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NOTULAE AD FLORAM AGARICINAM NEERLANDICAM — VIII
Pluteus Fr. in West-Europe

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Keys to, a checklist of and critical notes on the West-European species of the genus *Pluteus* are given. One new section, *Pluteus* section *Villosi* Schreurs & Vellinga is described and a new combination *Pluteus* subsection *Hispidodermini* Vellinga & Schreurs is made. One new species, *P. insidiosus* Vellinga & Schreurs and three new varieties, viz. *P. atricapillus* var. *albus* Vellinga, *P. hispidulus* var. *cephalocystis* Schreurs and *P. umbrosus* var. *albus* Vellinga are described; the new combinations *P. podospileus* f. *minutissimus* (Maire) Vellinga and *P. nanus* f. *griseopus* (P. D. Orton) Vellinga are made. Furthermore the critical species *P. ephebeus* and *P. plautus* are fully described.

The genus *Pluteus* is characterized macroscopically by free, pink-coloured lamellae, and absence of volva and annulus, microscopically by inverse hymenophoral trama, presence of cheilocystidia, and smooth, mostly broadly ellipsoid, non-amyloid, cyanophilous spores.

In this paper a key to the West-European species is given, followed by an annotated checklist with notes on taxonomy and nomenclature. This seems necessary because of the confusion existing in European literature on *Pluteus*. Some critical species are fully described here, whereas full descriptions of all species occurring in the Netherlands will appear in the second volume of the 'Flora agaricina neerlandica'.

The part of this paper concerning section *Villosi* and subsection *Hispidodermini* is based on an unpublished report of the second author who revised these groups for the Netherlands and adjacent regions.

The genus *Pluteus* is subdivided into three sections based on the structure of the pileipellis and characters of the pleurocystidia. Two main types of pileipellis occur: (i) a differentiated cutis and (ii) a derm consisting of more or less erect elements varying in shape from cylindrical to spheropedunculate. There are also two main types of pleurocystidia: (i) thick-walled narrowly fusiform cystidia with more or less prominent hooks at the apex and (ii) thin-walled variously shaped cystidia without hooks at the apex but sometimes with apical projections.

Section *Pluteus* is characterized by the combination of a differentiated cutis and thick-walled pleurocystidia, section *Villosi* by a differentiated cutis combined with thin-walled pleurocystidia, and section *Cellulodermа* by a derm-like pileipellis in combination with thin-walled cystidia.

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A more or less similar division of the genus has been proposed by Kühner (1926: 160 and 1980: 401); the genus was subdivided by him into two sections, corresponding with section *Pluteus* and section *Celluloderma* in our concept; the species with a differentiated cutis in combination with thin-walled pleurocystidia are not mentioned. Other authors (Fayod, 1889; Lange, 1917 and 1937; Imai, 1938; Singer, 1956) divided the genus in three sections in the following way: (i) a section with a differentiated cutis and thick-walled pleurocystidia, (ii) a section with a pileipellis consisting of elongated elements and with thin-walled pleurocystidia and (iii) a section with a pileipellis consisting of clavate to spheropedunculate elements and with thin-walled pleurocystidia.

In this classification the second section includes species with quite different types of pileipellis structure; only to the shape of the elements forming the pileipellis is given weight, whereas the arrangement of these elements is neglected. Furthermore, the position of the group of species with a pileipellis made up of a combination of clavate to spheropedunculate elements and elongate fusiform elements is not clear in this classification. Generally this group is considered to belong to the third section with short elements in the pileipellis, without further explanation. In the present paper section *Celluloderma* is divided into three subsections according to the shape of the elements forming the pileipellis.

As pointed out by several authors (Homola, 1975, Kühner, 1980) section *Pluteus* can be considered as the most primitive group of the genus, though the presence of thick-walled, hooked pleurocystidia is regarded as an evolved character by Homola (1975: 140); Kühner (1980: 404), on the other hand, considers it as a primitive character, as in his opinion these hooked pleurocystidia are directly derived from the basidia. This, however, is incorrect, as the cystidia are rooting in the hymenophoral trama and not like the basidia arising from the subhymenium.

We agree with Homola that the presence of a cutis-like pileipellis, clamp-connections in some species, dull colours and large basidiocarps make section *Pluteus* a primitive one. The most derived group within the genus is subsection *Eucellulodermini*, group with a hymenidermal pileipellis, made up of clavate to spheropedunculate elements, with small basidiocarps, and with bright colours in some species. It is not possible to derive the latter group directly from the primitive clamp-bearing *Plutei* with a differentiated cutis and thin-walled pleurocystidia, because other characters than those mentioned above, for instance the implantation of the cheilocystidia, seem to interfere with such a simple hypothesis.

PLUTEUS Fr.

Pluteus Fr., Fl. scan.: 338. 1835. — Type: *Agaricus pluteus* Batsch: Fr. (= *P. atricapillus*).

KEY TO SECTIONS AND SUBSECTIONS

1a. Pileipellis a trichoderm, a hymeniderm or a transition between a hymeniderm and an epithelium, consisting of cylindrical to narrowly fusiform or spheropedunculate to clavate elements or a mixture of those two types . . . . Section *Celluloderma*.2

b. Pileipellis a differentiated cutis consisting of repent to apically ascending hyphae 4

2a. Pileipellis consisting of two different types of elements, viz. cylindrical to narrowly fusiform elements and spheropedunculate to clavate elements . . . . Subsection *Mixtini*
b. Pileipellis consisting of only one type of elements, either cylindrical to narrowly fusiform or spheropedunculate to clavate 3
3a. Pileipellis consisting of cylindrical to fusiform elements . . . . . . Subsection *Hispidodermini*
b. Pileipellis consiting of spheropedunculate to clavate elements . . Subsection *Eucellulodermini*
4a. Pleurocystidia with thickened wall and apical hooks . . . . Section *Pluteus*
b. Pleurocystidia absent or if present thin-walled and without apical hooks . . . . . Section *Villosi*

Section **Pluteus**

Holotype: *Agaricus pluteus* Batsch: Fr. (= *Pluteus atricapillus*).

Pluteus section *Trichoderma* Fay. in Ann. Sci. nat., Bot. sér. VII, 9: 364. 1889. — Lectotype (design. nobis): *Pluteus atricapillus* (Batsch) Fay.

Pluteus [Aα] *Coronatae* J. Lange in Dansk bot. Ark. 2(7): 4. 1917 (illegitimate, no rank indicated).

Pluteus section *Fibrillosi* Imai in J. Fac. Agric. Hokkaido (imp.) Univ. 43: 159. 1938. — Lectotype (design. nobis): *Pluteus cervinus* (Schaeff.→) Kumm.

Characteristics.— Stipe solid; pleurocystidia very abundant, with more or less prominent hooks at apex and thick-walled at least at apex; cheilocystidia implanted on a layer of hyphae parallel to edge of lamellae; pileipellis a differentiated cutis; clamp-connections absent or present.

KEY TO THE SPECIES

1a. Edge of lamellae brown or grey-brown . . . . 2. *P. tricuspidatus*
b. Edge of lamellae white or concolorous with surface of lamellae 2
2a. Clamp-connections present, at least in pileipellis 3
b. Clamp-connections absent 5
3a. Pileus whitish, black fibrillose to squamulose . . . . 3. *P. pseudoroberti*
b. Pileus brown or grey 4
4a. Pileus grey, sometimes slightly brownish, with very dark greenish or bluish squamulose centre; on deciduous wood . . . . 1. *P. salicinus*
b. Pileus brown; on coniferous wood . . . . 4. *P. pouzarianus*
5a. Smell strongly raphanoid . . . . 5. *P. atricapillus*
b. Smell sweet or fungoid 6
6a. Pileus shiny white, with age at centre cream-coloured, with smooth surface; spores (6.5–)7.0–8.5(–9.0) × 4.5–5.5(–6.5) µm; cheilocystidia crowded; basidiocarps solitary . . . 6. *P. pellitus*
b. Pileus white to cream-coloured, brown fibrillose to squamulose, sometimes viscid; spores (5.0–) 5.5–8.0(–9.5) × 3.5–5.0(–5.5) µm; cheilocystidia scarce; basidiocarps mostly fasciculate 7. *P. petasatus*

1. **Pluteus salicinus** (Pers.: Fr.) Kumm.

Agaricus salicinus Pers., Ic. Descr. Fung.: 9. 1798. — *Agaricus salicinus* Pers.: Fr., Syst. mycol. 1: 202. 1821. — *Pluteus salicinus* (Pers.: Fr.) Kumm., Führ. Pilzk: 99. 1871. — *Rhodosporus salicinus* (Pers.: Fr.) J. Schroet. in Cohn, Krypt.-Fl. Schlesien 3(1): 620. 1889.

Misapplied names. — *Pluteus salignus* sensu Fay. in Ann. Sci. nat., Bot. sér. VII, 9: 364. 1889. — *Pluteus petasatus* sensu Rick., Blätterpilze: 277. 1913.

Selected descriptions & illustrations. — Konr. & M., Ic. sel. Fung. 1: pl. 21 fig. 1. 1925; J. Lange, Fl. agar. dan. 2: Pl. 69C. 1937; R. Phillips, Paddest. Schimm.: 119. 1981.

2. **Pluteus tricuspidatus** Velen.

Pluteus tricuspidatus Velen., Novit., mycol.: 143. 1939.

Pluteus cervinus var. *nigroflocosus* R. Schulz in Verh. bot. Ver. Brandenb. 54: 102. 1913. — *Pluteus nigrofloccosus* (R. Schulz) J. Favre in Mat. Fl. Cryptog. Suisse 10: 104. 1948.

Pluteus cervinus var. *atromarginatus* Sing. in Z. Pilzk. 4: 40. 1925. — *Pluteus cervinus* subsp. *atromarginatus* (Sing.) Konr. in Bull. trimest. Soc. mycol. Fr. 43: 148. 1927. — *Pluteus atromarginatus* (Sing.) Kühn. & Romagn., Fl. anal. Champ. sup.: 420. 1953 (not validly published, basionym not mentioned).

Misapplied names. — *Pluteus umbrosus* sensu Quél. in Mém. Soc. Emul. Montbéliard, sér. II, 5: 437. 1876 (Champ. Jura Vosges Suppl. 3); sensu Bres., Fungi trident. 2: 11. 1892; sensu Farl. & Burt., Ic. farlowianae: Pl. 44. 1929. — *Pluteus cervinus* var. *umbrosus sensu* J. Lange in Dansk bot. Ark. 9(6): 79. 1938.

Selected illustrations. — Konr. & M., Ic. sel. Fung. 1: Pl. 19. 1925 (as *P. cervinus* subsp. *atromarginatus*); Farl. & Burt., Ic. farlowianae: Pl. 44. 1929 (as *P. umbrosus*).

This species is generally known as *Pluteus atromarginatus* (Sing.) Kühner, but Velenovský (1939: 143) was the first to recognize this taxon on specific level.

3. **Pluteus pseudoroberti** Mos. & Stangl *emend.* Vellinga — Fig. 1

Pluteus pseudoroberti Mos. & Stangl in Z. Pilzk. 29: 39. 1963.

Type-study of *Pluteus pseudoroberti*.

Herbarium Meinh. Moser 51/100, German Federal Republic, Baden-Württemberg, Aalen, Spitalwald, 30 Aug. 1951, M. Moser, (M).

Spores (5.8–)6.4–7.0(–7.1) × (3.7–)4.1–4.3(–4.6) µm, Q = 1.5–1.65(–1.7), $\bar{Q}$ = 1.6, oblong-ellipsoid. Pleurocystidia very abundant, (65–)70–80(–85) × (11–)13–17 µm, narrowly fusiform with 3–4 not very prominent hooks at apex, with wall in the upper half up to 3 µm thick. Cheilocystidia crowded, (27–)33–50(–75) × 10–18 µm, narrowly clavate to clavate, thin-walled and colourless. Pileipellis a differentiated cutis of colourless 3–6 µm wide hyphae with 1–3 fusiform-inflated terminal elements, 60–160 × 14–25 µm, with brown intracellular pigment; clamp-connections abundant.

The characters of this species, as mentioned above, viz. the shape of the cheilocystidia and the presence of clamp-connections in the pileipellis, are not mentioned by Moser & Stangl (1963: 38). The other collection simultaneously described by them belongs to *Pluteus petasatus* on account of the following characters: cheilocystidia scarce, narrowly clavate and thin-walled; pileipellis a cutis of cylindrical pale brown hyphae; clamp-connections absent.

Pluteus pseudoroberti, in this new concept, is up till now only known from the type-collection. Wichanský (1963: 73) has described a species with marginal and facial cysti-

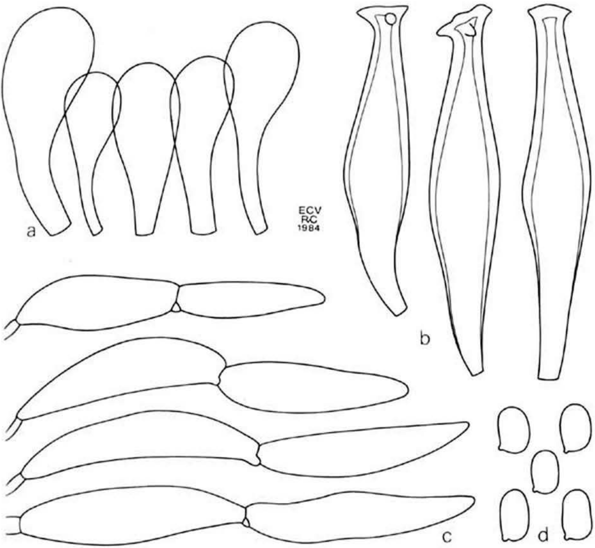

Fig. 1. *Pluteus pseudoroberti*, type. — a. Cheilocystidia (× 1000). — b. Pleurocystidia (× 1000). — c. Elements of pileipellis (× 500). — d. Spores (× 1500).

dia with apical hooks, viz. *P. pseudocervinus*. This would be the only species in Europe with this character; in some American species, e.g. *P. spinulosus* Murrill and *P. amphicystis* Sing., pleuro- and cheilocystidia are also isomorph (Pegler, 1983: 310, 313).

Pluteus pseudoroberti differs from the other clamp-bearing species in this section, viz. *P. atromarginatus, P. salicinus* and *P. pouzarianus*, in the size of the spores, the structure of the pileipellis and the shape of the elements of the pileipellis, and in the not coloured cheilocystidia.

4. **Pluteus pouzarianus** Sing.

Pluteus pouzarianus Sing. in Sydowia 36: 283. ('1983') 1984.
Selected description. — Sing. in Sydowia 36: 283–286. ('1983') 1984.

This species has been known under the provisional name *Pluteus emarginatus* Pouz. (Singer, 1975: 437). It resembles *P. atricapillus* in habit and is characterized by the presence of clamp-connections in pileipellis, pileitrama, stipitepellis and stipitetrama; furthermore, the pileipellis consists of two layers, an outer layer of non-coloured hyphae and an underlying layer of hyphae with brown intracellular pigment. The smell of *P. pouzarianus* is in general not like that of *P. atricapillus* strongly raphanoid, but sweet, fungoid or very faintly reminding of raw patatoes. *Pluteus pouzarianus* has a preference for coniferous wood (Picea and Abies) in mountainous and colline regions in Europe, but has also been found in the Netherlands, growing on a stump of Pinus.

5. **Pluteus atricapillus** (Batsch) Fay.

Agaricus atricapillus Batsch, Elench. Fung. Contin. 1: 77. 1786. — *Pluteus atricapillus* (Batsch) Fay. in Ann. Sci. nat., Bot. sér.VII, 9: 364. 1889.

Agaricus pluteus Batsch, Elench. Fung.: 79. 1786. — *Agaricus pluteus* Batsch: Fr., Syst. mycol. 1: 199. 1821.

Agaricus lividus Bull., Herb. France: pl. 382. 1788. — *Entoloma lividum* (Bull.) Quél. in Mém. Soc. Emul. Montbéliard. sér. II, 5 (Champ. Jura Vosges 1): 116. 1872.

Agaricus latus Bolt., Hist. Fung.: 2. 1788.

Agaricus curtisii Berk. in Hook. J. Bot. 1: 98. 1849. — *Pluteus curtisii* (Berk.) Sacc., Syll. Fung. 5: 675. 1887.

Agaricus cervinus Schaeff., Fung. Bavariae 4: 6. 1774; non *Agaricus cervinus* Hoffm.: Fr., Syst. mycol. 1: 82. 1821 (= *Clitocybe* spec.) — *Pluteus cervinus* (Schaeff.→) Kumm., Führ. Pilzk.: 99. 1871. — *Rhodosporus cervinus* (Schaeff.→ Kumm.) J. Schroet. in Cohn, Krypt.-Fl. Schlesien: 620. 1889.

Excluded. — *Pluteus curtisii* sensu Sing. in Trans. Br. mycol. Soc. 39: 160. 1956; sensu Mos. in Gams, Kl. Kryptog. Fl 2b/2, 5. Aufl.: 214. 1983 (= *P. petasatus*). — *Entoloma lividum* sensu Quél. in Mém. Soc. Emul. Montbéliard. sér. II, 5 (Champ. Jura Vosges 1): 116. 1872 (= *E. eulividum*).

Selected descriptions & illustrations. — J. Lange, Fl. agar. dan. 2: pl. 69A. 1937 (as *P. cervinus*); Sing. & Clémençon in Nova Hedwigia 23: 332–336. 1972; R. Phillips Paddest. Schimm.: 119. 1981.

KEY TO THE VARIETIES

1 a. Pileus brown, pale brown to dark brown. . . . . *P. atricapillus* var. *atricapillus*
b. Pileus white . . . . *P. atricapillus* var. *albus*

Pluteus atricapillus var. **albus** Vellinga, *var. nov.*

Differt a typo in coloribus albis pilei stipitisque. — Holotypus: C. Bas s.n., 30.V.1983, 'Leiden, prov. Zuid-Holland, Netherlands' (L).

Differing from the typical variety of *Pluteus atricapillus* in the completely white, only with age slightly browning pileus and stipe. Not all pigments, however, are absent, as the lamellae are pink-coloured.

Habitat. — In fascicle of some basidiocarps on trunk of *Populus*.

Collections examined. — NETHERLANDS, prov. Zuid-Holland, Leiden, 30 May 1983, C. Bas (coll. *E. C. Vellinga 534*; L) (holotype); ibidem, 4 Oct. 1983, C. Bas (coll. *E. C. Vellinga 557*; L).

6. **Pluteus pellitus** (Pers.: Fr.) Kumm.

Agaricus pellitus Pers., Syn. meth. Fung.: 366. 1801. — *Agaricus pellitus* Pers.: Fr., Syst. mycol. 1: 198. 1821. — *Pluteus pellitus* (Pers.: Fr.) Kumm., Führ. Pilzk.: 98. 1871. — *Rhodosporus pellitus* (Pers.: Fr.) J. Schroet. in Cohn., Krypt.-Fl. Schlesien 3(1): 619. 1889.

Excluded — *Pluteus pellitus* sensu Rick., Blätterpilze: 277. 1913 (= *P. petasatus*). — *Pluteus pellitus* sensu Kühn. & Romagn., Fl. anal. Champ. sup.: 420. 1953; sensu Mos. in Gams, Kl. Kryptog. fl. 2b/2, 5. Aufl.: 213. 1983 (= *Pluteus* spec.).

Selected descriptions & illustrations. — Konr. & M., Ic. sel. Fung. 1: pl. 21. 1925; Bres., Iconogr. mycol. 11: pl. 536. 1929; J. Lange, Fl. agar. dan. 2: pl. 70A. 1937.

Pluteus pellitus is considered here as a species with a shiny white pileus and lacking clamp-connections in pileipellis, pileitrama, and in other tissues. On the other hand Kühner & Romagnesi (1953: 420), followed by Moser (1983: 213), reported the presence of clamp-connections in pileipellis and stipe. Their descriptions differ also in other respects, e.g. spore-size, from *P. pellitus* in our concept. Although this latter character suggests *P. petasatus, P. pellitus* sensu Kühner & Romagnesi belongs to another, as yet unknown species, with numerous clamp-connections, and is, on account of the small spores, not a white variety of *P. salicinus* or *P. tricuspidatus*.

7. **Pluteus petasatus** (Fr.) Gillet

Agaricus petasatus Fr., Epicr.: 142. 1838. — *Pluteus petasatus* (Fr.) Gillet, Hyménomycètes: 395. 1876. — *Pluteus cervinus* var. *petasatus* (Fr.) Mass., Br. Fung. Fl. 2: 285. 1893.

Agaricus patricius S. Schulz. in Kalchbr., Ic. sel. Hymenomyc. Hungariae: 20. 1874. — *Pluteus cervinus* var. *patricius* (S. Schulz.) Mass., Br. Fung. Fl. 2: 284. 1893. — *Pluteus patricius* (S. Schulz.) Boud., Ic. mycol. 1: Pl. 87. 1904.

Pluteus straminiphilus Wichanský in Mykol. Sb., Praha 45: 119. 1968.

Misapplied names. — *Pluteus curtisii* sensu Sing. in Trans. Br. mycol. Soc. 39: 160. 1956; sensu Mos., in Gams, Kl. Krypt. Fl. 2b/2,5. Aufl.: 214. 1983. — *Pluteus pellitus* sensu Rick., Blätterpilze: 277. 1913.

Excluded. — *Pluteus petasatus* sensus Rick., Blätterpilze: 277. 1913 (= *P. salicinus*).

Selected illustrations. — J. Lange, Fl. agar. dan. 2: pl. 70C. 1937; Romagn., Nouv. Atl. Champ. 3: pl. 187. 1961 (as *P. patricius*).

Pluteus petasatus is generally considered as a species with a smooth, slightly viscid surface of pileus with some brown fibrils, and *P. patricius* as a species with a squamose surface of pileus. But it turned out that these two can not be separated from each other, as all kinds of transitions have been observed. Differences in spore-size, as suggested by Moser (1983: 214) are not correlated with other characters.

Pluteus section **Villosi** Schreurs & Vellinga, *sect. nov.*

Holotype: *Pluteus ephebeus* (Fr.: Fr.) Gillet.

Stipes solidus; pleurocystidia sine cornibus ad apicem, tenuiparietalia, aut absentia; cheilocystidia radiacantia in trama hymenophorali; pileipellis cutis differentiata fascicularum hypharum, 2–6 (aut plurium) elementorum; fibulae absentes in speciebus pluribus.

Characteristics. — Stipe solid; pleurocystidia present and then without hooks at apex and thin-walled, or absent; cheilocystidia rooting in hymenophoral trama; pileipellis a differentiated cutis made up of bundles of hyphae of 2 to 6 elements, with terminal elements inflated; clamp-connections in most species absent.

KEY TO THE SPECIES

1a. Pleurocystidia present and moderately abundant to abundant; basidiocarps big (pileus > 30 mm; stipe > 45 mm) . . . . 8. *P. ephebeus*

b. Pleurocystidia absent or very rare; basidiocarps small (pileus < 25 mm; stipe < 40 mm) 9. *P. hispidulus*

8. **Pluteus ephebeus** (Fr.: Fr.) Gillet — Figs. 2, 3

Agaricus ephebeus Fr., Observ. mycol. 2: 87. 1818 (nom. nov. for *A. villosus* Bull.). — *Agaricus ephebeus* Fr.: Fr., Syst. mycol. 1: 238. 1821. — *Pluteus ephebeus* (Fr.: Fr.) Gillet, Hyménomycètes: 392. 1876.

Agaricus villosus Bull., Hist. Champ. France: pl. 214. 1785; non *Agaricus villosus* Fr.: Fr., Elench. Fung. 1: 28. 1828 (= *Pholiota* spec.); nec *Agaricus villosus* Scop., Fl. carn.: 470. 1772; nec *Agaricus villosus* Bolt., Hist. Fung. Halifax 1: 42 1788 (= *Pholiota* spec.). — *Pluteus villosus* (Bull.→) Quél., Fl. mycol. France: 187. 1888.

Pluteus murinus Bres. in Annls mycol. 3: 160. 1905.

Pluteus pearsonii P. D. Orton in Trans. Br. mycol. Soc. 43: 361. 1960.

Misapplied names. — *Pluteus drepanophyllus* sensu Sing., Agaricales mod. Taxon.: 439. 1975. — *Pluteus plautus* sensu A. Pears. in Trans. Br. mycol. Soc. 35: 108. 1952.

Selected descriptions & illustrations. — Decary in Bull. trimest. Soc. mycol Fr. 43: pl. 19. 1927 (as *P. villosus*); Romagn. in Kühn. & Romagn. in Bull. trimest. Soc. mycol. Fr. 72: 212. 1956 (as *P. villosus*).

Pileus (30–)35–70(–90) mm, when young hemispherical with umbo, expanding to more or less applanate with broad low umbo, brown, grey-brown to brownish grey (Munsell 5 YR 2.5/2–4/2, 7.5 YR 3/4–5/4, 10 YR 2/2–5/4), in centre tomentose to delicately squamulose towards margin more fibrillose; underlying white context showing between those fibrils as regular or irregular streaks. Lamellae (L = 55–110 / l = (0–)1–3(–4)) moderately crowded, free, hardly to broadly ventricose, up to 7 mm broad, when young whitish or pale greyish, later via pink, dark pink to brownish pink, with concolorous or white flocculose, fimbriate or even edge. Stipe (22–)45–90(–95) × (2.5–)4–8(–11) mm, cylindrical to slightly broadening downwards, with more or less abrupt bulbous base up to 1.5 × wider than middle part of stipe, solid, rarely stuffed or fistulose, shiny, silvery white to grey and white striate, fibrillose striate, very rarely glabrous; mostly innate dark fibrillosity decreasing in intensity from base upwards. Context in pileus moderately to very thick, white, in stipe shiny white to greyish in base. Smell indistinct. Taste not unpleasant at first, later strongly unpleasant in throat, astringent. Spore print reddish or rust brown (Munsell 5 YR 4/4–5/6).

Spores (5.5–)6.0–8.0(8.5) × (4.5–)5.0–6.0(–7.0) μm, Q = (1.05–)1.1–1.5(–1.55), $\bar{Q}$ = 1.2–1.35, broadly ellipsoid to ellipsoid, some subglobose. Basidia (20–)22–

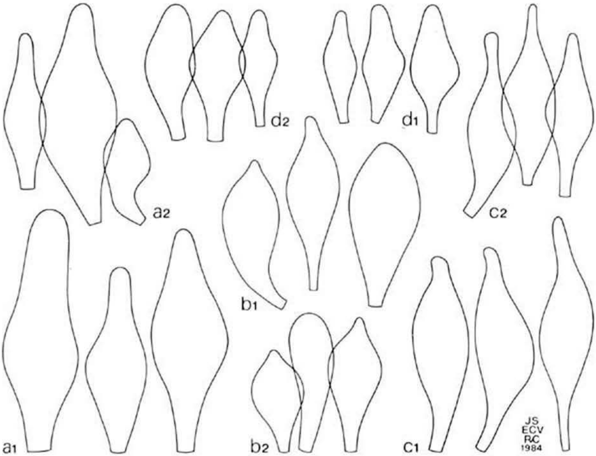

Fig. 2. *Pluteus ephebeus*. 1. Pleurocystidia (× 500) and 2. cheilocystidia (× 500). — a. *J. Schreurs 658*. — b. *Th. W. Kuyper 1793*. — c. *E. Kits van Waveren, 2 Sept. 1967*. — d. *J. Schreurs 527*.

38(–42) × 6.5–9.5(–10.5) μm, mostly 4-spored. Pleurocystidia scarce to abundant, (25–)40–90(–120) × (11–)14–32(–45) μm, varying in shape and size within one collection, and particularly between collections, broadly utriform, fusiform to broadly conical, sometimes lageniform, mucronate to subcapitate, thin-walled and colourless. Cheilocystidia crowded, (15–)25–75(–92) × (7–)9–35(–40) μm, with a wide range of variation in size and shape, clavate to broadly utriform-lageniform, mucronate or subcapitate or with up to 15 μm long projection, thin-walled or with thickened wall at apex, colourless or with pale brown pigment. Pileipellis a differentiated cutis of radial adnate bundles of hyphae, with particularly at centre ascending tips, consisting of (1–)2–3(–5 or more) elements, 7–15(–25) μm wide; terminal elements cylindrical to fusiform with obtuse apex, (35–)50–240(–450) × (7–)9–27(–65) μm, with brown intracellular pigment; in some collections all elements very broad and irregularly shaped. Stipitepellis a cutis of 5–15 μm wide, colourless hyphae, usually (but not always) on lower part of stipe with adnate to ascending, branched hyphae with brown intracellular pigment and cylindrical to fusiform terminal elements, 30–180 × 6–20(–28) μm; these brown hyphae decreasing in number and density towards apex; at base of stipe with external pigment.

Habitat & distribution. — Solitary to subgregarious, rarely in fairy rings, terrestrial, sometimes against or rarely on wood of deciduous trees, in deciduous woods throughout Europe with preference for clayey soils. June to October.

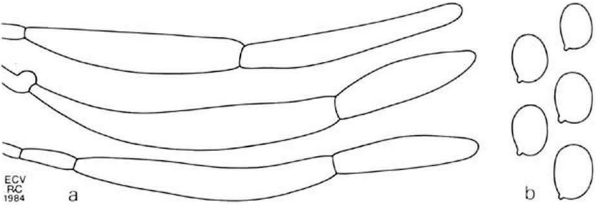

Fig. 3. *Pluteus ephebeus.* — Elements of pileipellis (× 500) and spores (× 1500) (type of *Pluteus murinus*).

Collections examined. — NETHERLANDS, prov. Gelderland: Neerijnen, estate 'Neerijnen', 21 Aug. 1979, *J. Schreurs 311* and *312* (L); ibidem, 14 Oct. 1980, *J. Schreurs 533* (L); ibidem, 29 Sept. 1981, *J. Schreurs 650* (L); prov. Utrecht: Amerongen, castle Amerongen, 16 Oct. 1960, *E. Kits van Waveren* (L); prov. Noord-Holland: Vogelenzang, Vogelenzangse Bos, 9 Oct. 1983, *C. Bas* (coll. E. C. Vellinga 565) (L); Amsterdam, Amsterdamse Bos, 11 July 1968, 21 Aug. 1971 and 4 Aug. 1973, *E. Kits van Waveren* (L); prov. Zuid-Holland: Voorschoten, estate 'Ter Horst', 21 Sept. 1980, *C. Bas 7690* (L); ibidem, 4 June 1981, *C. Bas 7773* (L); Leiden, Hortus Botanicus, 16 Sept. 1976, *C. Bas 7037* (L); prov. Zeeland: Axel, Axelse Bos, 8 June 1981, *A. de Meijer 303* (L); ibidem, 30 June 1981, *A. de Meijer 303b* (L); de Braakman, Noorderbossen, 26 Aug. 1981, *A. de Meijer & J. Schreurs 607* (L); ibidem, 19 Sept. 1980, *A. de Meijer 80 N 147* (L); IJsselmeerpolders: O. Flevoland, 't Spijk, 18 June 1980, *F. Tjallingii & G. J. M. G. Tjallingii-Beukers*; ibidem, 11 Sept. 1980, *J. Schreurs 488* (L); O. Flevoland, Lelystad, Langeveld, 16 June 1981, *C. Bas 7779* (L); O. Flevoland, Roggebotsbos, *F. Tajallingii & G. J. M. G. Tjallingii-Beukers*, 11 July 1975; O. Flevoland, Harderbos, 13 Sept. 1976, *F. Tjallingii & G. J. M. G. Tjallingii-Beukers*; O. Flevoland, Bremerbergbos, 8 Sept. 1975, *F. Tjallingii & G. J. M. G. Tjallingii-Beukers*; ibidem, 5 Sept. 1981, *F. Tjallingii & G. J. M. G. Tjallingii-Beukers*; ibidem, 4 Oct. 1981, *J. Schreurs 658* (L). — GERMAN FEDERAL REPUBLIC, Nordrhein-Westfalen, Detmold, Externsteine, 7 Oct. 1976, *J. Schreurs 44* (L). — FRANCE, dept. Ain, Nantua, 27 Aug. 1957, *H. S. C. Huijsman* (L). — ITALY, Alto Adige, Trento, Gocciadoro, 1 Oct. 1903, *G. Bresadola* (S) (holotype of *P. murinus*). — HUNGARY, Budapest, Csúcs-Hegy, 17 Sept. 1981, *Th. W. Kuyper 1793* (L). — GREAT BRITAIN, Sussex, Chichester, Plindon Park, 21 Sept. *1967, E. Kits van Waveren* (L); Surrey, Mickleham, Norbury Park, 8 Oct. 1949, *A. A. Pearson* (K) (holotype of *P. pearsonii*).

This species is in European literature generally known as *Pluteus villosus* (Bull.) Quél. However, Fries (1818: 87) introduced and subsequently sanctioned (1821: 238) a new name, *Agaricus ephebeus*, for the agaric described by Bulliard (1785: pl. 214) as *A. villosus* Bull., a later homonym of Scopoli's *A. villosus* (1772: 420). *Agaricus villosus* Bull. is also illegitimate, because of the existence of *A. villosus* Fr.: Fr. (= a species of *Pholiota*). The plate of Bulliard is automatically the type-plate of the species *P. ephebeus*.

Although macroscopically distinguishable, *P. murinus* Bres. and *P. pearsonii* P. D. Orton are considered here synonyms of *P. ephebeus*. *Pluteus murinus* is characterized as a relatively short-stiped fungus with a brown pileus and a non-striate stipe; *P. ephebeus* as a relatively long-stiped and slender fungus with a brown pileus and a regularly splitting pileipellis and *P. pearsonii* as a large fungus with a greyish pileus and an irregularly splitting pileipellis. However, because of the great variation in microscopical features, which is not correlated with the variation in macroscopical characters, and because of the existence of intermediates, these taxa do not deserve formal rank. The very characteristic taste of *P. ephebeus* is present in all three variants mentioned.

Singer (1956: 226) studied one of Bresadola's collections of *Pluteus murinus* Bres. in NY. We have studied the collection present in S, collected by G. Bresadola, 1 Oct. 1903, Gocciadoro, 'nel prato ad terram'. The following observations on this collections were made:

Spores (6.8–)6.9–7.6(–8.0) × (4.6–)4.9–5.6(–6.2) µm, Q = (1.2–)1.3–1.5, $\bar{Q}$ = 1.4. Pleurocystidia scattered, 35–72 × 17–35 µm, narrowly utriform to broadly lageniform with 4–7 µm wide apex or rarely narrowly clavate, colourless, thin-walled. Cheilocystidia not crowded, 30–63 × 14–28 µm, clavate, narrowly utriform to broadly lageniform with 5–8 µm wide apex, colourless, thin-walled. Pileipellis a differentiated cutis of repent hyphae; terminal elements cylindrical to slenderly fusiform, 10–20 µm wide, with brown intracellular pigment. Stipitepellis a cutis of colourless 4–9 µm wide cylindrical hyphae.

This collection agrees with Bresadola's description and represents the holotype of the species. Singer (1956: 226) mentioned a pileipellis consisting of two types of elements: spherical and fusiform elements. Therefore the collection studied by him and incorrectly designated as lectotype, is considered here as not conspecific because of serious disagreements with the original description (Bresadola, 1905: 160).

9. **Pluteus hispidulus** (Fr.: Fr.) Gillet — Fig. 4

Agacricus hispidulus Fr., Observ. mycol. 2: 97. 1818. — *Agaricus hispidulus* Fr.: Fr., Syt. mycol. 1: 201. 1821. — *Pluteus hispidulus* (Fr.: Fr.) Gillet, Hyménomycètes: 391. 1876.

KEY TO THE VARIETIES

1a. Cheilocystidia narrowly clavate to clavate, a very few subcapitate . *P. hispidulus* var. *hispidulus*
b. Cheilocystidia narrowly utriform to narrowly clavate, subcapitate to distinctly capitate
P. hispidulus var. *cephalocystis*

Pluteus hispidulus var. **hispidulus**

Pluteus exiguus var. *aberrans* Romagn. in Bull. trimest. Soc. mycol. Fr. 53: 120. 1937.

Pluteus hispidulus f. *typicus* Kühner in Kühn. & Romagn. in Bull. trimest. Soc. mycol. Fr. 72: 183. 1956 (inadmissible epitheton).

Pluteus hispidulus f. *terrestris* Kühner in Kühn. & Romagn. in Bull. trimest. Soc. mycol. Fr. 72: 182. 1956.

Misapplied name. — *Pluteus exiguus* sensu Romagn. in Rev. Mycol. 2: 95. 1937.

Excluded. — *Pluteus hispidulus* sensu Konr. & M., Ic. sel. Fung. 1: pl. 25. 1925. (= probably *P. exiguus*).

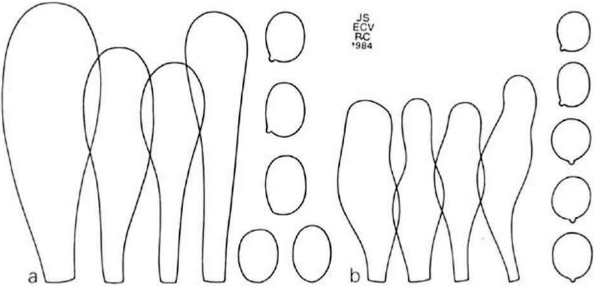

Fig. 4. *Pluteus hispidulus*. — Cheilocystidia (× 1000) and spores (× 1500). — a. *Pluteus hispidulus* var. *hispidulus* (*E. Kits van Waveren, 1 June 1960*). — b. *Pluteus hispidulus* var. *cephalocystis* (holotype).

Selected descriptions & illustrations. — Romagn. in Rev. Mycol. 2: 95 1937 (as *P. exiguus*); J. Lange, Fl. agar. dan. 2: pl. 70B. 1937; Kühner in Kühn. & Romagn. in Bull. trimest. Soc. mycol. Fr. 72: 183–187. 1956 (as *P. hispidulus* f. *typicus* and f. *terrestris*).

Pluteus hispidulus var. **cephalocystis** Schreurs, *var. nov.*

Differt a typo in cheilocystidiis subcapitatis vel capitatitis. — Holotypus: *H. Piepenbroek & G. Piepenbroek-Grooters 1243*, 27-IX-1981, 'estate Windesheim, Zwolle, prov. Overijssel, Netherlands' (L).

Pluteus hispidulus var. *cephalocystis* differs from the type variety in the shape of the cheilocystidia: subcapitate to capitate narrowly utriform to narrowly clavate versus narrowly to broadly clavate in var. *hispidulus* (Fig. 4). This variety resembles *P. exiguus* in the shape of the cheilocystidia, but differs in pileipellis structure: a differentiated cutis with ascending elements in *P. hispidulus* and a trichoderm in *P. exiguus*.

Habitat. On wood or woodchips of deciduous trees in frondose woods on rich soils.

Collections examined. — NETHERLANDS, prov. Overijssel, Windesheim, estate Windeheim, 27 Sept. 1981, *H. Piepenbroek & G. Piepenbroek-Grooters 1243* (holotype, L). — GREAT BRITAIN: Berkshire: Ascot, Swanley Park, 26 Oct. 1971 (K), *E. E. Green & L. Ryvarden* (K); Windsor, Ascot Park, 26 May 1965, *P. W. James* (K); Swanley Park, Windsor Great Park, 23 Aug. 1967, *D. A. Reid, R. W. G. Dennis & E. E. Green* (K); Sussex: Duncton, Duncton Hill, 12 Sept. 1970, *D. A. Reid*, (K); Somerset: Horner Water, 30 Aug. 1967, *P. D. Orton 3054* (E); Horner Water, 3 Sept. 1967, *P. D. Orton 3055* (E).— FRANCE, dept. Ain, Nantua-Bourg, 22 May 1957, *H. S. C. Huijsman* (L).

Section **Celluloderma** Fay.

Pluteus section *Celluloderma* Fay. in Ann. Sci. nat., Bot. sér. VII, 9: 364. 1889. — Lectotype (Sing. in Lloydia 21: 259. 1958): *Pluteus nanus* (Pers.: Fr.) Kumm.

Pluteus section *Hispidoderma* Fay. in Ann. Sci. nat., Bot. sér. VII, 9: 364. 1889. — Lectotype (Sing. in Lloydia 21: 216. 1958): *Pluteus leoninus* (Schaeff.: Fr.) Kumm.

Pluteus section *Pruinosi* Imai in J. Fac. Agric. Hokkaido (imp.) Univ. 43: 161. 1938. — Lectotype (design. nobis): *Pluteus nanus* (Pers.: Fr.) Kumm.

Pluteus section *Nudi* Imai in J. Fac. Agric. Hokkaido (imp.) Univ. 43: 163. 1938. — Lectotype (design. nobis): *Pluteus phlebophorus* (Ditm.: Fr.) Kumm.

Characteristics. — Stipe solid to fistulose; pleurocystidia absent or present and then without hooks at apex and thin-walled; cheilocystidia either implanted on layer of parallel hyphae or rooting in hymenophoral trama; pileipellis a hymeniderm, a transition between a hymeniderm and an epithelium or a trichoderm.

Pluteus subsection **Hispidodermini** (Fay.) Vellinga & Schreurs, *comb. & stat. nov.*

Basionym: *Pluteus* section *Hispidoderma* Fay. in Ann. Sci. nat., Bot. sér. VII, 9: 364. 1889. — Lectotype (Sing. in Lloydia 21: 216. 1958): *Pluteus leoninus* (Schaeff.: Fr.) Kumm.

Pluteus [Aβ] *Depauperatae* J. Lange in Dansk bot. Ark. 2(7): 4. 1917 (illegitimate, no rank indicated).

Characteristics. — Cheilocystidia implanted on a layer of hyphae parallel to edge of lamellae; pileipellis a hymeniderm made up of elongated elements only, with $\bar{Q} > 3$, or a trichoderm.

KEY TO THE SPECIES

1a. Pleurocystidia absent or very rare 2
 b. Pleurocystidia present and moderately abundant to abundant 3
2a. Spores mainly broadly ellipsoid to ellipsoid, $\bar{Q} = 1.25 - 1.35$; cheilocystidia colourless 10. *P. exiguus*
 b. Spores mainly subglobose, $\bar{Q} = 1.1$; cheilocystidia partly with brown content . 11. *P. pusillulus*
3a. Stipe not flocculose, at base often with some squamulose structures, without differentiated caulocystidia 4
 b. Stipe flocculose all over; differentiated caulocystidia present 5
4a. Pileus yellow to yellow-brown; stipe white, pale yellow at base, not pink coloured 12. *P. leoninus*
 b. Pileus brown to brown-grey; stipe whitish, pink coloured at base . . . . 13. *P. roseipes*
5a. Either pileus brown, edge of lamellae brown and stipe brown flocculose, ór basidiocarp entirely white; caulocystidia in squamules ascending from stipitepellis . . . . 14. *P. umbrosus*
 b. Basidiocarps dark brown to white; edge of lamellae concolorous with surface; caulocystidia in tufts, patent . . . . 15. *P. plautus*

10. **Pluteus exiguus** (Pat.) Sacc.

Agaricus exiguus Pat., Tab. anal. Fung. 1: 190. 1886. — *Pluteus exiguus* (Pat.) Sacc. in Syll. Fung. 5: 671. 1887.

Excluded. — *Pluteus exiguus* sensu Romagn. in Rev. Mycol. 2: 95. 1937 (= *P. hispidulus* var. *hispidulus*).

Selected descriptions. — Huijsman in Fungus 25: 34–35. 1955; Kühner in Kühn. & Romagn. in Bull. trimest. Soc. mycol. Fr. 72: 187–190. 1956.

11. **Pluteus pusillulus** Romagn. — Fig. 5

Pluteus minimus Romagn. in Rev. Mycol. 2: 133. 1937; *non Pluteus minimus* P. Henn. in Verh. bot. Ver. Brandenb. 40: 139. 1889. — *Pluteus pusillulus* Romagn. in Rev. Mycol. 5: 23. 1940 (change of name).

Type-study of *Pluteus pusillulus*.

Herbarium H. Romagnesi: France, dept. Seine-et-Oise, Villecresnes, Bois de la Grange, *H. Romagnesi*.

Spores (5.2–)5.5–6.3(–6.5) × (4.9–)5.2–5.8(–6.3) μm, Q = (1.0–)1.05–1.15 (–1.2), $\bar{Q}$ = 1.1, subglobose, a few globose or broadly ellipsoid. Basidia 23–33(–37) × 6.5–8.5(–9) μm, 4-spored. Pleurocystidia absent. Cheilocystidia (33–)42–72(–77) × 10–15(–17) μm, subcapitate narrowly fusiform, mostly not coloured, partly with brown vacuolar pigment. Pileipellis a hymeniderm of narrowly fusiform elements, (72–)80–130(–145) × (10–)12–19(–23) μm, with dark brown vacuolar pigment. Stipitepellis a cutis of cylindrical hyphae.

Romagnesi (1937) first described this species under the name *Pluteus minimus* Romagn. This name, however, is illegitimate because it is a younger homonym of *P. minimus* P. Henn. (1889). In 1940 Romagnesi changed the name of the present species to *P. pusillulus* without mentioning the basionym. From circumstancial evidence is perfectly clear, however, that this was a change of name for his *P. minimus*.

12. **Pluteus leoninus** (Schaeff.: Fr.) Kumm.

Agaricus leoninus Schaeff., Fung. Bavariae 4: 21. 1774. — *Agaricus leoninus* Schaeff.: Fr., Syst. mycol. 1: 199. 1821. — *Pluteus leoninus* (Schaeff.: Fr.) Kumm., Führ. Pilzk.: 98. 1871.

Agaricus sororiatus P. Karst. in Not. Sällsk. Fauna Fl. fenn. Förh. 9: 339. 1868. — *Pluteus sororiatus* (P. Karst.) P. Karst., Ryssl., Finl. Skand. Halföns Hattsvamp.: 254. 1879.

