - **Frl, TAA, Piem** (Isocrono & al. 2004), **C - Tosc** (Benesperi 2001).

Frut/ Ch/ A.i/ Terr/ pH: 2-3, L: 3, X: 2-3, E: 1/ Alt: 1-3/ Mont: er, SmedD: er, SmedH: vr, MedH: er/ PT: 1/ suboc/ Note: a mainly temperate, widespread but rare lichen found on soil and amongst mosses in humid-sheltered situations, such as open woodlands.

Cladonia squamosa Hoffm. var. *squamosa*

Deutschl. Fl., 2: 125, 1796.

Syn.: *Cenomyce cucullata* Delise, *Cladonia squamosa* var. *muricella* (Delise) Vain., *Cladonia squamosa* var. *phyllocoma* Rabenh., *Cladonia squamosa* var. *polychonia* Flörke

N - **Frl** (Tretiach & Hafellner 2000), **Ven** (Nimis 1994, Nascimbene & Caniglia 2003c), **TAA** (Caniglia & al. 2002, Nascimbene & al. 2005, 2005b, 2006, 2007b, 2008c, Nascimbene 2006c, 2008b, Watson 2014, Nimis & al. 2015), **Lomb** (Rivellini 1994, Rivellini & Valcuvia 1996, Zocchi & al. 1997, Roella 1999, Furlanetto 2010, Gheza & al. 2015, Gheza 2015), **Piem** (Isocrono & al. 2004, Isocrono & Piervittori 2008, Furlanetto 2010, Gheza 2015), **VA** (Piervittori & Isocrono 1999), **Emil, Lig, C - Tosc** (Benesperi & al. 2007, Benesperi 2011, Pasquinelli & al. 2009, 2013, Brackel 2015), **Marc** (Nimis & Tretiach 1999), **Umb** (Panfili 2000, Ravera & al. 2006), **Laz, Abr** (Nimis & Tretiach 1999), **Sar, S - Camp, Pugl, Bas** (Potenza 2006, Potenza & al. 2010), **Si** (Grasso & al. 1999).

Frut/ Ch/ A.i/ Terr-Lign/ pH: 1-2, L: 3, X: 2-3, E: 1-2/ Alt: 1-5/ Salp: r, Orom: vr, Mont: r, SmedD: vr, Pad: er, SmedH: vr, MedH: er/ PT: 1/ Note: a widespread holarctic lichen found on organic substrata in sheltered situations, rarely on bark, on basal parts of trunks; a very polymorphic taxon, which needs further study. Older records reported by Nimis (1993: 244) require confirmation.

Cladonia squamosa var. *subsquamosa* (Leight.) Vain.

Meddeland. Soc. Fauna Fl. Fenn., 6: 13, 1881 - *Cladonia delicata* var. *subsquamosa* Nyl. ex Leight., Lich. Fl. Gr. Brit.: 59, 1871.

Syn.: *Cladonia squamosa* var. *allosquamosa* Hennipman, *Cladonia subsquamosa* (Leight.) Cromb. non Kremp.

N - **Frl** (Tretiach & Hafellner 2000), **Ven, Lomb** (Rivellini & Valcuvia 1996), **Piem** (Isocrono & al. 2003, 2004, 2006, Isocrono & Piervittori 2008), **VA** (Piervittori & Isocrono 1997, 1999, Piervittori & al. 2001, 2004), **Lig** (Brunialti & al. 1999, Watson 2014), **C - Tosc** (Tretiach & Nimis 1994), **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera 2000, Ravera & al. 2006), **S - Cal** (Puntillo 1996), **Si** (Nimis & al. 1994).

Frut/ Ch/ A.i/ Terr-Lign/ pH: 1-2, L: 3, X: 2, E: 1/ Alt: 3-4/ Salp: rr, Mont: r/ PT: 1/ suboc/ Note: more hygrophytic than the typical variety, and more bound to higher altitudes, this chemical variety has been often considered as an independent species.

Cladonia stellaris (Opiz) Pouzar & Vězda

Preslia, 43: 196, 1971 - *Cenomyce stellaris* Opiz in Ponfinkl, Böhm. Phan. Crypt. Gew.: 141, 1823.

Syn.: *Cladina alpestris* auct. non (L.) Nyl., *Cladina stellaris* (Opiz) Brodo, *Cladonia aberrans* (Abbeyes) Stuckenb. non auct. ital., *Cladonia alpestris* auct. non (L.) Rabenh.

N - Ven (Nascimbene & al. 2006, Ravera & al. 2015), **TAA** (Caniglia & al. 2002, De Marco & al. 2003, Brackel 2013, Ravera & al. 2015), **Lomb** (Rivellini & Valcuvia 1996, Ravera & al. 2015), **Piem** (Isocrono & al. 2004, Morisi 2005), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Valcuvia 2000, Ravera & al. 2015), **Emil**.

Frut/ Ch/ S/ Terr/ pH: 1-2, L: 4-5, X: 3-4, E: 1/ Alt: 4-5/ Alp: er, Salp: er/ PT: 1/ Note: a circumpolar subarctic-subalpine species found in wind-protected sites with a long snow-lie, restricted to upland areas of the Alps, with a single station in the northern Apennines.

***Cladonia strepsilis* (Ach.) Grognot**

Pl. Crypt. Sône-et-Loire: 85, 1863 - *Baeomyces strepsilis* Ach., Meth. Lich. Suppl.: 52, 1803.

N - FrI (Tretiach & Hafellner 2000), **TAA** (Dalla Torre & Sarnthein 1902), **Lomb** (Zocchi & al. 1997), **Piem** (S-F69694), **Lig**.

Frut/ Ch/ S/ Terr/ pH: 1-2, L: 4, X: 2, E: 1/ Alt: 3-5/ Alp: vr, Salp: vr, Mont: er/ PT: 1/ suboc/ Note: a cool-temperate to boreal-montane lichen found on humous soil overlaying siliceous rocks and amongst bryophytes in humid depressions periodically filled by water, in open situations; restricted to the Alps in Italy.

***Cladonia stygia* (Fr.) Ruoss**

Botanica Helvetica, 95: 241, 1985 - *Cladonia rangiferina* f. *stygia* Fr., Nov. Sched. Crit. Lich. Suec., 8-9, 3: 22, 1826.

Syn.: *Cladina stygia* (Fr.) Ahti

N - VA (TSB 38871b).

Frut/ Ch/ A.f/ Terr/ pH: 1-2, L: 4-5, X: 2, E: 1/ Alt: 4/ Salp: er/ PT: 1/ Note: a very rare, probably declining species of subalpine *Sphagnum* bogs.

***Cladonia subcervicornis* (Vain.) Kernst.**

Jahresber. Staatsoberrschule Klagenfurt, 43: 25, 1900 - *Cladonia verticillata* var. *subcervicornis* Vain., Acta Soc. Fauna Fl. Fenn., 10: 197, 1894.

N - Ven, Piem (Isocrono & al. 2006, 2006b), **Lig, C - Tosc** (Brackel 2015), **Sar, S - Cal** (Puntillo 1996).

Frut/ Ch/ S/ Terr/ pH: 1-2, L: 4, X: 2-3, E: 1/ Alt: 1-3/ Mont: er, SmedD: er, SmedH: vr, MedH: r/ PT: 1/ suboc/ Note: on siliceous rocks and on soil rich in humus in open habitats; probably more widespread in Tyrrhenian Italy. The records from Piedmont and Lombardy by Valcuvia (2002, 2002b) are rather dubious.

***Cladonia subulata* (L.) F.H. Wigg.**

Primit. Florae Holsat.: 90, 1780 - *Lichen subulatus* L., Sp. Pl.: 1153, 1753.

Syn.: *Cladonia cornutoradiata* (Leight.) Sandst., *Cladonia fimbriata* var. *cornutoradiata* (Leight.) Vain., *Cladonia fimbriata* var. *radiata* (Schreb.) Cromb., *Cladonia fimbriata* var. *subcornuta* Nyl. ex Cromb., *Cladonia fimbriata* var. *subulata* (L.) Vain., *Cladonia subulata* var. *radiata* (Schreb.) Ozenda & Clauzade

N - FrI (Tretiach & Molaro 2007), **Ven** (Caniglia & al. 1999, Nascimbene 2002, 2008, Nascimbene & Caniglia 2003c), **TAA** (Nascimbene & Caniglia 2000, Nascimbene 2006c, 2008b), **Lomb** (Nascimbene 2006), **Piem** (Isocrono & al. 2004), **Emil, Lig** (Brunialti & al. 1999). **C - Tosc** (Benespero & al. 2007). **S - Cal** (Puntillo 1996).

Frut/ Ch/ A.s/ Terr/ pH: 2-3, L: 3-4, X: 3, E: 1/ Alt: 3-4/ Salp: vr, Orom: er, Mont: vr/ PT: 1/ Note: a cool-temperate to subarctic lichen found on mineral soil on track sides and in clearings of light forests and heaths, more rarely on rotting wood, in upland areas with siliceous substrata. The record from Venezia Giulia, in Nimis (1993: 246) was due to a misidentification. For the differences towards *C. rei* see Pino-Bodas & al. (2010b).

***Cladonia sulphurina* (Michx.) Fr.**

Lichenogr. Eur. Ref.: 237, 1831 - *Scyphophorus sulphurinus* Michx., Fl. Bor.-Amer., 2: 238, 1803.

Syn.: *Cladonia deformis* var. *gonecha* (Ach.) Arnold, *Cladonia gonecha* (Ach.) Asahina

N - FrI (Martellos 2005), **Ven** (Nascimbene & Caniglia 2003c, Nascimbene & al. 2006e, Nascimbene 2008c, 2011), **TAA** (Caniglia & al. 2002, Nascimbene 2005b, 2006b, 2006c, 2008b, 2013, Nascimbene & al. 2005, 2006, 2006e, 2007b, 2008c, Nimis & al. 2015), **Lomb** (Rivellini 1994, Rivellini & Valcuvia 1996, Nascimbene 2006, Nascimbene & al. 2006e), **Piem** (Morisi & Sereno 1995, Isocrono & al. 2003b, 2006, 2006b), **VA** (Valcuvia 2000, Matteucci & al. 2008, Isocrono & al. 2008).

Frut/ Ch/ A.s/ Lign-Terr/ pH: 1-2, L: 3-4, X: 3, E: 1/ Alt: 3-4/ Salp: rc, Mont: r/ PT: 1/ Note: a circumboreal-subarctic lichen found on organic substrata in cold-shaded situations, most common on rotting wood, e.g. on stumps and decaying fallen trunks. See also note on *C. deformis*.

***Cladonia symphycharpa* (Flörke) Fr.**

Nov. Sched. Crit. Lich. Suec., 8-9: 20, 1826 - *Capitularia symphycharpa* Flörke in Weber, Beitr. Naturk., 2: 281, 1810.

Syn.: *Cladonia dahliana* Kristinsson, *Cladonia hungarica* (Vain.) Szatala

N - VG, FrI (Tretiach & Molaro 2007), **Ven** (Nascimbene & Caniglia 1997, 2003c, Caniglia & al. 1999, Nascimbene 2005c, 2008, 2008c, Nascimbene & Marini 2007), **TAA** (Nascimbene & al. 2006, Nascimbene 2008b, Spitale & Nascimbene 2012, Bilovitz & al. 2014b), **Lomb** (Rivellini & Valcuvia 1996, Brackel 2013, Gheza 2015), **Piem** (Gheza 2015), **VA** (Valcuvia 2000), **Emil** (Nimis & al. 1996), **Lig** (Giordani & al. 2016). **C - Tosc** (Benespero & al. 2007, Brackel 2015), **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera & al. 2003, Ravera & al. 2006, Poponessi & al. 2014), **Laz**

(Brackel 2015), **Ab** (Recchia & Villa 1996, Nimis & Tretiach 1999, Brackel 2015), **Mol** (Nimis & Tretiach 2004, Caporale & al. 2008). **S - Camp** (Aprile & al. 2003b), **Pugl**.

Frut/ Ch/ S/ Terr/ pH: 4-5, L: 4-5, X: 4, E: 1-3/ Alt: 1-5/ Alp: r, Salp: rc, Orom: rr, Mont: rr, SmedD: rc, SmedH: rr, MedH: r, MedD: vr/ PT: 1-2/ Note: a widespread holarctic species found on calcareous ground in dry grasslands or on the top of exposed calcareous boulders, certainly occurring also throughout southern Italy.

Cladonia trassii Ahti

Folia Cryptog. Estonica, 32: 7, 1998.

Syn.: *Cladonia cerasphora* auct., *Cladonia lepidota* auct. non (Ach.) Nyl., *Cladonia stricta* auct.

N - Lomb (Rivellini & Valcuvia 1996), **Piem** (Morisi & Sereno 1995). **C - Tosc**.

Frut/ Ch/ S/ Terr/ pH: 1-2, L: 3-5, X: 3, E: 1/ Alt: 4-5/ Alp: vr, Salp: vr / PT: 1/ Note: on acid soil near or above treeline; all Italian records of this species are under *C. stricta* or *C. lepidota*. *C. stricta* is an arctic species, and according to Ahti (*in litt.*) Italian records most likely refer to *C. trassii* (see Ahti 1998).

Cladonia turgida Hoffm.

Deutschl. Fl., 2: 124, 1796.

N - Fri (Tretiach & Hafellner 2000), **Lomb** (Rivellini & Valcuvia 1996), **Piem** (Morisi & Sereno 1995, Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999), **Emil, Lig** (Watson 2014).

Frut/ Ch/ S/ Terr/ pH: 1-2, L: 4, X: 2-3, E: 1/ Alt: 4/ Salp: er/ PT: 1/ Note: a mainly boreal-montane, circumpolar species found on acid soil in open habitats, with optimum near treeline; restricted to the Alps in Italy.

Cladonia uncialis (L.) F.H. Wigg. subsp. ***biuncialis*** (Hoffm.) M. Choisy

Bull. Mens. Soc. Linn. Lyon, 20: 9, 1951 - *Cladonia biuncialis* Hoffm., Deutschl. Fl., 2: 116, 1796.

Syn.: *Cladonia uncialis* subsp. *dicraea* (Ach.) D. Hawksw., *Cladonia uncialis* f. *turgescens* (Delise) Fr.

N - Fri (Martellos 2005), **Ven** (Jatta 1909-1911).

Frut/ Ch/ S/ Terr/ pH: 1-3, L: 4, X: 3, E: 1/ Alt: 4-5/ Alp: er, Salp: r/ PT: 1/ Note: this subspecies differs from subsp. *uncialis* for the presence of squamatic acid, while morphological differences are not always clear.

Cladonia uncialis (L.) F.H. Wigg. subsp. ***uncialis***

Primit. Florae Holsat.: 90, 1780 - *Lichen uncialis* L., Sp. Pl.: 1153, 1753, *nom. cons.*

Syn.: *Cladonia uncialis* var. *obtusata* (Ach.) Räsänen

N - Fri (Tretiach & Hafellner 2000), **Ven** (Caniglia & al. 1999, Nascimbene & Caniglia 2003c), **TAA** (Caniglia & al. 2002, Nascimbene & al. 2005, 2006, Brackel 2013, Bilovitz & al. 2014), **Lomb** (Rivellini 1994, Rivellini & Valcuvia 1996, Dalle Vedove & al. 2004), **Piem** (Morisi & Sereno 1995, Isocrono & al. 2004, 2006, Isocrono & Piervittori 2008, Gheza 2015), **VA** (Piervittori & Isocrono 1999), **Emil** (Dalle Vedove & al. 2002, Benesperi & al. 2007), **Lig** (Watson 2014). **C - Tosc, Laz** (Jatta 1909-1911), **Sar**.

Frut/ Ch/ S/ Terr/ pH: 1-3, L: 4, X: 3, E: 1/ Alt: 4-5/ Alp: er, Salp: rc, Orom: er/ PT: 1/ Note: an arctic-alpine to northern boreal-montane, circumpolar species found on soil and amongst mosses in very open habitats with a long snow-lie near or above treeline, common only in the Alps. Some records could refer to subsp. *biuncialis*.

Cladonia verticillata (Hoffm.) Schaer.

Lich. Helv. Spicil., 1, 1: 31, 1823 - *Cladonia pyxidata* (unranked) *verticillata* Hoffm., Deutschl. Fl., 2: 122, 1796.

Syn.: *Cladonia cervicornis* var. *verticillata* (Hoffm.) Flot., *Cladonia cervicornis* subsp. *verticillata* (Hoffm.) Ahti, *Cladonia verticillata* var. *evoluta* (Th. Fr.) Stein

N - Ven, TAA, Lomb (Rivellini & Valcuvia 1996), **Piem** (Isocrono & al. 2004, Isocrono & Piervittori 2008), **VA** (Piervittori & Isocrono 1999), **Emil, Lig, C - Tosc, Umb** (Ravera & al. 2006, 2006b), **Laz** (Gigante & Petriccione 1995), **Sar** (Nöske 2000). **S - Camp, Pugl, Bas, Cal** (Puntillo 1996), **Si** (Ottonello & Romano 1997, Caniglia & al. 2005, Ottonello & al. 2011).

Frut/ Ch/ S/ Terr/ pH: 1-2, L: 3-4, X: 3, E: 1/ Alt: 2-5/ Alp: er, Salp: rr, Orom: er, Mont: vr, SmedD: er, SmedH: er/ PT: 1/ Note: a boreal-montane to subarctic-subalpine, circumpolar lichen found on acid soil in open habitats, most frequent in upland areas. Records from lowland areas of central and southern Italy should be checked against *C. cervicornis*.

Clauzadea Hafellner & Bellem.

in Hafellner, Beih. Nova Hedwigia, 79: 319, 1984.

This genus accommodates 4 species formerly treated as *Lecidea* or *Protoblastenia*, which differ in the uniform brown pigmentation of the apothecia, the non-septate and halonate ascospores, and the asci with an amyloid tube in the tholus; the type II conidiophores and the apical and lateral conidiogenesis provide additional valuable characters. A phylogenetic analysis based on molecular data suggests that the genus is most closely related to a group of genera (including *Bryobilimbia*, *Farnoldia*, *Lecidoma* and *Romjularia*) that do not belong to Lecideaceae *s.str.* (Fryday & al. 2014). All species occur on calcareous rocks. The genus has been monographed by Meyer (2002). Type: *C. monticola* (Ach.) Hafellner & Bellem.

Clauzadea chondrodes (A. Massal.) Hafellner & Türk

Clauzade & Cl. Roux *ex* Hafellner & Türk *Stapfia*, 76: 151, 2001 - *Biatora chondrodes* A. Massal., *Symmicta Lich.*: 39, 1855.

Syn.: *Biatora cyclisca* A. Massal., *Clauzadea cyclisca* (A. Massal.) V. Wirth, *Lecidea chondrodes* (A. Massal.) Malbr., *Lecidea cyclisca* (A. Massal.) Malbr., *Lecidea savonensis* B. de Lesd., *Protoblastenia chondrodes* (A. Massal.) Zahlbr.

N - VG (Meyer 2002), **Frl, Ven** (Lazzarin 2000b, Meyer 2002, Watson 2014), **TAA** (Meyer 2002), **Lomb, Lig** (Meyer 2002), **C - Tosc, Marc** (Nimis & Tretiach 1999), **Laz, Sar** (Meyer 2002), **S - Camp** (Aprile & al. 2003b, Garofalo & al. 2010), **Pugl, Si** (Grillo 1998, Meyer 2002, Grillo & Caniglia 2004).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 3-5, X: 3-4, E: 1-2/ Alt: 1-3/ Mont: rc, SmedD: rr, Pad: vr, SmedH: r, MedH: r, MedD: r/ PT: 1-2/ Note: a mainly temperate lichen found on limestone and dolomite, on surfaces with short water seepage after rain, often with colonies of cyanobacteria, but avoiding very dry situations; widespread and perhaps more common in Italy than the relatively few records would suggest.

Clauzadea immersa (Hoffm.) Hafellner & Bellem.

in Hafellner, *Beih. Nova Hedwigia*, 79: 322, 1984 - *Verrucaria immersa* Hoffm., *Descr. Adumbr. Plant. Lich.*, 1, 2: 58, 1789.

Syn.: *Biatora immersa* (Hoffm.) P. Syd., *Hymenelia immersa sensu* Jatta, *Lecidea calcivora* (Schaer.) A. Massal., *Lecidea immersa* (Hoffm.) Ach., *Lecidella immersa* (Hoffm.) Körb., *Lichen immersus* Weber *nom. illegit.*, *Protoblastenia immersa* (Hoffm.) J. Steiner

N - VG (Tretiach & Pecchiari 1995, Pinna & al. 1998, Meyer 2002, Crisafulli & al. 2006, Piervittori & al. 2006, Cucchi & al. 2009), **Frl** (Pinna & al. 1998), **Ven** (Meyer 2002, Nascimbene 2005c, Nascimbene & al. 2006, Thor & Nascimbene 2007), **TAA** (Meyer 2002, Nascimbene 2003), **Lomb, Piem** (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999), **Emil** (Meyer 2002, Dalle Vedove & al. 2002), **Lig** (Meyer 2002, Giordani & al. 2016), **C - Tosc** (Meyer 2002, Benesperi 2006, Tretiach & al. 2008), **Marc** (Nimis & Tretiach 1999, Meyer 2002), **Umb** (Genovesi & Ravera 2001, Ravera & al. 2006), **Laz** (Bartoli & al. 1998, Roccardi 2011), **Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **Sar** (Meyer 2002), **S - Camp** (Aprile & al. 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010), **Pugl** (Nimis & Tretiach 1999, Meyer 2002, Durini & Medagli 2002, 2004), **Bas** (Bartoli & Puntillo 1998, Nimis & Tretiach 1999, Potenza 2006), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994, Ottonello & Salone 1994, Ottonello & al. 1994, Ottonello 1996, Grillo 1998, Caniglia & Grillo 2001, 2005, 2006, Grillo & al. 2001, 2002, 2009, Meyer 2002, Grillo & Caniglia 2004, Liistro & Cataldo 2011).

Cr.end/ Ch/ S/ Sax/ pH: 5, L: 2-4, X: 3, E: 1-2/ Alt: 1-5/ Alp: vr, Salp: r, Orom: rr, Mont: rc, SmedD: vc, Pad: vr, SmedH: vc, MedH: c, MedD: r/ PT: 1-2/ Note: a widespread, temperate to southern boreal-montane lichen found on a wide variety of calciferous rocks, especially limestone, with a wide altitudinal range.

Clauzadea metzleri (Körb.) D. Hawksw.

Clauzade & Cl. Roux *ex* D. Hawksw. *in* Coppins & al., *Lichenologist*, 24: 367, 1992 - *Biatora metzleri* Körb., *Parerga Lichenol.*: 162, 1860.

Syn.: *Lecidea metzleri* (Körb.) Th. Fr., *Lecidea oolithina* Nyl., *Protoblastenia metzleri* (Körb.) J. Steiner

N - VG, Frl (TSB 6402), **Ven** (Nascimbene & Caniglia 2003c), **TAA** (Meyer 2002), **Lomb, Emil** (Nimis & al. 1996), **Lig** (Meyer 2002, Giordani & al. 2016), **C - Tosc** (TSB 35129), **Marc** (Nimis & Tretiach 1999), **Umb** (Genovesi & Ravera 2001, Ravera & al. 2006), **Laz, Abr** (Nimis & Tretiach 1999, Meyer 2002), **Mol** (Nimis & Tretiach, 1999, 2004, Caporale & al. 2008), **Sar, S - Camp** (Aprile & al. 2003, 2003b, Nimis & Tretiach 2004), **Pugl** (Nimis & Tretiach 1999, Meyer 2002), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994, Grillo & Caniglia 2004, Caniglia & Grillo 2005, 2006).

Cr/ Ch/ S/ Sax/ pH: 5, L: 3-4, X: 3-4, E: 1-2/ Alt: 1-3/ Orom: rr, Mont: rc, SmedD: c, Pad: vr, SmedH: c, MedH: rc, MedD: rr/ PT: 1-2/ p/ Note: a mainly temperate, holarctic early coloniser of small calcareous pebbles in dry grasslands, widespread and locally common throughout Italy, especially below the montane belt.

Clauzadea monticola (Schaer.) Hafellner & Bellem.

in Hafellner, *Beih. Nova Hedwigia*, 79: 319, 1984 - *Lecidea monticola* Ach. *ex* Schaer., *Lich. Helv. Spicil.*, 4-5: 161, 1833.

Syn.: *Biatora fuscorubens* Nyl., *Biatora ochracea* Hepp, *Biatora monticola* (Schaer.) Hepp, *Lecidea caementicola* Erichsen, *Lecidea concregens* H. Magn., *Lecidea fuscorubens* (Nyl.) Nyl., *Lecidea rubiginosa* Vain., *Lecidea subacervata* Müll. Arg., *Lecidella fuscorubens* (Nyl.) Stein, *Lecidella ochracea* Körb., *Protoblastenia monticola* (Schaer.) J. Steiner, *Sarcogyne chalcomaura* Norman

N - VG, Frl (TSB 4604), **Ven** (Nascimbene 2008c), **TAA** (Meyer 2002), **Lomb, Piem** (Isocrono & al. 2004), **Emil** (Meyer 2002, Tretiach & al. 2008), **Lig** (Brunialti & al. 1999, Giordani & al. 2016), **C - Tosc, Marc** (Nimis & Tretiach 1999), **Umb** (Nimis & Tretiach 1999, Ravera & al. 2006), **Laz** (Nimis & Tretiach 2004), **Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach, 1999, 2004, Caporale & al. 2008), **Sar** (Meyer 2002), **S - Camp** (Garofalo & al. 1999, 2010, Aprile & al. 2003, 2003b, Nimis & Tretiach 2004), **Pugl** (Nimis & Tretiach 1999, Durini & Medagli 2002, 2004), **Bas** (Nimis & Tretiach 1999, Meyer 2002), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994, Ottonello & Salone 1994, Ottonello & al. 1994, Grillo & al. 2001, Grillo & Caniglia 2004, Brackel 2008b, Liistro & Cataldo 2011, Cataldo & Minissale 2015).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 3-4, X: 3-4, E: 1-3/ Alt: 1-4/ Salp: vr, Orom: r, Mont: rc, SmedD: vc, Pad: vr, SmedH: vc, MedH: rc, MedD: rr/ PT: 1-2/ p/ Note: a widespread holarctic pioneer species of calciferous rocks (limestone, dolomite, sandstone, calciferous schists), also found on man-made substrata (*e.g.* on mortar walls), and even on gypsum, with optimum below the montane belt.

Clauzadeana Cl. Roux
Bull. Soc. Linn. Prov., 35: 100, 1984.

This monotypic genus of the Lecanoraceae includes a species with aspicilioid ascomata which differs from *Aspicilia s.lat.* in the nature of the hamathecial tissues, ascus structure, and the presence of algal cells in the exciple and under the hymenial tissues. Type: *C. macula* (Taylor) Coppins & Rambold

Clauzadeana macula (Taylor) Coppins & Rambold

in Rambold, Bibl. Lichenol., 34: 85, 1989 - *Lecidea macula* Taylor in Mackay, Fl. Hibern., 2: 115, 1836.

Syn.: *Aspicilia morioides* Blomb. ex Arnold, *Clauzadeana instratula* (Nyl.) Cl. Roux, *Lecanora morioides* (Arnold) Blomb., *Lecidea instratula* Nyl., *Lecidea perustula* Nyl., *Psora pissodes* (Stirt.) Walt. Watson

N - TAA, Piem (TSB 32891).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4-5, X: 4, E: 1/ Alt: 4-5/ Alp: er, Salp: vr/ PT: 1/ u/ Note: on hard, steeply inclined surfaces of crystalline siliceous rocks, exceptionally on dolomite, near or above treeline; probably overlooked in the Alps, but certainly not common.

Clavascidium Breuss

Ann. naturhist. Mus. Wien, 98 (suppl.): 41, 1996.

The genus *Catapyrenium s.lat.* was split into eight genera (Breuss 1996a), based on combinations of characters such as the type of pycnidium, ascus shape and arrangement of the ascospores, thallus anatomy and morphology (structure of the upper cortex and type of anchoring organs) and the presence/absence of an involucrellum. *Clavascidium* was synonymised with *Placidium* by Gueidan & al. (2009), but since it forms a monophyletic clade and can be differentiated by the presence of rhizines, it is accepted by Prieto & al. (2012). The genus, as re-circumscribed by Prieto & al. (2012), includes 5 species and is characterised by the presence of rhizines and clavate to (sub-)cylindrical asci. *C. semaforonense*, the only species of the genus with marginal pycnidia, is distantly related to the rest of species with laminal pycnidia. Type: *C. umbrinum* (Breuss) Breuss

Clavascidium lacinulatum (Ach.) M. Prieto

in Prieto & al., Am. J. Bot., 99: 28, 2012 - *Endocarpon hepaticum* var. *lacinulatum* Ach., Lichenogr. Univ.: 299, 1810.

Syn.: *Catapyrenium lacinulatum* (Ach.) Breuss, *Dermatocarpon trapeziforme* auct. non (J. König) Trevis., *Placidium lacinulatum* (Ach.) Breuss

N - Ven, TAA, C - Sar, S - Pugl, Cal (Puntillo 1996).

Sq/ Ch/ S/ Terr/ pH: 4-5, L: 4-5, X: 4-5, E: 1-2/ Alt: 1-2/ SmedD: vr, SmedH: vr, MedH: r, MedD: r/ PT: 1/ Note: a mainly Mediterranean-Atlantic to mild-temperate terricolous species found on loess and calciferous ground, most frequent in dry grasslands at relatively low elevations.

Clavascidium semaforonense (Breuss) M. Prieto

in Prieto & al., Am. J. Bot., 99: 28, 2012 - *Catapyrenium semaforonense* Breuss, Stapfia, 23: 112, 1990.

Syn.: *Dermatocarpella yunnana* H. Harada & Li-S. Wang, *Endopyrenium hepaticum* f. *nigratum* Müll. Arg., *Placidium semaforonense* (Breuss) Breuss

C - Sar, S - Pugl.

Sq/ Ch/ S/ Terr/ pH: 3, L: 4-5, X: 5, E: 1-2/ Alt: 1/ MedH: vr, MedD: r/ PT: 1/ Note: a Macaronesian-Mediterranean to Irano-Turanic terricolous lichen, also known from on fine-sandy soils in open, dry Mediterranean grasslands and garrigues. See also note on the genus.

Clavascidium umbrinum (Breuss) Breuss

Ann. naturhist. Mus. Wien, 98 (suppl.): 41, 1996 - *Catapyrenium umbrinum* Breuss, Linzer biol. Beitr., 22: 78, 1990.

Syn.: *Placidium umbrinum* (Breuss) M. Prieto & Breuss

N - Piem.

Sq/ Ch/ S/ Terr/ pH: 4-5, L: 4-5, X: 4-5, E: 1-2/ Alt: 2-3/ Mont: er, SmedD: er/ PT: 1/ Note: a terricolous lichen found on calciferous, clayey soil; only known from Dalmatia, France and Piemonte, this species is worthy of further study.

Cliostomum Fr.

Syst. Orb. Veget., 1: 116, 1825.

This genus is characterised by a crustose, esorediate or sorediate thallus, biatorine or zeorine apothecia that possess crystals and lack pigment or contain a mixture of a green and a reddish brown pigment in the epithecium and proper exciple, wide cell lumina in the proper exciple, moderately branched paraphyses, a *Biatora*-type ascus, mainly 1- or 3-septate, colourless spores, uni- or multilocular pycnidia, branched

conidiophores producing short conidia, and by chemical characters. The genus presently includes *c.* 20 species, but several more species are expected, since *Bacidia s.lat.* and *Catillaria s.lat.* are still incompletely known, and since several species may occur as sterile, sorediate crusts (see Ekman 1997). The genus seems to be the sister group of *Ramalina* in the Ramalinaceae (Ekman 2001). *Cliostomum leprosum* (Räsänen) Holien & Tønsberg is known from the Alps of Switzerland, *C. pallens* (Kullh.) S. Ekman from the Alps of Austria. Type: *C. corrugatum* (Ach.) Fr.

Cliostomum corrugatum (Ach.) Fr.

Lichenogr. Eur. Ref.: 455, 1831 - *Lecidea corrugata* Ach., Syn. Meth. Lich.: 18, 1814.

Syn.: *Biatora ehrhartiana* (Ach.) W. Mann, *Biatorina ehrhartiana* (Ach.) Mudd, *Biatorina graniformis* (K.G. Hagen) A.L. Sm., *Catillaria ehrhartiana* (Ach.) Th. Fr., *Catillaria graniformis* (K.G. Hagen) Vain., *Cliostomum graniforme* (K.G. Hagen) Coppins, *Lecidea ehrhartiana* (Ach.) Ach., *Rhytisma corrugatum* (Ach.) Fr.

N - Ven, TAA (Nascimbene & al. 2007b, 2014, Nascimbene 2014, Nascimbene & Marini 2015), **Lomb. C - Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **Sar** (Zedda 2002, 2002b), **S - Cal** (Puntillo 1996).

Cr/ Ch/ S/ Epiph-Lign/ pH: 1-2, L: 3-4, X: 2, E: 1/ Alt: 2-3/ Mont: er, SmedH: er/ PT: 1/ suboc/ Note: a mainly cool-temperate species found on old oaks, but also on *Abies* in humid stands, more rarely on lignum (decorticated trunks, wooden poles), both in the Alps and in humid montane forests of the Peninsula. It is included in the Italian red list of epiphytic lichens as “Near-threatened” (Nascimbene & al. 2013c).

Cliostomum griffithii (Sm.) Coppins

in Hawksworth & al., Lichenologist, 12: 106, 1980 - *Lichen griffithii* Sm., Engl. Bot., 25: pl. 1735, 1807.

Syn.: *Bacidia imitatrix* Malme, *Biatora anomala* (Ach.) Fr., *Biatora mixta* Fr., *Biatorina griffithii* (Sm.) A. Massal., *Biatorina mixta* (Fr.) Hellb., *Biatorina tricolor* auct., *Catillaria griffithii* (Sm.) H. Magn., *Catillaria tricolor* auct. non (With.) Th. Fr., *Lecidea anomala* Ach., *Lecidea tricolor sensu* Nyl.

N - Frl, Ven, Lomb, Emil, Lig. C - Tosc, Laz, Abr, Sar (Zedda 2002, Rizzi & al. 2011, Cossu 2013), **S - Camp** (Nimis & Tretiach 2004), **Bas** (Puntillo & al. 2012), **Cal** (Puntillo 1995, 1996), **Si** (Nimis & al. 1994).

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 3-4, X: 2-3, E: 1/ Alt: 1-2/ SmedD: er, SmedH: er, MedH: er/ PT: 1/ suboc/ Note: a mild-temperate species with a fragmented holarctic range, found on bark of old isolated trees in open, humid woodlands, rarely on lignum; probably more widespread in the past, presently mostly Tyrrhenian. The epithet “*griffithii*” (sometimes spelled “*Grippithii*”) was often used by XIX century Italian authors to designate *Lecania cyrtella s.lat.* (e.g. see Anzi 1860: 73). The record from Piemonte by Isocrono & Falletti (1999) needs confirmation, and is not accepted here. The species is included in the Italian red list of epiphytic lichens as “Near-threatened” (Nascimbene & al. 2013c).

Coenogonium Ehrenb.

in Nees von Esenbeck (ed.), Hor. Phys. Berol.: 120, 1820.

This is a fairly large genus of more than 90, mainly tropical species, characterised by biatorine (rarely zeorine), yellow to orange apothecia with paraplectenchymatous excipulum, partially amyloid hymenium, thin-walled unitunicate asci, 1-septate or rarely non-septate ascospores, and a trentepohlioid photobiont. Originally, it included only species with a filamentous thallus, while crustose taxa were separated in the genus *Dimerella*. However, the discovery of some species which have both a filamentous and a crustose thallus, and the fact that *Dimerella* and *Coenogonium* have the same type of apothecia, while the morphological differences are due to the photobiont, led Lücking & Kalb (2000) to unite both genera under the older name *Coenogonium*. Molecular data (Kauff & Lutzoni 2002) confirm the monophyly of the genus, which is placed in the family Coenogoniaceae, as circumscribed by Lücking & Kalb (2000). Type: *C. linkii* Ehrenb.

Coenogonium luteum (Dicks.) Kalb & Lücking

in Lücking & Kalb, Bot. Jahrb., 122: 32, 2000 - *Lichen luteus* Dicks., Fasc. Pl. Cryptog. Brit., 1: 11, 1785.

Syn.: *Biatorina lutea* (Dicks.) Körb., *Gyalecta lutea* (Dicks.) Hornem., *Dimerella lutea* (Dicks.) Trevis., *Microphiale lutea* (Dicks.) Zahlbr.

N - VG, Ven (Nascimbene 2004, Nascimbene & al. 2005b, 2006c), **Lomb** (Jatta 1909-1911), **Piem** (Isocrono & al. 2004), **C - Tosc, Laz** (Munzi & al. 2013), **Sar** (Zedda 2002, 2002b), **S - Camp** (Aprile & al. 2003b), **Pugl, Cal** (Puntillo 1996), **Si** (Nimis & al. 1994, Ottonello & Puntillo 2009, Ottonello & al. 2011).

Cr/ Tr/ S/ Epiph/ pH: 1-2, L: 1-2, X: 1-2, E: 1-2/ Alt: 1-2/ SmedD: er, SmedH: vr, MedH: er/ PT: 0/ suboc/ Note: a mild-temperate to humid subtropical lichen found on bark and epiphytic liverworts in semi-natural, old, humid forests at low elevations; mostly Tyrrhenian in Italy. It is included in the Italian red list of epiphytic lichens under the “Least Concern” category (Nascimbene & al. 2013c).

Coenogonium pineti (Ach.) Lücking & Lumbsch

in Lücking & al., Mycologia, 96: 290, 2004 - *Lecidea pineti* Schrad. ex Ach., Lichenogr. Univ.: 195, 1810.

Syn.: *Biatora pineti* (Ach.) Fr., *Biatorina diluta* (Pers.) Th. Fr., *Biatorina pineti* (Ach.) A. Massal., *Dimerella diluta* (Pers.) Trevis., *Dimerella pineti* (Ach.) Vězda, *Gyalecta alnicola* B. de Lesd., *Gyalecta diluta* (Pers.) Blomb. & Forssell,

Gyalecta pineti (Ach.) Tuck., *Gyalecta rosea* (Eitner) Zahlbr., *Microphiale diluta* (Pers.) Zahlbr., *Peziza diluta* Pers. non Fr.

N - VG (Carvalho 1997), **Frl**, **Ven** (Thor & Nascimbene 2007, Nascimbene & al. 2008e, 2013b, Nascimbene 2008, 2008c, Nascimbene & Marini 2010), **TAA** (Nascimbene 2006b, 2008b, 2013, 2014, Thor & Nascimbene 2007, Nascimbene & al. 2007b, 2008c, 2014, Nascimbene & Marini 2015, Nimis & al. 2015), **Lomb**, **Piem** (Isocrono & al. 2004), **Emil** (Nimis & al. 1996, Tretiach & al. 2008), **Lig** (Brunialti & al. 1999, Putorti & al. 1999b, Giordani & Incerti 2008). **C - Tosc** (Tretiach & Nimis 1994, Loppi & al. 1997b, Stofer 2006, Benesperi & al. 2007, Brunialti & Frati 2010, Benesperi 2011, Paoli & al. 2012, Brackel 2015, Nascimbene & al. 2015), **Umb** (Ravera 1998, Ravera & al. 2006, Panfili 2007), **Laz** (Ravera & al. 1999, 2003, Massari & Ravera 2002, Stofer 2006, Ravera 2006c, Munzi & al. 2007, Zucconi & al. 2013), **Abr** (Nimis & Tretiach 1999, Brackel 2015, Caporale & al. 2016), **Mol** (Caporale & al. 2008, Paoli & al. 2015), **Sar** (Rizzi & al. 2011). **S - Camp** (Puntillo & al. 2000, Nimis & Tretiach 2004, Brunialti & al. 2010, 2013, Ravera & Brunialti 2013), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1995, 1996, Sérusiaux 1998, Chiappetta 2000, Puntillo & Puntillo 2004, Incerti & Nimis 2006), **Si** (Ottonello & Romano 1997, Ottonello & al. 2011).

Cr/ Tr/ S/ Epiph-Lign/ pH: 1-3, L: 2-3, X: 1-3, E: 1-2/ Alt: 1-3/ Mont: vr, SmedD: r, SmedH: rr, MedH: r/ PT: 1-2/ Note: a probably holarctic lichen, most common on acid bark, both of conifers and of broad-leaved trees, below the subalpine belt; certainly widespread throughout the country, especially in non-heavily disturbed semi-natural areas with a humid climate.

Coenogonium tavaresianum (Vězda) Lücking, Aptroot & Sipman

in Rivas Plata & al., Fungal Divers., 23: 298, 2006 - *Dimerella tavaresiana* Vězda, Folia Geobot. Phytotaxon., 4: 446, 1969.

N - Lig, **C - Laz** (Ravera & al. 1999, 2000, Munzi & al. 2004, 2007). **S - Bas** (Bartoli & Puntillo 1996, 1998), **Cal** (Sérusiaux 1998).

Cr/ Tr/ S/ Epiph/ pH: 1-2, L: 2-3, X: 1, E: 1/ Alt: 1/ MedH: vr/ PT: 0/ suboc/ Note: a mild-temperate lichen found on acid bark of conifers and broad-leaved trees in open, humid and warm Mediterranean woodlands; strictly Tyrrhenian in Italy. It is included in the Italian red list of epiphytic lichens as “Vulnerable” (Nascimbene & al. 2013c).

Collema F.H. Wigg.

Prim. Fl. Holsat.: 89, 1970, *nom. cons.*

After the molecular study of the Collemataceae genera *Collema* and *Leptogium* by Otálora & al. (2014), the genus *Collema s.str.* has been re-circumscribed to include only 40 species belonging to four morphologically similar informal infrageneric *Collema* units (the *nigrescens*-, *japonicum*-, *leptaleum*-, and *coilocarpum*-groups), which, with a single exception, have transversely septate ascospores. The other species of *Collema s.lat.* now belong to different genera: *Blennothallia* (the *Collema crispum*-group), *Callome* (including only *C. multipartitum*), *Enchylium* (the *C. tenax*-group), *Lathagrium* (the *C. cristatum*-group), *Paracollema* (including only *C. italicum*), and *Rostania* (the *C. occultatum*-group). Type: *C. lactuca* (Weber) F.H. Wigg. (= *C. nigrescens*). The name is conserved against *Gabura* Adans. (1763) and *Kolman* Adans. (1763).

Collema curtisporum Degel.

Symb. Bot. Upsal., 13, 2: 437, 1954.

C - Tosc (Brackel 2015).

Fol.b/ Cy.h/ S/ Epiph/ pH: 2-3, L: 3-4, X: 2, E: 1-3/ Alt: 2/ SmedH: er/ PT: 1/ suboc/ Note: a mild-temperate to boreal lichen found on bark of broad-leaved trees in humid but open situations; easily mistaken with *C. nigrescens* or *C. subnigrescens*, this exceedingly rare species needs further study. It is included in the Italian red list of epiphytic lichens as “Critically Endangered” (Nascimbene & al. 2013c).

Collema flaccidum (Ach.) Ach.

Lichenogr. Univ.: 647, 1810 - *Lichen flaccidus* Ach., K. Vetensk.-Akad. Nya Handl., 16: 14, 1795.

Syn.: *Collema atropiumbeum* Hue, *Collema furvum* var. *flaccidum* (Ach.) Spreng., *Collema rupestre* (Sw.) Rabenh., *Lichen rupestris* Sw. *nom. illegit.*, *Lathagrium rupestre* (Sw.) A. Massal., *Parmelia flaccida* (Ach.) Ach., *Synechoblastus flaccidus* (Ach.) Körb., *Synechoblastus rupestris* (Sw.) Trevis.

N - VG (Carvalho 1997), **Frl** (Tretiach & Hafellner 2000, Tretiach & Molaro 2007), **Ven** (Caniglia & al. 1999, Nascimbene 2008c), **TAA** (Philippi 1983, Nascimbene 2005b, Nascimbene & al. 2007b), **Lomb** (Philippi 1983, Arosio & al. 2003, Valcuvia & al. 2003, De Vita & Valcuvia 2004), **Piem** (Morisi & Sereno 1995, Isocrono & al. 2004, Isocrono & Piervittori 2008), **VA** (Valcuvia 2000, Valcuvia & al. 2000b, Piervittori & al. 2001, Matteucci & al. 2015c), **Emil** (Gasparo & Tretiach 1996, Tretiach & al. 2008), **Lig** (Giordani & Incerti 2008). **C - Tosc** (Benesperi & al. 2007, Benesperi 2011, Brackel 2015), **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera 1998, Panfili 2000b, Ravera & al. 2006), **Laz** (Ravera 2001, Massari & Ravera 2002, Ravera & Genovesi 2008), **Abr** (Olivieri & Pacioni 1996, Olivieri & al. 1997, 1997b, Loppi & al. 1999, Nimis & Tretiach 1999, Caporale & al. 2008, 2016, Brackel 2015, Corona & al. 2016), **Mol** (Frati & al. 2004, Caporale & al. 2008), **Sar** (Nöske 2000, Zedda 2002, Rizzi & al. 2011, Cossu 2013). **S - Camp** (Ricciardi & al. 2000, Nimis & Tretiach 2004, Nascimbene & al. 2010b, Garofalo & al. 2010, Brunialti & al. 2013, Ravera & Brunialti 2013), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999, Potenza 2006, Potenza & Fascetti 2010), **Cal** (Puntillo 1996), **Si** (Czezuga & al. 1994, Grillo 1998, Grillo & Caniglia 2004, Liistro & Cataldo 2011, Ottonello & al. 2011).

Fol.b/ Cy.h/ A.i/ Epiph-Sax/ pH: 3-4, L: 3-4, X: 2, E: 1-2/ Alt: 1-3/ Mont: vr, SmedD: er, SmedH: rc, MedH: c, MedD: er/ PT: 1-2/ suboc/ Note: a mainly temperate to southern boreal-montane lichen with a

fragmented holarctic range, found on bark, epilithic mosses, base-rich siliceous and slightly calciferous rocks in sheltered, humid situations; more common in the past and now absent from urban areas and from the Po-Plain; mostly Tyrrhenian in Italy, but still locally frequent in humid Alpine and pre-Alpine areas.

Collema furfuraceum Du Rietz

Ark. Bot. K. Svenska Vetensk.-Akad., 22 A-3: 3, 1929.

Syn.: *Collema nigrescens* var. *furfuraceum* (Du Rietz) H. Olivier

N - **VG** (Castello 1996), **Ven** (Caniglia & al. 1999, Nascimbene & Caniglia 2000), **TAA**, **Lomb** (Arosio & al. 2003), **Emil**, **Lig** (Valcuvia & al. 2000, Giordani & al. 2001, 2002, Brunialti & Giordani 2003, Giordani 2006, Giordani & Incerti 2008). **C** - **Tosc** (Loppi 1996, 1996b, Loppi & al. 1997, 1998, 2002c, Putorti & al. 1998, Putorti & Loppi 1999b, Paoli & Loppi 2001, Frati & al. 2006b, Brunialti & Frati 2010, Loppi & Nascimbene 2010, Brunialti & al. 2012b), **Marc** (Nimis & Tretiach 1999, Frati & Brunialti 2006), **Umb** (Ravera 1998, Ravera & al. 2006), **Laz** (Ravera 2002, Massari & Ravera 2002, Nimis & Tretiach 2004, Munzi & al. 2007, Ravera & Genovesi 2008, Zucconi & al. 2013), **Abr** (Recchia & al. 1993, Olivieri & Pacioni 1996, Olivieri & al. 1997, 1997b, Loppi & al. 1998d, 1999, Caporale & al. 2016), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **Sar** (Zedda 1995, 2002, 2002b, Loi & al. 2000, Rizzi & al. 2011, Cossu 2013). **S** - **Camp** (Garofalo & al. 1999, 2010, Aprile & al. 2003, 2003b, Puntillo & al. 2000, Nimis & Tretiach 2004, Nascimbene & al. 2010b, Brunialti & al. 2013, Ravera & Brunialti 2013, Catalano & al. 2016), **Pugl** (Nimis & Tretiach 1999), **Bas** (Bartoli & Puntillo 1998, Potenza 2006, Brackel 2011), **Cal** (Puntillo 1995, 1996, Brackel 2011), **Si** (Ottonello & Salone 1994, Grillo & Cristaudo 1995, Grillo & al. 1996, Grillo 1998, Czezugza & al. 1999, Grillo & Caniglia 2004, Ottonello & Puntillo 2009, Ottonello & al. 2011, Liistro & Cataldo 2011).

Fol.b/ Cy.h/ A.i/ Epiph/ pH: 2-3, L: 3-4, X: 2, E: 1-3/ Alt: 1-3/ Mont: er, SmedD: er, SmedH: vr, MedH: rr/ PT: 1/ suboc/ Note: a mainly temperate, probably holarctic lichen found on bark of broad-leaved trees and on epiphytic mosses below the subalpine belt; more common in the past, presently confined to semi-natural, open stands, or to old plantations of *Olea* in humid areas, and mainly in Tyrrhenian Italy.

Collema glebulentum (Cromb.) Degel.

H. Magn. ex Degel., Symb. Bot. Upsal., 13, 2: 406, 1954 - *Leptogium glebulentum* Nyl. ex Cromb., J. Bot., 20: 272, 1882.

Syn.: *Collema coralliferum* Degel., *Collema furvellum* Räsänen

N - **Lomb**.

Fol.n/ Cy.h/ A.i/ Sax/ pH: 3-5, L: 4, X: 2, E: 1/ Alt: 4-5/ Alp: er, Salp: er/ PT: 1/ Note: on basic siliceous rocks, more rarely on limestone, in humid situations near or above treeline; the record of this arctic-alpine species is in Swiss territory, but near the Italian border.

Collema nigrescens (Huds.) DC.

in Lamarck & de Candolle, Fl. Franç., éd. 3, 2: 384, 1805 - *Lichen nigrescens* Huds., Fl. Angl.: 450, 1762.

Syn.: *Collema nigrescens* f. *quinqueseptatum* (Kernst.) Zahlbr., *Collema nigrescens* var. *roseaceum* Flot., *Collema vespertilio* (Lightf.) Hoffm., *Lathagrium nigrescens* (Huds.) Gray, *Lathagrium fasciculare* (L.) A. Massal., *Lichen vespertilio* Lightf. nom. illegit., *Synechoblastus nigrescens* (Huds.) Trevis., *Synechoblastus nigrescens* f. *quinqueseptatum* Kernst., *Synechoblastus vespertilio* (Lightf.) Hepp

N - **VG**, **Frl**, **Ven** (Caniglia & al. 1999, Nascimbene & Caniglia 2003c), **TAA** (Nascimbene & al. 2007b), **Lomb** (Valcuvia & Truzzi 2007b), **Piem** (Isocrono & al. 2004, Giordani & Malaspina 2016), **VA** (Pierivittori & Isocrono 1999), **Emil** (Gasparo & Tretiach 1996, Benesperi 2009, Brackel 2015), **Lig** (Brunialti & al. 1999, Giordani & al. 2002, Brunialti & Giordani 2003, Giordani & Incerti 2008). **C** - **Tosc** (Tretiach & Nimis 1994, Loppi & al. 1998, 2002c, Putorti & al. 1998, Loppi & Frati 2006, Benesperi & al. 2007, Pasquinelli & al. 2009, Loppi & Nascimbene 2010, Benesperi 2011, Brackel 2015), **Marc** (Nimis & Tretiach 1999, Frati & Brunialti 2006), **Umb** (Ravera 1998, Ravera & al. 2006), **Laz** (Massari & Ravera 2002, Munzi & al. 2007, Brackel 2015), **Abr** (Recchia & al. 1993, Olivieri & al. 1997, 1997b, Loppi & al. 1999, Nimis & Tretiach 1999, Caporale & al. 2016), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **Sar** (Zedda 1995, 2002, 2002b, Zedda & al. 2001, Rizzi & al. 2011, Cossu 2013). **S** - **Camp** (Aprile & al. 2003b, 2011, Nimis & Tretiach 2004, Catalano & al. 2016), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999, Potenza 2006, Brackel 2011), **Cal** (Puntillo 1995, 1996, Incerti & Nimis 2006), **Si** (Nimis & al. 1994, Ottonello & al. 1994, 2011, Ottonello 1996, Ottonello & Romano 1997, Grillo 1998, Grillo & Caniglia 2004, 2006, Brackel 2008b, 2008c, Ottonello & Puntillo 2009, Liistro & Cataldo 2011).

Fol.b/ Cy.h/ A.i/ Epiph/ pH: 2-3, L: 3-4, X: 1-2, E: 1-2/ Alt: 1-3/ Mont: er, SmedD: vr, SmedH: rc, MedH: c/ PT: 1-2/ suboc/ Note: a mainly temperate species found on more or less isolated trees (depending on air humidity), more common in the past, presently absent from heavily disturbed areas of the North, but locally still frequent in humid, semi-natural habitats, with optimum in Tyrrhenian Italy; the species is more wide-ranging in altitude and latitude than the closely related *C. subnigrescens*. The recent record from Tuscany by Pasquinelli & Puccini (2010), judging from the pictures and the description, is certainly wrong.

Collema ryssoleum (Tuck.) A. Schneid.

Guide Study Lich.: 181, 1898 - *Collema nigrescens* var. *rysssoleum* Tuck., Lich. Calif.: 34, 1866.

Syn.: *Collema meridionale* Hue, *Collema nigrescens* f. *rupestre* (Bagl.) Zahlbr., *Lathagrium nigrescens* var. *rupestre* Bagl.

N - **Lig** (Watson 2014, Giordani & al. 2016). **C** - **Tosc** (Pišút 1997, Tretiach & al. 2008), **Laz** (Tretiach 2004, Genovesi & al. 2011), **Sar** (Nöske 2000, Rizzi & al. 2011). **S** - **Camp** (Nimis & Tretiach 2004), **Cal** (Puntillo 1996), **Si** (Grillo & al. 1996, Ottonello & Romano 1997, Grillo 1998, Grillo & Caniglia 2004, Ottonello & al. 2011).

Fol.b/ Cy.h/ S/ Sax/ pH: 2-3, L: 4, X: 3, E: 1-2/ Alt: 1-2/ SmedH: rr, MedH: rc/ PT: 1/ suboc, w/ Note: a mild-temperate, mainly western species in Europe, found on steeply inclined seepage tracks of moderately acid to basic siliceous rocks at low elevations; restricted to the Tyrrhenian region in Italy.

Collema subflaccidum Degel.

Symb. Bot. Upsal., 20, 2: 140, 1974.

Syn.: *Collema subfurvum* auct.

N - **VG** (Castello 1996, Carvalho 1997, Castello & Skert 2005), **Frl** (Tretiach & Molaro 2007), **Ven** (Thor & Nascimbene 2007, Nascimbene 2008), **TAA** (Nimis & al. 2015), **Lomb** (Zocchi & al. 1997, Arosio & al. 2003), **Piem** (Isocrono & al. 2004, 2005b, Isocrono & Piervittori 2008), **Emil** (Benesperi 2009), **Lig** (Brunialti & Giordani 2003, Giordani & Incerti 2008). **C** - **Tosc** (Tretiach & Nimis 1994, Loppi & Putortì 1995, 1995b, Loppi & al. 1995, 1997, 1998, 1998b, 2002c, Loppi 1996, Loppi & De Dominicis 1996, Loppi & Nascimbene 1998, 2010, Putortì & al. 1998, 1999, Putortì & Loppi 1999b, Benesperi 2000a, 2006, 2011, Loppi & Pirtintzos 2000, Frati & al. 2006b, Loppi & Frati 2006, Benesperi & al. 2007, Lastrucci & al. 2009, Paoli & Loppi 2001, Brunialti & Frati 2010, Paoli & al. 2012, 2015d), **Marc** (Nimis & Tretiach 1999, Frati & Brunialti 2006), **Umb** (Ravera 1998, Ravera & al. 2006), **Laz** (Massari & Ravera 2002, Ravera & Genovesi 2008), **Abr** (Recchia & al. 1993, Olivieri & Pacioni 1996, Olivieri & al. 1997, 1997b, Loppi & al. 1999, Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008, Paoli & al. 2011, 2015), **Sar** (Zedda 2002, Rizzi & al. 2011, Cossu 2013), **S** - **Camp** (Aprile & al. 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010, Blasi & al. 2010, Brunialti & al. 2013, Ravera & Brunialti 2013, Catalano & al. 2016), **Pugl** (Nimis & Tretiach 1999), **Bas** (Potenza 2006), **Cal** (Puntillo 1996, Incerti & Nimis 2006), **Si** (Nimis & al. 1996b, Merlo 2004).

Fol.b/ Cy.h/ A.i/ Epiph/ pH: 2-3, L: 3-4, X: 2, E: 2-3/ Alt: 1-3/ Mont: r, SmedD: vr, Pad: er, SmedH: rc, MedH: rr, MedD: er/ PT: 1-2/ suboc/ Note: a mainly temperate, incompletely holarctic species found on more or less isolated broad-leaved trees in humid-rainy areas, mostly below the subalpine belt; more common in the past, presently absent from heavily disturbed habitats and most frequent in Tyrrhenian and northeastern Italy.

Collema subnigrescens Degel.

Symb. Bot. Upsal., 13, 2: 413, 1954.

Syn.: *Collema vespertilio* auct. p.p., *Lathagrium nigrescens* sensu A. Massal. (1853), *Parmelia nigrescens* var. *caesia* Clemente

N - **VG**, **Frl**, **Ven**, **Piem**, **Emil**, **Lig**, **C** - **Tosc** (Loppi & al. 1994, 1995, 1997, Frati & al. 2006b, Benesperi & al. 2007, Brunialti & Frati 2010, Paoli & al. 2012), **Marc** (Frati & al. 2004, Frati & Brunialti 2006), **Umb** (Ravera 1998, Ravera & al. 2006), **Laz** (Massari & Ravera 2002, Nimis & Tretiach 2004, Ruisi & al. 2005, Ravera & Genovesi 2008), **Abr** (Recchia & al. 1993, Nimis & Tretiach 1999, Corona & al. 2016), **Mol** (Frati & al. 2004, Caporale & al. 2008, Paoli & al. 2015), **Sar** (Zedda 1995, 2002, Rizzi & al. 2011), **S** - **Camp** (Nimis & Tretiach 2004, Nascimbene & al. 2010b, Brunialti & al. 2013, Ravera & Brunialti 2013), **Bas** (Potenza & al. 2014), **Cal** (Puntillo 1995, 1996, Puntillo & Puntillo 2004), **Si** (Nimis & al. 1996b, Grillo 1998, Grillo & Caniglia 2004, 2006, Grillo & Cataldo 2008, 2008b).

Fol.b/ Cy.h/ S/ Epiph/ pH: 3, L: 3-4, X: 2, E: 2-3/ Alt.: 1-2/ SmedD: er, SmedH: r, MedH: rr/ PT: 1-2/ suboc/ Note: a mild-temperate lichen found on the bark of more or less isolated broad-leaved trees, more thermophilic than the closely related *C. nigrescens*; presently extinct in northern Italy, except Liguria, still frequent and locally even common in humid sites of Tyrrhenian Italy, especially in Sardegna.

Collemopsidium Nyl.

Flora, 64, 6: 1881.

The genus *Pyrenocollema* Reinke has been in common use over the past 30 years for pyrenocarpous lichens of soil and intertidal, freshwater and terrestrial rocks with a cyanobacterial photobiont, a densely pigmented, cellular excipulum, anastomosing pseudoparaphyses, and obpyriform or obclavate, fissitunicate asci containing 1-septate ascospores. However, because the type species of *Pyrenocollema* was found to be a parasite of *Nostoc* with a different and distinctive ascomatal anatomy, *Collemopsidium* was recognised as a more appropriate genus for the species formerly attributed to *Pyrenocollema* (Grube & Ryan 2002). The genus, which includes c. 18 species, is now placed in the family Xanthopyreniaceae, of uncertain position within the Dothideomyceta (Pérez-Ortega & al. 2016). A key to the species of northwestern Europe is provided by Mohr & al. (2004). According to Perez-Ortega (*in litt.*), preliminary results suggest that the diversity of marine species has been largely underestimated: all Mediterranean samples analysed so far represent new species. Good descriptions and a key to the British species are in Orange (2013b). Type: *C. iocarpum* (Nyl.) Nyl.

Collemopsidium angermannicum (Degel.) A. Nordin

Graphis Scripta, 13: 39, 2002 - *Arthopyrenia angermannica* Degel., Ark. Bot., 24A, 3: 23, 1931.

Syn.: *Arthopyrenia strontianensis* Swinscow, *Pyrenocollema strontianense* (Swinscow) R.C. Harris

C - **Sar**.

Cr/ Cy.h/ S/ Sax/ pH: 2-3, L: 3-5, X: 1-3, E: 1/ Alt: 2-3/ Mont: vr, SmedH: vr/ PT: 1/ paras *Verrucaria* spp., 1/ Note: a species with a thin, episubstratic, smooth to rimose, olive-brown to dark brown thallus with a cyanobacterial photobiont (developing globose cells) and scattered black perithecioid ascomata containing fissitunicate asci with 1-septate ascospores and richly branched hamathecial elements. It grows on often submerged siliceous rocks along streams and along the margins of lakes; widespread in the Holarctic region, but not common

Collemopsidium caesium (Nyl.) Coppins & Aptroot

Lichenologist, 40: 368, 2008 - *Verrucaria caesia* Nyl., Bot. Not.: 162, 1853.

Syn.: *Arthopyrenia caesia* (Nyl.) Zahlbr., *Arthopyrenia nylanderii* (Hepp) Riedl, *Leiophloea caesia* (Nyl.) Trevis., *Leiophloea nylanderii* (Hepp) Trevis., *Pseudarthopyrenia caesia* (Nyl.) Keissl., *Pyrenocollema caesium* (Nyl.) R.C. Harris, *Sagedia nylanderii* Hepp

N - TAA, S - Si (Grillo & al. 2007).

Cr.end/ Cy.h/ S/ Sax/ pH: 4-5, L: 3-5, X: 1-3, E: 1/ Alt: 3-4/ Salp: vr, Mont: vr/ PT: 1/ Note: a species with a mostly endolithic thallus (forming dark brown thin patches only on non-calcareous rocks), and with more or less sessile ascomata, found on steeply inclined to vertical surfaces of permanently damp or moist limestones or base-rich siliceous rocks; widely distributed in the Holarctic region, but not common.

Collemopsidium foveolatum (A.L. Sm.) F. Mohr

in Mohr & al., Mycol. Res., 108: 529, 2004 - *Arthopyrenia foveolata* A.L. Sm., J. Bot., London, 49: 43, 1911.

Syn.: *Arthopyrenia gyalectoides* M. Knowles ex A.L. Sm., *Pyrenocollema foveolatum* (A.L. Sm.) C. Mohr

S - Pugl (Nimis & Tretiach 1999 as *C. halodytes*),

Cr.end/ Cy.h/ S/ Sax/ pH: 4-5, L: 2-3, X: 1, E: 1/ Alt: 1/ MedH: c, MedD: c/ PT: 1-2/ coast, 1/ Note: probably this is the most common species of the genus along the Italian coasts, where it most often occurs on barnacles; in the past, it has been frequently confused with *C. halodytes*.

Collemopsidium halodytes (Nyl.) Grube & B.D. Ryan

in Nimis, The Lichens of Italy. A second annotated catalogue: 19, 2016 - *Verrucaria halodytes* Nyl., Mém. Soc. Imp. Sc. Nat. Cherbourg, 5: 142, 1858 ("1857").

Syn.: *Arthopyrenia halodytes* (Nyl.) Arnold, *Arthopyrenia kelpii* Körb., *Arthopyrenia orustensis* Erichsen, *Leiophloea halodytes* (Nyl.) Trevis., *Paraphysothele halodytes* (Nyl.) Keissl., *Thelidium halodytes* (Nyl.) Erichsen, *Pyrenocollema halodytes* (Nyl.) R.C. Harris

N - VG (Tretiach 2015s), C - Tosc, Sar, S - Cal (Puntillo 1996), Si (Nimis & al. 1994).

Cr.end/ Cy.h/ S/ Sax/ pH: 4-5, L: 2-3, X: 1, E: 1/ Alt: 1/ MedH: r, MedD: r/ PT: 1-2/ coast, 1/ Note: a subcosmopolitan maritime lichen, common, but often overlooked, along the Italian coasts, most often found on barnacles (*Balanus*), *Patella*, *Littorina* etc, but also on calcareous rocks; the species however may have been confused with *C. foveolatum*: at least the record from the Tremiti Islands by Nimis & Tretiach (1999) refers to that species. Italian material needs revision.

Coniocarpon DC.

Fl. Franç., 2: 323, 1805.

In the molecular analysis of the Arthoniaceae published by Frisch & al. (2014), *Coniocarpon*, previously included in *Arthonia*, was recovered as a monophyletic genus, forming a well-supported clade. Compared to *A. radiata* and related taxa, the *Coniocarpon*-clade accommodates species with a mostly well developed, felty to byssoid thallus and ascomata covered by a thin white or red pruina and typically a felty disc and margin due to projecting tips of paraphysoids and parathecial hyphae; spores are transversely septate with enlarged apical cell or muriform, and frequently turn brown. The secondary chemistry is also different. The genus presently includes c. 5 species. Type: *C. cinnabarinum* DC.

Coniocarpon cinnabarinum DC.

in Lamarck & de Candolle, Fl. Franç., 3, 2 éd.: 323, 1805.

Syn.: *Arthonia affinis* (A. Massal.) Jatta, *Arthonia cinnabarina* (DC.) Wallr., *Arthonia gregaria* (Weigel) Körb. non Fée, *Arthonia gregaria* f. *coccinea* (Flörke) Jatta, *Arthonia tumidula* (Ach.) Ach., *Coniocarpon affine* A. Massal., *Coniocarpon gregarium* var. *glabrum* A. Massal., *Coniocarpon gregarium* var. *opegraphoides* A. Massal., *Lepra kermesina* auct. ital., *Lepra rubens* auct. ital., *Spiloma tumidulum* Ach.

N - Frl, Ven (Lazzarin 2000b, Nascimbene & Marini 2010), TAA (Nascimbene & al. 2007b), Lomb (Valcuvia & Truzzi 2007, 2007b), Piem (Matteucci & al. 2008b), Emil, Lig, C - Tosc (Putorti & Loppi 1999, Pasquinelli & al. 2009, Pasquinelli & Puccini 2010), Marc, Umb (Genovesi & al. 2001, Ravera & al. 2006), Laz (Ravera & al. 2003, Ravera 2006c, Munzi & al. 2007), Abr (Caporale 2015), Sar, S - Camp (Puntillo & al. 2000, Ricciardi & al. 2000, Aprile & al. 2003b, Nimis & Tretiach 2004), Pugl (Nimis & Tretiach 1999), Bas (Nimis & Tretiach 1999), Cal (Puntillo 1995, 1996, Sérusiaux 1998, Puntillo & Puntillo 2012), Si (Nimis & al. 1994, Grillo & Cristaudo 1995).

Cr/ Tr/ S/ Epiph/ pH: 2-3, L: 3-4, X: 2-3, E: 1/ Alt: 1-3/ Mont: er, SmedD: er, SmedH: vr, MedH: r/ PT: 1/ suboc/ Note: a mild-temperate, perhaps holarctic species found on *Fraxinus*, but also on trees with harder, more acid bark, such as *Carpinus*, *Fagus* and even *Quercus ilex*, in open, humid broad-leaved woodlands, e.g. along rivers; more frequent in the past, especially in northern Italy.

Coniocarpon elegans (Ach.) Duby

Bot. Gall., 2nd ed. (Paris), 2: 545-1068, 1830 - *Spiloma elegans* Ach., Lichenogr. Univ.: 135, 1810.

Syn.: *Arthonia elegans* (Ach.) Almq., *Arthonia ochracea* Dufour

N - Ven (Nascimbene & Marini 2010), Lomb (Sundin & Tehler 1998), Piem, Lig (Jatta 1909-1911), C - Tosc, Laz, Abr, S - Camp (Puntillo & al. 2000), Cal (Puntillo 1996, Puntillo & Puntillo 2004, 2012).

Cr/ Tr/ S/ Epiph/ pH: 2, L: 2-3, X: 2, E: 1/ Alt: 1-3/ Mont: er, SmedD: er, SmedH: vr, MedH: er/ PT: 1/ suboc/ Note: a mild-temperate lichen found on smooth bark, e.g. of *Corylus*, in humid woodlands, such as along rivers, often with *Pseudoschismatomma rufescens*. Some earlier Italian records (Nimis 1993: 77) need confirmation. The species is included in the Italian red list of epiphytic lichens as "Vulnerable" (Nascimbene & al. 2013c).

Cornicularia (Schreb.) Hoffm.

Descr. Adumbr. Pl. Crypt. Lich., 2: 36, 1794 - *Lichen Sect. Cornicularia* Schreb., Genera Plantarum: 768, 1791.

A boreal-montane to arctic-alpine, monotypic genus of the Parmeliaceae, differing from *Cetraria* in being firmly attached to the substratum (siliceous rocks), erect, and sparsely branched, with usually abundant apical apothecia. Type: *C. normoerica* (Gunnerus) Du Rietz

Cornicularia normoerica (Gunnerus) Du Rietz

Ark. Bot., 20A, 11: 32, 1926 - *Lichen normoericus* Gunnerus, Fl. Norveg., 2: 123, 1772.

Syn.: *Alectoria tristis* (F.H. Wigg.) Th. Fr., *Cetraria normoerica* (Gunnerus) Lyngé, *Cetraria tristis* (F.H. Wigg.) Fr., *Cornicularia tristis* (F.H. Wigg.) Ach., *Imbricaria tristis* (F.H. Wigg.) Anzi, *Parmelia tristis* (F.H. Wigg.) Spreng., *Platysma triste* (F.H. Wigg.) Nyl.

N - Fri (Tretiaich & Hafellner 2000), Ven, TAA (Caniglia & al. 2002, Thell & al. 2004, Thor & Nascimbene 2007), Lomb (Dalle Vedove & al. 2004), Piem (Morisi & Sereno 1995, Isocrono & al. 2004, Isocrono & Piervittori 2008), VA (Borlandelli & al. 1996, Piervittori & Isocrono 1997, Piervittori & al. 2004, Matteucci & al. 2015c), Lig. C - Sar (Nöske 2000). S - Bas (Potenza & al. 2014), Cal (Puntillo 1996, Potenza & al. 2011), Si.

Frut/ Ch/ S/ Sax/ pH: 1-2, L: 4-5, X: 3-5, E: 2-3/ Alt: 4-6/ Alp: c, Salp: rr, Orom: er/ PT: 1/ Note: a circumpolar, arctic-alpine lichen found on hard, wind-exposed siliceous rocks, with optimum above treeline; common only in the Alps, but reaching the southern Apennines in Calabria and the mountains of Sicilia.

Coscinocladium Kunze

Flora, 29: 768, 1846.

The position of the sterile western Mediterranean crustose-placodioid lichen formerly known as *Lecanora lisbonensis* was investigated by Crespo & al. (2004) using molecular data. The results showed that the species belongs to an independent genus of the Physciaceae, for which the generic name *Coscinocladium* is available. Previous reports of apothecia in the species proved to be a result of mixtures with other lichens. Type: *C. occidentale* Kunze

Coscinocladium gaditanum (Clemente) A. Crespo, Llimona & D. Hawksw.

in Crespo & al., Taxon, 53: 409, 2004 - *Variolaria gaditana* Clemente, Ens. Veg. Andalucia: 295, 1807.

Syn.: *Buellia lisbonensis* (Samp.) Werner, *Lecanora lisbonensis* Samp., *Placodium lisbonensis* (Samp.) Klem., *Psoroma lisbonense* (Samp.) Samp.

C - Sar (Crespo & al. 2004). S - Si (Nimis & al. 1994, Ottonello & Salone 1994, Crespo & al. 2004).

Cr.pl/ Ch/ A.s/ Sax/ pH: 4-5, L: 4, X: 3, E: 2-3/ Alt: 1/ MedH: r, MedD: er/ PT: 1-2/ suboc, coast/ Note: a mainly western, Mediterranean-Atlantic species growing on soft calcareous rocks wetted by rain and exposed to humid maritime winds, mostly on horizontal surfaces, often forming large monospecific stands. It is locally abundant along the western coasts of Sicilia and Sardegna.

Crespoa (D. Hawksw.) Lendemer & B.P. Hodk.

N. Amer. Fung., 7, 2: 3, 2012 - *Parmotrema* subgen. *Crespoa* D. Hawksw., Lichenologist, 43: 647, 2011.

Recent molecular phylogenetic analyses of the lichen family Parmeliaceae have revealed that the members of the *Parmelia crozalsiana* group form a sister clade to a clade containing members of the genus *Parmotrema*. The four species in this group were classified first in *Parmelia*, then in *Pseudoparmelia*, and later in *Canoparmelia*, until they were assigned to the newly created genus *Crespoa* (Lendemer & Hodkinson 2012). Type: *C. crozalsiana* (Harm.) Lendemer & B.P. Hodk.

Crespoa carneopruinata (Zahlbr.) Lendemer & B.P. Hodk.

N. Amer. Fung., 7, 2: 3, 2012 - *Parmelia carneopruinata* Zahlbr., Sber. Akad. Wiss. Wien, Math.-naturw. Kl., Abt. 1, 111: 419, 1902.

Syn.: *Canoparmelia carneopruinata* (Zahlbr.) Elix & Hale, *Parmelia sbarbaronis* B. de Lesd., *Parmotrema carneopruinatum* (Zahlbr.) D. Hawksw., *Pseudoparmelia carneopruinata* (Zahlbr.) Hale

N - Lig (Watson 2014).

Fol.b/ Ch/ A.s/ Epiph/ pH: 2-3, L: 3-4, X: 2, E: 2-3/ Alt: 1-2/ SmedH: er, MedH: er/ PT: 1/ suboc/ Note: this species is very closely related to *C. crozalsiana*, and a more detailed study is needed to ascertain whether the two species should be retained as distinct.

Crespoa crozalsiana (Harm.) Lendemer & B.P. Hodk.

N. Amer. Fung., 7, 2: 3, 2012 - *Parmelia crozalsiana* B. de Lesd. ex Harm., Lich. de France, 4: 555, 1910.

Syn.: *Canoparmelia crozalsiana* (Harm.) Elix & Hale, *Parmotrema crozalsianum* (Harm.) D. Hawksw., *Pseudoparmelia crozalsiana* (Harm.) Hale

N - Lig (Castello & al. 1994, Brunialti & Giordani 2000, 2003, Giordani & al. 2001, Giordani & Incerti 2008). **C - Laz** (TSB 17670). **S - Si** (Ottonello & al. 1994, Iacolino & Ottonello 2006).

Fol.b/ Ch/ A.s/ Epiph/ pH: 2-3, L: 3-4, X: 2, E: 2-3/ Alt: 1-2/ SmedH: er, MedH: er/ PT: 1/ suboc/ Note: a mild-temperate species with subtropical affinities, also reported from North America, locally abundant only - and strangely - in Liguria (especially in *Olea*-plantations), but also sporadically occurring in other warm-humid areas of Tyrrhenian Italy. It is included in the Italian red list of epiphytic lichens as "Endangered" (Nascimbene & al. 2013c). See also note on *C. carneopruinata*.

C r e s p o n e a Egea & Torrente

Mycotaxon, 48: 302, 1993.

Cresponea resembles *Lecanactis*, but is characterised by the epruinose margin of the rounded lecideine apothecia, the yellowish to reddish pruina on the apothecial disc, simple to sparsely branched, non-anastomosing paraphyses and ascospores with a conspicuous endospore. The genus, which belongs to the Opegraphaceae, is mainly tropical and includes c. 17 species. For further details see Egea & Torrente (1993). Type: *C. premnea* (Ach.) Egea & Torrente

Cresponea premnea (Ach.) Egea & Torrente

Mycotaxon, 48: 324, 1993 - *Lecidea premnea* Ach., Lichenogr. Univ.: 173, 1810.

Syn.: *Bacidia corisopitensis* (Piqu.) Zahlbr., *Cresponea premnea* var. *saxicola* (Leight.) Egea & Torrente, *Lecanactis plocina* auct. p.p. non (Ach.) A. Massal., *Lecanactis premnea* (Ach.) Arnold, *Lecanactis premnea* var. *saxicola* (Leight.) H. Olivier

N - Ven, TAA (Nascimbene & al. 2007b), **Lomb** (Egea & Torrente 1993), **Piem** (Isocrono & al. 2004).

Cr/ Tr/ S/ Epiph-Sax/ pH: 2-3, L: 3-4, X: 2, E: 1/ Alt: 1-2/ SmedD: er, MedH: er/ PT: 1/ suboc, u/ Note: a mild-temperate lichen found on bark of old deciduous trees (mainly oaks) in rain-protected faces, more rarely on rock, in very open, humid, park-like woodlands. The specimen from Lombardia was collected on rock. The species is included as "Regionally Extinct" in the Italian red list of epiphytic lichens (Nascimbene & al. 2013c).

C r e s p o r h a p h i s M.B. Aguirre

Bull. Brit. Mus. Nat. Hist., Bot. ser., 21: 146, 1991.

This genus, including 7 species, is distinguished from *Leptorhaphis*, which also has acicular to narrowly fusiform ascospores, by the lack of a well-developed involucrellum, the paraplectenchymatous excipular tissue, and the thin-walled, unilocular asci. It mainly includes non-lichenised bark saprobes, but algal cells are often observed in sections around the ascomata in some species. A key to all species was provided by Calatayud & Aguirre-Hudson (2001). *C. macrospora* (Eitner) M.B. Aguirre and *C. muelleri* (Duby) M.B. Aguirre are known from the Alps outside Italy. Type: *C. wienkampii* (Hazsl.) M.B. Aguirre

Cresporhaphis wienkampii (Hazsl.) M.B. Aguirre

Bull. Brit. Mus. Nat. Hist., Bot. ser., 21: 154, 1991 - *Leptorhaphis wienkampii* J. Lahm ex Hazsl., Verh. Ver. Nat. Heilk. Pressburg, 5: 12, 1861.

C - Abr (Di Santo & Ravera 2012, Corona & al. 2016). **S - Pugl** (Nimis & Tretiach 1999).

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 4, X: 3, E: 1-2/ Alt.: 2/ SmedD: er, SmedH: er/ PT: 1-2/ Note: a mainly temperate species found on rough bark of *Salix*, *Robinia*, deciduous oaks, mainly along bark furrows; certainly more widespread, also in northern Italy. The species is doubtfully lichenised: photobionts were reported from British material only. It is included in the Italian red list of epiphytic lichens as "Data Deficient" (Nascimbene & al. 2013c).

C r o c o d i a Link

Handb. zur Erkenntn. nutz. Gew., 3: 177, 1833.

In their phylogenetic study on the Lobariaceae, Moncada & al. (2013) suggested that the family can be divided into 12 genera, each delimited by a combination of morphological and chemical features. Jørgensen & Galloway (2011) proposed to split the large genus *Pseudocyphellaria*, which has the highest diversity in the Southern Hemisphere, into at least two genera by conserving *Pseudocyphellaria* for the larger *P. crocata* clade (with a conserved type), and using the name *Crocodia* for the small *P. aurata* clade (see also Galloway & Elix 2013). Type: *C. aurata* (Ach.) Link

Crocodia aurata (Ach.) Link

Handb. zur Erkenntn. nutz. Gew., 3: 177, 1833 - *Sticta aurata* Ach., Meth. Lich.: 277, 1803.

Syn.: *Pseudocyphellaria aurata* (Ach.) Vain.

S - Pugl, Si.

Fol.b/ Ch/ A.s/ Epiph/ pH: 2-3, L: 3, X: 1, E: 1/ Alt: 1/ MedH: er/ PT: 0/ oc/ Note: an oceanic-subtropical species of moist, warm, open forests, most probably extinct in Italy. The most recent record dates back to 1923 (Marche), with a record by Jatta from Abruzzo (Nimis 1993: 579): both records, from the eastern side of the Peninsula, being dubious are not accepted here. However, the species was also reported from warm-humid areas of southern Italy (Gargano-Puglia and Sicilia) by Flotow and Rabenhorst (Nimis 1993: 579). In southern Italy there are warm-humid sites which could have hosted this species.

Cryptolechia A. Massal.

Alcuni Gen. Lich.: 13, 1853.

A mainly tropical genus of the Gyalectaceae including 11 species, distinguished from *Gyalecta* by the tiny apothecia with pale discs and the mainly multispored asci (see Kalb 2007). Type: *C. carneolutea* (Turner) A. Massal.

Cryptolechia carneolutea (Turner) A. Massal.

Alcuni Gen. Lich.: 13, 1853 - *Parmelia carneolutea* Turner, Trans. Linn. Soc. London, 9: 145, 1808.

Syn.: *Gyalecta carneolutea* (Turner) H. Olivier, *Gyalectina carneolutea* (Turner) Vězda, *Pachyphiale carneolutea* (Turner) Samp.

N - Lomb. C - Tosc.

Cr/ Tr/ S/ Epiph/ pH: 3, L: 2-3, X: 1-2, E: 1/ Alt: 1-2/ SmedD: er, SmedH: er, MedH: er/ PT: 0/ oc/ Note: a mild-temperate species with subtropical affinities, found on nutrient-rich bark in very humid situations, only known from two old records and perhaps extinct, but to be looked for further in Tyrrhenian Italy. It is included as "Regionally Extinct" in the Italian red list of epiphytic lichens (Nascimbene & al. 2013c).

Cystocoleus Thwaites

Ann. Mag. Nat. Hist., ser. 2, 3: 241, 1849.

The enigmatic sterile filamentous lichens placed in the monotypic genera *Cystocoleus* and *Racodium* are characterised by fungal hyphae which surround a filament of the green alga *Trentepohlia*. Despite their anatomical similarity, molecular data have shown that the two genera are not part of a single monophyletic group (Muggia & al. 2008). The genus *Cystocoleus* is placed in the Racodiaceae and has a temperate to boreal distribution in both Hemispheres. Type: *C. ebeneus* (Dillwyn) Thwaites

Cystocoleus ebeneus (Dillwyn) Thwaites

Ann. Mag. Nat. Hist., ser. 2, 3: 241, 1849 - *Conferva ebenea* Dillwyn, Brit. Corferv.: tab. 101, 1809.

Syn.: *Coenogonium ebeneum* (Dillwyn) A.L. Sm., *Coenogonium germanicum* Glück, *Cystocoleus niger* auct. non (Huds.) Har., *Racodium ebeneum* (Dillwyn) Fr.

N - Frl (Tretiach 2004), **Ven** (Nascimbene & Caniglia 2000), **TAA** (Caniglia & al. 2002, Nascimbene 2005b, 2006c), **Lomb** (Nascimbene 2006), **Piem** (Matteucci & al. 2013), **VA** (Pierivittori & Isocrono 1999), **Emil** (Tretiach & al. 2008), **Lig** (Brunialti & al. 1999). **C - Tosc** (TSB 34222). **S - Bas** (Potenza & al. 2014), **Cal** (Puntillo 1995, 1996, Potenza & al. 2011).

Cr/ Tr/ A.f/ Sax/ pH: 2-3, L: 1-2, X: 1-2, E: 1/ Alt: 1-4/ Salp: er, Orom: er, Mont: vr, SmedD: er, SmedH: vr, MedH: er/ PT: 1/ suboc, u/ Note: a cool-temperate to boreal-montane, probably holarctic lichen found on vertical to underhanging surfaces of siliceous rocks protected from rain in very humid situations, more rarely on soil. The species often grows mixed with *Racodium rupestre*, forming black, felt-like patches over extensive areas of rock; the most commonly associated lichens are species of *Lepraria*; much overlooked, and certainly more widespread, at least in the Alps.

Dacampia A. Massal.

Sulla Lecidea Hookeri: 7, 1853.

This genus of 8 known species is very similar to several other lichenicolous genera placed in the Dacampiaceae. The type species, *D. hookeri*, has been demonstrated to be an independent lichen (Henssen 1995). In *D. engeliana*, however, the fungus modifies the host lichen to form a structure not unlike that of *D. hookeri*. The other lichenicolous, non-lichenised species in the genus tend to cause limited damage or to be commensalistic. The phylogenetic analysis by Ertz & al. (2015) indicates that the family Dacampiaceae is strongly polyphyletic and that the type species of *Dacampia* is placed in Pleosporales. Type: *D. hookeri* (Borrer) A. Massal.

Dacampia engeliana (Saut.) A. Massal.

Geneac. Lich.: 22, 1854 - *Sagedia engeliana* Saut. in Rabenh., Bot. Centralbl.: 406, 1846.

Syn.: *Bertia solorinae* Anzi?, *Pleospora engeliana* (Saut.) G. Winter

N - TAA (Brackel 2016), **Lomb** (Hafellner 2014, Brackel 2016), **Piem** (TSB 34652, Brackel 2016).

LF/ / S/ Terr/ pH: 3-4, L: 2-3, X: 2-3, E: 1/ Alt: 4-5/ Alp: r, Salp: rr/ PT: 1/ paras *Peltigera* and *Solorina* spp./ Note: an arctic-alpine lichenicolous fungus growing on the thalli of *Solorina*, more rarely of *Peltigera*, near or above treeline. The infection usually suppresses the development of ascomata in the host, so that the infested thalli are often sterile.

Dacampia hookeri (Borrer) A. Massal.

Sulla *Lecidea hookeri* di Schaer.: 7, 1853 - *Verrucaria hookeri* Borrer, Engl. Bot. Suppl.: tab. 2622, fig. 2, 1831.

Syn.: *Biatorina sphaerica* A. Massal., *Pleospora hookeri* (Borrer) Keissl.

N - **Frl** (Hafellner & Zimmermann 2012, Brackel 2016), **Ven** (Roux & Triebel 1994, Nascimbene & Caniglia 2003c, Thor & Nascimbene 2007, Nascimbene 2008c, Brackel 2016), **TAA** (Roux & Triebel 1994, Nascimbene & al. 2005, 2006, Nascimbene 2008, Hafellner & Zimmermann 2012), **Lomb** (Anzi Lich. Lang. 524: Roux & Triebel 1994, Brackel 2016), **Piem** (Isocrono & al. 2004, Hafellner & al. 2004, Hafellner & Zimmermann 2012, Brackel 2016), **VA** (vidi!). **C** - **Abr** (Tretiach 2015e, Brackel 2016). **S** - **Cal** (Puntillo 1996, Brackel 2016).

Cr/ Ch/ S/ Terr/ pH: 3-4, L: 3, X: 2-3, E: 1-2/ Alt: 3-5/ Alp: rr, Salp: rc, Orom: er, Mont: er/ PT: 1/ paras *Solorina* spp./ Note: a juvenile parasite on *Solorina*, spp., especially *Solorina saccata*, later becoming autonomous, found on humic soil over calcareous substrata throughout the Alps, and present also in the Apennines, south to Calabria.

Dactylina Nyl.

Syn. Meth. Lich., 1: 286, 1860.

This genus of the Parmeliaceae comprises only 2 species, both characterised by a hollow fruticose thallus, globose to subglobose ascospores, and oblong-citriform pycnoconidia (Kärnefelt & Thell 1996). The species have an arctic to arctic-alpine distribution and occur on soil and amongst bryophytes in tundra-like habitats. Type: *D. arctica* (Hook. f.) Nyl.

Dactylina ramulosa (Hook. f.) Tuck.

Proc. Amer. Acad. Arts Sc., 5: 397, 1862 - *Dufourea ramulosa* Hook., Bot. Appendix Parry J. Sec. Voy.: 414, 1825.

Syn.: *Dufourea muricata* Laurer

N - **TAA** (Tretiach 1993), **Lomb** (Dalle Vedove & al. 2004), **VA** (Piervittori & Isocrono 1999).

Frut/ Ch/ A.f/ Terr/ pH: 3-4, L: 4-5, X: 3-4, E: 1-2/ Alt: 5-6/ Alp: vr/ PT: 1/ Note: an arctic-alpine, circumpolar species found on soil developing from calcareous schists above treeline; probably confined to the Alps in Italy.

Dendrographa Darb.

Ber. deutsch. bot. Ges., 13: 321, 1895.

A two-locus phylogenetic study of the order Arthoniales was published by Ertz & Tehler (2011). Morphological characters such as growth form, fruit body type, exciple, hypothecium and ascospores colour, ascospores septation pattern, and chemistry were found to be of limited use in delimiting families and genera, which indicates an unusual level of plasticity in this group. Several genera, among them *Lecanactis* and *Schismatomma*, were found to be paraphyletic, and some species proved to belong to the genus *Dendrographa*, which in the past included maritime fruticose species only. The genus, which includes c. 6 species, is placed in the Roccellaceae. Type: *D. leucophaea* (Tuck.) Darb.

Dendrographa decolorans (Sm.) Ertz & Tehler

Fungal Divers., 49: 53, 2011 - *Spiloma decolorans* Turner & Borrer ex Sm. in Smith & Sowerby, Engl. Bot.: 34, tab. 2399, 1812.

Syn.: *Arthonia decolorans* (Sm.) Erichsen, *Lepraria decolorans* (Sm.) Almb., *Opegrapha albocincta* Nyl., *Opegrapha pitardii* B. de Lesd., *Schismatomma albocinctum* (Nyl.) Zahlbr., *Schismatomma decolorans* (Sm.) Clauzade & Vězda, *Schismatomma pitardii* (B. de Lesd.) Torrente & Egea

N - **VG, Frl** (TSB 5609), **Emil** (Nimis & al. 1996), **Lig** (Tehler 1993, Giordani & al. 2001, 2002, Brunialti & Giordani 2003, Giordani 2006, Giordani & Incerti 2008). **C** - **Tosc** (Loppi & al. 1999a, 2004c, Putorti & Loppi 1999, Senese & Critelli 2000, Laganà & al. 2002, Stofer 2006, Brunialti & Frati 2010, Brunialti & al. 2012b, Paoli & al. 2012, Benesperi & al. 2013), **Umb** (Ravera 2000, Ravera & al. 2006), **Laz** (Tehler 1993, Ravera & al. 1999, 2003, Massari & Ravera 2002, Stofer 2006, Munzi & al. 2007, Ravera 2008b, Zucconi & al. 2013), **Abr** (Caporale & Pagliani 2010, 2014), **Mol** (Paoli & al. 2015), **Sar** (Tehler 1993, Zedda 2002, 2002b, Cossu 2013). **S** - **Camp** (Aprile & al. 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010), **Pugl** (Nimis & Tretiach 1999, Brackel 2011), **Bas** (Bartoli & Puntillo 1998, Potenza 2006, Potenza & al. 2010), **Cal** (Puntillo 1995, 1996, Puntillo & Puntillo 2004, 2012, Incerti & Nimis 2006), **Si** (Grillo & al. 2009b, Ottonello & al. 2011).

Cr/ Tr/ A.s/ Epiph/ pH: 1-2, L: 1-3, X: 1-2, E: 2-3/ Alt: 1-2/ SmedD: vr, Pad: er, SmedH: rc, MedH: c/ PT: 1-2/ suboc/ Note: a mild-temperate, mostly western species found on ancient oaks in northern Italy, but most abundant in Tyrrhenian Italy (e.g. on orange-trees along the Amalfi coast). The fertile, non-sorediate morph previously called *Schismatomma albocinctum* is genetically identical to the sorediate morph (Ertz &

Tehler 2011); it has a Mediterranean-Atlantic distribution, and is found on bark of *Pinus*, *Juniperus*, *Pistacia* and other shrubs in maritime, very humid situations, being much rarer than the typical, sorediate form.

Dendrographa latebrarum (Ach.) Ertz & Tehler

Fungal Divers., 49: 53, 2011 - *Lichen latebrarum* Ach., Lichenogr. Suec. Prodr.: 7, 1799.

Syn.: *Crocynia albissima* B. de Lesd., *Crocynia fragilissima* Hue, *Crocynia hueana* B. de Lesd., *Crocynia latebrarum* (Ach.) Vain., *Lecanactis latebrarum* (Ach.) Arnold, *Lepra candida* auct. p.p., *Lepraria latebrarum* Ach.

N - **Frl** (Tretiach 2004), **TAA** (Egea & Torrente 1994), **Lomb** (UPS-L-176219).

Lepr/ Tr/ A.s/ Sax/ pH: 2-3, L: 1-2, X: 1-2, E: 1/ Alt: 2-3/ Mont: vr, SmedD: vr/ PT: 1/ u/ Note: a mainly temperate species found beneath underhangs and in crevices of siliceous rocks which are seldom wetted by rain, much more rarely on old trunks of *Quercus*.

D e r m a t o c a r p o n Eschw.

Syst. Lich.: 21, 1824.

Dermatocarpon, with c. 20 species, is characterised by having a foliose thallus attached to the substrate by an umbilicus or by cord-like holdfasts, and a lower cortex composed of thick-walled cells, which makes it the sole foliose member of the Verrucariaceae, other members of the family being crustose, squamulose or even fruticose. Species delimitation within the genus is notoriously difficult because of the morphological plasticity of several species: a thorough molecular study of European material is likely to considerably modify the delimitation of several species. The species of northern Europe and the *D. miniatum*-complex were studied by Heidmarsson (2001, 2003). Good descriptions and a key to the British species are in Orange (2013b). On the whole, the genus is still very poorly known in Italy. Type: *D. miniatum* (L.) W. Mann

Dermatocarpon arnoldianum Degel.

Nytt Mag. Naturvid., 75: 157, 1934.

N - **Frl** (TSB 25120), **Ven** (Nascimbene 2004), **Lomb**, **Piem** (TSB 34466).

Fol.u/ Ch/ S/ Sax/ pH: 3-4, L: 4-5, X: 2-3, E: 1-2/ Alt: 3-5/ Alp: r, Salp: rr, Orom: er, Mont: er/ PT: 1/ 1, #/ Note: a rather poorly understood, but characteristic, perhaps holarctic species found on calciferous or base-rich siliceous rocks in periodically wet places, or near the ground in upland areas.

Dermatocarpon complicatum (Lightf.) W. Mann

Lich. Bohem. Observ. Dispos.: 66, 1825 - *Lichen miniatus* var. *complicatus* Lightf., Fl. Scot., 2: 858, 1777.

Syn.: *Dermatocarpon aquaticum* var. *decepiens* auct., *Dermatocarpon decepiens* auct., *Dermatocarpon luridum* var. *decepiens* auct. non (A. Massal.) Riedl, *Dermatocarpon miniatum* var. *compactum* (Lamy) Zahlbr., *Dermatocarpon miniatum* var. *complicatum* (Lightf.) Th. Fr., *Dermatocarpon miniatum* var. *complicatissimum* (Nyl.) Lettau, *Dermatocarpon fluviatile* var. *decepiens* auct. non (A. Massal.) Vain., *Dermatocarpon weberi* var. *decepiens* auct., *Endocarpon complicatum* (Lightf.) Ach., *Endocarpon decepiens* auct. non A. Massal., *Endocarpon miniatum* var. *decepiens* auct. non A. Massal.

N - **Frl** (TSB 14671), **Ven**, **TAA**, **Lomb**, **Piem** (Isocrono & al. 2004). C - **Tosc**, **Sar** (Nöske 2000).

Fol.u/ Ch/ S/ Sax/ pH: 2-3, L: 3-5, X: 3, E: 1-2/ Alt: 3-5/ Alp: vr, Salp: r, Orom: er, Mont: er/ PT: 1/ #/ Note: in the delimitation of this critical taxon I follow Roux & coll. (2014), who claim that the greatest majority of the records of *D. decepiens* from upland areas refer to this species, which differs from *D. luridum* in the pruinose thallus and the medulla reacting I-.

Dermatocarpon intestiniforme (Körb.) Hasse

Bryologist, 15: 46, 1912 - *Endocarpon intestiniforme* Körb., Parerga Lichenol.: 42, 1859.

Syn.: *Dermatocarpon aquaticum* var. *decepiens* (A. Massal.) Zahlbr. non auct., *Dermatocarpon decepiens* (A. Massal.) Dalla Torre & Sarnth. non auct., *Dermatocarpon fluviatile* var. *decepiens* (A. Massal.) Vain. non auct., *Dermatocarpon luridum* var. *decepiens* (A. Massal.) H. Riedl non auct., *Dermatocarpon polyphyllum* Dalla Torre & Sarnth., *Dermatocarpon weberi* var. *decepiens* (A. Massal.) Lambinon non auct., *Endocarpon decepiens* A. Massal. non auct., *Endocarpon miniatum* var. *decepiens* A. Massal. non auct.

N - **Frl**, **Ven** (Nascimbene & Caniglia 2000, 2003c), **TAA**, **Piem** (Morisi & Sereno 1995, Isocrono & al. 2003, Morisi 2005), **VA** (Piervittori & Isocrono 1997, 1999). C - **Tosc** (TSB 35418), **Umb** (Ravera & Di Toma 2003, Ravera & al. 2006), **Mol** (Ravera & Genovesi 2012, Genovesi & Ravera 2014). **S** - **Cal** (Puntillo 1996).

Fol.n/ Ch/ S/ Sax/ pH: 3-5, L: 4-5, X: 2-3, E: 1-2/ Alt: 3-5/ Alp: r, Salp: rr, Orom: er, Mont: er/ PT: 1/ 1/ Note: a mainly boreal-montane to arctic-alpine, circumpolar lichen found on more or less calciferous rocks in periodically wet places, or near the ground, mostly in upland areas.

Dermatocarpon leptophyllodes (Nyl.) Zahlbr.

Cat. Lich. Univ., 1: 219, 1921 - *Endocarpon leptophyllodes* Nyl., Flora, 59: 576, 1876.

Syn.: *Dermatocarpon diffractum* (Th. Fr.) Blomb. & Forssell, *Dermatocarpon lorenzianum* Anders, *Dermatocarpon miniatum* var. *diffractum* Th. Fr., *Dermatocarpon phonolithicum* Anders

N - **VA** (Piervittori & al. 2004). **S** - **Cal** (Puntillo 1996).

Sq/ Ch/ S/ Sax/ pH: 3, L: 3-4, X: 1-2, E: 1/ Alt: 3-4/ Salp: vr, Orom: er, Mont: er/ PT: 1/ suboc, 1/ Note: a temperate to southern boreal-montane species found on periodically inundated surfaces of basic siliceous

rocks. The species is not easily recognised as belonging to *Dermatocarpon*, the thallus consisting of tightly arranged squamiform lobes (but with the pseudoparenchymatic lower cortex which is typical for the genus). For further details see Orange (1998).

Dermatocarpon leptophyllum (Ach.) K.G.W. Lång

Acta Soc. Fauna Fl. Fenn., 34, 3: 42, 1912 - *Lichen leptophyllus* Ach., Lichenogr. Suec. Prodr.: 141, 1799.

N - Ven, TAA, Lomb. C - Tosc. S - Camp.

Fol.u/ Ch/ S/ Sax/ pH: 3-5, L: 3-5, X: 2-3, E: 1-2/ Alt: 3-5/ Alp: vr, Salp: vr, Mont: vr/ PT: 1/ w/ Note: a species of the *D. miniatum* group with umbilicate thalli usually provided with blackish grey concave lobes, and subglobose uniseriate ascospores in cylindrical asci, found on horizontal or depressed rock faces of calcareous rocks in seasonally wet places. Most of the Italian records are old and require re-confirmation (see Nimis 1993: 274).

Dermatocarpon luridum (With.) J.R. Laundon

Lichenologist, 16: 222, 1984 - *Lichen luridus* With., Bot. Arrang. Veget. Gr. Brit.: 720, 1776.

Syn.: *Dermatocarpon aquaticum* (Weiss) Zahlbr., *Dermatocarpon fluviatile* (Weber) Th. Fr., *Dermatocarpon weberi* (Ach.) W. Mann, *Endocarpon aquaticum* (Weiss) P. Gaertn. G. Mey. & Scherb., *Endocarpon fluviatile* (Weber) DC.

N - Lomb (Rivellini 1994), **Piem** (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999, Piervittori & al. 2004, Watson 2014), **Emil, Lig** (Brunialti & al. 2001). **C - Tosc, Sar** (Nöske 2000).

Fol.u/ Ch/ S/ Sax/ pH: 2-3, L: 3-5, X: 1-2, E: 1/ Alt: 2-4/ Salp: er, Orom: er, Mont: er, SmedD: erMedH: er/ PT: 1/ 1/ Note: a cool-temperate to subarctic-subalpine, probably circumpolar species found on periodically inundated siliceous rocks near creeks and brooks, or on steeply inclined, shaded faces with frequent water seepage.

Dermatocarpon meiophyllizum Vain.

Acta Soc. Fauna Fl. Fenn., 49, 2: 14, 1921.

Syn.: *Dermatocarpon bachmannii* Anders var. *inundatum* Klem., *Dermatocarpon leptophyllum auct.ital. p.p.*, *Dermatocarpon meiophyllum* Vain.

N - Ven, TAA, Lomb. C - Sar. S - Camp (Ricciardi & al. 2000).

Fol.u/ Ch/ S/ Sax/ pH: 2-3, L: 3-5, X: 1-2, E: 1/ Alt: 2-5/ Alp: vr, Salp: vr, Orom: vr, Mont: er, SmedD: er, SmedH: er/ PT: 1/ 1/ Note: on periodically inundated siliceous rocks, especially in the splash zone of lake shores or along creeks, in seepage tracks on slightly sloping faces. For further information see Orange (1998).

Dermatocarpon miniatum (L.) W. Mann

Lich. Bohemia Observ. Disp.: 66, 1825 - *Lichen miniatus* L., Sp. Pl., 2: 1149, 1753.

Syn.: *Dermatocarpon miniatum* var. *circosodes* (Ach.) Zahlbr.?, *Dermatocarpon miniatum* var. *crispum* (A. Massal.) Zahlbr., *Dermatocarpon miniatum* var. *imbricatum* (A. Massal.) Dalla Torre & Sarnth., *Dermatocarpon miniatum* var. *panniforme* (Lamy) Zahlbr., *Dermatocarpon miniatum* var. *papillosum* (Anzi) Müll. Arg., *Dermatocarpon miniatum* var. *umbilicatum* (Schaer.) Vain., *Endocarpon miniatum* (L.) P. Gaertn., G. Mey & Scherb., *Endocarpon miniatum* var. *aetneum* Tornab., *Endocarpon miniatum* var. *crispum* A. Massal., *Endocarpon miniatum* var. *imbricatum* A. Massal., *Endocarpon miniatum* var. *pruinatum* A. Massal.

N - VG, Frl (Tretiach & Hafellner 2000, Tretiach & Molaro 2007, Breuss 2008), **Ven** (Nimis 1994, Lazzarin 2000b, Nascimbene & Caniglia 1997, 2003c, Caniglia & al. 1999, Nascimbene 2005c, 2008c, Nascimbene & Marini 2007), **TAA** (Nascimbene 2003, 2005b, 2008b, Nascimbene & al. 2005, 2006, Spitale & Nascimbene 2012), **Lomb** (Tretiach 1996, Valcuvia & al. 2003, De Vita & Valcuvia 2004, Dalle Vedove & al. 2004), **Piem** (Isocrono & al. 2004, Isocrono & Piervittori 2008), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Piervittori & al. 2001), **Emil** (Dalle Vedove & al. 2002, Tretiach & al. 2008), **Lig** (Giordani & al. 2016). **C - Tosc** (Benespero 2006 Tretiach & al. 2008), **Marc** (Nimis & Tretiach 1999, Brackel 2015), **Umb** (Panfili 2000, 2007, Ravera & al. 2006), **Laz** (Gigante & Petriccione 1995, Roccardi & al. 2014), **Abr** (Nimis & Tretiach 1999, Caporale & al. 2016), **Mol** (Nimis & Tretiach, 1999, 2004, Caporale & al. 2008, Genovesi & Ravera 2014), **Sar** (Rizzi & al. 2011). **S - Camp** (Garofalo & al. 1999, 2010, Aprile & al. 2003, 2003b, Catalano & al. 2016), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999, Potenza 2006, Brackel 2011), **Cal** (Puntillo 1996), **Si** (Ottonello & al. 1994, Ottonello 1996, Grillo 1998, Grillo & Caniglia 2004, Merlo 2004b).

Fol.u/ Ch/ S/ Sax/ pH: 3-5, L: 3-5, X: 4, E: 3/ Alt: 1-5/ Alp: rr, Salp: c, Orom: rr, Mont: c, SmedD: rc, SmedH: rc, MedH: r, MedD: vr/ PT: 1/ w/ Note: this is the most common species of the genus in Italy; it grows on more or less calciferous and on basic siliceous rocks, from calcareous schists to limestone and dolomite, especially on steeply inclined to underhanging surfaces, and in rain-tracks, from sea level to the Alpine belt.

Dermatocarpon moulinsii (Mont.) Zahlbr.

in Engler & Prantl, Natürl. Pflanzenfam., 1: 60, 1903 - *Endocarpon moulinsii* Mont., Annl. Sc. Nat. Bot., ser. 2, 20: 358, 1843.

Syn.: *Endocarpon miniatum* var. *exasperatum* A. Massal.

N - Frl (Breuss 1995), **Ven, TAA** (Breuss 1995), **Piem, Lig** (Giordani & Brunialti 2000). **C - Sar** (ASU 538417 det. B.D. Ryan).

Fol.u/ Ch/ S/ Sax/ pH: 2-3, L: 3-4, X: 1-2, E: 1/ Alt: 3-5/ Alp: vr, Salp: r, Orom: er, Mont: vr/ PT: 1/
Note: a silicolous, holarctic species of periodically wetted rocks. The record from Venezia Giulia in Nimis (1993: 273) has been excluded, as it refers to a site outside the present borders of Italy.

Dermatocarpon rivulorum (Arnold) Dalla Torre & Sarnth.

Die Flechten von Tirol: 504, 1902 - *Endocarpon rivulorum* Arnold, Verh. zool.-bot. Ges. Wien, 24: 249, 1874.

N - **Frl** (TSB 4608), **TAA** (Nascimbene & al. 2007b), **Lomb, Piem** (Isocrono & al. 2004, Isocrono & Piervittori 2008), **VA** (Piervittori & Isocrono 1999, Isocrono & al. 2008).

Fol.u/ Ch/ S/ Sax/ pH: 2-3, L: 3-4, X: 1-2, E: 1/ Alt: 3-5/ Alp: vr, Salp: r, Mont: vr/ PT: 1/ 1/ Note: a widespread, cool-temperate to arctic-alpine, circumpolar species found on periodically submerged siliceous rocks, in seepage tracks or along small streams, often completely inundated during summer; it also occurs in melt-water seepages below snow-beds and along lakeshores.

Dibaeis Clem.

Genera of Fungi., 78: 175, 1909.

This genus of *c.* 13 species was segregated from *Baeomyces* on the basis of molecular data and of such characters as apothecial colour, amyloidy of the hymenium, ascus type and secondary chemistry. The genus is more closely related to *Icmadophila* than to *Baeomyces* and is presently included in the Icmadophilaceae (Stenroos & al. 2002b). Type: *D. baeomyces* (L. f.) Rambold & Hertel

Dibaeis baeomyces (L. f.) Rambold & Hertel

in Rambold & al., Bibl. Lichenol., 53: 231, 1993 - *Lichen baeomyces* L. f., Suppl. Plant.: 450, 1781 (1782).

Syn.: *Baeomyces roseus* Pers., *Baeomyces roseus* f. *abortivus* A. Massal., *Dibaeis rosea* (Pers.) Clem.

N - **VG, Frl** (Tretlach & Hafellner 2000), **Ven** (Lazzarin 2000b), **TAA** (Caniglia & al. 2002, Nascimbene 2008b, Bilovitz & al. 2014), **Lomb** (Dalle Vedove & al. 2004), **Piem** (Isocrono & al. 2004, Isocrono & Piervittori 2008), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999), **Emil, Lig** (Watson 2014). **C - Tosc** (Benespero & al. 2007), **Marc. S - Si**.

Cr/ Ch/ S/ Terr/ pH: 1-2, L: 3-4, X: 2-3, E: 1-2/ Alt: 2-5/ Alp: vr, Salp: r, Orom: vr, Mont: rr, SmedD: vr, Pad: er, SmedH: vr/ PT: 1/ p/ Note: on humid, disturbed clay soil, often in *Calluna*-heaths, most frequent in upland areas. For further details see Gierl & Kalb (1993).

Dimelaena Norman

Nytt Mag. Naturvid., 7: 231, 1852.

A subcosmopolitan genus of *c.* 8 species, which was segregated from *Rinodina* on the basis of the placodioid thalli and unthickened spore walls. However, several morphological, chemical and molecular studies have shown that *D. radiata* is closely related to *Buellia tessarata*, so that both taxa should be recognised under the same generic name (either *Buellia* or *Dimelaena*), depending on the phylogenetic position of the type species, *D. oreina*. As a consequence, *Dimelaena* belongs now into the Caliciaceae and not in the Physciaceae (see *e.g.* Helms & al. 2003). Type: *D. oreina* (Ach.) Norman

Dimelaena lichenicola K. Knudsen, Sheard, Kocourk. & H. Mayrhofer

Bryologist, 116: 259, 2013.

N - **TAA** (Knudsen & al. 2013).

Cr/ Ch/ S/ Sax/ pH: 1-3, L: 4-5, X: 4-5, E: 1-4/ Alt: 2-3/ Mont: er, SmedD: er/ PT: 1/ subc/ Note: a lichenicolous lichen growing on *D. oreina*, described from California; the Italian record is the only one from Europe.

Dimelaena oreina (Ach.) Norman

Nytt Mag. Naturvid., 7: 231, 1852 - *Lecanora straminea* Ach. var. *oreina* Ach., Lichenogr. Univ.: 433, 1810.

Syn.: *Beltramia oreina* (Ach.) Trevis., *Dimelaena griseoviridis* (H. Magn.) Vězda, *Lecanora mougeotioides* Nyl., *Lecanora oreina* (Ach.) Ach., *Rinodina altissima* H. Magn., *Rinodina hueana* Vain., *Rinodina mougeotioides* (Nyl.) Mong., *Rinodina oreina* (Ach.) A. Massal., *Rinodina oreina* var. *mougeotioides* (Nyl.) Zahlbr.

N - **Frl, Ven, TAA** (Rambold & al. 1994, Nascimbene 2008b), **Lomb** (Dalle Vedove & al. 2004, Brackel 2013), **Piem** (Morisi & Sereno 1995, Allisiardi 2001, Isocrono & al. 2003, 2004, Isocrono & Piervittori 2008), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Piervittori & al. 1998, 2001, 2004, Isocrono & al. 2008, Favero-Longo & Piervittori 2009, Matteucci & al. 2015c), **Lig** (UPS-L-524279). **C - Abr, Sar. S - Si** (Nimis & al. 1996b).

Cr/ Ch/ S/ Sax/ pH: 1-3, L: 4-5, X: 4-5, E: 1-4/ Alt: 1-5/ Alp: rc, Salp: c, Orom: vr, Mont: rr, SmedD: vr, MedD: er/ PT: 1/ subc/ Note: a widespread, holarctic species found on hard siliceous rocks, incl. quartz, in sunny-dry situations, often on steeply inclined faces, common only in dry-continental areas, from some parts of the Mediterranean coast to dry Alpine valleys; the species is chemically variable (see *e.g.* Rico & al. 2006), and a chemical study of Italian populations is still wanting.

Diploicia A. Massal.
Ric. Auton. Lich. Crost.: 86, 1852.

Initial molecular studies by Molina & al. (2002) and Crespo & al. (2004) indicated that *Diploicia* and *Diploicia* formed a monophyletic clade in the Physciaceae so that those authors considered the two genera as synonymous. This was rejected in a genetic analysis carried out by Helms & al. (2003), a view that is adopted here (see also Roux & coll. 2014). The genus, which includes placodioid species only, is related to the non-placodioid genus *Endohyalina* (Giralt & al. 2010), and is placed in the Caliciaceae. Type: *D. canescens* (Dicks.) A. Massal.

Diploicia canescens (Dicks.) A. Massal.

Ric. Auton. Lich. Crost.: 86, 1852 - *Lichen canescens* Dicks., Fasc. Pl. Cryptog. Brit., 1: 10, 1785.

Syn.: *Buellia canescens* (Dicks.) De Not., *Catolechia canescens* (Dicks.) Anzi, *Lecidea canescens* (Dicks.) Ach., *Placodium canescens* (Dicks.) DC.

N - **VG**, **Ven**, **TAA** (Dalla Torre & Sarnthein 1902), **Lomb**, **Emil** (Valcuvia & Grieco 1995, Bouvet 2008), **Lig** (Valcuvia & al. 2000). **C** - **Tosc** (Monaci & al. 1997, Pišút 1997, Loppi & al. 1997, 1998b, 2002, 2004c, Putorti & Loppi 1999, Bacci & al. 2000, Senese & Critelli 2000, Del Guasta 2001, Lorenzini & al. 2003, Frati & al. 2007, 2008, Pasquinelli & al. 2009, Benesperi & al. 2013), **Marc** (Nimis & Treliach 1999, Frati & Brunialti 2006), **Umb** (Panfili 2000b, Ravera & al. 2006, Genovesi 2011), **Laz** (Bartoli & al. 1997, Massari & Ravera 2002, Ravera & al. 2003, Ruisi & al. 2005, Munzi & al. 2007, Ravera 2008b, Genovesi & al. 2011, Zucconi & al. 2013, Genovesi & Ravera 2014b, Brackel 2015), **Abr** (Nimis & Treliach 1999, Brackel 2015), **Mol** (Garofalo & al. 1999, Nimis & Treliach 1999, Caporale & al. 2008), **Sar** (Monte 1993, Zedda 1995, 2002, 2002b, Nöske 2000, Rizzi & al. 2011, Kodnik & al. 2011, Giordani & al. 2013, Cossu 2013). **S** - **Camp** (Garofalo & al. 1999, 2010, Ricciardi & al. 2000, Aprile & al. 2003b, Nimis & Treliach 2004, Catalano & al. 2012, 2016), **Pugl** (Garofalo & al. 1999, Nimis & Treliach 1999, Durini & Medagli 2002, 2004, Brackel 2011), **Bas** (Bartoli & Puntillo 1998, Nimis & Treliach 1999, Potenza 2006, Potenza & al. 2010), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994, Ottonello & Salone 1994, Ottonello & al. 1994, 2011, Ottonello 1996, Ottonello & Romano 1997, Grillo 1998, Grillo & al. 2001, 2002, 2009, Grillo & Caniglia 2004, 2006, Caniglia & Grillo 2006b, Cataldo & Cannavò 2014, Cataldo & Minissale 2015).

Cr.pl/ Ch/ A.s/ Epiph-Sax/ pH: 3-5, L: 3-5, X: 2-3, E: 2-4/ Alt: 1-2/ SmedD: er, SmedH: rc, MedH: c, MedD: er/ PT: 1-2/ suboc, u/ Note: a rather western and southern lichen in Europe, found on a wide variety of substrata including base-rich or eutrophicated bark, calciferous sandstone, and limestone, sometimes also found in underhangs of calcareous rocks protected from rain; rare in northern Italy and along the eastern side of the Peninsula. All records from Piemonte (see Nimis 1993: 277) and Valle d'Aosta (see Piervittori & Isocrono 1999: 119), being dubious, are not accepted here. See also note on *D. subcanescens*.

Diploicia subcanescens (Werner) Hafellner & Poelt

Herzogia, 5: 59, 1979 - *Buellia subcanescens* Werner, Bull. Soc. Hist. Nat. Afrique du Nord, 47: 90, 1956.

Syn.: *Buellia leptina* J. Steiner

C - **Tosc** (Brackel 2015), **Sar** (Rizzi & al. 2011). **S** - **Bas** (Potenza 2006, Potenza & al. 2010, Potenza & Fascetti 2012), **Cal** (Puntillo 1996), **Si** (Ottonello & Romano 1997, Ottonello & al. 2011).

Cr.pl/ Ch/ S/ Sax/ pH: 1-3, L: 4-5, X: 2-3, E: 1-2/ Alt: 1/ MedH: vr/ PT: 1/ coast/ suboc/ Note: a southern Mediterranean-Atlantic lichen found on siliceous rocks subject to humid, maritime winds, exclusively Tyrrhenian in Italy. Although there is some molecular evidence (Molina & al. 2002) that this is a synonym of *D. canescens*, I am not yet convinced (see also Roux & coll. 2014), and I prefer to maintain *D. subcanescens* as distinct from *D. canescens*.

Diploschistella Vain.

Ann. Univ., fenn. Aboënsis, Ser. A 2, 3: 26, 1926.

This genus was first established by Vainio for *D. urceolata*, without realising that his new species was conspecific with *Lecidea athalloides* Nyl. described 66 years earlier. When Vězda erected the new genus *Gyalideopsis* he overlooked that *D. urceolata* was conspecific with *L. athalloides*, and that a name was already available for his new genus. In a recent phenotype-based phylogenetic analysis, Lücking & al. (2005) showed that several small groups previously included within *Gyalideopsis* fell outside this genus, among them *G. athalloides* and its relatives, characterised by growth on inorganic substrata, a thin thallus, and immersed-erumpent apothecia with both a proper margin and an irregular thalline rim. The genus *Diploschistella* was therefore reinstated for this group of 4 species; it is placed in the Gomphillaceae. Type: *D. urceolata* Vain.

Diploschistella athalloides (Nyl.) Lücking, Knudsen & Fryday

in Nash & al., Lichen Flora Gr. Sonoran Desert Reg., 3: 228, 2007 - *Lecidea athalloides* Nyl., Bull. Soc. bot. Fr., 7: 503, 1860.

Syn.: *Diploschistella urceolata* Vain., *Gyalidea psammoica* (Nyl.) Lettau, *Lopadium athalloides* (Nyl.) Samp., *Gyalideopsis athalloides* (Nyl.) Vězda, *Lopadium newtonii* Samp.

S - **Cal** (Puntillo 1996, Puntillo & Puntillo 2004).

Cr/ Ch/ S/ Terr/ pH: 1-2, L: 3, X: 1-2, E: 1/ Alt: 1-2/ SmedH: er, MedH: er/ PT: 0/ p/ Note: a species with an ephemeral, thin thallus recalling an algal film, or completely immersed in the uppermost soil layers,

with immersed-erumpent apothecia, thin-branched and anastomosing paraphyses, and asci with submuriform ascospores; it grows on acid clay soil in disturbed and periodically dry habitats within open, otherwise very humid forests; widely distributed in both Hemispheres, but with scattered records only.

Diploschistes Norman

Nyt. Mag. Naturvid., 7: 232, 1853.

The genus *Diploschistes*, presently included into the Graphidaceae, comprises more than 30 species of crustose, saxicolous or terricolous lichens with a carbonised proper excipulum with lateral paraphyses, and a chemistry dominated by orcinol depsides. *D. ocellatus*, which lacks these excipular characters and has β -orcinol depsidones, was transferred to the new genus *Xalocoa* by Kraichak & al. (2013). A revision based on morphological, chemical, and molecular data was published by Fernández-Brime & al. (2013), who distinguished three lineages treated as distinct subgenera. The analysis also revealed that for some taxa, such as *D. scruposus* and *D. interpediens*, molecular variability does not correlate with either morphological or chemical diversity. Type: *D. scruposus* (Schreb.) Norman

Diploschistes actinostoma (Ach.) Zahlbr.

Hedwigia, 31: 34, 1892 - *Verrucaria actinostoma* Pers. ex Ach., Lichenogr. Univ.: 288, 1810.

Syn.: *Acrorixis actinostoma* (Ach.) Trevis., *Diploschistes sbarbaronis* B. de Lesd., *Limboria actinostoma* (Ach.) A. Massal., *Limboria actinostoma* var. *basalticola* A. Massal., *Limboria actinostoma* var. *trachytica* A. Massal., *Urceolaria actinostoma* var. *basalticola* (A. Massal.) Jatta, *Urceolaria actinostoma* var. *trachytica* (A. Massal.) Jatta

N - VG, Ven (Lazzarin 2000b), **TAA, Lomb, Piem** (Isocrono & al. 2004, Isocrono & Piervittori 2008), **VA** (Piervittori & Isocrono 1999), **Emil, Lig. C - Tosc, Marc** (Nimis & Tretiach 1999), **Umb** (Panfili 2000, 2003, Ravera & al. 2006, Genovesi 2011), **Laz** (Tretiach 2004), **Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **Sar** (Monte 1993, Rizzi & al. 2011, Terribile & al. 2012, Giordani & al. 2013, Cossu & al. 2015), **S - Camp** (Ricciardi & al. 2000, Aprile & al. 2003b), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996, Puntillo & Puntillo 2004), **Si** (Ottonello & Romano 1997, Grillo 1998, Poli & al. 1998, Grillo & Caniglia 2004, Ottonello & al. 2011).

Cr/ Ch/ S/ Sax/ pH: 3-4, L: 4-5, X: 3-4, E: 2-3/ Alt: 1-3/ Mont: er, SmedD: vr, Pad: er, SmedH: c, MedH: rc, MedD: er/ PT: 1-2/ Note: a mild-temperate lichen found on basic siliceous substrata, incl. roofing tiles, more rarely on porous, weakly calciferous rocks, most frequent and abundant in Tyrrhenian Italy, rarer in the eastern part of Peninsular Italy, where it is also found on limestone. The specific epithet is usually misspelled as “*actinostomus*”, but it is a name, not an adjective, meaning “a mouth with rays”.

Diploschistes caesioplumbeus (Nyl.) Vain.

Bot. Mag. Tokyo, 35: 70, 1921 - *Urceolaria actinostoma* var. *caesioplumbea* Nyl., Bull. Soc. Linn. Normandie, sér. 2, 6: 264, 1872.

Syn.: *Diploschistes actinostoma* var. *caesioplumbeus* (Nyl.) J. Steiner

N - Lig. C - Tosc, Sar.

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4-5, X: 3, E: 2-3/ Alt: 1-2/ SmedH: vr, MedH: r/ PT: 1/ suboc, coast, paras *Lecanora gangaleoides*/ Note: a mild-temperate lichen found on base-rich, mostly coastal siliceous rocks in the supralittoral zone, widely distributed along the Atlantic and Mediterranean coasts and exclusively Tyrrhenian in Italy; it often starts the life-cycle on *Lecanora gangaleoides*. Earlier records from Emilia and Trentino (see Nimis 1993: 278), being dubious, are not accepted here.

Diploschistes candidissimus (Kremp.) Zahlbr.

Cat. Lich. Univ., 2: 660, 1924 - *Limboria candidissima* Kremp. in Unger & Kotschy, Die Insel Cypern: 166, 1865.

Syn.: *Acrorixis actinostoma* var. *tectorum* (A. Massal.) Trevis., *Diploschistes actinostoma* var. *farinosus* (Anzi) Zahlbr., *Diploschistes calcareus* (Müll. Arg.) J. Steiner, *Diploschistes farinosus* (Anzi) Vězda, *Limboria actinostoma* var. *tectorum* A. Massal., *Urceolaria actinostoma* var. *farinosa* Anzi, *Urceolaria actinostoma* var. *tectorum* (A. Massal.) Jatta

N - Ven (Lazzarin 2000b), **TAA, Piem** (TSB 33971). **C - Tosc.**

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 3-4, X: 3, E: 1-2/ Alt: 1-3/ Mont: er, SmedD: er, SmedH: vr, MedH: vr/ PT: 1/ Note: a mainly Mediterranean species growing on compact calciferous rocks, also found in dry Alpine valleys. The species is both morphologically and molecularly different from *D. actinostoma*.

Diploschistes diacapsis (Ach.) Lumbsch

Lichenologist, 20: 20, 1988 - *Urceolaria diacapsis* Ach., Syn. Meth. Lich.: 339, 1814.

Syn.: *Diploschistes albescens* Lettau, *Diploschistes albissimus* (Ach.) Dalla Torre & Sarnth., *Diploschistes gypsaceus* auct. p.p., *Diploschistes induratus* (Vain.) Zahlbr., *Diploschistes minor* (Kremp.) Zahlbr., *Diploschistes ocellatus* var. *fallax* Werner, *Diploschistes scruposus* subsp. *albescens* (Lettau) Clauzade & Cl. Roux, *Diploschistes steppicus* Reichert, *Urceolaria scruposa* var. *diacapsis* (Ach.) Nyl., *Urceolaria sicula* Jatta?

N - TAA, Lomb, Piem (Isocrono & Falletti 1999, Morisi 2005), **Emil** (Nimis & al. 1996), **Lig. C - Tosc. S - Camp, Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo & Puntillo 2004), **Si** (Pišút 1995).

Cr/ Ch/ S/ Terr/ pH: 3-4, L: 4-5, X: 4-5, E: 1-3/ Alt: 1-3/ Mont: er, SmedD: vr, SmedH: r, MedH: r, MedD: rr/ PT: 1/ subc/ Note: a widespread species of arid grasslands, found on calciferous or base-rich soil, especially on gypsum, in open, dry situations; perhaps more widespread throughout the country.

Diploschistes euganeus (A. Massal.) J. Steiner

Verh. zool.-bot. Ges. Wien, 69: 96, 1919 - *Limboria euganea* A. Massal., Ric. Auton. Lich. Crost.: 155, 1852.

Syn.: *Diploschistes clausus* (Flot.) Zahlbr., *Urceolaria euganea* (A. Massal.) Jatta, *Urceolaria subsordida* Nyl.

N - Ven (Lazzarin 2000b), **TAA, Lomb** (De Vita & Valcuvia 2004), **Emil, Lig** (Valcuvia & al. 2000). **C - Tosc, Laz, Sar** (Rizzi & al. 2011). **S - Camp** (Nimis & Tretiach 2004), **Bas** (Nimis & Tretiach 1999), **Cal** (Nimis & Puntillo 2003, Puntillo 2011), **Si**.

Cr/ Ch/ S/ Sax/ pH: 3, L: 4-5, X: 3-4, E: 2-4/ Alt: 1-2/ SmedD: er, SmedH: rr, MedH: r/ PT: 1-2/ Note: a mild-temperate lichen found on basic siliceous rocks, more rarely on brick and roofing tiles, in warm-humid areas, sometimes starting the life-cycle on *Ochrolechia parella*; most frequent in Tyrrhenian Italy.

Diploschistes gypsaceus (Ach.) Zahlbr.

Hedwigia, 31: 35, 1892 - *Urceolaria gypsacea* Ach., Lichenogr. Univ.: 338, 1810.

Syn.: *Diploschistes cretaceus* (Ach.) Lettau, *Diploschistes ochrophanes* Lettau, *Diploschistes scruposus* subsp. *cretaceus* (Ach.) Clauzade & Cl. Roux, *Diploschistes scruposus* subsp. *ochrophanes* (Lettau) Clauzade & Cl. Roux, *Gyalecta cretacea* Ach.

N - VG (Tretiach & al. 2007b), **Frl** (Tretiach & Hafellner 2000), **Ven, TAA** (Nascimbene 2008b), **Lomb, Piem, Emil, Lig, C - Tosc, Marc** (Nimis & Tretiach 1999), **Umb** (Genovesi & Ravera 2001, Ravera & al. 2006), **Laz** (Genovesi & al. 2011), **Abr, Mol** (Ravera & Genovesi 2012, Genovesi & Ravera 2014), **Sar** (Rizzi & al. 2011). **S - Camp** (Aprile & al. 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010), **Bas, Cal** (Puntillo 1996), **Si** (Grillo 1998, Grillo & Caniglia 2004, Grillo & al. 2007b, Brackel 2008b, Ottonello & al. 2011, Cataldo & Minissale 2013, 2015).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 2-3, X: 2-3, E: 1/ Alt: 1-4/ Salp: er, Orom: er, Mont: r, SmedD: r, SmedH: rr, MedH: er/ PT: 1/ u/ Note: a widespread temperate to southern boreal-montane lichen found in rock fissures, on vertical or underhanging surfaces of calcareous rocks, often in woodlands, with a wide altitudinal range.

Diploschistes muscorum (Scop.) R. Sant. subsp. *muscorum*

in Hawksworth & al., Lichenologist, 12: 106, 1980 - *Lichen muscorum* Scop., Fl. Carniol., 2: 365, 1772.

Syn.: *Diploschistes bryophilus* (Ehrh.) Zahlbr., *Diploschistes lichenicola* (Mont. & Fr.) Vain., *Diploschistes scruposus* f. *argillosus* (Ach.) Dalla Torre & Sarnth., *Diploschistes scruposus* f. *muscicola* (Anzi) Zahlbr., *Diploschistes scruposus* subsp. *muscorum* (Scop.) Clauzade & Cl. Roux, *Diploschistes scruposus* var. *arenarius* (Schaer.) Müll. Arg., *Diploschistes scruposus* var. *bryophilus* (Ehrh.) Müll. Arg., *Diploschistes scruposus* var. *parasiticus* (Sommerf.) Zahlbr., *Dothidea lichenum* Sommerf., *Lichen impressus* Sw., *Stictis lichenicola* Mont. & Fr., *Urceolaria scruposa* f. *muscicola* Anzi, *Urceolaria scruposa* var. *iridata* A. Massal.

N - VG, Frl (Tretiach 1996), **Ven** (Caniglia & al. 1999, Lazzarin 2000b, Nascimbene 2002, 2008, Nascimbene & Marini 2007, Brackel 2013), **TAA** (De Benetti & Caniglia 1993, Nascimbene & al. 2008c, Nascimbene 2008b), **Lomb** (Valcuvia & al. 2003, De Vita & Valcuvia 2004), **Piem** (Isocrono & al. 2004, 2006, Hafellner & al. 2004, Morisi 2005), **VA** (Pierivittori & Isocrono 1999), **Emil** (Tretiach & al. 2008), **Lig, C - Tosc** (Lastrucci & al. 2009), **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera 2000, Ravera & al. 2006, Panfili 2007, Brackel 2015), **Laz** (Gigante & Petriccione 1995, Brackel 2015), **Abr** (Corona & al. 2016), **Mol** (Ravera & Genovesi 2012, Genovesi & Ravera 2014), **Sar** (Zedda 1995, 2002, 2002b, Nöske 2000, Zedda & al. 2010, Rizzi & al. 2011, Cogoni & al. 2011, Cossu 2013). **S - Camp** (Aprile & al. 2002, Nimis & Tretiach 2004, Catalano & al. 2016), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999, Potenza 2006), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994, Ottonello & Salone 1994, Ottonello & al. 1994, 2011, Ottonello & Romano 1997, Merlo 2004, 2004b, Grillo & al. 2007, Cataldo & Minissale 2015).

Cr/ Ch/ S/ Terr/ pH: 3-4, L: 4-5, X: 4-5, E: 1-3/ Alt: 1-5/ Alp: er, Salp: rr, Orom: r, Mont: rc, SmedD: r, Pad: er, SmedH: vr, MedH: vr, MedD: r/ PT: 1-2/ paras other lichens/ Note: a holarctic lichen, often - but apparently not always - parasitic on *Cladonia squamules* (especially *C. pocillum* and *C. symphycarpa*, sometimes also on the podetia of *Cladonia rangiformis*), generally on mosses and plant debris in dry grasslands on limestone, with a wide altitudinal range. Not always distinguished from *D. diacapsis* in the older literature and related to *D. scruposus*.

Diploschistes neutrophilus (Clauzade & Cl. Roux) Fern.-Brime & Llimona

in Fernandez-Brime & al., Taxon, 62: 277, 2013 - *Diploschistes gypsaceus* subsp. *neutrophilus* Clauzade & Cl. Roux, Bull. Soc. Bot. Centre-Ouest, n. sér., nr. spéc. 7: 823, 1985.

S - Cal (TSB 32894).

Cr/ Ch/ S/ Terr/ pH: 2-3, L: 4, X: 4-5, E: 1-2/ Alt: 1/ MedH: vr, MedD: vr/ PT: 1/ Note: this taxon was originally segregated from *D. gypsaceus* on account of its different ecology (it grows on neutral sandy to clay soil) and the amyloid reaction of the medulla, a character not confirmed by Fernández-Brime & al. (2013), but their molecular data indicate that this, in spite of the very weak morphological differences, is a good species, well distinguished from the calcicolous *D. diacapsis*. The species might be more widespread in Italy.

Diploschistes scruposus (Schreb.) Norman

Nytt Mag. Naturvid., 7: 232, 1853 - *Lichen scruposus* Schreb., Spicil. Fl. Lips.: 133, 1771.

Syn.: *Diploschistes gypsaceus* subsp. *interpediens* (Nyl.) Clauzade & Cl. Roux, *Diploschistes interpediens* (Nyl.) Zahlbr., *Diploschistes pychochrous* Lettau, *Diploschistes scruposus* f. *centrosus* Werner, *Diploschistes scruposus* f. *flavescens* Zahlbr., *Diploschistes scruposus* subsp. *pychochrous* (Lettau) Clauzade & Cl. Roux, *Diploschistes scruposus*

subsp. *violarius* (Nyl.) Clauzade & Cl. Roux, *Diploschistes scruposus* var. *clauzadei* B. de Lesd., *Diploschistes violarius* (Nyl.) Zahlbr.

N - VG, Frl (Tretiach & Hafellner 2000), **Ven** (Nascimbene & Caniglia 2003c, Nascimbene 2005c), **TAA** (Caniglia & al. 2002, Nascimbene 2001b, 2005b, 2008b, Brackel 2013), **Lomb** (Dalle Vedove & al. 2004, Brackel 2010), **Piem** (Morisi & Sereno 1995, Isocrono & al. 2004, Isocrono & Piervittori 2008), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Piervittori & al. 2001, 2004, Matteucci & al. 2015c), **Emil** (Tretiach & al. 2008), **Lig** (Valcuvia & al. 2000). **C - Tosc** (Pišút 1997), **Marc, Umb** (Panfili 2000b, Ravera & al. 2006), **Laz** (Bartoli 1997b, Genovesi & al. 2011, Brackel 2015), **Abr, Sar** (Nöske 2000, Rizzi & al. 2011). **S - Camp** (Ricciardi & al. 2000, Aprile & al. 2002, Nimis & Tretiach 2004, Catalano & al. 2016), **Pugl, Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996, Brackel & Puntillo 2016), **Si** (Czeczuga & al. 1994, 1999, Poli & al. 1995, Nimis & al. 1996b, Grillo & al. 1996, Ottonello & Romano 1997, Grillo 1998, Grillo & Caniglia 2004, Brackel 2008b, Ottonello & al. 2011, Cataldo & Minissale 2013).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 3-5, X: 3-4, E: 1-3/ Alt: 1-5/ Alp: er, Salp: rr, Orom: vr, Mont: rc, SmedD: rr, Pad: vr, SmedH: rc, MedH: c, MedD: vr/ PT: 1-2/ Note: a widespread holarctic lichen found on siliceous rocks, more rarely on soil, with a wide altitudinal range. Formerly frequently confused with similar species. The species, in its present circumscription, seems to be heterogeneous (see Fernández-Brime & al. 2013).

Diplotomma Flot.

Bot. Zeit., 8: 381, 1850.

Initial molecular studies indicated that *Diplotomma* and *Diploicia* formed a monophyletic clade in the Physciaceae (Molina & al. 2002, Crespo & al. 2004) and, consequently, those authors considered the two genera to be synonymous. This was rejected in a genetic analysis carried out by Helms & al. (2003), who also confirmed that both genera are members of the Caliciaceae. The genus includes c. 30, mostly poorly known and/or problematic species, and is insufficiently known in Italy. Here I do not always follow Nordin (1996) in considering several species as synonyms (see e.g. note on *D. hedinii*). Type: *D. alboatrum* (Hoffm.) Flot.

Diplotomma alboatrum (Hoffm.) Flot.

Uebers. Schles. Ges. vaterl. Kultur: 130, 1849 - *Lichen alboater* Hoffm., Enum. Lich. Icon.: 30, 1784.

Syn.: *Abacina alboatra* (Hoffm.) Norman, *Buellia alboatra* (Hoffm.) Th. Fr., *Buellia alboatra* var. *ambigua* (Ach.) Th. Fr., *Buellia alboatra* var. *subochracea* Zahlbr., *Buellia alboatra* var. *vulgata* Th. Fr., *Buellia alboatra* var. *zabotica* (Körb.) Th. Fr., *Buellia ambigua* (Ach.) Malme, *Buellia atromaculata* Sandst., *Buellia epipolia* (Ach.) Mong. non auct., *Buellia lainea* (Ach.) Clauzade & Ozenda, *Buellia subochracea* (Zahlbr.) J. Steiner, *Diplotomma ambiguum* (Ach.) Flagey, *Diplotomma epipolium* (Ach.) Arnold non auct., *Diplotomma epipolium* var. *ambiguum* (Ach.) Arnold, *Diplotomma heppianum* (Müll. Arg.) Arnold, *Diplotomma subochraceum* (Zahlbr.) Szatala, *Diplotomma tegulare* Körb., *Lecidea ambigua* Ach., *Lecidea heppiana* Müll. Arg., *Lichen epipolius* Ach. non auct., *Rhizocarpon alboatrum* (Hoffm.) Anzi, *Rhizocarpon soreumidium* (stirt.) A.L. Sm.

N - VG, Frl, Ven (Thor & Nascimbene 2007), **TAA** (Hafellner 1979, Nascimbene & al. 2007b, Nascimbene 2008b, Nimis & al. 2015), **Lomb, Piem** (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999), **Emil, Lig** (Giordani & al. 2016). **C - Tosc** (Tretiach & Nimis 1994, Loppi & al. 1995, 1998, 2006, Loppi & Putortì 1995, Putortì & al. 1998, Loppi & Fratì 2006, Brunialti & Fratì 2010, Benesperi 2011), **Marc** (Nimis & Tretiach 1999, Fratì & Brunialti 2006), **Umb** (Ravera 1998, Panfili 2000, 2000b, Ravera & al. 2006, Genovesi 2011), **Laz** (Bartoli & al. 1997, 1998, Massari & Ravera 2002, Roccardi 2003, Munzi & al. 2007, Genovesi & al. 2011), **Abr** (Olivieri & al. 1997, 1997b, Loppi & al. 1999, Nimis & Tretiach 1999), **Mol** (Garofalo & al. 1999, Nimis & Tretiach 1999, Caporale & al. 2008, Ravera & al. 2009, Genovesi & Ravera 2014), **Sar** (Zedda & al. 2001, Zedda 2002, Rizzi & al. 2011, Cossu 2013). **S - Camp** (Garofalo & al. 1999, 2010, Aprile & al. 2002, 2003, 2003b, Catalano & al. 2012, 2016), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999, Potenza 2006, Paoli & al. 2006, Potenza & al. 2010, Brackel 2011), **Cal** (Puntillo 1995, 1996, Puntillo & Puntillo 2004), **Si** (Nimis & al. 1994, Grillo & Cristaudo 1995, Grillo & Carfi 1997, Ottonello & Romano 1997, Grillo 1998, Poli & al. 1998, Caniglia & Grillo 2001, Grillo & al. 2001, Grillo & Caniglia 2004, 2006, Ottonello & al. 2011, Liistro & Cataldo 2011).

Cr/ Ch/ S/ Epiph-Sax/ pH: 3-4, L: 4-5, X: 4-5, E: 3-4/ Alt: 1-3/ Mont: er, SmedD: r, Pad: er, SmedH: rr, MedH: r, MedD: vr/ PT: 1-2/ Note: a mild-temperate to southern boreal-montane lichen found on bark and on base-rich or slightly calciferous rocks, brick, roofing tiles etc., below the subalpine belt. See also note on *D. nivale*.

Diplotomma chlorophaeum (Leight.) Kr.P. Singh & S.R. Singh

Bull. Bot. Surv. India 26, 12: 64, 1985 - *Lecidea chlorophaea* Hepp ex Leight., Lich. Fl. Gr. Brit.: 328, 1871.

Syn.: *Buellia chlorophaea* (Leight.) Lettau, *Buellia porphyrica* (Arnold) Mong., *Buellia subambigua* Werner, *Diplotomma porphyricum* Arnold, *Diplotomma porphyricum* var. *cinereum* Bagl.

N - VG (Castello 2002, Martellos & Castello 2004), **TAA, Lomb** (Delucchi & Valcuvia 2004), **Piem** (Morisi & Sereno 1995, Isocrono & al. 2004), **Emil, Lig** (Brunialti & al. 1999). **C - Tosc, Umb** (Panfili 2000, Ravera & al. 2006), **Abr** (Nimis & Tretiach 1999), **Sar** (Rizzi & al. 2011, Giordani & al. 2013). **S - Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Si** (Grillo 1998, Grillo & Caniglia 2004, Cataldo & Cannavò 2014).

Cr/ Ch/ S/ Sax/ pH: 3, L: 4-5, X: 3-4, E: 3-4/ Alt: 1-3/ Mont: vr, SmedD: r, Pad: vr, SmedH: rr, MedH: r, MedD: vr/ PT: 1-2/ p/ Note: a temperate, perhaps holarctic early coloniser of basic siliceous rocks and roofing tiles; overlooked, and certainly more widespread.

Diplotomma glaucoatrum (Nyl.) Cl. Roux

Bull. Soc. linn. Provence, 66: 92, 2015 - *Lecidea glaucoatra* Nyl., Flora, 56: 198, 1873.

Syn.: *Buellia glaucoatra* (Nyl.) Clauzade

C - Sar (B-Leg. H. Sipman nr. 24073).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4-5, X: 4, E: 2-3/ Alt: 1/ MedD: vr/ PT: 1/ coast/ Note: a saxicolous taxon of the *D. alboatrum*-group with a grey-white, verrucose to areolate thallus, found on various types of rocks near the seashore, widely distributed along the Atlantic and Mediterranean coasts of Europe. According to Roux & coll. (2014) this is a good species, differing from *D. alboatrum* in morphological characters and in the ecology; the Italian sample, identified by H. Sipman, was collected at Capo Falcone (Sassari), on siliceous schist boulders and outcrops, on steep slopes with garrigue at seashore, just above highwater level.

Diplotomma hedinii (H. Magn.) P. Clerc & Cl. Roux

in Clerc, Crypt. Helv., 19: 292, 2004 (as *hedinianum*) - *Buellia hedinii* H. Magn., Lich. Central Asia: 146, 1940.

Syn.: *Buellia epipolia* auct., *Buellia rivas-martinezii* Barreno & A. Crespo, *Diploschistes alboatrum* var. *epipolium* auct., *Diplotomma epipolium* auct. non (Ach.) Arnold, *Diplotomma rivas-martinezii* (Barreno & A. Crespo) Barreno & A. Crespo, *Lecidea alboatra* var. *saxicola* Ach., *Lecidea epipolia* auct., *Rhizocarpon alboatrum* var. *epipolium* auct.

N - VG (Castello 2002, Martellos & Castello 2004), **Frl, Ven** (Caniglia & al. 1999, Nascimbene 2004, 2005c, 2008c), **TAA** (Nascimbene 2003, 2004, Nascimbene & al. 2005, 2006, Nascimbene & Marini 2007), **Lomb** (Valcuvia & al. 2003), **Piem** (Isocrono & al. 2004, Morisi 2005), **VA** (Piervittori & Isocrono 1997, 1999), **Emil** (Nimis & al. 1996), **Lig** (Valcuvia & al. 2000). **C - Tosc** (Benespero 2000, 2006), **Marc** (Nimis & Tretiach 1999, Tretiach & Pinna 2000), **Umb** (Nimis & Tretiach 1999, Panfili 2003, 2007, Ravera & al. 2006, Genovesi 2011), **Laz** (Bartoli 1997b, Bartoli & al. 1998, Nimis & Tretiach 2004), **Abr** (Nimis & Tretiach 1999), **Mol** (Garofalo & al. 1999, Nimis & Tretiach, 1999, 2004, Caporale & al. 2008, Genovesi & Ravera 2014), **Sar. S - Camp** (Garofalo & al. 1999, 2010, Aprile & al. 2003, 2003b, Nimis & Tretiach 2004), **Pugl** (Garofalo & al. 1999, Nimis & Tretiach 1999), **Bas** (Bartoli & Puntillo 1998, Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Ottonello & Salone 1994, Ottonello & al. 1994, 2011, Ottonello 1996, Grillo 1998, Grillo & al. 2001, Grillo & Caniglia 2004, Merlo 2004b, Brackel 2008b).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 4-5, X: 4, E: 2-3/ Alt: 1-5/ Alp: vr, Salp: rr, Orom: r, Mont: rc, SmedD: vc, Pad: r, SmedH: vc, MedH: vc, MedD: rr/ PT: 1-2/ Note: a mainly temperate species of exposed calcareous rocks. The synonymisation of this species with *D. venustum*, by Nordin (1996) is not accepted here: this author carried out his studies in southern Scandinavia, the northernmost distributional limit of both species; in southern Europe, however, *D. hedinii* and *D. venustum* can be easily recognised by gross morphological traits and by their peculiar biology (see note on *D. venustum*), even disregarding the chemical characters which were considered as important by Nordin (1996).

Diplotomma lutosum A. Massal.

Miscell. Lichenol.: 41, 1856.

Syn.: *Buellia lutosa* (A. Massal.) Anzi, *Buellia subdispersa* Mig., *Diplotomma subdispersa* (Mig.) Etayo & Breuss

N - **Frl** (TSB 15363), **Lomb, Piem** (TSB 25801). **C - Tosc.**

Cr/ Ch/ S/ Sax/ pH: 2-4, L: 4-5, X: 3-4, E: 3-4/ Alt: 1-3/ Mont: vr, SmedD: vr, SmedH: vr, MedH: vr/ PT: 1-2/ Note: an apparently widespread but rare, or at least rarely distinguished, mostly silicolous species, characterised by four-celled spores with transversal septa only, and by the J+blue reaction of the medulla.

Diplotomma murorum (A. Massal.) Coppins

in Hawksworth & al., Lichenologist, 12: 106, 1980 - *Diplotomma alboatrum* var. *murorum* A. Massal., Ric. Auton. Lich. Crost.: 98, 1952.

Syn.: *Buellia epipolia* var. *murorum* (A. Massal.) Zahlbr.

N - **Ven** (Lazzarin 2000b), **Emil** (Nimis & al. 1996), **Lig. C - Abr** (Nimis & Tretiach 1999). **S - Bas** (Nimis & Tretiach 1999).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 4-5, X: 3-4, E: 3-4/ Alt: 1-2/ SmedD: rr, Pad: er, SmedH: rr, MedH: vr/ PT: 2/ suboc, paras *Caloplaca teicholyta*/ Note: a mild-temperate lichen starting the life-cycle on species of the *Caloplaca teicholyta*-complex, the peculiar biology of which deserves further study.

Diplotomma nivale (Bagl. & Carestia) Hafellner

Hertel ex Hafellner in Hafellner & Türk, Carinthia, 2: 611, 1995 - *Leciographa nivalis* Bagl. & Carestia, Comm. Soc. Critt. Ital., 2: 84, 1864.

Syn.: *Buellia margaritacea* (Fr.) Lyngby, *Buellia nivalis* (Bagl. & Carestia) Hertel ex Hafellner, *Diplotomma margaritaceum* (Fr.) Szatala, *Polyschistes nivalis* (Bagl. & Carestia) Keissl.

N - **Ven** (Nascimbene 2008c), **TAA** (Nascimbene 2004, 2008b), **Piem** (Isocrono & al. 2004), **Lig. C - Tosc, Umb** (Genovesi & Ravera 2001, Ravera & al. 2006), **Laz, Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **Sar. S - Si** (Monte & Ferrari 1996).

Cr/ Ch/ S/ Sax/ pH: 3-5, L: 4-5, X: 4-5, E: 3-4/ Alt: 3-5/ Alp: r, Salp: r, Orom: er, Mont: vr/ PT: 1-2/ paras *Caloplaca* and *Xanthoria*/ Note: on steeply inclined to vertical faces of more or less calciferous rocks in upland areas. I do not agree with Nordin (1996) who proposed the synonymisation of this taxon with *D. alboatrum*: the very different ecology and altitudinal distribution justify the separation of these taxa, at least pending a thorough revision of this difficult group.

Diplotomma pharcidium (Ach.) M. Choisy

Bull. mens. Soc. linn. Soc. Bot. Lyon, 19: 156, 1950 - *Lecanora pharcidia* Ach., Syn. Meth. Lich.: 147, 1814.

Syn.: *Buellia alboatra* var. *athroa* (Ach.) Th. Fr., *Buellia pharcidia* (Ach.) Malme, *Diplotomma athroum* (Ach.) Kernst., *Diplotomma zaboticum* Körb., *Lecanora pharcidia* Ach., *Lecidea parasema* var. *athroa* Ach.
N - **Emil** (B 60 0191511).

Cr/ Ch/ S/ Epiph/ pH: 3-4, L: 4-5, X: 4-5, E: 3-4/ Alt: 1-2/ SmedD: vr, MedH: vr/ PT: 1-2/ Note: mostly on the smooth bark of deciduous trees, much more rarely on lignum, at relatively low elevations. According to Roux & coll. (2014) this is a good species, differing from *D. alboatrum* in the larger apothecia with a thick margin. The Italian sample, identified by H. Sipman, was collected by V.J. Grummann near the Beach of Savio, on *Platanus*.

Diplotomma populorum A. Massal.

Ric. Auton. Lich. Crost.: 99, 1852.

Syn.: *Buellia alboatra* var. *populorum* (A. Massal.) H. Olivier, *Buellia caricae* (Bagl.) Lettau, *Buellia populorum* (A. Massal.) Clauzade & Cl. Roux, *Diplotomma caricae* (Bagl.) Jatta

N - **VG, Frl, Ven** (Lazzarin 2000b), **Piem, Emil, Lig, C - Tosc, Marc** (Nimis & Tretiach 1999), **Laz, Sar, S - Camp** (Aprile & al. 2003b), **Bas, Pugl, Cal** (Puntillo 1996), **Si**.

Cr/ Ch/ S/ Epiph/ pH: 3, L: 4-5, X: 4-5, E: 3-4/ Alt: 1-3/ Mont: er, SmedD: r, Pad: vr, SmedH: r, MedH: r, MedD: vr/ PT: 1-2/ Note: a mild-temperate lichen found on isolated trees with eutrophic or eutrophicated bark, usually at relatively low elevations. The relationship with *D. alboatrum* needs to be clarified.

Diplotomma scheideggerianum (Bricaud & Cl. Roux) Nimis

The Lichens of Italy: 284, 1993 - *Buellia scheideggeriana* Bricaud & Cl. Roux, Nova Hedwigia, 52: 169, 1991.

N - **VG** (Tretiach & Carvalho 1993), **Frl**.

Cr/ Ch/ S/ Sax/ pH: 5, L: 2-3, X: 1-2, E: 1-2/ Alt: 1-2/ SmedD: vr, SmedH: vr, MedH: er / PT: 1/ paras *Leproplaca* spp./ Note: this is certainly a well-distinct species, to be looked for throughout Italy wherever *Leproplaca chrysoidea* and *L. xantholyta* are present. This mild-temperate lichen, however, seems to have a narrower ecological range than that of its hosts, being slightly more hygro- and less photophytic.

Diplotomma venustum (Körb.) Körb.

Parerga Lichenol.: 179, 1860 - *Diplotomma alboatrum* var. *venustum* Körb. in Rabenh., Flecht. Eur., 13: nr. 384, 1858.

Syn.: *Buellia alboatra* var. *venusta* (Körb.) Th. Fr., *Buellia suevica* Bertsch, *Buellia venusta* (Körb.) Lettau, *Rhizocarpon alboatrum* var. *venustum* (Körb.) Anzi, *Rhizocarpon calcareum* auct. ital. p.p.

N - **VG** (Tretiach & al. 2007b), **Frl, Ven, Lomb, Piem** (Clerc & al. 1999), **Lig** (Bungartz & Nash 2004, Giordani & al. 2016), **C - Tosc** (Brackel 2015), **Marc** (Nimis & Tretiach 1999), **Umb** (Nimis & Tretiach 1999, Ravera & al. 2006), **Laz** (Nimis & Tretiach 2004), **Abr** (Recchia & Villa 1996, Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **S - Camp** (Aprile & al. 2003b, Nimis & Tretiach 2004), **Pugl** (Nimis & Tretiach 1999, Durini & Medagli 2002), **Bas** (Nimis & Tretiach 1999, Brackel 2011), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1996b).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 4-5, X: 4, E: 3-4/ Alt: 1-4/ Salp: vr, Orom: vr, Mont: r, SmedD: rc, SmedH: rc, MedH: rr, MedD: r/ PT: 1/ paras *Protoparmeliopsis versicolor*/ Note: this mild-temperate to Mediterranean lichen, at least when young, is a constant parasite on *Protoparmeliopsis versicolor*, reaching above treeline south of the Alps. Morphological and biological differences towards *D. hedinii* are so evident that the synonymisation of the two taxa proposed by Nordin (1996), based on samples from southern Sweden (!) and on chemical characters only, is not accepted here. See also note on *D. hedinii* and Roux & Gueidan (2002: 145-146).

Dirina Fr.

Syst. Orb. Veget.: 244, 1825.

A genus of the Roccellaceae with c. 13 species and infraspecific taxa mostly occurring in coastal regions of Mediterranean and subtropical climates, which has been recently re-visited by Tehler & al. (2013). Type: *D. repanda* Fr. (= *D. ceratoniae*).

Dirina ceratoniae (Ach.) Fr.

Lichenogr. Eur. Ref.: 194, 1831 - *Lecanora ceratoniae* Ach., Syn. Meth. Lich.: 361, 1814.

Syn.: *Dirina repanda* Fr. non auct., *Lecania ceratoniae* (Ach.) Stizenb., *Lecanora repanda* Duby f. *corticola* Harm., *Parmelia ceratoniae* (Ach.) Spreng.

N - **Lig, C - Tosc, Laz** (Gigante & Petriccione 1995, Bartoli & al. 1997), **Sar** (Zedda 2002, Tehler & al. 2013), **S - Camp** (Nimis & Tretiach 2004, Garofalo & al. 2010), **Pugl** (Nimis & Tretiach 1999, Durini & Medagli 2004, Tehler & al. 2013), **Si** (Nimis & al. 1994, Grillo & Carfi 1997, Ottonello & Romano 1997, Grillo 1998, Myllys & al. 1998, Grillo & al. 2002, Grillo & Caniglia 2004, Ottonello & al. 2011, Tehler & al. 2013).

Cr/ Tr/ S/ Epiph/ pH: 3-4, L: 2-4, X: 1-2, E: 2-4/ Alt: 1/ MedH: vr, MedD: er/ PT: 1-2/ suboc, coast/ Note: *D. ceratoniae* and *D. massiliensis* have been extensively studied from the molecular point of view, with numerous samples taken all over their respective distribution areas (Tehler & al. 2013). This showed that *D. ceratoniae* is not only corticolous, but quite frequently saxicolous as well. Mostly, the saxicolous specimens can be morphologically distinguished from the strictly saxicolous *D. massiliensis*. However, there are cases where saxicolous specimens of the two species are virtually indistinguishable without DNA data (Tehler in

litt.). The species is included in the Italian red list of epiphytic lichens under the “Least Concern” category (Nascimbene & al. 2013c).

Dirina cretacea (Zahlbr.) Tehler

Opera Bot., 69: 44, 1983 - *Chiodecton cretaceum* Zahlbr., Österr. bot. Z., 69: 245, 1899.

S - **Pugl** (Nimis & Tretiach 1999, Tehler & al. 2013).

Cr/ Tr/ S/ Sax/ pH: 5, L: 2-3, X: 1-2, E: 1/ Alt: 1/ MedD: rc/ PT: 1/ coast/ Note: most common along the coasts of Dalmatia and the eastern Mediterranean Region, locally abundant along the coast of Puglia. The record from Venezia Giulia (Nimis 1993: 285) is wrong, and refers to the pycnidiate form of *D. massiliensis*.

Dirina fallax De Not.

Giorn. Bot. Ital., 2, 1: 189, 1846.

Syn.: *Dirina schistosa* (Bagl.) Nyl., *Dirina repanda* f. *isidiosa* Werner, *Dirina repanda* f. *lecideina* H. Olivier, *Dirina repanda* f. *sorediata* Werner, *Dirina repanda* var. *crassa* Maheu & A. Gillet, *Dirina repanda* var. *schistosa* Bagl., *Dirina repanda* var. *stipitata* Nyl., *Lecidea praerimata* Nyl.

N - **Lig. C - Sar** (Tehler & al. 2013). S - **Si** (Tehler & al. 2013)

Cr/ Tr/ S, A.s/ Sax/ pH: 2-3, L: 2-3, X: 1-2, E: 1-2/ Alt: 1/ MedH: r, MedD: r/ PT: 1/ coast, u/ Note: a mainly western, Mediterranean-Atlantic species of siliceous rocks which occurs also in central Europe, along the Atlantic coast and in the British Isles, with both fertile or pycnidiate and sorediate specimens.

Dirina massiliensis Durieu & Mont.

in Durieu, Explor. Sc. Algérie: 257, 1847.

Syn.: *Dirina cyclosora* Poelt & Nimis, *Dirina immersa* f. *sorediata* Müll. Arg., *Dirina massiliensis* f. *aponina* (A. Massal.) Tehler, *Dirina massiliensis* f. *sorediata* (Müll. Arg.) Tehler, *Dirina patronii* Bagl., *Dirina repanda* auct. non Fr., *Dirina repanda* var. *pelagosae* J. Steiner & Zahlbr., *Dirina stenhammarii* (Fr.) Poelt & Follmann, *Dirinopsis massiliensis* De Not., *Lecanactis aponina* (A. Massal.) Arnold, *Lecanactis stenhammarii* (Fr.) Arnold, *Pyrenotea aponina* A. Massal.

N - **VG, Ven** (Lazzarin 2000b, Salvadori & Municchia 2016), **TAA, Piem, Emil** (Nimis & al. 1996), **Lig. C - Tosc** (Tretiach & al. 2008b, Salvadori & Municchia 2016), **Marc** (Nimis & Tretiach 1999), **Umb** (Panfili 2000b, Ravera & al. 2006), **Laz** (Edwards & al. 1997, 1997b, Bartoli & al. 1998, Roccardi & al. 2005, Roccardi 2011, Zucconi & al. 2012), **Abr, Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **Sar** (Monte 1993, Nöske 2000, Tehler & al. 2013). **S - Camp** (Altieri & al. 2000, Aprile & al. 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010), **Pugl** (Edwards & al. 1997, Nimis & Tretiach 1999, Durini & Medagli 2002, Tehler & al. 2013), **Bas** (Caneva & al. 2006, Nugari & al. 2009), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994, Ottonello & Salone 1994, Ottonello & al. 1994, 2011, Monte & Ferrari 1996, Ottonello & Romano 1997, Grillo 1998, Grillo & Caniglia 2004, Merlo 2004b, Genco & al. 2007, Grillo & al. 2009, Gianguzzi & al. 2009, Ottonello & Puntillo 2009, Tehler & al. 2013).

Cr/ Tr/ S, A.s/ Sax/ pH: 3-5, L: 2-3, X: 1-2, E: 1-2/ Alt: 1-2/ SmedD: er, Pad: er, SmedH: c, MedH: ec, MedD: rc/ PT: 1/ coast, u/ Note: on steeply inclined or underhanging surfaces of basic siliceous or calcareous rocks, very variable according to the type of substrata (thallus colour depends on the quantity of calcium oxalates, and on the density of epilichenic cyanobacteria); the sexual form seems to be absent along the Adriatic coast north of Abruzzo up to the coast near Trieste (like another ecologically similar species: *Roccella phycopsis*). For further details see Tehler & al. (2013).

Diromma Ertz & Tehler

in Ertz & al., Fungal Divers., 70: 41, 2014.

The phylogenetic analysis of the family Roccellaceae by Ertz & al. (2014) has shown that several traditionally accepted genera, among which *Schismatomma*, are para-/polyphyletic. In order to make these groups monophyletic, eight new genera were proposed, among which the monotypic genus *Diromma* for a rare species growing on *Dirina*, which was formerly included in *Schismatomma*. Type: *D. dirinellum* (Nyl.) Ertz & Tehler

Diromma dirinellum (Nyl.) Ertz & Tehler

in Ertz & al., Fungal Divers., 70: 41, 2014 - *Platygrapha dirinella* Nyl., Mém. Soc. Sc. Nat. Cherbourg, 4: 95, 1856.

Syn.: *Lecania diplotommoides* Bagl., *Platygrapha diplotommoides* (Bagl.) Jatta, *Schismatomma diplotommoides* (Bagl.) Samp., *Schismatomma diplotommoides* var. *crenulatum* B. de Lesd., *Schismatomma dirinellum* (Nyl.) Zahlbr.

N - **Lig** (Watson 2014). C - **Sar. S - Pugl**.

Cr/ Tr/ S/ Epiph/ pH: 2, L: 1-3, X: 1-3, E: 2-3/ Alt: 1/ MedH: vr, MedD: er/ PT: 1/ coast/ Note: a rare species living as a parasite on *Dirina ceratoniae*, strictly confined to the Mediterranean belt. See also note on *Ocellomma picconianum*.

Eiglera Hafellner

Beih. Nova Hedwigia, 79: 276, 1984.

This genus with 2 species was often considered to be closely related to *Hymenelia* and *Ionaspis*, differing in the amyloid apical dome of the asci. However, Miadlikowska & al. (2014) showed that it is more closely

related to the family Acarosporaceae, in which it was included by Jaklitsch & al. (2016). Type: *E. flavida* (Hepp) Hafellner

Eiglera flavida (Hepp) Hafellner

Beih. Nova Hedwigia, 79: 276, 1984 - *Lecanora flavida* Hepp, Flecht. Eur.: nr. 630, 1860.

Syn.: *Aspicilia argillacea* Anzi, *Aspicilia flavida* (Hepp) Rehm, *Aspicilia micrantha* Körb., *Aspicilia ochracea* A. Massal., *Lecidea contraria* Malme

N - **Fri** (TSB 14176), **Ven** (Nimis 1994), **TAA**, **Lomb**, **Piem** (Isocrono & al. 2004, Matteucci & al. 2013), **VA** (Matteucci & al. 2015c), **Emil** (Tretiach & al. 2008). **C** - **Tosc**, **Mol** (Nimis & Tretiach 2004, Caporale & al. 2008). **S** - **Si**.

Cr/ Ch/ S/ Sax/ pH: 3-4, L: 3, X: 2-3, E: 1/ Alt: 3-5/ Alp: r, Salp: rr, Orom: er, Mont: er / PT: 1/ Note: a cool-temperate to arctic lichen found on base-rich or weakly calciferous rocks, often on pebbles and small stones near the ground in cold sites, with optimum near or above treeline; very much overlooked, especially in the Alps.

Eiglera homalomorpha (Nyl.) Hafellner & Türk

Clauzade & Cl. Roux ex Hafellner & Türk, Stapfia 76: 151, 2001 - *Lecanora homalomorpha* Nyl., Flora, 66: 101, 1883.

Syn.: *Aspicilia homalomorpha* (Nyl.) Hue, *Hymenelia homalomorpha* (Nyl.) Poelt & Vězda, *Lecidea cavatula* Nyl. **N** - **Fri** (Cucchi & al. 2009, Tretiach 2015f).

Cr.end/ Ch/ S/ Sax/ pH: 5, L: 3, X: 2, E: 1-2/ Alt: 3-5/ Alp: rr, Salp: r, Mont: er/ PT: 1/ Note: on limestone near the ground, such as on basal parts of steep cliffs in upland areas; certainly more widespread in the Alps, where it is locally common. According to Tretiach (2015f), the records from Veneto reported by Nimis (1994), and Nascimbene & Caniglia (2000, 2003c) refer to another species.

Elixia Lumbsch

J. Hattori Bot. Lab., 83: 62, 1997.

A genus differing from *Ptychographa* in the more rounded apothecia and the smaller ascospores, presently placed in the Elixiaceae within the Umbilicariales. The genus was originally described as monotypic and included a single boreal-montane species, until Spribille & Lumbsch (2010) described a second species from the mountains of Crete, which should be looked for also in Italy. Type: *E. flexella* (Ach.) Lumbsch

Elixia flexella (Ach.) Lumbsch

J. Hattori Bot. Lab., 83: 62, 1997 - *Limboria flexella* Ach., K. Vetensk.-Akad. Nya Handl.: 258, 1815.

Syn.: *Hazslinszkyia inarensis* Vain., *Lecidea flexella* (Ach.) Hedl., *Leptographa flexella* (Ach.) M. Choisy, *Lithographa flexella* (Ach.) Zahlbr., *Ptychographa flexella* (Ach.) Coppins, *Xylographa flexella* (Ach.) Nyl., *Xylographa flexella* f. *plicata* Anzi ex Arnold

N - **TAA** (Nascimbene & al. 2007b, Spribille & Lumbsch 2010), **Lomb**.

Cr/ Ch/ S/ Lign/ pH: 1-2, L: 3, X: 2-3, E: 1/ Alt: 3-4/ Salp: vr, Mont: r/ PT: 1/ Note: on lignum, especially on vertical sides of stumps, with optimum in the subalpine belt; certainly more widespread in the Alps.

Encephalographa A. Massal.

Geneac. Lich.: 13, 1854.

The monotypic genus *Encephalographa* was sometimes considered to include a lichenicolous fungus, but Tretiach & Modenesi (1999) demonstrated it to be lichenised, with an endolithic, saxicolous thallus, dichotomously branched, laterally anastomosed, lirelliform pseudothecia with a longitudinal sulcus, and clavate, bitunicate asci bearing pigmented didymospores. The genus is presently included in the Melaspileaceae (Ertz & Diederich 2015). Type: *E. elisae* A. Massal.

Encephalographa elisae A. Massal.

Geneac. Lich.: 13, 1854.

Syn.: *Encephalographa cerebrina* f. *caesia* Anzi, *Encephalographa cerebrina* var. *elisae* (A. Massal.) Anzi, *Encephalographa rubiformis* A. Massal., *Melaspilea rubiformis* (A. Massal.) Redinger

N - **VG** (Tretiach & Modenesi 1999, Tretiach & Rinino 2006), **Fri** (Tretiach & Modenesi 1999, Lazzarin 2000b), **Ven** (Tretiach & Modenesi 1999, Lazzarin 2000b, Watson 2014), **Lomb**, **Piem**. **C** - **Tosc** (Tretiach & Modenesi 1999), **Laz** (Nimis & Tretiach 2004), **Sar** (Tretiach & Modenesi 1999). **S** - **Camp** (Nimis & Tretiach 2004), **Cal** (Puntillo 1996, Tretiach & Modenesi 1999), **Si** (Nimis & al. 1994, Tretiach & Modenesi 1999, Grillo & al. 2007b).

Cr/ Tr/ S/ Sax/ pH: 5, L: 1, X: 2, E: 1/ Alt: 1-2/ SmedD: vr, SmedH: r, MedH: vr/ PT: 1/ suboc, u/ Note: a mild-temperate lichen found on compact calcareous rocks in shaded, microclimatically stable situations, often in underhangs; the species seems to be most frequent in Tyrrhenian Italy. For further details see Tretiach & Modenesi (1999).

Enchylium (Ach.) Gray

Nat. Arr. Brit. Pl., 1: 396, 1821 - *Collema* sect. *Enchylium* Ach., Lichenogr. Univ.: 629, 1810.

A molecular study of the Collemataceae genera *Collema* and *Leptogium* by Otálora & al. (2014) has led to their re-circumscription, with two new genera and six old generic names resurrected, among which the genus *Enchylium*, to accommodate the old *Collema tenax*-group, characterised by swollen and plicate thallus lobes, and apothecia that usually have a distinct anatomy of the excipulum (euthyplechtenchymatous). Most of the 9 species are saxicolous or terricolous; the two epiphytic species (*E. conglomeratum* and *E. ligerinum*) were not included in the analysis of Otálora & al. (2014). Type: *E. tenax* (Sw.) Gray

Enchylium bachmanianum (Fink) Otálora, P.M. Jørg. & Wedin

Fungal Divers., 64: 286, 2014 - *Collemodus bachmanianum* Fink, Mycologia, 10: 236, 1918.

Syn.: *Collema bachmanianum* (Fink) Degel., *Collema bachmanianum* var. *millegranum* Degel.

N - Lomb.

Fol.b/ Cy.h/ S/ Terr/ pH: 3-4, L: 3-4, X: 3, E: 1/ Alt: 4-5/ Alp: er, Salp: er/ PT: 1/ Note: a mainly arctic-alpine, circumpolar species found on calciferous or base-rich siliceous soil near or above treeline; restricted to the Alps in Italy. Italian samples belong to var. *millegranum*.

Enchylium coccophorum (Tuck.) Otálora, P.M. Jørg. & Wedin

Fungal Divers., 64: 286, 2014 - *Collema coccophorum* Tuck., Proc. Amer. Acad. Arts and Sc., 5: 385, 1862.

Syn.: *Collema harmandii* Samp., *Collema pulposum* var. *microphyllum* Harm.

N - VG.

Fol.n/ Cy.h/ S/ Terr/ pH: 3-4, L: 4-5, X: 4, E: 1/ Alt: 1-2/ SmedD: er, MedD: er/ PT: 1/ subc/ Note: on calciferous soil in dry grasslands; the only locality is in Croatia (Istria), not far from the Italian border, but this almost cosmopolitan species of dry areas - which can be easily mistaken for *E. tenax* - might be more widespread in Italy, especially in dry Mediterranean areas of southern Italy.

Enchylium conglomeratum (Hoffm.) Otálora, P.M. Jørg. & Wedin

Fungal Divers., 64: 286, 2014 - *Collema conglomeratum* Hoffm., Deutschl. Fl.: 102, 1796.

Syn.: *Collema fasciculare* var. *conglomeratum* (Hoffm.) Ach., *Synechoblastus conglomeratus* (Hoffm.) Körb.

N - VG, Frl (Molaro 2005, Tretiač & Molaro 2007), **Ven, TAA** (Nascimbene & al. 2007b), **Lomb, Piem** (Isocrono & al. 2004, Matteucci & al. 2013), **Emil, Lig** (Giordani & Incerti 2008). **C - Tosc** (Loppi & Frati 2006), **Marc** (Nimis & Tretiač 1999, Frati & Brunialti 2006), **Umb** (Genovesi & al. 2002, Ravera & al. 2006), **Laz** (Massari & Ravera 2002, Ravera & Genovesi 2008), **Abr, Sar** (Rizzi & al. 2011). **S - Camp** (Garofalo & al. 2010), **Pugl, Bas** (Potenza & al. 2014), **Cal** (Puntillo 1996), **Si** (Merlo 2004).

Fol.n/ Cy.h/ S/ Epiph/ pH: 3, L: 4-5, X: 3, E: 3/ Alt: 1-2/ SmedD: vr, SmedH: r, MedH: er/ PT: 1-2/ Note: a mainly temperate species with a fragmented holarctic range, found on nutrient-rich bark, especially of *Juglans*; formerly more widespread, presently restricted to the vicinity of small settlements in mountain valleys, where it is locally abundant.

Enchylium ligerinum (Hy) Otálora, P.M. Jørg. & Wedin

Fungal Divers., 64: 286, 2014 - *Collema pulposum* var. *ligerinum* Hy, Mèm. Soc. Nat. Agricult. Sc. Arts Angers: 24, 1893.

Syn.: *Collema ligerinum* (Hy) Harm., *Collema verruculosum* auct. p.p., *Leptogium verruculosum* (A. Massal.) Jatta, *Lathagrium conglomeratum sensu* A. Massal.

N - VG, Frl (Castello & Skert 2005), **Ven, TAA** (Nascimbene & al. 2007b), **Lomb** (Brusoni & al. 1997, Brusoni & Valcuvia 2000), **Piem** (Pierivittori 2003, Isocrono & al. 2004), **VA** (Pierivittori & Isocrono 1999), **Emil, Lig** (Giordani & al. 2009, Giordani & Incerti 2008). **C - Tosc, Marc** (Nimis & Tretiač 1999, Frati & al. 2004, Frati & Brunialti 2006, Brackel 2015), **Umb** (Ravera 1998, Ravera & al. 2006, Brackel 2015), **Laz, Abr** (Recchia & al. 1993, Olivieri & al. 1997, 1997b, Loppi & al. 1999), **Mol** (Caporale & al. 2008). **S - Pugl, Bas** (Nimis & Tretiač 1999), **Cal** (Puntillo 1996, Puntillo & Puntillo 2004, Incerti & Nimis 2006).

Fol.n/ Cy.h/ S/ Epiph/ pH: 3, L: 4-5, X: 3, E: 3/ Alt: 2/ SmedD: vr, Pad: er, SmedH: vr/ PT: 1-2/ Note: a mild-temperate species found on base-rich bark, especially of *Juglans* and *Populus*; more widespread in the past, but locally still common near small settlements in montane valleys, e.g. in the eastern Pre-Alps. It is included in the Italian red list of epiphytic lichens as "Near-threatened" (Nascimbene & al. 2013c).

Enchylium limosum (Ach.) Otálora, P.M. Jørg. & Wedin

Fungal Divers., 64: 286, 2014 - *Lichen limosus* Ach., Lichenogr. Suec. Prodr.: 126, 1799.

Syn.: *Collema forissii* Szatala, *Collema glaucescens* Hoffm., *Collema limosum* (Ach.) Ach., *Collema viscosum* A. Massal.

N - Ven (Lazzarin 2000b), **TAA** (Watson 2014), **Lomb** (Jatta 1909-1911), **Piem** (Jatta 1909-1911), **Lig, C - Tosc** (Jatta 1909-1911), **Abr** (Jatta 1909-1911), **Sar, S - Camp, Cal** (Puntillo & Puntillo 2004), **Si** (Grillo 1998, Grillo & Caniglia 2004).

Fol.b/ Cy.h/ S/ Terr/ pH: 3-4, L: 3-4, X: 3, E: 2-3/ Alt: 1-3/ Mont: er, SmedD: er, SmedH: vr, MedH: vr/ PT: 1-2/ p/ Note: a holarctic, temperate to boreal-montane, short-lived species of mineral, clay soil in disturbed habitats, certainly overlooked, but never common in Italy.

Enchylium polycarpon (Hoffm.) Otálora, P.M. Jørg. & Wedin subsp. ***corcyrense*** (Arnold)

Provisionally placed here, ICN Art. 36.1b. - *Lathagrium orbiculare* var. *corcyrense* Arnold, Flora, 70: 152, 1887.

Syn.: *Collema polycarpon* var. *corcyrense* (Arnold) Degel., *Collema polycarpon* Hoffm. subsp. *corcyrense* (Arnold) Pišút, *Collema ragusanum* Zahlbr., *Collema salevense* (Müll. Arg.) Zahlbr., *Collema stygium* var. *stygioides* Flagey, *Lathagrium akralense* Flagey, *Lathagrium flaccidulum* Flagey, *Lathagrium salevense* (Müll. Arg.) M. Choisy, *Synechoblastus salevensis* Müll. Arg.

N - VG (TSB 6529), **Lomb, Piem, Lig. C - Laz** (Nimis & Tretiach 2004), **Sar. S - Camp** (Nimis & Tretiach 2004), **Pugl, Si** (Nimis & al. 1994).

Fol.b/ Cy.h/ S/ Sax/ pH: 5, L: 4-5, X: 4, E: 1-3/ Alt: 1-3/ Mont: er, SmedD: r, Pad: vr, SmedH: rr, MedH: rr, MedD: r/ PT: 1-2/ Note: more thermophytic and more southern than the typical subspecies, this taxon is worthy of further study.

Enchylium polycarpon (Hoffm.) Otálora, P.M. Jørg. & Wedin subsp. ***polycarpon***

Fungal Divers., 64: 286, 2014 - *Collema polycarpon* Hoffm., Deutschl. Fl.: 102, 1796.

Syn.: *Collema melaenum* var. *polycarpon* (Hoffm.) Nyl., *Collema multifidum* var. *polycarpon* (Hoffm.) Rabenh., *Collema orbiculare* (Schaer.) Tonglet, *Collema stygium* auct., *Collema stygium* var. *orbiculare* (Schaer.) Rabenh., *Collemodium polycarpoides* Nyl., *Leptogium polycarpoides* (Nyl.) Harm., *Lathagrium orbiculare* (Schaer.) Arnold, *Parmelia stygia* var. *orbicularis* Schaer., *Synechoblastus orbicularis* (Schaer.) Dalla Torre & Sarnth., *Synechoblastus polycarpus* (Hoffm.) Dalla Torre & Sarnth.

N - VG (Castello 2002, Martellos & Castello 2004), **Frl** (Tretiach & Molaro 2007), **Ven** (Nimis 1994, Caniglia & al. 1999, Nascimbene & Caniglia 2003c, Nascimbene 2005c, Thor & Nascimbene 2007, Nascimbene & Marini 2007), **TAA** (Nascimbene 2003, 2008b, Nascimbene & al. 2005, 2006, Spitale & Nascimbene 2012), **Lomb, Piem** (Morisi & Sereno 1995, Isocrono & al. 2004, Isocrono & Piervittori 2008), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999), **Emil, Lig** (Giordani & al. 2016). **C - Tosc** (Brackel 2015), **Marc** (Nimis & Tretiach 1999), **Umb** (Nimis & Tretiach 1999, Ravera & al. 2006), **Laz, Abr** (Nimis & Tretiach 1999), **Mol** (Garofalo & al. 1999, Caporale & al. 2008, Nimis & Tretiach 1999, Genovesi & Ravera 2014). **S - Camp** (Garofalo & al. 1999, Aprile & al. 2003b), **Pugl** (Nimis & Tretiach 1999), **Bas** (Potenza 2006), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1996b, Ottonello 1996, Grillo & Caniglia 2004, Caniglia & Grillo 2005, 2006, Gianguzzi & al. 2009).

Fol.b/ Cy.h/ S/ Sax/ pH: 4-5, L: 4-5, X: 4, E: 1-3/ Alt: 1-5/ Alp: vr, Salp: r, Orom: r, Mont: rc, SmedD: c, Pad: vr, SmedH: vc, MedH: c, MedD: rc/ PT: 1-2/ Note: a widespread holarctic species found on exposed, hard, calciferous rocks and dolomite. Several south Italian records could refer to subsp. *corcyrense*.

Enchylium tenax (Sw.) Gray

Nat. Arr. Brit. Pl. (London), 1: 397, 1821 - *Lichen tenax* Sw., N. Acta Reg. Soc. Sci. Upsal., 4: 249, 1784.

Syn.: *Collema ceranoides* Borrer, *Collema concinnum* Flot., *Collema crispum* var. *prasinum* ("Ach.") Duby, *Collema crustaceum* Kremp., *Collema euganeum* A. Massal., *Collema intestiniforme* Rabenh., *Collema meliteum* Jatta, *Collema meliteum* var. *conglomeratum* Jatta, *Collema molybdinum* Körb. et auct. p.p., *Collema obscurum* Hoffm., *Collema pulposum* auct., *Collema pulposum* var. *corallinum* A. Massal., *Collema subcorallinum* Degel., *Collema submarginale* (Wulfen) Ach., *Collema subpulposum* Nyl., *Collema tenax* (Sw.) Ach., *Collema tenax* var. *ceranoides* (Borrer) Degel., *Collema tenax* var. *crustaceum* (Kremp.) Degel., *Collema tenax* var. *corallinum* (A. Massal.) Degel., *Collema tenax* var. *diffractoareolatum* (Schaer.) Degel., *Collema tenax* var. *expansum* Degel., *Collema tenax* var. *vulgare* (Schaer.) Degel., *Collema turgidum sensu* Hepp, *Lichen palmatus sensu* Ach.

N - VG, Frl (Tretiach 1996, Tretiach & Molaro 2007, Tomasi 2007, Obermayer 2013), **Ven** (Caniglia & al. 1999, Lazzarin 2000b, Nascimbene & Caniglia 2003c, Thor & Nascimbene 2007), **TAA** (Nascimbene & al. 2006, Nascimbene 2008b, Hafellner & al. 2012, Brackel 2013), **Lomb** (Valcuvia & al. 2003), **Piem** (Clerc & al. 1999, Isocrono & al. 2004, Hafellner & al. 2004), **VA** (Piervittori & Isocrono 1999), **Emil** (Nimis & al. 1996, Benesperi 2009), **Lig** (Valcuvia & al. 2000). **C - Tosc** (Tretiach & Nimis 1994, Loppi & al. 2004b), **Marc** (Nimis & Tretiach 1999), **Umb** (Nimis & Tretiach 1999, Ravera & al. 2006), **Laz** (Nimis & Tretiach 2004), **Abr** (Nimis & Tretiach 1999, Brackel 2015), **Mol** (Garofalo & al. 1999, Nimis & Tretiach 1999, Caporale & al. 2008), **Sar. S - Camp** (Garofalo & al. 1999, 2010, Altieri & al. 2000, Ricciardi & al. 2000, Aprile & al. 2002, 2003, 2003b, Nimis & Tretiach 2004, Roccardi & Ricci 2006, Catalano & al. 2016), **Pugl** (Garofalo & al. 1999, Nimis & Tretiach 1999, Durini & Medagli 2002, 2004), **Bas** (Nimis & Tretiach 1999, Potenza 2006, Potenza & al. 2010), **Cal** (Puntillo 1996, Puntillo & Puntillo 2004), **Si** (Nimis & al. 1994, 1995, Ottonello & Salone 1994, Ottonello & al. 1994, Ottonello 1996, Grillo 1998, Poli & al. 1998, Caniglia & Grillo 2001, 2005, 2006, Grillo & al. 2001, 2002, 2007b, 2009, Merlo 2004, 2004b, Grillo & Caniglia 2004, Brackel 2008b, 2008c, Liistro & Cataldo 2011, Cataldo & Minissale 2013, 2015).

Fol.b/ Cy.h/ S/ Terr/ pH: 3-5, L: 3-5, X: 3-5, E: 1-3/ Alt: 1-6/ Alp: rc, Salp: c, Orom: vc, Mont: ec, SmedD: ec, Pad: rr, SmedH: ec, MedH: ec, MedD: rc/ PT: 1-3/ p/ Note: a widespread holarctic, almost cosmopolitan lichen found on calciferous or base-rich siliceous soil in open habitats (e.g. in dry grasslands), on consolidating sand dunes and on terricolous bryophytes, more rarely directly on rock, often found also in disturbed habitats such as track sides in urban settlements (e.g. in the very centre of Rome); an extremely polymorphic and ecologically wide-ranging species, certainly the most common of the genus in Italy.

Endocarpon Hedw.

Descr. Micr.-Anal. Musc. Frond., 2: 56, 1789.

A genus of the Verrucariaceae with c. 70 species occurring in arid to cool-temperate regions, rarely in the tropics, characterised by muriform ascospores and the presence of algal cells in the hymenium. Most species

inhabit sandy soils in arid and semi-arid regions, a few grow on rocks or bryophytes, rarely on bark. A molecular analysis of catapyrenioid genera by Prieto & al. (2012) showed that *Endocarpon* forms a group including *Anthracocarpon*, *Involucropyrenium*, *Neocatapyrenium*, and a subset of *Verrucaria* species, characterised by the presence of *Endocarpon*-type pycnidia, so that several nomenclatural changes are probable in the next future. Type: *E. pusillum* Hedw.

Endocarpon adscendens (Anzi) Müll. Arg.

Bull. Trav. Soc. Murith. Valais, 10: 58, 1881 - *Dermatocarpon pusillum* var. *adscendens* Anzi, Cat. Lich. Sondr.: 103, 1860.

Syn.: *Endocarpon pallidum* auct. p.p. non Ach.

N - Frl (TSB 16892), **TAA**, **Lomb**, **Piem** (Morisi & Sereno 1995, Clerc & al. 1999, Isocrono & al. 2003), **Lig. C - Marc** (Nimis & Tretiach 1999). **S - Camp** (Garofalo & al. 2010). **Cal** (Puntillo 1996).

Sq/ Ch/ S/ Terr/ pH: 3-4, L: 3-5, X: 3, E: 2-3/ Alt: 2-3/ Mont: rr, SmedD: r, SmedH: r/ PT: 1/ Note: a mainly temperate, perhaps holarctic lichen found on terricolous mosses, often near and on cyanobacterial colonies, with optimum in upland areas with base-rich siliceous rocks.

Endocarpon adsurgens Vain.

Acta Soc. Fauna Fl. Fenn., 49, 2: 73, 1921.

N - TAA (B 60 0196447).

Sq/ Ch/ S/ Terr/ pH: 3-4, L: 3-5, X: 3, E: 2-3/ Alt: 2-4/ Salp: vr, Mont: vr, SmedD: vr/ PT: 1/ Note: this species, described from Finland, is very similar to *E. adscendens*, differing in the dark rhizines and the paler spores; it is also known from the Austrian Alps; the Italian sample was collected by A. Buschardt in Vinschgau-Val Venosta, above the castle of Goldrain, at c. 800 m.

Endocarpon latzelianum Servít

Rozpr. Cesk. Akad. Ved. Rocn., 65, 3: 40, 1955.

N - Lig.

Sq/ Ch/ S/ Sax/ pH: 4-5, L: 3-4, X: 3-4, E: 1/ Alt: 1/ MedH: vr/ PT: 1/ #/ Note: described from Dalmatia, this rare calcicolous species, which is similar to the silicicolous *E. psorodeum*, was also reported from Austria, France, Switzerland and Germany.

Endocarpon pallidum Ach.

Lichenogr. Univ., 301, 1810.

Syn.: *Dermatocarpon pallidum* (Ach.) Mudd, *Verrucaria pallida* (Ach.) Nyl.

N - VG (Castello 2002, Martellos & Castello 2004), **Frl** (TSB 5207), **TAA**, **Lomb**, **Piem**, **Lig. C - Sar. S - Si** (Caniglia & Grillo 2001, 2006, Grillo & Caniglia 2004).

Sq/ Ch/ S/ Terr/ pH: 4-5, L: 3-4, X: 3, E: 1/ Alt: 1-2/ SmedD: rr, SmedH: r, MedH: vr, MedD: r/ PT: 1/ subc/ Note: a mainly southern lichen found in open, dry, calcareous grasslands. Several Italian records require re-confirmation: the epithet "*pallidum*" was often used in the past to designate *E. adscendens*.

Endocarpon psorodeum (Nyl.) Blomb. & Forssell

Enum. Pl. Scand.: 97, 1880 - *Verrucaria psorodea* Nyl., Notiser Sällsk. Fauna Fl. Fenn. Förh., 8: 188, 1866.

Syn.: *Dermatocarpon psorodeum* (Nyl.) Vain.

N - Piem (TSB 32667).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4-5, X: 3-4, E: 2-3/ Alt: 3/ Mont: vr/ PT: 1/ w/ Note: on mineral-rich basic siliceous rocks with some water seepage, usually in upland areas, often associated to colonies of cyanobacteria; probably more widespread in the Alps.

Endocarpon pulvinatum Th. Fr.

N. Acta Reg. Soc. Sci. Upsal., ser. 3, 3: 357, 1861.

N - TAA, **Lomb**, **Piem** (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999), **Lig.**

Sq/ Ch/ S/ Terr/ pH: 3-4, L: 3-4, X: 3, E: 1/ Alt: 3-5/ Alp: rr, Salp: r, Mont: vr/ PT: 1/ Note: on calciferous soil, sometimes on calcareous rocks, with optimum near and above treeline. All Italian records require re-confirmation.

Endocarpon pusillum Hedw.

Descr. Adumbr. Muscor. Frond., 2: 56, 1789.

Syn.: *Dermatocarpon glomeruliferum* A. Massal., *Dermatocarpon pusillum* (Hedw.) Anzi, *Dermatocarpon sorediatum* (Borrer) Arnold, *Endocarpon adnatum* (Nyl.) Nyl., *Endocarpon garovaglii* (Mont.) Schaer., *Endocarpon glomeruliferum* (A. Massal.) Trevis., *Endocarpon sorediatum* (Borrer) Hook., *Endocarpon subnitescens* (Nyl.) Nyl., *Endocarpon trapeziforme* (J. König) Trevis. non auct., *Endopyrenium pusillum* (Hedw.) Körb., *Leightonia pusilla* var. *glomerulifera* (A. Massal.) Garov., *Verrucaria subscabridula* Nyl.

N - VG (Castello 2002, Martellos & Castello 2004), **Frl** (Brackel 2013), **Ven** (Caniglia & al. 1999, Lazzarin 2000b), **TAA**, **Lomb**, **Piem** (Clerc & al. 1999, Isocrono & al. 2003), **VA** (Piervittori & Isocrono 1999), **Emil** (Nimis & al. 1996), **Lig. C - Tosc** (Brackel 2015), **Umb** (Genovesi 2003b, 2011, Ravera & al. 2006, Panfili 2007), **Laz** (Genovesi & al. 2011), **Abr** (Nimis & Tretiach 1999, Brackel 2015), **Sar. S - Camp** (Aprile & al. 2003b), **Bas**, **Cal** (Puntillo 1996,

Puntillo & Puntillo 2004), **Si** (Nimis & al. 1996b, Poli & al. 1998, Grillo & al. 2001, Caniglia & Grillo 2001, 2006, Grillo & Caniglia 2004, 2005, Ottonello & al. 2011, Cataldo & Minissale 2013, 2015).

Sq/ Ch/ S/ Terr-Sax/ pH: 4-5, L: 3-4, X: 3, E: 1-2/ Alt: 1-5/ Alp: rr, Salp: rc, Orom: r, Mont: rr, SmedD: vr, SmedH: r, MedH: er/ PT: 1/ #/ Note: on calcareous soil, most often in fissures of calcareous rocks; the genus *Endocarpon* badly needs revision, *E. pusillum* in the sense of most European authors is heterogeneous, and perhaps could be subdivided into several species.

Endocarpon schisticola B. de Lesd.

Bull. Soc. Bot. France, 84: 282, 1937.

N - Lig.

Sq/ Ch/ S/ Sax/ pH: 3, L: 3, X: 3, E: 1/ Alt: 1/ MedH: vr, MedD: vr/ PT: 1/ #/ Note: this taxon is known only from the type collection on non-calcareous schist. Indicator values are tentative.

Endohyalina Marbach

Bibl. Lichenol., 74: 201, 2000.

This genus of the Caliciaceae, based on species formerly belonging to the *Rinodina ericina*-group, is characterised by crustose, autonomous or obligately lichenicolous thalli, lecideine apothecia with a hymenium often more or less interspersed with oil droplets and a brown hypothecium, *Bacidia*-type asci, small *Dirinaria*-type ascospores developing with type B ontogeny, bacilliform conidia, and by diploicin as the major secondary metabolite. The genus is closely related to *Diploicia*; for further details see Giralto & al. (2010) and Nadyeina & al. (2010). Type: *E. rappii* (R.C. Harris) Marbach (= *E. ericina*).

Endohyalina ericina (Nyl.) Giralto, van den Boom & Elix

Mycol. Prog., 9: 43, 2010 - *Lecidea ericina* Nyl., Flora, 54: 452, 1878.

Syn.: *Buellia disciformis* var. *ericina* (Nyl.) Boistel, *Buellia ericina* (Nyl.) Jatta, *Rinodina ericina* (Nyl.) Giralto, *Rinodina madeirensis* Kalb & Hafellner

S - Pugl (Nimis & Tretiach 1999).

Cr/ Ch/ S/ Epiph-Lign/ pH: 1-2, L: 3-5, X: 2, E: 2/ Alt: 1-2/ SmedH: vr, MedH: vr/ PT: 1/ suboc, #/ Note: on acid bark, more rarely on lignum, in rather shaded and humid situations, with a western distribution in southern Europe. The species is included in the Italian red list of epiphytic lichens as "Endangered" (Nascimbene & al. 2013c). For further details see Giralto (2000).

Endohyalina insularis (Arnold) Giralto, van den Boom & Elix

Mycol. Prog., 9: 44, 2010 - *Buellia saxatilis* f. *insularis* Arnold, Verh. zool.-bot. Ges. Wien, 46: 119, 1896.

Syn.: *Rinodina insularis* (Arnold) Hafellner

N - TAA (Rambold & al. 1994, Giralto & Llimona 1997). **S - Si** (Brackel 2008c)

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4, X: 3-4, E: 2/ Alt: 3-4/ Salp: er, Mont: vr/ PT: 1/ paras *Lecanora rupicola* s.lat./ Note: a widespread, but apparently rare species described from South Tyrol, with a highly reduced thallus and an obligately lichenicolous growth on species of the *Lecanora rupicola*-group on siliceous rocks; to be looked for in other parts of the country.

Endohyalina kalbii (Giralto & Matzer) Giralto, van den Boom & Elix

Mycol. Prog., 9: 45, 2010 - *Rinodina kalbii* Giralto & Matzer, Lichenologist, 26: 328, 1994.

C - Sar (Giralto & Matzer 1994, Rambold & al. 1994).

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 3-4, X: 2, E: 2-3/ Alt: 1/ MedH: er/ PT: 1/ suboc, coast/ Note: a Mediterranean-Atlantic species, restricted to coastal localities with frequent humid, salt-loaden winds, e.g. on *Juniperus* on sand dunes. It is included as "Critically Endangered" in the Italian red list of epiphytic lichens (Nascimbene & al. 2013c).

Enterographa Fée

Essai Cryptog. Écorc. Officin: 66, 1825.

This mainly tropical genus of c. 53 species includes foliicolous, corticolous, saxicolous, and lichenicolous Roccellaceae with immersed, punctiform to lirelliform, often pseudostromatic ascomata, non-carbonised, hyaline or pale brown exciple and hypothecium, and hyaline, halonate, 3- to many-septate spores. The genus was monographed by Sparrius (2004), with many new species having been described in recent times. Recent phylogenetic studies suggest that the genus is not monophyletic (Ertz & al. 2009, Ertz & Tehler 2011). Type: *E. crassa* (DC.) Fée

Enterographa crassa (DC.) Fée

Essai Cryptog. Écorc. Offic.: 90, 1824 - *Opegrapha crassa* DC. in Lamarck & de Candolle, Fl. Franç., éd. 3, 2: 312, 1805.

Syn.: *Arthonia crassa* (DC.) Dufour, *Chiodecton crassum* (DC.) Zahlbr., *Chiodecton crassum* f. *atroviride* Erichsen, *Chiodecton crassum* f. *rufescens* B. de Lesd., *Chiodecton crassum* var. *geographicum* Erichsen, *Chiodecton*

venosum (Pers.) Zahlbr., *Chiodectonomyces crassi* Cif. & Tomas., *Enterographa crassa* f. *geographica* (Erichsen) Almb., *Enterographa crassa* f. *pallidocincta* (Erichsen) Almb., *Enterographa crassa* f. *rufescens* (B. de Lesd.) Erichsen, *Enterographa crassa* var. *geographica* (Erichsen) Redinger, *Enterographa venosa* (Pers.) A. Massal., *Enterographa venosa* f. *atroviridis* (Erichsen) Erichsen, *Enterographa venosa* f. *pallidocincta* Erichsen, *Enterographa venosa* f. *rufescens* (B. de Lesd.) Redinger, *Enterographa venosa* var. *geographica* (Erichsen) Erichsen, *Leucodecton crassum* (DC.) A. Massal., *Lichen obscurus* Sm. & Sowerby non Ach. nec Humb., *Porina aggregata* Ach. non P.M. McCarthy & Harada, *Sagedia aggregata* (Ach.) Fr., *Sagedia aggregata* var. *rupestris* Bagl., *Sagedia crassa* (DC.) A. Massal., *Stigmatidium crassum* (DC.) Duby, *Stigmatidium obscurum* (Sm. & Sowerby) Spreng., *Verrucaria obscura* (Sm. & Sowerby) Borrer

N - Ven, Lomb (UME-47419), **Lig** (Giordani & Brunialti 1998, Watson 2014). **C - Tosc, Laz** (Tretiach 1993, Ravera 2006c), **Sar** (Zedda 2002, 2002b). **S - Camp** (Puntillo & al. 2000, Aprile & al. 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010, Ravera & Brunialti 2013). **Pugl** (Nimis & Tretiach 1999), **Bas** (Bartoli & Puntillo 1996, 1998, Nimis & Tretiach 1999), **Cal** (Tretiach 1993, Puntillo & Vězda 1994, Puntillo 1995, 1996, Sérusiaux 1998, Puntillo & Puntillo 2012).

Cr/ Tr/ S/ Epiph/ pH: 2-3, L: 2-3, X: 1-2, E: 1-2/ Alt: 1-2/ SmedD: er, SmedH: vr, MedH: r/ PT: 0/ suboc/ Note: a mild-temperate to humid subtropical epiphytic lichen found on smooth bark in riparian, open, humid-warm woodlands below the montane belt; mainly Tyrrhenian, probably extinct in northern Italy.

Enterographa elaborata (Leight.) Coppins & P. James

Lichenologist, 11: 38, 1979 - *Platygramma elaborata* Lyell ex Leight., Ann. Mag. Nat. Hist., sér. 2, 13: 392, 1854.

Syn.: *Enterographa venosa* (Pers.) A. Massal. nomen sed non planta, *Enterographa jorgei* Vězda & Vivant

N - Ven (Jatta 1909-1911), **Lig** (S-F255427). **S - Camp** (Puntillo & al. 2000, Nimis & Tretiach 2004, Etayo & Puntillo 2011), **Cal** (Nimis & Puntillo 2003, Puntillo 2011, Puntillo & Puntillo 2012).

Cr/ Tr/ S/ Epiph/ pH: 2-3, L: 2-3, X: 1, E: 1/ Alt: 1/ MedH: er/ PT: 0/ oc/ Note: a mild-temperate to humid subtropical, mainly western species in Europe (but ranging from Macaronesia eastwards to the Black Sea area), known from a few stations only in Italy, on smooth bark in humid-warm woodlands. It is included in the Italian red list of epiphytic lichens as “Endangered” (Nascimbene & al. 2013c).

Enterographa hutchinsiae (Leight.) A. Massal.

Atti Ist. Ven. Sc. Lett. Arti, ser. 3, 5: 315, 1860 - *Platygramma hutchinsiae* Leight., Ann. Mag. Nat. Hist., ser. 2, 13: 393, 1854.

Syn.: *Chiodecton hutchinsiae* (Leight.) Zahlbr., *Enterographa germanica* (A. Massal.) A. Massal., *Enterographa venosa sensu* Culberson, *Opegrapha hutchinsiae* (Leight.) Körb., *Opegrapha umbrosa* O. Behr, *Stigmatidium germanicum* A. Massal., *Stigmatidium hutchinsiae* (Leight.) Nyl.

C - Tosc.

Cr/ Tr/ S/ Sax/ pH: 2-3, L: 2, X: 2, E: 1/ Alt: 1-2/ SmedH: er, MedH: er/ PT: 1/ oc, u/ Note: a mild-temperate to humid subtropical lichen found on vertical to underhanging surfaces of hard siliceous rocks, rarely on smooth bark, at low elevations; to be looked for further in Tyrrhenian Italy.

Enterographa pitardii (B. de Lesd.) Redinger

Feddes Rep., 43: 68, 1938 - *Stigmatidium pitardii* B. de Lesd. in Pitard & Harmand, Bull. Soc. Bot. France, Mém. 22: 66, 1911.

Syn.: *Chiodecton pitardii* (B. de Lesd.) Zahlbr., *Enterographa zaborskiana* (M. Choisy & Werner) Egea & Torrente, *Schismatomma zaborskianum* M. Choisy & Werner

S - Cal (Puntillo 1996, Sparrius 2004).

Cr/ Tr/ S/ Sax/ pH: 1-2, L: 2, X: 2, E: 1/ Alt: 1/ MedH: er/ PT: 1/ oc/ Note: a mild-temperate, mainly western lichen known from the Azores, Italy and Greece, found on siliceous rocks in humid-shaded situations at low elevations.

Enterographa zonata (Körb.) Torrente & Egea

Källsten ex Torrente & Egea, Bibl. Lichenol., 32: 198, 1989 - *Opegrapha zonata* Körb., Syst. Lich. Germ., 1855.

Syn.: *Lecanactis zonata* (Körb.) A. Massal., *Opegrapha horistica* (Leight.) P. Syd., *Verrucaria horistica* Leight.

N - Fri (Tretiach 2004), **TAA** (Nascimbene 2006c, 2014, Nascimbene & al. 2014), **Lomb, Piem** (Isocrono & al. 2004), **Emil** (Tretiach & al. 2008), **Lig** (Brunialti & al. 1999). **C - Tosc, Sar, S - Cal** (Puntillo 1996).

Cr/ Tr/ A.s/ Sax/ pH: 2-3, L: 1-2, X: 1-2, E: 1/ Alt: 2-4/ Mont: rr, SmedD: er, SmedH: er/ PT: 1/ suboc. u/ Note: a temperate to southern boreal-montane, perhaps circumpolar lichen found on vertical to underhanging surfaces of hard siliceous rocks in deep gorges or in mature forests, very rarely on bark, mostly in the mountains. See also Sparrius (2004).

Eopyrenula R.C. Harris

Michigan Bot., 12: 19, 1973.

This genus of the Pyrenulaceae, with c. 6 species, was segregated from *Pyrenula* owing to the different ascospores and macroconidia, the lack of an involucrellum, and the very small perithecia. A world key was provided by Aptroot (2012). Type: *E. leucoplaca* (Wallr.) R.C. Harris

Eopyrenula leucoplaca (Wallr.) R.C. Harris

Michigan Bot., 12: 19, 1973 - *Verrucaria leucoplaca* Wallr., Fl. Crypt. Germ., 3: 299, 1831.

Syn.: *Arthopyrenia farrea* auct. non (Ach.) H. Olivier, *Leptosphaeria leucoplaca* (Wallr.) Vain., *Porina chiomela* (Norman) Zahlbr., *Pyrenula alba* A. Massal., *Pyrenula alni* A. Massal., *Pyrenula farrea* auct. non (Ach.) Branth & Rostr., *Pyrenula leucoplaca* (Wallr.) Körb., *Pyrenula quercus* A. Massal., *Pyrenula schaeereri* A. Massal., *Spermatodium leucoplacum* (Wallr.) Trevis.

N - **VG** (TSB 5622), **Ven** (Lazzarin 2000b), **TAA** (Nascimbene & al. 2007b, 2014, Nascimbene 2014), **Emil** (TSB 35580), **Lig. C** - **Umb** (Ravera 2000, Ravera & al. 2006), **Laz** (Ruisi & al. 2005), **Abr** (Caporale & al. 2016), **Mol** (Paoli & al. 2015). **S** - **Pugl** (Nimis & Tretiach 1999), **Bas** (Ravera & al. 2015d), **Cal** (Puntillo & Puntillo 2004), **Si** (Grillo & Cristaudo 1995).

Cr/ Tr/ S/ Epiph/ pH: 1-2, L: 3, X: 3, E: 1-2/ Alt: 2-4/ Salp: er, Mont: vr, SmedD: er, SmedH: er/ PT: 0/ suboc/ Note: a temperate species found on the (mostly) smooth bark of deciduous trees in open, humid forests; probably more frequent in the past. It is included in the Italian red list of epiphytic lichens as "Near-threatened" (Nascimbene & al. 2013c).

E p h e b e Fr.

Syst. Orb. Veget.: 256, 1825.

A genus of the Lichinaceae with 13 species including thread-like lichens, where the photosynthetic partner is *Stigonema*, with the highest diversity in cold regions. Type: *E. lanata* (L.) Vain.

Ephebe lanata (L.) Vain.

Meddeland. Soc. Fauna Fl. Fenn., 14: 20, 1888 - *Lichen lanatus* L., Sp. Pl., 2: 1155, 1753.

Syn.: *Conferva atrovirens* Dillwyn, *Ephebe intricata* Lamy, *Ephebe lapponica* Nyl., *Ephebe pubescens* auct. p.p., *Ephebeia cantabrica* Nyl., *Ephebeia martindalei* Nyl., *Parmelia lanata* (L.) Nyl.

N - **Ven**, **TAA**, **Lomb** (Vězda Lich. Rar. Exs. 357), **Piem** (Isocrono & al. 2004, 2006), **VA** (Valcuvia 2000), **Emil** (Tretiach & al. 2008). **C** - **Tosc** (Tretiach & al. 2008, Lastrucci & al. 2009), **Sar** (Nöske 2000).

Frut.f/ Cy.h/ S/ Sax/ pH: 1-3, L: 3-4, X: 1-2, E: 1-2/ Alt: 3-5/ Alp: vr, Salp: r, Orom: er, Mont: r/ PT: 1/ l/ Note: an arctic-alpine to boreal-montane, circumpolar lichen with outliers in the cool-temperate zone, found on steeply inclined, periodically wetted or inundated siliceous rocks, on seepage tracks, etc., with optimum above treeline

Ephebe perspinulosa Nyl.

in Norrl., Meddeland. Soc. Fauna Fl. Fenn., 1: 7, 1876.

Syn.: *Ephebe papillata* H. Magn., *Ephebe trachytera* (Nyl. ex Vain.) Henssen, *Ephebeia perspinulosa* (Nyl.) Räsänen

N - **Piem** (TSB 38003).

Frut.f/ Cy.h/ S/ Sax/ pH: 2-3, L: 3-4, X: 1-2, E: 1-2/ Alt: 4-5/ Alp: vr, Salp: r/ PT: 1/ l/ Note: on periodically wetted siliceous rocks above and near treeline; perhaps more widespread in the Alps.

E p i l i c h e n Clements

Gen. Fungi: 69, 174, 1909.

This monotypic genus of lichenicolous lichens was originally created to accommodate the parasitic species of *Buellia* which had been assigned to *Karschia*. However, it differs in having broader, true paraphyses which are branched only at the apex, as well as in the *Lecanora*-type asci, and belongs to the Rhizocarpaceae, being related to *Catolechia*. *Epilichen glauconigellus* (Nyl.) Hafellner is known from the Alps of Austria. Type: *E. scabrosus* (Ach.) Clem.

Epilichen scabrosus (Ach.) Clem.

The Genera of Fungi: 174, 1909 - *Lecidea scabrosa* Ach., Meth. Lich.: 48, 1803.

Syn.: *Buellia scabrosa* (Ach.) A. Massal., *Karschia scabrosa* (Ach.) Rehm, *Skolekites scabrosus* (Ach.) Norman

N - **Frl** (Tretiach & Hafellner 2000, Brackel 2016), **Ven** (Brackel 2016), **TAA** (Brackel 2016), **Lomb** (Brackel 2016), **Piem** (Isocrono & al. 2004, Brackel 2016), **VA** (Piervittori & Isocrono 1999, Brackel 2016). **C** - **Sar** (Brackel 2016).

Cr/ Ch/ S/ Terr/ pH: 1-2, L: 4, X: 2-3, E: 1/ Alt: 3-5/ Alp: r, Salp: rr, Orom: er, Mont: er/ PT: 1/ paras *Baeomyces* spp./ Note: optimum in cold-humid situations in upland areas, at first a parasite on *Baeomyces*-species, becoming autotrophic when old.

E u o p s i s Nyl.

Flora, 58: 363, 1875.

This genus of the Lichinaceae, which includes 2 species widespread in cool-temperate to arctic regions of both Hemispheres, differs from *Pyrenopsis* in the open, disciform apothecia with glossy discs, asci which are partly amyloid, and more slender paraphyses; *Psorotichia* has a different photobiont and non-amyloid asci (Schultz & Büdel 2002). Type: *E. granatina* (Sommerf.) Nyl.

Euopsis granatina (Sommerf.) Nyl.

Flora, 58: 363, 1875 - *Lecanora granatina* Sommerf., Suppl. Fl. Lapp.: 90, 1826.

Syn.: *Pyrenopsis granatina* (Sommerf.) Nyl., *Pyrenopsis rufescens* Nyl.

N - TAA (S-F146882).

Cr/ Cy.c/ S/ Sax/ pH: 1-2, L: 3-5, X: 2, E: 1/ Alt: 4-6/ Alp: er, Salp: vr/ PT: 1/ w/ Note: a species with an areolate thallus, the granulose areoles being dark brown and spotted pale brown due to the presence of two photobionts, and with minute lecanorine apothecia recalling small garnets, found on periodically wet siliceous boulders and outcrops in sunny places, from the subalpine to the nival belt; widespread in the Holarctic region but altogether rare. The sample from South Tyrol was collected by Arnold near Predazzo (Margola) on syenitic rocks.

Euopsis pulvinata (Schaer.) Vain.

Meddeland. Soc. Fauna Fl. Fenn., 6: 85, 1881 - *Lecidea pulvinata* Schaer., Naturwiss. Anz., 2: 11, 1818.

Syn.: *Blennothallia haemalea* (Sommerf.) Trevis., *Collema haemaleum* Sommerf., *Pannaria haemalea* (Sommerf.) A. Massal., *Pyrenopsis haemalea* (Sommerf.) Norrl., *Pyrenopsis macrocarpa* E. Dahl, *Pyrenopsis pulvinata* (Schaer.) Hellb.

N - TAA.

Cr/ Cy.c/ S/ Sax/ pH: 1-2, L: 3-4, X: 2, E: 1/ Alt: 3-5/ Alp: er, Salp: vr, Mont: er/ PT: 1/ w/ Note: a cool-temperate to boreal-montane, perhaps circumpolar lichen found on siliceous rocks, especially in seepage tracks on small pebbles in wet places, sometimes even on soil, usually in upland areas; much overlooked, and probably more widespread in the Alps.

Evernia Ach.

in Luyken, Tent. Hist. Lich. 90, 1809.

A small genus of the Parmeliaceae including c. 10 species, widespread in the Northern Hemisphere. Type: *E. prunastri* (L.) Ach.

Evernia divaricata (L.) Ach.

Lichenogr. Univ.: 441, 1810 - *Lichen divaricatus* L., Syst. Nat., ed. 12., 2: 713, 1767.

Syn.: *Evernia perfragilis* Llano?, *Letharia divaricata* (L.) Hue

N - FrI, Ven (Nascimbene & Caniglia 1997, 2000b, 2002c, 2003c, Caniglia & al. 1999, Nascimbene & al. 2006e, Nascimbene 2011), **TAA** (Nascimbene & Caniglia 2000b, 2002c, Caniglia & al. 2002, Nascimbene 2003, 2006b, 2006c, 2008b, 2013, 2014, Gottardini & al. 2004, Thell & al. 2004, Nascimbene & al. 2005, 2006, 2006e, 2007b, 2009, 2010, 2014, Thor & Nascimbene 2007, Lang 2009, Nascimbene & Marini 2015, Nimis & al. 2015), **Lomb** (Zocchi & al. 1997, Dalle Vedove & al. 2004, Nascimbene & al. 2006e), **Piem** (Caniglia & al. 1992, Morisi & Sereno 1995, Isocrono & al. 2003, Morisi 2005, Isocrono & Piervittori 2008), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Matteucci & al. 2008, Isocrono & al. 2008), **Emil, Lig, C - Tosc** (Stofer 2006), **Abr** (Recchia & Villa 1996), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **Sar, S - Camp** (Aprile & al. 2003b), **Bas** (Puntillo & al. 2012), **Cal** (Puntillo 1996).

Frut/ Ch/ A.f/ Epiph/ pH: 1-2, L: 3-5, X: 1-2, E: 1/ Alt: 3-4/ Salp: r, Mont: rr/ PT: 1/ Note: a cool-temperate to southern boreal-montane, circumpolar lichen found on twigs of coniferous and deciduous trees in semi-natural montane to subalpine forests with frequent fog; most frequent in the Alps, rarer in southern Italy, with optimum in beech-fir forests. Albeit very rarely, the species also occurs on soil on windy ridges with frequent fog.

Evernia illyrica (Zahlbr.) Du Rietz

Svensk Bot. Tidskr., 20: 90, 1926 - *Evernia divaricata* subsp. *illyrica* Zahlbr., Ann. K.K. naturhist. Hofmus. Wien, 19: 418, 1904.

Syn.: *Letharia illyrica* (Zahlbr.) Harm.

S - Cal (Puntillo & Vězda 1994, Puntillo 1995, 1996).

Frut/ Ch/ A.f/ Epiph/ pH: 1-2, L: 3-4, X: 1-2, E: 1/ Alt: 3/ Mont: er/ PT: 1/ suboc/ Note: a Mediterranean-montane species found in humid beech-fir forests. An earlier record from Venezia Giulia cited by Nimis (1993: 294) is excluded, being from Slovenian territory (Tarnova, near Gorizia). It is included in the Italian red list of epiphytic lichens as "Endangered" (Nascimbene & al. 2013c).

Evernia mesomorpha Nyl.

Lichenes Scand.: 74, 1861.

Syn.: *Evernia prunastri* var. *thamnodes* Flot., *Evernia thamnodes* (Flot.) Arnold, *Letharia mesomorpha* (Nyl.) Du Rietz

N - FrI, Ven (Nascimbene & Caniglia 2000b, 2002c, 2003c, Nascimbene 2005c, Nascimbene & al. 2006e, Watson 2014), **TAA** (Caniglia & al. 2002, Nascimbene & Caniglia 2002c, Nascimbene 2003, 2006b, 2008b, 2013, 2014, 2014c, Nascimbene & al. 2005, 2006, 2006e, 2007b, 2014, Nascimbene & Marini 2015, Nimis & al. 2015), **Lomb** (Nascimbene & al. 2006e), **Piem** (Isocrono & al. 2004, Morisi 2005), **VA** (Piervittori & Isocrono 1999, Matteucci & al. 2008, Isocrono & al. 2008, Loppi 2014), **Emil - S - Bas** (Puntillo & al. 2012).

Frut/ Ch/ A.s/ Epiph-Lign/ pH: 1-2, L: 4-5, X: 3-4, E: 1/ Alt: 3-4/ Salp: rr, Mont: vr/ PT: 1/ subc/ Note: a boreal-montane, circumpolar lichen found on bark (often on twigs) of conifers, sometimes on lignum (e.g. on

wooden poles, decorticated branches), with optimum in the subalpine belt; most common in the Alps, but also found in the southern Apennines (Mt. Pollino).

***Evernia prunastri* (L.) Ach.**

Lichenogr. Univ.: 442, 1810 - *Lichen prunastri* L., Sp. Pl., 2: 1147, 1753.

Syn.: *Evernia arenaria* auct., *Evernia herinii* P.A. Duvign., *Evernia prunastri* var. *herinii* (P.A. Duvign.) Maas Geest., *Evernia prunastri* var. *retusa* Ach., *Evernia prunastri* var. *vulgaris* f. *minima* Jatta, *Letharia arenaria* auct., *Parmelia prunastri* (L.) Ach.

N - VG (Castello 1996, 2002, Castello 2002, Martellos & Castello 2004), **Fri** (Badin & Nimis 1996, Tretiach & Molero 2007, Tomasi 2007), **Ven** (Caniglia & al. 1994, Nimis & al. 1996c, Nascimbene & Caniglia 1997, 2000b, 2002c, 2003c, Lazzarin 1997, 2000, Caniglia & al. 1999, Valcuvia & al. 2000c, Nascimbene 2001b, 2005c, 2008, 2008c, 2011, Cercasov & al. 2002, Nascimbene & al. 2005b, 2006, 2006c, 2006e, 2007, 2009c, 2010b, 2013b, 2015, Nascimbene & Marini 2007, 2010, Brackel 2013), **TAA** (Diederich & Etayo 2000, Nascimbene & Caniglia 2000b, 2002c, Caniglia & al. 2002, Nascimbene 2003, 2005b, 2006b, 2006c, 2008b, 2013, 2014, Gottardini & al. 2004, Nascimbene & al. 2006e, 2007b, 2010, 2014, Zarabska & al. 2009, Brackel 2013, Nascimbene & Marini 2015, Nimis & al. 2015), **Lomb** (Rivellini 1994, Arosio & Rinaldi 1995, Alessio & al. 1995, Brusoni & al. 1997, Zocchi & al. 1997, Roella 1999, Brusoni & Valcuvia 2000, Arosio & al. 2000, 2003, Valcuvia & al. 2003, Dalle Vedove & al. 2004, Furlanetto 2010, Gheza & al. 2015), **Piem** (Morisi & Sereno 1995, Arosio & al. 1998, Piervittori 1998, 2003, Isocrono & Falletti 1999, Castino 2004, Isocrono & al. 2004, 2005b, 2006, 2007, Morisi 2005, Isocrono & Piervittori 2008, Furlanetto 2010, Matteucci & al. 2010, Giordani & Malaspina 2016), **VA** (Piervittori & Maffei 1996, Piervittori & Isocrono 1999, Piervittori & al. 2001, Matteucci & al. 2008, 2008c, Isocrono & al. 2008), **Emil** (Bassi 1995, Gasparo & Tretiach 1996, Nimis & al. 1996, Salles 2003, Tretiach & al. 2008, Cioffi 2009, Benesperi 2009, Malavasi 2014, Brackel 2015, Gerdol & al. 2014), **Lig** (Brunialti & al. 1999, Putortù & al. 1999b, Giordani & al. 2002, Brunialti & Giordani 2003, Giordani 2006, Giordani & Incerti 2008, Malaspina & al. 2009), **C - Tosc** (Tretiach & Nimis 1994, Loppi & Corsini 1995, 2003, Loppi & Putortù 1995b, 2001, Pišút 1997, Loppi & al. 1996c, 1997, 1997b, 1997e, 1998, 1999a, 2002, 2002b, 2003, 2004, 2004c, 2006, Loppi & De Dominicis 1996b, Monaci & al. 1997, Loppi & Nascimbene 1998, 2010, Putortù & al. 1998, Tretiach & Ganis 1999, Putortù & Loppi 1999b, Diederich & Etayo 2000, Benesperi 2000a, 2006, 2011, Loppi & Pirintsos 2000, Paoli & Loppi 2001, 2006, Laganà & al. 2002, Landi & Loppi 2003, Lorenzini & al. 2003, Loppi & Frati 2004, Nicolardi & al. 2005, Paoli & al. 2005, 2010, 2012, 2014, Pinto & al. 2005, Frati & al. 2005, 2006b, 2011, Pisani & al. 2006, 2007, Benesperi & al. 2007, Di Lella & al. 2007, Paoli & Loppi 2008, Lastrucci & al. 2009, Triggiani & al. 2009, Munzi & al. 2009b, 2010, 2013c, Pasquinelli & al. 2009, 2013, Brunialti & Frati 2010, Pasquinelli & Puccini 2010, Loppi & Baragatti 2011, Brunialti & al. 2012b, Paoli & al. 2012b, 2013, 2013c, 2015c, 2015d, Winkler & al. 2013, Tomassini 2013, Malaspina & al. 2014b, Loppi & Paoli 2015, Brackel 2015, Nannoni & al. 2015, Nascimbene & al. 2015), **Marc** (Nimis & Tretiach 1999, Frati & Brunialti 2006, Brackel 2015), **Umb** (Ravera 1998, 1999, Nimis & Tretiach 1999, Panfili 2000b, 2007, Ravera & al. 2006), **Laz** (Bartoli & al. 1997, Ravera 2002, 2008b, Massari & Ravera 2002, Nimis & Tretiach 2004, Ruisi & al. 2005, Munzi & al. 2007, 2012, Ravera & Genovesi 2008, Zucconi & al. 2013, Brackel 2015), **Abr** (Olivieri & al. 1997, 1997b, Loppi & al. 1998d, 1999, Nimis & Tretiach 1999, Conti & al. 2004, Stofer 2006, Brackel 2015, Caporale & al. 2016, Corona & al. 2016), **Mol** (Garofalo & al. 1999, Nimis & Tretiach 1999, Caporale & al. 2008, Ravera & al. 2010, Paoli & al. 2011, 2015, Genovesi & Ravera 2014, Loppi & al. 2015), **Sar** (Monte 1993, Nöske 2000, Loi & al. 2000, Zedda 1995, 2002, 2002b, Zedda & Sipman 2001, Zedda & al. 2001, Stofer 2006, Rizzi & al. 2011, Cossu 2013), **S - Camp** (Garofalo & al. 1999, 2010, Ricciardi & al. 2000, Aprile & al. 2002, 2003, 2003b, 2011, Nimis & Tretiach 2004, Nascimbene & al. 2010b, Brunialti & al. 2010, 2013, Catalano & al. 2012, 2016, Ravera & Brunialti 2013), **Pugl** (Garofalo & al. 1999, Nimis & Tretiach 1999, Durini & Medagli 2004, Brackel 2011), **Bas** (Bartoli & Puntillo 1998, Nimis & Tretiach 1999, Potenza 2006, Potenza & al. 2010, Brackel 2011, Caggiano & al. 2015), **Cal** (Puntillo 1995, 1996, Puntillo & Puntillo 2004, Incerti & Nimis 2006, Brackel & Puntillo 2016), **Si** (Nimis & al. 1994, Ottonello & Salone 1994, Ottonello & al. 1994, 2011, Grillo & Cristaudo 1995, Ottonello 1996, Grillo 1996, 1998, Ottonello & Romano 1997, Czczuga & al. 1999, Grillo & Caniglia 2004, 2006, Merlo 2004b, Falco Scampatelli 2005, Caniglia & Grillo 2006b, Iacolino & Ottonello 2006, Stofer 2006, Brackel 2008b, Liistro & Cataldo 2011).

Frut/ Ch/ A.s/ Epiph/ pH: 1-3, L: 3-5, X: 2-3, E: 1-3/ Alt: 1-4/ Salp: rc, Mont: vc, SmedD: rr, Pad: er, SmedH: rc, MedH: rr/ PT: 1-2/ Note: a widespread holarctic lichen, rare only in disturbed situations and in dry habitats, otherwise one of the most common epiphytic fruticose lichens of Italy.

Farnoldia Hertel

Mitt. bot. Staatss. München, 19: 442, 1983.

This genus is distinguished from *Porpidia* by the black exciple, which is usually separable from the hypothecium, from *Schaereria* and *Tremolecia* by the sessile apothecia, the ascospores with a thick episporium, and the amyloid tholus of the asci. A phylogenetic analysis based on molecular data suggests that the genus is most closely related to a group of genera (including *Bryobilimbia*, *Clauzadea*, *Lecidoma* and *Romjularia*) that do not belong to Lecideaceae *s.str.* (Fryday & al. 2014). All of the 6 hitherto recognised species are calcicolous and have a more or less arctic-alpine distribution. Type: *F. jurana* (Schaer.) Hertel

Farnoldia dissipabilis (Nyl.) Hertel

Mitt. bot. Staatss. München, 19: 443, 1983 - *Lecidea dissipabilis* Nyl., Flora, 57: 314, 1874.

Syn.: *Lecidea jurana* var. *sublutescens* (Nyl.) Hertel, *Lecidea obstans* Nyl., *Lecidea sublutescens* Nyl., *Melanolecia dissipabilis* (Nyl.) Hertel, *Tremolecia jurana* var. *sublutescens* (Nyl.) Hertel

N - Ven, TAA (Hertel & Schuhwerk 2010), **Piem** (TSB 34058).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 3-4, X: 3, E: 1/ Alt: 4-6/ Alp: r, Salp: vr/ PT: 1/ #/ Note: on calciferous rocks, especially in rock fissures and on steeply inclined to slightly overhanging surfaces near or above

treeline; very closely related to *F. jurana*, this taxon, known from the central European mountains (Alps, Carpathians), awaits further study.

Farnoldia hypocrita (A. Massal.) Fröberg var. ***hypocrita***

Calc. Lich. Öland: 57, 1989 - *Lecidea hypocrita* A. Massal., *Symmicta* Lich.: 53, 1855.

Syn.: *Biatora emergens* Müll. Arg., *Haplocarpon lithospermum* (Zahlbr.) M. Choisy, *Lecidea dissipata* H. Magn.?, *Lecidea elata* var. *violascens* Lynge, *Lecidea jurana* auct. ital. p.p. non Schaer., *Lecidea lithosperma* Zahlbr., *Lecidea murina* Ach., *Lecidea platycarpa* var. *apyospora* A. Massal.

N - Frl, Ven (Caniglia & al. 1999, Lazzarin 2000b), **TAA** (Hertel 2001, Nascimbene 2008b, Hertel & Schuhwerk 2010), **Lomb, Piem, Emil. C - Abr.**

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 4-5, X: 3-4, E: 1-2/ Alt: 3-5/ Alp: rr, Salp: r, Mont: vr/ PT: 1/ subc/ Note: an arctic-alpine, incompletely circumpolar species found on limestone and dolomite in upland areas, common in the Alps; the distinction from *F. jurana* is not always easy. All records from southern Italy cited in Nimis (1993: 295), being dubious, are not accepted here.

Farnoldia hypocrita (A. Massal.) Fröberg var. ***ligans*** (Nyl.) Hafellner & Türk

Stapfia, 76: 152, 2001 - *Lecidea ligans* Nyl., *Flora*, 59: 309, 1876.

Syn.: *Lecidea hypocrita* var. *ligans* (Nyl.) Hertel, *Lecidea lithyriga sensu* Fr. non Ach., *Lecidea sarcogynella* Nádv. **N - TAA** (Hertel & Schuhwerk 2010).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 4-5, X: 3-4, E: 1-2/ Alt: 3-5/ Alp: vr, Salp: vr/ PT: 1/ subc/ Note: a rare, still incompletely understood taxon known from a few localities in the Alps, the Tatra Mountains and the Rocky Mountains in North America, found on limestone and dolomite, in sunny places.

Farnoldia jurana subsp. ***bicineta*** (Hertel) Hafellner & Türk

Clauzade & Cl. Roux ex Hafellner & Türk, *Stapfia* 76: 152, 2001 - *Lecidea jurana* var. *bicineta* Hertel, *Beih. Nova Hedwigia*, 24: 89, 1967.

Syn.: *Melanolecia jurana* subsp. *bicineta* (Hertel) Clauzade & Cl. Roux, *Melanolecia jurana* var. *bicineta* (Hertel) Hertel

N - Frl (TSB 35606), **Ven** (Nimis 1994), **TAA** (Nascimbene 2005), **Piem** (TSB 34783).

Cr.end/ Ch/ S/ Sax/ pH: 4-5, L: 3-4, X: 3-4, E: 1-2/ Alt: 4-5/ Alp: rr, Salp: r/ PT: 1/ #/ Note: on exposed calcareous rocks near and above treeline, often associated with *Hymenelia coerulea*; probably more widespread in the Alps.

Farnoldia jurana (Schaer.) Hertel subsp. ***jurana***

Mitt. bot. Staatss. München, 19: 443, 1983 - *Lecidea jurana* Schaer., *Enum. Crit. Lich. Eur.*: 123, 1850.

Syn.: *Biatora annularis* Müll. Arg., *Biatora jurana* (Schaer.) Hepp nomen sed non planta, *Haplocarpon juranum* (Schaer.) M. Choisy, *Lecidea albosuffusa* Th. Fr., *Lecidea albosuffusa* f. *aggregata* (Jatta) Zahlbr., *Lecidea annularis* (Müll. Arg.) Müll. Arg., *Lecidea caerulea* Kremp., *Lecidea calcigena* Flörke, *Lecidea cyaniza* Nyl., *Lecidea inferior* Nyl., *Lecidea jurana* f. *dispersa* Arnold, *Lecidea petrosa* Arnold, *Lecidea petrosa* f. *aggregata* Jatta, *Lecidea petrosa* var. *glaucoarpa* Arnold, *Lecidea reuteri* Müll. Arg., *Lecidea subvorticosa* Nyl., *Melanolecia jurana* (Schaer.) Hertel, *Tremolecia jurana* (Schaer.) Hertel

N - Frl, Ven (Nimis 1994, Caniglia & al. 1999, Nascimbene & Caniglia 2003c, Nascimbene 2005c, Nascimbene & Marini 2007, Hertel & Schuhwerk 2010), **TAA** (Nascimbene 2003, 2008b, Nascimbene & al. 2005, 2006, Hertel & Schuhwerk 2010, Spitale & Nascimbene 2012), **Lomb, Piem** (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999), **Emil. C - Tosc, Marc** (Nimis & Tretiach 1999), **Laz** (Nimis & Tretiach 2004), **Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach, 1999, 2004, Caporale & al. 2008), **Sar. S - Camp** (Aprile & al. 2003b, Nimis & Tretiach 2004), **Bas, Si.**

Cr.end/ Ch/ S/ Sax/ pH: 4-5, L: 3-5, X: 3-4, E: 1-2/ Alt: 3-6/ Alp: vc, Salp: ec, Orom: c, Mont: rr/ PT: 1/ Note: a cool-temperate to arctic-alpine, circumpolar species found on limestone and dolomite, more rarely on other calciferous rocks (e.g. sandstone and schist) in upland areas; one of the most common calcicolous species above and near treeline, throughout the country.

Farnoldia jurana subsp. ***muveranii*** (Müll. Arg.) Hafellner & Türk

Stapfia, 76: 152, 2001 - *Biatora muveranii* Müll. Arg., *Flora*, 53: 165, 1870.

Syn.: *Lecidea muveranii* (Müll. Arg.) Hertel, *Melanolecia jurana* var. *muveranii* (Müll. Arg.) Hertel

C - Sar (TSB 13439).

Cr.end/ Ch/ S/ Sax/ pH: 3-5, L: 3-4, X: 3-4, E: 1-2/ Alt: 4-5/ Alp: vr, Salp: vr, Orom: vr/ PT: 1/ u, #/ Note: on calciferous rocks, including calcareous schists, near and above treeline; certainly present also in the Alps, and to be looked for there.

Farnoldia micropsis (A. Massal.) Hertel

Mitt. bot. Staatss. München, 19: 443, 1983 - *Lecidea micropsis* A. Massal., *Atti Ist. Ven. Sc. Lett. Arti*, ser. 3, 2: 18, 1857.

Syn.: *Lecidea dusenii* Lynge, *Lecidea hornii* Lynge, *Lecidea macrospora* Lynge, *Lecidea nivalis* Anzi, *Lecidea nivalis* var. *lutescens* Anzi, *Lecidea rhaetica* Hepp ex Th. Fr., *Lecidea rhaetica* f. *lutescens* (Anzi) Jatta, *Lecidea rhaetica* var. *micropsis* (A. Massal.) Dalla Torre & Sarnth., *Lecidea valpellinensis* B. de Lesd., *Lecidella micropsis* (A. Massal.) Körb., *Lecidella rhaetica* (Th.Fr.) Körb., *Melanolecia micropsis* (A. Massal.) Hertel, *Tremolecia nivalis* (Anzi) Hertel

N - Frl (TSB 10956), **Ven, TAA** (Nascimbene 2008b, Hertel & Schuhwerk 2010), **Lomb, Piem** (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999), **Lig, Emil. C - Abr** (Nimis & Tretiach 1999). **S - Camp** (Aprile & al. 2003b), **Cal** (Puntillo 1996).

Cr/ Ch/ S/ Sax/ pH: 4, L: 3-5, X: 3-4, E: 1-2/ Alt: 4-6/ Alp: rc, Salp: rr, Orom: vr/ PT: 1/ Note: an arctic-alpine, circumpolar species, with optimum on calciferous sandstone and schists, rarer on limestone and dolomite, mostly on inclined faces; common in only the Alps, with optimum in the alpine and nival belts.

Farnoldia muscigena (Vězda) Hafellner & Tretiach

in Tretiach & Hafellner, Herzogia, 14: 106, 2000 - *Lecidea jurana* var. *muscigena* Vězda, Acta Mus. Silesiae, ser. A, 10: 8, 1961.

Syn.: *Melanolecia muscigena* (Vězda) Hertel

N - Frl (Tretiach & Hafellner 2000), **Piem** (TSB 32924).

Cr/ Ch/ S/ Terr/ pH: 4-5, L: 4, X: 3-4, E: 1-2/ Alt: 4-5/ Alp: vr, Salp: vr/ PT: 1/ Note: known from the central European mountains (Tatra, Alps) this lichen is found on muribund bryophytes, crustose lichens and plant debris over calcareous substrata above or near treeline; probably more widespread in the Alps.

Farnoldia similigena (Nyl.) Hertel

Mitt. bot. Staatss. München, 19: 443, 1983 - *Lecidea similigena* Nyl., Flora, 64: 451, 1881.

Syn.: *Lecidea subrhaetica* Arnold ex Lettau, *Melanolecia similigena* (Nyl.) Hertel, *Tremolecia similigena* (Nyl.) Hertel

N - TAA (Hertel & Schuhwerk 2010).

Cr/ Ch/ S/ Sax/ pH: 3-4, L: 4, X: 3, E: 1/ Alt: 5-6/ Alp: vr/ PT: 1/ Note: a rare arctic-alpine, bipolar species found on inclined to vertical faces of calciferous siliceous rocks (e.g. calcareous sandstone and schist), above or near treeline.

Felipes Frisch & G. Thor
in Frisch & al., Taxon, 63: 738, 2014.

A recent overview of Arthoniales phylogeny (Ertz & al. 2009) revealed the homoplastic nature of morphological characters traditionally used to circumscribe genera, such as exciple carbonisation and ascomatal structure. A molecular analysis of the Arthoniales was published by Frisch & al. (2014); this genus was created to accommodate a single species formerly assigned to the genus *Arthonia*. Type: *F. leucopellaeus* (Ach.) Frisch & G. Thor

Felipes leucopellaeus (Ach.) Frisch & G. Thor

in Frisch & al., Taxon, 63: 738, 2014 - *Spiloma melaleucum* var. *leucopellaum* Ach., Lichenogr. Univ.: 138, 1810.

Syn.: *Arthonia leucopellaea* (Ach.) Almq., *Arthonia marmorata* Nyl., *Arthonia melaleuca sensu* Malme, *Arthonia schaereri* A. Massal., *Melaspilea associata* Norman, *Trachylia leucopellaea* (Ach.) Eitner

N - Frl. C - Sar (Cossu 2013).

Cr/ Tr/ S/ Epiph/ pH: 1-2, L: 2-3, X: 2-3, E: 1/ Alt: 3/ Mont: er/ PT: 0/ suboc/ Note: on bark of conifers in old-growth forests under suboceanic climatic conditions; widespread in the temperate to boreal zones of the Holarctic region, in the Alps mainly in the montane belt, but lacking in the central Alps with more continental climate conditions. The species is included in the Italian red list of epiphytic lichens as "Critically Endangered" (Nascimbene & al. 2013c).

Fellhanera Vězda
Folia Geobot. Phytotaxon., 21: 200, 1986.

This genus was created to accommodate 19 species formerly included into *Bacidia*, mostly tropical foliicolous lichens characterised by the pyriform conidia, the *Byssoloma*-ascus type, a thin-walled paraplectenchymatous excipulum and thin, anastomosing paraphyses. Several additional taxa have been described and combined in this genus, which now includes more than 70 species. Sérusiaux (1996) provided a key to all foliicolous species then known, and also introduced the genus *Fellhaneropsis* for two species formerly included in *Fellhanera*. The genus belongs in the Pilocarpaceae and is closely related to *Badimia*. Type: *F. fuscata* (Müll. Arg.) Vězda

Fellhanera bouteillei (Desm.) Vězda

Folia Geobot. Phytotaxon., 21: 214, 1986 - *Parmelia bouteillei* Desm., Ann. Sc. Nat. Bot., ser. 3: 8, 1847.

Syn.: *Biatorina bouteillei* (Desm.) Bausch, *Biatorina littorella* (Nyl.) A.L. Sm., *Catillaria bouteillei* (Desm.) Zahlbr., *Catillaria rubicola* (P. Crouan & H. Crouan) H. Olivier, *Lecidea littorella* Nyl.

N - Ven, TAA (Nascimbene & al. 2014, Nascimbene 2014), **Piem** (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999), **Lig** (Brunialti & al. 1999). **C - Tosc** (Puntillo & Ottonello 1997), **Umb** (Ravera & al. 2011), **Laz** (Ravera 2006, 2006c). **S - Camp** (Puntillo & al. 2000, Puntillo 2000, Nimis & Tretiach 2004), **Cal** (Puntillo & Vězda 1994, Puntillo 1995, 1996, 2000, Puntillo & Puntillo 2004).

Cr/ Ch/ S/ Foliic-Sax-Epiph/ pH: 1-2, L: 3, X: 1-2, E: 1/ Alt: 1-3/ Mont: er, MedH: er/ PT: 0/ suboc/ Note: a temperate to southern boreal-montane species found on leaves and twigs of conifers (especially *Abies* in the Alps), but also on evergreen Mediterranean trees and shrubs in very humid situations. *F. gyrophorica* Sérus., Coppins, Diederich & Scheid. is known from eastern central Europe; North Italian records should be checked against that species. The species is included in the Italian red list of epiphytic lichens as “Near-threatened” (Nascimbene & al. 2013c).

Fellhanera christiansenii Sérus. & Vězda

in Vězda, Nova Hedwigia, 58: 130-131, 1994.

S - Cal (Puntillo & Vězda 1994, Puntillo 1995, 1996, 2000, Sérusiaux 1996, 1998).

Cr/ Ch/ S/ Foliic/ pH: 1-2, L: 3, X: 1, E: 1-2/ Alt: 2-3/ Mont: er, SmedH: er/ PT: 0/ suboc/ Note: on needles of *Abies* and cladodes of *Ruscus* in humid woodlands. The species is included in the Italian red list of epiphytic lichens as “Endangered” (Nascimbene & al. 2013c).

Fellhanera colchica (Vězda) Llop

Lichenologist, 39: 393, 2007 - *Bacidia colchica* Vězda, Folia Geobot. Phytotaxon., 15: 206, 1979.

S - Camp (Puntillo & al. 2000, Puntillo 2000, Nimis & Tretiach 2004, Llop 2007).

Cr/ Ch/ S/ Foliic/ pH: 2-3, L: 2-3, X: 1, E: 1/ Alt: 1-2/ SMedH: er/ PT: 0/ oc/ Note: a humid subtropical species described from Caucasus and also reported from the Pyrenees, known from a single locality in Italy, a very humid gorge near the Tyrrhenian coast. It is included in the Italian red list of epiphytic lichens as “Critically Endangered” (Nascimbene & al. 2013c).

Fellhanera subtilis (Vězda) Diederich & Sérus.

in Sérusiaux, Mém. Soc. roy. Bot. Belg., 12: 142, 1990 - *Bacidia subtilis* Vězda, Preslia, 33: 367, 1961.

Syn.: *Arthonia subtilis* (Vězda) Vězda

N - Frl.

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 3, X: 1-2, E: 1/ Alt: 3-4/ Salp: vr, Mont: er/ PT: 0/ suboc/ Note: on twigs of small shrubs (*Vaccinium*, *Calluna*), more rarely on mosses (e.g. *Polytrichum*) and on twigs of *Picea* in cold sites, on north-facing slopes or in deep gorges, usually in upland areas; perhaps more widespread in the Alps. It is included in the Italian red list of epiphytic lichens as “Endangered” (Nascimbene & al. 2013c).

Fellhaneropsis Sérus. & Coppins

in Sérusiaux, Lichenologist, 28: 198, 1996.

This is a small genus of the Pilocarpaceae (see Andersen & Ekman 2005) segregated from *Fellhanera*, currently comprising 7 species. Most species are obligately or facultatively foliicolous. Three species are known from Europe, one of which extends to North America. A key to all pycnidiate species was published by Ekman (2015). Type: *F. myrtillicola* (Erichsen) Sérus. & Coppins

Fellhaneropsis myrtillicola (Erichsen) Sérus. & Coppins

in Sérusiaux, Lichenologist, 28: 199, 1996 - *Bacidia myrtillicola* Erichsen, Mitt. Inst. allg. Bot. Hamb., 10: 414, 1939.

Syn.: *Bacidia buxi* Vězda & Vivant, *Bacidia gorgonea* Vězda & Poelt, *Bacidia myriocarpa* Erichsen, *Fellhanera buxi* (Vězda & Vivant) Vězda, *Fellhanera myrtillicola* (Erichsen) Hafellner

N - Frl (TSB 15273). S - Camp (Puntillo & al. 2000, Puntillo 2000), Cal (Puntillo & Vězda 1994, Sérusiaux 1996, Puntillo 1996, 2000).

Cr/ Ch/ S/ Epiph-Foliic/ pH: 1-2, L: 3, X: 1, E: 1/ Alt: 1-3/ Mont: er, MedH: er / PT: 0/ suboc/ Note: a mild-temperate to southern boreal-montane lichen found on needles of *Abies* in very humid montane forests, but also on leaves of *Buxus* and *Laurus* in warm-humid gorges near the coast, to be looked for further in the most humid parts of the Alps, on twigs of *Picea*, and branches of *Calluna* and *Vaccinium*. The species is included in the Italian red list of epiphytic lichens as “Endangered” (Nascimbene & al. 2013c).

Fellhaneropsis vezdae (Coppins & P. James) Sérus. & Coppins

Lichenologist, 28: 208, 1996 - *Bacidia vezdae* Coppins & P. James, Lichenologist, 10: 190, 1978.

Syn.: *Fellhanera vezdae* (Coppins & P. James) V. Wirth

S - Cal (Puntillo & Vězda 1994, Puntillo 1995, 1996, 2000).

Cr/ Ch/ S/ Epiph-Foliic/ pH: 1-2, L: 2-3, X: 1-2, E: 1/ Alt: 2-3/ Mont: er, SmedH: er/ PT: 0/ suboc/ Note: a mild-temperate lichen found on bark of broad-leaved (especially *Quercus*) and coniferous (e.g. *Abies*) trees in very humid, open forests, especially on basal parts of trunks, sometimes foliicolous (e.g. in Calabria). It is included in the Italian red list of epiphytic lichens as “Critically Endangered” (Nascimbene & al. 2013c).

Flavocetraria Kärnefelt & A. Thell

in Kärnefelt & al., Acta Bot. Fenn., 150: 81, 1994.

This genus of the Parmeliaceae was segregated from the two closely related genera *Cetraria s.str.* and *Nephromopsis* by differences in the shape of the pycnoconidia, the number of layers in the exciple, and

cortical anatomy. It comprises 3 species, widespread in arctic-alpine regions of the Northern Hemisphere, with scattered occurrences also in the Southern Hemisphere. Type: *F. cucullata* (Bellardi) Kärnefelt & A. Thell

Flavocetraria cucullata (Bellardi) Kärnefelt & A. Thell

in Kärnefelt & al., Acta Bot. Fenn., 150: 81, 1994 - *Lichen cucullatus* Bellardi, Osserv. Bot.: 54, 1788.

Syn.: *Allocetraria cucullata* (Bellardi) Randle & Saag, *Cetraria cucullata* (Bellardi) Ach.

N - **Fri** (Tretiach & Hafellner 2000), **Ven** (Nascimbene & Caniglia 1997, 2003c, Caniglia & al. 1999, Giovagnoli & Tasinazzo 2014), **TAA** (Caniglia & al. 2002, Nascimbene & Caniglia 2002c, Nascimbene & al. 2006e, Nascimbene 2008b, Thell & Moberg 2011, Brackel 2013), **Lomb** (Rivellini 1994, Dalle Vedove & al. 2004), **Piem** (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999, Valcuvia 2000), **Emil. C** - **Abr**.

Frut/ Ch/ A.f/ Terr/ pH: 2-4, L: 4-5, X: 4, E: 1/ Alt: 4-5/ Alp: c, Salp: vr/ PT: 1/ Note: a circumpolar, arctic-alpine lichen, a typical element of tundra-like vegetation in open, dry habitats above treeline, most frequent on basic siliceous substrata, in wind-exposed ridges. The species was neotypified on an Italian specimen (see Thell & Moberg 2011).

Flavocetraria nivalis (L.) Kärnefelt & A. Thell

in Kärnefelt & al., Acta Bot. Fenn., 150: 84, 1994 - *Lichen nivalis* L., Sp. Pl.: 1145, 1753.

Syn.: *Allocetraria nivalis* (L.) Randle & Saag, *Cetraria nivalis* (L.) Ach.

N - **Fri** (Tretiach & Hafellner 2000), **Ven** (Nascimbene & Caniglia 1997, 2003c, Caniglia & al. 1999, Giovagnoli & Tasinazzo 2014), **TAA** (Caniglia & al. 2002, Nascimbene 2008b, 2001b, Lang 2009, Bilovitz & al. 2014), **Lomb** (Rivellini 1994, Dalle Vedove & al. 2004), **Piem** (Isocrono & al. 2004, Morisi 2005, Isocrono & Piervittori 2008), **VA** (Verger & al. 1993, Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Valcuvia 2000, Revel & al. 2001, Piervittori & al. 2004), **Emil, Lig. C** - **Mare** (TSB 24214), **Abr** (Nimis & Tretiach 1999).

Frut/ Ch/ A.f/ Terr/ pH: 2-4, L: 4-5, X: 3-4, E: 1/ Alt: 4-5/ Alp: c, Salp: vr/ PT: 1/ Note: a circumpolar, arctic-alpine lichen, a typical element of tundra-like vegetation in open, dry habitats above treeline; common throughout the Alps, this species is surprisingly abundant in the Gran Sasso Massif (central Apennines).

Flavoparmelia Hale

Mycotaxon, 25: 604, 1986.

This genus of the Parmeliaceae, with c. 32 species, includes yellow-green foliose lichens characterised by broad rounded lobes, non-ciliate margins, a pored epicortex, bifusiform or fusiform conidia, a cortex containing usnic acid, and cell-walls composed of isolichenan. The genus has a worldwide distribution with the highest diversity in temperate and subtropical areas. For further details on its systematic position see Crespo & al. (2010). Type: *F. caperata* (L.) Hale

Flavoparmelia caperata (L.) Hale

Mycotaxon, 25: 604, 1986 - *Lichen caperatus* L., Sp. Pl.: 1147, 1753.

Syn.: *Imbricaria caperata* (L.) DC., *Parmelia caperata* (L.) Ach., *Parmelia herreana* Zahlbr., *Parmelia negativa* Gyeln., *Pseudoparmelia caperata* (L.) Hale

N - **VG** (Tretiach 1993, Castello & al. 1995, Castello 1996, Carvalho 1997, 2001, Nimis & al. 2001, 2006, Castello & Skert 2005, Baruffo & al. 2006, 2008, Piccotto & al. 2006, 2011, Tretiach & al. 2007c, 2012b, Piccotto & Tretiach 2010, Bertuzzi & al. 2013, Bertuzzi & Tretiach 2013, Pellegrini & al. 2014), **Fri** (Tretiach 1993, Badin & Nimis 1996, Tretiach 1996, Nimis & al. 2001, Caniglia & al. 2005, Castello & Skert 2005, Tretiach & Molaro 2007, Bernini & al. 2010, Brackel 2013), **Ven** (Tretiach 1993, Nimis & al. 1996c, Nascimbene & Caniglia 1997, Lazzarin 1997, 2000, Caniglia & al. 1998b, 1999, Valcuvia & al. 2000c, Candeo & Caniglia 2005, Nascimbene 2005c, 2008, 2008c, Nascimbene & al. 2007, 2009c, Nascimbene & Marini 2010, Brackel 2013), **TAA** (Tretiach 1993, Nascimbene 2001b, 2005b, 2006c, 2008b, 2014, Gottardini & al. 2004, Oetl & al. 2013, Nascimbene & al. 2007b, 2014, Nascimbene & Marini 2015, Nimis & al. 2015), **Lomb** (Philippi 1983, Tretiach 1993, Rivellini 1994, Alessio & al. 1995, 2003, Arosio & Rinaldi 1995, Valcuvia & Gianatti 1995, Guidetti & Stefanetti 1996, Zocchi & al. 1997, Roella 1999, Arosio & al. 2000, Dalle Vedove & al. 2004, Anderi & al. 2005, Stofer 2006, Valcuvia & Truzzi 2007b, Furlanetto 2010, Brackel 2010, 2013, Gheza & al. 2015), **Piem** (Caniglia & al. 1992, Tretiach 1993, Stefanetti 1997, Arosio & al. 1998, Piervittori 1998, 2003, Clerc & al. 1999, Isocrono & Falletti 1999, Rizzio & al. 2001, Castino 2004, Isocrono & al. 2004, 2005b, 2006, 2007, 2009, Griselli & al. 2003, Isocrono & Piervittori 2008, Furlanetto 2010, Matteucci & al. 2010), **VA** (Piervittori & Maffei 1996, Piervittori & Isocrono 1999, Valcuvia & al. 2000b, Piervittori & al. 2001, Matteucci & al. 2008, Isocrono & al. 2008), **Emil** (Tretiach 1993, Gasparo & Tretiach 1996, Nimis & al. 1996, Sallase 2003, Morselli & Regazzi 2006, Tretiach & al. 2008, Cioffi 2009, Benesperi 2009, Malavasi 2014, Gerdol & al. 2014), **Lig** (Nimis & al. 1993, Tretiach 1993, Castello & al. 1994, Palmieri & al. 1997, Brunialti & al. 1999, Putortì & al. 1999b, Valcuvia & al. 2000, Caviglia & al. 2001, Giordani & al. 2001, 2002, Minganti & al. 2001, 2003, Brunialti & Giordani 2003, Modenesi & al. 2003, Benco & al. 2004, Minganti & al. 2004, Giordani 2006, Giordani & Incerti 2008), **C** - **Tosc** (Loppi & al. 1992, 1992b, 1994b, 1994c, 1995, 1995b, 1996, 1996b, 1996c, 1997, 1997b, 1997d, 1997e, 1997g, 1997h, 1998, 1998b, 1998c, 1999a, 2000, 2002, 2002b, 2002c, 2003, 2004, 2004b, 2006, Tretiach 1993, Tretiach & Nimis 1994, Loppi & Corsini 1995, 2003, Loppi & Putortì 1995, 1995b, 2001, Loppi 1995, 1995b, 1996, 1996b, Loppi & Bargagli 1996, Loppi & De Dominicis 1996, 1996b, Bargagli & al. 1997, Monaci & al. 1997, Pišút 1997, Corsini & al. 1998, Loppi & Nascimbene 1998, 2010, Putortì & al. 1998, 1999, Putortì & Loppi 1999, 1999b, Tretiach & Ganis 1999, Benesperi 2000a, 2006, 2011, Bacci & al. 2000, Senese & Critelli 2000, Loppi & Pirintsos 2000, Bettini 2001, Del Guasta 2001, Bargagli & al. 2002, 2003, Laganà & al. 2002, Loppi & Pirintsos 2003, Landi & Loppi 2003, Lorenzini & al. 2003, Loppi & Frati 2004, Baragatti & al. 2005, Baruffo & Tretiach 2005, Baragatti 2006, Frati & al. 2006b, 2007, Pisani & al. 2006, Stofer 2006, Benesperi & al. 2007, 2013, Paoli & Loppi 2008, Brackel 2008, 2015, Lastrucci & al. 2009, Pasquinelli & al.

2009, 2013, Paoli & al. 2010, 2012, 2012b, 2013, 2013d, 2015b, 2015d, Brunialti & Frati 2010, Pasquinelli & Puccini 2010, Loppi & Baragatti 2011, Brunialti & al. 2012b, Nascimbene & al. 2015), **Marc** (Tretiach 1993, Nimis & Tretiach 1999, Frati & Brunialti 2006, Brunialti & al. 2012, Brackel 2015), **Umb** (Tretiach 1993, Ravera 1998, Panfili 2000b, 2007, Ravera & al. 2006, Ciotti & al. 2009, Brackel 2015), **Laz** (Tretiach 1993, Gigante & Petriccione 1995, Bartoli & al. 1997, Massari & Ravera 2002, Nimis & Tretiach 2004, Ruisi & al. 2005, Stofer 2006, Munzi & al. 2007, Ravera 2008b, Ravera & Genovesi 2008, Genovesi & al. 2011, Zucconi & al. 2013, Brackel 2015), **Abr** (Tretiach 1993, Olivieri & al. 1997, 1997b, Loppi & al. 1999, Nimis & Tretiach 1999, Brackel 2015), **Mol** (Nimis & Tretiach 1999, Garofalo & al. 1999, Caporale & al. 2008, Paoli & al. 2015, Brackel 2015, Caporale & al. 2016), **Sar** (Tretiach 1993, Zedda 1995, 2002, 2002b, Nöske 2000, Loi & al. 2000, Zedda & al. 2001, Rizzi & al. 2011, Cossu 2013), **S - Camp** (Tretiach 1993, Garofalo & al. 1999, 2010, Ricciardi & al. 2000, Aprile & al. 2002, 2003, 2003b, 2010, 2011, Nimis & Tretiach 2004, Brunialti & al. 2010, 2013, Nascimbene & al. 2010b, Catalano & al. 2010, 2012, 2016, Ravera & Brunialti 2013), **Pugl** (Tretiach 1993, Garofalo & al. 1999, Nimis & Tretiach 1999, Durini & Medagli 2004, Brackel 2011), **Bas** (Bartoli & Puntillo 1998, Nimis & Tretiach 1999, Potenza 2006, Potenza & al. 2010, Potenza & Fascetti 2010, Brackel 2011), **Cal** (Tretiach 1993, Puntillo 1995, Puntillo & Puntillo 2004, Incerti & Nimis 2006, Brackel & Puntillo 2016), **Si** (Tretiach 1993, Nimis & al. 1994, Ottonello & Salone 1994, Ottonello & al. 1994, 2011, Ottonello 1996, Ottonello & Romano 1997, Grasso & al. 1999, Grillo & Caniglia 2004, 2006, Caniglia & al. 2005, Caniglia & Grillo 2006b).

Fol.b/ Ch/ A.s/ Epiph/ pH: 2-3, L: 3-4, X: 3, E: 1-3/ Alt: 1-3/ Mont: vr, SmedD: c, Pad: er, SmedH: vc, MedH: rr, MedD: er/ PT: 1-2/ Note: a mild-temperate lichen found on isolated deciduous, more rarely evergreen trees, only exceptionally on rocks (e.g. on north-exposed faces of basic siliceous rocks in dry-continental Alpine valleys); common and abundant in the submediterranean belt (except along the Adriatic side of the Peninsula that is more subject to dry-cold winds), rarer elsewhere; in humid areas common also within eu-Mediterranean vegetation, in arid areas restricted to sheltered situations, e.g. inside open forests.

Flavoparmelia soledians (Nyl.) Hale

Mycotaxon, 25: 605, 1986 - *Parmelia soledians* Nyl., Flora, 55: 426, 1872.

Syn.: *Pseudoparmelia soledians* (Nyl.) Hale

N - **VG** (Tretiach 1993), **Frl** (Tretiach 1993, Tretiach & Molaro 2007), **Ven** (Thor & Nascimbene 2007), **TAA** (Nascimbene & al. 2007b, 2014, Nimis & al. 2015), **Lomb** (Obermayer 2013), **Piem** (Castino 2004), **Emil** (Nimis & al. 1996), **Lig** (Tretiach 1993, Castello & al. 1994, Caviglia & al. 2001, Giordani & al. 2001, 2002, Brunialti & Giordani 2003, Giordani 2006, Giordani & Incerti 2008, Watson 2014). **C - Tosc** (Tretiach 1993, Putorti & Loppi 1999, Frati & al. 2007, 2008, Brunialti & Frati 2010, Loppi & Baragatti 2011, Paoli & al. 2012, 2015d), **Marc** (Frati & al. 2004), **Umb** (Ravera 2000, Ravera & al. 2006, Ciotti & al. 2009), **Laz** (Tretiach 1993, Bartoli & al. 1997, Massari & Ravera 2002, Nimis & Tretiach 2004, Ruisi & al. 2005, Munzi & al. 2007, Ravera 2008b, Gagliardi & al. 2010, Zucconi & al. 2013), **Abr** (Recchia & Villa 1996, Olivieri & al. 1997, 1997b, Loppi & al. 1999, Nimis & Tretiach 1999, Caporale & al. 2016), **Mol** (Frati & al. 2004, Caporale & al. 2008, Paoli & al. 2015), **Sar** (Tretiach 1993, Zedda 1995, 2002, Rizzi & al. 2011), **S - Camp** (Ricciardi & al. 2000, Aprile & al. 2002, 2003b, Nimis & Tretiach 2004, Brunialti & al. 2010, 2013, Garofalo & al. 2010, Nascimbene & al. 2010b, Ravera & Brunialti 2013), **Pugl** (Nimis & Tretiach 1999, Brackel 2011), **Bas** (Potenza & Fascetti 2005, 2012, Fascetti & al. 2006, Potenza & al. 2010), **Cal** (Tretiach 1993, Puntillo 1996, Incerti & Nimis 2006), **Si** (Tretiach 1993, Ottonello & al. 1994, Nimis & al. 1994, Baruffo & al. 2006, Caniglia & Grillo 2006b, Tretiach & al. 2011b).

Fol.b/ Ch/ A.s/ Epiph/ pH: 2-3, L: 4-5, X: 2-3, E: 2-3/ Alt: 1-2/ SmedD: vr, Pad: er, SmedH: rr, MedH: r/ PT: 1-2/ Note: a mild-temperate lichen found on broad-leaved, more rarely coniferous trees, with optimum in areas with a warm-humid climate, usually below the montane belt. Some coastal saxicolous collections (TSB) are worthy of further study.

Flavoplaca Arup, Frödén & Söchting

Nord. J. Bot., 31: 44, 2013.

In the molecular analysis of the Teloschistaceae by Arup & al. (2013) the newly created genus *Flavoplaca* forms a very well-delimited clade with many species that are often sorediate. It shows a strong phylogenetic relationship with the lobate species of *Calogaya*, but several species cannot be distinguished from *Athallia* without a molecular analysis. Several unresolved *Flavoplaca*-species might still be listed under *Caloplaca s.lat.* Type: *F. citrina* (Hoffm.) Arup, Frödén & Söchting

Flavoplaca arcis (Poelt & Vězda) Arup, Frödén & Söchting

Nord. J. Bot., 31: 44, 2013 - *Caloplaca chlorina* var. *arcis* Poelt & Vězda in Vězda, Sched. ad Lich. Sel. Exs., 99: 6 (nr. 2470), 1990.

C - **Sar** (Vondrák 2008). **S - Si** (Herb. Vondrák 10794).

Cr/ Ch/ A.s/ Sax/ pH: 2-3, L: 4-5, X: 3, E: 2-3/ Alt: 1/ MedH: er, MedD: er/ PT: 1/ suboc. coast/ Note: a species of the *F. citrina* group with thalli developing coarse blastidia in the centre, distinctly lobate margins, and common apothecia; mainly on inland sun-exposed, hard siliceous, but usually base-rich rock faces, occasionally on pure limestone and concrete as well. The sample from Sicily was collected on Mt. Etna near Linguaglossa, at 850 m, on concrete. Probably much more widespread in Italy, frequently subsumed under *F. citrina s.lat.*

Flavoplaca austrocitrina (Vondrák, Říha, Arup & Söchting) Arup, Söchting & Frödén

Nord. J. Bot., 31: 44, 2013 - *Caloplaca austrocitrina* Vondrák, Říha, Arup & Söchting in Vondrák & al., Lichenologist, 41: 588, 2009.

N - **Frl** (TSB 546).

Cr/ Ch/ A.s/ Sax/ pH: 3-5, L: 4-5, X: 3-4, E: 4-5/ Alt: 1-4/ Salp: er, Mont: r, SmedD: c, Pad: c, SmedH: c, MedH: rc, MedD: rc/ PT: 1-3/ p/ Note: a species of the *F. citrina* group with an areolate to subsquamulose, usually yellow to greenish-orange thallus and marginal soralia, apothecia not rare; mostly on artificial substrates like concrete or mortar in strongly manured places, e.g. in sites visited by dogs; certainly much more common and hidden behind records of *F. citrina*.

Flavoplaca calcitrata (Nav.-Ros., Gaya & Cl. Roux) Arup, Frödén & Söchting

in Arup & al., Nord. J. Bot., 31: 44, 2013 - *Caloplaca calcitrata* Nav.-Ros., Gaya & Cl. Roux, Bull. Soc. linn. Provence, 51: 147, 2000.

N - Lig (Navarro-Rosinés & al. 2000). C - Marc (Herb. Vondrák 8850).

Cr/ Ch/ S/ Sax/ pH: 5, L: 3-4, X: 3-4, E: 4-5/ Alt: 1/ MedH: vr, MedD: vr/ PT: 1/ Note: a recently-described species, resembling *Caloplaca inconnexa*, but non-parasitic and with different spores and ecology, found on horizontal or weakly inclined surfaces of compact calciferous rocks, especially in fissures; perhaps more widespread in Mediterranean Italy. The sample from Marche was collected at Ancona, on coastal rocks.

Flavoplaca citrina (Hoffm.) Arup, Frödén & Söchting

Nord. J. Bot., 31: 44, 2013 - *Verrucaria citrina* Hoffm., Deutschl. Fl.: 198, 1796.

Syn.: *Blastenia citrina* (Hoffm.) B. de Lesd., *Callopsisma citrinum* (Hoffm.) A. Massal., *Caloplaca citrina* (Hoffm.) Th. Fr., *Lecanora citrina* (Hoffm.) Ach., *Lecanora murorum* var. *citrina* (Hoffm.) Rabenh., *Lichen citrinus* (Hoffm.) Ach., *Parmelia parietina* var. *citrina* (Hoffm.) Schaer., *Placodium citrinum* (Hoffm.) Hepp, *Pyrenodesmia citrina* (Hoffm.) Trevis.

N - VG (Castello 2002, Martellos & Castello 2004), Frl (Nimis & Salvadori 1998, Tretiach & Hafellner 2000, Nascimbene & Salvadori 2008, Nascimbene & al. 2009b), Ven (Caniglia & al. 1993, Nascimbene & Caniglia 2003c, Nascimbene 2005c, Thor & Nascimbene 2007, Nascimbene & Marini 2007, Nascimbene & Salvadori 2008), TAA (De Benetti & Caniglia 1993, Nascimbene 2005b, 2008b, Zarabska & al. 2009), Lomb (Florio & al. 2004, 2006, Rigamonti & al. 2007, 2008, Di Silvestro & al. 2009, Gheza & al. 2015), Piem (Alessio & al. 1995, Isocrono & al. 2003, Morando & al. 2014), VA (Piervittori & Isocrono 1997, 1999, Revel & al. 2001), Emil (Nimis & al. 1996, Valcuvia & Savino 2000, Bouvet 2008), Lig (Valcuvia & al. 2000, Roccardi 2006, Giordani & al. 2016). C - Tosc (Tretiach & Nimis 1994, Benesperi 2011), Marc (Nimis & Tretiach 1999), Umb (Nimis & Tretiach 1999, Panfili 2000b, Ravera & al. 2006, Genovesi 2011), Laz (Bartoli 1997b, Bartoli & al. 1998, Ravera & al. 1999, Roccardi & Ricci 2006, Munzi & al. 2007, Pietrini & al. 2008, Ravera 2008b, Roccardi 2011, Genovesi & al. 2011), Abr (Nimis & Tretiach 1999, Stofer 2006, Caporale & al. 2016), Mol (Garofalo & al. 1999, Nimis & Tretiach 1999, Caporale & al. 2008, Genovesi & Ravera 2014), Sar (Loi & al. 2000, Zedda 2002, 2002b, Zedda & al. 2001, Rizzi & al. 2011). S - Camp (Garofalo & al. 1999, 2010, Ricciardi & al. 2000, Aprile & al. 2002, 2003, 2003b, Nimis & Tretiach 2004, Catalano & al. 2016), Pugl (Nimis & Tretiach 1999, Durini & Medagli 2002), Bas (Bartoli & Puntillo 1998, Nimis & Tretiach 1999), Cal (Puntillo 1996, Puntillo & Puntillo 2004), Si (Nimis & al. 1994, 1995, Ottonello & Salone 1994, Ottonello & al. 1994, Monte & Ferrari 1996, Ottonello 1996, Poli & al. 1996, 1997, 1998, Grillo & Carfi 1997, Ottonello & Romano 1997, Grillo 1998, Caniglia & Grillo 2001, Grillo & al. 2001, 2002, 2009, Grillo & Caniglia 2004, 2006, Merlo 2004b, Gianguzzi & al. 2009, Cataldo & Cannavò 2014).

Cr/ Ch/ A.s/ Sax/ pH: 3-5, L: 4-5, X: 3-4, E: 4-5/ Alt: 1-4/ Salp: vr, Orom: r, Mont: rr, SmedD: ec, Pad: ec, SmedH: ec, MedH: c, MedD: rc/ PT: 1-3/ p/ Note: *F. citrina* is often claimed to be an almost cosmopolitan lichen. However, after the molecular revision of the entire complex by Vondrák & al. (2009), it seems that the species has a rather restricted distribution centred in central Europe, being largely substituted by other species in the Mediterranean Region. The species complex, which still needs a thorough revision in Italy, occurs on a wide variety of substrata, from asbestos-cement, concrete and mortar to basic siliceous rocks or even eutrophicated wood, is very tolerant to, and even favoured by eutrophication (e.g. urine-deposits), and is common also in urban areas and along the main highways. See also notes on *F. arcis*, *F. austrocitrina*, *F. flavocitrina*, *F. communis*, *F. confusa*, and *F. limonia*.

Flavoplaca communis (Vondrák, Říha, Arup & Söchting) Arup, Söchting & Frödén

Nord. J. Bot., 31: 44, 2013 - *Caloplaca communis* Vondrák, Říha, Arup & Söchting, Lichenologist, 41: 591, 2009.

C - Tosc (Herb. Vondrák 8609), Sar (Vondrák & al. 2009).

Cr/ Ch/ A.s/ Sax/ pH: 2-3, L: 4-5, X: 3, E: 2-3/ Alt: 1/ MedH: vr/ PT: 1/ suboc, coast/ Note: a maritime species of siliceous seashore cliffs, closely related to *F. maritima*. The sample from Tuscany was collected at Punta Ala near Follonica.

Flavoplaca confusa (Vondrák, Říha, Arup & Söchting) Arup, Söchting & Frödén

Nord. J. Bot., 31: 45, 2013 - *Caloplaca confusa* Vondrák, Říha, Arup & Söchting, Lichenologist, 41: 593, 2009.

S - Si (Vondrák & al. 2009).

Cr/ Ch/ A.s/ Sax/ pH: 2-3, L: 4-5, X: 3, E: 2-3/ Alt: 1-3/ Mont: er, SmedD: vr, SmedH: vr, MedH: er / PT: 1/ suboc, coast/ Note: on hard siliceous, mainly volcanic sea shore cliffs in the supralittoral zone, from c. 2 m upwards in sheltered shores and 5-18 m on exposed shores; probably more widespread in Italy. The species is morphologically very similar to *F. flavocitrina* and earlier records might be under *Caloplaca citrina s.lat.*

Flavoplaca coronata (Körb.) Arup, Frödén & Söchting

Nord. J. Bot., 31: 45, 2013 - *Calloplisma aurantiacum* var. *coronatum* Kremp. ex Körb., Parerga Lichenol.: 66, 1859.

Syn.: *Caloplaca aurantiaca* var. *coronata* (Körb.) Jatta, *Caloplaca coronata* (Körb.) J. Steiner

N - VG, Frl, Ven, TAA), Lomb, Piem (TSB 33972), **Lig, C - Tosc, Marc** (Nimis & Tretiach 1999), **Umb** (Nimis & Tretiach 1999, Ravera & al. 2006), **Laz, Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **Sar, S - Camp** (Aprile & al. 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996, Macchione 2006), **Si** (Nimis & al. 1994, 1995, Grillo 1998, Grillo & al. 2001, Grillo & Caniglia 2004, Brackel 2008b).

Cr/ Ch/ A.i/ Sax/ pH: 4-5, L: 4-5, X: 4, E: 4-5/ Alt: 1-4/ Salp: er, Mont: er, SmedD: r, SmedH: vr, MedH: r, MedD: rr/ PT: 1/ paras crustose lichens/ Note: a mild-temperate to subtropical, mainly Mediterranean lichen found on the top of sun-exposed calcareous boulders, in sites often visited by birds; much overlooked in the past, and certainly more common, exceptionally reaching the subalpine belt on south facing rocks in dry-continental Alpine valleys.

Flavoplaca flavocitrina (Nyl.) Arup, Frödén & Söchting

in Arup & al., Nord. J. Bot., 31: 45, 2013 - *Lecanora flavocitrina* Nyl., Flora, 69: 461, 1886.

Syn.: *Caloplaca flavocitrina* (Nyl.) H. Olivier

N - TAA (Thor & Nascimbene 2007, Nimis & al. 2015). **C - Tosc** (Vondrák & al. 2009)

Cr/ Ch/ A.s/ Epiph-Sax/ pH: 3-5, L: 4-5, X: 3-4, E: 3-5/ Alt: 2-3/ Mont: c, SmedD: c, SmedH: c/ PT: 1-3/ p/ Note: a species of the *C. citrina* group mainly occurring on limestone, concrete and mortar, with a yellow to orange-yellow, areolate thallus, the areoles with marginal soralia, at the same time often fertile; several records of this common, widespread and ecologically wide-ranging species might be filed under *Caloplaca citrina* in the Italian literature. The entire group of non-effigurate sorediose *Flavoplaca* needs a thorough revision in Italy. For further details see Arup (2006) and Vondrák & al. (2016b).

Flavoplaca granulosa (Müll. Arg.) Arup, Frödén & Söchting

in Arup & al., Nord. J. Bot., 31: 45, 2013 - *Amphiloma granulorum* Müll. Arg., Mém. Soc. Phys. Hist. Nat. Genève, 16: 380, 1862.

Syn.: *Caloplaca granulosa* (Müll. Arg.) J. Steiner, *Caloplaca granulosa* var. *sardonica* Nimis & Poelt?, *Placodium granulorum* (Müll. Arg.) Hepp

N - VG, Frl (vidi!), **Ven** (vidi!), **TAA, C - Tosc, Marc** (Nimis & Tretiach 1999), **Umb** (Ravera & al. 2006), **Laz, Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **Sar, S - Camp** (Aprile & al. 2003b, Garofalo & al. 2010), **Pugl** (Nimis & Tretiach 1999), **Bas, Cal** (Puntillo 1996), **Si** (Grillo 1998, Grillo & Caniglia 2004).

Cr.pl/ Ch/ A.i/ Sax/ pH: 4-5, L: 4-5, X: 4, E: 4-5/ Alt: 1-2/ SmedD: rr, SmedH: rr, MedH: r, MedD: r/ PT: 1/ w/ Note: a mild-temperate lichen found on compact limestone, more rarely on dolomite, especially on weakly inclined faces with periodical seepage of nitrogen-rich solutions; the var. *sardonica*, lacking the typical isidioid granules, seems to be the most widespread morph in Sardegna.

Flavoplaca limonia (Nimis & Poelt) Arup, Frödén & Söchting

in Arup & al., Nord. J. Bot., 31: 45, 2013 - *Caloplaca limonia* Nimis & Poelt in Nimis & al., Bull. Soc. linn. Provence, 45: 252, 1994.

N - Ven (Vondrák 2008, Vondrák & al. 2009). **C - Sar** (Herb. Vondrák 10807). **S - Pugl** (Nimis & Tretiach 1999), **Si** (Nimis & al. 1994, 1996b, Vondrák & al. 2009).

Cr/ Ch/ A.s/ Sax-Terr/ pH: 4-5, L: 4-5, X: 3-4, E: 4-5/ Alt: 1-2/ SmedD: r, Pad: vr, SmedH: r, MedH: rr, MedD: er/ PT: 1-2/ Note: on calcareous rocks or on base-rich, hard siliceous cliffs in dry and sun-exposed to shaded and damp situations, but also on twigs of maritime shrubs or on soil, below the montane belt. The species, described from the calcareous cliffs along the coast of the Island of Marettimo, is also known from inland localities, and is certainly more widespread in Italy; earlier records might be under *F. citrina s.lat.*

Flavoplaca marina (Wedd.) Arup, Frödén & Söchting

in Arup & al., Nord. J. Bot., 31: 45, 2013 - *Lecanora marina* Wedd., Mém. Imp. Soc. Sc. Nat. Cherbourg, 19: 275, 1875.

Syn.: *Caloplaca lobulata* auct. non (Flörke) Hellb. nec (Sommerf.), *Caloplaca marina* (Wedd.) Du Rietz, *Caloplaca salina* Erichsen, *Gasparrinia marina* (Wedd.) Hav., *Placodium marinum* (Wedd.) H. Olivier

C - Sar, S - Si (Nimis & al. 1994).

Cr/ Ch/ S/ Sax/ pH: 2-4, L: 3-5, X: 2-3, E: 2-3/ Alt: 1/ MedH: rr, MedD: r/ PT: 1/ suboc, coast/ Note: a Mediterranean-Atlantic species in Europe, reported also from North America, growing on basic siliceous rocks, more rarely on calciferous substrata in the salt-spray belt. According to Vondrák (*in litt.*), however, *F. marina* could be absent from Italy: the lichen with *F. marina* appearance from siliceous shores in Sardinia and Sicily is in fact a member of *Haloplaca*; pending the publication of the new data, I still maintain these records under *F. marina*. See also note on *F. ora*.

Flavoplaca microthallina (Wedd.) Arup, Frödén & Söchting

in Arup & al., Nord. J. Bot., 31: 46, 2013 - *Lecanora microthallina* Wedd., Mém. Soc. Imp. Sc. Nat. Cherbourg, 19: 276, 1875.

Syn.: *Caloplaca irregularis* H. Magn., *Caloplaca microthallina* (Wedd.) Zahlbr., *Physcia microthallina* (Wedd.) Arnold, *Placodium microthallinum* (Wedd.) H. Olivier

C - Sar.

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4, X: 2-3, E: 2-3/ Alt: 1/ MedH: er/ PT: 1/ coast, paras *Hydropunctaria*/
Note: a mainly Atlantic species in Europe, also known from North America, confined to the salt-spray belt, in the mesic supralittoral zone where it often grows on *Hydropunctaria*-species; in Italy it is known from a single station in northwestern Sardegna (Punta Falcone).

Flavoplaca navasiana (Nav.-Ros. & Cl. Roux) Arup, Søchting & Frödén

Nord. J. Bot., 31: 46, 2013 - *Caloplaca navasiana* Nav.-Ros. & Cl. Roux, Cryptogamie, Bryol. Lichénol., 16: 91, 1995.

C - Tosc (TSB 38414, det. Cl. Roux), **Sar** (Navarro-Rosinés & Roux 1995). **S - Si** (Navarro-Rosinés & Roux 1995, Monte & Ferrari 1996).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 4-5, X: 4-5, E: 3-4/ Alt: 1/ MedH: vr, MedD: vr/ PT: 1/ coast/ Note: a Mediterranean, recently-described and perhaps more widespread lichen found on horizontal faces of calcareous rocks in coastal situations.

Flavoplaca oasis (A. Massal.) Arup, Frödén & Søchting *s.str.*

in Arup & al., Nord. J. Bot., 31: 46, 2013 - *Calloporisma aurantiacum* var. *oasis* A. Massal., Sched. Crit., 7: 134, 1856.

Syn.: *Caloplaca aurantiaca* f. *oasis* (A. Massal.) Th. Fr., *Caloplaca oasis* (A. Massal.) Szatala

N - VG, Ven (Lazzarin 2000b), **C - Tosc, Marc** (Nimis & Tretiach 1999), **Umb** (Genovesi & al. 2002, Ravera & al. 2006), **Laz** (Nimis & Tretiach 2004), **Abr, Mol** (Ravera & Genovesi 2012, Genovesi & Ravera 2014), **Sar, S - Camp** (Nimis & Tretiach 2004, Catalano & Aprile 2008, Garofalo & al. 2010), **Pugl** (Nimis & Tretiach 1999, Durini & Medagli 2004), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Grillo & al. 2007).

Cr.end/ Ch/ S/ Sax/ pH: 5, L: 3-4, X: 2-3, E: 1/ Alt: 1-3/ Orom: r, Mont: rc, SmedD: rr, SmedH: rr, MedH: r, MedD: vr/ PT: 1/ paras *Bagliettoa* spp./ Note: a mild-temperate lichen found on hard, compact limestone in sites with plenty of diffuse light, such as in open deciduous forests; locally common in beech forests of southern Italy. This species has been much misunderstood (see Arup 2009 and Roux & coll. 2014): here I restrict the records to those referring to specimens forming small, rounded, characteristic islands on the thalli of *Bagliettoa*-species (especially *B. calciseda*, Roux *in litt.*) in natural habitats, while the non-parasitic forms occurring on limestone and concrete are provisionally dealt with under the following entry. In the past, this lichens might have been confused with *F. polycarpa*, and the Italian samples need revision

Flavoplaca oasis A. Massal.) Arup, Frödén & Søchting f. *lithophila* *auct.*

sensu Roux, Cat. Lich. France: 238, 2014.

Syn.: *Caloplaca holocarpa* *auct. ital. p.p.*, *Caloplaca lithophila* *auct. non* H. Magn., *Caloplaca luteoalba* var. *saxicola* (Hepp) H. Olivier

N - VG (Castello 2002, Martellos & Castello 2004), **Frl** (Nimis & Salvadori 1998, Nascimbene & al. 2009b), **Ven** (Caniglia & al. 1999), **TAA, Lomb** (Arosio & al. 2003), **Piem** (Piervittori 2003, Morisi 2005, Favero-Longo & al. 2009b), **VA** (Isocrono & al. 2008, Favero-Longo & Piervittori 2009), **Emil** (Nimis & al. 1996, Valcuvia & Grieco 1995, Tretiach & al. 2008), **Lig** (Roccardi 2006, Giordani & al. 2016). **C - Tosc** (Benespero 2006, Brackel 2015), **Marc** (Nimis & Tretiach 1999, Frati & Brunialti 2006), **Umb** (Nimis & Tretiach 1999, Genovesi & Ravera 2001, Ravera & al. 2006, Genovesi 2011), **Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008, Ravera & al. 2009, Genovesi & Ravera 2014), **Laz** (Bartoli & al. 1998, Pietrini & al. 2008, Brackel 2015), **Sar** (Rizzi & al. 2011). **S - Camp** (Garofalo & al. 1999, 2010, Nimis & Tretiach 2004, Ravera & Brunialti 2013), **Pugl** (Nimis & Tretiach 1999, Brackel 2011), **Bas** (Nimis & Tretiach 1999), **Cal, Si** (Caniglia & Grillo 2001, 2005, 2006, Grillo & al. 2001, 2009, Grillo & Caniglia 2004, Brackel 2008b, Cataldo & Cannavò 2014).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 4-5, X: 3-5, E: 3-5/ Alt: 1-4/ Salp: r, Orom: r, Mont: rc, SmedD: vc, Pad: rc, SmedH: vc, MedH: vc, MedD: rc/ PT: 1-3/ p/ Note: this lichen, which is quite common on limestone and mortar throughout Italy, has been much misunderstood. Arup (2009) places it within the variation range of *F. oasis*, but here I follow Roux & coll. (2014) in maintaining it as a separate entry, albeit with a provisional name, because of the very different ecology and life-cycle (it is not parasitic on *Bagliettoa*-species). Many recent Italian records were under the name *Caloplaca holocarpa*, or *Caloplaca lithophila*.

Flavoplaca ora (Poelt & Nimis) Arup, Frödén & Søchting

in Arup & al., Nord. J. Bot., 31: 46, 2013 - *Caloplaca ora* Poelt & Nimis, in Nimis & Poelt, Studia Geobot., 7, suppl. 1: 70, 1987.

C - Tosc, Sar, S - Si (Nimis & al. 1994).

Cr.pl/ Ch/ S/ Sax/ pH: 2-4, L: 4-5, X: 2-3, E: 1-3/ Alt: 1/ MedH: r, MedD: vr/ PT: 1/ coast/ Note: a Mediterranean lichen found on siliceous, more rarely calcareous rocks near the sea, often associated with specimens identified as *F. marina* (see note on that species), apparently without transitional specimens. The species could prove to be a synonym of *Flavoplaca maritima* (B. de Lesd.) Arup, Frödén & Søchting.

Flavoplaca polycarpa (A. Massal.) Arup, Frödén & Søchting

in Arup & al., Nord. J. Bot., 31: 46, 2013 - *Calloporisma aurantiacum* var. *polycarpum* A. Massal., Symmicta Lich.: 31, 1855.

Syn.: *Calloporisma polycarpum* (A. Massal.) A. Massal., *Caloplaca fiumana* Zahlbr., *Caloplaca inconnexa* var. *verrucariarum* Clauzade & Cl. Roux, *Caloplaca lithophila* H. Magn., *Caloplaca polycarpa* (A. Massal.) Zahlbr., *Caloplaca tenuatula* (Nyl.) Zahlbr., *Caloplaca tenuatula* f. *athallina* Clauzade & Cl. Roux *nom. inval.*, *Caloplaca*

tenuatula var. *lithophila* (H. Magn.) Clauzade & Cl. Roux, *Caloplaca tenuatula* f. *pertenuis* (Harm.) Clauzade & Cl. Roux, *Caloplaca tenuatula* subsp. *verrucariarum* (Clauzade & Cl. Roux) Clauzade & Cl. Roux, *Lecanora elegans* var. *pertenuis* Harm., *Lecanora tenuatula* Nyl.

N - **VG** (Castello 2002, Martellos & Castello 2004, Tretiach & al. 2007b), **Frl**, **Ven** (Lazzarin 2000b, Nascimbene & Marini 2007), **Lomb**, **Piem** (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999), **Emil**, **Lig** (TSB 33572). **C** - **Tosc** (Paoli & al. 2014b), **Marc** (Nimis & Tretiach 1999), **Umb** (Nimis & Tretiach 1999, Ravera & al. 2006), **Laz** (Nimis & Tretiach 2004), **Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **Sar**, **S** - **Camp** (Garofalo & al. 1999, 2010, Aprile & al. 2003b, Nimis & Tretiach 2004), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994, Ottonello & al. 1994, Nimis & al. 1996b, Grillo 1998, Grillo & Caniglia 2004, Caniglia & Grillo 2005, 2006, Cataldo & Cannavò 2014).

Cr.end/ Ch/ S/ Sax/ pH: 4-5, L: 3, X: 2-3, E: 1-3/ Alt: 1-3/ Mont: er, SmedD: c, Pad: er, SmedH: vc, MedH: rc, MedD: vr/ PT: 1-2/ paras *Bagliettoa* spp./ Note: a mainly warm-temperate species found on compact limestone and, more rarely, dolomite, in sheltered situations, with optimum in open woodlands, in the Mediterranean belt confined to more humid-shaded situations, growing on the thalli of *Bagliettoa*-species with an involucrellum, especially *B. parmigerella* and *B. parmigera* (Roux *in litt.*). The species is morphologically variable but, pending further study, it is still treated here in a very broad sense (for a different arrangement see Roux & coll. 2014). In the past, it might have been confused with *F. oasis*, and the Italian samples need revision.

Flavoplaca tavaresiana (Nav.-Ros. & Cl. Roux) Arup, Frödén & Søchting
in Arup & al., Nord. J. Bot., 31: 46, 2013 - *Caloplaca tavaresiana* Nav.-Ros. & Cl. Roux, Nova Hedwigia, 57: 171, 1993.

Syn.: *Caloplaca flageyana* Zahlbr.?

C - **Tosc** (Herb. Vondrák 8720). **S** - **Si** (Navarro-Rosinés & Roux 1994b, Monte & Ferrari 1996).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 4-5, X: 4-5, E: 2-3/ Alt: 1/ MedH: r, MedD: r/ PT: 1/ coast/ Note: a Mediterranean, recently-described species found on soft calcareous substrata (incl. mortar) near the coast; locally very abundant, to be looked for throughout coastal Mediterranean Italy. The sample from Tuscany was collected at Porto Ercole, on coastal calcareous rocks.

Flavopunctelia (Krog) Hale

Mycotaxon, 20: 682, 1984 - *Punctelia* subgen. *Flavopunctelia* Krog, Nord. J. Bot., 2: 291, 1982.

This genus of the Parmeliaceae is a segregate of *Punctelia* based on differences in conidial morphology and chemistry. Molecular studies confirm the distinction of these two groups with roundish pseudocyphellae at generic level (Thell & al. 2005). The genus consists of *c.* 5 species and has its speciation centre in Europe, Africa and South America. It is characterised by broad, yellow-green lobes with punctiform pseudocyphellae on the upper surface, by bifusiform conidia, and by the presence of usnic acid. Type: *F. flaventior* (Stirt.) Hale

Flavopunctelia flaventior (Stirt.) Hale

Mycotaxon, 20: 682, 1984 - *Parmelia flaventior* Stirt., Scottish Natur., 4: 254, 1878.

Syn.: *Parmelia andreana* Müll. Arg., *Parmelia kernstockii* Lynge & Zahlbr., *Parmelia lobarina* Zahlbr., *Parmelia variata* Hue, *Punctelia flaventior* (Stirt.) Krog

N - **VG**, **Frl** (Tretiach & Molaro 2007), **Ven** (Nascimbene & Marini 2010), **TAA** (Nascimbene 2005b, 2006c, 2008b, 2014, Nascimbene & al. 2007b, 2014), **Lig** (TSB 21799). **S** - **Tosc** (Nascimbene & al. 2015), **Camp** (Aprile & al. 2002, Garofalo & al. 2010).

Fol.b/ Ch/ A.s/ Epiph/ pH: 1-2, L: 4-5, X: 4, E: 3/ Alt: 2-3/ Mont: er, SmedD: r, SmedH: vr/ PT: 1-2/ subc/ Note: a species of rather continental areas, found on more or less isolated deciduous trees, most frequent in dry Alpine valleys. The records from Campania (Mt. Vesuvius) are rather unusual and need re-confirmation.

Flavopunctelia soledica (Nyl.) Hale

Mycotaxon, 20: 682, 1984 - *Parmelia soledica* Nyl., Flora, 68: 605, 1885.

Syn.: *Parmelia manshurica* Asahina, *Parmelia ulophyllodes* (Vain.) Savicz, *Punctelia soledica* (Nyl.) Krog

N - **TAA** (Nascimbene 2005b, 2006c, 2014, Nascimbene & al. 2007b, 2014), **Lomb**.

Fol.b/ Ch/ A.s/ Epiph/ pH: 2-3, L: 3, X: 2-3, E: 1-2/ Alt: 3-4/ Salp: vr, Mont: vr/ PT: 1-2/ subc/ Note: a mainly epiphytic species, restricted to Alpine valleys with a continental climate, certainly very rare in Italy. It is included in the Italian red list of epiphytic lichens as “Endangered” (Nascimbene & al. 2013c).

Frutidella Kalb

Hoppea, 55: 582, 1994.

This originally monotypic genus, which now includes 2 species, was separated from *Bacidia* by the presence of sphaerophorin and the bluish-black apothecial discs. The genus is unrelated to *Bacidia* and probably belongs to the Lecanoraceae (see Schmull & al. 2011, and Miadlikowska & al. 2014). Type: *F. caesioatra* (Schaer.) Kalb

Frutidella caesioatra (Schaer.) Kalb

Hoppea, 55: 582, 1994 - *Lecidea caesioatra* Schaer., Naturwiss. Anz., 2: 10 not., 1818.

Syn.: *Lecidea arctica* Sommerf., *Lecidella arctica* (Sommerf.) Körb., *Lecidella caesioatra* (Schaer.) Kalb

N - Ven, TAA, Lomb, Piem (Isocrono & al. 2004), VA (Piervittori & Isocrono 1999).

Cr/ Ch/ S/ Terr/ pH: 1-3, L: 3-4, X: 2, E: 1/ Alt: 4-5/ Alp: rr, Salp: r/ PT: 1/ Note: an arctic-alpine lichen found on silicolous mosses, especially *Andreaea* and *Grimmia*, in places above or near treeline with a long snow-lie, more rarely directly on rock; probably restricted to the Alps in Italy.

Frutidella pullata (Norman) Schull

in Schull & al., Mycologia, 103: 990, 2011 - *Biatora pullata* Norman, Öfvers. K. Svensk. Vetensk.-Akad. Förh., 27: 803, 1870.

Syn.: *Biatora amaurospoda* Anzi, *Biatora furfuracea* Anzi non *Lecidea furfuracea* Pers., *Lecidea anziana* Zahlbr., *Lecidea furfuracea* (Anzi) Jatta non Pers., *Lecidea ostrogothensis* Nyl., *Lecidea pullata* (Norman) Th. Fr.

N - Frl (Hinteregger 1994, in Austrian terr.), Ven (Lazzarin 1997, Thor & Nascimbene 2007), TAA (Thor & Nascimbene 2007, Nascimbene & al. 2007b, Nascimbene 2014, Nascimbene & Marini 2015, Nimis & al. 2015), Lomb (Printzen 1995), Piem (Isocrono & al. 2004). C - Tosc (Benespero & al. 2007).

Cr/ Ch/ A.s/ Epiph-Lign/ pH: 1-2, L: 3, X: 2-3, E: 1/ Alt: 3-4/ Salp: rc, Mont: rr/ PT: 1/ Note: on bark, on basal parts of (mainly) coniferous trees, more rarely on lignum, often associated with *Parmeliopsis ambigua*, with optimum in the subalpine belt; most frequent in the Alps.

Fuscidea V. Wirth & Vězda

Beitr. naturk. Forsch. Südwestdeuschl., 31: 91, 1972.

A genus of the Fuscideaceae including c. 35 corticolous or saxicolous species, mainly occurring in the temperate parts of the Northern Hemisphere, especially in areas with a moist, cool, maritime climate. The genus is mainly defined by the morphology of the apothecia (essentially either sessile and lecideine or immersed and more or less aspicilioid), the size and shape of the ascospores, and by thallus chemistry. In its current circumscription, it is not monophyletic (see Bylin & al. 2007). The genus is poorly known in Italy: the following species are known from the Alps (outside Italy): *F. arboricola* Coppins & Tønsberg, *F. badensis* V. Wirth & Poelt, and *F. lightfootii* (Sm.) Coppins & P. James. Type: *F. aggregatilis* (Grummann) V. Wirth & Vězda (= *F. austera*).

Fuscidea austera (Nyl.) P. James

in Hawksworth & al., Lichenologist, 12: 106, 1980 - *Lecanora austera* Nyl., Flora, 57: 309, 1874.

Syn.: *Fuscidea aggregata* (Flot.) V. Wirth & Vězda, *Fuscidea aggregatilis* (Grummann) V. Wirth & Vězda, *Fuscidea taeniarum* (Malme) V. Wirth & Vězda, *Lecidea aggregata* (Flot.) H. Magn. non Chevall., *Lecidea aggregatilis* Grummann

N - TAA.

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 3-4, X: 1-2, E: 1/ Alt: 3-5/ Alp: er, Salp: vr, Mont: vr/ PT: 1/ u/ Note: on steeply inclined to underhanging surfaces of hard siliceous rocks in upland areas.

Fuscidea cyathoides (Ach.) V. Wirth & Vězda

in Wirth, Beitr. naturk. Forsch. Südwestdeuschl., 31: 92, 1972 - *Lichen cyathoides* Ach., Lichenogr. Suec. Prodr.: 62, 1799.

Syn.: *Biatora rivulosa* (Ach.) Fr., *Fuscidea subrivulosa* (Vain.) P. James, Poelt & May-Inoue, *Lecidea cyathoides* (Ach.) Ach., *Lecidea rivulosa* Ach.

N - Frl, Ven, TAA, Lomb, Piem (Isocrono & al. 2004), Emil, Lig. C - Tosc (Tretiach & al. 2008). S - Camp (Ricciardi & al. 2000, Ravera & Brunialti 2013), Si (Jatta 1909-1911).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 3-4, X: 2, E: 1/ Alt: 2-4/ Mont: rr, SmedD: er, SmedH: vr/ PT: 1/ suboc/ Note: a cool-temperate to southern boreal-montane, perhaps circumpolar lichen found on siliceous rocks, mostly in humid upland areas. See also note on *F. stiriaca*.

Fuscidea kochiana (Hepp) V. Wirth & Vězda

in Wirth, Beitr. naturk. Forsch. Südwestdeuschl., 31: 92, 1972 - *Lecidea kochiana* Hepp, Lichen-Flora von Würzburg: 61, 1824.

Syn.: *Biatora indigula* (Nyl.) Walt. Watson, *Biatora kochiana* (Hepp) Rabenh., *Biatora rivulosa* var. *kochiana* (Hepp) Fr., *Lecanora mammillifera* Stirt., *Lecidea coriacella* Nyl., *Lecidea interludens* Nyl., *Lecidea morosa* Dufour, *Lecidea rivulosa* var. *kochiana* (Hepp) Schaer.

N - Frl (Tretiach & Carvalho 1995, Tretiach & Hafellner 2000), Ven, TAA (Caniglia & al. 2002, Nascimbene 2008b), Lomb, Piem (Morisi & Sereno 1995, Isocrono & al. 2004, Watson 2014), VA (Piervittori & Isocrono 1999), Emil (Tretiach & al. 2008), Lig.

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 2-3, X: 2-3, E: 1/ Alt: 3-5/ Alp: rc, Salp: rr, Mont: vr/ PT: 1/ suboc/ Note: on steeply inclined surfaces of hard siliceous rocks in moderately shaded, humid situations, with optimum near or above treeline.

Fuscidea lygaea (W. Mann) V. Wirth & Vězda

in Wirth, Beitr. naturk. Forsch. Südwestdeutsh., 31: 92, 1972 - *Biatora lygaea* W. Mann, Lich. Bohem.: 48, 1825.

Syn.: *Catillaria massalongii* Körb. non auct., *Fuscidea periplaca* (Nyl.) V. Wirth & Vězda, *Fuscidea tenebrica* (Nyl.) V. Wirth & Vězda, *Lecidea kochiana* var. *lygaea* (Ach.) Leight., *Lecidea obscurata* (Ach.) Schaer., *Lecidea periplaca* Nyl., *Lecidea pantosticta* Ach., *Lecidea lygaeoplaca* Vain., *Lecidea tenebrica* Nyl., *Rhizocarpon massalongii* (Körb.) Malme non auct.

N - TAA, **Lomb**, **Piem** (Isocrono & al. 2004, 2006), **VA** (Piervittori & Isocrono 1999), **Lig**, **C** - **Tosc**, **Sar** (Nöske 2000).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 3-4, X: 2-3, E: 1/ Alt: 3-5/ Alp: r, Salp: r, Orom: r, Mont: vr/ PT: 1/ u/ Note: on steeply inclined to underhanging surfaces of hard siliceous rocks in upland areas.

Fuscidea mollis (Wahlenb.) V. Wirth & Vězda

in Wirth, Beitr. naturk. Forsch. Südwestdeutsh., 31: 92, 1972 - *Lecidea rivulosa* var. *mollis* Wahlenb., Fl. Lapon.: 472, 1812.

Syn.: *Biatora mollis* (Wahlenb.) Arnold, *Lecidea mollis* (Wahlenb.) Nyl., *Lecidea mollis* var. *albescens* (Körb.) H. Magn.

N - TAA, **Piem**, **VA** (Piervittori & Isocrono 1999).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 3-4, X: 2-3, E: 1/ Alt: 3-5/ Alp: vr, Salp: r, Mont: er/ PT: 1/ suboc/ Note: a mainly western species with isolated outposts in the central European mountains, found on steeply inclined, sheltered surfaces of siliceous rocks, usually in upland areas.

Fuscidea praeruptorum (Du Rietz & H. Magn.) V. Wirth & Vězda

in Wirth, Beitr. naturk. Forsch. Südwestdeutsh., 31: 92, 1972 - *Lecidea praeruptorum* Du Rietz & H. Magn. in Du Rietz, Akad. Abhandl.: 164, 1921.

S - **Cal** (Puntillo 1996).

Cr/ Ch/ A.s/ Sax/ pH: 1-2, L: 3-4, X: 2, E: 1/ Alt: 3-4/ Salp: er, Mont: vr/ PT: 1/ suboc, u/ Note: a mainly western species of steeply inclined to underhanging surfaces of hard siliceous rocks in cold-humid situations, more rarely occurring also on bark; overlooked in Italy, certainly present in the Alps, but never common.

Fuscidea pusilla Tønsberg

Sommerfeltia, 14: 138, 1992.

N - **Lomb** (UPS-L-166764).

Cr/ Ch/ A.s/ Epiph/ pH: 1-2, L: 2-3, X: 2, E: 1/ Alt: 3-4/ Salp: vr, Orom: vr, Mont: vr/ PT: 1/ Note: a widespread holarctic species found on the bark of (mostly) conifers in humid montane to subalpine forests. The Italian sample was collected by G. Thor in the Adamello National Park.

Fuscidea recensa (Stirt.) Hertel, V. Wirth & Vězda

in Wirth, Beitr. naturk. Forsch. Südwestdeutsh., 31: 92, 1972 - *Lecidea recensa* Stirt., Scottish Natur., 5: 219, 1879.

Syn.: *Fuscidea curvula* (H. Magn.) Hertel, *Lecidea arcuatula* (Arnold) Nyl., *Lecidea curvula* H. Magn.

N - TAA (Thor & Nascimbene 2007), **VA**, **Emil** (Tretiach & al. 2008).

Cr/ Ch/ A.s/ Sax/ pH: 1-2, L: 2-3, X: 2, E: 1/ Alt: 2-3/ Mont: vr, SmedD: er/ PT: 1/ suboc/ Note: on hard siliceous rocks in humid, sheltered sites, usually below the subalpine belt; overlooked in Italy, being often sterile. For the record from Valle d'Aosta see Nimis (1993: 301).

Fuscidea stiriaca (A. Massal.) Hafellner

Fritschiana, 33: 42, 2002 - *Biatora stiriaca* A. Massal., Ric. Auton. Lich. Crost., 125, 1852.

Syn.: *Biatorinella fagicola* (Zschacke) Deschâtres & Werner, *Fuscidea cyathoides* var. *corticola* (Fr.) Kalb, *Fuscidea fagicola* (Zschacke) Hafellner & Türk, *Lecidea cyathoides* var. *corticola* (Fr.) H. Magn., *Lecidea fagicola* Zschacke, *Lecidea rivulosa* var. *corticola* (Fr.) Jatta, *Lecidea stiriaca* (A. Massal.) Jatta

N - **VG**, **Fri** (TSB 29420), **Ven**, **TAA** (Nascimbene & al. 2007b), **Lomb** (Chiappetta & al. 2005), **Piem**, **Emil** (Tretiach & al. 2008, Watson 2014, Brackel 2015), **Lig** (Giordani & Incerti 2008). **C** - **Tosc** (Tretiach & Nimis 1994, Loppi & al. 1999a, Benesperi & al. 2007, Brunialti & Frati 2010, Benesperi 2011, Brackel 2015), **Umb** (Ravera 1998, Ravera & al. 2006), **Laz** (Ravera 2001, 2002, Massari & Ravera 2002), **Abr** (Stofer 2006), **Sar**, **S** - **Camp** (Aprile & al. 2003b, Brunialti & al. 2010, 2013, Garofalo & al. 2010), **Pugl** (Nimis & Tretiach 1999), **Bas** (Brackel 2011), **Cal** (Puntillo 1996, Incerti & Nimis 2006, Stofer 2006), **Si**.

Cr/ Ch/ S/ Sax-Epiph/ pH: 2-3, L: 3-4, X: 2, E: 1/ Alt: 2-3/ Mont: rr, SmedD: er, SmedH: er/ PT: 1/ suboc/ Note: a cool-temperate to southern boreal-montane lichen found on bark (mainly of *Fagus*); perhaps declining, especially in northern Italy. According to Roux & coll. (2014) it should be better treated as a variety of *F. cyathoides*.

Fuscopannaria P.M. Jørg.

J. Hattori Bot. Lab., 76: 198, 1994.

This genus of c. 50 species was separated from *Pannaria* on account of the hemiamyloid hymenium, the asci with an amyloid apical ring-structure, and the production of fatty acids and terpenoids, but not pannarin. In

addition, most species are small-squamulose and form apothecia with a variably developed thalline margin. Recent studies have segregated the genera *Nevesia* and *Vahliella*. The genus is widespread in mainly cool-temperate areas of the Northern Hemisphere, and has two evolutionary centres: one in the northern Pacific and adjacent regions in America, and the other in Asia, mainly in Pacific North America and East Asia. The systematic position of the genus within the Pannariaceae has been treated by Ekman (2014b). The genus *Moelleropsis*, after the transfer of one of its two species to *Gregorella*, became monotypic; molecular studies indicate that the type species, *M. nebulosa*, is nothing but a very specialised *Fuscopannaria* (Jørgensen 2007, Ekman & al. 2014b). Since *Moelleropsis* predates *Fuscopannaria*, all species of the latter genus should be recombined into *Moelleropsis*. However, if the proposal to conserve *Fuscopannaria* against *Moelleropsis* will be accepted, the only species left in *Moelleropsis* will be recombined into *Fuscopannaria*. Type: *F. leucosticta* (Tuck.) P.M. Jørg.

Fuscopannaria ignobilis (Anzi) P.M. Jørg.

J. Hattori Bot. Lab., 76: 205, 1994 - *Pannaria ignobilis* Anzi, Comm. Soc. Critt. Ital., 1: 138, 1862.

Syn.: *Pannaria servitiana* Gyeln., *Pannaria romanoana* Hue

N - **Lig** (Brunialti & al. 1999). C - **Tosc** (Tretiach & Nimis 1994, Putorti & Loppi 1999b, Tretiach & al. 2008, Benesperi 2011), **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera 1998, Ravera & al. 2006, Panfili 2007), **Laz**, **Abr** (Nimis & Tretiach 1999, Caporale & al. 2016), **Sar** (Loi & al. 2000, Zedda & al. 2001, Zedda 2002). **S - Camp** (Nimis & Tretiach 2004), **Bas** (Ravera & al. 2015d), **Cal** (Puntillo 1995, 1996, Incerti & Nimis 2006), **Si** (Brackel 2008b).

Sq/ Cy.h/ S/ Epiph/ pH: 2-3, L: 3-4, X: 1-2, E: 1-2/ Alt: 1-2/ SmedH: rr, MedH: r/ PT: 1/ suboc/ Note: a Mediterranean-Atlantic species, usually found in cracks of the bark of ancient trees, near the base of the boles; mostly Tyrrhenian in Italy.

Fuscopannaria leucosticta (Tuck.) P.M. Jørg.

J. Hattori Bot. Lab., 76: 205, 1994 - *Pannaria leucosticta* Tuck., Ann. Sci. Nat., Bot., 12: 294 1859.

Syn.: *Pannaria craspedia* Körb.

N - **VG**, **Frl** (UPS-L-168860), **Ven**, **Lomb**, **Piem**, **Lig** (Watson 2014). C - **Tosc**, **Sar** (Zedda 2002).

Sq/ Cy.h/ S/ Epiph/ pH: 2-3, L: 3-4, X: 1, E: 1/ Alt: 2-3/ Mont: er, SmedD: er, SmedH: er/ PT: 0/ suboc/ Note: on mossy trunks of broad-leaved trees; there are no recent records from the Alps of this declining species, which is included as “Regionally Extinct” in the Italian red list of epiphytic lichens (Nascimbene & al. 2013c).

Fuscopannaria mediterranea (Tav.) P.M. Jørg.

J. Hattori Bot. Lab., 76: 205, 1994 - *Pannaria mediterranea* Tav., Port. Acta Biol., B, 8: 5, 1965.

N - **Emil**, **Lig** (Giordani & Incerti 2008). C - **Tosc** (Benesperi & al. 2007, Benesperi 2011), **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera 2000, Ravera & al. 2006), **Laz** (Massari & Ravera 2002, Ravera & Genovesi 2008), **Abr** (Nimis & Tretiach 1999), **Mol** (Caporale & al. 2008, Paoli & al. 2015), **Sar** (Vězda Lich. Rar.Exs. 55, Zedda 1995, 2002, 2002b, Loi & al. 2000, Zedda & Sipman 2001, Zedda & al. 2001, Rizzi & al. 2011). **S - Camp** (Nimis & Tretiach 2004, Garofalo & al. 2010, Brunialti & al. 2013, Ravera & Brunialti 2013, Catalano & al. 2016), **Bas** (Potenza & al. 2014), **Cal** (Puntillo 1995, 1996), **Si** (Grillo & al. 2007, Brackel 2008c, Liistro & Cataldo 2011).

Sq/ Cy.h/ A.s/ Epiph/ pH: 3, L: 3-4, X: 2, E: 1-2/ Alt: 1-3/ Mont: er, SmedD: er, SmedH: r, MedH: r/ PT: 1/ suboc/ Note: a mild-temperate to Mediterranean species found on bark of ancient broad-leaved trees in semi-natural, rather undisturbed, humid woodlands, more rarely on siliceous, mossy rocks; mostly Tyrrhenian in Italy.

Fuscopannaria nebulosa (Hoffm.)

Provisionally placed here, ICN Art. 36.1b. - *Psora nebulosa* Hoffm., Plantae Lich.: 55, 1794.

Syn.: *Biatora triptophylla* var. *coronata* (Hoffm.) Rabenh., *Lecanora coronata* (Hoffm.) Röhl., *Lepidoma brunneum* var. *coronatum* (Hoffm.) Bagl., *Moelleropsis nebulosa* (Hoffm.) Gyeln., *Pannaria brunnea* var. *coronata* (Hoffm.) A. Massal., *Pannaria nebulosa* (Hoffm.) Nyl., *Trachyderma nebulosum* (Hoffm.) Trevis.

N - **Ven**, **TAA**, **Lomb**, **Piem**, **VA** (Piervittori & Isocrono 1999), **Lig**. C - **Tosc**, **Sar**. **S - Camp** (Aprile & al. 2003b), **Bas** (Puntillo & al. 2009, 2012), **Cal** (Puntillo 1995, 1996, Puntillo & Puntillo 2004), **Si** (Otonello & al. 2011).

Cr/ Cy.h/ S/ Terr-Sax/ pH: 2-3, L: 3-4, X: 2, E: 1-2/ Alt: 2-4/ Salp: er, Mont: vr, SmedH: r/ PT: 1-2/ suboc, p/ Note: a mild-temperate early coloniser of clay-sandy soil, especially earth banks along unpaved roads, with optimum in humid areas with siliceous substrata; most frequent in Tyrrhenian Italy, from the lowlands (in very humid areas) to the mountains. See also comment on the genus.

Fuscopannaria olivacea (P.M. Jørg.) P.M. Jørg.

J. Hattori Bot. Lab., 76: 205, 1994 - *Pannaria olivacea* P.M. Jørg., Opera Bot., 45: 49, 1978.

N - **Lig**. C - **Tosc** (Benesperi 2011), **Laz** (Ravera 2001, Massari & Ravera 2002), **Abr** (Nimis & Tretiach 1999), **Sar** (Zedda 1995, 2002). **S - Camp** (Nimis & Tretiach 2004, Garofalo & al. 2010, Brunialti & al. 2013, Ravera & Brunialti 2013, Catalano & al. 2016), **Cal** (Puntillo 1996, Puntillo & Puntillo 2004).

Sq/ Cy.h/ S/ Epiph/ pH: 2-3, L: 3-4, X: 1-2, E: 1-2/ Alt: 1-2/ SmedD: er, SmedH: vr, MedH: r/ PT: 0/ suboc/ Note: a mild-temperate to Mediterranean species found on bark and mossy trunks in humid broad-leaved woodlands; typically Tyrrhenian (the record from Abruzzo is exceptional).

Fuscopannaria praetermissa (Nyl.) P.M. Jørg.

J. Hattori Bot. Lab., 76: 205, 1994 - *Pannaria praetermissa* Nyl. in Chydenius & Furuhjelm, Not. Sällsk. Fauna Fl. Fenn. Förh., 4: 97, 1858.

Syn.: *Lecidea carnosa* var. *lepidiota* Sommerf., *Massalongia carnosa* var. *lepidiota* (Sommerf.) Körb., *Pannaria lepidiota* (Sommerf.) Th. Fr., *Pannaria lepidiota* f. *sorediosa* Vain., *Pannaria lepidiota* var. *imbricata* Vain., *Pannaria lepidiota* var. *tristis* Th. Fr., *Parmeliella lepidiota* (Sommerf.) Vain., *Parmeliella praetermissa* (Nyl.) P. James, *Toninia coeruleonigricans* (Lightf.) Th. Fr. non auct., *Trachyderma praetermissum* (Nyl.) Trevis.

N - **Fri** (Tretiač & Hafellner 2000), **Ven** (Nascimbene & Caniglia 2003c, Nascimbene 2005c, 2008c, Nascimbene & Marini 2007), **TAA** (Nascimbene & al. 2006, Thor & Nascimbene 2007, Nascimbene 2008b), **Lomb** (Etayo & Navarro-Rosinés 2008), **Piem** (Isocrono & al. 2004), **Lig** (TSB 33471).

Sq/ Cy.h/ A.s/ Terr/ pH: 3-4, L: 3-4, X: 2, E: 1/ Alt: 3-5/ Alp: r, Salp: rr, Mont: vr/ PT: 1/ Note: an arctic-alpine to boreal-montane, circumpolar lichen found on calciferous soil, mosses and plant debris, with optimum near and above treeline.

G a b u r a Adans.

Familles des Plantes, 1: 6, 1763.

As demonstrated by Otálora & Wedin (2013), *Collema fasciculare* belongs to the Arctomiaceae. This is also the type species of the genus *Gabura* Adans., one of the names that *Collema* is currently conserved against, which, however, is now a threat to the generic name *Arctomia* if not regarded as a separate genus. Type: *G. fascicularis* (L.) P.M. Jørg.

Gabura fascicularis (L.) P.M. Jørg.

Lichenologist, 46: 594, 2014 - *Lichen fascicularis* L., Mantissa Pl., 1: 133, 1767.

Syn.: *Arctomia fascicularis* (L.) Otálora & Wedin, *Collema aggregatum sensu* Sommerf., *Collema ascaridosporum* (A. Massal.) Degel., *Collema dinaricum* Zahlbr., *Collema fasciculare* (L.) F.H. Wigg., *Lathagrium aggregatum* ("Ach.") M. Choisy, *Lathagrium ascaridosporum* A. Massal., *Parmelia nigrescens* var. *fascicularis* (L.) Schaer., *Synechoblastus aggregatus* ("Ach.") Th. Fr., *Synechoblastus ascaridosporus* (A. Massal.) Zwackh, *Synechoblastus fascicularis* (L.) A.L. Sm., *Synechoblastus labyrinthicus* Anzi

N - **Ven** (Lazzarin 2000b, Nascimbene 2008c), **TAA** (Nascimbene & al. 2007b), **Lomb**, **Piem** (Isocrono & al. 2004, Matteucci & al. 2008b), **Emil**, **Lig**, **C** - **Tosc**, **Marc** (Nimis & Tretiač 1999), **Umb** (Ravera 1998, Ravera & al. 2006), **Laz** (Ravera 2002b), **Abr**, **Sar** (Zedda 2002), **S** - **Camp** (Garofalo & al. 2010), **Pugl**, **Bas** (Potenza 2006, Potenza & Fascetti 2012), **Cal** (Puntillo 1996), **Si**.

Fol.b/ Cy.h/ S/ Epiph/ pH: 2-3, L: 3-4, X: 2, E: 1-2/ Alt: 1-3/ Mont: er, SmedD: er, SmedH: er, MedH: vr/ PT: 1/ suboc/ Note: a mild-temperate lichen with a fragmented holarctic range, found on old broad-leaved trees, often on mosses in open, humid stands, somehow more frequent in the past, presently very much declining. With the probable exception of Liguria, it may be presently almost extinct in northern Italy, and could be restricted to a few humid sites of Tyrrhenian Italy. The recent record from Tuscany by Pasquinelli & Poccini (2010), judging from pictures and description, is wrong. The species is included in the Italian red list of epiphytic lichens as "Near-threatened" (Nascimbene & al. 2013c).

G l o e o h e p p i a Gyeln.

Feddes Repert., 38: 311 (527), 1935.

This genus of the Gloeohoppiaceae differs from *Heppia* in the small, squamulose to moderately peltate thalli, the reticulately branched hyphae with cylindrical or roundish cells surrounding the colonies of the small-celled cyanobiont, and the presence of interstices and cavities in the thallus. It currently includes 5 species occurring on calcareous substrata, mostly on soil, in arid and semi-arid regions of the Northern Hemisphere. Type: *G. turgida* (Ach.) Gyeln.

Gloeohoppia turgida (Ach.) Gyeln.

Feddes Rep., 38: 528, 1935 - *Endocarpon turgidum* Ach., Lichenogr. Univ.: 305, 1810.

Syn.: *Heppia endocarpea* (Fr.) Hue, *Heppia turgida* (Ach.) Nyl., *Lecanora endocarpea* (Fr.) Nyl.

N - **Lig**, **S** - **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994, Ottonello & al. 1994, Caniglia & Grillo 2001, 2006, Grillo & Caniglia 2004).

Sq/ Cy.h/ S/ Terr/ pH: 3-5, L: 4-5, X: 4-5, E: 1/ Alt: 1/ MedH: r, MedD: rr/ PT: 1/ Note: a mainly Mediterranean lichen found on calciferous soil in dry grasslands, occasionally on weathered basic siliceous rocks.

G l y p h o l e c i a Nyl.

Ann. Sci. Nat., Bot., sér. 3., 20: 317, 1853.

This monotypic genus of the Acarosporaceae, differing from *Acarospora s.str.* in the umbilicate thallus, was often considered as a synonym of *Acarospora*, but molecular data suggest that it should be retained as an independent genus (see Westberg & al. 2015). Type: *G. scabra* (Pers.) Müll. Arg.

Glypholecia scabra (Pers.) Müll. Arg.

Hedwigia, 31: 156, 1892 - *Urceolaria scabra* Pers., Ann. Wetter. Gesellsch. Ges. Naturk., 2: 10, 1811.

Syn.: *Acarospora grumulosa* (Schaer.) Hue, *Acarospora rhagadiosa* (Ach.) Th. Fr., *Acarospora scabra* (Pers.) Th. Fr., *Glypholecia candidissima* Nyl., *Glypholecia rhagadiosa* (Ach.) Nyl., *Glypholecia scaberrima* (Hue) Zahlbr.

N - **Piem** (Isocrono & al. 2003), **VA** (Piervittori & Isocrono 1999), **Lig** (TSB 33358).

Fol.u/ Ch/ S/ Sax/ pH: 3-4, L: 4-5, X: 4-5, E: 3-4/ Alt: 3-4/ Salp: er, Mont: er/ PT: 1/ subc/ Note: an incompletely holarctic species of dry-continental areas, found on exposed surfaces of calciferous and base-rich siliceous rocks; in Italy this characteristic species with an umbilicate thallus is restricted to the dry Alpine valleys with a continental climate.

Glyphopeltis Brusse

Lichenologist, 17: 267, 1985.

This genus was described to accommodate a peltate lecideoid lichen from South Africa, that was subsequently placed in synonymy with a Mediterranean species also occurring in Italy. The genus appears to be related to *Psora* and is now placed into the Psoraceae. Type: *Glyphopeltis eburina* Brusse (= *G. ligustica*).

Glyphopeltis ligustica (B. de Lesd.) Timdal

Mycotaxon, 31: 102, 1988 - *Psora ligustica* B. de Lesd., Bull. Soc. Bot. France, 28: 82, 1936.

Syn.: *Glyphopeltis eburina* Brusse, *Xanthopsorella llimonae* Hertel, Egea & Poelt

N - **Lig. C - Sar.**

Sq/ Ch/ S/ Sax/ pH: 2-3, L: 4, X: 4, E: 1/ Alt: 1/ MedH: er/ PT: 1/ paras *Peltula euploca* and *P. placodizans*, w/ Note: on steeply inclined surfaces of siliceous rocks, growing on the thalli of *Peltula*-species in areas with frequent humid maritime winds; much less frequent than its hosts and mostly coastal in Italy.

Gomphillus Nyl.

Mém., Soc. Sc. Nat. Cherbourg, 2: 15, 1853.

This mainly tropical genus of 6 species is separated from the other species of the Gomphillaceae by the vertically elongated apothecia containing very long asci and thread- to needle-like ascospores (see Lücking & al. 2005). Type: *G. calycioides* (Duby) Nyl.

Gomphillus calycioides (Duby) Nyl.

Mém. Soc. Sc. Nat. Cherbourg, 2: 15, 1853 - *Baeomyces calycioides* Delise ex Duby, Bot. Gallic., 2: 636, 1830.

Syn.: *Berengeria calycioides* (Duby) A. Massal., *Mycetodium calycioides* (Duby) A. Massal.

N - **Ven** (Nascimbene & Marini 2010), **Lomb, Piem.**

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 3, X: 1-2, E: 1/ Alt: 1-2/ SmedD: er/ PT: 0/ oc/ Note: a mild-temperate to tropical species found on bryophytes, mostly on basal parts of old trunks in mature warm-humid forests at low elevations. The regions from which it was reported, mostly in the Insubrian district of Italy, are presently affected by air pollution, so that the species was included as "Regionally Extinct" in the Italian red list of epiphytic lichens (Nascimbene & al. 2013c).

Graphis Adans.

Familles des Plantes, 2: 11, 1763.

The phylogeny of Graphidaceae has been elucidated by Rivas Plata & al. (2013). The large (c. 450 species), mainly tropical genus *Graphis* was thought to have very few representatives in Europe, the most common and widespread of which was *Graphis scripta*, an extremely variable lichen: on the same trunk one can often distinguish among several individual, never merging thalli, just on the base of the shape and form of the ascomata. Neuwirth & Aptroot (2011) have proposed a new taxonomy for *Graphis scripta s.lat.*, recognizing four distinct taxa, *G. betulina*, *G. macrocarpa*, *G. pulverulenta*, and *G. scripta s.str.* However, a more recent study based on both molecular and morphological characters (Kraichak & al. 2015) showed that, although between six and seven putative species are nested within the complex, these do not fully correspond to the taxa that were recently distinguished based on apothecium morphology, and cannot be circumscribed with the morphological characters that were traditionally used in the classification of the complex. Any formal taxonomic treatment will require additional sampling and evaluation of additional traits that potentially can characterize these clades. Pending a revision of the Italian material, I treat here *G. scripta* in the broad sense, while the few recent records of the "species" delimited by Neuwirth & Aptroot (2011) are provisionally treated as separate entities. Type: *G. scripta* (L.) Ach.

Graphis betulina (Pers.) Ach.

K. Vetensk.-Akad. Nya Handl., 30: 147, 1809 - *Opegrapha betulina* Pers., Ann. Bot. (Usteri), 7: 31, 1794.

Syn.: *Graphis juglandis* Garov. ex A. Massal., *Graphis massalongii* Kremp.

N - Ven (Lazzarin 2000b), **Lomb** (Lazzarin 2000b). **C - Umb** (Brackel 2015).

Cr/ Tr/ S/ Epiph/ pH: 2-3, L: 2-3, X: 2-3, E: 1-2/ Alt: 1-3/ Mont: r, SmedD: r, SmedH: rr/ PT: 1-2/ Note: a taxon of the *G. scripta*-group with apothecia additionally surrounded by conspicuous often raised white thalline margins, found on the bark of broad-leaved trees in various forest types; widely distributed in the Holarctic region. See also comment on the genus.

***Graphis elegans* (Sm.) Ach.**

Syn. Meth. Lich.: 85, 1814 - *Opegrapha elegans* Borrer ex Sm. in Smith & Sowerby, Engl. Bot., 26: tab. 1812, 1807.

Syn.: *Graphis neglecta* Erichsen, *Graphis petrina* Nyl., *Graphis ramificans* Nyl., *Graphis sulcata* (Pers.) A. Massal., *Phaeographis ramificans* (Nyl.) Lettau

N - Frl, TAA, Lomb (HAL-18596), **Piem** (Matteucci & al. 2010). **C - Tosc** (Pasquinelli & al. 2009)

Cr/ Tr/ S/ Epiph/ pH: 2-3, L: 2-3, X: 2, E: 1/ Alt: 1-3/ Mont: er, SmedD: er, SmedH: er/ PT: 0/ suboc/ Note: a mild-temperate to humid subtropical species found on smooth bark, especially of *Ilex* in warm-humid woodlands, to be looked for further in Tyrrhenian Italy. It is included in the Italian red list of epiphytic lichens as "Endangered" (Nascimbene & al. 2013c).

***Graphis inustuloides* Lücking**

in Lücking & McCune, Evansia, 9: 78, 2012.

Syn.: *Graphina anguina* auct. eur. non (Mont.) Müll. Arg., *Graphis inustula* Nyl. non Stirt., *Thalloloma anguinum* auct. non (Mont.) Trevis., *Ustalia anguina* auct. eur. non Mont.

N - Lomb.

Cr/ Tr/ S/ Epiph/ pH: 2-3, L: 2-3, X: 1-2, E: 1/ Alt: 1-2/ SmedD: er/ PT: 0/ suboc/ Note: a mild-temperate to tropical species found on smooth bark, perhaps extinct in Italy. The only Italian record, furthermore, is old and somehow dubious (see Nimis 1993: 304-305).

***Graphis macrocarpa* (Pers.) Röhl.**

Deutschl. Fl., 3, 2: 55, 1813 - *Opegrapha macrocarpa* Pers., Ann. Bot. (Usteri), 7: 29, 1794.

C - Umb (Brackel 2015).

Cr/ Tr/ S/ Epiph/ pH: 2-3, L: 2-3, X: 2-3, E: 1-2/ Alt: 1-3/ Mont: r, SmedD: r, SmedH: r/ PT: 1-2/ Note: a taxon of the *G. scripta*-group, characterised by apothecia with rounded ends and widely exposed epruinose brown discs, found on the bark of broad-leaved trees in various forest types. See also comment on the genus.

***Graphis pulverulenta* (Pers.) Ach.**

K. Vetensk.-Akad. Nya Handl., 30: 146, 1809 - *Opegrapha pulverulenta* Pers., Ann. Bot. (Usteri), 7: 29, 1794.

Syn.: *Graphis abietina* (Schaer.) Malbr., *Graphis cerasi* (Pers.) Ach., *Graphis diffracta* Turner ex Leight., *Graphis serpentina* (Ach.) Ach., *Graphis subtilis* (Pers.) Röhl., *Lichen serpentinus* Ach., *Opegrapha cerasi* Pers., *Opegrapha glaucoma* Chevall., *Opegrapha literella* (Ach.) Schumach., *Opegrapha scripta* var. *abietina* Schaer., *Opegrapha scripta* var. *subtilis* Pers., *Opegrapha serpentina* (Ach.) Schrad.

N - Frl (Neuwirth & Aptroot 2011), **TAA** (Neuwirth & Aptroot 2011), **Lomb** (Neuwirth & Aptroot 2011), **Piem** (Jatta 1909-1911). **S - Pugl** (Neuwirth & Aptroot 2011).

Cr/ Tr/ S/ Epiph/ pH: 2-3, L: 2-3, X: 2-3, E: 1-2/ Alt: 1-3/ Mont: rc, SmedD: r, SmedH: rr, MedH: vr/ PT: 1-2/ Note: a taxon of the *G. scripta*-group, characterised by apothecia with mostly acute ends and widely exposed white to grey pruinose discs, found on the bark of broad-leaved trees in various forest types. See also comment on the genus.

***Graphis scripta* (L.) Ach.**

Lichenogr. Univ.: 265, 1810 - *Lichen scriptus* L., Sp. Pl.: 1140, 1753.

Syn.: *Graphis hebraica* (Hoffm.) Röhl., *Graphis limitata* (Pers.) Röhl., *Graphis spathea* (Ach.) Röhl., *Graphis microcarpa* (Ach.) Röhl., *Graphis scripta* var. *limitata* (Pers.) Arnold, *Graphis scripta* var. *spathea* (Ach.) Mudd

N - VG (Carvalho 1997), **Frl** (Brackel 2013), **Ven** (Lazzarin 1997, Caniglia & al. 1999, Valcuvia & al. 2000c, Nascimbene 2005c, 2008, 2008c, Nascimbene & al. 2005b, 2006c, 2007, 2008e, 2013b), **TAA** (Philippi 1983, Hinteregger 1994, Nascimbene & al. 2007b, 2014, Nascimbene 2008b, 2014, Nimis & al. 2015), **Lomb** (Zocchi & al. 1997, Arosio & al. 2003, Roella 1999, Anderi & al. 2005, Valcuvia & Truzzi 2007b, Furlanetto 2010), **Piem** (Caniglia & al. 1992, Arosio & al. 1998, Piervittori 2003, Isocrono & al. 2004, 2005b, 2007, Morisi 2005, Isocrono & Piervittori 2008, Furlanetto 2010, Matteucci & al. 2010, Giordani & Malaspina 2016), **VA** (Piervittori & Isocrono 1999), **Emil** (Nimis & al. 1996, Benesperi 2009), **Lig** (Brunialti & al. 1999, Giordani & Incerti 2008). **C - Tosc** (Putorti & al. 1999c, Lorenzini & al. 2003, Tretiach & al. 2008, Pasquinelli & al. 2009, Brunialti & Frati 2010, Pasquinelli & Puccini 2010, Brunialti & al. 2012b, Benesperi & al. 2013, Brackel 2015, Nascimbene & al. 2015), **Marc** (Nimis & Tretiach 1999, Brackel 2015), **Umb** (Ravera 1998, Panfilii 2000, 2000b, 2007, Ravera & al. 2006, Brackel 2015), **Laz** (Bartoli & al. 1997, Ravera & al. 2003, Nimis & Tretiach 2004, Ruisi & al. 2005, Ravera 2006c, Munzi & al. 2007, Zucconi & al. 2013, Brackel 2015), **Abr** (Nimis & Tretiach 1999), **Mol** (Garofalo & al. 1999, Nimis & Tretiach 1999, Caporale & al. 2008, Ravera & al. 2010, Paoli & al. 2015), **Sar. S - Camp** (Garofalo & al. 1999, 2010, Puntillo & al. 2000, Aprile & al. 2002, 2003, 2003b, 2011, Nimis & Tretiach 2004, Brunialti & al. 2010, 2013, Etayo & Puntillo 2011, Ravera & Brunialti 2013, Catalano & al. 2016), **Pugl** (Garofalo & al. 1999, Nimis & Tretiach 1999v), **Bas** (Nimis & Tretiach 1999, Potenza 2006, Potenza & al. 2010, Brackel 2011), **Cal** (Puntillo 1995, 1996, Sérusiaux 1998, Puntillo & Puntillo 2004, 2012, Incerti & Nimis 2006, Stofer 2006, Brackel & Puntillo 2016), **Si** (Grillo & Cristaudo 1995, Grillo 1998, Grillo & Caniglia 2004, Ottonello & al. 2011).

Cr/ Tr/ S/ Epiph/ pH: 2-3, L: 2-3, X: 2-3, E: 1-2/ Alt: 1-3/ Mont: vc, SmedD: r, Pad: er, SmedH: rr, MedH: vr/ PT: 1-2/ Note: a widespread temperate to southern boreal-montane lichen found on smooth bark, mostly in deciduous forests, in humid areas also on twigs and branches, but normally on trunks, in drier areas restricted to the base of the boles. In a narrow sense the taxon is characterised by apothecia with more or less hidden disc, and a thin (≤ 0.1 mm) to absent thalline margin. The species is treated here in a broad sense (see comment on the genus).

Gyalecta Ach.

K. Vetensk.-Akad. Nya Handl.: 228, 1808.

This genus of the Gyalectaceae, with c. 50 species, has the highest diversity in the Northern Hemisphere. All species occur in humid, rather shaded situations, and prefer base-rich or subneutral substrata (bark, rock, and soil). In their revision of the Gyalectales, Kauff & Lutzoni (2002) transferred two species of *Petractis* into *Gyalecta*. The concept of the genus was further broadened to include *Belonia* and *Pachyphiale*, which were shown to be nested within *Gyalecta* (see Baloch & al. 2013). Type: *G. geoica* (Ach.) Ach.

Gyalecta arbuti (Bagl.) Baloch & Lücking

in Baloch & al., *Lichenologist*, 45: 726, 2013 - *Bacidiopsis arbuti* Bagl., *Comm. Soc. Critt. Ital.*, 1: 22, 1861.

Syn.: *Bacidia arbuti* (Bagl.) Jatta, *Pachyphiale arbuti* (Bagl.) Arnold

N - **Lig. C - Tosc** (Loppi & al. 2004b), **Sar**.

Cr/ Tr/ S/ Epiph/ pH: 2, L: 2-3, X: 1-2, E: 1/ Alt: 1-2/ SmedH: er, MedH: vr/ PT: 1/ suboc/ Note: a species of Mediterranean, rather humid forests, frequently confused with *G. carneola*. It is included in the Italian red list of epiphytic lichens as “Data Deficient” (Nascimbene & al. 2013c).

Gyalecta carneola (Ach.) Hellb.

Bih. K. Svenska Vetensk.-Akad. Handl., Afd. 3, 21, 3: 71, 1896 - *Lecidea carneola* Ach., *Lichenogr. Univ.*: 194, 1810.

Syn.: *Bacidia carneola* (Ach.) De Not., *Bacidia cornea* auct. non (With.) A. Massal., *Biatora carneola* (Ach.) Fr., *Gyalecta cornea* auct. non (With.) Tuck., *Pachyphiale carneola* (Ach.) Arnold, *Pachyphiale cornea* auct. non (With.) Poetsch

N - **VG** (TSB 10118), **FrI** (TSB 14340), **Ven** (Watson 2014), **Lomb**, **Piem**, **Lig. C - Tosc**, **Marc** (Candotto & Tretiach 2014), **Umb** (Ravera 1998, Ravera & al. 2006), **Laz** (Caporale 2013), **Abr** (Nimis & Tretiach 1999, Caporale & al. 2012), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008, Ravera & Genovesi 2010, Ravera & al. 2010, Paoli & al. 2015), **Sar** (Zedda 2002, 2002b, Zedda & al. 2001, Rizzi & al. 2011, Cossu 2013), **S - Camp** (Aprile & al. 2003b, Nimis & Tretiach 2004, Puntillo & Puntillo 2011, Garofalo & al. 2010, Brunialti & al. 2013, Ravera & Brunialti 2013), **Pugl** (Nimis & Tretiach 1999), **Bas** (Paoli & al. 2006, Ravera & al. 2015d), **Cal** (Puntillo & Vězda 1994, Puntillo 1995, 1996, Incerti & Nimis 2006), **Si** (Nimis & al. 1994).

Cr/ Tr/ S/ Epiph/ pH: 2, L: 2-3, X: 1-2, E: 1/ Alt: 1-3/ Mont: vr, SmedD: er, SmedH: vr, MedH: vr/ PT: 0/ suboc/ Note: a mild-temperate species found in old, humid forests; very much declining, especially in northern Italy. It is included in the Italian red list of epiphytic lichens as “Near-threatened” (Nascimbene & al. 2013c).

Gyalecta derivata (Nyl.) H. Olivier

Bull. Géogr. Bot., 21: 193, 1911 - *Lecidea derivata* Nyl., *Flora*, 48: 603, 1865.

Syn.: *Gyalecta croatica* Zahlbr., *Gyalecta decipiens* Samp., *Gyalecta truncigena* var. *biformis* (Körb.) Vězda, *Gyalecta truncigena* var. *croatica* (Zahlbr.) Vězda, *Gyalecta truncigena* var. *derivata* (Nyl.) Boistel

C - Tosc, **Umb** (Ravera 1999, Ravera & al. 2006), **Laz** (Massari & Ravera 2002, Ravera 2006c), **Abr** (Caporale & al. 2009, Corona & al. 2016), **Mol** (Paoli & al. 2015), **Sar** (Cossu 2013), **S - Cal** (Puntillo 1996), **Si** (Nimis & al. 1994).

Cr/ Tr/ S/ Epiph/ pH: 2-3, L: 3, X: 2, E: 1-2/ Alt: 1-3/ Mont: er, SmedD: er, SmedH: er, MedH: vr/ PT: 1/ suboc/ Note: a species of the *G. truncigena*-group with elongate-fusiform ascospores occasionally having 1-2 straight longitudinal septa, widespread in Europe and also known from Northern Africa, but rather rare, found on broad-leaved trees (especially *Acer* and *Fraxinus*) in humid areas; mostly Tyrrhenian in Italy (there are also scattered records from the Alps outside the Italian territory). It is included in the Italian red list of epiphytic lichens as “Near-threatened” (Nascimbene & al. 2013c).

Gyalecta erythrozona Lettau

Feddes Rep., Beih., 69: 141, 1937.

N - **FrI** (Tretiach 2015h).

Cr/ Tr/ S/ Sax/ pH: 2-3, L: 1-3, X: 2, E: 1/ Alt: 4-5/ Alp: er, Salp: vr/ PT: 1/ Note: a species of the *G. leucaspis*-group characterised by the entire (rather than radially incised) apothecial margins, and the elongate-fusiform (rather than acicular) ascospores; it grows on schists containing some calcium, on moist, shaded, steep rock faces or under overhangs; widely distributed in the Holarctic region, in the Central-European orbiomes it mostly occurs near or above treeline.

Gyalecta fagicola (Arnold) Kremp.

Denschr. kgl. bayer. bot. Ges., Abt. 2, 4: 168, 1861 - *Bacidia fagicola* Hepp ex Arnold, Flora, 41: 504, 1858.

Syn.: *Gyalecta corticola* (Lönnr.) Tuck., *Lecidea congruella* Nyl., *Pachyphiale corticola* Lönnr., *Pachyphiale fagicola* (Arnold) Zwackh

N - Frl, TAA (Nascimbene & al. 2014, Nascimbene 2014), **Emil** (Tretiach & al. 2008). **C - Tosc** (Benesperi 2007, 2011), **Marc** (Nimis & Tretiach 1999), **Abr** (Nimis & Tretiach 1999), **Sar** (Zedda 2002, 2002b). **S - Camp** (Aprile & al. 2003b), **Bas** (Potenza & al. 2014), **Cal** (Nimis & Puntillo 2003, Puntillo 2011).

Cr/ Tr/ S/ Epiph/ pH: 3, L: 3, X: 1-2, E: 1/ Alt: 2-3/ Mont: vr, SmedD: er, SmedH: er/ PT: 0/ suboc/ Note: often confused with *P. carneola*, but certainly rare throughout the country, with optimum in open deciduous forests or, in humid areas, also on isolated, old trees. The species is included in the Italian red list of epiphytic lichens under the “Least Concern” category (Nascimbene & al. 2013c).

Gyalecta flotowii Körb.

Syst. Lich. Germ.: 171, 1855.

Syn.: *Lecidea querceti* Nyl.

N - TAA (Watson 2014), **Lig** (Giordani & al. 2002). **C - Tosc** (Brunialti & Frati 2010), **Marc** (Frati & al. 2004, Frati & Brunialti 2006), **Umb** (Ravera & al. 2006, 2006b), **Laz** (Stofer 2006), **Sar, S - Camp** (Nimis & Tretiach 2004, Garofalo & al. 2010), **Pugl** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996, Incerti & Nimis 2006), **Si**.

Cr/ Tr/ S/ Epiph/ pH: 2-3, L: 3, X: 2-3, E: 1/ Alt: 1-3/ Mont: vr, SmedD: er, SmedH: r, MedH: er/ PT: 0/ suboc/ Note: a mild-temperate lichen found on broad-leaved trees in clearings of ancient, undisturbed forests, especially in deep fissures of the bark, often on *Acer* and *Fraxinus*. The species, which however is easy to overlook, is included in the Italian red list of epiphytic lichens as “Near-threatened” (Nascimbene & al. 2013c).

Gyalecta foveolaris (Ach.) Schaer.

Lich. Helv. Spicil., 7: 360, 1836 - *Urceolaria foveolaris* Ach., Meth. Lich.: 149, 1803.

Syn.: *Gyalecta wahlenbergiana* Ach., *Petractis foveolaris* (Ach.) A. Massal., *Secoliga foveolaris* (Ach.) A. Massal.

N - TAA (Nascimbene & al. 2006, Nascimbene 2008b), **Lomb, Piem** (Morisi 2005), **Lig, C - Marc** (Nimis & Tretiach 1999).

Cr/ Tr/ S/ Terr/ pH: 3-4, L: 3, X: 2-3, E: 1/ Alt: 4-5/ Alp: r, Salp: vr/ PT: 1/ Note: a circumpolar, arctic-alpine lichen found on calciferous soil, occasionally also on rocks, in humid and shaded situations near and above treeline; to be looked for throughout the calcareous Alps.

Gyalecta friesii Körb.

Syst. Lich. Germ.: 173, 1855.

Syn.: *Gyalecta denudata* Th. Fr., *Petractis friesii* (Körb.) A. Massal., *Secoliga friesii* (Körb.) A. Massal.

N - Ven.

Cr/ Tr/ S/ Terr/ pH: 2, L: 2-3, X: 2, E: 1/ Alt: 4-5/ Alp: er, Salp: er/ PT: 1/ Note: a circumboreal-montane species growing on bryophytes and plant debris, more rarely on bark of conifers and on siliceous rocks, with optimum near or above treeline.

Gyalecta geoica (Ach.) Ach.

K. Vetensk.-Akad. Nya Handl., 29: 229, 1808 - *Urceolaria geoica* Wahlenb. ex Ach., Meth. Lich.: 149, 1803.

Syn.: *Secoliga geoica* (Ach.) Körb.

N - Frl, Ven (Nascimbene 2003b, Tomaselli & al. 2006), **TAA** (Nascimbene 2003, 2008b, Nascimbene & al. 2004, 2004b), **Lomb, Piem** (TSB 34069). **S - Camp.**

Cr/ Tr/ S/ Terr/ pH: 3-4, L: 2-3, X: 3, E: 1/ Alt: 3-5/ Alp: r, Salp: vr, Orom: er, Mont: vr/ PT: 1/ Note: a cool-temperate to arctic-alpine, circumpolar species found on soil, bryophytes and plant debris over calcareous or basic siliceous substrata, often in rock fissures in sheltered situations, mostly in upland areas.

Gyalecta hypoleuca (Ach.) Zahlbr.

Cat. Lich. Univ., 2: 711, 1924 - *Urceolaria hypoleuca* Ach., Meth. Lich.: 149, 1803.

Syn.: *Gyalecta gyalectoides* (A. Massal.) Lindau, *Gyalecta thelotremoides* (Nyl.) Kremp., *Petractis hypoleuca* (Ach.) Vězda, *Secoliga gyalectoides* (A. Massal.) A. Massal., *Thelotrema gyalectoides* A. Massal., *Thelotrema gyalectoides* var. *exanthemoides* A. Massal., *Volvaria gyalectoides* (A. Massal.) Trevis.

N - Frl (Henssen & Tretiach 1995, Breuss 2008), **Ven** (Lazzarin 2000b, Nascimbene 2008c), **TAA** (Nascimbene 2008b), **Lomb, Lig** (Watson 2014). **C - Tosc** (Tretiach & al. 2008), **Marc** (Nimis & Tretiach 1999). **S - Camp** (Garofalo & al. 2010), **Pugl, Cal** (Puntillo 1996).

Cr/ Tr/ S/ Sax/ pH: 5, L: 1-3, X: 1-2, E: 1/ Alt: 2-5/ Alp: er, Salp: vr, Orom: er, Mont: rc, SmedD: er, SmedH: er/ PT: 1/ u/ Note: a cool-temperate species found on steeply inclined to underhanging faces of dolomitic rocks and limestone in rather sheltered situations, mostly in woodlands.

Gyalecta incarnata (Th. Fr.) Baloch & Lücking

in Baloch & al., Lichenologist, 45: 724, 2013 - *Belonia incarnata* Th. Fr. & Graewe ex Th. Fr., Öfvers. K. Svensk. Vetensk.-Akad. Förh., 21: 274, 1865.

Syn.: *Belonia russula* var. *terrigena* (Eitner) Keissl., *Belonia terrigena* Eitner, *Gongylia incarnata* (Th. Fr.) Zahlbr., *Gongylia macrospora* Suza

N - FrI (Tretiach & Hafellner 2000), **TAA**.

Cr/ Tr/ S/ Terr/ pH: 1-2, L: 3-4, X: 2, E: 1/ Alt: 4-5/ Alp: r, Salp: vr/ PT: 1/ p/ Note: an arctic-alpine species found on soil rich in humus, often in rather disturbed habitats, such as along mountain track sides, mostly above treeline; easy to overlook and probably widespread throughout the Alps.

Gyalecta jenensis (Batsch) Zahlbr.

Cat. Lich. Univ., 2: 720, 1924 - *Peziza jenensis* Batsch, Elench. Fung.: 219, 1786.

Syn.: *Gyalecta cupularis* (Hedw.) Schaer., *Gyalecta jenensis* var. *macrospora* Vězda?, *Gyalecta jenensis* var. *montenegrina* Servít?, *Gyalecta schisticola* Werner?

N - VG (Tretiach 1993), **FrI** (Tretiach 1993), **Ven** (Nascimbene & Caniglia 1997, 2003c, Caniglia & al. 1999, Nascimbene 2005c, 2008c, Nascimbene & Marini 2007, Brackel 2013), **TAA** (Nascimbene 2005b, 2008b, Nascimbene & al. 2006, 2007b), **Lomb** (Dalle Vedove & al. 2004, Brackel 2013), **Piem** (Isocrono & al. 2004, Isocrono & Piervittori 2008), **VA** (Piervittori & Isocrono 1999), **Emil, Lig** (Tretiach 1993). **C - Tosc** (Tretiach 1993, Benesperi 2006, Tretiach & al. 2008), **Marc** (Nimis & Tretiach 1999), **Umb** (Genovesi & Ravera 2001, Ravera & al. 2006), **Laz** (Tretiach 1993), **Abr** (Nimis & Tretiach 1999, Brackel 2015), **Mol** (Nimis & Tretiach 2004, Caporale & al. 2008), **Sar, S - Camp** (Garofalo & al. 2010), **Pugl, Bas** (Potenza 2006, Potenza & Fascetti 2012), **Cal** (Tretiach 1993, Puntillo 1996), **Si** (Tretiach 1993, Ottonello & al. 2011).

Cr/ Tr/ S/ Sax/ pH: 4-5, L: 1-3, X: 1-2, E: 1-2/ Alt: 2-5/ Alp: r, Salp: rr, Orom: rc, Mont: c, SmedD: vr, SmedH: r/ PT: 1/ u/ Note: a holarctic species found on limestone, dolomite, and other types of calciferous rocks, occasionally over bryophytes, in shaded situations, such as in deep rock fissures and underhangs; widespread throughout the country, with a wide altitudinal range. The var. *macrospora* Vězda is known from the Austrian Alps.

Gyalecta kukriensis (Räsänen) Räsänen

Ann. Bot. Soc. Zool. Bot. Fenn. Vanamo, 12, 1: 176, 1939 - *Gyalecta cupularis* var. *kukriensis* Räsänen, Ueber Flechtenstandorte NW Finnland: 46, 1927.

Syn.: *Gyalecta jenensis* var. *deminuta* Norman ex Lettau, *Gyalecta jenensis* var. *kukriensis* (Räsänen) Zahlbr.

N - Piem (TSB 32955).

Cr/ Tr/ S/ Sax/ pH: 3-4, L: 1-3, X: 1-2, E: 1-2/ Alt: 4-5/ Alp: er, Salp: er/ PT: 1/ u/ Note: on calciferous schists near or above treeline; also known from Austria, the Carpathians, and Scandinavia.

Gyalecta leucaspis (A. Massal.) Kremp.

Denkschr. k. bayer. bot. Ges., 4: 168, 1861 - *Secoliga leucaspis* Kremp. ex A. Massal., Atti Ist. Ven. Sc. Lett. Arti, ser. 3, 2: 370, 1856.

Syn.: *Gyalecta acicularis* Anzi, *Thelotrema leucaspis* Kremp.

N - VG (TSB 35017), **FrI** (Tretiach 2015i), **Ven** (Lazzarin 2000b, Nascimbene & Marini 2007, Nascimbene 2008c), **TAA** (Nascimbene 2008b), **Lomb, Piem** (Isocrono & al. 2004). **C - Sar, S - Camp** (Aprile & al. 2003b, Garofalo & al. 2010), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996).

Cr/ Tr/ S/ Sax/ pH: 4-5, L: 1-2, X: 2, E: 1/ Alt: 2-4/ Salp: vr, Orom: vr, Mont: r, SmedD: er/ PT: 1/ Note: on shaded, steeply inclined faces of dolomitic rocks below the Alpine belt; certainly less common than *G. jenensis*, but probably more widespread, and often overlooked.

Gyalecta liguriensis (Vězda) Vězda

Annot. Zool. Bot. Slov. Narodn. Mus., 13: 5, 1965 - *Gyalecta truncigena* var. *liguriensis* Vězda, Acta Univ. Agric. Sylvic. Brno, ser. C: 43, 1858.

N - Lig (Giordani & Incerti 2008). **C - Tosc** (Brunialti & Frati 2010), **Marc** (Frati & Brunialti 2006), **Umb** (Ravera 2000, Panfili 2000b, Ravera & al. 2006), **Laz** (Ravera 2001, Massari & Ravera 2002, Ravera & al. 2003, Munzi & al. 2004, 2007, Ruisi & al. 2005, Roccardi & al. 2014), **Mol** (Caporale & al. 2008, Paoli & al. 2011, 2015). **S - Camp** (Ravera & Brunialti 2013), **Pugl, Cal** (Nimis & Puntillo 2003, Puntillo 2011).

Cr/ Tr/ S/ Epiph/ pH: 2-3, L: 3, X: 2-3, E: 1-2/ Alt: 1-2/ SmedD: er, SmedH: er, MedH: vr/ PT: 0/ suboc/ Note: on bark of ancient trees in humid, sheltered situations in lowland areas; mostly Tyrrhenian and somehow coastal. The species is included in the Italian red list of epiphytic lichens under the "Least Concern" category (Nascimbene & al. 2013c).

Gyalecta nidarosiensis (Kindt) Baloch & Lücking

in Baloch & al., Lichenologist, 45: 724, 2013 - *Microglæna nidarosiensis* Kindt, Kgl. norske vidensk. Selsk. Skr.: 4, 1884.

Syn.: *Belonia caudata* (Vězda & Vivant) P.M. Jørg. & Vězda, *Belonia nidarosiensis* (Kindt) P.M. Jørg. & Vězda, *Clathroporina calcarea* Walt. Watson, *Clathroporina caudata* Vězda & Vivant

S - Cal (Puntillo 1996).

Cr/ Tr/ S/ Epiph-Sax/ pH: 2-5, L: 2-3, X: 1, E: 1-2/ Alt: 2-3/ Mont: er, SmedH: er/ PT: 1/ suboc/ Note: hitherto known only from the Austrian and French Alps, and from Calabria, where it was found on *Quercus* in a very humid site; it also occurs on shaded surfaces of calcareous rocks in very humid situations, often in

association with *Lepraria*-species. The species is included in the Italian red list of epiphytic lichens as "Critically Endangered" (Nascimbene & al. 2013c).

Gyalecta peziza (Mont.) Anzi

Cat. Lich. Sondr.: 62, 1860 - *Biatora peziza* Mont. in Garovaglio, Saggio Not. Nat. Civ. Lomb., 1: 334, 1844.

Syn.: *Secoliga peziza* (Mont.) Arnold

N - TAA, Lomb, Piem (Isocrono & al. 2004).

Cr/ Tr/ S/ Terr/ pH: 3-4, L: 3-4, X: 2, E: 1/ Alt: 4-5/ Alp: vr, Salp: vr/ PT: 1/ Note: a mainly arctic-alpine, circumpolar species found on slightly calciferous soil rich in humus, and on terricolous bryophytes near or above treeline; probably restricted to the Alps in Italy, where it is generally rare.

Gyalecta russula (Nyl.) Baloch, Lumbsch & Wedin

Lichenologist, 45: 725, 2013 - *Belonia russula* Körb. ex Nyl., Act. Soc. Linn. Bordeaux, 21: 346, 1856.

Syn.: *Belonia fennica* Vain., *Beloniella cinerea* Norman, *Gyalecta bacidiospora* (Eitner) Zahlbr., *Secoliga bacidiospora* Eitner

N - Frl, TAA (Arnold, Lich. Exs. 1066: UPS-L-169726), **Emil** (Benesperi & al. 2007, Tretiach & al. 2008). **C - Tosc** (TSB 35383).

Cr/ Tr/ S/ Terr-Sax/ pH: 2-3, L: 2-4, X: 1-2, E: 1/ Alt: 4-5/ Alp: vr, Salp: er/ PT: 1/ Note: a mainly arctic-alpine, probably circumpolar species found on base-rich soil, often on bryophytes, and on steeply inclined or underhanging surfaces of basic siliceous rocks, with optimum above treeline; perhaps more widespread in the Alps, but generally not common.

Gyalecta sbarbari Vězda

Ann. zool. bot. Bratislava, 13: 6-7, 1965.

N - Lig (Breuss & Brand 2010).

Cr/ Tr/ S/ Sax-Epiph/ pH: 3-5, L: 2-3, X: 2, E: 1/ Alt: 1-2/ SmedH: er, MedH: vr/ PT: 1/ Note: a rare species, also known from Austria. The type specimen was found on calcareous rocks in a humid-shaded site near the coast, but the typical substrate seems to be bark (Breuss & Brand 2010).

Gyalecta subclausa Anzi

Neosymb. Lich. Rar. Nov.: 8, 1866.

Syn.: *Gyalecta chlorobaea* Nyl., *Gyalecta elegantula* Müll. Arg., *Gyalecta rosellovirens* Nyl.

N - Frl, Lomb.

Cr/ Tr/ S/ Sax/ pH: 5, L: 2-3, X: 1-2, E: 1/ Alt: 3-4/ Salp: vr, Mont: er/ PT: 1/ Note: an inconspicuous, perhaps overlooked species found on vertical faces of calcareous rocks in humid, damp and shaded situations in upland areas.

Gyalecta thelotremella Bagl.

N. Giorn. Bot. Ital., 11: 87, 1879.

Syn.: *Petractis thelotremella* (Bagl.) Vězda

C - Tosc, Sar (Alonso & Egea 1994). **S - Camp** (Nimis & Tretiach 2004, Garofalo & al. 2010), **Pugl** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Alonso & Egea 1994, Nimis & al. 1994).

Cr/ Tr/ S/ Sax/ pH: 5, L: 1-3, X: 1-2, E: 1/ Alt: 1/ MedH: rr, MedD: vr/ PT: 1/ coast/ Note: on compact calcareous rocks in sheltered situations, often found together with *Petractis luetkemulleri*, mostly Tyrrhenian, but also present in Puglia, where it is not rare along the rocky coasts.

Gyalecta truncigena (Ach.) Hepp

Flecht. Eur.: nr. 27, 1853 - *Gyalecta wahlenbergiana* var. *truncigena* Ach., Lichenogr. Univ.: 152, 1810.

Syn.: *Gyalecta abstrusa* (Wallr.) A. Massal.

N - VG (Carvalho 1997), **Ven, TAA** (Nascimbene & al. 2007b), **Lomb** (Jatta 1909-1911), **Lig** (Giordani & Incerti 2008). **C - Tosc** (Tretiach & Nimis 1994, Loppi & al. 1998, Putortù & al. 1998, Stofer 2006, Brunialti & Frati 2010, Benesperi 2011), **Marc** (Frati & al. 2004, Frati & Brunialti 2006), **Umb** (Ravera 1998, Ravera & al. 2006), **Laz** (Massari & Ravera 2002, Munzi & al. 2004, 2007, Ruisi & al. 2005, Genovesi & al. 2008, Ravera & Genovesi 2008, Gagliardi & al. 2010), **Abr, Mol** (Caporale & al. 2008, Ravera & Genovesi 2010, Ravera & al. 2010, Paoli & al. 2015), **Sar** (Zedda 2002, Stofer 2006, Rizzi & al. 2011). **S - Camp, Pugl** (Nimis & Tretiach 1999), **Bas** (Bartoli & Puntillo 1998, Potenza 2006, Potenza & al. 2010), **Cal** (Puntillo 1995, 1996, Sérusiaux 1998, Puntillo & Puntillo 2004), **Si** (Nimis & al. 1994, Ottonello 1996).

Cr/ Tr/ S/ Epiph/ pH: 2-3, L: 3, X: 1-2, E: 1-2/ Alt: 2-3/ Mont: er, SmedD: er, SmedH: r/ PT: 0/ suboc/ Note: a temperate lichen found on mature trees, mostly *Acer* and *Fraxinus*, but also on the slightly nutrient-enriched bark of more acid-barked trees such as oaks, in mild-humid areas; more common in the past, presently localised in clearings of ancient, open, humid deciduous forests.

Gyalecta ulmi (Sw.) Zahlbr.

in Engler & Prantl, Natürl. Pflanzenfam., 1, 1: 126, 1905 - *Lichen ulmi* Sw., N. Acta Acad. Upsal., 4: 247, 1784.

Syn.: *Gyalecta rubra* (Hoffm.) A. Massal., *Lecania rubra* (Hoffm.) Müll. Arg., *Lecanora rubra* (Hoffm.) Ach., *Lepadolemma rubrum* (Hoffm.) Trevis., *Phialopsis rubra* (Hoffm.) Körb., *Phialopsis ulmi* (Sw.) Arnold
N - Ven, Lomb, Piem, Emil. C - Tosc, Marc, Umb (Ravera 1998, Ravera & al. 2006), Laz (Ravera 2001), Sar (Zedda 2002, 2002b, Zedda & al. 2001). S - Pugl (Nimis & Tretiach 1999), Bas (Potenza 2006, Potenza & Fascetti 2012), Cal (Puntillo 1996), Si (Grillo 1996).

Cr/ Tr/ S/ Epiph-Terr/ pH: 2-3, L: 3, X: 2-3, E: 1-2/ Alt: 2-3/ Mont: er, SmedD: er, SmedH: vr/ PT: 0/
Note: a temperate lichen found on mature trees (especially near the base of *Ulmus*), but also on mosses on steeply inclined faces of calciferous rocks, probably more frequent in the past; there are no recent records from northern Italy. The species is included in the Italian red list of epiphytic lichens as "Near-threatened" (Nascimbene & al. 2013c).

Gyalectidium Müll. Arg.

Flora, 64: 100, 1881.

This genus of foliicolous, mainly tropical lichens belongs to the Gomphillaceae, owing to the branched and highly anastomosing paraphyses and the highly specialised conidiomata (hyphophores). A world monograph of the genus, that currently includes 52 species, was published by Ferraro & al. (2001). Type: *G. filicinum* Müll. Arg.

Gyalectidium minus Sérus.

in Ferraro & al., Bot. J. Linn. Soc., 137: 340, 2001.

S - Camp (Puntillo & al. 2000, Puntillo 2000, Nimis & Tretiach 2004, Ferraro & al. 2001, Puntillo & Puntillo 2011).

Cr/ Cy.f/ S/ Foliic/ pH: 2-3, L: 2-3, X: 1, E: 1-2/ Alt: 1/ MedH: er / PT: 0/ oc/ Note: only known from a single station in Italy, on leaves of *Buxus*, *Laurus*, *Phyllirea*, and on cladodes of *Ruscus* in a warm-humid, coastal gorge; earlier records of *G. caucasicum* from Italy refer to this species, which is included in the Italian red list of epiphytic lichens as "Critically Endangered" (Nascimbene & al. 2013c).

Gyalectidium puntilloi Sérus.

in Ferraro & al., Bot. J. Linn. Soc., 137: 341, 2001.

S - Camp (Puntillo & al. 2000, Puntillo 2000, Ferraro & al. 2001, Puntillo & Puntillo 2011, Ravera & al. 2015c).

Cr/ Cy.f/ S/ Foliic/ pH: 2-3, L: 2-3, X: 1, E: 1-2/ Alt: 1-2/ SmedH: er, MedH: er/ PT: 0/ oc/ Note: a recently-described foliicolous species known only from southern Italy and the Pyrenees, where it grows in very humid and warm sites. It is included in the Italian red list of epiphytic lichens as "Critically Endangered" (Nascimbene & al. 2013c).

