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Melastiza (Boud.) comb. et stat. nov. – a subgenus of the genus Aleuria Fuck. emend. nov. (Discomycetes, Pezizales)

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Moravec J. (1994): Melastiza – a subgenus of the genus Aleuria (Discomycetes, Pezizales). – Czech Mycol. 47: 237–259

Relations between the genera Melastiza Boud. and Aleuria Fuck. are discussed. Examination of a number of collections of most species of both genera including the relevant type material has confirmed the opinion that the coloured outgrowths on the receptacles of species of Melastiza are not reliable and sufficient for generic delimitation and, as a result, a new emendation of the genus Aleuria Fuck. is proposed. The genus is divided into two subgenera: subgen. Aleuria and subgen. Melastiza (Boud.) comb. et stat. nov. The discussed mutual relations and leading features, especially a variability of the colour and the wall thickness of the excipular hyphae and hyphoid hairs in Melastiza, similar shapes of the hyaline hyphae and hyphoid hairs in Aleuria, the same type of ascospores and excipular structure, the same carotenoid composition in paraphyses, and the same habitat, are considered an evidence for the generic identity. Reexaminations of the type material (NY,K) of Peziza cornubiensis Berkeley et Broome [= Melastiza cornubiensis (Berk. et Br.) J. Moravec (1992b)], and the type (K) of Peziza chateri W. G. Smith [= Melastiza chateri (W. G. Smith) Boud.], have confirmed the identity of both fungi. Consequently, new combinations – Aleuria cornubiensis (Berk. et Br.) comb. nov., Aleuria carbonicola (J. Mor.) comb. nov., Aleuria flavida (Thind et Kaushal) comb. nov., Aleuria flavorubens (Rehm) comb. nov., Aleuria boudieri (v. Höhnel in Rehm) comb. nov. and Aleuria scotica (Graddon) comb. nov. are proposed. A Nepal collection of Aleuria rubra Batra [=Melastiza rubra (Batra) Maas Geesteranus] has also been examined. Aleuria latispora spec. nov. based on a collection from Central Asia is described as a new species of this subgenus too. Notes on the taxonomy, and descriptions and illustrations of all the taxa including SEM photomicrographs of ascospores accompany the paper.

Key words: Aleuria, subgen. Melastiza, Pezizales, taxonomy.

Moravec J. (1994): Melastiza – podrod rodu Aleuria (Discomycetes, Pezizales). – Czech Mycol. 47: 237–259

Jsou diskutovány vztahy mezi rody Melastiza Boud. a Aleuria Fuck. Na základě studia mnoha sběrů většiny druhů obou rodů byl potvrzen názor, že zbarvené odění zevní části excipula u Melastiza není spolehlivým znakem pro rodové rozlišení a závěrem je navrženo nové vymezení rodu Aleuria, který je rozdělen do dvou podrodů: subgen. Aleuria a subgen. Melastiza (Boud.) comb. et stat. nov. Diskutované vzájemné vztahy a rozhodující znaky, zejména variabilita zbarvení a síly stěn hyf a hyfovitých chlupů excipula u Melastiza a podobný tvar hyalinních hyf a hyfovitých chlupů u Aleuria, stejný typ askospor a struktury excipula, identická barviva v parafyzách a stejná ekologie, jsou považovány za důkazy pro identitu obou rodů. Studiem typového materiálu (NY,K) Peziza cornubiensis Berk. et Br. [= Melastiza cornubiensis (Berk. et Br.) J. Moravec (1992b)],

a typu (K) Peziza chateri W. G. Smith [= Melastiza chateri (W. G. Smith) Boud.] byla potvrzena identita obou hub. Následně jsou navrženy nové kombinace: Aleuria cornubiensis (Berk. et Br.) comb. nov., Aleuria carbonicola (J. Mor.) comb. nov., Aleuria flavida (Thind et Kaushal) comb. nov., Aleuria flavorubens (Rehm) comb. nov., Aleuria boudieri (v. Höhnel in Rehm) comb. nov. a Aleuria scotica (Graddon) comb. nov. Byl rovněž studován nepálský nález Aleuria rubra Batra [=Melastiza rubra (Batra) Maas Geesteranus]. Aleuria latispora spec. nov. je popsána jako nový taxon uvedeného podrodu na základě sběru ze Střední Asie. Příspěvek doplňují poznámky k taxonomii, popisy, kresby a mikrofotografie (SEM) askospor.

The establishment of the genus *Melastiza* Boudier (1885) was based on *Humaria miniata* Fuckel [= *Melastiza miniata* (Fuck.) Boud.], a species selected later by Clements and Shear (1931) as the type, and *P. chateri* W.G.Smith [= *Melastiza chateri* (W.G.Smith) Boud.]. Le Gal (1958) confirmed the Seaver's opinion (Seaver 1928) on the identity of the two taxa and the younger *H. miniata* was definitively filed under synonyms of *M. chateri.*

After the examination of the type material (K, S), I can confirm the identity. Moreover, I have found that they are also conspecific with *Peziza cornubiensis* Berk. et Br. [= *Melastiza cornubiensis* (Berk. et Br.) J. Moravec (1992b)]. The genus now comprises several other species and has generally been considered to be closely related to the genus *Aleuria* Boud. The relations between *Melastiza* and *Aleuria* were discussed by Le Gal (1963), Eckblad (1968), Rifai (1968), Mäkinen et Pohjola (1969), J. Moravec (1972), Gamundí (1975), and Häffner (1986, 1993). The taxa of *Melastiza* were summarized by Lassueur (1980) and those of *Aleuria* monographed by Hohmeyer & Häffner in an unpublished manuscript which later appeared in a German version by Häffner (1993).

The carotenoids as a character from the taxonomic viewpoint were studied by Arpin (1968), Arpin et Bouchez (1968), Valadon (1976), Goodwin (1980), and Gill et Steglich (1987). As a result, the carotenoid composition (see below) represents another feature that supports the idea of an identity of these two genera and simultaneously is important for the generic delimitation between the genera *Aleuria* Fuck. and *Sowerbyella* Nannfeldt. The "aleuriaxanthin", a pigment unique to *Aleuria* and *Melastiza,* has not been found in species of *Sowerbyella,* not even in *Sowerbyella rhenana* (Fuck.) J. Mor. which was previously kept in *Aleuria* due to its orange-red hymenium. In my opinion, the genus *Sowerbyella* is confined to the subfam. Otideoideae Korf (1972) as discussed also in J. Moravec (1988).

Earlier, (J. Moravec 1972), discussing the mutual relation between *Aleuria aurantia* and *Melastiza chateri* and the various habitat of the former, I noted difficulties in the distinguishing these fungi from each other when the old apothecia of the both species are found admixed and growing mutually densely aggregated, as

the coloured hairs on the surface and margin of old apothecia of *Melastiza chateri* (=*M. cornubiensis)* may be very scarce, pale or hyaline, and therefore barely seen. The similarity of older apothecia of these two fungi is surprisingly great, as is the similarity of other features including the apothecial structure and the reticulate apiculate ascospores, which are, in my experience, only slightly smaller in *Aleuria aurantia*. The only difference between these two fungi, and simultaneously the leading character for which they have still been kept in two different genera (and even placed into different tribes), is the presence of coloured hairs in *Melastiza,* whilst those in *Aleuria* are hyaline. I suggested (J. Moravec 1972) that *Aleuria* and *Melastiza* should be merged into one genus. Furthermore, in one recent collection of *Melastiza cornubiensis* (Česká Třebová, Bohemia), I have found the coloured hairs very scarcely present in the marginal excipulum. Instead of them, or admixed, there were bunches of hyaline (whitish when seen with the naked eye) hyphae which were of the same shape as those in *A. aurantia.*

Furthermore, I have found hyaline but thick-walled septate hairs on the surface of the lower part of apothecia of *Aleuria cestrica* (Ell. et Ev.) Seaver, *Aleuria balfourbrowneae* Waraitch and *Aleuria dalhousiensis* Thind et Waraitch (type). Such hairs are also described and illustrated by Häffner (1993) for *Aleuria luteonitens* (Berk. et Br.) Gill.

The habitat of species of these genera is extremely diverse. Apothecia of both are often collected among mosses. Häffner (1993) discussed a strong affinity of *A. bicucullata* and *A. cestrica* to mosses and considered them bryophilous species, and I can confirm this observation in species of *Melastiza* too. I have found a strong affinity to moss (*Brachythecium* sp.) in *A. latispora,* described below as a new species of the subgen. *Melastiza.* I found moss cells of thalli and rhizoids in the excipular cells near the base. The type species *Aleuria aurantia* was found by me on extremely diverse substrates, e.g. amongst dense moss (*Polytrichum*) in a spruce forest, but also on bare sand at edges of ponds in the company of *Melastiza cornubiensis,* and on soil mixed with cow dung associating with coprophilous discomycetes, and even on a heap of sawdust mixed with cow dung seemingly without any moss. Similarly, I have collected *Aleuria cestrica* on pig dung.

However, the bryophile habitat is evident and association with mosses (*Polytrichum* sp., *Bryum* sp., *Atrichum* sp., *Brachythecium* sp., *Dicranella* sp., *Fissidens* sp.) or their protonemata has been proved in all collections of *Aleuria* and *Melastiza* that I reexamined.

Examination of a number of collections of many species of both genera including the relevant type material has confirmed the opinion (J. Moravec 1972) that the coloured outgrowths on the receptacles of species of *Melastiza,* which has been the only feature distinguishing Boudier's genus from *Aleuria* are not reliable and

sufficient for generic delimitation, and that the genus *Melastiza* should be merged with *Aleuria* under the older generic name given by Fuckel.

Analogically, a similar situation exists in several other genera, such as *Neottiella* (Cooke) Sacc. versus *Octospora* Hedw., and *Coprobia* Boud. versus *Cheilymenia* Boud. The true hairy apothecia of *Neottiella hetieri* Boud. bearing pointed setae, as well as the apothecia of *Neottiella rutilans* (Fr.) Dennis and several other species bearing hyphoid hairs or merely hyphae, is not considered a valuable feature for generic delimitation between the genera *Neottiella* and *Octospora* (see Dennis & Itzerot 1973 and Caillet et Moyne 1987a, 1987b). The species possessing hairy apothecia now form the section *Neottiellae* Caillet et Moyne of the genus *Octospora,* as all other features fit the genus well. Similarly, hairless apothecia of species of the genus *Coprobia* cannot be considered a reliable feature for generic separation. The species which bear hyaline hyphae or hyphoid hairs possess all other features that are characteristic of several other species of the genus *Cheilymenia* as emended by Moravec (1992a), and therefore merely form a section *Coprobiae* of the genus.

The above mentioned variability of the colour of the hairs in *Melastiza,* which are of a similar shape as the hyaline hyphae in *Aleuria,* the fact that such hyaline hyphae also occur on the excipular surface or even in the margin of apothecia of *Melastiza,* the same type of ascospores and excipular structure, the same habitat, and the same carotenoid composition of the main pigments (β-carotene, γ-carotene, and especially a mixture of aleuriaxanthene esters unique to *Aleuria* and *Melastiza*), represent an evidence for the generic identity.

Consequently, I consider the species of *Melastiza* natural members of the genus *Aleuria.* However, I propose, partly for reasons of tradition, to accommodate species of the former in a separate subgenus of the latter, and thus establish two subgenera – subgen. *Aleuria* and subgen. *Melastiza* of the genus *Aleuria*:

Family **Pyronemataceae** Corda emend. Korf,
subfamily **Scutellinioideae** Clements emend. Korf,
tribe **Aleurieae** Seaver emend. Korf,
genus ***Aleuria*** Fuckel emend. nov.

Basionym: *Aleuria* Fuckel, Jb. Nassau. Ver. Naturk. 23-24: 325, 1870. (= *Aleuria* (Fr.) Gill., Champ. Fr. Discom. 30, 1879 p.p.).

Apothecia e magnitudine mediocre sat magna, rarius minuta,(3-90 mm in diam.) sessilia, solitaria vel gregaria, patellaria usque explanata, orbicularia denique saepe undulata, extus albido-aurantiaca vel pallide rubra, indistincte et breviter albo-subtomentosa vel fusco-floccosa vel subglabra (oculo nudo observata), hyphis et pilis fasciculatis, hyphoideis (pseudopili) brevibus, clavatis, vel longis et sursum attenuatis vel apice obtusis, hyalinis vel luteo-fuscis vestita; hymenio luteo-aurantiaco, aurantiaco, aurantiaco-rubro, rubro-miniato, lateritio, roseo-rubro usque coccineo. Excipulum externum e textura globuloso-angulari usque angulari, excipulum inter-

num (medulla) e textura angulari-intricata, usque intricata, subhymenium e textura intricata cellulis angularibus vel irregulariter formatis mixta. Asci cylindracei, octospori, non amyloidei. Ascosporae ellipsoideae, guttulis binis (vel guttula unica) instructae, sculpturatae; sculptura sporarum e costis et spinis irregulariter formatis vel reticulum irregularem vel regularem formans, vel e pustulis rotundatis saepe connectis constat; spinae, costae et pustulae ad polis incrassatae et longiores, saepe apiculus formatibus. Paraphyses filiformes, septatae, rectae, apice incrassatae vel clavatae, granulis aurantiacis impletae (pigmento β-caroteno, γ-caroteno, et aleuriaxantheni aesthero).

Habitat: ad terram humidam arenosam, humosam, argillaceam, muscosam, inter muscos (*Polytrichum* sp., *Bryum* sp., *Dicranella* sp., *Brachythecium* sp., *Fissidens* sp., *Atrichum* sp.), vel solo oculo nudo nudam sed inter muscos minutos vel inter protonemata, vel ad sedimenta in arvis, rarius ad terram stercoratam et in stercore accumulato (sed etiam inter protonemata) ad ripas piscinarum, rivularum, in silvis, arvis, hortis, in vicinitate pagorum etc.

Species typica: *Peziza aurantia* Pers.: Fr.

Subgen. I. **Aleuria**

Apothecia extus et marginemque hyphis vel pilis hyphoideis (parietibus tenuibus vel incrassatis), hyalinis, vestita.

Species typica:

Peziza aurantia Pers., Obs. mycol. 2: 76, 1799 = *Peziza aurantia* Pers.: Fries, Syst. mycol. 2: 49, 1822).

= *Aleuria aurantia* (Pers.: Fr.) Fuckel, 1870. Species ceterae: *A. balfour-browneae* Waraith, *A. bicucullata* Boud., *A. cestrica* (Ell. et Ev.) Seav., *A. dalhousiensis* Thind et Waraitch, *A. congrex* (Karst.) Svr., *A. exigua* Rifai, *A.luteonitens* (Berk. et Br.) Gill., *A. murreeana* Ahmad.

Subgen. II. **Melastiza** (Boud.) comb. et stat. nov.

Basionym: *Melastiza* Boudier, Bull. Soc. Mycol. France 1: 106, 1885.

Apothecia extus et marginemque hyphis et pilis hyphoideis (parietibus tenuibus vel saepe incrassatis), hyalinis vel saepe luteo-brunneis vestita.

Species typica: *Humaria miniata* Fuckel, Jb. nassau. Ver. 29-30: 32, 1875. [= *Peziza cornubiensis* Berkeley et Broome, = *Melastiza cornubiensis* (Berk. et Br.) J. Mor. = *Melastiza chateri* (W.G.Smith) Boudier, = *Peziza chateri* W.G.Smith, = *Aleuria cornubiensis* (Berk. et Br.) J. Mor.]

Species ceterae: *A. carbonicola* (J. Mor.) J. Mor.; *A. latispora* J. Mor.; *A. flavida* (Thind et Kaushal) J. Mor.; *A. rubra* Batra; *A. flavorubens* (Rehm) J. Mor.; *A. boudieri* (v. Höhnel in Rehm) J. Mor.; *A. scotica* (Graddon) J. Mor.;

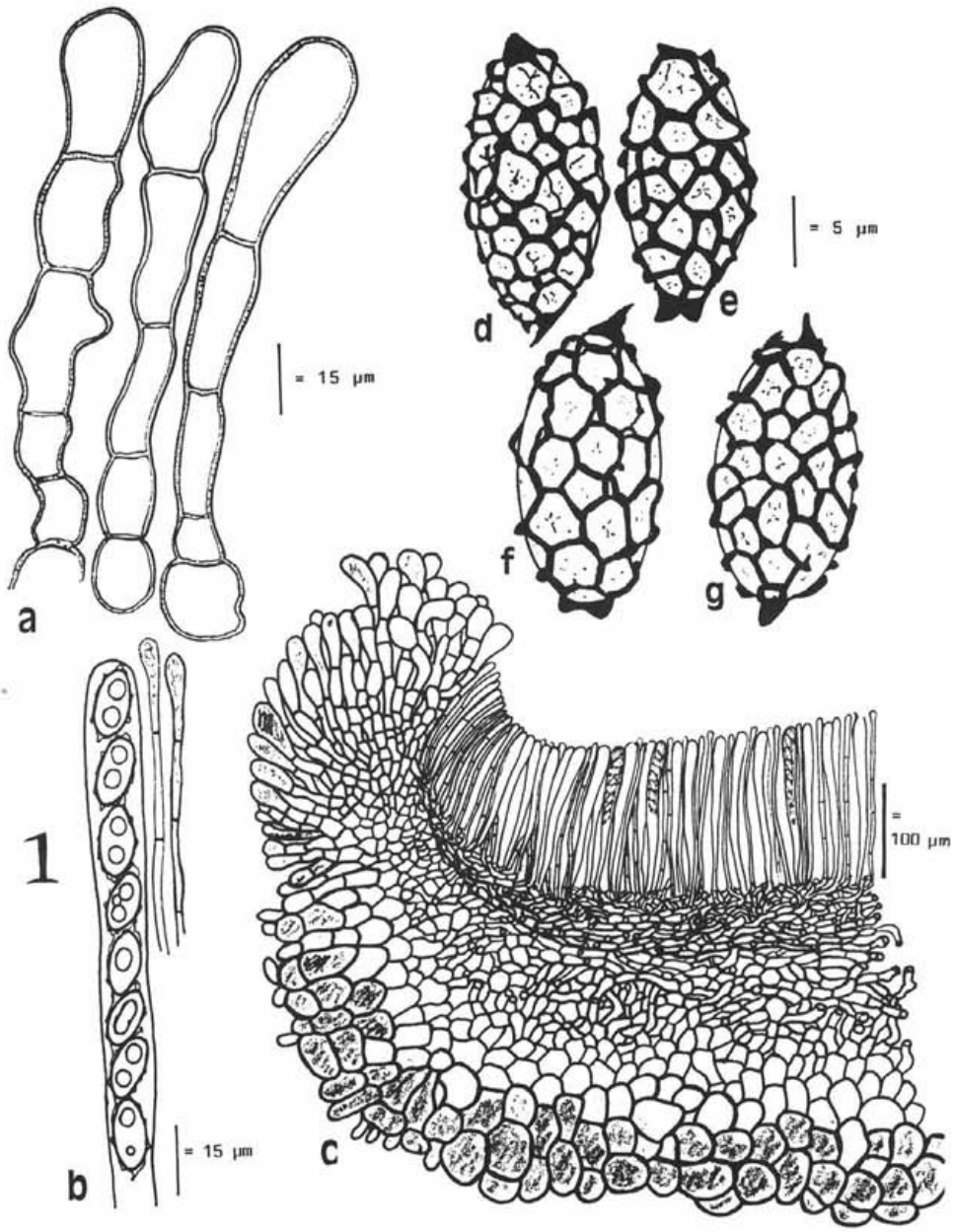


Fig. 1 *Aleuria* subgen. *Melastiza*: *Aleuria cornubiensis* (Berk. et Br.) J. Mor. – a. hairs, b. ascus and paraphyses (parts), c. median section of margin (holotype K); d – g. ascospores (oil immersion + CB): d. holotype (K), e. isotype (NY), f. type of *Peziza chateri* (K), g. type of *Humaria miniata* (S).

1. Aleuria cornubiensis (Berk. et Br.) comb. nov.

Basionym:
Peziza cornubiensis Berkeley et Broome, Ann. Mag. Nat. Hist. ser. 2, 13: 463, (n.767), 1854.
Synonyms:
≡ *Neottiella cornubiensis* (Berk. et Br.) Saccardo, Syll. Fung. 8: 190, 1889.
≡ *Lachnea cornubiensis* (Berk. et Br.) W.Phillips, Brit. Discom. 2, p. 229, 1893.
≡ *Cheilymenia cornubiensis* (Berk. et Br.) Le Gal, Rev. Mycol.18 : 82, 1953.
≡ *Melastiza cornubiensis* (Berk. et Br.) J. Moravec, Mycotaxon 44: 68, 1992
= *Peziza chateri* W.G.Smith, Gard. Chron. 1872: 9, 1872
≡ *Humaria chateri* (W.G.Smith) Rehm, Ascomyceten exs. No 455, 1878.
≡ *Leucoloma chateri* (W.G.Smith) Saccardo, Michelia 1: 69, 1879.
≡ *Lachnea chateri* (W.G.Smith) Rehm, Discom. Ascom. Hyst. in Rabenh. Krypt. Fl. 1 (3): 1059, 1895.
≡ *Melastiza chateri* (W.G.Smith) Boudier, Hist. Class. Discom. Eur. p. 64, 1907.
= *Humaria miniata* Fuckel, Jb. Nassau. Ver. 29/30: 32, 1875.
≡ *Lachnea miniata* (Fuck.) Gillet, Champ. Fr. Discom. p. 210, 1886.
≡ *Ciliaria miniata* (Fuck.) Patouliard, Tab. Anal. Fung. p. 276, 1884.
≡ *Scutellinia miniata* (Fuck.) Lambotte, Fl. Mycol. Belge, Suppl.1: 300, 1887.
≡ *Melastiza miniata* (Fuck.) Boudier, Hist. Class. Discom. Eur. p. 32, 1907
= *Ciliaria rubicunda* Quélet, Champ. Jur. Vosg. In C.R. Ass. franc. Av. Sc. 14 (2): 451, 1886, Grenoble.
≡ *Lachnea rubicunda* (Quél.) Saccardo, Syll. Fung. vol. 8: 177, 1889.
≡ *Melastiza rubicunda* (Quél.) Boudier, Hist. Class. Discom. Eur. p. 64, 1907.
[Non *Peziza chateri* W.G. Smith sensu Phillips, Elvellacei Britannici 58, 1874; nec *Melastiza chateri* (W.G. Smith) Boud. sensu Grelet, Rev. Mycol. 7: 22, 1942 = *A. flavorubens* (Rehm) J. Mor.].

Apothecia (5-)8-20(-28) mm in diam., scattered, gregarious to densely crowded, sessile, at first subglobose, becoming cupulate, expanding to shallowly cupulate and becoming plane, regular in outline but becoming often irregularly undulate, lobed, split, or unequally sided due to mutual pressure. Hymenium orange-red or bright red to nearly scarlet or vermilion with a pink tinge, in some collections the colour is vermilion, without any orange tinge, or brick-red, rarely pale orange, especially in old apothecia. Receptacle paler than the disk but dotted towards the margin by minute bunches of brown obtuse hairs and hyphae. The bunches are denser at the margin and are common and usually dark coloured in young apothecia (though hyaline hyphae and hyphoid hairs are also present), becoming paler, scarce, and hardly visible, or even missing when the apothecia are old; the hyphae towards the base are pale and longer and attach the substrate. Excipulum indistinctly differentiated into three layers (well seen when stained with CB): the

ectal layer 150-180 μm thick, textura globulosa-angularis – composed of mostly rectangular, rarely subglobose, pale brownish coloured cyanophilic cells which measure 20-75(-90) μm in diam. but are smaller and more angular towards the margin of the apothecia where hyaline to pale brownish, septate, obtuse hyphae and hairs arise from these cells. The hairs are thick-walled (the walls being 0.5-3(-4.5) μm thick), septate (consisting of 3-5 articles), clavate and obtuse at their tips, 80-160(-200) x 10-18(-24) μm. The medullary layer indistinctly differentiated, 180-220 μm thick, textura angularis composed of hyaline angular cells which measure 9-40 μm in diam., towards the subhymenium gradually changing into a textura angularis-subintricata to intricata composed of smaller hyaline cells and hyphae 9-18 μm thick. Subhymenium 100-115 μm thick, textura intricata composed of hyaline cyanophilic interwoven hyphae which are 6.5-9 μm thick and intermixed with small cells of an indefinite shape. Asci operculate, 180-300 x 10.5-15 μm, cylindrical, gradually attenuated towards the base, non-amyloid, eight-spored. Ascospores ellipsoid, hyaline, (14-)15-21(-22) x (7.5-)8.5-10.8(-11.2) μm (ornamentation excluded), biguttulate, covered by a rather regular coarsely raised reticulum; the ribs are 0.3-1(-1.5) μm thick and protrude the ascospore outline with spiny to hood-like projections and form irregular, 1-2.7(-3.5) μm high apiculi on the ascospore poles. Paraphyses filiform, 2.7-3 μm, apex slightly or rarely distinctly enlarged at the top (4-8 μm), containing orange granules.

Material examined:

Holotype: K, labelled: "*Peziza cornubiensis* Berk. et Br., on manured ground (no date and locality), ex Herb. Myc. Berkeleyanum presented by the Rev. M. J. Berkeley 1879". The type material consists of one dried apothecium which measure 15 mm in diam. and is glued on the label; the colour of this dried apothecium is brown with a pink-orange tinge; The type locality is Cornwall (=Cornubia, the Latin name of Cornwall), Great Britain.

Isotype: NY, labelled: "*Neottiella cornubiensis* (Berk. et Br.) – portion of type, Herb. Bronx, The New York Botanical Garden from the Herbarium of G. Massee purchased 1905". The isotype material consists of fragments of one apothecium which measured about 10 mm in diam., and is accompanied by a coloured picture.

Other collections examined:

Great Britain: England, Cambridge, on road-earth, December 1871, leg. J. J. Chater (K – type of *Peziza chateri* W.G. Smith);

Austria: Ca. Hattenheim, ad terram humidam, rarissime,(sin. dat.), Fungi Rhen. No 2688 (S – isotype of *Humaria miniata* Fuck.).