Pluteus luteomarginatus Rolland in Bull. Soc. mycol. Fr. 5: 167. 1889.

Pluteus fayodii Damblon, Darimont & Lambinon in Lejeunia 21: 93. ('1957') 1959.

Pluteus flavobrunneus J. Favre in Ergebn. Wiss. Unters. Schweiz. Natn. Parks, n.F.VI, 42: 559. 1960 (not validly published, no type indicated).

Pluteus luteomarginatus f. *gracilis* Métrod in Rev. Mycol. 11: 77. 1946 (not validly published, no latin diagnosis).

Excluded. — *Pluteus leoninus* sensu P. Karst, Ryssl., Finl. Skand. Halföns Hattsvamp.: 257. 1879; sensu Sing. in Beih. bot. Cbl. 46 (2 Abt.): 105. 1930; sensu Imai in J. Fac. Agric. Hokkaido (imp.) Univ. 43: 163. 1938; sensu Romagn. in Kühn. & Romagn. in Bull. trimest. Soc. mycol. Fr. 72: 233. 1956 (in all these cases = *P. chrysophaeus*). — *Pluteus luteomarginatus* sensu Sing. & Clémençon in Nova Hedwigia 23: 336. 1972 (= *P. roseipes*).

Selected description & illustrations. — Cooke, Ill. Brit. Fung. 3: pl. 421. 1884 Konr. & M., Ic. sel. Fung. 1: pl. 20. 1925. Romagn., Nouv. Atl. Champ. 3: pl. 192. 1961 (as *P. luteomarginatus*); R. Phillips, Paddest. Schimm.: 120. 1981.

According to the description of Schaeffer (1774: 21) and his plate (1762: pl. 48), the name *Pluteus leoninus* is the correct name for the golden yellow species belonging tc

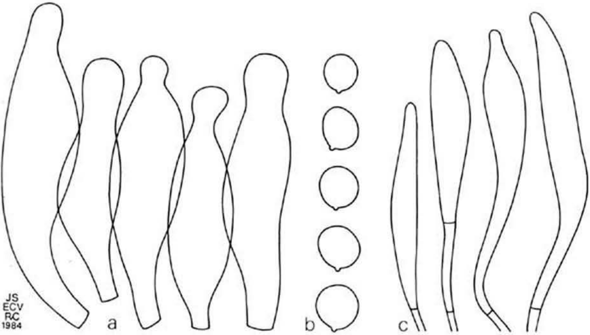

Fig. 5. *Pluteus pusillulus*, type. — a. Cheilocystidia (× 1000). — b. Spores (× 1500). — c. Elements of pileipellis (× 500).

subsection *Hispidodermini*. An additional argument is the fact that Schaeffer was able to discriminate between two yellow-capped species of *Pluteus*; his *Agaricus chrysophaeus* is clearly characterized as a species with a hymenidermal pileipellis ('pileo saturate aureo, pulverulente', 1774: 67).

Pluteus sororiatus (P. Karst.) P. Karst. is described as a yellow species with a squamulose-velvety pileus, and consequently microscopically with a pileipellis consisting of elongated elements, whereas Karsten (1879: 257) considered *P. leoninus* as a species with a smooth pileipellis. It is evident, therefore, that *P. sororiatus* has to be placed in the synonymy of *P. leoninus*.

Pluteus luteomarginatus Rolland, already considered as a synonym of *P. sororiatus* by Singer (1956: 184), is in this concept considered as a larger variant of *P. leoninus*, with a dark tinge on the pileus, but not as a distinct species.

Pluteus fayodii Damblon, Darimont & Lambinon is a superfluous new name for *P. leoninus* in the sense as is described here; the yellow species with clavate to spheropedunculate elements in the pileipellis is *P. chrysophaeus*.

13. **Pluteus roseipes** Höhn.

Pluteus roseipes Höhn. in Sber. Akad. Wiss. Wien 61: 1010. 1902.
Pluteus carneipes Kühner in Bull. mens. Soc. linn. Lyon 19: 100. 1950.
Pluteus subatratus J. Favre in Ergebn. wiss. Unters. schweiz. NatnParks, n.F. VI, 42: 563. 1960 (not validly published, no type indicated).

Misapplied name. — *Pluteus luteomarginatus* sensu Sing. & Clémençon in Nova Hedwigia 23: 336. 1972.

Selected descriptions & illustrations. — Kühner in Bull. mens. Soc. linn. Lyon 19: 100–102. 1950 (as *P. carneipes*); J. Favre in Ergebn. wiss. Unters. schweiz. Natn Parks, n.F. VI, 42: 563–565. 1960 (as *P. subatratus*); Romagn., Nouv. Atl. Champ. 3: pl. 191B. 1961.

14. **Pluteus umbrosus** (Pers.: Fr.) Kumm.

Pluteus umbrosus Pers., Ic. Descr. Fung. 1: 8. 1798. — *Agaricus umbrosus* Pers.: Fr., Syst. mycol. 1: 200. 1821. — *Pluteus umbrosus* (Pers.: Fr.) Kumm., Führ. Pilzk.: 98. 1871. — *Pluteus cervinus* var. *umbrosus* (Pers.: Fr.) J. Lange in Dansk bot. Ark. 9(6): 79. 1938.

Excluded. — *Pluteus umbrosus* sensu Cooke, Ill. Brit. Fung. 3: pl. 304. 1883; sensu Sacc. in Syll. Fung. 5: 667. 1887; sensu Bres., Fung. trident. 2: 11. 1892; sensu Farl. & Burt., Ic. farlowianae: pl. 44. 1929; *Pluteus cervinus* var. *umbrosus* sensu J. Lange in Dansk bot. Ark. 9(6): 79. 1938 (in all these cases = *Pluteus tricuspidatus*).

Selected descriptions & illustrations. — Konr. & M., Ic. sel. Fung. 1: pl. 26. 1925; Locq. in Bull. trimest. Soc. mycol. Fr. 59: 37. 1943; Sing. in Trans. Br. mycol. Soc. 39: 189. 1956; Romagn., Nouv. Atl. Champ. 3: pl. 188A. 1961; R. Phillips, Paddest. Schimm.: 119. 1981.

KEY TO THE VARIETIES

1a. Pileus brown; edge of lamellae brown; stipe brown flocculose. . . . . *P. umbrosus* var. *umbrosus*
b. Pileus white; edge of lamellae white; stipe white flocculose. . . . . *P. umbrosus* var. *albus*

Pluteus umbrosus var. **albus** Vellinga, *var. nov.*

Differt a typo in coloribus albis pilei, aciei lamellarum, stipitisque. — Holotyus: *T. Læssøe 596*, 17-IX-1983; 'Strødam Reservatet, Sjaelland, Denmark' (C).

This variety differs from the type-variety of *P. umbrosus* in the absence of brown pigments. Consequently pileus, edge of lamellae and stipe are white; cheilocystidia, pleurocystidia, elements of pileipellis, and caulocystidia are colourless. The lamellae, however, are pink-coloured.

Habitat. — Solitary on rotten *Fagus sylvatica*-trunk.

Collection examined. — DENMARK, Sjaelland, Strødam Reservatet, 17 Sept. 1983, *T. Læssøe 596* (holotype, C).

15. **Pluteus plautus** (Weinm.) Gillet — Figs. 6–9

Agaricus plautus Weinm., Hymenomyc. Gastromyc. Imp. ross. obs.: 136. 1836. — *Pluteus plautus* (Weinm.) Gillet, Hyménomycètes: 394. 1876.

Agaricus semibulbosus Lasch in Fr., Epicr.: 141. 1838. — *Pluteus semibulbosus* (Lasch.) Gillet, Hyménomycètes: 395. 1876.

Pluteus granulatus Bres. Fungi trident. 1: 10. 1881.

Agaricus praestabilis Britz. in Ber. naturh. Ver. Augsburg 27: 193. 1883 (Hymenomyc. Südbayern 3).

Pluteus candidus Pat., Tab. anal. Fung. 2: 31. 1887.

Pluteus pellitus var. *gracilis* Bres. in S. Schulz. in Hedwigia 24: 134. 1885. — *Pluteus gracilis* (Bres.) J. Lange in Dansk bot. Ark. 2(7): 6. 1917.

Pluteus puberulus Velen., České Houby: 607. 1921.

Pluteus stylobates Velen., České Houby: 608. 1921.

Pluteus inflatus Velen., České Houby: 609. 1921.

Pluteus depauperatus Romagn. in Kühn. & Romagn. in Bull. trimest. Soc. mycol. Fr. 72: 181. 1956.

Pluteus boudieri P. D. Orton in Trans. Br. mycol. Soc. 43: 352. 1960.

Pluteus punctipes P. D. Orton in Trans. Br. mycol. Soc. 43: 363. 1960.

Pluteus dryophiloides P. D. Orton in Not. roy. bot. Gdn Edinb. 29: 115. 1969.

Pluteus punctatus Wichanský in Mykol. Sb., Praha 49: 1. 1972.

Misapplied names. — *Pluteus roseoalbus* sensu Velen., České Houby: 606. 1929; Vaček in Stud. bot. Čech. 9: 37. 1948. — *Pluteus hiatulus* sensu Romagn. in Kühn. & Romagn. in Bull. trimest. Soc. mycol. Fr. 72: 215–218. 1956.

Excluded. — *Pluteus semibulbosus* sensu J. Lange in Dansk bot. Ark. 2(7): 8. 1917; P. D. Orton in Trans. Br. mycol. Soc. 43: 349. 1960 (both = *P. inquilinus*). — *Pluteus plautus* sensu A. Pears. in Trans. Br. mycol. Soc. 35: 108. 1952 (= *P. ephebeus*).

Selected descriptions & illustrations. — Boud., Ic. mycol.: pl. 89. 1905; Romagn. in Kühn. & Romagn. in Bull. trimest. Soc. mycol. Fr. 72: 218–220, 221–224. 1956 (as *P. granulatus* and *P. depauperatus*); P. D. Orton in Trans. Br. mycol. Soc. 43: 352, 363. 1960 (as *P. boudieri* and *P. punctipes*); Romagn., Nouv. Atl. Champ. 3: pl. 190, pl. 191B. 1961 (as *P. granulatus* and *P. hiatulus*); P. D. Orton in Not. roy. bot. Gdn Edinb. 26: 56–57. 1964; R. Phillips, Paddest. Schimm.: 120. 1981 (as *P. depauperatus*).

Pileus (7–)10–50(–65) mm, when young hemispherical, later obtuse conical or applanate with more or less distinct umbo, hygrophanous when moist translucently striate.

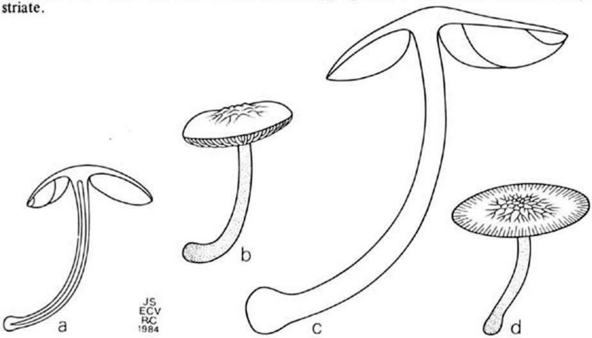

Fig. 6. *Pluteus plautus*. — Habits (× 1). — a. *J. Schreurs 735* (white basidiocarp). — b. *E. C. Vellinga 537* (pale basidiocarp). — c. *J. Schreurs 653* (brown basidiocarp). — d. *J. Schreurs 521* (dark brown basidiocarp).

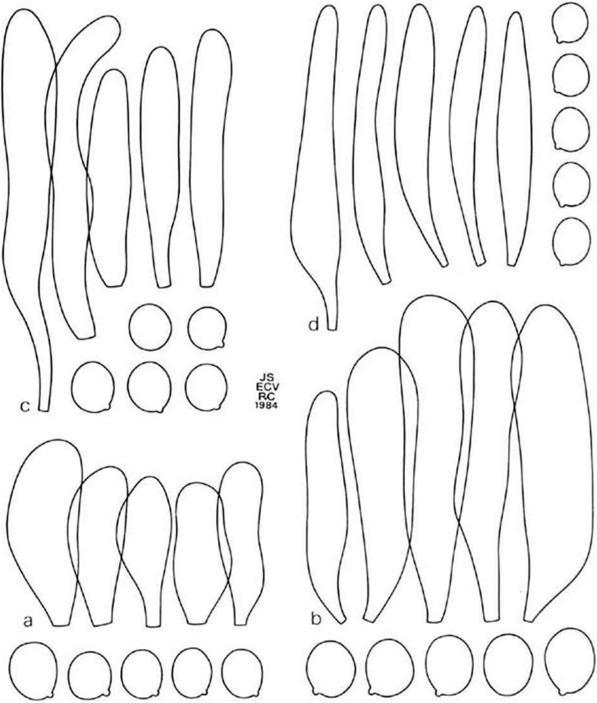

Fig. 7. *Pluteus plautus*. — Elements of pileipellis (× 500) and spores (× 1500). — a. *R. A. Maas Geesteranus 10521* (white basidiocarp). — b. *E. C. Vellinga 537* (pale basidiocarp). — c. *J. Schreurs 653* (brown basidiocarp). — d. *J. Schreurs 521* (dark brown basidiocarp).

up to half-way pileus, varying in colour from white, with olive tinge at centre and translucently pink, to dark blackish brown at centre and pallescent to brown at margin, with all shades of brown possible between those two extremes, like yellow-brown, greyish brown at centre, always paler at margin (Munsell 2.5 Y 8/2, 10 YR 4/3, 7.5 YR 3/4, 7.5

YR 3/2), on drying paler, mostly with a shade of translucent pink, not or slightly sulcate, larger basidiocarps with up to 2 mm broad veins round centre, when young glabrous to subgranulate or squamulose, later velvety-tomentose to distinctly squamose at centre, more glabrous at margin. Lamellae (L = 30–68/l = 1–3) moderately crowded to crowded, free, moderately broad to broadly ventricose, up to 10 mm broad, when young white or pale grey or pale brown, later sordid pink with white, concolorous, even or flocculose edge. Stipe (10–)15–60(–115) × (1–)1.5–5(–11) mm, cylindrical, often with abrupt bulbous base, stuffed or fistulose with age, white, whitish cream or whitish at apex and yellowish brown at base, fibrillosely striate, flocculose all over, white-flocculose, or at apex white-flocculose and at base brown-flocculose, or up to apex brown flocculose, with white to greyish tomentum, often with hairs at base. Context in pileus when moist white, greyish, brown-grey or grey, on drying pallescent to white or whitish; in stipe concolorous with context in pileus, darker at base, shiny. Smell absent to unpleasant like Lepiota cristata. Taste absent or slightly unpleasant. Spore print reddish brown (Munsell 5 YR 6/5).

Spores (5.0–)5.5–8.5(–9.5) × 4.5–7.0(–7.5) µm, Q = (1.0–)1.05–1.35(–1.85), $\bar{Q}$ = (1.1–)1.15–1.25(–1.65), subglobose to broadly ellipsoid, some globose or ellipsoid. Basidia (20–)22–30(–32) × 7–10 µm, 4-spored. Pleurocystidia abundant to scattered, (28–)35–90(–105) × (8–)11–33(–39) µm, narrowly utriform, utriform with 7–15 µm wide apex, clavate, subfusiform or subcapitate fusiform, colourless, or with intracellular brown pigment, or with some distinct vacuoles with brown pigment or with granular refracting contents. Cheilocystidia moderately crowded to crowded, (20–)30–65(–85) × (7–)10–25(–37) µm, clavate, narrowly clavate, narrowly utriform, or fusiform, colourless, very rarely a few with brown intracellular pigment. Pileipellis a hymeniderm of cylindrical, narrowly clavate or narrowly fusiform elements, (30–)45–155(–180) × (6–)9–30(–35) µm, colourless, or with very pale yellowish brown to dark brown intracellular pigment. Stipitepellis a cutis of 5–15 µm wide colourless cylindrical hyphae with tufts of caulocystidia, 30–75(–125) × 10–25 µm, cylindrical to narrowly clavate, narrowly fusiform with rounded apex, colourless or with brown intracellular pigment at base of stipe and colourless at apex, or with brown intracellular pigment over whole length of stipe.

Habitat & distribution. — Solitary or subgregarious on wood, twigs, trunks, or woodchips of mostly deciduous but also of coniferous trees, also found on cardboard, mostly in woods on more or less calcareous soils, throughout Europe, but not frequent. August to November, rarely already in May.

Collections examined. — NETHERLANDS: prov. Friesland: isl. Terschelling, decoy near Hoorn, 26 Oct. 1974, *A. E. Jansen 76* (L); isl. Vlieland, Oostervallei, 30 Oct. 1976, *C. Bas 7121* (L); Leeuwarden, Museum for Natural History, 16 Sept. 1971, *G. Stobbe* (L); prov. Overijssel: Zwolle, estate Windesheim, 27 Sept. 1981, *H. Piepenbroek & G. Piepenbroek-Grooters* (Coll. J. Schreurs 652 and 653, L); ibidem, 7 Oct. 1981, *J. Schreurs 661* (L); ibidem, 27 Oct. 1981, *J. Schreurs 669* (L); ibidem, 27 Aug. 1983, *H. Piepenbroek & G. Piepenbroek-Grooters* (coll. E. C. Vellinga 537) (L); Delden, estate 'Twickel', 11 Oct. 1965, 15 May 1970 and 1 Oct. 1979, *E. Kits van Waveren* (L); Oldenzaal, Smoddebos, 18 Oct. 1967, *E. Kits van Waveren* (L); Singraven, 22 Sept. 1961, *E. Kits van Waveren* (L); prov. Gelderland: Zoelen, estate 'Soelen', 11 Oct. 1979, *J. Schreurs 335* and *336* (L); Valburg, estate 'Oosterhout', 23 Aug. 1980, *C. Bas* (coll. J. Schreurs 457) (L); prov. Utrecht: Bunnik, Notenlaan, 18 Aug. 1978, *J. Schreurs 171* (L); ibidem, 17 Oct. 1978, *J. Schreurs 199* (L); prov. Noord-Holland: Santpoort, Duin en Kruidberg, 22 Oct. 1966 and 1 Sept. 1974, *E. Kits van Waveren* (L); Vogelenzang, 12 Oct. 1966, *E. Kits van Waveren* (L); 's-Graveland, greenhouse of firm Steenvoorde, 4 May 1972, J. Daams (L); prov. Zuid-Holland: Wassenaar, estate 'Voorlinden', 5 Nov. 1983, *Th. W. Kuyper* (coll. E. C. Vellinga 574) (L); Voorschoten, estate 'Ter

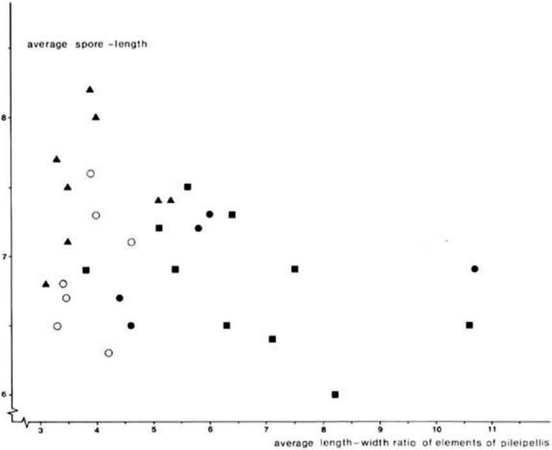

Fig. 8. *Pluteus plautus.* — Scatterdiagram, spore-length plotted against length-width ratio of elements of pileipellis. Each dot represents an average of 10 measurements per collection. (○ white basidiocarp. — ▲ pale basidiocarp. — ● brown basidiocarp. — ■ dark brown basidiocarp.)

Horst', 14 Aug. 1980, *C. Bas 7655* (coll. J. Schreurs 433) (L); Wassenaar, estate 'Raaphorst', 17 Aug. 1966, *C. Bas 4633* (L); prov. Noord-Brabant: Eindhoven, Feldershof, 7 Oct. 1965, *E. Kits van Waveren* (L); prov. Limburg: Linne, 11 July 1972, *C. Ph. Verschueren* (L); Horn, 31 July 1967, *C. Ph. Verschueren* (L); Valkenburg, Gerendal, 10 Oct. 1975, *F. Tjallingii & G. J. M. G. Tjallingii-Beukers*; St. Geertruid, Savelsbos, 11 Oct. 1970, *C. Bas 5456* (L); ibidem, 13 Oct. *1980, J. Schreurs 492* (L); ibidem, 29 Oct. 1980, *J. Schreurs 547*; ibidem, 24 Sept. 1981, *J. Schreurs 637*; IJsselmeerpolders: N.O. Polder, Voorsterbos, 11 Oct. 1983, *C. Bas* (coll. E. C. Vellinga 564) (L): O. Flevoland, Harderbos, 16 June 1977, *F. Tjallingii & G. J. M. G. Tjallingii-Beukers*. — BELGIUM: prov. Namur: Ave-et-Auffe, Fond d'Auffe, 3 Oct. 1982, *E. C. Vellinga* (coll. J. Schreurs 735) (L); Ave-et-Auffe, Le Roptai, 6 Oct. 1977, *Th. W. Kuyper & J. Schreurs 121*, (L); Rochefort, Bois de Famenne, 26 Sept. 1974, *F. Tjallingii & G. J. M. G. Tjallingii-Beukers*; Han-sur-Lesse, Bois banal, 8 Sept. 1975, *F. Tjallingii & G. J. M. G. Tjallingii-Beukers*; Resteigne, Bois de Resteigne, 24 Sept. 1974, *F. Tjallingii & G. J. M. G. Tjallingii-Beukers*, ibidem, 8 Sept. 1975, *C. Bas 6610* (L); ibidem, 4 Oct. 1977, *W. Hanegraaff* (coll. J. Schreurs 115 and 116) (L); ibidem, 22 Aug. 1980, *J. Schreurs 452* (L). — GERMAN FEDERAL REPUBLIC: Niedersachsen: Oldenburg, Hasbruch, 27 Aug. 1962, *C. Bas 2675* (L); Bad Bentheim, Bentheimer Wald, 27 Aug. 1982, *J. Schreurs 705* (L); Nordrhein-Westfalen: Detmold, Externsteine, 7 Oct. 1976, *J. Schreurs 41* (L); Münster-Mecklenbeck, Lövelinglohbüsche, 11 Oct. 1981, *A. Runge* (L); Warburg-Scherfede, Hellberg, 21 Oct. 1982, *A. Runge* (L); Rhein-

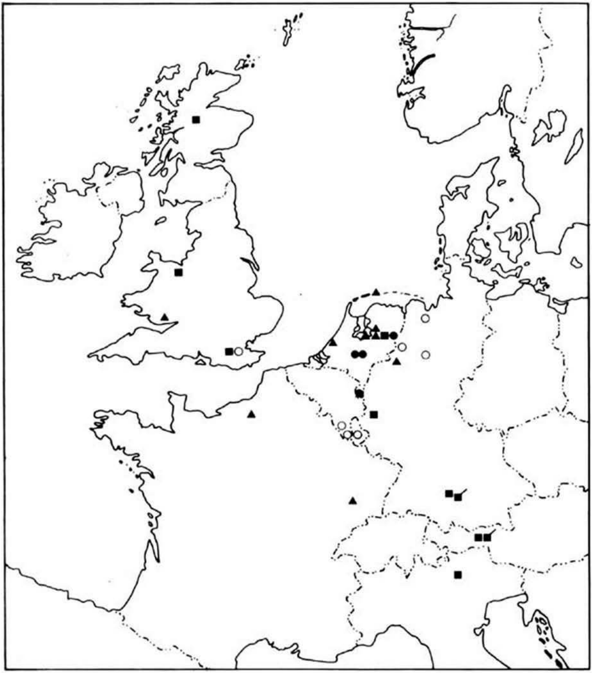

Fig. 9. *Pluteus plautus.* — Distributionmap of the collections of Fig. 8. — ■´ growing on coniferous wood. — ○, ▲, ●, and ■ growing on deciduous wood.

land-Pfalz: Gerolstein, Gees, Reichswald, 25 Sept. 1980, *M. E. Noordeloos* (coll. J. Schreurs 521) (L); Bayern: Leibi, Donau-Auwald, 24 Sept. 1981, *M. Enderle*; Wellenburg, 4 Aug. 1982, *Th. W. Kuyper 2100* (L). — LUXEMBOURG, Grundhof, valley of the Ernz Noire, 18 Aug. 1955, *R. A. Maas Geesteranus 10521* (L). — FRANCE: dept. Doubs, Lougres, 18 Sept. 1956, *H. S. C. Huijsman* (coll. C. Bas 1097) (L); dept. Seine-et-Oise, Yerres, Chateau de la Grange, June – Aug. 1936, *H. Romagnesi* (lectotype of *P. depauperatus*); dept. Oise, Lamorlaye, 10 Oct. 1946, *H. Romagnesi.* —

ITALY: Alto Adige: Estate, Aug. 1882, *G. Bresadola* (S) (lectotype of *P. granulatus*); Cavelmonte, Aug. 1898, *G. Bresadola* (S); Trento, parco Gocciadoro, 26 Sept. 1981, *Th. W. Kuyper 1856* (L). — AUSTRIA, Tirol: Mille, Gnadenwald, 9 Sept. 1982, *H. Schirmer*, (coll. J. Schreurs 714) (L); Reiterkogl, 8 Sept. 1982, *J. Stangl* (coll. J. Schreurs 713) (L). — GREAT-BRITAIN: Invernessshire: Tomich, Plodder Falls, 10 Sept. 1968, *E. Kits van Waveren* (L); Perthshire: Black Wood of Rannoch, 4 Sept. 1966, *E. Kits van Waveren* (L); Surrey: Mickleham, Juniper Hill, 12 Oct. 1952, *P. D. Orton* (holotype *P. punctipes*) (K); ibidem, 1 Oct. 1955, *P. D. Orton* (holotype *P. boudieri*) (K); Shropshire: Oswestry, Llangedwyn Est., 19 Sept. 1967, *E. Kits van Waveren* (L); Glamorgan: Pontypridd, St. Gwynno's Forest, 17 Sept. 1963, *E. Kits van Waveren* (L); Cardiff, Dinas Paris Wood, 13 Sept. 1973, *E. Kits van Waveren* (L).

The species *Pluteus punctipes* P.D. Orton, *P. punctatus* Wichanský, *P. granulatus* Bres., *P. dryophiloides* P.D. Orton, *P. depauperatus* Romagn., *P. semibulbosus* (Lasch) Gillet, *P. boudieri* P.D. Orton, *P. gracilis* (Bres.) J. Lange, *P. puberulus* Velen., *P. stylobates* Velen. and *P. inflatus* Velen., mainly distinguished on colour, habit, striation of pileus, absence or presence of squamules on pileus, but all characterized by a hymenidermal pileipellis, a stipe covered with floccules (microscopically with tufts of caulocystidia) and colourless cheilocystidia, are considered here all to belong to one very variable species, viz. *P. plautus*.

In our opinion up to now too much emphasis has been laid on the colour of the basidiocarps. However, when pigment is available, not only the pileipellis but also the caulocystidia and sometimes the pleurocystidia are coloured in varying degrees. Therefore, many supposed differences between the above-mentioned taxa are quantitative, not qualitative.

In an attempt to arrive at a rational subdivision of the *P. plautus* complex possible correlations between the following characters have been studied: colour of basidiocarps, and size and shape of spores, pleurocystidia, elements of pileipellis, and of caulocystidia.

Four different colour-classes of the pileus are recognized, viz.:

(i) dark brown in centre (more or less corresponding to *P. plautus*, *P. punctatus* and *P. punctipes*);
(ii) middle brown in centre (more or less corresponding to *P. granulatus*);
(iii) pale brown in centre (more or less corresponding to *P. depauperatus* and *P. dryophiloides*);
(iv) white (more or less corresponding to *P. boudieri*, *P. gracilis* and *P. semibulbosus*).

The microscopical characters have been scored quantitatively, based on the average of 10 measurements per collection. A scatterdiagram showing the distribution of 30 variously coloured collections with average spore-length plotted against average length-width ratio of elements of the pileipellis is given in Fig. 8.

From this diagram the following conclusions can be drawn. Generally speaking, white and pale basidiocarps tend to have larger spores and shorter elements in the pileipellis than dark-coloured specimens. So, it is evident that white and pale variants cannot be considered as pigmentless or poorly pigmented variants of a species with usually distinctly coloured basidiocarps, as they differ also in other characters than colour only. However, the diagram also shows much overlap in characters, which effectively precludes any meaningful classification of these variants. For this reason we firmly believe that the formal recognition of taxa, even on infraspecific level, is unwarranted.

In Fig. 9 the distribution of the examined collections of Fig. 8 in Europe is given and occurrence on coniferous or deciduous wood is indicated. No ecological or phytogeographical pattern seems to emerge: both basidiocarps with pale and dark colours has been found on deciduous wood. However, it might be added that in natural conifer forests in central Europe only dark coloured basidiocarps were found.

An explanation for the wide variation present in *P. plautus* might be found in the hypothesis that a white taxon with relatively short elements in the pileipellis and large spores has come in contact with a dark taxon with relatively long elements in the pileipellis and small spores, causing a (hybrid-)swarm of variants with basidiocarps in all shades of brown. Whether this represents a case of true hybridization of distinct species or only secondary genetical contact between morphological distinct but conspecific populations cannot be determined. However, the fact that specimens in the intermediate group are bigger and more fleshy, whereas many of the white and all the dark variants have basidiocarps that are more fragile, suggests some kind of hybrid vigour and possibly indicates true hybridization.

Pluteus plautus is with some authors (for instance Métrod, 1943: 16) a species growing only on coniferous wood, but in the original description (Weinman, 1836) the substrate given is discarded wood, without mention of its nature.

Pluteus semibulbosus is taken here as a species with a hymenidermal pileipellis of elongate elements, and not as a species with a pileipellis made up of spheropedunculate to clavate elements as it is the concept of Lange (1917: 8) and Orton (1960: 349) (see also under *P. inquilinus*. p. 370).

Heim & Romagnesi (1934: 166) published a description under the name *P. roberti* (Fr.) P. Karst., based on a few French collections. Later Romagnesi (1956: 182, 215–218) came to the conclusion that in 1934 the name *P. roberti* had been misapplied and described the taxon concerned as a new species, viz. *P. hiatulus* Romagn., citing an additional collection (Lamorlaye, 10 Oct. 1946).

The Lamorlaye-collection has been studied by one of us (J.S.) and is characterized as follows: spores (7.0–)7.3–8.4 × (5.5–)6.2–7.2(–7.5) µm, Q = 1.05–1.25, $\bar{Q}$ = 1.15, subglobose to broadly ellipsoid; pileipellis a hymeniderm made up of 50–100 × 15–24 µm large colourless elements on a cutis-like underlayer; stipitepellis with narrowly clavate caulocystidia. On account of these characters this collection belongs to *P. plautus*. The characters, particularly the structure of the pileipellis, are in contradiction with those as mentioned by Romagnesi (1956: 217).

It is not quite clear from the descriptions if *P. hiatulus* belongs to section *Villosi*, as suggested by Romagnesi or to *P. plautus*. One of the collections mentioned in 1934 (not studied by us) should be designated as lectotype and restudied. Until then the identity of *P. hiatulus* remains uncertain.

One of the six collections on which the original description of *P. depaupertus* Romagn. is based (Yerres, Chateau de la Grange, June–Aug. 1936) has been examined by one of us (J.S.) and is characterized by the following characters: spores 6.5–7.0 × (3.8–)4.0–4.4 µm, Q = 1.5–1.7(–1.85), $\bar{Q}$ = 1.65; elements of the pileipellis (40–)45–75(–80) × 15–20 µm, not or slightly coloured. The ellipsoid-oblong spores are exceptional within *P. plautus* and have not been recorded by Romagnesi, since he menstions subglobose to broadly ellipsoid spores (1956: 223). Despite its more slender spores this collection is considered conspicific with *P. plautus* and this collection is here designated as the lectotype of *P. depauperatus*.

In the Bresadola herbarium at Stockholm (S) four collections of *P. granulatus* Bres., collected by Bresadola himself, are conserved, and bear the following data:

(i) Estate, Aut. 1882. Orti dei pratis sulle asei d'abete marcete.
(ii) Aug. 1898. Cavelmonte, ad truncos abiegnos.
(iii) 1901, Andalo, ad truncos conifer.
(iv) Sept. 1904, Sopramonte, in truncis abiegnis.

The type-collection from Val di Sole is apparently missing. Singer (1959: 223) studied in NY another of Bresadola's collections of this species: (v) Aug. 1904, Mendalo, on coniferous trunks.

The characters of these collections are:

(i) Spores (7.2–)7.3–8.1(–9.0) × (5.5–)5.7–6.8(–7.6) µm, Q = 1.15–1.3(–1.4), $\bar{Q}$ = 1.25, broadly ellipsoid, a few ellipsoid; cheilocystidia not observed; pleurocystidia present, near pileus 43–65 × 8–13 µm, narrowly lageniform; pileipellis consisting of scattered clusters of erect elements, 55–100 × 13–25 µm, with brown intracellular pigment; underlying layer a cutis of brown coloured hyphae; stipitepellis a cutis of 4–10 µm wide cylindrical hyphae with clusters of pale brown to colourless caulocystidia.

(ii) Spores 6.8–7.6 × 5.3–6.0(–6.4) µm, Q = 1.2–1.35(–1.4), $\bar{Q}$ = 1.25, broadly ellipsoid, a few ellipsoid; pleurocystidia 50–70 × 13–27 µm, narrowly lageniform to utriform-ovoid, with 7–15 µm wide apex; cheilocystidia 28–68 × 11–35 µm, narrowly clavate, narrowly subutriform, some broadly clavate; pileipellis a hymeniderm of pale coloured elements, narrowly clavate-fusiform, 80–115 × 20–33 µm; stipitepellis a cutis with numerous brown coloured caulocystidia.

(iii) Spores (6.9–)7.0–8.0(–8.4) × (5.3–)5.9–6.4 µm, Q = (1.15–)1.2–1.3(–1.4), $\bar{Q}$ = 1.25, broadly ellipsoid, some ellipsoid; pleurocystidia 41–80 × 16–28 µm, lageniform-utriform; cheilocystidia 38–57 × 11–24 µm, clavate, narrowly lageniform; pileipellis a trichohymeniderm of pale coloured elements, up to 220 × 22 µm, fusiform; stipitepellis a cutis of cylindrical 5–10 µm wide hyphae with at base some squamule-like structures.

(iv) Spores (6.7–)7.0–8.0 × (5.2–)5.8–6.4 µm, Q = 1.15–1.3(–1.35), $\bar{Q}$ = 1.2, broadly ellipsoid; pleurocystidia clavate; cheilocystidia 45–57 × 10–20 µm, narrowly lageniform with 4–6 µm wide apex; pileipellis a hymeniderm of pale brown coloured elements, up to 95 × 15 µm; stipitepellis a cutis of cylindrical 5.5–13 µm wide hyphae.

(v) (according to Singer, 1959: 223) Spores 7–8.8 × 6–7 µm, subglobose to short cylindrical; pleuro- and cheilocystidia 50–78 × 7.7–13.2 µm, often short-pedicellate, narrowly lageniform, some subcapitate; pileipellis a differentiated cutis of 20–25 µm wide hyphae, yellowish hyaline to yellow, with fascicles of spheropedunculate to clavate elements, 16–50 × 11–16.5 µm.

The first collection, though in rather bad condition, is chosen here as the lectotype of *P. granulatus*; the second also represents *P. granulatus*; the third and the fourth collection probably represent *P. roseipes*, but notes of the colour of the stipe are lacking.

Subsection **Mixtini** Sing. ex Sing.

Pluteus subsect. *Mixtini* Sing. ex Sing. in Lloydia 21: 257. 1958. — Holotype: *Pluteus psichiophorus* (B. & Br.) Sacc.

Characteristics. — Cheilocystidia implanted on a layer of parallel hyphae; pileipellis a hymeniderm consisting of broadly clavate to clavate and fusiform, narrowly conical and cylindrical elements.

KEY TO THE SPECIES

1a. Pleurocystidia present; cheilocystidia not rostrate; stipe white or whitish, glabrous to innately brown fibrillose, rarely brown flocculose . . . . 16. *P. podospileus*
 b. Pleurocystidia absent or very rare; cheilocystidia rostrate; stipe grey with white (rarely brown) floccules . . . . 17. *P. thomsonii*

16. **Pluteus podospileus** Sacc. & Cub.

Pluteus podospileus Sacc. & Cub. in Sacc., Syll. Fung. 5: 672. 1887. — *Pluteus nanus* var. *podospileus* J. Rick in Lilloa 3: 444. 1938.

Pluteus nanellus Murrill in N. Amer. Fl. 10: 130. 1917.

Pluteus minutissimus Maire in Publcions Inst. bot., Barcelona 3: 94. 1937. — *Pluteus psichiophorus* var. *minutissimus* (Maire) Sing. in Trans. Br. mycol. Soc. 39: 214. 1956 (as *Pluteus 'psychriophorus'* var. *minutissimus*; not validly published, basionym not mentioned).

Leptonia seticeps Atk. in J. Mycol. 8: 116. 1902. — *Leptoniella seticeps* (Atk.) Murrill, N. Amer. Fl. 10: 92. 1917. — *Pluteus psichiophorus* var. *seticeps* (Atk.) Sing. in Trans. Br. mycol. Soc. 39: 214. 1956 (as *Pluteus 'psychriophorus'* var. *seticeps*; not validly published, basionym not mentioned). — *Pluteus seticeps* (Atk.) Sing. in Lloydia 21: 272. 1959.

Pluteus granulatus var. *tenellus* J. Favre in Mat. Fl. cryptog. Suisse 10: 213 1948.

Pluteus minutissimus f. *major* Kühner in Kühn. & Romagn. in Bull. trimest. Soc. mycol. Fr. 72: 182. 1956.

Misapplied name. — *Agaricus spilopus* sensu B. & Br. in Ann. Mag. nat. Hist., ser. V, 7: 126 1881.

KEY TO THE FORMAE

1a. Stipe entirely innately dark brown fibrillose or brown flocculose *P. podospileus* f. *podospileus*
 b. Stipe entirely smooth or innately dark brown fibrillose at base only *P. podospileus* f. *minutissimus*

Pluteus podospileus f. **podospileus**

Selected descriptions & illustrations. — P. D. Orton in Trans. Br. mycol. Soc. 43: 363. 1960 (as *P. podospileus*); R. Phillips, Paddest. Schim.: 118. 1981 (as *P. podospileus*).

Pluteus podospileus f. **minutissimus** (Maire) Vellinga, *stat. & comb. nov.*

Basionym: *Pluteus minutissimus* Maire in Publcions Inst. bot., Barcelona 3: 94. 1937.

Pluteus minutissimus f. *typicus* Kühn. in Kühn. & Romagn. in Bull. trimest. Soc. mycol. Fr. 72: 190. 1956 (inadmissible epitheton).

Selected description. — Kühner in Kühn. & Romagn. in Bull. trimest. Soc. mycol. Fr. 72: 190–192. 1956 (as *P. minutissimus* f. *typicus*).

Grauwinkel & al. (1984: 15–26) consider *Pluteus podospileus* and *P. minutissimus* identical. We follow, however, Kühner (1956: 190–195) who treats these taxa as conspecific formae, unfortunately using the incorrect name *P. minutissimus* for the species concerned. The only difference between the two formae is found in the covering of the stipe, viz. innately dark brown fibrillose or brown flocculose in f. *podospileus* against not dark brown fibrillose at all or only at the base of the stipe in f. *minutissimus*.

17. **Pluteus thomsonii** (B. & Br.) Dennis

Agaricus thomsonii B. & Br. in Ann. Mag. nat. Hist., ser. IV, 17: 131. 1876 (Notic. Brit. Fung. 1523) (as *Agaricus thomsoni*). — *Entoloma thomsonii* (B. & Br.) Sacc. in Syll. Fung. 5: 693. 1887. — *Pluteus thomsonii* (B. & Br.) Dennis in Trans. Br. mycol. Soc. 31: 206. 1948.

Pluteus cinereus Quél. in Ann. Sci. nat. Bordeaux: pl. 1. 1884.

Pluteus reisneri Velen. in České Houby: 610. 1921.

Pluteus pilatii Velen. in Mykologia 6: 25. 1929 (as *Pluteus pilati*).

Pluteus cinereus var. *venosus* Vaček in Studia bot. Čech. 11: 47. 1948.

Pluteus cinereus f. *typicus* Kühner in Kühn. & Romagn. in Bull. trimest. Soc. mycol. Fr. 72: 199. 1956 (inadmissible epitheton).

Pluteus cinereus f. *evenosus* Kühner in Kühn. & Romagn. in Bull. trimest. Soc. mycol Fr. 72: 181. 1956.

Misapplied name. — *Pluteus godeyi* sensu Kühn. & Romagn., Fl. anal. Champ. sup.: 423. 1953.

Excluded. — *Pluteus thomsonii* sensu Sing. in Trans. Br. mycol. Soc. 39: 216. 1956 (= *Pluteus cinereofuscus*).

Selected descriptions & illustrations. — Kühner in Kühn. & Romagn. in Bull. trimest. Soc. mycol. Fr. 72: 199–206. 1956 (as *P. cinereus* f. *typicus* and f. *evenosus*). — D. Reid in Fung. rar. Ic. col. 2: 20–22, pl. 14 b. 1967.

Subsection **Eucellulodermini** Sing. ex Sing.

Pluteus subsect. *Eucellulodermini* Sing. ex Sing. in Lloydia 21: 274. 1958. — Lectotype: *Pluteus nanus* (Pers.: Fr.) Kumm. (Sing. in Lloydia 21: 275. 1958).

Pluteus sect. *Pruinosi* Imai in J. Fac. Agric. Hokkaido (imp.) Univ. 43: 161. 1938. — Lectotype: *Pluteus nanus* (Pers.: Fr.) Kumm.

Pluteus sect. *Nudi* Imai in J. Fac. Agric. Hokkaido (imp.) Univ. 43: 163. 1938. — Lectotype: *Pluteus phlebophorus* (Ditm.: Fr.) Kumm.

Pluteus [B] *Micaceae* J. Lange in Dansk bot. Ark. 2(7): 4. 1917 (illegetimate, no rank indicated).

Characteristics. — Cheilocystidia rooting in hymenophoral trama; pileipellis from a hymeniderm of elements with $Q < 3$ to transition between hymeniderm and epithelium.

KEY TO THE SPECIES

1a. Pileus white . . . . 30. *P. inquilinus*
b. Pileus orange-red, brown, grey, yellow or olive-tinged, not white 2
2a. Pileus organge-red . . . . 31. *P. aurantiorugosus*
b. Pileus brown, grey, yellow or olive-tinged, not orange-red 3
3a. Stipe chrome yellow, at least at base . . . . 19. *P. romellii*
b. Stipe white, at most slightly yellowish cream at base or grey 4
4a. Pleurocystidia absent or scarce 5
b. Pleurocystidia present and moderately abundant to abundant 7
5a. Spores subglobose to broadly ellipsoid ($\bar{Q}$ = 1.15); cheilocystidia partly rostrate 22. *P. insidiosus*
b. Spores ellipsoid to oblong ($\bar{Q}$ = 1.5 – 1.65); cheilocystidia not rostrate 6
6a. Stipe without caulocystidia; surface of pileus radially splitting and breaking up into granules 20. *P. diettrichii*
b. Stipe, when young, with caulocystidia; surface of pileus glabrous . . . . . 21. *P. poliocnemis*
7a. Pileus dark grey, dark brown, soot-coloured, sometimes with slight olive tinge; surface of pileus becoming 'opaque' when gently rubbed; stipe white greyish striate, or grey all over and then white flocculose when young . . . . 18. *P. nanus*
b. Pileus yellow to dark brown, grey or olive-tinged, not becoming 'opaque' when gently rubbed; stipe white or pale cream, or with distinct bluish or greenish grey tinges in lower part and then not white flocculose when young (group of *P. phlebophorus*). 8
8a. Stipe, at least in lower part, distinctly greenish or bluish grey . . . . 28. *P. cyanopus*
b. Stipe lacking bluish or greenish grey tinges, but white or pale cream at base 9
9a. Edge of lamellae brown at least near margin of pileus . . . . 29. *P. luctuosus*
b. Edge of lamellae concolorous with surface 10
10a. Pileus with distinct papilla . . . . 27 *P. mammifer*
b. Pileus not distinctly papillate, mostly broadly umbonate 11
11a. Pileus yellowish, ochraceous brown, golden yellow at margin, sometimes with olive tinge; brown or hyaline elements of pileipellis in centre lying on a layer of yellow hyphae 23. *P. chrysophaeus*
b. Pileus brown, grey-brown, with or without olive tinges, not yellow 12
12a. Pileus slightly or not hygrophanous, venose to venulose, brown to dark brown 24. *P. phlebophorus*
b. Pileus distinctly hygrophanous, smooth to venulose in centre, grey-brown, brown, with or without olive tinges 13
13a. Pileus greyish brown to brown, with distinct olive tinge, especially when young; pleurocystidia in full-grown basidiocarps mostly narrowly lageniform . . . . 25. *P. cinereofuscus*
b. Pileus dark brown to brown; pleurocystidia broadly utriform to ovoid-oblong in full-grown basidiocarps . . . . 26. *P. pallescens*

18. **Pluteus nanus** (Pers.: Fr.) Kumm.

Agaricus nanus Pers., Syn. meth. Fung.: 357. 1801. — *Agaricus nanus* Pers.: Fr., Syst. mycol. 1: 200. 1821. — *Pluteus nanus* (Pers.: Fr.) Kumm., Führ. Pilzk.: 98. 1871.