Gyalidea Vězda

Lettau ex Vězda, Folia Geobot. Phytotaxon., 1: 312, 1966.

This genus of the Gomphillaceae includes c. 50 species characterised by gyalectoid apothecia, non-amyloid hymenium, simple, septate paraphyses and hyaline, submuriform or transversely septate ascospores. Most of the species grow on soil, rocks, mosses or plant debris. Aptroot & Lücking (2003) have shown that *Solorinella* Anzi belongs to the species traditionally assigned to *Gyalidea* (a name which is now conserved against *Solorinella*). Type: *G. lecideopsis* (A. Massal.) Vězda

Gyalidea asteriscus (Anzi) Aptroot & Lücking

Bibl. Lichenol., 86: 67, 2003 - *Solorinella asteriscus* Anzi, Cat. Lich. Sondr.: 37, 1860.

N - TAA (Farkas & Lökös 1994), Lomb (Farkas & Lökös 1994), Piem (TSB 35294), VA (Farkas & Lökös 1994, Piervittori & Isocrono 1999).

Fol/ Ch/ S/ Terr/ pH: 3-4, L: 4, X: 4-5, E: 1-2/ Alt: 2-3/ Salp: er, Mont: er, SmedD: er/ PT: 1/ subc/
Note: a typical lichen of steppe grasslands on loess, whose distribution extends widely into Central Asia, found on Loess and (in the Alps) on soil deriving from calcareous schists; restricted to strongly continental Alpine valleys in Italy.

Gyalidea diaphana (Nyl.) Vězda

Folia Geobot. Phytotaxon., 13: 400, 1978 - *Biatora diaphana* Körb. ex Nyl., Act. Soc. Linn. Bordeaux, 21: 352, 1856.

Syn.: *Bacidia bayeri* (E. Senft) Servít, *Biatorina diaphana* (Nyl.) Körb., *Catillaria bayeri* E. Senft, *Catillaria diaphana* (Nyl.) Lettau

C - Tosc.

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 2-3, X: 1-2, E: 1/ Alt: 3/ Mont: er/ PT: 0/ l/ Note: on periodically submerged micaceous rocks near brooks, with optimum in the montane belt; the species resembles *G. fritzei* but has one-septate ascospores. The Italian record needs confirmation (see Nimis 1993: 310).

Gyalidea fritzei (Stein) Vězda

Folia Geobot. Phytotaxon., 1: 324, 1966 - *Gyalecta fritzei* Stein in Cohn, Kryptogamenfl. von Schlesien, 2, 2: 154, 1879.

N - Lomb (Nascimbene 2006). **S - Cal** (Puntillo 2011).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 3-4, X: 1-2, E: 1/ Alt: 4-5/ Alp: vr, Salp: er, Orom: er/ PT: 1/ Note: on siliceous rocks in humid-shaded habitats, such as along creeks, with optimum above treeline; to be looked for further in the Alps, but certainly not common.

Gyalidea fruticola M. Svenss. & G. Thor

Lichenologist, 39: 335, 2007.

N - TAA (Svensson & Thor 2007).

Cr/ Ch/ S/ Epiph/ pH: 3-4, L: 3-5, X: 3-4, E: 3-4/ Alt: 3-4/ Salp: er, Orom: er, Mont: er/ PT: 1/ Note: a recently-described, probably boreal-montane species, known from Scandinavia and the Italian Alps, which usually grows on shrubby *Lonicera*-species in the montane and subalpine belts. It is included in the Italian red list of epiphytic lichens as “Critically Endangered” (Nascimbene & al. 2013c).

Gyalidea lecideopsis* var. *convarians (Nyl.) Vězda

Folia Geobot. Phytotaxon., 1: 320, 1966 - *Gyalecta convarians* Nyl., Flora, 68: 602, 1885.

Syn.: *Gyalidea lecideopsis* var. *eucarpa* (Servit) Vězda, *Lopadium cacuminum* H.Magn.

N - TAA.

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 3, X: 1-2, E: 1/ Alt: 3-4/ Salp: er, Mont: er/ PT: 0/ Note: a taxon with reduced spore numbers per ascus and muriform ascospores which are longer than 30 µm, found on limestone and dolomite in moist places, mostly in upland areas; widespread in Europe and also known from Asia and Arctic North America, but much rarer than the typical variety.

Gyalidea lecideopsis (A. Massal.) Vězda var. ***lecideopsis***

Lettau ex Vězda, Folia Geobot. Phytotaxon., 1: 312, 1966 - *Gyalecta lecideopsis* A. Massal., Miscell. Lichenol.: 39, 1856.

Syn.: *Gyalidea albocrenata* (Arnold) Lettau, *Gyalecta hyalina* Hepp, *Gyalecta stigmatoides* (Nyl.) Boistel, *Lecidea stigmatoides* Nyl.

N - Ven (Lazzarin 2000b), **TAA, Piem** (Isocrono & al. 2004).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 3, X: 1-2, E: 1/ Alt: 3-4/ Salp: er, Mont: er/ PT: 0/ Note: a northern-montane species found on limestone, dolomite, calciferous schists, on porous, damp faces; easily overlooked, but certainly rare.

Gyalidea phyllophila Vězda

Acta Mus. Silesiae, Opava, ser. A, 22: 89, 1973.

S - Camp (Puntillo & al. 2000, Puntillo 2000).

Cr/ Ch/ S/ Foliic/ pH: 1-2, L: 2-3, X: 1, E: 1/ Alt: 1/ MedH: er/ PT: 0/ oc/ Note: a foliicolous species described from Africa, and also known from the Pyrenees; in the only Italian station, a warm-humid coastal valley, it was found on the leaves of *Laurus*. It is included in the Italian red list of epiphytic lichens as “Critically Endangered” (Nascimbene & al. 2013c).

Gyalidea roseola (Arnold) Lettau

Feddes Rep. Beih., 69: 123, 1937 - *Gyalecta roseola* Arnold, Verh. zool.-bot. Ges. Wien, 23: 95, 1873.

N - TAA (Nascimbene 2008b), **Lig.**

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 3, X: 1, E: 1/ Alt: 3-4/ Salp: er, Mont: er/ PT: 1/ 1/ Note: on siliceous rocks (especially crystalline schists), on periodically wetted faces, such as near creeks and waterfalls in upland areas; an overall rare species, known from a few localities in northwestern Europe and from the Alps; the record from Liguria needs confirmation.

Gyalidea scutellaris (Bagl. & Carestia) Lettau

Feddes Rep. Beih., 69: 123, 1937 - *Gyalecta scutellaris* Bagl. & Carestia, Comm. Soc. Critt. Ital., 1, 5: 442, 1864.

Syn.: *Gyalecta pseudogeoica* Anzi, *Gyalecta arctica* Malme

N - Ven, Lomb, Piem (Isocrono & al. 2004).

Cr/ Ch/ S/ Terr/ pH: 1-2, L: 3-4, X: 1-2, E: 1/ Alt: 4-5/ Alp: vr, Salp: er/ PT: 1/ Note: an arctic-alpine species found on humid, acid substrata, such as muribund bryophytes and soil rich in humus. With optimum above treeline; restricted to the Alps in Italy.

Gyalideopsis Vězda

Folia Geobot. Phytotaxon., 7: 204, 1972.

Lücking & al. (2005) provided an extensive phenotype-based phylogenetic analysis of the family Gomphillaceae, including almost all species described in *Gyalideopsis s.lat.* The genus was retained in a more restricted sense, excluding taxa on inorganic substrata with immersed apothecia (*Diploschistella*), species with campylidioid hyphophores (*Ferraroa*), taxa with isidioid hyphophores termed “thlasidia” (*Jamesiella*), and species on inorganic substrata with lecideine apothecia, small transversely septate

ascospores and *Aulaxina*-type hyphophores (*Lithogyalideopsis*). *Gyalideopsis s.str.* remains the largest genus of the family, with c. 100 currently recognised species. The genus is poorly known in Italy. The following species are known from the Alps in neighbouring countries: *G. modesta* Vězda & Poelt, and *G. piceicola* (Nyl.) Vězda & Poelt. Type: *G. peruviana* Vězda

Gyalideopsis calabrica Puntillo & Vězda

Webbia, 46: 159, 1991.

S - Cal (Puntillo 1996).

Cr/ Ch/ A.i/ Epiph/ pH: 1-2, L: 3, X: 1, E: 1/ Alt: 3/ Mont: er/ PT: 0/ Note: on epiphytic bryophytes and on bark of *Fagus* in old, undisturbed, very humid forests. This species might prove to be a synonym of *G. muscicola* P. James & Vězda: the species was established on account of its filiform versus presumably moniliform diahyphae in *G. muscicola*, but the latter species is characterised by filiform diahyphae as well (see Lücking & al. 2006). The species is included in the Italian red list of epiphytic lichens as “Critically Endangered” (Nascimbene & al. 2013c).

Gyalideopsis helvetica van den Boom & Vězda

Öst. Z. Pilzk., 9: 28, 2000.

N - TAA (UPS-L-166763).

Cr/ Ch/ A.s/ Lign/ pH: 1-2, L: 3, X: 2, E: 1/ Alt: 3-4/ Salp: vr, Mont: er/ PT: 1/ Note: a species with a smooth, green-grey, glossy thallus and scattered excavate soralia, apothecia (when present) reddish-brown, with submuriform, fusiform ascospores in mostly 4-spored asci; it grows on fallen, decorticated tree trunks; widely distributed in the Holarctic region but altogether rare. The Italian sample was collected by G. Thor on a stump in the Stelvio National Park, in a subalpine, open *Larix*-stand.

Gyalideopsis piceicola (Nyl.) Vězda & Poelt

Nova Hedwigia, 53: 112, 1991 - *Lecidea piceicola* Nyl., Flora, 69: 99, 1886.

Syn.: *Gyalideopsis alnicola* W.J. Noble & Vězda

S - Cal (Puntillo 1996).

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 2-3, X: 1-2, E: 1/ Alt: 2-3/ Mont: er, SmedH: er/ PT: 0/ Note: *G. alnicola* was only known from a single station in Calabria, on twigs of *Abies* in a damp forest. However, according to Tønsberg, this species is a juvenile *G. piceicola* with whitish hyphophores, based on his observations in the Pacific Northwest of North America (from where *G. alnicola* was described): well-developed specimens often occur together with a mixture of young and white and mature and brown hyphophores. The species is included in the Italian red list of epiphytic lichens as “Critically Endangered” (Nascimbene & al. 2013c).

Gyalolechia A. Massal.

Ric. Auton. Lich. Crost.: 17, 1852.

In the re-definition of the Teloschistaceae genus *Caloplaca s.lat.* by Arup & al. (2013), *Gyalolechia* forms a large, monophyletic clade with good support, characterised by a chemistry dominated by fragilin. This clade includes both the old genus *Fulgensia*, the former *Caloplaca flavorubescens* group, and some species formerly included into *Caloplaca*. *Fulgensia schistidii* was transferred to the new genus *Calogaya*, *F. australis* and *F. paulii* to the new genus *Variospora*. However, both the whole clade and the genus *Fulgensia* in a more restricted sense show large variation in both morphology and anatomy, often with large differences between closely related species. Different cortex types also occur in closely related species, and the spores also show large variation, from simple to polar-diblastic with a short septum. For these reasons Arup & al. (2013) saw no relevance in trying to retain *Fulgensia* in the old sense, when it can easily be accommodated within a large genus kept together by its chemistry (but see the remarks of Roux & coll. 2014). An alternative nomenclature was proposed by Kondratyuk & al. (2014b), who do not accept a broad concept of *Gyalolechia*, splitting it into several smaller genera. Type: *G. aurea* (Schaer.) A. Massal.

Gyalolechia aurea (Schaer.) A. Massal.

Ric. Auton. Lich. Crost.: 17, 1852 - *Lecidea aurea* Schaer., Naturwiss. Anz., 2: 11, 1819.

Syn.: *Caloplaca aurea* (Schaer.) Th. Fr., *Thalloidima aureum* (Schaer.) Müll. Arg.

N - Frl, Ven (Nascimbene & Caniglia 2003c), TAA, Lomb, VA (Pierivittori & Isocrono 1999), Emil. C - Abr (Nimis & Tretiach 1999).

Cr/ Ch/ S/ Terr/ pH: 4-5, L: 4-5, X: 3, E: 2-3/ Alt: 4-5/ Alp: c, Salp: rr/ PT: 1/ Note: a species of the mountains of Central and southern Europe, found on plant debris and mosses in fissures and cracks of calcareous rocks and dolomite, with optimum above treeline; widespread but not common in the Alps, and also occurring on the highest peaks of the central Apennines (the record from Abruzzo is the southernmost in Europe).

Gyalolechia bracteata (Hoffm.) A. Massal.

Ric. Auton. Lich. Crost.: 17, 1852 - *Psora bracteata* Hoffm., Deutschl. Fl.: 169, 1796.

Syn.: *Caloplaca bracteata* (Hoffm.) Jatta, *Caloplaca bracteata* f. *alpina* (Th. Fr.) Zahlbr., *Caloplaca bracteata* f. *deformis* Erichsen?, *Fulgensia bracteata* (Hoffm.) Räsänen, *Fulgensia bracteata* subsp. *deformis* (Erichsen) Poelt?,

Fulgensia bracteata var. *alpina* (Th. Fr.) Räsänen, *Lecanora bracteata* (Hoffm.) Röhl., *Placodium bracteatum* (Hoffm.) Nyl., *Placodium fulgens* var. *alpinum* Th. Fr.

N - **Frl**, **Ven** (Nascimbene & Caniglia 1997, Caniglia & al. 1999, Brackel 2013), **TAA**, **Lomb**, **Piem** (Isocrono & al. 2004, Hafellner & al. 2004), **VA** (Piervittori & Isocrono 1999, Piervittori & al. 2001). **C** - **Tosc** (Vězda Lich. Rar. Exs. 172), **Marc** (Nimis & Treliach 1999).

Cr/ Ch/ S/ Terr/ pH: 4-5, L: 4-5, X: 4, E: 2-3/ Alt: 3-5/ Alp: rr, Salp: rc, Mont: er/ PT: 1/ Note: on calciferous soil and terricolous mosses in open situations, sometimes in fissures of calcareous rocks, mostly near or above treeline. The record of Grillo (1998) from the coast of Sicilia, is certainly due to a misidentification.

Gyalolechia canariensis (Follmann & Poelt) Søchting, Frödén & Arup

in Arup & al., Nord. J. Bot., 31: 70, 2013 - *Fulgensia canariensis* Follmann & Poelt, *Philippia*, 4/5: 372, 1981.

Syn.: *Caloplaca canariensis* (Follmann & Poelt) Breuss

C - **Sar**.

Cr/ Ch/ S/ Terr/ pH: 3, L: 4-5, X: 4, E: 1-2/ Alt: 1-2/ SmedD: er/ PT: 1/ Note: a xeric subtropical lichen found on base-rich clay soil in clearings of grasslands and shrublands, common in Macaronesia and also known from North Africa; in Europe only known from a single station in central Sardegna (Gennargentu Massif near Desulo).

Gyalolechia desertorum (Tomin) Søchting, Frödén & Arup

in Arup & al., Nord. J. Bot., 31: 70, 2013 - *Placodium desertorum* Tomin, Über Bodenfl. aus Halbwüsten Süd-Ost Russlands, Woronesh: 29, 1926.

Syn.: *Caloplaca geoica* H. Magn., *Fulgensia desertorum* (Tomin) Poelt, *Fulgensia bracteata* auct. eur. austr.

N - **Emil** (Nimis & al. 1996), **Lig** - **Abr** (TSB 25008), **Sar**.

Cr/ Ch/ S/ Terr/ pH: 4-5, L: 4-5, X: 4-5, E: 1-2/ Alt: 1-2/ SmedD: vr, SmedH: er, MedH: er, MedD: er/ PT: 1/ subc/ Note: in Italy only locally common, especially in areas with gypsum, in open grasslands; to be looked for also in dry-continental Alpine valleys.

Gyalolechia epiphyta (Lyngé) Vondrák

in Vondrák & al., Lichenologist, 48: 180, 2016 - *Caloplaca epiphyta* Lyngé, Skr. om Svalbard og Ishavet, 506, 81: 119, 1940.

Syn.: *Caloplaca loricina* Rondon, *Caloplaca juniperi* Poelt & Hinter., *Caloplaca juniperina* Tomin

N - **Piem** (Rondon 1964).

Cr/ Ch/ A.i/ Lign/ pH: 1-2, L: 4-5, X: 3-5, E: 3-4/ Alt: 3-4/ A1: vr, Mont: vr/ PT: 1-2/ Note: the record of *Caloplaca loricina* from Piedmont was overlooked by Nimis (1993); this species has been synonymised by Vondrák & al. (2016b) with *G. epiphyta*. This lichen is widely distributed in the arctic and temperate zones of the Northern Hemisphere. It prefers steppes and dry forests in continental regions, but it is also common in the Arctic. It is usually epiphytic or epixylic (often on *Juniperus*), but it also grows on soil and mosses in rock crevices in arctic-alpine habitats or in steppes; the sample from Piedmont was collected on lignum. For further details see Vondrák & al. (2016b).

Gyalolechia flavorubescens (Huds.) Søchting, Frödén & Arup var. *flavorubescens*

in Arup & al., Nord. J. Bot., 31: 70, 2013 - *Lichen flavorubescens* Huds., Fl. Angl.: 443, 1762.

Syn.: *Callophisma aurantiacum* var. *anomalum* A. Massal., *Callophisma aurantiacum* var. *picilos* A. Massal., *Caloplaca aurantiaca* auct. non (Lightf.) Th. Fr., *Caloplaca aurantiaca* var. *anomala* (A. Massal.) Jatta, *Caloplaca flavorubescens* (Huds.) J.R. Laundon, *Caloplaca flavovirescens* var. *salicina* (Schrad.) Dalla Torre & Sarnth., *Caloplaca salicina* (Schrad.) Szatala, *Caloplaca suberythrella* (Nyl.) Clauzade & Rondon

N - **VG**, **Frl**, **Ven** (Lazzarin 2000b, Nascimbene 2005c), **TAA** (Nascimbene 2003, Nascimbene & al. 2007b), **Lomb** (Brusoni & al. 1997, Brusoni & Valcuvia 2000), **Piem** (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999 Matteucci & al. 2008c), **Emil** (Nimis & al. 1996), **Lig** (Brunialti & al. 1999, Valcuvia & al. 2000, Giordani & al. 2002, Giordani & Incerti 2008). **C** - **Tosc** (Tretliach & Nimis 1994, Loppi & Putorti 1995b, 2001, Loppi 1996b, Putorti & al. 1998, Paoli & Loppi 2001, Loppi & al. 2003, 2006, Paoli & al. 2012), **Marc** (Nimis & Tretliach 1999, Frati & Brunialti 2006), **Umb** (Bartoli & al. 1997, Ravera 1998, Nimis & Tretliach 1999, Ravera & al. 2006, Panfili 2007), **Laz** (Bartoli & al. 1997b, Ravera 2002, Massari & Ravera 2002, Nimis & Tretliach 2004, Zucconi & al. 2013), **Abr** (Recchia & al. 1993, Olivieri & Pacioni 1996, Olivieri & al. 1997, 1997b, Loppi & al. 1999, Nimis & Tretliach 1999, Caporale & al. 2016, Corona & al. 2016), **Mol** (Nimis & Tretliach 1999, Caporale & al. 2008, Genovesi & Ravera 2014), **Sar** (Loi & al. 2000, Zedda 2002, Rizzi & al. 2011). **S** - **Camp** (Garofalo & al. 1999, 2010, Aprile & al. 2003b, Nimis & Tretliach 2004, Brunialti & al. 2013, Ravera & Brunialti 2013, Catalano & al. 2016), **Pugl** (Nimis & Tretliach 1999), **Bas** (Nimis & Tretliach 1999, Potenza 2006), **Cal** (Puntillo 1996), **Si** (Merlo 1993, 2004, 2004b, Nimis & al. 1994, Ottonello & Salone 1994, Ottonello & al. 1994, Grillo & Cristaudo 1995, Ottonello 1996, Grillo 1998, Grillo & al. 2002, Grillo & Caniglia 2004, 2006, Stofer 2006, Liistro & Cataldo 2011, Vondrák & al. 2016b).

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 4-5, X: 3, E: 2-3/ Alt: 1-3/ Mont: rr, SmedD: rc, Pad: er, SmedH: c, MedH: rc, MedD: r/ PT: 1-2/ Note: a mainly temperate lichen, most common on old, more or less isolated deciduous trees, especially oaks; a member of a difficult and variable group.

Gyalolechia flavorubescens (Huds.) Søchting, Frödén & Arup var. ***quercina*** (Flagey) Nimis

The Lichens of Italy. A second annotated Catalogue: 19, 2016 - *Caloplaca quercina* Flagey, Rev. Mycol., 13: 114, 1891.

N - VG (TSB 1608), **Frl** (TSB 1563), **TAA** (B 60 0191804). **C - Marc** (Nimis & Tretiach 1999), **Laz** (TSB 32402), **Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **Sar** (TSB 8512). **S - Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Brackel 2008b, 2008c).

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 4-5, X: 3, E: 3/ Alt: 1-3/ Mont: vr, SmedD: r, SmedH: rc, MedH: rr/ PT: 1-2/ #/ Note: a critical taxon, which deserves further study.

Gyalolechia flavovirescens (Wulfen) Søchting, Frödén & Arup

in Arup & al., Nord. J. Bot., 31: 70, 2013 - *Lichen flavovirescens* Wulfen, Schr. Ges. naturf. Fr. Berlin, 8: 122, 1787.

Syn.: *Biatora flavofusca* (Schrad.) W. Mann, *Callospisma aurantiacum* var. *flavovirescens* (Wulfen) A. Massal., *Caloplaca aurantiaca* var. *inalpina* (Ach.) H. Magn., *Caloplaca erythrella* (Ach.) Kieff., *Caloplaca flavorubescens* subsp. *flavovirescens* (Wulfen) Clauzade & Cl. Roux, *Caloplaca flavovirescens* (Wulfen) Dalla Torre & Sarnth., *Lecanora erythrella* (Ach.) Ach., *Placodium aurantiacum* var. *flavovirescens* (Wulfen) Hepp, *Placodium aurantiacum* var. *inalpinum* (Ach.) H. Magn., *Caloplaca flavovirescens* var. *dinae* Sbarbaro?, *Callospisma flavovirescens* f. *detritum* A. Massal.?

N - VG (Castello 2002, Martellos & Castello 2004), **Frl, Ven** (Lazzarin 2000b, Nascimbene & Caniglia 2003c, Nascimbene 2005c, 2008c, Nascimbene & Salvadori 2008), **TAA** (Nascimbene 2001b, 2005b, 2008b), **Lomb** (Valcuvia & al. 2003), **Piem** (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999, Valcuvia 2000), **Emil, Lig** (Valcuvia & al. 2000, Brunialti & Giordani 2003, Giordani & al. 2016). **C - Tosc** (Tretiach & Nimis 1994, Tretiach & al. 2008, Benesperi 2011, Brackel 2015), **Marc** (Nimis & Tretiach 1999), **Umb** (Genovesi & al. 2001, Ravera & al. 2006), **Laz** (Bartoli 1997b), **Abr** (Nimis & Tretiach 1999), **Mol** (Ravera & Genovesi 2012, Genovesi & Ravera 2014), **Sar** (Nöske 2000). **S - Camp** (Garofalo & al. 1999, Nimis & Tretiach 2004), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996, Puntillo & Puntillo 2004), **Si** (Ottonello & al. 1994, Poli & al. 1997, 1998, Ottonello & Romano 1997, Grillo 1998, Caniglia & Grillo 2001, 2005, 2006, Grillo & al. 2001, 2002, Grillo & Caniglia 2004, Grillo & al. 2009, Gianguzzi & al. 2009, Cataldo & Cannavò 2014).

Cr/ Ch/ S/ Sax/ pH: 3-4, L: 3-4, X: 3, E: 3-4/ Alt: 1-4/ Salp: vr, Mont: rr, SmedD: c, Pad: r, SmedH: c, MedH: rr, MedD: er/ PT: 1-2/ Note: a mainly temperate species with optimum on weakly calcareous sandstone and calciferous schists, on boulders and walls, with optimum at relatively low elevations.

Gyalolechia fulgens (Sw.) Søchting, Frödén & Arup

in Arup & al., Nord. J. Bot., 31: 70, 2013 - *Lichen fulgens* Sw., N. Acta Acad. Upsal., 4: 246, 1784.

Syn.: *Caloplaca fulgens* (Sw.) Körb., *Fulgensia fulgens* (Sw.) Elenkin, *Fulgensia vulgaris* A. Massal. & De Not., *Lecanora fulgens* (Sw.) Ach., *Placodium fulgens* (Sw.) DC., *Psoroma fulgens* (Sw.) A. Massal., *Squamaria fulgens* (Sw.) Hook., *Squamaria fulgens* var. *decepiens* Anzi

N - VG, Ven (Lazzarin 2000b), **TAA** (De Benetti & Caniglia 1993), **Lomb, Piem** (Clerc & al. 1999, Isocrono & al. 2003, Morisi 2005), **VA** (Piervittori & Isocrono 1999), **Emil** (Nimis & al. 1996), **Lig** (Brunialti & al. 1999, Giordani & al. 2016). **C - Tosc** (Loppi & al. 2004b, Benesperi 2006, Pasquinelli & Puccini 2010), **Marc** (Nimis & Tretiach 1999), **Umb** (Genovesi & al. 2001, Ravera & al. 2006, Panfili 2007), **Laz** (Brackel 2015), **Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008). **S - Camp** (Garofalo & al. 1999, Aprile & al. 2002, 2003, 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010), **Pugl, Bas** (Potenza & Fascetti 2005, 2012, Potenza & al. 2010, Brackel 2011), **Cal** (Puntillo 1996), **Si** (Grillo 1998, Grillo & Caniglia 2004, Cataldo & Minissale 2013).

Cr.pl/ Ch/ S/ Terr-Sax/ pH: 4-5, L: 4-5, X: 4, E: 2-3/ Alt: 1-3/ Mont: r, SmedD: rc, Pad: vr, SmedH: rc, MedH: rr, MedD: rr/ PT: 1/ subc/ Note: a subtropical to temperate lichen found on calcareous rocks and thin layers of soil, often in rock fissures below the subalpine belt.

Gyalolechia fulgida (Nyl.) Søchting, Frödén & Arup

in Arup & al., Nord. J. Bot., 31: 70, 2013 - *Placodium fulgidum* Nyl., Flora, 58: 212, 1875.

Syn.: *Caloplaca fulgida* (Nyl.) J. Steiner, *Fulgensia fulgida* (Nyl.) Szatala, *Lecanora fulgida* (Nyl.) Hue

N - Lig (Valcuvia & al. 2000). **C - Tosc** (Benesperi 2006, 2007), **Marc** (Nimis & Tretiach 1999), **Abr, Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **Laz, Sar** (Harutyunyan & al. 2008). **S - Camp** (Garofalo & al. 1999, 2010, Aprile & al. 2003b, Nimis & Tretiach 2004, Catalano & Aprile 2008), **Pugl** (Garofalo & al. 1999, Aprile & al. 2003, Nimis & Tretiach 1999), **Bas** (Westberg & Kaernefelt 1998, Nimis & Tretiach 1999, Potenza & al. 2010, Brackel 2011), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994, 1995, Ottonello & al. 1994, Ottonello 1996, Brackel 2008b, Gianguzzi & al. 2009).

Cr.pl/ Ch/ S/ Terr/ pH: 4-5, L: 4-5, X: 4-5, E: 2-3/ Alt: 1-2/ SmedD: r, SmedH: rr, MedH: rc, MedD: rc/ PT: 1/ Note: a mainly Mediterranean lichen found on rock, especially in fissures, more rarely on soil in dry grasslands, with optimum in the Mediterranean belt.

Gyalolechia pruinosa Körb.

Ver. zool.-bot. Ges. Wien, 17: 703, 1867.

Syn.: *Caloplaca aurea* f. *rupicola* (Arnold) Zahlbr., *Caloplaca pruinosa* (Körb.) Zahlbr., *Fulgensia pruinosa* var. *fissiseda* Poelt, *Fulgensia pruinosa* (Körb.) Poelt

N - TAA, Lomb. C - Abr.

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 4-5, X: 3, E: 1-3/ Alt: 4-5/ Alp: r, Salp: vr/ PT: 1/ u/ Note: on steeply inclined to underhanging faces of calcareous rocks, mostly in fissures, sometimes on epilithic bryophytes, with optimum above treeline; var. *fissiseda* grows on the top of birds' perching boulders.

Gyalolechia subbracteata (Nyl.) Söchting, Frödén & Arup

in Arup & al., Nord. J. Bot., 31: 72, 2013 - *Lecanora subbracteata* Nyl., Flora, 66: 534, 1883.

Syn.: *Caloplaca subbracteata* (Nyl.) Lettau, *Fulgensia subbracteata* (Nyl.) Poelt

N - **VG** (TSB 23280), **Ven** (Thor & Nascimbene 2007), **TAA**, **Piem** (Clerc & al. 1999), **Emil** (Scarpa 1993, Nimis & al. 1996), **Lig** (Westberg & Kaernefelt 1998, Valcuvia & al. 2000). **C** - **Tosc** (Tretiach & al. 2008), **Marc** (Nimis & Tretiach 1999), **Umb** (Nimis & Tretiach 1999, Ravera & al. 2006, Panfili 2007), **Laz**, **Abr** (Nimis & Tretiach 1999, Brackel 2015), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **Sar. S** - **Camp** (Aprile & al. 2002, 2003b, Nimis & Tretiach 2004), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999, Brackel 2011), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994, 1995, Ottonello & al. 1994, 2011, Ottonello 1996, Ottonello & Romano 1997, Gianguzzi & al. 2009, Cataldo & Minissale 2013, 2015).

Cr.pl/ Ch/ A.i/ Terr/ pH: 3-5, L: 4-5, X: 3-4, E: 2-3/ Alt: 1-3/ Mont: rr, SmedD: rc, SmedH: c, MedH: c, MedD: rc/ PT: 1-2/ #/ Note: on calciferous ground, in clearings of grasslands and shrublands, with optimum in the Mediterranean belt. A critical taxon, characterised by schizidia, which, however, also occur in other related species. According to Roux & coll. (2014), it cannot be separated from *G. fulgens*, the schizidia being just a re-generation form from damages to the thallus, but according to Vondrák (*in litt.*), molecular data show that the two taxa are distinct.

Gyalolechia xanthostigmoidea (Räsänen) Söchting, Frödén & Arup

in Arup & al., Nord. J. Bot., 31: 72, 2013 - *Placodium xanthostigmoideum* Räsänen, Ann. Missouri Bot. Gard., 20: 15, 1933.

Syn.: *Caloplaca xanthostigmoidea* (Räsänen) Zahlbr.

N - **Frl** (TSB 35604), **Ven** (Nascimbene 2005c), **TAA** (Nascimbene & al. 2004, 2004b), **Lomb** (Nascimbene 2006), **Piem** (TSB 34550).

Cr/ Ch/ A.s/ Sax-Epiph/ pH: 4-5, L: 4, X: 3, E: 3-4/ Alt: 4-5/ Alp: r, Salp: vr/ PT: 1/ Note: for further details see Vondrák & al. (2016).

Gyrocallema Vain.

Mycologia, 21: 36, 1929.

This very poorly known genus of the Lichinaceae includes 2 species only: *G. scyphuliferum* Vain. and *G. rupestrinum*. Type: *G. scyphuliferum* Vain.

Gyrocallema rupestrinum (Zahlbr.) Henssen

Syst. Ascomycetum, 5: 131, 1986 - *Ginzbergerella rupestrina* Zahlbr., Hedwigia, 71: 208-209, 1931.

C - **Abr**.

Cr/ Cy.f/ S/ Sax/ pH: 4-5, L: 3-4, X: 3-4, E: 1/ Alt: 5/ Alp: er/ PT: 1/ #/ Note: this very poorly understood species is known only from the type material, collected by Ginzberger in the Gran Sasso Massif (central Apennines) on calcareous rocks.

Gyrographa Ertz & Tehler

in Ertz & al., Fungal Divers., 70: 12, 2014.

A molecular analysis of the family Roccellaceae by Ertz & al. (2014) has shown that several traditionally accepted genera are para-/polyphyletic. In order to make these groups monophyletic, eight new genera were proposed, among which *Gyrographa*, to accommodate 2 species formerly included in *Opegrapha*. Type: *G. gyrocarpa* (Flot.) Ertz & Tehler

Gyrographa gyrocarpa (Flot.) Ertz & Tehler

in Ertz & al., Fungal Divers., 70: 42, 2014 - *Opegrapha gyrocarpa* Flot., Flora, 1825: 345, 1825.

Syn.: *Opegrapha gyrocarpa* var. *arenaria* Körb., *Opegrapha rupestris* var. *arenaria* (Körb.) Stein, *Opegrapha rupestris* var. *schisticola* Eitner, *Opegrapha saxicola* var. *gyrocarpa* (Flot.) Stizenb., *Opegrapha saxicola* var. *schisticola* (Eitner) Zahlbr.

N - **Frl** (Tretiach & Hafellner 2000), **Ven**, **TAA** (Hinteregger 1994, Nascimbene 2006c), **Lomb**, **Piem** (TSB 33728), **Emil** (Tretiach & al. 2008), **Lig** (TSB 31061). **C** - **Tosc** (Tretiach & al. 2008), **Sar. S** - **Camp**, **Cal**.

Cr/ Tr/ A.s/ Sax/ pH: 1-3, L: 1-2, X: 1-2, E: 1/ Alt: 2-5/ Alp: er, Salp: vr, Mont: r, SmedH: r/ PT: 1/ suboc, u/ Note: on steeply inclined to underhanging surfaces of siliceous rocks, often within forests in cold-humid situations, more rarely on subacid bark.

Haematomma A. Massal.

Ric. Auton. Lich. Crost.: 32, 1852.

This rather well-defined genus, presently included in the Haematommataceae (see Lumbsch & al. 2008), comprises c. 50 species, with Australia and South America being the main centres of diversity. For a long time, the genus included species which are now ascribed to three different genera: *Haematomma*, *Loxospora*, and *Ophioparma*, the latter two differing from *Haematomma* in their asci, paraphyses, conidiophores (although *Loxospora* has the same type of conidiophores as *Haematomma*), pycnidial and epihymenial

pigments, secondary metabolites, and lichenicolous fungi. Type (conserved): *H. vulgare* A. Massal. (= *H. ochroleucum*).

Haematomma ochroleucum (Neck.) J.R. Laundon var. ***ochroleucum***

Lichenologist, 4: 300, 1970 - *Lichen ochroleucus* Neck., Meth. Muscor.: 52, 1771.

Syn.: *Haematomma coccineum* (Dicks.) Körb., *Haematomma leiphaemium* (Ach.) Zopf, *Haematomma vulgare* A. Massal., *Lecanora haematomma* (Ach.) Röhl. p.p., *Lepra leiphaema* (Ach.) Mérat, *Lepra sulphurea* auct. ital. p.p.

N - VG (TSB 10025), **Fri** (Tretiach 2004), **Ven** (Lazzarin 2000b), **TAA** (Caniglia & al. 2002, Nascimbene & al. 2007b), **Lomb, Piem** (Isocrono & al. 2004, 2005b), **Emil** (Bouvet 2008), **Lig** (Castello & al. 1994, Giordani & al. 2002, Brunialti & Giordani 2003). **C - Tosc** (Loppi 1996, Loppi & De Dominicis 1996, Loppi & al. 1997, 1998b, 2002c, Putortì & Loppi 1999, Tretiach 2004, Loppi & Nascimbene 2010, Paoli & al. 2012), **Umb** (Ravera & al. 2006), **Laz** (Ruisi & al. 2005), **Sar** (Nöske 2000, Zedda 2002, Rizzi & al. 2011, Giordani & al. 2013). **S - Camp** (Ricciardi & al. 2000, Nimis & Tretiach 2004, Garofalo & al. 2010), **Cal** (Puntillo 1996, Incerti & Nimis 2006), **Si**.

Cr/ Ch/ A.s/ Sax-Epiph/ pH: 2-3, L: 3, X: 2-3, E: 1-2/ Alt: 1-3/ Mont: er, SmedD: er, SmedH: c, MedH: rc/ PT: 1-2/ suboc, u/ Note: a mild-temperate species found on steeply inclined to underhanging, somehow rain-protected and shaded surfaces of siliceous rocks, but also on bark; most common, and sometimes very abundant, in Tyrrhenian Italy (e.g. covering vast portions of the north-facing basalt strips of the cathedral of Orvieto).

Haematomma ochroleucum var. ***porphyrium*** (Pers.) J.R. Laundon

Lichenologist, 4: 300, 1970 - *Lichen haematomma* var. *porphyrius* Pers., Ann. Bot. (Usteri), 5: 17, 1794.

Syn.: *Haematomma coccineum* var. *porphyrium* (Pers.) Th. Fr., *Haematomma porphyrium* (Pers.) Zopf, *Lecanora haematomma* Ach. p.p.

N - Ven, TAA (Nascimbene & al. 2007b), **Lomb, Piem** (Isocrono & al. 2004, Isocrono & Piervittori 2008). **C - Tosc** (Loppi & al. 1997b, 1998), **Umb** (Ravera & al. 2006), **Laz** (Ruisi & al. 2005), **Sar** (Monte 1993, Nöske 2000, Rizzi & al. 2011). **S - Camp** (Catalano & al. 2016), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994, Caniglia & Grillo 2006b).

Cr/ Ch/ A.s/ Sax-Epiph/ pH: 2-3, L: 3, X: 2, E: 1-2/ Alt: 1-3/ Mont: er, SmedD: er, SmedH: c, MedH: rc/ PT: 1-2/ suboc, u/ Note: a mild-temperate taxon, much rarer on bark than the typical variety, and perhaps slightly less photophytic.

Halecania M. Mayrhofer

Herzogia, 7: 383, 1987.

This genus of c. 12 species was introduced to accommodate species of *Lecania s.lat.* that differ in having asci with a uniformly amyloid apical dome (*Catillaria*-type), paraphyses with dark brown apical caps, and halonate ascospores; further differences are found in the conidiomata, that are acrogenous and sickle-shaped or curved-filiform in *Lecania*, whereas in *Halecania* they are pleurogenous and shortly rod-shaped. The conidiogenous cells and conidia of *Halecania* are almost identical to those of *Catillaria s.str.*, which suggested that the two genera are related. However, according to Lendemer & Hodkinson (2013) the genus proved to be closely related to *Leprocaulon* in the new family Leprocaulaceae. Type: *H. alpivaga* (Th. Fr.) M. Mayrhofer

Halecania alpivaga (Th. Fr.) M. Mayrhofer

Herzogia, 7: 391, 1987 - *Lecania alpivaga* Th. Fr., Lichenogr. Scand., 1: 292, 1871.

Syn.: *Lecania thallophila* H. Magn.

N - TAA, Lomb.

Cr/ Ch/ S/ Sax/ pH: 3-4, L: 3-4, X: 2-3, E: 2-3/ Alt: 3-5/ Alp: er, Salp: vr, Mont: er/ PT: 1/ paras/ Note: a cool-temperate to arctic-alpine species found on weakly calciferous and basic siliceous rocks in humid situations, mostly in upland areas, often on the thalli of *Physcia*, *Collema* spp., and *Placynthium* spp.; probably more widespread in the Alps.

Halecania elaeiza (Nyl.) M. Mayrhofer

Herzogia, 7: 395, 1987 - *Lecanora elaeiza* Nyl., Flora, 57: 308, 1874.

N - TAA.

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 2-4, X: 2-3, E: 1-2 / Alt: 3-4/ Salp: vr, Mont: er/ PT: 1/ Note: a species with relatively small ascospores (< 15 µm long), found on calcareous rocks in upland areas, altogether rare in central and eastern Europe; the localities are in Austria, but not far from the Italian border.

Halecania lecanorina (Anzi) M. Mayrhofer & Poelt

in Mayrhofer, *Herzogia*, 7: 397, 1987 - *Thalloidima lecanorinum* Anzi, Cat. Lich. Sondr.: 67, 1860.

Syn.: *Diphrotora disparata* (Arnold) Jatta, *Gyalolechia lecanorina* (Anzi) Anzi, *Lecania disparata* (Arnold) Lettau, *Lecania lecanorina* (Anzi) Zahlbr., *Lecaniella disparata* (Arnold) Jatta, *Thalloidima disparatum* Arnold, *Toninia lecanorina* (Anzi) H. Olivier

N - Lomb, Piem (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999).

Cr/ Ch/ S/ Terr/ pH: 4-5, L: 3-4, X: 3, E: 1/ Alt: 4-5/ Alp: er, Salp: vr/ PT: 1/ Note: on thin layers of soil, on mosses and plant debris over calcareous substrata, with optimum near treeline; perhaps more widespread in the Alps, but certainly not common.

Halecania spodomela (Nyl.) M. Mayrhofer

Herzogia, 7: 402, 1987 - *Lecanora spodomela* Nyl., Flora, 59: 572, 1876.

Syn.: *Lecania spodomela* (Nyl.) A.L. Sm., *Lecidea nigrificans* Nyl.

N - Piem.

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4, X: 3, E: 2-3/ Alt: 2-3/ suboc/ Mont: er, SmedD: er/ PT: 1/ paras *Placynthium* spp./ Note: a species resembling *H. alpivaga*, but with a strongly reduced thallus and smaller apothecia, found on siliceous rocks, usually parasitic on *Placynthium*; in western Europe it is mainly coastal, and the central and eastern European historical records are in need of critical re-evaluation.

Harpidium Körb.

Syst. Lich. Germ.: 157, 1855.

The inclusion of this genus, including 3 species, one in Europe the other in North America, in the family Lichinaceae is supported by studies of ascus ultrastructure and ascoma ontogeny that revealed striking similarities with certain members of that family, especially *Pyrenopsis*. *Harpidium* is the only genus of the family with an obligatory green algal photobiont. The Mediterranean and Californian collections indicate a Madrean-Tethyan disjunction of the genus. Type: *H. rutilans* (Flot.) Körb.

Harpidium rutilans Körb.

Syst. Lich. Germ.: 157, 1855.

Syn.: *Zeora rutilans* Flot. *nom. nud.*

N - TAA, S - Si.

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4-5, X: 4, E: 1-2/ Alt: 1-4/ Salp: er, MedD: er/ PT: 1/ Note: on steeply inclined surfaces of siliceous rocks with periodical water seepage after rain, both in the Mediterranean Region and in dry-warm Alpine valleys; perhaps overlooked, but certainly not common.

Helocarpon Th. Fr.

N. Acta Reg. Soc. Sci. Upsal., ser. 3, 3: 278, 1861.

The systematic position of this small genus with 3 species only, often treated as a synonym of *Micarea*, is still an open problem, since the only collection with available sequence data in GenBank, was misidentified (Miadlikowka & al. 2014). The genus is provisionally placed into the Helocarpaceae within the Lecideales (see Jaklitsch & al. 2016). Type: *H. crassipes* Th. Fr.

Helocarpon pulverulum (Th. Fr.) Türk & Hafellner

Carinthia II, 183: 738, 1993 - *Lecidea crassipes* f. *pulverula* Th. Fr., Lichenogr. Scand., 1: 250, 1874.

Syn.: *Helocarpon crassipes* auct. eur. merid. non Th. Fr., *Micarea crassipes* auct. eur. merid. non (Th. Fr.)

Coppins

N - Frl (Tretiaich & Hafellner 2000), Ven (Nascimbene & Caniglia 2003c), TAA (Printzen & Rambold 1995, Caniglia & al. 2002).

Cr/ Ch/ S/ Terr/ pH: 2-3, L: 4, X: 3, E: 1/ Alt: 4-5/ Alp: vr, Salp: r/ PT: 1/ Note: on bryophytes and plant debris on the ground and amongst rocks, in areas with siliceous substrata, with optimum near treeline; probably more widespread in the Alps. The species is heterogeneous; according to Hafellner (2001) all material from at least the eastern Alps is morphologically different from *H. crassipes* s.str., and belongs instead into *H. pulverulum*.

Henrica B. de Lesd.

Bull. Soc. Bot. France, 21: 206, 1921.

This genus of the Verrucariaceae was first described as monotypic from Italy, to accommodate a species with large, at maturity dark brown, muriform spores (without hymenial algae) which showed an aberrant morphology: ascomata sitting on a thalline cushion extended to a "stalk". The genus, which now includes 4 species, has been recently emended by Savić & Tibell (2008): features regarded as characteristic, such as a squamulose thallus, double-walled perithecia and dark muriform ascospores do not supply a basis for the recognition of *Henrica*, not even in combination, the genus being primarily based on genetic differences (see also Ekman & al. 2009). Type: *H. ramulosa* B. de Lesd. (= *H. theleodes*).

Henrica melaspora (Taylor) Savić & Tibell

Nord. J. Bot., 26: 243, 2008 - *Verrucaria melaspora* Taylor in Hooker, London J. Bot., 6: 153, 1847.

Syn.: *Polyblastia melaspora* (Taylor) Zahlbr., *Polyblastia plotocarpa* Zschacke?, *Polyblastia scotinospora* (Nyl.) Hellb., *Polyblastia subinumbrata* (Nyl.) A.L. Sm.

N - TAA, Piem.

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 2-3, X: 2-3, E: 1/ Alt: 4-5/ Alp: vr, Salp: vr/ PT: 1/ Note: on siliceous to somewhat calcareous, wet rocks in open situations, often on slate, usually along rivers or by lakeshores or on pebbles at least intermittently flushed with running water, near or above treeline.

Henrica theleodes (Sommerf.) Savić, Tibell & Nav.-Ros.

in Savić & Tibell, Nord. J. Bot., 26: 244, 2008 - *Verrucaria theleodes* Sommerf. Suppl. Fl. Lapp.: 140, 1826.

Syn.: *Henrica ramulosa* B. de Lesd.

N - TAA, Lomb, Piem, VA (Piervittori & Isocrono 1999).

Frut/ Ch/ S/ Sax/ pH: 3, L: 4, X: 3, E: 1/ Alt: 5/ Alp: vr, Salp: er/ PT: 1/ Note: in niches and fissures of humid calcareous schists and granodiorite, usually along rivers or by lakeshores, often occurring together with cyanobacterial lichens, usually above treeline; known from Scandinavia, Iceland, Greenland, the Alps and the Pyrenees, and from Colorado in North America.

Heppia A. Massal.

Nägeli ex A. Massal., Geneac. Lich.: 7, 1854.

This genus, including *c.* 7 species occurring on soil in arid environments, forms a well-supported monophyletic entity differing from most members of the Lichinaceae only in the subgelatinous, corticate thallus with a vertical hyphal arrangement, and an ascoma primordium consisting of strictly vertically oriented generative hyphae (Schultz & Büdel 2003). Type: *H. urceolata* (Schaer.) Nägeli (= *H. adglutinata*).

Heppia adglutinata (Kremp.) A. Massal.

Geneac. Lich.: 8, 1854 - *Lecanora adglutinata* Kremp., Flora, 24: 675, 1851.

Syn.: *Heppia monguillonii* Harm., *Heppia urceolata* (Schaer.) Nägeli, *Heppia virescens* (Mont.) Nyl., *Nylanderopsis salevensis* Gyeln., *Solorina virescens* Mont.

N - Piem (Rabenhorst Lich. Eur. 610: Henssen 1994). **C - Sar** (TSB 21722). **S - Si** (Cataldo & Minissale 2015).

Sq/ Cy.h/ S/ Terr/ pH: 3-4, L: 4, X: 3, E: 1-2/ Alt: 2-4/ Alp: er, Salp: vr, Orom: er, Mont: vr/ PT: 1/ p/ Note: a cool-temperate to boreal-montane, circumpolar, ephemeral lichen of disturbed calciferous soil in dry, open grasslands; some records of *H. lutosa* might belong here.

Heppia despreauxii (Mont.) Tuck.

Gen. Lich.: 46, 1872 - *Solorina despreauxii* Mont., Hist. Nat. Isl. Canar., 3: 104, 1840.

Syn.: *Heppia gigantea* Egea & Llimona, *Heppia paulina* Marton, *Psora lobatoplicata* B. de Lesd.

N - Lig.

Sq/ Cy.h/ S/ Terr/ pH: 3, L: 4-5, X: 4-5, E: 1-2/ Alt: 1/ MedH: r, MedD: vr/ PT: 1/ subc/ Note: the Italian record is the northernmost known for this Mediterranean-Macaronesian lichen growing on clay soil in dry, open grasslands. According to Timdal (*in litt.*) *Psora lobatoplicata* is a likely synonym of this species.

Heppia lutosa (Ach.) Nyl.

Syn. Meth. Lich., 2: 45, 1863 - *Collema lutosum* Ach., Syn. Meth. Lich.: 309, 1814.

Syn.: *Collema sanguinolentum* (Kremp.) Stizenb., *Heppia atlantica* Gyeln.

N - Frl, Ven (Nascimbene & Caniglia 2003c), **TAA, Lomb, Piem** (E.C.I. 568: Roux & Triebel 1994, Isocrono & al. 2003), **VA** (Piervittori & Isocrono 1999), **Lig. C - Tosc, Sar. S - Cal** (Puntillo 2011).

Sq/ Cy.h/ S/ Terr/ pH: 3-4, L: 4, X: 4, E: 1/ Alt: 1-2/ SmedD: vr, SmedH: vr, MedH: vr, MedD: r/ PT: 1/ subc/ Note: a mainly Mediterranean-Atlantic lichen found on more or less calciferous soil in dry grasslands below the montane belt; it was often confused, in the older literature, with *H. adglutinata*, which is bound to upland areas.

Heppia solorinoides (Nyl.) Nyl.

Syn. Meth. Lich., 2: 46, 1863 - *Lecanora solorinoides* Nyl., Mém. Soc. Sc. Nat. Cherbourg, 2: 323, 1854.

Syn.: *Endocarpon reticulatum* Dufour nom. illegit., *Heppia reticulata* (Nyl.) Nyl.

C - Tosc (TSB 35171). **S - Pugl** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Caniglia & Grillo 2001, 2005, 2006, Grillo & Caniglia 2004, 2005, Cataldo & Minissale 2013, 2015).

Sq/ Cy.h/ S/ Terr/ pH: 4-5, L: 4-5, X: 4-5, E: 1-2/ Alt: 1/ MedH: er, MedD: r/ PT: 1/ subc/ Note: on clay or sandy-clay soil, restricted to very dry grasslands in Mediterranean Italy.

Hertelidea Printzen & Kantvilas

Bibl. Lichenol., 88: 541, 2004.

This genus, that now includes 5 species and is placed in the Stereocaulaceae (see Kantvilas & Elix 2006), was introduced to accommodate an assemblage of small crustose lichens with simple spores generally known as the *Lecidea botryosa*-group, which differ from *Lecidea s.str.* in several important characters, such as the

apothecia often growing in clusters, the persistent, cup-shaped apothecial margin, and the presence of *Micarea*-type asci. Type: *H. botryosa* (Fr.) Printzen & Kantvilas

Hertelidea botryosa (Fr.) Printzen & Kantvilas

Bibl. Lichenol., 88: 542, 2004 - *Biatora botryosa* Fr., K. Svenska Vetensk.-Akad. Handl.: 268, 1822.

Syn.: *Lecidea botryosa* (Fr.) Th. Fr.

N - Frl (TSB 15074), **Lomb, VA** (Piervittori & Isocrono 1999). **C - Tosc, Abr** (Recchia & Villa 1996).

Cr/ Ch/ S/ Lign-Epiph/ pH: 1-2, L: 3-4, X: 3, E: 1/ Alt: 3-4/ Salp: rr, Mont: vr/ PT: 1/ Note: a probably circumboreal-montane to cool-temperate lichen found on lignum, often on burnt trunks of conifers and *Quercus*, more rarely on acid bark, usually in upland areas but below treeline.

Heterodermia Trevis.

Atti Soc. Ital. Sc. Nat. Milano, 11: 613, 1868.

In the traditional circumscription, this was a subcosmopolitan genus of the Physciaceae with *c.* 100 species, most diverse in warm-temperate to subtropical and tropical regions, mainly in the Southern Hemisphere. A recent phylogenetic study by Mongkolsuk & al. (2015) retains the genus *Heterodermia* only for species with a lower cortex and *Pachysporaria*-type ascospores (without sporoblastidia), while the other species are segregated in the new genera *Leucodermia* Kalb, with foliose to subfruticose, linear-elongate, ribbon-like, dichotomously branched and loosely attached lobes without a lower cortex and *Polyblastidium*-type ascospores (with sporoblastidia), and *Polyblastidium* Kalb, with a foliose thallus attached to the substrate, no lower cortex and mostly *Polyblastidium*-type ascospores. The remaining species are assigned to groups without a formal generic name, awaiting further study, the *H. comosa*-group, and the *H. obscurata*-group that contains species with a cottony-woolly lower surface which is impregnated by anthraquinones. These results were confirmed by Diaz-Escandon & Lücking (2016) in Colombia, who found that the *H. obscurata* group was supported as sister to *Heterodermia s.str.*, both closely related to *Polyblastidium* and the *H. comosa* group, sister of *Leucodermia*. A study by Lücking & al. (2008) showed that the use of both medullary chemistry and underside pigmentation for the distinction of species is supported, which is in contrast to concepts used in some recent treatments of the genus. Type: *H. speciosa* (Wulfen) Trevis.

Heterodermia obscurata (Nyl.) Trevis.

N. Giorn. Bot. Ital., 1: 114, 1869 - *Physcia speciosa* subsp. *obscurata* Nyl., Acta Soc. Sci. Fenn., 7: 440, 1863.

Syn.: *Anaptychia hypoleuca* auct. p.p. non (Muhl.) A. Massal., *Anaptychia obscurata* (Nyl.) Vain., *Anaptychia sorediifera* (Müll. Arg.) Du Rietz & Lynge, *Heterodermia hypoleuca* auct. p.p., *Pseudophyscia hypoleuca* auct. p.p.

N - Ven (Nascimbene & Caniglia 2000), **TAA** (B-Leg. H. Sipman nr. 8585), **Lig** (Castello & al. 1994, Brunialti & Giordani 2000, 2003, Giordani & al. 2001, 2002, Giordani 2006, Giordani & Incerti 2008, Watson 2014). **C - Tosc** (Loppi & al. 1999a, Laganà & al. 2002, Lorenzini & al. 2003, Loppi & Frati 2006, Brunialti & Frati 2010, Brunialti & al. 2012b, Paoli & al. 2012, Benesperi & al. 2013), **Umb** (Ravera 2000, Panfili 2000, Ravera & al. 2006), **Laz** (Bartoli & al. 1997, Ravera 2001, Massari & Ravera 2002, Stofer 2006, Munzi & al. 2007), **Mol** (Frati & al. 2004, Caporale & al. 2008, Paoli & al. 2015), **Sar** (Zedda 2002). **S - Camp** (Nimis & Tretiach 2004, Nascimbene & al. 2010b, Brunialti & al. 2013, Ravera & Brunialti 2013), **Cal** (Puntillo 1996, Incerti & Nimis 2006).

Fol.n/ Ch/ A.s/ Epiph/ pH: 2-3, L: 4, X: 2, E: 1-3/ Alt: 1-2/ SmedD: er, SmedH: rr, MedH: rc/ PT: 1-2/ suboc/ Note: a mild-temperate species found on more or less isolated trees, occasionally on epilithic mosses; mainly Tyrrhenian, and also found in urban areas (e.g. at La Spezia). See also note on *Polyblastidium subneglectum*. The species will be probably soon transferred to another genus (see note on *Heterodermia*).

Heterodermia speciosa (Wulfen) Trevis.

Atti Soc. Ital. Sc. Nat. Milano, 11: 614, 1868 - *Lichen speciosus* Wulfen in Jacquin, Coll. Bot., 3: 119, 1791.

Syn.: *Anaptychia speciosa* (Wulfen) A. Massal., *Parmelia speciosa* (Wulfen) Ach., *Physcia speciosa* (Wulfen) Nyl.

N - Frl (Tretiach 1993), **Ven** (Tretiach 1993, Lazzarin 1997, Nascimbene & al. 2007, 2009c), **TAA** (Nascimbene 2001b, Nascimbene & al. 2007b, Nimis & al. 2015), **Lomb** (Philippi 1983 Tretiach 1993), **Piem** (Tretiach 1993, Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999), **Emil, Lig** (Brunialti & al. 2001). **C - Tosc** (Tretiach 1993), **Marc, Abr** (Nimis & Tretiach 1999), **Laz, Sar** (Zedda 2002, Rizzi & al. 2011). **S - Camp** (Aprile & al. 2003b), **Cal** (Tretiach 1993, Puntillo 1996), **Si** (Nimis & al. 1994).

Fol.n/ Ch/ S/ Epiph/ pH: 2-3, L: 3-4, X: 1-2, E: 1-2/ Alt: 1-3/ Mont: vr, SmedD: er, SmedH: vr/ PT: 1/ suboc/ Note: a temperate species found on bark, epiphytic bryophytes, sometimes on mossy rocks in humid, mostly montane woodlands. It is included in the Italian red list of epiphytic lichens as "Near-threatened" (Nascimbene & al. 2013c).

Heteroplacidium Breuss

Ann. naturhist. Mus. Wien, 98 (suppl.): 40, 1996.

A segregate from *Placidium* including *c.* 9 species characterised by clavate asci, biseriate ascospores and a less differentiated thallus anatomy, growing on soil and rock in warm-temperate regions. The close molecular

relationship of *Heteroplacidium* and *Placidium* found by Prieto & al. (2012) is in accordance with the traditional, morphologically and anatomically based classification. Although both genera are very closely related, molecular data support their distinction as monophyletic entities, with a few minor taxonomic adjustments. Type: *H. imbricatum* (Nyl.) Breuss

Heteroplacidium compactum (A. Massal.) Gueidan & Cl. Roux

Bull. Inf. Ass. Franç. Lichén., 33, 1: 25, 2008 - *Placidium compactum* A. Massal., Miscell. Lichenol.: 32, 1856.

Syn.: *Catapyrenium compactum* (A. Massal.) R. Sant., *Dermatocarpon compactum* (A. Massal.) Lettau, *Dermatocarpon compactum* var. *euryssporum* Lettau, *Dermatocarpon crassulum* (Müll. Arg.) Zahlbr., *Endopyrenium crassulum* Müll. Arg., *Rhodocarpon compactum* (A. Massal.) Lönnr., *Verrucaria compacta* (A. Massal.) Jatta

N - VG, TAA (Spitale & Nascimbene 2012), **Piem** (Isocrono & al. 2004), **Lig** (Breuss 1994). **C - Sar** (Breuss 1994). **S - Si**.

Cr/ Ch/ S/ Sax/ pH: 3-5, L: 4, X: 4, E: 3-4/ Alt: 3-4/ Salp: er, Orom: er, Mont: vr/ PT: 1/ #/ Note: on more or less calcareous rocks, sometimes on other crustose lichens, but not parasitic, usually in upland areas but below treeline. This name probably includes several taxa related to *H. fusculum*, whose taxonomic status is in need of clarification

Heteroplacidium contumescens (Nyl.) Breuss

Ann. naturhist. Mus. Wien, 98B: 40, 1996 - *Endocarpon contumescens* Nyl., Flora, 61: 341, 1878.

Syn.: *Catapyrenium contumescens* (Nyl.) Breuss, *Dermatocarpon contumescens* (Nyl.) Zahlbr.

N - Lig (Alonso & Egea 1994).

Sq/ Ch/ S/ Terr-Sax/ pH: 3-4, L: 4-5, X: 4-5, E: 1/ Alt: 1-2/ SmedD: vr, MedH: r, MedD: vr/ PT: 1/ Note: on steeply inclined to underhanging surfaces of base-rich or calciferous rocks, sometimes on soil in rock fissures, mostly in warm-dry situations, e.g. in grasslands and garrigues; perhaps more widespread in Mediterranean Italy.

Heteroplacidium divisum (Zahlbr.) Breuss

Ann. naturhist. Mus. Wien, 98B: 40, 1996 - *Dermatocarpon divisum* Zahlbr., Österr. bot. Z., 59: 349, 1909.

Syn.: *Catapyrenium divisum* (Zahlbr.) Breuss

N - Ven (Breuss 1996), **Lig**.

Sq/ Ch/ S/ Terr/ pH: 3, L: 4-5, X: 4, E: 1-2/ Alt: 1-2/ SmedD: vr, SmedH: vr, MedH: r/ PT: 1/ Note: a Mediterranean species recalling *H. imbricatum* but with much thinner and strongly divided squamules, found on base-rich soil over siliceous substrata in dry sites; hitherto known only from southern Europe (Italy, SE Spain, Balkan Peninsula).

Heteroplacidium fusculum (Nyl.) Gueidan & Cl. Roux

Mycol. Res., 111: 1157, 2007 - *Verrucaria fuscula* Nyl., Bot. Not.: 161, 1853.

Syn.: *Dermatocarpon insulare* (A. Massal.) Mig., *Dermatocarpon nantianum* (H. Olivier) Zahlbr., *Encliopyrenia fuscula* (Nyl.) Trevis., *Endocarpon insulare* (A. Massal.) A. Massal., *Endopyrenium insulare* (A. Massal.) Dalla Torre & Sarnth., *Placidium insulare* A. Massal., *Placidium iranicum* Szatala, *Verrucaria insularis* (A. Massal.) Jatta

N - VG, Frl, Ven (Lazzarin 2000b), **TAA, Lomb, Piem, Lig** (Lich. Alpium 261: Breuss 1994, Giordani & al. 2016). **C - Tosc** (Benesperi 2000a), **Marc** (Nimis & Tretiach 1999), **Umb** (Nimis & Tretiach 1999, Ravera & al. 2006, Panfili 2007), **Laz** (TSB 32427), **Abr** (Nimis & Tretiach 1999), **Mol** (Garofalo & al. 1999, Nimis & Tretiach 1999, Caporale & al. 2008, Ravera & al. 2009, Genovesi & Ravera 2014), **Sar** (Breuss 1994). **S - Camp** (Garofalo & al. 1999, 2010, Aprile & al. 2003, 2003b, Nimis & Tretiach 2004), **Pugl** (Garofalo & al. 1999, Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Breuss 1994, Puntillo 1996), **Si** (Breuss 1994, Nimis & al. 1994, 1995, Grillo & Caniglia 2004, Caniglia & Grillo 2005, 2006).

Cr/ Ch/ S/ Sax/ pH: 5, L: 4-5, X: 3-4, E: 3-4/ Alt: 1-3/ Mont: r, SmedD: ec, Pad: er, SmedH: ec, MedH: vc, MedD: rr/ PT: 1-2/ paras *Circinaria calcarea s.lat./* Note: a species with a crustose-areolate, dark brown thallus but otherwise with a *Heteroplacidium* anatomy, growing parasitically on taxa of the *Circinaria calcarea*-group, but finally often becoming independent, on calcareous rocks; widely distributed and fairly common in the Mediterranean Region, with some outposts in central Europe.

Heteroplacidium imbricatum (Nyl.) Breuss

Ann. naturhist. Mus. Wien, 98B: 40, 1996 - *Endocarpon imbricatum* Nyl., Bot. Not.: 161, 1853.

Syn.: *Catapyrenium imbricatum* (Nyl.) Clauzade & Cl. Roux, *Dermatocarpon imbricatum* (Nyl.) Zahlbr., *Endopyrenium imbricatum* (Nyl.) Boistel

N - VG, Frl (TSB 3062), **Ven, Lig, C - Tosc, Umb** (Genovesi & al. 2001, Ravera & al. 2006), **Sar, S - Camp** (Nimis & Tretiach 2004), **Si** (Nimis & al. 1996b, Grillo & Caniglia 2004, Caniglia & Grillo 2005, Cataldo & Minissale 2015).

Sq/ Ch/ S/ Terr-Sax/ pH: 4-5, L: 3-4, X: 3, E: 1-2/ Alt: 1-2/ SmedD: er, SmedH: r, MedH: rr, MedD: vr/ PT: 1/ Note: in fissures of hard calcareous rocks and amongst mosses, especially limestone, in rather sheltered situations, at low elevations.

Heteroplacidium zamenhofianum (Clauzade & Cl. Roux) Cl. Roux

in Roux & al., Bull. Soc. linn. Provence, 60: 172, 2009 - *Verrucaria zamenhofiana* Clauzade & Cl. Roux, Bull. Soc. Bot. Centre-Ouest, n. sér., nr. spéc. 7: 823, 1985.

Syn.: *Dermatocarpon compactum sensu* Clauzade & Rondon

N - Frl (vidi!), **Ven** (Nimis 1994), **TAA**, **Piem** (TSB 34795), **VA** (TSB 29429), **Lig**.

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 4, X: 3, E: 3/ Alt: 4-5/ Alp: rc, Salp: rr/ PT: 1/ paras *Staurothele areolata*
Note: a species with a crustose, dark brown thallus with incised to sublobate areoles, growing on taxa of the *Staurothele areolata*-group on slightly inclined to subhorizontal surfaces of calcareous rocks in upland areas; widely distributed in Europe and North America, as well as in the Alps, it is easy to overlook due to the thalli of host and parasite being concolorous. To be looked for in the central Apennines.

H u n e c k i a S.Y. Kondr., Elix, Kärnefelt, A. Thell & J.-S. Hur
Acta Bot. Hungarica 56: 102, 2014.

This genus segregated from *Caloplaca* is similar to *Blastenia*, but differs in having ascospores with very thick cell walls at the poles, and/or in its secondary chemistry. The genus apparently occupies an isolated position within the phylogenetic tree of the subfamily Caloplacoideae in the Teloschistaceae. At present, it includes 2 species, the Northern Hemisphere *H. pollinii* and the Australian *H. rheinigeri*. Type: *H. pollinii* (A. Massal.) S.Y. Kondr. & al.

Huneckia pollinii (A. Massal.) S.Y. Kondr., Elix, Kärnefelt, A. Thell, J. Kim, A.S. Kondratiuk & J.-S. Hur
Acta Bot. Hungarica 56: 111, 2014 - *Blastenia pollinii* A. Massal., Flora, 35: 575, 1852.

Syn.: *Blastenia ferruginea* var. *versicolor* Caldesi, *Callospisma ferrugineum* var. *pollinii* (A. Massal.) Bagl., *Callospisma pollinii* (A. Massal.) Trevis., *Caloplaca pollinii* (A. Massal.) Jatta, *Lecanora nigricans* Nyl., *Lecanora phaeocarpella* Nyl., *Lecidea ferruginea* var. *versicolor sensu* Garov., *Lecidea gibberosa* Pollini non Ach., *Placodium phaeocarpellum* (Nyl.) A.L. Sm., *Placodium pollinii* (A. Massal.) A.L. Sm.

N - VG, Frl, Ven (Lazzarin 2000b), **Lomb, Piem** (Isocrono & al. 2004), **Emil, Lig** (Giordani & al. 2002, Brunialti & Giordani 2003, Giordani 2006, Giordani & Incerti 2008, Watson 2014). **C - Tosc** (Loppi & Frati 2006, Brunialti & Frati 2010), **Umb** (Ravera 1998, Ravera & al. 2006), **Laz** (Bartoli & al. 1997, Massari & Ravera 2002), **Mol** (Caporale & al. 2008, Paoli & al. 2015), **Sar** (Rizzi & al. 2011). **S - Camp** (Nimis & Tretiach 2004), **Pugl, Bas** (Paoli & al. 2006), **Si** (Grillo & Carfi 1997, Grillo & Caniglia 2004, Merlo 2004b, Liistro & Cataldo 2011).

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 4-5, X: 3-4, E: 2-3/ Alt: 1-2/ SmedD: er, SmedH: er, MedH: er, MedD: er/ PT: 1/ Note: a warm-temperate species found mostly on the smooth bark of trees such as *Alnus* along rivers; apparently much more common in the past and presently extinct over much of its former range. It is included in the Italian red list of epiphytic lichens as "Near-threatened" (Nascimbene & al. 2013c).

H y d r o p u n c t a r i a C. Keller, Gueidan & Thüs
in Gueidan & al., Taxon, 58: 193, 2009.

Recent molecular phylogenetic analyses and morphological studies have shown that it is necessary to revise the current morphology-based generic delineation of the Verrucariaceae in order to account for evolutionary relatedness between species. Consequently, several genera were recently described or resurrected, and others were re-circumscribed (see Gueidan & al. 2009). One of the recently-created genera is *Hydropunctaria*, including c. 8 amphibious species with small to medium sized ascospores and the frequent formation of carbonaceous structures in the thallus with a punctiform to column-like appearance. The genus is still very poorly known in Italy, and there is evidence that, at least in marine species, several semi-cryptic species still await to be discovered (Orange 2012, 2013). Type: *H. maura* (Wahlenb.) C. Keller, Gueidan & Thüs

Hydropunctaria adriatica (Zahlbr.) Orange

Lichenologist, 44: 305, 2012 - *Dermatocarpon adriaticum* Zahlbr., Ann. Mycol., 2: 267, 1904.

N - VG, Ven, S - Pugl (Nimis & Tretiach 1999).

Cr/ Ch/ S/ Sax/ pH: 3-5, L: 3-4, X: 1, E: 1/ Alt: 1/ MedH: r, MedD: r/ PT: 1/ coast, #/ Note: a rather poorly known species of maritime, mostly calcareous rocks in the supralittoral zone. See also note on *H. amphibia*.

Hydropunctaria amphibia (Ach.) Cl. Roux

in Roux & al., Bull. Soc. linn. Provence, num. spéc. 14: 108, 2011 - *Verrucaria amphibia* Clemente ex Ach., Syn. Meth. Lich.: 94, 1814.

Syn.: *Verrucaria symbalana* Nyl.

N - Ven, Lig, C - Tosc, Sar, S - Camp, Cal (Puntillo 1996), **Si** (Nimis & al. 1994, Ottonello & Salone 1994, Ottonello & al. 1994, Grillo 1998, Grillo & Caniglia 2004).

Cr/ Ch/ S/ Sax/ pH: 2-5, L: 3-4, X: 1, E: 1/ Alt: 1/ MedH: r, MedD: r/ PT: 1/ coast/ Note: on maritime rocks. The whole complex of the Mediterranean-Atlantic brown maritime *Hydropunctaria*-species badly needs revision in Italy, but this is perhaps the most common species of the genus along the Italian coasts, occurring on both siliceous and calcareous rocks.

Hydropunctaria ligurica (Zschacke) Cl. Roux

Cat. Lich. France: 1314, 2015, *comb. inval.* - *Verrucaria ligurica* Zschacke, Hedwigia, 65: 47, 1924.

N - Lig.

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 3-4, X: 1, E: 1/ Alt: 1/ MedH: r, MedD: r/ PT: 1/ coast, #/ Note: a poorly known species of coastal calcareous rocks in the supralittoral zone, described from Liguria and also reported from southern France (Roux & coll. 2014).

Hydropunctaria maura (Wahlenb.) C. Keller, Gueidan & Thüs

Taxon, 58: 194, 2009 - *Verrucaria maura* Wahlenb. in Ach., Meth. Lich.: 19, 1803.

Syn.: *Verrucaria haeyrenii* Erichsen, *Verrucaria malmei* Servít, *Verrucaria scotina* Wedd., *Verrucaria trachinodes* Norman, *Verrucaria zschackeana* Erichsen

N - Lig (Watson 2014, Giordani & al. 2016). **C - Tosc, Sar** (Rizzi & al. 2011).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 3-4, X: 1, E: 1/ Alt: 1/ MedH: r, MedD: r/ PT: 1/ coast/ Note: this heterogeneous maritime species is most common along the Atlantic coasts, becoming very rare in the Mediterranean area, where it seems to be confined to siliceous substrata in the supralittoral belt; Italian records need confirmation. The recent records from Tuscany by Pasquinelli & al. (2009), and Pasquinelli & Puccini (2010), judging from the pictures, most probably refer to *Verrucaria nigrescens*.

Hydropunctaria rheitrophila (Zschacke) C. Keller, Gueidan & Thüs

Taxon, 58: 194, 2009 - *Verrucaria rheitrophila* Zschacke, Hedwigia, 67: 67, 1922.

Syn.: *Verrucaria cinereolutescens* Zschacke, *Verrucaria kernstockii* Zschacke, *Verrucaria minutipuncta* Erichsen, *Verrucaria sagedioides* Servít, *Verrucula rheitrophila* (Zschacke) M. Choisy

N - Ven (S-L12313), **TAA** (Nascimbene & al. 2007b).

Cr/ Ch/ S/ Sax/ pH: 2-4, L: 2-4, X: 1, E: 1/ Alt: 3-5/ Alp: er, Salp: vr, Mont: vr/ PT: 1/ 1/ Note: on both siliceous and calcareous rocks in cold, fast-running streams, in permanently submerged to frequently wetted places; widespread in the Holarctic region and also known from the Southern Hemisphere, the species is widely distributed in the Alps, but not common.

Hymenelia Kremp.

Flora, Jena, 35: 25, 1852.

In spite of careful numerical taxonomic studies, the characters of *Hymenelia*, *Ionaspis* and *Eiglera* overlap considerably; the type of photobiont, which in the past was used to separate *Hymenelia* from *Ionaspis*, is now considered as irrelevant for their separation (see Lutzoni & Brodo 1995). The genus, which currently comprises c. 25 species, is now placed in the Hymeneliaceae. Type: *H. prevostii* (Duby) Kremp.

Hymenelia coerulea A. Massal.

Symmicta Lich.: 25, 1855.

Syn.: *Aspicilia coerulea* (A. Massal.) Dalla Torre & Sarnth., *Hymenelia hiascens* A. Massal., *Hymenelia prevostii* var. *coerulescens* Kremp., *Lecanora cantiana* (Garov.) Zahlbr., *Lecanora coerulea* (A. Massal.) Nyl., *Lecanora pseudocoerulea* Zahlbr., *Manzonia cantiana* Garov.

N - Frl (TSB 3751), **Ven** (Nascimbene & Marini 2007), **TAA** (Nascimbene 2008b, Spitale & Nascimbene 2012), **Lomb. C - Marc** (Nimis & Tretiach 1999), **Abr** (Nimis & Tretiach 1999).

Cr.end/ Ch/ S/ Sax/ pH: 5, L: 3, X: 3, E: 1/ Alt: 2-5/ Alp: ec, Salp: rr, Orom: vr, Mont: er, SmedD: er/ PT: 1/ Note: on steeply inclined surfaces of hard calciferous rocks, including moderately dolomitic, hard limestone; certainly widespread and locally abundant throughout the Alps, with optimum in the montane and subalpine belts; the record from Abruzzo is the southernmost known in Italy. The records from Campania by Aprile & al. (2003b) are from low altitudes, and appear dubious to me.

Hymenelia cyanocarpa (Anzi) Lutzoni

in Lutzoni & Brodo, Bryologist, 20: 250, 1995 - *Aspicilia cyanocarpa* Anzi, Comm. Soc. Critt. Ital., 1, 3: 145, 1862.

Syn.: *Ionaspis cyanocarpa* (Anzi) Th. Fr.

N - TAA (Nascimbene & al. 2007b), **Lomb.**

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 3-4, X: 1-2, E: 1/ Alt: 4-5/ Alp: r, Salp: vr/ PT: 1/ 1/ Note: on periodically inundated, hard siliceous rocks, with optimum above treeline: probably more widespread in the Alps.

Hymenelia epulotica (Ach.) Lutzoni

in Lutzoni & Brodo, Bryologist, 20: 250, 1995 - *Gyalecta epulotica* Ach., Lichenogr. Univ.: 151, 1810.

Syn.: *Aspicilia epulotica* (Ach.) Anzi, *Hymenelia lithofraga* A. Massal., *Ionaspis epulotica* (Ach.) Blomb. & Forssell, *Pinacisca epulotica* (Ach.) Trevis.

N - Frl, Ven (Nascimbene 2005c), **TAA** (Nascimbene 2008b), **Lomb, Piem, Lig. C - Marc** (Nimis & Tretiach 1999), **Sar. S - Camp** (Garofalo & al. 1999, 2010, Aprile & al. 2003b), **Bas** (Puntillo & al. 2012), **Pugl** (Garofalo & al. 1999), **Cal** (Puntillo 1996).

Cr/ Ch/ S/ Sax/ pH: 3-5, L: 3, X: 2-3, E: 1/ Alt: 2-5/ Alp: vr, Salp: r, Orom: rr, Mont: rr, SmedD: vr, SmedH: vr/ PT: 1/ Note: an arctic-alpine to cool-temperate, circumpolar species found on hard, compact

calcareous rocks, such as limestone, dolomite, calcareous schists, in sheltered-humid situations; most frequent in the Alps, but reaching south to Calabria along the Apennines.

Hymenelia heteromorpha (Kremp.) Lutzoni

in Lutzoni & Brodo, Syst. Bot., 20: 250, 1995 - *Aspicilia cinereorufescens* var. *heteromorpha* Kremp., Denkschr. bot. Ges. Regensburg, 4, 2: 175, 1861.

Syn.: *Ionaspis annularis* H. Magn., *Ionaspis heteromorpha* (Kremp.) Arnold, *Ionaspis ochracella* (Nyl.) H. Magn., *Ionaspis reducta* H. Magn., *Ionaspis rhodopis* var. *melanopsis* (Sommerf.) Zahlbr., *Ionaspis schismatopsis* (Nyl.) Hue

N - Ven (Nimis 1994), **TAA, Lomb** (UPS-L-166762), **Piem** (TSB 34612).

Cr/ Ch/ S/ Sax/ pH: 3-5, L: 3, X: 2-3, E: 1/ Alt: 3-5/ Alp: vr, Salp: rr, Mont: r/ PT: 1/ Note: a probably holarctic species found on dolomite and hard limestone in rather sheltered situations, with optimum near treeline.

Hymenelia melanocarpa (Kremp.) Arnold

Flora, 52: 255, 1869 - *Hymenelia prevostii* var. *melanocarpa* Kremp., Flora, 35: 25, 1852.

Syn.: *Ionaspis cyrtaspis* auct. non (Wahlenb.) Arnold, *Ionaspis melanocarpa* (Kremp.) Arnold, *Lecanora prevostii* f. *melanocarpa* (Kremp.) Stizenb.

N - Frl, Ven (Nimis 1994, Nascimbene & Marini 2007, Nascimbene 2008c), **TAA** (Nascimbene & al. 2006), **Piem** (Isocrono & al. 2004), **Lig. C - Marc** (Nimis & Tretiach 1999).

Cr/ Ch/ S/ Sax/ pH: 5, L: 3, X: 2, E: 1/ Alt: 3-5/ Alp: rc, Salp: rr, Orom: vr, Mont: vr/ PT: 1/ Note: a mainly arctic-alpine, circumpolar species, most common on hard, compact calciferous rocks in upland areas; probably widespread throughout the Alps, very rare in the Apennines.

Hymenelia prevostii (Duby) Kremp.

Flora, 35: 25, 1852 - *Urceolaria prevostii* Fr. ex Duby, Bot. Gall., 2: 671, 1830.

Syn.: *Aspicilia prevostii* (Duby) Anzi, *Ionaspis prevostii* (Duby) Arnold, *Lecanora lithofraga* (A. Massal.) Jatta, *Lecanora prevostii* (Duby) Th. Fr.

N - Frl (Cucchi & al. 2009), **Ven** (Nascimbene & Caniglia 2003c), **TAA, Lomb, Piem** (Isocrono & al. 2004), **Lig. C - Tosc** (Tretiach & al. 2008), **Marc** (Nimis & Tretiach 1999), **Umb** (Genovesi & Ravera 2001, Ravera & al. 2006), **Laz** (Nimis & Tretiach 2004), **Mol** (Nimis & Tretiach, 1999, 2004, Caporale & al. 2008), **Sar. S - Camp** (Aprile & al. 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010), **Pugl, Bas** (Nimis & Tretiach 1999), **Si** (Nimis & al. 1994, Grillo & al. 2007).

Cr.end/ Ch/ S/ Sax/ pH: 5, L: 3, X: 2-3, E: 1-2/ Alt: 1-5/ Alp: vr, Salp: r, Orom: vr, Mont: vr, SmedD: er, SmedH: er, MedH: er/ PT: 1/ Note: on hard calcareous rocks, especially compact limestone, most frequent in the Alps, but also present in the Mediterranean mountains, probably occurring throughout the country. According to Roux & coll. (2014), this is just a phycotype of *H. epulotica* with trebuxioid algae.

Hymenelia similis (A. Massal.) M. Choisy

Bull. Mens. Soc. Linn. Lyon, 20: 133, 1951 - *Pinacisca similis* A. Massal., Neagen. Lich.: 5, 1854.

Syn.: *Aspicilia isabellina* De Not. ex Jatta, *Aspicilia similis* (A. Massal.) Anzi, *Ionaspis similis* (A. Massal.) Jatta, *Lecanora carneopallens* Nyl., *Lecanora similis* (A. Massal.) Nyl.

N - Ven (Lazzarin 2000b), **TAA, Lomb, Piem** (Isocrono & al. 2004), **Emil, Lig. C - Tosc, Sar. S - Camp** (Garofalo & al. 1999), **Si** (Nimis & al. 1994).

Cr.end/ Ch/ S/ Sax/ pH: 4-5, L: 3, X: 2, E: 1/ Alt: 1-4/ Salp: vr, Orom: vr, Mont: r, SmedH: vr, MedH: vr/ PT: 1/ Note: on shaded and steeply inclined surfaces of calciferous rocks, especially limestone and dolomite, descending to low altitudes in humid, coastal areas; probably more frequent in southern Italy than the few records would suggest.

Hyperphyscia Müll. Arg.
Bull. Herb. Boissier, 2, App. 1: 10, 1894.

This genus of c. 9 species, with the highest diversity in tropical and temperate regions (see e.g. Moberg 2004), is distinguished from other small-foliose Physciaceae by its filiform rather than bacilliform pycnoconidia and by the absence of atranorin in the upper cortex. Whether the filiform pycnoconidia can be maintained as a diagnostic character remains to be determined, given the demonstrated polyphyletic nature of *Amandinea*, which also possesses filiform propagules. Type: *H. adglutinata* (Flörke) H. Mayrhofer & Poelt

Hyperphyscia adglutinata (Flörke) H. Mayrhofer & Poelt

in Hafellner & al., Herzogia, 5: 62, 1979 - *Lecanora adglutinata* Flörke, Deutsch. Lich., 4: 7, 1819.

Syn.: *Anaptychia obscura* auct. var. *lecanorina* A. Massal., *Physcia adglutinata* (Flörke) Nyl., *Physcia elaeina* auct., *Physciopsis adglutinata* (Flörke) M. Choisy

N - VG (Tretiach & Carvalho 1995, Castello 1996, 2002, Carvalho 1997, Martellos & Castello 2004), **Frl** (Badin & Nimis 1996, Bernini & al. 2010), **Ven** (Lazzarin 2000, Valcuvia & al. 2000c, Nascimbene 2005c, 2008, Nascimbene & al. 2008e, 2015, Nascimbene & Marini 2010), **TAA** (Lich. Graec. 134: Obermayer 1997, Arosio & al. 2000, Zieger & al. 2003, Gottardini & al. 2004, Nascimbene 2006c, 2014, Nascimbene & al. 2007b, 2014, Cristofolini & al. 2008, Nascimbene & Marini 2015, Nimis & al. 2015), **Lomb** (Arosio & Rinaldi 1995, Grieco & Groppali 1995, Valcuvia & Brusoni 1996, Zocchi & al. 1997, Roella 1999, Arosio & al. 2003, Anderi & al. 2005, Stofer 2006, Valcuvia & Truzzi

2007b, Furlanetto 2010), **Piem** (Caniglia & al. 1992, Arosio & al. 1998, Piervittori 1998, 2003, Griselli & al. 2000, Castino & Ropolo 2003, Castino 2004, Isocrono & al. 2004, 2005b, 2007, Isocrono & Piervittori 2008, Furlanetto 2010, Matteucci & al. 2010, Giordani & Malaspina 2016), **VA** (Valcuvia & al. 2000b, Piervittori & al. 2001), **Emil** (Bassi 1995, Gasparo & Tretiach 1996, Nimis & al. 1996, Tretiach 1997, Sallese 2003, Marconi & al. 2006, Morselli & Regazzi 2006, Cioffi 2009), **Lig** (Castello & al. 1994, Valcuvia & al. 2000, Giordani & al. 2001, 2002, Brunialti & Giordani 2003, Giordani 2006, Giordani & Incerti 2008). **C - Tosc** (Loppi & Putorti 1995, 1995b, Loppi & al. 1995, 1996, 1996b, 1997, 1997b, 1997e, 1998, 1998b, 1999a, 2002, 2002b, 2002c, 2003, 2004, 2004c, 2006, Loppi 1996, 1996b, Loppi & De Dominicis 1996, Monaci & al. 1997, Putorti & al. 1998, Putorti & Loppi 1999, 1999b, Bacci & al. 2000, Senese & Critelli 2000, Benesperi 2000a, Loppi & Pirintzos 2000, Del Guasta 2001, Paoli & Loppi 2001, 2008, Lorenzini & al. 2003, Loppi & Corsini 2003, Loppi & Frati 2004, Frati & al. 2006b, 2007, 2008, Stofer 2006, Nali & al. 2007, Brunialti & Frati 2010, Loppi & Nascimbene 2010, Brunialti & al. 2012, Paoli & al. 2012, 2012b, 2013, 2015d, Benesperi & al. 2013, Brackel 2015, Nascimbene & al. 2015), **Marc** (Gasparo & al. 1989, Nimis & Tretiach 1999, Frati & Brunialti 2006, Brackel 2015, Pieri & al. 2015), **Umb** (Ravera 1998, Panfili 2000, 2007, Ravera & al. 2006, 2012b, Ciotti & al. 2009, Brackel 2015), **Laz** (Bartoli & al. 1997, Ravera & al. 1999, Massari & Ravera 2002, Nimis & Tretiach 2004, Ruisi & al. 2005, Stofer 2006, Munzi & al. 2007, Ravera 2008b, Ravera & Genovesi 2008, Zucconi & al. 2013, Brackel 2015), **Abr** (Recchia & al. 1993, Olivieri & al. 1997, 1997b, Loppi & al. 1999, Nimis & Tretiach 1999, Caporale & al. 2016), **Mol** (Garofalo & al. 1999, Nimis & Tretiach 1999, Caporale & al. 2008, Paoli & al. 2011, 2015), **Sar** (Zedda 2002, 2002b, Stofer 2006, Rizzi & al. 2011, Kodnik & al. 2011, Cossu 2013). **S - Camp** (Garofalo & al. 1999, 2010, Ricciardi & al. 2000, Aprile & al. 2002, 2003, 2003b, 2011, Nimis & Tretiach 2004, Brunialti & al. 2010, 2013, Nascimbene & al. 2010b, Ravera & Brunialti 2013, Catalano & al. 2016), **Pugl** (Garofalo & al. 1999, Nimis & Tretiach 1999, Brackel 2011), **Bas** (Bartoli & Puntillo 1998, Nimis & Tretiach 1999, Potenza 2006, Paoli & al. 2006, Potenza & al. 2010), **Cal** (Puntillo 1995, 1996, Puntillo & Puntillo 2004, Incerti & Nimis 2006), **Si** (Nimis & al. 1994, 1995, Ottonello & al. 1994, 2011, Grillo & Cristaudo 1995, Grillo 1998, Grillo & al. 2002, Merlo 2004, 2004b, Grillo & Caniglia 2004, 2006, Caniglia & Grillo 2006b, Grillo & Cataldo 2008, Liistro & Cataldo 2011, Cataldo & Minissale 2015).

Fol.n/ Ch/ A.s/ Epiph-Sax/ pH: 3-5, L: 4-5, X: 3-4, E: 3-5/ Alt: 1-3/ Mont: vr, SmedD: vc, Pad: rc, SmedH: ec, MedH: c, MedD: r/ PT: 1-3/ Note: a widespread mild-temperate species, common throughout Italy on isolated, mostly deciduous trees with nutrient-rich or -enriched bark, also in areas with intensive agriculture (especially in the Po-plain).

Hypocenomyce M. Choisy

Bull. mens. Soc. linn. Lyon, 20: 133, 1951.

A molecular study of *Hypocenomyce s.lat.* (Bendiksby & Timdal 2013) revealed that the genus is extremely polyphyletic, and that it can be subdivided into seven supported clades belonging in different genera, families, orders and even subclasses, thus representing a remarkable example of morphological and ecological convergence. The genus in the strict sense, which is sister to a clade consisting of *Boreoplaca* and *Ophioparma*, now comprises only 3 species, one of which occurs in Europe, and is included in the Ophioparmaceae within the Umbilicariales. Type: *H. scalaris* (Ach.) M. Choisy

Hypocenomyce scalaris (Ach.) M. Choisy

Bull. Mens. Soc. Linn. Lyon, 20: 133, 1951 - *Lichen scalaris* Ach., K. Vetensk.-Akad. Nya Handl., 16: 127, 1795.

Syn.: *Biatora ostreata* (Hoffm.) Fr., *Lecidea ostreata* (Hoffm.) Schaer., *Lecidea scalaris* (Ach.) Ach., *Psora ostreata* Hoffm., *Psora scalaris* (Ach.) Hook.

N - VG, Frl, Ven (Nascimbene & Caniglia 1997, 2000b, 2002c, 2003c, Caniglia & al. 1999, Nascimbene & al. 2006e, Nascimbene 2008c, Brackel 2013), **TAA** (Lecid. Exs. 262: Hertel 1992b, Nascimbene & Caniglia 2000b, 2002c, Caniglia & al. 2002, Nascimbene 2005b, 2006b, 2006c, 2008b, 2013, 2014, 2014c, Nascimbene & al. 2005, 2006, 2006e, 2007b, 2008c, 2014, Zarabska & al. 2009, Brackel 2013, Nascimbene & Marini 2015, Nimis & al. 2015), **Lomb** (Alessio & al. 1995, Valcuvia & al. 2003, Dalle Vedove & al. 2004, Nascimbene & al. 2006e, Furlanetto 2010, Gheza & al. 2015), **Piem** (Caniglia & al. 1992, Isocrono & al. 2004, 2007, Isocrono & Piervittori 2008, Furlanetto 2010, Matteucci & al. 2010), **VA** (Piervittori & Maffei 1996, Piervittori & Isocrono 1999, Valcuvia & al. 2000b, Matteucci & al. 2008, 2008c, Isocrono & al. 2008, Loppi 2014), **Emil** (Nimis & al. 1996, Tretiach & al. 2008), **Lig** (Giordani & al. 2009, Giordani & Incerti 2008). **C - Tosc** (Benesperi 2007, 2011, Brackel 2015), **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera 1998, Ravera & al. 2006), **Laz** (Massari & Ravera 2002), **Abr** (Nimis & Tretiach 1999), **Sar** (Zedda 1995, Zedda & Sipman 2001). **S - Bas** (Potenza 2006, Potenza & Fascetti 2012), **Cal** (Puntillo 1996, Brackel & Puntillo 2016), **Si** (Brackel 2008c).

Sq/ Ch/ A.s/ Epiph-Lign/ pH: 1-2, L: 3-5, X: 3-4, E: 1/ Alt: 2-4/ Salp: c, Mont: rr, SmedD: vr, SmedH: vr/ PT: 1-2/ Note: a temperate to boreal-montane, circumpolar lichen found on acid bark, especially of conifers, but also on *Castanea* and on lignum, incl. charred wood; much more common in northern Italy than in the mountains of southern Italy.

Hypogymnia (Nyl.) Nyl.

Lich. Envir. Paris: 39, 1896 - *Parmelia* subgen. *Hypogymnia* Nyl., Flora, 64: 537, 1881.

This genus of the Parmeliaceae, with more than 90 species, occurs in temperate to subpolar areas, with the greatest diversity in oceanic to suboceanic climates. It is found on all continents, but in tropical to subtropical latitudes the genus occurs at high elevations only. All species usually lack rhizines and have thickened lobes (either solid or hollow), bifusiform spermatia, substipitate apothecia, and asci with eight simple, hyaline, ellipsoid to subspherical spores. Most have hollow lobes, a black lower cortex, small spores, and contain

atranorin, physodic acid and related compounds. The genus presently includes also the genus *Cavernularia* (Miadlikowska & al. 2011). Type: *H. physodes* (L.) Nyl.

Hypogymnia austerodes (Nyl.) Räsänen

Ann. Bot. Soc. Zool.-Bot. Fenn. Vanamo, 18, 1: 13, 1943 - *Parmelia austerodes* Nyl., Flora, 64: 537, 1881.

Syn.: *Parmelia farinacea* var. *obscurascens* Bitter, *Parmelia obscurata* Bitter non auct., *Parmelia obscurata* var. *isidiata* (Lyngé) H. Magn.

N - Ven (Nascimbene & Caniglia 2000b, 2002c, 2003c, Nascimbene & al. 2006e, Nascimbene 2011), **TAA** (Nascimbene & Caniglia 2000b, 2002c, Nascimbene & al. 2005, 2006, 2006e, 2007b, 2009, 2010, 2014, Nascimbene 2006b, 2008b, 2014, Nimis & al. 2015), **Lomb** (Nascimbene & al. 2006e), **Piem** (Matteucci & al. 2013), **VA** (Matteucci & al. 2008).

Fol.n/ Ch/ A.s/ Sax-Epiph-Lign/ pH: 1-2, L: 3-4, X: 3, E: 1/ Alt: 3-4/ Salp: r, Mont: vr/ PT: 1/ Note: a mainly boreal-montane, circumpolar species found on acid bark, especially of conifers, and on lignum, occasionally on siliceous rocks, perhaps restricted to the climatically most continental parts of the Alps, with optimum near treeline. The record from the deciduous belt of Basilicata, by Potenza & Fascetti (2005), being dubious, is not accepted here.

Hypogymnia bitteri (Lyngé) Ahti

Ann. Bot. Fenn., 1: 20, 1964 - *Parmelia bitteri* Lyngé, Skr. Vidensk.-Selsk. Christiania, Math. Naturvidensk. Kl., 7: 138, 1921.

Syn.: *Hypogymnia obscurata* auct., *Parmelia obscurata* auct. et sensu Bitter

N - Frl, Ven (Nascimbene & Caniglia 2000, 2000b, 2002c, 2003c, Nascimbene & al. 2006e), **TAA** (Nascimbene & Caniglia 2000b, 2002c, Nascimbene & al. 2005, 2006, 2006e, 2007b, 2009, 2010, 2014, 2014c, Nascimbene 2006b, 2008b, 2013, 2014, Nascimbene & Marini 2015, Nimis & al. 2015), **Lomb** (Nascimbene & al. 2006e), **Piem** (Isocrono & al. 2004), **VA** (Matteucci & Vanacore Falco 2015), **Emil. C - Tosc. Abr. S - Bas** (Potenza 2006), **Cal** (TSB 12149), **Si**.

Fol.n/ Ch/ A.s/ Epiph/ pH: 1-2, L: 3-4, X: 3, E: 1/ Alt: 3-4/ Salp: rr, Mont: r/ PT: 1/ Note: a cool-temperate to boreal-montane, circumpolar lichen found on acid bark, especially of conifers, occasionally on lignum and on siliceous rocks, with optimum near treeline.

Hypogymnia farinacea Zopf

Ann. Chemie, 352: 42, 1907.

Syn.: *Hypogymnia bitteriana* (Zahlbr.) Räsänen, *Parmelia bitteriana* Zahlbr., *Parmelia farinacea* Bitter non (L.) Ach.

N - Frl, Ven (Nimis 1994, Nascimbene & Caniglia 2000b, 2002c, 2003c, Nascimbene & al. 2006e, Nascimbene 2008c, 2011, Brackel 2013), **TAA** (Nascimbene & Caniglia 2000b, 2002c, Caniglia & al. 2002, Nascimbene 2005b, 2006b, 2006c, 2008b, 2013, 2014, Nascimbene & al. 2005, 2006, 2006e, 2007b, 2009, 2014, Stofer 2006, Nimis & al. 2015), **Lomb** (Zocchi & al. 1997, Dalle Vedove & al. 2004, Nascimbene & al. 2006e, 2010, Nascimbene & Marini 2015), **Piem** (Isocrono & Ferrarese 2008), **VA, Emil** (Brunialti & al. 2001, Dalle Vedove & al. 2002), **C - Tosc** (Benesperi & al. 2007), **Laz, Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **Sar** (Zedda & Sipman 2001), **S - Bas** (Potenza 2006, Potenza & al. 2010, Brackel 2011, Potenza & Fascetti 2012), **Cal** (Puntillo 1996, Incerti & Nimis 2006), **Si** (Brackel 2008c).

Fol.n/ Ch/ A.s/ Epiph-Lign/ pH: 1-2, L: 3-4, X: 3-4, E: 1/ Alt: 2-4/ Salp: rc, Mont: rr, SmedD: vr, Pad: er, SmedH: vr/ PT: 1-2/ Note: a cool-temperate to boreal-montane lichen, most frequent in the Alps, much rarer in the mountains of southern Italy.

Hypogymnia laminisorediata D. Hawksw. & Poelt

in Hawksworth, Lichenologist, 5: 253, 1973.

S - Cal (Puntillo 1996).

Fol.n/ Ch/ A.s/ Epiph/ pH: 1-2, L: 3, X: 2-3, E: 1/ Alt: 3/ Mont: er/ PT: 0/ suboc/ Note: a species of the Mediterranean mountains, also known from Morocco, Macaronesia, Serbia and Turkey, found on acid bark in humid montane forests.

Hypogymnia physodes (L.) Nyl.

Lich. Environ. Paris: 39, 1896 - *Lichen physodes* L., Sp. Pl., 2: 1144, 1753.

Syn.: *Imbricaria physodes* (L.) DC., *Parmelia physodes* (L.) Ach., *Parmelia physodes* var. *inflata* Sambo, *Parmelia physodes* var. *labrosa* Ach., *Parmelia physodes* var. *platyphylla* Ach.

N - VG (Castello 1996, 2002, Martellos & Castello 2004, Castello & Skert 2005), **Frl** (Badin & Nimis 1996, Tretiach & Hafellner 2000, Stofer 2006, Tretiach & Molero 2007), **Ven** (Nimis 1994, Nimis & al. 1996c, Nascimbene & Caniglia 1997, 2000b, 2002c, 2003c, Lazzarin 1997, 2000, Caniglia & al. 1999, Nascimbene 2005c, 2008, 2008c, 2011, Nascimbene & al. 2006e, 2007, 2009c, 2010b, Nascimbene & Marini 2007, 2010, Brackel 2013), **TAA** (Nascimbene & Caniglia 2000b, 2002c, Caniglia & al. 2002, Nascimbene 2001b, 2003, 2005b, 2006b, 2006c, 2008b, 2013, 2014, Gottardini & al. 2004, Nascimbene & al. 2005, 2006, 2006e, 2007b, 2008c, 2009, 2010, 2014, Stofer 2006, Brackel 2006, 2013, Lang 2009, Nascimbene & Marini 2015, Nimis & al. 2015), **Lomb** (Rivellini 1994, Arosio & Rinaldi 1995, Valcuvia & Gianatti 1995, Alessio & al. 1995, Brusoni & al. 1997, Zocchi & al. 1997, Roella 1999, Brusoni & Valcuvia 2000, Arosio & al. 2003, Valcuvia & al. 2003, Dalle Vedove & al. 2004, Anderi & al. 2005, Nascimbene & al. 2006e, Stofer 2006, Bergamaschi & al. 2007, Furlanetto 2010, Brackel 2010, 2013, Gheza & al. 2015), **Piem** (Caniglia & al. 1992, Morisi & Sereno 1995, Arosio & al. 1998, Isocrono & Falletti 1999, Piervittori 2003, Castino 2004, Isocrono & al. 2004, 2005b, 2006, 2007, Morisi 2005, Isocrono & Piervittori 2008, Furlanetto 2010, Matteucci & al. 2010), **VA** (Borlandelli & al. 1996, Piervittori & Maffei 1996, 2001, Piervittori & Isocrono 1997, 1999, Piervittori & al. 2001,

Revel & al. 2001, Giordani & al. 2003b, Ghiraldi 2003, Bergamaschi & al. 2004, Isocrono & al. 2005, Matteucci & al. 2008c, Isocrono & al. 2008, Loppi 2014), **Emil** (Gasparo & Tretiach 1996, Nimis & al. 1996, Dalle Vedove & al. 2002, Benesperi 2009, Brackel 2015), **Lig** (Modenesi & al. 1997, Brunialti & al. 1999, Putorti & al. 1999b, Giordani & al. 2002, 2003b, Brunialti & Giordani 2003, Giordani 2006, Giordani & Incerti 2008). **C - Tosc** (Tretiach & Nimis 1994, Loppi & Corsini 1995, Loppi & Putorti 1995b, Loppi & al. 1996b, 1996c, 1997e, 1998, 1999a, 2002, 2002c, 2003, 2004, 2004c, 2006, Monaci & al. 1997, Loppi & Nascimbene 1998, 2010, Putorti & al. 1998, 1999, Tretiach & Ganis 1999, Putorti & Loppi 1999b, Bacci & al. 2000, Benesperi 2000a, 2006, 2011, Laganà & al. 2002, Loppi & Frati 2004, Baragatti & al. 2005, Baragatti 2006, Benesperi & al. 2007, Brackel 2008, Lastrucci & al. 2009, Brunialti & Frati 2010, Loppi & Baragatti 2011, Paoli & al. 2012, Brackel 2015, Nascimbene & al. 2015), **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera 1998, 1999, Ravera & al. 2006, Panfili 2007), **Laz** (Brackel 2015), **Abr** (Zedda 1995, Olivieri & al. 1997, 1997b, Loppi & al. 1999, Nimis & Tretiach 1999, Stofer 2006, Brackel 2015, Corona & al. 2016), **Mol** (Garofalo & al. 1999, Nimis & Tretiach 1999, Caporale & al. 2008), **Sar** (Nöske 2000, Zedda 2002, 2002b, Zedda & Sipman 2001, Zedda & al. 2001, Rizzi & al. 2011). **S - Camp** (Garofalo & al. 1999, 2010, Aprile & al. 2002, 2003, 2003b, 2011, Nimis & Tretiach 2004, Nascimbene & al. 2010b, Catalano & al. 2010, 2016, Brunialti & al. 2013, Ravera & Brunialti 2013), **Pugl** (Garofalo & al. 1999), **Bas** (Nimis & Tretiach 1999, Potenza 2006, Fascetti 2010, Brackel 2011), **Cal** (Puntillo 1995, 1996, van den Boom & Giralt 2002, Incerti & Nimis 2006, Brackel & Puntillo 2016), **Si** (Ottonello & al. 1994, Ottonello 1996, Brackel 2008b, 2008c).

Fol.n/ Ch/ A.s/ Epiph/ pH: 1-3, L: 3-4, X: 2-3, E: 1-2/ Alt: 1-4/ Salp: ec, Mont: ec, SmedD: rc, Pad: r, SmedH: rc, MedH: r, MedD: er/ PT: 1-3/ Note: a widespread holarctic lichen, still common throughout the country, and even occurring, albeit sporadically and with poorly developed specimens, in relatively polluted areas of the Po- plain; optimum in natural habitats, from the lowlands to the subalpine belt.

Hypogymnia tubulosa (Schaer.) Hav.

Bergens Mus. Arb. Naturvid., 2: 31, 1918 - *Parmelia ceratophylla* var. *tubulosa* Schaer., Lich. Helv. Spicil., 10: 459, 1840.

Syn.: *Parmelia tubulosa* (Schaer.) Bitter

N - VG, FrI (Badin & Nimis 1996, Tretiach & Molaro 2007), **Ven** (Nascimbene & Caniglia 1997, 2000b, 2002c, Caniglia & al. 1999, Nascimbene 2005c, 2008c, 2011, Nascimbene & al. 2006e, 2009c, 2010b, Nascimbene & Marini 2007, Brackel 2013), **TAA** (Nascimbene & Caniglia 2000b, 2002c, 2003c, Caniglia & al. 2002, Nascimbene 2003, 2005b, 2006b, 2006c, 2008b, 2013, 2014, Nascimbene & al. 2005, 2006, 2006e, 2007b, 2009, 2010, 2014, Lang 2009, Nascimbene & Marini 2015, Nimis & al. 2015), **Lomb** (Rivellini 1994, Alessio & al. 1995, Valcuvia & Gianatti 1995, Zocchi & al. 1997, Valcuvia & al. 2003, Nascimbene & al. 2006e, Abramini & al. 2008, Furlanetto 2010, Gheza & al. 2015), **Piem** (Caniglia & al. 1992, Isocrono & Falletti 1999, Isocrono & al. 2004, 2006, Morisi 2005, Isocrono & Piervittori 2008, Furlanetto 2010), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Piervittori & al. 2001, Matteucci & al. 2008, 2008c), **Emil** (Dalle Vedove & al. 2002, Benesperi 2009, Brackel 2015), **Lig** (Brunialti & al. 1999, Giordani & al. 2002, Giordani & Incerti 2008). **C - Tosc** (Loppi & al. 1994, 1998, 1999a, 2002, Tretiach & Nimis 1994, Putorti & al. 1998, Benesperi 2000a, 2011, Benesperi & al. 2007, Brackel 2015, Nascimbene & al. 2015), **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera 1998, Ravera & al. 2006, Brackel 2015), **Laz** (Massari & Ravera 2002, Brackel 2015), **Abr** (Nimis & Tretiach 1999), **Mol** (Caporale & al. 2008), **Sar** (Zedda 1995, 2002, 2002b, Nöske 2000, Loi & al. 2000, Zedda & Sipman 2001, Rizzi & al. 2011, Cossu 2013). **S - Camp** (Aprile & al. 2002, 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010, Catalano & al. 2016), **Pugl** (Nimis & Tretiach 1999, Brackel 2011), **Bas** (Nimis & Tretiach 1999, Potenza 2006, Potenza & al. 2010, Brackel 2011), **Cal** (Puntillo 1995, 1996, van den Boom & Giralt 2002, Incerti & Nimis 2006, Brackel & Puntillo 2016), **Si** (Czeczuga & al. 1994, Grillo & Caniglia 2004, 2006, Merlo 2004b, Ottonello 2005, Iacolino & Ottonello 2006, Stofer 2006, Brackel 2008b, Ottonello & al. 2011).

Fol.n/ Ch/ A.s/ Epiph/ pH: 1-2, L: 3, X: 2-3, E: 1-2/ Alt: 2-4/ Salp: vr, Mont: rc, SmedD: vr, Pad: er, SmedH: rr, MedH: er/ PT: 1-2/ Note: a mainly temperate, holarctic species of acid bark, often occurring on twigs; certainly rarer than *H. physodes*, and bound to more natural and humid situations.

Hypogymnia vittata (Ach.) Parrique

Act. Soc. Linn. Bordeaux, 53: 34, 1898 - *Parmelia physodes* var. *vittata* Ach., Meth. Lich.: 251, 1803.

Syn.: *Imbricaria physodes* var. *vittata* (Ach.) Körb., *Parmelia vittata* (Ach.) Röhl., *Parmelia vittata* var. *alpestris* Zahlbr.

N - FrI, Ven (Nascimbene & Caniglia 2002c, 2003c, Nascimbene & al. 2009c, Nascimbene 2011), **TAA** (Nascimbene & Caniglia 2000b, 2002c, Nascimbene & al. 2006e, 2007b, Nascimbene 2014, Nimis & al. 2015), **Lomb** (Zocchi & al. 1997), **Piem** (Isocrono & al. 2004).

Fol.n/ Ch/ A.s/ Epiph/ pH: 1-2, L: 3, X: 2-3, E: 1/ Alt: 3-4/ Salp: vr, Mont: er/ PT: 1/ Note: a circumboreal-montane lichen found on acid bark, often on basal parts of trunks, on acid soil and overgrowing muribund bryophytes, probably restricted to the Alps in Italy. It is included in the Italian red list of epiphytic lichens as "Vulnerable" (Nascimbene & al. 2013c).

Hypotrachyna (Vain.) Hale

Phytologia, 28: 341, 1974 - *Parmelia* sect. *Hypotrachyna* Vain., Acta Soc. Fauna Fl. Fenn., 7: 38, 1890.

This pantropical genus of the Parmeliaceae, which includes c. 260 species, was originally described to include parmelioid lichens with a combination of morphological characters such as a pored epicortex, narrow, sublinear to linear lobes with truncate apices, dichotomously branched rhizines, oval-ellipsoid ascospores, and bifusiform conidia. The genus appeared to be paraphyletic (see e.g. Crespo & al. 2010), so that 15 Asian species were segregated in the new genus *Remototrachyna*. As a consequence of the phylogenetic study of the *Hypotrachyna*-clade by Divakar & al. (2013), the genera *Cetrariastrum*, *Everniastrum*, and *Parmelinopsis*

were reduced to synonymy with *Hypotrachyna*. The genus is still very poorly known in Italy. A key to the species occurring in France was published by Masson (2005). Type: *H. brasiliiana* (Nyl.) Hale

Hypotrachyna afrorevoluta (Krog & Swinscow) Krog & Swinscow

Lichenologist, 19: 420, 1987 - *Parmelia afrorevoluta* Krog & Swinscow, Norw. J. Bot., 26: 22, 1979.

Syn.: *Parmelinopsis afrorevoluta* (Krog & Swinscow) Elix & Hale

N - Lig (UPS- L-187671). **C - Umb** (Brackel 2015), **Laz** (Brackel 2015).

Fol.b/ Ch/ A.s/ Epiph/ pH: 1-2, L: 3, X: 2-3, E: 1-3/ Alt: 1-3/ Mont: er, SmedD: vr, SmedH: rr, MedH: vr/ PT: 1-2/ suboc/ Note: a species differing from *H. revoluta* by lobes with a glossy lower surface, often simple, glossy rhizines, and coarse soredia developing from pustules, based on a type from Eastern Africa. It grows on bark of broad-leaved trees in areas with a more or less oceanic climate; widely distributed on both Hemispheres, and perhaps spreading in Europe in recent years. The species is very similar to *H. revoluta*, and several Italian records of the latter could refer to it. See also note on *H. revoluta*.

Hypotrachyna horrescens (Taylor) Krog & Swinscow

Lichenologist, 19: 420, 1987 - *Parmelia horrescens* Taylor in Mackay, Fl. Hibern., 2: 144, 1836.

Syn.: *Parmelia dissecta* Nyl., *Parmelina dissecta* (Nyl.) Hale, *Parmelina horrescens* (Taylor) Hale, *Parmelinopsis horrescens* (Taylor) Elix & Hale

N - Lig (Giordani & Brunialti 2000, Brunialti & Giordani 2003, Watson 2014). **C - Laz** (Ravera 2008), **Sar**.

Fol.b/ Ch/ A.i/ Epiph/ pH: 2-3, L: 3, X: 1-2, E: 1-2/ Alt: 1-3/ Mont: er, SmedH: er, MedH: er/ PT: 0/ suboc/ Note: a mild-temperate to humid subtropical lichen found on old trees in ancient, open, humid forests. According to Masson (2005) this is an Atlantic species: at least the records from the Alps and from the Adriatic part of the Peninsula should correspond to *H. minarum*. I still leave under this name the records from Tyrrhenian Italy, where several subatlantic species do occur: in any case, the Italian material badly needs revision, and the presence of this species in Italy is dubious. The species is included in the Italian red list of epiphytic lichens as “Near-threatened” (Nascimbene & al. 2013c).

Hypotrachyna laevigata (Sm.) Hale

Smithsonian Contr. Bot., 25: 44, 1975 - *Lichen laevigatus* Sm., Engl. Bot., 26: 1852, 1808.

Syn.: *Parmelia laevigata* (Sm.) Ach.

N - Frl (Nascimbene & al. 1998, Brackel 2013), **Ven** (Nascimbene & al. 2009c), **TAA** (Nascimbene & Caniglia 2000b, Nimis & al. 2015), **Lomb, Piem** (Isocrono & al. 2004, 2007), **VA** (Piervittori & Isocrono 1999), **C - Tosc** (Stofer 2006, Giordani & al. 2009), **Laz** (Fornasier & al. 2005). **S - Camp, Si** (Grillo 1998, Grillo & Caniglia 2004, Ottonello & Puntillo 2009, Ottonello & al. 2011).

Fol.b/ Ch/ A.s/ Epiph-Sax/ pH: 1-2, L: 3, X: 1-2, E: 1/ Alt: 1-3/ Mont: er/ oc/ PT: 0/ Note: a humid subtropical to mild-temperate species found in ancient, very humid forests, on mossy trunks and rocks, very much declining. It is included in the Italian red list of epiphytic lichens as “Near-threatened” (Nascimbene & al. 2013c).

Hypotrachyna minarum (Vain.) Krog & Swinscow

Lichenologist, 19: 420, 1987 - *Parmelia minarum* Vain., Acta Soc. Fauna Fl. Fenn. 7, 1: 48, 1890.

Syn.: *Parmelia scortella* auct. non Nyl., *Parmelinopsis minarum* (Vain.) Elix & Hale

N - TAA (Nascimbene 2006c, Nascimbene & al. 2007b, Masson 2005), **Lig** (Masson 2005). **C - Marc** (Nimis & Tretiach 1999), **Abr** (Nimis & Tretiach 1999, Corona & al. 2016).

Fol.b/ Ch/ A.s/ Epiph/ pH: 1-2, L: 3, X: 1-2, E: 1/ Alt: 1-3/ Mont: er, SmedD: er, MedH: er/ oc/ PT: 0/ Note: see note on *H. horrescens*.

Hypotrachyna revoluta (Flörke) Hale

Smithsonian Contr. Bot., 25: 60, 1975 - *Parmelia revoluta* Flörke Deutsche Lich., 1: 11, 1815.

Syn.: *Imbricaria revoluta* (Flörke) Flot., *Imbricaria sinuosa* var. *angustifolia* Anzi, *Imbricaria sinuosa* var. *latifolia* Anzi

N - VG (Castello 2002, Martellos & Castello 2004), **Frl** (Tretiach & Molaro 2007), **Ven** (Lazzarin 1997, Caniglia & al. 1999, Nascimbene 2005c, Thor & Nascimbene 2007, Nascimbene & al. 2010b, 2013b), **TAA** (Nascimbene & al. 2007b, Nascimbene 2014, Nascimbene & Marini 2015, Nimis & al. 2015), **Lomb** (Bartoli & al. 1997b, Zocchi & al. 1997), **Piem** (Isocrono & al. 2004, Isocrono & Piervittori 2008), **VA** (Piervittori & Isocrono 1999), **Emil, Lig** (Giordani & Incerti 2008). **C - Tosc, Marc, Laz** (Bartoli & al. 1997, Ruisi & al. 2005, Brackel 2015). **S - Camp, Cal** (Puntillo 1996, Incerti & Nimis 2006), **Si** (Falco Scampatelli 2005).

Fol.b/ Ch/ A.s/ Epiph/ pH: 1-2, L: 3, X: 2-3, E: 1-3/ Alt: 1-3/ Mont: er, SmedD: vr, SmedH: rr, MedH: vr/ PT: 1-2/ suboc/ Note: a mild-temperate lichen found on deciduous trees, exceptionally on mossy siliceous rocks in humid areas; very much declining, and absent from urban areas. The Italian material badly needs revision: several samples could belong to *H. afrorevoluta* (see e.g. Masson 2005).

Hypotrachyna sinuosa (Sm.) Hale

Smithsonian Contr. Bot., 25: 63, 1975 - *Lichen sinuosus* Sm. in Smith & Sowerby, Engl. Bot., 29: 2050, 1809.

Syn.: *Imbricaria sinuosa* (Sm.) Körb., *Parmelia despreauxii* Delise, *Parmelia sinuosa* (Sm.) Ach., *Parmelia sinuosa* var. *virescens* Kremp.

N - Frl, Ven (Watson 2014), **TAA** (Nascimbene & al. 2007b, Nimis & al. 2015), **Lomb** (Zocchi & al. 1997), **Piem** (Isocrono & al. 2004), **Emil. C - Tosc, Umb** (Ravera & al. 2006), **Sar. S - Cal** (S- L65878).

Fol.b/ Ch/ S/ Epiph/ pH: 1-2, L: 3, X: 1-2, E: 1/ Alt: 2-3/ Mont: vr, SmedD: er, SmedH: er/ PT: 0/ suboc/ Note: a widespread, but rare mild-temperate species found on bark and epiphytic mosses in open, humid and cold forests; declining throughout the country and presently almost extinct. All records from southern Italy reported by Nimis (1993: 483) and that from Umbria (Panfili 2000), being dubious, are not accepted here. The species is included in the Italian red list of epiphytic lichens as "Vulnerable" (Nascimbene & al. 2013c).

Hypotrachyna taylorensis (M.E. Mitch.) Hale

Phytologia, 28: 342, 1975 (1974) - *Parmelia taylorensis* M.E. Mitch., Rev. de Biol., 2: 215, 1961.

Syn.: *Parmelia rugosa* Taylor

N - Lomb, Piem (TSB 25777).

Fol.b/ Ch/ A.s/ Epiph/ pH: 1-2, L: 3, X: 1-2, E: 1/ Alt: 3/ Mont: er/ PT: 0/ oc/ Note: a mild-temperate, mostly oceanic species found on mossy trunks in ancient, undisturbed, moist forests. It is included as "Regionally Extinct" in the Italian red list of epiphytic lichens (Nascimbene & al. 2013c).

Icmadophila Trevis.

Riv. Per. Lav. I.R. Accad. Padova: 276, 1852, *nom. cons.*

This genus of the Icmadophilaceae, included 5 species growing on acidic substrata in temperate to cool humid climates, but preliminary results by Ludwig & al. (2016) indicate that it consists of 3 species only: *I. ericetorum*, *I. aversa*, and *I. japonica*. The genus is closely related to *Dibaeis* (Stenroos & al. 2002b). Type: *I. aeruginosa* (Scop.) Trevis. (= *I. ericetorum*).

Icmadophila ericetorum (L.) Zahlbr.

Wiss. Mitt. Bosn. Herzeg., 3: 605, 1895 - *Lichen ericetorum* L., Sp. Pl.: 1141, 1753.

Syn.: *Baeomyces aeruginosus* (Scop.) DC., *Baeomyces icmadophilus* (L. f.) Bory, *Biatora icmadophila* (L. f.) Fr., *Icmadophila aeruginosa* (Scop.) Trevis., *Icmadophila aeruginosa* var. *teretocarpa* A. Massal., *Icmadophila elveloides* (Weber) Hedl., *Lecidea icmadophila* (L. f.) Ach., *Patellaria aeruginosa* (Scop.) Spreng.

N - Frl (Tretiach & Hafellner 2000), **Ven** (Nimis 1994, Nascimbene & Caniglia 1997, 2003c, Caniglia & al. 1999, Lazzarin 2000b, Nascimbene 2011), **TAA** (Caniglia & al. 2002, Nascimbene 2005b, 2006c, 2008b, Nascimbene & al. 2005, 2006, 2007b, 2008c, Lang 2009), **Lomb, Piem** (Isocrono & al. 2004, 2006), **VA** (Piervittori & Isocrono 1999), **Lig** (Brunialti & al. 1999). **C - Tosc, Sar.**

Cr/ Ch/ S/ Lign-Terr/ pH: 1-2, L: 2-4, X: 1-2, E: 1/ Alt: 3-5/ Alp: rr, Salp: rc, Orom: er, Mont: rc/ PT: 1/ Note: a cool-temperate to boreal-montane, circumpolar species found on decaying wood and muribund bryophytes, usually in upland areas; common in the Alps, rarer on the high Mediterranean mountains.

Immersaria Rambold & Pietschm.

in Rambold, Bibl. Lichenol., 34: 239, 1989.

This genus of the Lecideaceae includes 7 species in both Hemispheres, and resembles *Porpidia*, which has a better developed exciple and lacks brown pigments in the cortex. Type: *I. athroocarpa* (Ach.) Rambold & Pietschm.

Immersaria athroocarpa (Ach.) Rambold & Pietschm.

in Rambold, Bibl. Lichenol., 34: 240, 1989 - *Lichen athroocarpus* Ach., Lichenogr. Suec. Prodr., 1799.

Syn.: *Amygdalaria athroocarpa* (Ach.) Clauzade & Cl. Roux, *Lecidea atrocarpoides* Vain., *Lecidea atrofuscescens* Nyl., *Lecidea athroocarpa* (Ach.) Ach., *Lecidea praetervisa* H. Magn., *Lecidella athroocarpa* (Ach.) Arnold, *Porpidia athroocarpa* (Ach.) Hertel & Rambold, *Psora fumosa* f. *polygonia sensu* Anzi

N - TAA, Lomb, Piem (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999), **Emil** (Tretiach & al. 2008), **Lig. C - Tosc** (Tretiach & al. 2008), **Sar. S - Cal** (Puntillo 1996).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4, X: 3, E: 1/ Alt: 2-5/ Alp: rc, Salp: rr, Orom: r, Mont: r, SmedH: er/ PT: 1/ paras *Aspicilia s.lat.* spp. when young, m/ Note: a cool-temperate to arctic-alpine, chemically variable, circumpolar species found on siliceous, often iron-rich and weathered rocks in exposed situations, starting the life-cycle on species of *Aspicilia s.lat.*

Immersaria cupreoatra (Nyl.) Calat. & Rambold

Lichenologist, 30: 232, 1998 - *Lecanora cupreoatra* Nyl., Not. Sällsk. Fauna Fl. Fenn. Förh., 8: 181, 1866.

Syn.: *Aspicilia cupreoatra* (Nyl.) Arnold, *Aspicilia olivacea* Bagl. & Carestia, *Bellemerea cupreoatra* (Nyl.) Clauzade & Cl. Roux

N - Piem (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999), **Lig** (UPS-L-670367). **C - Sar. S - Si** (Calatayud & Rambold 1998).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 4, X: 3, E: 1/ Alt: 3-5/ Alp: rr, Salp: vr, Orom: er, Mont: er/ PT: 1/ paras *Buellia* spp./ Note: an arctic-alpine lichen of siliceous rocks starting the life-cycle on *Buellia*-species; most frequent in the Alps above treeline, extremely rare in southern Italy. Records from lowland areas published after Nimis (1993) are certainly due to misidentifications, and are not cited here.

Immersaria usbekica (Hertel) M. Barbero, Nav.-Ros & Cl. Roux

Bull. Soc. linn. Provence, 41: 140, 1990 - *Lecidea usbekica* Hertel, Khumbu Himal, 6: 1977.

Syn.: *Amygdalaria tellensis* Esnault & Cl. Roux

C - Laz (Tretiach 2004). **S - Bas** (Nimis & Tretiach 1999).

Cr/ Ch/ S/ Sax/ pH: 3, L: 4-5, X: 4-5, E: 3-4/ Alt: 1-2/ SmedH: vr, MedH: vr / PT: 1/ paras *Aspicilia s.lat.* spp. when young/ Note: on base-rich siliceous rocks in lowland areas, on species of *Aspicilia s.lat.*

Imshaugia S.L.F. Mey.

Mycologia, 77: 337, 1985.

A genus of the Parmeliaceae with *c.* 7 species, closely related to *Parmeliopsis*, but differing in the smaller spores and the much smaller, bifusiform conidia. One species is widespread in boreal-montane habitats of the Northern Hemisphere. Type: *I. aleurites* (Ach.) S.L.F. Mey.

Imshaugia aleurites (Ach.) S.L.F. Mey.

Mycologia, 77: 337, 1985 - *Lichen aleurites* Ach., Lichenogr. Suec. Prodr.: 117, 1799.

Syn.: *Cetraria aleurites* (Ach.) Th. Fr., *Imbricaria aleurites* (Ach.) DC., *Parmelia aleurites* (Ach.) Ach., *Parmeliopsis aleurites* (Ach.) Nyl., *Parmeliopsis pallescens* (Hoffm.) Hillmann, *Parmeliopsis placorodia sensu Jatta non auct.*, *Platysma diffusum* (Weber) Nyl.

N - Frl, Ven (Nimis 1994, Nascimbene & Caniglia 2000b, 2002c, 2003c, Nascimbene & al. 2006e, Nascimbene 2008c), **TAA** (Nascimbene & Caniglia 2000b, 2002c, Caniglia & al. 2002, Nascimbene & al. 2005, 2006, 2006e, 2007b, 2008b, 2008c, 2009, 2010, 2014, Nascimbene 2006b, 2006c, 2013, 2014, 2014c, Lang 2009, Watson 2014, Nascimbene & Marini 2015, Nimis & al. 2015), **Lomb** (Alessio & al. 1995, Nascimbene & al. 2006e), **Piem** (Isocrono & al. 2004, Isocrono & Piervittori 2008), **VA** (Piervittori & Isocrono 1999, Matteucci & al. 2008, Isocrono & al. 2008), **Emil** (Tretiach & al. 2008), **Lig** (Giordani & al. 2009). **C - Tosc** (Benesperi 2007, Benesperi & al. 2007, Tretiach & al. 2008, Brackel 2015). **S - Cal** (Puntillo 1996, Incerti & Nimis 2006), **Si**.

Fol.n/ Ch/ A.i/ Epiph-Lign/ pH: 1-2, L: 3-5, X: 3-4, E: 1/ Alt: 3-4/ Salp: vc, Mont: vr/ PT: 1/ Note: a circumboreal-montane to cool-temperate species found on acid bark, mostly of conifers and on decorticated stumps, with optimum near treeline; common only in the Alps, much rarer in the mountains of southern Italy.

Ingvariella Guderley & Lumbsch

in Guderley & al., Nova Hedwigia, 64: 152, 1997.

The monotypic genus *Ingvariella* was originally segregated from *Diploschistes* by Guderley & al. (1997), due to the absence of a true exciple, this being replaced by a pseudoexciple of degenerating, pigmented hymenial elements, and was placed within the Thelotremataceae (now part of the Graphidaceae). However, the hymenium and amyloid ascus wall suggest different affinities. The phylogenetic study by Fernandez-Brime & al. (2011) demonstrated that *Ingvariella* is a member of the Stictidaceae, sister to the mainly saprotrophic genus *Cryptodiscus*. The genus has a worldwide distribution, but is most common at high elevations in semi-arid regions with winter rain. Type: *I. bispora* (Bagl.) Guderley & Lumbsch

Ingvariella bispora (Bagl.) Guderley & Lumbsch

in Guderley & al., Nova Hedwigia, 64: 152, 1997 - *Urceolaria bispora* Bagl., N. Giorn. Bot. Ital., 3: 246, 1871.

Syn.: *Diploschistes bisporus* (Bagl.) J. Steiner, *Diploschistes bisporus* var. *ochraceus* (Anzi) Poelt comb. inval., *Diploschistes scruposulus* (Nyl.) J. Steiner, *Rhizocarpon clauzadei* B. de Lesd., *Urceolaria ferruginea* Harm., *Urceolaria scruposa* f. *ochracea* Anzi, *Urceolaria scruposula* Nyl.

N - TAA, Lomb, VA (Piervittori & Isocrono 1999), **Emil** (Tretiach & al. 2008), **Lig** (TSB 33443). **C - Tosc** (Pišút 1997), **Marc** (Nimis & Tretiach 1999), **Laz, Sar** (Monte 1993, Nöske 2000, Fernandez-Brime & al. 2011, Rizzi & al. 2011, Giordani & al. 2013). **S - Camp** (Garofalo & al. 1999, Catalano & al. 2016), **Pugl** (Garofalo & al. 1999), **Cal** (Puntillo 1996), **Si** (Caniglia & Grillo 2003, Grillo & Caniglia 2004).

Cr/ Ch/ S/ Sax/ pH: 3, L: 4-5, X: 3, E: 3/ Alt: 1-3/ Mont: vr, SmedD: er, SmedH: rr, MedH: rc, MedD: er/ PT: 1/ paras yellow *Rhizocarpon* spp./ Note: on base-rich siliceous substrata, mostly on horizontal surfaces; most common in Mediterranean Italy but also found in the dry-continental Alpine valleys.

Inoderma (Ach.) Gray

Nat. Arrang. Brit. Pl., 1: 498, 1821 - *Verrucaria* (unranked) *Inoderma* Ach., Lichenogr. Univ.: 294, 1810.

Recent molecular revisions of the Arthoniaceae (*e.g.* Ertz & al. 2009, Ertz & Tehler 2011, Frisch & al. 2014) revealed that the genus *Arthonia* is very heterogeneous. As a consequence, the genus is being split into more natural groups based on morphological, chemical and molecular data. The genus *Inoderma* was resurrected by Frisch & al. (2015) to accommodate a species with elevated, white-pruinose pycnidia and a gelatinised hymenium. Type: *I. byssaceum* (Weigel) Gray

Inoderma byssaceum (Weigel) Gray

Nat. Arrang. Brit. Plants, 1: 498, 1821 - *Sphaeria byssacea* Weigel, Observ. Bot.: 42, 1772.

Syn.: *Arthonia biformis* (Flörke) Schaer., *Arthonia byssacea* (Weigel) Almq., *Arthonia velana* Jatta, *Pyrenotea biformis* (Flörke) A. Massal., *Pyrenotea byssacea* (Weigel) A. Massal.

N - Ven, TAA (Nascimbene & al. 2007b), **Emil** (E.C.I. 1848: TSB 25850, Watson 2014). **C - Tosc** (Loppi & Frati 2006), **Abr. S - Camp**.

Cr/ Tr/ S/ Epiph/ pH: 1-2, L: 3, X: 1-2, E: 1/ Alt: 2/ SmedD: er, SmedH: er/ PT: 0/ u/ Note: a mild-temperate species found on very old deciduous trees with acid bark (in Italy oaks) in open woodlands, often near rivers. Most Italian records are old, and the species was included as "Regionally Extinct" in the Italian red list of epiphytic lichens (Nascimbene & al. 2013c).

Involucropyrenium Breuss Ann. naturhist. Mus. Wien, 98 (suppl.): 37, 1996.

This still poorly known genus of the Verrucariaceae was separated from *Catapyrenium*, which has the same type of upper cortex, by the position of the perithecia, situated between the squamules, and the presence of an involucrellum. The genus, which includes 8 species, is distributed mainly in Europe, with a single species present in North America and Asia. The species occur on calcareous and gypsiferous soils, in rock fissures or directly on limestone, sometimes also on old bricks or mortar, in semi-arid to alpine and temperate environments. Type: *I. waltheri* (Kremp.) Breuss

Involucropyrenium sbarbaronis (Servít) Breuss

Stapfia, 23: 134, 1990 - *Dermatocarpon sbarbaronis* Servít, Ann. Mus. Civ. St. Nat. Genova, 64: 55, 1950.

Syn.: *Catapyrenium sbarbaronis* (Servít) Breuss

N - Lig.

Sq/ Ch/ S/ Terr/ pH: 3, L: 4-5, X: 4, E: 1/ Alt: 1/ MedH: vr/ PT: 1/ #/ Note: only known from the type collection, this terricolous species deserves further study. Indicator values are tentative.

Involucropyrenium tremniacense (A. Massal.) Breuss

Ann. naturhist. Mus. Wien, 98B: 40, 1996 - *Catapyrenium tremniacense* A. Massal., Lotos, 6: 79, 1856.

Syn.: *Dermatocarpon tremniacense* (A. Massal.) J. Steiner, *Involucrocarpon tremniacense* (A. Massal.) Servít, *Verrucaria tremniacensis* (A. Massal.) Nyl.

N - Ven (Lazzarin 2000b), **Piem, VA** (Piervittori & Isocrono 1999).

Sq/ Ch/ S/ Terr/ pH: 3-5, L: 4-5, X: 3-4, E: 1-3/ Alt: 2-4/ Mont: vr, SmedD: r/ PT: 1/ Note: a widespread terricolous species of open grasslands on more or less calcareous substrata, probably more common throughout the country.

Involucropyrenium waltheri (Kremp.) Breuss

Ann. naturhist. Mus. Wien, 98B: 40, 1996 - *Verrucaria waltheri* Kremp., Flora, 38: 69, 1855.

Syn.: *Catapyrenium waltheri* (Kremp.) Körb., *Dermatocarpon waltheri* (Kremp.) Blomb. & Forssell

N - TAA, Piem (Isocrono & al. 2004), **Lig.**

Sq/ Ch/ S/ Terr/ pH: 3-4, L: 4, X: 3-4, E: 1/ Alt: 4-5/ Alp: vr, Salp: er/ PT: 1/ Note: on calciferous, humus-rich soil in alpine grasslands, probably more widespread in the Alps.

Ionaspis Th. Fr. Lichenogr. Scand., 1: 273, 1871.

In spite of careful numerical taxonomic studies, the characters of *Hymenelia*, *Ionaspis* and *Eiglera* overlap considerably; the type of photobiont, which in the past was used to separate *Hymenelia* from *Ionaspis*, is now considered as irrelevant for their separation (see Lutzoni & Brodo 1995). The genus, which currently comprises 7 species, is now placed in the Hymeneliaceae. Type: *I. chrysophana* (Körb.) Stein (= *I. suaveolens*).

Ionaspis ceracea (Arnold) Hafellner & Türk

Stapfia 76: 153, 2001 - *Aspicilia ceracea* Arnold, Flora, 42: 149, 1859.

Syn.: *Hymenelia ceracea* (Arnold) M. Choisy, *Lecanora ceracea* (Arnold) Stizenb.

N - TAA, Lomb (Kantvilas 2014), **Piem** (Isocrono & al. 2003, 2004).

Cr/ Ch/ S/ Sax/ pH: 1-3, L: 2-3, X: 2, E: 1/ Alt: 3-5/ Alp: rr, Salp: r, Mont: vr/ PT: 1/ p/ Note: on siliceous rocks, including pebbles and stones near the soil, usually in upland areas; overlooked, or confused with small *Acarospora* species, to be looked for in the mountains of southern Italy. The record from Venezia Giulia in Nimis (1993: 317) has been excluded, as the locality is outside Italy. Perhaps this is a synonym of *Ionaspis lacustris*.

Ionaspis lacustris (With.) Lutzoni

in Lutzoni & Brodo, Syst. Bot., 20: 253, 1995 - *Lichen lacustris* With., Bot. Arrang. Brit. Plants, ed. 3, 4: 21, 1796.

Syn.: *Aspicilia lacustris* (With.) Th. Fr., *Hymenelia lacustris* (With.) M. Choisy, *Ionaspis hyalocarpa* Eitner, *Lecanora fulvomellea* A.L. Sm., *Lecanora lacustris* (With.) Nyl.

N - TAA (Nascimbene & al. 2007b), **Lomb, Piem** (TSB 33260), **VA** (Piervittori & Isocrono 1999, Isocrono & al. 2008, Favero-Longo & Piervittori 2009).

Cr/ Tr/ S/ Sax/ pH: 2-3, L: 3, X: 1-2, E: 1/ Alt: 3-5/ Alp: vr, Salp: r, Mont: r/ PT: 1/ 1/ Note: a cool-temperate to arctic-alpine, circumpolar species found on siliceous rocks, submerged in mountain creeks.

Ionaspis obtecta (Vain.) R. Sant.

in Santesson & al., Lichen-Forming and Lichenicolous Fungi of Fennoscandia: 141, 2004 - *Lecanora obtecta* Vain., Meddeland. Soc. Fauna Fl. Fenn., 3: 107, 1878.

Syn.: *Aspicilia obtecta* (Vain.) Hav., *Hymenelia obtecta* (Vain.) Poelt & Vězda

N - TAA (Thor & Nascimbene 2007).

Cr/ Tr/ S/ Sax/ pH: 1-2, L: 3-4, X: 2-3, E: 1/ Alt: 3-5/ Alp: vr, Salp: vr, Mont: er/ PT: 1/ 1/ Note: recently found in the Alps, this mainly northern lichen should be looked for more intensively on moist siliceous rocks, such as along creeks in upland areas.

Ionaspis odora (Schaer.) Stein

Th. Fr. ex Stein in Cohn, Krypt.-Fl. von Schlesien, 2, 2: 151, 1879 - *Gyalecta odora* Ach. ex Schaer., Lich. Helv. Spicil., 1, 6-7: 361, 1826.

Syn.: *Aspicilia odora* (Schaer.) A. Massal., *Ionaspis chrysophana* auct., *Pinacisca odora* (Schaer.) Trevis.

N - TAA (Nascimbene 2002, \ & al. 2003, Nascimbene & al. 2007b), **Lomb, Piem** (Isocrono & al. 2004), **VA** (Borlandelli & al. 1996).

Cr/ Tr/ S/ Sax/ pH: 1-2, L: 2-3, X: 1-2, E: 1/ Alt: 3-5/ Alp: r, Salp: rr, Mont: r/ PT: 1/ 1/ Note: a cool-temperate to arctic-alpine, circumpolar species found on hard siliceous rocks, amphibious near mountain creeks. For the complicated nomenclatural history see the (accepted) proposal by Lutzoni & Brodo (1994).

Ionaspis suaveolens (Fr.) Th. Fr.

Lichenogr. Scand., 1, 1: 273, 1871 - *Gyalecta suaveolens* Fr., Syst. Orb. Veg., 1: 285, 1825, *nom. cons.*

Syn.: *Aspicilia chrysophana* Körb., *Aspicilia suaveolens* (Fr.) A. Massal., *Ionaspis fuscoclavata* Eitner, *Ionaspis chrysophana* (Körb.) Stein, *Lecanora chrysophana* (Körb.) Nyl. ex Stizenb.

N - TAA (Thor & Nascimbene 2007), **Lomb, Piem** (Isocrono & al. 2004, Favero-Longo & al. 2015), **Emil**.

Cr/ Tr/ S/ Sax/ pH: 1-2, L: 2-3, X: 1-2, E: 1/ Alt: 3-5/ Alp: vr, Salp: rr, Mont: r/ PT: 1/ 1/ Note: on hard, compact, siliceous rocks in moist and rather shaded situations, mostly in upland areas. For the complicated nomenclatural history of this species see the (accepted) proposal by Lutzoni & Brodo (1994).

Jamesiella Lücking, Sérus. & Vězda

Lichenologist, 37: 165, 2005.

This genus of the Gomphillaceae, with *c.* 5 species, was segregated from *Gyalideopsis s.str.* by the presence of isidiiform hyphophores (thlasidia) in which the diahyphae are produced internally, so that the entire hyphophore is dispersed. Type: *J. anastomosans* (P. James & Vězda) Lücking, Sérus. & Vězda

Jamesiella anastomosans (P. James & Vězda) Lücking, Sérus. & Vězda

Lichenologist, 37: 165, 2005 - *Gyalideopsis anastomosans* P. James & Vězda in Vězda, Folia Geobot. Phytotaxon., 7: 209, 1972.

N - TAA (Nascimbene 2005, Nascimbene & al. 2006e). **S - Cal** (Puntillo 1996, Puntillo & Puntillo 2004).

Cr/ Ch/ A.i/ Epiph-Lign/ pH: 1-2, L: 3, X: 1-2, E: 1/ Alt: 2-3/ Mont: er, SmedH: er/ PT: 0/ oc/ Note: a mild-temperate lichen also known from New Zealand, found on bark of deciduous, rarely of coniferous trees in humid, undisturbed forests, often on twigs of *Abies*, more rarely on wooden bridges above small creeks. The species is included in the Italian red list of epiphytic lichens as “Endangered” (Nascimbene & al. 2013c).

Japewia Tønsberg

Lichenologist, 22: 205, 1990.

This genus was created to accommodate 3 corticolous “*Lecidea*”-species from cool temperate areas of the Northern Hemisphere, principally characterised by biatorine apothecia and unusually thick-walled, simple ascospores; other salient features include eight-spored asci with a conspicuous axial mass (*Lecidella*-type), hamathecium and excipulum both consisting of highly similar, branched and anastomosing, gelatinised hyphae, and capitate, brown-pigmented paraphysis tips. One species now belongs to *Japewiella*. *J. subaurifera* Muhr & Tønsberg is known from the Alps of Austria, Slovenia and Switzerland, and should be looked for in northern Italy. Type: *J. tornoënsis* (Nyl.) Tønsberg

Japewia tornoënsis (Nyl.) Tønsberg

Lichenologist, 22: 206, 1990 - *Lecidea tornoënsis* Nyl., Herbar. Mus. Fenn.: 110, 1859.

Syn.: *Biatora tornoënsis* (Nyl.) Th. Fr., *Lecidea breadalbanensis* Stirt., *Lecidea frigidella* Nyl., *Mycoblastus tornoënsis* (Nyl.) R.A. Anderson

N - Frl (Tretiach & Hafellner 2000), **Ven** (Thor & Nascimbene 2007), **TAA** (Nascimbene 2004, 2014, Nascimbene & al. 2006e, 2014, Nascimbene & Marini 2015), **VA** (TSB 29475).

Cr/ Ch/ S/ Epiph-Terr/ pH: 2-3, L: 3, X: 3, E: 1/ Alt: 3-5/ Alp: er, Salp: rc, Mont: r/ PT: 1/ Note: a circumboreal-montane species found on twigs of shrubs, on terricolous mosses and plant debris in upland areas, usually over siliceous substrata; certainly widespread throughout the Alps.

Japewiella Printzen

Bryologist, 102: 715, 2000.

This genus of the Lecanoraceae was segregated from *Japewia* to accommodate one species with a well-developed excipulum unlike that of *Japewia*, plus two additional species from temperate to subtropical latitudes. Currently, the genus comprises 5 species. Type: *J. tavaresiana* (H. Magn.) Printzen

Japewiella tavaresiana (H. Magn.) Printzen

in Hertel, *Arnoldia*, 18: 4, 2000 - *Lecidea tavaresiana* H. Magn. in Tavares, *Brotéria*, N. S., 16: 145, 1947.

Syn.: *Lecidea carrollii* Coppins & P. James, *Japewia carrollii* (Coppins & P. James) Tønsberg, *Japewiella carrollii* (Coppins & P. James) Printzen

N - Lig (Giordani & Incerti 2008). **C - Tosc** (Loppi & al. 1994, Loppi & Putorti 2001).

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 3-4, X: 2, E: 1-2/ Alt: 2/ SmedH: vr/ PT: 1/ Note: on smooth or slightly rough bark of small deciduous trees, or on branches and twigs of larger trees, in moist woodlands, especially by streams and bogs below the montane belt. The species is included in the Italian red list of epiphytic lichens as “Critically Endangered” (Nascimbene & al. 2013c).

Koerberia A. Massal.

Geneac. Lich.: 5, 1854.

This monotypic genus belonging to the newly established family Koerberiaceae (Spribille & Muggia 2013) includes a species occurring in southern Eurasia and in western North America, mostly under more or less Mediterranean conditions. Type: *K. biformis* A. Massal.

Koerberia biformis A. Massal.

Geneac. Lich.: 6, 1854.

N - Frl, Ven (Lazzarin 2000b), **Lomb, Lig** (Giordani & Incerti 2008). **C - Tosc, Marc** (Fрати & Brunialti 2006), **Umb** (Ravera 1998, Ravera & al. 2006), **Laz** (Ravera 2001, Massari & Ravera 2002, Ravera & Genovesi 2008), **Mol** (Caporale & al. 2008), **Sar** (Zedda 2002). **S - Camp** (Nimis & Tretiach 2004, Brunialti & al. 2013), **Bas** (Bartoli & Puntillo 1998), **Cal** (Puntillo 1996, Puntillo & Puntillo 2004), **Si** (Ottonello & al. 2011).

Fol.n/ Cy.h/ S/ Epiph/ pH: 2-3, L: 3-4, X: 2-3, E: 1-2/ Alt: 1-3/ Mont: vr, SmedD: er, SmedH: rr, MedH: r/ PT: 1/ suboc/ Note: a mild-temperate species found on rough bark, mostly of old deciduous trees, especially *Castanea* and *Quercus*, in humid areas; much rarer in the North than in Tyrrhenian Italy.

Koerberiella Stein

in Cohn, *Krypt.-Fl. Schlesien*, 2, 2: 143, 1879.

This genus of the Lecideaceae, including 2 species, is distinguished from *Bellemerea* primarily by the I-ascospore walls, and from other genera by the presence of a thalline exciple. Sterile forms were named differently by different authors. Type: *K. wimmeriana* (Körb.) Stein

Koerberiella wimmeriana (Körb.) Stein

in Cohn, *Krypt.-Fl. von Schlesien*, 2, 2: 143, 1879 - *Zeora wimmeriana* Körb., *Denkschr. schles. Ges. vaterl. Kultur*: 232, tab. 4, fig. 3, 1853.

Syn.: *Aspicilia acceptanda* (Nyl.) Arnold ex Hue, *Aspicilia leucophyma* (Leight.) Hue, *Aspicilia littoralis* (Vain.) Hue, *Lecanora acceptanda* Nyl., *Lecanora creatina* Norman ex Th. Fr., *Lecanora leucophyma* Leight., *Lecanora littoralis* (Vain.) Zahlbr., *Lecanora wimmeriana* (Körb.) Poetsch, *Lecanorella josiae* Frey, *Lecidea creatina* (Th. Fr.) Stizenb., *Perspicinora leucophyma* (Leight.) Riedl, *Pertusaria littoralis* Vain.

N - TAA (Nascimbene & al. 2007b), **Lomb, Piem** (Favero-Longo & al. 2015).

Cr/ Ch/ A.i/ Sax/ pH: 2-3, L: 3-4, X: 3-4, E: 1/ Alt: 3-5/ Alp: vr, Salp: vr, Mont: er/ PT: 1/ 1/ Note: an arctic-alpine, circumpolar species found on periodically wetted, base rich siliceous rocks, with optimum near and above treeline; being often sterile, it might have been largely overlooked in the Alps.

Lambiella Hertel

Beih. Nova Hedwigia, 79: 459, 1984.

This genus was established as monotypic for *L. psephota*, formerly treated as a *Rimularia*. A recent molecular study of several trapelioid genera by Resl & al. (2015) revealed the polyphyly of *Rimularia*, and brought to an expanded definition of *Lambiella*, which at the moment includes 10 species. It differs from *Rimularia* in

molecular characters, in the presence of depsidones, and perhaps in the apical apparatus of the asci. Type: *L. psephota* (Tuck.) Hertel

Lambiella furvella (Mudd) M. Westb. & Resl

in Resl & al., Fungal Divers., 73: 255, 2015 - *Lecidea furvella* Nyl. ex Mudd, Man. Brit. Lich.: 207, 1861.

Syn.: *Lecidea furvula* Nyl., *Lecidea nephaea* var. *isidiosa* Erichsen, *Lecidea orphnaeilla* Stirt., *Lecidea spongiosula* Nyl., *Rimularia furvella* (Mudd) Hertel & Rambold

S - Cal (MAF-Lich: 4390-1).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 3-4, X: 3-4, E: 2-3/ Alt: 3-5/ Alp: vr, Salp: vr, Orom: er, Mont: er/ PT: 1/ paras crustose lichens/ Note: this silicicolous species is able to invade several crustose lichens pertaining to different lineages, most often of *Rhizocarpon*-species; it certainly occurs also in the Alps, but was largely overlooked.

Lambiella insularis (Nyl.) T. Sprib.

in Spribille & al., Symb. Bot. Upsal., 37, 1: 25, 2015 - *Lecidea insularis* Nyl., Bot. Not.: 177, 1852.

Syn.: *Biatora intumescens* (Flörke ex Flot.) Hepp, *Lecidea intumescens* (Flörke ex Flot.) Nyl., *Lecidella intumescens* (Flörke ex Flot.) Arnold, *Nesolechia intumescens* (Flörke ex Flot.) Sacc. & D. Sacc., *Rimularia insularis* (Nyl.) Rambold & Hertel, *Toninia intumescens* (Flörke ex Flot.) Boistel

N - Fri (Tretiach & Hafellner 2000), **TAA** (Lecid. Exs. 279: Hertel 1992b), **Lomb, Piem** (Isocrono & al. 2003, 2004), **VA** (Piervittori & Isocrono 1999, Isocrono & al. 2008, Matteucci & al. 2015c), **Emil** (Tretiach & al. 2008), **Lig** (Brunialti & al. 1999). **C - Tosc** (Tretiach & al. 2008), **Laz, Sar** (Nöske 2000, Rizzi & al. 2011). **S - Pugl, Bas** (Puntillo & al. 2012), **Cal** (Puntillo 1996), **Si** (Brackel 2008b).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4, X: 3-4, E: 2/ Alt: 1-5/ Alp: rc, Salp: c, Orom: rr, Mont: r, SmedD: er, SmedH: vr, MedH: er/ PT: 1/ paras *Lecanora rupicola s.lat.*/ Note: a widespread holarctic lichen invading the thalli of *Lecanora rupicola s.lat.*; contrary to the host, it is absent from disturbed habitats.

Lasallia Mérat

Nouv. Fl. Envir. Paris., éd. 2, 1: 202, 1821.

A genus of the Umbilicariaceae with c. 17 species widely distributed in the northern, and to a lesser extent the southern temperate zones, mainly of the Northern Hemisphere. The circumscription of *Lasallia* was extended by Davydov & al. (2010) who included in the genus also a species with eight-spored asci. According to the new concept, *Lasallia* is distinguished from *Umbilicaria* by comprising species which combine large, multicellular, brown ascospores and a pustulate thallus. Type: *L. pustulata* (L.) Mérat

Lasallia brigantium (Zschacke) Llano

Monogr. Lich. Fam. Umbilicariaceae: 45, 1950 - *Umbilicaria brigantium* Zschacke, Verh. bot. Ver. Prov. Brandenburg, 69: 14, 1927.

C - Tosc, Sar (Nöske 2000).

Fol.u/ Ch/ S/ Sax/ pH: 2-3, L: 4-5, X: 4, E: 2-3/ Alt: 1/ MedH: vr, MedD: er/ PT: 1/ Note: on basic siliceous rocks, apparently restricted to Sardegna, Corsica, Toscana and adjacent islands, always at low altitudes and mostly near the coast.

Lasallia hispanica (Frey) Sancho & A. Crespo

Lichenologist, 21: 46, 1989 - *Umbilicaria brigantium* var. *hispanica* Frey, Ber. schweiz. bot. Ges., 59: 443, 1949.

Syn.: *Lasallia brigantium* var. *hispanica* (Frey) Llano

S - Bas (Potenza & al. 2014), **Cal** (Puntillo 1996, Potenza & al. 2011).

Fol.u/ Ch/ S/ Sax/ pH: 3, L: 4-5, X: 4, E: 2/ Alt: 3-5/ Orom: vr, Mont: vr/ PT: 1/ Note: on wind-exposed basic siliceous rocks wetted by rain, but avoiding seepage tracks, mostly in upland areas of the Mediterranean Region.

Lasallia pustulata (L.) Mérat

Nouv. Fl. Envir. Paris, 2 éd., 1: 202, 1821 - *Lichen pustulatus* L., Sp. Pl.: 1150, 1753.

Syn.: *Gyrophora pustulata* (L.) Ach., *Macrodictya pustulata* (L.) A. Massal., *Umbilicaria pustulata* (L.) Hoffm.

N - Ven, TAA (Nascimbene 2006c), **Lomb** (Dalle Vedove & al. 2004), **Piem** (Morisi & Sereno 1995, Isocrono & Falletti 1999, Isocrono & al. 2003, Morisi 2005, Isocrono & Piervittori 2008), **VA** (Piervittori & Isocrono 1999), **Emil, Lig** (Brunialti & al. 1999). **C - Tosc** (Pišút 1997), **Laz** (Genovesi & al. 2011, 2011b), **Sar** (Monte 1993, Feige & Lumbsch 1994, Nöske 2000, Rizzi & al. 2011, Cossu & al. 2015). **S - Camp, Bas** (Potenza 2006), **Cal** (Puntillo 1996), **Si** (Czeczuga & al. 1999, Ottonello 2005, Brackel 2008b).

Fol.u/ Ch/ A.i/ Sax/ pH: 2-3, L: 4-5, X: 3-4, E: 3-4/ Alt: 1-4/ Salp: vr, Orom: r, Mont: rr, SmedD: vr, SmedH: vr, MedH: er/ PT: 1/ Note: a temperate to boreal-montane, circumpolar species found on periodically wetted, but rapidly drying surfaces of basic siliceous rocks, usually in seepage tracks, with a wide altitudinal range, but usually absent above treeline. The species is widespread both in the Alps and in the mountains of Mediterranean Italy.

Lathagrium (Ach.) Gray

Nat. Arr. Brit. Pl., 1: 399, 1821 - *Collema* sect. *Lathagrium* Ach., Lichenogr. Univ.: 646, 1810.

The molecular study of the Collemataceae genera *Collema* and *Leptogium* by Otálora & al. (2014) has led to their re-circumscription, with two new genera and six old generic names resurrected, among which *Lathagrium*. This genus differs from *Collema* s.str. in spore septation and size, and by being exclusively saxicolous/terricolous, and from *Enchylium* in characteristics of the lobes and the proper exciple. *Lathagrium*, with 10 species known, forms a well-supported sister clade to *Scytinium*. The genus name was most often misspelled as "*Lethagrium*" in the old Italian lichenological literature. Type: *L. furvum* (Ach.) Gray (= *L. fuscovirens*).

Lathagrium auriforme (With.) Otálora, P.M. Jørg. & Wedin

Fungal Divers., 64: 287, 2014 - *Riccia auriformis* With., Bot. Arrang. Veget. Gr. Brit.: 704, 1776.

Syn.: *Collema auriculatum* Hoffm., *Collema auriculatum* var. *crenulatum* Flot., *Collema auriforme* (With.) Coppins & J.R. Laundon, *Collema granosum* auct. p.p., *Collema granosum* var. *auriculatum* (Hoffm.) Schaer., *Lichen granosus* Scop. nom. illegit., *Parmelia auriculata* (Hoffm.) Ach.

N - **VG** (Castello 200, Martellos & Castello 2004), **Frl** (Tretiach & Hafellner 2000, Tretiach & Molaro 2007, Breuss 2008, Brackel 2013), **Ven** (Caniglia & al. 1999, Nascimbene 2005c, 2008c, Nascimbene & Marini 2007), **TAA** (Nascimbene 2005b, 2008b), **Lomb** (Brackel 2013), **Piem** (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999), **Emil**, **Lig** (Valcuvia & al. 2000, Watson 2014, Giordani & al. 2016). **C** - **Tosc** (Tretiach & Nimis 1994, Benesperi 2011, Brackel 2015), **Marc** (Nimis & Tretiach 1999), **Umb** (Nimis & Tretiach 1999, Panfili 2000, 2007, Ravera & al. 2006), **Laz**, **Abr** (Nimis & Tretiach 1999, Brackel 2015, Caporale & al. 2016), **Mol** (Nimis & Tretiach, 1999, 2004, Caporale & al. 2008, Genovesi & Ravera 2014), **Sar**. **S** - **Camp** (Garofalo & al. 1999, 2010, Aprile & al. 2003b, Nimis & Tretiach 2004), **Pugl** (Nimis & Tretiach 1999, Brackel 2011), **Bas** (Nimis & Tretiach 1999, Potenza 2006, Brackel 2011), **Cal** (Puntillo 1996, Brackel & Puntillo 2016), **Si** (Nimis & al. 1994, 1995, Ottonello & Salone 1994, Grillo 1998, Grillo & Caniglia 2004).

Fol.b/ Cy.h/ A.i/ Sax/ pH: 3-5, L: 2-4, X: 2-3, E: 1-2/ Alt: 1-4/ Salp: vr, Orom: er, Mont: rr, SmedD: rc, Pad: er, SmedH: c, MedH: rc, MedD: er/ PT: 1-2/ Note: a temperate to southern boreal-montane, holarctic lichen found on calcicolous mosses, rarely directly on rock in sheltered situations, e.g. in woodlands or on shaded walls; usually absent above treeline and rare within settlements and in areas with intensive agriculture.

Lathagrium cristatum (L.) Otálora, P.M. Jørg. & Wedin

Fungal Divers., 64: 287, 2014 - *Lichen cristatus* L., Sp. Pl.: 1143, 1753.

Syn.: *Collema crispum* var. *cristatum* (L.) Ach., *Collema cristatum* (L.) F.H. Wigg., *Collema cristatum* var. *marginale* (Huds.) Degel., *Collema granuliferum* Nyl., *Collema hypergenum* Nyl., *Collema melaenum* (Ach.) Ach., *Collema multifidum* (Scop.) Rabenh., *Collema multifidum* var. *intermedium* Trevis., *Collema multifidum* var. *jacobaefolium* (Schränk) Rabenh., *Collema multifidum* var. *marginale* (Huds.) Rabenh., *Collema multifidum* var. *nudum* A. Massal., *Collema papulosum* Ach., *Lichen marginalis* Huds., *Lichen multifidus* Scop.

N - **VG**, **Frl** (Tretiach & Molaro 2007), **Ven** (Nascimbene & Caniglia 1997, 2003c, Caniglia & al. 1999, Lazzarin 2000b, Nascimbene 2005c, 2008c, Nascimbene & Marini 2007), **TAA** (De Benetti & Caniglia 1993, Nascimbene 2003, 2005b, 2008b, Spitale & Nascimbene 2012), **Lomb**, **Piem** (Morisi & Sereno 1995, Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999), **Emil** (Scarpa 1993, Nimis & al. 1996, Benesperi 2009), **Lig** (Valcuvia & al. 2000, Giordani & al. 2016). **C** - **Tosc** (Benesperi 2000a, 2006, Loppi & al. 2004b, Lastrucci & al. 2009, Brackel 2015), **Marc** (Nimis & Tretiach 1999), **Umb** (Nimis & Tretiach 1999, Ravera & al. 2006, Panfili 2007), **Laz** (Nimis & Tretiach 2004, Brackel 2015), **Abr** (Nimis & Tretiach 1999), **Mol** (Garofalo & al. 1999, Caporale & al. 2008, Nimis & Tretiach, 1999, 2004, Genovesi & Ravera 2014), **Sar** (Zedda & al. 2010, Cogoni & al. 2011). **S** - **Camp** (Garofalo & al. 1999, 2010, Aprile & al. 2003, 2003b, Nimis & Tretiach 2004, Roccardi & Ricci 2006), **Pugl** (Garofalo & al. 1999, Nimis & Tretiach 1999, Durini & Medagli 2002, 2004), **Bas** (Nimis & Tretiach 1999, Potenza 2006, Potenza & al. 2010), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994, 1995, Ottonello & Salone 1994, Ottonello 1996, Grillo 1998, Grillo & al. 2002, Merlo 2004, 2004b, Grillo & Caniglia 2004, Gianguzzi & al. 2009).

Fol.n/ Cy.h/ S/ Sax/ pH: 4-5, L: 4-5, X: 4-5, E: 1-3/ Alt: 1-5/ Alp: vr, Salp: rc, Orom: rc, Mont: vc, SmedD: ec, Pad: vr, SmedH: ec, MedH: ec, MedD: rc/ PT: 1-2/ Note: a widespread holarctic lichen found on exposed limestone and dolomite with some seepage of water after rain, an ecological feature which is very evident in dry Mediterranean areas, where the species is confined to rain-tracks. This is one of the most common species of the genus in Italy, with a wide altitudinal range, but it is rare in disturbed habitats. Of the two weakly distinguished varieties recognised by Degelius (1954), var. *marginale* seems to be slightly more southern and thermophilous, while the typical variety can reach the Alpine belt.

Lathagrium fuscovirens (With.) Otálora, P.M. Jørg. & Wedin

Fungal Divers., 64: 287, 2014 - *Lichen fuscovirens* With., Bot. Arrang. Veget. Gr. Brit.: 717, 1776.

Syn.: *Collema furvum* (Ach.) DC., *Collema furvum* var. *pustulosissimum* Harm., *Collema fuscovirens* (With.) J.R. Laundon, *Collema rupestre* var. *furvum* (Ach.) Rabenh., *Collema stillicidiorum* Harm., *Collema subgranosum* Harm., *Collema tuniforme* (Ach.) Ach., *Parmelia furva* (Ach.) Ach., *Lichen furvus* Ach., *Lichen tunaeformis* Ach.

N - **VG** (Castello 2002, Martellos & Castello 2004), **Frl** (Tretiach & Molaro 2007), **Ven** (Nascimbene & Caniglia 1997, Caniglia & al. 1999, Nascimbene & Marini 2007), **TAA**, **Lomb**, **Piem** (Isocrono & al. 2004, Favero-Longo & al. 2006b), **VA** (Piervittori & Isocrono 1999), **Emil**, **Lig** (Giordani & al. 2016). **C** - **Tosc** (Tretiach & Nimis 1994, Benesperi 2011), **Marc** (Nimis & Tretiach 1999), **Umb** (Nimis & Tretiach 1999, Ravera & al. 2006, Panfili 2007), **Laz**, **Abr** (Nimis & Tretiach 1999, Caporale & al. 2016), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008, Genovesi & Ravera 2014), **Sar**. **S** - **Camp** (Aprile & al. 2003b, Nimis & Tretiach 2004), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999,

Potenza 2006), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994, 1995, Grillo 1998, Grillo & Caniglia 2004, Liistro & Cataldo 2011).

Fol.b/ Cy.h/ A.i/ Sax/ pH: 4-5, L: 3-4, X: 3, E: 1-2/ Alt: 1-5/ Alp: vr, Salp: rc, Orom: vr, Mont: c, SmedD: c, Pad: vr, SmedH: c, MedH: rc, MedD: r/ PT: 1-2/ w/ Note: a widespread holarctic lichen found on calciferous rocks, more rarely on epilithic mosses, in moderately sheltered sites with some water seepage after rain, with a wide altitudinal range; one of the most common species of the genus in Italy.

Lathagrium latzelii (Zahlbr.) Otálora, P.M. Jørg. & Wedin

Fungal Divers., 64: 287, 2014 - *Collema latzelii* Zahlbr., Österr. bot. Z., 59: 493, 1909.

N - Emil (Valcuvia & Delucchi 2001). **C - Sar. S - Si** (Nimis & al. 1994).

Fol.n/ Cy.h/ S/ Sax/ pH: 3-5, L: 4-5, X: 3-4, E: 1-2/ Alt: 1-2/ SmedD: er, SmedH: er, MedH: vr/ PT: 1/ suboc, w/ Note: a mild-temperate species found on steeply inclined seepage tracks of calciferous rocks, sometimes of serpentine, usually at low elevations; overlooked, perhaps more widespread in southern Italy, but certainly not common.

Lathagrium undulatum (Flot.) Poetsch

in Poetsch & Schiedermayer, System. Aufzähl. samenlos. Pflanzen (Krypt.): 189, 1872 - *Collema undulatum* Laurer ex Flot., Linnaea, 23: 161, 1850.

Syn.: *Collema aggregatum* var. *laureri* (Flot.) Boistel, *Collema laureri* Flot., *Collema undulatum* var. *granulosum* Degel., *Lathagrium laureri* (Flot.) Arnold, *Lathagrium laureri* var. *microphyllum* Bagl. & Carestia

N - Frl, Ven (Nascimbene & Caniglia 1997, 2003c, Caniglia & al. 1999, Nascimbene 2005c, 2008c, Nascimbene & Marini 2007), **TAA** (Nascimbene 2003, 2008b, Nascimbene & al. 2005, 2006, Spitale & Nascimbene 2012), **Lomb** (Dalle Vedove & al. 2004), **Piem** (Isocrono & al. 2004, Matteucci & al. 2013), **VA** (Valcuvia 2000), **Emil** (Tretiach & al. 2008), **Lig** (Giordani & Brunialti 2000, Giordani & al. 2016). **C - Laz, Umb** (Nimis & Tretiach 1999, Ravera & al. 2006), **Abr** (Nimis & Tretiach 1999, Caporale & al. 2016), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008). **S - Camp** (Aprile & al. 2003, 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010), **Pugl, Bas** (Nimis & Tretiach 1999, Potenza 2006, Potenza & al. 2010), **Cal** (Puntillo 1996), **Si** (Grillo & Caniglia 2004, Grillo & al. 2007b).

Fol.b/ Cy.h/ S/ Sax/ pH: 5, L: 3-5, X: 4, E: 1-3/ Alt: 1-5/ Alp: er, Salp: vr, Orom: vr, Mont: rr, SmedD: vr, SmedH: vr, MedH: er/ PT: 1/ w/ Note: a temperate to arctic-alpine, probably circumpolar lichen found on calciferous rocks with some water seepage after rain, most frequent in upland areas. The record from Venezia Giulia cited by Nimis (1993: 264), being from outside Italy, is not accepted here.

Lecanactis Körb.

Syst. Lich. Germ.: 275, 1855, *nom. cons.*

Due to the unusual high level of homoplasy in morphological and chemical characters, Ertz & Tehler (2011) found that these were of limited use in delimiting taxonomic groups in Arthoniales. Some genera, among them *Lecanactis*, were found to be paraphyletic, which brought to the description of several new genera. *Lecanactis s.str.* includes now c. 25 species in tropical to temperate areas and belongs to the Roccellaceae. Type: *L. abietina* (Ach.) Körb.

Lecanactis abietina (Ach.) Körb.

Syst. Lich. Germ.: 276, 1855 - *Lichen abietinus* Ach., K. Vetensk.-Akad. Nya Handl., 16: 139, 1795.

Syn.: *Lecanactis illecebrosa* var. *megaspora* G. Merr., *Lecanactis megaspora* (G. Merr.) Brodo, *Lecidea abietina* (Ach.) Ach., *Pyrenotea leucocephala* (Ach.) Fr., *Schismatomma abietinum* (Ach.) A. Massal. *non* (Humb.) Almq.

N - Frl (Tretiach 1993, Egea & Torrente 1994), **TAA** (Nascimbene & al. 2007b), **Piem. C - Tosc** (Benespero & al. 2007), **Abr** (Stofer 2006).

Cr/ Tr/ S/ Epiph/ pH: 1-2, L: 1-2, X: 1-2, E: 1/ Alt: 2-3/ Mont: vr, SmedD: er, MedH: er/ PT: 0/ u/ Note: a cool-temperate lichen, mostly found in mixed montane forests with *Abies*, on dry undersides of trunks and old branches, in crevices of the bark, much more rarely on old *Quercus*. It is included in the Italian red list of epiphytic lichens as “Endangered” (Nascimbene & al. 2013c).

Lecania A. Massal.

Alcuni Gen. Lich.: 12, 1853.

This genus of the Ramalinaceae was found to be non-monophyletic by Reese Næsberg & al. (2007), which brought to the exclusion of some species; the closest genetic relatives are genera such as *Bilimbia*, *Mycobilimbia*, and *Biatora*. The phylogeny of the *L. cyrtella*-group was studied by Reese Næsberg (2008) with the resurrection of some species which were often considered as synonyms of *L. cyrtella*. In its present circumscription, the genus includes c. 50 species. Type: *L. fuscilla* (Schaer.) Körb.

Lecania aipospila (Wahlenb.) Th. Fr.

K. Svenska Vetensk.-Akad. Handl., 7, 2: 20, 1867 - *Parmelia aipospila* Wahlenb. in Ach., Meth. Lich. Suppl.: 36, 1803.

Syn.: *Aipospila wahlenbergii* (Ach.) Trevis., *Lecania aipospila* var. *maritima* (Sommerf.) A.L. Sm., *Lecania sampaiana* B. de Lesd., *Lecania spodophaeiza* (Nyl.) A.L. Sm., *Lecanora maritima* Sommerf., *Lecanora spodophaeiza* Nyl.

C - **Sar** (Rizzi & al. 2011). **S - Si** (Iacolino & Ottonello 2006).

Cr/ Ch/ S/ Sax/ pH: 3, L: 3-4, X: 3, E: 2-4/ Alt: 1/ MedH: er/ PT: 1/ suboc, coast/ Note: on basic siliceous rocks near the coast; the material from Sardegna is somehow different from that from the Atlantic coasts of Europe.

Lecania arenaria (Anzi) Flagey

Rev. Mycol., 17: 105, 1895 - *Biatora arenaria* Anzi, Comm. Soc. Critt. Ital., 1, 3: 153, 1862.

C - **Tosc** (Jatta 1909-1911).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 3-4, X: 3, E: 2-4/ Alt: 1-2/ SmedH: er, MedH: er/ PT: 1/ #/ Note: a poorly known species of siliceous rocks, also reported from France.

Lecania atrynoides M. Knowles

Sc. Proc. Roy. Dublin Soc., 14: 130, 1913.

Syn.: *Lecania macrocarpa* B. de Lesd.

N - **Piem, Lig. C - Tosc, Sar.**

Cr/ Ch/ S/ Sax/ pH: 1-3, L: 4, X: 3, E: 2-3/ Alt: 1-2/ SmedD: er, SmedH: er, MedH: vr/ PT: 1/ suboc, coast, paras *Caloplaca s.lat.* spp./ Note: a Mediterranean-Atlantic species of siliceous rocks, including basalt, often starting the life-cycle on species of *Caloplaca s.lat.*; most frequent in Tyrrhenian Italy.

Lecania cuprea (A. Massal.) van den Boom & Coppins

in van den Boom, Nova Hedwigia, 54: 234, 1992 - *Bilimbia cuprea* A. Massal., Lotos, 6: 77, 1856.

Syn.: *Bacidia albidocarnea* (Nyl.) Zahlbr. var. *alborubella* (Nyl.) Zahlbr., *Bacidia chlorotica sensu* Th. Fr., *Bacidia cuprea* (A. Massal.) Lettau, *Bacidia cupreorosella* (Nyl. ex Stizenb.) A. Schneid., *Bacidia prasinoides* (Nyl.) Nyl., *Biatora cupreorosella* (Stizenb.) Tuck., *Bilimbia cuprea* var. *areolata* A. Massal., *Bilimbia cuprea* var. *leprosa* A. Massal., *Catillaria herbidula* (Nyl.) Hulting *sensu* Hulting, *Catillaria umbraticula* (Nyl.) P. James, *Lecidea cupreorosella* Stizenb.

N - **VG, Frl** (TSB 16869), **Ven** (Lazzarin 2000b), **Piem** (Isocrono & al. 2004), **Lig. C - Tosc** (TSB 30001), **Laz. S - Cal** (Puntillo 1996).

Cr/ Ch/ S/ Sax/ pH: 3-5, L: 1-2, X: 2, E: 1-2/ Alt: 1-3/ Mont: r, SmedD: vr, SmedH: vr, MedH: vr/ PT: 1/ u/ Note: a mainly temperate species found on underhanging or vertical surfaces of base-rich to calciferous rocks in rather shaded places, such as in woodlands and gorges, sometimes overgrowing epilithic mosses, perhaps more widespread in Italy.

Lecania cyrtella (Ach.) Th. Fr.

Lichenogr. Scand., 1: 294, 1871 - *Lecidea cyrtella* Ach., Meth. Lich.: 67, 1803.

Syn.: *Biatora anomala* var. *cyrtella* (Ach.) Rabenh., *Biatora cyrtella* (Ach.) W. Mann, *Biatora microcyrtella* Anzi, *Biatora phacodoides* Anzi, *Biatorina cyrtella* (Ach.) Körb., *Biatorina heterobaphia* Anzi, *Biatorina pseudocyrtella* Anzi, *Catillaria heterobaphia* (Anzi) Lettau, *Lecaniella cyrtella* (Ach.) Jatta, *Lecidea austriaca* Zahlbr., *Lecidea microcyrtella* (Anzi) Jatta?, *Lecidea phacodoides* (Anzi) Jatta, *Lecidea subalpina* Zahlbr., *Sporoblastia cyrtella* (Ach.) Trevis.

N - **VG, Frl** (Hinteregger 1994), **Ven** (Lazzarin 1997, Thor & Nascimbene 2007, Nascimbene 2008, Nascimbene & al. 2008e, Nascimbene & Marini 2010), **TAA** (Hinteregger 1994, Nascimbene & al. 2007b, 2014, Svensson & Thor 2007, Zarabska & al. 2009, Nascimbene 2014, Nimis & al. 2015), **Lomb** (Anzi Lich. Lang. 516: Printzen 1995, Zocchi & al. 1997, Arosio & al. 2000, 2003, Valcuvia & Truzzi 2007b, Furlanetto 2010), **Piem** (Arosio & al. 1998, Bari & al. 2000, Piervittori 2003, Isocrono & al. 2003, 2005b, 2009, Isocrono & Piervittori 2008, Furlanetto 2010, Giordani & Malaspina 2016), **VA** (Isocrono & al. 2008, Matteucci & al. 2008, 2015d), **Emil** (Bassi 1995, Nimis & al. 1996, Valcuvia & Savino 2000, Tretiach & al. 2008), **Lig** (Giordani & Incerti 2008), **C - Tosc** (Anzi Lich. Etr. 26: Printzen 1995, Loppi & Putorti 1995b, Loppi & al. 1997, 1997b, 1998b, Loppi & Frati 2006, Paoli & al. 2012, Nascimbene & al. 2015), **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera & al. 2006, 2006b, Panfili 2007, Brackel 2015), **Laz** (Ravera & al. 1999, Munzi & al. 2007, Ravera 2008b, Brackel 2015), **Abr** (Nimis & Tretiach 1999, Brackel 2015, Corona & al. 2016), **Mol** (Nimis & Tretiach 1999, Ruisi & al. 2005, Caporale & al. 2008, Paoli & al. 2015, Genovesi & Ravera 2014), **Sar** (Zedda 2002, Rizzi & al. 2011), **S - Camp** (Aprile & al. 2002, 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010, Brunialti & al. 2013, Ravera & Brunialti 2013, Catalano & al. 2016), **Pugl** (Nimis & Tretiach 1999, Brackel 2011), **Bas** (Bartoli & Puntillo 1998, Nimis & Tretiach 1999, Paoli & al. 2006), **Cal** (Puntillo 1996, Brackel & Puntillo 2016), **Si** (Merlo 1993, Nimis & al. 1994, Ottonello & al. 1994, 2011, Grillo & Carfi 1997, Grillo 1998, Grillo & Caniglia 2004, 2006, Caniglia & Grillo 2006b, Brackel 2008b).

Cr/ Ch/ S/ Epiph/ pH: 3, L: 4-5, X: 3-4, E: 2-3/ Alt: 1-3/ Mont: rr, SmedD: vc, Pad: rr, SmedH: vc, MedH: rc, MedD: rr/ PT: 1-3/ Note: a widespread holarctic lichen found on the base-rich bark of isolated trees, e.g. on *Populus*, *Juglans*, *Fraxinus*, *Sambucus*, mostly in *Xanthorion* communities; some earlier records could refer to *L. cyrtellina* and *L. sambucina*. For further details see Reese Næsberg (2008).

Lecania cyrtellina (Nyl.) Sandst.

Abh. Naturw. Ver. Bremen, 21: 184, 1912 - *Lecanora cyrtellina* Nyl., Flora 56: 18, 1873.

Syn.: *Lecidea cyrtellina* (Nyl.) Lettau

N - **VG** (TSB 5262), **Emil** (B 60 0191315). **C - Laz** (Ravera & Genovesi 2008), **Mol** (Paoli & al. 2015), **Sar** (Cossu 2013). **S - Cal, Si** (TSB 21492).

Cr/ Ch/ S/ Epiph/ pH: 3, L: 4-5, X: 3-4, E: 2-3/ Alt: 2-4/ Salp: vr, Mont: r, SmedD: rr, Pad: r, SmedH: rr/ PT: 1-3/ Note: on the base-rich bark of more or less isolated deciduous trees. This species was not always distinguished from *L. cyrtella* by Italian authors. For further details see Reese Næsborg (2008).

***Lecania erysibe* (Ach.) Mudd**

Man. Brit. Lich.: 41, 1861 - *Lichen erysibe* Ach., Meth. Lich. Suppl.: 62, 1803.

N - **VG** (Castello 2002, Martellos & Castello 2004), **Frl** (Nimis & Salvadori 1998, Nascimbene & Salvadori 2008, Nascimbene & al. 2009b), **Ven** (Caniglia & al. 1993, Nascimbene & Salvadori 2008), **TAA**, **Lomb** (De Vita & Valcuvia 2004), **Piem**, **VA** (Piervittori & Isocrono 1999), **Emil** (Nimis & al. 1996, Bouvet 2008), **Lig** (Valcuvia & al. 2000). **C - Tosc**, **Marc** (Nimis & Tretiach 1999), **Umb** (Genovesi & Ravera 2001, Ravera & al. 2006, Genovesi 2011), **Laz** (Genovesi & al. 2011), **Abr** (Nimis & Tretiach 1999, Caporale & al. 2016), **Mol** (Ravera & Genovesi 2012, Genovesi & Ravera 2014), **Sar**. **S - Camp** (Altieri & al. 2000, Aprile & al. 2003, 2003b, Roccardi & Ricci 2006, Garofalo & al. 2010), **Pugl** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Ottonello & Salone 1994, Ottonello & al. 1994, Ottonello 1996, Caniglia & Grillo 2001, 2005, 2006, Grillo & al. 2001, Grillo & Caniglia 2004, Cataldo & Cannavò 2014).

Cr/ Ch/ A.s/ Sax/ pH: 3-5, L: 3-4, X: 3-4, E: 4-5/ Alt: 1-3/ Mont: r, SmedD: rc, Pad: rr, SmedH: rc, MedH: rr, MedD: r/ PT: 1-3/ p/ Note: a mainly temperate lichen found on calcareous substrata, often on mortar, concrete and brick walls below the subalpine belt; in the past often confused with other species.

***Lecania flavescens* Lynge**

Rep. Norw. Novaya Zemlya Exp., 43: 188, 1928.

S - Bas (Nimis & Tretiach 1999), **Cal** (Puntillo 1996).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 3-4, X: 3, E: 3-4/ Alt: 2-3/ Mont: vr, SmedH: vr/ PT: 1/ Note: on the top of calcareous boulders, including calciferous schists; probably more widespread in the mountains of the South.

***Lecania fuscella* (Schaer.) A. Massal.**

Alcuni Gen. Lich.: 12, 1855 - *Parmelia pallida* var. *fuscella* Schaer., Lich. Helvet. Spicil., 8: 397, 1839.

Syn.: *Lecania syringea* (Ach.) Th. Fr., *Lecanora hagenii* var. *syringea* (Ach.) Ach.

N - **VG**, **Ven** (Lazzarin 2000b), **TAA** (Nascimbene & al. 2007b), **Lomb** (Arosio & al. 2003), **Piem** (Arosio & al. 1998, Bari & al. 2000), **VA** (Matteucci & al. 2008, Isocrono & al. 2008), **Emil**, **Lig** (Giordani & Incerti 2008). **C - Tosc** (Loppi & Frati 2006), **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera 1998, Panfili 2000b, Ravera & al. 2006), **Laz** (Ravera 2001, Ruisi & al. 2005, Brackel 2015), **Abr** (Nimis & Tretiach 1999, Brackel 2015), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **Sar** (Zedda 2002). **S - Camp** (Aprile & al. 2003b), **Pugl**, **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 2011), **Si**.

Cr/ Ch/ S/ Epiph/ pH: 3, L: 4, X: 3-4, E: 2-4/ Alt: 1-3/ Mont: vr, SmedD: r, Pad: vr, SmedH: rr, MedH: r, MedD: vr/ PT: 1-2/ Note: a mild-temperate species found on the base-rich bark of isolated deciduous trees, especially *Populus*, *Juglans* and *Ulmus*; more frequent in the past, presently most common in southern Italy.

***Lecania hutchinsiae* (Nyl.) A.L. Sm.**

Monogr. Brit. Lich., 1: 348, 1918 - *Lecanora hutchinsiae* Nyl., Flora, 50: 326, 1867.

S - Cal (Puntillo 1996).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 3, X: 2, E: 3/ Alt: 1-2/ SmedH: vr, MedH: vr/ PT: 1/ suboc, 1/ Note: a Mediterranean-Atlantic lichen found on periodically wetted or immersed siliceous rocks, especially sandstone, in sheltered situations, mostly at low elevations; overlooked in Tyrrhenian Italy, but not common.

***Lecania inundata* (Körb.) M. Mayrhofer**

in Nimis & Poelt, Studia Geobot., 7, suppl. 1: 111, 1987 - *Biatorina inundata* Hepp ex Körb., Parerga Lichenol.: 145, 1860.

Syn.: *Catillaria italica* B. de Lesd., *Lecania erysibe* var. *granulata* B. de Lesd., *Lecania porracea* (Stizenb.) Flagey, *Lecania sbarbaronis* B. de Lesd., *Lecanora sbarbaronis* (B. de Lesd.) Zahlbr.

N - **Frl**, **Ven** (Lazzarin 2000b), **TAA**, **Piem** (Clerc & al. 1999), **VA** (Matteucci & al. 2013), **Emil** (Nimis & al. 1996), **Lig**. **C - Tosc**, **Laz**, **Sar**. **S - Camp** (Aprile & al. 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010), **Pugl** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Grillo & Caniglia 2004, Caniglia & Grillo 2005, 2006, Brackel 2008c, Liistro & Cataldo 2011).

Cr/ Ch/ S/ Sax/ pH: 3-5, L: 3-5, X: 3-4, E: 4-5/ Alt: 1-3/ Mont: r, SmedD: rc, Pad: vr, SmedH: rr, MedH: r, MedD: vr/ PT: 1-2/ Note: a mild-temperate calcicolous species, often found on man-made, more or less calciferous substrata; in the past confused with *L. erysibe* and *L. turicensis*.

***Lecania koerberiana* J. Lahm**

in Körber, Parerga Lichenol.: 68, 1859.

Syn.: *Lecania opuntiae* Bagl.

N - **TAA** (Nascimbene & al. 2007b), **Emil** (Nimis & al. 1996), **Lig**. **C - Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **Sar** (Rizzi & al. 2011). **S - Bas** (Nimis & Tretiach 1999), **Si** (Grillo 1998, Grillo & Caniglia 2004).

Cr/ Ch/ S/ Epiph/ pH: 3, L: 4-5, X: 3-4, E: 2-3/ Alt: 2-3/ Mont: vr, SmedD: rr, Pad: vr, SmedH: r/ PT: 1-2/ Note: a mild-temperate species found on nutrient-rich or -enriched bark; closely related to *L. fuscella*.

***Lecania naegelii* (Hepp) Diederich & van den Boom**

in van den Boom & al., Bull. Soc. Nat. Luxemb., 95: 154, 1994 - *Biatora naegelii* Hepp, Flecht. Eur.: nr. 19, 1853.

Syn.: *Bacidia abscondita* Erichsen, *Bacidia naegelii* (Hepp) Zahlbr., *Bilimbia aparallacta* A. Massal., *Bilimbia naegelii* (Hepp) Kremp., *Bilimbia naegelii* f. *pallescens* (Anzi) Jatta, *Bilimbia vallis-tellinae* Anzi, *Bilimbia vallis-tellinae* f. *pallescens* Anzi

N - **VG**, **Frl**, **Ven**, **TAA** (Nascimbene & al. 2007b, 2014, Nascimbene 2014), **Lomb**, **Piem** (Piervittori 2003, Isocrono & al. 2004, 2005b, 2009, Isocrono & Piervittori 2008, Matteucci & al. 2010), **Emil** (Sallese 2003), **Lig** (Valcuvia & al. 2000, Giordani & Incerti 2008). **C** - **Tosc** (Loppi & Putorti 1995, Loppi & al. 1994, 1995, 1997, 1998, 1998b, 2003, 2004c, 2006, Loppi 1996, Loppi & De Dominicis 1996, Putorti & al. 1998, Putorti & Loppi 1999, Loppi & Frati 2006, Brunialti & Frati 2010, Brackel 2015), **Marc** (Nimis & Tretiach 1999), **Umb** (Genovesi & al. 2002, Ravera & al. 2006), **Laz** (Ravera & al. 1999, Massari & Ravera 2002, Ruisi & al. 2005, Ravera 2006c, Munzi & al. 2007, Ravera 2008b, Ravera & Genovesi 2008), **Abr** (Nimis & Tretiach 1999, Caporale & al. 2016, Corona & al. 2016), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008, Brackel 2015, Paoli & al. 2015), **Sar** (Zedda 2002, 2002b, Zedda & al. 2001, Cossu 2013). **S** - **Camp** (Aprile & al. 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010, Brunialti & al. 2013, Ravera & Brunialti 2013), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Grillo & Cristaudo 1995, Grillo & Caniglia 2004, Caniglia & Grillo 2006b, Brackel 2008b, Liistro & Cataldo 2011).

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 4, X: 3, E: 1-3/ Alt: 1-3/ Mont: vr, SmedD: r, Pad: er, SmedH: rr, MedH: r/ PT: 1-2/ suboc/ Note: a mainly mild-temperate species, with optimum in the submediterranean belt, but also present within eu-Mediterranean vegetation in humid, coastal sites. The species does not belong to *Lecania s.str.* (see Reese Næsborg & al. 2007).

Lecania nylanderiana A. Massal.

Sched. Crit., 8: 152, 1856.

Syn.: *Lecania athrocarpa* Trevis., *Lecania odora* Bagl. & Carestia?, *Lecanora athrocarpa* Nyl.

N - **Frl**, **Ven** (Lazzarin 2000b, Nascimbene 2005c, 2008c, Watson 2014), **TAA** (Nascimbene & al. 2006), **Lomb** (TSB 21823), **Piem** (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999), **Emil**, **Lig**, **C** - **Laz**, **Sar**.

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 3, X: 3, E: 1-2/ Alt: 2-3/ Mont: vr, SmedD: vr, SmedH: vr/ PT: 1/ u/ Note: a temperate species found on vertical to underhanging surfaces of calcareous rocks. Several Italian records need confirmation.

Lecania olivacella (Nyl.) Zahlbr.

Cat. Lich. Univ., 5: 739, 1928 - *Lecanora olivacella* Nyl., Flora, 58: 298, 1875.

Syn.: *Lecanora subalbans* Nyl.

N - **Piem** (TSB 32902), **Lig** (Valcuvia & al. 2000). **C** - **Sar**. **S** - **Si** (Nimis & al. 1996b).

Cr/ Ch/ S/ Sax/ pH: 3-5, L: 3-4, X: 3-4, E: 2-3/ Alt: 1-4/ Salp: er, Orom: r, Mont: r, SmedD: vr, SmedH: vr, MedH: vr/ PT: 1/ Note: a widespread, but rare species found on calcareous and basic siliceous rocks, with a wide altitudinal range; to be looked for further in the Alps.

Lecania polycycla (Anzi) Lettau

Hedwigia, 52: 199, 1912 - *Rinodina polycycla* Anzi, Comm. Soc. Critt. Ital., 2, 1: 9, 1864.

Syn.: *Lecania amblyospora* (Harm.) Zahlbr., *Lecania genevensis* (Müll. Arg.) Lettau

N - **Ven**, **Piem** (Jatta 1909-1911). **C** - **Marc** (Nimis & Tretiach 1999). **S** - **Camp**, **Si** (Nimis & al. 1996b, Grillo 1998, Caniglia & Grillo 2001, 2006, Grillo & Caniglia 2004, Grillo & al. 2007b).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 4, X: 3-4, E: 3-4/ Alt: 1-4/ Salp: er, Mont: vr, SmedD: vr, SmedH: vr, MedH: vr, MedD: er/ PT: 1/ Note: a mainly temperate species of calcareous rocks, sometimes also occurring on concrete walls.

Lecania pusilla Tretiach

Lichenologist, 28: 9, 1995.

N - **VG** (Tretiach 1995), **Frl** (Tretiach 1996).

Cr/ Ch/ S/ Terr/ pH: 4-5, L: 2-3, X: 3, E: 1/ Alt: 2/ SmedD: vr/ PT: 1/ Note: a very inconspicuous lichen found on calcicolous bryophytes inside deciduous woods; to be looked for in other parts of submediterranean Italy.

Lecania rabenhorstii (Hepp) Arnold

Flora, 67: 403, 1884 - *Patellaria rabenhorstii* Hepp, Flecht. Eur.: nr. 75, 1853.

Syn.: *Biatorina rabenhorstii* (Hepp) A. Massal., *Biatorina ceramonea* A. Massal., *Biatorina proteiformis* var. *ceramonea* (A. Massal.) A. Massal., *Lecania actaea* var. *violacea* B. de Lesd., *Lecania alborubra* B. de Lesd., *Lecania algarbiensis* Cout., *Lecania erysibe* var. *ceramonea* (A. Massal.) Zahlbr., *Lecania erysibe* var. *rabenhorstii* (Hepp) Mudd, *Lecaniella rabenhorstii* (Hepp) Jatta

N - **VG**, **Frl**, **Ven** (Lazzarin 2000b), **TAA**, **Lomb**, **Piem** (Clerc & al. 1999), **VA** (Matteucci & al. 2013), **Lig**, **C** - **Tosc**, **Laz**, **Sar**. **S** - **Camp** (Ricciardi & al. 2000, Garofalo & al. 2010), **Pugl**, **Si** (Otonello & Salone 1994, Otonello & al. 1994, Caniglia & Grillo 2001, 2005, 2006, Grillo & Caniglia 2004).

Cr/ Ch/ S/ Sax/ pH: 3-5, L: 3-4, X: 3-4, E: 4/ Alt: 1-4/ Salp: er, Mont: vr, SmedD: vr, Pad: er, SmedH: rr, MedH: r/ PT: 1-2/ suboc/ Note: on more or less calciferous substrata, including concrete, tiles, cement etc., also in non-natural situations such as on walls in villages; closely related to *Lecania inundata*.

Lecania sambucina (Körb.) Arnold

Flora, 67: 416, 1884 - *Biatorina sambucina* Körb., Parerga Lichenol., 2: 137, 1860.

Syn.: *Diphrotora sambucina* (Körb.) Jatta, *Lecania cyrtella* subsp. *sambucina* (Körb.) Arnold, *Lecaniella sambucina* (Körb.) Jatta

S - Camp (Jatta 1909-1911), **Si** (Jatta 1909-1911).

Cr/ Ch/ S/ Epiph/ pH: 3, L: 4-5, X: 3-4, E: 2-3/ Alt: 1-2/ SmedD: rr, SmedH: rr, MedH: rr, MedD: r/ PT: 1-3/ Note: this species appears to prefer lichen-rich communities on old deciduous trees with rough, base-rich bark, such as *Sambucus*, *Populus*, and *Salix*. It is probably widespread throughout Europe, but very likely overlooked or mistaken for *L. cyrtella*, with which it has been often synonymised. For further details see Reese Næsberg (2008).

Lecania spadicea (Flot.) Zahlbr.

Denkschr. K. Akad. Wissensch., math.-naturw. Kl., 92: 316, 1915 - *Lecanora spadicea* Flot., Linnaea, 22: 362, 1849.

Syn.: *Bayrhofferia spadicea* (Flot.) Trevis., *Lecania spadicea* var. *gennarii* (Bagl.) J. Steiner, *Ricasolia gennarii* Bagl.

C - Tosc, Laz (Bartoli & al. 1998), **Abr, Sar, S - Camp** (Aprile & al. 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010), **Pugl** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994, Ottonello & Salone 1994, Ottonello & al. 1994, Monte & Ferrari 1996, Ottonello 1996, Grillo 1998, Caniglia & Grillo 2001, 2005, 2006, Grillo & al. 2001, Grillo & Caniglia 2004, Grillo & al. 2009).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 4-5, X: 4, E: 3-4/ Alt: 1-2/ SmedD: er, SmedH: vr, MedH: c, MedD: rr/ PT: 1-2/ Note: a mainly Mediterranean lichen found on inclined surfaces of compact calciferous rocks at relatively low elevations, especially common on walls in villages; mainly Tyrrhenian in Italy.

Lecania suavis (Müll. Arg.) Mig.

Krypt. Fl. Deutsch., Österr. u. Schweiz, 11: 331, 1926 - *Callospisma suave* Müll. Arg., Flora, 55: 472, 1872.

Syn.: *Lecania tavaresiana* Clauzade & Vězda

N - TAA (Etayo & van den Boom 1995), **Lomb** (Valcuvia 2002, 2002b), **Piem, Lig** (Valcuvia & al. 2000). **C - Sar.**

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 3-4, X: 3, E: 2-3/ Alt: 1-4/ Salp: er, Orom: vr, Mont: vr, SmedD: vr, SmedH: vr, MedH: er/ u/ PT: 1-2/ Note: on steeply inclined to underhanging surfaces of calcareous rocks, often near small cracks, but also on walls of mortar, usually below the montane belt; much overlooked and confused with other species in Italy, and probably more common.

Lecania subfuscata (Nyl.) S. Ekman

Opera Bot., 127: 134, 1966 - *Lecidea subfuscata* Nyl., Flora, 48: 604, 1865.

Syn.: *Bacidia circumpallens* (Nyl.) Arnold, *Bacidia subfuscata* (Nyl.) Th. Fr., *Lecidea circumpallens* Nyl.

N - Ven (Nascimbene 2002, 2003b, Tomaselli & al. 2006, Nascimbene 2008).

Cr/ Ch/ S/ Terr/ pH: 3-4, L: 3, X: 2-3, E: 1-2/ Alt: 2/ SmedD: vr/ PT: 1/ suboc/ Note: on more or less calciferous soil. The specimen from Veneto corresponds well to the description (*vidi!*).

Lecania sylvestris (Arnold) Arnold var. *sylvestris*

Flora, 67: 405, 1884 - *Biatora sylvestris* Arnold in Hepp, Flora, 42: 152, 1859.

Syn.: *Catillaria sylvestris* (Arnold) P. Syd.

N - Ven, Lomb, Emil, Lig (Giordani & al. 2016). **C - Tosc, Marc** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **Sar, S - Camp** (Aprile & al. 2003b), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Si** (Grillo & Caniglia 2004, Caniglia & Grillo 2005, 2006).

Cr/ Ch/ S/ Sax/ pH: 5, L: 3-4, X: 4, E: 3-4/ Alt: 1-3/ Mont: r, SmedD: rr, Pad: vr, SmedH: rr, MedH: r, MedD: vr/ PT: 1-2/ Note: a mild-temperate lichen of calcareous substrata, incl. mortar walls; probably more widespread, but never common, closely related to *Lecania hutchinsiae*.

Lecania sylvestris var. *umbratica* (Arnold) M. Mayrhofer

in Nimis & Poelt, Studia Geobot., 7, suppl. 1: 112, 1987 - *Biatorina proteiformis* f. *umbratica* Arnold, Flora, 57: 569, 1874.

N - Frl, C - Sar.

Cr/ Ch/ S/ Sax/ pH: 5, L: 3-4, X: 4, E: 3-4/ Alt: 1-3/ Mont: vr, SmedD: vr, SmedH: vr, MedH: vr/ PT: 1/ Note: a mainly temperate lichen of calcareous rocks, probably more widespread in southern Europe.

Lecania turicensis (Hepp) Müll. Arg.

Flora, 55: 386, 1862 - *Biatora turicensis* Hepp, Fl. Eur.: 8, 1853.

Syn.: *Biatorina albariella* (Nyl.) Arnold, *Biatorina proteiformis* A. Massal., *Biatorina proteiformis* var. *dispersa* A. Massal., *Biatorina rabenhorstii* var. *turicensis* (Hepp) Anzi, *Biatorina turicensis* var. *farinosa* A. Massal., *Lecania albariella* (Nyl.) Müll. Arg., *Lecania erysibe* f. *dispersa* (A. Massal.) Zahlbr., *Lecania erysibe* var. *proteiformis* (A. Massal.) Boistel, *Lecania farinosa* (A. Massal.) B. de Lesd., *Lecania phaeoleucodes* (Nyl.) Zahlbr., *Lecania proteiformis* (A. Massal.) Arnold, *Lecania subcaesia* (Nyl.) B. de Lesd., *Lecaniella rabenhorstii* var. *turicensis* (Hepp) Jatta, *Thalloidima barbeyanum* Müll. Arg.?, *Toninia barbeyana* (Müll. Arg.) Zahlbr.?

N - VG, Frl (Nimis & Salvadori 1998, Nascimbene & Salvadori 2008, Nascimbene & al. 2009b), **Ven** (Lazzarin 2000b), **TAA, Lomb** (De Vita & Valcuvia 2004, Gheza & al. 2015), **Piem** (Matteucci & al. 2013), **Emil** (Nimis & al. 1996), **Lig, C - Tosc, Marc** (Nimis & Tretiach 1999), **Umb** (Nimis & Tretiach 1999, Ravera & al. 2006, Genovesi 2011), **Laz** (Bartoli 1997b, Bartoli & al. 1998, Genovesi & al. 2011), **Abr, Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **Sar.**

S - Camp (Garofalo & al. 1999, 2010, Aprile & al. 2003b, Nimis & Tretiach 2004), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994, Poli & al. 1997, Grillo 1998, Caniglia & Grillo 2001, 2005, 2006, Grillo & al. 2001, 2002, Grillo & Caniglia 2004).

Cr/ Ch/ S/ Sax/ pH: 3-5, L: 3-4, X: 3, E: 4-5/ Alt: 1-3/ Mont: rr, SmedD: vc, Pad: rr, SmedH: vc, MedH: c, MedD: rc/ PT: 1-3/ Note: on calcareous rocks, mortar, basic siliceous rocks, brick and roofing tiles, often on man-made substrata, usually below the subalpine belt; probably the most common saxicolous species of the genus in Italy.

L e c a n o g r a p h a Egea & Torrente

Bibl. Lichenol., 54: 116, 1994.

A genus of c. 38 species in tropical, subtropical and temperate regions of both Hemispheres, presently included in the Lecanographaceae. The silicolous *L. abscondita* (Th. Fr.) Egea & Torrente is known from the Alps of Austria. See also comment on the genus *Paralecanographa*. Type: *L. lyncea* (Sm.) Egea & Torrente

Lecanographa amylacea (Pers.) Egea & Torrente

Bibl. Lichenol., 54: 122, 1994 - *Lichen amylaceus* Ehrh. ex Pers., Plant. Crypt. Exsicc.: 303, 1793.

Syn.: *Lecanactis amylacea* (Pers.) Arnold, *Lecanactis illecebrosa* (Dufour) Fr., *Lecidea farinosa* (Ach.) Röhl. non H. Magn., *Opegrapha illecebrosa* Dufour, *Schismatomma illecebrosus* (Dufour) A. Massal.

N - Ven (Nascimbene & Marini 2010), **TAA** (Nascimbene & al. 2007b), **Lig** (Giordani & al. 2009, Giordani & Incerti 2008), **C** - **Tosc, Laz** (Ravera & al. 1999, 2000, Munzi & al. 2004, 2007), **Sar** (Rizzi & al. 2011), **S** - **Pugl** (Durini & Medagli 2004), **Bas** (Potenza 2006, Potenza & al. 2010, Potenza & Fascetti 2012), **Cal** (Puntillo 1996, Incerti & Nimis 2006, Brackel & Puntillo 2016), **Si** (Nimis & al. 1994, Ottonello & al. 2011).

Cr/ Tr/ S/ Epiph/ pH: 1-2, L: 3-4, X: 2, E: 1/ Alt: 1-2/ SmedD: er, SmedH: vr, MedH: r/ PT: 0/ suboc, u/ Note: a mild-temperate, mainly western lichen found on isolated, old deciduous trees with acid bark, especially oaks, on faces seldom wetted by rain.

Lecanographa farinosa (Hepp) Egea & Torrente

Bibl. Lichenol., 54: 130, 1994 - *Opegrapha farinosa* Hepp in Stizenberger, N. Acta Leopoldin.-Carolin., 32, 4: 6, 1865.

Syn.: *Lecanactis farinosa* (Hepp) Egea, Torrente & Manrique

C - **Sar** (Egea & al. 1993, Egea & Torrente 1994).

Cr/ Tr/ S/ Sax/ pH: 2-3, L: 3-4, X: 1-2, E: 1/ Alt: 1/ MedH: vr/ PT: 1/ coast, u/ Note: a species known from the coasts of the Mediterranean Region, from Portugal to Tunisia, found beneath overhangs of coastal siliceous rocks protected against salt-spray.

Lecanographa lyncea (Sm.) Egea & Torrente

Bibl. Lichenol., 54: 142, 1994 - *Lichen lynceus* Sm. in Smith & Sowerby, Engl. Bot., 12: 809, 1801.

Syn.: *Lecanactis emersa* (Müll. Arg.) Stizenb., *Lecanactis lyncea* (Sm.) Fr., *Lecanactis plocina* (Ach.) A. Massal. non auct., *Lecanactis stictica* Durieu & Mont., *Opegrapha caesia* Ach. non DC., *Opegrapha emersa* Müll. Arg., *Opegrapha lyncea* (Sm.) Hook., *Opegrapha stictica* (Durieu & Mont.) Nyl., *Opegrapha vestita* Müll. Arg.

N - Ven, **TAA** (Dalla Torre & Sarnthein 1902, Nascimbene & al. 2007b), **Lomb, Lig, C** - **Tosc, Laz** (Egea & Torrente 1994), **Abr, S** - **Camp, Pugl** (Nimis & Tretiach 1999, Durini & Medagli 2004), **Bas**.

Cr/ Tr/ S/ Epiph/ pH: 1-2, L: 3-4, X: 2, E: 1/ Alt: 1-2/ SmedD: er, SmedH: vr, MedH: er/ PT: 0/ suboc, u/ Note: a mild-temperate, mainly western lichen found on the rough, acid bark of very old isolated trees, especially oaks; declining, especially in northern Italy, and presently mainly Tyrrhenian.

Lecanographa weneri (Faurel, Ozenda & Schotter) Egea & Torrente

Bibl. Lichenol., 54: 163, 1994 - *Opegrapha weneri* Faurel, Ozenda & Schotter, Bull. Soc. Hist. Nat. Afrique N., 44: 41, 1953.

Syn.: *Lecanactis weneri* (Faurel, Ozenda & Schotter) Egea & Torrente

C - **Sar** (Egea & Torrente 1994).

Cr/ Tr/ S/ Sax/ pH: 2-3, L: 3-4, X: 2, E: 1/ Alt: 1/ MedH: vr/ PT: 1/ coast, u/ Note: a southern Mediterranean species, hitherto known from North Africa and southwestern Europe, found beneath overhangs of siliceous rocks protected against salt-spray, usually along the coasts.

L e c a n o r a Ach.

in Luyken, Tent. Hist.: 90, 1809.

Lecanora in the traditional sense of Zahlbruckner was an artificial assemblage of species, and several genera have been split off over the years. In its present circumscription, it remains one of the largest genera of lichenised ascomycetes, with c. 550 species traditionally characterised by hyaline, non-septate ascospores, *Lecanora*-type asci, the presence of a thalline apothecial margin (lecanorine apothecia), and predominantly crustose, more rarely lobate thalli containing green-algal photobionts. *Lecanora* is still a heterogeneous assemblage of different groups, several of which probably deserve generic rank, but comprehensive molecular

work on the phylogeny of the Lecanoraceae is still in preliminary stages and hampered by the sheer size of the genus. Several groups have been recognised at various taxonomic levels, e.g. the *L. dispersa*-group (Śliwa & al. 2012, Zhao & al. 2015, here treated as *Myriolecis*), the *L. muralis*-group (here under *Protoparmeliopsis*), the *L. polytropa*- and *L. varia*-groups (Pérez-Ortega & al. 2010), the *L. rupicola*-group (Grube & al. 2004), and the *L. subfusca*-group (the core of the genus). Although the phylogenetic relationships among groups are still largely unresolved, recent molecular studies largely confirmed that some are in itself heterogeneous. The phylogenetic relationships between the major clades of *Lecanora* are still largely unresolved, and require more intensive taxon and character sampling. Type: *L. subfusca* (L.) Ach.

Lecanora aitema (Ach.) Hepp

Flecht. Eur.: nr. 69, 1853 - *Lecidea aitema* Ach., K. Vetensk.-Akad. Nya Handl., 29: 261, 1808.

Syn.: *Lecanora symmicta* var. *aitema* (Ach.) Th. Fr., *Lecanora symmicta* var. *saepincola* (Ach.) Nyl., *Lecanora symmicta* var. *aitema* (Ach.) Nyl.

N - Frl, TAA (Dalla Torre & Sarnthein 1902, Nascimbene & al. 2007b), **Lomb, Piem** (Isocrono & al. 2004). **C - Tosc.**

Cr/ Ch/ S/ Epiph-Lign/ pH: 1-2, L: 4, X: 3, E: 1-2/ Alt: 3-4/ Salp: vr, Orom: er, Mont: vr/ PT: 1/ Note: on twigs of *Calluna* and other shrubs, more rarely on lignum and bark of coniferous trees and oaks. Closely related to *L. symmicta*, this species is included in the Italian red list of epiphytic lichens as "Endangered" (Nascimbene & al. 2013c).

Lecanora albella (Pers.) Ach.

Lichenogr. Univ.: 369, 1810 - *Lichen albellus* Pers., N. Ann. Bot., 5: 18, 1794.

Syn.: *Lecanora albella* var. *cinerella* Flörke, *Lecanora pallida* (Schreb.) Rabenh. non Chévall., *Lecanora peralbella* Nyl., *Lecanora pseudopallida* Gyeln., *Lecanora scrupulosa* auct., *Lecanora subalbella* Nyl., *Lichen pallidus* Schreb., *Patellaria pallida* (Schreb.) Trevis.

N - VG (Carvalho 1997), **Frl** (Badin & Nimis 1996), **Ven, TAA** (Hinteregger 1994, Nascimbene & Caniglia 2000b, Nascimbene & al. 2007b, Zarabska & al. 2009, Nimis & al. 2015), **Lomb, Piem** (Morisi & Sereno 1995, Arosio & al. 1998, Isocrono & al. 2003, Giordani & Malaspina 2016), **VA** (Matteucci & al. 2008, Isocrono & al. 2008), **Emil** (Benesperi 2009), **Lig** (Brunialti & Giordani 2003, Giordani 2006, Giordani & Incerti 2008). **C - Tosc** (Putorti & al. 1999c, Benesperi 2006), **Marc, Umb** (Ravera 2000, Panfilo 2000, Ravera & al. 2006), **Laz** (Massari & Ravera 2002, Stofer 2006, Zucconi & al. 2013), **Sar** (Zedda 2002, Rizzi & al. 2011). **S - Camp** (Ricciardi & al. 2000, Aprile & al. 2002, Brunialti & al. 2013, Ravera & Brunialti 2013), **Pugl** (Nimis & Tretiach 1999), **Bas** (Potenza 2006), **Cal** (Puntillo 1996), **Si** (Merlo 1993, Ottonello & al. 1994).

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 3, X: 2, E: 1/ Alt: 2-3/ Mont: rr, SmedD: vr, SmedH: vr/ PT: 1/ Note: a mainly temperate, perhaps holarctic lichen found on smooth bark, especially of *Fagus*, but also of *Abies* in woodlands; apparently more frequent in the past, but perhaps formerly confused with *L. subcarpineae*.

Lecanora albellula (Nyl.) Th. Fr.

Lichenogr. Scand., 1, 1: 266, 1871 - *Lecidea albellula* Nyl., Not. Sällsk. Fauna Fl. Fenn. Förh., Ny Ser. 8: 147, 1866.

Syn.: *Lecanora cembricola* Nyl., *Lecanora effusella* Hedl., *Lecanora glaucella* (Flot.) Nyl., *Lecanora ochromma* Nyl., *Lecanora ochrostoma* Hepp, *Lecanora ochrostomoides* Nyl., *Lecanora piniperda* Körb., *Lecanora piniperda* var. *glaucella* (Flot.) Körb.

N - Frl, Ven (TSB 7812), **TAA** (Nascimbene & al. 2014, Nascimbene 2014, Nascimbene & Marini 2015), **Lomb** (Valcuvia & Truzzi 2007b), **Piem** (Isocrono & al. 2004), **VA** (Valcuvia 2000), **Emil** (van den Boom & Brand 2008), **Lig, C - Tosc, Abr** (Nimis & Tretiach 1999). **S - Cal** (Puntillo 1996, van den Boom & Brand 2008), **Si** (Falco Scampatelli 2005).

Cr/ Ch/ S/ Epiph-Lign/ pH: 1-2, L: 4-5, X: 3-4, E: 1/ Alt: 3-4/ Salp: rc, Mont: er/ PT: 1/ Note: a probably circumboreal-montane species of hard lignum and acid bark, usually in upland areas, with a mainly western distribution in Europe; certainly widespread throughout the Alps, and becoming rarer southwards.

Lecanora allophana (Ach.) Nyl. f. *allophana*

Flora, 55: 250, 1872 - *Lecanora subfusca* f. *allophana* Ach., Syn. Meth. Lich.: 158, 1814.

Syn.: *Lecanora carpathica* Zahlbr. non Zschacke, *Lecanora subfusca* (L.) Ach. nom. rej. non auct.

N - VG (Castello 1996), **Frl** (Badin & Nimis 1996), **Ven** (Lazzarin 1997, Caniglia & al. 1999, Valcuvia & al. 2000c), **TAA** (Nascimbene & al. 2007b), **Lomb** (Grieco & Groppali 1995, Zocchi & al. 1997, Arosio & al. 2000, 2003, Valcuvia & al. 2003), **Piem** (Caniglia & al. 1992, Arosio & al. 1998, Isocrono & Falletti 1999, Piervittori 2003, Isocrono & al. 2003, 2005b, Griselli & al. 2003, Isocrono & Piervittori 2008, Giordani & Malaspina 2016), **VA** (Piervittori & Maffei 1996, Piervittori & Isocrono 1999, Valcuvia & al. 2000b, Matteucci & al. 2008c), **Emil** (Valcuvia & Grieco 1995, Bassi 1995, Morselli & Regazzi 2006, Gerdol & al. 2014), **Lig** (Valcuvia & al. 2000, Giordani & al. 2002, Giordani & Incerti 2008). **C - Tosc** (Tretiach & Nimis 1994, Loppi & al. 1996c, 1997, 1997b, 2002, Lorenzini & al. 2003, Benesperi 2006, 2011, Benesperi & al. 2007, Paoli & Loppi 2008), **Marc** (Nimis & Tretiach 1999, Frati & Brunialti 2006), **Umb** (Ravera 1998, Ravera & al. 2006), **Laz** (Ravera 2002, Massari & Ravera 2002, Brackel 2015), **Abr** (Olivieri & Pacioni 1996, Olivieri & al. 1997, 1997b, Loppi & al. 1999, Nimis & Tretiach 1999, Stofer 2006, Caporale & al. 2016, Corona & al. 2016), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008, Ravera & al. 2010, Genovesi & Ravera 2014, Paoli & al. 2015), **Sar** (Zedda 2002, Rizzi & al. 2011). **S - Camp** (Aprile & al. 2002, 2003b, Garofalo & al. 2010, Brunialti & al. 2013, Ravera & Brunialti 2013, Catalano & al. 2016), **Pugl, Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1995, 1996), **Si** (Ottonello & al. 1994, Grillo & Cristaudo 1995, Grillo 1998, Grillo & Caniglia 2004, Brackel 2008c).

Cr/ Ch/ S/ Epiph/ pH: 3, L: 4-5, X: 3-4, E: 3/ Alt: 2-3/ Mont: rr, SmedD: r, Pad: er, SmedH: rr, MedH: er/ PT: 1-2/ Note: a mainly temperate lichen found on isolated deciduous trees with base-rich bark, especially

Juglans, *Acer* and *Fraxinus*, often along roads; most frequent in slightly continental areas, rare or absent in heavily disturbed areas of northern (e.g. the Po-plain) and Mediterranean Italy.

***Lecanora allophana* f. *sorediata* Vain.**

Meddeland. Soc. Fauna Fl. Fenn., 3: 103, 1878.

N - **Frl. C - Marc** (Nimis & Tretiach 1999).

Cr/ Ch/ A.s/ Epiph/ pH: 3, L: 4, X: 3, E: 3/ Alt: 2-3/ Mont: vr, SmedD: vr/ PT: 1-2/ Note: this taxon was sometimes considered as a synonym of *L. impudens*. According to Lendemmer & al. (2013) the two taxa, although similar in general appearance, have a different chemistry. This morph is included in the Italian red list of epiphytic lichens as "Data Deficient" (Nascimbene & al. 2013c).

***Lecanora alpigena* (Ach.) Cl. Roux**

in Roux & al., Bull. Soc. linn. Provence, num. spéc. 14: 108, 2011 - *Lecanora varia* var. *alpigena* Ach., Lichenogr. Univ.: 379, 1810.

Syn.: *Lecanora polytropa* var. *alpigena* (Ach.) Rabenh.

N - **Frl, Ven, TAA, Lomb, Piem** (Isocrono & al. 2003, 2004, 2006, Isocrono & Piervittori 2008), **VA** (Piervittori & al. 1998, 2004, Piervittori & Isocrono 1999), **Emil, Lig** (TSB 34373b).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 3-5, X: 3-4, E: 1-2/ Alt: 4-5/ Alp: c, Salp: rr/ PT: 1/ Note: on siliceous or slightly calciferous rocks in upland areas, with optimum above treeline.

***Lecanora anopta* Nyl.**

Flora, 56: 292, 1873.

Syn.: *Lecidea anopta* (Nyl.) Lettau

N - **Ven, TAA** (Nascimbene & al. 2007b). **C - Sar** (Zedda & Sipman 2001).

Cr/ Ch/ S/ Lign-Epiph/ pH: 1-2, L: 3-4, X: 2-3, E: 1/ Alt: 3-4/ Salp: r, Mont: vr/ PT: 1/ Note: on decorticated trunks, more rarely on the bark of conifers in upland areas; probably more widespread in the Alps. The sample from Sardinia deviates in having paler apothecia and a yellowish epihymenium.

***Lecanora argentata* (Ach.) Malme**

Lich. Suec. Exs.: nr. 5, 1897 - *Parmelia subfusca* var. *argentata* Ach., Meth. Lich.: 169, 1803.

Syn.: *Lecanora subfusca* auct. p.p., *Lecanora subfuscata* H. Magn., *Lecanora subrugosa* Nyl.

N - **VG** (Carvalho 1997), **Frl, Ven** (Nimis & al. 1996c, Lazzarin 1997, 2000, Nascimbene & Caniglia 2002c, 2003c, Nascimbene & al. 2006c, 2006e, 2007, 2008e, 2013b, Nascimbene & Marini 2007, Nascimbene 2008c), **TAA** (Nascimbene & Caniglia 2000b, Caniglia & al. 2002, Nascimbene 2003, 2006c, 2014, Nascimbene & al. 2005, 2006, 2006e, 2007b, 2009, 2010, 2014, Watson 2014, Nascimbene & Marini 2015, Nimis & al. 2015), **Lomb** (Alessio & al. 1995, Grieco & Groppali 1995, Zocchi & al. 1997, Dalle Vedove & al. 2004, Nascimbene & al. 2006e, Valcuvia & Truzzi 2007b), **Piem** (Caniglia & al. 1992, Arosio & al. 1998, Piervittori 1998, 2003, Griselli & al. 2003, Isocrono & al. 2004, 2005b, 2006, Isocrono & Piervittori 2008, Giordani & Malaspina 2016), **VA** (Valcuvia 2000, Isocrono & al. 2008), **Emil** (Bassi 1995, Nimis & al. 1996, Dalle Vedove & al. 2002, Tretiach & al. 2008, Benesperi 2009, Loppi 2014), **Lig** (Putorti & al. 1999b, Giordani 2006, Giordani & Incerti 2008). **C - Tosc** (Tretiach & Nimis 1994, Loppi 1996, Loppi & De Dominicis 1996, 1996b, Monaci & al. 1997, Loppi & al. 1997, 1997b, 1999a, 2006, Putorti & Loppi 1999b, Laganà & al. 2002, Benesperi & al. 2007, Brunialti & Frati 2010, Benesperi 2011, Paoli & al. 2012), **Umb** (Ravera 1998, Ravera & al. 2006), **Marc** (Recchia & al. 1989, Nimis & Tretiach 1999, Brackel 2015), **Laz** (Bartoli & al. 1997, Ravera 2002, 2006c, Massari & Ravera 2002, Ruisi & al. 2005, Munzi & al. 2007), **Abr** (Olivieri & al. 1997, 1997b, Loppi & al. 1999, Nimis & Tretiach 1999, Stofer 2006, Brackel 2015, Corona & al. 2016), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008, Ravera & al. 2010, Paoli & al. 2011, 2015), **Sar** (Zedda & Sipman 2001, Zedda 2002, Rizzi & al. 2011, Cossu 2013). **S - Camp** (Ricciardi & al. 2000, Nimis & Tretiach 2004, Brunialti & al. 2010, 2013, Garofalo & al. 2010, Ravera & Brunialti 2013), **Pugl** (Nimis & Tretiach 1999), **Bas** (Bartoli & Puntillo 1998, Nimis & Tretiach 1999), **Cal** (Puntillo 1995, 1996, Incerti & Nimis 2006), **Si** (Ottonello & al. 1994, 2011, Grillo & Cristaudo 1995, Ottonello & Romano 1997, Grillo 1998, Grillo & Caniglia 2004, Di Martino & Stancanelli 2015).

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 3-4, X: 3, E: 1-2/ Alt: 2-4/ Salp: r, Mont: ec, SmedD: vr, Pad: er, SmedH: r/ PT: 1-2/ Note: a widespread, temperate to southern boreal-montane lichen with optimum on smooth bark, especially of *Fagus*. The synonymisation of *L. subrugosa* with this species is supported by molecular data (Malíček *in litt.*, see also Malíček 2014).

***Lecanora argopholis* (Ach.) Ach.**

Lichenogr. Univ.: 346, 1810 - *Parmelia atra* var. *argopholis* Ach., Meth. Lich. Suppl.: 32, 1803.

Syn.: *Lecanora blyttii* (Fr.) Schaer., *Lecanora frustulosa* auct. p.p., *Lecanora frustulosa* var. *argopholis* (Ach.) Fr., *Lecanora thiodes* Spreng., *Patellaria frustulosa* var. *thiodes* (Spreng.) Trevis., *Schistoplaca argopholis* (Ach.) Brusse

N - **Ven, TAA, Lomb, Piem** (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999), **Lig. C - Tosc, Sar. S - Camp.**

Cr/ Ch/ S/ Sax/ pH: 3-4, L: 4-5, X: 4, E: 2-3/ Alt: 3-4/ Salp: er, Orom: er, Mont: er/ PT: 1/ Note: a holarctic lichen found on base-rich, sometimes weakly calciferous siliceous rocks, occasionally on detritus, bryophytes and other lichens (e.g. on *Psora globifera*); most frequent in the Alps.

***Lecanora atromarginata* (H. Magn.) Hertel & Rambold**

in Elvebakk & Hertel, Norsk Polarinst. Skr., 198: 1996 - *Lecidea atromarginata* H. Magn. Meddel. Göteborg. Bot. Trädg., 6: 95, 1931 ("1930").

N - **Ven** (Hertel & Schuhwerk 2010), **TAA** (Hertel & Schuhwerk 2010).

Cr/ Ch/ S/ Sax/ pH: 3-4, L: 4, X: 3, E: 1-2/ Alt: 4-6/ Alp: r, Salp: r, B:/ PT: 1/ Note: a holarctic species found on calciferous sandstone and basalt, with optimum above treeline, up to the nival belt; closely related to *Lecanora marginata*, differing mainly in chemistry (usnic and stictic acids).

Lecanora bicincta Ramond var. *bicincta*

Mém. Acad. Roy. Sc. France, 6: 248, 1825.

Syn.: *Lecanora glaucoma* var. *bicincta* (Ramond) Nyl., *Lecanora rupicola* var. *bicincta* (Ramond) Clauzade & Cl. Roux, *Lecanora sordida* var. *bicincta* (Ramond) Th. Fr.

N - Frl (Tretiach & Hafellner 2000), **Lomb, Piem** (Isocrono & al. 2004, Giordani & al. 2014, Favero-Longo & al. 2015), **VA** (Piervittori & Isocrono 1999, Piervittori & al. 2004), **Lig. C - Sar. S - Cal** (Puntillo 1996).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 3-5, X: 3, E: 1-2/ Alt: 3-5/ Alp: vc, Salp: rc, Orom: vr, Mont: er/ PT: 1/ u/ Note: a holarctic lichen found on vertical to underhanging surfaces of hard siliceous rocks. According to Roux & coll. (2014) this is just a morphotype of *L. rupicola*, transitional forms being common (see also Grube & al. 2004).

Lecanora bicincta var. *sorediata* (Flot.) Leuckert & Poelt

Nova Hedwigia, 49: 147, 1989 *comb. inval.* - *Zeora glaucoma* f. *sorediata* Flot., Lich. Exs., 369: 123, 1849.

N - Frl, Lomb, Piem (TSB 33165), **Lig** (TSB 33474). **C - Sar.**

Cr/ Ch/ A.s/ Sax/ pH: 2-3, L: 3-4, X: 3, E: 2-3/ Alt: 3-5/ Alp: r, Salp: rr, Orom: er, Mont: er/ PT: 1/ u/ Note: probably more widespread, at least in the Alps, but overlooked, and certainly not common. See also note on var. *bicincta*.

Lecanora boligera (Th. Fr.) Hedl.

Bih. K. Svenska Vetensk.-Akad. Handl., 18, 3, 3: 42, 1892 - *Lecidea fuscescens* f. *boligera* Norman ex Th. Fr., Lichenogr. Scand., 2: 461, 1874.

Syn.: *Biatora nylanderii* auct. non Anzi

N - Frl.

Cr/ Ch/ S/ Epiph-Terr/ pH: 1-2, L: 4-5, X: 3-4, E: 1/ Alt: 4-5/ Alp: vr, Salp: rc/ PT: 1/ Note: a circumboreal-montane species found on twigs of *Rhododendron* and other shrubs in open, often windy situations, on the top of small branches, sometimes on plant debris and lignum, with optimum near treeline; certainly widespread throughout the Alps.

Lecanora cadubriae (A. Massal.) Hedl.

Bih. K. Svenska Vetensk.-Akad. Handl., 18: 48, 1892 - *Biatora cadubriae* A. Massal., Geneac. Lich.: 20, 1854.

Syn.: *Biatora admixta* Th. Fr., *Biatora aitema sensu* A. Massal., *Lecanora nitida* auct.?, *Lecidea cadubriae* (A. Massal.) Th. Fr., *Lecidea magnussoniana* Hertel, *Lecidea nitida* Sommerf., *Lecidea subinsequens* Nyl.

N - Frl, Ven (Lazzarin 2000b, Nascimbene & Caniglia 2003c, Nascimbene & al. 2006e, Nascimbene 2008c, Watson 2014), **TAA** (Nascimbene & al. 2006, 2006e, 2007b, 2009, 2010, 2014, Thor & Nascimbene 2007, Nascimbene 2008b, 2013, 2014, Nascimbene & Marini 2015, Nimis & al. 2015), **Lomb** (Nascimbene & al. 2006e), **Piem** (Isocrono & al. 2004), **VA** (Loppi 2014). **C - Tosc** (Benesperi & al. 2007).

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 3, X: 2-3, E: 1/ Alt: 3-4/ Salp: rr, Mont: vr/ PT: 1/ Note: a circumboreal-montane species found on the bark of conifers, especially near the base of the trunks, more rarely on lignum of decorticated trunks, with optimum in the upper montane and subalpine belts.

Lecanora caesiosora Poelt

Denkschr. Regensb. Bot. Gs., 26: 82, 1966.

Syn.: *Lecanora cenisia* var. *soredians* Suza, *Lecanora soralifera* H. Magn. non (Suza) Räsänen

N - Piem (TSB 33270).

Cr/ Ch/ A.s/ Sax/ pH: 2-3, L: 4, X: 3-4, E: 1-3/ Alt: 3-4/ Salp: vr, Mont: vr/ PT: 1/ m/ Note: on hard siliceous rocks in upland areas; very much overlooked, but certainly not common.

Lecanora calabrica M. Brand & van den Boom

in van den Boom & Brand, Lichenologist, 40: 470, 2008.

C - Laz (van den Boom & Brand 2008), **Abr** (van den Boom & Brand 2008). **S - Camp** (van den Boom & Brand 2008), **Cal** (van den Boom & Brand 2008).

Cr/ Ch/ S/ Epiph-Lign/ pH: 2-3, L: 3-4, X: 3, E: 2-3/ Alt: 2-3/ Mont: rc, SmedD: er, SmedH: er/ PT: 1/ p/ Note: a recently-described species growing on the smooth bark of *Abies* and broad-leaved deciduous trees in mountain areas, apparently not uncommon in the southern part of the Italian Peninsula and also known from Croatia. It is superficially very similar to *Myriolecis hagenii*, differing in the chemistry and in the wider, subglobose spores. Several samples of *M. hagenii* reported from upland areas of central and southern Italy should be checked against this species.

Lecanora campestris (Schaer.) Hue

Bull. Soc. Bot. France, 35: 47, 1888 - *Parmelia subfusca* var. *campestris* Schaer., Lich. Helv. Spicil., 2, 8: 391, 1839.

Syn.: *Lecanora atra* var. *expansa* Ach., *Lecanora genuensis* B. de Lesd., *Lecanora ossicola* Erichsen, *Lecanora subfusca* var. *campestris* (Schaer.) Rabenh., *Lecanora subfusca* var. *trachytica* A. Massal., *Lecanora subglabrata* Werner, *Lecanora viridans* Maheu & Werner

N - VG (Castello 2002, Martellos & Castello 2004, Tretiach & al. 2007b), **Frl, Ven** (Lazzarin 2000b), **TAA, Lomb, Piem** (Isocrono & al. 2004, Isocrono & Piervittori 2008), **VA, Emil** (Nimis & al. 1996, Valcuvia & Savino 2000, Tretiach & al. 2008), **Lig** (Lumbsch 1994, Valcuvia & al. 2000, Giordani & al. 2016). **C - Tosc, Marc** (Nimis & Tretiach 1999), **Umb** (Panfili 2000b, 2007, Ravera & al. 2006, Genovesi 2011), **Laz** (Bartoli 1997b, Bartoli & al. 1998, Pietrini & al. 2008, Genovesi & al. 2011, Zucconi & al. 2013), **Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008, Ravera & al. 2009, Genovesi & Ravera 2014), **Sar** (Monte 1993, Rizzi & al. 2011, Cossu & al. 2015). **S - Camp** (Ricciardi & al. 2000, Aprile & al. 2003b, Nimis & Tretiach 2004, Catalano & al. 2016), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994, 1995, Ottonello & al. 1994, 2011, Ottonello 1996, Ottonello & Romano 1997, Grillo 1998, Grillo & al. 2001, Grillo & Caniglia 2004, Brackel 2008b, Cataldo & Cannavò 2014).

Cr/ Ch/ S/ Sax/ pH: 2-4, L: 4-5, X: 3, E: 2-3/ Alt: 1-4/ Salp: vr, Orom: vr, Mont: rr, SmedD: c, Pad: rr, SmedH: c, MedH: rc, MedD: r/ PT: 1-3/ Note: a widespread holarctic lichen found mostly on basic siliceous rocks, especially hard sandstone, often on small stones or on surfaces not far from the ground; calcicolous forms are quite frequent in southern Italy.

***Lecanora carpinea* (L.) Vain.**

Meddeland. Soc. Fauna Fl. Fenn., 14: 23, 1888 - *Lichen carpineus* L., Sp. Pl., 2: 1141, 1753.

Syn.: *Lecanora albella* var. *angulosa* (Schreb.) Flot., *Lecanora angulosa* (Schreb.) Ach., *Lecanora chondrotypa* Ach., *Lecanora cinerella* auct. non (Flörke) Rabenh., *Lecanora eriksonii* H. Magn., *Lecanora pallida* var. *angulosa* (Schreb.) Rabenh.

N - VG (Castello 1996, Castello & Skert 2005), **Frl** (Badin & Nimis 1996, Castello & Skert 2005, Bernini & al. 2010), **Ven** (Nimis & al. 1996c, Nascimbene & Caniglia 1997, Lazzarin 1997, Caniglia & al. 1999, Valcuvia & al. 2000c, Nascimbene 2005c, 2008, 2008c, Nascimbene & al. 2007, 2013b, Nascimbene & Marini 2007, 2010, Brackel 2013), **TAA** (De Benetti & Caniglia 1993, Nascimbene & Caniglia 2000b, 2002c, Nascimbene 2003, 2005b, 2006b, 2008b, 2014, Nascimbene & al. 2005, 2006, 2006e, 2007b, 2014, Nimis & al. 2015), **Lomb** (Arosio & Rinaldi 1995, Grieco & Groppali 1995, Alessio & al. 1995, Zocchi & al. 1997, Arosio & al. 2003, Valcuvia & al. 2003, Nascimbene & al. 2006e, Valcuvia & Truzzi 2007b, Furlanetto 2010, Gheza & al. 2015), **Piem** (Caniglia & al. 1992, Morisi & Sereno 1995, Arosio & al. 1998, Isocrono & Falletti 1999, Griselli & al. 2003, Piervittori 2003, Castino 2004, Isocrono & al. 2004, 2005b, 2006, 2009, Isocrono & Piervittori 2008, Furlanetto 2010, Giordani & Malaspina 2016), **VA** (Piervittori & al. 2001, Matteucci & al. 2008c), **Emil** (Bassi 1995, Gasparo & Tretiach 1996, Nimis & al. 1996, Lumbsch & al. 1997, Dalle Vedove & al. 2002, Sallèse 2003, Morselli & Regazzi 2006, Tretiach & al. 2008, Cioffi 2009, Benesperi 2009, Gerdol & al. 2014, Brackel 2015), **Lig** (Giordani & al. 2002, Brunialti & Giordani 2003, Giordani 2006, Giordani & Incerti 2008). **C - Tosc** (Tretiach & Nimis 1994, Loppi & Putorti 1995b, 2001, Loppi 1996, 1996b, Loppi & De Dominicis 1996, 1996b, Loppi & al. 1996b, 1997, 1997b, 1998, 1998b, 1999a, 2002, 2002b, 2002c, 2003, 2006, Monaci & al. 1997, Loppi & Nascimbene 1998, 2010, Putorti & al. 1998, 1999, Tretiach & Ganis 1999, Putorti & Loppi 1999b, Paoli & Loppi 2001, 2008, Laganà & al. 2002, Lorenzini & al. 2003, Landi & Loppi 2003, Benesperi 2006, 2011, Benesperi & al. 2007, Brunialti & Frati 2010, Brunialti & al. 2012b, Paoli & al. 2012, 2012b, 2013, 2015d, Brackel 2015, Nascimbene & al. 2015, Caporale & al. 2016), **Marc** (Gasparo & al. 1989, Nimis & Tretiach 1999, Frati & Brunialti 2006, Brackel 2015), **Umb** (Ravera 1998, Nimis & Tretiach 1999, Panfili 2000b, 2007, Ravera & al. 2006, Brackel 2015), **Laz** (Bartoli & al. 1997, Massari & Ravera 2002, Nimis & Tretiach 2004, Ruisi & al. 2005, Ravera 2008b, Ravera & Genovesi 2008, Zucconi & al. 2013, Brackel 2015), **Abr** (Olivieri & Pacioni 1996, Olivieri & al. 1997, 1997b, Loppi & al. 1999, Nimis & Tretiach 1999, Stofer 2006, Brackel 2015), **Mol** (Garofalo & al. 1999, Nimis & Tretiach 1999, Caporale & al. 2008, Ravera & al. 2010, Brackel 2015, Paoli & al. 2015), **Sar** (Zedda 1995, 2002, Rizzi & al. 2011, Cossu 2013). **S - Camp** (Garofalo & al. 1999, 2010, Aprile & al. 2002, 2003, 2003b, 2011, Nimis & Tretiach 2004, Catalano & al. 2010, 2016, Brunialti & al. 2013, Ravera & Brunialti 2013), **Pugl** (Garofalo & al. 1999, Nimis & Tretiach 1999, Brackel 2011), **Bas** (Nimis & Tretiach 1999, Berger & Brackel 2011, Brackel 2011), **Cal** (Puntillo 1996, Stofer 2006, Brackel & Puntillo 2016), **Si** (Grillo & Cristaudo 1995, Grillo 1996, Grillo 1998, Grillo & Caniglia 2004, Falco Scampatelli 2005, Stofer 2006, Brackel 2008b, 2008c, Liistro & Cataldo 2011).

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 3-5, X: 3-4, E: 1-3/ Alt: 1-4/ Salp: rr, Mont: ec, SmedD: ec, Pad: rr, SmedH: ec, MedH: vc, MedD: c/ PT: 1-3/ p/ Note: a mainly temperate early coloniser of smooth bark, with a wide altitudinal range, common throughout the country below the subalpine belt. According to Grube & al. (2004) the species is rich in diverse morphotypes, and may consist of several species which still need to be delimited. See also note on *L. subcarpinea*.

***Lecanora cateilea* (Ach.) A. Massal.**

Ric. Auton. Lich. Crost.: 9, 1852 - *Lecanora subfusca* var. *cateilea* Ach., Lichenogr. Univ.: 394, 1810.

N - Ven, Lig, C - Laz.

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 3, X: 2, E: 1/ Alt: 2-3/ Mont: vr, SmedD: vr, SmedH: vr/ PT: 1/ Note: this is a member of the *L. albella*-group, which includes species with a pruinose disc and an ecarticate apothecial margin. It is distinguished by the polysporous asci and the PD+ yellow apothecial margin (psoromic acid), and has a mainly northern distribution in Europe, growing on bark in rather shaded and humid situations. The Italian distribution follows Jatta (1909-1911) who provides a description fitting the essential characteres of the species.

***Lecanora cavicola* Creveld**

Bibl. Lichenol., 17: 273, 1981.

N - Piem (TSB 34560).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 4-5, X: 4, E: 1/ Alt: 4-6/ Alp: vr, Salp: vr/ PT: 1/ u/ Note: a recently-described species found on acid siliceous rocks near or above treeline; perhaps more widespread, but not common, in the Alps, where it reaches the nival belt.

***Lecanora cenisia* Ach.**

Lichenogr. Univ.: 361, 1810.

Syn.: *Lecanora atrynea* (Ach.) Nyl., *Lecanora atrynea* f. *integrella* (Schaer.) Jatta, *Lecanora atrynea* var. *melacarpa* Nyl., *Lecanora cenisia* var. *atrynea* (Ach.) H. Magn., *Lecanora saligna* f. *saxicola* B. de Lesd., *Lecanora subfusca* var. *atrynea* Ach., *Lecanora transcendens* (Nyl.) Arnold, *Patellaria cenisia* var. *integrella* (Schaer.) Trevis., *Zeora cenisia* (Ach.) Flot.

N - **Frl** (Tretiaich & Hafellner 2000), **Ven** (Nascimbene 2005c, 2008), **TAA** (Caniglia & al. 2002, Nascimbene 2003, 2006c, 2008b), **Lomb** (De Vita & Valcuvia 2004, Dalle Vedove & al. 2004), **Piem** (Morisi & Sereno 1995, Isocrono & al. 2004, Morisi 2005, Favero-Longo & al. 2006b, 2015, Isocrono & Ferrarese 2008, Isocrono & Piervittori 2008), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Piervittori & al. 2001, 2004, Matteucci & al. 2008c, 2015c, Isocrono & al. 2008, Favero-Longo & Piervittori 2009), **Emil** (Dalle Vedove & al. 2002, Tretiaich & al. 2008, Benesperi 2009), **Lig** (TSB 33415). **C** - **Tosc**, **Laz** (TSB 18677), **Sar** (Nöske 2000). **S** - **Camp** (Ricciardi & al. 2000), **Cal** (Puntillo 1996), **Si**.

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 3-4, X: 3, E: 1-3/ Alt: 3-5/ Alp: vc, Salp: ec, Orom: r, Mont: rr/ PT: 1-2/ Note: a circumpolar, cool-temperate to arctic-alpine lichen of siliceous rocks, more rarely found also on hard lignum, most frequent in upland areas; common and widespread in the Alps, becoming rarer along the Apennines, south to the mountains of Sicily.

Lecanora chlarotera* Nyl. subsp. *chlarotera

Bull. Soc. Linn. Normandie, sér. 2, 6: 274, 1872.

Syn.: *Lecanora chlarotera* f. *rugosella* (Zahlbr.) Poelt, *Lecanora crassula* H. Magn., *Lecanora istriana* Zahlbr., *Lecanora rugosella* Zahlbr., *Lecanora subfusca* var. *alboflavescens* A. Massal.

N - **VG** (Castello 1996, 2002 Carvalho 1997, Martellos & Castello 2004, Castello & Skert 2005), **Frl** (Badin & Nimis 1996, Castello & Skert 2005, Bernini & al. 2010), **Ven** (Nimis & al. 1996c, Nascimbene & Caniglia 1997, 2002c, 2003c, Lazzarin 1997, 2000, 2000b, Caniglia & al. 1999, Nascimbene 2005c, 2008, 2008c, Nascimbene & al. 2005b, 2006, 2007, 2013b, 2015, Thor & Nascimbene 2007, Nascimbene & Marini 2007, 2010, Cristofolini & al. 2008), **TAA** (Nascimbene 2003, 2005b, 2006c, 2014, Nascimbene & al. 2006e, 2007b, 2014, Zarabska & al. 2009, Nascimbene & Marini 2015, Nimis & al. 2015), **Lomb** (Arosio & Rinaldi 1995, Valcuvia & Gianatti 1995, Brusoni & al. 1997, Zocchi & al. 1997, Roella 1999, Brusoni & Valcuvia 2000, Chiappetta & al. 2005, Arosio & al. 2000, 2003, Valcuvia & al. 2003, Dalle Vedove & al. 2004, Anderi & al. 2005, Valcuvia & Truzzi 2007b, Furlanetto 2010, Brackel 2013, Gheza & al. 2015), **Piem** (Caniglia & al. 1992, Morisi & Sereno 1995, Arosio & al. 1998, Isocrono & Falletti 1999, Piervittori & al. 2001, Griselli & al. 2003, Piervittori 2003, Castino 2004, Isocrono & al. 2004, 2005b, 2006, 2007, 2009, Isocrono & Piervittori 2008, Furlanetto 2010, Matteucci & al. 2010, Giordani & Malaspina 2016), **VA** (Piervittori & Maffei 1996, 2001, Piervittori & Isocrono 1999, Valcuvia & al. 2000b, Matteucci & al. 2008c), **Emil** (Bassi 1995, Gasparo & Tretiaich 1996, Nimis & al. 1996, Valcuvia & Grieco 1995, Tretiaich 1997, Valcuvia & Savino 2000, Dalle Vedove & al. 2002, Sallesse 2003, Morselli & Regazzi 2006, Tretiaich & al. 2008, Cioffi 2009, Benesperi 2009, Malavasi 2014, Gerdol & al. 2014, Brackel 2015), **Lig** (Castello & al. 1994, Brunialti & al. 1999, Putortù & al. 1999b, Valcuvia & al. 2000, Giordani & al. 2001, 2002, Brunialti & Giordani 2003, Giordani 2006, Giordani & Incerti 2008). **C** - **Tosc** (Tretiaich & Nimis 1994, Loppi & Putortù 1995, 1995b, 2001, Loppi & al. 1994, 1995, 1996b, 1996c, 1997, 1997b, 1997e, 1998, 1998b, 1999a, 2002, 2002b, 2002c, 2003, 2004, 2004c, 2006, Loppi 1996, 1996b, Loppi & De Dominicis 1996, 1996b, Monaci & al. 1997, Loppi & Nascimbene 1998, 2010, Putortù & al. 1998, Tretiaich & Ganis 1999, Putortù & Loppi 1999, 1999b, Loppi & Pirintoso 2000, Senese & Critelli 2000, Benesperi 2000a, 2006, 2011, Paoli & Loppi 2001, 2008, Lorenzini & al. 2003, Landi & Loppi 2003, Loppi & Frati 2004, Frati & al. 2006b, 2007, 2008, Stofer 2006, Benesperi & al. 2007, 2013, Laganà & al. 2002, Lastrucci & al. 2009, Brunialti & Frati 2010, Brunialti & al. 2012b, Paoli & al. 2012, 2012b, 2013, 2015d, Brackel 2015, Nascimbene & al. 2015), **Marc** (Nimis & Tretiaich 1999, Frati & Brunialti 2006, Brackel 2015), **Umb** (Ravera 1998, Nimis & Tretiaich 1999, Panfilì 2000b, 2007, Ravera & al. 2006, Brackel 2015), **Laz** (Bartoli & al. 1997, Ravera 2002, 2008b, Massari & Ravera 2002, Nimis & Tretiaich 2004, Ruisi & al. 2005, Stofer 2006, Munzi & al. 2007, Ravera & Genovesi 2008, Zucconi & al. 2013, Brackel 2015), **Abr** (Recchia & al. 1993, Olivieri & Pacioni 1996, Olivieri & al. 1997, 1997b, Loppi & al. 1999, Nimis & Tretiaich 1999, Stofer 2006, Brackel 2015, Caporale & al. 2016, Corona & al. 2016), **Mol** (Nimis & Tretiaich 1999, Caporale & al. 2008, Ravera & al. 2010, Paoli & al. 2011, 2015, Genovesi & Ravera 2014, Brackel 2015), **Sar** (Zedda 1995, 2002, 2002b, Loi & al. 2000, Zedda & Sipman 2001, Zedda & al. 2001, Rizzi & al. 2011, Cossu 2013). **S** - **Camp** (Garofalo & al. 1999, 2010, Ricciardi & al. 2000, Aprile & al. 2002, 2003, 2003b, 2011, Nimis & Tretiaich 2004, Catalano & al. 2010, 2012, 2016, Brunialti & al. 2013, Ravera & Brunialti 2013), **Pugl** (Nimis & Tretiaich 1999, Durini & Medagli 2002, 2004, Brackel 2011), **Bas** (Bartoli & Puntillo 1998, Nimis & Tretiaich 1999, Potenza 2006, Paoli & al. 2006, Potenza & al. 2010, Brackel 2011, Brackel & Puntillo 2016), **Cal** (Puntillo 1995, 1996, Puntillo & Puntillo 2004, Incerti & Nimis 2006, Stofer 2006), **Si** (Merlo 1993, Nimis & al. 1994, 1995, Ottonello & al. 1994, 2011, Grillo & Cristaudo 1995, Grillo & al. 1996, 2002, 2007b, Grillo & Carfi 1997, Ottonello & Romano 1997, Grillo 1998, Grasso & al. 1999, Grillo & Caniglia 2004, 2006, Caniglia & Grillo 2006b, Stofer 2006, Falco Scampatelli 2005, Brackel 2008b, 2008c, Grillo & Cataldo 2008, Gianguzzi & al. 2009, Liistro & Cataldo 2011, Di Martino & Stancanelli 2015, Cataldo & Minissale 2015).

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 3-5, X: 3-4, E: 2-5/ Alt: 1-4/ Salp: vr, Mont: c, SmedD: ec, Pad: rc, SmedH: ec, MedD: ec, MedD: vc/ PT: 1-3/ p/ Note: this is certainly the most common epiphytic *Lecanora* throughout the country, still frequent even in the Po-plain. In my opinion, *L. rugosella* is just a morph of *L. chlarotera*, which, according to Malíček (*in litt.*) is also supported by molecular data (but samples of *L. rugosella* from North America belong to another species).

Lecanora chlarotera* subsp. *meridionalis (H. Magn.) Clauzade & Cl. Roux

Bull. Soc. Bot. Centre-Ouest, n. sér., nr. spéc. 7: 826, 1985 - *Lecanora meridionalis* H. Magn., Meddel. Göteb. Bot. Trädg., 7: 82, 1932.

N - Frl, Ven, Lomb (Arosio & al. 2000), **Piem** (Arosio & al. 1998, Griselli & al. 2003, Isocrono & al. 2005b), **Lig** (Giordani & Incerti 2008). **C - Tosc** (Loppi 1996, Loppi & De Dominicis 1996, Loppi & al. 1997, 1997b, 1999a, 2002c, 2006, Putortì & al. 1998, Putortì & Loppi 1999, Loppi & Putortì 2001, Paoli & Loppi 2008, Loppi & Nascimbene 2010, Benesperi & al. 2013), **Laz** (Nimis & Tretiach 2004), **Abr** (Olivieri & al. 1997, 1997b, Loppi & al. 1999, Nimis & Tretiach 1999), **Sar** (Zedda & Sipman 2001, Zedda 2002, Rizzi & al. 2011). **S - Camp** (Aprile & al. 2002), **Pugl** (Nimis & Tretiach 1999), **Si** (Grillo & al. 2007).

Cr/ Ch/ S/ Epiph/ pH: 3-4, L: 4-5, X: 3-4, E: 3/ Alt: 1-2/ SmedD: vr, Pad: er, SmedH: vr, MedH: rr, MedD: r/ PT: 1/ #/ Note: several Italian records of this very controversial taxon related to *L. chlarotera* need reconfirmation; perhaps these are just forms of *L. chlarotera* with darker apothecial discs.

Lecanora cinereofusca H. Magn.

Meddel. Göteb. Bot. Trädg., 7: 86, 1932.

Syn.: *Lecanora degelii* T. Schauer & Brodo

N - Frl (Tretiach & Carvalho 1995), **Lig** (Giordani & al. 2009, Giordani & Incerti 2008).

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 3, X: 2, E: 1/ Alt: 3/ Mont: er/ PT: 0/ Note: a very rare species found on the smooth bark of old deciduous trees, especially *Fagus*, more rarely *Abies*, in humid montane forests. It is included in the Italian red list of epiphytic lichens as “Critically Endangered” (Nascimbene & al. 2013c).

Lecanora circumborealis Brodo & Vitik.

Mycotaxon, 21: 288, 1984.

Syn.: *Lecanora coilocarpa* auct. non (Ach.) Nyl.

N - Frl, Ven (Caniglia & al. 1999, Nascimbene & Caniglia 2003c, Nascimbene & al. 2006e, Thor & Nascimbene 2007, Nascimbene & Marini 2007, Nascimbene 2008c), **TAA** (Nascimbene 2003, 2006b, 2006c, 2008b, 2014, Nascimbene & al. 2005, 2006, 2006e, 2007b, 2008c, 2009, 2010, 2014, Thor & Nascimbene 2007, Nascimbene & Marini 2015, Nimis & al. 2015), **Lomb, Piem** (Isocrono & al. 2005b), **VA** (Piervittori & Isocrono 1999), **Emil, Lig** (Brunialti & al. 1999). **C - Abr** (Nimis & Tretiach 1999, Corona & al. 2016), **Sar, S - Cal** (Puntillo 1996).

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 3-5, X: 3, E: 1-2/ Alt: 3-4/ Salp: c, Mont: rc/ PT: 1-2/ Note: a circumboreal-montane lichen found on acid bark, often on twigs, sometimes on lignum, mostly in upland areas, with optimum in the subalpine belt; common in the Alps, becoming rarer towards the south but reaching the mountains of Calabria.

Lecanora concolor Ramond

Mém. Soc. Linn. Paris, 4: 436, 1823.

Syn.: *Squamaria concolor* (Ramond) Nyl.

N - TAA, Lomb, Piem (Isocrono & al. 2003, 2004), **VA** (Piervittori & al. 1998, Piervittori & Isocrono 1999, Piervittori & al. 2001).

Cr.pl/ Ch/ S/ Sax/ pH: 1-2, L: 3-4, X: 2-3, E: 1-2/ Alt: 4-6/ Alp: rr, Orom: vr/ PT: 1/ u/ Note: on vertical to underhanging surfaces of hard siliceous rocks, with optimum above treeline; certainly widespread throughout the Alps, where it reaches the nival belt. An earlier record from Marche (see Nimis 1993: 347), being dubious, is not accepted here.

Lecanora confusa Almb.

K. Svensk. Vetensk. Avh. Naturskydd., 11: 72, 1955.

S - Si (Grillo & Cristaudo 1995).

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 4, X: 3-4, E: 1-2/ Alt: 3-4/ Salp: vr, Mont: vr/ PT: 1/ Note: a pioneer species found on smooth bark, especially on twigs of coniferous trees in upland areas, more rarely on lignum. The species is included in the Italian red list of epiphytic lichens as “Critically Endangered” (Nascimbene & al. 2013c).

Lecanora conizaeoides Cromb.

Nyl. ex Cromb., J. Bot., 23: 195, 1885.

Syn.: *Lecanora pityrea* Erichsen

N - Lomb (Zocchi & al. 1997), **Piem** (Griselli & al. 2003, Piervittori 2003, Piervittori & al. 1996b), **VA** (Valcuvia & al. 2000), **Lig** (Putortì & al. 1999b). **C - Tosc** (Tretiach & Ganis 1999, Putortì & al. 1999c, Brunialti & Frati 2010), **Umb** (Brackel 2015), **Laz** (Ravera 2006, 2006c). **S - Cal** (Puntillo 1996), **Si** (Brackel 2008b, 2008c).

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 3-5, X: 2-3, E: 1-3/ Alt: 2/ SmedD: vr, Pad: vr, SmedH: vr/ PT: 2-3/ suboc/ Note: this famous lichen, one of the most resistant against pollution, is very common in western Europe. Most of the Italian records, however, are dubious. An earlier record from Venezia Giulia (see Nimis 1993: 348), as well as that from Friuli by Badin & Nimis (1996) are wrong (*vidi!*), those from Sicilia by Grillo & al. (1996) and Grillo (1998) should be checked, and are not accepted here. In recent times this species is known with certainly only from geothermic areas of Toscana and Latium with emissions of sulphur dioxide, where it is fairly abundant, and from Sicily. It is included in the Italian red list of epiphytic lichens as “Data Deficient” (Nascimbene & al. 2013c).

Lecanora dispersoareolata (Schaer.) Lamy

Bull. Soc. Bot. France, 30: 370, 1883 - *Lecanora muralis* var. *dispersoareolata* Schaer., Lich. Helv. Spicil., 9: 418, 1840.

Syn.: *Placodium dispersoareolatum* (Schaer.) Körb., *Squamaria dispersoareolata* (Schaer.) Anzi

N - **Frl**, **Ven**, **TAA**, **Lomb**, **Piem** (Isocrono & al. 2004, Isocrono & Piervittori 2008), **VA** (Piervittori & Isocrono 1999), **Emil**.

Cr/ Ch/ S/ Sax/ pH: 3-4, L: 3-4, X: 3, E: 2-3/ Alt: 3-6/ Alp: rr, Salp: r, Mont: vr/ PT: 1/ Note: on exposed, weakly calcareous or basic siliceous rocks in upland areas.

Lecanora dvorakii Motyka

Porosty. 3, Rodzina Lecanoraceae. *Lecanora*: 226, 1996, *nom inval.*

Syn.: *Aspicilia dvorakii* Suza *nom.nud.*

N - **Emil** (Lichenoth. Graec. 146).

Cr/ Ch/ S/ Sax/ pH: 3, L: 3-4, X: 3, E: 2-3/ Alt: 3/ Mont: vr/ PT: 1/ #/ Note: an interesting lichen growing on serpentine; the species has no valid name, but I report it here to attract attention to it.

Lecanora epanora (Ach.) Ach.

Lichenogr. Univ.: 377, 1810 - *Lichen epanorus* Ach., Lich. Suec. Prodr.: 39, 1799.

Syn.: *Parmelia epanora* (Ach.) Ach., *Patellaria epanora* (Ach.) Trevis.

N - **Ven** (Thor & Nascimbene 2007), **TAA**, **Lomb** (Nascimbene 2006), **Piem** (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999).

Cr/ Ch/ A.s/ Sax/ pH: 1-2, L: 3-4, X: 2-3, E: 1-2/ Alt: 3-5/ Alp: vr, Salp: vr, Mont: vr/ PT: 1/ m, u, p/ Note: a holarctic early coloniser of steeply inclined to underhanging surfaces of metal-rich metamorphic rocks, mostly found in upland areas; probably restricted to the Alps in Italy.

Lecanora epibryon var. ***bryopsora*** Doppelb. & Poelt

in Poelt, Mitt. bot. Staatss. München, 5: 254, 1964.

Syn.: *Lecanora bryopsora* (Doppelb. & Poelt) Hafellner & Türk

N - **Piem** (TSB 33081). C - **Marc** (Nimis & Tretiach 1999).

Cr/ Ch/ A.s/ Terr/ pH: 3-4, L: 3-4, X: 3-4, E: 2-3/ Alt: 3-5/ Alp: vr, Salp: r, Orom: vr, Mont: vr/ PT: 1/ Note: on mosses and plant debris on calcareous substrata; certainly more widespread in the Alps, but difficult to recognise, being often sterile. According to Malíček (*in litt.*) molecular data suggest that this is just a soreadate morph of var. *epibryon*.

Lecanora epibryon (Ach.) Ach. var. ***epibryon***

Lichenogr. Univ.: 396, 1810 - *Lichen epibryon* Ach., Lichenogr. Suec. Prodr.: 79, 1799.

Syn.: *Lecanora subfusca* var. *hypnorum* Rabenh.

N - **Frl**, **Ven** (Nimis 1994, Caniglia & al. 1999, Nascimbene & Caniglia 2003c, Thor & Nascimbene 2007, Nascimbene 2008c), **TAA** (Caniglia & al. 2002, Nascimbene 2008, Hafellner 2015, Ertz & al. 2015), **Lomb** (Dalle Vedove & al. 2004, Ertz & al. 2015), **Piem** (Isocrono & al. 2004, Morisi 2005), **VA** (Valcuvia 2000), **Emil**, **Lig**, **C** - **Umb** (Genovesi & al. 2001, Ravera & al. 2006), **Abr** (Nimis & Tretiach 1999), **Mol** (Ravera & Genovesi 2012, Genovesi & Ravera 2014).

Cr/ Ch/ S/ Terr/ pH: 3-5, L: 4-5, X: 4, E: 2-3/ Alt: 4-5/ Alp: rc, Salp: c/ PT: 1/ Note: a circumpolar, arctic-alpine species found on mosses and plant debris in open calcareous grasslands and alpine tundras, often on ridges in *Carex firma* stands, common in the Alps near and above treeline, rarer in the Apennines.

Lecanora expallens Ach.

Lichenogr. Univ.: 374, 1810.

Syn.: *Lecanora conizaea* (Ach.) Nyl. *non auct.*, *Lecanora foehrensis* Erichsen, *Lecidea soralia* Vain.

N - **VG** (Castello 2002, Martellos & Castello 2004, Castello & Skert 2005), **Frl** (Bernini & al. 2010), **Ven** (Nascimbene & al. 2005b, 2006c, 2007), **TAA** (Nascimbene & al. 2006, 2007b, 2014, Zarabska & al. 2009, Nascimbene 2014, Nascimbene & Marini 2015), **Lomb** (Stofer 2006), **Piem** (Isocrono & al. 2009, Giordani & Malaspina 2016), **VA** (Matteucci & al. 2008, Isocrono & al. 2008), **Emil** (Nimis & al. 1996), **Lig** (Giordani 2006, Giordani & Incerti 2008). **C** - **Tosc** (Loppi & al. 1997b, 1999a, Putorti & Loppi 1999, Benesperi 2006, 2011, Benesperi & al. 2007, 2013, Tretiach & al. 2008, Frati & al. 2008, Brunialti & Frati 2010, Paoli & al. 2012, Nascimbene & al. 2015), **Marc** (Nimis & Tretiach 1999, Frati & Brunialti 2006), **Umb** (Nimis & Tretiach 1999, Ravera & al. 2006), **Laz** (Ravera & al. 1999, Massari & Ravera 2002, 2006c, Stofer 2006, Munzi & al. 2007, Ravera & Genovesi 2008), **Abr** (Nimis & Tretiach 1999, Stofer 2006, Caporale & al. 2016), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008, Ravera & al. 2010, Paoli & al. 2015), **Sar** (Zedda 2002, Stofer 2006, Rizzi & al. 2011, Cossu 2013). **S** - **Camp** (Aprile & al. 2002, 2003b, Nimis & Tretiach 2004, Ravera 2008b, Brunialti & al. 2010, 2013, Garofalo & al. 2010, Ravera & Brunialti 2013, Catalano & al. 2016), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999, Potenza 2006, Potenza & al. 2010), **Cal** (Puntillo & Puntillo 2004, Stofer 2006), **Si** (Grillo & Caniglia 2004, 2006, Falco Scampatelli 2005, Stofer 2006).

Cr/ Ch/ A.s/ Epiph/ pH: 1-2, L: 3-4, X: 2-3, E: 1-2/ Alt: 1-3/ Mont: vr, SmedD: c, Pad: r, SmedH: vc, MedH: rr/ PT: 1-2/ Note: a mainly temperate species found on acid, generally rough bark, especially abundant on *Quercus cerris* in open woodlands, sometimes on lignum, widespread and locally common throughout the country below the montane belt.

Lecanora expersa Nyl.

Flora, 58: 443, 1875.

N - Ven (Thor & Nascimbene 2007).

Cr/ Ch/ S/ Lign/ pH: 1-2, L: 3-4, X: 4, E: 1/ Alt: 4/ Salp: vr/ PT: 1/ Note: on acid bark; only recently found in the Italian Alps, this lichen is probably more widespread, especially in the subalpine belt. The Italian sample was collected on a snag of *Larix*. The species is included in the Italian red list of epiphytic lichens as "Data Deficient" (Nascimbene & al. 2013c).

Lecanora formosa (Bagl. & Carestia) Knoph & Leuckert

Herzogia, 14: 20, 2000 - *Lecidea formosa* Bagl. & Carestia, Comm. Soc. Critt. Ital., 2, 1: 82, 1864.

Syn.: *Lecidea alboradicata* B. de Lesd., *Lecidea bullata* auct. non (Körb.) Th. Fr. nec Meyen & Flot., *Lecidea contorta* Bagl. & Carestia, *Lecidea lacticolor* Arnold, *Lecidea mesotropiza* Nyl., *Lecidea nansenii* Lyng., *Lecidea subdiata* Nyl., *Lecidella bullata* auct. non Körb.

N - Frl (Tretiaich & Hafellner 2000), TAA (Hertel & Schuhwerk 2010), Piem (Knoph & Leuckert 2000, Isocrono & al. 2003), VA (Piervittori & Isocrono 1999, Knoph & Leuckert 2000, Piervittori & al. 2004, Hertel & Schuhwerk 2010).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 3-4, X: 3, E: 1-2/ Alt: 5-6/ Alp: r, Salp: er/ PT: 1/ u/ Note: on slightly underhanging surfaces of siliceous rocks, especially crystalline schist, in humid and cold situations in the alpine and nival belts of the Alps, often starting the life-cycle on other crustose lichens.

Lecanora frustulosa (Dicks.) Ach.

Lichenogr. Univ.: 405, 1810 - *Lichen frustulosus* Dicks., Fasc. Pl. Crypt. Brit., 3: 13, 1793.

Syn.: *Lecanora frustulosa* var. *ludwigii* (Spreng.) Th. Fr., *Lecanora hydrophila* Sommerf., *Lecanora insulata* (Ramond) Steud., *Lecanora ludwigii* (Spreng.) Ach., *Lecidea bossoniana* Croz., *Patellaria frustulosa* (Dicks.) Trevis., *Toninia bossoniana* (Croz.) Zahlbr.

N - Ven, TAA, Lomb, Piem (Isocrono & al. 2004), VA (Piervittori & Isocrono 1999, Isocrono & al. 2008, Favero-Longo & Piervittori 2009), Emil. C - Tosc, Sar.

Cr/ Ch/ S/ Sax/ pH: 3, L: 4-5, X: 3, E: 2-3/ Alt: 3-5/ Alp: vr, Salp: r, Orom: er, Mont: vr/ PT: 1/ subc/ Note: on steeply inclined surfaces of weakly calciferous siliceous rocks, often in otherwise dry seepage tracks, mostly in upland areas. Some Italian records need to be checked, as this species was not always distinguished in the past from *L. argopholis*.

Lecanora fuscescens (Sommerf.) Nyl.

in Norrlin, Not. Sällsk. Fauna Fl. Fenn. Förh., 13: 331, 1873 - *Lecidea fuscescens* Sommerf., K. Svenska Vetensk.-Akad. Handl.: 114, 1824.

Syn.: *Biatora fuscescens* (Sommerf.) Fr., *Biatorella fuscescens* (Sommerf.) Boistel

N - Ven (Lazzarin 1997), TAA (Nascimbene & al. 2007b), Lomb, Piem.

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 3-4, X: 3-4, E: 1-2/ Alt: 3-4/ Salp: rr, Mont: vr/ PT: 1/ Note: a probably circumboreal-montane species found on twigs of shrubs, especially *Rhododendron ferrugineum* in the subalpine belt, sometimes on lignum; probably restricted to the Alps in Italy.

Lecanora gangaleoides Nyl.

Flora, 55: 354, 1872.

Syn.: *Lecanora argopholis* var. *ocellulata* (Arnold) Jatta, *Lecanora cenisia* var. *gangaleoides* (Nyl.) Harm.

N - Ven, Lig (Brunialti & al. 1999, Watson 2014), C - Tosc, Umb (Panfili 2000b, Ravera & al. 2006), Laz (Roccardi 2003, Genovesi & al. 2011), Abr (De Angelis & al. 2003), Sar (Nöske 2000, Rizzi & al. 2011, Giordani & al. 2013), S - Camp (Garofalo & al. 1999, Aprile & al. 2002, Catalano & al. 2016), Cal (Puntillo 1996), Si (Ottonello & Romano 1997, Grillo 1998, Grillo & Caniglia 2004, Ottonello & al. 2011).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 3, X: 2-3, E: 1-2/ Alt: 1-3/ Mont: er, SmedD: er, SmedH: rc, MedH: c, MedD: er/ PT: 1-2/ suboc, u/ Note: a mild-temperate lichen found on base-rich, but lime-poor siliceous rocks in sheltered situations, often in underhangs; mainly Tyrrhenian in Italy. Several records from the Alps, e.g. those cited by Isocrono & al. (2003) are not accepted here.

Lecanora gisleri (Arnold) Arnold

Lich. Exs.: 1525, 1891 - *Biatora gisleri* Anzi ex Arnold, Verh. zool.-bot. Ges. Wien, 21: 1139, 1871.

N - Frl, TAA (Nascimbene & al. 2007b), Lomb (Hinteregger 1994), Piem (Isocrono & al. 2004).

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 3-4, X: 3, E: 1/ Alt: 4-5/ Alp: rr, Salp: rc/ PT: 1/ Note: a probably circumboreal-montane lichen found on twigs of shrubs, especially *Rhododendron ferrugineum* in the subalpine belt; probably restricted to the Alps in Italy.

Lecanora gisleriana Müll. Arg.

Flora, 57: 185, 1874.

Syn.: *Lecanora gisleri sensu* Poelt & Ullrich

N - VA (HAL-19112).

Cr/ Ch/ A.s/ Sax/ pH: 1-2, L: 3-4, X: 2-3, E: 1-2/ Alt: 4-5/ Alp: er, Salp: er/ PT: 1/ paras crustose lichens, m, u/ Note: on iron rich siliceous rocks near and above treeline, parasitic on the thalli of *L. epanora*, *L. handelii* and *L. subaurea*. The Italian sample was collected by B. Feige on metal-rich rocks at Plan Masson near Breuil at 2500 m.

***Lecanora glabrata* (Ach.) Nyl.**

Flora, 55: 250, 1872 - *Lecanora subfusca* var. *glabrata* Ach., Lichenogr. Univ.: 393, 1810.

Syn.: *Lecanora allophana* var. *glabrata* (Ach.) J. Steiner, *Lecanora subfusca* var. *geographica* A. Massal., *Lecanora subfusca* var. *rufa* (Weiss) Ach.

N - Frl, Ven (Lazzarin 2000b, Thor & Nascimbene 2007), **TAA** (Nascimbene & al. 2007b), **Lomb, Piem, VA** (Valcuvia 2000, Valcuvia & al. 2000b), **Emil** (Tretiach & al. 2008), **Lig** (Giordani & Incerti 2008). **C - Tosc, Umb** (Ravera 1998, Ravera & al. 2006), **Laz** (TSB 17944), **Abr** (Corona & al. 2016), **Mol** (Caporale & al. 2008), **Sar, S - Camp** (Aprile & al. 2003b), **Cal** (Puntillo 1996), **Si** (Ottonello & Salone 1994, Grillo 1998, Grillo & Caniglia 2004).

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 3, X: 3, E: 2-3/ Alt: 2-3/ Mont: r, SmedD: r, Pad: vr, SmedH: r/ PT: 1/

Note: a mainly temperate species found on smooth bark of deciduous trees; several old records require confirmation.

***Lecanora handelii* J. Steiner**

in Handel-Mazzetti, Ann. naturhist. Hofmus. Wien, 23: 119, 1909.

N - Lomb (Nascimbene 2006), **Piem, VA** (Pierivittori & Isocrono 1999).

Cr/ Ch/ A.s/ Sax/ pH: 1-2, L: 4, X: 2-3, E: 1-2/ Alt: 3-5/ Alp: er, Salp: vr, Mont: vr/ PT: 1/ m, u/ Note: on steeply inclined to underhanging surfaces of metalliferous rocks in upland areas. The record from Campania (see Nimis 1993: 353) requires confirmation, and is not accepted here.

***Lecanora horiza* (Ach.) Linds.**

Trans. Bot. Soc. Edinburgh, 9: 96, 1869 - *Lecanora subfusca* var. *horiza* Ach., Lichenogr. Univ.: 394, 1810.

Syn.: *Lecanora laevis* Poelt, *Lecanora oleae* Reichert & Galun, *Lecanora palestina* Räsänen, *Lecanora parisiensis* Nyl., *Lecanora sienae* B. de Lesd.?

N - Emil (Nimis & al. 1996, Benesperi 2009), **Lig** (Valcuvia & al. 2000, Giordani & Incerti 2008). **C - Tosc** (Loppi & Putorti 1995, Loppi & al. 1995, 1997, 1997b, 1998, 1998b, 2002, 2002c, 2003, 2004, 2004c, 2006, Loppi 1996, 1996b, Loppi & De Dominicis 1996, Putorti & al. 1998, Putorti & Loppi 1999, Bacci & al. 2000, Benesperi 2000a, Senese & Critelli 2000, Loppi & Frati 2004, Frati & al. 2006b, Paoli & Loppi 2008, Brunialti & Frati 2010, Loppi & Nascimbene 2010, Brunialti & al. 2012b), **Marc** (Nimis & Tretiach 1999, Frati & Brunialti 2006), **Umb** (Ravera 2000, Panfili 2000b, Ravera & al. 2006, Panfili 2007), **Laz** (Bartoli & al. 1997, Loppi & Pirintzos 2000, Massari & Ravera 2002, Ruisi & al. 2005, Ravera 2008b, Ravera & Genovesi 2008), **Abr** (Recchia & al. 1993, Olivieri & al. 1997, 1997b, Loppi & al. 1999, Nimis & Tretiach 1999, Stofer 2006), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008, Paoli & al. 2015), **Sar** (Zedda 2002, 2002b, Zedda & al. 2001, Rizzi & al. 2011). **S - Camp** (Ricciardi & al. 2000, Aprile & al. 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010, Brunialti & al. 2013, Ravera & Brunialti 2013, Catalano & al. 2016), **Pugl** (Durini & Medagli 2002, 2004, Grube & al. 2004, Brackel 2011), **Bas** (Nimis & Tretiach 1999, Potenza 2006, Paoli & al. 2006, Potenza & al. 2010, Brackel 2011), **Cal** (Puntillo 1996, Incerti & Nimis 2006), **Si** (Merlo 1993, Nimis & al. 1994, 1995, Ottonello & Salone 1994, Ottonello & al. 1994, 2011, Grillo & Cristaudo 1995, Ottonello 1996, Grillo & Carfi 1997, Grillo 1998, Grillo & al. 2002, 2007b, Grillo & Caniglia 2004, 2006, Caniglia & Grillo 2006b, Brackel 2008b, Liistro & Cataldo 2011).

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 4-5, X: 3-4, E: 2-3/ Alt: 1-2/ SmedD: vr, SmedH: c, MedH: vc, MedD: vc/ PT: 1-2/ Note: a mainly Mediterranean species found on smooth bark of isolated broad-leaved trees, much rarer in the North than in Mediterranean Italy. According to Malíček (*in litt.*) the synonymisation of *L. sienae* with *L. horiza* might prove to be incorrect: although the former is a very variable species, *L. sienae* would represent a real extreme in its variation range.

***Lecanora hybocarpa* (Tuck.) Brodo**

Beih. Nova Hedwigia, 79: 134, 1984 - *Parmelia hybocarpa* Tuck. in Lea, Cat. Plants Cincinnati: 45, 1849.

C - Sar (Zedda 2002, 2002b).

Cr/ Ch/ S/ Epiph-Lign/ pH: 2-3, L: 4-5, X: 3-4, E: 1-2/ Alt: 1-2/ SmedH: er, MedH: er/ PT: 1-2/ Note: on the bark of more or less isolated trees in lowland areas. Apparently common in North America, this species has been recently reported also from Europe. It is included in the Italian red list of epiphytic lichens as "Data Deficient" (Nascimbene & al. 2013c).

***Lecanora hypopta* (Ach.) Vain.**

Meddeland. Soc. Fauna Fl. Fenn., 6: 162, 1881 - *Lecidea hypopta* Ach., Meth. Lich.: 61, 1803.

Syn.: *Biatora hypopta* (Ach.) Räsänen, *Lecanora subintricata* var. *convexula* Arnold

N - TAA (Nascimbene & al. 2006e), **Piem, C - Tosc** (Benesperi & Lastrucci 2007, Giordani & al. 2009, Lastrucci & al. 2009), **Abr** (Stofer 2006), **Sar** (Zedda 2002). **S - Cal** (Nimis & Puntillo 2003, Puntillo 2011)

Cr/ Ch/ S/ Lign/ pH: 1-2, L: 2-4, X: 2, E: 1/ Alt: 3-4/ Salp: rr, Orom: r, Mont: r/ PT: 1/ Note: on hard lignum, especially on decorticated stumps, more rarely on the bark of conifers in upland areas; certainly more widespread in the Alps.

***Lecanora hypoptella* (Nyl.) Grummann**

Cat. Lich. Germ.: 19, 1963 - *Lecidea hypoptella* Nyl., Flora, 48: 146, 1865.

Syn.: *Lecanora symmictiza* (Nyl.) Hedl., *Lecidea symmictiza* Nyl.

N - Ven, TAA (Nascimbene 2013, Nascimbene & al. 2014).

Cr/ Ch/ S/ Lign-Epiph/ pH: 1-2, L: 2-4, X: 2, E: 1/ Alt: 3-4/ Salp: vr, Orom: vr, Mont: er/ PT: 1/ Note: a mainly boreal-montane lichen found on lignum and acid bark in upland areas; it belongs to a poorly known group and is widespread in Scandinavia, being also known from the British Isles, France, central Europe, and the mountains of the Iberian Peninsula; perhaps more widespread in the Alps.

Lecanora hypoptoides (Nyl.) Nyl.

Flora, 55: 249, 1872 - *Lecidea hypoptoides* Nyl., Flora, 50: 371, 1867.

N - Ven (Caniglia & al. 1999, Nascimbene & Caniglia 2000, Nascimbene 2008c), **TAA** (Nascimbene & Caniglia 2002c, Nascimbene & al. 2006e, 2007b, 2009, Nimis & al. 2015), **Lomb** (Nascimbene & al. 2006e), **Piem** (Griselli & al. 2003, Piervittori 2003). **C - Tosc** (Loppi & al. 1994, 1995), **Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **Sar** (Zedda 2002, 2002b, Zedda & Sipman 2001). **S - Cal** (van den Boom & Brand 2008).

Cr/ Ch/ S/ Lign-Epiph/ pH: 1-2, L: 2-4, X: 2, E: 1/ Alt: 3-4/ Salp: rr, Mont: r/ PT: 1/ Note: a boreal-montane lichen found on hard lignum, especially on decorticated stumps, more rarely on the acid bark of conifers and of *Castanea*, mostly in upland areas.

Lecanora impudens Degel.

Svensk Bot. Tidskr., 38: 50, 1944.

Syn.: *Lecanora chloropolia* auct. p.p., *Lecanora chloropolia* f. *maculata* Erichsen, *Lecanora maculata* (Erichsen) Almb., *Pertusaria farinacea* H. Magn., *Pertusaria maculata* Erichsen

N - Frl, **TAA** (Nascimbene & al. 2014, Nascimbene 2014, Nascimbene & Marini 2015), **Emil** (TSB 18181). **C - Sar** (Zedda 2002, 2002b). **S - Cal** (Puntillo 1996).

Cr/ Ch/ A.s/ Epiph/ pH: 2-3, L: 3-4, X: 2, E: 1-2/ Alt: 2-3/ Mont: er, SmedD: er, SmedH: vr/ PT: 1/ suboc/ Note: a temperate species found on base-rich bark, especially on isolated *Fraxinus* in humid riparian woodlands. According to Malíček (*in litt.*), who examined the original material, the record of *L. farinaria* Borrer from Sardegna by Zedda (2002, 2002b), actually refers to this species, which is included in the Italian red list of epiphytic lichens as “Vulnerable” (Nascimbene & al. 2013c). See also note on *L. allophana* f. *sorediata*.

Lecanora intricata (Ach.) Ach.

Lichenogr. Univ.: 380, 1810 - *Parmelia intricata* Ach., Meth. Lich.: 178, 1803.

Syn.: *Biatora polytropa* var. *intricata* (Ach.) Th. Fr., *Lecanora intricata* f. *coerulea* Lamy, *Lecanora polytropa* var. *intricata* (Ach.) Rabenh.

N - Frl (Tretiach & Hafellner 2000), **Ven** (Caniglia & al. 1999), **TAA** (Caniglia & al. 2002, Nascimbene 2003, Lang 2009), **Lomb**, **Piem** (Isocrono & al. 2004, Isocrono & Piervittori 2008, Favero-Longo & al. 2015), **VA** (Piervittori & Isocrono 1999), **Emil** (Dalle Vedove & al. 2002, Tretiach & al. 2008), **Lig**. **C - Tosc** (Tretiach & al. 2008), **Sar** (Nöske 2000).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 3-5, X: 3-4, E: 1-3/ Alt: 3-6/ Alp: vc, Salp: c, Orom: r, Mont: rr/ PT: 1/ Note: a circumpolar, arctic-alpine, ecologically wide-ranging silicicolous species, common in the Alps, much rarer in the mountains of southern Italy, with optimum above treeline, reaching the nival belt in the Alps.

Lecanora intumescens (Rebent.) Rabenh.

Deutsche Krypt.-Fl., 2: 334, 1845 - *Parmelia intumescens* Rebent., Prodr. Fl. Neomarch.: 301, 1804.

Syn.: *Lecanora intumescens* var. *glauco-rufa* (Mart.) Körb., *Lecanora subfusca* var. *intumescens* (Rebent.) Flot., *Ochrolechia parella* var. *tumidula* (Pers.) Arnold non auct., *Ochrolechia tumidula* (Pers.) Arnold non auct., *Patellaria intumescens* (Rebent.) Trevis.

N - VG (Carvalho 1997), **Frl**, **Ven** (Lazzarin 1997, 2000, Nascimbene & Caniglia 2003c, Nascimbene & al. 2007, Nascimbene 2008c), **TAA** (Nascimbene & Caniglia 2000b, 2002c, Nascimbene & al. 2006e, 2007b, Nimis & al. 2015), **Lomb** (Zocchi & al. 1997), **Piem** (Caniglia & al. 1992, Arosio & al. 1998, Isocrono & al. 2004, 2006, 2007), **Emil** (Nimis & al. 1996, Tretiach & al. 2008, Benesperi 2009), **Lig** (Lumbsch & al. 1997, Putortì & al. 1999b, Brunialti & Giordani 2003, Giordani 2006, Giordani & Incerti 2008, Watson 2014). **C - Tosc** (Tretiach & Nimis 1994, Loppi & Putortì 1995b, Paoli & Loppi 2001, Frati & al. 2006b, Loppi & al. 2006, Loppi & Frati 2006, Benesperi & al. 2007, Brunialti & Frati 2010, Benesperi 2011, Nascimbene & al. 2015), **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera 1998, Nimis & Tretiach 1999, Ravera & al. 2006), **Laz** (Massari & Ravera 2002), **Abr** (Nimis & Tretiach 1999, Caporale & al. 2016, Corona & al. 2016), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008, Ravera & al. 2010, Genovesi & Ravera 2014), **Sar** (Cossu 2013). **S - Camp** (Aprile & al. 2002, Nimis & Tretiach 2004, Brunialti & al. 2010, 2013, Garofalo & al. 2010, Ravera & Brunialti 2013), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996, Incerti & Nimis 2006), **SI** (Falco Scampatelli 2005).

Cr/ Ch/ S/ Epiph/ pH: 2, L: 3-4, X: 2, E: 1/ Alt: 2-3/ Mont: vc, SmedD: er, SmedH: vr/ PT: 1/ Note: a cool-temperate species found on smooth subacid bark, with optimum in humid beech forests; present throughout the country, but most common in the beech forests of central and southern Italy.

Lecanora lecideoides (Nyl.) Harm.

Lich. de France, 5: 984, 1913 - *Lecanora subfusca* var. *lecideoides* Nyl. Lich. Envir. Paris: 57, 1896.

Syn.: *Lecanora rubrofusca* var. *nigra* B. de Lesd., *Lecanora sbarbaroana* H. Magn. ex Sbarbaro

N - Lig.

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4-5, X: 3-4, E: 2-3/ Alt: 1/ MedH: vr/ PT: 1/ #/ Note: a very poorly known species of siliceous rocks, reported from a few localities in western and southern Europe. Ecological indicator values are tentative.

Lecanora leptacina Sommerf.

Suppl. Fl. Lappon.: 96, 1826.

Syn.: *Lecanora intricata* var. *leptacina* (Sommerf.) Stizenb.

N - **Lomb, Piem** (Isocrono & al. 2004).

Cr/ Ch/ S/ Terr/ pH: 1-2, L: 4-5, X: 2, E: 1-2/ Alt: 5/ Alp: er/ PT: 1/ Note: a probably circumpolar, arctic-alpine lichen found on mosses (*Andreaea*, *Grimmia*) and plant debris in sites with a long snow-lie above treeline, in areas with siliceous substrata; perhaps more widespread in the Alps.

Lecanora leptyroides (Nyl.) Degel.

Ark. Bot., 24a, 3: 82, 1931 - *Lecanora angulosa* var. *leptyroides* Nyl., Flora, 57: 16, 1874.

Syn.: *Lecanora nemoralis* Makar. non auct., *Lecanora pycnocarpa* H. Magn.

N - **VG, Frl, Ven** (Lazzarin 1997, Nascimbene & Caniglia 2002c, 2003c, Nascimbene 2005c, 2008, 2008c, Nascimbene & Marini 2007), **TAA** (Nascimbene & Caniglia 2000, 2000b, Nascimbene & al. 2005, 2006, 2006e, 2007b, 2008b, 2009, 2014, Nascimbene 2014, Nimis & al. 2015), **Lomb** (Alessio & al. 1995, Valcuvia & Truzzi 2007b), **Piem** (Caniglia & al. 1992, Isocrono & al. 2003, Piervittori 2003, Isocrono & Piervittori 2008), **VA** (Matteucci & al. 2008, Isocrono & al. 2008), **Emil** (Bassi 1995, Nimis & al. 1996), **Lig** (Putorti & al. 1999b, Giordani & Incerti 2008). **C - Tosc** (Tretiach & Nimis 1994, Loppi & al. 1994, 1997b, 1998, Loppi & De Dominicis 1996b, Putorti & al. 1998, Benesperi & al. 2007, Benesperi 2011), **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera 1998, Ravera & al. 2006, Panfili 2007), **Laz** (Nimis & Tretiach 2004), **Abr** (Nimis & Tretiach 1999, Corona & al. 2016), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **Sar** (Rizzi & al. 2011, Cossu 2013). **S - Camp** (Garofalo & al. 1999, 2010, Aprile & al. 2002, 2003, 2003b, Brunialti & al. 2013, Ravera & Brunialti 2013, Catalano & al. 2016), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996, Incerti & Nimis 2006), **Si**.

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 3-5, X: 2-3, E: 1-2/ Alt: 2-4/ Salp: r, Mont: ec, SmedD: r, Pad: er, SmedH: rr/ PT: 1/ p/ Note: a mainly cool-temperate early coloniser on the smooth bark of young trunks and branches (especially of *Fagus* and *Betula*) which, however, is able to persist on ancient trees as well, with optimum in beech forests, where it is locally common and sometimes even abundant, especially in humid areas. See also note on *L. subcarpineae*.

Lecanora lividocinerea Bagl.

N. Giorn. Bot. Ital., 11: 75, 1879.

Syn.: *Lecanora balearica* A. Crespo & Llimona, *Lecanora erubescens* Werner

C - Tosc (Loppi & al. 1999a, Putorti & Loppi 1999, Benesperi & al. 2013), **Laz** (Gigante & Petriccione 1995), **Sar** (Brodo & Elix 1993, Lumbsch 1994, Zedda 2002, 2002b). **S - Camp** (Catalano & al. 2012), **Pugl** (Nimis & Tretiach 1999), **Si** (Otonello & al. 2011).

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 4-5, X: 3, E: 2-3/ Alt: 1/ MedH: vr, MedD: er/ PT: 1/ suboc/ Note: a Mediterranean lichen found on branches of shrubs in littoral maquis subject to humid maritime winds; mainly Tyrrhenian in Italy. It is included in the Italian red list of epiphytic lichens as "Vulnerable" (Nascimbene & al. 2013c).

Lecanora lojkaeana Szatala

Ann. Hist. nat. Mus. nat. Hung., ser. nov., 5: 136, 1954.

Syn.: *Squamaria ferruginea* Szatala

N - **TAA**.

Cr/ Ch/ A.s/ Sax/ pH: 1-2, L: 3-4, X: 2-3, E: 1/ Alt: 3-5/ Alp: vr, Salp: vr, Mont: vr/ PT: 1/ u/ Note: a rarely collected species known from the Alps, the central European mountains and Scandinavia, found beneath underhanging surfaces of hard siliceous rocks in upland areas; perhaps overlooked and more widespread in the Alps, being almost always sterile.

Lecanora marginata (Schaer.) Hertel & Rambold

Bot. Jahrb., 107: 494, 1985 - *Lecidea marginata* Schaer., Naturwiss. Anz., 2: 10, 1818.

Syn.: *Biatora elata* (Schaer.) Hepp, *Lecanora atosulphurea* Ach. var. *eliminata* Arnold, *Lecanora eliminata* (Arnold) Nyl., *Lecidea amyloacea* Ach., *Lecidea elata* Schaer., *Lecidea elata* var. *formata* Maheu & A. Gillet, *Lecidea elata* var. *marginata* (Schaer.) A. Massal., *Lecidea elata* var. *subfarinosa* H. Magn., *Lecidea eliminata* (Arnold) Arnold, *Lecidea marginata* subsp. *elata* (Schaer.) Clauzade & Cl. Roux, *Lecidea marginata* var. *elata* (Schaer.) Anzi, *Lecidea marginata* var. *subfarinosa* (H. Magn.) J. Novak & Tobol., *Lecidea mollissima* Lyng., *Lecidea sulphurella* Th. Fr., *Lecidella elata* (Schaer.) Körb., *Lecidella marginata* (Schaer.) Körb.

N - **Frl** (Tretiach & Hafellner 2000), **Ven, TAA** (Caniglia & al. 2002), **Lomb** (Watson 2014), **Piem** (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999), **Emil, C - Tosc, Sar**.

Cr/ Ch/ S/ Sax/ pH: 3-4, L: 4, X: 3, E: 1-2/ Alt: 4-6/ Alp: rc, Salp: rr, Orom: er / PT: 1/ Note: a circumpolar, arctic-alpine lichen found on limestone, dolomite, and on more or less calciferous siliceous rocks near or above treeline, up to the nival belt, most frequent in the Alps. The record from Campania by Ricciardi & al. (2000) at a low elevation, is not accepted here.

Lecanora minutissima A. Massal.

Miscell. Lichenol.: 37, 1856.

N - **Ven** (Lazzarin 2000b). **C - Tosc** (Jatta 1909-1911). **S - Pugl** (Jatta 1909-1911).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 4-5, X: 3-4, E: 4-5/ Alt: 2/ SmedD: vr, Pad: vr, SmedH: er/ PT: 1-2/ #/ Note: a very poorly known taxon growing on calciferous rocks, also reported from the Czech Republic and

Romania, which well deserves further study. The type (VER) was collected “*ad saxa jurassica Prov. Veronensis (Grozana), leg. Tonini*”.

Lecanora mughicola Nyl.

Flora, 55: 248, 1872.

Syn.: *Lecanora varia* var. *alpina* Kremp., *Lecanora varia* var. *melanocarpa* Anzi

N - **Frl**, **Ven**, **TAA** (Nascimbene & Caniglia 2002c, Nascimbene & al. 2006e, 2007b, 2008c, Nimis & al. 2015), **Lomb**, **Piem** (TSB 33223), **VA** (Piervittori & Isocrono 1999), **Lig** (van den Boom & Brand 2008). **C** - **Laz** (van den Boom & Brand 2008). **S** - **Cal** (Puntillo 1996).

Cr/ Ch/ S/ Lign/ pH: 1-2, L: 3-4, X: 3-4, E: 1/ Alt: 3-4/ Salp: c, Mont: r/ PT: 1/ Note: a circumboreal-montane lichen found on hard lignum, mostly of conifers in upland areas, with optimum in the subalpine belt; common only in the Alps, much rarer in the mountains of southern Italy.

Lecanora ochroidea (Ach.) Nyl.

Lich. Envir. Paris: 59, 1896 - *Lichen ochroideus* Ach., Lichenogr. Suec. Prodr.: 72, 1798.

Syn.: *Lecanora subcarnea* var. *ochroidea* (Ach.) Ach., *Zeora subcarnea* var. *ochroidea* (Ach.) Arnold

N - **Lig** (Brunialti & al. 1999). **C** - **Laz**, **Sar** (Dickhauser & al. 1995 Nöske 2000).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4, X: 2, E: 1/ Alt: 1-2/ SmedH: r, MedH: er/ PT: 1/ suboc, u/ Note: a mild-temperate to Mediterranean lichen found on subvertical or underhanging faces of basic siliceous rocks in humid areas; mainly Tyrrhenian in Italy.

Lecanora orbicularis (Schaer.) Vain.

Termeszetr. Füzetek, 22: 286, 1899 - *Lecanora polytropa* var. *orbicularis* Schaer., Enum. Crit. Lich. Eur.: 81, 1850.

N - **TAA** (Hafellner 1993), **Lomb** (Nascimbene 2006), **Piem** (Morisi & Sereno 1995, Isocrono & al. 2003), **VA** (Piervittori & Isocrono 1999).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 4, X: 3, E: 1/ Alt: 4-6/ Alp: rr, Salp: r/ PT: 1/ u/ Note: an arctic-alpine lichen growing on hard siliceous rocks, often on steeply inclined to underhanging faces, with optimum above treeline; probably restricted to the Alps, where it reaches the nival belt.

Lecanora orosthea (Ach.) Ach.

Lichenogr. Univ.: 400, 1810 - *Lichen orostheus* Ach., Lichenogr. Suec. Prodr.: 38, 1799.

Syn.: *Biatora orosthea* (Ach.) W. Mann, *Lecanora sulphurea* var. *orosthea* (Ach.) Flagey, *Lecanora petrophila* Th. Fr., *Lecidea orosthea* (Ach.) Ach., *Zeora orosthea* (Ach.) Flot.

N - **TAA** (Nascimbene & Caniglia 2000), **Lomb**. **S** - **Si**.

Cr/ Ch/ A.s/ Sax/ pH: 1-2, L: 3-4, X: 2, E: 1/ Alt: 3-4/ Salp: vr, Orom: er, Mont: r/ PT: 1/ u/ Note: on vertical or underhanging surfaces of siliceous rocks protected from rain in upland areas; certainly more widespread in the Alps.

Lecanora paepalea Ach.

Syn. Lich.: 165, 1814.

Syn.: *Lecanora savonensis* B. de Lesd.

N - **Lig**.

Cr/ Ch/ S/ Sax/ pH: 3-4, L: 3-4, X: 3, E: 2-3/ Alt: 3-5/ Alp: vr, Salp: vr, Mont: vr/ PT: 1/ #/ Note: a poorly known species of more or less calciferous rocks. An earlier record from Puglia (see Nimis 1993: 360), being dubious, is not accepted here.

Lecanora pannonica Szatala

Ann. Hist. Nat. Mus. Nat. Hung., ser. nov. 5: 135, 1954.

N - **TAA** (Brodo & al. 1994), **Piem**.

Cr/ Ch/ A.s/ Sax/ pH: 2-3, L: 4, X: 3-4, E: 1-3/ Alt: 3-4/ Salp: vr, Mont: vr/ PT: 1/ m/ Note: on hard siliceous rocks, also on man-made substrata in the Alps, especially on vertical faces; very much overlooked, or confused with other species.

Lecanora paramerae I. Martínez, Aragón & Lumbsch

Lichenologist, 31: 315, 1999.

C - **Sar** (Zedda 2002).

Cr/ Ch/ S/ Epiph/ pH: 1-3, L: 3-4, X: 3-4, E: 1-2/ Alt: 2-3/ Mont: er, SmedH: er/ PT: 1/ Note: recently described from continental Spain, this epiphytic species is included in the Italian red list of epiphytic lichens as “Critically Endangered” (Nascimbene & al. 2013c).

Lecanora phaeostigma (Körb.) Almb.

in Santesson, The Lichens of Sweden and Norway: 148, 1984 - *Biatora phaeostigma* Körb., Syst. Lich. Germ.: 199, 1855.

Syn.: *Biatora obscurella* (Sommerf.) Arnold, *Lecanora obscurella* (Sommerf.) Hedl., *Lecidea obscurella* (Sommerf.) Nyl.

S - Cal (Puntillo 1996, Puntillo 2011).

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 3, X: 2-3, E: 1/ Alt: 3-4/ Salp: vr, Mont: vr/ PT: 1/ Note: this species, which is related to *L. cadubriae*, seems to be widespread in northern and central Europe; it grows on the bark of conifers, especially near the base of the trunks, more rarely on lignum of decorticated trunks, with optimum in the upper montane and subalpine belts; the species should be looked for also in the Alps.

Lecanora polytropa (Hoffm.) Rabenh. var. ***polytropa***

Deutsch. Krypt.-Fl., 2: 37, 1845 - *Verrucaria polytropa* Ehrh. ex Hoffm., Deutschl. Fl.: 196, 1796.

Syn.: *Biatora polytropa* (Hoffm.) Fr., *Biatora polytropa* var. *vulgaris* Körb., *Lecanora ehrhartiana* var. *polytropa* (Hoffm.) Sommerf., *Lecanora polytropa* f. *campestris* (Wallr.) Rabenh., *Lecanora polytropa* f. *illusoria* (Ach.) Leight., *Lecanora polytropa* f. *inops* Bagl.

N - VG (Castello 2002, Martellos & Castello 2004), **Frl** (Tretiach & Hafellner 2000), **Ven** (Caniglia & al. 1999, Nascimbene & Caniglia 2000, Nascimbene 2005c), **TAA** (Caniglia & al. 2002, Nascimbene 2003, 2005b, 2006c, 2008b, Lang 2009, Calatayud & al. 2013), **Lomb** (Dalle Vedove & al. 2004, Brackel 2013), **Piem** (Isocrono & Falletti 1999, Isocrono & al. 2003, 2004, 2006, Favero-Longo & al. 2006b, 2015, Isocrono & Piervittori 2008, Giordani & al. 2014), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Piervittori & al. 1998, 2001, 2004, Valcuvia 2000, Matteucci & al. 2008c, 2013b, 2015c, Isocrono & al. 2008, Favero-Longo & Piervittori 2009), **Emil** (Dalle Vedove & al. 2002, Tretiach & al. 2008), **Lig. C - Tosc** (Benespero 2006, Tretiach & al. 2008, Calatayud & al. 2013, Brackel 2015), **Umb** (Panfili 2000, Ravera & al. 2006), **Abr** (Brackel 2015), **Sar** (Monte 1993, Nöske 2000, Rizzi & al. 2011). **S - Camp, Cal** (Puntillo 1996, Brackel & Puntillo 2016), **Si** (Grillo 1998, Grillo & Caniglia 2004, Brackel 2008b, 2008c).

Cr/ Ch/ S/ Sax/ pH: 1-3, L: 3-5, X: 3-4, E: 1-3/ Alt: 2-6/ Alp: ec, Salp: ec, Orom: c, Mont: rc, SmedD: vr, SmedH: er/ PT: 1-2/ p/ Note: a cool-temperate to arctic-alpine, circumpolar, ecologically wide-ranging lichen found on siliceous rocks wetted by rain, with a wide altitudinal range but most frequent near and above treeline, reaching the nival belt in the Alps, where it is most common. The species is treated here in a broad sense, including *Lecanora albula* (Nyl.) Hue, that some authors (e.g. Roux & coll. 2014) consider as a distinct species. See also note on *L. stenotropia*.

Lecanora populicola (DC.) Duby

Bot. Gall., 2: 664, 1830 - *Patellaria populicola* DC. in Lamarck & de Candolle, Fl. Franç., éd. 3, 2: 363, 1805.

Syn.: *Lecanora distans* (Pers.) Nyl., *Lecanora subfusca* var. *distans* (Pers.) D. Dietr.

N - Ven, TAA (Nascimbene & al. 2007b), **Lomb, Piem** (Piervittori 2003, Isocrono & al. 2004, 2007), **Emil, Lig** (TSB 25865). **C - Tosc, Sar. S - Camp** (Aprile & al. 2003b), **Bas, Cal** (Puntillo 1996), **Si** (Grillo 1998, Grillo & Caniglia 2004).

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 3-4, X: 3, E: 1-4/ Alt: 3/ Mont: vr/ PT: 1/ Note: a cool-temperate to circumboreal-montane lichen found especially on *Populus tremula* and *Alnus* in the montane belt. Several Italian records need reconfirmation. The species is included in the Italian red list of epiphytic lichens as “Data Deficient” (Nascimbene & al. 2013c).

Lecanora praepostera Nyl.

Flora, 56: 19, 1873.

Syn.: *Lecanora briquetii* Zschacke, *Lecanora gangaleoides* f. *schistina* Nyl., *Lecanora schistina* (Nyl.) Arnold, *Lecanora sardoia* Bagl.?

C - Tosc, Laz, Sar (Monte 1993, Nöske 2000, Rizzi & al. 2011). **S - Cal** (Puntillo 1996).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 3-4, X: 3, E: 1-2/ Alt: 1-3/ Mont: er, SmedH: rr, MedH: vr/ PT: 1/ suboc/ Note: on steeply inclined to vertical surfaces of hard siliceous rocks, often with species of *Pertusaria*; mainly Tyrrhenian, and locally common in Italy at relatively low elevations.

Lecanora pseudistera Nyl.

Flora, 55: 354, 1872.

Syn.: *Lecanora atrofusca* B. de Lesd., *Lecanora atrofusca* var. *coalescens* Maheu & Werner, *Lecanora clauzadei* B. de Lesd., *Lecanora ripartii sensu* Poelt non Lamy, *Lecanora rubrofusca* B. de Lesd., *Parmularia sbarbaronis* B. de Lesd.

N - VG, TAA, Lomb, Piem, VA (Piervittori & Isocrono 1999), **Lig** (Lumbsch 1994). **C - Tosc, Laz, Sar** (Rizzi & al. 2011). **S - Cal** (Puntillo 1996).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4, X: 4, E: 2-3/ Alt: 1-2/ SmedD: r, Pad: er, SmedH: vr, MedH: r, MedD: rr/ PT: 1-2/ Note: a mild-temperate to Mediterranean species found on calciferous sandstone and basic siliceous rocks in warm-dry areas, mostly at low elevations.

Lecanora pseudosarcopidoides M. Brand & van den Boom

in van den Boom & Brand, Lichenologist, 40: 475, 2008.

N - TAA (van den Boom & Brand 2008).

Cr/ Ch/ S/ Lign/ pH: 1-2, L: 3-4, X: 4, E: 1-2/ Alt: 3-4/ Alp: er, Salp: rr/ PT: 1/ Note: a recently-described lignicolous species found on rotting trunks of conifers, mainly in the subalpine belt, in species-poor stands, often with *Parmeliopsis ambigua*. It is superficially similar to *L. saligna*, differing in the form of the conidia and in other minor morphological characters, and is certainly much more widespread in the Alps.

Lecanora pulicaris (Pers.) Ach.

Syn. Meth. Lich.: 336, 1814 - *Patellaria pulicaris* Pers., Ann. Wetter. Gesellsch. Ges. Naturk., 2, 1: 13, 1810.

Syn.: *Lecanora chlarona* (Ach.) Nyl. non auct. p.p., *Lecanora coilocarpa* (Ach.) Nyl. non auct., *Lecanora detrita* (Hoffm.) Ach., *Lecanora gangalea* auct., *Lecanora pinastris* (Schaer.) H. Magn., *Lecanora pulicaris* f. *pinastris* (Schaer.) Clauzade & Cl. Roux, *Lecanora subfusca* var. *detrita* (Hoffm.) A. Massal., *Lecanora subfusca* var. *pinastris* Schaer.

N - **VG** (TSB 18180), **Frl** (Badin & Nimis 1996), **Ven** (Nascimbene & Caniglia 1997, Caniglia & al. 1999, Nascimbene 2008c), **TAA** (Nascimbene 2003, 2014, Nascimbene & al. 2007b, 2009, 2010, 2014, Nascimbene & Marini 2015, Nimis & al. 2015), **Lomb** (Zocchi & al. 1997, Nascimbene & al. 2006e), **Piem** (Caniglia & al. 1992, Morisi & Sereno 1995, Griselli & al. 2003, Isocrono & al. 2004, 2006, Isocrono & Piervittori 2008, Matteucci & al. 2010, Giordani & Malaspina 2016), **VA** (Piervittori & Isocrono 1999, Matteucci & al. 2008, 2008c, Isocrono & al. 2008), **Emil** (Tretiach & al. 2008, Benesperi 2009), **Lig** (Giordani & al. 2002, Brunialti & Giordani 2003, Giordani 2006, Giordani & Incerti 2008, Watson 2014). **C** - **Tosc** (Tretiach & Ganis 1999, Loppi & Putorti 2001, Benesperi 2006, 2011, Benesperi & al. 2007, Brunialti & Frati 2010), **Marc** (Nimis & Tretiach 1999, Frati & Brunialti 2006), **Umb** (Ravera 2000, Panfili 2000b, Ravera & al. 2006), **Laz** (Ravera & al. 1999, Brackel 2015), **Abr** (Nimis & Tretiach 1999, Stofer 2006, Corona & al. 2016), **Mol** (Ravera & Genovesi 2012, Genovesi & Ravera 2014), **Sar** (Zedda 2002, Rizzi & al. 2011, Cossu 2013). **S** - **Camp** (Ricciardi & al. 2000, Nimis & Tretiach 2004, Garofalo & al. 2010, Brunialti & al. 2013, Ravera & Brunialti 2013, Catalano & al. 2016), **Pugl** (Brackel 2011), **Bas, Cal** (Puntillo 1996, van den Boom & Giralt 2002, Incerti & Nimis 2006), **Si** (Grillo & al. 1996, Grillo 1998, Grillo & Caniglia 2004, Stofer 2006, Liistro & Cataldo 2011).

Cr/ Ch/ S/ Epiph-Lign/ pH: 1-2, L: 3-5, X: 2-4, E: 1-2/ Alt: 2-4/ Salp: rc, Mont: rc, SmedD: vr, Pad: er, SmedH: vr/ PT: 1-2/ Note: a cool-temperate to boreal-montane, circumpolar lichen found on conifers, more rarely on broad-leaved trees, and on lignum; most common in the Alps, rarer in the mountains of southern Italy. The record from Rome by Munzi & al. (2007) is not accepted here pending confirmation.

Lecanora puniceofusca Bagl.

N. Giorn. Bot. Ital., 11: 73, 1879.

N - **Lig** (Lumsch 1994, Giordani & al. 2016). **C** - **Tosc, Sar** (Rizzi & al. 2011). **S** - **Cal** (HAL-19972), **Si** (Nimis & al. 1996b).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4-5, X: 4, E: 1-2/ Alt: 1/ MedH: r, MedD: vr/ PT: 1/ Note: on coarse-textured, basic siliceous rocks at low elevations. The sample from Calabria was collected by B. Feige near Briatico, on granite.

Lecanora quercicola Coppins & P. James

Lichenologist, 11: 145, 1979.

N - **Lomb** (Zocchi & al. 1997). **C** - **Tosc, Sar** (B 60 0153517, det Z. Palice).

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 3-5, X: 3, E: 1-2/ Alt: 2/ SmedD: er, SmedH: er/ PT: 1/ suboc/ Note: on well-lit boles of ancient deciduous trees (*Quercus*, *Castanea*); mainly Tyrrhenian, but also reported from the Austrian Alps. The species is included in the Italian red list of epiphytic lichens as "Critically Endangered" (Nascimbene & al. 2013c).

Lecanora reagens Norman

K. Norske Vidensk. Skr., 5: 324, 1868.

N - **TAA, Piem** (TSB 34121).

Cr/ Ch/ A.s/ Sax/ pH: 3, L: 3-4, X: 3-4, E: 1/ Alt: 3-5/ Alp: er, Salp: er, Mont: er/ PT: 1/ u/ Note: on underhanging surfaces of hard, mineral-rich siliceous rocks (gneiss, schists), mostly in fissures, occasionally on epilithic mosses, with optimum in upland areas.

Lecanora rhizinata Poelt, Barreno & V.J. Rico

Lazaroa, 5: 255, 1983.

C - **Sar**.

Cr/ Ch/ S/ Sax/ pH: 3, L: 4-5, X: 4, E: 1/ Alt: 5/ Orom: er/ PT: 1/ Note: on easily exfoliable metamorphic rocks in open, wind-exposed and snow-free sites above treeline.

Lecanora rhodi Szatala

Denkschr. Akad. Wiss. Wien, math.-naturw. Kl., 105: 38, 1943.

C - **Sar** (Dickhauser & al. 1995).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4, X: 2-3, E: 1/ Alt: 1/ MedH: er/ PT: 1/ u/ Note: an apparently Mediterranean-Atlantic lichen found on subvertical or underhanging surfaces of base-rich siliceous rocks in humid areas, at low elevations.

Lecanora rouxii S. Ekman & Tønnsberg

in Grube & al., Mycol. Res., 108: 12, 2004.

Syn.: *Lepraria flavescens* Clauzade & Cl. Roux nom. inval., *Lepraria flavescens* Cl. Roux & Tønnsberg

N - **Ven** (Nascimbene 2003, 2004, 2005c, Baruffo & al. 2006). **C** - **Marc** (Nimis & Tretiach 1999, Baruffo & al. 2006), **Abr** (Nimis & Tretiach 1999).

Lepr/ Ch/ A.s/ Sax/ pH: 4-5, L: 1-4, X: 2-3, E: 1-3/ Alt: 1-3/ Mont: rr, SmedD: rr/ PT: 1/ u/ Note: on vertical to underhanging surfaces of weathered or fissured calcareous rocks seldom wetted by rain, often in

woodlands, mostly in natural habitats; certainly more widespread. According to Grube & al. (2004) the species is closely related to *Lecanora swartzii*.

Lecanora rubicunda Bagl.

N. Giorn. Bot. Ital., 11: 74, 1879.

Syn.: *Lecanora augustinii* Erichsen, *Lecanora circumrubens* Samp., *Lecanora ochraceorosea* Werner, *Lecanora olivieri* Zahlbr., *Lecanora sylvestris* (Nyl.) Stizenb.

N - Lig (Giordani & Incerti 2008). **C - Tosc** (Loppi & al. 1997c, 1999a, 2004c, Putorti & al. 1999c, Senese & Critelli 2000), **Sar** (Lumbsch 1994, Loi & al. 2000, Zedda 2002, 2002b). **S - Camp** (Nimis & Tretiach 2004, Garofalo & al. 2010), **Pugl** (Nimis & Tretiach 1999), **Bas, Si** (Nimis & al. 1994).

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 4-5, X: 3, E: 2-3/ Alt: 1/ MedH: r, MedD: er/ PT: 1/ suboc/ Note: a mainly Mediterranean lichen found on smooth bark in open maquis and garrigue vegetation; confused with *L. chlarotera* in the past, but certainly not common.

Lecanora rupicola subsp. ***rupicola*** var. ***efflorens*** Leuckert & Poelt

Nova Hedwigia, 49: 151, 1989.

Syn.: *Lecanora rupicola* f. *sorediata* (Flot.) Zahlbr.

N - Frl, Piem (TSB 35252). **C - Sar, S - Si**.

Cr/ Ch/ A.s/ Sax/ pH: 2-3, L: 3-4, X: 3, E: 1-2/ Alt: 3-5/ Alp: vr, Salp: rr, Orom: vr, Mont: vr/ PT: 1/ Note: optimum in somehow more shaded-humid situations than the typical variety; probably more widespread in the Alps.

Lecanora rupicola (L.) Zahlbr. subsp. ***rupicola*** var. ***rupicola***

Cat. Lich. Univ., 5: 525, 1928 - *Lichen rupicola* L., Mantissa Pl.: 132, 1767.

Syn.: *Lecanora glaucoma* (Hoffm.) Ach., *Lecanora glaucoma* f. *scutellaris* (Schaeer.) H. Olivier, *Lecanora leptoplaca* Nyl., *Lecanora rimosa* (Retz.) Röhl., *Lecanora rimosa* f. *gregaria* A. Massal., *Lecanora sordida* (Pers.) Th. Fr., *Lecanora stenhammarii* (Körb.) Jatta, *Parmelia sordida* (Pers.) Fr.

N - Frl (Tretiach & Hafellner 2000), **Ven** (Lazzarin 2000b), **TAA** (Caniglia & al. 2002, Nascimbene 2003, 2006c, 2008b), **Lomb** (Dalle Vedove & al. 2004), **Piem** (Morisi & Sereno 1995, Isocrono & Falletti 1999, Isocrono & al. 2003, 2004, Morisi 2005, Favero-Longo & al. 2005, 2006b, 2015, Giordani & al. 2014), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Piervittori & al. 2001, 2004), **Emil** (Dalle Vedove & al. 2002, Tretiach & al. 2008), **Lig** (Brunialti & al. 1999), **C - Tosc** (Tretiach & al. 2008, Brackel 2015), **Umb** (Panfili 2000, Ravera & al. 2006), **Laz, Mol** (Garofalo & al. 1999, Caporale & al. 2008), **Sar** (Monte 1993, Nöske 2000, Rizzi & al. 2011, Cossu & al. 2015), **S - Camp** (Garofalo & al. 1999, Aprile & al. 2002), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Poli & al. 1995, Grillo & al. 1996, Ottonello & Romano 1997, Grillo 1998, Poli & Grillo 2000, Grillo & Caniglia 2004, Brackel 2008b, 2008c, Ottonello & al. 2011, Cataldo & Cannavò 2014).

Cr/ Ch/ S/ Sax/ pH: 1-3, L: 3-5, X: 3-4, E: 1-2/ Alt: 1-5/ Alp: ec, Salp: ec, Orom: c, Mont: vc, SmedD: rr, SmedH: rc, MedH: vr / PT: 1-2/ Note: a widespread, holarctic silicicolous lichen with a wide altitudinal range, rare only along the Adriatic side of the Peninsula, reaching the Mediterranean belt in Tyrrhenian Italy.

Lecanora rupicola subsp. ***subplanata*** (Nyl.) Leuckert & Poelt

Nova Hedwigia, 49: 152, 1989 - *Lecanora subplanata* Nyl., Flora, 64: 530, 1881.

Syn.: *Lecanora rupicola* var. *subplanata* (Nyl.) Clauzade & Cl. Roux, *Lecanora subradiosa* Nyl. *non auct.*

N - TAA, Lomb (Nascimbene 2004, 2006), **Piem, VA** (Matteucci & al. 2008c, Isocrono & al. 2008), **Lig** (TSB 33472). **C - Tosc, Laz, Sar** (Giordani & al. 2013). **S - Bas** (Nimis & Tretiach 1999), **Si** (Grillo & Caniglia 2004).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4, X: 3-4, E: 1-2/ Alt: 1-5/ Alp: vr, Salp: vr, Orom: r, Mont: rr, SmedD: er, SmedH: rr, MedH: r, MedD: er/ PT: 1/ Note: more southern and perhaps more xerophytic than the typical subspecies, this taxon should be looked for further throughout Italy.

Lecanora rupicola subsp. ***sulphurata*** (Ach.) Leuckert & Poelt

Nova Hedwigia, 49: 154, 1989 - *Lecanora glaucoma* var. *sulphurata* Ach., Syn. Meth. Lich.: 166, 1814.

Syn.: *Lecanora flavescens* (Bagl.) Bagl., *Lecanora sordida* var. *flavescens* Bagl., *Lecanora sordidoflava* Jatta, *Lecanora sulphurata* (Ach.) Nyl.

N - Piem (TSB 32644), **VA** (TSB 29483), **Lig** (TSB 33390). **C - Tosc, Laz, Sar** (Monte 1993, Nöske 2000, Rizzi & al. 2011, Giordani & al. 2013). **S - Bas** (Nimis & Tretiach 1999), **Cal** (TSB 10579), **Si** (Ottonello & al. 1994, 2011, Grillo & al. 1996, Ottonello & Romano 1997, Grillo 1998, Grillo & Caniglia 2004).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4-5, X: 4-5, E: 1-2/ Alt: 1-5/ Alp: rc, Salp: c, Mont: vr, SmedD: er, SmedH: rr, MedH: rr, MedD: er/ PT: 1-2/ suboc/ Note: more southern, more photo- and thermophytic than the typical subspecies; in the Alps it is common only in dry situations, such as on south-exposed faces.

Lecanora salicicola H. Magn.

Bot. Not.: 311, 1939.

Syn.: *Lecanora chlarona* f. *rhododendri* Harm., *Lecanora migdina sensu* Poelt & Vězda, *Lecanora pulicaris* subsp. *rhododendri* (Harm.) Clauzade & Cl. Roux, *Lecanora subfuscata* var. *rhododendri* Poelt

N - Ven (Nascimbene & Caniglia 2000, 2003c, Tomaselli & al. 2006), **TAA** (Nascimbene & al. 2006e, 2007b, 2014, Nascimbene 2014, Nascimbene & Marini 2015, Nimis & al. 2015), **Lomb** (Roux & Triebel 1994, Nascimbene & al. 2006e), **Piem** (Tretiach 1997, Griselli & al. 2003), **VA** (TSB 29452). **C - Abr** (Nimis & Tretiach 1999).

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 3-4, X: 3, E: 1-2/ Alt: 4-5/ Alp: vr, Salp: c/ PT: 1/ Note: a probably circumboreal-montane lichen found on dead or decaying twigs of shrubs, especially *Rhododendron ferrugineum* in the subalpine belt; certainly widespread throughout the Alps, much rarer in the Apennines.

Lecanora saligna (Schrad.) Zahlbr.

Cat. Lich. Univ.: 536, 1928 - *Lichen salignus* Schrad., Spicil. Fl. Germ., 1: 84, 1794.

Syn.: *Lecanora effusa* (Hoffm.) Ach., *Lecanora saligna* var. *ravida* (Hoffm.) Zahlbr., *Zeora effusa* (Hoffm.) Anzi

N - **FrI** (TSB 12692), **Ven** (Lazzarin 2000b, Nascimbene & Caniglia 2003c, Nascimbene 2008, 2008c), **TAA** (Nascimbene 2006c, 2008b, Nascimbene & al. 2007b, 2008c, Nimis & al. 2015), **Lomb**, **Piem**, **VA** (Matteucci & al. 2008c), **Emil** (Nimis & al. 1996), **Lig** (Giordani & Incerti 2008). **C** - **Tosc** (Tretiach & Ganis 1999, van den Boom & Brand 2008), **Marc** (Nimis & Tretiach 1999), **Abr** (Nimis & Tretiach 1999), **Laz** (van den Boom & Brand 2008), **Sar** (Rizzi & al. 2011). **S** - **Camp**, **Pugl**, **Cal** (Puntillo 1996, Incerti & Nimis 2006).

Cr/ Ch/ S/ Lign-Epiph/ pH: 1-2, L: 4-5, X: 4, E: 1-2/ Alt: 2-4/ Salp: rr, Mont: rc, SmedD: vr, Pad: er, SmedH: r/ PT: 1-2/ Note: a holarctic, temperate to boreal-montane lichen found on hard, undecomposed wood or on bark of conifers; most frequent in the Alps, but also present in the mountains of southern Italy.

Lecanora sarcopidoides (A. Massal.) A.L. Sm.

Monogr. Brit. Lich., 1: 295, 1918 - *Biatora sarcopidoides* A. Massal., Ric. Auton. Lich. Crost.: 128, 1852.

Syn.: *Biatora pumilionis* (Rehm) Oxner, *Lecanora metaboliza* Nyl., *Lecanora metabolooides* Nyl., *Lecanora piniperda* subsp. *sarcopidoides* (A. Massal.) Hedl., *Lecanora pumilionis* (Rehm) Arnold

N - **FrI** (TSB 20607), **Ven** (Lazzarin 2000b, Nascimbene & Caniglia 2003c), **TAA** (Nascimbene & al. 2006e, 2007b, Nimis & al. 2015, van den Boom & Brand 2008), **Lomb**, **Piem** (Isocrono & al. 2004).

Cr/ Ch/ S/ Epiph-Lign/ pH: 1-2, L: 3-4, X: 3, E: 1/ Alt: 3-4/ Salp: r, Mont: vr/ PT: 1/ #/ Note: a poorly known taxon of the *L. symmicta* complex, found on acid bark, most often of conifers, and on lignum, mostly in upland areas. The record from Mt. Vesuvius by Aprile & al. (2002), being dubious, is not accepted here.

Lecanora sarcopis (Ach.) Ach.

Syn. Lich.: 177, 1814 - *Parmelia varia* var. *sarcopis* Ach., Meth. Lich. Suppl.: 40, 1803.

Syn.: *Lecanora effusa* var. *sarcopis* (Ach.) Th. Fr., *Lecanora minuta* Colmeiro?, *Lecanora saligna* var. *sarcopis* (Ach.) Tomin

N - **FrI**, **Lomb**, **Lig** (Valcuvia & al. 2000). **C** - **Tosc** (Loppi & al. 1997c, 1999a, Laganà & al. 2002), **Abr**, **Sar**. **S** - **Si** (Merlo 1993).

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 4, X: 3-4, E: 2-3/ Alt: 1-3/ Mont: r, SmedD: rc, Pad: er, SmedH: rc, MedH: vr/ PT: 1-2/ Note: a mainly temperate species found on the acid bark of isolated deciduous trees; closely related to *L. saligna* and perhaps better treated at varietal rank.

Lecanora silvae-nigrae V. Wirth

Nova Hedwigia, 17: 181, 1968.

N - **FrI** (Tretiach & Hafellner 2000), **Piem** (Isocrono & al. 2004, Isocrono & Piervittori 2008), **VA** (Piervittori & al. 2004), **Emil**. **C** - **Sar**.

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 4, X: 3, E: 2-3/ Alt: 3-5/ Alp: vr, Salp: r, Orom: er, Mont: er/ PT: 1/ Note: a southern European orophyte found on siliceous, often iron-rich rocks, mostly near and above treeline.

Lecanora soralifera (Suza) Räsänen

Ann. Acad. Sci. Fenn., ser. A, 34: 84, 1931 - *Lecanora intricata* var. *soralifera* Suza, J. Sborn. Klub. prirod. Brno, 4: 17, 1922.

Syn.: *Lecanora efflorescens* (Cromb.) Lettau, *Lecanora polytropa* f. *efflorescens* Cromb.

N - **FrI** (Tretiach & Hafellner 2000), **Piem** (Isocrono & al. 2003, Giordani & al. 2014).

Cr/ Ch/ A.s/ Sax/ pH: 1-3, L: 3-4, X: 2-3, E: 1/ Alt: 3-5/ Alp: vr, Salp: r, Mont: vr/ PT: 1/ suboc, m, p/ Note: on iron-rich rocks, including pebbles, in upland areas; certainly more widespread in the Alps. A dubious record from Lazio (see Nimis 1993: 369) is not accepted here.

Lecanora stenotropa Nyl.

Flora, 55: 251, 1872.

N - **Piem** (TSB 2250b).

Cr/ Ch/ S/ Sax/ pH: 1-3, L: 3-5, X: 3-4, E: 1-3/ Alt: 3-4/ Salp: rc, Mont: vr/ PT: 1/ Note: this silicolous species, which is closely related to *L. polytropa*, is apparently quite widespread and locally common along the southern Alps (Roux & coll. 2014). Several other records might be hidden under *L. polytropa*.

Lecanora strobilina (Spreng.) Kieff.

Bull. Soc. Hist. Nat. Metz: 74, 1895 - *Parmelia strobilina* Spreng. in Linnaeus, Syst. Veget., 4, 1: 300, 1827.

Syn.: *Lecanora conizaea* auct. non (Ach.) Nyl.

N - **VG**, **FrI** (Badin & Nimis 1996), **TAA** (UPS-L-166828), **Lig** (Putortù & al. 1999b, Giordani & Brunialti 2000, Giordani & al. 2002, Brunialti & Giordani 2003, Giordani 2006, Giordani & Incerti 2008). **C** - **Tosc** (Putortù & Loppi 1999, Baragatti & al. 2005, Baragatti 2006, Stofer 2006, Frati & al. 2008, Brunialti & Frati 2010, Loppi & Baragatti

2011, Brunialti & al. 2012b, Paoli & al. 2012, 2015d, Benesperi & al. 2013), **Umb** (Ravera & al. 2011), **Laz** (Ravera 2006c, 2008b, Stofer 2006), **Mol** (Ravera & Genovesi 2012), **Sar** (Rizzi & al. 2011). **S - Camp** (Brunialti & al. 2013, Ravera & Brunialti 2013, Suija & al. 2015), **Si** (Brackel 2008b).

Cr/ Ch/ S/ Epiph-Lign/ pH: 1-2, L: 3, X: 2-3, E: 1/ Alt: 1-3/ Mont: er, SmedD: er, SmedH: r, MedH: vr/ PT: 1/ suboc/ Note: a temperate species found on acid bark and lignum, mostly in open woodlands; previously confused with other species and probably more widespread in Tyrrhenian Italy.

Lecanora subaurea Zahlbr.

Cat. Lich. Univ., 5: 547, 1928.

Syn.: *Lecanora aurea* Eitner, *Lecanora hercynica* Poelt & Ullrich

N - Frl (Tretiach & Hafellner 2000), **Lomb** (Nascimbene 2006), **Piem** (TSB 33829).

Cr/ Ch/ A.s/ Sax/ pH: 1-2, L: 4, X: 3, E: 1/ Alt: 2-4/ Salp: vr, Mont: vr, SmedD: er/ PT: 1/ m/ Note: on iron-rich rocks, including pebbles. A dubious record from M. Etna (see Nimis 1993: 370) is not accepted here.

Lecanora subcarnea (Lilj.) Ach.

Lichenogr. Univ.: 365, 1810 - *Lichen subcarneus* Lilj., Utkast Svensk Flora: 327, 1792.

Syn.: *Lecanora pallescens* A. Massal., *Lecanora pallida* var. *trachytica* A. Massal., *Lecanora sordida* var. *subcarnea* (Lilj.) Th. Fr., *Lecanora trevisanii* A. Massal., *Lecidea subcarnea* (Lilj.) Ach., *Patellaria massalongiana* Trevis., *Patellaria rupicola* var. *subcarnea* (Lilj.) Trevis., *Zeora subcarnea* (Lilj.) Arnold

N - Ven (Lazzarin 2000b), **TAA**, **Lomb**, **Piem**, **VA** (Piervittori & Isocrono 1999, Piervittori & al. 2001), **Emil**, **C - Tosc** (Tretiach & al. 2008), **Laz**, **Abr** (Caporale & al. 2016), **Sar** (Dickhauser & al. 1995, Nöske 2000, Rizzi & al. 2011). **S - Camp** (Ricciardi & al. 2000), **Cal** (Dickhauser & al. 1995, Puntillo 1996), **Si**.

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 3-4, X: 2, E: 1/ Alt: 1-3/ Mont: vr, SmedD: er, SmedH: rc, MedH: rr/ PT: 1/ suboc, u/ Note: a mild-temperate to Mediterranean species found on steeply inclined to underhanging surfaces of siliceous rocks, mostly below the upper montane belt; it is locally common in Tyrrhenian Italy.

Lecanora subcarpineae Szatala

Ann. Mus. Nat. Hungar., n. ser., 5: 136, 1954.

Syn.: *Lecanora leptyroides* auct. p.p., *Lecanora nemoralis* auct. p.p. non Makar.

N - Frl, **VA** (Matteucci & al. 2008c), **Emil** (Nimis & al. 1996, Grube & al. 2004). **C - Marc** (Nimis & Tretiach 1999), **Abr** (Nimis & Tretiach 1999, Corona & al. 2016), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008, Genovesi & Ravera 2014). **S - Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996).

Cr/ Ch/ S/ Epiph/ pH: 3, L: 3-5, X: 3-4, E: 1-2/ Alt: 1-3/ Mont: rr, SmedD: r, SmedH: rr, MedH: vr, MedD: vr/ PT: 1/ Note: on smooth bark of isolated trees. The Italian material of the *L. carpineae*-*L. leptyroides* complex still needs revision: here I place all records of specimens similar to *L. carpineae*, and usually found on base-rich, sun-exposed bark, but with the apothecial margin reacting P+ bright yellow.

Lecanora subintricata (Nyl.) Th. Fr.

Lichenogr. Scand., 1: 265, 1871 - *Lecanora varia* var. *subintricata* Nyl., Flora, 51: 478, 1868.

Syn.: *Lecanora varia* var. *atrocinerea* Schaer., *Lecanoropsis subintricata* (Nyl.) M. Choisy

N - Frl, **TAA** (Hinteregger 1994, Nascimbene & al. 2006e, 2007b, van den Boom & Brand 2008), **Lomb** (van den Boom & Brand 2008), **Piem** (Isocrono & al. 2004), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999), **Lig** (Giordani & Incerti 2008). **C - Sar** (TSB 13282). **S - Camp** (Aprile & al. 2002), **Cal** (Puntillo 1996).

Cr/ Ch/ S/ Epiph-Lign/ pH: 1-2, L: 3, X: 3, E: 1/ Alt: 3-4/ Salp: c, Mont: r/ PT: 1/ Note: a circumboreal-montane lichen found on lignum and, more rarely, on the bark of conifers in upland areas.

Lecanora subsaligna M. Brand & van den Boom

in van den Boom & Brand, Lichenologist, 40: 477, 2008.

N - Lig (van den Boom & Brand 2008).

Cr/ Ch/ S/ Epiph-Lign/ pH: 2-3, L: 4-5, X: 3-4, E: 1/ Alt: 2-3/ Mont: er, SmedH: er/ PT: 1/ Note: a recently-described, lignicolous and corticolous species with a mainly western distribution in Europe (the Italian record is the easternmost one), occurring as a pioneer in species-poor stands. It is closely related to *L. albellula* and easily confused with *Myriolecis hagenii*.

Lecanora sulphurea (Hoffm.) Ach.

Lichenogr. Univ.: 399, 1810 - *Lichen sulphureus* Hoffm., Enum. Lich., Ic.: 32, 1784.

Syn.: *Lecanora polytropa* var. *sulphurea* (Hoffm.) Schaer., *Lecanora sulphurea* f. *tumidula* Bagl., *Lecidea sulphurea* (Hoffm.) Wahlenb., *Zeora sulphurea* (Hoffm.) Flot.

N - VG, **Frl** (Tretiach & Hafellner 2000), **Ven**, **TAA**, **Lomb**, **Piem** (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999), **Emil**, **Lig** (Brunialti & al. 1999). **C - Tosc** (Benesperi 2006, Tretiach & al. 2008), **Marc**, **Umb** (Ravera & al. 2006), **Laz** (Genovesi & al. 2011), **Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 1999, Garofalo & al. 1999, Caporale & al. 2008), **Sar** (Monte 1993, Nöske 2000, Hafellner 2007b, Rizzi & al. 2011, Terribile & al. 2012). **S - Camp** (Garofalo & al. 1999, Aprile & al. 2002, 2003, 2003b, Nimis & Tretiach 2004, Catalano & al. 2016), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994, Ottonello & Salone 1994, Ottonello & al. 1994, 2011, Ottonello 1996, Ottonello & Romano 1997, Merlo 2004, Grillo & Caniglia 2004, Hafellner 2007b, Brackel 2008b, Gianguzzi & al. 2009).

Cr/ Ch/ S/ Sax/ pH: 2-5, L: 4-5, X: 2-3, E: 2/ Alt: 1-5/ Alp: vr, Salp: r, Orom: vr, Mont: r, SmedD: rr, Pad: er, SmedH: rc, MedH: rc, MedD: vr/ PT: 1-2/ paras *Tephromela atra*/ Note: a widespread and locally common lichen which often starts the life-cycle on *Tephromela atra*, with a wide altitudinal range; in southern and central Italy it is almost as common on limestone as on siliceous rocks.

Lecanora swartzii subsp. ***nuorensis*** Leuckert & Poelt

Nova Hedwigia, 49: 164, 1989.

C - Sar. S - Cal.

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 3-4, X: 3, E: 1/ Alt: 3-5/ Orom: r, Mont: vr/ PT: 1/ Note: a chemical variety distinguished by the presence of sordidone in the thallus, and thiophanic acid in the apothecial margin.

Lecanora swartzii subsp. ***nylanderii*** (Räsänen) Leuckert & Poelt

Nova Hedwigia, 49: 162, 1989 - *Lecanora subradiosa* var. *nylanderii* Räsänen, Ann. Bot. Soc. Zool.-Bot. Fenn. Vanamo, 12, 1: 70, 1939.

S - Cal (Puntillo 1996).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 3-4, X: 3, E: 1/ Alt: 4-5/ Orom: vr/ PT: 1/ Note: more frequent at high altitudes, to be looked for in the Alps.

Lecanora swartzii (Ach.) Ach. subsp. ***swartzii***

Lichenogr. Univ.: 363, 1810 - *Lichen swartzii* Ach., K. Vetensk.-Akad. Nya Handl.: 185, 1794.

Syn.: *Lecanora glaucoma* var. *swartzii* (Ach.) Nyl., *Lecanora pachycarpa* Samp., *Lecanora rupicola* var. *leucogaea* (Ach.) R. Sant., *Lecanora sordida* var. *swartzii* (Ach.) Rabenh., *Lecanora subradiosa* auct. non Nyl., *Zeora sordida* var. *swartzii* (Ach.) Körb.

N - Ven, TAA, Lomb, Piem (Isocrono & al. 2004, Isocrono & Piervittori 2008), VA (Piervittori & Isocrono 1999, Matteucci & al. 2015c), Emil, Lig (Watson 2014). C - Tosc (Tretiach & al. 2008), Sar (Roux & Triebel 1994). S - Cal (Puntillo 1996), Si (Grillo 1998, Grillo & Caniglia 2004).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 2-3, X: 3-4, E: 1/ Alt: 3-5/ Alp: rc, Salp: c, Orom: r, Mont: vr/ PT: 1/ u/ Note: an arctic-alpine lichen found on steeply inclined to underhanging surfaces of siliceous rocks, with optimum near and above treeline; most frequent in the Alps, but also occurring in the high Mediterranean mountains. The subsp. *caulescens* (J. Steiner) Leuckert & Poelt is known from the Austrian Alps.

Lecanora symmicta (Ach.) Ach.

Syn. Meth. Lich.: 340, 1814 - *Lecanora varia* var. *symmicta* Ach., Lichenogr. Univ.: 379, 1810.

Syn.: *Biatora maculiformis* (Hoffm.) Beltr., *Biatora symmicta* (Ach.) A. Massal., *Lecanora symmicta* var. *symmicta* (Nyl.) Zahlbr., *Lecanora symmicta* Nyl., *Lecanora trabalis* (Ach.) Nyl., *Lecanora varia* var. *maculiformis* (Hoffm.) Rabenh., *Lecidea symmicta* (Ach.) Ach., *Zeora maculiformis* (Hoffm.) Trevis.

N - VG (Castello 1996, 2002, Martellos & Castello 2004, Castello & Skert 2005), Fri (Badin & Nimis 1996, Castello & Skert 2005), Ven (Lecid. Exs. 244: Hertel 1992a, Lazzarin 1997, 2000, Nascimbene & Caniglia 2002c, Nascimbene 2005c, 2008, 2008c, Nascimbene & al. 2006e, 2014, Thor & Nascimbene 2007, Nascimbene & Marini 2007, Kantvilas & La Greca 2008), TAA (Hinteregger 1994, Nascimbene & Caniglia 2000b, 2002c, Nascimbene 2003, 2008b, Nascimbene & al. 2005, 2006, 2006e, 2007b, 2009, Thor & Nascimbene 2007, Nascimbene & Marini 2015, Nimis & al. 2015), Lomb (Arosio & Rinaldi 1995, Alessio & al. 1995, Zocchi & al. 1997, Roella 1999, Nascimbene & al. 2006e, Valcuvia & Truzzi 2007b, Furlanetto 2010), Piem (Isocrono & al. 2004, 2006, Furlanetto 2010), VA (Matteucci & al. 2008, Isocrono & al. 2008), Emil, Lig (Putorti & al. 1999b, Giordani & al. 2002, Brunialti & Giordani 2003, Giordani & Incerti 2008). C - Tosc (Loppi & Putorti 1995b, Loppi & al. 1996, 1999a, 2002c, 2004c, Putorti & Loppi 1999, Loppi & Corsini 2003, Loppi & Frati 2006, Benesperi & al. 2007, Brunialti & Frati 2010, Loppi & Nascimbene 2010, Benesperi 2011, Brunialti & al. 2012b, Paoli & al. 2012, 2015d, Brackel 2015), Umb (Ravera 2000, Ravera & al. 2006), Laz, Mol (Garofalo & al. 1999, Caporale & al. 2008), Sar (Zedda 2002, Rizzi & al. 2011, Cossu 2013). S - Camp (Garofalo & al. 1999, 2010, Aprile & al. 2002, 2003b, Nimis & Tretiach 2004, Catalano & al. 2016), Pugl (Garofalo & al. 1999, Nimis & Tretiach 1999), Cal (Puntillo 1996), Si (Brackel 2008b).

Cr/ Ch/ S/ Epiph-Lign/ pH: 1-2, L: 3-4, X: 2-3, E: 1-2/ Alt: 1-4/ Salp: r, Mont: rr, SmedD: rc, Pad: er, SmedH: rc, MedH: vr/ PT: 1-2/ Note: a holarctic, boreal-montane to temperate lichen found on acid bark, often on the twigs of shrubs, with a wide altitudinal range, sometimes occurring also within small conurbations; most frequent in northern and in Tyrrhenian Italy.

Lecanora umbrosa Degel.

Bot. Not.: 105, 1943.

Syn.: *Ionaspis epulotica* var. *macrocarpa* Creveld, *Lecanora neglecta* (Räsänen) Räsänen, *Lecanora soreidiifera* (Th. Fr.) Räsänen non Fée, *Lecanora subfusca* var. *soreidiifera* Th. Fr.

N - Fri, Ven (TSB 15384), Piem (TSB 34424). C - Sar (Rizzi & al. 2011).

Cr/ Ch/ A.s/ Sax/ pH: 3-4, L: 3, X: 3, E: 1/ Alt: 4-5/ Alp: vr, Salp: rr/ PT: 1/ Note: a cool-temperate to circumboreal-montane lichen found on steeply inclined to underhanging surfaces of weakly calciferous or base-rich, weathered siliceous rocks near or above treeline; certainly more widespread in the Alps but overlooked, being often sterile.

Lecanora valesiaca (Müll. Arg.) Stizenb.

Ber. Thät. St. Gall. Naturw. Ges.: 342, 1882 - *Placodium valesiacum* Müll. Arg., Bull. Trav. Soc. Murithienne Valais, 10: 56, 1881.

Syn.: *Squamaria valesiaca* (Müll. Arg.) H. Olivier

N - TAA, Piem (Clerc & al. 1999), VA (Piervittori & Isocrono 1999), Emil, Lig.

Cr/ Ch/ S/ Sax/ pH: 3-4, L: 4-5, X: 4-5, E: 1-4/ Alt: 3-4/ Salp: er, Mont: vr/ PT: 1/ subc/ Note: on base-rich rocks (gneiss, porphyr, schists, etc.) containing some calcium, in warm-dry situations. For the non-accepted records from southern Italy see Nimis (1993: 373).

Lecanora varia (Hoffm.) Ach.

Lichenogr. Univ.: 377, 1810 - *Patellaria varia* Hoffm., Descr. Adumbr. Pl. Crypt. Lich., 1: 102, 1790.

Syn.: *Lecanora subvaria* Nyl., *Lecanora varia* var. *denudata* Bagl.

N - Frl, Ven (Nimis 1994, Nascimbene & Caniglia 2002c, 2003c, Nascimbene & al. 2006e, Thor & Nascimbene 2007, Nascimbene & Marini 2007, Nascimbene 2008c), TAA (Nascimbene & Caniglia 2000b, 2002c, Caniglia & al. 2002, Nascimbene 2003, 2005b, 2006c, 2008, 2008b, 2013, 2014, Nascimbene & al. 2005, 2006, 2006e, 2007b, 2008c, 2009, 2010, 2014, Stofer 2006, Nimis & al. 2015), Lomb (Dalle Vedove & al. 2004, Nascimbene & al. 2006e), Piem (Isocrono & al. 2004, 2006), VA (Piervittori & Isocrono 1999, Matteucci & al. 2008, Loppi 2014), Emil, Lig. C - Tosc (Loppi & Putorti 1995b), Marc, Umb (Ravera 2000, Ravera & al. 2006), Laz (Ravera & al. 1999, Munzi & al. 2007, Ravera & Genovesi 2008), Abr (Nimis & Tretiach 1999), Mol (Nimis & Tretiach 1999, Caporale & al. 2008), Sar (Nöske 2000). S - Camp, Pugl, Bas, Cal (Puntillo 1996, Puntillo & Puntillo 2004, 2014c, Incerti & Nimis 2006), Si.

Cr/ Ch/ S/ Lign-Epiph/ pH: 1, L: 4-5, X: 3-4, E: 1-2/ Alt: 3-5/ Alp: r, Salp: rc, Mont: r/ PT: 1-2/ Note: a cool-temperate to circumboreal-montane lichen found on hard lignum, more rarely on smooth, hard, acid bark, especially of conifers, in upland areas; most frequent in the Alps, but also occurring in the Mediterranean mountains.

Lecanora variolascens Nyl.

Flora, 64: 183, 1881.

N - TAA (Nascimbene & al. 2007b).

Cr/ Ch/ A.s/ Epiph/ pH: 2-3, L: 3, X: 3, E: 2-3/ Alt: 2-3/ Mont: vr, SmedD: er/ PT: 1/ Note: mostly found at the base of trunks of isolated deciduous trees; perhaps overlooked, being mostly sterile. For the differences towards *L. intumescens* see Lumbsch & al. (1997).

Lecanora vinetorum Poelt & Huneck

Österr. bot. Z., 115: 414, 1968.

N - TAA.

Cr/ Ch/ S/ Sax/ */ Alt: 3-4/ Salp: er, Mont: vr / PT: 2/ #/ Note: a very poorly known species of the *L. varia* complex, characterised by the presence of vinetorin.

Lecanora viridiatra (Stenh.) Zahlbr.

Nyl. ex Zahlbr., Cat. Lich. Univ., 3: 795, 1925 - *Biatora viridiatra* Stenh., Lichenogr. Eur. Ref.: 277, 1831.

Syn.: *Lecidea luteoatra* Nyl., *Lecidea straminescens* Nyl.?, *Lecidea viridiatra* (Stenh.) Schaer.

N - Piem (Isocrono & al. 2003), VA (Piervittori & Isocrono 1999). C - Sar (Nöske 2000).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 4, X: 2, E: 1/ Alt: 4-5/ Alp: vr, Salp: er / PT: 1/ Note: a species of steeply inclined to vertical surfaces of very hard siliceous rocks rich in quartz, in seepage tracks, near or above treeline.

Lecanora zonata Bagl.

Nuovo G. Bot. Ital., 3: 237, 1871.

C - Tosc, Sar.

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 4, X: 3, E: 1/ Alt: 1/ MedH: er, MedD: er/ PT: 1-2/ m, #/ Note: an interesting, rare lichen growing on siliceous, often iron-rich rocks, which deserves further study, also reported from France (Roux & coll. 2014).

Lecidea Ach.

Meth. Lich.: 30, 32, 1803.

The largely artificial genus *Lecidea* in the sense of Zahlbruckner included almost 1200 species. Within the past 40 years, a clearer delimitation of the genus has been reached by moving many taxa to new genera, or by placing them into existing ones. The classification of the c. 427 species still included in *Lecidea* is mostly unsettled, but anticipated to represent several unrelated lineages within Lecanoromycetes, only about 100 of these (all saxicolous) being recognised in *Lecidea s.str.* Schmall & al. (2011) found that *Lecidea s.str.* forms, with *Porpidia*, a monophyletic group, and that the genus must be re-defined to include at least some members of *Porpidia*. Type: *L. fuscoatra* (L.) Ach.

Lecidea albofuscescens Nyl.

Flora, 50: 370, 1867.

Syn.: *Biatora albofuscescens* (Nyl.) Arnold

N - Ven, TAA (Thor & Nascimbene 2007, Nascimbene & al. 2007b, Nimis & al. 2015).

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 3-4, X: 3, E: 1-2/ Alt: 3-4/ Salp: vr, Mont: r/ PT: 1/ Note: a probably circumboreal species found on conifers, especially *Picea*, rarely on acid-barked deciduous trees such as *Betula* and *Sorbus aucuparia* in upland areas. According to Printzen (1995) it is closely related to *Lecidella*.

Lecidea albohyalina (Nyl.) Th. Fr.

Lichenogr. Scand., 2: 431, 1874 - *Lecidea anomala* f. *albohyalina* Nyl., Lichenes Scand.: 203, 1861.

Syn.: *Biatora albohyalina* (Nyl.) Bagl. & Carestia

N - Ven, TAA (Nascimbene & al. 2007b), Piem (Isocrono & al. 2004). C - Mol (Nimis & Tretiach 1999, Caporale & al. 2008).

Cr/ Ch/ S/ Epiph-Lign/ pH: 1-2, L: 3-4, X: 2-3, E: 1/ Alt: 3-4/ Salp: r, Mont: er/ PT: 1/ #/ Note: on smooth, acid bark. The species does not belong to *Lecidea s.str.*; Printzen (2014) found a close relationship with *Lecania*.

Lecidea alpestris Sommerf.

K. Norske Vidensk. Skrifter, 2, 2: 54, 1825.

Syn.: *Lecidea stenotera* (Nyl.) Nyl.

N - Frl, Ven, TAA, Lomb, Piem (Isocrono & al. 2004).

Cr/ Ch/ S/ Terr/ pH: 1-2, L: 4, X: 2, E: 1/ Alt: 4-5/ Alp: rr, Salp: r/ PT: 1/ Note: a circumpolar, arctic-alpine lichen found on naked soil, mosses and plant debris over siliceous substrata, more rarely on bark, on basal parts of conifers in the subalpine belt. Systematic position and delimitation of this species are still not clear (see Printzen 1995); it might belong to *Protomicarea*.

Lecidea atrobrunnea (DC.) Schaer. subsp. *atrobrunnea*

Lich. Helv. Spicil., sect. 3: 134, 1828 - *Rhizocarpon atrobrunneum* DC. in Lamarck & de Candolle, Fl. Franç., éd. 3, 2: 367, 1805.

Syn.: *Lecidea funckii* Flot., *Lecidea protecta* H. Magn., *Lecidea pseudassimilis* Hertel, *Lecidella atrobrunnea* (DC.) Körb., *Psora atrobrunnea* (DC.) A. Massal., *Sporastatia funckii* (Flot.) Dalla Torre & Sarnth.

N - Ven (TSB 11714), TAA (Hertel & Leuckert 2008), Lomb (Hertel & Leuckert 2008, Hertel & Schuhwerk 2010), Piem (Isocrono & al. 2003, 2004, Morisi 2005, Isocrono & Piervittori 2008, Hertel & Leuckert 2008, Hertel & Schuhwerk 2010, Favero-Longo & al. 2013, Watson 2014), VA (Piervittori & al. 1998, 2004, Piervittori & Isocrono 1999, Piervittori & al. 2001, Favero-Longo & al. 2005b, Isocrono & al. 2008, Favero-Longo & Piervittori 2009, Matteucci & al. 2013b, 2015c), Lig (TSB 33431). C - Sar (Rizzi & al. 2011). S - Bas (Hertel & Leuckert 2008).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 4-5, X: 4, E: 1-2/ Alt: 4-5/ Alp: ec, Salp: rc, Orom: vr / PT: 1/ paras *Bellemeria* spp. and *Lecidea silacea* when young, m/ Note: a bipolar, arctic-alpine to boreal-montane species of acid siliceous rocks in exposed situations, with optimum near and above treeline; common only in the Alps. The species is chemically variable, and several chemotypes were distinguished. For further details see Hertel & Leuckert (2008).

Lecidea atrobrunnea (DC.) Schaer. subsp. *stictica* Hertel & Leuckert

in Nash & al., Lichen Flora Gr. Sonoran Desert Reg., 2: 297, 2004.

N - Ven (Hertel & Schuhwerk 2010), Lomb (Hertel & Leuckert 2008).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 4-5, X: 4, E: 1-2/ Alt: 4-5/ Alp: ec, Salp: rc, Orom: vr/ PT: 1/ m/ Note: a holarctic silicicolous taxon with optimum near and above treeline; widespread but rarely collected in the Alps.

Lecidea auriculata subsp. *auriculata* Th. Fr.

N. Acta Reg. Soc. Sci. Upsal., ser. 3, 3: 213, 1861.

Syn.: *Lecidea auriculata* var. *subinops* Vain., *Lecidea confederans* Nyl.

N - TAA, Piem (Isocrono & al. 2003, 2004, Isocrono & Piervittori 2008, Favero-Longo & al. 2006b), VA (Piervittori & Isocrono 1999, Matteucci & al. 2015c).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 4-5, X: 4, E: 1/ Alt: 4-5/ Alp: rr, Salp: vr/ PT: 1/ Note: a much misunderstood circumpolar, arctic-alpine species (Hertel 2006) found on siliceous rocks in wind-exposed, sunny situations, in the high-Alpine belt of humid mountains; much rarer in the Alps than the closely related *L. promiscens*; Italian records need to be checked against that species.

Lecidea auriculata subsp. *brachyspora* Th. Fr.

Lichenogr. Scand., 2: 501, 1874.

Syn.: *Lecidea brachyspora* var. *dissentiens* Bagl. & Carestia?

N - Ven, TAA, Piem (Isocrono & al. 2004, 2006).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 4-5, X: 4, E: 1/ Alt: 4-5/ Alp: er, Salp: vr/ PT: 1/ Note: ecologically similar to the typical subspecies, from which it differs in the shorter spores, this taxon is also known from the Himalayas; the only certain record in the Alps is from Tyrol, and all Italian records need confirmation.

Lecidea berengeriana (A. Massal.) Nyl.

Not. Sällsk. Fauna Fl. Fenn. Förh., Ny Ser., 8: 144, 1866 - *Biatora berengeriana* A. Massal., Ric. Auton. Lich. Crost.: 128, 1852.

Syn.: *Biatora cupreiformis* (Nyl.) Arnold, *Biatora poetschiana* Körb., *Lecidea miscella* Sommerf. non Ach., *Lecidea strasseri* Zahlbr., *Mycobilimbia berengeriana* (A. Massal.) Hafellner & V. Wirth

N - Frl, Ven (Lazzarin 2000b, Nascimbene 2002, 2008, Nascimbene & Caniglia 2003c), **TAA** (Nascimbene & al. 2006, 2007b, Bilovitz & al. 2014b), **Lomb, Piem** (Isocrono & al. 2004). **C - Tosc, Umb** (Ravera 2000, Ravera & al. 2006), **Abr** (Nimis & Tretiach 1999). **S - Cal** (Puntillo 1996).

Cr/ Ch/ S/ Epiph-Terr/ pH: 4-5, L: 3-4, X: 3, E: 1-2/ Alt: 3-5/ Alp: rc, Salp: c, Orom: r, Mont: er/ PT: 1/ Note: a circumpolar, arctic-alpine to boreal-montane lichen found on mosses and plant debris over calcareous substrata; most common in the Alps, but probably occurring throughout the Apennines. The species does not belong to *Lecidea* nor to *Mycobilimbia* and is closely related to *Romjularia* (Fryday & al. 2014).

Lecidea betulicola (Kullh.) H.Magn.

Förteckn. Skandin. Växter, 4: 32, 1936 - *Biatora betulicola* Kullh., Not. Sällsk. Fauna Fl. Fenn. Förh., n. ser. 11: 275, 1871.

Syn.: *Lecidea epiphaea* Nyl., *Lecidea lignaria* (Körb.) Nyl., *Lecidea plusiospora* Th.Fr.

N - TAA (Dalla Torre & Sarnthein 1902).

Cr/ Ch/ S/ Epiph-Lign/ pH: 1-2, L: 3, X: 2, E: 1/ Alt: 3-4/ Salp: vr, Mont: vr/ PT: 1/ Note: a boreal-montane species found on acid bark and lignum in upland areas. The generic position is still not clear.

Lecidea cerviniicola B. de Lesd.

Bull. Soc. Bot. France, 102: 231, 1955.

Syn.: *Lecidea promiscua* var. *cerviniicola* (B. de Lesd.) Clauzade & Cl. Roux

N - TAA (Hertel 2001, Hertel & Schuhwerk 2010), **Lomb** (Hertel 2001), **Piem** (Isocrono & al. 2004, Isocrono & Piervittori 2008), **VA** (Hertel 1995, 2001, Piervittori & Isocrono 1999).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4, X: 3, E: 1-2/ Alt: 4-5/ Alp: vr, Salp: er/ PT: 1/ #/ Note: on low siliceous boulders, pebbles and flat stones scattered over the ground in Alpine heaths, sometimes also on large rock faces. The world distribution was mapped by Hertel (2006).

Lecidea commaculans Nyl.

Flora, 51: 476, 1868.

Syn.: *Lecidea intercalanda* Arnold, *Lecidea polycocca* Sommerf.

N - TAA, Piem (Matteucci & al. 2013, Giordani & al. 2014).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 3-4, X: 2, E: 1-2/ Alt: 4-5/ Alp: r, Salp: er/ PT: 1/ Note: an arctic-alpine species of humid siliceous rocks near and above treeline; probably more widespread in the Alps.

Lecidea confluens (Weber) Ach.

Meth. Lich.: 14, 1803 - *Lichen confluens* Weber, Spicil. Fl. Gött.: 180-182, tab. 2, 1778.

Syn.: *Lecidea confluens* var. *leucitica* Schaer.?, *Lecidea confluens* f. *oxydata* Körb., *Lecidea lepadina* Sommerf.?, *Lecidea leucitica* (Schaer.) Arnold, *Lecidea vapulata* Anzi

N - Frl (Tretiach & Hafellner 2000), **Ven, TAA** (Caniglia & al. 2002, Nascimbene 2003, 2006c, 2008, Peršoh & al. 2004, Lang 2009, Hertel & Schuhwerk 2010), **Lomb, Piem** (Isocrono & Falletti 1999, Allisiardi 2001, Isocrono & al. 2003, 2004, 2006, Isocrono & Piervittori 2008, Favero-Longo & al. 2015), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Piervittori & al. 1998, 2001, 2004, Isocrono & al. 2008, Favero-Longo & Piervittori 2009, Matteucci & al. 2015c), **Emil** (Dalle Vedove & al. 2002, Tretiach & al. 2008), **Lig, C - Tosc, Marc, Abr, Sar, S - Camp** (Aprile & al. 2003), **Cal** (Puntillo 1996), **Si**.

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4, X: 3, E: 1/ Alt: 3-5/ Alp: c, Salp: vc, Orom: vr, Mont: rr/ PT: 1/ Note: a boreal-montane to arctic-alpine, circumpolar species (Hertel 2006), found on low siliceous stones and boulders with a long snow-lie, with optimum near treeline; most common in the Alps, much rarer in the high Mediterranean mountains.

Lecidea confluentula Müll. Arg.

Flora, 55: 536, 1872.

Syn.: *Lecidea matildae* H. Magn., *Lecidea rimiseda* Nyl.

N - TAA.

Cr/ Ch/ S/ Sax/ pH: 3, L: 4, X: 3-4, E: 1-3/ Alt: 4-5/ Alp: vr, Salp: er/ PT: 1/ Note: known from northwestern Europe and the French Alps (Hertel 2006), this silicicolous species is related to *L. fuscoatra*, but is most frequent above treeline. Reported from Italy by Hertel (1995) without further details; the record (Hertel *in litt.*) refers to the Geisler Mnts. in south Tyrol.

Lecidea confluens Nyl.

Flora, 57: 12, 1874.

Syn.: *Lecidea venustula* Arnold

N - TAA, Piem (TSB 33703).

Cr/ Ch/ S/ Sax/ pH: 3-4, L: 3-4, X: 3, E: 2-3/ Alt: 4-6/ Alp: rc, Salp: vr/ PT: 1/ Note: on inclined to vertical faces of calciferous rocks, especially lime-containing schists, with optimum above treeline, up to the nival belt; related to *L. lapicida*, but calcicolous and probably restricted to the Alps where it is rare (Hertel 1995). The world distribution was mapped by Hertel (2006).

Lecidea diducens Nyl.

Flora, 48: 148, 1865.

Syn.: *Lecidea auriculata* var. *diducens* (Nyl.) Th. Fr., *Lecidea auriculata* var. *subfoederata* Vain., *Lecidea sarcogyniza* Nyl.

N - TAA (Hertel 2001, Hertel & Schuhwerk 2010), Lomb (S-F86838), Piem (Isocrono & al. 2004), VA (Piervittori & Isocrono 1999), Lig.

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 4-5, X: 4, E: 1/ Alt: 4-5/ Alp: rr, Salp: vr/ PT: 1/ Note: a circum- and bipolar, arctic-alpine silicicolous lichen (Hertel 2006), ecologically similar to, and closely related with *L. auriculata*.

Lecidea ecrustacea (Arnold) Arnold

Verh. zool.-bot. Ges. Wien, 26: 359, 1876 - *Lecidella polycarpa* var. *ecrustacea* Anzi ex Arnold, Verh. zool.-bot. Ges. Wien, 18: 954, 1868.

Syn.: *Lecidea complicata* H. Magn., *Lecidea lactea* var. *ecrustacea* (Arnold) Clauzade & Cl. Roux, *Lecidea pseudopilati* (Vain.) Vain.

N - TAA, Lomb (Anzi Lich. Lang. 399: Hertel 1995, Hertel & Schuhwerk 2010), Piem (Isocrono & al. 2004), VA (Piervittori & Isocrono 1999). C - Sar.

Cr.end/ Ch/ S/ Sax/ pH: 1-2, L: 4, X: 3-4, E: 1/ Alt: 4-5/ Alp: rc, Salp: rr, Orom: vr/ PT: 1/ #/ Note: a poorly known silicicolous taxon with optimum above treeline, doubtfully distinct from *L. lapicida* var. *pantherina*.

Lecidea erythrophaea Sommerf.

Flörke ex Sommerf., Suppl. Fl. Lapp.: 163, 1826.

Syn.: *Biatora alnicola* Anzi, *Biatora erythrophaea* (Sommerf.) Fr., *Lecidea alnicola* (Anzi) Jatta, *Lecidea cupuliformis* (Räsänen) H. Magn.?, *Lecidea hyalinella* (Körb.) Jatta, *Lecidea minuta* (Schaer.) A. Massal., *Lecidea tenebricosa* auct.

N - Fri, TAA (Nascimbene & al. 2007b), Lomb. C - Tosc (Printzen 1995), Umb (Ravera & al. 2006, 2006b), Laz (Ravera 2006, 2006c), Mol (Ravera & Genovesi 2012), Sar (Zedda 2002, 2002b, Cossu 2013). S - Camp (Brunialti & al. 2013, Ravera & Brunialti 2013), Pugl, Cal (Puntillo 1996), Si (Grillo & Cristaudo 1995, Grillo 1998, Grillo & Caniglia 2004).

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 3-4, X: 2, E: 1/ Alt: 3-4/ Salp: rr, Mont: vr/ PT: 0/ Note: a mainly boreal-montane, probably circumpolar species of acid bark, especially of conifers, in humid-cold situations, e.g. in *Sphagnum* bogs, which apparently reaches Sicilia along the Apennines (Sicilian records, however, need re-confirmation). Closely related to *L. rhododendri* and certainly not a *Lecidea s.str.*

Lecidea exigua Chaub.

in St.-Amans, Flore Agenaise: 478, 1821.

Syn.: *Biatora decandollei* Hepp, *Biatora exigua* (Chaub.) Fr., *Biatora geographica* A. Massal., *Lecidea decandollei* (Hepp) Jatta

N - VG (TSB 21635), Ven (Lazzarin 2000b, Nascimbene & Marini 2010), Lomb, Piem (Matteucci & al. 2013), Lig. C - Tosc, Laz (Ravera 2001, 2006c), Abr. S - Camp (Ricciardi & al. 2000, Nimis & Tretiach 2004), Pugl (Nimis & Tretiach 1999).

Cr/ Ch/ S/ Epiph/ pH: 2, L: 3-4, X: 2-3, E: 1-3/ Alt: 1-2/ SmedD: er, SmedH: vr, MedH: er/ PT: 1/ suboc/ Note: a mild-temperate to Mediterranean lichen found in very open woodlands, on smooth bark, especially on branches of deciduous trees; records from southern Italy are the first from Italy in the XX century. The species is included in the Italian red list of epiphytic lichens as "Vulnerable" (Nascimbene & al. 2013c).

Lecidea fissuriseda Poelt

Mitt. bot. Staatss. München, 4: 181, 1961.

Syn.: *Mycobilimbia fissuriseda* (Poelt) Poelt & Hafellner

N - TAA, Piem (TSB 34606), VA (Piervittori & Isocrono 1999).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 4-5, X: 3-4, E: 1/ Alt: 4-5/ Alp: r, Salp: vr/ PT: 1/ Note: a probably circumpolar, arctic-alpine lichen found in thin fissures of calciferous rocks (calcareous schist, dolomite, much more rarely pure limestone) near and especially above treeline; certainly more widespread in the Alps. It does not belong neither in *Lecidea s.str.* nor in *Mycobilimbia*, being related to *Clauzadea* in the Porpidiaceae.

Lecidea fuliginosa Taylor

in Mackay, Fl. Hibern.: 131, 1836.

Syn.: *Biatora conglomerata* A. Massal., *Lecidea confusa* Nyl., *Psora conglomerata* (A. Massal.) Körb., *Psora fuliginosa* (Taylor) Stein, *Psora koerberi* A. Massal., *Toninia confusa* (Nyl.) Boistel

N - TAA, Lomb, Piem (Isocrono & al. 2004), VA (Favero-Longo & al. 2006, Isocrono & al. 2008, Favero-Longo & Piervittori 2009). C - Abr (Jatta 1909-1911), Sar.