Czech Republic: Bohemia b., Křineč-Nová ves prope Kněžmost, districtus Mladá Boleslav, ad terram humidam arenosam inter muscos (*Bryum* sp.) in societate *Aleuriae aurantiae* ad ripam piscinae, 2. X. 1966, leg. et det. J. Moravec (J. Mor.); Bohemia, Branžež-Kněžmost prope Mnichovo Hradiště, districtus Mladá Boleslav,

ad terram humidam nudam stercoratam in campo otioso sub: *Tussilago, Arctium, Rumex,* 29. 10. 1988, leg. et det. J. Moravec (J. Mor.); Bohemia, Loučeň, district. Nymburk, ad terram humidam in sedimento in arvo (ager raparum), 5.X. 1967, leg. Jan Sobotka, det.: J. Moravec (J. Mor.); Bohemia, Česká Třebová, ad terram humidam calcaream inter muscos in pago, 14. X. 1986, leg. Kamil Moravec, det. J. Moravec (J. Mor.); Moravia, Brno – horto publico "Lužánky", ad terram humidam argillaceam nudam sub gramina, 21. IX. 1989, leg. et det. J. Moravec (J. Mor., CUP); Moravia, Uničov prope Olomouc, ad terram humidam in sedimento et sordes in agro (ager raparum) inter protonemata muscorum, 9. XI. 1968, leg. Jaroslav Kupka, det. J. Moravec (J. Mor.); Moravia, Košovy-Rajnochovice, prope Bystřice pod Hostýnem, ad terram humidam viae silvaticae inter muscos, 23. IX. 1976, leg. Alois Vágner, det. J. Moravec (J. Mor.); Moravia, Soběšice prope Brno, ad terram humidam ad viam in silva, 10. VI. 1973, leg. Alois Vágner, det. J. Moravec (J. Mor.); Moravia, Arboretum Křtiny prope Brno, ad terram humidam in prato silvatico, 16. X. 1984, leg. et det. J. Moravec (J. Mor.);

M. cornubiensis is a common discomycete in Europe. It has been collected by me in Czech republic and in Slovakia many times. I can confirm the variability of the colour of the apothecia, which range from orange through vermilion (often with a ping tinge) to scarlet. The colour and density (or even occurrence) of the apothecial marginal hairs is also extremely diverse (see discussion above), as is the habitat of this fungus. It usually fructificates on sandy soil often amongst dense or small mosses (*Polytrichum* sp., *Bryum* sp.) frequently associated with *Aleuria aurantia* (Pers.:Fr.) Fuck., but also on seemingly bare loamy or clayey, soil but in fact always in the association with low, barely seen mosses or protonemata.

As was discussed previously (J. Moravec 1992b), *Cheilymenia cornubiensis* (Berk. et Br.) Le Gal was excluded from the genus *Cheilymenia* Boud., and a new combination, *Melastiza cornubiensis* (Berk. et Br.) J. Mor., was proposed. Both portions of the type material (K holotype, NY isotype) of *P. cornubiensis* Berk. et Br. represent the same fungus and possess features that are all identical to those of the type collection (K) of *Peziza chateri* W.G. Smith [= *Melastiza chateri* (W.G.Smith) Boud.] and of the type of *Humaria miniata* Fuck. (S) which have also been examined. The older name *P. cornubiensis* has priority, and, consequently after the new emendation of Fuckel's genus, the taxon is transferred here to the genus *Aleuria*. This is quite a surprising result, as the fungus has been commonly considered a member of *Cheilymenia* after the Le Gal's erroneous classification which resulted in the recombination of *P. cornubiensis* as *Cheilymenia cornubiensis* (Berk. et Br.) Le Gal (1953). As was discussed in J. Moravec (1992b), the features which are characteristic of a *Melastiza* sp. were recognizable even from the original diagnose and clear also from the redescription of *Peziza cornubiensis* in Cooke (1879), Phillips (1887) under the generic name *Lachnea,* and under *Neottiella* in Massee (1896).

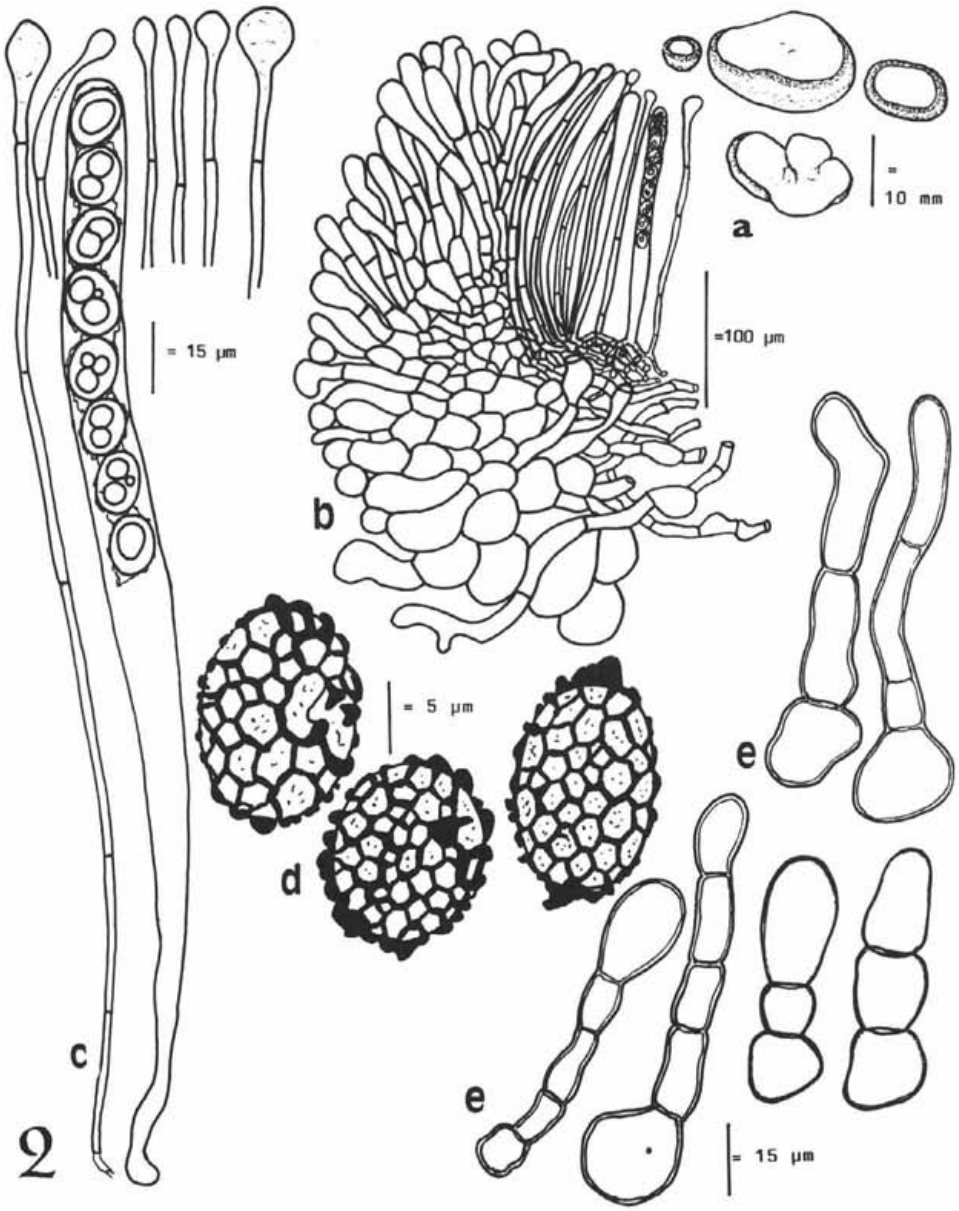


Fig. 2 *Aleuria* subgen. *Melastiza*: *Aleuria latispora* spec. nov. – a. apothecia, b. median section of marginal part, c. ascus and paraphyses, d. ascospores (oil immersion + CB), e. hairs (Holotype PRM).

2. Aleuria latispora spec. nov.

Apothecia 3-20 mm diam., sessilia, gregaria, leniter patellaria, dein discoidea usque pulvinata, orbicularia denique saepe undulata, margine integro, hymenio pulchre miniato-rubro vel cinnabarino, extus pallide rubeola, margineque primum minute pallide fusco-floccosa, dein subglabra. Excipulum externum e textura globuloso-angulari usque angulari e cellulis subglobosis vel angulatis, luteo-fuscis, margineque hyphis et pilis (pseudopili) brevibus, septatis, dense fasciculatis, hyalinis vel luteo-fuscis clavato-terminatis. Pseudopili 60-150 x 8-16(-25) μm, hyphoidei, septati, (2-4 cellulares), apice clavati, late rotundati, tenuiter tunicati (parietibus 0.5-1.5 μm crassis), hyalini vel luteo-fusci. Excipulum internum (medulla) e textura angulari-intricata, usque intricata. Subhymenium e textura intricata cum cellulis angularibus vel irregulariter formatis commixta. Asci 240-270 x 10.5-15.5 μm, cylindracei, deorsum sensim attenuati, octospori, non amyloidei. Ascosporae rotundato-ellipsoideae, 12-15 (-16) x 9-10.8 (-11.2) μm (saepe subglobosae, 12 x 10.5 μm, vel late ellipsoideae et 15 x 10.8 μm ornamento excluso), guttulis binis maioribus vel guttula unica magna instructae, irregulariter vel saepe regulariter reticulatae, ad polis breviter apiculatae. Paraphyses filiformes, 1.5-2.5 μm diam, septatae, rectae, apice clavatae vel saepe valde rotundato-incrassatae (6-12 μm), granulis aurantiacis impletae.

Habitat: Ad terram humidam stercoratam viae silvaticae (*Picea schrenkiana*) et inter muscos (*Brachythecium* sp.), Asia centralis, Kazachstan, montes Zailijskij Ala-Tau, Kastroj prope Talgar (alt. 1500 m), districtus Alma-Ata, 7.VIII. 1979 leg. Jiří Moravec. Holotypus in PRM, Isotypus in CUP, BRNM et J. Mor. asservantur.

Apothecia 3-20 mm diam., sessile, gregarious, shallowly cupulate, than becoming discoid to pulvinate, rounded or often undulate with a continuous margin, hymenium bright-red with a pink tinge, vermilion to brick-red (without any orange tinge); outer surface paler, dotted towards the margin by minute bunches of dense pale to brownish hyphoid hairs which are visible especially in young apothecia giving the marginal part of the receptacle a brownish pruinose appearance and are barely visible on the surface of older apothecia. Ectal excipulum textura globulosa-angularis to angularis, composed of subglobose or angular, often yellow-brown cells which measure 15-65(-100) μm in diam., in the marginal part gradually changing into fascicles of hyaline hyphae or hyaline or yellow- brownish hyphoid hairs. Hairs (pseudopili) 60-150 x 8-16(-25) μm, hyphoid, densely arranged in short bunches, articulated or septate (consisting of 2-4 articles), clavate and obtuse above, thin-walled (the walls 0.5-1.5 μm thick), arising from the cells of the ectal excipulum, hyaline or yellow-brownish. Medullary layer indistinctly differentiated, as the angular cells are passing into interwoven hyphae forming a textura angularis-intricata to intricata, the cells being 10-15 μm in diam., the hyphae 6-15 μm thick. Hypothecium composed of densely interwoven hyphae which are intermixed with

small globose or indefinitely shaped cells. Asci 240-270 x 10.5-15.5 μm, cylindrical, gradually attenuated towards the base, eight-spored. Ascospores 12-15 (-16) x 9-10.8 (-11.2) μm, (ornamentation excluded), often subglobose and measuring 12 x 10.5 μm, but also wide ellipsoid, 15 x 10.8 μm, containing one large or more usually two oil globules possessing a perisporium which is covered by an almost regular and rather coarse reticulum (of the same type as that in *A. aurantia* and *A. cornubiensis*), the ribs of the reticulum being 0.3-1.2(-1.5) thick and protruding the ascospore outline, forming short, 1-2.5 μm high, irregular, usually blunt apiculi on the ascospore poles. Paraphyses filiform, 1.5-2.5 μm thick, septate, straight, usually enlarged to 6-10.5(-12) μm at their clavate or often conspicuously wide rounded tips, containing orange granules.

Holotype: Central Asia, Kazachstan, Zailijskij Ala-Tau mountains, Kastroj near Talgar (alt. 1500 m.), Alma Ata env., on soil manured with horse dung and amongst moss (*Brachythecium* sp.), on a path in spruce forest (*Picea schrenkiana*), 7. VIII. 1979 leg. J. Moravec. Holotype PRM, Isotypes in BRNM, CUP et J. Mor.

A. latispora is a typical member of the subgenus *Melastiza* and is closely related to the type species *A. cornubiensis*. However, the new species is distinguished by the different size and shape of its broad or subglobose ascospores which bear shorter and usually obtuse apiculi on the ascospore poles, and by the conspicuously enlarged paraphyses which often possess a large bulbous apex. Moreover, its apothecia bear shorter, thin-walled, and usually articulated hyphae or hairs (pseudopili). After the examination of a great number of collections of species of *Aleuria* subgen. *Melastiza*, especially those of *A. cornubiensis*, taking into account their variability, I consider *A. latispora* a good independent species. The classification of our fungus as a separate, well-founded species corresponds to the mutual differences which delimit all other taxa of the genus. The new species was collected during an excursion of naturalists to the mountains of Central Asia in 1979 and is known only from the type locality.

3. Aleuria carbonicola (J. Mor.) comb. nov.

Basionym: *Melastiza carbonicola* J. Moravec, Čes. Mykol. 26: 78, 1972.

For detailed descriptions see J. Moravec (1972) and Blank et Dougoud (1991).

The species was described 22 years ago from a burnt place in Bohemia. Recently, it was reported and illustrated by Blank et Dougoud (1991) from a burnt place and also from soil in Switzerland. Besides the Swiss collections, I have examined many other collections from the Czech Republic, mostly from mossy soil. *A. carbonicola* is not an entirely carbonicolous species and is not strictly confined to burnt substrates but actually to moss (*Dicranella* sp. and probably other mosses).

The species can be especially distinguished by the ascospore ornamentation which consists of a much coarser and mostly irregular reticulum which is formed by

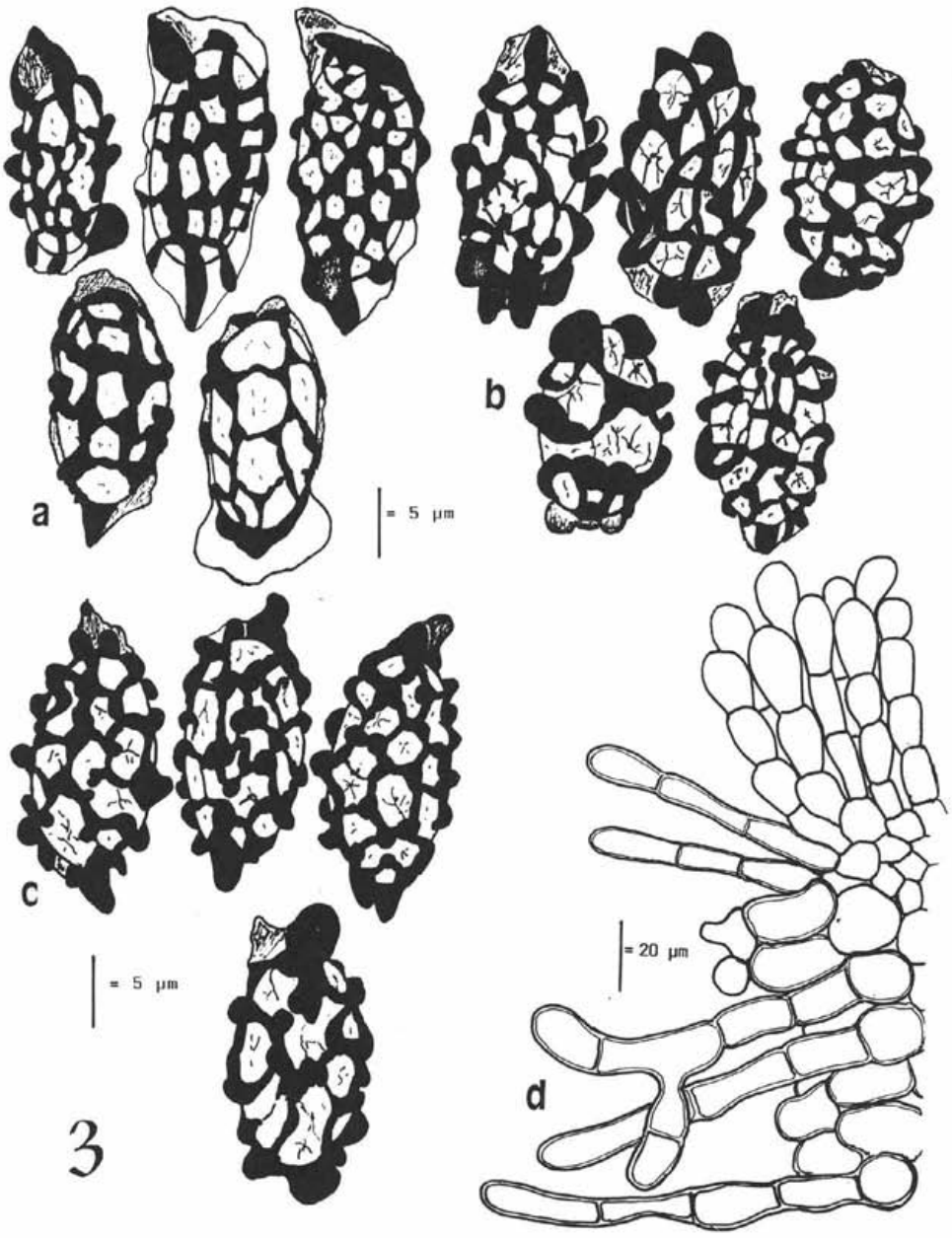


Fig. 3 *Aleuria* subgen. *Melastiza*: *Aleuria carbonicola* (J. Mor.) J. Mor. – a – c. ascospores (oil immersion + CB): a. holotype (PRM), b. Slovakia, Bystrička (J. Mor.), c. Switzerland (P.Blank, J. Mor); d. marginal cells and hairs (isotype J. Mor.).

cyanophilic, 1-2.3(-3) μm thick and 1.5-3.5 μm high ribs protruding the ascospore poles with much larger and higher (up to 6 μm) apiculi. The perisporium of a certain number of ascospores also bears an almost regular reticulum, but in such cases the ribs are thickened and conspicuously protrude the ascospore outline. Moreover, the ascospores of *M. carbonicola* are smaller, as they measure (without the sculpture) 14.5-17.7(-19) x 7-9.8 (usually 16.5 x 8.5) μm and thus only exceptionally exceed a length of 18 μm. The hairs are narrower, usually only 7-12 (exceptionally 18) μm thick, clavate and thick-walled, pale brownish, copious, and often much longer (up to 230 μm) than those in *M. cornubiensis*. I have not examined the two collections reported and illustrated by Häffner (1986) as *"Melastiza* sp.". In my opinion, they may be identical with *A. carbonicola* as their ascospore size and ornamentation agree with our species.

Material examined:

Holotype : Bohemia: Křineč non procul Branžež – Nová ves prope Mnichovo Hradiště, districtus Mladá Boleslav, in carbonario ad carbones et inter muscos (*Dicranella* sp.), ad ripam piscinae 6.VI.1970, leg. Jiří Moravec (holotype PRM, isotype BRA, CUP, J. Mor.)

Other material examined:

Czech Republic: Bohemia, Branžež prope Mnichovo Hradiště, districtus Mladá Boleslav, ad terram humidam stercoratam inter muscos viae in pascuo, 30. V. 1970, leg. et det. J. Moravec (J. Mor.); Moravia m., Melatín prope Brno, ad terram inter dense muscos (*Dicranella*) in silva mixta, 11. VI. 1984, leg. et det. J. Moravec (J. Mor.); Moravia, Bílovice nad Svitavou, districtus Brno, ad terram humidam viae silvaticae *(Picea excelsa),* 24. VI. 1972, leg. et det. J. Moravec (J. Mor.); Moravia, Bílovice nad Svitavou, districtus Brno, ad terram humidam viae silvaticae inter muscos (? *Dicranella* sp.), 10. VIII. 1973, leg. et det. J. Moravec (J. Mor.); Moravia, Bílovice nad Svitavou, districtus Brno, ad terram humidam viae silvaticae, 14. IX. 1974, leg. et det.J. Moravec (J. Mor.); Moravia, Vranov prope Brno, ad terram humidam argillaceam viae silvaticae inter muscos, 7. VII. 1984, leg. Alois Vágner, det. J. Moravec (J. Mor.); Moravia, Karlov, ad terram arenosam, 1. IX. 1986, leg. Alois Vágner, det. J. Moravec (J. Mor.); Moravia, Střítež, district. Žďár nad Sázavou, ad terram humidam argillaceam in silva (*Picea excelsa*), 13. VIII. 1989, leg. et det. J. Moravec (J. Mor.);

Slovacia: Bystrička prope Martin, ad terram humidam viae silvaticae, inter protonemata muscorum 16. VI. 1984 leg. L. Hagara et J. Moravec, det.J. Moravec (J. Mor.); Mt. Belanské Tatry, Ždiar, ad terram humidam ad ripam rivuli Belá, 12. VII. 1970, leg. et det. J. Moravec (J. Mor.); Mt. Západné Tatry, Oravica, ad terram margineque silvae (*Picea excelsa*) inter muscos minutos, 23. VII. 1987 leg. et det. J. Moravec (J. Mor.);

Switzerland: Delémant, a Lieu-Galet, sur sol nu d'un chemin forestier, 29. IX. 1989, leg. J.Rothenbühler, rev. J. Moravec (RD, PB, J. Mor.); Thayngen, sur une place à feu de 2 ans, 21. VIII. 1988, leg. Paul Blank, rev. J. Moravec (RD, PB, J. Mor.);

Bulgaria: Mt. Rila, Borovec, ad terram humidam viae silvaticae inter muscos, 6. VII. 1985, leg. et det. J. Moravec (J. Mor.);

Estonia: Ranametsa, on burnt soil and mostly on a sandy soil among small mosses or protonemata along a road in a spruce forest, 19. VIII. 1989, leg. et det. J. Moravec (J. Mor.).

4. Aleuria rubra Batra, Mycologia 52: 526, 1961.

≡ *Melastiza rubra* (Batra) Maas Geesteranus, Persoonia 4: 417, 1967.

For detailed descriptions and illustrations see also Batra (1961), Maas Geesteranus (1967) and Rifai (1968).

A. rubra is distinguished by the small ascospore size and prominent ascospore ornamentation. The other features including the hairs are very similar to those of the taxa treated above.

I have examined a collection from Nepal which in all features corresponds with the original diagnose and descriptions of the authors cited above.

The ascospores measure 10-13.5 x 6-8 μm and by the small size resemble ascospores of species of the subgenus *Aleuria*. However, the coloured hairs of a similar size and shape as those of *A. cornubiensis* clearly place this species into the subgenus *Melastiza*. The ascospore ornamentation is very conspicuous and consist of a very high usually almost regular reticulum. The reticulum is formed by ribs which protrude the ascospore outline as spines and spine-like projections 1.5-4.5 μm high forming irregular apiculi (up to 6 μm high) on the ascospore poles.

Material examined:

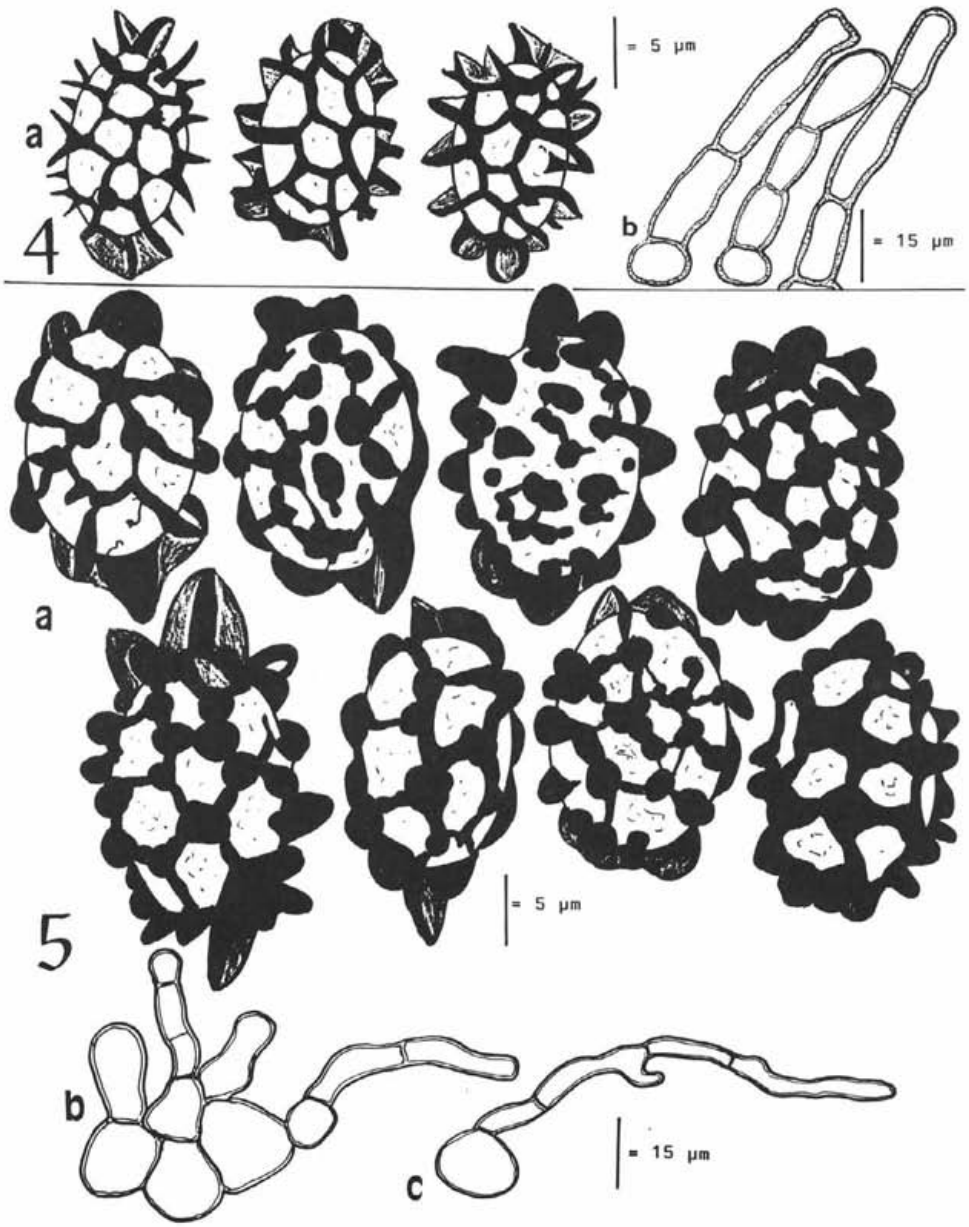
Nepal: Kathmandu-Chandragiri, on sandy soil on a bridle path, 17. VIII. 1969, leg. K. S. Waraitch, det K. S. Thind et K. S. Waraith, rev. J. Mor. (PAN 2325, CUP, J. Mor.).