Pluteus satur Kühn. & Romagn. in Bull. trimest. Soc. mycol. Fr. 72: 182. 1956 (Compl. Fl. anal. Champ. sup. 8).

Pluteus griseopus P. D. Orton in Trans. Br. mycol. Soc. 43: 356. 1960.

Excluded. — *Pluteus satur* sensu Romagn. in Kühn. & Romagn. in Bull. trimest. Soc. mycol. Fr. 72: 226. 1956 (= *Pluteus pallescens*).

Selected descriptions & illustrations.— Konr. & M., Ic. sel. Fung. 1: pl. 22. 1925; J. Lange, Fl. agar. dan. 2: pl. 72G. 1937; P. D. Orton in Trans. Br. mycol. Soc. 43: 358. 1960.

KEY TO THE FORMAE

1a. Stipe when young entirely covered with floccules . . . . *P. nanus* f. *griseopus*
b. Stipe when young smooth . . . . *P. nanus* f. *nanus*

Pluteus nanus f. **griseopus** (P. D. Orton) Vellinga, *stat. & comb. nov.*

Basionym: *Pluteus griseopus* P. D. Orton in Trans. Br. mycol. Soc. 43: 356. 1960.

Pluteus nanus and *P. griseopus* are usually distinguished on the nature of the stipe surface: glabrous in *P. nanus*, white-flocculose in *P. griseopus* when young. Moreover, Orton (1960: 356) described the colour of the stipe more grey in *P. griseopus* than in *P. nanus*. As these are the only distinctive characters and the stipe of *P. nanus* is not pure white but shows a greyish striation, I (E.C.V.) prefer to reduce *P. griseopus* to a forma of *P. nanus*. The pileipellis structures of *P. griseopus* and *P. nanus* are identical.

19. **Pluteus romellii** (Britz.) Sacc.

Agaricus romellii Britz., Hymenomyc. Südbayern 8: 5. 1891. — *Pluteus romellii* (Britz.) Sacc., Syll. Fung. 11: 44. 1895.

Agaricus nanus var. *lutescens* Fr., Epicr.: 141. 1838 — *Pluteus nanus* var. *lutescens* (Fr.) P. Karst., Ryssl., Finl., Skand. Halföns Hattsvamp.: 256. 1879. — *Pluteus lutescens* (Fr.) Bres., Iconogr. mycol. 11: 544, 1. 1929. — *Pluteus nanus* subsp. *lutescens* (Fr.) Konr. & M., Ic. sel. Fung. 6: 55. 1930.

Pluteus sternbergii Velen., České Houby: 610. 1921.

Pluteus splendidus A. Pears. in Trans. Br. mycol. Soc. 35: 110. 1952.

Misapplied name.—*Pluteus chrysophaeus* sensu Métrod in Revue Mycol. 7: 19. 1943.

Selected descriptions & illustrations.—J. Lange, Fl. agar, dan. 2: pl. 72F. 1937 (as *P. nanus* var. *lutescens*); Stangl. & Bresinsky in Z. Pilzk. 34: 96. 1968; Homola in Mycologia 64: 1243. 1972 (as *P. lutescens* var. *lutescens*); R. Phillips, Paddest. Schimm.: 120. 1981.

On account of the characters mentioned by Velenovský (1921: 610), viz. the combination of the brown pileus and the yellow stipe, *Pluteus sternbergii* is considered as a synonym of *P. romellii*.

Pearson (1952: 110) described *P. splendidus*, macroscopically characterized by the bicoloured aspect of the pileus, chrome yellow at centre and dark yellowish brown elsewhere, and the chrome to lemon yellow stipe. The two collections gathered by Pearson and conserved in K, have been examined: spores 6.0–7.0(–7.4) × (4.8–)5.1–6.0(–6.5) µm, Q = 1.05–1.25, $\bar{Q}$ = 1.15, subglobose to broadly ellipsoid; pleurocystidia broadly clavate to broadly utriform; pileipellis a hymeniderm of narrowly clavate, clavate to spheropedunculate cells, with brown vacuolar pigment. The exsiccates do not show the bicoloured aspect of the pileus; all elements of the pileipellis are filled with brown pigment. On account of the shape of the pleurocystidia and the characters mentioned above this species is regarded as a synonym of *P. romellii*. The oldest collection (*A. A.*

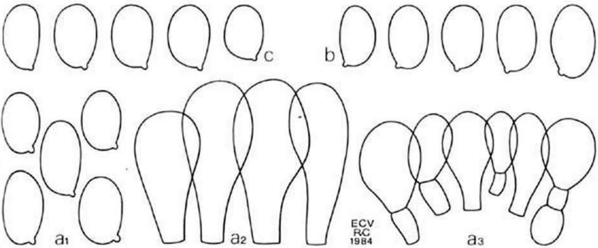

Fig. 10. *Pluteus diettrichii*. — a1. Spores (× 1500). — a2. cheilocystidia (× 1000). — a3. elements of pileipellis (× 500) (a. from lectotype). — b. Spores (× 1500) (*G. Bresadola, 8 July 1903*). — c. Spores (1500 ×) (lectotype of *Pluteus rimulosus*).

Pearson, 27 Sept. 1948, Great Britain, Yorkshire, Masham, Swinton Park (K)) is designated as the lectotype of *P. splendidus.*

20. **Pluteus diettrichii** Bres. — Fig. 10

Pluteus diettrichii Bres. in Annls mycol. 3: 160. 1905.
Pluteus rimulosus Kühn. & Romagn. in Bull. trimest. Soc. mycol. Fr. 72: 182. 1956.
Selected illustrations & descriptions. — Bres., Iconogr. mycol. 11: pl. 546. 1929; Kühn. & Romagn. in Bull. trimest. Soc. mycol. Fr. 72: 195–197, 224–226. 1956 (as *P. rimulosus*).

The two collections mentioned by Bresadola (1905: 160) and conserved in the Bresadola herbarium in Stockholm (S) have been studied; their characters are:

'*Diettrich*, Oct. 1904, Arco, in agris':
Spores (8.2–)8.3–10.8(–11.6) × (5.3–)5.6–6.3(–6.8) µm, Q = 1.4–1.75(–1.85), $\bar{Q}$ = 1.55; pleurocystidia absent; cheilocystidia 25–37 × 10–16 µm, narrowly clavate, some narrowly utriform; elements of pileipellis 25–42 × (12–)13–25 µm, narrowly clavate to spheropedunculate, with brown vacuolar pigment; stipitepellis a cutis of 4–5 µm wide cylindrical pale brown hyphae.

'*Bresadola*, 8 July 1903, Gocciadoro':
Spores 8.4–10.0(–10.1) × (5.1–)5.2–6.3(–6.5) µm, Q = 1.55–1.8(–1.85), $\bar{Q}$ = 1.65; pleurocystidia absent; cheilocystidia 28–56 × 11–25 µm, narrowly clavate to narrowly utriform; elements of pileipellis 42–62 × 24–42 µm, narrowly clavate to spheropedunculate, with brown vacuolar pigment; stipitepellis a cutis of 9–15 µm wide cylindrical hyphae.
The surface of the pileus of both exsiccata is radially splitting towards the margin and the underlying white context is showing.

In addition one of the original collections of *P. rimulosus* Kühn. & Romagn. has been studied (*H. Romagnesi*, 22 July 1947, France, dept. Seine-et-Oise, Luzarches; herb. H. Romagnesi). The characters found agree with the description (1956: 226):

Spores (7.5–)7.6–9.0(–9.2) × (5.2–)5.4–5.9(–6.2) µm, Q = (1.35–)1.4–1.6, $\bar{Q}$ = 1.5; pleurocystidia absent; cheilocystidia (36–)42–56(–61) × (15–)16–29(–32) µm, narrowly clavate to clavate; elements of pileipellis (30–)33–53(–58) × 18–32(–36) µm, with brown vacuolar pigment; stipitepellis a cutis of cylindrical 5–10 µm wide hyphae. This collection is designated as lectotype of *P. rimulosus*.

Pluteus rimulosus is considered as a synonym of *P. diettrichii* on account of the characters mentioned above, viz. the shape of the spores, the absence of pleurocystidia, the shape of the elements in the pileipellis, and macroscopically the surface of the pileus. The difference in spore-size between Bresadola's collections and the collection made by Romagnesi is insufficient for considering them as non-conspecific.

Diettrich's collection of *P. diettrichii* is chosen as the lectotype of the species, because of the presence of macroscopic notes with this collection; both collections in the Bresadola herbarium are in good condition.

21. **Pluteus poliocnemis** Kühner

Pluteus poliocnemis Kühner in Kühn. & Romagn. in Bull. trimest. Soc. mycol. Fr. 72: 182. 1956.

Selected illustration & description. — Kühner in Kühn. & Romagn. in Bull. trimest. Soc. mycol. Fr. 72: 197–199. 1956.

22. **Pluteus insidiosus** Vellinga & Schreurs, *spec. nov.* — Fig. 11

Pileus 25–40 mm, planoconvexus vel planus, leviter umbonatus, hygrophanus, humidus in centro fuscobrunneo-ater, ad marginem brunneus, margine striatula, in siccitate brunneus, venulosus in disco vel glaber. Lamellae liberae, ex roseae incarnatae vel brunneo-roseae, ad aciem integrae. Stipes 35–45 × 3–4 mm, aequalis vel leviter incrassatus ad basim, albidus vel argenteo-griseus, fibrillosus, glaber. Caro in pileo ex grisea in siccitate albida; in stipite grisea vel albida. Odor et sapor nulli. Sporae (5.5–)6.0–8.0(–8.5) × (5.0–)5.5–7.0(–7.5) µm, subglobosae vel late ellipsoideae. Pleurocystidia absentia vel rara. Cheilocystidia non densa, tenuiter clavata, tenuiter utriformia, vel acute fusiformia, nonnulla rostrata. Pileipellis hymenidermium elementorum sphaeropedunculatorum vel clavatorum brunneo-vacuolatorum. Ad truncos *Alni* et *Fagi*; VIII–X. — Holotypus: '*M. E. Noordeloos 983*, 22-VIII-1979, loampits, Buren, prov. Gelderland, Netherlands' (L).

Pileus 25–40 mm, planoconvex, applanate, with low umbo, slightly hygrophanous, when moist very dark brown to black in centre, pallescent towards margin to dark brown or brown (Munsell 7.5 YR 2/1 – 3/3), with translucently striate margin, on drying pallescent to brown (Munsell 7.5 YR 4/4), in centre venulose or smooth. Lamellae (L = 48–72 / l = 0–3) fairly crowded, free, slightly ventricose, up to 5 mm broad, first pink, later incarnate, sordid or brownish pink, with even concolorous edge. Stipe 35–45 mm, cylindrical or slightly broadening downwards, solid, whitish or silverish grey, innately fibrillose, glabrous and shiny. Context in pileus hygrophanous, when moist grey, pallescent on drying to whitish; in stipe concolorous with surface. Smell absent or bitterish; taste absent or slightly unpleasant.

Spores (5.5–)6.0–8.0(–8.5) × (5.0–)5.5–7.0(–7.5) µm, Q = 1.05–1.25(–1.4), $\bar{Q}$ = 1.15, subglobose to broadly ellipsoid, a few ellipsoid. Basidia (21–)27–36(–43) × 6–9(–11) µm, 4-spored. Pleurocystidia absent or very rare, 45–75 × 19–40 µm, utriform to broadly utriform, thin-walled and colourless. Cheilocystidia not crowded, (23–)26–44(–50) × (7–)8–14(–19) µm, clavate to narrowly subutriform, some

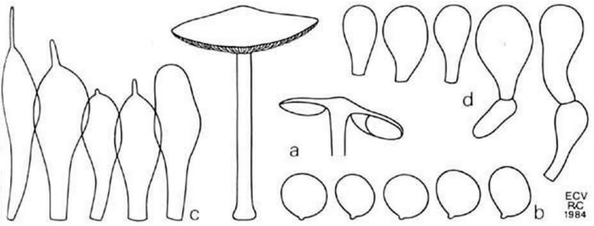

Fig. 11. *Pluteus insidiosus*, type. — a. Habit (× 1). — b. Spores (× 1500). — c. Cheilocystidia (× 1000). — d. Elements of pileipellis (× 500).

with narrow, needle-like, 3 – 40 µm long appendix at apex, colourless or with granular colourless content. Pileipellis a hymeniderm of spheropedunculate to narrowly clavate elements, (23 –)42 – 50(– 60) × (10 –)15 – 24(– 33) µm, with date brown vacuolar pigment. Stipitepellis a cutis of cylindrical, colourless, 4 – 10 µm wide hyphae; caulocystidia not present.

Habitat. — Solitary on stumps of deciduous trees (*Alnus, Fagus*) in resp. Alnetum and Fagetum nudum; August – October.

Collections examined. — NETHERLANDS, prov. Gelderland: Buren, loam-pits, 22 Aug. 1979, *M. E. Noordeloos 983* (coll. J. Schreurs 315, holotype, L); ibidem, 22 Aug. 1979, *M. E. Noordeloos s.n.*, (coll. J. Schreurs 316 L). — GERMAN FEDERAL REPUBLIC, Rheinland-Pfalz: Gees, Reichswald, 5 Oct. 1979, *J. Schreurs 354* (L).

Macroscopically *Pluteus insidiosus* resembles *P. nanus* and *P. phlebophorus*, but microscopically it is easily distinguished by the characteristic cheilocystidia and the absence of pleurocystidia, two features it has in common with *P. thomsonii* from which it can easily be separated on account of a different type of pileipellis and stipe-covering.

23. **Pluteus chrysophaeus** (Schaeff.) Quél.

Agaricus chrysophaeus Schaeff., Fung. Bavariae 4: 67. 1774. — *Agaricus leoninus g chrysophaeus* (Schaeff.) Fr.: Fr., Syst. mycol. 1: 199. 1821. — *Pluteus chrysophaeus* (Schaeff.) Quél. in Mém. Soc. Emul. Montbéliard, sér. II, 5: 82. 1872 (Champ. Jura Vosges 1).

Pluteus luteovirens Rea in Trans. Br. mycol. Soc. 12: 208. 1927.

Pluteus galeroides P. D. Orton in Trans. Br. mycol. Soc. 43: 354. 1960

Pluteus xanthophaeus P. D. Orton in Trans. Br. mycol. Soc. 43: 366. 1960.

Misapplied names. — *Pluteus leoninus* sensu P. Karst., Ryssl., Finl. Skand. Halföns Hattsvamp.: 257. 1879; sensu Sing. in Beih. bot. Cbl. 46 (2. Abt.): 105. 1930; sensu Imai in J.Fac. Agric. Hokkaido (imp.) Univ. 43: 163. 1938; sensu Romagn. in Kühn. & Romagn. in Bull. trimest. Soc. mycol. Fr. 72: 233. 1956.

Excluded. — *Agaricus chrysophaeus* sensu Fr., Epicr.: 142. 1838 (= *P. phlebophorus*). — *Pluteus chrysophaeus* sensu Fay. in Ann. Sci. nat., Bot. sér. VII, 9: 364. 1889 (= *Inocybe* spec.). —

Pluteus chrysophaeus sensu Métrod in Revue Mycol. 7: 19. 1943 (= *P. romellii*). — *Pluteus chrysophaeus* sensu Kühn. & Romagn., Fl. anal. Champ. sup.: 424. 1953 (= *P. phlebophorus*).

Selected descriptions & illustrations. — J. Lange, Fl. agar. dan. 2: pl. 72D. 1937; Romagn. in Kühn. & Romagn. in Bull. trimest. Soc. mycol. Fr. 72: 233–236. 1956 (as *P. leoninus*); P. D. Orton in Trans. Br. mycol. Soc. 43: 354, 366. 1960 (as *P. galeroides* and *P. xanthophaeus*); D. Reid, Fung. rar. Ic. col. 3: 18–21. 1968 (as *P. xanthophaeus*); R. Phillips, Paddest. Schimm.: 120. 1981 (as *P. luteovirens*).

Unlike Kühner & Romagnesi (1953: 424) and Orton (1960: 367) we consider *Pluteus chrysophaeus* and *P. phlebophorus* as two distinct species. This opinion is based mainly on a careful re-examination of Schaeffer's original description (1774: 67).

Judging from the original plate (conserved in K) – showing a slender white-stiped *Pluteus* with an umbonate yellow-brown pileus – *P. luteovirens* Rea is identical with *P. chrysophaeus*, just as, in our opinion, *P. galeroides* P. D. Orton and *P. xanthophaeus* P. D. Orton are conspecific with *P. chrysophaeus*. Microscopically these four 'species' are inseparable; macroscopically they only differ in colour, – yellow-brown, straw-coloured or more lemon yellow –, differences considered of minor importance by us.

24. **Pluteus phlebophorus** (Ditm.: Fr.) Kumm.

Agaricus phlebophorus Ditm. in Sturm, Deutschl. Fl. 3: 31. 1817. — *Agaricus phlebophorus* Ditm.: Fr., Syst. mocol. 1: 200. 1821. — *Pluteus phlebophorus* (Ditm.: Fr.) Kumm., Führ. Pilzk.: 98. 1871. — *Pluteus chrysophaeus* var. *phlebophorus* (Ditm.: Fr.) Quél., Fl. mycol. France: 185. 1888. — *Pluteus nanus* subsp. *phlebophorus* (Ditm.: Fr.) Konr. & M., Ic. sel. Fung. 1: 23. 1925.

Misapplied names. — *Agaricus chrysophaeus* sensu Fr., Epicr.: 142. 1838. — *Pluteus chrysophaeus* sensu Kühn. & Romagn., Fl. anal. Champ. sup.: 424. 1953; sensu Kühn. in Kühn. & Romagn. in Bull. trimest. Soc. mycol. Fr. 72: 206. 1956.

Selected descriptions & illustrations. — Konr. & M., Ic. sel. Fung. 1: pl. 23. 1925 (as *P. nanus* subsp. *phlebophorus*); J. Lange, Fl. agar. dan. 2: pl. 72E. 1937; Kühner in Kühn. & Romagn. in Bull. trimest. Soc. mycol. Fr. 72: 206–208. 1956 (as *P. chrysophaeus*).; Sing. in Trans. Br. mycol. Soc. 39: 207. 1956.

Pluteus phlebophorus, and the taxa around it, viz. *P. chrysophaeus*, *P. cinereofuscus*, *P. pallescens*, *P. mammifer*, *P. cyanopus* and *P. luctuosus*, form a taxonomically difficult group, as they cannot always clearly be separated from each other. For that reason it might sometimes turn out impossible to name individual specimens accurately. The main characters to distinguish these taxa are colour of the pileus (varying from yellow to dark brown or olive grey-brown), colour of the stipe (white to greenish or bluish grey), hygrophanity of the pileus (from not to slightly to very distinctly), colour of the edge of lamellae (white or brown), and shape of the pleurocystidia (narrowly lageniform to broadly utriform).

This difficulty in clearly delimiting the above-mentioned taxa seems to be caused by a comparatively recent speciation; it might even be possible that these taxa are still in a process of incipient speciation. More insight in these processes could be obtained from genetical experiments.

The differences with *P. nanus* are to be found in the structure of the pileipellis: elements loosely arranged in *P. nanus* and more tightly packed in the *P. phlebophorus*-group.

25. **Pluteus cinereofuscus** J. Lange

Pluteus cinereofuscus J. Lange in Dansk bot. Ark. 2(7): 9. 1917.
Pluteus olivaceus P. D. Orton in Trans. Br. mycol. Soc. 43: 359. 1960.
Pluteus nanus var. *major* Cooke ex Mass., Br. Fung. Fl. 2: 288. 1893.

Misapplied names. — *Pluteus godeyi* sensu J. Lange in Dansk bot. Ark. 2(7): 8. 1917; sensu P. D. Orton in Trans. Br. mycol. Soc. 43: 349. 1960. — *Pluteus thomsonii* sensu Sing. in Trans. Br. mycol. Soc. 39: 216. 1956.

Selected descriptions & illustrations. — J. Lange, Fl. agar. dan. 2: pl. 71G. 1937. — Kühner in Kühn. & Romagn. in Bull. trimest. Soc. mycol. Fr. 72: 210–212. 1956. — Mal. & Bert., Fl. Champ. sup. Maroc. 1: 95. 1970.

Orton (1969: 359) has described *Pluteus olivaceus* as a species very close to *P. cinereofuscus*, differing from *P. cinereofuscus* in the moist cap being more distinctly olive-tinged and in broader pleurocystidia. In our opinion the former character is of minor importance, as young specimens of *P. cinereofuscus* are more olive-tinged than old ones. Also the difference in shape of pleurocystidia is dependent of age: in young specimens broad and little differentiated cystidia occur; in old specimens pleurocystidia are narrowly lageniform to narrowly utriform. In conclusion, we consider *P. olivaceus* a synonym of *P. cinereofuscus*.

Pluteus godeyi in the sense of Lange (1917: 8) and Orton (1960: 349) is a small variant of *P. cinereofuscus*. *Pluteus godeyi* as originally described by Gillet (1876: 395) is a doubtful species. On account of the following combination of characters: pileus very glabrous, rugulose and slightly viscid, lamellae thick, subdistant and interveined, its place within the genus *Pluteus* is not sure.

26. **Pluteus pallescens** P. D. Orton

Pluteus pallescens P. D. Orton in Trans. Br. mycol. Soc. 43: 360. 1960.

Misapplied names. — *Pluteus umbrinellus* sensu Huijsman in Fungus 25: 38. 1955. — *Pluteus satur* sensu Romagn. in Kühn. & Romagn. in Bull. trimest. Soc. mycol. Fr. 72: 227–230. 1956.

Selected descriptions & illustrations: Huijsman in Fungus 25: 38–39. 1955 (as *P. umbrinellus*); Romagn. in Kühn. & Romagn. in Bull. trimest. Soc. mycol. Fr. 72: 227–230. 1956 (as *P. satur*); P. D. Orton inTrans. Br. mycol. Soc. 43: 360–361. 1960.

27. **Pluteus mammifer** Romagn.

Pluteus mammifer Romagn. in Bull. trimest. Soc. mycol. Fr. 94: 375. ('1978') 1979.

Selected description & illustration. — Romagn. in Bull. trimest. Soc. mycol. Fr. 94: 374–376. ('1978') 1979.

28. **Pluteus cyanopus** Quél.

Pluteus cyanopus Quél. in C. R. Ass. franç. Av. Sci. (Rochelle, 1882) 11: 6. 1883 (Champ. Jura Vosges Suppl. 11). — *Pluteus chrysophaeus* var. *cyanopus* (Quél.) Quél., Fl. mycol. France: 185. 1888.

Pluteus metrodii Mal. & Bert., Fl. Champ. sup. Maroc 1: 98. 1970 (not validly published, no Latin diagnosis).

Selected descriptions & illustrations. — Bres., Iconogr. mycol. 11: pl. 543 fig. 2. 1929; Métrod in Revue Mycol. 7: 17. 1943; Mal. & Bert., Fl. Champ. sup. Maroc 1: pl. 4. 1970; Homola in Mycologia 64: 1226. 1972; Derbsch in Z. Pilzk. 43: 181. 1977.

Métrod (1943: 17) has given a description of *Pluteus cyanopus* Quél., but according to Malençon & Bertault (1970: 98), Métrod's material differs from the real *P. cyanopus* in the following characters: stipe bluish green versus blue, pleuro- and cheilocystidia both being fusiform and of the same size in Métrod's material, versus pleurocystidia ventricose-fusiform and cheilocystidia clavate and smaller than pleurocystidia in their specimens of the true *P. cyanopus*. Malençon & Bertault introduced the name *P. metrodii* for the blue-tinged species described by Métrod.

In the Netherlands' collections examined the colour of the stipe varies from bluish to bluish-greenish grey and the shape of pleuro- and cheilocystidia varies from clavate to lageniform or ventricose-fusiform. On account of this variation *P. metrodii* is reduced to a synonym of *P. cyanopus.*

29. **Pluteus luctuosus** Boud.

Pluteus luctuosus Boud. in Bull. trimest. Soc. mycol. Fr. 21: 70. 1905. — *Pluteus marginatus* var. *luctuosus* (Boud.) Kühn. & Romagn., Fl. anal. Champ. sup.: 424. 1953 (not validly published, basionym not mentioned).

Pluteus phlebophorus var. *marginatus* Quél. in C. R. Ass. franç. Av. Sci. (Blois, 1884) 13: 2. 1885 (Champ. Jura Vosges Suppl. 13). — *Pluteus marginatus* (Quél.) Bres., Iconogr. mycol. 11: 546, 2. 1929.

Selected descriptions. — Kühner in Bull. mens. Soc. linn. Lyon 3: 50. 1935; Huijsman in Fungus 25: 36. 1955; Romagn. in Kühn. & Romagn. in Bull. trimest. Soc. mycol. Fr. 72: 230–233. 1956 (as *P. marginatus*).

30. **Pluteus inquilinus** Romagn.

Pluteus inquilinus Romagn. in Bull. trimest. Soc. mycol. Fr. 94: 377. ('1978') 1979.

Pluteus alborugosus Kühner in Kühn. & Romagn., Fl. anal. Champ. sup.: 423. 1953 (not validly published, no Latin diagnosis).

Misapplied name. — *Pluteus semibulbosus* sensu J. Lange in Dansk bot. Ark. 2(7): 8. 1917; sensu P. D. Orton in Trans. Br. mycol. Soc. 43: 349. 1960.

Selelected illustration. — J. Lange, Fl. agar. dan. 2: pl. 71C. 1937 (as *P. semibulbosus*).

In Lange's (1917: 8) concept *Pluteus semibulbosus* is a species with a pileipellis consisting of spheropedunculate elements and a nearly completely glabrous stipe. But the original description by Lasch (in Fries, 1838: 141) gives the following characters of pileus and stipe: 'pileo atomato-molli, stipite subtiliter fistuloso pubescente, basi bullato'. In our opinion this evidently is a species with a pileipellis made up of more elongate elements, also on account of the stipe-covering, representing a white variant of *P. plautus.*

Kühner (1953: 423) gave a new, be it invalid, name, viz. *P. alborugosus*, to Lange's taxon, which according to Lange (1917: 8) is characterized by long and narrow (up to

115 µm long) pleurocystidia. Records of this species from Europe are rare. The white cellulodermal *Plutei* found, usually miss the conspicuous narrow pleurocystidia (e.g. Reijnders, 1982: 72) and have pleurocystidia that are slenderly utriform to conical-fusiform, up to 80 µm long. However, one collection from the Netherlands showed long narrow pleurocystidia and in addition more obtuse and shorter ones. The long pleurocystidia were the most conspicuous in the fresh specimen, but were collapsed in the exsiccate. On account of these data all white specimens with a ± one-layered hymeniderm of clavate to spheropedunculate elements and long and narrow and/or shorter and broader pleurocystidia are considered here as belonging to one species of which *P. inquilinus* is the correct name.

Pluteus inquilinus, based on a collection of small specimens from an a-typical habitat, viz. on *Carex* and *Phragmites*-rests in a swamp, is in contrast with *P. alborugosus* validly published. In Romagnesi's opinion it differs in shape of pleurocystidia and habitat from *P. alborugosus*. However, as noted above, shape and size of pleurocystidia of *P. alborugosus* are very variable, whereas habitat differences hardly allow for the description of a new species.

On account of the presence of the very long and slender pleurocystidia, *P. inquilinus* is definitely not a white variant of one of the coloured species of this subsection, but a true species.

Other white species belonging to this subsection are the American species *P. roseocandidus* Atk., *P. pallidus* Homola and *P. hololeucus* Sing; the first differing in the pileipellis consisting of 2 to 3 layers of subglobose to clavate elements; *P. pallidus* in a slightly pigmented pileus and *P. hololeucus*, with the strongest resemblance to *P. inquilinus*, in relatively small pleurocystidia (up to 60 × 20 µm) and small spores, viz. 5.5–6.5(–7.0) × (4.5–)5.0–5.5(–6.0) µm (in *P. inquilinus*: (6.0–)6.5–8.0(–9.0) × 5.5–6.5(–7.0) µm). *Pluteus pallidus* has been recorded also from Europe (Singer, 1977: 125).

31. **Pluteus aurantiorugosus** (Trog) Sacc.

Agaricus aurantiorugosus Trog in Mittheil. Naturf. Gesell. Bern 388: 32. 1857. — *Pluteus aurantiorugosus* (Trog) Sacc. in Beibl. Hedwigia 35, 7: 5. 1896.

Pluteus leoninus var. *coccineus* Mass., Br. Fung. Fl. 2: 291. 1893. — *Pluteus coccineus* (Mass.) J. Lange, Fl. agar. dan. 2: 88. 1937.

Pluteus caloceps Atk. in Annls mycol. 7: 373. 1909.

Selected descriptions & illustrations. — J. Lange, Fl. agar. dan. 2: pl. 72C. 1937 (as *P. coccineus*); — A. Pears. in Trans. Br. mycol. Soc. 35: 109. 1952 (as *P. caloceps*).

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STUDIES IN INOCYBE–I

Revision of the new taxa of Inocybe described by Velenovský

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The 58 new taxa of *Inocybe* described by Velenovský have been revised. Several do not belong to the genus *Inocybe* as currently defined. Most species names are reduced to synonymy, but a few name changes are necessary. One new combination is proposed.

Professor Josef Velenovský (1858–1949) has been the author of a great number of new genera and new species, both in the Basidiomycetes and the Ascomycetes. His best known work is Ceské Houby (1920–1922) written in Czech language, and therefore not easily accessible to foreign mycologists. Fortunately, Pilát (1948) provided a Latin translation of all new taxa on the occasion of Velenovský's ninetieth birthday. A number of new taxa has also been described in Novitates mycologicae (1939) and Novitates mycologicae novissimae (1947).

However, to date only a part of Velenovský's new taxa has been revised, the major revisions being those by Kotlaba (1977) of new taxa in the polypores, and Svrček (1978) of new taxa in the operculate Discomycetes. Even less attention has been paid to a critical revision of his Agaricales. Besides a few revisions of smaller groups, Noordeloos (1979, 1980) studied all types of entolomatoid fungi.

It seems rather surprising that one mycologist has been responsible for the creation of so many new taxa (according to Pilát (1958) there are altogether 2727 new species). An explanation for this phenomenon has been offered by Kotlaba (1977), whose conclusions are summarized below:

1. Velenovský overestimated the importance of morphological variability typical for many fungi. Quite a lot of slightly aberrant variants were described as new species. It is therefore not surprising to discover that he described some species more than once.
2. He described many of his new species from very limited material, sometimes only a single specimen. This seriously hampers a critical evaluation of character variability.
3. The descriptions of his new species were founded primarily on macroscopical characters, as Velenovský was trained as a phanerogamist. His descriptions of microscopical characters are almost always too short, and quite often faulty, because he used a microscope of a poor quality.
4. He did not possess a good knowledge, even of the common species.
5. While collecting mushrooms, he sometimes mixed fruitbodies of different species of fungi. Some of his descriptions therefore refer to a mixture of species; this could provide an explanation for the curious set of characters of *Inocybe nuda*.

6. His knowledge of the mycological literature was limited, and he used mainly the works by Fries, Saccardo and Ricken. When he failed to find the fungus among their descriptions, he described it as new.

For that reason it comes as no surprise when after a critical revision the great majority of his new taxa are reduced to synonymy. The revision of his *Inocybes*, 57 new species and 1 new variety, does not form an exception to this rule.[1]

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Inocybe albicans—Fig. 1

Inocybe albicans Velen., České Houby: 367. 1920. — Holotypus: Velenovský, VIII. 1915, Mnichovice (PRC; bottle 151).

The type is well-preserved and shows the following microscopical characters. — Spores 7.0–8.0 × 5.0–5.5 μm, Q = 1.3–1.5(–1.6), with 10–16 pronounced knobs. Pleuro- and cheilocystidia (41–)43–50(–52) × 11–14 μm, cylindrical to subfusiform, sessile, very thick-walled, wall up to 4 μm, yellow. Velipellis with thick-walled, non-encrusting, cystidioid hyphae.

This is *I. petiginosa* (Fr.: Fr.) Gillet.

Another collection labeled *I. albicans* (PRC; bottle 149; VII. 1916, Chuchle) was not mentioned by Velenovský (1920: 368); it clearly is a determination error by the Czech mycologist, as it represents a species of Sect. *Cervicolores* Sing.

Inocybe albomarginata—Fig. 2

Inocybe albomarginata Velen., České Houby: 379. 1920. — Lectotypus (select. mihi): Velenovský, VIII.1915, Mnichovice (PRC; bottle 119).

The type-collection is heterogeneous, consisting of 4 specimens with angular spores and 1 specimen with smooth spores. This specimen is regarded here as the lectotype, showing the following microscopical characters. — Spores 6.5–8.0 × 4.0–5.0 μm, Q = 1.6–1.7(–1.8), smooth, slightly inaequilateral, with obtuse apex. Pleuro- and cheilocystidia (41–)42–54(–57) × (13–)15–17 μm, cylindrical to fusiform, slightly thick-walled, wall to 1.5 μm, hyaline. Caulocystidia present almost to base of stipe, identical to cheilocystidia.

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[1] The magnifications in the text-figures are as follows: spores × 1500, cystidia × 1000.

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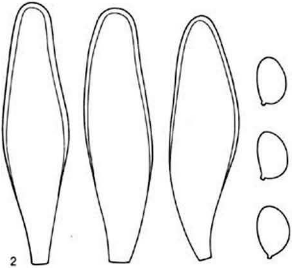

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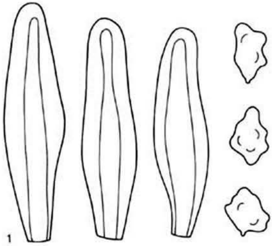

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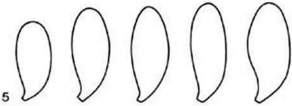

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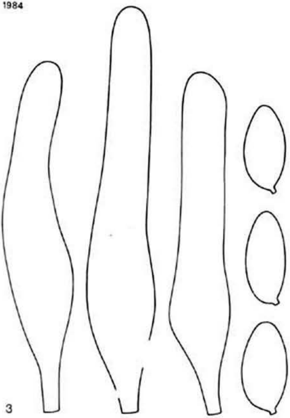

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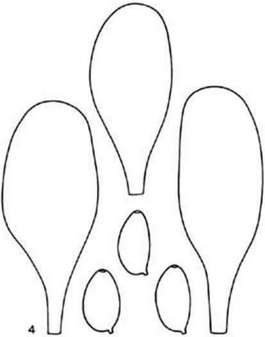


Fig. 1. *Inocybe albicans*, spores, pleurocystidia. — Fig. 2. *Inocybe albomarginata*, spores, pleurocystidia. — Fig. 3. *Inocybe annulata*, spores, pleurocystidia. — Fig. 4. *Inocybe autumnalis*, spores, pleurocystidia. — Fig. 5. *Inocybe avenacea*, spores.

The marginately bulbous stipe with caulocystidia all over, and the small spores clearly establish *I. albomarginata* as an older synonym of *I. reducta* J. Lange.

Stangl & Veselský (1973: 23) failed to locate the type and therefore designated a neotype. This neotypification must now be superseded.

Inocybe annulata — Fig. 3

Inocybe annulata Velen., České Houby: 371. 1920. — Lectotypus (select. mihi): Velenovský, VII.1919, Mnichovice (PRC; bottle 85).

One well-preserved specimen was found, at present without a ring, with the following microscopical characters. — Spores (11.0–)11.5–13.5(–14.0) × 5.5–6.5 μm, Q = 1.9–2.3, smooth, amygdaliform to limoniform, without germ-pore. Basidia 2-spored, without clamp. Cheilo- and pleurocystidia (49–)50–69(–70) × 10–14(–15) μm, cylindrical to sublageniform, thin-walled. Pileipellis a hymeniderm of clavate to spheropedunculate, colourless cells, 15–28 μm broad.

There can be no doubt that it represents *Agrocybe erebia* (Fr.: Fr.) Kühner, as already suggested by Svrcek (1966: 70), who was unable, however, to locate authentic material.

Inocybe autumnalis — Fig. 4

Inocybe autumnalis Velen., České Houby: 372. 1920. — Holotypus: Velenovský, X.1919, Kosoř (PRC; bottle 350).

As the contents of this bottle were completely dried out, the material was difficult to study. — Spores 8.0–9.5 × 5.0–5.5 μm, Q = (1.5–)1.6–1.8(–1.9), amygdaliform, with germ-pore. Basidia 4-spored, clamped. Cheilo- and pleurocystidia 53–62 × 15–20 μm, clavate to slenderly utriform, thin-walled. Pileipellis impossible to study.

On account of the conspicuously wrinkled pileus, suggesting a hymeniderm, and the microscopical characters, this species belongs in *Agrocybe*, where it keys out as *A. brunneola* sensu J. Lange. According to Watling (1983: 266) this species is in need of a new epithet, and therefore the following new combination is proposed: **Agrocybe autumnalis** (Velen.) Kuyp., *comb. nov.* (Basionym: *Inocybe autumnalis* Velen., České Houby: 372. 1920). It might be added that Velenovský (in Pilát, 1948: 124) already pointed out its resemblance to *Agrocybe erebia*.

Inocybe avenacea — Fig. 5

Inocybe avenacea Velen., České Houby: 387. 1920. — Holotypus: Velenovský, VII.1918, Mnichovice (PRC; bottle 435).

The material was completely dried out. — Spores (12.5–)13.0–15.0 × 5.5–6.5 μm, Q = (2.0–)2.2–2.4(–2.5), very pale, smooth, with a distinct hilary depression. Cheilocystidia not observed, but not metuloid.

This species belongs to *Lepiota* sect. *Lepiota*, where it keys out near *L. clypeolaria* (Bull.: Fr.) Kumm. The bad state of this collection does not permit a reliable determination, however.

Inocybe bubaci — Fig. 6

Inocybe bubaci Velen., České Houby: 378. 1920.

No type-material was found at PRC, nor at PR. However, there exists a more recent collection made by Velenovský (X. 1937, Mnichovice, PR 153848) with the following microscopical characters. — Spores 9.0–10.0(–10.5) × 5.5–6.0 µm, Q = 1.6–1.7(–1.8), smooth, subamygdaliform, with subconical apex. Cheilo- and pleurocystidia (45–)49–57(–58) × 15–18(–20) µm, subfusiform to subutriform, a few slenderly clavate, thick-walled, wall up to 4.0 µm, pale yellow. Caulocystidia present at base of stipe, similar to cheilocystidia.

This collection probably represents *I. hirtella* Bres.; it could be added that Velenovský himself (in Pilát 1948: 128) stated that *I. bubaci* was related to *I. hirtella*.

Inocybe caespitosa — Fig. 7

Inocybe caespitosa Velen., České Houby: 917. 1922. — Holotypus: Velenovský, IX.1920, near Mnichovice (PRC; bottle 97).

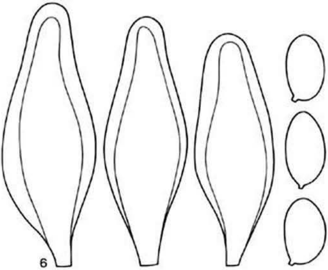
The type is well-preserved and showed the following microscopical characters. — Spores 8.0–10.0 × 5.0–5.5 µm, Q = (1.5–)1.6–1.9(–2.0), smooth, pale brownish yellow, somewhat inaequilateral, without germ-pore. Pleurocystidia (59–)64–79(–83) × 14–17(–18) µm, cylindrical to sublageniform, thick-walled, wall to 3.0 µm. Cheilocystidia finally as pleurocystidia. Pileipellis a hymeniderm of clavate, hyaline elements, rather difficult to study.

The densely clustered habit, structure of pileipellis and the presence of metuloid cystidia are typical of *Psathyrella* sect. *Homophron*, where it keys out as *P. spadicea* (Schaeff.) Sing.

Inocybe calida — Fig. 8

Inocybe calida Velen., České Houby: 366. 1920. — Holotypus: Velenovský, VII.919, Mnichovice (PRC; bottle 48).

I noted the following characters on the type-collection. — Spores 9.0–11.0 × 7.0–8.0(–8.5) µm, Q = 1.2–1.4(–1.5), with 10–15 distinct knobs, some spores even star-shaped. Cheilo- and pleurocystidia (61–)64–69 × 17–22 µm, fusiform to subutriform, thick-walled, wall up to 3.0 µm. Caulocystidia similar to cheilocystidia, descending to base of stipe.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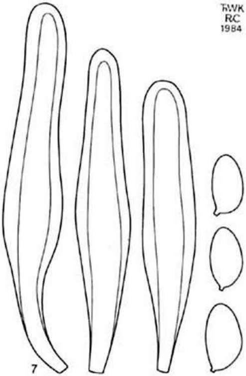

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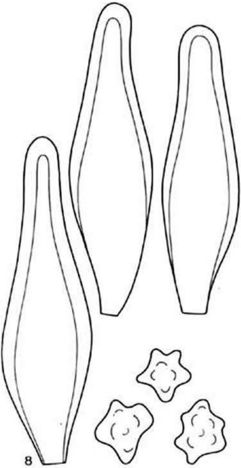
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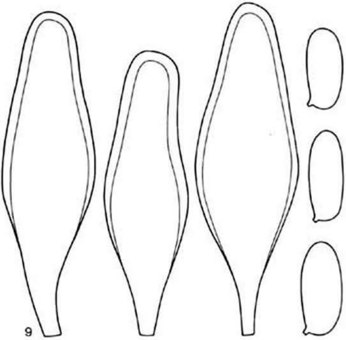
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Fig. 6. *Inocybe bubaci*, spores, pleurocystidia. — Fig. 7. *Inocybe caespitosa*, spores, pleurocystidia. — Fig. 8. *Inocybe calida*, spores, pleurocystidia. — Fig. 9. *Inocybe carbonaria*, spores, pleurocystidia.

Although there are some conspicuous discrepancies with the original description, as Velenovský (in Pilát 1948: 120) described the stipe as being non-bulbous, whereas this collection has marginate bulb, I feel confident that it represents the type, and that it is identical to *I. brunneorufa* Stangl & Veselský, for which species the epithet *calida*, being the older, must stand.

Inocybe carbonaria — Fig. 9

Inocybe carbonaria Velen., České Houby: 379. 1920, non *Inocybe carbonaria* (Fr.: Fr.) Roze in Bull. Soc. bot. Fr. 23: 113. 1876. — Holotypus: Velenovský VI.1919, Běchovice (PRC; bottle 362).

As the material has been dried out completely, it was difficult to study. — Spores 11.0–13.0(–14.0) × 5.0–6.0 µm, Q = 2.0–2.3, smooth, cylindrical, with a hilary depression. Cheilo- and pleurocystidia 52–71 × 20–25(–26) µm, fusiform to utriform, with rounded apex, slightly thick-walled, wall to 1.0 µm. Covering of stipe not studied.

On account of these characters the species does belong to *I. lacera* (Fr.: Fr.) Kumm. For the time being, I regard it as a minor variant, but it might deserve varietal rank because of its habitat and somewhat deviating cystidia with a rounded apex.

Inocybe carpinacea — Fig. 10

Inocybe carpinacea Velen., Novit. mycol. nov.: 60. 1947. — Holotypus: Velenovský, 4. IX.1941, Mnichovice (PR 153863).

Spores 6.5–8.0 × 5.0–6.0 µm, Q = 1.3–1.5(–1.6), angular-nodulose, with 6–10 indistinct knobs. Cheilo- and pleurocystidia (40–)42–48(–51) × 12–15 µm, cylindrical, sometimes subfusiform, sessile, thick-walled, wall to 3.5 µm, intensely yellow. Caulocystidia descending to base of stipe, similar to cheilocystidia.

This is *I. petiginosa* (Fr.: Fr.) Gillet.

Inocybe casimiri — Fig. 11

Inocybe casimiri Velen., České Houby: 369. 1920. — Holotypus: Velenovský, VII. 1916, Jevany (PRC; bottle 273).

The material is rather badly preserved, as the bottle seems to have been dried out, and refilled at a later time. I noted the following characters. — Spores 10.0–11.5 × (7.5–)8.0–9.0 µm, Q = (1.2–)1.3–1.4, nodulose, with 16–22 pronounced nodules, some spores subspinose. Cheilocystidia 38–51(–54) × (9–)10–15 µm, cylindrical to subutriform, thin-walled or minutely thick-walled, wall less than 0.5 µm. Pleurocystidia absent.

This is *I. leptophylla* Atk.

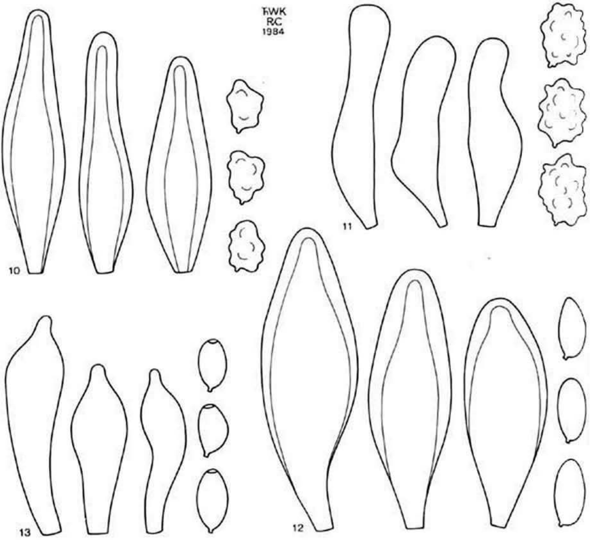


Fig. 10. *Inocybe carpinacea*, spores, pleurocystidia. — Fig. 11. *Inocybe casimiri*, spores, cheilocystidia. — Fig. 12. *Inocybe castanea*, spores, pleurocystidia. — Fig. 13. *Inocybe corcontica*, spores, chrysocystidia.