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4, X: 3-4, E: 3/ Alt: 3-4/ Salp: vr, Orom: er, Mont: er/ PT: 1/ Note: in small fissures of hard siliceous rocks in open, but wind-protected situations, mostly in upland areas. Most probably not a *Lecidea s.str.*

***Lecidea fuscoatra* (L.) Ach.**

Meth. Lich.: 44, 1803 - *Lichen fuscoater* L., Sp. Pl.: 1140, 1753.

Syn.: *Lecidea algeriensis* Zahlbr., *Lecidea badiopallens* Nyl., *Lecidea badiopallescens* Nyl., *Lecidea cechumena* Ach., *Lecidea contigua* var. *tectorum* A. Massal., *Lecidea fumosa* (Hoffm.) Ach., *Lecidea fumosa* var. *confluens* Bagl., *Lecidea fuscoatra* var. *fumosa* (Hoffm.) Spreng., *Lecidea maculosa* Stizenb. nom. illegit., *Lecidea prostratula* Stirt., *Lecidea psoroides* (Hepp) Bagl. & Carestia, *Lecidea sardoa* Bagl., *Lecidea trabicola* Erichsen, *Patellaria fumosa* (Hoffm.) Hoffm., *Psora fumosa* (Hoffm.) A. Massal., *Psora fumosa* var. *turgida* Anzi, *Psora prostratula* (Stirt.) Walt. Watson

N - **VG** (Castello 2002, Martellos & Castello 2004, Tretiach & al. 2007b), **Frl, Ven** (Lazzarin 2000b, Nascimbene & Caniglia 2003c), **TAA, Lomb** (Valcuvia & al. 2003, Callegari & al. 2004, De Vita & Valcuvia 2004), **Piem** (Morisi & Sereno 1995, Isocrono & al. 2003, 2004, Giordani & al. 2014, Favero-Longo & al. 2015), **VA** (Pierivittori & Isocrono 1999, Pierivittori & al. 2001, Isocrono & al. 2008, Favero-Longo & Pierivittori 2009, Matteucci & al. 2015c), **Emil** (Nimis & al. 1996, Tretiach & al. 2008), **Lig** (Brunialti & al. 1999, Watson 2014). **C - Tosc** (Brackel 2015), **Marc** (Nimis & Tretiach 1999), **Umb** (Panfili 2000, 2003, Ravera & al. 2006, Genovesi 2011), **Laz** (Bartoli 1997, 1997b, Genovesi & al. 2011), **Abr** (Nimis & Tretiach 1999, Brackel 2015), **Mol** (Nimis & Tretiach, 1999, 2004, Caporale & al. 2008), **Sar** (Monte 1993, Nöske 2000, Rizzi & al. 2011, Giordani & al. 2013). **S - Camp** (Garofalo & al. 1999, Ricciardi & al. 2000, Hertel 2001, Aprile & al. 2002, 2003b, Nimis & Tretiach 2004, Catalano & al. 2016), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996, Puntillo & Puntillo 2004), **Si** (Poli & al. 1995, Nimis & al. 1996b, Ottonello & Romano 1997, Grillo 1998, Adamo & al. 2000, Poli & Grillo 2000, Grillo & Caniglia 2004, Brackel 2008b, 2008c, Ottonello & al. 2011, Terribile & al. 2012, Vingiani & al. 2012, Di Martino & Stancanelli 2015).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4-5, X: 3-5, E: 2-4/ Alt: 1-4/ Salp: er, Orom: er, Mont: rc, SmedD: vc, Pad: rr, SmedH: c, MedH: r, MedD: rr/ PT: 1-3/ Note: a mainly temperate, widespread, extremely variable lichen found on rock faces wetted by rain on a wide variety of substrata, from base-rich siliceous rocks to brick and roofing tiles. According to Aptroot & van Herk (2007), *L. grisella* is a well-distinct species often growing together with *L. fuscoatra*. In southern Italy the degree of morphological variation is surprisingly high (e.g. on the Etna Vulcano), with morphologically very different specimens growing side by side; some records, especially from lowland areas of Mediterranean Italy, could correspond to *L. grisella*.

***Lecidea globulispora* Nyl.**

Lich. Exot.: 263, 1859.

Syn.: *Biatora antiloga* (Stirt.) Walt. Watson, *Lecidea antiloga* Stirt., *Lecidella antiloga* (Stirt.) M. Choisy

S - Cal (Puntillo 1996, van den Boom & Giralt 2002).

Cr/ Ch/ S/ Lign-Epiph/ pH: 1-2, L: 4, X: 2-3, E: 1/ Alt: 3-4/ Salp: er, Mont: r/ PT: 1/ suboc/ Note: a mainly cool-temperate to boreal-montane lichen also known from the Southern Hemisphere, found on hard, exposed lignum, more rarely on conifer bark; to be looked for in the Alps. According to Printzen (1995) the generic position of this species, related to the North American *Lecidea paddensis* (Tuck.) Zahlbr., is not clear.

***Lecidea grisella* Flörke**

in Flotow, Lich. Schlesien: 141-142, 1829.

Syn.: *Biatora livescens* (Leight.) Walt. Watson, *Lecidea fumosa* var. *grisella* (Flörke) Müll. Arg., *Lecidea fuscoatra* var. *grisella* (Flörke) Nyl., *Lecidea grisella* f. *mosigii* (Ach.) Zahlbr., *Lecidea livescens* Leight., *Lecidea segregula* Nyl.

N - VG, Frl, Ven, TAA, Piem, Lig (Watson 2014). **C - Tosc, Marc, Umb, Laz, Abr, Mol, Sar, S - Camp, Pugl, Bas, Cal, Si.**

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4-5, X: 3-5, E: 3-4/ Alt: 1-3/ Mont: rr, SmedD: ec, Pad: rc, SmedH: ec, MedH: c, MedD: rc/ PT: 2-3/ Note: this taxon was subsumed for a long time into *L. fuscoatra*, but according to Aptroot & van Herk (2007) it is a well-distinct species, mainly distinguished by the rimose instead of areolate thallus. It grows on base-rich siliceous rocks, often on man-made substrata, e.g. on roofing tiles, and seems to be most frequent at lower elevations than *L. fuscoatra*. Some authors, however (e.g. Roux & coll. 2014) still prefer to treat this taxon as a variety of the extremely polymorphic *L. fuscoatra*. The Italian distribution is mainly based on the samples preserved in TSB.

***Lecidea haerjedalica* H. Magn.**

Bot. Not.: 403-404, 1948.

N - TAA, Lig (TSB s.n.).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 4-5, X: 4-5, E: 1-2/ Alt: 4-5/ Alp: vr, Salp: r/ PT: 1/ Note: an arctic-alpine silicolous species of wind-exposed, snow-free sites, most frequent on crystalline schists near or above treeline. The world distribution was mapped by Hertel (2006).

***Lecidea infirmata* Arnold**

Verh. zool.-bot. Ges. Wien, 37: 112, 1887.

Syn.: *Lecidea paupercula* f. *infirmata* (Arnold) Lettau

N - TAA (Arnold Lich. Exs. 844: Hertel 1995, Hertel & Schuhwerk 2010).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 4-5, X: 4, E: 1-2/ Alt: 5/ Alp: vr/ PT: 1/ #/ Note: known only from the type collection and from a single record from Austria, this silicicolous species found above treeline is related to *L. atrobrunnea*. Indicator values are tentative.

Lecidea inturgescens Nyl.

Flora, 64: 186, 1891.

N - **Lomb**.

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4-5, X: 3-5, E: 2-4/ Alt: 2-3/ Mont: vr, SmedD: vr/ PT: 1-2/ #/ Note: a poorly known taxon growing on siliceous rocks with optimum in the montane belt, also reported from the French Alps; the species is closely related to *L. fuscoatra*.

Lecidea lapicida (Ach.) Ach. var. ***lapicida***

Meth. Lich.: 37, 1803 - *Lichen lapicida* Ach., Lichenogr. Suec. Prodr.: 61, 1799.

Syn.: *Lecidea contiguella* Nyl., *Lecidea declinans* (Nyl.) Nyl., *Lecidea declinascens* Nyl., *Lecidea dendroclinis* Nyl., *Lecidea leptoceramia* Anzi, *Lecidea scotoplaca* H. Magn., *Lecidea subinvoluta* Müll. Arg., *Lecidea subplanata* Vain., *Lecidea vestrogothica* H. Magn., *Lecidella lapicida* (Ach.) Körb.

N - **VG** (Castello 2002, Martellos & Castello 2004), **Fri** (Tretiaich & Hafellner 2000), **Ven** (Hertel & Schuhwerk 2010), **TAA** (Nascimbene 2003, Lang 2009, Hertel & Schuhwerk 2010, Watson 2014), **Lomb**, **Piem** (Isocrono & al. 2003, 2004, 2006, Isocrono & Piervittori 2008, Giordani & al. 2014), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Piervittori & al. 2001, Isocrono & al. 2008, Favero-Longo & Piervittori 2009, Matteucci & al. 2015c), **Emil** (Tretiaich & al. 2008), **Lig**, **C - Tosc**, **Abr** (Recchia & Villa 1996), **Sar**, **S - Cal** (Puntillo 1996), **Si**.

Cr/ Ch/ S/ Sax/ pH: 1-3, L: 3-5, X: 3-4, E: 1-3/ Alt: 3-6/ Alp: ec, Salp: ec, Orom: r, Mont: rc/ PT: 1-2/ Note: a circumpolar, arctic-alpine to boreal-montane and cool-temperate species (Hertel 2006) with a broad ecological range, found on hard, acid siliceous rocks, mostly in exposed, windy situations in upland areas, up to the nival belt in the Alps.

Lecidea lapicida var. ***pantherina*** (Hoffm.) Ach.

K. Vetensk.-Akad. Nya Handl., 29: 232, 1808 - *Verrucaria pantherina* Hoffm., Deutschl. Fl., 2: 184, 1796.

Syn.: *Lecidea contenebricans* Nyl., *Lecidea cyanea sensu* Vain., *Lecidea declinascens* f. *ochromeliza* Nyl., *Lecidea dubia* Schaer., *Lecidea lactea* Flörke ex Schaer., *Lecidea lactea* f. *ochromela* Arnold, *Lecidea obsoleta* Nyl., *Lecidea pannicta* Stirt., *Lecidea pantherina* (Hoffm.) Th. Fr., *Lecidea pantherina* f. *ochromela* (Arnold) Zahlbr., *Lecidea peralbida* (Th. Fr.) H. Olivier, *Lecidea polycarpa* Flörke ex Sommerf., *Lecidea spilotica* Nyl., *Lecidea subgrisella* Nyl., *Lecidea theiodes* Sommerf., *Lecidea variegata* Fr., *Lecidella lactea* (Schaer.) Arnold, *Lecidella pantherina* (Hoffm.) Stein

N - **Fri** (Tretiaich & Hafellner 2000), **Ven** (Hertel & Schuhwerk 2010), **TAA** (Lang 2009, Hertel & Schuhwerk 2010, Watson 2014), **Lomb** (Brackel 2010), **Piem** (Morisi & Sereno 1995, Isocrono & al. 2004, 2006, Isocrono & Piervittori 2008), **VA** (Piervittori & Isocrono 1999, Piervittori & al. 2001, Isocrono & al. 2008, Matteucci & al. 2015c), **Emil** (Dalle Vedove & al. 2002, Tretiaich & al. 2008), **Lig** (Brunialti & al. 1999), **C - Tosc** (Tretiaich & al. 2008), **Sar** (Nöske 2000), **S - Camp**, **Bas**, **Cal** (Puntillo 1996), **Si** (Brackel 2008b, 2008c).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 3-5, X: 2-4, E: 1/ Alt: 3-6/ Alp: vc, Salp: vc, Orom: r, Mont: rr/ PT: 1-2/ Note: doubtfully distinct from var. *lapicida* and perhaps just a chemical strain of the latter, with a similar distribution and ecology, this taxon is widespread and common in upland areas throughout the country, but most frequent in the Alps. The record from Venezia Giulia in Nimis (1993: 384) has been excluded, as it actually is from Slovenia.

Lecidea leprarioides Tønsberg

Sommerfeltia, 14: 173, 1992.

Syn.: *Lecidea turgidula* Fr. var. *pulveracea* Th. Fr.

N - **TAA** (Nascimbene & al. 2009, 2010, Nimis & al. 2015).

Cr/ Ch/ A.s/ Epiph/ pH: 1-2, L: 3-4, X: 2, E: 1/ Alt: 3-4/ Salp: er, Mont: er/ PT: 1/ Note: a rare, mainly boreal species of acid bark in upland areas, closely related to *L. turgidula* (Schmull & al. 2011).

Lecidea leprosolimbata (Arnold) Poelt

Lettau ex Poelt, Mitt. Bot. Staats. München, 3: 587, 1960 - *Psora atrobrunnea* var. *leprosolimbata* Arnold, Verh. zool.-bot. Ges. Wien, 39: 264, 1889.

Syn.: *Lecidea atrobrunnea* f. *leprosolimbata* (Arnold) Lettau

N - **TAA** (Hertel & Schuhwerk 2010), **Piem** (TSB 34401), **VA**.

Cr/ Ch/ S/ Sax/ pH: 3-4, L: 3-4, X: 3, E: 1-3/ Alt: 3-5/ Alp: r, Salp: rr, Mont: vr/ PT: 1/ paras *Bellemeria subcandida*/ Note: on sunny, inclined surfaces of hard, weakly calciferous siliceous rocks in upland areas; certainly more widespread in the Alps, and locally even common. The world distribution was mapped by Hertel (2006). See also note on *L. rapax*.

Lecidea leucothallina Arnold

Verh. zool.-bot. Ges. Wien, 29: 382, 1879.

Syn.: *Lecidea kujalae* Räsänen

N - **TAA** (Hertel 2001, Hertel & Schuhwerk 2010), **Lomb**, **VA** (Piervittori & Isocrono 1999).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 4, X: 2-3, E: 1/ Alt: 4-5/ Alp: r, Salp: er/ PT: 1/ Note: an arctic-alpine species (Hertel 2006), found on boulders and siliceous pebbles, especially on crystalline schist, near the ground in sites with a long snow-lie, with optimum above treeline; perhaps restricted to the Alps in Italy. The var. *discrepans* Rambold & Hertel is known from the Austrian Alps.

Lecidea lithophila (Ach.) Ach.

Syn. Meth. Lich.: 14, 1814 - *Lecidea lapicida* var. *lithophila* Ach., K. Vetensk.-Akad. Nya Handl., 29: 233, 1808.

Syn.: *Lecidea farinosa* H. Magn., *Lecidea heteromorpha* H. Magn., *Lecidea lithophiliza* Nyl., *Lecidea ochracea* Fée, *Lecidea pruinosa* auct., *Lecidea silacea* var. *lecanactis* A. Massal., *Lecidella lithophila* (Ach.) Arnold, *Lecidella pruinosa* Körb.

N - Ven (Lazzarin 2000b), **TAA** (Lecid. Exs. 268: Hertel 1992b, Hertel & Schuhwerk 2010), **Lomb, Piem** (Isocrono & al. 2004), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999), **Emil, Lig. C - Tosc, Sar. S - Camp.**

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 3-5, X: 2-3, E: 1-2/ Alt: 2-5/ Alp: ec, Salp: vc, Orom: vr, Mont: r, SmedD: er, SmedH: er/ PT: 1-2/ p/ Note: an ecologically wide-ranging, pioneer species found on vertical to slightly inclined surfaces of acid siliceous rocks close to the ground, also on iron-rich substrata, with optimum above the montane belt. The world distribution was mapped by Hertel (2006).

Lecidea meiocarpa Nyl.

Flora, 59: 577, 1876.

Syn.: *Biatora meiocarpa* (Nyl.) Arnold, *Lecidea minuta* auct. non (Nyl.) Nyl.

N - TAA, Lomb, Lig.

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 2-3, X: 2, E: 1/ Alt: 3-4/ Mont: vr/ PT: 1/ Note: Ekman (1994) states that this is a northern species, confined to Fennoscandia; reports from central Europe could be due to misidentifications, perhaps with the similar *Biatora helvola*, or with *Lecania cyrtellina*. Printzen (1995) excludes this taxon from *Biatora s.str.*, saying that it has strong affinities with *Lecidea albohyalina*. All Italian records (see Nimis 1993: 386) should be checked, because the species, which does not belong to *Lecidea s.str.* nor to *Biatora*, has been frequently misidentified.

Lecidea miscella Ach.

Meth. Lich.: 39, 1803.

N - TAA (TSB 37186).

Cr/ Ch/ S/ Terr/ pH: 1-2, L: 4, X: 3, E: 1/ Alt: 4-5/ Alp: vr, Salp: vr/ PT: 1/ Note: on soil and terricolous bryophytes over siliceous substrata near and above treeline.

Lecidea nylanderii (Anzi) Th. Fr.

Lichenogr. Scand., 1, 2: 462, 1874 - *Biatora nylanderii* Anzi, Cat. Lich. Sondr.: 75, 1860.

Syn.: *Lecidea leprodea* Nyl.

N - Ven (Caniglia & al. 1999), **TAA** (Nascimbene & al. 2007b, 2014, Nascimbene 2014), **Lomb.**

Cr/ Ch/ A.s/ Epiph/ pH: 1-2, L: 2-4, X: 2-3, E: 1/ Alt: 2-4/ Salp: r, Mont: vr, SmedD: er/ PT: 1/ Note: a probably circumboreal-montane lichen found on the bark old conifers inside forests, much more rarely on lignum, usually in upland areas. The species, related to *Myochroidea leprosula* (Printzen 1995), does not belong to *Lecidea s.str.*: Schmull & al. (2011) presented a phylogenetic tree where it is placed within Lecanoraceae.

Lecidea obluridata Nyl.

Flora, 56: 201, 1873.

Syn.: *Lecidea nigrogrisea* Nyl.

N - Piem (Isocrono & al. 2003). **C - Sar. S - Si** (Brackel 2008c).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4, X: 3-4, E: 1-2/ Alt: 3-5/ Salp: vr, Orom: vr, Mont: vr/ PT: 1/ #/ Note: a rather poorly known silicicolous species described from France, which needs further study.

Lecidea paratropoides Müll. Arg.

Flora, 57: 348, 1874.

N - TAA, VA (Piervittori & Isocrono 1999). **S - Si.**

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 4-5, X: 4-5, E: 1/ Alt: 4-5/ Alp: vr, Salp: vr, Orom: er/ PT: 1/ subc/ Note: on siliceous rocks near the ground in dry areas, with optimum near and above treeline; a member of the *L. auriculata* group, known from Central Asia, the dry Alpine valleys, the mountains of Sicily and the Pyrenees, mostly in continental areas.

Lecidea personata (Körb.) Jatta

Syll. Lich. Ital.: 343, 1900 - *Lecidella personata* Körb., Syst. Lich. Germ.: 238, 1855.

N - Lomb (Anzi Lich. Lang. 570: Jatta 1909-1911).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 3-4, X: 2-3, E: 1/ Alt: 4-5/ Alp: vr, Salp: vr/ PT: 1/ #/ Note: a very poorly known silicicolous species, reported from several scattered localities in central Europe, mostly in upland areas. The Italian material was collected on granite near Bormio.

Lecidea plana (J. Lahm) Nyl.

Flora, 55: 552, 1872 - *Lecidella plana* J. Lahm in Körber, Parerga Lichenol.: 211, 1861.

Syn.: *Catillaria eximia* Malme, *Catillaria stromatoides* H. Magn., *Lecidea enteromorpha* (Flot.) Vain., *Lecidea latypea* Ach. *non auct.*

N - Ven, TAA, Lomb, Piem (Isocrono & al. 2004), **VA** (Piervittori & al. 2001, Matteucci & al. 2015c), **Emil. C - Tosc, Sar.**

Cr/ Ch/ S/ Sax/ pH: 1-3, L: 3-4, X: 2-3, E: 1/ Alt: 3-5/ Alp: c, Salp: rc, Orom: er, Mont: er/ PT: 1/ m/ Note: a circumpolar, arctic-alpine to boreal-montane lichen (Hertel 2006) found on acid siliceous rocks, often on iron-rich substrata, on low boulders wetted by rain in humid areas, with optimum above treeline; frequent only in the Alps.

Lecidea praenubila Nyl.

Flora, 55: 21, 1873.

Syn.: *Lecidea aeneola* (Arnold) Vain., *Lecidea atrocervina* Vain.

N - TAA (Caniglia & al. 2002, Hertel & Schuhwerk 2010), **VA** (Piervittori & al. 2004).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 4, X: 2-3, E: 1/ Alt: 4-5/ Alp: vr, Salp: er/ PT: 1/ Note: an arctic-alpine to boreal-montane, perhaps circumpolar silicicolous species found on horizontal surfaces or on pebbles; much rarer in the Alpine belt of the Alps than in northern Europe; closely related to *L. paupercula*.

Lecidea promiscens Nyl.

Flora, 55: 358, 1872.

Syn.: *Lecidea promiscua* var. *promiscens* (Nyl.) Clauzade & Cl. Roux, *Lecidea strepsodea* Nyl.

N - Frl (TSB 20586), **TAA** (Nascimbene 2003, Lang 2009, Hertel & Schuhwerk 2010), **Piem** (Isocrono & al. 2004, 2006, Giordani & al. 2014), **VA** (Piervittori & Isocrono 1999, Matteucci & al. 2015c). **C - Tosc.**

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 4, X: 3, E: 1/ Alt: 3-6/ Alp: rc, Salp: rr, Mont: er/ PT: 1/ Note: a circum- and bipolar, arctic-alpine to boreal-montane lichen (Hertel 2006) found on boulders close to the ground and on siliceous pebbles in Alpine heaths; certainly more widespread in the Alps, where it reaches the nival belt, and also reported from the northern Apennines. See also note on *L. auriculata*.

Lecidea promiscua Nyl.

Flora, 57: 357, 1874.

Syn.: *Lecidea dilabens* Th. Fr., *Lecidea gregalis* Arnold, *Lecidea speciosa* Müll. Arg.

N - Frl (TSB 2738), **TAA. C - Sar.**

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 4, X: 3, E: 1/ Alt: 4-5/ Alp: vr, Salp: er, Orom: er/ PT: 1/ Note: a member of the difficult *L. auriculata* complex, closely related to *L. promiscens* and with a similar ecology, apparently common in the Alpine belt of the Alps (see Roux & coll. 2014), but overlooked.

Lecidea rapax Hertel

Herzogia, 1: 426, 1970.

N - Frl (Tretlach & Hafellner 2000), **TAA** (Hertel & Schuhwerk 2010), **Piem** (TSB 34492).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 4-5, X: 4, E: 1-2/ Alt: 4-5/ Alp: r, Salp: vr/ PT: 1/ paras *Bellemeria*/ Note: closely related to *L. leprosolimbata*, and so far known only from the Alps (Hertel 2006). Roux & coll. (2014) considers this species as a silicicolous ecotype of *L. leprosolimbata*.

Lecidea rhododendri (Hepp) Zahlbr.

Ann. naturhist. Hofsmus. Wien, 15: 183, 1900 - *Biatora sylvana* var. *rhododendri* Hepp, Flecht. Eur.: 733, 1867.

Syn.: *Biatora rhododendri* (Hepp) Arnold

N - Frl (Hinteregger 1994), **Ven** (Nascimbene & Caniglia 2000, 2003c, Tomaselli & al. 2006), **TAA** (Nascimbene & al. 2007b).

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 3-4, X: 2-3, E: 1/ Alt: 3-4/ Salp: rr, Mont: er/ PT: 1/ Note: on twigs of *Rhododendron* and other subalpine shrubs; probably restricted to the Alps in Italy. According to Printzen (1995) this species does not belong to *Biatora s.str.* and is closely related to *Lecidea erythrophaea*; it does not belong to *Lecidea s.str.* either.

Lecidea sarcogynoides Körb.

Syst. Lich. Germ.: 252, 1855.

Syn.: *Lecidea squamata* Flagey

N - Ven (TSB 2024), **TAA, Lomb, Piem** (Giordani & al. 2014), **VA** (Piervittori & Isocrono 1999), **Lig** (Hertel 2001). **C - Tosc** (Hertel 2001), **Sar** (Nöske 2000). **S - Cal** (Puntillo 1996), **Si** (Nimis & al. 1996b).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 4-5, X: 4-5, E: 1/ Alt: 1-4/ Salp: rr, Mont: r, SmedD: er, SmedH: er, MedH: vr/ PT: 1/ p/ Note: on exposed, steeply inclined faces of non-calcareous, mineral-rich rocks in lichen-poor communities, with a wide altitudinal range. The world distribution was mapped by Hertel (2006). The record from Venezia Giulia in Nimis (1993: 389), being far outside the present Italian border, is not accepted here.

Lecidea silacea (Hoffm.) Ach.

Meth. Lich.: 48, 1803 - *Patellaria silacea* Hoffm., Descr. Adumb. Plant. Lich., 1, 4: 89, 1790.

Syn.: *Lecidea subsilacea* Nyl., *Lecidella silacea* (Hoffm.) Stein, *Psora tabacina* Ramond ex DC. non auct.

N - Frl (Tretiach & Hafellner 2000), **Ven, TAA** (Hertel & Schuhwerk 2010), **Lomb, Piem** (Isocrono & al. 2004), **VA** (HAL-18670), **Emil, Lig**.

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 3-4, X: 2-3, E: 1/ Alt: 3-5/ Alp: vr, Salp: r, Mont: vr/ PT: 1/ m/ Note: a probably circumpolar, arctic-alpine to boreal-montane lichen (Hertel 2006) found on iron-containing rocks in humid, sheltered situations, mostly in upland areas. The sample from Valle d'Aosta was collected by B. Feige near Plan Masson near Breuil, at 2500 m.

Lecidea speirodes Nyl.

Flora, 68: 44, 1885.

Syn.: *Lecidea contigua* var. *subcretacea* Arnold, *Lecidea decorosa* Arnold, *Lecidea subcretacea* (Arnold) P. Syd., *Lecidea subumbonata* sensu Arnold et Lettau non Nyl.

N - TAA (Hertel & Schuhwerk 2010), **Piem** (TSB 33167), **VA** (Piervittori & Isocrono 1999), **Lig. C - Abr** (Nimis & Tretiach 1999).

Cr/ Ch/ S/ Sax/ pH: 3-4, L: 4-5, X: 4, E: 1-2/ Alt: 4-6/ Alp: rr, Salp: r/ PT: 1/ Note: a lichen known from the central and southern European mountains (Alps, Pyrenees, Cordillera Cantabrica in Spain, Tatra Mountains), found on steeply inclined, superficially decalcified calciferous rocks or on lime-containing siliceous rocks, with optimum in upland areas, up to the nival belt in the Alps. The world distribution was mapped by Hertel (2006). The record from Abruzzo (Gran Sasso) is the southernmost in Europe.

Lecidea subfumosa Arnold) J. Lahm

Jahresber. Westfäl. Prov. Wiss. u. Kunst, 11: 150, 1883. - *Psora atrobrunnea* var. *subfumosa* Arnold, Verh. zool.-bot. Ges. Wien, 29: 373, 1879.

N - TAA (Dalla Torre & Sarnthein 1902).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 4-5, X: 4, E: 1-2/ Alt: 5/ Alp: er/ PT: 1/ Note: a poorly known arctic-alpine, silicicolous species of the Alpine belt, related to *L. atrobrunnea*.

Lecidea sudetica Körb.

Syst. Lich. Germ.: 254, 1855.

Syn.: *Lecidea alboflava* (Körb.) Arnold, *Lecidea virescens* Müll. Arg., *Lecidella alboflava* Körb.

N - Lomb.

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 4-5, X: 3-4, E: 1-2/ Alt: 4-6/ Alp: rr, Salp: r/ PT: 1/ #/ Note: a rather poorly known silicicolous species reported from several localities in the Alps, where it reaches the nival belt, and in central Europe, with optimum above treeline.

Lecidea swartzioidea Nyl.

Not. Sällsk. Fauna Fl. Fenn. Förh., 4: 240, 1859.

Syn.: *Lecidea arnoldiana* Dalla Torre & Sarnth., *Lecidea gneissacea* Zahlbr., *Lecidea jemtlandensis* H. Magn., *Lecidea lapicida* var. *swartzioidea* (Nyl.) Nyl., *Lecidea lithophiloides* Müll. Arg. non Nyl., *Lecidea metamorpha* Anzi, *Lecidea swartzioidea* var. *lithophiloides* (Müll. Arg.) Clauzade & Cl. Roux, *Lecidea vogesiaca* Schaer.

N - Frl, TAA, Lomb, Piem (Morisi & Sereno 1995), **Lig** (TSB 33258b). **C - Sar** (Nöske 2000).

Cr/ Ch/ S/ pH: 1-2, L: 3-5, X: 3-4, E: 1-2/ Alt: 4-5/ Alp: c, Salp: rc, Orom: r/ PT: 1-2/ Note: a circumpolar, arctic-alpine to boreal-montane lichen of siliceous rocks (Hertel 2006) most common near and above treeline: closely related to *L. lapicida* and doubtfully worthy of being separated from it as a distinct species.

Lecidea tessellata var. *caesia* (Anzi) Arnold

Arnold, Verh. zool.-bot. Ges. Wien, 39: 264, 1889 - *Lecidea spilota* var. *caesia* Anzi, Cat. Lich. Sondr.: 80, 1860.

Syn.: *Biatora casimirii* Müll. Arg., *Lecidea azurea* Kremp., *Lecidea casimirii* (Müll. Arg.) Müll. Arg., *Lecidea injuncta* Nyl., *Lecidella azurea* (Kremp.) Körb.

N - Frl (Tretiach & Hafellner 2000), **TAA** (Hertel & Schuhwerk 2010), **Lomb** (Anzi Lich. Lang. 125: Hertel 1995), **Piem** (Isocrono & al. 2004), **Emil, Lig** (TSB 33416).

Cr/ Ch/ S/ Sax/ pH: 3-4, L: 4, X: 3-4, E: 1-2/ Alt: 4-5/ Alp: rr, Salp: rc/ PT: 1/ paras crustose lichens/ Note: on calciferous siliceous rocks, dolomite, superficially decalcified, hard limestone rocks near and above treeline, starting the life-cycle on other crustose lichens, especially *Aspicilia* spp.

Lecidea tessellata Flörke var. *tessellata*

Deutsch. Lich.: 64, 1819.

Syn.: *Lecidea cyanea* sensu Th. Fr. non (Ach.) Röhl., *Lecidea homalodes* Nyl., *Lecidea magna* Lynge, *Lecidea occidentalis* Lynge, *Lecidea spilota* Fr., *Lecidea spilota* var. *intricata* (Hepp) Anzi?, *Lecidella spilota* (Fr.) Körb.

N - Frl, Ven, TAA, Lomb, Piem (Isocrono & al. 2004, Favero-Longo & al. 2006b), **VA** (Piervittori & Isocrono 1999, Isocrono & al. 2008, Favero-Longo & Piervittori 2009, Matteucci & al. 2015c), **Emil** (Dalle Vedove & al. 2002), **Lig** (TSB 33420). **C - Tosc. S - Si**.

Cr/ Ch/ S/ Sax/ pH: 2, L: 4, X: 3-4, E: 1-2/ Alt: 3-6/ Alp: ec, Salp: c, Orom: vr, Mont: r/ PT: 1/ paras crustose lichens/ Note: a cool-temperate to arctic-alpine, circumpolar species (Hertel 2006) found on hard, often mineral-rich siliceous rocks in upland areas, which sometimes starts the life-cycle as a parasite of other crustose lichens, especially *Aspicilia* spp.; common in the Alps, where it reaches the nival belt, much rarer in the mountains of southern Italy.

***Lecidea turgidula* Fr.**

Sched. Crit., 1: 10, 1824.

Syn.: *Biatora turgidula* (Fr.) Nyl., *Lecidea denudata sensu* A. Massal., *Lecidea subglomerella* Nyl., *Lecidella turgidula* (Fr.) Körb., *Oedemocarpus turgidulus* (Fr.) Trevis.

N - Ven, TAA (Caniglia & al. 2002, Thor & Nascimbene 2007, 2014, Nascimbene & al. 2007b, 2008c, Nascimbene 2008b, 2013), **Lomb, Emil, Piem** (Isocrono & al. 2004), **Lig** (Giordani & al. 2009, Giordani & Incerti 2008). **C - Tosc, Marc** (Nimis & Tretiach 1999), **Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008). **S - Camp** (Aprile & al. 2003b), **Bas, Cal** (Puntillo 1996, van den Boom & Giralt 2002, Puntillo 2011), **Si**.

Cr/ Ch/ S/ Epiph-Lign/ pH: 1-2, L: 3-4, X: 2, E: 1/ Alt: 2-4/ Salp: rc, Mont: r, SmedD: vr, SmedH: vr/ PT: 1/ Note: on hard lignum, more rarely on bark of conifers; most common in the Alps, but also present in the mountains of southern Italy, especially in old *Castanea* woodlands. According to Printzen (1995) the systematic position of this species is not clear; it certainly does not belong to *Lecidea s.str.*

***Lecidea umbonata* (Hepp) Mudd**

Man. Brit. Lich.: 204, 1861 - *Biatora umbonata* Hepp, Flecht. Eur.: nr. 257, 1857.

Syn.: *Lecidea acosmeta* Lettau, *Lecidea exornans* (Arnold) Nyl., *Lecidea omphaliza* Lettau, *Lecidea umbonata* Nád., *Lecidella exornans* (Arnold) Arnold, *Lecidella umbonata* (Hepp) Körb., *Lecidella umbonata f. exornans* Arnold

N - Frl, Ven (Caniglia & al. 1999, Nascimbene & Caniglia 2000), **TAA** (Hertel 2001, Nascimbene 2008b, Hertel & Schuhwerk 2010), **Piem** (Hertel 2001, Hertel & Schuhwerk 2010), **Lig, C - Tosc** (Jatta 1909-1911), **Umb** (Panfili 2007), **Abr** (Nimis & Tretiach 1999).

Cr/ Ch/ S/ Sax/ pH: 3-4, L: 3, X: 3, E: 1-2/ Alt: 4-6/ Alp: c, Salp: rc/ PT: 1/ Note: a circumpolar, mainly arctic-alpine, variable species (Hertel 2006) found on calciferous siliceous rocks, especially schist, in cool and humid situations near or above treeline; most frequent in the Alps, where it reaches the nival belt, but also present along the Apennines.

***Lecidea verruca* Poelt**

Mitt. bot. Staatss. München, 4: 187, 1961.

N - TAA, Piem (Hafellner 2008).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4-5, X: 3, E: 2-3/ Alt: 4-5/ Alp: vr, Salp: vr/ PT: 1/ paras *Aspicilia* spp./ Note: an arctic-alpine, bipolar silicicolous species with a peculiar ecology (Hertel 2006), always growing on *Aspicilia* species near or above treeline; related to *L. tessellata*.

Lecidella Körb.

Syst. Lich. Germ.: 223, 1855.

This genus of the Lecanoraceae, with c. 80 species worldwide, is characterised by a crustose thallus with a trebouxoid photobiont, biatorine, dark-coloured apothecia with a persistent proper excipulum of radiating, thick-walled hyphae, clavate, amyloid, eight-spored asci of the *Lecidella*-type, simple, hyaline, non-halonate ascospores, and curved, filiform conidia; thallus chemistry is dominated by xanthonenes. While the genus is rather well-defined, species delimitation is not always clear. Type: *L. viridans* (Flot.) Körb.

***Lecidella aemulans* Arnold**

Flora, 55: 146, 1872.

Syn.: *Lecidea aemulans* (Arnold) Poelt

N - TAA.

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 4, X: 3, E: 2-3/ Alt: 4-5/ Alp: vr, Salp: vr/ PT: 1/ #/ Note: a poorly known calcicolous species reported from the Alps, the Tatra Mnts., and Spitsbergen, with optimum near or above treeline.

***Lecidella albida* Hafellner**

Stapfia, 76: 153, 2001.

Syn.: *Lecidea alba* Schleich. non (Roth.) Flörke, *Lecidella alba* auct.

N - TAA. C - Tosc, Laz.

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 3-4, X: 2-3, E: 1-2/ Alt: 1-3/ Mont: vr, SmedD: er, SmedH: vr, MedH: er/ PT: 1/ Note: a mainly central European species, growing on the smooth bark of more or less isolated individuals of *Fagus*, *Fraxinus* and *Acer*, more rarely of conifers, in non-eutrophicated, rather humid situations.

***Lecidella anomaloides* (A. Massal.) Hertel & H. Kilius**

in Hawksworth & al., Lichenologist, 12: 107, 1980 - *Lecidea anomaloides* A. Massal., Ric. Auton. Lich. Crost.: 72, 1852.

Syn.: *Biatora pungens* Körb., *Biatorina anomaloides* (A. Massal.) Jatta, *Catillaria anomaloides* (A. Massal.) Lettau, *Lecidea elaeochroma* var. *pungens* (Körb.) Th. Fr., *Lecidea goniophila* auct. non Flörke, *Lecidea pilularis* (Ach.) Fr., *Lecidea pungens* (Körb.) Nyl., *Lecidella cyanea* Körb., *Lecidella goniophila* auct., *Lecidella pilularis* (Ach.) Stein, *Lecidella pungens* (Körb.) Körb.

N - VG (Castello 2002, Martellos & Castello 2004), **Ven** (Lazzarin 2000b), **TAA** (Knoph & Leuckert 2000), **Lomb** (Valcuvia & al. 2003), **Piem** (Isocrono & Falletti 1999, Valcuvia 2002, 2002b, Isocrono & al. 2003), **VA** (Piervittori & Isocrono 1999, Piervittori & al. 2004), **Lig** (Watson 2014). **C - Tosc**, **Sar** (Knoph & Leuckert 2000). **S - Camp** (Ricciardi & al. 2000), **Si** (Ottonello & Romano 1997, Ottonello & al. 2011).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 2-3, X: 2-3, E: 1-2/ Alt: 2-5/ Alp: vr, Salp: r, Orom: r, Mont: r, SmedD: vr, SmedH: vr/ PT: 1/ Note: on steeply inclined to slightly underhanging surfaces of hard, base-rich or weakly calciferous siliceous rocks.

Lecidella asema (Nyl.) Knoph & Hertel var. ***asema***

Bibl. Lichenol., 36: 66, 1990 - *Lecidea asema* Nyl., Flora, 55: 356, 1872.

Syn.: *Lecidea distrata* Arnold non Nyl., *Lecidea distratula* Zahlbr., *Lecidea latypea* auct. p.p. non Ach., *Lecidea polyantha* Taylor ex Leight., *Lecidea subincongrua* Nyl., *Lecidella subincongrua* (Nyl.) Hertel & Leuckert

N - VG, **Frl** (Tretiach & Hafellner 2000), **TAA** (Arnold Lich. Exs. 941a, Orom: Knoph & Leuckert 1994, Caniglia & al. 2002), **Lomb** (Valcuvia 2002, 2002b), **Piem** (Morisi & Sereno 1995, Valcuvia 2002, 2002b), **VA** (Piervittori & al. 2004), **Lig** (Brunialti & al. 1999). **C - Tosc** (Pišút 1997), **Umb** (Ravera & al. 2006, 2006b, Genovesi 2011), **Laz** (Genovesi & al. 2011), **Abr** (Nimis & Tretiach 1999), **Sar** (Nöske 2000, Rizzi & al. 2011, Giordani & al. 2013). **S - Camp** (Garofalo & al. 1999), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1996b, Grillo & al. 1996, Grillo 1998, Grillo & Caniglia 2004, Cataldo & Cannavò 2014).

Cr/ Ch/ S/ Sax/ pH: 3, L: 3-4, X: 3, E: 3/ Alt: 1-4/ Salp: er, Mont: r, SmedD: vr, SmedH: rc, MedH: rr/ PT: 1-2/ Note: a widespread, chemically variable species of basic siliceous rocks, on faces wetted by rain, with a wide altitudinal range.

Lecidella asema var. ***elaeochromoides*** (Nyl.) Nimis & Tretiach

in Nimis & al., Boll. Mus. Reg. Sci. Nat. Torino 14, 1: 128, 1996 - *Lecidea parasema* var. *elaeochromoides* Nyl., Bull. Soc. Linn. Normandie, sér. 2, 6: 310, 1873.

Syn.: *Lecidea catalinaria* Stizenb., *Lecidea elaeochromoides* (Nyl.) Flagey, *Lecidea enteroleuca* var. *flavida* Fr., *Lecidea subincongrua* var. *elaeochromoides* (Nyl.) Poelt, *Lecidella elaeochromoides* (Nyl.) Knoph & Hertel, *Lecidella subincongrua* var. *elaeochromoides* (Nyl.) Hertel & Leuckert

N - TAA, **Piem** (TSB 32699), **Lig** (Watson 2014). **C - Tosc**, **Laz**, **Sar** (Knoph & Schmidt 1995, Rizzi & al. 2011). **S - Camp** (Garofalo & al. 1999), **Si** (Nimis & al. 1996b, Ottonello & Romano 1997, Grillo & Caniglia 2004, Ottonello & al. 2011).

Cr/ Ch/ S/ Sax/ pH: 3, L: 4-5, X: 3-4, E: 2-3/ Alt: 1-2/ SmedD: er, SmedH: rc, MedH: c, MedD: vr/ PT: 1/ suboc/ Note: the chemistry of *L. asema* is quite complex: this variety with a yellow thallus is so common in Tyrrhenian Italy, and so easily recognizable, that I still prefer to distinguish it from *L. asema s.str.*, at least at varietal level. It also occurs in dry-warm Alpine valleys.

Lecidella carpathica Körb.

Parerga Lichenol.: 212, 1865.

Syn.: *Blastenia rejecta* Th. Fr., *Lecidea baskalensis* Szatala, *Lecidea carpathica* (Körb.) Szatala, *Lecidea baskalensis* Szatala, *Lecidea continuior* Nyl., *Lecidea diffractula* H. Magn., *Lecidea durtetzii* H. Magn., *Lecidea fennica* Räsänen, *Lecidea kotiluoensis* Vain., *Lecidea latypea* auct. p.p. non Ach., *Lecidea latypiza* Nyl., *Lecidea latypizella* Nád., *Lecidea loudiana* Zahlbr., *Lecidea pertingens* Nyl., *Lecidea subsmaragdula* H. Magn., *Lecidea suprasedens* Zahlbr.

N - VG (Castello 2002, Martellos & Castello 2004), **Frl** (Tretiach & Hafellner 2000), **Ven** (Nascimbene 2005c), **TAA** (Caniglia & al. 2002 Nascimbene 2003, 2008b, Hertel & Schuhwerk 2010), **Lomb** (Valcuvia & al. 2003, De Vita & Valcuvia 2004, Brackel 2013), **Piem** (Isocrono & al. 2003, 2004, Favero-Longo & al. 2004, 2006b, Isocrono & Piervittori 2008, Giordani & al. 2014, Favero-Longo & al. 2015), **VA** (Piervittori & Isocrono 1997, 1999, Piervittori & al. 2001, 2004, Isocrono & al. 2008, Favero-Longo & Piervittori 2009, Matteucci & al. 2013b, 2015c), **Emil** (Tretiach & al. 2008, Watson 2014), **Lig** (Giordani & al. 2016). **C - Tosc** (Brackel 2015), **Marc** (Nimis & Tretiach 1999, Brackel 2015), **Umb** (Nimis & Tretiach 1999, Ravera & al. 2006), **Laz** (Bartoli & al. 1998, Nimis & Tretiach 2004, Genovesi & al. 2011), **Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008, Genovesi & Ravera 2014), **Sar** (Nöske 2000, Rizzi & al. 2011, Giordani & al. 2013). **S - Camp** (Aprile & al. 2003b, Nimis & Tretiach 2004, Catalano & al. 2016), **Pugl** (Nimis & Tretiach 1999), **Bas**, **Cal** (Puntillo 1996, Puntillo & Puntillo 2004), **Si** (Poli & Grillo 2000, Brackel 2008b, 2008c).

Cr/ Ch/ S/ Sax/ pH: 2-4, L: 4-5, X: 3-4, E: 2-4/ Alt: 1-5/ Alp: rc, Salp: vc, Orom: rc, Mont: c, SmedD: c, Pad: er, SmedH: vc, MedH: rc, MedD: er/ PT: 1-2/ paras crustose lichens when young/ Note: a widespread holarctic lichen with a broad altitudinal and latitudinal range found on base-rich rocks wetted by rain in exposed situations, often starting the life-cycle on other crustose lichens; in the Apennines and in southern Italy it is not uncommon on the top of calcareous boulders. For the chemistry see Knoph & Leuckert (1997).

Lecidella effugiens (Nilson) Knoph & Hertel

in Knoph, Bibl. Lichenol., 36: 96, 1990 - *Lecidea effugiens* Nilson, Flechtenveget. Sarekgeb.: 27, 1907.

Syn.: *Lecidea albidicinerella* Vain. nom. nud., *Lecidea incongruella* Vain., *Lecidella albidicinerella* (Vain.) Hertel, *Lecidella incongruella* (Vain.) Hertel & Leuckert

N - TAA (Hertel & Schuhwerk 2010). **C - Sar**.

Cr/ Ch/ S/ Sax/ pH: 3-4, L: 3-4, X: 3-4, E: 3/ Alt: 3-5/ Alp: vr, Salp: vr, Mont: er/ PT: 1/ #/ Note: on more or less calcareous or base-rich siliceous rocks, with optimum near or above treeline; a member of the *L. asema* complex, probably more widespread in the Alps and to be looked for in the Apennines.

Lecidella elaeochroma* (Ach.) M. Choisy var. *elaeochroma* f. *elaeochroma

Bull. Mens. Soc. linn. Lyon, 19: 19, 1950 - *Lecidea parasema* var. *elaeochroma* Ach., Meth. Lich.: 36, 1803.

Syn.: *Biatora ambigua* A. Massal., *Biatora tabescens* Körb., *Lecidea achrista* (Sommerf.) Britzelm., *Lecidea achristotera* Nyl., *Lecidea elaeochroma* (Ach.) Ach., *Lecidea elaeochroma* var. *tumidula* (A. Massal.) Müll. Arg., *Lecidea enteroleuca* var. *olivacea* (Hoffm.) Fr., *Lecidea limitata* auct., *Lecidea olivacea* (Hoffm.) A. Massal., *Lecidea parasema* auct. p.p. non (Ach.) Ach., *Lecidea parasema* var. *rugulosa* Ach., *Lecidea tumidula* A. Massal., *Lecidella achristotera* (Nyl.) Hertel & Leuckert, *Lecidella enteroleuca* (Ach.) Körb., *Lecidella olivacea* (Hoffm.) Hazsl.

N - VG (Castello 1996, 2002, Carvalho 1997, Martellos & Castello 2004, Castello & Skert 2005), **Frl** (Hinteregger 1994, Badin & Nimis 1996, Castello & Skert 2005, Bernini & al. 2010), **Ven** (Hinteregger 1994, Nimis & al. 1996c, Nascimbene & Caniglia 1997, 2000b, 2002c, 2003c, 2007, Lazzarin 1997, 2000, 2000b, Caniglia & al. 1999, Valcuvia & al. 2000c, Lazzarin 2000b, Nascimbene 2005c, 2008, 2008c, Thor & Nascimbene 2007, Nascimbene & Marini 2007, 2010, Nascimbene & al. 2008e, 2013b, 2015, Brackel 2013, Watson 2014), **TAA** (De Benetti & Caniglia 1993, Hinteregger 1994, Nascimbene & Caniglia 2000b, Caniglia & al. 2002, Nascimbene 2003, 2005b, 2006c, 2008b, 2014, Gottardini & al. 2004, Nascimbene & al. 2005, 2006, 2007b, 2014, Zarabska & al. 2009, Nimis & al. 2015), **Lomb** (Lecid. Exs. 249: Hertel 1992a, Arosio & Rinaldi 1995, Grieco & Groppali 1995, Valcuvia & Gianatti 1995, Zocchi & al. 1997, Roella 1999, Casarini & al. 2000, Arosio & al. 2000, 2003, Valcuvia & al. 2003, Dalle Vedove & al. 2004, Anderi & al. 2005, Valcuvia & Truzzi 2007b, Furlanetto 2010, Gheza & al. 2015), **Piem** (Caniglia & al. 1992, Morisi & Sereno 1995, Arosio & al. 1998, Isocrono & Falletti 1999, Piervittori 2003, Griselli & al. 2000, 2003, Castino 2004, Isocrono & al. 2004, 2005b, 2006, 2007, 2009, Morisi 2005, Isocrono & Piervittori 2008, Furlanetto 2010, Matteucci & al. 2010, Giordani & Malaspina 2016), **VA** (Piervittori & Maffei 1996, 2001, Piervittori & Isocrono 1997, 1999, Piervittori & al. 2001, Matteucci & al. 2008, 2008c), **Emil** (Bassi 1995, Gasparo & Tretiach 1996, Nimis & al. 1996, Valcuvia & Grieco 1995, Gasparo & Tretiach 1996, Dalle Vedove & al. 2002, Sallese 2003, Marconi & al. 2006, Morselli & Regazzi 2006, Tretiach & al. 2008, Cioffi 2009, Benesperi 2009, Malavasi 2014, Gerdol & al. 2014, Brackel 2015), **Lig** (Castello & al. 1994, Brunialti & al. 1999, Putorti & al. 1999b, Valcuvia & al. 2000, Giordani & al. 2001, 2002, Brunialti & Giordani 2003, Giordani 2006, Giordani & Incerti 2008), **C - Tosc** (Tretiach & Nimis 1994, Loppi & Corsini 1995, 2003, Loppi & Putorti 1995, 1995b, 2001, Loppi & al. 1994, 1995, 1996b, 1996c, 1997, 1997b, 1997e, 1998, 1998b, 2002, 2002b, 2002c, 2003, 2004, 2004c, 2006, Loppi 1996, 1996b, 1999a, Loppi & De Dominicis 1996, 1996b, Monaci & al. 1997, Loppi & Nascimbene 1998, 2010, Putorti & al. 1998, Putorti & Loppi 1999, 1999b, Tretiach & Ganis 1999, Benesperi 2000a, 2006, 2011, Bacci & al. 2000, Loppi & Pirintsos 2000, Senese & Critelli 2000, Paoli & Loppi 2001, 2008, Laganà & al. 2002, Lorenzini & al. 2003, Loppi & Frati 2004, Frati & al. 2006b, 2007, Benesperi & al. 2007, 2013, Lastrucci & al. 2009, Brunialti & Frati 2010, 2012b, Paoli & al. 2012, 2012b, 2013, 2015d, Brackel 2015, Nascimbene & al. 2015), **Marc** (Gasparo & al. 1989, Nimis & Tretiach 1999, Frati & Brunialti 2006, Brackel 2015, Pieri & al. 2015), **Umb** (Ravera 1998, Nimis & Tretiach 1999, Panfili 2000b, 2007, Ravera & al. 2006, Ciotti & al. 2009, Brackel 2015), **Laz** (Knoph & Schmidt 1995, Bartoli & al. 1997, Ravera & al. 1999, Ravera 2002, 2008b, Massari & Ravera 2002, Nimis & Tretiach 2004, Ruisi & al. 2005, Stofer 2006, Munzi & al. 2007, Ravera & Genovesi 2008, Zucconi & al. 2013, Brackel 2015), **Abr** (Recchia & al. 1993, Olivieri & Pacioni 1996, Olivieri & al. 1997, 1997b, Loppi & al. 1999, Nimis & Tretiach 1999, Stofer 2006, Brackel 2015, Caporale & al. 2016, Corona & al. 2016), **Mol** (Garofalo & al. 1999, Nimis & Tretiach 1999, Caporale & al. 2008, Ravera & al. 2010, Paoli & al. 2011, 2015, Genovesi & Ravera 2014, Brackel 2015), **Sar** (Knoph & Schmidt 1995, Zedda 1995, 2002, 2002b, Loi & al. 2000, Zedda & Sipman 2001, Zedda & al. 2001, Rizzi & al. 2011, Cossu 2013), **S - Camp** (Garofalo & al. 1999, 2010, Ricciardi & al. 2000, Aprile & al. 2002, 2003, 2003b, 2011, Nimis & Tretiach 2004, Brunialti & al. 2010, 2013, Catalano & al. 2010, 2012, 2016, Ravera & Brunialti 2013), **Pugl** (Garofalo & al. 1999, Nimis & Tretiach 1999, Durini & Medagli 2002, 2004, Brackel 2011), **Bas** (Bartoli & Puntillo 1998, Nimis & Tretiach 1999, Potenza 2006, Paoli & al. 2006, Potenza & al. 2010, Brackel 2011), **Cal** (Puntillo 1995, 1996, van den Boom & Giral 2002, Puntillo & Puntillo 2004, Incerti & Nimis 2006, Brackel & Puntillo 2016), **Si** (Merlo 1993, 2004, 2004b, Ottonello & al. 1994, 2011, Nimis & al. 1994, 1995, Ottonello & Salone 1994, Ottonello & al. 1994, Grillo & Cristaudo 1995, Ottonello 1996, Grillo & al. 1996, 2002, Ottonello & Romano 1997, Grillo 1998, Czezugza & al. 1999, Grillo & Caniglia 2004, 2006, Caniglia & Grillo 2006b, Stofer 2006, Brackel 2008b, 2008c, Grillo & Cataldo 2008, 2008b, Gianguzzi & al. 2009, Liistro & Cataldo 2011, Cataldo & Minissale 2015).

Cr/ Ch/ S/ Epiph/ pH: 2-4, L: 3-5, X: 2-5, E: 2-4/ Alt: 1-4/ Salp: vr, Orom: er, Mont: rc, SmedD: ec, Pad: rc, SmedH: ec, MedH: ec, MedD: ec/ PT: 1-3/ p/ Note: this is the commonest epiphytic lichen of Italy, with an extraordinarily wide ecological and altitudinal range, occurring both in natural forests and in urban environments. According to Zhao & al. (2015) the species might prove to be heterogeneous. Some records could refer to *L. euphorea*.

***Lecidella elaeochroma* var. *elaeochroma* f. *soralifera* (Erichsen) D. Hawksw.**

Fld Stud. 3, 4: 561, 1972 - *Lecidea elaeochroma* var. *soralifera* Erichsen, Ber. Bot. Ver. Prov. Brand., 71: 86, 1929.

Syn.: *Lecidea limitata* (Scop.) Gray var. *soralifera* (Erichsen) J.R. Laundon, *Lecidea olivacea* var. *soralifera* (Erichsen) Erichsen, *Lecidella elaeochroma* var. *soralifera* (Erichsen) Hertel

N - VG, Ven, TAA, C - Tosc (Loppi & al. 1997c, 1999a, Benesperi & al. 2007), **Laz, Mol** (Caporale & al. 2008), **Sar** (Loi & al. 2000, Rizzi & al. 2011, Cossu 2013), **S - Camp** (Nimis & Tretiach 2004, Garofalo & al. 2010), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994, Grillo & Cristaudo 1995, Caniglia & Grillo 2006b).

Cr/ Ch/ A.s/ Epiph/ pH: 2-4, L: 3, X: 2-3, E: 2-3/ Alt: 2-3/ Mont: r, SmedD: vr, SmedH: r/ PT: 1-2/ suboc/ Note: this sorediate-fruited lichen, in my opinion, is just an "occasionally" sorediate form of *L.*

elaeochroma. It is more widespread than the few records would suggest, but it is never common; it generally occurs immixed with fruiting specimens in humid-warm areas. The "occasional" appearance of asexually reproducing forms along south-to-north gradients, however, well deserves the attention of lichenologists.

Lecidella elaeochroma (Ach.) M. Choisy var. ***flavicans*** (Ach.) Hazsl.

Magyar Birodalom Zuzmó-Flórjáj: 197, 1884 - *Lecidea anomala* var. *flavicans* Ach., syn. Meth. Lich.: 39, 1814.

Syn.: *Lecidea flavens* (Nyl.) Nyl., *Lecidea parasema* var. *flavens* Nyl.

N - TAA, C - TOSC (Putortù & al. 1998), Laz, S - Camp (Garofalo & al. 2010), Pugl (Nimis & Tretiach 1999), Cal (Puntillo 1996), Si (TSB 15650).

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 4-5, X: 2-3, E: 2-4/ Alt: 1-2/ SmedD: er, SmedH: rr, MedH: rc, MedD: rr/ PT: 1/ Note: morphs with a yellowish thallus (v. *flavicans*) are more frequent in the southern part of Tyrrhenian Italy, within eu-Mediterranean vegetation. They were not always distinguished from var. *elaeochroma* in the literature

Lecidella elaeochroma var. ***juniperina*** (Poelt & Nimis)

Provisionally placed here, ICN Art. 36.1b. - *Lecidella achrostotera* var. *juniperina* Poelt & Nimis in Nimis & Poelt, Studia Geobot., 7, suppl. 1: 130, 1987.

C - Sar, Laz, S - Pugl.

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 4-5, X: 2-3, E: 2-4/ Alt: 1/ MedH: r, MedD: er/ PT: 1/ #/ Note: on shrubs, especially *Juniperus macrocarpa*, in areas with sand dunes subject to humid, maritime winds, but with long periods of aridity, ecologically similar to *Tornabea scutellifera*.

Lecidella euphorea (Flörke) Hertel

in Hawksworth & al., Lichenologist, 12: 107, 1980 - *Lecidea sabuletorum* var. *euphorea* Flörke, Mag. Gesell. naturf. Freunde, Berlin, 2: 311, 1808.

Syn.: *Lecidea dolosa* Ach., *Lecidea enteroleuca* var. *deusta* (A. Massal.) Trevis., *Lecidea euphorea* (Flörke) Nyl., *Lecidea glomerulosa* (DC.) Steud., *Lecidella dolosa* (Ach.) Stein, *Lecidella glomerulosa* (DC.) M. Choisy

N - VG, Frl, Ven, TAA, Lomb (Grieco & Groppali 1995), Piem (Piervittori 1998), VA (Piervittori & Isocrono 1999), Emil, Lig (Putortù & al. 1999b), C - TOSC (Loppi & De Dominicis 1996, Loppi & al. 1997b), Laz, Abr, Sar (Zedda 2002b, Cossu 2013), S - Camp (Garofalo & al. 2010), Cal, Si.

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 3-4, X: 2-4, E: 2-3/ Alt: 2-4/ Salp: vr, Orom: er, Mont: rr, SmedD: r, Pad: er, SmedH: rr/ PT: 1-2/ Note: often considered as a variety or a form of *L. elaeochroma*, this species proved to form a monophyletic clade in the molecular analysis by Zhao & al. (2015). It occurs on bark throughout the country, often in less nutrient-enriched and slightly more shaded situations than *L. elaeochroma*. It seems to be most frequent in northern Italy and in upland areas. In the older literature, and from 2003 to 2015, it was rarely distinguished from *L. elaeochroma*.

Lecidella flavosorediata (Vězda) Hertel & Leuckert

Willdenowia, 5: 374, 1969 - *Lecidea flavosorediata* Vězda, Preslia, 33: 366, 1961.

Syn.: *Lecidella elaeochroma* var. *flavosorediata* (Vězda) Clauzade & Cl. Roux

N - Ven (Nascimbene & al. 2015), TAA (Nascimbene 2014), Lig (TSB 33039), C - TOSC (Loppi & al. 1994), Sar (Zedda 2002), S - Pugl (Nimis & Tretiach 1999).

Cr/ Ch/ A.s/ Epiph/ pH: 2-3, L: 4, X: 3-4, E: 3-4/ Alt: 2-3/ Mont: vr, SmedD: vr, SmedH: vr/ PT: 1/ #/ Note: this epiphytic species seems to be most frequent in the mountains of southern Italy. For its chemistry see Knoph & Leuckert (1997).

Lecidella granulosa (Nyl.) Knoph & Leuckert

Herzogia, 14: 9, 2000 - *Lecidea granulosa* Nyl. in Crombie, Journ. Bot., 14: 21, 1876.

Syn.: *Lecidea chodatii* Samp., *Lecidea goniophiloides* B. de Lesd., *Lecidella chodatii* (Samp.) Knoph & Leuckert, *Lecidella viridans* var. *chodatii* (Samp.) Hertel & Leuckert

N - TAA (Knoph & Leuckert 2000), Lomb (Knoph & Leuckert 2000).

Cr/ Ch/ S/ Sax/ pH: 3-4, L: 4-5, X: 4-5, E: 2-3/ Alt: 2-3/ Mont: vr, SmedD: vr/ PT: 1/ subc/ Note: on basic siliceous rocks, probably restricted to dry-warm Alpine valleys in Italy.

Lecidella laureri (Hepp) Körb.

Syst. Lich. Germ.: 246, 1855 - *Biatora laureri* Hepp, Flecht. Eur.: nr. 4, 1853.

Syn.: *Lecidea euphorea* var. *laureri* (Hepp) Vain., *Lecidea laureri* (Hepp) Anzi

N - Ven, TAA (Nascimbene & al. 2007b), Lomb, Piem (Isocrono & al. 2004), C - Sar, S - Bas.

Cr/ Ch/ S/ Lign-Epiph/ pH: 2-3, L: 3-4, X: 3-4, E: 2-3/ Alt: 2-3/ Mont: r, SmedD: vr, SmedH: r/ PT: 1-2/ Note: on eutrophicated lignum and base-rich bark. Most Italian records require confirmation.

Lecidella patavina (A. Massal.) Knoph & Leuckert

in Knoph, Bibl. Lichenol., 36: 116, 1990 - *Lecidea patavina* A. Massal., Ric. Auton. Lich. Crost.: 69, 1852.

Syn.: *Buellia sordida* (A. Massal.) Jatta, *Catillaria sordida* A. Massal., *Lecidea acrocyanea* (Th. Fr.) H. Magn., *Lecidea alaiensis* Vain., *Lecidea araratica* Müll. Arg., *Lecidea endolitheae* Lynge, *Lecidea enteroleuca* var. *cacuminum*

J. Steiner, *Lecidea epipolioides* (J. Steiner) Szatala, *Lecidea inamoena* Müll. Arg., *Lecidea piemontensis* B. de Lesd., *Lecidea portensis* Nád., *Lecidea rolleana* H. Magn., *Lecidea rolleana* var. *portensis* (Nád.) Hertel, *Lecidea spitsbergensis* Lynge, *Lecidea vulgata* f. *patavina* (A. Massal.) Zahlbr., *Lecidella alaiensis* (Vain.) Hertel, *Lecidella alaiensis* var. *spitsbergensis* (Lynge) Clauzade & Cl. Roux, *Lecidella endolitheia* (Lynge) Hertel & Leuckert, *Lecidella inamoena* (Müll. Arg.) Hertel, *Lecidella spitsbergensis* (Lynge) Hertel & Leuckert

N - **Frl**, **Ven** (Nimis 1994, Caniglia & al. 1999, Lazzarin 2000b, Nascimbene & Caniglia 2003c, Thor & Nascimbene 2007), **TAA** (Nascimbene 2003, Hertel & Schuhwerk 2010, Spitale & Nascimbene 2012), **Lomb**, **Piem**, **VA** (Piervittori & Isocrono 1999), **Emil** (Tretiach & al. 2008), **Lig** (Giordani & al. 2016). **C** - **Tosc**, **Marc** (Nimis & Tretiach 1999), **Umb** (Nimis & Tretiach 1999, Ravera & al. 2006), **Laz** (Nimis & Tretiach 2004), **Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach, 1999, 2004, Caporale & al. 2008), **Sar**, **S** - **Camp** (Aprile & al. 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Grillo & al. 2007).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 4-5, X: 3-4, E: 3-4/ Alt: 2-6/ Alp: ec, Salp: vc, Orom: rc, Mont: vc, SmedD: er, SmedH: er/ PT: 1-2/ Note: a circumpolar, cool-temperate to arctic-alpine, nitrophilous lichen, one of the most common calcicolous lichens of upland areas throughout the country, reaching the nival belt in the Alps, related with *L. stigmatea*. For the chemistry see Knoph & Leuckert (1997, 2000).

Lecidella pulveracea (Schaer.) P. Syd.

Die Flecht. Deutschl.: 211, 1887 - *Lecidea enteroleuca* var. *pulveracea* Flörke ex Schaer., Enumer. Critic. Lich. Europ.: 128, 1850.

Syn.: *Biatora pulveracea* (Schaer.) Stein., *Lecidea dubia* Turner & Borrer non Schaer., *Lecidea pulveracea* (Schaer.) Th. Fr.

N - **Frl** (TSB 15106), **Ven** (Nascimbene & Marini 2010), **TAA** (Nascimbene & al. 2006, 2007b).

Cr/ Ch/ S/ Epiph/ pH: 3, L: 4, X: 3-4, E: 2-4/ Alt: 2-3/ Mont: vr, SmedD: er/ PT: 1-2/ Note: a mainly temperate lichen found especially on *Fraxinus*, sometimes on nutrient-enriched lignum. For the chemistry see Knoph & Leuckert (1997). It is included in the Italian red list of epiphytic lichens as "Data Deficient" (Nascimbene & al. 2013c).

Lecidella scabra (Taylor) Hertel & Leuckert

Willdenowia, 5: 375, 1969 - *Lecidea scabra* Taylor in Mackay, Fl. Hibern., 2: 121, 1836.

Syn.: *Lecidea continuior* var. *subviridans* Nyl., *Lecidea elaeochroma* var. *pulverulenta* Th. Fr., *Lecidea enterochlora* Taylor, *Lecidea prasinula* (Wedd.) B. de Lesd., *Lecidea protrusa* Fr., *Lecidella prasinula* (Wedd.) Hertel nomen sed non planta, *Lithographa larbalestieri* Leight.

N - **VG**, **TAA** (Knoph & al. 1997), **Lomb**, **Piem** (TSB 33660), **Emil** (Knoph & al. 1997, Tretiach & al. 2008), **Lig** (TSB 33407). **C** - **Tosc** (Tretiach & Nimis 1994, Benesperi 2011), **Laz**, **Abr**, **Sar** (Monte 1993, Rizzi & al. 2011, Giordani & al. 2013). **S** - **Camp** (Nimis & Tretiach 2004), **Cal** (Puntillo & Puntillo 2004), **Si** (Ottonello & al. 2011).

Cr/ Ch/ A.s/ Sax/ pH: 2-3, L: 3-5, X: 3-4, E: 1-2/ Alt: 1-4/ Mont: vr, SmedD: vr, Pad: er, SmedH: rc, MedH: rr/ PT: 1-2/ suboc/ Note: a mainly temperate to Mediterranean lichen found on basic siliceous substrata wetted by rain in species-poor stands; quite common on brick in archaeological areas of Tyrrhenian Italy, but also present in the Alps, the species is chemically heterogeneous (see Knoph & Leuckert 1997).

Lecidella stigmatea (Ach.) Hertel & Leuckert

Willdenowia, 5: 375, 1969 - *Lecidea stigmatea* Ach., Lichenogr. Univ.: 10, 1810.

Syn.: *Bacidia biseptata* H. Magn., *Bacidia ostrogothica* Malme, *Biatora arctoides* Hellb., *Lecidea arthoniza* Nyl., *Lecidea caesiocinerea* H. Magn., *Lecidea cinnamomea* Flörke ex Hellb., *Lecidea diasemoides* Nyl., *Lecidea enteroleuca* auct. p.p. non Ach., *Lecidea femerensis* Erichsen, *Lecidea glabra* (Kremp.) Hellb., *Lecidea imitatrix* Zahlbr., *Lecidea incongrua* (Nyl.) Nyl., *Lecidea prominula* Borrer, *Lecidea restricta* Stirt., *Lecidea sabuletorum* var. *aequata* Flörke, *Lecidea subcongrua* Nyl. non sensu Vain., *Lecidea subsequens* Nyl., *Lecidea vulgata* Zahlbr. nom. illegit., *Lecidea vulgata* var. *ferruginea* H. Magn., *Lecidella aequata* (Flörke) Kremp., *Lecidella glabra* Kremp., *Lecidella incongrua* (Nyl.) Arnold, *Lecidella micacea* Körb., *Lecidella vulgata* (Zahlbr.) M. Choisy

N - **VG** (Castello 2002, Martellos & Castello 2004, Tretiach & al. 2007b), **Frl** (Tretiach & Hafellner 2000), **Ven** (Brackel 2013), **TAA** (Hertel & Schuhwerk 2010), **Lomb** (Valcuvia & al. 2003, De Vita & Valcuvia 2004), **Piem** (Valcuvia 2002, 2002b, Isocrono & al. 2006), **VA** (Piervittori & Isocrono 1999, Piervittori & al. 2004, Isocrono & al. 2008, Favero-Longo & Piervittori 2009, Matteucci & al. 2015c), **Emil** (Nimis & al. 1996, Tretiach & al. 2008), **Lig** (Valcuvia & al. 2000). **C** - **Tosc**, **Marc** (Nimis & Tretiach 1999), **Umb** (Panfili 2000b, Ravera & al. 2006), **Laz** (Genovesi & al. 2011, Brackel 2015), **Abr** (Nimis & Tretiach 1999), **Mol** (Garofalo & al. 1999, Nimis & Tretiach 1999, Caporale & al. 2008), **Sar** (Nöske 2000). **S** - **Camp** (Garofalo & al. 1999), **Pugl** (Garofalo & al. 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Nimis & Puntillo 2003, Puntillo 2011), **Si** (Nimis & al. 1994, Grillo 1998, Grillo & Caniglia 2004, Brackel 2008b, 2008c, Liistro & Cataldo 2011, Ottonello & al. 2011).

Cr/ Ch/ S/ Sax/ pH: 3-4, L: 3-4, X: 3-4, E: 3-4/ Alt: 1-6/ Alp: rr, Salp: rr, Orom: r, Mont: rr, SmedD: c, Pad: r, SmedH: c, MedH: r, MedD: er/ PT: 1-3/ Note: a widespread holarctic species found on base-rich and more or less calciferous siliceous rocks; the species is morphologically variable and ecologically wide-ranging; it is often found in disturbed habitats, especially on sandstone walls, also within small conurbations, sometimes starting the life-cycle on the thalli of other crustose lichens. For the chemistry see Knoph & Leuckert (1997).

Lecidella umbrosa (A. Massal.) Hertel

Herzogia, 2: 502, 1973 - *Biatora umbrosa* Bagl. ex A. Massal., Symmicta Lich.: 37, 1855.

Syn.: *Lecidea umbrosa* (A. Massal.) Jatta

N - TAA (Knoph & Leuckert 2000), **Lig** (Knoph & Leuckert 2000, Lazzarin 2000b).

Cr/ Ch/ S/ Sax/ pH: 3, L: 3-4, X: 3, E: 3/ Alt: 1-3/ Mont: vr, SmedD: er, MedH: vr/ PT: 1/ #/ Note: a poorly known species of base-rich siliceous rocks, related with *L. anomaloides*, which needs further study.

Lecidella viridans (Flot.) Körb.

Syst. Lich. Germ.: 242, 1855 - *Lecidea sabuletorum* var. *viridans* Flot., Flora, 11: 697-698, 1828.

Syn.: *Biatora viridans* (Flot.) Hepp, *Lecidea elaeochromiza* (Nyl.) H. Olivier, *Lecidea glomerulosa* (DC.) Steud. f. *elaeochromiza* (Nyl.) Zahlbr., *Lecidea viridans* (Flot.) Lamy, *Lecidella elaeochromiza* (Nyl.) M. Choisy

N - Frl (TSB14171), **Ven, TAA** (Knoph & Leuckert 2000), **Lomb, Piem** (Isocrono & al. 2004), **Lig** (Watson 2014). **C - Tosc, Sar, S - Camp, Si** (Grillo 1998, Grillo & Caniglia 2004).

Cr/ Ch/ S/ Sax/ pH: 3, L: 4, X: 4, E: 2-3/ Alt: 1-3/ Mont: er, SmedD: er, SmedH: er, MedD: er/ PT: 1/ subc/ Note on base-rich or slightly calciferous siliceous rocks, especially on steeply inclined faces, in dry-warm areas.

Lecidella vorax Leuckert & Poelt

in Nimis & Poelt, Studia Geobot., 7, suppl. 1: 133, 1987.

C - Laz, Sar (Rizzi & al. 2011, Giordani & al. 2013). **S - Si**.

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4, X: 4, E: 2-3/ Alt: 1-2/ SmedH: vr, MedH: vr/ PT: 1/ paras *Lecanora rupicola* s.lat./ Note: chemically related to *L. asema*, but constantly parasitic on *Lecanora rupicola*.

Lecidella wulfenii (Hepp) Körb.

Parerga Lichenol.: 216, 1861 - *Biatora wulfenii* Hepp, Flecht. Eur.: nr. 5, 1853.

Syn.: *Lecidea elaeochroma* var. *muscorum* Th. Fr., *Lecidea glomerulosa* var. *muscorum* (Th. Fr.) Vain., *Lecidea heppii* R.A. Anderson & W.A. Weber, *Lecidea muscorum* (Th. Fr.) Dalla Torre & Sarnth., *Lecidea wulfeniana* Grummann, *Lecidea wulfenii* (Hepp) Arnold

N - Frl (Tretlach & Hafellner 2000), **Ven** (Nascimbene & Caniglia 2003c, Nascimbene 2008c), **TAA** (Bilovitz & al. 2014b), **Lomb, Piem** (Isocrono & al. 2004), **VA** (Valcuvia 2000), **Lig, C - Abr, S - Bas** (Nimis & Tretlach 1999).

Cr/ Ch/ S/ Terr/ pH: 3-4, L: 4, X: 3-4, E: 2-3/ Alt: 4-5/ Alp: ec, Salp: ec, Orom: vr/ PT: 1/ Note: a circumpolar, arctic-alpine lichen found on muribund bryophytes and plant remains in exposed habitats near and above treeline; most common in the Alps, but also present in the high mountains of southern Italy. For the chemistry see Knoph & Leuckert (1997).

Lecidella xylophila (Th. Fr.) Knoph & Leuckert

Bibl. Lichenol., 68: 131, 1997 - *Lecidea xylophila* Th. Fr. in Falck, Östra Blek. Lafflora: 16, 1874.

N - TAA (Nimis & al. 2015). **C - Abr**.

Cr/ Ch/ S/ Lign/ pH: 1-2, L: 3-4, X: 2, E: 1/ Alt: 3-4/ Salp: vr, Mont: er/ PT: 1/ #/ Note: on the whole, a very poorly known species growing on lignum near treeline. It is included in the Italian red list of epiphytic lichens as "Critically Endangered" (Nascimbene & al. 2013c).

L e c i d o m a Gotth. Schneid. & Hertel

in Hertel, Herzogia, 5: 460, 1981.

A monotypic genus including a subcosmopolitan terricolous species which shares with *Porpidia* the amyloid tube structures of the ascus, but with different features, whereas in *Lecidea* this tube seems to be reduced to a minute structure in the tholus tip; a carbonisation of portions of the apothecia as in the latter two genera is not found in *Lecidoma*. A phylogenetic analysis based on molecular data suggests that the genus is most closely related to a group of genera (including *Bryobilimbia*, *Clauzadea*, *Farnoldia* and *Romjularia*) that do not belong to Lecideaceae s.str. (Fryday & al. 2014). Type: *L. demissum* (Rutstr.) Gotth. Schneid. & Hertel

Lecidoma demissum (Rutstr.) Gotth. Schneid. & Hertel

in Hertel, Herzogia, 5: 460, 1981 - *Lichen demissus* Rutstr., Spicil. Pl. Crypt. Suec.: 8, 1794.

Syn.: *Biatora atrorufa* (Dicks.) Fr., *Biatora demissa* (Rutstr.) Fr., *Lecidea atrorufa* (Dicks.) Ach., *Lecidea demissa* (Rutstr.) Ach., *Lepidoma demissum* (Rutstr.) M. Choisy, *Psora atrorufa* (Dicks.) Hook., *Psora demissa* (Rutstr.) Stein

N - Frl (Tretlach & Hafellner 2000), **Ven, TAA** (Lang 2009, Bilovitz & al. 2014), **Lomb** (Dalle Vedove & al. 2004, Brackel 2013), **Piem** (Isocrono & al. 2004, Isocrono & Piervittori 2008), **VA** (Piervittori & Isocrono 1999, Piervittori & al. 2004). **C - Tosc** (Benespero & al. 2007). **S - Cal** (Puntillo 1996).

Cr/ Ch/ S/ Terr/ pH: 1-2, L: 4, X: 2-3, E: 1/ Alt: 4-5/ Alp: c, Salp: vc, Orom: vr/ PT: 1/ Note: a circumpolar, arctic-alpine lichen found on soil, rarely on siliceous rocks, in clearings of Alpine grasslands with a long snow-lie; most common in the Alps, but also occurring in the mountains of Calabria.

L e m m o p s i s (Vain.) Zahlbr.

in Engler & Prantl, Natürl. Pflanzenfam., 1: 171, 1906 - *Leptogium* sect. *Lemmopsis* Vain., Acta Soc. Fauna Fl. Fenn., 7, 1: 221, 1890.

A genus of the Lichinaceae including 3 species occurring in arid to temperate regions of the Northern Hemisphere, on calcareous rocks and clay soil (Ellis 1981). Type: *L. arnoldiana* (Hepp) Zahlbr.

Lemmopsis arnoldiana (Hepp) Zahlbr.

in Engler & Prantl, Natürl. Pflanzenfam., 1: 171, 1906 - *Physma arnoldianum* Hepp in Arnold, Flora, 41: 94, 1858.

Syn.: *Lemmopsis fulvida* (Harm.) Lettau, *Leptogium fulvidum* Harm., *Psorotichia arnoldiana* (Hepp) Körb., *Pyrenocarpon arnoldianum* (Hepp) Trevis.

N - Lig.

Cr/ Cy.c/ S/ Sax/ pH: 4-5, L: 2-3, X: 1-2, E: 1/ Alt: 1-2/ SmedH: vr, MedH: er/ PT: 1-2/ suboc/ Note: on calcareous pebbles in shaded woodland floors and crevices in rocky quarries, sometimes on mortar; in Italy the species is known from a single station in Liguria, but perhaps was overlooked and is somehow more frequent in Tyrrhenian Italy, albeit certainly not common.

Lempholemma Körb.

Syst. Lich. Germ.: 400, 1855.

This genus of the Lichinaceae, which comprises c. 35 species, is very heterogeneous and needs revision, also at species level (see Jørgensen 2007). *L. dispansum* H. Magn., and *L. radiatum* (Sommerf.) Henssen were reported from the Alps of Austria. Type: *L. compactum* (Wallr.) Körb. (= *L. polyanthes*).

Lempholemma botryosum (A. Massal.) Zahlbr.

Cat. Lich. Univ., 3: 20, 1924 - *Arnoldia botryosa* A. Massal., Miscell. Lichenol.: 20, 1856.

Syn.: *Omphalaria botryosa* (A. Massal.) Nyl., *Physma botryosum* (A. Massal.) Zahlbr., *Plectopsora botryosa* (A. Massal.) A. Massal.

N - Frl (Tretiach & Molaro 2007), **TAA, Lomb. C - Abr, Mol** (Nimis & Tretiach 1999, Caporale & al. 2008). **S - Camp** (Aprile & al. 2003b), **Pugl.**

Cr/ Cy.h/ S/ Sax/ pH: 4-5, L: 3-4, X: 4-5, E: 1-3/ Alt: 1-3/ Mont: r, SmedD: er, MedD: er/ PT: 1/ w/ Note: on steeply inclined surfaces of hard calciferous rocks with some water seepage after rain, often in sites with cyanobacterial colonies.

Lempholemma chalazanum (Ach.) B. de Lesd.

Recher. Lich. Dunkerque: 261, 1910 - *Collema chalazanum* Ach., Lichenogr. Univ.: 630, 1810.

Syn.: *Lempholemma franconicum* (A. Massal.) Schwend., *Physma chalazanum* (Ach.) Arnold, *Physma franconicum* A. Massal.

N - VG, Ven, Piem. C - Tosc.

Cr/ Cy.h/ S/ Terr/ pH: 4-5, L: 4, X: 4, E: 2/ Alt: 1-3/ Mont: er, SmedD: vr, SmedH: r, MedH: r/ PT: 1/ w/ Note: a mainly temperate lichen found on soil in open dry grasslands, sometimes overgrowing bryophytes and plant debris, but also on walls, probably overlooked and perhaps more widespread.

Lempholemma elveloideum (Ach.) Zahlbr.

Cat. Lich. Univ., 3: 21, 1924 - *Collema elveloideum* Ach., Lichenogr. Univ.: 641, 1810.

Syn.: *Arnoldia cyathodes* A. Massal., *Collema cyathodes* (A. Massal.) Nyl., *Physma cyathodes* (A. Massal.) Jatta, *Plectopsora cyathodes* (A. Massal.) A. Massal., *Plectopsora elveloidea* (Ach.) Zanfr.

N - Ven (Lazzarin 2000), **Lomb** (S- F145122), **Piem** (Isocrono & al. 2004). **C - Tosc.**

Fol.u/ Cy.h/ S/ Sax/ pH: 5, L: 4, X: 4-5, E: 1-2/ Alt: 1-3/ Mont: er, SmedD: vr, SmedH: r, MedH: r/ PT: 1/ w/ Note: a mainly temperate lichen found on steeply inclined faces of calcareous rocks, in seepage tracks, often with other cyanobacterial lichens, certainly much overlooked throughout Italy.

Lempholemma intricatum (Arnold) Zahlbr.

Cat. Lich. Univ., 3: 23, 1924 - *Omphalaria intricata* Arnold, Flora, 52: 254, 1869.

Syn.: *Leciophysma fennicum* Räsänen, *Lempholemma fennicum* (Räsänen) Degel., *Synalissa intricata* (Arnold) Nyl.

N - Frl (Henssen & Tretiach 1995).

Frut/ Cy.h/ S/ Sax/ pH: 3-5, L: 3-4, X: 3, E: 1-2/ Alt: 2-4/ Salp: er, Mont: er, SmedD: er/ PT: 1/ suboc, w/ Note: on steeply inclined surfaces of calcareous or basic siliceous rocks in seepage tracks, mostly in humid areas, perhaps more widespread in the Alps.

Lempholemma polyanthes (Bernh.) Malme

Sched. ad Lich. Suec. Exs.: nr. 883, 1924 - *Collema polyanthes* Bernh., J. Bot., 1: 12, 1799.

Syn.: *Collema chalazanellum* Nyl., *Collema myriococcum* (Ach.) Ach., *Lempholemma chalazanellum* (Nyl.) Zahlbr., *Lempholemma chalazanodes* (Nyl.) Zahlbr., *Lempholemma compactum* (Wallr.) Körb., *Lempholemma fasciculare* (Wulfen) Zahlbr., *Lempholemma muelleri* (Hepp) Zahlbr.?, *Lempholemma myriococcum* (Ach.) Th. Fr., *Physma chalazanellum* (Nyl.) Erichsen, *Physma compactum* (Wallr.) A. Massal., *Physma myriococcum* (Ach.) Körb., *Physma polyanthes* (Bernh.) Arnold

N - Frl (Molaro 2005, Tretiach & Molaro 2007, Brackel 2013), **Ven, TAA, Lomb** (Anzi 1860), **Piem** (TSB 34033). **S - Tosc, Umb** (Genovesi & al. 2002, Ravera & al. 2006), **Sar. S - Camp** (Nimis & Tretiach 2004), **Cal.**

Cr/ Cy.h/ S/ Terr/ pH: 4-5, L: 3-4, X: 2, E: 1/ Alt: 2-5/ Alp: er, Salp: vr, Orom: er, Mont: er, SmedD: er, SmedH: vr/ PT: 1/ Note: a cool-temperate to arctic-alpine, circumpolar lichen found on terricolous or

epilithic bryophytes, over soil or on plant debris, sometimes on walls; much overlooked or confused with *Collema s.lat.*-species, and probably more widespread.

Lepraria Ach.
Meth. Lich.: 3, 1803, *nom. cons.*

Lepraria s.lat. was a heterogeneous assemblage of sterile crustose species with leprose thalli. Although widely acknowledged to be polyphyletic, an alternative taxonomy was not proposed until the thorough revision of mainly American species by Lendemer & Hodkinson (2013), who re-delimited the genus to include c. 80 members of *Lepraria s.lat.* that do not produce the secondary compounds argopsin, pannarin and usnic acid. The genus, which is now placed in the Stereocaulaceae, is noteworthy because, despite an apparent lack of sexual reproduction, it has continued to diversify both chemically and morphologically. The Italian species were treated by Baruffo & al. (2006). Type: *L. incana* (L.) Ach. The name is conserved over *Conia* Vent. (1799) and *Pulina* Adans. (1763).

Lepraria alpina (B. de Lesd.) Tretiach & Baruffo
in Baruffo & al., *Nova Hedwigia*, 83: 390, 2006 - *Crocynia alpina* B. de Lesd., *Bull. Soc. Bot. France*, 61: 85, 1914.

Syn.: *Crocynia antarctica* Hue, *Crocynia caerulescens* Hue, *Crocynia candidissima* Hue, *Crocynia minima* Hue, *Lepraria angardiana* Øvstedal, *Lepraria angardianum* (Øvstedal) J.R. Laundon, *Lepraria cacuminum* (A. Massal.) J.R. Laundon, *Lepraria cacuminum* (A. Massal.) Loht.

N - Frl (Baruffo & al. 2006), **Ven**, **TAA**, **Lomb**, **Piem** (Baruffo & al. 2006), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1999, Piervittori & al. 2004, Baruffo & al. 2006, Isocrono & al. 2008), **Emil** (Benesperi & al. 2007). **C - Tosc** (Baruffo & al. 2006, Benesperi & al. 2007). **S - Cal** (Puntillo 1996, Baruffo & al. 2006).

Lepr/ Ch/ A.s/ Sax-Terr/ pH: 2-4, L: 3-4, X: 2-3, E: 1-2/ Alt: 4-6/ Alp: c, Salp: rc, Orom: r/ PT: 1/ Note: on epilithic mosses and soil in alpine grasslands, both on siliceous and on calcareous substrata, in sites with a long snow-lie, up to the nival belt in the Alps; rather common in the Alps, where it reaches the nival belt, rarer elsewhere in Italy.

Lepraria borealis Loht. & Tønsberg
Ann. Bot. Fenn., 31: 224, 1994.

N - Frl (Baruffo & al. 2006), **Piem** (Baruffo & al. 2006), **VA** (Baruffo & al. 2006), **Emil** (Baruffo & al. 2006). **C - Tosc** (Baruffo & al. 2006, Benesperi & al. 2007), **Sar** (Baruffo & al. 2006).

Lepr/ Ch/ A.s/ Terr-Sax/ pH: 1-2, L: 3-4, X: 2-3, E: 1/ Alt: 2-5/ Alp: rr, Salp: rr, Orom: er, Mont: vr, SmedD: er/ PT: 1/ Note: a circumboreal species growing on siliceous rocks and over epilithic mosses, with optimum in the oroboreal to Alpine belts of the Alps, but also occurring in the high Mediterranean mountains.

Lepraria caesioalba (B. de Lesd.) J.R. Laundon
Lichenologist, 24: 324, 1992 - *Crocynia caesioalba* B. de Lesd., *Bull. Soc. Bot. Fr.*, 61: 84, 1914.

Syn.: *Lepraria neglecta* auct. p.p., *Lepraria zonata* Brodo, *Lepraria caesioalba* (B. de Lesd.) M. Choisy
N - Frl (Tretiach & Hafellner 2000, Baruffo & al. 2006), **Ven** (Baruffo & al. 2006), **TAA** (Baruffo & al. 2006, Nascimbene 2008b), **Lomb** (Valcuvia & al. 2003, Nascimbene 2006), **Piem** (Baruffo & al. 2006, Isocrono & al. 2003b, 2006, Obermayer 2013), **Emil** (Baruffo & al. 2006). **C - Tosc** (Baruffo & al. 2006, Benesperi & al. 2007), **Sar** (Nöske 2000, Zedda 2000a, 2002, Baruffo & al. 2006, Cossu 2013). **S - Cal** (Baruffo & al. 2006), **Si** (Baruffo & al. 2006).

Lepr/ Ch/ A.s/ Terr-Sax/ pH: 1-3, L: 3-4, X: 2-3, E: 1/ Alt: 1-5/ Alp: vr, Salp: vr, Mont: vr, SmedD: vr, SmedH: vr, MedH: er/ PT: 1/ Note: on bryophytes, more rarely on siliceous rocks wetted by rain, especially on basal parts of siliceous boulders with a long snow-lie, certainly more widespread.

Lepraria crassissima (Hue) Lettau
Feddes Rep., 61: 125, 1958 - *Crocynia crassissima* Hue, *Bull. Soc. Bot. France*, 71: 393, 1924.

N - Frl (Baruffo & al. 2006), **Emil** (Scarpa 1993, Baruffo & al. 2006). **C - Tosc** (Baruffo & al. 2006).
Lepr/ Ch/ A.s/ Terr-Sax/ pH: 1-3, L: 3-4, X: 2-3, E: 1/ Alt: 2-4/ salp: vr, Mont: vr, SmedD: er/ PT: 1/ Note: an often misunderstood species (see Baruffo & al. 2006) occurring on vertical to underhanging surfaces of siliceous, more rarely calciferous rocks and on epilithic mosses in mountain areas. Older records, which could refer to *L. nivalis*, are not reported. A detailed discussion of this species is provided by Lendemer (2011).

Lepraria diffusa (J.R. Laundon) Kukwa
Ann. Bot. Fenn., 39: 226, 2002 - *Lepraria diffusum* J.R. Laundon, *Lichenologist*, 21: 16, 1989.

N - Frl (Baruffo & al. 2006), **Ven** (Baruffo & al. 2006, Thor & Nascimbene 2007), **TAA** (Nascimbene 2005, Baruffo & al. 2006, Bilovitz & al. 2014), **Piem** (Baruffo & al. 2006), **Emil** (Baruffo & al. 2006), **Lig** (Baruffo & al. 2006). **C - Tosc** (Baruffo & al. 2006), **Abr** (Baruffo & al. 2006), **Sar** (Zedda 2000a, 2002, 2002b). **S - Cal** (Baruffo & al. 2006), **Si**.

Lepr/ Ch/ A.s/ Sax-Terr-Epiph/ pH: 3-5, L: 3-4, X: 3, E: 1-2/ Alt: 1-4/ Salp: vr, Mont: r, SmedH: rr, MedH: r/ PT: 1/ Note: in niches and fissures of calcareous or dolomitic boulders, but also on soil, mosses and plant debris in dry grasslands; probably occurring throughout the country.

Lepraria eburnea J.R. Laundon

Lichenologist, 24: 331, 1992.

Syn.: *Lepraria frigida* J.R. Laundon

N - **Frl** (Baruffo & al. 2006), **VG** (Baruffo & al. 2006), **Ven** (Baruffo & al. 2006), **TAA** (Leuckert & al. 2002, Baruffo & al. 2006, Bilovitz & al. 2014, Nascimbene & al. 2014, Nascimbene 2014, Nascimbene & Marini 2015), **Emil** (Baruffo & al. 2006), **Lig** (Baruffo & al. 2006, Giordani & al. 2016). **C** - **Tosc** (Baruffo & al. 2006, Benesperi & al. 2007), **Marc** (Baruffo & al. 2006), **Umb** (Baruffo & al. 2006, Ravera & al. 2006, Panfili 2007), **Laz** (Baruffo & al. 2006), **Abr** (Nimis & Tretiach 1999, Baruffo & al. 2006, Corona & al. 2016), **Mol** (Nimis & Tretiach 1999, Baruffo & al. 2006, Caporale & al. 2008). **S** - **Cal** (Baruffo & al. 2006).

Lepr/ Ch/ A.s/ Epiph-Terr-Sax/ pH: 2-4, L: 2-4, X: 2-3, E: 1-2/ Alt: 1-3/ Mont: rc, SmedD: c, Pad: rc, SmedH: vr, MedD: er/ PT: 1-2/ u/ Note: on old trunks in underhangs protected from rain, but also on walls in urban areas; certainly more common throughout the country.

Lepraria elobata Tønsberg

Sommerfeltia, 14: 197, 1992.

N - **Frl** (Baruffo & al. 2006), **Ven** (Baruffo & al. 2006, Thor & Nascimbene 2007), **TAA** (Baruffo & al. 2006, Thor & Nascimbene 2007, Nascimbene & al. 2009, 2010, 2014, Nascimbene 2014, Nascimbene & Marini 2015, Nimis & al. 2015), **Piem** (Baruffo & al. 2006, Matteucci & al. 2010), **Emil** (Baruffo & al. 2006), **Lig** (Baruffo & al. 2006). **C** - **Tosc** (Baruffo & al. 2006, Benesperi & al. 2007). **S** - **Camp** (Baruffo & al. 2006).

Lepr/ Ch/ A.s/ Epiph-Terr-Sax/ pH: 1-2, L: 2-4, X: 2-3, E: 1-2/ Alt: 1-4/ Salp: rr, Mont: rc, SmedD: rr, SmedH: vr, MedD: er/ PT: 1-2/ u/ Note: a mainly montane species in Italy, requiring humid conditions; it prefers acid bark not colonised by bryophytes, especially at the base of old trunks, but it rarely occurs also on soil, lignum and epiphytic mosses.

Lepraria finkii (B. de Lesd.) R.C. Harris

Evansia, 2: 45, 1985 - *Crocynia finkii* B. de Lesd., Bull. Soc. Bot. France, 71: 334, 1924.

Syn.: *Crocynia aliciae* Hue, *Crocynia andrewii* B. de Lesd., *Crocynia lobificans* auct., *Crocynia mollissima* B. de Lesd., *Crocynia sciatropha* Hue, *Lepraria aeruginosa* auct. p.p., *Lepraria latebrarum* auct. p.p. non Ach., *Lepraria lobificans* auct. non Nyl., *Leptoloma lobificans* auct. non (Nyl.) Boistel

N - **VG** (Castello 2002, Martellos & Castello 2004, Baruffo & al. 2006), **Frl** (Baruffo & al. 2006), **Ven** (Baruffo & al. 2006, Thor & Nascimbene 2007, Nascimbene 2008, 2008c, Nascimbene & al. 2008e, 2010, 2013b, 2015, Nascimbene & Marini 2010), **TAA** (Leuckert & al. 2004, Nascimbene 2005, 2014, Baruffo & al. 2006, Lang 2009, Nascimbene & al. 2014, Bilovitz & al. 2014, Nascimbene & Marini 2015, Nimis & al. 2015), **Lomb** (Arosio & al. 2003, Baruffo & al. 2006, Valcuvia & Truzzi 2007, Gheza & al. 2015), **Piem** (Arosio & al. 1998, Piervittori 2003, Baruffo & al. 2006), **Emil** (Baruffo & al. 2006), **Lig** (Putortù & al. 1999b, Baruffo & al. 2006, Giordani & al. 2016). **C** - **Tosc** (Loppi & al. 1994, 1997b, 1997e, 1998, 1999a, 2004, Loppi & Corsini 1995, 2003, Loppi & Putortù 1995b, 2001, Loppi 1996, 1996b, Putortù & al. 1998, 1999, Baragatti 2006, Benesperi & al. 2007, Loppi & Baragatti 2011), **Umb** (Panfili 2000b, 2007, Baruffo & al. 2006, Ravera & al. 2006), **Laz** (Kümmerling & al. 1993, Ravera & al. 1999, Baruffo & al. 2006, Munzi & al. 2007), **Abr** (Olivieri & al. 1997, 1997b, Loppi & al. 1999, Baruffo & al. 2006, Brackel 2015), **Sar** (Kümmerling & al. 1993, Nöske 2000, Zedda 2000a, 2002, Zedda & al. 2001, Baruffo & al. 2006, Cossu 2013). **S** - **Camp** (Nimis & Tretiach 2004), **Bas** (Nimis & Tretiach 1999, Baruffo & al. 2006), **Cal** (Puntillo & Puntillo 2004, Baruffo & al. 2006), **Si** (Poli & al. 1997, Grillo 1998, Czeuczuga & al. 1999, Grillo & al. 2002, Brackel 2008b).

Lepr/ Ch/ A.s/ Epiph-Sax-Lign/ pH: 2-4, L: 2-4, X: 1-3, E: 1-2/ Alt: 1-4/ Salp: r, Orom: vr, Mont: rc, SmedD: c, Pad: rc, SmedH: c, MedH: rc, MedD: er/ PT: 1-3/ Note: one of the most common species of the genus in Italy, found in the lower parts of trunks, but also on rocks, lignum, soil and mosses, also occurring in rather polluted areas and on faces wetted by rain. This species was mostly called *L. lobificans*, but the type of that species proved to be identical with *L. santosii* (Lendemer 2013).

Lepraria incana (L.) Ach.

Meth. Lich.: 4, 1803 - *Byssus incana* L., Sp. Pl., 2: 1169, 1753.

Syn.: *Crocynia crassissima* Hue non auct., *Crocynia maritima* B. de Lesd., *Lepra sulphurea* (Schltdl.) Ehrh., *Lepraria aeruginosa* auct. p.p., *Lepraria crassissima* (Hue) Lettau non auct., *Lepraria glauccella* (Flörke) Ach., *Patellaria incana* (L.) Spreng.

N - **VG** (Baruffo & al. 2006), **Frl** (Baruffo & al. 2006), **Ven** (Caniglia & al. 1999, Nascimbene & Marini 2010, Nascimbene & al. 2015), **TAA** (Nascimbene & al. 2014, Nascimbene 2014, Nascimbene & Marini 2015), **Lomb** (De Vita & Valcuvia 2004, Brackel 2013), **Piem** (Morisi & Sereno 1995, Baruffo & al. 2006, Isocrono & al. 2003b, 2006, Matteucci & al. 2010, Giordani & Malaspina 2016), **Emil**, **Lig** (Brunialti & al. 1999, Putortù & al. 1999b, Brunialti & Giordani 2003, Giordani 2006, Giordani & Incerti 2008, Giordani & al. 2016). **C** - **Tosc** (Loppi & Putortù 2001, Baruffo & al. 2006, Brunialti & Frati 2010, Brackel 2015, Nascimbene & al. 2015), **Marc**, **Umb** (Panfili 2007), **Laz**, **Abr** (Loppi & al. 1999), **Sar** (Nöske 2000, Zedda 2000a, 2002, Cossu 2013). **S** - **Cal** (Incerti & Nimis 2006).

Lepr/ Ch/ A.s/ Epiph-Sax-Lign/ pH: 1-2, L: 2-4, X: 2-4, E: 1-2/ Alt: 1-4/ Salp: vr, Mont: rc, SmedD: rr, Pad: r, SmedH: rr, MedH: er/ PT: 1/ u/ Note: on acid bark of coniferous and deciduous trees, in sites protected from rain, sometimes on siliceous rocks, soil and lignum. Most Italian records need confirmation, and some recent dubious records are not reported here. According to Baruffo & al. (2006) in Italy it is most frequent in the mountains.

Lepraria isidiata (Llimona) Llimona & A. Crespo

in Wirth & al., Guía de Campo de los Liqueños, Musgos y Hepáticas: 309, 2004 - *Lepraria crassissima* var. *isidiata* Llimona in Vězda, Lich. Sel. Exs., 47: 7 (nr. 1175), 1973.

N - Emil (Nimis & al. 1996, Tretiach & al. 2009). **C - Abr** (Baruffo & al. 2006), **Sar** (Leuckert & al. 2004). **S - Camp** (Baruffo & al. 2006), **Cal** (Baruffo & al. 2006), **Si** (Baruffo & al. 2006).

Lepr/ Ch/ A.s/ Terr/ pH: 4-5, L: 2-4, X: 2-4, E: 1/ Alt: 1-2/ SmedD: rr, SmedH: rr, MedD: r/ PT: 1/
Note: on calciferous soil and on mosses in sheltered situations but in sunny and arid habitats, also on gypsum, below the montane belt.

Lepraria jackii Tønsberg

Sommerfeltia, 14: 200, 1992.

Syn.: *Lepraria toensbergiana* Slav.-Bay. & Kukwa

N - Frl (Kümmerling & Leuckert 1995, Austria, near the border, Baruffo & al. 2006), **Ven** (Baruffo & al. 2006), **TAA** (Nascimbene 2013, 2014, Nascimbene & al. 2014, Nascimbene & Marini 2015), **Piem** (Baruffo & al. 2006), **Emil** (Baruffo & al. 2006), **Lig** (Baruffo & al. 2006). **C - Tosc** (Baruffo & al. 2006, Benesperi & al. 2007), **Sar** (Zedda 2000a, 2002, Baruffo & al. 2006, Cossu 2013). **S - Si** (Kümmerling & Leuckert 1995).

Lepr/ Ch/ A.s/ Epiph-Lign-Sax/ pH: 1-3, L: 2-3, X: 2-3, E: 1/ Alt: 1-4/ Salp: er, Mont: vr, SmedD: rr, SmedH: rr, MedH: er, MedD: er/ PT: 1/ Note: on the acid to subneutral bark of conifers and other trees (the record from Sardegna is from *Quercus suber*), especially on basal parts of trunks in woodlands, but also on siliceous rocks and wood.

Lepraria leuckertiana (Zedda) L. Saag

in Saag & al., Lichenologist, 41: 41, 2009 - *Lecanora leuckertiana* Zedda, Nova Hedwigia, 71: 108, 2000.

N - TAA (Nascimbene & al. 2014, Nascimbene 2014, Nascimbene & Marini 2015). **C - Sar** (Zedda 2000b, 2002, 2002c, Zedda & al. 2001).

Lepr/ Ch/ A.s/ Epiph/ pH: 1-2, L: 3-4, X: 2, E: 1-2/ Alt: 1-2/ SmedH: er, MedH: vr/ PT: 1/ Note: on old trees in humid, but well-lit situations, with optimum in humid Mediterranean forests. The species has been reported also from eastern central Europe, but these records may refer to another lichen (see Bayerová & Kukwa 2004). According to Lendemer (*in litt.*) the species, which contains usnic acid, does not belong to *Lepraria s.str.* It is included in the Italian red list of epiphytic lichens as “Endangered” (Nascimbene & al. 2013c).

Lepraria lobificans Nyl.

Flora, 56: 196, 1873.

Syn.: *Lepraria santosii* Argüello & A. Crespo

C - Sar (Tretiach & al. 2009). **S - Camp** (Tretiach & al. 2009), **Si** (Tretiach & al. 2009).

Lepr/ Ch/ A.s/ Terr/ pH: 2-3, L: 2-4, X: 2-4, E: 1/ Alt: 1-2/ SmedH: rr, MedH: rr, MedD: r/ PT: 1/ Note: on siliceous soil and on terricolous mosses, more rarely directly over siliceous rocks, in sheltered situations but in sunny and arid habitats, with optimum in the Mediterranean belt; probably more widespread in southern Italy. The type of *L. lobificans* Nyl. proved to be identical with *L. santosii*, but the former name was widely used to designate *L. finkii* (Lendemer 2013).

Lepraria membranacea (Dicks.) Vain.

Acta Soc. Fauna Fl. Fenn., 49, 2: 265, 1921 - *Lichen membranaceus* Dicks., Fasc. Pl. Crypt. Brit., 2: 21, tab. 6, fig. 1, 1790.

Syn.: *Amphiloma lanuginosum* (Ach.) Nyl., *Crocynia lanuginosa* (Ach.) Hue, *Crocynia membranacea* (Dicks.) Zahlbr., *Leproloma lanuginosum* (Ach.) Nyl., *Leproloma membranaceum* (Dicks.) Vain., *Pannaria lanuginosa* (Ach.) Körb., *Psoroma lanuginosum* (Ach.) Müll. Arg.

N - Frl (Baruffo & al. 2006), **TAA** (Caniglia & al. 2002, Nascimbene 2005b, 2006c, 2007b), **Lomb** (Nascimbene 2006, Abramini & al. 2008), **Piem** (Baruffo & al. 2006), **VA** (Piervittori & Isocrono 1999, Baruffo & al. 2006), **Lig** (S-L43503). **C - Tosc** (Baruffo & al. 2006), **Umb** (Panfili 2000, Ravera & al. 2006), **Laz, Sar** (Nöske 2000, Zedda 2000a, 2002, Zedda & al. 2001, Baruffo & al. 2006). **S - Cal** (Puntillo 1996).

Lepr/ Ch/ A.s/ Sax-Epiph-Terr/ pH: 1-2, L: 2-3, X: 3, E: 1-2/ Alt: 1-5/ Alp: er, Salp: vr, Orom: er, Mont: r, SmedD: rr, SmedH: rc, MedH: rr, MedD: r/ PT: 1/ u/ Note: on steeply inclined to weakly underhanging surfaces of siliceous rocks, sometimes on epilithic bryophytes, much more rarely on bark, often forming monospecific stands; certainly much more widespread in Italy.

Lepraria neglecta (Nyl.) Erichsen

Flechtenfl. Nordwestdeutschl.: 394, 1957 - *Lecidea neglecta* Nyl., Not. Sällsk. Fauna Fl. Fenn. Förh., 4: 233, 1859.

Syn.: *Crocynia neglecta* (Nyl.) Hue, *Lecidella neglecta* (Nyl.) Stein

N - TAA (Kümmerling & al. 1993), **Lomb, Piem** (Morisi & Sereno 1995, Baruffo & al. 2006, Isocrono & al. 2003b, 2006), **VA** (Piervittori & Isocrono 1997), **Emil** (Baruffo & al. 2006).

Lepr/ Ch/ A.s/ Terr-Sax/ pH: 1-2, L: 3-4, X: 2-3, E: 1-2/ Alt: 3-6/ Alp: vc, Salp: c, Orom: er, Mont: vr/ PT: 1/ Note: a mainly arctic-alpine lichen found on moss cushions and stony siliceous ground, mostly in snow-beds near or above treeline, reaching the nival belt in the Alps. Earlier records from Sardinia are dubious (Baruffo & al. 2006).

Lepraria nivalis J.R. Laundon

Lichenologist, 24: 327, 1992.

Syn.: *Crocynia murorum* B. de Lesd., *Lepraria crassissima* auct. p.p. non (Hue) Lettau

N - VG (Baruffo & al. 2006), **Frl** (Baruffo & al. 2006), **TAA** (Baruffo & al. 2006, Nascimbene 2008b), **Lig** (Baruffo & al. 2006, Giordani & al. 2016), **C - Tosc** (Baruffo & al. 2006), **Umb** (Genovesi & al. 2001, Baruffo & al. 2006, Ravera & al. 2006, Panfili 2007), **Marc** (Nimis & Tretiach 1999, Baruffo & al. 2006), **Laz** (Baruffo & al. 2006), **Abr** (Nimis & Tretiach 1999, Baruffo & al. 2006, Tretiach & al. 2009), **Sar** (Zedda 2000a, 2002, 2002b, Zedda & al. 2001, Leuckert & al. 2004, Baruffo & al. 2006, Cossu 2013). **S - Camp** (Herb. Seaward 106.072, Aprile & al. 2003b, Nimis & Tretiach 2004, Baruffo & al. 2006), **Pugl** (Leuckert & al. 2004), **Cal** (Puntillo 1996, Baruffo & al. 2006), **Si** (Nimis & al. 1994, Ottonello & Salone 1994, Ottonello & al. 1994, 2011, Ottonello 1996, Ottonello & Romano 1997, Grillo & Caniglia 2004, 2005, 2006, Leuckert & al. 2004, Baruffo & al. 2006, Grillo & Cataldo 2008, 2008b, Grillo & al. 2009, Liistro & Cataldo 2011).

Lepr/ Ch/ A.s/ Sax-Terr-Epiph/ pH: 4-5, L: 1-3, X: 1-2, E: 1-2/ Alt: 1-5/ Alp: er, Salp: vr, Orom: vr, Mont: rr, SmedD: rc, SmedH: rc, MedH: rr, MedD: er/ PT: 1-2/ u/ Note: on lime-rich rocks, on mosses, but also on bark, on steeply inclined or underhanging faces protected from rain; certainly occurring throughout northern Italy. The sample from Campania, chemically analyzed by H. Kümmerling, is from Paestum (Seaward, *in litt.*).

Lepraria nylanderiana Kümmerl. & Leuckert

Bibl. Lichenol., 58: 250, 1995.

N - Piem (Baruffo & al. 2006, Favero-Longo & al. 2006b), **Emil** (Baruffo & al. 2006), **C - Tosc** (Baruffo & al. 2006), **Sar** (Leuckert & al. 1995, Nöske 2000, Zedda 2000a, 2002, 2002b, Zedda & al. 2001). **S - Cal** (Baruffo & al. 2006).

Lepr/ Ch/ A.s/ Terr-Sax-Epiph/ pH: 2-3, L: 3-4, X: 3, E: 1-2/ Alt: 1-3/ Mont: vr, SmedH: r, MedH: vr/ PT: 0-2/ Note: on base-rich siliceous rocks and soil, including brick walls in archaeological areas, but also on bark; most frequent in Tyrrhenian Italy, much overlooked and/or misunderstood, certainly more common. According to Baruffo & al. (2006); it can be considered as a good indicator of long ecological continuity, since it always occurs in old and well-preserved forests.

Lepraria rigidula (B. de Lesd.) Tønsberg

Sommerfeltia, 14: 205, 1992 - *Crocynia rigidula* B. de Lesd. *in Hue*, Bull. Soc. Bot. France, 71: 331-332, 1924.

N - VG (Baruffo & al. 2006), **Frl** (Baruffo & al. 2006), **TAA** (Baruffo & al. 2006, Nascimbene & al. 2009, 2010, 2014, Nascimbene 2014, Nascimbene & Marini 2015, Nimis & al. 2015), **Lomb** (Baruffo & al. 2006, Brackel 2013), **Piem** (Baruffo & al. 2006, Isocrono & al. 2006), **Emil** (Baruffo & al. 2006), **Lig** (Baruffo & al. 2006), **C - Tosc** (Baruffo & al. 2006, Benesperi & al. 2007, Brackel 2015), **Umb** (Baruffo & al. 2006, Panfili 2007), **Laz** (Baruffo & al. 2006), **Abr** (Nimis & Tretiach 1999), **Mol** (Baruffo & al. 2006, Caporale & al. 2008), **Sar** (Kümmerling & al. 1995, Zedda 2000a, 2002, Zedda & al. 2001, Baruffo & al. 2006), **S - Bas** (Baruffo & al. 2006, Brackel 2011), **Cal** (Baruffo & al. 2006), **Si** (Baruffo & al. 2006).

Lepr/ Ch/ A.s/ Epiph-Terr-Sax/ pH: 2-3, L: 2-4, X: 2-3, E: 1-3/ Alt: 2-5/ Alp: er, Salp: er, Mont: rr, SmedD: c, Pad: rr, SmedH: c/ PT: 1/ u/ Note: an ecologically wide-ranging species, certainly more common, also in the Alps, and to be looked for there. It seems to prefer acidic substrata and is mainly epiphytic.

Lepraria umbricola Tønsberg

Sommerfeltia, 14: 206, 1992.

C - Tosc (Baruffo & al. 2006), **Sar** (Zedda 2000a, 2002, Zedda & Sipman 2001, Baruffo & al. 2006).

Lepr/ Ch/ A.s/ Sax-Terr-Epiph/ pH: 1-2, L: 2, X: 2, E: 1/ Alt: 2-3/ Mont: vr, SmedH: vr/ PT: 1/ u/ Note: a warm-temperate species found on sheltered siliceous rocks and mosses, sometimes on basal parts of old trunks and on shaded sandy soil, certainly more widespread in Italy.

Lepraria vouauxii (Hue) R.C. Harris

in Egan, Bryologist, 90: 163, 1987 - *Crocynia vouauxii* Hue, Bull. Soc. Bot. France, 71: 392, 1924.

Syn.: *Crocynia arctica* Lyngé, *Lepraria arctica* (Lyngé) Wetmore, *Lepruloma vouauxii* (Hue) J.R. Laundon

N - VG (Baruffo & al. 2006), **Frl** (Baruffo & al. 2006), **Ven** (Baruffo & al. 2006), **TAA** (Baruffo & al. 2006, Nascimbene & al. 2007b), **Lomb** (Baruffo & al. 2006), **Piem** (Baruffo & al. 2006), **Emil** (Baruffo & al. 2006), **Lig** (Baruffo & al. 2006), **C - Tosc** (Baruffo & al. 2006), **Umb** (Baruffo & al. 2006, Ravera & al. 2006, Panfili 2007), **Abr** (Baruffo & al. 2006), **Sar** (Zedda 2000a, 2002, 2002b, Cossu 2013), **S - Pugl** (Baruffo & al. 2006), **Bas** (Baruffo & al. 2006)

Lepr/ Ch/ A.s/ Epiph-Sax/ pH: 2-4, L: 2-4, X: 2-3, E: 1-2/ Alt: 1-5/ Alp: r, Salp: rr, Orom: r, Mont: rc, SmedD: c, Pad: rc, SmedH: rc, MedH: rr, MedD: r/ PT: 1-2/ u/ Note: on isolated deciduous trees, in positions which are seldom wetted by rain, sometimes on brick walls, with a wide ecological and altitudinal range; certainly common throughout Italy.

Leprocaulon Nyl.

in Lamy, Bull. Soc. bot. Fr., 25: 352, 1878.

This genus was introduced to accommodate an unusual fruticose lichen that produces pseudopodetia. The revision of mainly American species by Lendemer & Hodkinson (2013) showed that most of the species previously placed in *Leprocaulon* are actually fruticose members of *Lepraria s.str.*, a conclusion supported by

both morphological and molecular characters. However, these authors also found that the type species of *Leprocaulon*, *L. quisquiliare*, belongs to an unrecognised, mainly Mediterranean lineage of 7 species that is distant to *Lepraria s.str.*, being characterised by the production of usnic acid, argopsin or pannarin, that do not occur in *Lepraria s.str.* The genus is currently placed in the Leprocaulaceae, together with *Halecania*. Type: *L. nanum* (Ach.) Nyl. (= *L. quisquiliare*).

Leprocaulon quisquiliare (Leers) M. Choisy

Bull. Mens. Soc. Linn. Soc. Bot. Lyon, 19: 166, 1950 - *Lichen quisquiliaris* Leers, Fl. Herborn.: 264, 1775.

Syn.: *Leprocaulon microscopicum* (Vill.) Gams, *Leprocaulon nanum* (Ach.) Nyl., *Lichen microscopicus* Vill., *Stereocaulon microscopicum* (Vill.) Frey, *Stereocaulon nanum* (Ach.) Ach., *Stereocaulon quisquiliare* (Leers) Hoffm.

N - VG, Ven, TAA (Nascimbene & al. 2007b), **Lomb** (Zocchi & al. 1997, De Vita & Valcuvia 2004, Furlanetto 2010), **Piem** (Castino 2004, Isocrono & al. 2004, 2007), **VA** (Piervittori & Isocrono 1999, Valcuvia & al. 2000b), **Lig** (Castello & al. 1994, Giordani & al. 2001, 2002, Brunialti & Giordani 2003, Giordani 2006). **C - Tosc** (Loppi & Corsini 1995, 2003, Loppi & al. 1995, 1996, 1996c, 1997e, 2002, 2004, 2004c, Loppi & Putorti 1995b, Pišút 1997, Putorti & al. 1999, Benesperi 2000a, Senese & Critelli 2000, Loppi & Frati 2006, Paoli & al. 2012, Brackel 2015), **Umb** (Panfili 2000b, 2007, Ravera & al. 2006), **Laz** (Massari & Ravera 2002, Munzi & al. 2007, Genovesi & al. 2011, Zucconi & al. 2013, Brackel 2015, Scatigno & Ravera 2015), **Sar** (Zedda 1995, 2002, 2002b, Nöske 2000, Zedda & Sipman 2001, Rizzi & al. 2011). **S - Camp** (Ricciardi & al. 2000, Aprile & al. 2002, Nimis & Tretiach 2004, Garofalo & al. 2010, Catalano & al. 2016), **Pugl, Bas** (Potenza 2006, Potenza & Fascetti 2012), **Cal** (Puntillo 1996, Puntillo & Puntillo 2004, Incerti & Nimis 2006), **Si** (Poli & al. 1995, Nimis & al. 1996b, Ottonello & Romano 1997, Grillo 1998, Grillo & al. 2001, Grillo & Caniglia 2004, Brackel 2008b, Grillo & Cataldo 2008, 2008b, Ottonello & al. 2011).

Frut/ Ch/ A.i/ Terr-Sax-Epiph/ pH: 2-3, L: 4-5, X: 3, E: 1-3/ Alt: 1-3/ Mont: vr, SmedD: vr, SmedH: vc, MedH: rc/ PT: 1-2/ suboc/ Note: a mainly mild-temperate to Mediterranean lichen found on basic siliceous rocks covered by a thin film of soil; very common on brick walls in archaeological areas of Tyrrhenian Italy, where it is also found on bark (e.g. of *Olea*), extremely rare along the eastern side of the Peninsula, exceptionally reaching the montane belt in the western Alps. For nomenclatural matters see Lendemmer & Hodkinson (2013).

L e p r o p l a c a (Nyl.) Nyl.

in Hue, Rev. Bot. Bull. Mens., 6: 148, 1887 - *Lecanora* subgen. *Leproplaca* Nyl., Flora, 66: 107, 1883.

Leproplaca was initially erected for the single, leprose species *L. xantholyta*, and was later extended to accommodate also *L. chrysodeta*. In the analysis by Arup & al. (2013), the genus includes 5 leprose, crustose or lobate species with anthraquinones, which never produce apothecia. The genus is related to *Variospora*, *Caloplaca s.str.* and *Seiropora* in the Teloschistaceae, but the exact relationship among these genera is not settled yet. Type: *L. xantholyta* (Nyl.) Hue

Leproplaca chrysodeta (Vain.) Ahti

J.R. Laundon ex Ahti in Ahti & al., Graphis Scripta, 27: 39, 2015 - *Placodium chrysodetum* Vain., Meddeland. Soc. Fauna Fl. Fenn., 47: 18, 1921.

Syn.: *Calloplisma chrysodetum* (Vain.) Räsänen, *Caloplaca chrysodeta* (Vain.) Domb. comb. inval.

N - VG (Tretiach 1997), **Frl, Ven** (Caniglia & al. 1999, Nascimbene & Caniglia 2000, Nascimbene & Marini 2007, Nascimbene 2008c), **Piem** (TSB 35311), **Emil** (Nimis & al. 1996), **Lig** (Brunialti & al. 1999, Valcuvia & al. 2000). **C - Tosc** (Tretiach & al. 2008), **Marc** (Nimis & Tretiach 1999), **Umb** (Genovesi & Ravera 2001, Ravera & al. 2006), **Laz** (Nimis & Tretiach 2004), **Mol** (Ravera & Genovesi 2010, Ravera & al. 2009, Genovesi & Ravera 2014), **Sar** (ASU-511124). **S - Camp** (Nimis & Tretiach 2004, Garofalo & al. 2010), **Pugl** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Ottonello & Salone 1994).

Lepr/ Ch/ A.s/ Sax/ pH: 4-5, L: 2-3, X: 2, E: 2-4/ Alt: 1-4/ Salp: r, Mont: r, SmedD: r, SmedH: rr, MedH: r/ PT: 1/ u/ Note: a temperate to humid subtropical species found on shaded, steeply inclined or underhanging surfaces of calciferous rocks, sometimes also overgrowing epilithic mosses or even occurring on the undersides of inclined old trunks of trees with base-rich bark; certainly ranging throughout the country, below the subalpine belt.

Leproplaca cirrochroa (Ach.) Arup, Frödén & Søchting

in Arup & al., Nord. J. Bot., 31: 72, 2013 - *Lecanora cirrochroa* Ach., Syn. Meth. Lich.: 181, 1814.

Syn.: *Amphiloma cirrochroum* (Ach.) Körb., *Caloplaca cirrochroa* (Ach.) Th. Fr., *Gasparrinia cirrochroa* (Ach.) Stein, *Lecanora murorum* var. *cirrochroa* (Ach.) Rabenh., *Physcia calloplisma* var. *cirrochroa* (Ach.) A. Massal., *Physcia cirrochroa* (Ach.) Arnold, *Placodium cirrochroum* (Ach.) Rabenh.

N - VG (Navarro-Rosinés & Roux 1994), **Frl** (Brackel 2013), **Ven** (Caniglia & al. 1999, Nascimbene & Caniglia 2003c, Nascimbene 2005c, 2008c, Nascimbene & Marini 2007), **TAA** (Nascimbene 2005b, 2008b, Nascimbene & al. 2006), **Lomb, Piem** (Isocrono & al. 2004, Morisi 2005), **VA** (Piervittori & Isocrono 1999), **Emil, Lig, C - Tosc, Marc** (Nimis & Tretiach 1999), **Umb** (Nimis & Tretiach 1999, Ravera & al. 2006), **Laz, Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **Sar, S - Camp** (Aprile & al. 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010), **Pugl, Bas** (Potenza 2006, Potenza & Fascetti 2012), **Cal** (Puntillo 2011), **Si** (Grillo 1998, Grillo & Caniglia 2004).

Cr.pl/ Ch/ A.s/ Sax/ pH: 4-5, L: 2-3, X: 3-4, E: 2-3/ Alt: 1-5/ Alp: vr, Salp: rr, Orom: r, Mont: rc, SmedD: r, Pad: er, SmedH: rr, MedH: vr/ PT: 1-2/ u/ Note: a mainly temperate, probably holarctic species

found on hard limestone and dolomite in rather shaded and sheltered situations, often on faces seldom wetted by rain. Some records from the Alps could refer to the superficially similar *L. proteus*.

Leproplaca obliterans (Nyl.) Arup, Frödén & Søchting

in Arup & al., Nord. J. Bot., 31: 72, 2013 - *Placodium obliterans* Nyl., Flora, 57: 7, 1874.

Syn.: *Caloplaca obliterans* (Nyl.) Blomb. & Forssell, *Gasparrinia obliterans* (Nyl.) Dalla Torre & Sarnth., *Lecanora obliterans* (Nyl.) Nyl., *Physcia obliterans* (Nyl.) Arnold, *Placodium cirrochroum* var. *obliterans* (Nyl.) A.L. Sm.

N - Ven, TAA, Lomb, Piem (TSB 32645), **VA** (Piervittori & Isocrono 1999, Matteucci & Vanacore Falco 2015), **Lig** (TSB 33430), **C - Tosc** (Tretiach & al. 2008), **S - Camp** (Jatta 1909-1911), **Si** (Jatta 1909-1911).

Cr/ Ch/ A.s/ Sax/ pH: 3-4, L: 3, X: 2-3, E: 2-3/ Alt: 3-5/ Alp: er, Salp: r, Mont: rc/ PT: 1/ u/ Note: a cool-temperate to boreal-montane, circumpolar species found in underhangs of basic siliceous rocks, especially calcareous schists, mostly in upland areas; most frequent in the Alps, but also present in the Mediterranean mountains.

Leproplaca proteus (Poelt) Arup, Frödén & Søchting

in Arup & al., Nord. J. Bot., 31: 73, 2013 - *Caloplaca proteus* Poelt, Mitt. bot. Staatss. München: 329, 1953.

Syn.: *Caloplaca cirrochroa* subsp. *fulva* (Körb.) Clauzade & Cl. Roux, *Placodium pusillum* var. *miniatum sensu* Anzi

N - Ven (Nimis 1994, Nascimbene & Caniglia 2003c, Nascimbene 2008c), **TAA** (Nascimbene 2008b), **Lomb, Piem** (Isocrono & al. 2004), **VA** (vidi!), **C - Sar**.

Cr.pl/ Ch/ A.s/ Sax/ pH: 4-5, L: 3-4, X: 4, E: 2-3/ Alt: 3-5/ Alp: rr, Salp: r, Orom: vr, Mont: er/ PT: 1/ Note: on steeply inclined to underhanging surfaces of compact, more or less calcareous rocks in rather sheltered situations, restricted to warm-dry sites in the mountains. See also note on *L. cirrochroa*.

Leproplaca xantholyta (Nyl.) Hue

Rev. Bot., 6: 148, 1888 - *Lecanora xantholyta* Nyl., Flora, 62: 361, 1879.

Syn.: *Caloplaca xantholyta* (Nyl.) Jatta, *Lepraria xantholyta* (Nyl.) Lettau, *Placodium xantholytum* (Nyl.) Nyl.

N - VG, Frl, Ven (Nascimbene 2005c, 2008c), **TAA** (Nascimbene & Caniglia 2000, Nascimbene 2005b, 2008b), **Lomb, Piem** (Morisi 2005), **Emil** (Benesperi 2009), **Lig. C - Tosc, Marc** (Nimis & Tretiach 1999), **Umb** (Panfili 2000, 2007, Ravera & al. 2006), **Laz** (Zucconi & al. 2012), **Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008, Genovesi & Ravera 2014), **Sar** (TSB 9665), **S - Camp** (Garofalo & al. 1999, 2010, Aprile & al. 2003b, Nimis & Tretiach 2004), **Pugl, Bas** (Bartoli & Puntillo 1998, Caneva & al. 2006), **Cal** (Puntillo 1996), **Si** (Grillo 1998, Grillo & al. 2001, Grillo & Caniglia 2004).

Lepr/ Ch/ A.s/ Sax/ pH: 4-5, L: 2-3, X: 1-2, E: 1-3/ Alt: 1-3/ Mont: r, SmedD: rc, Pad: er, SmedH: c, MedH: rr, MedD: er/ PT: 1/ u/ Note: a mild-temperate lichen of steeply inclined to underhanging surfaces of limestone and other calcareous rocks in humid, often shaded situations, below the subalpine belt.

Leptochidium M. Choisy
Bull. Mens. Soc. Linn. Lyon, 21: 165, 1952.

This genus of 2 species, superficially similar to *Leptogium s.lat.* but without a regular upper cortex, has totally different apothecia and spores. Wedin & al. (2007) showed that, together with *Massalongia* and *Polychidium*, it forms a well-supported monophyletic group which is characterised by molecular and morphological data. The three genera, which have a similar hemiangiocarpic ascoma ontogeny where only a few “cover cells” are produced, similarly built apothecia, and similar asci with an amyloid apical cap, are now placed in the Massalongiaceae (Wedin & al. 2007). Type: *L. albociliatum* (Desm.) M. Choisy

Leptochidium albociliatum (Desm.) M. Choisy

Bull. Mens. Soc. Linn. Lyon, 21: 165, 1952 - *Leptogium albociliatum* Desm., Ann. Sci. Nat. Bot., ser. 4: 132, 1855.

Syn.: *Collema albociliatum* (Desm.) Nyl., *Polychidium albociliatum* (Desm.) Zahlbr., *Polychidium cetrarioides* Anzi, *Polychidium gennarii* Bagl., *Pseudoleptogium gennarii* (Bagl.) Jatta, *Pseudoleptogium gennarii* var. *aetnicola* Caruso, *Pseudoleptogium albociliatum* (Desm.) Jatta

N - TAA, Lomb (Valcuvia & al. 2003), **Piem. C - Sar. S - Camp** (Garofalo & al. 2010), **Bas** (Potenza & Fascetti 2005, 2012, Potenza 2006), **Cal** (Puntillo 1996), **Si** (Czeczuga & al. 1994, Grillo 1996, Grillo & al. 1996, Grillo 1998, Grillo & Caniglia 2004, Iacolino & Ottonello 2006).

Fol.n/ Cy.h/ S/ Terr/ pH: 3, L: 4-5, X: 3, E: 1/ Alt: 2-5/ Alp: er, Salp: vr, Orom: vr, Mont: er, SmedH: vr/ PT: 1/ subc/ Note: a cool-temperate to arctic-alpine lichen found amongst bryophytes on rocks or on soil in open shrublands and grasslands on basic siliceous substrata.

Leptogium (Ach.) Gray s.str.
Nat. Arr. Brit. Pl., 1: 400, 1821.

The molecular revision of the Collemataceae genera *Collema* and *Leptogium* by Otálora & al. (2014) has led to their re-circumscription, with six old generic names resurrected, among which *Scytinium* for the small

Leptogium species, and *Pseudoleptogium* for *L. diffractum*. With c. 70 species, *Leptogium s.str.* is now the largest genus within the Collemales, including large foliose, eucorticate, mainly epiphytic species with a wide distribution, but also species restricted to tropical regions where the diversity of the genus is greater. It differs from the other eucorticate genus (*Scytinium*) in lobe and thallus size, habitat and distribution. The genus *Epiphloea*, formerly included into the Heppiaceae, proved to belong to the Collemales and was placed into *Leptogium s.str.* by Schultz & al. (2015), in spite of the crustose thallus and the different ecology. *Leptogium*-species are mainly corticolous (rarely saxicolous) and mostly occur in the wet tropics and in humid temperate regions, while *Scytinium* species are bryophilous or saxicolous/terricolous (rarely corticolous) and mainly occur in temperate regions. Type (prop.): *L. azureum* (Sw.) Mont.

***Leptogium brebissonii* Mont.**

in Webb & Berthelot, Hist. Nat. Iles Canar., 3, 2: 130, 1840.

Syn.: *Leptogium chloromelum* auct. ital. p.p. non (Ach.) Nyl., *Leptogium ruginosum* (Dufour ex Schaer) Nyl., *Synechoblastus ruginosus* (Dufour) Hepp

N - Lig, C - Tosc (Putorti & Loppi 1999b), **Umb** (Ravera 2000, Ravera & al. 2006), **Laz** (Ravera 2001, Massari & Ravera 2002, Ravera & Genovesi 2008), **Abr** (Recchia & Villa 1996, Caporale & al. 2016), **Mol** (Ravera & Genovesi 2012, Genovesi & Ravera 2014, Paoli & al. 2015), **Sar** (Zedda 2002), **S - Camp** (Nimis & Tretiach 2004, Garofalo & al. 2010, Ravera & Brunialti 2013), **Bas** (Bartoli & Puntillo 1996, 1998, Potenza 2006), **Cal** (Puntillo 1996, Puntillo & Puntillo 2004), **Si**.

Fol.b/ Cy.h/ A.i/ Epiph/ pH: 2-3, L: 3, X: 2, E: 1-2/ Alt: 1-2/ SmedD: er, SmedH: vr, MedH: r/ PT: 1/ suboc/ Note: a mild-temperate to humid subtropical, typically western-Tyrrhenian species in Italy, most frequent in open, humid woodlands, especially in old coastal plantations of *Olea*.

***Leptogium burnetiae* C.W. Dodge**

Beih. Nova Hedwigia, 12: 120, 1964.

Syn.: *Leptogium menziesii* f. *fuliginosum* Müll. Arg., *Leptogium menziesii* var. *coralloideum* Jatta

N - Lomb, Lig (Brunialti & al. 1999), **C - Tosc** (Benesperi & al. 2007), **Laz** (Ravera 2008).

Fol.b/ Cy.h/ A.s/ Epiph/ pH: 3, L: 4, X: 2, E: 2-3/ Alt: 2-3/ Mont: r, SmedD: er, SmedH: er/ PT: 1/ suboc/ Note: a mild-temperate species found on the often mossy bark of isolated trees, especially *Fraxinus*. A revision of herbarium material is much needed: several Italian records of *L. saturninum* could refer to this species.

***Leptogium byssinum* (Hoffm.) Nyl.**

Zwackh ex Nyl., Act. Soc. linn. Bordeaux, 21: 270, 1856 - *Collema byssinum* Hoffm., Deutschl. Fl., 2: 105, 1796.

Syn.: *Collema cheileum* var. *byssinum* (Hoffm.) Körb., *Leptogium amphineum* Ach. ex Nyl., *Epiphloea byssina* (Hoffm.) Henssen & P.M. Jørg., *Polychidium byssinum* (Hoffm.) Trevis.

N - TAA.

Cr/ Cy.h/ S/ Terr/ pH: 3-4, L: 2, X: 3-4, E: 1-2/ Alt: 2-4/ Salp: vr, Mont: vr, SmedD: vr/ PF: 1/ p/ Note: an inconspicuous, perhaps overlooked, ephemeral lichen of calciferous-clayey soil.

***Leptogium cochleatum* (Dicks.) P.M. Jørg. & P. James**

Lichenologist, 15: 113, 1983 - *Lichen cochleatus* Dicks., Fasc. Crypt. Brit., 1: 13, 1785.

Syn.: *Leptogium azureum* auct. p.p.

C - Laz, S - Cal (Puntillo 1996), **Si** (Grillo 1998, Grillo & Caniglia 2004, Ottonello & al. 2011).

Fol.b/ Cy.h/ S/ Epiph/ pH: 2-3, L: 3, X: 2, E: 1-2/ Alt: 1-3/ Mont: er, SmedD: er, SmedH: vr, MedH: er/ PT: 0/ suboc/ Note: a mild-temperate to Mediterranean species found on mossy trees and rocks in ancient, humid woodlands of Tyrrhenian Italy. It is included in the Italian red list of epiphytic lichens as "Vulnerable" (Nascimbene & al. 2013c).

***Leptogium coralloideum* (Meyen & Flot.) Vain.**

Suom. Tied. Toim., ser. A, 6, 7: 110, 1915 - *Leptogium diaphanum* var. *coralloideum* Meyen & Flot., Nova Acta Acad. Caesar. Leop. Carol., 19 (suppl.): 226, 1843.

Syn.: *Leptogium corrugatoum* Couderc

N - Lig (Gyelnik Lichenoth. Parva 25: Jørgensen 1994), **C - Tosc** (Jørgensen 1994), **Abr** (Jørgensen 1994, Caporale & al. 2016), **S - Bas** (Jørgensen 1994).

Fol.b/ Cy.h/ A.i/ Epiph/ pH: 2-3, L: 3, X: 2, E: 1-2/ Alt: 1-2/ SmedD: er, SmedH: vr, MedH: r/ PT: 1/ suboc/ Note: a Mediterranean-Atlantic species found on bark of broad-leaved trees, mostly Tyrrhenian in Italy.

***Leptogium corticola* (Taylor) Tuck.**

in Lea, Cat. Pl. Cincinnati: 47, 1849 - *Collema corticola* Taylor, London J. Bot., 5: 195, 1847.

Syn.: *Leptogium cimiciodorum* A. Massal.

N - VG, Ven (Lazzarin 2000b, Nascimbene & Marini 2010), **Lomb, Piem, Emil** (Jatta 1909-1911), **C - Tosc, Laz** (Munzi & al. 2007), **Abr** (Recchia & Villa 1996), **S - Camp** (Jatta 1909-1911), **Cal** (Puntillo 1996), **Si** (Ottonello & al. 2011).

Fol.b/ Cy.h/ S/ Epiph/ pH: 2-3, L: 3, X: 1-2, E: 1/ Alt: 1-3/ Mont: er, SmedD: er, SmedH: er, MedH: er/ PT: 0/ suboc/ Note: a mild-temperate to humid subtropical lichen found in ancient, humid forests. Most of the records are old: presently the species is extinct in large parts of the country, especially in northern Italy.

Leptogium cyanescens (Ach.) Körb.

Syst. Lich. Germ.: 420, 1855 - *Collema tremelloides* f. *cyanescens* Ach., Syn. Meth. Lich.: 326, 1814.

Syn.: *Leptogium caesium* (Ach.) Vain.

N - **VG** (TSB 10787), **Frl, Ven** (Nascimbene & al. 2005b, 2006c, 2007, Nascimbene & Marini 2010), **TAA** (Nascimbene & al. 2006e, 2007b), **Lomb, Piem** (Isocrono & al. 2004, Matteucci & al. 2013), **VA** (Piervittori & Isocrono 1999, Piervittori & al. 2001), **Emil, Lig** (Brunialti & al. 1999). C - **Tosc, Marc, Laz** (Ravera 2001, Massari & Ravera 2002), **Abr** (Ravera 2002b, Corona & al. 2016), **Mol** (Paoli & al. 2015), **Sar** (Zedda 2002). S - **Camp** (Ricciardi & al. 2000, Nimis & Tretiach 2004, Garofalo & al. 2010, Catalano & al. 2010, 2016), **Pugl, Cal** (Puntillo 1995, 1996), **Si** (Ottoneo & Romano 1997, Grillo & al. 2002, Grillo & Caniglia 2004, Caniglia & al. 2005, Caniglia & Grillo 2006b, Ottoneo & Puntillo 2009, Ottoneo & al. 2011).

Fol.b/ Cy.h/ A.i/ Epiph/ pH: 3, L: 2-3, X: 1-2, E: 1/ Alt: 1-3/ Mont: er, SmedD: er, SmedH: vr, MedH: er/ PT: 0/ suboc/ Note: a mild-temperate to humid subtropical lichen found in humid, old, open forests, on the trunks of old trees, occasionally on rocks and epilithic mosses. Most of the records are old; a recent record from Valle d'Aosta, a "continental" region, by Piervittori & Isocrono (1999) being dubious, is not accepted here. The species is included in the Italian red list of epiphytic lichens as "Near-threatened" (Nascimbene & al. 2013c).

Leptogium furfuraceum (Harm.) Sierk

Bryologist, 67: 266, 1964 - *Leptogium hildenbrandii* f. *furfuraceum* Harm., Lich. Fr., 1: 118, 1905.

C - **Laz** (Ravera 2008). S - **Cal** (Puntillo 1996, Puntillo & Puntillo 2004).

Fol.b/ Cy.h/ A.i/ Epiph/ pH: 2-3, L: 4, X: 2, E: 1-2/ Alt: 1-3/ Mont: er, SmedH: er, MedH: er/ PT: 1/ suboc/ Note: a mild-temperate to humid subtropical species of open woodlands in warm-humid areas, probably more widespread in, and restricted to Tyrrhenian Italy. It is included in the Italian red list of epiphytic lichens as "Endangered" (Nascimbene & al. 2013c).

Leptogium hildenbrandii (Garov.) Nyl.

Act. Soc. Linn. Bordeaux, 21: 272, 1856 - *Collema hildenbrandii* Garov., Lich. Prov. Comen., 1: 3, 1837.

Syn.: *Leptogium saturninum* var. *complicatum* Anzi

N - **Frl, Ven** (Caniglia & al. 1999), **TAA** (Nascimbene & al. 2007b), **Lomb** (Rivellini 1994, Tretiach 1996, Arosio & al. 2003, Dalle Vedove & al. 2004, Abramini & al. 2008), **Piem** (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999), **Emil, C - Marc, Umb** (Genovesi & al. 2002, Ravera & al. 2006, 2006b), **Abr** (Olivieri & Pacioni 1996, Olivieri & al. 1997, 1997b, Loppi & al. 1999, Brackel 2015). S - **Bas, Cal** (Puntillo 1996).

Fol.b/ Cy.h/ S/ Epiph/ pH: 2-3, L: 3-4, X: 2-3, E: 1-3/ Alt: 2/ SmedD: vr, SmedH: er/ PT: 1-2/ suboc/ Note: on isolated trees with base-rich bark, especially *Juglans*, *Fraxinus* and *Populus* in humid valleys with a rather continental climate. It is included in the Italian red list of epiphytic lichens as "Near-threatened" (Nascimbene & al. 2013c).

Leptogium saturninum (Dicks.) Nyl.

Act. Soc. Linn. Bordeaux, 21: 272, 1856 - *Lichen saturninus* Dicks., Fasc. Pl. Crypt. Brit., 2: 21, 1790.

Syn.: *Collema myochroum* (Ehrh.) Rabenh., *Collema saturninum* (Dicks.) DC., *Leptogium myochroum* (Ehrh.) Nyl., *Mallotium saturninum* (Dicks.) Gray, *Mallotium tomentosum* (Hoffm.) Körb.

N - **Frl, Ven** (Nascimbene & Caniglia 2003c, Nascimbene 22011), **TAA** (Nascimbene & Caniglia 2000b, Nascimbene & al. 2005, 2006, 2007b, 2014, Thor & Nascimbene 2007, Obermayer 2011b, Nascimbene 2014, Nimis & al. 2015), **Lomb, Piem** (Isocrono & al. 2004), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999), **Emil, Lig** (TSB 33516b). C - **Tosc** (Tretiach & Nimis 1994, Benesperi & al. 2007, Benesperi 2011, Brackel 2015), **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera 1998, Ravera & al. 2006, Brackel 2015), **Laz** (Ravera 2001), **Abr** (Olivieri & Pacioni 1996, Olivieri & al. 1997, 1997b, Loppi & al. 1999, Nimis & Tretiach 1999, Brackel 2015, Corona & al. 2016), **Mol** (Caporale & al. 2008), **Sar, S - Camp** (Ravera & Brunialti 2013), **Pugl, Bas** (Potenza 2006, Potenza & Fascetti 2010, 2012), **Cal** (Puntillo 1995, 1996, Incerti & Nimis 2006), **Si** (Brackel 2008b).

Fol.b/ Cy.h/ A.i/ Epiph/ pH: 2-3, L: 4, X: 2-3, E: 2-3/ Alt: 2-4/ Salp: er, Mont: r, SmedD: er, SmedH: vr/ PT: 1-2/ suboc/ Note: a cool-temperate to boreal-montane, circumpolar lichen found on bark, rarely on mossy rocks, only locally common, especially in upland areas. The recent record from Tuscany by Pasquinelli & al. (2009), judging from the picture, is most probably wrong and is not accepted here. See also note on *L. burnetiae*.

Leptogium terrenum Nyl.

Bull. Soc. Linn. Normandie, 2, 6, 1872.

Syn.: *Amphidium terrenum* (Nyl.) Nyl., *Epiphloea terrena* (Nyl.) Trevis., *Leptogium crozalsianum* Harm.

N - **Lig** (Watson 2014).

Cr/ Cy.h/ S/ Terr/ pH: 2-3, L: 3-4, X: 3-4, E: 1-2/ Alt: 1/ MedH: vr/ PT: 1/ Note: on bare siliceous soil in Mediterranean grasslands and garrigues; probably much overlooked in Italy, but certainly not common, being known from a single station in Liguria.

Letharia (Th. Fr.) Zahlbr.

Hedwigia, 31: 34, 1892, *nom. cons.* - *Evernia* sect. *Letharia* Th. Fr., Lichenogr. Scand., 2: 433, 1874.

This genus of the Parmeliaceae was earlier thought to comprise only a “species pair”: *L. vulpina* and *L. columbiana*, the former with abundant soredia, the latter with abundant ascomata. A molecular study found that the genus is composed of at least six such phylogenetic species, two that produce soredia, and four with ascomata. All 6 *Letharia* species occur in western North America, *L. vulpina* being the only species that has been found in Europe and North Africa, which, according Högberg & al. (2002), suggests that *L. vulpina* originated in western North America and migrated to Europe. Type: *L. vulpina* (L.) Hue

Letharia vulpina (L.) Hue

Nouv. Arch. Mus., sér. 4, 1: 57, 1899 - *Lichen vulpinus* L., Sp. Pl., 2: 1155, 1753.

Syn.: *Chlorea vulpina* (L.) Nyl., *Evernia vulpina* (L.) Ach., *Parmelia vulpina* (L.) Ach.

N - Frl (Tretiach 2015), **Ven** (Tretiach 1993, Nascimbene & Caniglia 2000b, 2002c, 2003c, Nascimbene & al. 2006e, 2008d), **TAA** (Tretiach 1993, Nascimbene & Caniglia 2000b, 2002c, Kroken & Taylor 2001, Caniglia & al. 2002, Högberg & al. 2002, De Marco & al. 2003, Nascimbene & al. 2005, 2006, 2006e, 2007b, 2008c, 2008d, 2009, 2010, 2014, 2014c, Nascimbene 2006b, 2006c, 2008b, 2013, 2014, Thor & Nascimbene 2007, Lang 2009, Brackel 2013, Nascimbene & Marini 2015, Nimis & al. 2015), **Lomb** (Tretiach 1993, Rivellini 1994, Alessio & al. 1995, Serio & al. 2001, Dalle Vedove & al. 2004, Nascimbene & al. 2006e), **Piem** (Tretiach 1993, Caniglia & al. 1992, Morisi & Sereno 1995, Triebel 1997, Isocrono & al. 2003, Morisi 2005, Isocrono & Piervittori 2008), **VA** (Tretiach 1993, Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Revel & al. 2001, Bergamaschi & al. 2004, Matteucci & al. 2008, 2008c, Loppi 2014), **Emil**, **Lig**, **C - Tosc** (Benespero & al. 2007). **S - Cal** (Puntillo 1996).

Frut/ Ch/ A.s/ Epiph/ pH: 1-2, L: 4-5, X: 3-4, E: 1/ Alt: 4/ Salp: rc/ PT: 1/ Note: a circumboreal-montane lichen growing on the bark of coniferous trees, mostly on *Larix* and *Pinus cembra*, more rarely on lignum, near treeline; common and locally abundant only in parts of the Alps with a continental climate, but exceptionally occurring also in the mountains of Calabria. See also comment on the genus.

Lethariella (Motyka) Krog

Norw. J. Bot., 23, 2: 88, 1976 - *Usnea* subgen. *Lethariella* Motyka, Lich. Gen. *Usnea* Monogr., 1: 39, 1936.

Species of this genus of the Parmeliaceae were formerly included within *Usnea* because of the more or less solid central axis of longitudinally arranged hyphae. In contrast to *Usnea*, which produces usnic acid, the species of *Lethariella* always contain atranorin. According to Obermayer (1997), both chemical and morphological differences might support the separation of subgenus *Lethariella* from the subgenera *Chlorea* and *Nipponica*, thus making *Lethariella s.str.*, which includes the only species occurring in Italy, a monotypic genus. Type: *L. intricata* (Moris) Krog

Lethariella intricata (Moris) Krog

Norw. J. Bot., 23: 94, 1976 - *Stereocaulon intricatum* Moris, El. Stir. Sard., 3: 22, 1827.

Syn.: *Chlorea soleirolii* var. *arborea* Jatta, *Letharia soleirolii* (Schaer.) Hue, *Neuropogon arboricola* (Jatta) Jatta, *Neuropogon soleirolii* (Schaer.) Jatta, *Usnea arboricola* Jatta, *Usnea intricata* (Moris) Th. Fr., *Usnea soleirolii* (Schaer.) Jatta

C - Tosc (Obermayer 1997, Ravera & al. 2010b), **Laz** (Ravera 2006), **Mol** (Ravera & al. 2010b), **Sar** (Obermayer 1997, Nöske 2000, Loi & al. 2000, Zedda & Sipman 2001, Zedda 2002, Ravera & al. 2010b), **S - Camp** (Ravera & al. 2010b, Ravera & Brunialti 2013), **Pugl** (Thüs & Licht 2006), **Bas** (Obermayer 1997, Potenza 2006, Puntillo & al. 2009, Potenza & Fascetti 2012, Potenza & al. 2013), **Cal** (Puntillo 1996, Obermayer 1997, Potenza & al. 2013), **Si** (Merlo 2004, Brackel 2008b).

Frut/ Ch/ A.s/ Epiph-Sax/ pH: 1-2, L: 4-5, X: 3-4, E: 1-2/ Alt: 1-3/ Mont: vr, MedH: er/ PT: 1/ suboc/ Note: this is probably an old, relict Mediterranean species found on siliceous rocks and acid bark (e.g. of old *Pinus leucodermis* near treeline in the southern Apennines). It is included in the Italian red list of epiphytic lichens as “Near-threatened” (Nascimbene & al. 2013c).

Leucodermia Kalb

in Mongkolsuk & al., Phytotaxa, 235, 1: 36, 2015.

This genus, which at the moment includes 10 species, was recently segregated from *Heterodermia* to include the species with foliose to subfruticose, linear-elongate, ribbon-like, dichotomously branched and loosely attached lobes without a lower cortex, and *Polyblastidium*-type ascospores (with sporoblastidia). For further details see Mongkolsuk & al. (2015). See also comment on the genus *Heterodermia*. Type: *L. leucomelos* (L.) Kalb

Leucodermia leucomelos (L.) Kalb

in Mongkolsuk & al., Phytotaxa, 235, 1: 35, 2015 - *Lichen leucomelos* L., Sp. Pl., 2 ed.: 1613, 1763.

Syn.: *Anaptychia leucomelos* (L.) A. Massal., *Anaptychia leucomelaena* auct., *Heterodermia leucomelos* (L.) Poelt, *Physcia leucomelos* (L.) Michx.

C - Tosc, **Sar** (HAL-419). **S - Si** (Nimis & al. 1994, Ottonello & Romano 1997, Ottonello & Puntillo 2009, Ottonello & al. 2011).

Fol.n/ Ch/ A.s/ Epiph/ pH: 2-3, L: 4, X: 1, E: 1-2/ Alt: 1/ MedH: er/ PT: 0/ oc/ Note: a humid subtropical to mild-temperate species found on bark and over epiphytic and epilithic bryophytes, sometimes on siliceous rocks in very humid areas with a mild climate, generally near the coast. The sample from Sardinia, identified by J. Poelt, was collected by B. Feige at M. Ferru. An earlier record from Trentino-Alto Adige (see Nimis 1993: 316), being very dubious, is not accepted here. The species is included in the Italian red list of epiphytic lichens as “Critically Endangered” (Nascimbene & al. 2013c). The old epithets *leucomela* and *leucomelaenos* are misspellings.

Lichenomphalia Redhead, Lutzoni, Moncalvo & Vilgalys
Mycotaxon, 83: 38, 2002.

This basidiomycete genus with omphalinoid fruiting bodies contains 8 lichenised taxa that form symbioses with the unicellular green algal photobiont *Coccomyxa*. The species are generally restricted to arctic-alpine environments, with the notable exceptions of the Mediterranean *L. meridionalis* and of *L. umbellifera*, which is also found in boreal and northern temperate rain forests and is considered to be the most broadly distributed and ecologically most wide-ranging species in the genus. Type: *L. hudsoniana* (H.S. Jenn.) Redhead & al.

Lichenomphalia alpina (Britzelm.) Redhead, Lutzoni, Moncalvo & Vilgalys

Mycotaxon, 83: 36, 2002 - *Agaricus alpinus* Britzelm., Ber. naturhist. Ver. Augsburg 30: 13, 1890.

Syn.: *Botrydina luteovitellina* (Pilát & Nannf.) Redhead & Kuyper, *Botrydina vulgaris* Bréb. p.p., *Cantharellus dovrejfeldiensis* Henn. & Kirschst., *Gerronema alpinum* (Britzelm.) Bresinsky & Stangl, *Gerronema luteovitellinum* (Pilát & Nannf.) Singer, *Omphalia alpina* (Britzelm.) Sacc., *Omphalia flava* (Cooke) F.H. Møller, *Omphalia luteovitellina* Pilát & Nannf., *Omphalia umbellifera* var. *citrina* (Quél.) Sacc., *Omphalina alpina* (Britzelm.) Bresinsky & Stangl, *Omphalina flava* (Cooke) M. Lange, *Omphalina luteovitellina* (Pilát & Nannf.) M. Lange

N - TAA (Nascimbene & al. 2007b).

Cr/ Ch/ S/ Terr-Lign/ pH: 1-2, L: 3-4, X: 1-2, E: 1/ Alt: 4-5/ Alp: er, Salp: vr/ PT: 1/ Note: a basidiolichen of acid organic soil, most common around treeline; perhaps more widespread in the Alps but overlooked by lichenologists.

Lichenomphalia hudsoniana (H.S. Jenn.) Redhead, Lutzoni, Moncalvo & Vilgalys

Mycotaxon, 83: 38, 2002 - *Hygrophorus hudsonianus* H.S. Jenn., Mem. Carnegie Mus., 3, 12: 2, 1936.

Syn.: *Botrydina viridis* (Ach.) Redhead & Kuyper nom. rej., *Coriscium viride* (Ach.) Vain., *Clitocybe hudsoniana* (H.S. Jenn.) H.E. Bigelow, *Dermatocarpon viride* (Ach.) W. Mann, *Endocarpon laetevirens* (Borrer) Taylor, *Endocarpon viride* Ach., *Gerronema hudsonianum* (H.S. Jenn.) Singer, *Lenormandia laetevirens* (Borrer) Nyl., *Lenormandia viridis* (Ach.) Arnold, *Normandina laetevirens* (Borrer) Nyl., *Normandina viridis* (Ach.) Nyl., *Omphalia luteoilacina* J. Favre, *Omphalina coriscium* Gams, *Omphalina hudsoniana* (H.S. Jenn.) H.E. Bigelow, *Omphalina luteoilacina* (J. Favre) D.M. Hend., *Phytoconis hudsoniana* (H.S. Jenn.) Redhead & Kuyper, *Phytoconis viridis* (Ach.) Redhead & Kuyper, *Verrucaria laetevirens* Borrer non Masee nec (Wedd.) Zschacke

N - Frl (Tretiach & Hafellner 2000), TAA (Roux & Triebel 1994, Caniglia & al. 2002, De Marco & al. 2003, Nascimbene & al. 2008c, Onofri & al. 2013), Lomb (Nascimbene 2006), Piem, VA (Piervittori & Isocrono 1999). C - Tosc (Benespero & al. 2007).

Sq/ Ch/ S/ Terr/ pH: 1-2, L: 3-4, X: 1-2, E: 1/ Alt: 4-5/ Alp: er, Salp: vr/ PT: 1/ Note: a circumboreal-montane basidiolichen of wet mosses and peaty soil, more rarely found also on rotting wood in siliceous areas, near and above treeline.

Lichenomphalia meridionalis (Contu & La Rocca) P.-A. Moreau & Courtec

Docum. Mycol., 34, 135: 50, 2008 - *Omphalina meridionalis* Contu & La Rocca, Fungi non Delineati, 9: 32-33, 1999.

C - Sar (Contu & La Rocca 1999, Barrasa & Esteve Raventós 2000, Barrasa & Rico 2001).

Cr/ Ch/ S/ Terr/ pH: 1-2, L: 3-4, X: 2, E: 1/ Alt: 1-2/ SmedH: er, MedH: er/ PT: 1/ Note: a Mediterranean to Mediterranean-montane basidiolichen of acid soils, roadsides and opening of evergreen oak woodlands, often associated with *Cistus*-stands, to be looked for in other parts of Mediterranean Italy.

Lichenomphalia umbellifera (L.) Redhead, Lutzoni, Moncalvo & Vilgalys

Mycotaxon, 83: 38, 2002 - *Agaricus umbelliferus* L., Sp. Pl., 2: 1175, 1753.

Syn.: *Agaricus chrysoleucus* Pers., *Agaricus pseudoandrosaceus* Bull., *Agaricus umbelliferus* var. *myochrous* Fr., *Botrydina botryoides* (L.) Redhead & Kuyper, *Botrydina vulgaris* Bréb. p.p., *Clitocybe umbellifera* (L.) H.E. Bigelow, *Gerronema ericetorum* (Pers.) Singer, *Lepra botryoides* (L.) F.H. Wigg., *Omphalia pseudoandrosacea* (Bull.) Sacc., *Omphalina ericetorum* (Pers.) M. Lange, *Omphalia umbellifera* (L.) P. Kumm., *Omphalia umbellifera* f. *albida* J.E. Lange, *Omphalia umbellifera* var. *chrysoleuca* (Pers.) Rea, *Omphalia umbellifera* var. *myochroa* (Fr.) Masee, *Omphalina fulvopallens* P.D. Orton, *Omphalina pseudoandrosacea* (Bull.) M.M. Moser non auct., *Omphalina umbellifera* (L.) Quél.

N - Frl (Tretiach & Hafellner 2000), Ven (Onofri & al. 2013), TAA, Lomb (Onofri & al. 2013), Piem (Onofri & al. 2013), Emil (Passerini 1871, Onofri & al. 2013), Lig (Zotti & Orsino 2001, Onofri & al. 2013). C - Tosc (Barluzzi & al. 1996, Salerni & al. 1998, Perini & al. 2002, Onofri & al. 2013), Sar (Onofri & al. 2013). S - Cal (Puntillo 1996).

Cr/ Ch/ S/ Terr-Lign/ pH: 1-2, L: 3-4, X: 1-2, E: 1/ Alt: 2-5/ Alp: er, Salp: vr, Mont: vr, SmedD: er, SmedH: er/ PT: 1/ Note: on acid organic soil and rotting wood, ecologically similar to *O. hudsoniana*, but rarer above treeline.

Lichenomphalia velutina (Quél.) Redhead, Lutzoni, Moncalvo & Vilgalys

Mycotaxon, 83: 43, 2002 - *Omphalia velutina* Quél. Comptes Rend. Ass. Franc. Avanc. Sci.: tab. 12, 1885.

Syn.: *Botrydina velutina* (Quél.) Redhead & Kuyper, *Botrydina vulgaris* Bréb. p.p., *Lichenomphalia grisella* (P. Karst.) Redhead, Lutzoni, Moncalvo & Vilgalys, *Omphalia grisella* P. Karst., *Omphalina grisella* (P. Karst.) M.M. Moser, *Omphalina pseudandrosacea* auct. non (Bull.) M.M. Moser, *Omphalina rustica* auct., *Omphalina velutina* (Quél.) Quél., *Phytoconis pararustica* (Cléménçon) P. Roux & P.A. Moreau, *Phytoconis velutina* (Quél.) Redhead & Kuyper

N - Ven (Onofri & al. 2013), TAA (Nascimbene 2013, Onofri & al. 2013), Lomb (Gaggianese & al. 1999, Onofri & al. 2013), Emil (Onofri & al. 2013). C - Tosc (Monti & al. 1999, Onofri & al. 2013), Sar (Onofri & al. 2013). S - Camp (Violante & al. 2002, Onofri & al. 2013).

Sq/ Ch/ S/ Terr/ pH: 1-2, L: 3-4, X: 1-2, E: 1/ Alt: 2-4/ Salp: er, Mont: er, SmedD: er/ PT: 1/ Note: on acid soil, often in clearings of *Pinus*-stands; known only from Europe (Swiss, Austrian and Italian Alps) and North America.

Lichina C. Agardh

Syn. Alg. Scand., 12: 9, 1817, *nom. cons.*

This small genus of the Lichinaceae is unmistakable, due to its seaweed-like appearance and the maritime habitat. It includes 9 species in both Hemispheres. For the earlier records of *Lichina pygmaea* from Veneto see Nimis (1993: 421). Type: *L. pygmaea* (Lightf.) C. Agardh. The name is conserved against *Pygmaea* Stackh (1809).

Lichina confinis (O.F. Müll.) C. Agardh

Spec. Algar., 1: 105, 1821 - *Lichen confinis* O.F. Müll., Fl. Dan., 5: 5, 1782.

Syn.: *Lichina confinis* var. *elisabethae* (A. Massal.) Jatta, *Lichina elisabethae* A. Massal., *Lichina transfuga* (Nyl.) Zahlbr.

N - Lig. C - Tosc, Laz. S - Camp (Lazzarin 2000b), Pugl, Bas (Bartoli & Puntillo 1998), Cal (Puntillo 1996, Vězda Lich. Rar. Exs. 329), Si (Grillo 1998, Grillo & Caniglia 2004).

Frut/ Cy.h/ S/ Sax/ pH: 2-5, L: 3-4, X: 1, E: 1/ Alt: 1/ MedH: rr, MedD: r/ PT: 1/ coast/ Note: a characteristic lichen found on rocks at the interface between the littoral and the mesic supralittoral belts; overlooked and perhaps more widespread, especially in southern Italy, but certainly not common.

Lichinella Nyl.

Flora, 56: 195, 1873.

In the original circumscription, this genus of the Lichinaceae included 6 species growing on base-rich siliceous rocks and/or limestone. The genus was later enlarged to include also the c. 30 species of *Gonohymenia*, a poorly delimited genus in itself, a fact that was not accepted by all authors; for example Jørgensen (2007) maintains the genus *Thallinocarpon* for the few non-Mediterranean species of this complex. Here, both *Thallinocarpon* and *Gonohymenia* are subsumed under *Lichinella*. Type: *L. stipatula* Nyl.

Lichinella cribellifera (Nyl.) P.P. Moreno & Egea

Cryptogamie, Bryol. Lichénol., 13: 243, 1992 - *Omphalaria cribellifera* Nyl., Flora, 67: 387, 1884.

Syn.: *Gonohymenia cribellifera* (Nyl.) Henssen, *Rechingeria cribellifera* (Nyl.) Servít, *Rechingeria granitica* (Samp.) Poelt, *Thyrea cribellifera* (Nyl.) Zahlbr.

C - Tosc (Pišút 1997), Sar.

Fol.u/ Cy.c/ S/ Sax/ pH: 2-3, L: 4-5, X: 4-5, E: 1-2/ Alt: 1-2/ SmedH: vr, MedH: r/ PT: 1/ w/ Note: on steeply inclined faces of siliceous rocks, especially in seepage tracks, usually below the montane belt; probably more widespread in Tyrrhenian Italy.

Lichinella heppii (Müll. Arg.) P. Clerc & Cl. Roux

in Clerc, Cryptogamica Helvetica, 19: 292, 2004 - *Omphalaria heppii* Müll. Arg., Mém. Soc. Phys. Hist. Nat. Genève, 16: 422, 1862.

Syn.: *Gonohymenia heppii* (Müll. Arg.) Henssen, *Thyrea heppii* (Müll. Arg.) Lettau

N - Emil.

Fol.u/ Cy.c/ S/ Sax/ pH: 4-5, L: 4, X: 3, E: 1-2/ Alt: 1-2/ SmedD: r/ PT: 1/ #/ Note: a critical taxon, purported to be most frequent in humid stands by rivers. The type is from France: "*sandstone boulders along the Arve near Mornex*". The only Italian record (Nimis 1993: 422) needs confirmation.

Lichinella iodopulchra (Croz.) P.P. Moreno & Egea

Cryptogamie, Bryol. Lichénol., 13: 245, 1992 - *Omphalaria iodopulchra* Couderc ex Croz., Bull. Acad. Int. Géogr. Bot., 19: 240, 1910.

Syn.: *Gonohymenia iodopulchra* (Croz.) Henssen & P.M. Jørg., *Gonohymenia nummularia* (Nyl.) Henssen nom. inval., *Omphalaria nummularia* Nyl. nom. illegit., *Omphalaria pulvinata* (Schaer.) Nyl., *Thyrea iodopulchra* (Croz.) Zahlbr., *Thyrea nummularia* (Nyl.) Zahlbr., *Thyrea pulvinata* (Schaer.) A. Massal. non auct.

N - **Lomb** (S-F146634). **C** - **Tosc**, **Laz**, **Sar**. **S** - **Pugl** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1996b).

Frut/ Cy.c/ S/ Sax/ pH: 3-5, L: 4-5, X: 4-5, E: 2-3/ Alt: 1-2/ SmedD: vr, SmedH: rr, MedH: r, MedD: rc/ PT: 1/ w/ Note: on steeply inclined to vertical seepage tracks of more or less calcareous or basic siliceous rocks, most common in the Mediterranean belt. Most of the records of *L. nigritella* reported by Nimis from southern Italy (1993: 422) belong here.

Lichinella nigritella (Lettau) P.P. Moreno & Egea

Cryptogamie, Bryol.-Lichénol., 13: 246, 1992 - *Thyrea nigritella* Lettau, Beih. Repert. Spec. Nov. Regni Veg., 119: 276, 1942.

Syn.: *Gonohymenia nigritella* (Lettau) Henssen, *Thallinocarpon nigritellum* (Lettau) P.M. Jørg.

N - **VG**, **Frl** (TSB 17372), **TAA** (Schultz 2000), **Piem** (Clerc & al. 1999), **Lig** (TSB 34678). **C** - **Abr** (Nimis & Tretiach 1999, Caporale & al. 2016), **Mol** (Caporale & al. 2008), **Sar** (TSB 6221). **S** - **Camp** (Nimis & Tretiach 2004), **Pugl** (Nimis & Tretiach 1999), **Cal**.

Frut/ Cy.c/ S/ Sax/ pH: 3-5, L: 4-5, X: 4-5, E: 1-2/ Alt: 1-3/ Mont: vr, SmedD: rr, Pad: er, SmedH: r, MedH: vr/ PT: 1/ w/ Note: on steeply inclined surfaces of calcareous or base-rich siliceous rocks with water seepage after rain; certainly more widespread in the Alps and in the Apennines. See note on *L. iodopulchra*.

Lichinella robusta Henssen

Symb. Bot. Upsal., 18, 1: 73, 1963.

C - **Sar** (Schultz 2000, Rizzi & al. 2011).

Frut.f/ Cy.c/ S/ Sax/ pH: 3-4, L: 4-5, X: 4-5, E: 2-3/ Alt: 1-2/ SmedH: vr, MedH: vr, MedD: r/ PT: 1/ w/ Note: on steeply inclined surfaces of base-rich siliceous rocks with periodical water seepage after rain; sometimes confused with *L. stipatula*, but certainly very rare in Italy.

Lichinella stipatula Nyl.

Bull. Soc. Linn. Normandie, sér. 2, 6: 301, 1872.

Syn.: *Psorotichia isidiosa* Werner?

N - **TAA**, **Lomb** (De Vita & Valcuvia 2004), **Piem** (TSB 34176), **VA** (Matteucci & al. 2013), **Emil** (Valcuvia & Delucchi 2001), **Lig**. **C** - **Tosc**, **Laz**, **Sar** (Monte 1993, Rizzi & al. 2011, Giordani & al. 2013). **S** - **Camp** (Nimis & Tretiach 2004, Catalano & al. 2016), **Pugl** (Nimis & Tretiach 1999), **Bas** (Bartoli & Puntillo 1998), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1996b, Ottonello & al. 2011).

Frut/ Cy.c/ S/ Sax/ pH: 3-4, L: 4-5, X: 4-5, E: 1-2/ Alt: 1-3/ Mont: vr, SmedD: vr, Pad: er, SmedH: rc, MedH: c, MedD: rr/ PT: 1-2/ subc, w/ Note: a holarctic lichen found on steeply inclined, sun-exposed seepage tracks of slightly calciferous or basic siliceous rocks, often overgrowing other lichens; certainly more widespread in the Alps, especially in dry-warm areas.

Lithographa Nyl.

Act. Soc. Linn. Bordeaux, 21: 393, 1857.

This genus of the Trapeliaceae is closely related to *Rimularia*; the only character separating the two genera is the shape of the ascospores: elongate (lirelliform) in *Lithographa*, rounded (lecidine or lecanorine) in *Rimularia* and *Xylographa* (Spribile & al. 2014). The genus includes 10 saxicolous species mostly occurring in cool areas of both Hemispheres. Type: *L. petraea* (Mont.) Nyl. (= *L. tesserata*).

Lithographa tesserata (DC.) Nyl.

Act. Soc. Linn. Bordeaux, 21: 441, 1857 - *Opegrapha tesserata* DC. in Lamarck & de Candolle, Fl. Franc., éd. 3, 2: 313, 1805.

Syn.: *Graphis petraea* (Ach.) Wallr., *Haplographa tumida* Anzi, *Lithographa petraea* (Ach.) Nyl., *Lithographa petrophila* (Wedd.) Boistel, *Lithographa tesserata* var. *petraea* (Ach.) Redinger, *Lithographa tumida* (Anzi) Ozenda & Clauzade, *Opegrapha petraea* Ach., *Placographa nivalis* Th. Fr., *Placographa tesserata* (DC.) Th. Fr.

N - **TAA**, **Lomb**, **Lig**.

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 2-3, X: 2, E: 1/ Alt: 3-5/ Alp: er, Salp: er, Mont: er/ PT: 1/ suboc/ Note: on sheltered base-rich siliceous rocks in humid upland areas; probably restricted to the Alps in Italy.

Lithothelium Müll. Arg.

Bot. Jahrb., 6: 386, 1885.

This genus of the Pyrenulaceae with c. 28 species is characterised by distoseptate ascospores with rounded lumina, unbranched paraphyses (reported to be anastomosing in one species), and cylindrical asci with a

conspicuous ocular chamber. The genus is known from most regions of the world; several species are pantropical, and a few appear to be restricted to temperate Europe or North America; most species are epiphytes, but others grow on limestone, lava or basalt. A world key was provided by Aptroot (2006). The delimitation of the genus with respect to *Pyrenula* is still an open problem (see Gueidan & al. 2016). Type: *L. cubanum* Müll. Arg.

Lithothelium triseptatum (Nyl.) Aptroot

Bibl. Lichenol., 44: 70, 1991 - *Verrucaria conoidea* var. *triseptata* Nyl., Act. Soc. Linn. Bordeaux, 21: 435, 1856.

Syn.: *Acrocordia conoidea* var. *triseptata* (Nyl.) Boistel, *Acrocordia triseptata* (Nyl.) Vězda, *Porina acrocordioides* (Zahlbr.) Zahlbr., *Porina lilacina* Zschacke, *Spermatodium triseptatum* (Nyl.) Trevis.

C - **Tosc** (TSB 35208), **Sar** - **S** - **Camp** (Nimis & Tretiach 2004, Garofalo & al. 2010), **Pugl** (Nimis & Tretiach 1999), **Bas** (Bartoli & Puntillo 1996, 1998), **Si** (Grillo & al. 2007b).

Cr.end/ Tr/ S/ Sax/ pH: 4-5, L: 1-2, X: 1-2, E: 1/ Alt: 1/ MedH: r, MedD: er/ PT: 1/ u/ Note: a subtropical species of sheltered, warm-humid, shaded surfaces of calcareous rocks, usually not far from the sea; to be looked for further in Tyrrhenian Italy.

L o b a r i a (Schreb.) Hoffm.

Deutschl. Fl., 2: 138, 1796 - *Lichen* sect. *Lobaria*, Schreb. in Linnaeus, Gen. Pl., 8 ed.: 768, 1791.

A phylogenetic analysis of the Lobariaceae using a combination of three genes and a phylogenetic maximum likelihood approach was published by Moncada & al. (2013), who demonstrated that *Lobaria s.lat.* forms at least six lineages: *Lobaria s.str.*, *Lobarina*, *Ricasolia*, and the new genera *Anomalobaria*, *Dendricosticta*, *Yoshimuriella*, and *Lobariella*. *Lobaria s.str.*, which is now restricted to the *Lobaria pulmonaria*-group (c. 60 species), is characterised by foveolate thalli with a lower tomentum forming veins immersed between the bulges of the surface, by short, broadly fusiform ascospores, and by chemical characters. Type: *L. pulmonaria* (L.) Hoffm.

Lobaria linita (Ach.) Rabenh.

Deutschl. Krypt.-Fl., 2: 65, 1845 - *Sticta linita* Ach., Syn. Meth. Lich.: 234, 1814.

Syn.: *Lobaria garovaglii* (Schaer.) Jatta, *Sticta garovaglii* Schaer.

N - **Frl** (Nascimbene & al. 1998, Tretiach & Hafellner 2000), **Ven** (Nascimbene & Caniglia 2000, 2003c, Nascimbene 2002, Tomaselli & al. 2006), **TAA** (Nascimbene & al. 2004, 2004b), **Lomb** (Dalle Vedove & al. 2004), **Piem** (Isocrono & al. 2004, Morisi 2005, Isocrono & Piervittori 2008, Matteucci & al. 2013), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999).

Fol.b/ Ch/ A.s/ Terr/ pH: 1-2, L: 3-4, X: 2, E: 1/ Alt: 4-5/ Alp: vr, Salp: er/ PT: 1/ Note: a circumpolar, arctic-alpine species found on bryophytes and acid soil rich in humus over siliceous substrata near and above treeline: restricted to the Alps in Italy.

Lobaria pulmonaria (L.) Hoffm.

Deutschl. Fl., 2: 146, 1796 - *Lichen pulmonarius* L., Sp. Pl., 2: 1145, 1753.

Syn.: *Lobaria pulmonacea* f. *sorediata* (Schaer.) Harm., *Lobaria pulmonaria* var. *meridionalis* auct. eur. non Asahina, *Sticta pulmonacea* (Ach.) A, *Sticta pulmonaria* (L.) Biroli

N - **VG** (Tretiach 1993), **Frl** (Tretiach 1993, 1996, Nascimbene & al. 1998, Nascimbene & Caniglia 2003, Tretiach & Molaro 2007, Tomasi 2007, Nascimbene & al. 2013), **Ven** (Tretiach 1993, Nascimbene & Caniglia 1997, 2003, 2003b, Lazzarin 1997, Caniglia & al. 1999, Nascimbene 2001, 2003b, 2008c, 2011, Caniglia & al. 2005, Nascimbene & al. 2005b, 2006c, 2007, 2009c, 2010b, 2013, 2013b, Franceschin 2009, Nascimbene & Marini 2010, Brackel 2013), **TAA** (Nascimbene 1997, Nascimbene & Caniglia 2003, Serafini & al. 2003, Nascimbene & al. 2007b), **Lomb** (Nascimbene & al. 2006b), **Piem** (Isocrono & al. 2004, Morisi 2005, Matteucci & al. 2008b, 2013, Nimis & al. 2015), **VA** (Piervittori & Isocrono 1999, Matteucci & Vanacore Falco 2015), **Emil** (Tretiach & al. 2008, Benesperi 2009, Nascimbene & al. 2013, Brackel 2015), **Lig** (Tretiach 1993, Brunialti & al. 1999, Giordani & Brunialti 2002, Giordani & al. 2003b, Viglione & al. 2005, Widmer & al. 2012, Nascimbene & al. 2013). **C** - **Tosc** (Tretiach 1993, Tretiach & Nimis 1994, Loppi & Putorti 1995b, Loppi & De Dominicis 1996b, Loppi & al. 1997b, 2004c, Putorti & al. 1999, Paoli & Loppi 2001, Benesperi & Sàmari Fappiano 2006, Sàmari Fappiano 2006, Nascimbene & al. 2006b, Benesperi 2006, 2011, Benesperi & al. 2007, Benesperi & Lastrucci 2007, Tretiach & al. 2008, Pasquinelli & al. 2009, Brackel 2008, 2015, Lastrucci & al. 2009, Brunialti & Frati 2010, Widmer & al. 2012, Nascimbene & al. 2013), **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera 1998, 1998b, Panfili 2000, 2007, Ravera & al. 2006), **Laz** (Tretiach 1993, Ravera 2002, Massari & Ravera 2002, Widmer & al. 2012, Zucconi & al. 2013, Brackel 2015), **Abr** (Nimis & Tretiach 1999, Di Santo 2012, Brackel 2015, Catalano & al. 2016, Corona & al. 2016), **Mol** (Garofalo & al. 1999, Nimis & Tretiach 1999, Caporale & al. 2008, Ravera & Genovesi 2010, Ravera & al. 2010, Nascimbene & al. 2013, Paoli & al. 2015), **Sar** (Tretiach 1993, Zedda 1995, 2002, 2002b, Loi & al. 2000, Zedda & al. 2001, Piccotto & Tretiach 2010, Rizzi & al. 2011, Widmer & al. 2012, Nascimbene & al. 2013, Cossu 2013). **S** - **Camp** (Puntillo & al. 2000, Aprile & al. 2002, 2003, 2003b, Nimis & Tretiach 2004, Brunialti & al. 2010, 2012c, 2013, Catalano & al. 2010, 2016, Puntillo & Puntillo 2011, Nascimbene & al. 2010b, 2013, Garofalo & al. 2010, Ravera 2013b, Ravera & Brunialti 2013, Brunialti & al. 2015, Sabatini & al. 2016), **Pugl** (Tretiach 1993, Nimis & Tretiach 1999, Brackel 2011), **Bas** (Nimis & Tretiach 1999, Fascetti & al. 2005, Nascimbene & al. 2006b, 2013, Potenza 2006, Puntillo & al. 2009, Potenza & Fascetti 2010, Brackel 2011, Hafellner 2011, Widmer & al. 2012), **Cal** (Tretiach 1993, Puntillo & Vězda 1994, Puntillo 1995, 1996, Incerti & Nimis 2006, Stofer 2006, Widmer & al. 2012, Nascimbene & al. 2013, Brackel & Puntillo 2016), **Si** (Tretiach 1993, Czezug & al. 1994, Nimis & al.

1994, Grillo 1996, Ottonello & Romano 1997, Merlo 2004, 2004b, Nascimbene & al. 2006b, 2013, Brackel 2008b, Ottonello & Puntillo 2009, Liistro & Cataldo 2011, Ottonello & al. 2011, Widmer & al. 2012).

Fol.b/ Ch/ A.s/ Epiph/ pH: 2-3, L: 3, X: 1-2, E: 1-2/ Alt: 1-3/ Mont: rr, SmedD: er, SmedH: r, MedH: vr/ PT: 1/ suboc/ Note: a mainly temperate, holarctic species found on bark and on epiphytic and epilithic mosses in humid forests; extinct in the plains of northern Italy, it is still abundant in humid montane forests of central and southern Italy, reaching the coast in undisturbed areas of Tyrrhenian Italy (e.g. in the Castelporziano Estate near Rome). A distribution map in Italy was published by Nascimbene & al. (2016). It is included in the Italian red list of epiphytic lichens under the "Least Concern" category (Nascimbene & al. 2013c).

L o b a r i n a Cromb.

Nyl *ex* Cromb., Monogr. Lich. Brit., 1: 270, 1894.

The phylogenetic analysis of the Lobariaceae published by Moncada & al. (2013) showed that *Lobaria s.lat.* forms at least six lineages, among which the genus *Lobarina*, which includes the *L. scrobiculata*-group with 15 species, characterised by scrobiculate lobes with reduced lower cortex, and an unusual chemistry of usnic acid in the cortex and the stictic and norstictic acid chemosyndrome in the medulla. Type: *L. scrobiculata* (Scop.) Nyl.

Lobarina scrobiculata (Scop.) Nyl.

Flora, 60: 233, 1877 - *Lichen scrobiculatus* Scop., Fl. Carn., ed. 2, 2: 384, 1772.

Syn.: *Lobaria scrobiculata* (Scop.) DC., *Lobaria verrucosa* (Huds.) Hoffm., *Lobaria verrucosa* f. *esorediosa* Gyeln., *Parmelia scrobiculata* (Scop.) Ach., *Sticta scrobiculata* (Scop.) Ach.

N - **Frl** (Tretiach 1993, 1996), **Ven** (Lazzarin 1997, Nascimbene 2003b, 2011, Nascimbene & al. 2005b, 2006c, 2007, 2009c, 2010b), **TAA** (Nascimbene & Caniglia 2000b, Nascimbene & al. 2007b, Nimis & al. 2015), **Lomb** (Dalle Vedove & al. 2004), **Piem** (Isocrono & al. 2004, Morisi 2005), **VA** (Piervittori & Isocrono 1999, Matteucci & al. 2013), **Emil** (Tretiach & al. 2008), **Lig** (Brunialti & al. 1999, Giordani & Brunialti 2000, Watson 2014). **C** - **Tosc** (Tretiach & Nimis 1994, Benesperi & al. 2007, Brunialti & Frati 2010, Benesperi 2011, Brackel 2015), **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera 1998, Ravera & al. 2006), **Laz** (Ravera 2002b), **Abr** (Nimis & Tretiach 1999), **Mol** (Caporale & al. 2008), **Sar** (Tretiach 1993, Zedda 1995, 2002, 2002b, Rizzi & al. 2011). **S** - **Camp** (Ricciardi & al. 2000, Tretiach 1993, Nascimbene & al. 2010b, Catalano & al. 2010, 2016, Ravera & Brunialti 2013), **Pugl**, **Bas** (Fascetti & al. 2005, Potenza 2006, Puntillo & al. 2009, Potenza & Fascetti 2010, 2012), **Cal** (Tretiach 1993, Puntillo & Vězda 1994, Puntillo 1995, 1996, Incerti & Nimis 2006), **Si** (Merlo 2004).

Fol.b/ Cy.h/ A.s/ Epiph/ pH: 1-2, L: 3, X: 1-2, E: 1/ Alt: 2-3/ Mont: vr, SmedD: er, SmedH: vr/ PT: 0/ suboc/ Note: a mild-temperate, suboceanic species found on old deciduous trees and on mossy rocks in humid open forests; formerly more frequent, presently extinct in several parts of the country (e.g. in the whole of the Po-plain), and declining elsewhere, with optimum in old *Castanea*-stands. A distribution map in Italy was published by Nascimbene & al. (2016). It is included in the Italian red list of epiphytic lichens as "Near-threatened" (Nascimbene & al. 2013c).

L o b o t h a l l i a (Clauzade & Cl. Roux) Hafellner

Acta Bot. Malac., 16, 1: 138, 1991 - *Aspicilia* subgen. *Lobothallia* Clauzade & Cl. Roux, Bull. Soc. Bot. Centre-Ouest, 15: 140, 1984.

A molecular revision of the large and difficult genus *Aspicilia s.lat.* was carried out by Nordin & al. (2010), who proposed a subdivision into five genera, among which *Lobothallia*, the sister group of the other Megasporaceae genera. *Aspicilia recedens* and *A. farinosa* were transferred to *Lobothallia*, and further species belonging to the old subgenus *Pachyothallia* were added to this genus by Roux (2012). As a consequence *Lobothallia*, that was originally established for species with a lobate thallus, is now characterised by immersed to appressed or constricted-sessile apothecia, asci with an non-amyloid tholus (*Aspicilia*-type), unbranched paraphyses, simple, hyaline spores and mainly bacilliform conidia; lobes are distinct in some species, while other species have indistinct lobes. Type: *L. alphoplaca* (Wahlenb.) Hafellner

Lobothallia alphoplaca (Wahlenb.) Hafellner

Acta Bot. Malacitana, 16, 1: 138, 1991 - *Parmelia alphoplaca* Wahlenb. in Ach., Meth. Lich.: 428, 1803.

Syn.: *Acarospora polycarpa* Th. Fr., *Aspicilia alphoplaca* (Wahlenb.) Poelt & Leuckert, *Lecanora alphoplaca* (Wahlenb.) Ach., *Lecanora alphoplaca* var. *inflata* Ach., *Lecanora inflata* (Ach.) Jatta, *Lecanora melanaspis* var. *alphoplaca* (Wahlenb.) Th. Fr., *Placodium alphoplacum* (Wahlenb.) Link, *Placodium alphoplacum* var. *inflatum* (Ach.) Arnold, *Placodium inflatum* (Ach.) A. Massal., *Squamaria alphoplaca* (Wahlenb.) Duby, *Squamaria alphoplaca* f. *olivacea* Anzi

N - **Frl**, **TAA** (Watson 2014), **Lomb**, **Piem** (Morisi & Sereno 1995, Isocrono & al. 2004, Morisi 2005), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Watson 2014). **C** - **Sar**. **S** - **Cal** (Puntillo 1996), **Si** (Merlo 2004b).

Cr.pl/ Ch/ S/ Sax/ pH: 2-3, L: 4-5, X: 4, E: 2-4/ Alt: 3-5/ Alp: rr, Salp: r, Orom: vr, Mont: rr/ PT: 1/ Note: a widespread species with an apparently disjunct distribution in mountain areas of the Northern Hemisphere, found on compact siliceous rocks wetted by rain in upland areas; locally abundant only in the Alps, wherever appropriate substrata are available.

Lobothallia cernohorskyana (Clauzade & Vězda) A. Nordin, Cl. Roux & Sohrabi

in Roux, Bull. Soc. linn. Provence, num. spéc. 16: 216, 2012 - *Lecanora cernohorskyana* Clauzade & Vězda, Preslia 42, 3: 216, 1970.

C - Sar (ASU-506831).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 4-5, X: 4, E: 2-3/ Alt: 1-2/ SmedH: vr, MedH: vr/ PT: 1/ Note: a mainly Mediterranean species growing on soft, porous calcareous marls in sunny situations.

Lobothallia cheresina (Müll. Arg.) A. Nordin, Cl. Roux & Sohrabi var. ***cheresina***

in Roux, Bull. Soc. linn. Provence, num. spéc. 16: 216, 2012 - *Lecanora cheresina* Müll. Arg., Rev. Mycol., 2: 75, 1880.

Syn.: *Aspicilia cheresina* (Müll. Arg.) Hue, *Aspicilia cheresina* var. *granuligera* (J. Steiner) Szatala?

N - Lig (Giordani & al. 2016). C - Umb (Nimis & Tretiach 1999, Ravera & al. 2006), Abr (Recchia & Villa 1996), Mol (Nimis & Tretiach 1999, Caporale & al. 2008, Ravera & al. 2009, Genovesi & Ravera 2014), Sar. S - Camp (Aprile & al. 2003, 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010), Cal (Puntillo 1996), Si (Nimis & al. 1994, 1995, Caniglia & Grillo 2001, 2005, 2006, Grillo & Caniglia 2004, Cataldo & Cannavò 2014).

Cr.pl/ Ch/ S/ Sax/ pH: 5, L: 4-5, X: 4, E: 2/ Alt: 2-5/ Orom: rc, Mont: rr, SmedD: vr, SmedH: r/ PT: 1/ paras *Circinaria calcarea s.lat.*/ Note: a southern European and Mediterranean-montane, very characteristic but often overlooked species described from Egypt; it is found on calcareous rocks, starting the life-cycle on *Circinaria calcarea* and related species. It is not rare in Italy, especially in the Apennines and on the main Islands, and should be looked for further in northern Italy. The species is chemically variable, which led to the description of several varieties whose taxonomic value should be re-assessed on the basis of molecular data, so that in the following I refrain from a formal recombination.

Lobothallia cheresina var. ***justii*** (Servít)

Provisionally placed here, ICN Art. 36.1b. - *Lecanora justii* Servít, Feddes Rep., 38: 65, 1935.

Syn.: *Aspicilia cheresina* var. *justii* (Servít) Clauzade & Cl. Roux

C - Umb (Genovesi & Ravera 2001, Ravera & al. 2006), Laz (Nimis & Tretiach 2004), Abr (Nimis & Tretiach 1999), Sar.

Cr.pl/ Ch/ S/ Sax/ pH: 5, L: 4-5, X: 4, E: 2/ Alt: 2-5/ Orom: r, Mont: vr, SmedH: vr/ PT: 1/ paras *Circinaria calcarea s.lat.*/ Note: perhaps just a chemical strain with stictic and norstictic acids, certainly more widespread, at least in the mountains of southern Italy. See also note on var. *cheresina*.

Lobothallia cheresina var. ***microspora*** (Arnold)

Provisionally placed here, ICN Art. 36.1b. - *Aspicilia calcarea* var. *microspora* Arnold in Glowacki, Verh. zool.-bot. Ges. Wien, 20: 450, 1870.

Syn.: *Aspicilia cheresina* var. *microspora* (Arnold) Clauzade & Cl. Roux, *Aspicilia microspora* (Arnold) Hue

N - VG, Lig (Valcuvia & al. 2000). C - Marc (Nimis & Tretiach 1999), Laz (Nimis & Tretiach 2004), Abr (Nimis & Tretiach 1999), Sar.

Cr.pl/ Ch/ S/ Sax/ pH: 5, L: 4-5, X: 4, E: 2/ Alt: 2-5/ Orom: r, Mont: rr, SmedD: er, SmedH: er/ PT: 1/ paras *Circinaria calcarea s.lat.*/ Note: perhaps just a chemical strain with norstictic acid only, probably more widespread in southern Italy. See also note on var. *cheresina*.

Lobothallia controversa Cl. Roux & A. Nordin

Herzogia, 29 (MB816278), 2016 (in press).

Syn.: *Aspicilia calcarea* var. *farinosa* auct., *Aspicilia farinosa* auct., *Lecanora farinosa* auct., *Pachyospora farinosa* auct. non (Flörke) A. Massal.

N - Fri (TSB 25297), Ven, TAA, Lomb, Emil, Lig (Giordani & al. 2016). C - Tose (Benespero 2000a), Umb (Genovesi & Ravera 2001, Ravera & al. 2006), Laz (Nimis & Tretiach 2004), Abr, Mol (Nimis & Tretiach, 1999, 2004, Caporale & al. 2008), Sar. S - Camp (Aprile & al. 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010), Pugl (Nimis & Tretiach 1999), Bas (Nimis & Tretiach 1999, Brackel 2011), Cal (Puntillo 2011), Si (Grillo 1998).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 4-5, X: 4, E: 2-3/ Alt: 1-5/ Alp: r, Salp: rr, Orom: c, Mont: rc, SmedD: vr, SmedH: vr, MedH: er/ PT: 1/ Note: a mainly southern species in Europe, found on hard rocks, especially on dolomite, with optimum in the montane belt. The nomenclature of this species has a complicated history, because Flörke used the epithet "*farinosa*" for *Circinaria calcarea* (Hafellner & Türk 2001): some old records from the Alps could refer to that species.

Lobothallia hydrocharis (Poelt & Nimis) Sohrabi & Nimis

in Nimis, The Lichens of Italy. A second annotated catalogue: 19, 2016 - *Aspicilia hydrocharis* Poelt & Nimis, in Nimis & Poelt, Studia Geobot., 7, suppl. 1: 44, 1987.

C - Sar (Ravera & Nascimbene 2015).

Cr.pl/ Ch/ S/ Sax/ pH: 3, L: 3-4, X: 1, E: 1/ Alt: 3/ Mont: er/ PT: 1/1/ Note: a very characteristic species known only from Sardinia, where it appears to be quite widespread (Ravera & Nascimbene 2015) on periodically submerged basaltic rocks in creeks that are dry during summer.

Lobothallia melanaspis (Ach.) Hafellner

Acta Bot. Malacitana, 16, 1: 138, 1991 - *Parmelia melanaspis* Ach., Meth. Lich.: 196, 1803.

Syn.: *Aspicilia melanaspis* (Ach.) Poelt & Leuckert, *Lecanora melanaspis* (Ach.) Ach.

N - TAA (Nascimbene 2005), Lomb, Piem.

Cr.pl/ Ch/ S/ Sax/ pH: 2-3, L: 3-4, X: 1-2, E: 1/ Alt: 3-4/ Salp: vr, Mont: vr/ PT: 1/ 1/ Note: a mainly boreal-montane species found on acid to slightly calciferous rocks in the inundation zone on shores of lakes, brooks, and streams, mostly in upland areas; to be looked for further throughout the Alps.

Lobothallia parasitica (B. de Lesd.)

Provisionally placed here, ICN Art. 36.1b. - *Aspicilia parasitica* B. de Lesd., Bull. Soc. Bot. France, 78: 728, 1932.

Syn.: *Lecanora parasitica* (B. de Lesd.) Zahlbr.

N - Frl, Lomb (Brackel 2013), Piem (Giordani & al. 2014), Lig (Loppi & Mariotti 1995), C - Tosc (Loppi & Mariotti 1995), Umb (Genovesi & al. 2001, Ravera & al. 2006), Laz (TSB 17773), Sar (Monte 1993, Loppi & Mariotti 1995, Rizzi & al. 2011, Giordani & al. 2013), S - Bas (Nimis & Tretiach 1999), Si (Nimis & al. 1996b).

Cr.pl/ Ch/ S/ Sax/ pH: 2-3, L: 5, X: 4-5, E: 3-4/ Alt: 1-3/ Mont: er, SmedD: er, SmedH: r, MedH: rr, MedD: vr/ PT: 1-2/ paras crustose lichens/ Note: a mainly Mediterranean lichen found on steeply inclined, sunny faces of siliceous rocks at relatively low elevations. After having examined several samples, I have the impression that this may prove to be a good species, differing from *L. radiosa* in the parasitic habit and in the presence of stictic acid. However, since *L. radiosa*, in its present broad circumscription, is chemically variable and sometimes starts the life-cycle on other crustose lichens, I refrain from a formal combination into *Lobothallia*, pending further studies.

Lobothallia praeradiosa (Nyl.) Hafellner

Acta Bot. Malacitana, 16, 1: 138, 1991 - *Lecanora praeradiosa* Nyl., Flora, 67: 389, 1884.

Syn.: *Aspicilia praeradiosa* (Nyl.) Poelt & Leuckert

N - TAA (Navarro-Rosinés & Hafellner 1996), VA (Piervittori & Isocrono 1999), C - Sar (B 60 0197145).

Cr.pl/ Ch/ S/ Sax/ pH: 3-4, L: 4, X: 4, E: 2-3/ Alt: 3-4/ Salp: er, Mont: vr/ PT: 1/ subc/ Note: on basic siliceous rocks, especially calciferous schists, mostly restricted to dry-warm Alpine valleys.

Lobothallia radiosa (Hoffm.) Hafellner

Acta Bot. Malacitana, 16: 138, 1991 - *Lichen radiosus* Hoffm., Enum. Lich. Eur., tab. 4, 1874.

Syn.: *Aspicilia radiosa* (Hoffm.) Poelt & Leuckert, *Aspicilia subcircinata* (Nyl.) Coppins, *Lecanora circinata* (Pers.) Ach., *Lecanora radiosa* (Hoffm.) Schaer., *Lecanora subcandicans* (Müll. Arg.) Stizenb., *Lecanora subcircinata* Nyl., *Placodium circinatum* (Pers.) Gray, *Placodium radiosum* (Hoffm.) Ach., *Placodium subcircinatum* (Nyl.) Arnold, *Psoroma circinatum* (Pers.) Rabenh., *Squamaria subcircinata* (Nyl.) H. Olivier

N - VG (Nimis & Tretiach 1995, Tretiach & Pecchiari 1995, Navarro-Rosinés & Hafellner 1996, Geletti 1997, Castello 2002, Martellos & Castello 2004, Tretiach & al. 2007b), Frl (Nimis & Salvadori 1998, Nascimbene & al. 2009b), Ven (Nascimbene & Caniglia 1997, Caniglia & al. 1999, Nascimbene 2005c, Nascimbene & Marini 2007), TAA (De Benetti & Caniglia 1993, Navarro-Rosinés & Hafellner 1996, Nascimbene 2003, Spitale & Nascimbene 2012), Lomb, Piem (Isocrono & al. 2004), VA (Piervittori & Isocrono 1999, Piervittori & al. 2001, 2004, Matteucci & al. 2008c, 2015c), Emil (Navarro-Rosinés & Hafellner 1996, Nimis & al. 1996, Benesperi 2009), Lig (Navarro-Rosinés & Hafellner 1996, Valcuvia & al. 2000, Giordani & al. 2016), C - Tosc (Adamo & al. 1993, Tretiach & Nimis 1994, Adamo 1997, Tretiach & al. 2008, Benesperi 2011, Brackel 2015), Marc (Nimis & Tretiach 1999), Umb (Nimis & Tretiach 1999, Panfili 2000b, 2007, Ravera & al. 2006, Genovesi 2011), Laz (Bartoli 1997b, Nimis & Tretiach 2004, Roccardi 2011, Brackel 2015), Abr (Nimis & Tretiach 1999, Catalano & al. 2016), Mol (Nimis & Tretiach, 1999, 2004, Caporale & al. 2008, Genovesi & Ravera 2014), Sar (Rizzi & al. 2011, Giordani & al. 2013, Cossu & al. 2015), S - Camp (Garofalo & al. 1999, 2010, Aprile & al. 2002, 2003, 2003b, Nimis & Tretiach 2004, Catalano & al. 2016), Pugl (Nimis & Tretiach 1999), Bas (Nimis & Tretiach 1999, Brackel 2011), Cal (Puntillo 1996), Si (Nimis & al. 1994, 1995, Ottonello & Salone 1994, Ottonello & al. 1994, 2011, Ottonello 1996, Navarro-Rosinés & Hafellner 1996, Ottonello & Romano 1997, Grillo 1998, Grillo & al. 2001, Grillo & Caniglia 2004, Merlo 2004b, Caniglia & Grillo 2005, 2006, Brackel 2008b, Gianguzzi & al. 2009, Liistro & Cataldo 2011, Cataldo & Cannavò 2014).

Cr.pl/ Ch/ S/ Sax/ pH: 3-5, L: 3-5, X: 3-4, E: 3-5/ Alt: 1-5/ Alp: rr, Salp: rc, Orom: c, Mont: vc, SmedD: ec, Pad: rr, SmedH: ec, MedH: c, MedD: rc/ PT: 1-3/ Note: a widespread holarctic lichen with a very wide altitudinal and latitudinal range, and with correspondingly broad ecological requirements, found on a wide variety of substrata, including basic siliceous rocks, limestone, dolomite, more rarely brick, roofing tiles and mortar; common throughout the country. The species, in its present circumscription, is chemically variable: the forms with norstictic acid, corresponding to "*Aspicilia subcircinata*", may represent just a chemotype (see e.g. Roux & coll. 2014). See also note on *L. parasitica*.

Lobothallia recedens (Taylor) A. Nordin, Savić & Tibell

Mycologia, 102: 1346, 2010 - *Lecidea recedens* Taylor in Mackay, Fl. Hibern., 2: 117, 1836.

Syn.: *Aspicilia bohemica* Körb., *Aspicilia polygonia* var. *pantherina* A. Massal., *Aspicilia recedens* (Taylor) Arnold, *Lecanora bohemica* (Körb.) H. Magn., *Lecanora griseola* Th. Fr., *Lecanora subcinerea* Nyl., *Lecanora recedens* (Taylor) Nyl.

N - Ven, TAA (Nascimbene 2005), Piem (Isocrono & al. 2003, Giordani & al. 2014), VA (Piervittori & Isocrono 1999, Matteucci & Vanacore Falco 2015).

Cr/ Ch/ S/ Sax/ pH: 2, L: 4, X: 3, E: 2-3/ Alt: 3-4/ Salp: er, Mont: vr/ PT: 1/ Note: a lichen ranging from the boreal zone to the Mediterranean mountains, found on periodically wetted but rapidly drying siliceous rocks in upland areas. It is ecologically similar to *Lasallia pustulata*, and is probably more widespread in the Alps.

Lopadium Körb.
Syst. Lich. Germ.: 210, 1855.

This subcosmopolitan genus of *c.* 5 species is characterised by asci which lack a distinct apical dome and by thick, more or less simple paraphyses with a dark brown conical cap. The taxonomic position of the Lopadiaceae within the Lecanoromycetidae is still unclear (see Miadlikowska & al. 2014). Type: *L. pezizoideum* (Ach.) Körb.

Lopadium disciforme (Flot.) Kullh.

Not. Sällsk. Fauna Fl. Fenn., 11: 275, 1870 - *Heterothecium pezizoideum* var. *disciforme* Flot., Bot. Zeit., 8: 553, 1850.

Syn.: *Lopadium pezizoideum* var. *disciforme* (Flot.) Körb., *Sporopodium pezizoideum* var. *disciforme* (Flot.) Vain.

N - **Frl** (Tretiach 2004), **Ven** (Nascimbene 2003b, 2011, Nascimbene & al. 2010, 2013b), **TAA** (Nascimbene & al. 2007b, 2009, Nimis & al. 2015), **S** - **Cal** (Puntillo 1996).

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 3, X: 2-3, E: 1/ Alt: 2-3/ Mont: er, SmedD: er/ PT: 1/ Note: on bark and epiphytic bryophytes on old *Picea* and other conifers, rarely on deciduous trees, especially *Quercus*, in cold-humid forests; perhaps overlooked in the Alps, but certainly not common. It is included in the Italian red list of epiphytic lichens as “Vulnerable” (Nascimbene & al. 2013c).

Lopadium pezizoideum (Ach.) Körb.

Syst. Lich. Germ.: 210, 1855 - *Lecidea pezizoidea* Ach., Lichenogr. Univ.: 182, 1810.

Syn.: *Lopadium muscicola* (Sommerf.) Körb., *Lopadium pezizoideum* var. *muscicola* (Sommerf.) Th. Fr. *p.p.*, *Sporopodium pezizoideum* var. *muscicola* (Sommerf.) Vain.

N - **Frl** (Tretiach & Hafellner 2000), **Ven** (Watson 2014), **TAA**, **Lomb**, **Piem** (Isocrono & al. 2004).

Cr/ Ch/ S/ Terr/ pH: 1-2, L: 3, X: 2-3, E: 1/ Alt: 4-5/ Alp: r, Salp: rr/ PT: 1/ Note: a circumboreal-montane lichen found on bryophytes and plant debris over siliceous rocks, with optimum above treeline; probably restricted to the Alps in Italy.

Loxospora A. Massal.
Ric. Auton. Lich. Crost.: 137, 1852.

A genus of *c.* 10, often sterile species occurring mostly as epiphytes in cool-temperate regions. Six species are restricted to the Northern Hemisphere whereas three occur in Australasia and montane areas of Borneo, New Guinea and New Caledonia. The genus was formerly included into *Haematomma* in the Lecanorales, but is quite unrelated to it, and is now placed in the family Sarrameanaceae in the order Sarrameanales (see Kantvilas 2004b). Type: *L. elatina* (Ach.) A. Massal.

Loxospora cismonica (Beltr.) Hafellner

in Wirth, Flechten Baden-Württembergs: 511, 1987 - *Haematomma cismonicum* Beltr., Lich. Bassan.: 127, 1858.

N - **Frl** (Tretiach & Carvalho 1995), **Ven**.

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 2-3, X: 2, E: 1/ Alt: 3/ Mont: er/ PT: 0/ oc/ Note: a cool-temperate, suboceanic lichen found on mature trees (mostly *Abies*) in humid, old forests, mostly in the montane belt. It is included in the Italian red list of epiphytic lichens as “Critically Endangered” (Nascimbene & al. 2013c).

Loxospora elatina (Ach.) A. Massal.

Ric. Auton. Lich. Crost.: 138, 1852 - *Lecanora elatina* Ach., Lichenogr. Univ.: 387, 1810.

Syn.: *Haematomma elatinum* (Ach.) A. Massal., *Lecanora chloropolia* (Erichsen) Almb.?, *Lecanora lutescens* Ach., *Pertusaria chloropolia* Erichsen?, *Pseudographis elatina* (Ach.) Nyl.

N - **Frl**, **Ven**, **TAA** (Thor & Nascimbene 2007, Nascimbene & al. 2007b, 2014, Nascimbene 2014, Nascimbene & Marini 2015, Nimis & al. 2015), **Lomb**.

Cr/ Ch/ A.s/ Epiph/ pH: 1-2, L: 2-3, X: 2-3, E: 1/ Alt: 3-4/ Salp: er, Mont: er/ PT: 0/ suboc/ Note: an epiphytic species found on *Abies* and *Picea*, more rarely on deciduous trees (*e.g.* *Betula*); certainly overlooked in the Alps, being most often sterile, but never common. It is included in the Italian red list of epiphytic lichens as “Endangered” (Nascimbene & al. 2013c).

Maronea A. Massal.
Flora, 18-19: 291, 1856.

A genus of *c.* 13 species, mainly found in tropical to warm-temperate regions, with one corticolous species widespread in Australasia. Early authors included the genus in the Acarosporaceae on account of the large number of spores in the asci, but the genus is closely related to *Fuscidea* in the Fuscideaceae; despite striking differences in ascocarp anatomy and spore number per ascus, the two genera share a unique ascus type and a distinctive type of epihymenial pigmentation (see Bylin & al. 2007). Type: *M. berica* A. Massal. (= *M. constans*).

Maronea constans (Nyl.) Hepp

Flecht. Eur.: nr. 771, 1860 - *Lecanora constans* Nyl., Mém. Soc. Sc. Nat. Cherbourg, 3: 199, 1855.

Syn.: *Acarospora constans* (Nyl.) H. Olivier, *Maronea berica* A. Massal.

N - VG (Castello 1996), **Ven** (Lazzarin 2000b), **Lomb**.

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 4-5, X: 3, E: 2-3/ Alt: 2-3/ Mont: er, SmedD: vr/ PT: 1/ Note: a mild-temperate lichen found on smooth bark, especially on twigs of deciduous, more rarely of coniferous trees; probably more frequent in the past. It is included in the Italian red list of epiphytic lichens as "Critically Endangered" (Nascimbene & al. 2013c).

Massalongia Körb.

Syst. Lich. Germ.: 109, 1855.

This genus includes 2 species in temperate to arctic regions of both Hemispheres, occurring on acid rocks or amongst mosses. Because of its apothecia, the genus was for a long time believed to belong to the Pannariaceae, but molecular data support its inclusion in the Peltigerinae (Jørgensen 2007). Wedin & al. (2007) showed that, together with *Polychidium* and *Leptochidium*, it forms a well-supported monophyletic group which is characterised by both molecular and morphological data; the three genera, which have a similar hemiangiocarpic ascoma ontogeny where only a few "cover cells" are produced, similarly built apothecia, and similar asci with an amyloid apical cap, are now placed in the Massalongiaceae (Wedin & al. 2007). Type: *M. carnososa* (Dicks.) Körb.

Massalongia carnososa (Dicks.) Körb.

Syst. Lich. Germ.: 109, 1855 - *Lichen carnosus* Dicks., Fasc. Pl. Crypt. Brit., 2: 21, 1790.

Syn.: *Biatora carnososa* (Dicks.) Rabenh., *Lecanora muscorum* Ach., *Pannaria muscorum* (Ach.) Delise, *Pannaria muscorum* var. *determinata* Nyl., *Pannularia muscorum* (Ach.) Stizenb.

N - FrI, TAA (UPS-L-166815), **Lomb, Piem** (Isocrono & al. 2004), **VA** (Valcuvia 2000), **Emil** (TSB 16659), **Lig. C - Sar. S - Cal** (Puntillo 1996).

Sq/ Cy.h/ S/ Terr/ pH: 1-2, L: 3-4, X: 2, E: 2/ Alt: 3-5/ Alp: er, Salp: er, Mont: er/ PT: 1/ Note: a circumpolar arctic-alpine to boreal-montane lichen found on bryophytes and soil rich in humus, on steeply inclined or underhanging faces near the ground level, with optimum above or near treeline in areas with siliceous substrata; the species is certainly most frequent in the Alps, but it also occurs in the mountains of Calabria.

Megalaria Hafellner

Beih. Nova Hedwigia, 79: 302, 1984.

This genus of the Ramalinaceae (see Miadlikowska & al. 2014) was separated from *Catinaria* to include the single species *M. grossa*, but it has subsequently been enlarged by the addition of numerous other morphologically similar taxa, and currently consists of c. 30 species from tropical, temperate and subpolar regions. The genus was originally characterised by asci with an axial body (barrel-shaped in the case of *M. grossa* but conical in other species), and by spores lacking a distinct perispore, until Ekman & Tønsberg (1996) included further characters, such as the texture of the excipulum and the reactions in KOH and HNO₃ of the insoluble apothecial pigments. See also Fryday & Lendemer (2010). Type: *M. grossa* (Nyl.) Hafellner

Megalaria grossa (Nyl.) Hafellner

Beih. Nova Hedwigia, 79: 302, 1984 - *Lecidea grossa* Pers. ex Nyl., Act. Soc. Linn. Bordeaux, 21: 385, 1856.

Syn.: *Catillaria grossa* (Nyl.) Körb., *Catillaria leucomplaca* auct. non (DC.) A. Massal., *Catillaria premnea* auct. p.p., *Catinaria grossa* (Nyl.) Vain., *Catinaria leucomplaca* auct. non (DC.) Zahlbr., *Lecidea premnea* Fr. non Ach.

N - Ven, Lomb, Emil. C - Tosc, Marc, Umb (Ravera 2000, Ravera & al. 2006), **Laz, Abr, Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **Sar** (Zedda 2002, 2002b, Rizzi & al. 2011). **S - Camp** (Aprile & al. 2003b, Nimis & Tretiach 2004), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si**.

Cr/ Tr/ S/ Epiph/ pH: 2-3, L: 3, X: 1-2, E: 1-2/ Alt: 2-3/ Mont: er, SmedD: er, SmedH: er/ PT: 0/ suboc/ Note: a mild-temperate to humid subtropical lichen found on base-rich bark of deciduous trees, especially of *Acer* and *Fraxinus*, locally still abundant in very humid forests of southern Italy but probably extinct in northern Italy. It is included in the Italian red list of epiphytic lichens as "Near-threatened" (Nascimbene & al. 2013c).

Megalaria laureri (Th. Fr.) Hafellner

in Nimis, The Lichens of Italy: 429, 1993 - *Catillaria laureri* Hepp ex Th. Fr., Lichenogr. Scand., 2: 582, 1874.

Syn.: *Biatorina intermixta* auct., *Catillaria intermixta* auct. non (Nyl.) Arnold ex Glow., *Catinaria intermixta* auct. non (Nyl.) P. James, *Catinaria laureri* (Th. Fr.) Degel., *Gyalecta livida* (Mudd) Zahlbr., *Phialopsis livida* Mudd

N - FrI, Ven (Nascimbene & al. 2005b), **Piem, VA** (Watson 2014). **C - Mol** (Caporale & al. 2008, Paoli & al. 2015), **Sar** (Cossu 2013). **S - Camp** (Aprile & al. 2003b), **Bas** (Puntillo & al. 2009, 2012), **Pugl** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996).

Cr/ Tr/ S/ Epiph/ pH: 1-2, L: 3, X: 1-2, E: 1-2/ Alt: 2-3/ Mont: er, SmedD: er, SmedH: er/ PT: 0/ suboc/ Note: a mild-temperate lichen found on bark of *Quercus* and *Fagus*, more rarely of *Abies* in humid forests, certainly declining. It is included in the Italian red list of epiphytic lichens as “Near-threatened” (Nascimbene & al. 2013c).

Megalaria pulverea (Borrer) Hafellner & E. Schreiner

in Schreiner & Hafellner, *Bibl. Lichenol.*, 45: 146, 1992 - *Lecidea pulverea* Borrer in Hooker & Sowerby, *Engl. Bot.*, Suppl. 2: tab. 2726, 1834.

Syn.: *Biatora commutata* (Ach.) Rabenh., *Biatorina commutata* (Ach.) A. Massal., *Biatorina pulverea* (Borrer) Mudd, *Catillaria incana* H. Olivier, *Catillaria pulverea* (Borrer) Lettau, *Catillochroma pulverea* (Borrer) Kalb, *Catinaria pulverea* (Borrer) Vězda & Poelt, *Pertusaria miniescens* Erichsen

N - TAA (Nascimbene & al. 2007b).

Cr/ Tr/ A.s/ Epiph/ pH: 1-2, L: 2-3, X: 1-2, E: 1/ Alt: 3/ Mont: er/ PT: 0/ suboc/ Note: a cool-temperate lichen found on bark and mossy trunks of deciduous trees and *Abies* in old, humid, montane woodlands. According to Printzen (1995) the ascus of *Biatora*-type and other anatomical characters do not support the inclusion of this species into *Megalaria*, but here I adopt a broad concept of the genus, following Fryday & Lendemer (2010).

Megalospora Meyen

in Meyen & Flotow, *N. Acta Leopoldin.-Carolin.*, 19, suppl.: 228, 1843.

This genus of the Megalosporaceae with c. 33 species is characterised, among other features, by the heavily inspersed hymenium in combination with the often large apothecia. Species with transversely septate ascospores can also be recognised by the large spore size, while taxa with muriform ascospores are easily confused with genera such as *Calopadia* in the Pilocarpaceae. For further details see Kantvilas & Lumbsch (2012). Type: *M. sulphurata* Meyen

Megalospora pachycarpa (Duby) H. Olivier

Exp. Syst. Descr. Lich. Ouest Fr., 2: 41, 1900 - *Patellaria pachycarpa* Delise ex Duby, *Bot. Gall.*, 2nd ed.: 655, 1830.

Syn.: *Bacidia tuberculosa* auct. non (Fée) Trevis., *Bombyliospora incana* A.L. Sm., *Bombyliospora pachycarpa* (Delise ex Duby) A. Massal., *Bombyliospora tuberculosa* auct. non (Fée) A. Massal., *Megalospora tuberculosa* auct. non (Fée) Sipman

N - Frl. C - Tosc.

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 3, X: 1-2, E: 1/ Alt: 3/ Mont: er/ PT: 1/ oc/ Note: a mainly pantropical species found on old deciduous (mainly *Fagus*) and coniferous (mainly *Abies*) trees in humid montane forests, sometimes overgrowing epiphytic bryophytes. It is included in the Italian red list of epiphytic lichens as “Critically Endangered” (Nascimbene & al. 2013c).

Megaspora (Clauzade & Cl. Roux) Hafellner & V. Wirth

in Wirth, *Flechten Baden-Württemb.*: 511, 1987 - *Aspicilia* subgen. *Megaspora* Clauzade & Cl. Roux, *Bull. Soc. Bot. Centre- Ouest*, n. s., 15: 139, 1984.

This small genus of the Megasporaceae (2 accepted varieties) was originally distinguished from *Aspicilia s.lat.* by its large, thick-walled ascospores and by having apothecia immersed in thalline verrucae, while it agreed with *Aspicilia s.lat.* in ascus-type (asci with a non-amyloid to pale amyloid tholus), presence of the pigment *Caesiocinerea*-green in the epihymenium, simple and hyaline ascospores, and branched and anastomosing paraphysoids. In the molecular revision of *Aspicilia s.lat.* by Nordin & al. (2010) the genus *Megaspora* is retained, although it appears to be very closely related to *Circinaria*. Type: *M. verrucosa* (Ach.) Hafellner & V. Wirth

Megaspora verrucosa (Ach.) Arcadia & A. Nordin

Taxon, 61: 465, 2012 - *Urceolaria verrucosa* Ach., *Lichenogr. Univ.*: 339, 1810.

Syn.: *Amygdalaria verrucosa* (Ach.) Norman, *Aspicilia verrucosa* (Ach.) Körb., *Lecanora urceolaria* (Fr.) Wetmore, *Pachyospora verrucosa* (Ach.) A. Massal., *Pertusaria freyi* Erichsen, *Urceolaria scruposa* var. *verrucosa* (Ach.) Schaer.

N - Frl, Ven (Caniglia & al. 1999, Nascimbene & Caniglia 2003c, Thor & Nascimbene 2007, Nascimbene 2008c), TAA (Nascimbene & al. 2006, Nascimbene 2008b, Hafellner & al. 2012), Lomb (Dalle Vedove & al. 2004), Piem (Isocrono & al. 2004, Morisi 2005, Matteucci & al. 2013), VA (Pierivittori & Isocrono 1999), Emil, Lig. C - Tosc (TSB 16387), Marc (Nimis & Tretiach 1999), Umb (Genovesi & al. 2001, Ravera & al. 2006), Laz, Abr (Nimis & Tretiach 1999), Mol (Nimis & Tretiach 2004, Caporale & al. 2008, Genovesi & Ravera 2014), Sar. S - Camp (Aprile & al. 2003b, Garofalo & al. 2010), Bas (Nimis & Tretiach 1999), Cal (Puntillo 1996), Si (Ottonello 1996).

Cr/ Ch/ S/ Terr/ pH: 3-4, L: 4-5, X: 3-4, E: 1-3/ Alt: 3-5/ Alp: c, Salp: ec, Orom: rr, Mont: vr/ PT: 1/ Note: a circumpolar, arctic-alpine lichen found on mosses and plant debris over calciferous ground in open situations, with optimum above treeline but descending to lower altitudes in dry-continental areas; common both in the Alps and in the Apennines. For nomenclatural matters see Arcadia & Nordin (2012).

Megaspora verrucosa var. **mutabilis** (Ach.) Nimis & Cl. Roux

in Nimis, The Lichens of Italy: 430, 1993 - *Urceolaria mutabilis* Ach., Lichenogr. Univ.: 335, 1810.

Syn.: *Aspicilia mutabilis* (Ach.) Körb., *Lecanora mutabilis* (Ach.) Nyl., *Pachyospora mutabilis* (Ach.) A. Massal., *Patellaria mutabilis* (Ach.) Trevis., *Pertusaria lapieana* B. de Lesd.

N - **VG**, **Ven** (Nascimbene & Caniglia 2000, 2003c), **Lomb**, **Piem** (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999), **Emil**, **C** - **Tosc** (Benesperi 2007), **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera 1998, Ravera & al. 2006), **Laz** (Fornasier & al. 2005), **Abr** (Recchia & al. 1993, Olivieri & Pacioni 1996, Olivieri & al. 1997, 1997b, Loppi & al. 1999, Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **S** - **Cal** (Puntillo 1996), **Si** (Grillo 1996).

Cr/ Ch/ S/ Epiph/ pH: 3, L: 4, X: 3-4, E: 2-3/ Alt: 2-4/ Salp: er, Mont: r, SmedD: vr, SmedH: vr/ PT: 1/

Note: on basal parts of old deciduous trees; most frequent in central Italy; doubtfully distinct from the typical variety.

Melanelia Essl.

Mycotaxon, 7: 46, 1978.

The genus *Melanelia* was segregated from *Parmelia s.lat.* to include c. 40 species with a brown thallus. Four species were transferred by Thell (1995) from *Cetraria*, based mainly on reproductive, morphological and anatomical characters. Subsequent molecular, chemical and morphological studies have shown that the genus was not monophyletic. Blanco & al. (2004) created two new genera, *Melanelixia* and *Melanohalea*, while the *Melanelia disjuncta*-group forms the new genus *Montanelia* (Divakar & al. 2012). *Melanelia stygia*, the type species of the genus, is placed outside the parmelioid lichens, while the *M. commixta*-group is in a different clade (see e.g. Thell & al. 2004, 2009, and the note on *Cetrariella*). As a result, *Melanelia s.str.* now includes 6 species only, 3 of which occur in Italy. Type: *M. stygia* (L.) Essl.

Melanelia agnata (Nyl.) A. Thell

Nova Hedwigia, 60: 416, 1995 - *Platysma agnatum* Nyl., Flora, 60: 562, 1877.

N - **TAA** (M 0024165).

Fol. b/ Ch/ S/ Sax/ pH: 1-2, L: 4, X: 3-4, E: 2-3/ Alt: 4-5/ Alp: er, Salp: er/ PT: 1/ Note: a rather neglected, arctic-alpine and circumpolar species described from Italy and also known from Switzerland and France, growing on acid siliceous rocks near and above treeline. The type, collected by Arnold, is from the surroundings of Brenner Pass in South Tyrol.

Melanelia hepatizon (Ach.) A. Thell

Nova Hedwigia, 60: 419, 1995 - *Lichen hepatizon* Ach., Lichenogr. Suec. Prodr.: 110, 1799.

Syn.: *Cetraria fahlunensis* auct. p.p. non (L.) Schaer., *Cetraria hepatizon* (Ach.) Vain., *Cetraria polyschiza* (Nyl.) Jatta, *Imbricaria fahlunensis* auct. p.p., *Parmelia fahlunensis* auct. p.p., *Parmelia fahlunensis* var. *hepatizon* (Ach.) Ach., *Platysma hepatizon* (Ach.) Vain., *Platysma polyschizum* Nyl., *Tuckermannopsis hepatizon* (Ach.) Kurok.

N - **Frl** (Tretiach & Hafellner 2000), **Ven** (Nascimbene & Caniglia 2002c, Watson 2014), **TAA** (Caniglia & al. 2002, Nascimbene & Caniglia 2002c, Thell & al. 2002, 2004, 2009, Nascimbene 2006c, Nascimbene & al. 2006e), **Lomb**, **Piem** (Morisi & Sereno 1995, Isocrono & al. 2004, Morisi 2005, Rico & al. 2005, Isocrono & Piervittori 2008), **VA** (Piervittori & Isocrono 1999), **C** - **Sar**, **S** - **Si**.

Fol. b/ Ch/ S/ Sax/ pH: 1-2, L: 4, X: 3-4, E: 1-3/ Alt: 3-5/ Alp: c, Salp: r, Orom: vr, Mont: er/ PT: 1/ Note: a circumpolar, arctic-alpine lichen found on hard siliceous rocks wetted by rain, with optimum above treeline; somehow less bound to cold-humid sites than the similar but unrelated *Cetrariella commixta*; widespread in the Alps, much rarer in the high Mediterranean mountains.

Melanelia stygia (L.) Essl.

Mycotaxon, 7: 47, 1978 - *Lichen stygius* L., Sp. Pl., 2: 1143, 1753.

Syn.: *Cetraria stygia* (L.) Schaer., *Cornicularia stygia* (L.) Nyl., *Imbricaria stygia* (L.) DC., *Lichen fahlunensis* L., *Parmelia fahlunensis* var. *stygia* (L.) Schaer., *Parmelia reagens* (Servit) Gyeln., *Parmelia stygia* (L.) Ach.

N - **Frl** (Tretiach & Hafellner 2000), **Ven**, **TAA** (Caniglia & al. 2002, Thell & al. 2002, 2004, 2009), **Lomb**, **Piem** (Isocrono & al. 2004), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999), **C** - **Sar**, **S** - **Cal** (Puntillo 1996).

Fol.n/ Ch/ S/ Sax/ pH: 1-2, L: 4-5, X: 3-4, E: 2-3/ Alt: 3-6/ Alp: vc, Salp: rc, Orom: er, Mont: vr/ PT: 1/ Note: a circumpolar, arctic-alpine lichen found on siliceous rocks in open habitats, with optimum near and above treeline; widespread in the Alps, where it reaches the nival belt, much rarer in the high Mediterranean mountains. Specimens from Calabria and Sardegna (TSB) are worthy of further study.

M e l a n e l i x i a O. Blanco, A. Crespo, Divakar, Essl., D. Hawksw. & Lumbsch

Mycol. Res., 108: 881, 2004.

Melanelixia (with *M. exasperata* as the type species), is a recent segregate of *Melanelia s.lat.*, based on molecular and morphological data (Blanco & al. 2004), which includes c. 15 species mainly distributed in the Northern Hemisphere. The genus is characterised by a pored or fenestrated epicortex, the lack of pseudocyphellae, and the production of lecanoric acid. For further details see e.g. Crespo & al. (2010). Type: *M. glabra* (Schaer.) O. Blanco & al.

Melanelixia fuliginosa (Duby) O. Blanco, A. Crespo, Divakar, Essl., D. Hawksw. & Lumbsch

Mycol. Res., 108: 881, 2004 - *Parmelia olivacea* var. *fuliginosa* Fr. ex Duby, Bot. Gall.: 602, 1830.

Syn.: *Melanelixia fuliginosa* (Duby) Essl., *Parmelia fuliginosa* (Duby) Nyl. non (Ach.) Schaer., *Parmelia glabrata* subsp. *fuliginosa* (Duby) J.R. Laundon, *Parmelia glabrata* var. *fuliginosa* (Duby) Grummann

N - **Ven** (Nascimbene & al. 2013b), **TAA** (Nascimbene & al. 2007b), **Lomb**, **Piem** (Morisi & Sereno 1995), **VA** (Matteucci & al. 2008c), **Lig** (Arup & Sandler 2011). **C** - **Tosc**, **Laz**, **Abr**, **Sar** (Monte 1993, Cossu & al. 2015). **S** - **Camp**, **Bas**, **Cal**, **Si**.

Fol.n/ Ch/ S/ Sax/ pH: 1-2, L: 3-5, X: 3-4, E: 2-3/ Alt: 2-4/ Salp: r, Orom: r, Mont: r, SmedD: vr/ PT: 1-2/. Note: a mainly silicicolous species (see Arup & Sandler Berlin 2011); the greatest majority of the post-1993 records of *M. fuliginosa* from Italy refer to *M. glabrata*.

Melanelixia glabra (Schaer.) O. Blanco, A. Crespo, Divakar, Essl., D. Hawksw. & Lumbsch

Mycol. Res., 108: 882, 2004 - *Parmelia olivacea* var. *corticola* f. *glabra* Schaer., Lich. Helv. Spicil., 10: 466, 1840.

Syn.: *Melanelixia glabra* (Schaer.) Essl., *Parmelia glabra* (Schaer.) Nyl., *Parmelia olivacea* auct. ital. p.p., *Parmelia olivacea* var. *glabra* (Schaer.) Linds., *Parmelia olivacea* var. *imbricata* A. Massal.

N - **VG** (Castello 1996, Castello & Skert 2005), **Frl** (Castello & Skert 2005), **Ven** (Nascimbene & Caniglia 1997, Caniglia & al. 1999, Lazzarin 2000, 2000b, Nascimbene 2005c, 2008c), **TAA** (Nascimbene 2003, Nascimbene & al. 2007b, Zarabska & al. 2009, Nimis & al. 2015), **Lomb** (Zocchi & al. 1997, Arosio & al. 2003, Abramini & al. 2008, Furlanetto 2010), **Piem** (Morisi & Sereno 1995, Clerc & al. 1999, Isocrono & Falletti 1999, Piervittori 2003, Isocrono & al. 2004, 2005b, 2006, Griselli & al. 2003, Morisi 2005, Isocrono & Piervittori 2008, Furlanetto 2010, Matteucci & al. 2010), **VA** (Piervittori & Maffei 1996, 2001, Piervittori & Isocrono 1999, Piervittori & al. 2001), **Emil** (Bassi 1995, Nimis & al. 1996, Tretiach & al. 2008, Benesperi 2009), **Lig** (Brunialti & al. 1999, Brunialti & Giordani 2003). **C** - **Tosc** (Tretiach & Nimis 1994, Loppi & al. 1997, 2002b, Monaci & al. 1997, Loppi & Nascimbene 1998, Putortì & Loppi 1999b, Paoli & Loppi 2001, Benesperi & al. 2007, Lastrucci & al. 2009, Benesperi 2011, Brackel 2015), **Marc** (Nimis & Tretiach 1999, Frati & Brunialti 2006, Brackel 2015), **Umb** (Ravera 1998, Nimis & Tretiach 1999, Panfilì 2007, Brackel 2015), **Laz** (Massari & Ravera 2002, Nimis & Tretiach 2004, Ruisi & al. 2005, Zucconi & al. 2013, Brackel 2015), **Abr** (Recchia & al. 1993, Olivieri & Pacioni 1996, Olivieri & al. 1997, 1997b, Loppi & al. 1999, Nimis & Tretiach 1999, Brackel 2015, Catalano & al. 2016, Corona & al. 2016), **Mol** (Garofalo & al. 1999, Nimis & Tretiach 1999, Caporale & al. 2008, Genovesi & Ravera 2014, Brackel 2015, Paoli & al. 2015), **Sar** (Zedda 2002). **S** - **Camp** (Garofalo & al. 1999, 2010, Aprile & al. 2003, 2003b, Nimis & Tretiach 2004, Nascimbene & al. 2010b, Brunialti & al. 2013, Ravera & Brunialti 2013, Catalano & al. 2016), **Pugl** (Garofalo & al. 1999, Nimis & Tretiach 1999, Brackel 2011), **Bas** (Bartoli & Puntillo 1998, Nimis & Tretiach 1999, Fascetti & al. 2005, Potenza 2006, Potenza & al. 2010, Brackel 2011, Ertz & al. 2015), **Cal** (Puntillo 1996, Puntillo & Puntillo 2004, Incerti & Nimis 2006), **Si** (Nimis & al. 1996b, Grillo & Cristaudo 1995, Ottonello 1996, Czczuga & al. 1999, Grillo & Caniglia 2004, 2006, Merlo 2004b, Falco Scampatelli 2005, Brackel 2008b).

Fol.b/ Ch/ S/ Epiph/ pH: 2-3, L: 4-5, X: 3-4, E: 2-3/ Alt: 1-3/ Mont: rr, SmedD: vc, Pad: er, SmedH: c, MedH: er, MedD: er/ PT: 1-2/ Note: a mild-temperate lichen found on more or less isolated, mostly deciduous trees; optimum in the submediterranean belt, but common also in the beech belt of the southern mountains and of the western Alps; ecologically similar to *Pleurosticta acetabulum*.

Melanelixia glabrata (Lamy) Sandler & Arup

in Arup & Sandler Berlin, Lichenologist, 43: 96, 2011 - *Parmelia fuliginosa* subsp. *glabrata* Lamy, Bull. Soc. bot. Fr., 30: 353, 1883.

Syn.: *Imbricaria olivacea* var. *isidioides* auct. ital., *Melanelixia glabrata* (Lamy) Essl., *Parmelia budae* (Gyeln.) Gyeln., *Parmelia ferruginascens* (Rosend.) Gyeln., *Parmelia flotowiana* Gyeln., *Parmelia fuliginosa* var. *laetevirens* (Flot.) Nyl., *Parmelia glabrata* (Lamy) Nyl., *Parmelia laetevirens* (Flot.) F. Rosend., *Parmelia olivacea* var. *pannosa* Beltr.

N - **VG** (Castello 1996, 2002, Carvalho 1997, Martellos & Castello 2004, Castello & Skert 2005), **Frl** (Badin & Nimis 1996, Lazzarin 1997, Tretiach & Molaro 2007), **Ven** (Nascimbene & Caniglia 1997, Caniglia & al. 1999, Lazzarin 2000, Valcuvia & al. 2000c, Nascimbene 2006c, 2011, Nascimbene & al. 2005b, 2006c, 2007, Nascimbene & Marini 2010), **TAA** (Nascimbene & Caniglia 2000b, Gottardini & al. 2004, Nascimbene & al. 2007b, 2010, 2014, Zarabska & al. 2009, Nascimbene 2013, 2014, Nascimbene & Marini 2015, Nimis & al. 2015), **Lomb** (Rivellini 1994, Alessio & al. 1995, Zocchi & al. 1997, Roella 1999, Arosio & al. 2000, 2003, Valcuvia & al. 2003, Stofer 2006, Furlanetto 2010), **Piem** (Caniglia & al. 1992, Morisi & Sereno 1995, Arosio & al. 1998, Piervittori 1989, 2003, Isocrono & Falletti 1999, Ricchiardone & al. 2002, Isocrono & al. 2004, 2005b, 2006, 2007, 2009, Griselli & al. 2003, Isocrono & Piervittori 2008, Furlanetto 2010, Matteucci & al. 2010, Giordani & Malaspina 2016), **VA** (Piervittori & Isocrono 1999, Valcuvia & al. 2000b, Piervittori & al. 2001, Matteucci & al. 2008, Isocrono & al. 2008), **Emil** (Bassi 1995, Nimis & al. 1996, Tretiach & al. 2008, Benesperi 2009), **Lig** (Castello & al. 1994, Brunialti & al. 1999, Giordani & al. 2001, Brunialti & Giordani 2003, Giordani 2006). **C** - **Tosc** (Loppi & al. 1992, 1996b, 1996c, 1997, 1997b, 1998, 2004c, 2006, Tretiach & Nimis 1994, Loppi & Putortì 1995b, 2001, Loppi & De Dominicis 1996b, Loppi 1996, Monaci & al. 1997, Loppi & Nascimbene 1998, 2010, Putortì & al. 1998, 1999, 1999b, Putortì & Loppi 1999b, Benesperi 2000a, Loppi & Pirsantos 2000, 2006, 2011, Lorenzini & al. 2003, Benesperi & al. 2007, Paoli & Loppi 2008, Lastrucci & al. 2009, Brunialti & Frati 2010, Loppi & Baragatti 2011, Brunialti & al. 2012b, Paoli & al. 2012, 2015d, Brackel 2015, Nascimbene & al. 2015), **Marc** (Gasparo & al. 1989, Nimis & Tretiach 1999, Frati & Brunialti 2006, Brackel 2015), **Umb** (Ravera 1998, Ravera & al. 2006, Panfilì 2007), **Laz** (Massari & Ravera 2002, Nimis & Tretiach 2004, Ruisi & al. 2005, Munzi & al. 2007, Brackel 2015), **Abr** (Recchia & al. 1993, Olivieri & al. 1997, 1997b, Loppi & al. 1999, Nimis & Tretiach 1999, Stofer 2006, Brackel 2015, Catalano & al. 2016), **Mol** (Garofalo & al. 1999, Caporale & al. 2008, Ravera & al. 2010, Paoli & al. 2015), **Sar** (Zedda 1995, 2002, Nöske 2000, Loi & al. 2000, Rizzi & al. 2011, Cossu 2013). **S** - **Camp** (Garofalo & al. 1999, 2010, Aprile & al. 2003b, 2011, Nimis & Tretiach 2004, Nascimbene & al. 2010b, Brunialti & al. 2013, Ravera & Brunialti 2013, Catalano & al. 2016), **Pugl** (Garofalo & al. 1999, Nimis & Tretiach 1999), **Bas** (Nimis &

Tretiach 1999, Potenza 2006, Brackel 2011), **Cal** (Puntillo 1996, Incerti & Nimis 2006), **Si** (Ottonello & al. 1994, Grillo & Cristaudo 1995, Ottonello 1996, Grillo 1998, Grillo & Caniglia 2004, 2006, Caniglia & Grillo 2006b, Falco Scampatellil 2005, Brackel 2008b).

Fol.b/ Ch/ A.i/ Epiph/ pH: 2-3, L: 3-4, X: 2-3, E: 2-3/ Alt: 1-4/ Salp: er, Mont: ec, SmedD: vc, Pad: r, SmedH: vc, MedH: rr, MedD: r/ PT: 1-3/ Note: a mainly temperate, ecologically wide-ranging species occurring both on wayside trees and in open forests (e.g. on *Fagus*). The greatest majority of the post-1993 records of *M. fuliginosa* from Italy refer to this epiphytic species. For further details see Arup & Sandler Berlin (2011).

Melanelixia subargentifera (Nyl.) O. Blanco, A. Crespo, Divakar, Essl., D. Hawksw. & Lumbsch

Mycol. Res., 108: 882, 2004 - *Parmelia subargentifera* Nyl., Flora, 58: 359, 1875.

Syn.: *Melanelixia subargentifera* (Nyl.) Essl., *Parmelia conspurcata* (Schaer.) Vain., *Parmelia soreliomanes* (Nyl.) Gyeln., *Parmelia verruculifera* auct. p.p. non Nyl.

N - **VG**, **Frl**, **Ven** (Caniglia & al. 1999, Lazzarin 2000, 2000b, Nascimbene & Caniglia 2002, 2003c, Nascimbene 2005c), **TAA** (Philippi 1983, Nascimbene 2003, 2005b, 2008b, 2014, Thor & Nascimbene 2007, Nascimbene & al. 2007b, Zarabska & al. 2009, Nimis & al. 2015), **Lomb** (Arosio & al. 2003, Chiappetta & al. 2005, Furlanetto 2010, Brackel 2013), **Piem** (Morisi & Sereno 1995, Clerc & al. 1999, Piervittori 2003, Isocrono & al. 2005b, Furlanetto 2010), **VA** (Piervittori & Maffei 1996, 2001, Piervittori & Isocrono 1999), **Emil** (Gasparo & Tretiach 1996), **Lig** (Giordani & Brunialti 2000), **C** - **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera 1998, Ravera & al. 2006), **Abr** (Recchia & al. 1993, Olivieri & al. 1997, 1997b, Loppi & al. 1999, Nimis & Tretiach 1999, Brackel 2015), **Mol** (Paoli & al. 2015), **S** - **Bas** (Potenza & al. 2014).

Fol.b/ Ch/ A.s/ Epiph/ pH: 2-4, L: 4-5, X: 3-4, E: 2-3/ Alt: 2-4/ Salp: er, Mont: vr, SmedD: r/ PT: 1-2/ subc/ Note: a temperate lichen of areas with a continental climate, found on the bark of isolated deciduous trees; most common in the dry-warm Alpine valleys, and extending into upland areas along the eastern side of the Peninsula, especially in the internal valleys of the Apennines.

Melanelixia subaurifera (Nyl.) O. Blanco, A. Crespo, Divakar, Essl., D. Hawksw. & Lumbsch

Mycol. Res., 108: 882, 2004 - *Parmelia subaurifera* Nyl., Flora, 56: 22, 1873.

Syn.: *Melanelixia subaurifera* (Nyl.) Essl., *Parmelia olivacea* var. *subaurifera* (Nyl.) O.J. Rich.

N - **VG** (Castello 1996, 2002, Carvalho 1997, Martellos & Castello 2004, Castello & Skert 2005), **Frl** (Badin & Nimis 1996, Castello & Skert 2005, Tretiach & Molaro 2007), **Ven** (Nascimbene & Caniglia 1997, 2000b, 2002c, 2003c, Lazzarin 1997, 2000, Caniglia & al. 1999, Valcuvia & al. 2000c, Nascimbene 2005c, 2008, 2008c, Nascimbene & al. 2005b, 2006, 2006c, 2006e, 2007, 2009c, 2010b, 2013b, 2008b, Nascimbene & Marini 2007, 2010, Brackel 2013), **TAA** (Nascimbene & Caniglia 2000b, Nascimbene 2003, 2005b, 2006b, 2006c, 2014, Nascimbene & al. 2006e, 2007b, 2014, Stofer 2006, Nascimbene & Marini 2015, Nimis & al. 2015), **Lomb** (Alessio & al. 1995, Arosio & Rinaldi 1995, Valcuvia & Gianatti 1995, Zocchi & al. 1997, Roella 1999, Arosio & al. 2000, 2003, Valcuvia & al. 2003, Dalle Vedove & al. 2004, Furlanetto 2010, Brackel 2010, Gheza & al. 2015), **Piem** (Caniglia & al. 1992, Arosio & al. 1998, Piervittori 1998, 2003, Isocrono & Falletti 1999, Isocrono & al. 2004, 2006, 2007, 2009, Griselli & al. 2003, Isocrono & Piervittori 2008, Furlanetto 2010, Matteucci & al. 2010, Giordani & Malaspina 2016), **VA** (Valcuvia 2000, Piervittori & al. 2001), **Emil** (Bassi 1995, Gasparo & Tretiach 1996, Nimis & al. 1996, Sallese 2003, Morselli & Regazzi 2006, Tretiach & al. 2008, Cioffi 2009), **Lig** (Castello & al. 1994, Brunialti & al. 1999, Putorti & al. 1999b, Valcuvia & al. 2000, Giordani & al. 2002, Brunialti & Giordani 2003, Giordani 2006), **C** - **Tosc** (Loppi & Corsini 1995, 2003, Loppi & al. 1995, 1996, 1996c, 1997b, 1997e, 1998, 1998b, 1999a, 2002, 2002b, 2002c, 2003, 2004, 2004c, 2006, Loppi & De Dominicis 1996b, Monaci & al. 1997, Loppi & Nascimbene 1998, 2010, Putorti & Loppi 1999, 1999b, Benesperi 2000a, 2011, Del Guasta 2001, Loppi & Putorti 2001, Paoli & Loppi 2001, Laganà & al. 2002, Loppi & Frati 2004, Benesperi & al. 2007, Lastrucci & al. 2009, Brunialti & Frati 2010, Loppi & Baragatti 2011, Brunialti & al. 2012b, Paoli & al. 2012, 2012b, 2013, Brackel 2015, Nascimbene & al. 2015), **Marc** (Gasparo & al. 1989, Nimis & Tretiach 1999, Frati & Brunialti 2006, Brackel 2015), **Umb** (Ravera 1998, Ravera & al. 2006, Panfili 2007), **Laz** (Massari & Ravera 2002, Ruisi & al. 2005, Munzi & al. 2007, Ravera 2008b, Ravera & Genovesi 2008, Zucconi & al. 2013, Brackel 2015), **Abr** (Recchia & al. 1993, Recchia & Villa 1996, Olivieri & al. 1997, 1997b, Loppi & al. 1999, Nimis & Tretiach 1999, Stofer 2006, Brackel 2015, Catalano & al. 2016, Corona & al. 2016), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008, Genovesi & Ravera 2014, Brackel 2015, Paoli & al. 2015), **Sar** (Zedda 1995, 2002, 2002b, Zedda & al. 2001, Stofer 2006, Rizzi & al. 2011, Cossu 2013), **S** - **Camp** (Aprile & al. 2003b, Nimis & Tretiach 2004, Brunialti & al. 2010, 2013, Nascimbene & al. 2010b, Garofalo & al. 2010, Ravera & Brunialti 2013, Catalano & al. 2016), **Pugl** (Nimis & Tretiach 1999, Brackel 2011), **Bas** (Nimis & Tretiach 1999, Brackel 2011), **Cal** (Puntillo 1995, 1996, Puntillo & Puntillo 2004, Incerti & Nimis 2006, Stofer 2006), **Si** (Nimis & al. 1994, Ottonello & al. 1994, Grillo & Cristaudo 1995, Czczuga & al. 1999, Merlo 2004, Grillo & Caniglia 2004, Stofer 2006, Brackel 2008b, Liistro & Cataldo 2011).

Fol.b/ Ch/ A.s/ Epiph/ pH: 2-3, L: 3-4, X: 2-3, E: 1-3/ Alt: 1-4/ Salp: vr, Mont: rc, SmedD: vc, Pad: vr, SmedH: vc, MedH: c, MedD: vr/ PT: 1-2/ Note: a mainly temperate, pioneer species of smooth bark, e.g. on twigs of shrubs and trees, but also on boles of oaks in open woodlands and parklands; common throughout the country, with optimum in the submediterranean belt.

M e l a n o h a l e a O. Blanco, A. Crespo, Divakar, Essl., D. Hawksw. & Lumbsch

Mycol. Res., 108: 882, 2004.

Melanohalea (with *M. exasperata* as the type species), is a recent segregate of *Melanelixia s.lat.* based on molecular and morphological data (Blanco & al. 2004), which includes c. 22 species, most of which have the primary distribution on bark and wood in the Northern Hemisphere, with a few species occurring in the Southern Hemisphere only. The genus is characterised by pseudocyphellae, usually on warts or isidial tips, a

non-pored epicortex, and a medulla containing depsidones or lacking secondary compounds. For further details see e.g. Crespo & al. (2010). A further species, *M. infumata*, is reported from Italy by Hawksworth & al. (2008), without details on the Italian distribution: this northern species, however, is likely to be absent from the Alps, having been often confused with saxicolous specimens of *M. elegantula* (see e.g. the note by Roux & coll. 2014: 703). Type: *M. exasperata* (De Not.) O. Blanco & al.

Melanohalea elegantula (Zahlbr.) O. Blanco, A. Crespo, Divakar, Essl., D. Hawksw. & Lumbsch

Mycol. Res., 108: 882, 2004 - *Parmelia olivacea* subsp. *aspidotata* var. *elegantula* Zahlbr., Verh. Ver. Nat. Heilk. Pressburg, 8: 39, 1894.

Syn.: *Collema exasperatum* Ach., *Melanelia elegantula* (Zahlbr.) Essl., *Melanelia incolorata* (Parrique) Essl., *Parmelia elegantula* (Zahlbr.) Szatala, *Parmelia exasperatula* var. *elegantula* (Zahlbr.) Zahlbr., *Parmelia incolorata* (Parrique) Lettau, *Parmelia jacquesii* Werner

N - VG (Castello 1996, Castello & Skert 2005), **Frl** (Tretiach & Molaro 2007), **Ven** (Nascimbene & Caniglia 1997, Caniglia & al. 1999, Nascimbene 2005c, Nascimbene & al. 2009c, Brackel 2013), **TAA** (Nascimbene 2003, Nascimbene & al. 2007b), **Lomb** (Rivellini 1994, Arosio & Rinaldi 1995, Zocchi & al. 1997, Roella 1999, Arosio & al. 2003, Stofer 2006, Brackel 2010, Furlanetto 2010), **Piem** (Morisi & Sereno 1995, Arosio & al. 1998, Isocrono & Falletti 1999, Piervittori 2003, Isocrono & al. 2004, 2007, Isocrono & Piervittori 2008, Furlanetto 2010, Matteucci & al. 2010, Giordani & Malaspina 2016), **VA** (Piervittori & Maffei 1996, Piervittori & Isocrono 1999, Valcuvia & al. 2000b, Matteucci & al. 2008, 2008c), **Emil** (Bassi 1995, Tretiach & al. 2008, Benesperi 2009, Gerdol & al. 2014), **Lig** (Brunialti & Giordani 2003). **C - Tosc** (Loppi & al. 1994, 1997, 1997b, 1998b, 2002, 2003, 2004c, 2006, Loppi & Putorti 1995b, Monaci & al. 1997, Loppi & Nascimbene 1998, 2010, Tretiach & Ganis 1999, Benesperi & al. 2007, Brunialti & Frati 2010, Benesperi 2011, Paoli & al. 2012, Brackel 2015), **Marc** (Gasparo & al. 1989, Nimis & Tretiach 1999, Brackel 2015), **Umb** (Ravera 1998, Ravera & al. 2006), **Laz** (Ravera 2001, 2002, 2008b, Massari & Ravera 2002, Ruisi & al. 2005, Munzi & al. 2007, Ravera & Genovesi 2008, Zucconi & al. 2013, Brackel 2015), **Abr** (Nimis & Tretiach 1999, Brackel 2015, Catalano & al. 2016, Corona & al. 2016), **Mol** (Nimis & Tretiach 1999, Ravera, Caporale & al. 2008, Genovesi & Ravera 2014), **Sar** (Zedda 1995, 2002, Loi & al. 2000, Rizzi & al. 2011), **S - Camp** (Aprile & al. 2002, 2003, Nimis & Tretiach 2004, Brunialti & al. 2010, 2013, Nascimbene & al. 2010b, Garofalo & al. 2010, Ravera & Brunialti 2013, Catalano & al. 2016), **Pugl** (Nimis & Tretiach 1999, Brackel 2011), **Bas** (Nimis & Tretiach 1999, Fascetti & al. 2005, Potenza 2006, Potenza & al. 2010, Brackel 2011), **Cal** (Puntillo 1995, 1996, Incerti & Nimis 2006, Stofer 2006, Brackel & Puntillo 2016), **Si** (Grillo & al. 1996, Grillo 1998, Grillo & Caniglia 2004, 2006, Falco Scampatelli 2005).

Fol.b/ Ch/ A.i/ Epiph-Sax/ pH: 2-3, L: 3-4, X: 3, E: 2-3/ Alt: 2-3/ Mont: rc, SmedD: vr, Pad: er, SmedH: r/ PT: 1/ Note: a mild-temperate lichen found on old trees (e.g. oaks, *Castanea*), more rarely on siliceous rocks (Roux & coll. 2014), with optimum in the montane belt; common in the Apennines, rare in northern Italy, and absent from urban areas.

Melanohalea exasperata (De Not.) O. Blanco, A. Crespo, Divakar, Essl., D. Hawksw. & Lumbsch

Mycol. Res., 108: 882, 2004 - *Parmelia exasperata* De Not., Giorn. Bot. Ital., 2: 193, 1847.

Syn.: *Imbricaria aspera* (A. Massal.) Körb., *Imbricaria aspidota* (Ach.) Rehm, *Melanelia exasperata* (De Not.) Essl., *Parmelia aspera* A. Massal., *Parmelia aspidota* (Ach.) Röhl., *Parmelia aspidota* var. *exasperata* (De Not.) P. Syd.

N - VG, Frl (Castello & Skert 2005, Tretiach & Molaro 2007, Bernini & al. 2010), **Ven** (Nimis & al. 1996c, Nascimbene & Caniglia 1997, Caniglia & al. 1999, Lazzarin 2000b, Nascimbene 2005c, 2008c, Nascimbene & Marini 2007), **TAA** (Nascimbene 2005b, Nascimbene & al. 2007b, Nimis & al. 2015), **Lomb** (Roella 1999, Furlanetto 2010), **Piem** (Caniglia & al. 1992, Isocrono & Falletti 1999, Isocrono & al. 2003, Piervittori 2003, Furlanetto 2010), **Emil** (Gasparo & Tretiach 1996, Benesperi 2009), **Lig** (Brunialti & Giordani 2000, Giordani & al. 2002, Brunialti & Giordani 2003). **C - Tosc** (Tretiach & Nimis 1994, Loppi & al. 1996b, 1998, 2002, 2006, Monaci & al. 1997, Putorti & al. 1998, Tretiach & Ganis 1999, Putorti & Loppi 1999b, Loppi & Frati 2006, Benesperi 2011, Brackel 2015), **Marc** (Gasparo & al. 1989, Nimis & Tretiach 1999, Frati & Brunialti 2006), **Umb** (Ravera 1998, Nimis & Tretiach 1999, Ravera & al. 2006, Panfili 2007, Brackel 2015), **Laz** (Nimis & Tretiach 2004, Ruisi & al. 2005, Brackel 2015), **Abr** (Nimis & Tretiach 1999, Brackel 2015, Catalano & al. 2016), **Mol** (Garofalo & al. 1999, Nimis & Tretiach 1999, Caporale & al. 2008, Genovesi & Ravera 2014), **Sar** (Zedda 1995, 2002, Zedda & al. 2001, Rizzi & al. 2011, Cossu 2013). **S - Camp** (Garofalo & al. 1999, 2010, Aprile & al. 2003, 2003b, 2011, Nimis & Tretiach 2004, Nascimbene & al. 2010b, Brunialti & al. 2013, Ravera & Brunialti 2013, Catalano & al. 2016), **Pugl** (Garofalo & al. 1999, Nimis & Tretiach 1999, Durini & Medagli 2004, Brackel 2011), **Bas** (Nimis & Tretiach 1999, Potenza 2006, Brackel 2011), **Cal** (Puntillo 1995, 1996, van den Boom & Giralt 2002, Puntillo & Puntillo 2004, Incerti & Nimis 2006), **Si** (Grillo & Cristaudo 1995, Merlo 2004b, Falco Scampatelli 2005, Caniglia & Grillo 2006b, Iacolino & Ottonello 2006, Brackel 2008b, 2008c, Di Martino & Stancanelli 2015).

Fol.b/ Ch/ S/ Epiph/ pH: 2-3, L: 4-5, X: 3-4, E: 2-3/ Alt: 1-3/ Mont: rr, SmedD: rc, Pad: er, SmedH: c, MedH: rc, MedD: rr/ PT: 1-2/ p/ Note: a mainly temperate to Mediterranean early coloniser of smooth bark, most common on twigs of shrubs and deciduous trees (e.g. *Prunus*, *Quercus*) below the subalpine belt.

Melanohalea exasperatula (Nyl.) O. Blanco, A. Crespo, Divakar, Essl., D. Hawksw. & Lumbsch

Mycol. Res., 108: 882, 2004 - *Parmelia exasperatula* Nyl., Flora, 56: 299, 1873.

Syn.: *Imbricaria olivacea* f. *papulosa* Anzi, *Melanelia exasperatula* (Nyl.) Essl., *Parmelia aspidota* var. *exasperatula* (Nyl.) P. Syd., *Parmelia papulosa* (Anzi) Vain. non Mont.

N - VG (Castello 1996), **Frl** (Badin & Nimis 1996, Tretiach & Molaro 2007, Bernini & al. 2010), **Ven** (Nimis & al. 1996c, Nascimbene & Caniglia 1997, 2002c, 2003c, Caniglia & al. 1999, Lazzarin 2000, Valcuvia & al. 2000c, Nascimbene 2005c, 2008, 2008c, Nascimbene & Marini 2007, Nascimbene & al. 2009, Brackel 2013), **TAA** (Philippi 1983, Caniglia & al. 2002, Nascimbene 2003, 2006c, 2008b, 2013, 2014, 2014c, Nascimbene & al. 2005, 2006, 2006e, 2014, Zarabska & al. 2009, Nascimbene & Marini 2015, Nimis & al. 2015), **Lomb** (Arosio & Rinaldi 1995, Valcuvia & Gianatti 1995, Valcuvia & Brusoni 1996, Arosio & al. 2000, 2003, Valcuvia & al. 2003, Dalle Vedove & al. 2004,

Anderi & al. 2005, Nascimbene & al. 2006e, Stofer 2006, Gheza & al. 2015), **Piem** (Caniglia & al. 1992, Morisi & Sereno 1995, Arosio & al. 1998, Isocrono & Falletti 1999, Piervittori 2003, Isocrono & al. 2004, 2005b, 2007, 2009, Griselli & al. 2003, Isocrono & Piervittori 2008, Furlanetto 2010, Matteucci & al. 2010), **VA** (Piervittori & Maffei 1996, 2001, Piervittori & Isocrono 1999, Valcuvia & al. 2000b, Piervittori & al. 2001, Matteucci & al. 2008, 2008c), **Emil** (Bassi 1995, Gasparo & Tretiach 1996, Nimis & al. 1996, Dalle Vedove & al. 2002, Morselli & Regazzi 2006, Benesperi 2009, Brackel 2015), **Lig** (Brunialti & al. 2001, Giordani & al. 2002), **C - Tosc** (Loppi & al. 1994, 1997b, 2002, 2002b, 2003, 2006, Tretiach & Nimis 1994, Monaci & al. 1997, Paoli & Loppi 2008, Benesperi 2011, Brackel 2015), **Marc** (Gasparo & al. 1989, Nimis & Tretiach 1999, Frati & Brunialti 2006, Genovesi & Ravera 2014), **Umb** (Ravera 1998), **Laz** (Ravera & al. 2003, Ruisi & al. 2005, Munzi & al. 2007, Brackel 2015), **Abr** (Nimis & Tretiach 1999, Brackel 2015), **Mol** (Ravera & Genovesi 2012), **Sar** (Zedda 1995, 2002, Rizzi & al. 2011, Cossu 2013), **S - Camp** (Aprile & al. 2003, 2003b, 2011, Nascimbene & al. 2010b, Garofalo & al. 2010, Ravera & Brunialti 2013, Catalano & al. 2016), **Pugl** (Brackel 2011), **Bas** (Potenza 2006, Brackel 2011, Potenza & Fascetti 2012), **Cal** (Puntillo 1995, 1996, Incerti & Nimis 2006), **Si** (Falco Scampatelli 2005, Brackel 2008b).

Fol.b/ Ch/ A.i/ Epiph/ pH: 2-3, L: 3-5, X: 3, E: 3/ Alt: 2-4/ Salp: ec, Mont: rc, SmedD: vr, Pad: er, SmedH: vr/ PT: 1-3/ Note: a cool-temperate to boreal-montane, circumpolar lichen found on isolated trees, especially on twigs and sometimes even on conifer needles, in *Xanthorion* communities; especially common on twigs of *Larix* throughout the Alps.

Melanohalea laciniatula (H. Olivier) O. Blanco, A. Crespo, Divakar, Essl., D. Hawksw. & Lumbsch
Mycol. Res., 108: 882, 2004 - *Parmelia exasperatula* var. *laciniatula* Flagey ex H. Olivier, Rev. Bot. Bull. Mens., 12: 69, 1894.

Syn.: *Melanelia laciniatula* (H. Olivier) Essl., *Parmelia laciniatula* (H. Olivier) Zahlbr.

N - Frl, Ven, Piem (Matteucci & al. 2010), **Lig** (Giordani & al. 2002), **C - Tosc** (Loppi & al. 1994, Tretiach & Nimis 1994, Benesperi & al. 2007, Benesperi 2011, Nascimbene & al. 2015), **Umb** (Ravera 1998, Ravera & al. 2006), **Laz** (Massari & Ravera 2002), **Abr** (Stofer 2006), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008, Ravera & al. 2010), **Sar** (Nöske 2000, Zedda 2002, Rizzi & al. 2011, Cossu 2013), **S - Camp** (Aprile & al. 2003b, 2011, Nimis & Tretiach 2004, Garofalo & al. 2010, Catalano & al. 2016), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996, Incerti & Nimis 2006), **Si** (Falco Scampatelli 2005).

Fol.b/ Ch/ A.i/ Epiph/ pH: 1-2, L: 3, X: 2, E: 2-3/ Alt: 2-3/ Mont: rc, SmedH: vr/ PT: 1/ Note: a mainly Mediterranean-montane species found on the smooth bark of old deciduous trees, especially *Fagus*, in open, humid, mostly montane forests; most abundant in the Apennines, perhaps declining in the Alps, absent from urban areas.

Melanohalea olivacea (L.) O. Blanco, A. Crespo, Divakar, Essl., D. Hawksw. & Lumbsch

Mycol. Res., 108: 882, 2004 - *Lichen olivaceus* L., Sp. Pl.: 1143, 1753, *nom. cons.*

Syn.: *Imbricaria olivacea* (L.) DC., *Melanelia olivacea* (L.) Essl., *Parmelia olivacea* (L.) Ach.

N - Ven, Lomb (Alessio & al. 1995), **VA** (Piervittori & Isocrono 1999).

Fol.b/ Ch/ S/ Epiph/ pH: 1-2, L: 4-5, X: 3, E: 1/ Alt: 3-4/ Salp: er, Mont: er/ PT: 1/ Note: a circumboreal-montane species, mostly found on *Betula* in cold, but sunny situations and in upland areas. The epithet "*olivacea*" was used in the past for several other species of this group; all earlier records from Italy are unreliable, including that of Ahti from the Euganean Hills (see Nimis 1993: 479); the recent ones from Lombardia and Valle d'Aosta need confirmation. The species, however, was recently reported from several localities in Switzerland.

Melanolecia Hertel

in Poelt & Vězda, Bibl. Lichenol., 16: 364, 1981.

The genus *Melanolecia*, as originally delimited, proved to be heterogeneous: the species with an amyloid ascus tip were segregated into the genus *Farnoldia*, leaving a single species in *Melanolecia s.str.* Type: *M. transitoria* (Arnold) Hertel

Melanolecia transitoria (Arnold) Hertel

in Poelt & Vězda, Bibl. Lichenol., 16: 365, 1981 - *Lecidea transitoria* Arnold, Flora, 53: 123, 1870.

Syn.: *Lecidea henricii* Zahlbr., *Lecidea subcoeruleascens* Arnold, *Tremolecia transitoria* (Arnold) Hertel

N - Ven (Hertel & Schuhwerk 2010), **TAA** (Hertel & Schuhwerk 2010), **Piem**.

Cr.end/ Ch/ S/ Sax/ pH: 4-5, L: 3-4, X: 3, E: 1/ Alt: 5-6/ Alp: vr/ PT: 1/ Note: a circumpolar, arctic-alpine lichen found on inclined to underhanging surfaces of calcareous rocks above treeline; probably restricted to the Alps, where it reaches the nival belt.

Melaspilea Nyl.

Act. Soc. Linn. Bordeaux, ser A, 21: 416, 1857.

The genus *Melaspilea*, in its original circumscription, was characterised by lirelliform apothecioid ascomata, an exciple composed of several cell layers, and brown 1-septate ascospores; it included c. 66 species, most of which are lichenised, except a dozen lichenicolous species. A molecular revision of the Melaspileaceae was published by Ertz & Diederich (2015), who showed that this is a heterogeneous group, with members placed in two main lineages of Dothideomycetes. The genera *Buelliella*, *Karschia*, *Labrocarpon* and several

members of *Melaspilea* proved to belong to Asterinales, and the genera *Melaspilella*, *Melaspileopsis*, and *Stictographa* were reinstated for former *Melaspilea*-species now placed in Asterinales. Some poorly known species are likely to be transferred to other genera in the next future. Type: *M. arthonioides* (Fée) Nyl.

Melaspilea bagliettoana Zahlbr.

Ann. naturhist. Hofmus. Wien, 19: 413, 1904.

Syn.: *Melaspilea opegraphoides* Bagl. non Nyl.

C - Tosc, Sar. S - Si (Grillo & al. 2002, Grillo & Caniglia 2004)

Cr/ Tr/ S/ Epiph/ pH: 3, L: 3, X: 3, E: 1-2/ Alt: 1-2/ SmedH: vr, MedH: vr/ PT: 1/ suboc/ Note: a mild-temperate lichen found on smooth bark of trees and shrubs such as *Fraxinus ornus* and *Nerium*; mostly Tyrrhenian, very much overlooked. The species, which might belong to the genus *Melaspilella* (Ertz & Diederich 2015), is included in the Italian red list of epiphytic lichens as "Data Deficient" (Nascimbene & al. 2013c).

Melaspilea enteroleuca (Ach.) Ertz & Diederich

Fungal Divers., 71: 151, 2015 - *Lecidea enteroleuca* Ach., Lich.Univ.: 177, 1810.

Syn.: *Abrothallus ricasolii* A. Massal., *Buellia ricasolii* (A. Massal.) A. Massal., *Buellia ricasolii* var. *hysteroides* A. Massal., *Catillaria ricasolii* (A. Massal.) A. Massal., *Lecidea sparsa* Dufour, *Melaspilea arthonioides* auct. non (Fée) Nyl., *Melaspilea urceolata* auct. eur. non (Fr.) Ertz & Diederich, *Poetschia arthonioides* auct. non (Fée) Stein

N - VG (Tretiach & Carvalho 1995), **Frl, Ven** (Lazzarin 2000), **TAA** (Nascimbene & al. 2007b), **Lomb, Emil** (Gasparo & Tretiach 1996), **Lig, C - Tosc** (Loppi & Frati 2006, Lazzarin 2000), **Marc** (Nimis & Tretiach 1999, Frati & al. 2004, Frati & Brunialti 2006), **Laz** (TSB 26112), **Abr** (Recchia & al. 1993), **Sar, S - Camp, Pugl** (Nimis & Tretiach 1999), **Si**,

Cr/ Tr/ S/ Epiph/ pH: 1-2, L: 3, X: 2-3, E: 1-2/ Alt: 1-2/ SmedD: er, SmedH: vr, MedH: er/ PT: 1/ suboc/ Note: a mild-temperate species found on hard bark of deciduous trees (*Quercus*, *Morus*, etc.); more widespread in the past, presently declining. Following Ertz & Diederich (2015), I have placed here all Italian records of *Melaspilea urceolata* and *M. arthonioides*, which are two different, American species. The species is included in the Italian red list of epiphytic lichens as "Near-threatened" (Nascimbene & al. 2013c).

Melaspilea ochrothalamia Nyl.

Flora, 48: 355, 1865.

C - Sar (Rizzi & al. 2011). **S - Camp** (Nimis & Tretiach 2004, Garofalo & al. 2010).

Cr/ Tr/ S/ Epiph-Lign/ pH: 2-3, L: 2-4, X: 2, E: 1-2/ Alt: 1/ MedH: vr/ PT: 1/ Note: on acid bark and lignum; hitherto known only from western Europe, perhaps more widespread, but never common, in Tyrrhenian Italy. It is included in the Italian red list of epiphytic lichens as "Data Deficient" (Nascimbene & al. 2013c).

Melaspilea poetarum (De Not. & Bagl.) Nyl.

Flora, 52: 85, 1869 - *Opegrapha poetarum* De Not. & Bagl., Comm. Soc. Critt. Ital., 1: 24, 1861.

N - Frl (TSB 15093), **Lig, C - Tosc, S - Si** (Nimis & al. 1994, Ottonello & Puntillo 1995).

Cr/ Tr/ S/ Epiph/ pH: 3, L: 3, X: 3, E: 1-2/ Alt: 1-2/ SmedD: er, SmedH: vr, MedH: er/ PT: 1/ Note: a mild-temperate species found on more or less smooth bark, especially of *Fraxinus ornus*. It is included in the Italian red list of epiphytic lichens as "Vulnerable" (Nascimbene & al. 2013c).

Melaspilea rhododendri (Arnold & Rehm) Almq.

K. Svenska Vetensk.-Akad. Handl., 17, 6: 44, 1880 - *Arthonia rhododendri* Arnold & Rehm, Flora, 15: 152, 1872.

N - TAA (Nascimbene & al. 2007b), **Lomb, Piem** (Isocrono & al. 2004). **C - Sar** (Nöske 2000, Brackel 2016).

F/ / S/ Epiph/ pH: 2-3, L: 2-3, X: 2, E: 1/ Alt: 3-4/ Salp: vr, Mont: er/ PT: 1/ Note: a rarely collected and rather poorly known species found on twigs of shrubs, with optimum in the subalpine belt the Alps, but also reported from the mountains of Sardegna.

Menegazzia A. Massal.

Neogenea Lichenum: 1, 1854.

This characteristic genus of the Parmeliaceae, which includes more than 70 species, has the main centre of speciation in the Southern Hemisphere. A few species only are known from the Northern Hemisphere, among which the relatively common *M. terebrata* and *M. subsimilis*, which have a wide distribution encompassing Asia, Europe, Oceania, South and North America. Type: *M. terebrata* (Hoffm.) A. Massal.

Menegazzia subsimilis (H. Magn.) R. Sant.

Ark. Bot., 30A, 11: 13, 1942 - *Parmelia subsimilis* H. Magn., Ark. Bot., 30B, 3: 5, 1941.

Syn.: *Menegazzia pertusa* f. *dissecta* Rass., *Menegazzia terebrata* var. *dissecta* (Rass.) Poelt, *Menegazzia dissecta* (Rass.) Hafellner

N - Frl (Nimis & Pittao 2015).

Fol.b/ Ch/ A.s/ Epiph/ pH: 1-2, L: 2-3, X: 1-2, E: 1/ Alt: 3/ Mont: vr/ PT: 1/ suboc/ Note: on bark in humid beech-fir forests, often with *M. terebrata*; the material of *Menegazzia terebrata* from Italy should be checked in search of this species.

Menegazzia terebrata (Hoffm.) A. Massal.

Neogenea Lichenum: 1, 1854 - *Lobaria terebrata* Hoffm., *Deutschl. Fl.*: 151, 1796.

Syn.: *Imbricaria terebrata* (Hoffm.) Körb., *Menegazzia pertusa* (Schaer.) J. Steiner, *Parmelia pertusa* Schaer., *Parmelia terebrata* (Hoffm.) Mart.

N - VG, FrI (Tretiach 1993, 1996, Modenesi & al. 1997, Nascimbene & al. 1998, Tretiach & Molaro 2007), **Ven** (Lazzarin 1997, Nascimbene & al. 2005b, 2006c, 2007, 2009c, 2010b, 2013b, Thor & Nascimbene 2007, Nascimbene 2011, Brackel 2013), **TAA** (Nascimbene & Caniglia 2000b, Nascimbene 2005b, 2008b, Nascimbene & al. 2007b, Nimis & al. 2015), **Lomb, Piem** (Isocrono & al. 2004). **C - Tosc** (Loppi & al. 1994, Loppi & Putortì 2001).

Fol.b/ Ch/ A.s/ Epiph/ pH: 1-2, L: 2-3, X: 1-2, E: 1/ Alt: 2-3/ Mont: vr, SmedD: er/ PT: 1/ suboc/ Note: on bark in humid beech-fir forests, exceptionally reaching the submediterranean belt. It is included in the Italian red list of epiphytic lichens as “Vulnerable” (Nascimbene & al. 2013c). See also note on *M. subsimilis*.

Micarea Fr.

Syst. Orb. Veg., 1: 256, 1825, *nom. cons.*

The genus *Micarea*, with more than 100 species, occurs on all continents, including Antarctica. Andersen & Ekman (2005) showed that the genus, in its classical delimitation, is polyphyletic: besides the likely assignment of several species to other genera, such as *Helocarpon* and *Scoliciosporum*, at least two different taxa are involved: the *M. bauschiana*-aggregate, that is close to *Psora decipiens*, and all other species (including the type species) forming a complex, partly unresolved, paraphyletic clade, with representatives of the Pilocarpaceae nested in it. The *M. sylvicola*-group has been segregated into the new genus *Brianaria* by Ekman & Svensson (2014), and further phylogenetic studies with several loci are needed to reach a well-supported delimitation of the genus. *Micarea*, after the classical monograph by B. Coppins, was monographed for Poland by Czarnota (2007). The genus is poorly known in Italy. The following species, reported from the Alps outside Italy should be looked for in the Italian Alps: *M. coppinsii* Tønsberg, *M. cyanescens* Poelt & Döbbeler, *M. hylacomii* Poelt & Döbbeler, *M. lynceola* (Th. Fr.) Palice, *M. melaeniza* Hedl., *M. minima* Poelt & Döbbeler, *M. myriocarpa* V. Wirth & Vězda ex Coppins, *M. nigella* Coppins, *M. rhabdogena* (Norman) Hedl. Type (conserved): *M. prasina* Fr. The name is conserved against *Micarea* Fr. published earlier during 1825.

Micarea adnata Coppins

Bull. Brit. Mus. Nat. Hist., Bot. ser., 11: 108, 1983.

N - Piem (Isocrono & al. 2004, Isocrono & Piervittori 2008). **C - Tosc** (Loppi & Baragatti 2011). **S - Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996).

Cr/ Ch/ S/ Lign-Epiph/ pH: 1-2, L: 2-3, X: 1-2, E: 1-2/ Alt: 2-3/ Mont: vr, SmedH: vr/ PT: 1/ suboc/ Note: on rather decomposed lignum, such as on old oak stumps and associated decaying bryophyte mats, more rarely on loose bark of deciduous trees in areas with high rainfall and mostly in woodlands; certainly more widespread in the Alps. The species is included in the Italian red list of epiphytic lichens as “Data Deficient” (Nascimbene & al. 2013c).

Micarea botryoides (Nyl.) Coppins

in Hawksworth & al., *Lichenologist*, 12: 107, 1980 - *Lecidea apochroeella* var. *botryoides* Nyl., *Flora*, 50: 373, 1867.

Syn.: *Lecidea botryoides* (Nyl.) Nyl.

N - TAA (Nascimbene 2014). **C - Marc** (Nimis & Tretiach 1999).

Cr/ Ch/ S/ Terr-Lign-Epiph/ pH: 1-2, L: 1-3, X: 1-2, E: 1/ Alt: 2-3/ Mont: r, SmedD: r/ PT: 1/ suboc, u/ Note: on a wide variety of substrata including soil, bryophytes, muribund plants, siliceous rocks, and conifer bark, mostly on vertical or underhanging faces; certainly much overlooked, but never common in Italy.

Micarea cinerea (Schaer.) Hedl.

Bih. K. Svenska Vetensk.-Akad. Handl., 3, 18: 81, 1892 - *Lecidea cinerea* Schaer., *Lich. Helv. Spicil.*, 3: 156, 1828.

Syn.: *Bacidia cinerea* (Schaer.) Trevis., *Biatora delicatula* Körb., *Bilimbia cinerea* (Schaer.) Körb., *Bilimbia delicatula* (Körb.) Körb., *Hastifera tenuispora* D. Hawksw. & Poelt, *Lecidea sphaeroides* var. *albella* Schaer.

N - FrI (Tretiach & Hafellner 2000), **TAA** (Nimis & al. 2015, Brackel 2016), **Lomb, Piem, Lig** (Giordani & al. 2002).

Cr/ Ch/ S/ Lign-Epiph/ pH: 1-2, L: 1-3, X: 1-2, E: 1/ Alt: 3-4/ Salp: rr, Mont: r/ PT: 1/ suboc/ Note: a cool-temperate to probably circumboreal-montane species found on bark of deciduous and coniferous trees, and on epiphytic bryophytes in humid montane to subalpine forests, more rarely on lignum of fallen, decorticated trunks. *Hastifera tenuispora* is probably an anamorph of this species.

Micarea contexta Hedl.

Bih. K. Svenska Vetensk.-Akad. Handl., 3, 18: 83, 1892.

Syn.: *Catillaria contexta* (Hedl.) Zahlbr.

N - Frl.

Cr/ Ch/ S/ Lign/ pH: 1-2, L: 2, X: 2, E: 1/ Alt: 3-4/ Salp: r, Mont: vr/ PT: 0/ Note: mostly on wood in sheltered situations, such as in montane to subalpine woodlands; perhaps more widespread in the Alps.

Micarea denigrata (Fr.) Hedl.

Bih. K. Svenska Vetensk.-Akad. Handl., 3, 18: 78, 1892 - *Biatora denigrata* Fr., K. Svenska Vetensk.-Akad. Handl.: 256, 1822.

Syn.: *Biatora aniptiza* (Stirt.) Walt. Watson, *Biatorina praeviridans* (Nyl.) Boistel, *Biatorina sinothea* auct., *Catillaria denigrata* (Fr.) Vain., *Catillaria hemipoliella* (Nyl.) Blomb. & Forssell, *Catillaria praeviridans* (Nyl.) Zahlbr., *Catillaria spodiza* (Nyl.) Zahlbr., *Catillaria synochea* auct., *Lecidea aniptiza* Stirt., *Lecidea denigrata* (Fr.) Nyl., *Lecidea discretula* Nyl., *Lecidea fungicola* Ach., *Lecidea hemipoliella* Nyl., *Lecidea parissima* Nyl., *Lecidea praeviridans* Nyl., *Lecidea spodiza* Nyl., *Lecidea synochea* auct., *Micarea denigrata* var. *friesiana* Hedl., *Micarea hemipoliella* (Nyl.) Vězda

N - Ven (Thor & Nascimbene 2007, Nascimbene 2008c), **TAA** (Nascimbene & al. 2007b, 2008c, Nimis & al. 2015), **Lomb, Piem** (Giordani & Malaspina 2016), **Lig** (TSB 33561). **C - Tosc, Laz, Abr** (Nimis & Tretiach 1999), **Sar** (Nöske 2000). **S - Camp** (Aprile & al. 2003b), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996).

Cr/ Ch/ S/ Lign-Epiph/ pH: 1-2, L: 2-4, X: 2-4, E: 1-3/ Alt: 2-4/ Salp: rc, Mont: rr, SmedD: r, SmedH: r/ PT: 1/ p/ Note: a cool-temperate to circumboreal-montane, very polymorphic species, most common on wooden poles in the mountains, on fallen trunks and stumps of coniferous and broad-leaved trees, rarer on the bark of conifers; widespread throughout the Alps and the Apennines, to be looked for in the mountains of Sicilia.

Micarea doliiformis (Coppins & P. James) Coppins & Sérus.

in Sérusiaux & al., *Bryologist*, 113: 339, 2010 - *Lecidea doliiformis* Coppins & P. James, *Lichenologist*, 24: 361, 1992.

S - Cal (Puntillo 1996).

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 3, X: 2-3, E: 1/ Alt: 1-2/ SmedH: er, MedH: er/ PT: 1/ suboc/ Note: the only Italian sample, collected on *Olea* at 385 m, is one of the few extra-British records. For further details see Sérusiaux & al. (2010). The species is included in the Italian red list of epiphytic lichens as "Critically Endangered" (Nascimbene & al. 2013c).

Micarea elachista (Körb.) Coppins & R. Sant.

Bull. Brit. Mus. Nat. Hist., Bot. ser., 11: 131, 1983 - *Biatora elachista* Körb., *Parerga Lichenol.*: 159, 1860.

Syn.: *Bacidia sororians* (Nyl.) H. Olivier, *Biatorina glomerella* (Nyl.) Arnold, *Catillaria elachista* (Körb.) Vain., *Catillaria glomerella* (Nyl.) Th. Fr., *Lecidea poliococca* Nyl., *Lecidea sororians* Nyl., *Micarea glomerella* (Nyl.) Hedl.

N - TAA (Nascimbene 2005, Nascimbene & al. 2006e), **Lomb** (Abramini & al. 2008). **C - Tosc, Marc** (Nimis & Tretiach 1999).

Cr/ Ch/ S/ Lign-Epiph/ pH: 1-2, L: 3, X: 2-3, E: 1/ Alt: 2-3/ Mont: r, SmedD: vr, SmedH: vr/ PT: 1/ Note: a cool-temperate to circumboreal-montane species with optimum on lignum, more rarely on acid bark, in *Castanea*-forests, often with *Chaenotheca ferruginea*; certainly more widespread, but much overlooked.

Micarea globulosella (Nyl.) Coppins

Bull. Brit. Mus. Nat. Hist., Bot. ser., 11: 134, 1983 - *Lecidea globulosella* Nyl., *Lich. Jap.*: 69, 1890.

Syn.: *Bacidia globulosella* (Nyl.) Zahlbr., *Micarea bacidiella sensu* Vězda & V. Wirth

N - Frl, Piem (TSB 34003). **C - Tosc** (Benespero & al. 2007), **Mol** (Nimis & Tretiach 1999). **S - Camp** (Aprile & al. 2003b), **Pugl** (Nimis & Tretiach 1999).

Cr/ Ch/ S/ Epiph-Lign/ pH: 1-2, L: 1-3, X: 1-2, E: 1/ Alt: 2-4/ Salp: er, Mont: er, SmedH: vr/ PT: 1/ suboc/ Note: a temperate to probably circumboreal-montane species found on bark of conifers and oaks in humid forests, more rarely on lignum; certainly more widespread in the Alps. It is included in the Italian red list of epiphytic lichens as "Data Deficient" (Nascimbene & al. 2013c).

Micarea hedlundii Coppins

Bull. Brit. Mus. Nat. Hist., Bot. ser., 11: 135, 1983.

N - Ven (Nascimbene & al. 2013b), **TAA** (Thor & Nascimbene 2007).

Cr/ Ch/ S/ Lign/ pH: 1-2, L: 3-4, X: 2-3, E: 1-2/ Alt: 3-4/ Salp: er, Mont: er/ PT: 1/ Note: a rather rare species growing on wood and rotting roots of conifers in montane to subalpine forests, ranging from the Alps to northern Europe. It is included in the Italian red list of epiphytic lichens as "Critically Endangered" (Nascimbene & al. 2013c).

Micarea incrassata Hedl.

Bih. K. Svenska Vetensk.-Akad. Handl., Afd. 3, 18: 82, 1892.

N - TAA (Bilovitz & al. 2014b).

Cr/ Ch/ S/ Terr/ pH: 1-2, L: 3-4, X: 2-3, E: 1-2/ Alt: 3-5/ Alp: er, Salp: er, Mont: r/ PT: 1/ Note: a widespread circumboreal species also known from the Southern Hemisphere, growing on acid soil in mountain heaths; apparently rare in the Alps, but perhaps overlooked.

Micarea inquinans (Tul.) Coppins

in Rambold & Triebel, *Bibl. Lichenol.*, 48: 169, 1992 - *Abrothallus inquinans* Tul., *Ann. Sci. Nat. (Bot.)*, 17: 117, 1852.

Syn.: *Lecidea inquinans* (Tul.) Nyl., *Nesolechia inquinans* (Tul.) A. Massal.

N - Frl (Tretiach & Hafellner 2000, Brackel 2016), **TAA** (Hafellner 1994, Brackel 2016).

LF/ / S/ Terr/ pH: 1-2, L: 3-4, X: 2-3, E: 1-2/ Alt: 3-4/ Salp: r, Mont: r/ PT: 1/ suboc, paras *Dibaeis baeomyces*/ Note: a non-lichenised parasite on the thallus of *Dibaeis*; overlooked, and probably widespread throughout the Alps.

Micarea intrusa (Th. Fr.) Coppins & H. Kilius

in Coppins, *Bull. Brit. Mus. Nat. Hist., Bot. ser.*, 11: 138, 1983 - *Lecidea intrusa* Th. Fr., *Bot. Not.*: 152, 1867.

Syn.: *Carbonea intrusa* (Th. Fr.) Rambold & Triebel, *Catillaria intrusa* (Th. Fr.) Th. Fr., *Conida intrusa* (Th. Fr.) Sacc. & D. Sacc., *Lecidea aphanooides* Nyl., *Lecidea contrusa* Vain. *nom. illegit.*, *Lecideopsis intrusa* (Th. Fr.) Zopf, *Lecidea melaphana* Nyl., *Scoliciosporum intrusum* (Th. Fr.) Hafellner

N - Frl, TAA.

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 3-4, X: 3-4, E: 1-2/ Alt: 4-5/ Alp: er, Salp: er/ PT: 1/ paras silicicolous crustose lichens/ Note: a probably circumpolar, arctic-alpine species, invading the thalli of different crustose silicicolous lichens; for further details see Hafellner (2004). According to Miadlikowska & al. (2014) this species does not belong to *Scoliciosporum* and, pending further study, should be best treated as a member of *Micarea*.

Micarea lignaria var. ***endoleuca*** (Leight.) Coppins

Bull. Brit. Mus. Nat. Hist., Bot. ser., 11: 146, 1983 - *Lecidea milliaria* var. *endoleuca* Leight., *Lich. Fl. Gr. Brit.*, 3rd ed.: 363, 1879.

N - TAA (Nascimbene & al. 2007b).

Cr/ Ch/ S/ Lign/ pH: 1-2, L: 2-3, X: 2, E: 1/ Alt: 2-3/ Mont: er, SmedD: er/ PT: 1/ oc/ Note: although sometimes sympatric with the typical variety, this taxon is restricted to very humid areas at lower altitudes. Surprisingly, the only Italian record is from a rather dry-continental region (see Nimis 1993: 435). This variety is included in the Italian red list of epiphytic lichens as "Data Deficient" (Nascimbene & al. 2013c).

Micarea lignaria (Ach.) Hedl. var. ***lignaria***

Bih. K. Svenska Vetensk.-Akad. Handl., 3, 18: 93, 1892 - *Lecidea lignaria* Ach., *K. Vetensk.-Akad. Nya Handl.*, 29: 236, 1808.

Syn.: *Bacidia gomphillacea* (Nyl.) Zahlbr., *Bacidia granulans sensu* H. Magn., *Bacidia lignaria* (Ach.) Lettau, *Bacidia meizospora* (Nyl.) Zahlbr., *Bacidia milliaria* (Fr.) Sandst., *Bilimbia lignaria* (Ach.) A. Massal., *Bilimbia milliaria* (Fr.) Körb., *Lecidea geomaea* Taylor, *Lecidea meizospora* Nyl., *Lecidea milliaria* Fr., *Micarea gomphillacea* (Nyl.) Vězda

N - Frl (Tretiach & Hafellner 2000), **Ven** (Nascimbene 2008c, Nascimbene & al. 2013b, Watson 2014), **TAA** (Nascimbene 2006c, 2008b, Nascimbene & al. 2007b, Nimis & al. 2015), **Lomb, Piem** (Isocrono & al. 2004, 2006), **Emil** (Dalle Vedove & al. 2002), **Lig** (Brunialti & al. 1999). **C - Tosc** (Benesperri & al. 2007), **Laz** (Stofer 2006), **Abr, Sar** (Nöske 2000, Rizzi & al. 2011). **S - Camp** (Ricciardi & al. 2000), **Cal** (Puntillo 1996).

Cr/ Ch/ S/ Lign-Terr-Epip/ pH: 1-2, L: 2-4, X: 2-3, E: 1-2/ Alt: 2-5/ Alp: r, Salp: rc, Orom: r, Mont: rc, SmedD: r, Pad: er, SmedH: rr/ PT: 1/ Note: a widespread temperate to boreal-montane species, the most common of the genus in Italy, found on a wide variety of substrata such as plant remains, bark, and lignum, in humid situations. The records from Umbria by Ravera & al. (2006, 2006b) do not refer to this species (Ravera, *in litt.*).

Micarea lithinella (Nyl.) Hedl.

Bih. K. Svenska Vetensk.-Akad. Handl., 3, 18: 78, 1892 - *Lecidea lithinella* Nyl., *Flora*, 45: 464, 1862.

N - TAA (Dalla Torre & Sarnthein 1902).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 2-4, X: 2, E: 1/ Alt: 2-3/ Mont: er, SmedD: er/ PT: 1/ Note: on compact siliceous rocks in rather sheltered situations; also reported from the Alps of Switzerland and Austria.

Micarea melaena (Nyl.) Hedl.

Bih. K. Svenska Vetensk.-Akad. Handl., 3, 18: 82, 96, 1892 - *Lecidea melaena* Nyl., *Bot. Not.*: 182, 1853.

Syn.: *Bacidia melaena* (Nyl.) Zahlbr., *Biatora stizenbergeri* Hepp, *Bilimbia melaena* (Nyl.) Arnold, *Catillaria constristans sensu* H. Magn., *Lecidea ilyophora* Stirt.

N - Ven (Nascimbene 2008c), **TAA** (Thor & Nascimbene 2007, Nascimbene & al. 2007b, 2008c, 2014, Nascimbene 2008b, 2013, 2014, Nimis & al. 2015), **Lomb, Piem, Emil, C - Tosc** (Tretiach & al. 2008). **S - Pugl.**

Cr/ Ch/ S/ Lign-Terr/ pH: 1-2, L: 2-4, X: 2, E: 1/ Alt: 3-4/ Salp: rr, Mont: rr/ PT: 1/ Note: a cool-temperate to circumboreal-montane species found on decomposed lignum of old stumps, but also on plant debris, siliceous rocks and soil rich in humus, mostly in upland areas; probably mode widespread in the mountains.

Micarea melaenida (Nyl.) Coppins

Bull. Brit. Mus. Nat. Hist., Bot. ser., 11: 154, 1983 - *Lecidea melaenida* Nyl., Flora, 48: 146, 1865.

Syn.: *Catillaria melaenida* (Nyl.) Arnold, *Catillaria schumannii* Körb. ex Stein, *Catillaria schumannii* var. *meridionalis* Cl. Roux & Vězda, *Catillaria zsakii* Szatala, *Toninia zsakii* (Szatala) Lettau

C - **Sar** (Zedda & al. 2010, Cogoni & al. 2011). S - **Cal** (Puntillo 1996, Puntillo & Puntillo 2004), **Si** (Otonello & al. 2011).

Cr/ Ch/ S/ Terr/ pH: 3, L: 4, X: 3, E: 1-2/ Alt: 1-3/ Mont: vr, SmedH: vr, MedH: er/ PT: 1-2/ p/ Note: a mainly mild-temperate species, with optimum on clay soil in rather disturbed habitats below the subalpine belt.

Micarea meridionalis van den Boom, Brand, Coppins & Sérus.

Lichenologist (in press) MB 811050, 2016.

C - **Laz** (van den Boom & al. 2016). S - **Cal** (van den Boom & al. 2016).

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 3-4, X: 2-4, E: 1-3/ Alt: 1-3/ MedH: vr/ PT: 1-3/ Note: a recently described corticolous species belonging to the *M. prasina*-complex, with a southern distribution in Europe; it is known from several stations in Portugal, where it grows in ruderal and even dusty situations such as along waysides and in urban parks; the Italian samples are from *Pinus* along the coast in Calabria, from the Botanical Garden of Rome, and from an open woodland at the periphery of Rome on *Quercus suber*. Ecological values are tentative. For further details see van den Boom & al. (2016).

Micarea micrococca (Körb.) Coppins

Gams ex Coppins, Checklist Lich. Great Brit. Ireland: 86, 2002 - *Biatora micrococca* Körb., Parerga Lichenol.: 155, 1860.

Syn.: *Lecidea micrococca* (Körb.) Cromb.

N - **Ven** (Thor & Nascimbene 2007).

Cr/ Ch/ S/ Epiph-Lign-Sax-Terr/ pH: 1-2, L: 2-3, X: 2, E: 1/ Alt: 3-4/ Salp: r, Mont: vr/ PT: 1/ Note: a member of the *M. prasina*-complex; earlier records might be under *M. prasina*.

Micarea misella (Nyl.) Hedl.

Bih. K. Svenska Vetensk.-Akad. Handl., 3, 18: 78, 88, 1892 - *Lecidea anomala* f. *misella* Nyl., Lichenes Scand.: 202, 1861.

Syn.: *Biatora misella* (Nyl.) H.G. Falk, *Lecidea asserculorum* sensu Th. Fr. non Ach., *Lecidea asserculorum* var. *intermedia* B. de Lesd., *Lecidea globularis* (Nyl.) Lamy, *Lecidea misella* (Nyl.) Nyl., *Micarea globularis* (Nyl.) Hedl.

N - **Frl**, **TAA** (Thor & Nascimbene 2007, Nascimbene & al. 2007b, 2008c), **Lomb**, **Lig**. C - **Abr** (Nimis & Tretiach 1999), **Sar**. S - **Bas** (Puntillo & al. 2012), **Cal** (Puntillo 1996).

Cr/ Ch/ S/ Lign-Epiph/ pH: 1-2, L: 2-4, X: 2-3, E: 1/ Alt: 2-4/ Salp: rr, Mont: r, SmedD: er, SmedH: er/ PT: 1/ Note: a cool-temperate to circumboreal-montane species found on lignum, more rarely on acid bark; most common in the Alps, but probably occurring throughout the Apennines.

Micarea nitschkeana (Rabenh.) Harm.

Bull. Soc. Sc. Nancy, 2, 33: 64, 1899 - *Bilimbia nitschkeana* J. Lahm ex Rabenh., Lich. Eur. Exs.: nr. 583, 1861.

Syn.: *Bacidia nitschkeana* (Rabenh.) Zahlbr., *Bilimbia spododes* (Nyl.) Arnold, *Bacidia spododes* (Nyl.) Zahlbr., *Lecidea nitschkeana* (Rabenh.) Stizenb., *Lecidea spododes* Nyl.

N - **TAA** (Nimis & al. 2015), **Lomb** (Alessio & al. 1995). C - **Tosc** (Loppi & Putorti 2001), **Umb** (Ravera 2000, Ravera & al. 2006).

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 3, X: 3, E: 1/ Alt: 2-4/ Salp: er, Mont: er, SmedH: er/ PT: 1/ Note: on twigs and small branches of conifers and, more rarely, of acid-barked deciduous trees and small shrubs, occasionally also on lignum. The species is included in the Italian red list of epiphytic lichens as "Vulnerable" (Nascimbene & al. 2013c).

Micarea peliocarpa (Anzi) Coppins & R. Sant.

in Coppins & James, Lichenologist, 11: 155, 1979 - *Bilimbia peliocarpa* Anzi, Atti Soc. Ital. Sc. Nat. Milano, 9: 250, 1866.

Syn.: *Bacidia albidolivens* (Nyl.) Zahlbr., *Bacidia hemipolioides* (Nyl.) Zahlbr., *Bacidia peliocarpa* (Anzi) Lettau, *Bacidia trisepta* (Nägeli) Zahlbr., *Bacidia triseptatuloidea* (Harm.) Zahlbr., *Bacidia violacea* (P. Crouan & H. Crouan ex Nyl.) Arnold, *Bilimbia albicans* Arnold, *Bilimbia hemipolioides* (Nyl.) A.L. Sm., *Bilimbia trisepta* (Nägeli) Hellb., *Bilimbia subviridescens* var. *trisepta* (Nägeli) A.L. Sm., *Lecidea albidolivens* Nyl., *Lecidea fraterculans* Nyl., *Lecidea hemipolioides* Nyl., *Lecidea triseptatula* Nyl., *Lecidea triseptatuloidea* Harm., *Lecidea violacea* P. Crouan & H. Crouan ex Nyl. non A. Massal. nom. illegit., *Micarea trisepta* (Nägeli) Wetmore, *Micarea violacea* (P. Crouan & H. Crouan ex Nyl.) Hedl.

N - **Frl**, **Ven** (Brackel 2013), **TAA** (Hinteregger 1994, Nascimbene & al. 2007b, Nascimbene 2008b, Nimis & al. 2015), **Lomb**, **VA** (Pierivittori & Isocrono 1999), **Emil** (Nimis & al. 1996, Tretiach & al. 2008). C - **Tosc** (Benesperi & al. 2007), **Umb** (Ravera 2000, Ravera & al. 2006), **Sar** (Zedda 2002). S - **Cal** (Puntillo 1995, 1996), **Si** (Nimis & al. 1994).

Cr/ Ch/ S/ Epiph-Lign-Sax-Terr/ pH: 1-2, L: 3, X: 2-3, E: 1/ Alt: 2-4/ Salp: r, Orom: r, Mont: rr, SmedD: vr, SmedH: vt/ PT: 1/ Note: a temperate to boreal-montane, ecologically wide-ranging species found on the acid bark of deciduous (especially old oaks and *Fagus*) and coniferous trees, lignum, peaty soil, muribund bryophytes, and small siliceous pebbles.

***Micarea prasina* Fr.**

Syst. Orb. Veget.: 27, 1825.

Syn.: *Bacidia subviridescens* (Nyl.) Zahlbr., *Biatorina prasina* (Fr.) Stein, *Bilimbia subviridescens* (Nyl.) H. Olivier, *Catillaria prasina* (Fr.) Th. Fr., *Catillaria prasiniza* (Nyl.) B. de Lesd., *Catillaria sordidescens* (Nyl.) Zahlbr., *Lecidea abdita* Erichsen, *Lecidea declivitatatum* Erichsen, *Lecidea prasinella* Müll. Arg., *Lecidea prasiniza* Nyl., *Lecidea sordidescens* Nyl., *Lecidea subviridescens* Nyl., *Micarea polytrichi* Poelt & Döbbele, *Micarea subviridescens* (Nyl.) Hedl.

N - Frl, Ven (Nascimbene & al. 2005b, 2008c, 2013b, 2015, Nascimbene 2008, 2011), **TAA** (Nascimbene & al. 2008c, 2009, 2010, 2014, Nascimbene 2008b, 2013, 2014, Nascimbene & Marini 2015, Nimis & al. 2015), **Lomb** (Stofer 2006), **Piem** (Isocrono & al. 2004, 2006, Giordani & Malaspina 2016), **VA** (Piervittori & Isocrono 1999), **Emil** (Nimis & al. 1996, Benesperi 2009), **Lig** (Giordani & al. 2002). **C - Tosc** (Tretiach & Nimis 1994, Loppi & al. 1999a, Putortì & Loppi 1999, Loppi & Putortì 2001, Tretiach & al. 2008, Benesperi 2011, Loppi & Baragatti 2011, Brunialti & al. 2012b), **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera 2000, Ravera & al. 2006), **Laz** (Ravera & al. 1999, Massari & Ravera 2002, Munzi & al. 2007), **Abr** (Stofer 2006, Di Santo & Ravera 2012), **Mol** (Ravera & al. 2010, Ravera & Genovesi 2012), **Sar** (Rizzi & al. 2011, Cossu 2013). **S - Camp** (Ricciardi & al. 2000, Aprile & al. 2003b, Catalano & al. 2016), **Pugl** (Nimis & Tretiach 1999), **Bas** (Potenza 2006, Potenza & al. 2010, Potenza & Fascetti 2012), **Cal** (Puntillo 1995, 1996, Puntillo & Puntillo 2004), **Si** (Grillo & al. 2002, Grillo & Caniglia 2004).

Cr/ Ch/ S/ Epiph-Lign-Sax-Terr/ pH: 1-2, L: 2-3, X: 2, E: 1/ Alt: 2-4/ Salp: rr, Orom: vr, Mont: rc, SmedD: r, Pad: er, SmedH: r/ PT: 1/ Note: a temperate to boreal-montane, morphologically and chemically variable species found on basal parts of old, acid-barked trees in montane forests, and on a wide range of other substrata; in its present circumscription, this is one of the most common species of the genus in Italy, especially in northern Italy and in the Apennines; however, this taxon represents a complex assemblage of species, yet to be properly disentangled (Czarnota & Guzow-Krzemińska 2010, van den Boom & al. 2016). See also notes on *M. meridionalis* and *M. micrococca*.

***Micarea ternaria* (Nyl.) Vězda**

Sched. Ad Lich. Sel. Exs., 35: 3 (nr. 858), 1970 - *Lecidea sabuletorum* f. *ternaria* Nyl., Not. Sällsk. Fauna Fl. Fenn. Förh., Ny Ser., 8: 151, 1866.

Syn.: *Lecidea ternaria* (Nyl.) Nyl.

N - TAA (Arnold, Lich. Exs. 1051: UPS- L-169711).

Cr/ Ch/ S/ Sax-Terr/ pH: 1-3, L: 2, X: 2, E: 1-2/ Alt: 4-5/ Alp: er, Salp: er/ PT: 1/ Note: an arctic-alpine species growing on plant remains and siliceous rocks near and above treeline; the Italian sample was collected by Lojka between Paneveggio and Predazzo, on a porphyric boulder.

***Micarea turfosa* (A. Massal.) Du Rietz**

Svensk Bot. Tidskr., 17: 94, 1923 - *Biatora turfosa* A. Massal., Ric. Auton. Lich. Crost.: 128, 1852.

Syn.: *Lecidea turfosa* (A. Massal.) Jatta, *Lecidea verrucula* (Norman) Th. Fr., *Lecidella verrucula* (Norman) Stein, *Micarea verrucula* (Norman) Hedl., *Oedemocarpus turfosus* (A. Massal.) Trevis.

N - Ven, TAA, C - Tosc, Abr.

Cr/ Ch/ S/ Terr/ pH: 1-2, L: 2, X: 2, E: 1/ Alt: 3-5/ Alp: vr, Salp: r, Mont: er/ PT: 1/ Note: a circumboreal-montane species found on peaty soil and terricolous bryophytes in upland areas. Records from central Italy, although not impossible (Nimis 1993: 437), require confirmation.

***Micarea viridileprosa* Coppins & van den Boom**

in van den Boom & Coppins, Lichenologist, 33: 87, 2001.

S - Camp (van den Boom & Coppins 2001).

Cr/ Ch/ A.s/ Epiph-Lign-Terr/ pH: 1-2, L: 3, X: 1-2, E: 1/ Alt: 1-2/ SmedH: vr, MedH: vr/ PT: 0/ Note: a recently-described, mostly sterile species found on a wide variety of acid substrata in humid lowland areas; probably more widespread in semi-natural sites of Tyrrhenian Italy. It is included in the Italian red list of epiphytic lichens as "Critically Endangered" (Nascimbene & al. 2013c).

Miriquidica Hertel & Rambold

Mitt. bot. Staatss. München, 23: 378, 1987.

This genus, which comprises *c.* 30 saxicolous species worldwide, was mainly circumscribed by the presence of miriquidic acid (in most species) and by anatomical characters of the apothecia, *e.g.*, asci of the *Lecanora*-type. It belongs to the Lecanoraceae and consists of species previously placed partly in *Lecidea* and partly in *Lecanora*. The genus has been treated *e.g.* by Rambold & Schwab (1990), Singh & al. (2013) and Hafellner & al. (2014). Preliminary results from a comprehensive study by Haugan & al. (2016) show the presence of several cryptic species, and demonstrate that the genus, as currently circumscribed, is polyphyletic. Even after the transfer of some species to other genera, *Miriquidica* remains paraphyletic, with species of *Protoparmelia*, *Lecanora*, *Lecidea s.lat.*, and *Myochroidea* nested, so that several nomenclatural changes are to be expected. Most species occur on siliceous rocks in the boreal to arctic-alpine zones. Type: *M. complanata* (Körb.) Hertel & Rambold

Miriquidica atrofulva (Sommerf.) A.J. Schwab & Rambold
in Rambold & Schwab, Nord. J. Bot., 117: 118, 1990 - *Lecidea atrofulva* Sommerf., Suppl. Fl. Lapp.: 143, 1826.

Syn.: *Lecidea atriuscula* H. Magn.

N - TAA (Rambold & Schwab 1990).

Cr/ Ch/ A.s/ Sax/ pH: 1-2, L: 3-4, X: 3, E: 1/ Alt: 3-5/ Alp: vr, Salp: vr, Mont: er/ PT: 1/ m/ Note: a circum- and bipolar lichen of metal-rich rocks, with optimum near and above treeline; mostly sterile and therefore perhaps overlooked in the Alps, but never common.

Miriquidica complanata (Körb.) Hertel & Rambold

Mitt. bot. Staatss. München, 23: 382, 1987 - *Lecanora complanata* Körb., Parerga Lichenol.: 84-85, 1859.

Syn.: *Aspicilia complanata* (Körb.) Stein, *Aspicilia microlepis* Körb., *Aspicilia superiuscula* (Nyl.) Hue, *Lecanora coracodes* Nyl., *Lecanora kulturalensis* Vain., *Lecanora microlepis* (Körb.) Lettau, *Lecanora superiuscula* Nyl., *Lecanora tenebricans* Nyl., *Lecidea vezdae* V. Wirth

N - TAA, Piem (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999). **C - Sar** (Nöske 2000).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 4-5, X: 2-3, E: 1/ Alt: 3-5/ Alp: r, Salp: vr, Orom: er, Mont: er/ PT: 1/ paras *Rhizocarpon geographicum* when young/ Note: on moist siliceous rocks in upland areas, starting the life-cycle on yellow *Rhizocarpon*-species, with optimum above treeline. The identification of the samples from Sardegna is dubious.

Miriquidica deusta (Stenh.) Hertel & Rambold

Mitt. bot. Staatss. München, 23: 383, 1987 - *Lecidea fuscoatra* var. *deusta* Stenh., Nov. Sched. Crit. Lich. Suec., 14: 9, 1833.

Syn.: *Lecidea deustata* Zahlbr., *Lecidea secernens* H. Magn.

N - Frl (Tretsch & Hafellner 2000), **TAA, C - Sar** (Hafellner & al. 2014, Rizzi & al. 2011, Giordani & al. 2013). **S - Si** (Nimis & al. 1996b).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4, X: 4, E: 2-3/ Alt: 1-5/ Salp: er, Orom: vr, Mont: er, SmedH: er, MedH: vr/ paras crustose lichens when young/ PT: 1/ Note: a much misunderstood and overlooked (being mostly sterile) species, with a probably western and southern distribution in Europe, which is fairly common in some parts of Italy (e.g. Sardegna) on exposed surfaces of base-rich siliceous rocks, with a wide altitudinal range.

Miriquidica disjecta (Nyl.) Hertel & Rambold

Mitt. bot. Staatss. München, 23: 384, 1987 - *Lecidea disjecta* Nyl., Flora, 64: 184, 1881.

N - TAA (type!).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 3-4, X: 2-3, E: 1-2/ Alt: 4-5/ Alp: er, Salp: er/ PT: 1/ #/ Note: the type material of this poorly known saxicolous species was collected on porphyric rocks near Paneveggio.

Miriquidica garovaglii (Schaer.) Hertel & Rambold

Mitt. bot. Staatss. München, 23: 384, 1987 - *Lecidea garovaglii* Schaer., Enum. Crit. Lich. Eur.: 109, 1850.

Syn.: *Biatora aenea* var. *garovaglii* (Schaer.) Jatta, *Lecidea aenea* (Fr.) Nyl., *Lecidea aenea* var. *garovaglii* (Schaer.) Jatta, *Lecidea atrobrunnea* var. *garovaglii* (Schaer.) Jatta, *Lecidea glacialis* Lynge, *Lecidea obscura* Ramond, *Parmelia aenea* Fr. nom. illegit., *Psora aenea* (Fr.) Anzi, *Psora garovaglii* (Schaer.) Anzi

N - Frl (Tretsch & Hafellner 2000), **TAA** (Caniglia & al. 2002, Peršoh & al. 2004, Hertel & Schuhwerk 2010), **Lomb** (Rambold & Schwab 1990, Hertel 2001, Dalle Vedove & al. 2004), **Piem** (Morisi & Sereno 1995, Isocrono & al. 2004, Morisi 2005, Hertel & Schuhwerk 2010), **VA** (Piervittori & Isocrono 1999, Piervittori & al. 2004), **Emil** (Dalle Vedove & al. 2002). **C - Tosc** (Benesperi 2007).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4-5, X: 4, E: 1/ Alt: 4-6/ Alp: c, Salp: rr/ PT: 1/ Note: a circumpolar, arctic-alpine species found on mineral-rich rocks wetted by rain in wind-exposed situations, such as on peaks and windy ridges in the Alps, usually near or above treeline, reaching the nival belt. The specific epithet is often spelled *garovaglio*, but the latinised name of Santo Garovaglio (who wrote most of his works in Latin) was *Garovaglius*, whose genitive is *garovaglii*.

Miriquidica instrata (Nyl.) Hertel & Rambold

Mitt. bot. Staatss. München, 23: 385, 1987 - *Lecidea instrata* Nyl., Flora, 60: 224, 1877.

Syn.: *Biatora instrata* (Nyl.) Arnold, *Lecidea subobscura* H. Magn.

N - TAA.

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 4-5, X: 3-4, E: 1-2/ Alt: 4-5/ Alp: r, Salp: vr/ PT: 1/ Note: on siliceous rocks, with optimum above treeline; probably more widespread in the Alps.

Miriquidica intrudens (H. Magn.) Hertel & Rambold

Mitt. bot. Staatss. München, 23: 386, 1987 - *Lecanora intrudens* H. Magn., Bot. Not.: 8-9, 1942.

N - Frl, TAA (Hafellner & al. 2014), **Piem** (Hafellner & al. 2014).

Cr/ Ch/ A.s/ Sax/ pH: 2-3, L: 4-5, X: 3-4, E: 1-2/ Alt: 4-5/ Alp: r, Salp: vr/ paras yellow *Rhizocarpon* spp./ PT: 1/ Note: a probably circumpolar, arctic-alpine silicolous species which was largely overlooked in the past, starting the life-cycle on yellow *Rhizocarpon*-species; certainly more widespread near and above

treeline in the Alps; perhaps confused with *Protoparmelia leproloma*, from which it differs in important morphological and chemical characters.

Miriquidica invadens Hafellner, Obermayer & Tretiach

Lichenologist, 46: 8, 2014.

N - FrI (Hafellner & al. 2014), **TAA** (Hafellner & al. 2014), **Lomb** (Hafellner & al. 2014), **Piem** (Hafellner & al. 2014).

Cr/ Ch/ A.s/ Sax/ pH: 2-3, L: 2-3, X: 2-3, E: 1-2/ Alt: 4-5/ Alp: r, Salp: vr/ PT: 1/ paras *Sporastatia polyspora*/ Note: an obligate parasite on *Sporastatia polyspora*, widely distributed in the Alps with optimum above treeline, and also known from the mountains of the Iberian and Balkan Peninsulas.

Miriquidica leucophaea (Rabenh.) Hertel & Rambold

Mitt. bot. Staatss. München, 23: 386, 1987 - *Biatora leucophaea* Flörke ex Rabenh., Deutschl. Krypt.-Fl., 2: 91, 1845.

Syn.: *Biatora consanguinea* Anzi, *Lecidea confertula* Stirt., *Lecidea discolorella* Nyl., *Lecidea leucophaea* (Rabenh.) Nyl., *Lecidea mesotropa* Nyl., *Lecidea sporotea* Stirt., *Lecidella nodulosa* Körb., *Psora confertula* (Stirt.) Stirt.

N - TAA, Lomb, Piem (Isocrono & al. 2004).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 3-4, X: 2-3, E: 1/ Alt: 3-5/ Alp: vr, Salp: rr, Mont: er/ PT: 1/ paras *Rhizocarpon* spp., m/ Note: a polymorphic species of metal-rich rocks, starting the life-cycle on yellow *Rhizocarpon*-species; more hygrophytic than *M. griseoatra*, being most frequent in sheltered situations, such as on faces with a late snow-lie in upland areas.

Miriquidica nigroleprosa (Vain.) Hertel & Rambold

Mitt. bot. Staatss. München, 23: 388, 1987 - *Lecanora nigroleprosa* Vain., Meddeland. Soc. Fauna Fl. Fenn., 10: 208-209, 1883.

Syn.: *Lecidea nigroleprosa* (Vain.) H. Magn.

N - FrI (Tretiach & Hafellner 2000, Hertel & Schuhwerk 2010). **C - Sar. S - Cal** (Hafellner & al. 2014).

Cr/ Ch/ A.s/ Sax/ pH: 1-2, L: 4-5, X: 3-4, E: 1/ Alt: 3-5/ Alp: rr, Salp: vr, Orom: er, Mont: er/ PT: 1/ paras *Rhizocarpon geographicum s.lat.*/ Note: on hard siliceous rocks (e.g. granite) in exposed situations such as windy ridges, starting the life-cycle on yellow *Rhizocarpon*-species; most often sterile, it has been largely overlooked in the Alps. The var. *liljenstroemii* (Du Rietz) Owe-Larsson & Rambold is known from the Austrian Alps and the Bretagne.

Miriquidica plumbea (Garov.) Hafellner, Obermayer & Tretiach

Lichenologist, 46: 17, 2014 - *Lecidea plumbea* Garov. in A. Massal., Ric. Auton. Lich. Crost.: 74: 1852.

Syn.: *Miriquidica limitata* Hertel & Rambold

N - FrI (Tretiach & Hafellner 2000, Hafellner & al. 2014), **Lomb** (Hafellner & al. 2014), **Piem** (Hafellner & al. 2014).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 3-4, X: 2-3, E: 1/ Alt: 4-6/ Alp: vr, Salp: er/ PT: 1/ m/ Note: an alpine to subnival species, confined to steep or overhanging surfaces of hard siliceous rocks, often with a high iron content. The basionym is often attributed to Massalongo, but he explicitly attributes the description of the new species to Garovaglio, who also sent him a specimen.

Miriquidica pulvinatula (Arnold) Hertel & Rambold

Mitt. bot. Staatss. München, 23: 389, 1987 - *Lecidella pulvinatula* Arnold, Verh. zool.-bot. Ges. Wien, 29: 382, 1879.

Syn.: *Lecidea circumnigrata* H. Magn., *Lecidea pulvinatula* (Arnold) Dalla Torre & Sarnth.

N - TAA.

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 3-4, X: 2-3, E: 1/ Alt: 4-5/ Alp: vr, Salp: er/ PT: 1/ m/ Note: on iron-rich crystalline rocks near and above treeline; closely related to *M. leucophaea*.

Miriquidica subplumbea (Anzi) Cl. Roux

in Roux & al., Bull. Soc. linn. Provence, nr.spec. 14: 108, 2011 - *Lecidea subplumbea* Anzi, Atti Soc. Ital. Sci. Nat., 11: 169, 1868.

Syn.: *Lecidea inserena* Nyl., *Lecidea inserena* f. *subplumbea* (Anzi) Arnold, *Lecidea tumidior* (Nyl.) Vain., *Lecidella subplumbea* (Anzi) Arnold, *Miriquidica griseoatra auct.*

N - FrI (Tretiach & Hafellner 2000), **TAA** (Hertel & Schuhwerk 2010), **Lomb, Piem** (Isocrono & al. 2004), **VA** (Pievittori & Isocrono 1997, 1999, Matteucci & al. 2015c).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 3-4, X: 4, E: 1-2/ Alt: 4-5/ Alp: rc, Salp: vr/ PT: 1/ Note: a probably circumpolar, arctic-alpine species found on wind-exposed, acid siliceous rocks in the Alps, with optimum above treeline. I have placed here all records of *M. griseoatra*; for further details see Hafellner & al. (2014).

M o n e r o l e c h i a Trevis.

Linnaea, 28: 296, 1857.

This genus of 4 species was originally erected to accommodate *M. badia*. It is characterised by thalli which are initially parasitic on various other lichens but become autonomous, asci approximating the *Lecanora*-type,

short, bacilliform conidia, a non-inspersed hymenium, and small *Buellia*-type ascospores which lack wall-thickenings at maturity; The ascus-type is somewhat intermediate between the *Bacidia*- and the *Lecanora*-type, with a very thin or even indistinct amyloid layer above the axial body, which is conical with converging flanks (see Kalb 2004, Giralt & van den Boom 2011). The genus, which is not accepted by all modern authors pending a clarification of the generic nomenclature of buellioid lichens, belongs to the Caliciaceae. Type: *M. bayrhofferi* (Schaer.) Trevis. (= *M. badia*).

Monerolechia badia (Fr.) Kalb

Bibl. Lichenol., 88: 312, 2004 - *Lecidea badia* Fr., Syst. Orb. Veget., 1: 287, 1825.

Syn.: *Buellia badia* (Fr.) A. Massal., *Buellia bayrhofferi* (Schaer.) H. Olivier, *Buellia conioptiza* (Nyl.) B. de Lesd., *Buellia duebenii* (Fr.) Hellb., *Buellia pernigrans* (Nyl.) Sandst., *Buellia schisticola* H. Magn., *Catolechia badia* (Fr.) Stein, *Karschia bayrhofferi* (Schaer.) Rehm, *Lecidea bayrhofferi* Schaer., *Lecidea conioptiza* Nyl., *Lecidea pernigrans* Nyl., *Monerolechia bayrhofferi* (Schaer.) Trevis., *Rhizocarpon badium* (Fr.) Sambo

N - Ven, **TAA** (Hafellner 1979), **Lomb, Piem** (Favero-Longo & al. 2015), **VA** (Hafellner 1979, Piervittori & Isocrono 1999, Matteucci & al. 2015c), **Lig** (Brunialti & al. 1999). **C** - **Tosc, Marc** (Nimis & Tretiach 1999), **Laz, Sar** (Monte 1993, Nöske 2000, Rizzi & al. 2011, Giordani & al. 2013). **S** - **Camp, Pugl, Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996, Brackel & Puntillo 2016), **Si** (Nimis & al. 1996b, Grillo & al. 1996, Grillo 1998, Grillo & Caniglia 2004, Brackel 2008b).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4-5, X: 4, E: 2-3/ Alt: 1-4/ Salp: r, Orom: r, Mont: vr, SmedD: er, SmedH: vr, MedH: rr, MedD: r/ PT: 1/ paras crustose and foliose lichens/ Note: a holarctic, subtropical to boreal-montane lichen found on steeply inclined, base-rich siliceous rocks, which starts the life-cycle on other lichens, later becoming autonomous.

M o n t a n e l i a Divakar, A. Crespo, Wedin & Essl.

Am. J. Bot., 99: 2022, 2012.

A recent molecular study of brown parmelioid Parmeliaceae by Divakar & al. (2012) showed that the *Melanelia disjuncta*-group forms a strongly supported, monophyletic lineage independent from *Melanelia s.str.* This group was segregated into the new genus *Montanelia*, which at the moment includes 5 species, mostly found in the Northern Hemisphere. The genus is characterised by short, narrow lobes with plane to convex margins, a non-pored epicortex, flat, effigurate pseudocyphellae on the upper surface, cylindrical to fusiform conidia, and a medulla containing orcinol depsides. Type: *M. panniformis* (Nyl.) Divakar & al.

Montanelia disjuncta (Erichsen) Divakar, A. Crespo, Wedin & Essl.

Am. J. Bot., 99: 2022, 2012 - *Parmelia disjuncta* Erichsen, Ann. Mycol., 37: 78, 1939.

Syn.: *Melanelia disjuncta* (Erichsen) Essl., *Melanelia granulosa* Essl., *Parmelia granulosa* Lynge nom. illegit., *Parmelia granulosa* Oxner, *Parmelia sorediata* var. *coralloidea* Lynge

N - Ven, **TAA** (Nascimbene 2006c), **Lomb, Piem** (Nascimbene 2006), **Piem** (Morisi & Sereno 1995), **VA** (Matteucci & al. 2015c). **C** - **Tosc** (TSB 33883), **Laz** (TSB 31330), **Sar**.

Fol.b/ Ch/ A.s/ Sax/ pH: 1-2, L: 4, X: 3, E: 3-4/ Alt: 3-5/ Alp: vr, Salp: r, Orom: er, Mont: r/ PT: 1/ Note: a widespread lichen of dry-cool areas found on steeply inclined surfaces of siliceous rocks in upland areas; most frequent, but generally not common, in the Alps, very rare in the high Mediterranean mountains.

Montanelia panniformis (Nyl.) Divakar, A. Crespo, Wedin & Essl.

Am. J. Bot., 99: 2023, 2012 - *Parmelia olivacea* var. *panniformis* Nyl., Herb. Mus. Fenn.: 83, 1859.

Syn.: *Melanelia panniformis* (Nyl.) Essl., *Parmelia crustificans* Hilitzer, *Parmelia panniformis* (Nyl.) Vain., *Parmelia pannariiformis* (Lamy) Vain., *Parmelia panniformis* var. *pulvinata* Hillmann

N - **TAA** (Nascimbene 2006c), **Lomb, Piem** (Morisi & Sereno 1995, Isocrono & al. 2004).

Fol.b/ Ch/ A.f/ Sax/ pH: 1-2, L: 3-4, X: 3, E: 1-2/ Alt: 2-4/ Salp: er, Mont: er, SmedD: er/ PT: 1/ Note: a mainly northern species in Europe found on steeply inclined surfaces of siliceous rocks in upland areas; almost certainly restricted to the Alps in Italy.

Montanelia sorediata (Ach.) Divakar, A. Crespo, Wedin & Essl.

Am. J. Bot., 99: 2023, 2012 - *Parmelia stygia* var. *sorediata* Ach., Lichenogr. Univ.: 471, 1810.

Syn.: *Imbricaria sorediata* (Ach.) Arnold, *Imbricaria sprengelii* (Flörke) Körb., *Melanelia sorediata* (Ach.) Goward & Ahti, *Melanelia sorediosa* (Almb.) Essl., *Parmelia sorediata* (Ach.) Th. Fr., *Parmelia sorediosa* Almb., *Parmelia sorediifera* R. Sant., *Parmelia sprengelii* Flörke

N - Ven, **TAA, Piem** (Morisi 2005), **Emil** (Jatta 1909-1911), **Lig, C** - **Tosc** (Jatta 1909-1911), **Sar** (Nöske 2000, Nöske & al. 2000). **S** - **Camp** (Jatta 1909-1911), **Pugl** (Jatta 1909-1911).

Fol.b/ Ch/ A.s/ Sax/ pH: 1-2, L: 3-4, X: 3-4, E: 2-3/ Alt: 3-4/ Salp: vr, Orom: er, Mont: vr/ PT: 1/ Note: on vertical seepage tracks of siliceous rocks, mostly in upland areas. All records from continental Italy (see Nimis 1993: 484) require confirmation.

Montanelia tominii (Oxner) Divakar, A. Crespo, Wedin & Essl.

Am. J. Bot., 99: 2023, 2012 - *Parmelia tominii* Oxner, Zh. Bio-Bot. Tsyklu, Kiev, 7-8: 171, 1933.

Syn.: *Melanelia substygia* (Räsänen) Essl., *Melanelia tominii* (Oxner) Essl., *Parmelia saximontana* R.A. Anderson & W.A. Weber, *Parmelia substygia* Räsänen

N - Ven, TAA, VA (Piervittori & Isocrono 1999).

Fol./b/ Ch/ A.s/ Sax/ pH: 1-2, L: 4, X: 4, E: 1-2/ Alt: 4-5/ Alp: r, Salp: vr/ PT: 1/ Note: an arctic-alpine to boreal-montane, perhaps circumpolar lichen of exposed siliceous rocks, with optimum near and above treeline. According to some Russian authors (e.g. T. Makryi *in litt.*), the synonymisation of *P. tominii* and *P. substygia* by Esslinger (1977) might be incorrect, the correct basionym for European samples being "*substygia*"; this problem requires further study.

Multiclavula R.H. Petersen

Am. Midl. Nat., 77: 207, 1967.

This genus includes a group of club-shaped Basidiomycetes which straddle the lichen border: the algal partners are enclosed in small capsules of mycelial tissue, but virtually unstructured, appearing as a green granular crust on the surfaces where the mushroom fruits. Although both symbionts live in an obligate mutualistic association, they remain recognisable morphologically. *Multiclavula* was traditionally included in the Clavariaceae, but molecular phylogenetic analysis shows its close relationship with the Cantharellid clade of the Homobasidiomycetes (see e.g. Ertz & al. 2008). Type: *M. corynoides* (Peck) R.H. Petersen

Multiclavula mucida (Pers.) R.H. Petersen

Am. Midl. Nat., 77: 212, 1967 - *Clavaria mucida* Pers., Comm. Fung. Clav.: 55, 1797.

Syn.: *Clavaria mucida* var. *rosea* Bres., *Lentaria mucida* (Pers.) Corner, *Stichoclavaria mucida* (Pers.) Paechn.

N - Ven (Onofri & al. 2013), Emil (Bernicchia & al. 1981).

Frut/ Ch/ S/ Lign/ pH: 1, L: 3-4, X: 2-3, E: 1/ Alt: 3/ Mont: er/ PT: 1/ Note: on decaying wood (logs, stumps) in pristine, humid montane forests; perhaps overlooked by lichenologists, but certainly very rare in Italy.

Multiclavula vernalis (Schwein.) R.H. Petersen

Am. Midl. Nat., 77: 216, 1967 - *Clavaria vernalis* Schwein., Schr. naturf. Ges. Leipzig, 1: 112, 1822.

Syn.: *Clavulinopsis vernalis* (Schwein.) Corner, *Stichoclavaria vernalis* (Schwein.) Paechn.

N - Lomb (Gaggianese & al. 1999).

Frut/ Ch/ S/ Terr/ pH: 1, L: 3-4, X: 2-3, E: 1/ Alt: 3-4/ Salp: er, Mont: er/ PT: 1/ Note: on humic to sandy, acid soil in humid situations; perhaps overlooked by lichenologists, but certainly very rare in Italy.

Mycobilimbia Rehm

Rabenh. Krypt.-Flora, 2 ed., 1, 3: 295, 327, 1890.

This genus of the Lecideaceae has faced several taxonomic complexities, and many species have been transferred to other genera. Three main groups were recognised: the first is now assigned to *Bilimbia* (formerly *Myxobilimbia*), which differs in having a warted perispore, the second contains *M. tetramera* (the type) and relatives, while the third, segregated into *Bryobilimbia*, comprises the *Lecidea hypnorum*-group with simple ascospores (Fryday & al. 2014). Type: *M. obscurata* (Sommerf.) Rehm (= *M. tetramera*).

Mycobilimbia carnealbida (Müll. Arg.) S. Ekman & Printzen

in Nash & al., Lichen Flora Gr. Sonoran Desert Reg., 2: 366, 2004 - *Patellaria carnealbida* Müll. Arg., Flora, 51: 50, 1868.

Syn.: *Bacidia carnealbida* (Müll. Arg.) Coppins, *Bacidia sphaeroides* auct. p.p. non (Dicks.) Zahlbr.

N - VG, Ven, TAA, Lomb, Piem, Emil, Lig, C - Laz, S - Camp, Pugl.

Cr/ Ch/ S/ Epiph-Terr/ pH: 2-3, L: 3-4, X: 1-2, E: 1-2/ Alt: 3-5/ Alp: r, Salp: rr, Mont: vr/ PT: 1/ Note: on bark, mosses and plant debris, more rarely directly on rock in upland areas with frequent fog. The species was frequently confused with other taxa and Italian material needs revision.

Mycobilimbia epixanthoides (Nyl.) Hafellner & Türk

Vitik., Ahti, Kuusinen, Lommi & T. Ulvinen ex Hafellner & Türk, Stapfia 76: 153, 2001 - *Lecidea epixanthoides* Nyl., Flora, 48: 5, 1865.

Syn.: *Bacidia epixanthoides* (Nyl.) Lettau, *Biatora epixanthoides* (Nyl.) Diederich

N - Frl, TAA (Nascimbene & al. 2008c, 2014, Nascimbene 2014, Nimis & al. 2015).

Cr/ Ch/ Epiph-Terr/ pH: 1-2, L: 4-5, X: 2-4, E: 1-2/ pH: 1-2, L: 3-4, X: 3, E: 1-2/ Alt: 2-3/ Mont: vr, SmedD: er/ PT: 1/ Note: on mossy trunks of deciduous trees, more rarely on siliceous rocks.

Mycobilimbia olivacea Aragón, Sarrión & Hafellner

in Sarrión & al., Lichenologist, 35: 3, 2003.

N - TAA (Thor & Nascimbene 2007).

Cr/ Ch/ S/ Lign-Epiph/ pH: 1-2, L: 4-5, X: 2-4, E: 1-2/ Alt: 3/ Mont: vr/ PT: 1/ Note: on bark, mainly of conifers, at the base of trunks. The Italian material differs from the description in the paler thallus and in not having biseriolate asci. According to Printzen (*in litt.*) the species is likely to be related to *Lecidea berengeriana*. It is included in the Italian red list of epiphytic lichens as "Data Deficient" (Nascimbene & al. 2013c).

Mycobilimbia pilularis (Körb.) Hafellner & Türk

Stapfia, 76: 153, 2001 - *Biatorina pilularis* Körb., *Parerga* Lichenol.: 136, 1860.

Syn.: *Bacidia sphaeroides* (Dicks.) Zahlbr., *Biatora pilularis* (Körb.) Hepp, *Biatora sphaeroides* (Dicks.) Hornem., *Biatorina sphaeroides* A. Massal., *Bilimbia sphaeroides* (Dicks.) Körb., *Catillaria sphaeroides* (A. Massal.) Schuler *non auct.*

N - VG, FrI, Ven, TAA (Nascimbene & al. 2007b, Nimis & al. 2015), **Lomb, Piem** (Isocrono & al. 2004), **Lig. C - Tosc, Umb** (Ravera 1998, Panfili 2000b, Ravera & al. 2006), **Laz** (Ravera 2001, Nimis & Tretiach 2004), **Abr. S - Camp, Pugl, Cal** (Puntillo 1995, 1996).

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 3, X: 1-2, E: 1-2/ Alt: 2-4/ Mont: r, SmedD: er, SmedH: vr/ PT: 1/ Note: on mosses growing on the bark of old deciduous trees, especially near the base of trunks in old, humid forests. Several old records are dubious, and could refer to *Bilimbia sabuletorum*.

Mycobilimbia tetramera (De Not.) Hafellner & Türk

Vitik., Ahti, Kuusinen, Lommi & T. Ulvinen *ex* Hafellner & Türk, Stapfia, 76: 154, 2001 - *Bilimbia tetramera* De Not., *Giorn. Bot. Ital.*, 1: 191, 1846.

Syn.: *Bacidia fusca* (A. Massal.) Du Rietz, *Bacidia indurata* Zahlbr., *Bacidia obscurata* (Sommerf.) Zahlbr., *Bacidia tetramera* (De Not.) Coppins, *Biatora fusca auct.*, *Bilimbia fusca* A. Massal., *Bilimbia obscurata* (Sommerf.) Th. Fr., *Lecidea triplicans* Nyl., *Mycobilimbia fusca* (A. Massal.) Hafellner & V. Wirth, *Mycobilimbia obscurata* (Sommerf.) Rehm

N - VG, FrI, Ven (Lazzarin 2000b, Thor & Nascimbene 2007), **TAA** (Nascimbene & al. 2007b), **Lomb, Piem, VA** (Pierivittori & Isocrono 1999), **Emil, Lig. C - Tosc** (Tretiach & al. 2008), **Umb** (Panfili 2007), **S - Cal** (Puntillo 1996).

Cr/ Ch/ S/ Epiph-Terr/ pH: 3-4, L: 3-4, X: 2-3, E: 1-2/ Alt: 2-5/ Alp: r, Salp: r, Orom: r, Mont: rr, SmedD: r, Pad: er, SmedH: r/ PT: 1/ Note: on mosses and plant debris on calcareous substrata, sometimes on bark, especially on basal parts of old trunks in open forests, and on other lichens (*e.g. Peltigera*); most frequent in the Alps, but reaching south along the Apennines to the mountains of Calabria.

Mycoblastus Norman

Nytt Mag. Naturvid., 7: 236, 1853.

In its traditional circumscription, this is a widely distributed group of mainly epiphytic species found in cool temperate to arctic regions of both Hemispheres. The type species is one of the common crustose lichens of circumboreal-montane coniferous forests, but Spribille & al. (2011b) showed that within *M. sanguinarius s.lat.* in the Northern Hemisphere, two species can be recovered, one of which matches the Southern Hemisphere species *M. sanguinarioides* (North America and Asia), and one of which corresponds to *M. sanguinarius s.str.* In the Northern Hemisphere the genus is currently considered to include 7 species, since *M. fucatus* has been recently transferred to the new genus *Violella* (Spribille & al. 2011). In its current circumscription, the genus, that includes c. 10 species worldwide, is placed in the Tephromelataceae (see *e.g.* Bendiksby & al. 2015). Type: *M. sanguinarius* (L.) Norman

Mycoblastus affinis (Schaer.) T. Schauer

in Poelt & Steiner, *Sched. ad Lich. Alpium*, 12: 230, 1964 - *Lecidea affinis* Schaer., *Enum. Crit. Lich. Eur.*: 132, 1850.

Syn.: *Lecidea melina* Kremp. *ex* Nyl., *Lecidea sanguinaria* var. *affinis* (Schaer.) Nyl., *Lecidea sanguinaria* var. *melina* Kremp. *ex* Nyl., *Megalospora affinis* (Schaer.) A. Massal., *Megalospora alpina* (Fr) Arnold, *Mycoblastus alpinus* (Fr.) Hellb., *Mycoblastus melinus* (Kremp. *ex* Nyl.) Hellb., *Mycoblastus sanguinarius* var. *alpinus* (Fr.) Stein

N - Ven, TAA (Nascimbene & Caniglia 2000, 2003c, Nascimbene & al. 2006e, 2009, 2013b, Nascimbene 2008c), **TAA** (Stofer 2006, Nascimbene & al. 2007b, 2010, 2014, Nascimbene 2008b, 2013, 2014, Nimis & al. 2015).

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 3, X: 1-2, E: 1/ Alt: 3-4/ Salp: er, Mont: vr/ PT: 1/ Note: an incompletely circumboreal-montane species found on old conifers, especially *Abies* and *Picea*, in open, humid, montane to subalpine woodlands, more rarely on lignum or siliceous rocks; perhaps more widespread in the Alps, but not common. It is included in the Italian red list of epiphytic lichens as "Endangered" (Nascimbene & al. 2013c).

Mycoblastus sanguinarius (L.) Norman

Nytt Mag. Naturvid., 7: 237, 1853 - *Lichen sanguinarius* L., *Sp. Pl.*: 1140, 1753.

Syn.: *Lecidea didymospora* Stirt., *Lecidea sanguinaria* (L.) Ach., *Lecidea sanguinaria* var. *endorhoda* Th. Fr., *Megalospora sanguinaria* (L.) A. Massal., *Oedemocarpus sanguinarius* (L.) Trevis.

N - Ven, TAA (Nascimbene & al. 2009, 2010, Nimis & al. 2015), **Piem.**

Cr/ Ch/ S/ Epiph-Lign/ pH: 1-2, L: 2-4, X: 2-3, E: 1/ Alt: 4/ Salp: r/ PT: 1/ Note: a circumboreal-montane species found on lignum and bark of conifers (especially *Larix*), mostly in the subalpine belt; perhaps restricted to the Alps in Italy.

Myochoidea Printzen, T. Sprib. & Tønsberg

Lichenologist, 40: 196, 2008.

This genus was recently described to accommodate four species of the *Lecidea leprosula*-group. It is characterised by a crustose thallus, reddish brown apothecia with an often persistent margin, moderately

branched and anastomosing paraphyses with often swollen, pigmented apical cells, asci of the *Micareia*-type, and colourless, one-celled, fusiform to broadly ellipsoid ascospores. For further details see Printzen & al. (2008). Type: *M. rufofusca* (Anzi) Printzen, T. Sprib. & Tønberg

Myochroidea leprosula (Arnold) Printzen, T. Sprib. & Tønberg
Lichenologist, 40: 198, 2008 - *Biatora leprosula* Arnold, Lich. Exs.: 545, 1874.
Syn.: *Lecidea leprosula* (Arnold) Harm.

N - Frl (Hinteregger 1994, in Austrian terr., near the border).

Cr/ Ch/ A.s/ Epiph/ pH: 1-2, L: 3, X: 2-3, E: 1/ Alt: 3-4/ Salp: er, Mont: er/ PT: 1/ Note: a circumboreal species growing on twigs of subalpine shrubs, certainly more widespread in the Alps.

Myochroidea porphyrospoda (Anzi) Printzen, T. Sprib. & Tønberg
Lichenologist, 40: 201, 2008 - *Biatora porphyrospoda* Anzi, Comm. Soc. Critt. Ital., 2: 13, 1864.
Syn.: *Lecidea porphyrospoda* (Anzi) Th. Fr.

N - Lomb (Hinteregger 1994, Anzi Lich. Lang. 339: Printzen 1995).

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 2-3, X: 2-3, E: 1/ Alt: 3-4/ Salp: er, Mont: er/ PT: 1/ Note: a mainly boreal-montane, probably circumpolar lichen found especially on basal parts of trunks, on bark, sometimes on lignum, mostly in upland areas; probably more widespread in the Alps.

Myochroidea rufofusca (Anzi) Printzen, T. Sprib. & Tønberg
Lichenologist, 40: 204, 2008 - *Biatora rufofusca* Anzi, Cat. Lich. Sondr.: 76, 1860.
Syn.: *Biatora porphyroplaca* Hinter. & Poelt, *Lecidea rufofusca* (Anzi) Th. Fr.

N - Ven, TAA (Dalla Torre & Sarnthein 1902), **Lomb**.

Cr/ Ch/ S/ Terr/ pH: 1-2, L: 4, X: 2, E: 1/ Alt: 4-5/ Alp: er, Salp: vr/ PT: 1/ #/ Note: on terricolous mosses and plant debris on siliceous substrata, with optimum near treeline; probably restricted to the Alps in Italy.

Myriolecis Clem. The Genera of Fungi: 79, 1909.

This recently resurrected genus of the Lecanoraceae includes species most common on calciferous rocks and bark, which were mostly placed in the *Lecanora dispersa*-group, that has been shown to form a clade separate from *Lecanora s.str.* and to be congeneric with *Arctopeltis thuleana* (see Zhao & al. 2016). While most species have a crustose and often inconspicuous thallus, a few taxa form placodioid to umbilicate thalli. The species either contain chlorinated xanthenes, often accompanied by depsidones, or lack secondary metabolites. The genus has a worldwide distribution, but it is most diverse in temperate to arctic-alpine regions of the Northern Hemisphere. Type: *M. sambuci* (Pers.) Clem.

Myriolecis agardhiana (Ach.) Śliwa, Zhao Xin & Lumbsch subsp. ***agardhiana***
in Zhao Xin & al., Fungal Divers., 78: 300, 2016 - *Lecanora agardhiana* Ach., Syn. Meth. Lich.: 152, 1814.

Syn.: *Lecanora agardhiana* Ach. subsp. *agardhiana*, *Lecanora agardhanioides* A. Massal., *Lecanora agardhanioides* var. *cilophthalma* A. Massal., *Lecanora agardhanioides* var. *dealbata* A. Massal., *Lecanora agardhanioides* var. *melanophthalma* A. Massal., *Lecanora agardhanioides* var. *microstigma* A. Massal., *Lecanora agardhanioides* var. *pacnodes* A. Massal.

N - VG, Frl, Ven (Lazzarin 2000b, Nascimbene 2005c), **TAA** (Nascimbene 2008b), **Lomb, Piem, Emil** (Tretiach & al. 2008), **Lig. C - Tose** (Benespero 2000a, Tretiach & al. 2008), **Marc** (Nimis & Tretiach 1999), **Umb** (Genovesi & Ravera 2001, Ravera & al. 2006), **Laz** (Nimis & Tretiach 2004), **Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 1999), 2004, Caporale & al. 2008), **Sar. S - Camp** (Aprile & al. 2003b, Nimis & Tretiach 2004), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994, Ottonello & al. 1994, Caniglia & Grillo 2005, 2006).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 3-5, X: 3-4, E: 1-3/ Alt: 1-5/ Alp: c, Salp: vc, Orom: vc, Mont: vc, SmedD: rc, SmedH: rc, MedH: rr, MedD: r/ PT: 1/ #/ Note: a widespread holarctic lichen found on horizontal to weakly inclined surfaces of hard limestone and dolomite, with a wide altitudinal range; the distinction from other related species still needs further study.

Myriolecis agardhiana subsp. ***catalaunica*** (Cl. Roux) Nimis & Cl. Roux
in Nimis, The Lichens of Italy. A Second Annotated Catalogue: 19, 2016 - *Lecanora agardhiana* subsp. *catalaunica* Cl. Roux, Bull. Soc. linn. Provence, 54: 120, 2003.

C - Sar.

Cr/ Ch/ S/ Sax/ pH: 5, L: 3-4, X: 3-4, E: 1-2/ Alt: 1-2/ SmedH: vr, MedH: r/ PT: 1/ coast, #/ Note: a taxon worthy of further study, found on inclined surfaces of hard, compact calciferous rocks, mostly at low elevations.

Myriolecis agardhiana subsp. ***sapaudica*** (Cl. Roux) Nimis & Cl. Roux
in Nimis, The Lichens of Italy. A Second Annotated Catalogue: 19, 2016 - *Lecanora agardhiana* subsp. *sapaudica* Cl. Roux, Bull. Soc. linn. Provence, 54: 120, 2003.

Syn.: *Lecanora agardhiana* subsp. *sapaudica* var. *lecidella* (Poelt) Leuckert & Poelt?, *Lecanora lecidella* Poelt?
N - Ven, Piem (TSB 32949). C - Abr (Nimis & Tretiach 1999).

Cr/ Ch/ S/ Sax/ pH: 5, L: 4-5, X: 4, E: 2-3/ Alt: 4-6/ Alp: vr, Salp: er/ PT: 1/ Note: restricted to areas near or above treeline, this calcicolous taxon is certainly more widespread in the Alps, where it reaches the nival belt, and is also known from the central Apennines.

Myriolecis albescens (Hoffm.) Śliwa, Zhao Xin & Lumbsch

in Zhao Xin & al., Fungal Divers.: 300, 2016 - *Psora albescens* Hoffm., Deuschl. Fl., 2: 165, 1796.

Syn.: *Lecanora albescens* (Hoffm.) Branth & Rostr., *Lecanora albescens* f. *lignaria* Nyl., *Lecanora albescens* f. *monstrosula* (Lamy) Zahlbr., *Lecanora dispersa* f. *verrucosa* (Leight.) J.R. Laundon, *Lecanora dissipata* Nyl., *Lecanora galactina* (Ach.) Ach., *Lecanora galactina* var. *muralis* f. *nigra* B. de Lesd., *Lecanora galactinoides* Jatta, *Lecanora sommerfeltiana* Flörke, *Lecanora urbana* Nyl., *Patellaria albescens* (Hoffm.) Trevis., *Placodium albescens* (Hoffm.) A. Massal., *Placodium albescens* var. *muralis* A. Massal., *Placodium albescens* var. *monsauri* A. Massal., *Squamaria albescens* (Hoffm.) Anzi

N - VG (Castello 2002, Martellos & Castello 2004), Frl (Nimis & Salvadori 1998, Nascimbene & Salvadori 2008, Nascimbene & al. 2009b), Ven (Caniglia & al. 1999, Lazzarin 2000b, Nascimbene & Salvadori 2008), TAA (Nascimbene & al. 2007b, Spitale & Nascimbene 2012), Lomb (Valcuvia & al. 2003, Florio & al. 2004, 2006), Piem (Caniglia & al. 1992, Gazzano & al. 2009b, Morando & al. 2014, 2016), VA (Piervittori & Isocrono 1999, Valcuvia 2000), Emil (Scarpa 1993, Mol (Garofalo & al. 1999, Valcuvia & Grieco 1995, Valcuvia & Savino 2000, Tretiach & al. 2008), Lig (Roccardi 2006, Giordani & al. 2016). C - Tosc (Tretiach & Nimis 1994), Marc (Nimis & Tretiach 1999), Umb (Panfili 2000b, 2007, Ravera & al. 2006, Genovesi 2011), Laz (Bartoli 1997b, Bartoli & al. 1998, Nimis & Tretiach 2004, Pietrini & al. 2008, Genovesi & al. 2011, Roccardi 2011), Abr (Recchia & Villa 1996 (Nimis & Tretiach 1999, De Angelis & al. 2003), Mol (Garofalo & al. 1999, Nimis & Tretiach 1999, Caporale & al. 2008), Sar. S - Camp (Garofalo & al. 1999, 2010, Ricciardi & al. 2000, Aprile & al. 2002, 2003, 2003b, 2005, Nimis & Tretiach 2004), Pugl (Nimis & Tretiach 1999, Durini & Medagli 2002), Bas (Nimis & Tretiach 1999), Cal (Puntillo 1996), Si (Nimis & al. 1994, 1995, Ottonello & Salone 1994, Ottonello & al. 1994, 2011, Ottonello 1996, Poli & al. 1997, Ottonello & Romano 1997, Grillo 1998, Caniglia & Grillo 2001, Grillo & al. 2001, 2002, 2009, Grillo & Caniglia 2004, Brackel 2008b).

Cr/ Ch/ S/ Sax/ pH: 3-5, L: 3-5, X: 3-5, E: 3-4/ Alt: 1-4/ Salp: vr, Orom: vr, Mont: rr, SmedD: ec, Pad: vc, SmedH: ec, MedH: ec, MedD: vc/ PT: 1-3/ Note: a holarctic, widespread lichen found on a wide variety of calciferous or base-rich substrata including mortar, brick, roofing tiles, and walls, also in large urban areas and in archaeological areas. According to Roux & coll. (2014) the taxon is still heterogeneous, and deserves further study.

Myriolecis antiqua (J.R. Laundon) Śliwa, X.Zhao & Lumbsch

in Zhao Xin & al., Fungal Divers., 78: 300, 2016 - *Lecanora antiqua* J.R. Laundon, Lichenologist, 42: 631, 2010.

Syn.: *Lecanora conferta* auct. non (Duby) Grognot, *Lecanora conferta* f. *terricola* H. Olivier

N - TAA, Piem (Matteucci & al. 2013, Giordani & al. 2014). S - Camp, Cal (Puntillo 1996), Si (Grillo 1998, Grillo & Caniglia 2004).

Cr/ Ch/ S/ Sax/ pH: 3-4, L: 4, X: 4, E: 2-3/ Alt: 2-5/ Alp: vr, Salp: vr, Mont: vr, SmedD: vr, SmedH: r/ PT: 1/ Note: on steeply inclined surfaces of basic siliceous rocks (especially basalt), sometimes on calciferous rocks. For further details see Laundon (2010).

Myriolecis bandolensis (B. de Lesd.) Cl. Roux & Nimis

in Nimis, The Lichens of Italy. A Second Annotated Catalogue: 19, 2016 - *Lecanora bandolensis* B. de Lesd., Bull. Soc. Bot. France, 101: 223, 1954.

Syn.: *Lecanora albescens* var. *bandolensis* (B. de Lesd.) Clauzade & Cl. Roux

C - Tosc (TSB 35190), Camp (Garofalo & al. 2010). Sar. S - Si.

Cr/ Ch/ S/ Sax/ pH: 3-5, L: 4-5, X: 3-4, E: 2-4/ Alt: 1/ MedH: rr, MedD: vr/ PT: 1/ coast, #/ Note: a mostly coastal, probably Mediterranean-Atlantic lichen of calcareous or basic siliceous rocks; related to *M. albescens*, but a different species (see Bertrand & al. 2010).

Myriolecis congesta (Clauzade & Vězda) M. Bertrand & Cl. Roux

in Nimis, The Lichens of Italy. A Second Annotated Catalogue: 19, 2016 - *Lecanora congesta* Clauzade & Vězda, Portugaliae Acta Biol, B, 9: 331, 1969.

S - Pugl (Nimis & Tretiach 1999).

Cr.pl/ Ch/ S/ Sax/ pH: 5, L: 4-5, X: 4, E: 3-4/ Alt: 1/ MedD: r/ PT: 1/ coast/ Note: a probably Mediterranean-Atlantic species found in the adlittoral belt in sites frequently hit by waves on inclined surfaces of calciferous rocks, probably more widespread along the Mediterranean coast. The species resembles *M. bandolensis*, but differs in the poorly developed, sublobate thallus reacting C+ red, the numerous, crowded, prominent apothecia covering almost the whole thallus, the thick thalline margin reacting C+ red and the pale grey-brown disc reacting C-, without the *bandolensis*-green pigment. Like *M. poeltiana*, it also contains 2,7-dichlorolichexanthone (thallus and apothecia), plus gyrophoric and lecanoric acids, the latter two however limited to the thalline margin of apothecia (see Bertrand & al. 2010).

Myriolecis crenulata (Hook.) Śliwa, Zhao Xin & Lumbsch

in Zhao Xin & al., Fungal Divers., 78: 300, 2016 - *Lecanora crenulata* Hook., Engl. Fl.: 190, 1833.

Syn.: *Lecanora caesioalba* (Flörke) Körb., *Lecanora hagenii* var. *crenulata* (Hook.) Ach., *Patellaria subfusca* var. *crenulata* (Hook.) Trevis., incl. *Lecanora dispersella* auct.

N - VG, Frl (Nascimbene & al. 2009b), **Ven** (Nascimbene & Salvadori 2008), **TAA** (Arnold Lich. Exs. 1808: Poelt & Leuckert 1995, Nascimbene 2005b, 2008b), **Lomb, Piem** (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999, Revel & al. 2001), **Emil** (Bouvet 2008, Tretiach & al. 2008), **Lig. C - Tosc** (Brackel 2015), **Marc** (Nimis & Tretiach 1999), **Umb** (Nimis & Tretiach 1999, Ravera & al. 2006, Panfili 2007), **Laz** (Bartoli & al. 1998, Nimis & Tretiach 2004), **Abr** (Nimis & Tretiach 1999, Brackel 2015), **Mol** (Nimis & Tretiach, 1999, 2004, Caporale & al. 2008, Genovesi & Ravera 2014), **Sar** (Rizzi & al. 2011), **S - Camp** (Garofalo & al. 1999, 2010, Aprile & al. 2003, 2003b, Nimis & Tretiach 2004), **Pugl, Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994, Ottonello & al. 1994, Grillo 1998, Grillo & Caniglia 2004).

Cr/ Ch/ S/ Sax/ pH: 3-5, L: 3-4, X: 3-4, E: 1-2/ Alt: 1-5/ Alp: rc, Salp: rc, Orom: rc, Mont: rr, SmedD: rr, SmedH: r, MedH: vr/ PT: 1/ u/ Note: a widespread holarctic lichen found on steeply inclined faces or in underhangs of hard calciferous rocks, most frequent in upland areas.

Myriolecis dispersa (Pers.) Śliwa, Zhao Xin & Lumbsch

in Zhao Xin & al., Fungal Divers., 78: 300, 2016 - *Lichen dispersus* Pers., Ann. Bot. (Usteri), 7: 27, 1794.

Syn.: *Lecanora dispersa* (Pers.) Röhl., *Lecanora umbrina* auct. p.p., *Patellaria caesioalba* var. *dispersa* (Pers.) Trevis.

N - VG (Castello 2002, Martellos & Castello 2004), **Frl** (Nimis & Salvadori 1998, Nascimbene & Salvadori 2008, Nascimbene & al. 2009b), **Ven** (Caniglia & al. 1993, 1999, Nimis 1994, Salvadori & al. 1994, Nascimbene & Caniglia 2003c, Nascimbene 2005c, 2008, Nascimbene & Marini 2007, Nascimbene & Salvadori 2008), **TAA** (Nascimbene 2003, 2005b, 2008b, Nascimbene & al. 2005, 2006), **Lomb** (Valcuvia & al. 2003, Valcuvia & Truzzi 2007b), **Piem** (Caniglia & al. 1992, Isocrono & Falletti 1999, Isocrono & al. 2003, Piervittori 2003, Favero-Longo & al. 2009b, 2015, Gazzano & al. 2009b, Giordani & al. 2014, Morando & al. 2016), **VA** (Piervittori & Isocrono 1999, Piervittori & al. 2001), **Emil** (Nimis & al. 1996, Valcuvia & Savino 2000, Bouvet 2008), **Lig** (Valcuvia & al. 2000, Gazzano & al. 2009, Giordani & al. 2016), **C - Tosc** (Brackel 2015), **Marc** (Nimis & Tretiach 1999), **Umb** (Nimis & Tretiach 1999, Panfili 2000, 2000b, 2007, Ravera & al. 2006, Genovesi 2011), **Laz** (Bartoli 1997b, Capponi & al. 2005, Pietrini & al. 2008, Genovesi & al. 2011, 2012, Roccardi 2011, Brackel 2015), **Abr** (Nimis & Tretiach 1999, Caporale & al. 2016), **Mol** (Garofalo & al. 1999, Nimis & Tretiach, 1999, 2004, Caporale & al. 2008, Ravera & al. 2009, Genovesi & Ravera 2014), **Sar** (Monte 1993, Nöske 2000, Zedda 2002, 2002b, Rizzi & al. 2011, Giordani & al. 2013, Cossu 2013, Cossu & al. 2015), **S - Camp** (Garofalo & al. 1999, 2010, Ricciardi & al. 2000, Aprile & al. 2002, 2003b, Nimis & Tretiach 2004, Catalano & al. 2016), **Pugl** (Nimis & Tretiach 1999, Durini & Medagli 2002, 2004), **Bas** (Bartoli & Puntillo 1998, Nimis & Tretiach 1999, Brackel 2011), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994, Ottonello & Salone 1994, Ottonello & al. 1994, 2011, Monte & Ferrari 1996, Ottonello 1996, Poli & al. 1997, Ottonello & Romano 1997, Grillo 1998, Caniglia & Grillo 2001, Grillo & al. 2001, 2002, Grillo & Caniglia 2004, Brackel 2008b, 2008c, Gianguzzi & al. 2009, Cataldo & Cannavò 2014).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 3-5, X: 4-5, E: 2-4/ Alt: 1-3/ Mont: rr, SmedD: ec, Pad: c, SmedH: ec, MedH: c, MedD: rr/ PT: 2-3/ Note: most frequent in urban areas (e.g. on monuments, mortar walls, asbestocement) up to the montane belt; records from natural habitats and from upland areas may refer to other species, especially to *M. semipallida*.

Myriolecis fugiens (Nyl.) Śliwa, Zhao Xin & Lumbsch

in Zhao Xin & al., Fungal Divers., 78: 301, 2016 - *Lecanora fugiens* Nyl., Flora, 56: 289, 1873.

C - Tosc, Sar. S - Cal.

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4, X: 3, E: 1-2/ Alt: 1/ MedH: r/ PT: 1/ suboc, coast/ Note: a maritime silicolous lichen, probably restricted to Tyrrhenian Italy. For further details see Bertrand & Roux (2011).

Myriolecis hagenii (Ach.) Śliwa, Zhao Xin & Lumbsch

in Zhao Xin & al., Fungal Divers., 78: 301, 2016 - *Lichen hagenii* Ach., Lichenogr. Suec. Prodr.: 57, 1799.

Syn.: *Lecanora bormiensis* Nyl., *Lecanora coerulescens* (Baumg.) Arnold, *Lecanora hagenii* (Ach.) Ach., *Lecanora hagenii* var. *bormiensis* (Nyl.) Dalla Torre & Sarnth., *Lecanora hagenii* var. *ocellulata* (A. Massal.) Bagl., *Lecanora hagenii* var. *lithophila* (Wallr.) Flot., *Lecanora hagenii* var. *umbrina* Ach., *Lecanora nigrescens* Stein, *Lecanora sommerfeltiana* var. *ocellulata* A. Massal., *Lecanora umbrina* (Ach.) A. Massal.

N - VG (Castello 1996), **Frl, Ven** (Nimis & al. 1996c, Caniglia & al. 1999, Lazzarin 1997, 2000, Valcuvia & al. 2000c, Lazzarin 2000b, Nascimbene & Caniglia 2003c, Nascimbene & Marini 2007), **TAA** (Nascimbene & al. 2006, 2007b, Nascimbene 2008b, Zarabska & al. 2009, Nimis & al. 2015), **Lomb** (Grieco & Groppali 1995, Valcuvia & Brusoni 1996, Brusoni & al. 1997, Zocchi & al. 1997, Roella 1999, Brusoni & Valcuvia 2000, Casarini & al. 2000, Arosio & al. 2000, 2003, Valcuvia 2002, 2002b, Valcuvia & al. 2003, Valcuvia & al. 2003, Anderi & al. 2005, Valcuvia & Truzzi 2007, 2007b, Furlanetto 2010, Gheza & al. 2015), **Piem** (Arosio & al. 1998, Piervittori 1998, 2003, Isocrono & Falletti 1999, Castino 2004, Isocrono & al. 2004, 2007, Furlanetto 2010, Matteucci & al. 2010, Marchiaro & al. 2013, Giordani & Malaspina 2016), **VA** (Piervittori & Maffei 1996, 2001, Piervittori & Isocrono 1997, 1999, Valcuvia & al. 2000b, De Vita & Valcuvia 2002, 2002b, 2004, Gazzano & al. 2009, 2009b), **Emil** (Bassi 1995, Gasparo & Tretiach 1996, Nimis & al. 1996, Valcuvia & Savino 2000, Sallese 2003, Morselli & Regazzi 2006, Cioffi 2009, Malavasi 2014, Watson 2014, Gerdol & al. 2014), **Lig** (Valcuvia & al. 2000, Giordani & Incerti 2008, Giordani & al. 2016), **C - Tosc** (Loppi & Corsini 1995, Loppi & al. 1996b, 1997e, 2002b, 2002c, 2003, 2004, Lorenzini & al. 2003, Loppi & Frati 2006, Frati & al. 2007, 2008, Benesperi & al. 2007, 2013, Loppi & Nascimbene 2010, Benesperi 2011, Brunialti & al. 2012b), **Marc** (Nimis & Tretiach 1999, Frati & Brunialti 2006), **Umb** (Ravera 2000, Ravera & al. 2006, 2006b, Panfili 2007, Brunialti & Frati 2010), **Laz** (Bartoli & al. 1997, Ravera & al. 1999, Massari & Ravera 2002, Ruisi & al. 2005, Munzi & al. 2007, Ravera 2008b, Ravera & Genovesi 2008, Zucconi & al. 2013), **Abr** (Recchia & al. 1993, Recchia & Villa 1996, Olivieri & al.

1997, 1997b, Loppi & al. 1999, Nimis & Tretiach 1999, Caporale & al. 2016, Corona & al. 2016), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008, Genovesi & Ravera 2014), **Sar** (Zedda 2002, Rizzi & al. 2011). **S - Camp** (Aprile & al. 2002, 2003b, Nimis & Tretiach 2004, Brunialti & al. 2010, 2013, Garofalo & al. 2010, Ravera & Brunialti 2013, Catalano & al. 2016), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999, Paoli & al. 2006), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994, Ottonello & Salone 1994, Ottonello 1996, Grillo & Cristaudo 1995, Grillo & Carfi 1997, Grillo 1998, Grillo & al. 2002, Grillo & Caniglia 2004, 2006, Caniglia & Grillo 2006b, Stofer 2006, Falco Scampatelli 2005, Grillo & Cataldo 2008, Liistro & Cataldo 2011).

Cr/ Ch/ S/ Epiph-Sax/ pH: 3-5, L: 4-5, X: 3-5, E: 2-4/ Alt: 1-4/ Salp: vr, Orom: r, Mont: rr, SmedD: ec, Pad: rr, SmedH: ec, MedH: c, MedD: rc/ PT: 1-3/ p/ Note: a widespread holarctic lichen belonging to a very difficult complex. It is common on isolated trees with base-rich bark, and on calciferous substrata, including walls of mortar. Indicator values refer to the species considered in a very broad sense. See also note on *Lecanora calabrica*.

Myriolecis invadens (H. Magn.) Śliwa, Zhao Xin & Lumbsch

in Zhao Xin & al., Fungal Divers., 78: 301, 2016 - *Lecanora invadens* H. Magn., Lich. Central Asia: 87, 1940.

Syn.: *Lecanora meolansii* B. de Lesd.

N - Ven (TSB 19712).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 4-5, X: 3-4, E: 4-5/ Alt: 3-5/ Alp: r, Salp: r, Orom: r, Mont: vr/ PT: 1/ paras crustose lichens/ Note: on calciferous rocks in upland areas, often starting the life-cycle on other crustose lichens; certainly more widespread throughout the country. The species is closely related to *M. semipallida*.

Myriolecis liguriensis (B. De Lesd.) Cl. Roux

in Nimis, The Lichens of Italy. A Second Annotated Catalogue: 19, 2016 - *Lecanora liguriensis* B. de Lesd., Bull. Soc. Bot. France, 96, 7-9: 175, 1949.

N - Lig.

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4-5, X: 3, E: 3-4/ Alt: 1/ MedH: vr/ PT: 1/ coast/ Note: a rather poorly known species found on siliceous rocks in the adlittoral belt, also reported from the Mediterranean coasts of France. It differs from *M. salina* in the absence of gyrophoric acid and in the smaller apothecia devoid of crystals (see Roux & coll. 2014).

Myriolecis oyensis (M. Bertrand & Cl. Roux) M. Bertrand & Cl. Roux

in Nimis, The Lichens of Italy. A Second Annotated Catalogue: 19, 2016 - *Lecanora oyensis* M. Bertrand & Cl. Roux, Bull. Inf. Ass. Franç. Lich., 36: 108, 2011.

Syn.: *Lecanora contractula auct. medit.*

C - Tosc, Sar.

Cr/ Ch/ S/ Sax/ pH: 2, L: 3-4, X: 3, E: 3-4/ Alt: 1/ MedH: vr/ PT: 1/ coast/ Note: a Mediterranean-Atlantic species of siliceous maritime rocks often visited by birds. For further details see Bertrand & Roux (2011). This is the lichen provisionally called *Lecanora contractula* by Nimis (1993: 348).

Myriolecis perpruinosa (Fröberg) Śliwa, Zhao Xin & Lumbsch

in Zhao Xin & al., Fungal Divers., 78: 301, 2016 - *Lecanora perpruinosa* Fröberg, Calc. Lich. Öland: 51, 1989.