5. Aleuria flavida (Thind et Kaushal) comb. nov.

Basionym: *Melastiza flavida* Thind et Kaushal, Bot. Notiser 132: 459, 1979.

For a detailed description and illustration see Thind et Kaushal (1979).

A. flavida differs from other species of the subgen. *Melastiza* in having very small discoid apothecia which measure 2.5 –3 mm in diam., a pale yellow hymenium, and very short, inconspicuous, usually hyaline or rarely pale brownish hyphae on the receptacle. This indicates the close affinity to species of the subgen. *Aleuria,* but such relations are in fact also evident between *A. cornubiensis* and *A. aurantia,* the



Figs. 4 – 5 *Aleuria* subgen. *Melastiza*: 4. *Aleuria rubra* Batra – a. ascospores (oil immersion + CB), b. hairs (Nepal, J. Mor ex PAN);
5. *Aleuria flavida* (Thind et Kaushal) J. Mor. – a. ascospores (oil immersion + CB), b. marginal cells and hairs, c. a hair arising from the outermost cell of a lower part of ectal excipulum (isotype J. Mor.).

type species of these subgenera, as discussed above. The ascospores of *A. flavida* measure (15.5-)16-19(-21) x 10.8-13(-13.6) μm (excluding the sculpture) and the ascospore perisporium is usually covered by a very thick and high irregular to almost regular reticulum, or rarely by warts which are irregularly connected by thinner buckles. The warts and ribs are 1.5-3(-4.5) μm thick, and form irregular apiculi which are up to 6 μm high on the ascospore poles. The ascospore ornamentation may resemble that of *A. carbonicola,* or rarely also *A. flavorubens,* both treated here, which are clearly distinguished by all other features, e.g. ascospore size, shape, size and colour of apothecia and apothecial hairs.

A. flavida is known from the type locality only.

Material examined:

Holotype: India: Mussoorie, Dhanaulty, on soil, 7. IX. 1973, leg. Kaushal (Holotype PAN 2573, isotype J. Mor., BRNM,BRA, CUP).

6. Aleuria flavorubens (Rehm) comb. nov.

Basionym: *Humaria flavorubens* Rehm in Rabenh. Kryptog. Fl. Deutschl., Oesterr. Schw. II, 1 (3) [42]: 960, 1894.

≡ *Melastiza flavorubens* (Rehm) Pfister et Korf, Phytologia, 21: 204, 1971.

= *Melastiza greleti* Le Gal, Bull. Soc. Mycol. France 74: 151, 1958.

[= *Peziza chateri* W.G. Smith sensu W. Phillips, Elvellacei Britannici 58, 1874;

= *Melastiza chateri* (W.G. Smith) Boud. sensu Grelet, Rev. Mycol. 7: 22, 1942].

For a detailed description see Le Gal (1958), J. Moravec (1972), and Lassueur (1980),

A. flavorubens is well distinguished by its ascospore ornamentation which consists of mostly rounded pustules mutually connected by thin ribs and buckles, occasionally forming an incomplete reticulum; the pustules are 0.5-1.5 μm in diam., protruding the ascospore poles with irregularly shaped, usually blunt apiculi which are up to 2.5 μm high. The ascospores measure (13-)15-18 x 7-9 μm (excluding the ornamentation). The apothecia are small, usually 3-7 mm in diam. The hairs are short and clavate, similar to those of *A. cornubiensis. Melastiza kumouensis* Khare is probably a synonym. I have not examined the type material but according to the description and illustrations (Khare 1985) the features well agree with *A. flavorubens.*

Material examined:

Czech Republic, Bohemia: Branžež prope Mnichovo Hradiště, districtus Mladá Boleslav, ad terram humidam viae silvaticae, 25. VI. 1966, leg. et det. J. Moravec (J. Mor.); Moravia, Josefov non procul Adamov prope Brno, ad terram humidam viae silvaticae inter muscos (*Dicranella* sp.), VII. 1971, leg. et det. J. Moravec (J. Mor.); Moravia, Adamov prope Brno, ad terram humidam muscosam margineque silvae,in societate *Aleuriae aurantiae,* 24.IX. 1972 leg. et det. J. Moravec (J. Mor.).

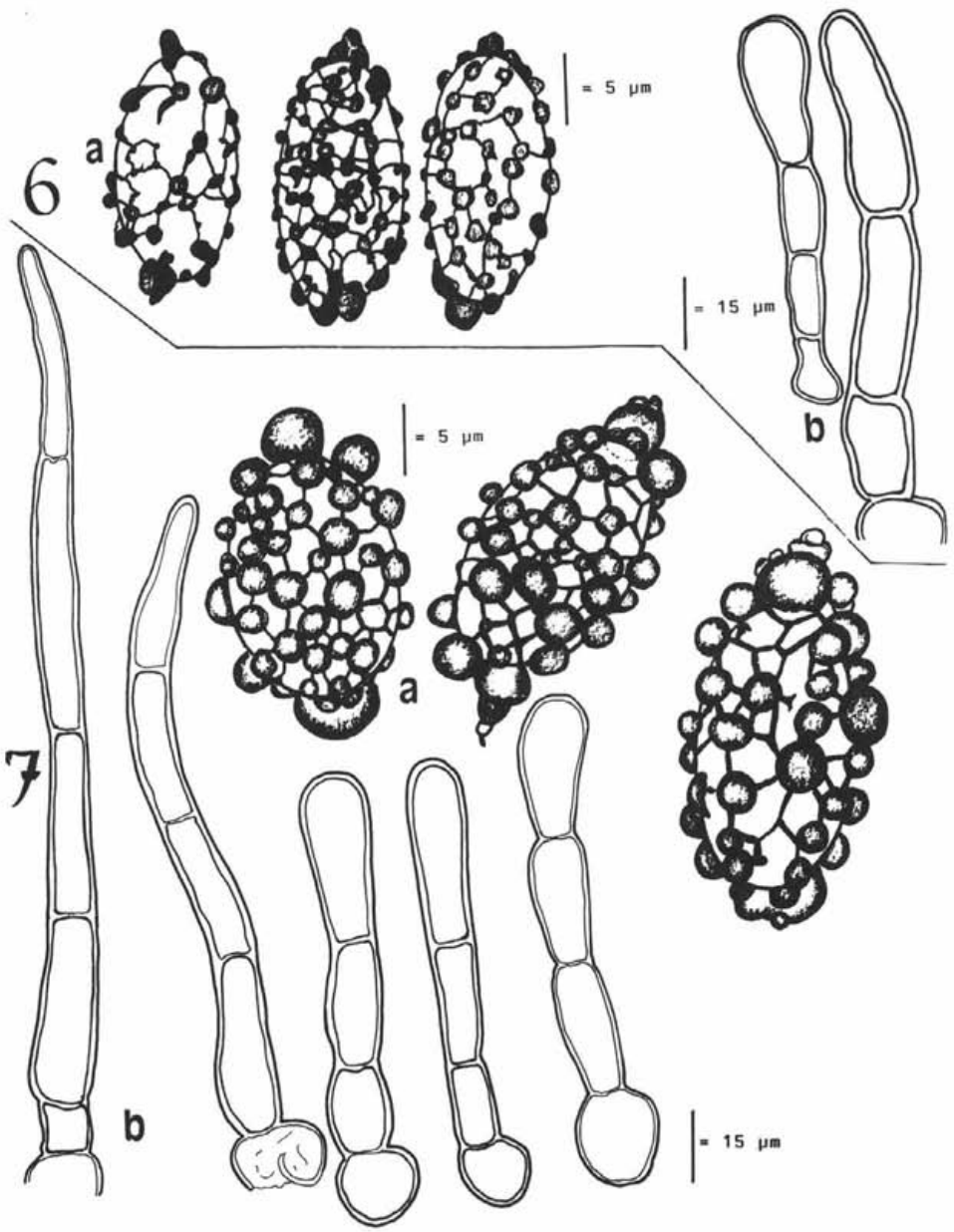


Fig. 6 – 7 *Aleuria* subgen. *Melastiza*: 6. *Aleuria flavorubens* (Rehm) J. Mor. – a. ascospores (oil immersion + CB), b. hairs (Bohemia, Branžež, J. Mor.);
7. *Aleuria boudieri* (v. Höhnel in Rehm) J. Mor. – a. ascospores (oil immersion + CB), b. hairs (holotype S).

Bosna i Hercegovina: Ilidja prope Sarajevo, ad terram humidam in horto publico, 11. VII. 1969, leg. et det. J. Moravec (J. Mor.)

Switzerland: Les Diablerets, ad terram humidam inter muscos, 16. IX. 1992, leg. et det. J. Moravec (J. Mor.).

7. Aleuria boudieri (v. Höhnel in Rehm) comb. nov.

Basionym: *Lachnea boudieri* v. Höhnel in Rehm, Ann. Mycol. 7: 298, 1910.

[Non *Lachnea boudieri* (Torr.) Saccardo et Trotter, Syll. Fung. 22: 630, 1913].

≡ *Melastiza boudieri* (v. Höhnel in Rehm) Le Gal, Bull. Soc. Mycol. Fr. 74: 152, 1958.

= *Lachnea austriaca* Saccardo et Trotter, Syll. Fung. 22: 634, 1913.

[Non *Lachnea austriaca* Beck in Saccardo, Syll. Fung. 8: 169,1889].

For detailed descriptions and illustrations see Le Gal (1958), Lasueur (1980) and Blank et Dougoud (1991).

A. boudieri is very close to *A. flavorubens* having a very similar but coarser ascospore ornamentation and small, reddish apothecia. However, *A. boudieri* differs clearly by much longer apothecial hairs, which are often narrowed towards the obtuse tips, though clavate and short hairs and hyphae are also present. The hairs (pseudopili) are 9-16 μm thick and 70-250 μm long, pale brownish. *A. boudieri* is easily recognizable not only by the presence of longer hairs, but also by the ascospores which are broader. They measure (excluding the sculpture) (15-) 16.5-19.5(-21) x 9.2-12.5(-15) μm (usually 18.5 x 10.5 μm). Also, the ascospore perisporium bears much larger and densely arranged pustules. The pustules are conspicuously spherical, 1.5-3(-4.5) μm in diam., mutually attached to each other or connected by thin buckles. On the ascospore poles, the pustules are enlarged and form spherical apiculi, and usually possess additional, irregularly shaped appendages which form irregular apiculi (up to 5.5 μm high).

Material examined:

Holotype: Österreich: auf Lehmboden bei Kalsburg-Wien, Wiener Wald, X. 1909 leg. v. Höhnel, Ascomyceten exsiccata Rehm No 1876 (S).

Other material examined:

Switzerland: Au lieudit Grätte, commune Merishausen (SH). sur terre argilo-calcaire (moussu *Fissidens taxifolium*) d'un petit chemin parmi les plantes herbacées, 9. VII. 1989, ibidem 1990, leg. Paul Blank, rev. J. Moravec (PB, RD, J. Mor.).

8. Aleuria scotica (Graddon) comb. nov.

Basionym: *Melastiza scotica* Graddon, Trans. Brit. Mycol. Soc. 44: 609, 1961.

For detailed descriptions and illustrations see Graddon (1961) and Breitenbach et Kränzlin (1981).

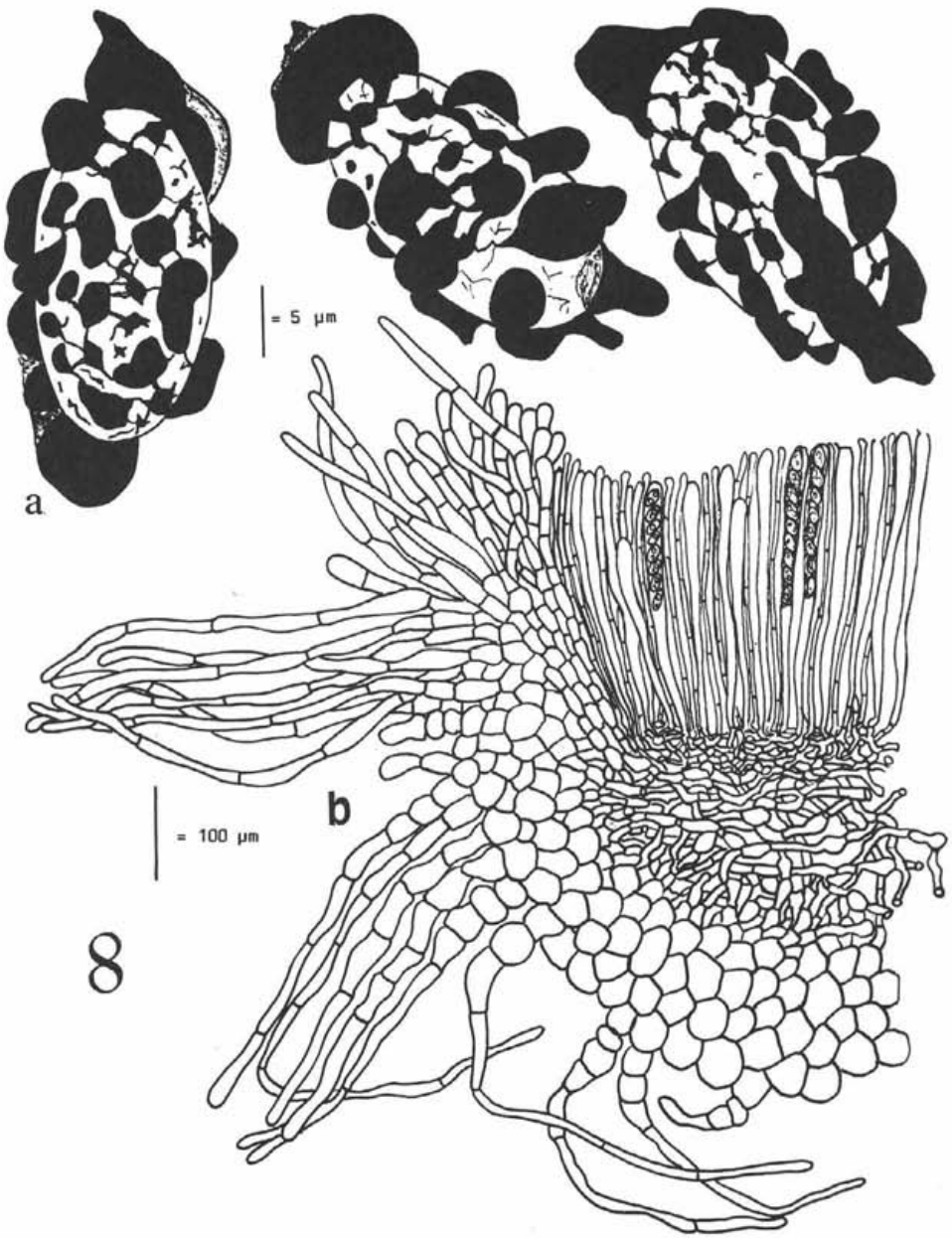
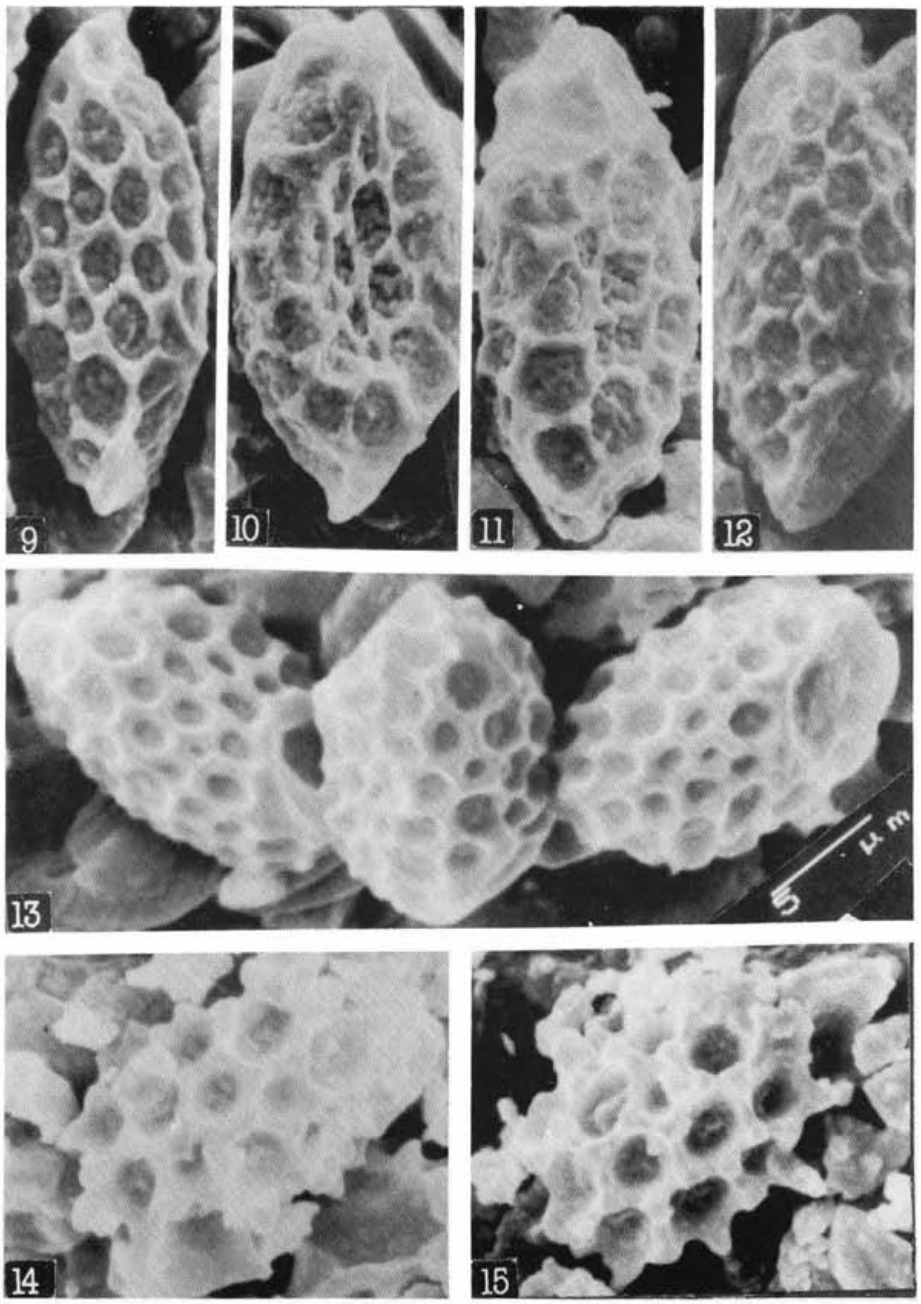
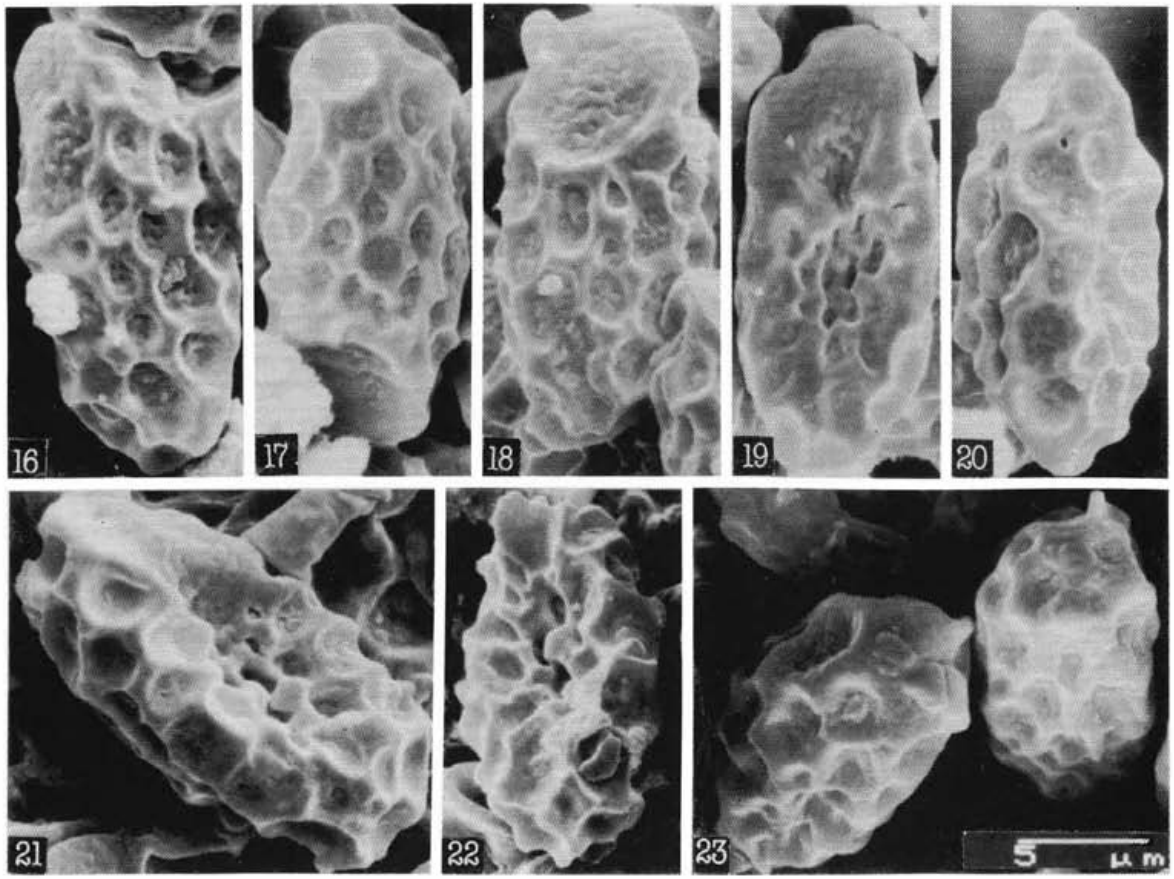


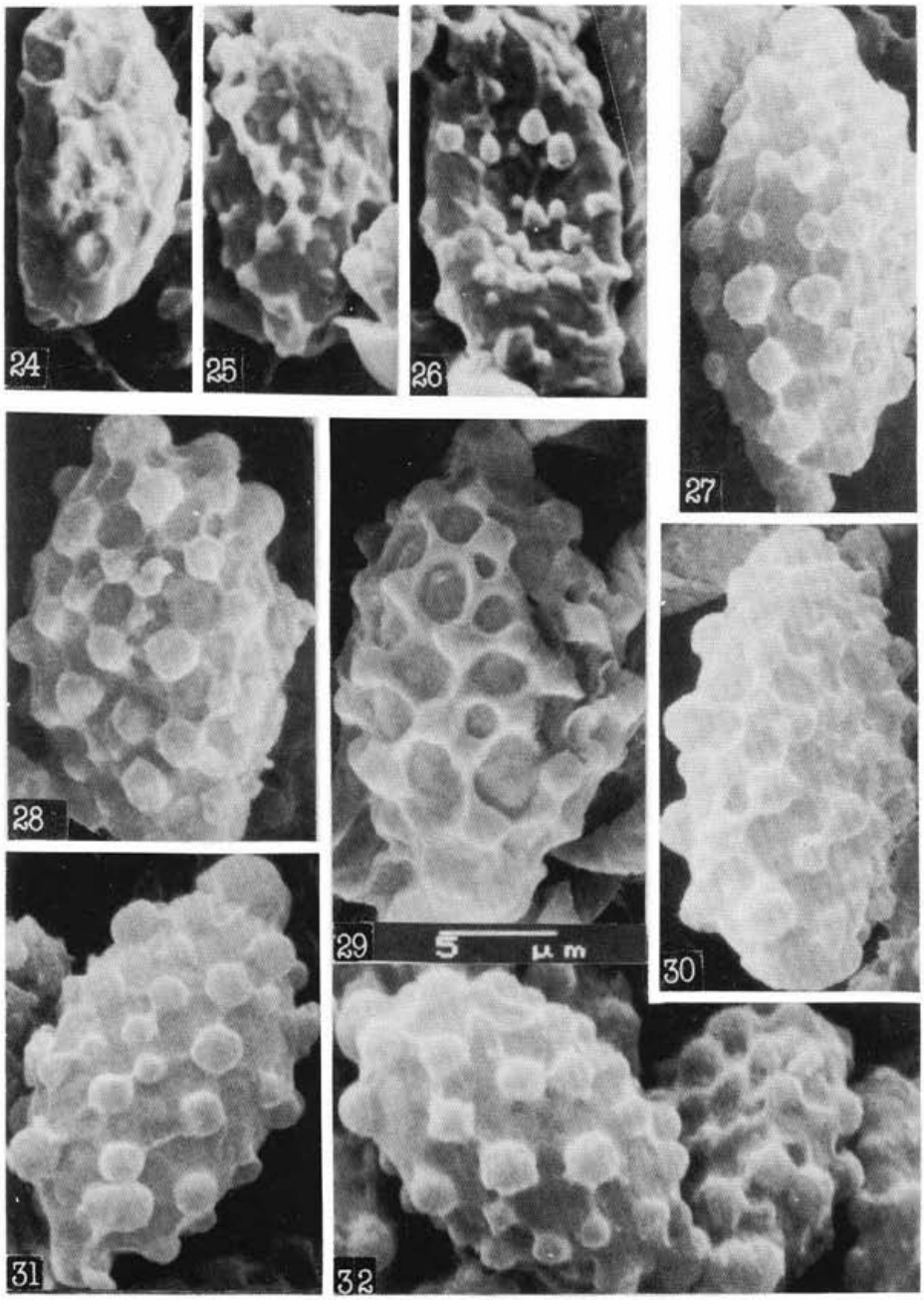
Fig. 8 *Aleuria* subgen. *Melastiza*: *Aleuria scotica* (Graddon) J. Mor.- a. ascospores (oil immersion + CB), b. median section of margin (holotype K).