Inocybe castanea — Fig. 12

Inocybe castanea Velen., České Houby: 375. 1920, non *Inocybe castanea* Peck in Bull. N. Y. State Mus. 75: 16. 1904. — Lectotypus (select. mihi): Velenovský, VII.1916, Karlštejn (PRC; bottle 99).

The lectotype is rather well-preserved with the following characters. — Spores (8.5–)9.0–10.0 × 5.0–6.0 μm, Q = (1.5–)1.6–1.9, smooth, subamygdaliform, with almost obtuse apex. Cheilo- and pleurocystidia 48–55 × 19–22 μm, clavate to subutriform, thick-walled, wall to 3.0 μm. Stipe pruinose all over, caulocystidia similar to cheilocystidia.

This is *I. phaeoleuca* Kühner.

Another collection of *I. castanea* (V.1919, Jíloviště, PRC; bottle 306) is in a rather bad state, but is certainly conspecific.

Inocybe collivaga

Inocybe collivaga Velen., České Houby: 381. 1920.

No type-material was found at PRC, nor at PR.

Inocybe corcontica — Fig. 13

Inocybe corcontica Velen., České Houby: 370. 1920. — Holotypus: Velenovský, VII.1918, Krkonoše (PRC; bottle 285).

The material is well-preserved. — Spores 7.0–8.0 × 3.0–4.0 µm, Q = 1.9–2.3, smooth, dark brown, with conspicuous germ-pore. Chrysocystidia 35–49 × 9–13 µm, often mucronate, thin-walled.

This is *Hypholoma sublateritium* (Fr.) Quél.

Inocybe cordae — Fig. 14

Inocybe cardae Velen., České Houby: 375. 1920. — Holotypus: Velenovský, VIII.1915, Radotín (PRC; bottle 173).

The holotype is in a rather bad state. — Spores (8.0–)8.5–10.0 × 5.0–6.0 µm, Q = 1.6–1.8, smooth, subamygdaliform, with subconical apex. Cheilo- and pleurocystidia (61–)63–75 × 14–18 µm, (sub)lageniform, thick-walled, wall to 3.0 µm, yellow. Stipe only in apical part with caulocystidia, similar to cheilocystidia.

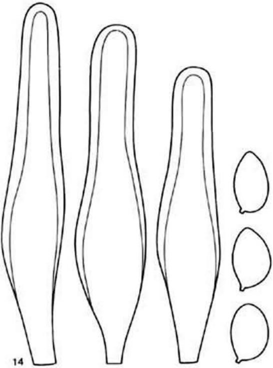
On account of these characters *I. cordae* is regarded a synonym of *I. flocculosa* (Berk. →) Sacc.

Inocybe demitrata — Fig. 15

Inocybe demitrata Velen., České Houby: 380. 1920. — Holotypus: Velenovský, VIII.1919, Vidrholec near Praha (PRC; bottle 153).

Spores 10.0–12.0 × 4.5–5.5 µm, Q = 2.0–2.2(–2.5), smooth, cylindrical, with hilary depression. Cheilo- and pleurocystidia (52–)54–61(–64) × (18–)20–23 µm, fusiform, with subacute apex, exceptionally mucronate, somewhat thick-walled, wall less than 1.0 µm. Caulocystidia absent.

This is *I. lacera* (Fr.: Fr.) Kumm.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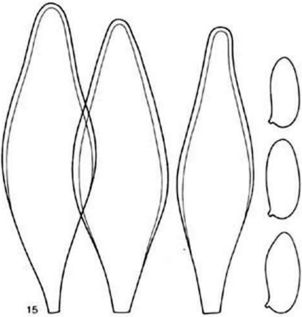
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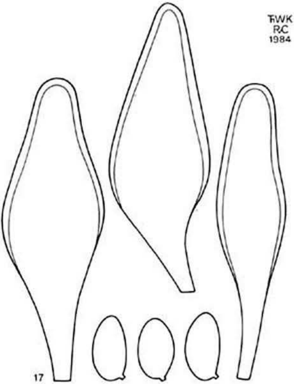
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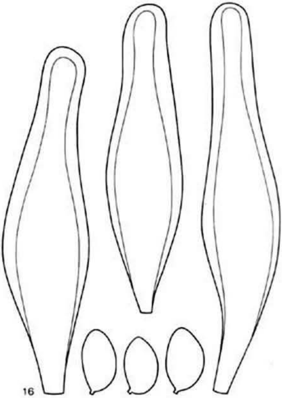
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Fig. 14. *Inocybe cordae*, spores, pleurocystidia. — Fig. 15. *Inocybe demitrata*, spores, pleurocystidia. — Fig. 16. *Inocybe dentifera*, spores, pleurocystidia. — Fig. 17. *Inocybe fechtneri*, spores, pleurocystidia.

Inocybe dentifera — Fig. 16

Inocybe dentifera Velen., Novit. mycol. nov.: 60. 1947. — Holotypus: Velenovský, 15.X.1941, Mnichovice (PR 153859).

The type is in a rather bad state, being damaged by a mould, with the following characters. — Spores 8.0–9.0(–9.5) × 5.0–5.5(–6.0) μm, Q = (1.5–)1.6–1.8, smooth, subamygdaliform, with subconical apex. Cheilo- and pleurocystidia 61–78 × 13–18 μm, (sub)lageniform, thick-walled, wall to 2.5 μm, yellow. Stipe covering difficult to study, caulocystidia only at extreme apex present, more or less similar to cheilocystidia, soon changing into caulocystidioid hairs.

The most conspicuous character of this species is its dentate-spinulose pileal margin. Otherwise it comes very close to *I. flocculosa* (Berk.→) Sacc. It is tentatively regarded as an independent species.

Inocybe fechtneri — Fig. 17

Inocybe fechtneri Velen., České Houby: 372. 1920. — Holotypus: Velenovský, VII.1916, Karlštejn (PRC; bottle 64).

The material is well-preserved, showing the following microscopical characters. — Spores (8.0–)8.5–10.0(–10.5) × 4.5–5.5 μm, Q = 1.7–1.9, smooth, subamygdaliform, with subconical apex. Cheilo- and pleurocystidia 54–69(–73) × (13–)15–22 μm, fusiform to subutriform, thick-walled, wall to 1.5 μm. Caulocystidia present in upper third part of stipe, similar to cheilocystidia.

The type corresponds in all respects to *I. pusio* P. Karst.

Inocybe fibrosa

Inocybe fibrosa Velen., Novit. mycol.: 121. 1939, non *Inocybe fibrosa* (Sow.) Gillet.

No type-material was found at PR, nor at PRC.

Inocybe fulvidula — Fig. 18

Inocybe fulvidula Velen., Novit. mycol.: 120. 1939. — Lectotypus (select. mihi): Velenovský, IX.1937, Mnichovice (PR 153846).

The type is badly damaged by a mould with the following characters. — Spores 9.0–10.5 × 5.0–6.0 μm, Q = (1.6–)1.7–1.9, smooth, subamygdaliform, with subconical apex. Cheilo- and pleurocystidia (54–)57–69(–71) × 15–18 μm, sublageniform to somewhat utriform, thick-walled, wall to 1.5 μm, somewhat yellowish. Stipe in apical part with caulocystidia, descending to 1/6th of stipe.

This represents a rather slender and pale variant of *I. flocculosa* (Berk.→) Sacc.

Another collection, however, by Velenovský (X.1937, Mnichovice, Hubačov, PR

153847) possesses smaller spores, viz. 8.0–9.0 × 4.5–5.0 µm, more cylindrical-sublageniform pleurocystidia and caulocystidia all over. This collection represents *I. sindonia* (Fr.) P. Karst.

Inocybe fuscidula — Fig. 19

Inocybe fuscidula Velen., České Houby: 378. 1920, non *Inocybe fuscidula* Bres., Iconogr. mycol. 15: pl. 735. 1930. — Holotypus: Velenovský, VII.1918, Davle (PRC; bottle 396).

The contents of this bottle consist of about 12 species adhering to each other. From *I. fuscidula* I reconstructed the following characters. — Spores (7.5–)8.0–9.0 × (4.5–) 5.0–5.5 µm, Q = 1.6–1.8, smooth, subamygdaliform, with subconical apex. Cheilo- and pleurocystidia 51–63(–68) × 13–17 µm, cylindrical to subutriform, sometimes subfusiform, thick-walled, wall to 2.0 µm. Caulocystidia frequent in upper half of stipe, resembling cheilocystidia.

The small habit, dark brown, rimose pileus and the microscopical characters are typical for *I. brunneoatra* (Heim) P. D. Orton, for which *I. fuscidula* is priorable.

Inocybe gintliana — Fig. 20.

Inocybe gintliana Velen., České Houby: 385. 1920. — Holotypus: Velenovský, VII.1916, Roblín (PRC; bottle 122).

In this bottle I found one specimen which probably is the type of *I. gintliana* with the following characters. — Spores 9.0–10.0 × 5.5–6.0 µm, verruculose. Cheilocystidia not observed, not metuloid.

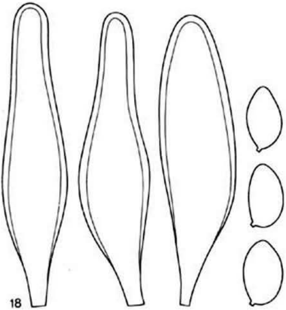
This is a species of *Cortinarius* Fr.

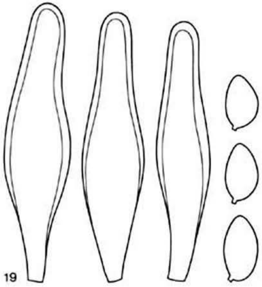
Inocybe glabrescens — Fig. 21

Inocybe glabrescens Velen., České Houby: 373. 1920. — Lectotypus (select. mihi): Velenovský, VIII.1915, Mnichovice (PRC; bottle 279).

The collection, designated here as the lectoype, consists of two well-preserved specimens, of which one was illustrated by Velenovský (1920: 362), with the following microsopical characters. — Spores (8.5–)9.0–10.0 × 5.0–5.5 µm, Q = (1.6–)1.7–1.9, smooth, subamygdaliform, with subconical apex. Cheilo- and pleurocystidia 57–64 × 15–18 µm, fusiform, sometimes subutriform to sublageniform, thick-walled, wall to 2.0–2.5 µm. Caulocystidia descending to base of stipe, similar to cheilocystidia, but somewhat less thick-walled.

On account of these characters this species belongs in the relationship of *I. abietis* Kühner, from which it differs in having a paler, more distinctly rimose pileus with a conspicuous umbo, and somewhat broader cystidia. In my opinion it represents a separate species.





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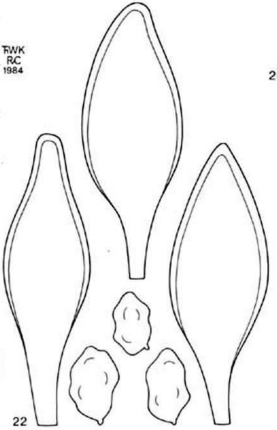
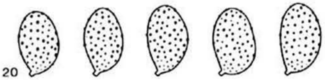




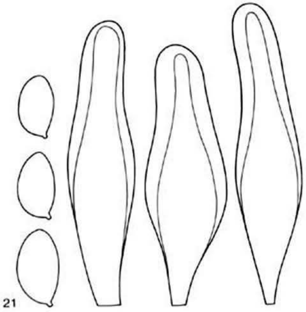


Fig. 18. *Inocybe fulvidula*, spores, pleurocystidia. — Fig. 19. *Inocybe fuscidula*, spores, pleurocystidia. — Fig. 20. *Inocybe gintliana*, spores. — Fig. 21. *Inocybe glabrescens*, spores, pleurocystidia. — Fig. 22. *Inocybe globocystis*, spores, pleurocystidia.

Another collection (Mnichovice, VI.1919, PRC; bottle 65) is in a bad state, showing the following characters. — Spores 8.5–10.0 × 5.0–6.0 µm, smooth, subamygdaliform. Cheilo- and pleurocystidia (55–)57–66 × 15–19 µm, fusiform, slightly thick-walled, wall to 1.0(–1.5) µm. Caulocystidia only present in apical part of stipe, similar to cheilocystidia. This collection evidently belongs to another species, and seems to represent *I. hypophaea* Furrer-Ziogas.

Inocybe globocystis — Fig. 22

Inocybe globocystis Velen., České Houby: 368. 1920. — Holotypus: Velenovský, VII.1919, Mnichovice (PRC; bottle 48).

The material in liquid is well-preserved, showing the following microscopical characters. — Spores (10.0–)10.5–12.5(–13.0) × 5.5–7.5 µm, Q = (1.6–)1.7–1.9, angular-subnodulose, nodulae not pronounced and very difficult to count. Cheilo- and pleurocystidia (49–)51–57(–61) × 20–24(–28) µm, pedicellate, broadly ovoid to even subglobose in upper part, sometimes mucronate, thick-walled, wall to 1.5–2.0 µm. Caulocystidia even at apex of stipe not observed.

This is *I. curvipes* P. Karst.

Inocybe infracta

Inocybe infracta Velen., České Houby: 384. 1920.

No type-collection is left at PR, nor at PRC. Judging from the description *I. infracta* comes very close to, or may be identical with *I. fastigiata* (Schaeff.) Quél.

Inocybe inodora — Fig. 23

Inocybe inodora Velen., České Houby: 373. 1920. — Holotypus: Velenovský, VI.1920, Bilichov (PRC; bottle 156).

The type-collection is well-preserved with the following microscopical characters. — Spores (10.5–)11.0–13.0 × 6.0–6.5(–7.0) µm, Q = (1.7–)1.8–2.0(–2.1), smooth, subamygdaliform, often with a hilary depression, with subconical apex. Cheilo- and pleurocystidia 58–78(–80) × (19–)21–24 µm, slenderly clavate, subfusiform to subutriform, thick-walled, wall to 2.5–3.0 µm. Caulocystidia descending to base of stipe, similar to cheilocystidia.

These microscopical characters clearly establish the synonymy of *I. inodora* with *I. albidodisca* Kühner, for which *inodora*, being the older epithet, must stand.

Inocybe laevigata — Fig. 24

Inocybe laevigata Velen., České Houby: 367. 1920, non *Inocybe laevigata* (P. Karst.) P. Karst. in Bidr. Finl. Nat. Folk 48: 210. 1889. — Lectotypus (select. mihi): Velenovský, VI.1919, Běchovice (PRC; bottle 112).

The well-preserved lectotype showed the following microscopical characters. — Spores (7.5–)8.0–9.0(–10.0) × (5.5–)6.0–7.0(–7.5) µm, Q = 1.3–1.4, nodulose, with (6–)8–11 prominent nodulae, a few spores more angular-subnodulose. Cheilo- and pleurocystidia (51–)54–61(–64) = 18–24(–25) µm, slenderly clavate, subfusiform to sublageniform, slightly thick-walled, wall less than 1.0 µm. Caulocystidia none observed.

The smooth, even subviscid dark brown pileus with a prominent umbo, and the microscopical characters are exactly those of *I. acuta* sensu Kühn. & Bours. (1932: 130), for which the correct name is *I. striata* Bres. *Inocybe striata* differs from true *I. acuta* Boud. in being larger, having a smooth subviscid pileus and more prominently nodulose spores, and in habitat.

Inocybe leucopus

Inocybe leucopus Velen., České Houby: 373. 1920.

No type-collection was found at PR, nor at PRC.

Inocybe longicystis

Inocybe longicystis Velen., České Houby: 373. 1920, non *Inocybe longicystis* Atk. in Amer. J. Bot. 5: 213. 1918.

No type-material was found at PR, nor at PRC. As Velenovský's name was illegitimate, the new name *Inocybe velenovskyi* Bours. & Kühn. in Bull. trimest. Soc. mycol. Fr. 44: 179. 1928 was proposed.

Inocybe lutescens

Inocybe lutescens Velen., České Houby: 375. 1920.

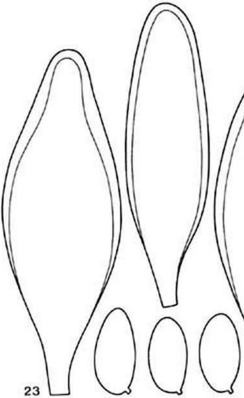
No type-material was found at PR, nor at PRC. The species has recently been neotypified by Stangl & Veselský (1980: 159) with a collection from the Federal Republic of Germany.

Inocybe macrocystis — Fig. 25

Inocybe macrocystis Velen., České Houby: 369. 1920. — Holotypus: Velenovský, VI.1916, Hvězda near Praha (PRC; bottle 275).

Spores 7.5–8.5 × 4.5–5.0 µm, Q = (1.5–)1.6–1.8, nodulose, with 5–8 nodulae. Cheilo- and pleurocystidia 62–77(–80) × 16–20(–22) µm, cylindrical, sometimes sublageniform, very thick-walled, wall to 3.5 µm, with distinct yellow tinge. Stipe pruinose all over, caulocystidia similar to cheilocystidia.

This is *Inocybe bresadolae* Massee.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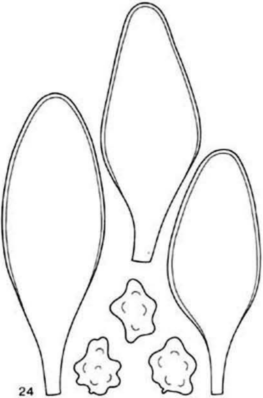
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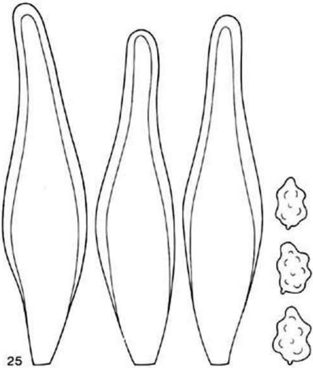
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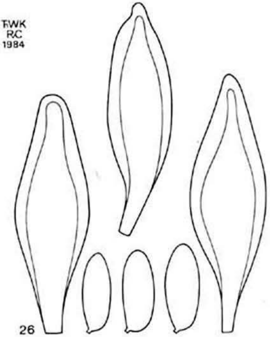

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Fig. 23. *Inocybe inodora*, spores, pleurocystidia. — Fig. 24. *Inocybe laevigata*, spores, pleurocystidia. — Fig. 25. *Inocybe macrocystis*, spores, pleurocystidia. — Fig. 26. *Inocybe mammosa*, spores, pleurocystidia.

Inocybe mammosa — Fig. 26

Inocybe mammosa Velen., České Houby: 381. 1920. — Lectotypus (select. mihi): Velenovský, VII.1919, Mnichovice (PRC; bottle 120).

The material in liquid is rather well-preserved with the following microscopical characters. — Spores 11.0–14.0(–14.5) × (4.5–)5.0–5.5 µm, Q = 2.0–2.4(–2.5), smooth, cylindrical, with a hilary depression, a few spores with a minutely angular tendency. Cheilo- and pleurocystidia (45–)46–59 × 15–20 µm, fusiform, acute towards apex, sometimes mucronate, thick-walled, wall to 2.0 µm. A few caulocystidia present at extreme apex of stipe, downwards soon disappearing.

On account of these characters *I. mammosa* is considered a synonym of *I. lacera* (Fr.: Fr.) Kumm. For the time being I regard it only as a minor variant.

Inocybe melampyri

Inocybe melampyri Velen., Novit. mycol. nov.: 60. 1947.

No type-material was left at PR, nor at PRC.

Inocybe mirabilis

Inocybe mirabilis Velen., České Houby: 363. 1920.

No type-material was left at PR, nor at PRC. Judging from the description (in Pilát 1948: 118) *I. mirabilis* is synonymous with *I. subcarpta* Kühn. & Bours. for which the name *I. mirabilis*, being the older, has priority.

Inocybe mitracea — Fig. 27

Inocybe mitracea Velen., České Houby: 130. 1920. — Holotypus: Velenovský, VI.1916, Ríp (PRC; bottle 282). — Fig. 27.

The type is well-preserved. — Spores (9.5–)10.0–12.0(–12.5) × 4.5–5.5 µm, Q = 2.0–2.4(–2.5), smooth, cylindrical, with hilary depression. Cheilo- and pleurocystidia (50–)52–63(–78) × 13–17 µm, fusiform, with subacute apex, slightly thick-walled, wall to 1.0 µm. Caulocystidia not observed.

This is *Inocybe lacera* (Fr.: Fr.) Kumm.

Inocybe naucoriiformis — Fig. 28

Inocybe naucoriiformis Velen., Novit mycol.: 119. 1939. — Holotypus: Velenovský, X.1939, Mnichovice (PR 153845).

The holotype is well-preserved and shows the following characters. — Spores 8.0–10.0(–10.5) × 5.0–6.5 µm, Q = (1.4–)1.5–1.7, nodulose, with 5–8 rather indistinct nodulae. Cheilo- and pleurocystidia 43–51(–58) × (13–)15–18 µm, cylindrical to subfusiform, thick-walled, wall to 2.0 µm, yellow to very pale yellow. Stipe with caulocystidia all over, caulocystidia similar to cheilocystidia. Hyphae of velipellis thick-walled, not encrusting.

On account of these characters *I. naucoriiformis* is a member of sect. *Petiginosae* where it is unique because of its somewhat hygrophanous, brick red pileus.

Inocybe nitida

Inocybe nitida Velen., České Houby: 365. 1920.

No type was found at PR, nor at PRC.

Inocybe nuda — Fig. 29

Inocybe nuda Velen., České Houby: 365. 1920. — Holotypus: Velenovský, V.1920, Krc (PRC; bottle 294).

The holotype is in a very bad state, as the material has been completely dried out. — Spores 7.0–9.0(–9.5) × 5.0–6.0(–6.5) µm, Q = (1.2–)1.3–1.6(–1.7), angular to subnodulose, with 6–9 rather indistinct nodulae. Cheilo- and pleurocystidia (62–)67–82(–88) × 18–25 µm, cylindrical to (sub)lageniform, thick-walled, wall to 3.0(–4.0) µm, yellow (according to Velenovský (in Pilát 1948: 122)). Covering of stipe impossible to study.

No known species of *Inocybe* seems to fit the macroscopical description and microscopical description and microscopical characters of *I. nuda*. The habitat on burned wood is completely aberrant for species of the mycorrhizal genus *Inocybe*. I consider it likely that Velenovský has mixed up material of different species, and for that reason I am inclined to regard *I. nuda* as a *nomen dubium*.

Inocybe odora — Fig. 30

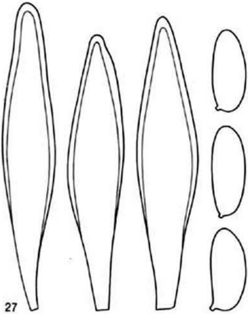
Inocybe odora Velen., Novit. mycol.: 121. 1939. — Holotypus: Velenovský, 20.X.1939, Myslín (PR 153866).

Spores (7.0–)7.5–8.5 × 4.5–5.0 µm, Q = 1.6–1.8, verruculose. Cheilocystidia absent.

Inocybe odora is a member of the genus *Cortinarius* Fr.

Inocybe olgae — Fig. 31

Inocybe olgae Velen., České Houby: 371. 1920. — Holotypus: Zvěrinova, X.1917, Bohnice near Praha (PRC; bottle 404).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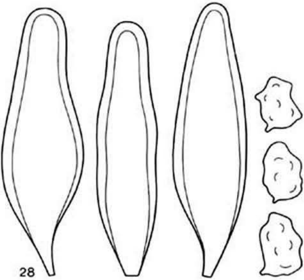
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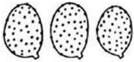
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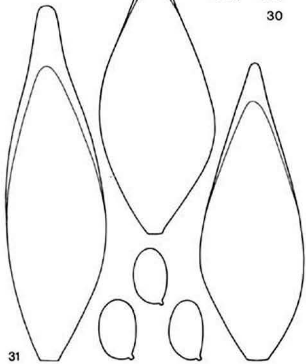
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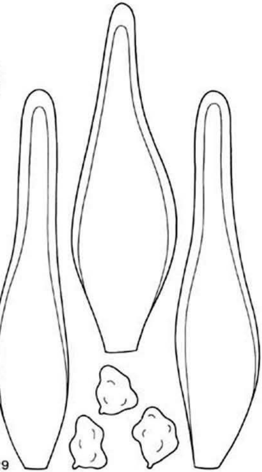
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Fig. 27. *Inocybe mitracea*, spores, pleurocystidia. — Fig. 28. *Inocybe naucoriiformis*, spores, pleurocystidia. — Fig. 29. *Inocybe nuda*, spores, pleurocystidia. — Fig. 30. *Inocybe odora*, spores. — Fig. 31. *Inocybe olgae*, spores, pleurocystidia.

The material in liquid is well-preserved with the following microscopical characters. — Spores (7.5–)8.0–9.0(–10.0) × (4.0–)4.5–5.0 µm, Q = 1.7–1.9(–2.0), smooth, often subphaseoliform, pale brownish yellow. Cheilo- and pleurocystidia (44–)50–66(–72) × 14–22 µm, fusiform, distinctly ventricose, with acute, mucronate apex, with thick-walled yellow apical part.

Inocybe olgae does not belong to the genus *Inocybe* but is a synonym of *Pholiota lenta* (Pers.: Fr.) Sing.

Inocybe pallescens — Fig. 32

Inocybe pallescens Velen., České Houby: 377. 1920. — Holotypus: Velenovský, V.1920, Jevany (PRC; bottle 170).

The holotype is well-preserved. — Spores (11.0–)11.5–14.0 × 4.5–5.5(–6.0) µm, Q = 2.3–2.7(–2.8), smooth, cylindrical, with hilary depression, almost colourless. Cheilo- and pleurocystidia 55–68(–69) × 17–22 µm, fusiform, with subacute apex, sometimes even submucronate, slightly thick-walled, wall to 1.0 µm. Caulocystidia not observed.

It is an unusually pale, probably semi-albinistic variant of *Inocybe lacera* (Fr.: Fr.) Kumm., which, in my opinion, does not deserve an autonomous rank. Albinistic forms are known in *I. sindonia* (Fr.) P. Karst., *I. pelargonium* Kühner, *I. asterospora* Quél., *I. lanuginosa* (Bull.: Fr.) Kumm., *I. flocculosa* (Berk.→) Sacc. and *I. lacera* (Fr.: Fr.) Kumm.

Recognition of these variants as separate taxa will ultimately result in a redoubling of *Inocybe* taxa!

Inocybe pallida — Fig. 33

Inocybe pallida Velen., České Houby: 366. 1920. — Holotypus: Velenovský, VII.1919, Mnichovice (PRC, bottle 48).

The type-collection is well-preserved. — Spores (9.0–)9.5–11.0(–11.5) × (5.5–)6.0–6.5(–7.0) µm, Q = 1.5–1.8(–1.9), angular, with indistinct nodulae. Cheilo- and pleurocystidia (50–)52–57(–63) × 20–24(–26) µm, clavate to subutriform, thick-walled, wall to 1.5 µm. Caulocystidia descending over halfway of stipe, similar to cheilocystidia.

Inocybe pallida is a good species, related to *I. decipiens* Bres., from which it differs in having smaller, more angular spores.

Inocybe pedicellata

Inocybe pedicellata Velen., České Houby: 385. 1920.

No type-material was found at PR, nor at PRC.

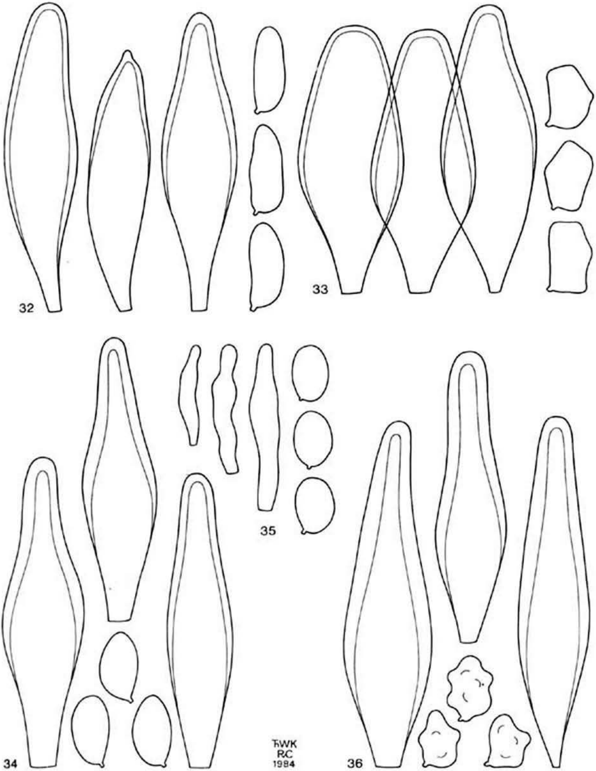


Fig. 32. *Inocybe pallescens*, spores, pleurocystidia. — Fig. 33. *Inocybe pallida*, spores, pleurocystidia. — Fig. 34. *Inocybe pedunculata*, spores, pleurocystidia. — Fig. 35. *Inocybe perpusilla*, spores, cheilocystidia. — Fig. 36. *Inocybe putilla* var. *semiorbicularis*, spores, pleurocystidia.

Inocybe pedunculata — Fig. 34

Inocybe pedunculata Velen., České Houby: 374. 1920. — Holotypus: Velenovský, V.1920, Černošice (PRC; bottle 370).

The holotype is completely dried out and therefore in a very bad state. — Spores (8.5–)9.0–11.0 × 5.0–6.0 μm, Q = 1.7–1.9, smooth, subamygdaliform, with subconical apex. Cheilo- and pleurocystidia (51–)56–68(–70) × 13–19 μm, cylindrical to sublageniform, thick-walled, wall to 3.0 μm. Covering of stipe impossible to study.

The macroscopical description and the microscopical characters indicate that *Inocybe pedunculata* is a synonym of *I. fuscidula* Velen., which name is adopted for this species.

Inocybe perpusilla — Fig. 35

Inocybe perpusilla Velen., České Houby: 388. 1920. — Holotypus: Velenovský, VII.1916, Kárlik (PR 68519).

Only a few fragments of lamellae could be found with the following characters. — Spores 7.5–8.5 × 5.0–5.5 μm, smooth, without germ-pore. Cheilocystidia 21–34(–38) × 4–7 μm, filiform, flexuose, thin-walled, hyaline. Pleurocystidia absent.

Inocybe perpusilla does not belong to the genus *Inocybe*.

Inocybe picetorum

Inocybe picetorum Velen., České Houby: 382. 1920.

No type-material was found at PR, nor at PRC. On account of Velenovský's description (in Pilát 1948: 130) I do not hesitate in referring it into the synonymy of *Inocybe conformata* P. Karst. (= *I. cincinnatula* Kühner).

Inocybe putilla var. **semiorbicularis** — Fig. 36

Inocybe putilla Bres. var. *semiorbicularis* Velen., České Houby: 365. 1920. — Holotypus: Velenovský, VII.1916, Roblín (PRC; bottle 124).

The type consists of one specimen with the following microscopical characters. — Spores (6.5–)7.0–8.0 × (4.5–)5.0–6.0 μm, Q = 1.3–1.6, angular-nodulose, but without pronounced nodulae. Cheilo- and pleurocystidia (63–)65–82 × (13–)15–19 μm, cylindrical to sublageniform, thick-walled, wall to 3.0 μm. Stipe with caulocystidia all over, caulocystidia similar to cheilocystidia.

Undoubtedly this is *Inocybe grammata* Quél.

Inocybe reisneri — Fig. 37

Inocybe reisneri Velen., České Houby: 384. 1920. — Holotypus: Reisner, VII.1916, Chuchle near Praha (PRC, bottle 472).

The holotype specimen is completely dried out. — Spores 9.0–10.0 × 5.0–6.0 µm, Q = 1.6–1.8(–2.0), smooth, regular to phaseoliform. Cheilocystidia not revived. Metuloids absent.

On account of Velenovský's description (in Pilát 1948: 131) I do not hesitate in synonymizing it with *Inocybe insignissima* Romagn., for which species the name *I. reisneri*, being the older, has priority.

Inocybe rohlenae — Fig. 38

Inocybe rohlenae Velen., České Houby: 379. 1920. — Holotypus: Fechtner, V.1916, Libochovičky (PRC; bottle 406).

The holotype is quite well-preserved. — Spores (8.5–)9.0–9.5 × 4.5–5.0 µm, Q = 1.8–2.0, smooth, subamygdaliform, with subconcial apex. Cheilo- and pleurocystidia (61–)66–76(–79) × 14–16 µm, sublageniform to lageniform, thick-walled, wall to 2.0 µm. Caulocystidia only present in apical part of stipe, similar to cheilocystidia, soon forming a transitional zone of caulocystidioid hairs.

This is another synonym of *Inocybe flocculosa* (Berk.→) Sacc.

Inocybe rosella

Inocybe rosella Velen., České Houby: 387. 1920.

No type was found at PR, nor at PRC.

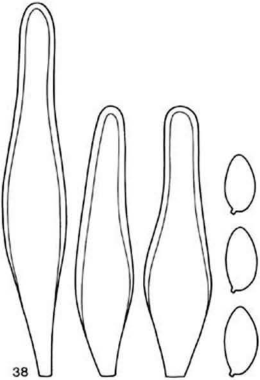
Judging from the description, however, it is clear that *Inocybe rosella* is not a representative of the genus.

Inocybe rostrata — Fig. 39

Inocybe rostrata Velen., České Houby: 367. 1920. — Lectotypus (select. mihi): Kavina, 1916, Revnice (PRC; bottle 284).

Spores 7.0–8.0 × 5.0–6.0 µm, Q = (1.2–)1.3–1.5, subnodulose, with 8–11 nodulae, sometimes more subangular. Cheilo- and pleurocystidia (48–)51–61(–66) × 16–20 µm, cylindrical, subfusiform to subutriform, thick-walled, wall to 2.0 µm. Stipe with caulocystidia all over, caulocystidia similar to cheilocystidia.

The small spores without pronounced nodulae and the completely pruinose stipe are distinctive for *Inocybe grammata* Quél., some minor discrepancies in the macroscopical description notwithstanding.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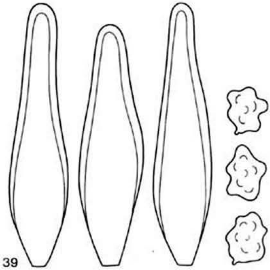
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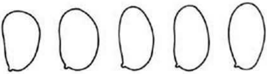
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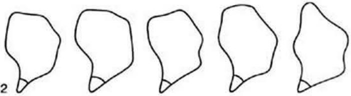
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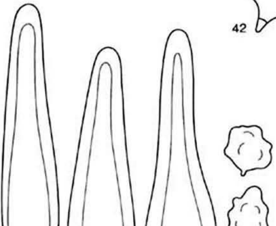
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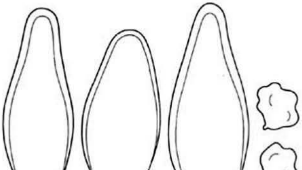
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Fig. 37. *Inocybe reisneri*, spores. — Fig. 38. *Inocybe rohlenae*, spores, pleurocystidia. — Fig. 39. *Inocybe rostrata*, spores, pleurocystidia. — Fig. 40. *Inocybe sapinea*, spores, pleurocystidia. — Fig. 41. *Inocybe soluta*, spores, pleurocystidia. — Fig. 42. *Inocybe spinosae*, spores.

Another collection (VII.1915, Chlumec, PRC; bottle 103) is in a bad state and differs macroscopically in having a submarginate bulb. It also represents *I. grammata*.

Inocybe sapinea — Fig. 40

Inocybe sapinea Velen., Novit. mycol.: 119. 1939. — Holotypus: Velenovský, X.1922, Mnichovice (PRC; bottle 200).

The holotype is well-preserved. Spores (7.5–)8.0–10.0 × 6.0–8.0 µm, subnodulose, with 8–12 rather indistinct nodulae. Cheilo- and pleurocystidia (57–)61–70(–72) × (13–)14–17 µm, subfusiform to subutriform, sessile, thick-walled, wall to 2.5(–3.0) µm, almost colourless. Caulocystidia descending to base of stipe, similar to cheilocystidia. Velipellis consisting of thick-walled, non-encrusting hyphae.

Inocybe sapinea is a member of sect. *Petiginosae* Heim, closely related to *I. jacobi* Kühner. It differs from that species in having less pronounced nodulose spores, and somewhat broader cystidia with almost colourless walls.

Inocybe solida

Inocybe solida Velen., Novit. mycol.: 119. 1939.

No type-material was found at PR, nor at PRC.

Inocybe soluta — Fig. 41

Inocybe soluta Velen., České Houby: 365. 1920. — Lectotypus (select. mihi): Velenovský, VI. 1918, Krkonoše (PRC; bottle 385).

The lectotype is well-preserved, showing the following microscopical characters. — Spores 7.0–7.5(–8.0) × 5.0–6.0 µm, Q = 1.2–1.4, angular-subnodulose, with rather indistinct nodulae. Cheilo- and pleurocystidia 51–60(–64) × (15–)18–22(–23) µm, clavate to fusiform, sometimes subutriform, slightly thick-walled, wall less than 1.0 µm. Caulocystidia not observed.

The small spores and absence of caulocystidia are typical for *Inocybe brevispora* Huijsman, for which *I. soluta* is the older, and therefore correct name.
Another collection of *I. soluta* (VII.1919, Mnichovice, PRC; bottle 86) is conspecific.

Inocybe spinosae — Fig. 42

Inocybe spinosae Velen., Novit. mycol.: 120. 1939. — Holotypus: Velenovský, VIII.1939, Budikov near Mnichovice (PR 153850).

The type is in bad condition. — Spores 9.0–11.0 × 7.0–8.0 µm, Q = 1.2–1.4, 5–6-angled in side-view. Cheilocystidia present, but not sufficiently revived.

Inocybe spinosae is a synonym of *Entoloma sericellum* (Fr.: Fr.) Kumm.

Inocybe submicrospora

Inocybe submicrospora Velen., Novit. mycol. nov.: 61. 1947.

No type-material was found at PR, nor at PRC.

Inocybe turfosa

Inocybe turfosa Velen., Novit. mycol.: 120. 1939.

No type-material was found at PR, nor at PRC.

Inocybe uliginosa

Inocybe uliginosa Velen., Ceské Houby: 374. 1920.

No type-material was found at PR, nor at PRC.

Judging from the description, however, *Inocybe uliginosa* seems conspecific with *I. sindonia* (Fr.) P. Karst.

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TYPE STUDIES IN THE CLAVARIOID FUNGI — IX

Miscellaneous taxa, with a section on Tremellodendropsis

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Type specimens of taxa in several genera are redescribed, with a special section on types of *Tremellodendropsis* taxa.

Clavaria candelabra Mass.

Clavaria candelabra Mass. 1901 ('1899'). In Kew Bull.: 172.
≡ *Clavaricorona candelabra* (Mass.) Corner. 1950. In Ann. Bot. Mem. 1: 286.
Type (holotype): K – Straits Settlements, Selanger, no date, *Ridley 37.*

Fruitbody one, very slender, branched, 20 × 12 mm, now brown-black, cartilaginous, arising from rotting wood. Stipe 9 × 1 mm, discrete, equal through most of length, expanded slightly upward. Major branches 2,8 × 1 mm, as stipe; branching pyxidate, with 5–6 branches produced from periphery of cup, in 3 ranks. Internodes diminishing gradually; apices minute, up to 0.5 mm thick, bluntly coronate.

Tramal hyphae of branches 3–8 μm diam., hyaline, thin-walled, clamped, occasionally secondarily septate, loosely interwoven. Gloeoplerous hyphae common, 3–6 μm diam, refringent under phase contrast, hardly yellowish; contents foamy or multiguttulate. Subhymenium obliterated.

Spores approximately 4 × 3 μm, broadly ellipsoid, hardly roughened, thin-walled hyaline, amyloid.

Corner (1950: 286–287) and Dodd (1970) reported thick-walled tramal hyphae in this species, the former report including a study of the type specimen. I can find no such hyphae, but only collapsed tramals which, when viewed in certain ways appear as narrower, thick-walled structures.

The reported thick-walled hyphae seem to be the only separating character between *C. candelabra* and *Clavaria colensoi* Berk. The gelatinized hymenium of *C. candelabra* appears as a phenomenon of poor drying. Fruitbodies of both taxa are usually slender, a good mark in the field.

Massee equated *C. candelabra* with *Clavaria epichnoa* Fr., which also is slender and fruits on wood. It is a species of *Lentaria*, however, with smooth spores and no gloeoplerous hyphae.

Clavaria echinospora B. & Br.

Clavaria echinospora B. & Br. 1875. In J. Linn. Soc. (Bot.) 14: 75. (*non C. echinospora* P. Henn. 1900. In Monsunia I: 43: 141; ≡ *Clavaria fragillima* Sacc. & Syd. 1902. Syll. Fung. 16; 206.)

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Type (holotype): K-Peradeniya, Ceylon, vii. 1868, herb. Berkeley (annot. Petch), no. 676 (not seen). (No. 677, considered the type by Kew, is not.)

No. 677: Fruitbody probably 1, now in three portions (longitudinal sections), 38 × 37 mm, obpyramidal in outline, now cartilaginous and brittle above, and there dark brown. Stipe discrete, 10 × 6 mm, covered with strigose, white mycelium involving substantial substrate. Major branches several, flattened, ascending, straight and appearing stiff, rebranched in 5–6 ranks; internodes diminishing gradually; axils acute; apices very minute, irregular, acute to cusped.

Hyphae of branch trama 1.5–2.5 μm diam., thin-walled, uninflated, hyaline, clamped, parallel, adherent. Hymenium thickening; basidia 26–32 × 7–9 μm, broadly clavate, clamped, hyaline; contents homogeneous; sterigmata 4.

Spores (Fig. 1) 6.1–6.8 × 4.0–4.3 μm ($E = 1.42–1.64$; $E^m = 1.56$; $L^m = 6.52$ μm), generally ellipsoid, apparently hyaline; contents homogeneous; wall thin to very slightly thick (up to 0.2 μm); ornamentation variable, from bluntly echinulate to beset with saddle-shaped warts, to angular-warted.

This is not the type specimen of *Clavaria echinospora*. Spore ornamentation spans the gamut of types in the genus *Scytinopogon*, and tramal hyphae are uninflated. Berkeley considered the specimen only a variety of *Clavaria megalorhiza* which darkened on drying, but that species had been placed in *Ramaria* subg. *Echinoramaria*.

Clavaria foetida Atk.

Clavaria foetida Atk. 1908. In Annls mycol. 6: 56.
Type (Holotype): CUP–Coy Glen, Ithaca, NY, 13. viii. 1901, *A.M. Ferguson 7740.*

Accompanying note: 'Plants cylindrical, tapering below, 5–10 cm high, 3–4 mm thick, small, not or rarely joined at base, color maize yellow. Spores elliptical inequilateral, smooth, granular, 6–8 × 3. Odor foetid, resembling skunk cabbage.'

Fruitbody one, 65 × 3 mm, simple club; stipe 1 mm thick, equal, expanded at base and there covered with a very thin white mycelial felt; club narrowly fusiform, apparently hollow, somewhat sulcate or longitudinally wrinkled; apex narrowly rounded.

Tramal hyphae of club 6–20 μm diam., of short cells, appearing as cracked ice in mass, unclamped, thin-walled, strictly parallel. Hymenium thickened; basidia 40–50 × 7–9 μm, clavate, collapsed, hyaline, not refringent, not clamped; sterigmata 4, erect, slender.

Spores (Fig. 2) 5.4–7.2 × 3.2–4.0 μm ($E = 1.36–2.00$; $E^m = 1.64$; $L^m = 6.01$ μm), ellipsoid to narrowly ovate, flattened adaxially, thin-walled, smooth; contents opalescent; hilar appendage prominent, papillate.

Clavaria fusco-lilacina Berk.

Clavaria fusco-lilacina Berk. 1856. In J. Bot., Hooker, 8: 276.
≡ *Clavulina fusco-lilacina* (Berk.) Overeem. 1923. In Bull. Jard. bot. Buitenzorg III 5: 262.
Type (holotype): K – Panuré, no date, *Spruce 125.*

Fruitbody (Fig. 3) one, 39 × 25 mm, branched, pressed somewhat, arising from sand. Stipe 8 × 6 mm, bluntly rooting, turnip-shaped, branching almost from the base, involving particles of sand. Major branches several, arising from the fleshy extension of

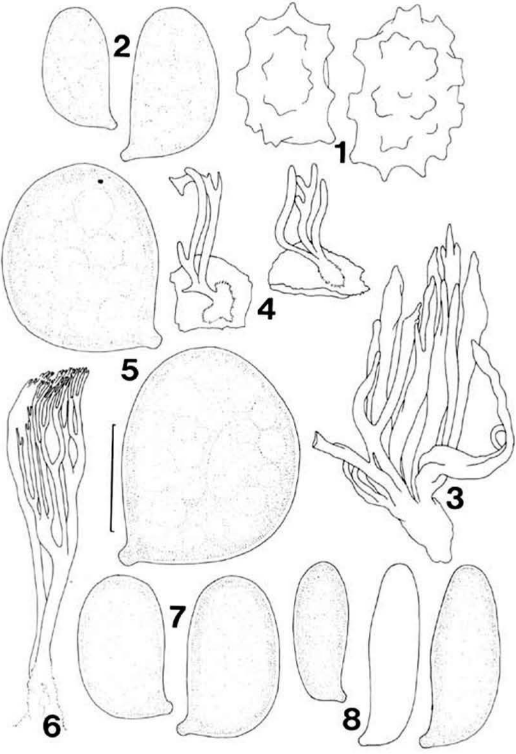


Fig. 1. *Clavaria echinospora*. — Spores. — Fig. 2. *Clavaria foetida*. — Spores. — Fig. 3. *Clavaria fusco-lilacina* — Fruitbody. — Figs. 4–5. *Clavaria humilis*. — 4. Fruitbodies. — 5. Spores. — Figs. 6–7. *Clavaria micheneri*. — 6. Fruitbody. — 7. Spores. — Fig. 8. *Clavaria patouillardii*. — Spores. (Standard bar = 5 μm for spores. For sizes of fruitbodies, see text.)

the base, curved ascending, sometimes branched dichotomously once, or more commonly simple to the apex, fleshy, somewhat flattened, now dull ochraceous brown; axils narrowly rounded; apices digitate-cristate to simple, now deep chocolate brown.
Tramal hyphae of branches 2–3.5 μm diam., hyaline, thick-walled (wall up to 0.5 μm thick), rather stiff, loosely interwoven, free, clamped.
Hymenium absent. Spores absent.