N - Frl (Poelt & Leuckert 1995), **TAA** (Nascimbene & al. 2006, Nascimbene 2008b), **Lomb** (Nascimbene 2006), **Piem** (TSB 34619), **VA, Lig** (TSB 33401). **C - Marc** (Nimis & Tretiach 1999).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 4-5, X: 4, E: 3-4/ Alt: 3-5/ Alp: rr, Salp: rc, Orom: rr, Mont: rr/ PT: 1/ Note: on calciferous rocks, often starting the life-cycle on other crustose lichens. A member of the difficult *M. dispersa* complex, certainly more widespread in the Alps and along the Apennines.

Myriolecis persimilis (Th. Fr.) Śliwa, Zhao Xin & Lumbsch

in Zhao Xin & al., Fungal Divers., 78: 301, 2016 - *Lecanora hagenii* subsp. *persimilis* Th. Fr., Lichenogr. Scand., 1: 251, 1871.

Syn.: *Lecanora persimilis* (Th. Fr.) Arnold

N - Emil (Nimis & al. 1996). **C - Marc** (Nimis & Tretiach 1999), **Umb** (Nimis & Tretiach 1999, Ravera & al. 2006, Panfili 2007), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **Sar. S - Pugl** (Nimis & Tretiach 1999), **Si** (TSB 21465).

Cr/ Ch/ S/ Epiph/ pH: 3, L: 4-5, X: 3, E: 3-4/ Alt: 1-3/ Mont: er, SmedD: rr, Pad: er, SmedH: rr, MedH: r, MedD: vr/ PT: 1-2/ Note: a mild-temperate to Mediterranean lichen which is easily overlooked, most frequent on branches of *Fraxinus*, *Populus* and *Sambucus*; probably more widespread throughout Italy.

Myriolecis poeltiana (Clauzade & Cl. Roux) Śliwa, Zhao Xin & Lumbsch

in Zhao Xin & al., Fungal Divers., 78: 301, 2016 - *Lecanora poeltiana* Clauzade & Cl. Roux, Beih. Nova Hedwigia, 79: 188, 1984.

Syn.: *Lecanora lactea sensu* Clauzade & Cl. Roux non (A. Massal.) Leight.

C - Sar. S - Camp (Nimis & Tretiach 2004, Garofalo & al. 2010), **Pugl** (Nimis & Tretiach 1999).

Cr/ Ch/ S/ Sax/ pH: 5, L: 3-4, X: 3-4, E: 2-3/ Alt: 1/ MedH: vr, MedD: vr/ PT: 1/ coast/ Note: on hard, compact calcareous rocks under the influence of salt-spray; probably more widespread, but certainly not common, along the Mediterranean coast. For the differences from other litoral species of *Myriolecis* see Bertrand & al. (2010).

Myriolecis prominens (Clauzade & Vězda) Cl. Roux & Nimis

in Nimis, The Lichens of Italy. A Second Annotated Catalogue: 20, 2016- *Lecanora prominens* Clauzade & Vězda, Rev. Fac. Ciênc. Lisboa, 2, C-14: 49, 1966.

C - **Tosc, Sar, S - Camp** (Garofalo & al. 1999), **Pugl** (Nimis & Tretiach 1999).

Cr/ Ch/ S/ Sax/ pH: 5, L: 4-5, X: 4, E: 2-3/ Alt: 2-5/ Orom: r, Mont: r, SmedH: vr/ PT: 1/ Note: a calcicolous species, probably more widespread, at least in the mountains of southern Italy.

Myriolecis pruinosa (Chaub.) Śliwa, Zhao Xin & Lumbsch

in Zhao Xin & al., Fungal Divers., 78: 301, 2016 - *Lecanora pruinosa* Chaub. in St.-Amans, Fl. Agenaise: 495, 1821.

Syn.: *Lecanora adriatica* Zahlbr., *Lecanora cretacea* (Müll. Arg.) Stizenb., *Lecanora lagostana* Zahlbr., *Lecanora pruinitifera* Nyl., *Lecanora sulphurascens* Nyl., *Lecanora teichotea* Nyl., *Placodium cretaceum* Müll. Arg., *Placodium myrrhinum* auct., *Squamaria sulphurascens* (Nyl.) H. Olivier

N - **VG, Frl, Ven, Emil, Lig, C - Tosc** (Benespero 2000a, 2006, Paoli & al. 2014b), **Marc** (Nimis & Tretiach 1999), **Umb** (Nimis & Tretiach 1999, Ravera & al. 2006, Brackel 2015), **Laz** (Bartoli & al. 1998, Nimis & Tretiach 2004, Roccardi & Ricci 2006, Pietrini & al. 2008, Genovesi & al. 2011), **Abr** (Nimis & Tretiach 1999, Caporale & al. 2016), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **Sar, S - Camp** (Aprile & al. 2003, 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010), **Pugl** (Nimis & Tretiach 1999, Durini & Medagli 2002), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994, 1995, Ottonello & al. 1994, 2011, Ottonello 1996, Ottonello & Romano 1997, Grillo 1998, Caniglia & Grillo 2001, 2005, 2006, Grillo & al. 2001, 2002, 2007b, 2009, Grillo & Caniglia 2004, Merlo 2004b, Brackel 2008b, 2008c, Liistro & Cataldo 2011).

Cr.pl/ Ch/ S/ Sax/ pH: 4-5, L: 3-5, X: 2-3, E: 2-4/ Alt: 1-4/ Salp: er, Orom: vr, Mont: r, SmedD: r, Pad: er, SmedH: c, MedH: rc, MedD: er/ PT: 1-2/ suboc, u/ Note: a mainly temperate species found on limestone, dolomite, mortar, brick and, more rarely, basic siliceous rocks; mainly Tyrrhenian, and there often found in settlements and on man-made substrata, much rarer along the Adriatic side of the Peninsula, and there most common in upland areas in underhangs of calcareous rocks. A dubious record from Valle d'Aosta (see Piervittori & Isocrono 1999: 129) is not accepted here.

Myriolecis reuteri (Schaer.) Śliwa, Zhao Xin & Lumbsch

in Zhao Xin & al., Fungal Divers., 78: 301, 2016 - *Lecanora reuteri* Schaer., Enum. Crit. Lich. Eur.: 59, 1850.

Syn.: *Placodium reuteri* (Schaer.) A. Massal.

N - **Frl, Ven** (Nascimbene 2004), **TAA** (Nascimbene 2003b, 2004, Nascimbene & al. 2004, 2004b), **C - Marc** (Nimis & Tretiach 1999), **Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **Sar, S - Camp** (Aprile & al. 2003b), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996).

Cr.pl/ Ch/ S/ Sax/ pH: 5, L: 4, X: 2-3, E: 1/ Alt: 3-5/ Salp: vr, Orom: r, Mont: rr/ PT: 1/ u/ Note: in underhangs or on steeply inclined surfaces of calcareous rocks in upland areas; certainly more widespread in the Alps and in the mountains of southern Italy.

Myriolecis salina (H. Magn.) Śliwa, Zhao Xin & Lumbsch

in Zhao Xin & al., Fungal Divers., 78: 301, 2016 - *Lecanora salina* H. Magn., Bot. Not.: 229, 1926.

C - **Sar** (Rizzi & al. 2011), **S - Si** (Ottonello & Puntillo 1995).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4-5, X: 3-4, E: 1-2/ Alt: 1/ MedH: r, MedD: vr/ PT: 1/ coast, #/ Note: a rather poorly known, mostly northern taxon of the *M. albescens* complex, occurring on coastal siliceous rocks. The Italian records are somewhat dubious. See also notes on *M. liguriensis* and *M. oyensis*.

Myriolecis sambuci (Pers.) Clem.

Gen. Fung.: 79, 1909 - *Lichen sambuci* Pers., Ann. Bot. (Usteri), 7: 26, 1794.

Syn.: *Lecanora sambuci* (Pers.) Nyl., *Lecanora sambucioides* H. Magn.

N - **VG, Ven** (Nascimbene & Marini 2010), **TAA** (Nascimbene & al. 2007b), **Piem** (Piervittori 2003, Isocrono & al. 2004), **Emil** (Bassi 1995), **Lig, C - Tosc** (Loppi & Putorti 1995b), **Marc** (Fрати & al. 2004), **Umb** (Genovesi & al. 2001, Ravera & al. 2006), **Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008, Genovesi & Ravera 2014), **Sar** (Zedda 2002, Rizzi & al. 2011), **S - Camp** (Aprile & al. 2003b, Garofalo & al. 2010, Catalano & al. 2012, 2016), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999, Brackel 2011), **Cal** (Puntillo 1996), **Si**.

Cr/ Ch/ S/ Epiph/ pH: 3-4, L: 3-5, X: 3, E: 1-3/ Alt: 1-3/ Mont: vr, SmedD: rr, Pad: er, SmedH: rr, MedH: vr, MedD: er/ PT: 1-2/ Note: a mainly mild-temperate species found on base-rich bark, especially on *Sambucus* and *Populus*.

Myriolecis semipallida (H. Magn.) Śliwa, Zhao Xin & Lumbsch

in Zhao Xin & al., Fungal Divers., 78: 301, 2016 - *Lecanora semipallida* H. Magn., Lichens from Central Asia: 89, 1940.

Syn.: *Lecanora flotoviana* auct. non Spreng., *Lecanora xanthostoma* Cl. Roux ex Fröberg

N - Frl (Poelt & Leuckert 1995, Tretiach & Hafellner 2000), **Ven** (Nimis 1994, Nascimbene & Caniglia 2000, 2003c, Nascimbene & Marini 2007, Nascimbene 2008c), **TAA** (Poelt & Leuckert 1995, Nascimbene & al. 2005, 2006, Nascimbene 2008b, Spitale & Nascimbene 2012), **Lomb** (Nascimbene 2006), **Piem** (Isocrono & al. 2004, Favero-Longo & al. 2015), **VA** (Matteucci & al. 2015c, 2015d), **Emil** (Tretiach & al. 2008), **Lig** (TSB 33370). **C - Tosc** (Benespero 2006, 2007b), **Marc** (Nimis & Tretiach 1999), **Umb** (Nimis & Tretiach 1999, Ravera & al. 2006), **Laz** (Nimis & Tretiach 2004), **Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 1999, 2004, Caporale & al. 2008), **Sar** (Monte 1993, Watson 2014). **S - Camp** (Nimis & Tretiach 2004, Garofalo & al. 2010), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996, 2011), **Si** (Poelt & Leuckert 1995).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 4-5, X: 3-4, E: 4-5/ Alt: 2-5/ Alp: vc, Salp: rc, Orom: vc, Mont: vc, SmedD: vr, SmedH: vr/ PT: 1/ paras crustose lichens/ Note: a calcicolous species found on the top of exposed boulders, in sites often visited by birds; certainly widespread throughout the country, absent from large settlements and very rare on man-made substrata. Most records of *M. dispersa* from Sardegna (Nimis & Poelt 1987) refer to this species. The closely related *M. torrida* is known from the Austrian Alps. Some records could refer to the closely related *M. invadens*.

Myriolecis zosteræ (Ach.) Śliwa, Zhao Xin & Lumbsch

in Zhao Xin & al., Fungal Divers., 78: 301, 2016 - *Lecanora subfusca* var. *zosteræ* Ach., Syn. Meth. Lich.: 158, 1814.

Syn.: *Lecanora hagenii* f. *saxifragæ* Anzi, *Lecanora hagenii* var. *fallax* Hepp, *Lecanora zosteræ* (Ach.) Nyl.

N - Frl (Tretiach & Hafellner 2000), **Ven** (Nascimbene 2008c), **TAA** (Nascimbene 2008b), **Lomb**, **Piem**, **VA** (Matteucci & al. 2008c), **Emil**, **Lig**. **C - Marc** (Nimis & Tretiach 1999), **Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 2004, Caporale & al. 2008). **S - Bas** (Nimis & Tretiach 1999).

Cr/ Ch/ S/ Terr/ pH: 3-5, L: 4-5, X: 2-4, E: 2-4/ Alt: 4-5/ Alp: vc, Salp: ec, Orom: rr/ PT: 1/ #/ Note: a circumpolar, arctic-alpine lichen found on plant debris and mosses over calciferous substrata from the Oromediterranean belt to the Arctic zone. Due to ecological differences, I am not certain that this is the correct name for the lichen which was called *Lecanora hagenii* var. *fallax* by Italian authors.

Myriolecis wetmorei (Śliwa) Śliwa, Zhao Xin & Lumbsch

in Zhao Xin & al., Fungal Divers., 78: 301, 2016 - *Lecanora wetmorei* Śliwa in Nash & al., Lichen Flora Gr. Sonoran Desert Reg., 2: 283, 2004.

N - TAA (B 60 0191821, det. H. Sipman).

Cr/ Ch/ S/ Epiph/ pH: 1-3, L: 3-5, X: 3, E: 2-3/ Alt: 3-4/ Salp: er, Mont: er/ PT: 1/ Note: a species described from western North America, recently found also in Iran and the Caucasus. The sample in B was collected by V.J. Grummann at Carrerpass, on dry twigs of *Picea abies*.

Myriospora Uloth

Nägeli ex Uloth, Flora, 44: 617, 1861.

This recently resurrected genus in the Acarosporaceae, which includes the former *Acarospora smaragdula*-group, is characterised by usually brown or grey areoles or squamules, slender paraphyses, a tall hymenium, and a photobiont layer interrupted by hyphal bundles. The genus, which contains c. 10 species, is distributed throughout the Northern Hemisphere, being much less diverse in the Southern Hemisphere. The genera *Silobia* M. Westb. & Wedin and *Trimmatothelopsis* Zschacke are sometimes considered as synonyms of *Myriospora* (Arcadia & Knudsen 2012, see also Roux & Navarro-Rosinés 2011, Westberg & al. 2011), but *Trimmatothelopsis* seems to be a distinct monotypic genus (Gueidan & al. 2014). Type: *M. smaragdula* (Ach.) Uloth

Myriospora hassei (Herre) K. Knudsen & Arcadia

in Arcadia & Knudsen, Opuscula Philolich., 11: 21, 2012 - *Acarospora hassei* Herre, Proc. Washingt. Acad. Sci., 12: 128, 1910.

Syn.: *Acarospora lesdainii* auct. non Harm., *Acarospora smaragdula* subsp. *lesdainii* auct. non (Harm.) Clauzade & Cl. Roux, *Silobia hassei* (Herre) K. Knudsen, *Trimmatothelopsis hassei* (Herre) Cl. Roux & Nav.-Ros.

N - Frl (Tretiach & Hafellner 2000), **Piem**, **Lig**. **S - Cal** (Puntillo 1996), **Si**.

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4, X: 2-3, E: 2-3/ Alt: 3-5/ Alp: vr, Salp: r, Orom: er, Mont: er/ PT: 1/ u, m/ Note: in underhangs of metal-rich siliceous rocks in upland areas; probably more widespread in the Alps and occurring also in the Mediterranean mountains.

Myriospora rhagadiza (Nyl.) K. Knudsen & Arcadia

in Arcadia & Knudsen, Opuscula Philolich., 11: 22, 2012 - *Lecanora rhagadiza* Nyl., Flora, 64: 1881.

Syn.: *Acarospora scyphulifera* Vain., *Acarospora smaragdula* subsp. *smaragdula* var. *scyphulifera* (Vain.) Clauzade & Cl. Roux, *Acarospora smaragdula* var. *rhagadiza* (Nyl.) Clauzade & Cl. Roux, *Silobia rhagadiza* (Nyl.) M. Westb.

S - Camp (Westberg & al. 2011).

Cr/ Ch/ S/ Sax/ pH: 2-4, L: 3-4, X: 3-4, E: 2-3/ Alt: 3-5/ Orom: vr, Mont: vr/ PT: 1-2/ u/ Note: optimum on basic siliceous rocks, usually not far from the coasts; a very variable, mainly western species in Europe, also reported from Mt. Vesuvius.

Myriospora smaragdula (Ach.) Uloth

Nägeli ex Uloth, Flora, 44: 618, 1861 - *Endocarpon smaragdulum* Wahlenb. ex Ach., Meth. Lich. Suppl.: 29, 1803.

Syn.: *Acarospora amphibola* Wedd., *Acarospora flavorubens* Bagl. & Carestia, *Acarospora isotorquensis* Alstrup, *Acarospora fusca* B. de Lesd., *Acarospora fuscata* var. *smaragdula* (Wahlenb.) Novák, *Acarospora lesdainii* Harm. ex A.L. Sm. non auct., *Acarospora murina* Sandst., *Acarospora scyphulifera* var. *sensitiva* H. Magn., *Acarospora smaragdula* subsp. *lesdainii* (A.L. Sm.) Clauzade & Cl. Roux, *Acarospora smaragdula* var. *fusca* (B. de Lesd.) Clauzade & Cl. Roux, *Acarospora smaragdula* var. *halophila* (H. Magn.) Clauzade & Cl. Roux, *Acarospora smaragdula* var. *lesdainii* (A.L. Sm.) H. Magn., *Acarospora smaragdula* var. *murina* (Sandst.) H. Magn., *Acarospora smaragdula* var. *pallescens* (Vain.) Clauzade & Cl. Roux, *Acarospora undata* Clauzade, Cl. Roux & V. Wirth, *Lecanora cervina* var. *smaragdula* (Wahlenb.) Schaer., *Myriospora smaragdula* subsp. *lesdainii* (A.L. Sm.) Clauzade & Cl. Roux non auct., *Silobia smaragdula* (Wahlenb. ex Ach.) M. Westb. & Wedin, *Thelocarpon robustum* Eitner, *Trimmatothelopsis smaragdula* (Wahlenb.) Cl. Roux & Nav.-Ros.

N - Frl (Tretiach & Hafellner 2000), **Ven** (S-F104826), **TAA**, **Lomb** (Valcuvia 2002, 2002b), **Piem** (Isocrono & al. 2003, 2004, 2006, Giordani & al. 2014), **VA** (Piervittori & Isocrono 1999, Matteucci & al. 2015c), **Lig. C - Sar** (Nöske 2000, Rizzi & al. 2011, Giordani & al. 2013), **S - Bas** (Puntillo & al. 2012), **Cal** (Puntillo 1996, Puntillo & Puntillo 2004), **Si** (Poli & al. 1995, Grillo 1998, Grillo & Caniglia 2004, Brackel 2008b, 2008c).

Cr/ Ch/ S/ Sax/ pH: 2-4, L: 3-4, X: 3-4, E: 2-3/ Alt: 3-5/ Alp: r, Salp: r, Orom: vr, Mont: vr/ PT: 1-2/ u/ Note: a cool-temperate to boreal-montane, perhaps circumpolar, variable species of steeply inclined to underhanging surfaces of base- and often metal-rich, sometimes weakly calciferous siliceous rocks, mostly in upland areas. The record from Venezia Giulia reported by Nimis (1993: 59) is excluded, being from Slovenia.

Naetrocymbe Körb.
Parerga Lichenol., 5: 441, 1865.

This genus of the Naetrocymbaceae, including c. 12 species, is quite problematic. It includes species which are usually non-lichenised, characterised by short-celled paraphyses with refractive bodies near the septa, obpyriform asci with a distinctive apical region lacking a nasse and short rod-shaped microconidia; the genus has a mainly temperate/boreal distribution. Since some *Naetrocymbe*-species can be lichenised, some authors consider the separation between *Naetrocymbe* and *Arthopyrenia* as unnecessary, also because of the relative importance of the hamathecial tissues as a valuable character (see e.g. Puntillo & Ravera 2013). However, *Arthopyrenia* and *Naetrocymbe* are presently included in two different families within the order Pleosporales (see Jaklitsch & al. 2016). Type: *N. fuliginea* Körb.

Naetrocymbe fraxini (A. Massal.) R.C. Harris

More Florida Lichens: 62, 1995 - *Arthopyrenia fraxini* A. Massal., Ric. Auton. Lich. Crost.: 167, 1852.

Syn.: *Arthopyrenia fraxini* f. *orbicularis* A. Massal., *Arthopyrenia fraxini* f. *rufidula* A. Massal., *Arthopyrenia megalospora* Lönnr., *Arthopyrenia persoonii* var. *fraxini* (A. Massal.) A. Massal., *Arthopyrenia punctiformis* var. *fraxini* (A. Massal.) Anzi, *Leiophloea punctiformis* var. *orbicularis* (A. Massal.) Trevis., *Pyrenula fraxini* (A. Massal.) Trevis., *Spermatodium malitiosum* var. *fraxinicola* Trevis., *Verrucaria epidermidis* var. *fraxini* (A. Massal.) Garov.

N - VG, Ven (Lazzarin 2000), **TAA** (Nascimbene & al. 2007b), **Lomb** (UPS-L-166798), **Piem** (Isocrono & al. 2004, 2005b), **Emil, Lig. C - Tosc, Marc** (Nimis & Tretiach 1999), **Laz** (Nimis & Tretiach 2004), **Sar. S - Camp** (Garofalo & al. 2010), **Bas, Cal** (Puntillo 1996), **Si**.

F/ / S/ Epiph/ pH: 2-3, L: 3-4, X: 3, E: 1-2/ Alt: 1-3/ Mont: vr, SmedD: rc, Pad: vr, SmedH: rc, MedH: r/ PT: 1-2/ p/ Note: a mild-temperate species found on smooth bark of (mostly) deciduous trees; most probably non-lichenised.

Naetrocymbe mori-albae Puntillo & Ravera

Fl. Medit., 23: 6, 2013.

S - Cal (Puntillo & Ravera 2013)

F/ / S/ Epiph/ pH: 2-3, L: 3-5, X: 3, E: 1-2/ Alt: 1-4/ MedH: r/ PT: 1-2/ p/ Note: a recently-described, non-lichenised species, to be looked for elsewhere in Italy.

Naetrocymbe punctiformis (Pers.) R.C. Harris

More Florida Lichens: 63, 1995 - *Verrucaria punctiformis* Pers., Ann. Bot. (Usteri), 11: 19, 1794.

Syn.: *Arthonia cembrina* Anzi, *Arthopyrenia analepta* auct. p.p., *Arthopyrenia analepta* var. *crataegi* A. Massal., *Arthopyrenia atrosanguinea* A. Massal., *Arthopyrenia cembrina* (Anzi) D. Hawksw., *Arthopyrenia padi* Rabenh., *Arthopyrenia punctiformis* (Pers.) A. Massal., *Arthopyrenia punctiformis* f. *laricis* Anzi, *Arthopyrenia punctiformis* var. *aenea* A. Massal., *Arthopyrenia punctiformis* var. *geographica* Anzi, *Arthopyrenia pyrenastrella* (Nyl.) Norman, *Arthopyrenia pyrenastrella* var. *maculans* (Nyl.) Keissl., *Arthopyrenia submicans* auct. non (Nyl.) Arnold, *Leiophloea punctiformis* (Pers.) Trevis., *Leiophloea punctiformis* var. *acerina* (Hepp) Trevis., *Naetrocymbe punctiformis* (Pers.) R.C. Harris, *Verrucaria epidermidis* var. *spectabilis* Garov.

N - VG, Frl (Bernini & al. 2010), **Ven** (Nimis & al. 1996c, Lazzarin 2000, Nascimbene & Marini 2007), **TAA** (Nascimbene & al. 2006e, 2007b, 2014, Nascimbene 2014), **Lomb** (Valcuvia & Truzzi 2007b), **Piem** (Caniglia & al. 1992, Isocrono & al. 2003, Giordani & Malaspina 2016), **VA** (Piervittori & Maffei 1996, Piervittori & Isocrono 1999, Matteucci & al. 2008, 2008c, Isocrono & al. 2008), **Emil** (Tretiach & al. 2008, Benesperi 2009), **Lig** (Valcuvia & al. 2000, Giordani & al. 2002, Brunialti & Giordani 2003, Giordani 2006, Ravera & al. 2016b), **C - Tosc** (Loppi & al. 1994, 1997b, Putortì & al. 1998, Putortì & Loppi 1999b, Ravera 2006b, Benesperi & al. 2007, Brunialti & Frati 2010, Benesperi 2011), **Marc** (Nimis & Tretiach 1999, Frati & Brunialti 2006), **Umb** (Ravera 1998, 1998b, Ravera & al. 2006, Ravera & al. 2016b), **Laz** (Munzi & al. 2007, Ravera & Genovesi 2008, Ravera & al. 2016b), **Abr** (Nimis & Tretiach

1999, Catalano & al. 2016), **Mol** (Garofalo & al. 1999, Nimis & Tretiach 1999, Caporale & al. 2008), **Sar** (Zedda 2002, Rizzi & al. 2011). **S - Camp** (Garofalo & al. 1999, 2010, Nimis & Tretiach 2004, Catalano & al. 2012, 2016), **Pugl** (Nimis & Tretiach 1999), **Bas** (Bartoli & Puntillo 1998, Nimis & Tretiach 1999, Potenza 2006, Paoli & al. 2006, Potenza & al. 2010), **Cal** (Puntillo 1995, 1996, Puntillo & Puntillo 2004), **Si** (Grillo & al. 2002, Grillo & Caniglia 2004, Grillo & Caniglia 2004, Ottonello & al. 2011, Ravera & al. 2016b).

F/ / S/ Epiph/ pH: 2-3, L: 3-5, X: 3, E: 1-2/ Alt: 1-4/ Salp: rr, Orom: vr, Mont: rc, SmedD: c, Pad: r, SmedH: c, MedH: rr, MedD: r/ PT: 1-2/ p/ Note: a holarctic, Mediterranean to boreal-montane early coloniser of smooth bark, especially on twigs of a wide variety of trees, rarer, and restricted to sheltered situations in dry Mediterranean Italy; probably non-lichenised.

Naetrocymbe rhododendri (Arnold) Hafellner & Türk

Stapfia, 76: 91, 2001 *comb. inval.* - *Arthopyrenia punctiformis* f. *rhododendri* Arnold, Verh. Zool.-bot. Ges. Wien, 22: 304, 1872.

Syn.: *Arthopyrenia rhododendri* (Arnold) Dalla Torre & Sarnth.

N - TAA (Hinteregger 1994, Nascimbene & al. 2007b), **Piem** (Isocrono & al. 2004).

F/ / S/ Epiph/ pH: 2-3, L: 2-4, X: 3, E: 1/ Alt: 4/ Salp: rr/ PT: 1/ Note: on smooth bark of shrubs in subalpine heaths, to be looked for throughout the Alps.

Naetrocymbe rhypona (Ach.) R.C. Harris

More Florida Lichens: 63, 1995 - *Verrucaria rhypona* Ach., K. Vetensk.-Akad. Nya Handl., 30: 150, 1809.

Syn.: *Arthopyrenia fumago* (Wallr.) Körb., *Arthopyrenia rhypona* (Ach.) A. Massal., *Arthopyrenia rhypona* f. *fumago* (Wallr.) Anzi ex Arnold, *Arthopyrenia rhypona* f. *tiliaecola* Anzi ex Garov., *Leiophloea rhypona* (Ach.) Trevis., *Pyrenula rhypona* (Ach.) Trevis., *Verrucaria fumago* Wallr.

N - Frl (TSB 2226), **Ven, TAA** (Thor & Nascimbene 2007, Nascimbene & al. 2007b), **Lomb, Piem** (Isocrono & al. 2004). **C - Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008). **S - Cal** (Puntillo 1996).

F/ / S/ Epiph/ pH: 3, L: 3, X: 3, E: 1-2/ Alt: 2-4/ Salp: rr, Mont: vr, SmedD: er, SmedH: er/ PT: 1/ p/ Note: a probably circumpolar species found on smooth bark, especially on twigs and branches of deciduous trees, most common in upland areas (especially in southern Italy); probably non-lichenised.

Naetrocymbe saxicola (A. Massal.) R.C. Harris

More Florida Lichens: 63, 1995 - *Arthopyrenia saxicola* A. Massal., *Symmicta* Lich.: 107, 1855.

Syn.: *Leiophloea saxicola* (A. Massal.) Riedl, *Naetrocymbe massalongiana* (Hepp) R.C. Harris, *Pyrenocollema saxicola* (A. Massal.) Coppins, *Sagedia massalongiana* Hepp, *Spermatodium saxicola* (A. Massal.) Trevis.

N - Frl (Tretiach 2004), **Ven** (Lazzarin 2000b, Roux 2009), **TAA** (Roux 2009), **Lomb, Piem** (Isocrono & al. 2004). **C - Mol** (Nimis & Tretiach 1999, Caporale & al. 2008). **S - Camp** (Garofalo & al. 1999), **Pugl**.

Cr.end/ Tr/ S/ Sax/ pH: 5, L: 3-4, X: 3, E: 1/ Alt: 3-4/ Salp: vr, Orom: r, Mont: r/ PT: 1/ p/ Note: an early coloniser of calcareous rocks, especially at the top of boulders, on surfaces which rapidly dry out after rain. According to Roux (2009), this species is clearly lichenised with *Trentepohlia*.

Neocatapyrenium H. Harada

Nat. Hist. Res., 2: 129, 1993.

The species of this genus of Verrucariaceae, segregated from *Catapyrenium s.lat.*, have a cushion-like thallus composed of imbricate squamules, anatomically similar to that of *Placidium*, but characterised by *Endocarpon*-type pycnidia with cylindrical conidia, the lack or reduction of rhizohyphae and the attachment to the substratum by rhizines or by the basal end of the squamules; the perithecia have a colourless exciple, the asci are clavate with biseriate ascospores. There are 5 species reported worldwide, 3 of which are present in Europe. For further details see Breuss (1996). Type: *N. cladonioideum* (Vain.) H. Harada

Neocatapyrenium radicescens (Nyl.) Breuss

Ann. naturhist. Mus. Wien, 98B: 40, 1996 - *Verrucaria radicescens* Nyl., Bull. Soc. Bot. France, 10: 267, 1863.

Syn.: *Catapyrenium radicescens* (Nyl.) Breuss, *Dermatocarpon pachylepis* (Anzi) Zahlbr., *Endocarpon pachylepis* Anzi

N - Lomb.

Sq/ Ch/ S/ Sax-Terr/ pH: 2-3, L: 4-5, X: 3-4, E: 1-2/ Alt: 4-5/ Alp: er, Salp: er/ PT: 1/ Note: on more or less fissured siliceous rocks near or above treeline; hitherto known only from southern France, Italy and Switzerland.

Nephroma Ach.

in Luyken, Tent. Hist. Lich.: 92, 1809.

A subcosmopolitan and rather well-known genus of c. 36 species. A phylogenetic analysis by Lohtander & al. (2002) has demonstrated that all *Nephroma*-species form a monophyletic group, presently placed in the

Nephromataceae, and that *Peltigera* is the sister group to *Nephroma*. Type: *N. polaris* (Ach.) Ach. (= *N. arcticum*).

Nephroma bellum (Spreng.) Tuck.

Boston J. Nat. Hist., 3: 293, 1841 - *Peltigera bella* Spreng., Caroli Linnaei Syst. Veget., ed. 16, 4, 1: 306, 1827.

Syn.: *Nephroma papyraceum* auct. p.p., *Nephroma laevigatum* auct. p.p. non Ach., *Nephromium subtomentellum* (Nyl.) Cromb.

N - **Frl** (Nascimbene & al. 1998, Tretiach & Molaro 2007), **Ven** (Nascimbene & al. 2005b, 2006c, 2007, Nascimbene 2011), **TAA** (Nascimbene & Caniglia 2000, Nascimbene & al. 2006e, Nimis & al. 2015), **Lomb** (Anzi, Lich. Rar. Lang. Exs. 24: S-L51525), **Piem** (Rabenhorst, Lich. Eur. Exs. 351: S- L51518, Brackel & Puntillo 2016), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999), **Emil, Lig. C** - **Tosc** (Tretiach & Nimis 1994, Benesperi & al. 2007, Benesperi 2011), **Abr** (Di Santo & Ravera 2012, Corona & al. 2016), **Sar** (Zedda 1995, 2002, 2002b, Loi & al. 2000), **S** - **Camp** (Aprile & al. 2003b, Garofalo & al. 2010), **Pugl. Bas** (Potenza 2006, Potenza & Fascetti 2012), **Cal** (Puntillo 1995, 1996, Brackel & Puntillo 2016), **Si** (Nimis & al. 1994, Liistro & Cataldo 2011, Ottonello & al. 2011).

Fol.b/ Cy.h/ S/ Epiph/ pH: 2-3, L: 3, X: 1-2, E: 1/ Alt: 1-3/ Mont: vr, SmedD: er, SmedH: er, MedH: er/ PT: 0/ suboc/ Note: a holarctic *Lobarion*-species of bark, epiphytic bryophytes and mossy rocks in humid forests. It is included in the Italian red list of epiphytic lichens as “Near-threatened” (Nascimbene & al. 2013c).

Nephroma expallidum (Nyl.) Nyl.

Flora, 48: 428, 1865 - *Nephromium expallidum* Nyl., Öfvers. K. Svensk. Vetensk.-Akad. Förh., 17: 295, 1860.

N - **Ven** (Nascimbene & Caniglia 2000, 2003c, Tomaselli & al. 2006), **TAA** (Nascimbene 2008b), **Piem** (Isocrono & al. 2004, Isocrono & Piervittori 2008).

Fol.b/ Ch/ S/ Terr/ pH: 1-2, L: 3-4, X: 2, E: 1/ Alt: 4-6/ Alp: er, Salp: er/ PT: 1/ Note: an arctic-alpine species found on soil and amongst bryophytes over siliceous substrata, near or above treeline; probably restricted to the Alps, where it exceptionally reaches the nival belt.

Nephroma helveticum Ach.

Lichenogr. Univ.: 532, 1810.

N - **Ven** (Nascimbene & al. 2006c), **TAA** (Nascimbene & Caniglia 2000), **Lomb, Piem** (Morisi & Sereno 1995, Piervittori 2003). **C** - **Tosc** (Benesperi & al. 2007).

Fol.b/ Cy.h/ A.i/ Epiph/ pH: 2, L: 3-4, X: 1-2, E: 1-2/ Alt: 3-4/ Salp: er, Mont: vr/ PT: 0/ Note: a cool-temperate to southern boreal-montane, circumpolar lichen found on bark, exceptionally on siliceous rocks in humid, but somehow subcontinental upland areas; probably more widespread in the Alps, but never common, and strongly declining. It is included in the Italian red list of epiphytic lichens as “Vulnerable” (Nascimbene & al. 2013c).

Nephroma laevigatum Ach.

Syn. Meth. Lich.: 242, 1814.

Syn.: *Nephroma lusitanicum* Schaer., *Nephroma lusitanicum* var. *subreagens* Gyeln., *Nephroma sublusitanicum* Gyeln., *Nephroma subpubescens* Gyeln., *Nephromium laevigatum* (Ach.) Nyl., *Nephromium lusitanicum* (Schaer.) Nyl.

N - **VG, Frl, Ven** (Lazzarin 1997, Caniglia & al. 1999), **TAA** (Nascimbene & al. 2007b, Nimis & al. 2015), **Lomb, Piem** (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999), **Emil** (Benesperi 2009), **Lig** (Brunialti & al. 1999, Giordani & al. 2002, Brunialti & Giordani 2003, Benco & al. 2004). **C** - **Tosc** (Tretiach & Nimis 1994, Paoli & Loppi 2001, Benesperi & al. 2007, Brunialti & Frati 2010, Benesperi 2011), **Umb** (Ravera 1998, Ravera & al. 2006), **Laz** (Massari & Ravera 2002, Brackel 2015), **Abr** (Nimis & Tretiach 1999, Catalano & al. 2016), **Mol** (Paoli & al. 2015), **Sar** (Nöske 2000, Loi & al. 2000, Zedda 2002, 2002b, Zedda & al. 2001, Rizzi & al. 2011, Cossu 2013). **S** - **Camp** (Puntillo & al. 2000, Aprile & al. 2003b, Nimis & Tretiach 2004, Catalano & al. 2010, 2016, Nascimbene & al. 2010b, Garofalo & al. 2010, Brunialti & al. 2013, Ravera & Brunialti 2013), **Pugl. Bas** (Bartoli & Puntillo 1998, Nimis & Tretiach 1999, Potenza 2006, Potenza & Fascetti 2010, Brackel 2011), **Cal** (Puntillo 1995, 1996, Puntillo & Puntillo 2004, Incerti & Nimis 2006, Stofer 2006), **Si** (Ottonello & Romano 1997, Merlo 2004, 2004b, Stofer 2006, Brackel 2008b, Ottonello & al. 2011, Cataldo & Ravera 2013).

Fol.b/ Cy.h/ S/ Epiph/ pH: 2-3, L: 3, X: 1-2, E: 1/ Alt: 1-3/ Mont: rr, SmedD: er, SmedH: vr, MedH: er/ PT: 1/ suboc/ Note: a mild-temperate to humid subtropical lichen found on bark, epiphytic bryophytes and mossy rocks in humid, open forests; this is the most frequent species of *Nephroma* in the country, descending to sea level in Tyrrhenian Italy.

Nephroma parile (Ach.) Ach.

Lichenogr. Univ.: 522, 1810 - *Lichen parilis* Ach., Lichenogr. Suec. Prodr.: 164, 1799.

Syn.: *Nephroma laevigatum* f. *sorediatum* Rabenh., *Nephroma laevigatum* f. *reagens* (B. de Lesd.) Zahlbr., *Nephroma reagens* (B. de Lesd.) Gyeln., *Nephromium laevigatum* var. *parile* (Ach.) Nyl., *Nephromium parile* f. *reagens* B. de Lesd.

N - **VG, Frl** (Nascimbene & al. 1998, Tretiach & Hafellner 2000, Tretiach & Molaro 2007), **Ven** (Nascimbene & Caniglia 1997, Caniglia & al. 1999, Nascimbene & al. 2005b, 2006c, 2007, 2010b, Nascimbene 2008c, 2011), **TAA** (Nascimbene & Caniglia 2000b, Lich. Graec. 246: Obermayer 2003, Nascimbene & al. 2006e, 2007b, Nimis & al. 2015), **Lomb** (Philippi 1983, Dalle Vedove & al. 2004), **Piem** (Morisi & Sereno 1995, Isocrono & al. 2004, Morisi 2005, Isocrono & Piervittori 2008), **VA** (Piervittori & Isocrono 1999), **Emil** (Tretiach & al. 2008), **Lig** (Brunialti & al. 1999,

Giordani & Brunialti 2000). **C - Tosc** (Benesperi & al. 2007, Benesperi 2011), **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera 2000, Ravera & al. 2006), **Laz, Abr. S - Camp** (Aprile & al. 2003b), **Cal** (Puntillo 1996).

Fol.b/ Cy.h/ A.s/ Epiph-Sax-Terr/ pH: 2-3, L: 3, X: 1, E: 1-2/ Alt: 3-5/ Alp: er, Salp: r, Mont: er/ PT: 0/ suboc/ Note: a cool-temperate to circumboreal-montane lichen found on bark, epiphytic mosses, basic siliceous rocks and soil in humid and sheltered situations, mostly in upland areas.

Nephroma resupinatum (L.) Ach.

Lichenogr. Univ.: 522, 1810 - *Lichen resupinatus* L., Sp. Pl., 2: 1148, 1753.

Syn.: *Nephroma filarszkyanum* Gyeln., *Nephroma papyraceum* (Hoffm.) De Not., *Nephroma rameum* A. Massal., *Nephroma resupinatum* f. *helvum* A. Massal., *Nephroma resupinatum* var. *tomentosum* (Hoffm.) Rabenh., *Nephroma tomentosum* (Hoffm.) Flot., *Nephromium resupinatum* (L.) Arnold, *Nephromium tomentosum* (Hoffm.) Nyl., *Peltidea resupinata* (L.) Ach., *Peltigera resupinata* (L.) DC.

N - Frl (Tretiach & Molaro 2007), **Ven** (Lazzarin 2000b, Nascimbene & Marini 2010), **TAA** (Nascimbene & al. 2006e, 2007b), **Lomb, Piem** (Isocrono & al. 2004, 2007), **VA** (Piervittori & Isocrono 1999), **Emil** (Tretiach & al. 2008, Brackel 2015), **Lig** (Brunialti & al. 1999), **C - Tosc** (Tretiach & Nimis 1994, Benesperi & al. 2007, Benesperi 2011, Brackel 2015), **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera 1998, Ravera & al. 2006), **Laz** (Ravera 2001, Brackel 2015), **Abr** (Nimis & Tretiach 1999, Brackel 2015, Corona & al. 2016), **Sar. S - Camp** (Ricciardi & al. 2000, Aprile & al. 2002, 2003, Nascimbene & al. 2010b, Blasi & al. 2010, Brunialti & al. 2013, Ravera & Brunialti 2013), **Bas** (Nimis & Tretiach 1999, Potenza 2006, Potenza & Fascetti 2010, Brackel 2011), **Cal** (Puntillo 1996), **Si** (Czeczuga & al. 1994).

Fol.b/ Cy.h/ A.i/ Epiph/ pH: 2, L: 2-3, X: 1-2, E: 1-2/ Alt: 2-4/ Salp: er, Mont: vr, SmedD: er, SmedH: er/ PT: 0/ suboc/ Note: a mainly temperate, holarctic lichen found on mossy trunks, rocks, more rarely on soil, in cool and sheltered habitats, with optimum in humid beech forests. It is included in the Italian red list of epiphytic lichens as "Near-threatened" (Nascimbene & al. 2013c).

Nephroma tangeriense (Maheu & A. Gillet) Zahlbr.

Cat. Lich. Univ., 8: 317, 1932 - *Nephromium tangeriense* Maheu & A. Gillet, Bull. Soc. Bot. France, 72: 869, 1926.

N - Piem. C - Tosc (Benesperi & al. 2007), **Laz** (TSB 6354), **Sar. S - Cal** (Puntillo 1996).

Fol.b/ Cy.h/ A.i/ Sax-Epiph/ pH: 2-3, L: 4, X: 2-3, E: 1/ Alt: 1-2/ SmedH: er, MedH: vr/ PT: 1/ suboc/ Note: a Mediterranean-Atlantic species found on rocks, more rarely on bark, in exposed situations, but in humid areas, usually at relatively low elevations. It is included in the Italian red list of epiphytic lichens as "Vulnerable" (Nascimbene & al. 2013c).

Nephromopsis Müll. Arg.

Flora, 74, 3: 374, 1891.

A molecular revision of cetrarioid lichens with bifusiform conidia by Thell & al. (2005b) detected a monophyletic clade including *Nephromopsis*, *Tuckneraria* and 2 species of *Cetraria s.lat.* The genus presently includes c. 20 species, being the largest genus of cetrarioid lichens in the Parmeliaceae. A single species, the only sorediate member of the genus, is present in Italy. Type: *N. stracheyi* (C. Bab.) Müll. Arg.

Nephromopsis laureri (Kremp.) Kurok.

J. Jap. Bot., 66: 156, 1991 - *Cetraria laureri* Kremp., Flora, 34: 673, 1851.

Syn.: *Cetraria complicata* Laurer, *Platysma complicatum* ("Laurer") Nyl., *Platysma laureri* (Kremp.) Nyl., *Tuckneraria laureri* (Kremp.) Randle & A. Thell

N - Frl, Ven (Nascimbene & Caniglia 2000b, 2002c, 2003c, Nascimbene 2005c, 2008c, 2011, Nascimbene & al. 2006e, Thor & Nascimbene 2007), **TAA** (Nascimbene & Caniglia 2000b, 2002c, Caniglia & al. 2002, Thell & al. 2002, 2009, Gottardini & al. 2004, Nascimbene 2005b, 2006b, 2006c, 2008b, 2014, 2014c, Nascimbene & al. 2005, 2006, 2006e, 2007b, 2009, 2010, 2014, Nelsen & al. 2011, Watson 2014, Nascimbene & Marini 2015, Nimis & al. 2015), **Lomb** (Nascimbene & al. 2006e), **C - Tosc** (Benesperi & al. 2007)

Fol.b/ Ch/ A.s/ Epiph/ pH: 1-2, L: 3, X: 2, E: 1/ Alt: 3-4/ Salp: er, Mont: er/ PT: 0/ Note: on acid-barked coniferous and deciduous trees in cold-humid montane woodlands, mostly in mixed *Fagus-Abies* forests, but also on *Larix* in humid subalpine stands. The species is included in the Italian red list of epiphytic lichens as "Vulnerable" (Nascimbene & al. 2013c).

Nevesia P. M. Jørg., L. Lindblom, Wedin & S. Ekman

Lichenologist, 46: 640, 2015.

In their revised generic classification for the Pannariaceae, Ekman & al. (2014) accepted 30 genera. Four genera were established as new, among which the monospecific genus *Nevesia*, to accommodate a species originally included in *Pannaria* and later transferred to *Fuscopannaria*. The species is not known with mature apothecia, and differs from most species of *Fuscopannaria* in having a very well developed hypothallus, and in the chestnut-coloured thallus lacking lichen substances. *Nevesia* is sister to a large group containing mainly *Leciophysma*, *Protopannaria*, and *Fuscopannaria*. Type: *N. sampaiana* (Tav.) P.M. Jørg. & al.

Nevesia sampaiana (Tav.) P.M. Jørg., L. Lindblom, Wedin & S. Ekman

Lichenologist, 46: 652, 2014 - *Pannaria sampaiana* Tav., Port. Acta Biol., ser. B, 3: 76, 1950.

Syn.: *Fuscopannaria sampaiana* (Tav.) P.M. Jørg., *Pannaria craspedia* var. *isidiata* Harm.

N - Emil, Lig (Brunialti & al. 1999). **C - Tosc** (Benesperri & al. 2007).

Sq/ Cy.h/ A.s/ Epiph/ pH: 2-3, L: 3, X: 1-2, E: 1-2/ Alt: 1-2/ SmedD: er, SmedH: er, MedH: er/ PT: 0/ suboc/ Note: a mild-temperate species found on bark of ancient deciduous trees in humid woodlands; certainly very rare and endangered in Italy. It is included in the Italian red list of epiphytic lichens as "Vulnerable" (Nascimbene & al. 2013c).

Normandina Nyl.

Mém. Soc. Sc. Nat. Cherbourg, 3: 191, 1855.

This is a small genus with only 3 species, 2 of which occur in Europe. The genus was recently confirmed in the Verrucariaceae by Muggia & al. (2010), thus ending long debates on the phylogenetic position of *N. pulchella*, which had been placed in e.g. Basidiomycetes and *Fungi incertae sedis* by previous authors. These conflicting hypotheses depended on whether or not the perithecia were interpreted as ascomata of the lichen itself, or of a lichenicolous fungus. Type: *N. jungermanniae* (Delise) Nyl. (= *N. pulchella*).

Normandina acroglypta (Norman) Aptroot

in Wirth, Flechtenflora, 2 Aufl.: 634, 1995 - *Thelidium acroglyptum* Norman in Fries, Bot. Not.: 154, 1868 (1867).

Syn.: *Arthopyrenia chlorococca* (Leight.) A.L. Sm., *Lauderlindsaya acroglypta* (Norman) R. Sant., *Lauderlindsaya chlorococca* (Leight.) Diederich & Sérus., *Lauderlindsaya erichsenii* (Keissl.) Diederich & Sérus., *Sphaerulina chlorococca* (Leight.) R. Sant., *Thelidium erichsenii* Keissl., *Thelidium sorbinum* (Nyl.) Hulting, *Verrucaria contribulans* Nyl.

N - Fri (TSB 26042), **Ven** (Thor & Nascimbene 2007).

Sq/ Ch/ S/ Epiph/ pH: 2-3, L: 3-4, X: 2-3, E: 1-3/ Alt: 2-3/ Mont: vr, SmedD: vr/ PT: 1-2/ suboc/ Note: a mild-temperate lichen, most often found on trees with subacid to base-rich bark, often on mosses; to be looked for further in Italy. It is included in the Italian red list of epiphytic lichens as "Data Deficient" (Nascimbene & al. 2013c).

Normandina pulchella (Borrer) Nyl.

Ann. Sc. Nat. Bot., ser. 4, 15: 382, 1861 - *Verrucaria pulchella* Borrer in Smith & Sowerby, Engl. Bot., Suppl. 1: tab. 2602, 1829.

Syn.: *Lauderlindsaya borrieri* (Tul.) J.C. David & D. Hawksw., *Lenormandia jungermanniae* Nyl., *Lenormandia pulchella* (Borrer) A. Massal., *Normandina jungermanniae* (Nyl.) Nyl.

N - VG (Tretiach 1993, Castello 1996, 2002, Carvalho 1997, Martellos & Castello 2004, Castello & Skert 2005, Nimis & al. 2006, Muggia & al. 2010), **Fri** (Tretiach 1993, Badin & Nimis 1996, Tretiach & Molaro 2007, Brackel 2013), **Ven** (Philippi 1983, Nimis & al. 1996c, Lazzarin 1997, 2000, Caniglia & al. 1999, Valcuvia & al. 2000c, Nascimbene & Cadorn 2004, Nascimbene 2005c, 2008, 2008c, Nascimbene & al. 2005b, 2006c, 2007, 2008e, 2009c, 2010b, 2013b, 2014, 2015, Nascimbene & Marini 2010), **TAA** (Philippi 1983, Nascimbene 2005b, 2006c, 2008b, 2014, Nascimbene & al. 2007b, 2014, Nimis & al. 2015), **Lomb** (Philippi 1983, Arosio & Rinaldi 1995, Zocchi & al. 1997, Putortì & Loppi 1999b, Arosio & al. 2003, Dalle Vedove & al. 2004, Stofer 2006, Brackel 2013), **Piem** (Caniglia & al. 1992, Tretiach 1993, Arosio & al. 1998, Isocrono & al. 2004, 2007, Isocrono & Ferrarese 2008, Matteucci & al. 2010), **VA** (Valcuvia 2000, Valcuvia & al. 2000b), **Emil** (Nimis & al. 1996, Benesperri 2009), **Lig** (Tretiach 1993, Castello & al. 1994, Brunialti & al. 1999, Putortì & al. 1999b, Giordani & al. 2001, 2002, Brunialti & Giordani 2003, Giordani 2006, Watson 2014), **C - Tosc** (Tretiach 1993, Tretiach & Nimis 1994, Loppi & Putortì 1995, Loppi & al. 1995, 1996, 1996c, 1997, 1997b, 1997e, 1998, 1998b, 1999a, 2002, 2002b, 2002c, 2003, 2004, Loppi 1996, 1996b, Loppi & De Dominicis 1996, Loppi & Nascimbene 1998, 2010, Putortì & al. 1998, 1999, Bacci & al. 2000, Loppi & Pirintsos 2000, Benesperri 2000a, 2006, Laganà & al. 2002, Lorenzini & al. 2003, Loppi & Corsini 2003, Loppi & Frati 2004, Tretiach & al. 2008, Brackel 2008, Paoli & Loppi 2008, Brunialti & Frati 2010, Brunialti & al. 2012b, Paoli & al. 2012, 2015d, Brackel 2015), **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera 1998, Panfili 2000b, Ravera & al. 2006, Panfili 2007, Brackel 2015, Nascimbene & al. 2015), **Laz** (Tretiach 1993, Ravera & al. 1999, Ravera 2001, 2002, 2008b, Ravera & al. 2003, Massari & Ravera 2002, Nimis & Tretiach 2004, Ruisi & al. 2005, Stofer 2006, Munzi & al. 2007, Ravera & Genovesi 2008, Brackel 2015), **Abr** (Caporale & Pagliani 2010), **Mol** (Frati & al. 2004, Caporale & al. 2008, Paoli & al. 2015), **Sar** (Tretiach 1993, Zedda 2002, 2002b, Loi & al. 2000, Stofer 2006, Rizzi & al. 2011, Cossu 2013), **S - Camp** (Tretiach 1993, Puntillo & al. 2000, Aprile & al. 2003b, Nimis & Tretiach 2004, Brunialti & al. 2010, 2013, Nascimbene & al. 2010b, Garofalo & al. 2010, Ravera & Brunialti 2013, Catalano & al. 2016), **Bas** (Bartoli & Puntillo 1998, Brackel 2011), **Cal** (Tretiach 1993, Puntillo 1995, 1996, Incerti & Nimis 2006, Stofer 2006), **Si** (Tretiach 1993, Nimis & al. 1994, Ottonello & Romano 1997, Ottonello & Puntillo 2009, Ottonello & al. 2011).

Sq/ Ch/ A.s/ Epiph/ pH: 2-3, L: 3-4, X: 2-3, E: 1-3/ Alt: 1-3/ Mont: r, SmedD: rr, Pad: er, SmedH: rc, MedH: rr/ PT: 1-2/ suboc/ Note: a mild-temperate lichen, most often found on epiphytic *Frullania* and other liverworts, most common in north-eastern and Tyrrhenian Italy, rare along the eastern side of the Peninsula.

Ocellomma Ertz & Tehler

in Ertz & al., Fungal Divers., 70: 45, 2014.

The phylogenetic analysis of the Roccellaceae by Ertz & al. (2014) has shown that several traditionally accepted genera, among which *Schismatomma*, are para-/polyphyletic. In order to make these groups

monophyletic, eight new genera were proposed, among which *Ocellomma* for a species formerly included in *Schismatomma*. Type: *O. picconianum* (Bagl.) Ertz & Tehler

Ocellomma picconianum (Bagl.) Ertz & Tehler

in Ertz & al., Fungal Divers., 70: 45, 2014 - *Lecania picconiana* Bagl. Comm. Soc. Crittog. Ital., 1, 3: 127, 1862.

Syn.: *Lecanactis saltelii* B. de Lesd., *Lecanactis saltelii* f. *ecrustacea* B. de Lesd., *Schismatomma picconianum* (Bagl.) J. Steiner, *Schismatomma picconianum* var. *microcarpum* (Bagl. ex Arnold) J. Steiner

N - Lig (Tehler 1993, Ertz & Tehler 2014, Watson 2014), **C - Tosc** (Tehler 1993, Frati & al. 2008, Brunialti & Frati 2010), **Umb** (Tehler 1993, Ravera & al. 2006), **Laz** (Tehler 1993), **Abr** (Caporale & Pagliani 2009, 2014b), **Sar** (Tehler 1993, Zedda 2002b), **S - Camp** (Nimis & Tretiach 2004, Garofalo & al. 2010), **Pugl** (Nimis & Tretiach 1999, Durini & Medagli 2002, 2004), **Bas** (Nimis & Tretiach 1999), **Cal** (Lich. Graec. 57: Obermayer 1996, Puntillo 1996), **Si** (Nimis & al. 1994, Grillo & al. 2002, Grillo & Caniglia 2004, Caniglia & Grillo 2006b, Cataldo & Minissale 2015).

Cr/ Tr/ S/ Epiph/ pH: 1-2, L: 1-3, X: 1-3, E: 2-3/ Alt: 1-2/ SmedH: vr, MedH: rr/ PT: 1/ coast/ Note: a Mediterranean-Atlantic species, most abundant on evergreen trees in Tyrrhenian Italy, especially on *Quercus ilex* in humid Mediterranean woodlands. The record of *Schismatomma dirinellum* by Caporale & Pagliani (2009, 2014b) from Abruzzo, those by Cataldo & Minissale (2015) and Caniglia & Grillo (2006b) from Sicily, and that by Frati & al. (2008) from Tuscany most probably refer to this species.

Ochrolechia A. Massal.

Ric. Auton. Lich. Crost.: 30, 1852.

This genus of the Ochrolechiaceae, comprising c. 60 crustose species with a usually conspicuous thallus and large apothecia, is distinguished by a hamathecium of branched and anastomosing paraphysoids, strongly amyloid hymenium and asci, and large, simple, thin-walled ascospores. The European species have been monographed by Kukwa (2011). Preliminary results from the phylogenetic analysis by Kukwa & al. (2016) indicate the presence of several previously unknown lineages which are mostly supported by morphological, chemical or biogeographic data, suggesting that a purely morphology-based taxonomy is misleading in *Ochrolechia*, and that revisions of the genus will include several new taxa as well as reinstatements of synonyms. Type: *O. tartarea* (L.) A. Massal.

Ochrolechia alboflavescens (Wulfen) Zahlbr.

Verh. zool.-bot. Ges. Wien, 76: 94, 1927 - *Lichen alboflavescens* Wulfen in Jacquin, Coll. Bot., 3: 111, 1789.

Syn.: *Lecanora tartarea* var. *alboflavescens* (Wulfen) Flot., *Ochrolechia alboflavescens* var. *plana* Verseghe, *Ochrolechia alboflavescens* f. *subfarinosa* Verseghe, *Ochrolechia parella* var. *alboflavescens* (Wulfen) Arnold, *Ochrolechia parella* f. *papillata* Räsänen, *Ochrolechia tartarea* var. *alboflavescens* (Wulfen) A. Massal., *Ochrolechia papillata* (Räsänen) Verseghe

N - Frl, **Ven** (Nascimbene & Caniglia 2002c, 2003c, Nascimbene & al. 2006e, Kukwa 2011, Brackel 2013), **TAA** (Nascimbene & Caniglia 2000b, 2002c, Caniglia & al. 2002, Nascimbene & al. 2005, 2006, 2006e, 2007b, 2008c, 2009, 2010, 2014, Nascimbene 2006b, 2008b, 2006c, 2013, 2014, Stofer 2006, Thor & Nascimbene 2007, Kukwa 2011, Nascimbene & Marini 2015, Nimis & al. 2015), **Lomb** (Alessio & al. 1995, Dalle Vedove & al. 2004, Nascimbene & al. 2006e), **Piem** (Isocrono & al. 2004, 2006, Isocrono & Piervittori 2008), **VA** (Piervittori & Isocrono 1999, Kukwa 2011, Matteucci & al. 2008), **Emil**, **C - Tosc** (Benespero & al. 2007), **Abr** (Stofer 2006), **Sar** (Rizzi & al. 2011), **S - Camp**, **Pugl**, **Cal** (Puntillo 1996).

Cr/ Ch/ A.s/ Epiph/ pH: 1-2, L: 3, X: 3, E: 1/ Alt: 3-4/ Salp: c, Mont: vr/ PT: 1/ Note: a boreal-montane species found on bark of conifers, more rarely of acid-barked deciduous trees, usually in upland areas; most frequent in the Alps, but locally common in humid parts of the Apennines.

Ochrolechia androgyna (Hoffm.) Arnold

Flora, 68: 236, 1885 - *Lichen androgynus* Hoffm., Enum. Lich.: 56, Tab. 7, f. 3, 1784.

Syn.: *Ochrolechia albosorediosa* Gyeln., *Ochrolechia androgyna* var. *albosorediosa* (Gyeln.) Erichsen, *Ochrolechia androgyna* var. *pergranulosa* Räsänen, *Ochrolechia androgyna* var. *saxorum auct. non* (Oeder) Verseghe, *Ochrolechia pulvinata* var. *ecorticata* Verseghe, *Ochrolechia tartarea* var. *androgyna* (Hoffm.) Arnold, *Ochrolechia tatraica* Gyeln., *Ochrolechia androgyna* f. *tatraica* (Gyeln.) Verseghe, *Ochrolechia roseosorediosa* Gyeln., *Ochrolechia tartarea* f. *verrucosa* Räsänen, *Ochrolechia bahusiensis* f. *roseosorediosa* (Gyeln.) Erichsen, *Pertusaria degelii* Erichsen, *Pertusaria tumidula* var. *perpityrea* Erichsen

N - Frl (Tretiach & Hafellner 2000), **Ven** (Nascimbene & al. 2005b, Nascimbene 2008c, 2011), **TAA** (Nascimbene 2006b, 2006c, 2008b, Nascimbene & al. 2006, 2007b, 2009, 2010, Thor & Nascimbene 2007, Zarabska & al. 2009, Kukwa 2011, Nimis & al. 2015), **Lomb**, **Piem** (TSB 33016), **VA** (Piervittori & Isocrono 1999, Valcuvia & al. 2000b, Piervittori & al. 2004), **Emil**, **C - Tosc** (Loppi & al. 1994, 1997, Loppi 1996, Loppi & De Dominicis 1996, Benespero & al. 2007), **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera & al. 2006b), **Laz** (Ravera 2001, Ravera & Genovesi 2008), **Abr** (Nimis & Tretiach 1999), **Mol** (Caporale & al. 2008, Paoli & al. 2015), **Sar** (Nöske 2000, Zedda 2002, 2002b, Zedda & Sipman 2001, Zedda & al. 2001, Rizzi & al. 2011), **S - Camp** (Brunialti & al. 2013, Ravera & Brunialti 2013), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Liistro & Cataldo 2011).

Cr/ Ch/ A.s/ Epiph-Sax-Terr/ pH: 1-2, L: 3, X: 2, E: 1/ Alt: 2-5/ Alp: vr, Salp: r, Mont: rr, SmedD: er, SmedH: er/ PT: 1/ Note: on bark and on steeply inclined faces of siliceous rocks in humid montane forests,

sometimes also on soil and bryophytes. The Italian material should be checked: some samples might belong to *O. bahusiensis* H. Magn. or to *O. mahluiensis* Räsänen (see Kukwa 2011).

Ochrolechia arborea (Kreyer) Almb.

Bot. Not.: 254, 1952 - *Variolaria lactea* var. *arborea* Kreyer, Acta Horti Petropolit., 31: 322, 1913.

Syn.: *Lecanora perleprosa* Räsänen, *Pertusaria arborea* (Kreyer) Zahlbr., *Pertusaria myriosora* Erichsen, *Pertusaria sordidogrisea* Erichsen, *Ochrolechia sordidogrisea* (Erichsen) E. Schreiner & Hafellner, *Variolaria arborea* var. *albula* Savicz, *Pertusaria arborea* f. *albula* (Savicz) Erichsen, *Ochrolechia arborea* var. *albula* (Savicz) Makar., *Variolaria arborea* (Kreyer) Ljub.

N - **VG** (Castello 1996, 2002, Martellos & Castello 2004), **Frl**, **Ven** (Nascimbene & Caniglia 2000, 2003c, Thor & Nascimbene 2007, Nascimbene 2008c, 2011), **TAA** (Nascimbene 2006b, 2008b, 2014, Thor & Nascimbene 2007, Nascimbene & al. 2007b, 2009, 2010, 2014, Nascimbene & Marini 2015, Nimis & al. 2015), **Lomb**, **Piem** (Isocrono & al. 2004), **Emil** (Nimis & al. 1996, Tretiach & al. 2008), **Lig** (Brunialti & al. 2001). **C** - **Tosc** (Tretiach & Nimis 1994, Benesperi 2011), **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera 2000, Ravera & al. 2006), **Laz**, **Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008, Genovesi & Ravera 2014), **Sar** (Zedda 1995, 2002, Rizzi & al. 2011). **S** - **Camp** (Aprile & al. 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010, Brunialti & al. 2013, Ravera & Brunialti 2013, Catalano & al. 2016), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1995, 1996, Incerti & Nimis 2006), **Si** (Nimis & al. 1996b, Grillo 1996).

Cr/ Ch/ A.s/ Epiph/ pH: 2, L: 3-4, X: 3, E: 1-3/ Alt: 2-3/ Mont: vr, SmedD: rr, Pad: er, SmedH: rr/ PT: 1-2/ Note: a mainly temperate lichen found on isolated deciduous trees with mineral-rich bark. According to Kukwa (2011) the species is more frequent in Fennoscandia and central-eastern Europe, being rare in the western and southern parts of the Continent.

Ochrolechia balcanica Verseghy

Beih. Nova Hedwigia, 1: 85, 1962.

N - **Lig** (Brunialti & al. 2001). **C** - **Tosc** (Tretiach & Nimis 1994, Loppi & Putortù 1995b, Tretiach & Ganis 1999, Kukwa 2011, Benesperi 2011), **Umb** (Ravera 1998, Ravera & al. 2006), **Laz** (Ravera 2002b), **Abr** (Di Santo & Ravera 2012, Corona & al. 2016), **Mol** (Garofalo & al. 1999, Caporale & al. 2008), **Sar** (Zedda 1995, 2002, 2002b, Loi & al. 2000, Kukwa 2011, Rizzi & al. 2011, Cossu 2013). **S** - **Camp** (Garofalo & al. 1999, 2010, Aprile & al. 2002, 2003, 2003b, 2011, Nimis & Tretiach 2004, Catalano & al. 2010, 2016, Brunialti & al. 2013, Ravera & Brunialti 2013), **Pugl** (Nimis & Tretiach 1999, Durini & Medagli 2004), **Bas** (Nimis & Tretiach 1999, Kukwa 2011), **Cal** (Puntillo 1996, Incerti & Nimis 2006), **Si** (Grillo & Cristaudo 1995, Grillo 1996, Brackel 2008b).

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 3, X: 2, E: 1-2/ Alt: 2-3/ Mont: c, SmedH: r, MedH: er/ PT: 1/ Note: common and abundant in humid beech forests of the Apennines, rarer in *Quercus* forests of Tyrrhenian Italy. Apparently absent from the Alps, this conspicuous lichen probably belongs, together with species such as *Parmelia submontana* and *Physconia venusta*, to an ancient, pre-glacial, Mediterranean-montane element which is well worthy of further study.

Ochrolechia crozalsiana Clauzade & Vězda

Acta Mus. Siles., ser. A, 19: 25, 1970.

Syn.: *Ochrolechia erichsenii* auct. non Hafellner & Türk, *Pertusaria tumidula* auct. non Erichsen?

N - **Lig** (Giordani & Brunialti 2000). **C** - **Tosc**, **Sar** (Kukwa 2011). **S** - **Cal** (Puntillo 1996), **Si** (Grillo 1998, Grillo & Caniglia 2004, Kukwa 2011).

Cr/ Ch/ A.s/ Sax/ pH: 1-2, L: 4, X: 2, E: 1/ Alt: 1-3/ Mont: er, SmedH: vr, MedH: vr/ PT: 1/ suboc, #/ Note: a rare Mediterranean species known from France, Italy and perhaps the Iberian Peninsula; it is related to *O. tartarea*, but is morphologically and chemically different, and has a Tyrrhenian distribution in Italy.

Ochrolechia dalmatica (Erichsen) Boqueras

in Boqueras & al., Cryptogamie, Mycol., 20: 313, 1999 - *Pertusaria dalmatica* Erichsen, Rabenh. Krypt.-Flora, 9, 5, 1: 540, 1936.

N - **Emil** (Boqueras & al. 1999). **C** - **Sar**, **S** - **Camp** (Brunialti & al. 2013, Ravera & Brunialti 2013).

Cr/ Ch/ A.s/ Epiph/ pH: 1-2, L: 3-4, X: 2-3, E: 1/ Alt: 1-2/ SmedD: er, SmedH: vr, MedH: vr/ PT: 1/ suboc, #/ Note: a poorly understood, rarely collected lichen, which badly deserves further study. Indicator values are tentative. The record from Venezia Giulia reported by Nimis (1993: 510) was due to a misidentification. The species is included in the Italian red list of epiphytic lichens as "Data Deficient" (Nascimbene & al. 2013c).

Ochrolechia frigida (Sw.) Lyng

Rep. Sc. Res. Norw. Exp. Novaya Zemlya 1921, 43: 182, 1928 - *Lichen frigidus* Sw., Meth. Muscor.: 36, 1781.

Syn.: *Ochrolechia elisabethae-kolae* Verseghy, *Ochrolechia inaequatula* (Nyl.) Zahlbr., *Ochrolechia gonatodes* (Ach.) Räsänen, *Ochrolechia groenlandica* Verseghy, *Ochrolechia lapuënsis* (Vain.) Räsänen, *Ochrolechia pterulina* (Nyl.) G.E. Howard, *Ochrolechia subtartarea* (Nyl.) A. Massal.?, *Ochrolechia tartarea* var. *theleporoides* (Th. Fr.) Arnold

N - **Ven**, **Lomb**, **Piem** (Isocrono & al. 2004), **VA**.

Cr/ Ch/ S/ Terr/ pH: 1-2, L: 3-4, X: 2, E: 1/ Alt: 5-6/ Alp: er/ PT: 1/ Note: an arctic-alpine, circumpolar species found on mosses, plant debris and soil in the Alps, where it reaches the nival belt. All Italian records need confirmation (see Nimis 1993: 455).

Ochrolechia microstictoides Räsänen

Lich. Fenn. Exs., 5: nr. 226, 1936.

Syn.: *Pertusaria jurana* var. *grisea* Erichsen, *Pertusaria leprarioides* auct. non Erichsen, *Pertusaria silvatica* H. Magn.

N - **Ven** (Thor & Nascimbene 2007, Nascimbene 2008c, 2011, Nascimbene & al. 2013b), **TAA** (Thor & Nascimbene 2007, Nascimbene 2008b, 2013, 2014, Nascimbene & al. 2009, 2010, 2014, Nascimbene & Marini 2015, Nimis & al. 2015). **C** - **Tosc**, **Sar** (Zedda & al. 2001, Zedda 2002). **S** - **Cal** (Nimis & Puntillo 2003, Puntillo 2011, Brackel & Puntillo 2016), **Si**.

Cr/ Ch/ A.s/ Epiph/ pH: 1-2, L: 3, X: 1-2, E: 1/ Alt: 2-3/ Mont: r, SmedD: vr, SmedH: vr/ PT: 1/ Note: a cool-temperate to boreal-montane lichen, mostly found on conifers in open, humid forests.

Ochrolechia pallescens (L.) A. Massal.

N. Ann. Sc. Nat. Bologna, 7: 212, 1853 - *Lichen pallescens* L., Sp. Pl.: 1142, 1753.

Syn.: *Lecanora pallescens* (L.) Röhl. non A. Massal., *Lecanora pallescens* var. *corticola* A. Massal., *Ochrolechia anomala* (Harm.) Verseghy, *Ochrolechia parella* subsp. *pallescens* (L.) Clauzade & Cl. Roux, *Ochrolechia parella* var. *corticola* (A. Massal.) Kieff., *Ochrolechia parella* var. *tumidula* auct. non (Pers.) Arnold, *Ochrolechia tumidula* auct. non (Pers.) Arnold, *Lecanora parella* f. *nivea* Cromb., *Ochrolechia pallescens* f. *nivea* (Cromb.) Verseghy, *Ochrolechia pallescens* f. *coronata* Verseghy, *Ochrolechia pallescens* f. *pulverulenta* Verseghy

N - **VG**, **Frl**, **Ven** (Lazzarin 2000b, Nascimbene & Caniglia 2003c), **TAA** (Nascimbene & al. 2007b, Nimis & al. 2015), **Lomb** (Abramini & al. 2008), **Piem** (Isocrono & Falletti 1999, Isocrono & al. 2003), **VA** (Valcuvia 2000), **Emil** (Tretiach & al. 2008), **Lig** (Brunialti & al. 1999, Kukwa 2011). **C** - **Tosc** (Benesperi & al. 2007, Brunialti & Frati 2010, Benesperi 2011, Nascimbene & al. 2015), **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera 1998, Nimis & Tretiach 1999, Ravera & al. 2006), **Laz** (Bartoli & al. 1997, Massari & Ravera 2002, Ravera 2006c), **Abr** (Nimis & Tretiach 1999, Stofer 2006, Kukwa 2011, Zucconi & al. 2013, Catalano & al. 2016, Corona & al. 2016), **Mol** (Garofalo & al. 1999, Caporale & al. 2008, Genovesi & Ravera 2014), **Sar** (Zedda 1995, 2002, 2002b, Loi & al. 2000, Kukwa 2011, Rizzi & al. 2011). **S** - **Camp** (Garofalo & al. 1999, 2010, Aprile & al. 2002, 2003, 2003b, Nimis & Tretiach 2004, Brunialti & al. 2013, Ravera & Brunialti 2013, Catalano & al. 2016), **Pugl** (Garofalo & al. 1999, Durini & Medagli 2004), **Bas** (Nimis & Tretiach 1999, Potenza 2006, Kukwa 2011, Brackel 2011), **Cal** (Puntillo 1996, Incerti & Nimis 2006), **Si** (Nimis & al. 1996b, Ottonello & Salone 1994, Ottonello & al. 1994, 2011, Grillo & Cristaudo 1995, Grillo & al. 1996, Ottonello & Romano 1997, Grillo 1998, Grillo & Caniglia 2004, 2006, Merlo 2004b, Falco Scampatelli 2005, Stofer 2006).

Cr/ Ch/ S/ Epiph/ pH: 1-3, L: 3-4, X: 2-3, E: 1-2/ Alt: 1-3/ Mont: vr, SmedD: er, SmedH: r, MedH: er/ PT: 1/ suboc/ Note: a mainly temperate species found on deciduous trees in humid areas. The relationships with *O. parella* remain to be clarified: the two species are similar, but have a different ecology and distribution, and they hardly can be treated as *formae* of one and the same species.

Ochrolechia parella (L.) A. Massal.

Ric. Auton. Lich. Crost.: 30, 1852 - *Lichen parellus* L., Mantissa Pl.: 132, 1767.

Syn.: *Gasparrinia pallescens* var. *parella* (L.) Tornab., *Lecanora parella* (L.) Ach., *Ochrolechia euganea* Sambo?, *Ochrolechia madeirensis* Verseghy, *Ochrolechia pallescens* var. *parella* (L.) Körb., *Ochrolechia parella* f. *angulosa* Verseghy, *Ochrolechia parella* f. *striata* Verseghy, *Ochrolechia parella* f. *tenuis* Verseghy, *Ochrolechia parella* var. *albissima* Zschacke, *Ochrolechia parella* var. *immersa* Szatala, *Ochrolechia parella* var. *kretaeensis* Verseghy, *Parmelia parella* (L.) Ach., *Pertusaria incarnata* Leight.

N - **VG**, **Ven**, **TAA**, **Lomb**, **VA** (Piervittori & Isocrono 1999), **Emil** (Tretiach & al. 2008), **Lig** (Brunialti & al. 1999). **C** - **Tosc** (Adamo & al. 1993, Tretiach & Nimis 1994, Adamo 1997, Pišút 1997, Putortì & Loppi 1999b, Benesperi 2006, 2011), **Marc**, **Umb** (Panfili 2000b, Ravera & al. 2006), **Laz** (Genovesi & al. 2011, Roccardi & al. 2014), **Abr**, **Mol** (Garofalo & al. 1999, Caporale & al. 2008, Nimis & Tretiach 1999), **Sar** (Kerstin & al. 1994, Nöske 2000, Kukwa 2011, Rizzi & al. 2011, Giordani & al. 2013, Cossu & al. 2015). **S** - **Camp** (Garofalo & al. 1999, Ricciardi & al. 2000, Aprile & al. 2002, Nimis & Tretiach 2004, Catalano & al. 2016), **Pugl**, **Bas**, **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994, Ottonello & Salone 1994, Ottonello & al. 1994, 2011, Grillo & al. 1996, 1996b, Ottonello & Romano 1997, Grillo & Caniglia 2004, Brackel 2008b, Kukwa 2011).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 3-4, X: 2-3, E: 1-3/ Alt: 1-3/ Mont: vr, SmedD: vr, Pad: er, SmedH: vc, MedH: c, MedD: vr/ PT: 1-2/ suboc/ Note: closely related to *O. pallescens*, but silicicolous and much more common, especially in Tyrrhenian Italy, where it is locally very abundant. See also note on *O. pallescens*.

Ochrolechia subviridis (Høeg) Erichsen

Verh. bot. Ver. Prov. Brandenburg, 72: 3, 1930 - *Pertusaria subviridis* Høeg, Nytt Mag. Naturvid., 61: 150, 1923.

Syn.: *Ochrolechia gallica* Verseghy, *Ochrolechia yasudae* auct. non Vain.

N - **VG** (Kukwa 2011), **Piem** (Giordani & Malaspina 2016), **Emil** (Nimis & al. 1996, Tretiach & al. 2008, Kukwa 2011), **Lig** (Kukwa 2011, Watson 2014). **C** - **Tosc** (Putortì & Loppi 1999b, Loppi & al. 2002c, Loppi & Nascimbene 2010, Kukwa 2011), **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera 2000, Ravera & al. 2006), **Laz** (Massari & Ravera 2002, Zucconi & al. 2013), **Abr**, **Mol** (Caporale & al. 2008), **Sar** (Zedda & al. 2001, Zedda 2002, Kukwa 2011, Rizzi & al. 2011). **S** - **Camp** (Aprile & al. 2003b, Garofalo & al. 2010, Kukwa 2011, Brunialti & al. 2013, Ravera & Brunialti 2013, Catalano & al. 2016), **Pugl** (Nimis & Tretiach 1999), **Bas**, **Cal** (Puntillo 1996, Incerti & Nimis 2006, Brackel & Puntillo 2016), **Si** (Nimis & al. 1994).

Cr/ Ch/ A.s/ Epiph/ pH: 1-2, L: 3-4, X: 2, E: 1/ Alt: 2-3/ Mont: er, SmedD: r, SmedH: rr/ PT: 1/ suboc/ Note: a mild-temperate lichen found on old, isolated deciduous trees in humid areas; certainly more widespread, especially in northern Italy.

Ochrolechia szatalaensis Verseghy

Ann. Hist. Nat. Mus. Nat. Hung., 50: 80, 1958.

Syn.: *Ochrolechia pseudotartarea* (Vain.) Verseghy, *Ochrolechia szatalaensis* var. *macrospora* Verseghy, *Ochrolechia tenuissima* Verseghy

N - Frl, Ven (Nascimbene & Caniglia 2000, 2003c, Nascimbene & al. 2006e, Nascimbene 2008c, Kukwa 2011), **TAA** (Nascimbene 2006b, 2008b, 2014, Nascimbene & al. 2006e, 2007b, 2014, Kukwa 2011, Nimis & al. 2015), **Lomb, Lig** (S- F118654), **C - Tosc** (Benesperri & al. 2007, Kukwa 2011), **Abr** (Brackel 2015), **Sar** (Zedda 2002, Cossu 2013), **S - Bas** (S-F118647), **Cal** (Puntillo 1995, 1996), **Si** (Brackel 2008c).

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 3, X: 2-3, E: 1/ Alt: 3-4/ Salp: er, Mont: vr/ PT: 1/ Note: a cool-temperate to boreal-montane species with optimum on twigs in humid and cold sites; certainly widespread throughout the Alps. The identification of the sample from Sicily by Brackel (2008c) is not fully certain. The species is included in the Italian red list of epiphytic lichens under the "Least Concern" category (Nascimbene & al. 2013c).

Ochrolechia tartarea (L.) A. Massal.

Ric. Auton. Lich. Crost.: 30, 1852 - *Lichen tartareus* L., Sp. Pl.: 1141, 1753.

Syn.: *Lecanora tartarea* (L.) Ach., *Lecanora tartarea* f. *crassissima* Nyl., *Ochrolechia androgyna* var. *saxorum* (Oeder) Verseghy non auct., *Ochrolechia tartarea* f. *crassissima* (Nyl.) Cout., *Ochrolechia pulvinata* Verseghy, *Ochrolechia tartarea* var. *pynidiifera* Verseghy, *Parmelia tartarea* (L.) Ach., *Pertusaria gyrocheila* Nyl.

N - Ven, TAA, Lomb, Piem (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999), **Emil, Lig, C - Tosc, Marc, Laz, Abr, Sar** (Monte 1993, Nöske 2000, Kukwa 2011), **S - Camp** (Ricciardi & al. 2000), **Pugl, Bas** (Potenza 2006), **Cal** (Puntillo 1996, Stofer 2006), **Si** (Ottonello & Romano 1997, Ottonello & al. 2011).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 3-4, X: 2, E: 1/ Alt: 3-5/ Alp: vr, Salp: r, Orom: er, Mont: vr, SmedD: er, SmedH: r/ PT: 1/ suboc/ Note: on siliceous rocks and on thin soil layers in humid situations, mostly in upland areas. In the past the species was frequently confused with other taxa.

Ochrolechia turneri (Sm.) Hasselrot

Svensk Bot. Tidskr., 39: 130, 1945 - *Lichen turneri* Sm. in Smith & Sowerby, Engl. Bot., 12: tab. 857, 1801.

Syn.: *Buellia farinosa* Malme, *Lecanora parella* var. *turneri* (Sm.) Arnold, *Lecanora turneri* (Sm.) Ach., *Ochrolechia alboflavescens* var. *turneri* (Sm.) Verseghy, *Ochrolechia pallescens* var. *turneri* (Sm.) Körb., *Ochrolechia parella* var. *turneri* (Sm.) Arnold, *Pertusaria leprarioides* auct. p.max.p. non Erichsen

N - VG (TSB 25973), **Ven** (Nascimbene & Caniglia 2000, 2003c), **TAA** (Nascimbene & al. 2007b), **Emil, Lig, C - Tosc** (Loppi & al. 1997, 1998b, Loppi & Frati 2006), **Marc** (Nimis & Tretiach 1999), **Umb** (Panfili 2000b, Ravera & al. 2006), **Laz** (Ravera 2002b), **Abr** (Nimis & Tretiach 1999), **Mol** (Caporale & al. 2008, Paoli & al. 2015), **Sar** (Loi & al. 2000, Zedda & al. 2001, Zedda 2002, Stofer 2006), **S - Pugl** (Nimis & Tretiach 1999), **Bas** (Potenza & al. 2014), **Si** (Ottonello & Isocrono 2004, Stofer 2006).

Cr/ Ch/ A.s/ Epiph/ pH: 2-3, L: 3, X: 2-3, E: 2-3/ Alt: 2-4/ Salp: r, Mont: vr, SmedD: vr, SmedH: er/ PT: 1-2/ Note: on bark of isolated (mostly) deciduous trees in open, humid, montane to subalpine woodlands.

Ochrolechia upsaliensis (L.) A. Massal.

Ric. Auton. Lich. Crost.: 31, 1852 - *Lichen upsaliensis* L., Sp. Pl.: 1142, 1753.

Syn.: *Lecanora parella* var. *upsaliensis* (L.) Ach., *Ochrolechia upsaliensis* f. *continua* Verseghy

N - Frl, Ven (Caniglia & al. 1999, Nascimbene & Caniglia 2000, 2003c, Tomaselli & al. 2006), **TAA** (Dupla Graec. Lich. 64: Obermayer 1999, Kukwa 2011, Nascimbene 2008b), **Lomb, Piem** (Isocrono & al. 2004, Morisi 2005), **Emil, C - Abr** (Nimis & Tretiach 1999).

Cr/ Ch/ S/ Terr/ pH: 4-5, L: 4, X: 3, E: 1-2/ Alt: 4-6/ Alp: r, Salp: rr/ PT: 1/ Note: an arctic-alpine species of calciferous soil and plant debris, with optimum above treeline; most frequent in the Alps, where it reaches the nival belt, but also present in the central Apennines.

Ochrolechia xanthostoma (Sommerf.) K. Schmitz & Lumbsch

in Schmitz & al., Acta Bot. Fenn., 150: 160, 1994 - *Porina xanthostoma* Sommerf., K. Svenska Vetensk.-Akad. Handl.: 115, 1824 (1823).

Syn.: *Aspicilia poriniformis* (Nyl.) Arnold, *Pertusaria poriniformis* (Nyl.) Clauzade & Cl. Roux, *Pertusaria xanthostoma* (Sommerf.) Fr.

N - Lomb (Jatta 1909-1911), **Piem**.

Cr/ Ch/ S/ Epiph-Terr/ pH: 1-2, L: 3-4, X: 2, E: 1/ Alt: 3-4/ Salp: er, Mont: er/ PT: 1/ Note: on bark, but also on plant debris, more rarely on siliceous rocks in upland areas. The Italian records are rather dubious (see also Nimis 1993: 520).

Opegrapha Ach.

K. Vetensk.-Acad. Nya Handl., 30: 97, 1809, *nom. cons.*

The circumscription of this genus has been drastically changed in recent times. The molecular revision of the Arthoniales by Ertz & al. (2009) revealed the homoplastic nature of morphological characters traditionally used to circumscribe genera, such as exciple carbonisation and ascomatal structure. The genus *Opegrapha* appeared polyphyletic, its species being nested in all the major clades within Arthoniales. The transfer of

Opegrapha atra and *O. calcarea* to *Arthonia* allows that genus and the family Arthoniaceae to be recognised as monophyletic. Ertz & Tehler (2011) suggested a new phylogeny of several groups within the Arthoniales based on molecular data, together with important taxonomic implications, among which was the resurrection of the genus *Alyxoria*, to accommodate several species formerly included into *Opegrapha*. Finally, a molecular analysis of the family Roccellaceae by Ertz & al. (2014) has shown that several traditionally accepted genera, are para-/polyphyletic; in order to make these groups monophyletic, eight new genera were proposed, among which *Gyrographa*, to accommodate 2 species formerly included in *Opegrapha*, and *Pseudoschismatomma* for the *O. rufescens* group. *Opegrapha s.str.* includes c. 300, both lichenised and lichenicolous species. Type (conserved): *O. vulgata* (Ach.) Ach. The name is conserved against *Opegrapha* Humb. (1793).

Opegrapha celtidicola (Jatta) Jatta

N. Giorn. Bot. Ital., 12: 231, 1880 - *Lecanactis lyncea* var. *celtidicola* Jatta, N. Giorn. Bot. Ital., 7: 229, 1875.

Syn.: *Opegrapha betulinoides* B. de Lesd., *Opegrapha thallicola* B. de Lesd., *Opegrapha xylographoides* J. Steiner

N - **Piem** (Giordani & Malaspina 2016), **Lig** (Watson 2014). **C** - **Tosc** (Loppi & al. 1997c, 1999a), **Marc** (Nimis & Tretiach 1999), **Laz** (Stofer 2006). **S** - **Camp** (Aprile & al. 2002, 2003b), **Pugl** (Nimis & Tretiach 1999, Durini & Medagli 2002, Brackel 2011), **Bas** (Bartoli & Puntillo 1998, Nimis & Tretiach 1999, Potenza & al. 2010), **Cal** (Puntillo 1996, Incerti & Nimis 2006), **Si** (Grillo & al. 2007).

Cr/ Tr/ S/ Epiph/ pH: 1-3, L: 3-4, X: 2-3, E: 1-2/ Alt: 1-2/ SmedD: er, SmedH: r, MedH: rr/ PT: 1/ suboc/ Note: a Mediterranean-Atlantic lichen found on old trees, near the base of the trunks, at relatively low elevations; mainly Tyrrhenian in Italy.

Opegrapha cesareensis Nyl.

Flora, 51: 477, 1868.

C - **Sar** (B - Leg. H. Sipman nr. 24085).

Cr/ Tr/ S/ Sax/ pH: 1-2, L: 3-4, X: 1-2, E: 1/ Alt: 1/ MedH: er/ PT: 1/ suboc, coast/ Note: a rare species growing on steeply inclined to underhanging surfaces of siliceous rocks, usually near the coasts. The material from Sardinia was collected at Punta Falcone (Sassari), on siliceous schist boulders and outcrops on steep slopes with garrigue at seashore.

Opegrapha conferta Anzi

Comm. Soc. Critt. Ital., 1, 3: 160, 1862.

Syn.: *Opegrapha confluens* (Ach.) Stizenb. *non auct.*

N - **Lomb**. **C** - **Tosc** (Tretiach & al. 2008), **Sar**.

Cr/ Tr/ S/ Sax/ pH: 1-3, L: 2-3, X: 2, E: 1/ Alt: 1-2/ SmedD: vr, SmedH: er, MedH: vr/ PT: 1/ suboc/ Note: a mild-temperate to Mediterranean lichen of shaded siliceous rocks, mostly coastal; probably overlooked, or confused with other species in the past, but certainly not common.

Opegrapha corticola Coppins & P. James

Lichenologist, 11: 162, 1979.

C - **Tosc**, **Laz**.

Cr/ Tr/ A.s/ Epiph/ pH: 1-2, L: 3, X: 1-2, E: 1/ Alt: 1/ MedH: er/ PT: 1/ suboc/ Note: a western European, mild-temperate species growing on the trunks of ancient trees, especially *Quercus ilex*; easy to overlook, being always sterile, but certainly extremely rare, and confined to Tyrrhenian Italy. It is included in the Italian red list of epiphytic lichens as "Endangered" (Nascimbene & al. 2013c).

Opegrapha deusta Jatta

De Not *ex* Jatta, N. Giorn. Bot. Ital., 13: 15, 1881.

N - **Lig**. **C** - **Sar**.

Cr/ Tr/ S/ Epiph/ pH: 1-2, L: 3, X: 2-3, E: 1/ Alt: 1/ MedH: er/ PT: 1/ #/ Note: a poorly known epiphytic species which needs further study, previously also known from Tunisia and Morocco, and recently reported from the Balearic Islands, with no recent record from Italy. The type material was collected on *Olea*. See also Nimis (1993: 458).

Opegrapha dolomitica (Arnold) Torrente & Egea

Clauzade & Cl. Roux *ex* Torrente & Egea, Bibl. Lichenol., 32: 146, 1989 - *Opegrapha rupestris* var. *dolomitica* Arnold, Flora, 43: 78, 1860.

Syn.: *Opegrapha saxicola* *auct. non Ach.*, *Opegrapha saxicola* var. *dolomitica* (Arnold) V. Wirth

N - **Frl** (Breuss 2008), **Ven** (Nascimbene & Marini 2007, Nascimbene 2008c), **TAA** (Nascimbene 2008b), **Lomb** (Brackel 2013), **Lig**. **S** - **Cal** (Puntillo 1996), **Si**.

Cr/ Tr/ S/ Sax/ pH: 4-5, L: 2-3, X: 2-3, E: 1/ Alt: 1-4/ Mont: r, SmedD: vr, SmedH: vr, MedH: er/ PT: 1/ u/ Note: on vertical or underhanging surfaces of dolomitic rocks and (more rarely) of limestone, with a wide altitudinal range.

Opegrapha durieui Mont.

in Durieu, Flore Algérie Crypt., 1: 279, 1846-1849.

Syn.: *Opegrapha arthonioidea* (Nyl.) Nyl., *Opegrapha grumulosa* var. *arthonioidea* Nyl., *Opegrapha polymorpha* (Müll. Arg.) Müll. Arg., *Stigmatidium polymorphum* Müll. Arg.

C - **Tosc, Sar, S - Pugl** (Nimis & Tretiach 1999), **Si** (Nimis & al. 1994).

Cr/ Tr/ S/ Sax/ pH: 5, L: 2-3, X: 1-2, E: 1/ Alt: 1/ MedH: r, MedD: er/ PT: 1/ suboc, coast/ Note: a mainly Mediterranean species found on steeply inclined to underhanging, generally north-facing surfaces of hard calcareous rocks near the coast. It probably does not belong to *Opegrapha s.str.*

Opegrapha lithyrge Ach.

Lichenogr. Univ.: 247, 1810.

Syn.: *Opegrapha lithyrgodes* Nyl. ex Leight.

N - TAA, Lomb, Piem (Isocrono & al. 2004), **Lig. C - Tosc, Sar, S - Camp, Pugl** (Jatta 1909-1911), **Cal** (Puntillo 1996), **Si** (Grillo 1998, Grillo & Caniglia 2004).

Cr/ Tr/ S/ Sax/ pH: 1-3, L: 1-3, X: 1-2, E: 1/ Alt: 2-3/ Mont: vr, SmedD: er, SmedH: vr/ PT: 1/ suboc, u/ Note: on vertical to underhanging surfaces of hard siliceous rocks in deep gorges or in mature forests. Closely related to *O. vulgata*.

Opegrapha lutulenta Nyl.

Mém. Soc. Sc. Nat. Cherbourg, 3: 201, 1855.

N - Lig (Watson 2014). **C - Tosc, Sar, S - Si** (Ottonello & Puntillo 2009).

Cr/ Tr/ S/ Sax/ pH: 3, L: 2-3, X: 2, E: 1/ Alt: 1/ MedH: r, MedD: er/ PT: 1/ suboc, coast/ Note: on steeply inclined surfaces of basic siliceous rocks, often with *Dirina* and *Roccella*; restricted to Tyrrhenian Italy.

Opegrapha multipuncta Coppins & P. James

in Coppins & al., Lichenologist, 24: 365, 1992.

N - VG (Tretiach 2004), **Frl** (Tretiach 2004).

Cr/ Tr/ A.s/ pH: 2-3, L: 3-4, X: 3, E: 2-3/ Alt: 2/ SmedD: r, Pad: er/ PT: 1-2/ Note: a mild-temperate lichen found mostly on fruit-trees in orchards; certainly more widespread, also in Tyrrhenian Italy, but overlooked, being always sterile.

Opegrapha niveoatra (Borrer) J.R. Laundon

Lichenologist, 2: 138, 1963 - *Verrucaria niveoatra* Borrer in Hooker & Sowerby, Engl. Bot. Suppl. 1: 2637, 1831.

Syn.: *Opegrapha amphotera* Nyl., *Opegrapha dubia* Leight. ex Arnold, *Opegrapha reticulata* DC., *Opegrapha subsiderella* (Nyl.) Arnold, *Opegrapha subsiderella* f. *rubella* B. de Lesd., *Opegrapha vulgata* var. *subsiderella* Nyl.

N - Ven (Thor & Nascimbene 2007), **TAA** (Thor & Nascimbene 2007, Nascimbene & al. 2007b, 2014, Nascimbene 2014, Nascimbene & Marini 2015, Nimis & al. 2015), **Emil** (Nimis & al. 1996), **Lig** (Watson 2014). **C - Tosc** (Brunialti & Frati 2010, Brackel 2015), **Marc** (Nimis & Tretiach 1999), **Laz** (Ravera & al. 1999, 2000, Munzi & al. 2007, Zucconi & al. 2013), **Abr** (Caporale & Pagliani 2010), **Sar** (Zedda 2002, Rizzi & al. 2011). **S - Camp** (Aprile & al. 2003b), **Pugl** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996, Puntillo & Puntillo 2004), **Si** (TSB 17354).

Cr/ Tr/ S/ Epiph/ pH: 1-2, L: 3, X: 2, E: 1-2/ Alt: 1-3/ Mont: er, SmedD: er, SmedH: r, MedH: vr/ PT: 1/ Note: a mild-temperate lichen found on old trees in open woodlands, mainly Tyrrhenian in Italy; closely related to *O. vulgata*, but differing in the shorter spermogonia.

Opegrapha parasitica (A. Massal.) H. Olivier

Bull. Acad. Intern. Géogr. Bot., 16: 190, 1906 - *Leciographa parasitica* A. Massal., Geneac. Lich. (Verona): 14, 1854.

Syn.: *Leciographa centrifuga* (A. Massal.) Rehm, *Opegrapha centrifuga* A. Massal.

N - VG (TSB 6657, Brackel 2016), **Ven** (Lazzarin 2000b, Brackel 2016), **TAA** (Brackel 2016), **Piem** (Brackel 2016). **C - Tosc** (Hafellner 2009, Brackel 2016), **Sar** (Hafellner 2009, Brackel 2016). **S - Cal** (Hafellner 2009, Brackel 2016), **Si** (Nimis & al. 1994, Brackel 2016).

LF/ / S/ Sax/ pH: 4-5, L: 1-3, X: 1-3, E: 1-2/ Alt: 1-5/ Alp: er, Salp: vr, Orom: vr, Mont: c, SmedD: rc, Pad: er, SmedH: c, MedH: rc, MedD: vr/ PT: 1-2/ Note: a parasite on *Circinaria calcarea* and related species, certainly much more widespread in Italy; in the past it was often confused with *O. rupestris*.

Opegrapha pertusariicola Coppins & P. James

Lichenologist, 11: 164 1979.

S - Si (Grillo & Cristaudo 1995, Brackel 2016).

LF/ / S/ Epiph/ pH: 1-2, L: 3, X: 2-3, E: 1/ Alt: 2-3/ Mont: vr, SmedH: vr/ PT: 1/ paras *Pertusaria* spp./ Note: a lichenicolous fungus, probably much more widespread, especially on *Pertusaria leioplaca*.

Opegrapha phaeophysciae R. Sant., Diederich, Ertz & Christnach

in Ertz & al., Bibl. Lichenol., 91: 132, 2005.

C - Tosc (Brackel 2015, 2016), **Laz** (Brackel 2015, 2016).

LF/ / S/ Epiph-Sax/ pH: 3-5, L: 4-5, X: 3-4, E: 3-5/ Alt: 2/ SmedH: er/ PT: 1-3/ paras *Phaeophyscia* spp. and *Hyperphyscia adglutinata*/ Note: this rare lichenicolous fungus (usually on *Phaeophyscia*) was reported from Japan, Russia, South Korea and the USA; the records from Italy, collected on *Hyperphyscia*, are new to Europe (see Brackel 2015).

Opegrapha phlyctidicola (Vouaux) Etayo

Bull. Soc. linn. Provence, 47: 103, 1996 - *Celidium phlyctidicola* Vouaux in Pitard & Harmand, Bull. Soc. Bot. France, 58, Mém. 22: 70, 1911.

Syn.: *Arthonia phlyctidicola* (Vouaux) Clauzade, Diederich & Cl. Roux, *comb. inval.*

C - Sar (Zedda & Sipman 2001, Brackel 2016)

LF/ / S/ Epiph/ pH: 1-2, L: 2, X: 2, E: 1/ Alt: 2-3/ Mont: er, SmedH: er/ PT: 1/ paras *Phlyctis argena*/ Note: a lichenicolous fungus growing on *Phlyctis argena*. The identification of the Sardinian samples, by R. Sundin, is not certain, as the specimen has unusually small spores.

Opegrapha pulvinata Rehm

in Lojka, Verh. zool.-bot. Ges. Wien, 19: 500, 1869.

Syn.: *Leciographa pulvinata* (Rehm) Arnold

N - TAA (Thor & Nascimbene 2007, Hafellner 2009, Brackel 2016), **Piem** (Brackel 2016). **S - Cal** (Puntillo 1996, Brackel 2016).

LF/ / S/ Terr/ pH: 3-4, L: 4, X: 3, E: 1/ Alt: 1-3/ Mont: vr, SmedD: vr, SmedH: vr/ PT: 1/ paras/ Note: a lichenicolous fungus growing on foliose to squamulose pyrenocarpous lichens (*Dermatocarpon*, *Catapyrenium* and *Endocarpon* spp.), probably overlooked, and somehow more frequent in Italy.

Opegrapha rotunda Hafellner

Herzogia, 10: 14, 1994.

S - Bas (Brackel 2011, 2016), **Si** (Brackel 2008b, 2016).

LF/ / S/ Epiph/ pH: 3-4, L: 4-5, X: 3-4, E: 3-4/ Alt: 1-3/ Mont: vr, SmedD: vr, SmedH: vr, MedH: vr, MedD: vr/ PT: 1-2/ paras *Physconia distorta*/ Note: this rare species is known only from the host *Physconia distorta*.

Opegrapha rupestris Pers.

Ann. Bot. (Usteri), 5: 20, 1794.

Syn.: *Leciographa monspeliensis* (Nyl.) Müll. Arg., *Opegrapha monspeliensis* Nyl., *Opegrapha mougeotii* var. *garganica* Jatta, *Opegrapha opaca* Nyl., *Opegrapha saxatilis* DC. *non auct.*, *Opegrapha saxicola* Ach. *non auct.*, *Opegrapha sbarbaronis* B. de Lesd., *Opegrapha semicincta* Zahlbr., *Opegrapha semicincta* f. *aggregata* Werner

N - VG (Castello 2002, Martellos & Castello 2004, Hafellner 2011), **Frl** (Hafellner 2011), **Ven** (Nascimbene & Caniglia 2003c), **TAA** (Brackel 2016), **Lomb**, **Piem** (Isocrono & al. 2004), **Lig** (Valcuvia & al. 2000). **C - Tosc** (Tretiach & al. 2008), **Umb** (Genovesi & Ravera 2001, Ravera & al. 2006), **Laz**, **Abr** (Nimis & Tretiach 1999), **Sar** (Vondrák & Kocourková 2008, Brackel 2016, Brackel 2016). **S - Camp** (Ricciardi & al. 2000, Aprile & al. 2002, 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010), **Pugl** (Nimis & Tretiach 1999, Durini & Medagli 2002, Brackel 2011, 2016), **Cal** (Puntillo 1996, Brackel 2016), **Si** (Nimis & al. 1994, 1995, Grillo 1998, Grillo & Caniglia 2004, Caniglia & Grillo 2005, 2006, Vondrák & Kocourková 2008, Liistro & Cataldo 2011, Brackel 2016).

LF/ / S/ Sax/ pH: 4-5, L: 1-3, X: 1-3, E: 1-2/ Alt: 1-5/ Alp: er, Salp: vr, Orom: vr, Mont: c, SmedD: rc, Pad: er, SmedH: c, MedH: rc, MedD: vr/ PT: 1-2/ Note: an ecologically wide-ranging species found both in natural habitats (especially shaded niches of calcareous rocks in woodlands), and in moderately disturbed situations (such as on north-facing walls), it often grows on other crustose lichens (especially *Bagliettoa* and *Verrucaria* species). See also note on *O. vulpina*.

Opegrapha vermicellifera (Kunze) J.R. Laundon

Lichenologist, 2: 139, 1963 - *Pyrenotea vermicellifera* Kunze in Reichenbach & Schubert, Lich. Exs.: nr. 60, 1823.

Syn.: *Opegrapha fuscella* (Fr.) Almb., *Opegrapha hapaleoides* Nyl., *Opegrapha leptospora* Werner & M. Choisy, *Opegrapha mehdiensis* Werner

N - VG (Tretiach 2015m), **Lomb** (Valcuvia & Truzzi 2007, 2007b), **Piem** (Valcuvia 2002, 2002b), **Emil** (TSB 7994). **C - Laz**, **Sar** (Zedda 2002). **S - Pugl** (Nimis & Tretiach 1999), **Bas** (Bartoli & Puntillo 1998), **Cal** (Puntillo 1995, 1996, Puntillo & Puntillo 2012).

Cr/ Tr/ S/ Epiph/ pH: 2-3, L: 3, X: 2, E: 1-2/ Alt: 2/ SmedD: er, SmedH: r/ PT: 1/ u/ Note: a mild-temperate lichen found on old trees in humid areas, especially near large rivers, on faces seldom wetted by rain.

Opegrapha vulgata (Ach.) Ach.

Meth. Lich.: 20, 1803 - *Lichen vulgatus* Ach., Lich. Suec. Prodr.: 21, 1799.

Syn.: *Opegrapha actophila* Nyl., *Opegrapha cinerea* Chevall., *Opegrapha cinerea* var. *intermedia* B. de Lesd., *Opegrapha danica* Erichsen, *Opegrapha devulgata* Nyl.

N - Frl (TSB 3602), **Ven** (Thor & Nascimbene 2007, Nascimbene 2008, 2008c, 2011, Nascimbene & al. 2008e, 2013b), **TAA** (Hinteregger 1994, Nascimbene & al. 2007b, 2014, Nascimbene 2008b, 2014, Nascimbene & Marini 2015, Nimis & al. 2015), **Lomb** (Alessio & al. 1995), **Piem** (Isocrono & al. 2004, Furlanetto 2010), **Emil** (Nimis & al. 1996), **Lig**, **C - Tosc** (Loppi & al. 1999a, 2004c, Putorti & Loppi 1999, Laganà & al. 2002, Stofer 2006, Brunialti & Frati 2010,

Brunialti & al. 2012b), **Laz** (Ravera & al. 1999, Ruisi & al. 2005, Ravera 2006c, Stofer 2006, Munzi & al. 2007, Gagliardi & al. 2010), **Abr** (Nimis & Tretiach 1999, Catalano & al. 2016), **Sar. S - Camp** (Ricciardi & al. 2000, Aprile & al. 2003b, Brunialti & al. 2010, 2013, Garofalo & al. 2010, Ravera & Brunialti 2013), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999, Potenza 2006, Potenza & al. 2010), **Cal** (Puntillo 1995, 1996), **Si** (Grillo & Carfi 1997, Grillo 1998, Grillo & Caniglia 2004, Caniglia & Grillo 2006b, Cataldo & Minissale 2015).

Cr/ Tr/ S/ Epiph/ pH: 2-3, L: 3, X: 1-2, E: 1/ Alt: 1-3/ Mont: rr, SmedD: vr, SmedH: r, MedH: er/ PT: 1-2/ Note: a widespread, but not common temperate species with optimum in humid forests, especially on *Abies*, but also on broad-leaved trees.

Opegrapha vulpina Vondrák, Kocourk. & Tretiach
in Vondrák & Kocourková, Lichenologist, 40: 177, 2008.

C - **Marc** (Vondrák & Kocourková 2008, Brackel 2016), **Abr** (Vondrák & Kocourková 2008, Brackel 2016).

LF/ / S/ Sax/ pH: 4-5, L: 4-5, X: 3-4, E: 2-3/ Alt: 3-5/ Alp: vr, Salp: vr, Orom: vr, Mont: c/ PT: 1-2/ Note: a non-lichenised fungus occurring on *Pyrenodesmia erodens* and other crustose Teloschistaceae.

Ophioparma Norman

Nyt. Mag. Naturvid., 7: 230, 1853.

A genus of c. 10 species occurring in boreal, high montane and temperate areas of the Northern Hemisphere and of South America, segregated from *Haematomma* mainly on the basis of ascus characters. It is now placed in the Ophioparmaceae within the Umbiliciales (Lumbsch & al. 2008). Type: *O. ventosa* (L.) Norman

Ophioparma rubricosa (Müll. Arg.) S. Ekman

Opera Bot., 127: 133, 1996 - *Patellaria rubricosa* Müll. Arg., Hedwigia, 34: 142, 1895.

C - **Sar** (Zedda & Sipman 2001).

Cr/ Ch/ A.s/ Epiph/ pH: 1-2, L: 4-5, X: 2-3, E: 1/ Alt: 3/ Mont: er/ PT: 1/ Note: the record from Sardinia is the first from Europe of this western North American epiphytic species. However, the Sardinian samples are sorediate, and could belong to a still undescribed taxon. The species is included in the Italian red list of epiphytic lichens as “Data Deficient” (Nascimbene & al. 2013c).

Ophioparma ventosa (L.) Norman

Nytt Mag. Naturvid., 7: 230, 1853 - *Lichen ventosus* L., Sp. Pl.: 1141, 1753.

Syn.: *Haematomma ventosum* (L.) A. Massal., *Lecanora ventosa* (L.) Ach., *Lepadolemma ventosum* (L.) Trevis., *Zeora ventosa* (L.) Flot.

N - **Frl** (Tretiach & Hafellner 2000), **Ven, TAA** (Caniglia & al. 2002), **Lomb** (Dalle Vedove & al. 2004), **Piem** (Morisi & Sereno 1995, Isocrono & al. 2004, Morisi 2005, Isocrono & Piervittori 2008), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Valcuvia 2000), **Emil. C - Tosc** (Benesperi 2007, Tretiach & al. 2008), **Abr** (Jatta 1909-1911), **Sar. S - Cal** (Puntillo 1996).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 4-5, X: 3-4, E: 1/ Alt: 3-6/ Alp: rc, Salp: r, Orom: er, Mont: er/ PT: 1/ Note: an arctic-alpine circumpolar lichen found on steeply inclined surfaces of siliceous rocks in wind-exposed situations, with optimum above treeline; most frequent in the Alps, where it reaches the nival belt, but reaching south to the mountains of Calabria.

Orphniospora Körb.

in Hertlaub & Lindemann, Zweite Deutsche Nordpolarfahrt, 2: 81, 1874.

A genus of 3 species, widely scattered on siliceous rocks in montane areas of both Hemispheres. The genus might be related to *Fuscidea* in the Fuscideaceae, which differs in the pale hypothecium and the absence of any green or purple pigment in the apothecia, but its taxonomic position still has to be settled. Type: *O. groenlandica* Körb. (= *O. moriopsis*).

Orphniospora moriopsis (A. Massal.) D. Hawksw.

Lichenologist, 14: 135, 1982 - *Catolechia moriopsis* A. Massal., Ric. Auton. Lich. Crost.: 85, 1852.

Syn.: *Buellia atrata* (Sm.) Anzi, *Buellia bahusiensis* Degel. nom. nud., *Buellia coracina* Körb., *Buellia moriopsis* (A. Massal.) Th. Fr., *Buellia subtenebrosa* Malme, *Orphniospora atrata* (Sm.) Poelt

N - **Frl** (Tretiach & Hafellner 2000), **TAA, Lomb** (Lazzarin 2000b), **Piem** (Isocrono & al. 2003, 2004).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 4, X: 3, E: 1/ Alt: 4-5/ Alp: rr, Salp: r/ PT: 1/ Note: an arctic-alpine circumpolar lichen found on inclined surfaces of hard siliceous rocks in cold habitats near or above treeline; probably restricted to the Alps in Italy. The record reported by Ricciardi & al. (2000) from Campania, at low elevation, is not accepted here.

Orphniospora mosigii (Körb.) Hertel & Rambold

Mitt. bot. Staatss. München, 27: 122, 1988 - *Lecidella mosigii* Körb., Parerga Lichenol.: 201, 1861.

Syn.: *Aspicilia obscurissima* (Nyl.) Maheu & A. Gillet, *Lecidea mosigii* (Körb.) Anzi, *Lecidea obscurissima* (Nyl.) Nyl., *Lecidea tenebrosa* var. *obscurissima* Nyl.

N - **Frl** (Tretiach & Hafellner 2000), **Ven** (Caniglia & al. 1999, Nascimbene & Caniglia 2000, Hertel & Schuhwerk 2010), **TAA** (Caniglia & al. 2002, Hertel & Schuhwerk 2010), **Lomb**, **Piem** (Morisi & Sereno 1995, Isocrono & al. 2004, Isocrono & Piervittori 2008, Favero-Longo & al. 2015), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Piervittori & al. 2001, Watson 2014), **Emil**.

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 4-5, X: 4, E: 1/ Alt: 4-5/ Alp: rc, Salp: r/ PT: 1/ Note: on steeply inclined surfaces of wind-exposed, hard siliceous rocks in upland areas.

Pachnolepia A. Massal.

Framm. Lichenogr.: 6, 1855.

The molecular analysis of the Arthoniales published by Frisch & al. (2014) showed that the genus *Arthonia*, in the traditional circumscription, is polyphyletic. *Pachnolepia* was resurrected to accommodate a single species which does not belong to *Arthonia s.str.* Type: *P. impolita* (Hoffm.) A. Massal. (= *P. pruinata*).

Pachnolepia pruinata (Pers.) Frisch & G. Thor

in Frisch & al., Taxon, 63: 740, 2014 - *Patellaria pruinata* Pers., Ann. Bot. (Usteri), 1: 28, 1794.

Syn.: *Arthonia algarbica* Samp., *Arthonia impolita* (Hoffm.) Borrer, *Arthonia pruinosa* Ach., *Arthonia pruinosa* var. *spilomatica* Linds., *Arthonia pruinata* (Pers.) A.L. Sm., *Pachnolepia impolita* (Ehrh.) A. Massal.

N - **Ven** (Nascimbene & Marini 2010), **Lomb**, **Emil** (Nimis & al. 1996), **Lig**, **C** - **Tosc**, **Umb** (Genovesi & al. 2001, Ravera & al. 2006), **Laz**, **Sar** (Zedda 2002), **S** - **Camp**, **Pugl** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996, Puntillo & Puntillo 2004, Incerti & Nimis 2006), **Si** (Nimis & al. 1994).

Cr/ Tr/ S/ Epiph/ pH: 1-2, L: 3-4, X: 2, E: 1/ Alt: 1-2/ SmedD: er, SmedH: vr, MedH: er/ PT: 0/ suboc, u/ Note: a mild-temperate lichen found on isolated, old deciduous trees, especially oaks, in parts of the boles seldom wetted by rain, restricted to humid areas; presently extremely rare in northern Italy, more frequent in Tyrrhenian Italy. The record from Venezia Giulia cited by Nimis (1993: 82) was due to a misidentification. The species is included in the Italian red list of epiphytic lichens as "Near-threatened" (Nascimbene & al. 2013c).

Pannaria Bory

Delise ex Bory, Dict. Class. Hist. Nat., 13: 20, 1828.

This genus of the Pannariaceae including c. 50 species, is recognised by a squamulose or foliose thallus, apothecia with a thalline margin, an amyloid hymenium, asci without internal amyloid apical structures, and the presence of pannarin and related substances. For further details see Ekman & al. (2014). Type: *P. rubiginosa* (Ach.) Bory

Pannaria conoplea (Ach.) Bory

Dict. Class. Hist. Nat., 13: 20, 1828 - *Parmelia conoplea* Ach., Lichenogr. Univ.: 467, 1810.

Syn.: *Pannaria coeruleobadia* (Schleich.) A. Massal., *Pannaria lanuginosa* auct., *Pannaria pityrea sensu* Degel. non (DC.) Degel., *Pannaria rubiginosa* var. *conoplea* (Ach.) Körb., *Pannaria rubiginosa* var. *lanuginosa* auct. non (Hoffm.) Zahlbr., *Trachyderma coeruleobadium* (Schleich.) Trevis.

N - **Frl** (Tretiach & Carvalho 1995, Nascimbene & al. 1998), **Ven** (Caniglia & al. 1999, Nascimbene & al. 2007, 2009c, 2010b), **TAA** (Nascimbene 2005b, Nascimbene & al. 2007b, Nimis & al. 2015), **Lomb** (Dalle Vedove & al. 2004), **Piem** (Isocrono & al. 2004, Morisi 2005), **VA** (Piervittori & Isocrono 1999), **Emil** (Tretiach & al. 2008), **Lig** (Brunialti & al. 1999, Watson 2014), **C** - **Tosc** (Putorti & Loppi 1999b, Tretiach & al. 2008), **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera 1998, Ravera & al. 2006), **Laz** (Genovesi & al. 2008, Ravera & Genovesi 2008), **Abr** (Nimis & Tretiach 1999), **Mol** (Ravera & Genovesi 2012), **Sar**, **S** - **Camp** (Garofalo & al. 2010, Catalano & al. 2016), **Pugl**, **Bas** (Potenza 2006, Potenza & Fascetti 2010, 2012, Brackel 2011), **Cal** (Puntillo 1996, Incerti & Nimis 2006), **Si** (Stofer 2006).

Fol.n/ Cy.h/ S/ Epiph/ pH: 2-3, L: 3, X: 1, E: 1/ Alt: 1-3/ Mont: er, SmedH: er, MedH: er/ PT: 0/ suboc/ Note: a *Lobarion*-species, most common on mossy bark in open, humid forests, sometimes on mossy siliceous rocks; declining, especially in northern Italy. It is included in the Italian red list of epiphytic lichens as "Near-threatened" (Nascimbene & al. 2013c).

Pannaria hookeri (Sm.) Nyl.

Mém. Soc. Imp. Sc. Nat. Cherbourg, 5: 109, 1858 - *Lichen hookeri* Borrer ex Sm. in Smith & Sowerby, English Bot., 32: 2283, 1811.

Syn.: *Pannaria hookeri* var. *macrior* Th. Fr., *Pannaria glacialis* Anzi, *Pannaria leucolepis* (Wahlenb.) Nyl.

N - **Frl** (Tretiach & Hafellner 2000), **TAA**, **Lomb**, **Piem** (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999).

Sq/ Cy.h/ S/ Sax-Terr/ pH: 2-3, L: 3-4, X: 2, E: 1/ Alt: 4-5/ Alp: vr, Salp: r/ PT: 1/ Note: on slightly calciferous soil (mostly deriving from metamorphic rocks) in sites with periodical water seepage, sometimes also directly on rock, with optimum near treeline; probably restricted to the Alps in Italy.

Pannaria rubiginosa (Ach.) Bory

Dict. Class. Hist. Nat., 13: 20, 1828 - *Lichen rubiginosus* Ach., Lichenogr. Suec. Prodr.: 99, 1799.

Syn.: *Lichen affinis* Dicks., *Lichen squamosus* Hoffm. nom. illegit., *Parmelia rubiginosa* (Ach.) Ach.

N - Frl (TSB 32724), **Ven** (Nascimbene & Marini 2010), **TAA** (Nascimbene & al. 2007b, Nimis & al. 2015), **Lomb, VA, Emil, Lig, C - Tosc, Marc, Sar** (Rizzi & al. 2011), **S - Bas** (Potenza 2006, Potenza & Fascetti 2012), **Cal** (Puntillo 1996), **Si** (Merlo 2004).

Fol.n/ Cy.h/ S/ Epiph/ pH: 3, L: 3, X: 1-2, E: 1/ Alt: 1-2/ SmedD: er, SmedH: er, MedH: er/ PT: 0/ oc/ Note: restricted to rainy-humid areas, mostly on old mossy trunks in forests, and strongly declining, especially in northern Italy. The species is included in the Italian red list of epiphytic lichens as "Near-threatened" (Nascimbene & al. 2013c).

Pannaria tavaresii P.M. Jørg.

Opera Bot., 45: 68, 1978.

Syn.: *Pannaria rubiginosa* f. *isidiosa* Tav.

N - Emil (Tretiach & al. 2008), **C - Sar, S - Cal** (Puntillo 1996).

Sq/ Cy.h/ A.s/ Epiph/ pH: 2-3, L: 3-4, X: 1-2, E: 1/ Alt: 1-3/ Mont: er, SmedH: er, MedH: er/ PT: 0/ oc/ Note: a southwestern species in Europe, restricted to *Lobarion* communities in humid forests. It is included in the Italian red list of epiphytic lichens as "Vulnerable" (Nascimbene & al. 2013c).

Parabagliettoa Gueidan & Cl. Roux
in Gueidan & al., Taxon, 58: 194, 2009.

Recent molecular phylogenetic analyses and morphological studies have shown that it is necessary to revise the traditional morphology-based generic delineation of the Verrucariaceae in order to account for evolutionary relatedness between species. According to Gueidan & al. (2009) *Parabagliettoa* is sister to *Bagliettoa*, differing mainly by the thallus having a pseudocortex (in opposition to the well differentiated lithocortex in *Bagliettoa*), and superficial perithecia with an involucrellum that is not radially split. The genus includes so far 3 species only, all of which do occur in Italy, but several species of *Verrucaria* will be likely added to this genus in the future. See also notes on *Verrucaria ampezzana*, *V. nidulifera*, and *V. ornata*. Type: *P. dufourii* (DC.) Gueidan & Cl. Roux

Parabagliettoa cyanea (A. Massal.) Gueidan & Cl. Roux

Taxon, 58: 195, 2009 - *Verrucaria cyanea* A. Massal., Mem. Lichenogr.: 144, 1853.

Syn.: *Involucrothele limitata* (Nyl.) Servít, *Thelidium limitatum* (Nyl.) Servít, *Verrucaria decussata* Garov., *Verrucaria limitata* (Nyl.) Kremp.

N - VG, Frl (TSB 3746), **Ven** (Lazzarin 2000b, Watson 2014), **TAA, Lomb, Piem** (Isocrono & al. 2004), **Emil** (Bouvet 2008), **Lig, C - Tosc** (Benespero 2006), **Laz** (Nimis & Tretiach 2004), **Mol** (Garofalo & al. 1999, Genovesi & Ravera 2014), **Sar, S - Camp** (Garofalo & al. 1999, 2010, Aprile & al. 2003b), **Pugl** (Nimis & Tretiach 1999), **Si** (Nimis & al. 1994, Caniglia & Grillo 2005, 2006, Grillo & al. 2007b, Liistro & Cataldo 2011).

Cr.end/ Ch/ S/ Sax/ pH: 4-5, L: 2-3, X: 2-3, E: 1/ Alt: 1-3/ Mont: rc, SmedD: r, SmedH: rr, MedH: vr/ PT: 1/ Note: on steeply inclined surfaces of compact limestone and dolomite in sheltered situations; optima in the submediterranean belt (in northern Italy), and in the montane belt (in southern Italy), much rarer, and mostly coastal, in shaded-humid situations of the eu-Mediterranean belt. The species differs from *P. dufourii* in the smaller, less prominent perithecia, and the thalli typically in a mosaic with conspecific thalli, separated by dark lines; the lines produced by one thallus typically do not merge completely with that of its neighbour, so the lines often appear double (Orange 2013).

Parabagliettoa disjuncta (Arnold) Krzewicka

Polish Bot. Stud., 27: 28, 2012 - *Verrucaria disjuncta* Arnold, Flora, 47: 599, 1864.

Syn.: *Lithocia tristis* f. *depauperata* A. Massal., *Verrucaria tristis* f. *acrustacea* Asta, Clauzade & Cl. Roux nom. inval., *Verrucaria tristis* f. *depauperata* (A. Massal.) A. Massal.

N - Ven.

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 3-4, X: 3-4, E: 1-2/ Alt: 4-5/ Alp: r, Salp: r/ PT: 1/ #/ Note: a formerly very poorly understood species growing on inclined to vertical surfaces of calcareous rocks, probably much more widespread in the Alps. For further details see Breuss & Berger (2010).

Parabagliettoa dufourii (DC.) Gueidan & Cl. Roux

Taxon, 58: 195, 2009 - *Verrucaria dufourii* DC. in Lamarck & de Candolle, Fl. Franç., éd. 3, 2: 318, 1805.

Syn.: *Involucrothele concinna* (Borrer) Servít, *Involucrothele dufourii* (DC.) Servít, *Verrucaria concinna* Borrer, *Verrucaria corcontica* Servít, *Verrucaria dufourii* var. *orbicularis* A. Massal., *Verrucaria malhamensis* Nyl.

N - VG, Frl (Breuss 2008), **Ven** (Lazzarin 2000b, Nascimbene & Marini 2007), **TAA** (Nascimbene & al. 2007b, Spitale & Nascimbene 2012), **Lomb** (De Vita & Valcuvia 2004), **Piem** (Isocrono & al. 2004), **Emil, Lig** (Giordani & al. 2016), **C - Tosc, Laz** (Nimis & Tretiach 2004), **Abr** (Nimis & Tretiach 1999), **S - Camp** (Nimis & Tretiach 2004), **Pugl** (Nimis & Tretiach 1999), **Si** (Grillo 1998, Grillo & al. 2001, 2009, Grillo & Caniglia 2004, Caniglia & Grillo 2005, 2006).

Cr.end/ Ch/ S/ Sax/ pH: 4-5, L: 3, X: 2-3, E: 1-2/ Alt: 1-5/ Alp: er, Salp: r, Orom: vr, Mont: rr, SmedD: r, SmedH: vr, MedH: er/ PT: 1/ Note: on steeply inclined surfaces of hard calcareous rocks, mainly limestone, in rather shaded situations, with a wide altitudinal range, reaching the eu-Mediterranean belt in particularly humid and shaded stands.

Paracollema Otálora & Wedin
in Otálora & al., Fungal Divers., 64: 288, 2014.

This small genus of 2 species, recently created to accommodate the *Collema italicum*-group, is distinguished from other Collemataceae by the very small asci and spores (see Otálora & al. 2014). Type: *P. italicum* (B. de Lesd.) Otálora, P.M. Jørg. & Wedin

Paracollema italicum (B. de Lesd.) Otálora, P.M. Jørg. & Wedin

Fungal Divers., 64: 288, 2014 - *Collema italicum* B. de Lesd., Bull. Soc. Bot. France, 84: 282, 1937.

N - **Lig** (Ravera & Giordani 2007, 2008). **C** - **Laz** (Ravera 2001, Massari & Ravera 2002, Ravera & Giordani 2007, 2008). **S** - **Pugl** (Brackel 2011).

Fol.n/ Cy.h/ S/ Epiph/ pH: 2-3, L: 4, X: 2-3, E: 1-2/ Alt: 1-2/ SmedH: er, MedH: er/ PT: 1/ suboc/ Note: a mild-temperate, Mediterranean-Atlantic species restricted to a few humid sites in Tyrrhenian Italy and the Gargano Peninsula, on trees such as *Olea* and *Quercus ilex*. It is included in the Italian red list of epiphytic lichens as "Endangered" (Nascimbene & al. 2013c).

Parainoa Resl & T. Sprib.
in Resl & al., Fungal Divers., 73: 254, 2015.

This monotypic genus was recently created to accommodate a formerly misunderstood species of *Trapelia*. The genus, likely to belong in the Baeomycetaceae, is similar to *Ainoa* but differs in containing depsidones; it is also similar to *Baeomyces* but differs in the complete lack of a differentiated, extended hypothecial stalk for the ascumata. For further details see Resl & al. (2015). Type: *P. subconcolor* (Anzi) Resl & T. Sprib.

Parainoa subconcolor (Anzi) Resl & T. Sprib.

in Resl & al., Fungal Divers., 73: 254, 2015 - *Biatora subconcolor* Anzi, Comm. Soc. Critt. Ital., 1, 3: 151, 1862.

Syn.: *Lecidea subconcolor* (Anzi) Jatta, *Trapelia subconcolor* (Anzi) Hertel, *Trapeliopsis subconcolor* (Anzi) Hertel

N - **TAA, Lomb** (Resl & al. 2015).

Cr/ Ch/ S/ Sax/ pH: 3, L: 3, X: 2, E: 1/ Alt: 3-4/ Salp: er, Mont: vr/ PT: 1/ Note: a rarely-collected subtropical species found on basic siliceous rocks in sheltered situations, mostly in upland areas.

Paralecanographa Ertz & Tehler
Fungal Divers., 49: 57, 2011.

Due to the unusual high level of homoplasy in morphological and chemical characters, Ertz & Tehler (2011) found that these were of limited use in delimiting taxonomic groups in Arthoniales. The new genus *Paralecanographa* was created to accommodate a single species which is not related to *Lecanographa s.str.*, and which belongs instead to the Opegraphaceae. Type: *P. grumulosa* (Dufour) Ertz & Tehler

Paralecanographa grumulosa (Dufour) Ertz & Tehler

Fungal Divers., 49: 57, 2011 - *Opegrapha grumulosa* Dufour, J. Phys. Chém. Hist. Nat., 87: 214, 1813.

Syn.: *Chiodecton spilocarpum* Nyl., *Ingaderia troglodytica* Feige & Lumbsch, *Lecanactis dilleniana* var. *monstrosa* (Bagl.) Jatta, *Lecanactis dilleniana* var. *subfumosa* (Jatta) Jatta, *Lecanactis grumulosa* (Dufour) Fr., *Lecanactis grumulosa* var. *monstrosa* (Bagl.) Grummann, *Lecanactis monstrosa* Bagl., *Lecanactis nothiza* (Nyl.) P. James, *Lecanactis pictonica* (Nyl.) H. Olivier, *Lecanographa grumulosa* (Dufour) Egea & Torrente, *Opegrapha cavernicola* Llimona & Werner, *Opegrapha diaphoroides* Nyl. non auct., *Opegrapha dirinaria* (Nyl.) Nyl., *Opegrapha grumulosa* var. *dirinaria* Nyl., *Opegrapha grumulosa* var. *platycarpa* Nyl., *Opegrapha platycarpa* (Nyl.) Nyl.

N - **Ven** (Brackel 2016), **Lomb** (Brackel 2016), **Lig** (Brackel 2016). **C** - **Tosc** (Benesperi & al. 2006b, Brackel 2016), **Laz** (Brackel 2016), **Sar** (Monte 1993, Feige & Lumbsch 1993, Brackel 2016). **S** - **Camp** (Nimis & Tretiach 2004, Garofalo & al. 2010, Brackel 2016), **Pugl** (Nimis & Tretiach 1999), **Bas** (Bartoli & Puntillo 1998, Brackel 2016), **Cal** (Puntillo 1996, Brackel 2016), **Si** (Vězda Lich.Rar.Exs. 65, Feige & Lumbsch 1993, Nimis & al. 1994, Ottonello & Salone 1994, Ottonello & al. 1994, 2011, Lich. Graec 9: Obermayer 1995, Gianguzzi & al. 2009, Grillo & al. 2009b, Hafellner 2009, Brackel 2016).

LF/ / S/ Sax/ pH: 3-5, L: 2-4, X: 1-2, E: 1-2/ Alt: 1-2/ SmedD: er, SmedH: er, MedH: vc, MedD: rc/ PT: 1/ suboc, coast, paras *Dirina* and *Roccella*, u/ Note: on steeply inclined to underhanging surfaces of more or less calcareous cliffs subject to humid maritime winds in rather shaded situations, starting as a lichenicolous fungus, later probably developing an own thallus. It sometimes forms long, fruticose outgrowths which look like a different lichen, previously called *Ingaderia troglodytica* (see Ertz & Tehler 2011).

Parmelia Ach.
Meth. Lich., 33: 153, 1803, *nom. cons.*

The genus *Parmelia s.str.* in the Parmeliaceae comprises c. 50 species, mostly restricted to the Northern Hemisphere (see Crespo & al. 2010). In recent times, several cryptic species were newly described, also from

Europe (see e.g. Feuerer & Thell 2002, Molina & al. 2004, Divakar & al. 2005), which are not always easy to identify without molecular data, and whose status will be better judged on the basis of more comprehensive sampling. Italian material needs revision, since it is probable that several of the newly recognised species do occur in Italy. Type: *P. saxatilis* (L.) Ach. The name is conserved against *Lichen* L. (1753).

Parmelia barrenoae Divakar, M.C. Molina & A. Crespo
Lichenologist, 37: 43, 2005.

C - **Mol** (Ravera & Genovesi 2012, Genovesi & Ravera 2014).

Fol.b/ Ch/ A.s/ Epiph/ pH: 1-3, L: 3-5, X: 2-3, E: 1-3/ Alt: 2-3/ Mont: r, SmedD: r, Pad: r, SmedH: r/ PT: 1-3/ Note: mostly epiphytic, more rarely on siliceous rocks; the distribution in Italy is very poorly known because it was almost never distinguished from *P. sulcata*.

Parmelia ernstiae Feuerer & A. Thell

Mitt. Inst. allg. Bot. Hamburg, 30-32: 52, 2002.

C - **Abr** (Corona & al. 2016). **S - Si** (B 60 0174204, det. H. Sipman).

Fol.b/ Ch/ A.i/ Epiph-Sax/ pH: 1-2, L: 3-4, X: 2-3, E: 1-3/ Alt: 1-3/ Mont: vr, SmedD: vr, SmedH: vr, MedH: vr/ PT: 1/ Note: this mainly epiphytic species differs from *P. saxatilis* in the strongly pruinose thallus and isidia, and in molecular characters; the species is likely to be more widespread in Italy. The sample from Sicily was collected on Mt. Etna, near Zafferana Etnea, on *Quercus* and *Pinus*.

Parmelia omphalodes (L.) Ach.

Meth. Lich.: 204, 1803 - *Lichen omphalodes* L., Sp. Pl.: 1143, 1753.

Syn.: *Imbricaria saxatilis* var. *omphalodes* (L.) Körb., *Parmelia insensitiva* Anders, *Parmelia saxatilis* var. *omphalodes* (L.) Fr.

N - Frl, Ven (Nimis 1994), **TAA** (Caniglia & al. 2002, Nascimbene & Caniglia 2002c, Nascimbene & al. 2006e, Thor & Nascimbene 2007), **Lomb** (Dalle Vedove & al. 2004), **Piem** (Isocrono & Falletti 1999, Piervittori 2003), **VA** (Piervittori & Isocrono 1999, Piervittori & al. 2001), **Emil, Lig** (Giordani & al. 2009). **C - Tosc** (Benespero & al. 2007), **Umb** (Ravera & al. 2006), **Sar** (Nöske 2000). **S - Cal** (Puntillo 1996), **Si** (Grillo 1998, Czeuczuga & al. 1999, Grillo & Caniglia 2004).

Fol.b/ Ch/ A.f/ Sax/ pH: 1-2, L: 3-5, X: 3, E: 1-2/ Alt: 3-6/ Alp: rc, Salp: vc, Orom: vr, Mont: er/ PT: 1/ Note: an arctic-alpine, circumpolar lichen found on rocks, epilithic bryophytes, more rarely on soil, mostly near or above treeline; common in the Alps, where it can reach the nival belt, less common in the mountains of southern Italy, and rarer in the highest peaks of the Apennines for the scarcity of suitable substrata; the record from Umbria by Panfili (2000) is dubious. The Italian material should be checked against *P. omphalodes* subsp. *pinnatifida* (Kurok.) Skult, which was reported from the Alps outside Italy, and against *Parmelia discordans* Nyl. [Syn.: *Parmelia omphalodes* var. *discordans* (Nyl.) H. Magn.], both of which do occur in the Alps outside Italy.

Parmelia saxatilis (L.) Ach.

Meth. Lich.: 204, 1803 - *Lichen saxatilis* L., Sp. Pl.: 1142, 1753.

Syn.: *Imbricaria saxatilis* (L.) Körb., *Parmelia saxatilis* f. *rubricosa* J. Steiner, *Parmelia saxatilis* var. *laciniata* Erichsen, *Parmelia saxatilis* var. *laevis* Nyl., *Parmelia saxatilis* var. *pseudoviridis* Gyeln., *Parmelia saxatilis* var. *retiruga* (DC.) Th. Fr.

N - VG (Castello 2002, Martellos & Castello 2004, Castello & Skert 2005), **Frl** (Badin & Nimis 1996, Hafellner 1998, Tretiach & Hafellner 2000, Giordani & al. 2003b, Tretiach & Molaro 2007, Tomasi 2007), **Ven** (Philippi 1983, Nascimbene & Caniglia 1997, 2000b, 2002c, 2003c, Lazzarin 1997, Caniglia & al. 1999, Nascimbene 2005c, 2008c, 2011, Nascimbene & al. 2005b, 2006, 2006c, 2006e, 2007, 2009c, 2010b, 2013b, Thor & Nascimbene 2007, Nascimbene & Marini 2007, Brackel 2013), **TAA** (Nascimbene & Caniglia 2000b, 2002c, Caniglia & al. 2002, Nascimbene 2003, 2005b, 2006b, 2006c, 2008b, 2013, 2014, 2014c, Nascimbene & al. 2006e, 2007b, 2008c, 2009, 2010, 2014, Stofer 2006, Lang 2009, Nascimbene & Marini 2015, Nimis & al. 2015), **Lomb** (Rivellini 1994, Arosio & Rinaldi 1995, Zocchi & al. 1997, Hafellner 1998, Arosio & al. 2003, Valcuvia & al. 2003, Dalle Vedove & al. 2004, Nascimbene & al. 2006e, Brackel 2010, Gheza & al. 2015), **Piem** (Morisi & Sereno 1995, Clerc & al. 1999, Isocrono & Falletti 1999, Isocrono & al. 2003, Piervittori 2003, Morisi 2005, Isocrono & Piervittori 2008, Furlanetto 2010, Matteucci & al. 2010, Favero-Longo & al. 2015, Giordani & Malaspina 2016), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Ghiraldi 2003, Isocrono & al. 2005, 2006, Matteucci & al. 2008, 2105c, Isocrono & al. 2008, Favero-Longo & Piervittori 2009, Loppi 2014), **Emil** (Dalle Vedove & al. 2002, Tretiach & al. 2008, Benespero 2009, Brackel 2015), **Lig** (Castello & al. 1994, Brunialti & al. 1999, Putorti & al. 1999b, Giordani & al. 2001, 2002, 2003b, Brunialti & Giordani 2003, Modenesi & al. 2003, Minganti & al. 2003, Giordani 2006). **C - Tosc** (Tretiach & Nimis 1994, Loppi & Putorti 1995b, Loppi & De Dominicis 1996b, Loppi & al. 1997b, 1999a, Putorti & Loppi 1999, 1999b, Putorti & al. 1999, Tretiach & Ganis 1999, Laganà & al. 2002, 2004c, Baruffo & Tretiach 2005, Benespero 2006, 2011, Benespero & al. 2007, Tretiach & al. 2008, Brunialti & Frati 2010, Paoli & al. 2012, Brackel 2015, Nascimbene & al. 2015), **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera 1998, Ravera & al. 2006, Panfili 2007), **Laz** (Ravera 2002, Massari & Ravera 2002, Ravera & Genovesi 2008, Brackel 2015), **Abr** (Nimis & Tretiach 1999, Stofer 2006, Corona & al. 2016), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008, Ravera & al. 2010, Genovesi & Ravera 2014), **Sar** (Monte 1993, Zedda 1995, 2002b, Nöske 2000, Loi & al. 2000, Rizzi & al. 2011, Cossu 2013). **S - Camp** (Garofalo & al. 1999, 2010, Ricciardi & al. 2000, Aprile & al. 2002, 2003, 2003b, Nimis & Tretiach 2004, Brunialti & al. 2010, 2013, Nascimbene & al. 2010b, Ravera & Brunialti 2013, Catalano & al. 2016), **Pugl** (Nimis & Tretiach 1999, Brackel 2011), **Bas** (Nimis & Tretiach 1999, Potenza 2006, Brackel 2011), **Cal** (Puntillo 1995, 1996, van den Boom & Giralt 2002, Incerti & Nimis 2006, Stofer 2006, Brackel & Puntillo 2016), **Si** (Czeuczuga & al. 1994, 1999, Grillo & al. 1996, 1996b,

Ottonello & Romano 1997, Grillo 1998, Poli & Grillo 2000, Merlo 2004, Grillo & Caniglia 2004, 2006, Falco Scampatelli 2005, Stofer 2006, Brackel 2008b, 2008c).

Fol.b/ Ch/ A.i/ Epiph-Sax/ pH: 1-2, L: 3-4, X: 2-3, E: 1-3/ Alt: 1-5/ Alp: r, Salp: rc, Orom: rr, Mont: c, SmedD: r, SmedH: rr, MedH: er/ PT: 1-2/ a often collected, mainly saxicolous lichen occurring in large parts of the World, which for centuries has been regarded as a well delimited species. Recently, however, it has been found that some morphologically deviating specimens may be regarded as distinct species, such as *P. ernstiae*, *P. serrana* and *P. squarrosa*. *P. saxatilis* s.str. is certainly widespread throughout Italy, but Italian material needs revision.

Parmelia serrana A. Crespo, M.C. Molina & D. Hawksw.

in Molina & al., Lichenologist, 36: 48, 2004.

N - **Frl** (LD-1256370)

Fol.b/ Ch/ A.i/ Epiph-Sax/ pH: 1-2, L: 3-4, X: 2-3, E: 1-3/ Alt: 3/ Mont: vr/ PT: 1/ Note: this species, which is morphologically very similar to *P. saxatilis*, seems to be widespread in southern Europe, especially in areas with a subcontinental climate. The Italian samples, collected by Hruby at Raibl near Tarvisio, were identified by G. Thor.

Parmelia squarrosa Hale

Phytologia, 22: 29, 1971.

N - **Frl** (Nimis 2015).

Fol.b/ Ch/ A.i/ Epiph/ pH: 1-2, L: 2-3, X: 1-2, E: 1/ Alt: 3/ Mont: er/ PT: 1/ suboc/ Note: this species, which is fairly common in North America and in Japan, also occurs, albeit rarely, in very humid beech forests of the Alps. The only known Italian station is a humid montane forest hosting several extremely rare lichens with suboceanic affinities, such as *Thelotrema suecicum* and *Usnea longissima*.

Parmelia submontana Hale

Smithsonian Contr. Bot., 66: 44, 1987.

Syn.: *Parmelia bohemica* Nád. non Gyeln., *Parmelia contorta* Bory non (Hoffm.) Spreng., *Parmelia saxatilis* var. *contorta* (Bory) Zahlbr., *Parmelia sulcata* var. *contorta* ("Bory") Nyl., *Parmelia sulcata* var. *contortoides* Zahlbr.

N - **Frl** (Nascimbene & al. 1998), **Ven** (Caniglia & al. 1999, Nascimbene & Caniglia 2000, 2000b, 2003c, Nascimbene 2005c, 2008c, Thor & Nascimbene 2007, Nascimbene & al. 2009c, 2010b, 2013b), **TAA** (Nascimbene & Caniglia 2000, 2000b, Nascimbene 2005b, 2008b, Nascimbene & al. 2007b, Nimis & al. 2015), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999), **Emil** (Dalle Vedove & al. 2002, Tretiach & al. 2008, Benesperi 2009), **Lig** (Brunialti & al. 1999, Giordani & al. 2002). **C - Tose** (Tretiach & Nimis 1994, Tretiach & Ganis 1999, Putorti & al. 1999, Benesperi 2006, 2011, Benesperi & al. 2007, Brackel 2015, Nascimbene & al. 2015), **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera 1998, Ravera & al. 2006), **Laz** (Ravera 2001, Massari & Ravera 2002, Nimis & Tretiach 2004, Brackel 2015), **Abr** (Nimis & Tretiach 1999, Stofer 2006), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **Sar** (Zedda 1995, Nöske 2000, Zedda & al. 2001, Rizzi & al. 2011). **S - Camp** (Aprile & al. 2003b, Nascimbene & al. 2010b, Garofalo & al. 2010, Brunialti & al. 2013, Ravera & Brunialti 2013), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999, Potenza 2006, Potenza & al. 2010, Brackel 2011), **Cal** (Puntillo 1995, 1996), **Si** (Brackel 2008b).

Fol.b/ Ch/ A.i/ Epiph/ pH: 1-2, L: 3, X: 1-2, E: 1-2/ Alt: 3/ Mont: rr/ PT: 1/ Note: on the trunks of old trees (mainly *Fagus* and *Abies*) in humid montane forests; locally very abundant in beech forests of the Apennines, much rarer in the Alps.

Parmelia sulcata Taylor

in Mackay, Fl. Hibern., 2: 145, 1836.

Syn.: *Parmelia saxatilis* var. *sulcata* (Taylor) Linds., *Parmelia sulcata* var. *laevis* Nyl.

N - **VG** (Castello 1996, 2002, Carvalho 1997, Martellos & Castello 2004, Castello & Skert 2005), **Frl** (Badin & Nimis 1996, Tretiach 1996, Hafellner 1998, Giordani & al. 2003b, Castello & Skert 2005, Tretiach & Molaro 2007, Bernini & al. 2010, Bertuzzi & Tretiach 2013, Brackel 2013), **Ven** (Nimis & al. 1996c, Nascimbene & Caniglia 1997, 2000, 2002b, 2002c, 2003c, Lazzarin 1997, 2000, Caniglia & al. 1999, Valcuvia & al. 2000c, Nascimbene 2005c, 2008, 2008c, 2011, Nascimbene & al. 2005b, 2006, 2006c, 2006e, 2007, 2009c, 2010b, 2013b, Nascimbene & Marini 2007, 2010, Brackel 2013), **TAA** (Nascimbene & Caniglia 2000b, 2002c, Caniglia & al. 2002, Nascimbene 2001b, 2003, 2005b, 2006b, 2006c, 2008b, 2014, Gottardini & al. 2004, Nascimbene & al. 2006e, 2007b, 2009, 2010, 2014, Stofer 2006, Lang 2009, Brackel 2013, Nascimbene & Marini 2015, Nimis & al. 2015), **Lomb** (Philippi 1983, Rivellini 1994, Alessio & al. 1995, Arosio & Rinaldi 1995, Valcuvia & Gianatti 1995, Valcuvia & Brusoni 1996, Brusoni & al. 1997, Zocchi & al. 1997, Roella 1999, Brusoni & Valcuvia 2000, Casarini & al. 2000, Serio & al. 2001, Arosio & al. 2000, 2003, Valcuvia & al. 2003, Dalle Vedove & al. 2004, Chiappetta & al. 2005, Anderi & al. 2005, Stofer 2006, Nascimbene & al. 2006e, Bergamaschi & al. 2007, Furlanetto 2010, Brackel 2010, 2013, Gheza & al. 2015), **Piem** (Caniglia & al. 1992, Morisi & Sereno 1995, Modenesi & Piana 1998, Arosio & al. 1998, Piervittori 1998, 2003, Caviglia & Modenesi 1999, Clerc & al. 1999, Isocrono & Falletti 1999, Piervittori & al. 2001, Rizzio & al. 2001, Buzio 2003, Griselli & al. 2003, Giordani & al. 2003b, Castino 2004, Isocrono & al. 2004, 2005b, 2006, 2007, 2009, Morisi 2005, Isocrono & Piervittori 2008, Furlanetto 2010, Matteucci & al. 2010, Motiejūnaitė & Grochowski 2014, Giordani & Malaspina 2016), **VA** (Borlandelli & al. 1996, Piervittori & Maffei 1996, 2001, Piervittori & Isocrono 1997, 1999, Valcuvia & al. 2000b, Revel & al. 2001, Giordani & al. 2003b, Bergamaschi & al. 2004, Matteucci & al. 2008, 2008c, 2015c, Isocrono & al. 2008), **Emil** (Bassi 1995, Valcuvia & Grieco 1995, Gasparo & Tretiach 1996, Nimis & al. 1996, Crespo & al. 1997, Dalle Vedove & al. 2002, Marconi & al. 2006, Morselli & Regazzi 2006, Tretiach & al. 2008, Cioffi 2009, Benesperi 2009, Malavasi 2014, Gerdol & al. 2014, Brackel 2015), **Lig** (Castello & al. 1994, Brunialti & al. 1999, Putorti & al. 1999b, Valcuvia & al. 2000, Giordani & al. 2001, 2002, 2003b, Brunialti & Giordani 2003, Minganti & al. 2003, Modenesi & al. 2003, Giordani 2006). **C - Tose** (Loppi & al. 1992, 1995, 1996, 1996b, 1996c, 1997, 1997b, 1997e, 1997f, 1998, 1998b,

1999a, 1999b, 1999c, 2002, 2002b, 2002c, 2003, 2004, 2004c, 2006, Tretiach & Nimis 1994, Loppi & Corsini 1995, 2003, Loppi & Putorti 1995, 1995b, 2001, Loppi 1996, 1997, 1996b, 1998, Loppi & De Dominicis 1996b, Crespo & al. 1997, Monaci & al. 1997, Loppi & Nascimbene 1998, 2010, Putorti & Loppi 1999, 1999b, Tretiach & Ganis 1999, Tretiach & al. 1999, 2003b, 2013, Bacci & al. 2000, Baruffo 2000, Loppi & Bonini 2000, Loppi & Pirintzos 2000, Benesperi 2000a, 2011, Del Guasta 2001, Tretiach & Baruffo 2001c, Paoli & Loppi 2001, 2008, Laganà & al. 2002, Crisafulli & al. 2003, Lorenzini & al. 2003, Loppi & Frati 2004, Baruffo & Tretiach 2005, Bucci & al. 2006, Stofer 2006, Frati & al. 2007, Benesperi & al. 2007, Lastrucci & al. 2009, Pasquinelli & al. 2009, Brunialti & Frati 2010, Pasquinelli & Puccini 2010, Loppi & Baragatti 2011, Brunialti & al. 2012, 2012b, Paoli & al. 2012, 2012b, 2013, 2015d, Brackel 2015, Nascimbene & al. 2015), **Marc** (Gasparo & al. 1989, Nimis & Tretiach 1999, Frati & Brunialti 2006, Brackel 2015), **Umb** (Ravera 1998, 1999, Nimis & Tretiach 1999, Panfili 2000b, 2007, Ravera & al. 2006, Genovesi 2011, Brackel 2015), **Laz** (Gigante & Petriccione 1995, Bartoli & al. 1997, Ravera 2002, 2008b, Massari & Ravera 2002, Nimis & Tretiach 2004, Ruisi & al. 2005, Stofer 2006, Munzi & al. 2007, Ravera & Genovesi 2008, Zucconi & al. 2013, Brackel 2015), **Abr** (Recchia & al. 1993, Olivieri & al. 1997, 1997b, Loppi & al. 1999, Nimis & Tretiach 1999, Brackel 2015, Catalano & al. 2016, Corona & al. 2016), **Mol** (Garofalo & al. 1999, Caporale & al. 2008, Nimis & Tretiach 1999, Ravera & al. 2010, Genovesi & Ravera 2014, Brackel 2015, Paoli & al. 2015), **Sar** (Zedda 1995, 2002, 2002b, Crespo & al. 1997, Loi & al. 2000, Zedda & al. 2001, Piccotto & al. 2009, Rizzi & al. 2011, Cossu 2013), **S - Camp** (Crespo & al. 1997, Garofalo & al. 1999, 2010, Aprile & al. 2002, 2003, 2003b, 2011, Nimis & Tretiach 2004, Brunialti & al. 2010, 2013, Catalano & al. 2010, 2016, Nascimbene & al. 2010b), **Pugl** (Garofalo & al. 1999, Nimis & Tretiach 1999, Durini & Medagli 2004, Brackel 2011), **Bas** (Crespo & al. 1997, Nimis & Tretiach 1999, Potenza 2006, Brackel 2011), **Cal** (Puntillo 1995, 1996, van den Boom & Giralt 2002, Puntillo & Puntillo 2004, Incerti & Nimis 2006, Stofer 2006, Brackel & Puntillo 2016), **Si** (Czeczuga & al. 1994, Nimis & al. 1994, Ottonello & al. 1994, Grillo & Cristaudo 1995, Ottonello 1996, Ottonello & Romano 1997, Merlo 2004b, Grillo & Caniglia 2004, 2006, Caniglia & Grillo 2006b, Brackel 2008b, 2008c, Liistro & Cataldo 2011).

Fol.b/ Ch/ A.s/ Epiph/ pH: 1-3, L: 3-5, X: 2-3, E: 1-3/ Alt: 1-4/ Salp: rc, Orom: vr, Mont: ec, SmedD: vc, Pad: rr, SmedH: ec, MedH: r, MedD: vr/ PT: 1-3/ Note: on acid or subacid bark, exceptionally also on wood; this is certainly the most common and wide-ranging *Parmelia* in Italy, also present near large urban settlements in northern Italy, rare only in the eu-Mediterranean belt. See also note on *Parmelia barrenoae*.

Parmeliella Müll. Arg.

Mém. Soc. Phys. Hist. nat. Genève 16: 376, 1862.

This genus was originally established for squamulose members of the Pannariaceae with apothecia lacking a thalline margin. In later treatments it was restricted to species with an amyloid apical ring structure in the asci and a lack of lichen substances in the thallus. Even after the separation of *Degelia*, *Parmeliella* remained heterogeneous. After the segregation of several species by Ekman & al. (2014), *Parmeliella* can be retained as a monophyletic entity. In this circumscription, it is a mostly temperate genus of small-squamulose species, generally without chemical substances and apothecia without a thalline margin, but with an amyloid hymenium producing asci with an internal apical tube structure. Type: *P. triptophylla* (Ach.) Müll. Arg.

Parmeliella parvula P.M. Jørg.

Skr. Norske Vidensk.-Akad., Mat.-Naturv. Kl., N.S., 36: 19, 1977.

Syn.: *Parmeliella jamesii* Ahlner & P.M. Jørg.

C - Tosc.

Sq/ Cy.h/ S/ Epiph/ pH: 2-3, L: 3, X: 1-2, E: 1/ Alt: 1-2/ SmedH: er, MedH: er/ PT: 0/ oc/ Note: a mild-temperate to oceanic-boreal lichen, mainly corticolous on ancient trees in open, but very humid forests, but also found on silicicolous bryophytes. It is included in the Italian red list of epiphytic lichens as "Critically Endangered" (Nascimbene & al. 2013c).

Parmeliella testacea P.M. Jørg.

Opera Bot., 45: 70, 1978.

N - Lomb, Lig, C - Tosc (Loppi & al. 2002c, Benesperi & al. 2007, Tretiach & al. 2008, Loppi & Nascimbene 2010), **Umb** (Ravera 1998, Ravera & al. 2006), **Sar** (Zedda 2002), **S - Camp** (Nascimbene & al. 2010b, Garofalo & al. 2010, Ravera & Brunialti 2013), **Cal** (Puntillo 1996, Incerti & Nimis 2006).

Sq/ Cy.h/ A.s/ Epiph/ pH: 1-2, L: 3, X: 1-2, E: 1/ Alt: 1-3/ Mont: er, SmedD: er, SmedH: vr, MedH: er/ PT: 1/ suboc/ Note: a mild-temperate lichen found on bark of ancient deciduous trees in mature forests, mostly in old plantations of *Castanea*. It is included in the Italian red list of epiphytic lichens under the "Least Concern" category (Nascimbene & al. 2013c).

Parmeliella triptophylla (Ach.) Müll. Arg.

Mém. Soc. Phys. Hist. Nat. Genève, 16: 376, 1862 - *Lecidea triptophylla* Ach., K. Vetensk.-Akad. Nya Handl., 29: 272, 1808.

Syn.: *Lecanora triptophylla* (Ach.) Link, *Lecidea microphylla* var. *corallinoides* sensu Ach., *Lecidea microphylla* var. *schraderi* Schaer., *Pannaria lasiella* Stirt., *Pannaria triptophylla* (Ach.) A. Massal., *Pannaria triptophylla* f. *incrassata* Nyl., *Pannaria triptophylla* f. *xamia* A. Massal., *Parmeliella corallinoides* auct. non (Hoffm.) Zahlbr., *Parmeliella corallinoides* var. *nigrocarpa* Gyeln., *Parmeliella corallinoides* var. *pulvinata* H. Magn., *Trachyderma triptophyllum* var. *oryctogenum* Anzi

N - VG, Fri (Tretiach 1996, Nascimbene & al. 1998, Tretiach & Hafellner 2000), **Ven** (Lazzarin 2000b, Nascimbene & al. 2005b, 2006c, 2007, Nascimbene 2008c), **TAA** (Caniglia & al. 2002, Nascimbene & al. 2006e, 2007b), **Lomb, Piem** (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999), **Emil** (Brackel 2015), **Lig** (Brunialti & al. 1999, Giordani &

Brunialti 2000, Giordani & al. 2002, Brunialti & Giordani 2003). **C - Tosc** (Tretiach & Nimis 1994, Benesperi & al. 2007, Benesperi 2011, Brackel 2015), **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera 1998, Ravera & al. 2006), **Laz** (Ravera 2001, Massari & Ravera 2002, Brackel 2015), **Abr** (Corona & al. 2016), **Mol** (Paoli & al. 2015), **Sar. S - Camp** (Nimis & Tretiach 2004, Garofalo & al. 2010, Catalano & al. 2016), **Pugl, Bas** (Potenza & al. 2014), **Cal** (Puntillo 1996).

Cr/ Cy.h/ A.i/ Epiph-Sax/ pH: 2-3, L: 3, X: 1-2, E: 1/ Alt: 1-5/ Alp: er, Salp: vr, Mont: vr, SmedD: er, SmedH: vr, MedH: er/ PT: 1/ suboc/ Note: a widespread, cool-temperate to boreal-montane lichen found on old trees and upon epiphytic bryophytes in humid forests, sometimes also on mossy siliceous rocks, with a wide altitudinal range. It is included in the Italian red list of epiphytic lichens as "Near-threatened" (Nascimbene & al. 2013c).

Parmelina Hale

Phytologia, 28: 481, 1974.

This genus of the Parmeliaceae was introduced to accommodate grey-coloured *Parmelia s.lat.*-species with sparse marginal cilia, a black lower surface and an upper cortex with a palisade plectenchyma and a pored epicortex. In its original circumscription, the genus included a number of unrelated elements that were subsequently placed elsewhere. In its restricted sense, the genus has a centre of distribution in western North America and Europe. It currently includes c. 15 species distributed in the temperate regions of both Hemispheres. Argüello & al. (2007) found that *P. quercina*, as circumscribed by Hale (1976), comprises four species, two of which do occur in Europe: *P. quercina* in the strict sense (continental Europe) and *P. carporrhizans* (oceanic and suboceanic Europe, and Macaronesia). A third species, the saxicolous *P. atricha*, was added to the European flora by Clerc & Truong (2008). The Italian material needs revision. Type: *P. tiliacea* (Hoffm.) Hale

Parmelina atricha (Nyl.) P. Clerc

in Clerc & Truong, Sauteria, 15: 185, 2008 - *Parmelia atricha* Nyl., Bull. Soc. linn. Normandie, sér. 2, 6: 271, 1872.

Syn.: *Parmelia quercina* f. *saxicola* (Körb.) Zahlbr., *Parmelia quercina* var. *convoluta* (Schaer.) Zahlbr.

N - TAA (B 60 0197479 and B 60 0197480, det H. Sipman), **Lomb** (Anzi, Lich. Lang. 26: Clerc & Truong 2008).

Fol.b/ Ch/ S/ Sax/ pH: 1-2, L: 3-4, X: 3-4, E: 2-3/ Alt: 2-3/ Mont: er, SmedD: er/ PT: 1/ Note: a saxicolous species described from the Pyrenees, so far known from the eastern Pyrenees, southern France, northern Italy and southern Switzerland, with a mainly submediterranean-montane distribution (see Clerc & Truong 2008). It grows on siliceous rocks in more or less exposed, dry areas, with optimum in the montane belt.

Parmelina carporrhizans (Taylor) Poelt & Vězda

Bestimmungsschl. europ. Flechten: 183, 1977 - *Parmelia carporrhizans* Taylor, London J. Bot., 6: 163, 1847.

Syn.: *Parmelia quercina* var. *carporrhizans* (Taylor) V. Wirth, *Parmelia tiliacea* subsp. *carporrhizans* (Taylor) Nyl., *Parmelia tiliacea* var. *carporrhizans* (Taylor) Flagey

N - Fri, TAA, Piem, Emil (TSB 4802), **Lig** (Watson 2014). **C - Tosc, Laz, Mol** (TSB 26861), **Sar. S - Camp, Pugl, Bas** (Brackel 2011), **Cal, Si** (Ottonello 1996).

Fol.b/ Ch/ S/ Epiph/ pH: 2-3, L: 4-5, X: 3-4, E: 2-3/ Alt: 1-3/ Mont: r, SmedD: rc, Pad: er, SmedH: rc, MedH: rc, MedD: vr/ PT: 1-2/ Note: a mild-temperate to Mediterranean lichen found on isolated, mostly broad-leaved trees, more photo- and thermo-, and less hygrophytic than the closely related *P. pastillifera* and *P. tiliacea*. The species was not always distinguished from *P. quercina* in the Italian literature.

Parmelina pastillifera (Harm.) Hale

Smithsonian Contr. Bot., 33: 39, 1976 - *Parmelia scortea* var. *pastillifera* Harm., Lich. de France, 4: 558, 1910 ("1909").

Syn.: *Parmelia tiliacea* var. *pastillifera* (Harm.) Grunmann, *Parmelia pastillifera* (Harm.) R. Schub. & Klem.

N - VG, Fri (Badin & Nimis 1996, Tretiach & Molaro 2007), **Ven** (Nascimbene & Caniglia 1997, Lazzarin 1997, 2000, Caniglia & al. 1999, Nascimbene 2005c, 2008, Nascimbene & al. 2007, 2008c, 2009c, 2010b), **TAA** (Nascimbene 2003, 2008b, Nascimbene & al. 2007b, Nimis & al. 2015), **Lomb** (Arosio & Rinaldi 1995, Valcuvia & Brusoni 1996, Zocchi & al. 1997, Arosio & al. 2003, Valcuvia & al. 2003, Dalle Vedove & al. 2004, De Vita & Valcuvia 2004), **Piem** (Caniglia & al. 1992, Isocrono & Falletti 1999, Piervittori 2003, Isocrono & al. 2004, Modenesi & al. 2003, Griselli & al. 2003, Isocrono & Piervittori 2008), **VA** (Piervittori & Isocrono 1999, Valcuvia & al. 2000b), **Emil** (Nimis & al. 1996, Tretiach & al. 2008, Benesperi 2009, Brackel 2015), **Lig** (Brunialti & al. 1999, Giordani & al. 2002, Minganti & al. 2003, Brunialti & Giordani 2003, Giordani 2006, Watson 2014). **C - Tosc** (Tretiach & Nimis 1994, Loppi & Putorti 1995b, Loppi & al. 1997, 1999b, 2006, Loppi & Nascimbene 1998, 2010, Tretiach & Ganis 1999, Paoli & Loppi 2001, 2008, Benesperi 2006, 2011, Benesperi & al. 2007, Brunialti & Frati 2010, Paoli & al. 2012, Brackel 2015, Nascimbene & al. 2015), **Marc** (Nimis & Tretiach 1999, Frati & Brunialti 2006), **Umb** (Ravera 1998, Panfilo 2000, 2007, Ravera & al. 2006), **Laz** (Massari & Ravera 2002, Nimis & Tretiach 2004, Brackel 2015), **Abr** (Recchia & al. 1993, Olivieri & al. 1997, 1997b, Nimis & Tretiach 1999, Stofer 2006, Brackel 2015, Corona & al. 2016), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008, Brackel 2015), **Sar** (Zedda 1995, 2002, Zedda & al. 2001, Rizzi & al. 2011, Cossu 2013). **S - Camp** (Aprile & al. 2003, 2003b, Nimis & Tretiach 2004, Nascimbene & al. 2010b, Catalano & al. 2010, 2016, Garofalo & al. 2010, Brunialti & al. 2013, Ravera & Brunialti 2013), **Pugl** (Nimis & Tretiach 1999, Brackel 2011), **Bas** (Nimis &

Tretiach 1999, Potenza 2006, Brackel 2011), **Cal** (Puntillo 1995, 1996, Incerti & Nimis 2006), **Si** (Falco Scampatelli 2005, Stofer 2006, Brackel 2008b).

Fol.b/ Ch/ A.i/ Epiph/ pH: 2-3, L: 4, X: 2, E: 2-3/ Alt: 2-4/ Salp: er, Mont: rc, SmedD: r, Pad: er, SmedH: rr/ PT: 1-2/ suboc/ Note: a temperate lichen found on deciduous trees with subacid to subneutral bark, more frequent in rainy upland areas than *P. tiliacea*, but descending to the Mediterranean belt in humid regions, such as in Tyrrhenian Italy.

Parmelina quercina (Willd.) Hale

Phytologia, 28: 483, 1974 - *Lichen quercinus* Willd., Fl. Berol. Prodr.: 353, 1787.

Syn.: *Parmelia quercina* (Willd.) Vain.

N - VG (Castello 1996, Castello & Skert 2005), **Frl, Ven** (Caniglia & al. 1999, Nascimbene 2005c), **TAA** (Nascimbene 2003), **Lomb** (Zocchi & al. 1997, Arosio & al. 2003, Valcuvia & al. 2003, Furlanetto 2010), **Piem** (Piervittori 1998, 2003, Griselli & al. 2003, Isocrono & al. 2004, Morisi 2005, Furlanetto 2010, Matteucci & al. 2013, Giordani & Malaspina 2016), **VA** (Piervittori & Isocrono 1999, Matteucci & al. 2008c), **Emil** (Gasparo & Tretiach 1996, Benesperi 2009), **Lig** (Brunialti & al. 1999, Putortì & al. 1999b, Brunialti & Giordani 2000, 2003, Giordani & al. 2002, Giordani 2006). **C - Tosc** (Tretiach & Nimis 1994, Loppi & al. 1994, 1995, 1996b, 1997, 1997b, 1998, 2002, 2002c, 2003, 2006, Loppi 1996, Loppi & De Dominicis 1996, Loppi & Nascimbene 1998, 2010, Putortì & al. 1998, 1999, Putortì & Loppi 1999b, Loppi & Putortì 2001, Paoli & Loppi 2008, Brunialti & Frati 2010, Paoli & al. 2012, Brackel 2015), **Marc** (Nimis & Tretiach 1999, Frati & Brunialti 2006, Brackel 2015), **Umb** (Ravera 1998, Nimis & Tretiach 1999, Panfilo 2000, 2000b, 2007, Ravera & al. 2006, Zucconi & al. 2013, Brackel 2015), **Laz** (Massari & Ravera 2002, Nimis & Tretiach 2004, Ruisi & al. 2005, Ravera & Genovesi 2008, Brackel 2015), **Abr** (Recchia & al. 1993, Recchia & Villa 1996, Olivieri & al. 1997, 1997b, Loppi & al. 1999, Nimis & Tretiach 1999, Brackel 2015, Catalano & al. 2016, Corona & al. 2016), **Mol** (Garofalo & al. 1999, Nimis & Tretiach 1999, Caporale & al. 2008, Genovesi & Ravera 2014, Paoli & al. 2015), **Sar** (Zedda 1995, 2002, 2002b, Rizzi & al. 2011). **S - Camp** (Garofalo & al. 1999, 2010, Aprile & al. 2002, 2003, 2003b, 2011, Nimis & Tretiach 2004, Brunialti & al. 2013, Ravera & Brunialti 2013, Catalano & al. 2016), **Pugl** (Nimis & Tretiach 1999, Nascimbene & al. 2010b), **Bas** (Bartoli & Puntillo 1998, Nimis & Tretiach 1999, Potenza 2006, Brackel 2011), **Cal** (Puntillo 1996, Puntillo & Puntillo 2004, Incerti & Nimis 2006, Brackel & Puntillo 2016), **Si** (Ottonello & al. 1994, Nimis & al. 1994, 1995, Ottonello 1996, Czczuga & al. 1999, Grillo & Caniglia 2004, 2006, Brackel 2008b, 2008c).

Fol.b/ Ch/ S/ Epiph/ pH: 2-3, L: 4-5, X: 3-4, E: 2-3/ Alt: 1-3/ Mont: r, SmedD: rc, Pad: er, SmedH: rc, MedH: rc, MedD: vr/ PT: 1-2/ Note: a mild-temperate to Mediterranean lichen found on isolated, mostly broad-leaved trees; more photo- and thermo-, and less hygrophytic than *P. pastillifera* and *P. tiliacea*. See also note on *P. carporrhizans*.

Parmelina tiliacea (Hoffm.) Hale

Phytologia, 28: 481, 1974 - *Lichen tiliaceus* Hoffm., Enum. Lich.: 96, pl. 16, fig. 2, 1784.

Syn.: *Imbricaria tiliacea* (Hoffm.) Flot., *Imbricaria tiliacea* var. *aetnensis* Caruso, *Parmelia quercifolia* var. *scortea* f. *microphylla* A. Massal., *Parmelia scortea* (Ach.) Ach., *Parmelia tiliacea* (Hoffm.) Ach., *Parmelia tiliacea* var. *scortea* (Ach.) Duby

N - VG (Castello 1996, 2002, Martellos & Castello 2004, Castello & Skert 2005), **Frl** (Badin & Nimis 1996, Castello & Skert 2005, Tretiach & Molaro 2007, Núñez-Zapata & al. 2015), **Ven** (Nimis & al. 1996c, Nascimbene & Caniglia 1997, Caniglia & al. 1999, Lazzarin 2000, 2000b, Nascimbene 2005c, 2008, 2008c, Nascimbene & Marini 2010, Nascimbene & al. 2015), **TAA** (Gottardini & al. 2004, Nascimbene 2005b, 2006c, 2008b, 2014, Nascimbene & al. 2007b, 2014), **Lomb** (Arosio & Rinaldi 1995, Valcuvia & Gianatti 1995, Valcuvia & Brusoni 1996, Brusoni & al. 1997, Zocchi & al. 1997, Roella 1999, Arosio & al. 2000, 2003, Valcuvia & al. 2003, Dalle Vedove & al. 2004, De Vita & Valcuvia 2004, Anderi & al. 2005, Valcuvia & Truzzi 2007b, Zarabska & al. 2009, Furlanetto 2010, Brackel 2013, Gheza & al. 2015, Núñez-Zapata & al. 2015), **Piem** (Caniglia & al. 1992, Morisi & Sereno 1995, Arosio & al. 1998, Piervittori 1998, 2003, Isocrono & Falletti 1999, Griselli & al. 2003, Castino 2004, Isocrono & al. 2004, 2005b, 2006, 2007, Morisi 2005, Isocrono & Piervittori 2008, Furlanetto 2010, Matteucci & al. 2010, Giordani & Malaspina 2016), **VA** (Piervittori & Maffei 1996, 2001, Piervittori & Isocrono 1999, Valcuvia & al. 2000b, Piervittori & al. 2001, Matteucci & al. 2008, 2008c, Isocrono & al. 2008), **Emil** (Bassi 1995, Gasparo & Tretiach 1996, Nimis & al. 1996, Salles 2003, Marconi & al. 2006, Morselli & Regazzi 2006, Tretiach & al. 2008, Cioffi 2009, Benesperi 2009, Malavasi 2014, Gerdol & al. 2014), **Lig** (Castello & al. 1994, Brunialti & al. 1999, Putortì & al. 1999b, Valcuvia & al. 2000, Giordani & al. 2001, 2002, Brunialti & Giordani 2003, Giordani 2006). **C - Tosc** (Tretiach & Nimis 1994, Loppi & Corsini 1995, 2003, Loppi & Putortì 1995, 1995b, Loppi & al. 1995, 1996, 1996b, 1996c, 1997, 1997b, 1997e, 1998, 1998b, 1999a, 2002, 2002b, 2002c, 2003, 2004, 2006, Loppi 1996, Loppi & De Dominicis 1996, 1996b, Monaci & al. 1997, Pišút 1997, Loppi & Nascimbene 1998, 2010, Putortì & al. 1998, Putortì & Loppi 1999b, Benesperi 2000a, 2011, Senese & Critelli 2000, Del Guasta 2001, Paoli & Loppi 2001, 2008, Laganà & al. 2002, Lorenzini & al. 2003, Loppi & Frati 2004, Frati & al. 2006b, 2007, Benesperi & al. 2007, Lastrucci & al. 2009, Pasquinelli & al. 2009, Brunialti & Frati 2010, Pasquinelli & Puccini 2010, Loppi & Baragatti 2011, Brunialti & al. 2012, 2012b, Paoli & al. 2012, 2012b, 2013, 2015d, Brackel 2015, Núñez-Zapata & al. 2015, Nascimbene & al. 2015), **Marc** (Gasparo & al. 1989, Nimis & Tretiach 1999, Frati & Brunialti 2006, Brackel 2015), **Umb** (Ravera 1998, Nimis & Tretiach 1999, Putortì & Loppi 1999, Panfilo 2000b, 2007, Ravera & al. 2006, Ciotti & al. 2009, Brackel 2015), **Laz** (Gigante & Petriccione 1995, Bartoli & al. 1997, Ravera 2002, 2008b, Massari & Ravera 2002, Ruisi & al. 2005, Munzi & al. 2007, Ravera & Genovesi 2008, Genovesi & al. 2011, Zucconi & al. 2013, Brackel 2015), **Abr** (Recchia & al. 1993, Olivieri & Pacioni 1996, Olivieri & al. 1997, 1997b, Loppi & al. 1999, Nimis & Tretiach 1999, Stofer 2006, Brackel 2015, Catalano & al. 2016, Corona & al. 2016), **Mol** (Garofalo & al. 1999, Nimis & Tretiach 1999, Caporale & al. 2008, Genovesi & Ravera 2014, Paoli & al. 2015), **Sar** (Monte 1993, Zedda 1995, 2002, 2002b, Nöske 2000, Loi & al. 2000, Zedda & al. 2001, Piccotto & al. 2009, Piccotto & Tretiach 2010, Rizzi & al. 2011, Kodnik & al. 2011, Giordani & al. 2013, Cossu 2013, Cossu & al. 2015, Núñez-Zapata & al. 2015). **S - Camp** (Garofalo & al. 1999, 2010, Aprile & al. 2002, 2003b, 2011, Nimis & Tretiach 2004, Nascimbene & al. 2010b, Catalano & al. 2010, 2016, Brunialti & al. 2013, Ravera & Brunialti 2013), **Pugl** (Garofalo & al. 1999, Aprile & al. 2003, Durini & Medagli 2004, Nimis & Tretiach 1999, Brackel 2011), **Bas** (Bartoli & Puntillo 1998, Nimis

& Tretiach 1999, Potenza 2006, Paoli & al. 2006, Brackel 2011), **Cal** (Puntillo 1996, Puntillo & Puntillo 2004, Incerti & Nimis 2006, Stofer 2006, Brackel & Puntillo 2016), **Si** (Nimis & al. 1994, 1995, Ottonello & Salone 1994, Ottonello & al. 1994, Grillo & Cristaudo 1995, Ottonello 1996, Grillo 1996, Ottonello & Romano 1997, Grillo 1998, Czczuga & al. 1999, Grasso & al. 1999, Merlo 2004, 2004b, Grillo & Caniglia 2004, 2006, Caniglia & Grillo 2006b, Falco Scampatelli 2005, Stofer 2006, Brackel 2008b, 2008c, Grillo & Cataldo 2008, Liistro & Cataldo 2011).

Fol.b/ Ch/ A.i/ Epiph-Sax/ pH: 2, L: 3-4, X: 3, E: 2-3/ Alt: 1-4/ Salp: er, Mont: rc, SmedD: c, Pad: er, SmedH: vc, MedH: rc/ PT: 1-3/ Note: a mainly mild-temperate lichen mostly found on broad-leaved trees, sometimes on mossy rocks, rare only in somehow continental areas, such as along the eastern part of the Peninsula. In the continental Alpine valleys, however, *P. tiliacea* can be found on the North-exposed faces of isolated basic siliceous boulders. The occurrence of "epiphytic" lichen communities on N-exposed rocks, a rather common phenomenon in strongly continental areas of Eurasia (*e.g.* in parts of the Baykal region, *vidi*) is also typical of dry-continental Alpine valleys. An interesting molecular study on the genetic diversity and population structure of this species was published by Núñez-Zapata & al. (2015), showing that the highest genetical diversity is in the Canary Islands.

Parmeliopsis (Nyl.) Nyl.

Lich. Lapp. Orient.: 121, 1866 - *Parmelia* subgen. *Parmeliopsis* Nyl., Lichenes Scand.: 105, 1861.

This genus of the Parmeliaceae includes 3 species, mainly corticolous or lignicolous, from boreal and cold-temperate regions in the Northern Hemisphere and montane regions of the Southern Hemisphere. It is unique among parmelioid lichens for having richly branched conidiophores (see *e.g.* Crespo & al. 2010). Molecular evidence supports the treatment of the two taxa occurring in Italy as distinct species rather than as chemotypes (Tehler & Källersjö 2001). Type (conserved): *P. ambigua* (Hoffm.) Nyl.

Parmeliopsis ambigua (Hoffm.) Nyl.

Syn. Meth. Lich., 2: 54, 1863 - *Squamaria ambigua* Hoffm., Descr. Pl. Cl. Crypt., 2, 24: 56, 1794.

Syn.: *Foraminella ambigua* (Hoffm.) S.L.F. Mey., *Imbricaria diffusa auct.*, *Parmelia ambigua* (Hoffm.) Ach., *Parmelia diffusa auct. non* (Hoffm.) Sandst., *Parmelia diffusa var. ochromatica* Wallr., *Parmelia subsoredians* Nyl., *Parmeliopsis diffusa auct.*, *Parmeliopsis subsoredians* (Nyl.) Nyl.

N - Frl (Stofer 2006, Tretiach & Molaro 2007, Tomasi 2007), **Ven** (Nimis 1994, Nascimbene & Caniglia 1997, 2000b, 2002c, 2003c, Caniglia & al. 1999, Nascimbene 2005c, 2008, 2008c, 2011, Nascimbene & al. 2006e, 2009c, 2013b, Nascimbene & Marini 2007, Brackel 2013), **TAA** (Nascimbene & Caniglia 2000b, 2002c, Caniglia & al. 2002, Nascimbene 2003, 2005b, 2006b, 2006c, 2008b, 2014, Gottardini & al. 2004, Nascimbene & al. 2005, 2006, 2006e, 2007b, 2008c, 2009, 2010, 2014, Stofer 2006, Thor & Nascimbene 2007, Lang 2009, Brackel 2013, Nascimbene & Marini 2015, Nimis & al. 2015), **Lomb** (Rivellini 1994, Alessio & al. 1995, Arosio & Rinaldi 1995, Zocchi & al. 1997, Arosio & al. 2003, Valcuvia & al. 2003, Dalle Vedove & al. 2004, Nascimbene & al. 2006e, Brackel 2013, Gheza & al. 2015), **Piem** (Caniglia & al. 1992, Morisi & Sereno 1995, Arosio & al. 1998, Isocrono & Falletti 1999, Piervittori 2003, Isocrono & al. 2004, 2006, Morisi 2005, Isocrono & Piervittori 2008, Motiejūnaitė & Grochowski 2014), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Valcuvia & al. 2000b, Piervittori & al. 2001, Revel & al. 2001, Ghiraldi 2003, Isocrono & al. 2005, Matteucci & al. 2008, 2008c, Isocrono & al. 2008, Loppi 2014), **Emil** (Tretiach & al. 2008), **Lig** (Brunialti & al. 1999, Giordani & al. 2002, Brunialti & Giordani 2003, Giordani 2006, Watson 2014). **C - Tose** (Loppi & al. 1994, Tretiach & Nimis 1994, Benesperi & al. 2007, Tretiach & al. 2008, Benesperi 2011, Brackel 2015), **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera 1998, Ravera & al. 2006), **Abr** (Nimis & Tretiach 1999, Corona & al. 2016), **Sar** (Nöske 2000). **S - Camp** (Aprile & al. 2003b, Garofalo & al. 2010), **Bas, Cal** (Puntillo 1996, Incerti & Nimis 2006), **Si** (Grillo & Caniglia 2004, 2006).

Fol.n/ Ch/ A.s/ Epiph/ pH: 1-2, L: 3-5, X: 3-4, E: 1/ Alt: 2-5/ Alp: er, Salp: ec, Mont: rr, SmedD: er, SmedH: er/ PT: 1-2/ Note: a mainly boreal-montane, circumpolar lichen found on basal parts of trunks, especially of conifers, with a long snow-lie; common in the Alps, especially in the subalpine belt, becoming much rarer in the Apennines, where it was often found in *Castanea* woodlands of the montane belt.

Parmeliopsis hyperopta (Ach.) Arnold

Verh. zool.-bot. Ges. Wien, 30: 117, 1880 - *Parmelia hyperopta* Ach., Syn. Meth. Lich.: 208, 1814.

Syn.: *Imbricaria ambigua* var. *albescens* (Wahlenb.) Fr., *Imbricaria hyperopta* (Ach.) Körb., *Foraminella hyperopta* (Ach.) S.L.F. Mey., *Parmelia ambigua* var. *albescens* (Wahlenb.) Schaer., *Parmelia diffusa* var. *albescens* (Wahlenb.) Rabenh., *Parmelia diffusa* var. *leucochroa* Wallr.

N - Frl (Tretiach & Molaro 2007), **Ven** (Nimis 1994, Nascimbene & Caniglia 1997, 2002c, 2003c, Caniglia & al. 1999, Nascimbene 2005c, 2008b, 2008c, 2011, Nascimbene & al. 2006e, 2013b, Nascimbene & Marini 2007), **TAA** (Nascimbene & Caniglia 2000b, 2002c, Caniglia & al. 2002, Nascimbene 2003, 2005b, 2006b, 2006c, 2014, 2014c, Gottardini & al. 2004, Nascimbene & al. 2005, 2006, 2006e, 2007b, 2008c, 2009, 2010, 2014, Stofer 2006, Thor & Nascimbene 2007, Lang 2009, Nascimbene & Marini 2015, Nimis & al. 2015), **Lomb** (Alessio & al. 1995, Arosio & Rinaldi 1995, Dalle Vedove & al. 2004, Nascimbene & al. 2006e), **Piem** (Morisi & Sereno 1995, Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1997, 1999, Matteucci & al. 2008, 2008c, Isocrono & al. 2008), **Lig** (Brunialti & al. 1999). **C - Tose** (Benesperi 2007, Benesperi & al. 2007), **Marc** (Nimis & Tretiach 1999). **S - Cal** (Puntillo 1996).

Fol.n/ Ch/ A.s/ Epiph/ pH: 1-2, L: 3, X: 3, E: 1/ Alt: 2-4/ Salp: vc, Mont: r, SmedD: er, SmedH: er/ PT: 1-2/ Note: a mainly boreal-montane, circumpolar lichen found on basal parts of trunks, especially of conifers, with a long snow-lie; ecology and distribution resemble those of *P. ambigua*, but this lichen is slightly less photo- and more hygrophytic.

Parmotrema A. Massal.
Atti Ist. Ven. Sc. Lett. Arti, 5, 3: 4, 1860.

This genus of the Parmeliaceae is characterised by foliose thalli forming short and broad, often ciliate lobes, a pored epicortex, cylindrical conidia, a usually wide bare marginal zone on the lower surface, and the intermediate type of lichenan between *Cetraria*- and *Xanthoparmelia*-type lichenan. Currently the genus comprises c. 300 species which occur mostly in the tropics, especially in the Pacific Islands and South America. The genera *Canomaculina*, *Concamerella*, *Rimelia*, and *Rimeliella* were synonymised with *Parmotrema* by Blanco & al. (2005). Type: *P. perforatum* (Jacq.) A. Massal.

Parmotrema arnoldii (Du Rietz) Hale

Phytologia, 28: 335, 1974 - *Parmelia arnoldii* Du Rietz, Nyt. Mag. Naturvid., 62: 80, 1924.

N - Frl (Tretiach 1993, Nascimbene & al. 1998), **Ven** (Lazzarin 1997, Nascimbene & al. 2010b).

Fol.b/ Ch/ A.s/ Epiph/ pH: 1-2, L: 3, X: 1-2, E: 1/ Alt: 3/ Mont: er/ PT: 0/ suboc/ Note: a cool-temperate to tropical lichen, in Italy restricted to humid beech forests; it frequently grows in the upper branches of the tree canopy in forests with frequent fog, and therefore it often goes unnoticed. A dubious old record from Valle d'Aosta (see Piervittori & Isocrono 1999) is not accepted here. It is included in the Italian red list of epiphytic lichens as "Endangered" (Nascimbene & al. 2013c).

Parmotrema crinitum (Ach.) M. Choisy

Bull. Mens. Soc. Linn. Lyon, 21: 175, 1952 - *Parmelia crinita* Ach., Syn. Meth. Lich.: 196, 1814.

Syn.: *Parmelia ciliata* (DC.) Nyl., *Parmelia excrescens* (Arnold) Hav., *Parmelia excrescens* var. *pilosella* (Hue) Lyngé, *Parmelia pilosella* Hue, *Parmelia proboscidea* Taylor, *Parmelia urceolata sensu* Jatta

N - VG (Tretiach 2004), **Frl** (Tretiach & Carvalho 1995, Nascimbene & al. 1998), **Ven** (Lazzarin 1997, Nascimbene & al. 2009c, 2013b), **TAA** (Nascimbene 2006c, Nascimbene & al. 2007b, Nimis & al. 2015), **Lomb** (Dalle Vedove & al. 2004), **Piem** (Isocrono & al. 2004, Morisi 2005), **VA** (Piervittori & Isocrono 1999), **Lig** (Brunialti & al. 1999, Giordani & Brunialti 2000, Watson 2014), **C - Tosc** (Loppi & Putorti 2001, Brackel 2015), **Laz** (Ravera 2001, Massari & Ravera 2002, Ruisi & al. 2005, Brackel 2015), **S - Camp** (Jatta 1909-1911), **Pugl** (S-F169678).

Fol.b/ Ch/ A.i/ Epiph/ pH: 1-2, L: 3, X: 1-2, E: 1/ Alt: 2-3/ Mont: vr, SmedD: er, SmedH: er/ PT: 1/ suboc/ Note: a cool-temperate lichen found on bark in open humid montane forests, rarely on epilithic bryophytes, exceptionally descending to the submediterranean belt in very humid areas. It is included in the Italian red list of epiphytic lichens as "Near-threatened" (Nascimbene & al. 2013c).

Parmotrema hypoleucinum (J. Steiner) Hale

Phytologia, 28: 336, 1974 - *Parmelia hypoleucina* J. Steiner, Österr. bot. Z., 67: 282, 1918.

Syn.: *Parmelia gattefossei* (M. Choisy) Zahlbr., *Parmelia hypotropa auct. non* Nyl., *Parmelia subincana* (Maheu & A. Gillet) Maheu & A. Gillet, *Parmelia wernerii* (M. Choisy) Zahlbr., *Parmotrema gattefossei* M. Choisy, *Parmotrema wernerii* M. Choisy

C - Tosc (Pasquinelli & al. 2009), **Laz** (Ravera & al. 2003, Massari & Ravera 2002, Ravera 2006c, Munzi & al. 2007, 2013b, Brackel 2015), **Sar. S - Pugl** (Durini & Medagli 2004, Brackel 2011), **Bas** (Potenza & Fascetti 2005, 2012, Fascetti & al. 2006, Potenza 2006, Potenza & al. 2010), **Cal** (Puntillo 1996), **Si** (Czeczuga & al. 1999, Caniglia & al. 2005, Caniglia & Grillo 2006b, Cataldo & Ravera 2013b).

Fol.b/ Ch/ A.s/ Epiph/ pH: 2-3, L: 4-5, X: 1-2, E: 1-2/ Alt: 1/ MedH: er/ PT: 1/ suboc/ Note: a Mediterranean-Atlantic lichen found on twigs of trees and shrubs in undisturbed Mediterranean maquis vegetation along the coast; exclusively Tyrrhenian in Italy. It is included in the Italian red list of epiphytic lichens as "Near-threatened" (Nascimbene & al. 2013c).

Parmotrema perlatum (Huds.) M. Choisy

Bull. Mens. Soc. Linn. Lyon, 21: 174, 1952 - *Lichen perlatus* Huds., Flora Anglica: 448, 1762.

Syn.: *Imbricaria perlata* (Huds.) Körb., *Lichen chinensis auct.*, *Parmelia coniocarpa* Laurer, *Parmelia perlata* (Huds.) Ach., *Parmelia perlata* var. *ciliata* (DC.) Duby, *Parmelia perlata* var. *munda* Harm., *Parmelia perlata* var. *sorediata* (Schaer.) Frey, *Parmelia trichotera* Hue, *Parmotrema chinense auct.*

N - VG (Castello 1996, 2002, Carvalho 1997, Martellos & Castello 2004, Castello & Skert 2005, Piccotto & Tretiach 2010, Piccotto & al. 2011, Bertuzzi & Tretiach 2013, Bertuzzi & al. 2013), **Frl** (Badin & Nimis 1996, Caniglia & al. 2005, Tretiach & Molaro 2007), **Ven** (Nascimbene & Caniglia 1997, Lazzarin 1997, Caniglia & al. 1999, Nascimbene 2005c, 2008c, Nascimbene & Marini 2010, Nascimbene & al. 2009c, 2010b, 2013b, 2015), **TAA** (Nascimbene 2005b, 2006c, Nascimbene & al. 2007b, Nimis & al. 2015), **Lomb** (Rivellini 1994, Zocchi & al. 1997, Dalle Vedove & al. 2004, Stofer 2006, Valcuvia & Truzzi 2007b, Abramini & al. 2008, Gheza & al. 2015), **Piem** (Isocrono & al. 2004, Morisi 2005, Furlanetto 2010, Giordani & Malaspina 2016), **VA** (Piervittori & Isocrono 1999), **Emil** (Sallese 2003), **Lig** (Castello & al. 1994, Brunialti & al. 1999, Putorti & al. 1999b, Valcuvia & al. 2000, Giordani & al. 2001, 2002, Brunialti & Giordani 2003, Benco & al. 2004, Giordani 2004, 2006, Malaspina & al. 2007). **C - Tosc** (Tretiach & Nimis 1994, Loppi & Putorti 1995, 1995b, 2001, Loppi & al. 1995, 1996c, 1997, 1998, 1998b, 1999a, 2002, 2002b, 2002c, 2004c, Loppi 1996, 1996b, Loppi & De Dominicis 1996, Monaci & al. 1997, Pišút 1997, Loppi & Nascimbene 1998, 2010, Putorti & al. 1998, 1999, Putorti & Loppi 1999, Putorti & Loppi 1999b, Benesperi 2000a, 2006, 2011, Bacci & al. 2000, Loppi & Pirintsos 2000, Senese & Critelli 2000, Del Guasta 2001, Laganà & al. 2002, Loppi & Corsini 2003, Lorenzini & al. 2003, Loppi & Frati 2004, Baruffo & Tretiach 2005, Frati & al. 2006b, Benesperi & al. 2007, 2013, Tretiach & al. 2008, Lastrucci & al. 2009, Pasquinelli & al. 2009, Brunialti & Frati 2010, Pasquinelli & Puccini 2010, Loppi & Baragatti 2011, Brunialti & al. 2012, 2012b, Paoli & al. 2012, 2012b, 2013, 2015d, Brackel 2015, Nascimbene & al. 2015), **Marc** (Frati & Brunialti 2006), **Umb** (Ravera 1998, Panfilii 2000b, 2007, Ravera & al. 2006, Brackel 2015),

Laz (Bartoli & al. 1997, Ravera & al. 2003, Massari & Ravera 2002, Nimis & Tretiach 2004, Ruisi & al. 2005, Munzi & al. 2007, Ravera 2008b, Ravera & Genovesi 2008, Zucconi & al. 2013, Brackel 2015), **Abr** (Catalano & al. 2016), **Mol** (Garofalo & al. 1999, Nimis & Tretiach 1999, Caporale & al. 2008, Paoli & al. 2015), **Sar** (Zedda 1995, 2002, 2002b, Nöske 2000, Loi & al. 2000, Zedda & al. 2001, Stofer 2006, Piccotto & al. 2009, Rizzi & al. 2011, Giordani & al. 2013, Cossu 2013). **S - Camp** (Garofalo & al. 1999, 2010, Ricciardi & al. 2000, Puntillo & al. 2000, Aprile & al. 2002, 2003, 2003b, 2010, 2011, Nimis & Tretiach 2004, Brunialti & al. 2010, 2013, Catalano & al. 2010, 2016, Nascimbene & al. 2010b, Ravera & Brunialti 2013), **Pugl** (Garofalo & al. 1999, Durini & Medagli 2004), **Bas** (Bartoli & Puntillo 1998, Potenza 2006, Potenza & al. 2010), **Cal** (Puntillo 1995, 1996, Puntillo & Puntillo 2004, Incerti & Nimis 2006, Stofer 2006, Brackel & Puntillo 2016), **Si** (Nimis & al. 1994, Ottonello & Salone 1994, Ottonello & al. 1994, Grillo & Cristaudo 1995, Ottonello 1996, Ottonello & Romano 1997, Grillo & Caniglia 2004, 2006, Ottonello 2005, Stofer 2006, Ottonello & al. 2006b, Caniglia & Grillo 2006b, Brackel 2008b, Liistro & Cataldo 2011).

Fol.b/ Ch/ A.s/ Epiph/ pH: 1-2, L: 3-4, X: 2-3, E: 1-2/ Alt: 1-3/ Mont: vr, SmedD: rr, Pad: er, SmedH: vc, MedH: vc/ PT: 1-2/ suboc/ Note: a mainly mild-temperate lichen found on bark and mossy siliceous rocks, on isolated trees only in humid areas, otherwise in light woodlands and restricted to the mossy base of trunks, exceptionally reaching the dry-continental Alpine valleys in sheltered situations (see note on *P. tiliacea*). This is the most common species of the genus in Italy, but it is rare and localised along the eastern side of the Peninsula.

Parmotrema reticulatum (Taylor) M. Choisy

Bull. Mens. Soc. Linn. Lyon, 21: 175, 1952 - *Parmelia reticulata* Taylor in Mackay, Fl. Hibern., 2: 148, 1836.

Syn.: *Parmelia amphigymnoides* Gyeln., *Parmelia cetrata* auct. p.p. non Ach., *Parmelia concors* Kremp., *Parmelia decorata* (Hue) C.W. Dodge, *Parmelia diffusoides* Gyeln., *Parmelia odontata* var. *rubiginosa* Sambo, *Parmelia ornata* (Hue) C.W. Dodge, *Rimelia reticulata* (Taylor) Hale & A. Flechter

N - VG, FrI (Brackel 2013), **Lomb, Piem, Lig** (Modenesi 1993, Caviglia & Modenesi 1999, Brunialti & Giordani 2000, 2003, Giordani & al. 2001, 2002, 2003b, Giordani 2006, Watson 2014). **C - Tosc** (Loppi & al. 2004c, Loppi & Frati 2006, Brunialti & al. 2012b, Benesperi & al. 2013), **Laz** (Gigante & Petriccione 1995, Ravera 2001, Massari & Ravera 2002, Ruisi & al. 2005, Zucconi & al. 2013, Brackel 2015), **Abr** (Catalano & al. 2016), **Mol** (Frati & al. 2004, Caporale & al. 2008, Paoli & al. 2015), **Sar** (Zedda 2002, 2002b, Loi & al. 2000, Rizzi & al. 2011). **S - Camp** (Nimis & Tretiach 2004, Nascimbene & al. 2010b, Ravera & Brunialti 2013, Catalano & al. 2016), **Pugl** (Nimis & Tretiach 1999, Durini & Medagli 2004, Brackel 2011), **Bas** (Potenza 2006, Potenza & al. 2010), **Cal** (Puntillo 1995, 1996, Incerti & Nimis 2006, Stofer 2006), **Si** (Nimis & al. 1994, Ottonello & Romano 1997, Falco Scampatelli 2005, Caniglia & Grillo 2006b, Ottonello & Puntillo 2009).

Fol.b/ Ch/ A.s/ Epiph/ pH: 2-3, L: 3-4, X: 2, E: 1-2/ Alt: 1-2/ SmedD: er, SmedH: rr, MedH: rc/ PT: 1-2/ suboc/ Note: a Mediterranean-Atlantic to mild-temperate lichen found on bark, rarely on mossy siliceous rocks; declining, presently mostly Tyrrhenian and coastal, almost extinct in northern Italy. The record from Veneto by Nascimbene (2008c) refers to *P. perlatum* (Nascimbene, *in litt.*).

Parmotrema robustum (Degel.) Hale

Phytologia, 28: 338, 1974 - *Parmelia robusta* Degel., Göteb. Vetensk.-och Vitter.-Handl., ser. B, 1, 7: 33, 1941.

Syn.: *Parmelia dilatata* auct. non Vain.

N - Lig, C - Tosc, S - Camp (Nimis & Tretiach 2004, Puntillo & Puntillo 2011).

Fol.b/ Ch/ A.s/ Epiph/ pH: 1-2, L: 3-4, X: 1-2, E: 1/ Alt: 1/ MedH: er/ oc/ PT: 0/ Note: a humid subtropical species found on broad-leaved trees in humid-warm situations; exclusively Tyrrhenian and extremely rare in Italy. It is included in the Italian red list of epiphytic lichens as “Critically Endangered” (Nascimbene & al. 2013c).

Parmotrema stuppeum (Taylor) Hale

Phytologia, 28: 339, 1974 - *Parmelia stuppea* Taylor, London J. Bot., 6: 175, 1847.

Syn.: *Parmelia claudelii* (Harm.) Vain., *Parmelia maxima* Hue, *Parmelia trichotera* var. *claudelii* (Harm.) Du Rietz

N - Lig (Giordani & Brunialti 2000, Giordani & al. 2001, Brunialti & Giordani 2003). **C - Tosc** (Putorti & Loppi 1999, Senese & Critelli 2000, Loppi & al. 2004c, Paoli & al. 2012), **Laz** (Brackel 2015), **Sar** (Stofer 2006, Rizzi & al. 2011). **S - Si** (TSB 17234).

Fol.b/ Ch/ A.s/ Epiph/ pH: 1-2, L: 3, X: 2, E: 1/ Alt: 2-3/ Mont: er, SmedH: er/ PT: 1/ suboc/ Note: a mainly mild-temperate species found in open woodlands with frequent fog, mostly on ancient trees, but also on epilithic bryophytes; certainly declining in Italy. It is included in the Italian red list of epiphytic lichens as “Vulnerable” (Nascimbene & al. 2013c).

P a r v o p l a c a Arup, Söchting & Frödén
Nord. J. Bot., 31: 49, 2013.

One of the new genera of Teloschistaceae segregated from *Caloplaca* by Arup & al. (2013) is *Parvoplaca*, a rather small genus of 4 species, but well separated from the related genera *Pachypeltis* and *Xanthomendoza*. It is characterised by a poorly developed thallus; some species lack anthraquinones in the thallus and/or in the apothecia, and most of them grow on moss, detritus, and bark. Type: *P. tirolensis* (Zahlbr.) Arup, Söchting & Frödén

Parvoplaca chelyae (Pérez-Vargas) Vondrák, Halıcı & Arup

in Arup & al., Lichenologist, 47: 384, 2015 - *Caloplaca chelyae* Pérez-Vargas in Pérez-Vargas & Pérez de Paz, Bryologist, 112: 840, 2009.

Syn.: *Caloplaca fulvolutea* auct. ital. p.p.

C - Abr (Nimis & Tretiach 1999), **Sar. S - Cal** (Puntillo 1996).

Cr/ Ch/ S/ Terr/ pH: 2-3, L: 4-5, X: 3-4, E: 2/ Alt: 4-5/ Alp: vr, Salp: vr, Orom: vr/ PT: 1/ Note: this species was described recently from the Canary Islands, where it grows on bryophytes in the dry alpine zone, and is also known from Turkey. It is probably strictly muscicolous and restricted to siliceous bedrocks in dry alpine or dry continental sites, and was treated under *Caloplaca fulvolutea* by most Italian authors.

Parvoplaca servitiana (Szatala) Arup, Søchting & Frödén

Nord. J. Bot., 31: 49, 2013 - *Caloplaca servitiana* Szatala in Reehinger, Denkschr. Kaiserl. Akad. Wiss. Wien, math. naturw. Kl, 105: 51, 1943.

S - Camp (Ravera & Brunialti 2013b, Ravera & al. 2015c).

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 4-5, X: 4-5, E: 2-3/ Alt: 1/ MedH: vr/ PT: 1-2/ Note: a black fruited epiphytic species described from Greece, included in the Italian red list of epiphytic lichens as "Critically Endangered" (Nascimbene & al. 2013c).

Parvoplaca tirolensis (Zahlbr.) Arup, Søchting & Frödén

Nord. J. Bot., 31: 49, 2013 - *Caloplaca tirolensis* Zahlbr., Annal. Mycol., 1: 360, 1903.

Syn.: *Caloplaca arctica* H. Magn., *Caloplaca cerina* f. *flava* (Anzi) Jatta, *Caloplaca friesii* H. Magn., *Caloplaca jungermanniae* var. *subolivacea* Th. Fr., *Caloplaca subolivacea* (Th. Fr.) Lynge, *Placodium cerinum* var. *flavum* Anzi

N - FrI (Tretiach & Hafellner 2000), **Ven** (Nimis 1994, Nascimbene & Caniglia 2000, 2003c, Nascimbene 2005c, 2008c), **TAA** (Nascimbene & al. 2006, Nascimbene 2008b, Ertz & al. 2015), **Lomb** (Dalle Vedove & al. 2004), **Piem** (TSB 33124), **C - Umb** (Ravera & Di Toma 2003, Ravera & al. 2006), **Abr** (Nimis & Tretiach 1999), **Mol** (Ravera & Genovesi 2012, Genovesi & Ravera 2014).

Cr/ Ch/ S/ Terr/ pH: 3-5, L: 4-5, X: 3-4, E: 1-3/ Alt: 4-6/ Alp: rc, Salp: c/ PT: 1/ Note: a holarctic, arctic-alpine species, mainly found on mosses and plant debris, often on leaves of *Saxifraga*, in *Carex firma* stands over calcareous substrata; common in the Alps near and above treeline up to the nival belt, rarer and localised in the Apennines.

Paulia Fée

Linnaea, 10: 471, 1836.

This still rather poorly known genus of the Lichinaceae includes c. 14 species with quite disjunctive distributions. The genus as a whole has a broad biogeographical range in arid to semi-arid, tropical regions of America, Africa, Australasia and some western Pacific Islands, with a single species known from temperate Europe. Most, but not all, of the species occur on calciferous rocks. Type: *P. pullata* Fée

Paulia glomerata Henssen & Tretiach

Nova Hedwigia, 60: 298, 1995.

N - FrI (Henssen & Tretiach 1995, Tretiach & Molaro 2007).

Frut/ Cy.c/ S/ Sax/ pH: 5, L: 3-4, X: 1-2, E: 1/ Alt: 2-3/ Mont: vr, SmedD: vr/ PT: 1/ Note: on steeply inclined surfaces of calcareous rocks in rainy areas, mostly starting its life-cycle in fissures of the rocks; to be looked for further in the Alps. The only Italian stations are from the Julian Pre-Alps, one of the rainiest areas in Europe.

Peccania Arnold

A. Massal. ex Arnold, Flora, 41: 93, 1858, *nom. cons.*

A still rather poorly known genus of the Lichinaceae, characterised by the filiform conidia. Most of the c. 15 species occur in dry areas. Type: *P. coralloides* (A. Massal.) A. Massal. The name is conserved against *Corinophoros* A. Massal.

Peccania coralloides (A. Massal.) Arnold

Flora, 41: 93, 1858 - *Corinophoros coralloides* A. Massal., Flora, 14: 213, 1856.

Syn.: *Omphalaria coralloides* (A. Massal.) Hepp

N - VG, FrI, Ven (Lazzarin 2000b, Nascimbene 2005c, 2008c, Nascimbene & Marini 2007), **TAA** (Spitale & Nascimbene 2012, Watson 2014), **Lomb, Piem** (Isocrono & al. 2004), **Lig. C - Tosc** (Benespero 2000a), **Laz, Abr** (Nimis & Tretiach 1999), **Sar. S - Camp** (Aprile & al. 2003, Nimis & Tretiach 2004, Garofalo & al. 2010), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994).

Frut/ Cy.c/ S/ Sax/ pH: 4-5, L: 4-5, X: 4-5, E: 1-2/ Alt: 1-5/ Alp: vr, Salp: rr, Mont: rr, SmedD: rc, SmedH: rc, MedH: rr, MedD: r/ PT: 1/ w/ Note: on steeply inclined, usually south-exposed seepage tracks of calciferous rocks, with a wide altitudinal range; certainly widespread throughout the country, but much overlooked.

Peccania tiruncula (Nyl.) Henssen

in Henssen & Jørgensen, *Lichenologist*, 22: 143, 1990 - *Omphalaria tiruncula* Nyl., *Flora*, 61: 338, 1878.

Syn.: *Thyrea tiruncula* (Nyl.) Zahlbr.

C - Abr (Nimis & Tretiach 1999).

Frut/ Cy.c/ S/ Sax/ pH: 4-5, L: 4-5, X: 4, E: 1-2/ Alt: 1-3/ Mont: vr, SmedD: vr, MedH: er, MedD: er/ PT: 1/ w, #/ Note: a poorly known species of exposed calcareous rocks, which deserves further study.

Pecten P.M. Jørg., L. Lindblom, Wedin & S. Ekman

in Ekman & al., *Lichenologist*, 46: 641, 2014.

The genus *Degelia* Arv. & D. J. Galloway was originally described to accommodate *Coccocarpia*-like, Southern Hemisphere species with apothecia similar to *Parmeliella* but with asci without an apical amyloid tube. Later, the three species of the Northern Hemispheric *Parmeliella plumbea*-group (section *Amphiloma*) were added to *Degelia*, even if they have *Nostoc* as photobiont, whereas other species are lichenised with *Scytonema*. Ekman & al. (2014) showed that in that circumscription *Degelia* is non-monophyletic, and that the monophyletic section *Amphiloma* should be recognised as a separate genus, *Pecten*, in the Pannariaceae. Type: *P. plumbea* (Lightf.) P.M. Jørg., L. Lindblom, Wedin & S. Ekman

Pecten atlantica (Degel.) P.M. Jørg., L. Lindblom, Wedin & S. Ekman

in Ekman & al., *Lichenologist*, 46: 652, 2014 - *Parmeliella atlantica* Degel., *Acta Phytogeogr. Suec.*, 7: 131, 1935.

Syn.: *Degelia atlantica* (Degel.) P.M. Jørg. & P. James

N - VG, Lig (Giordani & al. 2001, 2002, Brunialti & Giordani 2003, Giordani & Incerti 2008). **C - Tosc** (Tretiach & al. 2008), **Umb** (Ravera 1998, Ravera & al. 2006), **Laz** (Ravera 2001, Massari & Ravera 2002, Ravera & Genovesi 2008), **Sar** (Rizzi & al. 2011). **S - Camp** (Nimis & Tretiach 2004, Catalano & al. 2016), **Bas** (Bartoli & Puntillo 1996, 1998, Potenza 2006, Potenza & Fascetti 2012), **Cal** (Puntillo 1995, 1996, Puntillo & Puntillo 2004, Incerti & Nimis 2006), **Si**.

Fol.n/ Cy.h/ A.i/ Epiph/ pH: 2-3, L: 3, X: 1, E: 1/ Alt: 1-3/ Mont: er, SmedD: er, SmedH: er, MedH: vr/ PT: 0/ oc/ Note: a mild-temperate lichen, mainly western in Europe, found on trunks in moist-warm stands, e.g. in olive groves near the coast; mainly Tyrrhenian in Italy. It is included in the Italian red list of epiphytic lichens under the “Least Concern” category (Nascimbene & al. 2013c), but it is quite rare.

Pecten plumbea (Lightf.) P.M. Jørg., L. Lindblom, Wedin & S. Ekman

in Ekman & al., *Lichenologist*, 46: 652, 2014 - *Lichen plumbeus* Lightf., *Fl. Scot.*, 2: 826, 1777.

Syn.: *Coccocarpia plumbea* var. *cinereofumosa* Caruso, *Degelia plumbea* (Lightf.) P.M. Jørg. & P. James, *Pannaria delisei* Bory, *Pannaria lojaconii* (Müll. Arg.) Jatta, *Pannaria plumbea* (Lightf.) Bory, *Parmelia plumbea* var. *vetustior* Del Amo, *Parmeliella lojaconii* Müll. Arg., *Parmeliella plumbea* (Lightf.) Vain., *Trachyderma plumbeum* (Lightf.) Norman

N - Frl (Tretiach 1996), **Ven** (Nascimbene & Marini 2010), **TAA** (Nascimbene & al. 2007b), **Emil** (Benesperi 2009), **Lig** (Brunialti & al. 1999, Giordani & Brunialti 2000, Giordani & al. 2002, Brunialti & Giordani 2003, Giordani & Incerti 2008, Watson 2014). **C - Tosc** (Tretiach & Nimis 1994, Loppi & al. 1997b, Putorù & Loppi 1999b, Loppi & Frati 2006, Benesperi & al. 2007, Brunialti & Frati 2010, Benesperi 2011), **Umb** (Ravera 1998, 1998b, Panfili 2000, Ravera & al. 2006), **Laz** (Massari & Ravera 2002, Munzi & al. 2007, Brackel 2015), **Abr, Mol** (Frati & al. 2004, Caporale & al. 2008), **Sar** (Zedda 2002, Rizzi & al. 2011). **S - Camp** (Puntillo & al. 2000, Aprile & al. 2002, 2003, 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010, Catalano & al. 2010, 2016, Nascimbene & al. 2010b, Brunialti & al. 2013, Ravera & Brunialti 2013), **Pugl, Bas** (Potenza 2006, Potenza & Fascetti 2010, 2012), **Cal** (Puntillo 1995, 1996, Incerti & Nimis 2006, Brackel & Puntillo 2016), **Si** (Nimis & al. 1994, Grillo 1996, Merlo 2004, 2004b, Brackel 2008b, Liistro & Cataldo 2011).

Fol.n/ Cy.h/ S/ Epiph/ pH: 2-3, L: 2-3, X: 1-2, E: 1-2/ Alt: 1-3/ Mont: vr, SmedD: er, SmedH: vr, MedH: er/ PT: 0/ oc/ Note: a mild-temperate lichen with oceanic affinities, found on base-rich, often mossy bark of old trees, more rarely on mossy rocks in rainy-humid areas, mostly in *Lobarion*-communities. Widespread throughout the country, but generally rare and localised, it is included in the Italian red list of epiphytic lichens as “Near-threatened” (Nascimbene & al. 2013c).

Peltigera Willd.

Fl. Berol. Prodr.: 347, 1787, *nom. cons.*

Peltigera is a rather large genus of the Peltigeraceae with c. 100 species, including terricolous and muscicolous foliose macrolichens that are common and widespread in most continents. The genus is well defined by the absence of a lower cortex and the presence of a dense arachnoid-tomentose pilema that usually bears pale or dark veins with numerous rhizines. The European species were monographed by Vitikainen (1994), and a phylogenetic analysis of the genus, that includes 8 monophyletic sections, was published by Miadlikowska & Lutzoni (2000). Preliminary results from the phylogenetic study by Pardo De la Hoz & al. (2016) show that in section *Chloropeltigera* there are at least three new cryptic clades that should be recognised at species level. Similar results were obtained for other sections: the preliminary results of a phylogenetic study by Magain & al. (2016) showed a high number of cryptic species within phenotypically defined species: the number of *Peltigera*-species will increase from 90 to more than 170 when using various

species discovery and validation methods (see also Jüriado & al. 2016). Type: *P. canina* (L.) Willd. The name is conserved against *Placodion* P. Browne ex Adans. (1763).

***Peltigera apthosa* (L.) Willd.**

Fl. Berolin. Prodr.: 347, 1787 - *Lichen apthosus* L., Sp. Pl., 2: 1148, 1753.

Syn.: *Lichen verrucosus* Weber, *Peltidea apthosa* (L.) Ach., *Peltidea apthosa* var. *verrucosa* Ach., *Peltigera apthosa* var. *microthallina* Gyeln., *Peltigera apthosa* var. *phymatodes* Wallr.

N - **Frl** (Tretiach & Hafellner 2000, Nardini & al. 2013), **Ven** (Vitikainen 1994, Caniglia & al. 1999, Nascimbene & Caniglia 2003c), **TAA** (Vitikainen 1994, Caniglia & al. 2002, Nascimbene & al. 2005, 2006, 2008c, Nascimbene 2008b), **Lomb** (Anzi Lich. Lang. 458: Vitikainen 1994, Dalle Vedove & al. 2004), **Piem** (Vitikainen 1994, Isocrono & al. 2003, 2004, Morisi 2005), **VA** (Rivellini 1994, Vitikainen 1994, Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Piervittori & al. 2001, Valcuvia 2000), **Emil** (Dalle Vedove & al. 2002, Benesperi & al. 2007), **Lig** (Brunialti & al. 1999). **C** - **Tosc** (Benesperi & al. 2007), **Marc**, **Abr** (Nimis & Tretiach 1999).

Fol.b/ Ch-Cy.h/ S/ Terr/ pH: 1-2, L: 2-3, X: 2-3, E: 1/ Alt: 3-5/ Alp: rr, Salp: c, Orom: vr, Mont: rc/ PT: 1/ Note: a mainly boreal-montane, circumpolar acidophytic vicariant of *P. leucophlebia*, found on terricolous mosses and soil rich in humus, mostly in forests but also above treeline; common in the Alps, much rarer in the Apennines. The record from Campania reported by Nimis (1993: 496) is dubious, and probably refers to *P. leucophlebia*.

***Peltigera canina* (L.) Willd.**

Fl. Berol. Prodr.: 347, 1787 - *Lichen caninus* L., Sp. Pl., 2: 1149, 1753.

Syn.: *Lichen caninus* var. *cinereus* Weiss, *Lichen terrestris* Lam., *Peltidea canina* (L.) Ach., *Peltidea canina* var. *albescens* Wahlenb., *Peltigera canina* var. *cinerea* (Weiss) Gyeln., *Peltigera canina* var. *vulgaris* Duby, *Peltigera leucorrhiza* Flörke, *Peltigera suomensis* Gyeln., *Peltigera suomensis* var. *norrlandica* Gyeln.

N - **VG** (Vitikainen 1994), **Frl** (Tretiach & Hafellner 2000, Tretiach & Molaro 2007), **Ven** (Vitikainen 1994, Nascimbene & Caniglia 2003c, Nascimbene & Marini 2010), **TAA** (Vitikainen 1994, Nascimbene 2001b, Nascimbene & al. 2005, 2006), **Lomb** (Philippi 1983, Valcuvia & al. 2003, Valcuvia & Truzzi 2007b), **Piem** (E.C.I. 1, 516: Vitikainen 1994, Isocrono & al. 2003, Isocrono & Piervittori 2008), **VA** (Siniscalco 1995, Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Matteucci & al. 2008c), **Emil**, **Lig** (Brunialti & al. 1999). **C** - **Tosc** (Munzi & al. 2014b), **Marc**, **Umb** (Genovesi & al. 2002, Ravera & al. 2006), **Laz**, **Abr** (Nimis & Tretiach 1999, Corona & al. 2016), **Sar** (Vitikainen 1994, Loi & al. 2000). **S** - **Camp** (Garofalo & al. 1999, 2010, Ricciardi & al. 2000, Aprile & al. 2002, 2003, 2003b, Nascimbene & al. 2010b, Brunialti & al. 2013, Ravera & Brunialti 2013, Catalano & al. 2016), **Pugl**, **Bas** (Potenza 2006, Potenza & Fascetti 2012), **Cal** (Puntillo 1996), **Si** (Brackel 2008b).

Fol.b/ Ch-Cy.h/ S/ Terr/ pH: 2-4, L: 3-4, X: 2-3, E: 1/ Alt: 1-5/ Alp: r, Salp: rc, Orom: r, Mont: rc, SmedD: vr, Pad: er, SmedH: r, MedH: er/ PT: 1/ Note: a widespread holarctic species found on terricolous mosses and soil in open forests and heathlands, sometimes on bark in the basal parts of old trees; certainly rarer than *P. praetextata*, with which it was often confused in the past, but widespread and locally common, with a wide altitudinal range.

***Peltigera collina* (Ach.) Schrad.**

J. Bot.: 78, 1803 - *Lichen collinus* Ach., Lichenogr. Suec. Prodr.: 162, 1799.

Syn.: *Peltidea scutata* (Dicks.) Ach., *Peltidea scutata* var. *collina* (Ach.) Ach., *Peltigera limbata* Delise, *Peltigera molesta* Delise, *Peltigera perfida* Gyeln., *Peltigera propagulifera* (Flot. ex Körb.) Stein, *Peltigera scutata* (Dicks.) Duby, *Peltigera scutata* f. *alba* Gyeln., *Peltigera scutata* f. *isidiata-sorediosa* Gyeln., *Peltigera scutata* var. *collina* (Ach.) Duby, *Peltigera scutata* var. *propagulifera* Flot. ex Körb., *Peltigera scutata* var. *subscabrosa* Gyeln., *Peltigera scutata* var. *subscutata* (Gyeln.) Trass, *Peltigera scutata* var. *typica* Gyeln., *Peltigera sibirica* Gyeln., *Peltigera subscutata* Gyeln., *Peltigera subscutata* var. *spitsbergensis* Gyeln.

N - **Frl** (Vitikainen 1994, Nascimbene & al. 1998), **Ven** (Caniglia & al. 1999, Nascimbene & al. 2005b, 2006c, 2007, 2009c, 2010b), **TAA** (Nascimbene & al. 2006e, 2007b), **Lomb** (Anzi Lich. Lang. 25: Vitikainen 1994), **Piem** (Isocrono & al. 2003, 2004), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999), **Emil** (Vitikainen 1994, Tretiach & al. 2008, Benesperi 2009), **Lig** (Vitikainen 1994, Brunialti & al. 1999). **C** - **Tosc** (Tretiach & Nimis 1994, Vitikainen 1994, Paoli & Loppi 2001, Benesperi & al. 2007, Brunialti & Frati 2010, Benesperi 2011, Brackel 2015), **Umb** (Ravera 1998, Ravera & al. 2006), **Laz** (Ravera 2001, 2002), **Abr** (Nimis & Tretiach 1999, Corona & al. 2016), **Mol** (Garofalo & al. 1999, Caporale & al. 2008), **Sar** (Vitikainen 1994, Zedda 1995, 2002, 2002b, Nöske 2000, Zedda & al. 2001). **S** - **Camp** (Aprile & al. 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010, Catalano & al. 2010, 2016), **Bas** (Potenza 2006, Potenza & Fascetti 2010, 2012), **Cal** (Vitikainen 1994, Puntillo 1996, Incerti & Nimis 2006), **Si** (Czeczuga & al. 1999, Nimis & al. 1994, Brackel 2008b).

Fol.b/ Cy.h/ A.s/ Epiph/ pH: 2-3, L: 3, X: 1-2, E: 1-2/ Alt: 2-3/ Mont: rr, SmedD: er, SmedH: r, MedH: vr/ PT: 1/ Note: a typical *Lobarion*-species found on the mossy bark of old deciduous trees in humid, open forests, sometimes on epilithic mosses, with optimum in the montane belt.

***Peltigera degenii* Gyeln.**

Magyar Bot. Lapok, 25: 253, 1927.

Syn.: *Peltigera canina* f. *nitens* Anders, *Peltigera degenii* f. *nitens* (Anders) Oxner, *Peltigera degenii* var. *nitens* (Anders) Trass, *Peltigera nitens* (Anders) Gyeln., *Peltigera polydactylon* var. *submembranacea* Nyl., *Peltigera praetextata* var. *nitens* (Anders) Szatala, *Peltigera virescens* (J. Steiner) Gyeln.

N - **Frl** (Vitikainen 1994, Tretiach & Molaro 2007), **Ven** (Vitikainen 1994, Caniglia & al. 1999, Nascimbene 2008c, Nascimbene & al. 2010b, Brackel 2013), **TAA** (Nascimbene & Caniglia 2000), **Lomb** (Vitikainen 1994), **Piem** (Vitikainen 1994, Isocrono & al. 2003, Isocrono & Piervittori 2008), **Emil** (Tretiach & al. 2008), **Lig** (Brunialti & al.

1999). **C - Tosc** (Vitikainen 1994, Benesperi & Tretiach 2004, Benesperi & al. 2007, Benesperi 2011, Brackel 2015), **Mol** (Garofalo & al. 1999, Caporale & al. 2008). **S - Camp** (Garofalo & al. 1999, 2010, Catalano & al. 2016).

Fol.b/ Cy.h/ S/ Terr/ pH: 2-3, L: 2-3, X: 2-3, E: 1/ Alt: 2-4/ Salp: er, Mont: rr, SmedD: er, SmedH: er/ PT: 1/ Note: a temperate to southern boreal species found on terricolous bryophytes, on soil rich in humus and on mossy rocks in forests, sometimes on bark in the basal parts of trunks, with optimum in the montane belt.

Peltigera didactyla (With.) J.R. Laundon

Lichenologist, 16: 217, 1984 - *Lichen didactylus* With., Bot. Arrang. Veget. Gr. Brit., 1, 2: 718, 1776.

Syn.: *Lichen caninus* var. *pellucidus* Weber, *Lichen spurius* Ach., *Peltidea canina* var. *spuria* (Ach.) DC., *Peltigera canina* var. *crispata* J. Kickx f., *Peltigera canina* var. *notata* Th. Fr., *Peltigera canina* var. *pusilla* Fr., *Peltigera canina* var. *spuria* (Ach.) Schaer., *Peltigera erumpens* (Taylor) Lange, *Peltigera leptoderma* auct., *Peltigera pellucida* (Weber) Gyeln., *Peltigera pusilla* (Fr.) Körb., *Peltigera rufescens* var. *spuria* (Ach.) Gyeln., *Peltigera rufescens* var. *vulnerata* Müll. Arg., *Peltigera sorediata* (H. Olivier) Fink, *Peltigera spuria* (Ach.) DC., *Solorina sorediifera* Nyl.

N - Frl (Tretiach & Molaro 2007), **Ven** (Nimis 1994, Caniglia & al. 1999, Nascimbene & Marini 2007), **TAA** (De Benetti & Caniglia 1993, Vitikainen 1994, Roux & Triebel 1994, Thor & Nascimbene 2007, Nascimbene 2008b, Lang 2009, Brackel 2013, Bilovitz & al. 2014), **Lomb**, **Piem** (E.C.I., 2, 843: Vitikainen 1994 Morisi & Sereno 1995, Isocrono & al. 2003, 2004, Morisi 2005, Isocrono & Piervittori 2008), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Matteucci & al. 2008c), **Emil**, **Lig** (Brunialti & al. 1999). **C - Tosc** (Vitikainen 1994), **Marc**, **Laz**, **Abr** (Nimis & Tretiach 1999), **Sar**. **S - Camp** (Jatta 1909-1911), **Cal** (Puntillo 1996), **Si** (Brackel 2008b).

Fol.b/ Cy.h/ A.s/ Terr/ pH: 2-3, L: 4, X: 3-4, E: 3/ Alt: 2-5/ Alp: vr, Salp: r, Orom: er, Mont: er, SmedD: er, SmedH: er/ PT: 1-2/ p/ Note: a cool-temperate to boreal-montane, ephemeral lichen of disturbed mineral soil, most common in the Alps near and above treeline, becoming much rarer in southern Italy.

Peltigera elisabethae Gyeln.

Botanik Közlemények, 24: 135, 1927.

Syn.: *Peltigera elisabethae* f. *complicata* Gyeln., *Peltidea horizontalis* var. *lophyra* Ach., *Peltigera mauritzii* Gyeln., *Peltigera mauritzii* var. *stuckenbergiae* Dombro., *Peltigera microphylla* (Anders) Gyeln., *Peltigera polydactylon* f. *microphylla* Anders, *Peltigera polydactylon* var. *microphylla* (Anders) Trass

N - Frl (Tretiach & Hafellner 2000, Tretiach & Molaro 2007), **Ven** (Caniglia & al. 1999, Nascimbene & Caniglia 2003c, Nascimbene & Marini 2007), **TAA** (Vitikainen 1994, Nascimbene 1997, 2000, Nascimbene & Caniglia 2000, Lang 2009), **Lomb** (Rivellini 1994, Valcuvia & Delucchi 2001, Valcuvia & al. 2003, Delucchi & Valcuvia 2004), **Piem** (Vitikainen 1994, Isocrono & al. 2003, 2004, Isocrono & Piervittori 2008), **VA** (Vitikainen 1994, Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Piervittori & al. 2001, Revel & al. 2001, Matteucci & al. 2008c), **Emil** (Tretiach & al. 2008, Benesperi 2009), **Lig** (Brunialti & al. 2001). **C - Tosc** (Benesperi 2006, 2007, 2011, Benesperi & al. 2007, Munzi & al. 2014b), **Umb** (Genovesi & al. 2002, Ravera & al. 2006), **Mol** (Nimis & Tretiach 2004, Caporale & al. 2008). **S - Camp** (Catalano & al. 2016), **Bas** (Potenza 2006, Potenza & al. 2010, Potenza & Fascetti 2012), **Cal** (Puntillo 1996).

Fol.b/ Cy.h/ S/ Terr/ pH: 2-3, L: 2-3, X: 2-3, E: 1/ Alt: 3-4/ Salp: r, Mont: rr/ PT: 1/ Note: on terricolous bryophytes and soil rich in humus, with optimum in montane to subalpine forests.

Peltigera extenuata (Vain.) Lojka

Lichenoth. Univers., Fasc. 5: nr. 222, 1886 - *Peltigera canina* var. *extenuata* Nyl. ex Vain., Meddeland. Soc. Fauna Fl. Fenn., 2: 49, 1878.

Syn.: *Peltigera didactyla* var. *extenuata* (Nyl. ex Vain.) Goffinet & Hastings

N - VA (Matteucci & al. 2015d).

Fol.b/ Cy.h/ A.s/ Terr/ pH: 2-3, L: 4, X: 3-4, E: 3/ Alt: 3/ Mont: vr/ PT: 1/ p/ Note: this species has more or less the same ecology of *P. didactyla*, but seems to be restricted to the montane belt, and differs in the richly branched rhizines and in the C+ red medulla.

Peltigera horizontalis (Huds.) Baumg.

Fl. Lips.: 562, 1790 - *Lichen horizontalis* Huds., Fl. Angl.: 453, 1762.

Syn.: *Lichen horizontalis* var. *nebulosus* Vill., *Peltidea horizontalis* (Huds.) Ach., *Peltigera horizontalis* var. *muscorum* Schaer., *Peltigera horizontalis* f. *lacunculata* Gyeln., *Peltigera horizontalis* f. *scabrida* Oxner, *Peltigera horizontalis* var. *pallidovenosa* Savicz & Rass., *Peltigera horizontalis* var. *ticinensis* De Not., *Peltigera horizontalis* var. *zopfii* (Gyeln.) Trass, *Peltigera ticinensis* (De Not.) Jatta?, *Peltigera zopfii* Gyeln.

N - VG, Frl (Vitikainen 1994, Nascimbene & al. 1998, Tretiach & Molaro 2007), **Ven** (Massalongo Lich. Ital. 214: Vitikainen 1994, Caniglia & al. 1999, Nascimbene & Caniglia 2003c, Nascimbene 2005c, 2008c, Nascimbene & al. 2009c, Nascimbene & Marini 2010, Nascimbene & al. 2013b), **TAA** (Vitikainen 1994, Nascimbene 2001b, 2006c, 2008b), **Lomb** (Anzi Lich. Ital. 93 and Lich. Sondr. 60: Vitikainen 1994, Lang 2009, Brackel 2010), **Piem** (Vitikainen 1994, Triebel & al. 1997, Isocrono & al. 2003, Morisi 2005), **VA** (Vitikainen 1994, Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Matteucci & al. 2008c, Isocrono & Piervittori 2008), **Emil** (Nimis & al. 1996, Tretiach & al. 2008, Benesperi 2009, Brackel 2015), **Lig** (Vitikainen 1994, Brunialti & al. 1999). **C - Tosc** (Tretiach & Nimis 1994, Loppi & Putorti 1995b, Loppi & De Dominicis 1996b, Loppi & al. 1997b, 2004c, Putorti & al. 1999, Benesperi & Tretiach 2004, Benesperi 2006, 2011, Benesperi & al. 2007, Benesperi & Lastrucci 2007, Lastrucci & al. 2009, Nardini & al. 2013, Pasquinelli & al. 2013, Pasquinelli 2014, Brackel 2015), **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera 1998, Ravera & al. 2006, Panfili 2007), **Laz** (Vitikainen 1994), **Abr** (Nimis & Tretiach 1999, Catalano & al. 2016, Corona & al. 2016), **Sar**. **S - Camp** (Garofalo & al. 2010, Catalano & al. 2016), **Pugl** (Nimis & Tretiach 1999), **Bas** (Potenza 2006, Brackel 2011, Potenza & Fascetti 2012), **Cal**, **Si**.

Fol.b/ Cy.h/ S/ Terr/ pH: 2-3, L: 2-3, X: 1-3, E: 1/ Alt: 1-4/ Mont: rc, SmedD: vr, SmedH: r, MedH: er/ PT: 1/ Note: on mosses (also epiphytic and epilithic) and humous soil in the openings of humid forests, with a wide altitudinal range but with optimum in the montane belt.

Peltigera hymenina (Ach.) Delise

in Duby, Bot. Gall, 2: 579, 1830 - *Peltidea hymenina* Ach., Meth. Lich.: 284, 1803.

Syn.: *Lichen polydactylus* With. nom. illegit., *Peltigera lactucifolia* auct. non (With.) J.R. Laundon, *Peltigera polydactylon* f. *hymenina* (Ach.) Flot., *Peltigera polydactylon* var. *crassoides* Gyeln.

N - Fr1, TAA, Piem (Vitikainen 1994), **Lig, C - Tosc** (Loppi & al. 1994, 1997b), **S - Camp** (Catalano & al. 2016), **Bas** (Potenza 2006, Potenza & Fascetti 2012), **Si** (Alstrup 2004).

Fol.b/ Cy.h/ S/ Terr/ pH: 3, L: 3, X: 2-3, E: 1/ Alt: 2-4/ Mont: r, SmedD: vr, SmedH: vr/ PT: 1/ Note: on mineral soil in open, but never fully sun-exposed habitats, often associated with mosses, with optimum in the montane belt.

Peltigera kristinssonii Vitik.

Ann. Bot. Fenn., 22: 291, 1985.

Syn.: *Peltigera occidentalis sensu* Kristinsson

N - Lomb (Vitikainen 1994, in Switzerland, near the border), **Piem** (Matteucci & al. 2015b), **VA** (Vitikainen 1994, in France, near the border), **C - Marc** (Nimis & Tretiach 1999).

Fol.b/ Cy.h/ S/ Terr/ pH: 3-4, L: 3-4, X: 3, E: 1/ Alt: 4-5/ Alp: vr, Salp: r/ PT: 1/ Note: a slightly calciphilous species, probably more widespread, both in the Alps and the Apennines, with optimum near treeline.

Peltigera lepidophora (Vain.) Bitter

Ber. dtsch. bot. Ges., 22: 251, 1904 - *Peltigera canina* var. *lepidophora* Vain., Meddeland. Soc. Fauna Fl. Fenn., 2: 49, 1878.

Syn.: *Peltigera lepidophora* f. *helvetica* Gyeln., *Peltigera lepidophora* f. *nudiuscula* Gyeln.?, *Peltigera lepidophora* var. *dalecarlica* Gyeln.

N - Fr1, Ven (Nimis 1994, Nascimbene & Marini 2007), **TAA** (Nascimbene & al. 2006, Bilovitz & al. 2014b), **Lomb** (Vitikainen 1994), **Piem** (Clerc & al. 1999), **VA** (Vitikainen 1994), **C - Laz** (Brackel 2015), **S - Si** (Di Martino & Stancanelli 2015).

Fol.b/ Cy.h/ A.i/ Terr/ pH: 3-4, L: 3-4, X: 3, E: 1-2/ Alt: 3-5/ Alp: er, Salp: vr, Mont: er/ PT: 1/ p/ Note: a mainly boreal-montane, circumpolar pioneer species of base-rich mineral soil, most frequent in upland areas with optimum near treeline; most frequent in the Alps, but apparently reaching the mountains of Sicily.

Peltigera leucophlebia (Nyl.) Gyeln.

Magyar Bot. Lapok, 24: 79, 1926 - *Peltigera aphthosa* var. *leucophlebia* Nyl., Syn. Lich.: 323, 1860.

Syn.: *Peltidea aphthosa* f. *crispa* Vain., *Peltigera aphthosa* var. *complicata* (Th. Fr.) Zahlbr., *Peltigera leucophlebia* f. *variolosa* (A. Massal.) Gyeln., *Peltigera leucophlebia* var. *complicata* (Th. Fr.) Gyeln., *Peltigera variolosa* (A. Massal.) Gyeln., *Peltigera variolosa* f. *dilaceratella* Gyeln., *Peltigera variolosa* f. *subalba* Gyeln., *Peltigera variolosa* var. *dactylodes* Gyeln., *Peltigera variolosa* var. *microphyllina* Gyeln., *Peltigera vrangiana* Gyeln.

N - Fr1 (Vitikainen 1994, Tretiach & Hafellner 2000, Tretiach & Molaro 2007, Nardini & al. 2013), **Ven** (Massalongo Lich. Ital. 12 and Trevisan Lich. Ven. 154: Vitikainen 1994, Caniglia & al. 1999, Lazzarin 2000b, Nascimbene & Caniglia 2003c, Nascimbene 2005c, 2008c, 2011, Nascimbene & Marini 2007), **TAA** (Vitikainen 1994, Nascimbene 2001b, 2005b, 2008b, Nascimbene & al. 2005, 2006), **Lomb** (Anzi Lich. Lang. 458 and Lich. Ital. 90: Vitikainen 1994, Dalle Vedove & al. 2004, Brackel 2010), **Piem** (Vitikainen 1994), **VA** (Vitikainen 1994, Piervittori & Isocrono 1997, 1999), **Emil** (Vitikainen 1994, Dalle Vedove & al. 2002), **Lig** (Brunialti & al. 1999), **C - Tosc** (Benesperi 2006, 2007b), **Marc** (Nimis & Tretiach 1999), **Umb** (Panfilii 2000, Ravera & al. 2006), **Abr** (Recchia & Villa 1996), **Laz** (Ravera 2002b).

Fol.b/ Ch-Cy.h/ S/ Terr/ pH: 3-4, L: 2-3, X: 2-3, E: 1/ Alt: 2-5/ Alp: r, Salp: rr, Mont: vc, SmedD: er, SmedH: er/ PT: 1/ Note: this is the vicariant of *P. aphthosa* on more or less calcareous substrata in upland areas, most common in the beech belt of the Alps, to be looked for further throughout the Apennines.

Peltigera malacea (Ach.) Funck

Crypt. Gew. Fichtelgeb., 33: 5, 1827 - *Peltidea malacea* Ach., Syn. Meth. Lich.: 240, 1814.

Syn.: *Peltidea canina* var. *malacea* (Ach.) Wahlenb., *Peltigera canina* var. *malacea* (Ach.) Branth & Rostr., *Peltigera malacea* f. *crispa* Gyeln., *Peltigera malacea* f. *neimbricata* Gyeln., *Peltigera malacea* f. *panniformis* Vain., *Peltigera malacea* var. *dactylodes* Gyeln., *Peltigera malacea* var. *imbricata* Gyeln., *Peltigera malacea* var. *scabriosoides* Trass, *Peltigera malacea* var. *subpulverulenta* Gyeln., *Peltigera polydactyloides* f. *fennica* Gyeln., *Peltigera polydactyloides* f. *panniformis* (Vain.) Gyeln.

N - Fr1, Ven (Caniglia & al. 1999, Thor & Nascimbene 2007), **TAA** (Vitikainen 1994, Nascimbene & al. 2005, 2006), **Lomb** (Anzi Lich. Ital. 89 and Lich. Sondr. 55: Vitikainen 1994), **Piem** (Isocrono & al. 2003, Watson 2014), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999), **S - Bas** (Potenza & Fascetti 2005, 2012, Potenza 2006, Puntillo & al. 2009).

Fol.b/ Ch/ S/ Terr/ pH: 1-3, L: 3-4, X: 2-3, E: 1/ Alt: 4-5/ Alp: rr, Salp: er/ PT: 1/ Note: a circumpolar, arctic-alpine lichen found in grasslands and shrublands near and above treeline, often amongst mosses, on siliceous substrata; most common in the Alps, but also found in the southern Apennines.

Peltigera membranacea (Ach.) Nyl.

Bull. Soc. Linn. Normandie, sér. 4, 1: 74, 1887 - *Peltidea canina* var. *membranacea* Ach., Lichenogr. Univ.: 518, 1810.

Syn.: *Peltigera canina* var. *membranacea* (Ach.) Duby

N - **VG**, **Frl** (Tretiach & Molaro 2007), **Ven** (Caniglia & al. 1999, Nascimbene & Caniglia 2000), **TAA** (Nascimbene 2008b), **Lomb**, **Piem** (Morisi & Sereno 1995, Isocrono & al. 2004, Isocrono & Piervittori 2008), **Emil**, **C** - **Abr**, **Sar** (Vitikainen 1994). **S** - **Pugl**, **Bas**, **Cal**, **Si**.

Fol.b/ Cy.h/ S/ Terr/ pH: 2-3, L: 3, X: 2-3, E: 1/ Alt: 2-4/ Salp: rr, Mont: r, SmedD: r, SmedH: r/ PT: 1/ Note: on mossy rocks and at the base of boles in old woodlands, usually on base-rich substrata, with optimum in the montane belt.

Peltigera monticola Vitik.

Acta Bot. Fenn., 152: 64, 1994.

N - **Frl** (Martellos 2005), **Ven** (Vitikainen 1994). **C** - **Sar** (Vitikainen 1994).

Fol.b/ Cy.h/ S/ Terr/ pH: 4-5, L: 4-5, X: 4, E: 1/ Alt: 3-5/ Alp: vr, Salp: r, Orom: er, Mont: vr/ PT: 1/ Note: a recently-described and still rarely collected taxon related to *P. rufescens* and *P. ponojensis*, found on soil and amongst mosses over calcareous substrata, mostly in upland areas.

Peltigera neckeri Müll. Arg.

Hepp ex Müll. Arg., Mém. Soc. Phys. Hist. Nat. Genève: 16, 2: 370, 1862.

Syn.: *Peltigera horizontalis* f. *rubescens* Trass, *Peltigera polydactylon* f. *debilis* Lettau, *Peltigera polydactylon* var. *nervosa* Gyeln., *Peltigera polydactylon* var. *nigrovenosa* Savicz & Rass., *Peltigera polydactyloides* var. *velebitica* Gyeln.?

N - **VG** (TSB 2901), **Frl** (Tretiach & Molaro 2007), **Ven** (Massalongo Lich. Ital. 260: Vitikainen 1994), **TAA** (Vitikainen 1994, Nascimbene 2006c), **Lomb** (Vitikainen 1994), **Piem** (Vitikainen 1994), **Emil** (Vitikainen 1994, Benesperi 2001, 2009), **Lig** (Vitikainen 1994, Benesperi & al. 2001). **C** - **Tosc** (Vitikainen 1994, Benesperi 2001, 2006, Benesperi & Tretiach 2004, Brackel 2015), **Umb** (Genovesi & al. 2001, 2002, Ravera & al. 2006), **Abr** (Recchia & Villa 1996, Brackel 2015), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **Sar** (Vitikainen 1994, Zedda 2002). **S** - **Pugl** (Vitikainen 1994, Nimis & Tretiach 1999), **Bas** (Potenza 2006, Potenza & Fascetti 2012), **Si** (Vitikainen 1994).

Fol.b/ Cy.h/ S/ Terr/ pH: 2-3, L: 2-3, X: 2, E: 1/ Alt: 1-5/ Alp: er, Salp: r, Mont: rr, SmedD: vr, SmedH: vr, MedH: er/ PT: 1/ suboc/ Note: on soil and on terricolous, epiphytic and silicicolous mosses, with a wide altitudinal range but most frequent in humid-warm beech forests.

Peltigera neopolydactyla (Gyeln.) Gyeln.

Rev. Bryol. Lichénol., n.s. 5: 71, 1933 - *Peltigera polydactylon* var. *neopolydactyla* Gyeln., Magyar Bot. Lapok, 31: 46, 1932.

Syn.: *Peltigera occidentalis* (E. Dahl) Kristinsson non sensu Kristinsson, *Peltigera scabrosa* var. *occidentalis* E. Dahl

N - **Frl**, **Ven** (Vitikainen 1994), **TAA** (Vitikainen 1994), **Lomb** (Vitikainen 1994), **VA** (Vitikainen 1994, Piervittori & Isocrono 1999).

Fol.b/ Cy.h/ S/ Terr/ pH: 2-3, L: 3, X: 2-3, E: 1/ Alt: 3-4/ Salp: vr, Mont: rr/ PT: 1/ Note: a forest floor species, occurring amongst and over mosses, more rarely on rock or on bark, on basal parts of old trees, with optimum in the montane belt.

Peltigera polydactylon (Neck.) Hoffm.

Descr. Adumbr. Pl. Crypt. Lich., 1: 19, 1790 - *Lichen polydactylon* Neck., Meth. Muscor.: 85, 1771.

Syn.: *Lichen caninus* var. *polydactylon* (Neck.) Lightf., *Peltidea canina* var. *glabra* Ach., *Peltidea polydactylon* (Neck.) Ach., *Peltigera canina* var. *polydactylon* (Neck.) Branth & Rostr., *Peltigera polydactylon* f. *microcarpa* (Ach.) Mérat, *Peltigera polydactylon* f. *multilobata* Gyeln., *Peltigera polydactylon* f. *multisecta* Gyeln., *Peltigera polydactylon* var. *microcarpa* (Ach.) Schaer., *Peltigera rufescens* var. *polydactylon* (Neck.) Torss.

N - **VG**, **Frl** (Vitikainen 1994, Tretiach 1996, Tretiach & Hafellner 2000, Tretiach & Molaro 2007), **Ven** (Vitikainen 1994, Nascimbene & Caniglia 2003c, Nascimbene 2005c, 2008c, 2011, Nascimbene & Marini 2010, Nascimbene & al. 2010b), **TAA** (Vitikainen 1994, Caniglia & al. 2002, Nascimbene 2005b, 2006c, 2008c, Nascimbene & al. 2005, 2006), **Lomb** (Rivellini 1994, Anzi Lich. Ital. 94 and Lich. Sondr. 58: Vitikainen 1994), **Piem** (Vitikainen 1994, Morisi & Sereno 1995, Isocrono & al. 2003, Isocrono & Piervittori 2008), **VA** (Vitikainen 1994, Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Valcuvia 2000), **Emil** (Dalle Vedove & al. 2002, Benesperi 2009), **Lig** (Brunialti & al. 1999). **C** - **Tosc** (Benesperi & al. 2007, Benesperi 2011), **Marc**, **Umb** (Genovesi & al. 2001, Ravera & al. 2006, Panfilì 2007), **Laz**, **Abr** (Nimis & Tretiach 1999), **Mol** (Caporale & al. 2008), **Sar** (Vitikainen 1994, Nöske 2000). **S** - **Camp** (Garofalo & al. 1999, 2010, Aprile & al. 2003, 2003b, Catalano & al. 2016), **Pugl**, **Bas** (Potenza 2006), **Cal** (Puntillo 1995, 1996), **Si** (Ottonello & Romano 1997, Merlo 2004b).

Fol.b/ Cy.h/ S/ Terr/ pH: 2-3, L: 2-3, X: 2-3, E: 1/ Alt: 2-5/ Alp: vr, Salp: r, Mont: rc, SmedD: vr, SmedH: r/ PT: 1/ Note: an ecologically wide-ranging species of both mineral and organic, often base-rich soil, and on basal parts of mossy trunks and stumps in open forests; common in the Alps and along the Apennines, with optimum in the montane belt. Most of the old records from central and southern Italy (see Nimis 1993: 500) need confirmation, although this species is likely to range through the Apennines to the mountains of Sicilia. Some records could refer to other species of the complex.

Peltigera ponojensis Gyeln.

Mem. Soc. Fauna Fl. Fenn., 7: 143, 1931.

Syn.: *Peltigera plittii* Gyeln., *Peltigera plittii* var. *macrolobata* Gyeln.

N - **Frl** (Vitikainen 1994, Tretiach & Molaro 2007), **Ven** (Vitikainen 1994), **TAA** (Vitikainen 1994), **Piem** (Vitikainen 1994, Isocrono & al. 2003b), **VA** (Valcuvia 2000, Piervittori & al. 2004). **C** - **Tosc** (Benespero 2007), **Laz** (Vitikainen 1994), **Mol** (Nimis & Tretiach 2004, Caporale & al. 2008).

Fol.b/ Cy.h/ S/ Terr/ pH: 3-4, L: 3-4, X: 3, E: 1/ Alt: 3-5/ Alp: vr, Salp: r, Orom: vr, Mont: vr/ PT: 1/

Note: on subneutral to slightly basic soil in grasslands and heathlands, mostly in upland areas; often confused with *P. rufescens* in the past, this lichen is probably more widespread, also along the Apennines.

Peltigera praetextata (Sommerf.) Zopf

Ann. Chem., 364: 299, 1909 - *Peltidea ulorrhiza* var. *praetextata* Flörke ex Sommerf., Suppl. Fl. Lapon.: 123, 1826.

Syn.: *Peltidea ulorrhiza* var. *praetextata* Sommerf., *Peltigera canina* f. *undulata* Arnold, *Peltigera canina* f. *vivipara* Hazsl., *Peltigera canina* subsp. *praetextata* (Sommerf.) Ozenda & Clauzade, *Peltigera canina* var. *tectorum* Delise in Duby, *Peltigera canina* var. *ulorrhiza* f. *sorediata* Schaer., *Peltigera membranacea* f. *prolifera* J.W. Thomson, *Peltigera praetextata* f. *incusiuscula* Gyeln., *Peltigera praetextata* var. *prolifera* (J.W. Thomson) Clauzade & Cl. Roux, *Peltigera praetextata* var. *subglabra* Gyeln., *Peltigera rufescens* var. *praetextata* (Sommerf.) Nyl., *Peltigera subcanina* Gyeln., *Peltigera subcanina* var. *glabrescens* Gyeln., *Peltigera szatalae* Gyeln.

N - **VG** (Vitikainen 1994), **Frl** (Vitikainen 1994, Tretiach & Hafellner 2000, Tretiach & Molaro 2007, Bertuzzi & Tretiach 2013, Brackel 2013, Nardini & al. 2013), **Ven** (Trevisan Lich. Ven. 150: Vitikainen 1994, Caniglia & al. 1999, Nascimbene & Caniglia 2003c, Nascimbene 2005c, 2008c, 2011, Nascimbene & al. 2005b, 2006c, 2007, 2009c, 2010b, 2013b, Nascimbene & Marini 2007, Brackel 2013), **TAA** (De Benetti & Caniglia 1993, Vitikainen 1994, Caniglia & al. 2002, Nascimbene 2005b, 2006c, 2008c, Nascimbene & al. 2007b, Lang 2009, Nimis & al. 2015), **Lomb** (Rivellini 1994, Anzi Lich. Ital. 91, 92 and Lich. Sondr. 57: Vitikainen 1994, Valcuvia & al. 2003, Dalle Vedove & al. 2004, Brackel 2010), **Piem** (Vitikainen 1994 Morisi & Sereno 1995, Triebel & al. 1997, Isocrono & al. 2003b), **VA** (Vitikainen 1994, Borlandelli & al. 1996, Girlanda & al. 1997, Piervittori & Isocrono 1997, 1999, Triebel & al. 1997, Piervittori & al. 2001, Matteucci & al. 2008c), **Emil** (Vitikainen 1994, Nimis & al. 1996, Tretiach & al. 2008, Benespero 2009), **Lig** (Vitikainen 1994, Brunialti & al. 1999). **C** - **Tosc** (Tretiach & Nimis 1994, Vitikainen 1994, Loppi & Putorti 1995b, Loppi & De Dominicis 1996b, Loppi & al. 1997b, 2004c, Putorti & Loppi 1999b, Benespero 2000a, 2006, 2011, Paoli & Loppi 2001, Benespero & Tretiach 2004, Benespero & al. 2007, Benespero & Lastrucci 2007, Lastrucci & al. 2009, Pasquinelli & al. 2009, Brackel 2014, 2015, Munzi & al. 2014b), **Marc** (Vitikainen 1994), **Umb** (Ravera 1998, Panfili 2000b, 2007, Ravera & al. 2006), **Laz** (Vitikainen 1994, Nimis & Tretiach 2004, Zucconi & al. 2013, Brackel 2015), **Abr** (Nimis & Tretiach 1999, Brackel 2015, Catalano & al. 2016, Corona & al. 2016), **Mol** (Garofalo & al. 1999, Nimis & Tretiach 1999, Caporale & al. 2008), **Sar** (Vitikainen 1994, Zedda 1995, 2002, Nöske 2000, Rizzi & al. 2011), **S** - **Pugl** (Vitikainen 1994), **Camp** (Vitikainen 1994, Garofalo & al. 1999, 2010, Aprile & al. 2003, 2003b, Nimis & Tretiach 2004, Catalano & al. 2016), **Bas** (Potenza 2006, Potenza & Fascetti 2010, Brackel 2011), **Cal** (Vitikainen 1994, Puntillo 1995, 1996, Puntillo & Puntillo 2004, Stofer 2006), **Si** (Czeczuga & al. 1999, Vitikainen 1994, Ottonello & al. 1994, Ottonello 1996, Grillo 1996, 1998, Grillo & Caniglia 2004, Merlo 2004b, Falco Scampatelli 2005).

Fol.b/ Cy.h/ A.i/ Terr-Epiph-Lign/ pH: 2-4, L: 3-4, X: 3, E: 1-2/ Alt: 1-5/ Alp: vr, Salp: rr, Orom: r, Mont: c, SmedD: r, SmedH: rr, MedH: vr/ PT: 1-2/ Note: a holarctic, ecologically wide-ranging species found both in open woodlands and in grasslands (but only in humid areas), on mosses, mineral or organic soil, lignum (on stumps) and bark (on basal parts of old trees); one of the most common species of the genus in Italy, with a wide altitudinal range.

Peltigera rufescens (Weiss) Humb.

Fl. Friberg.: 2, 1793 - *Lichen caninus* var. *rufescens* Weiss, Pl. Crypt. Fl. Goett.: 79, 1770.

Syn.: *Lichen rufescens* (Weiss) Neck., *Peltidea canina* var. *crispa* Ach., *Peltidea canina* var. *inflexa* Ach., *Peltidea ulorrhiza* Flörke, *Peltigera canina* var. *inflexa* (Ach.) Delise, *Peltigera canina* var. *palmata* Delise in Duby, *Peltigera canina* var. *phaeorrhiza* Wallr., *Peltigera canina* var. *rufescens* (Weiss) Mudd, *Peltigera rufescens* f. *albidula* Gyeln., *Peltigera rufescens* f. *complicata* Gyeln., *Peltigera rufescens* f. *incusa* Flot., *Peltigera rufescens* var. *gotthardiana* Gyeln., *Peltigera rufescens* var. *palmata* (Delise) Gyeln., *Peltigera spuria* var. *calicicola* Räsänen

N - **VG** (Vitikainen 1994), **Frl** (Vitikainen 1994, Tretiach & Hafellner 2000, Tretiach & Molaro 2007, Tomasi 2007, Nardini & al. 2013), **Ven** (Nimis 1994, Vitikainen 1994, Caniglia & al. 1999, Nascimbene & Caniglia 2003c, Nascimbene 2005c, 2008c, Nascimbene & Marini 2007, Brackel 2013), **TAA** (Vitikainen 1994, Nascimbene 2003, 2008c, Nascimbene & al. 2006, Lang 2009, Bilovitz & al. 2014, 2014b), **Lomb** (Vitikainen 1994), **Piem** (Vitikainen 1994 Morisi & Sereno 1995, Hafellner & al. 2004, Isocrono & al. 2003, 2004, Isocrono & Piervittori 2008), **VA** (Vitikainen 1994, Piervittori & Isocrono 1997, 1999, Valcuvia 2000, Revel & al. 2001, Piervittori & al. 2004), **Emil** (Dalle Vedove & al. 2002), **Lig**. **C** - **Tosc** (Vitikainen 1994, Benespero 2006, 2011, Benespero & al. 2007, Lastrucci & al. 2009, Brackel 2015), **Marc** (Nimis & Tretiach 1999), **Umb** (Panfili 2000, 2007, Ravera & al. 2006), **Laz** (Brackel 2015), **Abr** (Nimis & Tretiach 1999, Brackel 2015), **Mol** (Garofalo & al. 1999, Nimis & Tretiach, 1999, 2004, Caporale & al. 2008), **Sar** (Vitikainen 1994, Zedda 2002), **S** - **Camp** (Garofalo & al. 1999, 2010, Aprile & al. 2002, 2003, 2003b, Nimis & Tretiach 2004, Catalano & al. 2016), **Pugl**, **Bas** (Brackel 2011), **Cal** (Vitikainen 1994, Puntillo 1996), **Si** (Vitikainen 1994, Ottonello & al. 1994, Ottonello 1996, Ottonello & Romano 1997).

Fol.b/ Cy./ S/ Terr/ pH: 3-4, L: 4-5, X: 3-4, E: 1-3/ Alt: 1-5/ Alp: c, Salp: ec, Orom: c, Mont: r, SmedD: vr, SmedH: vr, MedH: rr, MedD: r/ PT: 1-2/ Note: a widespread holarctic lichen, most common in dry grasslands, especially in upland areas, but also in the Mediterranean belt, where it is generally rare due to intensive grazing and trampling; one of the most common species of the genus throughout Italy, absent only from the plains of the North.

Peltigera scabrosa Th. Fr.

N. Acta R. Soc. Sci. Upsal, ser. 3: 45, 1860.

Syn.: *Peltigera genuina* Gyeln., *Peltigera genuina* f. *minutella* Gyeln., *Peltigera pulverulenta* auct. non (Taylor) Nyl.

N - Lomb.

Fol.b/ Cy.h/ S/ Terr/ pH: 1-2, L: 3, X: 2-3, E: 1/ Alt: 4-5/ Alp: er, Salp: er/ PT: 1/ Note: a circumpolar, mainly arctic-alpine lichen found on mossy soil and rocks near and above treeline. There is only an old record from Italy, which needs confirmation; however, this lichen is also known from a few non-Italian localities in the Alps, and from the Carpathians.

Peltigera venosa (L.) Hoffm.

Descr. Adumbr. Pl. Crypt. Lich., 1: 31, 1789 - *Lichen venosus* L., Sp. Pl., 2: 1148, 1753.

Syn.: *Peltidea venosa* (L.) Ach.

N - Fri (Tretiach & Hafellner 2000, Nardini & al. 2013), **Ven** (Massalongo Lich. Ital. 17: Vitikainen 1994, Nascimbene 2002, Nascimbene & Caniglia 2003c), **TAA** (Vitikainen 1994, Nascimbene 2008b), **Lomb** (Anzi Lich. Ital. 95 and Lich. Sondr. 61: Vitikainen 1994), **Piem** (Vitikainen 1994, Isocrono & al. 2003, 2004, 2007), **VA** (Vitikainen 1994, Piervittori & Isocrono 1997, 1999, Valcuvia 2000, Watson 2014), **Emil** (Vitikainen 1994), **Lig** (Brunialti & al. 2001). **C - Tosc** (Benesperri & al. 2007), **Marc**, **Umb** (Ravera & al. 2006, 2006b), **Abr. S - Cal** (Vitikainen 1994, Puntillo 1996).

Fol.b/ Ch/ S/ Terr/ pH: 1-3, L: 2-3, X: 2, E: 1/ Alt: 4-5/ Alp: r, Salp: rr, Orom: er/ PT: 1/ Note: an arctic-alpine to boreal-montane, circumpolar lichen found on soil rich in humus in cold-humid sites near and above treeline; most frequent in the Alps, very rare in the mountains of central and southern Italy.

Peltula Nyl.

Ann. Sci. Nat., Bot., sér. 3.: 316, 1853.

This is a worldwide distributed genus of c. 40, mostly soil- and rock-inhabiting species, with the highest diversity in arid and semi-arid regions, or wherever arid microclimates are found, on seepage tracks of both acidic and base-rich rocks. It has a high diversity in the Mediterranean Region, which hosts all of the species known so far from the European continent. Soil-inhabiting species are broadly similar in appearance to species of *Heppia* (Lichinaceae), which differ in having 8-spored, prototunicate asci without an apical apparatus. The genus is currently placed in the Peltulaceae within the Lichinales. Type: *P. radicata* Nyl.

Peltula euploca (Ach.) Poelt

in Pisùt, Zbor. Slov. Nar. Muz. Prir. Vedy, 13: 8, 1987 - *Lichen euplocus* Ach., Lichenogr. Suec. Prodr.: 141, 1799.

Syn.: *Anema veronense* (A. Massal.) Jatta, *Endocarpiscum guepinii* (Delise) Nyl., *Endocarpon guepinii* ("queppinii") Delise, *Endocarpon laciniatum* Bagl. & Carestia?, *Endocarpon maravignae* Tornab., *Guepinia polyspora* Hepp, *Heppia dermatocarpea* Räsänen, *Heppia euploca* (Ach.) Vain., *Heppia guepinii* (Delise) Nyl., *Heppia nigrolimbata* (Nyl.) Nyl., *Heppia polyphylla* B. de Lesd., *Heppia ruinicola* Nyl., *Heppia tenebrata* Nyl., *Omphalaria veronensis* A. Massal., *Peltula guepinii* (Delise) Gyeln., *Peltula laciniata* (Bagl. & Carestia) Poelt, *Peltula ruinicola* (Nyl.) Gyeln., *Thyrea veronensis* (A. Massal.) A. Massal.

N - Ven (Lazzarin 2000b), **TAA**, **Lomb** (Valcuvia & al. 2003), **Piem** (Clerc & al. 1999, Isocrono & al. 2003), **VA** (Piervittori & Isocrono 1999), **Emil** (Tretiach 2004), **Lig** (Tretiach 1993, Watson 2014). **C - Tosc** (Tretiach 1993, Pišút 1997), **Laz** (Tretiach 1993), **Sar** (Monte 1993, Tretiach 1993, Rizzi & al. 2011, Giordani & al. 2013). **S - Camp** (Catalano & al. 2016), **Pugl** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Tretiach 1993, Nimis & al. 1996b).

Fol.u/ Cy.h/ A.s/ Sax/ pH: 3, L: 4-5, X: 4-5, E: 1-3/ Alt: 1-3/ Mont: vr, SmedD: vr, SmedH: r, MedH: rr, MedD: rc/ PT: 1/ w/ Note: a widespread species of warm-dry areas, found on steeply inclined seepage tracks of basic siliceous rocks, with optimum below the montane belt.

Peltula obscurans (Nyl.) Gyeln.

Repert. Spec. Nov. Regni Veg., 38: 308, 1935 - *Endocarpiscum obscurans* Nyl., Bull. Soc. Linn. Normandie, 2, 6: 309, 1872.

Syn.: *Acarospora collemacea* Wedd., *Acarospora subglebosa* (Müll. Arg.) Hue, *Heppia acarosporoides* Müll. Arg., *Heppia collemacea* (Wedd.) Boistel, *Heppia deserticola* Zahlbr., *Peltula subglebosa* (Müll. Arg.) Filson, *Solorinaria collemacea* (Wedd.) Gyeln.

N - TAA, **Lig. C - Tosc**, **Laz**, **Sar** (Rizzi & al. 2011). **S - Si** (Nimis & al. 1996b).

Fol.u/ Cy.h/ S/ Sax/ pH: 3, L: 4-5, X: 4-5, E: 1-2/ Alt: 1-2/ SmedD: er, SmedH: vr, MedH: r, MedD: vr/ PT: 1/ w/ Note: on steeply inclined seepage tracks of basic siliceous rocks in lowland areas; a southern species, often found together with *P. euploca*, but much less frequent in Italy.

Peltula omphaliza (Nyl.) Wetmore

Ann. Missouri Bot. Gard., 57: 194, 1970 - *Heppia omphaliza* Nyl. in Eckfeldt, Bull. Torrey Bot. Cl., 16: 106, 1889.

Syn.: *Heppia subguepini* Werner

C - Tosc, **Sar**.

Fol.u/ Cy.h/ S/ Sax/ pH: 3, L: 4-5, X: 4-5, E: 1-2/ Alt: 1-2/ SmedH: er, MedH: vr, MedD: vr/ PT: 1/ w/ Note: on steeply inclined seepage tracks of basic siliceous rocks, with optimum in the Mediterranean belt; more thermophytic than *P. euploca*, and much less common in Italy.

Peltula patellata (Bagl.) Swinscow & Krog

Norw. J. Bot., 26: 221, 1979 - *Acarospora patellata* Bagl., N. Giorn. Bot. Ital., 7: 245, 1875.

Syn.: *Heppia polyspora* Tuck., *Peltula polyspora* (Tuck.) Wetmore, *Solorinaria abbatiana* Faurel, Ozenda & Schotter?

N - Lig. C - Sar.

Cr.pl/ Cy.h/ S/ Terr/ pH: 2-3, L: 4-5, X: 4, E: 1-2/ Alt: 1-2/ SmedH: er, MedH: vr, MedD: vr/ PT: 1/ subc/ Note: a rare species found on soil in dry grasslands over siliceous substrata, also known from Alpine dry valleys outside Italy.

Peltula placodizans (Zahlbr.) Wetmore

Ann. Missouri Bot. Gard., 57: 196, 1970 - *Heppia placodizans* Zahlbr., Bull. Torrey Bot. Cl., 35: 299, 1908.

Syn.: *Endocarpiscum placodizans* (Zahlbr.) Fink

N - TAA. C - Sar.

Cr.pl/ Cy.h/ S/ Sax/ pH: 3, L: 4-5, X: 4-5, E: 1-2/ Alt: 1-2/ SmedD: er, MedD: vr/ PT: 1/ w/ Note: on steeply inclined seepage tracks of basic siliceous rocks, both in the Mediterranean belt and in warm-dry Alpine valleys.

Peltula rodriguesii (Cromb.) Büdel

Lichenologist, 21: 293, 1989 - *Heppia rodriguesii* Cromb., J. Linn. Soc. Bot., 15: 436, 1876.

N - Lig.

Cr/ Cy.h/ S/ Sax/ pH: 3, L: 4-5, X: 4-5, E: 1-2/ Alt: 1/ MedH: er/ PT: 1/ subc, w/ Note: on basic siliceous rocks in the Mediterranean belt; the Italian record is the only one known from Europe.

Pertusaria DC.

in Lamarck & de Candolle, Fl. Franç., 3 éd., 2: 319, 1805, *nom. cons.*

In the traditional circumscription, *Pertusaria* was a very large genus with possibly over 1000 species. However, the genus has been shown to be polyphyletic, with species belonging even to different families within the order Pertusariales (see e.g. Schmitt & al. 2012). Schmitt & Lumbsch (2004) identified two main clades that are not closely related to *Pertusaria s.str.*, the *Variolaria*- and *Varicellaria*-groups. The latter, including the lecanoric acid-containing species, forms a well-supported, monophyletic clade, which is only distantly related to *Pertusaria s.str.*, and is now included in the genus *Varicellaria*. Schmitt & al. (2006) have re-delimited the family Pertusariaceae *s.str.* to include only *Pertusaria s.str.* and *Loxosporopsis*, that have an unsupported sister-group relationship with Coccotremataceae, while *Varicellaria* and the *Variolaria*-group are sister to *Ochrolechia* in the Ochrolechiaceae. Recently, several species of the *Variolaria*-group were segregated in the genus *Variolaria* Pers. (Lendemer & al. 2013b), but, due to the fact that this is a later homonym of *Variolaria* Ball., they were placed by Kondratyuk & al. (2015b) in the new genus *Marfloraea*, which is not accepted here because several earlier generic names exist for this group, that is currently under study by different authors. Before nomenclatural matters are clarified, I still retain the species of the *Variolaria*-group in *Pertusaria s.lat.* Type: *P. communis* DC. (= *P. pertusa*). The name is conserved over several earlier names.

Pertusaria albescens (Huds.) M. Choisy & Werner

in Werner, Cavanillesia, 5: 165, 1932 - *Lichen albescens* Huds., Fl. Angl., ed. 1: 445, 1762.

Syn.: *Marfloraea albescens* (Huds.) S. Y. Kondr., L. Lököš & J.-S. Hur, *Pertusaria albescens* f. *globulifera* (Turner) Ozenda & Clauzade, *Pertusaria albescens* var. *corallina* auct. non (Zahlbr.) J.R. Laundon., *Pertusaria communis* var. *discoidea* (Pers.) Garov., *Pertusaria communis* var. *variolosa* (Flot.) Schaer., *Pertusaria dacica* Erichsen, *Pertusaria discoidea* (Pers.) Malme, *Pertusaria globulifera* (Turner) A. Massal., *Pertusaria globulifera* var. *corallina* auct. non Zahlbr., *Pertusaria henrici sensu* Erichsen, *Pertusaria leprarioides* Erichsen non auct., *Pertusaria orbiculata* (Schreb.) Zahlbr., *Pertusaria scutellata* Hue, *Pertusaria sorediata* auct. ital., *Pertusaria tuberculata* (Erichsen) Erichsen, *Variolaria discoidea* Pers.

N - VG (Castello 1996, 2002, Carvalho 1997, Martellos & Castello 2004, Castello & Skert 2005, Craighero 2010), **Fri** (Badin & Nimis 1996, Craighero 2010), **Ven** (Lazzarin 1997, Caniglia & al. 1999, Nascimbene & Caniglia 2003c, Nascimbene & al. 2005b, 2006c, Nascimbene 2008c, Craighero 2010), **TAA** (Nascimbene & Caniglia 2000b, 2002c, Nascimbene & al. 2006e, 2007b, 2014, Thor & Nascimbene 2007, Zarabska & al. 2009, Craighero 2010, Nascimbene 2014, Nascimbene & Marini 2015, Nimis & al. 2015), **Lomb** (Zocchi & al. 1997, Arosio & al. 2003, Stofer 2006, Valcuvia & Truzzi 2007b, Craighero 2010, Furlanetto 2010), **Piem** (Caniglia & al. 1992, Arosio & al. 1998, Isocrono & Falletti 1999, Piervittori 2003, Isocrono & al. 2004, 2005b, 2006, Isocrono & Piervittori 2008, Craighero 2010, Furlanetto 2010, Matteucci & al. 2010), **VA** (Piervittori & Isocrono 1999, Valcuvia & al. 2000b, Matteucci & al. 2008, Isocrono & al. 2008), **Emil** (Gasparo & Tretiach 1996, Nimis & al. 1996, Dalle Vedove & al. 2002, Tretiach & al. 2008, Benesperi 2009, Craighero 2010, Brackel 2015), **Lig** (Brunialti & al. 1999, Putorti & al. 1999b, Valcuvia & al. 2000, Giordani & al. 2002, Brunialti & Giordani 2003, Giordani 2006, Giordani & Incerti 2008, Craighero 2010, Watson 2014). **C - Tosc** (Tretiach & Nimis 1994, Loppi & Putorti 1995, 1995b, Loppi & al. 1995, 1997, 1997b, 1998, 1998b,

1999a, 2002, 2002b, 2002c, 2004c, 2006, Loppi 1995c, 1996, 1996b, Loppi & De Dominicis 1996, 1996b, Monaci & al. 1997, Loppi & Nascimbene 1998, 2010, Putorti & al. 1998, 1999, Tretiach & Ganis 1999, Putorti & Loppi 1999b, Bacci & al. 2000, Loppi & Pirintzos 2000, Benesperi 2000a, 2006, 2011, Laganà & al. 2002, Lorenzini & al. 2003, Loppi & Frati 2004, Frati & al. 2006b, Paoli & Loppi 2001, Benesperi & al. 2007, Lastrucci & al. 2009, Brunialti & Frati 2010, Craighero 2010, Paoli & al. 2012, 2012b, 2013, 2015d, Nascimbene & al. 2015), **Marc** (Nimis & Tretiach 1999, Frati & Brunialti 2006, Craighero 2010, Brackel 2015), **Umb** (Ravera 1998, Nimis & Tretiach 1999, Panfili 2000b, 2007, Ravera & al. 2006, Craighero 2010, Brackel 2015), **Laz** (Ravera 2002, Massari & Ravera 2002, Ruisi & al. 2005, Ravera & Genovesi 2008, Craighero 2010, Zucconi & al. 2013, Brackel 2015), **Abr** (Recchia & al. 1993, Olivieri & Pacioni 1996, Loppi & al. 1999, Nimis & Tretiach 1999, Stofer 2006, Craighero 2010, Brackel 2015, Catalano & al. 2016, Corona & al. 2016), **Mol** (Garofalo & al. 1999, Nimis & Tretiach 1999, Caporale & al. 2008, Craighero 2010, Ravera & al. 2010, Genovesi & Ravera 2014, Paoli & al. 2015), **Sar** (Vězda Lich. Rar. Exs. 56, Zedda 1995, 2002, 2002b, Loi & al. 2000, Nöske 2000, Craighero 2010, Rizzi & al. 2011, Cossu 2013). **S - Camp** (Garofalo & al. 1999, 2010, Ricciardi & al. 2000, Aprile & al. 2002, 2003, 2003b, Nimis & Tretiach 2004, Brunialti & al. 2010, 2013, Craighero 2010, Ravera & Brunialti 2013, Catalano & al. 2016), **Pugl** (Nimis & Tretiach 1999, Durini & Medagli 2004, Craighero 2010, Brackel 2011), **Bas** (Nimis & Tretiach 1999, Craighero 2010, Brackel 2011), **Cal** (Puntillo 1995, 1996, Puntillo & Puntillo 2004, Incerti & Nimis 2006, Stofer 2006, Craighero 2010, Puntillo 2011, Brackel & Puntillo 2016), **Si** (Nimis & al. 1994, Grillo & Cristaudo 1995, Grillo & al. 1996, 2002, Grillo 1998, Grillo & Caniglia 2004, Falco Scampatelli 2005, Caniglia & Grillo 2006b, Brackel 2008b, Craighero 2010, Liistro & Cataldo 2011).

Cr/ Ch/ A.s/ Epiph/ pH: 2-3, L: 3-4, X: 2-3, E: 1-3/ Alt: 1-4/ Salp: vr, Mont: c, SmedD: r, Pad: er, SmedH: rc, MedH: r/ PT: 1-2/ Note: a widespread, mainly temperate lichen found on bark, with optimum on old oaks, rare in agricultural areas (e.g. the Po-Plain) and in the Mediterranean belt, most common in deciduous open woodlands of the submediterranean and montane belts.

Pertusaria alpina Ahles

Hepp ex Ahles, *Pertusar.* et Conotr.: 12, 1860.

Syn.: *Pertusaria alpina* var. *abietina* Erichsen, *Pertusaria alpina* var. *occulta* Erichsen, *Pertusaria laevigata* (Th. Fr.) Anzi non (Nyl.) Arnold, *Pertusaria leioplaca* var. *laevigata* Th. Fr.

N - Frl, TAA (Nascimbene & al. 2007b), **Lomb, Emil. C - Laz, Sar. S - Camp** (Nimis & Tretiach 2004), **Bas, Si.**

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 3-4, X: 2-3, E: 1/ Alt: 2-4/ Salp: er, Mont: vr, SmedH: er, MedH: er/ PT: 1/ Note: a mainly temperate species found on the smooth bark of deciduous trees, especially on twigs and branches, descending to the Mediterranean belt in very humid areas. It is included in the Italian red list of epiphytic lichens as “Endangered” (Nascimbene & al. 2013c).

Pertusaria amara (Ach.) Nyl. var. *amara*

Flora, 56: 22, 1873 - *Variolaria amara* Ach., K. Vetensk.-Akad. Nya Handl., 30, 3: 163, 1809.

Syn.: *Marfloraea amara* (Ach.) S. Y. Kondr., L. Lökös & J.-S. Hur, *Marfloraea pulvinata* (Erichsen) S. Y. Kondr., L. Lökös & J.-S. Hur, *Pertusaria amara* f. *isidiata* Harm., *Pertusaria amara* f. *pulvinata* (Erichsen) Alb., *Pertusaria communis* var. *amara* (Ach.) Rabenh., *Pertusaria faginea* auct. ital. p.p. non (L.) Leight., *Pertusaria pulvinata* Erichsen

N - VG (Carvalho 1997, Craighero 2010), **Frl** (Craighero 2010, Brackel 2013), **Ven** (Nascimbene & Caniglia 1997, 2000b, 2002c, Lazzarin 1997, Caniglia & al. 1999, Nascimbene 2005c, 2008c, 2011, Nascimbene & al. 2005b, 2006, 2006c, 2006e, 2007, 2013b, Nascimbene & Marini 2007, 2010, Craighero 2010), **TAA** (Hinteregger 1994, Nascimbene & Caniglia 2000b, 2003c, Caniglia & al. 2002, Nascimbene 2003, 2005b, 2006b, 2006c, 2008b, 2014, Gottardini & al. 2004, Nascimbene & al. 2006e, 2007b, 2009, 2010, 2014, Thor & Nascimbene 2007, Zarabska & al. 2009, Nascimbene & Marini 2015, Nimis & al. 2015), **Lomb** (Zocchi & al. 1997, Valcuvia & al. 2003, Dalle Vedove & al. 2004, Furlanetto 2010), **Piem** (Arosio & al. 1998, Piervittori 2003, Isocrono & al. 2005b, Craighero 2010, Furlanetto 2010, Giordani & Malaspina 2016), **VA** (Piervittori & Isocrono 1999), **Emil** (Nimis & al. 1996, Dalle Vedove & al. 2002, Marconi & al. 2006, Tretiach & al. 2008, Benesperi 2009, Craighero 2010, Brackel 2015), **Lig** (Brunialti & al. 1999, Putorti & al. 1999b, Giordani & al. 2001, 2002, Brunialti & Giordani 2003, Giordani 2006, Giordani & Incerti 2008, Craighero 2010, Watson 2014). **C - Tosc** (Loppi & al. 1994, 1995, 1996c, 1997, 1997b, 1998, 1998b, 2002b, 2002c, 2006, Tretiach & Nimis 1994, Loppi & Putorti 1995, 1995b, Loppi 1996, Loppi & De Dominicis 1996, Loppi & Nascimbene 1998, 2010, Putorti & al. 1998, 1999, Putorti & Loppi 1999, 1999b, Benesperi 2000a, 2006, 2011, Loppi & Frati 2006, Ravera & al. 2006, Stofer 2006, Benesperi & al. 2007, Pasquinelli & al. 2009, Brunialti & Frati 2010, Craighero 2010, Pasquinelli & Puccini 2010, Brunialti & al. 2012b, Paoli & al. 2012, Brackel 2015, Nascimbene & al. 2015), **Marc** (Nimis & Tretiach 1999, Frati & Brunialti 2006, Brackel 2015), **Umb** (Ravera 1998, Panfili 2000b, Craighero 2010, Brackel 2015), **Laz** (Bartoli & al. 1997, Ravera 2002, 2006c, Massari & Ravera 2002, Nimis & Tretiach 2004, Ruisi & al. 2005, Ravera & Genovesi 2008, Craighero 2010, Zucconi & al. 2013, Brackel 2015), **Abr** (Nimis & Tretiach 1999, Stofer 2006, Craighero 2010, Catalano & al. 2016, Corona & al. 2016), **Mol** (Garofalo & al. 1999, Nimis & Tretiach 1999, Caporale & al. 2008, Ravera & al. 2010, Craighero 2010, Genovesi & Ravera 2014, Paoli & al. 2015), **Sar** (Monte 1993, Zedda 1995, 2002, 2002b, Loi & al. 2000, Zedda & al. 2001, Craighero 2010, Rizzi & al. 2011, Cossu 2013). **S - Camp** (Garofalo & al. 1999, 2010, Aprile & al. 2003, 2003b, Nimis & Tretiach 2004, Brunialti & al. 2010, 2013, Catalano & al. 2010, 2016, Craighero 2010, Ravera & Brunialti 2013), **Pugl** (Nimis & Tretiach 1999, Craighero 2010), **Bas** (Bartoli & Puntillo 1998, Nimis & Tretiach 1999, Potenza 2006, Craighero 2010, Brackel 2011), **Cal** (Puntillo 1995, 1996, Puntillo & Puntillo 2004, Incerti & Nimis 2006, Stofer 2006, Craighero 2010, Brackel & Puntillo 2016), **Si** (Nimis & al. 1994, 1995, Ottonello & Salone 1994, Ottonello & al. 1994, Ottonello 1996, Ottonello & Romano 1997, Grillo 1998, Grillo & Caniglia 2004, Caniglia & Grillo 2006b, Stofer 2006, Craighero 2010, Brackel 2008b).

Cr/ Ch/ A.s/ Epiph/ pH: 1-3, L: 2-4, X: 2-3, E: 1-3/ Alt: 1-5/ Alp: vr, Salp: rr, Orom: r, Mont: vc, SmedD: c, Pad: vr, SmedH: vc, MedH: c, MedD: vr/ PT: 1-3/ Note: a widespread holarctic lichen, certainly the most common epiphytic species of the genus throughout Italy, with a wide ecological range. It often behaves as an aggressive competitor, being able to overgrow other crustose lichens and sometimes even bryophytes. According to Kondratyuk & al. (2015b) the forms corresponding to *Pertusaria pulvinata* should be segregated into a distinct species. According to Craighero (2010) two chemotypes are present in Italy, one

with the pycrolichenic acid syndrome only, the other with additional protocetraric acid; the two chemotypes have a somewhat different distribution within the country, the latter being most frequent in Tyrrhenian Italy.

Pertusaria amara* var. *flotowiana (Flörke) Erichsen

Feddes Rep., 35: 383, 1934 - *Pertusaria ocellata* var. *flotowiana* Flörke in Körb., Syst. Lich. Germ.: 383, 1855.

N - VA (Matteucci & al. 2015d), **Emil** (Benesperi 2009). **C - Tosc** (Craighero 2010), **Marc** (Nimis & Tretiach 1999), **Abr** (Nimis & Tretiach 1999), **Sar** (Craighero 2010). **S - Cal** (TSB 4686), **Si** (Otonello & Romano 1997).

Cr/ Ch/ A.s/ Sax/ pH: 2-3, L: 3-4, X: 2-3, E: 1-2/ Alt: 1-3/ Mont: r, SmedD: vr, SmedH: rr, MedH: r/ PT: 1/ #/ Note: on siliceous rocks. A very critical taxon, which badly needs revision, perhaps just a saxicolous form of *P. amara*.

Pertusaria amarescens Nyl.

Flora, 57: 311, 1874.

Syn.: *Pertusaria affinis* Erichsen, *Pertusaria coudercii* Harm., *Pertusaria flavicans* var. *coudercii* (Harm.) Erichsen, *Pertusaria flavicans* var. *schistosa* Erichsen

N - Ven, Lig. C - Tosc, Laz (TSB 8630), **Sar. S - Si** (Otonello & Romano 1997, Grillo 1998, Grillo & Caniglia 2004).

Cr/ Ch/ A.s/ Sax/ pH: 3, L: 4, X: 2-3, E: 1/ Alt: 1-3/ Mont: er, SmedD: er, SmedH: r, MedH: vr/ PT: 1/ suboc, #/ Note: on basic or slightly calciferous siliceous rocks. A poorly known and often misunderstood temperate taxon; some records could refer to *P. flavicans*, others to *P. aspergilla*. Here, except the recent record from Sicilia, only records checked by Hanks (1983) and by myself are accepted.

Pertusaria apennina Bagl.

in Massalongo, Misc. Lichenol.: 25, 1856.

N - Lig (Lazzarin 2000b). **C - Sar**.

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4, X: 2-3, E: 1/ Alt: 2-3/ Mont: vr, SmedH: vr/ PT: 1/ suboc, #/ Note: a mild-temperate saxicolous lichen which on the whole is very poorly known. The indicator values are tentative.

Pertusaria aspergilla (Ach.) J.R. Laundon

Taxon, 41: 744, 1992 - *Variolaria aspergilla* Ach., Lichenogr. Suec. Prodr.: 28, 1799.

Syn.: *Marfloraea aspergilla* (Ach.) S. Y. Kondr., L. Lökök & J.-S. Hur, *Pertusaria dealbata auct. non* (Ach.) Cromb., *Pertusaria dealbescens auct. non* Erichsen

N - TAA, Lomb (Valcuvia & al. 2003, De Vita & Valcuvia 2004, Delucchi & Valcuvia 2004, Nascimbene 2006), **Piem, VA** (Pierivittori & Isocrono 1999), **Emil** (Valcuvia & Delucchi 2001), **Lig. C - Tosc, Umb** (S-F127579), **Laz, Sar** (Nöske 2000, Nöske & al. 2000). **S - Cal** (Puntillo 1996), **Si** (Grillo & al. 1996, Grillo 1998, Grillo & Caniglia 2004, Iacolino & Otonello 2006).

Cr/ Ch/ A.s/ Sax/ pH: 1-2, L: 4, X: 2-3, E: 1/ Alt: 1-5/ Alp: vr, Salp: r, Mont: rr, SmedD: er, SmedH: r, MedH: vr/ PT: 1/ suboc/ Note: on steeply inclined surfaces of siliceous rocks, with optimum in the montane belt.

Pertusaria bryontha (Ach.) Nyl.

Lichenes Scand.: 178, 1861 - *Parmelia subfusca* var. *bryontha* Ach., Meth. Lich., 2: 167, 1803.

Syn.: *Pertusaria macrospora* Hepp

N - Fri (Tretiach & Hafellner 2000), **TAA, Lomb**.

Cr/ Ch/ S/ Terr/ pH: 3-4, L: 4, X: 2, E: 1/ Alt: 4-6/ Alp: rr, Salp: vr/ PT: 1/ Note: an arctic-alpine, circumpolar lichen found on mosses and plant debris, mostly over calcareous substrata, with optimum near and above treeline, up to the nival belt; probably widespread throughout the Alps, where it reaches the nival belt.

Pertusaria caesioalba (Flot.) Nyl.

Mém. Soc. Sc. Nat. Cherbourg, 3: 180, 1855 - *Phlyctis caesioalba* Flot., Bot. Z., 8: 572, 1850.

Syn.: *Pertusaria corinthiaca* Erichsen, *Pertusaria illicicola* Harm., *Thelotrema pruinosum auct.*

S - Si (Grillo & al. 2007).

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 3-4, X: 2-3, E: 1-2/ Alt: 1/ MedH: vr, MedD: er/ PT: 1/ suboc, #/ Note: a mainly Mediterranean lichen, widespread, but rare in the Mediterranean Region, mostly on smooth bark. The record from Sardinia by Zedda & Sipman (2001) was due to a misidentification and actually refers to *P. ophthalmiza* (Sipman *in litt.*). The species is included in the Italian red list of epiphytic lichens as "Critically Endangered" (Nascimbene & al. 2013c).

Pertusaria carneopallida (Nyl.) Nyl.

Anzi *ex* Nyl., Flora, 51: 478, 1868 - *Lecanora carneopallida* Nyl., Bot. Not.: 183, 1853.

Syn.: *Cryptolechia carneolutea auct. non* (Turner) A. Massal., *Pertusaria leptocarpa* Anzi, *Pertusaria protuberans* (Sommerf.) Th. Fr.

N - Fri (Tretiach & Carvalho 1995), **Ven** (TSB 7824), **TAA** (Nimis & al. 2015), **Lomb. C - Tosc. S - Camp**.

Cr/ Ch/ S/ Epiph/ pH: 2, L: 3, X: 2-3, E: 1/ Alt: 3-4/ Salp: er, Mont: vr/ PT: 1/ Note: a cool-temperate to boreal-montane lichen found on smooth-barked hardwoods in upland areas. It is included in the Italian red list of epiphytic lichens as "Endangered" (Nascimbene & al. 2013c).

Pertusaria chiodectonoides Bagl.

in A. Massal., Misc. Lichenol.: 26, 1855.

Syn.: *Pertusaria aspicioloides* Samp., *Pertusaria chiodectonoides* var. *inquinata* (Ach.) Poelt, *Pertusaria inquinata* (Ach.) Th. Fr., *Pertusaria inquinata* f. *nolens* (Nyl.) Boistel, *Pertusaria nolens* Nyl.

N - **TAA**, **VA** (Piervittori & Isocrono 1999), **Emil**, **Lig** (Lazzarin 2000b). **C - Tosc**, **Marc**, **Sar**, **S - Cal** (Puntillo 1996).

Cr/ Ch/ S/ Sax/ pH: 3, L: 4, X: 3, E: 2-3/ Alt: 1-3/ Mont: vr, SmedD: er, SmedH: vr, MedH: er/ PT: 1/ Note: a mild-temperate to Mediterranean species of basic siliceous rocks, whose total distribution is very poorly known.

Pertusaria coccodes (Ach.) Nyl.

Mém. Soc. Imp. Sc. Nat. Cherbourg, 5: 116, 1858 - *Lichen coccodes* Ach., Lichenogr. Suec. Prodr.: 10, 1799.

Syn.: *Pertusaria ceuthocarpa* Fr., *Pertusaria coccodes* f. *variolata* Harm., *Pertusaria coccodes* var. *phymatodes* (Ach.) Almb., *Pertusaria communis* var. *coccodes* (Ach.) Körb., *Pertusaria phymatodes* (Ach.) Erichsen, *Pertusaria polycarpiza* M. Choisy & Werner

N - **VG**, **Frl**, **Ven** (Lazzarin 1997), **Lomb**, **Emil** (Nimis & al. 1996, Tretiach & al. 2008), **Lig** (Brunialti & al. 1999, Giordani & al. 2002, Giordani & Incerti 2008). **C - Tosc** (Loppi & al. 1998, 2002c, Putorti & al. 1998, Loppi & Frati 2006, Benesperi & al. 2007, Putorti & al. 1999, Brunialti & Frati 2010, Loppi & Nascimbene 2010), **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera 1998, Ravera & al. 2006), **Laz** (Ravera 2001, 2002, Massari & Ravera 2002, Zucconi & al. 2013), **Abr** (Olivieri & al. 1997, 1997b, Loppi & al. 1999, Nimis & Tretiach 1999, Stofer 2006, Corona & al. 2016), **Mol** (Frati & al. 2004, Caporale & al. 2008, Ravera & al. 2010, Genovesi & Ravera 2014), **Sar** (Zedda 1995, 2002, Rizzi & al. 2011, Cossu 2013). **S - Camp** (Aprile & al. 2003, Brunialti & al. 2010, 2013, Ravera & Brunialti 2013), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996, Incerti & Nimis 2006), **Si** (Grillo & Caniglia 2004, Stofer 2006, Liistro & Cataldo 2011).

Cr/ Ch/ A.i/ Epiph-Sax/ pH: 2-3, L: 3-4, X: 2, E: 1-3/ Alt: 1-3/ Mont: r, SmedD: vr, SmedH: rr, MedH: vr/ PT: 1/ suboc/ Note: a mild-temperate lichen, locally common, especially along the Apennines, mostly on old oaks or beech trees in open situations, with optimum in open oak woodlands, much more rarely on siliceous rocks.

Pertusaria constricta Erichsen

Rabenh. Krypt.-Flora, 9, 5, 1: 432, 1936.

N - **Lomb**, **Piem** (Isocrono & al. 2004). **C - Sar**, **S - Si** (Nimis & al. 1994).

Cr/ Ch/ S/ Epiph/ pH: 2, L: 3, X: 2, E: 1/ Alt: 2-3/ Mont: vr, SmedD: er, SmedH: er/ PT: 1/ Note: on smooth bark, especially of *Quercus* and *Fagus*, probably more widespread. The species is included in the Italian red list of epiphytic lichens as "Endangered" (Nascimbene & al. 2013c).

Pertusaria corallina (L.) Arnold

Flora, 44: 658, 1861 - *Lichen corallinus* L., Mantissa Plant., 1: 131, 1767.

Syn.: *Marfloraea corallina* (L.) S. Y. Kondr., L. Lököcs & J.-S. Hur, *Pertusaria corallina* var. *verruculosa* Erichsen, *Pertusaria dealbata* f. *corallina* (L.) Cromb., *Pertusaria harmandii* M. Choisy, *Pertusaria subdubia* Nyl., *Pertusaria syncarpa* var. *corallina* Mudd, *Variolaria corallina* (L.) Ach.

N - **Frl** (Tretiach & Hafellner 2000), **TAA** (Caniglia & al. 2002), **Lomb** (Dalle Vedove & al. 2004), **Piem** (Isocrono & al. 2004), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Piervittori & al. 2001), **Emil** (Tretiach & al. 2008), **Lig**, **C - Tosc** (Tretiach & al. 2008), **Laz** (Zucconi & al. 2013), **Abr**, **Sar** (Nöske 2000, Rizzi & al. 2011). **S - Cal** (Puntillo 1996), **Si** (Grillo & al. 1996, Grillo 1998, Grillo & Caniglia 2004).

Cr/ Ch/ A.i/ Sax/ pH: 1-2, L: 3-4, X: 2-3, E: 1/ Alt: 3-5/ Alp: r, Salp: rr, Orom: er, Mont: vr/ PT: 1/ Note: a cool-temperate to boreal-montane lichen found on steeply inclined surfaces of siliceous rocks in rainy areas, where it is sometimes very abundant; most frequent in the Alps, rarer elsewhere, ranging south to the mountains of Sicily.

Pertusaria coronata (Ach.) Th. Fr.

Lichenogr. Scand., 1: 321, 1871 - *Porina coronata* Ach., Lichenogr. Univ.: 310, 1810.

Syn.: *Pertusaria coronata* var. *isidiifera* (Erichsen) Almb., *Pertusaria isidiifera* Erichsen

N - **Frl**, **Ven** (Lazzarin 1997, Nascimbene & al. 2005b, 2006c, 2007, 2008c), **TAA** (Nascimbene 2008b), **VA** (Valcuvia 2000, Valcuvia & al. 2000b), **Emil** (Tretiach & al. 2008), **Lig** (Giordani & al. 2009, Giordani & Incerti 2008). **C - Tosc** (Benesperi & al. 2007), **Umb** (Panfili 2000b, Ravera & al. 2006), **Abr** (Di Santo & Ravera 2012, Corona & al. 2016), **Mol** (Paoli & al. 2015), **Sar** (Rizzi & al. 2011). **S - Si**.

Cr/ Ch/ A.i/ Epiph/ pH: 2-3, L: 3-4, X: 2, E: 1-2/ Alt: 1-3/ Mont: r, SmedD: er, SmedH: vr, MedH: er/ PT: 1/ Note: a mild-temperate lichen found on bark of deciduous trees below the subalpine belt. Easily mistaken with the chemically different *P. coccodes*, and perhaps more widespread.

Pertusaria digrediens Nyl.

Act. Soc. Linn. Bordeaux, 53: 91, 1898.

N - **TAA**, **Piem**, **VA** (Piervittori & Isocrono 1999). **C - Tosc** (TSB 36928), **Sar** (Rizzi & al. 2011, Giordani & al. 2013). **S - Bas** (Nimis & Tretiach 1999), **Si** (TSB 11411).

Cr/ Ch/ A.s/ Sax/ pH: 2-3, L: 4, X: 2-3, E: 1-2/ Alt: 1-3/ Mont: vr, SmedD: vr, SmedH: vr, MedH: er/ PT: 1/ #/ Note: on siliceous rocks below the subalpine belt; closely related to *P. leucosora*, this taxon deserves further study.

Pertusaria dispar J. Steiner

Österr. bot. Z., 67: 279, 1918.

C - **Tosc** (Craighero 2010), **Laz** (Craighero 2010), **Sar** (Craighero 2010).

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 3-4, X: 2-3, E: 2-3/ Alt: 1/ MedH: r/ PT: 1/ Note: this species, which was described from Portugal and was previously known only from the Iberian Peninsula, grows on *Juniperus* in coastal situations, and is characterised by the presence of artothelin, granulysin and gyrophoric acid; it probably has a strictly Tyrrhenian distribution in Italy.

Pertusaria erumpens Erichsen

Acta F. Flor. Univ., ser. 2, Bot. 1, 17: 1, 1935.

N - **Lig**.

Cr/ Ch/ A.s/ Sax/ pH: 1-2, L: 4, X: 2-3, E: 1/ Alt: 1-2/ SmedH: vr, MedH: vr/ PT: 1/ #/ Note: a very poorly known taxon of siliceous rocks, also reported from Romania and Austria, related to *P. aspergilla*. The indicator values are tentative.

Pertusaria excludens Nyl.

Flora, 68: 296, 1885.

Syn.: *Marfloraea excludens* (Nyl.) S. Y. Kondr., L. Lököš & J.-S. Hur, *Pertusaria inopinata* Erichsen?

N - **Frl** (Tretiach & Hafellner 2000), **VA** (Isocrono & al. 2008, Matteucci & al. 2015d), **Lig**, **C - Tosc**, **Sar** (Nöske 2000, Craighero 2010, Rizzi & al. 2011). **S - Si** (Craighero 2010).

Cr/ Ch/ A.s/ Sax/ pH: 1-2, L: 3-4, X: 2-3, E: 1/ Alt: 1-4/ Salp: er, Mont: vr, SmedH: vr, MedH: vr/ PT: 1/ suboc/ Note: on steeply inclined surfaces of sheltered siliceous rocks, probably more widespread also in the Alps.

Pertusaria flavicans Lamy

Bull. Soc. Bot. France, 25: 427, 1878.

Syn.: *Pertusaria sulphurea* Schaer. p.p. nom. illegit.

N - **Frl** (Tretiach & Hafellner 2000), **TAA**, **Lomb** (Nascimbene 2006), **Emil** (Tretiach & al. 2008), **Lig** (Brunialti & al. 1999). **C - Tosc** (Pišút 1997, Tretiach & al. 2008), **Laz**, **Sar** (Monte 1993, Nöske 2000, Rizzi & al. 2011, Cossu & al. 2015). **S - Bas** (Puntillo & al. 2009, 2012, Potenza & Fascetti 2012), **Si** (TSB 17035).

Cr/ Ch/ A.s/ Sax/ pH: 2-3, L: 3-4, X: 2-3, E: 1/ Alt: 1-5/ Alp: rc, Salp: vc, Mont: rc, SmedD: vr, SmedH: rr, MedH: r/ PT: 1/ suboc, #/ Note: on lime-free but mineral-rich siliceous rocks, mostly on sheltered, steeply inclined surfaces; chemically variable and in need of further study.

Pertusaria flavida (DC.) J.R. Laundon

Lichenologist, 2: 144, 1963 - *Variolaria flavida* DC. in Lamarck & de Candolle, Fl. Franç., 3 éd.: 177, 1815.

Syn.: *Pertusaria fallax* var. *isidioidea* (Schaer.) Anzi, *Pertusaria lutescens* (Hoffm.) Lamy nom. illegit. non (Eschw.) Kremp., *Pertusaria sorediana* Nyl., *Pertusaria wulfenii* var. *lutescens* (Hoffm.) Th. Fr., *Pertusaria wulfenii* var. *variolosa* Fr.

N - **VG** (Carvalho 1997), **Frl** (TSB 1135), **Ven** (Lazzarin 1997), **Lomb** (Zocchi & al. 1997), **Piem** (Piervittori 2003, Isocrono & Piervittori 2008, Giordani & Malaspina 2016), **Emil** (Nimis & al. 1996, Tretiach & al. 2008, Benesperi 2009, Brackel 2015), **Lig** (Brunialti & al. 1999, Putortù & al. 1999b, Giordani & al. 2002, Brunialti & Giordani 2003, Giordani 2006, Giordani & Incerti 2008). **C - Tosc** (Tretiach & Nimis 1994, Loppi & Putortù 1995b, Loppi & al. 1997b, 2006, Putortù & al. 1999, Putortù & Loppi 1999b, Benesperi & al. 2007, Tretiach & al. 2008, Brunialti & Frati 2010, Benesperi 2011, Paoli & al. 2012, Brackel 2015, Nascimbene & al. 2015), **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera 1998, Ravera & al. 2006), **Laz** (Massari & Ravera 2002, Ruisi & al. 2005, Ravera & Genovesi 2008, Brackel 2015), **Abr** (Nimis & Tretiach 1999, Stofer 2006, Brackel 2015, Catalano & al. 2016, Corona & al. 2016), **Mol** (Garofalo & al. 1999, Nimis & Tretiach 1999, Caporale & al. 2008, Ravera & al. 2010), **Sar** (Zedda 1995, 2002b, Zedda & Sipman 2001, Rizzi & al. 2011). **S - Camp** (Garofalo & al. 1999, 2010, Aprile & al. 2002, 2003, 2003b, Nimis & Tretiach 2004, Brunialti & al. 2010, 2013, Ravera & Brunialti 2013, Catalano & al. 2016), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999, Brackel 2011), **Cal** (Puntillo 1996, Incerti & Nimis 2006), **Si** (Stofer 2006, Brackel 2008b, Liistro & Cataldo 2011).

Cr/ Ch/ A.s/ Epiph/ pH: 2-3, L: 3-4, X: 2, E: 1-2/ Alt: 1-3/ Mont: r, SmedD: vr, SmedH: rc, MedH: rr, MedD: er/ PT: 1/ suboc/ Note: a mild-temperate to Mediterranean species with optimum in open oak forests, mostly on old trees, rarer in northern Italy, still common along the Apennines. Epiphytic records of *P. flavicans* from Lombardia, by Zocchi & al. (1997) and from Basilicata by Potenza (2006) probably refer to this species.

Pertusaria geminipara (Th. Fr.) Brodo

C. Knight ex Brodo, Bryologist, 87: 105, 1984 - *Lecanora geminipara* Th. Fr., Lichenogr. Scand., 1: 236, 1871.

Syn.: *Ochrolechia leprothelia* (Nyl.) Arnold, *Ochrolechia geminipara* (Th. Fr.) Vain.

N - **Ven** (Nascimbene 2003, 2004), **TAA**, **Lomb**, **Piem** (Jatta 1909-1911), **VA**.

Cr/ Ch/ A.s/ Terr/ pH: 1-2, L: 3-4, X: 2, E: 1/ Alt: 4-6/ Alp: c, Salp: rc/ PT: 1/ Note: an arctic-alpine, circumpolar lichen found on mosses, plant debris and soil over acid substrata near and above treeline, reaching the nival belt in the Alps; certainly more widespread in the Alps but overlooked, confused with other species, and undercollected in the past.

Pertusaria glomerata (Ach.) Schaer.

Lich. Helv. Spicil., 2: 66, 1826 - *Porina glomerata* Schleich. ex Ach., Lichenogr. Univ.: 310, 1810.
N - **Fri** (Tretiac & Hafellner 2000), **Ven** (Caniglia & al. 1999), **TAA**, **Lomb**, **Piem** (Isocrono & al. 2004), **Emil**. C - **Tosc** (Benesperi & al. 2007)

Cr/ Ch/ S/ Terr/ pH: 3-4, L: 4, X: 2, E: 1/ Alt: 4-5/ Alp: rr, Salp: r/ PT: 1/ Note: an arctic-alpine lichen found on more or less calciferous soil rich in humus and on plant debris in sites with a long snow-lie near and above treeline; probably restricted to the Alps and the northern Apennines in Italy.

Pertusaria graeca Erichsen

Rabenh. Krypt.-Flora, 9, 5, 1: 624, 1936.

C - **Sar**.

Cr/ Ch/ S/ Epiph/ pH: 2, L: 4, X: 2, E: 1/ Alt: 1/ MedH: vr/ PT: 1/ #/ Note: an eu-Mediterranean epiphytic species known from Corsica, Sardegna and Greece, much misunderstood in the past, whose ecology and distribution are very poorly known. The indicator values reflect the situation observed in Sardegna. It is included in the Italian red list of epiphytic lichens as "Data Deficient" (Nascimbene & al. 2013c).

Pertusaria heterochroa (Müll. Arg.) Erichsen

Rabenh. Krypt.-Flora, 9, 5, 1: 490, 1936 - *Pertusaria pustulata* var. *heterochroa* Müll. Arg., Flora, 67: 285, 1884.

Syn.: *Pertusaria maximiliana* Klem., *Pertusaria pustulata* f. *superpallens* Nyl.

N - **Lig**. C - **Tosc** (Putortì & Loppi 1999, Craighero 2010), **Laz** (Bartoli & al. 1997, Craighero 2010), **Sar** (Zedda 2002, Rizzi & al. 2011). S - **Camp** (Nimis & Tretiac 2004), **Pugl** (Nimis & Tretiac 1999, Durini & Medagli 2002, 2004, Craighero 2010), **Cal** (Puntillo 1996, Incerti & Nimis 2006), **Si** (Nimis & al. 1994, Caniglia & Grillo 2006b).

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 4-5, X: 2-3, E: 1-3/ Alt: 1-2/ SmedD: er, SmedH: rc, MedH: c, MedD: rr/ PT: 1-2/ p/ Note: a mainly Mediterranean-Atlantic species with optimum in coastal situations on smooth bark (e.g. on twigs of shrubs in garrigue vegetation); mostly Tyrrhenian in Italy. *Pertusaria ficorum* Zahlbr. is very closely related, and could prove to be the correct name for this species (Craighero 2010).

Pertusaria hymenea (Ach.) Schaer.

Lich. Helv. Spicil., 7: 353, 1836 - *Lichen hymeneus* Ach., Lichenogr. Suec. Prodr.: 80, 1799.

Syn.: *Pertusaria fallax* (Ach.) Howitt, *Pertusaria fallax* f. *fertilis* Garov., *Pertusaria hymenea* f. *glabrescens* (Nyl.) Oxner, *Pertusaria lecanorodes* Erichsen, *Pertusaria sublecanorodes* Werner, *Pertusaria wulfenii* DC., *Pertusaria wulfenii* f. *carnea* Fr., *Pertusaria wulfenii* var. *fallax* (Ach.) Th. Fr., *Porina fallax* Ach., *Porina rugosa* Ach.

N - **VG**, **Ven** (Nascimbene & Marini 2010), **TAA** (Nascimbene & al. 2007b, Nimis & al. 2015), **Lomb**, **Piem** (Isocrono & al. 2004), **Emil** (Nimis & al. 1996, Benesperi 2009), **Lig** (Castello & al. 1994, Putortì & al. 1999b, Giordani & al. 2001, 2002, Brunialti & Giordani 2003, Giordani 2006, Giordani & Incerti 2008). C - **Tosc** (Tretiac & Nimis 1994, Loppi & Putortì 1995b, Loppi 1995c, 1996, 1996b, Loppi & De Dominicis 1996, Loppi & al. 1997, 1997b, 1998b, 2002c, 2004c, 2006, Loppi & Nascimbene 1998, 2010, Putortì & al. 1998, 1999, Putortì & Loppi 1999b, Loppi & Frati 2006, Brunialti & Frati 2010, Benesperi 2011, Brunialti & al. 2012b, Paoli & al. 2012, Benesperi & al. 2013, Brackel 2015, Nascimbene & al. 2015), **Marc** (Frati & Brunialti 2006), **Umb** (Ravera 1998, Panfili 2000b, Ravera & al. 2006), **Laz** (Ravera 2001, 2002, Massari & Ravera 2002, Ruisi & al. 2005, Munzi & al. 2007, Zucconi & al. 2013, Brackel 2015), **Abr** (Olivieri & al. 1997, 1997b, Catalano & al. 2016), **Mol** (Garofalo & al. 1999, Caporale & al. 2008), **Sar** (Zedda 1995, 2002, 2002b, Loi & al. 2000, Zedda & Sipman 2001, Zedda & al. 2001, Rizzi & al. 2011, Stofer 2006, Cossu 2013). S - **Camp** (Garofalo & al. 1999, 2010, Ricciardi & al. 2000, Aprile & al. 2002, 2003, 2003b, 2011, Nimis & Tretiac 2004, Catalano & al. 2010, 2016, Brunialti & al. 2013, Ravera & Brunialti 2013), **Pugl** (Nimis & Tretiac 1999), **Bas** (Bartoli & Puntillo 1998, Nimis & Tretiac 1999, Potenza 2006), **Cal** (Puntillo 1995, 1996, Puntillo & Puntillo 2004, Incerti & Nimis 2006, Brackel & Puntillo 2016), **Si** (Nimis & al. 1994, 1995, Grillo & al. 2002, Grillo & Caniglia 2004).

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 4-5, X: 2-3, E: 1-2/ Alt: 1-3/ Mont: er, SmedD: vr, SmedH: rc, MedH: c, MedD: er/ PT: 1-2/ suboc/ Note: a mainly mild-temperate lichen, rare in northern Italy, still common in the Apennines, with optimum on old oaks in open stands; in the beech belt of southern Italy it is confined to isolated trees in sunny situations.

Pertusaria jurana Erichsen

Feddes Rep., 41:100, 1936.

N - **Lig**.

Cr/ Ch/ A.i/ Epiph/ pH: 1-2, L: 3, X: 2-3, E: 1/ Alt: 3/ Mont: vr/ PT: 1/ suboc/ Note: a species of humid beech forests, most frequent on *Fagus*, known from several stations in the Mediterranean mountains. It is included as "Regionally Extinct" in the Italian red list of epiphytic lichens (Nascimbene & al. 2013c).

Pertusaria leioplaca (Ach.) DC.

in Lamarck & de Candolle, Fl. Franç., ed. 3, 5/6: 173, 1815 - *Porina leioplaca* Ach., K. Svenska Vetensk.-Akad. Handl., 30: 159, 1809.

Syn.: *Pertusaria creatomma* Norman, *Pertusaria leioplaca* var. *massalongiana* (Beltr.) Jatta, *Pertusaria leioplaca* var. *polystigma* Erichsen?, *Pertusaria leucostoma* (Ach.) A. Massal., *Pertusaria massalongiana* Beltr., *Pertusaria plena* Anzi, *Pertusaria trifer* Nyl., *Pertusaria trispora* (Ohlert) B. de Lesd., *Porina leucostoma* (Ach.) Ach., *Thelotrema leucostomum* Ach.

N - VG, Frl, Ven (Lazzarin 1997, Nascimbene & al. 2005b, Nascimbene 2008c, Nascimbene & Marini 2010), **TAA** (Nascimbene & al. 2007b, 2014, Nascimbene 2014, Nimis & al. 2015), **Lomb** (Valcuvia & Truzzi 2007b), **Piem** (Isocrono & al. 2004, Matteucci & al. 2010, Giordani & Malaspina 2016), **Emil** (Nimis & al. 1996, Benesperi 2009, Brackel 2015), **Lig** (Giordani & al. 2002, Giordani 2006, Giordani & Incerti 2008). **C - Tosc** (Tretiach & Nimis 1994, Loppi & De Dominicis 1996b, Loppi & al. 1997b, 1998, 1999a, 2002c, 2004c, 2006, Putortù & al. 1998, Tretiach & Ganis 1999, Putortù & Loppi 1999b, Laganà & al. 2002, Benesperi 2006, 2011, Loppi & Putortù 2001, Benesperi & al. 2007, Loppi & Nascimbene 2010, Nascimbene & al. 2015), **Marc** (Nimis & Tretiach 1999, Frati & Brunialti 2006), **Umb** (Ravera 1998, Ravera & al. 2006), **Laz** (Bartoli & al. 1997, Ravera 2002, 2006c, Massari & Ravera 2002, Nimis & Tretiach 2004, Stofer 2006, Zucconi & al. 2013), **Abr** (Nimis & Tretiach 1999, Stofer 2006, Catalano & al. 2016, Corona & al. 2016), **Mol** (Garofalo & al. 1999, Nimis & Tretiach 1999, Caporale & al. 2008, Ravera & al. 2010, Paoli & al. 2015), **Sar** (Zedda 1995, Loi & al. 2000, Rizzi & al. 2011, Cossu 2013). **S - Camp** (Garofalo & al. 1999, 2010, Ricciardi & al. 2000, Aprile & al. 2002, 2003, 2003b, 2011, Nimis & Tretiach 2004, Brunialti & al. 2013, Ravera & Brunialti 2013, Catalano & al. 2016), **Pugl** (Nimis & Tretiach 1999, Brackel 2011), **Bas** (Bartoli & Puntillo 1998, Nimis & Tretiach 1999, Potenza 2006, Potenza & al. 2010), **Cal** (Puntillo 1995, 1996, Puntillo & Puntillo 2004, Incerti & Nimis 2006, Stofer 2006), **Si** (Nimis & al. 1994, Ottonello & Salone 1994, Ottonello & al. 1994, Grillo & Cristaudo 1995, Grillo 1998, Grillo & al. 2002, Grillo & Caniglia 2004, Caniglia & Grillo 2006b, Liistro & Cataldo 2011).

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 3-4, X: 2-3, E: 1-2/ Alt: 1-4/ Salp: r, Mont: vc, SmedD: rr, Pad: er, SmedH: c, MedH: rr, MedD: vr/ PT: 1-/ p/ Note: a holarctic, mainly temperate early coloniser of smooth bark found on a wide variety of (mostly) broad-leaved trees; most common in the montane belt, in the Mediterranean belt it is restricted to humid situations.

***Pertusaria leucosora* Nyl.**

Flora, 60: 223, 1877.

N - TAA, Piem (Craighero 2010), **VA, Lig, C - Tosc** (Craighero 2010), **Marc** (Craighero 2010), **Laz** (Craighero 2010), **Abr** (Craighero 2010), **Sar** (Monte 1993, Nöske 2000, Craighero 2010).

Cr/ Ch/ A.s/ Sax/ pH: 1-2, L: 4, X: 2-3, E: 1/ Alt: 3-5/ Alp: vr, Salp: r, Mont: rr/ PT: 1/ Note: on siliceous rocks in upland areas. According to Roux & coll. (2014) this species is very closely related to, but distinct from *P. aspergilla*.

***Pertusaria mammosa* Harm.**

Lich. France, 5: 1141, 1913.

Syn.: *Marfloraea mammosa* (Harm.) S. Y. Kondr., L. Lökös & J.-S. Hur, *Pertusaria etrusca* Erichsen

C - Tosc, Laz, Sar (Nöske 2000). **S - Cal** (Puntillo 1996).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4, X: 2, E: 1-2/ Alt: 1-2/ SmedH: er, MedH: r/ PT: 1/ suboc/ Note: on steeply inclined to vertical surfaces of siliceous rocks in humid areas, usually below the montane belt; mainly Tyrrhenian in Italy.

***Pertusaria melanochlora* (DC.) Nyl.**

Bull. Soc. Linn. Normandie, sér. 2, 6: 289, 1872 - *Isidium melanochlorum* DC. in Lamarck & de Candolle, Fl. Franç., 3 éd., 2: 326, 1805.

C - Tosc, Laz (Tretiach 2004), **Sar** (Monte 1993).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 3-4, X: 2, E: 1/ Alt: 1-2/ SmedH: er, MedH: vr/ PT: 1/ suboc, #/ Note: a probably Mediterranean-Atlantic, very poorly known and often misunderstood taxon (e.g. confused with *P. mammosa*), found on compact siliceous rocks, usually below the montane belt. Several earlier records reported by Nimis (1993: 516) are not accepted here.

***Pertusaria monogona* Nyl.**

Bull. Soc. Linn. Normandie, sér. 2, 6: 289, 1872.

Syn.: *Pertusaria ceuthocarpa* var. *variolosa* Mudd, *Pertusaria clementeana* auct.

C - Tosc (Pišút 1997), **Sar** (Pišút 1997). **S - Cal** (Brackel & Puntillo 2016, Raavera & al. 2016).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4, X: 2, E: 1/ Alt: 1-2/ SmedH: er, MedH: vr/ PT: 1/ Note: on steeply inclined to vertical surfaces of more or less basic siliceous rocks, often near the coast; most common in Tyrrhenian Italy.

***Pertusaria multipuncta* (Turner) Nyl.**

Lichenes Scand.: 179, 1861 - *Variolaria multipuncta* Turner, Trans. Linn. Soc. London, 9: 137, 1808.

Syn.: *Pertusaria globulifera* var. *sorediata* Mudd, *Pertusaria leptospora* Nitschke, *Pertusaria sorediata* C. Knight

N - Frl, Ven (Nascimbene & Caniglia 2000), **TAA** (Nascimbene & al. 2007b), **Lomb, Piem** (Jatta 1909-1911), **VA** (Pierivittori & Isocrono 1999), **Emil, C - Tosc** (Jatta 1909-1911), **Abr** (Di Santo & Ravera 2012, Corona & al. 2016), **Mol** (Ravera & Genovesi 2010, Ravera & al. 2010), **Sar** (Rizzi & al. 2011). **S - Cal** (Puntillo 1996, Incerti & Nimis 2006).

Cr/ Ch/ A.s/ Epiph/ pH: 1-2, L: 3, X: 2, E: 1-2/ Alt: 2-3/ Mont: r, SmedD: er, SmedH: vr/ PT: 1/ suboc/ Note: a mainly temperate species found on smooth bark of deciduous trees (especially *Carpinus* and *Fagus*) in open, humid deciduous woodlands.

***Pertusaria oculata* (Dicks.) Th. Fr.**

Lichenogr. Scand., 1: 307, 1871 - *Lichen oculatus* Dicks., Fasc. Pl. Crypt. Brit., 2: 17, 1790.

Syn.: *Lecanidium oculatum* (Dicks.) A. Massal., *Lecanora oculata* (Dicks.) Ach.

N - **Frl** (Tretiach & Hafellner 2000), **TAA**, **Lomb**, **Piem**, **VA** (Piervittori & Isocrono 1999), **Emil** (Dalle Vedove & al. 2002), **Lig** (Anzi, Lich. Rar. Lang. Exs. 510: S-F135384).

Cr/ Ch/ A.i/ Terr/ pH: 1-2, L: 4, X: 2, E: 1/ Alt: 4-5/ Alp: rr, Salp: r/ PT: 1/ Note: a circumpolar, arctic-alpine lichen found on soil and plant remains on siliceous substrata, mostly above treeline; restricted to the Alps and the northern Apennines in Italy.

Pertusaria ophthalmiza (Nyl.) Nyl.

Flora, 48: 354, 1865 - *Pertusaria multipuncta* var. *ophthalmiza* Nyl., Lichenes Scand.: 180, 1861.

Syn.: *Marfloraea ophthalmiza* (Nyl.) S.Y. Kondr., L. Lökös & J.-S. Hur, *Pertusaria multipuncta* auct. p.p. non (Turner) Nyl.

N - **Frl** (Martellos 2005), **TAA** (Nascimbene & al. 2007b, 2014, Nascimbene 2014, Nascimbene & Marini 2015). **C** - **Sar** (Sipman *in litt.*). **S** - **Pugl** (Thüs & Licht 2006).

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 2-3, X: 1-2, E: 1/ Alt: 3-4/ Salp: r, Mont: vr/ PT: 1/ Note: a cool-temperate to southern boreal lichen with optimum on the bark of coniferous trees (*Abies*, *Picea*), both on boles and twigs in humid-cold situations (e.g. in gorges, dolinas), but also occurring on *Fagus*; certainly more widespread in the Alps, and also reported from the Gargano Peninsula., and from the mountains of Sardegna. In the past the species might have been confused with *P. multipuncta*, which has a different chemistry. See also note on *P. caesioalba*.

Pertusaria paramerae A. Crespo & Vězda

Anal. Jard. Bot. Madrid, 41, 2: 252, 1985.

S - **Bas**.

Cr/ Ch/ S/ Epiph/ pH: 1-3, L: 3-4, X: 3-4, E: 1-2/ Alt: 3/ Mont: er/ PT: 1/ Note: this species was described from the Iberian Peninsula, where it mostly grows on *Juniperus thurifera*. According to Sipman (*in litt.*), who has studied the specimen, the earlier record of *P. rhodiensis* from Basilicata (see Nimis 1993: 519) refers to *P. paramerae*. The species, which is also known from Turkey, is chemically variable (see Halıcı & al. 2010).

Pertusaria pertusa (L.) Tuck. var. *pertusa*

Enum. N. America Lich.: 56, 1845 - *Lichen pertusus* L., Mantissa Pl.: 131, 1767.

Syn.: *Pertusaria colliculosa* Körb., *Pertusaria communis* DC., *Pertusaria communis* var. *leiotera* Nyl., *Pertusaria communis* var. *pertusa* (L.) Körb., *Pertusaria leioterella* Erichsen, *Pertusaria oleae* Zschacke, *Pertusaria pertusa* var. *leiotera* (Nyl.) Zahlbr., *Pertusaria pertusa* var. *meridionalis* (Zahlbr.) Zahlbr., *Porina pertusa* (L.) Ach., *Variolaria communis* (DC.) Ach.

N - **VG** (Carvalho 1997), **Frl**, **Ven** (Lazzarin 1997, Nascimbene & al. 2005b, 2006c, 2007, Nascimbene & Marini 2010), **TAA** (Nascimbene & al. 2007b, Nimis & al. 2015), **Lomb** (Zocchi & al. 1997, Chiappetta & al. 2005), **Piem** (Isocrono & al. 2004, 2007, Giordani & Malaspina 2016), **VA** (Piervittori & Isocrono 1999), **Emil** (Nimis & al. 1996, Tretiach & al. 2008, Benesperi 2009, Brackel 2015), **Lig** (Brunialti & al. 1999, Putorti & al. 1999b, Giordani & al. 2002, Brunialti & Giordani 2003, Giordani 2006, Giordani & Incerti 2008). **C** - **Tosc** (Tretiach & Nimis 1994, Loppi & Putorti 1995b, Loppi & De Dominicis 1996b, Loppi & al. 1997, 1997b, 1999a, 2002c, 2004c, 2006, Monaci & al. 1997, Loppi & Nascimbene 1998, 2010, Putorti & al. 1998, 1999, Tretiach & Ganis 1999, Putorti & Loppi 1999b, Loppi & Pirintzos 2000, Del Guasta 2001, Laganà & al. 2002, Lorenzini & al. 2003, Loppi & Frati 2006, Benesperi 2006, 2011, Benesperi & al. 2007, Lastrucci & al. 2009, Pasquinelli & al. 2009, Brunialti & Frati 2010, Brackel 2015, Nascimbene & al. 2015), **Marc** (Nimis & Tretiach 1999, Frati & Brunialti 2006, Brackel 2015), **Umb** (Ravera 1998, Ravera & al. 2006, 2011, Panfili 2007), **Laz** (Ravera 2002, Massari & Ravera 2002, Nimis & Tretiach 2004, Ruisi & al. 2005, Stofer 2006, Zucconi & al. 2013, Brackel 2015), **Abr** (Nimis & Tretiach 1999, Stofer 2006, Brackel 2015, Catalano & al. 2016, Corona & al. 2016), **Mol** (Garofalo & al. 1999, Nimis & Tretiach 1999, Caporale & al. 2008, Ravera & al. 2010, Paoli & al. 2015), **Sar** (Zedda 1995, 2002, 2002b, Loi & al. 2000, Zedda & Sipman 2001, Zedda & al. 2001, Rizzi & al. 2011, Cossu 2013). **S** - **Camp** (Garofalo & al. 1999, 2010, Ricciardi & al. 2000, Aprile & al. 2002, 2003, 2003b, 2011, Brunialti & al. 2010, 2013, Catalano & al. 2012, 2016, Ravera & Brunialti 2013), **Pugl** (Nimis & Tretiach 1999, Durini & Medagli 2004, Brackel 2011), **Bas** (Bartoli & Puntillo 1998, Nimis & Tretiach 1999, Potenza 2006, Brackel 2011), **Cal** (Puntillo 1995, 1996, Incerti & Nimis 2006, Stofer 2006, Brackel & Puntillo 2016), **Si** (Nimis & al. 1994, Ottonello & Salone 1994, Ottonello & al. 1994, Grillo & al. 1996, Ottonello 1996, Ottonello & Romano 1997, Grillo 1998, Merlo 2004, Grillo & Caniglia 2004, Caniglia & Grillo 2006b, Stofer 2006, Brackel 2008b, Liistro & Cataldo 2011).

Cr/ Ch/ S/ Epiph/ pH: 2, L: 3, X: 2-3, E: 1-2/ Alt: 1-4/ Salp: er, Mont: vc, SmedD: r, SmedH: rc, MedH: rc/ PT: 1-2/ Note: a mainly temperate lichen with optimum on smooth bark in the deciduous forest belts and in natural habitats, most abundant in the montane belt; almost extinct in the plains of northern Italy and very rare in the eu-Mediterranean belt, except in humid, mostly coastal areas.

Pertusaria pertusa var. *rupestris* (DC.) Dalla Torre & Sarnth.

Die Flechten von Tyrol: 309, 1902 - *Pertusaria communis* var. *rupestris* DC. in Lamarck & de Candolle, Fl. Franç., 3 éd., 2: 162, 1805.

Syn.: *Pertusaria areolata* (Ach.) A. Massal., *Pertusaria chionea* DC., *Pertusaria communis* var. *plumbea* Duby, *Pertusaria pertusa* var. *areolata* (Ach.) Tuck., *Pertusaria rupestris* (DC.) Schaer., *Pertusaria rupestris* f. *subfarinosa* (Anzi) Erichsen, *Pertusaria rupestris* var. *subfarinosa* Anzi, *Pertusaria subrupestris* Zschacke, *Porina pertusa* var. *areolata* Ach.

N - **TAA**, **Lomb**, **Piem** (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999, Valcuvia 2000, Matteucci & al. 2008c), **Emil**, **Lig** (Brunialti & al. 1999). **C** - **Tosc**, **Marc**, **Laz**, **Sar** (Rizzi & al. 2011, Cossu & al. 2015). **S** - **Camp** (Garofalo & al. 1999, Ricciardi & al. 2000), **Cal** (Puntillo 1996), **Si** (Ottonello & Romano 1997, Grillo & Caniglia 2004).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 3-4, X: 2, E: 1-2/ Alt: 1-3/ Mont: vr, SmedD: er, SmedH: rc, MedH: rr/ PT: 1/ Note: a mainly temperate lichen found on base-rich siliceous rocks, often near the coast, but also in the coastal mountains of Tyrrhenian Italy. The relationship with the epiphytic forms could be best understood by a DNA study.

Pertusaria pluripuncta Nyl.

Flora, 66: 532, 1883.

Syn.: *Pertusaria gallica* B. de Lesd., *Pertusaria rupicola* var. *bispora* Werner

C - **Tosc** (Craighero 2010), **Sar** (Monte 1993, Craighero 2010, Rizzi & al. 2011). **S - Si** (Craighero 2010).

Cr/ Ch/ S/ Sax/ pH: 3, L: 4, X: 2, E: 1-2/ Alt: 1/ MedH: rc, MedD: vr/ PT: 1/ coast/ Note: a characteristic species of coastal communities on base- or mineral-rich siliceous rocks, where it can be very abundant; exclusively Tyrrhenian in Italy. For synonymies see Lumbsch & al. (1993).

Pertusaria pseudocorallina (Lilj.) Arnold

Verh. zool.-bot. Ges. Wien, 37: 84, 1887 - *Lichen pseudocorallinus* Lilj., K. Svenska Vetensk.-Akad. Handl.: 129, 1791.

Syn.: *Pertusaria ceuthocarpa* f. *microstictica* (Sm.) Croub., *Pertusaria ceuthocarpoides* var. *microstictica* (Sm.) Zahlbr., *Pertusaria ceuthocarpoides* Zahlbr., *Pertusaria concreta* Nyl., *Pertusaria ludovicæ* Werner, *Pertusaria microstictica* (Sm.) Erichsen, *Pertusaria westringii* (Lilj.) Leight.

N - Ven (Massalongo, Lich. Ital. Exs., 86: S-F136938), **TAA, Lomb** (Zocchi & al. 1997), **Piem** (Morisi & Sereno 1995), **VA** (Piervittori & Isocrono 1999, Matteucci & al. 2015c), **Emil** (TSB 35577, Watson 2014), **Lig. C - Tosc** (Tretiach & al. 2008), **Sar** (Rizzi & al. 2011, Cossu & al. 2015).

Cr/ Ch/ A.i/ Sax/ pH: 2-3, L: 4, X: 2, E: 1-2/ Alt: 1-3/ Mont: vr, SmedD: er, SmedH: r, MedH: vr/ PT: 1/ suboc/ Note: a mild-temperate species found on steeply inclined surfaces of siliceous rocks wetted by rain.

Pertusaria pupillaris (Nyl.) Th. Fr.

Lichenogr. Scand., 1: 305, 1871 - *Lecanora pupillaris* Nyl., Lichenes Scand.: 167, 1861.

N - TAA (Nascimbene 2005, 2014, Nascimbene & al. 2006e, 2008c, 2014, Thor & Nascimbene 2007, Nascimbene & Marini 2015, Nimis & al. 2015). **C - Tosc. S - Cal** (van den Boom & Giralt 2002).

Cr/ Ch/ A.s/ Lign-Epiph/ pH: 1-3, L: 3, X: 2-3, E: 1/ Alt: 2-4/ Salp: er, Mont: r/ PT: 1/ suboc/ Note: a temperate to southern boreal-montane, perhaps holarctic lichen found on hard lignum and smooth bark; overlooked, being almost always sterile, and perhaps more widespread, albeit never common, in upland areas of Italy; to be looked for throughout the Alps.

Pertusaria pustulata (Ach.) Duby

Bot. Gall., 2, 2: 673, 1830 - *Porina pustulata* Ach., Lichenogr. Univ.: 309, 1810.

Syn.: *Pertusaria melaleuca* (Turner & Borrer) Duby, *Pertusaria melaleuca* var. *glabrata* (Anzi) H. Olivier, *Pertusaria wulfenii* var. *cerasi* Jatta, *Pertusaria wulfenii* var. *glabrata* Anzi, *Variolaria pustulata* (Brodo & W.L. Culb.) Lendemer, B.P. Hodk. & R.C. Harris

N - VG (Craighero 2010), **Frl, Ven, TAA** (Nascimbene & al. 2007b), **Lomb, Piem** (Isocrono & al. 2004, Giordani & Malaspina 2016), **Lig** (Giordani & al. 2002, Brunialti & Giordani 2003, Giordani 2006, Giordani & Incerti 2008). **C - Tosc** (Loppi & al. 2002b, Stofer 2006, Brunialti & Frati 2010, Brunialti & al. 2012b), **Marc, Umb** (Ravera 1998, Ravera & al. 2006), **Laz** (Massari & Ravera 2002, Ravera 2006c, 2008b, Ruisi & al. 2005, Craighero 2010, Zucconi & al. 2013), **Abr** (Stofer 2006), **Mol** (Caporale & al. 2008), **Sar** (Rizzi & al. 2011). **S - Camp** (Nimis & Tretiach 2004, Craighero 2010, Garofalo & al. 2010, Brunialti & al. 2013, Ravera & Brunialti 2013), **Pugl, Bas** (Potenza & al. 2014), **Cal** (Puntillo 1996, Stofer 2006), **Si** (Stofer 2006).

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 3, X: 2-3, E: 1/ Alt: 1-3/ Mont: rr, SmedD: vr, SmedH: r, MedH: er/ PT: 1/ suboc/ Note: a mainly temperate species found on deciduous trees with smooth bark, especially *Carpinus* and *Fagus*, more rare on deciduous oaks in moist woodlands; most frequent in northern Italy and in upland areas of the South, but also occurring near the coast in humid situations.

Pertusaria rupicola (Fr.) Harm.

Bull. Soc. Sc. Nancy, sér. 2: 32, 1897 - *Pertusaria wulfenii* var. *rupicola* Fr., Lichenogr. Eur. Ref.: 424, 1831.

Syn.: *Pertusaria fallax* var. *rupicola* f. *sterilis* Garov., *Pertusaria rupicola* var. *coralloidea* (Anzi) Croz., *Pertusaria sulphurea* A. Massal. non Schaer., *Pertusaria sulphurea* var. *coralloidea* (Anzi) Jatta

N - TAA, Piem (Isocrono & al. 2003), **Emil, Lig** (Brunialti & al. 1999, Valcuvia & al. 2000). **C - Tosc, Laz** (Genovesi & al. 2011), **Mol** (Ravera & Genovesi 2012, Genovesi & Ravera 2014), **Sar** (Monte 1993, Nöske 2000, Rizzi & al. 2011, Giordani & al. 2013). **S - Camp** (Ricciardi & al. 2000, Catalano & al. 2016), **Pugl, Si** (Ottonello & Romano 1997).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 3-4, X: 2, E: 1-2/ Alt: 1-3/ Mont: er, SmedD: er, SmedH: rr, MedH: rc, MedD: er/ PT: 1/ suboc/ Note: a mild-temperate lichen of siliceous rocks, most frequent in Tyrrhenian Italy near the coast, but also occurring in the mountains. Isidiate and fruiting specimens are often found together, and intermediate specimens are frequent, the isidiate morphs (those with isidioid papillae bearing pycnidia) are better treated at the rank of *forma*.

Pertusaria schaeferi Hafellner

in Hafellner & Türk, Stapfia, 76: 155, 2001 *nom. nov. pro Spiloma isidioides* Schaer. Naturw. Anz. allg. Schweiz Ges. Gesamt. Naturwiss., 5: 34, 1821.

N - Frl (Tretiach & Hafellner 2000), **TAA, VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Matteucci & al. 2015c), **Emil** (TSB 4448).

Cr/ Ch/ A.i/ Sax/ pH: 2-3, L: 3-4, X: 2, E: 1/ Alt: 4-6/ Alp: r, Salp: er/ PT: 1/ Note: on base- or mineral-rich rocks in rainy areas near and above treeline, up to the nival belt in the Alps; probably restricted to the Alps and the northern Apennines in Italy.

Pertusaria slesvicensis Erichsen

Feddes Rep., 35: 391, 1934.

Syn.: *Pertusaria amara* f. *slesvicensis* (Erichsen) Almb.

C - Tosc (Brunialti & Frati 2010, Craighero 2010), **Laz** (Ravera 2001, 2002, Massari & Ravera 2002, Craighero 2010), **Mol** (Caporale & al. 2008), **Sar** (Zedda 1995, 2002, Loi & al. 2000, Zedda & Sipman 2001, Zedda & al. 2001, Craighero 2010, Cossu 2013), **S - Camp** (Brunialti & al. 2010, 2013, Craighero 2010, Ravera & Brunialti 2013), **Pugl** (Craighero 2010), **Bas** (Craighero 2010), **Cal** (Puntillo 1996, Incerti & Nimis 2006, Craighero 2010).

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 3-4, X: 3, E: 1-2/ Alt: 1/ MedH: rr, MedD: er/ PT: 1/ Note: a mainly Mediterranean lichen related to *P. amara*, but regularly fruiting, and restricted to eu-Mediterranean areas, with a mainly Tyrrhenian distribution in Italy (Craighero 2010). A DNA study could better clarify its status. It is included in the Italian red list of epiphytic lichens as “Data Deficient” (Nascimbene & al. 2013c).

Pertusaria sommerfeltii (Sommerf.) Fr.

Lichenogr. Eur. Ref.: 423, 1831 - *Endocarpon sommerfeltii* Flörke ex Sommerf., Suppl. Fl. Lappon.: 135, 1826.

Syn.: *Pertusaria angusticollis* Anzi, *Pertusaria melastoma* Nyl.

N - Frl, Ven, TAA (Nascimbene & al. 2007b), **Lomb, VA** (Piervittori & Isocrono 1999). **C - Marc** (Nimis & Tretiach 1999).

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 3-4, X: 3, E: 1/ Alt: 4-5/ Alp: vr, Salp: rc, Orom: er/ PT: 1/ Note: a circumpolar, subarctic-subalpine to boreal-montane lichen found on smooth bark of subalpine shrubs; most frequent in the Alps, rarer in the Apennines.

Pertusaria stenhammarii Hellb.

K. Svensk. Vetensk.-Akad. Förh., 22: 463, 1866.

N - TAA (Nascimbene & al. 2007b).

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 3-4, X: 3, E: 1/ Alt: 3-4/ Salp: er, Mont: er/ PT: 1/ Note: a very rarely collected, apparently panboreal-montane species found on the bark of conifers, with optimum in the upper montane and subalpine belts. Normally fertile, but the var. *elatina* Erichsen, described from the Alps, is sorediate. It is included in the Italian red list of epiphytic lichens as “Data Deficient” (Nascimbene & al. 2013c).

Pertusaria teneriffensis Vain.

Kgl. Dansk. Vidensk. Skrift., naturv. og math. afd., 8. række, vol. VI: 394 (112), 1924.

S - Si (Craighero 2010, Craighero & Tretiach 2010).

Cr/ Ch/ A.s/ Sax/ pH: 3, L: 3-4, X: 3, E: 1/ Alt: 1/ MedH: vr, MedD: vr/ PT: 1/ Note: a Mediterranean-Macaronesian species, for Italy hitherto known only from the island of Linosa, which hosts an interesting group of vascular plants with Macaronesian affinities.

Pertusaria trachythallina Erichsen

Ark. Bot., 30 A, 1: 36, 1940.

Syn.: *Pertusaria laevigata* (Nyl.) Arnold non (Th. Fr.) Anzi, *Variolaria trachythallina* (Erichsen) Lendemer, B.P. Hodk. & R.C. Harris

N - TAA.

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 3, X: 2, E: 1/ Alt: 3/ Mont: vr/ PT: 1/ #/ Note: a cool-temperate, perhaps circumpolar lichen found on smooth bark of deciduous trees, especially *Fagus*, in humid montane forests. It is included as “Regionally Extinct” in the Italian red list of epiphytic lichens (Nascimbene & al. 2013c).

Pertusaria waghornei Hulting

Hedwigia, 35: 191, 1896.

S - Pugl (Thüs & Licht 2006).

Cr/ Ch/ S/ Epiph/ pH: 2, L: 3, X: 1-2, E: 1-2/ Alt: 3/ Mont: er/ PT: 0/ suboc/ Note: a suboceanic epiphytic lichen recently found in the Gargano Peninsula, whose nearest populations are in humid forests of the northern Alps.

Petractis Fr.

Summa Veg. Scand., 1: 120, 1845.

In their molecular analysis of the Gyalectales and Ostropales, Kauff & Lutzoni (2002) have transferred two species of *Petractis* to the genus *Gyalecta*. The genus *Petractis s.str.*, which includes the type species, *P. clausa*, *P. farlowii* (which, like *P. clausa*, bears cyanobacteria as symbionts), and *P. luetkemuelleri*, remains heterogeneous. Type: *P. exanthematica* (Sm.) Fr. (= *P. clausa*).

Petractis clausa (Hoffm.) Kremp.

Denkschr. bayer. bot. Ges., 4, 2: 254, 1861 - *Lichen clausus* Hoffm., Enum. Lich.: 48, 1784.

Syn.: *Gyalecta clausa* (Hoffm.) A. Massal., *Gyalecta exanthematica* (Sm.) Fr., *Lecidea exanthematica* (Sm.) Nyl., *Petractis exanthematica* (Sm.) Fr., *Thelotrema clausum* (Hoffm.) Schaer., *Thelotrema exanthematicum* (Sm.) Ach., *Urceolaria exanthematica* (Sm.) Ach.

N - **VG** (Nimis & Tretiach 1995, Tretiach & Pecchiari 1995, Geletti 1997, Pinna & al. 1998, Crisafulli & al. 2006, Mathieu & al. 2006, Piervittori & al. 2006), **Fri** (Breuss 2008, Cucchi & al. 2009, Brackel 2013), **Ven** (Nascimbene & Caniglia 2003c, Thor & Nascimbene 2007, Nascimbene & Marini 2007, Nascimbene 2008c), **TAA** (Nascimbene & al. 2007b), **Lomb**, **Piem** (Isocrono & al. 2004, Morisi 2005), **Emil**, **Lig**, **C** - **Tosc** (Benesperi 2006, Tretiach & al. 2008), **Marc** (Nimis & Tretiach 1999), **Umb** (Genovesi & Ravera 2001, Ravera & al. 2006, Panfili 2007), **Laz**, **Abr** (Nimis & Tretiach 1999), **Mol** (Caporale & al. 2011), **Sar**, **S** - **Camp** (Aprile & al. 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010), **Pugl**, **Cal** (Puntillo 1996), **Si** (Ottonello & Salone 1994, Ottonello & al. 1994, Grillo 1998, Grillo & Caniglia 2004, Grillo & al. 2007b, 2009, Liistro & Cataldo 2011).

Cr.end/ Cy.h/ S/ Sax/ pH: 5, L: 1-3, X: 2-3, E: 1-2/ Alt: 1-3/ Mont: rr, SmedD: rc, SmedH: c, MedH: rr, MedD: er/ PT: 1/ suboc/ Note: a temperate species found on compact calcareous rocks in humid-shaded situations, such as in gorges and woodlands, with optimum in the submediterranean belt.

Petractis luetskemuelleri (Zahlbr.) Vězda

Preslia, 37: 137, 1965 - *Gyalecta luetskemuelleri* Zahlbr., Österr. bot. Z., 53: 178, 1903.

C - **Tosc** (TSB 35238), **Sar**, **S** - **Camp** (Nimis & Tretiach 2004, Garofalo & al. 2010), **Pugl** (Nimis & Tretiach 1999, Durini & Medagli 2004), **Bas** (Bartoli & Puntillo 1996, 1998), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994).

Cr.end/ Tr/ S/ Sax/ pH: 5, L: 1-3, X: 1-2, E: 1/ Alt: 1/ MedH: rr, MedD: vr/ PT: 1/ coast/ Note: on sheltered, often north-facing surfaces of calcareous cliffs, usually near the sea. The species does not belong to *Petractis s.str.*

Phaeographis Müll. Arg.

Flora, 65, 21: 336, 1882.

In their molecular phylogeny of the Graphidaceae, Rivas-Plata & al. (2013) have shown that the genus *Phaeographis* is polyphyletic. *Phaeographis s.str.* thus far appears to be restricted to the type species, *P. dendritica*, which is characterised by a white, ecorticate thallus and non-pruinose ascomata. Most of the *c.* 180 species of *Phaeographis s.lat.* have a corticate thallus and pruinose ascomata, and the name *Ectographis* is potentially available for these. However, many more species need to be sequenced to establish a solid phylogeny and generic concept for *Phaeographis* and its allies. Type: *P. dendritica* (Ach.) Müll. Arg.

Phaeographis dendritica (Ach.) Müll. Arg.

Flora, 65: 382, 1882 - *Opegrapha dendritica* Ach., Meth. Lich.: 31, 1803.

Syn.: *Graphis dendritica* (Ach.) Ach., *Graphis scripta* var. *dendritica* (Ach.) A. Massal.

N - **VG**, **Ven**, **Lomb**, **Emil**, **Lig**, **C** - **Tosc**, **Laz**, **Abr**, **S** - **Camp**, **Bas**.

Cr/ Tr/ S/ Epiph/ pH: 2-3, L: 2-3, X: 1-2, E: 1/ Alt: 1-2/ SmedD: er, SmedH: er, MedH: er/ PT: 0/ suboc/ Note: a mild-temperate to humid subtropical species found on smooth bark of deciduous and evergreen trees in very humid, open woodlands; strongly declining in Italy and presently extinct in several regions, especially in northern Italy. It is included in the Italian red list of epiphytic lichens as “Critically Endangered” (Nascimbene & al. 2013c).

Phaeographis inusta (Ach.) Müll. Arg.

Flora, 65: 383, 1882 - *Graphis inusta* Ach., Syn. Meth. Lich.: 85, 1814.

S - **Cal** (Nimis & Puntillo 2003, Puntillo 2011).

Cr/ Tr/ S/ Epiph/ pH: 2-3, L: 2-3, X: 1, E: 1/ Alt: 1/ MedH: er/ PT: 0/ oc/ Note: a mild-temperate to humid subtropical, mainly Atlantic species in Europe, known from a single hyperhumid station in Italy. It is included in the Italian red list of epiphytic lichens as “Data Deficient” (Nascimbene & al. 2013c).

Phaeographis smithii (Leight.) B. de Lesd.

Rech. Lich. Dunkerque: 218, 1910 - *Graphis smithii* Leight. Ann. Mag. Nat. Hist., 2, 13: 278, 1854.

S - **Camp** (Nimis & Tretiach 2004, Puntillo & Puntillo 2011, Etayo & Puntillo 2011), **Cal** (Puntillo & Puntillo 2012).

Cr/ Tr/ S/ Epiph/ pH: 2-3, L: 2-3, X: 1, E: 1/ Alt: 1/ MedH: er/ PT: 0/ oc/ Note: a mild-temperate to humid subtropical, mainly Atlantic species in Europe, known from only two hyperhumid stations in Italy. It is included in the Italian red list of epiphytic lichens as “Critically Endangered” (Nascimbene & al. 2013c).

Phaeophyscia Moberg

Symb. Bot. Upsal., 22, 1: 29, 1977.

This genus of the Physciaceae, mainly characterised by the ellipsoid conidia and the absence of atranorin, comprises *c.* 30 species with a mainly temperate to tropical distribution in both Hemispheres, and is particularly well represented in the submediterranean areas of Europe. Type: *P. orbicularis* (Neck.) Moberg

Phaeophyscia cernohorskyi (Nádv.) Essl.

Mycotaxon, 7: 294, 1978 - *Physcia cernohorskyi* Nádv., Stud. Bot. Cech., 8: 98, 1947.

Syn.: *Physcia hirsuta* var. *echinella* Poelt, *Physcia setosa* var. *albiciliata* B. de Lesd., *Physcia strigosa* Poelt & Buschardt, *Phaeophyscia strigosa* (Poelt & Buschardt) N.S. Golubk.

N - **VG**, **TAA** (Nascimbene & al. 2007b, Zarabska & al. 2009), **Lomb**, **Piem** (Clerc & al. 1999), **VA** (Piervittori & Isocrono 1999), **Lig** (Valcuvia & al. 2000). **C** - **Tosc** (Loppi & al. 1994, 1995, 1997 1998b, Loppi & Frati 2006), **Marc**, **Laz**, **Abr** (Recchia & al. 1993), **Sar** (Monte 1993). **S** - **Pugl** (Nimis & Tretiach 1999), **Bas** (Puntillo & al. 2012).

Fol.n/ Ch/ A.s/ Epiph-Sax/ pH: 2-3, L: 4-5, X: 4, E: 3-4/ Alt: 1-3/ Mont: er, SmedD: vr, SmedH: vr, MedH: vr, MedD: er/ PT: 1/ Note: a widespread, often misunderstood species, chiefly epilithic in the northern part of its range, but found on a wide variety of substrata in the southern part, with optimum in dry-warm areas. The relationships with *P. hirsuta* await further study: the latter species is rather frequent throughout submediterranean Italy, whereas *P. cernohorskyi* is common and abundant only in dry-warm areas, such as in the Alpine dry valleys; several records from Tyrrhenian Italy, especially Tuscany, are therefore dubious.

Phaeophyscia ciliata (Hoffm.) Moberg

Symb. Bot. Upsal., 22, 1: 30, 1977 - *Lichen ciliatus* Hoffm., Enum. Lich.: 69, 1784.

Syn.: *Lichen ulothrix* Ach. non Hoffm., *Parmelia obscura* var. *ciliata* (Hoffm.) Schaer., *Physcia ciliata* (Hoffm.) Du Rietz, *Physcia concrustans* Nyl., *Physcia norrlinii* Vain., *Physcia obscura* auct. non (Ehrh.) Hampe ex Fűrnr., *Physcia ulothrix* (Ach.) Nyl.

N - **VG**, **Frl** (Tretiach & Molaro 2007, Brackel 2013), **Ven** (Caniglia & al. 1999, Nascimbene & Caniglia 2003c, Nascimbene 2008), **TAA** (Nascimbene & al. 2006e, 2007b, Nimis & al. 2015), **Lomb** (Arosio & al. 2003, Brackel 2010, 2013), **Piem** (Piervittori 2003, Isocrono & al. 2004, 2005b, 2007), **VA** (Piervittori & Isocrono 1999), **Emil**, **Lig** (Brunialti & Giordani 2003). **C** - **Tosc** (Tretiach & Nimis 1994, Loppi & Frati 2006), **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera 1998, Ravera & al. 2006), **Laz** (Ravera 2001, Nimis & Tretiach 2004, Ruisi & al. 2005, Ravera & Genovesi 2008, Zucconi & al. 2013, Brackel 2015), **Abr** (Recchia & al. 1993, Olivieri & Pacioni 1996, Olivieri & al. 1997, 1997b, Loppi & al. 1999, Nimis & Tretiach 1999, Catalano & al. 2016), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **Sar** (Rizzi & al. 2011). **S** - **Camp** (Aprile & al. 2003, 2003b, Nascimbene & al. 2010b, Brunialti & al. 2013, Ravera & Brunialti 2013, Catalano & al. 2016), **Pugl** (Nimis & Tretiach 1999), **Bas** (Bartoli & Puntillo 1998, Nimis & Tretiach 1999), **Cal** (Puntillo 1996, Diederich & al. 2010), **Si**.

Fol.n/ Ch/ S/ Epiph/ pH: 2-3, L: 4-5, X: 3, E: 3/ Alt: 2-3/ Mont: rr, SmedD: vr, Pad: er, SmedH: vr/ PT: 1-2/ Note: a temperate to southern boreal lichen, most frequent on *Fraxinus* and *Juglans* in montane valleys, much less common than the closely related *P. orbicularis*, being absent from heavily disturbed areas and from eu-Mediterranean vegetation, and with narrower ecological requirements.

Phaeophyscia constipata (Norrl. & Nyl.) Moberg

Symb. Bot. Upsal., 22, 1: 33, 1977 - *Physcia constipata* Norrl. & Nyl., Herb. Lich. Fenn.: nr. 218, 1882.

Syn.: *Physcia pulverulenta* var. *tenuis* Th. Fr.

N - **TAA**, **Lomb**, **Piem** (Morisi & Sereno 1995), **VA** (Piervittori & Isocrono 1999).

Fol.n/ Ch/ S/ Terr/ pH: 3-4, L: 4, X: 4, E: 2-3/ Alt: 3-5/ Alp: er, Salp: vr, Mont: er/ PT: 1/ Note: a mainly circumboreal-montane species found on mosses and plant debris on basic siliceous substrata, sometimes on soil, in upland areas; in Italy probably restricted to the Alps, in dry-warm situations.

Phaeophyscia endococcina (Körb.) Moberg

Symb. Bot. Upsal., 22, 1: 35, 1977 - *Parmelia endococcina* Körb., Parerga Lichenol.: 36, 1859.

Syn.: *Hagenia obscura* var. *musciicola* (Schaer.) Bagl., *Parmelia obscura* var. *endococcina* (Körb.) Anzi, *Physcia endochroidea* Nyl., *Physcia endococcina* (Körb.) Th. Fr., *Physcia lithotodes* Nyl.

N - **Frl** (Tretiach & Hafellner 2000), **Ven**, **TAA**, **Lomb**, **Piem** (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999, Matteucci & al. 2015c), **Lig**, **C** - **Tosc** (Benesperi & al. 2007), **Marc** (Nimis & Tretiach 1999). **S** - **Cal** (Puntillo 1996).

Fol.n/ Ch/ S/ Sax/ pH: 2-3, L: 3-4, X: 1-3, E: 2-3/ Alt: 2-5/ Alp: rr, Salp: rc, Orom: r, Mont: r, SmedD: er/ PT: 1/ Note: a cool-temperate to circumboreal-montane lichen described from Italy, found near creeks and brooks, but also along seepage tracks in warm-dry Alpine valleys; specimens without the red pigment in the medulla are relatively frequent in the Alps, mostly at low elevations.

Phaeophyscia endophoenicea (Harm.) Moberg

Symb. Bot. Upsal., 22, 1: 38, 1977 - *Physcia obscura* var. *endophoenicea* Harm., Lich. de France, 4: 645, 1910 ("1909").

Syn.: *Physcia endophoenicea* (Harm.) Sántha, *Physcia labrata* sensu Frey non Mereschk., *Physcia labrata* f. *minor* Mereschk., *Physcia labrata* var. *endophoenicea* (Harm.) Mereschk., *Physcia ocellata* Erichsen

N - **VG** (Carvalho 1997), **Frl**, **Ven** (Nascimbene 2008c), **TAA** (Ceccon & al. 2009), **Lomb** (Zocchi & al. 1997), **Piem** (Isocrono & Ferrarese 2008), **Emil** (Bassi 1995), **Lig** (Brunialti & al. 1999, Giordani & Brunialti 2000, Brunialti & Giordani 2003, Benco & al. 2004, Giordani & Incerti 2008, Masson 2008). **C** - **Tosc** (Tretiach & Nimis 1994, Putorti & al. 1999c, Paoli & Loppi 2001, Benesperi & al. 2007, Benesperi 2011), **Marc** (Nimis & Tretiach 1999), **Laz** (Nimis & Tretiach 2004), **Abr** (Nimis & Tretiach 1999, Masson 2008, Corona & al. 2016), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008, Paoli & al. 2015). **S** - **Camp** (Nascimbene & al. 2010b, Brunialti & al. 2013, Ravera & Brunialti 2013), **Pugl** (Nimis & Tretiach 1999, Masson 2008), **Bas** (Potenza & al. 2014), **Cal** (Puntillo 2011).

Fol.n/ Ch/ A.s/ Epiph/ pH: 2-3, L: 3, X: 3, E: 2-3/ Alt: 1-3/ Mont: er, SmedD: vr, SmedH: r, MedH: vr/ PT: 1/ Note: a mild-temperate lichen found on epiphytic bryophytes and bark in open, humid woodlands;

specimens without the red pigment in the medulla, which are not rare, can be easily confused with other species.

Phaeophyscia hirsuta (Mereschk.) Essl.

Mycotaxon, 7: 302, 1978 - *Physcia hirsuta* Mereschk., Ann. Cons. J. Bot. Genève, 121: 181, 1919.

Syn.: *Physcia labrata* Mereschk. non sensu Frey, *Physcia labrata* var. *olivacea* Mereschk.

N - **VG** (Castello 1996, 2002, Carvalho 1997, Martellos & Castello 2004, Castello & Skert 2005), **Frl** (Nimis & Salvadori 1998, Tretiach & Molaro 2007, Nascimbene & Salvadori 2008, Nascimbene & al. 2009b), **Ven** (Nimis & al. 1996c, Caniglia & al. 1999, Lazzarin 2000, Nascimbene & Salvadori 2008, Nascimbene 2008, Nascimbene & al. 2008e, 2015, Nascimbene & Marini 2010), **TAA** (De Benetti & Caniglia 1993, Nascimbene 2006c, 2014, Nascimbene & al. 2007b, 2014, Zarabska & al. 2009, Nimis & al. 2015), **Lomb** (Zocchi & al. 1997, Arosio & al. 2003, Furlanetto 2010), **Piem** (Caniglia & al. 1992, Piervittori 2003, Isocrono & al. 2005b, Furlanetto 2010, Giordani & Malaspina 2016), **Emil** (Gasparo & Tretiach 1996), **Lig** (Castello & al. 1994, Brunialti & al. 1999, Giordani & al. 2001, 2002, Brunialti & Giordani 2003, Giordani 2006, Benesperi & al. 2007, Giordani & Incerti 2008). **C** - **Tosc** (Tretiach & Nimis 1994, Loppi & al. 1994, 1995, 1997, 1997e, 1998, 1998b, 2002, 2002b, 2002c, 2003, 2004, Putortù & al. 1998, Benesperi 2000a, 2011, Del Guasta 2001, Lorenzini & al. 2003, Frati & al. 2006b, 2007, 2008, Brunialti & Frati 2010, Loppi & Nascimbene 2010, Paoli & al. 2012, 2012b, 2013, Brackel 2015, Nascimbene & al. 2015), **Marc** (Frati & Brunialti 2006), **Umb** (Ravera 2000, Ravera & al. 2006), **Laz** (Ravera & al. 1999, Massari & Ravera 2002, Ruisi & al. 2005, Munzi & al. 2007, Ravera 2008b, Ravera & Genovesi 2008, Zucconi & al. 2013), **Abr** (Olivieri & al. 1997, 1997b, Loppi & al. 1999, Catalano & al. 2016, Corona & al. 2016), **Mol** (Frati & al. 2004, Caporale & al. 2008, Ravera & al. 2010, Paoli & al. 2011, 2015), **Sar** (Rizzi & al. 2011). **S** - **Camp** (Aprile & al. 2003b, Nascimbene & al. 2010b, Brunialti & al. 2013, Ravera & Brunialti 2013), **Bas** (Nimis & Tretiach 1999, Paoli & al. 2006), **Cal** (Puntillo 1996, Puntillo & Puntillo 2004, Incerti & Nimis 2006), **Si** (Grillo 1998, Grillo & Caniglia 2004).

Fol.n/ Ch/ A.s/ Epiph/ pH: 3-4, L: 4-5, X: 3-4, E: 3-4/ Alt: 1-3/ Mont: er, SmedD: vr, Pad: er, SmedH: rr, MedH: r, MedD: er/ PT: 1-2/ Note: a mainly temperate lichen found on isolated trees, more rarely on rock; most common in Tyrrhenian Italy. Some older records could refer to *P. cernohorskyi*.

Phaeophyscia hispidula (Ach.) Essl.

Mycotaxon, 7: 305, 1978 - *Parmelia hispidula* Ach., Lichenogr. Univ.: 468, 1810.

Syn.: *Physcia hispidula* (Ach.) Frey, *Physcia setosa* (Ach.) Nyl.

N - **TAA** (Nascimbene & al. 2007b, Zarabska & al. 2009), **Lomb** (Zocchi & al. 1997), **Piem** (Piervittori 2003, Watson 2014).

Fol.n/ Ch/ A.s/ Terr-Epiph-Sax/ pH: 2-3, L: 3-4, X: 3, E: 2-3/ Alt: 3-4/ Salp: er, Mont: er/ PT: 1/ Note: a mainly circumboreal-montane species, mostly found on terricolous or saxicolous bryophytes in upland areas; rare and restricted to the Alps in Italy.

Phaeophyscia insignis (Mereschk.) Moberg

Bot. Not., 131: 261, 1978 - *Physcia insignis* Mereschk., Ann. Cons. J. Bot. Genève, 121: 191, 1919.

Syn.: *Physcia ticinensis* (Mereschk.) Frey, *Physcia virella* f. *tenuisecta* Mereschk., *Physcia virella* var. *gracilis* Mereschk.

N - **VG**, **Frl** (TSB 4015), **Lomb** (Zocchi & al. 1997, Arosio & al. 2003), **Piem** (Morisi & Sereno 1995, Piervittori 2003, Isocrono & al. 2005b, Giordani & Malaspina 2016), **Lig** (UPS-L-145222). **C** - **Umb** (Ravera & Ciotti 2015), **Mol** (Ravera & Genovesi 2012, Genovesi & Ravera 2014, Paoli & al. 2015), **Sar** (Zedda 2002). **S** - **Camp** (Nimis & Tretiach 2004, Garofalo & al. 2010), **Bas** (Potenza & al. 2014).

Fol.n/ Ch/ A.s/ Epiph/ pH: 2-3, L: 3-4, X: 3, E: 3/ Alt: 2/ SmedD: rr, SmedH: r/ PT: 1/ Note: a mild-temperate species found on isolated trees with base-rich, soft bark; certainly more widespread albeit never common, perhaps often confused with stout specimens of *Hyperphyscia adglutinata*.

Phaeophyscia kairamoi (Vain.) Moberg

Symb. Bot. Upsal., 22, 1: 40, 1977 - *Physcia kairamoi* Vain., Meddeland. Soc. Fauna Fl. Fenn., 46: 3, 1921.

Syn.: *Physcia karakorina* Poelt, *Physcia nadvornikii* Frey & Poelt, *Phaeophyscia nadvornikii* (Frey & Poelt) N.S. Golubk.

N - **Frl**, **TAA** (Nascimbene & al. 2007b, Zarabska & al. 2009).

Fol.n/ Ch/ A.s/ Epiph-Sax/ pH: 3, L: 4-5, X: 3, E: 2-3/ Alt: 3-5/ Alp: er, Salp: vr, Mont: er/ PT: 1-2/ Note: on base-rich bark, more rarely on calciferous schistose rocks; probably restricted to the Alps in Italy. The species is included in the Italian red list of epiphytic lichens as "Data Deficient" (Nascimbene & al. 2013c).

Phaeophyscia nigricans (Flörke) Moberg

Symb. Bot. Upsal., 22, 1: 42, 1977 - *Lecanora nigricans* Flörke, Deutsch. Lich., Anm., 5: 10, 1819.

Syn.: *Physcia leptothallina* Vain., *Physcia nigricans* (Flörke) Stizenb., *Physcia nigricans* var. *sciastrrella* (Nyl.) Lyng, *Physcia nigricans* var. *tremulicola* (Nyl.) Lyng, *Physcia obscura* var. *nigricans* (Flörke) Stein, *Physcia obscura* var. *pulvinata* (Körb.) Stein, *Physcia sciastrrella* (Nyl.) Harm., *Physcia tremulicola* Nyl., *Physcia tribacella* Nyl.

N - **Ven** (Nascimbene & Caniglia 2003c, Nascimbene 2008c), **TAA** (Thor & Nascimbene 2007, Nascimbene & al. 2007b, Zarabska & al. 2009, Nimis & al. 2015), **Lomb** (Chiappetta & al. 2005, Arosio & al. 2003, Sunil Morgan & al. 2008), **Piem** (Isocrono & al. 2005b, 2007, Griselli & al. 2003, Piervittori 2003, Giordani & Malaspina 2016), **VA** (Piervittori & Maffei 1996, 2001, Piervittori & Isocrono 1999), **Emil** (Morselli & Regazzi 2006), **Lig** (Giordani &

Brunialti 2000, Giordani & Incerti 2008). **C - Tosc** (Fрати & al. 2007), **Mol** (Paoli & al. 2015), **Sar** (Rizzi & al. 2011). **S - Camp** (Catalano & al. 2016), **Bas** (Nimis & Tretiach 1999).

Fol.n/ Ch/ A.i/ Epiph-Sax/ pH: 3-4, L: 4-5, X: 3-4, E: 4/ Alt: 2-3/ Mont: er, SmedD: rr, Pad: vr, SmedH: vr/ PT: 1-2/ p/ Note: a mainly temperate, perhaps holarctic lichen found on a wide variety of substrata, not unfrequent, but overlooked, on isolated trees in the northeastern plains, with optimum in submediterranean areas, reaching much higher altitudes in the Alps. The record from Friuli in Nimis (1993: 527) was wrong (TSB 4846!); the species has been often misunderstood and confused with dark-coloured specimens of *P. orbicularis*.

Phaeophyscia orbicularis (Neck.) Moberg

Symb. Bot. Upsal., 22, 1: 44, 1977 - *Lichen orbicularis* Neck., Delic. Gallo-Belg.: 509, 1768.