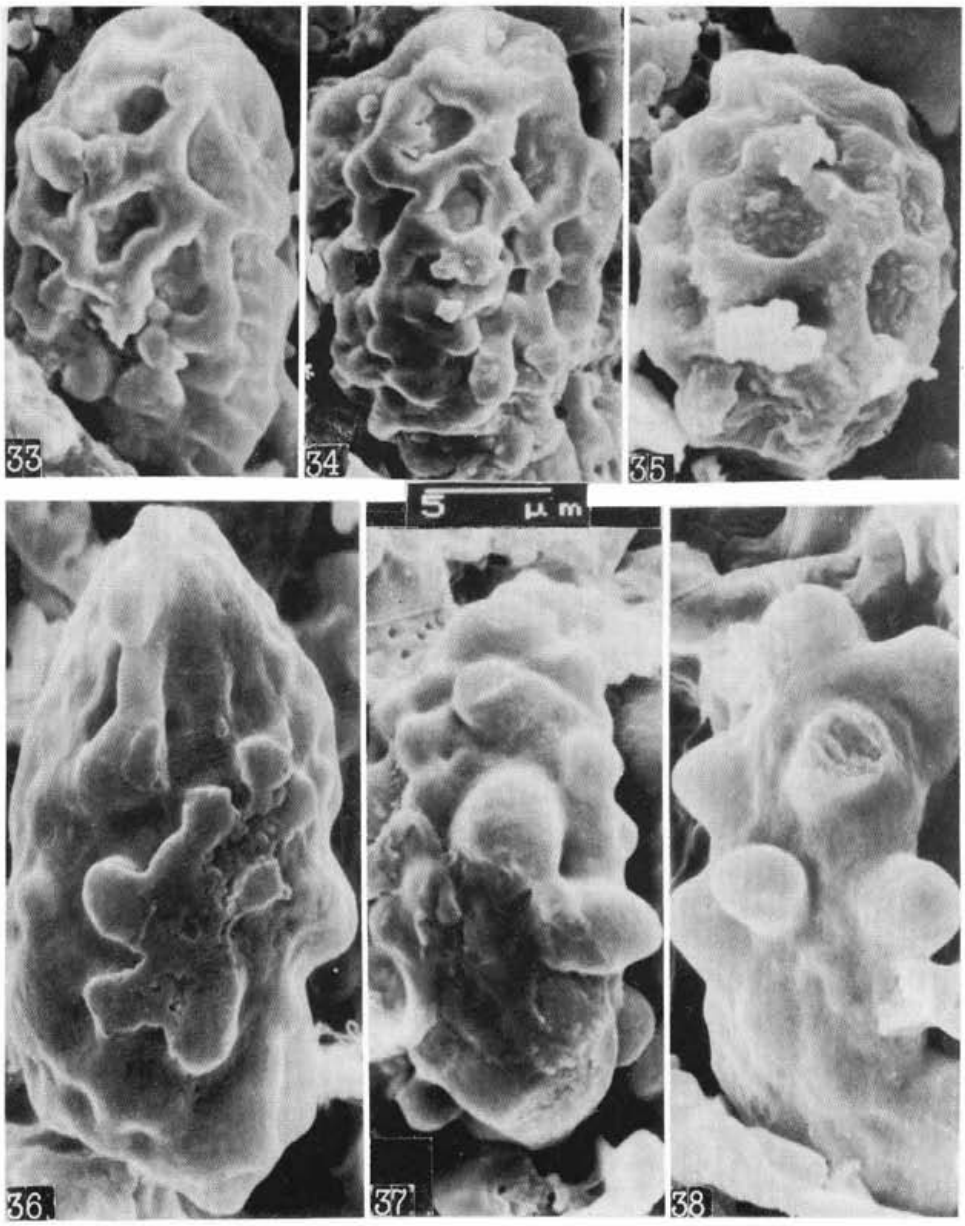
Figs. 9 – 15 SEM of ascospores of species of *Aleuria* subgen. *Melastiza*: 9 – 12. *A. cornubiensis* (Berk. et Br.) J. Mor. (Bohemia, Branžež, 29. X. 1988, J. Mor.); 13. *A. latispora* spec. nov. (isotype BRNM); 14 – 15. *A. rubra* Batra (Nepal, J. Mor. ex PAN).



Figs. 16 – 23 SEM of ascospores of of *Aleuria* subgen. *Melastiza: A. carbonicola* (J. Mor.) J. Mor. (16 – 20. from Switzerland, Thayngen, 21. VIII. 1988 P. Blank; 21-23. Slovakia, Bystrička, J. Mor.).



Figs. 24 – 32 SEM of ascospores of species of *Aleuria* subgen. *Melastiza*: 24 – 26. *A. flavorubens* (Rehm) J. Mor. (Moravia, Josefov VII. 1971, J. Mor.); 27 – 32. *A. boudieri* (v. Höhnel in Rehm) J. Mor. (holotype S).



Figs. 33 – 38 SEM of ascospores of species of *Aleuria* subgen. *Melastiza*: 33 – 35. *A. flavida* (Thind et Kaushal) J. Mor. (isotype J. Mor.); 36 – 38. *A. scotica* (Graddon) J. Mor. (holotype K).

A. scotica, in my opinion, has an outstanding position in the genus *Aleuria* although it possesses almost all features of the subgen. *Melastiza.*

The hairs are much longer, 70-360(-480) x 9-18(-20) μm, but they are of the same shape (including the clavate obtuse tips) and hyaline to pale brownish coloured as in other species treated above. The hymenium is orange-yellow and apothecia are deeply cupulate and irregularly undulate and thus resembling more those of the subgen. *Aleuria.* Contrary to the nice smell of *Viola odorata,* which is characteristic of all other species of *Aleuria* (including *Melastiza*), dried apothecia of *A. scotica* have a similar smell mixed with the smell of *Lactarius helvus.* In my opinion, the carotenoids of this species deserve further examination. The ascospores fit well in the genus. They measure (excluding the sculpture) 22-24.5 x 11.4-13.6 μm and the warts are only rarely rounded, usually the ornamentation is formed by cyanophilic warts or ribs of an irregular shape and they are 1.5-5 μm thick and 1.5-4.5 μm high, protruding the ascospore poles as irregular, up to 10 μm wide and 7.5 μm high apiculi.

The habitat of *A. scotica* seems to be different from other species of the subgenus as it is usually found in the montane to alpine zone on needle litter and twigs of coniferous trees (Breitenbach et Kränzlin (1981). However it always fructifies amongst moss (*Atrichum* sp.) and as all other species it is probably confined to it rather than being lignicolous.

Material examined:

Holotype: N.Scotland, moss (*Atrichum* sp.) / pines, VIII. 1957, leg. Roy Watling (K).

Other material examined:

Switzerland: Near Sörenberg, on Schwarzenegg, elev. 1450 m, in spruce forest on needle litter, 18. VIII. 1977, leg. Fred Kränzlin, FK 1808-77 K – colour photograph No 92 in Breitenbach et Kränzlin (1981), (LU, J. Mor.); Préalpes fribourgeoises, on needle litter, 10. VI. 1986, leg. René Dougoud (RD, J. Mor.).

ADDITIONAL NOTE TO SUBGEN. ALEURIA

Häffner (1993) has written that *Aleuria cestrica* (Ell. et Ev.) Seaver in the sense of J. Moravec (1980) has been misdetermined by me and represents in fact *Aleuria luteonitens* (Berk. et Br.) Gill. However, reexamination of my two collections from Bulgaria and of the type of *A. luteonitens* (K) has confirmed that the Bulgarian collections cannot be conspecific with *A. luteonitens* and thus I consider Häffner's opinion quite erroneous.

A. luteonitens clearly differs from *A. cestrica* by much larger ascospores which measure 10-13 x 6-7.5(-8.2) μm (without the ornamentation). This difference is also clear from Häffner's paper and therefore it is difficult to understand the reasons for

his conclusion. The ascospore ornamentation of both taxa varies from an incomplete to almost complete reticulum but the ascospore size differs conspicuously.

The Bulgarian collections possess ascospores of the typical size of *A. cestrica* as they measure 9-9.7(-10.8) x 4.7-5.8(-6.2) μm and the ascospore ornamentation is formed by an almost regular to incomplete reticulum. A revision of species of the subgen. *Aleuria* is now being prepared.

Acknowledgements

I wish to thank to Dr. Zdeněk Pouzar and Dr. Mirko Svrček (Prague) for reviewing the manuscript. I am also grateful to Prof. Nils Lundqvist (Stockholm), Dr. Brian Spooner (Kew), Mr. Fred Kränzlin and Mr. Joseph Breitenbach (Luzern) and curators of the herbaria S, K, PC and NY for arranging loans of the type and other material. Special thanks to Mr. Jiří Lhotecký (Brno), who kindly provided the SEM microphotographs.

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CZECH MYCOL. 47 (4), 1994

Some new taxa and combinations in the Pezizales

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Moravec J. (1994): Some new taxa and combinations in the Pezizales. – Czech Mycol. 47: 261–269

Rhodopeziza Hohmeyer and J. Moravec gen nov. is proposed for Rhodopeziza tuberculata (Gamundí) J. Moravec et Homeyer comb. nov., based on Aleuria tuberculata Gamundí (1975). Also two other new combinations are made: Sowerbyella phlyctispora (Lepr. et Mont. in Montagne) Hohmeyer et J. Moravec comb. nov. based on Peziza phlyctispora Lepr. et Mont. in Montagne, and Sowerbyella unicisa (Peck) J. Moravec comb. nov., based on Peziza unicisa Peck. Diagnosis of the new genus, descriptions, line drawings, SEM photomicrographs and notes on taxonomy accompany the paper.

Key words: Rhodopeziza gen. nov., Rhodopeziza tuberculata, Sowerbyella phlyctispora, Sowerbyella unicisa comb. nov.

Moravec J. (1994): Některé nové taxony a kombinace v řádu Pezizales. – Czech Mycol. 47: 261–269

Nový rod Rhodopeziza Hohmeyer et J. Moravec je navržen pro Rhodopeziza tuberculata (Gamundí) J. Moravec et Hohmeyer comb. nov., založený na Aleuria tuberculata Gamundí (1975). Jsou uvedena další dvě nová přeřazení: Sowerbyella phlyctispora (Lepr. et Mont. in Montagne) Hohmeyer et J. Moravec comb. nov., založené na Peziza phlyctispora Lepr. et Mont. in Montagne, a Sowerbyella unicisa (Peck) J. Moravec comb. nov., založené na Peziza unicisa Peck. Latinská diagnosa nově navrženého rodu, popisy, kresby mikroznaků a taxonomické poznámky jsou doplněny SEM mikrofotografiemi všech uvedených taxonů.

1. **Rhodopeziza** Hohmeyer et J. Moravec gen. nov.

Apothecia media usque magna, sessilia, cupuliformia, inaequalia, interdum auriculiformia, externe glabra, ad marginem pruinosa; hymenio miniato. Excipulum externum textura globulosa angularis compositum e cellulis latioribus, excipulum internum (medulla) textura globulosa angularis compositum e cellulis angustioribus cum hyphis intermixtis. Asci cylindracei, operculati, octospori, in toto iodo coerulescentes. Ascosporae late ellipsoideae, eguttulatae, pallide flavescentes, tuberculatae. Paraphyses filiformes, simplices, septatae, rectae sed apice curvatae, granulis aurantiacis impletae.

Typus generis: *Aleuria tuberculata* Gamundí, Fl. crypt. Tierra del Fuego (Fungi, Ascom., Pezizales) 10(3): 116, 1975.

≡ **Rhodopeziza tuberculata** (Gamundí) J. Moravec et Hohmeyer comb. nov.

Basionym: *Aleuria tuberculata* Gamundí, Fl. crypt. Tierra del Fuego (Fungi, Ascom., Pezizales) 10(3): 116, 1975.

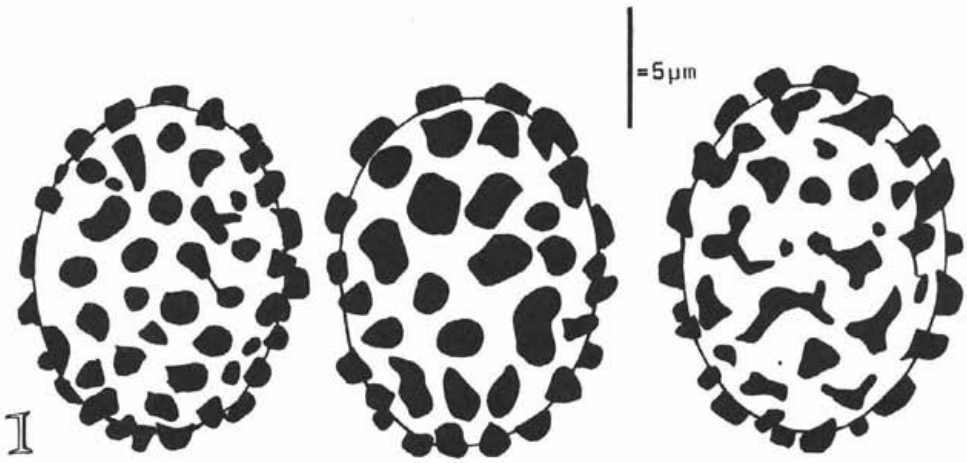


Fig. 1 Ascospores of *Rhodopeziza tuberculata*. (Oil immersion + CB). Holotype LPS.

Apothecia cupulate, asymmetrical, occasionally auriculate due to mutual pressure, sessile, 20 – 22 mm in diam. Hymenium concave, sometimes undulate, miniate red. Excipulum in the ectal layer a textura globulosa angularis, composed of subglobose to polygonal cells which are larger than those of the medullary excipulum. The medullary excipulum composed of smaller cells (textura globulosa angularis) occasionally intermixed with hyphal elements. Subhymenium of a textura intricata composed of small irregular hyphae. Asci eight-spored, cylindrical, operculate, turning blue with Melzer's reagent over the whole length, 170-215 (260-300 according to Gamundí's original description) x 12-14 µm. Ascospores uniseriate, broadly ellipsoid, with one small evanescent guttule, pale yellowish, tuberculate, 12.6-15.4 (-16.6) x 9.2-10.5 (-11) µm (excluding tubercles); the tubercles isolated 0.7-1.5 (-1.8) µm in diam. and 0.5-1.3 µm high, conical to truncate, rounded at their base or occasionally slightly asymmetrical (see fig. 1 of this paper). Paraphyses simple, septate, slightly clavate and curved towards the apex, 2.5-4 µm thick, filled with orange granules.

Specimen examined:

ARGENTINA: Tierra del Fuego, Depto. Ushuaia, Tierra Mayor, 12. II. 1965, leg. Lasifashaj, Hässel & Gamundí. (LPS 37095 holotype).

The description of the macro-features is based on the original description given by Gamundí – for a detailed illustration of apothecia, their excipular structure, and other features see Gamundí (1975).

My examination of the type material (LPS) confirmed the amyloid asci of *Aleuria tuberculata,* and I considered this taxon to represent an undescribed genus. Five years ago, Dr. Helmuth Hohmeyer (at that time in Liverpool) and I agreed to propose a new genus for this taxon in a paper by Hohmeyer on the genus *Aleuria* Fuckel. Later, in a joint paper on the genus *Aleuria* by Helmuth Hohmeyer and Jürgen Häffner (the final version of the manuscript written in English), the new genus *Rhodopeziza* Hohmeyer and J. Moravec, accompanied by a Latin diagnosis was founded. Also, the new combinations *Rhodopeziza tuberculata* and *Sowerbyella phlyctispora* were proposed. However, this joint paper, supposed to appear in Mycotaxon, has never been published. Surprisingly enough, instead of this joint paper, an almost identical paper, but written in German by Häffner alone appeared (Häffner 1993a). In the paper, the taxa are cited as "*Rhodopeziza tuberculata* (Gamundí) Hohmeyer & Moravec and *Sowerbyella phlyctispora* (Lepr. et Mont.) Hohmeyer & Moravec comb. nov.", but they are treated without a Latin diagnosis and quotations of the basionyms and are thus without any nomenclatural value. These circumstances have forced me to write this present paper, especially the fact that Dr. Hohmeyer, after he had lost interest to continue working on the genus *Aleuria* together with Häffner (see Häffner 1993a), did not answer any of my letters during the last four years. Consequently, as Häffner (1993a) has treated all the taxa proposed by Hohmeyer & J. Moravec mentioned above in his new version of the paper without publishing the names validly, it is necessary to validate these names.

The genus *Rhodopeziza* differs from *Aleuria* in having amyloid asci and tuberculate ascospores which are not regularly biguttulate. It has a special position in the Pezizales and could be considered close to genera *Peziza* [Dill.] L: Fr. and *Iodophanus* Korf in Kimbrough & Korf. It differs, however, from *Peziza* in having carotenoid granules in the paraphyses, which are therefore red ("miniato"), and asci in which the iodine reaction is not restricted to only a ring around the operculum but which turn blue over the whole length. *Iodophanus,* on the other hand, has much smaller apothecia (up to 3 mm in diam.) which are rarely red, a medullary excipulum of a textura intricata, and spores without any guttules. Since *A. tuberculata* hardly fits in any of these or other genera, the new genus has been proposed.

2. Sowerbyella phlyctispora (Lepr. et Mont. in Mont.) Hohmeyer et J. Moravec comb. nov.

Basionym: *Peziza phlyctispora* Lepr. et Mont. in Montagne, Ann. Sci. Nat. IV. sér. 3: 358, 1845.

≡ *Neottiella phlyctispora* (Lepr. et Mont. in Mont.) Saccardo, Syll.Fung. 8: 193, 1889.

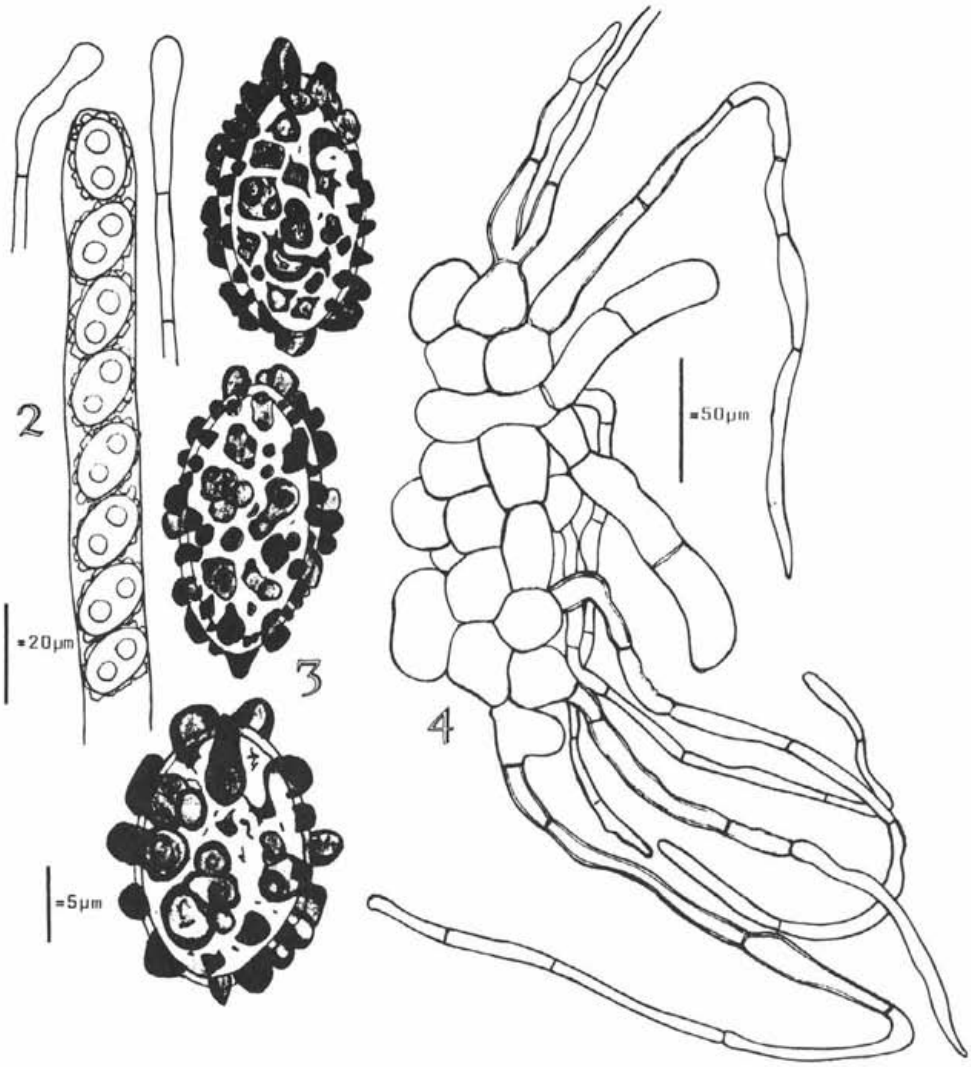


Fig. 2 – 4 *Sowerbyella phlyctispora*: 2. Ascus and paraphyses; 3 Ascospores (oil immersion + CB); 4. Part of the ectal excipulum of the stipe with hyphoid hairs. (Holotype of *Jafneadelphus tectipus*, K).

≡ *Scutellinia phlyctispora* (Lepr. et Mont. in Mont.) Le Gal, Prodr. Fl. mycol. Madag. 4: 159, 1953.

≡ *Aleuria phlyctispora* (Lepr. et Mont. in Mont.) Schumacher, Mycotaxon, Ithaca, 33:175, 1988.

= *Jafneadelphus tectipus* Spooner in Reid, Pegler et Spooner, Kew Bull. 35: 852, 1981.

≡ *Aleuria tectipus* (Spooner) W.-y Zhuang & Korf, Mycotaxon 26: 382, 1986.

The results of our examination of the type (K) of *Jafneadelphus tectipus* (type locality: Galapagos Is.) well agree with the detailed description and line drawings given by Spooner (1981).

T. Schumacher (1988) has revealed that *Peziza phlyctispora* Lepr. et Mont. in Montagne, which was described from French Guiana in 1845, is identical with the recently described *Jafneadelphus tectipus* Spooner (1981), and we, after our examination, have fully accepted his conclusion. Regarding the generic position, Schumacher (1988), at his recombination of *P. phlyctisora* in the genus *Aleuria,* has followed W.-y Zhuang & Korf (1986) who previously transferred *J. tectipus* to *Aleuria.* However, our examinations have revealed features which agree well with the present sense of the genus *Sowerbyella* Nannf. (J. Moravec 1985a, 1985b, 1986, 1988a and 1988b). These are particularly the colour and shape of the stipitate apothecia, and the excipular structure, in which the medullary layer is composed of a textura intricata, whilst the ectal layer is composed of a textura globulosa-angularis with hyaline hyphae and hyphoid hairs arising from the outermost cells of the ectal layer of the excipulum. We have found that the typical tomentum is also present on the surface of the stipe. The hyphoid hairs are 6-11 (-15) μm thick and up to 600 μm long, with walls 0.3-1.2 μm thick (see fig. 4). Also all the other features fit well within the generic concept of *Sowerbyella,* especially the biguttulate ascospores bearing a perisporium covered by a cyanophilic ornamentation. Consequently, after our examinations, we excluded it from the genus *Aleuria* and transferred it to *Sowerbyella* in the above mentioned manuscript of Hohmeyer & Häffner's paper on the genus *Aleuria.*

Our generic concept has been followed by Häffner (1993a), who has simultaneously cited our combination of *P. phlyctispora* as "*Sowerbyella phlyctispora* (Lepr. et Mont.) Hohmeyer et Moravec comb. nov." from the original English version of the unpublished manuscript of his joint paper with Hohmeyer mentioned above (see also the remarks on *Rhodopeziza tuberculata*). However, although Häffner has cited our names and views in his slightly modified version of the manuscript translated by himself into German, this combination was without correctly cited basionym and so not validly published. Moreover, Häffner continued such treatment of taxa in his last paper (Häffner 1993b) too. In that paper, without any quotation of the authors and our proposal, he has included this

taxon as "*Aleuria*" *phlyctispora* in a key of *Sowerbyella* compiled from a previously published key (J. Moravec 1988b). Therefore, the combination is formally made here. It is also necessary to note that Häffner's line drawings of ascospores of "*Aleuria phlyctispora*" in the compiled key (Häffner 1993b) show quite a different ornamentation and represent another discomycete as they were probably taken from *Scutellinia phlyctispora* (Lepr. et Mont. in Mont.) Le Gal (1954) – a misinterpreted name, which represents *Scutellinia badioberbis* (Berk. ex Cooke) O. Kuntze (teste Rifai 1968 and Schumacher 1990). The ascospore perisporium of *Sowerbyella phlyctispora* was examined by me on ascospores of the holotype of *J. tectipus* and on the holotype of *P. phlyctispora* too. The perisporium is covered by very large tubercles which are up to 4.5 (-5) μm in diam. and up to 4 μm high (see the line drawings in fig. 3, and SEM photographs figs. 9-10).