The sole fruitbody of the type specimen seems well preserved, but I can make out almost no microscopic details. Without notes on clamps, spores, cystidia and post-partal septation, I cannot accurately place the taxon, and I must treat the name as a *nomen dubium*.

One thing is certain: my treatment of the taxon from Australia (Petersen, 1983) as a simple fruitbody cannot be maintained, for the type fruitbody is obviously branched.

Berkeley surely took his colors from the dried specimen, so no reliable guide can be found in this regard. My experience, however, indicated that fruitbody color may have been tan to tan-avellaneous, which would match van Overeem's concept.

Corner (1950) included the name only in the index, and then questionably as a pyrenomycete. Elsewhere (Corner 1950: 329), he suggested that van Overeem's (1923: 262) sense of the taxon was not only a *Clavulina* (obvious from van Overeem's description and plate), but that the name was synonymous to *Clavaria leveillei* Sacc. I have kept the two separate, and have used *C. fusco-lilacina* in the assumed sense of van Overeem, having not seen his material under that name.

Clavaria humilis Cooke

Clavaria humilis Cooke. 1890. In Grevillea 19: 2.
≡ *Clavulina humilis* (Cooke) Corner. 1950. In Ann. Bot. Mem. 1: 327.
Type (Holotype): K – New Zealand, Opotiki Co., Maungaroa, no date, *Colenso 398*. Merotype: PDD.

Fruitbodies (Fig. 4) up to 4 × 1 mm, simple to twice-branched, arising from a well-developed but ill-defined mycelial mat on woody debris: color now rather bright orange.
Tramal hyphae 2.5–5 μm diam., hyaline, thin-walled, clamped, loosely interwoven. Hymenium thickening; basidia 60–75 × 7–8 μm, narrowly clavate to cylindrical, clamped; contents opalescent when immature; post-partal septation common; sterigmata 2, cornute.
Spores (Fig. 5) 8.3–10.1 × 7.2–8.3 μm ($E = 1.05–1.27$; $E^m = 1.16$; $L^m = 8.92$ μm), subglobose, flattened adaxially, refringent under phase contrast; hilar appendage broad, papillate.

I cannot find emergent, septate hyphae (cystidia) in the hymenium, but this is due to hyphal collapse and squash mounts. All other characters match what I have called *'Clavulina' trichomoides* on annotations of herbarium material. This name, of course, has no status, and must be considered a *nomen herbariorum*.

The orange color of dried material is not indicative of fresh color, especially in this genus. I see no sign of grey or white coloration, but I assume that the fresh specimen was white or pale grey.

The merotype at PDD is fragmentary, and micromorphology is almost impossible to discern.

Clavaria laetissima Berk.

Clavaria laetissima Berk. 1881. In J. Linn. Soc., (Bot.) 18: 386.
Type (holotype): K–South Queensland, Australia, no date, Hartman, *Lockyer 477*.

Fruitbody one, 65 × 40 mm, pressed, repeatedly branched, missing the base. Stipe missing. Major branches now dull orange, not cartilaginous, rebranching in open pyxidate fashion in 3–6 ranks; branches up to 2.5 mm thick; internodes diminishing gradually; axils comprising expanded cups, from the periphery of which arise 2–4 branches; apices minute, 1–2-pyxidate in final 2 mm, now dull dark orange-brown.

Tramal hyphae of branches 1.5–6 μm diam., hyaline, clamped, thin-walled, loosely interwoven, outward generally narrower. Gloeoplerous hyphae abundant in outer trama and subhymenium, up to 8 μm diam., yellow, refringent under phase contrast; contents multiguttulate to foamy. Hymenium thickening; basidia approximately 30 × 6–7 μm, narrowly clavate, mostly collapsed but hardly gelatinized, clamped; leptocystidia 1–1.5 μm diam., hyphal to slightly gnarled, abundant, protruding up 25 μm; gloeocystidia broadly lanceolate, up to 9 μm diam., yellow, refringent under phase contrast; sterigmata apparently 4.

Spores approximately 3.6 × 2.2 μm, ellipsoid, adaxially flattened, hardly roughened, hyaline, thin-walled, weakly amyloid.

In placing this species in synonymy under *Clavicorona turgida*, Dodd (1970) gave no indication that he had examined the type specimen. Its spores seem too small for *C. turgida* and its hymenium, while collapsed is not gelatinized as reported and emphasized by Dodd for *C. turgida*.

Likewise, the fruitbody is far too stout for *C. colensoi*, the spores of which come closest to those of *C. laetissima*. In short, I do not know another taxon like it, and so prefer to keep it separate.

Berkeley cited the taxon as *'Clavaria laetissima*, Pers.' an assumed *lapsus calami*. First; I can find no record that Persoon published such an epithet. Second; Berkeley supplied a Latin description, a practice he saved for new taxa.

The colors cited by Berkeley surely refer to the dried specimen, with no record of fresh colors. When fresh, I suspect that the fruitbody was quite pale, perhaps offwhite, with somewhat darker apices, perhaps the usual avellaneous shades of other similar taxa.

Clavaria micheneri B. & C.

Clavaria micheneri B. & C. in Berk. 1873. In Grevillea 1: 161.
Type (lectotype): FH – USA, Pennsylvania, no date, coll. Michener, *Curtis 3534*!; paratype, K.

Fruitbody (Fig. 6) one, 60 × 16 mm, discrete, not fragmented, narrowly obpyriform in outline, repeatedly branched, now brown to chocolate brown where fertile, dull ochre where sterile. Stipe discrete, 26 × 3 mm, laterally flattened, arising from a compact mat of mycelium (now ochre-beige), tapering to the narrow midpoint, then expanding upward. Major branches 2, erect, rebranching in 5–6 ranks, flattened; internodes diminishing gradually; axils rounded to lunate; apices up to 3 mm long, less than 1 mm thick, elongate awl-shaped to elongate-digitate; branching dichotomous generally, often subpalmate outward; hymenium clearly unilateral.

Hyphae of hyphal mat 1–2.5 μm diam., hyaline, clamped, thick-walled (wall occasionally obscuring cell lumen). Hyphae of branch trama 2.5–4 μm diam., thin- to slightly thick-walled (wall up to 0.3 μm thick), clamped, hyaline, tightly interwoven. Hymenium thickening; basidia 32–38 × 5–6 μm, clavate, clamped; sterigmata 4.

Spores (Fig. 7) 6.5–7.6 × 4.0–4.3 μm (E = 1.64–1.91; E^m = 1.77; L^m = 7.20 μm), short-cylindrical, usually flattened adaxially, smooth, hyaline, thin-walled; contents homogeneous to univacuolate; hilar appendage abrupt, papillate.

Spore dimensions, clearly unilateral hymenium and brown color serve to separate this from *C. patouillardii* Bres.

I find no ornamentation on the hyphae of the basal mat, unlike the situation in most species of *Lentaria*.

Paratype: K – no. 3763.

Fruitbody 20 × 12 mm, arising from a clearly defined basal mycelium. Stipe 4 × 3 mm, discrete, somewhat flattened. Branches arising as lateral appendages on a stout central trunk, dichotomous. Axils very narrowly rounded; apices very acute. Basal mycelium beige-ochre (white when fresh); stipe and steile areas of branches dull orange ochre; fertile areas deep brown; apices yellow ochre.

Hyphal construction as in the lectotype, but tramal hyphae often thick-walled. Spores as in the lectotype.

Clavaria patouillardii Bres.

Clavaria patouillardii Bres. 1892. Fungi Tridentini 2: 39, pl. 146, fig. 1.
≡ *Lentaria patouillardii* (Bres.) Corner. 1950. In Ann. Bot. Mem. 1: 444.

Type (lectotype): S – herb. Bresadola, 'in nemore frondoso Cappucinone', x. 1891, leg. Bresadola, s.n. Merotype: NCU.

Fruitbodies two, very fragmented, not measurable, branched, on dead twigs, arising from an extensive tangle of ropy, white, rhizomorphic strands, involving a superficial, fragile, white cottony pruina. Stipe discrete, up to 6 × 3.5 mm, lobed in cross-section, covered with hoary, white pruina downward; major branches 2, curved-ascending; internodes almost unobservable (because of fragmentation); axils narrowly rounded to lunate; apices awl-shaped, small, often curved or talon-like. Fruitbody color now dull tan.

Hyphae of basal pruina 1–1.5 μm diam., thin-walled, clamped, here and there ornamented with rounded or hemispherical, cyanophilous, blister-like deposits. Hyphae of stipe and branch trama 1.5–3.5 μm diam., thin- to somewhat thick-walled (wall up to 0.6 μm thick), hyaline, conspicuously clamped, the clamp often greatly inflated (up to 12 μm broad) but never ornamented. Hymenium thickening greatly; basidia 35–43 × 5.5–6.5 μm, clavate, clamped; contents homogeneous; sterigmata 4, slender, straight.

Spores (Fig. 8) 6.5–8.6 × 2.5–3.2 μm (E = 2.56–3.14; E^m = 2.74; L^m = 7.86 μm), cylindrical to boletoid, with a suprahilar depression and adaxial swelling, smooth, hyaline, thin-walled; contents homogeneous; hilar appendage gradual, not prominent.

I can find very few spores, and even those present are usually in clumps, so only six spores have been measured. All were typical of the concept of the taxon presented by

Corner (1950: 444). The Bresadola specimen at Kew, cited by Corner, was not described in detail, so I cannot tell if it is part of the type, but there is a fragment of the type at NCU, and an authentic specimen at NY.

The small basidia and very narrow spores make the taxon distinct. I can find no synonyms for the epithet.

Bresadola published two descriptions and two illustrations for the species. The descriptions (above, and Iconongr. mycol. 22: 39) are virtually identical. The illustrations are not (I have access to a 1976 reprint of the *Fungi Tridentini* by Edagricole Publishing Company), with the earlier much darker and brighter than the later. I conclude that the earlier is probably closer to nature for two reasons: (i) The later illustration places *Clavaria stricta* and *C. patouillardi* on the same plate. The color of *C. (Ramaria) stricta* is very pale and washed out, and almost the same as that of *C. patouillardii*, so I judge that the whole plate is too light. (ii) Bresadola's original description states the color of the branches as 'argillaceo-fusciduli', and in some fruitbodies 'subvirescentibus', colors more faithfully rendered in the accompanying plate. Moreover, I have collected specimens in western North America which conform to these colors, even to the greenish tips.

All fruitbody characters are similar to those of some small-spored taxa of *Ramaria* subg. *Echinoramaria*, just as noted by Bresadola, who drew attention to *R. flaccida* as most similar.

The blister-like encrustation on the subicular hyphae is typical of the genus, as are the inflated but unornamented clamp connections.

According to Corner (1970: 234), *Lentaria patouillardii* is a synonymous name under *L. micheneri* (Berk. & Curt.) Corner. I have seen the type specimen of *C. micheneri* (see above) and cannot attest to this synonymy. Corner also, however, included *Clavaria pinophila* Peck as a doubtful synonym under the same name, but I find that the spores of the type of *C. pinophila* (and other modern collections) are consistently broader than those of *L. patouillardii*. I must keep those two names separate, but *C. pinophila* and *L. micheneri* may be synonymous.

Unfortunately, Bresadola did not cite specific collection data (only 'Aestate-Autumno, in nemoribus frondosis prope Tridentum') for the species. It is impossible, therefore, to conclude that the specimen above was in Bresadola's possession at the time he wrote his description, and therefore a comfortable lectotype. The collection date, however, indicates such possession.

Clavaria semivestita B & Br.

Clavaria semivestita B. & Br. 1874. In J. Linn. Soc., Bot. 14: 75.

The type was reported on earlier (Petersen, 1984). No additional taxonomic commentary is necessary, but it is apparent that specimen no. 677 was considered by Berkeley (correctly) to be composed of two discordant elements. One was mentioned under *Clavaria echinospora* B. & Br. but not as the type. The other forms the type of *C. semivestita*.

Tremellodendropsis

Although not strictly clavarioid (I restrict that term to holobasidial forms), the types reported below were examined as a foundation for another paper (Petersen, 1985). In a few cases, the specimens were examined while away from home and only partial notes were taken. It should be mentioned that Crawford's specimens (types and auxiliary) of *Tremellodendropsis* have been deposited at PDD.

Clavaria flagelliformis Berk.

Clavaria flagelliformis Berk. 1867. Flora New Zealand (Hooker): 186.
≡ *Lachnocladium flagelliformis* (Berk.) Cooke. 1892. Handb. Austral. Fungi: 179.
≡ *Aphelaria flagelliformis* (Berk.) Corner. 1953. In Ann. Bot., n.s., 17: 350.
≡ *Tremellodendropsis flagelliformis* (Berk.) Crawford. 1954. In Trans. R. Soc. N. Z. 82: 621.
Type specimen (holotype): K – New Zealand, Bay of Islands, no date, herb. Berkeley, s.n.

Fruitbodies two, branched, up to 45 × 15 mm, slender ascending, tough, color no longer discernable; stipe up to 5 × 2 mm, flattened or lobed in cross-section, arising from a small mycelial pad in silicaceous soil; branches polychotomous below, dichotomous above, flattened; internodes lengthening upward; axils acute; apices very slender, flagelliform, narrowly acute. Taste and odor unrecorded.

Tramal hyphae 2.2–4 µm diam., hyaline, somewhat thick-walled (wall up to 0.4 µm thick), clamped, free, parallel, tightly packed. Basidia not measured, 4-sterigmate, incompletely cruciately septate.

Spores 9–11.9 × 5.4–7.2 µm ($E = 1.44$–1.74; $E^m = 1.56$; $L^m = 10.03$ µm), ellipsoid to short-cylindrical, somewhat flattened adaxially, smooth, hyaline, thin-walled; contents opalescent to minutely granular; hilar appendage broad, short, papillate; germination by repetition absent.

In modern taxonomy, the name belongs to *Tremellodendropsis*. Crawford (1954) reported on this specimen, and her description matches the material very comfortably.

Although whole basidia were not observable, several basidial apices were seen to be incompletely cruciately septate, and not excessively inflated (basidial diameter about 9–10 µm). Sterigmata, while sturdy, were not stout or swollen.

Spore statistics place the taxon at the low end of such statistics, with an E^m of only 1.56 (see Petersen, 1985, for the range in this taxon). Most of the type specimens of Crawford's (1954) taxa produced spores with higher E^m values. The lack of germination by repetition removes this specimen (and therefore this name) from possible synonymy with *Tremellodendropsis transpusio* var. *transpusio*.

Tremellodendropsis transpusio var. inflata Crawford

Tremellodendropsis transpusio var. *inflata* Crawford. 1954. In Trans. R. Soc. N.Z. 82: 624.
Type (holotype): PPD – Nelson, Rai Valley, South Island, New Zealand, no date, *Crawford 322*.

Fruitbodies as described by Crawford. Basidia (Fig. 11) subbulbous, completely cruciately septate; sterigmata rather spindly. Spores (fig. 12) 8–11 × 6–7 µm, smooth, thin-walled, broadly ovate, flattened adaxially: germination by repetition absent.

Fruitbodies are rather short and squat, but otherwise as described by Crawford. The type specimen is in three parts: dried fruitbodies in a small packet, fruitbodies preserved in spirits, and a prepared slide of tissue and hymenium. The slide is no longer of use, but the other protions support adequate microscopic analysis.

Petersen (1985) has proposed this taxon at the species rank as *Tremellodendropsis inflata* (Crawford) Petersen.

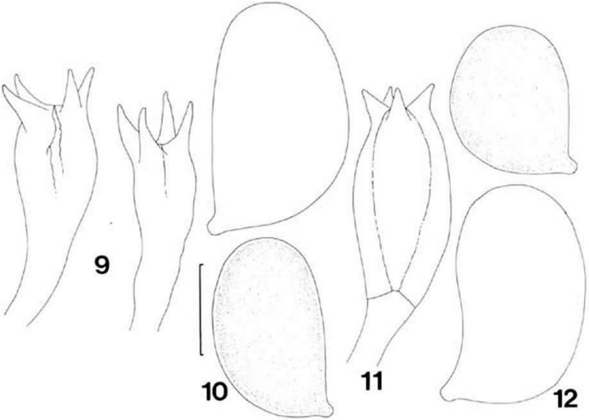
Tremellodendropsis transpusia var. **minor** Crawford

Tremellodendropsis transpusio var. *minor* Crawford. 1954. In Trans. R. Soc. N.Z. 82:625.

Type (Holotype): PDD – Wellington, Keith George Memorial Park, North Island, New Zealand, vi. 1949, *Crawford 241.*

Fruitbodies as described by Crawford. Hymenium not supporting microscopic analysis. Spores indistinguishable from those of *Crawford 322* and *258.*

The type specimen is in two parts: Fruitbodies preserved in spirits, and a prepared slide. The slide is no longer adequate for microscopic analysis, and the fruitbodies are not in good shape. No germination by repetition was observed.



Figs. 9–10. *Pterula tasmanica.* — 9. Basidial apices. — 10. Spores. — Figs. 11–12. *Tremellodendropsis transpusio* var. *inflata.* — 11. Basidium apex. — 12. Spores. (Standard bar = 5 μm for spores. For sizes of basidia, see text.)

Tremellodendropsis flagelliformis var. **ovalispora** Crawford

Tremellodendropsis flagelliformis var. *ovalispora* Crawford. 1954. In Trans. R. Soc. N. Z. 82: 621.
Type specimen (holotype): PDD – Wellington, Orangorango Ranges, Quoin Ridge, 8.viii.1948, *Crawford 157.*

Specimen represented by several dried fruitbodies in a packet. These show evident sign of discoloration toward dull orange-ochre where handled or bruised, and perhaps some vinescence (but this is obscure). There is an accompanying vial of two fruitbodies in spirits, but the accession number of the vial is questionable (either no. 258 or 157, as noted by Crawford on the vial label).

Basidia 60–75 × 9–10 µm, incompletely cruciately septate, with longitudinal septa ending indiscretely; transverse septa common, but unconnected to longitudinal septa; basidial apices occasionally sulcate.

Spores 8–10 × 5–7 µm, ovate to broadly ellipsoid, hyaline, smooth, thin-walled; hilar appendage broad, papillate; germination by repetition absent.

This name has been placed in synonym under *Tremellodendropsis flagelliformis* by Petersen (1985), with no infraspecific taxa accepted.

Clavaria pusio Berk.

Clavaria pusio Berk. 1867. Flora New Zealand, Hooker, : 185.
Type (holotype): K – New Zealand, no date, herb. Berkeley, s.n..

Fruitbodies two, up to 10 × 4 mm, branched. Stipe up to 5 × 2 mm, tough, channeled or lobed in cross-section, arising from a small ball of mycelium. Branching polychotomous; branches very slender (perhaps less than 0.5 mm thick), flagelliform, flattened somewhat.

Tramal hyphae 1.5–3 µm diam., clamped, hyaline, tightly packed, free, parallel. Basidia not supporting measurements, probably up to 80 µm long, with a long, equal stalk-like portion about 4–5 µm diam., and inflated distal portion up to 25 µm long, up to 22 µm broad, cruciately septate, with longitudinal septa divergent to outer basidial wall; sterigmata 4, stout, divergent.

Spores 11.9–14.4 × 6.5–7.6 µm ($E = 1.74–1.90$; $E^m = 1.82$; $L^m = 12.72$ µm), ellipsoid to broadly cylindrical, flattened adaxially, hyaline, smooth, thin-walled; hilar appendage broad, short, papillate; germination by repetition abundant, often with sterigmata forked.

This specimen comprises two juvenile or aberrant fruitbodies. One shows broken branches, but some apices, indicating that the living fruitbody may have been somewhat larger.

Very few spores were observed for measurement (only 3), but three others were seen with obvious sterigmata. This would seem to support the conclusion that when germination by repetition occurs, it is abundant, as also found on the type specimen of *T. transpusio* var. *transpusio*. My conclusion is that *T. pusio* and *T. transpusio* var. *transpusio* are synonymous.

Lachnocladium semivestitum B. & C.

Lachnocladium semivestitum B. & C. in Berk. 1873. In Grevillea 1: 161.

Type (holotype): K – USA, Pennsylvania, no date, coll. Michener, *Curtis 4260* (n.v.); merotype, FH!

Fruitbodies 2, up to 40 × 15 mm, pressed, branched, vase-shaped; stipe discrete, up to 15 × 2 mm, arising from soil with no discernable mat, flattened-lobed in cross-section, covered here and there with patches of minutely cottony mycelium, apparently off-white when fresh, now dull ochre and semicartilaginous. Branches in 1–3 ranks, acutely ascending, flattened, drying semicartilaginous in places; hymenium amphigenous; axils narrowly rounded to acute; lower internodes short, subapical internodes long; apices slender, long flagelliform. Color probably pale beige or pinkish ivory; no evidence of vinescence.

Tramal hyphae of branches slender, hyaline, clamped, parallel, tightly packed. Hymenium thickening; basidia not measureable, circum 14 μm broad, with incomplete longitudinal septa at maturity; sterigmata 4, stout, divergent, not sulcate.

Spores 9.7–15.5 × 5.0–6.5 μm (E = 1.59–2.69; E^m = 2.16; L^m = 12.30 μm), ellipsoid to elongate-ellipsoid, flattened adaxially, thin-walled, aguttulate (through preservation); hilar appendage broad, papillate.

Fruitbodies are typical for the complex, and would probably have been indistinguishable from those of other related taxa. The hymenium is largely collapsed and only a very few basidial apices were observable. None were seen to be transversely septate, but the longitudinal septa were obvious.

As might be expected from Coker's (1923: pl. 90, fig. 10) illustration, he used *Lachnocladium semivestitum* to represent at least two taxa. One is true to the type specimen, which he saw, but the other presumably is *Tremellodendropsis tuberosa* (Grev.) Crawford in the sense of Corner (1950).

In Corner's (1950, 1953, 1970) writings on *Aphelaria* and *Tremellodendropsis* I can find no indication that he examined this specimen. In 1950, he followed Coker's (1923) lead, placing *L. semivestitum* in synonymy under *Aphelaria tuberosa* (Grev.) Corner, but stated that no Greville specimen was to be found, and that the fungus which Greville described was not recognized in England (only in Scotland). Now that a more accurate description of *L. semivestitum* can be offered, it is obviously not contaxic with *A. tuberosa* as described by Corner (1950) and together with the apparent absence of a Greville specimen for *Merisma (Aphelaria) tuberosa* throws Corner's discussions under the latter name in doubt and confusion. Type studies must begin again, and some names (*A. tuberosa*) will be discarded in the process.

Two envelopes comprise the type specimen of *L. semivestitum*. (i) A sheet with two fruitbodies (described above), labelled in Curtis's hand '(4260) Clavaria semivestita, B. & C. Penn. a Dr. Michener (1184)'. A slide made by Burt is attached. (ii) A small envelope of note paper, labelled in large but unknown hand, 'Clavaria semivestita *BC*, 415. 1184. C. Garden'. Presumably the 'C' represents the Curtis herbarium, and the 1184 matches Michener's original number. Fruitbodies within are in better condition than those on the sheet, and represent the same taxon, but I cannot vouch for their authenticity. The handwriting perhaps is Burt's.

I am intrigued by a rather rare but consistent anomaly of spore shape. Of several hundred spores observed, five (three from fruitbodies on the sheet, two from the envelope) showed a peculiar beak-like protrusion just behind the hilar appendage. I do not know what it represents, nor its derivation, and it is a rare occurence, but must be noted in future observations. It may represent the earliest stages of secondary sterigmata formation, but if so, then some mature sterigmata should have been observed.

Pterula tasmanica Lloyd

Pterula tasmanica Lloyd. 1923. Mycol. Notes 70: 1227; fig. 2539.
Type specimen (holotype): BPI – Tasmania, no date, *L. Rodway 1267*, Cat. Lloyd no. 32715.

Annotation: 'Basidia shortly longit. divided as in *Aphelaria tuberosa*. E. J. H. Corner, March, 1951'.

Fruitbodies up to 39 × 17 mm, branched, very pale beige, with areas dark and cartilaginous. Stipe discrete, up to 12 × 2 mm, irregular in outline and covered with a felty mycelial mat in almost all instances, arising from indistinct balls of mycelium and soil. Major branches 2-several, flattened, rebranching in 1–2 ranks; internodes long, slender, more than 1 mm thick, flattened; axils very narrowly rounded; apices flagelliform, acerose, up 21 mm long. Small spots of suspected vinescent bruising around dirt specks.

Tramal hyphae of upper branches hyaline, clamped, uninflated, unagglutinated, parallel, tightly packed. Hymenium thickened, apparently unilateral; basidia (Fig. 9) not measurable, inflated apically up to 16 µm broad, thin-walled, easily broken when squashed, with very diaphanous veil septa longitudinal at the apex up to 18 m long, ending blindly; sterigmata 4, up to 13 µm long, stout, divergent, curved, sometimes causing the basidial apex to become sulcate.

Spores (fig. 10) 10.1–12.6 × 5.8–7.6 µm (E = 1.50–1.87; E^m = 1.70; L^m = 10.9 µm), ellipsoid to broadly ellipsoid, flattened somewhat adaxially, smooth, thin-walled, hyaline; hilar appendage eccentric, papillate; germination by repetition absent.

Basidia are typical of those of what Crawford (1954) called *Tremellodendropsis flagelliformis* var. *ovalispora*, and the spores overlap those of the same taxon. Spores are very scarce on the type, and some may have been over-inflated by KOH, others less so. Spore measurements must be treated generously, therefore.

No transverse basidial septa were seen, and the longitudinal septa never were connected to the basidial wall. The basidia, in short, were not tremellaceous by any definition, but, as stated by Corner (annotation), are like those of *Aphelaria tuberosa* (see above, under *Lachnocladium semivestitum*).

Tremellodendropsis transpusio Crawford

Tremellodendropsis transpusio Crawford. 1954. In Trans. R. Soc. N. Z. 82: 624.
Type (holotype): PDD – New Zealand, North Island, Wellington, Keith George Park, 10.vi.49, *Crawford 242*.

Fruitbodies as described by Crawford. Basidia completely cruciately septate, moderately inflated apically. Spores 10–11.5 × 4–5 µm, elongate-reniform to subcylindrical; germination by repetition abundant.

The type specimen includes three parts: (i) Dried fruitbodies; (ii) fruitbodies preserved in spirits; and (iii) a prepared slide. The slide is no longer useful, but both sets of fruitbodies are adequate for microscopic examination.

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A REDESCRIPTION OF SOME GENERA WITH STAUROSPORES

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Three plant-inhabiting fungi with tetraradiate conidia, *Tricornispora bambusae* Bonar, *Fumagopsis triglifioides* Speg., and *Eriosporella calami* (Niessl) Höhn., the type species of monotypic genera, are redescribed and illustrated from type specimens. These genera are regarded as distinct. *Fumagopsis* is possibly closely related to *Kazulia* Nag Raj. Since the type specimen of *Tridentaria* Preuss did not bear a fungus which agreed with the very brief original description, the genus *Tridentaria* Preuss is regarded as doubtful. The nematode-trapping Hyphomycetes formerly placed in *Tridentaria* should be reclassified.

During a study of nematode-trapping fungi certain species of the genus *Tridentaria* Preuss were included. The identity of the type species, *T. alba* Preuss, could not be established with certainty because the fungus was no longer present on the type specimen (Berlin) and the original description (Preuss, 1852) was brief and not illustrated. In 1912 Grove added a second species, *T. setigera* Grove, an aquatic Hyphomycete later reclassified as *Tetracladium setigerum* (Grove) Ingold (1942). Drechsler (1937, 1940, 1961, 1964) added four rhizopod- and nematode-trapping staurosporic Hyphomycetes with solitary, simple, erect conidiophores borne diffusely on the hyphae and not forming sporodochia. Preuss (1852) described *T. alba* as forming acervuli on *Brassica oleracea* with oblong to clavate staurospores (tetraradiate). Drechsler classified his species on the basis of the staurospores. However, the nematode- and rhizopod-trapping species, *T. carnivora*, *T. glossopaga*, *T. implicans*, and *T. tylota*, are hyphomycetous and neither sporodochial nor coelomycetous.

Kendrick & Carmichael (1973) and Carmichael & al. (1980) placed the sporodochial genera *Tricornispora* Bonar and *Fumagopsis* Speg. in synonymy with *Tridentaria* but also accepted Drechsler's concept of the genus in that they endorsed it by an illustration of *T. carnivora*. The description given by Preuss could have referred to any number of plant pathogenic genera with acervuli or sporodochia and staurospores, e.g. *Eriosporella* Höhn., *Kazulia* Nag Raj, *Tricornispora*, *Fumagopsis* etc. These four genera are properly typified and can be regarded as distinct, our reasons being substantiated below. We refrain from regarding *Tridentaria* as synonymous with any one of these.

The type specimens of *Tricornispora*, *Fumagopsis* and *Eriosporella* were studied, *Kazulia* being well illustrated and described elsewhere (Nag Raj, 1977).

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Tricornispora bambusae Bonar — Figs. 1–4

Tricornispora bambusae Bonar in Mycologia 59: 597. 1967.

Conidiomata amphigenous, on or close to unripe stromata of *Phyllachora orbicula*, forming pale ochraceous, roundish or ellipsoidal leaf spots 5–10 mm in diam., usually strongly pulvinate, erumpent through the epidermis which soon widely opens with a slit, pale brownish to almost orange in colour, 200–800(–1000) × 200–600 μm in size. Basal tissue sometimes reduced to a limited number of hyaline, thin-walled, pseudoparenchymatous cells which fill the stomatal cavities and bear only a few conidiophores, but usually more extended, sporodochial or somewhat acervuloid, composed of a pulvinate mass of hyaline, pseudoparenchymatous, subglobose or prismatic, rather thin-walled cells, 4–12(–20) μm in diam., either free in the host plant tissue and in the basal part intermixed with damaged parenchyma cells, or rising from the stroma of *Phyllachora*, the lower cells being mixed with and difficult to distinguish from the cells of the host fungus. In the superficial region this tissue gradually organises into more or less parallel, sympodially elongating rows of cells, apically bearing the conidiogenous cells. These are short cylindrical, subglobose or pyriform, often hardly differentiated from the subtending rows of conidiophorous cells, 2.5–4.5 × 2.5–7(–10) μm. Conidiogenous cells monoblastic, rarely polyblastic. Conidia hyaline, tetraradiate, composed of a basal main axis, which is cylindrical or clavate, 0–1-septate, not or only slightly constricted at the septa, 9–12 × 4–4.5 μm, bearing 3 apical, rather stiff, elongate, obclavate, often curved arms, which are the broadest just below the middle and taper gradually to the apex, 1–3-septate, rarely somewhat constricted at the septa, (15–)40–75 × 3–4.5 μm in size.

Isotype specimen (UC 405186) on leaf of *Bambusa spinosa* Roxb. affected by *Phyllachora orbicula* Rehm, Zaragosa, Nueva Ecija Province, Luzon, Philippine Islands, coll. J. Clemens, 6 Feb. 1929.

On the leaves of *Bambusa* two types of fructification are seen: (i) epiphyllous, shining, dark blackish brown, usually elliptical, up to 1100 × 500 μm, stromata belonging to *Phyllachora orbicula*, surrounded by pale ochraceous to pale orange leaf tissue; (ii) the amphigenous, pale orange fructifications of the *Tricornispora* on a more extended, discoloured part of the leaf or on the stromata of *Phyllachora*. The development of the host fungus is therefore hindered such that ascomata fail to develop. Although the mycelium of the host fungus is distinguished from that of *Tricornispora* with difficulty, there is no experimental or theoretical reason to consider them genetically connected. Bonar (1967) considered the *Tricornispora* a close associate or parasite of *Phyllachora orbicula* and *Broomelia miakei* Hino & Katumoto. The latter was described as having a conidial state similar to *Tricornispora* (Hino & Katumoto, 1955) but Bonar (1967) reexamined the type collection and pointed out that this fungus was no more than a parasite in the stromata of *Broomella miakei*. Anamorphs of *Phyllachora* have been reported in several coelomycetous genera but these are all very different from *Tricornispora* and, moreover, their phylogenetic connection with the *Phyllachora* species concerned is still doubtful or disproved. Many species of *Phyllachora* (including *P. orbicula*) certainly have spermatial states usually classified as *Linochora* Höhn., a genus with scolecosporous or bacilloid spermatia quite different from the staurospores of *Tricornispora* (von Arx & Müller, 1954; Parbery & Langdon, 1963; Parbery, 1967; Kamat & al., 1978). Anamorphs of *Broomella* are found in the coelomycetous genus *Pestalotia* s.l.

(Shoemaker & Müller, 1963). Our observations agree with those of Bonar who stated that the fungus might be a parasite of the mycelium of the *Phyllachora* within the host plant tissue.

Tricornispora bambusae does not fit the description of *Tridentaria alba* Preuss in that it was hyperparasitic and the colonies were not white and spreading. The conidial arms of *T. bambusae* were clavate, rather than elongate obclavate, and much tapered. A species with comparable conidia is *Triglyphium bambusae* A.K. Roy (Roy, 1968), the 3, seldom 4 conidial arms being shorter than those of *Tricornispora bambusae*. The species may differ in that the conidiomata on leaves of *Bambusa tulda* are completely superficial, subglobose or hemispherical. Material of this species could not be obtained. *Triglyphium* Fres. (1852) itself is a doubtful genus. Of the type species, *Tr. album* Fres., no material is in existence; this and a second species, *Tr. niveum* Massee (no material in CMI), are also sporodochial and have tetraradiate conidia with much shorter conidial arms than those of *Tricornispora bambusae*. *Zelopelta* Sutton & Gaur (1984) has conidia similar to or slightly smaller than those of *T. bambusae*, but quite different scutate (pycnothyrial) conidiomata.

Fumagopsis triglifioides Speg.—Figs. 5–6

Fumagopsis triglifioides Speg. in An. Mus. nac. B. Aires, ser. 3, 20: 464. 1910.

Mycelium superficial, forming an extended greyish-blackish network, indefinite in shape, 4–20 μm thick, composed of repeatedly branched, thin-walled, greyish brown, septate hyphae, strongly constricted at the septa, 3–5(–10) μm in diam., gradually changing into a pellicle of more compact prosenchyma close to the conidiomata. Setae borne on the hyphae, dark brown, thick-walled, aseptate, with a tapering (or pointed) tip on a broad or forked base, 3–6 μm wide, but up to 20 μm wide at the base, more than 200 μm long (almost all setae were broken in the specimen examined). Conidiomata sporodochial, hemispherical, 150–180(–200) μm in diam., 40–70(–85) μm high, prosenchymatous in the basal layers, pseudoparenchymatous in the middle and superficial layers, composed of greyish brown, irregularly shaped cells, 4–10(–15) μm in size. Setae erect, rising from the middle of the sporodochia, similar in shape and size to those of the pellicle. Conidiogenous cells discrete, directly on the superficial cells of the sporodochia, ampulliform, hyaline or faintly olivaceous near the conidiogenous locus, 4–10 × 5–8 μm in size, holoblastic. Conidia hyaline, tetraradiate, composed of a main axis which is subcylindrical or clavate 0–1-septate, not constricted at the septa, 10–18 × 2.0–2.8 μm, bearing 2 or 3 apical branches with 1–2 (rarely 3) septa, strongly constricted at the first septum, not constricted at the second septum, (12–)20–24 × 2.0–2.5 μm.

Holotype specimen (LPS) on *Lucuma neriifolia*, Argentina, La Plata, Isla Santiago, coll. C. Spegazzini, 14 Nov. 1909.

There are some deviations from the original description: the conidiogenous cells were described as filiform, 20–30 × 1.5–2 μm, but such structures could not be observed. The short ampulliform conidiogenous cells rise directly from the rather compact pseudoparenchymatous tissue of the conidiomata. Since it is this character which mainly distinguishes *Fumagopsis* from *Kazulia* Nag Raj (1977), the latter genus may be a more developed stage of *Fumagopsis*, although the conidia of *Kazulia* also have longer branches with more septa. In addition the structure of the superficial stroma of *Kazulia* does not differentiate this genus from *Fumagopsis*. Another difference might be the septation of the setae in *Kazulia*, but the setae in the type specimen of *Fumagopsis* were broken. Spegazzini also described and figured conidia with 3-septate branches; we observed only one such branch, some 2-septate and many 0–1-septate (developing) branches, another reason to suppose that the genus *Fumagopsis* is based on an unripe collection. We refrain from merging the genera until fresh material becomes available. Both genera mentioned differ from *Tricornispora* in the completely superficial growth and in the setose sporodochia; there is no doubt that they differ at the generic level. *Phalangispora* Nawawi & Webster (1982) mainly differs from all three genera in the branching pattern of the conidia and the polyblastic conidiogenesis.

In placing *Fumagopsis* and *Tricornispora* in synonymy with *Tridentaria* sensu Drechsler, Kendrick & Carmichael (1973) apparently stressed the similarity of the conidia but paid less regard to the different characters of the conidiogenous cells and conidiomata. *Tridentaria* sensu Drechsler is a well-defined genus which differs both morphologically and ecologically from the type species of *Tricornispora* and *Fumagopsis.*

Eriosporella calami (Niessl) Höhn.—Figs. 7–9

Eriosporella calami (Niessl) Höhn. in Sber. Akad. Wiss. Wien 125: 109. 1916 — *Cryptosporium calami* Niessl in Hedwigia 17: 176. 1878. *Pseuderiospora castanopsidis* Keissler in Anz. Akad. Wiss. Wien 60: 75. 1923.

Conidiomata developing intraepidermally, flat or lens-shaped, rupturing the upper layers of the multilayered epidermis, remnants of which wear away over the old fruitbodies, resulting in completely open, disciform, whitish acervuli. Basal stroma 2–5 cells thick and composed of isodiametrical, thin-walled, hyaline cells, 3–6 μm in diam., near the edges of the conidiomata slightly larger and up to 12 μm in diam., remaining attached to the epidermal remnants. Conidiophores rising from the basal tissue, hyaline, short-cylindrical or elongated, occasionally sympodially branched, 10–15(–17) × 1.5–3 μm, but sometimes much reduced so that the conidiogenous cells develop directly from the basal tissue. Conidiogenous cells subglobose, short-conical or cylindrical, phialidic with a minute thickening inside the apical pore, 2.5–7 × 2.5–4 μm. Conidia tetraradiate, composed of a main axis which is cylindrical, truncate at the base with a small marginal cellular appendage, 0–1-septate, hyaline, 9–12(–15) × 1.5–2.3 μm, bearing apically 3 diverging, rather slender and flexuous hyaline arms, 3–4(–5)-septate, tapering to the tips, 40–65 × 1.8–2.2 μm.

Isotype specimen (CBS H–3306) Rabenhorst Fungi europ. exsicc. Klotzii herbarii vivi mycol. Ed. 3, 245a, on dead leaves of *Calamus*, Calcutta, India, collected by S. Kurz.

Eriosporella was redescribed by Sutton (1980) from another part of the type collection. His description agrees with our observations except in that he did not refer to the typical cellular appendages of the basal cell of the conidium. The appendage is not seen in all the conidia as it often breaks off, leaving only a remnant of the very slender appendage attached to the conidiogenous locus. The appendage is seen more frequently on conidia with non-septate main axes, than on conidia with a 1-septate main axis. Nag Raj & DiCosmo (1981) noted the appendage but described the conidiogenous cells as 'annelides......with up to three annellations'. However, we were able to confirm the observations made by Sutton (1980) who regarded the conidiogenous process as phialidic.

The synonymy of *Pseuderiospora castanopsidis* Keissler is not very clear from the original description (Keissler, 1923; presented again as 'nov. spec.' in 1937), but Sutton (1977) based the synonymy on a study of the type specimen.

The fungus is different from *Tridentaria, Tricornispora, Fumagopsis* and *Kazulia* in the melanconeacious way of growth and the short appendages and long and slender branches of the conidia.

ACKNOWLEDGEMENTS

The curators of the herbaria of LPS and UC are acknowledged for loan of the type specimens.

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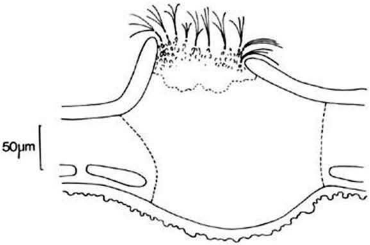

Fig. 1. *Tricornispora bambusae.* — Showing the position of a conidioma on a stroma of *Phyllachora orbicula* (from type specimen UC 405186).

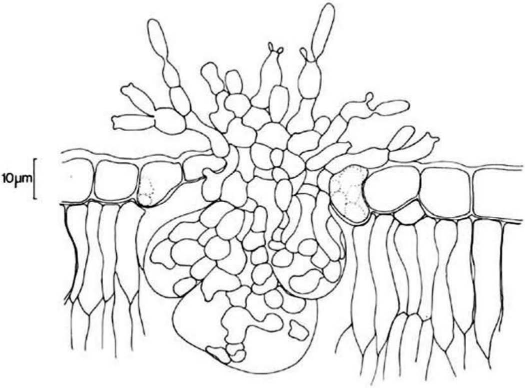

Fig. 2. *Tricornispora bambusae.* — Early development of conidioma in stomatal cavity of *Bambusa spinosa* leaf.

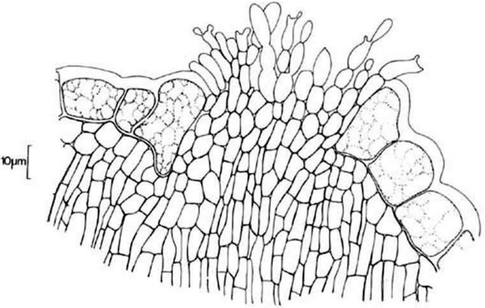

Fig. 3. *Tricornispora bambusae*. — Conidioma developing on stroma of *Phyllachora orbicula*.

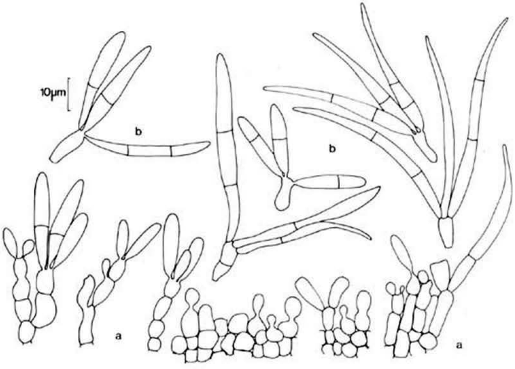

Fig. 4. *Tricornispora bambusae*. — a. Conidiogenous cells and conidial development. — b. Conidia after secession.

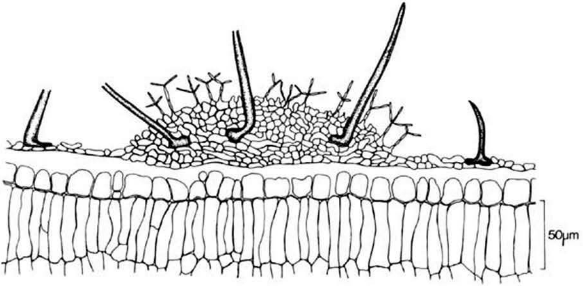

Fig. 5. *Fumagopsis triglifioides.* — Setose conidioma and pellicle (from type specimen LPS).

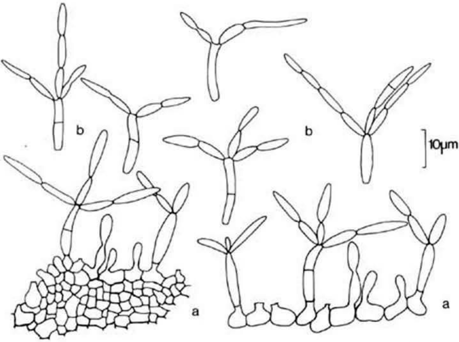

Fig. 6. *Fumagopsis triglifioides.* — a. Conidiogenous cells and conidial development. — b. Conidia.

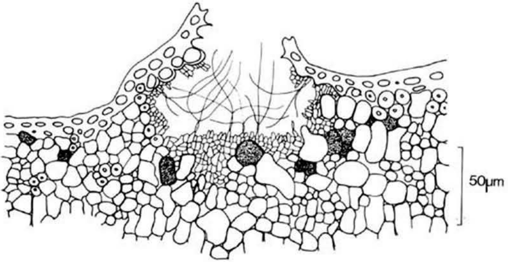

Fig. 7. *Eriosporella calami.* — Vertical section of conidioma (from isotype specimen CBS).

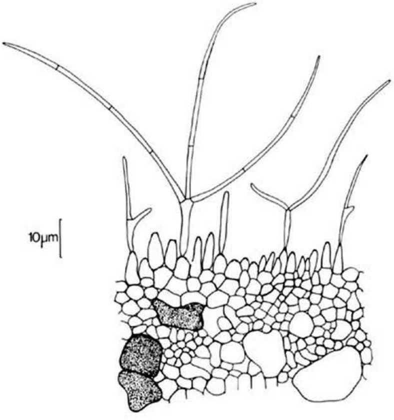

Fig. 8. *Eriosporella calami.* — Conidiogenous cells and conidial development.