Syn.: *Parmelia cyclozelis* (Ach.) Ach., *Parmelia obscura* var. *cyclozelis* (Ach.) Schaer., *Phaeophyscia orbicularis* var. *hueana* (Harm.) Clauzade & Cl. Roux, *Physcia cyclozelis* (Ach.) Vain. ex Räsänen, *Physcia hueana* (Harm.) Klem., *Physcia obscura* (Ehrh.) Hampe ex Fürnr. non auct., *Physcia obscura* var. *hueana* (Harm.) H. Olivier, *Physcia obscura* var. *saxicola* (A. Massal.) Stein, *Physcia obscura* var. *virella* (Ach.) Leight., *Physcia orbicularis* (Neck.) Poetsch, *Physcia orbicularis* var. *glauca* (Zahlbr.) Sántha, *Physcia orbicularis* var. *virella* (Ach.) A.L. Sm., *Physcia virella* (Ach.) Flagey, *Physcia virella* var. *hueana* (Harm.) Sántha

N - VG (Carvalho 1997, Castello 2002, Martellos & Castello 2004, Castello & Skert 2005), **Fri** (Badin & Nimis 1996, Nimis & Salvadori 1997, Castello & Skert 2005, Nascimbene & Salvadori 2008, Nascimbene & al. 2009b, Bernini & al. 2010, Brackel 2013), **Ven** (Nimis & al. 1996c, Lazzarin 2000, Valcuvia & al. 2000c, Nascimbene & Caniglia 2003c, Nascimbene 2005c, 2008, Nascimbene & Marini 2007, 2010, Nascimbene & Salvadori 2008, Nascimbene & al. 2008e, 2015), **TAA** (Zieger & al. 2003, Nascimbene 2003, 2005b, 2008b, 2014, Nascimbene & al. 2005, 2006, 2007b, 2014, Thor & Nascimbene 2007, Cristofolini & al. 2008, Lang 2009, Zarabska & al. 2009, Brackel 2013, Nimis & al. 2015), **Lomb** (Arosio & Rinaldi 1995, Valcuvia & Gianatti 1995, Valcuvia & Brusoni 1996, Brusoni & al. 1997, Zocchi & al. 1997, Brusa 1998, Roella 1999, Brusoni & Valcuvia 2000, Casarini & al. 2000, Arosio & al. 2000, 2003, Anderi & al. 2005, Picco & al. 2005, Valcuvia & Truzzi 2007b, Rigamonti & al. 2008, Di Silvestro & al. 2009, Furlanetto 2010), **Piem** (Caniglia & al. 1992, Arosio & al. 1998, Piervittori 1998, 2003, Clerc & al. 1999, Buzio 2003, Castino & Ropolo 2003, Castino 2004, Isocrono & al. 2004, 2005b, 2007, 2009, Griselli & al. 2003, Isocrono & Piervittori 2008, Gazzano & al. 2009, 2009b, Furlanetto 2010, Matteucci & al. 2010 Marchiaro & al. 2013, Giordani & Malaspina 2016), **VA** (Piervittori & Maffei 1996, 2001, Piervittori & Isocrono 1999, Valcuvia & al. 2000b, Piervittori & al. 2001, Matteucci & al. 2008c), **Emil** (Bassi 1995, Gasparo & Tretiach 1996, Nimis & al. 1996, Tretiach 1997, Valcuvia & Savino 2000, Sallase 2003, Marconi & al. 2006, Morselli & Regazzi 2006, Cioffi 2009, Benesperi 2009, Malavasi 2014, Gerdol & al. 2014), **Lig** (Valcuvia & al. 2000, Giordani & al. 2001, 2002, 2016, Brunialti & Giordani 2003, Giordani 2006, Giordani & Incerti 2008). **C - Tosc** (Loppi & Corsini 1995, 2003, Loppi & Putorti 1995, 1995b, Loppi & al. 1995, 1996b, 1997, 1997e, 1998, 1998b, 2002, 2002b, 2002c, 2003, 2004, 2004c, 2006, Loppi 1996, Loppi & De Dominicis 1996, Monaci & al. 1997, Loppi & Nascimbene 1998, 2010, Bacci & al. 2000, Benesperi 2000a, 2011, Del Guasta 2001, Lorenzini & al. 2003, Landi & Loppi 2003, Loppi & Frati 2004, Frati & al. 2006b, 2007, 2008, Benesperi & al. 2007, Paoli & Loppi 2008, Lastrucci & al. 2009, Brunialti & Frati 2010, Brunialti & al. 2012b, Paoli & al. 2012, 2012b, 2013, 2015d, Brackel 2015, Nascimbene & al. 2015), **Marc** (Gasparo & al. 1989, Nimis & Tretiach 1999, Brackel 2015), **Umb** (Ravera 1998, 1999, Nimis & Tretiach 1999, Ravera & al. 2006, Brackel 2015, Ravera & Ciotti 2015), **Laz** (Ravera & al. 1999, Ravera 2002, 2008b, Massari & Ravera 2002, Nimis & Tretiach 2004, Ruisi & al. 2005, Frati & Brunialti 2006, Stofer 2006, Munzi & al. 2007, Ravera & Genovesi 2008, Zucchini & al. 2013, Brackel 2015), **Abr** (Recchia & al. 1993, Olivieri & Pacioni 1996, Olivieri & al. 1997, 1997b, Loppi & al. 1999, Nimis & Tretiach 1999, Genovesi & Ravera 2014, Brackel 2015, Caporale & al. 2016), **Mol** (Garofalo & al. 1999, Nimis & Tretiach 1999, Caporale & al. 2008, Nascimbene & al. 2010b, Paoli & al. 2011, 2015), **Sar** (Zedda 1995, 2002, 2002b, Zedda & al. 2001, Rizzi & al. 2011, Cossu 2013, Cossu & al. 2015). **S - Camp** (Garofalo & al. 1999, 2010, Ricciardi & al. 2000, Aprile & al. 2003, 2003b, Nimis & Tretiach 2004, Ravera & Brunialti 2013, Catalano & al. 2016), **Pugl** (Nimis & Tretiach 1999, Brackel 2011), **Bas** (Nimis & Tretiach 1999, Potenza 2006, Paoli & al. 2006, Potenza & al. 2010, Brackel 2011, Brunialti & al. 2013), **Cal** (Puntillo 1996, Incerti & Nimis 2006, Brackel & Puntillo 2016), **Si** (Merlo 1993, Nimis & al. 1994, Ottonello & Salone 1994, Ottonello & al. 1994, Grillo & Cristaudo 1995, Ottonello 1996, Ottonello & Romano 1997, Grillo & al. 1996, 2002, Grillo & Carfi 1997, Poli & al. 1997, Grillo 1998, Caniglia & Grillo 2004, Grillo & Caniglia 2004, 2006, Brackel 2008b, 2008c, Grillo & Cataldo 2008, Liistro & Cataldo 2011, Cataldo & Cannavò 2014).

Fol.n/ Ch/ A.s/ Epiph-Sax/ pH: 2-5, L: 3-5, X: 3-4, E: 4-5/ Alt: 1-4/ Salp: er, Mont: r, SmedD: ec, Pad: c, SmedH: ec, MedH: rc, MedD: rr/ PT: 1-3/ p/ Note: a holarctic, very polymorphic, ecologically wide-ranging and common species also occurring within settlements on a wide variety of substrata. Some morphs, in my opinion, deserve further study.

Phaeophyscia poeltii (Frey) Nimis

The Lichens of Italy: 528, 1993 - *Physcia poeltii* Frey, Ber. Schweiz. bot. Ges., 73: 490, 1963.

N - VG (TSB 17381), **Fri** (TSB 12327), **Ven** (Anzi Lich. Ven. 22: Moberg 1994, Lazzarin 2000), **TAA** (Nascimbene & al. 2007b), **Lomb** (Zocchi & al. 1997), **Piem** (Valcuvia 2002, 2002b, Piervittori 2003), **VA** (Piervittori & Maffei 1996, 2001, Piervittori & Isocrono 1999, Matteucci & al. 2008c). **C - Tosc** (Loppi & Putorti 1995b, Loppi & al. 1996b), **Abr** (Recchia & Villa 1996), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **Sar** (Moberg 1994). **S - Camp** (Aprile & al. 2003b), **Cal** (Puntillo 1996).

Fol.n/ Ch/ S/ Epiph/ pH: 2-3, L: 4-5, X: 3, E: 2-3/ Alt: 1-2/ SmedD: r, SmedH: r, MedH: vr/ PT: 1-2/ Note: a temperate species found on isolated deciduous trees with nutrient-rich bark, especially in montane valleys. For further information see Moberg (1994).

Phaeophyscia pusilloides (Zahlbr.) Essl.

Mycotaxon, 7: 313, 1978 - *Physcia pusilloides* Zahlbr., Cat. Lich. Univ., 7: 678, 1931.

Syn.: *Physcia pusilla* Mereschk., *Physcia suzai* Nád.

N - VG (Carvalho 1997), **Frl** (Tretiach & Molaro 2007), **Ven** (Nascimbene 2008c, Nascimbene & Marini 2010), **Lomb** (Rivellini 1994, Arosio & al. 2003), **Piem** (Isocrono & al. 2005b, Matteucci & al. 2010), **Lig** (Giordani & Brunialti 2000, Giordani & Incerti 2008). **C - Tosc** (Monaci & al. 1997), **Marc** (Nimis & Tretiach 1999), **Laz** (Zucconi & al. 2013), **Abr** (Nimis & Tretiach 1999, Caporale & al. 2016), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008, Paoli & al. 2015), **Sar** (Rizzi & al. 2011). **S - Pugn** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996).

Fol.n/ Ch/ A.s/ Epiph/ pH: 2-3, L: 4-5, X: 3, E: 3/ Alt: 2-3/ Mont: er, SmedD: vr, SmedH: r/ PT: 1-2/ Note: a temperate species found on isolated deciduous trees with nutrient-rich bark, especially *Juglans* and *Fraxinus* in montane valleys, absent from urban areas, somehow less frequent in semi-natural stands; often confused, in the past, with other species. The record from Rome by Munzi & al. (2007) needs confirmation.

Phaeophyscia rubropulchra (Degel.) Moberg

Bot. Not., 131: 262, 1978 - *Physcia orbicularis* f. *rubropulchra* Degel., Ark. F. Bot., 30A, 1: 58, 1942.

N - VG (Masson 2008), **Frl** (Masson 2008). **C - Laz** (Masson 2008).

Fol.n/ Ch/ A.s/ Epiph/ pH: 2-3, L: 3-4, X: 3, E: 1-2/ Alt: 2/ SmedD: er, SmedH: r/ PT: 1-2/ Note: a mainly mild-temperate epiphytic species known from eastern North America and West Asia, with a few relict stations in Europe (see Masson 2008).

Phaeophyscia sciastra (Ach.) Moberg

Symb. Bot. Upsal., 22, 1: 47, 1977 - *Parmelia sciastra* Ach., Meth. Lich. Suppl.: 49, 1803.

Syn.: *Hagenia obscura* var. *sciastra* (Ach.) Bagl. & Carestia, *Physcia lithotea* auct., *Physcia sciastra* (Ach.) Du Rietz

N - VG, Frl, Ven (Nimis 1994), **TAA, Lomb, Piem** (Piervittori 2003, Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999, Matteucci & al. 2008c, 2015c), **Emil, Lig. C - Tosc, Marc** (Nimis & Tretiach 1999), **Umb** (Nimis & Tretiach 1999, Ravera & al. 2006), **Laz** (Nimis & Tretiach 2004), **Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **Sar. S - Camp** (Aprile & al. 2003b), **Pugn** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si**.

Fol.n/ Ch/ A.s/ Sax/ pH: 3-5, L: 3-5, X: 2-5, E: 3-4/ Alt: 1-5/ Alp: r, Salp: rr, Orom: er, Mont: rr, SmedD: rc, SmedH: rr, MedH: vr, MedD: er/ PT: 1-2/ Note: a holarctic lichen with a wide altitudinal and longitudinal range, found on the top of exposed calciferous boulders, sometimes on siliceous rocks or even on eutrophicated lignum, epilithic mosses, etc., with a wide altitudinal range.

Phaeorrhiza H. Mayrhofer & Poelt

Nova Hedwigia, 30: 783, 1979 ("1978").

This small genus of the Physciaceae, with 2 species, which was segregated from *Rinodina* by the presence of rhizohyphae which fasten the almost foliaceous thallus to the substratum, the type of ascospores and the variability of the apothecial margin, seems to be monophyletic (Grube & Arup 2001). Type: *P. nimbose* (Fr.) H. Mayrhofer & Poelt

Phaeorrhiza nimbose (Fr.) H. Mayrhofer & Poelt

Nova Hedwigia, 30: 785, 1979 ("1978") - *Parmelia nimbose* Fr., Lichenogr. Eur. Ref.: 129, 1831.

Syn.: *Lecanora nimbose* (Fr.) Nyl., *Pachysporaria nimbose* (Fr.) M. Choisy, *Psora nimbose* (Fr.) Hepp, *Rinodina nimbose* (Fr.) Th. Fr., *Rinodina nimbose* f. *nuda* (Bagl. & Carestia) H. Magn., *Rinodina nimbose* f. *pruinosa* (Bagl. & Carestia) H. Magn., *Rinodina phaeocarpa* (Sommerf.) Vain., *Squamaria nimbose* (Fr.) Boistel

N - Frl, Ven (Nimis 1994, Caniglia & al. 1999, Nascimbene & Caniglia 2003c, Thor & Nascimbene 2007), **TAA** (Dupla Graec. Lich. 64: Obermayer 1999, Nascimbene 2008b), **Lomb** (Obermayer 2015), **Piem** (Isocrono & al. 2004, 2005b, Hafellner & al. 2004), **VA** (HAL-19103), **Lig. C - Abr** (Nimis & Tretiach 1999).

Cr/ Ch/ S/ Terr/ pH: 3-4, L: 3-5, X: 3-4, E: 1-2/ Alt: 4-6/ Alp: c, Salp: rc/ PT: 1/ Note: a circumpolar, arctic-alpine species found on naked earth, dead mosses and plant debris on more or less calciferous ground, often in wind-exposed situations, with optimum above treeline; common in the Alps, where it reaches the nival belt, much rarer in the Apennines.

Phaeorrhiza sareptana (Tomin) H. Mayrhofer & Poelt var. ***sphaerocarpa*** (Th. Fr.) H. Mayrhofer & Poelt

Nova Hedwigia, 30: 793, 1979 ("1978") - *Rinodina nimbose* var. *sphaerocarpa* Th. Fr., Lichenogr. Scand., 1: 193, 1871.

Syn.: *Buellia hypoleuca* H. Magn.

N - Ven (TSB 3222), **TAA**.

Cr/ Ch/ S/ Terr/ pH: 3-4, L: 3-5, X: 3-4, E: 1-2/ Alt: 4-6/ Alp: er, Salp: er/ PT: 1/ Note: on naked earth, dead mosses and plant debris in dry grasslands near and above treeline, reaching the nival belt in the Alps.

Phlyctis (Wallr.) Flot.

Bot. Zeit., 8: 571, 1850, *nom. cons.* - *Peltigera* sect. *Phlyctis* Wallr., Fl. Crypt. Germ., 3: 553, 1831.

This genus of c. 20 species, with the highest diversity in tropical to temperate areas of the Southern Hemisphere, is in need of a modern revision to clarify its circumscription and affinities. It has traditionally been included in the Lecanorales due to the amyloid hymenium and the chlorococcoid photobiont. Thallus

and apothecial structure, however, are more reminiscent of the Ostropales, therefore supporting the placement of the Phlyctidaceae in the latter group, as suggested by phylogenetic inference (Miadlikowska & al. 2006). Type: *P. agelaea* (Ach.) Flot. The name is conserved against *Phlyctis* Raf. (1810), a genus of Algae.

Phlyctis agelaea (Ach.) Flot.

Bot. Zeit., 8: 574, 1850 - *Lichen agelaeus* Ach., Lichenogr. Suec. Prodr.: 30, 1799.

N - **VG** (Carvalho 1997), **Frl**, **Ven**, **Lomb** (Valcuvia 2002, 2002b), **Piem**, **Emil** (Benespero 2009), **Lig** (Giordani & Incerti 2008). **C** - **Tosc** (Tretiach & Nimis 1994, Loppi & al. 1997b, Putortì & al. 1998, Paoli & Loppi 2001, Benespero & al. 2007, Benespero 2011), **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera 1998, Ravera & al. 2006, Panfili 2007), **Laz** (Bartoli & al. 1997, Ravera 2002, Ravera & al. 2003, Massari & Ravera 2002, Nimis & Tretiach 2004, Ruisi & al. 2005, Stofer 2006, Munzi & al. 2007, Zucconi & al. 2013), **Abr** (Nimis & Tretiach 1999, Stofer 2006, Caporale & al. 2016, Corona & al. 2016), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008, Ravera & al. 2010, Paoli & al. 2015), **Sar** (Zedda 1995, 2002, 2002b, Loi & al. 2000, Vězda Lich. Rar. Exs. 448: Vězda 2000, Zedda & al. 2001, Rizzi & al. 2011, Cossu 2013). **S** - **Camp** (Garofalo & al. 1999, 2010, Ricciardi & al. 2000, Aprile & al. 2003, 2003b, Nimis & Tretiach 2004, Brunialti & al. 2010, 2013, Ravera & Brunialti 2013, Catalano & al. 2016), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999, Potenza 2006), **Cal** (Puntillo 1995, 1996, Puntillo & Puntillo 2004, Incerti & Nimis 2006), **Si** (Nimis & al. 1994, Grillo & Cristaudo 1995, Merlo 2004, Stofer 2006, Liistro & Cataldo 2011).

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 3, X: 2-3, E: 1-2/ Alt: 1-3/ Mont: er, SmedH: rc, MedH: c, MedD: er/ PT: 1-2/ Note: a mild-temperate to Mediterranean lichen found on acid-barked trees (especially *Quercus ilex*) in slightly sheltered but not very shaded situations; most frequent in Tyrrhenian Italy, much rarer in northern Italy and along the eastern side of the Peninsula.

Phlyctis argena (Spreng.) Flot.

Bot. Zeit., 8: 572, 1850 - *Parmelia argena* Spreng., Caroli Linnaei Syst. Veget., 4, 1: 300, 1827.

Syn.: *Pertusaria reducta* Stirt., *Phlyctis erythrosora* Erichsen, *Thelotrema variolarioides* (Pers.) Ach., *Urceolaria variolarioides* Pers.

N - **VG** (Castello 1996, 2002, Carvalho 1997, Martellos & Castello 2004), **Frl** (Badin & Nimis 1996, Brackel 2013), **Ven** (Lazzarin 1997, Nascimbene 2005c, 2008, 2008c, 2011, Nascimbene & al. 2005b, 2006c, 2007, 2008e, 2013b, 2015, Thor & Nascimbene 2007, Nascimbene & Marini 2007, Obermayer 2011), **TAA** (Philippi 1983, Nascimbene 2005b, 2006b, 2006c, 2008b, 2014, Nascimbene & al. 2007b, 2014, Zarabska & al. 2009, Nascimbene & Marini 2015, Nimis & al. 2015), **Lomb** (Zocchi & al. 1997, Gheza & al. 2015), **Piem** (Piervittori 2003, Matteucci & al. 2010, Giordani & Malaspina 2016), **Emil** (Gasparo & Tretiach 1996, Nimis & al. 1996, Tretiach & al. 2008, Benespero 2009, Brackel 2015), **Lig** (Brunialti & al. 1999, Putortì & al. 1999b, Giordani & al. 2002, Brunialti & Giordani 2003, Giordani 2006, Giordani & Incerti 2008). **C** - **Tosc** (Tretiach & Nimis 1994, Loppi & Putortì 1995b, Loppi & al. 1995, 1997, 1997b, 1998, 1998b, 1999a, 2002, 2002b, 2002c, 2004, 2004c, 2006, Loppi 1996, 1996b, Loppi & De Dominicis 1996, 1996b, Putortì & al. 1998, 1999, Tretiach & Ganis 1999, Putortì & Loppi 1999b, Bacci & al. 2000, Benespero 2000a, 2006, 2011, Senese & Critelli 2000, Paoli & Loppi 2001, Laganà & al. 2002, Lorenzini & al. 2003, Stofer 2006, Benespero & al. 2007, Lastrucci & al. 2009, Brunialti & Frati 2010, Loppi & Nascimbene 2010, Brunialti & al. 2012b, Paoli & al. 2012, 2015d, Brackel 2015, Nascimbene & al. 2015), **Marc** (Nimis & Tretiach 1999, Frati & Brunialti 2006, Brackel 2015), **Umb** (Ravera 1998, Nimis & Tretiach 1999, Ravera & al. 2006, Panfili 2007, Brackel 2015), **Laz** (Ravera 2002, 2008b, Ravera & al. 2003, Massari & Ravera 2002, Nimis & Tretiach 2004, Ruisi & al. 2005, Munzi & al. 2007, Ravera & Genovesi 2008, Zucconi & al. 2013, Brackel 2015), **Abr** (Nimis & Tretiach 1999, Stofer 2006, Brackel 2015, Caporale & al. 2016, Corona & al. 2016), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008, Ravera & al. 2010, Genovesi & Ravera 2014, Paoli & al. 2015), **Sar** (Zedda 1995, 2002, 2002b, Loi & al. 2000, Zedda & Sipman 2001, Zedda & al. 2001, Stofer 2006, Rizzi & al. 2011, Cossu 2013). **S** - **Camp** (Aprile & al. 2003b, Nimis & Tretiach 2004, Brunialti & al. 2010, 2013, Garofalo & al. 2010, Ravera & Brunialti 2013, Catalano & al. 2016), **Pugl** (Nimis & Tretiach 1999, Brackel 2011), **Bas** (Nimis & Tretiach 1999, Potenza 2006, Brackel 2011), **Cal** (Puntillo 1996, Incerti & Nimis 2006, Stofer 2006), **Si** (Nimis & al. 1994, Ottonello & Salone 1994, Ottonello & al. 1994, Grillo 1998, Grillo & al. 2002, Grillo & Caniglia 2004, Caniglia & Grillo 2006b, Stofer 2006, Brackel 2008b, Liistro & Cataldo 2011).

Cr/ Ch/ A.s/ Epiph/ pH: 1-2, L: 2-3, X: 2-3, E: 1-2/ Alt: 1-3/ Mont: vc, SmedD: c, Pad: er, SmedH: vc, MedH: r/ PT: 1-2/ p/ Note: a subtropical to southern boreal-montane, holartic lichen, an aggressive coloniser of smooth bark (e.g. of *Carpinus*) in sheltered situations (e.g. in forests), with optimum in the deciduous forest belts.

Phylliscum Nyl.

Mém. Soc. Imp. Sc. Nat. Cherbourg, 3: 166, 1855.

This genus of the Lichinaceae, with c. 8 species, is quite polymorphic and perhaps non-monophyletic (Jørgensen 2007). Type: *P. demangeonii* (Moug. & Mont.) Nyl.

Phylliscum demangeonii (Moug. & Mont.) Nyl.

Mém. Soc. Imp. Sc. Nat. Cherbourg, 3: 166, 1855 - *Collema demangeonii* Moug. & Montagne in Montagne, Ann. Sc. Bot., 3 sér., 12: 291, 1849.

Syn.: *Endocarpon phylliscum* Wahlenb., *Phylliscum endocarpoides* Nyl.

N - **TAA**, **Piem** (Isocrono & al. 2004, Watson 2014). **S** - **Cal** (Puntillo 2011).

Fol.u/ Cy.c/ S/ Sax/ pH: 2-3, L: 4-5, X: 4, E: 1-2/ Alt: 3-4/ Salp: er, Mont: vr/ PT: 1/ w/ Note: a cool-temperate to boreal-montane, probably circumpolar lichen found on steeply inclined seepage tracks of siliceous rocks, mostly in upland areas; probably more widespread in the Alps.

Phylloblastia Vain.

Ann. Acad. Sci. fenn., Ser. A, 15, 6: 323, 1921.

This genus of the Verrucariaceae, which includes *c.* 14 follicolous species, is most diverse in the Neotropics and in Australia, less so in western Europe, tropical Africa, and southeast Asia. It is characterised by an often inconspicuous thallus with a chlorococcoid photobiont, perithecioid ascomata enclosed within a spreading involucrellum, the lack of paraphyses, substituted by short pseudoparaphyses resembling periphyses, and fissitunicate 8-spored asci with elongate multiseptate ascospores. The 3 European species were treated by Llop & Gómez-Bolea (2009). A single species is so far known from Italy. Type: *P. dolichospora* Vain.

Phylloblastia inexpectata Sérus., Coppins & Lücking

Lichenologist, 39: 104, 2007.

S - Camp (Sérusiaux & al. 2007).

Cr/ Ch/ S/ Foliic/ pH: 1-2, L: 2-3, X: 1, E: 1/ Alt: 1/ MedH: er/ PT: 0/ oc/ Note: a follicolous, Atlantic-Macaronesian species, also known from the British Isles and Madeira. The only Italian station is a warm-humid coastal gorge hosting several other rare, oceanic-tropical lichens.

Phyllopsora Müll. Arg.

Bull. Herb. Boissier, 2, app. 1: 11, 45, 1894.

This pantropical and subtropical genus of the Ramalinaceae includes *c.* 55 species occurring in humid forests, primarily on bark, but also on decorticated wood, rock and bryophytes. The genus is similar to *Biatora*, differing in the pubescent-squamulose thallus and in the slightly different ascus structure. Type: *P. breviuscula* (Nyl.) Müll. Arg.

Phyllopsora rosei Coppins & P. James

Lichenologist, 11: 166, 1979.

S - Cal (Puntillo 1996).

Sq/ Ch/ S/ Epiph/ pH: 1-2, L: 3, X: 1, E: 1/ Alt: 2-3/ Mont: er, SmedH: er/ PT: 0/ suboc/ Note: a rare western European epiphytic species with humid subtropical affinities; the single Italian collection is from the acid bark of *Pinus leucodermis*. The species is included as “Critically Endangered” in the Italian red list of epiphytic lichens (Nascimbene & al. 2013c).

Physcia (Schreb.) Michx.

Fl. Boreali-Americ., 2: 326, 1803 - *Lichen* sect. *Physcia* Schreb., Gen. Pl., 2: 768, 1791.

This well-defined cosmopolitan genus of the Physciaceae, which includes *c.* 80 species, is characterised by the bacilliform conidia and the presence of atranorin. The *P. aipolia*-*P. caesia* complex has been studied by Myllys & al. (2001) and Lothander & al. (2009), who showed that neither taxon is monophyletic, and that an independent taxonomic status should be assigned to some controversial morphotaxa. Type: *P. tenella* (Scop.) DC.

Physcia adscendens H. Olivier

Fl. Lich. Orne, 1: 79, 1882, *nom. cons.*

Syn.: *Physcia stellaris* var. *adscendens* auct., *Physcia stellaris* var. *radiata* (Ach.) Nyl.

N - VG (Castello 1996, 2002, Carvalho 1997, Martellos & Castello 2004, Castello & Skert 2005), **Frl** (Badin & Nimis 1996, Tretiach 1996, Nimis & Salvadori 1997, Castello & Skert 2005, Tretiach & Molaro 2007, Nascimbene & Salvadori 2008, Nascimbene & al. 2009b, Bernini & al. 2010), **Ven** (Nimis & al. 1996c, Nascimbene & Caniglia 1997, 2000b, 2003c, Lazzarin 1997, 2000, Caniglia & al. 1999, Valcuvia & al. 2000c, Nascimbene 2005c, 2008, 2008c, Nascimbene & al. 2007, 2008e, 2010b, 2015, Nascimbene & Marini 2007, 2010, Nascimbene & Salvadori 2008, Brackel 2013, Nimis & al. 2015), **TAA** (De Benetti & Caniglia 1993, Nascimbene 2003, 2005b, 2006c, 2008b, 2014, Zieger & al. 2003, Gottardini & al. 2004, Nascimbene & al. 2005, 2006, 2007b, 2014, Zarabska & al. 2009, Nascimbene & Marini 2015), **Lomb** (Philippi 1983, Rivellini 1994, Arosio & Rinaldi 1995, Grieco & Groppali 1995, Valcuvia & Gianatti 1995, Valcuvia & Brusoni 1996, Brusoni & al. 1997, Zocchi & al. 1997, Roella 1999, Brusoni & Valcuvia 2000, Arosio & al. 2000, 2003, Valcuvia & al. 2003, Valcuvia & al. 2003, Dalle Vedove & al. 2004, De Vita & Valcuvia 2004, Picco & al. 2005, Anderi & al. 2005, Stofer 2006, Valcuvia & Truzzi 2007b, Di Silvestro & al. 2009, Furlanetto 2010, Gheza & al. 2015), **Piem** (Caniglia & al. 1992, Morisi & Sereno 1995, Piervittori & al. 1996b, Arosio & al. 1998, Piervittori 1998, 2003, Isocrono & Falletti 1999, Bari & al. 2000, Griselli & al. 2000, 2003, Ricchiardone & al. 2002, Buzio 2003, Castino & Ropolo 2003, Castino 2004, Isocrono & al. 2004, 2005b, 2007, 2009, Isocrono & Piervittori 2008, Furlanetto 2010, Matteucci & al. 2010, Giordani & Malaspina 2016), **VA** (Piervittori & Maffei 1996, 2001, Piervittori & Isocrono 1999, Piervittori & al. 2001, Matteucci & al. 2008c), **Emil** (Bassi 1995, Gasparo & Tretiach 1996, Nimis & al. 1996, Valcuvia & Grieco 1995, Tretiach 1997, Valcuvia & Savino 2000, Sallese 2003, Marconi & al. 2006, Morselli & Regazzi 2006, Tretiach & al. 2008, Cioffi 2009, Benesperi 2009, Malavasi 2014, Gerdol & al. 2014), **Lig** (Castello & al. 1994, Brunialti & al. 1999, Putortù & al. 1999b, Valcuvia & al. 2000, Giordani & al. 2001, 2002, 2016, Brunialti & Giordani 2003, Giordani 2006, Giordani & Incerti 2008), **C - Tosc** (Loppi & al. 1992, 1995, 1996, 1996b, 1996c, 1997, 1997e, 1998, 1998b, 1999a, 2002, 2002b, 2002c, 2003, 2004, 2004c, 2006, Tretiach & Nimis 1994, Loppi & Corsini 1995, 2003, Loppi & Putortù 1995, 1995b, Loppi 1995c, 1996, 1996b, Loppi & De Dominicis 1996, Monaci & al. 1997,

Loppi & Nascimbene 1998, 2010, Putortì & Loppi 1999, Putortì & al. 1998, Tretiach & Ganis 1999, Bacci & al. 2000, Benesperi 2000a, 2006, 2011, Loppi & Pirintsos 2000, Senese & Crielli 2000, Bettini 2001, Laganà & al. 2002, Del Guasta 2001, Lorenzini & al. 2003, Landi & Loppi 2003, Loppi & Frati 2004, Frati & al. 2006b, 2007, 2008, Benesperi & al. 2007, 2013, Nali & al. 2007, Paoli & Loppi 2008, Lastrucci & al. 2009, Pasquinelli & al. 2009, Brunialti & Frati 2010, Pasquinelli & Puccini 2010, Brunialti & al. 2012, 2012b, Paoli & al. 2012, 2012b, 2013, 2015d, Brackel 2015, Nascimbene & al. 2015), **Marc** (Gasparo & al. 1989, Nimis & Tretiach 1999, Frati & Brunialti 2006, Brackel 2015), **Umb** (Ravera 1998, Nimis & Tretiach 1999, Panfili 2000b, 2007, Ravera & al. 2006, Ciotti & al. 2009, Genovesi 2011, Brackel 2015, Ravera & Ciotti 2015), **Laz** (Gigante & Petriccione 1995, Bartoli & al. 1997, 1998, Ravera & al. 1999, Ravera 2002, 2008b, Massari & Ravera 2002, Nimis & Tretiach 2004, Ruisi & al. 2005, Stofer 2006, Munzi & al. 2007, Pietrini & al. 2008, Ravera & Genovesi 2008, Genovesi & al. 2011, Zucconi & al. 2013, Brackel 2015), **Abr** (Recchia & al. 1993, Olivieri & Pacioni 1996, Olivieri & al. 1997, 1997b, Loppi & al. 1999, Nimis & Tretiach 1999, Brackel 2015, Caporale & al. 2016, Corona & al. 2016), **Mol** (Garofalo & al. 1999, Nimis & Tretiach 1999, Caporale & al. 2008, Nascimbene & al. 2010b, Paoli & al. 2011, 2015, Genovesi & Ravera 2014, Brackel 2015), **Sar** (Zedda 1995, 2002, 2002b, Zedda & al. 2001, Rizzi & al. 2011, Kodnik & al. 2011, Giordani & al. 2013, Cossu 2013, Cossu & al. 2015), **S - Camp** (Garofalo & al. 1999, 2010, Ricciardi & al. 2000, Aprile & al. 2002, 2003, 2003b, 2011, Nimis & Tretiach 2004, Brunialti & al. 2010, 2013, Catalano & al. 2010, 2012, 2016, Ravera & Brunialti 2013), **Pugl** (Nimis & Tretiach 1999, Durini & Medagli 2002, 2004, Brackel 2011), **Bas** (Bartoli & Puntillo 1998, Nimis & Tretiach 1999, Potenza 2006, Paoli & al. 2006, Potenza & al. 2010, Brackel 2011), **Cal** (Puntillo 1996, Puntillo & Puntillo 2004, Incerti & Nimis 2006, Brackel & Puntillo 2016), **Si** (Merlo 1993, 2004, 2004b, Nimis & al. 1994, 1995, Ottonello & Salone 1995, Ottonello & al. 1994, Grillo & Cristaudo 1995, Ottonello 1996, Grillo & Carfi 1997, Ottonello & Romano 1997, Grillo 1998, Grasso & al. 1999, Caniglia & Grillo 2001, 2006b, Grillo & al. 2001, 2002, 2009, Grillo & Caniglia 2004, 2006, Falco Scampatelli 2005, Stofer 2006, Brackel 2008b, 2008c, Grillo & Cataldo 2008, Gianguzzi & al. 2009, Liistro & Cataldo 2011, Cataldo & Cannavò 2014, Di Martino & Stancanelli 2015).

Fol.n/ Ch/ A.s/ Epiph-Sax/ pH: 2-5, L: 4-5, X: 3-4, E: 3-5/ Alt: 1-5/ Alp: r, Salp: rr, Orom: rr, Mont: rc, SmedD: ec, Pad: rc, SmedH: ec, MedH: vc, MedD: c/ PT: 1-3/ p/ Note: a widespread holarctic lichen, one of the most common species of the genus throughout the country, mostly on isolated trees, but also on walls and eutrophicated calciferous rocks. See also note on *P. tenella* and *P. vitii*.

Physcia aipolia (Humb.) Fűrnr.

Natur. Topogr. Regensburg, 2: 249, 1839 - *Lichen aipolius* Ehrh. ex Humb., Fl. Friberg. Specim.: 19, 1793.

Syn.: *Parmelia aipolia* (Humb.) Ach., *Parmelia stellaris* var. *aipolia* (Humb.) Hazsl., *Physcia aipolia* var. *acrita* (Ach.) Hue, *Physcia aipolia* var. *angustata* (Nyl.) Vain., *Physcia aipolia* var. *anthelina* (Ach.) Zahlbr., *Physcia aipolia* var. *cercidia* (Ach.) Nyl., *Physcia stellaris* var. *angustata* Nyl., *Physcia stellaris* var. *cercidia* (Ach.) Th. Fr.

N - VG (Castello 1996, Castello & Skert 2005), **Frl** (Badin & Nimis 1996, Tretiach & Molaro 2007), **Ven** (Nimis & al. 1996c, Nascimbene & Caniglia 1997, 2003c, Caniglia & al. 1999, Lazzarin 2000, Nascimbene 2005c, 2008, Nascimbene & Marini 2007), **TAA** (Philippi 1983, Nascimbene 2001b, 2003, 2005b, Nascimbene & al. 2007b, Nimis & al. 2015), **Lomb** (Philippi 1983, Rivellini 1994, Arosio & Rinaldi 1995, Valcuvia & Gianatti 1995, Valcuvia & al. 1997, Arosio & al. 2003, Valcuvia & al. 2003, Dalle Vedove & al. 2004, De Vita & Valcuvia 2004), **Piem** (Morisi & Sereno 1995, Arosio & al. 1998, Piervittori 1998, 2003, Isocrono & al. 2003, 2005b, Castino 2004, Griselli & al. 2003, Isocrono & Piervittori 2008, Matteucci & al. 2010), **VA** (Piervittori & Maffei 1996, 2001, Piervittori & Isocrono 1997, 1999, Piervittori & al. 2001, Matteucci & al. 2008, 2008c), **Emil** (Bassi 1995, Gasparo & Tretiach 1996, Marconi & al. 2006, Benesperi 2009), **Lig** (Castello & al. 1994, Brunialti & al. 1999, Giordani & al. 2002, Brunialti & Giordani 2003, Giordani & al. 2003b, Giordani & Incerti 2008). **C - Tose** (Tretiach & Nimis 1994, Loppi & Putortì 1995, 1995b, Loppi & al. 1995, 1996b, 1997, 1997e, 1998, 1998b, 1999a, 2002, 2002b, 2002c, 2003, 2004, 2004c, 2006, Loppi 1995c, 1996, Loppi & De Dominicis 1996, Monaci & al. 1997, Loppi & Nascimbene 1998, 2010, Putortì & al. 1998, Putortì & Loppi 1999b, Bacci & al. 2000, Benesperi 2000a, 2006, 2011, Loppi & Pirintsos 2000, Del Guasta 2001, Paoli & Loppi 2001, 2008, Frati & al. 2006b, 2007, Benesperi & al. 2007, Lastrucci & al. 2009, Pasquinelli & al. 2009, Brunialti & Frati 2010, Pasquinelli & Puccini 2010, Brunialti & al. 2012b, Paoli & al. 2012, Brackel 2015), **Marc** (Gasparo & al. 1989, Nimis & Tretiach 1999, Frati & Brunialti 2006, Brackel 2015), **Umb** (Nimis & Tretiach 1999, Panfili 2000b, 2007, Ravera & al. 2006, Ciotti & al. 2009, Brackel 2015), **Laz** (Massari & Ravera 2002, Nimis & Tretiach 2004, Ruisi & al. 2005, Munzi & al. 2007, Ravera & Genovesi 2008, Brackel 2015), **Abr** (Recchia & al. 1993, Olivieri & Pacioni 1996, Olivieri & al. 1997, 1997b, Loppi & al. 1999, Nimis & Tretiach 1999, Zucconi & al. 2013, Brackel 2015, Caporale & al. 2016, Corona & al. 2016), **Mol** (Garofalo & al. 1999, Nimis & Tretiach 1999, Caporale & al. 2008, Paoli & al. 2015, Genovesi & Ravera 2014), **Sar** (Zedda 1995, 2002, 2002b, Rizzi & al. 2011, Cossu 2013), **S - Camp** (Aprile & al. 2002, 2003, 2003b, 2011, Nimis & Tretiach 2004, Nascimbene & al. 2010b, Garofalo & al. 2010, Brunialti & al. 2013, Ravera & Brunialti 2013, Catalano & al. 2016), **Pugl** (Nimis & Tretiach 1999, Durini & Medagli 2004, Brackel 2011), **Bas** (Bartoli & Puntillo 1998, Nimis & Tretiach 1999, Potenza 2006, Paoli & al. 2006, Brackel 2011), **Cal** (Puntillo 1995, 1996, Puntillo & Puntillo 2004, Incerti & Nimis 2006, Brackel & Puntillo 2016), **Si** (Ottonello & al. 1994, Grillo & Cristaudo 1995, Ottonello 1996, Grillo 1996, Grasso & al. 1999, Merlo 2004, Falco Scampatelli 2005, Stofer 2006, Brackel 2008b, 2008c, Liistro & Cataldo 2011, Di Martino & Stancanelli 2015).

Fol.n/ Ch/ S/ Epiph/ pH: 2-3, L: 4-5, X: 3, E: 3-4/ Alt: 1-4/ Salp: er, Mont: rr, SmedD: c, Pad: vr, SmedH: c, MedH: vr/ PT: 1-3/ Note: a mainly temperate species, altitudinally intermediate between *P. biziana* and *P. stellaris*, most frequent at low elevations only in humid areas. The molecular study by Lothander & al. (2009) showed that the *Physcia aipolia*-*P. caesia* complex includes several entities which, differing also in morphology and/or chemistry, can be treated as distinct species.

Physcia albinea (Ach.) Nyl.

Observ. Lich. Pyren. Orient.: 6, 1873 - *Parmelia albinea* Ach., Lichenogr. Univ.: 491, 1810.

Syn.: *Parmelia caesia* var. *albinea* (Ach.) Torss., *Physcia albonigra* (Schleich.) Dalla Torre & Sarnth., *Physcia caesia* var. *albinea* auct. non Anzi, *Physcia stellaris* subsp. *albinea* (Ach.) Clauzade & Cl. Roux

N - TAA, Lomb, Piem (Morisi & Sereno 1995, Isocrono & al. 2004, Isocrono & Piervittori 2008), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Isocrono & al. 2008, Favero-Longo & Piervittori 2009, Matteucci & al. 2015c), **Emil** (Dalle Vedove & al. 2002), **Lig. C - Sar**.

Fol.n/ Ch/ S/ Sax/ pH: 3, L: 4, X: 3-4, E: 2-3/ Alt: 3-5/ Alp: vr, Salp: r, Mont: rr/ PT: 1/ Note: on basic siliceous rocks, certainly rare in Italy and doubtfully distinct from *P. stellaris*. Earlier records from southern Italy (see Nimis 1993: 532), being dubious, are not accepted here.

Physcia biziana (A. Massal.) Zahlbr. var. *biziana*

Österr. bot. Z., 51: 26, 1901 - *Squamaria biziana* A. Massal., Miscell. Lichenol.: 35, 1856.

Syn.: *Physcia ragusana* Zahlbr.

N - VG (Castello 1996, 2002, Martellos & Castello 2004, Castello & Skert 2005), **Fri** (Badin & Nimis 1996, Castello & Skert 2005, Tretiac & Molaro 2007), **Ven** (Nimis & al. 1996c, Lazzarin 2000, Valcuvia & al. 2000c), **Lomb** (Arosio & Rinaldi 1995, Valcuvia & Brusoni 1996, Brusoni & al. 1997, Zocchi & al. 1997, Roella 1999, Arosio & al. 2000, 2003, Valcuvia & al. 2003, Anderi & al. 2005, Abramini & al. 2008, Furlanetto 2010), **Piem** (Caniglia & al. 1992, Morisi & Sereno 1995, Arosio & al. 1998, Piervittori 1998, 2003, Isocrono & Falletti 1999, Griselli & al. 2003, Isocrono & al. 2007, Furlanetto 2010), **VA** (Valcuvia 2000, Valcuvia & al. 2000b), **Emil** (Bassi 1995, Nimis & al. 1996, Valcuvia & Grieco 1995, Sallese 2003, Marconi & al. 2006, Morselli & Regazzi 2006, Tretiac & al. 2008, Cioffi 2009, Malavasi 2014, Gerdol & al. 2014), **Lig** (Giordani & al. 2002, Brunialti & Giordani 2003, Giordani & Incerti 2008), **C - Tosc** (Loppi & Putorti 1995, Loppi & al. 1995, 1996b, 1997, 1998b, 2002, 2002b, 2003, Loppi 1996, 2006, Loppi & De Dominicis 1996, Monaci & al. 1997, Pišút 1997, Del Guasta 2001, Loppi & Frati 2004, 2006, Frati & al. 2007, Paoli & Loppi 2008, Brunialti & Frati 2010, Brunialti & al. 2012, Paoli & al. 2012, 2012b, 2013), **Marc** (Gasparo & al. 1989, Nimis & Tretiac 1999, Frati & Brunialti 2006, Pieri & al. 2015), **Umb** (Panfili 2000, 2000b, 2007, Ravera & al. 2006, Ciotti & al. 2009), **Laz** (Bartoli & al. 1997, Ruisi & al. 2005, Munzi & al. 2007, Ravera & Genovesi 2008, Brackel 2015), **Abr** (Recchia & al. 1993, Olivieri & al. 1997, 1997b, Loppi & al. 1999, Nimis & Tretiac 1999, Caporale & al. 2016, Corona & al. 2016), **Mol** (Garofalo & al. 1999, Nimis & Tretiac 1999, Caporale & al. 2008, Paoli & al. 2011, 2015, Genovesi & Ravera 2014), **Sar** (Zedda 1995, 2002, 2002b, Nöske 2000, Rizzi & al. 2011, Cossu 2013), **S - Camp** (Garofalo & al. 1999, Nimis & Tretiac 2004, Nascimbene & al. 2010b, Aprile & al. 2011, Brunialti & al. 2013, Ravera & Brunialti 2013, Catalano & al. 2016), **Pugl** (Nimis & Tretiac 1999, Brackel 2011), **Bas** (Bartoli & Puntillo 1998, Nimis & Tretiac 1999, Paoli & al. 2006, Brackel 2011), **Cal** (Puntillo 1996, Puntillo & Puntillo 2004, Brackel & Puntillo 2016), **Si** (Merlo 1993, Nimis & al. 1996b, Ottonello & Salone 1994, Ottonello & al. 1994, Grillo & Cristaudo 1995, Ottonello 1996, Grillo 1998, Czczuga & al. 1999, Caniglia & Grillo 2004, 2006b, Grillo & Caniglia 2004, 2006, Brackel 2008c, Grillo & Cataldo 2008, 2008b, Gianguzzi & al. 2009).

Fol.n/ Ch/ S/ Epiph/ pH: 2-3, L: 4-5, X: 3-4, E: 3-4/ Alt: 1-2/ SmedD: rc, Pad: er, SmedH: vc, MedH: c, MedD: rr/ PT: 1-3/ Note: a Mediterranean to mild-temperate species found on isolated trees at low altitudes throughout the country.

Physcia biziana var. *leptophylla* Vězda

Sched. ad Lich. Sel. Exs., 12: 6 (nr. 298), 1964.

Syn.: *Physcia rondoniana* Clauzade & Vězda

N - Lomb (Delucchi & Valcuvia 2004), **Piem** (Morisi & Sereno 1995), **Lig** (Giordani & Brunialti 2000), **C - Tosc** (Frati & al. 2007, Brunialti & Frati 2010), **Laz** (Ravera & al. 1999, Massari & Ravera 2002, Roccardi 2003, Munzi & al. 2007, Ravera 2008b, Gagliardi & al. 2010), **Mol** (Ravera & Genovesi 2012, Genovesi & Ravera 2014, Paoli & al. 2015), **Sar** (Monte 1993, Zedda 1995, 2002, 2002b, Rizzi & al. 2011), **S - Camp** (Aprile & al. 2003, 2003b, Nimis & Tretiac 2004, Santitoro & al. 2004, Garofalo & al. 2010, Catalano & al. 2014, 2016), **Cal, Si** (Nimis & al. 1996b, Grillo & Caniglia 2004, 2006, Merlo 2004b, Caniglia & Grillo 2006b).

Fol.n/ Ch/ A.i/ Epiph-Sax/ pH: 2-3, L: 2-3, X: 3, E: 3/ Alt: 1-2/ SmedH: rc, MedH: rc/ PT: 1-3/ #/ Note: an interesting taxon well worth of further study, with a mainly Tyrrhenian distribution in Italy.

Physcia biziana var. *phyllidiata* Poelt & Vězda

in Vězda, Lich. Rar. Exs., Fasc. 9: 3. 1993.

C - Sar (Nimis & Poelt 1987).

Fol.n/ Ch/ A.i/ Sax/ pH: 3, L: 3-4, X: 3, E: 2-3/ Alt: 1-2/ SmedH: er, MedH: er/ PT: 1-3/ #/ Note: this relatively large saxicolous lichen, which is distinctly phyllidiate, is also known from Austria (Steiermark), where it grows on steeply inclined surfaces of volcanic rocks. This taxon was overlooked by Nimis (1993) in the first checklist of Italy.

Physcia caesia (Hoffm.) Fűrnr. var. *caesia*

Natur. Topogr. Regensburg, 2: 250, 1839 - *Lichen caesius* Hoffm., Enum. Lich.: 65, 1784.

Syn.: *Hagenia caesia* (Hoffm.) Bagl. & Carestia, *Parmelia caesia* (Hoffm.) Ach., *Parmelia pulchella* var. *caesia* (Hoffm.) Schaer., *Physcia caesia* var. *ventosa* (Lyng) Lyng, *Physcia ventosa* (Lyng) Sántha

N - VG, Fri (Tretiac & Molaro 2007), **Ven** (Caniglia & al. 1999, Nascimbene & Caniglia 2003c, Nascimbene 2005c, 2008c, Nascimbene & Marini 2007, Nascimbene & Salvadori 2008), **TAA** (Nascimbene & al. 2006, Nascimbene 2008b, Spitalé & Nascimbene 2012), **Lomb** (Valcuvia & al. 2003, Rigamonti & al. 2008, Di Silvestro & al. 2009), **Piem** (Morisi & Sereno 1995, Clerc & al. 1999, Isocrono & al. 2003, 2004, Giordani & al. 2014), **VA** (Piervittori & Isocrono 1999, Piervittori & al. 2001, Revel & al. 2001, Matteucci & al. 2015c), **Emil, Lig. C - Tosc** (Lastrucci & al. 2009), **Marc** (Nimis & Tretiac 1999), **Laz, Abr** (Nimis & Tretiac 1999), **Mol** (Nimis & Tretiac 1999, Caporale & al. 2008), **Sar** (Rizzi & al. 2011, Cossu & al. 2015), **S - Camp** (Ricciardi & al. 2000, Aprile & al. 2003b), **Bas** (Nimis & Tretiac 1999), **Cal** (TSB 12203), **Si** (Nimis & al. 1996b, Brackel 2008b).

Fol.n/ Ch/ A.s/ Sax/ pH: 3-5, L: 4-5, X: 4, E: 4-5/ Alt: 2-5/ Alp: c, Salp: rc, Orom: rr, Mont: r, SmedD: r, SmedH: vr/ PT: 1-2/ Note: a cool-temperate to arctic-alpine, circumpolar species, common only in upland

areas, from the Alps to Sicilia, mostly in natural habitats (e.g. on the top of calcareous boulders); it exceptionally grows also on bark and lignum impregnated with calcareous dust.

Physcia caesia* var. *caesiella (B. de Lesd.) Clauzade & Cl. Roux

Bull. Soc. Bot. Centre-Ouest, n. sér., nr. spéc. 7: 1985 - *Physcia tribacioides* var. *caesiella* B. de Lesd., Bull. Soc. Bot. France, 70: 844, 1923.

Syn.: *Physcia caesiella* (B. de Lesd.) Suza, *Physcia wainioi* Räsänen

N - **TAA**, **Lomb** (Valcuvia & al. 2003, De Vita & Valcuvia 2004), **Piem** (Morisi & Sereno 1995), **VA** (Piervittori & Isocrono 1999, Piervittori & al. 2001, Isocrono & al. 2008), **Emil**, **Lig** (Watson 2014). **C** - **Tosc** (Benespero 2007, Tretiach & al. 2008), **Laz**, **Sar** (Nöske 2000, Rizzi & al. 2011, Giordani & al. 2013). **S** - **Cal** (Puntillo 1996), **Si** (Grillo & al. 1996, Grillo 1998, Grillo & Caniglia 2004, Brackel 2008b).

Fol.n/ Ch/ A.s/ Sax/ pH: 4-5, L: 4-5, X: 4, E: 3-5/ Alt: 3-4/ Salp: vr, Orom: er, Mont: er/ PT: 1/ #/ Note: ecologically similar to the typical variety, but most common in dry-warm alpine valleys.

Physcia caesia* var. *rhaetica Frey

Ergebn. Wiss. Unters. Schweiz. Nationalparks, n.F. 3, 27: 484, 1952.

N - **Piem** (TSB 33303).

Fol.n/ Ch/ A.s/ Sax/ pH: 3-5, L: 4-5, X: 4, E: 4-5/ Alt: 4-5/ Alp: vr, Salp: r/ PT: 1-2/ #/ Note: a morph with orange medulla, most frequent in continental Alpine areas, which is worthy of further study.

Physcia clementei (Turner) Lynge

in Rabenhorst Kryptogamenfl., ed. 2: 93, 1935 - *Parmelia clementei* Turner in Smith & Sowerby, Engl. Bot., 25: tab. 1779, 1807.

Syn.: *Hagenia stellaris* var. *caricae* Schaer. ex A. Massal., *Parmelia sideralis* Ach., *Physcia astroidea* auct., *Physcia clementiana* (Ach.) J. Kickx f.

N - **VG** (Castello 1996, Castello & Skert 2005), **Frl** (Badin & Nimis 1996), **Ven** (Lazzarin 2000, Nascimbene & Marini 2010), **Lomb** (Zocchi & al. 1997, Arosio & al. 2003), **Piem** (Arosio & al. 1998, Castino 2004, Morisi 2005, Furlanetto 2010), **Emil** (Nimis & al. 1996, Gerdol & al. 2014), **Lig** (Giordani & al. 2001, 2002, Brunialti & Giordani 2003, Giordani 2006, Giordani & Incerti 2008). **C** - **Tosc** (Loppi & Putorti 1995, Loppi & al. 1995, 1997, 1998b, 2002b, 2002c, Loppi 1996, Loppi & De Dominicis 1996, Bacci & al. 2000, Benespero 2000a, Lorenzini & al. 2003, Brunialti & Frati 2010, Loppi & Nascimbene 2010, Paoli & al. 2012, 2015d), **Marc**, **Laz** (Massari & Ravera 2002, Ravera & al. 2003, Ruisi & al. 2005, Munzi & al. 2007, Gagliardi & al. 2010), **Mol** (Frati & al. 2004, Caporale & al. 2008, Paoli & al. 2015), **Sar**. **S** - **Camp** (Nimis & Tretiach 2004, Catalano & al. 2016), **Si** (Nimis & al. 1994).

Fol.n/ Ch/ A.i/ Epiph/ pH: 2-3, L: 4-5, X: 2-3, E: 2-3/ Alt: 1-2/ SmedD: er, SmedH: rr, MedH: vr/ PT: 1-2/ suboc/ Note: a Mediterranean to mild-temperate, mainly western species growing on more or less isolated trees; rare throughout the country, but most frequent in Tyrrhenian Italy and in the upper Friulian plain (humid-rainy climate).

Physcia dimidiata (Arnold) Nyl.

Flora, 64: 573, 1881 - *Parmelia pulverulenta* var. *dimidiata* Arnold, Flora, 47: 594, 1864.

Syn.: *Parmelia albinea* var. *dimidiata* (Arnold) Jatta, *Physcia dimidiata* var. *ornata* (Nádv.) Moberg?

N - **TAA** (Nascimbene & al. 2007b), **Lomb**, **Piem** (Castino 2004), **VA** (Piervittori & Isocrono 1999), **Emil** (Valcuvia & Delucchi 2001), **Lig**. **C** - **Marc** (Nimis & Tretiach 1999), **Laz**, **Abr**, **Sar** (Zedda 2002, Rizzi & al. 2011). **S** - **Camp**, **Pugl**.

Fol.n/ Ch/ A.s/ Sax-Epiph/ pH: 3-4, L: 4-5, X: 4, E: 3-4/ Alt: 1-2/ SmedD: vr, SmedH: r, MedH: vr/ PT: 1/ w/ Note: a Mediterranean to mild-temperate, probably holarctic lichen found on steeply inclined surfaces of basic siliceous rocks and of calciferous sandstones, on old walls, more rarely on basal parts of old trees, mostly below the montane belt.

Physcia dubia (Hoffm.) Lettau

Hedwigia, 52: 254, 1912 - *Lobaria dubia* Hoffm., Deutschl. Fl.: 156, 1796.

Syn.: *Parmelia caesia* var. *teretiuscula* Ach., *Parmelia pulchella* var. *dubia* (Hoffm.) Schaer., *Physcia caesia* var. *dubia* (Hoffm.) Th. Fr., *Physcia caesitia* Nyl., *Physcia dubia* var. *teretiuscula* (Ach.) Clauzade & Cl. Roux, *Physcia intermedia* Vain., *Physcia lyngei* Nádv., *Physcia teretiuscula* (Ach.) Lynge, *Physcia tribacia* auct. p.p. non (Ach.) Nyl., *Physcia wahlenbergii* Lynge

N - **VG**, **Frl** (Tretiach & Hafellner 2000), **Ven** (Nascimbene & Caniglia 1997, 2003c, Caniglia & al. 1999, Nascimbene 2005c, 2008c, Thor & Nascimbene 2007, Nascimbene & Marini 2007), **TAA** (Caniglia & al. 2002, Nascimbene 2003, 2006c, 2008b, al. 2014, Nascimbene & al. 2005, 2006, 2006e, 2007b, Zarabska & al. 2009, Spitale & Nascimbene 2012, Nimis & al. 2015), **Lomb** (Rivellini 1994, Grieco & Groppali 1995, Brusoni & al. 1997, Zocchi & al. 1997, Roella 1999, Brusoni & Valcuvia 2000, Arosio & al. 2003, Valcuvia & al. 2003, De Vita & Valcuvia 2004, Anderi & al. 2005, Furlanetto 2010), **Piem** (Morisi & Sereno 1995, Arosio & al. 1998, Isocrono & Falletti 1999, Piervittori 2003, Giordani & al. 2003b, Castino 2004, Isocrono & al. 2004, 2005b, 2006, 2007, Griselli & al. 2003, Isocrono & Piervittori 2008, Favero-Longo & al. 2009b, Furlanetto 2010), **VA** (Piervittori & Isocrono 1997, 1999, Valcuvia 2000, Piervittori & al. 2001, Matteucci & al. 2008, 2008c, 2015c), **Emil** (Dalle Vedove & al. 2002), **Lig** (Brunialti & al. 1999, Giordani & Brunialti 2000, Brunialti & Giordani 2003, Giordani & al. 2003b). **C** - **Tosc**, **Umb** (Ravera & al. 2006, Panfilo 2007), **Laz** (Ruisi & al. 2005), **Abr** (Nimis & Tretiach 1999), **Mol** (Ravera & al. 2007, Genovesi 2012, Genovesi & Ravera 2014), **Sar** (Rizzi & al. 2011, Cossu & al. 2015). **S** - **Bas** (Potenza 2006, Paoli & al. 2006, Potenza & Fascetti 2012), **Cal** (Puntillo 1996), **Si**.

Fol.n/ Ch/ A.s/ Epiph-Sax/ pH: 2-4, L: 4-5, X: 4, E: 4-5/ Alt: 1-5/ Alp: rc, Salp: vc, Orom: rr, Mont: c, SmedD: r, Pad: er, SmedH: rr, MedH: vr/ PT: 1-3/ Note: a widespread holarctic species with a broad latitudinal and altitudinal range, found on base-rich substrata, both in natural situations and on walls in villages, with a wide altitudinal range.

Physcia erumpens Moberg

Nord. J. Bot., 6: 856, 1986.

N - Lig.

Fol.n/ Ch/ A.s/ Epiph-Sax/ pH: 2-3, L: 4, X: 2, E: 3/ Alt: 1/ MedH: er/ PT: 1/ suboc/ Note: a humid subtropical species growing both on bark and on siliceous rocks; extremely rare and probably restricted to the Tyrrhenian coast in Italy. It is included as "Regionally Extinct" in the Italian red list of epiphytic lichens (Nascimbene & al. 2013c).

Physcia leptalea (Ach.) DC.

in Lamarck & de Candolle, Fl. Franç., ed. 3, 2: 395, 1805- *Lichen leptaleus* Ach., Lichenogr. Suec. Prodr.: 108, 1799.

Syn.: *Lichen semipinnatus* J. F. Gmel., *Physcia subteres* (Harm.) Lettau, *Physcia semipinnata* (J. F. Gmel.) Moberg

N - VG, Fri (Tretiach 1996), **Ven, TAA** (Nascimbene & al. 2007b, Zarabska & al. 2009), **Lomb** (Zocchi & al. 1997), **Piem** (Castino 2004), **Emil, Lig** (Brunialti & al. 1999, Giordani & al. 2002, Brunialti & Giordani 2003, Giordani & Incerti 2008). **C - Tosc** (Loppi & Corsini 1995, Loppi & Putorti 1995, Loppi & al. 1995, 1996b, 1997, 1997b, 1998, 1998b, Loppi 1996, Loppi & De Dominicis 1996, Monaci & al. 1997, Loppi & Nascimbene 1998, Putorti & al. 1998, Paoli & Loppi 2001, Lorenzini & al. 2003, Loppi & Frati 2006, Pasquinelli & al. 2009, Putorti & Loppi 1999b, Brunialti & Frati 2010, Pasquinelli & Puccini 2010, Brunialti & al. 2012b, Paoli & al. 2012, Benesperi & al. 2013, Brackel 2015), **Marc** (Nimis & Tretiach 1999, Frati & Brunialti 2006, Brackel 2015), **Umb** (Ravera 1998, Nimis & Tretiach 1999, Ravera & al. 2006, Panfili 2007, Ciotti & al. 2009, Brackel 2015), **Laz** (Gigante & Petriccione 1995, Ravera & al. 1999, Massari & Ravera 2002, Nimis & Tretiach 2004, Ruisi & al. 2005, Munzi & al. 2007, Ravera 2008b, Ravera & Genovesi 2008, Zucconi & al. 2013, Brackel 2015), **Abr** (Recchia & al. 1993, Olivieri & al. 1997, 1997b, Loppi & al. 1999, Stofer 2006, Brackel 2015, Caporale & al. 2016, Corona & al. 2016), **Mol** (Garofalo & al. 1999, Nimis & Tretiach 1999, Caporale & al. 2008, Ravera & al. 2010, Brackel 2015, Paoli & al. 2015), **Sar** (Zedda 1995, 2002, 2002b, Nöske 2000, Zedda & Sipman 2001, Rizzi & al. 2011, Cossu 2013). **S - Camp** (Garofalo & al. 1999, 2010, Aprile & al. 2002, 2003, 2003b, 2011, Nimis & Tretiach 2004, Nascimbene & al. 2010b, Catalano & al. 2012, 2016, Brunialti & al. 2013, Ravera & Brunialti 2013), **Pugl** (Nimis & Tretiach 1999, Brackel 2011), **Bas** (Bartoli & Puntillo 1998, Nimis & Tretiach 1999, Potenza 2006, Potenza & al. 2010 Brackel 2011), **Cal** (Puntillo 1995, 1996, Puntillo & Puntillo 2004, Incerti & Nimis 2006, Brackel & Puntillo 2016), **Si** (Merlo 1993, 2004b, Nimis & al. 1994, Ottonello & Salone 1994, Ottonello & al. 1994, Grillo & Cristaudo 1995, Ottonello 1996, Grillo 1996, 1998, Ottonello & Romano 1997, Grillo & Caniglia 2004, 2006, Caniglia & Grillo 2006b, Stofer 2006 Falco Scampatelli 2005, Brackel 2008b, 2008c, Liistro & Cataldo 2011, Cataldo & Minissale 2015).

Fol.n/ Ch/ S/ Epiph/ pH: 2-4, L: 4-5, X: 3-4, E: 2-3/ Alt: 1-3/ Mont: vr, SmedD: r, Pad: er, SmedH: rc, MedH: c, MedD: r/ PT: 1-2/ Note: a Mediterranean to mild-temperate lichen, most common on twigs of shrubs in southern Italy, where it reaches the beech belt in the mountains.

Physcia magnussonii Frey

Erg. wiss. Unters. Schweiz. Nationalpark Unterengadin, n. F. 3, 27: 480, 1952.

Syn.: *Physcia aipolia* var. *subincisa* (Th. Fr.) Lynge, *Physcia stellaris* var. *subincisa* Th. Fr.

N - TAA, Lomb, Piem (TSB 34161), **VA** (Piervittori & Isocrono 1997, 1999, Piervittori & al. 2001, Isocrono & al. 2008), **Emil** (TSB 7552). **C - Tosc** (Giordani & al. 2009).

Fol.n/ Ch/ S/ Sax/ pH: 3-4, L: 4-5, X: 4-5, E: 3-4/ Alt: 3-4/ Salp: r, Mont: vr/ PT: 1/ w/ Note: on steeply inclined surfaces of base-rich siliceous rocks, often starting its development in fissures of the rock; for Italy hitherto known only from the Alps and the northern Apennines, but is likely to be found on some Mediterranean mountains with suitable substrata.

Physcia mediterranea Nimis

The Lichens of Italy. A second Annotated Catalogue: 20, 2016 - *Physcia aipolia* subsp. *scopulorum* Lambinon & Vězda in Vězda, Sched. ad Lich. Sel. Exs., 35: 6 (nr. 871), 1970.

Syn.: *Physcia scopulorum* (Lambinon & Vězda) Poelt & Nimis *nom. inval. non Physcia scopulorum* (Ach.) DC.

C - Tosc (Paz Bermudez & al. 1998, Senese & Critelli 2000, Loppi & al. 2004c), **Laz** (Gigante & Petriccione 1995), **Sar** (Paz Bermudez & al. 1998).

Fol.n/ Ch/ S/ Sax/ pH: 3, L: 4-5, X: 4, E: 3-4/ Alt: 1/ MedH: vr, MedD: er/ PT: 1/ coast/ Note: a Mediterranean-Atlantic silicicolous species known from the Tyrrhenian region (Corsica, Sardegna, Tyrrhenian Italy), the Atlantic coast of the Iberian Peninsula and the Greek Islands, always near the sea.

Physcia phaea (Tuck.) J.W. Thomson

Beih. Nova Hedwigia, 7: 54, 1963 - *Parmelia phaea* Tuck. in Darlington, Flora Cestrica, ed. 3: 440, 1853.

Syn.: *Physcia aipolia* subsp. *phaea* (Tuck.) Clauzade & Cl. Roux, *Physcia melops* Dufour ex Nyl.

N - TAA, VA (Matteucci & al. 2015c).

Fol.n/ Ch/ S/ Sax/ pH: 2-3, L: 3-4, X: 3, E: 2-3/ Alt: 4-6/ Alp: vr, Salp: er/ PT: 1/ Note: an arctic-alpine to boreal-montane, circumpolar lichen found on siliceous rocks slightly manured by birds, with optimum

above treeline, up to the nival belt in the Alps. The record from Emilia by Valcuvia & Delucchi (2001), being dubious, is not accepted here.

***Physcia stellaris* (L.) Nyl.**

Act. Soc. Linn. Bordeaux, 21: 307, 1856 - *Lichen stellaris* L., Sp. Pl.: 1144, 1753.

Syn.: *Hagenia stellaris* (L.) De Not., *Parmelia stellaris* (L.) Ach., *Physcia aipolia* var. *ambigua* (Ehrh.) H. Olivier, *Physcia stellaris* var. *rosulata* (Ach.) Hue, *Physcia stellaris* var. *tenera* Lynge

N - **Frl** (Giordani & al. 2003b, Tretiach & Molaro 2007, Hafellner & Zimmermann 2012), **Ven** (Nimis & al. 1996c, Hafellner 1997, Nascimbene & Caniglia 1997, Caniglia & al. 1999, Lazzarin 2000, Nascimbene 2005c, 2008, 2008c, Nascimbene & Marini 2007), **TAA** (Nascimbene 2001b, 2003, 2005b, 2008b, Nascimbene & al. 2005, 2006, 2007b, Zarabska & al. 2009, Nimis & al. 2015), **Lomb** (Rivellini 1994, Valcuvia & Gianatti 1995, Zocchi & al. 1997, Arosio & al. 2003), **Piem** (Caniglia & al. 1992, Morisi & Sereno 1995, Arosio & al. 1998, Clerc & al. 1999, Isocrono & Falletti 1999, Castino 2004, Isocrono & al. 2004, 2005b, 2007, 2009, Griselli & al. 2003, Piervittori 2003, Giordani & Malaspina 2016), **VA** (Piervittori & Maffei 1996, 2001, Piervittori & Isocrono 1997, 1999, Piervittori & al. 2001, Revel & al. 2001, Matteucci & al. 2008c), **Emil** (Bassi 1995, Gasparo & Tretiach 1996, Nimis & al. 1996, Sallesse 2003, Benesperi 2009, Brackel 2015), **Lig** (Brunialti & al. 1999, Giordani & al. 2002, Brunialti & Giordani 2003, Giordani 2006, Giordani & Incerti 2008), **C - Tosc** (Loppi & al. 1996b, 1997b, 1998b, 1999a, 2002, 2002b, 2003, 2006, Loppi & Nascimbene 1998, 2010, Tretiach & Ganis 1999, Putorti & Loppi 1999b, Loppi & Putorti 2001, Tretiach & al. 2008, Frati & al. 2008, Brunialti & Frati 2010, Benesperi 2011, Brackel 2015, Nascimbene & al. 2015), **Marc** (Nimis & Tretiach 1999, Frati & Brunialti 2006, Brackel 2015), **Umb** (Ravera 1998, Ravera & al. 2006, Panfili 2007, Brackel 2015), **Laz** (Ravera 2001, Massari & Ravera 2002, Nimis & Tretiach 2004, Ruisi & al. 2005, Zucconi & al. 2013, Brackel 2015), **Abr** (Recchia & al. 1993, Olivieri & Pacioni 1996, Olivieri & al. 1997, 1997b, Loppi & al. 1999, Nimis & Tretiach 1999, Brackel 2015, Caporale & al. 2016, Corona & al. 2016), **Mol** (Garofalo & al. 1999, Nimis & Tretiach 1999, Caporale & al. 2008, Paoli & al. 2015), **Sar** (Zedda 1995, 2002, Cossu 2013), **S - Camp** (Garofalo & al. 1999, 2010, Ricciardi & al. 2000, Aprile & al. 2003b, 2011, Nimis & Tretiach 2004, Catalano & al. 2016), **Pugl** (Durini & Medagli 2004, Brackel 2011), **Bas** (Nimis & Tretiach 1999, Potenza 2006, Potenza & al. 2010, Brackel 2011), **Cal** (Puntillo 1996, Incerti & Nimis 2006, Brackel & Puntillo 2016), **Si** (Ottonello & al. 1994, Merlo 2004, Falco Scampatelli 2005, Brackel 2008b).

Fol.n/ Ch/ S/ Epiph/ pH: 2-3, L: 4-5, X: 3, E: 2-4/ Alt: 2-4/ Salp: rc, Mont: vc, SmedD: r, SmedH: vr/ PT: 1-2/ Note: a (cool-) temperate to southern boreal-montane, circumpolar lichen of isolated trees. *P. biziana*, *P. aipolia* and *P. stellaris*, although often overlapping in their altitudinal distributions, are altitudinal vicariants in Italy, *P. stellaris* has the optimum in and above the beech-belt, from Sicilia to the Alps where it is most common, and is the most "continental" of the three species.

***Physcia tenella* (Scop.) DC.**

in Lamarck & de Candolle, Fl. Franç., éd. 3, 2: 396, 1805, *nom. cons.* - *Lichen tenellus* Scop., Fl. Carniol., ed. 2, 2: 394, 1772.

Syn.: *Borreria tenella* (Scop.) Ach., *Hagenia tenella* (Scop.) De Not., *Parmelia stellaris* var. *tenella* (Scop.) Spreng., *Parmelia tenella* (Scop.) Ach., *Physcia adscendens* var. *tenella* (Scop.) H. Olivier, *Physcia leptalea* var. *italica* B. de Lesd., *Physcia stellaris* var. *subobscura* Nyl., *Physcia stellaris* var. *tenella* (Scop.) Nyl., *Physcia tenella* var. *marina* (A. Nyl.) Lynge

N - **VG** (Castello 1996, 2002, Carvalho 1997, Martellos & Castello 2004, Castello & Skert 2005), **Frl** (Badin & Nimis 1996, Castello & Skert 2005, Tretiach & Molaro 2007, Bernini & al. 2010, Brackel 2013), **Ven** (Nimis & al. 1996c, Nascimbene & Caniglia 1997, Lazzarin 1997, 2000, Caniglia & al. 1999, Valcuvia & al. 2000c, Nascimbene 2005c, 2008, 2008c, Nascimbene & Marini 2007, Nascimbene & al. 2008e, 2010b, Brackel 2013), **TAA** (Nascimbene 2003, 2006c, 2014, Zieger & al. 2003, Gottardini & al. 2004, Nascimbene & al. 2005, 2006, 2006e, 2007b, 2014, Cristofolini & al. 2008, Zarabska & al. 2009, Nimis & al. 2015), **Lomb** (Arosio & Rinaldi 1995, Grieco & Groppali 1995, Valcuvia & Brusoni 1996, Brusoni & al. 1997, Zocchi & al. 1997, Roella 1999, Brusoni & Valcuvia 2000, Arosio & al. 2000, 2003, Valcuvia & al. 2003, De Vita & Valcuvia 2004, Anderi & al. 2005, Valcuvia & Truzzi 2007b, Sunil Morgan & al. 2008, Di Silvestro & al. 2009, Furlanetto 2010), **Piem** (Caniglia & al. 1992, Morisi & Sereno 1995, Arosio & al. 1998, Isocrono & Falletti 1999, Rizzio & al. 2001, Casarini & al. 2000, Piervittori 2003, Isocrono & al. 2004, 2005b, 2006, 2007, Furlanetto 2010, Matteucci & al. 2010, Giordani & Malaspina 2016), **VA** (Piervittori & Maffei 1996, Piervittori & Isocrono 1999, Valcuvia & al. 2000b, Giordani 2006), **Emil** (Bassi 1995, Nimis & al. 1996, Valcuvia & Grieco 1995, Valcuvia & Savino 2000, Sallesse 2003, Marconi & al. 2006, Cioffi 2009, Benesperi 2009, Malavasi 2014), **Lig** (Castello & al. 1994, Putorti & al. 1999b, Valcuvia & al. 2000, Giordani & al. 2000, Giordani & Incerti 2008), **C - Tosc** (Loppi & al. 1992, 1995, 1997, 1997e, 1998b, 2006, Tretiach & Nimis 1994, Loppi & Corsini 1995, Loppi & Putorti 1995, 2001, Loppi 1996, Loppi & De Dominicis 1996, Monaci & al. 1997, Benesperi 2000a, 2011, Stofer 2006, Brunialti & Frati 2010, Pasquinelli & Puccini 2010, Paoli & al. 2012, 2015d, Brunialti & al. 2012b, Brackel 2015), **Marc** (Gasparo & al. 1989, Nimis & Tretiach 1999, Frati & Brunialti 2006, Brackel 2015), **Umb** (Ravera 1998, 1999, Ravera & al. 2006, Panfili 2007, Ciotti & al. 2009, Brackel 2015), **Laz** (Gigante & Petriccione 1995, Massari & Ravera 2002, Ruisi & al. 2005, Munzi & al. 2007, Ravera 2008b, Zucconi & al. 2013, Brackel 2015), **Abr** (Recchia & al. 1993, Olivieri & Pacioni 1996, Olivieri & al. 1997, 1997b, Loppi & al. 1999, Nimis & Tretiach 1999, Brackel 2015, Caporale & al. 2016, Corona & al. 2016), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008, Ravera & Genovesi 2010, Genovesi & Ravera 2014, Paoli & al. 2015), **Sar** (Monte 1993, Zedda 1995, 2002, 2002b, Loi & al. 2000, Zedda & al. 2001, Rizzi & al. 2011, Giordani & al. 2013, Cossu 2013), **S - Camp** (Ricciardi & al. 2000, Aprile & al. 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010), **Pugl** (Nimis & Tretiach 1999, Brackel 2011), **Bas** (Nimis & Tretiach 1999, Potenza 2006, Potenza & al. 2010, Brackel 2011), **Cal** (Puntillo 1995, 1996, Puntillo & Puntillo 2004, Incerti & Nimis 2006, Brackel & Puntillo 2016), **Si** (Nimis & al. 1994, Ottonello & Salone 1994, Ottonello & al. 1994, Rambold & al. 1994, Ottonello 1996, Grillo & al. 1996, Ottonello & Romano 1997, Grillo 1998, Merlo 2004, Grillo & Caniglia 2004, 2006, Caniglia & Grillo 2006b, Falco Scampatelli 2005, Brackel 2008b, 2008c).

Fol.n/ Ch/ A.s/ Epiph-Sax/ pH: 2-4, L: 4-5, X: 3-4, E: 3-4/ Alt: 1-3/ Mont: r, SmedD: rr, Pad: er, SmedH: rr, MedH: vr/ PT: 1-2/ Note: a mainly temperate species. Its separation from *P. adscendens* is not always

clear to me: very characteristic specimens, hardly referable to *P. adscendens*, are most common in the submediterranean belt, in the mountains of the Peninsula and of the Islands, mostly in semi-natural situations. *P. tenella* certainly occurs throughout Italy, but it is not so common as the many records could suggest: several of them - especially those from polluted areas of northern Italy - are probably due to confusion with young or poorly developed specimens of *P. adscendens*.

Physcia tribacia (Ach.) Nyl.

Flora, 57: 48, 1874 - *Lecanora tribacia* Ach., Lichenogr. Univ.: 415, 1810.

Syn.: *Physcia erosa* Zwackh, *Physcia tribacia* var. *exempta* (Ach.) K.G.W. Lång

N - Ven (TSB 8420), **TAA**, **Lomb**, **Piem** (Favero-Longo & al. 2015), **VA** (Piervittori & Isocrono 1999), **Emil** (Valcuvia & Delucchi 2001), **Lig**. **C - Tosc** (Pišút 1997, Loppi & Frati 2006), **Laz**, **Abr**, **Sar** (Monte 1993). **S - Camp**, **Cal** (Puntillo 1996).

Fol.n/ Ch/ A.s/ Sax/ pH: 3, L: 4-5, X: 4-5, E: 3-4/ Alt: 1-2/ SmedD: er, SmedH: r, MedH: rr, MedD: rc/ PT: 1/ w/ Note: a widespread Mediterranean to xeric subtropical lichen found on basic siliceous rocks in sunny situations, often with *Peltula euploca* and ecologically related species, but less bound to periodical seepage of water; fairly common in parts of Mediterranean Italy, wherever suitable substrata are available, rarer in dry-warm Alpine valleys.

Physcia tribacioides Nyl.

Flora, 57: 307, 1874.

N - Lig (Giordani & Brunialti 2000, Brunialti & Giordani 2003, Giordani & al. 2009, Giordani & Incerti 2008). **C - Tosc**, **Laz** (Ravera 2001, Massari & Ravera 2002).

Fol.n/ Ch/ A.s/ Epiph/ pH: 3, L: 4-5, X: 2, E: 3/ Alt: 1-2/ SmedH: er, MedH: er/ PT: 1/ suboc/ Note: a humid subtropical to Mediterranean-Atlantic lichen found on isolated, mostly old trees, generally near the coast but not in maritime situations; in Italy certainly confined to the Tyrrhenian region. Recent records from Toscana (Loppi & Putortì 1995, Loppi & al. 1994, 1995, 1996b), where the species does in any case occur, are certainly wrong (Putortì *in litt.*). It is included in the Italian red list of epiphytic lichens as "Vulnerable" (Nascimbene & al. 2013c).

Physcia vitii Nád. v.

Stud. Bot. Cech., 8: 94, 1947.

N - Fri (Tretiach & Molaro 2007), **Ven** (Nimis & al. 1996c, Lazzarin 2000), **Lomb** (Valcuvia & Gianatti 1995, Grieco & Groppali 1995, Valcuvia & Brusoni 1996, Brusoni & al. 1997, Zocchi & al. 1997, Roella 1999, Brusoni & Valcuvia 2000, Arosio & al. 2003, Valcuvia & Truzzi 2007b, Furlanetto 2010), **Piem** (Piervittori 1998, 2003, Griselli & al. 2003, Furlanetto 2010, Giordani & Malaspina 2016), **Emil** (Gasparo & Tretiach 1996, Nimis & al. 1996, Valcuvia & Savino 2000), **Lig** (Brunialti & Giordani 2003, Giordani 2006, Giordani & Incerti 2008). **C - Tosc** (Loppi & al. 1996), **Marc** (Candotto & Tretiach 2013b), **Laz** (Ravera & al. 2000, Munzi & al. 2007), **Mol** (Paoli & al. 2015), **Sar** (Rizzi & al. 2011). **S - Camp** (Aprile & al. 2003b), **Cal** (Puntillo 1996), **Si** (Otonello & Isocrono 2004).

Fol.n/ Ch/ A.s/ Epiph/ pH: 2-3, L: 4-5, X: 3, E: 4-5/ Alt: 2/ SmedD: r, Pad: rc, SmedH: r/ PT: 2-3/ #/ Note: the circumscription of this species is not clear to me: it resembles a very stout *P. adscendens* without fibrils, and is most common in heavily polluted areas of the Po-plain. I wonder whether this name, at least as it was applied by Italian authors, does not refer to a morph of *P. adscendens* induced by environmental stress, especially eutrophication.

Physciella Essl.

Mycologia, 78: 93, 1986.

This small genus of the Physciaceae includes 4 species which differ from *Physcia* in the lack of atranorin, and from *Phaeophyscia* in the paraplectenchymatous lower cortex. The distinction between *Physciella* and *Phaeophyscia* is not accepted by some authors, but seems to be confirmed by molecular data (Figueras & Hladun 2009). Type: *P. chloantha* (Ach.) Essl.

Physciella chloantha (Ach.) Essl.

Mycologia, 78: 94, 1986 - *Parmelia chloantha* Ach., Syn. Meth. Lich.: 217, 1814.

Syn.: *Phaeophyscia chloantha* (Ach.) Moberg, *Physcia labrata* var. *intermedia* Mereschk., *Physcia luganensis* Mereschk., *Physcia obscura* var. *chloantha* (Ach.) Rabenh., *Physcia pragensis* Nád. v.

N - VG (Castello 1996, 2002, Carvalho 1997, Martellos & Castello 2004, Castello & Skert 2005, Tretiach & al. 2007b), **Fri** (Badin & Nimis 1996, Nimis & Salvadori 1997, Castello & Skert 2005, Tretiach & Molaro 2007, Nascimbene & Salvadori 2008, Nascimbene & al. 2009b, Bernini & al. 2010), **Ven** (Nascimbene 2005c, 2008, Nascimbene & Salvadori 2008, Nascimbene & al. 2008e, 2015, Nascimbene & Marini 2010), **TAA** (De Benetti & Caniglia 1993, Nascimbene 2005b, 2006c, 2014, Nascimbene & al. 2007b, 2014, Zarabska & al. 2009, Nimis & al. 2015), **Lomb** (Rivellini 1994, Arosio & Rinaldi 1995, Zocchi & al. 1997, Brusa 1998, Arosio & al. 2000, 2003, Anderi & al. 2005, Valcuvia & Truzzi 2007b, Gheza & al. 2015), **Piem** (Caniglia & al. 1992, Arosio & al. 1998, Piervittori 1998, 2003, Clerc & al. 1999, Castino 2004, Isocrono & al. 2004, 2005b, 2007, Griselli & al. 2003, Isocrono & Piervittori 2008, Furlanetto 2010, Matteucci & al. 2010), **VA** (Piervittori & Isocrono 1999, Valcuvia & al. 2000b), **Emil** (Bassi 1995, Gasparo & Tretiach 1996, Nimis & al. 1996, Sallese 2003, Morselli & Regazzi 2006, Tretiach & al. 2008), **Lig** (Giordani & Brunialti 2000, Giordani & al. 2002, Giordani & Incerti 2008). **C - Tosc** (Loppi & al. 1997c, 2002, 2002b, 2002c, 2003, 2004, 2006, Lorenzini & al. 2003, Loppi & Corsini 2003, Loppi & Frati 2006, Paoli & Loppi 2008, Brunialti & Frati 2010, Loppi &

Nascimbene 2010, Nascimbene & al. 2015), **Marc** (Fрати & al. 2004, Frati & Brunialti 2006), **Umb** (Ravera 2000, Ravera & al. 2006, Ciotti & al. 2009, Paoli & al. 2012), **Laz** (Gigante & Petriccione 1995, Ravera & al. 1999, Massari & Ravera 2002, Nimis & Tretiach 2004, Ruisi & al. 2005, Munzi & al. 2007, Ravera 2008b, Ravera & Genovesi 2008), **Abr** (Recchia & al. 1993, Catalano & al. 2016), **Mol** (Fрати & al. 2004, Caporale & al. 2008, Ravera & al. 2010, Paoli & al. 2011, 2015), **Sar** (Rizzi & al. 2011), **S - Camp**, **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999, Paoli & al. 2006), **Cal** (Puntillo 1996, Incerti & Nimis 2006), **Si** (Nimis & al. 1996b).

Fol.n/ Ch/ A.s/ Epiph-Sax/ pH: 3-5, L: 3-4, X: 3, E: 3-4/ Alt: 1-3/ Mont: er, SmedD: rr, Pad: er, SmedH: rr, MedH: vr/ PT: 1-2/ Note: a mild-temperate, typically submediterranean species occurring on a wide range of substrata (mostly on bark of isolated trees, but also on limestone in open woodlands), but never common in heavily disturbed habitats, rare along the eastern side of the Peninsula.

Physconia Poelt Nova Hedwigia, 9: 30, 1965.

This genus of the Physciaceae, with c. 25 species, was proposed to accommodate the section *Pulverulentae* of *Physcia s.lat.* on the basis of spore characters, Initially it was thought to have the centre of diversity in the Mediterranean area, but subsequent studies in North America and Asia have shown a broader distribution. A molecular phylogenetic study (Cubero & al. 2004) supports *Physconia* as a monophyletic group most closely related to *Anaptychia*. Divakar & al. (2007) showed that *P. distorta* and the European populations of "*P. americana*" form two monophyletic species and that both are distinct from the true, strictly American *P. americana*, which led to the description of a new species (*P. thorstenii*) from Europe. Type (conserved): *P. pulverulacea* Moberg (= *P. distorta*).

Physconia detersa (Nyl.) Poelt

Nova Hedwigia, 12: 123, 1966 - *Parmelia pulverulenta* var. *detersa* Nyl., Syn. Meth. Lich., 1: 420, 1860.

Syn.: *Hagenia detersa* (Nyl.) Bagl., *Physcia detersa* (Nyl.) Nyl., *Physcia grisea* f. *subnitens* (Vain.) Räsänen, *Physcia grisea* var. *detersa* (Nyl.) Lynge, *Physcia lanuginosa* var. *pannarioides* Räsänen, *Physcia leucoleiptes* auct. p.p. non (Tuck.) Lettau, *Physcia leucoleiptes* var. *detersa* (Nyl.) Nád. v.

N - Ven, **TAA** (Nascimbene 2005b, Nascimbene & al. 2007b), **Lomb** (Zocchi & al. 1997), **Piem** (Isocrono & al. 2004, Matteucci & al. 2010), **VA** (Piervittori & Isocrono 1999), **Emil**, **Lig** (Brunialti & Giordani 2003, Watson 2014), **C - Tosc** (Loppi & al. 1994, 1995, 1997, Benesperi 2000a), **Marc**, **Umb** (Panfili 2000, 2007, Ravera & al. 2006), **Laz** (Zucconi & al. 2013), **Abr** (Recchia & Villa 1996 (Nimis & Tretiach 1999), **Mol** (Caporale & al. 2008), **Sar** (Zedda 1995, 2002, Rizzi & al. 2011), **S - Bas** (Potenza & al. 2014).

Fol.n/ Ch/ A.s/ Epiph/ pH: 2-3, L: 4, X: 2, E: 2-3/ Alt: 3/ Mont: vr/ PT: 1/ Note: on mossy rocks along steep slopes, and on trunks of deciduous trees in the montane belt; some Italian records could refer to *P. perisidiosa*, which is much more common in Italy.

Physconia distorta (With.) J.R. Laundon

Lichenologist, 16: 218, 1984 - *Lichen distortus* With., Bot. Arrang. Veget. Gr. Brit., 1: 711, 1776.

Syn.: *Hagenia pulverulenta* auct. ital., *Parmelia pulverulenta* (Schreb.) Ach., *Parmelia pulverulenta* var. *allochroa* Schaer., *Parmelia pulverulenta* var. *angustata* (Hoffm.) Ach., *Physcia pulverulenta* (Schreb.) Hampe ex Fülln., *Physcia pulverulenta* var. *angustata* (Hoffm.) Nyl., *Physcia pulverulenta* var. *argyphaea* (Ach.) Nyl., *Physcia pulverulenta* var. *turgida* (Schaer.) Sántha, *Physconia pulverulacea* Moberg, *Physconia pulverulenta* (Schreb.) Poelt

N - VG (Castello 1996, 2002, Martellos & Castello 2004, Castello & Skert 2005), **Fri** (Castello & Skert 2005, Tretiach & Molaro 2007), **Ven** (Nascimbene & Caniglia 1997, 2003c, Caniglia & al. 1999, Lazzarin 2000, Valcuvia & al. 2000c, Nascimbene 2005c, 2008, 2008c, Thor & Nascimbene 2007, Nascimbene & Marini 2010, Nascimbene & al. 2010b), **TAA** (Philippi 1983, Nascimbene 2001b, 2005b, 2014, Nascimbene & al. 2007b, 2014, Nimis & al. 2015), **Lomb** (Philippi 1983, Rivellini 1994, Zocchi & al. 1997, Roella 1999, Arosio & al. 2003, Valcuvia & al. 2003, Dalle Vedove & al. 2004, Furlanetto 2010), **Piem** (Caniglia & al. 1992, Morisi & Sereno 1995, Arosio & al. 1998, Piervittori 1998, 2003, Clerc & al. 1999, Isocrono & Falletti 1999, Griselli & al. 2003, Castino 2004, Isocrono & al. 2004, 2005b, 2007, Morisi 2005, Isocrono & Piervittori 2008, Furlanetto 2010, Giordani & Malaspina 2016), **VA** (Borlandelli & al. 1996, Piervittori & Maffei 1996, 2001, Piervittori & Isocrono 1997, 1999, Piervittori & al. 2001, Revel & al. 2001), **Emil** (Bassi 1995, Gasparo & Brunialti 2006, Nimis & al. 1996, Sallese 2003, Tretiach & al. 2008, Cioffi 2009, Benesperi 2009), **Lig** (Brunialti & al. 1999, Putortù & al. 1999b, Brunialti & Giordani 2000, Giordani & al. 2002, 2003b, Brunialti & Giordani 2003, Giordani 2006, Giordani & Incerti 2008), **C - Tosc** (Loppi & al. 1992, 1995, 1996b, 1996c, 1997, 1997b, 1998, 1998b, 1999a, 2002, 2002b, 2002c, 2003, 2004, 2006, Tretiach & Nimis 1994, Loppi & Putortù 1995, 1995b, Loppi 1996, 1996b, Loppi & De Dominicis 1996, 1996b, Monaci & al. 1997, Loppi & Nascimbene 1998, 2010, Putortù & al. 1998, 1999, Bacci & al. 2000, Loppi & Pirintzos 2000, Benesperi 2000a, 2011, Del Guasta 2001, Paoli & Loppi 2001, 2008, Loppi & Corsini 2003, Frati & al. 2006b, 2007, Benesperi & al. 2007, Lastrucci & al. 2009, Brunialti & Frati 2010, Brunialti & al. 2012, 2012b, Brackel 2015, Nascimbene & al. 2015), **Marc** (Gasparo & al. 1989, Nimis & Tretiach 1999, Frati & Brunialti 2006, Brackel 2015, Pieri & al. 2015), **Umb** (Ravera 1998, Nimis & Tretiach 1999, Ravera & al. 2006, Panfili 2007, Ciotti & al. 2009, Brackel 2015), **Laz** (Gigante & Petriccione 1995, Ravera 2002, Massari & Ravera 2002, Nimis & Tretiach 2004, Ruisi & al. 2005, Ravera & Genovesi 2008, Zucconi & al. 2013, Brackel 2015), **Abr** (Recchia & al. 1993, Olivieri & Pacioni 1996, Olivieri & al. 1997, 1997b, Loppi & al. 1999, Nimis & Tretiach 1999, Stofer 2006, Brackel 2015, Caporale & al. 2016, Corona & al. 2016), **Mol** (Garofalo & al. 1999, Nimis & Tretiach 1999, Caporale & al. 2008, Paoli & al. 2011, 2015, Genovesi & Ravera 2014), **Sar** (Zedda 1995, 2002, 2002b, Loi & al. 2000, Stofer 2006, Rizzi & al. 2011, Kodnik & al. 2011, Giordani & al. 2013, Cossu 2013), **S - Camp** (Garofalo & al. 1999, 2010, Ricciardi & al. 2000, Aprile & al. 2002, 2003, 2003b, 2011, Nimis & Tretiach 2004, Catalano & al. 2010, 2016, Brunialti & al. 2013, Ravera & Brunialti 2013), **Pugl** (Nimis & Tretiach 1999), **Bas** (Bartoli & Puntillo 1998, Nimis & Tretiach 1999, Potenza 2006, Potenza & al. 2010, Brackel 2011), **Cal** (Puntillo 1996, Puntillo

& Puntillo 2004, Incerti & Nimis 2006, Brackel & Puntillo 2016), **Si** (Merlo 1993, 2004, Ottonello & Salone 1994, Ottonello & al. 1994, Nimis & al. 1996b, Ottonello 1996, Grillo & Cristaudo 1995, Grillo 1996, 1998, Grillo & al. 1996, Grillo & Carfi 1997, Czczuga & al. 1999, Grasso & al. 1999, Caniglia & Grillo 2004, 2006b, Merlo 2004b, Grillo & Caniglia 2004, 2006, Falco Scampatelli 2005, Stofer 2006, Brackel 2008b, 2008c, Liistro & Cataldo 2011, Di Martino & Stancanelli 2015).

Fol.n/ Ch/ S/ Epiph/ pH: 3-4, L: 4-5, X: 3-4, E: 3-4/ Alt: 1-3/ Mont: rr, SmedD: c, Pad: vr, SmedH: vc, MedH: rr, MedD: r/ PT: 1-3/ Note: a Mediterranean to temperate lichen of isolated trees, rare only in truly Mediterranean vegetation and in polluted areas, most frequent below the montane belt.

Physconia enteroxantha (Nyl.) Poelt

Nova Hedwigia, 12: 125, 1966 - *Physcia enteroxantha* Nyl., Flora, 56: 196, 1873.

Syn.: *Physcia enteroxanthella* (Harm.) H. Olivier, *Physcia leucoleiptes auct. eur. non* (Tuck.) Lettau, *Physcia subdetersa* Nyl.

N - VG (Castello & Skert 2005), **Frl, Ven** (Caniglia & al. 1999, Valcuvia & al. 2000c), **TAA** (Thor & Nascimbene 2007, Nascimbene & al. 2007b, Nimis & al. 2015), **Lomb** (Brusoni & al. 1997, Brusoni & Valcuvia 2000, Valcuvia & al. 2003), **Piem** (Morisi & Sereno 1995, Roella 1999, Valcuvia 2002, 2002b, Piervittori 2003, Castino 2004, Furlanetto 2010), **VA** (Piervittori & Maffei 1996, Piervittori & Isocrono 1999), **Emil** (Bassi 1995, Gasparo & Tretiach 1996), **Lig** (Otte & al. 2002, Giordani & al. 2002, Brunialti & Giordani 2003, Watson 2014). **C - Tosc** (Loppi & al. 1996c, Benesperi & Lastrucci 2007, Lastrucci & al. 2009), **Umb** (Ravera 2000, Ravera & al. 2006), **Laz** (Ruisi & al. 2005, Ravera & Genovesi 2008, Zucconi & al. 2013), **Abr** (Olivieri & al. 1997, 1997b, Loppi & al. 1999, Nimis & Tretiach 1999, Corona & al. 2016), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **Sar** (Monte 1993, Zedda 1995, 2002, 2002b, Nöske 2000, Zedda & Sipman 2001, Zedda & al. 2001, Rizzi & al. 2011, Cossu 2013). **S - Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999, Brackel 2011), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1996b).

Fol.n/ Ch/ A.s/ Epiph-Sax/ pH: 2-3, L: 4-5, X: 3, E: 3-4/ Alt: 1-3/ Mont: vr, SmedD: r, Pad: er, SmedH: rr, MedH: r, MedD: er/ PT: 1-2/ suboc/ Note: a Mediterranean to temperate species found on isolated trees, sometimes on mossy rocks; most frequent in southern Italy, and along the Tyrrhenian coast at low altitudes (below 800 m), much rarer elsewhere.

Physconia grisea subsp. ***algeriensis*** (Flagey) Poelt

Nova Hedwigia, 12: 119, 1966 - *Physcia farrea* var. *pulverulenta* f. *algeriensis* Flagey, Cat. Lich. Alg.: 17, 1896.

Syn.: *Physcia algeriensis* (Flagey) M. Choisy, *Physcia grisea* var. *algeriensis* (Flagey) J. Steiner

N - Lig. C - Umb (Ravera & Ciotti 2015), **Laz, Sar** (Zedda 2002, Rizzi & al. 2011, Giordani & al. 2013). **S - Si** (Brackel 2008b).

Fol.n/ Ch/ S/ Epiph-Sax/ pH: 3, L: 4, X: 3, E: 2-3/ Alt: 1-2/ smedH: er, MedH: r/ PT: 1/ Note: this taxon, which is both saxicolous and epiphytic, is worthy of further investigation: it could prove to be the primary, sexually reproducing species of *P. grisea*.

Physconia grisea (Lam.) Poelt subsp. ***grisea***

Nova Hedwigia, 9: 30, 1965 - *Lichen griseus* Lam., Encycl. Meth. Bot., 3: 480, 1789.

Syn.: *Hagenia pulverulenta* var. *pityrea* (Ach.) Bagl. & Carestia, *Parmelia farrea* Ach. non auct. p.p., *Parmelia pityrea* (Ach.) Ach., *Physcia grisea* (Lam.) Zahlbr., *Physcia grisea* var. *hillmannii* (Lyng) Nád., *Physcia grisea* var. *pityrea* (Ach.) Flagey, *Physcia pityrea* (Ach.) Nyl., *Physconia farrea* (Ach.) Poelt non sensu Poelt

N - VG (Carvalho 1997, Castello 2002, Martellos & Castello 2004), **Frl** (Badin & Nimis 1996, Castello & Skert 2005, Bernini & al. 2010), **Ven** (Nimis & al. 1996c, Nascimbene & Caniglia 1997, Caniglia & al. 1999, Lazzarin 2000, Valcuvia & al. 2000c, Nascimbene 2008), **TAA** (Nascimbene & al. 2007b, Zarabska & al. 2009), **Lomb** (Arosio & Rinaldi 1995, Valcuvia & Brusoni 1996, Brusoni & al. 1997, Zocchi & al. 1997, Brusoni & Valcuvia 2000, Casarini & al. 2000, Arosio & al. 2000, 2003, Anderi & al. 2005, Valcuvia & Truzzi 2007b, Furlanetto 2010), **Piem** (Caniglia & al. 1992, Arosio & al. 1998, Clerc & al. 1999, Roella 1999, Buzio 2003, Castino & Ropolo 2003, Piervittori 2003, Isocrono & al. 2003, 2004, 2007, Griselli & al. 2003, Castino 2004, Furlanetto 2010, Giordani & Malaspina 2016), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Giordani & al. 2003b, Matteucci & al. 2008c), **Emil** (Bassi 1995, Nimis & al. 1996, Gasparo & Tretiach 1996, Tretiach 1997, Valcuvia & Savino 2000, Sallesse 2003, Marconi & al. 2006, Morselli & Regazzi 2006, Cioffi 2009, Malavasi 2014, Gerdol & al. 2014), **Lig** (Castello & al. 1994, Giordani & al. 2001, 2002, Brunialti & Giordani 2003, Giordani 2006, Giordani & Incerti 2008). **C - Tosc** (Tretiach & Nimis 1994, Loppi & al. 1995, 1996b, 1997, 1997e, 1998b, 2002, 2002b, 2002c, 2003, 2004, 2006, Monaci & al. 1997, Loppi & Nascimbene 1998, 2010, Putortì & Loppi 1999, Dupla Graec. Lich. 64: Obermayer 1999, Bacci & al. 2000, Del Guasta 2001, Loppi & Corsini 2003, Lorenzini & al. 2003, Loppi & Frati 2004, Frati & al. 2006b, 2007, Paoli & Loppi 2008, Lohtander & al. 2008, Lastrucci & al. 2009, Brunialti & Frati 2010, Benesperi 2011, Paoli & al. 2012, 2012b, 2013, 2015d, Brackel 2015), **Marc** (Gasparo & al. 1989, Nimis & Tretiach 1999, Brunialti & al. 2012, Brackel 2015), **Umb** (Ravera 1998, Ravera & al. 2006, Frati & Brunialti 2006, Brackel 2015, Ravera & Ciotti 2015), **Laz** (Ravera & al. 1999, Massari & Ravera 2002, Ruisi & al. 2005, Munzi & al. 2007, Ravera 2008b, Ravera & Genovesi 2008, Genovesi & al. 2011, Zucconi & al. 2013), **Abr** (Recchia & al. 1993, Olivieri & Pacioni 1996, Olivieri & al. 1997, 1997b, Loppi & al. 1999, Nimis & Tretiach 1999, Brackel 2015, Caporale & al. 2016), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008, Paoli & al. 2011, 2015, Genovesi & Ravera 2014), **Sar** (Zedda 1995, 2002, 2002b, Loi & al. 2000, Zedda & Sipman 2001, Otte & al. 2002, Rizzi & al. 2011, Kodnik & al. 2011, Giordani & al. 2013, Cossu 2013). **S - Camp** (Ricciardi & al. 2000, Aprile & al. 2003b, 2011, Nimis & Tretiach 2004, Garofalo & al. 2010, Catalano & al. 2016), **Pugl** (Nimis & Tretiach 1999), **Bas** (Bartoli & Puntillo 1998, Nimis & Tretiach 1999, Potenza 2006, Paoli & al. 2006, Potenza & al. 2010, Brackel 2011), **Cal** (Puntillo & Puntillo 2004, Incerti & Nimis 2006), **Si** (Ottonello & Salone 1994, Nimis & al. 1996b, Grillo & al. 1996, Ottonello 1996, Grillo 1998, Grillo & Caniglia 2004, 2006, Brackel 2008c).

Fol.n/ Ch/ A.s/ Epiph-Sax/ pH: 3-4, L: 3-5, X: 3, E: 4-5/ Alt: 1-4/ Salp: er, Mont: vr, SmedD: vc, Pad: rr, SmedH: vc, MedH: rc, MedD: er/ PT: 1-3/ Note: a mainly mild-temperate, perhaps holarctic lichen found both on bark (often on basal parts of isolated trees) and on calciferous rocks (especially calcareous sandstone, e.g. on walls); widespread throughout the country with optimum below the montane belt, locally common also in urban areas.

***Physconia grisea* subsp. *lilacina* (Arnold) Poelt**

Nova Hedwigia, 12: 120, 1966 - *Parmelia pulverulenta* f. *lilacina* Arnold, Flora, 46: 589, 1863.

Syn.: *Physcia grisea* var. *lilacina* (Arnold) Nádv., *Physcia lilacina* (Arnold) Poelt, *Physconia lilacina* (Arnold) Poelt

N - VA (Piervittori & Isocrono 1999), **Lig. C - Sar. S - Cal** (Puntillo 1996, Otte & al. 2002), **Si** (Otte & al. 2002, Grillo & Caniglia 2004, 2006).

Fol.n/ Ch/ A.s/ Sax/ pH: 3-4, L: 4-5, X: 3, E: 2-3/ Alt: 1-3/ Mont: er, SmedD: er, SmedH: vr, MedD: vr/ PT: 1/ Note: on rock, more rarely on eutrochicated bark or lignum; in Italy mostly restricted to dry-warm sites (in the Mediterranean belt and in dry-warm Alpine valleys).

***Physconia muscigena* var. *bayeri* (Nádv.) Poelt**

Nova Hedwigia, 9: 30, 1965 - *Physcia bayeri* Nádv., Stud. Bot. Cech., 8: 124, 1947.

N - VA (Piervittori & Isocrono 1999).

Fol.n/ Ch/ S/ Terr/ pH: 3-5, L: 4-5, X: 3-4, E: 2-4/ Alt: 4-5/ Alp: er, Salp: vr/ PT: 1/ #/ Note: a critical taxon, which needs further study.

Physconia muscigena* (Ach.) Poelt var. *muscigena

Nova Hedwigia, 9: 30, 1965 - *Parmelia muscigena* Ach., Lichenogr. Univ.: 472, 1810.

Syn.: *Hagenia pulverulenta* var. *muscigena* (Ach.) Bagl. & Carestia, *Physcia muscigena* (Ach.) Nyl., *Physcia pulverulenta* subsp. *muscigena* (Ach.) Nyl., *Physcia pulverulenta* var. *muscigena* (Ach.) Nyl.

N - Frl (Tretiach & Hafellner 2000), **Ven** (Nimis 1994, Caniglia & al. 1999, Nascimbene & Caniglia 2003c, Thor & Nascimbene 2007, Nascimbene & Marini 2007), **TAA** (Nascimbene & al. 2006, Nascimbene 2008b), **Lomb** (Valcuvia & al. 2003, Dalle Vedove & al. 2004), **Piem** (Morisi & Sereno 1995, Isocrono & al. 2004, Morisi 2005, Isocrono & Piervittori 2008), **VA** (Piervittori & Isocrono 1997, 1999, Valcuvia 2000, Piervittori & al. 2001), **Emil. Lig** (TSB 33473). **C - Tose** (Benespero 2006, 2007, 2007b), **Marc** (Nimis & Tretiach 1999), **Umb** (Nimis & Tretiach 1999, Ravera & al. 2006, Panfili 2007), **Laz** (Brackel 2015), **Abr** (Nimis & Tretiach 1999, van den Boom & Brand 2008b), **Mol** (Nimis & Tretiach 2004, Caporale & al. 2008), **Sar** (Zedda 2002, Rizzi & al. 2011). **S - Camp** (Garofalo & al. 1999, Aprile & al. 2003b, Nimis & Tretiach 2004), **Bas** (Nimis & Tretiach 1999, Potenza 2006), **Cal, Si**.

Fol.n/ Ch/ S/ Terr/ pH: 3-5, L: 4-5, X: 3-4, E: 2-4/ Alt: 3-5/ Alp: ec, Salp: ec, Orom: rr, Mont: r/ PT: 1-2/ Note: an arctic-alpine, circumpolar lichen found on mosses and plant debris in open situations, such as in grasslands and on mosses growing on isolated calcareous boulders, from the subalpine and alpine belts of the Alps, throughout the Apennines, to the mountains of Sicilia.

***Physconia perisidiosa* (Erichsen) Moberg**

Symb. Bot. Upsal., 22, 1: 90, 1977 - *Physcia perisidiosa* Erichsen, Verh. bot. Ver. Prov. Brandenburg, 72: 57, 1930.

Syn.: *Physcia farrea* auct. p.p., *Physcia farrea* var. *laceratula* B. de Lesd., *Physconia farrea* auct.

N - VG (Tretiach & Carvalho 1995, Carvalho 1997), **Frl** (TSB 18183), **Ven** (Nascimbene 2008c, Nascimbene & Marini 2010), **TAA** (Nascimbene & al. 2007b, 2014, Nascimbene 2014), **Lomb** (Zocchi & al. 1997, Valcuvia & al. 2003, Isocrono & al. 2008), **Piem** (Caniglia & al. 1992, Giordani & al. 2003b, Piervittori 2003, Castino 2004, Matteucci & al. 2010, Giordani & Malaspina 2016), **VA** (Piervittori & Isocrono 1999, Giordani & al. 2003b, Matteucci & al. 2008), **Emil** (Bassi 1995, Gasparo & Tretiach 1996, Nimis & al. 1996), **Lig** (Brunialti & al. 1999, Giordani & al. 2002, Brunialti & Giordani 2003). **C - Tose** (Tretiach & Nimis 1994, Loppi & Corsini 1995, Loppi & Putorti 1995, Loppi & al. 1994, 1995, 1997, 1997e, 1998, 1998b, 1999a, 2002, 2002c, 2004, 2006, Loppi 1996, Loppi & De Dominicis 1996, Monaci & al. 1997, Putorti & al. 1998, Loppi & Nascimbene 1998, 2010, Benespero 2000a, 2011, Loppi & Pirintzos 2000, Frati & al. 2006b, 2007, Benespero & al. 2007, Paoli & Loppi 2008, Brunialti & Frati 2010, Paoli & al. 2012, 2012b, 2013, 2015d, Brackel 2015), **Marc** (Nimis & Tretiach 1999, Brackel 2015), **Umb** (Ravera 1998, Panfili 2000b, Ravera & al. 2006), **Laz** (Ravera 2001, Massari & Ravera 2002, Nimis & Tretiach 2004, Ruisi & al. 2005, Munzi & al. 2007, Ravera & Genovesi 2008, Zucconi & al. 2013), **Abr** (Recchia & al. 1993, Olivieri & Pacioni 1996, Olivieri & al. 1997, 1997b, Loppi & al. 1999, Frati & Brunialti 2006, Brackel 2015, Caporale & al. 2016, Corona & al. 2016), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008, Genovesi & Ravera 2014, Paoli & al. 2015), **Sar** (Zedda 1995, 2002, 2002b, Zedda & al. 2001, Rizzi & al. 2011, Kodnik & al. 2011, Giordani & al. 2013). **S - Camp** (Aprile & al. 2003b, Ravera & Brunialti 2013), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999, Potenza 2006, Brackel 2011), **Cal** (Puntillo 1995, 1996, Incerti & Nimis 2006), **Si** (Nimis & al. 1994, Brackel 2008b).

Fol.n/ Ch/ A.s/ Epiph/ pH: 2-3, L: 3-4, X: 2-3, E: 2-3/ Alt: 1-3/ Mont: r, SmedD: rr, Pad: er, SmedH: rc, MedH: rr, MedD: er/ PT: 1-2/ suboc/ Note: a Mediterranean to mild-temperate lichen with a fragmented holarctic distribution, found both on bark and on epiphytic mosses; most common in submediterranean areas with a warm-suboceanic climate, but rare in disturbed habitats.

***Physconia petraea* (Poelt) Vězda & Poelt**

in Vězda, Sched. ad Lich. Sel. Exs., 36: 7 (nr. 899), 1970 - *Physconia muscigena* var. *petraea* Poelt, Nova Hedwigia, 12: 123, 1966.

N - **TAA**, **Lomb** (Valcuvia & al. 2003), **Piem** (TSB 32672), **VA** (Piervittori & Isocrono 1999), **Emil** (Valcuvia & Delucchi 2001), **Lig** (Steiner, Lich. Alpium 269: Otte & al. 2002). **C** - **Tosc** (Benespero & Lastrucci 2007, Lastrucci & al. 2009), **Sar** (Nöske 2000, Rizzi & al. 2011). **S** - **Cal** (Puntillo 1996), **Si** (Nimis & al. 1996b).

Fol.n/ Ch/ S/ Sax/ pH: 3-4, L: 4-5, X: 4, E: 2-3/ Alt: 1-4/ Salp: er, Mont: er, SmedD: er, SmedH: er, MedH: er/ PT: 1/ #/ Note: on base-rich siliceous rocks and epilithic mosses in dry-warm situations; known only from southern Europe, and in need of further study.

Physconia servitii (Nádv.) Poelt

Nova Hedwigia, 9: 30, 1965 - *Physcia servitii* Nádv., Stud. Bot. Cech., 9: 154, 1948.

N - **VG**, **TAA** (Nascimbene & Caniglia 2000), **Emil** (Sallese 2003), **Lig** (Giordani & al. 2002, Giordani & Incerti 2008). **C** - **Tosc** (Loppi & Putortù 1995, 1995b, Loppi & al. 1995, 1996, 1996b, 1997, 1997b, 1998, 1998b, 1999a, 2002, 2002b, 2002c, 2006, Loppi 1996, 1996b, Loppi & De Dominicis 1996, Putortù & al. 1998, Loppi & Nascimbene 1998, 2010, Putortù & Loppi 1999b, Lorenzini & al. 2003, Loppi & Corsini 2003, Paoli & Loppi 2008, Brunialti & Frati 2010, Brunialti & al. 2012b, Paoli & al. 2012, 2012b, 2013, 2015d, Brackel 2015), **Marc** (Nimis & Tretiach 1999, Frati & Brunialti 2006), **Umb** (Ravera 1998, Ravera & al. 2006), **Laz** (Bartoli & al. 1997, Massari & Ravera 2002, Nimis & Tretiach 2004, Ruisi & al. 2005, Munzi & al. 2007, Ravera & Genovesi 2008, Zucconi & al. 2013, Brackel 2015), **Abr** (Recchia & al. 1993, Olivieri & al. 1997, 1997b, Loppi & al. 1999, Caporale & al. 2016, Corona & al. 2016), **Mol** (Garofalo & al. 1999, Caporale & al. 2008, Ravera & al. 2010, Paoli & al. 2015), **Sar** (Zedda 1995, 2002, Zedda & al. 2001, Rizzi & al. 2011, Cossu 2013). **S** - **Camp** (Garofalo & al. 1999, 2010, Aprile & al. 2003, 2003b, Nimis & Tretiach 2004, Blasi & al. 2010, Brunialti & al. 2010, 2013, Nascimbene & al. 2010b, Ravera & Brunialti 2013), **Pugl** (Nimis & Tretiach 1999, Brackel 2011), **Bas** (Nimis & Tretiach 1999, Potenza 2006, Paoli & al. 2006, Potenza & al. 2010, Brackel 2011), **Cal** (Puntillo 1996, Puntillo & Puntillo 2004, Incerti & Nimis 2006), **Si** (Grillo 1998, Grillo & Caniglia 2004, 2006, Brackel 2008b, Grillo & Cataldo 2008, 2008b, Liistro & Cataldo 2011).

Fol.n/ Ch/ S/ Epiph/ pH: 2-3, L: 3-4, X: 2-3, E: 2-3/ Alt: 1-3/ Mont: er, SmedD: er, SmedH: rr, MedH: rc/ PT: 1/ suboc/ Note: a Mediterranean-Atlantic to mild-temperate, mainly western lichen found on old trees in open woodlands; mostly Tyrrhenian in Italy.

Physconia subpulverulenta (Szatala) Poelt var. *atlantica* Poelt

Nova Hedwigia, 12: 127, 1966.

C - **Sar** (Zedda 1995, 2002, Zedda & Sipman 2001).

Fol.n/ Ch/ S/ Epiph/ pH: 3, L: 4, X: 3, E: 3/ Alt: 3/ Mont: er/ PT: 1/ suboc, #/ Note: a critical taxon, which needs further study. It was included in the Italian red list of epiphytic lichens as "Data Deficient" (Nascimbene & al. 2013c).

Physconia subpulverulenta (Szatala) Poelt var. *subpulverulenta*

Nova Hedwigia, 12: 127, 1966 - *Physcia subpulverulenta* Szatala, Borbasia, 3: 135, 1941.

C - **Sar** (Zedda 1995, 2002, 2002b, Zedda & al. 2001, Otte & al. 2002, Rizzi & al. 2011, Cossu 2013). **S** - **Camp** (Catalano & al. 2010, 2016), **Pugl** (Garofalo & al. 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Otte & al. 2002, Puntillo 2011), **Si** (Otte & al. 2002).

Fol.n/ Ch/ S/ Epiph/ pH: 3, L: 4-5, X: 3, E: 3-4/ Alt: 1-2/ SmedH: vr, MedH: vr/ PT: 1-2/ suboc/ Note: a mainly Mediterranean-Atlantic lichen of isolated trees. The taxonomic significance of yellow medullary pigments in *Physconia* still awaits a satisfactory evaluation. This taxon is rare in Italy, and restricted to warm-humid Tyrrhenian areas. It was included in the Italian red list of epiphytic lichens as "Data Deficient" (Nascimbene & al. 2013c).

Physconia thorstenii A. Crespo & Divakar

in Divakar & al., Mycol. Res., 111: 1315, 2007.

N - **TAA** (Divakar & al. 2007). **C** - **Laz** (Divakar & al. 2007), **Sar** (Divakar & al. 2007).

Fol.n/ Ch/ S/ Epiph/ pH: 3-4, L: 4-5, X: 3-4, E: 3-4/ Alt: 1-3/ Mont: vr, SmedD: vr, SmedH: vr, MedH: vr, MedD: vr/ PT: 1-2/ Note: this recently-described corticolous species grows on the nutrient-rich or moderately eutrophicated rough bark of a wide range of both deciduous and evergreen trees. Common in the central Iberian Peninsula, it is also known from the southern Euro-Asiatic region (Italy, Austria, France, Greece, Cyprus, Saudi Arabia, Afghanistan, Pakistan, Tadjikistan), and from North Africa (Morocco). In Italy it might have been confused with *P. distorta*, and might be more frequent.

Physconia venusta (Ach.) Poelt

Nova Hedwigia, 12: 130, 1966 - *Parmelia venusta* Ach., Meth. Lich.: 211, 1803.

Syn.: *Anaptychia subaquila* (Nyl.) Kurok., *Parmelia hybrida* (Ach.) Röhl., *Physcia amoena* (Zahlbr.) Nádv., *Physcia subaquila* auct. non Nyl., *Physcia pulverulenta* var. *venusta* (Ach.) Nyl., *Physcia venusta* (Ach.) Nyl.

N - **Ven** (Nascimbene & Caniglia 2003c), **TAA** (Nascimbene & al. 2007b), **Lomb** (Zocchi & al. 1997, Litterski & Otte 2002, Chiappetta & al. 2005), **Emil** (Benespero 2009, Brackel 2015), **Lig** (Brunialti & al. 1999, Giordani & al. 2002, Brunialti & Giordani 2003). **C** - **Tosc** (Tretiach & Nimis 1994, Loppi & Putortù 1995, 1995b, Loppi & al. 1995, 1996b, 1996c, 1997, 1997b, 1998, 1998b, 2002b, 2002c, 2004, 2004c, Loppi 1995c, 1996, Loppi & De Dominicis 1996, Loppi & Nascimbene 1998, 2010, Putortù & al. 1998, 1999, Tretiach & Ganis 1999, Putortù & Loppi 1999b, Del Guasta 2001, Laganà & al. 2002, Loppi & Frati 2006, Paoli & Loppi 2001, Benespero & al. 2007, Lastrucci & al. 2009, Brunialti & Frati 2010, Benespero 2011, Paoli & al. 2012, Brackel 2015), **Marc** (Nimis & Tretiach 1999, Frati & Brunialti 2006, Brackel 2015), **Umb** (Ravera 1998, Panfili 2000b, 2007, Ravera & al. 2006, Brackel 2015), **Laz** (Ravera 2002, Litterski & Otte 2002, Massari & Ravera 2002, Nimis & Tretiach 2004, Ruisi & al. 2005, Ravera & Genovesi 2008, Zucconi & al. 2013, Brackel 2015), **Abr** (Recchia & al. 1993, Olivieri & al. 1997, 1997b, Loppi & al. 1999, Nimis & Tretiach 1999,

Stofer 2006, Brackel 2015, Caporale & al. 2016, Corona & al. 2016), **Mol** (Garofalo & al. 1999, Nimis & Tretiach 1999, Caporale & al. 2008, Genovesi & Ravera 2014, Paoli & al. 2015), **Sar** (Zedda 1995, 2002, 2002b, Loi & al. 2000, Zedda & Sipman 2001, Zedda & al. 2001, Litterski & Otte 2002, Otte & al. 2002, Stofer 2006, Rizzi & al. 2011, Cossu 2013). **S - Camp** (Garofalo & al. 1999, 2010, Aprile & al. 2002, 2003, 2003b, 2011, Nimis & Tretiach 2004, Brunialti & al. 2010, 2013, Nascimbene & al. 2010b, Ravera & Brunialti 2013, Catalano & al. 2016), **Pugl** (Garofalo & al. 1999, Nimis & Tretiach 1999, Brackel 2011), **Bas** (Nimis & Tretiach 1999, Litterski & Otte 2002, Fascetti & al. 2005, Potenza & Fascetti 2010, Brackel 2011), **Cal** (Puntillo 1995, 1996, Litterski & Otte 2002, Puntillo & Puntillo 2004, Incerti & Nimis 2006, Brackel & Puntillo 2016), **Si** (Ottonello & al. 1994, Grillo & Cristaudo 1995, Ottonello 1996, Litterski & Otte 2002, Merlo 2004, Falco Scampatelli 2005, Stofer 2006, Brackel 2008c, Liistro & Cataldo 2011).

Fol.n/ Ch/ S/ Epiph/ pH: 2-3, L: 3-4, X: 2, E: 1-2/ Alt: 2-3/ Mont: vc, SmedD: er, SmedH: r/ PT: 1/ Note: one of the few lichens whose distribution is centred on the Mediterranean mountains, and one of the most abundant and typical lichens of the central and south Italian humid beech forests, which is rare in the Alps. An earlier record from Piemonte (see Nimis 1993: 543) and the recent ones from Piemonte (Castino 2004) and Rome (Munzi & al. 2007), being dubious, are not accepted here. According to Roux & coll. (2014) the forms called *subaquila* are worthy of further study: they differ in the black lower surface and the saxicolous growth, and could represent a good species.

Piccolia A. Massal.
Miscell. Lichenol.: 41, 1856.

A small genus of crustose lichens with only 7 species, characterised by multispored asci, a chlorococcoid photobiont and the presence of anthraquinone pigments in the apothecia. Its taxonomic position within the Lecanoromycetes is still unclear. For further details on the only species occurring in Italy see Hafellner (2004b). Type: *P. crocea* (Spreng.) A. Massal.

Piccolia ochrophora (Nyl.) Hafellner

Symb. Bot. Upsal., 34, 1: 91, 1995- *Lecidea ochrophora* Nyl., Flora, 48: 355, 1865.

Syn.: *Biatorella ochrophora* (Nyl.) Arnold, *Biatorella ochrophora* var. *planiuscula* Vězda, *Strangospora ochrophora* (Nyl.) R.A. Anderson

N - Emil (Nimis & al. 1996, Tretiach & al. 2008). **C - Tosc, Umb** (Ravera 2000, Ravera & al. 2006), **Laz** (Ravera 2001, Munzi & al. 2014), **Abr** (Caporale & Pagliani 2010, 2013, 2014, Caporale & al. 2012), **Mol** (Caporale & al. 2008), **Sar** (Zedda 2002, Rizzi & al. 2011). **S - Pugl** (Nimis & Tretiach 1999), **Bas** (Bartoli & Puntillo 1996, 1998), **Cal** (Puntillo 1996, Puntillo & Puntillo 2004, Incerti & Nimis 2006), **Si** (Ottonello & Puntillo 1995, 2009).

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 2-4, X: 2-3, E: 2-3/ Alt: 1-2/ SmedD: er, SmedH: vr, MedH: er/ PT: 1-2/ suboc/ Note: a mild-temperate species found on *Populus*, but also on *Sambucus* and other trees with base-rich bark in rather shaded and humid situations; overlooked, but certainly rare and declining. It is included in the Italian red list of epiphytic lichens under the “Least Concern” category (Nascimbene & al. 2013c).

Pilophorus Th. Fr.
Stereoc. Piloph. Comm.: 40, 1857.

This genus of the Cladoniaceae is characterised by a crustose primary thallus, short and simple pseudopodetia, green epihymenium, simple spores, and the presence of cephalodia. The genus, well studied worldwide, comprises 11 species distributed in temperate and alpine regions, where they typically grow on siliceous rocks. Type: *P. robustus* Th. Fr.

Pilophorus cereolus (Ach.) Th. Fr.

Lichenogr. Scand., 1: 55, 1871 - *Lichen cereolus* Ach., Lichenogr. Suec. Prodr.: 89, 1799.

Syn.: *Stereocaulon cereolinum* Ach. non auct. ital., *Stereocaulon cereolum* (Ach.) Ach.

N - TAA, Piem.

Frut/ Ch/ S/ Sax/ pH: 1-2, L: 3-4, X: 2, E: 1/ Alt: 3-4/ Salp: er, Mont: er/ PT: 1/ Note: an arctic-alpine, probably incompletely circumpolar lichen found on siliceous rocks in moist-wet situations near treeline; restricted to the Alps in Italy, and perhaps more widespread, but certainly not common.

Placidiopsis Beltr.
Lich. Bassan.: 212, 1858.

This genus of the Verrucariaceae consists of c. 20 species worldwide, growing on soil, detritus, mosses and algal or lichen crusts. *Placidiopsis* differs from the closely related *Catapyrenium*, which has the same type of upper cortex, in having septate ascospores and lacking pycnidia. The distinction between the two genera has been confirmed by molecular data (Prieto & al. 2010, 2012). Type: *P. grappae* Beltr. (= *P. cinerascens*).

Placidiopsis cinerascens (Nyl.) Breuss

Plant Syst. Evol., 148: 315, 1985 - *Endocarpon cinerascens* Nyl., Bot. Not.: 160, 1853.

Syn.: *Bohleria tenella* (Nyl.) Trevis., *Catapyrenium circinatum* (Bagl.) Jatta, *Catapyrenium grappae* (Beltr.) Jatta, *Catapyrenium pisanum* (Bagl.) Jatta, *Dermatocarpon baumgartneri* (Zahlbr.) Zahlbr., *Dermatocarpon cinerascens* (Nyl.) Zahlbr., *Endocarpon grappae* (Beltr.) Garov., *Endocarpon pervirescens* Nyl., *Endocarpon tenellum* Nyl.,

Placidiopsis baumgartneri Zahlbr., *Placidiopsis circinata* Bagl., *Placidiopsis dalmatica* Servít, *Placidiopsis grappae* Beltr., *Placidiopsis pisana* Bagl., *Placidiopsis tenella* (Nyl.) Zahlbr., *Placidium cinerascens* (Nyl.) Arnold, *Placocarpus cinerascens* (Nyl.) Trevis., *Verrucaria cinerascens* (Nyl.) Nyl.

N - Ven (Breuss 1996b). **C - Tosc** (Breuss 1996b), **Sar** (Breuss 1996b). **S - Pugl** (Breuss 1996b), **Bas** (Breuss 1996b, Puntillo 1996, Puntillo & Puntillo 2004, Prieto & al. 2010, Potenza & al. 2010), **Si** (Nimis & al. 1994, Breuss 1996b, Caniglia & Grillo 2005, 2006, Cataldo & Minissale 2013).

Cr/ Ch/ S/ Terr/ pH: 3-5, L: 4-5, X: 4-5, E: 1-2/ Alt: 1-2/ SmedD: er, SmedH: vr, MedH: r, MedD: r/ PT: 1/ Note: on clayey, somewhat calciferous but often superficially decalcified soil in grasslands and garrigues below the montane belt; in Italy this species seems to behave as a vicariant of the submediterranean *P. cartilaginea* in the Mediterranean belt. For the synonymisation with *P. tenella* see Prieto & al. (2010).

Placidiopsis crassa (Anzi) Clauzade & Cl. Roux

Bull. Soc. Bot. Centre-Ouest, n. sér., nr. spéc. 7: 827, 1985 - *Endocarpon crassum* Anzi, Comm. Soc. Critt. Ital., 2, 1: 23, 1864.

Syn.: *Dermatocarpon crassum* (Anzi) Zahlbr., *Endopyrenium crassum* (Anzi) Müll. Arg., *Verrucaria crassa* (Anzi) Jatta non A. Massal. nec Eschw.

N - Lomb, Lig.

Cr/ Ch/ S/ Sax/ pH: 3, L: 3-4, X: 1-2, E: 1/ Alt: 1-2/ SmedD: er/ PT: 1/ Note: on periodically flooded siliceous rocks below the montane belt, perhaps more widespread in southern Italy.

Placidiopsis custnani (A. Massal.) Körb.

Parerga Lichenol.: 305, 1863 - *Placidium custnani* A. Massal., Lotus, 6: 78, 1856.

Syn.: *Catapyrenium custnani* (A. Massal.) Jatta, *Dermatocarpon crenulatum* (Nyl.) Mig., *Endocarpidium custnani* (A. Massal.) Müll. Arg., *Endocarpon cinereum* var. *cartilagineum* Nyl., *Paraplacidiopsis crenulata* (Nyl.) Servít, *Placidiopsis cartilaginea* (Nyl.) Vain., *Placidiopsis crenulata* (Nyl.) Zschacke, *Verrucaria crenulata* (Nyl.) Nyl.

N - Ven (Lazzarin 2000b, Breuss 1996b), **TAA, Lomb, Piem, VA** (Pierivittori & Isocrono 1999). **S - Si** (Breuss 1996b).

Cr/ Ch/ S/ Terr/ pH: 4-5, L: 4, X: 3-4, E: 1-2/ Alt: 1-3/ Mont: vr, SmedD: r, SmedH: vr, MedH: vr, MedD: r/ PT: 1/ Note: an overlooked terricolous lichen found on calciferous soil and calcicolous mosses which, in Italy, seems to be most common in the submediterranean belt. Most of the records are from the Alps.

Placidiopsis dermatocarpoides Anzi

Atti Soc. Ital. Sc. Nat. Milano, 11: 173, 1868.

Syn.: *Catapyrenium dermatocarpoides* (Anzi) Jatta, *Endocarpon anzianum* Garov. nom. illegit. non *Dermatocarpon anzianum* Servít, *Verrucaria dermatocarpoides* (Anzi) Stizenb.

N - Lomb (Breuss 1996b).

Cr/ Ch/ S/ Sax/ pH: 3, L: 3-4, X: 3-4, E: 1/ Alt: 4/ Salp: vr/ PT: 1/ #/ Note: known only from the type collection, on soil in fissures of serpentine rocks.

Placidiopsis pseudocinerea Breuss

Plant Syst. Evol., 142: 248, 1983.

N - TAA (Breuss 1996b), **Piem** (TSB 34197), **VA. C - Abr** (Brackel 2015).

Cr/ Ch/ S/ Terr-Sax/ pH: 3-4, L: 3-4, X: 2-3, E: 1/ Alt: 4-5/ Alp: rr, Salp: r/ PT: 1/ Note: an arctic-alpine, circumpolar lichen found on soil and on muribund bryophytes on siliceous, base-rich or slightly calciferous soil (e.g. on calcareous schist), with optimum near and above treeline; it can be easily confused with *Catapyrenium cinereum* and is certainly much more widespread through the Italian Alps, also occurring in the central Apennines.

Placidiopsis tirolensis Breuss

Linzer Biol. Beitr., 21: 595, 1989.

N - Frl (Breuss 1996b).

Cr/ Ch/ S/ Terr/ pH: 4-5, L: 3-4, X: 3, E: 1/ Alt: 4-5/ Alp: vr, Salp: er/ PT: 1/ Note: on calciferous, mostly organic soil near and above treeline. The locality cited by Breuss (1996) is in Austria, but very close to the Italian border.

Placidium A. Massal.

Symmicta Lich.: 75, 1855.

The genus *Catapyrenium s.lat.* was split into eight genera (Breuss 1996a), based on combinations of characters such as the type of pycnidium, ascus shape and arrangement of the ascospores, colour of the excipulum, thallus anatomy and morphology (structure of the upper cortex and type of anchoring organs) and the presence/absence of an involucrellum. *Placidium*, with c. 28 species, is characterised by marginal or laminal pycnidia and the absence of rhizines. It is closely related to *Heteroplacidium* in the Verrucariaceae, but molecular data support the distinction of the two genera as monophyletic entities. The genus *Clavascidium* was synonymised with *Placidium* by Gueidan & al. (2009), but since it forms a monophyletic clade and can be differentiated by the presence of rhizines (which, however, are sometimes difficult to observe), it was accepted by Prieto & al. (2012). Type: *P. michelii* A. Massal.

Placidium adami-borosi Szatala

Ann. Mus. Nat. Hungar., n. ser., 7: 271, 1956.

Syn.: *Catapyrenium adami-borosi* (Szatala) Breuss

C - Sar. S - Cal (Puntillo 1996), **Si**.

Sq/ Ch/ S/ Terr/ pH: 3, L: 4-5, X: 4-5, E: 1-2/ Alt: 3-5/ Orom: vr, Mont: vr/ PT: 1/ Note: a mainly Mediterranean (-montane) lichen found on soil derived from metamorphic base-rich rocks in dry grasslands.

Placidium boccanum (Servít) Breuss

Ann. naturhist. Mus. Wien, 98B: 41, 1996 - *Dermatocarpon boccanum* Servít, Rozpr. Cesk. Akad. Ved, 65: 23, 1955.

Syn.: *Catapyrenium boccanum* (Servít) Breuss

N - VG, Ven. C - Tosc, Mol (Nimis & Tretiach 1999, Caporale & al. 2008). **S - Si** (Caniglia & Grillo 2001, 2006Grillo & Caniglia 2004).

Sq/ Ch/ S/ Sax/ pH: 4-5, L: 4, X: 4-5, E: 2/ Alt: 1-2/ SmedD: vr, SmedH: vr, MedH: vr, MedD: r/ PT: 1-2/ Note: a Mediterranean to mild-temperate lichen growing on calciferous clayey soil, often also found on walls, including those of mortar; rare in northern Italy, but probably more common in southern Italy.

Placidium imbecillum (Breuss) Breuss

Ann. naturhist. Mus. Wien, 98B: 41, 1996 - *Catapyrenium imbecillum* Breuss, Stapfia, 23: 80, 1990.

S - Cal (Puntillo 1996).

Sq/ Ch/ S/ Terr/ pH: 3, L: 4, X: 3-4, E: 1-2/ Alt: 4-5/ Alp: vr, Salp: vr, Orom: vr/ PT: 1/ Note: a terricolous species known from the Austrian Alps and from several isolated stations in southern Europe, with optimum near and above treeline; to be looked for in the Alps.

Placidium lachneum (Ach.) B. de Lesd.

Ann. Cryptog. Exot., 5: 100, 1932 - *Lichen lachneus* Ach., Lichenogr. Suec. Prodr.: 140, 1799.

Syn.: *Catapyrenium lachneum* (Ach.) R. Sant., *Dermatocarpon lachneum* (Ach.) A.L. Sm., *Endopyrenium lachneum* (Ach.) Hav.

N - Frl (TSB 16129), **Ven** (Nascimbene 2008c), **TAA, Lomb, Piem** (Hafellner & al. 2004), **VA** (Piervittori & al. 2004). **C - Umb** (Genovesi & al. 2002, Ravera & al. 2006), **Abr** (Nimis & Tretiach 1999).

Sq/ Ch/ S/ Terr/ pH: 3-4, L: 4, X: 4, E: 1-2/ Alt: 3-6/ Alp: rc, Salp: rr, Orom: r, Mont: er/ PT: 1/ Note: a mainly boreal-montane to arctic-alpine, circumpolar lichen found on terricolous bryophytes and on more or less organic calciferous soil in upland areas, reaching the nival belt in the Alps, also occurring in the central Apennines.

Placidium michelii A. Massal.

Sched. Crit., 5: 100, 1856.

Syn.: *Catapyrenium michelii* (A. Massal.) R. Sant., *Dermatocarpon michelii* (A. Massal.) Zwackh, *Endocarpon michelii* (A. Massal.) Bausch, *Endopyrenium michelii* (A. Massal.) Körb.

N - Ven (Lazzarin 2000b), **Lomb, Piem** (Isocrono & al. 2004). **C - Tosc**.

Sq/ Ch/ S/ Terr/ pH: 3, L: 4-5, X: 4-5, E: 1/ Alt: 2-3/ Mont: r, SmedD: vr/ PT: 1/ Note: a mainly temperate lichen found on mineral, especially sandy soil in open grasslands. Earlier dubious records from southern Italy, and that from Lazio (see Nimis 1993: 200) are not accepted here.

Placidium pilosellum (Breuss) Breuss

Ann. naturhist. Mus. Wien, 98B: 41, 1996 - *Catapyrenium pilosellum* Breuss, Stapfia, 23: 98, 1990.

N - VG, Frl, Ven, TAA, Piem (Clerc & al. 1999), **Emil** (Nimis & al. 1996), **Lig. C - Tosc, Marc, Umb** (Ravera & al. 2006, 2006b), **Laz** (Nimis & Tretiach 2004), **Sar. S - Bas** (Bartoli & Puntillo 1998), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994).

Sq/ Ch/ S/ Terr/ pH: 3-5, L: 4, X: 3-4, E: 1/ Alt: 1-3/ Mont: vr, SmedD: rr E: a, SmedH: rc, MedH: rr, MedD: vr/ PT: 1/ suboc/ Note: a Mediterranean to mild-temperate lichen found on more or less calciferous soil rich in humus, often growing amongst bryophytes; several Italian records need reconfirmation.

Placidium rufescens (Ach.) A. Massal.

Sched. Crit., 6: 114, 1856 - *Endocarpon rufescens* Ach., Lichenogr. Univ.: 304, 1810.

Syn.: *Catapyrenium lachneum* subsp. *rufescens* (Ach.) Clauzade & Cl. Roux, *Catapyrenium rufescens* (Ach.) Breuss, *Dermatocarpon rufescens* (Ach.) Th. Fr., *Dermatocarpon rufopallens* (Nyl.) Zahlbr., *Dermatocarpon terrigenum* Tomlin, *Endocarpon rufopallens* Nyl., *Endopyrenium rufescens* (Ach.) Körb., *Endopyrenium rufopallens* (Nyl.) Müll. Arg.

N - VG, Frl (Brackel 2013), **TAA, Ven, Lomb, Piem** (Clerc & al. 1999, Isocrono & al. 2003), **VA** (Piervittori & Isocrono 1999), **Emil** (Nimis & al. 1996), **Lig. C - Tosc** (Brackel 2015), **Umb** (Genovesi & al. 2001, Ravera & al. 2006), **Laz** (Nimis & Tretiach 2004), **Abr** (Brackel 2015), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008, Genovesi & Ravera 2014), **Sar. S - Camp** (Aprile & al. 2002, 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010), **Pugl, Si** (Ottoneo & al. 1994, Grillo 1998, Caniglia & Grillo 2001, 2005, 2006, Grillo & al. 2002, 2009, Grillo & Caniglia 2004, Merlo 2004b, Cataldo & Minissale 2013, 2015).

Sq/ Ch/ S/ Terr-Sax/ pH: 4-5, L: 4-5, X: 4-5, E: 1-3/ Alt: 1-3/ Mont: vr, SmedD: rr, SmedH: r, MedH: rr, MedD: r/ PT: 1/ w/ Note: a Mediterranean to (mainly) mild-temperate, holarctic lichen found on vertical

seepage tracks of calcareous rocks, almost always with colonies of cyanobacteria, more rarely on plant debris, calciferous soil, terricolous or epilithic bryophytes.

Placidium squamulosum (Ach.) Breuss

Ann. naturhist. Mus. Wien, 98B: 41, 1996 - *Endocarpon squamulosum* Ach., Meth. Lich.: 126, 1803.

Syn.: *Catapyrenium squamulosum* (Ach.) Breuss, *Dermatocarpella squamulosa* (Ach.) H. Harada, *Dermatocarpon desertorum* Tomin, *Dermatocarpon hepaticum* auct. p.p. non (Ach.) Th. Fr., *Dermatocarpon trapeziforme* auct. p.p. non (J. König) Trevis., *Endocarpon exiguum* Nyl., *Endopyrenium exiguum* (Nyl.) Boistel

N - VG, Frl (TSB 3385), **Ven** (Nascimbene 2002, 2008), **TAA** (De Benetti & Caniglia 1993), **Lomb, Piem, Emil** (Nimis & al. 1996), **Lig, C - Tosc** (Loppi & al. 2004b, Brackel 2015), **Marc, Umb** (Genovesi & al. 2002, Ravera & al. 2006), **Laz** (Nimis & Tretiach 2004, Brackel 2015), **Abr** (Brackel 2015), **Sar, S - Camp** (Ricciardi & al. 2000, Nimis & Tretiach 2004), **Pugl** (Nimis & Tretiach 1999), **Bas** (Potenza 2006, Potenza & al. 2010, Brackel 2011), **Cal** (Puntillo 1996, Puntillo & Puntillo 2004), **Si** (Nimis & al. 1994, Caniglia & Grillo 2001, 2005, 2006, Grillo & Caniglia 2004, Cataldo & Minissale 2013).

Sq/ Ch/ S/ Terr/ pH: 4-5, L: 4-5, X: 3-5, E: 1-3/ Alt: 1-4/ Salp: vr, Orom: rr, Mont: r, SmedD: rc, Pad: er, SmedH: rc, MedH: c, MedD: rc/ PT: 1-2/ Note: a widespread holarctic lichen found on calciferous soil, often amongst bryophytes in open dry grasslands, with a rather wide altitudinal range. This is probably the most common species of the genus in Italy.

Placidium tenellum (Breuss) Breuss

Ann. naturhist. Mus. Wien, 98B: 41, 1996 - *Catapyrenium tenellum* Breuss, Stapfia, 23: 126, 1990.

S - Si.

Sq/ Ch/ S/ Terr/ pH: 5, L: 4-5, X: 4-5, E: 1-2/ Alt: 1/ MedD: r/ PT: 1/ Note: a widespread but rare species of dry, very open Mediterranean grasslands and garrigues on calcareous substrata, extending eastward to Mongolia.

Placocarpus Trevis.

Conspect. Verruc.: 19, 1860.

This small genus of the Verrucariaceae, which includes 3 species only, is a sister genus to *Verrucula* (Gueidan & al. 2007), which includes only species parasitic on Teloschistaceae with anthraquinones. Two of the known species are juvenile parasites on species of *Protoparmeliopsis*. Type: *P. saxorum* (Chaillet) Trevis. (= *P. schaereri*).

Placocarpus schaereri (Fr.) Breuss

Plant Syst. Evol., 148: 314, 1985 - *Parmelia schaereri* Fr., Lichenogr. Eur. Ref.: 106, 1831.

Syn.: *Catapyrenium schaereri* (Fr.) R. Sant., *Dermatocarpon monstrosum* (Schaer.) Vain., *Dermatocarpon saxorum* (Chaillet) Trevis., *Endocarpon miniatum* var. *monstrosum* Schaer., *Endocarpon monstrosum* (Schaer.) A. Massal., *Endopyrenium monstrosum* (Schaer.) Hazsl., *Placidium monstrosum* (Schaer.) A. Massal., *Placocarpus saxorum* (Chaillet) Trevis., *Verrucaria schaereri* (Fr.) Nyl., *Verrucula monstrosum* (Schaer.) J. Steiner

N - VG (Watson 2014), **Frl, Ven, TAA, Lomb, Piem, VA** (Piervittori & Isocrono 1999), **Emil, Lig** (Watson 2014). **C - Tosc, Marc** (Nimis & Tretiach 1999), **Umb** (Nimis & Tretiach 1999, Ravera & al. 2006, Panfili 2007), **Laz, Abr** (Nimis & Tretiach 1999), **Mol** (Garofalo & al. 1999, Nimis & Tretiach 1999, Caporale & al. 2008, Ravera & al. 2009, Genovesi & Ravera 2014), **Sar, S - Camp** (Garofalo & al. 1999, Aprile & al. 2003, 2003b, Nimis & Tretiach 2004), **Pugl** (Garofalo & al. 1999, Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si.**

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 4-5, X: 4, E: 3-4/ Alt: 1-4/ Salp: er, Orom: vr, Mont: rr, SmedD: vc, Pad: er, SmedH: vc, MedH: rr, MedD: r/ PT: 1/ paras *Protoparmeliopsis versicolor*/ Note: a Mediterranean to mild-temperate lichen found on exposed calcareous boulders, with optimum in the submediterranean belt; when young, it is a constant parasite on *Protoparmeliopsis versicolor*; in the Apennines it can exceptionally reach up to 1800 m, as in the Gran Sasso Massif.

Placolecis Trevis.

Rev. Per. Lav. R. Accad. Sci. Padova, 5: 73, 1857.

This is a monotypic genus belonging to the Catillariaceae, characterised by the production of anthraquinones in the medulla. Type: *P. opaca* (Dufour) Hafellner

Placolecis opaca (Dufour) Hafellner

Beih. Nova Hedwigia, 79: 317, 1984 - *Lecidea opaca* Dufour in Fries, Lichenogr. Eur. Ref.: 289, 1831.

Syn.: *Astropalca balanina* (Fr.) Anzi, *Astropalca opaca* (Dufour) Bagl., *Biatora opaca* (Dufour) Jatta, *Lecidea adglutinata* Nyl., *Lecidea balanina* (Fr.) Hue, *Lecidea entochrysoides* Hue, *Parmelia balanina* Fr. nom. illegit., *Placolecis balanina* Trevis., *Psora opaca* (Dufour) A. Massal., *Psora opaca* var. *crocea* B. de Lesd.

N - VG, Frl (vidi!), **Ven, TAA, Lomb, Piem, Lig** (Watson 2014, Giordani & al. 2016). **C - Tosc, Laz, Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **Sar** (Rizzi & al. 2011). **S - Camp** (Garofalo & al. 1999, 2010, Aprile & al. 2003, 2003b, Nimis & Tretiach 2004), **Pugl** (Nimis & Tretiach 1999), **Bas** (Bartoli & Puntillo 1996, 1998), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1996b).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 3-4, X: 3, E: 2-3/ Alt: 1-2/ SmedD: r, Pad: er, SmedH: rr, MedH: rr, MedD: er/ PT: 1/ Note: a calcicolous lichen found in the Mediterranean and (more rarely) submediterranean belts, on both shaded and sunny surfaces of compact calcareous rocks. Its distribution extends widely into Central Asia. The record from Friuli is from the southern slopes of Mt. Bernadia near Ramandolo (Prov. Udine).

Placopsis (Nyl.) Linds.

Trans. Linn. Soc. London, 25: 536, 1866 - *Squamaria* subgen. *Placopsis* Nyl., Ann. Sci. Nat., Bot., sér. 4, 15: 376, 1861.

This genus of the Trapeliaceae includes *c.* 60 species, mostly early colonisers of rock surfaces and bare soil, such as recently deglaciated areas, and has the highest diversity in the Southern Hemisphere, especially in subantarctic regions. Although having a green algal primary photobiont, *Placopsis*-species also have cyanobacteria in cephalodia, a character missing in the closely related genus *Trapelia*. For further details see Schmitt & al. (2003). Type: *P. gelida* (L.) Linds.

Placopsis gelida (L.) Linds.

Trans. Linn. Soc. London, 25: 536, 1866 - *Lichen gelidus* L., Mantissa Pl., 1: 133, 1767.

Syn.: *Lecanora gelida* (L.) Ach., *Lecanora gelida* f. *neglecta* Degel., *Placodium gelidum* (L.) Gray, *Squamaria gelida* (L.) Hook.

N - Piem.

Cr/ Ch-Cy.h/ S/ Sax/ pH: 1-2, L: 3, X: 2, E: 1/ Alt: 3-4/ Salp: er, Mont: er/ PT: 1/ suboc/ Note: a boreal-montane to arctic-alpine, incompletely circumpolar lichen found on small siliceous pebbles and on basal parts of large boulders, mostly in moist situations of the upper montane and subalpine belts; very rare and confined to the Alps in Italy.

Placopyrenium Breuss

in Nimis & Poelt, Studia Geobot., 7, suppl. 1: 182, 1987.

This genus of the Verrucariaceae currently contains *c.* 22 species characterised by an areolate to subsquamulose thallus, immersed perithecia with a reduced or missing involucrellum, colourless, simple or 2-celled spores, and pycnidia of the *Dermatocarpon*-type. Several species of *Verrucaria* were transferred to this genus by Navarro-Rosines & al. (2007). For further details see Gueidan & al. (2009) and Orange (2013b). Type: *P. bucekii* (Nádv. & Servít) Breuss

Placopyrenium bucekii (Nádv. & Servít) Breuss

in Nimis & Poelt, Studia Geobot., 7, suppl. 1: 182, 1987 - *Dermatocarpon bucekii* Nádv. & Servít, Beih. Bot. Centralbl., 55 b: 267, 1936.

Syn.: *Placidium steineri* Wettst.

C - Tosc, Laz (Tretiach 2004), **Sar. S - Pugl** (Nimis & Tretiach 1999), **Bas, Cal** (Puntillo 1996), **Si** (Nimis & al. 1996b, Grillo 1998, Grillo & Caniglia 2004, Iacolino & Ottonello 2006).

Cr/ Ch/ S/ Sax/ pH: 3-4, L: 3-5, X: 4-5, E: 3-4/ Alt: 1-2/ SmedH: rr, MedH: rr, MedD: r/ PT: 1-2/ w/ Note: a mainly Mediterranean lichen with outposts in dry-warm temperate areas, found on base-rich siliceous rocks, exceptionally on limestone and sometimes even on soil, often occurring together with *Peltula euploca*, but with a different ecology, being most common on dust-impregnated faces. It should be looked for in suitable habitats of the Alps, especially in dry-warm situations.

Placopyrenium canellum (Nyl.) Gueidan & Cl. Roux

in Navarro-Rosinés & al., Bull. Soc. Linn. Prov., 58: 174, 2007 - *Verrucaria canella* Nyl., Flora, 66: 102, 1883.

Syn.: *Verrucaria aspiciliae* Zehetl. non (J. Lahm) Stizenb. nec Vain., *Verrucaria aspiciliicola* R. Sant., *Verrucaria glaucina* subsp. *canella* (Nyl.) A.L. Sm.

N - VG (TSB 10627), **Frl, Ven, Piem, Emil, Lig. C - Tosc** (vidi!), **Marc** (Nimis & Tretiach 1999), **Umb** (Nimis & Tretiach 1999, Ravera & al. 2006, Panfili 2007), **Laz** (Nimis & Tretiach 2004), **Abr** (Nimis & Tretiach 1999), **Mol** (Caporale & al. 2008), **Sar** (Rizzi & al. 2011), **S - Camp** (Aprile & al. 2003b, Nimis & Tretiach 2004, V), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 2011), **Si** (Nimis & al. 1994, 1995, Ottonello & Salone 1994, Ottonello 1996, Gianguzzi & al. 2009).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 4-5, X: 4, E: 3-4/ Alt: 1-4/ Salp: rr, Orom: r, Mont: rc, SmedD: vc, Pad: er, SmedH: vc, MedH: c, MedD: rr/ PT: 1/ paras *Circinaria calcarea s.lat.*/ Note: a very common, formerly misunderstood saxicolous species which starts the life-cycle on species of the *Circinaria calcarea*-complex; certainly widespread throughout Italy. Some records could refer to *Verrucaria polysticta*.

Placopyrenium fuscillum (Turner) Gueidan & Cl. Roux

in Navarro-Rosinés & al., Bull. Soc. Linn. Prov., 58: 174, 2007 - *Lichen fuscillus* Turner, Trans. Linn. Soc. London, 7: 90, 1804.

Syn.: *Lithocia fuscilla* (Turner) A. Massal., *Verrucaria fuscilla* (Turner) Winch, *Verrucaria fuscilla* var. *crassa* Garov., *Verrucaria fuscilla* var. *subviridula* Garov., *Verrucaria glaucelloides* Hepp, *Verrucaria glaucina sensu* Zetterst. et auct. *p.p non* Ach., *Verrucaria glaucina* var. *caeruleoalba* B. de Lesd., *Verrucaria glaucina* var. *furva* Hue,

Verrucaria glaucina var. *griseoatra* (Kremp.) J. Steiner, *Verrucaria glebulosa* Nyl., *Verrucaria griseoatra* (Kremp.) Servít, *Verrucula fuscella* (Turner) J. Steiner

N - VG, Frl (TSB 2206), **Ven, TAA, Lomb, Piem** (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999), **Emil, Lig** (Giordani & al. 2016), **C - Tosc** (Paoli & al. 2014b), **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera & al. 2004, 2006b, Genovesi 2011), **Laz** (Pietrini & al. 2008, Genovesi & al. 2011), **Abr** (Nimis & Tretiach 1999), **Mol** (Garofalo & al. 1999, Nimis & Tretiach 1999), **Sar** (Rizzi & al. 2011, Giordani & al. 2013), **S - Camp** (Garofalo & al. 1999, Aprile & al. 2003b, Nimis & Tretiach 2004), **Pugl** (Garofalo & al. 1999, Nimis & Tretiach 1999), **Cal, Si** (Grillo 1998, Grillo & Caniglia 2004, Caniglia & Grillo 2005, 2006).

Cr/ Ch/ S/ Sax/ pH: 3-5, L: 3-5, X: 3-4, E: 3-4/ Alt: 1-5/ Alp: r, Salp: rc, Orom: rr, Mont: c, SmedD: vc, Pad: vr, SmedH: vc, MedH: rc, MedD: rr/ PT: 1/ #/ Note: on steeply inclined calciferous rocks (mainly limestone and dolomite), often on *Verrucaria nigrescens*; a polymorphic taxon in need of revision. For further details see Nimis (1993: 739) and Orange (2013b).

Placopyrenium trachyticum (Hazsl.) Breuss

in Nimis & Poelt, *Studia Geobot.*, 7, suppl. 1: 183, 1987 - *Endopyrenium trachyticum* Hazsl., *Verh. Ver. f. Naturk.*, Pressburg, 5: 7, 1861.

Syn.: *Catapyrenium trachyticum* (Hazsl.) R. Sant., *Dermatocarpon trachyticum* (Hazsl.) Vain., *Placidiopsis trachytica* (Hazsl.) Servít, *Verrucula subcrustosa* (Nyl.) J. Steiner

N - Piem, VA (Piervittori & Isocrono 1999), **Lig, C - Tosc, Sar, S - Camp, Pugl, Si** (Nimis & al. 1996b).

Cr/ Ch/ S/ Sax/ pH: 3-4, L: 4-5, X: 3-4, E: 2-3/ Alt: 1-3/ Mont: er, SmedD: vr, SmedH: r, MedH: vr, MedD: er/ PT: 1/ #/ Note: on base-rich siliceous rocks. This species, frequently confused with *P. fuscillum*, extends more widely in the submediterranean belt than *P. bucekii*.

Placynthiella Elenkin

Izv. Imp. St.-Peterburgs. Bot. Sada, 9: 17, 1909.

This genus of the Trapeliaceae, with 7 species growing on acidic substrata, is characterised by a crustose, granular-verrucose thallus, biatorine to lecideine apothecia with a pseudoparenchymatous exciple and a dark brown epihymenium and hypothecium, *Trapelia*-type asci with 8, mostly simple ascospores, and paraphyses with dark, apically swollen tips. Type: *P. arenicola* Elenkin (= *P. hyporhoda*).

Placynthiella dasaea (Stirt.) Tønsberg

Sommerfeltia 14: 271, 1992 - *Lecidea dasaea* Stirt., *Scottish Natur.*, 5: 219, 1880.

N - Ven (Thor & Nascimbene 2007), **TAA** (UPS-L-166869), **Lomb** (UPS-L-166868).

Cr/ Ch/ A.i/ Terr-Lign/ pH: 1-2, L: 3-4, X: 2-3, E: 1-2/ Alt: 3-5/ Alp: rr, Salp: rc, Orom: vr, Mont: rr/ PT: 1-2/ p/ Note: on acid soil, lignum and bark in upland areas; probably more widespread in the Alps, but overlooked.

Placynthiella hyporhoda (Th. Fr.) Coppins & P. James

Lichenologist, 16: 244, 1984 - *Lecidea hyporhoda* Th. Fr., *Lichenogr. Scand.*, 1, 2: 456 1874.

Syn.: *Saccomorpha hyporhoda* (Th. Fr.) Clauzade & Cl. Roux

N - TAA (Nascimbene & al. 2008, Nimis & al. 2015).

Cr/ Ch/ A.i/ Terr/ pH: 1-2, L: 3-4, X: 2-3, E: 1-2/ Alt: 3-5/ Alp: r, Salp: r, Mont: vr/ PT: 1-2/ p/ Note: on soil rich in heavy metals in upland areas; probably more widespread in the Alps, but overlooked.

Placynthiella icmalea (Ach.) Coppins & P. James

Lichenologist, 16: 244, 1984 - *Lecidea icmalea* Ach., *K. Vetensk.-Akad. Nya Handl.*, 29: 267, 1808.

Syn.: *Biatora fuliginea* (Ach.) Fr., *Biatora uliginosa* var. *fuliginea* (Ach.) Fr., *Lecanora terricola* Ach., *Lecidea fuliginea* Ach., *Lecidea trachylina* Nyl., *Lecidea uliginosa* var. *fuliginea* (Ach.) Link, *Lemmopsis suomiensis* Räsänen, *Pannularia perfurfurea* Nyl., *Parmeliella perfurfurea* (Nyl.) Zahlbr., *Saccomorpha icmalea* (Ach.) Clauzade & Cl. Roux
N - Frl (Tretiach & Hafellner 2000), **Ven** (Nimis 1994, Nascimbene & Caniglia 2003c, Nascimbene 2008c, 2011, Watson 2014), **TAA** (Nascimbene 2004, 2005b, 2006c, 2008b, 2015, Nascimbene & al. 2006e, 2008c, 2014, Thor & Nascimbene 2007, Nascimbene & Marini 2015, Nimis & al. 2015), **Lomb, Piem** (Isocrono & al. 2004), **VA** (Matteucci & al. 2008), **Emil** (Tretiach & al. 2008), **Lig** (Brunialti & al. 1999), **C - Tosc** (Tretiach & Nimis 1994, Tretiach & Ganis 1999, Benesperi & al. 2007, Benesperi 2011), **Marc** (Nimis & Tretiach 1999), **Abr** (Nimis & Tretiach 1999), **Sar, S - Camp** (Nimis & Tretiach 2004), **Bas** (Potenza & al. 2014), **Cal** (Puntillo 1996).

Cr/ Ch/ A.i/ Terr-Lign/ pH: 1-2, L: 3-4, X: 2-3, E: 1-2/ Alt: 2-5/ Alp: rr, Salp: rc, Orom: vr, Mont: rr, SmedD: vr, Pad: er, SmedH: vr/ PT: 1-2/ p/ Note: a widespread, mainly northern holarctic lichen found on disturbed soil, turf, decomposed lignum (common on stumps), much more rarely on acid bark, and then mostly on basal parts of trunks; most frequent in the Alps, but extending south to Calabria through the Apennines in *Castanea*-stands.

Placynthiella oligotropa (J.R. Laundon) Coppins & P. James

Lichenologist, 16: 245, 1984 - *Lecidea oligotropa* J.R. Laundon, *Lichenologist*, 1: 164, 1960.

Syn.: *Lecidea uliginosa sensu* Vain. *et auct. non* (Schrad.) Ach., *Lecidea uliginosa* var. *verruculosa* Hedl., *Saccomorpha oligotropa* (J.R. Laundon) Clauzade & Cl. Roux

N - **Frl** (Tretiach & Hafellner 2000), **Ven** (Thor & Nascimbene 2007), **TAA** (Nascimbene 2003, 2004, 2008b, Nascimbene & al. 2008c, Nimis & al. 2015), **Lomb** (Nascimbene 2006), **Piem** (TSB 33872). **C** - **Tosc** (Benesperri & al. 2007).

Cr/ Ch/ S/ Terr/ pH: 1-2, L: 3-4, X: 2-3, E: 1/ Alt: 3-5/ Alp: vr, Salp: r, Mont: vr/ PT: 1/ Note: a cool-temperate to boreal-montane, probably circumpolar lichen found on soil and turf, more rarely on weathering siliceous rocks, mostly in clearings of woodlands in upland areas.

Placynthiella uliginosa (Schrad.) Coppins & P. James

Lichenologist, 16: 245, 1984 - *Lichen uliginosus* Schrad., Spicil. Fl. Germ., 1: 88, 1794.

Syn.: *Biatora humosa* (Hoffm.) Arnold, *Biatora uliginosa* (Schrad.) Fr., *Biatora uliginosa* var. *humosa* (Hoffm.) Fr., *Lecidea humosa* (Hoffm.) Leight., *Lecidea uliginosa* (Schrad.) Ach. non auct., *Lecidea uliginosa* var. *argillacea* (Kremp.) Hedl., *Lecidea uliginosa* var. *humosa* (Hoffm.) Ach., *Saccomorpha arenicola* Elenkin, *Saccomorpha uliginosa* (Schrad.) Hafellner, *Stereonema chthonoblastes* A. Braun ex Kütz.

N - **Frl**, **Ven**, **TAA** (Nascimbene 2006b, 2008b, Nascimbene & al. 2007b), **Lomb**, **Piem** (Isocrono & al. 2004), **VA** (Pierivittori & Isocrono 1999), **Emil** (Nimis & al. 1996, Benesperri 2009). **C** - **Tosc** (Benesperri & al. 2007), **Marc** (Nimis & Tretiach 1999), **Sar** (Nöske 2000). **S** - **Si** (Falco Scampatelli 2005).

Cr/ Ch/ S/ Terr-Lign/ pH: 1-2, L: 3-4, X: 3, E: 1/ Alt: 2-5/ Alp: rr, Salp: rc, Orom: vr, Mont: r, SmedD: er, SmedH: vr/ PT: 1-2/ Note: a cool-temperate to boreal-montane, probably circumpolar lichen, mostly found on acid soil, more rarely on strongly decomposed lignum; most frequent in the Alps, rarer along the Apennines, where it is most common in old *Castanea* stands.

Placynthium (Ach.) Gray

Nat. Arr. Brit. Pl., 1: 395, 1821 - *Collema* (subdiv.) *Placynthium* Ach., Lichenogr. Univ.: 628, 1810.

A still rather poorly known genus of c. 25 species, with the highest diversity in temperate areas of the Northern Hemisphere, included in the family Placynthiaceae. The monotypic genus *Collolechia*, previously distinguished on the basis of differences in ascospores, ascus apex and the leprose thallus, was recently analysed by Košuthová & al. (2016) with molecular and morphological data, showing that it is clearly nested within *Placynthium*. The species of the Iberian Peninsula were treated by Burgaz (2010), those of the Alps and neighbouring territories by Czeika & Czeika (2007), who also provide a complete key to the species. Type: *P. nigrum* (Huds.) Gray

Placynthium asperellum (Ach.) Trevis.

Sched. ad Lich. Ven. Exs.: nr. 98, 1869 - *Collema asperellum* Ach., Lichenogr. Univ.: 629, 1810.

Syn.: *Catillaria subalpina* Th. Fr., *Placynthium aspratile* (Ach.) Henssen, *Placynthium vragianum* Gyeln., *Pterygium asperellum* (Ach.) Nyl., *Toninia asperella* (Ach.) A. Massal.

N - **Lomb**.

Cr/ Cy.h/ A.i/ Sax/ pH: 3-4, L: 3-4, X: 2-3, E: 1-2/ Alt: 4-5/ Alp: vr, Salp: vr/ PT: 1/ Note: on moist calciferous and base-rich siliceous rocks in upland areas; the single record from the Italian Alps requires confirmation.

Placynthium caesium (Fr.) Jatta

Syll. Lich. Ital.: 38, 1900 - *Lecidea contigua* var. *caesia* Fr., Lich. Eur.: 302, 1831.

Syn.: *Bacidia caesitia* (Nyl.) Jatta, *Collolechia caesia* (Fr.) A. Massal., *Lecidea caesitia* Nyl., *Lecidea triptophylla* var. *caesia* Schaer., *Placynthium caesitium* (Nyl.) Hue, *Placynthium caesitium* f. *pseudonigrum* Gyeln., *Placynthium garovaglii sensu* Malme, *Racoblenna caesia* (Schaer.) A. Massal. nomen sed non planta, *Scoliosporum caesitium* (Nyl.) Jatta

N - **Ven**, **TAA**, **Lomb**, **Piem**.

Cr/ Cy.h/ S/ Sax/ pH: 5, L: 4, X: 4-5, E: 2-3/ Alt: 2-4/ Salp: vr, Orom: vr, Mont: rr, SmedD: er/ PT: 1/ w/ Note: a mainly southern species in Europe, found on steeply inclined surfaces of calcareous rocks with some water seepage after rain. In northern Europe the species has been frequently confused with *Placynthium garovaglii* (see Jørgensen 2005), which is a completely different species, although material with poorly developed marginal lobes may resemble *P. caesium*.

Placynthium dolichoterum (Nyl.) Trevis.

Sched. ad Lich. Ven. Exs.: nr. 98, 1869 - *Pannaria dolichotera* Nyl., Lichenes Scand.: 127, 1861.

Syn.: *Parmeliella melantera* (Stirt.) A.L. Sm., *Placynthium pluriseptatum* (Arnold) Arnold

N - **Frl**, **TAA**, **Lig**.

Cr/ Cy.h/ A.i/ Sax/ pH: 3-5, L: 2-3, X: 2, E: 2-3/ Alt: 4-5/ Alp: er, Salp: vr/ PT: 1/ #/ Note: on basic siliceous or slightly calciferous rocks in humid-sheltered situations near or above treeline. A poorly known species of the *P. nigrum* complex, which badly needs revision. According to Roux & coll. (2014) it is fairly common in the western Alps.

Placynthium filiforme (Garov.) M. Choisy

Bull. Mens. Soc. Linn. Lyon, 20: 86, 1951 - *Parmelia filiformis* Garov. in Nyl., Bot. Not.: 164, 1853.

Syn.: *Leptogium cornicularioides* Bagl., *Polychidium centrifugum* (Nyl.) Jatta, *Pterygium centrifugum* Nyl., *Pterygium filiforme* (Garov.) A.L. Sm.

N - VG (TSB 35697), **Frl, Ven, TAA** (Czeika & Czeika 2007), **Lomb, Emil, C - Tosc** (Benespero 2000a), **Marc** (Nimis & Tretiach 1999), **Laz, Abr, Mol** (Nimis & Tretiach 1999, Caporale & al. 2008). **S - Camp** (Garofalo & al. 1999, Aprile & al. 2003b), **Si**.

Cr/ Cy.h/ S/ Sax/ pH: 4-5, L: 3-4, X: 4, E: 1-2/ Alt: 1-4/ Salp: er, Mont: rr, SmedD: vr, SmedH: vr, MedH: vr, MedD: er/ PT: 1/ w/ Note: a Mediterranean (-montane) to mild-temperate lichen found on steeply inclined seepage tracks of calcareous rocks, with a rather wide altitudinal range.

Placynthium flabellum (Tuck.) Zahlbr.

Cat. Lich. Univ., 3: 227, 1925 - *Pannaria flabellum* Tuck., Proc. Amer. Acad. Arts and Sc., 5: 401, 1862.

Syn.: *Anziella adglutinata* (Anzi) Gyeln., *Lecothecium adglutinatum* Anzi, *Placynthium adglutinatum* (Anzi) Trevis.

N - TAA (Coste 2010), **Lomb, C - Tosc**.

Cr/ Cy.h/ S/ Sax/ pH: 2-3, L: 3-4, X: 2, E: 1/ Alt: 3-5/ Alp: vr, Salp: r, Mont: vr/ PT: 1/ suboc, 1/ Note: a temperate to boreal-montane, perhaps circumpolar lichen found on moist siliceous rocks (inundation zones along streams, seepage tracks), often near mountain rivulets.

Placynthium garovaglii (A. Massal.) Malme

Lich. Suec. Exs., fasc. 30: nr. 743, 1918 - *Racoblenna garovaglii* A. Massal., Mem. Lichenogr.: 134, 1853.

Incl.: *Placynthium garovaglii* var. *subtile* Czeika & Czeika

N - VG (TSB 3277), **Frl** (TSB 1622), **Ven** (Lazzarin 2000b), **TAA** (Czeika & Czeika 2007, as var. *subtile*), **Lomb, Piem, C - Marc** (Nimis & Tretiach 1999). **S - Camp** (Aprile & al. 2003b).

Cr/ Cy.h/ S/ Sax/ pH: 5, L: 4, X: 4-5, E: 2-3/ Alt: 1-5/ Alp: er, Salp: vr, Orom: vr, Mont: rr, SmedD: r, SmedH: r, MedH: vr, MedD: er/ PT: 1/ w/ Note: on steeply inclined, sunny surfaces of calcareous rocks with some water seepage; certainly more widespread in southern Italy, but largely overlooked by earlier authors. The species name is often spelled *garovaglio*, but the latinised name of Santo Garovaglio (who wrote most of his works in Latin) was *Garovaglius*, whose genitive is *garovaglii*.

Placynthium hungaricum Gyeln.

Borbasia, 1: 52, 1939.

N - VG, Frl, Lomb (UPS-L-160451). **C - Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008). **S - Camp** (Aprile & al. 2003b).

Cr/ Cy.h/ S/ Sax/ pH: 5, L: 4-5, X: 4-5, E: 2-3/ Alt: 1-3/ Mont: rr, SmedD: r, MedD: er/ PT: 1/ w/ Note: a Mediterranean to mild-temperate species found on steeply inclined, sun-exposed seepage tracks of calcareous rocks, usually below the subalpine belt; certainly much overlooked and more widespread, at least in the submediterranean belt.

Placynthium lismorensis (Cromb.) Vain.

Ark. Bot., 8, 4: 98, 1909 - *Pterygium lismorensis* Cromb., Grevillea, 5: 108, 1877.

C - Abr (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008). **S - Camp** (Aprile & al. 2003b), **Si** (Nimis & al. 1994).

Cr/ Cy.h/ S/ Sax/ pH: 3-5, L: 4-5, X: 3-4, E: 1-3/ Alt: 1-2/ SmedD: vr, MedH: vr, MedD: vr/ PT: 1/ Note: on more or less calcareous rocks along seepage tracks at relatively low elevations.

Placynthium nigrum (Huds.) Gray

Nat. Arrang. Brit. Plants, 1: 395, 1821 - *Lichen niger* Huds., Fl. Angl., 2 ed., 2: 524, 1778.

Syn.: *Collema nigrum* (Huds.) Hoffm., *Lecothecium corallinoides* (Schaer.) Körb., *Lecothecium nigrum* (Huds.) A. Massal., *Pannaria psotina* (Nyl.) Leight., *Pannularia nigra* (Huds.) Nyl., *Placynthium corallinoides* (Schaer.) Jatta, *Placynthium corallinoides* var. *fuscum* (A. Massal.) Jatta, *Placynthium nigrum* var. *psotinum* (Nyl.) Trevis., *Placynthium psotinum* (Nyl.) Harm., *Placynthium siliceum* Gyeln., *Pyrenopsis lecanopsoides* Nyl. var. *marginata* Maheu & Werner, *Racoblenna fusca* A. Massal.

N - VG (Castello 2002, Martellos & Castello 2004), **Frl** (Brackel 2013), **Ven** (Nascimbene & Caniglia 1997, 2003c, Caniglia & al. 1999, Nascimbene 2005c, 2008c, Nascimbene & Marini 2007), **TAA** (De Benetti & Caniglia 1993, Nascimbene 2005b, 2008b, Czeika & Czeika 2007, Spitale & Nascimbene 2012), **Lomb** (Dalle Vedove & al. 2004), **Piem** (Isocrono & al. 2004, Morisi 2005, Isocrono & Piervittori 2008), **VA** (Piervittori & Isocrono 1999), **Emil** (Nimis & al. 1996), **Lig** (Giordani & al. 2016). **C - Tosc** (Tretiach & Nimis 1994, Benespero 2000a, 2006, 2011, Tretiach & al. 2008), **Marc** (Nimis & Tretiach 1999), **Umb** (Nimis & Tretiach 1999, Ravera & al. 2006, Panfili 2007), **Laz** (Nimis & Tretiach 2004), **Abr** (Nimis & Tretiach 1999, Caporale & al. 2016), **Mol** (Garofalo & al. 1999, Nimis & Tretiach 1999, Caporale & al. 2008, Genovesi & Ravera 2014, Catalano & al. 2016), **Sar, S - Camp** (Garofalo & al. 1999, 2010, Aprile & al. 2003, 2003b, Nimis & Tretiach 2004), **Pugl** (Garofalo & al. 1999, Nimis & Tretiach 1999, Durini & Medagli 2002), **Bas** (Bartoli & Puntillo 1998, Nimis & Tretiach 1999), **Cal** (Puntillo 1996, Puntillo & Puntillo 2004), **Si** (Nimis & al. 1994, 1995, Ottonello & Salone 1994, Ottonello & al. 1994, Ottonello 1996, Poli & al. 1997, Caniglia & Grillo 2001, 2006, Grillo & al. 2001, Grillo & Caniglia 2004, Brackel 2008b, Gianguzzi & al. 2009).

Cr/ Cy.h/ S/ Sax/ pH: 3-5, L: 3, X: 2-3, E: 2-3/ Alt: 1-5/ Alp: vr, Salp: r, Orom: vr, Mont: rc, SmedD: c, Pad: rr, SmedH: vc, MedH: rc, MedD: vr/ PT: 1-3/ Note: a probably holarctic, subtropical to subarctic species found on more or less calciferous rocks, often near the ground in sheltered situations, from the

Mediterranean belt (only in shaded-humid situations) to the mountains, also common in small urban settlements (e.g. on north-facing walls).

Placynthium rosulans (Th. Fr.) Zahlbr.

Cat. Lich. Univ., 3: 235, 1925 - *Lecothecium corallinoides* subsp. *rosulans* Th. Fr., Bot. Not.: 12, 1863.

Syn.: *Placynthium pannariellum* (Nyl.) H. Magn. var. *rosulans* (Th. Fr.) Degel.

N - Piem (TSB 34355).

Cr/ Cy.h/ S/ Sax/ pH: 2-3, L: 3, X: 2, E: 1-2/ Alt: 4-5/ Alp: vr, Salp: er/ PT: 1/ 1, #/ Note: a northern species found on moist siliceous rocks, e.g. in inundation zones along brooks, near or above treeline; known from a few localities in the Alps, but perhaps more widespread. The relationship with *P. pannariellum* (Nyl.) H. Magn. still needs further study; in my opinion, the two taxa may prove to be not distinct.

Placynthium subradiatum (Nyl.) Arnold

Flora, 67: 240, 1884 - *Pannaria subradiata* Nyl., Act. Soc. Linn. Bordeaux, 21: 314, 1856.

Syn.: *Lecothecium controversum* Anzi, *Lecothecium radiosum* Anzi, *Lecothecium subradiatum* (Nyl.) Dalla Torre & Sarnth., *Placynthium radiosum* (Anzi) Jatta, *Pterygium petersii* Nyl., *Pterygium subradiatum* (Nyl.) Nyl., *Wilmsia radiosa* (Anzi) Körb.

N - VG, Fr1, Ven (Thor & Nascimbene 2007, Nascimbene 2008c), **TAA** (Nascimbene 2008b), **Lomb, Lig** (Czeika & Czeika 2007). **C - Marc** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **Sar, S - Camp** (Nimis & Tretiach 2004, Garofalo & al. 2010), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994).

Cr/ Cy.h/ A.f/ Sax/ pH: 5, L: 4-5, X: 4-5, E: 2-4/ Alt: 1-5/ Alp: er, Salp: vr, Orom: vr, Mont: r, SmedD: rc, SmedH: rc, MedH: r, MedD: vr/ PT: 1/ w/ Note: on vertical, sun-exposed seepage tracks of calcareous rocks, in the Mediterranean belt mostly on north-exposed faces, and also occurring in the mountains.

Placynthium tantaleum (Hepp) Hue

Bull. Soc. Linn. Normandie, sér. 5, 9: 153, 1906 - *Biatora corallinoides* var. *tantalea* Hepp, Flecht. Eur.: nr. 276, 1857.

Syn.: *Placynthium diblastum* Gyeln., *Placynthium nigrum* var. *tantaleum* (Hepp) Arnold, *Racoblenna tantalea* (Hepp) Trevis.

N - Piem (TSB 33335).

Cr/ Cy.h/ S/ Sax/ pH: 3-5, L: 3-4, X: 1-2, E: 1/ Alt: 3-5/ Alp: er, Salp: er, Mont: vr/ PT: 1/ 1, #/ Note: on basic siliceous rocks along mountain streams. The epithet has been used for various forms of *P. nigrum*, and I am not sure that the TSB sample really refers to this lichen, as I did not see the type. Our samples however comply with the description, and have broader, 2-celled spores. Older records, being dubious, are not accepted here.

Placynthium tremniacum (A. Massal.) Jatta

Syll. Lich. Ital.: 38, 1900 - *Racoblenna tremniaca* A. Massal., Ric. Auton. Lich. Crost.: 140, 1852.

N - Ven (Lazzarin 2000b), **Lig** (S- F155907).

Cr/ Cy.h/ S/ Sax/ pH: 3-5, L: 3, X: 2-3, E: 2-3/ Alt: 1-5/ Alp: vr, Salp: vr, Orom: vr, Mont: vr, SmedD: vr, Pad: vr, SmedH: vr, MedH: vr, MedD: vr/ PT: 1-2/ Note: the 1-septate spores and the pruinose thallus with somewhat stouter, more or less flat, minute squamules, different marginal lobes, and the less developed prothallus distinguish this rather poorly known species from *P. nigrum*. Czeika & Czeika (2007), however, consider this species as a synonym of the latter.

Platismatia W.L. Culb. & C.F. Culb.

Contr. U.S. Nat. Herb., 34: 524, 1968.

This genus, with 11 species, has the centre of diversity in the Northern Hemisphere. Only *P. glauca*, the type species, is widely distributed in all continents except Australia. The systematic position of the genus within the group of cetrarioid lichens in the Parmeliaceae is still not clear. Type: *P. glauca* (L.) W.L. Culb. & C.F. Culb.

Platismatia glauca (L.) W.L. Culb. & C.F. Culb.

Contr. U.S. Nat. Herb., 34: 530, 1968 - *Lichen glaucus* L., Sp. Pl., 2: 1148, 1753.

Syn.: *Cetraria fallax* (Weber) Anders, *Cetraria glauca* (L.) Ach., *Cetraria glauca* f. *coralloidea* Körb., *Cetraria glauca* var. *fallax* (Weber) Rass., *Parmelia glauca* (L.) Hepp, *Platysma fallax* (Weber) Hoffm., *Platysma glaucum* (L.) Frege

N - VG, Fr1, Ven (Nascimbene & Caniglia 1997, 2000b, 2002c, 2003c, Lazzarin 1997, Nascimbene 2005c, 2008c, 2011, Nascimbene & al. 2006e, 2010b, 2013b, Brackel 2013), **TAA** (Nascimbene & Caniglia 2000b, 2002c, Caniglia & al. 2002, Nascimbene 2003, 2006b, 2006c, 2008b, 2014, Gottardini & al. 2004, Nascimbene & al. 2005, 2006, 2006e, 2007b, 2009, 2010, 2014, Nascimbene & Marini 2015, Nimis & al. 2015), **Lomb, Piem** (Caniglia & al. 1992, Isocrono & al. 2003), **VA** (Pierivittori & Isocrono 1999), **Emil** (Dalle Vedove & al. 2002, Tretiach & al. 2008, Benesperi 2009), **Lig** (Brunialti & al. 1999). **C - Tosc** (Tretiach & Nimis 1994, Tretiach & Ganis 1999, Laganà & al. 2002, Benesperi & al. 2007, Benesperi & Lastrucci 2007, Lastrucci & al. 2009, Pasquinelli & al. 2009, Brackel 2015), **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera 1998, Panfili 2000, Ravera & al. 2006), **Laz** (Ravera 2001, 2002, Massari & Ravera 2002, Brackel 2015), **Abr, Mol** (Garofalo & al. 1999, Caporale & al. 2008), **Sar** (Zedda 1995, Nöske 2000, Zedda & Sipman

2001, Cossu 2013). **S** - **Camp** (Garofalo & al. 1999, 2010, Ricciardi & al. 2000, Aprile & al. 2002, 2003, 2003b, Brunialti & al. 2010, 2013, Nascimbene & al. 2010b, Catalano & al. 2010, 2016, Ravera & Brunialti 2013), **Pugl, Bas** (Potenza 2006, Brackel 2011, Caggiano & al. 2015), **Cal** (Puntillo 1995, 1996, Incerti & Nimis 2006, Obermayer & Randlane 2012, Brackel & Puntillo 2016), **Si** (Czeczuga & al. 1999, Grillo 1996, Merlo 2004, Ottonello 2005, Iacolino & Ottonello 2006).

Fol.b/ Ch/ A.i/ Epiph-Sax/ pH: 1-2, L: 3-5, X: 3, E: 1-2/ Alt: 3-4/ Salp: c, Mont: rr/ PT: 1-2/ Note: a cool-temperate to circumboreal species, abundant in the montane and subalpine belts of the Alps, both on bark of beech and of conifers, sometimes even on lignum, becoming progressively rarer along the Apennines.

Pleopsidium Körb.

Syst. Lich. Germ.: 113, 1855.

This genus was resurrected to segregate from *Acarospora* effigurate species producing rhizocarpic acid, with a *Pleopsidium*-type of ascus. It includes c. 4 saxicolous species in arid to arctic-alpine regions of both Hemispheres. The genus was classified in Lecanoraceae, mainly due to differences in the ascus apex construction; polyspored asci were considered an example of convergent evolution (Hafellner 1993). However, Wedin & al. (2005) confirmed the finding of Bellèmere (1994) that the *Pleopsidium* is closely related to *Acarospora* in the Acarosporaceae. The molecular phylogeography of the genus has been studied by Reeb & al. (2007). Type: *P. flavum* (Trevis.) Körb.

Pleopsidium chlorophanum (Wahlenb.) Zopf

Ann. Chem., 284: 117, 1895 - *Parmelia chlorophana* Wahlenb. in Ach., Meth. Lich. Suppl.: 44, 1803.

Syn.: *Acarospora chlorophana* (Wahlenb.) A. Massal., *Acarospora flava* var. *chlorophana* (Wahlenb.) Stein, *Gussonea chlorophana* (Wahlenb.) Tornab.

N - **Frl** (Tretiach & Hafellner 2000, Reeb & al. 2007), **TAA** (Hafellner 1993), **Lomb** (Dalle Vedove & al. 2004), **Piem** (Isocrono & al. 2004), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999). **C** - **Tosc, Sar** (Hafellner 1993). **S** - **Cal** (Puntillo 1996), **Si**.

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 4-5, X: 4, E: 1/ Alt: 4-6/ Alp: rc, Salp: vr, Orom: er/ PT: 1/ u/ Note: an arctic-alpine, bipolar lichen found on vertical or underhanging surfaces of often metal-rich siliceous rocks in exposed situations with optimum above treeline, reaching the nival belt in the Alps; widespread and locally abundant throughout the siliceous Alps, extending southwards to the mountains of Sicilia.

Pleopsidium flavum (Trevis.) Körb.

Syst. Lich. Germ.: 114, 1855 - *Acarospora flava* Trevis., Rev. Per. Lav. Imp. R. Acad. Padova, 1: 262. 1852, *non Lichen flavus* Bellardi nom. illegit.

Syn.: *Acarospora chlorophana* f. *dissoluta* H. Magn., *Acarospora oxytona* (Ach.) A. Massal., *Gussonea flava* (Trevis.) Anzi, *Gussonea oxytona* (Ach.) A. Massal., *Lecanora oxytona* Ach., *Pleopsidium oxytonum* (Ach.) Rabenh.

N - **TAA** (Hafellner 1993), **Lomb** (Dalle Vedove & al. 2004), **Piem** (Morisi & Sereno 1995, Allisiardi 2001, Isocrono & al. 2003, 2004, 2006, Morisi 2005), **VA** (Piervittori & al. 1998, 2001, Piervittori & Isocrono 1999, Isocrono & al. 2008, Matteucci & al. 2015c), **Lig, C** - **Sar** (Hafellner 1993, Reeb & al. 2007). **S** - **Cal** (Puntillo 1996), **Si**.

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 4-5, X: 4, E: 1/ Alt: 3-5/ Alp: rr, Salp: r, Orom: vr, Mont: er/ PT: 1/ u/ Note: on vertical or underhanging surfaces of often metal-rich siliceous rocks in exposed situations somehow more common than *P. chlorophanum* in the mountains of southern Italy, and in areas with a continental climate, as in the western and central Italian Alps.

Pleurosticta Petr.

Kryptogamenfl. Forsch. bayer. bot. Ges. Erforsch. Leim. Flora, 2: 190, 1931.

This small genus of the Parmeliaceae, originally described on the basis of pycnidial characters only, includes 2 species restricted to Eurasia and North Africa. The clarification of its relationships with other groups of brown parmelioid lichens requires further study (see Crespo & al. 2010). Type: *P. lichenicola* Petr. (= *P. acetabulum*).

Pleurosticta acetabulum (Neck.) Elix & Lumbsch

in Lumbsch & Elix, Mycotaxon, 33: 453, 1988 - *Lichen acetabulum* Neck., Delic. Gallo-Belg. Silv., 2: 506, 1768.

Syn.: *Imbricaria acetabulum* (Neck.) DC., *Melanelia acetabulum* (Neck.) Essl., *Parmelia acetabulum* (Neck.) Duby, *Parmelia corrugata* (Sm.) Ach., *Pleurosticta lichenicola* Petr.

N - **VG** (Castello 1996), **Frl** (Badin & Nimis 1996, Castello & Skert 2005, Tretiach & Molaro 2007), **Ven** (Nimis & al. 1996c, Valcuvia & al. 2000c), **TAA** (Nimis & al. 2015), **Lomb** (Zocchi & al. 1997, Arosio & al. 2000, 2003, Anderi & al. 2005, Furlanetto 2010), **Piem** (Furlanetto 2010, Giordani & Malaspina 2016), **Emil** (Bassi 1995, Gasparo & Tretiach 1996, Nimis & al. 1996, Sallesse 2003, Morselli & Regazzi 2006, Benesperi 2009, Gerdol & al. 2014, Brackel 2015), **Lig** (Brunialti & al. 1999, Brunialti & Giordani 2000, 2003, Giordani & al. 2002, 2003b, Giordani & Incerti 2008). **C** - **Tosc** (Tretiach & Nimis 1994, Loppi & Putorti 1995b, Loppi 1996, Loppi & De Dominicis 1996, Loppi & al. 1996b, 1996c, 1997, 1997b, 1998, 1999a, 2002, 2002b, 2002c, 2003, 2006, Monaci & al. 1997, Loppi & Nascimbene 1998, 2010, Putorti & al. 1998, Putorti & Loppi 1999b, Del Guasta 2001, Paoli & Loppi 2001, 2008, Loppi & Frati 2004, Benesperi & al. 2007, Benesperi & Lastrucci 2007, Lastrucci & al. 2009, Brunialti & Frati 2010, Benesperi 2011, Brunialti & al. 2012b, Brackel 2015, Nascimbene & al. 2015), **Marc** (Gasparo & al. 1989, Nimis & Tretiach 1999, Frati & Brunialti

2006, Brackel 2015), **Umb** (Ravera 1998, 1999, Nimis & Tretiach 1999, Ravera & al. 2006, Panfili 2007, Ciotti & al. 2009, Brackel 2015), **Abr** (Recchia & al. 1993, Olivieri & Pacioni 1996, Olivieri & al. 1997, 1997b, Loppi & al. 1999, Nimis & Tretiach 1999, Stofer 2006, Brackel 2015, Caporale & al. 2016, Corona & al. 2016), **Mol** (Garofalo & al. 1999, Nimis & Tretiach 1999, Caporale & al. 2008, Ravera & al. 2010, Genovesi & Ravera 2014, Brackel 2015, Paoli & al. 2015), **Laz** (Ravera & al. 2003, Massari & Ravera 2002, Nimis & Tretiach 2004, Ruisi & al. 2005, Munzi & al. 2007, Zucconi & al. 2013, Brackel 2015), **Sar** (Zedda 1995, 2002, 2002b, Nöske 2000, Loi & al. 2000, Zedda & al. 2001, Rizzi & al. 2011, Giordani & al. 2013, Cossu 2013). **S - Camp** (Garofalo & al. 1999, 2010, Ricciardi & al. 2000, Aprile & al. 2002, 2003, 2003b, 2011, Nimis & Tretiach 2004, Nascimbene & al. 2010b, Brunialti & al. 2013, Ravera & Brunialti 2013, Catalano & al. 2016), **Pugl** (Garofalo & al. 1999, Nimis & Tretiach 1999), **Bas** (Bartoli & Puntillo 1998, Nimis & Tretiach 1999, Potenza 2006, Potenza & al. 2010, Brackel 2011, Brackel & Puntillo 2016), **Cal** (Puntillo 1995, 1996, Puntillo & Puntillo 2004), **Si** (Czeczuga & al. 1994, Ottonello & al. 1994, Grillo & Cristaudo 1995, Ottonello 1996, Grillo 1998, Grasso & al. 1999, Grillo & Caniglia 2004, 2006, Merlo 2004b, Falco Scampatelli 2005, Stofer 2006, Brackel 2008b, 2008c, Liistro & Cataldo 2011).

Fol.b/ Ch/ S/ Epiph/ pH: 2-3, L: 4-5, X: 3-4, E: 2-3/ Alt: 1-4/ Salp: er, Orom: er, Mont: vc, SmedD: rc, Pad: er, SmedH: rr, MedH: vr/ PT: 1-2/ Note: a mainly epiphytic species, very abundant in central- to south Italian beech and oak forests, rarer in Mediterranean and Tyrrhenian Italy and in the North, and almost extinct in the Po-Plain; also occurring, with strongly pruinose forms, on calciferous rocks in the high Mediterranean mountains (e.g. in the Madonie Mnts. of Sicilia), exceptionally reaching the subalpine belt in the Alps.

Poeltinula Hafellner Beih. Nova Hedwigia, 79: 330, 1984.

This genus of the Rhizocarpaceae, which includes 2 saxicolous species, differs from *Rhizocarpon* in having ascospores that react red with nitric acid, and shortly lirelliform to angular apothecia. According to Ihlen & Ekman (2002), however, *Rhizocarpon* in its current sense is polyphyletic, and can only be made monophyletic if *R. hochstetteri* is excluded or *Poeltinula*, and possibly also *Catolechia*, are included. Type: *P. cerebrina* (DC.) Hafellner

Poeltinula cacuminum (Asta, Clauzade & Cl. Roux) Cl. Roux

Bull. Soc. linn. Provence, 54: 120, 2003 - *Encephalographa cerebrina* subsp. *cacuminum* Asta, Clauzade & Cl. Roux in Clauzade & Roux, Bull. Soc. linn. Provence, 30: 11, 1978.
N - Frl.

Cr/ Tr/ S/ Sax/ pH: 5, L: 3-4, X: 4-5, E: 1-2/ Alt: 4-5/ Alp: r, Salp: vr/ PT: 1/ Note: on hard calciferous and dolomitic rocks in exposed, but not sunny situations, with optimum above treeline; much overlooked, probably more widespread in the Alps.

Poeltinula cerebrina (DC.) Hafellner

Beih. Nova Hedwigia, 79: 330, 1984 - *Opegrapha cerebrina* DC. in Lamarck & de Candolle, Fl. Franç., éd. 3, 2: 312, 1805.

Syn.: *Buellia cerebrina* (Dc.) Th. Fr., *Encephalographa cerebrina* (DC.) A. Massal., *Encephalographa cerebrina* subsp. *parvocalcicola* Asta & Cl. Roux, *Lecidea cerebrina* (DC.) Schaer., *Lithographa cerebrina* (DC.) Leight., *Encephalographa cerebrina* f. *candida* Anzi, *Encephalographa cerebrina* f. *steriza* Anzi, *Patellaria cerebrina* (DC.) Duby, *Poeltinula cerebrina* subsp. *parvocalcicola* (Asta & Cl. Roux) Clauzade & Cl. Roux

N - Ven, TAA, Lomb, Piem, Lig.

Cr/ Tr/ S/ Sax/ pH: 4-5, L: 3, X: 4-5, E: 1/ Alt: 3-5/ Alp: rr, Salp: r, Mont: vr/ PT: 1/ Note: on steeply inclined faces of compact calciferous rocks, especially dolomite, but also on rocks which are poor in calcium, mostly in upland areas.

Polyblastia A. Massal. Ric. Auton. Lich. Crost.: 147, 1852 *nom. cons.*

The taxonomy of the Verrucariaceae is presently being revised on the basis of molecular data. Gueidan & al. (2007) and Savić & al. (2008) have shown that morphological features traditionally used for characterising the genera *Polyblastia*, *Thelidium*, *Staurothele* and *Verrucaria*, such as spore septation and colour, occurrence of hymenial photobionts, involucrellum structure, and substrate preference, are only partially consistent with supported clades, and thus are not always reliable for characterising natural groups. *Polyblastia* (with c. 120 species), *Thelidium*, *Staurothele* and *Verrucaria*, as currently delimited, are non-monophyletic. The analysis by Savić & al. (2008) revealed strongly supported groups, such as *Polyblastia* s.str. and the *Thelidium* group (a mixture of *Polyblastia*, *Thelidium*, *Staurothele* and *Verrucaria* species). Many nomenclatural changes are expected to occur in these genera in the next future (see also Orange 2013). Type: *P. cupularis* A. Massal. The name is conserved against *Sporodictyon* A. Massal. (1852).

Polyblastia abscondita (Nyl.) Arnold

Flora, 46: 141, 1863 - *Verrucaria abscondita* Nyl. in Stitzenberger, Jahresber. St. Gallisch. naturw. Gesellsch.: 486, 1882.

N - TAA (Dalla Torre & Sarnthein 1902).

Cr.end/ Ch/ S/ Sax/ pH: 4-5, L: 2-3, X: 2-3, E: 1/ Alt: 4-5/ Alp: vr, Salp: vr/ PT: 1/ Note: on calcareous rocks in rather sheltered situations near and above treeline: closely related to *P. albida*.

Polyblastia albida Arnold

Flora, 41: 551, 1858.

Syn.: *Polyblastia circularis* Blomb. ex T. Fr.

N - Frl, Ven, TAA (Nascimbene & al. 2007b), **Piem** (Isocrono & al. 2004). **C - Marc** (Nimis & Tretiach 1999), **Umb** (Genovesi & Ravera 2001, Ravera & al. 2006), **Abr** (Cucchi & al. 2009). **S - Camp** (Garofalo & al. 1999, 2010, Aprile & al. 2003b), **Cal** (Nimis & Puntillo 2003, Puntillo 2011).

Cr.end/ Ch/ S/ Sax/ pH: 4-5, L: 2-3, X: 2-3, E: 1/ Alt: 3-5/ Alp: r, Salp: rr, Orom: vr, Mont: rr/ PT: 1/

Note: on hard calciferous rocks and dolomite in sheltered situations, also within forests; frequent in the Alps, much rarer in the Apennines, where it is confined to high altitudes.

Polyblastia amota Arnold

Flora, 54: 264, 1869.

Syn.: *Amphoroblastia amota* (Arnold) Servít, *Amphoroblastia obsoleta* (Arnold) Servít, *Polyblastia obsoleta* Arnold

N - Ven (Dalla Torre & Sarnthein 1909), **TAA** (Dalla Torre & Sarnthein 1909).

Cr.end/ Ch/ S/ Sax/ pH: 4-5, L: 2-3, X: 2-3, E: 1/ Alt: 3-5/ Alp: vr, Salp: vr, Mont: er/ PT: 1/ Note: on calciferous rocks in sheltered situations, mostly in upland areas; closely related to *P. albida*, from which it differs in the slightly larger spores (see Roux & coll. 2014: 899).

Polyblastia ardesiaca (Bagl. & Carestia) Zschacke

Hedwigia, 55: 292, 1914 - *Thelidium ardesiacum* Bagl. & Carestia, Comm. Soc. Critt. Ital., 2: 84, 1864.

Syn.: *Polyblastia sprucei* (Anzi) Arnold, *Sagedia sprucei* Anzi, *Verrucaria cryptarum* var. *detersa* Garov., *Polyblastia verrucosa* f. *hydrophila* Asta, Clauzade & Cl. Roux, *Thelidium rivale* Arnold?

N - Frl, Ven, TAA (Nascimbene 2008b), **Lomb, Piem** (Isocrono & al. 2004, Morisi 2005). **C - Marc** (Nimis & Tretiach 1999).

Cr/ Ch/ S/ Sax/ pH: 5, L: 3, X: 1-2, E: 1/ Alt: 4-5/ Alp: r, Salp: vr/ PT: 1/ 1/ Note: a calcicolous species found on periodically submerged rocks in mountain creeks, usually near or above treeline; most frequent in the Alps.

Polyblastia cinerea (A. Massal.) Jatta

Syll. Lich. Ital.: 567, 1900 - *Amphoridium cinereum* A. Massal., Lotos, 6: 80, 1856.

Syn.: *Verrucaria dictyospora* Stizenb., *Verrucaria lariana* var. *cinerea* (A. Massal.) Garov.

N - Ven (Lazzarin 2000), **Lomb**.

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 3, X: 2, E: 1/ Alt: 3-5/ Alp: vr, Salp: vr, Mont: er/ PT: 1/ #/ Note: on sheltered calcareous rocks near or above treeline; a critical taxon, which deserves further study.

Polyblastia clandestina (Arnold) Jatta

Syll. Lich. Ital.: 568, 1900 - *Sporodictyon clandestinum* Arnold, Verh. zool.-bot. Ges. Wien, 21: 1135, 1871.

N - Ven, TAA.

Cr/ Ch/ S/ Sax/ pH: 3-5, L: 2-3, X: 2, E: 1/ Alt: 4-5/ Alp: r, Salp: vr/ PT: 1/ Note: on more or less calcareous rocks in sheltered situations near or above treeline; apparently restricted to the Alps, where it might be more widespread.

Polyblastia cupularis A. Massal. f. *cupularis*

Ric. Auton. Lich. Crost.: 148, 1852.

Syn.: *Polyblastia flavicans* Müll. Arg., *Polyblastia intercedens* (Nyl.) Lönnr. non sensu Th. Fr., *Polyblastia lutosa* Zschacke, *Polyblastia pallescens* Anzi, *Thelotrema acrocordiaeforme* Anzi

N - Frl, Ven (Lazzarin 2000b), **TAA, Lomb, Piem** (Isocrono & al. 2004), **VA** (Favero-Longo & al. 2006, Isocrono & al. 2008, Favero-Longo & Piervittori 2009), **Emil. C - Tosc, Umb** (Genovesi & Ravera 2001, Ravera & al. 2006), **Laz, Abr** (Nimis & Tretiach 1999).

Cr.end/ Ch/ S/ Sax/ pH: 3-5, L: 2-3, X: 2-3, E: 1/ Alt: 3-5/ Alp: rc, Salp: rr, Orom: vr, Mont: r/ PT: 1/ Note: a circumboreal to arctic-alpine species found on hard rocks, including dolomite and calciferous schist, in rather sheltered and humid situations; most frequent in the Alps, much rarer along the Apennines. Here the species is treated in a broad sense. A dubious record from Campania (see Nimis 1993: 554) is not accepted.

Polyblastia cupularis A. Massal. f. *microcarpa* Arnold

Verh. zool.-bot. Ges. Wien, 29: 378, 1879.

Syn.: *Polyblastia microcarpa* (Arnold) Lettau

N - Ven (Dalla Torre & Sarnthein 1909), **TAA** (Dalla Torre & Sarnthein 1909).

Cr.end/ Ch/ S/ Sax/ pH: 3-5, L: 2-3, X: 2-3, E: 1/ Alt: 4-5/ Alp: vr, Salp: vr/ PT: 1/ #/ Note: on base-rich or calcareous rocks in sheltered situations near or above treeline; a poorly known taxon, differing in the smaller perithecia, usually accepted at varietal level (e.g. by Roux & coll. 2014).

Polyblastia deplanata Arnold

Verh. zool.-bot. Ges. Wien, 37: 128, 1887.

N - TAA.

Cr/ Ch/ S/ Sax/ pH: 5, L: 3-4, X: 3, E: 1/ Alt: 4-5/ Alp: vr, Salp: er/ PT: 1/ #/ Note: on calcareous rocks near or above treeline; closely related to *P. ventosa*, poorly known and rarely collected.

Polyblastia dermatodes A. Massal.

Geneac. Lich.: 24, 1854.

Syn.: *Amphoroblastia dermatodes* (A. Massal.) Servít, *Amphoroblastia tyrolensis* (Arnold) Servít, *Polyblastia schraderi* (Gray) A.L. Sm.

N - Ven (Lazzarin 2000b), TAA. C - Abr (Cucchi & al. 2009).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 2-3, X: 2, E: 1/ Alt: 4-5/ Alp: rr, Salp: vr/ PT: 1/ Note: on shaded, inclined surfaces of calciferous rocks (limestone, dolomite) near and above treeline, often with *Eiglera homalomorpha*.

Polyblastia evanescens Arnold

Verh. zool.-bot. Ges. Wien, 21: 1123, tab. 14, fig. 11, 1871.

N - TAA.

Cr/ Ch/ S/ Terr/ pH: 2-4, L: 3-4, X: 3, E: 1/ Alt: 4-5/ Alp: r, Salp: vr/ PT: 1/ Note: on bryophytes (*Rhacomitrium*, *Distichum*, *Encalypta*), with optimum above treeline; very rarely collected, but perhaps more widespread in the Alps.

Polyblastia forana (Anzi) Arnold

Flora, 45: 56, 1862 - *Thelotrema foranum* Anzi, Cat. Lich. Sondr.: 105, 1860.

Syn.: *Verrucaria forana* (Anzi) Nyl., *Verrucaria pallidelutea* Garov.

N - TAA, Lomb.

Cr.end/ Ch/ S/ Sax/ pH: 4-5, L: 3, X: 3, E: 1/ Alt: 3-5/ Alp: vr, Salp: er, Mont: er/ PT: 1/ #/ Note: this rarely collected lichen growing on calcareous pebbles in upland areas is worthy of further study.

Polyblastia fuscoargillacea Anzi

Comm. Soc. Critt. Ital., 2, 1: 26, 1864.

Syn.: *Polyblastia abstrahenda* Arnold?

N - TAA, Lomb, Piem (Isocrono & al. 2004). C - Abr (Recchia & Villa 1996).

Cr/ Ch/ S/ Sax/ pH: 3-5, L: 2-3, X: 2-3, E: 1-2/ Alt: 4-5/ Alp: vr, Salp: er/ PT: 1/ p/ Note: an early coloniser of calciferous rocks, including small pebbles on the ground, with optimum near or above treeline.

Polyblastia helvetica Th. Fr.

Bot. Not.: 112, 1865.

Syn.: *Amphoroblastia helvetica* (Th. Fr.) Servít

N - Frl, Ven (TSB 15382), Lomb (Nascimbene 2006).

Cr/ Ch/ S/ Terr/ pH: 3-4, L: 4, X: 2, E: 1/ Alt: 4-5/ Alp: vr, Salp: r/ PT: 1/ Note: on more or less calciferous soil, often amongst bryophytes, with optimum near treeline; restricted to the Alps in Italy.

Polyblastia intermedia Th. Fr.

N. Acta Reg. Soc. Sci. Upsal., vol. extra ord., 8: 24, 1877.

Syn.: *Polyblastia kernstockii* Zschacke?

N - TAA.

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 3, X: 3, E: 1/ Alt: 4-5/ Alp: vr, Salp: er/ PT: 1/ Note: an arctic-alpine species of calciferous rocks with optimum above treeline, probably restricted to the Alps in Italy. Here the species is treated in a broad sense: the only Italian record refers to *P. kernstockii*.

Polyblastia nidulans (Stenh.) Arnold

Ber. naturhist. Ver. Brandenburg, 14: 64, 1861 - *Verrucaria nidulans* Stenh., Öfvers. K. Svensk. Vetensk.-Akad. Förh.: 121, 1857.

C - Abr (Nimis & Tretiach 1999, Cucchi & al. 2009). S - Camp (Garofalo & al. 2010).

Cr.end/ Ch/ S/ Sax/ pH: 4-5, L: 2-3, X: 2, E: 1/ Alt: 3-6/ Alp: er, Salp: vr, Mont: er/ PT: 1/ Note: on compact limestone and dolomite in sheltered situations, with optimum above treeline, reaching the nival belt; probably occurring also in the Alps. The record from Campania requires confirmation.

Polyblastia philaea Zschacke

Rabenh. Krypt.-Flora, 9, 1, 1: 448, 1933.

Syn.: *Amphoroblastia philaea* (Zschacke) Servít

N - TAA (Nascimbene 2005).

Cr/ Ch/ S/ Terr/ pH: 2-4, L: 4, X: 3, E: 1/ Alt: 4-5/ Alp: er, Salp: er/ PT: 1/ #/ Note: a very poorly known species found on soil, both on bare ground and amongst bryophytes near or above treeline.

Polyblastia plicata (A. Massal.) Lönnr.

Flora, 41: 631, 1858 - *Verrucaria plicata* A. Massal., Lotos, 6: 80, 1856.

Syn.: *Polyblastia singularis* (Kremp.) Arnold

N - Ven, TAA, Piem (Isocrono & al. 2004).

Cr.end/ Ch/ S/ Sax/ pH: 4-5, L: 2-3, X: 2-3, E: 1/ Alt: 3-5/ Alp: r, Salp: vr, Mont: er/ PT: 1/ Note: on compact limestone and dolomite in shaded and humid situations, mostly in upland areas.

Polyblastia quinqueseptata (Nyl.) Zschacke

Rabenh. Krypt.-Flora, 9, 1, 1: 436, 1933 - *Verrucaria quinqueseptata* Nyl., Exp. Syn. Pyrenocarp.: 58, 1858.

N - Ven, TAA, Piem.

Cr/ Ch/ S/ Sax/ pH: 5, L: 2-3, X: 2-3, E: 1/ Alt: 4-5/ Alp: vr, Salp: rr/ PT: 1/ #/ Note: on shaded surfaces of calcareous rocks in the mountains; closely related to *P. sepulta*.

Polyblastia rouxiana Vězda & Vivant

Bull. Soc. Bot. France, 120, 3-4: 154, 1973.

N - Ven (TSB 20911), C - Tosc (TSB 35614), S - Cal (Puntillo 1996, Puntillo & Puntillo 2004), Si (Nimis & al. 1994, Grillo & al. 2002, Grillo & Caniglia 2004, Caniglia & Grillo 2005, 2006).

Cr/ Ch/ S/ Terr/ pH: 4-5, L: 4, X: 3-4, E: 1-2/ Alt: 1-2/ SmedD: er, SmedH: er, MedH: vr/ PT: 1/ Note: on bare soil in clearings of garrigue and maquis vegetation over calcareous substrata, mainly in the Mediterranean belt. For further details see Roux & al. (2014: 905).

Polyblastia sendtneri Kremp.

Flora, 38: 67, 1855.

Syn.: *Thelotrema sendtneri* (Kremp.) Anzi

N - Frl (TSB 35586), Ven (Nimis 1994, Thor & Nascimbene 2007), TAA (Nascimbene 2008b), Lomb, Piem (Isocrono & al. 2004), VA (Piervittori & Isocrono 1999), C - Marc (Nimis & Tretiach 1999), Abr (Nimis & Tretiach 1999).

Cr/ Ch/ S/ Terr/ pH: 2-4, L: 4, X: 2, E: 1-2/ Alt: 4-5/ Alp: rr, Salp: vr/ PT: 1/ Note: a circumpolar, arctic-alpine species found on organic soil, mosses and plant debris with optimum above treeline; most common in the Alps, but also reported from the northern and central Apennines.

Polyblastia sepulta A. Massal.

Lotos, 6: 81, 1856.

Syn.: *Amphoroblastia pertusula* (Nyl.) Servít, *Amphoroblastia sepulta* (A. Massal.) Servít, *Polyblastia bavarica* (Dalla Torre & Sarnth.) Zschacke, *Polyblastia dominans* (Arnold) Zschacke., *Polyblastia pertusula* (Nyl.) Zschacke, *Thelidium dominans* Arnold, *Thelidium epipolaeum* Arnold non sensu A. Massal.?, *Verrucaria sepulta* (A. Massal.) Wedd.

N - Frl (Tretiach 2004), Ven (Lazzarin 2000b, Nascimbene & Marini 2007, Nascimbene 2008c), TAA (Nascimbene & al. 2007b), VA (Piervittori & Isocrono 1999), C - Marc (Nimis & Tretiach 1999), Umb (Genovesi & Ravera 2001, Ravera & al. 2006), Abr (Nimis & Tretiach 1999, Cucchi & al. 2009), S - Camp (Nimis & Tretiach 2004).

Cr.end/ Ch/ S/ Sax/ pH: 5, L: 2-3, X: 2, E: 1/ Alt: 3-5/ Alp: r, Salp: rr, Mont: vr/ PT: 1/ #/ Note: on hard calciferous rocks in shaded and humid situations, often on pebbles, most frequent in the Alps above treeline. The whole complex - see synonyms - is in need of revision.

Polyblastia ventosa Arnold

Verh. zool.-bot. Ges. Wien, 19: 648, 1869 *nom. illegit., non* A. Massal.

N - Frl, Ven, TAA (Nascimbene & al. 2006, 2007b, Nascimbene 2008b), Lomb (Nascimbene 2006), Piem (Isocrono & al. 2004), Emil, C - Marc (Nimis & Tretiach 1999), Abr (Recchia & Villa 1996 (Nimis & Tretiach 1999), Mol (Nimis & Tretiach 2004, Caporale & al. 2008).

Cr.end/ Ch/ S/ Sax/ pH: 4-5, L: 3-4, X: 3, E: 1/ Alt: 4-5/ Alp: rc, Salp: er/ PT: 1/ Note: on limestone and dolomite in rather exposed situations, with optimum above treeline; much more common in the Alps than in the Apennines.

Polyblastia verrucosa (Ach.) Lönnr.

Flora, 41: 631, 1848 - *Pyrenula verrucosa* Ach., Lichenogr. Univ.: 314, 1810.

N - Frl (TSB 16888), Ven (Nascimbene & Marini 2007), TAA (Nascimbene 2003), Piem (Isocrono & al. 2004), VA (Piervittori & Isocrono 1999), C - Abr (Nimis & Tretiach 1999).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 2-3, X: 2, E: 1/ Alt: 5-6/ Alp: rr/ PT: 1/ Note: on steeply inclined, sheltered surfaces of calcareous rocks above treeline, reaching the nival belt in the Alps; widespread in the calcareous Alps, much rarer and localised in the Apennines.

Polyblastidium Kalb

in Mongkolsuk & al., Phytotaxa, 235, 1: 38, 2015.

This genus, which at the moment includes 18 species, was recently segregated from *Heterodermia* to include the species with a foliose thallus attached to the substrate, no lower cortex and mostly *Polyblastidium*-type

ascospores. For further details see Mongkolsuk & al. (2015). See also note on the genus *Heterodermia*. Type: *P. japonicum* (M. Satô) Kalb

***Polyblastidium subneglectum* (Elix) Kalb**

in Mongkolsuk & al., Phytotaxa, 235, 1: 5, 2015- *Heterodermia subneglecta* Elix, Australas. Lichenol., 68: 17, 2011.

Syn.: *Heterodermia japonica* auct. eur., *Heterodermia obscurata* auct. eur. p.max.p.

N - Frl (Badin & Nimis 1996 as *Heterodermia obscurata*).

Fol.n/ Ch/ A.s/ Epiph/ pH: 2-3, L: 4, X: 2, E: 1-3/ Alt: 1-2/ SmedD: vr, SmedH: rr, MedH: rc/ PT: 1-2/ suboc/ Note: according to Roux & coll. (2014) most samples of *H. obscurata* from Europe do actually belong to this species, which differs in chemical characters and in having a white, yellow-orange-spotted lower surface (whereas the lower surface of *H. obscurata* is yellow-orange throughout).

Polycauliona Hue

Bull. Soc. linn. Normandie, sér. 6, 1: 75, 1908.

Polycauliona, as re-defined by Arup & al. (2013) is a rather large (c. 25 species) genus of Teloschistaceae consisting of the smaller-sized foliose and fruticose species formerly included in *Xanthoria*, together with crustose as well as placodioid and leprose species. Within the genus there are also three fully supported subclades, which could be recognised as genera, such a *Massjukiella* (Kondratyuk & al. 2014); one consists of only crustose members and two of lobate, crustose and subfruticose or foliose species. According to Arup & al. (2013), however, recognizing them at the generic level does not make more sense than keeping them as one genus, as the level of information does not increase considerably. Type: *P. regalis* (Vain.) Hue

***Polycauliona candelaria* (L.) Frödén, Arup & Søchting**

in Arup & al., Nord. J. Bot., 31: 51, 2013 - *Lichen candelarius* L., Sp. Pl., 1141, 1753.

Syn.: *Lecanora candelaria* (L.) Ach., *Massjukiella candelaria* (L.) S.Y. Kondr., Fedorenko, S. Stenroos, Kärnefelt, Elix, J.S. Hur & A. Thell, *Parmelia parietina* var. *candelaria* (L.) Spreng., *Physcia candelaria* (F.H. Wigg.) Anzi, *Physcia controversa* A. Massal., *Physcia lychnea* (Ach.) Nyl., *Placodium candelarium* F.H. Wigg., *Xanthoria controversa* (A. Massal.) Rabenh., *Xanthoria lychnea* (Ach.) Th. Fr. non auct. p.p., *Xanthoria lychnea* var. *perfusa* (Nyl.) H. Olivier, *Xanthoria lychnea* var. *pygmaea* (Bory) Th. Fr., *Xanthoria candelaria* (L.) Th. Fr.

N - Frl, Ven (Nascimbene & Caniglia 1997, 2003c, Caniglia & al. 1999, Nascimbene 2008c), **TAA** (Nascimbene & Caniglia 2000b, Nascimbene & al. 2005, 2006, 2008c, Nascimbene 2008b, 2014, 2014c, Zarabska & al. 2009, Nascimbene & Marini 2015), **Lomb** (Arosio & al. 2003, Nascimbene & al. 2006e, Furlanetto 2010), **Piem** (Caniglia & al. 1992, Morisi & Sereno 1995, Arosio & al. 1998, Piervittori 1998, Isocrono & al. 2004, 2007, Furlanetto 2010), **VA** (Piervittori & Isocrono 1999, Piervittori 2003, Matteucci & al. 2008, 2008c), **Emil, Lig** (Brunialti & al. 1999, Giordani & al. 2002b, Brunialti & Giordani 2003). **C - Tosc** (Brackel 2015), **Umb** (Ravera 2000, Brackel 2015), **Laz** (Brackel 2015), **Abr** (Nimis & Tretiach 1999), **Sar** (Zedda 2002). **S - Cal** (TSB 11003).

Fol.n/ Ch/ A.s/ Epiph-Sax/ pH: 2-4, L: 4-5, X: 4, E: 4-5/ Alt: 2-5/ Alp: vr, Salp: rr, Orom: vr, Mont: r, SmedD: er, Pad: er/ PT: 1-2/ subc/ Note: both on bark and on rock, sometimes also on lignum; certainly not common in Italy, being restricted to upland areas with a subcontinental climate (continental Alpine valleys, eastern Apennines, etc.). The old record from Campania cited by Nimis (1993: 761) could be due to confusion with other species, and is not accepted here.

***Polycauliona phlogina* (Ach.) Arup, Frödén & Søchting**

in Arup & al., Nord. J. Bot., 31: 53, 2013 - *Parmelia citrina* var. *phlogina* Ach., Meth. Lich.: 180, 1803.

Syn.: *Caloplaca citrina* f. *phlogina* (Ach.) D. Hawksw., *Caloplaca phlogina* (Ach.) Flagey

N - VG, Frl, Ven, TAA, Lomb, Piem, Emil, Lig, C - Tosc, Marc, Laz, Mol (Ravera & Genovesi 2012, Genovesi & Ravera 2014), **Sar, S - Camp, Pugl, Cal, Si**.

Cr/ Ch/ A.s/ Sax/ pH: 3-4, L: 4-5, X: 3-4, E: 4-5/ Alt: 1-3/ Mont: rr, SmedD: c, Pad: rc, SmedH: rc, MedH: rr, MedD: r/ PT: 1-3/ p/ Note: for a long time this species was regarded as a mainly corticolous ecotype of *Flavoplaca citrina*. According to Sérusiaux & al. (1999) and Arup (2006), it is however distinct from *Flavoplaca citrina*, and was surprisingly included in *Polycauliona* by Arup & al. (2013). Here I provisionally place all regions from which I have seen epiphytic samples of the *F. citrina*-group, warning that the whole complex urgently needs a thorough revision in Italy. For further information see Vondrák & al. (2010).

***Polycauliona polycarpa* (Hoffm.) Frödén, Arup & Søchting**

in Arup & al., Nord. J. Bot., 31: 53, 2013 - *Lobaria polycarpa* Hoffm., Deutschl. Fl.: 136, 1796.

Syn.: *Massjukiella polycarpa* (Hoffm.) S.Y. Kondr., Fedorenko, S. Stenroos, Kärnefelt, Elix, J.S. Hur & A. Thell, *Parmelia parietina* var. *polycarpa* (Hoffm.) Fr., *Physcia parietina* var. *pulvinata* A. Massal., *Xanthoria lychnea* var. *polycarpa* (Hoffm.) Th. Fr., *Xanthoria parietina* var. *polycarpa* (Hoffm.) Nyl., *Xanthoria polycarpa* (Hoffm.) Rieber

N - Frl, Ven (Nascimbene 2005c, Nascimbene & al. 2006, Nascimbene & Marini 2007), **TAA** (Lich. Graec. 20: Obermayer 1995, Hafellner 1997, Nascimbene & Caniglia 2000, 2002c, Nascimbene 2003, 2006c, Nascimbene & al. 2006e, 2007b, Zarabska & al. 2009), **Lomb** (Dalle Vedove & al. 2004, Nascimbene & al. 2006e), **Piem** (Morisi & Sereno 1995, Griselli & al. 2003), **VA** (Piervittori & Isocrono 1999), **Emil** (Sallese 2003), **Lig** (LD-1400195). **C - Tosc** (Brackel 2015, Tretiach 2015t), **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera 2000, Panfili 2000, Ravera & al. 2006), **Laz** (Ravera 2008), **Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008, Genovesi &

Ravera 2014), **Sar** (Zedda 1995, 2002, Zedda & al. 2001, Cossu 2013). **S - Camp** (Aprile & al. 2003b, Nimis & Tretiach 2004), **Pugl** (Brackel 2011), **Bas** (Nimis & Tretiach 1999, Potenza 2006, Paoli & al. 2006, Brackel 2011), **Cal** (Puntillo 1996), **Si** (Falco Scampatelli 2005).

Fol.n/ Ch/ S/ Epiph-Lign/ pH: 2-3, L: 4-5, X: 3-4, E: 2-3/ Alt: 3-4/ Salp: rr, Mont: vr/ PT: 1-2/ Note: a mainly boreal-montane, circumpolar species found on isolated trees and sun-exposed branches and small twigs, on wooden poles and fences; most frequent in the Alps, rarer in the eastern Apennines, south to Calabria and the mountains of Sicily.

Polychidium (Ach.) Gray

Nat. Arr. Brit. Pl.: 401, 1821 - *Collema* (unranked) *Polychidium* Ach., Lichenogr. Univ.: 658, 1810.

Wedin & al. (2007) showed that, together with *Massalongia* and *Leptochidium*, this monotypic genus forms a well-supported monophyletic group, which is characterised by both molecular and morphological data. The three genera, which have a similar hemiangiocarpic ascoma ontogeny, similarly built apothecia, and similar asci with an amyloid apical cap, are now placed in the family Massalongiaceae. Type: *P. muscicola* (Sw.) Gray

Polychidium muscicola (Sw.) Gray

Nat. Arrang. Brit. Pl.: 402, 1821 - *Lichen muscicola* Sw., N. Acta Reg. Soc. Sci. Upsal., 4: 248, 1784.

Syn.: *Collema muscicola* (Sw.) Ach., *Homodium muscicola* (Sw.) Nyl., *Leptogium muscicola* (Sw.) Fr., *Polychidium kalkuense* Räsänen

N - Frl (Tretiach & Hafellner 2000), **TAA, Lomb, Piem** (Isocrono & al. 2004), **Emil, Lig, C - Sar, S - Camp** (Aprile & al. 2003b), **Cal** (Puntillo 1996), **Si** (Grillo 1998, Grillo & Caniglia 2004).

Cr/ Cy.h/ S/ Terr/ pH: 2-3, L: 3-4, X: 2-3, E: 1-2/ Alt: 1-4/ Salp: er, Orom: er, Mont: vr, SmedD: er, SmedH: vr, MedH: vr/ PT: 1/ suboc/ Note: a widespread mild-temperate to southern boreal lichen found on soil and amongst bryophytes over siliceous substrata, more rarely on the basal parts of ancient trees, with a rather wide altitudinal range.

Polysporina Vězda

Folia Geobot. Phytotaxon., 13: 399, 1978.

This genus of the Acarosporaceae includes c. 10 species, mainly in temperate areas of both Hemispheres. The molecular study of Acarosporaceae by Westberg & al. (2015) showed that the occurrence of strongly black pigmented (carbonised or melanised) ascomata has arisen secondarily and independently numerous times in the evolution of this group, so that the genera *Sarcogyne* and *Polysporina* are distinctly non-monophyletic, and the latter could prove to be even a synonym of *Acarospora*. Further study is required also on the delimitation of the species. Relevant information is also provided by Knudsen & Kocourková (2008). Type: *P. simplex* (Davies) Vězda

Polysporina cyclocarpa (Anzi) Vězda

Folia Geobot. Phytotaxon., 13: 399, 1978 - *Lithographa cyclocarpa* Anzi, Cat. Lich. Sondr.: 97, 1860.

Syn.: *Acarospora cyclocarpa* (Anzi) Jatta, *Biatorella cyclocarpa* (Anzi) Lindau, *Sarcogyne cyclocarpa* (Anzi) J. Steiner

N - Ven, TAA (Kantvilas 1998, Knudsen & Koucourkova 2011), **Lomb** (Kantvilas 1998), **Piem** (Isocrono & al. 2004), **Lig** (Giordani & al. 2016).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 3-4, X: 4-5, E: 1-2/ Alt: 4-5/ Alp: r, Salp: er/ PT: 1/ Note: on dolomite and calcareous schists, more rarely on pure limestone, with optimum above treeline; probably restricted to the Alps; closely related to *P. urceolata*.

Polysporina ferruginea (Lettau) Kantvilas

M. Steiner ex Kantvilas, Lichenologist, 30: 557, 1998 - *Sarcogyne simplex* f. *ferruginea* Lettau, Feddes Repert., 57: 73, 1955.

Syn.: *Polysporina simplex* f. *ferruginea* (Lettau) Clauzade & Cl. Roux

N - Frl (Tretiach & Hafellner 2000).

Cr/ Ch/ S/ Sax/ pH: 3, L: 3-4, X: 3-4, E: 1-2/ Alt: 4-5/ Alp: er, Salp: vr/ PT: 1/ Note: on basic or slightly calciferous siliceous rocks, probably lichenicolous on an as yet unidentified host, later forming an autonomous thallus. Perhaps a synonym of *P. subfuscescens* according Knudsen & Kocourková (2008), but a well-distinct species according to Roux (*in litt.*).

Polysporina pusilla (Anzi) Nimis

The Lichens of Italy: 560, 1993 - *Sarcogyne pusilla* Anzi, Comm. Soc. Critt. Ital., 1, 3: 157, 1862.

Syn.: *Biatorella pusilla* (Anzi) Zahlbr.

N - Ven, TAA (Spitale & Nascimbene 2012), **Lomb** (Knudsen & Kocourková 2008), **Piem, Emil, C - Tosc, Abr, Mol, S - Pugl, Cal** (Puntillo 1996).

LF/ / S/ Sax/ pH: 5, L: 4, X: 3, E: 2-3/ Alt: 2-6/ Alp: er, Salp: vr, Orom: vr, Mont: rr, SmedD: er, SmedH: er/ PT: 1/ paras *Protoblastenia*/ Note: a widespread lichenicolous fungus, doubtfully lichenised, most

frequent on calcareous rocks in sunny habitats in upland areas; growing in the apothecia of *Protoblastenia*-species. This species was invalidly and accidentally re-combined into *Polysporina* by Kantvilas (1998: 558).

Polysporina simplex (Taylor) Vězda

Folia Geobot. Phytotaxon., 13: 399, 1978 - *Lecidea simplex* Taylor in Mackay, Fl. Hibern., 2: 124, 1836, non *Lichen simplex* Davies, Trans. Linn. Soc. London, 2: 283, 1793 *nom. illegit.*

Syn.: *Acarospora simplex* (Taylor) Jatta, *Bacidia simplex* (Taylor) Branth & Rostr., *Sarcogyne privigna* (Ach.) A. Massal. non *auct.*, *Sarcogyne regularis* var. *decepiens* (A. Massal.) N.S. Golubk. *nomen sed non planta?*, *Sarcogyne simplex* (Taylor) Nyl., *Sarcogyne simplex* var. *minor* B. de Lesd.?, *Sarcogyne simplex* var. *strepsodina* (Ach.) Stein

N - VG (Castello 2002, Martellos & Castello 2004), **Frl** (Tretiach & Hafellner 2000), **Ven** (Lazzarin 2000b), **TAA** (Thor & Nascimbene 2007, Isocrono & al. 2008, Lang 2009), **Lomb, Piem** (Isocrono & al. 2004, Favero-Longo & al. 2004, 2006b, 2015, 2015b, Isocrono & Piervittori 2008), **VA** (Piervittori & Isocrono 1999, Favero-Longo & Piervittori 2009, Matteucci & al. 2015c), **Emil, Lig** (Giordani & al. 2016). **C - Tosc** (Brackel 2015), **Laz, Abr, Sar** (Nöske 2000). **S - Camp** (Nimis & Tretiach 2004), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996, Puntillo & Puntillo 2004), **Si** (Nimis & al. 1996b, Iacolino & Ottonello 2006).

Cr.end/ Ch/ S/ Sax/ pH: 2-3, L: 4-5, X: 3-4, E: 2-3/ Alt: 1-5/ Alp: rr, Salp: rc, Orom: r, Mont: vr, SmedD: vr, SmedH: rr, MedH: r, MedD: vr/ PT: 1-2/ p/ Note: a holarctic early coloniser of small cracks of siliceous, sometimes base-rich or slightly calciferous rocks.

Polysporina subfuscescens (Nyl.) K. Knudsen & Kocourk.

Mycotaxon, 105: 151, 2008 - *Lecanora subfuscescens* Nyl., Bull. Soc. linn. Normandie, sér. 2, 6: 308, 1872.

Syn.: *Acarospora sernanderi* H. Magn., *Acarospora silesiaca* (H. Magn.) H. Magn., *Acarospora subfuscescens* (Nyl.) H. Magn., *Acarospora tyroliensis* (H. Magn.) H. Magn., *Biatorella subfuscescens* (Nyl.) H. Olivier, *Polysporina dubia* (H. Magn.) Vězda, *Polysporina lapponica auct. p.max.p.*, *Sarcogyne dubia* H. Magn., *Sarcogyne simplex* f. *incrassata* Arnold, *Sarcogyne subfuscescens* (Nyl.) Boistel

N - VG (Castello 2002, Martellos & Castello 2004), **TAA** (Lang 2009), **VA** (Favero-Longo & al. 2006, Isocrono & al. 2008, Favero-Longo & Piervittori 2009), **Lig, C - Tosc, Laz, Sar** (Kantvilas 1998, Nöske 2000, Rizzi & al. 2011).

LF/ / S/ Sax/ pH: 2-3, L: 4-5, X: 3-4, E: 2-3/ Alt: 1-4/ Salp: er, Mont: r, SmedD: rr, SmedH: rr, MedH: r, MedD: vr/ PT: 1-2/ paras crustose lichens/ Note: a widespread lichenicolous fungus, often growing on *Acarospora*. I have placed here all records of *Sarcogyne lapponica* found on the thalli of other lichens (see Knudsen & Kocourková 2008). The species is heterogeneous and in need of revision (Roux & coll. 2014, Westberg & al. 2015).

Polysporina urceolata (Anzi) Brodo

in Ahti & al., Mycotaxon, 28: 95, 1987 - *Sarcogyne urceolata* Anzi, Comm. Soc. Critt. Ital., 1, 3: 157, 1862.

Syn.: *Acarospora urceolata* (Anzi) Jatta, *Biatorella urceolata* (Anzi) J. Steiner, *Sarcogyne urceolata* var. *herpes* Norman

N - Lomb, C - Abr (Nimis & Tretiach 1999).

Cr.end/ Ch/ S/ Sax/ pH: 4-5, L: 4, X: 3-4, E: 1-3/ Alt: 3-5/ Alp: vr, Salp: r, Mont: er/ PT: 1/ Note: on calcareous rocks in upland areas; probably much more widespread in the Alps and certainly rarer in the Apennines; related to *P. cyclocarpa*.

Porina Ach.

K. Vetensk.-Akad. Nya Handl., 30: 158, 1809, *nom. cons.*

The taxonomy of this large (c. 140 species) genus of the Porinaceae is far from being settled. Hafellner & Kalb (1995) resurrected the genus name *Pseudosagedia* for species of the *Porina nitidula*-group with the perithecial pigment termed *Pseudosagedia*-violet and lacking setae. This and other attempts of a new generic classification were not widely accepted, and criticism was raised by some authors (e.g. Lücking 1998) who observed that the characters for the segregation of other genera from *Porina* are found in smooth transition throughout the family and therefore difficult to apply. *Porina* would then be an interesting case where previously distinguished genera have been progressively synonymised to leave only very few genera in the family, yet of unclear relationships (see e.g. Baloch & Grube 2006). However, according to Lücking (*in litt.*) the genus is likely to be split into several smaller genera in the future (see also Orange 2013). Pending further study, I still treat it in a broad sense. Type (conserved): *P. nucula* Ach.

Porina aenea (Wallr.) Zahlbr.

Cat. Lich. Univ., 1: 363, 1922 - *Verrucaria aenea* Wallr., Fl. Crypt. Germ., 3: 299, 1831.

Syn.: *Porina carpinea* (Ach.) Zahlbr., *Porina chlorotica* var. *carpinea* (Ach.) Keissl., *Pseudosagedia aenea* (Ach.) Hafellner & Kalb, *Pyrenula carpinea* (Ach.) Trevis., *Sagedia abietina* Körb., *Sagedia aenea* (Wallr.) Körb., *Sagedia carpinea* (Ach.) A. Massal., *Sagedia chloromelaena* A. Massal., *Sagedia erumpens* A. Massal., *Spermatodium aeneum* (Wallr.) Trevis., *Spermatodium carpineum* (Ach.) Trevis., *Spermatodium chloromelaenum* (A. Massal.) Trevis., *Spermatodium erumpens* (A. Massal.) Trevis., *Trichothelium aeneum* (Wallr.) R.C. Harris, *Verrucaria carpinea* Pers. ex Ach., *Verrucaria erumpens* (A. Massal.) Garov.

N - Frl, Ven (Lazzarin 2000b, Nascimbene 2008), **TAA** (Nascimbene & al. 2007b, 2014, Nascimbene 2014, Nascimbene & Marini 2015), **Lomb** (Lazzarin 2000b), **Piem** (Isocrono & al. 2004), **Emil** (Brackel 2015). **C - Tosc** (Benesperi & al.

2007, Brunialti & Frati 2010, Brackel 2015), **Marc** (Nimis & Tretiach 1999, Tretiach 2014), **Umb** (Ravera 1998, Ravera & al. 2006), **Laz** (Nimis & Tretiach 2004, Ravera 2006c, Stofer 2006, Brackel 2015), **Abr** (Nimis & Tretiach 1999, Caporale & al. 2008, 2016, Brackel 2015, Corona & al. 2016), **Mol** (Nimis & Tretiach 1999, Ravera & al. 2010, Genovesi & Ravera 2014, Paoli & al. 2015), **Sar** (Stofer 2006, Rizzi & al. 2011, Cossu 2013). **S - Camp** (Aprile & al. 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010, Etayo & Puntillo 2011, Brunialti & al. 2013, Ravera & Brunialti 2013), **Pugl** (Nimis & Tretiach 1999), **Bas** (Bartoli & Puntillo 1998, Nimis & Tretiach 1999, Potenza 2006, Potenza & al. 2010, Brackel 2011), **Cal** (Puntillo 1995, 1996, Sérusiaux 1998, Puntillo & Puntillo 2004, 2012, Incerti & Nimis 2006), **Si** (Nimis & al. 1994, Grillo & Cristaudo 1995, Grillo 1998, Grillo & al. 2002, Grillo & Caniglia 2004, Caniglia & Grillo 2006b, Liistro & Cataldo 2011, Cataldo & Minissale 2015).

Cr/ Tr/ S/ Epiph/ pH: 2-3, L: 1-2, X: 1-3, E: 1/ Alt: 1-3/ Mont: r, SmedD: vr, SmedH: rr, MedH: rc, MedD: er/ PT: 1/ Note: a mainly temperate to Mediterranean-Atlantic species found on smooth bark of broad-leaved deciduous and evergreen trees and shrubs, mostly in woodlands and forests, common also in shaded-humid *Quercus ilex* stands.

Porina ahlesiana (Körb.) Zahlbr.

Cat. Lich. Univ., 8: 99, 1931 - *Segestrella ahlesiana* Körb., Parerga Lichenol.: 324, 1865.

Syn.: *Porina globosa* (Taylor) A.L. Sm., *Porina insiliens* (Larbal.) A.L. Sm., *Porina insularis* (Larbal.) A.L. Sm., *Porina septemseptata* (Hepp ex Zwackh) Swinscow non (Kremp.) Zahlbr.

N - **Piem** (TSB 32846). C - **Tosc** (Tretiach 2015o).

Cr/ Tr/ S/ Sax/ pH: 2-3, L: 1-2, X: 1-2, E: 1/ Alt: 1-5/ Alp: er, Salp: er, Mont: er, SmedH: er, MedH: er/ PT: 1/ Note: a rare species of shaded-humid siliceous rocks, with a somehow western distribution in Europe and a wide altitudinal range.

Porina austriaca (Körb.) Arnold

Flora, 65: 143, 1882 - *Sagedia austriaca* Körb., Parerga Lichenol.: 356, 1863.

Syn.: *Pseudosagedia austriaca* (Körb.) Hafellner

N - **TAA**.

Cr/ Tr/ S/ Sax/ pH: 1-2, L: 2-3, X: 2, E: 1/ Alt: 4-5/ Alp: vr, Salp: vr/ PT: 1/ #/ Note: a poorly known species of shaded and humid surfaces of siliceous rocks near or above treeline, which needs further study.

Porina borrieri (Trevis.) D. Hawksw. & P. James

in Hawksworth & al., Lichenologist, 12: 107, 1980 - *Spermatodium borrieri* Trevis., Consp. Verruc.: 11, 1860.

Syn.: *Arthopyrenia olivacea* (Schaer.) A. Massal., *Porina borrieri* var. *leptospora* (Nyl.) D. Hawksw., *Porina leptospora* (Nyl.) A.L. Sm., *Porina olivacea* auct. non (Pers.) A.L. Sm., *Porina olivacea* var. *leptospora* (Nyl.) Keissl., *Pseudosagedia borrieri* (Trevis.) Hafellner & Kalb

N - **Frl** (Tretiach 2004), **Lig** (Giordani & al. 2009, Giordani & Incerti 2008). C - **Tosc**, **Marc** (Brackel 2015). **S - Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994).

Cr/ Tr/ S/ Epiph/ pH: 2-3, L: 1-2, X: 1-3, E: 1/ Alt: 1-3/ Mont: er, SmedD: er, SmedH: r, MedH: vr/ PT: 0/ suboc/ Note: a mild-temperate lichen found on bark of deciduous trees in moist forests; probably more widespread, but certainly not common.

Porina byssophila (Hepp) Zahlbr.

in Engler & Prantl, Nat. Pflanzenfam., 1: 66, 1903 - *Sagedia byssophila* Körb. ex Hepp, Flecht. Eur., 12: nr. 695, 1860.

Syn.: *Pseudosagedia byssophila* (Hepp) Hafellner & Kalb, *Spermatodium cinereorufescens* Trevis.

N - **VG** (Tretiach 2015u), **TAA**. **S - Pugl** (Nimis & Tretiach 1999), **Bas** (Bartoli & Puntillo 1998), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994, 1995, Grillo & al. 2007).

Cr/ Tr/ S/ Sax/ pH: 4-5, L: 1-3, X: 1-3, E: 1/ Alt: 1-2/ SmedD: vr, SmedH: r, MedH: vr, MedD: er/ PT: 1/ Note: a mild-temperate to humid subtropical species found on calcareous rocks in damp and shaded habitats, e.g. in forests; somehow rarer than the closely related *P. linearis*.

Porina chlorotica (Ach.) Müll. Arg.

Rev. Mycol., 6, 21: 20, 1884 - *Verrucaria chlorotica* Ach., Lichenogr. Univ.: 283, 1810.

Syn.: *Arthopyrenia elaeospila* (Nyl.) H. Olivier, *Phylloporina elaeospila* (Nyl.) Zahlbr., *Porina chlorotella* (Nyl.) Zahlbr., *Porina chlorotica* var. *suaveolens* (Anzi) Zahlbr., *Porina tenuifera* (Nyl.) A.L. Sm., *Pseudosagedia chlorotica* (Ach.) Hafellner & Kalb, *Pyrenula chlorotica* (Ach.) Trevis., *Sagedia athallina* Bagl. & Carestia, *Sagedia chlorotica* (Ach.) A. Massal., *Sagedia macularis* var. *suaveolens* Anzi, *Sagedia persicina* var. *chlorotica* (Ach.) Jatta, *Trichothelium chloroticum* (Ach.) R.C. Harris

N - **Frl**, **Ven**, **TAA** (Caniglia & al. 2002), **Lomb**, **Piem** (Isocrono & al. 2004), **Emil** (Tretiach & al. 2008), **Lig** (Brunialti & al. 1999). C - **Tosc**, **Sar** (Nöske 2000, Rizzi & al. 2011, Giordani & al. 2013). **S - Cal** (Puntillo 1996, Sérusiaux 1998), **Si** (Grillo 1998, Grillo & Caniglia 2004).

Cr/ Tr/ S/ Sax/ pH: 1-2, L: 1-2, X: 1-2, E: 1/ Alt: 1-3/ Mont: r, SmedD: vr, SmedH: r, MedH: vr/ PT: 1/ suboc, p/ Note: a temperate to humid subtropical, probably holarctic species found on siliceous pebbles in humid-shaded situations, mostly in deciduous forests.

Porina coralloidea P. James

Lichenologist, 3: 142, 1971.

Syn.: *Porina stoechadiana* F. Rose & Cl. Roux, *Zamenhofia coralloidea* (P. James) Clauzade & Cl. Roux, *Zamenhofia stoechadiana* (F. Rose & Cl. Roux) Clauzade & Cl. Roux

C - Tosc, Laz (Hafellner & Kalb 1995, Stofer 2006, Tretiach 2014). **S - Camp** (Nimis & Tretiach 2004), **Cal** (Puntillo 1996, Sérusiaux 1998), **Si** (Nimis & al. 1994).

Cr/ Tr/ S/ Epiph/ pH: 2-3, L: 2-3, X: 1-2, E: 1-2/ Alt: 1/ MedH: vr/ PT: 0/ suboc/ Note: a humid subtropical to Mediterranean-Atlantic lichen found on old, moderately sheltered trunks (e.g. of *Quercus ilex*) in humid areas, with a clearly Tyrrhenian range in Italy. It is included in the Italian red list of epiphytic lichens as “Vulnerable” (Nascimbene & al. 2013c).

Porina curnowii A.L. Sm.

J. Bot., London, 49: 44, 1911.

C - Sar (TSB 13201).

Cr/ Tr/ S/ Sax/ pH: 1-3, L: 2-3, X: 2-3, E: 1/ Alt: 1/ MedH: er/ PT: 1/ suboc/ Note: a rare species of shaded and humid faces of siliceous rocks at low elevations. The sample from Sardinia (Capo Ferrato, SE coast) has poorly developed spores, and the identification is not fully certain.

Porina ginzbergeri Zahlbr.

Österr. bot. Z., 53: 150, 1903.

Syn.: *Porina oleriana* var. *ginzbergeri* (Zahlbr.) Clauzade & Cl. Roux, *Pseudosagedia ginzbergeri* (Zahlbr.) Hafellner & Kalb

C - Laz, S - Cal (Puntillo 1996), **Si**.

Cr/ Tr/ S/ Sax/ pH: 5, L: 2-3, X: 2-3, E: 1/ Alt: 1-2/ SmedH: vr, MedH: r/ PT: 1/ suboc/ Note: a mild-temperate lichen found on calcareous rocks in sheltered situations, often near the coast; mostly Tyrrhenian in Italy.

Porina guentheri (Flot.) Zahlbr.

Cat. Lich. Univ., 1: 384, 1922 - *Verrucaria guentheri* Flot., Bot. Z., 8: 575, 1850.

Syn.: *Porina eitneri* Zahlbr., *Porina koerberi* (Flot.) Lettau, *Pseudosagedia guentheri* (Flot.) Hafellner & Kalb, *Sagedia ferruginosa* Eitner, *Trichothelium guentheri* (Flot.) R.C. Harris

N - Lomb, Piem (Isocrono & al. 2004). **C - Sar**.

Cr/ Tr/ S/ Sax/ pH: 1-2, L: 1-2, X: 1-2, E: 1/ Alt: 3-4/ Salp: er, Orom: er, Mont: er/ PT: 1/ 1/ Note: a cool-temperate to subarctic lichen found along mountain creeks in the montane and subalpine belts, on periodically inundated siliceous rocks, but also on very shaded, not inundated rocks near the ground; probably more widespread in the Alps.

Porina hibernica P. James & Swinscow

Lichenologist, 2: 35, 1962.

Syn.: *Zamenhofia hibernica* (P. James & Swinscow) Clauzade & Cl. Roux

S - Si (Nimis & al. 1994, Tretiach 2014).

Cr/ Tr/ S/ Epiph/ pH: 2-3, L: 2-3, X: 1-2, E: 1-2/ Alt: 1/ MedH: er/ PT: 0/ suboc/ Note: a Mediterranean-Atlantic lichen found on ancient trunks, e.g. of *Quercus ilex*, in shaded-humid situations, especially in humid forests. It is included as “Critically Endangered” in the Italian red list of epiphytic lichens (Nascimbene & al. 2013c).

Porina hoehneliana (Jaap) R. Sant.

Symb. Bot. Upsal., 12, 1: 262, 1952 - *Calonectria hoehneliana* Jaap, Ann. Myc., 14: 10, 1916.

C - Tosc (Puntillo & Ottonello 1997, Puntillo 2000), **Umb** (Ravera & al. 2011), **Laz, S - Camp** (Puntillo & al. 2000, Puntillo 2000, Nimis & Tretiach 2004, Puntillo & Puntillo 2004), **Bas** (Puntillo & al. 2012), **Cal** (Puntillo 1996, 2000, Sérusiaux 1998).

Cr/ Tr/ S/ Epiph-Foliic/ pH: 2-3, L: 2-3, X: 1-2, E: 1-2/ Alt: 1-2/ SmedH: er, MedH: vr/ PT: 0/ suboc/ Note: a humid subtropical to Mediterranean-Atlantic lichen found on smooth bark and leaves of evergreen plants (e.g. on leaves of *Buxus* and cladodes of *Ruscus*) in warm-humid woodlands near the coast; exclusively Tyrrhenian in Italy. It is included in the Italian red list of epiphytic lichens as “Vulnerable” (Nascimbene & al. 2013c).

Porina lectissima (Fr.) Zahlbr.

in Engler & Prantl, Natürl. Pflanzenfam., 1, 1: 66, 1903 - *Segestria lectissima* Fr., Syst. Orb. Veg., 1: 287, 1825.

Syn.: *Sagedia umbonata* (Schaer.) Jatta, *Segestrella umbonata* (Schaer.) Körb., *Verrucaria irrigua* Taylor, *Verrucaria rubiginosa* Taylor, *Verrucaria umbonata* (Schaer.) Garov. nom. illegit.

N - Fr1 (Tretiach 2004), **TAA, Lomb, Piem** (Isocrono & al. 2004), **Emil** (Tretiach & al. 2008), **Lig** (Brunialti & al. 1999). **C - Tosc** (Tretiach & al. 2008), **Sar** (Nöske 2000, Nöske & al. 2000). **S - Cal** (Puntillo 1995, 1996).

Cr/ Tr/ S/ Sax/ pH: 1-3, L: 1-2, X: 1-2, E: 1/ Alt: 1-3/ Mont: r, SmedD: er, SmedH: vr, MedH: vr/ PT: 1/ suboc/ Note: a mild-temperate to Mediterranean-Atlantic species found on steeply inclined surfaces of siliceous rocks in shaded-moist situations, often in forests, or on periodically submerged rocks near creeks and lakes.

Porina leptalea (Durieu & Mont.) A.L. Sm.

Monogr. Brit. Lich., 2: 333, 1911 - *Biatora leptalea* Durieu & Mont. in Durieu, Fl. Algérie Crypt., 1: 268, 1847.

Syn.: *Bacidia micrococcoides* Erichsen, *Segestria leptalea* (Durieu & Mont.) R.C. Harris

S - Bas (Bartoli & Puntillo 1998), **Cal** (Puntillo & Vězda 1994, Puntillo 1995, 1996).

Cr/ Tr/ S/ Epiph-Foliic/ pH: 2-3, L: 2-3, X: 1, E: 1/ Alt: 1-3/ Mont: er, SmedH: er, MedH: er/ PT: 0/ suboc/ Note: a humid subtropical to Mediterranean-Atlantic lichen found on smooth bark of broad-leaved trees in moist forests, sometimes foliicolous on evergreen trees and shrubs (e.g. on *Buxus*). It is included in the Italian red list of epiphytic lichens as "Vulnerable" (Nascimbene & al. 2013c).

Porina leptosperma Müll. Arg.

Flora, 66: 333, 1883.

Syn.: *Phylloporina leptosperma* (Müll. Arg.) Müll. Arg.

S - Cal (Puntillo & Vězda 1994, Puntillo 1995, 1996, 2000).

Cr/ Tr/ S/ Foliic/ pH: 1-2, L: 1-2, X: 1, E: 1/ Alt: 2/ SmedH: er/ PT: 0/ Note: an obligately foliicolous lichen with tropical-subtropical affinities; the Italian material is from cladodes of *Ruscus* near a creek in a warm-humid forest. The species is included as "Critically Endangered" in the Italian red list of epiphytic lichens (Nascimbene & al. 2013c).

Porina linearis (Leight.) Zahlbr.

Cat. Lich. Univ., 1: 391, 1922 - *Verrucaria linearis* Leight., Brit. Spec. Angiocarp. Lich.: 52, 1851.

Syn.: *Porina chlorotica* var. *linearis* (Leight.) A.L. Sm., *Porina chlorotica* var. *persicina* (Körb.) A.L. Sm., *Porina persicina* (Körb.) Zahlbr., *Pseudosagedia linearis* (Leight.) Hafellner & Kalb, *Sagedia alpina* (Bagl. & Carestia) Jatta?, *Sagedia harrimannii* A. Massal., *Sagedia persicina* Körb., *Spermatodium lineare* (Leight.) Trevis., *Trichothelium lineare* (Leight.) R.C. Harris, *Verrucaria chlorotica* subsp. *leucotica* Nyl., *Verrucaria gibelliana* Garov., *Verrucaria immergens* Nyl., *Verrucaria ricasolii* Garov.

N - VG, Frl, Ven (Nascimbene & Marini 2007), **TAA, Lomb, Piem** (Isocrono & al. 2004), **Emil, Lig. C - Tosc** (TSB 35266), **Marc** (Nimis & Tretiach 1999, Tretiach 2014), **Umb** (Genovesi & Ravera 2001, Ravera & al. 2006), **Laz** (Bartoli & al. 1998, Nimis & Tretiach 2004), **Abr, Sar. S - Camp** (Aprile & al. 2003b, Nimis & Tretiach 2004), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994, 1995, Ottonello & Salone 1994, Ottonello & al. 1994, Ottonello 1996, Grillo 1998, Grillo & Caniglia 2004, Caniglia & Grillo 2005, 2006, Grillo & al. 2009).

Cr.end/ Tr/ S/ Sax/ pH: 4-5, L: 1-3, X: 1-3, E: 1/ Alt: 1-3/ Mont: r, SmedD: rc, Pad: er, SmedH: c, MedH: rc, MedD: vr/ PT: 1-2/ Note: a mainly mild-temperate species found on limestone in sheltered situations, mostly near the ground, often with *Acrocordia conoidea*.

Porina mammillosa (Th. Fr.) Zahlbr.

Cat. Lich. Univ., 1: 393, 1922 - *Segestria mammillosa* Th. Fr., N. Acta Reg. Soc. Sci. Upsal., ser. 3, 3: 362, 1861.

Syn.: *Porina epigaeoides* (Nyl.) A.L. Sm., *Porina furvescens* (Nyl.) A.L. Sm., *Porina humicolor* (Nyl.) A.L. Sm., *Sagedia declivum* Bagl. & Carestia, *Sagedia trechalea* (Nyl.) Arnold, *Verrucaria furvescens* Nyl. non Zschacke

N - Frl (Tretiach & Hafellner 2000), **Piem** (Isocrono & al. 2004).

Cr/ Tr/ S/ Terr/ pH: 2-3, L: 2-3, X: 2, E: 1/ Alt: 4-5/ Alp: vr, Salp: r/ PT: 1/ Note: an arctic-alpine, probably circumpolar species found on bryophytes and plant debris over siliceous substrata, near or above treeline.

Porina oleriana (A. Massal.) Lettau

Hedwigia, 52: 105, 1912 - *Sagedia oleriana* A. Massal., Symmicta Lich.: 95, 1855.

Syn.: *Pseudosagedia oleriana* (A. Massal.) Hafellner & Kalb

N - VG (Tretiach 1997, Tretiach & Rinino 2006), **Ven, Lomb. C - Tosc** (TSB 35269), **Abr** (Tretiach 2015o), **Sar** (TSB 13927), **S - Camp** (Aprile & al. 2003b, Nimis & Tretiach 2004), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994).

Cr/ Tr/ S/ Sax/ pH: 4-5, L: 1-3, X: 1-3, E: 1-2/ Alt: 1-2/ SmedD: r, SmedH: rr, MedH: rc, MedD: vr/ PT: 1/ Note: on shaded calcareous rocks, often found with *Acrocordia conoidea*, but less confined to very shaded situations, most common in Tyrrhenian Italy.

Porina oxneri R. Sant.

Symb. Bot. Upsal., 12, 1: 221, 1952.

Syn.: *Phylloporina obsoleta* Oxner, *Pseudosagedia obsoleta* (Oxner) Hafellner & Kalb

C - Tosc (Puntillo & Ottonello 1997, Puntillo 2000), **Umb** (Ravera & al. 2011), **Laz** (Ravera 2006, 2006c), **S - Camp** (Puntillo & al. 2000, Puntillo 2000, Nimis & Tretiach 2004), **Bas** (Puntillo & al. 2012), **Cal** (Puntillo & Vězda 1994, Puntillo 1995, 1996, 2000, Puntillo & Puntillo 2004).

Cr/ Tr/ S/ Foliic/ pH: 1-2, L: 1-3, X: 1, E: 1/ Alt: 1-3/ Mont: vr, SmedH: er/ PT: 0/ suboc/ Note: an obligately foliicolous lichen, confined to warm-moist forests, on needles of *Abies*, leaves of evergreen trees and shrubs (e.g. *Buxus*), and cladodes of *Ruscus*. It is included in the Italian red list of epiphytic lichens as "Vulnerable" (Nascimbene & al. 2013c), although it seems to be quite widespread, albeit not common.

Porina provincialis (Clauzade & Cl. Roux) Cl. Roux

in Roux & al., Bull. Soc. linn. Provence, 54: 131, 2003 - *Porina oleriana* var. *provincialis* Clauzade & Cl. Roux, Bull. Soc. Bot. Centre-Ouest, n. sér., nr. spéc. 7: 823, 1985.
N - VG (TSB 34051). S - Camp (TSB 31922), Pugl (TSB 22557).

Cr/ Tr/ S/ Sax/ pH: 4-5, L: 1-2, X: 1-3, E: 1/ Alt: 1-2/ SmedD: r, SmedH: rr, MedH: rc, MedD: vr/ PT: 1/
Note: on shaded surfaces of calcareous or dolomitic rocks in lowland areas.

Porina pseudohibernica Tretiach

Lichenologist, 46: 618, 2014.

N - Frl (Tretiach 2014).

Cr/ Tr/ S/ Epiph/ pH: 2-3, L: 2-3, X: 1-2, E: 1-2/ Alt: 3/ Mont: er/ PT: 0/ suboc/ Note: a recently-described species found on the shaded bark of epiphytic bryophytes in humid forests, hitherto known from several localities in southern Europe.

Porocyphus Körb.

Syst. Lich. Germ.: 425, 1855.

A subcosmopolitan genus of the Lichinaceae with 8 species occurring in arid regions, characterised by simple spores, poriform apothecia, and *Calothrix* as a photobiont. Type: *P. coccodes* (Flot.) Körb.

Porocyphus coccodes (Flot.) Körb.

Syst. Lich. Germ.: 426, 1855 - *Collema coccodes* Flot., Linnaea, 23: 152, 1850.

Syn.: *Collema furfurellum* Nyl., *Homopsella aggregatula* Nyl., *Porocyphus areolatus* (Flot.) Körb., *Porocyphus cataractarum* Körb., *Porocyphus furfurellus* (Nyl.) Forssell, *Porocyphus vivariensis* Couderc, *Psorotichia furfurella* (Nyl.) Boistel, *Psorotichia pyrenopsoides* (Nyl.) Forssell

C - Sar.

Cr/ Cy.c/ S/ Sax/ pH: 3, L: 4-5, X: 4-5, E: 1-2/ Alt: 2-4/ Salp: er, Mont: vr, SmedH: vr/ PT: 1/ w/ Note: a temperate to southern boreal-montane, probably holarctic lichen found in seepage tracks on steeply inclined surfaces of basic siliceous rocks, e.g. with *Peltula*, more rarely along creeks and rivers.

Porocyphus rehmicus (A. Massal.) Zahlbr.

Cat. Lich. Univ., 2: 765, 1924 - *Psorotichia rehmica* A. Massal., Miscell. Lichenol.: 23, 1856.

Syn.: *Collemopsis rehmi* (Körb.) H. Olivier, *Porocyphus byssoides* Hepp, *Porocyphus globulosus* (A. Massal.) Couderc, *Porocyphus rehmi* (Körb.) Harm., *Porocyphus riparius* (Arnold) Körb., *Psorotichia riparia* Arnold

N - Ven, Lomb, Piem, Emil, Lig. C - Sar.

Cr/ Cy.c/ S/ Sax/ pH: 3-4, L: 3-4, X: 2, E: 3/ Alt: 2-3/ Mont: er, SmedD: vr, SmedH: er/ PT: 1/ 1/ Note: on seepage tracks of base-rich or slightly calciferous rocks, more rarely along creeks and rivers, often on sandstone walls.

Porpidia Körb.

Syst. Lich. Germ.: 221, 1855.

This genus is the largest segregate (c. 30 species) from the genus *Lecidea* in the Lecideaceae, being distinguished by the distinctive ascus-type and the larger, halonate ascospores. However, a recent molecular analysis of lecideoid lichens by Schmull & al. (2011) has shown that two *Porpidia*-species are nested within *Lecidea s.str.* (*P. albocaerulescens* and *P. speirea*). So far, the delimitation of both genera and species within each genus is still problematic and should be subjected to a comprehensive phylogenetic study (see also Buschbom & Mueller 2004). See also note on the genus *Lecidea*. Type: *P. trullisata* (Kremp.) Körb.

Porpidia albocaerulescens (Wulfen) Hertel & Knoph

Mitt. bot. Staatss. München, 20: 476, 1984 - *Lichen albocaerulescens* Wulfen in Jacquin, Collect. Bot., 2: 184, 1791 (1788).

Syn.: *Haplocarpon albocaerulescens* (Wulfen) M. Choisy, *Huilia albocaerulescens* (Wulfen) Hertel, *Lecidea albocaerulescens* (Wulfen) Ach. nomen sed non planta, *Lecidea alboflavescens* Vain., *Lecidea nitescens* Leight.

N - VG, Ven, TAA, Lomb, Piem (Isocrono & al. 2004), VA (Piervittori & Isocrono 1999, Matteucci & al. 2015c), Lig. C - Tosc, Sar (TSB 8890). S - Camp (Ricciardi & al. 2000), Cal (Puntillo 1996).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 3, X: 2, E: 1/ Alt: 1-3/ Mont: vr, SmedD: er, SmedH: r, MedH: er/ PT: 1/ suboc/ Note: on siliceous boulders in sheltered, humid situations, such as in deciduous forests. Several earlier records reported by Nimis (1993: 566) and not checked by Hertel, are not accepted here.

Porpidia cinereoatra (Ach.) Hertel & Knoph

in Hertel, Beih. Nova Hedwigia, 79: 437, 1984 - *Lecidea cinereoatra* Ach., Lichenogr. Univ.: 167, 1810.

Syn.: *Haplocarpon cinereoatrum* (Ach.) M. Choisy, *Haplocarpon musivum* (Körb.) Vězda, *Huilia cinereoatra* (Ach.) Hertel, *Huilia macrocarpa* var. *convexa* (Fr.) Hertel, *Huilia musiva* (Körb.) Vězda, *Lecidea albocaerulescens* auct. non (Wulfen) Ach., *Lecidea convexa* (Fr.) Th. Fr., *Lecidea contigua* (Hoffm.) Fr. non auct., *Lecidea macrocarpa*

var. *convexa* (Fr.) H. Magn., *Lecidea musiva* Korb., *Porpidia musiva* (Korb.) Hertel & Knoph, *Lecidea ochrochlora* Ach., *Porpidia herteliana* Gowan

N - VG (Castello 2002, Martellos & Castello 2004), **Frl** (Tretiach & Hafellner 2000), **TAA** (Caniglia & al. 2002), **Lomb** (De Vita & Valcuvia 2004, Nascimbene 2006, Gheza & al. 2015), **Piem** (Isocrono & Falletti 1999, Isocrono & al. 2004, 2006), **VA** (Piervittori & Isocrono 1999, Piervittori & al. 2004, Isocrono & al. 2008, Favero-Longo & Piervittori 2009), **Emil** (Valcuvia & Delucchi 2001, Bouvet 2008), **Lig** (Brunialti & al. 1999). **C - Tosc** (UPS-L-135152), **Umb** (Panfili 2003), **Laz, Abr** (De Angelis & al. 2003), **Sar** (Rizzi & al. 2011, Giordani & al. 2013). **S - Camp** (Nimis & Tretiach 2004), **Cal** (Puntillo 1996), **Si** (Poli & al. 1995, Grillo 1998, Czczuga & al. 1999, Grillo & Caniglia 2004, Iacolino & Ottonello 2006).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 3-4, X: 2-3, E: 1/ Alt: 1-4/ Salp: vr, Mont: rr, SmedD: r, SmedH: rc, MedH: vr, MedD: er/ PT: 1-2/ #/ Note: on siliceous rocks wetted by rain, especially low boulders and large pebbles in rainy-humid areas, with a wide altitudinal range.

Porpidia contraponenda (Arnold) Knoph & Hertel

in Hertel & Knoph, Mitt. bot. Staatss. München, 20: 477, 1984 - *Lecidea contraponenda* Arnold, Verh. zool.-bot. Ges. Wien, 36: 79, 1886.

N - TAA.

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 3, X: 2-3, E: 1/ Alt: 3-4/ Salp: er, Mont: er/ PT: 1/ Note: on siliceous rocks near the ground, e.g. on large pebbles, in humid-moist situations, in open forests on track sides and in shrublands, most frequent in upland areas but generally rare.

Porpidia crustulata (Ach.) Hertel & Knoph

in Hertel, Beih. Nova Hedwigia, 79: 435, 1984 - *Lecidea parasema* var. *crustulata* Ach., Lichenogr. Univ.: 176, 1810.

Syn.: *Biatora crustulata* (Ach.) Hepp, *Haploparcon crustulatum* (Ach.) M. Choisy, *Huilia crustulata* (Ach.) Hertel, *Lecidea chrysoteichiza* Nyl., *Lecidea crustulata* (Ach.) Spreng., *Lecidea crustulata* f. *ferruginea* Kremp., *Lecidea crustulata* f. *martinatiana* (A. Massal.) Arnold, *Lecidea martinatiana* A. Massal., *Lecidea martinatiana* var. *coerulescens* A. Massal., *Lecidea meiospora* f. *oxydata* Kernst., *Lecidea nitidula* Fr., *Lecidea scutellata* Walt. Watson, *Lecidea umensis* H. Magn.

N - VG, Frl (Tretiach & Hafellner 2000), **Ven** (Lazzarin 2000b), **TAA** (Nascimbene 2003, 2005b), **Lomb** (De Vita & Valcuvia 2004), **Piem** (Isocrono & al. 2004, Giordani & al. 2014, Favero-Longo & al. 2015), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Valcuvia 2000, Piervittori & al. 2004, Isocrono & al. 2008, Favero-Longo & Piervittori 2009, Matteucci & al. 2015c), **Emil, Lig** (Giordani & al. 2016). **C - Tosc** (Brackel 2015), **Laz, Abr** (Nimis & Tretiach 1999, Brackel 2015), **Sar** (Rizzi & al. 2011, Giordani & al. 2013). **S - Camp** (Nimis & Tretiach 2004), **Pugl, Cal** (Puntillo 1995, 1996, Puntillo & Puntillo 2004), **Si** (Nimis & al. 1996b, Grillo 1998, Grillo & Caniglia 2004, Merlo 2004b).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 3-4, X: 2-3, E: 1-2/ Alt: 1-5/ Alp: rc, Salp: vc, Orom: c, Mont: rc, SmedD: rc, Pad: er, SmedH: rc, MedH: rr, MedD: vr/ PT: 1-2/ p/ Note: a widespread, holarctic early coloniser of siliceous pebbles and small stones on the ground, with a wide altitudinal range; rare only in the driest parts of Mediterranean Italy and in the Po-plain, but common elsewhere. The distinction towards *P. macrocarpa* is still an open problem.

Porpidia flavicunda (Ach.) Gowan

Bryologist, 92: 43, 1989 - *Lecidea flavicunda* Ach., Lichenogr. Univ.: 166, 1810.

Syn.: *Biatora flavocoerulescens* (Hornem.) Hepp, *Haploparcon flavocoerulescens* (Hornem.) V. Wirth ex Hertel, *Huilia flavicunda* (Ach.) Mas. Inoue, *Huilia flavocoerulescens* (Hornem.) Hertel, *Lecidea contigua* var. *flavicunda* (Ach.) Nyl., *Lecidea flavocoerulescens* Hornem., *Porpidia flavocoerulescens* (Hornem.) Hertel & A.J. Schwab

N - Ven, TAA, Lomb, Piem (Isocrono & al. 2003), **Emil, Lig** (Brunialti & al. 1999). **C - Tosc, S - Camp** (Jatta 1909-1911), **Cal** (Jatta 1909-1911).

Cr/ Ch/ S-A-s/ Sax/ pH: 1-2, L: 2-3, X: 2, E: 1/ Alt: 3-5/ Alp: er, Salp: vr, Mont: er/ PT: 1/ Note: a variable species which can produce both apothecia and soredia, found on siliceous boulders in humid and wind-protected situations, e.g. in deep gorges, or along mountain creeks in woodlands, reaching beyond treeline in the Alps. The Italian material needs revision: some records could refer to *P. melinodes*.

Porpidia macrocarpa (DC.) Hertel & A.J. Schwab

in Hertel, Beih. Nova Hedwigia, 79: 437, 1984 - *Patellaria macrocarpa* DC. in Lamarck & de Candolle, Fl. Franç., éd. 3, 2: 347, 1805.

Syn.: *Haploparcon macrocarpum* (DC.) M. Choisy, *Haploparcon nigrocruentum* (Anzi) Hertel, *Huilia macrocarpa* (DC.) Hertel, *Huilia nigrocruenta* (Anzi) Hertel, *Lecidea baderi* Müll. Arg., *Lecidea contigua* auct. p.p., *Lecidea contigua* var. *platycarpa* (Ach.) Fr., *Lecidea contortula* Stirt., *Lecidea macrocarpa* (DC.) Steud., *Lecidea macrocarpa* f. *oxydata* (Korb.) Vain., *Lecidea macrocarpa* var. *steriza* (Ach.) Vain., *Lecidea nigrocruenta* Anzi, *Lecidea phylliscina* Nyl., *Lecidea platycarpa* Ach., *Lecidea steriza* (Ach.) Vain., *Lecidea tenebrans* Nyl., *Lecidea vinorubens* Werner, *Porpidia nigrocruenta* (Anzi) Diederich & Sérus.

N - Frl (Tretiach & Hafellner 2000), **Ven, TAA** (Lecid. Exs. 276: Hertel 1992b, Caniglia & al. 2002 Nascimbene 2003, Nascimbene & al. 2007b, Lang 2009, Hertel & Schuhwerk 2010), **Lomb** (Valcuvia & al. 2003), **Piem** (Isocrono & Falletti 1999, Isocrono & al. 2003, 2004, Isocrono & Piervittori 2008, Giordani & al. 2014), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Piervittori & al. 1998, 2001, Valcuvia 2000, Matteucci & al. 2008c, 2015c, Isocrono & al. 2008, Favero-Longo & Piervittori 2009), **Emil** (Dalle Vedove & al. 2002), **Lig, C - Tosc, Umb** (Genovesi & al. 2002, Ravera & al. 2006), **Laz, Abr, Mol** (Ravera & Genovesi 2012, Genovesi & Ravera 2014), **Sar** (Nöske 2000, Rizzi

& al. 2011). **S - Camp** (Ricciardi & al. 2000), **Pugl, Bas, Cal** (Puntillo 1996), **Si** (Ottonello & Salone 1994, Ottonello & al. 1994, Ottonello 1996, Ottonello & Romano 1997, Grillo 1998, Grillo & Caniglia 2004, Merlo 2004b, Brackel 2008b).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 3-4, X: 2-3, E: 1/ Alt: 1-5/ Alp: rr, Salp: rc, Orom: r, Mont: rr, SmedD: vr, SmedH: rr, MedH: vr, MedD: er/ PT: 1/ Note: on siliceous rocks near the ground, sometimes on metal-rich substrata in humid-sheltered situations, with a wide altitudinal range; present also in the Mediterranean belt, especially in forest areas, wherever suitable substrata are present. The record from Venezia Giulia reported by Nimis (1993: 568) was excluded, as it is from outside the present borders of Italy; see also note on *P. crustulata*.

Porpidia melinodes (Körb.) Gowan & Ahti

Ann. Bot. Fenn., 30: 67, 1993 - *Aspicilia melinodes* Körb., Sber. Akad. Wiss. Wien, Math.-naturw. Kl., Abt. 1, 71: 3, 1872.

Syn.: *Haplocarpon melinodes* (Körb.) V. Wirth, *Huilia melinodes* (Körb.) Hertel, *Lecidea melinodes* (Körb.) H. Magn.

N - TAA (UPS-L-166873).

Cr/ Ch/ A.s/ Sax/ pH: 1-2, L: 3-4, X: 2-3, E: 1/ Alt: 3-5/ Alp: vr, Salp: vr, Mont: vr/ PT: 1/ Note: on horizontal to moderately inclined surfaces of siliceous rocks lying on or near the ground in scree fields, mostly in upland areas; for a long time treated as a sorediate morph of *P. flavicunda*; some records of *P. melinodes* are likely hidden under that species.

Porpidia ochrolemma (Vain.) Brodo & R. Sant.

in Brodo, Mycotaxon, 56: 161, 1995 - *Pertusaria ochrolemma* Vain., Meddeland. Soc. Fauna Fl. Fenn., 6: 180, 1881.

Syn.: *Aspicilia ochrolemma* (Vain.) Hue, *Hymenelia ochrolemma* (Vain.) Gowan & Ahti, *Porpidia pseudomelinodes* A.J. Schwab

N - TAA (Nascimbene 2004, 2008b, Nascimbene & al. 2007b), **Lomb** (Dalle Vedove & al. 2004, Nascimbene 2006), **Piem.**

Cr/ Ch/ Ch/ Sax/ pH: 1-2, L: 3, X: 2-3, E: 1/ Alt: 4-5/ Alp: vr, Salp: vr/ PT: 1/ Note: on siliceous rocks near watercourses or in humid, but well-illuminated situations near or above treeline. Probably restricted to the Alps in Italy.

Porpidia platycarpoides (Bagl.) Hertel

in Nimis & Poelt, Studia Geobot., 7, suppl. 1: 187, 1987 - *Lecidea platycarpoides* Bagl., N. Giorn. Bot. Ital., 11: 99, 1879.

Syn.: *Huilia percontigua* (Nyl.) Mas. Inoue, *Huilia platycarpoides* (Bagl.) Hertel, *Lecidea normannica* Werner, *Lecidea percontigua* Nyl., *Lecidea reagens* Zschacke, *Porpidia cinereoatra* var. *platycarpoides* (Bagl.) Boissière & Cl. Roux, *Porpidia macrocarpa* var. *percontigua* (Nyl.) Boissière & Cl. Roux, *Porpidia macrocarpa* var. *platycarpoides* (Bagl.) Boissière & Cl. Roux

C - Tosc, Laz, Sar (Rizzi & al. 2011). **S - Si** (Nimis & al. 1996b, Iacolino & Ottonello 2006).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 3-4, X: 2-3, E: 1/ Alt: 1-2/ SmedH: r, MedH: rr, MedD: vr/ PT: 1-2/ Note: a Mediterranean-Atlantic lichen found on siliceous rocks in rather sheltered situations; most frequent in Tyrrhenian Italy, where it is locally abundant (e.g. in parts of Sardegna).

Porpidia rugosa (Taylor) Coppins & Fryday

in Fryday, Lichenologist, 37: 29, 2005 - *Endocarpon rugosum* Taylor, Fl. Hibern., 2: 258, 1836.

Syn.: *Haplocarpon glaucophaeum* (Körb.) V. Wirth, *Huilia glaucophaea* (Körb.) Hertel, *Lecidea albocoerulescens* var. *alpina* Schaer., *Lecidea albuginosa* Nyl., *Lecidea glaucophaea* Körb., *Lecidea phaenterodes* Nyl., *Lecidea soredizodes* (Nyl.) Vain., *Porpidia glaucophaea* (Körb.) Hertel & Knoph

N - TAA (Nascimbene & al. 2007b), **Lomb, Emil** (Tretiach & al. 2008). **C - Tosc** (Tretiach & al. 2008).

Cr/ Ch/ A.s/ Sax/ pH: 2-3, L: 2-3, X: 2, E: 1/ Alt: 2-4/ Salp: er, Mont: vr, SmedD: er/ PT: 1/ Note: a mainly mild-temperate species found on siliceous, often metamorphic rocks in sheltered situations, such as in forests and deep gorges, along rivers and creeks, or on pebbles on moist ground.

Porpidia soredizodes (Lamy) J.R. Laundon

Bot. J. Linn. Soc., 101: 104, 1989 - *Lecidea meiospora* var. *soredizodes* Lamy, Bull. Soc. Bot. Fr., 30: 410, 1883.

Syn.: *Haplocarpon soredizodes* (Lamy) V. Wirth, *Huilia soredizodes* (Lamy) Hertel, *Lecidea soredizodes* (Lamy) Sandst. non (Nyl.) Vain.

N - TAA.

Cr/ Ch/ A.s/ Sax/ pH: 2-3, L: 2, X: 2, E: 1/ Alt: 3-4/ Salp: er, Mont: vr/ PT: 1/ suboc/ Note: a cool-temperate to boreal-montane lichen found on siliceous rocks in forests, gorges, and on north-exposed faces of large siliceous boulders, mostly in upland areas but not reaching beyond treeline.

Porpidia speirea (Ach.) Kremp.

Denkschr. bayer. bot. Ges. Regensburg, 2, 4: 210, 1861 - *Lichen speireus* Ach., Lichenogr. Suec. Prodr.: 59, 1799.

Syn.: *Huilia speirea* (Ach.) Kremp., *Lecidea elata* var. *prochsthallina* A. Massal., *Lecidea margaritacea* Ach. non auct., *Lecidea peltata* Zahlbr., *Lecidea speirea* (Ach.) Ach., *Lecidea speirea* var. *alpina* (Arnold) Hertel?, *Lecidea speirea* var. *prochsthallina* (A. Massal.) Hertel?, *Porpidia speirea* var. *alpina* (Arnold) Hafellner & Türk, *Porpidia speirea* var. *prochsthallina* (A. Massal.) Hafellner & Türk

N - Frl (Tretiach & Hafellner 2000), **Ven** (Caniglia & al. 1999, Lazzarin 2000b), **TAA, Lomb, Piem** (Morisi & Sereno 1995, Isocrono & al. 2004, Isocrono & Piervittori 2008), **VA** (Piervittori & Isocrono 1999, Piervittori & al. 2001, 2004, Isocrono & al. 2008, Favero-Longo & Piervittori 2009, Blisa & al. 2011), **Emil** (Tretiach & al. 2008), **Lig** (Brunialti & al. 1999). **C - Tosc, Sar.**

Cr/ Ch/ S/ Sax/ pH: 3-4, L: 3, X: 2, E: 1/ Alt: 3-5/ Alp: rc, Salp: c, Orom: vr, Mont: er/ PT: 1/ Note: on inclined faces of schist and weakly calciferous rocks in cold-humid situations, mostly in upland areas, reaching beyond treeline in the Alps.

***Porpidia superba* (Körb.) Hertel & Knoph**

in Hertel, Beih. Nova Hedwigia, 79: 438, 1984 - *Lecidea superba* Körb., Syst. Lich. Germ.: 248, 1855.

Syn.: *Huilia superba* (Körb.) Hertel, *Lecidea incrassata* H. Magn., *Lecidea macrocarpa* var. *superba* (Körb.) Th. Fr.

N - TAA, Piem (Isocrono & al. 2004).

Cr/ Ch/ S/ Sax/ pH: 3, L: 2-3, X: 2, E: 1/ Alt: 4-5/ Alp: vr, Salp: vr/ PT: 1/ Note: a mainly arctic-alpine lichen found on weakly calciferous or basic siliceous rocks in sheltered situations near or above treeline. An earlier record from Emilia (see Nimis 1993: 570), being dubious, is not accepted here.

***Porpidia trullisata* (Kremp.) Körb.**

Syst. Lich. Germ.: 221, 1855 - *Diplotomma trullisatum* Kremp., Flora, 36: 442-444, 1853.

Syn.: *Lecidea euspeirea* Nyl., *Lecidea speirea* f. *trullisata* (Kremp.) Stein, *Lecidea speirea* var. *trullisata* (Kremp.) Arnold, *Lecidea trullisata* (Kremp.) Anzi

N - TAA, Piem (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999).

Cr/ Ch/ S/ Sax/ pH: 3-4, L: 2-3, X: 2-3, E: 1/ Alt: 4-6/ Alp: r, Salp: vr/ PT: 1/ Note: on north-facing, steeply inclined surfaces of weakly calciferous rocks with optimum above treeline, reaching the nival belt; apparently restricted to the Alps in Italy.

***Porpidia tuberculosa* (Sm.) Hertel & Knoph**

in Hertel, Beih. Nova Hedwigia, 79: 438, 1984 - *Spiloma tuberculosum* Sm. in Smith & Sowerby, Engl. Bot., 36, tab. 2556, 1814.

Syn.: *Huilia tuberculosa* (Sm.) P. James, *Lecidea confluens* var. *tumida* (A. Massal.) A. Massal., *Lecidea contigua* f. *tumida* (A. Massal.) Arnold, *Lecidea macrocarpa* var. *tumida* (A. Massal.) Stein, *Lecidea platycarpa* var. *tumida* (A. Massal.) Stein, *Lecidea solediza* Nyl., *Lecidea tumida* A. Massal.

N - Frl (Tretiach & Hafellner 2000), **Ven** (Lazzarin 2000b), **TAA** (Lang 2009, Hertel & Schuhwerk 2010), **Lomb, Piem, VA** (Piervittori & Isocrono 1999), **Emil** (Tretiach & al. 2008), **Lig** (Brunialti & al. 1999). **C - Tosc, Sar.**

Cr/ Ch/ A.s/ Sax/ pH: 2-3, L: 3, X: 2-3, E: 1/ Alt: 2-4/ Salp: er, Orom: er, Mont: vr, SmedD: er, SmedH: er/ PT: 1/ Note: on steeply inclined surfaces of siliceous rocks, or in woodlands, mostly near the ground. Earlier records from Marche, Campania and Sicilia (see Nimis 1993: 571), being dubious, are not accepted here.

***Porpidia zeoroides* (Anzi) Knoph & Hertel**

in Hertel & Knoph, Mitt. bot. Staatss. München, 20: 477, 1984 - *Lecidea zeoroides* Anzi, Comm. Soc. Critt. Ital., 2, 1: 17, 1864.

Syn.: *Huilia macrocarpa* var. *trullisata* (Arnold) Hertel non *Porpidia trullisata* (Kremp.) Körb., *Lecidea cyclosora* Lettau, *Lecidea macrocarpa* var. *trullisata* (Arnold) Mig., *Lecidea platycarpa* f. *trullisata* Arnold

N - Frl (TSB 7737), **TAA** (Dalla Torre & Sarnthein 1902), **Lomb, Piem** (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999), **Emil**.

Cr/ Ch/ S/ Sax/ pH: 3-4, L: 3, X: 2-3, E: 1/ Alt: 3-5/ Alp: er, Salp: vr, Mont: er/ PT: 1/ Note: on steeply inclined, often north-exposed faces of weakly calciferous rocks in upland areas, reaching beyond treeline in the Alps.

P o r p i d i n i a Timdal

Bibl. Lichenol., 104: 334, 2010.

This genus was described to accommodate one species formerly treated as a member of *Toninia*. The ascus resembles that of *Porpidia* in the Lecideaceae, but the genus differs in having a non-amyloid hymenial gelatine and more loosely conglutinated paraphyses with a more sharply delimited pigmented cap. For further details see Timdal (2010). Type: *P. tumidula* (Sm.) Timdal

***Porpidinia tumidula* (Sm.) Timdal**

Bibl. Lichenol., 104: 334, 2010 - *Lichen tumidulus* Sm., Trans. Linn. Soc. London, 1: 82, tab. 4, fig. 3, 1791.

Syn.: *Biatorina mammillaris* (Gouan) Jatta, *Lecidea mammillaris* (Gouan) Fr., *Biatorina tumidula* (Sm.) A.L. Sm., *Lichen mammillaris* Gouan, *Thalloidima mammillare* (Gouan) A. Massal., *Thalloidima mesenteriforme* Arnold,

Thalloidima tumidulum (Sm.) Szatala, *Toninia hercegovinica* Zahlbr., *Toninia mammillaris* (Gouan) Th. Fr., *Toninia mesenteriformis* (Arnold) Schuler, *Toninia tumidula* (Sm.) Zahlbr.

N - VG, Frl, Ven (Nascimbene & Caniglia 1997, Caniglia & al. 1999, Nascimbene & Marini 2007), **TAA** (Nascimbene & al. 2006, Nascimbene 2008b), **Piem, Lig** (Giordani & al. 2016). **C - Tosc, Mol** (TSB 27023), **Sar, S - Pugl, Bas** (Potenza & al. 2014), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994).

Sq/ Ch/ S/ Sax/ pH: 4-5, L: 4-5, X: 4, E: 2/ Alt: 1-3/ Mont: r, SmedD: rr, SmedH: rr, MedH: vr, MedD: er/ PT: 1/ Note: on weathered calciferous rocks, most often in fine crevices and on steeply inclined surfaces, with optimum in the submediterranean belt.

Protoblastenia (Zahlbr.) J. Steiner

Verh. zool.-bot. Ges. Wien, 61: 47, 1911 - *Blastenia* sect. *Protoblastenia* Zahlbr. in Engler & Prantl, Nat. Pflanzenfam., 1, 1: 226, 1908.

Protoblastenia s.str. comprises only species with apothecia encrusted by anthraquinones and with *Psora*-type asci containing non-septate ascospores. The genus proved to be close to *Psora*, both genera forming the core of the family Psoraceae. All of the c. 14 species grow on limestone or other substrates with at least a low content of calcium. The Alps seem to be the centre of diversity for the genus (Kainz & Rambold 2004). Type: *P. rupestris* (Scop.) J. Steiner

Protoblastenia aurata Poelt & Vězda

in Poelt, Bestimmungsschl. eur. Flechten: 540, 1969.

Syn.: *Protoblastenia coniasis* (A. Massal.) Poelt *planta sed non nomen*

N - Emil, Lig (M Herb. Klement 04975).

Cr/ Ch/ S/ Sax/ pH: 4, L: 4-5, X: 3-4, E: 1-2/ Alt: 4-5/ Alp: er, Salp: vr/ PT: 1/ Note: on calciferous siliceous rocks, especially schists, near and above treeline; to be looked for in the Alps, where it is certainly present.

Protoblastenia calva (Dicks.) Zahlbr.

Cat. Lich. Univ., 7: 1, 1930 - *Lichen calvus* Dicks., Fasc. Pl. Crypt. Brit., 2: 18, 1790.

Syn.: *Blastenia rupestris* var. *calva* (Dicks.) Lettau, *Placodium rupestre* var. *calvum* (Dicks.) A.L. Sm., *Protoblastenia rupestris* var. *calva* (Dicks.) J. Steiner

N - VG (Crisafulli & al. 2006, Piervittori & al. 2006), **Frl, Ven** (Caniglia & al. 1999, Nascimbene & Caniglia 2003c, Nascimbene 2005c, 2008c, Nascimbene & Marini 2007), **TAA** (Kainz & Rambold 2004, Nascimbene & al. 2007b, Nascimbene 2008b), **Lomb, Piem** (Isocrono & al. 2004), **Emil, Lig** (Giordani & al. 2016). **C - Tosc** (Benesperi 2006, 2007b, Tretiach & al. 2008), **Marc** (Nimis & Tretiach 1999), **Umb** (Nimis & Tretiach 1999, Ravera & al. 2006), **Laz** (Nimis & Tretiach 2004), **Abr** (Nimis & Tretiach 1999, Caporale & al. 2016), **Mol** (Nimis & Tretiach 2004, Caporale & al. 2008, Genovesi & Ravera 2014), **Sar, S - Camp** (Aprile & al. 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010), **Pugl, Bas, Cal** (Puntillo 1996), **Si** (Grillo & al. 2007).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 2-4, X: 3-4, E: 1/ Alt: 1-5/ Alp: rr, Salp: rc, Orom: c, Mont: rc, SmedD: vr, SmedH: vr, MedH: er/ PT: 1/ Note: on steeply inclined faces of hard limestones and dolomite, with a wide altitudinal range but most common in the mountains, from the Alps to Sicilia, descending to lower altitudes in humid areas.

Protoblastenia cyclospora (Körb.) Poelt

Mitt. bot. Staatss. München, 12: 5, 1975 - *Biatora cyclospora* Hepp ex Körb., Parerga Lichenol.: 152, 1860.

Syn.: *Biatora rubidula* (Nyl.) Walt. Watson, *Lecidea cyclospora* (Körb.) Müll. Arg., *Lecidea rubidula* Nyl., *Protoblastenia globulificans* (Nyl.) Zahlbr.

N - Frl (Henssen & Tretiach 1995, Vězda Lich. Rar. Exs. 326, Kainz & Rambold 2004, Peršoh & al. 2004), **TAA** (TSB 20345). **C - Tosc** (Benesperi 2006, 2007, 2007b), **Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **Sar** (Tretiach 2015q). **S - Camp** (Aprile & al. 2003b).

Cr/ Ch/ S/ Sax/ pH: 5, L: 4-5, X: 2-3, E: 1-3/ Alt: 2-4/ Salp: er, Mont: r, SmedD: vr, SmedH: er/ PT: 1/ suboc/ Note: on steeply inclined surfaces of calcareous rocks in humid-rainy areas below the Alpine belt; to be looked for in other parts of Italy with very high precipitation and calcareous-dolomitic substrata (e.g. the Apuan Alps).

Protoblastenia incrustans var. *coniasis* (A. Massal.) Nimis

The Lichens of Italy: 573, 1993 - *Biatora coniasis* A. Massal., Atti I. R. Ist. Ven. Sc. Lett. Arti, 6, 2, ser. 3: 365, 1856.

Syn.: *Lecidea coniasis* (A. Massal.) Lettau, *Protoblastenia incrustans* f. *coniasis* (A. Massal.) Zahlbr.

N - TAA, Lomb, Emil (Tretiach & al. 2008). **C - Tosc**.

Cr.end/ Ch/ S/ Sax/ pH: 4-5, L: 4, X: 3-4, E: 2-3/ Alt: 4-5/ Alp: r, Salp: er/ PT: 1/ #/ Note: on steeply inclined surfaces of more or less calciferous rocks near and above treeline; certainly more widespread throughout the Alps, but not common, this taxon is well worthy of further study.

Protoblastenia incrustans (DC.) J. Steiner var. *incrustans*

in Reehinger, Verh. zool.-bot. Ges. Wien, 61: 47, 1911 - *Patellaria incrustans* DC. in Lamarck & de Candolle, Fl. Franç., éd. 3, 2: 361, 1805.

Syn.: *Biatora rupestris* var. *incrustans* (DC.) A. Massal., *Blastenia incrustans* (DC.) A. Massal., *Blastenia rupestris* var. *incrustans* (DC.) Lettau, *Caloplaca incrustans* (DC.) Flagey, *Lecidea rupestris* var. *incrustans* (DC.) Schaer., *Placodium incrustans* (DC.) A.L. Sm., *Placodium rupestre* f. *incrustans* (DC.) A.L. Sm., *Protoblastenia rupestris* var. *incrustans* (DC.) Zahlbr.

N - VG (Cucchi & al. 2009), **Frl** (Nimis & Salvadori 1998), **Ven** (Pinna & al. 1998, Nascimbene & Caniglia 2003c, Nascimbene 2005c, Thor & Nascimbene 2007, Nascimbene & Marini 2007), **TAA** (Nascimbene 2003, 2008b, Spitale & Nascimbene 2012), **Lomb, Piem** (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999), **Emil, Lig, C - Tosc** (Benesperi 2006, 2007, 2007b, Tretiach & al. 2008), **Marc** (Nimis & Tretiach 1999), **Umb** (Nimis & Tretiach 1999, Ravera & al. 2006, Panfili 2007), **Laz** (Nimis & Tretiach 2004), **Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008, Genovesi & Ravera 2014), **Sar, S - Camp** (Aprile & al. 2003, 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994, 1996b).

Cr.end/ Ch/ S/ Sax/ pH: 5, L: 3-4, X: 3-4, E: 1-2/ Alt: 1-6/ Alp: c, Salp: vc, Orom: vc, Mont: ec, SmedD: ec, Pad: vr, SmedH: ec, MedH: c, MedD: rr/ PT: 1-3/ Note: a widespread temperate to circum-arctic lichen, one of the most common species on calcareous rocks in natural habitats throughout the country, with a very wide altitudinal range, reaching the nival belt in the Alps.

Protoblastenia lilacina Poelt & Vězda

in Vězda, Čas. slezsk. Mus. Opavě, A 19: 26, 1970.

Syn.: *Biatora rupestris* var. *sanguinea* Arnold, *Protoblastenia calva* var. *sanguinea* (Arnold) Cl. Roux, *Protoblastenia rupestris* var. *sanguinea* (Arnold) Zahlbr.

N - Ven (Kainz & Rambold 2004). **S - Pugl** (Kainz & Rambold 2004).

Cr.end/ Ch/ S/ Sax/ pH: 5, L: 4, X: 3-4, E: 2-3/ Alt: 1-3/ Mont: vr, SmedD: vr, MedD: vr/ PT: 1/ #/ Note: a rather poorly known species of sunny calcareous rocks below the subalpine belt, reported from Germany, France, Austria, Italy, and Croatia. It is characterised by the weak reaction of the apothecia to K.

Protoblastenia rupestris (Scop.) J. Steiner

Verh. zool.-bot. Ges. Wien, 61: 47, 1911 - *Lichen rupestris* Scop., Fl. Carniol., 2 ed., 1: 363, 1772.

Syn.: *Biatora irrubata* (Ach.) Kernst., *Biatora rupestris* (Scop.) Fr., *Biatora similis* A. Massal., *Biatora viridiflavescens* (Wulfen) Fr., *Blastenia rupestris* (Scop.) Zahlbr., *Lecanora irrubata* (Ach.) Nyl., *Lecidea rupestris* (Scop.) Ach., *Placodium rupestre* (Scop.) Branth & Rostr., *Protoblastenia rupestris* var. *irrubata* (Ach.) Szatala

N - VG (Castello 2002, Martellos & Castello 2004), **Frl, Ven** (Nascimbene & Caniglia 2003c, Nascimbene 2005c, 2008, 2008c, Nascimbene & Marini 2007, Brackel 2013), **TAA** (De Benetti & Caniglia 1993, Nascimbene 2003, 2005b, 2008b), **Lomb, Piem** (Isocrono & al. 2004, Morisi 2005), **Emil** (Nimis & al. 1996), **Lig** (Valcuvia & al. 2000, Kainz & Rambold 2004, Giordani & al. 2016). **C - Tosc, Marc** (Nimis & Tretiach 1999), **Umb** (Nimis & Tretiach 1999, Ravera & al. 2006, Panfili 2007), **Laz** (Nimis & Tretiach 2004, Brackel 2015), **Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach, 1999, 2004, Caporale & al. 2008), **Sar, S - Camp** (Aprile & al. 2002, 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010, Catalano & al. 2016), **Pugl** (Nimis & Tretiach 1999), **Bas** (Potenza 2006), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994, Ottonello & Salone 1994, Ottonello & al. 1994, Caniglia & Grillo 2001, 2006, Grillo & Caniglia 2004, Brackel 2008b).

Cr/ Ch/ S/ Sax/ pH: 3-5, L: 3-5, X: 3-4, E: 2-3/ Alt: 1-4/ Salp: er, Orom: er, Mont: rr, SmedD: vc, Pad: er, SmedH: vc, MedH: rc, MedD: rr/ PT: 1-3/ p/ Note: a common and ecologically wide-ranging species, most frequent on faces of calciferous rocks wetted by rain near the ground, an early coloniser of several substrata, from mortar-cement to basic siliceous pebbles, often found also in urban areas, most frequent below the subalpine belt.

Protoblastenia siebenhaariana (Körb.) J. Steiner

Verh. K.K. zool.-bot. Ges. Wien, 61: 48, 1911 - *Biatora siebenhaariana* Körb., Syst. Lich. Germ.: 207, 1855.

Syn.: *Blastenia siebenhaariana* (Körb.) Lettau, *Protoblastenia siebenhaariana* var. *alpina* (Arnold) Clauzade & Cl. Roux?, *Protoblastenia rupestris* subsp. *albida* Asta & Cl. Roux, *Protoblastenia rupestris* subsp. *siebenhaariana* (Körb.) A.L. Sm., *Protoblastenia siebenhaariana* subsp. *albida* (Asta & Cl. Roux) Clauzade & Cl. Roux

N - Frl, Ven (Nimis 1994, Nascimbene & Marini 2007, Nascimbene 2008c), **TAA, Lomb, Piem** (TSB 34497), **VA** (Piervittori & Isocrono 1999), **Emil** (Tretiach & al. 2008), **Lig, C - Tosc, Marc** (Nimis & Tretiach 1999). **S - Camp**.

Cr/ Ch/ S/ Sax/ pH: 3-5, L: 3-4, X: 3, E: 2-3/ Alt: 3-5/ Alp: rr, Salp: r, Orom: er, Mont: er/ PT: 1/ Note: a mainly arctic-alpine, probably circumpolar lichen found on base-rich or calciferous siliceous rocks and on dolomite in upland areas; not frequent in Italy, but locally common. The var. *alpina* (Arnold) Clauzade & Cl. Roux (*Biatora rupestris* var. *alpina* Arnold) perhaps does not belong to this taxon.

Protoblastenia terricola (Anzi) Lyngé

Lich. Novaya Zemlya: 216, 1928 - *Biatora rupestris* var. *terricola* Anzi, Cat. Lich. Sondr.: 78, 1860.

Syn.: *Biatora terricola* (Anzi) Th. Fr., *Blastenia terricola* (Anzi) Lindau, *Lecidea terricola* (Anzi) Th. Fr., *Protoblastenia siebenhaariana* var. *terricola* (Anzi) Hafellner & Türk

N - Frl, Ven (Nascimbene & al. 2006), **TAA** (Nascimbene & al. 2004, 2004b, Nascimbene 2008b), **Lomb, Piem** (Isocrono & al. 2004).

Cr/ Ch/ S/ Terr/ pH: 3-5, L: 4, X: 3, E: 2-3/ Alt: 3-5/ Alp: rr, Salp: r, Orom: er, Mont: er/ PT: 1/ Note: on soil over weakly calcareous or dolomitic substrata in upland areas; perhaps this is only a terricolus morph of *P. siebenhaariana*, most frequent in the southern part of its distributional range.

Protomicarea Hafellner

Stapfia, 76: 156, 2001.

This genus was created to accommodate a species formerly included in *Lecidea*, differing in the immarginate apothecia and the *Psora*-type of ascus. The genus is currently listed as a questionable taxon within the Psoraceae (see Schmitt & al. 2011). Type: *P. limosa* (Ach.) Hafellner

Protomicarea limosa (Ach.) Hafellner

in Hafellner & Türk, Stapfia, 76: 156, 2001- *Lecidea limosa* Ach., Lichenogr. Univ.: 182, 1810.

Syn.: *Lecidea borealis* (Körb.) Anzi, *Lecidea ementiens* Nyl., *Lecidella borealis* Körb.

N - **Frl** (Tretiach & Hafellner 2000), **Ven**, **TAA** (Caniglia & al. 2002), **Lomb** (Dalle Vedove & al. 2004), **Piem** (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1997, 1999), **Emil** (Dalle Vedove & al. 2002).

Cr/ Ch/ S/ Terr/ pH: 1-2, L: 3-4, X: 2, E: 1/ Alt: 4-6/ Alp: rc, Salp: rr/ PT: 1/ Note: an arctic-alpine to boreal-montane, circumpolar lichen found on naked soil in sites with a long snow-lie, in clearings of Alpine grasslands, more rarely on muribund bryophytes and plant debris: in the Alps it can reach the nival belt.

Protopannaria (Gyeln.) P.M. Jørg. & S. Ekman

in Jørgensen, Bryologist, 103: 699, 2001 - *Pannaria* subgen. *Protopannaria* Gyeln., Rabenh.

Kryptogamenfl., ed 2, 9: 216, 1940.

This genus of the Pannariaceae includes 7 crustose-squamulose species without secondary chemistry, apothecia with thalline margin, and amyloid hymenia with asci lacking internal amyloid structures. For further details see Ekman (2014b). Type: *P. pezizoides* (Weber) P. M. Jørg. & S. Ekman

Protopannaria pezizoides (Weber) P.M. Jørg. & S. Ekman

in Jørgensen, Bryologist, 103: 699, 2001 - *Lichen pezizoides* Weber, Spicil. Fl. Goett.: 200, 1778.

Syn.: *Lecanora brunnea* (Sw.) Ach., *Lecanora pezizoides* (Weber) Borrer, *Lichen badius* J.F. Gmel., *Lichen brunneus* Sw., *Pannaria brunnea* (Sw.) A. Massal., *Pannaria brunnea* var. *demissa* Th. Fr., *Pannaria pezizoides* (Weber) Trevis., *Pannaria pezizoides* f. *pseudonebulosa* Gyeln.

N - **Frl** (Tretiach & Hafellner 2000, Tretiach & Molaro 2007), **Ven** (Nimis 1994, Nascimbene 2002, 2008c, Nascimbene & Caniglia 2003c, Nascimbene 2011), **TAA** (Nascimbene 2005b, 2008b, Nascimbene & al. 2006, Bilovitz & al. 2014b, Watson 2014), **Lomb**, **Piem** (Isocrono & al. 2003, 2004, Morisi 2005), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999), **Emil** (Tretiach & al. 2008), **Lig. C** - **Tosc** (Benesperi & al. 2007), **Marc**, **Umb** (Ravera & Di Toma 2003, Ravera & al. 2006), **Abr** (Nimis & Tretiach 1999), **Sar. S** - **Camp** (Garofalo & al. 2010), **Bas** (Brackel 2011), **Cal** (Puntillo 1995, 1996).

Cr/ Cy.h/ S/ Terr/ pH: 2-3, L: 3-4, X: 2, E: 1-2/ Alt: 3-5/ Alp: c, Salp: vc, Orom: vr, Mont: vr/ PT: 1/ Note: an arctic-alpine to boreal-montane, circumpolar lichen found on mosses, plant debris, and organic soil in open habitats, with optimum near and above treeline; most common in the Alps, but occurring, albeit more rarely, throughout the Apennines.

Protoparmelia M. Choisy

Bull. Soc. Bot. France., 76: 523, 1929.

This is a cosmopolitan genus with *c.* 25 species, differing from *Lecanora* by the grey- to reddish-brown thallus, the generally smaller, narrower ascospores, and the straight conidia. The structure of the excipulum is similar to that found in the Parmeliaceae, and the genus has been included in that family by various authors, also on the base of recent molecular investigations (Arup & al. 2007, Crespo & al. 2007). The phylogenetic study by Singh & al. (2015) confirms that, in the present circumscription, the genus is heterogeneous: five previously described species and one species putatively new to science are close to *Miriquidica*. In contrast to members of *Protoparmelia s.str.*, which produce lobaric or alectoronic acids, these taxa synthesize norstictic acid, and often parasitize other lichens. The taxonomic consequences will be drawn in a future revision of *Miriquidica* by E. Timdal & al., so that here these species are still placed into *Protoparmelia s.lat.* In *Protoparmelia s.str.* the analysis of Singh & al. (2015) suggest the presence of a tropical and an extra-tropical lineage, and eleven previously unrecognised distinct species-level lineages within *P. badia s.lat.* and *P. montagnei s.lat.* Type: *P. badia* (Hoffm.) Hafellner

Protoparmelia atriseda (Fr.) R. Sant. & V. Wirth

in Wirth, Flechten Baden-Württembergs: 211, 1987 - *Parmelia badia* var. *atriseda* Fr., Nov. Sched. Crit.: 7, 1827.

Syn.: *Lecanora atriseda* (Fr.) Nyl., *Lecanora nephaea* auct. non Sommerf.

N - **TAA. S** - **Bas** (Puntillo & al. 2012), **Si**.

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 4, X: 3-4, E: 1-2/ Alt: 3-5/ Alp: r, Salp: vr, Orom: er, Mont: er/ PT: 1/ paras yellow *Rhizocarpon* spp./ Note: on hard siliceous rocks in upland areas, with optimum above treeline, starting the life-cycle on yellow *Rhizocarpon*-species, later becoming autonomous. A heterogeneous taxon (see Nimis 1993: 574), which does not belong to *Protoparmelia s.str.*

Protoparmelia badia (Hoffm.) Hafellner

Beih. Nova Hedwigia, 79: 292, 1984 - *Verrucaria badia* Hoffm., Deuschl. Fl., 2: 182, 1796.

Syn.: *Lecanora badia* (Hoffm.) Ach., *Lecanora badia* f. *palescens* Harm., *Lecanora badia* var. *picea* (Dicks.) Link, *Lecanora badia* var. *milvina* Rabenh., *Lecanora badia* var. *striatula* Lamy, *Lecanora grandis* H. Magn., *Lecanora picea* (Dicks.) Nyl. non auct., *Lichen piceus* Dicks. non auct., *Protoparmelia picea* (Dicks.) Hafellner non auct.

N - **Frl** (Tretiach & Hafellner 2000), **Ven**, **TAA** (Caniglia & al. 2002, Nascimbene 2008b, Lang 2009), **Lomb** (Dalle Vedove & al. 2004), **Piem** (Isocrono & Falletti 1999, Isocrono & al. 2003, 2004, 2006, Isocrono & Piervittori 2008, Favero-Longo & al. 2015), **VA** (Piervittori & Isocrono 1999, Valcuvia 2000, Piervittori & al. 2004, Isocrono & al. 2008, Favero-Longo & Piervittori 2009, Matteucci & al. 2015c), **Emil** (Tretiach & al. 2008, Watson 2014), **Lig** (Brunialti & al. 1999), **C - Tosc**, **Laz**, **Abr** (Nimis & Tretiach 1999), **Sar** (Nöske 2000, Singh & al. 2015), **S - Camp** (Ricciardi & al. 2000), **Cal** (Puntillo 1996), **Si** (Grillo 1998, Grillo & Caniglia 2004, Iacolino & Ottonello 2006, Brackel 2008b).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 3-4, X: 3, E: 1-3/ Alt: 2-6/ Alp: c, Salp: vc, Orom: rr, Mont: r, SmedD: er, SmedH: vr, MedH: er/ PT: 1/ Note: on siliceous rocks, with a wide altitudinal range, reaching the nival belt of the Alps; most common above treeline in the Alps, but sometimes extending to lower altitudes, albeit rarely to the Mediterranean belt (e.g. in Sardegna). The species, in its present circumscription, is heterogeneous (Singh & al. 2015).

Protoparmelia cupreobadia (Nyl.) Poelt

in Poelt & Leuckert, Nova Hedwigia, 52: 52, 1991 - *Lecanora cupreobadia* Nyl., Bot. Not.: 165, 1853.

Syn.: *Lecanora badia* var. *cupreobadia* (Nyl.) Boistel

N - **TAA**, **C - Sar**.

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 3, X: 3, E: 1-2/ Alt: 4-5/ Alp: r, Salp: vr, Orom: er/ PT: 1/ paras yellow *Rhizocarpon* spp./ Note: on gneiss and compact porphyric rocks near and especially above treeline, starting the life-cycle on yellow *Rhizocarpon*-species, later becoming autonomous; probably more widespread in the Alps. This species does not belong to *Protoparmelia s.str.*

Protoparmelia leproloma (R. Sant.) Rambold & Poelt

in Poelt & Leuckert, Nova Hedwigia, 52: 54, 1991 *comb. inval.* - *Lecidea leproloma* R. Sant., Sched. ad Lich. Sel. Upsal.: 14, 1986.

N - **Piem** (TSB 34093).

Cr/ Ch/ A.f/ Sax/ pH: 1-2, L: 4, X: 3-4, E: 1-2/ Alt: 5/ Alp: vr/ PT: 1/ paras/ Note: an arctic-alpine silicicolous species which starts the life-cycle on other lichens (*Lecidea praenubila*, *Sporastatia*, and other crustose lichens), more widespread in Scandinavia than in the Alps, where it occurs above treeline. The species does not belong to *Protoparmelia s.str.*

Protoparmelia memnonia Hafellner & Türk

Stapfia, 76: 157, 2001.

Syn.: *Lecanora picea* auct. non (Dicks.) Nyl., *Protoparmelia picea* auct. non (Dicks.) Hafellner

N - **Piem** (Isocrono & al. 2004, Isocrono & Piervittori 2008), **VA** (Piervittori & Isocrono 1997, 1999, Piervittori & al. 2004).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 4, X: 2-3, E: 1/ Alt: 4-5/ Alp: r, Salp: vr/ PT: 1/ suboc/ Note: on hard siliceous rocks in exposed situations, with optimum above treeline in rainy-humid areas; probably ranging throughout the siliceous Alps.

Protoparmelia montagnei (Fr.) Poelt & Nimis

in Nimis & Poelt, Studia Geobot., 7, suppl. 1: 188, 1987 - *Parmelia montagnei* Fr., Lichenogr. Eur. Ref.: 107, 1831.

Syn.: *Lecanora badia* var. *microcarpa* Anzi?, *Lecanora bagliettoana* Jatta?, *Lecanora fuscopallens* (Kremp.) Zahlbr., *Lecanora montagnei* (Fr.) Schaer., *Lecanora psarophana* Nyl., *Lecanora psarophana* var. *aquilina* Clauzade & Cl. Roux, *Lecanora psarophana* var. *pallida* (Wedd.) Harm., *Lecanora stenospora* Hue in Maheu & A. Gillet, *Lecanora verruculosa* Bagl.?, *Protoparmelia psarophana* (Nyl.) Sancho & A. Crespo, *Solenopsora montagnei* (Fr.) M. Choisy & Werner, *Solenopsora psarophana* (Nyl.) M. Choisy & Werner

C - Tosc, **Laz**, **Sar** (Monte 1993, Rizzi & al. 2011), **S - Camp** (Aprile & al. 2002), **Bas** (Puntillo & al. 2012), **Cal** (Puntillo 1996), **Si** (Ottonello & Puntillo 1995, Nimis & al. 1996b, Grillo 1998, Grillo & Caniglia 2004).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 3-5, X: 3, E: 1-2/ Alt: 1-2/ SmedH: rc, MedH: c, MedD: rc/ PT: 1/ coast/ Note: a Mediterranean-Macaronesian, chemically variable species found on siliceous rocks at relatively low altitudes. For further details see Barbero & al. (2006) and Singh & al. (2015).

Protoparmelia nitens (Pers.) Sancho & A. Crespo

Actas del VI Simp. Nac. Bot. Cript., Granada: 445, 1987 - *Patellaria nitens* Pers., Ann. Wetter. Gesellsch. Ges. Naturk., 2: 12, 1811 (1810).

Syn.: *Lecanora nitens* (Pers.) Ach.

N - **TAA**, **Piem**, **VA**, **Lig**.

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 3-5, X: 3, E: 1-2/ Alt: 1-3/ Mont: vr, SmedH: vr, MedH: vr/ PT: 1/ #/ Note: a poorly known and often misunderstood silicicolous species. The Italian records, especially those from upland areas, need re-confirmation.

Protoparmelia ochrococca (Nyl.) P.M. Jørg., Rambold & Hertel
in Hertel, Lecideaceae Exsiccatae, X, 7 (nr. 196), 1988 - *Lecidea ochrococca* Nyl., Öfvers. K. Svensk. Vetensk.-Akad. Förh., 17: 297, 1860.

N - TAA (Nimis & al. 2015). C - Sar (Zedda 2002).

Cr/ Ch/ S/ Epiph-Lign/ pH: 1-2, L: 3-4, X: 2-3, E: 1-2/ Alt: 2/ SmedD: er, SmedH: er/ PT: 1/ suboc/ Note: a mainly western epiphytic to lignicolous species with two known stations in Italy. It is included in the Italian red list of epiphytic lichens as "Endangered" (Nascimbene & al. 2013c).

Protoparmelia oleagina (Harm.) Coppins
in Coppins & al., Lichenologist, 24: 368, 1992 - *Lecanora oleagina* Harm., Lich. France: 1023, 1913.
Syn.: *Lecanora furva* H. Magn.?

N - TAA (Nascimbene & al. 2008c, Nimis & al. 2015), Lomb.

Cr/ Ch/ S/ Epiph-Lign/ pH: 1-2, L: 3, X: 2, E: 1/ Alt: 2-3/ Mont: er, SmedD: er/ PT: 1/ suboc/ Note: mostly on lignum, more rarely on acid bark in damp deciduous forests. This "western" species should be looked fore more intensively in Tyrrhenian Italy. The record from Lombardy is a "virtual" record. *Sphinctrina anglica*, an obligate parasite of this species, was reported from this region (see Nimis 1993: 659), based on Anzi, Lich. Lang. 212.

Protoparmelia phaeonesos Poelt
in Poelt & Leuckert, Nova Hedwigia, 52: 56, 1991.

N - Fri (Tretiac & Hafellner 2000), TAA.

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 4, X: 3, E: 1-2/ Alt: 4-5/ Alp: r, Salp: vr/ PT: 1/ paras *Aspilidea myrini*/ Note: on acid siliceous rocks near and especially above treeline; probably much more widespread in the Alps. The species does not belong to *Protoparmelia s.str.*

Protoparmelia placentiformis (J. Steiner) Poelt
in Poelt & Leuckert, Nova Hedwigia, 52: 59, 1991 - *Lecanora placentiformis* J. Steiner, Ann. Mycol., 8: 233, 1910.

N - Lig (TSB 33429).

Cr.pl/ Ch/ S/ Sax/ pH: 2-3, L: 4-5, X: 4-5, E: 1-3/ Alt: 3-4/ Salp: er, Mont: er/ PT: 1/ paras *Bellemerea cupreatra*/ Note: on sunny siliceous rock in dry upland areas. Described from arid parts of Asia, after the record in Macedonia, this is the second finding from Europe; the Italian specimens are much larger than the 1-2 cm diam. reported by Poelt, but for the rest, they fully comply with the description, This characteristic lichen most probably does not belong to *Protoparmelia s.str.*

Protoparmeliopsis M. Choisy

Bull. Soc. Bot. France, 76: 524, 1929.

This genus, which was resurrected to accommodate the *Lecanora-muralis*-group in the Lecanoraceae, was not accepted by all authors, mainly because of the lack of molecular data. Kondratyuk & al. (2014c) provided a first attempt to delimit the genus on the basis of molecular data, suggesting that the genus, although heterogeneous in the present circumscription, could be largely retained. I tentatively accept it here, although the taxonomy of *Lecanora s.lat.* is far from being satisfactorily settled (see Zhao & al. 2015). See also note on *Rhizoplaca*. Type: *P. muralis* (Schreb.) M. Choisy. The type is conserved.

Protoparmeliopsis achariana (A.L. Sm.) Moberg & R. Sant.
in Santesson & al., Lichen-forming and lichenicolous fungi of Fennoscandia: 268, 2004 - *Lecanora achariana* A.L. Sm., Monogr. Brit. Lich., 1: 261, 1918.

Syn.: *Lecanora cartilaginea* (Ach.) Ach.

C - Sar (Nöske 2000).

Cr.pl/ Ch/ S/ Sax/ pH: 1-2, L: 3-4, X: 2, E: 2-3/ Alt: 5/ Orom: er/ PT: 1/ suboc/ Note: on exposed siliceous rocks, usually on the top of large boulders, sometimes overgrowing bryophytes; the only Italian station is from the summit of the Gennargentu Massif, where the species is fairly abundant.

Protoparmeliopsis admontensis (Zahlbr.) Hafellner
in Hafellner & al., Mitt. naturwiss. Ver. Steiermark, 134: 95, 2005 - *Lecanora admontensis* Zahlbr., Ann. Mycol., 1: 357, 1903.

Syn.: *Lecanora luridescens* Zahlbr.

N - Ven (Nascimbene 2004), TAA (Nascimbene 2004, Nascimbene & al. 2004, 2004b), Lig (TSB 33615). C - Abr. S - Cal (Puntillo 1996, Hafellner & al. 2005), Si.

Cr/ Ch/ S/ Sax/ pH: 3-4, L: 4, X: 3-4, E: 1/ Alt: 3-5/ Alp: er, Orom: vr, Mont: vr/ PT: 1/ subc, u/ Note: on steeply inclined to underhanging surfaces of calciferous rocks in rather dry upland areas with a rather continental climate.

Protoparmeliopsis bolcana (Pollini) Lumbsch

in Gasparyan & al., *Herzogia*, 2016 (in press) - *Lecidea bolcana* Pollini, *Giorn. Fis. Chim. St. Nat. Pavia*, 9: 178, 1816.

Syn.: *Lecanora diffracta* auct. ital. p.p., *Lecanora muralis* subsp. *bolcana* (Pollini) Clauzade & Cl. Roux, *Lecanora bolcana* (Pollini) Poelt

N - Ven, Lomb (Valcuvia & Delucchi 2001, Valcuvia & al. 2003, De Vita & Valcuvia 2004, Delucchi & Valcuvia 2004), **Piem** (Morisi & Sereno 1995, Morisi 2005), **Emil** (Valcuvia & Delucchi 2001), **Lig. C - Tosc** (Pišút 1997, Tretiach & al. 2008, Brackel 2015), **Laz, Mol** (Garofalo & al. 1999, Caporale & al. 2008), **Sar** (Nöske 2000, Rizzi & al. 2011, Giordani & al. 2013, Cossu & al. 2015), **S - Camp** (Garofalo & al. 1999, Nimis & Tretiach 2004, Catalano & al. 2016), **Pugl** (Garofalo & al. 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996, Scarciglia & al. 2012, 2012b), **Si** (Poli & al. 1995, Nimis & al. 1996b, Grillo & al. 1996, Grillo 1998, Poli & Grillo 2000, Grillo & Caniglia 2004, Merlo 2004b, Brackel 2008b, 2008c).

Cr.pl/ Ch/ S/ Sax/ pH: 2-3, L: 4-5, X: 4, E: 3-4/ Alt: 1-3/ Orom: vr, SmedD: vr, SmedH: rc, MedH: c, MedD: rc/ PT: 1-2/ Note: ecologically similar to *L. muralis*, but more restricted to natural habitats, on less basic substrata, and with optimum in the Mediterranean belt.

Protoparmeliopsis garovaglii (Körb.) Arup, Zhao Xin & Lumbsch

in Zhao Xin & al., *Fungal Divers.*, 78: 301, 2016 - *Placodium garovaglii* Körb., *Parerga Lichenol.*: 54, 1865.

Syn.: *Lecanora cascadenis* H. Magn., *Lecanora garovaglii* (Körb.) Zahlbr., *Lecanora nevadensis* H. Magn., *Placodium peruvianum* Müll. Arg., *Squamaria garovaglii* (Körb.) Anzi

N - Ven, TAA (Calatayud & al. 2013), **Lomb, Piem** (Clerc & al. 1999, Isocrono & al. 2003), **VA** (Pierivittori & Isocrono 1999, Matteucci & al. 2015c).

Cr.pl/ Ch/ S/ Sax/ pH: 3, L: 4-5, X: 4, E: 3/ Alt: 2-3/ Mont: vr, SmedD: r/ PT: 1/ subc/ Note: a circumpolar, arctic-alpine to boreal-montane species found on basic siliceous rocks; apparently restricted to the Alps, especially at low altitudes in warm-dry valleys. The species name is often spelled *garovaglioi*, but the latinised name of Santo Garovaglio (who wrote most of his works in Latin) was *Garovaglius*, whose genitive is *garovaglii*.

Protoparmeliopsis graeca (J.Steiner) Sipman & Cl. Roux

in Nimis, *The Lichens of Italy. A Second Annotated Catalogue*: 20, 2016 - *Lecanora graeca* J. Steiner, *Verh. zool.-bot. Ges. Wien*, 69: 80, 1919.

C - Abr (Nimis & Tretiach 1999).

Cr.pl/ Ch/ S/ Sax/ pH: 3-4, L: 3-4, X: 3-4, E: 2-4/ Alt.: 5/ Alp: er/ PT: 1/ #/ Note: hitherto known only from the eastern Mediterranean, the Maritime Alps of France, and the central Apennines, this lichen occurring on base rich or slightly calciferous siliceous rocks is worthy of further study.

Protoparmeliopsis laatokkensis (Räsänen) Moberg & R. Sant.

in Santesson & al., *Lichen-forming and lichenicolous fungi of Fennoscandia*: 269, 2004 - *Parmularia laatokkensis* Räsänen, *Ann. Bot. Soc. Zool.-Bot. Fenn. Vanamo*, 12, 1: 63, 1939.

Syn.: *Lecanora laatokkensis* (Räsänen) Poelt

N - TAA (Ryan & Nash 1993), **Lig** (Ryan & Nash 1993). **C - Sar** (Rizzi & al. 2011, Giordani & al. 2013). **S - Cal** (Puntillo 1996), **Si**.

Cr/ Ch/ S/ Sax/ pH: 1-3, L: 4, X: 3, E: 2-3/ Alt: 2-5/ Alp: er, Salp: vr, Orom: r, Mont: r, SmedH: vr/ PT: 1/ Note: on schist, serpentine, amphibolite, mostly on horizontal faces near the ground, at least when young, parasitic on other crustose lichens. The record from Lombardy by Valcuvia & Delucchi (2001) is dubious.

Protoparmeliopsis macrocyclos (H. Magn.) Moberg & R. Sant.

in Santesson & al., *Lichen-forming and lichenicolous fungi of Fennoscandia*: 269, 2004 - *Lecanora muralis* var. *macrocyclos* H. Magn., *Bot. Not.*: 115, 1929.

Syn.: *Lecanora macrocyclos* (H. Magn.) Degel., *Lecanora muralis* subsp. *macrocyclos* (H. Magn.) Clauzade & Cl. Roux

N - Ven.

Cr.pl/ Ch/ S/ Sax/ pH: 2-3, L: 4-5, X: 3-4, E: 2-4/ Alt: 4-5/ Alp: er, Salp: er/ PT: 1/ #/ Note: an arctic-alpine, silicicolous member of the difficult *L. muralis*-complex, which needs further study. For further details see Timdal (1987).

Protoparmeliopsis muralis (Schreb.) M. Choisy *s.lat.*

Contrib. Lichénogr., dec. I, tab. 7, 1929 - *Lichen muralis* Schreb., *Spicil. Fl. Lips.*: 130, 1771.

Syn.: *Lecanora diffracta* (Ach.) Ach. *non auct. ital.*, *Lecanora muralis* (Schreb.) Rabenh., *Lecanora saxicola* (Pollich) Ach., *Patellaria muralis* (Schreb.) Trevis., *Placolecnora muralis* (Schreb.) Räsänen

N - VG (Crisafulli & al. 2004, Castello 2002, Martellos & Castello 2004, Tretiach & al. 2007b, 2012), **Frl** (Muggia & al. 2013), **Ven** (Caniglia & al. 1993, 1999, Nascimbene & Caniglia 1997, 2003c, Nascimbene 2005c, 2008, Nascimbene & Marini 2007, Brackel 2013), **TAA** (Caniglia & al. 2002, Nascimbene 2003, 2005b, 2006c, 2008b, Lang 2009), **Lomb**

(Realini & al. 1994, Roux & Triebel 1994, Brusa 1998, Valcuvia & al. 2003, De Vita & Valcuvia 2004, Gheza & al. 2015), **Piem** (Morisi & Sereno 1995, Clerc & al. 1999, Isocrono & Falletti 1999, Isocrono & al. 2004, 2006, Morisi 2005, Isocrono & Ferrarese 2008, Isocrono & Piervittori 2008, Gazzano & al. 2009b, Giordani & al. 2014, Favero-Longo & al. 2015), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Valcuvia 2000, Piervittori & al. 2001, Revel & al. 2001, Isocrono & al. 2008, Favero-Longo & Piervittori 2009, Matteucci & al. 2015c), **Emil** (Nimis & al. 1996, Valcuvia & Grieco 1995, Valcuvia & Savino 2000, Dalle Vedove & al. 2002, Benesperi 2009), **Lig** (Brunialti & al. 1999, Valcuvia & al. 2000, Roccardi 2006, Giordani & al. 2016), **C - Tosc** (Loppi & al. 1996b, Benesperi 2000a, 2006, Tretiach & al. 2008, Lastrucci & al. 2009, Pasquinelli & al. 2009, Pasquinelli & Puccini 2010, Brackel 2015), **Marc** (Nimis & Tretiach 1999), **Umb** (Nimis & Tretiach 1999, Panfili 2000b, 2007, Ravera & al. 2006, Genovesi 2011), **Laz** (Bartoli 1997b, Pietrini & al. 2008, Genovesi & al. 2011, Roccardi 2011, Zucconi & al. 2013, Brackel 2015), **Abr** (Nimis & Tretiach 1999, Brackel 2015, Caporale & al. 2016), **Mol** (Nimis & Tretiach 1999, 2004, Caporale & al. 2008, Ravera & al. 2009, Ravera & Genovesi 2010, Genovesi & Ravera 2014), **Sar** (Monte 1993, Zedda 1995, 2002, 2002b, Rizzi & al. 2011, Giordani & al. 2013, Cossu & al. 2015), **S - Camp** (Garofalo & al. 1999, 2010, Ricciardi & al. 2000, Altieri & al. 2000, Aprile & al. 2002, 2003, 2003b, Nimis & Tretiach 2004, Catalano & Aprile 2008, Catalano & al. 2016), **Pugl** (Nimis & Tretiach 1999, Durini & Medagli 2002), **Bas** (Nimis & Tretiach 1999, Potenza 2006), **Cal** (Puntillo 1996, Puntillo & Puntillo 2004, Scarciglia & al. 2007, Muggia & al. 2013, Brackel & Puntillo 2016), **Si** (Nimis & al. 1994, 1995, Ottonello & Salone 1994, Ottonello & al. 1994, 2011, Poli & al. 1995, 1996, 1997, Monte & Ferrari 1996, Ottonello & Romano 1997, Grillo 1998, Grasso & al. 1999, Di Benedetto & al. 2002, Grillo & al. 2001, 2002, 2009, Grillo & Caniglia 2004, Merlo 2004b, Caniglia & Grillo 2005, 2006, Brackel 2008b, Gianguzzi & al. 2009, Cataldo & Cannavò 2014, Di Martino & Stancanelli 2015).

Cr.pl/ Ch/ S/ Sax/ pH: 2-4, L: 3-5, X: 3-4, E: 3-5/ Alt: 1-5/ Alp: r, Salp: rr, Orom: r, Mont: rc, SmedD: ec, Pad: c, SmedH: ec, MedH: vc, MedD: rc/ PT: 1-3/ Note: a widespread, polymorphic, holarctic lichen found on siliceous rocks, roofing tiles, brick, also occurring in urban areas (*e.g.* in the centre of Rome). Several records could refer to *P. versicolor* (see note on that species), but *P. muralis s.str.* is certainly widespread and common in all regions of Italy.

Protoparmeliopsis muralis* var. *dubyi (Müll. Arg.) Hafellner & Türk

Stapfia, 76: 157, 2001 - *Lecanora dubyi* Müll. Arg., Bull. Soc. Hallerienne: 36, 1853.

Syn.: *Lecanora muralis* subsp. *dubyi* (Müll. Arg.) Poelt

N - Frl, TAA (Calatayud & al. 2013), **Lomb** (Valcuvia & Delucchi 2001, Valcuvia & al. 2003, Delucchi & Valcuvia 2004), **Piem** (Isocrono & al. 2004, Isocrono & Piervittori 2008), **VA** (Matteucci & al. 2008c), **Emil** (Valcuvia & Delucchi 2001, Calatayud & al. 2013), **C - Laz** (TSB 8049), **Sar** (Rizzi & al. 2011, Giordani & al. 2013), **S - Camp, Si** (Ottonello & al. 1994, 2011, Ottonello & Romano 1997).

Cr.pl/ Ch/ S/ Sax/ pH: 2-3, L: 4, X: 3-4, E: 3-4/ Alt: 3-5/ Alp: rc, Salp: c, Orom: r, Mont: vr/ PT: 1/ Note: on weakly calciferous or basic siliceous rocks in upland areas, with optimum near and above treeline. The var. *schneebergensis* (Zahlbr.) Hafellner & Türk is known from the Austrian Alps.

Protoparmeliopsis muralis* var. *subcartilaginea (Poelt)

Provisionally placed here, ICN Art. 36.1b. - *Lecanora muralis* var. *subcartilaginea* A. Massal. ex Poelt, Mitt. bot. Staats. München, 19-20: 500, 1958.

N - Frl (Tretiach & Hafellner 2000), **Ven, Piem** (TSB 34019), **S - Si** (Nimis & al. 1996b, Ottonello 1996), **S - Camp** (Ricciardi & al. 2000)

Cr.pl/ Ch/ S/ Sax/ pH: 2-3, L: 4, X: 3-4, E: 2-4/ Alt: 4-5/ Alp: r, Salp: er, Orom: er/ PT: 1/ #/ Note: on horizontal to weakly inclined surfaces of siliceous rocks in upland areas. A poorly known taxon, well worthy of further study.

Protoparmeliopsis peltata (Ramond) Arup, Zhao Xin & Lumbsch

in Zhao Xin & al., Fungal Divers., 78: 301, 2016 - *Lichen peltatus* Ramond in Lamarck & de Candolle, Fl. Franç., éd. 3, 2: 377, 1805.

Syn.: *Lecanora peltata* (Ramond) Steud., *Lecanora rubina* var. *heteromorpha* Ach., *Psoroma concinnum* Bagl. & Carestia, *Rhizoplaca peltata* (Ramond) Leuckert & Poelt

N - Piem (Isocrono & al. 2004), **VA** (Valcuvia 2000).

Fol.u/ Ch/ S/ Sax/ pH: 3, L: 4, X: 4, E: 3-5/ Alt: 5/ Alp: vr/ PT: 1/ subc/ Note: a chemically variable species also known from Africa, Asia, and North America, found on exposed siliceous rocks above treeline.

Protoparmeliopsis versicolor (Pers.) M. Choisy

Contr. Lichénogr., 2: no. 13, 1931 - *Lichen versicolor* Pers., Ann. Bot. (Usteri), 1: 24, 1794.

Syn.: *Lecanora alboeffigurata* (Anzi) Jatta, *Lecanora albomarginata* (Nyl. ex Th. Fr.) Cromb., *Lecanora muralis* var. *albopulverulenta* (Schaer.) Rabenh., *Lecanora muralis* var. *versicolor* (Pers.) Tuck., *Placodium albopulverulentum* (Schaer.) A. Massal., *Placodium versicolor* (Pers.) Frege, *Squamaria saxicola* var. *diffRACTA* f. *dealbata* Anzi, *Squamaria alboeffigurata* Anzi

N - VG, Frl, Ven, TAA, Lomb, Piem, VA (Piervittori & isocrono 1999), **Emil, Lig, C - Tosc, Marc** (Nimis & Tretiach 1999), **Umb** (Nimis & Tretiach 1999), **Laz, Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 1999), **Sar, S - Camp** (Garofalo & al. 1999), **Pugl** (Nimis & Tretiach 1999), **Cal, Si**.

Cr.pl/ Ch/ S/ Sax/ pH: 5, L: 3-5, X: 3-4, E: 3-5/ Alt: 1-4/ Salp: vr, Orom: vr, Mont: rr, SmedD: vc, Pad: vr, SmedH: vc, MedH: c, MedD: c/ PT: 1-2/ Note: this lichen has been often treated (*e.g.* by Nimis 1993: 358) just as a calcicolous morph of *P. muralis*, and hence it has not been always distinguished in the recent lichenological literature. However, since it is easily recognisable, and above all because, contrary to *P. muralis*, it is parasitised by *Placocarpus schaeereri*, I have decided to treat it separately, using the rank of

species only because a combination into *Protoparmeliopsis* was already available. Its status could be solved only by a thorough molecular analysis of the whole complex in Europe. The records are mainly based on herbarium samples in TSB, and on the Italian distribution of the synonyms; several records of *P. muralis* s.lat. could refer to this lichen, which is certainly widespread throughout Italy, with optimum below the montane belt.

Prothelenella Räsänen

Ann. bot. Soc. Zool.-Bot. fenn. Vanamo 18, 1: 102, 1943.

This genus, which was segregated from *Microglæna* because of deviating ascus structures, is characterised by a crustose, sometimes non-lichenised thallus with globose to pear-shaped, dark perithecia, bitunicate asci with an amyloid tholus, and colourless, multiseptate or muriform ascospores. The genus is now included in the Prothelenellaceae within the Ostropales (see e.g. Schmitt & al. 2005) and includes c. 12 species worldwide. Type: *P. reducta* (Th. Fr.) Räsänen (= *P. sphinctrinoidella*).

Prothelenella corrosa (Körb.) H. Mayrhofer & Poelt

Herzogia, 7: 42, 1985 - *Limboria corrosa* Körb., Syst. Lich. Germ.: 376, 1855.

Syn.: *Acrorixis corrosa* (Körb.) Trevis., *Microglæna corrosa* (Körb.) Arnold, *Microglæna gibbosula* (Nyl.) Blomb. & Forssell, *Microglæna nericiensis* Hellb., *Polyblastia arenaria* (Hampe) Jatta, *Thelenella corrosa* (Körb.) Vain.

N - TAA (Ohmura & Mayrhofer 2016), **Piem** (Isocrono & al. 2004).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 3, X: 2, E: 1/ Alt: 3-5/ Alp: r, Salp: vr, Mont: er/ PT: 1/ suboc/ Note: an arctic-alpine to boreal-montane, probably circumpolar lichen found on slightly calciferous rocks, especially by creeks and lakes, on boulders and pebbles near the ground; much overlooked and certainly more widespread in the Alps, with optimum above treeline.

Prothelenella croceae (Bagl. & Carestia) Hafellner & H. Mayrhofer

in Mayrhofer, Herzogia, 7: 320, 1987 - *Xenosphaeria croceae* Bagl. & Carestia, Atti Soc. Critt. Ital., 2, 3: 352, 1880.

Syn.: *Pleospora croceae* (Bagl. & Carestia) Vouaux

N - FrI (Tretiach & Hafellner 2000, Brackel 2016), **Piem** (Isocrono & al. 2004, Brackel 2016).

LF/ / S/ Terr/ pH: 1-2, L: 3-4, X: 2, E: 1/ Alt: 4-5/ Alp: rr, Salp: er/ PT: 1/ paras *Peltigera* spp. and *Solorina croceae*/ Note: an arctic-alpine lichenicolous fungus found growing on old, dying thalli of *Solorina croceae* and *Peltigera*-species, with optimum above treeline; certainly more widespread in the Alps, but probably overlooked.

Prothelenella leucothelia (Nyl.) H. Mayrhofer & Poelt

Herzogia, 7: 45, 1985 - *Verrucaria leucothelia* Nyl., Flora, 47: 356, 1864.

Syn.: *Dactyloblastus leucothelii* (Nyl.) Anzi, *Microglæna leucothelia* (Nyl.) Arnold

N - Ven, TAA (Nascimbene & al. 2007b), **Lomb**.

Cr/ Ch/ S/ Terr-Lign/ pH: 1-2, L: 3-4, X: 2-3, E: 1/ Alt: 4-5/ Alp: vr, Salp: r/ PT: 1/ Note: on soil, muribund bryophytes, plant debris and lichens (*Cladonia*), sometimes on rotting wood, near and above treeline; probably ranging throughout the Alps, but overlooked.

Prothelenella sphinctrinoidella (Nyl.) H. Mayrhofer & Poelt

Herzogia, 7: 47, 1985 - *Verrucaria sphinctrinoidella* Nyl., Flora, 47: 355, 1864.

Syn.: *Microglæna coenosa* (Vain.) Zahlbr., *Microglæna geoctona* Hellb., *Microglæna sphinctrinoidella* (Nyl.) Arnold, *Microglæna sphinctrinoides* subsp. *reducta* Th. Fr., *Thelenella coenosa* Vain., *Thelenella reducta* Vain.

N - TAA (Bilovitz & al. 2014b, Ohmura & Mayrhofer 2016), **Piem** (TSB 34303).

Cr/ Ch/ S/ Terr/ pH: 2-3, L: 3-4, X: 2-3, E: 1/ Alt: 3-5/ Alp: r, Salp: vr, Mont: vr/ PT: 1/ p/ Note: on acid to subneutral soil, muribund bryophytes and lichens, more rarely on decaying plants in upland areas, often in rather disturbed habitats, e.g. along mountain track sides; certainly more widespread in the Alps, but probably overlooked.

Prothelenella sphinctrinoides (Nyl.) H. Mayrhofer & Poelt

Herzogia, 7: 53, 1985 - *Verrucaria sphinctrinoides* Nyl., Not. Sällsk. Fauna Fl. Fenn. Förh., 4: 6, 1858.

Syn.: *Chromatochlamys sphinctrinoides* (Nyl.) Trevis., *Gloeopyrenia gelatinosa* (Zahlbr.) Zschacke, *Microglæna gelatinosa* Zahlbr., *Microglæna sphinctrinoides* (Nyl.) Lönnr., *Polyblastia sphinctrinoides* (Nyl.) Jatta, *Thelenella sphinctrinoides* (Nyl.) Vain., *Verrucaria gelatinosa sensu* Sommerf. non Ach.

N - FrI (Tretiach & Hafellner 2000), TAA, **Piem** (Isocrono & al. 2004). C - Tosc (Benesperi & al. 2007).

Cr/ Ch/ S/ Terr/ pH: 1-2, L: 3, X: 2, E: 1/ Alt: 4-5/ Alp: rr, Salp: r/ PT: 1/ p/ Note: an arctic-alpine to boreal-montane, circumpolar lichen found on muribund bryophytes on soil and rock, more rarely directly on soil, in rather disturbed sites (e.g. on mountain track sides) with a long snow-lie, often in crevices or small depressions of the ground; much undercollected and probably ranging throughout the Alps, with optimum above treeline.

Pseudephebe M. Choisy
Icon. Lich. Univ., ser. 2, 1: *sine pag.*, 1930.

A small genus of the Parmeliaceae including 2 species with an arctic-alpine, bipolar distribution, distinguished from other alectorioid genera (see Myllys & al. 2014) by the absence of lichen products, the distinctive cortical structure and the lack of pseudocyphellae. Type: *P. pubescens* (L.) M. Choisy

Pseudephebe minuscula (Arnold) Brodo & D. Hawksw.

Opera Bot., 42: 140, 1977 - *Imbricaria lanata* var. *minuscula* Arnold, Verh. zool.-bot. Ges. Wien, 28: 293, 1878.

Syn.: *Alectoria minuscula* (Arnold) Degel., *Parmelia minuscula* (Arnold) Nyl.

N - TAA (Thell & al. 2004), **Lomb, Piem** (TSB 33153). **C** - **Sar, S** - **Cal** (Puntillo 1996).

Frut/ Ch/ A.f/ Sax/ pH: 1-2, L: 4-5, X: 3-4, E: 1-3/ Alt: 4-6/ Alp: c, Salp: vr, Orom: er/ PT: 1/ Note: an arctic-alpine, circumpolar species found on hard siliceous rocks (including pure quartz) in wind-exposed situations near and especially above treeline, up to the nival belt of the Alps; often confused with *P. pubescens* in the older literature; most common in the Alps, rarer in the high Mediterranean mountains, reaching south to the mountains of Calabria.

Pseudephebe pubescens (L.) M. Choisy

Icon. Lich. Univ., sér. 2, 1: *sine pag.*, 1930 - *Lichen pubescens* L., Sp. Pl., 2: 1155, 1753.

Syn.: *Alectoria lanata* (Neck.) Nyl., *Alectoria lanata* var. *alpicola* (Wahlenb.) Boistel, *Alectoria lanata* (Hoffm.) Vain., *Alectoria pubescens* (L.) R. Howe, *Alectoria pubescens* var. *reticulata* (Wulfen) A.E. Wade, *Bryopogon pubescens* (L.) M. Choisy, *Cornicularia pubescens* (L.) Ach., *Parmelia pubescens* (L.) Vain.

N - **Fri** (Tretiach & Hafellner 2000), **TAA** (Caniglia & al. 2002, Lang 2009), **Lomb** (Dalle Vedove & al. 2004), **Piem** (Morisi & Sereno 1995, Isocrono & al. 2004, Morisi 2005, Isocrono & Piervittori 2008), **VA** (Piervittori & Isocrono 1997, 1999, Matteucci & al. 2015c), **Lig** (TSB 34116b). **C** - **Tosc, Sar, S** - **Bas** (Potenza & al. 2014), **Cal** (Puntillo 1996, Potenza & al. 2011).

Frut/ Ch/ A.f/ Sax/ pH: 1-2, L: 4-5, X: 3-4, E: 1-3/ Alt: 4-6/ Alp: vc, Salp: c, Orom: vr/ PT: 1/ Note: an arctic-alpine to (more rarely) boreal-montane lichen which is ecologically similar to *P. minuscula*, but with a somehow broader altitudinal range; more frequent than *P. minuscula* in the mountains of southern Italy.

Pseudevernia Zopf
Beih. bot. Centralbl., 14: 124, 1903.

A small genus of the Parmeliaceae including c. 5 species with a mostly temperate to boreal distribution. For the Italian distribution of the two chemical varieties see Martellos (2003). Type: *P. furfuracea* (L.) Zopf

Pseudevernia furfuracea var. ***ceratea*** (Ach.) D. Hawksw.

Lichenologist, 4: 162, 1969 - *Parmelia furfuracea* var. *ceratea* Ach., Meth. Lich.: 255, 1803.

Syn.: *Evernia furfuracea* var. *ceratea* (Ach.) Opiz, *Evernia olivetorina* Zopf, *Parmelia ceratea* (Ach.) Sandst., *Parmelia furfuracea* var. *olivetorina* (Zopf) Zahlbr., *Parmelia olivetorina* (Zopf) Sandst., *Pseudevernia furfuracea* var. *olivetorina* (Zopf) Zopf, *Pseudevernia olivetorina* (Zopf) Zopf

N - **Fri** (Martellos 2003), **Ven** (Nascimbene & Caniglia 2000, 2002c, 2003c, Martellos 2003, Nascimbene & al. 2006e, Nascimbene & Marini 2007, Nascimbene 2008c), **TAA** (Nascimbene & Caniglia 2002c, Martellos 2003, Nascimbene 2005b, 2006c, 2008b, 2014, 2014c, Nascimbene & al. 2006e, 2007b, 2008c, 2014), **Lomb** (Alessio & al. 1995, Martellos 2003, Nascimbene & al. 2006e, Nascimbene & Marini 2015), **Piem** (Isocrono & Falletti 1999, Isocrono & al. 2004, 2006, Martellos 2003, Isocrono & Piervittori 2008, Isocrono & al. 2011), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Martellos 2003, Matteucci & al. 2008, Isocrono & al. 2008, Malaspina & al. 2014), **Lig** (Martellos 2003). **C** - **Tosc** (Martellos 2003), **Marc** (Martellos 2003), **Umb** (Ravera 1998, 1999, Ravera & al. 2006), **Abr, Sar** (Martellos 2003). **S** - **Bas** (Martellos 2003), **Cal** (Martellos 2003).

Fol.b/ Ch/ A.i/ Epiph-Lign-Sax/ pH: 1-2, L: 3-5, X: 4-5, E: 1-2/ Alt: 3-4/ Salp: rc, Orom: vr, Mont: er/ PT: 1-2/ Note: distinguished by the presence of olivetoric acid, this variety is more frequent than the typical one in dry-continental areas (see Martellos 2003).

Pseudevernia furfuracea (L.) Zopf var. ***furfuracea***

Beih. Bot. Centralbl., 14: 124, 1903 - *Lichen furfuraceus* L., Sp. Pl., 2: 1146, 1753.

Syn.: *Borreria furfuracea* (L.) Ach., *Evernia furfuracea* (L.) W. Mann, *Parmelia furfuracea* (L.) Ach., *Parmelia furfuracea* f. *elongata* (Sambo) Zahlbr., *Parmelia furfuracea* f. *laricicola* Gyeln., *Parmelia furfuracea* var. *cincinnata* (Sambo) Zahlbr., *Parmelia soralifera* (Bitter) Lynge, *Pseudevernia soralifera* (Bitter) Zopf

N - **VG** (Castello 1996, 2002, Martellos 2003, Agnorelli & al. 2004, Martellos & Castello 2004, Castello & Skert 2005), **Fri** (Badin & Nimis 1996, Tretiach & Hafellner 2000, Martellos 2003, Castello & Skert 2005, Crisafulli & al. 2005, Tretiach & al. 2005, 2007, 2011, Rinino & al. 2005, Rinino 2006, Tretiach & Molaro 2007, Adamo & al. 2008, Bertuzzi & Tretiach 2013, Giordano & al. 2013), **Ven** (Caniglia & al. 1993b, 1999, Nimis 1994, Calliari & al. 1995, Nascimbene & Caniglia 1997, 2000b, 2002c, 2003c, Lazzarin 1997, 2000, Adamo & al. 2003b, Martellos 2003, Nascimbene 2005c, 2008, 2008c, 2011, Nascimbene & al. 2006e, 2007, 2009c, 2010b, 2014b, Nascimbene & Marini 2007, 2010, Brackel 2013, Kodnik & al. 2015), **TAA** (Follmann & Schulz 1993, Nascimbene & Caniglia 2000b, 2002c, Caniglia & al. 2002, Martellos 2003, Nascimbene 2001b, 2003, 2005b, 2006b, 2006c, 2008b, 2014, Gottardini & al. 2004, Nascimbene & al. 2005, 2006, 2006e, 2007b, 2009, 2010, 2014, 2014b, Stofer 2006, Brackel 2013, Lang 2009, Nascimbene & Marini

2015, Nimis & al. 2015), **Lomb** (Rivellini 1994, Alessio & al. 1995, Arosio & Rinaldi 1995, Valcuvia & Gianatti 1995, Brusoni & al. 1997, Zocchi & al. 1997, Roella 1999, Brusoni & Valcuvia 2000, Casarini & al. 2000, Arosio & al. 2003, Martellos 2003, Valcuvia & al. 2003, Dalle Vedove & al. 2004, Nascimbene & al. 2006e, Bergamaschi & al. 2007, Furlanetto 2010, Brackel 2013, Gheza & al. 2015), **Piem** (Caniglia & al. 1992, Morisi & Sereno 1995, Piervittori & al. 1997, Arosio & al. 1998, Piervittori 1998, 2003, Isocrono & Falletti 1999, Rizzio & al. 2001, Castino 2004, Isocrono & al. 2004, 2006, 2007, Martellos 2003, Isocrono & Ferrarese 2008, Isocrono & Piervittori 2008, Furlanetto 2010, Isocrono & al. 2011, Motiejūnaitė & Grochowski 2014), **VA** (Borlandelli & al. 1996, Piervittori & Maffei 1996, 2001, Piervittori & Isocrono 1997, 1999, Bari & al. 2001, Piervittori & al. 2001, Revel & al. 2001, Ghiraldi 2003, Martellos 2003, Bergamaschi & al. 2004, Isocrono & al. 2005, Matteucci & al. 2008, 2008c, Isocrono & al. 2008, Loppi 2014, Malaspina & al. 2014, 2015, Casale & al. 2015), **Emil** (Dalle Vedove & al. 2002, Martellos 2003, Benesperi 2009, Barba & al. 2012, Brackel 2015), **Lig** (Brunialti & al. 1999, Giordani & al. 2001, 2002, Brunialti & Giordani 2003, Martellos 2003, Giordani & Incerti 2008, Malaspina & al. 2009, 2014c). **C - Tosc** (Tretiach & Nimis 1994, Loppi & al. 1997, 1998, Loppi & Nascimbene 1998, Putortì & al. 1998, Tretiach & Ganis 1999, Paoli & Loppi 2001, Laganà & al. 2002, Martellos 2003, Benesperi & al. 2007, Benesperi & Lastrucci 2007, Lastrucci & al. 2009, Benesperi 2011, Brackel 2015, Nascimbene & al. 2015), **Marc** (Nimis & Tretiach 1999, Martellos 2003), **Umb** (Ravera 1998, Martellos 2003, Ravera & al. 2006, Panfili 2007, Brackel 2015), **Laz** (Owczarek & al. 2001, Ravera 2002, Martellos 2003, Guidotti & al. 2003, 2005, 2009, Massari & Ravera 2002, Ruisi & al. 2005, Guidotti & Owczarek 2013, Protano & al. 2014, 2015, Brackel 2015), **Abr** (Nimis & Tretiach 1999, Martellos 2003, Brackel 2015, Caporale & al. 2016), **Mol** (Garofalo & al. 1999, Caporale & al. 2008), **Sar** (Zedda 1995, 2002, 2002b, Nöske 2000, Zedda & Sipman 2001, Martellos 2003, Cossu 2013). **S - Camp** (Garofalo & al. 1999, 2010, Aprile & al. 2002, 2003, 2003b, Martellos 2003, Basile & al. 2008, Nascimbene & al. 2010b, Brunialti & al. 2013, Ravera & Brunialti 2013, Catalano & al. 2016), **Pugl** (Thüs & Licht 2006), **Bas** (Nimis & Tretiach 1999, Martellos 2003, Potenza 2006, Brackel 2011, Caggiano & al. 2015), **Cal** (Puntillo 1995, 1996, van den Boom & Giralt 2002, Martellos 2003, Incerti & Nimis 2006, Corapi & al. 2014, Gallo & al. 2014, Lucadamo & al. 2015, Brackel & Puntillo 2016), **Si** (Ottonello 1996, Czczuga & al. 1999, Clocchiatti & al. 2000, 2002b, Martellos 2003, Merlo 2004, Grillo & Caniglia 2004, 2006, Ottonello 2005, Falco Scampatelli 2005, Iacolino & Ottonello 2006, Stofer 2006, Brackel 2008b, Carasci & Cataldo 2016).

Fol.b/ Ch/ A.i/ Epiph-Lign-Sax/ pH: 1-2, L: 3-5, X: 3-4, E: 1-2/ Alt: 2-4/ Salp: ec, Orom: er, Mont: ec, SmedD: vr, Pad: er, SmedH: er/ PT: 1-2/ Note: a cool-temperate to boreal-montane lichen found on acid bark and lignum, occasionally also on siliceous rocks, with optimum in the montane and subalpine belts; abundant only in the Alps, rarer in the Apennines, exceptionally reaching the plains of northern Italy on very acid substrata. References refer to the species in a broad sense; some records could refer to var. *ceratea*.

Pseudoleptogium Müll. Arg.

Flora, 68: 516, 1885.

The molecular study of the genera *Collema* and *Leptogium* by Otálora & al. (2014) has led to their re-circumscription, with six old generic names resurrected, among which *Pseudoleptogium*, a monospecific genus that may resemble some squamulose species of *Scytinium*, from which it differs in the presence of two well differentiated squamule types. Type: *P. diffractum* (Körb.) Müll. Arg.

Pseudoleptogium diffractum (Körb.) Müll. Arg.

Flora, 68: 516, 1885 - *Leptogium diffractum* Kremp. ex Körb., Parerga Lichenol.: 424, 1865.

Syn.: *Leptogium placodiellum* Nyl.

N - VG, Frl, Ven (Jatta 1909-1911), **TAA, Piem** (Isocrono & al. 2004), **Lig. C - Tosc, Laz, Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **Sar. S - Camp** (Aprile & al. 2003b, Nimis & Tretiach 2004), **Bas** (Bartoli & Puntillo 1998).

Cr.pl/ Cy.h/ S/ Sax/ pH: 5, L: 3-5, X: 4, E: 1-2/ Alt: 1-3/ Mont: vr, SmedD: r, SmedH: rr, MedH: rr, MedD: r/ PT: 1/ w/ Note: a mainly temperate to Mediterranean species found on steeply inclined seepage tracks of hard calcareous rocks.

Pseudopannaria (B. de Lesd.) Zahlbr.

Cat. Lich. Univ., 2: 686, 1924 - *Bacidia* subgen. *Pseudopannaria* B. de Lesd., Bull. Soc. Bot. Fr., 53: 583, 1906.

This monotypic genus currently included in the Lecideaceae badly needs further study. Type: *P. marcii* (B. de Lesd.) Zahlbr.

Pseudopannaria marcii (B. de Lesd.) Zahlbr.

Cat. Lich. Univ., 2: 686, 1924 - *Bacidia marcii* B. de Lesd., Bull. Soc. Bot. France, 53: 583, 1906.

S - Si (Nimis & al. 1994).

Cr/ Cy.h/ S/ Sax-Terr/ pH: 1-2, L: 2-3, X: 1-2, E: 1/ Alt: 1-2/ SmedH: vr, MedH: vr/ PT: 1/ #/ Note: on mosses overgrowing siliceous rocks in shaded-humid sites at relatively low elevations. A very poorly known taxon, which well deserves further study.

Pseudoschismatoma Ertz & Tehler

in Ertz & al., Fungal Divers., 70: 15, 2014.

The phylogenetic analysis of the family Roccellaceae by Ertz & al. (2014) has shown that several traditionally accepted genera, among which *Opegrapha*, are para- or polyphyletic. In order to make these groups

monophyletic, eight new genera were proposed, among which *Pseudoschismatomma*, which includes the former *Opegrapha rufescens*-group. Type: *P. rufescens* (Pers.) Ertz & Tehler

Pseudoschismatomma rufescens (Pers.) Ertz & Tehler

in Ertz & al., Fungal Divers., 70: 15, 2014 - *Opegrapha rufescens* Pers., Ann. Bot. (Usteri), 11: 29, 1794.

Syn.: *Opegrapha contexta* Stirt., *Opegrapha herpetica* (Ach.) Ach., *Opegrapha herpetica* f. *arthonioidea* Schaer., *Opegrapha herpetica* f. *subocellata* Ach., *Opegrapha lilacina* A. Massal., *Opegrapha rubecula* A. Massal., *Opegrapha rubella* Pers., *Opegrapha siderella* Ach., *Opegrapha subocellata* var. *fraxinea* W. Mann

N - **VG** (Carvalho 1997), **Frl**, **Ven** (Lazzarin 2000b, Nascimbene 2008, Nascimbene & al. 2008e), **TAA** (Hinteregger 1994, Nascimbene & al. 2007b), **Lomb**, **Piem** (Isocrono & al. 2004), **Emil**, **Lig** (Brunialti & al. 1999). **C** - **Tosc** (Tretiach & Nimis 1994, Putorti & al. 1998, Benesperi 2011), **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera 1998, Ravera & al. 2006, Panfili 2007), **Laz** (Ruisi & al. 2005), **Abr** (Nimis & Tretiach 1999, Catalano & al. 2016, Corona & al. 2016), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008, Paoli & al. 2015), **Sar** (Zedda 2002). **S** - **Camp** (Puntillo & al. 2000, Ricciardi & al. 2000, Aprile & al. 2003b, Nimis & Tretiach 2004), **Pugl**, **Bas** (Bartoli & Puntillo 1998, Nimis & Tretiach 1999, Potenza 2006, Potenza & al. 2010), **Cal** (Puntillo 1995, 1996, Incerti & Nimis 2006), **Si** (Grillo & Cristaudo 1995, Grillo 1998, Grillo & Caniglia 2004).

Cr/ Tr/ S/ Epiph/ pH: 2-3, L: 2-3, X: 1-2, E: 1/ Alt: 1-3/ Mont: rr, SmedD: r, Pad: er, SmedH: rc, MedH: rr/ PT: 1/ Note: a mainly temperate, widespread lichen found on the smooth bark of deciduous trees, especially in woodlands near creeks and rivers in humid valleys, below the subalpine belt.

Pseudothelomma M. Prieto & Wedin

Fungal Divers., 2016 (MB 817542).

This is a small, distinct group of species with immersed ascomata, growing on dry and exposed lignum, which was segregated from *Thelomma* by Prieto & Wedin (2016). It differs from the similar *Acolium* in the thin and non-sclerotised excipulum, and from the likewise similar *Thelomma* in the ecology, and in the thin, crystal-free cortex.

Pseudothelomma ocellatum (Körb.) M. Prieto & Wedin

Fungal Divers., 2016 (MB 817543) - *Acolium ocellatum* Körb., Parerga Lichenol.: 285, 1861.

Syn.: *Cyphelium caliciforme* (Flot.) Zahlbr., *Cyphelium ocellatum* (Körb.) Trevis., *Thelomma ocellatum* (Körb.) Tibell

N - **TAA** (Thor & Nascimbene 2007, Nascimbene & al. 2007b, 2008c, 2014, Nascimbene 2008b, 2014, Puntillo & Puntillo 2009, Nimis & al. 2015), **Lomb** (Puntillo & Puntillo 2009), **VA** (Piervittori & Isocrono 1999, Puntillo & Puntillo 2009). **S** - **Cal** (Puntillo & Puntillo 2015c).

Cr/ Ch/ A.s/ Lign-Epiph/ pH: 1-2, L: 4-5, X: 4, E: 2-3/ Alt: 3-5/ Alp: er, Salp: rr, Orom: er, Mont: er/ PT: 1-2/ Note: a circumboreal-montane species found on hard rotting wood, e.g. on poles and fences, more rarely on *Larix* and *Pinus cembra* in the subalpine belt; certainly more widespread in the Alps, especially in subcontinental areas, but overlooked, being mostly sterile, this species is also known from the mountains of Calabria. This is one of the few calicioid fungi that reproduce via lichenised diaspores.

Psilolechia A. Massal.

Atti Ist. Ven. Sci. Lett. Art., ser. 3 5: 264, 1860.

This subcosmopolitan genus with 6 species was thought to be closely related to *Micarea*, but Andersen & Ekman (2005) demonstrated that the two genera are only distantly related, and presently the genus is placed into its own family, the Psilolechiaceae. Type: *P. lucida* (Ach.) M. Choisy

Psilolechia clavulifera (Nyl.) Coppins

Bull. Brit. Mus. Nat. Hist., Bot. ser., 11: 201, 1983 - *Lecidea clavulifera* Nyl., 1869.

Syn.: *Micarea clavulifera* (Nyl.) Coppins & P. James

C - **Tosc** (Benesperi & al. 2006, 2007). **S** - **Cal** (Puntillo 2011).

Cr/ Ch/ S/ Sax-Terr-Epiph/ pH: 1-2, L: 1-2, X: 2, E: 1/ Alt: 2-3/ Mont: er, SmedH: er/ PT: 0/ u/ Note: on acid siliceous stones and consolidated soil of dry underhangs, on banks or on the roots of fallen trees, mostly in the deciduous forest belts; perhaps overlooked and more widespread, but certainly rare in Italy.

Psilolechia leprosa Coppins & Purvis

Lichenologist, 19: 35, 1987.

S - **Si**.

Lepr/ Ch/ A.s/ Sax/ pH: 1-2, L: 2-3, X: 2, E: 1/ Alt: 3/ Mont: vr/ PT: 1/ suboc, u, m/ Note: on shaded surfaces of mineral-rich siliceous rocks in underhangs, with optimum in the montane belt; probably overlooked and more widespread, but certainly not common in Italy.

Psilolechia lucida (Ach.) M. Choisy

Bull. Mens. Soc. Linn. Lyon, 18: 142, 1949 - *Lichen lucidus* Ach., Lichenogr. Suec. Prodr.: 39, 1799.

Syn.: *Biatora lucida* (Ach.) Fr., *Lecidea lucida* (Ach.) Ach., *Lepra chlorina sensu* A. Massal.

N - **Fri** (Tretiach 2004), **Ven**, **TAA** (Caniglia & al. 2002, Nascimbene 2006c), **Lomb**, **Piem** (Morisi & Sereno 1995, Piervittori & al. 1996b, Isocrono & Falletti 1999, Isocrono & al. 2003, Morisi 2005, Isocrono & Piervittori 2008), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999), **Emil** (Tretiach & al. 2008). **C** - **Tosc** (Benespero & al. 2007), **Sar**. **S** - **Cal** (Puntillo 2011, Brackel & Puntillo 2016).

Lepr/ Ch/ A.s/ Sax/ pH: 2-3, L: 2-3, X: 1-2, E: 1/ Alt: 1-5/ Alp: er, Salp: vr, Orom: er, Mont: r, SmedD: er, SmedH: vr, MedH: er/ PT: 1/ suboc, u/ Note: in underhangs of siliceous rocks protected from rain in humid areas, but also on a wide range of substrata (soil, exposed roots, bases of ancient trees), with a correspondingly wide altitudinal range; in Italy it is restricted to natural habitats and is most frequent in the Alps and the in the most humid parts of the Mediterranean belt.

Psora Hoffm.

Deutschl. Fl., 2: 161, 1796, *nom. cons.*

A subcosmopolitan genus of the Psoraceae with c. 40 species mostly occurring on more or less calcareous soil and rocks. The genus *Romjularia* has been recently created for *R. lurida*, which had been switched back and forward between several genera, among which *Lecidea*, *Mycobilimbia* and *Psora* (Timdal 2007). Type: *P. decipiens* (Hedw.) Hoffm. The name is conserved against *Psora* Hill (1762) and *Psora* Hoffm. (1789).

Psora decipiens (Hedw.) Hoffm.