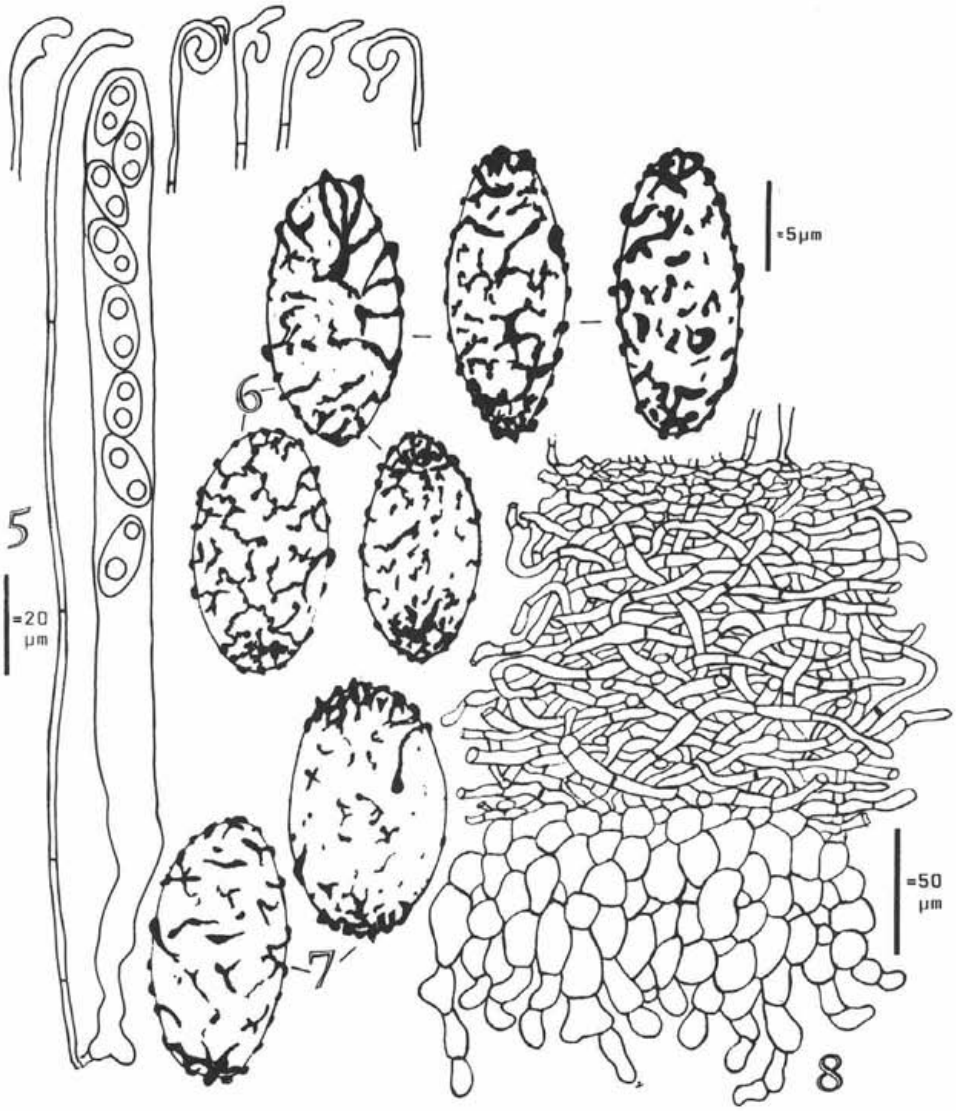
3. Sowerbyella unicisa (Peck) J. Moravec comb. nov.

Basionym: *Peziza unicisa* Peck, New York St. Mus. Rep. 26:81, 1874.
≡ *Otidea unicisa* (Peck) Harmaja, Karstenia 26:43, 1986.

Apothecia scattered to gregarious, 2-3 cm in diam. and 3-5 cm high, cupulate, substipitate to shortly stipitate, with a continuous margin or often split on one side to the base, receptacle surface brownish-yellow with a reddish tinge, rugulose and minutely granulose and powdered, hymenium yellow to pale yellow, slightly tinged with pink. Excipulum in the ectal layer a textura globulosa angularis composed of globose to angular or elongated thick-walled cyanophilic cells 8-30 μm in diam.; from these cells hyaline, thin-walled, articulated, short, 6-9(-15) μm thick hyphae arise. The medullary excipulum composed of interwoven, hyaline, septate, thin-walled, occasionally inflated (3-) 10-15 μm thick hyphae. Asci 200-225 x 7-10.5 μm, cylindrical, eight-spored, inamyloid, gradually attenuated towards the bilobed base. Paraphyses filiform, 1.5-2.8 μm thick, with a more or less enlarged (up to 4 μm) and curved or hook-like apex which is often with one or two dents or short branches turned in an obtuse angle upwards like fingers, with yellowish contents. Ascospores 12-15(-16.5) x 6-7.5 (-8) μm, ellipsoid, containing two guttules and bearing a perisporium covered by cyanophylic ornamentation which consists of elongated warts, ribs and crests forming an irregular reticulum; the ribs are 0.2-1 μm thick and 0.1-0.8 μm high, the highest ribs are on the ascospore poles (see the line drawings figs 6-7, and the SEM photographs in figs 11-12).

Material examined:

NORTH AMERICA: USA, New York, Lewis Co. Croghan Jelt House, IX. leg. C.H. Peck. (Holotype, NYS); USA, Tennessee, Great Smoky Mts. Nat. Park, Big Creek Ranger Station, about alt. 400 m., on the ground of a mixed forest, 16. VI. 1991 leg. Vladimír Antonín, det. J. Mor. (BRNM).

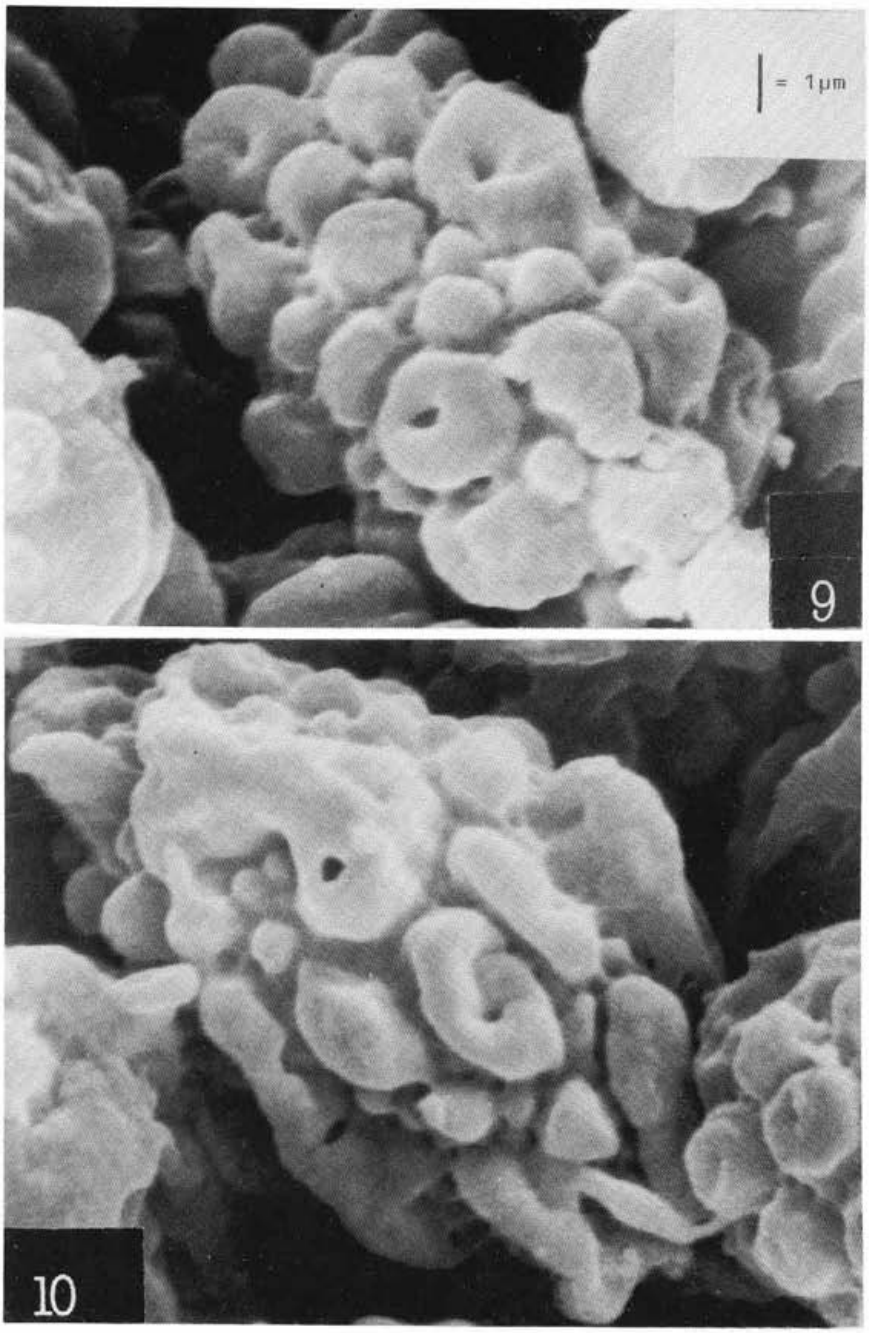


Figs. 5 – 8 *Sowerbyella unicisa*: 5. Ascus and paraphyses; 6-7. Ascospores (oil immersion + CB); 8. Apothecial structure (part of section). (Figs. 5-6 from BRNM; 7-8. from Holotype NYS).

This taxon was compared to *Otidea onotica* (Pers.: Fr.) Fuckel in a note in the cited original paper by Peck (1874) with the description of *Peziza unicisa*. Seaver (1928) covered both taxa under *Scodellina leporina* (Batsch: Fr.) S.F.Gray = *Otidea leporina* (Batsch: Fr.) Fuckel. The differences between these taxa, particularly in the shape and colour of the apothecia and the ornamented ascospores, as well as the generic delimitation of *Otidea* (Pers.) Bonorden, *Tarzetta* (Cooke) Lamb. and *Sowerbyella* Nannf., were briefly mentioned by Harmaja (1986). He has nevertheless transferred *P. unicisa* to the genus *Otidea*.

My examination of the type material (NYS) and of the recent collection (BRNM) made by Dr. Vladimír Antonín (Moravian Museum,Brno) in the USA has revealed that this taxon fits in the genus *Sowerbyella* Nannf. Almost all the features well agree with the generic concept of this genus: the excipular structure, the paraphyses which are hooked and occasionally shortly branched at their apex, but especially the biguttulate ascospores possessing a perisporium covered by cyanophilic ribs and crests which form an incomplete reticulum. The hyaline thin-walled articulated hyphae arising from the outermost cells of the ectal excipulum are rare and very short and thus the ectal excipular layer may resemble that of the genus *Otidea*. However, there also exist differences in several other species of *Sowerbyella* as to these outgrowths [see also the discussion on the delimitation of *Otidea and Sowerbyella* in Eckblad (1968)]. The outermost excipular cells in *S. unicisa* are thick-walled with coloured walls and give a minutely granulated brownish appearance to the surface of the apothecia. Such surface may also resemble that of apothecia in the genus *Otideopsis* (Liu et Cao 1987), which, however, possess brownish cells forming large brown pustules (see also J. Moravec 1988a, 1988b). Moreover, the apothecia of *S. unicisa* as well as of the two known species of *Otideopsis* are split towards the base and thus more resemble those of *Otidea*. However, such split margins may occasionally also occur in apothecia of *Sowerbyella* species, and, conversely, there are species in the genus *Otidea* having apothecia with unsplit margins, such as *Otidea indivisa* Velen. and *O. integra* (Bres.) Harmaja (1986). The discussed *S. unicisa* possesses rarely also apothecia with entire margins. This indicates that the delimitation of these three genera (but also of *Flavoscypha* and *Tarzetta*) may be complicated by certain limited features of individual species of each genus. Notwithstanding, I do not agree with Harmaja's recombination of *P. unicisa* in the genus *Otidea*, particularly for the ornamented perisporium of the ascospores of *S. unicisa* – a feature which is unknown in any other species of *Otidea*.

In my opinion (J. Moravec 1988b), the position of *Sowerbyella* in the family *Pyronemataceae* Corda em. Korf is in the subfamily *Otideoideae* Korf, and the same place should also have the above mentioned genera. However, the classification of all members of the subfamily *Otideoideae* into tribes needs, in my opinion, further investigation.



Figs. 9 – 10 SEM of ascospores of *Sowerbyella phlyctispora*. (Holotype of *Jafneadelphus tectipus* K).

Acknowledgements

I would like to thank Dr. Zdeněk Pouzar (Prague) for reviewing the paper as well as Dr. Vladimír Antonín (Brno), Dr. I. Gamundí (La Plata), Dr. B. M. Spooner (Kew), and curators of herbaria BRNM, LPS, NYS, and K, for arranging loans of the type and other material. With special thanks to Mr. Jiří Lhotecký (Brno) for the preparation of the SEM photomicrographs and to Dr. Helmuth Hohmeyer (Liverpool) for collaboration on the treated taxa.

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CZECH MYCOL. 47 (4), 1994

Luciotrichus lasioboloides, a new genus and a new species of the Pezizales

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Galán R. and Raitviir A. (1994): Luciotrichus lasioboloides, a new genus and a new species of the Pezizales. – Czech Mycol. 47: 271–275

A new genus Luciotrichus, related to the setose genera of the Pyronemataceae Corda em. Korf, is proposed with Luciotrichus lasioboloides sp. nov. as the type species, collected in Spain on dead leaves of Pistacia and, incidentally, of Quercus.

Key words: Pezizales, taxonomy, new taxa, Spain.

Galán R. and Raitviir A. (1994): Luciotrichus lasioboloides, nový rod a druh řádu Pezizales. – Czech Mycol. 47: 271–275

Vystavuje se nový rod Luciotrichus, příbuzný setósním zástupcům čeledi Pyronemateceae Corda em. Korf. Typový a současně jediný druh Luciotrichus lasioboloides sp. nov. byl sbírán ve Španělsku na odumřelých listech Pistacia, případně Quercus.

INTRODUCTION

The first author discovered a number of minute, setose fungal fruitbodies on decomposed fragments of several leaves of *Pistacia lentiscus* shrubs and *Quercus faginea* trees. Under the light microscope, operculate asci typical for the Pezizales were seen. Macroscopically, the minute turbinate apothecia were similar to those of *Lasiobolus,* particularly *L. diversisporus* (Fuckel) Sacc., but they were microscopically significantly different.

We sent part of this collection to Mr. Jiří Moravec asking him to comment on the possible relationships of our material to the large and variable genus *Cheilymenia* Boud. em. J. Moravec (Moravec, 1990). He kindly answered that this fungus is not related to *Cheilymenia* and that our collection could represent a new genus of the Pyronemataceae. It differs from *Cheilymenia* in having a different apothecial structure consisting of much smaller cells, short asci, very thin paraphyses,a different ascospore ornamentation and, especially, in the absence of the yellow refractive colour of mature ascospores when stained with lactophenol cotton blue. Moreover, the apothecia are very small and bear slender but very thick-walled

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hairs. Instead, it is very similar to the genus *Mycoarctium* Jain et Cain which has, however, asci without a functional operculum.

We, therefore, propose the new genus *Luciotrichus* which we temporarily assign to the family Pyronemataceae Corda em. Korf (Korf, 1972), until the classification system for the Pezizales is finally defined although, currently, its relationships seems to be near the setose genera ascribed to the Scutellinioideae Clem., Otideaceae Eckbl. by Korf & Zhuang (1991).

Methods are the same as described by Galán, Raitviir, Ayala & Ochoa (1994).

Luciotrichus R. Galán & Raitv. genus novum

Apothecia sessilia, turbinata vel cupulata, pallide colorata, extus longe rigidipilosa. Pili hyalini, conici, valde crasso-tunicati, multiseptati. Asci operculati, cylindraceo-clavati, inamyloidei, octospori. Sporae ellipsoideae vel late ellipsoideae, non guttulatae, aliquando "de Bary bubble" praeditae, verrucosae. Paraphyses filiformes, apicibus rectis vel subcurvatis.

Mycoarctium Jain & Cain similis, ascis operculatis differt.

Typus generis: *Luciotrichus lasioboloides* R. Galán & Raitv.

Etymology: refers to the shining setae.

Luciotrichus lasioboloides R. Galán & Raitv. species nova (Figs. 1-26)

Apothecia sessilia, turbinata vel cupulata, 0.3-0.4 mm in diametro, flavo-virida,, extus longe rigidipilosa. Pili hyalini, conici, valde crasso-tunicati, multiseptati, 150-300 x 10-12(-16) μm. Asci operculati, cylindraceo-clavati, inamyloidei, octospori, 120-150 x 13.5-18.5 μm. Sporae ellipsoideae vel late ellipsoideae, non guttulatae, aliquando "de Bary bubble" praeditae, verrucosae, 15-17 x 8 μm. Paraphyses filiformes, hyalinae, apicibus rectis vel subcurvatis, 1.5-2 μm in diametro.

Holotypus: ad folia dejecta Pistaciae lentiscus et Quercus fagineae, via Puerto de Galis-Ubrique, 50 km extra Ubrique, Parque Natural de los Alcornocales, Cádiz, Hispania, 30.11.1993, R. Galán & al. (RG 6808). Isotypi in herbario J. Moravecii (J. Mor.) asservantur.

Apothecia superficial, sessile, turbinate to cupulate with a plane hymenium, 0.3-0.4 mm diam., pale yellowish green in colour, externally covered by long, stiff, white, glistening hairs. Ectal excipulum of textura angularis at the base and flanks, textura prismatica at the margin; cells hyaline, thin-walled, 5-12 x 5-8 μm. Hairs conical, simple to branched, with a simple or sometimes slightly forked base, where often strongly swollen above and then gradually tapering to an acute apex, hyaline, with very thick walls and numerous thin septa, 150-300 μm long, basally 10-12 μm diam., swellings up to 16 μm diam., apex 2.5 μm diam., walls 3-4 μm thick. Asci operculate, cylindric-clavate, not blued in MLZ, with a deep dextrinoid content

Fig. 1 *Luciotrichus lasioboloides.* Apothecia in their natural habitat.

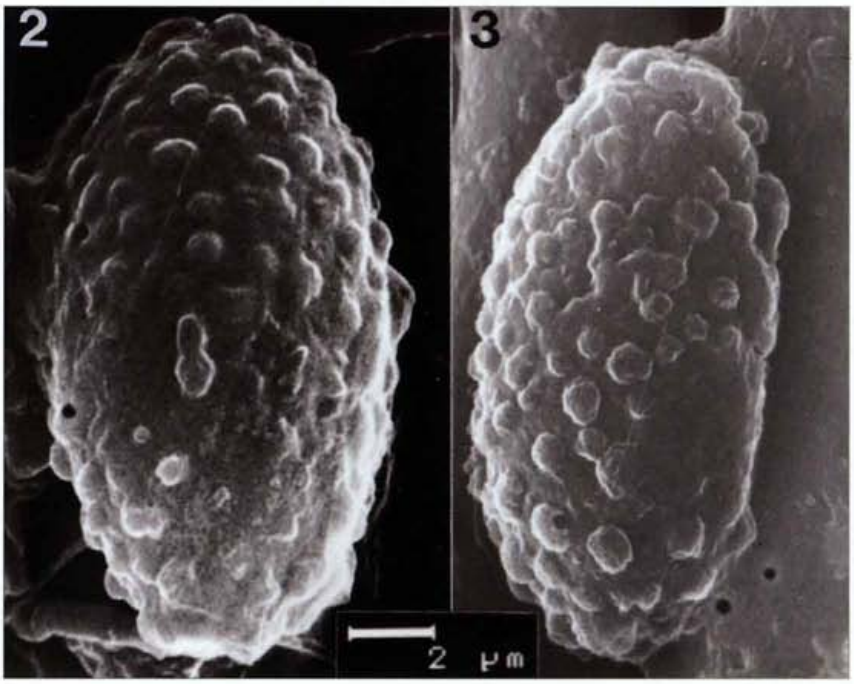

Fig. 2 – 3 *Luciotrichus lasioboloides.* Ascospores in SEM.

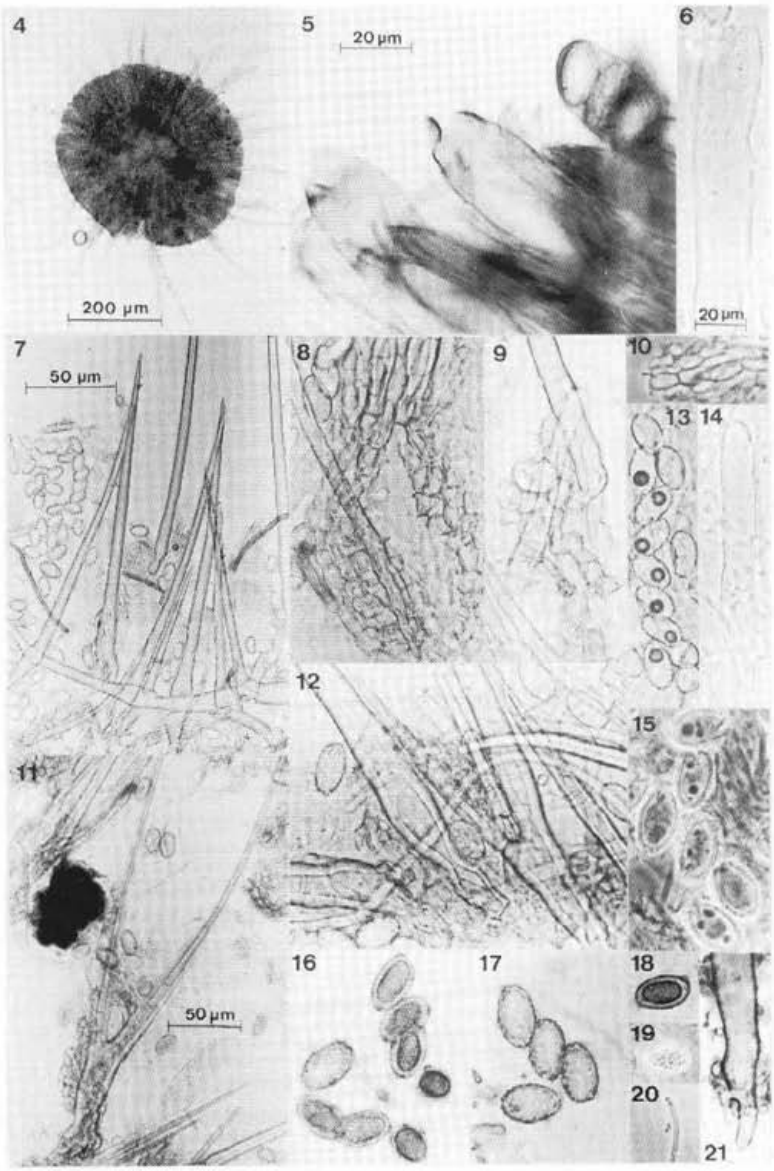

Fig. 4 – 21 *Luciotrichus lasioboloides*. 4. Apothecium; 5. Asci with opercula; 6. Empty ascus showing the operculum; 7. Setose margin of the excipulum and free spores; 8-10. Fragments of the ectal excipulum, 11. Bifurcate seta, 12. Two simple and one branched setae; 13. Spores containing de Bary bubbles; 14. Empty ascus and a paraphysis; 15. Ascospores with several stained inclusions; 16. Immature spores with a dextrinoid content; 17. Ascospores showing an ornamented surface; 18. Immature spore; 19. External surface of a spore; 20. Apex of a paraphysis; 21. Bifurcate base of a seta. (Figs. 6, 10, 14, 15, 19 & 20 in phase-contrast; 4, 8 & 12 in tap water; 5 in Congo red; 6-10, 13-15 & 19-20 in MLZ; 16-18 in Lugol; 21 in Cresyl blue). Scale bar on fig. 5 is valid also for figures 10 & 15-18. Scale bar on fig. 6 is valid also for figures 8, 9, 12-14 & 19-21.

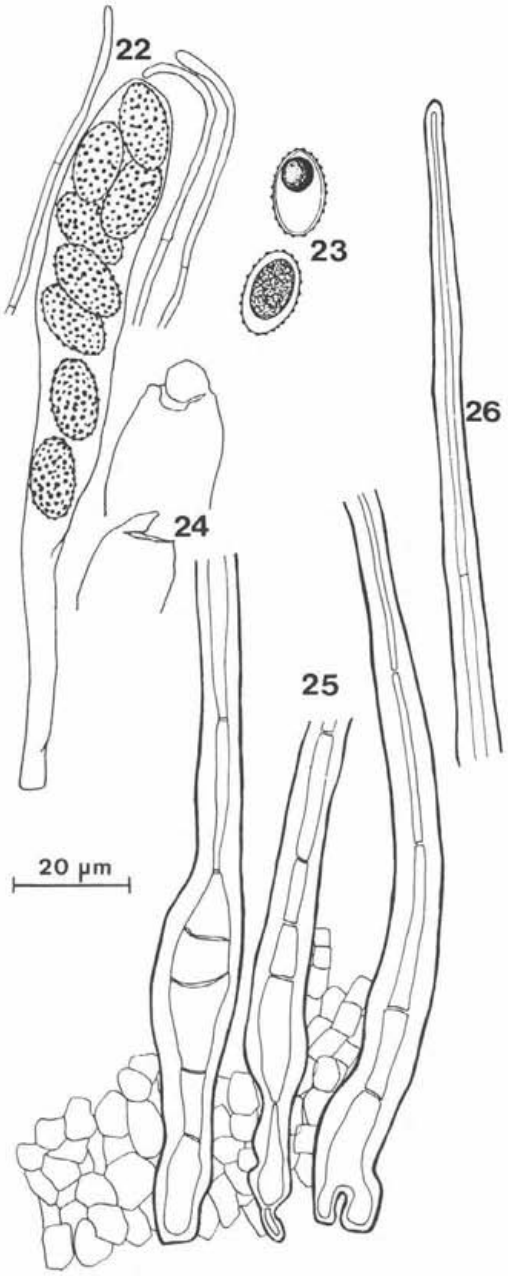

Fig. 22 – 26 *Luciotrichus lasioboloides*. 22. A ripe ascus and apices of three paraphyses; 23. Two ascospores in optical section, showing a de Bary bubble (top) and a dextrinoid body (bottom); 24. Two ascus tips showing operculum; 25. Excipular cells and three basal parts of setae; 26. Pointed apex of a seta.

when immature, 8-spored, 120-150 x 13.5-18.5 μm. Ascospores ellipsoid to broadly ellipsoid, hyaline, without oil drops, often with one de Bary bubble, ornamented with prominent cyanophilic warts, 15-17 x 8 μm. Paraphyses cylindrical, apically straight or slightly bent, hyaline, 1.5-2 μm diam.