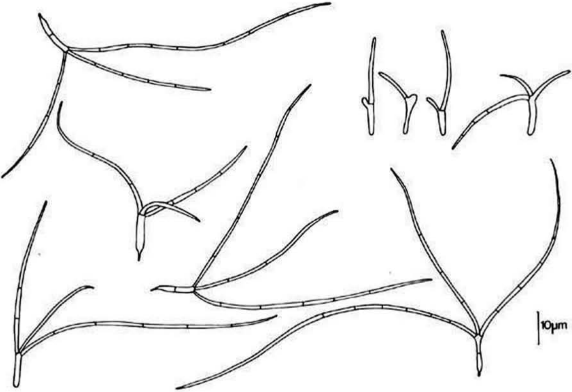

Fig. 9. *Eriosporella calami.* — Young conidia and conidia after secession.

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NOTULAE AD FLORAM AGARICINAM NEERLANDICAM—IX

Mycenella

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Five species of *Mycenella* (Agaricales) appear to occur in the Netherlands, viz. *M. bryophila*, *M. margaritispora*, *M. rubropunctata* spec. nov., *M. salicina* and *M. trachyspora* comb. nov. A key to and descriptions and illustrations of these species are given. Moreover the following new combinations are introduced: *Mycenella bryophila* var. *caesia*, *Mycenella nodulosa* and *Xerula kuehneri*.

The genus *Mycenella* (J. Lange) Sing. was erected by J. Lange (1914: 16) as a subgenus of the genus *Mycena* S. F. Gray and contained species with warty spores. Singer (1938: 9) raised it to generic level. Five *Mycenella* species, viz. *M. bryophila*, *M. trachyspora*, *M. margaritispora*, *M. rubropunctata*, and *M. salicina* occur in the Netherlands, but they all appear to be rare to very rare.

Mycenella (J. Lange) Sing.

Mycena subg. *Mycenella* J. Lange in Dansk. bot. Ark. 1 (5): 16. 1914. — *Mycenella* (J. Lange) Sing. in Notul. syst. Sect. crypt. Inst. bot. Acad. Sci. URSS 4 (10–12): 9. 1938. — *Mycena* subg. *Para-Mycena* 'groupe *Mycenella*' Kühner, Genre Mycena: 609. 1938. — Type species: *Mycena margaritispora* J. Lange.

Marasmius sect. *Laccariosporae* Sing. in Beih. bot. Zbl. 56 B: 163. 1936. — Type species: *Marasmius cyatheae* Sing.

Basidiocarps mycenoid, small, tough. Pileus conical, convex or applanate, frequently with low umbo, thin-fleshed, somewhat hygrophanous, with centre dark greyish brown, becoming paler towards margin, striate, when fresh finely pruinose. Lamellae distant, adnate to emarginate, ventricose, whitish, cream or greyish. Stipe slender, cylindrical, frequently rooting, flexuose, at apex whitish, becoming ochraceous, brown, grey-brown or blueish grey towards base, pubescent. Smell indistinct. Taste indistinct. Spore print white to pale cream. Spores subglobose, in most species with low, broad, obtuse warts, thin-walled, hyaline, inamyloid, with conspicuous apiculus. Basidia clavate, 2- or 4-spored. Cheilocystidia ventricose or fusiform with apex obtuse, subacute, mucronate or with branched projections, thin- or rather thin-walled, sometimes with yellowish brown, resinaceous substance around apex. Pleurocystidia similar to cheilocystidia. Hymenophoral trama subregular. Stipitetrama sarcodimitic (Corner, 1966: 148, 175). Pileipellis tending to a hymeniderm (Kühner 1980: 733), made up of irregular branched clavate cells or thin repent hyphae with wart-like excrescences.

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Caulocystidia lageniform or fusiform. Clamp-connections present. Terrestrial in both coniferous and broad-leaved forests or on decayed wood. Rare. According to Singer (1975: 346) the species with warty spores have a temperate distribution.

KEY TO THE SPECIES OF MYCENELLA IN WESTERN EUROPE

1. Spores without warts (but occasionally with one or two germ tubes) . . . . 1. *M. salicina*
1. Spores with conspicuous warts.
   2. Spores < 10 µm, with rounded warts.
      3. Apex of cystidia with simple or branched projections . . . . 3. *M. margaritispora*
      3. Apex of cystidia without projections.
         4. Cheilo- and pleurocystidia lageniform with a long cylindrical neck with non-mucronate, obtuse apex. Basidia 2-spored.
            5. Stipe grey-brown . . . . 5a. *M. bryophila* var. *bryophila*
            5. Stipe blueish grey . . . . 5b. *M. bryophila* var. *caesia*
         4. Cheilo- and pleurocystidia fusiform with subacute or mucronate apex. Basidia mostly 4-spored.
            6. Lamellae and upper part of stipe with small reddish spots. Cheilo- and pleurocystidia frequently mucronate . . . . 4. *M. rubropunctata*
            6. Without small red spots. Cheilo- and pleurocystidia not mucronate 2. *M. trachyspora*
   2. Spores > 10 µm, with large conical warts . . . . (6. *Xerula kuehneri*)

1. **Mycenella salicina** (Vel.) Sing.—Fig. 1

Mycena salicina Vel., Ceské houby: 306. 1920. — *Mycenella salicina* (Vel.) Sing. in Lilloa 22: 291. 1951.

Selected descriptions.—Kühner, Genre *Mycena*: 620. 1938; Gulden & Jennsen, Arctic and Alpine Mycology, First Int. Symp. Arcto-Alpine Mycology, Eds. Laursen & Ammirati: 187. 1982; Pearson in Trans. Br. mycol. Soc. 35: 101. 1952; Pilát, Velenovskýi Species novae Basiomycetum: 94. 1948.

Basidiocarps small, solitary. Pileus up to 13–15 mm in diam., convex or campanulate, finally becoming flattened, thin-fleshed, at centre brown to dark brown, towards margin greyish brown, pallescent on drying, dull, glabrous, occasionally with centre of pileus of dried basidiocarps very slightly pruinose, becoming somewhat plicate on drying. Lamellae rather distant (L = 17–30, l = 1–3), adnexed to emarginate, ventricose or nearly triangular, pale grey, with white, finely eroded edge (lens!). Stipe 17–50 × 0.8–2.5 mm, slenderly cylindrical, fistulose, at apex whitish, towards base becoming greyish, with outermost base yellow-brown to dark brown, entirely whitish pubescent, at base with brown rhizoids. Context of pileus pale grey, of stipe white with cortex becoming brown towards base. Smell and taste indistinct.

Spores 5.0–6.7 × 4.1–5.6 µm, Q = 1.0–1.3, globose, subglobose or broadly ellipsoid, sometimes somewhat angular, occasionally with broad germ tube, thin-walled, hyaline, with conspicuously large hilar appendage. Basidia 25–32 × 5.5–7.0 µm, clavate, 4-spored, occasionally 2-spored (Huysman s.n., 15 Oct. 1957). Cheilocystidia 50–80 × 9–16 µm, ventricose-lageniform, with 3–7 µm wide obtuse neck, rather thick-walled, with resinaceous contents, sometimes near apex with surrounding resinaceous substance. Pleurocystidia similar to cheilocystidia. Pileipellis a cutis made up of 2–3 µm wide repent hyphae with scattered cylindrical pileocystidia, slightly gelatinized; elements just below surface with intracellular reddish brown pigment.

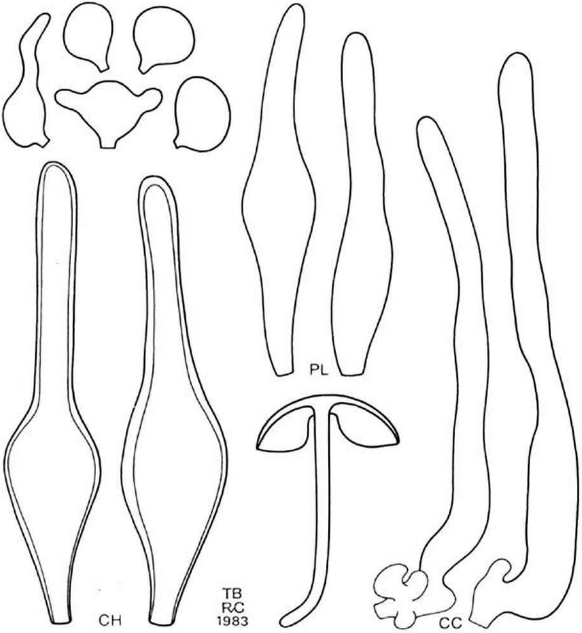


Fig. 1. *Mycenella salicina*. Habit, spores, pleurocystidia (PL), cheilocystidias (CH), and caulocystidia (CC). (Habit × 1.4, spores × 2.100, cystidia × 1.400).

Stipitepellis a cutis with many coralloid or simple protuberances, with subcylindrical caulocystidia measuring 50–120 × 3–10 μm.

Habitat & distribution.—Terrestrial in calcareous grasslands, but also found in *Pinus* forest. Very rare. In the Netherlands only known from calcareous coastal dunes and from the south-eastern limestone area.

Material examined.—NETHERLANDS: prov. Zuid-Holland, Noordwijk, 16 Nov. 1957, *C. Bas 1382* (L); prov. Limburg, Wijlre, 11 Oct. 1968, *P. B. Jansen 68–140* (L); unknown locality, 15 Oct. 1968, *H. S. C. Huysman s.n.*

Among the european *Mycenella* species *M. salicina* is easily recognized by its subglobose spores. As already indicated by Gulden & Jenssen (1982: 187) their material from Greenland has larger spores (viz. 6–9.5 µm) than european specimens.

2. **Mycenella trachyspora** (Rea) Boekhout, *comb. nov.*—Fig. 2

Mycena trachyspora Rea in Trans. Br. mycol. Soc. 12: 216. 1927 (basionym).

Mycena cooliana Oort in Meded. Ned. mycol. Vereen. 16–17: 248.—*Mycenella cooliana* (Oort) Sing. in Beih. Sydowia 7: 32. 1973.

Selected descriptions.—Smith, North American spec. Mycena: 445. 1947.

Basidiocarps small, growing in small groups. Pileus ca. 15 mm in diam., conico-campanulate, with low umbo, grey-brown, pallescent on drying, pruinose, striate when moist, somewhat wrinkling on drying. Lamellae rather distant, rather thick, up to c. 2 mm wide, sometimes furcate and venose, white. Stipe 20–30 × 3 mm, cylindrical, fistulose, tough, at apex pale grey, towards base becoming yellowish or even dark brown flocculose. Context whitish. Smell indistinct. Taste indistinct.

Spores 5.5–6.0 × 4.8–5.3 µm, Q = 1.05–1.25, subglobose to broadly ovoid, with low, obtuse warts, thin-walled, hyaline, with conspicuously large hilum. Basidia 23–45 × 6–7 µm, clavate, 4-spored. Cheilocystidia 55–75 × 6–11 µm, slenderly fusiform, gradually tapering towards subobtuse apex, rather thick-walled. Pleurocystidia 70–95 × 7–10 µm, slenderly fusiform. Pileipellis with subcylindrical pileocystidia, measuring 40–60 × 3–7 µm. Stipitepellis a cutis made up of hyphae with simple or coralloid projections, with subcylindrical or slenderly fusiform caulocystidia, measuring 45–85 × 5–11 µm.

Habitat & distribution.—Among mosses at base of trunk of *Ulmus*; very rare in the Netherlands. Found only once (1926) near Leiden (type locality of *Mycena cooliana*).

Material examined.—NETHERLANDS, prov. Zuid-Holland, Oegstgeest, estate 'Rhijnhof', *anonymus* (L).—U.S.A.: *A. H. Smith 218, 3731* (MICH).

The description above is based mainly on Oort's description of *Mycena cooliana*.

Mycenella trachyspora (Rea) Boekhout is considered to be conspecific with *M. cooliana* (Oort) Sing. because of similar morphology and habitat, viz. on wood of *Ulmus*.

The cheilocystidia in the holotype of *M. cooliana* seems to be somewhat more fusoid if compared with Rea's description: 'hyaline, flexuose, often ventricose at base, 40–60 × 6–10 µm, apex obtuse, sometimes constricted into a globose head.' However, the cheilocystidia in specimens from the U.S.A. are comparable to those of the Netherlands' specimen.

Maas Geesteranus (1982: 382) regards *M. cooliana* conspecific with *M. bryophila*. I disagree because the cheilocystidia of *M. bryophila* are lageniform with a cylindrical, obtuse neck.

Dr. E. Horak drew my attention to a still undescribed alpine taxon of *Mycenella* which is very close to *M. trachyspora* because of the presence of subfusiform cheilocystidia similar to those of *M. trachyspora*. It differs however, by its very dark blackish brown pileus and it alpine habitat.

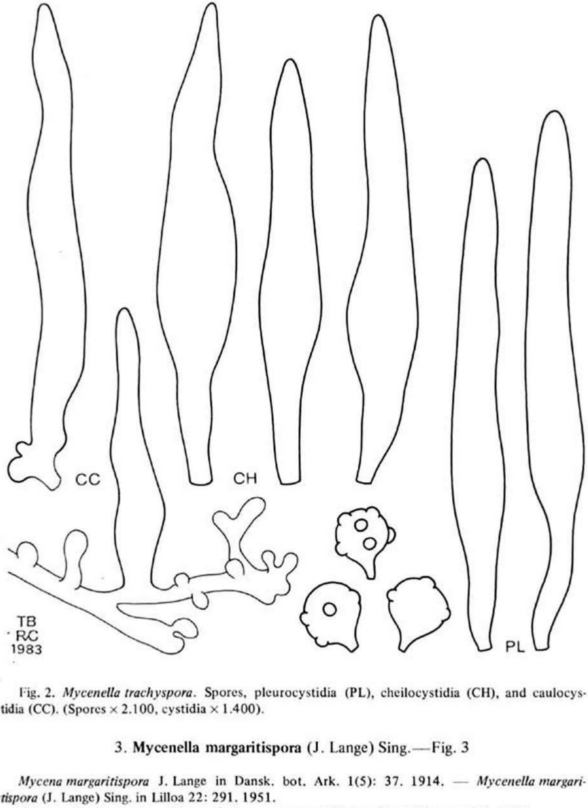


Fig. 2. *Mycenella trachyspora*. Spores, pleurocystidia (PL), cheilocystidia (CH), and caulocystidia (CC). (Spores × 2.100, cystidia × 1.400).

3. **Mycenella margaritispora** (J. Lange) Sing.—Fig. 3

Mycena margaritispora J. Lange in Dansk. bot. Ark. 1(5): 37. 1914. — *Mycenella margaritispora* (J. Lange) Sing. in Lilloa 22: 291. 1951.

Misapplied name.—*Mycena lasiosperma* sensu Kühner, Genre Mycena: 612. 1938.

Selected illustrations.—J. Lange, l.c., pl. 1k; Fl. agar. dan. 2, pl. 58 D, D1. 1931.

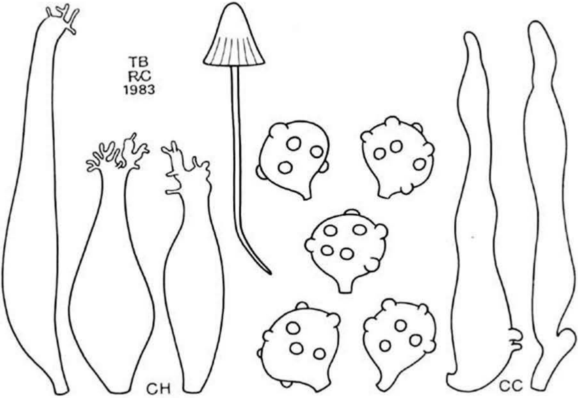


Fig. 3. *Mycenella margaritispora*. Habit, spores, cheilocystidia (CH), and caulocystidia (CC). (Habit × 1.4, spores × 2.100, cystidia × 1.400).

Selected descriptions.—J. Lange, Fl. agar. dan. 2: 50. 1936; Smith, North American spec. *Mycena*: 443. 1947.

Basidiocarps small, solitary. Pileus 5–8 mm high, conical to campanulate, hygrophanous, with centre brownish grey, grey or pearl grey, towards margin brownish, pallescent on drying, striate. Lamellae distant, adnexed, narrow, pale grey. Stipe ca. 15 × 0.5 mm, sometimes somewhat rooting, at apex whitish, becoming dark grey-brown towards base, pubescent. Context pallid, tough. Smell indistinct. Taste indistinct.

Spores (5.5–)6.3–8.1 × (4.5–)5.1–6.7(–7.4) µm, Q = 1.0–1.3, subglobose to broadly ellipsoid, with low obtuse warts, thin-walled, hyaline, with conspicuously large hilar appendage. Basidia 23–35 × 6–8 µm, clavate, 2-spored. Cheilocystidia 35–60 × 7–12 µm, fusiform or lageniform with obtuse apex, mostly with simple or coralloid excrescences, thin-walled. Pleurocystidia similar to cheilocystidia. Pileipellis hymeniform, made up of cylindrical, clavate or irregularly shaped cells covered with simple to branched wart-like or cylindrical excrescences, with fusiform, thin- to slightly thick-walled pileocystidia measuring 20–45 × 4–7 µm. Stipitepellis a cutis, made up of hyphae with wart-like protuberances, and subcylindrical caulocystidia, 20–65 × 4–7 µm, sometimes with excrescences at their apex.

Habitat & distribution.—Terrestrial, among grasses and mosses and on fallen branches of trees. Very rare. In the Netherlands only known from two localities on sandy or loamy soil in the south-western part of the country.

Material examined.—NETHERLANDS, prov. Noord-Brabant: Bergen op Zoom, estate 'Zoomland', 26 Oct. 1973, *P. B. Jansen 73–124* (L); ditto, 24 Oct. 1975, *P. B. Jansen 75–151* (L); Dorst, 24 Aug. 1968, *P. B. Jansen 68–127* (L).

Mycenella margaritispora is characterized by a small, conical to campanulate pileus and cheilocystidia with simple or coralloid excrescences at their apex. In the latter aspect this species agrees with *M. lasiosperma* (Bres.) Sing., which according to some authors (e.g. Kühner, 1938: 612, 1980: 896) is conspecific with *M. margaritispora*.

I have studied too few specimens to have a definite opinion on this problem, but to me *M. margaritispora* seems to differ from *M. lasiosperma* in smaller non-fasciculate basidiocarps, in the absence of a rooting base and in having a not very pronounced smell. The smell of *M. lasiosperma* is described by Bresadola (1883: 33) as 'forti farinaceo-rancido'.

4. **Mycenella rubropunctata** Boekhout, *spec. nov.*—Figs. 4–5

Misapplied name.—*Mycena bryophila* Vogl. sensu Kühner p.p. (4-spored variant), Genre *Mycena*: 614. 1938.

Pileus 5–25 mm diam., primum conicus ad convexus, deinde applanatus vel convexus, tenuis, hygrophanus, humiditate umbrinus, ad sepiaceus, marginem versus pallidior, transparenter striatus, pruinosus. Lamellae densae, emarginatae ad anguste adnatae, ventricosae, albidae vel cremeae vel griseo-flavidae, in exsiccatis rubropunctatae. Stipes 30–75 × 0.5–2.2 mm, radicans, ochraceo-brunneus, sursum albidus, pubescens. Contextus griseo-brunneus. Odor et sapor indistincti. Sporae subglobose ad late ellipsoideae, verrucis obtusis obtectae, 4.5–6.0 × 4.2–5.5 µm (in basidiis bisporis 5.8–8.1 × 5.6–8.0 µm). Basidia quadrispora, raro bispora, 22–28 × 6–7 µm. Cheilocystidia 40–70 × 9–16 µm, fusiformia, nonnumquam modice lageniformia, sursum ampliata et truncata, saepe mucronata, fere crassitunicata, saepe sursum materia resinacea incrustata. Pleurocystidia cheilocystidiis similia. Pileipellis cutis ex hyphis angustis tenuitunicatis composita, appendicibus simplicibus vel coralloideis ornata, pileocystidiis cylindricis vel subventricosis, 30–65 × 4–7 µm praedita. Typus.—'*R. A. Maas Geesteranus 15532*, in silva coniferarum prope Wijlre, prov. Limburg in Neerlandia, 31 VIII 1977 (L)'.

Basidiocarps small, solitary. Pileus 5–25 mm, conical to convex, becoming applanate, finally concave with margin uplifted, thin-fleshed, hygrophanous, when moist dark brown to sepia (Mu. 10 YR 5/2) but towards margin pale yellowish sepia and outermost margin whitish, becoming silvery grey-brown (Mu. 10 YR 8/2–3) on drying, somewhat viscid, translucently striate, finely pruinose (lens!). Lamellae rather crowded (L = c. 25), emarginate to narrowly adnate, ventricose, up to 3 mm wide, somewhat venose, whitish, whitish cream or greyish yellow, when dried with distinct reddish spots, with concolorous edge. Stipe 30–75 × 0.5–2.0 mm, somewhat flexuose, terete or somewhat flattened, rooting, fistulose, whitish at apex, becoming ochraceous to brownish (Mu. 10 YR 5–6/3) towards base, at apex white pubescent, becoming yellowish pubescent towards base, when dried with reddish spots on upper part of stipe. Context of pileus grey-brown, of upper part of stipe pale brown, browner towards base. Smell indistinct or very weak, jodoform-like. Taste absent or somewhat herbaceous. Spore print colour unknown (not recorded in material studied).

Spores in 4-spored form 4.5–6.0 × 4.2–5.5 µm, Q = 1.0–1.25, in 2-spored form 5.8–8.1 × 5.6–8.0 µm, Q = 1.0–1.2, subglobose to broadly ellipsoid, with low, obtuse warts, thin-walled, hyaline, with conspicuously large hilar appendage. Basidia 22–28 ×

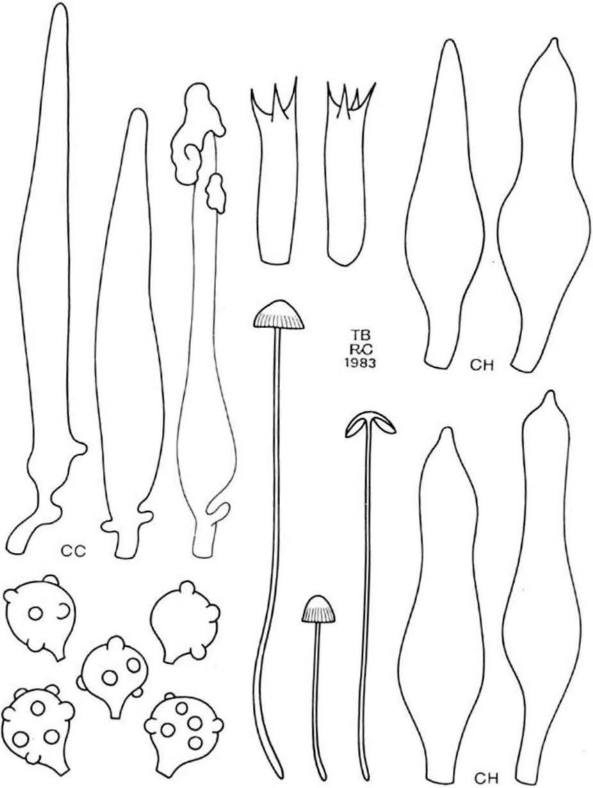
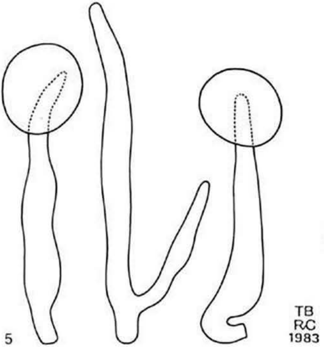


Fig. 4. *Mycenella rubropunctata*. Habit, spores, basidia, cheilocystidia (CH), and caulocystidia (CC). (Habit × 1.4, spores × 2.100, cystidia × 1.400).



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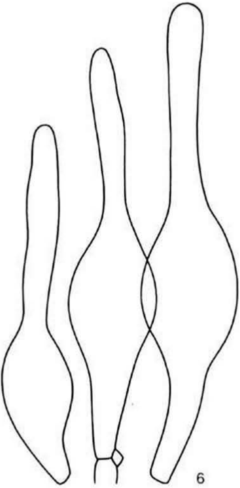

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Fig. 5. *Mycenella rubropunctata*. Pileocystidia.
Fig. 6. *Mycenella nodulosa*. Cheilocystidia (from type) (all Figs. × 1.400).

6–7 µm, clavate, 4-spored; occasionally 2-spored. Cheilocystidia 40–70 × 9–16 µm, fusiform, sometimes tending to lageniform with broad tapering neck, frequently with mucronate apex, rather thick-walled, often with yellowish resinaceous substance around apex. Pleurocystidia similar to cheilocystidia. Hymenophoral trama subregular, made up of hyphae with fusiform cells measuring 50–90 × 7–12 µm. Pileipellis a cutis made up of slender hyphae with simple to branched coralloid excrescences, with cylindrical to subventricose pileocystidia, measuring c. 30–65 × 4–7 µm. Stipitepellis a cutis, made up of slender hyphae with wart-like excrescences, and fusiform, rather thick-walled caulocystidia, measuring 40–80 × 5–9 µm.

Habitat & distribution.—Terrestrial in both broad-leaved and coniferous forests, probably with preference for calcareous soils. Very rare. In the Netherlands only known from two localities; one in the south-western part (prov. Noord-Brabant) and one in the south-eastern part (prov. Limburg). Also known from Belgium (prov. Namur) and Norway (prov. Østfold and Telemark).

Material examined.—NETHERLANDS: prov. Noord-Brabant, Bergen op Zoom, estate 'Zoomland', 4 Aug. 1973, *P. B. Jansen 63–119* (L); prov. Limburg, Wijlre, 31 Aug. 1977, *R. A. Maas*

Geesteranus 15532, 15533 (L). — BELGIUM, prov. Namur: Rochefort, 5 Oct. 1978, *J. Schreurs 672* (L); Ave-et-Auffe, 28 Aug. 1980, *J. Schreurs 451* (L); ditto 2 Oct. 1977, *P. B. Jansen, 77–291* (L). — GREAT-BRITAIN, Sussex, Chichester, 5 Sept. 1967, *E. Kits van Waveren s.n.* (L). — NORWAY: prov. Østfold, Harekö, Onsoy, 10 Oct. 1984, *Ø. Weholt 69/84* (L); prov. Telemark, Gjømle, Bamble, 20 Nov. 1982, *Ø. Weholt 252/82* (L).

This species has already been reported twice in european mycological literature. First as von Höhnel's '2. *Mycena* species' (1914: 24) and later as Kühner's 4-spored form of *Mycenella bryophila* (1938: 614).

Mycenella rubropunctata is very close to *Mycena nodulosa* A. H. Smith (1936: 411, 1947: 446), because of a rather similar morphology, including the presence of reddish spots on the lamellae and the upper part of the stipe. **Mycenella nodulosa** (A. H. Smith) Boekhout, *comb. nov.*[1], differs however in its pileipellis which is made up of clavate cells, its slightly larger spores (viz. 6–7 µm), and its hymenial cystidia which are lageniform with a long cylindrical neck (Fig. 6). Moreover the pileocystidia of *M. rubropunctata* (Fig. 5) are considerably shorter than those of *M. nodulosa* (viz. 30–65 × 4–7 µm in *M. rubropunctata*, as against 100–150 × 7–9(–10) µm in *M. nodulosa* (A. H. Smith, l.c.). The type material does not show red spots on the lamellae probably owing to desintegration of the reddish substance during the long period of preservation in the herbarium.

5. **Mycenella bryophila** (Vogl.) Sing.—Fig. 7

Mycena bryophila Vogl. in Atti Ist. veneto Sci., ser. 6, IV: 617. 1886. — *Mycenella bryophila* (Vogl.) Sing. in Lilloa 22: 291. 1951.

Mycena meulenhoffiana Oort in Meded. ned. mycol. Vereen. 16–17: 247. 1928.

var. **bryophila**

Misapplied name. — *Mycena lasiosperma* sensu J. Lange in Dansk bot. Ark. 1: 36. 1914.

Selected description. — Kühner, Genre *Mycena*: 616. 1938 (2-spored form).

Basidiocarps small, solitary. Pileus 20–40 mm, conico-convex to applanate, with prominent umbo, thin-fleshed, with centre dark brown (Mu. 7.5 YR 3/2, towards margin pale brown, translucently striate up to centre by dark brown stripes. Lamellae moderately crowded (L = c. 18), adnate to nearly adnexed, ventricose, up to 5 mm wide, sometimes venose, whitish to pale greyish brown, with concolorous edge. Stipe 30–50 × 1–2.5 mm, slenderly cylindrical, with up to 5 mm broad clavate base, rooting, at apex whitish to very pale grey-brown, becoming grey-brown (Mu. 10 YR 5/3) at base, entirely white pubescent. Context of pileus and upper part of stipe pale grey-brown, towards base of stipe becoming dark grey-brown. Smell indistinct. Taste indistinct.

Spores (5.0–)6.5–9.5 × 5.0–7.8 µm, Q = 1.0–1.25, subglobose to broadly ellipsoid, with low, obtuse warts, thin-walled, hyaline, with conspicuously large hilar appendage. Basidia 25–35 × 7–12 µm, clavate, 2-spored. Cheilocystidia 45–80 × 7–14 (–16) µm, lageniform with 3–6 µm wide, long cylindrical neck, with obtuse apex, rather thick-walled. Pleurocystidia similar to cheilocystidia. Pileipellis somewhat gela-

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[1] Basionym: *Mycena nodulosa* A. H. Smith in Mycologia 28: 411. 1936.

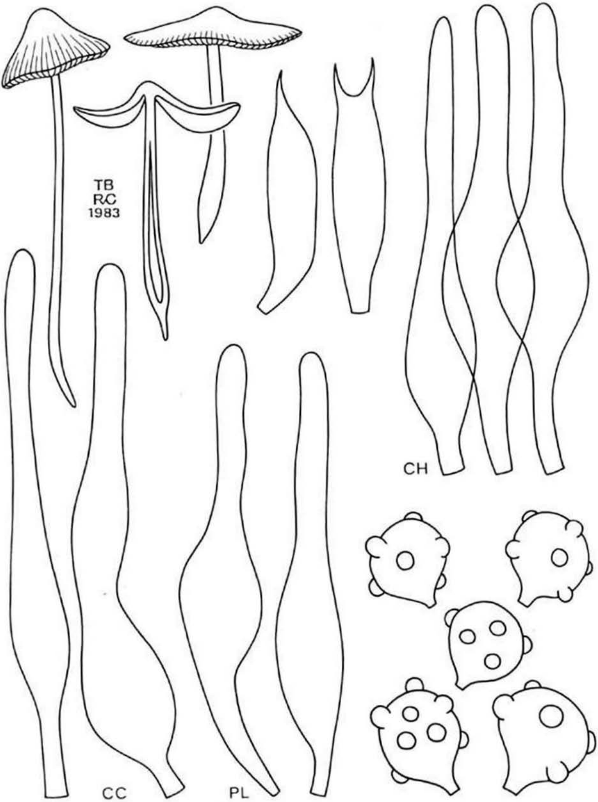

Fig. 7. *Mycenella bryophila*. Habit, spores, basidia, pleurocystidia (PL), cheilocystidia (CH), and caulocystidia (CC). (Habit × 1.4, spores × 2.100, basidia and cystidia × 1.400).

tinized, made up of thin-walled, colourless, clavate cells, with cylindrical or subventricose pileocystidia measuring c. 25–40 × 3–6 µm, with under this suprapellis a compact cutis-like subpellis made up of slender hyphae with yellowish brown cell walls. Stipitepellis a cutis, made up of hyphae with wart-like excrescences, with lageniform caulocystidia, 55–95 × 5–13 µm.

Habitat & distribution. — Terrestrial, in both coniferous and broad-leaved forests in calcareous coastal dunes and in parks on rich soils. Rather rare. In the Netherlands known from the coastal dunes (prov. Noord-Holland, Castricum: prov. Zuid-Holland, Katwijk: prov. Zeeland, Oostkapelle) and from estates along brooks and rivers (prov. Overijssel, Delden; prov. Limburg, Gulpen).

Material examined. — NETHERLANDS: prov. Overijssel, Delden, 28 Sept. 1980, *E. Kits van Waveren s.n.* (L); prov. Noord-Holland: Castricum, 7 Nov. 1964, *E. Kits van Waveren s.n.* (L); Vogelenzang, 31 Oct. 1953. *A. F. M. Reijnders s.n.* (L); prov. Zeeland: Walcheren, Zeeduin, 28 Sept. 1937, *H. S. C. Huysman* (L); Walcheren, Oostkapelle, 9 Oct. 1938, *H. S. C. Huysman* (L); prov. Limburg, Gulpen, 12 Oct. 1952, *H. S. C. Huysman* (L).—FRANCE, dept. Ain, Martignat, 31 Sept. 1957, *H. S. C. Huysman* (L).—U.S.A., *A. H. Smith 17956* (MICH).

Mycenella bryophila in its present concept differs from Voglino's original description in having 2-spored basidia and a flocculose stipe. The cystidia agree well.

According also to A.H. Smith (1947: 447, fig. 54.9), J. Lange (1914: 36, 1936: 50), and Natarajan & Raman (1980: 227) *M. bryophila* has 2-spored basidia but the cystidia described by these authors differ in being more fusiform. However, a collection (*A. H. Smith 17956*) from the U.S.A., kindly sent on loan and studied by me, shows typical lageniform cystidia with a long cylindrical neck.

Mycena meulenhoffiana Oort (1928: 247) seems conspecific with *Mycenella bryophila*, because according to the original description it differs from *M. bryophila* only by a non-striate pileus. No material is present at L.

The holotype of *Mycena meulenhoffiana* var. *caesia* Oort differs from *M. bryophila* in the blueish grey colour of the stipe. Therefore a new combination is proposed:

Mycenella bryophila var. **caesia** (Oort) Boekhout, *comb. nov.*

Mycena meulenhoffiana var. *caesia* Oort in Meded. ned. mycol. Vereen. 16–17: 247. 1928 (basionym).

Differs from the typical variety by a blueish-grey stipe.

Habitat & distribution. — Terrestrial, among grasses in broad leaved forest on clayey or sandy soil. In the Netherlands known only from two localities in the prov. Zuid-Holland: Katwijk and Voorschoten.

Material examined. — NETHERLANDS, prov. Zuid-Holland, Voorschoten, estate 'Raaphorst', 4 Nov. 1927, *C. Cool s.n.* (holotype, L).

Oort (l.c.) described both the pileus and stipe as blue or blue-grey. However, a water colour painting (*Scholtes s.n.*, 13-X-1926, near Katwijk) shows a grey-brown pileus with a rather dark centre.

The first *Mycena* species described in 1914 (: 71) by von Höhnel fully agrees with *M. bryophila* var. *caesia* because of its steel grey-blue stipe and its similar cystidia and spores ('Kugelig 6 bis 8 μm breit, locker-warzig-stachelig').

6. **Xerula kuehneri** (Romagn.) Bas & Boekhout *comb. nov.*

Mycenella kuehneri Romagn. in Bull. trimest. Soc. mycol. Fr. 56: 63. 1940 (basionym). — *Oudemansiella kuehneri* (Romagn.) Sing. in Sydowia 15: 59 ('1961') 1962.

This species, in 1984 collected also in the Netherlands, has been described by Romagnesi as the perfect intermediate between *Mycenella* and *Oudemansiella*: the minute fruit-body and the echinate spores pointing towards the first, but the strictly trichohymenidermal pileipellis with its long hair-like pileocystidia and the large spores and basidia pointing towards the second genus.

For us the structure of pilei- and stipitepellis and the large size of basidia and spores in addition to the information that in South America more typical *Oudemansiellas* with echinate spores do occur, viz. *O. steffenii* (Rick) Sing. and *O. macracantha* Sing., are the reasons for not accepting this species in *Mycenella*, thus following Singer and Moser.

As, in accordance with Dörfelt (1979: 365; 1981: 658), we wish to restrict *Oudemansiella* to the annulate species growing directly on wood and to exclude from it the exannulate species (dry and viscid) not directly growing on wood (*Xerula*), the new combination in *Xerula* was necessary.

A full description of the Netherlands' specimen of *Xerula kuehneri* will be published in another paper in the next fascicle of Persoonia.

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REDÉCOUVERTE DU THIELAVIA COACTILIS NICOT, UN ASCOMYCÈTE OBSERVÉ SUR DES FEUILLES MORTES DE CARPINUS, ET SES RAPPORTS AVEC CERTAINES ESPÈCES DE CE GENRE

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Thielavia coactilis Nicot a été redécouvert se développant sur des feuilles mortes de *Carpinus* collectées en la forêt de Fontainebleau. Son isolement en culture pure a permis d'établir une description plus détaillée de cet ascomycète et de préciser ses particularités distinctives par rapport aux espèces connues de *Thielavia* Zopf qui lui sont affines. *T. kuwaitensis* Moustafa est considéré synonyme de *T. coactilis.*

En 1973, nous avons publié un article sur les espèces de *Thielavia* Zopf isolées de quelques sols de régions arides de l'Egypte, lors de l'étude analytique de leur mycoflores (Mouchacca, 1982). Ce travail, qui nous avait conduit à réviser certains taxons de ce genre, a abouti à la diagnose de trois espèces nouvelles; celles-ci se sont révélées représenter des micromycètes thermotolérants tous pourvus, en culture, d'une forme conidienne accessoire composée de simple aleuries. En outre, la synthèse des informations systématiques alors disponibles relatives à cette entité générique, nous avait conduit à souligner son caractère hétérogène et la nécessité d'une révision plus approfondie. Cette synthèse avait également mis en évidence une absence d'informations concernant certains détails structuraux de quelques *Thielavia* dont *T. coactilis* Nicot (Nicot & Longis, 1961). Enfin et pour ce *Thielavia*, l'examen de sa souche-type avait à l'époque permis de constater que celle-ci ne produisait plus en culture, les structures sporales caractérisant cet ascomycète.

Thielavia coactilis a été ainsi dénomé par Nicot en raison de l'aspect feutré de son mycelium aérien qui y est abondant chez ce champignon; sa souche-type a été isolée d'un échantillon de sable provenant d'une plage voisine de la ville de Beyrouth (Liban). Les caractéristiques morphologiques de ce *Thielavia* ne sont connues que par la brève diagnose suivante: 'Périthèces sphériques brun noir, à paroi mince, sans ostiole, 100–200 µm diam. Asques octosporés claviformes, à paroi mince, à disposition plectascée, 25–30 × 13–20 µm. Ascospores elliptiques, unicellulaires, pourvues d'un pore germinatif subapical, 6–11 × 5–7 µm (Nicot & Longis, 1961)'. Par ailleurs, dans le même article décrivant cet ascomycète, est également fourni la diagnose d'un deuxième *Thielavia, T. hyrcaniae*. Selon Nicot & Longis (1961), bien que ce dernier se distingue, entre autres, du précédent, par la disposition hymeniée de ses asques dans les cleistothèces, la morphologie et la structure des ascospores de ces deux *Thielavia* sont absolument semblables:

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'l'existence d'une différence dans l'épaisseur de l'épispore brune des deux faces de leur ascospores conduit à l'apparition chez les ascospores désséchées d'un profond sillon ventral longitudinal'.

Cependant quelques années plus tard, Booth & Shipton (1966) précisent que *T. coactilis* est identique au *T. terricola* (Gilman & Abbott) *forma minor* Rayss & Borut (Rayss & Borut, 1958), élevée au rang de variété par Booth en 1961; cette synonymie a été d'ailleurs ultérieurement signalée par Udagawa et Takada (1967).

Egalement en 1973, Malloch & Cain publient une mise au point sur les éléments du genre *Thielavia*; pour *T. coactilis*, ils notent aussi l'état stérile de sa souche-type. Malloch & Cain suggérent néamoins, en se basant sur la brève diagnose fournie pour cette espèce, que la présence d'un pore germinatif en position subapicale chez ses ascospores conduit à ne pas la considérer comme identique à la variété *minor* du *T. terricola*; pour cette dernière, ces auteurs proposent d'ailleurs la combinaison suivante: *T. minor* (Rayss & Borut) Malloch & Cain. Mais en 1975, von Arx, conclut après un examen de matériel authentique de *T. basicola* Zopf, espèce-type du genre (Zopf, 1876) et ascomycète également peu connu, que *T. minor* n'est pas distinct de l'espèce-type; quant au *T. coactilis*, von Arx ne fournit aucune information additionelle mais il le maintient dans le genre *Thielavia*.

En 1979, lors des essais préliminaires visant à nous familiariser avec les techniques d'études des micromycètes colonisant les feuilles de *Carpinus betulus* L. (Mouchacca & Geoffroy, 1984), vivantes ou gisant sur le sol, nous avons observé sur des feuilles fraîchement tombées de cette essence forestière, le développement d'un *Thielavia* par la suite isolé en culture pure. Les caractérisitiques morphologiques de cet isolement conduisent à le considérer commme représentant *T. coactilis* Nicot. La redécouverte de cet ascomycète permet alors d'établir une description plus élaborée de ce *Thielavia* et de préciser ses particularités distinctives par rapport aux espèces connues de ce genre.

Thielavia coactilis Nicot ex Nicot & Longis — Fig. 1

Thielavia coactilis Nicot ex Nicot & Longis in C. r. hebd. Séanc. Acad. Sci., Paris 253: 304, 1961.
Thielavia kuwaitensis Moustafa in Trans. Br. mycol. Soc. 66: 336, 1976.

En culture sur milieu gélosé à 2% d'extrait de malt, la croissance de ce champignon est modérée à 24°C, les colonies atteignant 70 mm de diamètre en 14 j.; à 37°C, la croissance est nulle à très réduite selon les isolats.

Les colonies produites sont laineuses, blanc crayeux, épaisse de jusqu'à 5 mm et à revers incolore; le mycélium aérien est compacte, composé d'hyphes hyalins, septés, ramifiés, atteignant 4 μm de largeur; tardivement certains segments hyphals acquièrent une paroi plus épaisse, jaune claire.

Les cleistothèces apparaissent tardivement en culture et sont généralement formées dans le mycélium aérien et sur la surface de la gélose; elles sont sphériques à subsphériques, 100–300 μm de diam., glabres; d'abord hyalines et à paroi péridiale composée de plusieurs couches de cellules, elles acquièrent progressivement une couleur brunâtre qui n'influe nullement sur l'aspect général de la colonie; à maturité, seul persiste la couche externe de la paroi péridiale, celle-ci étant alors translucide, membranacée, de texture épidermoïde et composée de cellules plates à contour irrégulier, brunâtre clair.

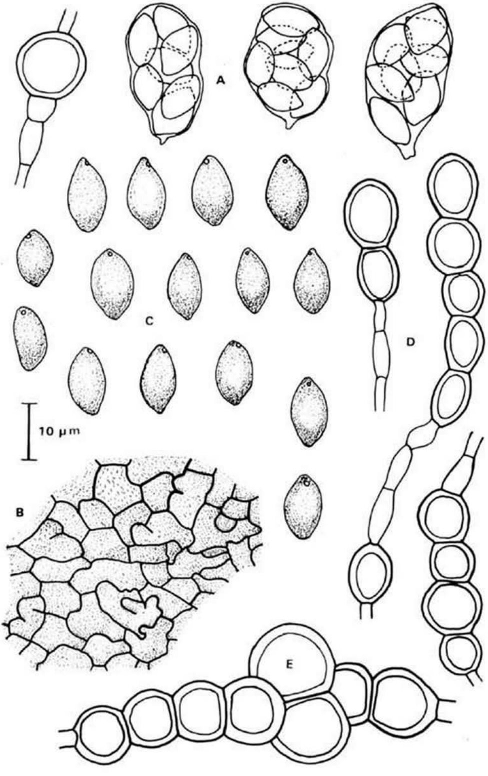

Fig. 1. *Thielavia coactilis*. — A. Asques renfermant sept ou huit ascospores. — B. Texture épidermoïde de la paroi péridiale des cleistothèces. — C. Ascospores à pore germinatif subapical. — D. Chlamydospores terminales ou intercalaires, unicellulaires ou réunies en courtes chaînes. — E. Amas de chlamydospores observé sur feuille morte de *Carpinus*.

Les asques généralement octosporés et disposés en rayons autour d'un noyau central dans les jeunes cleistothèces, sont d'abord claviformes et pédicellés, devenant ensuite subglobuleux, 21–28 × 13–19 µm; à maturité, la paroi ascale est évanescente.

Les ascospores mûrs sont brunâtres, inégalement ellipsoïdes à fusiformes larges en vue latérale avec un côté à courbure plus accentuée, ellipsoïdes vue de face, légèrement apiculées aux deux extrémitées arrondies, 9–12,5 × (5) 6–7 µm et pourvues d'un seul pore germinatif subapical, 1 µm de diam., localisé du côté de l'ascospore à courbure plus accentuée; les ascospores mûrs collapsées extériorisent la présence d'un profond sillon ventral longitudinal.

Le champignon produit également en culture, mais tardivement et dans le mycélium aérien et intramatrical, des chlamydospores en position terminale ou intercalaire, unicellulaires ou réunies en courtes chaînes ou en amas composé d'un petit nombre de cellules (les amas de chlamydospores observés sur les feuilles mortes de *Carpinus* comportent un nombre de cellules comparativement plus élevé); ces chlamydospores sont ovoïdes, subglobuleuses à globuleuses, 7–15 × 7–14 µm, à paroi épaisse de 1–1,5 µm, réfringente, jaunâtre.