Descr. Adumbr. Pl. Crypt. Lich., 2: 68, 1794 - *Lichen decipiens* Hedw., Descr. Adumbr. Musc. Frond., 2: 7, 1789.

Syn.: *Biatora decipiens* (Hedw.) Fr., *Lecanora decipiens* (Hedw.) Ach., *Lecidea decipiens* (Hedw.) Ach., *Lecidea flavorubens* Werner

N - **VG** (Tretiach 1996), **Fri**, **Ven** (Caniglia & al. 1999, Nascimbene 2002, 2008, Nascimbene & Caniglia 2003c, Nascimbene & Marini 2007), **TAA** (Nascimbene & al. 2006, Nascimbene 2008b), **Lomb** (Dalle Vedove & al. 2004), **Piem** (Isocrono & al. 2004, Hafellner & al. 2004), **VA** (Piervittori & Isocrono 1999, Piervittori & al. 2001, Isocrono & al. 2008), **Emil** (Scarpa 1993, Nimis & al. 1996), **Lig**. **C** - **Tosc** (Loppi & al. 2004b, Benespero 2006, Tretiach & al. 2008), **Marc** (Nimis & Tretiach 1999), **Umb** (Panfili 2000, 2007, Ravera & al. 2006), **Laz**, **Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **Sar**. **S** - **Camp** (Garofalo & al. 1999, 2010, Aprile & al. 2003b, Nimis & Tretiach 2004), **Pugl** (Nimis & Tretiach 1999, Durini & Medagli 2002, 2004), **Bas** (Nimis & Tretiach 1999, Potenza 2006, Potenza & al. 2010, Brackel 2011), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994, 1995, Ottonello & Salone 1994, Ottonello & al. 1994, 2011, Ottonello 1996, Ottonello & Romano 1997, Grillo 1998, Caniglia & Grillo 2001, 2005, 2006, Grillo & al. 2002, Merlo 2004, 2004b, Grillo & Caniglia 2004, 2005, Gianguzzi & al. 2009, Cataldo & Minissale 2013, 2015, Di Martino & Stancanelli 2015).

Sq/ Ch/ S/ Terr/ pH: 3-5, L: 4-5, X: 4-5, E: 1-3/ Alt: 1-5/ Alp: rc, Salp: vc, Orom: rc, Mont: rc, SmedD: rr, SmedH: rr, MedH: rc, MedD: rc/ PT: 1-2/ Note: a widespread holarctic species with a broad altitudinal and latitudinal range, found on bare calciferous soil, especially in dry grasslands; rare only in areas with intensive grazing, high trampling, and intense disturbance. The wide ecological amplitude could be due to the capacity of this species to associate with several different species of *Trebouxia* and *Asterochloris* (Ruprecht & al. 2016). The records of *Psora crenata* from Sardegna and Sicilia by Jatta (1909-1911) most probably refer to this species.

Psora globifera (Ach.) A. Massal.

Ric. Auton. Lich. Crost.: 91, 1852 - *Lecidea globifera* Ach., Meth. Lich.: 213, 1803.

N - **Ven**, **TAA** (Watson 2014), **Lomb**, **Piem** (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999), **Emil**, **Lig**.

Sq/ Ch/ S/ Terr/ pH: 3-4, L: 4, X: 4, E: 1-2/ Alt: 3-5/ Alp: vr, Salp: rr, Mont: er/ PT: 1/ Note: on slightly calciferous or base-rich soil and weathered siliceous rocks in upland areas. Earlier records from central Italy (see Nimis 1993: 581), being dubious, are not accepted here.

Psora gresinonis B. de Lesd.

Bull. Soc. Bot. France, 77: 614, 1930.

Syn.: *Lecidea gresinonis* (B. de Lesd.) Zahlbr.

N - **Emil** (S- F174410), **Lig**. **C** - **Sar**. **S** - **Cal** (Puntillo 1996).

Sq/ Ch/ S/ Terr/ pH: 3, L: 4, X: 3-4, E: 1-2/ Alt: 1-2/ SmedD: er, SmedH: vr, MedH: vr/ PT: 1/ Note: on soil, in fissures of base-rich or slightly calciferous siliceous rocks, with optimum in dry grasslands at relatively low elevations; chemically heterogeneous (with and without norstictic acid), with a mainly Tyrrhenian range in Italy.

Psora rubiformis (Ach.) Hook.

Engl. Fl., 5: 197, 1844 - *Baeomyces rubiformis* Ach., Meth. Lich.: 324, tab. 7 fig. 5, 1814.

Syn.: *Lecidea rubiformis* (Ach.) Wahlenb.

N - **Lomb**, **Piem**, **VA** (HAL-3325).

Sq/ Ch/ S/ Terr/ pH: 4-5, L: 4-5, X: 4-5, E: 1-2/ Alt: 4-5/ Alp: vr, Salp: er/ PT: 1/ subc/ Note: an arctic-alpine species found on loess and calciferous soil, in fissures of calciferous siliceous rocks (e.g. calciferous schists) near and above treeline; chemically heterogeneous (with and without gyrophoric acid). An earlier record from Campania (see Nimis 1993: 582), being dubious, is not accepted here.

Psora saviczii (Tomin) Follmann & A. Crespo

Philippia, 2: 283, 1975 - *Lecidea saviczii* Tomin, Nat. Agric. arid Reg. USSR: 47, 1927.

N - **Emil** (Nimis & al. 1996, Vězda Lich.Rar.Exs. 259).

Sq/ Ch/ S/ Terr/ pH: 4-5, L: 4-5, X: 4-5, E: 1-2/ Alt: 1-2/ SmedD: er/ PT: 1/ subc/ Note: a mainly gypsicolous, southern species in Europe, to be looked for in other areas with gypsum outcrops (e.g. in Sicilia).

Psora testacea Hoffm.

Descr. Adumbr. Pl. Crypt. Lich., 1: 99, 1794.

Syn.: *Biatora testacea* (Hoffm.) W. Mann, *Chrysopsora testacea* (Hoffm.) M. Choisy, *Lecanora testacea* (Hoffm.) Ach., *Lecidea testacea* (Hoffm.) Ach., *Protoblastenia testacea* (Hoffm.) Clauzade & Rondon, *Psora testacea* var. *argillicola* B. de Lesd.

N - **Ven** (Nascimbene & Caniglia 1997, Caniglia & al. 1999), **TAA, Lomb, Piem, VA** (Piervittori & Isocrono 1999), **Lig. C - Tosc, Laz** (Nimis & Tretiach 2004), **Abr** (Recchia & Villa 1996), **Sar. S - Camp** (Aprile & al. 2003b, Nimis & Tretiach 2004), **Bas** (Potenza & al. 2014), **Cal** (Puntillo 1996), **Si** (Brackel 2008b).

Sq/ Ch/ S/ Sax-Terr-Sax/ pH: 4-5, L: 4-5, X: 3-4, E: 1-3/ Alt: 2-4/ Salp: er, Orom: rr, Mont: r, SmedD: vr/ PT: 1/ subc/ Note: a species which is widespread in southern and eastern Europe, with optimum in fissures of base-rich or lime-containing metamorphic rocks, most frequent in dry alpine valleys and in upland areas along the eastern side of the Peninsula, but not reaching beyond treeline.

Psora vallesiaca (Schaer.) Timdal

Nord. J. Bot., 4: 538, 1984 - *Lecidea vallesiaca* Schaer., Lich. Helv. Spicil., 12: 631, 1842.

Syn.: *Lecidea albilabra* auct., *Lecidea deceptor* Nyl., *Psora albilabra* auct. non (Dufour) Körb., *Psora albilabra* subsp. *deceptor* (Nyl.) Clauzade & Cl. Roux, *Psora deceptor* (Nyl.) Flagey, *Psora subdecepiens* (Nyl.) Flagey, *Squamaria deceptor* (Nyl.) M. Choisy & Werner

N - **Ven, Piem, VA** (Piervittori & Isocrono 1999), **Emil, Lig. C - Tosc, Marc** (Nimis & Tretiach 1999), **Umb** (Genovesi & al. 2002, Ravera & al. 2006), **Sar** (Alonso & Egea 1994), **S - Camp** (Aprile & al. 2003, 2003b, Garofalo & al. 2010), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Alonso & Egea 1994, Nimis & al. 1996b).

Sq/ Ch/ S/ Sax/ pH: 3-5, L: 4, X: 4, E: 2-3/ Alt: 1-3/ Mont: er, SmedD: r, SmedH: rr, MedH: vr, MedD: vr/ PT: 1/ subc/ Note: on bare soil and in fissures of rocks, not rare where suitable habitats are present (subcontinental conditions and base-rich, slightly calciferous siliceous substrata). The record from Venezia Giulia by Nimis (1993: 582) was due to a misidentification.

Psorinia Gotth. Schneid.

Bibl. Lichenol., 13: 128, 1980 (1979).

This genus of the Lecanoraceae, which includes 2 species only, was segregated from *Toninia* on the basis of anatomical characters of the upper cortex, and different paraphyses and asci. Type: *P. conglomerata* (Ach.) Gotth. Schneid.

Psorinia conglomerata (Ach.) Gotth. Schneid.

Bibl. Lichenol., 13: 130, 1980 (1979) - *Lecidea conglomerata* Ach., Lichenogr. Univ.: 201, 1810.

Syn.: *Lecidea arytta* Ach., *Lecidea conglomerascens* Nyl., *Lecidea glomerans* Nyl., *Lecidea rugifera* Vain., *Lecidea squalens* Nyl., *Thalloidima conglomeratum* (Ach.) A. Massal., *Toninia conglomerascens* (Nyl.) Zahlbr., *Toninia conglomerata* (Ach.) Boistel, *Toninia glomerans* (Nyl.) Boistel, *Toninia squalens* (Nyl.) H. Olivier

N - **FrI** (Tretiach & Hafellner 2000, Hertel & Schuhwerk 2010), **Ven** (Hertel & Schuhwerk 2010), **TAA** (Hertel & Schuhwerk 2010), **Lomb, Piem** (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999). **C - Abr**.

Sq/ Ch/ S/ Sax/ pH: 2-3, L: 4, X: 3-4, E: 1-2/ Alt: 3-6/ Alp: r, Salp: vr, Mont: er/ PT: 1/ u/ Note: a mainly arctic-alpine, circumpolar species found on steeply inclined to underhanging surfaces of subacid to slightly basic siliceous rocks, often in fissures and cracks; most frequent above treeline in the Alps, where it reaches the nival belt, but also occurring in the central Apennines.

Psoroglaena Müll. Arg.

Flora, 74, 3: 381, 1891.

This genus of the Verrucariaceae, in its current circumscription, includes c. 15 species of minute pyrenocarpous lichens, predominantly in the tropics. The genus has a complicated recent taxonomic history, with several species previously treated as members of *Macentina* or *Leucocarpia*. The delimitation against the tropical foliicolous genus *Phylloblastia* remains partly unclear (Lücking 2008). For further details see Harada (2003). Type: *P. cubensis* Müll. Arg.

Psoroglaena abscondita (Coppins & Vězda) Hafellner & Türk

Stapfia, 76: 157, 2001 - *Macentina abscondita* Coppins & Vězda, Lichenologist, 9: 47, 1977.

N - **Ven** (Nascimbene 2008, Nascimbene & al. 2008e, Muggia & al. 2010).

Cr/ Ch/ S/ Epiph/ pH: 3-4, L: 1-2, X: 1-2, E: 1/ Alt: 2-3/ Mont: er, SmedD: er/ PT: 1/ Note: optimum on the bark of *Sambucus* in shaded-humid situations. The species is included as “Critically Endangered” in the Italian red list of epiphytic lichens (Nascimbene & al. 2013c).

Psoroglaena biatorella (Arnold) Lücking & Sérus.

in Lücking, Fl. Neotrop., Monogr., 103: 193, 2008 - *Microglaena biatorella* Arnold, Verh. zool.-bot. Ges. Wien, 23: 501, 1873.

Syn.: *Leucocarpia biatorella* (Arnold) Vězda

N - Frl.

Cr/ Ch/ S/ Sax-Terr/ pH: 3-4, L: 3-4, X: 2, E: 1/ Alt: 3-4/ Salp: er, Mont: er/ PT: 1/ Note: an inconspicuous lichen found on thin layers of more or less calciferous, humus-rich ground, or over epilithic mosses, mostly in upland areas; probably overlooked and more widespread, but never common, in the Alps.

Psoroglaena stigonemoides (Orange) Henssen

Bibl. Lichenol., 57: 203, 1995 - *Macentina stigonemoides* Orange, Lichenologist, 21: 229, 1989.

Syn.: *Leucocarpia stigonemoides* (Orange) Hafellner & Kalb

N - Frl (Tretiach 1997). **S - Puagl** (Nimis & Tretiach 1999).

Cr/ Ch/ S/ Epiph-Follic/ pH: 2-3, L: 1-2, X: 1-2, E: 1/ Alt: 2-3/ Mont: er, SmedD: er, SmedH: er/ PT: 1/ suboc/ Note: a humid subtropical to Mediterranean-Atlantic lichen mainly found on *Sambucus nigra* in humid-shaded situations, and on the leaves of *Buxus* in the undergrowth of moist-warm forests; certainly not common, but probably also overlooked. It is included in the Italian red list of epiphytic lichens as “Endangered” (Nascimbene & al. 2013c).

Psoroma Michx.

Fl. Boreali-Americ., 2: 321, 1803.

In the traditional taxonomy of the Pannariaceae, all green algal species of the family were included in *Psoroma*, with the exception of two species assigned to *Psoromidium*. After the segregation of *Psorophorus*, *Xanthopsoroma* (Elvebakk & al. 2010), and *Gibbosporina* (Elvebakk & al. 2016), the current circumscription of *Psoroma s.str.* includes squamulose to small-squamulose lichens with green algae as the main photobiont, ascomata with a distinct thalline margin, tube-like apical amyloid ascus structures, and mostly no secondary medullary substances. The genus, which is still heterogeneous, includes c. 60 species, most of which have a circum-antarctic distribution. Type: *P. hypnorum* (Vahl) Gray

Psoroma hypnorum (Vahl) Gray

Nat. Arrang. Brit. Plants, 1: 445, 1821 - *Lichen hypnorum* Vahl, Fl. Dan., 6, 16: 8, 1787.

Syn.: *Lecanora hypnorum* (Vahl) Ach., *Pannaria femsjonensis* var. *microphylla* Anzi nom. nud., *Pannaria hypnorum* (Vahl) Körb., *Pannaria porriginosa* Vain., *Parmelia lepidora* Ach., *Psora deaurata* Hoffm., *Psoroma femsjonense* Fr.,

N - Frl (Tretiach & Hafellner 2000), **Ven** (Nascimbene & Caniglia 1997, Caniglia & al. 1999), **TAA** (Bilovitz & al. 2014), **Lomb, Piem** (Isocrono & al. 2003, 2004), **VA** (Piervittori & Isocrono 1999, Piervittori & al. 2004, Isocrono & al. 2008), **Emil. C - Tosc** (Benespero & al. 2007), **Marc, Umb** (Ravera & al. 2006), **Laz, Abr** (S-F156497), **Sar. S - Camp, Cal** (Puntillo 1996).

Cr/ Ch/ S/ Terr/ pH: 1-2, L: 3-4, X: 2, E: 1/ Alt: 4-6/ Alp: rc, Salp: rr, Orom: er/ PT: 1/ Note: an arctic-alpine to boreal-montane, circumpolar lichen found on soil, often in and amongst bryophytes over siliceous substrata, in moist habitats near or above treeline; most frequent in the Alps, where it can reach the nival belt, much rarer along the Apennines.

Psoroma tenue Henssen var. ***boreale*** Henssen

in Henssen & Renner, Mycotaxon, 13: 441, 1981.

N - TAA (Jørgensen 2004: Austria, near the border, Thor & Nascimbene 2007, Breuss 2012b, Bilovitz & al. 2014, 2014b), **Lomb** (Anzi Lich. Lang. Exs. 64: Jørgensen 2004).

Cr/ Ch/ S/ Terr/ pH: 1-2, L: 3-4, X: 2, E: 1/ Alt: 5-6/ Alp: rc, Salp: vr/ PT: 1/ Note: an arctic-alpine, circumpolar lichen weak in competition, found on wet, naked soil, near glaciers or late snow-beds over siliceous substrata; certainly more widespread in the nival belt of the Alps, but easily confused with *P. hypnorum* (see Jørgensen 2004 and Breuss 2012b).

Psoronactis Ertz & Tehler

in Ertz & al., Fungal Divers., 70: 15, 2014.

The phylogenetic analysis of the family Roccellaceae by Ertz & al. (2014) has shown that several traditionally accepted genera, among which *Lecanactis*, are para-/polyphyletic. In order to make these groups monophyletic, eight new genera were proposed, among which the monotypic genus *Psoronactis*, which includes a species formerly assigned to *Lecanactis*. Type: *P. dilleniana* (Ach.) Ertz & Tehler

Psoronactis dilleniana (Ach.) Ertz & Tehler

in Ertz & al., Fungal Divers., 70: 46, 2014 - *Lichen dillenianus* Ach., Lichenogr. Suec. Prodr.: 57, 1798.

Syn.: *Lecanactis dilleniana* (Ach.) Körb., *Schismatomma epipolium* A. Massal.

N - TAA (Lojka Lich. Univ. 86: Egea & Torrente 1994), Piem (TSB 32833), Lig. C - Tosc. S - Camp (Ricciardi & al. 2000).

Cr/ Tr/ S/ Sax/ pH: 2-3, L: 2-3, X: 2, E: 1/ Alt: 3-5/ Alp: vr, Salp: vr, Mont: er/ PT: 1/ u/ Note: on hard crystalline rocks, beneath underhangs and in crevices which are seldom wetted by rain, mostly in upland areas.

Psorotichia A. Massal.

Framm. Lichenogr.: 15, 1855.

This genus of the Lichinaceae, differing from *Lemmopsis* mainly in details of apothecial anatomy, is still very poorly known: it includes c. 50 species, many of which are poorly known as well, and often likely to belong to other genera. The species of the western Mediterranean Region were treated by Moreno & Egea (1994). Type: *P. murorum* A. Massal.

Psorotichia allobrogensis Hue

Journ. Botanique, 10: 8, 1896.

S - Camp (Nimis & Tretiach 2004, Garofalo & al. 2010), Si (Nimis & al. 1994).

Cr/ Cy.h/ S/ Sax/ pH: 4-5, L: 4-5, X: 4-5, E: 1-2/ Alt: 1-2/ SmedH: vr, MedH: vr, MedD: er/ PT: 1/ u, #/ Note: a poorly known species of steeply inclined surfaces of calcareous rocks with some water seepage after rain, mostly at relatively low elevations.

Psorotichia diffracta (Nyl.) Forssell

N. Acta Reg. Soc. Sci. Upsal., 3, 13: 76, 1885 - *Collema diffractum* Nyl., Mém. Soc. Imp. Sc. Nat. Cherbourg, 3: 198, 1855.

Syn.: *Collemopsis diffracta* (Nyl.) Nyl.

N - VG.

Cr/ Cy.h/ S/ Sax/ pH: 4-5, L: 4-5, X: 4-5, E: 1-2/ Alt: 1-3/ Mont: er, SmedD: r/ PT: 1/ w/ Note: on sun-exposed seepage tracks of calcareous rocks; overlooked, and perhaps more widespread.

Psorotichia frustulosa Anzi

Comm. Soc. Critt. Ital., 2: 4, 1864.

Syn.: *Collemopsis frustulosa* (Anzi) Nyl., *Pyrenopsis subolivacea* Werner

N - Lomb, Lig (S-F145650).

Cr/ Cy.c/ S/ Sax/ pH: 3-5, L: 4-5, X: 4, E: 1-2/ Alt: 3-5/ Alp: er, Salp: vr, Mont: er/ PT: 1/ w, #/ Note: on steeply inclined, sunny surfaces of calcareous or basic siliceous rocks in upland areas.

Psorotichia gelatinosa Anzi

Neosymb. Lich. Rar. Nov.: 2, 1866.

N - Lomb.

Cr/ Cy.c/ S/ Sax/ pH: 3-5, L: 4-5, X: 4, E: 1-2/ Alt: 4-5/ Alp: vr, Salp: vr/ PT: 1/ #/ Note: this could well be a good species, but it is known only from the type material, and needs further study.

Psorotichia murorum A. Massal.

Framm. Lichenogr.: 15, 1855.

Syn.: *Collemopsis murorum* (A. Massal.) Stizenb.

N - Ven (Lazzarin 2000b), TAA, Lomb, Piem, Emil, Lig. C - Tosc, Abr, Sar. S - Pugl, Si.

Cr/ Cy.h/ S/ Sax/ pH: 3-5, L: 4-5, X: 4, E: 1-2/ Alt: 1-3/ Mont: er, SmedD: r, SmedH: vr, MedH: vr/ PT: 1-2/ w, #/ Note: on sunny surfaces of calcareous rocks, mostly below the montane belt.

Psorotichia obtenebrans (Nyl.) Forssell

N. Acta Reg. Soc. Sci. Upsal., ser. 3, 13: 77, 1885 - *Collemopsis obtenebrans* Nyl., Flora, 68: 39, 1885.

C - Tosc (TSB 30615).

Cr/ Cy.h/ S/ Sax/ pH: 3-5, L: 4-5, X: 4, E: 1-2/ Alt: 1-2/ SmedD: r, SmedH: vr, MedH: vr/ PT: 1/ w, #/ Note: a southern species of sunny calcareous rocks at relatively low elevations; perhaps related to *Pterygiopsis affinis*.

Psorotichia pictava (Nyl.) Forssell

N. Acta Reg. Soc. Sci. Upsal., ser. 3, 13: 75, 1885 - *Pyrenopsis pictava* Nyl., Flora, 52: 82, 1869.

Syn.: *Collemopsis pictava* (Nyl.) Nyl.

N - Lig.

Cr/ Cy.h/ S/ Sax/ pH: 3-5, L: 4-5, X: 4, E: 1-2/ Alt: 1-2/ SmedH: er, MedH: vr/ PT: 1-2/ w, #/ Note: on sunny surfaces of calcareous rocks, mostly in the Mediterranean belt; a very poorly known taxon, which needs further study.

Psorotichia schaeereri (A. Massal.) Arnold

Flora, 52: 265, 1869 - *Pannaria schaeereri* A. Massal., Ric. Auton. Lich. Crost.: 114, 1852.

Syn.: *Collema subbadium* Nyl., *Collemopsis caesia* Nyl., *Collemopsis schaeereri* (A. Massal.) Cromb., *Psorotichia caesia* (Nyl.) Forssell, *Pyrenopsis schaeereri* (A. Massal.) Nyl., *Trachyderma schaeereri* (A. Massal.) Trevis.

N - **VG**, **Ven**, **TAA**, **Lomb**, **Piem** (Isocrono & al. 2004), **Lig** (Giordani & al. 2016). **C** - **Tosc** (Brackel 2015), **Abr** (Jatta 1909-1911). **S** - **Camp** (Nimis & Tretiach 2004, Garofalo & al. 2010), **Pugl** (Jatta 1909-1911), **Si** (Nimis & al. 1996b, Grillo 1998, Grillo & Caniglia 2004).

Cr/ Cy.h/ S/ Sax/ pH: 3-5, L: 3-4, X: 2-4, E: 1-2/ Alt: 1-4/ Salp: er, Orom: er, Mont: vr, SmedD: r, SmedH: rr, MedH: r, MedD: er/ PT: 1-2/ w/ Note: on more or less shaded seepage tracks of limestone, dolomite, calcareous sandstone and schists, rarely on walls, with a wide altitudinal range, but not reaching beyond treeline.

Psorotichia tirolensis Zahlbr.

Termeszetr. Füzetek, 22: 312, 1924.

Syn.: *Porocyphus arnoldii* (Heufl.) Arnold, *Psorotichia arnoldii* Heufl. non Körb.

N - **TAA** (Dalla Torre & Sarnthein 1902).

Cr/ Cy.h/ S/ Sax/ pH: 3-5, L: 4-5, X: 4, E: 1-3/ Alt: 3/ Mont: er/ PT: 1/ w, #/ Note: a very poorly known species; ecological indicator values are tentative.

Psorula Gotth. Schneid.

Bibl. Lichenol., 13: 135, 1980 ("1979").

This monotypic genus includes a lichenised fungus forming a unique lichenicolous association with filamentous cyanolichens of the genus *Spilonema*. According to Miadlikowska & al. (2014) it is separated from the remaining members of Psoraceae and may represent an undescribed family in the Lecanoromycetidae. Type: *P. rufonigra* (Tuck.) Gotth. Schneid.

Psorula rufonigra (Tuck.) Gotth. Schneid.

Bibl. Lichenol., 13: 136, 1980 ("1979") - *Biatora rufonigra* Tuck., Proc. Amer. Acad. Arts, 1: 250, 1848.

Syn.: *Lecidea rufonigra* (Tuck.) Nyl., *Psora rufonigra* (Tuck.) A. Schneid.

N - **TAA**. **C** - **Sar**.

Sq/ Ch/ S/ Sax/ pH: 2-3, L: 4-5, X: 4-5, E: 2-3/ Alt: 1-2/ SmedD: r, MedD: vr/ PT: 1/ subc, paras *Spilonema* spp./ Note: a widespread, mainly southern species of dry areas, found on sun-exposed, inclined to vertical seepage tracks of base-rich siliceous rocks, always associated with cyanolichens of the genus *Spilonema*; probably more widespread in the Alps, especially in dry-continental valleys.

Pterygiopsis Vain.

Acta Soc. Fauna Fl. Fenn., 7, 1: 238, 1890.

This genus of the Lichinaceae includes c. 17 species, mostly occurring in tropical areas: according to Jørgensen (2007) its delimitation is somewhat uncertain. A single species was hitherto reported from Italy, plus a second sorediate species from Puglia which is presently under study (Ongaro & al. 2016). Type: *P. atra* Vain.

Pterygiopsis affinis (A. Massal.) Henssen

Ber. dtsch. bot. Ges., 92: 486, 1979 - *Enchylium affine* A. Massal., Mem. Lichenogr.: 94, 1853.

Syn.: *Enchylium affine* var. *melanophaeum* A. Massal., *Enchylium affine* var. *pulvinatum* A. Massal., *Enchylium flageyi* Harm., *Enchylium rubbianum* A. Massal., *Forssellia affinis* (A. Massal.) Zahlbr., *Heppia purpurascens* (Nyl.) Nyl., *Lecanora purpurascens* Nyl.

N - **VG** (TSB 5759), **Frl** (TSB 16744), **Ven** (Lazzarin 2000b), **TAA**, **Piem** (Isocrono & al. 2004), **Lig**. **C** - **Laz** (TSB 17640), **Abr** (Nimis & Tretiach 1999), **Sar** (Vězda Lich. Rar. Exs. 355). **S** - **Camp** (Nimis & Tretiach 2004), **Pugl** (Nimis & Tretiach 1999).

Cr/ Cy.h/ S/ Sax/ pH: 2-5, L: 4-5, X: 4-5, E: 1-2/ Alt: 1-3/ Mont: vr, SmedD: r, SmedH: vr, MedH: r, MedD: rr/ PT: 1-2/ w/ Note: on periodically wetted surfaces of calcareous or siliceous rocks, especially along sun-exposed seepage tracks.

Punctelia Krog

Nord. J. Bot., 2: 290, 1982.

This genus of the Parmeliaceae with c. 45 species is subcosmopolitan, with the highest diversity in the Neotropics and in Africa (see e.g. Alors & al. 2016). The most similar genus is *Flavopunctelia*, which differs in conidial morphology and the presence of usnic acid (see Crespo & al. 2010). The Italian epiphytic species were treated by Leandrin (2004). Type: *P. borrieri* (Sm.) Krog

***Punctelia borrieri* (Sm.) Krog**

Nord. J. Bot., 2: 291, 1982 - *Lichen borrieri* Sm., Engl. Bot., 25: 1780.

Syn.: *Imbricaria borrieri* (Sm.) Körb., *Parmelia borrieri* (Sm.) Turner, *Parmelia borrieri* var. *pseudoborrieri* (Asahina) Targé & Lambinon, *Parmelia pseudoborrieri* Asahina

N - **VG** (Leandrin 2004, 2006), **Frl** (Tretiach & Baruffo 2001, 2001b, Giordani & al. 2003b, Leandrin 2004, Thell & al. 2005, Tretiach & Molaro 2007), **Ven** (Caniglia & al. 1999, Leandrin 2004, Nascimbene 2005c, 2008, Nascimbene & Marini 2010, Nascimbene & al. 2015), **TAA** (Thell & al. 1998, Tretiach & al. 2003, Gottardini & al. 2004, Leandrin 2004, Thell & al. 2005, Nascimbene & al. 2007b, Nimis & al. 2015), **Lomb** (Tretiach & al. 2003, Leandrin 2004, Furlanetto 2010), **Piem** (Valcuvia 2002, 2002b, Leandrin 2004, Furlanetto 2010, Matteucci & al. 2010), **Emil** (Tretiach & al. 2003, Leandrin 2004), **Lig** (Leandrin 2004, Giordani 2006, Giordani & Incerti 2008). **C** - **Tosc** (Loppi & Putorti 1995, 1995b, Loppi 1996, Loppi & De Dominicis 1996, Loppi & al. 1996, 1999a, 2004c, Putorti & al. 1998, Bacci & al. 2000, Senese & Critelli 2000, Leandrin 2004, Paoli & Loppi 2008, Brunialti & Frati 2010, Paoli & al. 2012, 2012b, 2013, 2015d, Benesperi & al. 2013, Winkler & al. 2013, Nascimbene & al. 2015), **Marc** (Tretiach & al. 2003, Frati & al. 2004, Leandrin 2004, Frati & Brunialti 2006), **Umb** (Ravera 1998, Panfili 2000b, Leandrin 2004, Ravera & al. 2006, Ciotti & al. 2009), **Laz** (Bartoli & al. 1997, Ravera & al. 2003, Massari & Ravera 2002, Leandrin 2004, Ruisi & al. 2005, Munzi & al. 2007, Ravera 2008b, Ravera & Genovesi 2008, Zucconi & al. 2013), **Abr** (Recchia & Villa 1996, Thell & al. 2002, 2004, 2005), **Mol** (Frati & al. 2004, Caporale & al. 2008, Paoli & al. 2015), **Sar** (Zedda 2002, 2002b, Leandrin 2004, Leandrin 2006). **S** - **Camp** (Ricciardi & al. 2000, Aprile & al. 2002, Nimis & Tretiach 2004, Leandrin 2004, Garofalo & al. 2010, Catalano & al. 2016), **Pugl** (Tretiach & al. 2003, Leandrin 2004), **Bas** (Tretiach & al. 2003), **Cal** (Tretiach & al. 2003, Leandrin 2004), **Si** (Tretiach & al. 2003, Leandrin 2004).

Fol.b/ Ch/ A.s/ Epiph/ pH: 3, L: 3-4, X: 3, E: 2-3/ Alt: 1-3/ Mont: er, SmedD: r, Pad: er, SmedH: rr, MedH: r/ PT: 1-2/ suboc/ Note: a mainly mild-temperate lichen found on more or less isolated, mostly deciduous trees; perhaps more frequent in Tyrrhenian Italy and in rainy-humid areas than *P. subrudecta*.

***Punctelia jeckeri* (Roum.) Kalb**

Bibl. Lichenol., 95: 312, 2007 - *Sticta jeckeri* Roum., Rev. Mycol., 3: 33, 1881.

Syn.: *Parmelia borrieri* var. *ulophylla* (Ach.) Nyl., *Parmelia caperata* var. *ulophylla* Ach., *Parmelia dubia* var. *ulophylla* (Ach.) Harm., *Parmelia ulophylla* (Ach.) F. Wilson, *Punctelia ulophylla* (Ach.) Herk & Aptroot

N - **VG** (Leandrin 2004, 2006), **Frl** (Giordani & al. 2003b, Leandrin 2004), **Ven** (Nascimbene & al. 2013b), **TAA** (Giordani & al. 2003b), **Lomb** (Brackel 2013), **Piem** (Leandrin 2004), **Lig** (Giordani & al. 2009, Giordani & Incerti 2008). **C** - **Tosc** (Leandrin 2004, Tretiach & al. 2008, Brackel 2015), **Umb** (Ravera & al. 2011), **Laz** (Leandrin 2004, Ravera 2008, 2008b, Ravera & Genovesi 2008), **Mol** (Ravera & Genovesi 2012, Paoli & al. 2015), **S** - **Camp** (Leandrin 2004, Nascimbene & al. 2010b, Brunialti & al. 2013, Ravera & Brunialti 2013), **Bas** (Potenza & al. 2014), **Cal** (Leandrin 2004).

Fol.b/ Ch/ A.s/ Epiph/ pH: 2-4, L: 3-4, X: 3, E: 1-3/ Alt: 2-3/ Mont: vr, SmedD: rr, Pad: er, SmedH: rr/ PT: 1-3/ Note: a recently-resurrected species found on bark of isolated deciduous trees, ecologically intermediate between *Xanthorion* and *Parmelion*; to be looked for throughout Italy. European specimens might not be identical with North American material, and deserve further study (see Lendemer & Hodkinson, 2010).

***Punctelia perreticulata* (Räsänen) G. Wilh. & Ladd**

Mycotaxon, 28: 249, 1987 - *Parmelia duboscqii* Abbayes var. *perreticulata* Räsänen in Sbarbaro, Ann. Mus. Civ. Storia Nat. Genova, 41: 40, 1941.

Syn.: *Parmelia perreticulata* (Räsänen) Hale

N - **Lig** (Gyelnik Lichenoth. Parva 72: Adler & Ahti 1996, Longàn & al. 2000, Leandrin 2004, Giordani & Incerti 2008, Lendemer & Hodkinson 2010). **C** - **Tosc** (Tretiach & al. 2002, Leandrin 2004).

Fol.b/ Ch/ A.s/ Sax-Epiph/ pH: 2-3, L: 4-5, X: 2, E: 2-3/ Alt: 1/ MedH: er/ PT: 1/ suboc/ Note: a mainly Mediterranean-Atlantic lichen found on siliceous rocks and bark, restricted to Tyrrhenian Italy. It is included in the Italian red list of epiphytic lichens as "Endangered" (Nascimbene & al. 2013c).

***Punctelia stictica* (Duby) Krog**

Nord. J. Bot., 2: 291, 1982 - *Parmelia borrieri* var. *stictica* Duby, Bot. Gall., 2: 601, 1830.

Syn.: *Parmelia dubia* var. *stictica* (Duby) Schaer., *Parmelia stictica* (Duby) Nyl.

N - **TAA**, **Lomb**.

Fol.b/ Ch/ A.s/ Sax/ pH: 2-3, L: 3, X: 3, E: 1-2/ Alt: 2-3/ Mont: vr, SmedD: er/ PT: 1/ suboc/ Note: on siliceous rocks in open situations; probably more widespread in the Alps.

***Punctelia subrudecta* (Nyl.) Krog**

Nord. J. Bot., 2: 291, 1982 - *Parmelia subrudecta* Nyl., Flora, 69: 320, 1886.

Syn.: *Imbricaria borrieri* auct. ital. p.p., *Parmelia borrieri* auct.ital. p.p., *Parmelia borrieri* var. *subrudecta* (Nyl.) Clauzade & Cl. Roux, *Parmelia helenae* B. de Lesd., *Parmelia dubia* (Wulfen) Schaer., *Parmelia dubia* var. *caesiocinerea* B. de Lesd., *Parmelia dubia* f. *scrobiculata* B. de Lesd., *Parmelia maculato-soresdiosa* (Gyeln.) Gyeln., *Punctelia helenae* (B. de Lesd.) De Priest & B.W. Hale

N - **VG** (Castello 1996, 2002, Leandrin 2004, Martellos & Castello 2004, Castello & Skert 2005, Thell & al. 2005, Leandrin 2006), **Frl** (Badin & Nimis 1996, Leandrin 2004, Castello & Skert 2005, Tretiach & Molaro 2007, Bernini & al. 2010), **Ven** (Nimis & al. 1996c, Nascimbene & Caniglia 1997, Caniglia & al. 1999, Lazzarin 2000, Valcuvia & al. 2000c, Leandrin 2004, Nascimbene 2005c, 2008, 2008c, Nascimbene & al. 2007, Nascimbene & Marini 2010), **TAA** (Philippi 1983, Gottardini & al. 2004, Leandrin 2004, Nascimbene 2006c, 2008b, 2014, Nascimbene & al. 2007b, 2014, Nimis & al. 2015), **Lomb** (Philippi 1983 Rivellini 1994, Arosio & Rinaldi 1995, Zocchi & al. 1997, Roella 1999, Arosio

& al. 2003, Anderi & al. 2005, Valcuvia & Truzzi 2007b, Abramini & al. 2008, Furlanetto 2010, Gheza & al. 2015), **Piem** (Caniglia & al. 1992, Arosio & al. 1998, Piervittori 1998, 2003, Clerc & al. 1999, Isocrono & al. 2003, 2005b, Castino 2004, Leandrin 2004, Isocrono & Piervittori 2008, Furlanetto 2010, Matteucci & al. 2010, Giordani & Malaspina 2016), **VA** (Piervittori & Isocrono 1999, Valcuvia 2000, Valcuvia & al. 2000b), **Emil** (Bassi 1995, Gasparo & Tretiach 1996, Nimis & al. 1996, Sallese 2003, Leandrin 2004, Marconi & al. 2006, Morselli & Regazzi 2006, Cioffi 2009, Malavasi 2014, Gerdol & al. 2014), **Lig** (Castello & al. 1994, Adler & Ahti 1996, Putorti & al. 1999b, Giordani & al. 2002, Brunialti & Giordani 2003, Leandrin 2004, Giordani 2006, Giordani & Incerti 2008, Watson 2014). **C - Tosc** (Adamo & al. 1993, Loppi & Corsini 1995, 2003, Loppi & Putorti 1995, 1995b, Loppi & al. 1995, 1996, 1996b, 1996c, 1997, 1997e, 1998, 1998b, 1999a, 2002, 2002b, 2002c, 2003, 2004, 2004c, 2006, Adamo 1997, Monaci & al. 1997, Loppi & Nascimbene 1998, 2010, Putorti & al. 1998, Benesperi 2000a, 2006, Loppi & Pirintsos 2000, Bettini 2001, Del Guasta 2001, Lorenzini & al. 2003, Landi & Loppi 2003, Loppi & Frati 2004, Baruffo & Tretiach 2005, 2007, Frati & al. 2006b, 2007, Tretiach & al. 2008, Lastrucci & al. 2009, Brunialti & Frati 2010, Loppi & Baragatti 2011, Brackel 2015), **Marc** (Gasparo & al. 1989, Nimis & Tretiach 1999, Leandrin 2004, Frati & Brunialti 2006, Brackel 2015, Nascimbene & al. 2015), **Umb** (Ravera 1998, Leandrin 2004, Ravera & al. 2006, Panfili 2007, Brunialti & al. 2012b, Brackel 2015), **Laz** (Bartoli & al. 1997, Ravera & al. 1999, Massari & Ravera 2002, Leandrin 2004, Nimis & Tretiach 2004, Ruisi & al. 2005, Munzi & al. 2007, Ravera 2008b, Zucconi & al. 2013, Brackel 2015), **Abr** (Recchia & al. 1993, Olivieri & al. 1997, 1997b, Loppi & al. 1999, Caporale & al. 2016), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008, Paoli & al. 2015), **Sar** (Loi & al. 2000, Zedda 2002, Rizzi & al. 2011). **S - Camp** (Aprile & al. 2003b, 2011, Nimis & Tretiach 2004, Catalano & al. 2010, 2016, Nascimbene & al. 2010b, Garofalo & al. 2010, Brunialti & al. 2013, Ravera & Brunialti 2013), **Pugl** (Nimis & Tretiach 1999, Durini & Medagli 2004), **Bas** (Bartoli & Puntillo 1998, Nimis & Tretiach 1999, Leandrin 2004, Potenza 2006, Potenza & al. 2010), **Cal** (Puntillo 1996, Lich. Graec. 95: Obermayer 1997, Leandrin 2004, Puntillo & Puntillo 2004, Incerti & Nimis 2006, Brackel & Puntillo 2016), **Si** (Nimis & al. 1994, Ottonello 1996, Leandrin 2004, Caniglia & Grillo 2006b).

Fol.b/ Ch/ A.s/ Epiph/ pH: 2-4, L: 3-4, X: 3, E: 1-3/ Alt: 1-3/ Mont: er, SmedD: vc, Pad: rr, SmedH: vc, MedH: rr, MedD: vr/ PT: 1-3/ Note: a mainly temperate species found on bark of isolated deciduous trees, ecologically intermediate between *Xanthorion* and *Parmelion*; quite rare along the eastern side of the Peninsula and in the eu-Mediterranean belt, otherwise common below the montane belt.

Puttea S. Stenroos & Huhtinen
in Stenroos & al., Bryologist, 112: 550, 2009.

This genus, which currently includes 3 species, was described as monotypic for the species formerly known as *Fellhanera margaritella* (Stenroos & al. 2009). It is characterised by an inconspicuous thallus, a gelatinised excipulum of radiating hyphae, hemiamyloid asci of the *Psora*-type, simple spores, and a crystalline layer covering hymenium and excipulum. Its taxonomic position within the Lecanorales is still unclear (see Jaklitsch & al. 2016). Type: *P. margaritella* (Hulting) S. Stenroos & Huhtinen

Puttea caesia (Fr.) M. Svenss. & T. Sprib.

in Dillman & al., Herzogia, 25: 182, 2012 - *Agryrium caesium* Fr., Syst. Mycol. (Lundae) 2, 1: 231, 1822.

Syn.: *Lecidea symmictella* Nyl., *Biatora symmictella* (Nyl.) Arnold

N - **TAA** (Nascimbene & al. 2007b).

Cr/ Ch/ S/ Lign/ pH: 1-2, L: 3-4, X: 2-3, E: 1/ Alt: 3-4/ Salp: vr, Mont: vr/ PT: 1/ #/ Note: on hard lignum., e.g. on horizontal faces of old stumps, sometimes on mosses, mostly in upland areas. See also note on *Catillaria erysiboides*.

Pycnora Hafellner
Stapfia, 76: 157, 2001.

A molecular study of *Hypocenomyce s.lat.* (Bendiksby & Timdal 2013) showed that the genus, in the traditional circumscription, was extremely polyphyletic, and that it can be subdivided into seven supported clades belonging in different genera, families, orders and even subclasses. The genus *Pycnora*, an earlier segregate from *Hypocenomyce*, was found to be polyphyletic as well. In its present circumscription it includes 3 species only, and is placed in its own family, the Pycnoraceae, included in the order Candelariales. Type: *P. xanthococca* (Sommerf.) Hafellner

Pycnora praestabilis (Nyl.) Hafellner

in Hafellner & Türk, Stapfia, 76: 156, 2001 - *Lecidea praestabilis* Nyl., Flora, 57: 13, 1874.

Syn.: *Hypocenomyce praestabilis* (Nyl.) Timdal, *Hypocenomyce xanthococca auct. non* (Sommerf.) P. James & Gotth. Schneid.?, *Lecidea xanthococca auct. non* Sommerf.

N - **FrI** (Tretiach 2015r), **Ven, TAA** (Nascimbene & al. 2007b). **S - Cal.**

Sq/ Ch/ A.s/ Epiph-Lign/ pH: 1, L: 3-5, X: 3-4, E: 1/ Alt: 3-4/ Salp: vr, Mont: er/ PT: 1/ Note: on wood, more rarely on the bark of conifers in the mountains. The record from Calabria (Nimis 1993: 321) needs confirmation.

Pycnora sorophora (Vain.) Hafellner

in Poelt & Vězda, Bibl. Lichenol., 16: 364, 1981 - *Lecidea xanthococca* subsp. *sorophora* Vain., Acta Soc. Fauna Fl. Fenn., 57, 2: 237, 1834.

Syn.: *Lecidea giselae* Zahlbr., *Hypocenomyce sorophora* (Vain.) P. James & Poelt

N - Ven (Nascimbene & Caniglia 2000, 2003c, Nascimbene & al. 2006e, Nascimbene 2008c, 2011), **TAA** (Nascimbene 2006c, 2008b, 2014, Nascimbene & al. 2008c, 2014, Nimis & al. 2015).

Sq/ Ch/ A.s/ Epiph-Lign/ pH: 1, L: 3-5, X: 3-4, E: 1/ Alt: 3-4/ Salp: er, Mont: er/ PT: 1/ Note: on wood and on the bark of conifers in upland areas. The species is included in the Italian red list of epiphytic lichens as "Vulnerable" (Nascimbene & al. 2013c).

Pycnothelia Dufour Ann. Gén. Sci. Phys., 8: 45, 1821.

This genus of the Cladoniaceae includes 2 species growing on soil or peat, mainly in cool, moist climates. Type: *P. papillaria* Dufour

Pycnothelia papillaria Dufour

Ann. Gén. Sci. Phys., 8: 46, 1821.

Syn.: *Cladonia papillaria* Hoffm nom. illegit., *Cladonia trapezuntica* J. Steiner, *Cenomyce papillaria* Ach. nom. illegit., *Lecidea epimarta* Nyl., *Biatora epimarta* (Nyl.) Walt. Watson

N - Frl (Tretiach & Hafellner 2000), **Ven** (vidi!), **TAA** (Bilovitz & al. 2014), **Lomb**, **Piem** (Isocrono & al. 2004, Obermayer 2009), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Piervittori & al. 2004), **Emil** (Dalle Vedove & al. 2002, Benesperi & al. 2007, Tretiach & al. 2008), **Lig**, **C** - **Tosc** (Benesperi & al. 2007). **S** - **Si**.

Frut/ Ch/ S/ Terr/ pH: 1-2, L: 4, X: 2-3, E: 1-2/ Alt: 2-6/ Alp: r, Salp: rr, Orom: er, Mont: vr, SmedD: er, SmedH: er/ PT: 1/ Note: an arctic-alpine to cool-temperate lichen found on clay soil, often in *Calluna*-heaths; most frequent in the Alps, becoming much rarer southwards.

Pyrenocarpon Trevis. Riv. Accad. Padova, 3: 49, 1855.

This genus of the Lichinaceae is rather similar to, and was often confused with *Porocyphus*, but has different apothecia which open to expose the strongly widened proper exciple, a character that also sets the genus apart from *Psorotichia*. The genus, which includes 2 species, seems to be closely related to *Lemmopsis* (Jørgensen 2007). Type: *P. flotowianum* (Hepp) Trevis. (= *P. thelostomum*).

Pyrenocarpon montinii (A. Massal.) Trevis.

Riv. Accad. Padova, 3: 49, 1855 - *Thelochroa montinii* A. Massal., *Symmicta* Lich.: 86, 1855.

Syn.: *Porocyphus montinii* (A. Massal.) Arnold, *Psorotichia montinii* (A. Massal.) Forssell, *Psorotichia recondita* Arnold

N - **VG**, **Frl** (TSB 16802), **Ven** (Lazzarin 2000b), **TAA**, **Lig** (Watson 2014). **C** - **Laz** (Bartoli & al. 1998), **Abr**, **S** - **Pugl** (Nimis & Tretiach 1999), **Si** (Nimis & al. 1994).

Cr/ Ch.c/ S/ Sax/ pH: 4-5, L: 4-5, X: 4, E: 2-3/ Alt: 1-3/ Mont: vr, SmedD: r, SmedH: r, MedH: rr, MedD: er/ PT: 1/ w/ Note: a mainly southern species found on steeply inclined, south-exposed seepage tracks of calcareous rocks, sometimes invading the thalli of endolithic lichens, especially *Bagliettoa*-species; certainly more widespread.

Pyrenocarpon thelostoma (J. Harriman) Coppins & Aptroot

Lichenologist, 40: 372, 2008 - *Verrucaria thelostoma* Ach. ex J. Harriman in Winch & al., Bot. Guide, 2: 44, 1807.

Syn.: *Psorotichia flotowiana* (Hepp) Müll. Arg., *Pyrenocarpon flotowianum* (Hepp) Trevis., *Pyrenopsis flotowiana* (Hepp) Nyl., *Pyrenula umbonata* Ach., *Thelochroa flotowiana* (Hepp) Körb., *Thrombium thelostoma* (J. Harriman) A.L. Sm., *Verrucaria flotowiana* Hepp

N - **VG**, **TAA**.

Cr/ Cy.h/ S/ Sax/ pH: 3-5, L: 4-5, X: 3-4, E: 1-2/ Alt: 2/ SmedD: er/ PT: 1/ w, #/ Note: a poorly known lichen found on steeply inclined seepage tracks of more or less calcareous rocks at relatively low elevations.

Pyrenodesmia A. Massal. Atti Ist. Ven. Sci. Lett. Art., ser. 2, 3, app. 3: 119, 1853 (1852).

As re-defined by Arup & al. (2013), *Pyrenodesmia s.str.* includes most of the black-fruited species of *Caloplaca s.lat.* in the Teloschistaceae, although only 6 species were currently accepted. The phylogeny around the core group of species must be further studied. The relationship with many other species lacking orange pigments in both apothecia and thallus has partly been studied by Muggia & al. (2008), who found no close relationship to other groups of *Caloplaca*, but there are still further groups to evaluate. The species of the *Caloplaca erythrocarpa*-group, those of the *C. xerica*-group, and those of the *C. aractinal/C. haematites* group seem to be related to *Pyrenodesmia*, but further study is needed to resolve the relationship with this genus. Type: *P. chalybaea* (Fr.) A. Massal.

***Pyrenodesmia albopruinosa* (Arnold)**

Provisionally placed here, ICN Art. 36.1b. - *Biatorina albopruinosa* Arnold, Flora, 42: 152, 1859.

Syn.: *Caloplaca agardhiana* auct. non *Pyrenodesmia agardhiana* (Flot.) A. Massal., *Blastenia agardhiana* auct., *Blastenia agardhiana* var. *cinereovirens* (J. Steiner) Szatala?, *Blastenia agardhiana* var. *minuta* (J. Steiner) Szatala?, *Callospisma agardhianum* auct., *Caloplaca agardhiana* var. *nigricans* (Arnold) Jatta?, *Caloplaca albopruinosa* (Arnold) H. Olivier

N - **VG**, **Frl**, **Ven** (Nascimbene & Caniglia 2003c, Nascimbene 2005c, Tretiach & Muggia 2006, Muggia & al. 2007), **TAA** (Nascimbene 2003, Spitale & Nascimbene 2012), **Lomb**, **Piem** (Isocrono & al. 2004), **Emil**, **Lig**, **C** - **Tosc** (Benespero 2006, 2007b), **Marc** (Nimis & Tretiach 1999), **Umb** (Genovesi & Ravera 2001, Ravera & al. 2006), **Laz**, **Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach, 1999, 2004, Caporale & al. 2008, Ravera & al. 2009, Genovesi & Ravera 2014), **Sar**, **S** - **Camp** (Nimis & Tretiach 2004, Garofalo & al. 2010), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 2011), **Si** (Nimis & al. 1994, 1995, Grillo & al. 2001, Grillo & Caniglia 2004, Caniglia & Grillo 2005).

Cr.end/ Ch/ S/ Sax/ pH: 4-5, L: 4-5, X: 3-4, E: 1-2/ Alt: 2-4/ Salp: vr, Orom: vr, Mont: rc, SmedD: er, SmedH: er/ PT: 1/ Note: on hard limestones and dolomite in sunny, exposed sites, mostly in the montane belt. In the analysis of Arup & al. (2013) this species is not placed in the same clade of *Pyrenodesmia s.str.* Several earlier records, especially those from low altitudes, are likely to refer to other species of the *Pyrenodesmia*-complex, especially to *P. alociza*. For further details see Muggia & al. (2007). I refrain from formally recombining this species into *Pyrenodesmia*, because a phylogenetic analysis of the entire group is in progress (Fernandez-Mendoza & al. 2016).

***Pyrenodesmia alociza* (A. Massal.) Arnold**

Flora, 67: 310, 1884 - *Biatorina alociza* A. Massal., *Symmicta Lich.*: 42, 1855.

Syn.: *Caloplaca alociza* (A. Massal.) Mig., *Lecaniella alociza* (A. Massal.) Jatta, *Lecanora variabilis* f. *ecrustacea* Nyl., *Placodium variabile* var. *ecrustaceum* (Nyl.) Nyl., *Sporoblastia alocyza* (A. Massal.) Trevis.

N - **VG** (Crisafulli & al. 2006, Piervittori & al. 2006, Tretiach & Muggia 2006), **Frl**, **Ven** (Lazzarin 2000b, Tretiach & al. 2003, Nascimbene & Caniglia 2003c, Tretiach & Muggia 2006, Muggia & al. 2007, Thor & Nascimbene 2007), **TAA** (Spitale & Nascimbene 2012), **Emil**, **C** - **Tosc** (TSB 37172), **Marc** (Nimis & Tretiach 1999), **Umb** (Nimis & Tretiach 1999, Ravera & al. 2006, Panfili 2007), **Laz** (Nimis & Tretiach 2004), **Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008, Genovesi & Ravera 2014), **Sar**, **S** - **Camp** (Aprile & al. 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010), **Pugl** (Nimis & Tretiach 1999, Tretiach & Muggia 2006), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994, Grillo 1998, Grillo & Caniglia 2004, Caniglia & Grillo 2005, 2006).

Cr.end/ Ch/ S/ Sax/ pH: 4-5, L: 4-5, X: 3-4, E: 1-2/ Alt: 1-5/ Alp: c, Salp: vc, Orom: ec, Mont: ec, SmedD: c, Pad: r, SmedH: rr, MedD: r/ PT: 1/ Note: on hard limestones and dolomite on sunny, exposed cliffs, with a wide altitudinal range; in Italy this is one of the most frequent species of *Pyrenodesmia*. For further details see Muggia & al. (2007).

***Pyrenodesmia badioreagens* (Tretiach & Muggia) Søchting, Arup & Frödén**

in Arup & al., Nord. J. Bot., 31: 73, 2013 - *Caloplaca badioreagens* Tretiach & Muggia, Lichenologist, 38: 224, 2006.

C - **Abr** (Tretiach & Muggia 2006), **Sar** (Muggia & al. 2007), **S** - **Pugl** (Tretiach & Muggia 2006).

Cr.end/ Ch/ S/ Sax/ pH: 4-5, L: 4-5, X: 3-4, E: 2-3/ Alt: 1-2/ SmedD: er, MedH: vr, MedD: vr/ PT: 1/ Note: a recently-described, rather peculiar species of the Mediterranean belt, exceptionally reaching to 1000 m on south-exposed vertical faces, found on calcareous boulders within xerothermic grasslands or maquis in sunny and dry situations. For further details see Tretiach & Muggia (2006) and Muggia & al. (2007).

***Pyrenodesmia chalybaea* (Fr.) A. Massal.**

Atti reale Ist. Veneto Sci. ser. 2., 3 append.: 123, 1853 - *Parmelia chalybaea* Fr., Lichenogr. Eur. Ref.: 123, 1831.

Syn.: *Caloplaca chalybaea* (Fr.) Müll. Arg., *Caloplaca olivacea* (A. Massal.) Jatta, *Caloplaca variabilis* f. *chalybaea* (Fr.) Clauzade & Cl. Roux, *Caloplaca variabilis* var. *lilacina* (A. Massal.) Jatta, *Caloplaca variabilis* var. *ocellulata* (Ach.) Boistel, *Callospisma variabile* var. *lilacinum* (A. Massal.) Müll. Arg., *Caloplaca variabilis* var. *ocellulata* f. *chalybaea* (Fr.) Clauzade & Cl. Roux, *Catillaria lapsans* (Nyl.) Boistel, *Placodium chalybaeum* (Fr.) Hepp, *Pyrenodesmia olivacea* A. Massal.

N - **VG**, **Frl**, **Ven** (Lazzarin 2000b, Nascimbene & Caniglia 2003c, Nascimbene & Marini 2007, Watson 2014), **TAA**, **Lomb** (Florio & al. 2004, 2006), **Piem** (TSB 32936), **VA** (Piervittori & Isocrono 1999), **Lig** (Giordani & al. 2016), **C** - **Tosc**, **Marc** (Nimis & Tretiach 1999), **Umb** (Nimis & Tretiach 1999, Ravera & al. 2006), **Laz** (Nimis & Tretiach 2004), **Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach, 1999, 2004, Caporale & al. 2008, Genovesi & Ravera 2014), **Sar**, **S** - **Camp** (Garofalo & al. 1999, 2010, Aprile & al. 2003b, Nimis & Tretiach 2004), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 2011), **Si** (Nimis & al. 1994, 1995, Grillo 1998, Grillo & Caniglia 2004).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 4-5, X: 4, E: 2-3/ Alt: 1-5/ Alp: r, Salp: rr, Orom: ec, Mont: ec, SmedD: rc, SmedH: rc, MedH: rr, MedD: vr/ PT: 1/ Note: a mild-temperate species known from Europe and adjoining Africa and Asia, found on hard calciferous rocks (mostly on compact limestone) and dolomite, often, but not exclusively, on steeply inclined faces; especially common in central and southern Italy, above the Mediterranean belt.

***Pyrenodesmia diphyodes* (Nyl.) M. Choisy**

Bull. Mens. Soc. Linn. Lyon, 20: 199, 1951 - *Lecanora diphyodes* Nyl., Flora, 55: 353, 1872.

Syn.: *Calloporisma diphyodes* (Nyl.) Bagl. & Carestia, *Calloporisma variabile* var. *riparium* Müll. Arg., *Caloplaca diphyodes* (Nyl.) Jatta, *Caloplaca diphyodes* var. *helygeoides* (Vain.) H. Olivier, *Caloplaca helygeoides* (Vain.) Dalla Torre & Sarnth., *Caloplaca variabilis* subsp. *diphyodes* (Nyl.) Clauzade & Cl. Roux

N - Frl (TSB 10027), **TAA** (Nascimbene 2003, Nascimbene & al. 2004, 2004b), **Piem** (Isocrono & al. 2004), **Lig**.

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4-5, X: 2-3, E: 2-3/ Alt: 3-6/ Alp: vr, Salp: r, Mont: er/ PT: 1/ #/ Note: known both from the Arctic and from the mountains of the temperate zone, this lichen occurs on siliceous rocks in sheltered situations, often along creeks. The species has been much misunderstood, mainly due to the synonymisation with *Caloplaca lecideina* (Müll. Arg.) Clauzade & Rondon, a calcicolous species, by Wunder (1974). According to Roux (*in litt.*) the type of *P. diphyodes*, from Central France, is clearly silicicolous, and the species is more or less aquatic (see also Roux & coll. 2014). The material from the Alps is mostly from calcareous schists, dolomite and serpentine, and needs revision.

Pyrenodesmia erodens (Tretiach, Pinna & Grube) Søchting, Arup & Frödén

in Arup & al., Nord. J. Bot., 31: 72, 2013 - *Caloplaca erodens* Tretiach, Pinna & Grube, Mycol. Prog., 2: 129, 2003.

N - Frl (Hafellner & Muggia 2006, Tretiach 2015d), **Ven** (Tretiach & al. 2003, Nascimbene 2004, 2005c, Thor & Nascimbene 2007, Nascimbene & Marini 2007), **TAA** (Tretiach & al. 2003, Nascimbene 2004, Nascimbene & al. 2004, 2004b), **Piem** (Tretiach & al. 2003, Morando & al. 2014, 2016), **VA** (Tretiach & al. 2003). **C - Marc** (Tretiach & al. 2003), **Umb** (Tretiach & al. 2003), **Abr** (Tretiach & al. 2003, Tretiach & Muggia 2006, Muggia & al. 2007). **S - Camp** (Tretiach & al. 2011c).

Cr.end/ Ch/ A.s/ Sax/ pH: 4-5, L: 4-5, X: 4-5, E: 1-2/ Alt: 2-5/ Alp: rc, Salp: c, Orom: rr, Mont: c, SmedD: er/ PT: 1-2/ Note: a recently-described, characteristic species, probably more widespread in upland areas. It occurs on exposed, subvertical faces of limestone and dolomite, including old monuments, in dry sites of the montane and subalpine belts between 900 and 2500 m. The total distribution extends to the Irano-Turanian Region: I have observed the species on the tomb of Cyrus in Pasargade (Iran).

Pyrenodesmia variabilis (Pers.) A. Massal.

Atti reale Ist. Veneto Sci. ser. 2., 3 append.: 125, 1853 - *Lichen variabilis* Pers., Ann. Bot. (Usteri), 1: 26, 1794.

Syn.: *Blastenia rhinodinoidea* (J. Steiner) Szatala, *Calloporisma variabile* (Pers.) Trevis., *Caloplaca alpestris sensu* Ozenda & Clauzade, *Caloplaca fulva* (Anzi) J. Steiner, *Caloplaca intercedens* (Trevis.) J. Steiner, *Caloplaca paepalostoma* (Anzi) Jatta, *Caloplaca rhinodinoidea* J. Steiner, *Caloplaca variabilis* (Pers.) Th. Fr., *Caloplaca variabilis* f. *fulva* (Anzi) Clauzade & Cl. Roux, *Caloplaca variabilis* f. *fusca* (A. Massal.) Jatta, *Caloplaca variabilis* f. *paepalostoma* (Anzi) Clauzade & Cl. Roux, *Caloplaca variabilis* var. *granulosa* (Arnold) Dalla Torre & Sarnth., *Caloplaca variabilis* var. *ochracea* Müll. Arg., *Caloplaca variabilis* var. *subimmersa* (Nyl.) Blomb. & Forssell, *Lecanora variabilis* (Pers.) Ach., *Placodium fulvum* Anzi, *Placodium paepalostomum* Anzi, *Placodium variabile* (Pers.) Hepp, *Pyrenodesmia intercedens* Trevis., *Pyrenodesmia variabilis* f. *fusca* A. Massal., *Rinodina articulata* Bagl.

N - VG, Frl, Ven (Lazzarin 2000b, Nascimbene 2005c), **TAA** (Spitale & Nascimbene 2012), **Lomb, Piem** (Matteucci & al. 2013), **VA** (TSB 29427), **Emil, Lig** (Valcuvia & al. 2000, Giordani & al. 2016). **C - Tosc** (Benesperi 2000a, Brackel 2015), **Marc** (Nimis & Tretiach 1999), **Umb** (Nimis & Tretiach 1999, Ravera & al. 2006, Panfili 2007), **Laz** (Brackel 2015), **Abr** (Nimis & Tretiach 1999, Caporale & al. 2016), **Mol** (Garofalo & al. 1999, Nimis & Tretiach, 1999, 2004, Caporale & al. 2008, Genovesi & Ravera 2014), **Sar, S - Camp** (Garofalo & al. 1999, 2010, Aprile & al. 2003, 2003b, Nimis & Tretiach 2004), **Pugl** (Nimis & Tretiach 1999, Durini & Medagli 2004), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994, Ottonello & Salone 1994, Ottonello & al. 1994, Ottonello 1996, Poli & al. 1997, 1998, Grillo 1998, Caniglia & Grillo 2001, 2006, Grillo & al. 2001, 2002, 2009, Grillo & Caniglia 2004, Brackel 2008b, 2008c, Cataldo & Minissale 2015).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 4-5, X: 3-4, E: 2-4/ Alt: 1-5/ Alp: rr, Salp: rc, Orom: r, Mont: rc, SmedD: c, Pad: r, SmedH: vc, MedH: c, MedD: rr/ PT: 1-3/ Note: a probably holarctic, subtropical to boreal-montane, very polymorphic lichen found a wide variety of calciferous substrata wetted by rain, with a wide altitudinal range. The whole complex is worthy of further study (see Muggia & al. 2007).

Pyrenopsis (Nyl.) Nyl.

Syn. Meth. Lich., 1: 97, 1858, *nom. cons.* - *Synalissa* B *Pyrenopsis* Nyl., Mem. Soc. Imp. Sci. Nat. Cherbourg 3: 164, 1855.

According to Jørgensen (2007) this genus of the Lichinaceae is insufficiently understood at all levels. Even after the removal of *Cryptothele* and *Euopsis*, the genus, which includes c. 40 species, is far from being homogeneous, and appears in need of further division. Several species are very poorly known as well. Type (conserved): *P. fuscata* Nyl.

Pyrenopsis fuliginoides Rehm

in Sauter, Mitt. Ges. Salzburger Landesg., 12: 79, 1872.

N - TAA (S- F157559).

Cr/ Cy.c/ S/ Sax/ pH: 3-5, L: 4-5, X: 4-5, E: 1-3/ Alt: 3/ Mont: vr/ PT: 1/ w, #/ Note: on steeply inclined surfaces of more or less base-rich siliceous rocks, or of calcareous rocks, with optimum in the montane belt.

Pyrenopsis micrococca (Bornet & Nyl.) Forssell

N. Acta Reg. Soc. Sci. Upsal., ser. 3, 13: 45, 1885 - *Synalissa micrococca* Bornet & Nyl., Mém. Soc. Sc. Nat. Cherbourg, 4: 231, 1856.

C - Sar.

Cr/ Cy.c/ S/ Sax/ pH: 2-3, L: 4-5, X: 4-5, E: 1-3/ Alt: 1/ MedD: vr/ PT: 1/ w/ Note: on basic siliceous rocks, in sun-exposed seepage tracks, mostly in the Mediterranean belt.

Pyrenopsis sanguinea Anzi

Atti Soc. Ital. Sc. Nat., 9: 241, 1866.

Syn.: *Psorotichia sanguinea* (Anzi) Jatta

N - TAA (UPS-L-166875), **Lomb.**

Cr/ Cy.c/ S/ Sax/ pH: 2-3, L: 4-5, X: 3-4, E: 1-2/ Alt: 3-4/ Mont: vr/ PT: 1/ w, #/ Note: on sunny surfaces of basic siliceous rocks along seepage tracks. This taxon was synonymised by Hafellner & Türk (2001) with *Cryptothele rhodosticta*, a species whose occurrence in the Alps is dubious (see Jørgensen 2007). However, for several reasons (see Nimis 1993: 589), I prefer to leave it here under *Pyrenopsis* waiting for further studies on this very difficult complex.

Pyrenopsis subareolata Nyl.

Lich. Scand., 1: 27, 1861.

Syn.: *Cryptothele rhodosticta auct. non* (Taylor) Henssen, *Pyrenopsis fuscatula* Nyl., *Pyrenopsis rhodosticta auct. non* (Taylor) Müll. Arg., *Pyrenopsis rocaltensis* Couderc

N - TAA, Lomb, VA. C - Tosc.

Cr/ Cy.c/ S/ Sax/ pH: 2-3, L: 4-5, X: 2, E: 1-2/ Alt: 2-4/ Salp: vr, Orom: er, Mont: er/ PT: 1/ 1, #/ Note: on siliceous rocks with a prolonged water seepage after rain. See also Nimis (1993: 589), Orange (2003), and Jørgensen (2007: 51).

Pyrenopsis subcooperta Anzi

Atti Soc. Ital. Sci. Nat., 11: 158, 1868.

N - Lomb.

Cr/ Cy.c/ S/ Sax/ pH: 2-3, L: 3-4, X: 2, E: 1-2/ Alt: 2-3/ Mont: vr, SmedD: er/ PT: 1/ 1, #/ Note: on siliceous rocks with a prolonged water seepage after rain; on the whole, a very poorly known species, also reported from France.

Pyrenopsis triptococca Nyl.

Flora, 70: 129, 1881.

C - Tosc, Laz, Sar (TSB 11728), **S - Cal** (Puntillo 1996), **Si** (Otonello & al. 2011).

Cr/ Cy.c/ S/ Sax/ pH: 3, L: 4-5, X: 3-4, E: 1-2/ Alt: 1-3/ Mont: er, SmedD: er, MedH: r, MedD: r/ PT: 1/ w/ Note: on basic siliceous rocks, especially basalt, in sunny seepage tracks.

Pyrenula Ach.

Syn. Lich.: 117, 1814, *nom. cons.*

This large, mainly tropical genus of the Pyrenulaceae is poorly represented in Europe. A recent key to the species of *Pyrenula* worldwide was published by Aptroot (2012), who accepted 169 species out of the c. 745 named taxa in the genus. Good descriptions and a key to all British species are in Orange (2013b). Type (conserved): *P. nitida* (Weigel) Ach. The name is conserved against *Pyrenula* Ach. (1809).

Pyrenula chlorospila Arnold

Flora, 70: 155, 1887.

N - Lig (Giordani & al. 2009, Giordani & Incerti 2008), **C - Tosc, Laz** (Massari & Ravera 2002), **Sar** (Rizzi & al. 2011), **S - Camp** (Nimis & Tretiach 2004, Garofalo & al. 2010), **Pugl** (Nimis & Tretiach 1999, Durini & Medagli 2004), **Bas** (Bartoli & Puntillo 1998, Nimis & Tretiach 1999, Potenza 2006, Puntillo & al. 2009, Potenza & al. 2010), **Cal** (Puntillo 1996, Sérusiaux 1998, Puntillo & Puntillo 2004, 2012), **Si** (Nimis & al. 1994).

Cr/ Tr/ S/ Epiph/ pH: 2-3, L: 3, X: 2, E: 1-2/ Alt: 1-2/ SmedD: er, SmedH: r, MedH: vr/ PT: 1/ suboc/ Note: a mild-temperate to Mediterranean-Atlantic species found on smooth bark (especially of *Fraxinus* and *Salix*, but also of *Corylus* and *Quercus*) in deciduous open forests, often along rivers; mainly Tyrrhenian in Italy.

Pyrenula coryli A. Massal.

Ric. Auton. Lich. Crost.: 164, 1852.

Syn.: *Arthopyrenia coryli* (A. Massal.) Müll. Arg., *Mycopyrenula coryli* (A. Massal.) Vain., *Verrucaria coryli* (A. Massal.) Nyl.

N - Ven (Lazzarin 2000b), **TAA** (Nascimbene & al. 2007b), **Lomb, Piem** (Isocrono & al. 2004), **C - Laz, Abr** (Ravera 2002b), **S - Camp, Cal** (Puntillo 1996).

Cr/ Tr/ S/ Epiph/ pH: 1-2, L: 3, X: 2-3, E: 1/ Alt: 2/ SmedD: vr, SmedH: vr/ PT: 1/ Note: a temperate species of smooth bark, most frequent on *Corylus*; doubtfully lichenised.

Pyrenula laevigata (Pers.) Arnold

Flora, 68: 158, 1885 - *Verrucaria laevigata* Pers., Ann. Wetter. Gesellsch. Ges. Naturk., 2: 11, 1810.

Syn.: *Pyrenula alba* var. *laevigata* (Pers.) Trevis., *Pyrenula alba* var. *microcarpa* (Hepp) Trevis., *Pyrenula glabrata* (Ach.) A. Massal., *Verrucaria glabrata* Ach.

N - Frl (TSB 2892), **Ven, Lomb, Lig. C - Sar** (Zedda 2002). **S - Camp** (Puntillo & al. 2000).

Cr/ Tr/ S/ Epiph/ pH: 2-3, L: 3, X: 2-3, E: 1/ Alt: 2-3/ Mont: vr, SmedD: er, SmedH: er/ PT: 1/ suboc/

Note: a temperate species of smooth bark, most frequent on *Carpinus* and *Fagus* in open, humid woodlands. It is included in the Italian red list of epiphytic lichens as "Endangered" (Nascimbene & al. 2013c).

Pyrenula macrospora (Degel.) Coppins & P. James

in Hawksworth & al., Lichenologist, 12: 107, 1980 - *Pyrenula nitida* var. *macrospora* Degel., Göteb. K. Vetensk. Vitterh. Samh. Handl., ser. 6 B, 1, 7: 8, 1941.

S - Pugl, Si (Grillo & Cristaudo 1995).

Cr/ Tr/ S/ Epiph/ pH: 2-3, L: 3, X: 2, E: 1/ Alt: 1-2/ SmedH: r, MedH: vr/ PT: 1/ suboc/ Note: a mild-temperate species found on bark of deciduous trees (especially *Fraxinus*) in humid situations, but never in deep shade, below the montane belt.

Pyrenula nitida (Weigel) Ach.

Syn. Meth. Lich.: 125, 1814 - *Sphaeria nitida* Weigel, Observ. Bot.: 45, 1772.

Syn.: *Arthopyrenia nitida* (Weigel) H. Olivier, *Bunodea nitida* (Weigel) Beltr., *Lichen alveolatus* Scop., *Verrucaria nitida* (Weigel) Schrad.

N - VG, Frl, Ven (Lazzarin 1997, Nascimbene & al. 2005b, 2006c, 2007, 2008c, 2013b, Nascimbene & Marini 2010), **TAA** (Nascimbene & al. 2007b, Nimis & al. 2015), **Lomb** (Valcuvia & Truzzi 2007b), **Piem** (Isocrono & al. 2004), **Emil** (Tretiach & al. 2008), **Lig** (Giordani 2006, Giordani & Incerti 2008). **C - Tosc** (Pasquinelli & al. 2009, Nascimbene & al. 2015), **Marc** (Brackel 2015), **Umb** (Ravera 1998, Ravera & al. 2006), **Laz** (Stofer 2006), **Abr** (Nimis & Tretiach 1999, Brackel 2015, Corona & al. 2016), **Mol** (Nimis & Tretiach 2004, Caporale & al. 2008). **S - Camp** (Aprile & al. 2003b, Brunialti & al. 2013, Ravera & Brunialti 2013), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999, Potenza 2006), **Cal** (Puntillo 1995, 1996, Stofer 2006), **Si**.

Cr/ Tr/ S/ Epiph/ pH: 1-2, L: 2-3, X: 1-2, E: 1/ Alt: 2-3/ Mont: rr, SmedD: er, SmedH: vr/ PT: 1/ Note: a temperate species with optimum on basal parts of old trunks of *Fagus* in slightly open forests, but also on *Carpinus* and other deciduous trees (e.g. *Quercus*).

Pyrenula nitidella (Schaer.) Müll. Arg.

in Engler, Bot. Jahrb., 6: 414, 1885 - *Verrucaria nitida* var. *nitidella* Flörke ex Schaer., Lich. Helv. Spicil., 2: 58, 1826.

Syn.: *Bunodea nitida* var. *nitidella* (Schaer.) Beltr., *Pyrenula nitida* var. *dermatodes* (Borrer) Trevis., *Pyrenula nitida* var. *nitidella* (Schaer.) Schaer.

N - Ven, Lomb, VA (Pievittori & Isocrono 1999), **Emil, Lig** (Giordani & al. 2002, Brunialti & Giordani 2003, Giordani & Incerti 2008, Watson 2014). **C - Tosc** (Senese & Critelli 2000, Loppi & al. 2004c), **Laz** (Ravera 2006c), **Sar** (Zedda & al. 2001, Zedda 2002). **S - Camp, Pugl** (Thüs & Licht 2006), **Cal** (Puntillo 1996).

Cr/ Tr/ S/ Epiph/ pH: 2-3, L: 3, X: 2, E: 1/ Alt: 1-2/ SmedD: er, SmedH: r, MedH: vr/ PT: 1/ suboc/ Note: a mild-temperate to Mediterranean-Atlantic species found on the bark of deciduous trees in open, humid woodlands; very rare in the North, more frequent in Tyrrhenian Italy.

Pyrenula occidentalis (R.C. Harris) R.C. Harris

in Ahti & al., Mycotaxon, 28: 96, 1987 - *Pyrenula neglecta* subsp. *occidentalis* R.C. Harris, Michigan Bot., 12: 51, 1973.

Syn.: *Pyrenula harrisii* Hafellner & Kalb

C - Sar (Zedda 2002). **S - Cal** (Puntillo 1995, 1996).

Cr/ Tr/ S/ Epiph/ pH: 1-2, L: 2-3, X: 1-2, E: 1/ Alt: 1-3/ Mont: er, SmedH: er, MedH: er/ PT: 1/ suboc/ Note: a humid-subtropical to Mediterranean-Atlantic lichen found on the smooth bark of deciduous trees; the Italian records are from very humid forests. It is included in the Italian red list of epiphytic lichens as "Endangered" (Nascimbene & al. 2013c).

Pyrenula relicta Etayo & Puntillo

Flora Mediterranea, 21: 243, 2011.

S - Camp (Etayo & Puntillo 2009, 2011, Ravera & al. 2015c).

Cr/ Tr/ S/ Foliic/ pH: 1-2, L: 2-3, X: 1, E: 1/ Alt.: 1-2/ SmedH: er, MedH: er/ PT: 0/ oc/ Note: on twigs and leaves of *Buxus* in humid sites with a warm-oceanic climate; hitherto known from France (Kakouetta) and Italy (Gole del Bussento).

Pyrgidium Nyl.

Flora, 50: 3, 1867.

This genus of the Sphinctrinaceae includes 3 characteristic, mainly tropical species with a peculiar ascocarp shape, excipulum structure and distinctive spores, one of which was surprisingly described from northern Italy, where it might be presently extinct. For further details see Tibell (1996). Type: *P. bengaliense* Nyl.

Pyrgidium montelicum (Beltr.) Tibell

Lichenologist, 14: 239, 1982 - *Acolium montelicum* Beltr., Lich. Bassan.: 285, 1858.

N - Ven (Nascimbene & Marini 2010).

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 2-3, X: 1, E: 1/ Alt: 2/ SmedD: er/ PT: 0/ oc/ Note: a mainly tropical species described from the Insubrian region of Italy (the only European record), where it is probably extinct. The hitherto known distribution includes Italy, India, Colombia, and Costa Rica. It is included as "Regionally Extinct" in the Italian red list of epiphytic lichens (Nascimbene & al. 2013c).

Pyrrhospora Körb.

Syst. Lich. Germ.: 209, 1855.

This genus of the Lecanoraceae, after the segregation of several species into *Ramboldia*, contains *c.* 7, mostly tropical species. *Pyrrhospora s.str.* differs from *Ramboldia* in having broadly ellipsoidal, hyaline ascospores that become brownish with age, a euthyplectenchymatous exciple and in the presence of the pigment 7-chloroemodin in the apothecia. The European species were treated by Hafellner (1993b). Type: *P. querneae* (Dicks.) Körb.

Pyrrhospora querneae (Dicks.) Körb.

Syst. Lich. Germ.: 209, 1855 - *Lichen querneus* Dicks., Fasc. Crypt. Brit., 1: 9, 1875.

Syn.: *Biatora querneae* (Dicks.) Fr., *Lecidea querneae* (Dicks.) Ach., *Protoblastenia querneae* (Dicks.) Clauzade

N - Frl, Lomb, Piem (Matteucci & al. 2010). C - Tosc (Putortì & Loppi 1999, Benesperi & al. 2013), Marc, Umb (Ravera 2000, Ravera & al. 2006), Laz (Massari & Ravera 2002), Sar (Hafellner 1993b, Zedda 2002, 2002b, Zedda & Sipman 2001, Rizzi & al. 2011). S - Camp (Catalano & al. 2012), Pugl (Nimis & Tretiach 1999, Durini & Medagli 2004), Bas (Puntillo & al. 2012), Cal (Puntillo 1995, 1996, Incerti & Nimis 2006), Si (Nimis & al. 1994, Grillo & Caniglia 2004, Caniglia & Grillo 2006b, Liistro & Cataldo 2011, Ottonello & al. 2011).

Cr/ Ch/ A.s/ Epiph/ pH: 1-2, L: 4-5, X: 2, E: 1-3/ Alt: 1-2/ SmedD: er, SmedH: rc, MedH: c, MedD: vr/ PT: 1-2/ suboc/ Note: a mainly Mediterranean-Atlantic species found on bark, sometimes on lignum, abundant in humid coastal-Mediterranean, mostly Tyrrhenian sites, where it is often fertile, much rarer elsewhere; also occurring, albeit rarely - and then mostly sterile - in the Insubrian District of Lombardia, probably extinct in Friuli.

Pyxine Fr.

Syst. Orb. Veg., 1: 267, 1825.

This is a mainly tropical genus in the Caliciaceae, with *c.* 70 species currently accepted worldwide. A key to the species with a yellow medulla was published by Aptroot & al. (2014b). Type: *P. soredata* (Ach.) Mont.

Pyxine soredata (Ach.) Mont.

in Sagra, Hist. Physc. Cuba, Bot. Pl. Cell., 9: 188, 1842 - *Lecidea soredata* Ach., Syn. Meth. Lich.: 54, 1814.

Syn.: *Physcia endochrysoides* Nyl., *Pyxine endochrysoides* (Nyl.) Degel.

C - Laz.

Fol.n/ Ch/ A.s/ Epiph-Sax/ pH: 2-3, L: 4, X: 2, E: 2-3/ Alt: 1/ MedH: er/ PT: 1/ oc/ Note: a subtropical species occurring both on bark (rarely) and on siliceous rocks. The species, which was considered as a pre-glacial relict in Europe by Masson (2008), is certainly very rare in Italy.

Pyxine subcinerea Stirt.

Trans. Proc. N. Z. Inst., 30: 397, 1898.

Syn.: *Pyxine chrysantha* Vain., *Pyxine chrysanthoides* Vain.

N - Lig (Castello & al. 1994, Brunialti & Giordani 2000, 2003, Modenesi & al. 2001, Giordani & al. 2001, 2002, 2003b, Benco & al. 2004, Ravera & Giordani 2007, 2008, Giordani & Incerti 2008). C - Tosc (Giordani & al. 2009, Benesperi & al. 2013), Laz (Massari & Ravera 2002, Ravera & Giordani 2007, 2008).

Fol.n/ Ch/ A.s/ Epiph/ pH: 2-3, L: 4, X: 2, E: 2-3/ Alt: 1/ MedH: vr/ PT: 1/ oc/ Note: a subtropical species; the Italian records are from *Olea* and *Cupressus*. It is included in the Italian red list of epiphytic lichens as "Vulnerable" (Nascimbene & al. 2013c).

Racodium Fr.

Syst. Mycol., 3, 1: 229, 1829, *nom. cons.*

The enigmatic sterile filamentous lichens placed in *Cystocoleus* and *Racodium* are characterised by fungal hyphae which surround a filament of the green alga *Trentepohlia*. Despite their anatomical similarity, molecular data have now shown that the two genera are not part of a single monophyletic group (Muggia & al. 2008), although they are both still classified in the Racodiaceae. The genus *Racodium* is monotypic, and occurs in both Hemispheres. Type: *R. rupestre* Pers.

Racodium rupestre Pers.

Tent. Disp. Meth. Fung.: 76, 1797.

Syn.: *Cystocoleus rupestris* (Pers.) Rabenh., *Rhacodiopsis rupestris* (Pers.) Donk

N - TAA (Muggia & al. 2008b, Muggia & Grube 2010), **Lomb, VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999).

Cr/ Tr/ A.f/ Sax/ pH: 1-2, L: 1-2, X: 1-2, E: 1/ Alt: 2-5/ Alp: er, Salp: r, Orom: vr, Mont: r, SmedD: vr/ PT: 1/ u/ Note: a widespread, temperate to southern boreal-montane, circumpolar lichen found on shaded, vertical or underhanging surfaces of siliceous rocks protected from rain, with a rather wide altitudinal range; undercollected, and certainly more widespread in the Alps.

R a m a l i n a Ach.

in Luyken, Tent. Hist. Lich.: 95, 1809, *nom. cons.*

This large genus with c. 250 species worldwide is one of the few genera of lichens that includes a high number of endemic species, especially on islands (e.g. in Macaronesia, Saint Helena, the Galapagos, Hawaii, and possibly Sardinia). A molecular study by Sérusiaux & al. (2010b) did not find any support for the recognition of the segregated genus *Fistulariella* Bowler & Rundel, and showed that the genus *Niebla* Rundel & Bowler is restricted to the New World, so that the several superficially similar species of Macaronesia and the Mediterranean Region should be retained in *Ramalina*. The genus is still insufficiently studied in southern Europe; the species of the Iberian Peninsula were treated by Arroyo (1993). Type (conserved): Type: *R. fraxinea* (L.) Ach.

Ramalina bourgaeana Nyl.

Mont. ex Nyl., Bull. Soc. Linn. Normandie, sér. 2, 4: 152, 1870.

Syn.: *Niebla bourgaeana* (Nyl.) Rundel & Bowler

C - Sar. S - Si (TSB 17363).

Frut/ Ch/ S/ Sax/ pH: 1-2, L: 4, X: 2, E: 1-3/ Alt: 1/ MedH: vr, MedD: er/ PT: 1/ coast/ Note: a Mediterranean-Macaronesian species found on coastal siliceous rocks; related to *R. rosacea*, but chemically different.

Ramalina breviuscula (Nyl.) Nyl.

Flora, 55: 426, 1872 - *Ramalina cuspidata* f. *breviuscula* Nyl., Bull. Soc. Linn. Normandie, ser. 2, 4: 159, 1870.

Syn.: *Ramalina mediterranea* H. Magn., *Ramalina pollinaria* var. *pulvinata* Anzi, *Ramalina pulvinata* (Anzi) Nyl.

N - Lig (Jatta 1909-1911). **C - Tosc, Laz** (Gigante & Petriccione 1995), **Sar** (Monte 1993). **S - Cal** (Puntillo 1996), **Si** (Ottonello & Romano 1997, Ottonello & al. 2011).

Frut/ Ch/ S/ Sax/ pH: 2-3, L: 4-5, X: 2, E: 1-3/ Alt: 1/ MedH: c, MedD: rc/ PT: 1/ coast, #/ Note: a mainly Mediterranean species found on coastal siliceous rocks; one of the most common epilithic Ramalinas in the Mediterranean area, with a Tyrrhenian distribution in Italy. It belongs to a complex in need of revision.

Ramalina calicaris (L.) Fr.

Sched. Crit.: 17, 1824 - *Lichen calicaris* L., Sp. Pl.: 1146, 1753.

Syn.: *Ramalina calicaris* var. *canaliculata* Fr., *Ramalina calicaris* var. *evernioides* (Anzi ex Jatta) Motyka, *Ramalina fraxinea* var. *evernioides* Anzi ex Jatta, *Ramalina polymorpha* var. *crispa* A. Massal. ex Beltr.

N - Ven, TAA (Nascimbene & al. 2007b), **Lomb, Piem** (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999), **Emil, Lig. C - Tosc, Marc, Laz, Abr, Mol** (Garofalo & al. 1999, Nimis & Tretiach 1999, Caporale & al. 2008), **Sar** (Zedda 1995, 2002, 2002b, Zedda & al. 2001, Cossu 2013). **S - Camp** (Garofalo & al. 1999, Aprile & al. 2003b), **Pugl** (Garofalo & al. 1999, Nimis & Tretiach 1999, Durini & Medagli 2004, Brackel 2011), **Bas** (Brackel 2011), **Cal** (Incerti & Nimis 2006), **Si** (Brackel 2008b).

Frut/ Ch/ S/ Epiph/ pH: 1-2, L: 4, X: 2, E: 1-2/ Alt: 2-3/ Mont: r, SmedH: er/ PT: 1/ Note: a mainly temperate species found on deciduous, more rarely coniferous trees, especially on branches in humid beech forests. Several earlier Italian records require confirmation, that from Venezia Giulia (see Nimis 1993: 596) was due to a misidentification.

Ramalina canariensis J. Steiner

Österr. bot. Z., 9: 8, 1904.

Syn.: *Ramalina latzelii* Zahlbr.

N - Lig (Valcuvia & al. 2000). **C - Tosc** (Pišút 1997, Putortù & Loppi 1999, Benesperi & al. 2013, Brackel 2015), **Laz** (Gigante & Petriccione 1995, Massari & Ravera 2002), **Sar** (Zedda 2002, Rizzi & al. 2011). **S - Camp** (Nimis & Tretiach 2004, Garofalo & al. 2010, Catalano & al. 2012), **Pugl** (Nimis & Tretiach 1999, Durini & Medagli 2002, 2004), **Bas** (Potenza & Fascetti 2005, 2012, Fascetti & al. 2006, Potenza 2006, Potenza & al. 2010), **Cal** (Puntillo & Vèzda 1994, Puntillo 1996, Incerti & Nimis 2006), **Si** (Nimis & al. 1994, Ottonello & Salone 1994, Ottonello & al. 1994, 2011, Ottonello & Romano 1997, Czezuga & al. 1999, Grillo & al. 2002, Grillo & Caniglia 2004, Caniglia & al. 2005, Caniglia & Grillo 2006b, Liistro & Cataldo 2011).

Frut/ Ch/ A.s/ Epiph/ pH: 1-3, L: 4-5, X: 2, E: 2-4/ Alt: 1-2/ SmedH: r, MedH: rc, MedD: vr/ PT: 1-2/ Note: a Mediterranean-Atlantic species found on the branches of littoral shrubs and small trees in maquis vegetation subject to humid maritime winds; mostly Tyrrhenian in Italy.

Ramalina capitata (Ach.) Nyl. var. ***capitata***

Flora, 55: 426, 1872 - *Ramalina polymorpha* var. *capitata* Ach., Lichenogr. Univ.: 601, 1810.

Syn.: *Ramalina strepsilis* (Ach.) Zahlbr., *Ramalina tinctoria* auct. p.p.

N - TAA (Caniglia & al. 2002), **Lomb** (Rivellini 1994), **Piem** (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999, Piervittori & al. 2001), **Emil, Lig. C** - **Laz, Sar** (Monte 1993, Zedda 1995, 2002, 2002b, Nöske 2000, Rizzi & al. 2011, Cossu & al. 2015). **S** - **Si** (Ottonello & Romano 1997, Ottonello & al. 2011).

Frut/ Ch/ A.s/ Sax/ pH: 2-3, L: 4-5, X: 3, E: 4-5/ Alt: 2-5/ Alp: rr, Salp: rc, Orom: rc, Mont: r, SmedD: vr, SmedH: vr/ PT: 1/ Note: on the top of exposed siliceous boulders frequently visited by birds.

Ramalina capitata var. ***digitellata*** (Nyl.) Nimis

The Lichens of Italy: 597, 1993 - *Ramalina digitellata* Nyl., Flora, 63: 10, 1880.

C - **Sar** (Cossu & al. 2015). **S** - **Si** (Ottonello & Romano 1997, Ottonello & al. 2011).

Frut/ Ch/ A.s/ Sax/ pH: 2-3, L: 4, X: 3, E: 4-5/ Alt: 1-2/ SmedH: vr, MedH: vr/ PT: 1/ Note: on the top of exposed siliceous boulders frequently visited by birds in Mediterranean Italy.

Ramalina capitata var. ***protecta*** (H. Magn.) Nimis

The Lichens of Italy: 597, 1993 - *Ramalina protecta* H. Magn., Bot. Not., 109: 150, 1956.

Syn.: *Ramalina polymorpha* var. *protecta* (H. Magn.) Clauzade & Cl. Roux

C - **Sar** (Lo Forti & al. 2004).

Frut/ Ch/ A.s/ Sax/ pH: 2, L: 4, X: 3, E: 3-4/ Alt: 1/ MedH: vr, MedD: er/ PT: 1/ Note: often found together with the other varieties, especially with var. *digitellata*, but perhaps more frequent under overhangs; not uncommon in parts of Sardegna.

Ramalina carminae R. Arroyo & Serriñá

in Arroyo & al., Bot. Complut., 35: 6, 2011.

C - **Sar** (Arroyo & al. 2011).

Frut/ Ch/ A.s/ Sax/ pH: 1-2, L: 4, X: 3, E: 3-4/ Alt: 1/ MedH: vr, MedD: er/ PT: 1/ Note: a recently-described species in the *R. polymorpha* complex, hitherto known from the Iberian Peninsula and Sardegna, characterised by the presence of soredia and of variolaric acid.

Ramalina clementeana Llimona & Werner

Acta Phytotaxon. Barcinon., 16: 9, 1975.

Syn.: *Ramalina cribrosa* f. *fastigiata* De Not.

C - **Tosc. Sar**.

Frut/ Ch/ S/ Sax/ pH: 2-3, L: 4, X: 1-2, E: 2-3/ Alt: 1/ MedH: er/ PT: 1/ coast/ Note: a Mediterranean-Macaronesian lichen found on coastal siliceous rocks, only in areas with frequent humid, maritime winds; related to *R. pusilla*, differing in the ecology and in some minor morphological characters, but also in the absence of salazinic acid.

Ramalina dilacerata (Hoffm.) Hoffm.

Herb. Viv., Coll. Plant. Sicc. Ces. Univ. Mosquensis: 451, 1825 - *Lobaria dilacerata* Hoffm., Deutschl. Fl., 2: 140, 1796.

Syn.: *Fistulariella dilacerata* (Hoffm.) Bowler & Riefner, *Fistulariella minuscula* (Nyl.) Bowler & Rundel, *Ramalina minuscula* Nyl.

N - **Ven, TAA** (Nascimbene & al. 2007b). **C** - **Abr, Mol** (Ravera & Genovesi 2012, Genovesi & Ravera 2014). **S** - **Camp** (Aprile & al. 2003), **Bas** (Ravera & al. 2015d).

Frut/ Ch/ S/ Epiph/ pH: 1-2, L: 3-4, X: 1-2, E: 1/ Alt: 3-4/ Salp: er, Mont: er/ PT: 1/ Note: a cool-temperate to boreal-montane, probably circumpolar lichen found on twigs and branches of acid-barked trees (especially conifers) and more rarely on lignum in very humid situations, mostly in the montane and subalpine belts. For the earlier records from southern Italy see Nimis (1993: 598). It is included in the Italian red list of epiphytic lichens as "Vulnerable" (Nascimbene & al. 2013c).

Ramalina elegans (Bagl. & Carestia) Stizenb.

Jahresber. Naturf. Ges. Graubündens, n.F. 34: 91, 1891 - *Ramalina calicaris* var. *elegans* Bagl. & Carestia, Atti Soc. Critt. Ital., 2: 159, 1880.

N - **TAA, Piem** (Isocrono & al. 2004). **C** - **Abr**.

Frut/ Ch/ S/ Epiph/ pH: 1-2, L: 3-4, X: 1-2, E: 1/ Alt: 3-4/ Salp: er, Mont: er/ PT: 1/ #/ Note: on bark of old deciduous trees, more rarely on conifers, in very humid, open montane forests; a lichen which deserves further study. It was included in the Italian red list of epiphytic lichens as "Data Deficient" (Nascimbene & al. 2013c).

Ramalina farinacea (L.) Ach.

Lichenogr. Univ.: 606, 1810 - *Lichen farinaceus* L., Sp. Pl., 1146, 1753.

Syn.: *Ramalina calicaris* var. *farinacea* (L.) Rabenh., *Ramalina fallax* Motyka, *Ramalina farinacea* var. *digitoradiata* Sambo, *Ramalina farinacea* var. *hypoprotocetrarica* (W.L. Culb.) D. Hawksw., *Ramalina farinacea* var. *multifida* Ach., *Ramalina farinacea* var. *pendulina* (Ach.) Ach., *Ramalina farinacea* var. *phalerata* (Ach.) Ach., *Ramalina farinacea* var. *reagens* B. de Lesd., *Ramalina farinacea* var. *subphalerata* Motyka, *Ramalina*

hypoprotocetrarica W.L. Culb., *Ramalina reagens* (B. de Lesd.) W.L. Culb., *Ramalina subfarinacea* var. *salazinic*a D. Hawksw.

N - VG (Carvalho 1997), **Frl** (Tretiach 1996, Tretiach & Molaro 2007), **Ven** (Nascimbene & Caniglia 1997, 2000b, 2003c, Lazzarin 1997, Caniglia & al. 1999, Cercasov & al. 2002, Nascimbene 2005c, 2008, 2008c, 2011, Nascimbene & al. 2005b, 2006, 2006c, 2007, 2009c, 2010b, 2013b, Nascimbene & Marini 2007, 2010, Brackel 2013), **TAA** (Nascimbene & Caniglia 2000b, Caniglia & al. 2002, Nascimbene 2003, 2005b, 2006b, 2006c, 2008b, 2014, Nascimbene & al. 2006e, 2007b, 2009, 2010, 2014, Brackel 2013, Nimis & al. 2015), **Lomb** (Rivellini 1994, Tretiach 1996, Dalle Vedove & al. 2004, Nascimbene & Marini 2015), **Piem** (Arosio & al. 1998, Buzio 2003, Piervittori 2003, Isocrono & al. 2003, Castino 2004, Isocrono & Piervittori 2008, Furlanetto 2010), **VA** (Valcuvia 2000, Valcuvia & al. 2000b, Furlanetto 2010), **Emil** (Tretiach & al. 2008, Benesperi 2009, Brackel 2015), **Lig** (Giordani & al. 2002, Giordani & Incerti 2008). **C - Tosc** (Tretiach & Nimis 1994, Loppi & Putortù 1995b, 2001, Loppi & De Dominicis 1996b, Loppi & al. 1997b, 1998, 2002, Putortù & al. 1998, Tretiach & Ganis 1999, Putortù & Loppi 1999b, Paoli & Loppi 2001, Loppi & Frati 2006, Frati & al. 2006b, Benesperi & al. 2007, Lastrucci & al. 2009, Brunialti & Frati 2010, Benesperi 2011, Brunialti & al. 2012b, Paoli & al. 2012, 2015d, Brackel 2015), **Marc** (Brackel 2015), **Umb** (Ravera 1998, Ravera & al. 2006, Panfili 2007, Brackel 2015), **Laz** (Bartoli & al. 1997, Ravera 2002, Massari & Ravera 2002, Ravera & al. 2003, Nimis & Tretiach 2004, Ruisi & al. 2005, Munzi & al. 2007, Zucconi & al. 2013, Brackel 2015), **Abr** (Olivieri & al. 1997, 1997b, Nimis & Tretiach 1999, Brackel 2015, Caporale & al. 2016, Corona & al. 2016), **Mol** (Garofalo & al. 1999, Nimis & Tretiach 1999, Caporale & al. 2008, Ravera & al. 2010, Genovesi & Ravera 2014, Brackel 2015, Paoli & al. 2015), **Sar** (Zedda 1995, 1999, 2002, 2002b, Loi & al. 2000, Zedda & al. 2001, Rizzi & al. 2011, Giordani & al. 2013, Cossu 2013). **S - Camp** (Garofalo & al. 1999, 2010, Ricciardi & al. 2000, Aprile & al. 2002, 2003, 2003b, 2011, Nimis & Tretiach 2004, Nascimbene & al. 2010b, Brunialti & al. 2013, Ravera & Brunialti 2013, Catalano & al. 2016), **Pugl** (Garofalo & al. 1999, Nimis & Tretiach 1999, Durini & Medagli 2004, Brackel 2011), **Bas** (Nimis & Tretiach 1999, Potenza 2006, Potenza & al. 2010, Brackel 2011), **Cal** (Puntillo 1995, 1996, Puntillo & Puntillo 2004, Incerti & Nimis 2006, Puntillo 2011, Brackel & Puntillo 2016), **Si** (Czeczuga & al. 1994, Nimis & al. 1994, Ottonello & Salone 1994, Ottonello & al. 1994, 2006d, Grillo & Cristaudo 1995, Ottonello 1996, Ottonello & Romano 1997, Grillo & Caniglia 2004, 2006, Falco Scampatelli 2005, Caniglia & Grillo 2006b, Stofer 2006, Brackel 2008b, 2008c, Gianguzzi & al. 2009, Liistro & Cataldo 2011).

Frut/ Ch/ A.s/ Epiph/ pH: 2-3, L: 3-5, X: 1-2, E: 1-2/ Alt: 1-4/ Salp: rr, Mont: vc, SmedD: r, SmedH: rc, MedH: rr/ PT: 1-2/ Note: a widespread, Mediterranean-Atlantic to southern boreal lichen found on bark in humid situations, from the mountains to the Mediterranean belt; extinct over much of the northern plains but still common in upland areas; the species is chemically and morphologically very polymorphic: in my opinion, the various chemical strains, and perhaps even the saxicolous forms usually called *R. subfarinacea* (see note on that taxon), hardly deserve a segregation above the varietal level.

***Ramalina fastigiata* (Pers.) Ach.**

Lichenogr. Univ.: 603, 1810 - *Lichen fastigiatus* Pers., N. Ann. Bot., 1: 156, 1794.

Syn.: *Ramalina calicaris* var. *fastigiata* (Pers.) Fr., *Ramalina fastigiata* var. *exasperata* Delise, *Ramalina fastigiata* var. *multipartita* Erichsen, *Ramalina fastigiata* f. *torulosa* A. Massal. ex Jatta, *Ramalina fenestrata* Motyka, *Ramalina populina* (Hoffm.) Vain.

N - VG (Tretiach 1993, Castello 2002, Martellos & Castello 2004), **Frl** (Tretiach 1993, Tretiach & Molaro 2007), **Ven** (Tretiach 1993, Nascimbene & Caniglia 1997, 2002c, 2003c, Lazzarin 1997, 2000, Caniglia & al. 1999, Nascimbene 2005c, 2008c, Nascimbene & al. 2006c, 2010b, Nascimbene & Marini 2007), **TAA** (Nascimbene & Caniglia 2000b, Nascimbene 2003, 2005b, 2008b, Nascimbene & al. 2005, 2006, 2006e, Nimis & al. 2015), **Lomb** (Zocchi & al. 1997, Dalle Vedove & al. 2004, Furlanetto 2010), **Piem** (Isocrono & al. 2004, Furlanetto 2010), **Emil** (Tretiach 1993, Nimis & al. 1996, Dalle Vedove & al. 2002, Benesperi 2009, Gerdol & al. 2014, Brackel 2015), **Lig** (Tretiach 1993, Brunialti & al. 1999, Putortù & al. 1999b, Giordani & al. 2002, Brunialti & Giordani 2003). **C - Tosc** (Tretiach 1993, Tretiach & Nimis 1994, Loppi & Putortù 1995b, Loppi 1996, Loppi & De Dominicis 1996, 1996b, Loppi & al. 1997, 1997b, 1998, 1999a, 2002, 2002c, 2003, 2004, 2004c, 2006, Monaci & al. 1997, Putortù & al. 1998, Loppi & Nascimbene 1998, 2010, Tretiach & Ganis 1999, Putortù & Loppi 1999b 9, Senese & Critelli 2000, Paoli & Loppi 2001, 2008, Lorenzini & al. 2003, Landi & Loppi 2003, Loppi & Frati 2004, 2006, Benesperi 2006, 2011, Benesperi & al. 2007, Brackel 2008, Lastrucci & al. 2009, Pasquinelli & al. 2009, Brunialti & Frati 2010, Pasquinelli & Puccini 2010, Loppi & Pirintzos 2000, Paoli & al. 2012b, 2013, Brackel 2015), **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera 1998, Panfili 2000b, 2007, Ravera & al. 2006), **Laz** (Tretiach 1993, Bartoli & al. 1997, Ravera 2002, Ravera & al. 2003, Massari & Ravera 2002, Nimis & Tretiach 2004, Ruisi & al. 2005, Munzi & al. 2007, Zucconi & al. 2013, Brackel 2015), **Abr** (Tretiach 1993, Recchia & al. 1993, Olivieri & al. 1997, 1997b, Loppi & al. 1998d, 1999, Nimis & Tretiach 1999, Stofer 2006, Caporale & al. 2016), **Mol** (Garofalo & al. 1999, Nimis & Tretiach 1999, Caporale & al. 2008, Genovesi & Ravera 2014), **Sar** (Tretiach 1993, Zedda 1995, 2002, 2002b, Loi & al. 2000, Zedda & al. 2001, Rizzi & al. 2011, Cossu 2013). **S - Camp** (Garofalo & al. 1999, 2010, Ricciardi & al. 2000, Aprile & al. 2002, 2003, 2003b, 2011, Nimis & Tretiach 2004, Brunialti & al. 2010, 2013, Nascimbene & al. 2010b, Ravera & Brunialti 2013, Catalano & al. 2016), **Pugl** (Garofalo & al. 1999, Nimis & Tretiach 1999, Durini & Medagli 2004, Brackel 2011), **Bas** (Nimis & Tretiach 1999, Potenza 2006, Brackel 2011, Ertz & al. 2015), **Cal** (Tretiach 1993, Puntillo 1996, Puntillo & Puntillo 2004, Incerti & Nimis 2006, Puntillo 2011, Brackel & Puntillo 2016), **Si** (Tretiach 1993, Merlo 1993, 2004, 2004b, Czeczuga & al. 1994, Nimis & al. 1994, Ottonello & Salone 1994, Ottonello & al. 1994, Grillo & Cristaudo 1995, Ottonello 1996, Ottonello & Romano 1997, Grillo 1998, Grillo & Caniglia 2004, 2006, Stofer 2006, Brackel 2008b, 2008c, Gianguzzi & al. 2009, Liistro & Cataldo 2011).

Frut/ Ch/ S/ Epiph/ pH: 2-3, L: 3-5, X: 2-3, E: 1-3/ Alt: 1-4/ Salp: r, Mont: c, SmedD: rc, Pad: er, SmedH: rc, MedH: rr, MedD: er/ PT: 1-2/ Note: a widespread, mainly temperate lichen found on broad-leaved, more rarely coniferous trees in open stands; still common throughout Italy, but almost extinct in the plains of northern Italy; some morphs from humid beech forests of southern Italy deserve further study.

***Ramalina fraxinea* (L.) Ach.**

Lichenogr. Univ.: 602, 1810 - *Lichen fraxineus* L., Sp. Pl., 2: 1146, 1753.

Syn.: *Ramalina calicaris* var. *fraxinea* (L.) Mont., *Ramalina canaliculata* var. *apenninica* Sambo, *Ramalina fraxinea* f. *calycula* (A. Massal.) Zahlbr., *Ramalina fraxinea* var. *ampliata* (Ach.) Ach., *Ramalina fraxinea* var. *angulosa* (A. Massal.) Motyka, *Ramalina fraxinea* var. *calicariiformis* Nyl., *Ramalina fraxinea* var. *crispa* Motyka, *Ramalina fraxinea* var. *fastuosa* (A. Massal.) Motyka, *Ramalina fraxinea* var. *oleae* A. Massal., *Ramalina fraxinea* var. *taeniata* (Ach.) Rebert., *Ramalina polymorpha* var. *angulosa* A. Massal., *Ramalina polymorpha* var. *calycula* A. Massal., *Ramalina polymorpha* var. *fastuosa* A. Massal.

N - VG, FrI, Ven (Nascimbene & Caniglia 1997, Lazzarin 1997, Caniglia & al. 1999, Lazzarin 2000b, Nascimbene 2008c), **TAA** (Nascimbene 2003, Stofer 2006, Nascimbene & al. 2007b), **Lomb** (Dalle Vedove & al. 2004), **Piem** (Pierivittori 2003, Isocrono & al. 2004, 2007, Morisi 2005), **Emil** (Tretiach & al. 2008, Benesperi 2009), **Lig** (Brunialti & al. 1999, Giordani & al. 2002, Giordani 2006, Giordani & Incerti 2008). **C - Tosc** (Loppi & al. 1995, 1997, 1997b, 1998, 1998b, Putortù & al. 1998, Loppi & Nascimbene 1998, 2010, Tretiach & Ganis 1999, Putortù & Loppi 1999b, Loppi & Frati 2006, Benesperi 2006, 2011, Benesperi & al. 2007, 2013, Lastrucci & al. 2009, Brunialti & Frati 2010, Brunialti & al. 2012b, Paoli & al. 2012, 2012b, 2013, Brackel 2015, Nascimbene & al. 2015), **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera 1998, 1999, Panfili 2000, 2000b, 2007, Ravera & al. 2006, Brackel 2015), **Laz** (Ravera 2002, Massari & Ravera 2002, Ruisi & al. 2005, Munzi & al. 2007, Zucconi & al. 2013, Brackel 2015), **Abr** (Nimis & Tretiach 1999, Brackel 2015, Caporale & al. 2016), **Mol** (Garofalo & al. 1999, Nimis & Tretiach, 1999, 2004, Caporale & al. 2008, Genovesi & Ravera 2014), **Sar** (Zedda 1995, 2002, 2002b, Zedda & al. 2001, Rizzi & al. 2011). **S - Camp** (Garofalo & al. 1999, 2010, Aprile & al. 2002, 2003, 2003b, 2011, Nimis & Tretiach 2004, Nascimbene & al. 2010b, Brunialti & al. 2013, Ravera & Brunialti 2013, Cossu 2013, Catalano & al. 2016), **Pugl** (Garofalo & al. 1999, Nimis & Tretiach 1999, Brackel 2011), **Bas** (Nimis & Tretiach 1999, Potenza 2006, Brackel 2011, Caggiano & al. 2015), **Cal** (Puntillo 1995, 1996, Puntillo & Puntillo 2004, Incerti & Nimis 2006, Brackel & Puntillo 2016), **Si** (Czeczuga & al. 1994, Ottonello & Salone 1994, Ottonello & al. 1994, Grillo & Cristaudo 1995, Ottonello 1996, Ottonello & Romano 1997, Clocchiatti & al. 2000, 2002b, Merlo 2004, 2004b, Grillo & Caniglia 2004, 2006, Falco Scampatelli 2005, Brackel 2008b, 2008c, Liistro & Cataldo 2011, Ertz & al. 2015).

Frut/ Ch/ S/ Epiph/ pH: 2-3, L: 4-5, X: 2-3, E: 2-3/ Alt: 2-3/ Mont: rc, SmedD: vr, SmedH: rr/ PT: 1/ Note: a mainly mild-temperate lichen found on more or less isolated deciduous trees; locally abundant in the Apennines, much rarer in northern Italy, and extinct in the Po-plain.

***Ramalina implectens* Nyl.**

Bull. Soc. Linn. Normandie, sér. 2, 4: 116, 1870.

C - Sar (Zedda 1995, 2002, 2002b). **S - Camp** (Nimis & Tretiach 2004), **Cal** (Puntillo 1996), **Si**.

Frut/ Ch/ S/ Epiph/ pH: 1-2, L: 3-4, X: 1-2, E: 1-2/ Alt: 1/ MedH: vr/ PT: 1/ suboc/ Note: a Mediterranean-Macaronesian species found on branches of evergreen trees and shrubs in open, but very humid stands in Tyrrhenian Italy; this is perhaps the primary, sexually reproducing species of *R. farinacea*. It is included in the Italian red list of epiphytic lichens as “Vulnerable” (Nascimbene & al. 2013c).

***Ramalina implexa* (Nyl.) Krog**

Acta Bot. Fenn., 150: 103, 1994 - *Ramalina scopulorum* var. *implexa* Nyl., Syn. Lich.: 293, 1980.

Syn.: *Alectoria arabum* auct. eur. non Dill. ex Ach., *Ramalina arabum* auct. eur. non (Dill. ex Ach.) Meyen & Flot., *Ramalina usnea* auct. eur.

C - Tosc, Laz (Gigante & Petriccione 1995), **Sar** (Krog 1994). **S - Si** (Krog 1994, Ottonello & Romano 1997).

Frut/ Ch/ A.f/ Sax/ pH: 2-4, L: 3-4, X: 1-2, E: 1-2/ Alt: 1/ MedH: vr/ PT: 1/ coast/ Note: a mainly Mediterranean lichen found on siliceous, much more rarely calcareous rocks in coastal sites with frequent fog and/or exposed to humid maritime winds; widespread and locally abundant in the small siliceous islands (a stunted specimen in TSB is on limestone).

***Ramalina lacera* (With.) J.R. Laundon**

Lichenologist, 16: 221, 1984 - *Lichen lacerus* With., Bot. Arrang. Veget. Gr. Brit.: 716, 1776.

Syn.: *Desmazieria evernioides* auct., *Ramalina duriaei* (De Not.) Bagl., *Ramalina evernioides* auct. non Nyl.

C - Tosc, Laz, Sar (Zedda 2002, 2002b, Rizzi & al. 2011). **S - Camp, Pugl** (Nimis & Tretiach 1999, Durini & Medagli 2004), **Bas** (Fascetti & al. 2006, Potenza 2006, Potenza & al. 2010), **Si** (Nimis & al. 1994, Ottonello & Salone 1994, Grillo & Cristaudo 1995, Grillo 1998, Czeczuga & al. 1999, Grillo & Caniglia 2004, Caniglia & Grillo 2006b).

Frut/ Ch/ A.s/ Epiph-Sax/ pH: 2-3, L: 4-5, X: 1-2, E: 2-3/ Alt: 1-2/ SmedH: er, MedH: r, MedD: er/ PT: 1/ suboc/ Note: a mainly Mediterranean-Atlantic lichen recently reported also from the Americas, found on twigs, more rarely on rocks in maquis vegetation near the coast; mostly Tyrrhenian in Italy. An earlier record from Emilia (see Nimis 1993: 600), being dubious, is not accepted here.

***Ramalina lusitanica* H. Magn.**

Bot. Not., 109: 149, 1956.

C - Laz, Sar (Zedda 2002, 2002b). **S - Camp**.

Frut/ Ch/ S/ Epiph/ pH: 2-3, L: 4-5, X: 1-2, E: 1-2/ Alt: 1/ MedH: er/ PT: 1/ suboc/ Note: a typically Mediterranean species of coastal maquis vegetation subject to humid maritime winds. found on twigs of evergreen shrubs and small trees in open situations. It is included in the Italian red list of epiphytic lichens as “Vulnerable” (Nascimbene & al. 2013c).

***Ramalina maciformis* (Delise) Bory**

Dict. Class. Hist. Nat., 14: 458, 1828 - *Parmelia maciformis* Delise, Descr. Egypte: 144, 1813.

Syn.: *Niebla maciformis* (Delise) Rundel & Bowler, *Ramalina evernioides* Nyl. non auct.

C - Tosc. S - Bas, Si (Ottonello & Romano 1997).

Frut/ Ch/ A.s/ Sax/ pH: 2-3, L: 4-5, X: 2, E: 1-3/ Alt: 1/ MedH: vr, MedD: vr/ PT: 1/ coast/ Note: a Mediterranean species of coastal siliceous rocks, probably occurring also in Sardegna and in some of the small islands of southern Italy.

Ramalina obtusata (Arnold) Bitter

Pringsheim Jahrb. wiss. Bot., 36: 435, 1901 - *Ramalina minuscula* var. *obtusata* Arnold, Verh. zool.-bot. Ges. Wien, 25: 472, 1875.

Syn.: *Ramalina baltica* auct. p.p. non Lettau

N - Frl, Ven (Nascimbene & Caniglia 1997, 2003c, Caniglia & al. 1999, Nascimbene & al. 2009c, Nascimbene 2011), **TAA** (Nascimbene 2006b, 2008b, 2014, Nascimbene & al. 2006, 2006e, 2007b, 2009, 2010, 2014, Stofer 2006, Nascimbene & Marini 2015, Nimis & al. 2015). **C - Mol** (Nimis & Tretiach 1999, Caporale & al. 2008). **S - Camp** (Aprile & al. 2003b, Garofalo & al. 2010).

Frut/ Ch/ A.s/ Epiph/ pH: 1-2, L: 3-4, X: 1-2, E: 1/ Alt: 3-4/ Salp: er, Mont: vr/ PT: 0/ Note: a cool-temperate to southern boreal species found on old conifers, more rarely on deciduous trees and shrubs in cold-moist, but open montane forests; probably more widespread, but never common, in the mountains. It is included in the Italian red list of epiphytic lichens as "Vulnerable" (Nascimbene & al. 2013c).

Ramalina panizzei De Not.

Giorn. Bot. Ital., 1: 211, 1846.

N - Frl (Groner & La Greca 1997), **Ven, Lig** (Groner & La Greca 1997). **C - Tosc, Laz** (TSB 6363), **Abr** (Groner & La Greca 1997), **Sar** (TSB 6030). **S - Camp** (Aprile & al. 2003b), **Bas** (Puntillo & al. 2012, Ravera & al. 2015d), **Cal** (Puntillo 1996, Groner & La Greca 1997), **Si**.

Frut/ Ch/ S/ Epiph/ pH: 1-2, L: 3-4, X: 1-2, E: 1-2/ Alt: 3/ Mont: vr/ PT: 1/ Note: on bark in humid montane forests, frequently confused with *R. fastigiata*, but differing, among other characters, by the presence of sekikaic and homosekikaic acids (see Groner & La Greca 1997). It is included in the Italian red list of epiphytic lichens as "Near-threatened" (Nascimbene & al. 2013c).

Ramalina pollinaria (Westr.) Ach.

Lichenogr. Univ.: 608, 1810 - *Lichen pollinarius* Westr., K. Vetensk.-Akad. Nya Handl., 16: 56, 1795.

Syn.: *Ramalina farinacea* var. *bolcana* A. Massal., *Ramalina intermedia* auct. non (Delise ex Nyl.) Nyl., *Ramalina pollinaria* var. *humilis* Ach.

N - Frl, Ven (Caniglia & al. 1999, Nascimbene 2005c, 2008c, 2011, Nascimbene & al. 2005b, 2006c, 2007, 2009c, 2010b, Nascimbene & Marini 2007), **TAA** (Nascimbene 2005b, 2006c, 2008c, 2014, Nascimbene & al. 2006e, 2007b, 2014, Nascimbene & Marini 2015, Nimis & al. 2015), **Lomb** (Rivellini 1994, Valcuvia & al. 2003, Dalle Vedove & al. 2004), **Piem** (Morisi & Sereno 1995, Isocrono & Falletti 1999, Isocrono & al. 2003, Piervittori 2003, Morisi 2005, Isocrono & Piervittori 2008, Sandrone & al. 2009), **VA** (Piervittori & Maffei 1996, Piervittori & Isocrono 1997, 1999, Piervittori & al. 2001, Isocrono & al. 2008), **Emil, Lig** (Brunialti & al. 1999). **C - Tosc** (Benesperi & al. 2007, Benesperi 2011), **Laz, Abr, Sar, S - Camp** (Ricciardi & al. 2000, Nascimbene & al. 2010b, Brunialti & al. 2013, Ravera & Brunialti 2013), **Pugl, Bas, Si** (Nimis & al. 1994).

Frut/ Ch/ A.s/ Epiph-Sax/ pH: 2-4, L: 3-5, X: 2-3, E: 2-4/ Alt: 2-4/ Salp: rr, Mont: r, SmedD: vr, SmedH: er/ PT: 1-2/ subc, u/ Note: a widespread, cool-temperate to subarctic-subalpine, circumpolar lichen found on ancient isolated trees, and on vertical to underhanging surfaces of base-rich or calciferous rocks; widespread, but never common in Italy, except in dry-warm sites of the central-western Alps, where it mostly occurs on rocks.

Ramalina polymorpha (Lilj.) Ach.

Lichenogr. Univ.: 600, 1810 - *Lichen calicaris* var. *polymorphus* Lilj., Utkast Svensk Flora: 426, 1798.

Syn.: *Ramalina grappae* Sambo, *Ramalina polymorpha* var. *empletta* (Ach.) Ach., *Ramalina polymorpha* var. *ligulata* (Ach.) Ach., *Ramalina tinctoria* auct. ital. p.p.

N - Frl, Ven, TAA (Caniglia & al. 2002), **Lomb** (Valcuvia & al. 2003), **Piem** (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999), **Emil, Lig** (Brunialti & al. 1999). **C - Laz, Sar** (Monte 1993, Nöske 2000, Cossu & al. 2015). **S - Camp, Bas** (Puntillo & al. 2012), **Cal** (Puntillo 1996), **Si** (Czeczuga & al. 1994, Ottonello & Romano 1997, Grillo & Caniglia 2004, Brackel 2008b, Ottonello & al. 2011).

Frut/ Ch/ A.i/ Sax/ pH: 2-3, L: 4, X: 2-3, E: 3-4/ Alt: 3-5/ Alp: vr, Salp: rr, Orom: c, Mont: rr/ PT: 1/ Note: on the top of isolated siliceous boulders manured by birds, e.g. in grasslands and pastures, common only wherever suitable substrata are present, especially in the mountains of southern Italy (e.g. Sila Massif in Calabria, siliceous mountains of Sardegna).

Ramalina pusilla Duby

Bot. Gall., 2: 614, 1830.

C - Tosc (Benesperi & al. 2013), **Laz** (Gigante & Petriccione 1995), **Sar** (Zedda 2002, 2002b, Munzi & Ravera 2013). **S - Camp** (Garofalo & al. 2010, Ravera & Brunialti 2013), **Pugl** (Durini & Medagli 2004, Brackel 2011), **Si** (Nimis & al. 1994).

Frut/ Ch/ S/ Epiph/ pH: 2-3, L: 4, X: 1-2, E: 2/ Alt: 1/ MedH: vr/ PT: 1/ suboc/ Note: a Mediterranean-Macaronesian lichen found on twigs and small branches, especially of evergreen shrubs and trees in open stands, restricted to undisturbed, open coastal forests and maquis with frequent humid winds or fog; exclusively Tyrrhenian in Italy. The record of *R. inflata* by Ravera & Brunialti (2013) refers to this species.

The authors are often specified as “Le Prév. ex Duby”, but Le Prévost just collected the lichen described by Duby. It is included in the Italian red list of epiphytic lichens as “Vulnerable” (Nascimbene & al. 2013c).

Ramalina requienii (De Not.) Jatta

Syll. Lich. Ital.: 64, 1900 - *Ramalina polymorpha* var. *requienii* De Not., Giorn. Bot. Ital., 2, 1: 215, 1846.

Syn.: *Ramalina pollinaria* f. *cetarioides* Bagl.

N - Lig. C - Tosc. Laz. Sar (Nöske 2000, Zedda 2002, Cossu & al. 2015). **S - Si** (Grillo 1998, Grillo & Caniglia 2004, Ottonello & al. 2011).

Frut/ Ch/ A.s/ Sax/ pH: 2-3, L: 4, X: 2, E: 1-2/ Alt: 1/ MedH: r/ PT: 1/ Note: a Mediterranean species found on coastal siliceous rocks subject to humid maritime winds; exceptionally found also far from the coast, and then in sheltered, but light-rich situations.

Ramalina roesleri (Schaer.) Nyl.

Bull. Soc. linn. Normandie, sér. 2, 4: 165 (note), 1870 - *Ramalina farinacea* var. *roesleri* Höchst. ex Schaer., Enum. Crit. Lich. Eur.: 9, 1850.

Syn.: *Fistulariella roesleri* (Schaer.) Bowler & Rundel, *Ramalina pollinariella* (Nyl.) Nyl.

N - Ven, TAA (Dalla Torre & Sarthein 1902, Nascimbene & al. 2007b). **C - Tosc** (Brackel 2015), **Sar** (Tretiach 1993). **S - Si** (Tretiach 1993, Nimis & al. 1994, Ottonello & Salone 1994, Ottonello & Romano 1997).

Frut/ Ch/ A.s/ Epiph/ pH: 1-2, L: 4-5, X: 2, E: 1-2/ Alt: 1-3/ Mont: er, SmedH: er, MedH: er/ PT: 1/ suboc/ Note: both in open humid beech forests and in very humid Mediterranean maquis vegetation, perhaps extinct in northern Italy. Very abundant on shrubs on the island of Marettimo, at c. 300-400 m, in a belt dominated by *Teloschistes chrysophthalmus* with variable air humidity conditions (frequent alternance between fog and sun). The species is included in the Italian red list of epiphytic lichens as “Vulnerable” (Nascimbene & al. 2013c).

Ramalina rosacea (A. Massal.) Hepp

Flecht. Eur.: nr. 356, 1857 - *Ramalina polymorpha* var. *rosacea* Schaer. ex A. Massal., Sched. Crit., 11: 157, 1856.

Syn.: *Ramalina bourgeana* auct. ital. p.p., *Ramalina bourgaeana* var. *morisiana* Bagl.

C - Sar. S - Si.

Frut/ Ch/ S/ Sax/ pH: 1-2, L: 4, X: 2, E: 1-3/ Alt: 1/ MedH: r, MedD: vr/ PT: 1/ coast, #/ Note: a Mediterranean species found on coastal siliceous rocks subject to maritime winds; related to *R. bourgeana*, but chemically different.

Ramalina siliquosa (Huds.) A.L. Sm.

Monogr. Brit. Lich., 1: 172, 1918 - *Lichen siliquosus* Huds., Fl. Angl.: 460, 1762.

Syn.: *Ramalina crassa* (Delise ex Nyl.) Motyka, *Ramalina cribrosa* De Not., *Ramalina druidarum* W.L. Culb., *Ramalina incrassata* (Nyl.) Motyka, *Ramalina kullensis* Zopf, *Ramalina scopulorum* (Retz.) Ach., *Ramalina scopulorum* var. *incrassata* Nyl., *Ramalina siliquosa* var. *druidarum* (W.L. Culb.) D. Hawksw.

C - Tosc. Laz (Gigante & Petriccione 1995), **Sar** (Monte 1993). **S - Camp, Si** (Ottonello & Romano 1997, Ottonello & al. 2011).

Frut/ Ch/ S/ Sax/ pH: 1-3, L: 4-5, X: 1-2, E: 1-2/ Alt: 1/ MedH: er/ PT: 1/ suboc, coast/ Note: a mainly Atlantic species of coastal siliceous rocks; in Italy it is evidently rare and restricted to the Tyrrhenian region.

Ramalina sinensis Jatta

N. Giorn. Bot. Ital., n. ser., 9: 462, 1902.

Syn.: *Ramalina calicaris* f. *fibrillosa* Th. Fr., *Ramalina calicaris* var. *nervosa* (Nyl.) Räsänen, *Ramalina fastigiata* var. *nervosa* Nyl., *Ramalina landroënsis* Zopf, *Ramalina nervosa* (Nyl.) Räsänen

N - TAA (Nascimbene & al. 2007b).

Frut/ Ch/ S/ Epiph/ pH: 2-3, L: 4, X: 2, E: 3-4/ Alt: 3-4/ Salp: er, Mont: er/ PT: 1/ subc/ Note: on twigs of trees and shrubs in montane forests, this species is abundant in *Picea obovata* stands along rivers in Central Asia (e.g. in the Altay Mnts., Burjatja, the Baikal region, TSB). I have never seen a sample from Italy, but the old record from Trentino might be correct, while that from Campania (see Nimis 1993: 604), being dubious, is not accepted here. The species was included as “Regionally Extinct” in the Italian red list of epiphytic lichens (Nascimbene & al. 2013c).

Ramalina subfarinacea (Cromb.) Nyl.

Bull. Soc. Linn. Normandie, sér. 2, 6: 258, 1872 - *Ramalina scopulorum* var. *subfarinacea* Nyl. ex Cromb., J. Bot. London, 10: 74, 1872.

Syn.: *Ramalina angustissima* (Anzi) Vain., *Ramalina farinacea* var. *angustissima* Anzi, *Ramalina farinacea* var. *rubescens* Räsänen, *Ramalina farinacea* f. *saxicola* Jatta

N - Ven (Lazzarin 2000b), **Emil** (Tretiach & al. 2008), **Lig. C - Tosc. Laz. Abr. Sar** (Monte 1993, Nöske 2000, Zedda 2002, Rizzi & al. 2011, Cossu & al. 2015). **S - Camp, Bas, Cal** (Puntillo 1996), **Si** (Ottonello & Romano 1997, Czeczuga & al. 1999, Iacolino & Ottonello 2006, Ottonello & al. 2006d, 2011, Liistro & Cataldo 2011).

Frut/ Ch/ A.s/ Sax/ pH: 2-3, L: 4-5, X: 2, E: 2-3/ Alt: 1-2/ SmedD: er, SmedH: r, MedH: vr/ PT: 1/ suboc/ Note: on siliceous and weakly calcareous rocks in humid, but very open situations. I am not certain that this saxicolous taxon deserves to be separated from *R. farinacea* at species level.

Ramalina subgeniculata Nyl.

Bull. Soc. Linn. Normandie, sér. 2, 4: 167, 1870.

Syn.: *Ramalina panizzei* auct. non De Not.

C - Tosc, Laz (Gigante & Petriccione 1995, Ravera 2002), **Sar** (Zedda 2002, Rizzi & al. 2011), **S - Camp** (Nimis & Tretiach 2004, Nascimbene & al. 2010b, Garofalo & al. 2010, Brunialti & al. 2013), **Bas** (Nimis & Tretiach 1999, Fascetti & al. 2006, Potenza 2006, Potenza & al. 2010), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994, Ottonello & Salone 1994, Ottonello & al. 1994, Ottonello 1996, Liistro & Cataldo 2011).

Frut/ Ch/ S/ Epiph/ pH: 1-2, L: 4, X: 2, E: 1-2/ Alt: 1-2/ SmedH: er, MedH: vr/ PT: 1/ suboc/ Note: a Mediterranean-Macaronesian species found on twigs of shrubs and young trees in warm-humid Mediterranean areas, generally near the coast, almost exclusively Tyrrhenian in Italy; the record from inland Basilicata, from a humid oak forest, is somehow surprising. It is included in the Italian red list of epiphytic lichens under the "Least Concern" category (Nascimbene & al. 2013c).

Ramalina thrausta (Ach.) Nyl.

Syn. Lich., 1: 296, 1860 - *Alectoria thrausta* Ach., Lichenogr. Univ.: 596, 1810.

Syn.: *Alectoria crinalis* Ach., *Alectoria sarmentosa* var. *crinalis* (Ach.) H. Olivier, *Ramalina crinalis* (Ach.) Gyeln., *Ramalina thrausta* f. *sorediosula* Nyl.

N - Frl (Nascimbene & al. 1998), **Ven** (Nascimbene & Caniglia 2000b, 2003c, Nascimbene 2003b, 2011, Nascimbene & al. 2009c), **TAA** (Nascimbene 2006b, 2008c, 2014, Nascimbene & al. 2006e, 2007b, 2009, 2010, 2014, Nascimbene & Marini 2015, Nimis & al. 2015), **C - Tosc** (Benespero & al. 2007), **Sar, S - Pugl** (Nimis & Tretiach 1999), **Si**.

Frut/ Ch/ A.s/ Epiph/ pH: 1-2, L: 3-5, X: 1-2, E: 1/ Alt: 3-4/ Salp: er, Mont: vr/ PT: 0/ suboc/ Note: a cool-temperate to southern boreal lichen found on branches and twigs of conifers and deciduous trees in montane forests with frequent fog, occasionally lignicolous and saxicolous; rare and probably declining throughout Italy.

Ramalina tingitana Salzm.

Bull. Soc. Linn. Normandie, sér. 2, 4: 160, 1870.

C - Tosc, Laz (Gigante & Petriccione 1995), **Sar** (Monte 1993), **S - Si** (Ottonello & Puntillo 2009, Ottonello & al. 2011).

Frut/ Ch/ S/ Sax/ pH: 2-3, L: 4-5, X: 2-3, E: 2-3/ Alt: 1/ MedH: r, MedD: vr/ PT: 1/ coast, #/ Note: a Mediterranean-Macaronesian lichen found on coastal siliceous rocks, exclusively Tyrrhenian in Italy; on the whole, a still poorly known taxon, which badly needs further study (see Nimis 1993: 606).

R a m b o l d i a Kantvilas & Elix

Bryologist, 97: 296, 1994.

This is primarily a Southern Hemisphere genus of *c.* 30 species, occurring in cool-temperate to tropical regions on bark, decorticated wood or rock. The genus, currently placed into the Ramboldiaceae, differs from *Pyrrhospora* in the narrowly ellipsoidal to bacilliform ascospores that remain hyaline, and in the prosoplectenchymatous rather than euthyplectenchymatous exciple (Kantvilas & Elix 1994). The genus was emended by Kalb & al. (2008), who included also species containing anthraquinones in the apothecia (*Pyrrhospora* has 7-chloroemodin and xanthones, the *Ramboldia russula*-group has russulone and haematommone). Type: *R. stuartii* (Hampe) Kantvilas & Elix

Ramboldia cinnabarina (Sommerf.) Kalb, Lumbsch & Elix

Nova Hedwigia, 86: 32, 2008 - *Lecidea cinnabarina* Sommerf., K. Svenska Vetensk.-Akad. Handl.: 114, 1824.

Syn.: *Biatora cinnabarina* (Sommerf.) Fr., *Protoblastenia cinnabarina* (Sommerf.) Räsänen, *Pyrrhospora cinnabarina* (Sommerf.) M. Choisy

N - Ven (Caniglia & al. 1999), **Piem** (Isocrono & al. 2004), **Lig**.

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 3-4, X: 2, E: 1/ Alt: 3-4/ Salp: rr, Mont: vr/ PT: 1/ Note: a mainly subarctic-subalpine, circumpolar species found on the smooth bark of small shrubs in the subalpine belt, usually near the ground; overlooked, being often sterile. A dubious earlier record from Marche (see Nimis 1993: 592), and a recent one from Sardegna by Zedda (2002, on twigs of *Quercus ilex*) are not accepted here.

Ramboldia elabens (Fr.) Kantvilas & Elix

Lichenologist, 38: 139, 2007 - *Lecidea elabens* Fr., Vet. Akad. Handl.: 256, 1822.

Syn.: *Lecidea enteroleuca* f. *microcarpa* Jatta, *Lecidea melancheima* Tuck., *Lecidea sabuletorum* var. *microspora* A. Massal., *Pyrrhospora elabens* (Fr.) Hafellner

N - Frl, Ven (Lazzarin 2000b, Watson 2014), **TAA** (Nascimbene & al. 2007b), **Lomb, Piem** (Isocrono & al. 2004), **C - Sar** (Hafellner 1993b, Zedda & Sipman 2001).

Cr/ Ch/ S/ Lign/ pH: 1-2, L: 3-5, X: 3, E: 1/ Alt: 3-4/ Salp: vr, Mont: er/ PT: 1/ Note: a subarctic-subalpine to boreal-montane, probably circumpolar species found on hard wood, often with *Cyphelium tigillare*. It is included in the Italian red list of epiphytic lichens as “Vulnerable” (Nascimbene & al. 2013c).

Ramboldia insidiosa (Th. Fr.) Hafellner

in Hafellner & Türk, Carinthia, 2, 185/105: 624, 1995 - *Lecidea insidiosa* Th. Fr., Bot. Not.: 153, 1867.

Syn.: *Nesolechia erichsenii* Räsänen

N - Ven (Nascimbene & Caniglia 2000, 2003c, Thor & Nascimbene 2007), TAA (Nascimbene & al. 2006e), Lomb. C - Sar.

Cr/ Ch/ S/ Epiph-Lign/ pH: 1-2, L: 3-5, X: 3-4, E: 1-2/ Alt: 3-4/ Salp: vr, Mont: vr/ PT: 1/ paras *Lecanora varia*/ Note: obligately lichenicolous on *Lecanora varia*, on hard lignum, more rarely on smooth, hard bark, most frequent in the Alps; the material from Sardegna, on *Lecanora muralis*, is worthy of further study. The species is included in the Italian red list of epiphytic lichens as “Vulnerable” (Nascimbene & al. 2013c).

Ramboldia lusitanica (Räsänen) Kalb, Lumbsch & Elix

Nova Hedwigia, 86: 34, 2008 - *Protoblastenia lusitanica* Räsänen, Arch. Soc. Zool.-Bot. Fenn. Vanamo, 3: 81, 1949.

Syn.: *Pyrrhospora lusitanica* (Räsänen) Hafellner

C - Tosc (TSB 35275), Sar.

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 3, X: 1-2, E: 1/ Alt: 1/ MedH: er/ PT: 0/ oc/ Note: a Mediterranean-Atlantic species found on *Pinus*, *Cistus* and *Erica* in humid, mostly coastal maquis vegetation, restricted to Tyrrhenian Italy. It is included as “Critically Endangered” in the Italian red list of epiphytic lichens (Nascimbene & al. 2013c).

Ramboldia petraeoides (C. Bab. & Mitt.) Kantvilas & Elix

Bryologist, 97: 298, 1994 - *Lecidea petraeoides* Nyl. ex C. Bab. & Mitt. in Hook., Fl. Tasman., 2: 352, 1859.

Syn.: *Lecidea aspidula* Kremp., *Lecidea myoplaca* Zahlbr., *Lecidea subtenebrosa* Nyl., *Protoparmelia petraeoides* (C. Bab. & Mitt.) Hertel, *Pyrrhospora petraeoides* (C. Bab. & Mitt.) Hafellner

C - Sar (Kantvilas & Elix 1994 Nöske 2000).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 4-5, X: 4-5, E: 1-2/ Alt: 3/ Mont: er/ PT: 1/ Note: on siliceous rocks in exposed, dry situations; the collection from Sardegna is the only one known from the Northern Hemisphere.

Ramboldia russula (Ach.) Kalb, Lumbsch & Elix

Nova Hedwigia, 86: 37, 2008 - *Lecidea russula* Ach., Meth. Lich., Sectio prior: 61, 1803.

Syn.: *Biatora russula* (Ach.) Mont., *Protoblastenia russula* (Ach.) Räsänen, *Pyrrhospora russula* (Ach.) Hafellner

C - Tosc.

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 3, X: 1-2, E: 1/ Alt: 1/ MedH: er/ PT: 0/ oc/ Note: on twigs and branches of evergreen trees and shrubs (*Arbutus*, *Myrtus* etc.) in humid situations; the Italian record is in need of confirmation (see Nimis: 1993: 593).

Ramonia Stizenb.

Ber. Tät. St Gall. naturw. Ges.: 168, 1862.

This genus of the Gyalectaceae includes c. 24 species occurring in tropical, subtropical and oceanic-temperate areas. A world key was published by Aptroot & al. (2015). Type: *R. valenzueliana* (Mont.) Stizenb.

Ramonia calcicola Canals & Gómez-Bolea

Lichenologist, 24: 308, 1992.

N - VG (Tretiach 1997, Tretiach & Rinino 2006). S - Camp (Puntillo 2014).

Cr/ Tr/ S/ Sax/ pH: 5, L: 1-2, X: 2, E: 1/ Alt: 2/ SmedD: er, SmedH: er, MedH: er/ PT: 1/ Note: a rare species growing on sheltered, shaded surfaces of compact calcareous rocks at relatively low elevations.

Ramonia chrysophaea (Pers.) Vězda

Folia Geobot. Phytotaxon., 1: 166, 1966 - *Peziza chrysophaea* Pers., Icon. Descr. Fung. 2: 17, tab. 8, fig. 1-2, 1798.

Syn.: *Lecidea chrysophaea* (Pers.) Nyl., *Stictis chrysophaea* (Pers.) Pers.

N - Fri (Gambera & Tretiach 2003, Tretiach 2004). C - Sar (Rizzi & al. 2011)

Cr/ Tr/ S/ Epiph/ pH: 3, L: 2, X: 1-2, E: 1-2/ Alt: 1-2/ SmedD: er, SmedH: er, MedH: er/ PT: 0/ suboc/ Note: a Mediterranean-Atlantic species found on the soft bark of old trees, especially *Ulmus*, in humid and shaded situations; inconspicuous and easily overlooked, but certainly not common. It is included in the Italian red list of epiphytic lichens as “Vulnerable” (Nascimbene & al. 2013c).

Ramonia luteola Vězda

Folia Geobot. Phytotaxon., 2: 311, 1967.

N - Emil (Loppi & al. 2004c). **C - Tosc** (Senese & Critelli 2000, Loppi & al. 2004c).

Cr/ Tr/ S/ Epiph/ pH: 2-3, L: 2, X: 1, E: 1-2/ Alt: 1-3/ Mont: er, SmedH: er, MedH: er/ PT: 0/ suboc/ Note: on trunks of deciduous trees in humid and shaded situations; hitherto known from humid areas of Austria, the Balkan Peninsula, the Carpathians, Finland and Scotland. It is included in the Italian red list of epiphytic lichens as “Vulnerable” (Nascimbene & al. 2013c).

Ramonia subsphaeroides (Tav.) Vězda

Folia Geobot. Phytotaxon., 1: 165, 1966 - *Gyalecta subsphaeroides* Tav., Portugaliae Acta Biol., B, 3: 59, 1950.

C - Umb (Ravera & al. 2016), **Laz** (Nascimbene & Ravera 2014).

Cr/ Tr/ S/ Epiph/ pH: 1-2, L: 2, X: 1, E: 1-2/ Alt: 1-2/ SmedH: er, MedH: er/ PT: 0/ suboc/ Note: a Mediterranean-Atlantic epiphytic species, mostly found on *Quercus* in shaded and humid stands, known from a few localities only.

Reichlingia Diederich & Scheid.

Bull. Soc. Nat. luxemb., 97: 4, 1996.

This genus was originally described for a species thought to be a lichenicolous fungus parasitising a crustose lichen with trentepohlioid photobiont, which was later accepted as a hyphomycetous lichen with sporodochia-like conidiomata and a byssoid thallus. The phylogenetic analysis by Frisch & al. (2014b) added to the genus two fertile species lacking conidiomata. Fertile species of *Reichlingia* are characterised by the adnate, pruinose and often elongated to stellate-branched ascomata with a basally constricted exciple and a thin tomentum formed by the free tips of paraphysoids and excipular hyphae, a well-developed hyaline to pale brownish hypothecium, and the transversely septate to submuriform spores that sometimes turn brownish at maturity. In ascoma and thallus morphology, *Reichlingia* shows similarities with species of *Coniocarpon*, which however differ in the secondary chemistry as they include red anthraquinones in the ascomata, but lack perlatolic and 2'-O-methylperlatolic acids. Type: *R. leopoldii* Diederich & Scheid.

Reichlingia leopoldii Diederich & Scheid.

Bull. Soc. Nat. Luxemb., 97: 5, 1996.

N - Lomb (Brackel 2010, 2016).

Cr/ Tr/ S/ Sax/ pH: 1-3, L: 3, X: 2, E: 1/ Alt: 2/ SmedD: er/ PT: 1/ Note: originally described as a lichenicolous fungus, this species is now recognised as a lichenised hyphomycete (see e.g. Aptroot 2010). It grows on underhanging surfaces of siliceous rocks, more rarely on the bark of old oaks in sheltered situations, mostly in the submediterranean belt.

Reichlingia zwackhii (Sandst.) Frisch & G. Thor

in Frisch & al., Nova Hedwigia, 98: 310, 2014 - *Arthonia zwackhii* Sandst., Abh. naturw. Ver. Bremen, 17: 604, 1903.

C - Tosc, Laz.

Cr/ Tr/ S/ Epiph/ pH: 1-3, L: 3, X: 2, E: 1/ Alt: 2-3/ Mont: er, SmedH: vr/ PT: 1/ suboc/ Note: a mild-temperate to tropical species found on smooth bark, especially of *Fraxinus* and *Carpinus*, in humid deciduous woodlands; in Italy it was overlooked or confused with other species, and is perhaps more widespread, but never common, being included in the Italian red list of epiphytic lichens as “Endangered” (Nascimbene & al. 2013c).

Rhizocarpon DC.

Ramond ex DC. in Lamarck & de Candolle, Fl. Franç., 3 éd., 2: 365, 1805.

This is a genus of c. 250 crustose species in the Rhizocarpaceae. Although predominantly free-living, a substantial minority of species are parasitic on other lichens, at least early in their development, and a few are even non-lichenised. The genus is most diverse and abundant on siliceous rocks in montane habitats and at temperate to high latitudes; it is much less represented or completely absent in the wet and dry tropics and subtropics and in hot-arid regions. Molecular studies (e.g. Ihlen & Ekman 2002) have shown that the genus in its current circumscription constitutes a polyphyletic group, which can only be made monophyletic if *R. hochstetteri* is excluded or *Poeltinula*, and possibly also *Catolechia*, are included. The subgenera *Rhizocarpon* and *Phaeothallus* are artificial as well (see e.g. Roca-Valiente & al. 2016). Important information on the brown species was provided by Fryday (2000, 2002) and by Ihlen (2004). The separation among species is problematic in some groups, and according to an unpublished thesis by B. Roca-Valiente, several species and subspecific taxa of yellow *Rhizocarpon* species, which I still maintain here, proved to fall within a wide concept of *Rh. geographicum*. Type: *R. geographicum* (L.) DC.

Rhizocarpon alpicola (Wahlenb.) Rabenh.

Flecht. Eur., 22: 618, 1861 - *Lecidea atrovirens* var. *alpicola* Wahlenb., Fl. Lapp.: 474, 1812.

Syn.: *Buellia alpicola* (Wahlenb.) Anzi, *Catocarpus chionophilus* (Th. Fr.) Stein, *Catocarpus oreites* (Vain.) Eitner, *Diplotomma geographicum* f. *conglomeratum* (Fr.) Jatta, *Lecidea alpicola* (Wahlenb.) Hepp, *Lecidea*

geographica var. *alpicola* (Wahlenb.) Schaer., *Rhizocarpon chionophilum* Th. Fr., *Rhizocarpon conglomeratum* (Fr.) Räsänen, *Rhizocarpon geographicum* f. *conglomeratum* (Fr.) A. Massal., *Rhizocarpon geographicum* var. *alpicola* (Wahlenb.) A. Massal., *Rhizocarpon geographicum* var. *geronticum* (Ach.) Räsänen, *Rhizocarpon geronticum* (Ach.) H. Magn. comb. *inval.*, *Rhizocarpon oreites* (Vain.) Zahlbr., *Rhizocarpon ridniense* Räsänen

N - Frl (Tretiach & Hafellner 2000), **TAA, Lomb, Piem** (Isocrono & al. 2004), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999), **Emil**.

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 3-4, X: 3, E: 1/ Alt: 4-6/ Alp: vc, Salp: rc/ PT: 1/ Note: an arctic-alpine, circumpolar lichen found on horizontal to weakly inclined surfaces of hard siliceous rocks with a long snow-lie in cold situations.

Rhizocarpon atroflavescens Lyngé

Lich. Novaya Zemlya: 141, 1928.

Syn.: *Rhizocarpon atroflavescens* subsp. *pulverulentum* (Schaer.) Runemark, *Rhizocarpon chiasmaterum* Lettau, *Rhizocarpon geographicum* var. *contiguum* f. *calcicolum* Anzi, *Rhizocarpon pulverulentum* (Schaer.) Räsänen

N - TAA, Lomb, Piem, Emil (Tretiach & al. 2008), **Lig. C - Tosc, Abr** (Nimis & Tretiach 1999), **Sar** (Rizzi & al. 2011).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 3-4, X: 3, E: 1/ Alt: 4-5/ Alp: rc, Salp: rr, Orom: r/ PT: 1/ paras *Pertusaria*/ Note: a cool-temperate to arctic-alpine, perhaps circumpolar species found on steeply inclined surfaces of base-rich, or weakly calciferous siliceous rocks near or above treeline; common and certainly more widespread in the Alps, rare in the Apennines; the record from Abruzzo is the southernmost one in Europe.

Rhizocarpon badioatrum (Spreng.) Th. Fr.

Lichenogr. Scand., 2: 613, 1874 - *Lecidea badioatra* Flörke ex Spreng., Neue Entdeck., 2: 95, 1821.

Syn.: *Buellia atroalba* (L.) Th. Fr., *Buellia badioatra* (Spreng.) Mudd, *Catocarpus badioater* (Spreng.) Arnold, *Catocarpus badioater* var. *vulgaris* (Körb.) Arnold, *Lecidea atroalba* (L.) Ach., *Lecidea atroalbula* Nyl.

N - Frl (Tretiach & Hafellner 2000), **Ven** (Nascimbene 2005c), **TAA** (Lecid. Exs. 277: Hertel 1992b, Caniglia & al. 2002 Nascimbene 2003, 2006c, 2008b, Nascimbene & al. 2007b), **Lomb, Piem** (Isocrono & al. 2003, 2004, 2006, Giordani & al. 2014), **VA** (Piervittori & Isocrono 1999, Matteucci & al. 2013b, 2015c), **Emil** (Dalle Vedove & al. 2002), **Lig. C - Tosc, Sar**.

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 3-4, X: 2-3, E: 1-3/ Alt: 1-5/ Alp: rc, Salp: rr, Orom: r, Mont: c, SmedD: vr, Pad: er, SmedH: vr, MedH: r/ PT: 1/ p/ Note: a holarctic early coloniser of siliceous pebbles and small boulders near the ground, with a wide altitudinal range; common only in the Alps, but to be looked for in all siliceous mountains of southern Italy. The identification of the samples from Sicily by Brackel (2008c) is not completely certain.

Rhizocarpon coeruleoalbum (Kremp.) Zahlbr.

Cat. Lich. Univ., 4: 331, 1927 - *Rehmiella coeruleoalba* Kremp., Denkschr. kgl. bayer. bot. Ges., 4, 2: 211, 1861.

Syn.: *Buellia coeruleoalba* (Kremp.) Th. Fr.

N - TAA, Piem, VA (Piervittori & Isocrono 1999). **C - Umb** (Ravera & al. 2011).

Cr/ Ch/ S/ Sax-4/ pH: 3, L: 3-4, X: 3, E: 1-2/ Alt: 3-5/ Alp: r, Salp: vr, Mont: er/ PT: 1/ Note: on weakly calcareous or base-rich siliceous rocks, especially calcareous schists, with optimum above treeline.

Rhizocarpon captans Poelt

Mitt. bot. Staatss. München, 29: 525, 1990.

S - Cal, Si.

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4, X: 3, E: 2-3/ Alt: 3-5/ Orom: r, Mont: r/ PT: 1/ paras *Aspicilia s.lat.* spp./ Note: on silicicolous species of *Aspicilia s.lat.* in upland areas; probably occurring also in the Alps.

Rhizocarpon carpaticum Runemark

Opera Bot., 2: 133, 1956.

N - Frl (Tretiach & Hafellner 2000), **Ven, TAA, Piem** (Morisi & Sereno 1995, Morisi 2005). **C - Tosc** (Tretiach & al. 2008)

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 4, X: 3, E: 1/ Alt: 3-5/ Alp: vr, Salp: r, Mont: er/ PT: 1/ u/ Note: on siliceous rocks in underhangs protected from rain in cold sites with frequent fog, with optimum near or above treeline.

Rhizocarpon copelandii (Körb.) Th. Fr.

Lichenogr. Scand., 2: 615, 1874 - *Buellia copelandii* Körb., Zweite Deutsche Nordpolarfahrt, 2: 79, 1874.

Syn.: *Catocarpus badioater* f. *copelandii* (Körb.) Eitner, *Catocarpus copelandii* (Körb.) Arnold, *Rhizocarpon cyclodes* Hellb. ex Th. Fr., *Rhizocarpon elevatum* H. Magn., *Rhizocarpon hyperboreum* (Vain.) Vain.

N - TAA.

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 4-5, X: 3-4, E: 1/ Alt: 4-6/ Alp: vr, Salp: er/ PT: 1/ Note: an arctic-alpine lichen of siliceous rocks above treeline, much more frequent in the Arctic zone than in the Alps, where it reaches the nival belt.

Rhizocarpon dinothetes Hertel & Leuckert

Herzogia, 5: 27, 1979.

C - Sar.

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 4, X: 3, E: 1-2/ Alt: 4-5/ Orom: vr, Mont: vr/ PT: 1/ paras *Protoparmelia*/ Note: on siliceous rocks near and above treeline, starting the life-cycle on the thalli of *Protoparmelia badia*; probably present also in the Alps, and to be looked for there.

Rhizocarpon disporum (Hepp) Müll. Arg.

Rev. Mycol., 1: 170, 1879 - *Lecidea dispora* Nägeli ex Hepp, Flecht. Eur.: nr. 28, 1853.

Syn.: *Lecidea montagnei* Flot., *Rhizocarpon confervoides sensu* A. Massal., *Rhizocarpon disporum* var. *irriguum* (Flot.) Zahlbr., *Rhizocarpon montagnei* Körb.

N - TAA, Lomb (Valcuvia & al. 2003, De Vita & Valcuvia 2004), Piem (Isocrono & al. 2004), VA (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Piervittori & al. 2001, Revel & al. 2001, Matteucci & al. 2015c). C - Tosc, Laz (Genovesi & al. 2011), Sar. S - Camp.

Cr/ Ch/ S/ Sax/ pH: 3, L: 4-5, X: 4, E: 2-3/ Alt: 2-4/ Salp: vr, Mont: rr, SmedD: r, SmedH: r/ PT: 1/ subc, p/ Note: a widespread, probably holarctic lichen of dry-continental areas, found on exposed surfaces of basic siliceous rocks; most frequent in dry-continental Alpine valleys.

Rhizocarpon distinctum Th. Fr.

Lichenogr. Scand., 2: 625, 1874.

Syn.: *Lecidea distincta* (Th. Fr.) Stizenb., *Lecidea illota* Sandst., *Lecidea porphyrostroma* Vain., *Rhizocarpon ambiguum* (Schaer.) Zahlbr., *Rhizocarpon danicum* Galløe, *Rhizocarpon atroalbum* Arnold, *Rhizocarpon illotum* (Sandst.) Lettau, *Rhizocarpon porphyrostrotum* (Vain.) Vain.

N - Frl (TSB 2857), TAA, Piem (Matteucci & al. 2013, Favero-Longo & al. 2015), VA (Piervittori & Isocrono 1999, Valcuvia 2000, Piervittori & al. 2001, Matteucci & al. 2008c, 2015c), Lig. C - Tosc, Umb (Genovesi & Ravera 2001, Ravera & al. 2006), Sar (Nöske 2000, Rizzi & al. 2011). S - Camp, Bas (Nimis & Tretiach 1999), Si (Brackel 2008c).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4, X: 3, E: 2-3/ Alt: 2-6/ Alp: vr, Salp: r, Orom: er, Mont: rr, SmedD: r, SmedH: r/ PT: 1-2/ suboc, p/ Note: on basic siliceous rocks, often on brick and roofing tiles, with a wide altitudinal range, up to the nival belt in the Alps; sometimes parasitic, when young, on *Circinaria caesiocinerea*; certainly more widespread in the Alps, rarer along the Apennines.

Rhizocarpon effiguratum (Anzi) Th. Fr.

Lichenogr. Scand., 2: 613, 1874 - *Buellia effigurata* Anzi, Cat. Lich. Sondr.: 90, 1860.

Syn.: *Catocarpus anzianus* Müll. Arg., *Lecidea effigurata* (Anzi) Stizenb., *Rhizocarpon italicum* Räsänen?, *Rhizocarpon sphaericum* (Schaer.) Mig., *Rhizocarpon superficiale* var. *rugulosum* (Müll. Arg.) Zahlbr.

N - Frl (Tretiach & Hafellner 2000), TAA, Lomb, Piem, VA (Piervittori & Isocrono 1999).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 4-5, X: 4, E: 1/ Alt: 3-5/ Alp: vr, Salp: r, Mont: er/ PT: 1/ u/ paras *Pleopsidium* spp./ Note: a weak competitor found on underhanging or vertical surfaces of siliceous rocks protected from rain in upland areas, on the thalli of *Pleopsidium*-species.

Rhizocarpon episilum (Nyl.) Zahlbr.

Cat. Lich. Univ., 4: 333, 1926 - *Lecidea episila* Nyl., Bull. Soc. Linn. Normandie, sér. 2, 4: 292, 1872.

Syn.: *Buellia episila* (Nyl.) B. de Lesd., *Rhizocarpon superstratum* J. Steiner

N - Lig (Giordani & Brunialti 2000). C - Marc (Nimis & Tretiach 1999), Sar (Nöske 2000).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 3, X: 3, E: 1-2/ Alt: 1-2/ SmedD: vr, SmedH: r, MedH: vr/ PT: 1/ paras *Pertusaria* spp./ Note: on sheltered siliceous rocks wetted by rain, starting the life-cycle on thalli of *Pertusaria* below the montane belt; probably more widespread, but overlooked, throughout central and southern Italy.

Rhizocarpon eupetraeoides (Nyl.) Blomb. & Forssell

Enum. Pl. Scandin.: 93, 1880 - *Lecidea eupetraeoides* Nyl., Flora, 58: 12, 1875.

N - Piem (TSB 33166).

Cr/ Ch/ S/ Sax/ pH: 3-4, L: 4-5, X: 4, E: 1-2/ Alt: 4-5/ Alp: r, Salp: vr/ PT: 1/ Note: on weakly calciferous rocks near and above treeline; probably more widespread in the Alps.

Rhizocarpon eupetraeum (Nyl.) Arnold

Flora, 53: 478, 1870 - *Lecidea eupetraea* Nyl., Flora, 53: 36, 1870.

Syn.: *Lecidea parapetraea* Nyl., *Lecidea petraeiza* Nyl., *Rhizocarpon arcticum* Räsänen, *Rhizocarpon dissentiens* Arnold, *Rhizocarpon grande* (Flörke ex Flot.) Arnold, *Rhizocarpon grande* f. *eupetraeum* (Nyl.) Th. Fr., *Rhizocarpon endamyleum* Th. Fr., *Rhizocarpon parapetraeum* (Nyl.) Zahlbr., *Rhizocarpon petraeizum* (Nyl.) Kieff.

N - Ven, TAA, Piem (Isocrono & al. 2004), VA (Piervittori & Isocrono 1999), Emil. C - Tosc, Marc, Mol (Nimis & Tretiach 1999). S - Pugl (Nimis & Tretiach 1999).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 3-4, X: 3-4, E: 1-2/ Alt: 2-6/ Alp: r, Salp: vr, Orom: er, Mont: er, SmedD: er/ PT: 1/ Note: on inclined to vertical faces of acidic siliceous rocks, mostly sandstone, with a wide altitudinal range, up to the nival belt in the Alps.

Rhizocarpon ferax H. Magn.

Bot. Not., 101: 405, 1948.

N - TAA (Nascimbene 2005).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 4, X: 3-4, E: 1/ Alt: 3-5/ Alp: vr, Salp: vr, Mont: r/ PT: 1/ paras crustose lichens/ Note: on siliceous rocks near and above treeline, starting the life-cycle on other crustose lichens; probably more widespread in the Alps.

Rhizocarpon fraticida Poelt & Nimis

in Nimis & Poelt, Studia Geobot., 7, suppl. 1: 203, 1987.

C - Sar. S - Si.

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 4, X: 3-4, E: 1/ Alt: 1-3/ Mont: r, MedH: r/ PT: 1/ paras yellow *Rhizocarpon* spp./ Note: on siliceous rocks, starting the life-cycle on other yellow *Rhizocarpon*-species; probably more widespread in southern Italy.

Rhizocarpon furax Poelt & V. Wirth

Mitt. bot. Staatss. München, 8: 194, 1970.

N - Frl (Tretiach & Hafellner 2000), TAA.

Cr/ Ch/ S/ Sax/ pH: 2, L: 4, X: 3, E: 1-2/ Alt: 4-5/ Alp: r, Salp: rr/ PT: 1/ paras *Lecidea lapicida s.lat.*/ Note: on mineral-rich siliceous rocks near and above treeline, starting the life-cycle on the thalli of *Lecidea lapicida s.lat.*; certainly more widespread in the Alps.

Rhizocarpon furfurosum H. Magn. & Poelt

in Poelt, Verh. zool.-bot. Ges. Wien, 95: 112, 1955.

Syn.: *Rhizocarpon obscuratum* f. *granulosum* Schade

N - Piem (TSB 33843). C - Sar.

Cr/ Ch/ A.s/ Sax/ pH: 1-2, L: 4, X: 3-4, E: 1/ Alt: 3-4/ Salp: er, Mont: vr/ PT: 1/ m/ Note: on metal-rich siliceous rocks, mostly on steeply inclined to underhanging faces in upland areas; easy to overlook, being mostly sterile, and to be looked for further in the Alps.

Rhizocarpon geminatum Körb.

Syst. Lich. Germ.: 259, 1855.

Syn.: *Biatorina concreta* (Ach.) Mudd, *Buellia concreta* (Ach.) Zwackh, *Rhizocarpon concretum* (Ach.) Zahlbr., *Rhizocarpon disporum auct. non* (Nägeli ex Hepp) Müll. Arg.

N - Frl, Ven, TAA, Lomb (Brackel 2010), Piem (Isocrono & al. 2004, Isocrono & Piervittori 2008, Favero-Longo & al. 2015), VA (Piervittori & Isocrono 1999, Isocrono & al. 2008, Favero-Longo & Piervittori 2009, Matteucci & al. 2015c), Emil (Valcuvia & Delucchi 2001, Lig (Giordani & Brunialti 2000). C - Tosc, Sar. S - Bas (Nimis & Tretiach 1999), Cal (Puntillo 1996).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 3-4, X: 3-4, E: 2-3/ Alt: 2-5/ Alp: r, Salp: rr, Orom: r, Mont: vr, SmedD: er, SmedH: vr/ PT: 1/ Note: a widespread lichen of dry-continental areas, found on steeply inclined faces of base-rich or weakly calciferous siliceous rocks, both in natural and man-made substrata (e.g. on roofing tiles, walls); a chemically heterogeneous species, probably less thermophilous than the closely related *Rh. disporum*.

Rhizocarpon geographicum (L.) DC. *s.lat.*

in Lamarck & de Candolle, Fl. Franç., 3 éd., 2: 365, 1805 - *Lichen geographicus* L., Sp. Pl., 2: 1140, 1753.

Syn.: *Lecidea atrovirens* (L.) Ach., *Lecidea atrovirens* var. *geographica* (L.) Ach., *Lecidea geographica* (L.) Rebert., *Lecidea geographica* var. *atrovirens* (L.) Schaer., *Lichen atrovirens* L., *Patellaria geographica* (L.) Duby, *Rhizocarpon arnoldii* Räsänen, *Rhizocarpon geographicum* var. *atrovirens* (L.) Körb., *Rhizocarpon haeyrenii* Räsänen, *Rhizocarpon semilecanorinum* Räsänen, *Rhizocarpon tinei sensu* Runemark *excl.* subsp. *tinei*, *Rhizocarpon tinei* subsp. *vulgare* Runemark

N - Frl (Tretiach & Hafellner 2000), Ven (Nascimbene & Caniglia 1997, Caniglia & al. 1999, Nascimbene 2005c), TAA (Diederich & Etayo 2000, Caniglia & al. 2002, Nascimbene 2003, 2005b, 2006c, 2008b), Lomb (Rambold & al. 1998, Valcuvia & al. 2003, De Vita & Valcuvia 2004, Dalle Vedove & al. 2004, Brackel 2013), Piem (Morisi & Sereno 1995, Isocrono & Falletti 1999, Isocrono & al. 2003, 2004, 2006, Favero-Longo & al. 2004, 2006b, 2015, Hafellner 2007, Isocrono & Piervittori 2008, Giordani & al. 2014), VA (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Piervittori & al. 1998, 2001, 2004, Favero-Longo & al. 2005b, 2014, Matteucci & al. 2008c, 2012, 2013b, 2015c, Isocrono & al. 2008, Favero-Longo & Piervittori 2009, Blisa & al. 2011, Sandrone & al. 2013, Sandrone 2014), Emil (Dalle Vedove & al. 2002, Tretiach & al. 2008), Lig (Brunialti & al. 1999). C - Tosc (Tretiach & al. 2008, Lastrucci & al. 2009, Benesperi 2006, Pasquinelli & Puccini 2010, Pasquinelli & al. 2013, Brackel 2015), Marc, Umb (Ravera & al. 2006), Laz, Abr (Nimis & Tretiach 1999, Brackel 2015), Mol (Nimis & Tretiach 1999, Caporale & al. 2008, Genovesi & Ravera 2014), Sar (Monte 1993, Nöske 2000, Rizzi & al. 2011, Terribile & al. 2012, Giordani & al. 2013, Cossu & al. 2015). S - Camp (Aprile & al. 2003b, Catalano & al. 2016), Pugl, Bas (Nimis & Tretiach 1999, Potenza 2006), Cal (Puntillo 1996, Scarciglia & al. 2007, Puntillo & Puntillo 2015b, Brackel & Puntillo 2016), Si (Ottonello & al. 1994, Poli & al. 1995, Grillo 1998, Grillo & Caniglia 2004, Brackel 2008b, 2008c).

Cr/ Ch/ S/ Sax/ pH: 1-3, L: 3-5, X: 3-4, E: 1-3/ Alt: 1-6/ Alp: vc, Salp: ec, Orom: rc, Mont: c, SmedD: vr, SmedH: vr, MedH: er, MedD: er/ PT: 1-2/ Note: a cool-temperate to arctic-alpine, circumpolar,

polymorphic lichen of siliceous rocks wetted by rain. Here I place all records of *Rh. geographicum s.lat.*: this taxon badly needs a revision worldwide (see Roca-Valiente & al. 2016).

Rhizocarpon geographicum* subsp. *arcticum (Runemark) Hertel

in Hertel & Ullrich, Mitt. bot. Staatss. München, 12: 483, 1976 - *Rhizocarpon tinei* subsp. *arcticum* Runemark, Opera Bot., 2: 125, 1956.

N - VA (Piervittori & Isocrono 1999).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 4-5, X: 3-4, E: 1/ Alt: 6/ Alp: vr/ PT: 1/ Note: an arctic-alpine lichen found on siliceous, exposed rocks, restricted to the nival belt of the Alps.

Rhizocarpon geographicum* subsp. *diabasicum (Räsänen) Poelt & Vězda

in Hawksworth & al., Lichenologist, 12: 107, 1980 - *Rhizocarpon diabasicum* Räsänen, Ann. Bot. Soc. Zool.-Bot. Fenn. Vanamo, 19: 9, 1944.

Syn.: *Rhizocarpon amphiboliticum* Räsänen, *Rhizocarpon havaasii* Räsänen, *Rhizocarpon tinei* subsp. *diabasicum* (Räsänen) Runemark

N - TAA, Lomb, Piem. S - Si.

Cr/ Ch/ S/ Sax/ pH: 1-3, L: 4-5, X: 3-4, E: 1-3/ Alt: 4-5/ Alp: vr, Salp: vr, Orom: vr/ PT: 1/ Note: on siliceous rocks, sometimes also on superficially decalcified calcareous rocks, where it appears in forms with a whitish thallus, near and above treeline.

Rhizocarpon geographicum* subsp. *frigidum (Räsänen) Hertel

in Hertel & Ullrich, Mitt. bot. Staatss. München, 12: 483, 1976 - *Rhizocarpon frigidum* Räsänen, Ann. Bot. Soc. Zool.-Bot. Fenn. Vanamo, 19: 9, 1944.

Syn.: *Rhizocarpon tinei* subsp. *frigidum* (Räsänen) Runemark

N - TAA, Lomb, VA (Piervittori & Isocrono 1999).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 3-5, X: 3-4, E: 1-2/ Alt: 4-6/ Alp: rr, Salp: r/ PT: 1/ Note: an arctic-alpine lichen found on exposed, steeply inclined to underhanging surfaces of siliceous rock above treeline; restricted to the Alps, where it can reach the nival belt.

Rhizocarpon geographicum* subsp. *kittilense (Räsänen) Ahti

Norrlinia, 17: 57, 2008 - *Rhizocarpon kittilense* Räsänen, Ann. Bot. Soc. Zool.-Bot. Fenn. Vanamo, 19: 58, 1942.

Syn.: *Rhizocarpon lindsayanum* subsp. *kittilense* (Räsänen) Runemark, *Rhizocarpon olivetorum* Räsänen, *Rhizocarpon riparium* Räsänen

N - Piem, VA, Emil.

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 3-4, X: 2-3, E: 1/ Alt: 4-6/ Alp: rr, Salp: r/ PT: 1/ Note: on steeply inclined surfaces of siliceous rocks in rather sheltered and humid situations, from the subalpine to the nival belt.

Rhizocarpon geographicum* subsp. *lindsayanum (Räsänen) Ahti

Norrlinia, 17: 57, 2008 - *Rhizocarpon lindsayanum* Räsänen, Rev. Sudam. Bot., 7: 87, 1942.

Syn.: *Rhizocarpon riparium* subsp. *lindsayanum* (Räsänen) J.W. Thomson

N - VG (TSB 11681). S - Si.

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 3-5, X: 3-4, E: 2-3/ Alt: 2-4/ Salp: vr, Orom: vr, Mont: vr, SmedD: vr/ PT: 1/ Note: this subspecies seems to have a circumboreal distribution. It is found on siliceous, often dust-impregnated rocks, also on walls and boulders in semi-urban environments. It certainly occurs also in the Alps, but was rarely distinguished from *Rh. geographicum s.lat.*

Rhizocarpon geographicum* subsp. *prospectans (Räsänen) D. Hawksw. & Sowter

Trans. Leicester Lit. Phil. Soc., 63: 58, 1969 - *Rhizocarpon prospectans* Räsänen, Ann. Bot. Soc. Zool.-Bot. Fenn. Vanamo, 19: 8, 1944.

Syn.: *Rhizocarpon tinei* subsp. *prospectans* (Räsänen) Runemark

N - Lomb.

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 3-5, X: 3, E: 1-2/ Alt: 2-4/ Salp: er, Mont: vr, SmedD: er/ PT: 1/ suboc, #/ Note: on exposed surfaces of base-rich siliceous rocks. A western lichen in Europe, which needs further study.

Rhizocarpon hochstetteri (Körb.) Vain.

Acta Soc. Fauna Fl. Fenn., 53, 1: 280, 1922 - *Catillaria hochstetteri* Körb., Parerga Lichenol.: 195, 1861.

Syn.: *Biatorina concreta* auct. p.p. non (Ach.) Mudd, *Buellia chlorospora* (Nyl.) Hellb., *Buellia colludens* Arnold, *Buellia hochstetteri* (Körb.) Mong., *Catillaria colludens* (Arnold) Jatta, *Catillaria concreta* auct. p.p. non (Ach.) A. Massal., *Catocarpus applanatum* (Fr.) Arnold, *Catocarpus koerberi* Stein, *Lecidea applanata* (Fr.) Leight., *Lecidea atroalba* var. *applanata* Fr., *Lecidea atroalba* var. *chlorospora* Nyl., *Lecidea colludens* (Arnold) Nyl., *Lecidea hochstetteri* var. *colludens* (Arnold) Vain., *Rhizocarpon applanatum* (Fr.) Th. Fr., *Rhizocarpon concretum* auct. p.p. non (Schaer.) Zahlbr. nec (Ach.) Elenkin, *Rhizocarpon crenulatum* H. Magn., *Rhizocarpon massalongii sensu* Malme non (Körb.)

N - Frl, Ven, TAA, Lomb, Piem (Isocrono & al. 2004, 2006), **VA** (Favero-Longo & al. 2006, Isocrono & al. 2008, Favero-Longo & Piervittori 2009). **C - Tosc, Sar** (Rizzi & al. 2011). **S - Si** (Nimis & al. 1996b, Brackel 2008b).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 3-4, X: 2, E: 1-2/ Alt: 2-4/ Salp: rc, Orom: er, Mont: rr, SmedD: vr/ PT: 1/ Note: a widespread, probably northern holarctic lichen found on mineral-rich siliceous rocks, in seepage tracks and near creeks; most common in the Alps below the Alpine belt, rare in the mountains of southern Italy.

Rhizocarpon inarense (Vain.) Vain.

Hedwigia, 37: 86, 1898 - *Lecidea chionophiloides* subsp. *inarenis* Vain., Meddel. Soc. Fauna Flora Fenn., 10: 124, 1883.

N - TAA (Nascimbene 2005).

Cr/ Ch/ S/ Sax/ pH: 1-3, L: 3-5, X: 3-4, E: 1-3/ Alt: 4-6/ Alp: vr, Salp: vr/ PT: 1/ Note: a circumboreal to arctic-alpine species of siliceous rocks, reaching the nival belt in the Alps, where it is probably more widespread.

Rhizocarpon inimicum Poelt & Vězda

Herzogia, 6: 471, 1984.

S - Cal, Si.

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4, X: 3-4, E: 2/ Alt: 1-3/ Mont: er, SmedH: vr, MedH: er/ PT: 1/ paras *Lecanora rupicola* s.lat./ Note: a mostly southern European species of siliceous rocks which starts the life-cycle on the thalli of species of the *Lecanora rupicola*-complex; probably more widespread in southern Italy, to be looked for in Sardegna.

Rhizocarpon intersitum Arnold

Verh. zool.-bot. Ges. Wien, 27: 554, 1877.

Syn.: *Rhizocarpon diversisporum* Hav.

N - TAA (Dalla Torre & Sarnthein 1909).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 3-4, X: 2-3, E: 1-2/ Alt: 3-5/ Alp: vr, Salp: vr, Mont: er/ PT: 1/ #/ Note: a rather poorly known species found on inclined to vertical faces of acidic siliceous rocks, often near waterfalls, mostly in upland areas.

Rhizocarpon lavatum (Fr.) Hazsl.

A Magyar Birod. Zuzmò-Flòraja: 206, 1884 - *Lecidea atroalba* var. *lavata* Fr., Nov. Sched. Crit.: 18, 1827.

Syn.: *Lecidea lavata* Ach., *Lecidea perluta* Nyl., *Rhizocarpon confervoides* auct. p.p. non DC., *Rhizocarpon obscuratum* f. *lavatum* (Fr.) Th. Fr., *Rhizocarpon orphnum* (Vain.) Vain., *Rhizocarpon perlutum* (Nyl.) Zahlbr. non auct., *Rhizocarpon pseudorivulare* Eitner, *Rhizocarpon subcoeruleum* Eitner

N - Frl (Tretiac & Hafellner 2000), **TAA** (Dalle Vedove & al. 2003, Nascimbene & al. 2007b), **Lomb, Piem** (TSB 33830), **VA** (Isocrono & al. 2008, Favero-Longo & Piervittori 2009), **Emil** (Tretiac & al. 2008). **S - Cal** (Puntillo & Puntillo 2004, Puntillo 2011).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 2-4, X: 1-2, E: 1/ Alt: 3-6/ Alp: rr, Salp: r, Mont: vr/ PT: 1/ 1/ Note: a cool-temperate to arctic-alpine, circumpolar lichen found on perennially humid siliceous rocks, e.g. in mountain rivulets, or on small pebbles on moist ground; related to *Rh. obscuratum*. According to Fryday (2000) the type of *Rh. obscuratum* is identical to that of *Rh. lavatum*, but the two species are different.

Rhizocarpon lecanorinum Anders

Hedwigia, 64: 261, 1923.

Syn.: *Diplotomma geographicum* f. *lecanorinum* (Anders) Jatta, *Lecidea atrovirens* var. *lecanora* Flörke, *Rhizocarpon atrovirens* auct. p.p., *Rhizocarpon geographicum* var. *lecanorum* (Flörke) A. Massal., *Rhizocarpon lecanora* (Flörke) Lynge comb. inval.

N - VG, Frl (TSB 3828), **Ven, TAA, Lomb, Piem** (Favero-Longo & al. 2006b), **VA** (Piervittori & Isocrono 1999, Matteucci & al. 2008c), **Lig** (TSB 33485). **C - Marc** (Nimis & Tretiac 1999), **Umb** (Panfili 2000, 2003, Ravera & al. 2006), **Laz, Abr** (Nimis & Tretiac 1999), **Mol** (Caporale & al. 2008), **Sar, S - Camp** (Garofalo & al. 1999, Nimis & Tretiac 2004), **Pugl** (Nimis & Tretiac 1999), **Bas** (Nimis & Tretiac 1999), **Cal** (Puntillo 1996, Puntillo & Puntillo 2004, Scarciglia & al. 2012, 2012b), **Si** (Brackel 2008b, 2008c).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4-5, X: 3-4, E: 3/ Alt: 2-5/ Alp: er, Salp: vr, Mont: r, SmedD: vr, SmedH: vr/ PT: 1-2/ Note: a temperate to boreal-montane, circumpolar lichen, most common on snowwalls, dust-impregnated siliceous boulders, roofing tiles, but also found in natural habitats, e.g. with *Umbilicaria deusta*.

Rhizocarpon leptolepis Anzi

Comm. Soc. Critt. Ital., 1: 158, 1862 nom. nud.

N - TAA, Lomb, Piem (Isocrono & al. 2004).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 3, X: 2-3, E: 1/ Alt: 3-5/ Alp: r, Salp: vr, Mont: er/ PT: 1/ u/ Note: a boreal-montane to arctic-alpine species growing on steeply inclined surfaces of hard siliceous rocks in sheltered situations, mostly in upland areas; probably restricted to the Alps in Italy.

Rhizocarpon lusitanicum (Nyl.) Arnold

Flora, 53: 478, 1871 - *Lecidea lusitanica* Nyl., Flora, 47: 605, 1865.

C - Sar.

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4, X: 2-3, E: 1-2/ Alt: 1-2/ SmedH: er, MedH: vr/ PT: 1/ paras *Pertusaria* spp./ Note: a southern European species of siliceous rocks which starts the life-cycle on the thalli of *Pertusaria*-species below the montane belt; to be looked for in other parts of Tyrrhenian Italy.

Rhizocarpon macrosporum Räsänen

Feddes Rep., 52: 139, 1943.

Syn.: *Rhizocarpon riparium* var. *helveticum* Räsänen, *Rhizocarpon sphaerosporum* Räsänen

N - Frl (TSB 13638), TAA, Lomb, Piem (Morisi & Sereno 1995, Isocrono & al. 2004, Isocrono & Piervittori 2008, Giordani & al. 2014), VA (Revel & al. 2001, Matteucci & al. 2008c). S - Si (Grillo & Caniglia 2004).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4, X: 3-4, E: 2-3/ Alt: 3-5/ Alp: vr, Salp: rr, Orom: vr, Mont: r/ PT: 1-3/ Note: a chemically heterogeneous species of dust-impregnated, exposed siliceous rocks, including walls in small settlements, most common in upland areas.

Rhizocarpon norvegicum Räsänen

Feddes Repert., 52, 2: 141, 1943.

N - Frl (Tretiach & Hafellner 2000).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4, X: 3-4, E: 1-2/ Alt: 3-5/ Alp: vr, Salp: er, Mont: vr/ PT: 1/ p/ Note: a pioneer species of schistaceous, slightly calciferous or basic eruptive rocks in upland areas, which often starts the life-cycle on members of Acarosporaceae (Tindal *in litt.*).

Rhizocarpon ochrolechia (Poelt & Nimis) Hafellner

in Kalb & Hafellner, Herzogia, 9: 86, 1992 - *Rhizocarpon lusitanicum* var. *ochrolechia* Poelt & Nimis *in* Nimis & Poelt, Studia Geobot., 7, suppl. 1: 205, 1987.

C - Sar (Brackel 2016).

LF/ / S/ Sax/ pH: 2-3, L: 3-4, X: 3, E: 1-3/ Alt: 1/ MedH: vr/ PT: 1/ suboc, paras *Ochrolechia parella*/ Note: a lichenicolous fungus growing on base-rich siliceous rocks, on the thalli of *Ochrolechia parella*; related to *Rh. lusitanicum*, but differing in the absence of a green thallus, perhaps more widespread in Tyrrhenian Italy.

Rhizocarpon oederi (Ach.) Körb.

Parerga Lichenol.: 232, 1861 - *Lecidea oederi* Ach., Meth. Lich.: 49. 1803.

Syn.: *Aspicilia oederi* (Ach.) A. Massal., *Lecidea atroalba* var. *oxydata* Fr., *Lichen koenigii* Retz., *Rhizocarpon petraeum* var. *oederi* (Ach.) Körb.

N - Frl, TAA, Lomb, Piem (Isocrono & al. 2004, Favero-Longo & al. 2006b), VA (Piervittori & Isocrono 1999), Emil.

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 3-4, X: 2, E: 1/ Alt: 2-4/ Salp: er, Mont: er, SmedD: vr/ PT: 1/ p, m/ Note: a mainly cool-temperate species with a wide but scattered distribution, found on metal-rich siliceous rocks, mostly at low elevations.

Rhizocarpon oportense (Vain.) Räsänen

Revista Sudamer. Bot., 7: 85, 1942 - *Rhizocarpon viridiatrum* var. *oportense* Vain., Lichenogr. Fenn., 2: 285, 1922.

C - Sar. S - Si (Otonello & Puntillo 1995).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 4, X: 3-4, E: 1-2/ Alt: 2-3/ Mont: r, SmedH: vr/ PT: 1/ Note: a species of the southern European mountains found on exposed siliceous rocks.

Rhizocarpon petraeum (Wulfen) A. Massal.

Ric. Auton. Lich. Crost.: 102, 1852 - *Lichen petraeus* Wulfen, Schr. Ges. naturf. Fr. Berlin, 8: 89, 1787.

Syn.: *Buellia concentrica* auct., *Lecidea carphina* Ach., *Lecidea excentrica* (Ach.) Röhl., *Lecidea petraea* (Wulfen) Ach., *Rhizocarpon concentricum* auct. non (Davies) Beltr., *Rhizocarpon excentricum* (Ach.) Arnold, *Rhizocarpon perlutum* auct. non (Nyl.) Zahlbr., *Rhizocarpon petraeum* f. *albicans* (Körb.) Jatta, *Rhizocarpon petraeum* f. *dealbatum* A. Massal., *Rhizocarpon petraeum* f. *lapidica* A. Massal., *Rhizocarpon petraeum* f. *orbiculare* A. Massal., *Rhizocarpon petraeum* var. *subconcentricum* Körb., *Rhizocarpon subconcentricum* (Körb.) Körb., *Rhizocarpon variegatum* J. Steiner

N - VG, Frl, Ven (Caniglia & al. 1999, Lazzarin 2000b), TAA (Nascimbene 2001b, 2003, 2005b, 2006c), Lomb, Piem (Isocrono & al. 2004, Favero-Longo & al. 2004, 2006b), VA (Piervittori & Isocrono 1999, Isocrono & al. 2008, Favero-Longo & Piervittori 2009), Emil (Dalle Vedove & al. 2002), Lig. C - Tosc, Marc, Umb (Ravera & al. 2006), Laz, Abr (Nimis & Tretiach 1999), Sar (Rizzi & al. 2011, Giordani & al. 2013). S - Camp (Ricciardi & al. 2000, Aprile & al. 2003, 2003b, Nimis & Tretiach 2004), Pugl (Nimis & Tretiach 1999), Bas, Cal (Puntillo 1996), Si.

Cr/ Ch/ S/ Sax/ pH: 3, L: 3-4, X: 3, E: 1-3/ Alt: 1-5/ Alp: er, Salp: vr, Orom: vr, Mont: rr, SmedD: r, Pad: er, SmedH: r, MedH: vr, MedD: er/ PT: 1-2/ p/ Note: a widespread, holarctic pioneer species of base-rich siliceous rocks, often found on roofing tiles and on slightly calciferous sandstone, with a wide altitudinal range.

Rhizocarpon polycarpum (Hepp) Th. Fr.

Lichenogr. Scand., 2: 617, 1874 - *Lecidea confervoides* var. *polycarpa* Hepp, Flecht. Eur.: nr. 35, 1853.

Syn.: *Buellia atroalbella* (Nyl.) Mong. non auct., *Buellia umensis* H. Magn., *Catocarpus dendriticus* (Hoffm.) M. Choisy ex Werner, *Catocarpus polycarpus* ("Hepp") Arnold, *Lecidea atroalbella* (Nyl.) Nyl., *Lecidea atroalbicans* Nyl., *Rhizocarpon confervoides sensu* Rabenh. non A. Massal., *Rhizocarpon cyanescens* (Hellb.) Zahlbr.

N - Frl (Tretiach & Hafellner 2000), **Ven. TAA, Lomb, Piem** (Isocrono & al. 2004, Morisi 2005, Isocrono & Piervittori 2008, Favero-Longo & al. 2015), **VA** (Piervittori & Isocrono 1999, Piervittori & al. 2001, 2004, Matteucci & al. 2015c). **C - Tosc, Laz, Sar** (Nöske 2000), **S - Si** (Grillo & Caniglia 2004).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 3-4, X: 2, E: 1-2/ Alt: 1-5/ Alp: rr, Salp: rc, Orom: rr, Mont: rr, SmedD: vr, SmedH: vr, MedH: er/ PT: 1/ p/ Note: a probably holarctic pioneer species found on siliceous pebbles over moist ground, or on steeply inclined faces near the ground, present at low altitudes only in humid areas.

Rhizocarpon pusillum Runemark

Opera Bot., 2: 63, 1956.

N - Frl (Tretiach & Hafellner 2000), **TAA, Lomb, Piem.**

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 4, X: 4, E: 1/ Alt: 4-6/ Alp: rr, Salp: vr/ PT: 1/ paras *Sporastatia* spp., u/ Note: an arctic-alpine, circumpolar lichen related to *Rh. effiguratum*, found on exposed surfaces of hard siliceous rocks, starting the life-cycle on species of *Sporastatia*; probably restricted to the Alps, where it reaches the nival belt.

Rhizocarpon rapax V. Wirth & Poelt

Mitt. bot. Staatss. München, 8: 196, 1970.

N - TAA, Piem (TSB s.n.).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4-5, X: 3, E: 1-2/ Alt: 4-5/ Alp: r, Salp: er/ PT: 1/ paras *Acarospora*, *Rimularia* and *Aspicilia* spp./ Note: on siliceous rocks near and above treeline, starting the life-cycle on the thalli of different crustose lichens; related to *Rh. tinei*, but differing in the parasitic growth; probably overlooked, and more frequent in the Alps, especially in rainy areas.

Rhizocarpon reductum Th. Fr.

Lichenogr. Scand., 2: 633, 1874.

Syn.: *Lecidea detinens* Nyl., *Lecidea obscurata* auct. non (Ach.) Schaer., *Lecidea ochrotropa* Nyl., *Lecidea rhodonensis* Nyl., *Rhizocarpon excedens* Kremp., *Rhizocarpon lapillorum* (Vain.) Vain., *Rhizocarpon obscuratum* auct. non (Ach.) A. Massal., *Rhizocarpon permolestum* Arnold, *Rhizocarpon pycnocarpoides* Eitner, *Rhizocarpon subreductum* (Vain.) Vain., *Rhizocarpon triseptatum* H. Magn.

N - Frl (Tretiach & Hafellner 2000), **Ven. TAA, Lomb, Piem** (Isocrono & al. 2003, 2004, 2006, Favero-Longo & al. 2015), **VA** (Revel & al. 2001, Matteucci & al. 2013), **Emil, Lig. C - Tosc, Umb** (Genovesi & al. 2001, Ravera & al. 2006), **Laz, Abr** (Recchia & Villa 1996), **Mol** (Nimis & Tretiach 1999), **Sar** (Nöske 2000). **S - Camp** (Nimis & Tretiach 2004), **Pugl** (Nimis & Tretiach 1999), **Si** (Poli et al. 1995).

Cr/ Ch/ S/ Sax/ pH: 1-3, L: 3-4, X: 2-3, E: 1-2/ Alt: 1-5/ Alp: rr, Salp: c, Orom: rc, Mont: vc, SmedD: rr, Pad: er, SmedH: rr, MedH: vr, MedD: er/ PT: 1-2/ p/ Note: a morphologically and chemically variable species of siliceous rocks, often found on pebbles, or on boulders near the ground; in southern Italy the optimum is in upland areas, but the species also occurs within eu-Mediterranean vegetation, in shaded-humid situations. See also note on *Rh. lavatum*.

Rhizocarpon renneri Poelt

Planta, 51: 306, 1958.

N - TAA.

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4-5, X: 4, E: 2-3/ Alt: 3-5/ Alp: er, Salp: r, Mont: r/ PT: 1/ subc, paras *Dimelaena oreina*/ Note: on steeply inclined to underhanging surfaces of siliceous rocks, starting the life-cycle on the thalli of *Dimelaena oreina*; probably more widespread, but never common, in the dry valleys of the Alps.

Rhizocarpon richardii (Nyl.) Zahlbr.

Cat. Lich. Univ., 4: 341, 1926 - *Lecidea richardii* Lamy ex Nyl., Flora, 58: 446, 1875.

Syn.: *Rhizocarpon atlanticum* I.M. Lamb, *Rhizocarpon constrictum* Malme, *Rhizocarpon constrictum* subsp. *richardii* (Nyl.) Clauzade & Cl. Roux

C - Sar (Rizzi & al. 2011), **S - Si** (Brackel 2008c).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 3-4, X: 3-4, E: 1-2/ Alt: 1-3/ SmedH: vr, MedH: er/ PT: 1/ coast/ Note: in Atlantic Europe this species is restricted to the supralittoral belt of siliceous rock shores, where it occupies the driest, most rapidly draining places; occasionally, it also occurs in inland rock outcrops exposed to westerly winds, and this is the case of the only Italian record from Sardegna. Another record, whose identification is not fully certain, is that by Brackel (2008c) from Sicily.

Rhizocarpon ridescens (Nyl.) Zahlbr.

in Engler & Prantl, Natürl. Pflanzenfam., 1 ed.: 138, 1905 - *Lecidea ridescens* Nyl., Flora, 64: 533, 1881.

N - Frl (Tretiach & Hafellner 2000), **TAA** (Lecid. Exs. 278: Hertel 1992b), **Lomb** (Dalle Vedove & al. 2004, Nascimbene 2006), **Piem** (TSB 33849). **C - Tosc** (TSB 15517).

Cr/ Ch/ A.s/ Sax/ pH: 1-2, L: 3-4, X: 2-3, E: 1-2/ Alt: 4-5/ Alp: vr, Salp: vr/ PT: 1/ u, m/ Note: on iron-rich siliceous rocks, mostly in underhangs, near or above treeline; easily overlooked, being always sterile.

Rhizocarpon saanaense Räsänen

Ann. Soc. Zool.-Bot. Fenn. Vanamo, 16: 61, 1942.

Syn.: *Rhizocarpon fruticosum* Räsänen, *Rhizocarpon subucidum* Räsänen?

N - Frl (Tretiach & Hafellner 2000), **TAA, Lomb, Piem** (Isocrono & al. 2004, Isocrono & Piervittori 2008), **VA** (Piervittori & Isocrono 1999), **Lig**.

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 3-4, X: 2-3, E: 1/ Alt: 3-5/ Alp: rr, Salp: vr, Mont: er/ PT: 1/ Note: an arctic-alpine, probably circumpolar lichen found on slightly calciferous siliceous rocks with a late snow lie, probably restricted to the Alps, with optimum above treeline.

Rhizocarpon simillimum (Anzi) Lettau

Hedwigia, 52: 156, 1912 - *Buellia simillima* Anzi, Comm. Soc. Critt. Ital., 2, 1: 19, 1864.

Syn.: *Buellia subbadia* Anzi, *Catocarpus simillimus* (Anzi) Arnold, *Rhizocarpon atroalbum* var. *africanum* Flagey, *Rhizocarpon sublestum* (Nyl.) Zahlbr.

N - Frl (TSB 4365), **TAA, Lomb, Piem** (Giordani & al. 2014), **VA** (Piervittori & Isocrono 1999, Valcuvia 2000, Matteucci & al. 2015c), **Emil. C - Tosc, Sar** (Nöske 2000), **S - Camp** (Garofalo & al. 1999), **Cal** (Puntillo 1996).

Cr/ Ch/ S/ Sax/ pH: 3, L: 4-5, X: 4, E: 1-2/ Alt: 3-5/ Alp: r, Salp: rc, Orom: vr, Mont: r/ PT: 1/ Note: on steeply inclined surfaces of siliceous, base-rich or slightly calciferous rocks in upland areas; present both in the Alps and along the Apennines, south to the mountains of Calabria.

Rhizocarpon solediosum Runemark

Opera Bot., 2: 135, 1956.

N - Lomb.

Cr/ Ch/ A.s/ Sax/ pH: 1-2, L: 3-4, X: 2-3, E: 1-2/ Alt: 3-5/ Alp: er, Salp: vr, Mont: er/ PT: 1/ m/ Note: on heavy metals-bearing siliceous rocks in upland areas; probably overlooked, being almost always sterile; closely related to *Rh. ridescens*.

Rhizocarpon subpostumum (Nyl.) Arnold

Verh. zool.-bot. Ges. Wien, 27: 554, 1877 - *Lecidea subpostuma* Nyl. in Arnold, Verh. zool.-bot. Ges. Wien, 27: 554, 1877.

N - Piem (Jatta 1909-1911).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 3-4, X: 2-3, E: 1/ Alt: 3-5/ Alp: vr, Salp: vr, Mont: vr/ PT: 1/ #/ Note: a poorly known silicicolous species, differing from *Rh. postumum* in the K+red epithecium.

Rhizocarpon superficiale (Schaer.) Malm

Svensk Bot. Tidskr., 8, 3: 282, 1914 - *Lecidea superficialis* Schaer., Lich. Helv. Spicil.: 125, 1828.

Syn.: *Rhizocarpon crystalligenum* Lyngé, *Rhizocarpon scabridum* Räsänen, *Rhizocarpon splendidum* Malm

N - Frl (Tretiach & Hafellner 2000), **TAA, Lomb, Piem, VA** (Piervittori & Isocrono 1999).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 4, X: 4, E: 1/ Alt: 4-6/ Alp: rc, Salp: r/ PT: 1/ Note: a mainly arctic-alpine species found on exposed siliceous rocks with a short snow-lie, often very abundant in the nival belt of the Alps.

Rhizocarpon tavaresii Räsänen

Arch. Soc. Zool.-Bot. Fenn. Vanamo, 3: 85, 1949.

Syn.: *Diplotomma geographicum* f. *tenellum* (Müll. Arg.) Jatta?, *Rhizocarpon geographicum* f. *tenellum* Müll. Arg.?

C - Tosc, Sar. S - Bas (Puntillo & al. 2012), **Cal** (Puntillo 1996), **Si**.

Cr/ Ch/ S/ Sax/ pH: 3, L: 4, X: 3-4, E: 1/ Alt: 1-2/ SmedH: rr, MedH: r, MedD: vr/ PT: 1/ #/ Note: a mainly south European, poorly known taxon found on basic siliceous rocks at relatively low elevations.

Rhizocarpon tetrasporum Runemark

Opera Bot., 2: 86, 1956.

N - Piem (Morisi & Sereno 1995), **VA** (Piervittori & Isocrono 1999), **C - Sar. S - Camp** (Aprile & al. 2002).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 4, X: 3-4, E: 1-2/ Alt: 3-5/ Alp: vr, Salp: vr, Orom: er, Mont: vr/ PT: 1/ #/ Note: on siliceous rocks in the mountains. Closely related to *Rh. viridiatrum* and *Rh. oportense*, this taxon is worthy of further study.

Rhizocarpon tinei (Tornab.) Runemark

Opera Bot., 2: 118, 1956 - *Lecidea tinei* Tornab., Lichenogr. Sicula: 17, 1848.

Syn.: *Diplotomma geographicum* f. *contiguum* (Schaer.) Jatta, *Rhizocarpon anzianum* Räsänen, *Rhizocarpon geographicum* f. *contiguum* (Schaer.) A. Massal., *Rhizocarpon geographicum* subsp. *tinei* (Tornab.) Clauzade & Cl. Roux

N - VG, Ven, TAA, Lomb (De Vita & Valcuvia 2004), **Piem** (Isocrono & al. 2004, Isocrono & Piervittori 2008), **VA** (Piervittori & Isocrono 1999, Valcuvia 2000), **Emil, Lig** (Valcuvia & al. 2000), **C - Tosc, Umb** (Genovesi & Ravera

2001, Ravera & al. 2006), **Laz** (Genovesi & al. 2011, 2011b), **Sar** (Rizzi & al. 2011). **S - Camp, Pugl** (Nimis & Tretiach 1999), **Bas, Cal** (Puntillo 1996), **Si** (Nimis & al. 1996b, Poli & Grillo 2000, Aprile & al. 2005).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4-5, X: 3-4, E: 1-2/ Alt: 1-3/ Orom: rc, Mont: vr, SmedD: vr, SmedH: vr, MedH: er/ PT: 1/ Note: on siliceous rocks; most common in the Mediterranean mountains, but also found in the Alps in dry-warm areas, closely related to *Rh. geographicum*.

Rhizocarpon umbilicatum (Ramond) Flagey

Mém. Soc. Emulat. Doubs., sér. 6, 8: 98, 1894 - *Lecidea umbilicata* Ramond, Mém. Acad. R. Sc. Inst. France, 6: 128, 1827.

Syn.: *Diplotomma calcareum* (Ach.) Flot., *Diplotomma calcareum* var. *reagens* B. de Lesd., *Lecidea calcarea* (Ach.) Schaer., *Lecidea petraea* var. *umbilicata* (Ramond) Nyl., *Rhizocarpon calcareum* (Ach.) Anzi, *Rhizocarpon pseudospireum* (Th. Fr.) Lyngé, *Rhizocarpon umbilicatum* var. *reagens* (B. de Lesd.) Clauzade & Cl. Roux, *Siegertia calcarea* (Ach.) Körb., *Siegertia pseudospirea* (Th. Fr.) V. Wirth comb. inval., *Siegertia umbilicata* (Ramond) V. Wirth comb. inval.

N - Frl (Tretiach & Hafellner 2000), **Ven** (Nimis 1994, Caniglia & al. 1999, Nascimbene & Caniglia 2003c, Nascimbene & Marini 2007), **TAA** (Ihlen 2004, Nascimbene & al. 2006, Nascimbene 2008b), **Lomb, Piem** (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999), **Emil, Lig, C - Tosc** (Benesperi 2007, Tretiach & al. 2008, Pasquinelli & al. 2009, Pasquinelli & Puccini 2010), **Marc** (Nimis & Tretiach 1999), **Umb** (Genovesi & Ravera 2001, Ravera & al. 2006, Panfili 2007), **Laz** (Nimis & Tretiach 2004), **Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 1999, 2004, Caporale & al. 2008), **Sar, S - Camp** (Aprile & al. 2003b, Garofalo & al. 2010), **Pugl, Bas, Cal** (Puntillo 1996), **Si**.

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 3, X: 3-4, E: 1/ Alt: 3-6/ Alp: vc, Salp: c, Orom: rr, Mont: r/ PT: 1/ Note: a mainly arctic-alpine, circumpolar species found on steeply inclined, often north-facing surfaces of calcareous, more rarely base-rich or slightly calciferous siliceous rocks; most common in the Alps, but occurring throughout the Apennines, especially along the eastern side of the Peninsula.

Rhizocarpon viridiatrum (Wulfen) Körb.

Syst. Lich. Germ.: 262, 1855 - *Lichen viridiater* Wulfen in Jacquin, Coll. Bot., 2: 186, 1788.

Syn.: *Buellia viridiatra* (Wulfen) H. Olivier, *Diplotomma viridiatrum* (Wulfen) Jatta, *Lecidea viridiatra* (Wulfen) Ach., *Rhizocarpon subtile* Runemark

N - VG, Ven, TAA, Lomb, Piem (Isocrono & al. 2004, Favero-Longo & al. 2015), **VA** (Piervittori & Isocrono 1999), **Emil** (TSB 13640), **Lig, C - Tosc** (Lastrucci & al. 2009), **Marc** (Nimis & Tretiach 1999), **Laz, Sar, S - Camp, Cal** (Puntillo 1996), **Si** (Nimis & al. 1996b, Grillo & Caniglia 2004, Iacolino & Ottonello 2006, Brackel 2008b).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4-5, X: 4, E: 1-2/ Alt: 1-5/ Alp: er, Salp: vr, Mont: r, SmedD: r, SmedH: rc, MedH: rr, MedD: vr/ PT: 1/ paras crustose lichens/ Note: on basic siliceous rocks with optimum in dry-warm areas, sometimes on roofing tiles, starting the life-cycle on other crustose lichens (*Aspicilia s.lat.*, *Lecidea s.lat.* and *Tremolecia* spp.), with a wide altitudinal range.

Rhizoplaca Zopf

Ann. Chemie, 340: 291, 1905.

This genus of c. 19 species, in the traditional circumscription, was characterised by an umbilicate thallus with an upper and a lower cortex, as well as a cupulate hypothecium. The genus occurs in the Northern Hemisphere, South America, and Antarctica, but is absent from Australasia. It has the centre of distribution in western North America. Within the past decade, a number of studies have indicated that traditional phenotype-based species circumscriptions fail to recognize multiple species-level lineages within this genus, e.g. in the analysis by Arup & Grube (2000), most species form a well-supported clade, but *Rh. peltata* proved to be more closely related to *Protoparmeliopsis*. Furthermore, molecular data suggest that many cryptic species may be present, such as in the *Rh. melanophthalma*-group (Leavitt & al. 2013, 2016, Lindgren & al. 2016). In a study by Zhao & al. (2016) *Rhizoplaca* was emended to include three placodioid taxa previously classified in *Lecanora*, whereas *R. aspidophora* and *R. peltata* were excluded, the latter having been transferred into *Protoparmeliopsis*. Type: *R. opaca* (Ach.) Zopf (= *R. melanophthalma*).

Rhizoplaca chrysoleuca (Sm.) Zopf

Ann. Chemie, 340: 291, 1905 - *Lichen chrysoleucus* Sm., Trans. Linn. Soc. London, 1: 82, 1791.

Syn.: *Lecanora chrysoleuca* (Sm.) Ach., *Lecanora chrysoleuca* var. *pallida* Sambo?, *Lecanora rubina* auct., *Squamaria chrysoleuca* (Sm.) Duby

N - TAA, Lomb (Dalle Vedove & al. 2004), **Piem** (Morisi & Sereno 1995, Isocrono & al. 2003, 2004, Morisi 2005, Isocrono & Piervittori 2008, Giordani & al. 2014), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Piervittori & al. 2001, Isocrono & al. 2008, Matteucci & al. 2015c), **Emil, Lig** (TSB 33460). **C - Sar**.

Fol.u/ Ch/ S/ Sax/ pH: 2-3, L: 4-5, X: 4-5, E: 3-5/ Alt: 3-5/ Alp: c, Salp: vc, Orom: r, Mont: vr/ PT: 1/ subc/ Note: a widespread holarctic lichen found on bird's perching siliceous rocks and boulders, especially in the mountains; most frequent in areas with a dry-subcontinental climate, e.g. in the central Alps.

Rhizoplaca melanophthalma (DC.) Leuckert & Poelt

in Leuckert & al., Nova Hedwigia, 28: 72, 1977 - *Squamaria melanophthalma* DC. in Lamarck & de Candolle, Fl. Franc., ed. 3, 2: 376, 1805.

Syn.: *Lecanora liparia* (Ach.) Ach., *Lecanora subpeltata* Lynge, *Squamaria chrysoleuca* var. *melanophthalma* (DC.) Boistel

N - Ven (TSB 13727), **TAA** (Nascimbene 2008b), **Lomb** (Dalle Vedove & al. 2004, Brackel 2013), **Piem** (Isocrono & al. 2003, 2004), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Isocrono & al. 2008), **Lig** (TSB 34365). **C - Tosc** (Jatta 1909-1911). **S - Si** (Grillo 1998, Grillo & Caniglia 2004).

Fol.u/ Ch/ S/ Sax/ pH: 2-3, L: 4-5, X: 4, E: 3-4/ Alt: 3-5/ Alp: rc, Salp: c, Orom: vr, Mont: vr/ PT: 1/ Note: a widespread holarctic lichen found on bird's perching siliceous rocks, especially in the mountains.

Rhizoplaca subdiscrepans (Nyl.) R. Sant.

The Lichens of Sweden and Norway: 278, 1984 - *Squamaria chrysoleuca* var. *subdiscrepans* Nyl., Flora, 44: 718, 1861.

Syn.: *Lecanora subdiscrepans* (Nyl.) Stizenb., *Squamaria chrysoleuca* var. *lecanorea* Anzi?

N - Lomb.

Fol.u/ Ch/ S/ Sax/ pH: 3-4, L: 4, X: 4-5, E: 3-5/ Alt: 4-5/ Alp: vr, Salp: er/ PT: 1/ #/ Note: at the top of calciferous or basic siliceous boulders frequently visited by birds, with optimum above treeline.

Ricasolia De Not.

Giorn. Bot. Ital., 2: 178, 1846.

A phylogenetic analysis of the Lobariaceae by Moncada & al. (2013) showed that *Lobaria s.lat.* forms at least six lineages: *Lobaria s.str.*, *Lobarina*, *Ricasolia*, and the new genera *Anomalobaria*, *Dendriscosticta*, *Yoshimuriella*, and *Lobariella*. *Ricasolia*, with 15 species, includes the former *Lobaria amplissima*-group. Type: *R. amplissima* (Scop.) De Not.

Ricasolia amplissima (Scop.) De Not. - chloromorph

Giorn. Bot. Ital., 2: 179, 1846 - *Lichen amplissimus* Scop., Fl. Carniol., 2 ed.: 386, 1772.

Syn.: *Lobaria amplissima* (Scop.) Forssell, *Lobaria glomulifera* (Lightf.) Hoffm., *Lobaria laciniata* (Huds.) Vain., *Parmelia amplissima* (Scop.) Schaer., *Parmelia glomulifera* (Lightf.) Ach., *Ricasolia glomulifera* (Lightf.) Nyl., *Sticta amplissima* (Scop.) Rabenh., *Sticta glomulifera* (Lightf.) Delise

N - VG, Frl (Tretiach 1996, 2015f), **Ven, TAA** (Nascimbene & al. 2007b), **Lomb, VA** (Piervittori & Isocrono 1999), **Emil** (Tretiach 1993, Tretiach & al. 2008, Benesperi 2009), **Lig** (Brunialti & al. 1999, Giordani & Brunialti 2000, Watson 2014). **C - Tosc** (Tretiach 1993, Tretiach & Nimis 1994, Benesperi & al. 2007, Brunialti & Frati 2010, Benesperi 2011), **Marc, Umb** (Ravera 1998, Ravera & al. 2006), **Laz** (Ravera 2001, Massari & Ravera 2002), **Abr** (Nimis & Tretiach 1999), **Mol** (Ravera & Genovesi 2012), **Sar** (Tretiach 1993, Loi & al. 2000, Zedda 2002, 2002b, Zedda & al. 2001, Rizzi & al. 2011). **S - Camp** (Aprile & al. 2002, 2003b, Nascimbene & al. 2010b, Catalano & al. 2010, 2016, Ravera 2013, Brunialti & al. 2013, Ravera & Brunialti 2013), **Pugl** (Tretiach 1993, Nimis & Tretiach 1999, Thüs & Licht 2006), **Bas** (Fascetti & al. 2005, Potenza 2006, Puntillo & al. 2009, Potenza & Fascetti 2010, 2012, Brackel 2011), **Cal** (Tretiach 1993, Puntillo 1995, 1996, Puntillo & Puntillo 2004, Incerti & Nimis 2006, Brackel & Puntillo 2016), **Si** (Tretiach 1993, Ottonello & Puntillo 2009, Ottonello & al. 2011).

Fol.b/ Ch/ S/ Epiph/ pH: 2-3, L: 3-4, X: 1-2, E: 1-2/ Alt: 2-3/ Mont: vr, SmedD: er, SmedH: vr/ PT: 0/ suboc/ Note: a mild-temperate species found on old, isolated deciduous trees in humid areas with high rainfall, formerly more widespread in northern Italy, presently extinct in Venezia Giulia and in the Po-Plain. A distribution map in Italy was published by Nascimbene & al. (2016). It is included in the Italian red list of epiphytic lichens as "Near-threatened" (Nascimbene & al. 2013c).

Ricasolia amplissima (Scop.) De Not. - cyanomorph

Syn.: *Dendriscoaulon bolacinum* (Ach.) Nyl., *Dendriscoaulon dendroides* auct. eur., *Leptogium bolacinum* (Ach.) Nyl., *Dendriscoaulon unhausense* (Auersw.) Degel., *Polychidium unhausense* (Auersw.) Henssen

N - Ven (Nascimbene 2003b, Nascimbene 2011), **TAA** (Dalla Torre & Sarnthein 1902, Nascimbene & al. 2007b), **Lig** (Brunialti & al. 1999, Brunialti & Giordani 2003, Giordani & Incerti 2008). **C - Tosc** (Putorti & Loppi 1999b, Benesperi & al. 2007, Brunialti & Frati 2010), **Umb** (Ravera 1998, Ravera & al. 2006), **Laz** (Massari & Ravera 2002, Munzi & al. 2007, Genovesi & al. 2008, Ravera & Genovesi 2008), **Abr** (Nimis & Tretiach 1999), **Sar** (Zedda 1995, 2002, 2002b, Rizzi & al. 2011). **S - Camp** (Nimis & Tretiach 2004, Nascimbene & al. 2010b, Ravera & Brunialti 2013, Catalano & al. 2016), **Bas** (Puntillo & al. 2009, Ravera & al. 2015d), **Cal** (Puntillo 1995, 1996, Puntillo & Puntillo 2004, Incerti & Nimis 2006), **Si** (Grillo 1998, Grillo & Caniglia 2004, Falco Scampatelli 2005, Grillo & Cataldo 2008, 2008b).

Frut/ Cy.h/ S/ Epiph/ pH: 2-3, L: 2-3, X: 1-2, E: 1/ Alt: 1-2/ SmedD: er, SmedH: vr, MedH: vr/ PT: 0/ suboc/ Note: on bark of broad-leaved trees and on epiphytic mosses in warm-humid areas, mainly Tyrrhenian in Italy. This is the cyanobacterial morph of *R. amplissima*. Besides the obvious differences in morphology, it has a rather different ecology and distribution, and perhaps it would deserve a separate name for ecologists who want to specify what morph they have recorded. However, these dendriscoauloid thalli can hardly be determined with certainty, as similar thalli are developed also by other lichens, such as *Dendriscosticta wrightii*. This morph is included in the Italian red list of epiphytic lichens as "Near-threatened" (Nascimbene & al. 2013c).

Ricasolia virens (With.) H.H. Blom. & Tønberg

in Tønberg & al., Opuscula Philolich., 15: 15, 2016 - *Lichen virens* With., Bot. Arrang. Veg. Gr. Brit.: 710, 1776.

Syn.: *Lobaria herbacea* (Huds.) DC., *Lobaria laetevirens* (Lightf.) Zahlbr., *Lobaria virens* (With.) J.R. Laundon, *Ricasolia herbacea* (Huds.) De Not., *Sticta herbacea* (Huds.) Ach.

N - Ven, Lomb (S-L29262), **Lig** (Watson 2014). **C - Tosc, Marc, Umb** (Ravera & al. 2006), **Laz, Abr, Sar, S - Camp** (Puntillo & al. 2000, Ricciardi & al. 2000, Nimis & Tretiach 2004, Puntillo & Puntillo 2011), **Pugl** (Nimis & Tretiach 1999), **Bas, Cal** (Tretiach 1993, Puntillo & Vězda 1994, Puntillo 1995, 1996, Schumm 2003, Giordani & al. 2009), **Si** (Tretiach 1993, Ottonello & Romano 1997, Ottonello & Puntillo 2009, Ottonello & al. 2011).

Fol.b/ Ch/ S/ Epiph/ pH: 2-3, L: 2-3, X: 1, E: 1/ Alt: 1-3/ Mont: er, SmedH: er, MedH: er/ PT: 0/ oc/ Note: a mild-temperate to humid subtropical species found on old deciduous trees, more rarely on mossy rocks in old, natural, warm-humid forests; probably almost extinct in northern Italy and along the eastern side of the Peninsula, except in the Gargano Peninsula, and very much declining, locally abundant only in few humid forests of southern Italy. It is included in the Italian red list of epiphytic lichens as “Near-threatened” (Nascimbene & al. 2013c).

Rimularia Nyl.

Flora, 51: 346, 1868.

The phylogenetic analysis of the Trapeliaceae by Resl & al. (2015) rejected the monophyly of the genus *Rimularia* as traditionally circumscribed. *Rimularia s.str.* (around the type species *R. limborina*) formed a basal group with Trapeliaceae, while 11 species were placed in the genus *Lambiella*. Type: *R. limborina* Nyl.

Rimularia badioatra (Kremp.) Hertel & Rambold

Bibl. Lichenol., 38: 164, 1990 - *Aspicilia badioatra* Kremp., Denkschr. kgl. bayer. bot. Ges., 4, 2 Abt.: 285, 1861.

Syn.: *Aspicilia corrugatula* (Arnold) Hue, *Lecanora badioatra* (Kremp.) Hepp, *Lecanora bockii* f. *contracta* Th. Fr., *Lecanora contracta* (Th. Fr.) Zahlbr., *Lecanora corrugatula* (Arnold) Nyl., *Lecanora umbriformis* (Nyl.) Grummann, *Lecidea badioatra* (Kremp.) Arnold, *Lecidea corrugatula* Arnold, *Lecidea illita* Nyl., *Lecidea insulatula* Nyl., *Lecidea umbonatula* Nyl., *Lecidea umbriformis* Nyl., *Mosigia illita* (Nyl.) R. Sant.

N - TAA.

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 3-4, X: 3, E: 1/ Alt: 3-4/ Mont: vr/ PT: 1/ Note: on steeply inclined surfaces of hard, base-rich or weakly calciferous siliceous rocks, mostly in upland areas but rarely occurring above treeline.

Rimularia gibbosa (Ach.) Coppins, Hertel & Rambold

in Hertel & Rambold, Bibl. Lichenol., 38: 171, 1990 - *Pyrenula gibbosa* Ach., Lichenogr. Univ.: 317, 1810.

Syn.: *Aspicilia bockii* (T. Rödiger) Boistel, *Lecanora bockii* T. Rödiger, *Lecanora grimselana* A. Massal., *Mosigia gibbosa* (Ach.) Körb.

N - TAA, Piem (Isocrono & al. 2004).

Cr/ Ch/ S-A.s/ Sax/ pH: 2-3, L: 3-4, X: 2-3, E: 1/ Alt: 3-5/ Alp: er, Salp: vr, Mont: er/ PT: 1/ Note: on steeply inclined surfaces of mineral-rich to basic siliceous rocks wetted by rain, often in seepage tracks, usually in upland areas. The species often produces both apothecia and soredia.

Rinodina (Ach.) Gray

Nat. Arr. Brit. Pl., 1: 448, 1821 - *Lecanora* (unranked) *Rinodina* Ach., Lichenogr. Univ.: 344, 1810.

Comprising c. 300 species, this cosmopolitan genus of the Physciaceae is widely distributed in both Hemispheres, from polar to tropical latitudes. *Rinodina*-species usually have crustose thalli, lecanorine apothecia, 2-celled brown ascospores with inner wall thickenings, and *Lecanora*-type asci. The most important character complexes are those of the proper excipulum, ascospores and asci. Nadyeina & al. (2010), besides accepting the segregation of some species in the resurrected genus *Endohyalina*, suggest that both excipulum type and ascospore characters are rather dynamic in the evolution of *Rinodina*-species, and only appear consistent in foliose and fruticose groups of the Physciaceae. Classical morphological and anatomical characters should thus be re-evaluated and supported by other parameters for a new generic delimitation within the Physciaceae. The species of the Iberian Peninsula were treated by Giralt (2001). Important information was provided by Giralt & Mayrhofer (1994, 1994b, 1995), Giralt & Matzer (1994), Giralt & al. (1994, 1995), Giralt & Llimona (1997), Mayrhofer & Moberg (2002), Mayrhofer & Sheard (2007), van den Boom & al. (2009), and Sheard (2010). Type: *R. sophodes* (Ach.) A. Massal.

Rinodina alba Arnold

Metzler ex Arnold, Verh. zool.-bot. Ges. Wien, 22: 35, 1872.

Syn.: *Lecanora michaudiana* Harm., *Rinodina michaudiana* (Harm.) Croz., *Rinodina subcanella* Zahlbr.

C - Tosc, Sar.

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4-5, X: 3-4, E: 2/ Alt: 1/ MedH: r, MedD: vr/ PT: 1/ coast/ Note: on hard siliceous rocks near the shoreline, but sometimes also found at some distance from the coast in the Mediterranean parts of Tyrrhenian Italy, such as in Sardegna.

Rinodina albana (A. Massal.) A. Massal.

Ric. Auton. Lich. Crost.: 15, 1952 - *Hagenia albana* A. Massal., Verh. zool.-bot. Ges. Wien, 1: 222, 1853.

Syn.: *Berengeria albana* (A. Massal.) Trevis., *Psora horiza sensu* Hepp, *Rinodina sophodes* var. *albana* (A. Massal.) Bagl. & Carestia

N - Ven (Lazzarin 2000b), TAA (Nascimbene & al. 2007b, 2014, Nascimbene 2014), Lomb (Lazzarin 2000b), Piem (Isocrono & al. 2004), Emil, Lig. C - Tosc, Marc (Nimis & Tretiach 1999), Laz (TSB 13035), Abr (Loppi & al. 1999, Nimis & Tretiach 1999), Sar (Zedda 2002). S - Camp, Pugl.

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 4, X: 3, E: 2-3/ Alt: 2-3/ Mont: rr, SmedD: vr, SmedH: r/ PT: 1-2/ Note: a temperate species found on isolated deciduous trees with more or less smooth bark; often confused with similar species and perhaps more widespread.

Rinodina anomala (Zahlbr.) H. Mayrhofer & Giralt

in Kalb & Hafellner, Herzogia, 9: 88, 1992 - *Buellia anomala* Zahlbr., Ann. Mycol., 12: 343, 1914.

N - Piem (Morisi & Sereno 1995). C - Tosc (TSB 31239), Sar (Giralt & Matzer 1994, Zedda 2002). S - Pugl (Durini & Medagli 2004).

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 4, X: 2-3, E: 2-3/ Alt: 1-2/ SmedD: vr, MedH: r, MedD: er/ PT: 1/ suboc/ Note: a mainly western species growing on the branches of broad-leaved trees (*Quercus*, *Ulmus*, etc.), mostly at low elevations.

Rinodina archaea (Ach.) Arnold

Flora, 64: 195, 1881 - *Parmelia sophodes* var. *archaea* Ach., Meth. Lich: 156, 1803.

Syn.: *Diploicia trevisanii* (Hepp) A. Massal. non auct., *Lecanora archaea* (Ach.) Harm., *Rinodina archaea* f. *aggregata* H. Magn., *Rinodina archaea* f. *paupera* H. Magn., *Rinodina exigua* var. *lecideoides* (Nyl.) Arnold, *Rinodina laevigata* (Ach.) Malme, *Rinodina lecideoides* (Nyl.) Mig., *Rinodina lecideoides* var. *cinerea* H. Magn., *Rinodina subobscura* H. Magn., *Rinodina trevisanii* (Hepp) Körb. non auct., *Lecanora sophodes* var. *laevigata* Ach.

N - Ven, TAA (Mayrhofer & Sheard 2007, Nascimbene & al. 2007b), Lomb (Mayrhofer & Sheard 2007), Piem, Emil (Nimis & al. 1996). C - Tosc (Mayrhofer & Sheard 2007), Sar (Giralt & Mayrhofer 1995, Zedda & Sipman 2001, Mayrhofer & Sheard 2007). S - Cal (Giralt & Mayrhofer 1995, Puntillo 1996).

Cr/ Ch/ S/ Epiph-Lign-Sax/ pH: 2-3, L: 4, X: 3, E: 2-3/ Alt: 2-4/ Salp: er, Mont: r, SmedD: vr, SmedH: vr/ PT: 1/ Note: a mainly temperate lichen, with optimum on basal parts of broad-leaved trees, more rarely of conifers in open woodlands, sometimes on eutrophicated wood, with optimum in the montane belt.

Rinodina arnoldii H. Mayrhofer & Poelt

Bibl. Lichenol., 12: 54, 1979.

N - TAA, Lomb. C - Sar (Nöske 2000).

Cr/ Ch/ S/ Sax/ pH: 3-4, L: 4, X: 3-4, E: 2-3/ Alt: 4-5/ Alp: vr, Salp: vr, Orom: er/ PT: 1/ #/ Note: on calciferous schists and sandstone near and above treeline. The Italian records need confirmation; for further details see Giralt & Llimona (1997).

Rinodina aspersa (Borrer) J.R. Laundon

Lichenologist, 18: 175, 1986 - *Lecanora aspersa* Borrer in Hooker & Sowerby, Engl. Bot. Suppl. 2: tab. 2728, 1832.

Syn.: *Buellia aspersa* (Borrer) P. James, *Rinodina atrocinerea* var. *fatiscens* (Th. Fr.) Clauzade & Cl. Roux, *Rinodina exigua* f. *fatiscens* Th. Fr., *Rinodina fatiscens* (Th. Fr.) Vain.

C - Sar.

Cr/ Ch/ A.s/ Sax/ pH: 1-2, L: 3-4, X: 2-3, E: 1/ Alt: 1-2/ SmedH: r, MedH: vr/ PT: 1/ suboc/ Note: on hard siliceous rocks near the ground in cold-humid habitats, sometimes (but not in Italy) on walls, mostly below the montane belt.

Rinodina atrocinerea (Hook.) Körb.

Syst. Lich. Germ.: 125, 1855 - *Lecidea atrocinerea* Sm. ex Hook. in Smith & Sowerby. Engl. Fl., 5, 1: 174, 1833.

Syn.: *Lecanora atrocinerea* (Fr.) Link, *Lecanora plumbella* Nyl., *Rinodina aspersa* subsp. *atrocinerea* (Hook.) Cl. Roux, *Rinodina confragosa* var. *atrocinerea* (Hook.) Stein, *Rinodina plumbella* (Nyl.) H. Olivier

N - Ven (Nascimbene & Marini 2007), Lomb, Piem, Emil, Lig. C - Tosc, Sar. S - Camp (Aprile & al. 2002), Si (Ottonello & Romano 1997, Grillo 1998, Grillo & Caniglia 2004, Ottonello & al. 2011).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4-5, X: 3, E: 1-2/ Alt: 1-3/ Mont: vr, SmedD: r, SmedH: rr, MedH: vr/ PT: 1/ suboc/ Note: on steeply inclined to vertical surfaces of hard siliceous rocks below the subalpine belt.

Rinodina beccariana Bagl. var. *beccariana*

N. Giorn. Bot. Ital., 3: 239, 1871.

Syn.: *Lecanora confragosa* f. *dispersa* B. de Lesd., *Lecanora confragosa* var. *fumosa* Wedd., *Lecanora confragosa* var. *turgida* Wedd., *Lecanora subglauescens* Nyl., *Rinodina beccariana* var. *cinerea* Bagl., *Rinodina bimarginata* Zahlbr., *Rinodina confragosa* var. *turgida* (Wedd.) Boistel, *Rinodina subglauescens* (Nyl.) Sheard

N - Lig (Mayrhofer & al. 1993). **C - Tosc** (Mayrhofer & al. 1993), **Laz** (Mayrhofer & al. 1993, Gigante & Petriccione 1995), **Sar** (Mayrhofer & al. 1993 Nöske 2000, Terribile & al. 2012). **S - Camp** (Mayrhofer & al. 1993), **Si** (Mayrhofer & al. 1993, Nimis & al. 1996b).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 3-4, X: 3, E: 1-2/ Alt: 1-2/ SmedH: rc, MedH: rr, MedD: er/ PT: 1/ suboc/
Note: a mainly Mediterranean-Atlantic lichen of siliceous rocks; common, and often abundant, only in Tyrrhenian Italy.

Rinodina beccariana var. **lavicola** (J. Steiner) Matzer & H. Mayrhofer

in Mayrhofer & al., Nova Hedwigia, 57: 292, 1993 - *Rinodina lavicola* J. Steiner, Österr. bot. Z., 54: 361, 1904.

Syn.: *Rinodina subglaucescens* var. *lavicola* (J. Steiner) H. Mayrhofer

C - Sar (Mayrhofer & al. 1993). **S - Si** (Mayrhofer & al. 1993).

Cr/ Ch/ S/ Sax/ pH: 3, L: 3-4, X: 4, E: 1-2/ Alt: 1/ SmC:, MedH: r, MedD: vr/ PT: 1/ Note: a Mediterranean-Macaronesian lichen of volcanic rocks, known from the Canary Islands, Madeira, Azores and the Mediterranean area; a well-distinguished variety, somehow less photo- and hygrophytic than the typical one.

Rinodina bischoffii (Hepp) A. Massal.

Framm. Lichenogr.: 26, 1855 - *Psora bischoffii* Hepp, Flecht. Eur.: nr. 81, 1853.

Syn.: *Berengeria bischoffii* (Hepp) Trevis., *Lecanora subrubescens* (Vain.) Zahlbr., *Rinodina nigrella* Müll. Arg., *Rinodina subconfragosa* auct. p.p.

N - VG, Frl, Ven (Nascimbene & Caniglia 2003c), **TAA** (Rambold & al. 1994), **Lomb, Piem** (Matteucci & al. 2013), **VA** (Piervittori & Isocrono 1999), **Emil** (Nimis & al. 1996), **Lig** (Valcuvia & al. 2000). **C - Tosc** (Benespero 2006), **Marc** (Nimis & Tretiach 1999), **Umb** (Panfili 2000, 2007, Ravera & al. 2006), **Laz, Abr** (Nimis & Tretiach 1999), **Sar**. **S - Camp** (Aprile & al. 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Ottonello & Salone 1994, Ottonello & al. 1994, Ottonello 1996, Grillo 1998, Grillo & Caniglia 2004, Caniglia & Grillo 2005, Brackel 2008c, Cataldo & Cannavò 2014).

Cr/ Ch/ S/ Sax/ pH: 3-5, L: 4, X: 3-4, E: 2-4/ Alt: 1-5/ Alp: er, Salp: vr, Orom: er, Mont: vr, SmedD: rc, Pad: r, SmedH: rc, MedH: rr, MedD: vr/ PT: 1-2/ p/ Note: a widespread early coloniser of calciferous or basic siliceous rocks, often found on walls, roofing tiles etc., but also on pebbles on the ground, with a wide altitudinal range, exceptionally reaching the Alpine belt in dry-warm areas.

Rinodina calcarea (Arnold) Arnold

Verh. zool.-bot. Ges. Wien, 29: 362, 1879 - *Rinodina caesiella* var. *calcarea* Arnold, Flora, 43: 69, 1860.

Syn.: *Lecanora confragosa* var. *glebulosa* Harm., *Rinodina calcarea* var. *ampsagana* (Stizenb.) Zahlbr., *Rinodina calcarea* var. *melanocarpa* J. Steiner, *Rinodina calcarea* var. *nummilitica* Flagey, *Rinodina confragosa* var. *glebulosa* (Harm.) Zahlbr.

N - VG (TSB 3156), **Ven, TAA, VA** (Piervittori & Isocrono 1999), **Emil, Lig** (TSB 32484). **C - Tosc, Abr** (Nimis & Tretiach 1999), **Mol** (Garofalo & al. 1999, Caporale & al. 2008). **S - Camp** (Garofalo & al. 1999, Aprile & al. 2003b), **Pugl** (Nimis & Tretiach 1999, Garofalo & al. 1999), **Bas** (Nimis & Tretiach 1999), **Si** (Nimis & al. 1996b, Ottonello & Salone 1994).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 4-5, X: 4, E: 3-4/ Alt: 1-4/ Salp: r, Mont: rr, SmedD: rc, SmedH: rc, MedH: r, MedD: vr/ PT: 1/ Note: a southern species found on the top of sun-exposed boulders of dolomite, limestone and calcareous schists, with a rather wide altitudinal range.

Rinodina cana (Arnold) Arnold

Verh. zool.-bot. Ges. Wien, 30: 125, 1880 - *Rinodina arenaria* var. *cana* Arnold, Flora, 55: 289, 1872.

N - TAA, Piem (TSB 34548).

Cr/ Ch/ S/ Sax/ pH: 3, L: 4-5, X: 4, E: 2/ Alt: 2-4/ Salp: r, Mont: r, SmedD: vr/ PT: 1/ Note: on steeply inclined surfaces of weakly calcareous schists and basic siliceous rocks, most frequent in dry-warm areas; certainly overlooked and more frequent, at least in the Alps, mostly below treeline.

Rinodina canariensis Matzer, H. Mayrhofer & P. Clerc

Nord. J. Bot., 14: 105, 1994.

C - Tosc (Matzer & al. 1994). **S - Si** (Matzer & al. 1994).

Cr/ Ch/ S/ Sax/ pH: 3, L: 4-5, X: 4, E: 1-2/ Alt: 1/ MedH: vr, MedD: er/ PT: 1/ paras crustose lichens/
Note: a Mediterranean-Macaronesian lichen found on base-rich volcanic rocks, such as andesite and basalt, more or less confined to coastal localities and to low coastal mountains, starting the life-cycle on several species of crustose lichens, especially *Acarospora heufleriana*, *Lecanora schistina*, *Ochrolechia parella*, and *Pertusaria pluripuncta*.

Rinodina candidogrisea Hafellner, Muggia & Obermayer

Bibl. Lichenol., 108: 80, 2012.

N - Frl (Hafellner & al. 2012), **TAA** (Hafellner & al. 2012), **Piem** (Hafellner & al. 2012).

Cr/ Ch/ S/ Terr/ pH: 3-4, L: 4, X: 3-4, E: 4-5/ Alt: 4-5/ Alp: vr, Salp: vr/ PT: 1/ Note: a recently-described, ornitocrophilous, terricolous species growing on mosses and plant debris over calcareous substrata near and above treeline; probably more widespread in the Alps.

Rinodina capensis Hampe

in A. Massal., Mem. Ist. Ven. Sc., Lett. Arti, 10: 87, 1861.

Syn.: *Rinodina corticicola* Dalla Torre & Sarnth., *Rinodina corticicola* (Arnold) Arnold, *Rinodina teichophila* var. *corticicola* Arnold

N - Frl (Giralt & Mayrhofer 1994), **TAA** (Giralt & Mayrhofer 1994, Nascimbene & al. 2007b, 2009, 2010, Nascimbene 2014, Nascimbene & Marini 2015, Nimis & al. 2015), **Lomb** (Rabenhorst Lich. Eur. 889: Giralt & Mayrhofer 1994), **Piem** (Piervittori 2003), **Emil** (Nimis & al. 1996). **C - Tosc** (Giralt & Mayrhofer 1994, Benesperi & al. 2007), **Abr** (Di Santo & Ravera 2012, Corona & al. 2016), **Sar** (Giralt & Mayrhofer 1994, Zedda & Sipman 2001, Zedda 2002). **S - Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Giralt & Mayrhofer 1994, Puntillo 1996, Incerti & Nimis 2006, Puntillo 2011), **Si** (Caniglia & Grillo 2003, Grillo & Caniglia 2004, 2006, Liistro & Cataldo 2011).

Cr/ Ch/ S/ Epiph-Lign/ pH: 2-3, L: 3-4, X: 3, E: 1-2/ Alt: 2-4/ Salp: rc, SmedD: er/ PT: 1/ p/ Note: a cool-temperate to boreal-montane pioneer species, mostly found on smooth bark, but also on lignum, with optimum in the subalpine and montane vegetation belts; the species is also known from the Canary Islands.

Rinodina castanomela (Nyl.) Arnold

Verh. zool.-bot. Ges. Wien, 37: 121, 1887 - *Lecanora castanomela* Nyl., Flora, 69: 99, 1886.

N - TAA (Giralt & Llimona 1997).

Cr/ Ch/ S/ Sax/ pH: 3-4, L: 4, X: 3, E: 2-3/ Alt: 4-5/ Alp: r, Salp: vr/ PT: 1/ u/ Note: an arctic-alpine to boreal-montane, perhaps circumpolar lichen found under overhanging cliffs of weakly calcareous or basic siliceous rocks, marl and calciferous schist near or above treeline; perhaps more widespread in the Alps.

Rinodina castanomelodes H. Mayrhofer & Poelt

Bibl. Lichenol., 12: 81, 1979.

Syn.: *Rinodina bischoffii* var. *castanomelodes* (H. Mayrhofer & Poelt) Giralt & Llimona, *Rinodina orcularia* H. Mayrhofer & Poelt

N - Ven (Nimis 1994), **TAA**, **Lomb**, **Piem** (TSB 34209), **VA** (Piervittori & Isocrono 1999). **S - Bas**.

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 4, X: 3-4, E: 2-3/ Alt: 4-6/ Alp: r, Salp: rr, Orom: vr/ PT: 1/ Note: an arctic-alpine to boreal-montane, perhaps circumpolar lichen found on limestone, marl and calcareous schists in and above treeline; widespread but not common in the Alps, where it can reach the nival belt, and also reported from the mountains of southern Italy.

Rinodina cinnamomea (Th. Fr.) Räsänen

Die Flecht. Estl., 1: 137, 1931 - *Rinodina mniaraea* var. *cinnamomea* Th. Fr., N. Acta Reg. Soc. Sci. Upsal., ser. 3, 3: 228, 1860.

Syn.: *Rinodina mniaraea* var. *chrysopasta* Lettau

N - Ven (Nascimbene & Caniglia 2000, 2003c, Tomaselli & al. 2006), **TAA** (Nascimbene 2008b), **Lomb**, **Piem** (Isocrono & al. 2004). **C - Umb** (Ravera & Di Toma 2003, Ravera & al. 2006).

Cr/ Ch/ S/ Terr/ pH: 3-4, L: 3-5, X: 3, E: 1-2/ Alt: 4-5/ Alp: rr, Salp: r/ PT: 1/ Note: on soil, mosses, and plant debris in tundra-like environments over more or less calciferous substrata, with optimum near treeline.

Rinodina colobina (Ach.) Th. Fr.

Lichenogr. Scand., 1: 205, 1871 - *Lecanora colobina* Ach., Lichenogr. Univ.: 358, 1810.

Syn.: *Rinodina leprosa* A. Massal., *Rinodina virella* (Ach.) Körb.

N - Frl (Ropin & Mayrhofer 1995), **Ven** (Massalongo Lich. Ital. 293, 294 *p.p.*: Ropin & Mayrhofer 1995), **TAA** (Ropin & Mayrhofer 1995, Nascimbene & al. 2007b), **Lomb** (Anzi Lich. Lang. 305: Ropin & Mayrhofer 1995), **Piem** (Rabenhorst Lich. Eur. 965: Ropin & Mayrhofer 1995, Isocrono & al. 2003), **Lig** (Rabenhorst Lich. Eur. 305 and ECI 190: Ropin & Mayrhofer 1995). **C - Umb** (Ravera 1998, 1999, Ravera & al. 2006), **Abr** (Nimis & Tretiach 1999, Brackel 2015), **Sar** (Ropin & Mayrhofer 1995, Rizzi & al. 2011). **S - Camp** (Aprile & al. 2003b), **Pugl** (Nimis & Tretiach 1999), **Bas** (Ropin & Mayrhofer 1995, Puntillo 1996), **Cal** (Ropin & Mayrhofer 1995), **Si**.

Cr/ Ch/ S/ Epiph/ pH: 3-4, L: 4-5, X: 4, E: 3-4/ Alt: 1-3/ Mont: er, SmedD: er, SmedH: er, MedH: er/ PT: 1/ Note: a mild-temperate to Mediterranean lichen found on dust-impregnated bark of isolated trees, especially *Populus*, *Fraxinus*, *Juglans* and *Ulmus*, often on the basal parts of trunks; certainly declining, and presently extinct in several regions, probably due to the disappearance of unpaved roads during this century. It is included in the Italian red list of epiphytic lichens as "Near-threatened" (Nascimbene & al. 2013c).

Rinodina colobinoides (Nyl.) Zahlbr.

Cat. Lich. Univ., 7: 499, 1931 - *Lecanora colobinoides* Nyl., Acta Soc. Sc. Fenn., 7: 444, 1863.

Syn.: *Lecanora erysiphaea* Nyl., *Rinodina erysiphaea* (Nyl.) Zahlbr., *Rinodina sorediata* H. Magn.

C - Sar.

Cr/ Ch/ A.s/ Epiph/ pH: 3, L: 4, X: 3-4, E: 3-4/ Alt: 1/ MedH: er/ PT: 1/ oc/ Note: an oceanic species with a wide, tropical to subtropical distribution, found base-rich bark; to be looked for further in Tyrrhenian Italy.

Rinodina conchophylla H. Mayrhofer & Poelt

Bibl. Lichenol., 12: 85, 1979.

Syn.: *Rinodina violascens sensu* Poelt (1975) *non* H. Magn.

N - TAA.

Cr/ Ch/ S/ Sax/ pH: 3-4, L: 4-5, X: 4, E: 2-3/ Alt: 2-3/ Mont: er, SmedD: vr/ PT: 1/ subc/ Note: on calcareous schists and basic siliceous rocks in warm-dry areas; perhaps more widespread in the dry Alpine valleys.

Rinodina confinis Samp.

Bolet. Soc. Broter., ser. 2, 2: 19, 1924.

N - Lig (Giralt & Mayrhofer 1995). C - Sar.

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 3-4, X: 2, E: 1-2/ Alt: 1/ MedH: r/ PT: 1/ suboc/ Note: on rough bark of trees such as *Olea* and *Quercus ilex* in more or less coastal, warm-humid areas; rare, and probably exclusively Tyrrhenian in Italy.

Rinodina confragosa (Ach.) Körb.

Syst. Lich. Germ.: 125, 1855 - *Parmelia confragosa* Ach., Meth. Lich.: 33, 1803.

Syn.: *Lecanora atra* var. *confragosa* (Ach.) Ach., *Lecanora caesiella* Flörke ex Spreng., *Lecanora confragosa* (Ach.) Röhl., *Lecanora confragosa* var. *exterior* Nyl., *Lecanora confragosa* var. *extrusa* Vain., *Rinodina aggregata* Bagl., *Rinodina caesiella* (Flörke) Körb., *Rinodina caesiella* var. *aggregata* (Bagl.) Arnold, *Rinodina confragosa* var. *dispersa* Räsänen, *Rinodina confragosa* var. *exterior* (Nyl.) H. Olivier, *Rinodina confragosa* var. *extrusa* (Vain.) H. Olivier, *Rinodina crassescens* (Nyl.) Arnold, *Rinodina firma* (Nyl.) Arnold, *Rinodina metabolica* var. *saxicola* Anzi, *Rinodina romeana* Müll. Arg., *Rinodina samothrakiana* Szatala

N - Ven, TAA, Lomb (De Vita & Valcuvia 2004), Piem (Isocrono & al. 2004), Emil, Lig. C - Tosc, Laz, Sar (Rizzi & al. 2011, Giordani & al. 2013). S - Camp (Ricciardi & al. 2000), Pugl, Cal (Puntillo 1996), Si (Grillo & al. 1996, Ottonello & Romano 1997, Grillo 1998, Grillo & Caniglia 2004, Iacolino & Ottonello 2006, Brackel 2008c, Ottonello & al. 2011).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4-5, X: 3, E: 2-3/ Alt: 2-5/ Alp: er, Salp: r, Mont: rr, SmedD: vr, SmedH: vr/ PT: 1/ Note: a cool-temperate to boreal-montane, circumpolar lichen found on vertical or underhanging surfaces of hard siliceous rocks protected from rain, exceptionally reaching beyond treeline in dry-warm areas; the species is chemically variable.

Rinodina conradii Körb.

Syst. Lich. Germ.: 123, 1855.

Syn.: *Rinodina pyreniospora* (Nyl.) Branth & Rostr.

N - Fri (Tretsch & Hafellner 2000), Ven (TSB 13730), TAA (Nascimbene & al. 2004, 2004b), Lomb, Piem, Lig. C - Umb (Ravera & al. 2006, 2006b).

Cr/ Ch/ S/ Terr/ pH: 2-3, L: 4, X: 3, E: 1-2/ Alt: 2-5/ Salp: vr, Orom: er, Mont: vr, SmedD: er/ PT: 1/ p/ Note: a widespread, short-lived early coloniser of base-rich soil and terricolous bryophytes in open habitats, sometimes on mosses on basal parts of ancient trees.

Rinodina cretica H. Mayrhofer

J. Hattori Bot. Lab., 55: 402, 1984.

C - Sar.

Cr.end/ Ch/ S/ Sax/ pH: 5, L: 4-5, X: 4, E: 1/ Alt: 1-2/ MedH: vr, MedD: er/ PT: 1/ Note: a Mediterranean calcicolous species, probably somehow more widespread in southern Italy.

Rinodina dalmatica Zahlbr.

Österr. bot. Z., 51: 348, 1901.

Syn.: *Lecanora dalmatica* (Zahlbr.) Croz.

C - Laz (Giralt & al. 1994, 1995), Sar (Zedda 2002).

Cr/ Ch/ A.s/ Epiph/ pH: 1-2, L: 4, X: 3-4, E: 1-2/ Alt: 1-2/ MedH: vr, MedD: er/ PT: 1/ Note: a Mediterranean species of acid bark (often on *Pinus halepensis*, covering wide areas, especially at the base of the trunks) in coastal situations, probably more widespread in Tyrrhenian Italy. It is included in the Italian red list of epiphytic lichens as "Endangered" (Nascimbene & al. 2013c).

Rinodina degeliana Coppins

Lichenologist, 15: 147, 1983.

N - TAA (Nascimbene 2014, Nascimbene & Marini 2015).

Cr/ Ch/ A.s/ Epiph/ pH: 1-2, L: 3, X: 2-3, E: 1/ Alt: 2-3/ Mont: er, SmedD: er/ PT: 1/ Note: an apparently rare, but also easily overlooked sorediate lichen with a holarctic distribution, growing on bark in rather shaded and humid situations, mostly in the deciduous forest belts.

Rinodina destituta (Nyl.) Zahlbr.

Cat. Lich. Univ., 7: 510, 1931 - *Lecidea destituta* Nyl., Sert. Lich. Trop. Labuan Singapore: 41, 1891.

Syn.: *Rinodina atrocinerea* var. *nigrocaerulescens* (Wedd.) H. Olivier, *Rinodina confragosa* var. *nigrocaerulescens* (Wedd.) Boistel, *Rinodina vezdae* H. Mayrhofer

N - Lig. C - Sar.

Cr/ Ch/ S/ Sax/ pH: 3, L: 3-4, X: 2-3, E: 1-2/ Alt: 1-3/ Mont: vr, SmedH: vr, MedH: vr/ PT: 1/ Note: a species known from N America, central Europe, the Mediterranean Region, Morocco and the Canary Islands, found on basic siliceous rocks, such as magmatite; closely related to *Rinodina oxydata*. For further details see Sheard (2010).

Rinodina dubyana (Hepp) J. Steiner

Verh. zool.-bot. Ges. Wien, 69: 60, 1919 - *Lecidea dubyana* Hepp, Flecht. Eur.: nr. 322, 1857.

Syn.: *Buellia dubyana* (Hepp) Rabenh., *Lecanora bischoffii* var. *melanops* (Müll. Arg.) Stizenb., *Lecanora bischoffii* var. *mediterranea* Stizenb., *Rinodina bischoffii* var. *mediterranea* (Stizenb.) Flagey, *Rinodina bischoffii* var. *melanops* Müll. Arg., *Rinodina mediterranea* (Stizenb.) Flagey

N - VG, Frl, Ven, TAA, Piem (TSB 32930), **C - Tosc, Marc** (Nimis & Tretiach 1999), **Umb** (Genovesi & Ravera 2001, Ravera & al. 2006), **Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **Sar. S - Camp** (Aprile & al. 2003, 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994, Grillo & Caniglia 2004, Caniglia & Grillo 2005, 2006, Grillo & al. 2007b).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 4-5, X: 3, E: 1-2/ Alt: 1-4/ Mont: rr, SmedD: rc, SmedH: vr, MedH: vr, MedD: vr/ PT: 1/ Note: a mainly temperate species found on steeply inclined to underhanging, sunny surfaces of limestone and dolomite wetted by rain, sometimes also on pebbles on the ground, with optimum below the subalpine belt.

Rinodina efflorescens Malme

Svensk Bot. Tidskr., 21: 251, 1927.

Syn.: *Lecanora hueana* Harm., *Rinodina hueana* (Harm.) H. Olivier *nom. illegit. non* Vain.

N - Ven (Thor & Nascimbene 2007). **C - Tosc. S - Si** (TSB 26110).

Cr/ Ch/ A.s/ Epiph/ pH: 1-2, L: 3, X: 3, E: 1/ Alt: 2-3/ Mont: er, SmedH: r/ PT: 1/ suboc/ Note: a mild-temperate, suboceanic species found on twigs and boles of deciduous trees, especially *Quercus* and *Fagus*, in open, moist deciduous woodlands; to be looked for further in the Alps.

Rinodina epimilvina H. Mayrhofer

J. Hattori Bot. Lab., 55: 408, 1984.

N - TAA (Giralt & Llimona 1997). **C - Tosc.**

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 4, X: 3, E: 2-3/ Alt: 3-5/ Alp: r, Salp: vr, Mont: vr/ PT: 1/ paras *Rinodina milvina*/ Note: on acidic siliceous rocks wetted by rain in upland areas, starting the life-cycle on *Rinodina milvina*; not common, but certainly more widespread than the few records would suggest, especially in the Alps, with optimum above treeline.

Rinodina excrecens Vain.

in Ahlqu., Kolemänn. tutkim. Länsi-Siperiassa, 4: 82, 1928.

C - Sar (Herb. Vondrák 10635).

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 3-5, X: 3-4, E: 1-2/ Alt: 1/ MedD: er/ PT: 1/ Note: a rare species of acid bark, with a primarily eastern North American-eastern Asian distribution and scattered outliers elsewhere. The sample from Sardegna was collected on *Erica arborea* near S. Pantaleo (Olbia).

Rinodina exigua (Ach.) Gray

Nat. Arrang. Brit. Plants, 1: 450, 1821 - *Lichen exiguus* Ach., Lichenogr. Suec. Prodr.: 69, 1799.

Syn.: *Berengeria exigua* (Ach.) Trevis., *Rinodina kornhuberi* Zahlbr.

N - VG, Frl, Ven (Nimis & al. 1996c, Caniglia & al. 1999, Lazzarin 2000, Thor & Nascimbene 2007), **TAA** (Nascimbene 2005b, 2014, Nascimbene & al. 2006e, 2007b, 2008c, Nascimbene & Marini 2015, Nimis & al. 2015), **Lomb** (Grieco & Gropali 1995, Brusoni & al. 1997, Zocchi & al. 1997, Brusoni & Valcuvia 2000, Arosio & al. 2003, Furlanetto 2010), **Piem** (Piervittori 1998, 2003, Isocrono & al. 2004, Furlanetto 2010, Matteucci & al. 2010), **VA** (Piervittori & Isocrono 1999, Valcuvia 2000, Valcuvia & al. 2000b, Matteucci & al. 2008c), **Emil** (Bassi 1995, Nimis & al. 1996, Valcuvia & Savino 2000, Marconi & al. 2006), **Lig. C - Tosc** (Loppi & al. 1997b, 1998, 2002b, Putorti & al. 1998, Benesperi & al. 2007, Brunialti & Frati 2010, Brackel 2015, Nascimbene & al. 2015), **Umb** (Ravera 1998, Ravera & al. 2006), **Laz** (Bartoli & al. 1997, Ruisi & al. 2005, Ravera 2008b), **Abr** (Olivieri & al. 1997, 1997b, Loppi & al. 1999, Nimis & Tretiach 1999, Brackel 2015, Caporale & al. 2016), **Mol** (Caporale & al. 2008), **Sar** (Zedda 2002, 2002b, Rizzi & al. 2011, Cossu 2013). **S - Camp** (Ricciardi & al. 2000, Aprile & al. 2003b, Catalano & al. 2016), **Pugl** (Brackel 2011), **Bas** (Potenza 2006, Brackel 2011), **Cal** (Puntillo 1995, 1996, Incerti & Nimis 2006), **Si** (Grillo & Cristaudo 1995, Grillo & Carfi 1997, Grillo 1998, Grillo & al. 2002, Grillo & Caniglia 2004, 2006, Brackel 2008b).

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 3-5, X: 3-4, E: 3/ Alt: 1-3/ Salp: r, Mont: rr, SmedD: rc, Pad: er, SmedH: c, MedH: rr, MedD: er/ PT: 1-2/ p/ Note: a temperate species found on the smooth bark of isolated trees, more rarely on rather eutrophicated wood. It is certainly widespread throughout Italy, but many records need to be checked; the epithets “*exigua*” and “*pyrina*” were often used by those who work on biomonitoring for any *Rinodina* they encountered, without much regard to the many other epiphytic species occurring in Italy.

Rinodina ficta (Stizenb.) Zahlbr.

Cat. Lich. Univ., 7: 518, 1931 - *Lecanora ficta* Stizenb., Ber. Tät. St Gall. naturw. Ges.: 210, 1890.

Syn.: *Rinodina boleana* Giralt & H. Mayrhofer

N - Frl (Giralt & Mayrhofer 1995). **S - Si** (Nimis & al. 1994, Giralt & Mayrhofer 1995).

Cr/ Ch/ S/ Epiph/ pH: 3, L: 4-5, X: 4, E: 3-4/ Alt: 1-2/ SmedD: vr, SmedH: vr, MedH: vr/ PT: 1-2/ Note: on evergreen broad-leaved trees in parklands, waysides, and in open maquis or woodlands; also known from South Africa, New Zealand, North America, the Iberian Peninsula, Greece and Croatia, this species is probably more widespread in Mediterranean Italy. It was included in the Italian red list of epiphytic lichens as "Data Deficient" (Nascimbene & al. 2013c). For nomenclatural matters see Mayrhofer & al. (2014).

Rinodina fimbriata Körb.

Parerga Lichenol.: 76, 1859.

Syn.: *Rinodina confragosa* var. *inundata* (Blomb. ex Th. Fr.) H. Olivier, *Rinodina exigua* var. *inundata* Blomb. ex Th. Fr.

C - Sar (Rizzi & al. 2011).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4, X: 1-2, E: 1/ Alt: 2-3/ Mont: er, SmedH: er/ PT: 1/ 1/ Note: a very rarely collected species found on periodically inundated siliceous rocks in mountain creeks and rivers; several stations might have disappeared as a consequence of environmental changes.

Rinodina freyi H. Magn.

Acta Horti Gothob., 17: 236, 1947.

Syn.: *Rinodina glauca* Ropin, *Rinodina ramulicola* Kernst. ex Arnold nom. illegit.

N - TAA (Sheard 2010).

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 3-4, X: 3, E: 1-2/ Alt: 3-4/ Salp: vr, Mont: vr/ PT: 1/ p/ Note: a subarctic-subalpine to boreal-montane, probably circumpolar lichen found on shrubs and on muribund plants. The species was treated together with *R. glauca* as a synonym of *R. septentrionalis* by Giralt & Mayrhofer (1995). Sheard (2010) distinguishes *R. freyi* and *R. septentrionalis*, placing *R. glauca* as a synonym of *R. freyi*. Most records of *R. septentrionalis* could belong to this species.

Rinodina furfuracea H. Magn.

Meddel. Göteb. Bot. Trädg., 17: 236, 1947.

C - Sar (Giralt & al. 1995). **S - Camp** (Nimis & Tretiach 2004, Garofalo & al. 2010).

Cr/ Ch/ A.i/ Epiph/ pH: 2-3, L: 3-4, X: 2, E: 2/ Alt: 1/ SmedH: er, MedH: er/ PT: 1/ suboc, coast/ Note: a Mediterranean-Atlantic lichen restricted to coastal localities with frequent humid, salt-loaden winds, e.g. on *Juniperus* on sand dunes, but also in very humid deciduous forests far from the coast. It is included in the Italian red list of epiphytic lichens as "Endangered" (Nascimbene & al. 2013c).

Rinodina furfurea H. Mayrhofer & Poelt

Bibl. Lichenol., 12: 177, 1979.

N - TAA.

Cr/ Ch/ A.i/ Sax/ pH: 2-3, L: 4, X: 4-5, E: 2/ Alt: 3-4/ Mont: vr/ PT: 1/ Note: known only from a few collections, on exposed siliceous rocks in very dry sites, this interesting species needs further study.

Rinodina gennarii Bagl.

Comm. Soc. Critt. Ital., 1: 17, 1861.

Syn.: *Buellia alocizoides* (Leight.) A.L. Sm., *Lecanora atra* var. *accumulata* Ach., *Lecanora subexigua* Nyl., *Rinodina cinerascens* J. Steiner, *Rinodina demissa* (Flörke) Arnold, *Rinodina exigua* var. *obscurata* H. Magn., *Rinodina pallida* H. Magn., *Rinodina salina* Degel., *Rinodina subexigua* (Nyl.) H. Olivier

N - VG, Frl, Ven, TAA, Lomb (De Vita & Valcuvia 2004), **Piem** (Isocrono & al. 2004, Giordani & al. 2014), **VA** (Pierivittori & Isocrono 1999, Valcuvia 2000, Matteucci & al. 2015c), **Emil** (Nimis & al. 1996, Valcuvia & Savino 2000), **Lig** (Giralt & Llimona 1997). **C - Tosc, Laz** (Genovesi & al. 2011), **Sar** (Rizzi & al. 2011, Giordani & al. 2013, Cossu 2013, Cossu & al. 2015). **S - Camp** (Aprile & al. 2002), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996, Puntillo & Puntillo 2004), **Si** (Caniglia & Grillo 2003, Grillo & Caniglia 2004, Iacolino & Ottonello 2006, Brackel 2008b, Ottonello & al. 2011, Cataldo & Cannavò 2014).

Cr/ Ch/ S/ Sax/ pH: 3-4, L: 4-5, X: 3-4, E: 3-4/ Alt: 1-3/ Mont: vr, SmedD: c, Pad: vr, SmedH: c, MedH: rr, MedD: vr/ PT: 1-2/ Note: a mainly temperate species found on base-rich or slightly calciferous siliceous substrata, e.g. calciferous schists and sandstone, often also in small urban settlements, on brick walls, mortar, and roofing tiles, mostly below the subalpine belt. The species is very closely related to the epiphytic *R. oleae*, so much that it was considered as a synonym of the latter by Kaschik (2006).

Rinodina griseosoralifera Coppins

Lichenologist, 21: 169, 1989.

N - Frl, Lig (TSB 33566). **C - Sar** (ASU-516331, det. J. Sheard).

Cr/ Ch/ A.s/ Epiph/ pH: 2-3, L: 3-4, X: 3, E: 3/ Alt: 2-3/ Mont: er, SmedD: vr, SmedH: vr/ PT: 1/ Note: a species found on trunks of broad-leaved trees, often near the base, sometimes invading epiphytic mosses; easy to overlook, being mostly sterile, it is probably more widespread throughout the country, mostly at relatively low elevations. It was included in the Italian red list of epiphytic lichens as "Data Deficient" (Nascimbene & al. 2013c).

Rinodina guzzinii Jatta

N. Giorn. Bot. Ital., 23: 354, 1891.

Syn.: *Rinodina bischoffii* var. *ochrata* J. Steiner, *Rinodina controversa* var. *terricola* Flagey

N - Frl, Piem (TSB 33332), **Emil** (Nimis & al. 1996), **Lig. C - Tosc, Marc** (Nimis & Tretiach 1999), **Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **Sar** (Rizzi & al. 2011). **S - Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Si** (Giralt & Llimona 1997).

Cr/ Ch/ S/ Sax/ pH: 3-4, L: 4-5, X: 4-5, E: 2-3/ Alt: 1-3/ Mont: er, SmedD: r, SmedH: vr, MedH: r, MedD: rr/ PT: 1/ subc/ Note: an Irano-Turanian-Mediterranean species found on more or less horizontal, exposed surfaces of weakly calciferous rocks, most frequent in dry-warm areas below treeline.

Rinodina immersa (Körb.) J. Steiner

Sitzungsber. Akad. Wiss. Wien, math.-naturw. Kl., Abt. 1, 102: 164, 1893 - *Rinodina bischoffii* var. *immersa* Körb., Parerga Lichenol.: 75, 1859.

Syn.: *Rinodina bischoffii* var. *exigua* Müll. Arg., *Rinodina bischoffii* var. *intermedia* Müll. Arg., *Rinodina bischoffii* var. *ochracea* Müll. Arg., *Rinodina bischoffii* var. *perexigua* Müll. Arg.

N - VG (Nimis & Tretiach 1995, Tretiach & Pecchiari 1995, Geletti 1997, Pinna & al. 1998, Crisafulli & al. 2006, Piervittori & al. 2006, Tretiach & al. 2007b), **Frl** (TSB 3005), **Ven** (Nascimbene & Caniglia 2000, 2003c), **TAA** (Spitale & Nascimbene 2012), **Lomb, Lig** (TSB 33575). **C - Tosc, Marc** (Nimis & Tretiach 1999), **Umb** (Nimis & Tretiach 1999, Ravera & al. 2006), **Laz** (Nimis & Tretiach 2004), **Abr** (Nimis & Tretiach 1999, Cucchi & al. 2009, Caporale & al. 2016), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008, Ravera & al. 2009), **Sar** (Rizzi & al. 2011). **S - Camp** (Aprile & al. 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1996b, Grillo 1998, Grillo & Caniglia 2004, Brackel 2008b, 2008c).

Cr.end/ Ch/ S/ Sax/ pH: 4-5, L: 3-5, X: 3-5, E: 1-2/ Alt: 1-5/ Alp: vr, Salp: r, Orom: r, Mont: rc, SmedD: vc, Pad: vr, SmedH: c, MedH: rc, MedD: r/ PT: 1/ Note: a mainly southern species found on horizontal to steeply inclined, dry surfaces of limestone and (more rarely) dolomite wetted by rain, but also on pebbles, exceptionally reaching the Alpine belt.

Rinodina intermedia Bagl.

Comm. Soc. Critt. Ital., 1: 313, 1863.

Syn.: *Psora surfacea* f. *ligustica* Rabenh., *Rinodina diplinthia* (Nyl.) Zahlbr., *Rinodina lusitanica* Arnold

N - TAA, Lomb, Lig.

Cr/ Ch/ S/ Terr/ pH: 2-3, L: 4-5, X: 3-4, E: 1-2/ Alt: 1-2/ SmedD: er, SmedH: vr, MedH: vr/ PT: 1/ suboc/ Note: a widespread species reported from Asia, Central and South America, Europe and Africa, including the Canary Islands and the Cape Verde Islands, found on soil and mosses over basic siliceous substrata, in open grasslands and garrigue vegetation.

Rinodina isidioides (Borrer) H. Olivier

Mém. Soc. Nat. Sc. Nat. Cherbourg, 37: 186, 1909 - *Parmelia isidioides* Borrer in Hooker & Sowerby, Suppl. Engl. Bot., 3: tab. 2808, 1843.

C - Tosc.

Cr/ Ch/ A.i/ Epiph/ pH: 1-2, L: 3, X: 2, E: 1-2/ Alt: 1/ MedH: er/ PT: 0/ suboc/ Note: a mild-temperate, Mediterranean-Atlantic species found on rough bark, more rarely on epiphytic mosses in ancient, undisturbed forests. It is included as "Critically Endangered" in the Italian red list of epiphytic lichens (Nascimbene & al. 2013c).

Rinodina lecanorina (A. Massal.) A. Massal.

Geneac. Lich.: 19, 1854 - *Mischoblastia lecanorina* A. Massal., Ric. Auton. Lich. Crost.: 41, 1852.

Syn.: *Berengeria lecanorina* (A. Massal.) Trevis., *Lecanora controversa* var. *numida* Stizenb., *Lecanora ocellata* (Hoffm.) Nyl., *Lecanora sophodes* var. *pictavica* Wedd., *Lecidea lecanorina* (A. Massal.) Nyl., *Placodium ocellatum* (Hoffm.) Duby, *Rinodina controversa* var. *numida* (Stizenb.) Zahlbr., *Rinodina ocellata* (Hoffm.) Arnold non (Flot.) Branth & Rostr., *Rinodina sophodes* var. *pictavica* (Wedd.) Zahlbr., *Verrucaria ocellata* Hoffm.

N - VG, Frl, Ven, TAA, Lomb (Lazzarin 2000b, Giralt & Llimona 1997), **Piem** (Isocrono & al. 2004, Watson 2014), **VA** (Piervittori & Isocrono 1999), **Emil, Lig. C - Tosc, Marc** (Nimis & Tretiach 1999), **Umb** (Nimis & Tretiach 1999, Ravera & al. 2006), **Laz, Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 1999, Garofalo & al. 1999, Caporale & al. 2008), **Sar. S - Camp** (Garofalo & al. 1999, Ricciardi & al. 2000, Aprile & al. 2003, 2003b, Garofalo & al. 2010), **Pugl, Bas, Cal** (Puntillo 1996), **Si** (Grillo 1998, Grillo & Caniglia 2004).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 4-5, X: 3-4, E: 3-4/ Alt: 1-4/ Salp: vr, Orom: r, Mont: rc, SmedD: c, Pad: er, SmedH: c, MedH: r, MedD: vr/ PT: 1/ Note: on the top of isolated boulders of limestone and dolomitic rocks, usually on nutrient-enriched surfaces such as in birds' perching sites, with a wide altitudinal range but usually absent above treeline.

Rinodina luridata (Körb.) H. Mayrhofer, Scheid. & Sheard

Bibl. Lichenol., 38: 346, 1990 - *Buellia luridata* Körb., Parerga Lichenol.: 188, 1860.

Syn.: *Rinodina euryspora* Zahlbr., *Rinodina iodes* H. Mayrhofer & Poelt, *Rinodina iodes* var. *immersa* H. Mayrhofer & Cl. Roux

S - Bas, Cal.

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 4, X: 3-4, E: 2-3/ Alt: 3-5/ Alp: er, Salp: vr, Orom: r, Mont: r/ PT: 1/ Note: on sun-exposed calcareous outcrops in upland areas; certainly present also in the Alps.

Rinodina luridescens (Anzi) Arnold

Flora, 55: 39, 1872 - *Buellia luridescens* Anzi, Comm. Soc. Critt. Ital., 1, 3: 158, 1862.

Syn.: *Buellia coniopta* (Nyl.) Malme, *Buellia sciodes* (Nyl.) Boistel, *Buellia steineri* Servit, *Lecanora coniopta* Nyl., *Lecanora sciodes* Nyl., *Lecidea coniopta* (Nyl.) Wedd., *Rinodina coniopta* (Nyl.) Hav., *Rinodina luridescens* var. *bithynica* J. Steiner, *Rinodina sciodes* (Nyl.) H. Olivier

C - **Tosc, Sar** (Monte 1993, Nöske 2000, Rizzi & al. 2011). **S - Bas, Cal** (Puntillo 1996), **Si**.

Cr/ Ch/ S/ Sax/ pH: 1-3, L: 3-4, X: 2, E: 2-3/ Alt: 1-2/ SmedH: vr, MedH: rr/ PT: 1/ suboc/ Note: a Mediterranean-Atlantic lichen described from Tuscany, found on hard siliceous rocks subject to frequent humid winds, often near the coast; not uncommon in some parts of Mediterranean Italy, e.g. in Sardegna on Nuraghes.

Rinodina malangica (Norman) Arnold

Flora, 64: 196, 1881 - *Rinodina leprosa* subsp. *malangica* Norman, K. Norske Vid. Selsk. Skr., 5: 342, 1868.

Syn.: *Rinodina pyrina* f. *rhododendri* ("Hepp") Arnold, *Rinodina rhododendri* Hepp ex H. Magn., *Rinodina sophodes* var. *malangica* (Norman) Th. Fr.

N - **Frl, TAA** (Nascimbene & al. 2007b), **Piem** (Tretiach 1997).

Cr/ Ch/ A.s/ Epiph/ pH: 1-2, L: 3-4, X: 2-3, E: 1-2/ Alt: 3-4/ Salp: rc, Mont: er/ PT: 1/ Note: a species known from the central European mountains, the Pyrenees, Norway and the Canary Islands, found on shrubs (often on *Rhododendron*) in the subalpine belt, especially on the basal parts of stems, where it can be very abundant, sometimes on lignum; probably widespread throughout the Alps.

Rinodina milvina (Wahlenb.) Th. Fr.

N. Acta Reg. Soc. Sci. Upsal., ser. 3, 3: 224, 1861 - *Parmelia milvina* Wahlenb. in Ach., Meth. Lich. Suppl.: 34, 1803.

Syn.: *Lecanora milvina* (Wahlenb.) Ach., *Lecanora sophodes* var. *scopulina* Nyl., *Lecanora sophodes* var. *submilvina* Nyl., *Lecanora subconfragosa* Nyl., *Rinodina milvina* var. *scopulina* (Nyl.) H. Olivier, *Rinodina milvina* var. *karelica* Räsänen, *Rinodina sophodes* f. *saxicola* Kernst., *Rinodina sophodes* var. *scopulina* (Nyl.) Croz., *Rinodina subconfragosa* (Nyl.) Flagey

N - **Frl** (Tretiach & Hafellner 2000), **Ven, TAA** (Nascimbene 2003), **Lomb, Piem** (Isocrono & al. 2004, Favero-Longo & al. 2015), **VA** (Piervittori & Isocrono 1999, Matteucci & al. 2008c, 2015c, Favero-Longo & Piervittori 2009, Isocrono & al. 2008), **Emil** (Tretiach & al. 2008), **Lig** (Brunialti & al. 1999). C - **Tosc, Sar** (Nöske 2000, Rizzi & al. 2011, Giordani & al. 2013). **S - Pugl, Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si**.

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 3-4, X: 3, E: 2-4/ Alt: 3-5/ Alp: c, Salp: vc, Orom: rc, Mont: rr/ PT: 1/ paras crustose lichens when young/ Note: a cool-temperate to arctic-alpine, circumpolar lichen found on boulders of base-rich to weakly calciferous siliceous rocks, usually on steeply inclined surfaces, often (but not always) parasitic on other crustose lichens; the Italian distribution ranges from the Alps to the high Mediterranean mountains, with optimum near or above treeline.

Rinodina mniaraea (Ach.) Körb.

Syst. Lich. Germ.: 126, 1855 - *Lecanora mniaraea* Ach., Syn. Meth. Lich.: 339, 1814.

Syn.: *Pachysporaria mniaraea* (Ach.) M. Choisy, *Rinodina mniaraea* f. *amniocola* (Ach.) Arnold, *Rinodina mniaraea* var. *normalis* Th. Fr.

N - **Frl** (Tretiach & Hafellner 2000), **Ven** (Nimis 1994), **TAA** (Bilovitz & al. 2014, 2014b), **Lomb, Piem** (Isocrono & al. 2004), **VA, C - Mol** (Nimis & Tretiach 2004, Caporale & al. 2008).

Cr/ Ch/ S/ Terr/ pH: 3-4, L: 3-5, X: 3, E: 1-2/ Alt: 4-6/ Alp: vc, Salp: rc/ PT: 1/ Note: an arctic-alpine, circumpolar species found on soil, mosses, and plant debris in tundra-like environments, reaching the nival belt in the Alps.

Rinodina mniaraeiza (Nyl.) Arnold

Flora, 53: 469, 1870 - *Lecanora mniaraeiza* Nyl., Flora, 53: 33, 1870.

Syn.: *Diploicia muscorum sensu* A. Massal., *Rinodina mniaraea* f. *biatorina* (Nyl.) Arnold, *Rinodina mniaraea* var. *mniaraeiza* (Nyl.) H. Magn.

N - **TAA** (Bilovitz & al. 2014b), **Lomb**.

Cr/ Ch/ S/ Terr/ pH: 2-4, L: 3-5, X: 3, E: 1-2/ Alt: 4-5/ Alp: rr, Salp: r/ PT: 1/ Note: on soil, mosses, plant debris, in tundra-like environments; perhaps more widespread in the Alps.

Rinodina nimisii Giralt & H. Mayrhofer

in Giralt & al., Lichenologist, 27: 16, 1995.

N - **Lig** (Giordani & Incerti 2008, Giordani & al. 2009). C - **Sar** (Giralt & al. 1995).

Cr/ Ch/ A.s/ Epiph/ pH: 2-3, L: 4, X: 2, E: 2-3/ Alt: 1/ MedH: er/ PT: 1/ suboc, coast/ Note: a Mediterranean-Macaronesian lichen known from several Mediterranean Islands (Corsica Sardinia, Menorca), Portugal, and the Canary Islands, restricted to coastal localities with frequent humid, salt-loaden winds, e.g. on *Juniperus* in sites with sand dunes. It is included in the Italian red list of epiphytic lichens as "Endangered" (Nascimbene & al. 2013c).

Rinodina nivalis H. Mayrhofer

J. Hattori Bot. Lab., 55: 442, 1984.

N - TAA.

Cr.end/ Ch/ S/ Sax/ pH: 4, L: 4-5, X: 3-4, E: 1-2/ Alt: 5/ Alp: vr/ PT: 1/ #/ Note: this species is only known from the eastern Alps, on dolomite. Indicator values are tentative.

Rinodina notabilis (Lyngé) Sheard

The Lichen Genus *Rinodina* in North America: 142, 2010 - *Buellia notabilis* Lyngé, Skr. om Svalbard og Ishavet, 81: 121, 1940.

Syn.: *Buellia parvula* (H. Mayrhofer & Poelt) H. Mayrhofer & Scheid., *Rinodina parvula* H. Mayrhofer & Poelt N - TAA (Nadyeina & al. 2010).

Cr/ Ch/ S/ Sax/ pH: 3-4, L: 4-5, X: 3-5, E: 3-4/ Alt: 4-5/ Alp: vr, Salp: vr/ PT: 1/ Note: on more or less calciferous rocks in upland areas; the species is known also from Austria, Switzerland, France, Slovakia, and Spain, and from North America (Sheard 2010).

Rinodina obnascens (Nyl.) H. Olivier

Bull. Acad. Int. Géogr. Bot., 12: 380, 1903 - *Lecanora obnascens* Nyl., Flora, 69: 462, 1886.

N - Lig. C - Tosc. Laz. Sar. S - Bas (Nimis & Tretiach 1999), Si (Pišút 1995, Iacolino & Ottonello 2006).

Cr/ Ch/ A.i/ Sax/ pH: 2-3, L: 4, X: 3, E: 2-3/ Alt: 1-3/ Mont: er, SmedH: rr, MedH: r, MedD: er/ PT: 1/ suboc, paras *Aspicilia* spp. and other crustose lichens/ Note: a Mediterranean-Atlantic lichen found on weakly inclined to horizontal surfaces of siliceous rocks wetted by rain, starting the life-cycle especially on *Aspicilia intermutans*, but sometimes on other lichens, e.g. *Rhizocarpon*-species; mostly Tyrrhenian in Italy.

Rinodina occulta (Körb.) Sheard

Lichenologist, 3: 349, 1967 - *Buellia occulta* Körb., Parerga Lichenol.: 186, 1860.

Syn.: *Lecanora tegulicola* Nyl., *Rinodina diplocheila* Vain., *Rinodina tegulicola* (Nyl.) J. Steiner, *Rinodina verrucarioides* H. Magn.

N - VA (Pierivittori & Isocrono 1999, Matteucci & al. 2015d), Lig. C - Sar. S - Camp (Jatta 1909-1911).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 3-4, X: 2-3, E: 1/ Alt: 1-3/ Mont: vr, SmedD: er, SmedH: vr, MedH: vr/ PT: 1/ suboc, u/ Note: on vertical to underhanging surfaces of hard siliceous rocks; to be looked for more intensively, especially in Tyrrhenian Italy and in the dry Alpine valleys.

Rinodina oleae Bagl.

Mem. R. Accad. Sci. Torino, ser. 2, 17: 403, 1857.

Syn.: *Rinodina exigua* var. *glauca* H. Magn.

N - Lig (Anzi Lich. Lang. 304 and E.C.I. 35: Giralt & Mayrhofer 1995), C - Tosc (Jatta 1909-1911), Sar (Giralt & Mayrhofer 1995), S - Camp (Aprile & al. 2003b), Pugl (Giralt & Mayrhofer 1995, Nimis & Tretiach 1999), Cal (Giralt & Mayrhofer 1995), Si (TSB 21495).

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 3-5, X: 3-4, E: 2-3/ Alt: 1/ MedH: r, MedD: vr/ PT: 1/ coast/ Note: a mainly coastal, Mediterranean epiphytic lichen which was overlooked or confused with similar species in the past; mostly Tyrrhenian in Italy. The species is very closely related to the saxicolous *R. gennarii* (see comment on that species).

Rinodina olivaceobrunnea C.W. Dodge & G.E. Baker

Ann. Miss. Bot. Gard., 15: 659, 1938.

Syn.: *Rinodina archaea* f. *minuta* Anzi ex Arnold, *Rinodina archaeoides* H. Magn., *Rinodina laxa* H. Magn., *Rinodina soredicola* Degel.

N - Ven (Caniglia & al. 1999, Nascimbene & Caniglia 2000, Tomaselli & al. 2006), TAA, Lomb. C - Sar. S - Si.

Cr/ Ch/ S/ Terr/ pH: 2-3, L: 4, X: 3, E: 2-3/ Alt: 4-5/ Alp: rc, Salp: rr, Orom: vr/ PT: 1/ Note: an arctic-alpine, circumpolar species found on soil, bryophytes and plant debris in tundra-like environments over siliceous substrata; certainly widespread throughout the Alps, and also reported from the high Mediterranean mountains.

Rinodina orculata Poelt & M. Steiner

Mitt. bot. Staatss. München, 8: 191, 1970.

Syn.: *Rinodina exigua* f. *corticicola* Anzi, *Rinodina trevisanii* auct. p.p. non (Hepp) Körb.

N - Fri (Giralt & Mayrhofer 1995), TAA (Mayrhofer & Sheard 2007, Nascimbene & al. 2007b), Lomb (Mayrhofer & Sheard 2007), Piem (Isocrono & al. 2004, Mayrhofer & Sheard 2007), VA (Pierivittori & Isocrono 1999), Emil (Obermayer 2011).

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 3-4, X: 3, E: 1-2/ Alt: 3-4/ Salp: r, Mont: vr/ PT: 1/ Note: on the bark of conifers and subalpine shrubs, especially common on *Rhododendron*; certainly more widespread in the Alps, mostly near treeline.

Rinodina oxydata (A. Massal.) A. Massal.

Geneac. Lich.: 19, 1854 - *Mischoblastia oxydata* A. Massal., Ric. Auton. Lich. Crost.: 42, 1852.

Syn.: *Berengeria oxydata* (A. Massal.) Trevis., *Buellia discolor* (Hepp) Anzi, *Buellia discolor* var. *candida* (Arnold) Anzi, *Buellia griseonigra* (Nyl.) Zahlbr., *Lecanora contribuens* Nyl., *Lecanora discolorans* (Arnold) Nyl.,

Lecanora dissentanea Nyl., *Lecanora griseofusca* Nyl., *Lecanora intuta* Nyl., *Lecidea discolor* Hepp, *Rinodina aequalis* (Nyl.) Zahlbr., *Rinodina biatorina* Körb., *Rinodina candida* Arnold, *Rinodina concava* B. de Lesd., *Rinodina contribuens* (Nyl.) Boistel, *Rinodina discolor* (Hepp) Arnold, *Rinodina dissimilis* Anzi, *Rinodina griseofusca* (Nyl.) H. Olivier, *Rinodina griseonigra* (Nyl.) Zahlbr., *Rinodina imitatrix* Zahlbr., *Rinodina intuta* (Nyl.) H. Olivier, *Rinodina lecideotropa* (Nyl.) Zahlbr., *Rinodina oxydata* var. *squamulosa* Bagl., *Rinodina subarenaria* A.L. Sm.

N - Ven (Lazzarin 2000b), **TAA**, **Lomb** (De Vita & Valcuvia 2004), **Piem** (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999, Isocrono & al. 2008), **Lig**, **C - Sar** (Rambold & al. 1994, Rizzi & al. 2011, Giordani & al. 2013).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4, X: 2, E: 1-3/ Alt: 2-3/ Mont: r, SmedD: vr/ PT: 1/ subc/ Note: a temperate to tropical, widespread species known from southern Africa, Asia, Australia, North and South America, Macaronesia and Europe, found on seepage tracks of (mostly) base-rich, hard, smooth metamorphic rocks, often along mountain creeks. The species is widespread in the Alps, but has been also reported from the Mediterranean mountains.

Rinodina papillata H. Magn.

Bot. Not.: 194, 1953.

N - TAA (Nascimbene & al. 2014, Nascimbene 2014).

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 3-4, X: 2, E: 1-2/ Alt: 2/ SmedD: er/ PT: 0/ Note: this epiphytic species was recently reported as new to Europe from an oak forest of South Tyrol. The ecological indicator values are tentative.

Rinodina parasitica H. Mayrhofer & Poelt

Bibl. Lichenol., 12: 137, 1979.

Syn.: *Rinodina milvina* var. *amphibolitica* Räsänen

N - Frl (Tretiach & Hafellner 2000). **C - Sar**.

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 4, X: 3-4, E: 1-2/ Alt: 3-5/ Alp: er, Salp: vr, Orom: vr, Mont: vr/ PT: 1/ paras crustose lichens/ Note: an arctic-alpine species found on siliceous rocks in upland areas, often growing on the thalli of other crustose lichens; easy to overlook and certainly more widespread, at least in the Alps.

Rinodina pityrea Ropin & H. Mayrhofer

Bibl. Lichenol., 58: 374, 1995.

Syn.: *Rinodina leprosa* var. *lecideina* A. Massal., *Rinodina leprosa* var. *lecideina* f. *capniochroa* A. Massal., *Rinodina leprosa* var. *lecideina* f. *fuliginea* A. Massal.

N - Ven (Lazzarin 2000, 2000b, Obermayer 2011), **Emil** (Ropin & Mayrhofer 1995). **C - Sar** (Ropin & Mayrhofer 1995).

Cr/ Ch/ A.s/ Sax/ pH: 4-5, L: 4, X: 3, E: 3-4/ Alt: 1-2/ SmedD: vr, SmedH: r, MedH: r/ PT: 2-3/ suboc/ Note: a temperate species found on asbestos-cement and mortar, often on walls; certainly more widespread, but easy to overlook, being often sterile.

Rinodina plana H. Magn.

Acta Horti Gothob., 17: 298, 1947.

N - Lig (Rabenhorst Lich. Eur. 508: Giralt & Mayrhofer 1995). **C - Sar** (Giralt & Mayrhofer 1995, Zedda 2002). **S - Si** (Nimis & al. 1994, Giralt & Mayrhofer 1995).

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 4-5, X: 3-4, E: 1-2/ Alt: 1-3/ Mont: er, SmedH: r, MedH: vr, MedD: er/ PT: 1/ p/ Note: an early coloniser of smooth bark, especially of young twigs.

Rinodina poeltiana Giralt & Obermayer

Herzogia, 9: 709, 1993.

N - TAA (Nascimbene & al. 2014, Nascimbene 2014).

Cr/ Ch/ S/ Epiph/ pH: 3, L: 4-5, X: 3-4, E: 1-2/ Alt: 2-3/ Mont: er, SmedD: er/ PT: 1/ #/ Note: a rather poorly known epiphytic species. The type material, from Austria, was growing on *Salix alba*.

Rinodina polyspora Th. Fr.

N. Acta Reg. Soc. Sci. Upsal., ser. 3, 3: 226, 1861.

Syn.: *Berengeria polyspora* (Th. Fr.) Trevis., *Buellia polysporella* (Nyl.) Arnold, *Lecanora polyspora* (Th. Fr.) Nyl., *Lecanora sophodes sensu* A. Massal. non *Lichen sophodes* Ach., *Lecidea polysporella* Nyl.

N - Ven (Trevisan Lichenoth. Ven. 21: Rinaldi 1994), **TAA** (Massalongo Lich. It. 237: Giralt & Mayrhofer 1994, Nascimbene & al. 2007b), **Lomb** (Anzi Lich. It. 221: Giralt & Mayrhofer 1994, Arosio & al. 2003), **Piem** (Griselli & al. 2003, Piervittori 2003, Isocrono & al. 2004, Matteucci & al. 2010).

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 3-4, X: 3, E: 1-2/ Alt: 2-3/ Mont: er, SmedD: vr/ PT: 1/ Note: a temperate species found on smooth bark, especially of *Fraxinus*, *Sorbus* and *Carpinus* in open woodlands; probably declining. It was included as "Regionally Extinct" in the Italian red list of epiphytic lichens (Nascimbene & al. 2013c).

Rinodina polysporoides Giralt & H. Mayrhofer

Herzogia, 10: 33, 1994.

N - TAA (Arnold Lich. Exs. 1654 p.p.: Giralt & Mayrhofer 1994, Nascimbene & al. 2007b), **VA** (Piervittori & Maffei 1996, 2001, Piervittori & Isocrono 1999).

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 4, X: 3-4, E: 2-3/ Alt: 2-3/ Mont: er, SmedD: vr/ PT: 1/ Note: a temperate species found on smooth bark of trunks and branches of deciduous, more rarely of evergreen broad-leaved trees, especially on *Juglans* and *Fraxinus*, but also on *Quercus*; certainly more widespread. It is included in the Italian red list of epiphytic lichens as “Endangered” (Nascimbene & al. 2013c).

Rinodina pruinella Bagl.

Nuovo Giorn. Bot. Ital., 11: 79, 1879.

Syn.: *Lecanora pruinella* (Bagl.) Samp., *Lecanora pruinella* var. *cintrana* Samp., *Rinodina cintrana* Samp., *Rinodina magnussoniana* Reichert & Galun, *Rinodina maroccana* H. Magn., *Rinodina pruinella* f. *laevigata* H. Magn., *Rinodina turgescens* H. Magn.

C - Tosc (Putorti & Loppi 1999), **Laz** (Giralt & Mayrhofer 1994), **Sar** (Baglietto 1879: Giralt & Mayrhofer 1994, Zedda 2002). **S - Pugl** (Jatta 1909-1911), **Si** (Giralt & Mayrhofer 1994, Giralt & al. 1994, Nimis & al. 1996b).

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 4, X: 3, E: 2-3/ Alt: 1/ MedH: rr, MedD: r/ PT: 1/ coast/ Note: a Mediterranean-Atlantic species found on twigs of trees and shrubs near the sea; mainly Tyrrhenian in Italy.

Rinodina pyrina (Ach.) Arnold

Flora, 64: 196, 1881 - *Lichen pyrinus* Ach., Lichenogr. Suec. Prodr.: 52, 1799.

Syn.: *Berengeria exigua* var. *maculiformis* (Hepp) Trevis., *Lecanora pyrina* (Ach.) Röhl., *Rinodina exigua* var. *maculiformis* (Hepp) Bagl., *Rinodina exigua* var. *pyrina* (Ach.) Th. Fr., *Rinodina maculiformis* (Hepp) Arnold

N - VG (Castello 1996), **Frl** (Castello & Skert 2005), **Ven** (Nascimbene 2005c, Nascimbene & al. 2006), **TAA** (Nascimbene 2003, 2005b, Nascimbene & al. 2006e, 2007b, Nimis & al. 2015), **Lomb** (Arosio & Rinaldi 1995, Brusoni & al. 1997, Zocchi & al. 1997, Brusoni & Valcuvia 2000, Arosio & al. 2000, Gheza & al. 2015), **Piem** (Caniglia & al. 1992, ECI 421: Giralt & Mayrhofer 1995, Isocrono & al. 2003, 2009, Piervittori 2003, Isocrono & Piervittori 2008, Matteucci & al. 2010, Giordani & Malaspina 2016), **VA** (Piervittori & Maffei 1996, 2001, Piervittori & Isocrono 1999, Matteucci & al. 2008, 2008c), **Emil** (Gasparo & Tretiach 1996, Nimis & al. 1996, Valcuvia & Savino 2000, Sallase 2003, Benesperi 2009), **Lig** (Putorti & al. 1999b, Giordani 2006, Giordani & Incerti 2008). **C - Tosc** (Loppi & al. 1994, 1996b, 1997b, 199, 2002b, 2003, 2006, Loppi 1996, Putorti & al. 1998, Loppi & Putorti 2001, Loppi & Frati 2006, Paoli & Loppi 2008, Paoli & al. 2012, Brackel 2015), **Marc** (Gasparo & al. 1989, Giralt & Mayrhofer 1995, Frati & Brunialti 2006), **Laz** (Ravera & al. 1999, 2000, Munzi & al. 2007), **Abr** (Recchia & al. 1993, Olivieri & Pacioni 1996, Recchia & Villa 1996, Olivieri & al. 1997, 1997b, Loppi & al. 1999, Nimis & Tretiach 1999), **Mol** (Caporale & al. 2008, Paoli & al. 2011, 2015, Genovesi & Ravera 2014), **Sar** (Giralt & Mayrhofer 1995, Zedda 2002, Rizzi & al. 2011, Cossu 2013), **S - Camp** (Aprile & al. 2003b, Catalano & al. 2012, 2016, Brunialti & al. 2013, Ravera & Brunialti 2013), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999, Paoli & al. 2006), **Cal** (Puntillo 1996), **Si** (Merlo 1993, Grillo & al. 1996, Grillo & Caniglia 2004, Falco Scampatelli 2005, Caniglia & Grillo 2006b).

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 4-5, X: 3, E: 2-3/ Alt: 1-3/ Mont: rr, SmedD: rc, Pad: vr, SmedH: rc, MedH: r, MedD: vr/ PT: 1-2/ p/ Note: a temperate to southern boreal-montane, perhaps circumpolar early coloniser of the smooth bark of deciduous trees, often found on twigs and branches, with a broad ecological amplitude. Several, even recent, records might refer to other species (see note on *R. exigua*).

Rinodina rinodinoides (Anzi) H. Mayrhofer & Scheid.

Nord. J. Bot., 12: 454, 1992 - *Buellia rinodinoides* Anzi, Atti Soc. Ital. Sc. Nat. Milano, 9: 253, 1866.

Syn.: *Lecidea rinodinoides* (Anzi) Stizenb., *Rinodina melanocarpa* Müll. Arg., *Rinodina serpentinei* H. Mayrhofer & Poelt

N - TAA, Lomb (Giralt & Llimona 1997), **Emil**. **C - Sar**. **S - Cal**.

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4-5, X: 3-4, E: 1-3/ Alt: 4-5/ Alp: er, Salp: vr, Orom: er/ PT: 1/ Note: an arctic-alpine species described from the Italian Alps and also known from the Karakorum Mountains, found on usually south-exposed surfaces of very hard, base-rich siliceous rocks and serpentine near and above treeline.

Rinodina roboris (Nyl.) Arnold

Flora, 64: 197, 1881 - *Lecanora sophodes* var. *roboris* Dufour ex Nyl. in Crouan & Crouan, Florule Finistère: 96, 1867.

Syn.: *Lecanora roboris* (Nyl.) Nyl., *Rinodina metabolica* var. *roboris* (Nyl.) Bagl. & Carestia

N - Lomb, Piem (Isocrono & al. 2004). **C - Laz** (Giralt & Mayrhofer 1994, Bartoli & al. 1997, Massari & Ravera 2002), **Sar** (Zedda 2002, 2002b, Rizzi & al. 2011). **S - Camp, Cal** (Puntillo 1995, 1996).

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 3-4, X: 2-3, E: 1-2/ Alt: 1-2/ SmedD: er, SmedH: vr, MedH: er/ PT: 0/ suboc, u/ Note: a mainly Atlantic species also known from Macaronesia, found on dry bark of ancient, more or less isolated trees, especially oaks, in relatively undisturbed, open, humid woodlands. The record by Bassi (1996) from Emilia is dubious, that from Venezia Giulia by Nimis (1993: 636) is wrong (!). The species is included in the Italian red list of epiphytic lichens as “Vulnerable” (Nascimbene & al. 2013c).

Rinodina roscida (Sommerf.) Arnold

Verh. zool.-bot. Ges. Wien, 37: 133, 1887 - *Lecanora roscida* Sommerf., Suppl. Fl. Lappon.: 97, 1826.

Syn.: *Berengeria turfacea* var. *microcarpa* (Hepp) Trevis., *Rinodina turfacea* var. *microcarpa* (Hepp) Körb.

N - Frl (TSB 2759), **Ven** (Nimis 1994, Thor & Nascimbene 2007), **TAA** (Nascimbene & al. 2006), **Lomb, Piem** (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999).

Cr/ Ch/ S/ Terr/ pH: 3-4, L: 4, X: 3, E: 1-2/ Alt: 4-5/ Alp: r, Salp: vr/ PT: 1/ Note: an arctic-alpine, circumpolar species found on soil, bryophytes and plant debris over calcareous substrata in tundra-like habitats; widespread throughout the Alps.

Rinodina santorinensis J. Steiner

Verh. zool.-bot. Ges. Wien, 69: 55, 1919.

C - **Tosc** (Mayrhofer & al. 1993), **Laz** (Mayrhofer & al. 1993), **Sar** (Mayrhofer & al. 1993). **S - Camp** (Mayrhofer & al. 1993), **Si** (Mayrhofer & al. 1993, Ottonello & al. 2011).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 3-4, X: 3-4, E: 2-3/ Alt: 1/ MedH: rr, MedD: er/ PT: 1/ coast, paras crustose lichens/ Note: a mainly Mediterranean-Macaronesian species found on different types of base-rich, especially volcanic rocks in areas under maritime influence, often starting the life-cycle on other crustose lichens; exclusively Tyrrhenian in Italy; related to *R. beccariana*.

Rinodina septentrionalis Malmé

Svensk Bot. Tidskr., 6: 920, 1913.

Syn.: *Rinodina dispersella* (Vain.) Vain., *Rinodina hyperborea* H. Magn., *Rinodina phaeostigmella* H. Magn., *Rinodina subfusca* H. Magn.

N - **Ven** (LD- 1171611), **TAA** (Nascimbene & al. 2007b, Nascimbene 2014), **Lomb**, **Piem**, **VA** (Matteucci & al. 2015d), **Emil** (Giralt & Mayrhofer 1995). **C - Sar** (Giralt & Mayrhofer 1995, Zedda 2002).

Cr/ Ch/ S/ Epiph-Lign/ pH: 1-2, L: 3-4, X: 3, E: 1-2/ Alt: 3-4/ Salp: rr, Mont: vr/ PT: 1/ p/ Note: a subarctic-subalpine to boreal-montane, probably circumpolar lichen found on shrubs in open situations, especially common on *Rhododendron*, most frequent on muribund plants, especially in basal parts, rarely on lignum. The very dubious records by Grillo (1996) from Sicilia and Frati & Brunialti (2006) from the Marche are not accepted here; the record from Sardegna as well is questionable. See also note on *R. freyi*.

Rinodina sicula H. Mayrhofer & Poelt

Bibl. Lichenol., 12: 143, 1979.

Syn.: *Rinodina orculariopsis* H. Mayrhofer

C - **Sar** (Mayrhofer & Sheard 2007). **S - Cal** (Mayrhofer & Sheard 2007), **Si** (Giralt & Llimona 1997).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4, X: 3-4, E: 1-2/ Alt: 1-2/ SmedH: r, MedH: vr, MedD: er/ PT: 1/ suboc, p/ Note: a Mediterranean to subatlantic early coloniser of compact siliceous rocks, forming inconspicuous patches amongst other crustose lichens; certainly overlooked, and more widespread, especially in Tyrrhenian Italy, but generally rare. Earlier records from Tuscany and Sardinia (see Nimis 1993: 637) refer to saxicolous forms of *R. archaea* (Mayrhofer & Sheard 2007). See also Giralt & Llimona (1997).

Rinodina sophodes (Ach.) A. Massal.

Ric. Auton. Lich. Crost.: 14, 1852 - *Lichen sophodes* Ach., Lichenogr. Suec. Prodr.: 67, 1799.

Syn.: *Berengeria sophodes* (Ach.) Trevis., *Dimelaena sophodes* (Ach.) Norman, *Gasparrinia sophodes* (Ach.) Tornab., *Lecanora sophodes* (Ach.) Ach., *Parmelia sophodes* (Ach.) Ach., *Rinodina albana* f. *orbicularis* A. Massal., *Rinodina sophodes* var. *lusitanica* H. Magn., *Rinodina sophodes* var. *orbicularis* (A. Massal.) H. Olivier

N - **VG** (Giralt & Mayrhofer 1995), **Frl** (Giralt & Mayrhofer 1995, Badin & Nimis 1996), **Ven** (Lazzarin 2000b, Thor & Nascimbene 2007), **TAA** (Nascimbene & al. 2007b, Nimis & al. 2015), **Lomb** (Arosio & Rinaldi 1995, Arosio & al. 2000, 2003), **Piem** (Caniglia & al. 1992, Arosio & al. 1998, Isocrono & al. 2003, Griselli & al. 2003, Matteucci & al. 2010, Giordani & Malaspina 2016), **VA** (Piervittori & Isocrono 1999), **Emil** (Giralt & Mayrhofer 1995, Morselli & Regazzi 2006, Tretiach & al. 2008, Benesperi 2009), **Lig** (Giordani & Incerti 2008). **C - Tosc** (Loppi & al. 1997b, 2002, Loppi & Putorti 2001, Benesperi & al. 2007, Benesperi 2011), **Marc** (Nimis & Tretiach 1999, Frati & Brunialti 2006, Loppi & Frati 2006), **Umb** (Nimis & Tretiach 1999, Ravera & al. 2006, Panfilì 2007), **Laz** (Nimis & Tretiach 2004, Ruisi & al. 2005), **Abr** (Olivieri & al. 1997, 1997b, Nimis & Tretiach 1999, Brackel 2015), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008, Genovesi & Ravera 2014), **Sar** (Giralt & Mayrhofer 1995, Zedda 2002, Rizzi & al. 2011, Cossu 2013). **S - Camp** (Aprile & al. 2002, 2003, 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010, Catalano & al. 2012, 2016, Brunialti & al. 2013, Ravera & Brunialti 2013), **Pugl** (Giralt & Mayrhofer 1995, Nimis & Tretiach 1999, Brackel 2011), **Bas** (Giralt & Mayrhofer 1995, Nimis & Tretiach 1999), **Cal** (Giralt & Mayrhofer 1995, Puntillo 1996, Puntillo & Puntillo 2004), **Si** (Lich. Graec. 15: Obermayer 1995, Giralt & Mayrhofer 1995, Caniglia & Grillo 2006b, Cataldo & Minissale 2015).

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 4-5, X: 3-4, E: 1-2/ Alt: 1-4/ Salp: rr, Mont: ec, SmedD: rr, Pad: vr, SmedH: rr, MedH: r, MedD: er/ PT: 1-2/ p/ Note: a widespread temperate early coloniser of smooth bark, most common on twigs and branches, with a wide ecological amplitude and a correspondingly wide altitudinal range.

Rinodina teichophila (Nyl.) Arnold

Flora, 46: 329, 1863 - *Lecanora teichophila* Nyl., Flora, 46: 78, 1863.

Syn.: *Rinodina arenaria* auct. non (Hepp) Th. Fr., *Rinodina colletica* (Flörke) Arnold, *Rinodina metabolica* var. *colletica* Flörke, *Rinodina suberumpens* (Nyl.) H. Olivier

N - **VG**, **Ven**, **TAA**, **Piem** (Isocrono & al. 2004), **Lig**. **C - Tosc**, **Marc** (Nimis & Tretiach 1999), **Laz**, **Abr** (Nimis & Tretiach 1999), **Sar** (Matzner & Mayrhofer 1994, Rizzi & al. 2011, Cossu & al. 2015). **S - Camp** (Nimis & Tretiach 2004), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Caniglia & Grillo 2003, Grillo & Caniglia 2004).

Cr/ Ch/ S/ Terr/ pH: 3-4, L: 4, X: 3, E: 1-2/ Alt: 4-5/ Alp: r, Salp: vr/ PT: 1/ Note: an arctic-alpine, circumpolar species found on soil, bryophytes and plant debris over calcareous substrata in tundra-like habitats; widespread throughout the Alps.

Rinodina tephrae (Tuck.) Herre

Proc. Wash. Acad. Sci., 12: 250, 1910 - *Lecanora tephrae* Tuck., Amer. J. Sci. Arts, ser. 2, 25: 425, 1858.

Syn.: *Rinodina arenaria* (Hepp) Th. Fr., *Rinodina badiella* (Nyl.) Th. Fr., *Rinodina glebulosa* (Arnold) Arnold, *Rinodina pannarioides* Körb. ex Stein

N - TAA (Arnold, Lich. exs. Nr. 494: UPS- L-168799).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 2-3, X: 1-2, E: 1/ Alt: 3-5/ Alp: vr, Salp: vr, Mont: er/ PT: 1/ Note: on siliceous rocks in upland areas, in moist and often shaded situations such as near waterfalls, rapids, gorges and shores of lakes, often associated with Cyanobacteria (*Stigonema*).

Rinodina trachytica (A. Massal.) Bagl. & Carestia

Atti Soc. Critt. Ital., 2: 209, 1880 - *Mischoblastia lecanorina* var. *trachytica* A. Massal., Ric. Auton. Lich. Crost.: 41, 1852.

Syn.: *Lecanora confragosa* var. *immersoareolata* Harm., *Rinodina confragosa* var. *immersoareolata* (Harm.) Zahlbr., *Rinodina iberica* H. Mayrhofer, *Rinodina subtrachytica* J. Steiner

N - VG, Ven (Lazzarin 2000b), TAA, Lomb, Piem (Isocrono & al. 2004), Emil (Scheidegger & al. 2001), Lig (Giordani & al. 2016). C - Tosc, Sar (Rizzi & al. 2011, Giordani & al. 2013). S - Camp (Aprile & al. 2002), Si (Grillo & al. 1996, Grillo 1998, Grillo & Caniglia 2004).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4-5, X: 3-4, E: 2-3/ Alt: 1-2/ SmedD: r, SmedH: rc, MedH: rr, MedD: vr/ PT: 1/ Note: a Mediterranean-Macaronesian to mild-temperate lichen found on base-rich, mostly volcanic rocks, and on serpentinite, most common in Mediterranean Italy.

Rinodina tunicata H. Mayrhofer & Poelt

Bibl. Lichenol., 12: 153, 1979.

C - Tosc (TSB 35281), Abr (Nimis & Tretiach 1999), Mol (Nimis & Tretiach 2004, Caporale & al. 2008), Sar. S - Pugl (Nimis & Tretiach 1999), Cal (Rambold & al. 1994), Si (Nimis & al. 1996b, Giralt & Llimona 1997, Caniglia & Grillo 2005, 2006).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 4-5, X: 4, E: 2-3/ Alt: 1-2/ SmedD: vr, SmedH: r, MedH: r, MedD: vr/ PT: 1/ Note: a Mediterranean to mild-temperate lichen found on compact, pure limestone or dolomite at relatively low elevations; probably more widespread in southern Italy.

Rinodina turfacea (Wahlenb.) Körb.

Syst. Lich. Germ.: 123, 1855 - *Lichen turfaceus* Wahlenb., Fl. Lappon.: 408, 1812.

Syn.: *Berengeria turfacea* (Wahlenb.) Trevis., *Psora turfacea* (Wahlenb.) Hepp, *Rinodina orbata* (Ach.) Vain., *Rinodina turfacea* var. *orbata* (Ach.) Jatta

N - TAA, Lomb, Piem (Isocrono & al. 2004), VA (Piervittori & Isocrono 1999, Valcuvia 2000), Lig.

Cr/ Ch/ S/ Terr/ pH: 2-4, L: 4-5, X: 2-3, E: 1-2/ Alt: 4-5/ Alp: c, Salp: rc/ PT: 1/ Note: an arctic-alpine, circumpolar lichen found on soil rich in humus and plant remains in tundra-like habitats.

Rinodina venostana Buschardt & H. Mayrhofer

in Mayrhofer & Poelt, Bibl. Lichenol., 12: 155, 1979.

Syn.: *Rinodina exigua* f. *saxicola* Anzi

N - TAA (Giralt & Llimona 1997), Lomb, Piem (Isocrono & al. 2004). C - Tosc, Sar.

Cr/ Ch/ S/ Sax/ pH: 3-4, L: 4-5, X: 4, E: 3/ Alt: 2-3/ Mont: r, SmedD: vr/ PT: 1/ subc/ Note: a species known from the southern part of central Europe to the Mediterranean area, extending to Macaronesia, found on slightly calcareous schists. The old records from Toscana and Sardegna (Nimis 1993: 639) require confirmation.

Rinodina zwackhiana (Kremp.) Körb.

Syst. Lich. Germ.: 126, 1855 - *Lecanora zwackhiana* Kremp., Flora, 37: 145, 1854.

Syn.: *Rinodina murorum* B. de Lesd., *Rinodina transsylvanica* (Nyl.) H. Olivier, *Rinodina violascens* H. Magn.

N - Lig.

Cr/ Ch/ S/ Sax/ pH: 5, L: 4-5, X: 4, E: 2-3/ Alt: 1-2/ SmedH: r, MedH: vr/ PT: 1/ Note: a mainly mild-temperate lichen found on steeply inclined to slightly underhanging surfaces of calcareous rocks, on walls, sometimes a juvenile parasite on other lichens; probably more widespread and much overlooked.

Rinodinella H. Mayrhofer & Poelt

Hoppea, 37: 91, 1978.

This genus of the Physciaceae was segregated from *Rinodina* on the basis of the very thin-walled, pale brownish coloured ascospores. It currently comprises 6 species, 2 of which occur in Europe. Type: *R. controversa* (A. Massal.) H. Mayrhofer & Poelt

Rinodinella controversa (A. Massal.) H. Mayrhofer & Poelt

Hoppea, 37: 92, 1978 - *Rinodina controversa* A. Massal., Ric. Auton. Lich. Crost.: 16, 1852.

Syn.: *Berengeria fusca* (A. Massal.) Trevis., *Buellia dubyana* var. *nigrescens* Müll. Arg., *Catolechia fusca* A. Massal., *Lecanora budensis* Nyl., *Lecanora crustulata* (A. Massal.) Stizenb., *Lecanora sophodes* f. *controversa* (A. Massal.) Nyl., *Rinodina budensis* (Nyl.) Zahlbr., *Rinodina controversa* f. *crustulata* A. Massal., *Rinodina crustulata* (A. Massal.) Arnold, *Rinodina fusca* (A. Massal.) Bagl., *Rinodina sublobata* (Arnold) H. Olivier

N - VG, Frl, Ven (Lazzarin 2000b), **TAA, Lomb, Piem** (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999), **Emil, Lig, C - Tosc** (Benesperi 2000a, 2006), **Umb** (Genovesi & Ravera 2001, Ravera & al. 2006), **Laz** (Roccardi 2003), **Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **Sar, S - Camp** (Garofalo & al. 1999, 2010, Aprile & al. 2003b), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 2011), **Si** (Nimis & al. 1996b, Grillo 1998, Grillo & Caniglia 2004, Grillo & al. 2007b).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 3-5, X: 4-5, E: 2-3/ Alt: 1-3/ Mont: r, SmedD: rc, Pad: er, SmedH: rc, MedH: rr, MedD: vr/ PT: 1/ Note: a mainly southern species in Europe, found on the top of exposed calcareous boulders, with optimum below the montane belt.

Rinodinella dubyanoides (Hepp) H. Mayrhofer & Poelt

Hoppea, 37: 98, 1978 - *Lecidea dubyanoides* Hepp, Flecht. Eur.: nr. 323, 1857.

Syn.: *Buellia dubyanoides* (Hepp) Müll. Arg., *Buellia dubyanoides* var. *evoluta* Zahlbr., *Lecanora aequatula* Nyl., *Lecanora dubyanoides* (Hepp) Stizenb., *Rinodina aequatula* (Nyl.) B. de Lesd., *Rinodina dubyanoides* (Hepp) Arnold, *Rinodina dubyanoides* var. *evoluta* Zahlbr., *Rinodina minuta* B. de Lesd., *Rinodina subgranulata* Müll. Arg.

N - VG, TAA, Lomb, C - Tosc, Sar, S - Camp (Aprile & al. 2003, 2003b, v), **Cal** (Puntillo 1996), **Si** (Ottonello & Salone 1994, Grillo & Caniglia 2004, Caniglia & Grillo 2005, 2006).

Cr.end/ Ch/ S/ Sax/ pH: 5, L: 4-5, X: 4, E: 1-2/ Alt: 1-3/ Mont: r, SmedD: rr, SmedH: rr, MedH: r, MedD: vr/ PT: 1/ Note: a mild-temperate to Mediterranean species found on hard, compact calcareous rocks, mostly on steeply inclined faces wetted by rain, below the subalpine belt.

Roccella DC.

in Lamarck & de Candolle, Fl. Franç., éd. 3, 2: 334, 1805, *nom. cons.*

This genus of the Roccellaceae includes c. 40 fruticose species, mainly distributed in the Northern Hemisphere, which are typical of maritime habitats. The Mediterranean Region appears to be surprisingly species-poor when compared *e.g.* with the situation in Macaronesia. A world key was published by Aptroot & Schumm (2011); the Mediterranean species were treated by Tehler & al. (2004) and, limited to the western species, by Carballal (2013). Type: *R. fuciformis* (L.) DC. The name is conserved against *Thamnium* Vent. (1799).

Roccella fuciformis (L.) DC.

in Lamarck & de Candolle, Fl. Franç., éd. 3, 2: 335, 1805 - *Lichen fuciformis* L., Sp. Pl., 2: 1147, 1753.

Syn.: *Roccella teneriffensis* Vain.

N - Lig, C - Tosc, Sar (Monte 1993, Nöske 2000, Zedda 2002), **S - Pugl** (Nimis & Tretiach 1999, Durini & Medagli 2004), **Si** (Ottonello & Romano 1997, Grillo 1998, Grillo & Caniglia 2004, Ottonello & al. 2006a, 2011).

Frut/ Tr/ A.s/ Sax/ pH: 3-5, L: 2-3, X: 1-2, E: 1-2/ Alt: 1/ MedH: vr, MedD: er/ PT: 1/ suboc, coast/ Note: a supralittoral Mediterranean-Macaronesian species found on steeply inclined to underhanging surfaces of a wide variety of rocks (mainly calcareous) exposed to humid maritime winds, mostly in rather shaded situations; much rarer and less heliophytic than *R. phycopsis*; absent from the Adriatic coast north of Puglia.

Roccella phycopsis Ach.

Lichenogr. Univ.: 440, 1810.

Syn.: *Roccella fucoides* (Neck.) Vain., *Roccella fucoides* var. *corticola* Sambo, *Roccella phycopsis* var. *cecilia-metella* Rabenh. *nom. nud.*, *Roccella pygmaea* Durieu & Mont.

N - Ven (Jatta 1909-1911), **Lig** (Giordani 2006b, Watson 2014), **C - Tosc, Marc, Laz** (Gigante & Petriccione 1995, Roccardi 2003, Genovesi & Ravera 2014b), **Sar** (Monte 1993, Nöske 2000, Zedda 2002, Rizzi & al. 2011), **S - Camp, Pugl** (Nimis & Tretiach 1999, Brackel 2011), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994, Ottonello & Salone 1994, Ottonello & al. 1994, Monte & Ferrari 1996, Ottonello & Romano 1997, Grillo 1998, Grillo & Caniglia 2004, Ottonello & al. 2006a, 2011, Ottonello & Puntillo 2009).

Frut/ Tr/ A.s/ Sax/ pH: 2-5, L: 2-3, X: 1-2, E: 1-3/ Alt: 1/ MedH: c, MedD: rr/ PT: 1-2/ suboc, coast/ Note: on a very wide variety of rocks, including brick walls, sometimes on littoral shrubs, in rather sheltered situations and in habitats subject to frequent, salt-loaden, maritime winds. Very rare north of the Gargano Peninsula (Puglia), but extending northwards to Liguria along the Tyrrhenian coast. For nomenclatural matters see Tehler (2003).

Roccella tinctoria DC.

Fl. Franç., éd. 3, 2: 334, 1805.

Syn.: *Roccella arnoldii* Vain., *Roccella canariensis* Darb., *Roccella canariensis* var. *vincentina* (Vain.) Zahlbr., *Roccella dichotoma* (Pers.) Darb., *Roccella fastigiata* Bory, *Roccella guanchica* Feige & Viethen, *Roccella patellata* Stirt., *Roccella tuberculata* var. *vincentina* Vain., *Roccella vincentina* (Vain.) Follmann

C - Tosc, Sar (Monte 1993, Watson 2014), **S - Si** (Ottonello & Romano 1997, Ottonello & al. 2006a, Ottonello & al. 2011).

Frut/ Tr/ A.s/ Sax/ pH: 2-3, L: 3-4, X: 1-2, E: 1-2/ Alt: 1/ MedH: vr/ PT: 1/ suboc, coast/ Note: this species with a Macaronesian- western Mediterranean distribution occurs on steeply inclined surfaces of siliceous rocks subject to humid, salt-loaden maritime winds. The species can be both fertile and sorediate (see Tehler & al. 2009), but all Italian specimens, restricted to a few sites in Tyrrhenian Italy, are sorediate. For nomenclatural matters see Tehler (2002).

Roccellographa J. Steiner

Denkschr. K. Akad. Wiss., math.-naturwiss. Kl., 71: 98, 1902.

Ertz & Tehler (2011) presented a new phylogeny of several groups within the Arthoniales based on molecular data, together with important taxonomic implications, among which the inclusion of the crustose species of *Peterjamesia* D. Hawksw. in the fruticose genus *Roccellographa*, which now comprises 3 species and is placed in its own family, the Roccellographaceae. Type: *R. cretacea* J. Steiner

Roccellographa circumscripta (Leight.) Ertz & Tehler

Fungal Divers., 49: 58, 2011 - *Sagedia circumscripta* Leight., Brit. Angiocarp. Lich.: 24, 1851.

Syn.: *Chiodecton leucinum* (Nyl.) Zahlbr., *Chiodecton pruinosum* (B. de Lesd.) Zahlbr., *Enterographa leucina* (Nyl.) A. Massal., *Peterjamesia circumscripta* (Leight.) D. Hawksw., *Sclerophytonomyces circumscriptus* (Leight.) Sparrius & P. James, *Sclerophyton circumscriptum* (Leight.) Zahlbr., *Sclerophyton circumscriptum* f. *dendrizum* (Nyl.) Zahlbr., *Sclerophyton circumscriptum* f. *leucinum* (Nyl.) Redinger, *Sclerophyton circumscriptum* f. *pruinosum* (B. de Lesd.) Redinger, *Stigmatella circumscripta* (Leight.) Mudd nom. illegit., *Stigmatidium crassum* var. *leucinum* (Nyl.) H. Olivier, *Stigmatidium leucinum* Nyl., *Stigmatidium pruinosum* B. de Lesd., *Verrucaria circumscripta* Taylor nom. illegit.
C - Sar. S - Si

Cr/ Tr/ S/ Sax/ pH: 2-3, L: 2-3, X: 1-2, E: 1/ Alt: 1/ MedH: er/ PT: 1/ suboc, coast, u/ Note: a tropical to subtropical-temperate species of oceanic, coastal areas, with a subcosmopolitan distribution (see Sparrius 2004), found on very hard siliceous rocks subject to humid maritime winds, mostly in underhangs; extremely rare and worthy of protection in Italy.

Romjularia Tindal

in Nash & al., Lichen Flora Gr. Sonoran Desert Reg., 3: 287, 2007.

This monotypic genus has been created to accommodate *R. lurida*, which had been switched back and forward between several genera, among which *Lecidea*, *Mycobilimbia* and *Psora* (Tindal 2007). A phylogenetic analysis based on molecular data suggests that the genus is most closely related to a group of genera (including *Bryobilimbia*, *Clauzadea*, *Farnoldia* and *Lecidoma*) that do not belong to Lecideaceae s.str. (Fryday & al. 2014). Type: *R. lurida* (Ach.) Tindal

Romjularia lurida (Ach.) Tindal

in Nash & al., Lichen Flora Gr. Sonoran Desert Reg., 3: 288, 2007 - *Lecidea lurida* Ach., Meth. Lich.: 77, 1803.

Syn.: *Mycobilimbia lurida* (Ach.) Hafellner & Türk, *Psora lurida* (Ach.) DC., *Psora lurida* f. *dispersa* A. Massal., *Psora petri* (Tuck.) Fink

N - VG, Fri (Tretiach & Molaro 2007, Brackel 2013), **Ven** (Caniglia & al. 1999, Lazzarin 2000b, Nascimbene & Caniglia 2003c, Nascimbene 2005c, Thor & Nascimbene 2007, Nascimbene & Marini 2007), **TAA** (Nascimbene 2003, 2008b, Nascimbene & al. 2005, 2006), **Lomb** (Valcuvia & al. 2003), **Piem** (Morisi & Sereno 1995, Clerc & al. 1999, Isocrono & al. 2003, Hafellner & al. 2004, Morisi 2005), **VA** (Pierivittori & Isocrono 1999), **Emil, Lig** (Valcuvia & al. 2000, Giordani & al. 2016), **C - Tosc** (Benespero 2000a, 2006, Brackel 2015), **Marc** (Nimis & Tretiach 1999), **Umb** (Panfili 2000, 2000b, 2007, Ravera & al. 2006), **Laz** (Bartoli & al. 1998, Nimis & Tretiach 2004, Brackel 2015), **Abr** (Nimis & Tretiach 1999, Catalano & al. 2016), **Mol** (Garofalo & al. 1999, Nimis & Tretiach, 1999, 2004, Caporale & al. 2008, Genovesi & Ravera 2014), **Sar. S - Camp** (Garofalo & al. 1999, 2010, Ricciardi & al. 2000, Aprile & al. 2002, 2003b, Nimis & Tretiach 2004), **Pugl** (Garofalo & al. 1999, Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994, 1995, Ottonello & Salone 1994, Ottonello & al. 1994, Ottonello 1996, Grillo 1998, Grillo & Caniglia 2004, Merlo 2004b, Gianguzzi & al. 2009).

Sq/ Ch/ S/ Sax-Terr/ pH: 4-5, L: 4-5, X: 3-4, E: 1-3/ Alt: 1-5/ Alp: rr, Salp: c, Orom: c, Mont: c, SmedD: vc, Pad: er, SmedH: vc, MedH: c, MedD: rc/ PT: 1-2/ Note: a calcicolous, ecologically and altitudinally wide-ranging species, whose development often starts in fissures of the rock subject to temporary water seepage after rain, with a wide altitudinal range but rather rare above treeline.

Ropalospora A. Massal.

Atti Ist. Veneto Sci. Lett. Arti, ser. 3, 5: 263, 1860.

As presently circumscribed, *Ropalospora* includes 7 saxicolous or corticolous species and is found mainly in temperate parts of the Northern Hemisphere. The genus differs from *Fuscidea* in the multiseptate ascospores as well as in more subtle features of ascus and excipulum anatomy, and is not closely related to *Fuscidea* (see Bylin & al. 2007). Type: *R. caffra* A. Massal.

Ropalospora lugubris (Sommerf.) Poelt

in Hertel, Sched. ad Lecid. Exs., fasc. 2: nr. 40, 1980 - *Lecidea lugubris* Sommerf., Flor. Lappon.: 143, 1826.

Syn.: *Bacidia lugubris* (Sommerf.) Zahlbr., *Bilimbia lugubris* (Sommerf.) Th. Fr., *Fuscidea lugubris* (Sommerf.) P. James & Purvis, *Lecidea caudata* Nyl., *Ropalospora cafra* A. Massal., *Toninia caudata* (Nyl.) Arnold, *Toninia lugubris* (Sommerf.) Th. Fr.

N - **Frl** (TSB 1666), **TAA**, **Lomb**, **Piem** (Isocrono & al. 2004).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 4, X: 2-3, E: 1-2/ Alt: 3-5/ Alp: vr, Salp: er, Mont: er/ PT: 1/ Note: an arctic-alpine to boreal-montane, perhaps circumpolar lichen found on steeply inclined surfaces of hard siliceous rocks in cold-humid upland areas.

Ropalospora viridis (Tønsberg) Tønsberg

Sommerfeltia, 14: 293, 1992 - *Fuscidea viridis* Tønsberg in Culberson & al., Mycologia, 76: 156, 1984.

N - **Frl** (TSB s.n.).

Cr/ Ch/ A.s/ Epiph/ pH: 1-2, L: 3-4, X: 2, E: 1/ Alt: 2-3/ Mont: vr, SmedD: er/ PT: 1/ Note: on smooth bark of deciduous and coniferous trees in cold-humid, open woodlands; perhaps more widespread, but certainly not common. It was included in the Italian red list of epiphytic lichens as "Data Deficient" (Nascimbene & al. 2013c).

Rostania Trevis.

Rendic. Ist. Lomb. Milano, ser. 2, 13: 75, 1880.

The molecular study of the genera *Collema* and *Leptogium* by Otálora & al. (2014) has led to their re-circumscription, with two new genera and six old generic names resurrected, among which *Rostania*, characterised by minute thalli and cubic muriform spores, which corresponds to the *Collema occultatum*-group of earlier authors. The genus, which includes 7 species, is mainly distributed in the temperate regions of the Northern Hemisphere (Europe and North America), with some representatives in subtropical Asia and Africa. Type: *R. quadrata* (Körb.) Trevis. (= *R. occultata*).

Rostania ceranisca (Nyl.) Otálora, P.M. Jørg. & Wedin

Fungal Divers., 64: 289, 2014 - *Collema ceranicum* Nyl., Flora, 48: 353, 1865.

Syn.: *Collema arcticum* Lynge, *Collema subhumosum* Nyl., *Collema tetragonoides* Anzi, *Leptogium tetragonoides* (Anzi) Lettau

N - **Lomb**.

Fol.b/ Cy.h/ S/ Terr/ pH: 3, L: 4, X: 3, E: 1/ Alt: 5/ Alp: er/ PT: 1/ Note: an arctic-alpine, perhaps circumpolar lichen found over frost-disturbed, weakly calcareous soil above treeline; to be looked for further in the Alps, where it is perhaps more widespread.

Rostania multipunctata (Degel.) Otálora, P.M. Jørg. & Wedin

Fungal Divers., 64: 289, 2014 - *Collema multipunctatum* Degel., Symb. Bot. Upsal., 13, 2: 260, 1954.

Syn.: *Collema verruciforme* (Ach.) Nyl.

N - **Lig** (Valcuvia & al. 2000, Giordani & Incerti 2008), **C** - **Tosc** (Loppi & al. 1997, 1998b), **Laz**, **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **S** - **Camp** (Nimis & Tretiach 2004), **Cal** (Puntillo 1996), **Si** (Ottonello & al. 2011).

Fol.b/ Cy.h/ S/ Epiph/ pH: 2-3, L: 4, X: 2, E: 2/ Alt: 1-2/ SmedD: er, SmedH: er, MedH: vr/ PT: 1-2/ suboc/ Note: a mild-temperate, Mediterranean-Atlantic species found on more or less isolated trees in warm-humid areas, especially on *Olea*; mostly Tyrrhenian in Italy. It is included in the Italian red list of epiphytic lichens under the "Least Concern" category (Nascimbene & al. 2013c).

Rostania occultata (Bagl.) Otálora, P.M. Jørg. & Wedin

Fungal Divers., 64: 289, 2014 - *Collema occultatum* Bagl., Comm. Soc. Critt. Ital., 1: 1, 1861.

Syn.: *Collema quadratum* J. Lahm ex Körb., *Leptogium occultatum* (Bagl.) Zahlbr., *Rostania quadrata* (Körb.) Trevis.

N - **VG** (TSB 18684), **TAA** (Nascimbene & al. 2007b), **Piem**, **Lig** (S-F148069), **C** - **Tosc** (Benesperi & al. 2007), **Umb** (Genovesi & al. 2002, Ravera & al. 2006), **Laz** (Ravera 2001), **Abr** (Ravera 2002b), **Mol** (Caporale & al. 2008), **Sar** (Zedda 2002), **S** - **Bas** (Potenza & al. 2014, Brackel 2011), **Si** (Grillo 1998, Grillo & Caniglia 2004).

Cr/ Cy.h/ S/ Epiph/ pH: 3, L: 3, X: 2-3, E: 1-2/ Alt: 2-3/ Mont: er, SmedD: er, SmedH: er/ PT: 1-2/ Note: a temperate lichen found on smooth, base-rich, but not very eutrophicated bark of more or less isolated broad-leaved trees (*Acer*, *Fraxinus*, *Juglans*, *Populus*) in rather humid sites, especially on basal parts of old trunks; easy to overlook and widespread, but certainly not common in Italy. It is included in the Italian red list of epiphytic lichens as "Data Deficient" (Nascimbene & al. 2013c).

Rufoplaca Arup, Søchting & Frödén

Nord. J. Bot., 31: 74, 2013.

In the molecular analysis of the Teloschistaceae by Arup & al. (2013), *Rufoplaca* seems to be a homogeneous genus of 6 similar species that may be confused with *Blastenia*, differing in the apothecia with chlorinated

anthraquinones, and the broader spores with thick septa. The species of the former *Caloplaca xerica*-group are also similar, but they differ in spore and chemical characters. Some other unresolved taxa might be still treated here under *Caloplaca s.lat.* Type: *R. subpallida* (H. Magn.) Arup, Søchting & Frödén

Rufoplaca arenaria (Pers.) Arup, Søchting & Frödén

Nord. J. Bot., 31: 74, 2013 - *Lichen arenarius* Pers., Ann. Bot. (Usteri), 1: 27, 1794.

Syn.: *Blastenia arenaria* (Pers.) A. Massal., *Blastenia lamprocheila* (DC.) Arnold, *Caloplaca arenaria* (Pers.) Müll. Arg., *Caloplaca craspedia* (Ach.) Szatala, *Caloplaca ferruginascens* (Nyl.) H. Olivier, *Caloplaca lamprocheila* (DC.) Flagey, *Lecanora lamprocheila* (DC.) Nyl.

N - **VG** (Castello 2002, Martellos & Castello 2004), **Frl** (Tretiach & Hafellner 2000), **Ven** (Nascimbene 2005c, Nascimbene & Marini 2007), **TAA** (Caniglia & al. 2002), **Lomb** (De Vita & Valcuvia 2004), **Piem** (Isocrono & al. 2003, 2004, Favero-Longo & al. 2006b, 2015, Isocrono & Ferrarese 2008, Isocrono & Piervittori 2008, Giordani & al. 2014), **VA** (Piervittori & Isocrono 1999, Piervittori & al. 2001, 2004, Revel & al. 2001, Isocrono & al. 2008, Favero-Longo & Piervittori 2009, Matteucci & al. 2015c), **Emil** (Dalle Vedove & al. 2002), **Lig** (Loppi & al. 1997, Giordani & al. 2016). **C** - **Tosc** (Benesperi 2006, Lastrucci & al. 2009), **Laz**, **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **Sar** (Nöske 2000, Rizzi & al. 2011, Giordani & al. 2013). **S** - **Camp** (Garofalo & al. 1999, Ricciardi & al. 2000, Aprile & al. 2002, Catalano & al. 2016), **Pugl** (Garofalo & al. 1999), **Cal** (Puntillo 1996, Puntillo & Puntillo 2004), **Si** (Grillo & Caniglia 2004, Brackel 2008c).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4-5, X: 3-4, E: 2-4/ Alt: 1-5/ Alp: vr, Salp: r, Orom: vr, Mont: rr, SmedD: rc, Pad: r, SmedH: rc, MedH: rr, MedD: r/ PT: 1-2/ #/ Note: a holarctic lichen found on calciferous siliceous rocks, including walls, often overgrowing other crustose lichens; on the whole, a heterogeneous taxon in need of revision.

Rufoplaca scotoplaca (Nyl.) Arup, Søchting & Frödén

Nord. J. Bot., 31: 74, 2013 - *Lecanora scotoplaca* Nyl., Flora: 232, 1876.

Syn.: *Biatora caesiorufa* auct. p.p. non (Wibel) Fr., *Caloplaca caesiorufa* auct. p.p. non (Wibel) Flagey, *Caloplaca scotoplaca* (Nyl.) H. Magn.

N - **TAA**, **Lomb**, **Piem**, **Emil** (Valcuvia & Delucchi 2001). **C** - **Tosc**, **Laz**, **Sar** (Rizzi & al. 2011). **S** - **Camp**, **Si**.

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4, X: 3, E: 2-3/ Alt: 1-3/ Orom: vr, Mont: vr, SmedH: er, MedH: er/ PT: 1/ #/

Note: at least in southern Europe this lichen of basic, hard siliceous rocks has been much misunderstood; several earlier Italian records, especially those from outside the Alps, need confirmation, as well as those from Sardegna (see Nimis & Poelt 1987: 74).

Rufoplaca subpallida (H. Magn.) Arup, Søchting & Frödén

Nord. J. Bot., 31: 74, 2013 - *Caloplaca subpallida* H. Magn., Bot. Not.: 305: 1945.

Syn.: *Caloplaca scotoplaca* f. *depauperata* H. Magn.

N - **Frl**, **Ven** (Nascimbene & Marini 2007), **TAA** (Nascimbene 2002, 2003), **Piem** (Favero-Longo & al. 2006b), **VA** (Isocrono & al. 2008, Piervittori & al. 2001, Matteucci & al. 2015c). **C** - **Sar** (Rizzi & al. 2011, Giordani & al. 2013). **S** - **Si** (Brackel 2008c).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4-5, X: 3-4, E: 2-3/ Alt: 3-4/ Salp: vr, Orom: vr, Mont: vr/ PT: 1/ #/ Note: a cool-temperate to arctic-alpine lichen found on mineral-rich siliceous rocks, sometimes parasitic on other lichens (*Aspicilia*, *Rhizocarpon*, "*Neofuscelia*"); many Mediterranean records (e.g. from the Iberian Peninsula) are probably wrong. The species has been often considered as a synonym of "*Caloplaca*" *oxfordensis* J. Hedrick, a taxon described from North America, but molecular data indicate that the two species are different (Arup & al. 2013).

Rufoplaca tristiuscula (H. Magn.) Arup, Søchting & Frödén

Nord. J. Bot., 31: 74, 2013 - *Caloplaca tristiuscula* H. Magn., Bot. Not.: 50, 1944.

N - **TAA** (B 60 0195727).

Cr/ Ch/ S/ Sax/ pH: 3, L: 4-5, X: 3-4, E: 2-3/ Alt: 4-5/ Alp: vr, Salp: vr/ PT: 1/ #/ Note: a poorly known species described from Sweden, growing on base-rich siliceous rocks in subalpine-alpine areas, also reported from the Austrian Alps; the Italian sample, identified by J. Poelt, was collected by Buschardt in Val Venosta at c. 500 m.

Rusavskia S.Y. Kondr. & Kärnefelt

Ukrayins'kyi Bot. Zhurn., 60: 433, 2003.

The genus *Rusavskia* was separated from *Xanthoria s.str.* in the Teloschistaceae on the basis of several morphological characters whose validity was questioned by some authors (see e.g. Arup & al. 2013). As originally described, the genus was heterogeneous, as it included both *Dufourea capensis* and *Xanthoria resendei*, which are morphologically similar to the species in *Rusavskia*. As circumscribed by Arup & al. (2013) the genus is genetically well-delimited and separate from both *Xanthoria s.str.* and other segregates from that genus and it so far contains 10 species. Type: *R. elegans* (Link) S.Y. Kondr. & Kärnefelt

Rusavskia elegans (Link) S.Y. Kondr. & Kärnefelt subsp. *elegans*

Ukrayins'kyi Bot. Zhurn., 60: 433, 2003 - *Lichen elegans* Link, Ann. Naturges., 1: 37, 1791.

Syn.: *Amphiloma elegans* (Link) Körb., *Caloplaca dissidens* (Nyl.) Mérat, *Caloplaca elegans* (Link) Th. Fr., *Caloplaca elegans* var. *tenuis* (Wahlenb.) Th. Fr., *Caloplaca tegularis* (Ehrh.) Sandst. non auct., *Gasparrinia elegans* (Link) Stein, *Physcia miniata sensu* A. Massal. et auct. ital. p.p., *Placodium dissidens* Nyl., *Placodium elegans* (Link) DC., *Placodium elegans* var. *tenuis* (Wahlenb.) Nyl., *Xanthoria elegans* (Link) Th. Fr. var. *elegans*, *Xanthoria elegans* var. *tenuis* (Wahlenb.) Th. Fr.

N - **VG**, **Frl** (TSB 3429), **Ven** (Nimis 1994, Nascimbene & Caniglia 1997, 2003c, Caniglia & al. 1999, Nascimbene 2005c, 2008, 2008c, Thor & Nascimbene 2007, Nascimbene & Marini 2007), **TAA** (Caniglia & al. 2002, Nascimbene 2003, 2005b, 2008b, Nascimbene & al. 2005, 2006, Lang 2009, Spitale & Nascimbene 2012), **Lomb** (Rivellini 1994, Valcuvia & al. 2003, Dalle Vedove & al. 2004), **Piem** (Morisi & Sereno 1995, Isocrono & Falletti 1999, Isocrono & al. 2003, 2004, Morisi 2005, Isocrono & Piervittori 2008, Favero-Longo & al. 2004, 2006b, 2015), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Piervittori & al. 2001, 2004, Matteucci & al. 2008c, 2015c, Gazzano & al. 2009b, Sandrone 2014), **Emil**, **Lig** (Brunialti & al. 1999). **C** - **Tosc** (Benespero 2011), **Marc** (Nimis & Tretiach 1999, Tretiach & Pinna 2000), **Umb** (Nimis & Tretiach 1999, Ravera & al. 2006), **Abr** (Nimis & Tretiach 1999, Brackel 2015), **Mol** (Ravera & Genovesi 2012, Genovesi & Ravera 2014), **Sar**. **S** - **Bas** (Potenza 2006), **Cal** (Puntillo 1996), **Si** (Ottonello & al. 2011, Di Martino & Stancanelli 2015).

Fol.n/ Ch/ S/ Sax/ pH: 3-5, L: 4-5, X: 4, E: 3-4/ Alp: vc, Salp: vc, Orom: r, Mont: vr, SmedD: er, SmedH: er/ PT: 1-2/ Note: a northern holarctic species found both on natural rock outcrops and on man-made substrata (especially tiles), mostly in upland areas, descending to lower elevations in continental sites; in strongly eutrophicated situations it can occasionally overgrow bryophytes and plant remains.

Rusavskia elegans (Link) S.Y. Kondr. & Kärnefelt subsp. **orbicularis** (Schaer.)

Provisionally placed here, ICN Art. 36.1b. - *Parmelia elegans* var. *orbicularis* Schaer., Enum. Crit. Lich. Eur.: 51, 1850.

Syn.: *Xanthoria elegans* subsp. *orbicularis* (Schaer.) Clauzade & Cl. Roux

N - **Frl** (vidi!), **Ven** (Nimis 1994), **TAA**, **Piem** (Morisi & Sereno 1995).

Fol.n/ Ch/ S/ Sax/ pH: 4-5, L: 4-5, X: 4, E: 4/ Alt: 5/ Alp: rr/ PT: 1/ #/ Note: I have the impression that, at least in the Alps, *R. elegans* is heterogeneous; some forms, provisionally treated under this name, might prove to belong to the *Xanthoria calcicola* complex, and well deserve further study.

Rusavskia hafellneri (S.Y. Kondr. & Kärnefelt) S.Y. Kondr. & Kärnefelt

Ukrayins'kyi Bot. Zhurn., 60: 434, 2003 - *Xanthoria hafellneri* S.Y. Kondr. & Kärnefelt, Ukrayins'kyi Bot. Zhurn., 60, 2: 123, 2003.

N - **TAA** (Plantae Graec. Lich. 181, Kondratyuk & Kärnefelt 2003).

Fol.n/ Ch/ S/ Sax/ pH: 4-5, L: 4-5, X: 4, E: 4/ Alt: 4-5/ Alp: vr, Salp: vr/ PT: 1/ #/ Note: a very poorly known taxon belonging to a group including also *R. papillifera* and *R. domogledensis*, which badly needs revision. The type material is very similar to that of *Xanthoria elegans* var. *granulifera* Giralt, Nimis & Poelt

Rusavskia sorediata (Vain.) S.Y. Kondr. & Kärnefelt

Ukrayins'kyi Bot. Zhurn., 60: 434, 2003 - *Lecanora elegans* var. *sorediata* Vain., Meddeland. Soc. Fauna Fl. Fenn., 6: 143, 1881.

Syn.: *Caloplaca sorediata* (Vain.) Du Rietz, *Xanthoria elegans* subsp. *compacta* (Nyl.) Clauzade & Cl. Roux, *Xanthoria scandinavica* B. de Lesd., *Xanthoria sorediata* (Vain.) Poelt

N - **Frl**, **Ven** (Nascimbene & Caniglia 1997, 2003c, Caniglia & al. 1999, Nascimbene 2005c, Nascimbene & Marini 2007), **TAA** (Nascimbene 2003, 2008b, Nascimbene & al. 2005, 2006, Spitale & Nascimbene 2012), **Lomb**, **Piem** (Isocrono & al. 2004, Morisi 2005, Isocrono & Piervittori 2008), **VA** (Isocrono & al. 2008, Favero-Longo & Piervittori 2009), **Lig** (TSB 33389). **C** - **Umb** (Ravera & Di Toma 2003, Ravera & al. 2006), **Abr** (Recchia & Villa 1996, Nimis & Tretiach 1999), **Mol** (Ravera & Genovesi 2012, Genovesi & Ravera 2014).

Fol.n/ Ch/ A.s/ Sax/ pH: 3-5, L: 4-5, X: 3-4, E: 3-5/ Alt: 4-6/ Alp: rc, Salp: c, Mont: vr/ PT: 1/ Note: a mainly arctic-alpine, circumpolar species found on steeply inclined to underhanging surfaces of exposed calcareous or dolomitic boulders, sometimes also of basic siliceous rocks; most frequent in the Alps, where it can reach the nival belt, much rarer in the Apennines.

Sagedia Ach.

K. Vetensk.-Akad. Nya Handl., 30: 165, 1809.

This small genus of the Megasporaceae was resurrected by Nordin & al. (2010) to include 3 species formerly treated within *Aspicilia s.lat*. The genus lacks easily observed morphological features and its maintainance was questioned by some authors (see e.g. Miadlikowska & al. 2014, Roux & coll. 2014). However, it is accepted in the recent *Syllabus of Plant Families* (Jaklitsch & al. 2016). Pending further study, I maintain it here, also because it permits to separate *Megaspora* as an independent genus. Type: *S. zonata* Ach.

Sagedia mastrucata (Wahlenb.) A. Nordin, Savić & Tibell

Mycologia, 102: 1346, 2010 - *Lichen mastrucatus* Wahlenb., Fl. Lapp.: 413, 1812.

Syn.: *Aspicilia mastrucata* (Wahlenb.) Th. Fr., *Aspicilia subreagens* (H. Magn.) R. Sant., *Lecanora subreagens* H. Magn.

N - **TAA**.

Cr/ Ch/ A.i/ Sax/ pH: 2-3, L: 4-5, X: 3, E: 3/ Alt: 4-5/ Alp: vr, Salp: vr/ PT: 1/ #/ Note: a species found on siliceous to weakly calciferous rocks, mostly above treeline, belonging to a poorly understood complex,

reported from northern Europe, upland areas of central Europe (including the Austrian and Swiss Alps) and Turkey; it is however dubious that the samples from the Alps belong to *S. mastrucata* in the strict sense.

Sagedia simoënsis (Räsänen) A. Nordin, Savić & Tibell

Mycologia, 102: 1346, 2010 - *Aspicilia simoënsis* Räsänen, Meddeland. Soc. Fauna Fl. Fenn., 1: 39, 1925.

Syn.: *Aspicilia montana* (H. Magn.) Creveld, *Lecanora bahusiensis* H. Magn., *Lecanora isidiata* (H. Magn.) H. Magn., *Lecanora simoënsis* (Räsänen) Zahlbr., *Lecanora simoënsis* var. *isidiata* H. Magn., *Lecanora variegatula* H. Magn.

N - **Ven** (Nascimbene 2003), **TAA** (Nascimbene 2004), **VA** (Favero-Longo & al. 2006, Isocrono & al. 2008, Favero-Longo & Piervittori 2009), **Emil. C** - **Sar. S** - **Si**.

Cr/ Ch/ A.i/ Sax/ pH: 1-2, L: 4-5, X: 3, E: 3-4/ Alt: 3-4/ Salp: vr, Mont: vr/ PT: 1/ Note: a mostly sterile species with areolate thallus reacting K+ red, described from Finland as sorediate; the populations from the Alps have dense clusters of isidia later breaking down into soredia-like propagules (fitting *Lecanora simoënsis* var. *isidiata* H. Magn.). It grows on siliceous boulders visited by birds and is widely distributed, at least in the eastern Alps. The record from Sicilia (see Nimis 1993: 105), if confirmed, would suggest that the species should be looked for more intensively along the Apennines, in areas with siliceous substrata.

Sagedia zonata Ach.

K. Vetensk-Akad. Nya Handl., 30: 165, 1809.

Syn.: *Aspicilia inconspicua* (H. Magn.) Räsänen, *Aspicilia litorea* (H. Magn.) Räsänen, *Aspicilia malmeana* (H. Magn.) Ozenda & Clauzade, *Aspicilia obscurascens* (H. Magn.) Clauzade & Rondon, *Aspicilia rolleana* Hue, *Aspicilia tenebrica* (H. Magn.) Vitik., Ahti, Kuusinen, Lommi & T. Ulvinen, *Aspicilia zonata* (Ach.) R. Sant., *Aspicilia waldrastensis* (H. Magn.) Clauzade & Rondon, *Lecanora haerjedalica* H. Magn., *Lecanora inconspicua* H. Magn., *Lecanora litorea* H. Magn., *Lecanora malmeana* H. Magn., *Lecanora obscurascens* H. Magn., *Lecanora pleiocarpa* H. Magn., *Lecanora tenebrica* H. Magn., *Lecanora tromsoënsis* H. Magn., *Lecanora rolleana* (Hue) Zahlbr., *Lecanora waldrastensis* H. Magn., *Lecanora xyloxena* H. Magn.

N - **TAA** (UPS-L-199960).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 3-5, X: 2-4, E: 2-4/ Alt: 3-5/ Alp: vr, Salp: vr, Mont: er/ PT: 1/ #/ Note: this species has been frequently confused with *Circinaria caesiocinerea*, from which it differs in the 8-spored asci, the slightly smaller spores, and the absence of aspiciliin. It grows on siliceous rocks in the montane-subalpine belts. Several records of *C. caesiocinerea* from upland areas, especially from the Alps, could refer to this species. For the synonymies I follow Roux & coll. (2014).

Sagiolechia A. Massal.

Geneac. Lich.: 11, 1854.

This genus of 3 species has a mainly circumpolar distribution. The new family Sagiolechiaceae was proposed by Baloch & al. (2010) to accommodate *Rhexophiale* and *Sagiolechia* within the Ostropales. Type: *S. protuberans* (Ach.) A. Massal.

Sagiolechia protuberans (Ach.) A. Massal.

Geneac. Lich.: 11, 1854 - *Sagedia protuberans* Ach., Lichenogr. Univ.: 328, 1810.

Syn.: *Bilimbilia protuberans* (Ach.) A. Massal., *Gyalecta cimbrica* (A. Massal.) Jatta, *Gyalecta protuberans* (Ach.) Anzi, *Gyalecta protuberans* var. *mamillata* (Hepp) Anzi, *Lecidea protuberans* (Ach.) Schaer., *Sagiolechia cimbrica* A. Massal., *Sagiolechia leioplacoides* (Vain.) Vain., *Verrucaria leioplacoides* Vain.

N - **Frl**, **Ven** (Lazzarin 2000b), **TAA** (Nascimbene 2008b), **Lomb**, **VA** (Piervittori & Isocrono 1999), **Emil. C** - **Marc** (Nimis & Tretiach 1999), **Umb** (Genovesi & Ravera 2001, Ravera & al. 2006), **Sar. S** - **Camp** (Aprile & al. 2003b), **Cal** (Puntillo 1996).

Cr/ Tr/ S/ Sax/ pH: 4-5, L: 3-4, X: 2-3, E: 1-2/ Alt: 2-5/ Alp: er, Salp: er, Orom: vr, Mont: er, SmedH: er/ PT: 1/ Note: on dolomite and hard calciferous rocks in rather humid situations; probably more widespread, and locally even common, along the Apennines.

Sarcogyne Flot.

Bot. Z., 9: 753, 759, 1851.

This genus of the Acarosporaceae includes c. 28 species growing on calcareous and siliceous rocks, less commonly on soil, and has the highest diversity in temperate and semi-arid regions (especially in Europe, North Africa and North America). While variability in some of the most common species has prompted the description of numerous infraspecific taxa, several taxa may have been inadequately collected and documented, and remain poorly understood. The molecular study of Acarosporaceae by Westberg & al. (2015) showed that the occurrence of strongly black-pigmented (carbonised or melanised) ascogonia has arisen secondarily and independently numerous times in the evolution of the group, and that *Sarcogyne* is distinctly non-monophyletic. Type: *S. corrugata* Flot. *nom. inval.* (!)

Sarcogyne algoviae H. Magn.

Rabenh. Krypt.-Flora, 9, 5, 1: 57, 1935.

Syn.: *Biatorella algoviae* (H. Magn.) Zahlbr.

N - Piem (TSB 34087).

Cr.end/ Ch/ S/ pH: 3-4, L: 4-5, X: 4, E: 2-3/ Alt: 5-6/ Alp: vr/ PT: 1/ Note: on non- or weakly calciferous, mostly dolomitic rocks in sunny situations, with optimum above treeline, reaching the nival belt in the Alps.

***Sarcogyne clavus* (DC.) Kremp.**

Lich. Fl. Bayerns: 212, 1861 - *Patellaria clavus* DC. in Lamarck & de Candolle, Fl. Franç., 3 ed., 2: 348, 1805.

Syn.: *Biatorella clavus* (DC.) Th. Fr., *Lecanora eucarpa* (Nyl.) Nyl., *Lecidea eucarpa* Nyl., *Sarcogyne clavus* f. *macrocarpa* (Franzoni & De Not.) H. Magn., *Sarcogyne eucarpa* (Nyl.) Hellb., *Stereopeltis carestiae* De Not., *Stereopeltis macrocarpa* Franzoni & De Not.

N - TAA, Lomb, Piem (Isocrono & al. 2004, Giordani & al. 2014, Watson 2014). **C - Umb** (Genovesi & al. 2002, Ravera & al. 2006), **Sar** (Nöske 2000). **S - Camp** (Ricciardi & al. 2000), **Cal** (MAF-Lich: 4425-1).

Cr.end/ Ch/ S/ Sax/ pH: 2-3, L: 4-5, X: 4-5, E: 1-3/ Alt: 2-4/ Salp: rr, Orom: vr, Mont: r, SmedD: er/ PT: 1/ w/ Note: on steeply inclined to underhanging surfaces of hard, mineral-rich siliceous rocks, especially granite, mostly in fissures of the rock.

***Sarcogyne fallax* H. Magn.**

Rabenh. Krypt.-Flora, 9, 5, 1: 98, 1936.

N - Emil, Lig (TSB 33457). **C - Tosc** (Tretiach & Nimis 1994, Benesperi 2011), **Umb** (Genovesi & al. 2001, Ravera & al. 2006), **Abr** (Nimis & Tretiach 1999).

Cr/ Ch/ S/ Sax/ pH: 3-4, L: 3-4, X: 3-5, E: 1-2/ Alt: 2-3/ Mont: vr, SmedD: er, SmedH: er/ PT: 1/ u, #/ Note: a mainly mild-temperate lichen found on steeply inclined to underhanging surfaces of base-rich siliceous rocks, more rarely on calcareous rocks, which is worthy of further study. The records by Valcuvia (2000, 2002b) from Lombardy and Piedmont need confirmation.

***Sarcogyne hypophaea* (Nyl.) Arnold**

Flora, 53: 475, 1870 - *Lecanora hypophaea* Nyl., Flora, 53: 34, 1870.

Syn.: *Biatorella hypophaea* (Nyl.) Blomb. & Forssell, *Biatorella immersa* var. *atrosanguinea* A. Massal., *Biatorella privigna* auct. non (Ach.) Sandst., *Sarcogyne privigna* auct. non (Ach.) A. Massal., *Sarcogyne privigna* var. *callicola* H. Magn.

N - Ven, TAA, Lomb, Piem (Isocrono & al. 2004, Favero-Longo & al. 2004, 2006b, Isocrono & Piervittori 2008), **VA** (Piervittori & Isocrono 1999, Matteucci & al. 2015c), **Emil** (S- F87142), **Lig**. **C - Tosc** (Brackel 2015), **Marc** (Nimis & Tretiach 1999), **Umb** (Genovesi & al. 2001, Ravera & al. 2006), **Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **Sar**. **S - Camp** (Aprile & al. 2003b), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996).

Cr/ Ch/ S/ Sax/ pH: 2-4, L: 4-5, X: 4, E: 1-3/ Alt: 1-4/ Salp: rr, Orom: rr, Mont: rc, SmedD: r, SmedH: r, MedH: vr, MedD: er/ PT: 1/ Note: a cool-temperate to arctic-alpine, circumpolar species, with optimum on steeply inclined faces and in fissures of the rock, mainly on base-rich siliceous substrata, but frequent also on limestone along the eastern side of the Peninsula (v. *callicola*).

***Sarcogyne lapponica* (Schaer.) K.Knudsen & Kocourk.**

Mycotaxon, 105: 160, 2008 - *Lecidea lapponica* Ach. ex Schaer., Enum. Crit. Lich. Europ.: 125, 1850.

Syn.: *Acarospora lapponica* (Ach. ex Schaer.) Th. Fr., *Acarospora lapponica* var. *silesiaca* H. Magn. *Acarospora tromsoënsis* Norman, *Polysporina lapponica* (Schaer.) Degel., *Sarcogyne canasiacensis* (Hue) H. Magn.

N - TAA (Kantvilas 1998).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4-5, X: 3-4, E: 2-3/ Alt: 1-4/ Salp: er, Mont: r, SmedD: rr, SmedH: rr, MedH: r, MedD: vr/ PT: 1-2/ Note: this species, whose type material is lignicolous, has been for a long time confused with the lichenicolous *Polysporina subfuscescens*. Its real presence in Italy is dubious.

***Sarcogyne regularis* var. *platycarpoides* (Anzi) N.S. Golubk.**

Nov. Syst. Plant. non Vasc., 14: 187, 1977 - *Sarcogyne platycarpoides* Anzi, Comm. Soc. Crittogamol. Ital., 2, 1: 19, 1861.

Syn.: *Biatorella platycarpoides* (Anzi) Th. Fr., *Sarcogyne pruinosa* var. *platycarpoides* (Anzi) H. Magn., *Sarcogyne platycarpoides* var. *flexuosa* Bagl. & Carestia?

N - Ven (Nimis 1994), **Lomb, Piem** (Isocrono & al. 2004), **Emil** (Tretiach & al. 2008). **C - Umb** (Panfili 2007).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 4, X: 4, E: 1-2/ Alt: 4-5/ Alp: vr, Salp: er/ PT: 1/ Note: this is one of the several morphs of *S. regularis* s.lat. which are worthy of a molecular study. It is an interesting taxon, most common on dolomitic pebbles above treeline, and it might be more widespread in the Alps.

Sarcogyne regularis* Körb. var. *regularis

Syst. Lich. Germ.: 267, 1855.

Syn.: *Biatorella embergeri* Werner & M. Choisy, *Biatorella immersa* var. *pruinosa* ("Ach.") A. Massal., *Biatorella pruinosa* auct., *Biatorella pruinosa* var. *illuta* (Ach.) Stein, *Biatorella regularis* (Körb.) Lettau, *Gonohymenia monicae* Werner, *Lecidea immersa* var. *pruinosa* ("Ach.") Schaer., *Lecidea pruinosa* var. *immersa* (Sommerf.) Rabenh., *Sarcogyne henricii* B. de Lesd., *Sarcogyne pruinosa* auct., *Sarcogyne pruinosa* var. *minuta* A. Massal., *Sarcogyne regularis* var. *decipiens* (A. Massal.) N.S. Golubk.?, *Sarcogyne regularis* var. *intermedia* (Körb.) N.S. Golubk.?, *Sarcogyne regularis* var. *macroloma* (Körb.) N.S. Golubk.?, *Sarcogyne regularis* var. *minuta* (A. Massal.) N.S. Golubk.

N - VG (Pinna & al. 1998, Castello 2002, Martellos & Castello 2004), **Frl, Ven** (Lazzarin 2000b, Nascimbene & Caniglia 2003c, Nascimbene 2005c, 2008, 2008c), **TAA** (Nascimbene 2003, 2008b, Nascimbene & al. 2005, 2006), **Lomb** (Rigamonti & al. 2007), **Piem** (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999), **Emil** (Nimis & al. 1996, Tretiach & al. 2008), **Lig** (Valcuvia & al. 2000, Giordani & al. 2016). **C - Tosc** (Benespero 2000a, Brackel 2015), **Umb** (Panfili 2000, 2007, Ravera & al. 2006, Genovesi 2011), **Marc** (Nimis & Tretiach 1999), **Laz** (Bartoli 1997b, Bartoli & al. 1998, Nimis & Tretiach 2004, Brackel 2015), **Abr** (Nimis & Tretiach 1999, Brackel 2015), **Mol** (Nimis & Tretiach 1999, Garofalo & al. 1999, Caporale & al. 2008, Ravera & al. 2009, Genovesi & Ravera 2014), **Sar** (Rizzi & al. 2011). **S - Camp** (Garofalo & al. 1999, 2010, Ricciardi & al. 2000, Aprile & al. 2002, 2003, 2003b, Nimis & Tretiach 2004, Catalano & al. 2016), **Pugl** (Nimis & Tretiach 1999, Garofalo & al. 1999), **Bas** (Bartoli & Puntillo 1998, Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1996b, Ottonello & al. 1994, Grillo 1998, Caniglia & Grillo 2001, 2005, 2006, Grillo & al. 2001, 2002, 2007b, 2009, Grillo & Caniglia 2004, Liistro & Cataldo 2011, Cataldo & Minissale 2015).

Cr.end/ Ch/ S/ Sax/ pH: 4-5, L: 4-5, X: 3-5, E: 1-3/ Alt: 1-6/ Alp: rr, Salp: rc, Orom: r, Mont: c, SmedD: ec, Pad: rc, SmedH: ec, MedH: c, MedD: rc/ PT: 1-3/ p, #/ Note: a vary variable, perhaps heterogeneous, holarctic-subcosmopolitan calcicolous species which needs a revision based on molecular data. It is common both in urban areas (*e.g.* on mortar walls) and in natural situations, mostly in lichen-poor stands, with a very wide altitudinal range.

Sarcosagium A. Massal.

Flora, 39: 289, 1856.

A monotypic genus including an inconspicuous, ephemeral species appearing in autumn on soil and decaying mosses in disturbed sites, including urban wastelands and mine spoil heaps. The genus is currently classified in the Thelocarpaceae, but its precise phylogenetic placement within Pezizomycotina still remains unknown (Miadlikowska & al. 2014). Type: *S. biatorellum* A. Massal. (= *S. campestre*).

Sarcosagium campestre (Fr.) Poetsch & Schied.

Syst. Aufzähl. samenl. Pflanzen: 189, 1872 - *Biatora campestris* Fr., K. Svenska Vetensk.-Akad. Handl.: 273, 1822.

Syn.: *Biatorella campestris* (Fr.) Th. Fr., *Biatorella sarcosagium* Anzi, *Sarcosagium biatorellum* A. Massal.

N - Frl (TSB 3309), **Ven** (Nimis 1994, Lazzarin 2000b), **Lomb. C - Abr** (S-F78109).

Cr/ Ch/ S/ Terr/ pH: 3-4, L: 2-4, X: 2-3, E: 2-3/ Alt: 3-5/ Alp: er, Salp: r, Mont: r/ PT: 1-2/ p/ Note: an early coloniser of more or less calciferous soil, muribund bryophytes and plant debris, sometimes also growing on decaying wood, mostly in disturbed habitats, *e.g.* in burned sites, in upland areas; perhaps more widespread in the Alps, and also occurring in the central Apennines.

Schadonia Körb.

Parerga Lichenol., 1: 93, 1859.

This genus includes 3 species in temperate-arctic areas of the Northern Hemisphere. It resembles *Lopadium*, differing in the 2-8-spored asci with an amyloid tholus, and in the branched-anastomosing paraphyses without swollen, pigmented apical cells. The genus is usually included into the Ramalinaceae, but at least *S. fecunda* has been assigned to the Pilocarpaceae (Miadlikowska & al. 2014). Type: *S. alpina* Körb.

Schadonia alpina Körb.

Parerga Lichenol.: 93, 1859.

Syn.: *Bombyliospora gemella* Anzi, *Lopadium gemellum* (Anzi) Jatta

N - Lomb.

Cr/ Ch/ S/ Terr/ pH: 1-2, L: 3-4, X: 2, E: 1/ Alt: 4-6/ Alp: er, Salp: er/ PT: 1/ Note: a mainly arctic-alpine species found on soil and muribund bryophytes over siliceous substrata, reaching the nival belt. Very rare, but probably more widespread in the Alps.

Schadonia fecunda (Th. Fr.) Vězda & Poelt

in Hawksworth & al., Lichenologist, 12: 107, 1980 - *Lopadium fecundum* Th. Fr., N. Acta Reg. Soc. Sci. Upsal., ser. 3, 3: 302, 1861.

Syn.: *Diplotomma sociale* (Körb.) Jatta, *Lopadium sociale* Körb.

N - TAA, Lomb, Piem (Isocrono & al. 2004).

Cr/ Ch/ S/ Terr/ pH: 1-2, L: 3-4, X: 2-3, E: 1/ Alt: 4-5/ Alp: er, Salp: er/ PT: 1/ Note: a mainly arctic-alpine species found on mosses and plant remains over acid siliceous substrata near and above treeline. Probably restricted to the Alps in Italy.

Schaereria Körb.

Syst. Lich. Germ.: 232, 1855.

The main characters of this genus are: lecideine apothecia with a well-developed, proper exciple and a non-gelatinised hymenium with asci and paraphyses separating easily; the characteristic asci are of the *Schaereria*-

type: cylindrical, with thin, faintly amyloid walls, lacking a tholus, and containing eight simple spores. The genus, with c. 16 species, belongs to the monotypic family Schaereriaceae in the order Sarrameanales. Type (conserved): *S. lugubris* Falkenstein (= *S. cinereorufa*).

Schaereria cinereorufa (Schaer.) Th. Fr.

N. Acta Reg. Soc. Sci. Upsal., ser. 3, 3: 175, 1861 - *Lecidea cinereorufa* Schaer., Lich. Helv. Spicil., 3: 122, 1828.

Syn.: *Lecidea subfurva* Nyl., *Psora cinereorufa* (Schaer.) Hellb., *Schaereria lugubris* (Fr.) Körb.

N - Ven, TAA, Piem (Isocrono & al. 2004).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 3-4, X: 2, E: 1/ Alt: 4-6/ Alp: r, Salp: vr/ PT: 1/ Note: an arctic-alpine to boreal-montane, circumpolar species found on inclined to vertical faces of mineral-rich rocks wetted by rain, often near the ground, usually associated with species of *Pertusaria*; probably restricted to the Alps, where it can reach the nival belt.

Schaereria fuscocinerea (Nyl.) Clauzade & Cl. Roux

Bull. Soc. Bot. Centre Ouest, n. sér., nr. spéc. 7: 829, 1985 - *Lecidea fuscocinerea* Nyl., Bot. Not.: 177, 1852.

Syn.: *Aspicilia cambusiana* Walt. Watson, *Aspicilia complanatoidea* (A.L. Sm.) Walt. Watson, *Aspicilia fuscocinerea* (Nyl.) Maheu & A. Gillet, *Aspicilia tenebrosa* (Flot.) Körb., *Aspicilia tenebrosa* var. *lecidina* Körb., *Lecanora calvosina* Samp., *Lecanora cambusiana* (Walt. Watson) Cretz., *Lecanora complanatoidea* A.L. Sm., *Lecanora coracina* (Hoffm.) Hepp, *Lecidea atrocinerea* (Schaer.) Vain., *Lecidea endocyanea* Stirt., *Lecidea epiiodiza* Nyl., *Lecidea griseoatra* auct., *Lecidea tenebrosa* Flot., *Lecidella tenebrosa* (Flot.) Stein, *Schaereria endocyanea* (Stürt.) Hertel & Gotth. Schneid., *Schaereria tenebrosa* (Flot.) Hertel & Poelt

N - Frl (Tretiach & Hafellner 2000), **Ven** (Caniglia & al. 1999), **TAA** (Thor & Nascimbene 2007), **Lomb, Piem** (Isocrono & al. 2004, Isocrono & Piervittori 2008, Giordani & al. 2014, Favero-Longo & al. 2015), **VA** (Piervittori & Isocrono 1999, Valcuvia 2000, Matteucci & al. 2015c), **Lig** (TSB 33478). **C - Tosc** (Tretiach & al. 2008), **Sar** (Nöske 2000). **S - Cal** (Puntillo 1996), **Si** (Brackel 2008b).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 4-5, X: 3-4, E: 1-2/ Alt: 3-6/ Alp: c, Salp: rr, Orom: vr, Mont: er/ PT: 1/ Note: an arctic-alpine to boreal-montane, circumpolar species found on hard siliceous rocks in exposed situations, with optimum above treeline, reaching the nival belt in the Alps; common only in the Alps, much rarer in the Apennines.