On fallen decaying leaves.

Specimen examined: On fallen leaves of *Pistacia lentiscus* L. or, incidentally, of *Quercus faginea* subsp. *broteroi* (Coutinho) A. Camus, at the 50 km mark on route no. 3331 from Puerto de Galis to Ubrique, Parque de los Alcornocales, Cádiz, Spain, 30.11.1993, R. Galán & al. (Holotype RG 6808, isotype in the herbarium of J. Mor.).

This peculiar fungus bears a strong resemblance to *Mycoarctium ciliatum* Jain & Cain, differing mostly in the larger and differently ornamented spores – with a strongly warted perispore instead of the subreticulate ornamentation of *M. ciliatum* – and presence of a well-developed functional operculum in the ascus apex. Although the two species have such common features as habit of apothecia, absence of carotenoid pigments, presence of de Bary bubbles in ascospores with a cyanophilic ornamentation, we feel it is impossible to place species with asci having functional opercula and species with asci without them into one and the same genus.

The genera *Lasiobolus* Sacc. and *Ochotrichobolus* Kimbrough & Korf have operculate asci, very similar to those of *Luciotrichus*. However, the smooth spores and typically non-septate hairs of the former, and the particular construction of the excipulum of the latter allow us to distinguish easily between these genera.

The genus *Trichophaeopsis* Korf & Erb comprises species with a very similar habitat, shape, colour and structure of apothecia, shape of apothecial hairs, and may also have ascospores possessing an ornamented perisporium as, for instance, *Trichophaeopsis latispora* J. Moravec (Moravec, 1979), but differs in the "brownish hairs and more prominent ascospore ornamentation", according to the findings of Mr. Moravec, who has compared our fungus with the type material of *T. latispora*.

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CZECH MYCOL. 47 (4), 1994

Species of Taphrina on Populus in Slovakia

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Bacigálová K. (1994): Species of Taphrina on Populus in Slovakia. – Czech Mycol. 47: 277–283

The paper deals with the species Taphrina populina Fr. on Populus nigra L. as well as Taphrina johansonii Sadeb. on Populus tremula L. till now unsufficiently known from the Slovakian territory. The author presents some new data on biology, ecology and distribution of the fungi and their host plants. Ecological characteristics of new localities are described.

Key words: Taphrina, Populus, Slovakia, biology, ecology, distribution.

Bacigálová K. (1994): Druhy rodu Taphrina rastúce na topole na Slovensku. – Czech Mycol. 47: 277–283

Autorka uvádza v mykoflóre doteraz málo známe druhy Taphrina populina Fr. na Populus nigra L. a Taphrina johansonii Sadeb. na Populus tremula L. na Slovensku. Opisuje symptómy ochorenia hostiteľských rastlín, anatomicko-morfologickú charakteristiku húb, lokality ich výskytu a ich ekologickú charakteristiku.

The previous papers (Bacigálová 1992,1993) treated the phytopathogenic fungi *Taphrina* on *Alnus, Carpinus* and *Parageum montanum* as host plants in the ecological conditions of Slovakia. This paper completes the studied problem and presents basic information on *T. populina* and *T. johansonii* on *Populus*.

MATERIAL AND METHODS

Material was obtained from mycofloristic research in Slovakia and from existing herbarium items at the following institutes: Mycological Herbarium of the Slovak National Museum, Bratislava – BRA, Tatry National Park, Tatranská Lomnica – TNP, Moravian Museum, Brno – BRNM, Mycological Department of the National Museum, Prague – PRM, Department of Botany, Faculty of Natural Sciences, Charles University, Prague – PRC, and collected specimens of *Taphrina* deposited in the Herbarium of the Institute of Botany, Slovak Academy of Sciences, Bratislava – SAV.

For the identification of the fungi and their anatomical-morphological characteristic a method used earlier (Bacigálová 1992) was applied. An evaluation was made by help of a Zeiss "Amplival" microscope with microphotographic equipment.

The locations of the fungi and their host plants are arranged in maps. A list of locations grouped according to their phytogeographical classification (Futák 1966) was compiled.

All collected specimens of *Taphrina* are deposited in the Herbarium of the Institute of Botany, Slovak Academy of Sciences, Bratislava – SAV.

Notes: R. – river, B. – brook, surr. – surroundings

Fig. 1 Yellow convex-concave spots caused by *T. populina* on *P. nigra*.

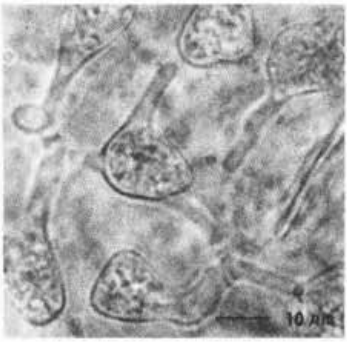

Fig. 2 Mycelium cells become enlarged to form ascogenous cells inthe subcuticular leaf layer.

Taphrina populina Fries, Syst. Mycol. 3:520.1832.

Symptoms. The fungus causes convex-concave golden yellow spots on the leaves of *Populus* (Fig. 1). They are often small (5-10 mm large), sometimes confluent and extensive involving half of the leaf blade. The yellow spots change to greyish-black, and remain as a scab on living leaves till leaf fall.

Anatomical and morphological characteristics. The vegetative mycelium is intercellular and subcuticular. The cells of the mycelium are thin, elongated and divided by layered septa which appear to be composed of several bands of cell wall material. The size of the cells increases and in the region between epidermal cells and leaf cuticle the cells become strongly thickened and are disintegrated into shapeless, later ovoid, thick-walled ascogenous cells (Fig. 2 and 3). During their further development the ascogenous cells increase in length and asci are formed (Fig. 4).

The asci are two-celled, cylindric, at the top rounded, at the base narrowed and attached to the host cells by a sheath (the rest of the outer ascogenous cell layer). The stalk cells are variable in form, often triangular wedge-shaped or bluntly

rounded (Fig. 4). The asci have gold yellow epiplasma. They measure 55-85 x 10-22 μm, mostly 65-70 x 15-17 μm. The stalk cells are 2.5-10 μm in diameter, most frequently 5-7.5 – 13-15 μm.

The asci have 8 ascospores. They are round or ellipsoid 4-6 x 3-4 μm, budding at once to fill the ascus with numerous blastospores.

The asci show size and form variability on different host species of Populus and the stalk cell may be present or not (Mix 1949). According to his opinion, it is possible to distinguish different asci for each host species, but variability in types growing on the same host species is not common. Our evaluations correspond with the mentioned opinion as well with the measurements of the following authors: according to Mix (1949), the asci are 30-122 x 13-30 μm, the stalk cells 4-27 x 8-32 μm, according to Salata (1974), the asci are 30-120 x 13-30 μm, most frequently 60-85 x 12-20 μm, the stalk cells triangular in form, 4-27 x 8-23 μm, according to Naidenov (1986), the asci are 48.6-113.8 x 13.8-42.1 μm, the stalk cells 3.9-41.2 x 8.2-16.7 μm.

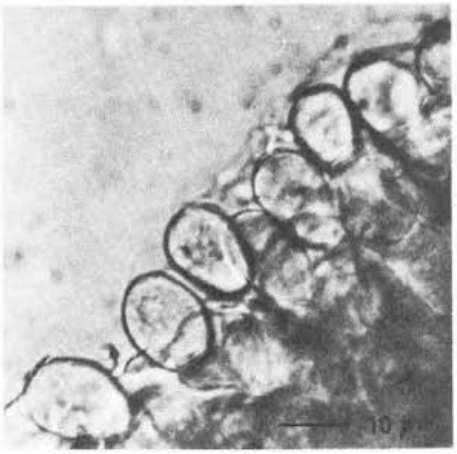

Fig. 3 Maturing thick-walled ovoid ascogenous cells.

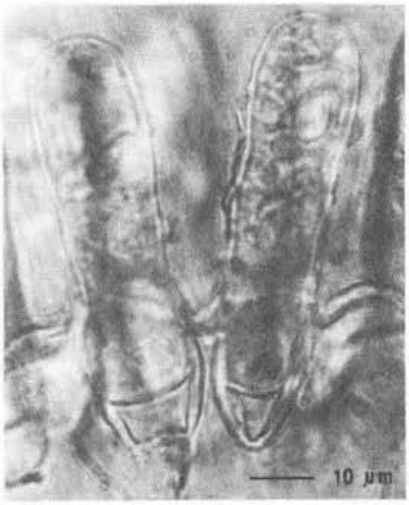

Fig. 4 Mature asci of *T. populina* with ascospores and blastospores.

Locations of the fungus and their ecological characteristics. *T. populina* was collected on *P. nigra* by Hazslinsky at Eperjes (Prešov) and by Bäumler at Pozsony (Bratislava) (Moesz 1939). Later the fungus was collected on P. pyramidalis by A.Kmeť in 1895 in the region Sitno, at Šipice (Štiavnické vrchy Mts.) (BRA), at Levoča by Greschik in 1918 and 1920 (BRA), on Populus sp. at Levoča by Greschik in 1923 (Jeschková 1957), and in Piešťany on *P. nigra* by Fuksa in 1920 (Jeschková 1957).

During our mycofloristic observations we found new locations of the fungus situated in Central, North and East Slovakia, occurring predominantly on solitarily

growing trees of P. nigra along rivers or roads. The fungus was not found on locations in the south and west of Slovakia, detected by Fuksa in 1920, or any other locations detected earlier by Bäumler in Poszony (Moesz, 1939) and Linhart in 1884 on *P. nigra* at Óvar (Mosonmagyaróvár) near Bratislava (TNP). The absence of the fungus can be explained by its possible reaction on rapid climate changes in the mentioned regions during the last 90 years such as decreasing precipitation and soil humidity, global warming – greenhouse effect, and other changes (Závodský et Závodská, 1992, Lapin, 1993). The suitable conditions for *T. populina* are a minimum humidity of 75% and a maximum temperature of 15-20 °C.

List of locations (Fig. 5): 6. Podunajská nížina Lowlands: Poszony, 1887; leg. Bäumler, (Moesz 1939). Piešťany, old park, 1920; leg. Fuksa, (Jeschková 1957). 14e. Štiavnické vrchy Mts.: Šipice 1895; leg. Kmeť, (BRA). 15. Slovenské rudohorie Mts.: Čierny Balog, 1992; Krásna hôrka Motel, Rožňavské Bystré, 1989; omnia leg. Bacigálová, (SAV). 18. Stredné pohornádie: Margecany near bridge, Jaklovce,surr. Hnilec R., 1989; leg. Bacigálová, (SAV). 19. Slánske vrchy Mts.: Kapušany near bridge, 1992; leg. Bacigálová, (SAV). 20. Vihorlat Mts.: Dúbrava, 1989; leg. Bacigálová, (SAV). 22. Nízke Tatry Mts.: Švermovo, along road, 1989; leg. Bacigálová, (SAV). 23. Vysoké Tatry Mts.: Podbanské along road, 1992; leg. Bacigálová, (SAV). 26b. Spišské kotliny: Levoča, 1918; 1920; 1921; leg. Greschik, (BRA), ibid. Greschik 1923; (Jeschková 1957), Poprad-Kvetnica,1989; leg. Bacigálová, (SAV). 28. Západné Beskydy Mts.: Zázrivá, surr. Zázrivka R., Zázrivá-Kozinská, Zázrivá-Minoľa, Kysucký Lieskovec, surr. Kysuca R., 1989; leg.Bacigálová, (SAV). 30a. Šarišská vrchovina Mts.: Eperjes (Prešov), leg. Hazslinszky, (Moesz 1939), Žipov, 1989; Prešov, 1989; 1992; omnia leg. Bacigálová, (SAV). 30b. Čergov Mts.: Ľubotnín, surr. Poprad R., 1989; leg. Bacigálová, (SAV). 30c. Nízke Beskydy Mts.: Chotča, 1989; Nižný Orlík, 1989; Nižná Polianka, 1989; 1992; Demjata B., Tulčik, 1992; Demjata-Raslavice, 1989; Smilno, 1989; omnia leg. Bacigálová, (SAV).

T. populina is wide-spread on various species of *Populus* in Europe, North America, China, Japan and India (Mix 1949). In Europe it was found on *P. balsamifera* L., *P. berolinensis* Dipp., *P. canadensis* Moench, *P. deltoides* Marsh., *P. nigra* L. and *nigra* cv. Italica in Norway (Gjaerum 1964), on *P. canadensis* Moench, *P. nigra* L., and *nigra* cv. Italica in Poland (Salata 1974), on *P. nigra* in Bulgaria (Naidenov 1986), in Ukraine (Zerova 1969), and on Sicilia (Venturella 1991). According to American authors (Faar et al. 1989) and authors from Georgia (Kolektiv 1986), the fungus also appears on Alnus species.

Taphrina johansonii Sadebeck, Jahrb. Hamb. Wiss. Anst. 8: 9.61-95.1890

Symptoms. The fungus causes yellow hypertrophied enlargements of ovaries and all catkins of *Populus tremula* L.

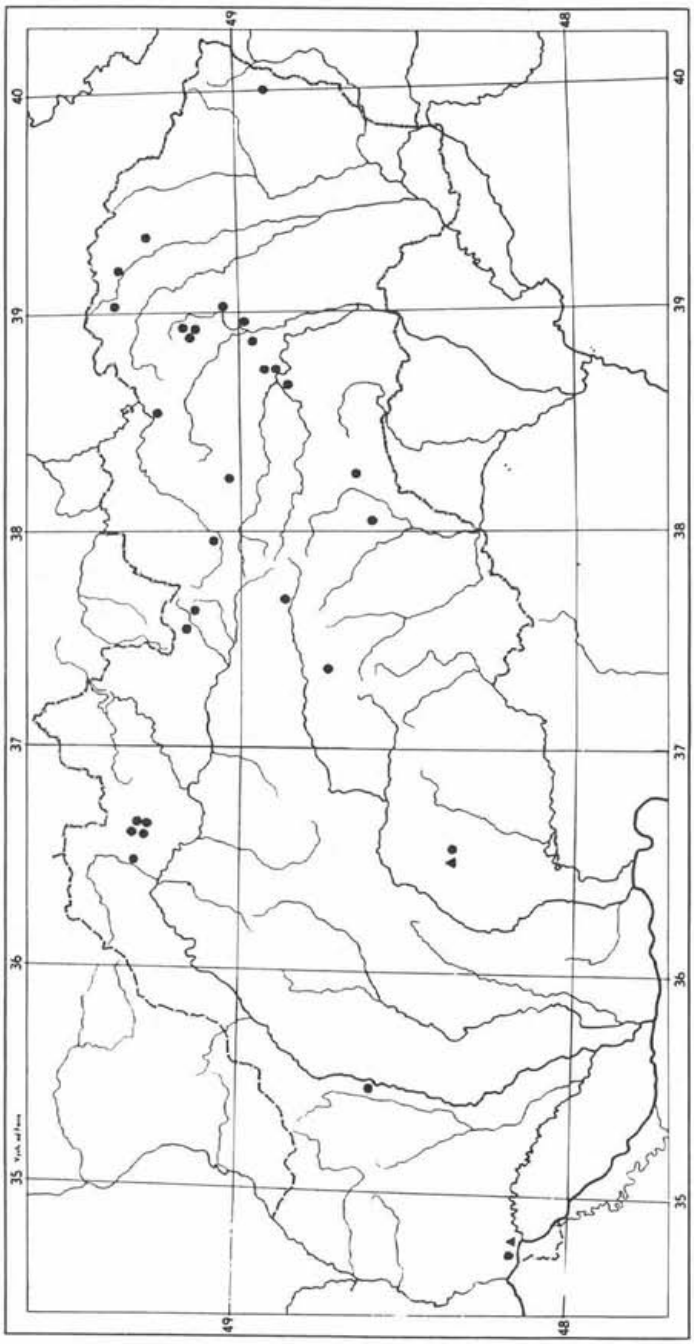

Fig. 5 Distribution map of *T. populina* on *P. nigra* – ● and *T. johansonii on P. tremula* ▲

Taphrina johansonii was collected on *P. tremula* by Bäumler in 1889 in the Malé Karpaty Mts. near Bratislava (PRC), in Pozsony, in 1897, and by Tuzson in Vihnye (Vyhne) (Štiavnické Mts.), Moesz (1939). During our mycofloristic observations no other new location of this fungus was found, and we had no possibility to observe authentic infected material from Slovakian territory.

T. johansonii was found parasitizing on *P. tremula* in Bulgaria (Naidenov 1986) and in Georgia (1986). A few locations are known from Poland (Salata 1974, 1975) and from Norway (Gjaerum 1964). The fungus occurs on *P. grandidentata* Michx. and on *P. tremuloides* Michx. in North America and on *P. sieboldii* Miq. in Japan (Salata 1974).

SUMMARY

New data on the biology and ecology of *Taphrina populina* Fr. on *Populus nigra* L. and *Taphrina johansonii* Sadeb. on *Populus tremula* L. including a list of locations in Slovakia are given. The contemporary occurrence of *T. populina* Fr. predominantly in north-east Slovakia points out that climate conditions – lower temperature and higher humidity – are favorable in this region. We suppose that booth *Taphrina* species prove to be sensitiv to environmental changes.

A c k n o w l e d g e m e n t s

The author is grateful to Mrs. G. Vosátková for her technical assistance.

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CZECH MYCOL. 47 (4), 1994

Taphrina viridis – a new species for the Karpaty Mts.

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Bacigálová K. (1994): Taphrina viridis – a new species for the Karpaty Mts. – Czech Mycol. 47: 285–288

Taphrina viridis Maire was found for the first time in the Západné Tatry Mts. (Karpaty Mts.) on Duschekia alnobetula (Ehrh.) Pouzar, (syn. Alnus viridis (Chaix) DC.). The author presents some new biological data on the mentioned fungus and ecological characteristics of its habitat.

Key words: Taphrina viridis, Duschekia alnobetula (= Alnus viridis), biology, ecology, Karpaty Mts., Slovakia

Bacigálová K. (1994): Taphrina viridis – nový druh pre Karpaty. – Czech Mycol. 47: 285–288

Taphrina viridis Maire bola zistená na Slovensku v Západných Tatrách na lokalite v Kamenistej doline, na živých listoch Duschekia alnobetula (Ehrh.) Pouzar, (= Alnus viridis (Chaix) DC.). Ide o prvý nález uvedenej huby v Karpatoch. Autorka prezentuje nové poznatky z oblasti biológie tejto fytopatogénnej huby a ekologickú charakteristiku lokality jej výskytu.

During the years 1988-1993 mycofloristic research on the genus *Taphrina* and its host plants in the National Park of the High Tatra Mts. in Slovakia was carried out. The symptoms of *Taphrina viridis* infections were observed on leaves ofthe rarely occurring shrub *Duschekia alnobetula* (Ehrh.) Pouzar, syn. *Alnus viridis* (Chaix) DC. It was the first record of the fungus in Slovakia as well as in the Karpaty Mts.

Taphrina viridis Maire, Bull. Soc. Bot. Fr., ser. 4.10: CLXVII. 1910.

Symptoms. The fungus causes several rounded, variously large spots on leavea of its host plants, which often occupy half of the leaf area (Fig. 1). The infected parts of the leaves are pale green or yellowish, in the period of asci maturing asci they are greyish, and later turn into brown, become dry and remain on the leaves (Fig. 1).

Anatomical-morphological characteristic of the fungus. Thin cross sections were made of blades from naturally infected leaves and observed in a drop of 50% lactic acid. Observations were carried out with the help of an Amplival microscope with microphotographic equipment.

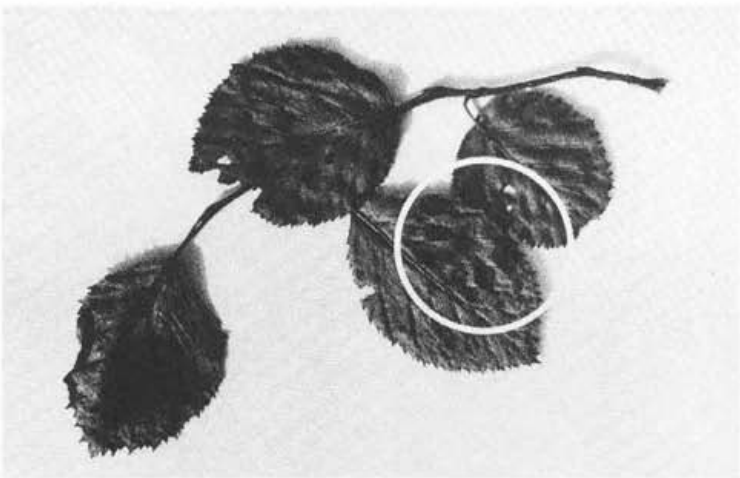

Fig. 1 Pale green spots on leaves of *Duschekia alnobetula* caused by *Taphrina viridis*.

Fig. 2a Various stages of mycelium cells in the subcuticular leaf layer (yeast-like cells, cells of fine fibrous mycelium, early stages of developing ascogenous cells), 10 μm

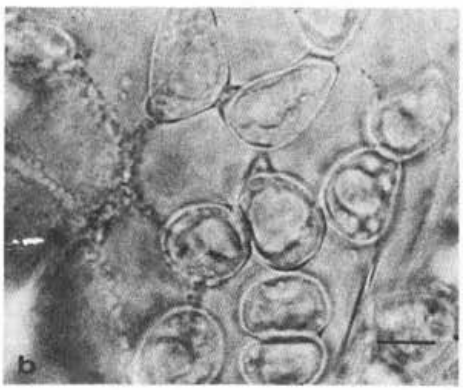

Fig. 2b The fibrous subcuticular hyphae connect ascogenous cells, 10 μm

The vegetative phase of the fungus is characterized by yeast-like cells, which form chain-like colonies beneath the leaf cuticle (Fig. 2a). The mycelium has an irregular form. The mycelium cells are elongated, divided or partitioned by layered septa which appear to be composed of several bands of wall material. The cytoplasm of the young cells is dense, but becomes granulated and vacuolated as the cells develop into ascogenous cells. Occasionally the cells of mycelium branch, but do not form such extensive mycelium as formed by some of the other *Taphrina* species. The size of the cells vary depending on intercellular spaces of the host parenchyma. In the

subcuticular leaf layer, the mycelial cells become thickened and round, and thick-walled ascogenous cells are formed. During their further development the cuticle is ruptured and ascogenous cells increase in size and form asci (Fig. 3b).

The asci are amphigenous, cylindrical or ellipsoidal-oblong, rounded or truncate at the top, on average 23-33 x 11-16 μm, but most frequently 26-30 x 13-15 μm. The stalk cells are rounded, on average 8-22 x 15-25 μm, but most frequently 16 x 16 μm. The asci have eight ascospores. They are globoid or oval, 4.5-6 x 5-6 μm (Fig. 3b).

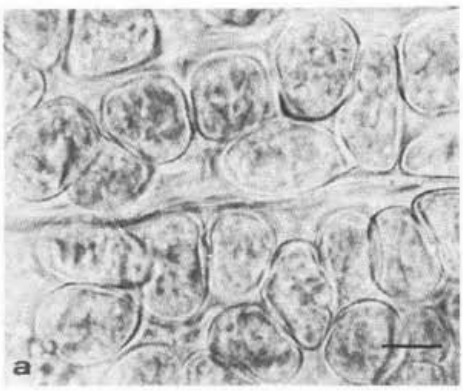

Fig. 3a Ascogenous cells situated in a vascular bundle beneath the cuticle, 10 μm

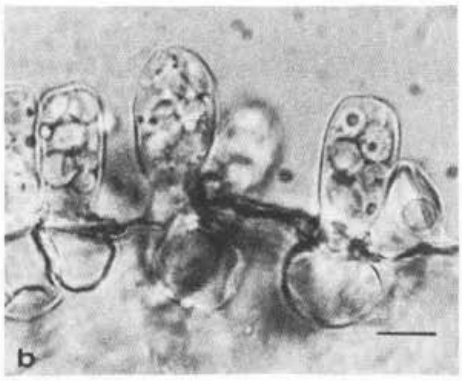

Fig. 3b Ascogenous cells situated in a vascular bundle beneath the cuticle, 10 μm

Locations. Slovakia, Západné Tatry Mts., Kamenistá dolina Valley near Kamenistý potok Brook, 1200-1250 m a.s.l. on living leaves of *Duschekia alnobetula,* 6.9.1988, 9.8.1993 leg. et det. Bacigálová, (SAV).

The symptoms of *T. viridis* on *Duschekia alnobetula* are similar to *T. sadebeckii* on *Alnus glutinosa* (L.) Gaertn., but anatomical and morphological features of the fungus are different. *Taphrina viridis* is characterized by smaller asci and stalk cells in the subcuticular layer of the host leaves, in agreement with collected specimens and with the characteristic of *T. viridis* as recorded by Mix (1949) and Salata (1974). The vegetative and generative phase of the life cycle of this fungus is very similar to the group of *Taphrina* represented by *T. virginica* Sadebeck. (Kramer 1960).

Herbarium and literature items suggest a rare occurrence of *T. viridis* in Europe. This fact might also be explained by the limited occurrence of its host plants (*Duschekia alnobetula*) in valleys ofthe southeastern Karpaty Mts., (Dostál et Červenka 1991). The Slovakian locations of *D. alnobetula* are not autochtonous,

as it is in the case of the High Tatra Mts. locations, where *D. alnobetula* was planted (Dr. A. Šoltésová, Tatra National Park, personal communication).