CULTURES EXAMINÉES: *Carpinus* 12, isolé, après incubation en chambres humides, de feuilles mortes de cette plante collectées en la forêt de Fontainebleau (France), avril 1979; CBS 945.72: souche-type du *T. kuwaitensis* Moustafa, isolé par cet auteur d'un sol halomorphe du Kuwait.

La culture-type du *T. coactilis* (Mycothèque Muséum no. 1644, Nicot & Longis, 1961) étant devenue stérile, celle du *T. kuwaitensis* est proposé comme néotype; une culture sèche de cette dernière est déposée à PC.

Thielavia coactilis se caractérise essentiellement par ses cultures blanches à revers incolore et qui le demeure malgré la formation tardive des cleistothèces renfermant des ascospores mûrs noirâtre en masse, la présence d'un pore germinatif en position subapicale chez ces ascospores ellipsoïdes brunâtres, de dimensions comparativement moyennes et, enfin, la formation de chlamydospores dans le mycélium aérien et intramatrical.

La description établie pour ce *Thielavia* se conforme dans ses grandes lignes à la diagnose succinte du *T. coactilis* (Nicot & Longis, 1961); les seuls points de discordances ont trait, d'une part, à la biomètre des ascospores: 9–12,5 × (5)6–7 µm, valeurs observées, contre 6–11 × 5–7 µm, valeurs fournies dans la diagnose; les écarts existants résultent probablement de mensurations effectuées à l'origine sur des ascospores non mûrs. A cet égard, on note que chez les asques ne contenant que sept ascospores, les dimensions de l'une d'entre elles peuvent atteindre des valeurs plus élevées: 13,5 × 7,5 µm. D'autre part, la présence de chlamydospores dans le mycélium aérien représente un caractère non signalé par Nicot & Longis (1961), en raison peut-être de leurs apparition tardive dans les cultures de ce micromycète. Cette description du *T. coactilis* est cependant identique à celle du *T. kuwaitensis* Moustafa (Moustafa, 1976); l'examen de sa culture-type nous permet de l'affirmer.

Par ailleurs, *T. coactilis* s'avère être un champignon non thermotolérant en comparaison aux seuils de thermotolérance démontrés par d'autres espèces mésophles de *Thielavia* (Mouchacca, 1973; von Arx, 1975). A une température d'incubation de 37°C, sa croissance est, selon les isolats, nulle (*Carpinus* 12) à très réduite (CBS 945.72: 10 mm en 8 j.); nous avons noté un comportement comparable chez la souche-type no. 1644 de ce champignon (Mouchacca, 1973). A ce propos, Udagawa et Takada précisent que le développement et la sporulation des isolements rapportés en 1976 par ces auteurs à la variété *minor* du *T. terricola* sont, à l'inverse, comparativement plus rapides à une température d'incubation de 37° C.

Comparé aux espèces connues de *Thielavia* ayant également des ascospores ellipsoïdes de dimensions analogues (von Arx, 1975), *T. coactilis* ne peut être confondu avec *T. arenaria* Mouchacca dont les ascospores possèdent aussi un pore germinatif subapical; en effet, ce dernier produit en culture des colonies brunâtres à revers noir bleuté et son mycélium aérien, dépourvu de chlamydospores, est ornée d'un forme conidienne accessoire représentée par de simples aleuries. Il en est de même avec *T. microspora* Mouchacca, caractérisé par des cultures également brunâtres, des cleistothèces pourvues d'une enveloppe hyphale extrapéridiale, des ascospores à pore germinatif polaire, comparativement moins larges, et la présence d'aleuries dans le mycélium aérien.

Les valeurs biométriques des ascospores du *T. coactilis* le différencient aussi aisément du *T. terricola* (Gilman & Abbott) Emmons, les ascospores à pore germinatif franchement apical de ce dernier étant sensiblement plus grandes: 10,5 – 17 × 6,8 – 10,5 selon Malloch & Cain (1973) et 12 – 16 × 7 – 9 µm selon von Arx (1975). Toutefois, de par cette caractéristique, *T. coactilis* pourrait être confondu avec *T. basicola* Zopf mais d'après von Arx (1975), les ascospores brunes de l'espèce-type ont un pore germinatif polaire. Concernant *T. basicola*, il est à noter que son comportement *in vitro* n'a pas encore été précisé et cela en raison de l'absence d'un isolement représentatif de ce champignon (von Arx, 1975); des observations complémentaires sont donc nécessaires afin de délimiter de manière plus précise l'ensemble des caractères permettant de mieux distinguer ces deux *Thielavia*.

Summary

Thielavia coactilis Nieto has been rediscovered developing on dead leaves of *Carpinus* collected at Fontainebleau and incubated in damp chambers. A detailed description of this ascomycete is provided from pure cultural studies, followed by a discussion of his taxonomic position in the genus *Thielavia* Zopf. This non- thermotolerant fungus is characterised by its unicellular ellipsoidal brown ascospores of moderate dimensions having a distinctive subapical germ pore and the formation of chlamydospores in the hyaline mycelium. *T. kuwaitensis* Moustafa proved to be identical to *T. coactilis*.

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NOMENCLATURAL NOTES ON RUSSULA

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The nomenclatural status of the names of the *Russula*-species occurring in the Netherlands is investigated. Several names are found to be incorrect, illegitimate or invalid. The impact of the sanctioning system on nomenclatural stability is discussed, and its superiority is demonstrated. Four new combinations are made, viz. *Russula fragilis* var. *knauthii*, *R. laurocerasi* var. *fragans*, *R. pseudoaeruginea*, and *R. risigallina*. *Russula clariana* is validly described.

During the compilation of a checklist of *Russula*-species occurring in the Netherlands (van Vuure, 1985), it became evident that several names were incorrect, illegitimate or invalid under the present rules of the International Code of Botanical Nomenclature (Voss & al., 1983). Therefore we decided to investigate the nomenclatural status of the names of all *Russula*-species from our country, supplemented with a few extralimital species about which Singer & Machol (1983) made a preliminary nomenclatural publication. Although our attention was primarily directed to the consequences of the new wording of Art. 13.1 (d), the so-called sanctioning system, we came across several instances where frequently used names would have been incorrect even under the old Code.

In this paper the first author takes responsibility for the nomenclatural decisions, whereas the second author is responsible for the taxonomic part. The taxonomy is of course primarily based on the opus magnum by Romagnesi (1967); only in sect. *Viridantinae* (the group of species around *R. xerampelina*) we feel that the present taxonomy is still unsatisfactory. For that reason, Romagnesi's new species 'ad interim' in this group have not been validated, whereas in other cases we provide validations of new species and combinations.

During our nomenclatural activities we tried to follow the I.C.B.N. as closely as possible. However, considering the fact that not all problems with the new sanctioning system have been resolved till thusfar, we sometimes had to make a choice between different options. In these cases we followed the same course as earlier advocated by one of us (Gams & Kuyper, 1984). For that reason we did not accept the equivocal wording of Art. 7.17 which introduces in our opinion a major inconsistency in the Code. We fear that the wording of this Article, which allows for typification of sanctioned names by everything associated with the name in the sanctioning work, introduces more ambiguities than it possibly can resolve, and we urgently advocate its abolition as soon as possible. We typify sanctioned names therefore on the basis of the validating protologue solely. It implies that names which without sanction would have

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been superfluous are automatically typified by the type of the name which ought to have been adopted, in accordance with Art. 7.11.

Art. 72. Example 2 states not only that illegitimate homonyms, when transferred to another genus where there is no obstacle to its employment, must be treated as the name of a new taxon with priority from its date of publication, but also that only the 'legitimizing' author of this name must be cited. In our opinion this obscures important bibliographic information as already noted by Donk (1963d). Considering the rather large number of homonyms within the generic name *Agaricus* and the circumstance that a considerable number of those so-called new taxa came into being by a mere reference to the original illegitimate name, we prefer to introduce a device for retaining this bibliographic information, and we propose a horizontal arrow in this case. The citation *Pluteus cervinus* (Schaeff. →) Kumm. 1870 for instance means that Kummer created a new species with priority dating from 1870, but that his new species is based on, and must be typified with *Agaricus cervinus* Schaeff. 1774, an illegitimate homonym of *Agaricus cervinus* Hoffm. 1789: Fr. The mere citation as *P. cervinus* Kumm. would obscure this important aspect.

Several names treated in Arnolds & al. (1984) have not been accepted for the checklist, as they are supposed to represent incorrect identifications.

As the striving for a perfect nomenclature of the Agaricales often seems a quest for the impossible, and – as the saying goes – 'nomenclatural right is something crooked having been bent', we would not be surprised if some errors will be found in this paper. We welcome therefore any comments on nomenclatural and/or taxonomic conclusions arrived at in this paper.

The names discussed have been arranged alphabetically under the name that is supposed to be correct.

NOMENCLATURAL SYNOPSIS

adusta

The application of the epithet *adusta* is a nice example of the difficulties encountered under a Code of Nomenclature which establishes automatical typification of superfluous and new names. *Agaricus adustus* Pers. 1801 was a nomen novum for *A. nigricans* Bull. 1785 non *A. nigricans* O.F. Müll. 1782, and is therefore automatically typified by Bulliard's plate. The sanctioning of the name *A. adustus* Pers.: Fr. has no influence on this typification. However, Fries (1838) came to the conclusion that Persoon (1801) had included more than one species under this name. Fries also felt that both epithets *adusta* and *nigricans* were available within the generic name *Russula*. He then used the name *R. adusta* for a part of Persoon's taxon under explicit exclusion of Bulliard's type, and therefore created a new species that must be ascribed solely to him, *Russula adusta* Fr. 1838 (Art. 48.1). Having done so, Fries considered the epithet *nigricans* to be available for Bulliard's species, and he made the new name *R. nigricans* (Bull. →) Fr. 1838. Fries correctly considered the sanctioned epithet *adustus* not any longer possible for this Bulliardian species, as a new combination based on the sanctioned basionym would become an illegitimate homonym of *R. adusta* Fr. 1838 (inverted use of Art. 64 and 55).

Summarizing the above arguments, we accept 2 species, *R. adusta* Fr. 1838 and *R. nigricans* (Bull. →) Fr. 1838 respectively, and our nomenclatural solution saves both names in their present taxonomic circumscription, and promotes nomenclatural stability.

atropurpurea

See under *krombholzii.*

aurata

See under *aurea.*

aurea

Singer & Machol (1983) pointed out that the name *Russula aurea* Pers. 1796 might threaten the name *Agaricus auratus* With. 1796, but they were unable to arrive at a definite conclusion as the exact chronology of both publications could not be determined. However, *A. auratus* With. 1796 is an illegitimate homonym of *A. auratus* O.F. Müll. 1782; the legitimacy of the name *R. aurata* dates therefore only from 1838 onwards when Fries made the new name *R. aurata* (With. →) Fr. None of these names being sanctioned, it is clear then that *R. aurea* Pers. 1796 becomes the correct name for the species called *R. aurata.*

chamaeleontina

See under *risigallina.*

delica

Singer & Machol (1983) suggested that the name *R. delica* is threatened because of the existence of *Agaricus exsuccus* (Pers.) Otto 1816, which is supposed to be a synonym of *R. delica* Fr. 1838.

However, as *A. exsuccus* (Pers.) Otto is based on *Lactarius piperatus* var. *exsuccus* Pers. 1799, and this taxon is typified by us with *Agaricus giganteus* Leyss. 1783: Fr. – nowadays called *Leucopaxillus giganteus* (Leyss.: Fr.) Sing. – which was included by Persoon as a synonym, the epithet *exsuccus* is clearly illegitimate on specific level, as it is a superfluous name for *A. giganteus*, although it is legitimate on varietal level. It is clear then that the above suggestion by Singer & Machol is incorrect.

insignis

In our opinion there cannot be much doubt that the application of the epithet *livescens* for a species of sect. *Ingratae* characterized by dermatocystidia with yellow incrustrations is incorrect. There is nothing in Batsch's (1786) description which could make such an identity plausible, as *A. livescens* was characterized by a grey pileus and stipe. *Russula insignis* Quél. 1888 on the other hand clearly refers to that species, as already noted by Moser (1967) who later droppped this name and adopted Romagnesi's nomenclature. We have seen collections of *R. insignis* from the vicinity of

Lougres (France) where Quélet collected his species, but as these collections are not annotated we prefer not to designate one of these as neotype.

krombholzii

It has been pointed out by Shaffer (1970) that *R. atropurpurea* (Kromb.) Britz. 1893 is an illegitimate homonym of *R. atropurpurea* Peck 1888, a species of sect. *Viridantinae*. However, his new name *R. krombholzii* Shaffer 1970 seems to have been overlooked by European mycologists, and for that reason we want to draw attention to this necessary name change once again.

lepida

See under *rosea*.

livescens

See under *insignis*.

lutea

There has been considerable taxonomic and nomenclatural confusion about the species of *Russula* stirps *Chamaeleontina*. According to Romagnesi (1967), there are two species involved, one with a sweetish smell, especially on drying, the other with a somewhat disagreeable smell reminding of vinegar.

The first species has been known as *R. chamaeleontina* Fr., but is correctly called *R. risigallina* (see under *risigallina*). The second species has been known under the names *R. vitellina* (Pers.→) Fr. and *R. lutea* (Huds: Fr.) S.F. Gray. *Agaricus vitellinus* Pers., however, is not only an illegitimate homonym of (another) *A. vitellinus* Pers.: Fr., but also a superfluous name for *A. risigallinus*, which was included as a synonym. It cannot be applied therefore to this second species. And although the description of *Agaricus luteus* Huds. 1778: Fr. is rather short and some critical characters are lacking, there is nothing in the protologue that contradicts the application of this name for the second species.

nigricans

See under *adusta*.

nitida

Singer & Machol (1983) suggested that even the sanctioned name *Russula nitida* (Pers.: Fr.) Fr. might be threatened under the new sanctioning system. However, their reasoning clearly reveals several misunderstandings about the sanctioning system. They suggested that even sanctioned names could be illegitimate because of superfluity. However, the wording of Art. 63 makes explicit that sanctioned names can never be illegitimate. The epithet *risigallinus* does not play any role in this respect.

Singer & Machol suggested also that the protologue of *A. nitidus* Pers. 1801, which serves as the basis for typification, indicates that it is a renaming of *A. purpureus* Schaeff., implying that *A. purpureus* Schaeff. must be the final type of *A. nitidus* Pers. However, this assertion is likewise untrue, as Persoon (1801) did not consider the

Schaefferian species conspecific; he only wondered whether *A. purpureus* Schaeff. could possibly belong to the same species. But this statement of taxonomic doubt does not have any bearing on the status of the name *A. nitidus* nor on its typification.

risigallina

As *Russula chamaeleontina* Fr. 1838 is a superfluous name for *R. ochracea* (Pers. →) Fr. 1815, non *R. ochracea* Fr. 1838, a new name is necessary.

It has been noted in the discussion of the epithet *lutea*, that there exists abundant confusion in the taxonomy of this group (cf. Singer & Machol, 1983), especially with regard to a closely related species *R. lutea* (Huds.: Fr.) S.F. Gray, and although old diagnoses are often difficult to interpret, we feel confident that *Agaricus risigallinus* (Batsch, 1786) refers to the same species. Therefore the following new combination is proposed: **Russula risigallina** (Batsch) Kuyp. & Vuure, *comb. nov.* — *Agaricus risigallinus* Batsch, Elench. Fung. Contin 1: 67. 1786 (basionym).

rosea

Under the new rules of nomenclature the name *R. rosea* (Schaeff. →) Quél. 1886 has become an illegitimate homonym of *R. rosea* Pers. 1796. Following a suggestion by Singer & Machol (1983) the former species is correctly named *R. velutipes* Velen.

Russula rosea Pers. on the other hand is, according to type studies by Singer (1962) identical with the species *R. lepida* Fr. 1836, necessitating therefore another name change in the genus *Russula*. This name change has already been accepted by Imler (1982), who failed to mention, however, that it is synonymous with *R. lepida.*

velutipes

See under *rosea.*

vitellina

See under *lutea.*

VALIDATIONS

The following new combinations, till thusfar all invalid under Art. 33.2 which requires the citation of the basionym with a full and direct reference to its author, place of valid publication with page or plate reference and date on or after 1 Jan. 1953, are also necessary:

Russula fragilis var. **knauthii** (Sing.) Kuyp. & Vuure, *comb. & stat. nov.* — *Russula emetica* f. *knauthii* Sing. in Hedwigia 66: 216. 1926 (basionym).

Russula laurocerasi var. **fragrans** (Romagn.) Kuyp. & Vuure, *comb. & stat. nov.* — *Russula fragrans* Romagn. in Bull. mens. Soc. linn. Lyon 23: 112. 1954 (basionym).

Russula pseudoaeruginea (Romagn.) Kuyp. & Vuure, *comb. & stat. nov.* — *Russula aeruginea* var. *pseudoaeruginea* Romagn. in Bull. mens. Soc. linn. Lyon 21: 111. 1952 (basionym).

Russula clariana Heim, till now invalid under Art. 36.1 which requires a Latin diagnosis on or after 1 Jan. 1935, is formally validated, based on an abundant collection from the Netherlands:

Russula clariana Heim ex Kuyp. & Vuure, *spec. nov.*

Pileus plano-convexus vel depressus, margine initio glabro tum breviter tuberculato, sordide lilacino-purpureus vel sordide ochraceo-olivaceus, impolitus. Lamellae latae, pallide cremeae, sordide brunneolae maculatae, intervenosae vel furcatae. Stipes albidus, sordide ochraceo-brunnescens, glaber vel subarachnoideus. Caro alba, tarde griseobrunnescens. Odor peculiaris, pisciodorus fructiodorusque. Sapor acerrimus. Sporae in cumulo cremeae (Romagnesi 2a), 8.0–10.0 × 6.5–8.0 µm, cristatae-subreticulatae, ornamentis ad 1.5 µm altis. Cystidia appendiculata, 8–11 µm lata. Cutis cum cystidiis abundantibus articulatis. Sub Populo canadensi. Holotypus: 'Netherlands, prov. Limburg, Julianakanaal south of Elsloo, 10.X.1970, *C. Bas 5447* (L; isotypus in herb. Romagnesi).

Pileus 60–130 mm, at first irregularly convex or conico-convex with obtuse inflexed margin, soon plano-convex with slightly depressed centre to shallowly saucer-shaped, margin at first smooth but in older stages with short coarsely tuberculate ridges, colour ranging from sordid lilaceous-purplish to sordid pale ochraceous olive, remarkably dull (unpolished) and minutely granular, whitish pruinose when young, pileipellis half-peeling. Lamellae moderately crowded to subdistant, emarginate, fairly broad (to 12 mm), pale cream with sordid brownish spotting, with entire but somewhat irregular, concolorous edge, intervenose, often forked near stipe. Stipe 55–120 × 15–45 mm, usually somewhat clavate, spongy inside, later hollow, white but slowly turning sordid ochraceous then greyish, somewhat arachnoid under lens when young, later glabrous, longitudinally rugulose. Context white, slowly turning grey-brown. Smell strong, fishy and fruity, reminding of empty sardine-cans. Taste very acrid. Spore print cream (Romagnesi 2a). Guiac slowly dark olive grey; $FeSO_4$ slightly greyish pinkish; formol on stipe slowly pink.

Spores 8.0–10.0 × 6.5–8.0 µm, ornamentation consisting of thick crests, to 1.5 µm high, only indistinctly reticulate, strongly amyloid. Cystidia appendiculate, not changing colour in sulfovanilline 8–11 µm broad. Hyphae of pileipellis cylindraceous or weakly moniliform, not or hardly branched. Dermatocystidia abundant, septate, 6–10 µm broad.

Habitat & distribution: Under *Populus canadensis* and other *Populus* species. Widespread in Europe, but rare.

Collection examined: Netherlands, prov. Limburg, Julianakanaal south of Elsloo, 10 Oct. 1970, *C. Bas 5447* (L; holotype).

EPILOGUE

Shortly after the Sydney Congress at which the modification of Art. 13 was enacted, Singer & Machol (1983) pointed out that the new wording of this article would led to a considerable destabilization of agaric nomenclature. They cited 6 cases of *Russula*-nomenclature where they expected the necessity of nomenclatural change, and offered the suggestion that a return to the 1821-starting point might be the better solution for nomenclatural stability, at least within the Agaricales. However, we do not concur with all of their nomenclatural conclusions and strongly disagree with their plea for the old system of starting points. In our opinion the new sanctioning system is more

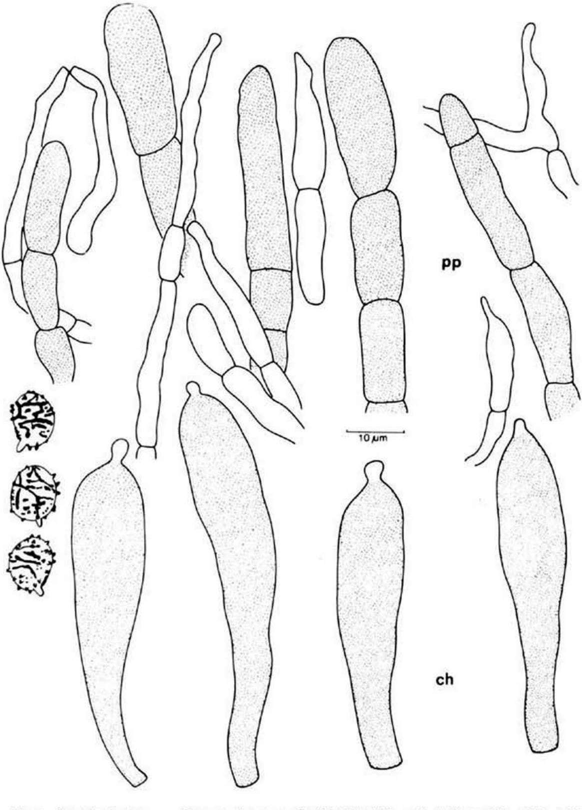

Fig. 1. *Russula clariana*. — Spores, elements of pileipellis (PP), and cheilocystidia (CH). (All Figs. from type.)

exact and simple, and although it temporarily diverts from the ideal of a 'stable method of naming' (Preamble 1), it will make our task of bringing 'the nomenclature of the past into order' (Preamble 4) considerably easier and more logical.

Summarizing our attempts in adapting the *Russula*-nomenclature to the requirements of the ICBN, we conclude that 7 species names (of 95 species) are changed, amounting to 7.4%. In comparison with figures about the impact of the sanctioning system on names of gasteromycetes and polypores, where they are 3% and 1.9% respectively (see Demoulin & al., 1981), this number is distinctly higher.

However, even when accepting Singer & Machol's assertion that the situation in *Russula* is fairly typical for the larger genera of Agaricales, we would warn against any preliminary generalisation about the impact of the new Code on nomenclatural stability. We would like to stress that the above estimate is most probably too high. Several of the name changes were even necessary under the old Code, and this would reduce the number of changes to only 4, that is 4.2%.

On the other hand it should be noted that this survey is not based on a complete perusal of the pre-1821 literature. But it should be borne in mind that the interpretation of old names, of which in most cases no type does exist and only a description without microscopical and microchemical characters is available, is often very difficult and almost never completely unequivocal. We cannot do more than conclude that the present interpretation does not contradict with the original description. Although this might provide sufficient justification for the retention of certain names, and should serve as a guide-line for neotypification, it is hardly acceptable as an argument for the introduction of new names.

We feel therefore confident that responsible taxonomists and nomenclaturalists would restrict themselves to those cases only where the present name is illegitimate or invalid or when the present interpretation is seriously at odds with the protologue. It is our firm conviction that only this voluntary self-restraint can lead to a stable nomenclature which is the final purpose of the ICBN.

However, it has become evident that under the new wording of Article 13.1 (d) several names are illegitimate because of homonymy (Art. 64) or superfluity (Art. 63). That the mycological community has been rather reluctant – even under the old Code – in accepting the consequences of this situation, seems a heritage bequeathed by Donk (1963a–d), who has always struggled against the concept of illegitimacy and, even when his proposals in this respect were not accepted, deliberately refused to adhere to the Code. Notwithstanding the merit of his proposals in this respect, we feel that the time has come to adhere to the Code without making exceptions for mycology instead of going our own course. Although this will necessitate several name changes and therefore seems temporarily to promote instability, we firmly belief that only by this procedure a correct and stable nomenclature of the agarics could be achieved.

ACKNOWLEDGEMENTS

We are extremely grateful to Dr. C. Bas for his help in guiding us through the nomenclatural jungle.

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NOTULAE AD FLORAM AGARICINAM NEERLANDICAM—X–XI ENTOLOMA

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X. NOMENCLATURAL NOTES ON SPECIFIC NAMES USED IN THE FLORA

While I was preparing the manuscript of *Entoloma* for the Flora agaricina neerlandica Thomas Kuyper drew my attention to nomenclatural complications concerning some of the specific names used. Accordingly some nomenclatural changes and corrections are proposed here, partly induced by the recent changes in the International Code of Botanical Nomenclature ('Sydney-Code', 1983).

lividum.—Entoloma eulividum Noordel., *spec. nov.*

Misapplied names.—*Entoloma lividum* (Bull.→) Quél. sensu Quél., auct. eur. p.p. non Bull.

Entoloma sinuatum (Bull. ex Pers: Fr.) Kumm. sensu auct. eur. p.p. (e.g. Dennis, Orton & Hora, 1960; Moser, 1983) non Bull.; Romagnesi (1978); Noordeloos (1981).

Basidiomata robusta; pileus usque ad 210 mm latus, haud hygrophanus, haud translucido-striatus, pallide griseo-brunneus vel griseo-ochraceus vel dilute luteus, glaber vel radialiter innato-fibrillosus, margine interdum leviter rimosus; lamellae confertae, adnatae vel emarginatae, segmentiformes vel ventricosae, flavidae vel ochraceae demum salmoneae; stipes 40–150 × 5–35 mm, cylindraceus, versus basim attenuatus vel incrassatus, albidus, grosse longitudinaliter fibrillosus; caro alba, firma; odor graveolens-acidulus, farinaceus vel rancidus. Sporae 8–10.5(–11.5) × 7–9.5 μm, Q = 1.0–1.3, hexa-angulatae; basidia tetrasporigera; acies lamellarum fertilis; cystidia nulla; pileipellis ixocutis hyphis cylindraceis 2–5 μm latis pigmentis intracellulosis; fibulae numerosae. Ad terram argillaceam calcaream in silvis frondosis.—Holotypus: *C. Bas 6618*, 9-IX-1975, 'Le Roptai, Ave-et-Auffe, prov. Namur, Belgium' (L).

Although widely used the name *Entoloma lividum* (Bull. →) Quél. cannot be maintained for this well-known and, because of its toxicity, important species. *Agaricus lividus* Bull. is typified by Bulliard's plate which clearly depicts *Pluteus atricapillus* (Batsch) Fayod (syn. *P. cervinus*). Furthermore Bulliard's name is a later homonym of *Agaricus lividus* Huds. 1778. It is not quite clear how Quélet (1872, 1886) could misunderstand Bulliard's concept of the species so badly when he started to use the epithet *lividum* for the well-known large *Entoloma* with yellow lamellae.

Many authors consider *E. sinuatum* (Bull. ex Pers.: Fr.) Quél. as being identical with *E. lividum* sensu Quél., but Romagnesi (1978) and Noordeloos (1981) made clear that here another species, characterised by a different colour of pileus and lamellae, is involved. The striking yellow colour of the lamellae of *E. lividum* sensu Quél., however, was first mentioned by Quélet (1872), and later on generally accepted as the most important diagnostic character of the species. As no other name has been found for *E. lividum* sensu Quél., I decided to describe this taxon as a new species. To 'conserve' the widely known name *lividum*, the epithet *eulividum* was chosen.

Some older taxa which come close to *Entoloma eulividum* are *Agaricus fertilis* Pers. (which is the same as *A. fertilis* 'Berk.' in Dennis, Orton & Hora, 1960) and *A. sublividus* Britz. Both taxa differ in the lack of yellow colours in the lamellae, besides *A. fertilis* is said to be hygrophanous and *A. sublividus* has a totally different colour of the pileus. Two more recently described species of *Entoloma* with yellow lamellae are *E. flavifolium* Peck and *E. luridum* Hesl. They differ, however, in habit and spores (*E. flavifolium*) or in having a hygrophanous, translucently striate pileus and smaller spores (*E. luridum*).

bloxamii.—*Entoloma bloxamii* (B. & Br.) Sacc., Syll. Fung. 5: 648. 1887.

Misapplied name.—*Agaricus madidus* Fr. (nom. superfl. for *Agaricus globosus* Schum.).

Fries (1836) introduced *Agaricus madidus* as a new species referring to *A. 'subglobosus'* Schum. and Fl dan., tab. 2148. Obviously Fries erroneously used the epithet *subglobosus*, and *A. globosus* Schum., Enum. plant. Saellandiae sept. orient. 2: 296. 1803 stands for the species concerned. According to the present nomenclatural rules *A. madidus* Fr. must be considered a nomen superfluum for *A. globosus* Schum. and consequently be typified with the type of the latter species.

Now the question arises whether *A. globosus* Schum. is identical with the fungus Fries had in mind, which is the same as what we generally consider *Entoloma madidum* (Fr.) Gill.

Schumacher (1803) described *A. globosus* as follows: '..solitarius, pileo carnoso hemispherico conico umbonato laevi fuscoviolaceo; lamellis carne sublatioribus violaceis; stipite sublongo deorsum subincrassato coeruleo, basi radiciformi tenui albo incurvo. Inter folia dejecta faginea (Bagsvaerd). Octob. Caro violacea. Pileus haud ultra 0.5 poll. latus & altus. Stipes sub 2 poll. longus, superne 1.5 lin. inferne 3 lin. crassus.'

It is quite clear from this description that on account of the violaceous lamellae and the habitat in *Fagus* forest, *Agaricus globosus* Schum. does not agree with the current concept of *E. madidum*. The illustration of *A. globosus* in Fl. dan., tab. 2148 (1832), gives a fungus with an almost mycenoid habit. The violaceous lamellae also exclude the possibility that *A. globosus* has anything to do with the fungus we call nowadays *E. nitidum* (= *A. ardosiacus* Bull. sensu Fr.), which has pale pink lamellae.

Fries (1821: 202; 1838: 148) considered *Agaricus purpureus* Bolt., Hist. Fung. Halifax, pl. 41B (1788) as identical with *A. globosus*. It is probable that both Schumacher and Bolton depicted a fungus identical with *Mycena pura* (Pers.: Fr.) Kumm. or a species of *Cortinarius*. However, it is clear that *Agaricus globosus* Schum. does not represent *Entoloma madidum* sensu auct., and therefore the name *Entoloma bloxamii* (B. & Br.) Sacc. must be used for that species.

niphoides.—Entoloma niphoides Romagn. ex Noordel., *spec. nov.*

Rhodophylus niphoides Romagn. in Bull. trimest. Soc. mycol. Fr. 63: 198. 1947 (nom. nud., no latin diagnosis).
Misapplied name.—*Entoloma speculum* (Fr.) Quél. sensu Cooke, Ill. Brit. Fungi 3, pl. 342 (308). 1884.

Basidiomata alba. Pileus 20–145 mm latus, convexus demum planus, umbonatus, leviter hygrophanus, ad marginem translucido-striatus, glaber; lamellae moderate distantes, adnatae vel emarginatae, segmentiformes vel ventricosae, albidae demum roseae; stipes 45–80 × 4–15 mm, cylindraceus interdum versus basim incrassatus, glaber, leviter striatus; caro subfirma, alba; odore saporeque farinaceis. Sporae 8–10(–11–5) × 7.5–9.5(–11) μm, subisodiametricae, angulatae; basidia tetrasporigera; acies lamellarum fertilis; cystidia nulla; pileipellis ixocutis hyphis cylindraceis 4–6 μm latis pigmentis nullis; fibulae presentes. Ad terram in vicinitate *Prunarum spinosarum*, vernalis. —Holotypus: *M. E. Noordeloos 159*, 2-VI-1976, 'camp-site de Roos, Beerse, prov. Overijssel, the Netherlands' (L).

For a full description, illustrations and literature references see Noordeloos (1981).

saepius.—*Entoloma saepium* (Noul. & Dass.) Richon & Roze, Fl. Champ. com. vén.: 92. 1880 (as *E. sepium*).

Noulet & Dassier (1838) published a new vernal *Entoloma* under the name *Agaricus saepius* (agaric with sepiaceous colour). Richon & Roze (l.c.) 'corrected' this into *Entoloma sepium*, which means *Entoloma* of the hedges which is an appropriate name but an illegitimate name-change. The latter name, however, is widely used thereafter, also in my monographic treatment of *Entoloma* subg. *Entoloma* (Noordeloos, 1981). In the Flora agaricina neerlandica, however, I go back to the original spelling and meaning of the specific epithet for this vernal *Entoloma.*

cuspidiferum.—*Entoloma cuspidiferum* (Kühn. & Romagn.) ex Noordel. in Persoonia 10: 461. 1980 (as *E. 'cuspidifer'* comb. nov.)

When I made the new combination *Entoloma cuspidifer* I was not aware of the fact that *Rhodophyllus cuspidifer* Kühn. & Romagn. had not been published validly according to the International Code of Botanical Nomenclature (art. 33.2) because the publication date was lacking in the citation of the basionym. Therefore my so-called new combination cited above must be considered to include an unintentional validation of *Entoloma cuspidiferum* as a new name for *Rhodophyllus cuspidatus* (Fr.) Favre 1948 non *R. cuspidatus* Pat. 1924 nec *Entoloma cuspidatum* (Peck 1870) Sacc. 1887.

pleopodium.—Entoloma pleopodium (Bull. ex DC.: Fr.) Noordel., *comb. nov.*

Basionym: *Agaricus pleopodius* Bull. ex DC. in Lamarck & DC., Fl. franc. 2: 194. 1805.
Synonym.—*Agaricus icterinus* Fr.: Fr., Syst. mycol. 1: 207. 1821.

In my revision of *Entoloma* subg. *Nolanea* (Noordeloos, 1980) I argued that *Agaricus pleopodius* Bull. ex DC. and *A. icterinus* Fr. must be considered synonyms. According to the recent International Code of Botanical Nomenclature ('Sydney-Code') *A. pleopodius* must be considered the oldest name available, and therefore the combination *Entoloma pleopodium* is used here instead of *E. icterinum*.

elodes.—*Entoloma elodes* (Fr.: Fr.) Kumm., Führ. Pilzk.: 98. 1871.

The original spelling by Fries (1821) is *elodes*, and this may not be 'corrected' into *helodes*.

XI. NEW TAXA, NAMES, AND COMBINATIONS.

While preparing the manuscript on *Entoloma* for the Flora agaricina neerlandica and simultaneously a monograph of subgen. *Leptonia*, some new taxa were discovered, which are formally described here. Full descriptions and illustrations will be published in the two works mentioned. In addition some new combinations and one new name are introduced.

Entoloma poliopus (Romagn.) Noordel. var. **parvisporigerum** Noordel., *var. nov.*

A varietate typica differt in sporis minoribus, 8–11 × 6–8 µm.—Holotypus: *P. B. Jansen 81.178*, 25-VII-1981, 'Staverden, Loam-pits, Ermelo, prov. Gelderland, The Netherlands (L).

Entoloma poliopus (Romagn.) Noordel. var. **discolor** Noordel., *var. nov.*

A varietate typica differt in acie lamellarum concolora, cheilocystidiis brevibus et stipite ardesiaco.—Holotypus: *M. E. Noordeloos 1441*, 6-IX-1981, 'Standing stone, Kirkmichael, Perthshire, Scotland' (L).

Entoloma allospermum Noordel., *spec. nov.*

Pileus 7–20 mm latus, convexus demum applanatus, papillatus, haud hygrophanus, haud translucido-striatus, pallide vel obscure grisobrunneus, granuloso-subsquamulosus; lamellae adnatae vel adnexae, sordide roseae; stipes 27–50 × 2 mm, ardosiacus; odore saporeque farinaceis. Sporae 7–10 × 7–8 µm, subisodiametricae, obtuse angulatae; basidia tetrasporigera; acies lamellarum fertilis; cystidia nulla; pileipellis trichoderma elementis inflatis 6–17 µm latis pigmentis intracellulosis; fibulae absentes. Ad terram inter gramines in silvis betularum subalpinis.—Holotypus: *M. E. Noordeloos 8360*, 22-IX-1983, 'Struan Birchwood near Blair Atholl, Perthshire, Scotland' (L).

Entoloma glaucobasis [Huijsman] ex Noordel., *spec. nov.*

Pileus 10–27 mm latus, convexus vel conicus, papillatus vel applanatus raro umbilicatus, sordide brunneus, translucido-striatus, fibrillosus vel subsquamulosus; lamellae adnexae vel leviter adnatae, albidae demum roseae; stipes 25–45 × 1–2 mm, bicolo:, in parte superiore sordide brunneus in parte inferiore caeruleo-glaucus, politus; odore saporeque nullis. Sporae (9–)10–13.5 × 7.5–9 µm, pluri-angulatae; basidia tetrasporigera; acies lamellarum sterilis; cheilocystidia clavata vel vesiculosa, 20–50 × (8–)12–22 µm; pileipellis cutis ad marginem, trichoderma in centro elementis inflatis 15–35 µm latis pigmentis intracellulosis. In graminosis subalpinis.—Holotypus: *G. Wölfel 27/84*, 18-VIII-1984, 'Trudenbach, Naturpark Trudnerhorn, W. Germany' (L).

Entoloma caeruleoflocculosum Noordel., *spec. nov.*

Pileus 7–18 mm, convexo-umbilicatus, haud hygrophanus, haud translucido-striatus, obscure brunneus, toto squamulosus; lamellae late-adnatae, sordide incarnatae; stipes 20–40 × 1.5–3 mm, cylindraceus, obscure caeruleo-flocculosus; odore saporeque nullis. Sporae 9–13.5 × 6.5–9 µm, 5–7-angulatae; basidia tetrasporigera; acies lamellarum sterilis cheilocystidiis clavatis 7–12 µm latis; piliepellis cutis vel trichoderma elementis inflatis 10–22 µm latis pigmentis intracellulosis; fibulae absentes. In graminosis.—Holotypus: *M. E. Noordeloos 8362*, 22-IX-1983, 'Struan Birchwood, Blair Atholl, Perthshire, Scotland' (L).

Entoloma sarcitulum (P. D. Orton) Arnolds var. **microsporum** Noordel., *var. nov.*

A varietate typica differt in sporis minoribus, 7.5–10.5 × 6.5–9 µm.—Holotypus: *C. Bas 7667*, 13-IX-1980, 'Quackjeswater, Rockanje, Isl. Voorne, prov. Zuid-Holland, The Netherlands' (L).

Entoloma olivaceotinctum Noordel., *spec. nov.*

Pileus 5–20 mm latus, convexus, leviter depressus, paule hygrophanus, translucido-striatus, centro obscure brunneo-olivaceo, margine pallidior, centro squamuloso, margine glabro; lamellae distantes, adnatae, albae demum roseae; stipes 12–25 × 1–1.5 mm, cylindraceus, luteolo-olivaceus, fibrilloso-striatus; odore saporeque nullis. Sporae 7–9 × 6–7-angulatae; basidia tetrasporigera; acies lamellarum sterilis cheilocystidiis clavatis 18–40 × 6–10 µm; pileipellis trichoderma elementis inflatis ad 15 µm latis pigmentis intracellulosis; fibulae presentes in hymenio. In graminosis.—*Jukka Vauras 1552F*, 9-VIII-1983, 'Antikkala, Puijo, Kuopio, Savonia borealis, Finland' (L).

Entoloma sect. **Cephalotricha** Noordel., *sect. nov.*

Basidiomata statura *Alboleptoniae*. Pileipellis cutis hyphis cylindriaceis elementis terminalibus capitatis; fibulae nullae.—Holotypus: *E. cephalotrichum* (P. D. Orton) Noordel.

Entoloma exile var. **pyrospilum** (P. D. Orton) Noordel., *comb. & stat. nov.* — Basionym: *Leptonia pyrospila* P. D. Orton in Trans. Br. mycol. Soc. 43: 298. 1960.

Entoloma formosum (Fr.: Fr.) Noordel., *comb. nov.* — Basionym: *Agaricus formosus* Fr.: Fr., Syst. mycol. 1: 208. 1821.

Entoloma incarnatofuscescens (Britz.) Noordel., *comb. nov.* — Basionym: *Agaricus incarnatofuscescens* Britz., Hymenomyc. Südbayern 8: 6. 1894 ('1891').

Entoloma kuehnerianum Noordel., *nom. nov.* — Basionym: *Rhodophyllus mammosus* var. *sericoides* Kühner in Kühn. & Romagn. in Rev. Mycol. 19: 10. 1954 non *Entoloma sericeoides* (J. Lange) Noordel. 1980.

Entoloma myrmecophilum forma **atrogaleatum** (Noordel.) Noordel. *stat. nov.* — Basionym: *Entoloma myrmecophilum* var. *atrogaleatum* Noordel. in Persoonia 11: 198. 1981.

Entoloma phaeocyathus Noordel., *nom. nov.* — Basionym: *Eccilia triste* Bres. in Sacc., Syll. Fung. 9: 89. 1891 non *Entoloma triste* (Velen.) Noordel. 1979.

Entoloma plebeioides (S. Schulz.) Noordel., *comb. nov.* — Basionym: *Agaricus plebeioides* S. Schulz. in Verh. zool. bot. Ges. Wien 26: 428. 1876.

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FIRST RECORD OF STEPHENSIA CROCEA QUÉL. IN THE NETHERLANDS

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A species of *Stephensia* with orange fruit-bodies, discovered in a garden at Drimmelen (prov. Noord-Brabant, Netherlands), August 1982, is described and classified as *S. crocea* Quél. This is a new addition to the mycoflora of the Netherlands. Pure cultures have been deposited in the collection of the 'Centraalbureau voor Schimmelcultures' at Baarn and registered as CBS 709.82. *Stephensia shanori* (Gilkey) Gilkey is regarded as a synonym.

The genus *Stephensia* Tul. emend. Gilkey was classified in the Eutuberaceae Fischer by Fischer (1896). Trappe (1979) placed it in the Pyronemataceae Corda sensu Korf and recognized six species.

In August 1982 Mrs. W. Sommer-Kenniphaas discovered a species of *Stephensia* with orange fruit-bodies in her garden at Drimmelen (prov. Noord-Brabant, Netherlands). Fruit-bodies were found over a distance of four to five meter on and at the side of an old, formerly gravelled path on heavy clay. The adjacent phanerogamic vegetation consisted of shrubs of *Weigelia, Deutzia*, and *Sorbus aucuparia* with a *Betula* tree a little further away.

In November 1982 Mrs. Sommer on request sent fresh specimens from the same locality to the author. The fungus resembled *Stephensia crocea* Quél. and *S. shanori* (Gilkey) Gilkey and differed from *S. bombycina* (Vitt.) Tul. in having smaller ascospores and orange instead of yellowish ascomata.

Pure cultures were made from a young specimen by means of tissue culture technique. These were compared with cultures of *S. bombycina* and *S. shanori.*

COLLECTIONS EXAMINED

The following collections of dried herbarium material were studied:

Stephensia bombycina: Netherlands, prov. Limburg, Slenaken, 4 Oct. 1968, *G. A. de Vries* (herb. de Vries 894). — German Democratic Republic, Kreis Weissenfels, Leissling, 21 Oct. 1968, *U. Nothnagel* (L 968.280.059).

Stephensia crocea: France, Charente Maritime, Rochefort, 1886 or earlier, (herb. P. Brunaud, PC). — Netherlands, prov. Noord-Brabant, Drimmelen, 15 Oct. 1982 and 18 Nov. 1982, *W. Sommer-Kenniphaas*, (herb. de Vries 1030).

Stephensia shanori: U.S.A., Illinois, Urbana, 14 June 1953, *L. Shanor* (type, Gilkey 764a, OSC) and Illinois, Urbana, Brownfield Woods, July 1960, *D. D. McClain* (OSC).

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Stephensia crocea Quél. — Figs. 1, 2

Ascomata up to 2 cm in diam., subglobse, often irregularly lobed, enclosing air in the tissues and lighter than water, smooth to tomentose, pale orange (5A5)[1] to orange (6C8), though brown (7E6) in the grooves. Herbarium specimens brownish orange (7C5) and light brown to brown (7D6 to 7E5). Peridium 400 – 700 μm, pale lemon yellow with a 40 – 45 μm thick, brown, pseudoparenchymatous cortex. Cortex consisting of several layers of irregularly arranged, thick-walled, brown, 10 – 20 μm wide cells which gradually change into a paler, plectenchymatous inner peridium of thin-walled, generally 2.5 – 4 μm thick hyphae. Ascoma covered with short, sometimes slightly capitate, hyaline to brown, septate, verrucose hyphae. Ostiolum either completely obturated with verrucose hyphae, rarely round or fissurate, especially in young ascomata. Gleba white to very pale lemon yellow, with narrow, winding cavities which are more or less filled with elongated paraphyses. Paraphyses branched, multiseptate, hyaline to pale brown, 2.5 – 5.0 μm thick, normally smooth, though rough when growing out above the asci in the vicinity of the ostiolum and then indistinguishable from the hyphae on the surface of the ascoma. Asci cylindrical to oblong, 120 – 200 × 18 – 23 μm, with narrow base, 4 – 8-spored, non-amyloid. Ascospores globose, hyaline, 10 – 17 μm, exceptionally up to 22 μm (average 13.0 ± 1.7 μm), with a c. 1 μm thick, smooth wall. Smell strong, pungent with iodine- or mustard-like component. Taste not investigated.