Schismatomma A. Massal.

Flot. & Körb. ex A. Massal., Ric. Auton. Lich. Crost.: 55, 1852.

The phylogenetic analysis of the family Roccellaceae by Ertz & al. (2014) has shown that several traditionally accepted genera, among which *Schismatomma*, are para-/polyphyletic; in order to make these groups monophyletic, eight new genera were proposed, among which *Diromma* and *Ocellomma* for species formerly included in *Schismatomma*. The genus includes now c. 10 species. The European species were treated by Tehler (1993, 1994). Type: *S. pericleum* (Ach.) Branth & Rostr.

Schismatomma niveum D. Hawksw. & P. James

in James, Lichenologist, 5: 145, 1971.

C - Sar (Zedda 2002).

Cr/ Tr/ A.s/ Epiph/ pH: 1-2, L: 3, X: 1-2, E: 1-2/ Alt: 1-2/ SmedH: er, MedH: er/ PT: 1/ suboc, u/ Note: a western species, never found fertile, found on the dry sides of trunks of old deciduous oaks in sheltered situations, which most probably does not belong to *Schismatomma s.str.* It is included as "Critically Endangered" in the Italian red list of epiphytic lichens (Nascimbene & al. 2013c).

Schismatomma pericleum (Ach.) Branth & Rostr.

Bot. Tidskr., 3: 244, 1869 - *Lichen pericleus* Ach., Lichenogr. Suec. Prodr.: 78, 1799.

Syn.: *Lecanora periclea* (Ach.) Ach., *Lecanactis periclea* (Ach.) M. Choisy, *Platygrapha dolosa* (Duby) Anzi, *Platygrapha periclea* (Ach.) Nyl., *Pyrenotea incrustans* (Ach.) Fr., *Schismatomma dolosum* (Duby) Flot. & Körb., *Schismatomma pericleum* var. *farinosum* (Ach.) Lettau

N - Ven (Nascimbene 2003b, 2008c, 2011, Nascimbene & al. 2013b), **TAA** (Tehler 1993, Nascimbene 2006b, 2006c, 2008b, 2014, Stofer 2006, Nascimbene & al. 2007b, 2009, 2010, 2014, Nascimbene & Marini 2015), **Lomb, Piem** (Isocrono & al. 2004). **C - Marc** (Nimis & Tretiach 1999), **Umb** (Ravera 2000, Ravera & al. 2006), **Abr** (Nimis & Tretiach 1999, Corona & al. 2016), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008). **S - Camp** (Aprile & al. 2003b, Garofalo & al. 2010), **Cal** (Puntillo 1996).

Cr/ Tr/ S/ Epiph/ pH: 1-2, L: 2, X: 2, E: 1/ Alt: 2-4/ Salp: er, Mont: er, SmedH: er/ PT: 0/ u/ Note: a temperate, mainly western species with optimum in humid beech forests, mostly on conifers (*Abies*, *Picea*), much more rarely on oaks. It is included in the Italian red list of epiphytic lichens as "Near-threatened" (Nascimbene & al. 2013c).

Schismatomma ricasolii (A. Massal.) Egea & Torrente

in Torrente & Egea, Bibl. Lichenol., 32: 222, 1989 - *Lecanactis ricasolii* A. Massal., Ric. Auton. Lich. Crost.: 53, fig. 100, 1852.

Syn.: *Chiodecton graphidioides* Leight., *Chiodecton italicum* (B. de Lesd.) Zahlbr., *Chiodecton italicum* f. *roseum* B. de Lesd., *Enterographa flotowii* A. Massal., *Enterographa graphidioides* (Leight.) Almb., *Enterographa hutchinsiae* var. *zwackhii* A. Massal., *Enterographa italica* B. de Lesd., *Enterographa pseudorufescens* (B. de Lesd.) Redinger, *Enterographa rimata* (Nyl.) Zwackh, *Enterographa rimata* f. *contigua* Redinger nom. inval., *Enterographa zwackhii* (Zwackh) A. Massal., *Opegrapha ricasolii* (A. Massal.) Jatta, *Opegrapha pseudorufescens* B. de Lesd., *Platygrapha rimata* Flot. ex Nyl., *Schimatomma graphidioides* (Leight.) Zahlbr., *Schimatomma rimatum* (Nyl.) Branth & Rostr.

N - Fri (TSB 31107), **Lomb, Lig** (Tehler 1993, Benco & al. 2004, Sparrius 2004, Giordani & Incerti 2008). **C - Tosc** (Tehler 1994, Lazzarin 2000b, Loppi & al. 2004c, Tretiach & al. 2008), **Marc** (TSB 23608), **Umb** (Ravera 2000, Ravera & al. 2006), **Laz** (Munzi & al. 2009c), **Sar** (Zedda & al. 2001). **S - Camp** (Aprile & al. 2003b, Nimis & Tretiach 2004, Brunialti & al. 2013, Ravera & Brunialti 2013), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1995, 1996), **Si** (Nimis & al. 1994).

Cr/ Tr/ S/ Epiph/ pH: 2-3, L: 2, X: 1-2, E: 1/ Alt: 1-3/ Mont: vr, SmedD: er, SmedH: er/ PT: 0/ Note: a cool-temperate, mainly western species with optimum in humid *Abies-Fagus* forests of the Apennines, but also occurring in humid sites of Tyrrhenian Italy within the Mediterranean belt. Tehler (*in litt.*) has seen material of *Opegrapha ricasolii* from "Etruria" (Herb. S) collected by Ricasoli and determined by Garovaglio that might be accepted as a lectotype; this is identical to *Schimatomma graphidioides* and the epithet "*ricasolii*" is the correct one. The species is included in the Italian red list of epiphytic lichens as "Near-threatened" (Nascimbene & al. 2013c).

Sclerophora Chevall.

Fl. Gén. Env. Paris, 1: 315, 1826.

This genus includes 6 species and has a broad distribution in warm-temperate to temperate areas of both Hemispheres. The genus belongs to the Coniocybaceae, a previously unrecognised lichenised lineage (Coniocybomycetes, Coniocybales) related to Lichinomycetes, as shown by Prieto & al. (2013). The two species which are present in Italy were treated by Puntillo & Puntillo (2009). Type: *S. furfuracea* (L.) Chevall.

Sclerophora pallida (Pers.) Y.J. Yao & Spooner

Kew Bull., 54, 3: 688, 1999 - *Calicium pallidum* Pers., Ann. Bot. (Usteri), 7: 20, 1794.

Syn.: *Coniocybe curta* H. Magn., *Coniocybe nivea* var. *pallida* (Pers.) Arnold, *Coniocybe pallida* (Pers.) Fr., *Coniocybe pallida* var. *leucocephala* (Wallr.) Schaer., *Coniocybe subpallida* Nyl., *Sclerophora nivea* (J.F. Gmel.) Tibell **N - Ven** (Puntillo & Puntillo 2009), **TAA** (Nascimbene & al. 2007b, Puntillo & Puntillo 2009), **Lomb** (Puntillo & Puntillo 2009), **C - Tosc** (Puntillo & Puntillo 2009), **Umb** (Ravera & Di Toma 2003, Ravera & al. 2006), **Abr** (Puntillo & Puntillo 2009), **Mol** (Vězda Lich. Rar. Exs. 356, Nimis & Tretiach 1999, Caporale & al. 2008, Puntillo & Puntillo 2009), **Sar** (Puntillo & Puntillo 2009), **S - Camp** (Aprile & al. 2003b), **Bas** (Puntillo & al. 2009, 2012), **Cal** (Puntillo 1994, 1996, Puntillo & Puntillo 2009), **Si** (Ottonello & Isocrono 2004, Puntillo & Puntillo 2009).

Cr/ Tr/ S/ Epiph/ pH: 3, L: 2-3, X: 1-2, E: 1/ Alt: 2-3/ Mont: er, SmedD: er, SmedH: er/ PT: 0/ u/ Note: a temperate species found on old trees, such as *Acer*, *Ulmus* and *Fraxinus* in dry crevices of the bark. Certainly strongly declining, especially in northern Italy, it is included in the Italian red list of epiphytic lichens as "Vulnerable" (Nascimbene & al. 2013c).

Sclerophora peronella (Ach.) Tibell

Beih. Nova Hedwigia, 79: 679, 1984 - *Lichen peronellus* Ach., Lichenogr. Suec. Prodr.: 84, 1799.

Syn.: *Coniocybe hyalinella* Nyl., *Coniocybe peronella* (Ach.) Tibell, *Roesleria hyalinella* (Nyl.) Sacc.

C - Tosc (Puntillo & Puntillo 2009), **Marc** (Nimis & Tretiach 1999, Puntillo & Puntillo 2009), **Abr** (Di Santo & Ravera 2012, Corona & al. 2016). **S - Camp** (Aprile & al. 2003b), **Bas** (Puntillo & Puntillo 2009, Puntillo & al. 2012), **Cal** (Puntillo 1994, 1996, Amo & Burgaz 2004, Puntillo & Puntillo 2009).

Cr/ Tr/ S/ Epiph-Lign/ pH: 2-3, L: 2-3, X: 1-2, E: 1/ Alt: 3/ Mont: vr/ PT: 0/ u/ Note: on bark and lignum of mature broad-leaved trees, often forming monospecific stands; Italian records are recent, but the species is probably declining and was included in the Italian red list of epiphytic lichens as "Vulnerable" (Nascimbene & al. 2013c).

Scoliciosporum A. Massal.

Ric. Auton. Lich. Crost.: 104, 1852.

This genus, included in its own family Scoliciosporaceae, contains c. 15 species in temperate and subtropical areas. It somehow resembles *Micarea*, differing in the *Lecanora*-type asci, the large-celled photobiont, and the paraphyses with a dark cap. *S. pruinosum* deviates in several important characters, including ascus-type, and will be probably transferred to another genus. Type: *S. holomelaenum* (Florke) A. Massal. (= *S. umbrinum*).

Scoliciosporum chlorococcum (Stenh.) Vězda

Folia Geobot. Phytotaxon., 13: 414, 1978 - *Biatora hypnophila* var. *chlorococcum* Graewe ex Stenh., Öfvers. K. Svensk. Vetensk.-Akad. Förh., 19: 473, 1863.

Syn.: *Bacidia chlorococca* (Stenh.) Lettau, *Bacidia interspersula* (Nyl.) Zahlbr., *Bacidia salicicola* Wheldon & Travis, *Bilimbia chlorococca* (Stenh.) Th. Fr.

N - VG (Castello 2002, Martellos & Castello 2004), **Frl, Ven** (Lazzarin 2000), **TAA** (Nascimbene 2006c, 2014, Thor & Nascimbene 2007, Nascimbene & al. 2014, Nimis & al. 2015), **Lomb** (Zocchi & al. 1997, Furlanetto 2010), **Piem** (Piervittori 2003, Isocrono & al. 2006, 2006b, Valcuvia 2002, 2002b, Castino 2004, Furlanetto 2010, Matteucci & al. 2010), **VA** (Matteucci & al. 2008), **Emil** (Valcuvia & Savino 2000), **Lig** (Giordani & al. 2002, Brunialti & Giordani 2003, Giordani & Incerti 2008). **C - Tosc** (Loppi & Corsini 1995, Loppi & al. 1996c, 1997b, 1997e, 2004, Benesperi 2000a, Benesperi & al. 2007, Tretiach & al. 2008, Loppi & Baragatti 2011), **Umb** (Ravera 1998, Ravera & al. 2006), **Laz** (Stofer 2006, Munzi & al. 2007), **Abr** (Di Santo & Ravera 2012, Corona & al. 2016), **Sar** (Stofer 2006, Rizzi & al. 2011). **S - Bas**.

Cr/ Ch/ S/ Epiph-Sax/ pH: 1-3, L: 2-3, X: 2-3, E: 1-3/ Alt: 1-4/ Salp: er, Mont: rc, SmedD: rr, Pad: vr, SmedH: rr, MedH: r, MedD: vr/ PT: 1-2/ Note: a widespread holarctic, ecologically wide-ranging species found on bark (especially of *Fagus*), lignum, and more rarely siliceous rocks, tolerant to air pollution; several earlier and also some recent records, however, need confirmation.

***Scoliciosporum gallurae* Vězda & Poelt**

in Nimis & Poelt, *Studia Geobot.*, 7, suppl. 1: 221, 1987.

C - Tosc (TSB 31214), **Marc** (Nimis & Tretiach 1999), **Laz** (Fornasier & al. 2005), **Sar** (Zedda 2002).

Cr/ Ch/ S/ Epiph/ pH: 1-3, L: 3-4, X: 2-3, E: 2-3/ Alt: 1-2/ SmedD: vr, Pad: er, SmedH: rr, MedH: r, MedD: er/ PT: 1-2/ suboc/ Note: on twigs and branches, more rarely on trunks of coniferous and broad-leaved trees at relatively low elevations; quite common in southern Europe, being often sterile it has been frequently overlooked, and is probably much more widespread, especially in Tyrrhenian Italy.

***Scoliciosporum perpusillum* Körb.**

J. Lahm *ex* Körb., *Parerga Lichenol.*: 241, 1861.

Syn.: *Bacidia perpusilla* (Körb.) Th. Fr.

N - Piem (Matteucci & al. 2013). **C - Laz** (TSB 4208). **S - Camp** (Aprile & al. 2003b), **Cal** (Puntillo 1996).

Cr/ Ch/ S/ Epiph-Foliic/ pH: 1-2, L: 3-4, X: 1-2, E: 1/ Alt: 3/ Mont: vr/ PT: 1/ suboc/ Note: a mild-temperate, probably western species, generally found on acid bark, especially of conifers, but also on needles of *Abies* in damp montane forests. It is included in the Italian red list of epiphytic lichens as “Vulnerable” (Nascimbene & al. 2013c).

***Scoliciosporum pruinosum* (P. James) Vězda**

Folia Geobot. Phytotaxon., 13: 414, 1978 - *Bacidia pruinosum* P. James, *Lichenologist*, 5: 117, 1971.

N - VG. C - Laz (TSB 17669). **S - Cal** (Puntillo 1996, Puntillo 2011).

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 3, X: 2, E: 1-2/ Alt: 1-3/ Mont: vr, SmedD: er, SmedH: vr, MedH: er/ PT: 1/ suboc, u/ Note: a mild-temperate species found on bark, especially of old oaks, usually on underhanging surfaces protected from rain, with optimum in humid deciduous, more rarely evergreen forests, often along rivers. Perhaps the species does not belong to *Scoliciosporum*. It is included in the Italian red list of epiphytic lichens as “Endangered” (Nascimbene & al. 2013c).

***Scoliciosporum sarothamni* (Vain.) Vězda**

Folia Geobot. Phytotaxon., 13: 411, 1978 - *Bacidia sarothamni* Vain., *Acta Soc. Fauna Fl. Fenn.*, 53: 214, 1922.

N - Frl (TSB 2908), **Ven** (Nascimbene 2003b, Thor & Nascimbene 2007, Nascimbene & Marini 2007). **Emil. C - Tosc** (Loppi & al. 1994, Loppi & Putortì 2001, Benesperi & al. 2007), **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera & al. 2006, 2006b), **Abr** (Nimis & Tretiach 1999).

Cr/ Ch/ A.s/ Epiph-Sax/ pH: 2-3, L: 2-3, X: 2, E: 1-2/ Alt: 2-3/ Mont: vr, SmedD: er, SmedH: vr/ PT: 1/ p/ Note: a mainly mild-temperate early coloniser of smooth bark, rarely occurring also on siliceous rocks and on leaves of *Buxus* and *Abies*. Probably overlooked, being mostly sterile, it was included in the Italian red list of epiphytic lichens under the “Least Concern” category (Nascimbene & al. 2013c).

***Scoliciosporum umbrinum* (Ach.) Arnold**

Flora, 54: 50, 1871 - *Lecidea umbrina* Ach., *Lichenogr. Univ.*: 183, 1810.

Syn.: *Bacidia compacta* (Körb.) Jatta, *Bacidia corticicola* (Anzi) Dalla Torre & Sarnth., *Bacidia holomelaena* (Flörke) Anzi, *Bacidia holomelaena* var. *corticicola* Anzi, *Bacidia holophaea* Anzi, *Bacidia pelidniza* (Nyl.) H. Olivier, *Bacidia turgida* (Körb.) Hellb., *Bacidia umbrina* (Ach.) Bausch, *Bacidia umbrina* var. *compacta* (Körb.) Th. Fr., *Bacidia umbrina* var. *corticola* (Anzi) Bausch, *Bacidia umbrina* var. *psotina* (Fr.) Th. Fr., *Bacidia umbrina* var. *turgida* (Körb.) Th. Fr., *Scoliciosporum compactum* Körb., *Scoliciosporum compactum* var. *saxicolum* Körb., *Scoliciosporum corticicola* (Anzi) Arnold, *Scoliciosporum holomelaenum* (Flörke) A. Massal., *Scoliciosporum turgidum* Körb., *Scoliciosporum umbrinum* var. *asserculorum* Stizenb., *Scoliciosporum umbrinum* var. *compactum* (Körb.) Clauzade & Cl. Roux, *Scoliciosporum umbrinum* var. *corticola* (Anzi) Bagl. & Carestia

N - VG (Carvalho 1997, Castello 2002, Martellos & Castello 2004), **Frl** (Tretiach & Hafellner 2000), **Ven** (Lazzarin 1997), **TAA** (Hinteregger 1994, Caniglia & al. 2002, Nascimbene 2006c, 2014, Nascimbene & al. 2007b, Watson 2014, Nimis & al. 2015), **Lomb** (Hinteregger 1994, Gheza & al. 2015), **Piem** (Piervittori 2003, Isocrono & al. 2004, 2006, Favero-Longo & al. 2004, 2006b, Giordani & Malaspina 2016), **VA** (Piervittori & Isocrono 1999, Matteucci & al. 2015c), **Emil** (Nimis & al. 1996, Tretiach & al. 2008, Benesperi 2009), **Lig** (Giordani 2006, Giordani & Incerti 2008). **C - Tosc** (Loppi & al. 1999a, Tretiach & Ganis 1999, Loppi & Putortì 2001, Benesperi 2006, 2011, Benesperi & al. 2007, Tretiach & al. 2008, Brunialti & Frati 2010, Nascimbene & al. 2015), **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera 1998, Ravera & al. 2006, Panfili 2007), **Laz** (Ravera & al. 1999, Massari & Ravera 2002, Nimis & Tretiach 2004, Munzi & al. 2007), **Abr** (Nimis & Tretiach 1999, Stofer 2006, Corona & al. 2016), **Mol** (Nimis & Tretiach 1999, Caporale & al.

2008), **Sar** (Rizzi & al. 2011, Cossu 2013, Watson 2014). **S - Camp** (Garofalo & al. 1999, 2010, Ricciardi & al. 2000, Aprile & al. 2002, 2003b, Nimis & Tretiach 2004, Brunialti & al. 2013, Ravera & Brunialti 2013), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999, Brackel 2011), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1996b, Grillo & Cristaudo 1995, Grillo 1998, Grillo & Caniglia 2004).

Cr/ Ch/ S/ Epiph-Sax-Lign/ pH: 1-3, L: 3-4, X: 2-4, E: 1-3/ Alt: 1-5/ Alp: er, Salp: vr, Orom: vr, Mont: c, SmedD: rc, Pad: vr, SmedH: rc, MedH: rc, MedD: vr/ PT: 1-3/ Note: an ecologically wide-ranging, probably holarctic species, also present in urban areas, sometimes parasitic on other lichens (especially when on siliceous rocks), with a wide altitudinal range.

Scytinium (Ach.) Gray

Nat. Arr. Brit. Pl., 1: 398, 1821 - *Collema* subdiv. *Scytinium* Ach., Lichenogr. Univ.: 642, 1810.

The molecular study of the Collemataceae genera *Collema* and *Leptogium* by Otálora & al. (2014) has led to their re-circumscription, with six old generic names resurrected, among which *Scytinium*, in itself a very heterogeneous genus, although the species share the same type of ascospores (shape, septation), have a small to medium size thallus, and most have a cortex or pseudocortex. *Scytinium* includes c. 46 species formerly placed in three *Leptogium* sections (sect. *Homodium*, *Collemodium* and *Leptogium*), and three groups formerly included in *Collema* (the *Fragrans*-, *Callopismum*- and *Leptogioides*-groups). Most species occur in temperate regions of the Northern Hemisphere, and are very rare in tropical regions. Several species occurring in Italy were treated e.g. by Aragón & al. (2004), Jørgensen (2007), and Otálora & al. (2008). In some groups, species delimitation is still an open problem, and the revision of the Italian material of e.g. *S. lichenoides* s.lat. is much needed. Type: *S. palmatum* (Huds.) Gray

Scytinium aragonii (Otálora) Otálora, P.M. Jørg. & Wedin

Fungal Divers., 64: 290, 2014 - *Leptogium aragonii* Otálora in Otálora & al., Taxon, 57: 915, 2008.

N - VG (B 60 0113703), **Piem** (Otálora & al. 2008), **Lig** (S-L33867). **C - Tosc** (Otálora & al. 2008). **S - Si** (B 60 0113703).

Sq/ Cy.h/ S/ Terr/ pH: 3-4, L: 2-3, X: 3, E: 1-2/ Alt: 1-3/ Mont: vr, SmedD: r, SmedH: rc, MedH: rr, MedD: er/ PT: 1-2/ Note: widely distributed throughout Europe, occurring in preserved forests from 200 m in northern regions to 1800 m in the southern part of Europe, on pleurocarpous mosses close to the base of trunks, and over mossy walls or calcareous rocks within forests. The specimens in B, originally labeled as *Leptogium lichenoides*, were identified by M. G. Otálora.

Scytinium biatorinum (Nyl.) Otálora, P.M. Jørg. & Wedin

Fungal Divers., 64: 290, 2014 - *Collema biatorinum* Nyl., Act. Soc. Linn. Bordeaux, 21: 268, 1856.

Syn.: *Leptogium biatorinum* (Nyl.) Leight., *Leptogium cretaceum* (Sm.) Nyl., *Leptogium pusillum* Nyl.

N - VG (Castello 2002, Martellos & Castello 2004), **Lomb, Emil, Lig. C - Marc, Sar**.

Cr/ Cy.h/ S/ Terr-Sax/ pH: 3-4, L: 4, X: 3, E: 1-2/ Alt: 2/ SmedD: vr, SmedH: vr/ PT: 1-2/ p/ Note: a temperate ephemeral lichen of disturbed habitats, most frequent on concrete walls, but also found on calciferous soil; certainly more widespread but overlooked, or confused with other species

Scytinium callopismum (A. Massal.) Otálora, P.M. Jørg. & Wedin

Fungal Divers., 64: 290, 2014 - *Collema callopismum* A. Massal., Miscell. Lichenol.: 23, 1856.

Syn.: *Collema callopismum* f. *granulosum* Degel., *Leptogium callopismum* (A. Massal.) Harm.

N - VG, Frl, TAA, Ven, Lomb, Piem (Isocrono & al. 2004, Isocrono & Piervittori 2008), **VA** (Revel & al. 2001), **Emil, Lig. C - Tosc, Umb** (Genovesi 2003b, Ravera & al. 2006).

Fol.n/ Cy.h/ S/ Sax/ pH: 3-5, L: 4, X: 2-3, E: 1-2/ Alt: 2-3/ Mont: er, SmedD: vr, Pad: er, SmedH: vr/ PT: 1/ w/ Note: a mainly western European, temperate lichen of more or less calciferous rocks, often on seepage tracks; the species was poorly understood by several Italian authors, and all Italian records, except those checked by Degelius from Veneto and Liguria (Nimis 1993: 253), need confirmation. The records from Calabria by Puntillo (1996) are excluded: the corresponding material in TSB belongs to another species.

Scytinium euthallinum (Zahlbr.) Otálora, P.M. Jørg. & Wedin

Fungal Divers., 64: 290, 2014 - *Collema leptogioides* var. *euthallinum* Zahlbr., Österr. bot. Z., 59: 494, 1909.

Syn.: *Collema euthallinum* (Zahlbr.) Degel., *Leptogium diffractum* var. *euthallinum* (Zahlbr.) Zahlbr.

N - Lig (Giordani & al. 2016). **S - Cal** (Puntillo 1996).

Fol.n/ Cy.h/ S/ Sax/ pH: 5, L: 4-5, X: 4, E: 1-2/ Alt: 1-2/ SmedH: vr, MedH: vr/ PT: 1/ w/ Note: a Mediterranean species also known from Dalmatia, found on steeply inclined seepage tracks of calcareous rocks; perhaps overlooked and more widespread in Mediterranean Italy, but never common.

Scytinium fragile (Taylor) Otálora, P.M. Jørg. & Wedin

Fungal Divers., 64: 290, 2014 - *Collema fragile* Taylor in Mackay, Fl. Hibern., 2: 109 and 259, 1836.

Syn.: *Leptogium fragile* (Taylor) Nyl.

N - Piem (Morisi & Sereno 1995), **Lig. S - Pugl, Si**.

Fol.n/ Cy.h/ S/ Sax/ pH: 5, L: 4-5, X: 4, E: 1/ Alt: 1/ MedH: r, MedD: er/ PT: 1/ suboc, w/ Note: a southwestern species in Europe, found on steeply inclined seepage tracks of calcareous rocks; much overlooked and perhaps more widespread in Tyrrhenian Italy, but never common.

Scytinium fragrans (Sm.) Otálora, P.M. Jørg. & Wedin

Fungal Divers., 64: 290, 2014 - *Lichen fragrans* Sm. in Smith & Sowerby, Engl. Bot., 27: tab. 1912, 1808.

Syn.: *Collema capnichroum* A. Massal., *Collema fragrans* (Sm.) Ach., *Collema microphyllum* Ach. nom. illegit., *Collema terrulentum* Nyl., *Leptogium fragrans* (Sm.) Leight., *Leptogium microphyllum* (Gray) Leight., *Parmelia crispa* var. *prasina* (Hoffm.) Ach.

N - VG, Ven (Lazzarin 2000b), **TAA** (Nascimbene & al. 2007b), **Lomb** (Rivellini 1994), **Piem, Emil, Lig** (Giordani & Incerti 2008), **C - Tosc** (Frati & al. 2006b), **Marc, Umb** (Ravera 1998, Ravera & al. 2006), **Laz, Abr, Mol** (Caporale & al. 2008, Paoli & al. 2015), **Sar** (Zedda 2002), **S - Camp** (Ravera & Brunialti 2013), **Bas** (Potenza & al. 2014), **Si**.

Fol.n/ Cy.h/ S/ Epiph/ pH: 2-3, L: 3-4, X: 3, E: 3/ Alt: 1-3/ Mont: er, SmedD: er, SmedH: r, MedH: vr/ PT: 1/ suboc/ Note: a mild-temperate lichen found on bark in open but mature, humid, broad-leaved woodlands; presently extremely rare or extinct in northern Italy (the recent record from Lombardy requires confirmation), and most frequent in Tyrrhenian Italy.

Scytinium gelatinosum (With.) Otálora, P.M. Jørg. & Wedin

Fungal Divers., 64: 290, 2014 - *Lichen gelatinosus* With., Bot. Arrang. Veget. Gr. Brit.: 710, 1776.

Syn.: *Collema scotinum* (Ach.) Ach., *Leptogium scotinum* (Ach.) Fr., *Leptogium gelatinosum* (With.) J.R. Laundon, *Leptogium scotinum* var. *sinuatum* (Huds.) Torss., *Leptogium sinuatum* (Huds.) A. Massal.

N - Frl, Ven (Nascimbene & Caniglia 2003c), **TAA, Lomb, Piem** (Isocrono & al. 2004), **VA** (Matteucci & al. 2013), **Emil** (Nimis & al. 1996), **Lig** (Otálora & al. 2008), **C - Tosc** (Brackel 2015), **Marc** (Nimis & Tretiach 1999), **Umb** (Genovesi & al. 2001, Ravera & al. 2006), **Laz, Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach, 1999, 2004, Caporale & al. 2008), **Sar** (Zedda 2002), **S - Camp** (Nimis & Tretiach 2004), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999, Potenza 2006), **Cal** (Puntillo 1996), **Si** (Ottonello & al. 1994, Nimis & al. 1996b, Ottonello 1996).

Sq/ Cy.h/ S/ Terr/ pH: 3-4, L: 4-5, X: 3, E: 1-2/ Alt: 1-5/ Alp: r, Salp: rr, Orom: r, Mont: vr, SmedD: r, SmedH: rc, MedH: rr, MedD: er/ PT: 1-2/ Note: a widespread holarctic lichen, most common on base-rich siliceous substrata, especially in open grasslands, well distinguished from the more calcicolous *S. lichenoides*.

Scytinium imbricatum (P.M. Jørg.) Otálora, P.M. Jørg. & Wedin

Fungal Divers., 64: 290, 2014 - *Leptogium imbricatum* P.M. Jørg., Lichenologist, 26: 7, 1994.

N - Piem (TSB 34145).

Sq/ Cy.h/ S/ Terr/ pH: 3-4, L: 4-5, X: 4, E: 1-2/ Alt: 4-5/ Alp: r, Salp: rr/ PT: 1/ Note: on more or less calciferous ground in alpine grasslands; likely to occur throughout the Italian Alps, but formerly filed under pulvinate forms of *S. gelatinosum* and *S. lichenoides*.

Scytinium intermedium (Arnold) Otálora, P.M. Jørg. & Wedin

Fungal Divers., 64: 290, 2014 - *Leptogium minutissimum* var. *intermedium* Arnold, Flora, 50: 122, 1867.

Syn.: *Leptogium intermedium* (Arnold) Arnold, *Leptogium minutissimum* auct. non (Flörke) Fr.

N - Frl (TSB 15419), **Ven** (Thor & Nascimbene 2007), **TAA** (Nascimbene & al. 2007b), **Lomb** (Jørgensen 1994, Otálora & al. 2008), **Piem** (Isocrono & al. 2004, Otálora & al. 2008), **C - Tosc** (Otálora & al. 2008), **Umb** (Ravera & al. 2006, 2006b), **Sar, S - Camp, Si**.

Sq/ Cy.h/ S/ Terr-Epiph/ pH: 3-4, L: 3-4, X: 3-4, E: 1-2/ Alt: 2-4/ Salp: er, Mont: er, SmedD: vr, SmedH: vr/ PT: 1/ #/ Note: a mainly temperate species found on soil, occasionally on the mossy bases of ancient trunks, more rarely on calcareous rocks.

Scytinium leptogioides (Anzi) Otálora, P.M. Jørg. & Wedin

Fungal Divers., 64: 290, 2014 - *Collema leptogioides* Anzi, Comm. Soc. Critt. Ital., 1, 3: 132, 1862.

Syn.: *Leptogium marcii* Harm.

N - Lig, C - Tosc.

Fol.n/ Cy.h/ S/ Sax/ pH: 5, L: 3-4, X: 4, E: 1/ Alt: 1-2/ SmedH: er, MedH: r/ PT: 1-2/ w/ Note: a mainly Mediterranean species found on steeply inclined surfaces of calcareous rocks, often on cyanobacterial colonies, sometimes also on walls; to be looked for in southern Italy.

Scytinium lichenoides (L.) Otálora, P.M. Jørg. & Wedin

Fungal Divers., 64: 290, 2014 - *Tremella lichenoides* L., Sp. Pl.: 1157, 1753.

Syn.: *Collema atrocoeruleum* (Schaer.) Rabenh., *Collema fimbriatum* (Ach.) Röhl., *Collema lacerum* DC., *Leptogium atrocoeruleum* (Schaer.) A. Massal., *Leptogium lacerum* (Sw.) Gray, *Leptogium lacerum* var. *majus* Körb., *Leptogium lacerum* var. *sendtneri* (Flot.) Müll. Arg., *Leptogium lichenoides* (L.) Zahlbr., *Leptogium lophaeum* (Ach.) Cromb., *Leptogium pellucidum* M. Choisy

N - VG, Frl (Tretiach & Hafellner 2000, Tretiach & Molaro 2007, Tomasi 2007, Otálora & al. 2008, Brackel 2013), **Ven** (Caniglia & al. 1999, Nascimbene & Caniglia 2003c, Nascimbene 2005c, 2008c, 2011, Nascimbene & al. 2005b, 2006c, 2007, 2010b, Thor & Nascimbene 2007, Nascimbene & Marini 2007, Otálora & al. 2008), **TAA** (Philippi 1983, De Benetti & Caniglia 1993, Nascimbene 2003, 2005b, 2008b, Nascimbene & al. 2006, 2007b, Nimis & al. 2015), **Lomb** (Philippi 1983), **Piem** (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999), **Emil** (Nimis & al. 1996), **Lig** (Brunialti

& al. 1999, Valcuvia & al. 2000, Otálora & al. 2004, Giordani & al. 2016). **C - Tosc** (Tretiach & Nimis 1994, Otálora & al. 2004, Benesperi 2006, 2011, Benesperi & al. 2007, Brackel 2015), **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera 1998, Nimis & Tretiach 1999, Ravera & al. 2006, Panfili 2007), **Laz** (Ravera 2002, Massari & Ravera 2002, Nimis & Tretiach 2004, Ravera & Genovesi 2008 Otálora & al. 2008, Brackel 2015), **Abr** (Nimis & Tretiach 1999, Brackel 2015, Corona & al. 2016), **Mol** (Garofalo & al. 1999, Nimis & Tretiach, 1999, 2004, Caporale & al. 2008, Genovesi & Ravera 2014), **Sar** (Zedda 2002, 2002b, Zedda & al. 2010, Rizzi & al. 2011, Cogoni & al. 2011). **S - Camp** (Garofalo & al. 1999, 2010, Aprile & al. 2002, 2003, 2003b, Nimis & Tretiach 2004, Nascimbene & al. 2010b, Brunialti & al. 2013, Ravera & Brunialti 2013, Catalano & al. 2016), **Pugl** (Garofalo & al. 1999, Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999, Potenza 2006, Brackel 2011), **Cal** (Puntillo 1996, Puntillo & Puntillo 2004, Incerti & Nimis 2006, Stofer 2006), **Si** (Nimis & al. 1994, 1995, Ottonello & Salone 1994, Ottonello & al. 1994, 2011, Ottonello 1996, Ottonello & Romano 1997, Grillo 1998, Grillo & Caniglia 2004, Merlo 2004, 2004b, Brackel 2008b Otálora & al. 2008, Gianguzzi & al. 2009, Liistro & Cataldo 2011).

Sq/ Cy.h/ S/ Terr-Epiph/ pH: 3-5, L: 3-5, X: 2-4, E: 1-3/ Alt: 1-5/ Alp: c, Salp: ec, Orom: c, Mont: ec, SmedD: vc, Pad: er, SmedH: vc, MedH: c, MedD: rr/ PT: 1-2/ Note: a widespread holarctic lichen mostly found on soil and amongst mosses in dry grasslands, more rarely on basal parts of trunks. Many records could refer to *S. pulvinatum* (see notes to that species, to *S. imbricatum*, and to *S. gelatinosum*).

Scytinium magnussonii (Degel. & P.M. Jørg.) Otálora, P.M. Jørg. & Wedin

Fungal Divers., 64: 290, 2014 - *Leptogium magnussonii* Degel. & P.M. Jørg. in Jørgensen, Lichenologist, 26: 14, 1994.

N - Lomb. C - Tosc (Benesperi 2006), **Mol** (Paoli & al. 2015). **S - Bas** (Potenza & al. 2014).

Fol.n/ Cy.h/ A.i/ Sax/ pH: 2-4, L: 3-4, X: 2, E: 2-3/ Alt: 2-3/ Mont: er, SmedD: vr, SmedH: vr/ PT: 1/ 1/ Note: described from Scandinavia, and also known from western Europe and Austria, this species is found in seepage tracks of granitic rocks, gneiss and weakly calcareous rocks below the subalpine belt. The specimen from Lombardy was collected by U. Gröner (Cannero Municipality, Valle Piancassone, on the road to Travego).

Scytinium massiliense (Nyl.) Otálora, P.M. Jørg. & Wedin

Fungal Divers., 64: 291, 2014 - *Leptogium massiliense* Nyl., Flora, 62: 354, 1879.

N - VG, Frl (Tretiach & Carvalho 1995), **Lig** (Jørgensen 1994). **C - Tosc** (Jørgensen 1994, Benesperi 2007, 2007b), **Marc** (Nimis & Tretiach 1999), **Laz** (Nimis & Tretiach 2004), **Abr** (Jørgensen 1994, Brackel 2015), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008). **S - Camp** (Aprile & al. 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010), **Pugl** (Jørgensen 1994, Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999, Potenza 2006), **Cal** (Puntillo 1996), **Si** (Ottonello & al. 2006b).

Frut.f/ Cy.h/ S/ Sax/ pH: 5, L: 4-5, X: 3-4, E: 1-2/ Alt: 1-3/ Mont: rr, SmedD: rc, SmedH: rc, MedH: rc, MedD: r/ PT: 1/ w/ Note: a mild-temperate to Mediterranean species found on steeply inclined surfaces of calcareous rocks with periodical seepage of water; certainly more widespread in northern Italy.

Scytinium palmatum (Huds.) Gray

Nat. Arr. Brit. Pl., 1: 398, 1821 - *Lichen palmatus* Huds., Fl. Angl., ed 2: 536, 1778.

Syn.: *Collema corniculatum* Hoffm., *Collema palmatum* (Huds.) Ach., *Leptogium corniculatum* (Hoffm.) Minks, *Leptogium palmatum* (Huds.) Mont., *Obryzum corniculatum* auct. ital.

N - Ven, TAA, Lig. C - Tosc, Laz, Mol (Garofalo & al. 1999, Caporale & al. 2008), **Sar** (Nöske 2000). **S - Camp** (Garofalo & al. 1999, Catalano & al. 2016), **Pugl** (Garofalo & al. 1999), **Cal** (Puntillo 1996, Puntillo & Puntillo 2004), **Si** (Grillo 1998, Czezugza & al. 1999, Grillo & Caniglia 2004, Iacolino & Ottonello 2006).

Fol.b/ Cy.h/ S/ Terr/ pH: 2-3, L: 3-4, X: 2-3, E: 1/ Alt: 1-3/ Mont: er, SmedD: er, SmedH: er, MedH: vr/ PT: 1/ suboc/ Note: a mild-temperate lichen found amongst terricolous or epilithic mosses in areas with siliceous substrata, sometimes on soil; mainly Tyrrhenian in Italy.

Scytinium parvum (Degel.) Otálora, P.M. Jørg. & Wedin

Fungal Divers., 64: 291, 2014 - *Collema parvum* Degel., Symb. Bot. Upsal., 13, 2: 273, 1954.

Syn.: *Collema leptogioides* auct. p.p. non Anzi

N - VG (TSB 5736), **Frl** (TSB 7946), **Lomb. C - Abr. S - Camp** (Nimis & Tretiach 2004).

Cr/ Cy.h/ S/ Sax/ pH: 5, L: 4-5, X: 4, E: 1-2/ Alt: 2-4/ Salp: er, Mont: vr, SmedD: er, SmedH: er/ PT: 1/ w/ Note: on steeply inclined seepage tracks of calcareous rocks with colonies of cyanobacteria, most frequent in upland areas; certainly much overlooked or confused with other species in Italy.

Scytinium plicatile (Ach.) Otálora, P.M. Jørg. & Wedin

Fungal Divers., 64: 291, 2014 - *Lichen plicatilis* Ach., K. Vetensk.-Akad. Nya Handl., 16: 11, 1795.

Syn.: *Collema hydrocharum* (Ach.) Ach., *Collema plicatile* (Ach.) Ach., *Collemodium plicatile* (Ach.) Nyl., *Leptogium cataclystum* (Körb.) Harm., *Leptogium cataclystum* var. *fluctuans* (Kremp.) Zahlbr., *Leptogium firmum* Nyl., *Leptogium hydrocharum* (Ach.) Zahlbr., *Leptogium plicatile* (Ach.) Leight., *Leptogium plicatile* f. *subplicatile* Hue

N - VG, Frl (Tretiach & Molaro 2007), **Ven** (Nascimbene & Caniglia 2003c), **TAA, Lomb, Piem** (Isocrono & al. 2004), **VA** (Matteucci & al. 2013), **Emil, Lig** (Watson 2014). **C - Tosc, Marc, Umb** (Genovesi & Ravera 2001, Ravera & al. 2006), **Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **Sar. S - Camp** (Nimis & Tretiach 2004), **Pugl** (Nimis & Tretiach 1999), **Bas** (Potenza & al. 2014), **Cal** (Puntillo & Puntillo 2004), **Si** (Nimis & al. 1996b).

Fol.n/ Cy.h/ S/ Sax/ pH: 3-5, L: 3-4, X: 3-4, E: 1-3/ Alt: 1-3/ Mont: r, SmedD: rc, Pad: er, SmedH: rc, MedH: r, MedD: er/ PT: 1/ w/ Note: a mainly mild-temperate to Mediterranean lichen found on steeply inclined, but not fully sun-exposed seepage tracks of more or less calcareous rocks.

Scytinium pulvinatum (Hoffm.) Otálora, P.M. Jørg. & Wedin

in Otálora & Wedin, *Mycosphere*, 5: 502, 2014 - *Collema pulvinatum* Hoffm., *Deutschl. Fl.*: 104, 1796.

Syn.: *Leptogium atrocoeruleum* var. *pulvinatum* (Hoffm.) Beltr., *Leptogium lacerum* var. *pulvinatum* (Hoffm.) Zahlbr., *Leptogium lichenoides* var. *pulvinatum* (Hoffm.) Zahlbr., *Leptogium pulvinatum* (Hoffm.) Cromb.

N - VG (LD-1186681), **Frl** (TSB 12882), **Ven, TAA** (B 600108318), **Lomb** (S-L34070), **Piem** (TSB *s.n.*), **Lig** (S-L35349), **C - Sar** (TSB 6244), **S - Pugl** (S- L33728), **Si** (LD-1185405).

Sq/ Cy.h/ S/ Terr-Sax-Epiph/ pH: 3-5, L: 4-5, X: 3-4, E: 1-3/ Alt: 1-5/ Alp: c, Salp: ec, Orom: c, Mont: ec, SmedD: vc, Pad: er, SmedH: vc, MedH: c, MedD: rr/ PT: 1-2/ #/ Note: this species occurs among mosses at the base of trees or occasionally directly over bark of different trees, but also on walls, rocks or soil in open habitats over acrocarpous mosses, from the coast to the mountains. Though there is molecular evidence that this should be accepted as a species, it is hard to distinguish from extreme forms of *S. lichenoides*, and also the poor type is from a garden path in Oxford, a rather unlikely habitat for this arctic-alpine taxon (Jørgensen, *in litt.*). A revision of the *L. lichenoides* complex in Italy is needed to clarify its present distribution. The specimen in B, originally labeled as *Leptogium lichenoides*, was identified by M. G. Otálora.

Scytinium schraderi (Ach.) Otálora, P.M. Jørg. & Wedin

Fungal Divers., 64: 291, 2014 - *Parmelia schraderi* Ach., *Meth. Lich., Sect. post.*: 243, 1803.

Syn.: *Collema bacillare* (Wallr.) Wallr., *Leptogium schraderi* (Bernh.) Nyl., *Lichen schraderi* Bernh. *nom. illegit.*

N - VG, Frl, Ven (Nascimbene 2002), **TAA, Piem** (TSB 33154), **Emil** (Nimis & al. 1996), **C - Tosc** (Putortù & al. 1999c), **Umb** (Genovesi & Ravera 2001, Ravera & al. 2006), **Laz, Abr** (Caporale & al. 2016), **Sar, S - Pugl** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Grillo & al. 2002, Grillo & Caniglia 2004, Caniglia & Grillo 2005).

Frut/ Cy.h/ S/ Sax-Terr/ pH: 4-5, L: 3-5, X: 3-4, E: 1-2/ Alt: 1-3/ Mont: vr, SmedD: rr, Pad: er, SmedH: rr, MedH: r, MedD: er/ PT: 1-2/ Note: on calciferous rocks and soil, often on other lichens (*e.g. Romjularia lurida*), sometimes on terricolous mosses, below the Alpine belt.

Scytinium subaridum (P.M. Jørg. & Goward) Otálora, P.M. Jørg. & Wedin

Fungal Divers., 64: 291, 2014 - *Leptogium subaridum* P.M. Jørg. & Goward, *Acta Bot. Fenn.*, 150: 76, 1994.

C - Sar (Aragon & al. 2004).

Sq/ Cy.h/ S/ Epiph-Sax/ pH: 2-3, L: 3, X: 2-3, E: 1-2/ Alt: 1-2/ SmedH: vr, MedD: vr/ PT: 1-2/ #/ Note: a Mediterranean to mild-temperate lichen known from North America, found on the base of old trees, more rarely on schists. According to Jørgensen (*in litt.*), however, the presence of this species in Europe is dubious. It is included in the Italian red list of epiphytic lichens as "Data Deficient" (Nascimbene & al. 2013c).

Scytinium subtile (Schr.) Otálora, P.M. Jørg. & Wedin

Fungal Divers., 64: 291, 2014 - *Lichen subtilis* Schrad., *Spicil. Fl. Germ.*, 1: 95, 1794.

Syn.: *Collema minutissimum* Flörke *non auct.*, *Collema subtile* (Schr.) Hoffm., *Leptogium minutissimum* (Flörke) Fr. *non auct.*, *Leptogium subtile* (Schr.) Torss.

N - Ven (Anzi Lich. Lang. 539: Jørgensen 1994), **TAA** (Nascimbene 2013), **Lomb, Emil, Piem** (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999), **Emil** (Nimis & al. 1996), **C - Tosc, Laz** (Ravera 2001), **Abr** (Nimis & Tretiach 1999), **Sar** (Zedda 2002).

Sq/ Cy.h/ S/ Epiph-Terr/ pH: 3, L: 4, X: 2-3, E: 1-3/ Alt: 2-3/ Mont: r, SmedD: rr, SmedH: rr/ PT: 1-2/ Note: a mild-temperate lichen found in the basal parts of old trees with a base-rich bark, especially *Juglans*, *Populus* and *Salix*, sometimes on wood, more rarely on soil.

Scytinium tenuissimum (Hoffm.) Otálora, P.M. Jørg. & Wedin

Fungal Divers., 64: 291, 2014 - *Collema tenuissimum* Hoffm., *Deutschl. Fl.*, 2: 103, 1796.

Syn.: *Collema atrocoeruleum* var. *tenuissimum* (Hoffm.) Schaer., *Leptogium humosum* Nyl., *Leptogium spongiosum* (Sm.) Nyl., *Leptogium tenuissimum* (Hoffm.) Körb., *Lichen tenuissimus* Dicks. *nom. illegit.*

N - Frl, Ven (S-L35787), **TAA** (Nascimbene & al. 2007b), **Lomb, Emil, Piem** (Isocrono & al. 2006), **Lig, C - Tosc, Umb** (Ravera & al. 2006, 2006b), **Abr** (Caporale & Pagliani 2010, Caporale & al. 2016), **Sar** (Zedda 2002), **S - Camp, Pugl** (Nimis & Tretiach 1999), **Bas** (Potenza & al. 2014), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1996b, Ottonello & al. 2011).

Sq/ Cy.h/ S/ Terr-Epiph-Sax/ pH: 2-3, L: 3-4, X: 2-3, E: 1-3/ Alt: 1-4/ Salp: er, Mont: vr, SmedD: r, SmedH: r, MedH: vr/ PT: 1/ Note: on base-rich soil, but also on bark, in the basal parts of old trunks, rarely on base-rich rocks.

Scytinium teretiusculum (Wallr.) Otálora, P.M. Jørg. & Wedin

Fungal Divers., 64: 291, 2014 - *Parmelia teretiuscula* Wallr., *Fl. Crypt. Germ.*, 3: 551, 1831.

Syn.: *Garovaglina microscopica* (Nyl.) Trevis., *Homodium microscopicum* (Nyl.) Boistel, *Leptogium microscopicum* Nyl., *Leptogium teretiusculum* (Wallr.) Arnold

N - Lig (Giordani & al. 2002, Brunialti & Giordani 2003), **C - Tosc, Marc** (Nimis & Tretiach 1999, Frati & al. 2004, Frati & Brunialti 2006), **Umb** (Ravera 2000, Ravera & al. 2006, Panfili 2007), **Laz** (Nimis & Tretiach 2004, Brackel 2015), **Abr** (Nimis & Tretiach 1999, Caporale & al. 2016), **Mol** (Paoli & al. 2015), **Sar** (Zedda 2002 Zedda & al. 2010,

Rizzi & al. 2011, Cogoni & al. 2011). **S** - **Pugl** (Nimis & Tretiach 1999), **Bas** (Bartoli & Puntillo 1998), **Cal** (Puntillo 1996, Puntillo & Puntillo 2004), **Si** (Grillo 1998, Grillo & Caniglia 2004, Caniglia & Grillo 2006b, Liistro & Cataldo 2011).

Sq/ Cy.h/ A.i/ Epiph-Terr-Sax/ pH: 2-3, L: 3-4, X: 2-3, E: 1-3/ Alt: 1-3/ Mont: vr, SmedD: r, SmedH: rr, MedH: vr, MedD: er/ PT: 1-2/ Note: a mainly temperate, perhaps holarctic lichen found on basal parts of old trees, sometimes also directly on soil or on weathered rocks; certainly present in the Alps, and to be looked for there.

Scytinium turgidum (Ach.) Otálora, P.M. Jørg. & Wedin

Fungal Divers., 64: 291, 2014 - *Collema turgidum* Ach., Lichenogr. Univ.: 634, 1810.

Syn.: *Collemodium turgidum* (Ach.) Nyl., *Leptogium turgidum* (Ach.) Cromb.

N - **Ven**, **TAA** (B 60 0197069), **Lomb**, **Piem**, **Emil**. **C** - **Tosc**, **Abr**. **S** - **Camp**, **Pugl** (S-L35897).

Cr/ Cy.h/ S/ Sax/ pH: 5, L: 4-5, X: 4, E: 1-2/ Alt: 1-3/ Mont: vr, SmedD: vr, SmedH: vr, MedH: vr, MedD: vr/ PT: 1/ w/ Note: on calcareous rocks in surfaces with some water seepage after rain. The sample in B was identified by H. Sipman. According to Jørgensen (*in litt.*) this species could prove to be just a growth form of *S. schraderi*, one where the fruticose part is poorly developed.

Scytinium sp.

Syn.: *Leptogium microphylloides* auct. non Nyl.

C - **Marc** (Nimis & Tretiach 1999), **Laz** (Ravera 2008, Ravera & Genovesi 2008). **S** - **Camp** (Ravera & Brunialti 2013), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999).

Sq/ Cy.h/ S/ Epiph/ pH: 3-4, L: 4, X: 2-3, E: 2-3/ Alt: 1-2/ SmedH: vr, MedD: vr/ PT: 1-2/ #/ Note: here I place epiphytic broad-lobed specimens resembling *S. teretiusculum* with marginal and sometimes also laminal isidia, which were often called *Leptogium microphylloides* by European authors (see e.g. Christensen 2014).

Seiophora Poelt

Flora, 174, 5/6: 440, 1983.

This genus of the Teloschistaceae with c. 11 species differs from *Teloschistes s.str.* in a number of characters, such as the lack of cilia or rhizines, the presence of multiseriate, complex hairs consisting of strongly conglutinated hyphae, and spores with a shorter septum (see also Arup & al. 2013). The species occur in rather dry areas, but with frequent spells of high air humidity. Type: *S. magara* (Kremp.) Poelt (= *S. villosa*).

Seiophora contortuplicata (Ach.) Frödén

in Frödén & Lassen, Lichenologist, 36: 29, 2004 - *Parmelia contortuplicata* Ach., Syn. Meth. Lich.: 210, 1814.

Syn.: *Teloschistes contortuplicatus* (Ach.) Clauzade & Rondon, *Xanthoria contortuplicata* (Ach.) Boistel

N - **Frl**, **Ven** (Caniglia & al. 1999, Nascimbene & Caniglia 2000, Nascimbene 2004), **TAA** (Nascimbene 2004, Nascimbene & al. 2004, 2004b), **Lomb**, **Piem**, **VA** (TSB *s.n.*), **Emil** (TSB 33891), **Lig** (TSB 33362). **C** - **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera & al. 2003), **Abr** (Nimis & Tretiach 1999), **Sar** (B - *ex herb.* Grummann 5474).

Frut/ Ch/ A.s/ Sax/ pH: 4-5, L: 4-5, X: 4-5, E: 2-4/ Alt: 3-5/ Alp: er, Salp: vr, Orom: er, Mont: er/ PT: 1/ subc, u/ Note: in south-facing surfaces protected from rain (e.g. in underhangs) of calciferous rocks in the mountains. Not uncommon in the western Alps and locally frequent along the eastern slopes of the central Apennines.

Seiophora villosa (Ach.) Frödén

in Frödén & Lassen, Lichenologist, 36: 297, 2004 - *Parmelia villosa* Ach., Meth. Lich.: 254, 1803.

Syn.: *Physcia magara* Kremp., *Physcia villosa* var. *calvescens* De Not., *Physcia villosa* f. *brevior* Nyl., *Seiophora magara* (Kremp.) Poelt, *Teloschistes brevior* (Nyl.) Hillmann, *Teloschistes villosus* (Ach.) Norman

C - **Tosc** (Putorti & Loppi 1999, Benesperi & Ravera 2011, Munzi & al. 2011, Benesperi & al. 2013, Watson 2014, Giordani & al. 2015, Brackel 2015), **Laz** (Lich. Graec. 40: Obermayer 1995b, Benesperi & Ravera 2011), **Sar** (Salvà & al. 2009, 2010a, 2010b, Benesperi & Ravera 2011). **S** - **Camp** (Benesperi & Ravera 2011, Catalano & Aprile 2011, Catalano & al. 2012), **Si** (Benesperi & Ravera 2011).

Frut/ Ch/ S/ Epiph/ pH: 2-3, L: 4-5, X: 2-4, E: 2-3/ Alt: 1/ MedH: er/ PT: 0/ Note: on twigs of shrubs and small trees subject to spells of dry situations and frequent humid maritime winds; presently restricted to a few natural sites of Tyrrhenian Italy, on almost undisturbed sand dunes. It is included in the Italian red list of epiphytic lichens as “Endangered” (Nascimbene & al. 2013c).

Solenopsora A. Massal.

Framm. Lichenogr.: 20, 1855.

The European species of this genus were treated by Guttová & al. (2014), who recognised 8 species in Europe. Their results showed a discrepancy between the number of currently recognised taxa and that of identified genetic entities. The phylogenetic analysis revealed two major lineages, but the generic circumscription and phylogenetic position are still problematic and await additional study. The genus,

currently listed under the Catillariaceae, mainly occurs in temperate and subtropical regions, and the centre of diversity is in the Mediterranean, Macaronesian, and Madrean biogeographical regions. Type: *S. requienii* A. Massal. (= *S. holophaea*).

Solenopsora candicans (Dicks.) J. Steiner

Österr. bot. Z., 65: 288, 1915 - *Lichen candicans* Dicks., Fasc. Plant. Crypt. Brit., 3: 15, 1793.

Syn.: *Caloplaca candicans* (Dicks.) Flagey, *Diphrotora candicans* (Dicks.) Jatta, *Lecania candicans* (Dicks.) Stizenb., *Lecanora candicans* (Dicks.) Schaer., *Placodium candicans* (Dicks.) Duby, *Placodium epigaeum* (Ach.) Gray, *Placolecania candicans* (Dicks.) Zahlbr., *Ricasolia candicans* (Dicks.) A. Massal.

N - **VG**, **Frl** (Tretiach & Molaro 2007), **Ven** (Guttová & al. 2014), **TAA**, **Lomb** (Guttová & al. 2014), **Piem**, **Emil**, **Lig** (Guttová & al. 2014, Watson 2014, Giordani & al. 2016). **C** - **Tosc** (Pišút 1997, Benesperi 2006, Guttová & al. 2014), **Marc** (Nimis & Tretiach 1999), **Umb** (Genovesi & Ravera 2001, Genovesi & al. 2002, Ravera & al. 2006), **Laz** (Bartoli & al. 1998, Nimis & Tretiach 2004), **Abr** (Nimis & Tretiach 1999), **Mol** (Garofalo & al. 1999, Nimis & Tretiach 1999, Caporale & al. 2008, Guttová & al. 2014), **Sar**, **S** - **Camp** (Garofalo & al. 1999, 2010, Aprile & al. 2003, 2003b, Nimis & Tretiach 2004), **Pugl** (Garofalo & al. 1999, Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994, Grillo 1998, Merlo 2004, 2004b, Grillo & Caniglia 2004, Brackel 2008b).

Cr.pl/ Ch/ S/ Sax/ pH: 4-5, L: 3-5, X: 3-4, E: 2-3/ Alt: 1-3/ Mont: r, SmedD: rc, Pad: er, SmedH: rc, MedH: rc, MedD: rr/ PT: 1/ Note: a Mediterranean to mild-temperate species found on calcareous boulders, most often on horizontal faces; more heliophytic in northern than in southern Italy, where it often occurs in sheltered situations.

Solenopsora cesatii (A. Massal.) Zahlbr.

Österr. bot. Z., 68: 303, 1919 - *Ricasolia cesatii* A. Massal., Mem. Lichenogr.: 47, 1853.

Syn.: *Berengeria cesatii* (A. Massal.) Trevis., *Diphrotora cesatii* (A. Massal.) Jatta, *Lecania cesatii* (A. Massal.) Bagl., *Placolecania cesatii* (A. Massal.) Zahlbr., *Solenopsora carpathica* Pišút & Vězda

N - **VG**, **Ven** (Lazzarin 2000b, Guttová & al. 2014), **Lomb** (Lazzarin 2000b, Guttová & al. 2014), **Piem**, **Emil**, **Lig**, **C** - **Tosc** (Benesperi 2006), **Laz**, **Abr** (Caporale & al. 2016), **Sar**, **S** - **Camp** (Aprile & al. 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010), **Pugl** (Durini & Medagli 2002), **Bas** (Potenza & al. 2014), **Cal** (Puntillo 1996), **Si** (Ottonello & al. 1994, Grillo & al. 2007).

Cr.pl/ Ch/ S/ Sax/ pH: 4-5, L: 3-4, X: 3, E: 2/ Alt: 1-2/ SmedD: vr, SmedH: rr, MedH: r, MedD: vr/ PT: 1/ Note: a southern lichen with optimum in the Mediterranean and submediterranean belts, found in fissures of calcareous boulders in rather sheltered situations; this and the following species may be difficult to distinguish, intermediate forms being frequent.

Solenopsora grisea (Bagl.) Kotlov

Nov. Sist. Niz. Rast., 37: 251, 2004 - *Ricasolia cesatii* var. *grisea* Bagl., Comm. Soc. Critt. Ital., 1, 3: 121, 1862.

Syn.: *Solenopsora bagliettoana* Tav. ined.

N - **Ven** (Guttová & al. 2012), **Lomb** (Guttová & al. 2012), **Lig** (Guttová & al. 2014), **C** - **Tosc** (Guttová & al. 2014), **Marc** (Nimis & Tretiach 1999), **Laz** (Nimis & Tretiach 2004), **Sar**, **S** - **Camp** (Nimis & Tretiach 2004), **Pugl** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994).

Cr.pl/ Ch/ A.s/ Sax/ pH: 4-5, L: 3-4, X: 3, E: 2-3/ Alt: 1-2/ SmedD: vr, SmedH: rr, MedH: rc, MedD: er/ PT: 1/ suboc/ Note: on calcareous rocks in open to sheltered situations; for further details see Guttová & al. (2014).

Solenopsora holophaea (Mont.) Samp.

Broteria, ser. bot., 19: 26, 1921 - *Parmelia holophaea* Mont. in Webb & Berthelot, Hist. des Iles Canaries, 3, 2, 4, 51: 113, 1840.

Syn.: *Lecania holophaea* (Mont.) A.L. Sm., *Lecania requienii* (A. Massal.) Zahlbr., *Lecanora holophaea* (Mont.) Nyl., *Massalongia requienii* (A. Massal.) Jatta, *Pannaria holophaea* (Mont.) B. de Lesd., *Solenopsora requienii* A. Massal., *Thalloidima holophaeum* (Mont.) Arnold

N - **Lig** (Guttová & al. 2014, Watson 2014), **C** - **Tosc**, **Sar** (Lazzarin 2000b, Kantvilas 2004, Guttová & al. 2014), **S** - **Camp**, **Cal** (Puntillo 1996), **Si** (Nimis & al. 1996b, Ottonello & al. 2011).

Fol-Sq/ Ch/ S/ Sax/ pH: 3, L: 3, X: 2, E: 1-2/ Alt: 1/ MedH: r/ PT: 1/ suboc, coast/ Note: a Mediterranean-Atlantic lichen found in sheltered crevices of basic siliceous rocks and on soil, especially along the coast; exclusively Tyrrhenian in Italy. Certainly not related to other species of *Solenopsora*, but the synonym *S. requienii* is the type species of the genus!

Solenopsora liparina (Nyl.) Zahlbr.

Öst. bot. Z., 68: 304, 1919 - *Lecanora liparina* Nyl., Flora, 59: 305, 1876.

Syn.: *Solenopsora cesatii* f. *liparina* (Nyl.) Clauzade & Cl. Roux, *Ricasolia cesatii* var. *olivacea* Bagl., *Ricasolia liparina* (Nyl.) Flagey

N - **Lig** (Guttová & al. 2014), **C** - **Tosc** (TSB 35296).

Cr.pl/ Ch/ S/ Sax/ pH: 3, L: 3, X: 3-4, E: 1-2/ Alt: 1/ MedH: r/ PT: 1/ Note: on inclined surfaces of ultrabasic siliceous rocks (e.g. serpentine and basalt), often in fissures, in shaded situations also on vertical faces, mostly in the Mediterranean belt.

Solenopsora marina (Zahlbr.) Zahlbr.

Cat. Lich. Univ., 5: 756, 1828 - *Placolecania marina* Zahlbr., Österr. Bot. Z., 57: 396, 1907.

S - Bas (Potenza & al. 2014).

Sq/ Ch/ S/ Sax/ pH: 4-5, L: 2-3, X: 2, E: 1-2/ Alt: 1/ MedH: vr/ PT: 1/ suboc, coast/ Note: on calcareous substrata, mostly in rock fissures and in humid and shaded situations; also known from the Dalmatian coasts and from the Ukraine.

Solenopsora olivacea subsp. ***olbiensis*** (Nyl.) Clauzade & Cl. Roux

in Roux, Bull. Soc. Bot. Centre-Ouest, n. sér. 13: 226, 1982 - *Lecanora olbiensis* Nyl., Flora, 59: 306, 1876.

Syn.: *Catillaria olivacea* var. *soredifera* Zahlbr., *Toninia olivacea* var. *olbiensis* (Nyl.) Clauzade

N - Lig (Guttová & al. 2014). **C - Tosc** (Guttová & al. 2014). **S - Camp** (Nimis & Tretiach 2004), **Pugl** (Durini & Medagli 2002), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994, 1996b).

Cr.pl/ Ch/ A.s/ Sax/ pH: 3-4, L: 2, X: 2, E: 1-2/ Alt: 1-2/ PT: 1/ SmedH: rr, MedH: r, MedD: er/ suboc/ Note: on basic siliceous rocks, often associated with the typical subspecies, but rarer, and bound to more humid and shaded situations. A varietal rank is perhaps more appropriate.

Solenopsora olivacea (Fr.) H. Kiliass subsp. ***olivacea***

Herzogia, 5: 399, 1981 - *Biatora olivacea* Dufour ex Fr., Syst. Orb. Veget., 1: 285, 1825.

Syn.: *Biatorina michelettiana* A. Massal., *Biatorina olivacea* (Fr.) Anzi, *Catillaria olivacea* (Fr.) Zahlbr., *Lecanora olivacea* (Fr.) Nyl., *Placodiella olivacea* (Fr.) Szatala, *Ricasolia olivacea* (Fr.) Bagl., *Toninia olivacea* (Fr.) Clauzade

N - Lig (Alonso & Egea 1994 Guttová & al. 2014). **C - Tosc, Laz, Mol** (Garofalo & al. 1999, Caporale & al. 2008), **Sar** (Alonso & Egea 1994). **S - Camp** (Garofalo & al. 1999, 2010, Aprile & al. 2003, 2003b, Nimis & Tretiach 2004), **Pugl** (Nimis & Tretiach 1999), **Bas** (Bartoli & Puntillo 1998), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994, Poli & al. 1997, Grillo 1998, Grillo & Caniglia 2004, Caniglia & Grillo 2005, 2006).

Cr.pl/ Ch/ S/ Sax/ pH: 3-4, L: 3, X: 2-3, E: 2-3/ Alt: 1-2/ SmedD: er, SmedH: rc, MedH: vr, MedD: er/ PT: 1-2/ suboc/ Note: a Mediterranean-Atlantic species found on large boulders of basic siliceous rocks, usually on surfaces near the ground or on seepage tracks, especially in open woodlands of Tyrrhenian Italy.

Solenopsora vulturienensis A. Massal.

Lotos, 6: 75, 1856.

Syn.: *Lecania holophaea* var. *glaucozpora* (Nyl.) A.L. Sm., *Lecania leucospirea* (Nyl.) A.L. Sm., *Lecanora holophaea* var. *glaucozpora* Nyl., *Lecanora leucospirea* Nyl., *Lecanora subdisparata* Nyl., *Solenopsora leucospirea* (Nyl.) Zahlbr., *Solenopsora subdisparata* (Nyl.) Samp., *Thalloidima leucospireum* (Nyl.) Arnold

N - Lig (Lazzarin 2000b). **C - Tosc, Laz, Sar** (Rizzi & al. 2011). **S - Camp** (Nimis & Tretiach 2004), **Si** (Nimis & al. 1996b).

Cr.pl/ Ch/ A.s/ Sax/ pH: 3, L: 3-4, X: 2-3, E: 2-3/ Alt: 1-2/ MedH: rr/ PT: 1-2/ suboc/ Note: a Mediterranean-Atlantic lichen found on basic siliceous substrata, including brick walls, in open to most often sheltered situations; exclusively Tyrrhenian in Italy.

Solitaria Arup, Söchting & Frödén

Nord. J. Bot., 31: 55, 2013.

This monotypic genus was created to accommodate a single species of the Teloschistaceae formerly treated as a member of *Caloplaca*, which holds a solitary position in the phylogenetic tree (Arup & al. 2013). Type: *S. chrysophthalma* (Degel.) Arup, Söchting & Frödén

Solitaria chrysophthalma (Degel.) Arup, Söchting & Frödén

Nord. J. Bot., 31: 55, 2013 - *Caloplaca chrysophthalma* Degel., K. Sv.-Akad. Skr. Natursk., 46: 56, 1944.

C - Umb (Ravera & al. 2006, 2006b), **Laz, Sar, S - Camp** (Brunialti & al. 2013, Ravera & Brunialti 2013), **Pugl** (Nimis & Tretiach 1999), **Si** (TSB 21489).

Cr/ Ch/ A.s/ Epiph/ pH: 2-3, L: 4-5, X: 3, E: 2-3/ Alt: 1-2/ SmedH: er, MedH: er/ PT: 1/ suboc/ Note: a rare mild-temperate lichen found on base-rich bark of isolated trees (e.g. of *Populus*, *Juglans* and *Fraxinus*). Earlier records from northern Italy (Nimis 1993: 160) are due to misidentifications. It is included in the Italian red list of epiphytic lichens as "Vulnerable" (Nascimbene & al. 2013c).

Solorina Ach.

K. Vetensk-Akad. Nya Handl., 29: 228, 1808.

This genus of the Peltigeraceae includes c. 10 terricolous species and has a bipolar, arctic-alpine distribution. According to Miadlikowska & Lutzoni (2004) the genus is not monophyletic. Type: *S. crocea* (L.) Ach.

Solorina bispora Nyl. subsp. ***bispora***

Syn. Lich.: 331, 1860.

N - **Frl** (Tretiach & Molaro 2007), **Ven** (Nimis 1994, Nascimbene & Caniglia 1997, 2003c, Caniglia & al. 1999, Nascimbene 2008c), **TAA** (Nascimbene 2008b, Lang 2009, Bilovitz & al. 2014b), **Lomb, Piem** (Morisi & Sereno 1995, Isocrono & al. 2004, Hafellner & al. 2004), **VA** (Piervittori & Isocrono 1999). **C** - **Marc** (Nimis & Tretiach 1999), **Abr** (Nimis & Tretiach 1999, Brackel 2015), **Mol** (Nimis & Tretiach 2004, Caporale & al. 2008). **S** - **Camp** (Aprile & al. 2003b).

Fol.b/ Ch/ S/ Terr/ pH: 3-4, L: 3-4, X: 2, E: 1/ Alt: 3-5/ Alp: vc, Salp: rc, Orom: er, Mont: er/ PT: 1/
Note: an arctic-alpine, circumpolar lichen found on humid soil rich in humus with a long snow-lie, with optimum above treeline; common only in the Alps, but extending along the Apennines to the mountains of southern Italy. Some records could refer to *S. bispora* subsp. *macrospora*.

Solorina bispora subsp. **macrospora** (Harm.) Burgaz & I. Martínez

Ann. Bot. Fenn., 35: 140, 1998 - *Solorina macrospora* Harm., Lich. de France, 4: 661, 1910 (1909).

Syn.: *Solorina bispora* var. *macrospora* (Harm.) H. Olivier

N - **Frl, TAA** (Nascimbene & al. 2006), **Piem** (Matteucci & al. 2015b).

Fol.b/ Ch/ S/ Terr/ pH: 3-5, L: 3-4, X: 2, E: 1/ Alt: 4-5/ Alp: r, Salp: vr/ PT: 1/ Note: distinguished by the larger spores, this subspecies is probably more widespread in the Alps than the few records would suggest. See also note on subsp. *bispore*.

Solorina crocea (L.) Ach.

K. Vetensk. Akad. Nya Handl., 29: 228, 1808 - *Lichen croceus* L., Sp. Pl., 2: 1149, 1753.

Syn.: *Peltidea crocea* (L.) Ach., *Peltigera crocea* (L.) Hoffm., *Solorina crocea* var. *complicata* Anzi

N - **Frl** (Tretiach & Hafellner 2000), **Ven, TAA** (Lang 2009, Bilovitz & al. 2014), **Lomb** (Rivellini 1994, Dalle Vedove & al. 2004), **Piem** (Isocrono & Falletti 1999, Isocrono & al. 2003, 2004, Isocrono & Piervittori 2008), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Valcuvia 2000, Piervittori & al. 2004), **Emil** (Tomaselli 1991, Dalle Vedove & al. 2002), **Lig**.

Fol.b/ Ch/ S/ Terr/ pH: 1-2, L: 3-4, X: 2, E: 1-2/ Alt: 4-6/ Alp: c, Salp: rr/ PT: 1/ Note: an arctic-alpine, circumpolar lichen found on acid mineral soil with a long snow-lie, mostly above treeline, reaching the nival belt in the Alps; restricted to the Alps and the northern Apennines in Italy.

Solorina octospora (Arnold) Arnold

Verh. zool.-bot. Ges. Wien, 26: 371, 1876 - *Solorina saccata* var. *octospora* Arnold, Verh. zool.-bot. Ges. Wien, 23: 103, 1873.

N - **Ven** (Nascimbene & Caniglia 2000, 2003c, Tomaselli & al. 2006), **TAA** (Nascimbene & al. 2006, Watson 2014), **Lomb, Piem** (Isocrono & al. 2004).

Fol.b/ Ch/ S/ Terr/ pH: 3-4, L: 3-4, X: 2, E: 1/ Alt: 4-6/ Alp: rr, Salp: vr/ PT: 1/ Note: an arctic-alpine to boreal-montane, probably circumpolar lichen found on soil rich in humus and on terricolous mosses, often in rock fissures, usually on calciferous substrata, with optimum above treeline, reaching the nival belt in the Alps; most probably restricted to the Alps in Italy.

Solorina saccata (L.) Ach.

K. Vetensk. Akad. Nya Handl., 29: 228, 1808 - *Lichen saccatus* L., Fl. Suec., 2: 419, 1755.

N - **Frl** (Tretiach 1996, Tretiach & Molaro 2007), **Ven** (Nimis 1994, Nascimbene & Caniglia 1997, 2003c, Caniglia & al. 1999, Nascimbene 2005c, 2008c, Nascimbene & Marini 2007, Brackel 2013, Giovagnoli & Tasinazzo 2014), **TAA** (Nascimbene 2001b, 2003, 2008b, Nascimbene & al. 2005, 2006, Brackel 2013, Obermayer 2013), **Lomb, Piem** (Isocrono & al. 2004, Morisi 2005), **VA** (Piervittori & Isocrono 1999), **Emil, Lig, C** - **Tosc** (Benesperi 2006), **Umb** (Panfili 2000, 2007, Ravera & al. 2006), **Marc, Laz** (Ravera 2002b, Nimis & Tretiach 2004), **Abr** (Caporale 2014). **S** - **Camp** (Ricciardi & al. 2000, Aprile & al. 2002, 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010), **Bas** (Puntillo & al. 2012), **Cal** (Puntillo 1996).

Fol.b/ Ch/ S/ Terr/ pH: 3-4, L: 3-4, X: 2, E: 1/ Alt: 2-5/ Alp: ec, Salp: c, Orom: vr, Mont: vr, SmedD: er, SmedH: er/ PT: 1-2/ Note: a cool-temperate to arctic-alpine, circumpolar lichen found on calciferous soil rich in humus and terricolous mosses, often in cracks of the rock; most common in the Alps, rarer in the Apennines, exceptionally descending to the submediterranean belt in the most humid parts of Tyrrhenian Italy. The record from Venezia Giulia reported by Nimis (1993: 657), being from Slovenian territory, is excluded here.

Solorina spongiosa (Ach.) Anzi

Lich. Lang., 2: 46, 1861 - *Collema spongiosum* Ach., Lichenogr. Univ.: 661, 1810.

Syn.: *Solorina saccata* var. *spongiosa* (Ach.) Nyl.

N - **Frl** (Tretiach & Molaro 2007), **Ven** (Caniglia & al. 1999, Nascimbene & Caniglia 2003c, Nascimbene & Marini 2007, Brackel 2013), **TAA** (Nascimbene 2003, 2008b, Nascimbene & al. 2005, 2006, Brackel 2013), **Lomb, Piem, VA** (Piervittori & Isocrono 1999).

Fol.b/ Ch/ S/ Terr/ pH: 4-5, L: 3-4, X: 2, E: 1/ Alt: 4-6/ Alp: c, Salp: vr/ PT: 1/ Note: an arctic-alpine, circumpolar lichen found on moist calciferous soil near and above treeline, reaching the nival belt in the Alps; widespread and locally common in the Alps, especially in the Alpine belt, the species should be looked for also on the highest peaks of the central Apennines.

Sparria Ertz & Tehler
Fungal Divers., 49: 58, 2011.

Recent molecular revisions of the Arthoniales (e.g. Ertz & al. 2009, Ertz & Tehler 2011, Frisch & al. 2014) revealed that the genus *Arthonia* is very heterogeneous. As a consequence, the genus is being split into more natural groups based on morphological, chemical and molecular data. The genus *Sparria* includes 2 species formerly treated as members of *Arthonia*, and belongs to the Opegraphaceae. Type: *S. cerebriformis* (Egea & Torrente) Ertz & Tehler

Sparria endlicheri (Garov.) Ertz & Tehler

Fungal Divers., 49: 59, 2011 - *Opegrapha endlicheri* Garov., Lich. Prov. Com., 1: 4, 1837.

Syn.: *Arthonia decussata* Flot., *Arthonia endlicheri* (Garov.) Oxner, *Arthonia lobata* (Flörke) A. Massal., *Pachnolepia decussata* (Flot.) Körb., *Pachnolepia endlicheri* (Garov.) A. Massal.

N - Ven, TAA, Lomb, Piem (Isocrono & al. 2004), **Lig. C - Tosc. S - Camp** (Ricciardi & al. 2000), **Si** (Otonello & Salone 1994).

Cr/ Tr/ S/ Sax/ pH: 2-3, L: 2-3, X: 1-2, E: 1/ Alt: 1-3/ Mont: er, SmedD: er, SmedH: er, MedH: vr/ PT: 1/ suboc, u/ Note: on vertical to underhanging faces seldom wetted by rain of compact, basic siliceous rocks, much more rarely on weakly calcareous rocks or, exceptionally, on rain-protected bases of ancient trees. The species is known from southern Europe and Turkey.

Sphaerophorus Pers.

Ann. Bot. (Usteri), 7: 23, 1794, *nom. cons.*

A bipolar genus of c. 8 species growing as epiphytes, on rocks or on the ground in arctic/antarctic-alpine and temperate to cool-temperate areas. The genus is currently included into the Sphaerophoraceae within the Lecanorales (see Wedin 1993). Type: *S. coralloides* Pers. (= *S. globosus*).

Sphaerophorus fragilis (L.) Pers.

Ann. Bot. (Usteri), 7: 23, 1794 - *Lichen fragilis* L., Sp. Pl.: 1154, 1753.

Syn.: *Lichen caespitosus* Roth *nom. illegit.*, *Sphaerophorus caespitosus* DC., *Sphaerophorus coralloides* var. *caespitosus* (DC.) Turner & Borrer

N - Fr1 (Tretiach & Hafellner 2000, Puntillo & Puntillo 2009), **TAA** (Puntillo & Puntillo 2009), **Lomb** (Dalle Vedove & al. 2004, Puntillo & Puntillo 2009), **Piem** (Isocrono & al. 2004, Puntillo & Puntillo 2009), **VA** (Piervittori & Isocrono 1999, Puntillo & Puntillo 2009), **Emil** (Puntillo & Puntillo 2009).

Frut/ Ch/ S/ Sax-Terr/ pH: 1-2, L: 4, X: 2-3, E: 1/ Alt: 4-5/ Alp: er, Salp: er/ PT: 1/ Note: an arctic-alpine to boreal-montane, circumpolar lichen of siliceous rocks and mineral soil in very rainy areas, near or above treeline; probably restricted to the Alps and the northern Apennines in Italy.

Sphaerophorus globosus (Huds.) Vain.

Res. Voy. S. Y. Belgica, Bot.: 35, 1903 - *Lichen globosus* Huds., Fl. Angl.: 460, 1762.

Syn.: *Sphaerophorus coralloides* Pers., *Sphaerophorus globiferus* (L.) DC.

N - Ven (Puntillo & Puntillo 2009), **TAA** (Nascimbene & al. 2006e, 2007b, Puntillo & Puntillo 2009), **Lomb** (Puntillo & Puntillo 2009), **Piem** (Isocrono & al. 2004, Puntillo & Puntillo 2009), **VA** (Puntillo & Puntillo 2009), **Emil** (Brunialti & al. 2001, Puntillo & Puntillo 2009), **C - Tosc** (Puntillo & Puntillo 2009), **Sar** (Puntillo & Puntillo 2009), **S - Bas** (Puntillo & al. 2012), **Cal** (Puntillo 1994, 1996, Puntillo & Puntillo 2009).

Frut/ Ch/ S/ Sax-Epiph/ pH: 1-2, L: 3-4, X: 1-2, E: 1/ Alt: 3-4/ Salp: er, Mont: er/ PT: 0/ suboc/ Note: restricted to cold-humid areas, mostly on rocks, very rarely (in Italy) at the base of old boles in natural forests, probably extinct in several regions. Earlier records from Sicily, not validated by Puntillo & Puntillo (2009), are excluded. For further information see Högnabba & Wedin (2003). The species is included in the Italian red list of epiphytic lichens as "Vulnerable" (Nascimbene & al. 2013c).

Spilonema Bornet

Mém. Soc. Imp. Sc. Nat. Cherbourg, 4: 226, 1856.

This small genus of 4 species, the only one of Peltigerales which includes species lichenised with the cyanobacterial genus *Stigonema*, was long been placed in Coccocarpiaceae based on ascomatal development, a fact that has been confirmed by molecular data (Spribile & al. 2014). *Spilonema revertens* Nyl. is known from several neighbouring countries and should be looked for in Italy. Type: *S. paradoxum* Bornet

Spilonema paradoxum Bornet

Mém. Soc. Imp. Sc. Nat. Cherbourg, 4: 225, 1856.

Syn.: *Spilonema pannosum* Hy, *Spilonema tenellum* Vain.

N - TAA, Lig. C - Tosc, Sar (TSB 13292).

Cr/ Cy.h/ S/ Sax/ pH: 2-3, L: 4-5, X: 4, E: 2-3/ Alt: 1-3/ Mont: er, SmedD: vr, SmedH: vr, MedH: er/ PT: 1/ subc, w/ Note: a widespread lichen found on sun-exposed, inclined to vertical seepage tracks of basic siliceous rocks below the subalpine belt; perhaps overlooked, but certainly not common in Italy.

Sporastatia A. Massal.

Geneac. Lich.: 9, 1854.

The taxonomic position of this genus of *c.* 10 species occurring in montane and arctic regions of both Hemispheres has been clarified by Miadlikowska & al. (2014): the genus, previously placed in the Catillariaceae, is related to *Rhizocarpon* but placed in its own family, the Sporastatiaceae. Type: *S. testudinea* (Ach.) A. Massal.

Sporastatia polyspora (Nyl.) Grummann

Cat. Lich. Germ.: 23, 1963 - *Gyrothecium polysporum* Nyl., Essai Nouv. Classif. Lich.: 186, 1854.

Syn.: *Biatorrella cinerea* (Schaer.) Th. Fr., *Lecidea morio* var. *cinerea* Schaer., *Lecidea nigrocinerea* Nyl., *Sporastatia cinerea* (Schaer.) Körb., *Sporastatia morio* var. *cinerea* (Schaer.) Körb.

N - **Frl** (Tretiach & Hafellner 2000, Hafellner & al. 2014), **Ven. TAA** (Caniglia & al. 2002, Lang 2009, Hafellner & al. 2014), **Lomb** (Hafellner & al. 2014), **Piem** (Isocrono & al. 2003, 2004, Hafellner & al. 2014), **VA** (Piervittori & al. 1998, Piervittori & Isocrono 1999), **Emil** (Tretiach & al. 2008).

Cr/ Ch/ S/ Sax/ pH: 1-3, L: 3-4, X: 3, E: 1/ Alt: 4-6/ Alp: vc, Salp: c/ PT: 1 /u/ Note: an arctic-alpine, circumpolar lichen found on steeply inclined to underhanging, surfaces of hard siliceous rocks, with optimum above treeline, reaching the nival belt in the Alps; probably restricted to the Alps and the northern Apennines in Italy.

Sporastatia testudinea (Ach.) A. Massal.

Geneac. Lich.: 9, 1854 - *Lecidea cechumena* var. *testudinea* Ach., K. Vetensk.-Akad. Nya Handl., 29: 232, 1808.

Syn.: *Acarospora testudinea* (Ach.) A. Massal., *Biatorrella morio* auct. non (Duby) Flagey, *Biatorrella testudinea* (Ach.) A. Massal., *Biatorrella testudinea* var. *coracina* (Schaer.) Th. Fr., *Lecidea coracina* Sommerf. nom. illegit., *Lecidea morio* auct. non (Duby) Fr., *Lecidea morio* var. *coracina* Schaer., *Sporastatia morio* auct. non (Duby) Körb., *Sporastatia morio* var. *testudinea* (Ach.) Körb., *Sporastatia testudinea* var. *coracina* (Schaer.) Stein, *Sporastatia testudinea* var. *pallens* (Fr.) Stein

N - **Frl** (Tretiach & Hafellner 2000), **Ven. TAA** (Lang 2009), **Lomb** (Dalle Vedove & al. 2004), **Piem** (Morisi & Sereno 1995, Allisiardi 2001, Isocrono & al. 2003, 2004, Isocrono & Piervittori 2008, Favero-Longo & al. 2013, Watson 2014), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Piervittori & al. 1998, 2001, 2004, Favero-Longo & al. 2005b, Isocrono & al. 2008, Favero-Longo & Piervittori 2009, Matteucci & al. 2015c), **Emil, Lig** (TSB 33699b). **C - Sar** (Nöske 2000).

Cr/ Ch/ S/ Sax/ pH: 1-3, L: 4-5, X: 4, E: 1/ Alt: 3-6/ Alp: ec, Salp: vc, Orom: er, Mont: er/ PT: 1/ Note: an arctic-alpine to boreal-montane, circumpolar lichen found on hard siliceous rocks, including pure quartz in wind-exposed sites near or above treeline, reaching the nival belt in the Alps; most frequent in the Alps, but also known from the high Mediterranean mountains.

Sporodictyon A. Massal.

Flora, 35: 326, 1852.

The taxonomy of the Verrucariaceae is presently being revised on the basis of molecular data. Savić & al. (2008) have shown that morphological features traditionally used for characterising genera such as *Polyblastia*, e.g. spore septation and colour, involucrellum structure, and substrate preference, are only partially consistent with supported clades, and thus are not always reliable for characterising natural groups. *Polyblastia*, in the traditional delimitation, is non-monophyletic. The analysis by Savić & al. (2008) revealed strongly supported groups within the genus, such as *Sporodictyon*, a small genus of *c.* 5 species, which also is reasonably easy to characterise and recognise morphologically, as the perithecia are more or less covered by the thallus and not immersed. *Sporodictyon*-species grow on rocks, particularly by streams and on lakeshores, and among mosses. Type: *S. schaererianum* A. Massal.

Sporodictyon cruentum (Körb.) Körb.

Parerga Lichenol.: 332, 1863 - *Segestrella cruenta* Körb., Denkschr. Schles. Ges. vaterl. Cultur: 237, 1853.

Syn.: *Polyblastia cruenta* (Körb.) P. James & Swinscow, *Polyblastia henscheliana* (Körb.) Lönnr., *Polyblastia robusta* Arnold, *Sphaeromphale henscheliana* Körb., *Sporodictyon henschelianum* (Körb.) Körb., *Verrucaria subumbrina* Nyl.

N - **TAA** (Thor & Nascimbene 2007), **Lomb** (Nascimbene 2006).

Cr/ Cy.h/ S/ Sax/ pH: 1-2, L: 3-4, X: 1-2, E: 1/ Alt: 4-5/ Alp: vr, Salp: r/ PT: 1/ 1/ Note: a silicicolous species, periodically submerged in montane to Alpine creeks; poorly collected and perhaps more widespread in the Alps. For further details see Savić & Tibell (2009).

Sporodictyon schaererianum A. Massal.

Flora, 35: 326, 1852.

Syn.: *Lecanora atra* var. *verrucoso-areolata* Schaer., *Polyblastia schaereriana* (A. Massal.) Müll. Arg., *Polyblastia subpyrenophora* (Leight.) Zschacke, *Polyblastia theleodes* auct. non (Sommerf.) Th. Fr., *Verrucaria subpyrenophora* Leight., *Verrucaria theleodes* Sommerf. var. *contigua* Sommerf.

N - TAA (Hafellner 2010), **Lomb**, **Piem** (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999). **C** - TOSC (Hafellner 2010).

Cr/ Cy.h/ S/ Sax/ pH: 3-4, L: 2-3, X: 2, E: 1/ Alt: 3-5/ Alp: rr, Salp: r, Mont: er/ PT: 1/ Note: a mainly circum-arctic to boreal-montane lichen found on hard calciferous rocks, often on dolomite, but also on calcareous sandstone and schist in cold-humid situations, with optimum above treeline. For further details see Savić & Tibell (2009).

Sporodictyon terrestre (Th. Fr.) Savić & Tibell

in Savić, Acta Universitatis Upsaliensis, 370: 18, 2007 - *Polyblastia terrestris* Th. Fr., N. Acta Reg. Soc. Sci. Upsal., ser. 3, 3: 365, 1861.

Syn.: *Polyblastia fertilis* (Nyl.) Boistel, *Polyblastia inumbrata* (Nyl.) Arnold, *Polyblastia sommerfeltii* Lynge, *Polyblastia subocellata* Th. Fr., *Polyblastia subviridicans* (Nyl.) A.L. Sm., *Polyblastia tarvesedis* (Anzi) Bagl. & Carestia, *Polyblastia turicensis* (G. Winter) Zschacke, *Sporodictyon turicense* G. Winter, *Thelotrema tarvesedis* Anzi, *Verrucaria fertilis* Nyl., *Verrucaria inumbrata* Nyl., *Verrucaria subviridicans* Nyl.

N - TAA (Bilovitz & al. 2014b), **Lomb** (Hafellner 2010), **Piem** (Isocrono & al. 2004), **VA** (Valcuvia 2000), **Emil** (Tretiach & al. 2008).

Cr/ Cy.h/ S/ Sax-Terr/ pH: 3-4, L: 4, X: 3, E: 1/ Alt: 4-5/ Alp: vr, Salp: vr/ PT: 1/ #/ Note: an arctic-alpine, polymorphic species found on calciferous to neutral or slightly acidic siliceous rocks by streams, often in the splash zone, more rarely on base-rich soil (but spreading from small pebbles), sometimes also on bare ground and amongst bryophytes, usually near or above treeline. For further details see Savić & Tibell (2009) and Roux & coll. (2014: 905, 1105).

Sporodophoron Frisch, Y. Ohmura, Ertz & G. Thor

Lichenologist, 47: 246, 2015.

Recent molecular revisions of the Arthoniales (e.g. Ertz & al. 2009, Ertz & Tehler 2011, Frisch & al. 2014) revealed that several genera, including *Schismatomma*, are very heterogeneous. The genus *Sporodophoron* was created by Frisch & al. (2015) to accommodate 4 species in the Arthoniaceae, with the same characteristics of *Inoderma*, but forming sporodochia instead of pycnidia. Type: *S. gossypinum* Frisch, Y. Ohmura & G. Thor

Sporodophoron cretaceum (Hue) Ertz & Frisch

in Frisch & al., Lichenologist, 47: 248, 2015 - *Crocynia cretacea* Hue, Bull. Soc. Bot. France, 73: 347, 1924.

Syn.: *Schismatomma cretaceum* (Hue) J.R. Laundon, *Schismatomma virgineum* D. Hawksw. & P. James

C - Sar (Zedda 2002, Cossu 2013).

Cr/ Tr/ A.s/ Epiph/ pH: 1-2, L: 3, X: 1-2, E: 1-2/ Alt: 1-2/ SmedH: er, MedH: er/ PT: 1/ suboc/ Note: a species with a mainly western European distribution, never found fertile (usually with sporodochia), which grows on the dry sides of old isolated trees below the montane belt. It is included as “Critically Endangered” in the Italian red list of epiphytic lichens (Nascimbene & al. 2013c).

Squamarina Poelt

Mitt. bot. Staatss. München, 19-20: 524, 1958.

A genus of c. 25 species, mostly occurring in arid to semi-arid regions of the Northern Hemisphere. According to Miadlikowska & al. (2006) the genus appears to be related to the Stereocaulaceae, which, however, is incongruent with morpho-anatomical and ecological characters (e.g. all *Squamarina*-species grow on calcareous substrates), so that some authors prefer to place it in its own family, the Squamarinaceae. Type: *S. gypsacea* (Sm.) Poelt

Squamarina cartilaginea (With.) P. James var. *cartilaginea*

in Hawksworth & al., Lichenologist, 12: 107, 1980 - *Lichen cartilagineus* With., Bot. Arrang. Brit. Plants, 2: 708, 1776.

Syn.: *Lecanora benacensis* (A. Massal.) Jatta, *Lecanora cartilaginea* (With.) A.L. Sm., *Lecanora crassa* (Huds.) Ach., *Lecanora crassa* var. *caespitosa* (Vill.) Rabenh., *Parmelia dufourei* Fr., *Placodium crassum* (Huds.) Link, *Psoroma benacense* A. Massal., *Psoroma crassum* (Huds.) Gray, *Squamaria crassa* (Huds.) DC., *Squamarina crassa* (Huds.) Poelt, *Squamarina cartilaginea* f. *iberica* (Mattick) Clauzade & Cl. Roux

N - VG (Martellos & al. 2014), **Frl** (Tretiach 1996, Tretiach & Molaro 2007, Martellos & al. 2014), **Ven** (Nascimbene & Caniglia 1997, 2003c, Caniglia & al. 1999, Lazzarin 2000b, Nascimbene 2005c, 2008c, Thor & Nascimbene 2007, Nascimbene & Marini 2007, Martellos & al. 2014), **TAA** (Nascimbene 2001b, 2008b, Nascimbene & al. 2006), **Lomb** (Dalle Vedove & al. 2004), **Piem** (Clerc & al. 1999, Isocrono & al. 2003, Martellos & al. 2014), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999), **Emil** (Scarpa 1993, Nimis & al. 1996, Martellos & al. 2014), **Lig** (Valcuvia & al. 2000, Martellos & al. 2014, Giordani & al. 2016). **C** - TOSC (Benespero 2000a, 2006, Loppi & al. 2004b, Benespero & Lastrucci 2007, Tretiach & al. 2008, Lastrucci & al. 2009, Pasquinelli & Puccini 2010, Pasquinelli & al. 2013, Martellos & al. 2014), **Marc** (Nimis & Tretiach 1999, Martellos & al. 2014), **Umb** (Nimis & Tretiach 1999, Panfili 2000b, 2007, Ravera & al. 2006, Brackel 2015), **Laz** (Nimis & Tretiach 2004, Martellos & al. 2014, Brackel 2015), **Abr** (Nimis & Tretiach 1999, Martellos & al. 2014, Caporale & al. 2016), **Mol** (Garofalo & al. 1999, Nimis & Tretiach 1999, Caporale

& al. 2008, Martellos & al. 2014, Genovesi & Ravera 2014), **Sar** (Nöske 2000, Rizzi & al. 2011, Martellos & al. 2014). **S - Camp** (Garofalo & al. 1999, 2010, Aprile & al. 2002, 2003, 2003b, Nimis & Tretiach 2004, Martellos & al. 2014), **Pugl** (Garofalo & al. 1999, Nimis & Tretiach 1999, Durini & Medagli 2002, Brackel 2011, Martellos & al. 2014), **Bas** (Nimis & Tretiach 1999, Potenza 2006, Potenza & al. 2010), **Cal** (Puntillo 1996, Lich. Graec. 297: Obermayer 2006, Martellos & al. 2014), **Si** (Nimis & al. 1994, 1995, Ottonello & al. 1994, 2011, Ottonello 1996, Ottonello & Romano 1997, Grillo 1998, Grillo & al. 2002, 2009, Grillo & Caniglia 2004, Merlo 2004b, Caniglia & Grillo 2005, 2006, Brackel 2008b, Gianguzzi & al. 2009, Cataldo & Minissale 2013, Martellos & al. 2014).

Sq/ Ch/ S/ Sax-Terr/ pH: 4-5, L: 3-5, X: 3-4, E: 1-3/ Alt: 1-4/ Salp: er, Orom: vr, Mont: rc, SmedD: ec, Pad: vr, SmedH: ec, MedH: c, MedD: c/ PT: 1/ Note: a mainly southern, chemically variable species found on calcareous rocks and soil, mostly in dry grasslands; the most common species of the genus in Italy. According to Martellos & al. (2014) the two chemical varieties (var. *crassa* and var. *pseudocrassa*) have a different distribution in Italy, the former being more common in northern Italy and in upland areas, the latter in Mediterranean Italy; older records could refer to var. *pseudocrassa*.

***Squamarina cartilaginea* var. *pseudocrassa* (Mattick) D. Hawksw.**

in Hawksworth & al., Lichenologist, 12: 107, 1980 - *Lecanora lentigera* var. *pseudocrassa* Mattick, Ber. deutsch. bot. Ges., 58: 352, 1940.

Syn.: *Squamarina crassa* f. *pseudocrassa* (Mattick) Poelt

N - VG (Martellos & al. 2014), **Frl** (Martellos & al. 2014), **Ven** (Martellos & al. 2014), **TAA** (Martellos & al. 2014), **Lomb** (Martellos & al. 2014), **Emil** (Martellos & al. 2014), **Lig** (Martellos & al. 2014). **C - Tosc** (Martellos & al. 2014), **Abr** (Martellos & al. 2014), **Sar** (Martellos & al. 2014). **S - Camp** (Martellos & al. 2014), **Cal** (Martellos & al. 2014), **Si** (Martellos & al. 2014)

Sq/ Ch/ S/ Sax-Terr/ pH: 4-5, L: 3-5, X: 3-4, E: 1-3/ Alt: 1-4/ Salp: er, Orom: vr, Mont: rr, SmedD: rc, Pad: er, SmedH: ec, MedH: vc, MedD: vc/ PT: 1/ Note: see note on var. *cartilaginea*.

***Squamarina concrescens* (Müll. Arg.) Poelt**

Mitt. bot. Staatss. München, 2: 532, 1958 - *Placodium concrescens* Müll. Arg., Bull. Herb. Boissier, 1: 130, 1893.

Syn.: *Lecanora sublentigera* Jatta, *Squamarina concrescens* subsp. *cravensis* (Clauzade & Cl. Roux) Clauzade & Cl. Roux?, *Squamarina concrescens* var. *cravensis* Clauzade & Cl. Roux?

N - Lig. C - Tosc (TSB 35301), **Laz** (Nimis & Tretiach 2004), **Abr** (Nimis & Tretiach 1999), **Sar. S - Camp** (Nimis & Tretiach 2004, Garofalo & al. 2010), **Pugl** (Nimis & Tretiach 1999), **Cal** (Nimis & Puntillo 2003, Puntillo 2011), **Si** (Nimis & al. 1994, Ottonello & al. 2011).

Cr.pl/ Ch/ A.i/ Terr-Sax/ pH: 3-4, L: 4-5, X: 3-4, E: 1-3/ Alt: 1-2/ SmedD: vr, SmedH: rr, MedH: r, MedD: vr/ PT: 1/ Note: an often misunderstood species, with a southern distribution centred in dry areas, found on base-rich clay soil in clearings of grasslands and garrigues, but also on weathered or fissured rocks; mostly Tyrrhenian in Italy.

***Squamarina gypsacea* (Sm.) Poelt**

Mitt. bot. Staatss. München, 2: 539, 1958 - *Lichen gypsaceus* Sm., Trans. Linn. Soc. London, 1: 81, 1791.

Syn.: *Lecanora crassa* var. *gypsacea* (Sm.) Rabenh., *Lecanora fragilis* Zahlbr., *Lecanora gypsacea* (Sm.) Müll. Arg., *Lecanora smithii* (Ach.) Ach., *Placodium gypsaceum* (Sm.) Trevis., *Psoroma gypsaceum* (Sm.) A. Massal., *Squamaria gypsacea* (Sm.) Nyl., *Squamarina gypsacea* var. *subcetrarioides* (Zahlbr.) Pišút

N - VG, Frl (Tretiach & Molaro 2007), **Ven** (Caniglia & al. 1999, Nascimbene & Caniglia 2003c, Nascimbene 2005c, 2008c, Thor & Nascimbene 2007, Giovagnoli & Tasinazzo 2014), **TAA** (Nascimbene & al. 2006, Nascimbene 2008b), **Lomb** (Dalle Vedove & al. 2004), **Piem** (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999), **Emil** (Tretiach & al. 2008), **Lig. C - Tosc** (Benespero 2006, Benespero & Lastrucci 2007, Lastrucci & al. 2009, Brackel 2015), **Marc** (Nimis & Tretiach 1999), **Umb** (Genovesi & Ravera 2001, Ravera & al. 2006), **Laz** (Nimis & Tretiach 2004), **Abr, Mol** (Nimis & Tretiach 1999, Caporale & al. 2008, Genovesi & Ravera 2014), **Sar. S - Camp** (Aprile & al. 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994, 1995, Ottonello & al. 1994, 2011, Ottonello 1996, Ottonello & Romano 1997, Grillo 1998, Grillo & Caniglia 2004).

Sq/ Ch/ S/ Sax/ pH: 4-5, L: 4-5, X: 3-4, E: 1-3/ Alt: 1-6/ Alp: rr, Salp: rc, Orom: rr, Mont: r, SmedD: r, SmedH: r, MedH: rr, MedD: r/ PT: 1/ subc/ Note: in fissures of calcareous boulders, with optima both in the Mediterranean-submediterranean belts and in dry-continental parts of the Alps, often growing on the thalli of *Romularia lurida*. The var. *subcetrarioides*, found in upland areas and not uncommon in the Alps, is worthy of further study.

***Squamarina lamarckii* (DC.) Poelt**

Mitt. bot. Staatss. München, 2: 538, 1958 - *Urceolaria lamarckii* DC. in Lamarck & de Candolle, Fl. Franç., 3 éd., 2: 372, 1805.

Syn.: *Lecanora lagascae* Ach., *Lecanora lamarckii* (DC.) Rabenh., *Parmelia lagascae* (Ach.) Spreng., *Placodium lamarckii* (DC.) Müll. Arg., *Psoroma lagascae* (Ach.) Körb., *Squamaria lagascae* (Ach.) Balb.

N - Frl, Ven (Nimis 1994), **TAA** (Nascimbene 2008b), **Lomb** (Dalle Vedove & al. 2004), **Piem** (Isocrono & al. 2004), **Emil. C - Tosc, Abr** (Nimis & Tretiach 1999), **Sar**.

Sq/ Ch/ S/ Sax/ pH: 4-5, L: 4-5, X: 4, E: 1-2/ Alt: 4-5/ Alp: er, Salp: vr, Orom: er/ PT: 1/ Note: on steeply inclined surfaces of calcareous rocks with short periods of water seepage after rain, mostly near and above treeline; rarer in the Apennines than in the Alps, to be looked for in the mountains of southern Italy.

Squamarina lentigera (Weber) Poelt

Mitt. bot. Staatss. München, 2: 536, 1958 - *Lichen lentigerus* Weber, Spicil. Fl. Goett.: 192, 1778.

Syn.: *Lecanora crassa* var. *lentigera* (Weber) St.-Amans, *Lecanora lentigera* (Weber) Ach., *Placodium lentigerum* (Weber) Gray, *Psoroma lentigerum* (Weber) A. Massal., *Squamaria lentigera* (Weber) DC.

N - VG, Frl (Tretiach 1996), **Ven, TAA, Lomb, Piem, VA** (Piervittori & Isocrono 1999), **Emil** (Nimis & al. 1996), **Lig. C - Tosc** (Loppi & al. 2004b), **Marc, Umb** (Ravera & al. 2006), **Laz, Abr** (Nimis & Tretiach 1999, Brackel 2015), **Sar. S - Camp** (Aprile & al. 2003b, Garofalo & al. 2010), **Pugl, Bas** (Bartoli & Puntillo 1998, Nimis & Tretiach 1999, Potenza 2006, Potenza & al. 2010, Brackel 2011), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994, Ottonello & al. 1994, Grillo 1998, Grillo & Caniglia 2004, Cataldo & Minissale 2015).

Cr.pl/ Ch/ S/ Terr/ pH: 3-5, L: 4-5, X: 4-5, E: 1-2/ Alt: 1-2/ SmedD: vr, SmedH: vr, MedH: r, MedD: rr/ PT: 1/ subc/ Note: a species of dry-continental areas, only locally common, especially on gypsaceous or clayey soil in dry grasslands, also present in dry-warm Alpine valleys.

Squamarina nivalis Frey & Poelt

in Poelt, Mitt. bot. Staatss. München, 2: 353, 1958.

N - TAA, VA (HAL-19091).

Cr/ Ch/ S/ Sax/ pH: 3-4, L: 4, X: 4, E: 1-2/ Alt: 5-6/ Alp: er/ PT: 1/ Note: on wind-exposed outcrops of calcareous schists above treeline, reaching the nival belt in the Alps, where it is probably more widespread but certainly not common. The sample from Valle d'Aosta was collected by B. Feige near Plan Masson near Breuil, at 2500 m.

Squamarina oleosa (Zahlbr.) Poelt

Mitt. bot. Staatss. München, 2: 353, 1958 - *Lecanora oleosa* Zahlbr. in Handel- Mazzetti, Symb. Sin., 3: 175, 1930.

N - VG, VA (Piervittori & Isocrono 1999), **Emil** (Tretiach & al. 2008), **Lig. C - Tosc** (Benesperi 2006, 2007b), **Marc** (Nimis & Tretiach 1999), **Sar. S - Camp** (Aprile & al. 2003), **Cal** (Puntillo 1996), **Si** (Ottonello & al. 1994).

Sq/ Ch/ S/ Sax/ pH: 4-5, L: 3-4, X: 3, E: 1-2/ Alt: 1-3/ Mont: r, SmedD: vr, SmedH: vr, MedH: er/ PT: 1/ Note: a typically submediterranean lichen found in fissures of calcareous rocks; never common, but certainly more widespread.

Squamarina periculosa (Schaer.) Poelt

Mitt. bot. Staatss. München, 2: 534, 1958 - *Lecanora crassa* var. *periculosa* Dufour ex Schaer., Enum. Crit. Lich. Eur.: 58, 1850.

Syn.: *Placolecanora crassa* var. *tricolor* B. de Lesd.

N - VG, Frl (Martellos 2005), **TAA, Lomb, Piem** (TSB 33149), **VA** (Piervittori & Isocrono 1999), **Lig. C - Tosc** (Benesperi 2007), **Sar. S - Cal** (Puntillo 1996).

Sq/ Ch/ S/ Sax/ pH: 4-5, L: 3-4, X: 3, E: 1-2/ Alt: 2-4/ Mont: vr, SmedD: vr, SmedH: vr/ Note: in fissures of steeply inclined surfaces of calciferous rocks, with optimum in upland areas. The record from the temples of Paestum by Altieri & al. (2000) and Roccardi & Ricci (2006), being dubious, is not accepted here.

Squamarina stella-petraea Poelt

Mitt. bot. Staatss. München, 2: 540, 1958.

N - Piem (TSB 25900), **Lig** (Valcuvia & al. 2000). **C - Marc** (Nimis & Tretiach 1999), **Umb** (Nimis & Tretiach 1999, Ravera & al. 2006), **Laz** (Nimis & Tretiach 2004), **Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **Sar. S - Camp** (Garofalo & al. 1999, Aprile & al. 2003b, Nimis & Tretiach 2004), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si**.

Sq/ Ch/ S/ Sax-Terr/ pH: 4-5, L: 4-5, X: 4-5, E: 1-3/ Alt: 1-3/ Mont: vr, SmedD: r, SmedH: rr, MedH: rc, MedD: c/ PT: 1/ Note: a mainly Mediterranean species with outposts in dry-warm areas of the submediterranean belt, found on calcareous rocks or on thin soil layers in dry grasslands; overlooked or confused with *S. cartilaginea* in the past but locally abundant, especially in southern Italy.

S q u a m u l e a Arup, Söchting & Frödén

Nord. J. Bot., 31: 55, 2013.

Squamulea is a well-delimited genus of 5 species in the Teloschistaceae, segregated from *Caloplaca s.lat.* and characterised by a squamulose thallus (lobate in one species), and apothecia with a paraplectenchymatous proper exciple. Squamulose species also occur in other related genera, but none of them have a paraplectenchymatous exciple and usually not a true paraplectenchymatous cortex. The genus is distributed worldwide, with a clear centre of distribution in southwestern North America and a single species occurring in Europe (see Arup & al. 2013). Type: *S. subsoluta* (Nyl.) Arup, Söchting & Frödén

Squamulea subsoluta (Nyl.) Arup, Söchting & Frödén

Nord. J. Bot., 31: 56, 2013 - *Lecanora murorum* var. *subsoluta* Nyl. in Wedd., Bull. Soc. bot. Fr., 23: 98, 1876.

Syn.: *Callopisma aurantiacum* var. *gyalectoides* A. Massal. sensu Jatta, *Callopisma aurantiacum* var. *irrubescens* Arnold, *Caloplaca aurantia* var. *irrubescens* (Arnold) Jatta, *Caloplaca irrubescens* (Arnold) Zahlbr., *Caloplaca subsoluta* (Nyl.) Zahlbr.

N - Frl (TSB 10832), **Ven, TAA, Lomb, Piem** (Favero-Longo & al. 2015), **VA** (Piervittori & Isocrono 1999, Piervittori & al. 2001), **Lig** (Giordani & al. 2016). **C - Tosc, Laz, Sar** (Monte 1993, Rizzi & al. 2011). **S - Pugl, Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Poli & al. 1995, Nimis & al. 1996b, Grillo & al. 1996, Ottonello & Romano 1997, Grillo 1998, Grillo & Caniglia 2004).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4-5, X: 4-5, E: 2-4/ Alt: 1-4/ Salp: vr, Orom: vr, Mont: er, SmedD: vr, SmedH: r, MedH: rr, MedD: rr/ PT: 1/ w/ Note: a mild-temperate to subtropical, widespread lichen found on steeply inclined, sunny surfaces of basic siliceous rocks, often with *Peltula euploca*, but less bound to seepage tracks.

Staurolemma Körb.

Verh. zool.-bot. Ges. Wien, 17: 618, 706, 707, 1867.

This small genus with 3 species was considered as a member of the Collemataceae until recent molecular phylogenetic studies indicated that the gelatinous thallus structure was not a synapomorphy of a monophyletic group (Wedin & al. 2009; Otálora & al. 2010). Most of the gelatinous taxa with septate ascospores formed a distinct group (Collemataceae *s.str.*), while the genera with simple ascospores, such as *Staurolemma*, were shown to belong to a different family within the same order, the Pannariaceae. Type: *S. dalmaticum* Körb. (= *S. omphalarioides*).

Staurolemma omphalarioides (Anzi) P.M. Jørg. & Henssen

Graphis Scripta, 5: 13: 1993 - *Collema omphalarioides* Anzi, Comm. Soc. Critt. Ital., 1: 131, 1862.

Syn.: *Lempholemma hispanicum* (Samp.) Zahlbr., *Lempholemma omphalarioides* (Anzi) Zahlbr., *Physma hispanicum* Samp., *Physma omphalarioides* (Anzi) Arnold, *Staurolemma dalmaticum* Körb.

N - VG, Lig (Brunialti & al. 1999). **C - Tosc, Umb** (Genovesi & al. 2002, Ravera & al. 2006), **Laz** (Ravera 2001, 2006c, Massari & Ravera 2002, Nimis & Tretiach 2004), **Abr** (Recchia & al. 1993, Nimis & Tretiach 1999), **Mol** (Paoli & al. 2015), **Sar** (Zedda 1995, 2002). **S - Camp** (Aprile & al. 2002, Nimis & Tretiach 2004), **Pugl, Bas** (Potenza & al. 2014), **Cal** (Puntillo 1996, Puntillo & Puntillo 2004), **Si** (Grillo & Caniglia 2004, 2006).

Fol.n/ Cy.h/ A.i/ Epiph/ pH: 1-2, L: 4, X: 2, E: 1-2/ Alt: 1-2/ SmedD: er, SmedH: r, MedH: rr/ PT: 1/ suboc/ Note: a mild-temperate, Mediterranean-Atlantic lichen, only locally common, e.g. on *Olea* in parts of Tyrrhenian Italy. For further information see Jørgensen & Henssen (1993, with map).

Staurothele Norman

Nytt Mag. Naturvid., 7: 28, 1853, *nom. cons.*

In the traditional circumscription, *Staurothele* comprised *c.* 72 species, all characterised by a crustose thallus, muriform ascospores, and hymenial stichococcoid algae which are dispersed together with the ascospores. The latter character is also found in *Endocarpon*. Gueidan & al. (2007) revealed *Staurothele* to be polyphyletic, a fact confirmed by Savić & al. (2008), who have shown that morphological features traditionally used for characterising the genera *Polyblastia*, *Thelidium*, *Staurothele* and *Verrucaria*, such as spore septation and colour, occurrence of hymenial photobionts, involucrellum structure, and substrate preference, are not always reliable for characterising natural groups; in particular, hymenial algae seem to have evolved independently in at least three distinct lineages of the Verrucariaceae. Currently, the genus includes *c.* 40 species. Good descriptions and a key to all British species are in Orange (2013b). Type: *S. clopima* (Wahlenb.) Th. Fr. The name is conserved against *Paraphysorma* A. Massal. (1852).

Staurothele ambrosiana (A. Massal.) Zschacke

Zeitschr. f. Naturw., 80: 251, 1908 - *Paraphysorma ambrosianum* A. Massal., Mem. Lichenogr.: 136, 1853.

Syn.: *Dermatocarpon ambrosianum* (A. Massal.) A. Massal., *Dermatocarpon ambrosianum* var. *effusum* A. Massal., *Dermatocarpon ambrosianum* var. *orbiculare* A. Massal., *Staurothele catalepta* auct. *p.p.* non (Ach.) Blomb. & Forssell

N - VG (Castello 2002, Martellos & Castello 2004), **Ven** (Lazzarin 2000b), **VA** (Piervittori & Isocrono 1999).

Cr/ Ch/ S/ Sax/ pH: 3-4, L: 3-4, X: 3, E: 3/ Alt: 3-5/ Alp: c, Salp: rr, Mont: er/ PT: 1/ #/ Note: on sheltered surfaces of calcareous rocks in upland areas. Related to *S. frustulenta* and *S. areolata*, and perhaps a synonym of one of these two species.

Staurothele areolata (Ach.) Lettau

Hedwigia, 52: 84, 1912 - *Pyrenula areolata* Ach., Syn. Meth. Lich.: 122, 1814.

Syn.: *Staurothele clopima* auct. *p.p.* non (Wahlenb.) Th. Fr.

N - Frl (Watson 2014), **Ven** (Nimis 1994, Nascimbene & Caniglia 2003c, Nascimbene 2005c, 2008, 2008c), **TAA** (Nascimbene 2003, 2008b, Nascimbene & al. 2005, 2006, Spitale & Nascimbene 2012), **Lomb, Piem** (Isocrono & al. 2004, Favero-Longo & al. 2015), **VA** (Piervittori & Isocrono 1999, Isocrono & al. 2008, Favero-Longo & Piervittori 2009, Blisa & al. 2011), **Emil** (Dalle Vedove & al. 2002), **Lig** (TSB 34499b). **C - Abr** (Nimis & Tretiach 1999). **S - Camp, Cal** (Puntillo 1996).

Cr/ Ch/ S/ Sax/ pH: 3-5, L: 3-5, X: 3, E: 3/ Alt: 3-5/ Alp: c, Salp: vc, Orom: vr, Mont: rr/ PT: 1/ Note: an arctic-alpine to boreal-montane, circumpolar species found on calcareous to basic siliceous rocks wetted by rain in open habitats (e.g. on boulders in alpine and subalpine grasslands); very common throughout the Alps.

According to Wirth (1995) this is a possible synonym of *S. frustulenta*, but specimens from upland areas clearly differ from those collected at lower altitudes (treated here as *S. frustulenta*).

***Staurothele bacilligera* (Arnold) Arnold**

Flecht. Frank. Jura: 256, 1885 - *Polyblastia bacilligera* Arnold, Flora, 52: 516, 1869.

N - Ven, TAA (Nascimbene 2005).

Cr.end/ Ch/ S/ Sax/ pH: 5, L: 4, X: 3, E: 1-2/ Alt: 4-5/ Alp: vr, Salp: vr/ PT: 1/ #/ Note: on calcareous rocks near or above treeline; a taxon which needs further study.

***Staurothele caesia* (Arnold) Arnold**

Flecht. Frank. Jura: 246, 1885 - *Polyblastia caesia* Arnold, Flora, 41: 251, 1858.

Syn.: *Verrucaria caesia* f. *saprophila* (Arnold) Stizenb.

N - Ven, TAA.

Cr.end/ Ch/ S/ Sax/ pH: 4-5, L: 4, X: 3, E: 1-2/ Alt: 3-4/ Salp: er, Mont: vr/ PT: 1/ Note on limestone and dolomite in exposed situations in upland areas, but usually not reaching the Alpine belt.

***Staurothele clopima* (Wahlenb.) Th. Fr.**

N. Acta Reg. Soc. Sci. Upsal., ser. 3, 3: 263, 1861 - *Verrucaria clopima* Wahlenb. in Ach., K. Vetensk.-Akad. Nya Handl., 30: 152, 1809.

Syn.: *Staurothele fuscocuprea* (Nyl.) Zschacke, *Staurothele perradiata* Lynge, *Staurothele septentrionalis* Lynge, *Verrucaria cuprea* var. *fuscocuprea* Nyl.

N - TAA (Nascimbene 2005, Thor & Nascimbene 2007, Nascimbene & al. 2007b), Lomb.

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 3-4, X: 1-2, E: 1/ Alt: 4-5/ Alp: vr, Salp: r/ PT: 1/ 1/ Note: on siliceous rocks, amphibious in montane to Alpine creeks; probably restricted to the Alps in Italy, and more widespread there.

***Staurothele clopimoides* (Bagl. & Carestia) J. Steiner**

in Penther & Zederbauer, Ann. naturhist. Hofmus. Wien, 20, 1905: 383, 1907 - *Stigmatomma fissum* var. *clöpimoides* Bagl. & Carestia, Comm. Soc. Critt. Ital., 1, 5: 419, 1865.

Syn.: *Sphaeromphale areolata* var. *clöpimoides* (Bagl. & Carestia) Dalla Torre & Sarnth.

N - TAA, Lomb, Piem (Isocrono & al. 2004).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 3-4, X: 1, E: 1/ Alt: 4-5/ Alp: r, Salp: rr/ PT: 1/ 1/ Note: a probably circumboreal-montane freshwater species found on siliceous rocks in creeks near and above treeline; restricted to the Alps in Italy.

***Staurothele fissa* (Taylor) Zwackh**

Flora, 14: 552, 1862 - *Verrucaria fissa* Taylor in Mackay, Fl. Hibern., 2: 95, 1836.

Syn.: *Polyblastia umbrina* (Wahlenb.) Rostr., *Sphaeromphale fissa* (Taylor) Körb., *Sphaeromphale silesiaca* A. Massal., *Staurothele hazslinszkyi* (Körb.) Blomb. & Forssell, *Staurothele inconversa* (Nyl.) Blomb. & Forssell, *Staurothele lithina sensu Zahlbr.*, *Staurothele silesiaca* (A. Massal.) Zschacke, *Staurothele umbrina* (Wahlenb.) Hellb., *Thelotrema fissum* (Taylor) Hepp, *Verrucaria umbrina* Wahlenb.

N - TAA (Nascimbene 2005, Thor & Nascimbene 2007), Lomb, Piem (Isocrono & al. 2004), VA (Piervittori & Isocrono 1999). C - Marc, Sar, S - Cal (Puntillo 1996).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 3, X: 1, E: 1/ Alt: 3-5/ Alp: er, Salp: rr, Orom: er, Mont: vr/ PT: 1/ 1/ Note: a probably circumpolar lichen growing amphibious in montane to Alpine creeks, or on moist siliceous rocks; much rarer in the high Mediterranean mountains than in the Alps.

***Staurothele frustulenta* Vain.**

Acta Soc. Fauna Fl. Fenn., 49, 2: 93, 1921.

Syn.: *Polyblastia spadicea* (Wallr.) Jatta, *Staurothele catalepta* auct. p.p. non (Ach.) Blomb. & Forssell, *Staurothele elegans* (Wallr.) Zwackh, *Stigmatomma spadiceum* (Wallr.) Körb.

N - VA (Matteucci & al. 2013), Lig (TSB 33552). C - Abr (Jatta 1909-1911). S - Bas (Nimis & Tretiach 1999).

Cr/ Ch/ S/ Sax/ pH: 3-5, L: 4, X: 3-4, E: 2-3/ Alt: 2-3/ Mont: vr, SmedD: vr/ PT: 1/ Note: on calcareous or basic siliceous rocks in open habitats, mostly below the subalpine belt. See also note on *S. areolata*.

***Staurothele geioca* Zschacke**

Hedwigia, 60: 5, 1918.

N - Frl, C - Tosc (TSB 35304). S - Cal (Puntillo & Puntillo 2004, Puntillo 2011), Si (Nimis & al. 1996b).

Cr/ Ch/ S/ Terr/ pH: 4-5, L: 3-4, X: 3-4, E: 1-2/ Alt: 2-5/ Mont: vr, SmedH: vr/ PT: 1/ #/ Note: on soil amongst bryophytes and on plant debris on more or less calcareous substrata, apparently with a wide altitudinal range. This taxon, however, deserves further study.

***Staurothele guestphalica* (Körb.) Arnold**

Flora, 68: 154, 1885 - *Polyblastia guestphalica* J. Lahm ex Körb., Parerga Lichenol.: 339, 1863.

Syn.: *Porphyriospora guestphalica* (Körb.) Servít, *Staurothele orbicularis* auct. p.p. non (A. Massal.) Th. Fr., *Staurothele dalmatica* Servít

N - VG (TSB 3278), Lig (Giordani & al. 2016).

Cr.end/ Ch/ S/ Sax/ pH: 4-5, L: 4, X: 3-4, E: 1-2/ Alt: 2-4/ Salp: er, Mont: vr, SmedD: er, Pad: er, SmedH: vr/ PT: 1/ #/ Note: on calcareous boulders near the ground, and on large pebbles in dry grasslands; related to *S. orbicularis*, and in need of further study.

Staurothele hymenogonia (Nyl.) Th. Fr.

Bot. Not.: 40, 1865 - *Verrucaria hymenogonia* Nyl., Act. Soc. Linn. Bordeaux, 21: 430, 1856.

Syn.: *Polyblastia hymenogonia* (Nyl.) H. Olivier, *Polyblastia spurcella* (Nyl.) A.L. Sm., *Polyblastia ventosa* A. Massal. non Arnold, *Polyblastia ventosa* var. *dispersa* A. Massal., *Staurothele arenarum* B. de Lesd., *Staurothele mediterranea* B. de Lesd., *Staurothele ventosa* (A. Massal.) P. Syd.

N - **VG, Ven** (Lazzarin 2000b), **TAA** (Nascimbene 2008b), **Piem** (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999), **Emil** (Watson 2014). **C** - **Tosc, Marc** (Nimis & Tretiach 1999), **Umb** (Genovesi & al. 2001, Ravera & al. 2006), **Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008). **S** - **Camp** (Aprile & al. 2003b), **Pugl** (Durini & Medagli 2004), **Bas** (Nimis & Tretiach 1999, Potenza & al. 2010), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1996b, Ottonello & Salone 1994, Grillo & Caniglia 2004, Liistro & Cataldo 2011).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 3-4, X: 3-4, E: 2-3/ Alt: 1-5/ Alp: vr, Salp: r, Orom: r, Mont: r, SmedD: rr, Pad: er, SmedH: rr, MedH: vr/ PT: 1-2/ p/ Note: on soft calciferous rocks, including calcareous sandstone and dolomite, sometimes also on concrete, with a wide altitudinal range.

Staurothele immersa (A. Massal.) Dalla Torre & Sarnth.

Die Flechten von Tirol: 553, 1902 - *Porphyriospora immersa* Bagl. ex A. Massal., Symmicta Lich.: 102, 1855.

N - **TAA, Lig** (Lazzarin 2000b, Watson 2014, Giordani & al. 2016). **C** - **Marc** (Nimis & Tretiach 1999), **Umb** (Genovesi & Ravera 2001, Ravera & al. 2006), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **Sar, S** - **Camp** (Nimis & Tretiach 2004, Garofalo & al. 2010), **Pugl** (Nimis & Tretiach 1999).

Cr.end/ Ch/ S/ Sax/ pH: 4-5, L: 3, X: 3, E: 1-2/ Alt: 1-2/ SmedD: vr, SmedH: rr, MedH: r/ PT: 1/ Note: on limestone and dolomite, usually on steeply inclined surfaces; this is one of the few species of the genus with optimum below the montane belt.

Staurothele orbicularis (A. Massal.) Th. Fr.

Öfvers. K. Svensk. Vetensk.-Akad. Förh., 21: 275, 1865 - *Porphyriospora orbicularis* A. Massal., Ric. Auton. Lich. Crost.: 154, 1852.

Syn.: *Porphyriospora orbicularis* var. *geographica* A. Massal., *Staurothele nigella* (Kremp.) Kernst., *Staurothele viperae* Servít

N - **Ven** (Lazzarin 2000b), **TAA, Lig** (Giordani & al. 2016). **C** - **Marc** (Nimis & Tretiach 1999), **Umb** (Genovesi & Ravera 2001, Ravera & al. 2006), **Abr** (Cucchi & al. 2009).

Cr.end/ Ch/ S/ Sax/ pH: 4-5, L: 3-4, X: 3, E: 1-2/ Alt: 3-4/ Salp: r, Mont: vr/ PT: 1/ Note: on more or less calciferous rocks in upland areas: related to *S. guestphalica*, but with 2-spored asci, and more widespread.

Staurothele rufa (A. Massal.) Zschacke

Hedwigia, 54: 190, 1913 - *Polyblastia rufa* A. Massal., Ric. Auton. Lich. Crost.: 147, 1852.

Syn.: *Polyblastia scabrida* (Anzi) Jatta, *Staurothele rufa* f. *albescens* Servít, *Stigmatomma rufum* (A. Massal.) Arnold, *Staurothele scabrida* (Anzi) B. de Lesd., *Stigmatomma rufum* var. *subathallinum* (Arnold) Dalla Torre & Sarnth., *Thelotrema scabridum* Anzi

N - **TAA, Lomb** (Lazzarin 2000b), **Lig** (Giordani & al. 2016). **C** - **Tosc, Abr**.

Cr/ Ch/ S/ Sax/ pH: 3-5, L: 3-4, X: 3, E: 1-2/ Alt: 3-5/ Alp: rr, Salp: rc, Mont: r/ PT: 1/ Note: on more or less calciferous rocks in the mountains.

Staurothele rugulosa (A. Massal.) Arnold

Verh. zool.-bot. Ges. Wien, 47: 389, 1897 - *Polyblastia rugulosa* A. Massal., Mem. Lichenogr.: 139, 1853.

Syn.: *Polyblastia amphiboloides* (Nyl.) Trevis., *Staurothele amphiboloides* (Nyl.) Zahlbr., *Thelidium hammoniense* Erichsen, *Verrucaria amphiboloides* Nyl.

N - **Ven** (Lazzarin 2000b), **TAA, Piem, Lig** (Giordani & al. 2016). **C** - **Marc** (Nimis & Tretiach 1999).

Cr/ Ch/ S/ Sax/ pH: 3-5, L: 3-4, X: 3, E: 3-4/ Alt: 3-5/ Alp: r, Salp: rr, Mont: rr/ PT: 1-2/ Note: on limestone, dolomite, calcareous sandstone, often on walls, roofing tiles etc., usually in upland areas; probably more widespread in the Alps; the record from Marche is the southernmost in Italy.

Staurothele rupifraga (A. Massal.) Arnold

Verh. zool.-bot. Ges. Wien, 30: 149, 1880 - *Polyblastia rupifraga* A. Massal., Geneac. Lich.: 24, 1854.

Syn.: *Polyblastia calcarea* (Nyl.) Parrique, *Polyblastia umbrina* var. *calcarea* (Nyl.) Boistel, *Sporodictyon rupifragum* (A. Massal.) Trevis., *Verrucaria umbrina* var. *calcarea* Nyl.

N - **Ven** (Lazzarin 2000b), **TAA** (Nascimbene & al. 2007b), **Lomb, VA** (Piervittori & Isocrono 1999), **Lig** (Watson 2014, Giordani & al. 2016).

Cr.end/ Ch/ S/ Sax/ pH: 4-5, L: 3-4, X: 3, E: 1/ Alt: 4-5/ Alp: rr, Salp: r/ PT: 1/ Note: a probably arctic-alpine species found on hard limestone and dolomite near and above treeline. A dubious earlier record from Campania (see Nimis 1993: 669) is not accepted here.

Staurothele sienae B. de Lesd.

Bull. Soc. Bot. France, 86: 81, 1939.

C - Tosc.

Cr/ Ch/ S/ Sax/ pH: 3, L: 3-4, X: 3-4, E: 1/ Alt: 1-2/ SmedH: vr, MedH: vr/ PT: 1-2/ #/ Note: a poorly known species of basic siliceous rocks at relatively low elevations, also reported from the Pyrenees and Greece. The type material was collected on a sandstone wall (see Nimis 1993: 670).

Staurothele solvens (Anzi) Zschacke

Hedwigia, 54: 195, 1913 - *Polyblastia solvens* Anzi, Comm. Soc. Critt. Ital., 2, 1: 27, 1864.

Syn.: *Staurothele meylanii* B. de Lesd.

N - TAA (Nascimbene & al. 2007b), **Lomb.**

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 3, X: 2-3, E: 1/ Alt: 5/ Alp: vr/ PT: 1/ #/ Note: on limestone and dolomite, often along creeks in the alpine belt, only known from the south European mountains (Alps, Pyrenees). According to Roux & coll. (2014) the species can be subdivided into three well-distinct varieties.

Staurothele succedens (Arnold) Arnold

Verh. zool.-bot. Ges. Wien, 30: 149, 1880 - *Polyblastia succedens* Rehm ex Arnold, Flora, 53: 17, 1870.

N - TAA (Nascimbene & al. 2007b, Nascimbene 2008b), **Piem, Lig.**

Cr/ Ch/ S/ Sax/ pH: 3-5, L: 2-4, X: 1-2, E: 1/ Alt: 3-5/ Alp: er, Salp: r, Mont: vr/ PT: 1/ 1/ Note: on basic siliceous to calcareous rocks with frequent seepage of water, often near creeks, in gorges, etc., mostly in upland areas.

Staurothele terricola (Bagl.) Poelt & Nimis

in Nimis & Poelt, Studia Geobot., 7, suppl. 1: 226, 1987 - *Polyblastia terricola* Bagl., N. Giorn. Bot. Ital., 11: 113, 1879.

C - Sar.

Cr/ Ch/ S/ Terr/ pH: 3, L: 4, X: 3-4, E: 1/ Alt: 1/ MedD: vr/ PT: 1/ #/ Note: known only from clearings of Mediterranean garrigues in Sardegna, this terricolous species needs further study.

Steinia Körb.

in Stein, Jahresber. schles. Ges. vaterl. Kultur, 50: 169, 1873.

A small genus of 2 species, mainly occurring on disturbed soil. The genus, together with *Aphanopsis*, is included in the family Aphanopsidaceae, characterised by the ascus tip structure. *Steinia* differs from *Aphanopsis* by the thin, simple paraphyses embedded in a distinct hymenial gel. The two genera represent basal lineages within Leotiomycetes (Prinzen & al. 2012). Type: *S. luridescens* Körb. (= *S. geophana*).

Steinia geophana (Nyl.) Stein

in Cohn, Krypt.-Fl. von Schlesien, 2: 209, 1879 - *Lecidea geophana* Nyl., Lichenes Scand.: 212, 1861.

Syn.: *Biatora geophana* (Nyl.) Th. Fr., *Biatorella geophana* (Nyl.) Rehm, *Lecidea boreella* Nyl., *Lecidea trichogena* Norman, *Pleolecis geophana* (Nyl.) Clem., *Steinia luridescens* Körb.

N - TAA (Nascimbene & al. 2007b).

Cr/ Ch/ S/ Terr-Lign/ pH: 2-3, L: 3-4, X: 2, E: 1-2/ Alt: 2-5/ Alp: r, Salp: r, Mont: vr, SmedD: er/ PT: 1-2/ p/ Note: an ephemeral, facultatively lichenised species of moist, slightly calciferous soil, rotten wood, small pebbles, terricolous *Peltigera*- and *Solorina*-species and plant debris, often found in rather disturbed habitats such as on earth banks along white roads and on track sides; perhaps overlooked, at least in the Alps, but certainly never common.

Stenhammarella Hertel

Beih. Nova Hedwigia, 24: 124, 1967.

A monotypic genus whose systematic position is still not clear, currently included in the Lecideaceae. Type: *S. turgida* (Ach.) Hertel

Stenhammarella turgida (Ach.) Hertel

Beih. Nova Hedwigia, 24: 125, 1967 - *Biatora turgida* Ach., Lichenogr. Univ.: 273, 1810.

Syn.: *Lecidea albocaerulescens* var. *turgida* (Ach.) Ach., *Lecidea turgida* (Ach.) A. Dietr., *Porpidia turgida* (Ach.) Cl. Roux & P. Clerc, *Stenhammara turgida* (Ach.) Körb.

N - Frl, Ven, TAA (Hertel & Schuhwerk 2010), **Lomb, Piem** (Isocrono & al. 2004), **Emil** (Tretiach & al. 2008), **Lig, C - Tosc.**

Cr/ Ch/ S/ Sax/ pH: 4, L: 3, X: 2-3, E: 1/ Alt: 4-5/ Alp: vr, Salp: rr, Orom: er/ PT: 1/ Note: a specialist of rocks which contain a low percentage of calcium carbonate, mostly found on steeply inclined, north-exposed and rather humid faces near or above treeline; also known from northwestern Yunnan and perhaps restricted to the Alps and the northern Apennines in Italy. The record from Toscana (Nimis 1993: 671) is dubious, but is still accepted here, as the presence of this species in the northern Apennines is not impossible.

Stereocaulon Hoffm.
Deutshl. Fl., 2: 128, 1796, *nom. cons.*

This genus of the Stereocaulaceae, with c. 140 species, traditionally included lichens with a crustose primary thallus and a fruticose secondary thallus. The traditional view of *Stereocaulon* has changed in recent years, as five crustose species completely lacking a secondary thallus have been transferred to the genus; the phylogenetic analysis by Högnabba (2006) supports the inclusion of the crustose species in *Stereocaulon* (see also Timdal 2002), while the current infrageneric classification is not supported. Furthermore, species concepts need to be re-examined, as some species do not appear as monophyletic entities in the phylogeny. Type: *S. paschale* (L.) Hoffm. The name is conserved against *Stereocaulon* (Schreb.) Schrad. (1794).

***Stereocaulon alpinum* Laurer**

in Funck, Crypt. Gewächse, 33: 6, 1827.

Syn.: *Stereocaulon alpinum* var. *erectum* Frey, *Stereocaulon paschale* var. *alpinum* (Laurer) Mudd, *Stereocaulon tomentosum* var. *alpinum* (Laurer) Th. Fr.

N - **Frl** (Tretiach & Hafellner 2000), **Ven**, **TAA** (Bilovitz & al. 2014, 2014b, Oset 2015), **Lomb** (Rivellini 1994, Rivellini & Valcuvia 1996, Dalle Vedove & al. 2004), **Piem** (Isocrono & al. 2003, 2004, 2006, Morisi 2005, Isocrono & Piervittori 2008, Watson 2014), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, Valcuvia 2000, Piervittori & al. 2004, Isocrono & al. 2008).

Frut/ Ch-Cy.h/ S/ Terr/ pH: 1-2, L: 4, X: 3, E: 1/ Alt: 4-6/ Alp: r, Salp: r/ PT: 1/ p/ Note: an arctic-alpine, circumpolar early coloniser of mineral soil, especially gravel and sand in the vicinity of glaciers, probably restricted to the Alps in Italy, where it can reach the nival belt. The record from Mt. Etna by Di Martino & Stancanelli (2015) appears as dubious to me.

***Stereocaulon botryosum* Ach.**

Lichenogr. Univ.: 581, 1810.

Syn.: *Stereocaulon alpinum* var. *botryosum* (Ach.) Laurer, *Stereocaulon evolutum* var. *fastigiatum* (Anzi) Th. Fr., *Stereocaulon fastigiatum* Anzi

N - **Frl** (Tretiach & Hafellner 2000), **TAA**, **Lomb** (Rivellini 1994, Rivellini & Valcuvia 1996, Oset 2015), **Piem** (Isocrono & al. 2004), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999).

Frut/ Ch-Cy.h/ S/ Sax/ pH: 1-2, L: 3, X: 2-3, E: 1/ Alt: 4-6/ Alp: r, Salp: vr/ PT: 1/ Note: an arctic-alpine, probably circumpolar lichen found on steeply inclined surfaces of siliceous rocks in humid-shaded situations, with optimum above treeline, up to the nival belt; restricted to the Alps in Italy.

***Stereocaulon condensatum* Hoffm.**

Deutshl. Fl., 2: 130, 1796.

Syn.: *Stereocaulon acaulon* Nyl., *Stereocaulon condensatum* f. *septentrionale* H. Magn., *Stereocaulon condyloideum* Ach., *Stereocaulon paschale* var. *condensatum* (Hoffm.) Schaer.

N - **Ven**, **Lomb** (Rivellini & Valcuvia 1996, Gheza & al. 2015, Gheza 2015), **Piem** (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999), **Lig** (Brunialti & al. 2001).

Frut/ Ch-Cy.h/ S/ Terr/ pH: 1-2, L: 4, X: 3, E: 1/ Alt: 3-4/ Salp: r, Mont: er/ PT: 1-2/ p/ Note: a cool-temperate to boreal-montane, circumpolar lichen found on sandy to gravelly, often disturbed soil in open situations, often associated with *Pycnothelia papillaria*; probably restricted to the Alps in Italy. An earlier record from Campania (Nimis 1993: 673), being dubious, is not accepted here

***Stereocaulon coniophyllum* I.M. Lamb**

Bot. Not., 114: 267, 1961.

N - **TAA** (Thor & Nascimbene 2007).

Frut/ Ch-Cy.h/ S/ Sax/ pH: 1-2, L: 3-4, X: 2-3, E: 1/ Alt: 4-5/ Alp: vr, Salp: r/ PT: 1/ Note: an arctic-alpine to boreal-montane, circumpolar lichen found on siliceous rocks near and above treeline; to be looked for further in the Alps.

***Stereocaulon dactylophyllum* Flörke**

Deutsch. Lich., 4: 13, 1819.

Syn.: *Stereocaulon corallinum* (L.) Schrad., *Stereocaulon coralloides* Th. Fr., *Stereocaulon coralloides* var. *dactylophyllum* (Flörke) Th. Fr., *Stereocaulon curtulum* Nyl.

N - **Ven**, **TAA** (Oset 2015), **Lomb** (Rivellini & Valcuvia 1996), **Piem** (Isocrono & al. 2004, Watson 2014), **VA** (Piervittori & Isocrono 1999).

Frut/ Ch-Cy.h/ S/ Sax/ pH: 1-2, L: 3-4, X: 2-3, E: 1/ Alt: 4-5/ Alp: vr, Salp: r/ PT: 1/ Note: an arctic-alpine to boreal-montane, circumpolar lichen found on siliceous rocks, especially on large boulders, near and above treeline; probably widespread throughout the Alps.

***Stereocaulon glareosum* (Savicz) H. Magn.**

Göteb. K. Vetensk. Samh. Handl., 30: 60, 1928 - *Stereocaulon tomentosum* f. *glareosum* Savicz, Bull. Jard. Imp. Pierre le Grand, 14: 121, 1914.

N - **Ven**.

Frut/ Ch-Cy.h/ S/ Terr/ pH: 1-2, L: 4, X: 2-3, E: 1/ Alt: 4-5/ Alp: vr, Salp: r/ PT: 1/ Note: an arctic-alpine to boreal-montane, probably circumpolar lichen found on sandy or gravelly ground, such as on banks of streams and in snow-beds, forming low, compact mats; probably more widespread in the Alps, with optimum near treeline.

Stereocaulon incrustatum Flörke

Deutsch. Lich., 4: 12, 1819.

Syn.: *Stereocaulon abduanum* Anzi, *Stereocaulon incrustatum* f. *gracile* Frey, *Stereocaulon incrustatum* var. *abduanum* (Anzi) Frey

N - Ven, TAA, Lomb (Rivellini & Valcuvia 1996), **Piem** (Watson 2014, Oset 2015), **Lig**.

Frut/ Ch-Cy.h/ S/ Terr/ pH: 1-2, L: 4, X: 3, E: 1/ Alt: 4-5/ Alp: vr, Salp: r/ PT: 1/ Note: an arctic-alpine to boreal-montane, circumpolar lichen found on mineral, nutrient-poor soil, in *Pinus*-woodlands, in the vicinity of glaciers and by rivers; restricted to the Alps in Italy, with optimum near treeline.

Stereocaulon nanodes Tuck.

Am. J. Sc. Arts, 2, 28: 201, 1859.

Syn.: *Stereocaulon carinthiacum* Frey, *Stereocaulon hypopetraeum* Vain. & Räsänen, *Stereocaulon nanodes* f. *tyroliense* (Nyl.) I.M. Lamb, *Stereocaulon tyroliense* Nyl.

N - Frl (Tretsch & Hafellner 2000), **Ven** (Nascimbene 2002), **TAA** (Nascimbene 2003, Bilovitz & al. 2014b), **Lomb** (Nascimbene 2006), **Piem** (TSB 33837).

Frut/ Ch-Cy.h/ A.s/ Sax/ pH: 1-2, L: 4, X: 3, E: 1/ Alt: 3-6/ Alp: r, Salp: rr, Mont: er/ PT: 1-2/ p, m/ Note: an arctic-alpine to boreal-montane, circumpolar lichen found on mineral-rich rocks, also under overhanging faces, on pebbles and large boulders, often on metal-rich substrata and in rather disturbed habitats in upland areas, reaching the nival belt; certainly more widespread in the Alps.

Stereocaulon pileatum Ach.

Lichenogr. Univ.: 582, 1810.

Syn.: *Stereocaulon saxonicum* Bachm.

N - Ven, Lomb (Rivellini & Valcuvia 1996), **Piem** (Isocrono & al. 2004), **Lig**.

Frut/ Ch-Cy.h/ A.s/ Sax/ pH: 2-3, L: 3, X: 2-3, E: 1-2/ Alt: 3-4/ Salp: r, Mont: vr/ PT: 1-2/ p/ Note: a cool-temperate to arctic-alpine, circumpolar early coloniser of mineral-rich siliceous rocks, including roofing tiles, in upland areas but mostly below the Alpine belt; restricted to the Alps in Italy.

Stereocaulon plicatile (Leight.) Fryday & Coppins

Lichenologist, 28: 513, 1996 - *Lecidea plicatilis* Leight., Ann. Mag. nat. Hist., Ser. 4, 4: 201, 1869.

Syn.: *Rhizocarpon plicatile* (Leight.) A.L.Sm., *Rhizocarpon rubescens* Th.Fr.

N - TAA (Dalla Torre & Sarnthein 1902).

Cr/ Ch-Cy.h/ S/ Sax/ pH: 1-2, L: 3-4, X: 2, E: 1/ Alt: 4-5/ Alp: er, Salp: er/ PT: 1/ p/ Note: on siliceous rocks and pebbles in damp habitats with a late snow-lie, either on vertical rocks in north-facing slopes or on stones and pebbles near cornice snow beds, near or above treeline; probably restricted to the Alps in Italy.

Stereocaulon rivulorum H. Magn.

Göteb. K. Vetensk. Samh. Handl., 30: 63, 1926.

N - Frl (TSB 14044), **Lomb** (Rivellini 1994, Rivellini & Valcuvia 1996), **Piem, VA** (Piervittori & Isocrono 1999).

Frut/ Ch-Cy.h/ S/ Terr/ pH: 2-3, L: 3-4, X: 3, E: 1/ Alt: 3-5/ Alp: rr, Salp: vr, Mont: vr/ PT: 1/ p/ Note: an arctic-alpine to boreal-montane lichen found on gravel and sand in snow-beds or on banks of streams near glaciers, sometimes on weakly calciferous schists; restricted to the Alps in Italy.

Stereocaulon tomentosum Fr.

Sched. Crit., 3: 20, 1825.

Syn.: *Stereocaulon botryocarpum* H. Magn., *Stereocaulon cupriniforme* Nyl., *Stereocaulon tomentosum* var. *campestre* Körb.

N - Ven, TAA, Lomb (Rivellini & Valcuvia 1996), **Piem** (Jatta 1909-1911), **VA** (Piervittori & Isocrono 1999, Valcuvia 2000).

Frut/ Ch-Cy.h/ S/ Terr/ pH: 1-2, L: 3-4, X: 3, E: 1/ Alt: 3-5/ Alp: er, Salp: r, Mont: vr/ PT: 1/ Note: a mainly boreal-montane, circumpolar lichen found on mineral soil in open habitats, such as in clearings of *Pinus*-stands; several Italian records need re-confirmation.

Stereocaulon vesuvianum Pers.

Ann. Wetter. Gesellsch. Ges. Naturk., 2: 19, 1811.

Syn.: *Stereocaulon denudatum* Flörke, *Stereocaulon denudatum* var. *compactum* Flot., *Stereocaulon vesuvianum* var. *depressum* (H. Magn.) I.M. Lamb?, *Stereocaulon denudatum* var. *pulvinatum* (Rabenh.) Flot., *Stereocaulon vesuvianum* var. *nodulosum* (Wallr.) I.M. Lamb

N - TAA, Lomb (Rivellini & Valcuvia 1996), **Piem** (Isocrono & al. 2004). **C - Tosc, Sar, S - Camp** (Adamo 1997, Adamo & al. 1997, 2003, 2004, Ricciardi & al. 2000, Nimis & Tretsch 2004, Aprile & al. 2002, 2005, Spribille & al. 2010, Conti & al. 2014, Catalano & al. 2016), **Cal** (Puntillo 1996, Puntillo & Puntillo 2004), **Si** (Czeczuga & al. 1994,

1999, Adamo & al. 2000, Poli & al. 1995, Grasso & al. 1999, Poli & Grillo 2000, Merlo & Mazzola 2001, Aprile & al. 2005, Merlo 2007, Brackel 2008b, 2008c, Ottonello & al. 2011, Vingiani & al. 2012, Watson 2014, Di Martino & Stancanelli 2015).

Frut/ Ch-Cy.h/ S/ Sax/ pH: 2-3, L: 4-5, X: 4, E: 1-2/ Alt: 3-5/ Salp: er, Orom: er, Mont: er/ PT: 1/ Note: on volcanic rocks; abundant on the Vesuvium and the Etna Volcanoes, but much rarer elsewhere in Italy, due to the scarcity of suitable substrata; most records from the Alps need confirmation.

Sticta (Schreb.) Ach.

Meth. Lich.: 275, 1803 - *Lichen* (sect.) *Sticta* Schreb. in Linnaeus, Gen. Plant., ed. 8: 768, 1791.

In their phylogenetic study on the Lobariaceae, Moncada & al. (2013) suggested that the family can be divided into 12 genera, each delimited by a combination of morphological and chemical features. *Sticta s.lat.* forms two unrelated lineages, *Sticta s.str.* (type *S. sylvatica*) and the *S. wrightii* group, which was segregated in the new genus *Dendriscosticta*. A molecular phylogenetic study of *Sticta s.str.* focusing on Colombia (Moncada & al. 2014) showed that similar morphodemes evolved independently multiple times. As a consequence, currently applied names such as *S. fuliginosa* and *S. weigeli* comprise numerous (up to more than 20) unrelated species-level lineages, which can be distinguished also phenotypically using previously unrecognised characters; the genus *Sticta* could therefore contain four to five times the number of currently recognised species. Similar results were obtained for Europe by Magain & Sérusiaux (2015). Type: *S. sylvatica* (Huds.) Ach.

Sticta canariensis (Bory) Delise

Bory ex Delise, Hist. Lich. *Sticta*: 114, 1822 - *Pulmonaria canariensis* Bory in Flörke, Mag. N. Entdeck. Ges. Naturk. Ges. Naturf. Freunde Berlin, 3: 126, 1809.

Syn.: *Sticta dufourii* Bory ex Delise, *Stictina dufourii* (Delise) Nyl.

C - Tosc. S - Cal (Puntillo 1995, 1996).

Fol.b/ Cy.h/ A.i/ Epiph/ pH: 2-3, L: 3, X: 1, E: 1/ Alt: 1-3/ MedH: er/ PT: 0/ oc/ Note: a humid subtropical lichen found on bark and epiphytic mosses in very moist forests, sometimes on mossy rocks. The morph with cyanobacteria is the only one occurring in Italy. Presently it is probably restricted to a few localities in western Calabria (the records from Toscana date back to the previous century). It is included in the Italian red list of epiphytic lichens as “Endangered” (Nascimbene & al. 2013c).

Sticta fuliginosa (Hoffm.) Ach.

Meth. Lich.: 280, 1803 - *Lobaria fuliginosa* Hoffm., Deutschl. Fl., 2: 109, 1796.

Syn.: *Sticta sylvatica* var. *fuliginosa* (Hoffm.) Hepp, *Stictina fuliginosa* (Hoffm.) Nyl.

N - Frl (Tretiach & Carvalho 1995, Nascimbene & al. 1998, Nascimbene & Caniglia 2003, Tretiach 2004), **Ven** (Nascimbene 2003b, 2011, Nascimbene & al. 2007, 2010b), **TAA** (Nascimbene & al. 2007b, Nimis & al. 2015), **Lomb, Piem, VA** (Piervittori & Isocrono 1999), **Emil. S - Cal** (Puntillo 1996), **Si** (Giordani & al. 2009).

Fol.b/ Cy.h/ A.i/ Epiph-Sax/ pH: 1-2, L: 3, X: 1, E: 1/ Alt: 2-3/ Mont: er, SmedH: er/ PT: 0/ oc/ Note: a western species in Europe, found on bark, more rarely on mossy rocks in semi-natural forests, most records date back to the previous century. Italian material should be compared with the recently described *Sticta fuliginoides* Magain & Sérusiaux, whose occurrence in Italy is probable (see Magain & Sérusiaux 2015). The species is included in the Italian red list of epiphytic lichens as “Vulnerable” (Nascimbene & al. 2013c).

Sticta limbata (Sm.) Ach.

Meth. Lich.: 280, 1803 - *Lichen limbatus* Sm. in Smith & Sowerby, Engl. Bot., 16: 1104, 1802.

Syn.: *Stictina limbata* (Sm.) Nyl.

N - Frl (Nascimbene & al. 1998, Nascimbene & Caniglia 2003), **Ven** (Nascimbene 2003b, 2011, Nascimbene & al. 2009c), **Lig. C - Tosc, Laz. S - Camp** (Nascimbene & al. 2010b, Brunialti & al. 2013, Ravera & Brunialti 2013), **Cal** (Stofer 2006, Giordani & al. 2009), **Si** (Ottonello & Romano 1997, Ottonello & Puntillo 2009, Ottonello & al. 2011).

Fol.b/ Cy.h/ A.s/ Epiph-Sax/ pH: 1-2, L: 3, X: 1, E: 1/ Alt: 1-3/ Mont: er, MedH: er/ PT: 0/ oc/ Note: a humid subtropical to Mediterranean-Atlantic species found on bark, often associated with bryophytes, on mossy rocks and soil in very humid situations, certainly worthy of protection in Italy. It is included in the Italian red list of epiphytic lichens as “Vulnerable” (Nascimbene & al. 2013c).

Sticta sylvatica (Huds.) Ach.

Meth. Lich.: 281, 1803 - *Lichen sylvaticus* Huds., Fl. Angl.: 453, 1762.

Syn.: *Stictina sylvatica* (Huds.) Nyl.

N - Frl (Nascimbene & Caniglia 2003), **Ven, TAA** (Nascimbene & Caniglia 2003), **Lomb, Piem** (Isocrono & al. 2004, 2007, Morisi 2005, Matteucci & al. 2013), **VA** (Piervittori & Isocrono 1999, Matteucci & al. 2015d), **Emil, Lig. C - Tosc, Laz** (Ravera 2001, Massari & Ravera 2002), **Abr** (Di Santo & Ravera 2012, Corona & al. 2016). **S - Pugl, Cal** (Puntillo 1996).

Fol.b/ Cy.h/ A.i/ Epiph-Sax/ pH: 1-2, L: 3, X: 1, E: 1/ Alt: 3/ Mont: vr/ PT: 0/ oc/ Note: a western species in Europe, found on mossy trunks and on epilithic bryophytes in natural forests, Most of the Italian records are old, and the species is included in the Italian red list of epiphytic lichens as “Vulnerable” (Nascimbene & al. 2013c).

Strangospora Körb.

Parerga Lichenol., 2: 173, 1860.

The taxonomy of the small genus *Strangospora*, also after the segregation of *S. ochrophora* into the genus *Piccolia*, is rather poorly known. Schmull & al. (2011) suggest that at least *S. pinicola* is part of Ostropomycetidae and is closely related to members of *Schaereria* (*S. fuscocinerea*), but without significant support. Currently, the genus is included in the Strangosporaceae, of uncertain position within the Pezizomycotina. Type: *S. pinicola* (A. Massal.) Körb.

Strangospora deplanata (Almq.) Clauzade & Cl. Roux

Bull. Soc. Bot. Centre-Ouest, n. sér., nr. spéc. 7: 829, 1985 - *Biatorella deplanata* Almq., Bot. Not.: 69, 1866.

N - TAA (Nimis & al. 2015). **C - Abr.**

Cr/ Ch/ S/ Epiph/ pH: 3, L: 3, X: 3, E: 1-3/ Alt: 3/ Mont: er/ PT: 1/ Note: on *Fraxinus*, *Salix*, *Populus*, and other trees with base-rich bark in rather shaded situations. The species is included in the Italian red list of epiphytic lichens as “Endangered” (Nascimbene & al. 2013c).

Strangospora microhaema (Norman) R.A. Anderson

Bryologist, 78: 55, 1975 - *Biatorella microhaema* Norman in Th. Fr., Bot. Not.: 99, 1865.

N - TAA (Nascimbene & al. 2007b). **C - Mol** (Caporale & al. 2008, Paoli & al. 2011), **Sar** (Rizzi & al. 2011).

Cr/ Ch/ S/ Epiph-Lign/ pH: 1-3, L: 4-5, X: 3, E: 2-3/ Alt: 3-4/ Salp: er, Mont: vr/ PT: 1/ Note: a cool-temperate to boreal-montane, perhaps circumpolar species of base-rich bark and slightly eutrophicated lignum. It is included in the Italian red list of epiphytic lichens as “Vulnerable” (Nascimbene & al. 2013c).

Strangospora moriformis (Ach.) Stein

in Cohn, Krypt.-Fl. von Schlesien, Flecht.: 176, 1879 - *Arthonia moriformis* Ach., Syn. Meth. Lich.: 5, 1814.

Syn.: *Biatorella improvisa* (Nyl.) Almq., *Biatorella moriformis* (Ach.) Th. Fr., *Biatorella nitens* Th. Fr.

N - TAA (Thor & Nascimbene 2007, Nascimbene & al. 2007b, 2014, Nascimbene 2014, Nimis & al. 2015), **Lomb** (Nascimbene 2006, Nascimbene & al. 2006e), **Piem** (Isocrono & al. 2004, Isocrono & Piervittori 2008), **VA** (Piervittori & Isocrono 1999), **Lig. C - Marc, Umb** (Ravera 2000, Ravera & al. 2006). **S - Pugl** (Brackel 2011), **Cal** (Puntillo 1996), **Si** (Falco Scampatelli 2005).

Cr/ Ch/ S/ Epiph-Lign/ pH: 1-2, L: 4, X: 4, E: 2-3/ Alt: 2-4/ Salp: er, Mont: vr, SmedH: er/ PT: 1-2/ Note: on hard lignum (*e.g.* on wooden poles), and on the bark of conifers, rarely of deciduous trees, mostly on the basal parts of old trunks. It is included in the Italian red list of epiphytic lichens as “Near-threatened” (Nascimbene & al. 2013c).

Strangospora pinicola (A. Massal.) Körb.

Parerga Lichenol.: 173, 1860 - *Sarcogyne pinicola* A. Massal., Lotos, 6: 78, 1856.

Syn.: *Biatorella pinicola* (A. Massal.) Anzi

N - Frl, Lomb. C - Tosc (Putorti & al. 1999c, Loppi & al. 2004, Loppi & Baragatti 2011), **Umb** (Ravera 1999, Ravera & al. 2006). **S - Camp** (Nimis & Tretiach 2004).

Cr/ Ch/ S/ Epiph-Lign/ pH: 1-2, L: 4, X: 3, E: 2-3/ Alt: 2-4/ Salp: er, Mont: vr, SmedH: vr/ PT: 1-2/ Note: on hard lignum (*e.g.* on poles) and on acid bark, especially of conifers; perhaps more widespread in the Alps. The species is included in the Italian red list of epiphytic lichens as “Vulnerable” (Nascimbene & al. 2013c).

Strigula Fr.

Syst. Mycol., 2, 2: 535, 1823.

A genus of *c.* 70, (mostly) foliicolous lichens, with the highest diversity in the wet tropics, reasonably diverse in the subtropics and warm-temperate regions, much less so at higher latitudes. Its taxonomic position was not clear (Nelsen & al. 2009), but presently the genus is included into the Strigulaceae in its own order Strigulales (see Jaklitsch & al. 2016). European species were treated by Roux & Sérusiaux (2004). Good descriptions and a key to the British species are in Orange (2013b). Type: *S. smaragdula* Fr.

Strigula affinis (A. Massal.) R.C. Harris

in Hawksworth & al., Lichenologist, 12: 107, 1980 - *Sagedia affinis* A. Massal., Mem. Lichenogr.: 138, 1853.

Syn.: *Arthopyrenia affinis* (A. Massal.) R.C. Harris, *Porina affinis* (A. Massal.) Zahlbr.

N - VG, Frl, Ven (Lazzarin 2000b), **TAA** (Nascimbene & al. 2007b), **Lomb, Piem** (Isocrono & al. 2004). **C - Tosc, Marc** (Nimis & Tretiach 1999, Frati & Brunialti 2006), **Umb** (Genovesi & al. 2002, Ravera & al. 2006), **Laz** (Fornasier & al. 2005, Ravera 2006, Stofer 2006), **Abr** (Caporale & al. 2016), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008). **S - Camp** (Aprile & al. 2003b), **Bas** (Potenza 2006, Potenza & Fascetti 2012), **Cal** (Puntillo 1995, 1996, Puntillo & Puntillo 2004, Roux & Sérusiaux 2004).

Cr/ Tr/ S/ Epiph/ pH: 2-3, L: 3-4, X: 3, E: 2-3/ Alt: 1-3/ Mont: r, SmedD: vr, SmedH: r, MedH: er/ PT: 1-2/ Note: a mainly temperate species found on the smooth bark of deciduous trees, e.g. *Fraxinus*, *Juglans*, *Tilia*.

Strigula buxi Chodat

in Nahas, Etude biologique sur le *Phoma buxi* et le *Strigula buxi*: 50, 1933.

Syn.: *Strigula elegans* auct. eur. non (Fée) Müll. Arg., *Strigula smaragdula* auct. eur. non Fr.

S - Camp (Puntillo & al. 2000, Puntillo 2000, Nimis & Tretiach 2004, Roux & Sérusiaux 2004, Sérusiaux & Diederich 2005).

Cr/ Tr/ S/ Foliic/ pH: 1-2, L: 2-3, X: 1-2, E: 1/ Alt: 1/ MedH: er/ PT: 0/ oc/ Note: a foliicolous subcuticular, Atlantic-Macaronesian species, also known from the Pyrenees and western France. The only Italian station is from a warm-humid coastal gorge hosting several rare lichens with subtropical affinities. The species is included as “Critically Endangered” in the Italian red list of epiphytic lichens (Nascimbene & al. 2013c).

Strigula calcarea Bricaud & Cl. Roux

Bull. Soc. linn. Prov., 42: 13, 1991.

N - VG (Tretiach 1997, Tretiach & Rinino 2006).

Cr/ Tr/ S/ Sax/ pH: 5, L: 2, X: 2-3, E: 1-2/ Alt: 1-2/ SmedD: vr/ PT: 1/ Note: a recently-described species found on limestone in submediterranean woodlands, mostly in rather shaded situations; perhaps more widespread in Italy.

Strigula endolithe Cl. Roux & Bricaud

in Roux & Sérusiaux, Bibl. Lichenol., 90: 88, 2004.

N - VG (Tretiach & Rinino 2006).

Cr/ Tr/ S/ Sax/ pH: 5, L: 1-2, X: 2, E: 1/ Alt: 1/ SmedD: vr/ PT: 1/ u/ Note: a recently-described species, hitherto known from southern France and the Park of the Miramare Castle near Trieste, on shaded calcareous rocks near the coast.

Strigula glabra (A. Massal.) V. Wirth

Flechtenflora: 531, 1980 - *Sagedia glabra* A. Massal., Ric. Auton. Lich. Crost.: 161, 1852.

Syn.: *Arthopyrenia glabra* (A. Massal.) J. Nowak & Tobol., *Porina glabra* (A. Massal.) Zahlbr., *Pyrenula netrospora* Nägeli, *Sagedia candida* Anzi, *Sagedia phyllireae* Jatta, *Spermatodium glabrum* (A. Massal.) Trevis.

N - VG (TSB 35653), **Ven, Lomb** (Roux & Sérusiaux 2004), **S - Pugl, Cal** (Puntillo 1996), **Si** (Caniglia & Grillo 2003).

Cr/ Tr/ S/ Epiph/ pH: 2, L: 3, X: 2, E: 1/ Alt: 1-3/ Mont: vr, SmedD: vr, SmedH: vr, MedH: er/ PT: 1/ Note: a mild-temperate lichen found on smooth bark of deciduous trees (e.g. *Carpinus*, *Fagus*, *Fraxinus*), especially in humid deciduous woodlands along rivers and creeks. It is included in the Italian red list of epiphytic lichens as “Vulnerable” (Nascimbene & al. 2013c).

Strigula minor (Vězda) Cl. Roux & Sérus.

in Puntillo & al., Cryptogamie, Mycol., 31: 175, 2000 - *Raciborskiella minor* Vězda, Folia Geobot. Phytotaxon., 18: 49, 1983.

S - Camp (Puntillo & al. 2000, Puntillo 2000, Nimis & Tretiach 2004), **Cal** (Puntillo 2000, Roux & Sérusiaux 2004).

Cr/ Ch/ S/ Epiph-Foliic/ pH: 1-2, L: 2-3, X: 1, E: 1-2/ Alt: 1-2/ SmedH: er, MedH: er/ PT: 1/ oc/ Note: a mild-temperate to Mediterranean-Atlantic species with subtropical affinities, described from Georgia and also known from the Pyrenees. In Italy it was found on evergreen leaves, and on cladodes of *Ruscus* in warm-humid stands. It is included in the Italian red list of epiphytic lichens as “Endangered” (Nascimbene & al. 2013c).

Strigula porinoides Canals, Boqueras & Gómez-Bolea

Mycotaxon, 55: 391, 1995.

S - Si (Nimis & al. 1994, Canals & al. 1995, Roux & Sérusiaux 2004).

Cr/ Tr/ S/ Sax/ pH: 5, L: 1-2, X: 2, E: 1-2/ Alt: 1/ MedH: vr/ PT: 1/ Note: on calcareous rocks, rarely also on smooth bark, mostly in Mediterranean forests; the species is hitherto known only from the island of Marettimo, from Catalonia in Spain, and from the Carnic Alps in Austria (Breuss 2012).

Strigula stigmatella (Ach.) R.C. Harris

in Hawksworth & al., Lichenologist, 12: 107, 1980 - *Lichen stigmatellus* Ach., Lichenogr. Suec. Prodr.: 15, 1799.

Syn.: *Arthopyrenia faginea* (Schaer.) Swinscow, *Arthopyrenia stigmatella* (Ach.) A. Massal., *Opegrapha thuretii* Hepp, *Porina cinerea* (Pers.) Zahlbr., *Porina faginea* (Schaer.) Arnold, *Porina muscorum* A. Massal., *Porina thuretii* (Hepp) Lettau, *Porina tenebricosa* A. Massal., *Pyrenula muscorum* var. *faginea* (Schaer.) Hepp, *Sagedia tenebricosa* (A. Massal.) Jatta, *Verrucaria cinerea* Pers. non (L.) Humb., *Verrucaria stigmatella* (Ach.) Ach., *Verrucaria thuretii* var. *vulgaris* Garov.

N - VG (TSB 2192), **Frl** (Roux & Sérusiaux 2004, Tretiach 2014), **Ven** (Lazzarin 2000b, Nascimbene 2008c, Nascimbene & al. 2013b), **TAA** (Nascimbene & al. 2007b), **Lomb, Piem** (Isocrono & al. 2004, Giordani & Malaspina

2016), **Emil** (Tretiach & al. 2008, Tretiach 2014), **Lig. C - Tosc, Laz** (Stofer 2006). **S - Camp** (Ravera & Brunialti 2013), **Bas** (Nimis & Tretiach 1999, Potenza & al. 2010), **Si** (Nimis & al. 1994).

Cr/ Tr/ S/ Epiph/ pH: 1-2, L: 2-3, X: 2, E: 1/ Alt: 1-3/ Mont: r, SmedD: er, SmedH: vr, MedH: er/ PT: 1/
Note: a temperate species found on bark and on epiphytic mosses on basal parts of trunks of deciduous trees, especially *Fagus*.

Strigula ziziphi (A. Massal.) Cl. Roux & Sérus.

Bibl. Lichenol., 90: 55, 2004 - *Sagedia ziziphi* A. Massal., Miscell. Lichenol., 30: 60, 1856.

Syn.: *Porina schizospora* Vain., *Porina ziziphi* (A. Massal.) Zahlbr., *Strigula mediterranea* Etayo

N - VG (Tretiach & Carvalho 1995, Carvalho 1997), **TAA** (Roux & Sérusiaux 2004), **Lomb** (Roux & Sérusiaux 2004). **C - Tosc, Laz** (Ravera 2006), **Abr** (Di Santo & Ravera 2012, Corona & al. 2016), **Sar** (Zedda 2002, Rizzi & al. 2011). **S - Pugl** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996, Puntillo & Puntillo 2004), **Si**.

Cr/ Tr/ S/ Epiph/ pH: 2-3, L: 3, X: 2-3, E: 1-3/ Alt: 1-2/ SmedD: er, SmedH: r, MedH: vr/ PT: 1/ suboc/
Note: a mild-temperate to Mediterranean-Atlantic lichen found on bark of deciduous trees in open woodlands (e.g. on *Quercus*, *Castanea*); probably more widespread, especially in southern Italy, but not common. The record of *Strigula taylorii* s.lat. from Sicilia by Nimis & al. (1994) refers to this species.

Synalissa Fr.

Syst. Orb. Veg.: 297, 1825.

A small genus of 5 species in the Lichinaceae. The type species, which was frequently confused for one of the subfruticulose species of *Lempholemma*, is variably polysporous. Type: *S. symphorea* (Ach.) Nyl. (= *S. ramulosa*).

Synalissa ramulosa (Bernh.) Fr.

Syst. Orb. Veg.: 297, 1825 - *Collema ramulosum* Hoffm. ex Bernh., J. Bot. (Schrader), 1: 24, 1799.

Syn.: *Synalissa symphorea* auct. non (Ach.) Nyl.

N - VG (Tretiach 1993), **Frl** (Tretiach 1993, Henssen & Tretiach 1995, Tretiach & Molaro 2007), **Ven** (Thor & Nascimbene 2007, Nascimbene 2008c), **TAA, Lomb** (Valcuvia & al. 2003), **Piem** (Isocrono & al. 2004), **VA** (Matteucci & al. 2015d), **Emil, Lig** (Watson 2014). **C - Tosc** (Benespero 2006), **Marc** (Nimis & Tretiach 1999), **Umb** (Panfili 2000, 2007, Ravera & al. 2006), **Laz, Abr** (Nimis & Tretiach 1999, Caporale & al. 2016), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **Sar** (Tretiach 1993). **S - Camp** (Aprile & al. 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010), **Pugl, Cal** (Tretiach 1993, Puntillo 1996), **Si**.

Frut/ Cy.c/ S/ Sax/ pH: 4-5, L: 4-5, X: 4-5, E: 2-3/ Alt: 1-5/ Alp: vr, Salp: r, Orom: r, Mont: rr, SmedD: rc, SmedH: rc, MedH: rr, MedD: vr/ PT: 1/ w/ Note: a mainly southern species in Europe, found on steeply inclined faces of calcareous rocks with periodical water seepage, often overgrowing the thalli of *Romjularia lurida*, with a wide altitudinal range but with optimum at relatively low elevations.

Syncesia Taylor

in Mackay, Fl. Hibern., 2: 103, 1836.

This genus with 17 accepted species was monographed by Tehler (1997); six species have been described since then (see e.g. Sundin & Tehler 1998), and now 23 species are known worldwide. The genus, which differs from *Chiodecton* in the pruinose or tomentose stroma with innate, discoid ascomata, proved to be monophyletic in the phylogeny of Arthoniales by Ertz & Tehler (2011), and belongs to the Roccellaceae. Type: *S. albida* Taylor

Syncesia myrticola (Fée) Tehler

Fl. Neotrop. Monogr., 75: 18, 1997 - *Chiodecton myrticola* Fée, Essai Cryptog. Ecorc. Offic., 1: 63, 1824.

Syn.: *Chiodecton albidum* (Taylor) Leight., *Chiodecton petraeum* Delise, *Syncesia albida* Taylor

N - Lig. C - Tosc, Sar (Sundin & Tehler 1998). **S - Si** (Nimis & al. 1994, Ottonello & Romano 1997, Ottonello & al. 2011).

Cr/ Tr/ S/ Epiph-Sax/ pH: 2-3, L: 3-4, X: 1-2, E: 1-2/ Alt: 1/ MedH: er/ PT: 1/ coast/ Note: a humid subtropical to Mediterranean-Atlantic lichen found on bark and base-rich siliceous rocks in the most humid parts of Tyrrhenian Italy, usually in the Mediterranean belt and not far from the sea.

Teloschistes Norman

Nytt Mag. Naturvid., 7: 228, 1853.

This genus of c. 20 species - the type genus of the Teloschistaceae - which has been recently re-delimited (see eg. Arup & al. 2013), is widely distributed in the Southern Hemisphere, with diversity centres in Australia/New Zealand, South Africa and central South America. Only a few species occur outside these areas, and in the Northern Hemisphere only 3 species are present, which probably have spread from the Southern Hemisphere. Type: *T. flavicans* (Sw.) Norman

***Teloschistes chrysophthalmos* (L.) Th. Fr.**

Gen. Heterolich.: 51, 1860 - *Lichen chrysophthalmos* L., Mantissa Plant., 2: 311, 1771.

Syn.: *Borrera chrysophthalmos* (L.) Ach., *Physcia chrysophthalmos* (L.) De Not., *Tornabenia chrysophthalmos* (L.) A. Massal., *Xanthoria chrysophthalmos* (L.) Stizenb.

N - VG (Tretiach 1993, Nimis & al. 2006), **Frl** (Tretiach 1993, 1996, Capozzi & al. 2013), **Ven** (Tretiach 1993), **Lomb, Piem** (Matteucci & al. 2008b), **Emil, Lig. C - Tosc** (Loppi & al. 1998, Putorti & al. 1998, 1999c, Ravera & al. 2011b), **Umb** (Ravera 2000, Panfili 2000, Ravera & al. 2006, Ravera & al. 2011b), **Laz** (Ravera & al. 2011b, Brackel 2015), **Mol** (Ravera & al. 2011b), **Sar** (Ravera & al. 2011b). **S - Camp** (Catalano & al. 2016), **Pugl, Bas** (Nimis & Tretiach 1999, Potenza 2006, Potenza & al. 2010, Potenza & Fascetti 2012), **Cal** (Puntillo 1996), **Si** (Tretiach 1993, Nimis & al. 1994, Ottonello & Romano 1997, Ottonello & al. 2006b, 2011, Ottonello & Puntillo 2009, Ravera & al. 2011b).

Frut/ Ch/ S/ Epiph/ pH: 2-3, L: 4-5, X: 3-4, E: 2-3/ Alt: 1-2/ SmedD: er, SmedH: er, MedH: er/ PT: 1/ Note: typical of situations with a dry climate with frequent spells of fog, this species grows on twigs of shrubs and isolated trees in open habitats. It was much more common in the past, and presently it is extinct in many regions (especially in northern Italy). The name is usually spelled “*chrysophthalmus*” but “*chrysophthalmos*” in Greek is a noun, not an adjective. The species is included in the Italian red list of epiphytic lichens as “Near-threatened” (Nascimbene & al. 2013c).

***Teloschistes flavicans* (Sw.) Norman**

Nytt Mag. Naturvid., 7: 229, 1853 - *Lichen flavicans* Sw., Nov. Gen. Sp. Pl.: 147, 1788.

Syn.: *Borrera flavicans* (Sw.) Ach., *Tornabenia flavicans* (Sw.) A. Massal.

C - Sar. S - Si (Nimis & al. 1994, Ottonello & Romano 1997, Ottonello & Puntillo 2009, Ottonello & al. 2011).

Frut/ Ch/ S/ Epiph/ pH: 2-3, L: 3-5, X: 1, E: 2-3/ Alt: 1/ MedH: er/ PT: 0/ oc/ Note: a tropical to Mediterranean-Atlantic lichen found on branches, bryophytes and siliceous rocks in a few warm-humid stands of Tyrrhenian Italy, mostly near the coast in areas with frequent fog. It is included in the Italian red list of epiphytic lichens as “Endangered” (Nascimbene & al. 2013c).

Tephromela M. Choisy

Bull. Soc. Bot. Fr., 76: 522, 1929.

This is a cosmopolitan genus of *c.* 30 species found in temperate to tropical regions on bark, wood, rock or on other lichens. Its familial placement was for a long time unclear: preliminary molecular data (Miądlikowska & al. 2006, Arup & al. 2007) indicated that it does belong neither in the Lecanoraceae nor in the Ramalinaceae, but is related to *Mycoblastus*, being currently placed in the Tephromelataceae (see also Miądlikowska & al. 2014). The *T. atra* complex was studied by Muggia & al. (2008). Type: *T. atra* (Huds.) Hafellner

Tephromela atra* (Huds.) Hafellner var. *atra

in Kalb, Lich. Neotrop., 7: 297, 1983 - *Lichen ater* Huds., Fl. Angl., 1: 445, 1762.

Syn.: *Lecanora atra* (Huds.) Ach., *Lecidea atroides* Walt. Watson, *Patellaria atra* var. *xylophila* (Beltr.) Trevis.?

N - VG (Tretiach & al. 2007b), **Frl** (Tretiach & Hafellner 2000, Muggia & al. 2008), **Ven** (Nascimbene & Caniglia 1997, 2003c, Caniglia & al. 1999), **TAA** (Caniglia & al. 2002, Nascimbene 2001b, 2003, 2006c, 2008b Muggia & al. 2008), **Lomb** (Valcuvia & al. 2003, Callegari & al. 2004, De Vita & Valcuvia 2004 Muggia & al. 2008), **Piem** (Isocrono & al. 2004, Isocrono & Piervittori 2008), **VA** (Piervittori & Isocrono 1999, Isocrono & al. 2008, Favero-Longo & Piervittori 2009, Matteucci & al. 2015c), **Emil** (Hafellner 2007b, Tretiach & al. 2008, Benesperi 2009), **Lig** (Brunialti & al. 1999, Valcuvia & al. 2000, Roccardi 2006, Muggia & al. 2008). **C - Tosc** (Tretiach & Nimis 1994, Putorti & Loppi 1999, Loppi & al. 2004c, Benesperi 2006, 2011, Muggia & al. 2006, 2008, Tretiach & al. 2008, Lastrucci & al. 2009, Brunialti & Frati 2010, Pasquinelli & Puccini 2010, Brackel 2015, Muggia & al. 2015), **Marc** (Nimis & Tretiach 1999), **Umb** (Panfili 2000b, 2003, 2007, Ravera & al. 2006, Genovesi 2011), **Laz** (Tretiach 2004, Ruisi & al. 2005, Zucconi & al. 2013), **Abr** (Nimis & Tretiach 1999), **Mol** (Garofalo & al. 1999, Caporale & al. 2008, Genovesi & Ravera 2014, Paoli & al. 2015), **Sar** (Nöske 2000, Zedda & Sipman 2001, Zedda 2002, Muggia & al. 2008, Harutyunyan & al. 2008, Spribille & al. 2011, Rizzi & al. 2011, Giordani & al. 2013, Cossu 2013, Cossu & al. 2015). **S - Camp** (Garofalo & al. 1999, Ricciardi & al. 2000, Aprile & al. 2002, 2003 Muggia & al. 2008, Spribille & al. 2011, Catalano & al. 2012, 2016), **Pugl** (Garofalo & al. 1999, Nimis & Tretiach 1999, Durini & Medagli 2002, 2004), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996, Scarciglia & al. 2007, 2012), **Si** (Ottonello & al. 1994, 2011, Poli & al. 1995, Nimis & al. 1996b, Ottonello & Romano 1997, Grillo 1998, Poli & Grillo 2000, Grillo & al. 2001, Merlo 2004, 2004b, Grillo & Caniglia 2004, Brackel 2008b, 2008c, Muggia & al. 2008, Gianguzzi & al. 2009).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 3-4, X: 2-4, E: 1-2/ Alt: 1-6/ Alp: rc, Salp: c, Orom: rc, Mont: rc, SmedD: rr, Pad: er, SmedH: c, MedH: rc, MedD: vr/ PT: 1-3/ Note: a widespread, holarctic, polymorphic and ecologically wide-ranging species with a very wide ecological and altitudinal range, reaching the nival belt in the Alps; in the eu-Mediterranean belt it is restricted to sheltered situations, but elsewhere it occurs in sun-exposed habitats; albeit rarely, it can also occur on bark. For further details see Muggia & al. (2008).

***Tephromela atra* var. *calcareea* (Jatta) Clauzade & Cl. Roux**

Bull. Soc. Bot. Centre-Ouest, n. sér., nr. spéc. 7: 829, 1985 - *Lecanora atra* var. *calcareea* Jatta, N. Giorn. Bot. Ital., 12: 218, 1880.

Syn.: *Lecanora atra* f. *pachyhallina* Th. Fr., *Lecanora atra* var. *discolor* Schaer., *Lecanora cypria* Körb., *Tephromela atra* var. *cypria* (Körb.) Nimis, *Tephromela cypria* (Körb.) Hafellner

N - Emil. C - Tosc (Muggia & al. 2006, 2008), **Marc** (Nimis & Tretiach 1999), **Umb** (Nimis & Tretiach 1999, Ravera & al. 2006), **Abr** (Nimis & Tretiach 1999 Muggia & al. 2008), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **Sar**

(Muggia & al. 2008, Rizzi & al. 2011). **S - Camp** (Aprile & al. 2003b, Nimis & Tretiach 2004), **Pugl** (Nimis & Tretiach 1999 Muggia & al. 2008), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994, Ottonello & Salone 1994, Ottonello 1996, Muggia & al. 2008).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 3-4, X: 3-4, E: 1-3/ Alt: 1-3/ Mont: vr, SmedD: rr, SmedH: rc, MedH: c, MedD: rr/ PT: 1-2/ Note: on calciferous rocks wetted by rain, mostly in upland areas. Calcicolous specimens are common in southern Italy, rarer in northern Italy, and perhaps deserve to be treated at the rank of a *forma*. For further details see Muggia & al. (2008).

Tephromela atra* var. *torulosa (Flot.) Hafellner

in Kalb & Hafellner, Herzogia, 9: 91, 1992 - *Lecanora atra* var. *torulosa* Flörke ex Flot., Deutsche Lich., 7: 12, 1821.

Syn.: *Lecanora atra* f. *corticola* Hepp, *Lecanora atra* var. *corticola* (Hepp) Egeling, *Tephromela atra* var. *corticola* (Hepp) Hafellner & Jerzer

N - VG, Frl (TSB 5257), **Ven, TAA** (Nascimbene & al. 2007b), **Lomb, Piem** (Isocrono & al. 2004, Giordani & Malaspina 2016), **Lig** (Putortù & al. 1999b, Giordani & al. 2002, Giordani 2006, Giordani & Incerti 2008). **C - Tosc** (Tretiach & Nimis 1994, Loppi 1996, Loppi & De Dominicis 1996, Loppi & al. 1996b, 1997, 1997b, 1998, 1998b, 1999a, 2006, Loppi & Nascimbene 1998, Putortù & al. 1998, Tretiach & Ganis 1999, Muggia & al. 2006, 2008, Benesperi & al. 2007, 2013, Brunialti & Frati 2010, Benesperi 2011, Paoli & al. 2012, Nascimbene & al. 2015), **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera 1998, Ravera & al. 2006), **Laz** (Bartoli & al. 1997, Massari & Ravera 2002, Nimis & Tretiach 2004, Ravera & Genovesi 2008), **Abr** (Corona & al. 2016), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008, Ravera & al. 2010, Genovesi & Ravera 2014), **Sar** (Loi & al. 2000 Muggia & al. 2008, Rizzi & al. 2011). **S - Camp** (Aprile & al. 2003b, 2011, Nimis & Tretiach 2004, Muggia & al. 2008, Brunialti & al. 2010, 2013, Ravera & Brunialti 2013, Catalano & al. 2016), **Pugl** (Nimis & Tretiach 1999, Brackel 2011), **Bas** (Nimis & Tretiach 1999, Potenza 2006 Muggia & al. 2008, Brackel 2011), **Cal** (Puntillo 1995, 1996, Incerti & Nimis 2006), **Si** (Ottonello & Salone 1994, Grillo & Caniglia 2004, Ottonello 1996, Liistro & Cataldo 2011).

Cr/ Ch/ S/ Epiph/ pH: 1-2, L: 3-4, X: 3, E: 1-2/ Alt: 1-3/ Mont: rr, SmedD: r, SmedH: rr, MedH: r, MedD: er/ PT: 1-2/ #/ Note: a temperate lichen found on the bark of deciduous and evergreen broad-leaved trees. This taxon deserves further study: corticolous forms of typical *T. atra* are not rare, but the most common morph differs in several respects from epiphytic samples of *T. atra s.str.*, and there is molecular evidence that two taxa are involved (see Cestaro & al. 2016). Several records of corticolous *T. atra* are filed here, but their attribution to this taxon needs confirmation.

Tephromela grumosa (Pers.) Hafellner & Cl. Roux

in Clauzade & Roux, Bull. Soc. Bot. Centre-Ouest, n. sér., nr. spéc. 7: 829, 1985 - *Lichen grumosus* Pers., Ann. Bot. (Usteri), 8: 36, 1795.

Syn.: *Lecanora atra* var. *grumosa* (Pers.) Ach., *Lecanora grumosa* (Pers.) Röhl.

N - TAA (Dalla Torre & Sarnthein 1902), **VA** (Pierivittori & Isocrono 1999), **Emil. C - Tosc** (Tretiach 2002, 2004, Muggia & al. 2006, 2008), **Sar** (Muggia & al. 2008). **S - Si** (Muggia & al. 2008).

Cr/ Ch/ A.s/ Sax/ pH: 1-2, L: 3-5, X: 2-3, E: 1-2/ Alt: 2-3/ Mont: vr, SmedH: er/ PT: 1/ suboc/ Note: a mainly cool-temperate lichen found on steeply inclined surfaces of acidic siliceous rocks. Earlier records from Marche and Sicilia reported by Nimis (1993: 683), being dubious, are not accepted here.

Tetramelas Norman

Nytt Mag. Naturvid., 7: 236, 1853.

Phylogenetic studies based on molecular data have shown that the genus *Tetramelas* constitutes a well founded segregate of *Buellia s.lat.* within the Caliciaceae (see e.g. Helms & al. 2003). The genus was resurrected by Marbach (2000) and later it was emended with the addition of new diagnostic characters. Since then, 13 species have been combined into the genus and one new species has been described. A key to all known species was provided by Giralt & Clerc (2011). Type: *T. geophilus* (Sommerf.) Norman

Tetramelas chloroleucus (Körb.) A. Nordin

Lichenologist, 36: 356, 2004 - *Buellia chloroleuca* Körb., Parerga Lichenol.: 191, 1860.

Syn.: *Buellia parasema* var. *saprophila* (Ach.) Körb., *Buellia poeltii* T. Schauer, *Buellia punctata* var. *saprophila* (Ach.) Anzi, *Buellia zahlbruckneri sensu* T. Schauer, *Tetramelas poeltii* (T. Schauer) Kalb

N - Frl, Ven (Giralt & al. 2000, Nascimbene & Caniglia 2003c, Thor & Nascimbene 2007), **TAA** (Giralt & al. 2000, Nascimbene & al. 2006e, 2007b, 2008c, Nimis & al. 2015), **Lomb** (Giralt & al. 2000), **Piem** (Isocrono & al. 2004), **Emil. C - Abr**.

Cr/ Ch/ S/ Lign/ pH: 1-2, L: 3-4, X: 3-4, E: 2-3/ Alt: 3-4/ Salp: rr, Mont: r/ PT: 1/ Note: a mainly boreal-montane species found on lignum, more rarely on bark, especially of conifers, with optimum in the upper montane belt. See also note on *B. erubescens*.

Tetramelas concinnus (Th. Fr.) Giralt

in Giralt & al., Nova Hedwigia, 89: 330, 2009 - *Buellia concinna* Th. Fr., N. Acta Reg. Soc. Sci. Upsal., ser. 3, 3: 232, 1860.

Syn.: *Buellia nodulosa* (Lyngé) H. Magn., *Buellia subconcinna* (Vain.) Zahlbr., *Buellia subviridescens* (Nyl. ex Th. Fr.) Vain., *Lecidea perlutescens* Nyl. ex Th. Fr., *Lecidea subconcinna* Vain.

C - Sar (Rizzi & al. 2011).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 4-5, X: 3-4, E: 1/ Alt: 3/ Mont: vr/ PT: 1/ paras crustose and foliose lichens when young/ Note: a cool-temperate to boreal-montane, circumpolar species found on steeply inclined surfaces of hard siliceous rocks in upland areas, often starting the life-cycle on other crustose lichens; probably occurring also in the Alps.

Tetramelas geophilus (Sommerf.) Norman

Nytt Mag. Naturvid., 7: 236, 1853 - *Lecidea geophila* Flörke ex Sommerf., Suppl. Fl. Lapon.: 157, 1826.

Syn.: *Buellia geophila* (Sommerf.) Lyngby, *Buellia insignis* var. *muscorum* (Hepp) Körb., *Lecidea triphragmia* Nyl. non auct., *Buellia triphragmia* (Nyl.) Arnold non auct., *Diplotomma geophilum* (Sommerf.) S.R. Singh & D.D. Awasthi N - **TAA**, **Piem** (Isocrono & al. 2004), **VA** (TSB 29476).

Cr/ Ch/ S/ Terr/ pH: 3-4, L: 4, X: 4, E: 1-2/ Alt: 4-5/ Alp: r, Salp: vr/ PT: 1/ Note: a mainly boreal-montane to arctic-alpine, circumpolar lichen overgrowing terricolous and epilithic mosses on calciferous substrata near and above treeline, restricted to the Alps in Italy. A related species, "*Buellia*" *trifracta* J. Steiner, is known from the Alps of Austria.

Tetramelas insignis (Hepp) Kalb

in Döbbele & Rambold, Bibl. Lichenol., 88: 323, 2004 - *Lecidea insignis* Nägeli ex Hepp, Flecht. Eur.: nr. 39, 1853.

Syn.: *Buellia disciformis* var. *insignis* (Hepp) Flagey, *Buellia insignis* (Hepp) Körb., *Buellia parasema* var. *albicincta* Th. Fr., *Buellia parasema* var. *muscorum* (Schaer.) Th. Fr., *Buellia epigaea* var. *cacuminum* (A. Massal.) Jatta, *Diploicia cacuminum* A. Massal.

N - **Frl** (Tretsch & Hafellner 2000), **Ven** (Lazzarin 2000b), **TAA** (Bilovitz & al. 2014), **Lomb**, **Piem**, **VA** (Piervittori & Isocrono 1999, Piervittori & al. 2004). **C** - **Abr** (Jatta 1909-1911), **Sar** (Jatta 1909-1911). **S** - **Pugl** (Jatta 1909-1911).

Cr/ Ch/ S/ Terr/ pH: 2-4, L: 4-5, X: 3-4, E: 1/ Alt: 3-5/ Alp: rr, Salp: rc, Mont: vr/ PT: 1/ Note: a species of the high European mountains found on terricolous mosses and plant debris, rarely on rock, lignum and bark, especially on basal parts of trunks; most frequent in the Alps; the records by Jatta from central and southern Italy require confirmation.

Tetramelas papillatus (Sommerf.) Kalb

in Döbbele & Rambold, Bibl. Lichenol., 88: 323, 2004 - *Lecidea papillata* Sommerf., Suppl. Fl. Lapp.: 154, 1826.

Syn.: *Buellia papillata* (Sommerf.) Tuck., *Buellia parasema* var. *papillata* (Sommerf.) Th. Fr.

N - **Frl**, **Lomb**, **Piem** (Isocrono & al. 2004), **Lig** (TSB 33479).

Cr/ Ch/ S/ Terr/ pH: 3-4, L: 4-5, X: 4, E: 1/ Alt: 4-6/ Alp: vr, Salp: er/ PT: 1/ Note: an arctic-alpine lichen found on terricolous bryophytes, mostly above treeline, reaching the nival belt in the Alps; it is related to *T. insignis*.

Tetramelas pulverulentus (Anzi) A. Nordin & Tibell

Lichenologist, 37: 497, 2005 - *Abrothallus pulverulentus* Anzi, Cat. Lich. Sondr.: 116, 1860.

Syn.: *Arthonia muscigenae* (Anzi) Jatta, *Buellia convexa* Th. Fr., *Buellia pulverulenta* (Anzi) Jatta, *Diplotomma pulverulentum* (Anzi) D. Hawksw., *Leciographa muscigenae* (Anzi) Rehm, *Karschia pulverulenta* (Anzi) Körb.

N - **TAA** (Dalla Torre & Sarnthein 1902, Nascimbene & al. 2007b, Brackel 2016), **Lomb** (Brackel 2016), **VA** (Hafellner 1979, Brackel 2016). **C** - **Marc** (Nimis & Tretsch 1999, Brackel 2016), **Abr** (Nimis & Tretsch 1999, Brackel 2016), **Sar** (Brackel 2016).

Cr/ Ch/ S/ Terr-Sax-Epiph/ pH: 2-5, L: 4-5, X: 3-4, E: 2-4/ Alt: 3-5/ Alp: rc, Salp: rr, Orom: vr, Mont: er/ PT: 1/ paras crustose and foliose lichens/ Note: a holarctic endoparasitical lichen (it grows inside the thalli of Physciaceae, especially *Physconia muscigena*, but with its own photobiont), certainly more widespread in the Alps, but much overlooked in the past; most frequent above treeline, but descending below the oroboreal belt in dry-continental regions; rarer south of the central Apennines, and to be looked for in the mountains of Calabria and Sicilia.

Tetramelas thiopolizus (Nyl.) Giralt & P. Clerc

Lichenologist, 43: 418, 2011 - *Lecidea thiopoliza* Nyl., Flora, 56: 244, 1878.

Syn.: *Buellia hypophana* (Nyl.) Zahlbr., *Buellia reagens* H. Magn., *Buellia thiopoliza* (Nyl.) Boistel, *Lecidea hypophana* Nyl.

N - **TAA** (Nimis & al. 1996), **VA** (Piervittori & al. 2004). **C** - **Sar** (Nöske 2000).

Cr/ Ch/ S/ Terr/ pH: 2-3, L: 4-5, X: 3-4, E: 1/ Alt: 4-5/ Alp: vr, Salp: er, Orom: vr/ PT: 1/ Note: on *Grimmia* spp. and other mosses overgrowing siliceous rocks with optimum above treeline; probably more widespread in the Alps.

Tetramelas triphragmioides (Anzi) A. Nordin & Tibell

Lichenologist, 37: 497 2005 - *Buellia triphragmioides* Anzi, Atti Soc. Ital. Sc. Nat. Milano, 11: 171, 1868.

Syn.: *Buellia triphragmia* var. *rugulosa* Bagl. & Carestia, *Buellia triphragmia* var. *lividescens* Bagl. & Carestia, *Diplotomma triphragmioides* (Anzi) Szatala

N - **TAA** (Nascimbene & al. 2006e, 2007b), **Lomb** (Nordin 1996), **Piem** (Isocrono & al. 2004), **VA** (Matteucci & al. 2008c).

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 3, X: 3, E: 1-2/ Alt: 3-4/ Salp: er, Mont: vr/ PT: 1/ Note: on the smooth bark of *Alnus*, *Populus tremula*, *Salix*, etc., more rarely of conifers; this species is characterised by the yellowish thallus, and the C+reaction of the medulla. It is included in the Italian red list of epiphytic lichens as “Vulnerable” (Nascimbene & al. 2013c).

Thamnolia Schaer.

Ach. ex Schaer., Enum. Crit. Lich. Europ.: 243, 1850.

The classification of this genus in the Lecanorales was apparently based solely on the character of lichenisation. The two to several species, depending on the taxonomic concept, are non-sexual, and not only fail to produce ascospores but also lack any vegetative or mitotic propagules typical of other lichens (but see e.g. Lord & al. 2013). They occur on soil in arctic-alpine habitats of both Hemispheres. Molecular data suggest that the genus is closely related to *Siphula*, and that both genera are paraphyletic with the baemycetoid lichens of the Icmadophilaceae (Platt & Spatafora 2000, Stenroos & al. 2002). Molecular sequence data suggest that the two chemotypes, which are provisionally still accepted here, do not form well-supported, monophyletic lineages, which may be due to rare or historic recombination, repeated chemotype evolution or incomplete lineage sorting (Nelsen & Gargas 2009). Type: *T. vermicularis* (Sw.) Schaer.

Thamnolia vermicularis* var. *subuliformis (Ehrh.) Schaer.

Enum. Critic. Lich. Europ.: 243, 1850 - *Lichen subuliformis* Ehrh., Beitr. Naturk., 3: 82, 1788.

Syn.: *Thamnolia subuliformis* (Ehrh.) W.L. Culb., *Thamnolia subvermicularis* Asahina

N - **Frl** (TSB 318), **Ven** (Nascimbene & Caniglia 2003, 2003c), **TAA** (Bilovitz & al. 2014b), **Lomb** (TSB 6645), **Piem** (TSB 35249), **VA** (Valcuvia 2000, Piervittori & al. 2004).

Frut/ Ch/ A.f/ Terr/ pH: 2-4, L: 4-5, X: 4, E: 1-2/ Alt: 4-5/ Alp: rc, Salp: er/ PT: 1/ Note: an arctic-alpine, circumpolar lichen found in open, wind-exposed Alpine tundras; much rarer in the Italian Alps than the typical variety.

Thamnolia vermicularis* (Sw.) Schaer. var. *vermicularis

Ach. ex Schaer., Enum. Crit. Lich. Eur.: 243, 1850 - *Lichen vermicularis* Sw., Meth. Musc. Illus.: 37, 1871.

Syn.: *Cenomyce taurica* (Wulfen) Röhl., *Cenomyce vermicularis* (Sw.) Röhl., *Cladonia taurica* (Wulfen) Hoffm., *Cladonia vermicularis* (Sw.) DC., *Thamnolia vermicularis* f. *minor* Lamy

N - **Frl** (Tretlach & Hafellner 2000), **Ven** (Nascimbene & Caniglia 1997, 2003c, Caniglia & al. 1999, Giovagnoli & Tasinazzo 2014), **TAA** (Caniglia & al. 2002, Nascimbene & al. 2005, 2006, Nascimbene 2008b, Lang 2009, Bilovitz & al. 2014, 2014b), **Lomb** (Rivellini 1994, Dalle Vedove & al. 2004), **Piem** (Isocrono & al. 2004, Hafellner & al. 2004, Morisi 2005, Isocrono & Piervittori 2008), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Valcuvia 2000, Piervittori & al. 2004, Favero-Longo & al. 2006, Isocrono & al. 2008), **Lig. C - Laz** (Jatta 1909-1911).

Frut/ Ch/ A.f/ Terr/ pH: 2-4, L: 4-5, X: 4, E: 1-2/ Alt: 4-6/ Alp: ec, Salp: r/ PT: 1/ Note: an arctic-alpine, circum- and bipolar lichen found on wind-exposed Alpine tundras, both on calcareous and siliceous substrata. The old record from the mountains of Latium, as the recent one from Mt. Etna by Di Martino & Stancanelli (2015), which is not accepted here, need re-confirmation.

Thelenella Nyl.

Mém. Soc. Imp. Sc. Nat. Cherbourg, 3: 193, 1855.

This genus with c. 33 species is part of the Ostropomycetidae within the Lecanoromycetes and is currently placed in the Thelenellaceae. *Chromatochlamys* Trevis. was subsumed formally in *Thelenella* by Fryday & Coppins (2004); the close relationship between the two genera was confirmed by the phylogenetic study by Schmitt & al. (2005). A worldwide key to the species was published by Morse (2016). Type: *T. modesta* (Nyl.) Nyl.

Thelenella inductula (Nyl.) H. Mayrhofer

Bibl. Lichenol., 26: 38, 1987 - *Verrucaria inductula* Nyl. in Hasse, Bull. Torrey Bot. Club, 24: 448, 1897.

Syn.: *Microglæna sampaiana* B. de Lesd., *Microglæna inductula* (Nyl.) Servít, *Polyblastia inductula* (Nyl.) Zahlbr., *Thelenella sampaiana* (B. de Lesd.) H. Mayrhofer & Poelt

S - Si (Otonello & Puntillo 1995).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 3-4, X: 2-3, E: 2-3/ Alt: 1/ MedH: er/ PT: 1/ suboc/ Note: a mainly Mediterranean lichen found on volcanic rocks, granite and schist, in sheltered and rather shaded, humid situations.

Thelenella justii (Servít) H. Mayrhofer & Poelt

Herzogia, 7: 61, 1985 - *Microglæna justii* Servít in Zschacke, Rabenh. Krypt.-Flora, 9, 1: 665, 1934.

C - Laz.

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 3, X: 2, E: 1-2/ Alt: 2/ SmedH: vr/ PT: 1/ suboc/ Note: a mild-temperate, mainly western lichen found on the rough bark of broad-leaved trees and shrubs in sheltered situations, with optimum in the submediterranean belt. It was included in the Italian red list of epiphytic lichens as “Data Deficient” (Nascimbene & al. 2013c).

Thelenella melanospora Etayo & H. Mayrhofer

Nova Hedwigia, 77: 111, 2003.

C - **Tosc** (TSB 35306), **Sar** (Etayo & Mayrhofer 2003). **S - Si** (TSB 31103).

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 3, X: 2, E: 1-2/ Alt: 1/ MedH: vr/ PT: 1/ suboc, p/ Note: on the (mostly) smooth bark of shrubs (e.g. *Pistacia*) in Mediterranean maquis vegetation. The species is included in the Italian red list of epiphytic lichens as “Endangered” (Nascimbene & al. 2013c). See also note on *Th. modesta*.

Thelenella modesta (Nyl.) Nyl.

Mém. Soc. Sc. Nat. Cherbourg, 3: 193, 1855 - *Verrucaria modesta* Nyl., Bot. Not.: 164, 1853.

Syn.: *Dactyloblastus wallrothianus* (Körb.) A. Massal., *Luykenia modesta* (Nyl.) Trevis., *Microglæna modesta* (Nyl.) A.L. Sm., *Microglæna subcorallina* Hasse, *Microglæna wallrothiana* Körb., *Microglæna wallrothiana* var. *septentrionalis* Th. Fr., *Phlyctis norvegica* Norman, *Polyblastia modesta* (Nyl.) H. Olivier, *Thelenella wallrothiana* (Körb.) Syd., *Verrucaria sericea* var. *wallrothiana* (Körb.) Garov.

N - Ven, Lomb, Piem (Caniglia & al. 1992), **Lig** (Valcuvia & al. 2000). **C - Tosc, Marc** (Candotto & al. 2013c), **Umb** (Ravera 1998, Ravera & al. 2006), **Laz** (Ravera 2001), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **Sar, S - Pugl** (Nimis & Tretiach 1999), **Bas** (Potenza & al. 2014), **Cal** (Puntillo 1996, Puntillo & Puntillo 2004), **Si** (Nimis & al. 1994, Grillo & Cristaudo 1995, Grillo & Carfi 1997, Grillo 1998, Grillo & Caniglia 2004, Ottonello & Puntillo 2009, Ottonello & al. 2011).

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 3, X: 2, E: 1-2/ Alt: 1-2/ SmedD: er, SmedH: vr, MedH: vr/ PT: 1/ suboc/ Note: a mainly mild-temperate, western lichen found on bark of broad-leaved trees and shrubs in rather sheltered and humid situations; mostly Tyrrhenian in Italy. Some earlier records from southern Italy could refer to the strictly Mediterranean *Th. melanospora*. The species is included in the Italian red list of epiphytic lichens as “Near-threatened” (Nascimbene & al. 2013c).

Thelenella muscorum (Th. Fr.) Vain. var. ***muscorum***

Term. Füz., 22: 341, 1899 - *Microglæna muscorum* Th. Fr., Nova Acta R. Soc. Scient. Upsal., ser. 3, 3: 362, 1861.

Syn.: *Chromatochlamys muscicola* (Ach.) Trevis., *Chromatochlamys muscorum* (Th. Fr.) H. Mayrhofer & Poelt, *Microglæna holliana* A.L. Sm., *Microglæna lesdainii* (Harm.) Tav., *Microglæna macrospora* B. de Lesd., *Weitenwebera muscorum* (Th. Fr.) Körb., *Verrucaria muscicola* Ach., *Verrucaria muscorum* Fr. nom. illegit.

N - VG, Frl, Ven, TAA (Nascimbene & al. 2007b), **Lomb, Piem** (Isocrono & al. 2004), **Emil** (Nimis & al. 1996). **C - Tosc** (Benesperi & al. 2007, Tretiach & al. 2008, Brackel 2015), **Marc** (Nimis & Tretiach 1999), **Umb** (Nimis & Tretiach 1999, Ravera & al. 2006), **Laz** (Nimis & Tretiach 2004), **Abr** (Nimis & Tretiach 1999, Corona & al. 2016), **Mol** (Nimis & Tretiach 2004, Caporale & al. 2008), **Sar, S - Camp** (Nimis & Tretiach 2004), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996, Puntillo & Puntillo 2004, Incerti & Nimis 2006), **Si** (Nimis & al. 1996b, Brackel 2008b).

Cr/ Ch/ S/ Epiph-Terr/ pH: 2-4, L: 3-4, X: 3, E: 1-2/ Alt: 2-5/ Alp: vr, Salp: rr, Mont: rr, SmedD: r, SmedH: r, MedH: vr/ PT: 1/ Note: a holarctic lichen found on muribund pleurocarpous mosses on rocks and soil, more rarely on the basal parts of old trunks, with optimum in the montane belt.

Thelenella muscorum var. ***octospora*** (Nyl.) Coppins & Fryday

in Fryday & Coppins, Lichenologist, 36: 91, 2004 - *Verrucaria muscicola* var. *octospora* Nyl. in Ohlert, Lich. Prov. Preussen: 43, 1870.

Syn.: *Chromatochlamys muscorum* var. *octospora* (Nyl.) H. Mayrhofer & Poelt

N - Piem (TSB 34009).

Cr/ Ch/ S/ Epiph-Terr/ pH: 2-3, L: 3-4, X: 3, E: 1-2/ Alt: 3-4/ Salp: er, Mont: er/ PT: 1/ Note: a mainly western lichen in Europe found on muribund mosses on rocks and soil, mostly in upland areas. The record from the Italian Alps is somehow surprising.

Thelenella pertusariella (Nyl.) Vain.

Acta Soc. Fauna Fl. Fenn., 49, 2: 155, 1921 - *Verrucaria pertusariella* Nyl., Flora, 47: 356, 1864.

Syn.: *Microglæna pertusariella* (Nyl.) Norman, *Phlyctis submuriformis* H. Magn.

N - TAA (Nascimbene & al. 2007b).

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 3, X: 3, E: 1-2/ Alt: 3-4/ Mont: vr/ PT: 1/ Note: on the smooth bark of small shrubs in the mountains (*Daphne, Rhododendron, Salix, Sorbus*). The record is from Austria, but close to the Italian border.

Thelidium A. Massal.

Framm. Lichenogr.: 15, 1855.

The taxonomy of the Verrucariaceae is presently being revised on the basis of molecular data. Savić & al. (2008) have shown that morphological features traditionally used for characterising the genera *Polyblastia*, *Thelidium*, *Staurothele* and *Verrucaria*, are not always reliable for characterising natural groups. *Polyblastia*,

Thelidium, *Staurothele* and *Verrucaria*, as currently delimited, are non-monophyletic. *Thelidium* was usually considered as closely related to *Polyblastia*, but in the “sporological” tradition it was characterised exclusively by having transversal septa, whereas *Polyblastia* also has longitudinal septa. The strongly supported “*Thelidium*-clade” in the analysis by Savić & al. (2008) contains a mixture of species included into *Polyblastia*, *Thelidium*, *Staurothele* and *Verrucaria*, with a dramatic variability in spore septation and colour, and even the presence of some species with hymenial algae. Many nomenclatural changes are expected to occur in these genera in the next future. Currently c. 100 species, mostly described more than one century ago, are classified in this genus. Good descriptions and a key to the British species are in Orange (2013b). Type: *T. amylaceum* A. Massal.

Thelidium absconditum (Hepp) Rabenh.

Flecht. Eur.: nr. 797, 1867 - *Sagedia nigrella* var. *abscondita* Hepp, Flecht. Eur.: nr. 698, 1860.

N - TAA, Lig. C - Marc (Nimis & Tretiach 1999), Umb (Genovesi & al. 2002, Ravera & al. 2006), Mol (Garofalo & al. 1999, Caporale & al. 2008). S - Camp (Garofalo & al. 1999, Nimis & Tretiach 2004).

Cr.end/ Ch/ S/ Sax/ pH: 4-5, L: 3, X: 2-3, E: 1-2/ Alt: 3-5/ Alp: rr, Salp: rc, Orom: er, Mont: vr/ PT: 1/ #/ Note: on limestone, dolomite, calciferous schists in upland areas; certainly more widespread also in the Alps. The relationship with *Th. decipiens* remains to be clarified. An earlier record from Venezia Giulia (see Nimis 1993: 685) is not accepted here, as it is far from the present border.

Thelidium acrotellum Arnold

Flora, 49: 532, 1866.

N - TAA (Dalla Torre & Sarnthein 1902).

Cr/ Ch/ S/ Sax/ pH: 3-5, L: 4, X: 3, E: 1-2/ Alt: 3-5/ Alp: er, Salp: vr, Mont: vr/ PT: 1-2/ p/ Note: on more or less calciferous rocks in upland areas: according to Breuss (2004) the species is not easy to distinguish from *T. minutulum*, but has a colourless excipulum and a thin involucrellum.

Thelidium aethioboloides Zschacke

Hedwigia, 62: 44, 1920.

N - Ven (Thüs & Nascimbene 2008, Nascimbene 2008c), TAA (Thüs & Nascimbene 2008, Nascimbene 2008b).

Cr/ Ch/ S/ Sax/ pH: 3-5, L: 2-3, X: 1-2, E: 1/ Alt: 3-4/ Salp: r, Mont: vr/ PT: 1/ Note: amphibious, but usually not permanently submerged, on calciferous rocks in shaded situations, with optimum in the upper montane belt; perhaps more widespread in the Alps.

Thelidium amylaceum A. Massal.

Framm. Lichenogr.: 15, 1855.

N - VG (TSB 15238), Ven (Lazzarin 2000b).

Cr.end/ Ch/ S/ Sax/ pH: 4-5, L: 3-4, X: 2-3, E: 1-2/ Alt: 3-5/ Alp: vr, Salp: vr, Mont: vr/ PT: 1/ #/ Note: a very poorly known calcicolous species, sometimes synonymised with *T. decipiens*. The type material (see Lazzarin 2000b) urgently needs further study because this is the type species of *Thelidium*.

Thelidium antonellianum Bagl. & Carestia

Atti Soc. Critt. Ital., 2: 326, 1880.

Syn.: *Involucrothele antonelliana* (Bagl. & Carestia) Servít

N - TAA, Piem (Isocrono & al. 2004).

Cr/ Ch/ S/ Sax/ pH: 3, L: 3, X: 3, E: 1/ Alt: 5-6/ Alp: vr/ PT: 1/ #/ Note: a poorly known species of crystalline, weakly calciferous schists above treeline, reaching the nival belt. The type material, from the Italian Alps, was collected at 4.500 m.

Thelidium auruntii (A. Massal.) Kremp.

Denkschr. kgl. bayer. bot. Ges., Abt. 2 4: 248, 1861 - *Verrucaria auruntii* A. Massal., Symmicta Lich: 77, 1855.

N - Ven (Lazzarin 2000b), TAA, Lig. C - Sar.

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 4, X: 2-3, E: 1/ Alt: 3-5/ Alp: vr, Salp: vr, Orom: vr, Mont: vr/ PT: 1/ Note: differing from *T. pyrenophorum* by the well-developed, brown thallus and the smaller spores, this species, also known from Scandinavia, grows on limestone, dolomite and calciferous schists in upland areas.

Thelidium bubulcae (A. Massal.) Arnold

Verh. zool.-bot. Ges. Wien, 18: 706, 1868 - *Lithocia bubulcae* A. Massal., Framm. Lichenogr.: 23, 1855.

Syn.: *Leiophloea bubulcae* (A. Massal.) Trevis., *Sagedia bubulcae* (A. Massal.) Garov.

N - Ven (Lazzarin 200b)

Cr/ Ch/ S/ Sax-Terr/ pH: 3-5, L: 4, X: 2-3, E: 1-2/ Alt: 2/ SmedD: vr/ PT: 1-2/ p, #/ Note: often considered as a synonym of *T. zwackhii*, this poorly known calcicolous species is accepted by Roux & coll. (2014).

Thelidium decipiens (Nyl.) Kremp.

Denkschr. kgl. bayer. bot. Ges., 4, 2: 246, 1861 - *Verrucaria pyrenophora* var. *decipiens* Hepp ex Nyl., Mém. Soc. Imp. Sc. Nat. Cherbourg, 5: 137, 1858.

Syn.: *Amphoridium crassum* (A. Massal.) Servít, *Amphoridium uberinum* A. Massal., *Thelidium amylaceum* auct. non A. Massal., *Thelidium cinerascens* (Anzi) Servít, *Thelidium coeruleascens* Jatta, *Thelidium crassum* A. Massal., *Thelidium decipiens* f. *cinerascens* (Anzi) Arnold, *Thelidium hymenelioides* Körb., *Thelidium immersum* (Leight.) Mudd, *Thelidium leightonii* M. Choisy, *Thelidium pachysporum* Zschacke, *Thelidium thuringiacum* Zschacke, *Thelidium umbrosum* Arnold non (A. Massal.) A. Massal., *Verrucaria scrobicularis* Garov.

N - Frl (Cucchi & al. 2009), **Ven** (Nimis 1994, Lazzarin 2000), **TAA** (Nascimbene 2008b), **Lomb, Piem** (TSB 34785), **VA** (Piervittori & Isocrono 1999), **Lig** (Brunialti & al. 1999). **C - Marc** (Nimis & Tretiach 1999), **Umb** (Genovesi & Ravera 2001, Ravera & al. 2006), **Abr, Mol** (Nimis & Tretiach 2004, Caporale & al. 2008). **S - Camp** (Aprile & al. 2003b), **Pugl, Cal** (Puntillo 1996), **Si** (Grillo 1998, Grillo & Caniglia 2004).

Cr.end/ Ch/ S/ Sax/ pH: 4-5, L: 3-4, X: 2-3, E: 1-2/ Alt: 3-5/ Alp: c, Salp: rc, Orom: r, Mont: er/ PT: 1/ Note: a cool-temperate to arctic-alpine, circumpolar species of calcareous rocks, including large pebbles, in rather sheltered situations, mostly in upland areas, with optimum above treeline. See also note on *T. absconditum*.

Thelidium dionantense (Hue) Zschacke

Hedwigia, 62: 130, 1920 - *Verrucaria dionantensis* Hue in Tonglet, Bull. Soc. Bot. Belgique, 37: 41, 1898.

C - Abr (Nimis & Tretiach 1999).

Cr.end/ Ch/ S/ Sax/ pH: 5, L: 3-4, X: 2-3, E: 1/ Alt: 3-5/ Alp: r, Salp: vr, Mont: vr/ PT: 1/ Note: on steeply inclined surfaces of calciferous rocks in upland areas; to be looked for also in the Alps.

Thelidium exile Arnold

Flora, 65, 26: 410, 1882.

N - TAA.

Cr/ Ch/ S/ Sax/ pH: 3-5, L: 4, X: 3, E: 1-2/ Alt: 3-5/ Alp: er, Salp: vr, Mont: vr/ PT: 1/ Note: on more or less calciferous rocks in upland areas. The species was frequently considered as a synonym of *T. minutulum*, but according to Roux & coll. (2014) it differs in having half-protruding perithecia.

Thelidium fontigenum A. Massal.

Miscell. Lichenol.: 31, 1851.

Syn.: *Involucrothele cataractarum* (Hepp) Servít, *Thelidium cataractarum* (Hepp) Lönnr., *Sagedia cataractarum* Hepp

N - Ven, Piem, VA (Piervittori & Isocrono 1999).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 3-4, X: 1-2, E: 1/ Alt: 3-4/ Salp: r, Mont: vr/ PT: 1/ Note: on limestone, dolomite, calcareous sandstone, near creeks and waterfalls in upland areas, but usually below treeline.

Thelidium impressum (Müll. Arg.) Zschacke

Hedwigia, 62: 124, 1920 - *Sagedia impressa* Müll. Arg., Flora, 55: 504, 1872.

C - Marc (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008).

Cr.end/ Ch/ S/ Sax/ pH: 5, L: 3-4, X: 2-3, E: 1-2/ Alt: 3-5/ Alp: er, Salp: vr, Mont: vr/ PT: 1/ #/ Note: on inclined surfaces of compact calcareous rocks in upland areas; probably present also in the Alps, but overlooked or confused with other species.

Thelidium incavatum Mudd

Nyl. ex Mudd, Man. Brit. Lich.: 295, 1861.

Syn.: *Amphoridium umbrosum* A. Massal., *Amphoroblastia incavata* (Mudd) Servít, *Polyblastia incavata* (Mudd) Croz., *Thelidium umbrosum* (A. Massal.) A. Massal. non Arnold, *Verrucaria cryptarum* var. *asperata* Garov.

N - Frl (Breuss 2008), **Ven** (Lazzarin 2000, Nascimbene 2008c), **TAA, Piem** (TSB 33967), **Emil** (Tretiach & al. 2008), **Lig, C - Umb** (Genovesi & Ravera 2001, Ravera & al. 2006), **Abr** (Cucchi & al. 2009), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008). **S - Camp** (Aprile & al. 2003b), **Cal** (Puntillo 1996).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 3-4, X: 2-3, E: 1-2/ Alt: 3-5/ Alp: rc, Salp: rr, Orom: vr, Mont: er/ PT: 1/ Note: on small calcareous pebbles close to the ground, usually in upland areas; probably more widespread, but overlooked. According to Breuss (2014) *T. umbrosum* is perhaps an independent species.

Thelidium inundatum Zschacke

Rabenh. Krypt.-Flora, 9, 1, 1: 344, 348, 1933.

N - Ven (Nascimbene & Nimis 2007, Nascimbene 2008, Nascimbene & al. 2009), **TAA** (Nascimbene & al. 2007b).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 3-4, X: 1-2, E: 1/ Alt: 3-4/ Salp: r, Mont: vr/ PT: 1/ Note: an endolithic amphibian lichen found in periodically submerged situations, mostly on calcareous substrata in upland areas, but usually below the Alpine belt.

Thelidium methorium (Nyl.) Hellb.

Öfvers. K. Svensk. Vetensk.-Akad. Förh., 32, 3: 80, 1875 - *Verrucaria methoria* Nyl., Öfvers. K. Svensk. Vetensk.-Akad. Förh., 17: 296, 1860.

Syn.: *Involucrothele aeneovinosa* (Anzi) Servít, *Involucrothele kutakii* (Servít) Servít, *Sagedia aeneovinosa* Anzi, *Thelidium aeneovinosum* (Anzi) Arnold, *Thelidium aeneovinosum* var. *kutakii* Servít, *Thelidium diaboli* A. Massal., *Thelidium kutakii* (Servít) Servít

N - Frl (Tretiach & Hafellner 2000), **TAA** (Thüs & Nascimbene 2008), **Lomb** (Thüs & Nascimbene 2008), **Piem** (Isocrono & al. 2004), **Lig**.

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 3-4, X: 1, E: 1/ Alt: 3-5/ Alp: r, Salp: rr, Mont: r/ PT: 1/ 1/ Note: an arctic-alpine to boreal-montane, probably circumpolar lichen found on periodically submerged siliceous rocks in Alpine to montane creeks.

Thelidium minimum (Körb.) Arnold

Verh. zool.-bot. Ges. Wien, 21: 1132, 1871 - *Verrucaria minima* A. Massal. ex Körb., *Parerga Lichenol.*, 4: 380, 1863.

N - TAA.

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 3-4, X: 2-4, E: 1/ Alt: 3-5/ Alp: vr, Salp: vr, Mont: vr/ PT: 1/ Note: on calcareous pebbles, or on rock surfaces close to the ground in upland areas.

Thelidium minutulum Körb.

Parerga Lichenol.: 351, 1863.

Syn.: *Arthopyrenia mesotropa* (Nyl.) Arnold, *Thelidium aethioboloides* Vain. non Zschacke, *Thelidium eimeri* Zahlbr., *Thelidium hospitum* Arnold, *Thelidium mesotropum* (Nyl.) A.L. Sm., *Thelidium viride* Eitner, *Verrucaria intercedens* var. *aethioboloides* Nyl.

N - Ven (Nascimbene 2008, Nascimbene & al. 2009), **TAA** (Nascimbene & al. 2007b).

Cr/ Ch/ S/ Sax/ pH: 3-5, L: 4, X: 3, E: 1-2/ Alt: 3-5/ Alp: er, Salp: vr, Mont: vr/ PT: 1-2/ p, #/ Note: a widespread, cool-temperate to arctic-alpine, circumpolar pioneer lichen found on calcareous pebbles close to the ground, on roofing tiles and on brick walls, occasionally also in the splash water zone of creeks; probably more widespread in the Alps.

Thelidium obscurum (Garov.) Zschacke

Hedwigia, 62: 133, 1921 - *Verrucaria olivacea* var. *obscura* Garov., *Tent. Disp. Lich. Langob.*: 64, 1865.

Syn.: *Involucrothele obscura* (Garov.) Servít

N - Lomb, Emil, S - Cal.

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 2-3, X: 2, E: 1-2/ Alt: 2-3/ Mont: vr/ PT: 1/ #/ Note: a poorly known species of sheltered calcareous rocks.

Thelidium olivaceum (Schaer.) Körb.

Parerga Lichenol.: 382, 1863 - *Pyrenula olivacea* Schaer., *Enum. Crit. Lich. Europ.*: 209, 1850.

Syn.: *Arthopyrenia pseudolivacea* (Nyl.) H. Olivier, *Involucrothele pseudolivacea* (Nyl.) Servít, *Verrucaria pseudolivacea* Nyl., *Verrucaria olivacea* Fr. nom. illegit.

N - Ven, TAA, Lomb, Emil, Lig, C - Abr, S - Cal (Puntillo 1996).

Cr/ Ch/ S/ Sax/ pH: 5, L: 3-4, X: 3, E: 1/ Alt: 3-5/ Alp: rr, Salp: rc, Orom: er, Mont: vr/ PT: 1/ Note: a circumboreal-montane species of calcareous rocks, most common in the Alps.

Thelidium papulare (Fr.) Arnold

Flora, 68: 147, 1855 - *Verrucaria papularis* Fr., *Lichenogr. Eur. Ref.*: 434, 1831.

Syn.: *Acrocordia conoidea* var. *rubella* (A. Massal.) H. Olivier, *Arthopyrenia sprucei* (Bab.) H. Olivier, *Polyblastia lariana* A. Massal., *Polyblastia papularis* (Fr.) Servít, *Sagedia lariana* (A. Massal.) Anzi, *Thelidium jurassicum* Zschacke, *Thelidium larianum* (A. Massal.) A. Massal., *Thelidium pertundens* (Nyl.) Zahlbr., *Thelidium pyrenophorum sensu* A. Massal., *Thelidium rubellum* A. Massal., *Thelidium sprucei* (Bab.) Lönnr., *Thelidium subpapulare* Zschacke, *Thelidium umbilicatum* Th. Fr., *Thelidium variabile* B. de Lesd.?, *Verrucaria cryptarum* Garov., *Verrucaria pertundens* Nyl., *Verrucaria sprucei* Bab.

N - Frl, Ven, TAA (Nascimbene & al. 2007b, Spitale & Nascimbene 2012), **Lomb** (Lazzarin 2000b), **Piem** (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999), **Emil** (Tretiach & al. 2008), **Lig** (Giordani & al. 2016). **C - Tosc** (Tretiach & al. 2008), **Marc** (Nimis & Tretiach 1999), **Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 2004), **Sar** (Rizzi & al. 2011, Giordani & al. 2013). **S - Camp** (Garofalo & al. 1999, Aprile & al. 2003b, Nimis & Tretiach 2004), **Bas** (Puntillo & al. 2012).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 3, X: 2-3, E: 1-2/ Alt: 3-5/ Alp: rr, Salp: rc, Orom: r, Mont: rr/ PT: 1/ Note: an arctic-alpine to boreal-montane, circumpolar species found on calcareous rocks, with optimum on limestone and dolomite, but also on calciferous schist and sandstone in upland areas, also growing in temporarily submerged sites along creeks.

Thelidium pertusatii (Garov.) Jatta

Syll. Lich. Ital.: 541, 1900 - *Verrucaria pertusatii* Garov., *Tent. Disp. Lich. Langob.*: 61, tab. 4, fig. 4, 1865.

N - TAA (Nascimbene 2005, Thüs & Nascimbene 2008), **Piem, VA.**

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 4, X: 1-2, E: 1/ Alt: 5/ Alp: vr/ PT: 1/ 1, #/ Note: an amphibious species on frequently wetted siliceous rocks in alpine rivers and irrigated rocks. The type material is on granite, and was collected near a creek.

Thelidium pyrenophorum (Ach.) A. Massal.

Symmicta Lich.: 104, 1855 - *Verrucaria pyrenophora* Ach., Lichenogr. Univ.: 285, 1810.

Syn.: *Involucrothele pyrenophora* (Ach.) Servít, *Involucrothele subincincta* Servít, *Paraphysothele viridis* (Deakin) Zschacke, *Thelidium borrieri* Mudd, *Thelidium incinctum* (Vain.) Vain., *Thelidium nylanderii* (Hepp) Lönnr., *Thelidium viride* (Deakin) Zahlbr.

N - VG, Frl, Ven, TAA (Nascimbene 2008b), Lomb, Piem (Isocrono & al. 2004), VA (Piervittori & Isocrono 1999), Emil, Lig (Giordani & al. 2016). C - Marc (Nimis & Tretiach 1999), Sar, S - Cal (Puntillo 1996).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 4, X: 2-3, E: 1/ Alt: 2-5/ Alp: rr, Salp: rc, Orom: vr, Mont: vr, SmedD: er, SmedH: er/ PT: 1/ Note: a widespread lichen, with optimum on limestone and dolomite, but also found on calciferous sandstone; most common in the Alps, rarer, but perhaps more widespread, in the Apennines.

Thelidium submethorium (Vain.) Zschacke

Hedwigia, 62: 140, 1920 - *Verrucaria aeneovinosa* subsp. *submethoria* Vain., Meddeland. Soc. Fauna Fl. Fenn., 19: 170, 1883.

N - TAA (Thüs & Nascimbene 2008).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 3-4, X: 1-2, E: 1/ Alt: 5/ Alp: vr/ PT: 1/ 1/ Note: a rare species of siliceous substrata in clean creeks and rivers of high mountain ranges, with optimum above treeline.

Thelidium subrimulatum (Nyl.) Zschacke

Hedwigia, 62: 138, 1921 - *Verrucaria subrimulata* Nyl., Flora, 57: 316, 1874.

Syn.: *Thelidium opacum* J. Lahm

N - VG (TSB 36838), Frl, Lig.

Cr/ Ch/ S/ Sax/ pH: 3-4, L: 3-4, X: 2-3, E: 1/ Alt: 3-5/ Alp: vr, Salp: vr, Mont: vr/ PT: 1/ Note: this species, described from the Pyrenees, has been collected from very few localities in upland areas of southern Europe, on limestone and calcareous schists.

Thelidium ungeri Körb.

Flot. ex Körb., Syst. Lich. Germ.: 354, 1855.

Syn.: *Leiophloea ungeri* (Körb.) Trevis., *Thelidium pyrenophorum* f. *intermedium* Asta, Clauzade & Cl. Roux, *Sagedia ungeri* (Körb.) Anzi, *Verrucaria ungeri* var. *decussata* Garov.

N - Ven, TAA, Lomb, Piem (TSB 32944).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 4, X: 2-3, E: 1/ Alt: 3-5/ Alp: r, Salp: rr, Mont: vr/ PT: 1/ Note: on inclined surfaces of calciferous rocks in upland areas. Closely related to *T. pyrenophorum*, from which it differs in the thick, verrucose thallus, this species seems to be widespread in the Alps.

Thelidium zwackhii (Hepp) A. Massal.

Framm. Lichenogr.: 16, 1855 - *Sagedia zwackhii* Hepp, Lich. Eur.: nr. 96, 1853.

Syn.: *Thelidium fueistingii* auct. non Körb., *Thelidium microcarpum* (Davies ex Leight.) A.L. Sm., *Thelidium montinii* Beltr., *Thelidium sparsulum* (Nyl.) A.L. Sm., *Thelidium subgelatinosum* Zschacke, *Thelidium velutinum* auct. p.p. non (Bernh.) Körb., *Thelidium xylospilum* (Nyl.) Zschacke, *Verrucaria xylospila* Nyl.

N - Frl, Ven (Nascimbene & al. 2008b, Nascimbene 2008, Thüs & Nascimbene 2008). C - Tosc, Marc (Nimis & Tretiach 1999).

Cr/ Ch/ S/ Sax-Terr/ pH: 2-5, L: 2-4, X: 2-3, E: 1-2/ Alt: 2-3/ Mont: r, SmedD: vr, SmedH: er/ PT: 1-2/ p/ Note: a mainly temperate, ecologically broad-ranging pioneer species found both on calcareous and on siliceous rocks, and on thin layers of soil, e.g. on walls, pebbles, etc., occasionally also in periodically submerged sites; one of the few species of the genus which occur at low altitudes in Italy. Certainly overlooked, and to be searched for more intensively throughout the country.

Thelignya A. Massal.

Framm. Lichenogr.: 18, 1855.

This small genus of the Lichinaceae, with 2 species, superficially resembles *Pyrenopsis* in the sunken pycnoascocarps and in the growth-form, but is easily distinguished by the dark greenish (*Calothrix*) rather than reddish brown colour when wet (Jørgensen 2007). It differs from *Porocyphus* in the poriform ascomata and the looser, weakly lichenised thallus. Type: *T. fuliginea* (Ach.) A. Massal. (= *T. lignyota*).

Thelignya lignyota (Wahlenb.) P.M. Jørg. & Henssen

in Henssen & Jørgensen, Lichenologist, 22: 145, 1990 - *Verrucaria lignyota* Wahlenb. in Ach., Meth. Lich.: 301, 1803.

Syn.: *Arctotheppia scholanderi* (Lyng) Lyng, *Porocyphus dispersus* E. Dahl, *Porocyphus ocellatus* (Th. Fr.) Henssen, *Psorotichia fuliginea* (Ach.) Körb., *Psorotichia lignyota* (Wahlenb.) Forssell, *Psorotichia ocellata* (Th. Fr.) Forssell, *Pyrenopsis ocellata* Th. Fr., *Thelignya fuliginea* (Ach.) A. Massal.

C - Sar.

Cr/ Cy.c/ S/ Sax/ pH: 3-4, L: 3-4, X: 1-2, E: 1/ Alt: 3-5/ Salp: vr, Orom: vr, Mont: vr/ PT: 1/ I/ Note: a more or less arctic-alpine species found on base- or lime-rich siliceous substrata, periodically submerged in cold creeks, or in seepage tracks; to be looked for also in the Alps.

Thelocarpon Nyl.

Ann. Sci. Nat., Bot., sér. 3, 20: 318, 1853.

A mainly northern-temperate genus of c. 25 species, usually found on soil, but also on bark, wood and rock, rarely lichenicolous. Several species are ephemeral, the ascomata and thalline warts appearing after fire or other disturbance, and disappearing in weeks. The genus is characterised by a chlorocoid photobiont, pale fragile ascomata, multispored asci and minute, mostly simple ascospores. Variation in ascocarp morphology and especially ascus structure suggested polyphyly, but the molecular study by Lumbsch & al. (2009) has proved its monophyly. The genus is currently classified in the Thelocarpaceae, but its precise phylogenetic placement within Pezizomycotina still remains unknown (Miądlikowska & al. 2014). Good descriptions and a key to the British species are in Orange (2013b). Type: *T. laureri* (Flot.) Nyl.

Thelocarpon citrum (Wallr.) Rossman

Stud. Mycol., 42: 221, 1999 - *Sphaeria citrum* Wallr., Fl. Crypt. Germ., 2: 788, 1833.

Syn.: *Thelocarpon arenicola* Vain., *Thelocarpon herteri* J. Lahm, *Thelocarpon vicinellum* Nyl.

N - TAA.

Cr/ Ch/ S/ Sax-Terr/ pH: 1-2, L: 3, X: 2, E: 1/ Alt: 4/ Salp: er/ PT: 1-2/ p, #/ Note: an ephemeral species of disturbed habitats, with optimum near treeline. *T. vicinellum* was described from Italy, on decaying algae on porphyritic stones in a damp, shaded place; the relationships with *T. superellum* Nyl. need to be clarified.

Thelocarpon epibolum Nyl. var. *epibolum*

Not. Sällsk. Fauna Fl. Fenn. Förh., 5: 188, 1866.

Syn.: *Thelocarpon conoidellum* Nyl.

N - Frl (TSB 14678, Brackel 2016), Ven (Lazzarin 2000, Brackel 2016), TAA (Brackel 2016).

Cr/ Ch/ S/ Terr-Lign/ pH: 1-2, L: 3-4, X: 2, E: 1/ Alt: 3-5/ Alp: vr, Salp: r, Mont: vr/ PT: 1/ paras/ Note: an ephemeral, facultatively lichenised species found on foliose lichens (*Baeomyces*, *Solorina* spp. and other lichens), rotting wood, decaying bryophytes, peaty soil, mostly in upland areas; overlooked, and certainly more widespread in the Alps.

Thelocarpon epibolum Nyl. var. *epithallinum* (Leight.) G. Salisb.

North West. Nat.: 70, 1953 - *Thelocarpon epithallinum* Leight., Ann. Mag. nat. Hist., Ser. 3, 18: 24, 1866.

N - Ven (Brackel 2013, 2016), TAA (Nascimbene & al. 2007b, Brackel 2013, 2016).

LF/ / S/ Terr-Lign/ pH: 1-2, L: 3-4, X: 2, E: 1/ Alt: 3-5/ Alp: vr, Salp: vr, Mont: vr/ PT: 1/ paras/ Note: this variety, characterised by having larger spores, and likely to be non-lichenised, is probably more widespread in the Alps.

Thelocarpon impressellum Nyl.

Flora, 50: 179, 1867.

N - TAA (Arnold 1887, Brackel 2016).

Cr/ Ch/ S/ Terr-Lign/ pH: 1-4, L: 3-4, X: 2, E: 1/ Alt: 4-5/ Alp: vr, Salp: vr/ PT: 1/ Note: a doubtfully lichenised species found on humus-rich soil, mosses, rotten wood and other lichens in upland areas. The only Italian record, referring to a sample growing on *Squamarina cartilaginea*, is dubious.

Thelocarpon intermediellum Nyl.

Flora, 48: 261, 1865.

Syn.: *Thelocarpon intermixtulum* Nyl.

N - TAA (Nascimbene & al. 2007b).

Cr/ Ch/ S/ Sax-Lign/ pH: 1-2, L: 3-4, X: 2, E: 1/ Alt: 3-4/ Salp: er, Mont: er/ PT: 1/ p/ Note: a rarely-collected but apparently widespread ephemeral species of siliceous rocks and, occasionally, rotten wood, mostly in upland areas.

Thelocarpon laureri (Flot.) Nyl.

Mém. Soc. Imp. Sc. Nat. Cherbourg, 3: 191, 1855 - *Sphaeropsis laureri* Flot., Bot. Z., 5: 65, 1847.

Syn.: *Thelocarpon interceptum* Nyl., *Thelocarpon prasinellum* Nyl.

N - TAA (Hafellner 1995, Nascimbene & al. 2007b). S - Cal (Puntillo 1996).

Cr/ Ch/ S/ Epiph-Terr-Sax/ pH: 2-3, L: 4, X: 2, E: 1-2/ Alt: 3-4/ Salp: r, Orom: er, Mont: vr/ PT: 1-2/ p/ Note: an ephemeral early coloniser of different substrata, including roofing tiles, rotten wood, and soil; perhaps more widespread, but very much overlooked.

Thelocarpon lichenicola (Fuckel) Poelt & Hafellner

Phyton, 17: 70, 1975 - *Ahlesia lichenicola* Fuckel, Jahrb. nassauisch. Ver. f. Naturkunde, 23/24: 281, 1870.

Syn.: *Ahlesia strasseri* (Zahlbr.) Keissl., *Thelocarpon applanatum* H. Magn., *Thelocarpon strasseri* Zahlbr.

N - TAA (Hafellner 1995, Brackel 2016).

Cr/ Ch/ S/ Terr/ pH: 1-2, L: 4, X: 2-3, E: 1-2/ Alt: 2-4/ Salp: er, Mont: r, SmedD: er/ PT: 1/ paras *Baeomyces* spp./ Note: on clay soil in disturbed sites, often in *Calluna*-heaths, mostly on *Baeomyces rufus*; doubtfully lichenised, to be searched for further in the Alps.

Thelocarpon macchiaie Nimis, Poelt & Puntillo

in Nimis & al., Bull. Soc. linn. Provence, 45: 259, 1994.

S - Pugl (Nimis & Tretiach 1999), Cal (Nimis & al. 1994, Puntillo 1996), Si (Nimis & al. 1994).

Cr/ Ch/ S/ Terr/ pH: 3-4, L: 4, X: 3, E: 1-2/ Alt: 1/ MedH: vr/ PT: 1/ p/ Note: easy to overlook, perhaps more widespread in humid parts of Mediterranean Italy, in opening of garrigue vegetation.

Thelocarpon sphaerosporum H. Magn.

Rabenh. Krypt.-Fl., 2 ed., 9, 5, 1: 305, 1935.

N - TAA (M 0033500, type).

Cr/ Ch/ S/ Epiph-Terr-Sax/ pH: 2-3, L: 4, X: 2, E: 1-2/ Alt: 3-4/ Salp: er, Mont: er/ PT: 1-2/ p/ Note: an ephemeral early coloniser of different substrata, including the thalli of other lichens, mostly in upland areas.

Thelomma A. Massal.

Atti Ist. Veneto Sci. Lett Arti, ser. 3, 5: 268, 1860.

After the segregation of *Pseudothelomma* by Prieto & Wedin (2016), this genus of the Caliciaceae includes 5 saxicolous species in temperate and arid subtropical regions of both Hemispheres. It differs from the related *Texosporium* by growing on rocks in Mediterranean areas, and by lacking the distinctive spore ornamentation. *Pseudothelomma* differs in having a thin cortex, lacking the granular crystals that intersperse the usually thick cortex of *Thelomma*, and in the ecology, as it grows on decorticated wood. Type: *T. mammosum* (Hepp) Tibell

Thelomma siliceum (Fée) Tibell

Bot. Not., 129: 243, 1976 - *Gassicurtia silicea* Fée in Mérat, Nouv. Fl. Envir. Paris: 252, 1831.

Syn.: *Carlosia lusitanica* Samp., *Coniothecium siliceum* (Fée) Keissl., *Spilomium siliceum* (Fée) Nyl.

C - Tosc (Puntillo & Puntillo 2009), Sar (Nöske 2000, Puntillo & Puntillo 2009).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 3-4, X: 2, E: 1-2/ Alt: 1/ MedH: er/ PT: 1/ suboc/ Note: on hard siliceous rocks in open sites exposed to humid, maritime winds in the Mediterranean belt; certainly very rare, and probably restricted to Tyrrhenian Italy.

Thelopsis Nyl.

Mém. Soc. Imp. Sc. Nat. Cherbourg, 3: 194, 1855, *nom. cons.*

This lichen genus of rather uncertain taxonomic position is characterised by a Trentepohlioid photobiont, short and stiff periphyses, long and simple paraphyses, unitunicate polysporous asci, and simple to submuriform ascospores. It is classified in the Stictidaceae and it includes c. 10 species worldwide. With the recent addition of more or less intermediate species, the distinction from *Topelia* has become somehow arbitrary (Aptroot & al. 2014). Good descriptions and a key to the British species are in Orange (2013b). Type: *T. rubella* Nyl. The name is conserved against *Sychnogonia* Körb. (1855).

Thelopsis flaveola Arnold

Verh. zool.-bot. Ges. Wien, 23: 505, 1873.

N - Lomb (UPS- L-166842). S - Si (Nimis & al. 1994).

Cr/ Tr/ S/ Epiph/ pH: 1-2, L: 2-3, X: 2, E: 1/ Alt: 1-4/ SmedH: er/ PT: 0/ u/ Note: a mainly temperate species found on bark of ancient deciduous trees, but also, in the subalpine belt, on bases of old *Rhododendron* shrubs; to be looked for further in the Alps. The species is included as "Critically Endangered" in the Italian red list of epiphytic lichens (Nascimbene & al. 2013c).

Thelopsis isiaca Stizenb.

Ber. St. Gall. naturw. Ges.: 262, 1895.

Syn.: *Thelopsis subporinella* Nyl.

N - Lig. C - Tosc. Laz (TSB 31406), Sar. S - Pugl (Nimis & Tretiach 1999), Bas (Potenza 2006, Potenza & al. 2010, Potenza & Fascetti 2012), Si (Nimis & al. 1994, 1995, Grillo & Carfi 1997, Grillo 1998, Grillo & al. 2002, Grillo & Caniglia 2004, Ottonello & Puntillo 2009, Ottonello & al. 2011).

Cr/ Tr/ S/ Epiph-Terr-Sax/ pH: 3-4, L: 2-3, X: 1-2, E: 1-2/ Alt: 1/ MedH: vr/ PT: 1-2/ suboc, coast, u/ Note: a Mediterranean-Macaronesian species also known from western North America, found on base-rich

rocks, soil, mosses, tree bark, in situations protected from rain; mostly Tyrrhenian, locally abundant in coastal situations, such as in some islands of southern Italy. It is included in the Italian red list of epiphytic lichens under the “Least Concern” category (Nascimbene & al. 2013c).

Thelopsis melathelia Nyl.

Flora, 47: 358, 1864.

Syn.: *Sagedia melathelia* (Nyl.) Jatta, *Sagedia rugosa* Anzi, *Thelopsis rugosa* (Anzi) Jatta, *Thelopsis umbratula* Nyl.

N - Frl, Ven, TAA, Lomb, Piem (TSB 32915).

Cr/ Tr/ S/ Terr/ pH: 3-4, L: 2-3, X: 2-3, E: 1-2/ Alt: 4-5/ Alp: rr, Salp: vr/ PT: 1/ Note: an arctic-alpine, circumpolar species found on muribund bryophytes, humic soil and plant remains over more or less calcareous substrata near or above treeline.

Thelopsis rubella Nyl.

Mém. Soc. Sc. Nat. Cherbourg, 3: 200, 1855.

Syn.: *Pyrenula bayrholferi* (Körb.) Hepp, *Sagedia rubella* (Nyl.) Jatta

N - VG (Tretiach & Carvalho 1995, Carvalho 1997), **Frl** (Tretiach & Carvalho 1995), **Lomb, Lig** (Giordani & Incerti 2008, Giordani & al. 2009). **C - Tosc, Marc** (Nimis & Tretiach 1999), **Umb** (Ravera 1998, Ravera & al. 2006), **Laz** (Ravera 2008), **Sar, S - Cal** (Puntillo 1996).

Cr/ Tr/ S/ Epiph/ pH: 2-3, L: 2-3, X: 2-3, E: 1/ Alt: 1-3/ SmedD: er, SmedH: vr, MedH: er/ PT: 0/ suboc/ Note: a mild-temperate species found on old deciduous trees (*e.g. Fagus, Quercus*), especially near the base of the boles, in areas with high rainfall. It is included in the Italian red list of epiphytic lichens under the “Least Concern” category (Nascimbene & al. 2013c).

Thelotrema Ach.

Meth. Lich.: 130, 1803.

Generic concepts in the former Thelotremataceae, now included in the Graphidaceae, have changed considerably within the last decade (Rivas Plata & al. 2010, 2012, 2013). The genus *Thelotrema*, in its modern circumscription, is characterised by immersed-erumpent to sessile, non-carbonised, ecolumellate, perithecioid to apothecioid ascomata with a double margin caused by a free proper exciple, and lateral periphysoids. It comprises c. 110 species, most of which are tropical to subtropical in distribution, occurring predominantly on bark. A world-wide key to thelotremoid species was published by Rivas Plata & al. (2010). European species were treated by Purvis & al. (1995). Type: *T. lepadinum* (Ach.) Ach.

Thelotrema lepadinum (Ach.) Ach.

Meth. Lich.: 132, 1803 - *Lichen lepadinus* Ach., Lichenogr. Suec. Prodr.: 30, 1799.

Syn.: *Volvaria lepadina* (Ach.) A. Massal.

N - Frl (Tretiach 1993), **Ven** (Thor & Nascimbene 2007), **TAA** (Nascimbene & al. 2007b), **Lomb, Piem, Emil, C - Tosc, Marc, Sar** (Tretiach 1993, Zedda 2002, 2002b, Cossu 2013). **S - Camp** (Puntillo & al. 2000, Aprile & al. 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010, Puntillo & Puntillo 2011, Etayo & Puntillo 2011), **Cal** (Tretiach 1993, Puntillo 1995, 1996), **Si** (Tretiach 1993, Nimis & al. 1994).

Cr/ Tr/ S/ Epiph/ pH: 1-2, L: 2-3, X: 2, E: 1/ Alt: 1-3/ Mont: vr, SmedD: er, SmedH: er, MedH: er/ PT: 0/ suboc/ Note: a mild-temperate lichen found on the bark of *Fagus* and *Abies*, more rarely of other broad-leaved trees in humid montane forests with frequent fog or near rivers, exceptionally occurring in evergreen Mediterranean, coastal-humid forests. It is included in the Italian red list of epiphytic lichens as “Near-threatened” (Nascimbene & al. 2013c).

Thelotrema suecicum (H. Magn.) P. James

Lichenologist, 9: 186, 1977 - *Ocellularia suecica* H. Magn., Bot. Not.: 125, 1937.

N - Frl (Tretiach 2004). **S - Camp** (Ravera & al. 2016).

Cr/ Tr/ S/ Epiph/ pH: 1-2, L: 2-3, X: 2, E: 1/ Alt: 3/ Mont: er, SmedH: er/ PT: 0/ suboc/ Note: a rarely collected species found on bark in montane humid beech forests. It is included in the Italian red list of epiphytic lichens as “Endangered” (Nascimbene & al. 2013c).

Thermutis Fr.

Syst. Orb. Veg.: 302, 1825.

A monotypic genus of the Lichinaceae the most primitive of the family (Jørgensen 2007), distinguished from other fruticose cyanobacterial lichens by having *Scytonema* as a photobiont. When sterile, it is difficult to distinguish from free-living *Scytonema*, as it is weakly lichenised. Type: *T. velutina* (Ach.) Flot.

Thermutis velutina (Ach.) Flot.

Linnaea, 23: 170, 1850 - *Lichen velutinus* Ach., Lichenogr. Suec. Prodr.: 218, 1799.

Syn.: *Collema pannosum* Hoffm., *Collema velutinum* (Ach.) Ach., *Collema velutinum* var. *pannosum* (Hoffm.) Rabenh., *Gonionema velutinum* (Ach.) Nyl.

N - **Frl, Ven, TAA, Lomb, Piem** (Isocrono & al. 2004), **Lig. C - Tosc. S - Camp** (Aprile & al. 2003b), **Cal** (Puntillo 1996).

Frut./ Cy.h/ S/ Sax/ pH: 3-4, L: 3-4, X: 3-4, E: 1-2/ Alt: 3-4/ Salp: vr, Orom: er, Mont: er/ PT: 1/ w/ Note: on base-or mineral-rich siliceous rock, in sun-exposed seepage tracks with colonies of cyanobacteria, mostly in upland areas but usually below treeline.

Thrombium Wallr.

Fl. Crypt. Germ., 1: 287, 1831.

A genus distinguished from other pyrenocarpous lichens by the combination of: lack of involucrellum, colourless, simple ascospores and persistent paraphyses. Similarities in ascus structure and molecular data suggest a close relationship of the Thrombiaceae with *Protothelenella* in the Protothelenellaceae, a family of uncertain taxonomic position (Schmitt & al. 2005). *T. thelostomum* is now included in the genus *Pyrenocarpon* within the Lichinaceae. Type: *T. epigaeum* (Pers.) Wallr.

Thrombium epigaeum (Pers.) Wallr.

Fl. Krypt. Germ., 3: 294, 1831 - *Sphaeria epigaea* Pers., Syn. Meth. Fung., addenda: 27, 1801.

Syn.: *Thrombium aoristoides* I.M. Lamb, *Verrucaria epigaea* (Pers.) Ach.

N - **VG, Frl, Ven, TAA, Lomb, Piem** (Isocrono & al. 2004, Morisi 2005), **Emil, Lig. C - Tosc. S - Camp** (Ricciardi & al. 2000), **Bas** (Potenza & al. 2010), **Cal** (Puntillo 1996, Puntillo & Puntillo 2004), **Si** (Ottonello & al. 2011).

Cr/ Ch/ S/ Terr/ pH: 3-4, L: 4, X: 3, E: 1-2/ Alt: 2-5/ Alp: vr, Salp: r, Orom: vr, Mont: er, SmedD: er, SmedH: er/ PT: 1-2/ p/ Note: an ephemeral, probably holarctic coloniser of calciferous, clayey soil in rather disturbed habitats, such as track sides and openings in grasslands.

Thyrea A. Massal.

Sched. Crit., 4: 75, 1856.

In the traditional circumscription, this genus of the Lichinaceae was very heterogeneous and has undergone major redefinitions based on ascomata characters (see e.g. Moreno & Egea 1992), which has reduced the number of species worldwide to 13, and those occurring in Italy to 3. Type: *T. plectopsora* A. Massal.

Thyrea confusa Henssen

in Henssen & Jørgensen, Lichenologist, 22: 146, 1990.

Syn.: *Omphalaria pulvinata* auct. non (Schaer.) Nyl., *Thyrea pulvinata* auct. non (Schaer.) A. Massal.

N - **VG, Frl, Ven, TAA, Lomb, Piem** (Isocrono & al. 2004), **Lig. C - Tosc, Marc** (Nimis & Tretiach 1999), **Laz, Abr** (Nimis & Tretiach 1999, Caporale & al. 2016), **Sar. S - Cal** (Puntillo 1996), **Si** (Nimis & al. 1996b, Ottonello & al. 2011).

Frut/ Cy.c/ S/ Sax/ pH: 4-5, L: 5, X: 4-5, E: 1-2/ Alt: 1-4/ Salp: er, Mont: vr, SmedD: rr, SmedH: r, MedH: vr, MedD: er/ PT: 1/ w/ Note: on steeply inclined, sunny faces of calcareous rocks with short periods of water seepage after rain; certainly more widespread.

Thyrea girardii (Durieu & Mont.) Bagl. & Carestia

Atti Soc. Critt. Ital., 2: 349, 1881 - *Collema girardii* Durieu & Mont. in Durieu, Flore Algérie Crypt., 1: 1999, 1846-1849.

Syn.: *Omphalaria helvelloidea* (Schaer.) A. Massal.

N - **VG** (TSB 5706), **Frl, Ven, Lomb, Piem** (Isocrono & al. 2004), **Lig. S - Cal** (Puntillo 1996).

Fol.u/ Cy.c/ A.i/ Sax/ pH: 4-5, L: 5, X: 4-5, E: 2-3/ Alt: 1-2/ SmedD: r, SmedH: r, MedH: rr, MedD: vr/ PT: 1/ w/ Note: a Mediterranean to mild-temperate species found on calcareous rocks; ecology and distribution resemble those of *T. confusa*.

Thyrea plectopsora A. Massal.

Sched. Crit., 4: 75, n 110, 1856.

Syn.: *Omphalaria camaromorpha* A. Massal.?, *Thyrea phyllisoides* (Nyl.) Zahlbr.

N - **VG, Ven** (Lazzarin 2000b), **Lig** (Lazzarin 2000b). **C - Tosc, Sar** (TSB 13427). **S - Camp** (Nimis & Tretiach 2004).

Sq/ Cy.c/ S/ Sax/ pH: 4-5, L: 5, X: 4-5, E: 2-3/ Alt: 1-2/ SmedD: vr, SmedH: vr, MedH: r, MedD: vr/ PT: 1/ w/ Note: on steeply inclined seepage tracks of calcareous rocks at relatively low elevations. The taxonomic position of this taxon is still not clear (see Nimis 1993: 696).

Timdalia Hafellner

in Hafellner & Türk, Stapfia, 76: 158, 2001.

This monotypic genus was segregated from *Acarospora* and classified in the Lecanoraceae mainly due to differences in the ascus apex construction, polyspored asci having been considered as an example of convergent evolution (Hafellner & Türk 2001). However, Wedin & al. (2005) demonstrated that the genus is

closely related to *Acarospora* in the Acarosporaceae (see also Westberg & al. 2015). Type: *T. intricata* (H. Magn.) Hafellner

Timdalia intricata (H. Magn.) Hafellner

in Hafellner & Türk, *Stapfia*, 76: 159, 2001 - *Acarospora intricata* H. Magn., Rabenh. Krypt.-Flora, 9: 142, 1935.

N - TAA (Nascimbene 2005), Lomb (Nascimbene 2006).

Cr/ Ch/ S/ Sax/ pH: 3-4, L: 4-5, X: 3, E: 2-3/ Alt: 4-5/ Alp: r, Salp: vr/ PT: 1/ Note: on base-rich siliceous rocks in sunny, exposed sites, with optimum above treeline; perhaps more widespread in the Alps.

Toninia A. Massal.

Ric. Auton. Lich. Crost.: 107, 1852.

This genus of c. 85 species was monographed by Timdal (1992). It is currently placed in the Ramalinaceae, and also after the segregation of *Porpidinia* (Timdal 2010) seems to be highly polyphyletic (Ekman 2001, see also Miadlikowska & al. 2014). Apparently, some species groups are more closely related to taxa traditionally referred to *Arthosporum*, *Bacidia*, *Bacidina*, or *Waynea* than they are to each other. Some of the generic names treated as synonyms of *Toninia* may have to be resurrected in the future, e.g. *Thalloidima* A. Massal. Type: *T. cinereovirens* (Schaer.) A. Massal.

Toninia albilabra (Dufour) H. Olivier

Bull. Géogr. Bot., 21: 196, 1911 - *Biatora albilabra* Dufour in Fries, Lichenogr. Eur. Ref.: 251, 1831.

Syn.: *Lecidea albilabra* (Dufour) Dufour, *Psora albilabra* (Dufour) Körb. non auct., *Toninia albomarginata* B. de Lesd.

N - TAA, VA (Piervittori & Isocrono 1999), Emil (Nimis & al. 1996), Lig. C - Sar. S - Camp (Aprile & al. 2003b, Garofalo & al. 2010), Cal (Puntillo 1996), Si (Nimis & al. 1994, Ottonello & Puntillo 2009, Ottonello & al. 2011).

Sq/ Ch/ S/ Terr/ pH: 3-5, L: 4-5, X: 4-5, E: 1-2/ Alt: 1-3/ Mont: rr, SmedD: r, SmedH: r, MedH: vr, MedD: er/ PT: 1-2/ Note: a mainly Mediterranean species found on more or less calciferous ground and in fissures of rocks and walls, often on cyanobacteria or cyanobacterial lichens when young; common only in dry areas, including the Alpine valleys with a continental climate.

Toninia alutacea (Anzi) Jatta

Fl. Ital. Crypt., 3: 655, 1911 - *Thalloidima alutaceum* Anzi, Atti Soc. Ital. Sc. Nat. Milano, 9: 249, 1866.

Syn.: *Biatorina alutacea* (Anzi) Jatta, *Thalloidima intermedium* A. Massal. ex Arnold, *Toninia intermedia* (Arnold) H. Olivier, *Toninia subcandida* B. de Lesd.?

N - VG, Frl (Tretiach 1996), Ven (Nimis 1994, Caniglia & al. 1999, Nascimbene & Caniglia 2003c, Nascimbene 2005c, Thor & Nascimbene 2007), TAA (Spitale & Nascimbene 2012), Lomb, Piem, VA (Piervittori & Isocrono 1999), Emil (Tretiach & al. 2008), C - Tosc (Tretiach & al. 2008), Marc (Nimis & Tretiach 1999), S - Bas (Nimis & Tretiach 1999), Cal.

Sq/ Ch/ S/ Sax/ pH: 4-5, L: 4-5, X: 4, E: 1-2/ Alt: 2-5/ Alp: rc, Salp: c, Orom: rc, Mont: rc, SmedD: rr, SmedH: vr/ PT: 1/ Note: an arctic-alpine, circumpolar species with southern outposts in steppic-continental regions, found in fissures of calciferous rocks; when young it often overgrows cyanobacterial colonies and cyanobacterial lichens.

Toninia aromatica (Sm.) A. Massal.

Framm. Lichenogr.: 24, 1855 - *Lichen aromaticus* Sm. in Smith & Sowerby, Engl. Bot., 25: tab. 1777, 1807.

Syn.: *Bacidia sardoa* (Körb.) Zahlbr., *Bilimbia acervulata* (Nyl.) Jatta, *Bilimbia aromatica* (Sm.) Jatta, *Bilimbia sanguinaria* (Bagl.) Jatta, *Bilimbia sardoa* Körb., *Bilimbia turneri* (Leight.) A.L. Sm., *Lecidea acervulata* Nyl., *Lecidea aromatica* (Sm.) Turner, *Lecidea austerula* Nyl., *Lecidea geoleuca* Nyl., *Lecidea heterophora* Nyl., *Lecidea hypsophila* Nyl., *Lecidea subaromatica* Nyl., *Lecidea turneri* Leight., *Toninia acervulata* (Nyl.) Kremp., *Toninia affinis* Vězda, *Toninia aromatica* f. *virescens* Bagl., *Toninia geoleuca* (Nyl.) Zahlbr., *Toninia heterophora* (Nyl.) Arnold, *Toninia hypsophila* (Nyl.) Zahlbr., *Toninia meridionalis* B. de Lesd., *Toninia pelophila* Poelt & Vězda, *Toninia sanguinaria* Bagl., *Toninia sinensis* Zahlbr., *Toninia turneri* (Leight.) H. Olivier

N - VG (Castello 2002, Martellos & Castello 2004), Frl (TSB 16710), Ven, TAA, Lomb, Piem (Isocrono & al. 2004), Emil, Lig (Valcuvia & al. 2000), C - Tosc, Marc, Umb (Genovesi & al. 2002, Ravera & al. 2006, Panfili 2007, Genovesi 2011), Laz (Bartoli 1997b, Bartoli & al. 1998), Sar (Vězda Lich.Rar.Exs. 90), S - Camp (Ricciardi & al. 2000, Nimis & Tretiach 2004, Garofalo & al. 2010), Pugl (Nimis & Tretiach 1999, Durini & Medagli 2002, 2004), Bas, Cal (Puntillo 1996), Si (Nimis & al. 1994, 1995, Ottonello & Salone 1994, Ottonello & al. 1994, 2011, Ottonello 1996, Ottonello & Romano 1997, Grillo 1998, Caniglia & Grillo 2001, 2005, 2006, Grillo & al. 2001, 2002, Grillo & Caniglia 2004, Merlo 2004b).

Sq/ Ch/ S/ Sax-Terr/ pH: 3-5, L: 3-4, X: 3-4, E: 2-4/ Alt: 1-5/ Alp: er, Salp: vr, Orom: vr, Mont: rr, SmedD: rc, Pad: vr, SmedH: c, MedH: rc, MedD: r/ PT: 1-3/ paras crustose lichens when young/ Note: a holarctic species with a wide latitudinal range, found on horizontal to weakly inclined surfaces of calcareous to basic siliceous substrata, including bricks and roofing tiles in urban areas, often starting the life-cycle on other crustose lichens; the species has a wide altitudinal range, but seems to be most common in Tyrrhenian Italy at relatively low elevations.

Toninia athallina (Hepp) Timdal

Opera Bot., 110: 42, 1991 - *Biatora athallina* Hepp, Flecht. Eur., 9: nr. 499, 1860.

Syn.: *Biatorina lenticularis* f. *acrustacea* Hepp ex Arnold nom.nud., *Catillaria acrustacea* Arnold, *Catillaria athallina* (Hepp) Hellb., *Catillaria dvorakii* Servít, *Catillaria mongolica* H. Magn., *Catinaria acrustacea* (Arnold) Vain., *Catinaria athallina* (Hepp) Lynge, *Kiliasia athallina* (Hepp) Hafellner

N - VG, TAA, Lomb, Lig (Giordani & al. 2016). **C - Tosc, Marc** (Nimis & Tretiach 1999), **Umb** (Nimis & Tretiach 1999, Genovesi & Ravera 2001, Ravera & al. 2006), **Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 2004, Caporale & al. 2008), **Sar** (TSB 13463). **S - Camp** (Garofalo & al. 2010), **Pugl** (Nimis & Tretiach 1999), **Si**.

Cr.end/ Ch/ S/ Sax/ pH: 5, L: 3-5, X: 4, E: 1-2/ Alt: 1-6/ Alp: vr, Salp: r, Orom: r, Mont: rr, SmedD: rc, Pad: er, SmedH: rc, MedH: rr, MedD: r/ PT: 1/ p, u/ Note: a temperate to arctic species of calcareous rocks, mostly found on steeply inclined or underhanging faces in open, dry situations, sometimes invading the thalli of endolithic lichens, with a wide altitudinal range, reaching the nival belt in the Alps; certainly widespread throughout Italy, but overlooked.

Toninia candida (Weber) Th. Fr.

K. Svenska Vetensk.-Akad. Handl., 7, 2: 33, 1867 - *Lichen candidus* Weber, Spicil. Fl. Goett.: 193, 1778.

Syn.: *Biatorina candida* (Weber) Jatta, *Lecidea candida* (Weber) Ach., *Psora candida* (Weber) Hoffm., *Thalloidima candidum* (Weber) A. Massal.

N - VG, Frl, Ven (Nascimbene & Caniglia 2003c, Nascimbene 2005c, 2008c, Thor & Nascimbene 2007, Nascimbene & Marini 2007), **TAA** (De Benetti & Caniglia 1993, Nascimbene & al. 2006, Nascimbene 2008b), **Lomb, Piem** (Clerc & al. 1999, Isocrono & al. 2003), **VA** (Piervittori & Isocrono 1999), **Emil, Lig, C - Tosc** (Benesperi 2006, Tretiach & al. 2008), **Marc** (Nimis & Tretiach 1999), **Umb** (Nimis & Tretiach 1999, Ravera & al. 2006), **Laz, Abr** (Nimis & Tretiach 1999, Caporale & al. 2016), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008, Genovesi & Ravera 2014). **S - Camp** (Garofalo & al. 1999, 2010, Aprile & al. 2003, 2003b, Nimis & Tretiach 2004), **Pugl** (Nimis & Tretiach 1999), **Bas, Cal** (Puntillo 1996), **Si** (Nimis & al. 1996b, Grillo 1998, Grillo & Caniglia 2004).

Sq/ Ch/ S/ Sax/ pH: 3-5, L: 4-5, X: 4-5, E: 1-2/ Alt: 1-5/ Alp: rr, Salp: rc, Orom: rr, Mont: r, SmedD: rr, SmedH: rr, MedH: vr, MedD: er/ PT: 1/ subc, w/ Note: a mainly southern, incompletely holarctic species found on steeply inclined surfaces and in fissures of calciferous rocks, chiefly limestone and dolomite, often on cyanobacteria or cyanobacterial lichens when young, with a wide altitudinal range.

Toninia cinereovirens (Schaer.) A. Massal.

Ric. Auton. Lich. Crost.: 107, 1852 - *Lecidea cinereovirens* Schaer., Lich. Helv. Spicil., 3: 109, 1828.

Syn.: *Bilimbia cinereovirens* (Schaer.) Jatta, *Bilimbia fallasca* (A. Massal.) Jatta, *Bilimbia nigrescens* (Anzi) Jatta, *Toninia fallasca* A. Massal., *Toninia nigrescens* Anzi, *Toninia olivaceoatra* H. Magn., *Toninia potteri* Maheu & Werner, *Toninia sbarbaronis* B. de Lesd.

N - VG, Ven (Lazzarin 2000b), **TAA, Lomb, Piem** (Isocrono & al. 2004, Morisi 2005), **VA** (Piervittori & Isocrono 1999), **Lig** (Valcuvia & al. 2000). **C - Tosc, Laz** (Genovesi & al. 2011, 2011b), **Abr** (Caporale & al. 2016), **Sar** (Rizzi & al. 2011). **S - Camp** (Garofalo & al. 1999, Ricciardi & al. 2000), **Cal** (Puntillo 1996), **Si** (Caniglia & Grillo 2001, Grillo & Caniglia 2004).

Sq/ Ch/ S/ Sax/ pH: 3-4, L: 4-5, X: 4, E: 1-3/ Alt: 1-4/ Salp: er, Mont: rr, SmedD: r, SmedH: rr, MedH: r, MedD: r/ PT: 1/ subc, w/ Note: a mainly southern, perhaps incompletely holarctic species found on steeply inclined, somehow weathered faces of calciferous and basic siliceous rocks with some seepage of water after rain, often in rock fissures and on colonies of cyanobacteria.

Toninia coelestina (Anzi) Vězda

Cas. Slezsk. Mus. Oprave, ser. A, 10: 105, 1961 - *Bacidia coelestina* Anzi, Atti Soc. Ital. Sc. Nat. Milano, 9: 251, 1866.

Syn.: *Bacidia atosanguinea* subsp. *oribata* (Nyl.) A.L. Sm., *Lecidea oribata* Nyl., *Lecidea subincompta* subsp. *oribata* (Nyl.) Cromb., *Toninia aggregata* Vězda, *Toninia oribata* (Nyl.) P. James

N - Lomb.

Cr/ Ch/ S/ Sax/ pH: 3-4, L: 3-4, X: 4, E: 2/ Alt: 3-4/ Salp: er, Mont: er/ PT: 1/ w/ Note: a rare species found on cyanobacterial lichens or cyanobacterial colonies developing on weathered calciferous schists in upland areas.

Toninia collematicola Timdal

Opera Bot., 110: 57, 1991.

N - Frl (Brackel 2016), **Lomb** (Brackel 2016).

LF/ / S/ Sax/ pH: 5, L: 4, X: 3-4, E: 2/ Alt: 2-3/ Mont: vr, SmedD: vr/ PT: 1/ paras *Callome multipartita*/ Note: an obligately lichenicolous fungus described from the Italian Alps, growing on *Callome multipartita*, on limestone, in exposed, south-facing rock surfaces.

Toninia diffracta (A. Massal.) Zahlbr.

Österr. bot. Z., 51: 284, 1901 - *Thalloidima vesiculare* var. *diffractum* A. Massal., Ric. Auton. Lich. Crost.: 95, 1852.

Syn.: *Biatorina diffracta* (A. Massal.) Jatta, *Thalloidima diffractum* (A. Massal.) A. Massal.

N - VG, Frl, Ven (Lazzarin 2000b, Nascimbene & Caniglia 2003c), **TAA, Piem** (Hafellner & al. 2004, Isocrono & al. 2006), **VA** (Piervittori & Isocrono 1999), **Emil, Lig, C - Tosc, Marc** (Nimis & Tretiach 1999), **Umb** (Genovesi & al.

2002, Ravera & al. 2006), **Laz**, **Abr**, **Mol** (Garofalo & al. 1999, Caporale & al. 2008, Nimis & Tretiach 1999), **Sar**, **S - Camp** (Garofalo & al. 1999, 2010, Ricciardi & al. 2000, Aprile & al. 2003, 2003b, Nimis & Tretiach 2004), **Pugl**, **Bas**, **Cal** (Puntillo 1996), **Si**.

Sq/ Ch/ S/ Sax-Terr/ pH: 4-5, L: 4-5, X: 4, E: 1-2/ Alt: 1-5/ Alp: r, Salp: rr, Orom: rc, Mont: rc, SmedD: c, SmedH: c, MedH: rc, MedD: rr/ PT: 1/ subc/ Note: a mainly southern, eurasiatic species found in small fissures of steeply inclined faces of calcareous rocks, often on cyanobacteria or cyanobacterial lichens when young, sometimes on soil, with optimum at low altitudes, but exceptionally reaching the Alpine belt.

Toninia episema (Nyl.) Timdal

Opera Bot., 110: 62, 1991 - *Lecidea episema* Nyl., Bot. Not.: 161, 1853.

Syn.: *Biatorina episema* (Nyl.) A.L. Sm., *Bilimbia episema* (Nyl.) Arnold, *Catillaria athallina* f. *parasitica* Bagl.?, *Catillaria episema* (Nyl.) H. Olivier, *Catillaria supernula* (Nyl.) H. Olivier, *Kiliasia episema* (Nyl.) Hafellner, *Lecidea supernula* Nyl., *Scutula episema* (Nyl.) Zopf

N - VG, **Frl** (Brackel 2016), **Lomb** (Brackel 2016), **Piem** (Isocrono & al. 2004, Brackel 2016), **Emil** (Brackel 2016), **Lig** (Hafellner 2006, Brackel 2016). **C - Tosc** (Hafellner 2006, Brackel 2016), **Marc** (Nimis & Tretiach 1999, Brackel 2016), **Umb** (Genovesi & Ravera 2001, Ravera & al. 2006, Brackel 2016), **Laz** (Brackel 2016), **Abr** (Nimis & Tretiach 1999, Brackel 2016), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008, Brackel 2016), **Sar** (Brackel 2016). **S - Camp** (Aprile & al. 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010, Brackel 2016), **Pugl** (Nimis & Tretiach 1999, Brackel 2016), **Bas** (Hafellner 2006, Brackel 2016), **Cal** (Puntillo 1996, Brackel & Puntillo 2016, Brackel 2016), **Si** (Nimis & al. 1994, Brackel 2008b, 2016).

LF/ / S/ Sax/ pH: 5, L: 4-5, X: 4, E: 2-3/ Alt: 1-3/ Mont: rr, SmedD: c, Pad: er, SmedH: c, MedH: rc, MedD: r/ PT: 1/ paras *Circinaria calcarea*/ Note: a mainly Mediterranean(-Atlantic) lichenicolous fungus found on hard limestone, on the thalli of *Circinaria calcarea*, more rarely of *C. coronata* and *Protoparmeliopsis versicolor*.

Toninia leptogii Timdal

Opera Bot., 110: 68, 1991.

Syn.: *Scutula leptogii* Dughi

S - Cal (Puntillo 1996, Brackel & Puntillo 2016, Brackel 2016).

LF/ / S/ Terr-Sax/ pH: 5, L: 3-4, X: 4, E: 1-2/ Alt: 1/ MedH: er/ PT: 1/ paras *Leptogium* and *Collema* spp./ Note: a lichenicolous fungus growing on *Scytinium lichenoides*, *S. diffractum*, and *Collema* sp., on steeply inclined to slightly underhanging surfaces of weathered limestones wetted by rain in Mediterranean habitats.

Toninia lutosa (Ach.) Timdal

Opera Bot., 110: 69, 1991 - *Lecidea lutosa* Ach., Lichenogr. Univ.: 182, 1810.

Syn.: *Biatorina verrucosa* (A. Massal.) Jatta, *Thalloidima verrucosum* A. Massal., *Toninia verrucosa* (A. Massal.) Flagey, *Toninia violacea* B. de Lesd.

N - Ven (Lazzarin 2000b), **TAA** (Nascimbene 2005), **Lomb**. **C - Mol** (Nimis & Tretiach 1999, Caporale & al. 2008). **C - Camp** (Aprile & al. 2003b).

Sq/ Ch/ S/ Terr-Sax/ pH: 4-5, L: 4, X: 3-4, E: 1-2/ Alt: 1-2/ SmedD: er/ PT: 1/ subc/ Note: a probably incompletely holarctic species of continental areas, found on soil and weathered calciferous rocks, often in association with cyanobacteria or cyanobacterial lichens when young, mostly at relatively low elevations. An earlier record from Venezia Giulia (see Nimis 1993: 702) being actually from Slovenia, is not accepted here.

Toninia massata (Tuck.) Herre

Proc. Wash. Acad. Sc., 12, 2: 103, 1910 - *Lecidea massata* Tuck., Lich. Calif.: 25, 1866.

Syn.: *Biatorina glaucomela* (Nyl.) Jatta, *Lecidea glaucomela* Nyl., *Thalloidima glaucomelum* (Nyl.) Jatta, *Thalloidima kelleri* Elenkin, *Toninia glaucomela* (Nyl.) Boistel, *Toninia kelleri* (Elenkin) H. Olivier

N - Lig. **C - Tosc** (Putortù & al. 1999c), **Sar**.

Sq/ Ch/ S/ Terr/ pH: 3, L: 4, X: 4-5, E: 1-2/ Alt: 1-2/ SmedH: er, MedH: er/ PT: 1/ subc/ Note: an incompletely holarctic, mainly southern species of continental areas found on soil and in fissures of basic siliceous rocks with some seepage of water after rain, often in association with cyanobacteria and cyanobacterial lichens, mostly at relatively low elevations.

Toninia mesoidea (Nyl.) Zahlbr.

Cat. Lich. Univ., 4: 289, 1926 - *Lecidea mesoidea* Nyl., Flora, 51: 457, 1868.

Syn.: *Bilimbia mesoidea* (Nyl.) A.L. Sm.

C - Sar. **S - Si** (TSB 17320).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 3-4, X: 3, E: 1-2/ Alt: 1/ MedH: vr, MedD: vr/ PT: 1/ suboc, coast, #/ Note: a very poorly known, perhaps Mediterranean-Atlantic species of maritime siliceous rocks.

Toninia nordlandica Th. Fr.

Lichenogr. Scand., 2: 339, 1874.

Syn.: *Lecidea subrimulosa* Nyl., *Toninia steineri* Poelt & Vězda, *Toninia subrimulosa* (Nyl.) Zahlbr.

N - TAA, **Lomb**, **Piem** (TSB s.n.), **VA** (Piervittori & Isocrono 1999).

Sq/ Ch/ S/ Sax/ pH: 3-5, L: 4-5, X: 4, E: 2/ Alt: 3-5/ Alp: vr, Salp: r, Mont: vr/ PT: 1/ w/ Note: an arctic-alpine species found on steeply inclined to slightly underhanging seepage tracks of calciferous or basic siliceous rocks, almost always on cyanobacterial colonies, or on thalli of *Placynthium*, at least when young, mostly in upland areas.

Toninia opuntioides (Vill.) Timdal

Opera Bot., 110: 76, 1991 - *Lichen opuntioides* Vill., Hist. Pl. Dauphiné, 3: 967, tab. 55, 1789.

Syn.: *Toninia bornmuelleri* (J. Steiner) Zahlbr.?

N - VG (TSB 1419), **Frl. Ven** (Nascimbene & Marini 2007), **TAA, Piem** (Giordani & al. 2014), **Lomb, VA** (Piervittori & Isocrono 1999), **Lig. C - Tosc** (Benesperi 2006, 2007b), **Marc** (Nimis & Tretiach 1999), **Umb** (Genovesi & al. 2001, Ravera & al. 2006, Panfili 2007, Brackel 2015), **Laz** (Nimis & Tretiach 2004), **Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach, 1999, 2004, Caporale & al. 2008, Genovesi & Ravera 2014), **S - Camp** (Aprile & al. 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010), **Pugl** (Brackel 2011), **Bas** (Brackel 2011), **Cal** (Puntillo 1996).

Sq/ Ch/ S/ Sax-Terr/ pH: 3-5, L: 3-4, X: 3, E: 2/ Alt: 2-5/ Alp: vr, Salp: r, Orom: r, Mont: rr, SmedD: vr, SmedH: vr/ PT: 1/ Note: a widespread, arctic to temperate, circumpolar lichen found often amongst bryophytes, always associated to cyanobacterial colonies or cyanobacterial lichens when young.

Toninia pennina (Schaer.) Gyeln.

Lilloa, 3: 52, 1938 - *Lecidea pennina* Schaer., Lich. Helv. Spicil., 3: 120, 1828.

Syn.: *Biatora pennina* (Schaer.) Hepp, *Catillaria scotina* (Körb.) Hertel & H. Kiliias, *Lecidea aeneiformis* (Anzi) Jatta, *Lecidea scotina* (Körb.) Arnold, *Lecidella scotina* Körb., *Psora aeneiformis* Anzi

N - Ven, TAA (Dalla Torre & Sarnthein 1902), **Lomb. C - Sar.**

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 4-5, X: 4, E: 2/ Alt: 3-4/ Salp: r, Orom: vr, Mont: vr/ PT: 1/ w/ Note: a rarely collected lichen of continental-dry areas, found on steeply inclined seepage tracks of dolomite, rarely of compact limestone, almost always growing on cyanobacterial colonies when young.

Toninia philippea (Mont.) Timdal

Opera Bot., 110: 79, 1991 - *Lecidea philippea* Mont., Ann. Sc. Nat., Bot. ser. 3, 12: 291, 1849.

Syn.: *Catillaria arctica* Lynge, *Catillaria areolata* H. Magn., *Catillaria cirtensis* (Stizenb.) Flagey, *Catillaria holtedahlii* Lynge, *Catillaria kansuensis* H. Magn., *Catillaria ligustica* B. de Lesd., *Catillaria lutosa* A. Massal., *Catillaria philippea* (Mont.) A. Massal., *Catillaria riparia* (Müll. Arg.) Zahlbr., *Catillaria subgrisea* (Nyl.) Flagey, *Kiliasia philippea* (Mont.) Hafellner, *Kiliasia riparia* (Müll. Arg.) Hafellner, *Lecidea capitata* Anzi, *Lecidea cirtensis* Stizenb., *Lecidea subgrisea* Nyl., *Patellaria riparia* Müll. Arg.

N - Ven, TAA, Lomb, Lig. C - Tosc, Umb (Genovesi & Ravera 2001, Ravera & al. 2006), **Abr** (Nimis & Tretiach 1999, Caporale & al. 2016), **Sar. S - Si** (Brackel 2008b).

Cr/ Ch/ S/ Sax/ pH: 3-5, L: 4, X: 3-4, E: 2/ Alt: 1-5/ Alp: er, Salp: vr, Orom: vr, Mont: er, SmedD: er, SmedH: er, MedH: vr, MedD: vr/ PT: 1/ subc/ Note: an incompletely holarctic lichen of dry areas, found on limestone, dolomite, calciferous sandstone and schists in open situations, most common in dry grasslands, with a wide altitudinal range.

Toninia physaroides (Opiz) Zahlbr.

Cat. Lich. Univ., 4: 275, 1926 - *Lecidea physaroides* Opiz, Lotos, 6: 158, 1856.

Syn.: *Bacillina antipolitana* Nyl., *Biatorina lurida* (Bagl. ex Arnold) Jatta, *Thalloidima luridum* Bagl. ex Arnold, *Toninia alluviicola* M. Choisy, *Toninia lurida* (Bagl. ex Arnold) H. Olivier

N - Ven, Emil (Nimis & al. 1996), **Lig** (Watson 2014), **C - Tosc** (Putorti & al. 1999c), **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera & al. 2006), **Laz, Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **Sar. S - Camp** (Garofalo & al. 1999, Aprile & al. 2003b), **Pugl** (Nimis & Tretiach 1999), **Bas** (Potenza 2006, Potenza & al. 2010, Potenza & Fascetti 2012), **Cal** (Puntillo 1996).

Sq/ Ch/ S/ Terr/ pH: 3-4, L: 4, X: 3-4, E: 2-3/ Alt: 1-4/ Salp: er, Mont: vr, SmedD: vr, SmedH: er, MedH: vr, MedD: r/ PT: 1-2/ subc/ Note: a mainly temperate species, most common on soil developing from calciferous sandstone, often amongst mosses and associated to cyanobacterial lichens when young, rare in limestone areas.

Toninia plumbina (Anzi) Hafellner & Timdal

in Timdal, Opera Bot., 110: 85, 1991 - *Leciographa plumbina* Anzi, Comm. Soc. Critt. Ital., 1, 3: 158, 1862.

Syn.: *Bacidia plumbina* (Anzi) R. Sant., *Bilimbina plumbina* (Anzi) H. Olivier

N - Emil (UPS-F-523945, Brackel 2016), **Lig** (Brunialti & al. 2001, Brackel 2016), **C - Tosc** (Brackel 2016), **Umb** (Ravera 1998, 1998b, Ravera & al. 2006, Brackel 2016), **Laz** (Ravera 2001, Brackel 2016), **Sar** (Brackel 2016), **S - Camp** (Nimis & Tretiach 2004, Garofalo & al. 2010, Catalano & al. 2016, Brackel 2016), **Bas** (Bartoli & Puntillo 1996, 1998, Brackel 2016), **Cal** (Puntillo 1996, Puntillo & Puntillo 2004, Brackel & Puntillo 2016, Brackel 2016).

LF/ / S/ Epiph/ pH: 2-3, L: 3, X: 1-2, E: 1-2/ Alt: 1-2/ SmedH: er, MedH: er/ PT: 1/ suboc, paras *Pecten* spp./ Note: a Mediterranean-Atlantic, mainly western lichenicolous fungus growing on species of *Pecten*, most frequent in Tyrrhenian Italy. It is included in the Italian red list of epiphytic lichens as "Near-threatened" (Nascimbene & al. 2013c).

Toninia rosulata (Anzi) H. Olivier

Bull. Géogr. Bot., 21: 197, 1911 - *Thalloidima rosulatum* Anzi, Atti Soc. Ital. Sc. Nat. Milano, 11: 166, 1868.

Syn.: *Biatorina rosulata* (Anzi) Jatta, *Toninia melanocarpizans* Zahlbr.

N - Frl, Ven, TAA, Lomb, Piem (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999).

Sq/ Ch/ S/ Terr-Sax/ pH: 4-5, L: 3-5, X: 3-4, E: 2/ Alt: 3-5/ Alp: rr, Salp: vr, Mont: er/ PT: 1/ Note: an arctic-alpine, mainly European species found on soil and in fissures and crevices of calciferous rocks, often on cyanobacteria or cyanobacterial lichens when young, with optimum above treeline.

Toninia sedifolia (Scop.) Timdal

Opera Bot., 110: 93, 1991 - *Lichen sedifolius* Scop., Fl. Carniol., ed. 2, 2: 395, 1772.

Syn.: *Biatorina vesicularis* (Hoffm.) Jatta, *Lecidea glebosa* Ach., *Lecidea subtabacina* Nyl., *Lecidea vesicularis* (Hoffm.) Ach., *Lichen radicans* Vill., *Lichen squamatus* Dicks., *Patellaria vesicularis* Hoffm., *Psora vesicularis* (Hoffm.) Hoffm., *Thalloidima coeruleonigricans* auct. non (Lightf.) Poetsch, *Thalloidima coeruleonigricans* var. *carolitanum* Bagl. ex Arnold, *Thalloidima vesiculare* (Hoffm.) A. Massal., *Toninia arenaria* Räsänen, *Toninia coeruleonigricans* auct. non (Lightf.) Th. Fr., *Toninia carolitana* (Bagl. ex Arnold) Nimis & Poelt, *Toninia muricola* B. de Lesd., *Toninia ochracea* Werner?, *Toninia subtabacina* (Nyl.) H. Olivier, *Toninia vesicularis* (Hoffm.) Mong., *Verrucaria grisea* Willd.

N - VG, Frl (Tretiach 1996, Tretiach & Molaro 2007), **Ven** (Nascimbene & Caniglia 1997, 2003c, Caniglia & al. 1999, Nascimbene 2005c, 2008c, Nascimbene & Marini 2007, Brackel 2013, Giovagnoli & Tasinazzo 2014), **TAA** (De Benetti & Caniglia 1993, Nascimbene & al. 2006, Nascimbene 2008b, Muggia & Grube 2010, Spitale & Nascimbene 2012), **Lomb** (Valcuvia & al. 2003), **Piem** (Clerc & al. 1999, Isocrono & al. 2004, Hafellner & al. 2004), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1999, Piervittori & al. 2001), **Emil** (Scarpa 1993, Nimis & al. 1996), **Lig** (Valcuvia & al. 2000), **C - Tosc** (Loppi & al. 2004b, Brackel 2015), **Marc** (Nimis & Tretiach 1999), **Umb** (Nimis & Tretiach 1999, Ravera & al. 2006, Panfili 2007), **Laz** (Nimis & Tretiach 2004, Brackel 2015), **Abr** (Nimis & Tretiach 1999, Genovesi & Ravera 2014, Caporale & al. 2016), **Mol** (Garofalo & al. 1999, Caporale & al. 2008, Nimis & Tretiach 1999), **Sar, S - Camp** (Garofalo & al. 1999, 2010, Ricciardi & al. 2000, Aprile & al. 2002, 2003, 2003b, Nimis & Tretiach 2004, Catalano & Aprile 2008, Catalano & al. 2016), **Pugl** (Nimis & Tretiach 1999, Durini & Medagli 2002, 2004), **Bas** (Bartoli & Puntillo 1998, Nimis & Tretiach 1999, Potenza 2006, Potenza & al. 2010), **Cal** (Puntillo 1996, Puntillo & Puntillo 2004, Brackel & Puntillo 2016), **Si** (Nimis & al. 1994, 1995, Ottonello & Salone 1994, Ottonello & al. 1994, 2011, Ottonello 1996, Grillo 1998, Grillo & Caniglia 2004, Merlo 2004b, Brackel 2008b, Gianguzzi & al. 2009).

Sq/ Ch/ S/ Terr/ pH: 3-5, L: 3-5, X: 4-5, E: 2-3/ Alt: 1-5/ Alp: rr, Salp: rc, Orom: vc, Mont: vc, SmedD: vc, Pad: er, SmedH: vc, MedH: c, MedD: rc/ PT: 1-2/ Note: a widespread holarctic lichen with a broad altitudinal and latitudinal range, found on soil and weathered calciferous, more rarely basic siliceous rocks, often overgrowing mosses and associated with cyanobacteria or cyanobacterial lichens when young; common in dry, open grasslands throughout the country. According to preliminary results by Wesberg & al. (2016) the species is heterogeneous, and at least two species should be recognised in Europe.

Toninia squalecens (Nyl.) Th. Fr.

Lichenogr. Scand., 1, 2: 340, 1874 - *Lecidea squalecens* Nyl., Öfvers. K. Svensk. Vetensk.-Akad. Förh., 17: 297, 1860.

Syn.: *Thalloidima rimulosum* Th. Fr.

N - Lomb.

Cr/ Ch/ S/ Terr-Sax/ pH: 1-2, L: 4, X: 3, E: 1/ Alt: 4-5/ Alp: er, Salp: er/ PT: 1/ #/ Note: on silicicolous mosses, mostly on *Andreaea* near or above treeline; on the whole, a rather poorly known species which certainly does not belong to *Toninia*.

Toninia squalida (Ach.) A. Massal.

Ric. Auton. Lich. Crost.: 108, 1852 - *Lecidea squalida* Ach., Lichenogr. Univ.: 169, 1810.

Syn.: *Bacidia acervulans* (Nyl.) B. de Lesd., *Bilimbia caulescens* (Anzi) Jatta, *Bilimbia multiseptata* (Anzi) Jatta, *Bilimbia squalida* (Ach.) Jatta, *Lecidea acervulans* Nyl., *Lecidea atrorufa* var. *squarrosa* Ach., *Lecidea caulescens* (Anzi) Tuck., *Lecidea norvegica* Sommerf., *Toninia acervulans* (Nyl.) H. Olivier, *Toninia caulescens* Anzi, *Toninia cinereovirens* var. *verruculosa* Th. Fr., *Toninia havaasii* H. Magn., *Toninia multiseptata* Anzi, *Toninia squarrosa* (Ach.) Th. Fr., *Toninia verruculosa* (Th. Fr.) Vain.

N - Frl (Tretiach & Hafellner 2000), **Ven, TAA, Lomb, Piem** (Isocrono & al. 2004, Matteucci & al. 2015b), **VA** (Piervittori & Isocrono 1999), **Lig, C - Tosc, Sar, S - Camp, Cal** (Puntillo 1996), **Si**.

Sq/ Ch/ S/ Terr-Sax/ pH: 2-3, L: 4, X: 3, E: 2/ Alt: 3-5/ Alp: rr, Salp: rc, Orom: rr, Mont: r/ PT: 1/ Note: an incompletely holarctic lichen with a very broad latitudinal range, found on soil, more rarely on weathered base-rich or weakly calciferous siliceous rocks in dry-warm upland areas, often associated to cyanobacteria or cyanobacterial lichen when young.

Toninia subfuscae (Arnold) Timdal

Opera Bot., 110: 101, 1991 - *Celidium subfuscae* Arnold in Zwackh, Flora, 47: 87, 1864.

Syn.: *Bacidia subfuscae* (Arnold) Clauzade & Cl. Roux, *Bilimbia subfuscae* (Arnold) Arnold, *Lecidea subfuscaria* Nyl., *Mycobilimbia subfuscae* (Arnold) Rehm

N - VG (TSB 2287, Brackel 2016), **Emil** (Gasparo & Tretiach 1996, Nimis & al. 1996, Brackel 2016), **C - Tosc** (TSB 10381, Brackel 2016), **Sar** (Brackel 2016), **S - Bas** (Brackel 2011, 2016), **Si** (Nimis & al. 1996b, Brackel 2016).

LF/ / S/ Epiph/ pH: 3-4, L: 4, X: 3, E: 2-3/ Alt: 1-2/ SmedD: er, SmedH: vr, MedH: er/ PT: 1-2/ paras *Lecanora* and *Lecidella* spp./ Note: a lichenicolous fungus found in the thallus of different epilithic (e.g.

Lecanora campestris, *Protoparmeliopsis muralis*, *Lecidella scabra*) and also epiphytic (*Lecanora subfusca* s.lat.) crustose lichens.

Toninia subnitida (Hellb.) Hafellner & Türk

Stapfia, 76: 157, 2001 - *Catillaria subnitida* Hellb., Nerikes Lafflora: 92, 1871.

Syn.: *Catillaria tristis* (Müll. Arg.) Arnold, *Kiliasia tristis* (Müll. Arg.) Hafellner, *Lecidea platycarpiza* Nyl., *Patellaria tristis* Müll. Arg.

N - TAA, Piem (TSB 33968). S - Bas (Nimis & Tretiach 1999), Si.

Cr/ Ch/ S/ Sax/ pH: 3-5, L: 3-4, X: 3-4, E: 1-2/ Alt: 3-5/ Alp: r, Salp: rr, Orom: vr, Mont: vr/ PT: 1/
Note: on more or less calcareous substrata in upland areas; the generic position is still an open problem.

Toninia taurica (Szatala) Oxner

Fl. Lisch. Ukraini, 2: 173, 1968 - *Thalloidima tauricum* Szatala, Borbasia, 4: 79, 1942.

Syn.: *Toninia clemens* H. Baumg. nom. inval., *Toninia schafeevii* Tomin

N - Frl, Ven (Nascimbene 2003b, 2005c, Nascimbene & Marini 2007), TAA (Nascimbene 2008b, Spitale & Nascimbene 2012), Lomb, Piem (TSB 33999), Lig (TSB 33477). C - Tosc (Tretiach & al. 2008), Marc (Nimis & Tretiach 1999), Umb (Nimis & Tretiach 1999, Ravera & al. 2006, Panfilo 2007), Laz (Nimis & Tretiach 2004), Abr (Caporale & al. 2016), Sar. S - Pugl (Nimis & Tretiach 1999), Cal (Puntillo 1996), Si (Nimis & al. 1994).

Sq/ Ch/ S/ Terr/ pH: 3-5, L: 4-5, X: 3-4, E: 2/ Alt: 1-5/ Alp: r, Salp: rr, Orom: vr, Mont: r, SmedD: vr, SmedH: vr, MedH: er/ PT: 1/ Note: a mainly southern species with an Eurasiatic distribution, found on calciferous soil and in fine crevices of the rocks, often associated with cyanobacterial lichens when young, with a wide altitudinal range but generally rare in the eu-Mediterranean belt.

Toninia toepfferi (Stein) Navàs

Broteria, ser. Bot., 11: 9, 1913 - *Thalloidima toepfferi* Stein, Verh. schles. Ges. vaterl. Kultur, 60: 232, 1883.

C - Laz, Sar. S - Cal (Puntillo 1996).

Sq/ Ch/ S/ Terr/ pH: 3, L: 4-5, X: 4, E: 1-2/ Alt: 1/ MedH: er, MedD: er/ PT: 1/ Note: a Mediterranean-Macaronesian lichen found on soil developing from basic siliceous substrata in dry-warm regions with a mild climate, usually in very open grasslands; it is certainly rare in Italy.

Toninia toniniana (A. Massal.) Zahlbr.

in Beck, Ann. naturhist. Hofmus. Wien, 1: 305, 1886 - *Thalloidima mammillare* var. *toniniana* A. Massal., Ric. Auton. Lich. Crost.: 97, 1852.

Syn.: *Biatorina toniniana* (A. Massal.) Jatta, *Lecidea caesiocandida* Nyl., *Thalloidima caesiocandidum* (Nyl.) Arnold, *Thalloidima toninianum* (A. Massal.) A. Massal., *Toninia caesiocandida* (Nyl.) Th. Fr.

N - VG, Frl, Ven (Lazzarin 2000b), TAA, Lomb, Piem (TSB 34194), VA (Piervittori & Isocrono 1999). C - Tosc, Marc (TSB 31366).

Sq/ Ch/ S/ Sax/ pH: 4-5, L: 4-5, X: 4-5, E: 2/ Alt: 2-4/ Salp: er, Mont: vr, SmedD: vr, SmedH: vr/ PT: 1/
w/ Note: a mainly Mediterranean to submediterranean species found on steeply inclined to slightly underhanging seepage tracks of calcareous rocks, always in association with cyanobacterial colonies.

Toninia toninioides (Jatta) Cl. Roux

Catal. Lich. France: 1314, 2014 comb. inval. - *Leptographa toninioides* Jatta, Boll. Soc. Bot. Ital.: 211, 1892.

Syn.: *Bilimbia deformans* Jatta, *Toninia deformans* (Jatta) Jatta

S - Camp (Jatta 1909-1911).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4-5, X: 4, E: 1-2/ Alt: 1/ MedH: er, MedD: er/ PT: 1/ paras *Lecanora rupicola*, #/ Note: a very poorly known species of siliceous rocks; according to Roux & coll. (2014) it is lichenised and grows as a parasite on *Lecanora rupicola*.

Toninia tristis (Th. Fr.) Th. Fr. s.lat.

Lichenogr. Scand., 2: 341, 1874 - *Psora tabacina* var. *tristis* Th. Fr., Bot. Not.: 38, 1865.

N - VG, Ven, TAA, Lomb, Piem (Isocrono & al. 2004), VA (Piervittori & Isocrono 1999), Emil, Lig (Valcuvia & al. 2000). C - Tosc, Abr (LD-1001465), Sar. S - Camp (Ricciardi & al. 2000), Pugl, Bas, Cal (Puntillo 1996), Si (Nimis & al. 1994).

Sq/ Ch/ S/ Terr-Sax/ pH: 3-5, L: 4-5, X: 4, E: 1-2/ Alt: 1-5/ Alp: vr, Salp: rr, Orom: r, Mont: r, SmedD: r, SmedH: r, MedH: vr/ PT: 1/ Note: a holarctic lichen of continental areas, with a wide latitudinal and altitudinal range, found on weathered, calcareous or basic siliceous rock, often associated with cyanobacterial colonies.

Toninia tristis subsp. *asiae-centralis* (H. Magn.) Timdal

Opera Bot., 110: 112, 1991 - *Lecidea asiae-centralis* H. Magn., Lich. Centr. Asia: 55, 1940.

N - Frl, TAA, Lomb, Piem (TSB 34198). C - Umb (Genovesi & Ravera 2001, Ravera & al. 2006). S - Cal (Puntillo 1996).

Sq/ Ch/ S/ Terr-Sax/ pH: 3-5, L: 4-5, X: 4, E: 1-2/ Alt: 2-4/ Mont: vr, Orom: vr, SmedD: r, SmedH: r, MedH: vr/ PT: 1/ subc/ Note: on calciferous rocks and soil; despite the name, this subspecies is widespread also in southern and central Europe, with scattered outposts north to Greenland.

Toninia tristis subsp. ***pseudotabacina*** Timdal

Opera Bot., 110: 113-114, 1991.

N - Ven, TAA, Lomb, Lig. C - Sar.

Sq/ Ch/ S/ Terr/ pH: 3-5, L: 4-5, X: 4, E: 1-2/ Alt: 3-5/ Alp: vr, Salp: vr, Orom: vr, Mont: er/ PT: 1/ Note: a mainly Mediterranean-Macaronesian taxon found on soil over calcareous substrata, sometimes reaching the oromediterranean belt.

Toninia tristis (Th. Fr.) Th. Fr. subsp. ***tristis***

Lichenogr. Scand., 2: 341, 1874 - *Psora tabacina* var. *tristis* Th. Fr., Bot. Not.: 38, 1865.

Syn.: *Toninia tabacina* auct. p.p. et sensu A. Massal.

N - Lomb, VA (Piervittori & Isocrono 1999), Lig (Watson 2014).

Sq/ Ch/ S/ Terr-Sax/ pH: 4-5, L: 4-5, X: 4, E: 1-2/ Alt: 4-5/ Alp: vr, Salp: rr/ PT: 1/ Note: in fine crevices of calciferous rocks, with optimum near and above treeline.

Toninia verrucariae (Nyl.) Timdal

in Rambold & Triebel, Bibl. Lichenol., 48: 170, 1992 - *Lecidea verrucariae* Metzler ex Nyl., Flora, 51: 164, 1868.

N - VG (TSB 26041, Brackel 2016), TAA (Lettau 1958: 145-146, Brackel 2016).

LF/ / S/ Sax/ pH: 5, L: 1-2, X: 2, E: 1/ Alt: 1-2/ SmedD: vr/ PT: 1/ paras *Encephalographa* and endolithic lichens/ Note: a lichenicolous fungus growing on the thalli of calcicolous endolithic lichens, (e.g. *Bagliettoa calciseda* and *Encephalographa elisae*) at relatively low elevations; probably more widespread, but much overlooked.

Toninia verrucarioides (Nyl.) Timdal

Opera Bot., 110: 116, 1991 - *Lecidea aromatica* var. *verrucarioides* Nyl., Bot. Not.: 157, 1853.

Syn.: *Bilimbia carbonacea* (Anzi) Jatta, *Lecidea subimbricata* Nyl., *Lecidea verrucarioides* Nyl., *Thalloidima boissieri* Müll. Arg., *Toninia boissieri* (Müll. Arg.) Arnold, *Toninia aromatica* var. *cervina* (Lönnr.) Th. Fr., *Toninia carbonacea* Anzi, *Toninia cervina* Lönnr., *Toninia congesta* Hepp ex Kremp., *Toninia conjungens* Th. Fr., *Toninia kolax* Poelt, *Toninia subimbricata* (Nyl.) H. Olivier

N - VG, Lomb, Lig (TSB 33570). C - Umb (Genovesi & al. 2002, Ravera & al. 2006), Sar. S - Cal (Puntillo 1996, Brackel & Puntillo 2016).

Sq/ Ch/ S/ Sax/ pH: 4-5, L: 3-4, X: 3, E: 2/ Alt: 3-5/ Alp: er, Salp: vr, Orom: vr, Mont: er/ PT: 1/ Note: an arctic-alpine to cool-temperate lichen found in fissures and fine crevices of calcareous rocks in upland areas, often growing on species of *Placynthium* when young.

Topelia P.M. Jørg. & Vězda

Beih. Nova Hedwigia, 79: 502, 1984.

This genus, which currently includes c. 10 species, mainly differs from *Thelopsis* by having only 8 ascospores per ascus, which are muriform rather than submuriform. With the recent addition of more or less intermediate species, the distinction between the two genera has become somehow arbitrary. A world key to all species was provided by Aptroot & al. (2014). The inclusion of the genus in the Stictidaceae is not certain. Type: *T. rosea* (Servít) P. M. Jørg. & Vězda

Topelia heterospora (Zahlbr.) P.M. Jørg. & Vězda

Beih. Nova Hedwigia, 79: 505, 1984 - *Clathroporina heterospora* Zahlbr., Österr. bot. Z., 49: 247, 1899.

S - Si (Nimis & al. 1994, Caniglia & Grillo 2005, 2006).

Cr/ Tr/ S/ Sax/ pH: 4-5, L: 2-3, X: 1-2, E: 1-2/ Alt: 1/ MedH: er/ PT: 1/ suboc/ Note: a humid subtropical to Mediterranean-Atlantic lichen found on hard, compact calcareous rocks in sheltered situations.

Topelia nimisiana Tretiach & Vězda

Lichenologist, 24: 107, 1992.

C - Tosc (Benesperri & al. 2006b), Laz. S - Bas (Bartoli & Puntillo 1996, 1998), Si (Otonello & Puntillo 2009, Otonello & al. 2011).

Cr/ Tr/ S/ Epiph/ pH: 1-2, L: 2-3, X: 1-2, E: 1/ Alt: 1/ MedH: er/ PT: 0/ suboc/ Note: known from Italy and the Iberian Peninsula, this species grows on the bark of ancient trees in humid, but open evergreen forests, often near the base of the trunks, and is probably restricted to Tyrrhenian Italy. It is included in the Italian red list of epiphytic lichens as "Vulnerable" (Nascimbene & al. 2013c).

Topelia rosea (Servít) P.M. Jørg. & Vězda

Beih. Nova Hedwigia, 79: 507, 1984 - *Microglæna rosea* Servít, Webbia, 8: 419, 1952.

Syn.: *Microglaena corrosa* var. *carnea* B. de Lesd.

N - **Lig. S** - **Bas** (Bartoli & Puntillo 1996, 1998), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994, Ottonello & Puntillo 2009, Ottonello & al. 2011).

Cr/ Tr/ S/ Sax-Terr/ pH: 4-5, L: 2-4, X: 1-2, E: 1-2/ Alt: 1/ MedH: er/ PT: 1/ suboc/ Note: a mainly Mediterranean-Atlantic lichen found on calcareous rocks, over soil and muribund bryophytes in shaded-humid situations.

Tornabea Østh.

in Østhagen & Sundin, *Taxon*, 29: 688, 1980.

This monotypic fruticose genus of the Physciaceae has a remarkably disjunct distribution in semi-arid areas of both Hemispheres (see Nimis & Tretiach 1997). Type: *T. scutellifera* (With.) J.R. Laundon

Tornabea scutellifera (With.) J.R. Laundon

Lichenologist, 16: 226, 1984 - *Lichen scutelliferus* With., *Bot. Arrang. Veget. Gr. Brit.*: 728, 1776.

Syn.: *Anaptychia intricata* (DC.) A. Massal., *Parmelia atlantica* Ach., *Teloschistes intricatus* (DC.) Hue, *Tornabea atlantica* (Ach.) Østh., *Tornabea atlantica* var. *intricata* (DC.) Clauzade & Cl. Roux, *Tornabenia atlantica* (Ach.) Kurok., *Tornabeniopsis atlantica* (Ach.) Follmann *comb.inval.*

C - **Tosc** (Nimis & Tretiach 1997), **Laz** (Lich. Graec. 39: Obermayer 1995b, Nimis & Tretiach 1997, Nordin & Mattsson 2001), **Sar** (Nimis & Tretiach 1997, Watson 2014), **S** - **Camp** (Nimis & Tretiach 1997), **Pugl** (Nimis & Tretiach 1997, 1999), **Si** (Nimis & al. 1994, Ottonello & Salone 1994, Ottonello & al. 1994, 2011, Nimis & Tretiach 1997, Ottonello & Romano 1997).

Frut/ Ch/ A.s/ Epiph-Sax/ pH: 2-4, L: 3-5, X: 1-2, E: 2-3/ Alt: 1/ MedH: er/ PT: 1/ Note: on a wide variety of substrata, most frequent on branches of littoral shrubs but also on rocks, and, but only in a few very warm-humid areas, even on mortar (*e.g.* it is still abundant in the village of Erice in Sicilia); much more widespread in the past, but presently restricted to a few, localised stations with natural vegetation, especially sand dunes, mostly along the Tyrrhenian coast, in sites with a high persistence of fog, or with frequent humid maritime winds alternating with dry periods. It is included in the Italian red list of epiphytic lichens under the "Least Concern" category (Nascimbene & al. 2013c).

Trapelia M. Choisy

Bull. Soc. Bot. France, 76: 523, 1929.

This genus of the Trapeliaceae includes *c.* 13 species and is closely related to *Trapeliopsis*, which differs in having *e.g.* more robust apothecia, a shallower hymenium and smaller ascospores. The distinction between the two genera has been often questioned, but seems to be confirmed by molecular data (Lumbsch & al. 2007). Type: *T. coarctata* (Sm.) M. Choisy. The name is conserved against *Discocera* A. L. Sm. & Ramsb. (1917).

Trapelia coarctata (Sm.) M. Choisy

in Werner, *Bull. Soc. Sc. Nat. Maroc*, 12: 160, 1932 - *Lichen coarctatus* Turner *ex Sm. in* Smith & Sowerby, *Engl. Bot.*: 8, tab. 534, 1799.

Syn.: *Biatora aridens* (Nyl.) Walt. Watson, *Biatora coarctata* (Sm.) Th. Fr., *Biatora coarctata* subsp. *terrula* Hulting, *Biatora coarctata* var. *elachista* (Ach.) Oxner, *Lecanactis aridens* Nyl., *Lecanora coarctata* (Sm.) Ach., *Lecanora coarctata* var. *argilliseda* Dufour *ex* Schaer., *Lecanora ocrinaeta* Ach., *Lecidea aridens* Nyl., *Lecidea coarctata* (Sm.) Nyl., *Lecidea coarctata* var. *elachista* (Ach.) Th. Fr., *Lecidea cotaria* Ach., *Zeora coarctata* (Sm.) Flot.

N - **VG** (Castello 2002, Martellos & Castello 2004, Tretiach & al. 2007b), **Frl** (Tretiach & Hafellner 2000), **Ven**, **TAA** (Thor & Nascimbene 2007), **Lomb** (Gheza & al. 2015), **Piem** (Isocrono & al. 2004, Favero-Longo & al. 2006b), **VA** (Pievittori & Isocrono 1999, Valcuvia 2000), **Emil** (Tretiach & al. 2008), **Lig** (Brunialti & al. 1999). **C** - **Tosc** (Tretiach & Nimis 1994, Benesperi 2011, Brackel 2015), **Umb** (Genovesi & al. 2001, Ravera & al. 2006, Genovesi 2011), **Laz** (Bartoli 1997b), **Mol** (Nimis & Tretiach 2004, Caporale & al. 2008), **Sar**, **S** - **Camp** (Nimis & Tretiach 2004), **Pugl**, **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996, Puntillo & Puntillo 2004, Potenza & al. 2011), **Si** (Nimis & al. 1996b).

Cr/ Ch/ S/ Sax-Terr/ pH: 2-3, L: 3, X: 2-3, E: 1-2/ Alt: 1-5/ Alp: rc, Salp: c, Orom: r, Mont: rr, SmedD: r, Pad: er, SmedH: rc, MedH: r, MedD: er/ PT: 1-2/ p/ Note: a holarctic early coloniser of siliceous pebbles near the soil surface, sometimes also found on bare clayey soil, with a wide altitudinal and altitudinal range; it is most frequent in upland areas, becoming rare, and mostly Tyrrhenian, in the eu-Mediterranean belt.

Trapelia corticola Coppins & P. James

Lichenologist, 16: 254, 1984.

Syn.: *Lecidea elegantula* Riehm. *nom. illegit.*

N - **Lomb** (Stofer 2006). **C** - **Tosc**. **S** - **Si** (Nimis & al. 1994).

Cr/ Ch/ A.s/ Epiph/ pH: 2-3, L: 3, X: 2, E: 1-2/ Alt: 1-2/ SmedD: er, SmedH: vr, MedH: vr/ PT: 1/ Note: on the spongy, loose bark of deciduous trees, sometimes on muribund epiphytic bryophytes in sheltered, humid woodlands at low elevations. It is included in the Italian red list of epiphytic lichens as "Endangered" (Nascimbene & al. 2013c).

Trapelia glebulosa (Sm.) J.R. Laundon

J. Linn. Soc., Bot., 147: 492, 2005 - *Lichen glebulosus* Sm. in Smith & Sowerby, Engl. Bot., 29: tab. 1955, 1809.

Syn.: *Biatora coarctata* var. *ornata* (Sommerf.) Th. Fr., *Biatora coarctata* var. *glebulosa* (Sm.) Arnold, *Lecanora angelica* Parrique, *Lecanora coarctata* var. *involuta* (Taylor) Mudd, *Lecanora coarctata* var. *ornata* Sommerf., *Lecanora involuta* Taylor, *Lecidea coarctata* var. *ornata* (Sommerf.) Malbr., *Lecidea ornata* (Sommerf.) Hue, *Parmelia coarctata* var. *microphyllina* Fr., *Trapelia involuta* (Taylor) Hertel, *Trapelia ornata* (Sommerf.) Hertel

N - VG (Castello 2002, Martellos & Castello 2004), **Frl, Ven, Lomb, Piem** (Valcuvia 2002, 2002b, E.C.I. 1, 73: S-F162749), **Lig, C - Tosc** (Brackel 2015), **Laz, Sar, S - Si** (Nimis & al. 1996b).

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 3-4, X: 2-3, E: 1-3/ Alt: 1-2/ SmedD: er, SmedH: r, MedH: vr/ PT: 1-2/ Note: on basic siliceous rocks, roofing tiles, brick walls; mainly Tyrrhenian in Italy.

Trapelia obtegens (Th. Fr.) Hertel

Ber. dtsh. bot. Ges., n. F., 4: 181, 1970 - *Biatora coarctata* subsp. *obtegens* Th. Fr., Bot. Not.: 152, 1867.

Syn.: *Biatora coarctata* var. *obtegens* (Th. Fr.) Stein, *Lecidea coarctata* var. *obtegens* (Th. Fr.) Th. Fr., *Lecidea obtegens* (Th. Fr.) Vain.

N - Frl (Tretiach & Hafellner 2000).

Cr/ Ch/ A.s/ Sax/ pH: 2-3, L: 3-4, X: 3, E: 2-3/ Alt: 2-4/ Salp: r, Mont: r/ PT: 1-2/ Note: on siliceous pebbles near the ground, sometimes on roofing tiles and over thin soil layers over siliceous substrata. The records from Lazio reported by Nimis (1993: 711), and probably that by Bartoli (1997b), were due to misidentifications, and are not accepted here.

Trapelia placodioides Coppins & P. James

Lichenologist, 16: 257, 1984.

N - VG, TAA (Thor & Nascimbene 2007, Lang 2009), **Piem** (Isocrono & al. 2006). **C - Tosc** (Brackel 2015). **S - Camp** (Nimis & Tretiach 2004).

Cr/ Ch/ A.s/ Sax/ pH: 2-4, L: 3, X: 2-3, E: 1-2/ Alt: 1-3/ Mont: er, SmedD: vr, SmedH: r/ PT: 1-2/ Note: on base- rich or slightly calciferous siliceous substrata, sometimes also on walls, in humid areas, with optimum below the montane belt; probably more widespread, but never common.

Trapeliopsis Hertel & Gotth. Schneid.

in Schneider, Bibl. Lichenol., 13: 143, 1980.

After the segregation of a misunderstood species into *Parainoa* (Resl & al. 2015), this genus of the Trapeliaceae includes c. 20 species. The distinction from *Trapelia* has been often questioned, but seems to be confirmed by molecular data (Lumbsch & al. 2007). Type: *T. wallrothii* (Spreng.) Hertel & Gotth. Schneid.

Trapeliopsis flexuosa (Fr.) Coppins & P. James

Lichenologist, 16: 258, 1984 - *Biatora flexuosa* Fr., Sched. Crit. Lich. Suec., 2, 8: 11, 1826.

Syn.: *Lecidea aeruginosa* Borrer, *Lecidea flexuosa* (Fr.) Nyl., *Lecidea granulosa* subsp. *flexuosa* (Fr.) Th. Fr., *Lecidea sapinea* (Fr.) Zahlbr. non sensu Vain., *Lecidea sporadiza* Stirt.

N - VG (Castello 2002, Martellos & Castello 2004), **Frl, Ven, TAA** (Nascimbene & al. 2006e, 2007b, 2014, Thor & Nascimbene 2007, 2008b, 2014, 2014c, Nascimbene & Marini 2015), **Lomb, Piem** (Giordani & Malaspina 2016), **Emil** (Nimis & al. 1996, Tretiach & al. 2008, Benesperi 2009), **Lig, C - Tosc** (Tretiach & Nimis 1994, Benesperi & al. 2007, Tretiach & al. 2008, Benesperi 2011), **Marc** (Nimis & Tretiach 1999), **Laz, Abr** (Nimis & Tretiach 1999), **Sar** (Zedda 1995, Nöske 2000, Zedda & Sipman 2001). **S - Camp** (Aprile & al. 2003b), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996, Incerti & Nimis 2006), **Si**.

Cr/ Ch/ S/ Lign-Epiph/ pH: 1-2, L: 4-5, X: 2-4, E: 1-2/ Alt: 2-4/ Salp: r, Mont: c, SmedD: vr, Pad: er, SmedH: rr, MedH: vr/ PT: 1-2/ Not a widespread, temperate to boreal-montane, circumpolar lichen found on lignum (often on wooden fences) and acid bark, especially of *Pinus* and *Castanea*.

Trapeliopsis gelatinosa (Flörke) Coppins & P. James

Lichenologist, 16: 258, 1984 - *Lecidea gelatinosa* Flörke, Schr. Ges. naturf. Fr. Berlin Mag., 3: 201, 1809.

Syn.: *Biatora gelatinosa* (Flörke) Flot., *Biatora viridescens* var. *gelatinosa* (Flörke) Fr., *Micarea gelatinosa* (Flörke) Brodo

N - Frl (Tretiach & Hafellner 2000), **TAA** (Thor & Nascimbene 2007), **Lomb, Piem** (Isocrono & al. 2004, Isocrono & Piervittori 2008), **Emil** (Tretiach & al. 2008), **Lig** (Brunialti & al. 1999). **C - Tosc** (Tretiach & al. 2008), **Umb** (Ravera & al. 2011).

Cr/ Ch/ S/ Terr/ pH: 1-2, L: 3-4, X: 2, E: 1/ Alt: 3-5/ Alp: er, Salp: rr, Mont: r/ PT: 1/ p/ Note: a boreal-montane to cool-temperate early coloniser of mineral acid soil, sometimes overgrowing bryophytes and plant debris, mostly in upland areas.

Trapeliopsis granulosa (Hoffm.) Lumbsch

in Hertel, Lecid. Exs., 5: 99, 1983 - *Verrucaria granulosa* Hoffm., Descr. Adumbr. Pl. Crypt. Lich., 2, 1: 21, tab. 30, 1794.

Syn.: *Biatora decolorans* auct., *Biatora granulosa* (Hoffm.) Flot., *Lecidea decolorans* (Hoffm.) Flörke, *Lecidea granulosa* (Hoffm.) Ach., *Lecidea hilaris* Nyl., *Lecidea quadricolor* (Dicks.) Borrer, *Trapelia granulosa* (Hoffm.) V. Wirth

N - **Frl** (Tretiach & Hafellner 2000), **Ven** (Nascimbene 2008c), **TAA** (Nascimbene 2006c, 2008b, Nascimbene & al. 2006, 2007b, 2008c, Thor & Nascimbene 2007, Lang 2009, Bilovitz & al. 2014, Nimis & al. 2015), **Lomb** (Valcuvia & Truzzi 2007b), **Piem** (Isocrono & al. 2004, 2006, Isocrono & Piervittori 2008), **VA** (Piervittori & Isocrono 1999), **Emil**, **Lig**, **C** - **Tosc** (Tretiach & Nimis 1994, Putortù & al. 1999, Benesperi & al. 2007, Benesperi 2011, Brackel 2015), **Laz**, **Abr** (Nimis & Tretiach 1999), **Sar** (Nöske 2000).

Cr/ Ch/ S/ Lign-Terr/ pH: 1-2, L: 3-4, X: 2-3, E: 1/ Alt: 3-5/ Alp: rc, Salp: c, Orom: r, Mont: vr/ PT: 1/
Note: an arctic-alpine to cool-temperate, circumpolar lichen mostly found on rotting wood, more rarely on soil rich in humus, bryophytes and peat, mostly in clearings of grasslands and shrublands, with optimum near treeline; most common in the Alps, much rarer in the Apennines.

Trapeliopsis pseudogranulosa Coppins & P. James

Lichenologist, 16: 259, 1984.

N - **Emil** (Tretiach & al. 2008), **C** - **Tosc**, **Marc** (Nimis & Tretiach 1999), **Abr** (Nimis & Tretiach 1999).

Cr/ Ch/ A.s/ Terr-Lign-Epiph/ pH: 1, L: 2-3, X: 2, E: 1/ Alt: 1-4/ Salp: er, Mont: vr, SmedD: er, SmedH: vr, MedH: vr/ PT: 1/ suboc/ Note: this lichen is most frequent in humid *Castanea* woodlands, on mosses on basal parts of trunks, decaying lignum and acid organic soil, especially in areas with siliceous substrata; certainly more widespread.

Trapeliopsis viridescens (Schrad.) Coppins & P. James

Lichenologist, 16: 263, 1984 - *Lichen viridescens* Schrad. in Gmelin, Syst. Nat., 2, 2: 1361, 1792.

Syn.: *Biatora sphaeroides* f. *viridescens* (Schrad.) Rabenh., *Biatora viridescens* (Schrad.) W. Mann, *Biatora viridescens* var. *putrida* (Körb.) Hazsl., *Lecidea viridescens* (Schrad.) Ach., *Micarea viridescens* (Schrad.) Brodo, *Trapelia viridescens* (Schrad.) V. Wirth

N - **TAA** (Nascimbene & al. 2007b), **Lomb**, **Piem** (Isocrono & al. 2004), **Emil** (Nimis & al. 1996).

Cr/ Ch/ S/ Lign/ pH: 1, L: 3, X: 2, E: 1/ Alt: 3-4/ Salp: rr, Mont: vr/ PT: 1/ Note: a mainly boreal-montane lichen found on rotting, soft lignum, sometimes overgrowing mosses, mostly in coniferous forests or in *Castanea*-stands.

Trapeliopsis wallrothii (Spreng.) Hertel & Gotth. Schneid.

in Schneider, Bibl. Lichenol., 13: 153, 1980 ("1979") - *Lecidea wallrothii* Flörke ex Spreng., Neue Entdeck., 2: 96, 1820.

Syn.: *Biatora glebulosa* Fr., *Biatora wallrothii* (Spreng.) Körb., *Trapelia wallrothii* (Spreng.) V. Wirth

N - **Lomb**, **Piem** (Isocrono & al. 2004), **Lig**, **C** - **Tosc**, **Sar** (Nöske 2000), **S** - **Cal** (Puntillo 1996), **Si**.

Cr/ Ch/ S/ Terr/ pH: 1-3, L: 4, X: 3-4, E: 1/ Alt: 1-3/ Mont: vr, SmedD: er, SmedH: vr, MedH: er/ PT: 1/
Note: on base-rich, non- or weakly calciferous soil, sometimes overgrowing mosses, mostly in open situations, with optimum below the montane belt.

Tremolecia M. Choisy

Bull. Mens. Soc. Linn. Soc. Bot. Lyon, 22: 177, 1953.

This monotypic genus of the Hymeneliaceae has a wide distribution in cold to cool areas of both Hemispheres. Type: *T. dicksonii* (J.F. Gmel.) M. Choisy (= *T. atrata*).

Tremolecia atrata (Ach.) Hertel

Khumbu Himal, 6, 3: 351, 1977 - *Gyalecta atrata* Ach., K. Vetensk.-Akad. Nya Handl., 29: 229, 1808.

Syn.: *Aspicilia dicksonii* (J.F. Gmel.) Maheu & A. Gillet, *Aspicilia melanophaea* (Fr.) Körb., *Lecidea atrata* (Ach.) Wahlenb., *Lecidea atroferrata* Branth & Grønlund, *Lecidea circumcisa* H. Magn., *Lecidea dicksonii* auct. non (J.F. Gmel.) Ach., *Lecidea lactea* var. *melanophaea* (Fr.) Nyl., *Lecidea melanophaea* Fr., *Tremolecia dicksonii* (J.F. Gmel.) M. Choisy

N - **Frl** (Tretiach & Hafellner 2000), **Ven**, **TAA** (Nascimbene 2003, Thor & Nascimbene 2007, Lang 2009, Hertel & Schuhwerk 2010), **Lomb** (Dalle Vedove & al. 2004), **Piem** (Allisiardi 2001, Isocrono & al. 2003, 2004, 2006, Isocrono & Piervittori 2008), **VA** (Piervittori & al. 1998, 2004, Piervittori & Isocrono 1999, Isocrono & al. 2008, Favero-Longo & Piervittori 2009), **Emil**, **Lig** (Brunialti & al. 1999), **C** - **Sar**.

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 3-5, X: 2-3, E: 1/ Alt: 3-6/ Alp: vc, Salp: c, Orom: er, Mont: vr/ PT: 1/ p, m/
Note: a species widespread in cool to cold areas of both Hemispheres, found on hard magmatic and metamorphic rocks, often rich in iron, mostly on small boulders in upland areas; widespread and locally common in the Alps, much rarer along the Apennines and in the Mediterranean mountains.

Tuckermannopsis Gyeln.

Acta Faun. Fl. Univ., ser. 2, Bot., 1, 5-6: 6, 1933.

This genus of c. 10 species was segregated from *Cetraria* on the basis of the foliose habit, the presence of sparse rhizines, the lack of pseudocyphellae and fine details of ascus structure. The genus, however, was

found to be polyphyletic by Nelsen & al. (2011) who claimed that many cetrarioid genera are narrowly defined relative to other Parmeliaceae genera, and that their continued retention should be justified by further studies of ascomatal and conidiomatal features. The name, dedicated to E. Tuckerman, is sometimes spelled “*Tuckermannopsis*”, but the double *n* is an intentional latinisation. Type: *T. ciliaris* (Ach.) Gyeln.

Tuckermannopsis chlorophylla (Willd.) Hale

in Egan, Bryologist, 90: 164, 1987 - *Lichen chlorophyllus* Willd. in Humboldt, Fl. Frib. Spec.: 20, 1793.

Syn.: *Cetraria chlorophylla* (Willd.) Vain., *Cetraria chlorophylla* var. *klementii* (Servit) H. Magn., *Cetraria scutata* auct. non (Wulfen) Poetsch, *Platysma chlorophyllum* (Willd.) Vain.

N - Frl (Tretiach & Molaro 2007), **Ven** (Nascimbene & Caniglia 1997, 2000b, 2002c, 2003c, Caniglia & al. 1999, Nascimbene & al. 2006e, Nascimbene 2011, Brackel 2013), **TAA** (Nascimbene & Caniglia 2000b, 2002c, Caniglia & al. 2002, Nascimbene 2003, 2006b, 2006c, 2008b, 2014, 2014c, Gottardini & al. 2004, Nascimbene & al. 2005, 2006, 2006e, 2007b, 2009, 2010, 2014, Stofer 2006, Nascimbene & Marini 2015, Nimis & al. 2015), **Lomb** (Rivellini 1994, Alessio & al. 1995, Dalle Vedove & al. 2004, Nascimbene & al. 2006e, Brackel 2010, Matteucci & al. 2008), **Piem** (Isocrono & al. 2004, Isocrono & Piervittori 2008), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Matteucci & al. 2008c), **Emil** (TSB 6848), **Lig** (Brunialti & al. 2001, 2002). **C - Tosc** (Tretiach & Nimis 1994, Benesperi 2011), **Sar. S - Pugl** (Nimis & Tretiach 1999), **Bas** (Potenza 2006, Potenza & Fascetti 2012), **Cal** (Puntillo 1995, 1996, Rico & al. 2005, Incerti & Nimis 2006), **Si** (Ottonello & Salone 1994).

Fol./b/ A.s/ Epiph/ pH: 1-2, L: 3-4, X: 3, E: 1-2/ Alt: 3-4/ Salp: rr, Mont: vr/ PT: 1/ Note: on isolated conifers (e.g. *Larix* in the subalpine belt), more rarely on old acid-barked deciduous trees in montane forests; most frequent in the Alps, rarer in the mountains of southern Italy.

Umbilicaria Hoffm.

Descr. Adumb. Plant. Lich., 1, 1: 8, 1789, *nom. cons.*

This distinctive genus of foliose lichens, with *c.* 70 species, is widely distributed in cold areas, almost exclusively on siliceous rocks. The genus has the greatest diversity in the Northern Hemisphere, particularly at intermediate latitudes, whereas in the Southern Hemisphere it seems to be restricted to relatively small areas in the Andes, New Zealand, Australia, South Africa, and Antarctica. Molecular phylogenetic studies indicated that members of Umbilicariaceae were among the oldest groups to evolve within Lecanoromycetidae (Lutzoni & al. 2004, Miadlikowska & al. 2006). Preliminary results from the phylogenetic analysis by Davydov & al. (2016) show that none of the previous classifications within Umbilicariaceae *s.str.* are supported, and that the family has to be divided into 8 genera, 3 of which will be newly erected, so that many nomenclatural changes are to be expected in the next future. Type: *U. hyperborea* (Ach.) Hoffm. The name is conserved against the homotypic *Omphalodes* Mill. (1754), and against *Umbilicaria* Heist. ex Fabr. (1759), a vascular plant genus.

Umbilicaria aprina Nyl.

Syn. Lich., 2: 12, 1863.

Syn.: *Gyrophora aprina* (Nyl.) Nyl.

N - Piem.

Fol.u/ Ch/ A.s/ Sax/ pH: 1-2, L: 4, X: 3, E: 1-2/ Alt: 5-6/ Alp: er/ PT: 1/ Note: an arctic-alpine species of hard siliceous rocks above treeline, reaching the nival belt. The only record is from France, but near the border (Mt. Blanc).

Umbilicaria cinerascens (Arnold) Frey

Hedwigia, 71: 115, 1931 - *Gyrophora cinerascens* Arnold, Verh. zool.-bot. Ges. Wien, 25: 438, 1875.

N - TAA, Lomb, Piem (Isocrono & al. 2004), **VA** (S- F215845).

Fol.u/ Ch/ A.s/ Sax/ pH: 1-2, L: 3, X: 3, E: 1-2/ Alt: 4-6/ Alp: vr, Salp: er/ PT: 1/ Note: on steeply inclined, often north-facing surfaces of siliceous rocks, mostly in small colonies, with optimum above treeline reaching the nival belt; almost certainly restricted to the Alps in Italy.

Umbilicaria cinereorufescens (Schaer.) Frey

Hedwigia, 71: 109, 1931 - *Umbilicaria vellea* var. *spodochroa* f. *cinereorufescens* Schaer., Enum. Crit. Lich. Eur.: 25, 1850.

Syn.: *Gyrophora cinereorufescens* (Schaer.) Schol., *Gyrophora mammulata* Ach.

N - TAA (Nascimbene 2005), **Lomb, Piem, VA** (HAL-18699).

Fol.u/ Ch/ A.s/ Sax/ pH: 1-2, L: 4-5, X: 2-3, E: 1-3/ Alt: 3-6/ Alp: r, Salp: vr, Mont: er/ PT: 1/ u/ Note: a holarctic species also known from the mountains of Africa, found on wind-exposed, vertical or slightly underhanging surfaces of hard siliceous rocks in humid upland areas (frequent fog and high rainfall), but in apparently dry situations, reaching the nival belt in the Alps.

Umbilicaria crustulosa subsp. *crustulosa* var. *badiofusca* Frey

Rabenh. Krypt.-Flora, 9, 4, 1: 264, 1933.

Syn.: *Gyrophora hirsuta* var. *meizospora* (Harm.) H. Olivier, *Gyrophoropsis meizospora* (Harm.) M. Choisy, *Umbilicaria hirsuta* var. *meizospora* Harm.

N - Lomb, Piem (Isocrono & al. 2004), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999).

Fol.u/ Ch/ S/ Sax/ pH: 1-2, L: 4-5, X: 2-4, E: 1-3/ Alt: 4-5/ Alp: r, Salp: rr/ PT: 1/ #/ Note: a taxon of the mountains of southern Europe, worthy of further study.

Umbilicaria crustulosa* (Ach.) Lamy subsp. *crustulosa* var. *crustulosa

Bull. Soc. bot. Fr., 25: 386, 1879 - *Gyrophora crustulosa* Ach., Lichenogr. Univ.: 673, 1810.

Syn.: *Gyrophora cirrhosa* auct. p.p. non (Hoffm.) Vain., *Gyrophora depressa* (Ach.) Röhl., *Gyrophora depressa* var. *crustulosa* (Ach.) Dalla Torre & Sarnth., *Gyrophora spodochoa* var. *depressa* Ach., *Omphalodiscus crustulosus* (Ach.) Schol., *Umbilicaria depressa* (Ach.) Duby, *Umbilicaria spodochoa* auct. medioeur. p.p. non Ehrh. ex Hoffm.

N - Frl (Tretiach & Hafellner 2000), **Ven, TAA** (Thor & Nascimbene 2007, Lang 2009), **Lomb** (Rivellini 1994), **Piem** (Morisi & Sereno 1995, Isocrono & Falletti 1999, Isocrono & al. 2004, 2006, Morisi 2005, Isocrono & Piervittori 2008), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Isocrono & al. 2008, Favero-Longo & Piervittori 2009), **Emil** (TSB 10002), **Lig** (Brunialti & al. 1999). **C - Tosc** (Vězda Lich.Rar.Exs. 179!), **Sar** (Nöske 2000). **S - Cal** (Puntillo 1996), **Si** (Ottonello & Isocrono 2004).

Fol.u/ Ch/ S/ Sax/ pH: 1-2, L: 4-5, X: 3-4, E: 1-3/ Alt: 3-6/ Alp: c, Salp: vc, Orom: rr, Mont: vr/ PT: 1/ w/ Note: a widespread, cool-temperate to arctic-alpine, circumpolar lichen found on exposed, often steeply inclined surfaces of siliceous rocks with some water seepage in upland areas, reaching the nival belt in the Alps; rare in the Apennines for the scarcity of suitable substrata.

***Umbilicaria crustulosa* subsp. *punctata* A. Crespo & Sancho**

Anal. Inst. Bot. Cavanilles, 35: 89, 1978.

C - Sar.

Fol.u/ Ch/ S/ Sax/ pH: 1-2, L: 4-5, X: 3-4, E: 1-3/ Alt: 3-5/ Orom: vr/ PT: 1/ Note: a recently-described taxon, hitherto known from the Iberian Peninsula and from Sardegna; it could be more widespread in the Mediterranean mountains.

Umbilicaria cylindrica* (L.) Delise var. *cylindrica

in Duby, Bot. Gall., 2: 595, 1830 - *Lichen cylindricus* L., Sp. Pl., 2: 1144, 1753.

Syn.: *Gyrophora cylindrica* (L.) Ach., *Gyrophora cylindrica* var. *nudiuscula* (Schaer.) Flot.

N - Frl (Tretiach & Hafellner 2000), **Ven, TAA** (Caniglia & al. 2002, Nascimbene 2003, 2006c, 2008b, Lang 2009), **Lomb** (Rivellini 1994, Dalle Vedove & al. 2004, Brackel 2013), **Piem** (Morisi & Sereno 1995, Isocrono & Falletti 1999, Isocrono & al. 2003, 2004, 2006, Morisi 2005, Isocrono & Piervittori 2008, Giordani & al. 2014, Favero-Longo & al. 2015), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Piervittori & al. 1998, 2001, 2004, Valcuvia 2000, Isocrono & al. 2008, Favero-Longo & Piervittori 2009, Blisa & al. 2011, Matteucci & al. 2013b, 2015c, Watson 2014), **Emil** (Dalle Vedove & al. 2002), **Lig** (Brunialti & al. 1999). **C - Tosc, Abr, Sar, S - Bas** (Potenza & al. 2014), **Cal** (Puntillo 1996, Potenza & al. 2011).

Fol.u/ Ch/ S/ Sax/ pH: 1-2, L: 3-5, X: 3-4, E: 1-3/ Alt: 3-6/ Alp: c, Salp: vc, Orom: r, Mont: rr/ PT: 1/ Note: an ecologically wide-ranging, cool-temperate to arctic-alpine, circumpolar lichen found on wind-exposed boulders with a short snow-covering period, often on or near the top, with optimum above treeline, reaching the nival belt in the Alps; common only in the Alps, becoming much rarer southwards, also for the scarcity of suitable substrata, up to the mountains of Calabria.

***Umbilicaria cylindrica* var. *delisei* Nyl.**

Despr. ex Nyl., Lichenes Scand.: 117, 1861.

Syn.: *Gyrophora cylindrica* var. *delisei* (Nyl.) Th. Fr., *Umbilicaria canescens* (Dombr.) Dombr., *Umbilicaria delisei* (Nyl.) Kremp.

N - TAA, Piem (Isocrono & al. 2006, 2006b), **VA** (Piervittori & Isocrono 1999, Matteucci & al. 2015c).

Fol.u/ Ch/ S/ Sax/ pH: 1-2, L: 3-4, X: 3, E: 1-2/ Alt: 4-5/ Alp: r, Salp: rr/ PT: 1/ Note: more hygrophytic than the typical variety, and often found in sheltered situations, such as in niches of the rock.

***Umbilicaria cylindrica* var. *tornata* (Ach.) Nyl.**

Lichenes Scand.: 117, 1861 - *Gyrophora tornata* Ach., K. Vetensk.-Akad. Nya Handl., 29: 274, 1808.

N - Frl, TAA, Lomb, Piem (Isocrono & Falletti 1999, Isocrono & al. 2004, 2006), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1999, Piervittori & al. 2001, Isocrono & al. 2008, Matteucci & al. 2015c). **C - Sar, S - Bas** (Potenza & al. 2014), **Cal** (Puntillo 1996).

Fol.u/ Ch/ S/ Sax/ pH: 1-2, L: 3-4, X: 4, E: 1-2/ Alt: 4-6/ Alp: c, Salp: rc, Orom: r/ PT: 1/ Note: on very exposed surfaces of siliceous rock, a weakly differentiated variety, apparently adapted to more xeric conditions.

***Umbilicaria decussata* (Vill.) Zahlbr.**

Cat. Lich. Univ, 8: 490, 1932 - *Lichen decussatus* Vill., Hist. Plant. Dauphiné, 3: 964, 1789.

Syn.: *Gyrophora decussata* (Vill.) Zahlbr., *Gyrophora discolor* Th. Fr., *Gyrophora ptychophora* (Nyl.) Nyl., *Gyrophora reticulata* (Schaer.) Th. Fr., *Omphalodiscus decussatus* (Vill.) Schol., *Umbilicaria ptychophora* Nyl., *Umbilicaria reticulata* (Schaer.) Nyl.

N - Ven, TAA, Lomb, Piem (Isocrono & al. 2004, Isocrono & Piervittori 2008), **VA** (Piervittori & Isocrono 1999, Piervittori & al. 2004, Blisa & al. 2011, Matteucci & al. 2015c). **S - Cal** (TSB 3223)

Fol.u/ Ch/ A.s/ Sax/ pH: 1-2, L: 4, X: 3-4, E: 2-3/ Alt: 3-6/ Alp: c, Salp: rc, Mont: r/ PT: 1/ u/ Note: an arctic-alpine to boreal-montane, circumpolar lichen found on steeply inclined to slightly underhanging

surfaces of wind-exposed siliceous rocks, reaching the nival belt in the Alps, and also reported from the mountains of Calabria.

Umbilicaria deusta (L.) Baumg.

Fl. Lips.: 571, 1790 - *Lichen deustus* L., Sp. Pl., 2: 1150, 1753.

Syn.: *Gyrophora aenea* var. *flocculosa* (Wulfen) Schaer., *Gyrophora deusta* (L.) Ach., *Gyrophora flocculosa* (Wulfen) Turner & Borrer, *Gyrophora polyphylla* var. *deusta* (L.) Rabenh., *Umbilicaria flocculosa* (Wulfen) Hoffm.

N - **Frl** (Tretiach & Hafellner 2000), **Ven** (Caniglia & al. 1999), **TAA** (Caniglia & al. 2002, Nascimbene 2003, 2006c, 2008b, Lang 2009), **Lomb** (Zocchi & al. 1997, Dalle Vedove & al. 2004), **Piem** (Morisi & Sereno 1995, Isocrono & Falletti 1999, Isocrono & al. 2003, 2004, 2006, Isocrono & Piervittori 2008, Giordani & al. 2014, Favero-Longo & al. 2015), **VA** (Piervittori & Isocrono 1997, 1999, Piervittori & al. 2001, Isocrono & al. 2008, Matteucci & al. 2015c), **Emil** (Dalle Vedove & al. 2002), **Lig** (Brunialti & al. 1999). **C** - **Tosc** (Benesperi 2007, Tretiach & al. 2008), **Sar** (Nöske 2000, Rizzi & al. 2011). **S** - **Bas** (Potenza 2006, Potenza & Fascetti 2012), **Cal** (Puntillo 1996, Potenza & al. 2011), **Si**.

Fol.u/ Ch/ A.i/ Sax/ pH: 2-3, L: 4-5, X: 3, E: 3-4/ Alt: 3-5/ Alp: c, Salp: ec, Orom: r, Mont: r/ PT: 1-2/ Note: an arctic-alpine to boreal-montane, circumpolar lichen found on rocks wetted by rain near the ground, in sites with a long snow-lie; one of the most common Umbilicarias in the Alps, reaching south to the mountains of Sicily.

Umbilicaria freyi Codogno, Poelt & Puntillo

Plant Syst. Evol., 165: 63, 1989.

Syn.: *Umbilicaria grisea* f. *subpapyria* Frey, *Umbilicaria hirsuta* var. *pyrenaica* Frey

N - **VA** (Piervittori & Isocrono 1999), **Emil**. **C** - **Tosc**, **Sar** (Narui & al. 1996). **S** - **Cal** (Codogno 1995, Puntillo 1996).

Fol.u/ Ch/ S/ Sax/ pH: 1-2, L: 4, X: 3, E: 2-3/ Alt: 2-4/ Salp: rr, Orom: r, Mont: r, SmedD: er, SmedH: er/ PT: 1/ Note: on steeply inclined to underhanging surfaces of siliceous rocks, ecologically intermediate between *U. grisea* and *U. deusta*; probably more widespread in the Alps.

Umbilicaria grisea Hoffm.

Deutschl. Fl., 2: 111, 1796.

Syn.: *Gyrophora grisea* (Hoffm.) Turner & Borrer, *Gyrophora murina* (Ach.) Ach., *Umbilicaria murina* (Ach.) DC.

N - **TAA**, **Lomb** (De Vita & Valcuvia 2004), **Piem** (TSB *s.n.*), **VA** (Valcuvia 2000). **C** - **Sar** (Nöske 2000). **S** - **Bas** (Potenza 2006, Potenza & Fascetti 2012), **Cal** (Puntillo 1996), **Si** (Caniglia & Grillo 2003).

Fol.u/ Ch/ A.s/ Sax/ pH: 1-2, L: 3-4, X: 3, E: 2-3/ Alt: 2-3/ Mont: vr, SmedD: er, SmedH: er/ PT: 1/ u/ Note: on steeply inclined to underhanging surfaces of siliceous rocks only slightly wetted after rain, usually below the Alpine belt.

Umbilicaria hirsuta (Westr.) Ach.

K. Vetensk.-Akad. Nya Handl., 15: 97, 1794 - *Lichen hirsutus* Sw. ex Westr., K. Vetensk.-Akad. Nya Handl.: 47, 1793.

Syn.: *Gyrophora hirsuta* (Westr.) Ach., *Gyrophora hirsuta* var. *melanotricha* Flot., *Gyrophora hirsuta* var. *vestita* Th. Fr., *Gyrophora vellea* var. *hirsuta* (Westr.) Rabenh.

N - **Frl**, **TAA**, **Lomb** (Valcuvia & al. 2003), **Piem** (Isocrono & Falletti 1999, Isocrono & al. 2003, Isocrono & Piervittori 2008), **VA** (Piervittori & Isocrono 1997, 1999), **Emil**, **Lig** (TSB *s.n.*). **C** - **Tosc**, **Sar**. **S** - **Bas** (Potenza & al. 2014), **Cal** (Puntillo 1996), **Si**.

Fol.u/ Ch/ A.s/ Sax/ pH: 2-3, L: 3-5, X: 2-3, E: 2-4/ Alt: 2-5/ Alp: c, Salp: vc, Orom: rr, Mont: r, SmedD: er, SmedH: er/ PT: 1/ Note: a widespread, arctic-alpine to boreal-montane, circumpolar lichen found on steeply inclined to slightly underhanging surfaces of siliceous rocks, often in somehow dusty situations; common in the Alps, rarer in the Apennines and in the mountains of Sicilia, also for the scarcity of suitable substrata.

Umbilicaria hyperborea (Ach.) Hoffm.

Deutschl. Fl., 2: 110, 1796 - *Lichen hyperboreus* Ach., K. Vetensk.-Akad. Nya Handl., 15: 89, 1794.

Syn.: *Gyrophora aenea* var. *hyperborea* (Ach.) Schaer., *Gyrophora hyperborea* (Ach.) Ach., *Gyrophora hyperborea* var. *primaria* Th. Fr., *Gyrophora ustulata* (Vain.) Dalla Torre & Sarth.

N - **Ven**, **TAA**, **Lomb**, **Piem** (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999). **S** - **Bas** (Potenza & al. 2014).

Fol.u/ Ch/ S/ Sax/ pH: 1-2, L: 4, X: 3, E: 1-2/ Alt: 4-5/ Alp: rr, Salp: rc/ PT: 1/ Note: an arctic-alpine, probably circumpolar lichen found on siliceous boulders wetted by rain, usually near the ground, with optimum near treeline; probably restricted to the Alps in Italy.

Umbilicaria laevis (Schaer.) Frey

Hedwigia, 71: 17, 1931 - *Gyrophora atropruinosa* var. *laevis* Schaer., Naturwiss. Anz., 1: 8, 1818.

Syn.: *Agyrophora laevis* (Schaer.) Llano, *Gyrophora laevis* (Schaer.) Du Rietz

N - **TAA** (Lich.Alpium 320: Narui & al. 1996), **Lomb**, **Piem** (Isocrono & al. 2004), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Piervittori & al. 2004).

Fol.u/ Ch/ A.s/ Sax/ pH: 1-2, L: 4-5, X: 4, E: 1-2/ Alt: 4-5/ Alp: rr, Salp: vr/ PT: 1/ w/ Note: on inclined, sun-exposed surfaces of siliceous rocks, generally in dry situations, with optimum above treeline.

***Umbilicaria leiocarpa* DC.**

in Lamarck & de Candolle, Fl. Franç., éd. 3, 2: 410, 1805.

Syn.: *Agyrophora leiocarpa* (DC.) Gyeln., *Agyrophora lyngei* (Schol.) Llano, *Gyrophora leiocarpa* (DC.) Steud., *Umbilicaria atropuinos* Schaer.

N - TAA, Lomb, Piem (Isocrono & al. 2004), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999).

Fol.u/ Ch/ A.s/ Sax/ pH: 1-2, L: 4-5, X: 4, E: 1-3/ Alt: 4-5/ Alp: rr, Salp: vr/ PT: 1/ Note: a mainly arctic-alpine, probably circumpolar lichen found on steeply inclined to vertical, wind- and sun-exposed surfaces of large siliceous boulders wetted by rain with a short snow-lie period, with optimum above treeline; probably restricted to the Alps in Italy.

***Umbilicaria microphylla* (Laurer) A. Massal.**

Ric. Auton. Lich. Crost.: 62, 1852 - *Umbilicaria atropuinos* var. *microphylla* Laurer in Sturm, Deutschl. Fl., 2, 24: 13, 1832.

Syn.: *Agyrophora microphylla* (Laurer) Llano, *Gyrophora anthracina* var. *microphylla* (Laurer) Rabenh., *Gyrophora microphylla* (Laurer) Arnold

N - TAA, Lomb, Piem (Isocrono & al. 2003, 2004), **VA** (Isocrono & al. 2008, Favero-Longo & Piervittori 2009, Watson 2014).

Fol.u/ Ch/ S/ Sax/ pH: 1-2, L: 4-5, X: 4, E: 1-2/ Alt: 4-6/ Alp: r, Salp: vr/ PT: 1/ Note: on steeply inclined, wind-exposed surfaces of hard siliceous rocks, often forming monospecific stands, with optimum above treeline, reaching the nival belt; probably restricted to the Alps in Italy.

***Umbilicaria nylanderiana* (Zahlbr.) H. Magn.**

Lich. Sel. Scand. Exs.: 252, 1937 - *Gyrophora nylanderiana* Zahlbr., Cat. Lich. Univ, 4: 720, 1927.

Syn.: *Umbilicaria corrugata* Nyl.

N - TAA (Nascimbene 2008b), **Lomb, Piem** (Isocrono & al. 2004, Isocrono & Piervittori 2008), **VA** (Piervittori & Isocrono 1999, Piervittori & al. 2001, 2004), **C - Tosc** (Tretiach & al. 2008), **Sar. S - Bas** (Potenza & al. 2014), **Cal** (Puntillo 1996), **Si** (Ottonello & Isocrono 2004, Iacolino & Ottonello 2006).

Fol.u/ Ch/ A.s/ Sax/ pH: 1-2, L: 4-5, X: 3-4, E: 3-4/ Alt: 4-5/ Alp: rr, Salp: r, Orom: vr/ PT: 1/ Note: an arctic-alpine, probably circumpolar lichen found on the top of isolated siliceous boulders, most frequent in the Alps above treeline, but reaching south to the mountains of Calabria.

***Umbilicaria polyphylla* (L.) Baumg.**

Fl. Lips.: 571, 1790 - *Lichen polyphyllus* L., Sp. Pl., 2: 1150, 1753.

Syn.: *Gyrophora anthracina* (Wulfen) Körb., *Gyrophora glabra* (Ach.) Ach., *Gyrophora polyphylla* (L.) Funck, *Umbilicaria anthracina* (Wulfen) Hoffm., *Umbilicaria glabra* Ach.

N - Frl (Tretiach & Hafellner 2000), **Ven, TAA, Lomb, Piem** (Morisi & Sereno 1995, Isocrono & Falletti 1999, Isocrono & al. 2003, 2004, 2006), **VA** (Piervittori & Isocrono 1997, 1999), **Emil. C - Tosc** (Tretiach & al. 2008), **Sar** (Nöske 2000), **S - Bas** (Potenza & al. 2014), **Cal** (Puntillo 1996, Potenza & al. 2011), **Si** (Caniglia & Grillo 2003, Ottonello 2005, Iacolino & Ottonello 2006).

Fol.u/ Ch/ A.s/ Sax/ pH: 1-2, L: 4-5, X: 2-3, E: 1-3/ Alt: 3-5/ Alp: r, Salp: rr, Orom: vr, Mont: er/ PT: 1/ suboc/ Note: a variable and ecologically wide-ranging species of rainy areas, with optimum on inclined surfaces of siliceous rocks wetted by rain, present both in the Alps and in the high Mediterranean mountains.

***Umbilicaria polyrrhiza* (L.) Fr.**

Sched. Crit. Lich. Suec. Exs., 5-6: 3, 1825 - *Lichen polyrrhizos* L., Sp. Pl., 2: 1151, 1753.

Syn.: *Actinogyra polyrrhiza* (L.) Schol., *Gyrophora pellita* (Ach.) Ach., *Gyrophora polyrrhiza* (L.) Körb., *Umbilicaria pellita* (Ach.) Ach.

N - Piem (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999), **Emil. C - Umb** (Ravera & al. 2006), **Sar** (Tretiach 1993, Nöske 2000), **S - Cal** (Tretiach 1993, Puntillo 1996).

Fol.u/ Ch/ A.s/ Sax/ pH: 2-3, L: 4-5, X: 3, E: 1-3/ Alt: 4-5/ Alp: rr, Salp: r, Orom: vr/ PT: 1/ Note: on steeply inclined surfaces of siliceous rocks wetted by rain in humid-rainy areas, with optimum near and above treeline. Earlier records from Marche, Lazio and Sicilia (see Nimis 1993: 719), being dubious, are not accepted here.

***Umbilicaria proboscidea* (L.) Schrad.**

Spicil. Fl. Germ., 1: 103, 1794 - *Lichen proboscideus* L., Sp. Pl., 2: 1150, 1753.

Syn.: *Gyrophora polymorpha* var. *proboscidea* (L.) Schaer., *Gyrophora proboscidea* (L.) Ach.

N - TAA (Nascimbene 2003), **Lomb, Piem** (Tretiach 1993, Isocrono & al. 2004), **VA** (Piervittori & al. 1998, Piervittori & Isocrono 1999, Watson 2014).

Fol.u/ Ch/ S/ Sax/ pH: 1-2, L: 4-5, X: 3, E: 1-3/ Alt: 4-5/ Alp: rc, Salp: r/ PT: 1/ Note: a mainly arctic-alpine, circumpolar lichen found on siliceous rocks, often on small boulders, ecologically similar to *U. cylindrica*, but with a narrower range, with optimum in colder and less continental areas above treeline.

***Umbilicaria ruebeliana* (Du Rietz & Frey) Frey**

Hedwigia, 71: 112, 1931 - *Gyrophora ruebeliana* Du Rietz & Frey, Hedwigia, 69: 244, 1929.

Syn.: *Omphalodiscus ruebelianus* (Du Rietz & Frey) Schol.

N - TAA (Nascimbene 2002), **Lomb** (Codogno 1995), **Piem, VA** (Piervittori & Isocrono 1997, 1999).

Fol.u/ Ch/ S/ Sax/ pH: 1-2, L: 3-5, X: 3-4, E: 2-3/ Alt: 5-6/ Alp: r/ PT: 1/ Note: on steeply inclined to underhanging, often south- or west-facing surfaces of siliceous rocks above treeline, reaching the nival belt; hitherto known only from the Alps in Italy.

***Umbilicaria spodochoa* Hoffm.**

Ehrh. ex Hoffm., *Deutschl. Fl.*, 2: 113, 1796.

Syn.: *Gyrophora cirrhosa* auct. p.p. non (Hoffm.) Flörke, *Gyrophora spodochoa* (Hoffm.) Ach., *Omphalodiscus spodochoous* (Hoffm.) Schol., *Umbilicaria cirrhosa* auct. p.p. non Hoffm.

N - TAA, Lomb, Piem (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999). **C - Sar.**

Fol.u/ Ch/ S/ Sax/ pH: 1-2, L: 3-4, X: 3, E: 2-3/ Alt: 4-5/ Alp: rr, Salp: r, Orom: er/ PT: 1/ suboc/ Note: a mainly western-oceanic species growing on inclined surfaces of siliceous rocks near or above treeline. Most Italian records need confirmation.

***Umbilicaria subglabra* (Nyl.) Harm.**

Lich. France, 4: 707, 1910 - *Gyrophora subglabra* Nyl., Lich. Envir. Paris: 135, 1896.

Syn.: *Agyrophora subglabra* (Nyl.) M. Choisy, *Umbilicaria subglabra* var. *schmidtii* Frey?

N - Frl (Codogno 1995), **TAA, Piem** (Isocrono & al. 2006), **VA** (HAL-782).

Fol.u/ Ch/ S/ Sax/ pH: 1-2, L: 3-4, X: 2-3, E: 2-4/ Alt: 3-5/ Alp: r, Salp: rr, Mont: er/ PT: 1/ Note: on steeply inclined to horizontal, exposed surfaces of siliceous rocks, often at the top of large boulders; certainly widespread throughout the Alps.

***Umbilicaria torrefacta* (Lightf.) Schrad.**

Spicil. Fl. Germ., 1: 104, 1794 - *Lichen torrefactus* Lightf., Fl. Scot., 2: 862, 1777.

Syn.: *Gyrophora erosa* (Weber) Ach., *Gyrophora erosa* var. *torrefacta* (Lightf.) Th. Fr., *Gyrophora torrefacta* (Lightf.) Cromb., *Gyrophora torrida* (Ach.) Röhl., *Umbilicaria erosa* (Weber) Ach., *Umbilicaria torrida* (Ach.) Nyl.

N - Ven, TAA, Lomb, Piem (Isocrono & Falletti 1999, Isocrono & al. 2003, Isocrono & Piervittori 2008), **VA** (Piervittori & Isocrono 1999, Matteucci & al. 2015c). **S - Bas** (Potenza & al. 2014), **Cal** (Tretlach 1993, Puntillo 1996, Potenza & al. 2011).

Fol.u/ Ch/ S/ Sax/ pH: 1-2, L: 4-5, X: 3, E: 1-2/ Alt: 4-5/ Alp: r, Salp: er, Orom: er/ PT: 1/ Note: an arctic-alpine, circumpolar lichen found on siliceous rocks, most frequent above treeline. An earlier record from Emilia (see Nimis 1993: 721), being dubious, is not accepted here; several records from the Alps also need confirmation.

***Umbilicaria vellea* (L.) Ach.**

K. Vetensk-Acad. Nya Handl., 15: 101, 1794 - *Lichen velleus* L., Sp. Pl., 2: 1150, 1753.

Syn.: *Gyrophora cirrhosa* (Hoffm.) Flörke non auct., *Gyrophora vellea* (L.) Ach., *Gyrophora vellea* Nyl., *Umbilicaria cirrhosa* Hoffm. non auct., *Umbilicaria spodochoa* auct. p.p. non Hoffm.

N - Frl (TSB 16540), **Ven, TAA, Lomb, Piem** (Morisi & Sereno 1995, Isocrono & al. 2003, 2004), **VA** (Piervittori & Isocrono 1997, 1999), **Emil, Lig. C - Tosc, Sar** (TSB 7288). **S - Bas** (Potenza & al. 2014), **Cal** (Puntillo 1996).

Fol.u/ Ch/ A.s/ Sax/ pH: 1-2, L: 4, X: 3-4, E: 2-3/ Alt: 4-5/ Alp: rr, Salp: vr, Orom: er/ PT: 1/ w/ Note: an arctic-alpine, probably circumpolar lichen found on steeply inclined to vertical, exposed surfaces of siliceous rocks with some water seepage, especially along fissures, with optimum above treeline. Earlier records from Marche and Lazio (see Nimis 1993: 721) plus the record from Umbria by Ravera & al. (2004), being dubious, are not accepted here.

***Umbilicaria virginis* Schaer.**

Bibl. Univ. de Genève, 36: 153, 1841.

Syn.: *Gyrophora stipitata* (Nyl.) Branth, *Gyrophora virginis* (Schaer.) Frey, *Umbilicaria rugifera* Nyl., *Umbilicaria stipitata* Nyl.

N - TAA, Lomb (Rivellini 1994), **Piem** (Isocrono & Falletti 1999, Isocrono & al. 2003, Isocrono & Piervittori 2008), **VA** (Piervittori & Isocrono 1999).

Fol.u/ Ch/ S/ Sax/ pH: 1-2, L: 4-5, X: 4, E: 1/ Alt: 6/ Alp: vr/ PT: 1/ u/ Note: an arctic-alpine, probably circumpolar lichen found on wind-exposed siliceous cliffs, often in small niches and under overhangs, strictly limited to the nival belt in the Alps.

U s n e a Adans.

Dill. ex Adans., *Fam. Pl.*, 2: 7, 1763.

This large (c. 350 species) subcosmopolitan genus is among the richest within the Parmeliaceae, including several hundred taxa. The distinction of species, however, is problematic: most of the described species seem to be connected by a continuous array of transitional forms, and most of the herbarium material is wrongly identified or labelled just as *Usnea* sp., even in the rather well-investigated Europe. The clarification of species concepts in this genus by Clerc (1998), and the key to European species by Randlane & al. (2009) could contribute to a better knowledge of this genus in Italy. A recent molecular study by Mark & al. (2106) tried to assess the monophyly of 18 species from section *Usnea* occurring in North America and Europe, including sorediate and sexually reproducing taxa with both pendent and shrubby thalli; the resulting clades

partly represent traditional morphology-based species (*Usnea cavernosa*, *U. praetervisata*, *U. silesiaca*, *U. wasmuthii*), while others cluster two or more species together. Type: *U. florida* (L.) F.H. Wigg.

***Usnea articulata* (L.) Hoffm.**

Deutschl. Fl., 2: 133, 1796 - *Lichen articulatus* L., Sp. Pl., 2: 1156, 1753.

Syn.: *Usnea articulata* subsp. *intestiniformis* (Ach.) Motyka, *Usnea articulata* subsp. *mediterranea* Motyka, *Usnea barbata* var. *articulata* (L.) Ach.

N - Ven, Lomb, Emil. C - Tosc, Laz (Roca & al. 1998), **Abr, Sar** (Loi & al. 2000, Zedda 2002b). **S - Camp** (Aprile & al. 2003b), **Pugl** (Nimis & Tretiach 1999), **Bas** (Potenza & al. 2014), **Cal** (Puntillo 1995, 1996, Brackel & Puntillo 2016), **Si** (Nimis & al. 1994, Ottonello & Salone 1994, Ottonello & Romano 1997, Ottonello & al. 2006b, 2011, Ottonello & Puntillo 2009).

Frut.f/ Ch/ A.f/ Epiph/ pH: 1-2, L: 3-5, X: 1-2, E: 1/ Alt: 1-3/ Mont: er, SmedH: er, MedH: er/ PT: 0/ suboc/ Note: a Mediterranean-Macaronesian lichen with subtropical affinities, found on the branches of ancient trees in humid forests of southern Italy, certainly extinct in northern Italy. The recent record from Tuscany by Pasquinelli & al. (2009), judging from the picture, is wrong. The species is included in the Italian red list of epiphytic lichens as "Vulnerable" (Nascimbene & al. 2013c).

***Usnea barbata* (L.) F.H. Wigg.**

Brit. Fl., 1: 206, 1780 - *Lichen barbatus* L., Sp. Pl., 2: 1155, 1753.