The location of the fungus is situated in a valley in the montane belt (1200 – 1250 m a.s.l.) with numerous shrubs of the host plant near a brook and near a touristic path. This fact leads us to draw the conclusion that also tourism helps spreading this fungus. We suppose that the mentioned fungus may also be distributed in some other sites in our territory, not researched so far. It is remarkable that *T. viridis* was not found in Poland (Sałata 1974) and other countries of Northern Europe.

Acknowledgements

The author is grateful to Mrs. Gabriela Vosátková for technical assistance.

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CZECH MYCOL. 47 (4), 1994

Cystolepiota cystophora: first record from the Czech Republic

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Antonín V. (1994): Cystolepiota cystophora: first record from the Czech Republic.– Czech Mycol. 47: 289–292

The first Czech and probably also extra-Mediterranean collection of Cystolepiota cystophora (Malenç.) Bon is reported and completed with drawings of microfeatures.

Key words: Basidiomycetes, Agaricaceae, Cystolepiota cystophora, Czech Republic.

Antonín V. (1994): První nález Cystolepiota cystophora v České republice.– Czech Mycol. 47: 289–292

Autor publikuje první nález Cystolepiota cystophora (Malenç.)Bon v České republice a zřejmě i mimo Středomoří. Je uveřejněn popis podle nalezených plodnic, doplněný kresbami mikroznaků.

In late autumn 1993, I have found very interesting species, *Cystolepiota cystophora* (Malenç.)Bon, in a thermophilous oak forest of southern Moravia (Czech Republic).

Microscopical features are described from material mounted in Melzer's reagent and NH_4OH. For the basidiospores the following factors are used: E (quotient of length and width in any one spore); Q (mean of E-values).

DESCRIPTION OF THE CZECH CARPOPHORES:

Carpophores solitary. Pileus up to 25 mm broad, conical-hemispherical, then convex, almost undulate-applanate when old, without a distinct papilla, with involute when young, later inflexed margin decorated with white velar remnants, connected by velum with the stipe when young, surface entire or often divided into small appressed squamules, forming more or less concentric, small, granulose-woolly squamules towards margin, squamules only fimbriate to missing at margin when old; surface whitish, squamules lilac, lilac-brownish to brownish at centre, paler (almost white) towards margin. Lamellae moderately close, l = 3, free, cream-coloured, with concolorous, dentate-pubescent edge. Stipe up to 40 x 4 mm, cylindrical, slightly broadened at the top, slightly bulbous at base, entirely finely longitudinally fibrillose, often fibrillose-squamulose or fibrillose-tomentose, with white basal tomentum, sometimes with radial mycelial strains around base;

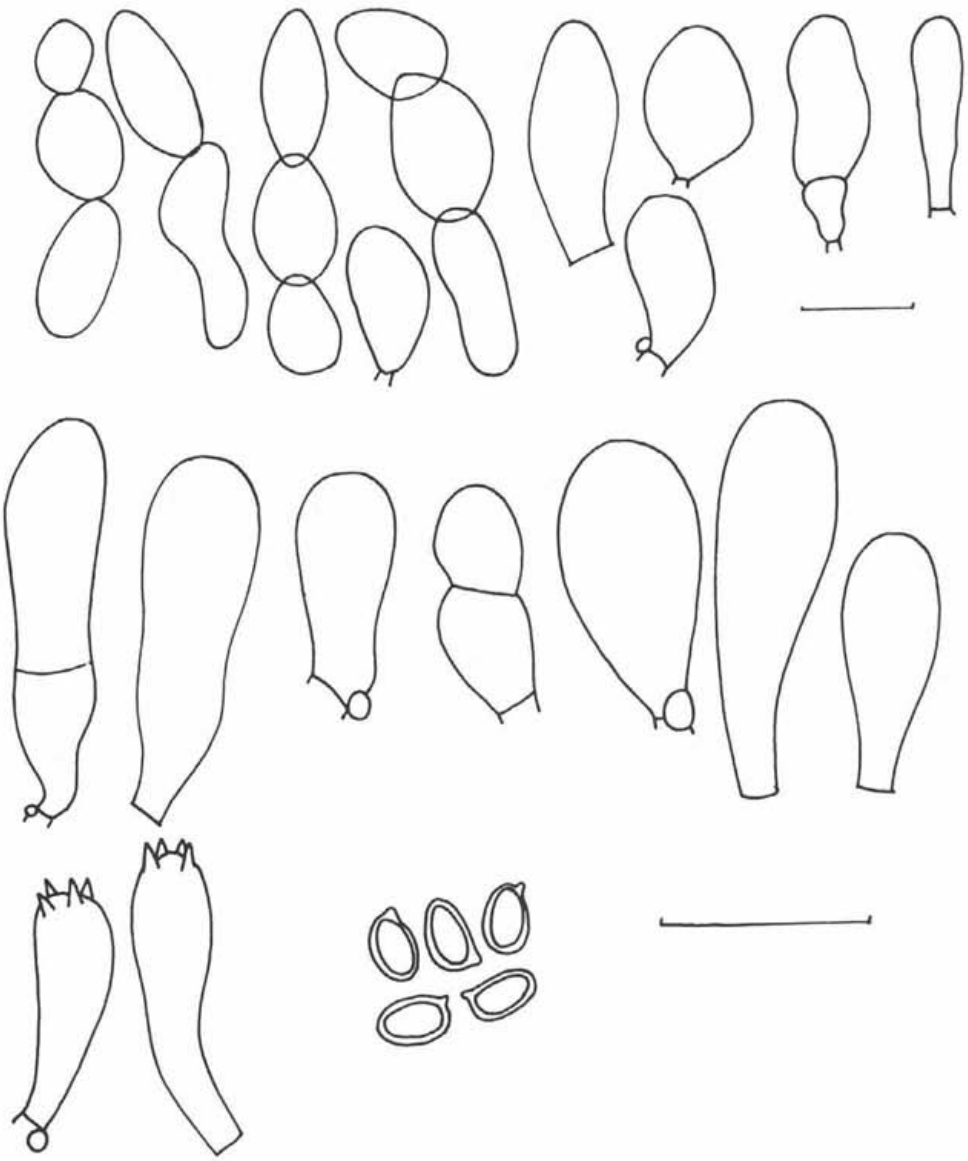

Fig. 1 – 4 *Cystolepiota cystophora:* 1. pileipellis cells, 2. cheilocystidia, 3. basidia, 4. basidiospores. Scale bar = 20 μm.

white when young, with slightly lilac hue when old or after touching. Annulus white, woolly-pelliculose when young, soon indistinct, consisting of only a few fibrils. Context without any distinct smell.

Basidiospores 6.2-7.7 x 3.8-4.6 μm, E = (1.5-)1.6-1.9 (-2.0), Q = 1.7, ellipsoid, non-dextrinoid, rarely seeming to be very slightly dextrinoid, thick-walled, without germ-pore, smooth. Basidia (21.5-)25.4-29.2 x 6.9-9.2 μm, 4-spored, clavate, sometimes subcapitate, clamped. Basidioles 12.0-26.2 x 5.0-8.0 μm, clavate, thin-walled, clamped. Cheilocystidia 15.5-41.1 x 7.7-14.6 μm, clavate, broadly clavate, subfusoid, sometimes with one septum, thin-walled, clamped. Pleurocystidia absent. Trama hyphae thin-walled, cylindrical to subinflated, clamped, up to 15 μm wide. Pileipellis made up of 26-53 x 11-25 μm large, globose, subglobose, sphaeropedunculate, broadly clavate to clavate cells (sphaerocysts), thin to slightly thick-walled, sometimes clamped at base, often forming chains. Stipitipellis a cutis of parallel, more or less thin-walled, non-dextrinoid, up to 10 μm wide hyphae.

Hab. on soil in a thermophilous oak forest.

Loc. Czech Republic, Moravia, Kobylí na Moravě, forest called "Ochozy", 10. XI. 1993, leg. et det. V. Antonín 93.466 (BRNM 576869).

Cystolepiota cystophora belongs to sect. *Cystolepiota*, subsect. *Floccosinae* (Knudsen) Bon. It is characterized in having a stipe with a typical lilac hue, a typical *Cystolepiota* pileipellis with chains of globose to subglobose cells, and rather large, non-dextrinoid or rarely very slightly dextrinoid basidiospores. The extremely similar species *Lepiota cystophoroides* Josserand & Riousset 1972 growing in the same biotope differs especially in having sordid coloured lamellae, a stipe without squamules, a differently formed pileipellis with only rarely globose to subglobose elements, and slightly dextrinoid basidiospores (Bon 1981, 1993; Candusso et Lanzoni 1990). It belongs to *Lepiota* sect. *Lilaceae* Bon.

The macroscopical and microscopical description of the carpophores collected in Moravia (Czech Republic) agree very well with a description by Candusso et Lanzoni (1990). However, the basidiospores seem to be slightly dextrinoid sometimes. This fact corresponds with Bon (1981).

Cystolepiota cystophora was described from Morocco as *Lepiota cystophora* Malençon in Malençon et Bertault (1970), and is also known from oak forests in the Mediterranean region of Europe (Bon 1981). The collection described here represents the first location in the Czech Republic, and probably also the first extra-Mediterranean location.

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CZECH MYCOL. 47 (4), 1994

Production of abscisic acid and cytokinins in static liquid culture by Schizophyllum commune

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Janitor A. and Vizárová G. (1994): Production of abscisic acid and cytokinins in static liquid culture by Schizophyllum commune – Czech Mycol. 47: 293–302

The superficial cultivation of fungus Schizophyllum commune Fr. in static liquid cultures showed production of abscisic acid – type inhibitor (ABA) and isopentyl – adenine type cytokinins (2iP) by this fungus. The analyses were done after 28 days of cultivation.

Key words: production abscisic acid, cytokinins, static liquid culture, Schizophyllum commune Fr.

Janitor A. and Vizárová G. (1994): Produkcia kyseliny abscisovej a cytokinínov hubou Schizophyllum commune v tekutých kultúrach. – Czech Mycol. 47: 293–302

Pri povrchovej kultivacii huby Schizophyllum commune Fr. v statických tekutých kultúrach bolo zistené, že huba produkuje do média inhibítor typu kyseliny abscisovej (ABA) a cytokiníny typu izopentyl-adenín (2iP). Analýzy boli robené po 28 dňoch kultivácie.

INTRODUCTION

During the last years the literature takes notice of the ability of some saprophytic and parasitic fungi to synthesize abscisic acid (ABA) (Crocoll et al. 1991). Abscisic acid a natural plant growth regulator has been first identified in *Cercospora rosicola* in 1977 (Assante et al. 1977) and *Fusarium culmorum* in 1984 (Michniewicz et al. 1984). On the other hand it is well known that some hemibiotrophic fungi (*Monilia* sp., *Cytospora* sp., *Helminthosporium* sp., *Cercospora* sp., *Taphrina* sp., *Botrytis* sp., etc) show the ability to produce some phytohormones – cytokinins (Kern and Neaf-Roth 1975, Vizárová 1975, Arrora and Mandahar 1979, Strzelczyk and Kempert 1983, Mills and Van Staden 1978, Mazin et al. 1980). The present work deals with the production of the above – mentioned substances by wood destroying parasitic – saprophytical fungus *Schizophyllum commune* Fr.

MATERIAL AND METHODS

An isolate of the parasitic – saprophytical fungus *Schizophyllum commune* Fr. (Sch/5), obtained from Slovakian apricot cultures was used for our experimental

works.In comparison with many isolates of Slovak and foreign provenance the isolate showed the greatest activity in connection with the pathological injury of apricot vessel system (Janitor 1989). The fungus was cultivated in a liquid medium (Lilly et Barnet 1953) containing the following compounds: 15 g glucose, 0.5 g asparagine, 0.25 g $MgSO_4.7H_2O$, 0.75 g KH_2PO_4, 25 mg thiamin, and 5 mg biotin in 500 ml of distilled H_2O (pH of the medium before inoculation was 5.0). The cultures were inoculated with a solid inoculum (five pieces per 1 cm^2 in 0,4 l Erlenmeyer flasks) and kept in an incubator at 25 °C. After 28 days of cultivation the analysis was made (Fig. 1).

Fig. 1 Mycelium growth in Erlenmayer flasks after 28 days of cultivation.

Extraction and purification of phytohormones

a) Cytokinins

method of column thickening of cytokinins by help of ion – converter Dowex in H^+ cycle (50-80 mesh.) was applied. This method was also used for thickening of isotopes. The pH of the filtrate before separation of cytokinins was 5.2. The filtrate was further purified on the Dowex column (20 cm long. 3 cm in diameter). The resulting filtrate showed pH of 3-3.2. The lowered pH indicated separation of low basic substances. The absorbed compounds of cytokinins with a similar character were removed from the column by 200 ml of 0.1 M NH_4OH in 70 % ethanol. The

eluate obtained was evaporated in vacuum to dryness and dissolved in 10 ml of 96 % ethanol and reevaporated. Then 10 ml of alkaline water (pH 7,8) was added to the evaporate and extracted with n-butanol (2:1 v/v) for 24 hours. Subsequently n-butanol was evaporated to dryness. The residue was dissolved in 96% ethanol. The solution was filtered on DEAE cellulose column in vacuum (3x2 cm). The cytokinins obtained were analyzed by thin-layer chromatography (TLC), gas liquid chromatography (GLC), mass spectrometry (MS) and by biotest (Vizárová et Vozár 1984, Palni et al. 1985, Lethan 1968). As the stamdards following commercial preparations were used: F. A. Sigma, zeatin, zeatin ribosid and isopentyl-adenine (2iP).

b) Abscisic acid – type inhibitor (ABA)

The filtrate after column thickening on Dowex 50 (in H^+ cycle pH=3,0) was extracted 3 times with ethylacetate. The mixed ethylacetate extracts were evaporated in vacuum to dryness at 35 °C. The residue was dissolved in methanol and laid on thin layers of silica gel. The developing mixture was benzene-ethylacetate-acetic acid (100/20/5). For rechromathography a mixture of benzene-acetone-acetic acid (70/30/1 v/v) was used (Rypák and Kamenická 1986). The R_F position responsible for ABA was determined with a UV lamp at 254 nm. This position was further used for ABA detection by a biotest according to Nikolajeva and Daleckaja (1963). The method is based on inhibition of seed germination of mustard seeds and on biotest based on the determination of growth principe of wheat segment. Gas liquid chromatography (GLC) was performed by method of methylation modified by Vozár and Vizárová (1992) (unpublished). Methanol extract was evaporated to dryness dissolved in 2 ml of benzene and in 2 ml of the methylic agent (BF methanol) and methylated at the temperature of 92 °C for 5 minutes in the dark. A glass column (3 % OV-17 on WAW chromosorb 80-100 mesh.) was used to carry out GLC separation. Conditions were as follows: t = + 200 °C, detector t = + 230 °C, injector = + 250 °C. Shimadzu CR3A computer was used for automatic registration.

RESULTS AND DISCUSSION

The results obtained from the analysis of the culture medium showed the ability of this fungus to produce ABA and cytokinins into the culture medium. The methods of purificaton and identification of inhibitors applied in our experiments demostrated a considerable production of abscisic acid (ABA). TLC, GLC and biotest (Fig. 2, 3a, b) were used for its determination. Our results correspond to the literature dates with the following fungi as ABA producers: *Agrocybe praecox, Alternaria alternata, Coprinus domesticus, Cunninghamella echinulata,' Mucor spinosus, Polyporus brumalis, Rhizopus arrhizus, Rhizopus nigricans, Trametes*

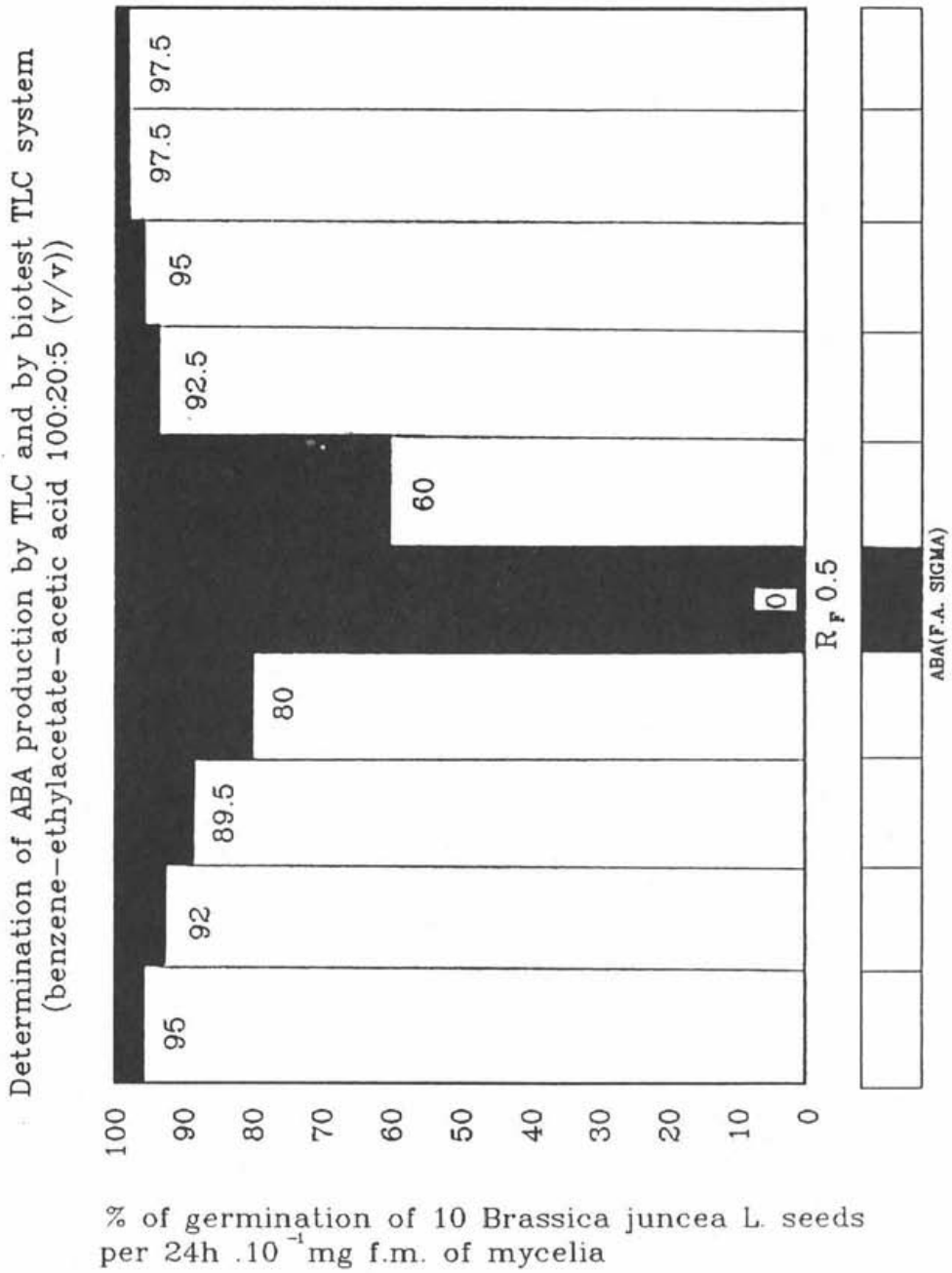

Determination of ABA production by TLC and by biotest TLC system
(benzene–ethylacetate–acetic acid 100:20:5 (v/v))
95
92
89.5
80
0
60
92.5
95
97.5
97.5
R_F 0.5
ABA(F.A. SIGMA)
100
90
80
70
60
50
40
30
20
10
0
% of germination of 10 Brassica juncea L. seeds
per 24h .10 $^{-1}$ mg f.m. of mycelia

Fig. 2

versicolor (Crocoll et al. 1991), as well as *Cercospora pini-densiflorae, Cercospora theate, Cercospora fici, Verticillium dahliae* (Okamoto et al., 1988), and fungus *Fusarium culmorum* (Michniewicz et al., 1984). All studies have been based on a work dealing with ABA production by *Cercospora rosicola* (Assante et al., 1977). Our studies suggest the ability of fungus *Schizophyllum commune* to produce an inhibitor of the ABA type in the culture medium together with the ability of their biosynthesis. These results are corresponding with the work of Dorffling and Peterson (1984), who identified ABA in fungi of the genus *Botrytis, Ceratocystis, Fusarium* and *Rhizoctonia.* Although only GLC and TLC methods and biotest could be used in our studies for identification of ABA, we suppose that our results contribute to the extension of the knowledge about the ability of the parasitic-saprophytical fungus *Schizophyllum commune* Fr. to biosynthetize and produce ABA also as well as other parasitic and saprophytic species mentioned above. Similar methods were used for identification of ABA in Ficus superba var. Japonice (Uede et al., 1991).

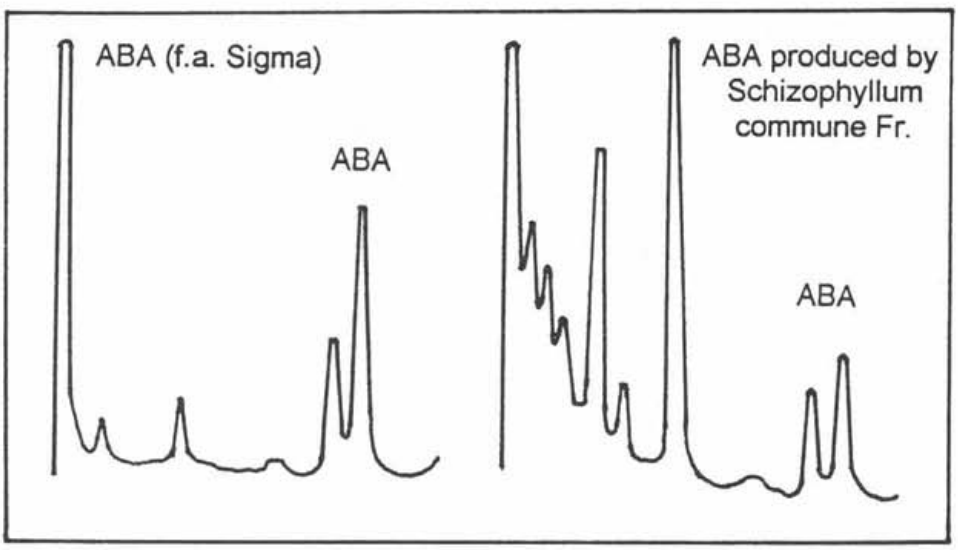


Fig. 3a **Fig. 3b**

To the contrary, we found the above – mentioned fungus being able to produce cytokinins in the culture medium. TLC (one – and two – dimensional), GLC, MS and biotest were used for determination of cytokinins. Isopentyl – adenine (2iP) was identified by the two chromatography methods (Fig. 4, 5a, 5b). Our results may complete the information in literature about the ability of hemibiotrophic fungi

to produce cytokinins (Mandahar et Angara 1987). The recent literature provides contradictory data on the individual cytokinin production by fungi. For example in Fusarium moniliforme var. subglutianus, a high level of isopentenyl-adenine and low levels of zeatin and zeatin riboside were identified in infected plant cells by using of HPLC (Van Staden et Nicholson 1989). To the contrary in healthy plant tissues high levels of zeatin and zeatin riboside were determined. In the fungus Cylindrocarpon destructans, zeatin and zeatin riboside were identified (Strzelczyk et Kemptner 1983). Our results showed 2iP production. Similar results concerning 2iP production in a culture medium were obtained in the bacterium Corynebacterium fasciens (Phillips et Torrey 1970). Our results might be in correlation with some literature data where in cells infected with parasitic fungi an amount of 2iP was identified by using HPLC and GLC methods (Nicholson et Van Staden 1988, Vizárová et al., 1988).