Syn.: *Usnea alpina* Motyka, *Usnea catenulata* Motyka, *Usnea caucasica* Vain., *Usnea cembricola* Motyka, *Usnea erikssonii* Motyka, *Usnea ferox* Motyka, *Usnea freyi* Motyka, *Usnea graciosa* Motyka, *Usnea implexa* (Lam.) Motyka, *Usnea leucosticta* Vain., *Usnea maxima* Motyka, *Usnea pendulina* Motyka, *Usnea plicata* (L.) F.H. Wigg., *Usnea prostrata* Vain., *Usnea rugulosa* Vain., *Usnea scabrata* Nyl., *Usnea scabrata* var. *cembricola* (Motyka) Clauzade & Cl. Roux?, *Usnea scrobiculata* Motyka, *Usnea subscabrata* (Vain.) Motyka, *Usnea tenax* Motyka, *Usnea tortuosa* De Not.

N - Frl, Ven (Nascimbene & Caniglia 2002c), **TAA** (Nascimbene & Caniglia 2002c, Nascimbene & al. 2006e, 2007b, Nascimbene 2014, 2014c), **Lomb, Piem, VA** (Valcuvia 2000, Matteucci & al. 2008, Matteucci & al. 2008c), **Emil. C - Tosc, Umb** (Panfili 2000, Ravera & al. 2006), **Laz** (Ravera 2006), **Abr, Sar** (Zedda 2002, 2002b). **S - Camp, Bas** (Potenza 2006), **Cal, Si**.

Frut.f/ Ch/ S/ Epiph/ pH: 1-2, L: 3-4, X: 1-2, E: 1/ Alt: 3-4/ Salp: rr, Mont: vr/ PT: 0/ #/ Note: a boreal-montane species found in oroboreal-montane forests with high rainfall and frequent fog, especially on branches and twigs of *Picea*. According to Clerc (*in litt.*) this is one of the most morphologically variable species of the genus.

***Usnea cavernosa* Tuck.**

in Agassiz, Lake Superior: 171, 1850.

Syn.: *Usnea arnoldiana* Zahlbr., *Usnea microcarpa* Arnold

N - Frl, TAA (Nascimbene & al. 2006e, 2007b), **Lomb, Piem, Lig.**

Frut.f/ Ch/ S/ Epiph/ pH: 1-2, L: 4-5, X: 1-2, E: 1/ Alt: 3-4/ Salp: r, Mont: rr/ PT: 0/ Note: this species seems to be more frequent in central and southern Europe; it is restricted to damp montane to subalpine forests, on branches of coniferous and deciduous trees.

***Usnea ceratina* Ach.**

Lichenogr. Univ.: 619, 1810.

N - Frl (Tretiach 1993), **Ven** (Caniglia & al. 1999, Nascimbene & Caniglia 2000b, 2002c, 2003c, Nascimbene 2005c, 2008c, Nascimbene & al. 2006e, Nascimbene & Marini 2007), **TAA** (Nascimbene & Caniglia 2000b, 2002c, Caniglia & al. 2002, Nascimbene 2005b, 2006b, 2006c, 2008b, Nascimbene & al. 2006e, 2007b, Stofer 2006, Nimis & al. 2015), **Lomb** (Nascimbene 2006, Nascimbene & al. 2006e), **Piem** (Isocrono & al. 2004), **VA** (Pierivittori & Isocrono 1999), **Lig** (S- F201643). **C - Tosc** (Tretiach 1993), **Marc, Laz, Abr, Mol** (Garofalo & al. 1999, Caporale & al. 2008), **Sar** (Zedda 2002, 2002b, Rizzi & al. 2011). **S - Camp** (Aprile & al. 2002, 2003b), **Pugl** (Garofalo & al. 1999), **Bas, Cal** (Puntillo 1996), **Si** (Merlo 2004).

Frut.f/ Ch/ A.f/ Epiph/ pH: 1-2, L: 4-5, X: 1-2, E: 1/ Alt: 2-4/ Salp: rr, Orom: rr, Mont: rc, SmedD: er, SmedH: vr/ PT: 0/ Note: a cool-temperate to boreal-montane lichen also known from the Southern Hemisphere, found on branches of trees in damp forests with frequent fog; most common in the Alps, but occurring throughout the Apennines in mixed beech-fir stands and in relict forests with *Taxus* (*e.g.* in Sardegna).

***Usnea cornuta* Körb.**

Parerga Lichenol.: 2, 1865.

Syn.: *Usnea confusa* Asahina, *Usnea constrictula* Stirt., *Usnea inflata* (Duby) Motyka, *Usnea inflata* var. *cornuta* (Körb.) Clauzade & Cl. Roux, *Usnea intexta* Stirt., *Usnea subpectinata* Stirt.

N - Frl, TAA (Nascimbene & al. 2007b), **Lig. C - Tosc. S - Camp, Cal** (Brackel & Puntillo 2016).

Frut.f/ Ch/ A.s/ Epiph-Sax/ pH: 1-2, L: 4-5, X: 1-2, E: 1/ Alt: 2-3/ Mont: vr, SmedH: er/ PT: 1/ oc/ Note: a chemically and morphologically variable epiphytic species also occurring on siliceous rocks, restricted to damp sites with frequent fog, mostly in the montane belt. It is included in the Italian red list of epiphytic lichens as "Endangered" (Nascimbene & al. 2013c).

***Usnea dasaea* Stirt.**

Scottish Natur., 6: 104, 1881.

Syn.: *Usnea dolosa* Motyka, *Usnea galbinifera* Asahina, *Usnea spinigera* Asahina, *Usnea spinulifera* (Vain.) Motyka, *Usnea undulata* Stirt.

N - Ven, Lomb.

Frut.f/ Ch/ A.s/ Epiph/ pH: 1-2, L: 4-5, X: 1-2, E: 1/ Alt: 1-2/ SmedD: vr, MedH: er/ PT: 1/ suboc/ Note: a mainly southern species in Europe, found on twigs in moist woodlands, exceptionally on rocks, at relatively low elevations. Italian records require confirmation.

Usnea dasopoga (Ach.) Nyl.

in Norrlin, Meddeland. Soc. Fauna Fl. Fenn., 1: 14, 1876 - *Usnea plicata* var. *dasopoga* Ach., Meth. Lich., Sect. Post.: 312, 1803.

Syn.: *Usnea bicolor* (Motyka) Bystrek, *Usnea capillaris* Motyka, *Usnea diplotypus* Vain., *Usnea fibrillosa* Motyka, *Usnea filipendula* Stirt., *Usnea filipendula* var. *capillaris* (Motyka) Clauzade & Cl. Roux, *Usnea fascinata* Bystrek, *Usnea flagellata* Motyka, *Usnea grisea* (Motyka) Bystrek, *Usnea hirtella* (Arnold) Motyka, *Usnea muricata* Motyka, *Usnea saxicola* Anders, *Usnea stramineola* (Motyka) Bystrek, *Usnea sublaxa* Vain., *Usnea tuberculata* (Motyka) Bystrek

N - Frl, Ven (Caniglia & al. 1999, Nascimbene & Caniglia 2000b, 2002c, 2003c, Nascimbene & al. 2006e, Nascimbene 2011, Brackel 2013), **TAA** (Nascimbene & Caniglia 2000b, 2002c, Nascimbene 2003, 2005b, 2014, Nascimbene & al. 2006e, 2007b, 2014, Lang 2009, Brackel 2013, Nascimbene 2014, Nascimbene & Marini 2015, Nimis & al. 2015), **Lomb** (Alessio & al. 1995), **Piem** (Morisi & Sereno 1995, Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999), **Emil** (Dalle Vedove & al. 2002), **Lig. C - Tosc** (Brackel 2015), **Umb** (Panfili 2000, Ravera & al. 2006), **Laz** (Brackel 2015), **Abr** (Nimis & Tretiach 1999, Brackel 2015), **Sar** (Zedda 2002, 2002b, Cossu 2013). **S - Camp** (Aprile & al. 2003b, Garofalo & al. 2010), **Pugl** (Nimis & Tretiach 1999), **Bas** (Potenza 2006, Potenza & Fascetti 2012), **Cal** (Puntillo & Vězda 1994, Puntillo 1995, 1996, Brackel & Puntillo 2016), **Si** (Nimis & al. 1994).

Frut.f/ Ch/ A.s/ Epiph/ pH: 1-2, L: 3-5, X: 1-3, E: 1/ Alt: 2-4/ Salp: r, Orom: vr, Mont: rc, SmedH: vr, MedH: er/ PT: 1/ Note: a variable species, most common in humid montane deciduous forests with frequent fog, both on branches and on boles. Although most Italian records need confirmation, the species is certainly widespread in the Alps and along the Apennines. According to Clerc (2011) *U. diplotypus* corresponds to short morphotypes of *U. dasopoga*. The name was frequently spelled *dasyopoga* in the past.

Usnea esperantiana P. Clerc

Candollea, 47: 514, 1992.

N - Lig. C - Tosc (Putortù & al. 1998), **Laz** (Ravera 2006, 2006c), **Sar** (Zedda 2002).

Frut.f/ A.s/ Epiph/ pH: 1-2, L: 4-5, X: 1-2, E: 1/ Alt: 1-2/ SmedH: vr, MedH: vr/ PT: 1/ suboc/ Note: a Mediterranean-Macaronesian species also known from western North America, found in damp forests with frequent fog, mostly on branches of ancient trees, usually at relatively low elevations; perhaps somehow more widespread in Tyrrhenian Italy. It is included in the Italian red list of epiphytic lichens as “Vulnerable” (Nascimbene & al. 2013c).

Usnea flammea Stirt.

Scottish Natur., 6: 102, 1881.

Syn.: *Usnea dalmatica* Motyka, *Usnea rupestris* Motyka

N - Ven, Lig. C - Tosc (Loppi & Baragatti 2011), **Sar** (B-40161).

Frut.f/ Ch/ A.s/ Epiph-Sax/ pH: 1-2, L: 4-5, X: 1-2, E: 1/ Alt: 2-3/ Mont: vr, SmedH: vr/ PT: 1/ oc/ Note: a western European, oceanic species, mainly epiphytic, but also found on rocks and soil in damp situations, below the subalpine belt. All Italian records, except that from Sardinia which was identified by Ph. Clerc, need confirmation. The species was included in the Italian red list of epiphytic lichens as “Data Deficient” (Nascimbene & al. 2013c).

Usnea florida (L.) F.H. Wigg.

Primit. Florae Holsat., 2: 7, 1780 - *Lichen floridus* L., Sp. Pl., 2: 1156, 1753.

Syn.: *Usnea barbata* var. *florida* (L.) Fr., *Usnea florida* subsp. *arbuscula* Motyka, *Usnea florida* subsp. *pseudostrigosa* Motyka, *Usnea tominii* Räsänen

N - Frl (Tretiach & Molaro 2007, Tomasi 2007), **Ven** (Caniglia & al. 1999, Nascimbene & Marini 2007, Nascimbene 2008c), **TAA** (Nascimbene 2001b, 2003, 2014, Thor & Nascimbene 2007, Nascimbene & al. 2007b, 2014, Nascimbene & Marini 2015, Nimis & al. 2015), **Lomb** (Alessio & al. 1995, Tretiach 1996), **Piem** (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999, Matteucci & al. 2008c), **Emil, Lig** (Giordani & Incerti 2008). **C - Tosc** (Tretiach & Ganis 1999, Loppi & Putortù 2001), **Laz, Abr, Sar. S - Camp, Pugl, Bas** (Potenza 2006, Potenza & Fascetti 2012), **Cal** (Puntillo 1996), **Si** (Falco Scampatelli 2005).

Frut.f/ Ch/ S/ Epiph/ pH: 1-2, L: 4-5, X: 1-2, E: 1/ Alt: 2-4/ Mont: rc, SmedD: er, SmedH: er/ PT: 1/ Note: a boreal-montane to cool-temperate lichen found in forests with frequent fog, on twigs and branches, with optimum in the upper montane and subalpine belts, from the Alps to the mountains of Sicily. An earlier record from Venezia Giulia (see Nimis 1993: 724) is excluded, as it was from Slovenian territory.

Usnea fragilescens Lynge

Hav. ex Lynge, Skr. Vindensk.-Selsk. Christiania, Math.-Naturvidensk. Kl, 7: 230, 1921.

C - Tosc.

Frut.f/ Ch/ A.s/ Epiph-Sax/ pH: 1-2, L: 4-5, X: 1-2, E: 1/ Alt: 2-3/ Mont: vr, SmedH: vr/ PT: 1/ oc/ Note: a mainly subatlantic species in Europe, growing on siliceous rocks and acid bark in sites with high air humidity. The record from Italy requires confirmation.

***Usnea glabrata* (Ach.) Vain.**

Ann. Acad. Sci. Fenn., Ser.A, 4, 7: 7: 1915 - *Usnea plicata* var. *glabrata* Ach., Lichenogr. Univ.: 624, 1810.

Syn.: *Usnea barbata* var. *sorediifera* Arnold, *Usnea florida* var. *sorediifera* (Arnold) Hue, *Usnea kujalae* Räsänen, *Usnea sorediifera* (Arnold) Lyngae non auct.

N - Ven (Caniglia & al. 1999, Nascimbene & Caniglia 2000b, 2003c), **TAA** (Nascimbene & Caniglia 2000b, 2002c, Nascimbene & al. 2006e, 2007b, Nimis & al. 2015), **Lomb** (Alessio & al. 1995), **VA** (Piervittori & Isocrono 1999, Matteucci & al. 2008, Isocrono & al. 2008). **C - Tosc, Sar** (Zedda 2002, 2002b). **S - Cal** (Puntillo 1996).

Frut.f/ Ch/ A.s/ Epiph/ pH: 1-2, L: 4-5, X: 1-2, E: 1-2/ Alt: 3-4/ Salp: rc, Mont: rr/ PT: 1/ Note: on bark, sometimes on lignum, in cold-humid, but open situations, mostly in the upper montane and subalpine belts.

***Usnea glabrescens* var. *fulvorea* Räsänen**

Ann. Acad. Sci. Fenn., A, 34, 4: 20, 1931.

Syn.: *Usnea fulvorea* (Räsänen) Räsänen

N - Frl, Ven, Lomb (Alessio & al. 1995), **Emil. C - Umb** (Panfili 2000, Ravera & al. 2006), **Sar** (Zedda 2002, 2002b). **S - Pugl** (Thüs & Licht 2006).

Frut.f/ Ch/ A.s/ Epiph/ pH: 1-2, L: 4-5, X: 1-2, E: 1/ Alt: 3-4/ Salp: r, Mont: vr/ PT: 1/ Note: on twigs and branches of conifers, more rarely of deciduous trees in cold-humid, open woodlands with frequent fog; chemically heterogeneous. Some Italian records could refer to *U. lapponica*.

Usnea glabrescens* (Vain.) Räsänen var. *glabrescens

Vain. ex Räsänen, Luonnon Ystävä, 23: 9, 1919 - *Usnea barbata* var. *glabrescens* Nyl. ex Vain., Meddeland. Soc. Fauna Fl. Fenn., 2: 46, 1878.

Syn.: *Usnea distincta* Motyka nom. illegit., *Usnea extensa* Vain., *Usnea glabrella* (Motyka) Räsänen

N - Ven (Nascimbene & al. 2006e, Nascimbene & Marini 2007), **TAA** (Caniglia & al. 2002, Nascimbene & Caniglia 2002c, Nascimbene & al. 2006e, 2007b, Nimis & al. 2015), **Lomb** (Alessio & al. 1995), **Piem** (TSB 33011), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Matteucci & al. 2008, Isocrono & al. 2008). **C - Sar** (Zedda 2002, 2002b, Cossu 2013). **S - Pugl** (Nimis & Tretiach 1999).

Frut.f/ Ch/ A.s/ Epiph-Lign/ pH: 1-2, L: 4-5, X: 2, E: 1/ Alt: 3-4/ Salp: rr, Mont: vr/ PT: 1/ subc, #/ Note: on bark and lignum in cold-humid but open situations in montane to subalpine forests. The record from Puglia, as most of those from Italy, requires confirmation.

***Usnea hirta* (L.) F.H. Wigg.**

Primit. Florae Holsat.: 91, 1780, nom. cons. - *Lichen hirtus* L., Sp. Pl., 2: 1155, 1753.

Syn.: *Usnea barbata* var. *hirta* (L.) Fr., *Usnea florida* var. *hirta* (L.) Ach., *Usnea foveata* Vain., *Usnea glaucescens* Vain., *Usnea hirta* subsp. *helvetica* Motyka, *Usnea hirta* subsp. *laricicola* Motyka, *Usnea plicata* var. *foveata* (Vain.) Clauzade & Cl. Roux, *Usnea variolosa* Motyka

N - Frl (Tretiach 1996), **Ven** (Caniglia & al. 1999, Nascimbene & Caniglia 2000b, 2002c, 2003c, Nascimbene & al. 2006e, Nascimbene & Marini 2007, Nascimbene 2008c, 2011), **TAA** (Nascimbene & Caniglia 2000b, 2002c, Caniglia & al. 2002, Nascimbene 2003, 2005b, 2006b, 2006c, 2008b, 2014, Nascimbene & al. 2006e, 2007b, 2008c, 2009, 2010, 2014, 2014c, Stofer 2006, Nascimbene & Marini 2015, Nimis & al. 2015), **Lomb** (Rivellini 1994, Alessio & al. 1995, Serio & al. 2001, Valcuvia & al. 2003, Nascimbene & al. 2006e, Abramini & al. 2008), **Piem** (Caniglia & al. 1992, Morisi & Sereno 1995, Isocrono & al. 2003, Matteucci & al. 2010), **VA** (Piervittori & Isocrono 1999, Isocrono & al. 2005, Matteucci & al. 2008, Isocrono & al. 2008), **Emil, Lig** (Brunialti & al. 1999, Giordani & al. 2002, Giordani & Incerti 2008). **C - Tosc** (Brackel 2015), **Marc, Laz, Abr** (Olivieri & al. 1997, 1997b, Loppi & al. 1999, Brackel 2015), **Sar** (Loi & al. 2000). **S - Camp** (Aprile & al. 2003, 2003b), **Pugl, Bas** (Potenza & al. 2014), **Cal** (Puntillo 1995, 1996, Puntillo & al. 2000, Incerti & Nimis 2006), **Si** (Ottonello & Salone 1994, Ottonello & Romano 1997, Ottonello & al. 2006b, 2011).

Frut.f/ Ch/ A.s/ Epiph-Lign/ pH: 1-2, L: 4-5, X: 2-3, E: 1-2/ Alt: 2-4/ Salp: c, Mont: rc, SmedD: er, SmedH: er/ PT: 1/ subc/ Note: most common in continental, but humid areas, on bark (branches and boles) of isolated trees and on lignum (e.g. wooden fences and poles); widespread throughout the Alps, restricted to upland areas, and mostly to those with siliceous substrata, in the Apennines. Several records, especially those from southern Italy, might be due to confusion with other species.

***Usnea intermedia* (A. Massal.) Jatta**

Fl. Italica Crypt., 3: 145, 1909 - *Usnea barbata* var. *intermedia* A. Massal., Sched. Crit., 3: 62, 1856.

Syn.: *Usnea balcanica* Bystrek, *Usnea carpatica* Motyka, *Usnea faginea* Motyka, *Usnea florida* subsp. *floridula* Motyka, *Usnea glauca* Motyka, *Usnea glauca* var. *pseudoflorida* (Motyka) Motyka, *Usnea hapalotera* (Harm.) Motyka, *Usnea harmandii* Motyka, *Usnea leiopoga* Motyka, *Usnea montana* Motyka, *Usnea neglecta* Motyka, *Usnea protea* Motyka, *Usnea quasirigida* Lendemèr & I.I. Tav., *Usnea rigida* Motyka non Vain., *Usnea smaragdina* Motyka

N - Frl, Ven (Caniglia & al. 1999, Lazzarin 2000b, Brackel 2013), **TAA** (Nascimbene & Caniglia 2002c, Nascimbene 2003, 2014, Nascimbene & al. 2007b, Nascimbene & Marini 2015), **Lomb** (Alessio & al. 1995), **Piem** (Morisi & Sereno 1995, Isocrono & al. 2004, Morisi 2005), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Matteucci & al. 2008c). **C - Abr, S - Cal** (Puntillo 1996), **Si**.

Frut.f/ Ch/ S/ Epiph/ pH: 1-2, L: 4-5, X: 1-2, E: 1/ Alt: 3-4/ Salp: rc, Mont: vr/ PT: 1/ Note: a polymorphic and not clearly understood taxon, most common on conifers in humid montane forests, which is treated here in a very broad sense.

***Usnea longissima* Ach.**

Lichenogr. Univ.: 626, 1810.

Syn.: *Dolichousnea longissima* (Ach.) Articus

N - Frl (Lich. Graec. 60: Obermayer 1996, Nascimbene & Tretiach 2009), **Ven** (Nascimbene 2003b, 2011, Nascimbene & Tretiach 2009), **TAA, Piem.**

Frut.f/ Ch/ A.f/ Epiph/ pH: 1-2, L: 3-5, X: 1, E: 1/ Alt: 3-4/ Salp: er, Mont: er/ PT: 0/ Note: a mainly cool-temperate to boreal-montane species found on branches of old (mostly coniferous) trees in closed, semi-natural forests in areas with high rainfall and frequent fog, restricted to a few localities and very much declining. According to Nascimbene & Tretiach (2009) the only recently confirmed records are in two sites only, one in Veneto, the other in the Carnic Alps (Friuli); earlier records for Valle d'Aosta are likely to be due to a misidentification (Matteucci & al. 2015). The species is included as "Critically Endangered" in the Italian red list of epiphytic lichens (Nascimbene & al. 2013c).

***Usnea mutabilis* Stirt.**

Scottish Natur., 6: 107, 1881.

Syn.: *Usnea marocana* Motyka

C - Laz.

Frut.f/ Ch/ A.s/ Epiph/ pH: 1-2, L: 4-5, X: 2, E: 1-2/ Alt: 1/ MedH: er/ PT: 1/ suboc/ Note: a Mediterranean-Atlantic species, found on bark of ancient deciduous and evergreen, isolated trees in semi-natural, open forests subject to frequent humid winds, mostly in the Mediterranean belt; to be looked for elsewhere in Tyrrhenian Italy. It is included as "Critically Endangered" in the Italian red list of epiphytic lichens (Nascimbene & al. 2013c).

***Usnea perplexans* Stirt.**

Scottish Natur., 6: 103, 1881.

Syn.: *Usnea arnoldii* Motyka, *Usnea betulina* Motyka, *Usnea fulvoviregens* auct. non (Räsänen) Räsänen, *Usnea lapponica* Vain., *Usnea laricina* auct. p.p. non Vain. ex Räsänen

N - Ven (Caniglia & al. 1999), **TAA** (Nascimbene & al. 2007b), **Piem** (Morisi & Sereno 1995), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Bergamaschi & al. 2004). **C - Tosc, Abr, Mol** (Caporale & al. 2008), **Sar** (Zedda 2002).

Frut.f/ Ch/ A.s/ Epiph/ pH: 1-2, L: 3-4, X: 1-2, E: 1/ Alt: 2-4/ Salp: rr, Mont: r, SmedH: er/ PT: 0/ Note: on branches of conifers in montane, cold-humid forests with frequent fog. Two dubious records from Campania (see Nimis 1993: 727, and Aprile & al. 2002) are not accepted here; some records from the Alps could refer to *U. substerilis*. For further details see Clerc (2016).

***Usnea rubicunda* Stirt.**

Scottish Natur., 6: 102, 1881.

Syn.: *Usnea protensa* Stirt., *Usnea subflurida* Stirt.

N - Ven, TAA, Lig, C - Tosc, Laz (Bartoli & al. 1997, Massari & Ravera 2002, Zucconi & al. 2013, Brackel 2015), **Sar, S - Camp** (Puntillo & al. 2000, Nimis & Tretiach 2004), **Cal** (Nimis & Puntillo 2003, Puntillo 2011), **Si** (Nimis & al. 1994).

Frut.f/ Ch/ A.s/ Epiph/ pH: 1-2, L: 3-4, X: 2, E: 1-2/ Alt: 1-2/ Mont: er, SmedH: er, MedH: er/ PT: 0/ Note: a mild-temperate, chiefly Mediterranean-Atlantic species found on ancient specimens of *Quercus cerris*, *Q. suber*, and other acid-barked broad-leaved trees in open, but semi-natural, warm-humid forests below the montane belt; locally abundant only in parts of Tyrrhenian Italy, from Toscana to Calabria, mostly not far from the coast; there is no recent record from northern Italy, where the species might be extinct. It is included in the Italian red list of epiphytic lichens as "Near-threatened" (Nascimbene & al. 2013c).

***Usnea silesiaca* Motyka**

Wyd. Muz. Slask. Katowic., 3, 2: 19, 1930.

Syn.: *Usnea madeirensis* Motyka

C - Sar (Zedda 2002). **S - Pugl** (Thüs & Licht 2006).

Frut.f/ Ch/ A.f/ Epiph/ pH: 1-2, L: 3-5, X: 1, E: 1/ Alt: 2-3/ Mont: er, SmedH: er/ PT: 0/ suboc/ Note: a mainly western species of humid montane forests. It is included in the Italian red list of epiphytic lichens as "Endangered" (Nascimbene & al. 2013c).

***Usnea subfloridana* Stirt.**

Scottish Natur., 6: 294, 1882.

Syn.: *Usnea comosa* subsp. *eucomosa* Motyka, *Usnea comosa* subsp. *similis* Motyka, *Usnea comosa* var. *scabriuscula* Motyka, *Usnea plicata* var. *comosa* (Ach.) Ach., *Usnea similis* (Motyka) Räsänen

N - VG (Castello 2002, Martellos & Castello 2004, Castello & Skert 2005), **Frl** (Badin & Nimis 1996), **Ven** (Nimis & al. 1996c, Caniglia & al. 1999, Nascimbene & Caniglia 2002c, 2003c, Nascimbene 2005c), **TAA** (Nascimbene & Caniglia 2000b, 2002c, Nascimbene & al. 2007b, 2014, Lang 2009, Nascimbene 2014, 2014c, Nimis & al. 2015), **Lomb**

(Nascimbene 2006, Nascimbene & al. 2006e), **Piem** (Morisi & Sereno 1995), **VA** (Matteucci & al. 2008). **C - Tosc** (Loppi & al. 1998, Putorti & al. 1998), **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera 2000, Panfili 2000, Ravera & al. 2006), **Laz** (Gigante & Petriccione 1995), **Abr** (Nimis & Tretiach 1999), **Sar** (Zedda 2002). **S - Pugl** (Nimis & Tretiach 1999), **Bas** (Potenza 2006, Potenza & Fascetti 2012), **Si** (Ottonello & Romano 1997, Ottonello & al. 2011).

Frut.f/ Ch/ A.s/ Epiph/ pH: 1-3, L: 3-5, X: 2-3, E: 1-2/ Alt: 2-4/ Salp: rc, Mont: r, SmedD: r, SmedH: r/ PT: 1-2/ Note: on branches of trees in relatively closed forests (but then in the upper parts of the crowns), and on isolated trees, one of the few species of *Usnea* which, albeit with stunted specimens, is also found at low altitudes and in relatively disturbed habitats. According to Clerc (*in litt.*) this is the “secondary” species of *U. florida*.

Usnea subscabrosa Motyka

Nyl. ex Motyka, Lich. Gen. Usnea Stud. Monogr., 2: 306, 1937.

C - Tosc, Umb (Ravera & al. 2006). **S - Camp, Bas**.

Frut.f/ Ch/ A.s/ Epiph-Sax/ pH: 1-2, L: 4, X: 2, E: 1-2/ Alt: 3-4/ Mont: vr/ PT: 1/ #/ Note: a well-defined taxon, mainly southwestern species in Europe, found both on basic siliceous rocks and on bark in humid situations, mostly in the upper montane and subalpine belts. It is included as “Regionally Extinct” in the Italian red list of epiphytic lichens (Nascimbene & al. 2013c).

Usnea substerilis Motyka

Wyd. Muz. Slask. Katowic., 3, 2: 24, 1930.

Syn.: *Usnea soreidifera* Motyka *nom. illegit. non* (Arnold) Lynge, *Usnea soreidifera* var. *substerilis* (Motyka) Keissl., *Usnea stuppea* (Räsänen) Motyka

N - Ven (TSB 7789), **TAA** (Nascimbene 2014, Nascimbene & Marini 2015), **Lomb** (Abramini & al. 2008). **VA** (Matteucci & al. 2008, Matteucci & al. 2008c, Isocrono & al. 2008). **C - Umb** (Ravera 1999, Ravera & al. 2006), **Laz** (Ravera 2006). **S - Bas** (Potenza 2006, Potenza & Fascetti 2012).

Frut.f/ Ch/ A.s/ Epiph/ pH: 1-2, L: 4-5, X: 1-3, E: 1-2/ Alt: 3-4/ Salp: rc, Mont: rr/ PT: 1/ Note: a subcontinental species, often confused in the past with the related *U. perplexans*; probably one of the most frequent *Usneas* of the Alps. According to Mark & al. (2016) this is a synonym of *U. lapponica* (presently *U. perplexans*), a conclusion which, however is questioned by Clerc (*in litt.*).

Usnea wasmuthii Räsänen

Ann. Acad. Sci. Fenn., Ser.A, 34, 4: 19, 1931.

N - Lig, C - Tosc (Putorti & al. 1998), **Umb** (Panfili 2000, Ravera & al. 2006), **Sar** (Zedda 2002). **S - Pugl** (Thüs & Licht 2006), **Si** (Ottonello & Salone 1994, Ottonello & al. 1994, 2011, Ottonello & Romano 1997).

Frut.f/ Ch/ A.s/ Epiph/ pH: 1-2, L: 4-5, X: 1-2, E: 1/ Alt: 1-3/ Mont: vr, SmedH: r, MedH: vr/ PT: 0/ suboc/ Note: ecologically similar to *U. florida*, but more frequent at lower altitudes in warm-humid areas, such as in parts of Tyrrhenian Italy and in the Gargano Peninsula.

Usnochroma Søchting, Arup & Frödén

Nord. J. Bot., 31: 75, 2013.

This is one of the most distinctive genera of Teloschistaceae segregated from *Caloplaca s.lat.* by Arup & al. (2013): it includes 2 species and is unique in the presence of usnic acid in the thallus. Type: *U. carphineum* (Fr.) Søchting, Arup & Frödén

Usnochroma carphineum (Fr.) Søchting, Arup & Frödén

in Arup & al., Nord. J. Bot., 31: 75, 2013 - *Parmelia carphinea* Fr., Lichenogr. Eur. Ref.: 110, 1831.

Syn.: *Amphiloma carphineum* (Fr.) Bagl., *Calloposma carphineum* (Fr.) Trevis., *Caloplaca carphinea* (Fr.) Jatta, *Physcia carphinea* (Fr.) A. Massal., *Squamaria carphinea* (Fr.) Boistel

N - Lig, C - Sar, S - Camp, Si (Grillo & Caniglia 2004).

Cr.pl/ Ch/ S/ Sax/ pH: 1-2, L: 4-5, X: 4, E: 2-3/ Alt: 1/ MedH: er, MedD: er/ PT: 1/ coast/ Note: a subtropical to mild-temperate, mostly coastal lichen of hard siliceous rocks in exposed situations. The record from Piemonte by Isocrono & Falletti (1999), being dubious, is not accepted here.

Usnocetraria M.J. Lai & J.C. Wei

J. Nat. Taiwan Mus., 60: 45, 2007.

Usnocetraria oakesiana, the only Italian species of this genus, was until recently placed in *Allocetraria* as the only soreidiate species of that genus (Randlane & Saag 2004). Lai & al. (2007) re-delimited *Allocetraria* and introduced the genus *Usnocetraria* for eleven species (only two of which were validly recombined), with *U. oakesiana* as the type. According to Nelsen & al. (2011), however, many cetrarioid genera are narrowly defined relative to other genera of the Parmeliaceae, and their retention should be justified by further studies. Type: *U. oakesiana* (Tuck.) M.J. Lai & J.C. Wei

Usnocetraria oakesiana (Tuck.) M.J. Lai & J.C. Wei

J. Nat. Taiwan Mus., 60: 45, 2007 - *Cetraria oakesiana* Tuck., Boston J. Nat. Hist., 3: 445, 1841.

Syn.: *Allocetraria oakesiana* (Tuck.) Randle & A. Thell, *Cetraria bavarica* Kremp., *Platysma oakesianum* (Tuck.) Nyl., *Tuckermannopsis oakesiana* (Tuck.) Hale

N - Fri (Nascimbene & al. 1998), **Ven** (Nascimbene & Caniglia 2003c, Watson 2014), **TAA** (Nascimbene & Caniglia 2000b, Nascimbene & al. 2007b, 2014, Nascimbene 2014, Nimis & al. 2015).

Fol.b/ Ch/ A.s/ Epiph/ pH: 1-2, L: 2-3, X: 2, E: 1/ Alt: 3-4/ Salp: er, Mont: er/ PT: 1/ subc/ Note: a cool-temperate to boreal-montane, incompletely circumpolar species found on basal parts of conifers in humid-cold montane forests, more rarely on lignum (*e.g.* on stumps); restricted to the Alps in Italy. It is included in the Italian red list of epiphytic lichens as “Vulnerable” (Nascimbene & al. 2013c).

Vahliella P.M. Jørg.

Lichenologist, 40: 222, 2008.

This genus was described to accommodate the subgenus *Micropannaria* of *Fuscopannaria*. Currently, it includes 8 species in the Northern Hemisphere, with the highest diversity in North America, but it does also occur in Europe and India. Molecular studies have shown that *Vahliella* differs so much from *Fuscopannaria* that it cannot even be placed in the Pannariaceae within the suborder Collematinae, the family Vahliellaceae having been recently segregated within the suborder Peltigerinae (Wedin & al. 2011). Type: *V. leucophaea* (Vahl) P. M. Jørg.

Vahliella atlantica (P.M. Jørg. & P. James) P.M. Jørg.

Lichenologist, 40: 223, 2008 - *Fuscopannaria atlantica* P.M. Jørg. & P. James, Lichenologist, 37, 5: 2005.

Syn.: *Pannaria italica* Gyeln., *Pannaria microphylla* var. *italica* Gyeln. *nom. inval.*

N - Lig (Jørgensen & James 2005).

Cr/ Cy.h/ S/ Terr/ pH: 2-3, L: 3-4, X: 2, E: 1-2/ Alt: 1/ SmedH: er/ PT: 1/ oc, coast/ Note: a recently-described Macaronesian-Atlantic lichen extending as far north as Scotland and western Scandinavia, with a single disjunct station in Liguria (Varazze).

Vahliella leucophaea (Vahl) P.M. Jørg.

Lichenologist, 40: 224, 2008 - *Lichen leucophaeus* Vahl, Fl. Dan., 6, 16: 8, 1787.

Syn.: *Biatora microphylla* (Sw.) Ach., *Collema microphyllum* (Sw.) DC., *Fuscopannaria leucophaea* (Vahl) P.M. Jørg., *Lecidea microphylla* (Sw.) Ach., *Lecidea microphylla* var. *swartzii* Schaer., *Lichen picinus* Ach., *Massalongia cheilea* Mudd, *Moelleropsis nebulosa* f. *taborensis* Gyeln., *Pannaria austriaca* Zahlbr., *Pannaria leucophaea* (Vahl) P.M. Jørg., *Pannaria microphylla* (Sw.) A. Massal., *Pannaria microphylla* f. *lecanorina* Gyeln., *Pannaria microphylla* var. *pseudocraspedia* Hazsl., *Parmeliella pseudocraspedia* (Hazsl.) Gyeln.

N - Ven (Nascimbene & Marini 2010), **TAA** (Nascimbene 2005b, 2008b), **Lomb, Piem** (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999), **Emil, Lig, C - Tosc** (Tretiach & Nimis 1994, Benesperi 2011), **Marc** (Nimis & Tretiach 1999), **Laz, Sar** (Zedda 2002). **S - Camp, Pugl, Cal** (Puntillo 1996).

Sq/ Cy.h/ S/ Sax/ pH: 2-3, L: 3, X: 2, E: 1-2/ Alt: 1-4/ Salp: r, Orom: er, Mont: r, SmedD: er, SmedH: r, MedH: er/ PT: 1/ Note: on basic siliceous rocks in sheltered and humid situations, such as in seepage tracks; most frequent in the Alps. An earlier record from Venezia Giulia (see Nimis 1993: 468) is excluded, as it was actually from Slovenian territory.

Vahliella saubinetii (Mont.) P.M. Jørg.

Lichenologist, 40: 224, 2008 - *Parmelia saubinetii* Mont., Ann. Sc. Nat. Bot., ser. 2, 6: 331, 1836.

Syn.: *Fuscopannaria saubinetii* (Mont.) P.M. Jørg., *Massalongia rabenhorstiana* Gyeln., *Pannaria saubinetii* (Mont.) Nyl., *Parmeliella saubinetii* (Mont.) Zahlbr., *Parmeliella saubinetii* f. *grisea* Gyeln., *Trachyderma saubinetii* (Mont.) Trevis.

N - VG, Ven, Piem, Emil, C - Tosc, S - Camp (Brunialti & al. 2013, Ravera & Brunialti 2013, Ravera & al. 2015c).

Sq/ Cy.h/ S/ Epiph/ pH: 2-3, L: 3, X: 1-2, E: 1/ Alt: 1-2/ SmedD: er, SmedH: er, MedH: er/ PT: 0/ suboc/ Note: a mild-temperate species found on trunks of mature deciduous trees in rather shaded and humid situations; extremely rare, but to be looked for in other parts of Tyrrhenian Italy. It is included in the Italian red list of epiphytic lichens as “Vulnerable” (Nascimbene & al. 2013c).

Varicellaria Nyl.

Mém. Soc. Imp. Sc. Nat. Cherbourg, 5: 119, 1858.

The large genus *Pertusaria* has been shown to be polyphyletic, with species belonging even to different families within the order Pertusariales (see *e.g.* Schmitt & al. 2012). Schmitt & Lumbsch (2004) identified two main clades that are not closely related to *Pertusaria s.str.*, the *Variolaria*- and *Varicellaria*-groups. The latter, including the lecanoric acid-containing species, forms a well-supported, monophyletic clade of 7 species, which is now segregated into the genus *Varicellaria*. Schmitt & al. (2006) have re-delimited the family Pertusariaceae, excluding *Varicellaria*, that is sister to *Ochrolechia* in the Ochrolechiaceae. Type: *V. microsticta* Nyl. (= *V. rhodocarpa*).

Varicellaria hemisphaerica (Flörke) I. Schmitt & Lumbsch

in Schmitt & al., MycoKeys, 4: 29, 2012 - *Variolaria hemisphaerica* Flörke, Deutsche Lich., 2, 2: 6, 1815.

Syn.: *Lecanora parella* f. *variolosa* (Flot.) Anzi, *Ochrolechia pallescens* f. *variolosa* (Flot.) Jatta, *Pertusaria hemisphaerica* (Flörke) Erichsen, *Pertusaria hibernica* Erichsen, *Pertusaria speciosa* Høeg

N - **VG** (Tretiach 1993), **Frl** (Tretiach 1993), **Ven** (Lazzarin 1997, Nascimbene & al. 2007, 2013b, Nascimbene 2008c), **TAA** (Nascimbene & Caniglia 2000, Nascimbene 2006b, 2008b, 2014, Nascimbene & al. 2014, Nascimbene & Marini 2015, Nimis & al. 2015), **Lomb**, **Piem** (Matteucci & al. 2010), **Emil** (Nimis & al. 1996, Tretiach & al. 2008), **Lig** (Putorti & al. 1999b, Giordani & al. 2002, Giordani 2006, Giordani & Incerti 2008). **C** - **Tosc** (Tretiach 1993, Tretiach & Nimis 1994, Loppi & De Dominicis 1996b, Loppi & al. 1997b, 1998, 2004c, Putorti & al. 1998, 1999, Putorti & Loppi 1999b, Senese & Critelli 2000, Laganà & al. 2002, Loppi & Frati 2006, Benesperi 2011), **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera 2000, Ravera & al. 2006), **Laz** (Tretiach 1993, Ravera 2002, Massari & Ravera 2002, Zucconi & al. 2013), **Abr** (Stofer 2006, Catalano & al. 2016, Corona & al. 2016), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **Sar** (Tretiach 1993, Zedda 1995, 2002b, Loi & al. 2000, Zedda & al. 2001, Rizzi & al. 2011). **S** - **Camp** (Aprile & al. 2003b, Nimis & Tretiach 2004, Blasi & al. 2010, Brunialti & al. 2013, Ravera & Brunialti 2013, Catalano & al. 2016), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Tretiach 1993, Puntillo 1996, Incerti & Nimis 2006), **Si** (Nimis & al. 1994, Ottonello & Romano 1997, Grillo 1998, Grillo & Caniglia 2004, Caniglia & Grillo 2006b, Grillo & Cataldo 2008, Liistro & Cataldo 2011).

Cr/ Ch/ A.s/ Epiph/ pH: 1-2, L: 3-4, X: 2-3, E: 1-2/ Alt: 1-3/ Mont: vr, SmedD: r, SmedH: rr, MedH: vr/ PT: 1/ Note: a mild-temperate species found on old deciduous trees, mainly oaks, in open forests, widespread throughout the country but not common, with optimum below the montane belt.

Varicellaria lactea (L.) I. Schmitt & Lumbsch

in Schmitt & al., MycoKeys, 4: 31, 2012 - *Lichen lacteus* L., Mantissa Pl., 1: 132, 1767.

Syn.: *Lecanora pallescens* var. *variolosa sensu* Anzi non Jatta, *Lecanora rimosa* var. *sorediifera* (Schaer.) Rabenh., *Ochrolechia lactea* (L.) Matzer & Hafellner, *Pertusaria lactea* (L.) Arnold, *Pertusaria lactea* f. *cinerascens* Nyl., *Pertusaria lactea* var. *confluens* Erichsen, *Variolaria lactea* (L.) Pers.

N - **Frl** (Tretiach & Hafellner 2000), **Ven**, **TAA** (Matzer 1993, Hinteregger 1994, Caniglia & al. 2002, Nascimbene & Caniglia 2002c, Nascimbene 2005b, 2006c, 2008b), **Lomb** (Valcuvia 2002, 2002b, Dalle Vedove & al. 2004), **Piem** (Morisi & Sereno 1995), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999), **Emil** (Tretiach & al. 2008), **Lig** (Brunialti & al. 1999). **C** - **Tosc**, **Laz**, **Sar** (Rizzi & al. 2011). **S** - **Camp** (Ricciardi & al. 2000), **Pugl**, **Si** (Grillo 1998, Grillo & Caniglia 2004).

Cr/ Ch/ A.s/ Sax/ pH: 1-2, L: 3, X: 2, E: 1/ Alt: 2-4/ Salp: er, Mont: rr, SmedD: er, SmedH: vr/ PT: 1/ Note: optimum on steeply inclined, lime-free, rather shaded surfaces of siliceous rocks in humid areas.

Varicellaria rhodocarpa (Körb.) Th. Fr.

Lichenogr. Scand., 1: 322, 1871 - *Pertusaria rhodocarpa* Körb., Syst. Lich. Germ.: 384, 1855.

Syn.: *Varicellaria kemensis* Räsänen, *Varicellaria microsticta* Nyl.

N - **Frl**, **Ven**, **TAA** (Hinteregger 1994), **Lomb**. **C** - **Tosc** (Jatta 1909-1911)

Cr/ Ch/ A.s/ Terr-Lign-Sax/ pH: 1-2, L: 3-4, X: 2-3, E: 1/ Alt: 4-5/ Alp: rr, Salp: vr/ PT: 1/ Note: a mainly arctic-alpine species found on acid soil and plant remains, more rarely on lignum or on rocks in tundra-like environments near or above treeline; restricted to the Alps and the northern Apennines in Italy.

Varicellaria velata (Turner) I. Schmitt & Lumbsch

in Schmitt & al., MycoKeys, 4: 31, 2012 - *Parmelia velata* Turner, Trans. Linn. Soc. London, 9: 143, 1808.

Syn.: *Pertusaria conglobata* (Ach.) Th. Fr., *Pertusaria obvelata* Nyl., *Pertusaria velata* (Turner) Nyl., *Variolaria conglobata* Ach.

C - **Sar** (Loi & al. 2000, Zedda 2002). **S** - **Pugl** (Nimis & Tretiach 1999).

Cr/ Ch/ S/ Epiph/ pH: 2-3, L: 3, X: 1-2, E: 1-2/ Alt: 1-2/ SmedH: er, MedH: vr/ PT: 0/ suboc/ Note: a chemically variable, mild-temperate to humid subtropical lichen found on bark in humid-sheltered situations; certainly rare, and mostly coastal in Italy, but to be looked for in other parts of the Tyrrhenian district. It is included in the Italian red list of epiphytic lichens as “Vulnerable” (Nascimbene & al. 2013c).

Variospora Arup, Søchting & Frödén

Nord. J. Bot., 31: 75, 2013.

This genus of the Teloschistaceae, currently including 12 species, was recently segregated from *Caloplaca s.lat.* and seems to be related to *Seiophora*, which strongly differs in having a villose, more or less fruticose thallus usually lacking orange pigments. Lobate species resemble those of e.g. *Calogaya* or even *Rusavskia*, but can be separated by the citriform spores or the spore septum. Crustose species can be confused with those of several other genera. In many species of *Variospora*, even in the crustose members, the thallus can be sublobate or produce microlobes. For further details see Arup & al. (2013). Type: *V. velana* (A. Massal.) Arup, Søchting & Frödén

Variospora aegaea (Sipman) Arup, Frödén & Søchting

in Arup & al., Nord. J. Bot., 31: 76, 2013 - *Caloplaca aegaea* Sipman in Sipman & Raus, Willdenowia, 32: 366, 2002.

C - Tosc (Herb. Vondrák 8823). **Sar** (Sipman & Raus 2002).

Cr.pl/ Ch/ S/ Sax/ pH: 3-4, L: 4-5, X: 4-5, E: 3-4/ Alt: 1/ MedH: vr, MedD: vr/ PT: 1/ Note: a recently-described, mostly coastal species of base-rich or calciferous siliceous rocks, probably more widespread in Mediterranean Italy.

Variospora aurantia (Pers.) Arup, Frödén & Söchting

in Arup & al., Nord. J. Bot., 31: 80, 2013 - *Lichen aurantius* Pers., Ann. Bot. (Usteri), 5: 14, 1794.

Syn.: *Amphiloma aurantium* (Pers.) Müll. Arg., *Amphiloma calloplisma* (Ach.) Körb., *Calloplisma vulgaris* De Not., *Caloplaca aurantia* (Pers.) Hellb., *Caloplaca aurantia* var. *intermedia* Zahlbr., *Caloplaca aurantia* var. *papillata* Poelt, *Caloplaca calloplisma* (Ach.) Th. Fr., *Gasparrinia aurantia* (Pers.) Syd., *Gasparrinia calloplisma* (Ach.) Syd., *Lecanora calloplisma* Ach., *Placodium aurantium* (Pers.) Vain., *Placodium calloplismum* (Ach.) Mérat

N - VG (Tretiach & Pecchiari 1995, Castello 2002, Martellos & Castello 2004), **Frl** (Nimis & Salvadori 1998, Nascimbene & al. 2009b), **Ven** (Nascimbene & Caniglia 1997, Caniglia & al. 1999, Nascimbene 2005c, Nascimbene & Marini 2007, Gaya 2009), **TAA, Lomb** (Valcuvia & al. 2003, Florio & al. 2004, 2006), **Piem, VA** (Piervittori & Isocrono 1999), **Emil** (Nimis & al. 1996, Valcuvia & Savino 2000), **Lig** (Valcuvia & al. 2000, Roccardi 2006, Giordani & al. 2016). **C - Tosc** (Benesperi 2000, Pasquinelli & Puccini 2010), **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera & al. 2006, Panfilo 2007, Genovesi 2011), **Laz** (Nimis & Tretiach 2004, Roccardi & Ricci 2006, Pietrini & al. 2008, Gazzano & al. 2009, Roccardi 2011, Genovesi & al. 2011), **Abr** (Nimis & Tretiach 1999), **Mol** (Garofalo & al. 1999, Nimis & Tretiach, 1999, 2004, Caporale & al. 2008, Genovesi & Ravera 2014), **Sar** (Rizzi & al. 2011). **S - Camp** (Garofalo & al. 1999, 2010, Altieri & al. 2000, Aprile & al. 2003, 2003b, Nimis & Tretiach 2004, Roccardi & Ricci 2006, Catalano & Aprile 2008), **Pugl** (Garofalo & al. 1999, Nimis & Tretiach 1999, Durini & Medagli 2002, 2004, Brackel 2011), **Bas** (Bartoli & Puntillo 1998, Nimis & Tretiach 1999, Brackel 2011), **Cal** (Puntillo 1996, Puntillo & Puntillo 2015b), **Si** (Nimis & al. 1994, 1995, Ottonello & Salone 1994, Ottonello & al. 1994, Monte & Ferrari 1996, Ottonello 1996, Poli & al. 1996, 1997, 1998, Ottonello & Romano 1997, Grillo 1998, Czezcuga & al. 1999, Caniglia & Grillo 2001, 2005, 2006, Grillo & al. 2001, 2002, 2007b, 2009, Grillo & Caniglia 2004, Merlo 2004b, Genco & al. 2007, Brackel 2008b, 2008c, Sou & Vondrák 2008, Gianguzzi & al. 2009, Cataldo & Cannavò 2014).

Cr.pl/ Ch/ S/ Sax/ pH: 4-5, L: 4-5, X: 4-5, E: 3-4/ Alt: 1-3/ Mont: r, SmedD: c, Pad: rr, SmedH: vc, MedH: ec, MedD: vc/ PT: 1-3/ Note: a mild-temperate to subtropical species found on a wide variety of calciferous substrata, common in the Mediterranean-submediterranean belts, rarer at higher altitudes, more helio- and thermophytic than the closely related *V. flavescens*.

Variospora australis (Arnold) Arup, Söchting & Frödén

Nord. J. Bot., 31: 80, 2013 - *Physcia australis* Arnold, Flora, 58: 154, 1875.

Syn.: *Candelariella australis* (Arnold) Zahlbr., *Caloplaca australis* (Arnold) Zahlbr., *Fulgensia australis* (Arnold) Poelt, *Gasparrinia australis* (Arnold) Dalla Torre & Sarnth., *Gyalolechia australis* (Arnold) J. Steiner

N - Frl, Ven (Nascimbene 2003, 2004), **TAA** (Westberg & Kaernefelt 1998), **Piem** (TSB 33944), **VA** (vidi!). **C - Abr** (Nimis & Tretiach 1999). **C - Camp** (Aprile & al. 2003).

Cr.pl/ Ch/ S/ Sax/ pH: 5, L: 4-5, X: 4, E: 3-4/ Alt: 4-5/ Alp: r, Salp: rr/ PT: 1/ Note: on exposed calciferous rocks near or above treeline, e.g. on the top of large, isolated boulders and on steeply inclined to vertical surfaces.

Variospora dolomiticola (Hue) Arup, Söchting & Frödén

Nord. J. Bot., 31: 80, 2013 - *Lecanora dolomiticola* Hue, Ann. Mycol., 13: 83, 1915.

Syn.: *Caloplaca velana* var. *dolomiticola* (Hue) Clauzade & Cl. Roux

N - Frl (TSB 1450), **TAA** (type material).

Cr.pl/ Ch/ S/ Sax/ pH: 3-4, L: 4-5, X: 4-5, E: 1-3/ Alt: 4-5/ Alp: vr, Salp: vr/ PT: 1/ #/ Note: a still poorly understood species, often considered as a synonym of *V. velana*, growing on dolomite and schists in upland areas, with optimum above the montane belt.

Variospora flavescens (Huds.) Arup, Frödén & Söchting

in Arup & al., Nord. J. Bot., 31: 75, 2013 - *Lichen flavescens* Huds., Fl. Angl., ed. 2, 2: 445, 1762.

Syn.: *Amphiloma heppianum* Müll. Arg., *Caloplaca brevilobata* (Nyl.) Zahlbr., *Caloplaca flavescens* (Huds.) J.R. Laundon, *Caloplaca heppiana* (Müll. Arg.) Zahlbr., *Caloplaca sympagea* (Ach.) Sandst., *Gasparrinia heppiana* (Müll. Arg.) Versegghy, *Lecanora heppiana* (Müll. Arg.) Hue, *Lecanora sympagea* Ach., *Physcia calloplisma* var. *centroleuca* A. Massal., *Physcia heppiana* (Müll. Arg.) Arnold, *Physcia murorum* var. *centrifuga* A. Massal., *Physcia murorum* var. *detrita* A. Massal., *Placodium calloplismum* var. *brevilobatum* (Nyl.) A.L. Sm., *Placodium calloplismum* var. *plicatum* (Wedd.) Leight., *Placodium flavescens* (Huds.) A.L. Sm., *Placodium heppianum* (Müll. Arg.) Flagey

N - VG (Castello 2002, Martellos & Castello 2004, Tretiach & al. 2007b), **Frl** (Nimis & Salvadori 1998, Nascimbene & al. 2009b), **Ven** (Caniglia & al. 1993, Lazzarin 2000b, Nascimbene & Marini 2007), **TAA** (Spitale & Nascimbene 2012), **Lomb** (Realini & al. 1994), **Piem** (Isocrono & al. 2004, Morisi 2005, Gazzano & al. 2009, 2009b), **VA** (Piervittori & Isocrono 1999), **Emil** (Scarpa 1993, Nimis & al. 1996, Bouvet 2008), **Lig** (Valcuvia & al. 2000). **C - Tosc** (Tretiach & Nimis 1994, Benesperi 2000a, 2006, 2011, Lastrucci & al. 2014b), **Marc** (Nimis & Tretiach 1999, Tretiach & Pinna 2000), **Umb** (Nimis & Tretiach 1999, Panfilo 2000b, 2003, Ravera & al. 2006, Genovesi 2011), **Laz** (Bartoli 1997b, Bartoli & al. 1998, Nimis & Tretiach 2004, Genovesi & al. 2011), **Abr** (Nimis & Tretiach 1999, Caporale & al. 2016), **Mol** (Garofalo & al. 1999, Nimis & Tretiach 1999, Caporale & al. 2008, Genovesi & Ravera 2014), **Sar** (Rizzi & al. 2011). **S - Camp** (Garofalo & al. 1999, 2010, Aprile & al. 2002, 2003b, Nimis & Tretiach 2004, Catalano & al. 2016), **Pugl** (Garofalo & al. 1999, Nimis & Tretiach 1999, Durini & Medagli 2002, Macchione 2006, Brackel 2011), **Bas** (Bartoli & Puntillo 1998, Nimis & Tretiach 1999, Brackel 2011), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994, 1995, Ottonello & Salone 1994, Ottonello & al. 1994, Ottonello 1996, Poli & al. 1996, 1997, Grillo 1998, Caniglia & Grillo 2001, 2005, 2006, Grillo & al. 2001, 2002, 2009, Di Benedetto & al. 2002, Grillo & Caniglia 2004,

Brackel 2008b, 2008c, Gianguzzi & al. 2009, Liistro & Cataldo 2011, Cataldo & Cannavò 2014, Di Martino & Stancanelli 2015).

Cr.pl/ Ch/ S/ Sax/ pH: 4-5, L: 3-5, X: 3-4, E: 3-4/ Alt: 1-3/ Mont: rr, SmedD: ec, Pad: rc, SmedH: ec, MedH: rr, MedD: r/ PT: 1-3/ Note: a mainly temperate, common species found on limestone, dolomite, calciferous sandstone, sometimes also on man-made substrata such as brick, mortar and roofing tiles, on walls, monuments etc., somehow less helio- and xerophytic than the closely related *V. aurantia*, sometimes ascending to above treeline in the mountains of southern Italy.

Variospora glomerata (Arup) Arup, Söchting & Frödén

Nord. J. Bot., 31: 75, 2013 - *Caloplaca glomerata* Arup, Ann. Bot. Fenn., 27: 329, 1990.

S - Cal (Puntillo 1996).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 4, X: 3-4, E: 3/ Alt: 2-3/ Mont: er, SmedH: vr/ PT: 1/ Note: a mainly Mediterranean species with an areolate, usually richly fertile thallus bearing several crowded apothecia per areole, and ascospores with lumina recalling the *Mischoblastia*-type, found on limestone in *Circinaria calcarea* communities, often invading thalli of various species of the *Pyrenodesmia variabilis* group; probably more widespread in southern Italy but overlooked, or confused with other species.

Variospora macrocarpa (Anzi) Arup, Söchting & Frödén

Nord. J. Bot., 31: 75, 2013 - *Placodium aurantiacum* var. *macrocarpum* Anzi, Cat. Lich. Sondr.: 43, 1860.

Syn.: *Caloplaca macrocarpa* (Anzi) Zahlbr.

N - Lomb.

Cr.pl/ Ch/ S/ Sax/ pH: 4-5, L: 4-5, X: 4-5, E: 1-3/ Alt: 4-5/ Alp: vr, Salp: vr/ PT: 1/ Note: this neglected species growing on calcareous rocks, with optimum above the montane belt, appears to be common in the Austrian Alps and should be looked for more intensively in Italy. According to Vondrák (*in litt.*), however, at least the material called *Caloplaca macrocarpa* by Poelt and Hafellner (GZU) belongs to a different species which should be probably included in *Xanthocarpia*.

Variospora thallincola (Wedd.) Arup, Frödén & Söchting

in Arup & al., Nord. J. Bot., 31: 77, 2013 - *Lecanora murorum* var. *thallincola* Wedd., Mém. Soc. Imp. Sc. Nat. Cherbourg, 19: 274, 1875.

Syn.: *Caloplaca thallincola* (Wedd.) Du Rietz, *Placodium callopismum* f. *thallincolum* (Wedd.) Walt. Watson, *Placodium thallincolum* (Wedd.) H. Olivier

C - Sar (Lo Forti & al. 2004).

Cr.pl/ Ch/ S/ Sax/ pH: 2-3, L: 4-5, X: 3, E: 2-3/ Alt: 1/ MedH: er/ PT: 1/ suboc, coast/ Note: a mainly Atlantic species confined to the salt-spray belt, reported from a single station in western Sardegna.

Variospora velana (A. Massal.) Arup, Söchting & Frödén

Nord. J. Bot., 31: 77, 2013 - *Callopisma aurantiacum* var. *velanum* A. Massal., Atti Ist. Ven. Sc. Lett. Arti, ser. 2, 3, app. 3: 74, 1852.

Syn.: *Callopisma aurantiacum* var. *diffRACTUM* A. Massal., *Callopisma aurantiacum* var. *leucotis* A. Massal., *Callopisma aurantiacum* var. *ochroleucum* A. Massal., *Callopisma aurantiacum* var. *placidium* A. Massal., *Callopisma dalmaticum* A. Massal., *Caloplaca aurantiaca* var. *ochroleuca* (A. Massal.) Jatta, *Caloplaca aurantiaca* var. *placidia* (A. Massal.) Flagey, *Caloplaca aurantiaca* var. *velana* (A. Massal.) Flagey, *Caloplaca placidia* (A. Massal.) J. Steiner, *Caloplaca velana* (A. Massal.) Du Rietz, *Caloplaca velana* var. *dalmatica* (A. Massal.) Clauzade & Cl. Roux, *Lecidea velana* (A. Massal.) Hue, *Placodium aurantiacum* var. *diffRACTUM* (A. Massal.) Anzi

N - VG, Frl, Ven (Lazzarin 2000b, Caniglia & al. 1999, Nascimbene & Marini 2007), TAA (Nascimbene 2003), Lomb, Piem (TSB), VA (Pierivittori & Isocrono 1999), Emil, Lig (Valcuvia & al. 2000, Giordani & al. 2016). C - Tosc, Marc (Nimis & Tretiach 1999), Umb (Nimis & Tretiach 1999, Panfili 2000b, 2007, Ravera & al. 2006), Laz (Bartoli & al. 1998, Nimis & Tretiach 2004, Brackel 2015), Abr (Nimis & Tretiach 1999), Mol (Nimis & Tretiach, 1999, 2004, Caporale & al. 2008), Sar. S - Camp (Garofalo & al. 1999, 2010, Nimis & Tretiach 2004), Pugl (Nimis & Tretiach 1999, Durini & Medagli 2002), Bas (Nimis & Tretiach 1999), Cal (Puntillo 1996), Si (Ottonello & Salone 1994, Ottonello & al. 1994, Ottonello 1996, Nimis & al. 1996b, Grillo 1998, Grillo & al. 2002, Grillo & Caniglia 2004, Brackel 2008b, 2008c, Gianguzzi & al. 2009).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 4-5, X: 3-4, E: 3-4/ Alt: 1-5/ Alp: rr, Salp: rc, Orom: rc, Mont: c, SmedD: vc, Pad: r, SmedH: vc, MedH: rc, MedD: rr/ PT: 1-2/ #/ Note: on a wide variety of calcareous substrata in exposed, rather eutrophicated situations; extremely polymorphic, this taxon is certainly heterogeneous, and in need of revision.

Variospora velana (A. Massal.) Arup, Söchting & Frödén var. *schaereri* (Flörke)

Provisionally placed here, ICN Art. 36.1b. - *Lecidea schaeereri* Flörke in Arnold, Flora, 64: 312, 1881.

Syn.: *Caloplaca schaeereri* (Flörke) Zahlbr., *Caloplaca velana* var. *schaereri* (Flörke) Clauzade & Cl. Roux

N - Lomb. S - Pugl (Durini & Medagli 2004), Cal (Puntillo 1996), Si (Nimis & al. 1996b).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 4-5, X: 3-4, E: 3-4/ Alt: 2-4/ Salp: vr, Orom: r, Mont: r, SmedD: r, SmedH: vr/ PT: 1/ #/ Note: among the several infraspecific taxa recognised by Clauzade & Roux (1985) this one is accepted here only because there are several records from Italy; the whole group, however, badly needs revision.

Verrucaria Schrad.
Spicil. Fl. Germ., 1: 108, 1794, *nom. cons.*

The taxonomy of the Verrucariaceae is presently being thoroughly revised on the basis of molecular data (see e.g. Gueidan & al. 2007, 2009). Savić & al. (2008) have shown that morphological features traditionally used for characterising the genera *Polyblastia*, *Thelidium*, *Staurothele* and *Verrucaria*, such as spore septation and colour, occurrence of hymenial photobionts, involucrellum structure, and substrate preference, are only partially consistent with supported clades, and thus are not always reliable for characterizing natural groups. *Polyblastia*, *Thelidium*, *Staurothele* and *Verrucaria*, as currently delimited, are non-monophyletic. Some 200 species are currently accepted worldwide. See also notes to *Bagliettoa*, *Hydropunctaria*, *Parabagliettoa*, *Verrucula* and *Verruculopsis*. Many poorly known species of *Verrucaria* were described from Italy, especially by Servít; most of them (those which have not been re-evaluated in recent papers) are listed separately under the poorly known taxa at the end of this book. Good descriptions and a key to the British species are in Orange (2013b). Type: *V. rupestris* Schrad. The name is conserved against *Verrucaria* Scop. (1777).

Verrucaria aberrans Garov.

Tent. Disp. Lich. Lang.: 11, 1864.

N - Lomb.

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 2-3, X: 1-2, E: 1/ Alt: 3/ Mont: vr/ PT: 1/ #/ Note: a very poorly known silicicolous species, also reported from Germany (Wirth & al. 2010); the type material is from granite in a humid, shaded *Castanea*-woodland. See also Nimis (1993: 731).

Verrucaria acrotella Ach.

Meth. Lich.: 123, 1803.

Syn.: *Verrucaria aethiobola* var. *acrotella* (Ach.) H. Olivier

N - TAA, Lig. C - Tosc, Sar. S - Si.

Cr/ Ch/ S/ Sax/ pH: 1-3, L: 3-4, X: 2-4, E: 1-3/ Alt: 2-3/ Mont: vr, SmedD: vr/ PT: 1/ #/ Note: a very poorly known species found on siliceous rocks, mostly close to the ground; see also comment in Nimis (1993: 731), and Orange (2008).

Verrucaria aethiobola Wahlenb.

in Ach., Meth. Lich. Suppl.: 17, 1803.

Syn.: *Lithocia aethiobola* (Wahlenb.) Stein, *Pyrenula aethiobola* (Wahlenb.) Ach., *Verrucaria aquilella* Nyl., *Verrucaria catalepta* Schaer. non (Ach.) Spreng., *Verrucaria chlorotica* Hepp non Ach., *Verrucaria fuscocinerascens* Nyl., *Verrucaria hibernica* Zschacke, *Verrucaria hydrela* var. *aethiobola* (Wahlenb.) A. Massal., *Verrucaria laevata* Ach. non auct. nec sensu Körb., *Verrucaria viridicana* Erichsen

N - Ven (Nascimbene & Nimis 2007, Nascimbene 2008, Nascimbene & al. 2009), **TAA, Lomb, Piem** (Isocrono & al. 2004), **Emil. C - Tosc, Umb** (Panfili 2007), **Sar** (Rizzi & al. 2011, Giordani & al. 2013).

Cr/ Ch/ S/ Sax/ pH: 2-4, L: 3-4, X: 1-2, E: 1/ Alt: 2-4/ Salp: r, Orom: vr, Mont: r, SmedD: vr, SmedH: vr/ PT: 1/ 1/ Note: a widespread species, both in northern Europe and in the Alps, periodically submerged on hard, mostly siliceous rocks along creeks. According to Thüs (*in litt.*) the epithet *aethiobola* was used for two genetically well-separated taxa: *V. aethiobola s.str.* and *V. cernaensis* Zschacke, and it is likely that at least some of the lowland records from Italy could refer to the latter species. Some dubious records from southern Italy reported by Nimis (1993: 732) are not accepted here. See also note on *V. cataleptoides*.

Verrucaria alpicola Zschacke

Hedwigia, 67: 75, 1931.

N - Ven (Thüs & al. 2015), **TAA** (Thüs & al. 2015), **VA** (Thüs & al. 2015).

Cr.end/ Ch/ S/ Sax/ pH: 2-5, L: 3-4, X: 2-3, E: 2-4/ Alt: 3-5/ Alp: r, Salp: r, Mont: vr/ PT: 1/ p, #/ Note: a typically sub-aquatic species which often occurs in the splash water zone in streams, but also at temporarily inundated sites in springs, both on calcareous and on siliceous rocks, in sunny to moderately shaded sites, mostly in upland areas; probably more widespread, at least in the Alps.

Verrucaria alpigena Breuss

Sauteria, 15: 122, 2008.

Syn.: *Verrucaria alpina* Breuss, *Verrucaria alpina* (Arnold) Breuss non (Bagl. & Carestia) Stizenb., *Verrucaria muralis* var. *alpina* Arnold

N - TAA (De Benetti & Caniglia 1993).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 3-4, X: 3-4, E: 1-3/ Alt: 3-5/ Alp: er, Salp: er, Mont: er/ PT: 1/ #/ Note: on calciferous rocks in upland areas; closely related to *V. muralis*, but with larger spores (see Breuss 2008b), this species was reported from the Alps and the Carpathian Mountains.

Verrucaria ampezzana Servít

Stud. Bot. Čech., 11: 104, 1950.

N - TAA.

Cr/ Ch/ S/ Sax/ pH: 3-4, L: 3-4, X: 3-4, E: 1-2/ Alt: 3-4/ Salp: vr, Mont: vr/ PT: 1/ #/ Note: a poorly known species described from South Tyrol and also reported from the French Alps (Roux & coll. 2014), found on inclined surfaces of calciferous schists near or above treeline. According to Breuss (2016) the species is closely related to *Parabagliettoa dufourii* but it differs in the larger spores, and should be included in *Parabagliettoa*.

Verrucaria anceps Kremp.

in Hepp, Flecht. Eur.: nr. 686, 1860.

Syn.: *Polyblastia anceps* (Kremp.) Servít

N - Ven, TAA (Dalla Torre & Sarnthein 1902), **Piem** (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999).

Cr.end/ Ch/ S/ Sax/ pH: 4-5, L: 3-4, X: 2-3, E: 1/ Alt: 2-4/ Salp: vr, Mont: r, SmedD: vr/ PT: 1/ #/ Note: on limestone and dolomite in humid-shaded situations below treeline; reported from a few localities in the mountains of central Europe and the southern Alps.

Verrucaria anziana Garov.

Tentam. Dispos. Lich. Langob.: 20, 1865.

N - Lomb. C - Sar (B-24002 det. H. Sipman).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 3-4, X: 1-3, E: 1/ Alt: 3-4/ Salp: vr, Mont: vr/ PT: 1/ #/ Note: this species was often considered as a synonym of *V. latebrosa*, but according to Orange (2008, 2013) it differs in several important characters, although Thüs (*in litt.*) questions this assumption, since no evidence for a reliable correspondence between morphology, and ITS gene tree has been published yet. It usually grows on siliceous rocks by streams, rivers and lakes, and is known from both the Alps and Scandinavia.

Verrucaria apatela (A. Massal.) Trevis.

Consp. Verruc.: 7, 1860 - *Lithocia apatela* A. Massal., Framm. Lichenogr.: 23, 1855.

Syn.: *Verrucaria monguilloni* Servít

N - Ven (Lazzarin 2000b, Breuss 2008b), **TAA, Lomb, Piem** (Isocrono & al. 2004), **Emil, Lig** (Watson 2014). **S - Camp** (Ricciardi & al. 2000).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 3-4, X: 3, E: 1-2/ Alt: 2-4/ Salp: vr, Orom: vr, Mont: r, SmedD: vr/ PT: 1-2/ #/ Note: on steeply inclined faces of limestone and dolomite. Reported from many sites in central and southern Europe; closely related to *V. macrostoma*. For further details see Breuss (2008b).

Verrucaria apomelaena (A. Massal.) Hepp

Flecht. Eur.: nr. 684, 1860 - *Lithocia apomelaena* A. Massal., Framm. Lichenogr.: 23, 61: 1855.

N - Ven (Lazzarin 2000b), **Emil, Lig** (Watson 2014).

Cr/ Ch/ S/ Sax/ pH: 3-5, L: 3-4, X: 3, E: 2-3/ Alt: 2-3/ Mont: vr, SmedD: vr, SmedH: vr/ PT: 1/ #/ Note: a rather poorly known species found both on limestone and on calciferous sandstone below treeline.

Verrucaria aquatilis Mudd

Man. Brit. Lich.: 285, 1861.

Syn.: *Bachmannia maurula* (Müll. Arg.) Zschacke, *Verrucaria aquatilis* var. *aerimontana* Servít, *Verrucaria maurula* Müll. Arg., *Verrucaria relecta* Zschacke, *Verrucaria vitricola* Nyl.?

N - Ven (Nascimbene & Nimis 2007, Thor & Nascimbene 2007, Nascimbene 2008, Nascimbene & al. 2008b, 2009), **TAA** (Nascimbene & al. 2007b). **S - Cal** (Puntillo 1996).

Cr/ Ch/ S/ Sax/ pH: 2-5, L: 3-4, X: 1, E: 1/ Alt: 2-4/ Salp: vr, Orom: vr, Mont: r, SmedD: er/ PT: 1/ 1/ Note: distinguished from other freshwater species by the thin blackish thallus and the very small, broadly ellipsoid ascospores (see Orange 2013), this species grows on siliceous or calcareous rocks submerged in cold creeks; probably overlooked, like many amphibious lichens in Italy.

Verrucaria asperula Servít

Sborn. Národn. Mus Praze, 5, B, 9, bot. 3: 15, 1949.

N - Lig. C - Tosc.

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 3-4, X: 3-4, E: 1-2/ Alt: 2-4/ Salp: vr, Orom: vr, Mont: r, SmedD: er, SmedH: er/ PT: 1/ #/ Note: a poorly known species described from Germany and also reported from the French Alps, growing on siliceous rocks in relatively warm sites, mostly below treeline.

Verrucaria attica (J. Steiner) J. Steiner

Verh. zool.-bot. Ges. Wien, 61: 39, 1911 - *Verrucaria rupestris* var. *attica* J. Steiner, Sitzungsber. K. Akad. Wiss., math. naturwiss. Cl., 107: 177, 1898.

S - Si (Otonello & Salone 1994, Grillo & al. 2007).

Cr.end/ Ch/ S/ Sax/ pH: 5, L: 3-4, X: 3, E: 1/ Alt: 1/ MedD: vr/ PT: 1/ #/ Note: a very poorly known species of calciferous rocks, with a few records from the eastern part of the Mediterranean Region. Ecological indicator values refer to the situation observed in Sicilia (Marettimo Island).

Verrucaria beltraminiana (A. Massal.) Trevis.

Conspect. Verruc.: 7, 1860 - *Lithocia beltraminiana* A. Massal., Symmicta Lich.: 93, 1855.

N - VG (TSB 11675), **Ven** (Caniglia & al. 1999, Lazzarin 2000b), **Piem. C - Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **Sar. S - Camp** (Aprile & al. 2003b), **Pugl. Bas.**

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 4, X: 3-4, E: 3-4/ Alt: 1-4/ Salp: er, Mont: er, SmedD: rr, Pad: er, SmedH: r, MedH: vr/ PT: 1-2/ Note: on horizontal to weakly inclined surfaces of calcareous rocks, including walls in small settlements. A critical species, closely related to (but perhaps distinct from) *Verruculopsis lecideoides*, which should probably be included in *Verruculopsis*.

***Verrucaria bisagnoensis* Servít**

Sborn. Narodn. Mus Praze, 5, B, 9, bot. 3: 16, 1949.

N - Lig.

Cr/ Ch/ S/ Sax/ pH: 2-4, L: 4, X: 3-4, E: 2-3/ Alt: 1-2/ SmedD: vr, MedD: vr/ PT: 1-2/ #/ Note: a long-forgotten species which was recently resurrected by Muchnik & Breuss (2015), present also in Slovenia and Russia. The type was collected in Val Bisagno near Genova, on sandstone, but material from Slovenia and Russia is on limestone.

***Verrucaria caerulea* DC.**

in Lamarck & de Candolle, Fl. Franç., éd. 3, 2: 318, 1805.

Syn.: *Involucrothele bormiensis* (Servít) Servít, *Involucrothele plumbea* (Ach.) Servít, *Verrucaria amylicea* f. *compacta* Arnold, *Verrucaria bormiensis* Servít, *Verrucaria fusca* f. *benacensis* Arnold, *Verrucaria fusca* f. *caesia* Anzi, *Verrucaria glaucina* Ach. non auct., *Verrucaria plumbea* Ach., *Verrucaria truncatula* Nyl.

N - VG, Frl (Breuss 2008), **Ven** (Nascimbene & Caniglia 2003c), **TAA** (Nascimbene & al. 2006), **Lomb, Piem** (Isocrono & al. 2004), **Emil, Lig** (Valcuvia & al. 2000, Watson 2014). **C - Tosc, Umb** (Genovesi & Ravera 2001, Ravera & al. 2006), **Abr** (Nimis & Tretiach 1999). **S - Camp** (Aprile & al. 2003), **Pugl, Cal** (Puntillo 1996), **Si** (Grillo 1998, Grillo & Caniglia 2004, Brackel 2008c).

Cr/ Ch/ S/ Sax/ pH: 5, L: 3, X: 2-3, E: 1-2/ Alt: 2-5/ Alp: er, Salp: vr, Orom: vr, Mont: rr, SmedD: vr, SmedH: vr/ PT: 1/ Note: on steeply inclined surfaces of compact calciferous rocks, restricted to upland areas in southern Italy, where it exceptionally occurs also above treeline. Probably related to *Staurothele*.

***Verrucaria caesiella* Servít**

Stud. Bot. Čech., 9: 76, 1948.

Syn.: *Amphoridium caesiellum* (Servít) Servít, *Verrucaria calciseda* f. *caesia* Anzi

N - Lomb (Gueidan & Roux 2007).

Cr/ Ch/ S/ Sax/ pH: 5, L: 4, X: 3-4, E: 1-3/ Alt: 2-4/ Salp: er, Mont: vr, SmedD: vr/ PT: 1/ #/ Note: on calcareous rocks, usually near the ground. For a detailed description of this poorly known species see Gueidan & Roux (2007).

***Verrucaria caesiopsila* Anzi**

Comm. Soc. Critt. Ital., 2, 1: 23, 1864.

Syn.: *Amphoridium caesiopsilum* (Anzi) Arnold, *Verrucaria integrella* (Hue) Nyl.

N - Ven, TAA, Lomb, Piem (Isocrono & al. 2004), **VA** (Pierivittori & Isocrono 1999).

Cr.end/ Ch/ S/ Sax/ pH: 5, L: 3-4, X: 3, E: 1-2/ Alt: 2-3/ Mont: vr, SmedD: r/ PT: 1/ #/ Note: a poorly known species of calcareous rocks (limestone and dolomite). The ecological indicator values are tentative.

***Verrucaria cataleptoides* (Nyl.) Nyl.**

Bull. Soc. Bot. Fr., 10: 268, 1861 - *Verrucaria margacea* var. *cataleptoides* Nyl., Act. Soc. linn. Bordeaux, 21: 428, 1856.

Syn.: *Verrucaria aethiobola* var. *cataleptoides* (Nyl.) Vain.,

N - TAA (Dalla Torre & Sarnthein 1909).

Cr/ Ch/ S/ Sax/ pH: 3-4, L: 3-4, X: 1-2, E: 1/ Alt: 2-4/ Salp: er, Mont: er, SmedD: er/ PT: 1/ #/ Note: on periodically submerged calcareous rocks. According to Breuss (2008b) this species, frequently considered as a synonym of *V. aethiobola*, clearly differs in important morphological characters and in the occurrence on calcareous rocks (like the sample collected in South Tyrol near Arco by Kernstock, see Dalla Torre & Sarnthein 1909: 517). The Italian record, however, needs confirmation.

***Verrucaria cinereorufa* Schaer.**

Lich. Helv. Spicil., 7: 338, 1836.

N - Frl (Breuss 2008), **Lomb, Piem** (Morisi 2005), **Lig.**

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 3, X: 3, E: 1-2/ Alt: 2-4/ Salp: er, Mont: r, SmedD: vr/ PT: 1/ suboc, #/ Note: a poorly known species of periodically humid surfaces of calcareous or dolomitic rocks, also reported from the western Pyrenees and from several sites of western and central Europe.

***Verrucaria collematodes* Garov.**

Tentam. Dispos. Lich. Langob.: 31, 1865.

N - Ven, Lomb, Emil, Lig. C - Tosc. S - Camp.

Cr/ Ch/ S/ Sax/ pH: 3-5, L: 3-5, X: 2-5, E: 2-5/ Alt: 1-3/ Mont: r, SmedD: rr, Pad: vr, SmedH: vr, MedH: vr, MedD: vr/ PT: 1-3/ p, #/ Note: mostly on calciferous or base-rich siliceous substrata, including roofing

tiles, walls and mortar; on the whole a rather poorly known taxon of the *V. nigrescens* complex, reported from different countries in central and southern Europe.

Verrucaria confluens A. Massal.

Symmicta Lich: 77, 1855. *nom. illegit. non* (Weber) F.H. Wigg.

Syn.: *Verrucaria muralis* var. *confluens* (A. Massal.) Körb.

N - Ven (Lazzarin 2000b), **Lomb**.

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 3-4, X: 3-4, E: 1-3/ Alt: 2-3/ Mont: er, SmedD: vr/ PT: 2-3/ p, #/ Note: according to Breuss (2002) this species, which has been often considered to be a synonym of *V. muralis*, differs in the thicker thallus and the crowded perithecia with a thick involucrellum. The species has no valid name.

Verrucaria cryptica (Arnold) J. Steiner

Verh. zool.-bot. Ges. Wien, 61: 41, 1911 - *Amphoridium crypticum* Arnold, Flora, 68: 148, 1885.

N - Frl, TAA, Lig.

Cr.end/ Ch/ S/ Sax/ pH: 4-5, L: 3, X: 3, E: 1-2/ Alt: 5-6/ Alp: r/ PT: 1/ #/ Note: on compact calcareous rocks and dolomite near and above treeline, up to the nival belt; a very critical taxon, related to *V. hochstetteri* s.lat., which needs further study.

Verrucaria dinarica Zahlbr.

Österr. bot. Z., 68: 66, 1919.

S - Si (Nimis & al. 1994).

Cr.end/ Ch/ S/ Sax/ pH: 5, L: 4, X: 3, E: 1-2/ Alt: 3-5/ Alp: vr, Salp: vr, Orom: vr, Mont: vr, MedH: vr/ PT: 1/ #/ Note: a very poorly known species of calcareous rocks in upland areas. Indicator values refer to the situation observed in Sicilia (Island of Marettimo).

Verrucaria discernenda Zschacke

Rabenh. Krypt.-Flora, 9: 55, 1933.

N - TAA.

Cr.end/ Ch/ S/ Sax/ pH: 4-5, L: 3-4, X: 3, E: 1-2/ Alt: 4-5/ MedH: vr/ PT: 1/ #/ Note: a very poorly known endolithic lichen of dolomitic rocks, reported only from upland areas of South Tyrol and Westfalia. A revision of the type is much needed.

Verrucaria dolomitica (A. Massal.) Kremp.

Denkschr. kgl. bayer. bot. Ges., Abt. 2, 4: 238, 1861- *Amphoridium dolomiticum* A. Massal., Symmicta Lich.: 80, 1855.

N - VG, Ven (Lazzarin 2000b), **Lomb, Emil. C - Tosc, Abr. S - Pugl** (Jatta 1909-1911).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 2-3, X: 2-3, E: 1-2/ Alt: 2-5/ Alp: r, Salp: rr, Orom: er, Mont: rr, SmedD: er, SmedH: er/ PT: 1/ #/ Note: on calcareous rocks and pebbles, usually near the ground. A species belonging to the poorly understood complex of *V. hochstetteri*, also reported from several localities in the Austrian and French Alps, differing from *V. foveolata* in the small apical involucrellum.

Verrucaria dolosa Hepp

Flecht. Eur.: nr. 689, 1860.

Syn.: *Verrucaria krempehuberi* Lindau, *Verrucaria mutabilis auct. p.p. non* Leight.

N - Frl, Ven (Nascimbene & Nimis 2007, Nascimbene 2008, Nascimbene & al. 2009), **TAA, Lomb, Piem** (Favero-Longo & al. 2015), **VA** (Favero-Longo & al. 2006, Isocrono & al. 2008, Favero-Longo & Piervittori 2009), **Emil** (Nimis & al. 1996), **Lig** (Giordani & al. 2016). **C - Tosc, Sar** (Rizzi & al. 2011, Giordani & al. 2013). **S - Camp** (Nimis & Tretiach 2004), **Si** (Grillo & al. 2007, 2007b).

Cr/ Ch/ S/ Sax/ pH: 3-5, L: 3, X: 3, E: 1-2/ Alt: 2-4/ Mont: r, SmedD: rr, SmedH: rr/ PT: 1/ p/ Note: a probably holarctic early coloniser of small pebbles near the ground, growing both on calcareous and base-rich siliceous rocks in sheltered situations, such as in open woodlands and in moist habitats by watercourses, e.g. in the splash zone. The species is related to *V. hydrophila* (Orange 2013).

Verrucaria eggerthii J. Steiner

Verh. zool.-bot. Ges. Wien, 61: 40, 1911.

S - Si (Grillo 1998, Grillo & Caniglia 2004, Grillo & al. 2007b).

Cr/ Ch/ S/ pH: 4-5, L: 3-4, X: 3-4, E: 1-2/ Alt: 1/ MedD: vr/ PT: 1/ #/ Note: a saxicolous eu-Mediterranean species known only from the type locality in Corfu (Greece), from Croatia, and from Sicilia. The first Italian record (see Nimis 1993: 738) was probably identified by Servit.

Verrucaria elaeina Borrer

in Hooker, Engl. Bot., suppl. 1, tab. 2623, fig. 2, 1830.

N - Lomb (Jatta 1909-1911).

Cr/ Ch/ S/ Sax/ pH: 3-5, L: 2-3, X: 2-3, E: 1/ Alt: 2-3/ Mont: er, SmedD: vr/ PT: 1/ Note: a long-forgotten species that seems to be quite common in the British Isles (see Orange 2002, 2013). It grows on

shaded limestone, concrete, siliceous rocks and brick, in woodlands or beneath herbaceous vegetation, in natural habitats or on wasteground, in gardens or on damp walls, being characteristic of weakly calcareous rocks in shade. Perhaps more widespread in Italy. For further details see Orange (2000, 2013b).

Verrucaria elaeomelaena (A. Massal.) Arnold

Verh. zool.-bot. Ges. Wien, 18: 958, 1868 - *Lithocia elaeomelaena* A. Massal., Atti Ist. Ven. Sc. Lett. Arti, ser. 3, 2: 380, 1856.

Syn.: *Verrucaria davosiensis* Zschacke, *Verrucaria degenerascens* Nyl. ex A.L. Sm., *Verrucaria jurana* Zschacke
N - Ven (Lazzarin 2000b, Nascimbene & Nimis 2007, Nascimbene 2008, 2008c, Nascimbene & al. 2008b, 2009), TAA (Nascimbene & al. 2007b). C - Tosc, Sar (TSB 18724).

Cr/ Ch/ S/ Sax/ pH: 2-5, L: 2-3, X: 1, E: 1/ Alt: 3-5/ Alp: vr, Salp: r, Orom: vr, Mont: vr/ PT: 1/ 1/ Note: a cool-temperate to boreal-montane, perhaps circumpolar species, almost perennially submerged in cold montane to alpine creeks, emerging only in very shaded situations; perhaps more widespread in the Alps. In northern Europe this name was often used for *V. funckii* (Spreng.) Zahlbr. According to Thüs (*in litt.*), based on the currently available data from north of the Alps, *V. elaeomelaena s.str.* appears to be restricted to limestone, but it cannot be separated by morphology alone from several other unnamed lineages which grow on calcareous and siliceous substrata alike, especially in deep shade. As there is no sequenced material yet of *V. elaeomelaena s.str.* from Italy, I adopt a wide concept of the species, including also silicolous samples.

Verrucaria elevata (Nyl.) Zschacke

Rabenh. Krypt.-Fl., ed. 2, 9, 1: 287, 1933 - *Lithocia viridula* var. *elevata* Nyl., Verh. zool.-bot. Ges. Wien, 32: 172, 1882.

Syn.: *Verrucaria macrostomoides* Servít

N - Lig.

Cr/ Ch/ S/ Sax/ pH: 3-4, L: 3-4, X: 3-4, E: 1-2/ Alt: 2-3/ Mont: vr, SmedD: vr, SmedH: vr/ PT: 1-2/ #/ Note: a poorly known species, most frequent on calciferous schists, superficially similar to *V. macrostoma*, reported from a few localities in central Europe and the Alps. For a good description see Breuss (2008).

Verrucaria endocarpoides Servít

Preslia, 24: 357-358, 1952.

N - Frl (Breuss 2008, 2008b), Lig.

Cr/ Ch/ S/ Sax/ pH: 5, L: 2-3, X: 2-3, E: 1/ Alt: 2-3/ Mont: er, SmedD: vr/ PT: 1/ #/ Note: a poorly known, but apparently widespread taxon belonging to a group of species with a thick, brown, areolate thallus, which still needs revision. It has been reported from Italy, Austria, Slovakia and North America (see Breuss 2008).

Verrucaria euganea Trevis.

Spighe e Paglie: 19, 1853.

Syn.: *Verrucaria obductilis* var. *reticulata* B. de Lesd.

N - Ven (Breuss 2008b, Breuss & Berger 2010).

Cr/ Ch/ S/ Sax/ pH: 3-5, L: 3-4, X: 3-4, E: 3-5/ Alt: 2-4/ Mont: r, SmedD: r, SmedH: vr, MedH: c/ PT: 1-3/ p, u, #/ Note: an early coloniser of walls (mortar, brick, cement, limestone) in urban settlements; related to *V. macrostoma*, but differing in several important morphological characters (see Breuss 2008b, Breuss & Berger 2010); probably more widespread.

Verrucaria eusebii Servít

Stud. Bot. Čechosl., 11: 111, 1950.

Syn.: *Verrucaria amylicata* Hepp *nom. illegit. non Ach.*

N - Ven, Piem (Isocrono & al. 2004), Lig (Breuss 2008b). C - Tosc, Marc (Nimis & Tretiach 1999).

Cr.end/ Ch/ S/ Sax/ pH: 4-5, L: 3, X: 2-3, E: 2-3/ Alt: 1-3/ Mont: r, SmedD: rr/ PT: 1/ u/ Note: on limestone and dolomite in sheltered situations protected from rain, e.g. with *Leproplaca cirrochroa*, perhaps overlooked, and more widespread. For further details see Breuss (2008b).

Verrucaria finitima Breuss & F. Berger

Öst. Z. Pilzk., 21: 118, 2012.

N - Frl (TSB *s.n.*).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 3-4, X: 3, E: 2-3/ Alt: 4-5/ Alp: vr, Salp: vr/ PT: 1/ Note: a recently-described species, similar to *V. poeltii*, found near and above treeline in the Alps on hard, exposed limestone rocks with a long snow-lie. See also note on *V. fischeri*.

Verrucaria fischeri Müll. Arg.

Flora, 51: 51, 1868.

Syn.: *Lithocia tristis* A. Massal., *Lithocia tristis* f. *deformata* A. Massal., *Verrucaria diffracta* Anzi, *Verrucaria tristis* (A. Massal.) Kremp. *non* Hepp

N - Frl, Ven (Caniglia & al. 1993, Nimis 1994, Nascimbene 2005c), TAA (Nascimbene & al. 2006, Nascimbene 2008b, Breuss & Berger 2012), Lomb, Piem (Isocrono & al. 2004), VA (Piervittori & Isocrono 1999), Lig. C - Abr.

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 3-4, X: 3, E: 2-3/ Alt: 4-5/ Alp: rc, Salp: rr/ PT: 1/ Note: on steeply inclined faces of compact limestone and dolomite in open habitats, mostly above treeline. All earlier and recent (*e.g.* Grillo 1998) records from southern Italy, and that from Toscana (see Nimis 1993: 749), being very dubious, are not accepted here. Most Italian records should be checked against the very similar *V. finitima* and *V. poeltii* (see Breuss & Berger 2012). The species does not belong to *Verrucaria* and seems to be related to *Staurothele* (Gueidan & al. 2007).

Verrucaria floerkeana Dalla Torre & Sarnth.

Die Flecht. Tirol: 524, 1902.

N - TAA.

Cr/ Ch/ S/ Sax/ pH: 3-4, L: 2-4, X: 2-3, E: 1-2/ Alt: 3-5/ Alp: vr, Salp: r, Orom: vr, Mont: vr/ PT: 1/ #/ Note: on more or less calciferous rocks, especially on pebbles and small stones in rather sheltered situations. A rather difficult taxon, very similar to *V. dolosa* and often confused with that species. Most of the records from South Tyrol are on siliceous rocks, but some are from calcareous substrata.

Verrucaria foveolata (Flörke) A. Massal.

Ric. Auton. Lich. Crost.: 346, 1852 - *Verrucaria schraderi* var. *foveolata* Flörke, Deutsch. Lich., 2: 6, 1815.

Syn.: *Amphoridium foveolatum* (Flörke) A. Massal., *Verrucaria dolomitica* auct. non (A. Massal.) Kremp.

N - VG, Frl (Breuss 2008 as *V. dolomitica*), Ven, TAA, Lomb, Piem (Isocrono & al. 2004), VA (Pierivittori & Isocrono 1999), Emil, Lig (Giordani & al. 2016). C - Tosc, Umb (Ravera & al. 2006), Abr (TSB 24545), Sar. S - Camp, Pugl, Si (Otonello & Salone 1994, Grillo 1998, Grillo & Caniglia 2004, Grillo & al. 2007b).

Cr.end/ Ch/ S/ Sax/ pH: 4-5, L: 3-4, X: 2-3, E: 2-3/ Alt: 2-5/ Alp: rr, Salp: rc, Orom: r, Mont: rr, SmedD: rr, SmedH: r/ PT: 1/ p, #/ Note: an ecologically wide-ranging species of compact limestone and dolomite, found both on the top of large boulders and on small pebbles near the ground. It belongs to the poorly understood complex of *V. hochstetteri*. For further details see Nimis (1993: 738-739).

Verrucaria funckii (Spreng.) Zahlbr.

Cat. Lich. Univ., 1: 41, 1921 - *Pyrenula funckii* Spreng., Crypt. Gew., 32: 5, 1826.

Syn.: *Verrucaria elaeomelaena* f. *silicicola* Zschacke, *Verrucaria silicea* Servit

N - TAA (Nascimbene & al. 2007b, Thüs & al. 2015).

Cr/ Ch/ S/ Sax/ pH: 1-3, L: 2-4, X: 1, E: 1-2/ Alt: 3-5/ Alp: vr, Salp: r, Orom: vr, Mont: vr/ PT: 1/ #/ Note: among freshwater Verrucariaceae, this is one of the few species which are usually found in permanently submerged conditions, more rarely in the splash zone of water courses or on deeply shaded stream banks, always on siliceous substrata. It is a typical element of springs and clear headwaters, where it can dominate the benthic community. Probably much more widespread in the Alps.

Verrucaria fuscoatroides Servit

Sborn. Narodn. Mus Praze, 5, B, 9, bot. 3: 26, 1949.

N - Lig.

Cr/ Ch/ S/ Sax/ pH: 3-4, L: 3-4, X: 3-4, E: 1-2/ Alt: 2-5/ Alp: vr, Salp: vr, Mont: vr, SmedD: vr, SmedH: vr/ PT: 1/ #/ Note: on more or less calciferous rocks. An apparently rather widespread, but still poorly known species described from Germany and also reported from several localities in the Austrian Alps (see Breuss 2008b).

Verrucaria geophila Zahlbr.

Österr. bot. Z., 59: 317, 1909, *nom. illegit. non* Nyl.

C - Tosc (TSB 35321), Sar. S - Cal (Puntillo 1996), Si (Nimis & al. 1994).

Cr/ Ch/ S/ Terr/ pH: 3-4, L: 4, X: 3, E: 1/ Alt: 1/ MedH: vr, MedD: vr/ PT: 1/ Note: a rare species of slightly calciferous soil in dry Mediterranean grasslands. The name is illegitimate and would require conservation.

Verrucaria hochstetteri Fr.

Lichenogr. Eur. Ref.: 435, 1831.

Syn.: *Amphoridium dolomiticum* var. *obtectum* Arnold, *Amphoridium hochstetteri* (Fr.) A. Massal., *Amphoridium koerberi* (Hepp) A. Massal., *Amphoridium obtectum* (Arnold) Arnold, *Verrucaria arnoldii* J. Steiner?, *Verrucaria dolomitica* var. *gibbosa* Werner, *Verrucaria dolomitica* var. *obtecta* (Arnold) Zahlbr., *Verrucaria hiascens* auct. non (Ach.) Spreng., *Verrucaria hochstetteri* f. *insculpta* Zschacke, *Verrucaria hochstetteri* f. *nivalis* (Arnold) Zahlbr., *Verrucaria hochstetteri* f. *obtecta* (Arnold) Zahlbr., *Verrucaria hochstetteri* f. *praecellens* (Arnold) Zahlbr., *Verrucaria hochstetteri* var. *alpina* Zschacke, *Verrucaria hochstetteri* var. *arnoldii* (J. Steiner) Clauzade & Cl. Roux?, *Verrucaria hochstetteri* var. *obtecta* (Arnold) Clauzade & Cl. Roux, *Verrucaria integra* auct. non (Nyl.) Nyl., *Verrucaria praecellens* (Arnold) Servit

N - VG (Pierivittori & al. 2006), Frl (Breuss 2008, Cucchi & al. 2009), Ven (Tretiach & Nascimbene 2006, Nascimbene & Marini 2007, Nascimbene 2008c), TAA (Nascimbene 2003, 2008b), Lomb, Piem (Isocrono & al. 2004), VA (Pierivittori & Isocrono 1999), Lig. C - Tosc, Umb (Genovesi & Ravera 2001, Ravera & al. 2006), Abr (Nimis & Tretiach 1999, Cucchi & al. 2009), Sar. S - Camp (Nimis & Tretiach 2004), Pugl (Nimis & Tretiach 1999), Bas (Nimis & Tretiach 1999), Si (Nimis & al. 1994, Grillo & al. 2007).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 2-3, X: 2-3, E: 1-2/ Alt: 2-5/ Alp: rr, Salp: rc, Orom: vr, Mont: r, SmedD: vr, SmedH: er/ PT: 1/ Note: a variable species found on steeply inclined surfaces of compact limestone and dolomite in sheltered situations; restricted to upland areas in southern Italy, where sometimes it reaches the oromediterranean belt. See also Tretiach & Nascimbene (2006) and the note on *V. foveolata*.

Verrucaria hydrela Ach.

Syn. Meth. Lich.: 94, 1814.

Syn.: *Lithocia hydrela* (Ach.) A. Massal., *Verrucaria denudata* Zschacke *nom. illegit.*, incl. *Verrucaria hydrophila* Orange

N - Ven (Nascimbene & Nimis 2007, Nascimbene 2008), TAA (Nascimbene & al. 2007b), Lomb, Piem (Isocrono & al. 2004), Emil, Lig. C - Tosc (Tretiach & al. 2008), Laz. S - Camp, Pugl, Bas (Puntillo & al. 2012), Cal (Puntillo 1996).

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 2-4, X: 2, E: 1/ Alt: 3-4/ Salp: rc, Orom: r, Mont: r/ PT: 1/ 1/ Note: on siliceous pebbles in humid-shaded situations (e.g. in open woodlands), sometimes on boulders in creeks, but never submerged for long periods, usually in upland areas but rarely reaching above treeline. Several records, especially those from southern Italy, need confirmation. For nomenclatural matters, I partly follow Roux & al. (2014: 1246), and partly the suggestion by Thüs (*in litt.*) to use the name *V. hydrophila* Orange only for sequenced material with an ITS sequence that fits the one published for the type material. The whole complex is presently under revision by Thüs and Nascimbene.

Verrucaria inaspecta Servít

Preslia, 24: 359, 1952.

Syn.: *Verrucaria olivacella* Servít

N - Lig.

Cr/ Ch/ S/ Sax/ pH: 3-5, L: 3, X: 3, E: 1-2/ Alt: 2-3/ Mont: vr, SmedD: vr/ PT: 1/ p, #/ Note: on calcareous or base-rich siliceous rocks in rather shaded situations; similar to *V. dolosa*, but with larger spores, this poorly known and long-forgotten species is also known from northern Europe and North America.

Verrucaria incertula (Arnold) Zahlbr.

Cat. Lich. Univ., 1: 51, 1921 - *Amphoridium incertulum* Arnold, Verh. zool.-bot. Ges. Wien, 37: 127, 1887.

N - TAA (M 0091870, type).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 3-5, X: 3-4, E: 1/ Alt: 3/ Mont: vr/ PT: 1/ #/ Note: on very compact calcareous rocks subject to periodical water seepage. Also known from the French Maritime Alps, this species is related to *V. saprophila*, differing in the smaller perithecia and spores (see Roux & coll. 2014: 1247).

Verrucaria inornata Servít

Stud. Bot. Čech., 11: 114, 1950.

N - Lig.

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 2-3, X: 2-3, E: 1-3/ Alt: 3/ Mont: vr/ PT: 1/ #/ Note: on rather shaded and moist surfaces of calciferous rocks, this species is similar to *V. memnonia*, differing in the larger spores and the pale excipulum. For a recent description see Breuss (2004).

Verrucaria latebrosa Körb.

Syst. Lich. Germ.: 349, 1855.

Syn.: *Verrucaria delita* Nyl., *Verrucaria griseocinascens* (Vain.) Zschacke

N - Ven, TAA (Thor & Nascimbene 2007, Nascimbene & al. 2007b), Lomb, Piem (Isocrono & al. 2004), Emil, Lig (Watson 2014). C - Sar.

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 3-4, X: 1, E: 1/ Alt: 3-5/ Alp: vr, Salp: r, Orom: vr, Mont: vr/ PT: 1/ 1/ Note: a freshwater species, periodically submerged on hard siliceous rocks, occasionally also on calcareous substrata, mostly in upland areas. Most of the earlier Italian records need confirmation. The species was included in *V. aethiobola* by Orange (2013) as a member of a “collective species”, and its relation to *V. anziana* has to be clarified. No material from the type locality has been sequenced, which may be necessary to select a sequenced epitype to fix the ambiguous use of this name (Thüs *in litt.*). See also note on *V. anziana*.

Verrucaria lecanoroides Servít

Preslia, 24: 361, 1952.

N - Lig.

Cr/ Ch/ S/ Sax/ pH: 3-5, L: 3-4, X: 3-4, E: 3-4/ Alt: 1/ SmedH: c, MedD: vr/ PT: 1-2/ #/ Note: this characteristic, *Aspicilia*-like *Verrucaria* is known only from the type collection. According to Breuss (2016) it probably constitutes a good species. The ecological indicator values are tentative.

Verrucaria macrostoma DC. f. *furfuracea* B. de Lesd.

Rev. Bryol. Lichénol., 18: 71, 1949.

Syn.: *Verrucaria furfuracea* (B. de Lesd.) Breuss, *Verrucaria macrostoma* var. *imbricum* Garov., *Verrucaria tectorum* auct. p.p.

N - Frl (TSB *s.n.*)

Cr/ Ch/ A.s/ Sax/ pH: 4-5, L: 4, X: 3-4, E: 4-5/ Alt: 2/ SmedD: vr/ PT: 2-3/ #/ Note: mainly on man-made substrata, including mortar walls, on steeply inclined faces; frequently confused with *V. nigrescens* f. *tectorum*, which is isidiate and not soresidiate, and has a thinner thallus (see Roux & coll. 2014), and certainly much more widespread in Italy.

Verrucaria macrostoma* DC. f. *macrostoma

Dufour ex DC. in Lamarck & de Candolle, Fl. Franç., éd. 3, 2: 319, 1805.

Syn.: *Lithocia macrostoma* (DC.) A. Massal., *Lithocia thrombioides* (A. Massal.) Bagl., *Verrucaria macrostoma* f. *intermedia* Anzi, *Verrucaria macrostoma* f. *terrestris* B. de Lesd., *Verrucaria thrombioides* A. Massal., *Verrucaria viridula* auct. p.p. non (Schrad.) Ach.

N - VG (Castello 2002, Martellos & Castello 2004), **Frl** (Nimis & Salvadori 1998, Nascimbene & Salvadori 2008), **Ven** (Caniglia & al. 1993, Lazzarin 2000b, Nascimbene & Salvadori 2008, Nascimbene 2008), **TAA** (Spitale & Nascimbene 2012), **Lomb** (Gheza & al. 2015), **Piem** (Isocrono & al. 2004, Gazzano & al. 2009, Gazzano & al. 2009b, Morando & al. 2016), **VA** (Piervittori & Isocrono 1999, Gazzano & al. 2009, 2009b, Matteucci & al. 2013, 2015c), **Emil** (Nimis & al. 1996, Valcuvia & Grieco 1995, Valcuvia & Savino 2000), **Lig** (Valcuvia & al. 2000, Giordani & al. 2016), **C - Tosc**, **Marc** (Nimis & Tretiach 1999), **Umb** (Panfili 2000, Ravera & al. 2006, Genovesi 2011), **Laz** (Bartoli 1997b), **Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach, 1999, 2004, Caporale & al. 2008), **Sar. S - Camp** (Aprile & al. 2002, 2003, 2003b, Nimis & Tretiach 2004, Catalano & al. 2016), **Pugl. Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Ottonello & Salone 1994, Ottonello & al. 1994, Ottonello 1996, Poli & al. 1997, Grillo 1998, Caniglia & Grillo 2001, 2005, 2006, Grillo & al. 2001, 2002, Grillo & Caniglia 2004, Cataldo & Cannavò 2014).

Cr/ Ch/ S/ Sax/ pH: 3-5, L: 3-4, X: 3-4, E: 3-5/ Alt: 1-4/ Salp: er, Mont: vr, SmedD: vc, Pad: r, SmedH: vc, MedH: c, MedD: rr/ PT: 1-3/ u, p/ Note: an early coloniser of walls (mortar, brick, cement, limestone) in urban settlements, more rarely found on calcareous rocks in natural environments, with a wide ecological amplitude, from horizontal to steeply inclined faces visited by birds.

***Verrucaria maculiformis* Kremp.**

Flora, 41: 303, 1858, *nom. illegit. non* Hoffm.

Syn.: *Involucrothele maculiformis* (Servít) Servít, *Thelidium maculiforme* Servít

N - Ven, Lomb, Lig. C - Tosc. S - Camp.

Cr/ Ch/ S/ Sax/ pH: 3-5, L: 3, X: 3-4, E: 2-3/ Alt: 2-3/ Mont: er, SmedD: vr, SmedH: vr/ PT: 1-3/ #/ Note: this species seems to be most frequent in western and central Europe, on more or less calcareous pebbles or on bricks, especially in rather shaded situations. Most Italian records require confirmation. The name is not legitimate, being a later homonym of *V. maculiformis* Hoffm. (1796).

***Verrucaria margacea* (Wahlenb.) Wahlenb.**

Fl. Lappon.: 465, 1812 - *Thelotrema margaceum* Wahlenb. in Ach., Meth. Lich. Suppl.: 30, 1803.

Syn.: *Lithocia margacea* (Wahlenb.) A. Massal., *Verrucaria applanata* Hepp, *Verrucaria divergens* Nyl.?, *Verrucaria filarszkyana* Szatala, *Verrucaria leightonii* Hepp non A. Massal., *Verrucaria tirolensis* Zschacke, *Verrucaria vallis-flueelae* Zschacke?

N - Ven, TAA (Dalle Vedove & al. 2003, Nascimbene & al. 2007b, Nascimbene 2008b), **Lomb** (Nascimbene 2006), **Piem** (Isocrono & al. 2004), **Emil. C - Tosc.**

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 3-4, X: 1, E: 1/ Alt: 3-5/ Alp: er, Salp: r, Mont: vr/ PT: 1/ 1/ Note: an amphibious freshwater lichen of siliceous rocks beside streams and lakes; it prefers constantly inundated and even permanently submerged rocks to those merely in the spray zone. The species seems to be widespread in Scandinavia and is also known from the Southern Hemisphere. The records from Emilia and Toscana (see Nimis 1993: 743) are particularly dubious.

***Verrucaria mastoidea* (A. Massal.) Trevis.**

Conspect. Verruc.: 8, 1860 - *Amphoridium mastoideum* A. Massal., Symmicta Lich: 82, 1855.

Syn.: *Verrucaria papularis* var. *platyspora* Garov.

N - Ven (Lazzarin 2000b), **TAA** (Jatta 1909-1911), **Piem** (TSB 32940), **C - Tosc** (TSB 35323), **S - Pugl** (Jatta 1909-1911).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 2-3, X: 2-3, E: 1-2/ Alt: 2-5/ Alp: r, Salp: rr, Orom: er, Mont: vr, SmedD: vr, SmedH: er/ PT: 1/ #/ Note: on calciferous rocks; according to Breuss (2002) this rather poorly known species differs from *V. hochstetteri* by the presence of a small involucrellum.

***Verrucaria mimicrans* Servít**

Stud. Bot. Čech., 11: 116, 1950.

N - Lig. C - Tosc (Breuss 2008b).

Cr/ Ch/ S/ Sax/ pH: 3-5, L: 3-4, X: 3, E: 1-3/ Alt: 2/ SmedD: vr, SmedH: vr/ p, #/ Note: a rather poorly known species described from former Yugoslavia, differing from *V. muralis* in the larger spores, the longer periphyses and in the form of the involucrellum; the total distribution covers wide parts of Europe and the species is also known from North America (see Breuss 2004, 2008b). It is a pioneer species on more or less calcareous substrata, especially on pebbles and on recently exposed rock surfaces, usually at relatively low elevations.

***Verrucaria monacensis* Servít**

Preslia, 24: 364, 1952.

N - Piem.

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 3-4, X: 3-4, E: 1-3/ Alt: 2/ SmedD: vr/ PT: 2/ #/ Note: according to Breuss (2016) this species was described on the basis of a sample collected on the calcareous pebbles of a scree slope near München, and identified by F. Arnold as *Amphoridium dolomiticum* (= *Verrucaria dolomitica*), from which it differs in several important characters; the species also resembles *Verrucaria muralis*, differing in the rimose thallus. Beside the type collection (the original station is probably lost) the species was reported by Sbarbaro (see Nimis 1993: 754) from Piedmont; since Sbarbaro was in close scientific contact with Servít, it is probable that the latter had identified the Italian samples.

***Verrucaria mortarii* (Arnold) Lamy**

Bull. Soc. Bot. Fr., 25: 498, 1879, *nom. illegit. non* Leight. (1879) - *Amphoridium leightonii* f. *mortarii* Arnold, Flora, 49: 532, 1866.

Syn.: *Amphoridium mortarii* (Arnold) Flagey

N - Piem. C - Tosc.

Cr/ Ch/ S/ Sax/ pH: 5, L: 3-4, X: 3, E: 2-3/ Alt: 2/ SmedD: r, SmedH: r/ suboc, #/ Note: a poorly known species growing on man-made calciferous substrata, including mortar, especially on walls below the montane belt, closely related to *V. foveolata*. The name is illegitimate and a new name would be required.

***Verrucaria muralis* Ach.**

Meth. Lich.: 115, 1803.

Syn.: *Verrucaria subdendritica* Servít, *Verrucaria submuralis* Nyl.

N - VG (Castello 2002, Martellos & Castello 2004), **Frl** (Nascimbene & al. 2009b), **Ven** (Caniglia & al. 1993, 1999, Nascimbene 2008, 2008c, Brackel 2013), **TAA** (Nascimbene & al. 2007b), **Lomb** (De Vita & Valcuvia 2004), **Piem** (Isocrono & al. 2004), **VA** (Piervittori & Isocrono 1999, Isocrono & al. 2008), **Emil** (Nimis & al. 1996, Bouvet 2008), **Lig** (Valcuvia & al. 2000, Giordani & al. 2016). **C - Tosc.**, **Marc** (Nimis & Tretiach 1999), **Umb** (Genovesi & Ravera 2001, Ravera & al. 2006, Genovesi 2011), **Laz** (Brackel 2015), **Abr** (Brackel 2015), **Mol** (Garofalo & al. 1999, Caporale & al. 2008, Genovesi & Ravera 2014), **Sar** (Rizzi & al. 2011). **S - Camp** (Garofalo & al. 1999, 2010, Ricciardi & al. 2000, Aprile & al. 2002, 2003, 2003b, Catalano & al. 2016), **Pugl** (Garofalo & al. 1999, Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999, Brackel 2011), **Si** (Nimis & al. 1994, 1995, Ottonello & al. 1994, Poli & al. 1996, 1997, Grillo 1998, Caniglia & Grillo 2001, 2005, 2006, Grillo & al. 2001, 2002, 2009, Grillo & Caniglia 2004, Liistro & Cataldo 2011, Cataldo & Cannavò 2014).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 3-4, X: 3-4, E: 1-3/ Alt: 1-5/ Alp: er, Salp: vr, Mont: r, SmedD: rc, Pad: vr, SmedH: rc, MedH: rr, MedD: vr/ PT: 2-3/ p/ Note: a widespread early coloniser of pebbles, mortar walls, brick and roofing tiles, with optimum in the submediterranean belt, but with a wide altitudinal range. Some records could refer to *V. rupestris*, which until recently was confused with this species, from which it differs in the endolithic thallus and the perithecia which are immersed in the thallus and in the rock.

***Verrucaria murina* Leight.**

Angioc. Lich.: 59, 1851.

Syn.: *Amphoridium myriocarpum* (Hepp ex Lönnr.) Servít, *Verrucaria brachyspora* Arnold?, *Verrucaria pazientii* A. Massal.?

N - Ven (Caniglia & al. 1999, Lazzarin 2000b), **TAA**, **Lomb**, **Emil**, **Lig** (Giordani & al. 2016). **C - Tosc**, **Umb** (Genovesi & Ravera 2001, Ravera & al. 2006), **Sar** (Rizzi & al. 2011).

Cr.end/ Ch/ S/ Sax/ pH: 4-5, L: 3-4, X: 3, E: 1-2/ Alt: 2-5/ Alp: vr, Salp: vr, Orom: er, Mont: vr, SmedD: er, SmedH: er/ PT: 1/ #/ Note: on limestone and dolomite in upland areas. According to Orange (2013) the epithet *murina* has been used for widely different species, and the entire complex is presently under revision. Earlier records from southern Italy (see Nimis 1993: 745), being dubious, are not accepted here.

***Verrucaria murorum* (A. Massal.) Lindau**

Die Flecht.: 5, 1913 - *Thrombium murorum* A. Massal., Ric. Auton. Lich. Crost.: 157, 1852.

Syn.: *Lithocia murorum* (A. Massal.) Arnold

N - Ven (Lazzarin 2000b), **TAA**, **Lomb**, **Emil**, **Lig**. **C - Tosc**, **Sar**. **S - Camp**, **Pugl**, **Bas** (TSB 21992), **Si**.

Cr/ Ch/ S/ Sax/ pH: 3-5, L: 3-4, X: 3-4, E: 3-5/ Alt: 1-4/ Salp: er, Mont: vr, SmedD: r, Pad: vr, SmedH: r, MedH: vr, MedD: vr/ PT: 1-3/ #/ Note: a rather poorly known species of calcareous rocks, belonging to the *V. macrostoma*-complex. For a detailed description see Breuss (2008).

***Verrucaria nidulifera* Servít**

Věstn. Král. České Spol. Nauk, Třída Matem.-Přírod., Ročník 1947, nr. X: 15, 1948.

N - TAA.

Cr.end/ Ch/ S/ Sax/ pH: 4-5, L: 3, X: 2-3, E: 1-2/ Alt: 2-3/ Mont: vr, SmedD: vr/ PT: 1/ #/ Note: according to Breuss (2016) the species resembles *Parabagliettoa dufourii* (which was growing together with the type material), differing in the less developed involucrellum, the more immersed perithecia and the presence of oil hyphae. The species was described on the basis of a sample collected by F. Arnold on dolomite (see Nimis 1993: 755). Ecological indicator values are tentatively the same of *P. dufourii*.

Verrucaria nigrescens* Pers. f. *nigrescens

Ann. Bot. (Usteri), 15: 36, 1795.

Syn.: *Lithocia acrotelloides* (A. Massal.) A. Massal., *Lithocia controversa* (A. Massal.) A. Massal., *Lithocia controversa* var. *prototallina* A. Massal., *Lithocia funckii sensu* A. Massal., *Lithocia nigrescens* (Pers.) A. Massal., *Verrucaria acrotelloides* A. Massal., *Verrucaria controversa* A. Massal., *Verrucaria fusca auct. non Pers.*, *Verrucaria nigrescens* f. *virescens* Anzi, *Verrucaria nigrescens* var. *acrotelloides* (A. Massal.) Trevis., *Verrucaria nigrescens* var. *funckii* (A. Massal.) Zwackh non *Verrucaria funckii* (Spreng.) Zahlbr., *Verrucaria umbrina* var. *nigrescens* (Pers.) Ach., *Verrucaria velana* (A. Massal.) Zahlbr.

N - **VG** (Castello 2002, Martellos & Castello 2004, Tretiach & al. 2012), **Frl** (Nimis & Salvadori 1998, Nimis & al. 2006, Nascimbene & Salvadori 2008, Nascimbene & Salvadori 2008, Breuss 2008, Nascimbene & al. 2009b, Brackel 2013), **Ven** (Caniglia & al. 1993, 1999, Nascimbene & Caniglia 1997, 2003c, Lazzarin 2000b, Nascimbene 2005c, 2008, 2008c, Nascimbene & Marini 2007, Brackel 2013), **TAA** (Nascimbene 2005b, 2008b, Nascimbene & al. 2006), **Lomb** (Valcuvia & al. 2003, Gheza & al. 2015), **Piem** (Isocrono & al. 2004, Isocrono & Piervittori 2008, Gazzano & al. 2009, Favero-Longo & al. 2009b, 2015), **VA** (Piervittori & Isocrono 1999), **Emil** (Nimis & al. 1996, Bouvet 2008), **Lig** (Valcuvia & al. 2000, Roccardi 2006, Giordani & al. 2016). **C** - **Tosc** (Benespero 2006, Lastrucci & al. 2009, Paoli & al. 2014b, Brackel 2015), **Marc** (Nimis & Tretiach 1999), **Umb** (Nimis & Tretiach 1999, Panfili 2000b, 2003, 2007, Ravera & al. 2006, Genovesi 2011, Brackel 2015), **Laz** (Bartoli 1997b, Bartoli & al. 1998, Roccardi & Ricci 2006, Pietrini & al. 2008, Brackel 2015), **Abr** (Nimis & Tretiach 1999, Roccardi 2011, Brackel 2015, Caporale & al. 2016), **Mol** (Garofalo & al. 1999, Nimis & Tretiach, 1999, 2004, Caporale & al. 2008, Ravera & Genovesi 2010, Ravera & al. 2009, Genovesi & Ravera 2014), **Sar** (Rizzi & al. 2011, Giordani & al. 2013, Watson 2014). **S** - **Camp** (Garofalo & al. 1999, 2010, Altieri & al. 2000, Ricciardi & al. 2000, Aprile & al. 2003, 2003b, Nimis & Tretiach 2004, Roccardi & Ricci 2006, Bertuzzi & al. 2011, Tretiach & al. 2011c, Roccardi 2012, Catalano & al. 2016), **Pugl** (Nimis & Tretiach 1999, Durini & Medagli 2002, 2004, Brackel 2011), **Bas** (Bartoli & Puntillo 1998, Nimis & Tretiach 1999, Potenza 2006, Brackel 2011), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994, 1995, Ottonello & Salone 1994, Ottonello & al. 1994, 2011, Monte & Ferrari 1996, Ottonello 1996, Ottonello & Romano 1997, Poli & al. 1996, 1997, Grillo 1998, Caniglia & Grillo 2001, 2005, 2006, Grillo & al. 2001, 2002, 2007b, 2009, Di Benedetto & al. 2002, Grillo & Caniglia 2004, Merlo 2004b, Genco & al. 2007, Brackel 2008b, 2008c, Gianguzzi & al. 2009, Liistro & Cataldo 2011, Cataldo & Cannavò 2014).

Cr/ Ch/ S/ Sax/ pH: 3-5, L: 3-5, X: 2-5, E: 2-5/ Alt: 1-5/ Alp: rc, Salp: c, Orom: c, Mont: ec, SmedD: ec, Pad: c, SmedH: ec, MedH: ec, MedD: vc/ PT: 1-3/ p/ Note: a subcosmopolitan species, one of the most common saxicolous lichens throughout Italy, found both in urban and natural habitats, with a very wide ecological tolerance; several morphs from natural habitats, however, well deserve further study.

***Verrucaria nigrescens* f. *tectorum* (A. Massal.) Coppins & Aptroot**

Lichenologist, 40: 372, 2008 - *Lithocia tectorum* A. Massal., Symmicta Lich.: 91, 1855.

Syn.: *Verrucaria viridula* f. *tectorum* (A. Massal.) J.R. Laundon

N - **VG** (Castello 2002, Martellos & Castello 2004), **Frl** (Nimis & Salvadori 1998, Nascimbene & al. 2009b), **Ven** (Lazzarin 2000b), **Lomb**, **Piem**, **Emil** (Nimis & al. 1996), **Lig** (Valcuvia & al. 2000). **C** - **Marc** (Nimis & Tretiach 1999), **Umb** (Panfili 2000, Ravera & al. 2006), **Abr** (Nimis & Tretiach 1999). **S** - **Camp** (Garofalo & al. 1999, 2010, Ricciardi & al. 2000, Nimis & Tretiach 2004), **Pugl** (Garofalo & al. 1999, Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999).

Cr/ Ch/ A.i/ Sax/ pH: 3-5, L: 3-5, X: 2-5, E: 2-5/ Alt: 1-5/ Alp: rc, Salp: c, Orom: c, Mont: ec, SmedD: ec, Pad: c, SmedH: ec, MedH: ec, MedD: vc/ PT: 1-3/ p/ Note: mainly on man-made substrata, including mortar walls. frequently confused with *V. macrostoma* f. *furfuracea*, which is sorediate and not isidiate and has a thicker thallus (see Roux & coll. 2014)

***Verrucaria nigrofusca* Servít**

Acta Mus. Nat. Pragae, 5, B, 9, Bot. 3: 38, 1949.

N - **Lig**.

Cr/ Ch/ S/ Sax/ pH: 3-5, L: 3-5, X: 2-5, E: 2-4/ Alt: 3-5/ Alp: vr, Salp: vr, Mont: er/ PT: 1-2/ #/ Note: a very poorly known species, described from the Czech Republic and also reported from France (Maritime Alps), on both calcareous and basic siliceous rocks. According to Breuss (2016) it differs from *V. fuscoatroides* in the smaller perithecia and spores.

***Verrucaria nigroumbrina* Servít**

Ann. Mus. Civ. Stor. Nat. Genova, 64: 52, 1950.

Syn.: *Lithocia nigrescens* var. *umbrina* A. Massal.

N - **Lig**.

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 3-4, X: 3-4, E: 2-4/ Alt: 2/ SmedD: vr/ PT: 1-2/ #/ Note: this rather poorly known calcicolous species was recently reported from several localities in central Europe. For the Italian record see Nimis (1993: 755).

***Verrucaria ochrostoma* (Leight.) Trevis.**

Conspect. Verrucar.: 8, 1860 - *Sagedia ochrostoma* Borrer ex Leight., Brit. Spec. Angioc. Lich.: 23, 1851.

Syn.: *Verrucaria cataleptoides* var. *ochrostoma* (Leight.) Servít

N - **Ven**, **Lig**.

Cr/ Ch/ S/ Sax/ pH: 3-5, L: 3-4, X: 3-4, E: 4-5/ Alt: 1-2/ SmedD: r, Pad: vr, SmedH: vr, MedH: vr/ PT: 1-3/ #/ Note: closely related to *V. murorum*, this poorly known species, characterised by the superficial thallus

and immersed perithecia without an involucrellum (see Orange 2013), seems to prefer concrete walls and nutrient-enriched, dusty surfaces at relatively low elevations.

Verrucaria ornata Servít

Stud. Bot. Čech. 11: 119, 1950.

N - Lig.

Cr./end/ Ch/ S/ Sax/ pH: 4-5, L: 2-3, X: 2-3, E: 1/ Alt: 1-2/ SmedD: vr, MedD: vr/ PT: 1/ #/ Note: according to Breuss (2016) this species, described from the surroundings of Genova, is related to *Parabagliettoa cyanea* but differs in the smaller perithecia with a more superficial involucrellum, and should be included in *Parabagliettoa*.

Verrucaria pachyderma Arnold

Verh. zool.-bot. Ges. Wien, 30: 146, 1880.

Syn.: *Verrucaria pissina* Nyl.

N - TAA.

Cr/ Ch/ S/ Sax/ pH: 1-2, L: 3-4, X: 1, E: 1/ Alt: 3-5/ Alp: er, Salp: vr, Mont: vr/ PT: 1/ 1/ Note: a freshwater species of periodically submerged siliceous rocks in upland areas, also known from the British Isles, Scandinavia, and the Austrian and Swiss Alps. For further details see Orange (2013b).

Verrucaria papillosa Ach.

Lichenogr. Univ.: 286, 1810.

N - Frl (TSB 26483), Ven, TAA, Lomb, Lig, C - Tosc, S - Camp, Si.

Cr/ Ch/ S/ Sax/ pH: 3-5, L: 2-3, X: 2-3, E: 1-2/ Alt: 2-4/ Mont: vr, SmedD: vr, SmedH: vr/ PT: 1-2/ #/ Note: on more or less calciferous rocks in rather humid situations; closely related to *V. viridula*, but a distinct species according to Roux & coll. (2014).

Verrucaria pinguicula A. Massal.

Lotos, 6: 80, 1856.

Syn.: *Amphoridium integrum* (Nyl.) B. de Lesd., *Involucrothele pinguicula* (A. Massal.) Servít, *Thelidium persicinum* (Hepp) Servít, *Verrucaria caecula* Servít, *Verrucaria integra* (Nyl.) Nyl. non auct., *Verrucaria lilacina* A. Massal.?, *Verrucaria peloclitia* Nyl., *Verrucaria persicina* Hepp

N - Frl (Breuss 2008), **Ven** (Lazzarin 2000b, Watson 2014), **TAA, VA** (Piervittori & Isocrono 1999), **Emil, Lig** (Giordani & al. 2016), **C - Marc** (Nimis & Tretiach, 1999), **Umb** (Genovesi & Ravera 2001, Ravera & al. 2006, Panfili 2007), **Laz, S - Camp** (Aprile & al. 2003, 2003b), **Pugl** (Nimis & Tretiach 1999).

Cr/ Ch/ S/ Sax/ pH: 5, L: 3-4, X: 3-4, E: 1-2/ Alt: 1-4/ Salp: vr, Mont: r, SmedD: rc, SmedH: rc, MedH: vr, MedD: vr/ PT: 1/ Note: on hard, compact limestone; much overlooked, probably more frequent in Italy. For a good description and further details see Breuss (2008b).

Verrucaria poeltii (Servít) Breuss

Linzer biol. Beitr., 22: 721, 1990 - *Involucrocarpon poeltii* Servít in Poelt, Feddes Repert., 58: 168, 1955.

N - Frl (Breuss & Berger 2012).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 3-4, X: 3, E: 2-3/ Alt: 4-5/ Alp: vr, Salp: vr/ PT: 1/ Note: on very compact calcareous rocks. The record is actually from Austrian territory, but very close to the border, and the species seems to be common and widespread in the Austrian Alps. For the differences with the very similar *V. finitima* and *V. fischeri* see Breuss & Berger (2012).

Verrucaria polysticta Borrer

in Hooker & Sowerby, Suppl. Engl. Bot., 2: tab. 2741, 1834.

Syn.: *Dermatocarpon subfuscillum* (Nyl.) Servít, *Verrucaria fuscilla* var. *nigricans* Nyl., *Verrucaria nigricans* (Nyl.) Zschacke, *Verrucaria subfuscilla* Nyl.

S - Si (Brackel 2008b).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 4-5, X: 4, E: 3-4/ Alt: 1-4/ Salp: r, Orom: r, Mont: r, SmedD: r, Pad: er, SmedH: r, MedH: r, MedD: r/ PT: 1-2/ paras crustose lichens/ Note: on calcareous rocks, often growing on the thalli of other crustose lichens, especially *Circinaria calcarea* and *Verrucaria nigrescens*; probably more widespread in Italy, but often confused with *Placopyrenium canellum* in the past.

Verrucaria porphyricola Servít

Stud. Bot. Čech., 7: 74-75, 1946.

N - TAA.

Cr/ Ch/ S/ Sax/ pH: 3, L: 4, X: 3-4, E: 1-2/ Alt: 5/ Alp: vr/ PT: 1/ Note: a rarely-collected species of basic siliceous rocks (see Nimis 1993: 747-748). According to Breuss (2016) the species is related to *Verruculopsis minuta*.

Verrucaria praerupta Anzi

Atti Soc. Ital. Sci. Nat., 11: 173, 1868.

N - Lomb (Breuss & Berger 2010).

Cr/ Ch/ S/ Sax/ pH: 3-5, L: 3-5, X: 2-5, E: 2-5/ Alt: 4-5/ Alp: vr, Salp: vr/ PT: 1/ p, #/ Note: closely related to *V. nigrescens*, but differing in several important morphological characters, this poorly known species occurs on calcareous rocks in upland areas; it is also known from the Austrian Alps (see Breuss & Berger, 2010) and from Haute Savoie in France (Roux & coll., 2014).

Verrucaria praetermissa (Trevis.) Anzi

Comm. Soc. Critt. Ital., 2, 1: 24, 1864 - *Leiophloea praetermissa* Trevis., Consp. Verruc.: 10, 1860.

Syn.: *Verrucaria laevata sensu* Korb. non Ach. nec auct., *Verrucaria subturicensis* Zahlbr., *Verrucaria turicensis* Zschacke non (G. Winter) Stizenb., *Verrucaria zahlbruckneri* Zschacke

N - TAA, Lomb (Jatta 1909-1911). C - Tosc (Tretiach & al. 2008).

Cr/ Ch/ S/ Sax/ pH: 3-4, L: 3-4, X: 1-2, E: 1-3/ Alt: 2-4/ Salp: er, Mont: vr/ PT: 1/ suboc, 1/ Note: a silicicolous, probably circumboreal freshwater species, submerged only for very short periods, mostly found along creeks, on mineral-rich siliceous rocks, more rarely on calcareous substrata; perhaps more widespread in the Alps. The Italian material should be compared with the species discussed by Orange (2014).

Verrucaria prosoplectenchymatica Servít

Preslia, 24: 372, 1952.

N - Lig.

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 3-4, X: 3-4, E: 2-3/ Alt: 1/ MedH: vr/ PT: 1-3/ #/ Note: this long-forgotten silicicolous species described from the surroundings of Genova has been recently resurrected in the 3rd volume of the Lichen Flora of the Greater Sonoran Region (Nash & al. 2007), where it is reported from southwestern North America, with a good description.

Verrucaria pseudovirescens Servít

Preslia, 24: 379, 1952.

N - Ven (Anzi, Lich. Rar. Ven. 158, sub *V. nigrescens* var. *virescens*: Breuss & Berger 2010).

Cr/ Ch/ S/ Sax/ pH: 3-5, L: 3-4, X: 3-4, E: 3-5/ Alt: 2/ SmedD: vr, Pad: vr/ PT: 1-3/ p. u, #/ Note: closely related to *V. macrostoma*, but differing in the thinner thallus, smaller perithecia and spores (see Breuss & Berger 2010), this species is known from a few localities only (Italy, Austria, Germany and Russia), but is probably more widespread, having been confused with *V. macrostoma* and *V. nigrescens* (Breuss 2016).

Verrucaria rapallensis Servít

Stud. Bot. Čech., 11: 121, 1950.

N - Lig.

Cr.end/ Ch/ S/ Sax/ pH: 5, L: 4-5, X: 4-5, E: 2-4/ Alt: 1-5/ Alp: er, Salp: vr, Orom: vr, MedH: r/ PT: 1/ #/ Note: according to Breuss (2016) this calcicolous species, described from the surroundings of Genova, differs from *V. sbarbaronis* in the smaller spores and the less protruding perithecia. Indicator values are tentative.

Verrucaria ruderum DC.

in Lamarck & de Candolle, Fl. Franç., 3 éd., 2: 318, 1805.

Syn.: *Amphoridium ruderum* (DC.) Servít

N - Ven, Lomb, VA (Pierivittori & Isocrono 1999), Emil (Nimis & al. 1996). S - Si (Grillo 1998, Grillo & Caniglia 2004).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 3-4, X: 3, E: 2-3/ Alt: 2-3/ Mont: vr, SmedD: rr, Pad: er, SmedH: rr/ PT: 2-3/ suboc, #/ Note: mostly on walls made of mortar and cement. Perhaps a synonym of other species.

Verrucaria rufofuscella Servít

Stud. Bot. Čech., 11: 21, 1950.

N - Lig.

Cr/ Ch/ S/ Sax/ pH: 2-3, L: 4, X: 3-4, E: 1-2/ Alt: 1/ MedH: vr/ PT: 1-2/ #/ Note: a long-forgotten species of siliceous rocks, described from Germany and recently resurrected in the 3rd volume of the Lichen Flora of the Greater Sonoran Region (Nash & al. 2007), where it is reported from southwestern North America, with a good description. In overall appearance it resembles *V. fuscoatroides*, which mainly differs in having a considerably thicker involucrellum.

Verrucaria rupestris Schrad.

Spicil. Fl. Germ., 1: 109, 1794.

N - TAA (Dalla Torre & Sartnthein 1909).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 3-4, X: 3-4, E: 1-3/ Alt: 2-4/ Mont: vr, SmedD: vr/ PT: 1-3/ p/ Note: an early coloniser of pebbles, mortar walls, brick and roofing tiles, until recently confused with *V. muralis*, from which it differs in the endolithic thallus and the perithecia which are immersed in the thallus and in the rock; certainly more widespread in Italy, earlier records could be under *V. muralis*.

Verrucaria saprophila (A. Massal.) Trevis.

Consp. Verruc.: 8, 1860 - *Amphoridium saprophilum* A. Massal., Symmicta Lich.: 79, 1855.

- Syn.: *Thelidium saprophilum* (A. Massal.) Servít
N - Ven (Lazzarin 2000), **TAA**.
 Cr.end/ Ch/ S/ Sax/ pH: 4-5, L: 3, X: 3, E: 1-2/ Alt: 4-5/ Alp: er, Salp: vr/ PT: 1/ #/ Note: a rare, poorly known, southern- to central-European species of rather shaded calcareous rocks, which needs further study.
- Verrucaria sbarbaronis** B. de Lesd.
 Bull. Soc. Bot. France, 94: 199, 1948.
N - Lig.
 Cr.end/ Ch/ S/ Sax/ pH: 5, L: 4-5, X: 4-5, E: 2-4/ Alt: 1-5/ Alp: er, Salp: vr, Orom: vr, MedH: r/ PT: 1/ w, #/ Note: this poorly known calcicolous species is known also from Austria, Slovenia and Greece. For further details see Breuss (2008, 2008b). The ecological indicator values are tentative.
- Verrucaria sphaerospora** Anzi
 Cat. Lich. Sondr.: 110, 1860.
 Syn.: *Catapyrenium sphaerosporum* (Anzi) Arnold, *Dermatocarpon anzianum* Servít, *Dermatocarpon pulvinulosum* (Harm.) Zahlbr., *Involucrocarpon sphaerosporum* (Anzi) Servít
N - Lomb, Piem, Emil, C - Abr (Nimis & Tretiach 1999), **Sar** (Rizzi & al. 2011, Giordani & al. 2013). **S - Camp** (Nimis & Tretiach 2004).
 Cr/ Ch/ S/ Sax/ pH: 4, L: 4, X: 3, E: 2-4/ Alt: 2-4/ Salp: er, Mont: r, SmedD: er, SmedH: er/ PT: 1-2/ #/ Note: a very characteristic species forming a complex of still poorly known entities growing on calciferous sandstone, often on walls, that probably belongs to *Verruculopsis*.
- Verrucaria subcuneata** Servít
 Webbia, 8: 417, 1952.
N - Lig.
 Cr/ Ch/ S/ Sax/ pH: 4-5, L: 2-3, X: 2-3, E: 1-2/ Alt: 2-3/ Mont: vr, SmedD: vr/ PT: 1/ #/ Note: according to Breuss (2016) this poorly known species, described from Val Bisagno near Genova, is also present in the Alps of Austria and Germany. Ecological indicator values are tentative: from the scanty available information the species seems to grow on calciferous rocks in rather shaded situations, such as in forests.
- Verrucaria subdolosa** Servít
 Sborn. Narodn. Mus Praze, 5, B, 9, bot. 3: 44, 1949.
N - Frl (Breuss 2008), **Piem, Lig**.
 Cr/ Ch/ S/ Sax/ pH: 4-5, L: 3-4, X: 2-3, E: 1-2/ Alt: 2-3/ Mont: er, SmedD: er/ PT: 1/ #/ Note: a critical taxon, for further details see Breuss (2008). The ecological indicator values are tentative: they are based on the list of accompanying species given by Breuss (2008).
- Verrucaria subintegra** Servít
 Preslia, 24: 376, 1952.
N - Lig.
 Cr/ Ch/ S/ Sax/ pH: 3-5, L: 3-4, X: 2-4, E: 1-3/ Alt: 2/ SmedD: vr/ PT: 1/ #/ Note: according to Breuss (2004) this poorly known calcicolous species differs from *V. acrotella* in several morphological characters and in the ecology.
- Verrucaria submersella** Servít
 Českoslov. Lišejn. Čeledi Verrucariaceae: 142, 1954.
 Syn.: *Verrucaria submersa* Schaer. *non* Borrer
N - TAA (Thüs & al. 2015), **Lomb** (as *V. aberrans* Garov).
 Cr/ Ch/ S/ Sax/ pH: 3-4, L: 2-4, X: 1, E: 1-2/ Alt: 3-5/ Alp: vr, Salp: r, Orom: vr, Mont: vr/ PT: 1/ 1, #/ Note: closely related to *V. elaeomelaena* and *V. funckii*, but differing in several morphological characters, this calcicolous freshwater lichen needs further study.
- Verrucaria tabacina** (A. Massal.) Trevis.
 Consp. Verruc.: 8, 1860 - *Lithocia tabacina* A. Massal., *Symmicta* Lich.: 90, 1855.
N - Ven (Lazzarin 2000b). **S - Camp** (Aprile & al. 2003), **Cal** (Puntillo 1996).
 Cr/ Ch/ S/ Sax/ pH: 3-5, L: 3-5, X: 2-5, E: 2-5/ Alt: 1-3/ Mont: r, SmedD: r, Pad: r, SmedH: r, MedH: r/ PT: 1-3/ p, #/ Note: a poorly known species of calcareous rocks reported from several localities in central Europe (see Breuss 2006); it has been frequently considered as a synonym of *V. nigrescens*.
- Verrucaria transiliens** (Arnold) Lettau
 Hedwigia, 52: 89, 1912 - *Amphoridium transiliens* Arnold, *Denkschr. kgl. bayer. bot. Ges.*, 6: 42, 1890.
N - Frl (Breuss 2008), **Piem, Lig**.
 Cr/ Ch/ S/ Sax/ pH: 4-5, L: 3, X: 2-3, E: 2-3/ Alt: 2-3/ Mont: vr, SmedD: vr, Pad: er, SmedH: vr/ PT: 1/ Note: on calcareous pebbles (e.g. on calciferous sandstone) near the ground, especially in clearings of woodlands and on track sides; probably more widespread, having been overlooked, or confused with similar species. For further details see Breuss (2004).

Verrucaria veronensis A. Massal.

Ric. Auton. Lich. Crost: 173, 1852.

Syn.: *Amphoridium veronense* (A. Massal.) A. Massal.

N - Ven (Lazzarin 2000b), **TAA**, **Emil**, **Lig. C - Umb. S - Camp, Pugl. Si**.

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 3-4, X: 3-4, E: 1/ Alt: 2-3/ Mont: er, SmedD: vr, SmedH: vr/ PT: 1/ Note: a species of calcareous rocks and dolomite, reported from several localities in southern and central Europe.

Verrucaria vicinalis Arnold

Verh. zool.-bot. Ges. Wien, 29: 377, 1879.

N - Fr (Breuss 2008), **TAA** (Breuss 2008b).

Cr.end/ Ch/ S/ Sax/ pH: 5, L: 2-3, X: 2-3, E: 1/ Alt: 2-3/ Mont: er, SmedD: vr/ PT: 1/ #/ Note: a species of calcareous rocks, known from South Tyrol, the Carpathians and a few localities in the Alps and the Pyrenees, which needs further study; the record from Liguria (Nimis 1993: 750), being especially dubious, is not accepted here. For further details see Breuss (2008, 2008b).

Verrucaria vindobonensis Zschacke

Hedwigia, 67: 56, 1927.

Syn.: *Amphoridium vindobonense* (Zschacke) Servít

N - Lig.

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 3-4, X: 3-4, E: 1/ Alt: 3-5/ Alp: vr, Salp: vr, Mont: er/ PT: 1/ #/ Note: a very poorly known but apparently widespread species of calcareous rocks in alpine-subalpine habitats, reported from the eastern Alps and Liguria, which badly needs further study.

Verrucaria viridula (Schrad.) Ach.

Meth. Lich. Suppl.: 16, 1803 - *Endocarpon viridulum* Schrad., Spicil. Fl. Germ., 1: 192, 1794.

Syn.: *Amphoridium leightonii* (A. Massal.) Arnold, *Amphoridium polygonium* (Körb.) Servít, *Amphoridium viridulum* (Schrad.) Servít, *Verrucaria griseorubens* Mig., *Verrucaria leightonii* A. Massal. non Hepp, *Verrucaria obductilis* (Nyl.) Zschacke, *Verrucaria polygonia* Körb.

N - VG (Castello 2002, Martellos & Castello 2004), **Fr** (Tretiach & Hafellner 2000), **Ven, TAA, Lomb** (Valcuvia & Truzzi 2007b), **Piem** (Isocrono & al. 2004), **Emil** (Bouvet 2008), **Lig** (Giordani & al. 2016). **C - Tosc, Marc, Umb** (Ravera & al. 2006, 2006b, Genovesi 2011), **Laz** (Bartoli & al. 1998, Roccardi 2011), **Abr, Sar** (Rizzi & al. 2011). **S - Camp** (Ricciardi & al. 2000, Nimis & Tretiach 2004), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Si** (Otonello & Salone 1994, Otonello & al. 1994, Grillo 1998, Caniglia & Grillo 2001, Grillo & Caniglia 2004, Grillo & al. 2009, Cataldo & Cannavò 2014).

Cr/ Ch/ S/ Sax/ pH: 3-5, L: 3-4, X: 3-4, E: 3-4/ Alt: 1-3/ Mont: vr, SmedD: c, Pad: er, SmedH: c, MedH: rr, MedD: er/ PT: 1-2/ Note: an early coloniser of calciferous substrata, most common on small pebbles, also in urban areas (e.g. on roofing tiles); easily mistaken for *V. macrostoma*.

Verrucaria weddellii Servít

Stud. Bot. Čech., 7: 80, 1946.

Syn.: *Verrucaria transiliens* auct. non (Arnold) Lettau

N - Ven (TSB 10446), **TAA** (Nascimbene 2005), **Piem, Emil** (Nimis & al. 1996), **Lig, C - Marc** (Nimis & Tretiach 1999), **Umb** (Genovesi & al. 2002, Ravera & al. 2006). **S - Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 3, X: 2-3, E: 2-3/ Alt: 2-3/ Mont: r, SmedD: rr, Pad: er, SmedH: rr/ PT: 1/ #/ Note: this species was almost always confused with *V. transiliens* by Italian authors; I have placed here all records by Italian authors of *V. transiliens* except those by Sbarbaro, whose material was probably identified by Servít. The species grows on porous calciferous rocks with temporary seepage of water after rain, in rather sheltered situations. For further details see Breuss (2004) and Roux & coll. (2014: 1265).

Verrucaria xyloxena Norman

Bot. Not.: 87, 1867.

Syn.: *Involucrothele velutinoides* (Hellb.) Servít, *Thelidium velutinoides* (Hellb.) Servít, *Verrucaria acrotella* f. *terrestris* Arnold, *Verrucaria floerkei* Trevis., *Verrucaria melaenella* Vain. non auct., *Verrucaria terrestris* (Arnold) Vain. non (Th. Fr.) Tuck., *Verrucaria velutinoides* Hellb.

N - TAA.

Cr/ Ch/ S/ Terr/ pH: 4-5, L: 4, X: 3, E: 1-2/ Alt: 3-4/ Salp: r, Mont: vr/ PT: 1/ Note: on calciferous soil, often associated with acrocarpous mosses, mostly in upland areas but usually below the Alpine belt; easily overlooked, and perhaps more widespread in the Alps.

Verrucula J. Steiner

Ber. Akad. Wiss. Wien, math.-naturw. Kl., Abt. 1, 105: 444, 1896.

This genus of the Verrucariaceae was segregated from the very heterogeneous genus *Verrucaria* to accommodate a group of species which are mainly parasitic on species of *Caloplaca s.lat.* with anthraquinones, and on *Rusavskia elegans*. The genus is closely related to *Placocarpus*. In *Verrucula*, specificity to the lichen host seems to be high, since in general each host species is colonised by a different species of *Verrucula* (Navarro-Rosinés & al. 2007), leading to the current recognition of 30 species.

However, it has also been suggested that, because of the low morphological variation in this group, all species parasitic on the species of the former *Caloplaca* section *Gasparrinia* could in fact constitute a single species. For further details see Navarro-Rosinés & al. (2007) and Gueidan & al. (2009). Type: *V. aegyptiaca* (Mull. Arg.) J. Steiner

Verrucula arnoldaria Nav.-Ros. & Cl. Roux
in Navarro-Rosinés & al., Bull. Soc. linn. Provence, 58: 152, 2007.

C - Sar.

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 4-5, X: 4, E: 3-4/ Alt: 2-4/ Salp: er, Orom: vr, Mont: vr, SmedD: vr, SmedH: vr/ PT: 1/ paras *Calogaya arnoldii*/ Note: a recently-described parasite of *Calogaya arnoldii*, certainly more widespread in Italy.

Verrucula biatorinaria (Zehetl.) Nav.-Ros. & Cl. Roux
in Navarro-Rosinés & al., Bull. Soc. linn. Provence, 58: 153, 2007 - *Verrucaria biatorinaria* Zehetl., Nova Hedwigia, 29: 721, 1978.

N - Ven (Navarro-Rosinés & al. 2007), **TAA, Piem** (TSB 34037). **C - Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008). **S - Camp** (Aprile & al. 2003b).

Cr/ Ch/ S/ Sax/ pH: 5, L: 4-5, X: 4, E: 3-4/ Alt: 3-5/ Alp: r, Salp: rr, Mont: vr/ PT: 1/ paras *Calogaya biatorina*/ Note: certainly more widespread in the Alps and along the Apennines.

Verrucula clauzadaria Nav.-Ros. & Cl. Roux
in Navarro-Rosinés & al., Bull. Soc. linn. Provence, 58: 154, 2007.

C - Abr (TSB *s.n.*).

Cr.pl/ Ch/ S/ Sax/ pH: 5, L: 4-5, X: 4-5, E: 2-3/ Alt: 1-2/ Mont: r, SmedD: r, SmedH: r, MedH: r, MedD: vr/ PT: 1/ w, paras *Caloplaca clauzadeana*/ Note: a recently-described parasite on *Caloplaca clauzadeana*, probably more widespread in Italy.

Verrucula coccinearia (Zehetl.) Nav.-Ros. & Cl. Roux
in Navarro-Rosinés & al., Bull. Soc. linn. Provence, 58: 154, 2007 - *Verrucaria coccinearia* Zehetl., Nova Hedwigia, 29: 729, 1978.

N - Piem (TSB 33973). **C - Abr** (Nimis & Tretiach 1999).

Cr/ Ch/ S/ Sax/ pH: 5, L: 4-5, X: 4, E: 1-2/ Alt: 3-5/ Alp: r, Salp: vr, Mont: er/ PT: 1/ paras *Caloplaca coccinea*/ Note: overlooked and more widespread, certainly more widespread in the Alps.

Verrucula elegantaria (Zehetl.) Nav.-Ros. & Cl. Roux
in Navarro-Rosinés & al., Bull. Soc. linn. Provence, 58: 156, 2007 - *Verrucaria elegantaria* Zehetl., Nova Hedwigia, 29: 729, 1978.

N - Frl (*vidi!*), **Ven** (*vidi!*), **TAA** (Navarro-Rosinés & al. 2007), **Piem** (TSB 34781).

Cr/ Ch/ S/ Sax/ pH: 3-5, L: 4-5, X: 4, E: 4/ Alt: 4-5/ Alp: r, Salp: vr/ PT: 1/ paras *Rusavskia elegans*/ Note: certainly more widespread in the Alps.

Verrucula granulosaria (Clauzade & Zehetl.) Nav.-Ros. & Cl. Roux
in Navarro-Rosinés & al., Bull. Soc. linn. Provence, 58: 157, 2007 - *Verrucaria granulosaria* Clauzade & Zehetl., Nova Hedwigia, 29: 725, 1978.

C - Abr (Nimis & Tretiach 1999). **S - Pugl** (Nimis & Tretiach 1999).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 4-5, X: 4, E: 4-5/ Alt: 1-2/ SmedD: r, SmedH: r, MedD: r/ PT: 1/ paras *Flavoplaca granulosa*/ Note: on *Flavoplaca granulosa*, certainly more widespread.

Verrucula helvetica (B. de Lesd.) Nav.-Ros. & Cl. Roux
in Navarro-Rosinés & al., Bull. Soc. linn. Provence, 58: 158, 2007 - *Endopyrenium helveticum* B. de Lesd., Bull. Soc. bot. Fr., 68: 493, 1921.

Syn.: *Dermatocarpon helveticum* (B. de Lesd.) Frey, *Verrucaria helveticorum* Zehetl.

N - VG (Navarro-Rosinés & Roux 1994, Navarro-Rosinés & al. 2007). **S - Si** (Nimis & al. 1994).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 3-4, X: 3, E: 2-3/ Alt: 2-3/ Mont: r, SmedD: vr, SmedH: vr/ PT: 1/ paras *Leproplaca cirrochroa*/ Note: certainly much more widespread throughout the country.

Verrucula inconnexaria Nav.-Ros. & Cl. Roux
in Navarro-Rosinés & al., Bull. Soc. linn. Provence, 58: 160, 2007.

N - VG (Navarro-Rosinés & al. 2007).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 4-5, X: 3-4, E: 3-4/ Alt: 1-3/ Orom: vr, Mont: vr, SmedD: rr, SmedH: rr, MedH: r, MedD: r/ PT: 1/ paras *Caloplaca inconnexa*/ Note: recently-described and certainly more widespread in Italy.

Verrucula latericola (Erichsen) Nav.-Ros. & Cl. Roux
in Navarro-Rosinés & al., Bull. Soc. linn. Provence, 58: 161, 2007 - *Verrucaria latericola* Erichsen, Ann. Mycol., 41: 198, 1943.

N - **VG** (Navarro-Rosinés & al. 2007).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 4-5, X: 4, E: 4-5/ Alt: 1-2/ SmedD: r/ PT: 1/ paras *Calogaya pusilla*/ Note: on *Calogaya pusilla*, perhaps more widespread.

Verrucula polycarparia Nav.-Ros. & Cl. Roux

in Navarro-Rosinés & al., Bull. Soc. linn. Provence, 58: 163, 2007.

N - **VG** (*vidi!*).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 3, X: 2-3, E: 1-3/ Alt: 1-3/ Mont: er, SmedD: vr, SmedH: vr/ PT: 1/ paras *Flavoplaca polycarpa*/ Note: recently-described and probably more widespread in Italy.

Verrucula protearia (Zehetl.) Nav.-Ros. & Cl. Roux

in Navarro-Rosinés & al., Bull. Soc. linn. Provence, 58: 164, 2007 - *Verrucaria protearia* Zehetl., Nova Hedwigia, 29, 3-4: 727, 1978.

N - **TAA** (Navarro-Rosinés & al. 2007).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 4, X: 4, E: 2-3/ Alt: 3-5/ Alp: rr, Salp: r, Orom: vr, Mont: er/ PT: 1/ paras *Leproplaca proteus*/ Note: the record is actually from Austria, but near the border.

Verruculopsis Gueidan, Nav.-Ros. & Cl. Roux

in Navarro-Rosinés & al., Bull. Soc. linn. Provence, 58: 139, 2007.

This genus of the Verrucariaceae, with 4 species, was initially created to segregate from the very heterogeneous genus *Verrucaria* a group of mainly parasitic species which are related to *Placopyrenium*. Species of both *Verrucula* and *Verruculopsis* are morphologically quite similar, probably as a result of a convergence to parasitism. Only a few characters help in distinguishing them: in *Verrucula*, the excipulum is pale except for the part around the ostiole, which is pale to pale brown, whereas in *Verruculopsis*, the excipulum is, at maturity, pale brown at the base and dark brown in the upper part. Moreover, the medulla in *Verrucula* is I+(blue) to I-, whereas *Verruculopsis* has always a I- medulla. The concept of the genus has been later enlarged to include also *V. lecideoides* and *V. minuta*, which are morphologically quite different and do not grow on species of Teloschistaceae. For further details see Navarro-Rosinés & al. (2007) and Gueidan & al. (2009). Type: *V. poeltiana* (Clauzade & Cl. Roux) Gueidan, Nav.Ros. & Cl. Roux

Verruculopsis flavescens Gueidan, Nav.-Ros. & Cl. Roux

in Navarro-Rosinés & al., Bull. Soc. linn. Provence, 58: 166, 2007.

N - **VG** (*vidi!*).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 3, X: 3, E: 3-4/ Alt: 1-2/ SmedD: r, SmedH: r, MedH: rr, MedD: rr/ PT: 1-2/ paras *Variospora flavescens*/ Note: recently-described and certainly more widespread, especially in Mediterranean Italy, this species has a narrower range than its host, as it mostly occurs in rather shaded situations. The species has been observed on the wall of a private house at San Lorenzo near Trieste.

Verruculopsis lecideoides (A. Massal.) Gueidan & Cl. Roux var. *lecideoides*

in Navarro-Rosinés & al., Bull. Soc. linn. Provence, 58: 174, 2007 - *Thrombium lecideoides* A. Massal., Ric. Auton. Lich. Crost.: 157, 1852.

Syn.: *Catapyrenium lecideoides* (A. Massal.) Arnold, *Dermatocarpon lecideoides* (A. Massal.) Zahlbr., *Verrucaria fraudulosa* Nyl., *Verrucaria lecideoides* (A. Massal.) Trevis., *Verrucaria lecideoides* var. *flavovirens* Bagl.?, *Verrucula lecideoides* (A. Massal.) J. Steiner

N - **VG** (Castello 2002, Martellos & Castello 2004), **Frl** (TSB 5959), **Ven** (Lazzarin 2000b, Nascimbene & Salvadori 2008), **TAA**, **Lomb**, **Piem**, **Emil**, **Lig** (Valcuvia & al. 2000). **C** - **Marc** (Nimis & Tretiach 1999), **Umb** (Nimis & Tretiach 1999, Ravera & al. 2006), **Laz** (Bartoli 1997b), **Abr** (Nimis & Tretiach 1999, Caporale & al. 2016), **Mol** (Nimis & Tretiach 1999, Ravera & al. 2009, Caporale & al. 2008, Genovesi & Ravera 2014), **Sar** (Monte 1993, Rizzi & al. 2011). **S** - **Camp** (Aprile & al. 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010, Catalano & al. 2016), **Pugl** (Nimis & Tretiach 1999), **Si** (Nimis & al. 1994, 1995, Caniglia & Grillo 2001, 2005, 2006, Grillo & al. 2001, 2002, 2009, Grillo & Caniglia 2004, Gianguzzi & al. 2009, Liistro & Cataldo 2011).

Cr/ Ch/ S/ Sax/ pH: 3-5, L: 4-5, X: 3-4, E: 3-4/ Alt: 1-4/ Salp: er, Mont: rr, SmedD: rc, Pad: er, SmedH: vc, MedH: rr, MedD: r/ PT: 1-2/ Note: on calciferous rocks, mostly limestone and dolomite, but also on base-rich siliceous substrata, in exposed situations (*e.g.* on the top of isolated boulders). See also note on *Verrucaria beltraminiana*.

Verruculopsis minuta (Hepp) Krzew.

Polish Bot. Stud., 27: 115, 2012 - *Verrucaria lecideoides* var. *minuta* Hepp, Flecht. Eur.: nr. 683, 1860.

Syn.: *Verrucaria minuta* (Hepp) Zschacke

N - **Ven**, **TAA**, **Lomb**, **Lig**. **C** - **Tosc**, **Sar**.

Cr/ Ch/ S/ Sax/ pH: 3-4, L: 4-5, X: 3-4, E: 2-3/ Alt: 1-3/ Mont: vr, SmedD: r, SmedH: rr, MedH: r, MedD: vr/ PT: 1/ #/ Note: very closely related to *V. lecideoides*, but more frequent on basic siliceous rocks. See also note on *Verrucaria porphyricola*.

Verruculopsis poeltiana (Clauzade & Cl. Roux) Gueidan, Nav.-Ros. & Cl. Roux
in Navarro-Rosinés & al., Bull. Soc. linn. Provence, 168: 166, 2007 - *Verrucaria poeltiana* Clauzade &
Cl. Roux, Beih. Nova Hedwigia, 79: 196, 1984.
N - Lig (Navarro-Rosinés & al. 2007). C - Sar.

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 4-5, X: 3-4, E: 3-4/ Alt: 1/ MedH: er/ PT: 1/ paras *Variospora aurantia*/
Note: an obligately lichenicolous species, perhaps more widespread.

Vestergrenopsis Gyeln.
Rabenh. Krypt.-Fl., 2nd ed., 9: 265, 1940.

This small genus of 3 species, belonging to the recently established family Koerberiaceae (Spribile & Muggia 2013) also includes a species occurring in southern Eurasia and in western North America. Type: *V. elaeina* (Wahlenb.) Gyeln.

Vestergrenopsis sonomensis (Tuck.) T. Sprib. & Muggia
Fungal Divers., 58: 192: 2013 - *Pannaria sonomensis* Tuck., Proc. Amer. Acad. Arts Sci., 12, n.ser. 4:
169, 1877.

Syn.: *Koerberia lusitanica* Samp., *Tingiopsidium pubescens* Werner, *Koerberia sonomensis* (Tuck.) Henssen

C - Tosc (Tretiach 2015g), Laz, Sar.

Fol.n/ Cy.h/ S/ Sax/ pH: 2-3, L: 4, X: 2, E: 1/ Alt: 1/ MedH: er/ PT: 1/ suboc, coast/ Note: a mainly
Mediterranean species, also known from California, found on sun-exposed surfaces of siliceous rocks with
frequent water seepage after rain in periodically humid areas.

Vezeadaea Tscherm.-Woess & Poelt
in Brown & al. (eds.), Lichenology: Progress & Problems: 91, 1976.

This genus of the monotypic family Vezeadaeaceae (see Lumbsch & al. 2009) comprises 13 species worldwide,
7 of which occur in Europe. It is mainly characterised by the absence of a true hypothecium, a hymenial gel-
matrix, and branched paraphyses which are characteristically entwined around the thick-walled asci. Most
species are poorly collected, because they produce minute, inconspicuous, mostly epibryophytic and
ephemeral thalli which develop mature ascomata seasonally, mainly in winter and spring. A key to European
species was provided by Giralt & al. (1993). Type: *V. aestivalis* (Ohlert) Tscherm.-Woess & Poelt

Vezeadaea aestivalis (Ohlert) Tscherm.-Woess & Poelt
in Brown & al. (eds.), Lichenology: Progress and Problems: 91, 1976 - *Lecidea aestivalis* Ohlert, Schr.
phys-ökon. Ges. Königsb., 10: 16, 1870.

Syn.: *Biatora aestivalis* (Ohlert) Lindau, *Catillaria byssacea* Vězda, *Pachyascus byssaceus* (Vězda) Vězda

N - Frl. S - Cal (Nimis & Puntillo 2003, Puntillo 2011).

Cr/ Ch/ S/ Terr-Epiph/ pH: 3-4, L: 2-3, X: 1-2, E: 1/ Alt: 2-3/ Mont: er, SmedH: er/ PT: 1/ suboc, p/
Note: a mild-temperate to Mediterranean-Atlantic, ephemeral species found on epiphytic bryophytes, mosses,
plant debris, soil, much more rarely on mossy trunks of deciduous trees with a base-rich bark. Being
inconspicuous, and likely to be confused with the much more common *Bilimbia sabuletorum*, this species
might be more widespread, but is certainly not common in Italy.

Violella T. Sprib.
in Spribile & al., Lichenologist, 43: 459, 2011.

This genus of the Tephromelataceae, which was segregated from *Mycoblastus s.lat.* by Spribile & al. (2011),
includes 2 species, and is characterised by brownish inner ascospore walls, a brilliant violet hymenial pigment
granules (*Fucatus*-violet), and a different secondary chemistry. Type: *V. fucata* (Stirt.) T. Sprib.

Violella fucata (Stirt.) T. Sprib.
Lichenologist, 43: 461, 2011 - *Lecidea fucata* Stirt., Scottish Natur., 5: 16, 1879.
Syn.: *Megalospora fucata* (Stirt.) H. Olivier, *Mycoblastus fucatus* (Stirt.) Zahlbr., *Mycoblastus sterilis* Coppins &
P. James

N - TAA (Thor & Nascimbene 2007, Nascimbene & al. 2007b, Nimis & al. 2015). C - Tosc (Brackel 2015).

Cr/ Ch/ A.s/ Epiph/ pH: 1-2, L: 4-5, X: 2-3, E: 1/ Alt: 3/ Mont: vr/ PT: 1/ Note: a cool-temperate lichen
found on bark in humid woodlands of the montane belt; certainly much overlooked in the Alps, being mostly
sterile. It is included in the Italian red list of epiphytic lichens as "Data Deficient" (Nascimbene & al. 2013c).

Vulpicida J.-E. Mattsson & M.J. Lai
Mycotaxon, 46: 427, 1993.

This small segregate from *Cetraria s.lat.* is easily recognisable by the bright yellow colour due to the presence
of pinastric acid, but molecular data indicate that it is very closely related to *Cetraria*. Species delimitation

within the genus was rather problematic as well: on the basis of molecular data Saag & al. (2014) have reduced the number of accepted species from 6 to 4. Type: *V. juniperinus* (L.) J.-E. Mattsson & M.J. Lai

Vulpicida juniperinus (L.) J.-E. Mattsson & M.J. Lai

Mycotaxon, 46: 427, 1993 - *Lichen juniperinus* L., Sp. Pl., 2: 1147, 1753, *nom. cons.*

Syn.: *Cetraria alvarensis* (Wahlenb.) Vain., *Cetraria juniperina* (L.) Ach. var. *alvarensis* (Wahlenb.) Torss., *Cetraria juniperina* var. *alvarensiformis* Du Rietz, *Cetraria juniperina* var. *campestris* Stenh., *Cetraria juniperina* var. *pseudopinastri* Du Rietz, *Cetraria juniperina* var. *terrestris* auct. non Schaer., *Cetraria tilesii* auct. non Ach., *Cetraria tubulosa* (Schaer.) B. de Lesd., *Cetraria juniperina* (L.) Ach., *Cetraria juniperina* var. *tubulosa* Schaer., *Tuckermannopsis juniperina* (L.) Hale, *Vulpicida tubulosus* (Schaer.) J.-E. Mattsson & M.J. Lai

N - Frl, Ven (Nascimbene & Caniglia 1997, 2003c, Caniglia & al. 1999, Giovagnoli & Tasinazzo 2014), **TAA** (Nascimbene & al. 2006, Nascimbene 2008b), **Lomb, Piem** (Isocrono & al. 2004, Matteucci & al. 2015b), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999).

Fol.b/ Ch/ A.f/ Terr-Epiph/ pH: 3-5, L: 4, X: 4, E: 1/ Alt: 5-6/ Alp: vr, Salp: er/ PT: 1/ Note: this mainly subarctic-subalpine to boreal-montane species is found on calciferous mineral soil in dry Alpine grasslands and on wind-exposed ridges, more rarely on the twigs of shrubs. It is included as "Regionally Extinct" in the Italian red list of epiphytic lichens (Nascimbene & al. 2013c), but this referred only to the epiphytic forms formerly treated as *V. juniperinus*.

Vulpicida pinastri (Scop.) J.-E. Mattsson & M.J. Lai

Mycotaxon, 46: 428, 1993 - *Lichen pinastri* Scop., Flora Carniol., 2, 2nd ed.: 382, 1772.

Syn.: *Cetraria caperata sensu* Vain., *Cetraria juniperina* var. *pinastri* (Scop.) Ach., *Cetraria pinastri* (Scop.) Gray, *Platysma pinastri* (Scop.) Frege, *Tuckermannopsis pinastri* (Scop.) Hale

N - VG, Frl (Tretiach & Hafellner 2000, Tretiach & Molaro 2007), **Ven** (Nascimbene & Caniglia 1997, 2000b, 2002c, 2003c, Caniglia & al. 1999, Nascimbene 2005c, 2008c, 2011, Nascimbene & al. 2006e, 2007, 2009c, 2010b, 2013b, 2014, Nascimbene & Marini 2007, Brackel 2013, Nimis & al. 2015), **TAA** (Nascimbene & Caniglia 2000b, 2002c, Caniglia & al. 2002, Nascimbene 2003, 2005b, 2006c, 2008c, 2014, Gottardini & al. 2004, Nascimbene & al. 2005, 2006, 2006b, 2006e, 2007b, 2008c, 2009, 2010, 2014, 2014c, Stofer 2006, Lang 2009, Brackel 2013, Nascimbene & Marini 2015, Nimis & al. 2015), **Lomb** (Rivellini 1994, Alessio & al. 1995, Arosio & Rinaldi 1995, Zocchi & al. 1997, Valcuvia & al. 2003, Dalle Vedove & al. 2004, Nascimbene & al. 2006e, Stofer 2006, Brackel 2013), **Piem** (Morisi & Sereno 1995, Piervittori 2003, Isocrono & al. 2004, 2006, 2007, Morisi 2005, Isocrono & Piervittori 2008), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Ghiraldi 2003, Isocrono & al. 2005, Matteucci & al. 2008, 2008c, Isocrono & al. 2008), **Lig** (Brunialti & al. 1999, Giordani & al. 2002, Giordani & Incerti 2008), **C - Tosc** (Loppi & al. 1994, Tretiach & Nimis 1994, Benesperi & al. 2007, Benesperi 2011, Brackel 2015), **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera 1998, Ravera & al. 2006), **Abr** (Nimis & Tretiach 1999), **Sar** (Nöske 2000), **S - Cal** (Puntillo 1996).

Fol.b/ Ch/ A.s/ Epiph/ pH: 1-2, L: 3-5, X: 3, E: 1/ Alt: 2-5/ Alp: vr, Salp: ec, Orom: er, Mont: rr, SmedD: er/ PT: 1-2/ Note: a subarctic-subalpine to boreal-montane, circumpolar species found on basal parts of trunks, especially of conifers, and on twigs with long snow-lie, often associated with *Parmeliopsis* near treeline; common only in the Alps, much rarer, and mostly confined to *Castanea* or conifers stands in the Apennines.

W a d e a n a Coppins & P. James

Lichenologist, 10: 203, 1978.

This genus, which currently includes 2 species, differs from superficially similar genera, like *Lithographa* and *Opegrapha*, in having polysporous asci, simple spores and fissitunicate asci. Its taxonomic position is still unclear (Lumbsch & Huhndorf 2009). Type: *W. dendrographa* (Nyl.) Coppins & P. James

Wadeana dendrographa (Nyl.) Coppins & P. James

Lichenologist, 10: 203, 1978 - *Lithographa dendrographa* Nyl., Flora, 47: 488, 1864.

C - Tosc.

Cr/ Tr/ S/ Epiph/ pH: 2-3, L: 3, X: 2, E: 1/ Alt: 1-2/ SmedH: er, MedH: er/ PT: 0/ suboc/ Note: a humid subtropical to Mediterranean-Atlantic lichen, reaching as far north as the British Isles, found on rough, base-rich bark of mature broad-leaved trees (e.g. *Fraxinus*, *Quercus*, *Ulmus*) in semi-natural habitats. It is included as "Critically Endangered" in the Italian red list of epiphytic lichens (Nascimbene & al. 2013c).

W a y n e a Moberg

Lichenologist, 22: 249, 1990.

This genus of the Ramalinaceae, described to accommodate a single species from North America, presently comprises 7 species mainly occurring in areas with a Mediterranean climate (one species, however is limited to Siberia). The genus is characterised by a squamulose thallus, a well developed upper eucortex, laminal, biatorine apothecia with an algal layer below the hypothecium, asci of the *Bacidia*-type, and ellipsoidal to acicular, 0-5-septate ascospores. Type: *W. californica* Moberg

Waynea adscendens V.J. Rico

Rivasgodaya, 6: 130, 1991.

S - Cal (Puntillo 1995, 1996).

Sq/ Ch/ A.s/ Epiph/ pH: 2-3, L: 4, X: 1-2, E: 1-3/ Alt: 1/ MedH: er/ PT: 0/ suboc/ Note: a Mediterranean-Atlantic species found on the bark of more or less isolated, old broad-leaved trees in very humid areas, mostly in the Mediterranean belt. It is included as "Critically Endangered" in the Italian red list of epiphytic lichens (Nascimbene & al. 2013c).

Waynea stoechadiana (Abbassi Maaf & Cl. Roux) Cl. Roux & P. Clerc

Bull. Soc. linn. Provence, 42: 130, 1991 - *Hypocenomyce stoechadiana* Abbassi Maaf & Cl. Roux, Bull. Soc. linn. Provence, 36: 191, 1985.

C - Tosc (Stofer 2006), Laz (Roux & al. 1995, Ravera & al. 1999, 2000, 2003, Munzi & al. 2007), Sar (Zedda 2002, Rizzi & al. 2011). S - Cal (Puntillo 1996, Puntillo & Puntillo 2004, Llop 2006), Si (Ottonello & Puntillo 2009, Ottonello & al. 2011).

Sq/ c/ S/ Epiph/ pH: 1-2, L: 4, X: 2-3, E: 2-3/ Alt: 1/ MedH: er/ PT: 1/ suboc/ Note: a Mediterranean-Macaronesian species found on ancient specimens of *Olea* and *Q. ilex* in warm-humid areas; exclusively Tyrrhenian in Italy. It is included in the Italian red list of epiphytic lichens as "Vulnerable" (Nascimbene & al. 2013c).

Xalocoa Kraichak, Lücking & Lumbsch
in Kraichak & al., Austral. Syst. Bot., 26: 472, 2013.

Some phylogenetic studies revealed the monophyly of *Diploschistes*, including *D. ocellatus* (e.g. Fernández-Brime & al. 2013), but others found that genus in its current circumscription to be non-monophyletic (e.g. Rivas Plata & al. 2013). Such discrepancies led Kraichak & al. (2013) to increase the numbers of molecular markers, showing that *D. ocellatus* is only distantly related to *Diploschistes s.str.* While taxa in *Diploschistes s.str.* have perithecioid to urceolate ascomata and a dark-pigmented, paraplectenchymatous exciple with lateral paraphyses, *D. ocellatus* has lecanoroid ascomata, a reduced exciple and lacks lateral paraphyses; chemically, it also differs in containing the norstictic acid chemosyndrome. Because of these differences the species, which was previously classified in subgen. *Thorstenia* within *Diploschistes* (Fernández-Brime & al. 2013), was included into a new monotypic genus by Kraichak & al. (2013). Type: *X. ocellata* (Fr.) Kraichak, Lücking & Lumbsch

Xalocoa ocellata (Fr.) Kraichak, Lücking & Lumbsch

in Kraichak & al., Austral. Syst. Bot., 26: 472, 2013 - *Parmelia ocellata* Fr., Lich. Eur. Ref.: 190, 1831.

Syn.: *Diploschistes ocellatus* (Fr.) Norman, *Diploschistes ocellatus* var. *tuberculatus* Werner, *Lichen ocellatus* Vill. nom. illegit., *Urceolaria ocellata* (Fr.) DC.

N - Ven, TAA, Lomb, Piem (Watson 2014), Emil, Lig. C - Tosc (Benespero 2000a), Marc, Umb (Ravera & al. 2006, Panfili 2007), Laz, Abr (Nimis & Tretiach 1999), Mol (Nimis & Tretiach 1999, Ravera & Genovesi 2012, Genovesi & Ravera 2014), Sar. S - Camp (Garofalo & al. 1999, 2010, Ricciardi & al. 2000, Aprile & al. 2003, Nimis & Tretiach 2004, Catalano & al. 2016), Pugl (Nimis & Tretiach 1999), Bas (Nimis & Tretiach 1999), Cal (Puntillo 1996), Si (Nimis & al. 1996b).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 4-5, X: 3-4, E: 2-3/ Alt: 1-3/ Mont: vr, SmedD: er, SmedH: rr, MedH: rr, MedD: r/ PT: 1-2/ Note: a mild-temperate to Mediterranean lichen found on limestone, dolomite and calciferous sandstone, more rarely on soil; more frequent in the southwestern part of the Peninsula.

Xanthocarpia A. Massal. & De Not.
in A. Massal., Alconi Gen. Lich.: 11, 1853.

This genus of the Teloschistaceae was recently segregated from *Caloplaca s.lat.* by Arup & al. (2013). It mainly includes crustose species characterised, with the exception of *X. ochracea*, by spores with a thin septum. There are other groups, e.g. *Cerothallia*, with these characteristics but *Xanthocarpia* seems to be well-delimited, and the spore traits may have developed independently from each other in the genera. The genus is fairly species-rich and consists of mainly European species, but it will certainly expand in the future to accommodate more Asian and North American taxa. Type: *X. ochracea* (Schaer.) A. Massal. & De Not.

Xanthocarpia aquensis (Houmeau & Cl. Roux) Frödén, Arup & Søchting

in Arup & al., Nord. J. Bot., 31: 57, 2013 - *Caloplaca aquensis* Houmeau & Cl. Roux, Bull. Soc. bot. Centre-Ouest, N. sér., 15: 143, 1984.

C- Tosc (Herb. Vondrák 8646).

Cr/ Ch/ S/ Sax/ pH: 5, L: 4-5, X: 3-4, E: 3-4/ Alt: 1/ MedH: vr/ PT: 1/ coast/ Note: a Mediterranean-Atlantic, coastal species growing on horizontal to weakly inclined surfaces of calcareous rocks in sites which are subject to salt-spray; probably more widespread, but certainly not common, in Tyrrhenian Italy.

Xanthocarpia crenulatella (Nyl.) Frödén, Arup & Søchting

in Arup & al., Nord. J. Bot., 31: 57, 2013 - *Lecanora crenulatella* Nyl., Flora, 69: 461, 1886.

Syn.: *Caloplaca clauzadei* B. de Lesd., *Caloplaca crenulatella* (Nyl.) H. Olivier, *Caloplaca ferrarii* var. *diabasicola* Servit & Čern., *Caloplaca lactea* f. *aestimabilis* (Arnold) Lettau, *Caloplaca lactea* f. *aurata* (Harm.) Zahlbr., *Caloplaca lactea* f. *ecrustacea* (Harm.) Zahlbr., *Caloplaca lactea* f. *flavicunda* (H. Olivier) Zahlbr., *Placodium crenulatellum* (Nyl.) A.L. Sm.

N - VG (Castello 2002, Martellos & Castello 2004), **Frl, Ven** (Caniglia & al. 1999, Nascimbene & Caniglia 2003c, Nascimbene 2005c, Nascimbene & Marini 2007), **TAA** (Navarro-Rosinés & Hladun 1996, Nascimbene & Caniglia 2000, Thor & Nascimbene 2007), **Piem** (Morisi & Sereno 1995, Isocrono & al. 2004, Morisi 2005, Isocrono & Piervittori 2008), **VA** (Piervittori & Isocrono 1999, Isocrono & al. 2008, Gazzano & al. 2009, 2009b, Sandrone & al. 2013, Sandrone 2014, Matteucci & al. 2015c), **C - Tosc** (Benespero 2007), **Umb** (Genovesi & al. 2002, Ravera & al. 2006), **Laz** (Bartoli 1997b, Bartoli & al. 1998), **Sar** (Navarro-Rosinés & Hladun 1996, Rizzi & al. 2011, Giordani & al. 2013), **S - Camp** (Aprile & al. 2003b, Garofalo & al. 2010), **Si** (Poli & al. 1996, 1997, Grillo 1998, Caniglia & Grillo 2001, 2005, 2006, Grillo & Caniglia 2004, Cataldo & Cannavò 2014).

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 4, X: 3-4, E: 4/ Alt: 1-4/ Alp: r, Salp: r, Orom: r, Mont: rr, SmedD: rc, Pad: rr, SmedH: rr, MedH: vr/ PT: 1-2/ Note: a mild-temperate to subtropical species, often found on calcareous walls, perhaps parasitic of *Verrucaria nigrescens* when young, very much misunderstood in the past (see note on *X. lactea*). Recently, this taxon has been considered to be paraphyletic and to contain at least four lineages (Vondrák & al. 2011). Several records from siliceous rocks, such as those of Nimis & Tretiach (1999) from Abruzzo and Basilicata, refer to *X. diffusa*.

Xanthocarpia diffusa (Vondrák & Llimona) Frödén, Arup & Søchting

in Arup & al., Nord. J. Bot., 31: 57, 2013 - *Caloplaca diffusa* Vondrák & Llimona, Lichenologist 43: 471, 2011.

Syn.: *Caloplaca prinii* B. de Lesd.

N - Lig (TSB 34395), **C - Abr** (TSB 26990), **S - Bas** (TSB 29718).

Cr/ Ch/ S/ Sax/ pH: 3, L: 4, X: 3-4, E: 3-4/ Alt: 1-2/ SmedH: r, MedH: r, MedD: r/ PT: 1-2/ Note: on base-rich siliceous rocks. According to Roux & coll. (2014) the type of *Caloplaca prinii* B. de Lesd. belongs to this species: the latter name having priority a new combination would be required if the synonymy will be confirmed by molecular data. See also note on *X. crenulatella*.

Xanthocarpia ferrarii (Bagl.) Frödén, Arup & Søchting

in Arup & al., Nord. J. Bot., 31: 57, 2013 - *Callospisma ferrarii* Bagl., Mem. Accad. Sc. Torino, 2, 17: 406, 1858.

Syn.: *Caloplaca ferrarii* (Bagl.) Jatta, *Caloplaca ferrarii* var. *pura* J. Steiner

N - Frl, TAA (Nascimbene 2003, 2004), **Lomb** (Nascimbene 2006, Sunil Morgan & al. 2008), **Piem, VA** (Piervittori & Isocrono 1999), **Emil** (Tretiach & al. 2008), **Lig** (TSB 33069), **C - Marc** (Nimis & Tretiach 1999), **Umb** (Genovesi & al. 2002, Ravera & al. 2006), **Laz** (Bartoli & al. 1998), **Abr** (Nimis & Tretiach 1999), **Sar** (Rizzi & al. 2011), **S - Camp** (Aprile & al. 2003b, Garofalo & al. 2010), **Bas** (Nimis & Tretiach 1999), **Si** (Monte & Ferrari 1996).

Cr/ Ch/ S/ Sax/ pH: 5, L: 4-5, X: 4, E: 2-3/ Alt: 1-2/ SmedD: vr, Pad: er, SmedH: vr, MedH: vr, MedD: vr/ PT: 1-2/ p/ Note: a temperate early coloniser of mortar walls, gypsum outcrops and other calciferous, often man-made, soft substrata at relatively low elevations. Recently, this taxon was shown to be paraphyletic and to contain at least two lineages (Vondrák & al. 2011).

Xanthocarpia interfulgens (Nyl.) Frödén, Arup & Søchting

in Arup & al., Nord. J. Bot., 31: 57, 2013 - *Lecanora interfulgens* Nyl., Flora, 56: 340, 1878.

Syn.: *Caloplaca interfulgens* (Nyl.) J. Steiner

C - Sar (Rizzi & al. 2011), **S - Camp** (Ricciardi & al. 2000, Nimis & Tretiach 2004, Garofalo & al. 2010), **Cal** (Herb. Vondrák 10829), **Si**.

Cr/ Ch/ S/ Sax/ pH: 4-5, L: 5, X: 4-5, E: 3-4/ Alt: 1/ MedH: vr, MedD: r/ PT: 1-2/ #/ Note: a species ranging from Central Asia to the Mediterranean Region, found on sun-exposed calcareous, more rarely basic siliceous rocks wetted by rain in at least seasonally dry habitats. Most records from southern Europe, including those from Italy, need to be checked.

Xanthocarpia lactea (A. Massal.) A. Massal.

Framm. Lichenogr.: 25, 1855 - *Callospisma ochraceum* var. *lacteam* A. Massal., Flora, 35: 572, 1852.

Syn.: *Blastenia lactea* (A. Massal.) Trevis., *Caloplaca lactea* (A. Massal.) Zahlbr., *Gyalolechia calcicola* Galløe nom. inval., *Gyalolechia lactea* (A. Massal.) Arnold, *Placodium pyraceum* var. *lacteam* (A. Massal.) A.L. Sm.

N - VG, Frl (TSB 5345), **Ven** (Navarro-Rosinés & Hladun 1996, Arup & al. 2013), **TAA** (TSB 35698), **Lomb, Piem** (Morando & al. 2016), **VA** (Favero-Longo & Piervittori 2009), **Emil** (Nimis & al. 1996), **Lig** (Giordani & al. 2016), **C - Tosc** (Navarro-Rosinés & Hladun 1996, Loppi & al. 2004b), **Marc** (Nimis & Tretiach 1999), **Umb** (Genovesi & Ravera 2001, Ravera & al. 2006, Panfili 2007), **Laz** (Bartoli 1997b), **Abr** (Nimis & Tretiach 1999), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008, Genovesi & Ravera 2014), **Sar** (Rizzi & al. 2011), **S - Camp** (Nimis & Tretiach 2004, Garofalo & al. 2010), **Pugl** (Nimis & Tretiach 1999, Durini & Medagli 2002, 2004), **Bas** (Nimis & Tretiach 1999), **Si** (Nimis & al. 1994, Ottonello & Salone 1994, Ottonello & al. 1994, 2011, Monte & Ferrari 1996, Poli & al. 1997, 1998, Grillo 1998, Caniglia & Grillo 2001, 2005, 2006, Grillo & al. 2001, 2002, 2007b, 2009, Grillo & Caniglia 2004, Brackel 2008c, Liistro & Cataldo 2011).

Cr.end/ Ch/ S/ Sax/ pH: 4-5, L: 4, X: 3-4, E: 2-3/ Alt: 1-2/ Alp: a A1: a, Orom: vr, SmedH: rr, MedH: rc, MedD: rc/ PT: 1-3/ p/ Note: a mainly Mediterranean early coloniser of small calcareous pebbles in open

habitats (e.g. stony ground in dry grasslands). *X. lactea* s.str. is a strictly Mediterranean lichen, and some records from the Alps could refer to other *Xanthocarpia*-species.

***Xanthocarpia marmorata* auct.**

non (Bagl.) Frödén, Arup & Söchting in Arup & al., Nord. J. Bot., 31: 57, 2013 nec *Callopsisma marmoratum* Bagl., N. Giorn. Bot. Ital., 11: 84, 1879.

Syn.: *Caloplaca lactea* f. *fulva* (Harm.) Zahlbr., *Caloplaca lactea* f. *rubra* (B. de Lesd.) Zahlbr., *Caloplaca marmorata* auct. non (Bagl.) Jatta, *Gyalolechia lactea* f. *rubra* B. de Lesd., *Lecanora lactea* f. *fulva* Harm.

N - VG (TSB 18712), **Emil** (Nimis & al. 1996). **C - Tosc** (Benesperi 2006), **Marc** (Nimis & Tretiach 1999), **Laz, Abr** (Nimis & Tretiach 1999), **Sar. S - Camp** (Nimis & Tretiach 2004, Garofalo & al. 2010), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Cal, Si** (Nimis & al. 1994, Navarro-Rosinés & Hladun 1996, Grillo 1998, Caniglia & Grillo 2001, 2005, 2006, Grillo & al. 2002, 2009, Grillo & Caniglia 2004, Gianguzzi & al. 2009, Liistro & Cataldo 2011).

Cr.end/ Ch/ S/ Sax/ pH: 5, L: 4-5, X: 4-5, E: 2-3/ Alt: 1-3/ Mont: vr, SmedD: vr, SmedH: rr, MedH: c, MedD: vc/ PT: 1-2/ p/ Note: a mild-temperate to xeric-continental early coloniser of calcareous pebbles in dry grasslands, overlooked or misunderstood in the past, but fairly common in Mediterranean Italy; rarer, and confined to south-exposed slopes, in the submediterranean belt. I have seen the type of *Callopsisma marmoratum* Bagl. (MOD-TSB), which clearly belongs to the lichen which is usually called “*Caloplaca subochracea*” (see note on that species), a fact that will have quite heavy nomenclatural consequences to be dealt with in future studies.

***Xanthocarpia ochracea* (Schaer.) A. Massal. & De Not.**

in Massalongo, Alcuni Gen. Lich.: 11, 1853 - *Lecidea ochracea* Schaer., Naturwiss. Anz., 2: 11, 1818.

Syn.: *Blastenia ochracea* (Schaer.) Trevis., *Callopsisma ochraceum* (Schaer.) A. Massal., *Callopsisma tetrastichum* (Nyl.) Walt. Watson, *Caloplaca ochracea* (Schaer.) Th. Fr., *Caloplaca tetrasticha* (Nyl.) H. Olivier, *Gyalecta tetrasticha* (Nyl.) Jatta, *Gyalolechia ochracea* (Schaer.) Syd., *Placodium ochraceum* (Schaer.) Anzi, *Placodium tetrastichum* (Nyl.) H. Olivier

N - VG (Tretiach & Pecchiari 1995, Pinna & al. 1998), **Frl** (Pinna & al. 1998), **Ven** (Lazzarin 2000b, Nascimbene 2005c), **TAA, Lomb, Piem** (Isocrono & al. 2004), **Emil** (Bouvet 2008), **Lig. C - Tosc, Marc** (Nimis & Tretiach 1999), **Umb** (Panfili 2000, Ravera & al. 2006), **Laz** (Bartoli 1997b, Bartoli & al. 1998, Nimis & Tretiach 2004), **Abr** (Nimis & Tretiach 1999, Caporale & al. 2016), **Mol** (Garofalo & al. 1999, Caporale & al. 2008, Nimis & Tretiach 1999), **Sar. S - Camp** (Garofalo & al. 1999, 2010, Aprile & al. 2003, 2003b, Nimis & Tretiach 2004), **Pugl** (Garofalo & al. 1999, Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Ottonello & al. 1994, Ottonello 1996, Nimis & al. 1996b, Grillo 1998, Grillo & Caniglia 2004, Merlo 2004b, Caniglia & Grillo 2005, 2006, Grillo & al. 2009, Gianguzzi & al. 2009, Liistro & Cataldo 2011).

Cr.end/ Ch/ S/ Sax/ pH: 5, L: 2-4, X: 3, E: 1-2/ Alt: 1-3/ Mont: rc, SmedD: c, Pad: er, SmedH: c, MedH: r, MedD: er/ PT: 1-2/ Note: a warm-temperate species found on hard, compact limestones in sheltered situations, with optimum in the submediterranean belt; in southern Italy it occurs in the beech belt as well, and in the Mediterranean belt it is confined to more humid-shaded situations, such as within deciduous open forests.

Xanthomendoza S.Y. Kondr. & Kärnefelt

Bibl. Lichenol., 68: 26, 1997.

The taxonomy of the family Teloschistaceae is presently in a state of flux and high confusion, with several authors proposing different generic arrangements. The most comprehensive attempt of a re-definition of the family, including *Xanthoria* s.lat., is that proposed by Arup & al. (2013) on the basis of molecular data, where 39 genera are recognised. The nomenclatural history of this genus is quite complicated. Here I follow Arup & al. (2013), who opted for a broader definition of this clade with 15-20 species, avoiding to split it into five genera (*Gallowayella*, *Oxneria*, *Honeggeria*, *Jesmurraya* and *Xanthomendoza*), or even six if *X. trachyphylla* is included, with at least three (possibly four) monotypic genera as has been suggested by Fedorenko & al. (2012). Type: *X. mendozae* (Räsänen) S.Y. Kondr. & Kärnefelt

***Xanthomendoza aphrodites* (Kalb, Poelt & S.Y. Kondr.) Söchting, Kärnefelt & S.Y. Kondr.**

Mitt. Inst. allg. Bot. Hamburg 30-32: 237, 2002 - *Xanthoria aphrodites* Kalb, Poelt & S.Y. Kondr. in Kondratyuk & Poelt, Lichenologist, 29: 180, 1997.

S - Cal (Puntillo & Puntillo 2015).

Fol.n/ Ch/ S/ Epiph/ pH: 3, L: 4-5, X: 4, E: 3-4/ Alt: 1/ MedH: er, MedD: er/ PT: 1-2/ Note: a Mediterranean epiphytic species, hitherto known only from Crete, Cyprus and Calabria.

***Xanthomendoza fallax* (Arnold) Söchting, Kärnefelt & S.Y. Kondr.**

Mitt. Inst. allg. Bot. Hamburg, 30-32: 237, 2002 - *Xanthoria fallax* Arnold, Verh. zool.-bot. Ges. Wien, 30: 121, 1880.

Syn.: *Lecanora candelaria* var. *substellaris* Ach., *Physcia fallax* Hepp ex Arnold nom. illegit., *Physcia controversa* auct. ital. p.p., *Physcia parietina* var. *sorediosa* Nyl., *Xanthoria substellaris* (Ach.) Vain., *Xanthoria ulophylla* (Wallr.) Arnold

N - Frl (TSB 16119), **Lomb** (TSB 12761)

Fol.n/ Ch/ A.s/ Sax/ pH: 3-4, L: 4-5, X: 4, E: 3-4/ Alt: 2-3/ Mont: r, SmedD: vr, SmedH: er/ PT: 1-2/ subc/ Note: this mainly northern to montane species mainly grows on siliceous or calcareous rocks. Almost all records of *X. fallax* from Italy are from bark and refer to the mainly epiphytic *X. huculica* (see note on that species). There is an open nomenclatural problem with this species, as the purported basionym, *Physcia fallax* Hepp ex Arnold, is a later homonym of *Physcia fallax* (Weber) DC. (1805).

Xanthomendoza fulva (Hoffm.) Søchting, Kärnefelt & S.Y. Kondr.

Mitt. Inst. allg. Bot. Hamburg, 30-32: 237, 2002 - *Lobaria fulva* Hoffm., Deutschl. Fl., 2: 159, 1796.

Syn.: *Oxneria fulva* (Hoffm.) S.Y. Kondr. & Kärnefelt, *Xanthoria candelaria* f. *fulva* (Hoffm.) Zahlbr., *Xanthoria fulva* (Hoffm.) Poelt & Petut., *Xanthoria ligustica* M. Steiner ex Poelt nom. sol.

N - VG, Frl, Ven, TAA (Thor & Nascimbene 2007, Nascimbene & al. 2007b, 2014, Zarabska & al. 2009, Nascimbene 2014, Nimis & al. 2015), **Lomb, Piem** (Matteucci & al. 2013), **Lig. C - Laz** (Ravera 2006), **Abr** (Nimis & Tretiach 1999), **S - Bas** (Ravera 2014), **Cal** (Puntillo 1996, Eichenberger 2007, Brackel & Puntillo 2016).

Fol.n/ Ch/ A.s/ Epiph/ pH: 3, L: 4-5, X: 4, E: 3-4/ Alt: 2-4/ Salp: er, Mont: vr, SmedD: r, SmedH: er/ PT: 1/ subc/ Note: most frequent on isolated deciduous trees along roads in continental Alpine valleys; often confused with *X. huculica* in the past, and with a similar ecology, but perhaps more xerophytic.

Xanthomendoza huculica (S.Y. Kondr.) Diederich

Bull. Soc. Nat. Luxemb., 115: 163, 2014 - *Oxneria huculica* S.Y. Kondr., Flora Lishajnikiv Ukraïni, 2, 3: 435, 2010.

Syn.: *Xanthoria fallax* auct. non (Hepp) Arnold

N - VG (Castello 1996), **Frl** (Badin & Nimis 1996, Castello & Skert 2005, Tretiach & Molaro 2007), **Ven** (Nimis & al. 1996c, Caniglia & al. 1999, Lazzarin 2000, Nascimbene 2005c, 2008), **TAA** (Zieger & al. 2003, Nascimbene 2005b, 2006c, 2014, Nascimbene & al. 2007b, 2014, Cristofolini & al. 2008, Zarabska & al. 2009, Brackel 2013, Nimis & al. 2015), **Lomb** (Rivellini 1994, Arosio & Rinaldi 1995, Valcuvia & Brusoni 1996, Brusoni & al. 1997, Zocchi & al. 1997, Roella 1999, Brusoni & Valcuvia 2000, Casarini & al. 2000, Arosio & al. 2000, 2003, Furlanetto 2010, Brackel 2013, Gheza & al. 2015), **Piem** (Caniglia & al. 1992, Piervittori & al. 1996b, Arosio & al. 1998, Piervittori 1998, 2003, Clerc & al. 1999, Isocrono & Falletti 1999, Griselli & al. 2000, 2003, Castino 2004, Isocrono & al. 2004, 2005b, 2007, Isocrono & Piervittori 2008, Furlanetto 2010, Matteucci & al. 2010), **VA** (Piervittori & Maffei 1996, 2001, Piervittori & Isocrono 1999, Valcuvia & al. 2000b, Piervittori & al. 2001, Matteucci & al. 2008, 2008c, Isocrono & al. 2008), **Emil** (Bassi 1995, Gasparo & Tretiach 1996, Marconi & al. 2006, Morselli & Regazzi 2006, Cioffi 2009), **Lig** (Giordani & Incerti 2008), **C - Tosc, Marc** (Fрати & Brunialti 2006), **Abr** (Olivieri & al. 1997, 1997b, Loppi & al. 1999), **Sar** (Rizzi & al. 2011), **S - Camp, Pugl, Si**.

Fol.n/ Ch/ A.s/ Epiph/ pH: 3, L: 4-5, X: 4, E: 3-4/ Alt: 2-3/ Mont: vr, SmedD: rr, SmedH: er/ PT: 1-2/ subc/ Note: a recently-described epiphytic species differing from *X. fallax* in the much larger lobes with numerous rhizines, in the narrower spores with shorter septum, and in the ecology (epiphytic versus saxicolous). From a preliminary analysis of the epiphytic samples of *X. fallax* in TSB, all of them appear to belong to *X. huculica*. Thus, I have placed here all records of *X. fallax* from Italy collected on bark. The species seems to be most frequent in areas with a subcontinental climate (dry alpine valleys and eastern side of the Peninsula).

Xanthomendoza oregana (Gyeln.) Søchting, Kärnefelt & S.Y. Kondr.

Mitt. Inst. allg. Bot. Hamburg, 30-32: 237, 2002 - *Xanthoria oregana* Gyeln., Rev. Bryol. Lichénol., n.s., 5: 33, 1932.

Syn.: *Xanthomendoza poeltii* (S.Y. Kondr. & Kärnefelt) Søchting, Kärnefelt & S.Y. Kondr., *Xanthoria poeltii* S.Y. Kondr. & Kärnefelt

N - Lig (LD-1400315).

Fol.n/ Ch/ A.s/ Epiph/ pH: 3, L: 4-5, X: 4, E: 3-4/ Alt: 1-3/ Mont: vr, SmedD: vr/ PT: 2-3/ subc/ Note: mainly epiphytic, this recently-resurrected species was frequently confused with *X. ulophyllodes*.

Xanthomendoza ulophyllodes (Räsänen) Søchting, Kärnefelt & S.Y. Kondr.

Mitt. Inst. allg. Bot. Hamburg, 30-32: 238, 2002 - *Xanthoria ulophyllodes* Räsänen, Ann. Acad. Sci. Fenn., 34, 4: 105, 1931.

Syn.: *Oxneria ulophyllodes* (Räsänen) S.Y. Kondr. & Kärnefelt, *Parmelia parietina* var. *fibrillosa* Schaer., *Physcia controversa* var. *stenophylla* A. Massal., *Xanthoria stenophylla* (Harm.) B. de Lesd., *Xanthoria substellaris* var. *isidiigera* Räsänen

N - Frl (TSB), **Ven** (Lazzarin 2000b, Nascimbene & Caniglia 2003c), **TAA** (Nascimbene & al. 2007b, Nimis & al. 2015), **Lomb, Piem** (Castino 2004, Isocrono & al. 2004, 2005b, 2007, Isocrono & Piervittori 2008, Matteucci & al. 2010), **Lig** (LD- 1088800), **C - Tosc** (Benesperi & al. 2007).

Fol.n/ Ch/ A.s/ Epiph/ pH: 3, L: 4-5, X: 4, E: 3-4/ Alt: 2-3/ Mont: vr, SmedD: r/ PT: 1-3/ subc/ Note: on isolated trees, often near the base of the trunks along roads, formerly often confused with *X. huculica* and especially with *X. oregana*; the Italian samples should be checked against *X. oregana*.

Xanthoparmelia (Vain.) Hale

Phytologia, 28: 485, 1974 - *Parmelia* sect. *Xanthoparmelia* Vain., Acta Soc. Fauna Fl. Fenn., 7: 60, 1890.

This segregate from *Parmelia s.lat.* comprises more than 800 species worldwide, with the highest diversity in semi arid-areas, mostly on siliceous rocks. Originally, the genus included only the greenish-yellow species

with atranorin and usnic/isousnic acids in the upper cortex, while similar species with brown thalli were placed in *Neofuscelia*. Molecular studies have shown that *Neofuscelia* is polyphyletic, with clades scattered within *Xanthoparmelia*. Consequently, as anticipated by Nimis (1998), the species of *Neofuscelia* have been included in *Xanthoparmelia* (Blanco & al. 2004b). The species concept in this genus is still open to discussion: in my opinion, all too many chemical strains were raised to the rank of species. Matteucci & al. (2016) studied the morphological and chemical variability at the local scale, finding a high number of morpho-chemotypes, with several metabolites showing a rather continuous variability that was often related to macro- and micronutrient contents in thalli, which suggests that environmental influence may complicate variability patterns in *Xanthoparmelia*. Some authors (e.g. Roux & coll. 2014) tend to subsume several chemical taxa at the level of variety or chemical form without taxonomic recognition. Pending further molecular analyses, I still accept them here. Type: *X. conspersa* (Ach.) Hale. The name is conserved against *Chondriopsis* Nyl. ex Croum. (1879).

Xanthoparmelia angustiphylla (Gyeln.) Hale

Mycotaxon, 33: 401, 1988 - *Parmelia conspersa* var. *angustiphylla* Gyeln., Feddes Rep., 29: 153, 1931.

Syn.: *Parmelia angustiphylla* (Gyeln.) Gyeln., *Parmelia conspersa* var. *paniculosa* Erichsen, *Parmelia subconspersa* f. *marusica* Gyeln.

N - VA (Matteucci & al. 2015c), **Lig** (Giordani & al. 2002b, Rizzi & al. 2006). **C - Tosc** (Benespero 2006, 2007b, Pasquini 2014), **Sar** (Nöske 2000, Giordani & al. 2009, Rizzi & al. 2011). **S - Si** (Giordani & al. 2002b).

Fol.b/ Ch/ S/ Sax/ pH: 2-3, L: 3-5, X: 3-4, E: 2-3/ Alt: 1/ MedH: vr, MedD: r/ PT: 1/ Note: a southern species in Europe, found on siliceous boulders, that might be more widespread in Mediterranean Italy. Perhaps better treated as a subspecies of *X. conspersa* (see Roux & coll. 2014: 1279).

Xanthoparmelia conspersa (Ach.) Hale

Phytologia, 28: 485, 1974 - *Lichen conspersus* Ehrh. ex Ach., Lichenogr. Suec. Prodr.: 118, 1799.

Syn.: *Imbricaria conspersa* (Ach.) DC., *Imbricaria conspersa* var. *coralloidea* Hazsl., *Imbricaria conspersa* var. *isidiata* Anzi, *Imbricaria conspersa* var. *munda* Hazsl., *Parmelia bakonyensis* Gyeln., *Parmelia bohemia* Gyeln., *Parmelia centrifuga* var. *conspersa* (Ach.) Schaer., *Parmelia conspersa* (Ach.) Ach., *Parmelia conspersa* f. *dispersa* Mereschk., *Parmelia conspersa* f. *heteroclyta* Mereschk., *Parmelia conspersa* f. *munda* (Harm.) Zahlbr., *Parmelia conspersa* subsp. *digitulata* Nyl., *Parmelia conspersa* var. *isidiata* (Anzi) E.C. Berry, *Parmelia conspersa* var. *tatrensis* Suza, *Parmelia isidiata* (Anzi) Gyeln., *Parmelia lojkana* Gyeln., *Parmelia subconspersa* Nyl.

N - VG (Giordani & al. 2002b, Castello 2002, Martellos & Castello 2004, Tretiach & al. 2007b), **Fri** (Giordani & al. 2002b), **Ven** (Caniglia & al. 1999, Giordani & al. 2002b), **TAA** (Triebel & Rambold 1995, Hafellner 2001, Giordani & al. 2002b, Nascimbene 2005b, 2006c, Lang 2009, Brackel 2013), **Lomb** (Rivellini 1994, Giordani & al. 2002b, Valcuvia & al. 2003, Dalle Vedove & al. 2004, De Vita & Valcuvia 2004, Brackel 2010, 2013), **Piem** (Morisi & Sereno 1995, Isocrono & Falletti 1999, Giordani & al. 2002b, Isocrono & al. 2003, 2004, Morisi 2005, Isocrono & Ferrarese 2008, Isocrono & Piervittori 2008), **VA** (Piervittori & al. 1998, 2001, Piervittori & Isocrono 1999, Giordani & al. 2002b, Matteucci & al. 2015c), **Emil** (Giordani & al. 2002b, Tretiach & al. 2008), **Lig** (Brunialti & al. 1999, Giordani & al. 2002b, 2016). **C - Tosc** (Adamo & al. 1993, Adamo 1997, Giordani & al. 2002b, Lastrucci & al. 2009, Brackel 2015), **Marc**, **Laz** (Gigante & Petriccione 1995, Giordani & al. 2002b, Brackel 2015), **Sar** (Triebel & Rambold 1995, Zedda 2002, 2002b, Giordani & al. 2002b, 2013, Rizzi & al. 2011, Cossu & al. 2015). **S - Camp** (Garofalo & al. 1999, Ricciardi & al. 2000, Aprile & al. 2002, Giordani & al. 2002b, Nimis & Tretiach 2004, Terribile & al. 2012, Catalano & al. 2016), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996, Giordani & al. 2002b, Brackel & Puntillo 2016), **Si** (Ottonello & al. 1994, 2011, Ottonello 1995, Poli & al. 1995, Grillo & al. 1996, 1996b, Ottonello & Romano 1997, Grillo 1998, Czezugza & al. 1999, Grasso & al. 1999, Monna & al. 1999, Poli & Grillo 2000, Varrica & al. 2000, Clocchiatti & al. 2002, Giordani & al. 2002b, Merlo 2004, Grillo & Caniglia 2004, Brackel 2008b, 2008c, Grillo & Cataldo 2008, Cataldo & Cannavò 2014).

Fol.b/ Ch/ A.i/ Sax/ pH: 2-3, L: 3-5, X: 3-4, E: 2-3/ Alt: 1-5/ Alp: r, Salp: rc, Orom: rr, Mont: vc, SmedD: rc, Pad: er, SmedH: rr, MedH: r, MedD: er/ PT: 1-2/ Note: on siliceous rocks wetted by rain, including pebbles near the ground, with a wide altitudinal range; restricted to upland areas in southern Italy, less frequent than the vicariant *X. tinctoria* in the Mediterranean belt.

Xanthoparmelia cumberlandia (Gyeln.) Hale

Phytologia, 28: 487, 1974 - *Parmelia subconspersa* var. *cumberlandia* Gyeln., Feddes Rep., 36: 164, 1934.

N - VA (Matteucci & al. 2015c), **Lig** (Giordani & al. 2002b, 2009). **C - Sar** (Giordani & al. 2002b, 2013, Rizzi & al. 2011).

Fol.b/ Ch/ S/ Sax/ pH: 2-3, L: 3-5, X: 3-4, E: 2-3/ Alt: 1/ MedH: vr, MedD: r/ PT: 1/ Note: on siliceous rocks, perhaps more widespread in Mediterranean Italy.

Xanthoparmelia delisei (Duby) O. Blanco, A. Crespo, Elix, D. Hawksw. & Lumbsch

Taxon, 53: 967, 2004 - *Parmelia olivacea* var. *delisei* Duby in DC., Bot. Gall., 2 éd., 2: 602, 1830.

Syn.: *Neofuscelia delisei* (Duby) Essl., *Parmelia delisei* (Duby) Nyl., *Parmelia proluxa* var. *perlata* Sambo, *Parmelia pulla* var. *delisei* (Duby) H. Magn., *Parmelia samboana* Gyeln.

N - VG (Giordani & al. 2003), **TAA** (Giordani & al. 2003), **Lomb** (Giordani & al. 2003), **Piem** (Giordani & al. 2003), **VA** (Piervittori & al. 2001), **Emil** (Giordani & al. 2003), **Lig** (Giordani & al. 2003, Rizzi & al. 2006). **C - Tosc** (Giordani & al. 2003), **Marc** (Giordani & al. 2003), **Laz** (Giordani & al. 2003), **Sar** (Giordani & al. 2003, Rizzi & al. 2011). **S - Camp** (Garofalo & al. 1999, Ricciardi & al. 2000, Giordani & al. 2003), **Si** (Giordani & al. 2003).

Fol.b/ Ch/ S/ Sax/ pH: 2-3, L: 4, X: 3-4, E: 2-3/ Alt: 1-3/ Mont: vr, SmedD: rr, SmedH: rr, MedH: r, MedD: er/ PT: 1-2/ Note: on base-rich siliceous rocks. Perhaps this may be the primary, sexually reproducing species of *X. loxodes*, chemically different from *X. pulla*, and probably often confused with it in the earlier Italian literature.

Xanthoparmelia glabrans (Nyl.) O. Blanco, A. Crespo, Elix, D. Hawksw. & Lumbsch

Taxon, 53: 967, 2004 - *Parmelia glabrans* Nyl., Flora, 58: 15, 1875.

Syn.: *Neofuscelia glabrans* (Nyl.) Essl., *Parmelia pulla* subsp. *glabrans* (Nyl.) Clauzade & Cl. Roux

N - TAA (Giordani & al. 2003), VA (Matteucci & al. 2012, 2013, 2015c, 2015d), Lig (S- F185259, Watson 2014).

Fol.b/ Ch/ S/ Sax/ pH: 2-3, L: 4-5, X: 3, E: 2-3/ Alt: 1/ MedH: rr, MedD: er/ PT: 1-2/ suboc/ Note: on siliceous rocks. Differing from *X. pulla* for the presence of collatolic and aleatoronic acids. Despite the purported preference for a Mediterranean climate, most Italian records are from continental alpine valleys. Earlier records from Sardegna and Puglia are dubious.

Xanthoparmelia loxodes (Nyl.) O. Blanco, A. Crespo, Elix, D. Hawksw. & Lumbsch

Taxon, 53: 968, 2004 - *Parmelia loxodes* Nyl., Flora, 55: 426, 1872.

Syn.: *Neofuscelia loxodes* (Nyl.) Essl., *Parmelia delisei* var. *isidiascens* (Nyl. ex Cromb.) Zahlbr., *Parmelia glabrizans* Flagey, *Parmelia isidiotyloa* Nyl., *Parmelia prolixa* var. *isidiascens* Nyl. ex Cromb.

N - VG (Crisafulli & al. 2004, Giordani & al. 2003, Tretiach & al. 2007b), Frl, TAA (Giordani & al. 2003), Lomb (Valcuvia & Delucchi 2001, Valcuvia & al. 2003, De Vita & Valcuvia 2004, Delucchi & Valcuvia 2004), Emil (Giordani & al. 2003), Lig (Giordani & al. 2003, Rizzi & al. 2006, Watson 2014). C - Tose (Benesperi 2000a, Giordani & al. 2003, Lastrucci & al. 2009), Marc (Nimis & Tretiach 1999, Giordani & al. 2003), Umb (Panfili 2000b, Ravera & al. 2006, Genovesi 2011), Laz (Gigante & Petriccione 1995, Giordani & al. 2003, Zucconi & al. 2013), Abr (Nimis & Tretiach 1999, Giordani & al. 2003), Mol (Garofalo & al. 1999, Caporale & al. 2008), Sar (Monte 1993, Giordani & al. 2003, 2013, Rizzi & al. 2011, Cossu & al. 2015). S - Camp (Garofalo & al. 1999, Aprile & al. 2002, Giordani & al. 2003, Nimis & Tretiach 2004, Catalano & al. 2016), Pugl (Garofalo & al. 1999), Bas (Nimis & Tretiach 1999, Giordani & al. 2003), Cal (Puntillo 1996), Si (Ottonello & al. 1994, 2011, Nimis & al. 1996b, Ottonello & Romano 1997, Grillo 1998, Giordani & al. 2003, Grillo & Caniglia 2004).

Fol.b/ Ch/ A.s/ Sax/ pH: 2-4, L: 3-4, X: 3-4, E: 3-5/ Alt: 1-3/ Mont: rr, SmedD: vc, Pad: vr, SmedH: ec, MedH: vc, MedD: rc/ PT: 1-3/ Note: a mainly temperate, common species of basic siliceous rocks, occurring also in urban areas (e.g. well into the outskirts of Rome), with a slightly suboceanic distribution in Europe.

Xanthoparmelia luteonotata (J. Steiner) O. Blanco, A. Crespo, Elix, D. Hawksw. & Lumbsch

Taxon, 53: 968, 2004 - *Parmelia luteonotata* J. Steiner, Verh. zool.-bot. Ges. Wien, 12: 472, 1902.

Syn.: *Neofuscelia luteonotata* (J. Steiner) Essl., *Parmelia pulla* subsp. *luteonotata* (J. Steiner) Clauzade & Cl. Roux

N - TAA (Giordani & al. 2003), Lig (Giordani & al. 2003). C - Tose (Giordani & al. 2003), Laz (Giordani & al. 2003), Sar (Giordani & al. 2003). S - Cal (Giordani & al. 2003), Si (Giordani & al. 2003).

Fol.b/ Ch/ S/ Sax/ pH: 2-3, L: 4-5, X: 4, E: 2-3/ Alt: 1-3/ Mont: vr, SmedH: vr, MedH: r, MedD: r/ PT: 1-2/ Note: a mainly Mediterranean species of sun-exposed siliceous rocks wetted by rain, occurring also in dry-warm sites of the Alps; it was not always distinguished from *X. pulla* in the Italian literature, so that the total distribution is poorly known.

Xanthoparmelia mexicana (Gyeln.) Hale

Phytologia, 28: 488, 1974 - *Parmelia mexicana* Gyeln., Feddes Rep., 29: 488, 1931.

N - Lig (Giordani & al. 2009). C - Sar (Nöske 2000, Giordani & al. 2002b, Rizzi & al. 2011).

Fol.b/ Ch/ A.i/ Sax/ pH: 2-3, L: 3-5, X: 3-4, E: 2-3/ Alt: 1-2/ SmedH: vr, MedH: vr, MedD: r/ PT: 1/ Note: on siliceous rocks wetted by rain, perhaps more widespread in Mediterranean Italy.

Xanthoparmelia mougeotii (Schaer.) Hale

Phytologia, 28: 488, 1974 - *Parmelia mougeotii* Schaer. in Dietrich, Deutsch. Krypt. Gew., 4: 118, 1846.

Syn.: *Parmelia conspersa* var. *quarzicola* Moug., *Parmelia discreta* (Nyl.) Nyl.

N - Lomb (TSB 6840), VA (Piervittori & Isocrono 1999, Giordani & al. 2002b), Emil (Giordani & al. 2002b). C - Marc (Giordani & al. 2002b), Sar (Nöske 2000, Giordani & al. 2002b).

Fol.n/ Ch/ A.s/ Sax/ pH: 1-2, L: 4, X: 3, E: 1-2/ Alt: 2-4/ Salp: r, Orom: er, Mont: vr, SmedD: vr/ PT: 1-2/ Note: a mainly boreal-montane, circumpolar species found on hard siliceous rocks, often near the ground, e.g. on pebbles; probably more widespread in the Alps, but never common.

Xanthoparmelia ferrugata (Nyl.) O. Blanco, A. Crespo, Elix, D. Hawksw. & Lumbsch

Taxon, 53: 968, 2004 - *Parmelia ferrugata* Nyl., Flora, 68: 295, 1885.

Syn.: *Neofuscelia ferrugata* (Nyl.) Elix

N - TAA (Giordani & al. 2003), Lomb (Giordani & al. 2003), Piem (Giordani & al. 2003), VA (Giordani & al. 2003), Lig (Giordani & al. 2003). C - Tose (Giordani & al. 2003, Benesperi 2006, Brackel 2015), Sar (Giordani & al. 2003). S - Camp (Giordani & al. 2003), Pugl (Giordani & al. 2003), Cal (Giordani & al. 2003), Si (Giordani & al. 2003).

Fol.b/ Ch/ S/ Sax/ pH: 2-3, L: 4-5, X: 3-4, E: 2-3/ Alt: 1-4/ Salp: vr, Orom: rr, Mont: rr, SmedD: rr, Pad: r, SmedH: rr, MedH: r, MedD: r/ PT: 1-3/ Note: a boreal to (mainly) Mediterranean species found on exposed

siliceous rocks, including pebbles, exceptionally also on limestone; in the past it has been frequently confused with other species of the *X. pulla* group.

Xanthoparmelia plittii (Gyeln.) Hale

Phytologia, 28: 488, 1974 - *Parmelia plittii* Gyeln., Feddes Rep., 29: 287, 1931.

N - Lig (Giordani & al. 2009). **C - Tosc** (Giordani & al. 2009), **Sar** (Giordani & al. 2002b).

Fol.b/ Ch/ A.i/ Sax/ pH: 2-3, L: 3-5, X: 3-4, E: 2-3/ Alt: 1/ MedH: vr, MedD: vr/ PT: 1/ Note: on siliceous rocks, perhaps more widespread in Mediterranean Italy.

Xanthoparmelia pokorny (Körb.) O. Blanco, A. Crespo, Elix, D. Hawksw. & Lumbsch

Taxon, 53: 970, 2004 - *Imbricaria pokorny* Körb. in Pokorny, Verh. zool.-bot. Ges. Wien, 10: 285, 1860.

Syn.: *Neofuscelia pokorny* (Körb.) Essl., *Parmelia pokorny* (Körb.) Szatala, *Parmelia pulla* var. *pokorny* (Körb.) Türk & Breuss

C - Sar (HAL-3087).

Fol.b/ Ch/ S/ Terr/ pH: 2-3, L: 3-5, X: 4-5, E: 1-2/ Alt: 1/ MedH: er, MedD: er/ PT: 1/ Note: a mainly terricolous species of steppe-like habitats, closely related to *X. pulla*. The Italian sample was collected by B. Feige at Monte Linas.

Xanthoparmelia protomatrae (Gyeln.) Hale

Phytologia, 28: 488, 1974 - *Parmelia protomatrae* Gyeln., Feddes Rep., 29: 155, 1931.

Syn.: *Parmelia conspersa* f. *matrae* Gyeln., *Parmelia nigrescens* Gyeln. non Stirt. nec (Huds.) Ach., *Parmelia mitrovicensis* Gyeln., *Parmelia protomatrae* f. *angustifolia* Gyeln., *Parmelia protomatrae* f. *crustaeformis* Gyeln., *Parmelia serbica* Gyeln., *Parmelia subconspersa* var. *varazzana* Gyeln., *Xanthoparmelia somloënsis* var. *protomatrae* R. Sant. comb. inval.

N - Ven (Giordani & al. 2002b), **TAA** (Giordani & al. 2002b), **Lomb** (Giordani & al. 2002b, Dalle Vedove & al. 2004), **Piem** (Isocrono & Falletti 1999, Giordani & al. 2002b), **VA** (Matteucci & al. 2015c), **Emil** (Giordani & al. 2002b), **Lig** (Giordani & al. 2002b). **C - Tosc** (Benesperi 2001, Giordani & al. 2002b, Brackel 2015), **Laz** (Giordani & al. 2002b), **Sar** (Giordani & al. 2002b, Rizzi & al. 2011). **S - Camp** (Aprile & al. 2002, Giordani & al. 2002b, Nimis & Tretiach 2004, Catalano & al. 2016), **Cal** (Puntillo 1996, Giordani & al. 2002b), **Si** (Czeczuga & al. 1999, Giordani & al. 2002b).

Fol.b/ Ch/ S/ Sax/ pH: 2-3, L: 4, X: 4, E: 2-3/ Alt: 1-5/ Alp: vr, Salp: vr, Orom: rr, Mont: r, SmedD: r, SmedH: rc, MedH: rc, MedD: rr/ PT: 1-2/ Note: on weathered siliceous rocks, mostly near the ground. Considered by Roux & coll. (2014) as a chemotype of *X. stenophylla*.

Xanthoparmelia pulla (Ach.) O. Blanco, A. Crespo, Elix, D. Hawksw. & Lumbsch

Taxon, 53: 970, 2004 - *Parmelia pulla* Ach., Syn. Meth. Lich.: 206, 1814.

Syn.: *Imbricaria dendritica* auct. ital. p.p., *Neofuscelia pulla* (Ach.) Essl., *Parmelia olivacea* var. *saxicola* auct. ital., *Parmelia prolixa* (Ach.) Röhl., *Parmelia subprolixa* Nyl. ex Kremp.

N - VG (Castello 2002, Martellos & Castello 2004), **Frl, Ven** (Caniglia & al. 1999, Nascimbene 2008), **TAA** (Giordani & al. 2003, Nascimbene 2001b, 2005b 2006c, 2008b), **Lomb** (Giordani & al. 2003, Valcuvia & al. 2003, Dalle Vedove & al. 2004, De Vita & Valcuvia 2004), **Piem** (Morisi & Sereno 1995, Clerc & al. 1999, Isocrono & Falletti 1999, Isocrono & al. 2003, 2004, Favero-Longo & al. 2004, 2005, 2006b, Isocrono & Piervittori 2008), **VA** (Borlandelli & al. 1996, Piervittori & Isocrono 1997, 1999, Piervittori & al. 1998, 2001, Revel & al. 2001, Matteucci & al. 2015c), **Emil** (Giordani & al. 2003), **Lig** (Brunialti & al. 1999, Giordani & al. 2003, Rizzi & al. 2006). **C - Tosc** (Benesperi 2000a, Giordani & al. 2003, Tretiach & al. 2008, Lastrucci & al. 2009), **Umb** (Genovesi & Ravera 2001, Panfilii 2003, Ravera & al. 2006), **Marc** (Nimis & Tretiach 1999), **Laz** (Gigante & Petriccione 1995, Giordani & al. 2003, Zucconi & al. 2013), **Abr** (Recchia & Villa 1996), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **Sar** (Monte 1993, Zedda 1995, 2002, 2002b, Nöske 2000, Giordani & al. 2003, 2013, Rizzi & al. 2011, Cossu & al. 2015). **S - Camp** (Garofalo & al. 1999, Aprile & al. 2002, Giordani & al. 2003, Nimis & Tretiach 2004, Catalano & al. 2016), **Pugl** (Nimis & Tretiach 1999), **Bas** (Bartoli & Puntillo 1998, Nimis & Tretiach 1999, Giordani & al. 2003), **Cal** (Puntillo 1996, Giordani & al. 2003, Puntillo & Puntillo 2004, 2015b, Scarciglia & al. 2007, 2012, 2012b, Brackel & Puntillo 2016), **Si** (Czeczuga & al. 1994, 1999, Ottonello & Salone 1994, Ottonello & al. 1994, 2011, Poli & al. 1995, Ottonello 1995, 1996, Nimis & al. 1996b, Grillo & al. 1996, 1996b, Ottonello & Romano 1997, Grillo 1998, Grasso & al. 1999, Poli & Grillo 2000, Giordani & al. 2003, Merlo 2004, 2004b, Grillo & Caniglia 2004, Brackel 2008b, 2008c, Cataldo & Cannavò 2014).

Fol.b/ Ch/ S/ Sax/ pH: 2-3, L: 4-5, X: 3-4, E: 2-3/ Alt: 1-5/ Alp: er, Salp: r, Orom: rc, Mont: c, SmedD: vc, Pad: r, SmedH: ec, MedH: ec, MedD: vc/ PT: 1-3/ Note: a mainly temperate to Mediterranean species found on exposed siliceous rocks, including pebbles, exceptionally also on limestone, with a broad, but mainly Tyrrhenian distribution in Italy. Some records could refer to other, morphologically similar but chemically different taxa.

Xanthoparmelia stenophylla (Ach.) Ahti & D. Hawksw.

Lichenologist, 37: 363, 2005 - *Parmelia conspersa* var. *stenophylla* Ach., Meth. Lich.: 206, 1803.

Syn.: *Parmelia centrifuga* var. *stenophylla* auct., *Parmelia conspersa* f. *convoluta* Rabenh., *Parmelia conspersa* var. *heraultensis* Gyeln., *Parmelia conspersa* var. *imbricata* A. Massal., *Parmelia convoluta* (Rabenh.) Gyeln., *Parmelia hypopallida* Gyeln., *Parmelia imitans* (Müll. Arg.) Gyeln., *Parmelia molluscula* auct. non Ach., *Parmelia somloënsis* Gyeln., *Parmelia stenophylla* (Ach.) Heugel, *Parmelia taractica* auct. non Kremp., *Xanthoparmelia somloënsis* (Gyeln.) Hale, *Xanthoparmelia taractica* auct.

N - VG (Giordani & al. 2002b, Castello 2002, Martellos & Castello 2004), **Frl** (Giordani & al. 2002b), **Ven** (Lazzarin 2000b, Giordani & al. 2002b), **TAA** (Giordani & al. 2002b, Nascimbene 2008b), **Lomb** (Tretiach 1996, Giordani & al.

2002b), **Piem** (Morisi & Sereno 1995, Giordani & al. 2002b, Isocrono & al. 2003, Isocrono & Piervittori 2008, Favero-Longo & al. 2015b), **VA** (Borlandelli & al. 1996, Girlanda & al. 1997, Piervittori & Isocrono 1997, 1999, Piervittori & al. 2001, Revel & al. 2001, Giordani & al. 2002b, Matteucci & al. 2015c), **Emil** (Giordani & al. 2002b), **Lig** (Brunialti & al. 1999, Giordani & al. 2002b). **C - Tosc** (Benesperi 2000a, 2006, Giordani & al. 2002b, Lastrucci & al. 2009, Brackel 2015), **Umb** (Genovesi & al. 2001, Ravera & al. 2006), **Laz** (Gigante & Petriccione 1995, Giordani & al. 2002b, Zucconi & al. 2013), **Sar** (Zedda 1995, 2002b, Giordani & al. 2002b, 2013, Rizzi & al. 2011, Cossu & al. 2015). **S - Camp** (Giordani & al. 2002b, Nimis & Tretiach 2004), **Bas** (Nimis & Tretiach 1999, Giordani & al. 2002b), **Cal** (Puntillo 1996, Giordani & al. 2002b), **Si** (Poli & al. 1995, Giordani & al. 2002b, Merlo 2004b).

Fol.b/ Ch/ S/ Sax-Terr/ pH: 2-3, L: 4-5, X: 4, E: 2-3/ Alt: 1-5/ Alp: r, Salp: rr, Orom: r, Mont: er, SmedD: vr, Pad: er, SmedH: rr, MedH: vr, MedD: vr/ PT: 1-2/ Note: on weathered siliceous rocks and mineral soil in open, dry situations, with a very wide altitudinal range.

Xanthoparmelia sublaevis (Cout.) Hale

Mycotaxon, 33: 406, 1988 - *Parmelia sublaevis* Cout., Lich. Lusit. Cat.: 71, 1916.

Syn.: *Imbricaria conspersa* var. *hypoclista* (Nyl.) Arnold, *Parmelia conspersa* var. *hypoclista* Nyl.

N - TAA (Giordani & al. 2002b, Nascimbene 2006c), **VA** (Matteucci & al. 2015c, 2015d), **Lig** (Giordani & al. 2009). **C - Tosc** (Giordani & al. 2009), **Sar** (Giordani & al. 2002b).

Fol.b/ Ch/ S/ Sax/ pH: 2-3, L: 4, X: 4, E: 1-3/ Alt: 1-2/ SmedD: er, MedH: er, MedD: vr/ PT: 1/ Note: on siliceous rocks wetted by rain, hitherto known from the Mediterranean Region and the dry-warm Alpine valleys

Xanthoparmelia tinctina (Maheu & A. Gillet) Hale

Phytologia, 28: 489, 1974 - *Parmelia tinctina* Maheu & A. Gillet, Bull. Soc. Bot. France, 72: 860, 1925.

Syn.: *Parmelia algeriensis* B. de Lesd., *Parmelia conspersa* subsp. *tinctina* (Maheu & A. Gillet) Clauzade & Cl. Roux, *Parmelia conspersa* var. *isidiosa* Nyl., *Parmelia tokajensis* Gyeln.

N - TAA (Giordani & al. 2002b), **Lomb** (Valcuvia & Delucchi 2001, Giordani & al. 2002b, Valcuvia & al. 2003), **Piem** (Isocrono & Falletti 1999, Giordani & al. 2002b, Favero-Longo & al. 2004, 2005, 2006b, Favero-Longo & Piervittori 2012), **VA** (Matteucci & al. 2012, 2015c), **Emil** (Valcuvia & Delucchi 2001, Giordani & al. 2002b), **Lig** (Giordani & Brunialti 2000, Giordani & al. 2002b, 2016). **C - Tosc** (Giordani & al. 2002b, Benesperi 2006, Lastrucci & al. 2009, Brackel 2015), **Umb** (Panfili 2000b, Giordani & al. 2002b, Ravera & al. 2006), **Laz** (Giordani & al. 2002b, Giordani & al. 2002b, Zucconi & al. 2013), **Sar** (Monte 1993, Zedda 1995, 2002, 2002b, Nöske 2000, Giordani & al. 2002b, 2013, Piccotto & al. 2009, Piccotto & Tretiach 2010, Rizzi & al. 2011). **S - Camp** (Aprile & al. 2002, Giordani & al. 2002b, Nimis & Tretiach 2004, Catalano & al. 2016), **Bas** (Nimis & Tretiach 1999, Potenza 2006), **Cal** (Puntillo 1996, Giordani & al. 2002b, Puntillo & Puntillo 2004), **Si** (Ottonello 1995, Nimis & al. 1996b, Clocchiatti & al. 2000, 2002b, Giordani & al. 2002b, Merlo 2004b, Ottonello & al. 2011, Cataldo & Cannavò 2014).

Fol.b/ Ch/ A.i/ Sax/ pH: 2-3, L: 4-5, X: 4, E: 3-4/ Alt: 1-2/ SmedD: er, SmedH: c, MedH: vc, MedD: rc/ PT: 1-2/ Note: a mainly southern species found on siliceous rocks (including serpentine) in sunny situations, common in the Mediterranean belt, but also occurring in dry-warm Alpine valleys.

Xanthoparmelia verrucigera (Nyl.) Hale

Smithsonian Contr. Bot., 74: 220, 1990 - *Parmelia verrucigera* Nyl., Flora, 55: 426, 1872.

Syn.: *Parmelia conspersa* var. *isidiophora* Trevis., *Parmelia conspersa* var. *lusitana* (Nyl.) Lettau, *Parmelia conspersa* var. *verrucigera* (Nyl.) Boistel, *Parmelia isidiigera* f. *ligustica* Gyeln., *Parmelia lusitana* Nyl., *Parmelia pseudoservitiana* Gyeln., *Parmelia pulvinaris* var. *mediterranea* Gyeln., *Parmelia servitiana* Gyeln., *Parmelia tarpatakensis* Gyeln., *Xanthoparmelia lusitana* (Nyl.) Krog

N - VG (Giordani & al. 2002b), **Frl** (Giordani & al. 2002b), **Ven** (Giordani & al. 2002b), **VA** (Matteucci & al. 2015c), **Lig** (Giordani & al. 2002b, 2009). **C - Tosc** (Giordani & al. 2002b), **Sar** (Giordani & al. 2002b, Rizzi & al. 2011). **S - Camp** (Giordani & al. 2002b), **Bas** (Giordani & al. 2002b).

Fol.b/ Ch/ A.i/ Sax/ pH: 2-3, L: 4-5, X: 4, E: 3/ Alt: 1-2/ SmedD: vr, MedH: r/ PT: 1/ Note: on siliceous rocks; related to *X. conspersa*, but chemically different (stictic acid, lusitana-unknown, lacking norstictic acid).

Xanthoparmelia verruculifera (Nyl.) O. Blanco, A. Crespo, Elix, D. Hawksw. & Lumbsch

Taxon, 53: 972, 2004 - *Parmelia verruculifera* Nyl., Flora, 61: 247, 1878.

Syn.: *Neofuscelia verruculifera* (Nyl.) Essl., *Parmelia glomellifera* (Nyl.) Nyl., *Parmelia isidiotyta* var. *glomellifera* (Nyl.) Maas Geest., *Parmelia loxodes* var. *verruculifera* (Nyl.) Clauzade & Cl. Roux, *Parmelia massalongoana* Gyeln., *Parmelia olivacea* var. *leucocheila* A. Massal., *Parmelia proluxa* var. *glomellifera* Nyl., *Parmelia proluxa* var. *sorediosa* Sambo

N - VG (Giordani & al. 2003), **Ven**, **TAA** (Giordani & al. 2003), **Lomb** (Giordani & al. 2003), **Piem** (Morisi & Sereno 1995, Isocrono & al. 2004, Isocrono & Piervittori 2008, Favero-Longo & al. 2015), **VA** (Matteucci & al. 2015d), **Emil**, **Lig** (Giordani & al. 2003). **C - Tosc** (Giordani & al. 2003, Brackel 2015), **Laz**, **Sar** (Nöske 2000, Giordani & al. 2003, 2013, Rizzi & al. 2011). **S - Pugl** (Jatta 1909-1911), **Cal** (S- F186458), **Si** (Brackel 2008b, 2008c).

Fol.b/ Ch/ A.s/ Sax/ pH: 2-4, L: 3-4, X: 3-4, E: 3-4/ Alt: 1-3/ Mont: r, SmedD: r, Pad: er, SmedH: r, MedH: vr, MedD: er/ PT: 1/ Note: on base-rich, sometimes slightly calciferous siliceous rocks, mostly on horizontal faces, this species is characterised by the presence of divaricatic, rarely of stenosporic acids. Related to *X. loxodes*, but with a less suboceanic distribution in Europe. Earlier records from Puglia and Sicilia are dubious.

Xanthoria (Fr.) Th. Fr.

Nova Acta R. Soc. Scient. Upsal., ser. 3, 3: 166, 1861 (1860) - *Parmelia* subdiv. *Xanthoria* Fr., Syst. Orb. Veg., 1: 243 1825.

The traditional circumscription of the genus *Xanthoria* has been profoundly modified in recent times with the segregation of several species into other genera, such as *Polycauliona*, *Rusavskia* and *Xanthomendoza* (see Arup & al. 2013). In its narrower definition, *Xanthoria* is a well-supported genus of c. 10 species in the Teloschistaceae, including *X. resendei*, even if this species differs in slightly narrower spore septa and in the anatomy of the upper cortex. The genus is best represented in the Northern Hemisphere, with an obvious diversity centre in the Mediterranean area, where most species occur. See also comments on the genus *Xanthomendoza*. Type: *X. parietina* (L.) Th. Fr. The name is conserved against *Blasteniospora* Trevis. (1853) and *Dufourea* Ach. ex Luyk. (1809).

Xanthoria aureola (Ach.) Erichsen

Verh. bot. Ver. Prov. Brandenburg 72: 39, 1930 - *Parmelia aureola* Ach., Lichenogr. Univ.: 437, 1810.

Syn.: *Physcia ectaneoides* Nyl., *Xanthoria ectaneoides* (Nyl.) Zahlbr., *Xanthoria parietina* subsp. *ectanea* auct. non (Ach.) Clauzade & Cl. Roux, *Xanthoria parietina* var. *ectanea* auct. non (Ach.) J. Kickx f.

N - **VG** (Tretiach & al. 2007b), **Lig** (Valcuvia & al. 2000). **C** - **Tosc** (Adamo & al. 1993, Adamo 1997, Terribile & al. 2012), **Sar** (TSB 25561). **S** - **Camp** (Nimis & Tretiach 2004), **Pugl** (Nimis & Tretiach 1999), **Si** (Nimis & al. 1994, Ottonello & Salone 1994, Ottonello & Romano 1997, Ottonello & al. 2011).

Fol.b/ Ch/ S/ Sax/ pH: 3-4, L: 3-5, X: 2-3, E: 3-4/ Alt: 1/ MedH: r, MedD: vr/ PT: 1/ suboc, coast, #/ Note: a Mediterranean-Atlantic species with optimum on basic siliceous rocks near the coast, much more rare on limestone and on eutrophicated, acid siliceous rocks. The species is delimited here following Purvis & al. (1992); however, according to Roux & coll. (2014) it is probably restricted to Atlantic Europe and the Mediterranean records refer instead to *Xanthoria calcicola* var. *ectaniza* (Nyl.) Cl. Roux.

Xanthoria calcicola Oxner

Viznachnik Lishainikiv URSR: 302, 1937.

Syn.: *Xanthoria aureola* auct. non (Ach.) Erichsen, *Xanthoria ectanea* auct. ital. p.p., *Xanthoria parietina* subsp. *calcicola* (Oxner) Clauzade & Cl. Roux, *Xanthoria parietina* var. *aureola* auct. non (Ach.) Th. Fr.

N - **VG** (Castello 2002, Martellos & Castello 2004), **Frl**, **Ven**, **TAA**, **Lomb** (Valcuvia & al. 2003, De Vita & Valcuvia 2004), **Piem** (Valcuvia 2002, 2002b, Morisi 2005, Sandrone & al. 2009, Gazzano & al. 2009b), **VA** (Piervittori & Isocrono 1999), **Emil** (Nimis & al. 1996, Valcuvia & Savino 2000), **Lig** (Brunialti & al. 1999, Valcuvia & al. 2000). **C** - **Tosc** (Pišút 1997, Loppi & al. 2004c, Pasquinelli & al. 2009, Pasquinelli & Puccini 2010, Brackel 2015), **Marc** (Nimis & Tretiach 1999), **Umb** (Nimis & Tretiach 1999, Panfili 2003, Ravera & al. 2006, Genovesi 2011), **Laz** (Gigante & Petriccione 1995, Roccardi 2003, Pietrini & al. 2008, Zucconi & al. 2013, Brackel 2015), **Abr** (Nimis & Tretiach 1999), **Mol** (Garofalo & al. 1999, Nimis & Tretiach 1999, Caporale & al. 2008, Genovesi & Ravera 2014), **Sar** (Monte 1993, Nöske 2000, Piccotto & Tretiach 2010, Rizzi & al. 2011, Giordani & al. 2013, Cossu & al. 2015), **S** - **Camp** (Garofalo & al. 1999, 2010, Aprile & al. 2002, 2003b, Nimis & Tretiach 2004, Catalano & al. 2016), **Pugl** (Garofalo & al. 1999, Nimis & Tretiach 1999), **Bas**, **Cal** (Puntillo 1996), **Si** (Nimis & al. 1994, 1995, Ottonello & Salone 1994, Ottonello & al. 1994, 2011, Dongarrà & al. 1995, Ottonello 1995, 1996, Grillo & al. 1996b, 2001, 2002, 2009, Monte & Ferrari 1996, Ottonello & Romano 1997, Poli & al. 1997, Soechting 1997, Catalano & al. 1997, Salamone 1997, Grillo 1998, Czezug & al. 1999, Clocchiatti & al. 2000, 2002, 2002b, Varrica & al. 2000, Caniglia & Grillo 2001, 2005, 2006, Mangiafico & Pitruzzello 2003, Caniglia & al. 2004, Grillo & Caniglia 2004, Brackel 2008b, 2008c, Gianguzzi & al. 2009, Cataldo & Cannavò 2014).

Fol.b/ Ch/ S/ Sax/ pH: 3-4, L: 4-5, X: 4, E: 4-5/ Alt: 1-4/ Salp: vr, Orom: r, Mont: rr, SmedD: rc, Pad: vr, SmedH: ec, MedH: vc, MedD: c/ PT: 1-2/ Note: a mainly Mediterranean to mild-temperate lichen found on the top of isolated calcareous and basic siliceous boulders, and, limited to the western side of the Peninsula, abundant on roofing tiles; in strongly eutrophicated situations it can occasionally overgrow bryophytes and plant remains. See also note on *X. aureola*.

Xanthoria mediterranea Giralt, Nimis & Poelt

J. Hattori Bot. Lab., 74: 275, 1993.

Syn.: *Physcia parietina* var. *isidioidea* Beltr.?, *Xanthoria isidioidea* (Beltr.) Szatala?

N - **Frl** (TSB 21653), **Lig** (Giordani & al. 2009). **C** - **Laz** (TSB 5359), **Abr** (Eichenberger 2007), **Mol** (Garofalo & al. 1999, Nimis & Tretiach 1999, Caporale & al. 2008), **Sar** (Rizzi & al. 2011). **S** - **Camp** (Garofalo & al. 1999, Aprile & al. 2003b, Nimis & Tretiach 2004), **Pugl** (Garofalo & al. 1999, Nimis & Tretiach 1999, Durini & Medagli 2002), **Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996), **Si** (Nimis & al. 1996b).

Fol.b/ Ch/ A.i/ Sax/ pH: 4-5, L: 4-5, X: 4, E: 4-5/ Alt: 1-2/ SmedD: er, SmedH: er, MedH: vr, MedD: r/ PT: 1/ Note: a mainly Mediterranean species found on the top of isolated calcareous outcrops, often together with *X. calcicola*, and with a similar ecology, but with a narrower altitudinal range.

Xanthoria parietina (L.) Th. Fr.

N. Acta Reg. Soc. Sci. Upsal., ser. 3, 3: 67, 1861 - *Lichen parietinus* L., Sp. Pl., 2: 1143, 1753.

Syn.: *Parmelia parietina* (L.) Ach., *Parmelia parietina* var. *vulgaris* Schaer., *Physcia parietina* (L.) De Not., *Physcia parietina* var. *microphylla* (Flot.) Körb., *Physcia parietina* var. *platyphylla* (Wallr.) Körb.

N - **VG** (Castello 1996, 2002, Nimis & al. 1999, 2001, Castello 2002, Martellos & Castello 2004, Castello & Skert 2005, Piccotto & Tretiach 2010, Piccotto & al. 2011), **Frl** (Badin & Nimis 1996, Tretiach 1996, Nimis & al. 1999, 2001,

Tretiach & Baruffo 2001, 2001b, Castello & Skert 2005, Tretiach & Molaro 2007, Tomasi 2007, Nascimbene & Salvadori 2008, Tretiach & Pittao 2008, Nascimbene & al. 2009b, Bernini & al. 2010, Bertuzzi & al. 2013, Brackel 2013), **Ven** (Nimis & al. 1996c, Nascimbene & Caniglia 1997, 2000b, 2002, 2003c, Caniglia & al. 1999, Lazzarin 2000, Nimis & al. 2000, Valcuvia & al. 2000c, Nascimbene 2005c, 2008, Nascimbene & Marini 2007, 2010, Nascimbene & Salvadori 2008, Nascimbene & al. 2008e, 2015, Obermayer 2011b), **TAA** (De Benetti & Caniglia 1993, Nascimbene 2003, 2005b, 2008b, 2014, Nascimbene & al. 2005, 2006, 2007b, 2014, Cristofolini & al. 2008, Lang 2009, Zarabska & al. 2009, Nimis & al. 2015), **Lomb** (Rivellini 1994, Arosio & Rinaldi 1995, Grieco & Groppali 1995, Valcuvia & Gianatti 1995, Valcuvia & Brusoni 1996, Brusoni & al. 1997, Zocchi & al. 1997, Roella 1999, Brusoni & Valcuvia 2000, Casarini & al. 2000, Arosio & al. 2000, 2003, Valcuvia & al. 2003, Dalle Vedove & al. 2004, Anderi & al. 2005, Valcuvia & Truzzi 2007b, Rigamonti & al. 2008, Bontempi & al. 2008, Furlanetto 2010, Brackel 2010, 2013, Gheza & al. 2015), **Piem** (Caniglia & al. 1992, Piervittori & al. 1994, 1994b, 1996, 1996b, Alessio 1995, Usai 1995, Piervittori & Maffei 1996, 2001, Arosio & al. 1998, Piervittori 1998, 2003, Isocrono & Falletti 1999, Griselli & al. 2003, Castino 2004, Isocrono & al. 2004, 2005b, 2007, 2009, Furlanetto 2010, Giordani & Malaspina 2016), **VA** (Piervittori & Isocrono 1999, Piervittori & al. 2001, Matteucci & al. 2008c, Isocrono & Piervittori 2008, Matteucci & al. 2010), **Emil** (Bassi 1995, Gasparo & Tretiach 1996, Nimis & al. 1996, Valcuvia & Grieco 1995, Tretiach 1997, Valcuvia & Savino 2000, Sallesse 2003, Sanità di Toppi & al. 2005, Marconi & al. 2006, Morselli & Regazzi 2006, Tretiach & al. 2008, Cioffi 2009, Benesperi 2009, Malavasi 2014, Gerdol & al. 2014, Brackel 2015), **Lig** (Brunialti & al. 1999, Valcuvia & al. 2000, Giordani & al. 2002, Brunialti & Giordani 2003, Giordani 2006, Roccardi 2006, Giordani & Incerti 2008), **C - Tosc** (Tretiach & Nimis 1994, Loppi & Corsini 1995, 2003, Loppi & Putorti 1995, 1995b, 1995c, 1996, 1996b, 1996c, 1997, 1997b, 1998, 1998b, 1999a, 2002, 2002b, 2002c, 2003, 2004, 2004c, 2006, Loppi 1995c, 1996, 1996b, 2001, Loppi & De Dominicis 1996, Monaci & al. 1997, Loppi & Nascimbene 1998, 2010, Putorti & al. 1998, Putorti & Loppi 1999, 1999b, Scerbo & al. 1999, 2002, Bacci & al. 2000, Benesperi 2000a, 2011, Loppi & Pirintsos 2000, Senese & Critelli 2000, Del Guasta 2001, Paoli & Loppi 2001, 2004, 2008, Lorenzini & al. 2003, Landi & Loppi 2003, Loppi & Frati 2004, Pisani & al. 2006, 2009, 2011, Frati & al. 2006b, 2007, 2008, Benesperi & al. 2007, 2013, Brackel 2008, Lastrucci & al. 2009, Pasquinelli & al. 2009, 2013, Triggiani & al. 2009, Munzi & al. 2009, 2010, Brunialti & Frati 2010, 2012b, Pasquinelli & Puccini 2010, Brunialti & al. 2012, Paoli & al. 2012, 2012b, 2013, 2013b, 2014, 2014c, 2015b, 2015c, 2015d, Brackel 2015, Nascimbene & al. 2015), **Marc** (Gasparo & al. 1989, Nimis & Tretiach 1999, Brunialti & al. 2004, Urbani & al. 2004, Frati & Brunialti 2006, Brackel 2015, Pieri & al. 2015), **Umb** (Ravera 1998, Nimis & Tretiach 1999, Bargagli & al. 2000, Panfili 2000b, 2007, Ravera & al. 2006, Ciotti & al. 2009, Genovesi 2011, Brackel 2015), **Laz** (Gigante & Petriccione 1995, Bartoli & al. 1997, 1998, Ravera & al. 1999, Ravera 2002, 2008b, Massari & Ravera 2002, Honegger & al. 2004, Nimis & Tretiach 2004, Ruisi & al. 2005, Stofer 2006, Eichenberger 2007, Munzi & al. 2007, Ravera & Genovesi 2008, Roccardi 2011, Zucconi & al. 2013, Brackel 2015, Owczarek & Guidotti 2016), **Abr** (Recchia & al. 1993, Olivieri & Pacioni 1996, Olivieri & al. 1997, 1997b, Loppi & al. 1999, Nimis & Tretiach 1999, Cantù & al. 2002, De Angelis & al. 2003, Urbani & al. 2004, Stofer 2006, Brackel 2015, Caporale & al. 2016, Corona & al. 2016), **Mol** (Garofalo & al. 1999, Nimis & Tretiach 1999, Cerroni & al. 2004, Giancola & al. 2006, Caporale & al. 2008, Paoli & al. 2011, 2015, Cocozza & al. 2013, 2016, Genovesi & Ravera 2014, Brackel 2015), **Sar** (Zedda 1995, 2002, 2002b, Zedda & Sipman 2001, Zedda & al. 2001, Piccotto & al. 2009, Rizzi & al. 2011, Kodnik & al. 2011, Giordani & al. 2013, Cossu 2013, Loppi & al. 2014), **S - Camp** (Garofalo & al. 1999, 2010, Ricciardi & al. 2000, Aprile & al. 2002, 2003, 2003b, 2011, Nimis & Tretiach 2004, Catalano & al. 2010, 2012, 2016, Brunialti & al. 2013, Ravera & Brunialti 2013), **Pugl** (Garofalo & al. 1999, Nimis & Tretiach 1999, Durini & Medagli 2002, Nascimbene & al. 2010b, Brackel 2011), **Bas** (Bartoli & Puntillo 1998, Nimis & Tretiach 1999, Durini & Medagli 2004, Potenza 2006, Paoli & al. 2006, Potenza & al. 2010, Brackel 2011), **Cal** (Diederich & Puntillo 1995, Puntillo 1995, 1996, Puntillo & Puntillo 2004, Incerti & Nimis 2006, Brackel & Puntillo 2016), **Si** (Merlo 1993, 2004, 2004b, Czczuga & al. 1994, Nimis & al. 1994, Ottonello & Salone 1994, Ottonello & al. 1994, 2006b, 2011, Grillo & Cristaudo 1995, Ottonello 1996, Grillo 1996, 1998, Grillo & Carfi 1997, Ottonello & Romano 1997, Poli & al. 1997, Catalano & al. 1997, Grasso & al. 1999, Clocchiatti & al. 2000, 2002, 2002b, Grillo & al. 2001, 2002, 2007b, Di Benedetto & al. 2002, Mangiafico & Pitruzzello 2002, 2003, Grillo & Caniglia 2004, 2006, Caniglia & al. 2004, Falco Scampatelli 2005, Caniglia & Grillo 2006b, Stofer 2006, Eichenberger 2007, Brackel 2008b, 2008c, Grillo & Cataldo 2008, Gianguzzi & al. 2009, Liistro & Cataldo 2011, Cataldo & Cannavò 2014, Di Martino & Stancanelli 2015, Cataldo & Minissale 2015).

Fol.b/ Ch/ S/ Epiph-Sax/ pH: 2-4, L: 3-5, X: 3-4, E: 3-4/ Alt: 1-4/ Salp: vr, Orom: vr, Mont: rc, SmedD: ec, Pad: rr, SmedH: ec, MedD: vc/ PT: 1-3/ Note: absent only from heavily polluted areas, mainly epiphytic, but sometimes present on calciferous or basic siliceous rocks as well.

Xanthoria resendei Poelt & Tav.

Portug. Acta Biol., B, 9, 3-4: 302, 1968.

Syn.: *Martinjahnsia resendei* (Poelt & Tav.) S.Y. Kondr., Fedorenko, S. Stenroos, Kärnefelt, Elix, J.S. Hur & A.Thell, *Xanthoria subelegans sensu* Tav. & Poelt

C - **Tosc** (Senese & Critelli 2000, Loppi & al. 2004c). S - **Si** (Ottonello & Romano 1997, Ottonello & al. 2011).

Fol.n/ Ch/ S/ Sax/ pH: 3-4, L: 4-5, X: 4-5, E: 2-4/ Alt: 1/ MedH: er, MedD: er/ PT: 1/ coast/ Note: an apparently western Mediterranean (Macaronesia, NW Africa, Iberian Peninsula to Italy), strictly coastal silicicolous species, most frequent on steeply inclined surfaces of basic siliceous rocks.

Xanthoria steineri I.M. Lamb

J. Bot., 74: 350, 1936.

S - **Si** (Nimis & al. 1994).

Fol.b/ Ch/ S/ Epiph/ pH: 3, L: 4-5, X: 3, E: 2-3/ Alt: 1/ MedH: vr/ PT: 1/ coast, #/ Note: a poorly known taxon of the *X. parietina* complex, described from Iran, mostly occurring near the coast in Mediterranean Italy. The species, which needs further study, was included in the Italian red list of epiphytic lichens as "Data Deficient" (Nascimbene & al. 2013c).

Xanthoria stiligera Giralt, Nimis & Poelt

J. Hattori Bot. Lab., 74: 281, 1993.

S - Camp (Garofalo & al. 1999), **Pugl**.

Fol.b/ Ch/ A.i/ Sax/ pH: 4-5, L: 4-5, X: 4, E: 4-5/ Alt: 1/ MedH: vr, MedD: vr/ PT: 1/ Note: a strictly Mediterranean calcicolous species, ecologically similar to *X. mediterranea*.

Xylographa (Fr.) Fr.

Fl. Scand.: 344, 1836 - *Stictis* subgen. *Xylographa* Fr., Syst. Mycol., 2, 1: 197, 1822.

This genus of the Trapeliaceae, with 20 species, includes some of the most abundant wood-inhabiting lichens in boreal and temperate regions of both Hemispheres. The genus has been recently monographed by Spribille & al. (2015), who found that it forms a strongly supported monophyletic group closely related to *Lithographa* and *Ptychographa*, as well as to rock-dwelling and lichenicolous species of *Rimularia s.lat.* Type: *X. parallela* (Ach.) Behlen & Desberger

Xylographa pallens (Nyl.) Malmgren

Not. Sällsk. Fauna Fl. Fenn. Förhandl., n. s. 6: 84, 1861 - *Xylographa parallela* var. *pallens* Nyl., Act. Soc. Linn. Bordeaux, 21: 393, 1857.

N - TAA (Spribille & al. 2015), **Lomb** (Jatta 1909-1911).

Cr/ Ch/ S/ Lign/ pH: 1-2, L: 3-4, X: 3-4, E: 1/ Alt: 3-4/ Salp: r, Mont: r/ PT: 1/ Note: a widespread species in the Northern Hemisphere, growing on wood, especially in exposed habitats becoming dry in summer, mainly in montane to subalpine coniferous forests.

Xylographa parallela (Ach.) Fr.

Summa Veg. Scand.: 372, 1849 - *Lichen parallelus* Ach., Lichenogr. Suec. Prodr.: 23, 1799.

Syn.: *Hysterium abietinum* Pers., *Xylographa abietina* (Pers.) Zahlbr., *Xylographa abietina* var. *rubescens* (Räsänen) Degel., *Xylographa incerta* A. Massal., *Xylographa laricicola* Nyl., *Xylographa parallela* var. *sessitana* Bagl., *Xylographa rubescens* Räsänen

N - Frl, Ven (Nimis 1994, Thor & Nascimbene 2007, Nascimbene 2008c, 2011, Nascimbene & al. 2013b), **TAA** (Hinteregger 1994, Thor & Nascimbene 2006c, 2007, Nascimbene & al. 2007b, 2008c, Nascimbene 2008b, Nimis & al. 2015), **Lomb** (Nascimbene & al. 2006e), **Piem** (Isocrono & al. 2004, Spribille & al. 2015), **VA** (Piervittori & Isocrono 1999), **Lig** (TSB 33648). **C - Abr. S - Camp** (Nimis & Tretiach 2004), **Pugl, Bas** (Nimis & Tretiach 1999), **Cal** (Puntillo 1996).

Cr/ Ch/ S/ Lign/ pH: 1-2, L: 2-3, X: 2-3, E: 1/ Alt: 2-4/ Salp: vc, Mont: c, SmedD: vr, SmedH: vr/ PT: 1-2/ Note: a cool-temperate to boreal-montane, circumpolar species found on hard wood, on poles, fences and on flanks of decorticated boles, especially of conifers; restricted to high altitudes in southern Italy.

Xylographa soralifera Holien & Tønnsberg

Graphis Scripta, 20: 58, 2008.

N - TAA (Heininger & Spribille 2009), **Lomb** (Holien & Tønnsberg 2008).

Cr/ Ch/ A.s/ Lign/ pH: 1-2, L: 3, X: 2, E: 1/ Alt: 3-4/ Salp: vr, Mont: er/ PT: 1-2/ Note: a rather rare species occurring on lignum in upland areas, perhaps more widespread in the Alps.

Xylographa trunciseda (Th. Fr.) Redinger

Minks ex Redinger, Rabenh. Krypt.-Flora, 9, 2, 1: 216, 1938 - *Lecidea trunciseda* Th. Fr., Lichenogr. Scand., 1: 467, 1874.

N - TAA (Nimis & al. 2015). **S - Cal** (Puntillo 1996).

Cr/ Ch/ S/ Lign/ pH: 1-2, L: 3, X: 2-3, E: 1/ Alt: 3-4/ Salp: vr, Mont: vr/ PT: 1-2/ Note: on rotting wood, mostly of conifers, usually in the montane and subalpine belts; certainly more widespread in the Alps. The species was included in the Italian red list of epiphytic lichens as "Data Deficient" (Nascimbene & al. 2013c).

Xylographa vitiligo (Ach.) J.R. Laundon

Lichenologist, 2: 147, 1963 - *Spiloma vitiligo* Ach., Meth. Lich.: 10, 1803.

Syn.: *Agyrium rufum sensu* Anzi, *Agyrium spilomaticum* Anzi, *Xylographa spilomatica* (Anzi) Th. Fr.

N - Frl, Ven (TSB 1966), **TAA** (Thor & Nascimbene 2007, Nimis & al. 2015), **Lomb** (Spribille & al. 2015), **Piem, VA** (TSB 33605), **Lig** (TSB 33605). **C - Abr** (Nimis & Tretiach 1999). **S - Cal** (Puntillo 1996).

Cr/ Ch/ A.s/ Lign/ pH: 1-2, L: 3, X: 2, E: 1/ Alt: 2-4/ Salp: rc, Mont: r, SmedD: er/ PT: 1-2/ Note: a mainly boreal-montane species found on decaying, decorticated but still hard stumps, mostly of conifers, especially near the base, or on fallen trunks, with optimum near treeline.

Xylopsora Bendiksby & Timdal

Taxon, 62: 952, 2013.

A molecular study of *Hypocenomyce s.lat.* (Bendiksby & Timdal 2013) revealed that the genus was extremely polyphyletic, and that it can be subdivided into seven supported clades belonging in different genera, families,

orders and even subclasses. The genus *Xylopsora* includes 2 species, and is morphologically and anatomically similar to *Fulgidea*, mainly differing in the size of pycnoconidia and the secondary chemistry. The genus was included into the Umbilicariaceae, extending the concept of the family to include crustose and squamulose lichens as well. Type: *X. friesii* (Ach.) Bendiksbj & Timdal

Xylopsora caradocensis (Nyl.) Bendiksbj & Timdal

Taxon, 62: 953, 2013 - *Lecidea caradocensis* Leight. ex Nyl., Act. Soc. Linn. Bordeaux, 21: 383, 1857.

Syn.: *Bilimbia caradocensis* (Nyl.) A.L. Sm., *Hypocenomyce caradocensis* (Nyl.) P. James & Gotth. Schneid., *Lecidea acutula* Nyl., *Psora acutula* (Nyl.) Walt. Watson, *Psora caradocensis* (Nyl.) Mudd, *Toninia caradocensis* (Nyl.) J. Lahm

N - Ven, TAA (Nascimbene 2008b, 2013). C - Abr (Nimis & Tretiach 1999).

Sq/ Ch/ S/ Epiph-Lign/ pH: 1-2, L: 3-4, X: 3, E: 1/ Alt: 3-4/ Salp: vr, Mont: vr/ PT: 1/ Note: a cool-temperate to boreal-montane lichen, mostly found on conifers in the upper montane and subalpine belts; probably more widespread in the Alps. It is included in the Italian red list of epiphytic lichens as "Endangered" (Nascimbene & al. 2013c).

Xylopsora friesii (Ach.) Bendiksbj & Timdal

Taxon, 62: 953, 2013 - *Lecidea friesii* Ach. in Liljeblad, Utkast Svensk Flora, 3: 610, 1816.

Syn.: *Hypocenomyce friesii* (Ach.) P. James & Gotth. Schneid., *Psora friesii* (Ach.) Hellb., *Psora ostreata* var. *athrocarpa* Anzi

N - TAA (Nascimbene 2005, Nascimbene & al. 2006e, Nimis & al. 2015), Lomb. C - Tosc.

Sq/ Ch/ S/ Lign/ pH: 1-2, L: 3-4, X: 3, E: 1/ Alt: 3-4/ Salp: vr, Mont: er/ PT: 1/ Note: a mainly boreal-montane lichen found on bark of conifers (especially *Pinus*) and on charred wood, with optimum in the upper montane and subalpine belts; perhaps more widespread in the Alps. It is included in the Italian red list of epiphytic lichens as "Critically Endangered" (Nascimbene & al. 2013c).

Zahlbrucknerella Herre

J. Wash. Acad. Sci., 2: 384, 1912.

A saxicolous genus of the Lichinaceae with c. 10 species, occurring mostly on rocks along the banks of rivers and lakes, and in moist depressions (one species is maritime), mainly represented in the cool- to cold-temperate regions of both Hemispheres, with the greatest diversity in the Americas. Type: *Z. calcarea* (Herre) Herre

Zahlbrucknerella calcarea (Herre) Herre

J. Wash. Acad. Sci., 2: 384, 1912 - *Zahlbrucknerella calcarea* Herre, Proc. Wash. Acad. Sci., 12: 129, 1910.

Syn.: *Ephebe lanata* f. *tenuis* H. Magn., *Lecanephebe meylanii* Frey

N - TAA. S - Cal.

Cr/ Cy.h/ S/ Sax/ pH: 3-5, L: 3-4, X: 2-3, E: 1-2/ Alt: 2-4/ Salp: er, Orom: er, Mont: vr/ PT: 1/ 1/ Note: on limestone and dolomite, more rarely on basic siliceous rocks, in sheltered seepage tracks on steeply inclined surfaces; certainly more widespread, but never common in Italy.

Zwackhia Körb.

Syst. Lich. Germ.: 285, 1855.

Ertz & Tehler (2011) proposed a new phylogeny of several groups within the Arthoniales based on molecular data, together with important taxonomic implications, among which was the resurrection of the genus *Zwackhia* to accommodate a species formerly treated as an *Opegrapha*, which is presently included in the Lecanographaceae. The molecular-based distinction between *Alyxoria* and *Zwackhia* is also supported by differences in the formation of the excipulum (Hillmann & al. 2016). Type: *Z. involuta* (Wallr.) Körb. (= *Z. viridis*).

Zwackhia viridis (Ach.) Poetsch & Schied.

Syst. Aufz. Krypt. Pfl.: 186, 1872 - *Opegrapha rubella* var. *viridis* Pers. ex Ach., Meth. Lich.: 22, 1803.

Syn.: *Graphis involuta* Wallr., *Opegrapha involuta* (Wallr.) Jatta, *Opegrapha viridis* (Ach.) Ach., *Sclerographa squalida* Erichsen, *Zwackhia involuta* (Wallr.) Körb.

N - Ven (Thor & Nascimbene 2007), TAA (Hinteregger 1994, Nascimbene & al. 2007b, 2014, Nascimbene 2014), Lomb (Alessio & al. 1995), Lig. C - Tosc, Laz (Ravera 2006c), Abr (Olivieri & al. 1997, 1997b), Sar (Zedda 2002). S - Pugl (Nimis & Tretiach 1999, Durini & Medagli 2004), Bas (Nimis & Tretiach 1999), Cal (Puntillo 1996, Incerti & Nimis 2006, Stofer 2006).

Cr/ Tr/ S/ Epiph/ pH: 2-3, L: 3, X: 2, E: 1/ Alt: 1-3/ Mont: er, SmedD: vr, SmedH: rr, MedH: r/ PT: 1-2/ Note: a widespread mild-temperate species found in woodlands on the bark of broad-leaved trees, more rarely of conifers; more common in the Tyrrhenian than in the Adriatic side of the Peninsula.

Genera with non-lichenised fungi only, but often treated by lichenologists

C e c i d o n i a Triebel & Rambold

Nova Hedwigia, 47: 280, 1988.

A genus of the Lecideaceae including 2 species of lichenicolous fungi which are easily recognised by the characteristic galls (coecidia) formed on a host thallus, that in the past were sometimes considered as autonomous lichen thalli. Type: *C. umbonella* (Nyl.) Triebel & Rambold

Cecidonia umbonella (Nyl.) Triebel & Rambold

Nova Hedwigia, 47: 284, 1988 - *Lecidea umbonella* Nyl., Flora, 49: 372, 1866.

N - Frl (Tretiach & Hafellner 2000, Brackel 2016), **TAA** (Hertel & Schuhwerk 2010, Brackel 2016), **Emil** (Tretiach & al. 2008, Brackel 2016). **C - Sar** (Brackel 2016). **S - Si** (Brackel 2016).

LF/ / S/ Sax/ pH: 1-2, L: 4, X: 3-4, E: 1-2/ Alt: 4-5/ Alp: r, Salp: r, Orom: er/ PT: 1/ paras *Lecidea lapicida* s.lat./ Note: a lichenicolous fungus found on exposed siliceous rocks near and above treeline, growing on the thalli of *Lecidea lapicida* s.lat., certainly occurring throughout the Alps.

Cecidonia xenophana (Körb.) Triebel & Rambold

Nova Hedwigia, 47: 291, 1988 - *Placographa xenophana* Körb., Parerga Lichen.: 464, 1865.

Syn.: *Lecidea alumnula* Nyl., *Lecidea dealbatula* Nyl., *Lecidea deparcula* Nyl., *Lecidea hymeneliicola* Alstrup & D. Hawksw., *Lecidea subumbonata* Nyl., *Lecidea subumbonella* Lamy, *Lecidea umbonella* var. *alumnula* (Nyl.) Hertel, *Nesolechia xenophana* (Körb.) Vouaux

N - Frl (Tretiach & Hafellner 2000, Brackel 2016).

LF/ / S/ Sax/ pH: 1-2, L: 3, X: 2-3, E: 1/ Alt: 3-5/ Alp: vr, Salp: r, Mont: vr/ PT: 1/ paras *Porpidia* spp./ Note: an obligately lichenicolous fungus growing on the thalli of *Porpidia*-species; probably more widespread in the Alps.

C h a e n o t h e c o p s i s Vain.

Acta Soc. Fauna Fl. Fenn., 57, 1: 70, 1927.

This genus of the non-lichenised Sphinctrinaceae is traditionally dealt with by lichenologists on account of the morphological similarity of the stalked, pin-like apothecia with those of lichenised Caliciaceae, which often grow in the same habitats. The genus is cosmopolitan and comprises c. 60 species that are saprobes, parasites or commensals on lichens and free-living algae, with the highest diversity in temperate areas. Its systematic position is still poorly understood and in need of further study (Tibell 1999b, Tibell & Vinuesa 2005). A synopsis of the species occurring in Italy was published by Puntillo & Puntillo (2009). A key to the European species was published by Groner (2006). Type: *C. rubescens* Vain.

Chaenothecopsis consociata (Nádv.) A.F.W. Schmidt

Mitt. Staats. allg. Bot. Hamburg, 13: 148, 1970 - *Calicium consociatum* Nádv., Stud. Bot. Cech., 5: 10, 1942.

N - Frl (!), **TAA** (Puntillo & Puntillo 2009, Brackel 2016), **Lig** (TSB 33583, Brackel 2016).

LF/ / S/ Epiph/ pH: 1-2, L: 3-4, X: 2, E: 1/ Alt: 3-4/ Salp: vr, Mont: vr/ PT: 1/ u, paras *Chaenotheca chrysocephala*/ Note: parasitic or parasymbiotic on *Chaenotheca chrysocephala* on trunks of old trees in ancient and humid, montane to subalpine coniferous forests; certainly more widespread in the Alps, but not common.

Chaenothecopsis debilis (Sm.) Tibell

Symb. Bot. Upsal., 21, 2: 45, 1975 - *Lichen debilis* Turner & Borrer ex Sm. in Smith & Sowerby, Engl. Bot., 35: tab. 2462, 1813.

Syn.: *Chaenothecopsis elevata* (Vain.) Tibell, *Calicium norvegicum* Vain. ex Hav.

N - Frl (Puntillo & Puntillo 2009). **C - Abr** (Puntillo & Puntillo 2009), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008), **Sar** (Puntillo & Puntillo 2009). **S - Bas** (Puntillo & al. 2012), **Cal** (Puntillo 1994, 1996, Puntillo & Puntillo 2009).

F/ / S/ Lign/ pH: 1-2, L: 3, X: 2-3, E: 1/ Alt: 2-3/ Mont: vr, SmedD: er, SmedH: er/ PT: 1/ u/ Note: on dry and weathered lignum of deciduous trees (*Populus*, *Fraxinus*, *Ulmus*), more rarely on conifers, in open situations, often in hollows of the trunks in species-poor stands; probably overlooked and more widespread, but never common.

Chaenothecopsis epithallina Tibell

Symb. Bot. Upsal., 21, 2: 116, 1975.

S - Cal (Puntillo 1994, 1996, Puntillo & Puntillo 2009, Brackel & Puntillo 2016, Brackel 2016).

LF/ / S/ Epiph/ pH: 1-2, L: 1-3, X: 1-2, E: 1/ Alt: 3-4/ Salp: vr, Mont: vr/ PT: 1/ u, paras *Chaenotheca trichialis*/ Note: parasitic or parasymbiotic in the thalli of *Chaenotheca trichialis*, mainly on old conifers, much more rarely on lignum and deciduous trees, mostly in upland areas; probably occurring in the Alps, but

very much overlooked. The record from Sicily by Grillo (1996), not validated by Puntillo & Puntillo (2009) is not accepted here.

Chaenothecopsis hospitans (Th. Fr.) Tibell

in Tibell & Ryman, *Nova Hedwigia*, 60: 202, 1995 - *Calicium hospitans* Th. Fr., *Bot. Not.*: 40, 1865.

Syn.: *Calicium paroicum sensu Nád. et auct.*, *Calicium paroicum* subsp. *exsertum* Nyl., *Chaenothecopsis exserta* (Nyl.) Tibell, *Strongyleuma exsertum* (Nyl.) Vain. subsp. *hemileucum* Vain., *Strongyleuma exsertum* subsp. *albipes* Vain., *Strongyleuma paroicum auct. non* (Ach.) Vain.

C - **Tosc** (TSB 34246, Brackel 2016). S - **Cal** (Puntillo 1994, 1996, Puntillo & Puntillo 2009, Brackel & Puntillo 2016, Brackel 2016).

LF/ / S/ Sax/ pH: 2-3, L: 3, X: 2, E: 1/ Alt: 2-3/ Mont: er, SmedH: vr, MedH: er/ PT: 1/ u, paras *Haematomma ochroleucum*/ Note: parasitic or parasymbiont on the thalli of the *Haematomma ochroleucum* in underhangs of basic siliceous rocks protected from rain below the subalpine belt; probably more widespread in Tyrrhenian Italy.

Chaenothecopsis nana Tibell

Publ. Herb. Univ. Uppsala, 4: 4, 1979.

C - **Sar** (Zedda & Sipman 2001, Puntillo & Puntillo 2009, Brackel 2016).

F/ / S/ Epiph-Lign/ pH: 1-2, L: 3, X: 2-3, E: 1/ Alt: 3-4/ Orom: er, Mont: er/ PT: 1/ Note: a mainly boreal-montane species occurring on bark and lignum of coniferous trees in humid-shaded situations.

Chaenothecopsis ochroleuca (Körb.) Tibell & K. Ryman

Nova Hedwigia, 60: 208, 1995 - *Calicium ochroleucum* Körb., *Parerga Lichenol.*: 295, 1863.

Syn.: *Chaenothecopsis koerberi* (Nád.) Tibell, *Strongyleuma koerberi* Nád.

N - **TAA** (Tibell & Ryman 1995, Puntillo & Puntillo 2009, Brackel 2016).

LF/ / S/ Epiph/ pH: 2-3, L: 3, X: 2-3, E: 1-2/ Alt: 3/ Mont: er/ PT: 0/ suboc, paras *Haematomma ochroleucum*/ Note: parasitic or parasymbiont on the thalli of the *Haematomma ochroleucum* in underhangs of basic siliceous rocks protected from rain below the subalpine belt; perhaps more widespread in the beech belt of the Alps.

Chaenothecopsis parasitaster (Bagl. & Carestia) D. Hawksw.

Notes R. Bot. Gard. Edinb., 36: 184, 1978 - *Calicium pusillum* var. *parasitaster* Bagl. & Carestia, *Atti Soc. Crittogam. Ital.* 2: 246, 1880,

Syn.: *Calicium parasitaster* (Bagl. & Carestia) Zopf

N - **TAA** (Puntillo & Puntillo 2009, Brackel 2016), **Lomb** (Jatta 1909-1911, Brackel 2016), **Piem** (Puntillo & Puntillo 2009, Brackel 2016).

LF/ / S/ Epiph-Lign-Terr/ pH: 1, L: 2, X: 2, E: 1/ Alt: 2-4/ Salp: r, Mont: vr, SmedD: er, SmedH: vr/ PT: 1/ paras *Cladonia* spp., u/ Note: this taxon, frequently synonymised with *Ch. pusilla*, seems to be a distinct species (see Groner 2010), which is strictly parasitic on *Cladonia* spp.

Chaenothecopsis pusilla (Ach.) A.F.W. Schmidt

Mitt. Staatsinst. allg. Bot. Hamburg, 13: 151, 1970 - *Calicium claviculare* var. *pusillum* Ach., *K. Vetensk.-Akad. Nya Handl.*: 279, 1808.

Syn.: *Calicium alboatrum* Flörke, *Calicium culmigenum* De Not. & Bagl.?, *Calicium floerkei* Zahlbr., *Calicium italicum auct.*, *Calicium nigrum* Schaer., *Calicium subpusillum* Vain., *Chaenothecopsis alboatra* (Flörke) Nád., *Chaenothecopsis culmigena* (De Not. & Bagl.) Puntillo?, *Chaenothecopsis subpusilla* (Vain.) Tibell, *Embolidium italicum* Sacc.

N - **FrI** (Puntillo & Puntillo 2009, Brackel 2016), **Ven** (Nascimbene 2008c), **TAA** (Puntillo & Puntillo 2009, Nascimbene 2008b, 2013, 2014, Nascimbene & al. 2009, 2010, 2014, Nascimbene & Marini 2015, Puntillo & Puntillo 2009, Brackel 2016), **Lomb** (Puntillo & Puntillo 2009, Brackel 2016), **Piem** (Isocrono & al. 2004, Puntillo & Puntillo 2009, Brackel 2016), **Emil** (Puntillo & Puntillo 2009, Brackel 2016). C - **Tosc** (Puntillo & Puntillo 2009, Brackel 2015, 2016), **Umb** (Ravera 1998, Ravera & al. 2006), **Laz** (Puntillo & Puntillo 2009, Brackel 2016), **Abr** (Puntillo & Puntillo 2009, Brackel 2016), **Sar** (Puntillo & Puntillo 2009, Brackel 2016). S - **Camp** (Puntillo & Puntillo 2009, Brackel 2016), **Bas** (Puntillo & al. 2012), **Cal** (Puntillo 1994, 1996, Puntillo & Puntillo 2009, Brackel & Puntillo 2016, Brackel 2016), **Si** (Puntillo & Puntillo 2009, Brackel 2016).

F/ / S/ Epiph-Lign/ pH: 1, L: 2, X: 2, E: 1/ Alt: 2-4/ Salp: r, Mont: vr, SmedD: er, SmedH: vr/ PT: 1/ u/ Note: on trunks of old conifers in ancient forests, and on lignum, sometimes on old oaks, perhaps a parasite of free-living algal colonies, or possibly a saprophyte. See also note on *Ch. parasitaster*.

Chaenothecopsis pusiola (Ach.) Vain.

Acta Soc. Fauna Fl. Fenn., 57, 1: 70, 1927 - *Calicium pusiolum* Ach., *K. Sv. Vetensk.-Acad. Handl.*: 231, 1817.

Syn.: *Calicium lignicolum* Nád., *Chaenothecopsis lignicola* (Nád.) A.F.W. Schmidt, *Coniocybe nigricans* Fr.

N - **Ven** (Nascimbene 2008c, Brackel 2016), **TAA** (Brackel 2016), **Piem** (Isocrono & al. 2004, Puntillo & Puntillo 2009, Brackel 2016). S - **Cal** (Puntillo 1994, 1996, Puntillo & Puntillo 2009, Brackel & Puntillo 2016, Brackel 2016).

LF/ / S/ Epiph-Lign/ pH: 1-2, L: 3, X: 1-2, E: 1/ Alt: 3-4/ Mont: vr/ PT: 0/ paras *Chaenotheca* spp., u/ Note: on lignum of conifers, more rarely of deciduous trees in the upper montane and subalpine belts, most

often associated with *Chaenotheca brunneola*, *Ch. trichialis* and *Ch. xyloxena*, and probably a parasite or parasymbiont of these species; certainly more widespread, but not common, in the Alps.

***Chaenothecopsis subparoica* (Nyl.) Tibell**

in Tibell & Ryman, Nova Hedwigia, 60: 215, 1995 - *Calicium subparoicum* Nyl., Herb. Mus. Fenn.: 78, 1859.

N - TAA (Arnold Lich. Exs. 1132: Tibell & Ryman 1995, Brackel 2016). **C** - Tose (Tretiach 2004, Puntillo & Puntillo 2009, Brackel 2016), **Sar** (Puntillo & Puntillo 2009, Brackel 2016). **S** - **Cal** (Puntillo & Puntillo 2009, Brackel & Puntillo 2016, Brackel 2016).

LF/ / S/ Sax/ pH: 2-3, L: 3, X: 2-3, E: 1-2/ Alt: 1-2/ SmedD: vr, SmedH: vr/ PT: 1/ suboc, paras *Haematomma ochroleucum s.lat.* and *Tephromela grumosa*, u/ Note: in underhangs of siliceous rocks, on the thalli of *Haematomma ochroleucum* and *Tephromela grumosa*; according to Roux & coll. (2014) it sometimes grows also on *Enterographa zonata*.

***Chaenothecopsis treicheliana* (Stein) Kalb**

Herzogia, 6: 77, 1983 - *Calicium treichelianum* Stein, Schr. naturf. Ges. Danzig, N.S. 6, 2: 89, 1885.

S - **Cal** (Puntillo 1996, Brackel 2016).

LF/ / S/ Epiph/ pH: 2-3, L: 3, X: 2, E: 1/ Alt: 2-3/ Mont: er, SmedH: vr/ PT: 1/ paras *Lecanora* spp., u/ Note: Tibell & Ryman (1995) did not recognize *Ch. treicheliana* as a distinct species and presumed it might be a synonym of *Ch. hospitans*. However, according to Gasparyan & al. (2014), *Ch. hospitans* shows a faint K⁺ reaction of the ascomata, and its stalk and ascospores are distinctly larger (7.8-9.6 × 3.9-5 μm). The species, which is also known from Austria, Poland and Armenia, occurs as a parasite on the thalli of epiphytic *Lecanora*-species.

***Chaenothecopsis vainioana* (Nádv.) Tibell**

Publ. Herb. Univ. Uppsala, 4: 5, 1979 - *Calicium vainioanum* Nádv., Preslia, 18/19: 128, 1940.

C - **Sar** (Zedda 2002, Puntillo & Puntillo 2009, Cossu 2013, Brackel 2016).

F/ / S/ Epiph-Lign/ pH: 1-2, L: 2-3, X: 2, E: 1/ Alt: 2/ SmedH: er/ PT: 0/ Note: on old oaks, more rarely on conifers, very rare throughout its range.

***Chaenothecopsis viridireagens* (Nádv.) A.F.W. Schmidt**

Mitt. Staatsinst. allg. Bot. Hamburg, 13: 153, 1970 - *Calicium viridireagens* Nádv., Preslia, 18/19: 129, 1940.

N - **Frl** (Puntillo & Puntillo 2009, Brackel 2016).

LF/ / S/ Epiph-Lign/ pH: 1-2, L: 2-3, X: 1-2, E: 1/ Alt: 3-4/ Salp: er, Mont: vr/ PT: 1/ paras *Chaenotheca* and *Calicium* spp.?, u/ Note: a mainly boreal-montane, perhaps circumpolar species found on decorticated stumps, occasionally on acid bark inside montane and subalpine forests on the thalli of *Chaenotheca*- and *Calicium*-species; probably more widespread, but never common, in the Alps.

Cyrtidula Minks

Beitr. Bau. Flecht. 1: 510, 1876.

This very poorly known genus includes c. 30 species which grow endophleodically on young, smooth-barked trees. The species are non-lichenised, but occasional association with Trentepohlioid algae were sometimes reported, so that some species were traditionally treated also by lichenologists. For further details see Harris (1995). Type *C. ptelaeodes* (Ach.) Minks (= *C. hippocastani*).

***Cyrtidula hippocastani* (DC.) R.C. Harris**

More Florida Lichens: 65, 1995 - *Verrucaria hippocastani* DC. in Lamarck & de Candolle, Fl. Franç., éd. 3, 2: 314, 1805.

Syn.: *Cyrtidula ptelaeodes* (Ach.) Minks, *Dermatina ptelaeodes* (Ach.) Zahlbr., *Mycoporum hippocastani* (DC.) Coppins

N - **VG** (TSB 12790), **TAA** (Arnold, Lich. Exs. Nr. 1573: S-F76071).

F/ / S/ Epiph/ pH: 2-3, L: 3-4, X: 3, E: 1/ Alt: 2/ SmedD: r, SmedH: r/ PT: 1/ p/ Note: on the branches of different broad-leaved trees in the submediterranean belt; the Italian material was collected on *Fraxinus ornus*.

***Cyrtidula quercus* (A. Massal.) Minks**

Rev. Mycol., 13: 61, 1891 - *Arthopyrenia quercus* A. Massal., Ric. Auton. Lich. Crost.: 169, 1852.

Syn.: *Dermatina quercus* (A. Massal.) Zahlbr., *Mycoporum miserrimum* Nyl., *Mycoporum quercus* (A. Massal.) Müll. Arg.

N - **VG**, **Ven** (Lazzarin 2000b), **Lomb**. **C** - **Tosc**, **Umb** (Ravera 2000, Ravera & al. 2006).

F/ / S/ Epiph/ pH: 1-2, L: 3-4, X: 3, E: 1/ Alt: 2/ SmedD: r, SmedH: r/ PT: 1/ p/ Note: on young twigs of trees, mainly oaks, but also on *Alnus* and other species, mostly in the submediterranean belt.

Epigloea Zukai

Verh. zool.-bot. Ges. Wien, 39: 78, 1889.

This genus, with c. 12 species, includes algicolous fungi occurring on algal films over decaying vegetation, mainly bryophytes but also lichens and plant debris. Its association with algae was considered as a form of highly adapted biotrophic parasitism as the hyphae form haustoria within the algal cells without any apparent benefit to the algae, but the precise biological nature of the algicolous lifestyle, whether lichenised, weakly parasitic, or necrotrophic, still requires further study. The genus is presently placed in its own family, Epigloeaceae, of uncertain position within the Pezizomycotina (Lumbsch & Huhndorf 2010). Type: *E. bactrospora* Zukai

Epigloea bactrospora Zukai

Österr. bot. Z., 40: 327, 1890.

N - TAA (Nascimbene & al. 2007b, Brackel 2016), Lomb (Brackel 2010, 2016).

F/ / S/ Epiph-Lign/ pH: 1-2, L: 2-3, X: 2, E: 1/ Alt: 3-4/ Salp: vr, Mont: vr/ PT: 1/ Note: most common on algal colonies on rotting wood in the montane and subalpine belts; certainly overlooked, and more widespread in the Alps.

Epigloea grumannii Döbbeler

Beih. Nova Hedwigia, 29: 220, 1984.

N - TAA (Brackel 2016).

F/ / S/ Terr/ pH: 2-3, L: 2, X: 2, E: 1/ Alt: 3-4/ Salp: vr, Mont: vr/ PT: 1/ Note: on algal colonies developing on dying mats of *Grimmia* and *Hypnum* in the montane and subalpine belts; certainly overlooked, and more widespread in the Alps.

Epigloea medioincrassata (Grumann) Döbbeler

Beih. Nova Hedwigia, 29: 223, 1984 - *Vorarlbergia medioincrassata* Grumann, Sydowia, 22: 220, 1969.

N - TAA (Brackel 2016).

F/ / S/ Terr/ pH: 2-3, L: 2, X: 2, E: 1/ Alt: 4/ Salp: vr/ PT: 1/ Note: on algal colonies on muribund bryophytes and, more rarely, on lignum, with optimum near treeline; certainly overlooked, and more widespread in the Alps.

Epigloea soleiformis Döbbeler

Beih. Nova Hedwigia, 29: 229, 1984.

N - TAA (Nascimbene & al. 2007b, Brackel 2016). C - Tosc (Brackel 2015, 2016).

F/ / S/ Terr-Lign/ pH: 2-3, L: 2, X: 2, E: 1/ Alt: 3-4/ Salp: vr, Mont: er/ PT: 1/ Note: on algal colonies developing on muribund bryophytes, squamules of *Cladonia*, decaying wood and humus, sometimes lichenicolous on *Placynthiella* (Czarnota & Ernik 2013), with optimum near treeline; certainly overlooked, and more widespread in the Alps.

Halospora (Zschacke) Tomas. & Cif.

Arch. Bot. Ital., 28: 11, 1952 - *Polyblastia* II. subgen. *Halospora* Zschacke, Hedwigia, 55: 289, 1914.

This genus was segregated from *Merismatium* by Hafellner (2011) to include lichenicolous *Polyblastia*-like species with thick-walled halonate ascospores and ascomata with a typically verrucarialean shape in longitudinal section. Species with thin-walled, non-halonate ascospores (all on calcicolous lichens) are retained in *Merismatium*. The species are non-lichenised, but were frequently treated as lichens in the past. Type: *H. deminuta* (Arnold) Tomas. & Cif.

Halospora deminuta (Arnold) Tomas. & Cif.

Arch. Bot. Ital., 28: 11, 1952 - *Polyblastia deminuta* Arnold, Flora, 44: 264, 1861.

Syn.: *Amphoroblastia deminuta* (Arnold) Servít, *Merismatium deminutum* (Arnold) Cl. Roux & Nav.-Ros., *Verrucaria deminuta* (Arnold) Leight.

N - TAA (Roux & al. 2002, Hafellner 2011, Brackel 2016), Lomb (Brackel 2016).

LF/ / S/ Sax/ pH: 5, L: 3, X: 3, E: 1/ Alt: 3-5/ Alp: rr, Salp: vr, Mont: er/ PT: 1/ paras endolithic lichens/ Note: on steeply inclined surfaces of calcareous rocks in upland areas, often in association with *Hymenelia coerulea*, on *Thelidium*, *Polyblastia* and other endolithic lichens. The formation of the ascomata of the host is often suppressed, and the lichenicolous behaviour is indicated by the ascomata of the species, mostly developing in the pits left by fallen ascomata of the host lichen, not fitting in size with the holes, being much smaller (Hafellner 2011). Records from Venezia Giulia reported by Nimis (1993: 555), being dubious, are not accepted here.

Halospora discrepans (Arnold) Hafellner

Bibl. Lichenol., 106: 87, 2011 - *Polyblastia discrepans* J. Lahm ex Arnold, Verh. zool.-bot. Ges. Wien, 18: 709, 1868.

Syn.: *Arthopyrenia subdiscrepans* (Nyl.) Zahlbr., *Merismatium discrepans* (J. Lahm ex Arnold) Triebel, *Verrucaria subdiscrepans* Nyl.

N - TAA (Roux & al. 2002, Hafellner 2011, Brackel 2016).

LF/ / S/ Sax/ pH: 5, L: 3, X: 3, E: 1/ Alt: 3-5/ Alp: vr, Salp: vr, Mont: vr/ PT: 1/ paras crustose lichens/ Note: a rather rare species, growing on the ascocarps of crustose calcicolous lichens (*Protoblastenia*, *Clauzadea*, *Hymenelia*, *Verrucaria* etc.), mostly in upland areas. Most records are from the central European mountains, but there are also some records from sites at low elevations in other parts of Europe. For further details see Hafellner (2011).

Hazslinszky Körb.

Parerga Lichenol.: 257, 1861.

The molecular revision of the Melaspileaceae by Ertz & Diederich (2015) showed that this is a heterogeneous group. One non-lichenised species of *Melaspilea* was re-transferred to *Hazslinszky*, a genus whose taxonomic position still has to be settled. Type: *H. gibberulosa* (Ach.) Körb.

Hazslinszky gibberulosa (Ach.) Körb.

Parerga Lichenol.: 258, 1861 - *Arthonia gibberulosa* Ach., Lichenogr. Univ.: 142, 1810.

Syn.: *Melaspilea deformis* (Schaer.) Nyl., *Melaspilea gibberulosa* (Ach.) Zwackh, *Melaspilea megalyna* (Ach.) Arnold

N - Lomb, Emil. C - Tosc (TSB 31112).

F/ / S/ Epiph/ pH: 1-2, L: 3, X: 2, E: 1/ Alt: 3/ Mont: er/ PT: 1/ Note: on bark of deciduous trees and *Abies* in humid montane forests.

Julella Fabre

Ann. Sci. Nat., Bot. sér. 6, 9: 113, 1879.

A subcosmopolitan genus of c. 15 species, with the highest diversity in arid tropical regions. The species are non-lichenised, but occasional association with Trentepohlioid algae was sometimes reported, so that some species were traditionally treated also by lichenologists. The inclusion of the genus in the Thelenellaceae is not certain. Type: *J. buxi* Fabre

Julella fallaciosa (Arnold) R.C. Harris

in Egan, Bryologist, 90: 163, 1987 - *Polyblastia fallaciosa* Stizenb. ex Arnold, Flora: 604, 1863.

Syn.: *Mycoglaena fallaciosa* (Arnold) Vain., *Polyblastiopsis fallaciosa* (Arnold) Zahlbr.

N - Ven.

F/ / S/ Epiph/ pH: 1-2, L: 3-4, X: 3, E: 1/ Alt: 2-3/ Mont: vr, SmedD: vr/ PT: 1/ p/ Note: a rare species growing on smooth bark, especially of *Betula*.

Julella lactea (A. Massal.) M.E. Barr

Sydowia, 38: 13, 1986 - *Blastodesmia lactea* A. Massal., Ric. Auton. Lich. Crost.: 181, 1852.

Syn.: *Blastodesmia lactea* var. *deaurolata* A. Massal., *Polyblastia lactea* var. *decipiens* Bagl., *Polyblastiopsis lactea* (A. Massal.) Zahlbr., *Polyblastiopsis naegelii* (Hepp) Zahlbr., *Sporodictyon lacteum* (A. Massal.) Trevis., *Verrucaria lactea* (A. Massal.) Garov., *Verrucaria naegelii* (Hepp) Nyl.

N - VG (TSB 16147), Frl (UPS-L-168899), Ven (Lazzarin 2000b), TAA (Nascimbene & al. 2007b), Piem, Lig. C - Marc (Nimis & Tretiach 1999), Tosc, Laz.

F/ / S/ Epiph/ pH: 3, L: 3-4, X: 3-4, E: 1-2/ Alt: 1-2/ SmedD: r, SmedH: rr, MedH: er/ PT: 1/ p/ Note: on smooth bark, mostly of *Fraxinus*. The record from Venezia Giulia is from Slovenia, but very close to the border.

Julella myrticola (B. de Lesd.) M.E. Barr

in Egea, Bocconeia, 6: 54, 1996 - *Polyblastiopsis myrticola* B. de Lesd., Bull. Soc. bot. Fr., 70: 848, 1923.

C - Tosc. S - Si (TSB 15767).

F/ / S/ Epiph/ pH: 2-3, L: 3, X: 3, E: 1/ Alt: 1/ MedH: vr/ PT: 1/ p, #/ Note: on the bark of evergreen Mediterranean shrubs, especially *Myrtus*. Poorly known, perhaps overlooked in Mediterranean Italy.

Julella sericea (A. Massal.) Coppins

in Coppins & al., Lichenologist, 24: 367, 1992 - *Polyblastia sericea* A. Massal., Symmicta Lich.: 99, 1855.

Syn.: *Microglaena sericea* (A. Massal.) Lönnr., *Polyblastiopsis sericea* (A. Massal.) Zahlbr., *Sporodictyon sericeum* (A. Massal.) Trevis., *Verrucaria sericea* (A. Massal.) Garov.

N - VG, Fri (UPS- L-168900), **Ven** (Lazzarin 2000b). **C - Laz** (Ravera 2006, Zucconi & al. 2013), **Sar** (Zedda 2002, 2002b). **S - Cal** (Puntillo & Puntillo 2014b).

F/ / S/ Epiph/ pH: 1-2, L: 3-4, X: 3, E: 1/ Alt: 2/ SmedD: vr/ PT: 1/ p/ Note: perhaps identical to *J. fallaciosus*.

Labrocarpon Etayo & Pérez-Ortega
in Pérez-Ortega & Etayo, Lichenologist, 42: 271, 2010.

The molecular revision of the Melaspileaceae by Ertz & Diederich (2015) showed that this is a heterogeneous group, with members placed in two main lineages of Dothideomycetes. The monotypic genus *Labrocarpon*, created to accommodate a species previously included in *Melaspilea*, belongs to the Asterinales, that are not lichenised, in the family Asterinaceae. Type: *L. canariense* (D. Hawksw.) Etayo & Pérez-Ortega

Labrocarpon canariense (D. Hawksw.) Etayo & Pérez-Ortega
in Pérez-Ortega & Etayo, Lichenologist, 42: 272, 2010 - *Melaspilea canariensis* D. Hawksw., Lichenologist, 14: 84, 1982.

Syn.: *Karschia talcophila* var. *irregularis* Vouaux

C - Tosc (TSB 11017, Brackel 2016), **Sar** (Calatayud & al. 1995, Brackel 2016). **S - Si** (Santesson 1994, Ottonello & Romano 1997, Ottonello & al. 2011, Brackel 2016).

LF/ / S/ Sax/ pH: 3, L: 3-4, X: 2-3, E: 1-2/ Alt: 1/ MedH: r, MedD: er/ PT: 1/ suboc, paras *Pertusaria* spp./ Note: a lichenicolous fungus found on silicicolous *Pertusaria*-species; certainly more widespread in Tyrrhenian Italy.

Leptorhaphis Körb.
Syst. Lich. Germ.: 371, 1855, *nom. cons.*

This genus of the Naetrocymbaceae includes only non-lichenised fungi (c. 12 species) mainly growing on the bark of deciduous trees, some of them being host-specific. An occasional association with Trentepohlioid algae was sometimes reported, so that some species were traditionally treated also by lichenologists. Type: *L. oxyspora* (Nyl.) Körb. The name is conserved against *Endophis* Norman (1852).

Leptorhaphis amygdali (A. Massal.) Zwackh
Flora, 65: 565, 1862 - *Campylacia amygdali* A. Massal., Sched. Crit., 10: 184, 1856.
Syn.: *Leiophloea amygdali* (A. Massal.) Trevis., *Sagedia amygdali* (A. Massal.) Jatta

N - Ven (Lazzarin 2000b). **S - Pugl**.

F/ / S/ Epiph/ pH: 1-2, L: 3-4, X: 3, E: 1/ Alt: 1-2/ SmedD: r, MedD: vr/ PT: 1/ p/ Note: mostly on *Prunus dulcis*, but also on *Olea* and other trees.

Leptorhaphis atomaria (Ach.) Szatala
Magyar Bot. Lapok, 26: 31, 1928 ("1927") - *Lichen atomarius* Ach., Lichenogr. Suec. Prodr.: 16, 1799.
Syn.: *Arthopyrenia analepta* var. *atomaria* (Ach.) Jatta, *Arthopyrenia atomaria* (Ach.) Müll. Arg., *Arthopyrenia persoonii* f. *atomaria* (Ach.) A. Massal., *Arthopyrenia punctiformis* var. *atomaria* (Ach.) Anzi, *Didymella atomaria* (Ach.) Szatala, *Leiophloea punctiformis* var. *atomaria* (Ach.) Trevis., *Leptorhaphis tremulae* auct. ital. non Körb., *Microthelia adpersa* Körb., *Sagedia salicis* A. Massal.?, *Verrucaria epidermidis* var. *atomaria* (Ach.) Schaer., *Verrucaria punctiformis* var. *atomaria* (Ach.) Ach., *Verrucaria populicola* Nyl.?

N - VG (TSB 2345), **Ven** (Lazzarin 2000b), **TAA** (Nascimbene & al. 2007b), **Lomb** (Brusoni & al. 1997, Brusoni & Valcuvia 2000), **Piem** (Isocrono & al. 2004), **Lig** (Giordani & al. 2009). **C - Tosc**. **S - Cal** (Puntillo & Puntillo 2004), **Si** (Ottonello & al. 2011).

F/ / S/ Epiph/ pH: 3, L: 3-4, X: 3, E: 1/ Alt: 2-3/ Mont: vr, SmedD: rr, SmedH: r/ PT: 1/ p/ Note: on *Populus*, *Fraxinus*, etc.

Leptorhaphis epidermidis (Ach.) Th. Fr.
N. Acta Reg. Soc. Sci. Upsal., ser. 3, 3: 373, 1861 - *Lichen epidermidis* Ach., Lichenogr. Suec. Prodr.: 16, 1799.

Syn.: *Arthopyrenia epidermidis* (Ach.) A. Massal., *Arthopyrenia oxyspora* (Nyl.) Mudd, *Campylacia oxyspora* (Nyl.) Anzi, *Campylacia oxyspora* f. *fusispora* (Garov.) Bagl. & Carestia, *Leptorhaphis oxyspora* (Nyl.) Körb., *Pyrenula oxyspora* (Nyl.) Hepp, *Sagedia oxyspora* (Nyl.) Tuck., *Spermatodium oxysporum* (Nyl.) Trevis., *Verrucaria epidermidis* (Ach.) Ach., *Verrucaria oxyspora* Nyl.

N - Ven (Anzi, Lich. Rar. Ven. 126), **TAA** (Nascimbene & al. 2007b), **Lomb**, **Piem**, **Lig**.

F/ / S/ Epiph/ pH: 1-2, L: 3-4, X: 3, E: 1/ Alt: 2-3/ Mont: vr, SmedD: vr/ PT: 1/ p/ Note: mostly on the smooth bark of *Betula*.

Leptorhaphis maggiana (A. Massal.) Körb.
Parerga Lichenol.: 386, 1865 - *Campylacia maggiana* A. Massal., Sched. Crit., 4: 74, 1856.
Syn.: *Spermatodium maggianum* (A. Massal.) Trevis., *Verrucaria maggiana* (A. Massal.) Stizenb.
N - Ven (Lazzarin 2000b)

F/ / S/ Epiph/ pH: 1-2, L: 3-4, X: 3, E: 1/ Alt: 2/ SmedD: vr/ PT: 1/ p/ Note: a southern temperate species found on the smooth bark of *Carpinus*, *Corylus*, more rarely of young *Quercus* (e.g. on twigs).

Leptorhaphis oleae (A. Massal.) Körb.

Parerga Lichenol.: 386, 1865 - *Sagedia oleae* A. Massal., *Symmicta* Lich.: 96, 1855.

Syn.: *Leptorhaphis epidermidis* var. *olivatorum* Samp., *Limboria oleae* (A. Massal.) Trevis.

N - Ven (Lazzarin 2000b), Lig. S - Camp (Nimis & Tretiach 2004, Garofalo & al. 2010).

F/ / S/ Epiph/ pH: 1-2, L: 3-4, X: 3, E: 1/ Alt: 1/ SmedD: er, SmedH: er, MedH: vr/ PT: 1/ p/ Note: most frequent on *Olea*.

Leptorhaphis parameca (A. Massal.) Körb.

Parerga Lichenol.: 388, 1865 - *Sagedia parameca* A. Massal., *Symmicta* Lich.: 97, 1855.

Syn.: *Leptorhaphis xylographoides* Norman, *Spermatodium paramecum* (A. Massal.) Trevis., *Verrucaria parameca* (A. Massal.) Stizenb.

N - Ven (Lazzarin 2000b), TAA (Nascimbene & al. 2007b).

F/ / S/ Epiph/ pH: 1-2, L: 3-4, X: 3, E: 1/ Alt: 2/ SmedD: r/ PT: 1/ p/ Note: mostly found on *Prunus*.

Leptorhaphis tremulae Körb.

Syst. Lich. Germ.: 372, 1855.

Syn.: *Campylacia tremulae* (Körb.) A. Massal., *Leptorhaphis sphenospora* (Nyl.) Arnold, *Spermatodium tremulae* (Körb.) Trevis., *Sagedia tremulae* (Körb.) Anzi

N - Ven, TAA.

F/ / S/ Epiph/ pH: 1-3, L: 3-4, X: 3, E: 1/ Alt: 2-3/ Mont: r, SmedD: r/ PT: 1/ p/ Note: on the smooth bark of *Populus*, especially *P. tremula*, more rarely of *Salix*. Earlier records from southern Italy, being dubious, are not accepted here (see Nimis 1993: 418).

Lichenothelia D. Hawksw.

Lichenologist, 13: 142, 1981.

The c. 25 species of this genus often look as they are true lichens when viewed with a hand-lens or a dissecting microscope, and therefore have been often considered to be lichenised. It seems however that the group is not lichenised, and that the thallus is essentially a fungal stroma on which a variety of epiphytic algae can occur. The genus belongs in the Dothideomycetes, being segregated in the monotypic family Lichenotheliaceae, and is poorly known in Italy. For further details see Muggia & al. (2013b, 2015b). Type: *L. scopularia* (Nyl.) D. Hawksw.

Lichenothelia macrocarpa Henssen

Bibl. Lichenol., 25: 260, 1987.

N - Piem (Isocrono & al. 2004).

F/ / S/ Sax/ pH: 2-3, L: 3-4, X: 3, E: 1/ Alt: 3-5/ Alp: vr, Salp: vr, Mont: vr/ PT: 1/ #/ Note: hitherto known only from the type collection, on mica-schist.

Lichenothelia metzleri (J. Lahm) D. Hawksw.

Lichenologist, 13: 143, 1981 - *Microthelia metzleri* J. Lahm in Körb., Parerga Lichenol.: 398, 1865.

N - Piem.

F/ / S/ Sax/ pH: 2-3, L: 3-4, X: 3, E: 1/ Alt: 4-5/ Alp: vr, Salp: vr/ PT: 1/ Note: on base-rich siliceous rocks in alpine areas. The Italian record is rather dubious (see Nimis 1993: 420).

Lichenothelia scopularia (Nyl.) D. Hawksw.

Lichenologist, 13: 147, 1981 - *Verrucaria scopularia* Nyl., Not. Sällsk. Fauna. Fl. Fenn. Förh., 6: 282, 1861.

Syn.: *Anzia aterrima* (Anzi) Garov., *Buellia anthracina* Anzi, *Microthelia anthracina* (Anzi) Arnold, *Microthelia aterrima* (Anzi) Zahlbr., *Microthelia scopularia* (Nyl.) Blomb. & Forssell, *Rinodina aterrima* Kremp. ex Anzi

N - TAA, Lomb, Piem.

F/ / S/ Sax/ pH: 2-3, L: 3-5, X: 2-4, E: 1/ Alt: 2-4/ Salp: er, Mont: vr, SmedD: er/ PT: 1/ Note: on metamorphic rocks, sometimes, but only in northern Europe, on rocks inundated by the sea; the Italian distribution seems to be restricted to the Alps.

Lichenothelia rugosa (G. Thor) Ertz & Diederich

Fungal Divers., 66: 135, 2014 - *Lichenostigma rugosum* G. Thor, Lichenologist, 17: 269, 1985.

N - TAA (Brackel 2016), Lig (Brackel 2016). C - Laz (Brackel 2016), Sar (Brackel 2016). S - Cal (Brackel 2016), Si (Brackel 2016).

F/ / S/ Sax/ pH: 3-4, L: 3-5, X: 2-4, E: 1/ Alt: 1-4/ Alp: vr, Salp: vr, Mont: vr, SmedD: vr, SmedH: vr, MedH: vr, MedD: vr/ PT: 1/ paras *Diploschistes* spp./ Note: a parasite on silicicolous species of *Diploschistes*; the distribution in Italy is according to Brackel (2016).

Melaspileella (P. Karst.) Vain.

Ann. Acad. Sci. Fenn., Ser. A 15, 6: 317, 1921 - *Celidium* sect. *Melaspileella* P. Karst., Acta Soc. Fauna Fl. Fenn. 2, 6: 163, 1885.

This genus was recently re-instated to accommodate one species formerly treated as a member of *Melaspilea*, which proved to belong to the Asterinales. For further details see Értz & Diederich (2015). Type: *M. proximella* (Nyl.) Ertz & Diederich

Melaspileella proximella (Nyl.) Ertz & Diederich

Fungal Divers., 71: 161, 2015 - *Arthonia proximella* Nyl., Lich. Scand.: 262, 1861.

Syn.: *Arthopyrenia furfuracea* A. Massal., *Buellia mughorum* Anzi, *Caldesia proximella* (Nyl.) Trevis., *Melaspilea fugax* Müll. Arg., *Melaspilea proximella* (Nyl.) Nyl.

N - **Frl**, **Ven** (Lazzarin 2000), **TAA** (Nascimbene & al. 2007b), **Lomb** (Valcuvia & Truzzi 2007b), **Lig** (Watson 2014). **C** - **Tosc**, **Marc** (Nimis & Tretiach 1999), **Sar** (S-F75929).

F/ / S/ Epiph/ pH: 1-3, L: 3-4, X: 2-3, E: 1-2/ Alt: 3-4/ Salp: er, Mont: vr, SmedD: er, Pad: er, SmedH: vr, MedH: er/ PT: 1/ Note: an inconspicuous, probably overlooked species, found on the bark of deciduous and coniferous trees in upland areas. The Massalongian name is from 1856.

Microcalicium Vain.

Acta Soc. Fauna Fl. Fenn., 57, 1: 77, 1927.

This small genus of 4 species belongs to the Ostropomycetidae (Prieto & al. 2013) and is now placed in the Microcaliciaceae within the Pertusariales (Jaklitsch & al. 2016). Type: *M. disseminatum* (Ach.) Vain.

Microcalicium ahlneri Tibell

Bot. Not., 131: 234, 1978.

N - **Frl** (Puntillo & Puntillo 2009, Brackel 2016), **TAA** (Thor & Nascimbene 2007, Brackel 2016).

F/ / S/ Lign/ pH: 1-2, L: 3, X: 2, E: 1/ Alt: 3-4/ Salp: er, Mont: er/ PT: 1/ Note: on decorticated stumps of conifers heavily attacked by brown rot fungi, more rarely of deciduous trees, often in cavities and cracks, confined to humid upland areas; probably overlooked in the Alps, but certainly never common.

Microcalicium arenarium (A. Massal.) Tibell

Bot. Not., 131: 237, 1978 - *Cyphelium arenarium* Hampe ex A. Massal., Miscell. Lichenol.: 20, 1856.

Syn.: *Calicium arenarium* (A. Massal.) Körb., *Calicium citrinum* (Leight.) Nyl., *Calicium gneissicum* Nyl., *Calicium pulverariae* Auersw., *Coniocyopsis arenaria* (A. Massal.) Vain.

N - **TAA** (Puntillo & Puntillo 2009, Brackel 2016), **Piem** (Isocrono & al. 2004, Puntillo & Puntillo 2009, Brackel 2016). **C** - **Umb** (Genovesi & al. 2001, Ravera & al. 2006, Puntillo & Puntillo 2009, Brackel 2016). **S** - **Cal** (Puntillo 1994, 1995, 1996, Puntillo & Puntillo 2009, Brackel 2016).

F/ / S/ Sax/ pH: 1-2, L: 2-3, X: 2, E: 1/ Alt: 1-3/ Mont: r, SmedH: vr, MedH: er/ PT: 1/ u/ Note: on silicicolous lichens, soil, rootlets, decorticated stumps and algal colonies in underhangs of siliceous rocks, often together with *Psilolechia lucida*; probably more widespread in the Alps than the few records would suggest.

Microcalicium disseminatum (Ach.) Vain.

Acta Soc. Fauna Fl. Fenn., 57, 1: 77, 1927 - *Cyphelium disseminatum* Ach., K. Vetensk.-Akad. Nya Handl.: 227, 1817.

Syn.: *Calicium atomarium* Fr., *Calicium disseminatum* (Ach.) Fr., *Calicium microcephalum* var. *patelliforme* Schaer., *Calicium subpedicellatum* Schaer., *Calicium viridulum* (Ach.) Fr., *Cyphelium atomarium* Ach., *Cyphelium viridulum* Ach., *Microcalicium subpedicellatum* (Schaer.) Tibell, *Strongyloopsis commixta* Vain., *Strongyloopsis discreta* Nád., *Strongyloopsis leucopus* Vain., *Strongyloopsis stichococci* Vain.

N - **Frl** (Puntillo & Puntillo 2009, Brackel 2016), **Ven** (Nascimbene 2008c, Puntillo & Puntillo 2009, Brackel 2016), **TAA** (Nascimbene 2006c, 2008b, 2013, 2014, Nascimbene & al. 2007b, Puntillo & Puntillo 2009, Nascimbene & al. 2009, 2010, 2014, Nascimbene & Marini 2015, Brackel 2016), **Lomb** (Puntillo & Puntillo 2009, Brackel 2016).

LF/ / S/ Epiph/ pH: 1-2, L: 2-3, X: 2-3, E: 1/ Alt: 3-4/ Salp: r, Mont: vr/ PT: 1/ paras Caliciales/ Note: on lignum and bark of both deciduous and coniferous trees, parasitic on calicioid lichens, especially *Chaenotheca* species, with the conidiomata forming much earlier than the ascomata, or saprophytic on bark, lignum and algal colonies; probably more widespread in the Alps.

Mniaecia Boud.

Bull. Soc. Mycol. Fr., 1: 114, 1885.

A small genus of endophytic fungi living as parasites on liverworts, characterised by small, sessile apothecia and cylindrical to clavate 8-spored asci with a thick, non-amyloid apical dome, containing a cylindrical tube- or plug-like structure. The genus is now placed in the Leotiomycetes. For further details see Czarnota & Hernik (2013b). Type: *M. jungermanniae* (Fr.) Boud.

Mniaecia jungermanniae (Fr.) Boud.

Hist. Class. Discom. Eur: 99, 1907 - *Peziza jungermanniae* Fr., Syst. Mycol., 2: 144, 1822.

N - Frl (Tretiach 2004). **C - Tosc** (Benespereri & al. 2007).

F/ / S/ Terr/ pH: 1-2, L: 3-4, X: 2, E: 1/ Alt: 2-4/ Salp: er, Mont: er, SmedH: er/ PT: 1/ Note: this endophytic fungus is confined to small liverworts growing in humid situations over siliceous substrata, belonging to the genera *Calypogeia*, *Cephalozia*, *Cephaloziella*, *Diplophyllum*, *Jungermannia*, *Lepidozia*, *Lophozia*, *Lophocolea* and on *Nardia scalaris*.

Mycocalicium Vain.

Acta Soc. Fauna Fl. Fenn., 7, 2: 182, 1890.

This genus of the non-lichenised Sphinctrinaceae is traditionally dealt with by lichenologists on account of the morphological similarity of the stalked, pin-like apothecia with those of the lichenised Caliciaceae, which often grow in the same habitats. The genus is widespread in cool temperate to tropical areas and comprises c. 12 species that are saprobic (see Tibell & Wedin 2000). For the species occurring in Italy see Puntillo & Puntillo (2009). Type: *M. parietinum* (Ach.) Vain. (= *M. subtile*).

Mycocalicium hyaloparvicellulum Daranagama & K.D. Hyde

in Ariyawansa & al., Fungal Divers.: 102, 2015.

S - Cal (Ariyawansa & al. 2015).

F/ / S/ Lign/ pH: 1-2, L: 4, X: 3-4, E: 1-2/ Alt: 1/ MedH: vr, MedD: vr/ PT: 1/ Note: a recently-described species, closely related to *M. subtile*, but differing in apothecium size, colour and structure of stalk, ascus size and spore dimensions and colour. The type material was growing as a saprobe on cones of *Pinus halepensis* in the Mediterranean belt.

Mycocalicium subtile (Pers.) Szatala

Magyar Bot. Lapok, 24: 47, 1926 - *Calicium subtile* Pers., Tent. Disp. Meth. Fung. Suppl.: 60, 1797.

Syn.: *Calicium minutellum* Ach., *Calicium parietinum* Ach., *Mycocalicium minutellum* (Ach.) Nád., *Mycocalicium parietinum* (Ach.) Vain.

N - Frl (Puntillo & Puntillo 2009), **Ven** (Nascimbene 2008c, Puntillo & Puntillo 2009, Nascimbene & al. 2013b), **TAA** (Nascimbene & al. 2007b, Puntillo & Puntillo 2009, Nascimbene 2014, Nascimbene & Marini 2015), **Lomb** (Puntillo & Puntillo 2009), **Piem** (Isocrono & al. 2004, Puntillo & Puntillo 2009). **C - Tosc** (Benespereri & al. 2007, Puntillo & Puntillo 2009), **Marc** (Puntillo & Puntillo 2009), **Umb** (Ravera 2000, Ravera & al. 2006), **Laz** (Ravera 2008, Ravera & Genovesi 2008), **Mol** (Puntillo & Puntillo 2009), **Sar** (Puntillo & Puntillo 2009). **S - Bas** (Puntillo & al. 2009, 2012), **Cal** (Puntillo 1994, 1996, Puntillo & Puntillo 2009).

F/ / S/ Lign/ pH: 1-2, L: 4, X: 3-4, E: 1-2/ Alt: 3-4/ Salp: rr, Orom: er, Mont: vr/ PT: 1/ Note: a saprophyte on dry, hard lignum, especially of conifers, in open situations, mostly in the montane and subalpine belts.

Mycomicrothelia Keissl.

Rabenh. Krypt.-Flora, 2nd ed., 9, 1-2: 7, 1936.

A subcosmopolitan genus of c. 10 corticolous species in the Arthopyreniaceae with the highest diversity in the tropics, closely related to *Arthopyrenia*, from which it differs in the ascospores with warted walls turning brown at maturity within the ascus. Most species are host-specific and non-lichenised, but occasional associations with trentepohlioid algae were reported for some species, so that the genus is traditionally treated also by lichenologists. Type: *M. macularis* (A. Massal.) Keissl.

Mycomicrothelia confusa D. Hawksw.

Bull. Brit. Mus. Nat. Hist., Bot. ser., 14: 76, 1986 ("1985").

N - Piem (Isocrono & al. 2007), **Lig** (Giordani & al. 2009). **C - Marc** (Fрати & al. 2004, Frати & Brunialti 2006), **Tosc** (Loppi & Putortù 1995, Loppi & al. 1994, 1995, 1997b, 2002, 2002b, 2006, Ravera 2006b, Lastrucci & al. 2009, Brunialti & Frати 2010, Brunialti & al. 2012b, Paoli & al. 2012), **Laz** (Ravera 2006, Ravera & al. 2006, Ravera 2006c, Giordani & al. 2009, Zucconi & al. 2013), **Sar** (Zedda 2002, Rizzi & al. 2011). **S - Camp** (Brunialti & al. 2013, Ravera & Brunialti 2013), **Si** (Nimis & al. 1994).

F/ §/ S/ Epiph/ pH: 2-3, L: 2-3, X: 1-2, E: 1-2/ Alt: 2-3/ Mont: vr, SmedH: vr/ PT: 1/ suboc/ Note: on the smooth bark of deciduous trees in shaded-humid situations; certainly more widespread in Italy.

Mycomicrothelia macularis (A. Massal.) Keissl.

Rabenh. Krypt.-Flora, 9, 1, 2: 36, 1936 - *Microthelia macularis* Hampe ex A. Massal., Miscell. Lichenol.: 58, 1856.

Syn.: *Didymosphaeria analeptoides* (Bagl. & Carestia) Rehm, *Microthelia analeptoides* Bagl. & Carestia, *Verrucaria analeptoides* (Bagl. & Carestia) Hue

N - Piem (Isocrono & al. 2004).

F/ / S/ Epiph/ pH: 1-2, L: 3-4, X: 3, E: 1/ Alt: 3/ Mont: vr/ PT: 1/ p/ Note: on twigs of shrubs, mostly of *Daphne* and *Ribes*.

Mycomicrothelia melanospora (Hepp) D. Hawksw.

Lichenologist, 14: 134, 1982 - *Pyrenula melanospora* Hepp, Flecht. Eur.: nr. 710, 1860.

Syn.: *Microthelia atomaria* auct., *Microthelia koerberi* Trevis., *Verrucaria micula* var. *cinereolutescens* Garov.

N - **VG, Piem** (Isocrono & al. 2004).

F/ / S/ Epiph/ pH: 1-2, L: 3-4, X: 3, E: 1/ Alt: 2-3/ Mont: vr, SmedD: vr/ PT: 1/ p/ Note: on the smooth bark of deciduous trees, especially of *Crataegus germanica*.

Mycoporum Nyl.

Flot. ex Nyl., Mém. Soc. Imp. Sci. Nat. Cherbourg, 3: 186, 1855.

This subcosmopolitan genus of the Pleosporales includes c. 25 species growing on bark. The genus has often been considered to be lichenised, and hence has been often treated by lichenologists, but is now recognised to be non-lichenised or only occasionally and facultatively associated with algae. Type: *M. elabens* (A. Massal.) Nyl.

Mycoporum antecellens (Nyl.) R.C. Harris

More Florida Lichens: 67, 1995 - *Verrucaria antecellens* Nyl., Flora, 49, 1866.

Syn.: *Arthopyrenia analeptoides* (Nyl.) A.L. Sm., *Arthopyrenia antecellens* (Nyl.) Arnold, *Pyrenula zwackhii* (Hepp) Hepp

N - **Frl** (TSB 1822), **Ven** (Nimis & al. 1996c, Lazzarin 2000), **TAA** (Nascimbene & al. 2007b), **Lomb** (Brusoni & al. 1997, Brusoni & Valcuvia 2000, Abramini & al. 2008), **Piem** (Caniglia & al. 1992, Isocrono & al. 2003), **Lig. C - Tosc** (Loppi & Frati 2006), **Abr, Mol** (Ravera & Genovesi 2012), **Sar** (Rizzi & al. 2011).

F/ / S/ Epiph/ pH: 2-3, L: 3-4, X: 3, E: 1/ Alt: 2-3/ Mont: rr, SmedD: r, Pad: er, SmedH: r/ PT: 1/ suboc, p/ Note: an early coloniser of smooth bark, especially on twigs of broad-leaved trees and shrubs (e.g. *Corylus* and *Fagus*), in humid deciduous woodlands.

Nigropuncta D. Hawksw.

Bull. Brit. Mus. Nat. Hist., Bot. ser., 9: 46, 1981.

This genus, includes 2 species and the type species, *N. rugulosa*, was described as being lichenised, because the infection strongly suppresses the production of apothecia in the host. The species, however, have been proven to be non-lichenised lichenicolous fungi. Type: *N. rugulosa* D. Hawksw.

Nigropuncta rugulosa D. Hawksw.

Bull. Brit. Mus. Nat. Hist., Bot. ser., 9: 46, 1981.

N - **TAA** (Brackel 2016).

LF/ / S/ Sax/ pH: 2-3, L: 3-4, X: 2-3, E: 1/ Alt: 4-5/ Alp: vr, Salp: er/ PT: 1/ paras *Bellemeria* spp/ Note: on smooth and hard, almost vertical surfaces of siliceous rocks in the subalpine (-alpine) belt, on the thalli of *Bellemeria*-species.

Phacographa Hafellner

Bibl. Lichenol., 100: 101, 2009.

Hafellner (2009) revised the lichenicolous opegraphoid species with discoid ascomata and included them in either *Phacothecium* or the newly erected genus *Phacographa*, discussing the generic concepts in that group and providing a key to the species. Lumbsch & Huhndorf (2010) included *Phacographa* in the Roccellaceae, but in a recent systematic revision of the Arthoniales Ertz & Tehler (2010) resurrected the family Opegraphaceae and, although they did not include *Phacographa* in the study, they did mention that it had affinities to *Opegrapha*. Presently, the genus is included in the Lecanographaceae. The species are non-lichenised, but they were frequently treated by lichenologists, because they were included in *Arthonia s.lat.*, which comprises many lichenised species. Type: *P. glaucomaria* (Nyl.) Hafellner

Phacographa glaucomaria (Nyl.) Hafellner

Bibl. Lichenol., 100: 102, 2009 - *Lecidea glaucomaria* Nyl., Nya Bot. Not.: 177, 1852.

Syn.: *Arthonia glaucomaria* (Nyl.) Nyl., *Dactylospora maculans* Arnold, *Leciographa maculans* (Arnold) Rehm, *Opegrapha maculans* (Arnold) Hafellner, *Opegrapha glaucomaria* (Nyl.) Källsten

N - **TAA** (Hafellner 2009, Brackel 2016), **Lomb** (Jatta 1909-1911), **Piem, Emil** (Tretiach & al. 2008, Hafellner 2009, Brackel 2016). **C - Tosc** (Jatta 1909-1911, Brackel 2016), **Laz** (TSB 8642 as *A. intexta* det. M. Grube), **Sar** (Monte 1993). **S - Camp** (Jatta 1909-1911), **Pugl** (Jatta 1909-1911), **Cal** (Hafellner 2009, Brackel & Puntillo 2016, Brackel 2016), **Si** (Ottonello & Romano 1997).

LF/ / S/ Sax/ pH: 2-3, L: 3-4, X: 3, E: 2/ Alt: 2-5/ Alp: r, Salp: r, Mont: vr, SmedD: vr, Smed H: er/ PT: 1/ paras *Lecanora rupicola s.lat.*/ Note: a holarctic lichenicolous fungus with a wide altitudinal and latitudinal range, growing on the thalli of species of the *Lecanora rupicola*-complex; certainly neglected and occurring throughout the country wherever the host is present. The record from Friuli by Tretiach & Hafellner (2000) refers to *P. protoparmeliae* (Hafellner 2009).

Phacographa protoparmeliae Hafellner

Bibl. Lichenol., 100: 106, 2009.

N - Frl (Hafellner 2009, Brackel 2016).

LF/ / S/ Sax/ pH: 2-3, L: 3-4, X: 3, E: 1-3/ Alt: 3-5/ Alp: vr, Salp: vr, Mont: vr/ PT: 1/ paras *Protoparmelia* spp./ Note: a lichenicolous fungus on saxicolous species of *Protoparmelia*, especially *P. badia*. The record from Friuli of *Opegrapha glaucomaria* by Tretiach & Hafellner (2000) refers to this species (Hafellner 2009).

Phacographa zwackhii (Zwackh) Hafellner

Bibl. Lichenol., 100: 108, 2009 - *Leciographa zwackhii* A. Massal. ex Zwackh, Flora, 45: 571, 1862.

Syn.: *Opegrapha nothella* Nyl., *Opegrapha zwackhii* (Zwackh) Källsten

N - Lomb (Jatta 1909-1911), **C - Abr** (Brackel 2015, 2016). **S - Bas** (Brackel 2011, 2016).

LF/ / A.s/ Epiph/ pH: 1-2, L: 2-3, X: 2-3, E: 1-2/ Alt: 2-3/ Mont: vr, SmedD: vr, SmedH: vr/ PT: 1-2/ paras *Phlyctis* spp./ Note: a lichenicolous fungus growing on species of *Phlyctis*. The species might be more widespread in Italy, but is certainly not common. The old record from Lombardy is rather dubious (see Brackel 2016).

Phacothecium Trevis.

Linnaea, 28: 298, 1857.

Hafellner (2009) revised the lichenicolous opegraphoid species with discoid ascomata and included them in either *Phacothecium* or the newly erected genus *Phacographa*, discussing the generic concepts in that group and providing a key to the species. The species of *Phacothecium* are non-lichenised, but they were frequently treated by lichenologists since they were included in *Arthonia s.lat.*, which comprises many lichenised species. Type: *P. varium* (Tul.) Trevis.

Phacothecium varium (Tul.) Trevis.

Linnaea, 27: 298, 1856 - *Phacopsis varia* Tul., Ann. Sci. Nt. Bot., sèr. 2, 17: 125, 1852.

Syn.: *Arthonia varia* (Tul.) Jatta, *Celidium varium* (Tul.) Körb., *Lecidea physciaria* Nyl., *Leciographa physciaria* (Nyl.) H. Olivier, *Opegrapha physciaria* (Nyl.) D. Hawksw. & Coppins

N - Lomb (Brackel 2016), **Emil** (Brackel 2016), **Lig** (TSB 33405, Brackel 2016). **C - Laz** (Brackel & Puntillo 2016, Brackel 2016), **Abr** (Brackel & Puntillo 2016, Brackel 2016). **S - Camp** (Brackel 2016), **Pugl** (Brackel 2016), **Cal** (Brackel & Puntillo 2016, Brackel 2016), **Si** (Nimis & al. 1994, Grillo & al. 2002, Grillo & Caniglia 2004, Hafellner 2009, Brackel 2016).

LF/ / S/ Epiph-Sax/ pH: 3-4, L: 4-5, X: 3-4, E: 3-4/ Alt: 1-3/ Mont: er, SmedH: vr, MedH: vr/ PT: 1-2/ paras *Xanthoria* spp./ Note: a lichenicolous fungus growing on species of *Xanthoria*; certainly more widespread in Italy.

Phaeocalicium A.F.W. Schmidt

Mitt. Staatsinst. allg. Bot. Hamburg, 13: 128, 1970.

This genus of the Sphinctrinaceae includes 17 non-lichenised saprobic and/or weakly parasitic species mostly growing on thin, decaying branches of deciduous trees or shrubs. It is traditionally dealt with by lichenologists on account of the morphological similarity of the stalked, pin-like apothecia with those of the lichenised Caliciaceae. The genus occurs mainly in cool temperate to temperate regions of the Northern Hemisphere, with one species each occurring in Australasia and South America. For further details see Tibell (1996b). The species occurring in Italy were treated by Puntillo & Puntillo (2009). Type: *P. praecedens* (Nyl.) A.F.W. Schmidt

Phaeocalicium compressulum (Vain.) A.F.W. Schmidt

Mitt. Staatsinst. allg. Bot. Hamburg, 13: 130, 1970 - *Mycocalicium praecedens* var. *compressulum* Nyl. ex Vain., Acta Soc. Fauna Fl. Fenn., 57, 1: 85, 1827.

N - Frl (Puntillo & Puntillo 2009), **Ven** (Nascimbene & Caniglia 1997, Caniglia & al. 1999, Thor & Nascimbene 2007, Nascimbene & Marini 2007, Nascimbene 2008c, Puntillo & Puntillo 2009), **TAA** (Thor & Nascimbene 2007, Nascimbene & al. 2007b, Puntillo & Puntillo 2009), **Lomb** (Nascimbene 2006), **Piem** (vidi!), **VA** (vidi!), **Lig** (TSB 33070).

F/ / S/ Epiph/ pH: 1-2, L: 3-4, X: 3, E: 1/ Alt: 3-4/ Salp: vc, Mont: vr/ PT: 1/ p/ Note: saprobic on *Alnus viridis*, certainly widespread throughout the Alps and locally very common, especially in the subalpine belt.

Phaeocalicium mildeanum (Hepp) Puntillo

Studia Geobot.: 64, 2001 - *Calicium mildeanum* Hepp in Rabenhorst, Lich. Eur. 718, 1864.

Syn.: *Mycocalicium mildeanum* (Hepp) Nád., *Mycocalicium ornicola* (J. Steiner) Nád., *Stenocybe mildeana* (Hepp) Jatta

N - TAA (Nascimbene & al. 2007b, Puntillo & Puntillo 2009). **C - Marc** (Nimis & Tretiach 1999, Puntillo & Puntillo 2009), **Umb** (Genovesi & al. 2001, Ravera & al. 2006, Puntillo & Puntillo 2009).

F/ / S/ Epiph/ pH: 3, L: 3, X: 2-3, E: 2-3/ Alt: 2/ SmedD: er/ PT: 1/ Note: mostly on *Fraxinus*, certainly declining: the record from Marche is the first one from Italy in this century.

Phaeocalicium populneum (Duby) A.F.W. Schmidt

Mitt. Staatsinst. allg. Bot. Hamburg, 13: 132, 1970 - *Calicium populneum* Brond. ex Duby, Bot. Gall., 2: 638, 1830.

Syn.: *Calicium exile* Anzi?, *Embolidium populneum* (Duby) Vain., *Phacotium populneum* (Duby) Trevis.

N - **TAA** (Nascimbene & al. 2007b, Puntillo & Puntillo 2009), **Lomb** (Puntillo & Puntillo 2009), **Piem** (Puntillo & Puntillo 2009). **C - Sar** (Puntillo & Puntillo 2009).

F/ / S/ Epiph/ pH: 3, L: 3-4, X: 3, E: 1-2/ Alt: 2-3/ Mont: er, SmedD: er, SmedH: er/ PT: 1/ p/ Note: saprophytic on thin, mostly decaying twigs of *Populus tremula*.

S a r e a Fr.

Syst. Orb. Veg., 1: 86, 1825.

This genus including 2 resinicolous, non-lichenised fungi has been often treated by lichenologists due to similarities with the genus *Biatorrella*. Its inclusion in the Trapeliaceae requires confirmation. Type: *S. difformis* (Fr.) Fr.

Sarea difformis (Fr.) Fr.

Elench. Fung., 2: 14, 1828 - *Peziza difformis* Fr., Syst. Mycol., 2: 151, 1822.

Syn.: *Biatorrella difformis* (Fr.) Vain., *Tromera difformis* (Fr.) Rehm, *Tromera myriospora* f. *sarcogynoides* (A. Massal. ex Arnold) Kremp., *Tromera sarcogynoides* A. Massal. ex Arnold

N - **Ven**, **TAA** (Nascimbene & al. 2014, Nascimbene 2014, Nascimbene & Marini 2015), **Lomb**, **Piem** (Isocrono & al. 2004).

F/ / S/ Epiph/ pH: 1-2, L: 2-3, X: 2-3, E: 1/ Alt: 3-4/ Salp: r, Mont: vr/ PT: 1/ Note: a probably boreal-montane non-lichenised fungus growing on the resinous exudates of coniferous trees in rather shaded and humid situations, sometimes also found on bark at the base of the trunks of old *Abies* and *Picea* in montane forests.

Sarea resiniae (Fr.) Kuntze

Revis. Gen. Pl., 3, 2: 515, 1898 - *Peziza resiniae* Fr., Syst. Mycol., 2: 149, 1822.

Syn.: *Biatorrella resiniae* (Fr.) Th. Fr., *Nectriella resiniae* (Fr.) Sacc., *Tromera myriospora* (Hepp) Anzi, *Tromera resiniae* (Fr.) Körb., *Tromera xanthostigma* A. Massal. ex Arnold

N - **Fr1**, **TAA** (Nascimbene & al. 2007b, Nascimbene 2014, Nascimbene & Marini 2015), **Lomb**, **Piem** (Isocrono & al. 2004). **C - Tosc**.

F/ / S/ Epiph/ pH: 1-2, L: 2-3, X: 2-3, E: 1/ Alt: 3-4/ Salp: r, Mont: vr/ PT: 1/ Note: a mainly boreal-montane, probably circumpolar fungus, growing on the resin of coniferous trees in the upper montane and subalpine belts.

S p h i n c t r i n a Fr.

Syst. Orb. Veg.: 120, 1825.

This genus of the Sphinctrinaceae includes 5 non-lichenised lichenicolous species growing mostly on *Pertusaria*-species (rarely also on *Lecanora* and *Diploschistes*), and was traditionally dealt with by lichenologists on account of the morphological similarity of the stalked, pin-like apothecia with those of the lichenised Caliciaceae. The genus occurs mainly in temperate to tropical regions of both Hemispheres. For the species occurring in Italy see also Puntillo & Puntillo (2009). Type: *S. turbinata* (Pers.) De Not.

Sphinctrina anglica Nyl.

Mém. Soc. Imp. Sc. Nat. Cherbourg, 5: 334, 1858.

Syn.: *Calicium microscopicum* (Anzi) Jatta, *Phacotiella microcephala* (Sm.) Vain., *Sphinctrina microscopica* Anzi, *Sphinctrina pinicola* Körb.

N - **TAA** (Brackel 2016), **Lomb** (Puntillo & Puntillo 2009, Brackel 2016).

LF/ / S/ Lign-Epiph/ pH: 1-2, L: 3, X: 2, E: 1/ Alt: 3/ Mont: er/ PT: 1/ suboc, paras *Protoparmelia oleaginea*/ Note: a parasite on the thalli of *Protoparmelia oleaginea*; certainly extremely rare, although quite widespread in the Northern Hemisphere.

Sphinctrina leucopoda Nyl.

Syn. Lich., 1, 2: 144, 1860.

Syn.: *Sphinctrina obscurata sensu* Nádvy. non (Nyl.) Nádvy., *Sphinctrina pedata* (Stenh.) R. Sant.

C - Tosc (Puntillo & Puntillo 2009, Brackel 2016), **Marc** (Nimis & Tretiach 1999, Puntillo & Puntillo 2009, Brackel 2016), **Umb** (Ravera 1998, Ravera & al. 2006, Puntillo & Puntillo 2009, Brackel 2016), **Laz** (Puntillo & Puntillo 2009, Brackel 2016), **Sar** (Puntillo & Puntillo 2009, Brackel 2016). **S - Camp** (Nimis & Tretiach 2004 Puntillo & Puntillo 2009, Garofalo & al. 2010, Brackel 2016), **Cal** (Puntillo 1996, Puntillo & Puntillo 2009, Brackel & Puntillo 2016, Brackel 2016), **Si** (Brackel 2008b, 2016).

LF/ / S/ Epiph/ pH: 1-2, L: 3, X: 2, E: 1/ Alt: 2-3/ Mont: vr, SmedD: er, SmedH: vr/ PT: 1/ suboc, paras *Pertusaria* spp./ Note: a parasite on the thalli of epiphytic crustose lichens, mostly of *Pertusaria pertusa*;

certainly declining. Earlier records from Sicily (Caniglia & Grillo, 2003, Grillo & Caniglia, 2004), not validated by Puntillo & Puntillo (2009), are excluded.

Sphinctrina tubiformis A. Massal.

Mem. Lichenogr.: 155, 1853.

Syn.: *Sphinctrina microcephala* Nyl. non (Sm.) Körb., *Sphinctrina obducta* Nyl.

N - **Frl** (Puntillo & Puntillo 2009, Brackel 2016), **Ven** (Puntillo & Puntillo 2009, Lazzarin 2000b, Brackel 2016), **TAA** (Nascimbene & al. 2007b, Brackel 2016), **Lomb** (Puntillo & Puntillo 2009, Brackel 2016), **Piem** (Puntillo & Puntillo 2009, Brackel 2016), **VA** (Watson 2014), **Lig** (Puntillo & Puntillo 2009, Brackel 2016). **C** - **Tosc** (Puntillo & Puntillo 2009, Brackel 2016), **Laz** (Puntillo & Puntillo 2009, Brackel 2016), **Sar** (Puntillo & Puntillo 2009, Rizzi & al. 2011, Brackel 2016). **S** - **Camp** (Ricciardi & al. 2000, Puntillo & Puntillo 2009, Brackel 2016), **Pugl** (Puntillo & Puntillo 2009, Brackel 2011), **Cal** (Puntillo 1994, 1996, Puntillo & Puntillo 2009, Brackel & Puntillo 2016, Brackel 2016).

LF// S/ Epiph/ pH: 1-2, L: 3-4, X: 2, E: 1/ Alt: 2-3/ Mont: r, SmedD: vr, SmedH: vr/ PT: 1/ suboc, paras *Pertusaria* spp./ Note: a parasite on the thalli of crustose lichens, mostly *Pertusaria leioplaca*.

Sphinctrina turbinata (Pers.) De Not.

Giorn. Bot. Ital., 2: 314, 1846 - *Calicium turbinatum* Pers., Tent. Disp. Fung.: 59, 1797: Fr. Elenc. Fung., 2: 148, 1828.

Syn.: *Acolium stigonellum* (Ach.) Gray, *Calicium stigonellum* Ach., *Sphinctrina gelasinata* (With.) Zahlbr. nom.inval.

N - **Ven** (Nascimbene & Marini 2010, Brackel 2016), **Lomb** (Puntillo & Puntillo 2009, Brackel 2016), **Piem** (Puntillo & Puntillo 2009), **Emil** (Puntillo & Puntillo 2009, Brackel 2016), **Lig** (Watson 2014). **C** - **Tosc** (Puntillo & Puntillo 2009, Brackel 2016), **Umb** (Ravera & al. 2011, Brackel 2016), **Laz** (Ravera 2001, 2002, Massari & Ravera 2002, Brackel 2016), **Abr** (Nimis & Tretiach 1999, Puntillo & Puntillo 2009, Corona & al. 2016, Brackel 2016), **Mol** (Caporale & al. 2008, Brackel 2016), **Sar** (Rizzi & al. 2011, Cossu 2013, Brackel 2016). **S** - **Camp** (Aprile & al. 2003b, Puntillo & Puntillo 2009, Garofalo & al. 2010, Brackel 2016), **Pugl** (Puntillo & Puntillo 2009, Brackel 2016), **Bas** (Potenza 2006, Puntillo & Puntillo 2009, Potenza & Fascetti 2012, Brackel 2016), **Cal** (Puntillo 1994, 1995, 1996, Puntillo & Puntillo 2004, 2009, Brackel & Puntillo 2016, Brackel 2016), **Si** (Nimis & al. 1994, Grillo & Cristaudo 1995, Caniglia & Grillo 2006b, Puntillo & Puntillo 2009, Ottonello & al. 2011, Brackel 2016).

LF// S/ Epiph/ pH: 1-2, L: 3, X: 2, E: 1/ Alt: 1-3/ Mont: rr, SmedD: vr, SmedH: r, MedH: er/ PT: 0/ suboc, paras *Pertusaria* spp./ Note: mostly on *Pertusaria pertusa* in humid beech forests, much more rarely on saxicolous *Pertusaria*-species.

Stenocybe Körb.

Nyl. ex Körb., Syst. Lich. Germ.: 306, 1855.

This genus of the Sphinctrinaceae includes c. 10 species occurring mainly in temperate areas of the Northern Hemisphere, with one species in New Zealand. The species are not lichenised, growing as saprobes or possibly weak parasites on the branches of trees and shrubs, and are very host-specific. They are traditionally dealt with by lichenologists on account of the morphological similarity of the stalked, pin-like apothecia with those of the lichenised Caliciaceae. The delimitation of the genus towards *Phaeocalicium* needs further study. Italian species were treated by Puntillo & Puntillo (2009). Type: *S. byssacea* (Fr.) Körb. (= *S. pullatula*).

Stenocybe major Körb.

Nyl. ex Körb., Syst. Lich. Germ.: 306, 1855.

Syn.: *Calicium eusporum* Nyl., *Stenocybe euspora* (Nyl.) Anzi

N - **TAA** (Puntillo & Puntillo 2009, Nascimbene & al. 2014, Nascimbene 2014), **Lomb** (Puntillo & Puntillo 2009), **Piem** (Isocrono & al. 2004, Puntillo & Puntillo 2009).

LF// S/ Epiph/ pH: 1-2, L: 2-3, X: 2-3, E: 1/ Alt: 3/ Mont: er/ PT: 0/ suboc, paras *Loxospora* spp./ Note: on the trunk of old trees, especially *Abies*, in humid montane forests, on the thalli of *Loxospora*-species.

Stenocybe pullatula (Ach.) Stein

in Cohn, Krypt- Fl. von Schlesien, 2, 2: 298, 1879 - *Calicium pullatulum* Ach., K. Vetensk.-Akad. Nya Handl.: 121, 1816.

Syn.: *Calicium byssaceum* Fr., *Stenocybe byssacea* (Fr.) Körb.

N - **Frl** (Puntillo & Puntillo 2009), **TAA** (Nascimbene & al. 2007b, Puntillo & Puntillo 2009), **Lomb** (Puntillo & Puntillo 2009), **Piem** (Isocrono & al. 2004, Puntillo & Puntillo 2009). **C** - **Tosc** (Puntillo & Puntillo 2009).

F// S/ Epiph/ pH: 1-2, L: 3-4, X: 3, E: 1/ Alt: 2-3/ Mont: vr, SmedD: er/ PT: 1/ Note: saprobic or parasitic on branches of *Alnus*, on decaying branches and trunks, especially along streams and lakes, usually associated with algal colonies.

Tomaselia A. Massal.

Flora, 39: 283, 1856.

This genus of the Naetrocymbaceae includes c. 5 species growing on smooth bark. The genus has often been considered to be lichenised, and hence has been often treated by lichenologists, but a photobiont is clearly missing. Type: *T. arthonioides* (A. Massal.) A. Massal.

Tomasellia arthonioides (A. Massal.) A. Massal.

Flora, 39: 284, 1856 - *Arthopyrenia arthonioides* A. Massal., Ric. Auton. Lich. Crost.: 169, 1852.

Syn.: *Melanotheca arthonioides* (A. Massal.) Nyl., *Pyrenula arthonioides* (A. Massal.) Trevis.

N - **VG**, **Frl**, **Ven** (Lazzarin 2000), **TAA** (Nascimbene & al. 2007b), **Lomb**, **Piem** (Isocrono & al. 2004), **Emil**, **Lig**, **C** - **Tosc**, **Marc** (Nimis & Tretiach 1999), **Umb** (Ravera 1998, Ravera & al. 2006), **Laz** (Nimis & Tretiach 2004), **Abr** (Caporale & al. 2016), **Mol** (Nimis & Tretiach 1999, Caporale & al. 2008). **S** - **Camp** (Aprile & al. 2003b, Nimis & Tretiach 2004, Garofalo & al. 2010), **Pugl** (Nimis & Tretiach 1999), **Bas** (Nimis & Tretiach 1999, Potenza 2006), **Cal** (Puntillo 1996, Puntillo & Puntillo 2004), **Si** (Nimis & al. 1994).

F//S/ Epiph/ pH: 3, L: 3-4, X: 3, E: 1-2/ Alt: 1-2/ SmedD: rr, SmedH: rc, MedH: r/ PT: 1-2/ p/ Note: a mild-temperate fungus, most frequent on the smooth bark of *Fraxinus ornus* in the submediterranean belt.

Tomasellia diffusa (Leight.) J. Lahm

Jahresber. Westfäl. Prov.-Vereins, 13: 57-85, 1885 - *Melanotheca diffusa* Leight., Lich. Fl. Gr. Brit.: 467, 1871.

C - **Tosc**, **Umb** (Ravera 1999, Ravera & al. 2006), **Mol** (Caporale & al. 2008).

F//S/ Epiph/ pH: 1-2, L: 3-4, X: 3, E: 1/ Alt: 1-2/ SmedD: vr, SmedH: vr, MedH: er/ PT: 1/ p/ Note: a mainly western, rare species, most frequent on the smooth bark of *Alnus*.

Tomasellia gelatinosa (Chevall.) Zahlbr.

Cat. Lich. Univ., 1: 474, 1922 - *Arthonia gelatinosa* Chevall., J. Phys. Chem. Hist. Nat., 94: 54, 1822.

Syn.: *Athrismidium gelatinosum* (Chevall.) Trevis., *Melanotheca gelatinosa* (Chevall.) Zahlbr., *Melanotheca leightonii* (A. Massal.) Kremp., *Tomasellia leightonii* A. Massal.

N - **Ven**, **Lig**, **C** - **Umb** (Ravera 1999, Ravera & al. 2006), **Laz** (Ravera 2006, Munzi & al. 2007), **Mol** (Caporale & al. 2008). **S** - **Cal** (Puntillo 1996).

F//S/ Epiph/ pH: 1-2, L: 3-4, X: 3, E: 1/ Alt: 1-2/ SmedD: vr, SmedH: r, MedH: vr/ PT: 1/ p/ Note: a mainly temperate, pioneer fungus growing on the smooth bark of deciduous trees (e.g. *Alnus*, *Corylus*, *Sorbus*, *Tilia* etc.).

Poorly known taxa

Here I place a long list of taxa described or reported from Italy, which are very poorly understood, being mostly known from the type collection only. Most of them were already commented on by Nimis (1993). The list includes a high number of pyrenocarpic lichens described by Servít, which await a critical revision (a few of them have been recently re-evaluated by O. Breuss and are now placed among the accepted taxa). Several species described by Bouly de Lesdain remain problematic as well, because his herbarium was destroyed at Dunkirk during the Second World War. The most interesting entries of this list are the taxa described by lichenologists such as M. Anzi, A. Massalongo, and F. Baglietto, which are well worthy of further study, especially those described by Anzi, whose type material might now be available in the recently re-discovered Herbarium Anzi in TO (Isocrono & al. 2014), and by Massalongo, whose nomenclatural types preserved in VER have been catalogued by Lazzarin (2000b).

- Acarospora hostilis* H. Magn. - See Nimis (1993: 54).
Acarospora valdobbiansis Bagl. & Carestia - See Nimis (1993: 107).
Amphoridium crustificans Servít - See Nimis (1993: 751).
Amphoridium galactinum A. Massal. = *Verrucaria galactinella* Servít non *Verrucaria galactina* Ach. - See Nimis (1993: 753).
Arthonia bassanensis Beltr. - See Nimis (1993: 85).
Arthonia copromya Anzi - See Nimis (1993: 85).
Arthonia tabidula Anzi - See Nimis (1993: 86).
Arthopyrenia copromya A. Massal. - See Nimis (1993: 92).
Arthopyrenia parolinii Beltr. - See Nimis (1993: 92).
Arthopyrenia punctiformis f. *ilicicola* Bagl. & Carestia - See Nimis (1993: 92).
Arthopyrenia stigmatella var. *pseudarthonia* A. Massal. - See Nimis (1993: 92).
Aspicilia lactea A. Massal. - According to Lazzarin (2000b) Cl. Roux has seen the type and has annotated that it belongs to a *Lecania*.
Aspicilia scopulicola B. de Lesd. - See Nimis (1993: 105).
Biatora brunnea Anzi - See Nimis (1993: 127).
Biatora castanearum Jatta - See Nimis (1993: 127).
Biatora fuscovirens Bagl. & Carestia - Known only from the type collection.
Biatora holomicra Anzi - See Nimis (1993: 127).
Biatora lecideola Bagl. - See Nimis (1993: 127).
Biatora lygaeoides Anzi - See Nimis (1993: 393).
Biatora valerii Anzi - See Nimis (1993: 127).
Biatorina cohabitans Jatta - See Nimis (1993: 206).
Biatorina cyrtella var. *carneorubra* Anzi - Known only from the type collection, on *Populus*.
Biatorina haematophaea Anzi - See Nimis (1993: 206).
Biatorina ignita Anzi - See Nimis (1993: 206).
Biatorina melanophaea Anzi - According to M. Mayrhofer (1988) the type belongs to *Lecidea s.lat.*
Biatorina luctuosa Anzi - See Nimis (1993: 190).
Bilimbia lecideoides Anzi - A very poorly known taxon.
Bilimbia leptosperma Anzi - See Nimis (1993: 115).
Bilimbia scoliciosporoides Bagl. - See Nimis (1993: 116).
Bilimbia sordida Anzi - This is probably a *Lecania*.
Bilimbia spartii Jatta - See Nimis (1993: 116).
Bilimbia sublutescens Jatta - Known only from the type collection.
Bilimbia visianica Beltr. = *Bacidia visianica* (Beltr.) Lettau - See Nimis (1993: 116).
Buellia henrici B. de Lesd. - See Nimis (1993: 146).
Buellia mycetoides Anzi = *Melaspilea mycetoides* (Anzi) Nyl. - The type was collected on *Pinus* in the Alps of Lombardy.
Buellia sbarbaronis B. de Lesd. - See Nimis (1993: 146-147).
Calloposma tremiacense A. Massal. - See Nimis (1993: 191).
Caloplaca bisagnonis B. de Lesd. - See Nimis (1993: 189); a description of the type was provided by Loppi & al. (1997).
Caloplaca italica B. de Lesd. - See Nimis (1993: 190).
Caloplaca melanocarpa f. *depauperata* Jatta - Known only from the type collection (Island of Giglio).
Catillaria dimorpha A. Massal. - This is a *Lecanora* whose apothecia are infected by an *Arthonia*.
Catillaria fuscorubra B. de Lesd. - Described from Liguria, growing on the thallus of a *Verrucaria*.
Catillaria stenocarpa B. de Lesd. - See Nimis (1993: 207) and Roux & coll. (2014: 282).
Cliostomum tetrasporum De Not. ex Jatta - See Nimis (1993: 147).
Dermatocarpon areolatatum B. de Lesd. - See Nimis (1993: 274).
Dermatocarpon turgidum Servít - See Nimis (1993: 275).
Endocarpon lunardii B. de Lesd. - See Nimis (1993: 288).
Endopyrenium italicum B. de Lesd. - See Nimis (1993: 754).
Gyalecta bilimbioides Anzi - Known only from the type collection.

Gyalolechia glaucescens Bagl. & Carestia - Known only from the type collection, on granite.
Involucrocarpon arenzanoense Servít - See Nimis (1993: 202).
Involucrocarpon framurense Servít - Known only from the type collection (Liguria, Cinqueterre, Framura).
Involucrocarpon savonicum Servít - See Nimis (1993: 202).
Involucrothele inordinata Servít - See Nimis (1993: 689).
Involucrothele ligurica Servít - See Nimis (1993: 689-690).
Involucrothele paneveggiansis Servít - See Nimis (1993: 690).
Involucrothele tegulicola Servít - See Nimis (1993: 690).
Lecanora albella f. *florescens* Cif. - See Nimis (1993: 374).
Lecanora capricola B. de Lesd. - See Nimis (1993: 375).
Lecanora maceriacola B. de Lesd. - See Nimis (1993: 375); according to Roux & coll. (2014) very closely related to *Myriolecis aghardhiana*.
Lecanora polycarpa Anzi nom. illegit. = *Lecanora polycarpella* Zahlbr. - See Nimis (1993: 375).
Lecanora protecta Bagl. & Carestia - See Nimis (1993: 375).
Lecanora sororia Bagl. & Carestia - See Nimis (1993: 376).
Lecanora straminella Bagl. - See Nimis (1993: 376).
Lecanora straminella f. *lithophila* Bagl. - See Nimis (1993: 376).
Lecanora subfusca f. *azurea* Anzi - Known only from the type collection.
Lecanora subfusca var. *puniceofuscens* Jatta - See Nimis (1993: 376).
Lecanora variaeformis Bagl. - See Nimis (1993: 376).
Lecanora vulcanica Bagl. - See Nimis (1993: 376).
Lecidea antiqua B. de Lesd. - See Nimis (1993: 392).
Lecidea convexa var. *porschii* Jatta - A very poorly known taxon.
Lecidea epixanthina Nyl. - See Nimis (1993: 115).
Lecidea interjecta Bagl. & Carestia nom. inval. non Nyl. nec (Müll. Arg.) Stizenb. = *Lecidea bagliettoana* Zahlbr. - See Nimis (1993: 392).
Lecidea inflata Anzi - See Nimis (1993: 393).
Lecidea isidiosa Anzi - See Nimis (1993: 393).
Lecidea italica B. de Lesd. - See Nimis (1993: 393).
Lecidea pallidiformis Anzi = *Lecanora pallidiformis* (Anzi) Bagl. ("pallidaeformis") - See Nimis (1993: 393).
Lecidea pertusariicola Jatta - This might be identical to the lichenicolous fungus *Rhymbocarpus pertusariae* Diederich, Zhurb. & Etayo, but the type is in poor conditions (see Diederich & Etayo 2000).
Lecidea proxima Anzi - See Nimis (1993: 394).
Lecidea sbarbaronis B. de Lesd. - See Nimis (1993: 395).
Lecidea sessitana Bagl. & Carestia = *Psora sessitana* (Bagl. & Carestia) Bagl. & Carestia - See Nimis (1993: 583).
Lecidea sollana Jatta - See Nimis (1993: 395).
Lecidea sphaerocarpa Bagl. & Carestia - See Nimis (1993: 395).
Lecidea spotornonis B. de Lesd. - See Nimis (1993: 395).
Lecidea spuriaeformis Anzi - See Nimis (1993: 395).
Lecidea subconfluens Anzi - See Nimis (1993: 395).
Lecidea titubans Bagl. & Carestia - Known only from the type collection.
Lecidea violacea A. Massal. - The type was collected on trachyte in the Euganean Hills.
Melaspilea tyroliensis Szatala - See Nimis (1993: 432).
Opegrapha atra var. *phoenicicola* Jatta - See Nimis (1993: 464).
Paraphysothele italica Servít - See Nimis (1993: 690).
Paraphysothele sbarbaronis Servít - See Nimis (1993: 690).
Paraplacidiopsis sbarbaronis Servít - Breuss (1996b) could not examine the type; see also Nimis (1993: 546).
Placidium marcomanici A. Massal. - See Nimis (1993: 274).
Placidium pulchrevirens Anzi = *Caloplaca pulchrevirens* (Anzi) Jatta - See Nimis (1993: 190).
Polyblastia bormiensis Servít - See Nimis (1993: 558).
Polyblastia etrusca Servít - See Nimis (1993: 558-559).
Polyblastia sbarbaronis Servít - See Nimis (1993: 559).
Pyrenodesmia tauriliana A. Massal. = *Caloplaca tauriliana* (A. Massal.) Jatta - See Nimis (1993: 191).
Pyrenotea toniniana A. Massal. - Type collected on mica-schist near Recoaro; Jatta (1909-1911) considers it as a *Sarcogyne*.
Pyrenopsis endoxantha Anzi = *Psorotichia endoxantha* (Anzi) Forssell - See Nimis (1993: 589).
Pyrenopsis leprosa Anzi = *Psorotichia leprosa* (Anzi) Forssell - See Nimis (1993: 589).
Rinodina fittipaldiana Jatta - See Nimis (1993: 640).
Rinodina saxicola B. de Lesd. - See Nimis (1993: 640).
Sagedia cembricola Anzi = *Arthopyrenia cembricola* (Anzi) Lettau, *Porina cembricola* (Anzi) Lettau - See Nimis (1993: 565).
Sagedia constricta Anzi = *Porina constricta* (Anzi) Lettau - See Nimis (1993: 565).
Sarcogyne coronata Jatta = *Biatorrella coronata* (Jatta) Zahlbr. - See Nimis (1993: 646).

Scoliciosporum villae-lati A. Massal. = *Bacidia incompta* var. *villae-lati* (Jatta) Arnold, *Bacidia villae-lati* (A. Massal.) Jatta - See Nimis (1993: 116).

Siphulastrum alpinum Jatta - Known only from the type collection. The envelope purported to contain the type, in NAP (*vidi*), is empty; the type is presently in S (L474) and appears to be almost completely eaten by insects and thus unidentifiable. An annotation by A. Henssen states that it could be a taxon in the Heppiaceae.

Synechoblastus siculus Borzì - See Nimis (1993: 264).

Thelidium fulloëense Servít - See Nimis (1993: 690).

Thelidium mammillatum Bagl. - Perhaps a synonym of *Lithothelium triseptatum*; see also Nimis (1993: 690).

Thelidium metzlerianum Servít - Described from Germany and also reported from Liguria: see Nimis (1993: 690).

Thyrea arenae A. Massal. - See Nimis (1993: 696).

Thyrea borzii Beltr. - See Nimis (1993: 696).

Urceolaria scruposa var. *flavicans* Moris & De Not. - See Nimis (1993: 282).

Usnea augustana Tosco - See Nimis (1993: 729).

Verrucaria abdita Servít - See Nimis (1993: 751).

Verrucaria bagliettoi Servít - See Nimis (1993: 752).

Verrucaria barrandei f. *albofissa* Servít - See Nimis (1993: 752).

Verrucaria cinereolimbata Servít - See Nimis (1993: 752).

Verrucaria conchea Servít - See Nimis (1993: 752).

Verrucaria corrosa Jatta - See Nimis (1993: 752).

Verrucaria corticata Anzi - See Nimis (1993: 752).

Verrucaria contardonis Servít - See Nimis (1993: 752).

Verrucaria delitescens Servít - See Nimis (1993: 752).

Verrucaria dermatoidea Servít = *Verrucaria veronensis* f. *dermatoidea* A. Massal. ex Anzi - See Nimis (1993: 752).

Verrucaria despecta Servít - See Nimis (1993: 752).

Verrucaria diplothemoides Servít - See Nimis (1993: 752).

Verrucaria fascensis Servít - See Nimis (1993: 753).

Verrucaria ferratensis Servít - See Nimis (1993: 753).

Verrucaria forissii Servít - See Nimis (1993: 753).

Verrucaria geomelaena Anzi - See Nimis (1993: 753).

Verrucaria gorzegnoensis Servít - See Nimis (1993: 753).

Verrucaria hercegensis Servít - See Nimis (1993: 753).

Verrucaria hilitzeriana Servít - See Nimis (1993: 753).

Verrucaria imitatoria Servít - See Nimis (1993: 753).

Verrucaria imperfecta Servít - See Nimis (1993: 753).

Verrucaria inaequata var. *kummerleana* Servít - See Nimis (1993: 754).

Verrucaria incompta Servít - See Nimis (1993: 753-754).

Verrucaria jodophila Servít - See Nimis (1993: 689).

Verrucaria langhensis Servít - See Nimis (1993: 754).

Verrucaria latebrosoides Servít - See Nimis (1993: 754).

Verrucaria maculiformis var. *acrotella* Anzi = *Verrucaria pseudoacrotella* Servít - See Nimis (1993: 756).

Verrucaria metzleri Servít - See Nimis (1993: 754).

Verrucaria modestula Servít - See Nimis (1993: 754).

Verrucaria montettensis Servít - See Nimis (1993: 755).

Verrucaria nylanderiana Servít - See Nimis (1993: 755).

Verrucaria obscurella Servít - See Nimis (1993: 755).

Verrucaria pantaleoni Servít - See Nimis (1993: 755).

Verrucaria paradoxa Servít - See Nimis (1993: 755).

Verrucaria paramauroides Servít - See Nimis (1993: 755).

Verrucaria paranigrescens Servít - See Nimis (1993: 755).

Verrucaria parapinguis Servít - See Nimis (1993: 755).

Verrucaria pilisensis Servít - See Nimis (1993: 756).

Verrucaria portofinensis Servít - See Nimis (1993: 756).

Verrucaria pseudomacrostoma Servít - See Nimis (1993: 756).

Verrucaria pseudomyriocarpa Servít - See Nimis (1993: 756).

Verrucaria pseudopapillaris Servít - See Nimis (1993: 756).

Verrucaria pulicaris A. Massal. *nom. illegit.*

Verrucaria rechingerii Servít - See Nimis (1993: 756).

Verrucaria ruinicola Servít - See Nimis (1993: 756).

Verrucaria savonensis Servít - See Nimis (1993: 756).

Verrucaria slavonica Servít - See Nimis (1993: 756).

Verrucaria spotornensis Servít - See Nimis (1993: 756-757).

Verrucaria strasseri Servít - See Nimis (1993: 757).

Verrucaria tatrensis Servít - See Nimis (1993: 757).

Verrucaria terminalis Servít - See Nimis (1993: 757).

Verrucaria toscanica Servít - See Nimis (1993: 757).
Verrucaria trachyticola Servít - See Nimis (1993: 757).
Verrucaria turgida Servít - See Nimis (1993: 757).
Verrucaria valpellinensis B. de Lesd. - See Nimis (1993: 757).
Verrucaria varigottiana B. de Lesd. - See Nimis (1993: 757).
Verrucaria volterrensis Servít - See Nimis (1993: 757).
Weitenwebera latebrosa Bagl. & Carestia - See Nimis (1993: 559).
Zeora leucoderma Anzi - See Nimis (1993: 375).
Zeora rubella Anzi - See Nimis (1993: 375).

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