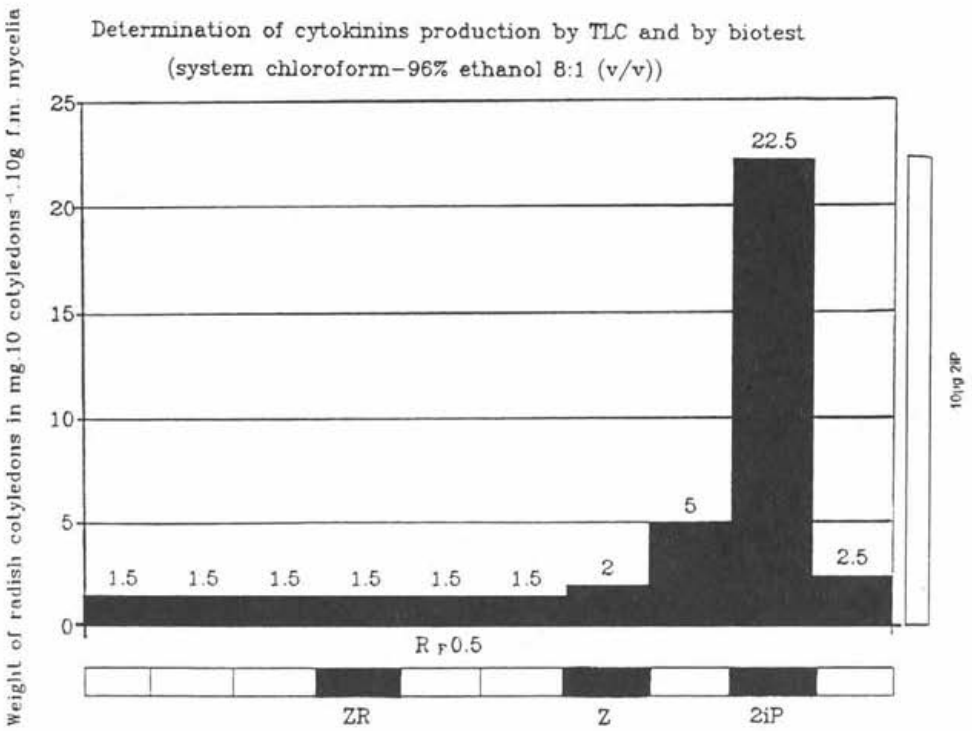
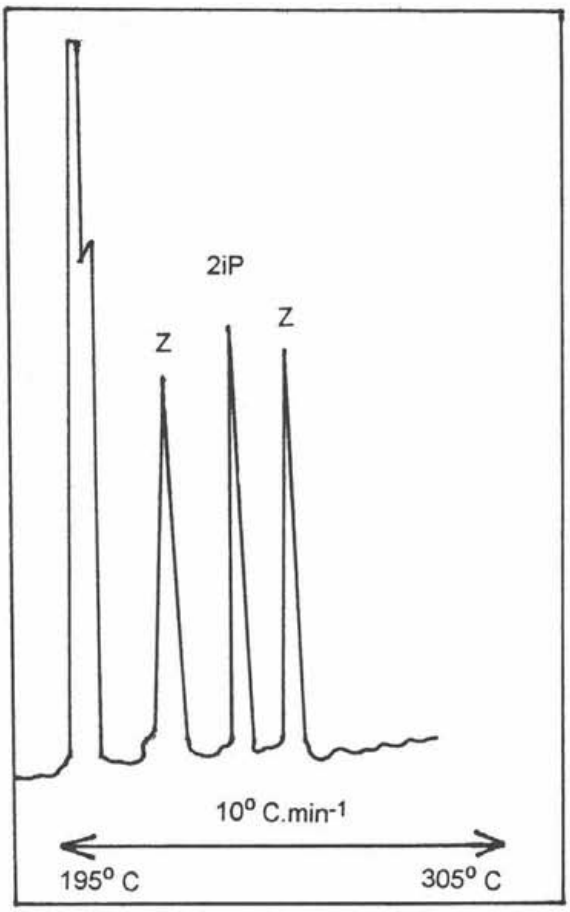


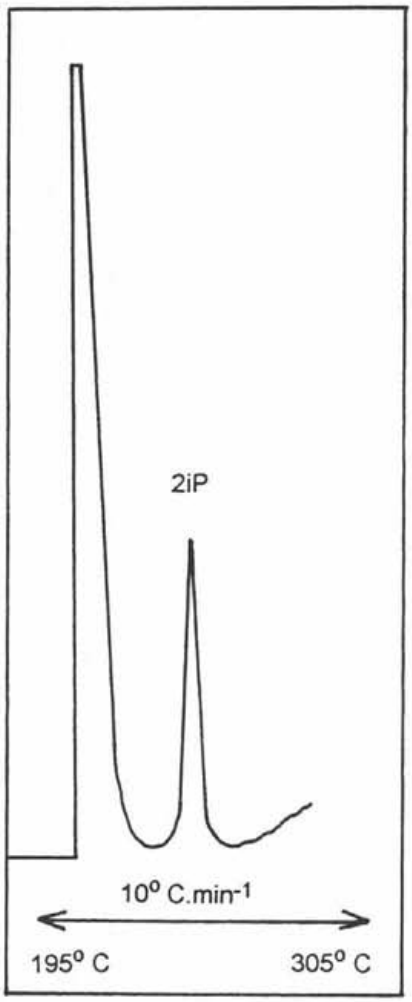
Fig. 4

According to the important function of ABA and cytokinins in plant metabolism and with the fact that their participation in plants depend on their concentration and a donor activation causing metabolic changes these compounds might be an



TMS derivates of cytokinins (f.a.SIGMA) determined by GLC as TMS derivatives.
Z = zeatin, 2iP = isopentyl adenine, ZR = zeatin ribaside
Column 2% OV 101 CHROMOSORBE WAW - MDCS 80 - 100 mesh.
Gas flow: N2 = 30 $cm^3.min^{-1}$, H2 = 30 $cm^3.min^{-1}$, air = 300 $cm^3.min^{-1}$
temperature from 195° C to 305° C.

Fig. 5a



Cytokinins produced by Schizophyllum commune Fr. determined by GLC as TMS derivatives. Column 2% OV 101 CHROMOSORBE WAW - MDCS 80 - 100 mesh. Gas flow: N2 = 30 $cm^3.min^{-1}$, H2 = 30 $cm^3.min^{-1}$, air = 300 $cm^3.min^{-1}$ temperature from 195° C to 305° C.

Fig. 5b

important product of fungal metabolism during their growth and development. We suppose that our primary data concerning the ability of the fungus Schizophyllum commune to produce these compounds into the culture medium may elucidate the mechanism of the pathogene-host plant interaction and also the processes connected with the changes of metabolism of the attacked woody-plants by the above mentioned fungus.

Although we had no possibility to apply mass spectroscopy we cannot eliminate the possibility to identificate also another inhibitor besides ABA e. g. jasmonic acid (Lopez et al., 1987).

A c k n o w l e d g e m e n t s

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The effect of disinfection substances on the propagules of heat-resistant fungi in vitro

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Jesenská Z., Volná F. and Piecková E. (1994): The effect of disinfection substances on the propagules of heat-resistant fungi in vitro.– Czech Mycol. 47: 303–309

Inoculum from the strains of thermoresistant strains of the fungi Botryotrichum (Bo.) piluliferum, Byssochlamys (B.) fulva, B. nivea, Neosartorya (N.) fischeri, Talaromyces (T.) avellaneus, T. bacillisporus, T. flavus and T. trachyspermus consisting from the mixture of mycelium, spores, asci, ascospores, kleistothecia or aleuriospores was exposed in vitro to the action of 7 various types of disinfection solutions, the exposure time being 15 and 60 minutes. Under the experimental conditions, the most effective solutions proved to be the 0.2% Persteril and 1% Septonex solutions, the least effective was 1% Chloramine B solution. Among the tested strains, strain Bo. piluliferum was the most sensitive; B. nivea, B. fulva and N. fischeri were the most resistant strains.

Key words: Heat-resistant fungi, disinfection substances

Jesenská Z., Volná F. a Piecková E. (199.): Účinok dezinfekčných látok na termorezistentné mikromycéty in vitro.– Czech Mycol. 47: 303–309

Inokulum z kmeňov termorezistentných mikromycét Botryotrichum (Bo.) piluliferum, Byssochlamys (B.) fulva, B. nivea, Neosartorya (N.) fischeri, Talaromyces (T.) avellaneus, T. bacillisporus, T. flavus a T. trachyspermus pozostávajúce zo zmesi mycélia, spór, askov, askospór, kleistotécií, resp. aleuriospór bolo exponované in vitro účinku 7 dezinfekčných látok počas 15 a 60 min. V experimentálnych podmienkach sa najúčinnejším javil 0,2 %-ný roztok Persterilu a 1 %-ný roztok Septonexu, najmenej účinný bol 1 %-ný roztok Chlóramínu B. Najcitlivejší bol kmeň Bo. piluliferum, najodolnejšie kmene B. nivea, B. fulva a N. fischeri.

Heat-resistant fungi cause serious problems in the canning industry at the production of fruit preserves. The germs of these fungi which survived the effect of higher temperatures begin to grow – after some time of latency – and the products become mouldy (Beuchat et Rice 1979, Beuchat et Toledo 1977, Hocking et Pitt 1984, King 1986, Scott et Bernard 1987, Splittostoesser 1978, Splittstoesser et al. 1970).

The not at all negligible source of fruit contamination and thus of production rooms and equipment in the canning industry are the propagules of the heat-resistant fungi in the soil. In Slovakia the heat-resistant germs of the *Neosartorya fischeri* strains occurred in the investigated samples of the soil in the amounts up to 149 colonies forming units (CFU) and the germs of the strains *Talaromyces flavus* up to 39 CFU/10 grams of the soil (Jesenská et Piecková 1991, Jesenská et al. 1991).

Colonies of other surviving species of fungi were also isolated from the soil after the effect of higher temperatures, e.g. *Botryotrichum piluliferum, Byssochlamys (B.) fulva, B. nivea, Talaromyces (T.) avellaneus, T. bacillisporus, T. trachyspermus,* and others (Jesenská et al. 1992).

The question of the effectiveness of the disinfection substances on the heat-resistant fungi arose into foreground. This question was not studied until now, nevertheless, the elucidation of this would enable to perform directed sanitation of the production facilities in the canning industry.

The aim of our work was to obtain certain basic information about the *in vitro* effect of selected disinfection substances on the germs of such an important fungi strains as are the fungi able to resist to the temperatures used in the fruit canning industry.

MATERIAL AND METHODS

Fungi strains

There are introduced the tested strains in the Table 1; the cultures of these strains were isolated from the soil samples which had been exposed to the temperature of 70 °C in the environment of Sabouraud agar with Bengal Rose (Jesenská et al. 1992). The strains were isolated, then inoculated on the oblique Sabouraud agar (IMUNA, Šarišské Michaľany, Slovakia) in the test tubes and incubated at 25 °C for the time necessary for the formation and maturation of the reproductive structures, namely ascospores. The duration of incubation was from 4 to 6 weeks. Formation and maturation of kleistothecia, resp. asci and ascospores was examined microscopically in the native preparations.

Inoculum

The grown-up strain was transported by inoculation needle from one test tube into Erlenmayer flask containing 10 ml of sterile saline and was homogenized by sterile balls during 1 hour in the laboratory quiver-machine. The number of the colony-forming units (CFU)/ ml during 72 hours of the incubation on the surface of Sabouraud agar was determined by the dilution method. The inoculum consisted – as verified microscopically in the native preparation – from the mixture of mycelium, spores, asci, ascospores and rest of kleistothecia (as far as the strains of *Neosartorya fischeri* or *Talaromyces* strains were present) and aleuriospores of *Botryotrichum piluliferum.*

Disinfection substances

Disinfection substances usual in the common practice in Slovakia were used in the experiment:

Table 1: The effect of disinfection substances on the propagules of heat-resistent micromycetes in vitro.

Micromycetes	BP		BF		BN		NF		TA		TB		TF		TT	
	Time of effect of disinfection substances in minutes															
	15	60	15	60	15	60	15	60	15	60	15	60	15	60	15	60
Disinfection substances	Number of isolated colonies after effect of disinfection substances															
Ajatin (1%)	S	S	180	100	110	40	30	20	20	S	S	S	S	S	S	S
Septonex (1%)	S	S	30	S	16	1	S	S	S	S	S	S	C	S	S	S
Chloramin (1%)	32	S	C	C	C	100	43	6	C	1	S	S	C	77	C	100
Jodonal (2%)	S	S	S	S	5	S	S	S	C	6	C	C	100	4	C	C
Desigalin (2%)	S	S	10	6	16	10	3	S	5	S	S	S	S	S	S	S
Chlorhexidin (2%)	S	S	25	40	10	2	20	20	80	15	2	S	S	S	S	S
Persteril (0,2%)	S	S	30	S	S	S	60	S	15	S	S	S	4	S	S	S
Inoculum number of CFU.10^7/3 ml	3		0,3		0,3		30		3		40		50		10	

Notes a: BP... Botryitrichum piluliferum, BN... Byssochlamys nivea, BF... Byssochlamys fulva, NF... Neosartorya fischeri, TA... Talaromyces avellaneus, TB... Talaromyces bacillisporus, TF... Talaromyces flavus, TT... Talaromyces trachyspermus

S... Inoculated media stayed sterile

C... Uncoutable number of colonies

AJATIN: 10% of active substance: dimethylbenzyldodecylamonium bromide. Manufacturer: SLOVAKOFARMA, Hlohovec (Slovakia).

SEPTONEX: 1-(etoxycarbonyl)-pentadecyl-trimetylamonium bromide. Manufacturer: SLOVAKOFARMA, Hlohovec.

(Note: The quarterly ammonium compounds used in Slovakia are comparable to foreign ones. Ajatin is a substance similar to Benzalkonium chloride, Septonex has antimicrobial spectrum corresponding with Cetrimide).

CHLORAMIN B: Trihydrate of sodium salt of benzensulfochloramine. The preparation contains from 25 to 28% of active chloramine. Manufacturer: LACHEMA, Brno (Czech Republic).

JODONAL B: Active component: 1,7% of active iodine. Manufacturer: LACHEMA, Brno.

(Note: Substance with a wide antimicrobial spectrum which is comparable with iodinephores used abroad. The activity of this substance is significantly reduced in the protein-containing environment).

CHLORHEXIDIN: Chlorhexidin-gluconate 20% water solution. Active substance: 1,6-di-(4-chlorfenyl-diguanido)-hexan. Manufacturer: POLFA, Lodž (Poland).

DESIGALIN: Chlorhexidin-gluconate 7,5%. Manufacturer: POLFA, Lodž (Poland). SEPTONEX 15 %; additives. Manufacturer: GALENA, Komárov (Czech Republic).

PERSTERIL: Content of the peroxyacetic acid 28-32%, hydrogen peroxide 8-12%, sulfuric acid 1%. Manufacturer: CHEMICAL INDUSTRIES, Sokolov (Czech Republic).

Concentrations of above mentioned disinfection preparations were applied in the experiment and are quoted in the Table 1. These concentrations were chosen with respect to the concentrations used in the practice.

Experimental devitalization of germs of the tested strains

0.1 ml of the inoculum suspension was pipetted by a sterile pipette into 0.9 ml of disinfection solution. After the exposition time (15 to 60 minutes), 0.1 ml of the sample was inoculated and spread on the surface of Sabouraud agar (IMUNA, Šarišské Michaľany, Slovakia) in a Petri dish. Dishes were incubated for 5 to 7 days at 25 °C and the number of the colonies on the agar surface was determined.

RESULTS

On the basis of our results (Table 1) which were obtained by the above mentioned method, we can conclude that the germs of the *Botryotrichum piluliferum* strains were the most sensitive to the tested solutions. All the propagules in the inoculum

were devitalized after the exposure to disinfection solutions with the exception when after 15 minutes exposure to 1% Chloramin B solution only 32 CFU survived from the original number of the germs. The germs of the strains *T. bacillisporus* and *T. trachyspermus* were sufficiently sensitive to 15 minutes exposure to disinfection solutions with one exception, when these germs proved to be resistant to 1% solution of Jodonal. Among the tested strains, the germs of the *B. fulva, B. nivea* and *N. fischeri* showed to be the most resistant to the tested disinfection solutions. The 1% solution of Chloramin B showed to be the least effective in our experiment: after 15 minutes exposure we had observed growth of germs of the strains *B. fulva, B. nivea, T. avellaneus, T. flavus* and *T. trachyspermus* in the dishes with Sabouraud agar; after 60 minutes exposure there was growth of *B. fulva* with countless number of the colonies of this strain. The 2 % solution of Chlorhexidin and 1 % solution of Ajatin also proved to be less effective. 1% solution of Septonex showed to be the most effective; the 15 minutes exposure had devitalized the germs in four and the 60 minutes exposure in seven out of the eight tested strains. Good effect was observed also in 0.2% solution of Persteril, which after 15 minutes exposure devitalized the germs in four and after 60 minutes in all of the tested strains.

DISCUSSION

Fungi, whose germs are able to survive certain grade of the thermal processing of fruits and fruit juices, cause considerable problems in the canning industry by the moulding of the ready products. *B. fulva, B. nivea, N. fischeri,* and *T. flavus* are the most important thermoresistant fungi. These fungi occur in the soil in various amounts and with variable share of individual species (Bettucci et Rodriguez 1989, Beuchat et Rice 1979, Fravel et Adams 1986, Gochenaur 1975, Jesenská et Piecková 1991, Jesenská et al. 1991, 1992, Moubasher et Abdel-Hafez 1979, Mouchacca et Joly 1976,. Okagbue 1989).

Other investigations of the ecology of heat-resistant fungi showed that – besides above mentioned species – there are germs of other fungi which are able to resist to the limited thermal processing (Jesenská et al.,1992, Lacey 1989, Lambert 1990, Pitt et Hocking 1985, Raper et Thom 1949, Samson 1989, Samson et Liuten 1975, Samson et Tansey 1975, Splittstoesser et al. 1989, van der Spuy et al. 1975). Thus, it is nearly certain, that these other species of fungi can take part – besides the known species – in the moulding of canned fruit.

The germs of these heat-resistant fungi get into the environment of food processing factories together with the soil rests which are stuck on fruit. For this, it is necessary to consider – among others – also the sanitation of the environment and equipment in the factories by the use of disinfection solutions.

In the literature we did not find information on the efficacy of disinfection solutions on the germs of heat-resistant fungi. For this reason, in our experiment 8

selected strains of fungi were investigated; these strains were isolated from the soil samples. We have examined the possibilities of devitalization of their propagules 7 various commonly used disinfection substances.

Certain differences in the sensitivity of individual strains and in the efficacy of individual disinfection solutions were shown. The strain *Botryotrichum piluliferum* – whose typical trait is to produce aleuriospores – showed to be the relatively most sensitive. The strains *B. nivea* and *B. fulva* – whose teleomorphic stadium is expressed by the formation of asci and ascospores – and *N. fischeri* strain with formation of kleistothecia, asci and ascospores showed to be the most resistant. Among the disinfection preparations, 1% Chloramin B and 2% Jodonal solutions were less effective, whereas the 0.2% Persteril and 1% Septonex solutions showed to be the most effective. The results were obtained *in vitro;* nevertheless, the effective sanitation of the environment under the operation conditions in food industry can be influenced by many other factors, i.e. not only from the aspect of the interaction between disinfection substances and thermoresistant fungi. In spite of this, the importance of performing disinfection is indisputable.

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CZECH MYCOL. 47 (4), 1994

Jiří Lazebníček – 60th birthday

Bronislav Hlůza

J. Lazebníček was born on June 9, 1934 in Olomouc (Central Moravia). He studied at the Faculty of Forestry, University of Agriculture, Brno, in the years 1952-1957.

Jiří has been particularly engaged in biology, botany, phytocoenology, dendrology, forest typology, mycology and phytopathology, phytochorology, protection of nature and landscape. All these interests were used later in all his jobs.

He started his career as a forest typologist in 1957 in the Training Forest Enterprise of the Faculty of Forestry, Křtiny. Later (1960-1961) he was employed in the Forest Management Institute, Olomouc, also in the field of forest typology.

His next post as a dendrologist was in the Silesian Museum, Opava, in the Nový Dvůr Regional Arboretum department. The object of his work was applied dendrology concerning the cultivation and recultivation of mine dumps in the OKR (Ostrava-Karviná Coal-Mine Region). In the Arboretum, howerer, also some other activities were carried out: phenological observations, dendrological research in North-Moravian parks, the establishment of a seed collection and a dendrological laboratory, etc.

During his employment in the Silesian Museum, Opava (1961-1963), Jiří collaborated with RNDr. J. Špaček and Ing. K. Kříž, both from Brno, and RNDr. J. Duda from Opava in installing a fungi exhibition in Opava in 1961. He was also in charge of the mycological club in the Silesian Museum.

J. Lazebníček finished this promising job in April, 1963 to take up a job in the Czechoslovak Academy of Sciences, Botanical Institute, Brno. With the Moravian mycologist RNDr. F. Šmarda he was engaged in mycological research in 40 permanent mycological plots in southern Moravia and in western Slovakia and occasionally also in many other regions of Czechoslovakia. He collaborated in the "Mapping of a Hundred Species of Macromycetes" project, a very important and interesting European action proclaimed at the occasion of the Second Congress

of European Mycologists in Czechoslovakia in 1960. In 1966, Jiří took part in the 4th Congress of European Mycologists in Poland.

During his employment in the Botanical Institute (1964-1967), J. Lazebníček mapped 1280 km^2 for the Geobotanical Map of Slovakia; eight years ago he mapped 280 km^2 of Moravia for the Geobotanical Map of the Czech Republic. During the mapping, he was also concerned with mycological research.

In 1968 Jiří started to work at the Institute for International Biological Programme, University of Agriculture, Brno. His working terrain was situated in the region of floodplain forests near Lednice na Moravě. He was in charge of herb layer primary production in an elm(ash) – oak forest as well as in phenological observations of 80 higher plants.

In 1968 Jiří joined the Military Forest Management Institute at Velká Bystřice near Olomouc as a research worker, where he has been employed till today. He is concerned with the typology of Czechoslovak forests, the evaluation of forest stands for seed collection, designing and establishing gene banks cf. forest tree species, designing seed plantations, projects of amenity planting for military and industrial enterprises as well as phytopathological and mycofloristic studies.

His mycological papers concern mainly chapters on fungi in several monographs on Slovak protected landscape and nature reserves (Malá Fatra, Veľká Fatra, Slovenský raj, Vihorlat, Východné Karpaty) and national parks (Pieniny, Vysoké a Belanské Tatry), publications on mycocoenology of thermophilous oak forests, beech forests, mountane and submountane Norway spruce forests, wetland forests, the autecology of several thermophilous (*Boletus aereus, B. fechtneri, Omphalotus olearius, Amanita caesarea, A. strobiliformis*) and other fungi (*Pholiota albocrenulata, Phallogaster saccatus, Boletus subappendiculatus, Ganoderma applanatum*), studies on wood-destroying fungi and studies on the geographical distribution of fungi in Czechoslovakia and in Central Europe. He described one new species: *Boletus subappendiculatus* (with A. Dermek and J. Veselský). He also produced a number of contributions for several newspapers popularizing botany and mycology, collaborated in several mycological exhibitions, was a member of editorial boards of some Czechoslovak natural science and mycological journals (Časopis Slezského muzea v Opavě, Mykologický zpravodaj Brno), and was in charge of editing some mycological and other publications (Zeměpisné rozšíření hub v Československu /Geographical distribution of fungi in Czechoslovakia/ together with K. Kříž, Poškozování smrkových porostů v oblasti Levočských vrchů /Damage of Norway spruce stands in the region of the Levočské vrchy Mts./, Hospodářská a genetická klasifikace a uznávání porostů pro sběr osiva /Economic and genetic classification and evaluation of forest stands for seed collection/).

We wish Jiří Lazebníček good health and great pleasure in his work as well as a very good time in his private life.

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1962

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CZECH MYCOL. 47 (4), 1994

Remembrance of Dr. Marta Semerdžieva

The whole mycological community has been shocked by the sad news that Dr. Marta Semerdžieva unexpectedly passed away on April 2, 1994. Details on her creative activity were summarized in Czech Mycology (Česká mykologie 42: 233-239) in 1988 when she celebrated her 60th anniversary.

We would like remember late Dr. Semerdžieva by the memorial address presented by Prof. H. P. M o l i t o r i s at 7th IUMS Mycology Division, Prague, July 1994, at the opening of colloquium MC-1 Taxonomy of Basidiomycetes, of which Dr. Semerdžieva was a convener.

"Ladies and gentlemen,

this Czech start of my address was the last that was tought to me as an introduction to a paper last September by our beloved friend and respected colleague Dr. Marta Semerdžieva whom we recently have lost by a tragic accident.

Please let me shortly review the life of this extraordinary personality.

Marta Malischová was born in 1928 in Prague and grew up near the wonderful town of Karlovy Vary. In 1951 she married the Bulgarian architect Stefan Semerdžiev and lived for several years in Bulgaria where she also started her mycological work as an assistant at the Bulgarian Academy of Sciences.

After her return to Czechoslovakia she studied from 1959 to 1964 mycology at the Charles University in Prague and did her Masters thesis on "Cultivation in vitro of some fungi of the family *Agaricaceae*" and her PhD thesis on the "Genetical basis of mucidin production". In 1972 she received her RNDr.

In 1973 she spent a year as Humboldt fellow at Bochum University, Germany, with Prof. Esser where I was doing my habilitation. This was the beginning of our long-lasting cooperation resulting also in sincere friendship between our families.

In the Institute of Microbiology of the Czechoslovac Academy of Sciences her scientific interests were focused on physiology, biochemical activities and metabolites of basidiomycetes resulting in almost 100 research papers and coauthorship

in a book on "Medicinal Fungi". Particularly important is her establishment of the world-wide wellknown "Culture Collection of Basidiomycetes (CCBAS)" and her participation in the work leading to the development of the fungal antibiotic mucidin from *Oudemansiella mucida* together with the late Dr. Musílek and others. All these activities were recognized by the nomination of "Meritious worker of the Czechoslovak Academy of Sciences".

Beeing member of a number of national and international Societies and committees, Dr. Semerdžieva even found time for a "scientific hobby", mushrooms on stamps, where she turned out the booklet "Mycophilately in Czechoslovakia", the first and only Czechoslovak catalogue of mushrooms on stamps.

First of all, however, we all found in her, besides all her professional abilities, a warmhearted woman which beyond all borders of language, countries and professions was always ready to cooperate and to help, often until physical exhaustion, but alwys with smile on her face.

We all have lost with Marta Semerdžieva an unforgettable colleague, moreover a dear friend. We will miss her.

Please let us now to observe a moment of silence for Marta Semerdžieva."

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Preparation of manuscripts. Manuscripts are to be submitted in English, German or French. The text of the manuscript should be written on one side of white paper (A4, 210 × 297 mm) with broad margins (maximum 30 lines per page). Each manuscript must include *an abstract* (in English) not exceeding 300 words and a maximum of five key words. The paper will be followed by an abstract in Czech (or Slovak). The journal is responsible, however, for the translation of abstracts into Czech for foreign authors. Please send *two copies* of the typescript. The authors are asked to submit diskettes with *the accepted manuscripts* prepared on IBM-compatible personal computers.The files should be in ASCII under DOS. Both HD and DD/3.5″ and 5.25″ diskettes are acceptable.

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Moravec J. (1984): Two new species of Coprobia and taxonomic remarks on the genera Cheilymenia and Coprobia (Discomycetes, Pezizales). – Čes. Mykol. 38: 146–155. (journal article)

Ryvarden L. (1978): The Polyporaceae of North Europe, Vol. 2. Inonotus-Tyromyces. – Oslo, 507 pp. (book)

Tommerup I. C., Kuek C., and Malajczuk N. (1987): Ectomycorrhizal inoculum production and utilization in Australia. – In: Sylvia D. M., Hung L. L., and Graham J. H. (eds.) Proceedings of the 7th North American Conference on Mycorrhizae, pp. 93–295, Gainesville.

The references *in text* should be Moravec (1984), or (Moravec 1984); or Kühner et Romagnesi (1974). When there are three or more authors use the form Tommerup et al. (1987).

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Proof corrections. Proofs of the paper will be sent to authors together with the original manuscript. If not returned within three weeks, the proof correction will be carried out by the editor. The principal author will receive 30 reprints free of charge.

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