Cultural characters. — Malt extract agar (MEA) and Sabouraud's glucose agar (SGA) are excellent media for growth. Optimum temperature 24 °C. Rate of growth 1.2 – 2 mm/24 h. Colony lanose, pale orange (5A3 and 5A4), and orange (6C8) to greyish brown (5D6); Reverse on MEA yellowish brown (5F6), on SGA yellowish brown (5A7) to brown (6E8). Hyphae septate, sometimes anastomosing, branched, at first smooth-, later becoming rough-walled, hyaline to brown, sometimes with yellowish contents, 2 – 5 μm thick, similar to those on the surface of the ascomata. No aleuroconidia observed.

Antibiotic action. — Slight inhibition of the growth of *Trichophyton mentagrophytes*, *T. rubrum*, *Microsporum canis*. No inhibition of *Bacillus subtilis*, *Escherichia coli*, *Staphylococcus aureus*, *Nocardia asteroides*, *Candida albicans*, *Cryptococcus albidus*, *Absidia corymbifera*, *Aspergillus fumigatus*, and *Prototheca wickerhamii*.

Description based on. — *De Vries 1030* (herbarium material) and living culture (CBS 709.82).

The great scarcity of all *Stephensia* species, except *S. bombycina*, makes it very difficult to get a good idea of their intraspecific variability.

Gilkey (1961) accepted four species in her key which was based on the following characters: spore shape, number of spores per ascus, presence or absence of a peridial tomentum, and presence or absence of a central or basal cavity in the ascomata. Referring to *S. crocea*, she quoted Fischer (1938) who regarded as a variety of *S. bombycina*. The last mentioned author did not explain, why he reduced *S. crocea* to a varietal status.

Stephensia crocea was established in 1886 by Quélet with a very short latin diagnosis in which the sizes of spores and ascomata were not mentioned. In a more detailed French description of 1887 the same author described the ascomata as tomentose-velutinous, flesh-coloured orange, with brick-red spots at maturity, and the ascospores as hyaline, globose and 16 μm in diameter.

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[1] Colour numbers refer to Kornerup & Wanscher (1978).

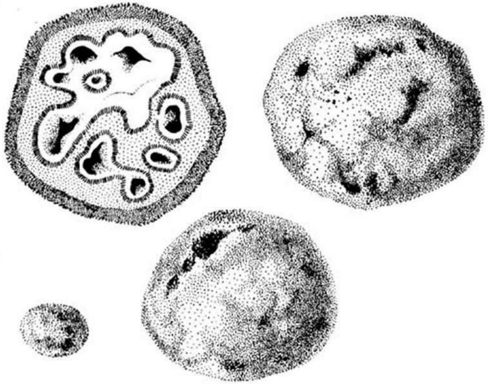

Fig. 1. *Stephensia crocea* (de Vries 1030). — Ascomata showing gleba in one specimen. (c. × 3).

The figure on Quélet's plate can be regarded as representing a section which did not pass through the centre of the ostiolar area. A later demonstration of an ostiolum or ostiolar area in the type material will be impossible, since only a thin carpophore slice remains. Difficulty in finding an ostiolum or ostiolar area was also experienced by the author during his study of the Drimmelen collection. Gilkey's (1954) establishment of the, now abandoned, genus *Densocarpa* and Uecker's (1967) opinion regarding angiocarpic development of *S. shanori* are further evidence for the fact that an ostiolum or ostiolar area is often concealed. Even in *S. bombycina*, where an ostiolum and a central or basal cavity are usually well developed, this character may become obsolete (Fischer, 1896). In the majority of the *S. crocea* specimens from Drimmelen no ostiolum was apparent. Some small ascomata, however, had a small but distinct ostiolum, the orientation of which could not be traced. Kers (1980) discovered that the ostiolum of *S. bombycina* could be apical, lateral or basal. Such a variable orientation may also be expected in *S. crocea*.

The colour of the ascomata is regarded as a good character for species differentiation. It is yellowish or yellowish brown in *S. bombycina* and orange or reddish in *S. crocea*.

The structure of the peridium of *S. crocea* is similar to that of *S. bombycina*. The pseudoparenchymatous cortex is made up of several layers of thick-walled, brown, isodiametric to elongated cells and gradually passes into the colourless to yellowish white, plectenchymatous innner peridium. A radial orientation of the cortical cells is of-

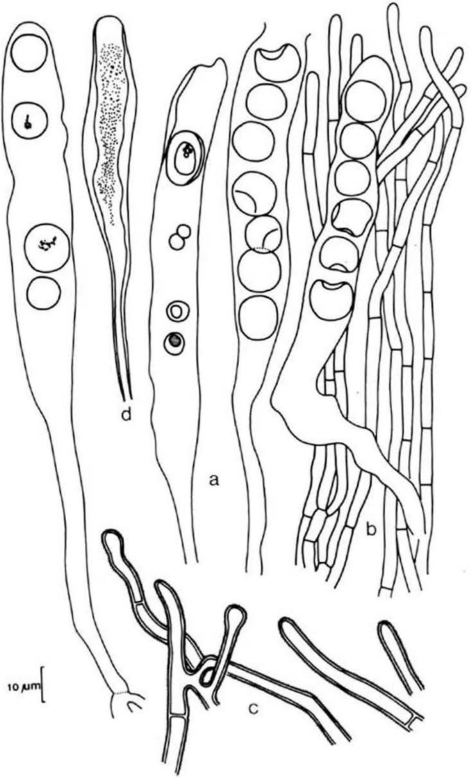

Fig. 2. *Stephensia crocea* (de Vries 1030). — a. Asci. — b. Paraphyses. — c. Hyphae of the peridial tomentum. — d. Ascus with thickened wall.

ten quite distinct in *S. bombycina*. It is less evident although not completely absent in the type material of *S. crocea* and *S. shanori*.

The velutinous ascoma of *S. bombycina* is covered with rather long hyphae. The hyphae on the cortex of *S. crocea* are shorter and often appressed to the surface of the ascoma. Ascomata of *S. crocea* are therefore smooth to tomentose. The tomentum is best developed and also persistent in the grooves. The hairiness of the cortex appears to be dependent on the age of the ascomata and the structure of the surrounding soil. Quélet (1887) described his *S. crocea* as tomentose-velutinous but pictured it as strictly velutinous. Gilkey (1961) supposed young ascomata of *S. shanori* to be tomentose. Uecker could not confirm this.

The ascus wall is usually rather thin. In some cases, however, it is more or less thickened and composed of several layers. This wall thickening, which should not be confused with folding of the ascus wall, was first reported by Uecker. It was observed by the present author in the type material of *S. crocea* and in the specimens collected at Drimmelen, and is regarded as an abnormality. Another abnormality, also observed by Uecker, is the occasional occurrence of a ring near the tip of the ascus. This last mentioned phenomenon was observed only once in a specimen from Drimmelen.

The occurrence of less than eight spores per ascus appears to be quite common. Quélet (1887) reported *S. crocea* as having eight spores per ascus. Examination of the type material, however, showed that the number of spores per ascus was often less than eight. Gilkey (1954) described *S. shanori* as having eight spores at first and one to four at maturity. Fischer (1896) did not record a reduction of the spore number of *S. bombycina*, although he shows several asci with less than eight spores in his figure 11 D.

The spore size is regarded by the present author as a good taxonomical character. There is, however, a considerable variation partly depending on the number of spores per ascus and partly depending on other factors involved in cases where a slight variation in asci with eight spores is observed (cf. Uecker, 1967, fig. 24). Occasionally a very large *S. crocea* spore is seen, the size of which overlaps the lower range of the *S. bombycina* spore size. The averages of the spore sizes of *S. crocea* and *S. bombycina* are distinctly different (Table I).

Uecker observed the production of conidia in his cultures. These conidia can be regarded as aleuroconidia. In 1983 production of conidia was also observed in *S. bombycina* (A. Fontana, pers. comm). They were not seen in the cultures obtained from the ascomata collected at Drimmelen. It is, however, not unlikely that they will be discovered when more pure cultures can be examined.

Whether *S. crocea* forms mycorrhiza is unknown. As several cultures are already available and the species is very easily obtained in pure culture, it is possible to try to establish the synthesis of mycorrhiza under experimental conditions. Fontana & Giovannetti (1980/81) cultured *S. bombycina* and *Salix* and *Quercus* together without obtaining mycorrhizae.

The smaller ascospores and the orange colour of the tomentose, usually rather compact ascomata without a distinct central or basal cavity, are regarded by the author to provide sufficient reason for maintaining *S. crocea* as a separate species, distinct from

S. bombycina. *Stephensia shanori* strongly resembles *S. crocea* and is regarded as conspecific.

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Table I. Spore sizes with averages and standard deviations of six *Stephensia* collections.

S. crocea	Type	13.0 – 15.6 av. 14.0 ± 0.8 μm
S. crocea	Drimmelen	10.0 – 17.0 av. 13.0 ± 1.7 μm
S. shanori	Type	12.5 – 15.0 av. 14.1 ± 0.7 μm
S. shanori	Brownfield	11.5 – 19.2 av. 14.2 ± 2.2 μm
S. bombycina	Slenaken	16.0 – 24.0 av. 19.6 ± 2.2 μm
S. bombycina	Weissenfels	15.5 – 26.5 av. 19.2 ± 2.7 μm

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OCCURRENCE OF PSILOCYBIN AND BAEOCYSTIN IN THE GENUS INOCYBE (FR.) FR.

T. STIJVE,* J. KLÁN** & TH. W. KUYPER***

The presence of psilocybin and its monomethyl analogue baeocystin is for the first time demonstrated in five taxa of the genus *Inocybe*, viz. *I. coelestium, I. corydalina* var. *corydalina, I. corydalina* var. *erinaceomorpha, I. haemacta* and *I. aeruginascens*. These taxa are characterized by a glaucous coloration of the stipe. A sixth taxon, *I. calamistrata*, which also has a blue-green stipe was found to be exempt of psilocybin and other methylated tryptamines. Negative results were also obtained for other *Inocybes*. Muscarin is absent in the psilocybin-containing species. However, no relation between taxonomic position and the presence of either compound seems to exist.

INTRODUCTION

After the discovery of psilocybin and related 4-oxygenated indole alkaloids in Mexican representatives of the agaric genus *Psilocybe* (Fr.) Kumm., the possible presence of these hallucinogenic compounds in other genera and families has been subject to various investigations.

To date psilocybin, psilocin and/or baeocystin have been found in the following families of gill-fungi: Strophariaceae (mainly *Psilocybe*; see Guzmán, 1983 for a review), Coprinaceae (*Panaeolus* (Fr.) Quél.; Ola'h, 1969, Stamets, 1978), Bolbitiaceae (*Conocybe* Fay.; Benedict & al., 1962), Pluteaceae (*Pluteus salicinus* (Pers.: Fr.) Kumm.; Saupe, 1981) and Cortinariaceae (*Gymnopilus* P. Karst.; Hatfield & al., 1978).

Recently, Drewitz (1983) published a report on a case of hallucinogenic mushroom-poisoning caused by ingestion of *Inocybe aeruginascens* Babos. Interestingly, no muscarinic syndrome (normally typical for *Inocybe*-poisoning) was observed, but the victims exhibited the symptoms typical for intoxication with psilocybin/psilocin. Additional evidence for the presence of these hallucinogenic compounds was the bluish green colouration of the stipe and the positive indole reaction obtained by a presumptive chemical test. However, the presence of the said 4-oxygenated tryptamines was not unequivocally demonstrated. For this reason, the present authors decided to use modern analytical techniques for the analysis of psilocybin in *I. aeruginascens*. Moreover, this work was extended to a systematic search for hallucinogenic compounds in a representative selection of *Inocybe* species.

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MATERIALS AND METHODS

With very few exceptions specimens of the *Inocybe* species of interest were taken from herbarium-material available at the Rijksherbarium, Leiden, the Netherlands. These collections were made during the last three years and the species form a representative sample of the genus in western and central Europe (Table 1).

Possible present residual water was removed from the carpophores by freeze-drying. The material thus obtained was ground to fine powder and extraction of possible present tryptamin derivatives was performed by shaking 100–200 mg with 10 ml methanol overnight at room temperature. The extract was filtered over a small folded paper filter and concentrated to 2 ml by blowing with a stream of nitrogen.

All extracts were first analysed by thin-layer chromatography (TLC) for muscarin (Stijve, 1981) and for psilocybin and related tryptamines (Stijve & al., 1984). Quantitation was performed by comparing spot dimensions with those given by a suitable range of standards. Presence of muscarin was confirmed by derivatisation to acetyl muscarin and the resulting change in Rf-value (Eugster, 1956). Results obtained by TLC for psilocybin and its precursor were corroborated by subjecting the extracts to high performance liquid chromatography (HPLC) using a reversed phase Lichrosorb RP 18 column and a mobile phase consisting of 15 percent methanol and 85 percent aqueous phosphate citric acid buffer solution (Stijve & al., 1984). Detection was performed by ultra-violet absorption at 266 nm.

The reference compounds of most tryptamine derivatives were obtained from Serva Feinbiochemica GmbH and Co., D-6900 Heidelberg, GFR, whereas psilocin and psilocybin were a gift from Sandoz AG, Basle, Switzerland. Since baeocystin was not commercially available, an extract of *Psilocybe semilanceata* (Fr.) Kumm. containing a known concentration of this compound was co-chromatographed with each series of extracts to serve as a reference.

RESULTS AND DISCUSSION

Psilocybin and its precursor baeocystin were found in the following species: *I. aeruginascens*, *I. corydalina* var. *corydalina*, *I. corydalina* var. *erinaceomorpha*[1] and *I. coelestium*[1] and *I. haemacta* (Table 1). Identity of both compounds was confirmed by TLC in three different systems and by HPLC. In the extract of *I. haemacta* the concentration was sufficiently high to permit additional confirmatory procedures as derivatisation to psilocin by treatment with lithium hydroxide (Stahl & Brombeer, 1978), or by measuring the ultraviolet spectrum which showed the maxima at 227, 267, 278 and 291 nm characteristic for psilocybin (Fiussello & Scurti, 1972).

The four psilocybin-containing species are all characterized by a glaucous discolouration at the lower half of the stipe, and often also at the centre of the pileus. This greenish-greyish colour is sometimes rather indistinct, but it may become more manifest on bruising and/or ageing. This phenomenon is reminiscent of the typical blue col-

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[1] See Kuyper on pp. 479–482 of this fascicle of Persoonia.

ouration observed in many psilocybian mushrooms, which is caused by the stepwise oxidation of psilocybin to psilocin to a blue pigment (Chilton, 1978).

Inocybe calamistrata also has a blue-green stipe, but its colour does not change on bruising, and this species does indeed not contain any psilocybin.

In the psilocybin-positive *Inocybes* the hallucinogen was found to be accompanied by appreciable amounts of baeocystin. In one sample of *I. corydalina* var. *corydalina* the concentration of the latter compound even exceeds that of psilocybin. This phenomenon has not yet been observed in other psilocybin-containing fungi. However, the data reported in this paper concern mostly herbarium material and should, therefore, be interpreted with caution. It is well-known that psilocybin slowly disappears from exsiccates during conservation, especially if the latter are exposed to air. This can be concluded from a comparison between dried material of *I. corydalina* var. *corydalina* collected in 1982 which showed much higher concentrations of psilocybin and baeocystin than another collection of the same taxon gathered in 1977. Moreover, a fresh carpophore of *I. aeruginascens* picked in 1984 in the Rhone valley was also found to contain significantly more of the two psychotropic compounds than the two year old herbarium collection. For the moment, no definite conclusions can be drawn about the biochemical pathway of the synthesis of psilocybin in *Inocybe*. However, the presence of relatively high concentrations of baeocystin suggests that phosphorylation preceded methylation, just as is the case in *Psilocybe semilanceata*, implying the following reactions (Repke & Leslie, 1977; Stijve, 1983):

tryptophan → tryptamin → 4-hydroxytryptamin → norbaeocystin → baeocystin → psilocybin.

Making allowance for appreciable decrease during storage in the herbarium, it can be concluded that the psilocybin content of these *Inocybe* species is sufficiently high to include them in the rapidly growing list of European psychotropic fungi.

Since the occurrence of hallucinogenic compounds in certain mushrooms generally invites their recreational use, it is interesting to note that the psilocybin containing *Inocybes* were found to be exempt of muscarin, the toxic principle of many species of the genus. Unlike psilocybin, muscarin does hardly degrade during storage, and the levels listed in Table 1 for such species as *I. griseolilacina, I. napipes* and *I. trechispora* are in agreement with those reported in literature (Malone et al., 1962). The absence of muscarin also confirms Drewitz's (1983) observations on the behaviour of poisoned patients after their consumption of *I. aeruginascens*.[1]

The occurrence of psilocybin in the genus *Inocybe* seems to be restricted to only two sections, viz. *Lactiferae* Heim and *Fibrillosae* Heim. Moreover, only some species within these sections are psilocybin-positive, whereas others are not. The presence of psilocybin in the said *Inocybe* species has therefore no chemotaxonomic relevance.

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[1] Absence of muscarin in *I. corydalina* var. *corydalina*, *I. haemacta* and *I. calamistrata* was also demonstrated in vivo with rats (after Malone & al., 1962).

The absence of muscarin in psilocybin-containing species of *Inocybe* is interesting, but can hardly be considered characteristic, since many *Inocybes* do not contain detectable levels of either compound.

Table 1. Concentrations of muscarin, psilocybin, psilocin and related compounds in selected *Inocybe* species.

Species	Provenance	Year	% Muscarin	% Psilocybin	% Baeocystin	% Psilocin
I. terrigena (Fr.) Kuyp.	I	1982	–	–	–	–
I. calamistrata (Fr.: Fr.) Gill.	NL	1979	–	–	–	–
I. bongardii (Weinm.) Quél.	D	1980	–	–	–	–
I. cervicolor (Pers.) Quél.	D	1980	–	–	–	–
ditto	A	1982	–	–	–	–
I. adaequata (Britz.) Sacc.	NL	1982	–	–	–	–
I. haemacta (B. & Cooke) Sacc.	A	1982	–	0.17	0.034	0.02
I. corydalina Quél. var. *corydalina*	F	1977	–	0.011	0.007	–
ditto var. *corydalina*	A	1982	–	0.032	0.092	–
ditto var. *erinaceomorpha* (Stangl & Veselský) Kuyp.	D	1982	–	0.1	0.04	–
I. coelestium Kuyp.	D	1982	–	0.035	0.025	–
I. incarnata Bres.	D	1982	–	–	–	–
I. appendiculata Kühner	D	1982	–	–	–	–
I. pudica Kühner	A	1982	0.027	–	–	–
I. aeruginascens Babos	NL	1980	–	0.085	0.02	–
ditto	CH	1984	–	0.28	0.08	0.008
I. flocculosa (Berk. →) Sacc.	NL	1982	0.19	–	–	–
I. griseolilacina J. Lange	NL	1982	0.063	–	–	–
I. napipes J. Lange	NL	1982	0.55	–	–	–
I. trechispora (Berk.) P. Karst	NL	1982	0.25	–	–	–

A = Austria; CH = Switzerland; D = Federal Republic of Germany; F = France; I = Italy; NL = Netherlands; – = below detection limit, i.e. less than 0.005 %.

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NOTES ON HYGROPHORUS–IV

New species and new combinations in Hygrophoraceae

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Six new taxa of *Hygrocybe* are described and twelve new combinations are made in *Hygrocybe, Hygrophorus* and *Hygrotrama.*

In the scope of a revision of Hygrophoraceae for the Flora agaricina neerlandica (see Bas, 1983) some new taxa have to be described and some new combinations have to be made. In this paper only the latin diagnoses and new combinations are published. Descriptions and discussions will be published in the next volume of Persoonia.

Hygrocybe acutoconica (F. Clem.) Sing. var. **cuspidata** (Peck) Arnolds, *comb. nov.*
Basionym: *Hygrophorus cuspidatus* Peck in Torrey bot. Club Bull. 24: 141. 1897.

Hygrocybe calciphila Arnolds, *spec. nov.*

Pileus 10–32 mm, semiglobatus vel convexus, dein plano-convexus vel applanatus, disco depressus, hygrophanus, miniatus vel aurantio-ruber, dein aurantio-flavus, striatus, siccus, disco squamulis parvis pilosis aurantiis vel luteis obtectus. Lamellae (L = 14–23, l = 1–3) late adnatae vel subdecurrentes, distantes, pallide luteae vel aurantiae, raro pro parte roseae vel miniatae. Stipes 20–50 × 1.5–5 mm, deorsum aequalis vel attenuatus, aurantiacus vel aurantio-flavus, interdum apice aurantiaco-miniatus, glaber, siccus. Caro concolor. Odor et sapor nulli. Sporae 6–9(–10.5) × (4–)4.5–7(–7.5) µm, Q = (1.05–)1.1–1.5(–1.7), late ellipsoideae vel ovoideae, haud lentiformae, haud strangulatae. Basidia 30–52 × 7.5–9.5(–11) µm, clavata, 4-sporigera. Lamellarum acies fertilis. Lamellarum trama subregularis, cellulis brevis, 30–150(–200) × 4–19 µm. Pileipellis trichodermiformis, hyphis ad septa strangulatis, cellulis exterioris subcylindraceis vel clavatis, 20–90 × 7–14 µm. Stipitepellis cutiformis, hyphis 2.5–6 µm latis, apices pro parte minoris erectis, ad 50 µm longis. Fibulae frequentes. Inter graminosis ad terram calcaream. — Holotypus: 'Vleuten, Bijleveld, 14 Oct. 1976, *C. Bas 7101*' (L).

Hygrocybe coccineocrenata (P. D. Orton) Moser var. **sphagnophila** (Peck) Arnolds, *comb. nov.*
Basionym: *Hygrophorus miniatus* var. *sphagnophilus* Peck in N.Y. State Mus. Rep. 53: 856. 1901.

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*Comm. No. 282 of the Biological Station Dr. W. Beijerinck, Wijster — Comm. No. 89 of the Dept. of Plant ecology of the Agricultural University, Wageningen.

Hygrocybe conica (Scop.: Fr.) Kumm. var. **chloroides** (Malençon) Arnolds, *comb. nov.*

Basionym: *Hygrophus conicus* var. *chloroides* Malençon in Malençon & Bertault, Champ. Maroc 2: 496. 1975.

Hygrocybe conica (Scop.: Fr.) Kumm. forma **pseudoconica** (J. Lange) Arnolds, *comb. nov.*

Basionym: *Hygrocybe pseudoconica* J. Lange in Dansk bot. Ark. 4(4): 24. 1923.

Hygrocybe constrictospora Arnolds, *spec. nov.*

Pileus 8–32 mm latus, convexus vel applanato-conicus, dein plano-convexus, interdum centro depressus, hygrophanus, miniatus vel aurantio-miniatus, dein aurantio-flavus, ad marginem angustissime flavus, jove pluvio ad marginem striatus, siccus, glaber vel tomentosus, haud squamulosus. Lamellae (L = 17–23, l = 1–3(–5) late adnatae vel subdecurrentes, subdistantes, pallide flavae vel pallide aurantiaceae, dein rosaceo-aurantiacae vel aurantio-rubrae. Stipes (15–)25–70 × 1.5–4 mm, deorsum aequalis vel attenuatus, aurantio-miniatus vel aurantius, dein aurantio-flavus vel flavus, glaber, siccus. Caro concolor. Sporae 6.5–10(–11.5) × 3.5–5(–5.5) µm, Q = 1.6–2.2(–2.4), ellipsoideae-oblongae, obovoideae-oblongae vel cylindraceae, haud lentiformae, pro parte majoris strangulatae. Basidia 35–58 × (5.5–)6–8 µm, 4-sporigera vel 4-, 3- et 2-sporigera intermixta. Lamellarum acies fertilis. Lamellarum trama subregularis, cellulis brevis, cylindraceis vel inflatis, 32–88 × 6–18 µm. Pileipellis cutiformis, 20–40(–60) µm latus, hyphis 3.5–6 µm latis, cylindraceis, interdum pro parte minoris erectis. Stipitepellis cutiformis, hyphis 2.5–5 µm latis. Fibulae frequentes. Inter graminosis ad terram. — Holotypus: 'Drunen, Drongelens Kanaal, 26 Oct. 1975, *E. Arnolds 3486*' (in herb. Biol. Stat. Dr. W. Beijerinck, Wijster = WBS).

Hygrocybe fornicata (Fr.) Sing. var. **streptopus** (Fr.) Arnolds, *comb. nov.*

Basionym: *Hygrophorus streptopus* Fr., Epicr.: 327. 1838.

Hygrocybe griseopallida Arnolds, *spec. nov.*

Pileus 7–20 mm latus, convexus, dein plano-convexus centro depressus, haud hygrophanus, pallide griseus, siccus, margine leviter sulcatus. Lamellae (L = 12–20, l = 1–3) decurrentes, distantes, intervenosae, pallide griseae, acie albidae. Stipes 14–25 × 1.5–3 mm, deorsum attenuatus, fistulosus, albus, siccus. Caro tenuis, alba. Odor et sapor nulli. Sporae (5.5–)6–9.5 × (3–)3.5–5 µm, ellipsoideo-oblongae, obovoideo-oblongae vel obpyriformae, hyalinae. Basidia 27–34 × 6–8 µm, clavata, vulgo 4-sporigera, raro pro parte minoris 2-sporigera. Lamellarum acies fertilis. Lamellarum trama subirregularis, hyphis cylindricis vel inflatis, 54–150 × 10–31 µm. Pileipellis cutiformis, c. 25 µm latus, hyphis 1.5–4(–6) µm latis, pro parte erectis, filamentosis. Stipitepellis cutiformis, hyphis 3–6 µm latis, cellulis exterioris pro parte erectis, clavatis, 20–38 × 5–7 µm. Fibulae frequentes. Inter graminos ad terram. — Holotypus: 'Amsterdam, Amsterdamse Bos, 6 Nov. 1971, *E. Kits van Waveren*' (L).

Hygrocybe konradii (R. Haller) P. D. Orton forma **pseudopersistens** (M. Bon) Arnolds, *comb. nov.*

Basionym: *Hygrocybe konradii* var. *pseudopersistens* M. Bon in Doc. mycol. 8 (30): 69. 1978.

Hygrocybe luteolaeta Arnolds, *spec. nov.*

Pileus 5–14(–17) mm, semiglobatus, dein plano-convexus vel applanatus, disco depressus, hygrophanus, vitellinus, dein cremeus, jove pluvio viscidissimus et striatus, jove sicco cremeus vel albidus. Lamellae (L = 18–22, l = 0–1) decurrentes, subdistantes, haud ventricosae, vitellinae, posterior pallescentes, ad aciem hyalinae, gelatinosae. Stipes 13–28 × 1.2–2.5 mm, aequalis, vitellinus, posterior pallescens, viscidissimus. Caro concolor, fragilis. Odor debilis vel fortis, foetidus, odore Hygrocybe laeta similis. Sporae 6.5–8.5(–9.5) × 5–6.5(–7.5) μm, Q = 1.15–1.5(–1.16), late ellipsoideae, pro parte minoris ellipsoideae vel ovoideae. Basidia 25–39 × 5–8.5 μm, 4-sporigera vel 4-, 3- et 2-sporigera intermixta. Lamellarum acies sterilis, ixotrichodermiformis, hyphis erectis, ramosis, gelatinosis, ad 200 μm longis, cellulis exterioris cylindraceis vel clavatis, 17.5–44 × 2–4(–5) μm. Subhymenium tenue, haud gelatinosum. Lamellarum trama subregularis, cellulis brevis, inflatis, 30–125 × 14–35 μm. Pileipellis ixotrichodermiformis, 70–200 μm latus, hyphis erectis, ramosis, filamentosis, 1.5–4 μm latis. Stipitepellis ixotrichodermiformis, 30–100 μm latus. Fibulae frequentes. — Holotypus: 'Schiermonnikoog, Westerplas, 2 Nov. 1975, *E. Arnolds 3509'* (in herb. Biol. Stat. Dr. W. Beijerinck, Wijster = WBS; isotypus in L).

Hygrocybe nivea (Fr.) Murril var. **fuscescens** (Bres.) Arnolds, *comb. nov.*
Basionym: *Hygrophorus niveus* var. *fuscescens* Bres., Iconogr. mycol. 7: pl. 330. 1928.

Hygrocybe perplexa (A. H. Smith & Hesl.) Arnolds, *comb. nov.*
Basionym: *Hygrophorus perplexus* A. H. Smith & Hesl. in Sydowia 8: 328. 1954.

Hygrocybe phaeococcinea (Arnolds) Arnolds, *comb. nov.*
Basionym: *Hygrophorus phaeococcineus* Arnolds in Persoonia 9: 247. 1977.

Hygrocybe pratensis (Pers.: Fr.) Murril var. **pallida** (Cooke) Arnolds, *comb. nov.*
Basionym: *Hygrophorus pratensis* var. *pallidus* Cooke in Grevillea 2: 118. 1874.

Hygrocybe subglobispora (P. D. Orton) Moser forma **aurantiorubra** Arnolds, *forma nova.*

A typo differt pileo primo miniata vel aurantio-rubro, stipiteque aurantio-rubro pro parte. — Holotypus: 'Drunen, Drongelens Kanaal, 26 Oct. 1975, *E. Arnolds 3479'* (in herb. Biol. Stat. Dr. W. Beijerinck, Wijster = WBS).

Hygrophorus eburneus (Bull.: Fr.) Fr. var. **quercorum** (P. D. Orton) Arnolds, *comb. nov.*
Basionym: *Hygrophorus quercorum* P. D. Orton in Notes R. bot. Gdn. Edinb. 41: 585. 1984.

Hygrotrama phaeophyllum (Romagn.) Arnolds, *comb. nov.*
Basionym: *Hygrophorus rugulosus* var. *phaeophyllus* Romagn. in Bull. trimest. Soc. mycol. Fr. 86: 871. 1971.

Hygrocybe viola Geesink & Bas, *spec. nov.*

Pileus 4–7 mm, semiglobatus vel plano-convexus, disco applanatus vel subumbilicatus, margine subcrenulatus, subsulcatus, pallide purpureus, centro purpureus, glaber, siccus. Lamellae (L = 12–14, l = 0–1) late adnatae vel subdecurrentes, subdistantes interdum furcatae, pallide lilaceoviolaceae, interdum albidae, acie concolor. Stipes 7–9 × 0.8–1.1 mm, deorsum subattenuatus, purpureus vel pallide purpureus, interdum ad basium leviter ochraceus, glaber, siccus. Caro purpurea. Odor nullus. Sporae 6.5–10.5(–11) × 5–7(–7.5) µm, Q = 1.15–1.6, $\overline{Q}$ = 1.25–1.45, late ellipsoideae, late ovoideae, ellipsoideae, obovoideae vel sublacrimiformae, raro leviter strangulatae. Basidia 36–61 × 8–11(–13) µm, clavata, 4–(2–)sporigera. Lamellarum acies fertilis. Lamellarum trama irregularis, cellulis brevis, cylindricis vel inflatis, (15–)25–125 × 6–20 µm. Pileipellis cutiformis, 20–25 µm latus, hyphis 3–8(–15) µm latis, cylindricis, apices pro parte minor erectis. Pigmentis inconspicuis, intracellulosis vel minutissime incrustatis. Stipitepellis cutiformis, hyphis 2–5 µm latis. Fibulae frequentes. Inter muscos ad terram prope *Fagus*. — Holotypus: 'Belgium, Vencimont, Vallée d'Houille, 3 Oct. 1977, *J. Geesink (Bas 7225)* (L).

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STUDIES IN INOCYBE–II

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One new species, viz. *Inocybe coelestium*, is described, and two new combinations, *I. corydalina* var. *erinaceomorpha* (Stangl & Veselský) Kuyp. and *I. terrigena* (Fr.) Kuyp. are made.

This study is intended as a companion to a chemosystematic paper by Stijve & al. (1985) for validation of a number of taxa. It forms part of a critical revision of the European representatives of the smooth-spored species of the genus *Inocybe* (Kuyper, 1985). Terminology will be explained in greater detail in that monograph. The term velipellis is used here for the velum universale, which is present as a thin layer above the pileipellis proper. Along the gill edge two types of sterile elements are present, (almost) always connected by intermediates. The thin-walled clavate to pyriform elements are called paracystidia, whereas the term cheilocystidia is restricted to metuloids that are similar to pleurocystidia. The magnifications in the text-figures are as follows: habit × 1, spores × 1.500, pleurocystidia × 1.000.

ACKNOWLEDGEMENTS

Mr. J. Stangl, Augsburg, Federal Republic of Germany, is gratefully thanked for making available important collections of *Inocybe*. Thanks are also due to Ruth van Crevel, Leiden, who prepared the figures for printing.

Inocybe coelestium Kuyp., *sp. nov.* — Fig. 1.

Pileus ochraceo-brunneus, centro glauco, lanato-coactus, dein recurvate squamuloso-subsquarrosus, centro subtomentoso, velipelli obtecto. Lamellae densissimae angustissimaeque, adnatae, luteolo-griseolae, dein sordide brunneae, margine fimbriata, pallidiore. Stipes aequalis vel subbulbosus, pallide ochraceus vel brunneus, ad basim glaucus, fuscans ad olivaceoniger, apice glabro vel pubescente. Caro alba in pileo, glauco-brunnea in stipite, non rubescens, odore pyrino sicut in *I. incarnata*. Sporae (7.0–)7.5–9.0(–9.5) × 5.0–6.0(–6.5) µm, laeves, subamygdaliformes. Pleurocystidia (29–)31–53(–65) × (10–)11–16(–18) µm, cylindracea, crassiparietalia, cheilocystidia simillima. Caulocystidia absentia. Differt ab *I. corydalina* pileo squamuloso-subsquarroso, lamellis densissimis angustissimisque, carne non rubescente.

Holotypus: *Th. W. Kuyper 2088*, 3.VIII.1982, Federal Republic of Germany, Bavaria, Augsburg, Haunstetterwald (L).

Etymology: coelestes, the inhabitants of the Olympus, the gods; referring to its hallucinogenic properties.

Pileus 15–32 mm, conico-convex, convex to plano-convex, margin reflexed when young, straight later on, without or with low broad umbo, not appendiculate at mar-

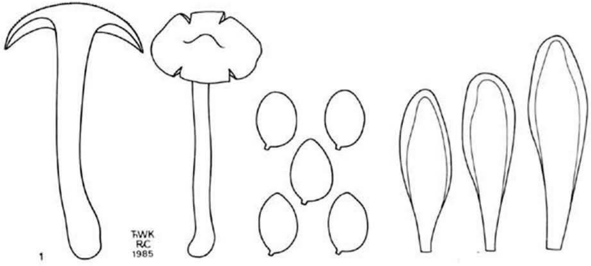


Fig. 1. *Inocybe coelestium* — Habit, spores and pleurocystidia (from holotype).

gin, ochraceous brown (Mu. 10 YR 5/6, 6/6), at centre with (pale) greenish-greyish tinges, sometimes almost whitish around disc, coarsely woolly-felty to recurvately squamulose-subsquarrose, but subtomentose around disc because of velipellis. Lamellae, L = 45–60, l = 3–5, thin, very crowded, very narrow, segmentiform, 1–3 mm broad, rather broadly adnexed, yellowish-greyish (2.5 Y 7/3, 7/4), then sordid brown (10 YR 6/4, 5/4), edge almost even to fimbriate, concolorous to whitish. Stipe 23–52 × 3–5 mm, equal to subbulbous (5–6 mm), solid, apex white to pale ochraceous, brownish halfway, at base mixed with greenish-greyish tinges, darkening on age, and becoming dark olivaceous grey, at apex smooth to hairy, not pruinose, downwards with aeriferous longitudinal striation or smooth. Context whitish in pileus, brown with a greyish-greenish tinge in stipe, not reddening on exposure. Smell faint, as Peruvian balsam, sometimes also with a faint, disagreeable, chemical component.

Spores (7.0–)7.5–9.0(–9.5) × 5.0–6.0(–6.5) μm, on average 7.7–8.5 × 5.5–6.0 μm, Q = 1.3–1.6, $\bar{Q}$ = 1.4–1.5, smooth, subamygdaliform, not limoniform, with subconical apex. Pleurocystida (29–)31–53(–65) × (10–)11–16(–18) μm, cylindrical, somewhat thick-walled, wall to 2.0(–2.5) μm thick, hyaline to very pale yellow, crystalliferous at apex, but sometimes hardly so, moderately abundant. Cheilocystidia identical to pleurocystida, scarce. Paracystidia (slenderly) clavate, thin-walled, hyaline, abundant. Basidia 25–31(–32) × 8–10 μm, 4-spored. Pigment of pileipellis not encrusting. Caulocystidia absent, stipe-apex with scattered, rather undifferentiated to caulocystidioid hairs, without paracystidia, downwards soon disappearing.

Habitat & distribution.—Under deciduous (*Fagus sylvatica*) and coniferous (*Picea abies*) trees on calcareous soil. Known from Austria and the Federal Republic of Germany. Aug.–Oct.

Collections examined.—AUSTRIA, Tirol, Pertisau, Dristenautal, 6.IX.1982, *Kuyper 2154* (L). — FEDERAL REPUBLIC OF GERMANY, Bavaria: Haspelmoor, 4.VIII.1982, *Kuyper 2106* (L); Augsburg, Haunstetter Wald, 3.VIII.1982, *Kuyper 2088* (L, holotype), 12.VIII.1982, *Stangl* (M), 22.IX.1981, *Stangl* (M); Augsburg, Gögginger Wäldchen, 20.X.1984, *Stangl* (M).

Inocybe coelestium differs from *I. corydalina* Quél. var. *corydalina* in smaller habit, squamulose-subsquarrose covering of pileus, very crowded and narrow lamellae, and un-changing, not-reddening context. The pleurocystidia seem to be somewhat more abundant, but this character is difficult to use for specific discrimination. The smell is also somewhat dissimilar from other members of sect. *Lactiferae.*

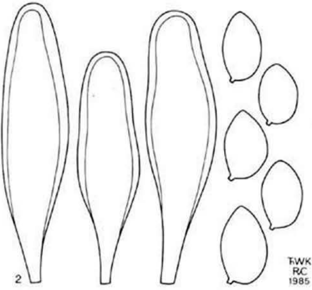
Inocybe corydalina Quél. var. **erinaceomorpha** (Stangl & Veselský) Kuyp., *comb. & stat. nov.* — Fig. 2.

Inocybe erinaceomorpha Stangl & Veselský in Ceská Mykol. 33: 72. 1979 (basionym).

Pileus 38–52 mm, convex, plano-convex to almost applanate, when young with involute margin, straight later on, margin extending somewhat beyond lamellae, sometimes even denticulate, umbonate or not, dark brown to almost blackish brown at centre, outwards brown to brownish buff, with appressed, polygonal or somewhat irregular scales at centre, towards margin squamulose or fibrillose-subsquamose; pileipellis later excoriate in outer half; velipellis usually absent, sometimes present, but indistinct, slightly greenish-tinged grey. Lamellae, L = 50–75, l = 1–3, crowded, subventricose, 3–5 mm broad, narrowly adnexed, buff, pale brown or pale greyish brown, with minutely fimbriate, concolorous or paler edge. Stipe 39–85 × 5–8 mm, cylindrical or broadened at apex and somewhat tapering below, at first whitish, then sordid greyish buff or sordid brownish, white at apex, sometimes with reddish tinges, exceptionally with greenish-greyish tinges at base, minutely hairy under lens at apex, downwards indistinctly fibrillose. Context whitish to pale greyish buff, only slightly reddening on exposure. Smell faint to strong, as Peruvian balsam.

Spores 7.0–10.0(–10.5) × 5.0–6.0 µm, on average 7.8–9.8 × 5.1–5.8 µm Q = 1.4–1.7(–1.8), $\bar{Q}$ = 1.5–1.6, smooth, (sub)amygdaliform, with (sub)conical apex. Pleurocystidia (36–)37–64(–70) × 10–16(–18) µm, cylindrical to slenderly fusiform, thick-walled, wall to 2.0 µm, hyaline to very pale yellow, apex not or hardly

2



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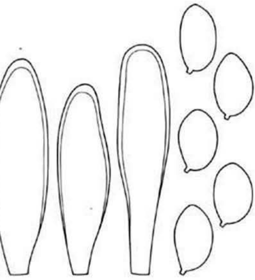

Fig. 2. *Inocybe corydalina* var. *erinaceomorpha* — Spores and pleurocystidia (from holotype).
Fig. 3. *Inocybe corydalina* — Spores and pleurocystidia (from *Kuyper 1936*, the Netherlands, Utrecht, estate Oud Amelisweerd, 13.X.1981).

crystalliferous, scarce. Cheilocystidia as pleurocystidia, (very) scarce. Paracystidia clavate, thin-walled, hyaline, abundant. Basidia (27–)28–34 × 8–10 µm, 4-spored. Pileipellis with minutely encrusting pigment. Caulocystidia absent, at extreme apex only some undifferentiated hairs present.

Habitat & distribution.—Under deciduous trees (pre-dominantly *Fagus*, but also *Quercus* and *Carpinus*), once found under *Picea abies*, on calcareous, nutrient-rich soil. Widespread in western and central Europe. Aug.–Oct.

Collections examined.—BELGIUM: prov. Namur, Houyet, 6.X.1982, *Kuyper 2277* (L). — FEDERAL REPUBLIC OF GERMANY, Bavaria: Augsburg, Siebentischpark, 6.IX.1964, *Stangl 345* (M, holotype); Augsburg, Wittelsbacherpark, 8.IX.1984, *Stangl* (L, M); Unterfahlheim, 4.IX.1982, *Enderle* (L); Rheinland Pfalz: Gerolstein, 24.IX. 1966, *Bas 4758* (L). — NETHERLANDS: prov. Gelderland, Rheden, Estate Middachten, 19. VIII.1961, *Bas 2359* (L); prov. Utrecht: Utrecht, Koningsweg, 16.X.1968, *Arnolds 326* (L); Utrecht, Estate Amelisweerd, 20.X.1984, *Bas 8346* (L); prov. Zuid-Holland, Oegstgeest, Rhijnhof, 16.VIII.1960, *Bas 2015* (L).

Examination of the type of *Inocybe erinaceomorpha* and several other collections belonging to the same taxon showed complete similarity with the microscopical characters of *I. corydalina* (see Fig. 3). The only difference between both taxa is to be found in the structure of the pileipellis, viz. with appressed scales in *I. erinaceomorpha*, and with a smooth, subtomentose velipellis in *I. corydalina*, which causes the characteristic greenish tinge in the centre of the pileus. Considering the fact that *I. erinaceomorpha* sometimes also shows a very thin greenish-tinged greyish velipellis, and that both taxa are able to synthesize psilocybin, the reduction of *I. erinaceomorpha* to a variety of *I. corydalina* seems inevitable.

As the combination *Inocybe terrigena* (Fr.) Kühner is invalid under ICBN Art. 33.2, it is formally validated here: **Inocybe terrigena** (Fr.) Kuyp., *comb. nov.* — *Agaricus terrigenus* Fr. in Öfv. K. Vet-Akad. Förh. 8: 46. 1852 ('1851') (basionym).

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COPRINUS HERCULES, SPEC. NOV.

C. B. ULJÉ* & C. BAS**

Coprinus hercules, a new species related to *C. plicatilis* and found on lawns in the Netherlands, is described and illustrated.

Several times a small species of *Coprinus* has been collected by one of us (C. B. U.) on the regularly mown lawns of a recreation area at Leiden. This species, called *C. hercules* because of the very large spores it carries, shows a great similarity to *C. plicatilis* but can easily be distinguished by its large, flattened, subtriangular spores born on 4-spored basidia.

In the following description the colour code of Munsell Soil Color Charts (abbreviated Mu.) is used to designate colours. The notation [360/18/6] stands for '360 spores from 18 basidiocarps from 6 collections measured'. 'L' indicates the length of the spores, 'D_1' the width of the spores in face view and 'D_2' the width in profile. Q_1 and Q_2 stand for the length-width ratio respectively in face view and in profile.

Coprinus hercules Uljé & Bas, *spec. nov.* — Figs. 1 – 6

Pileus primo campanulatus vel hemisphaericus, dein convexus vel applanatus, 8 – 14(– 17) mm latus, sulcatus usque ad centrum, brunneus vel pallide brunneus, postea cinerascens, nudus. Lamellae liberae, subdistantes (L = 16 – 24; l = 0 – 1(– 3)), ex albo cinerascentes vel nigricantes. Stipes 48 – 71 × 0.6 – 1.2 mm, sursum subattenuatus, albidus, subvitreus, glaber, fragilis, basi subbulbosus. Sporae 12.4 – 17.2 × 11.3 – 15.2 × 8.2 – 10;8 μm, valde lentiformes, subtriangulatae vel subquinqueangulatae, poro germinativo excentrico instructae, obscure rubro-brunneae (fere nigrae), in cumulo purpureo-nigrae. Basidia 4-sporigera. Cheilocystidia vesiculosa vel late utriformia, usque ad 50(– 70) μm longa, 10 – 23(– 30) μm lata. Pleurocystidia subutriformia vel subcylindrica, usque ad 105 μm longa, 22 – 30 μm lata. Pileipellis hymeniformis. Fibulae praesentes. Typus: 'Netherlands, Leiden, 10 VIII 1984, *C. B. Uljé* (L)'.

Basidiocarps small to very small, solitary, terrestrial. Pileus at first campanulate to hemispherical, later convex to flat and then 8 – 14(– 17) mm in diam., sulcate-striate up to centre, brown (Mu. 5YR 3/4) at centre and on ridges, later somewhat paler (from 7.5 YR 4/6 to 5/6), near margin pale grey-brown (10 YR 5/3), finally turning grey from margin towards centre, glabrous. Lamellae free, fairly distant (L = 16 – 24, l = 0 – 1(– 3)), up to 2 mm wide, at first whitish, later grey to almost black. Stipe in mature basidiocarps 48 – 71 × 0.6 – 1.2 mm, slightly thickening towards subbulbous, up to 1.5 mm wide base, whitish, somewhat vitreous, glabrous, very fragile. Spore print blackish with faint purplish hue.

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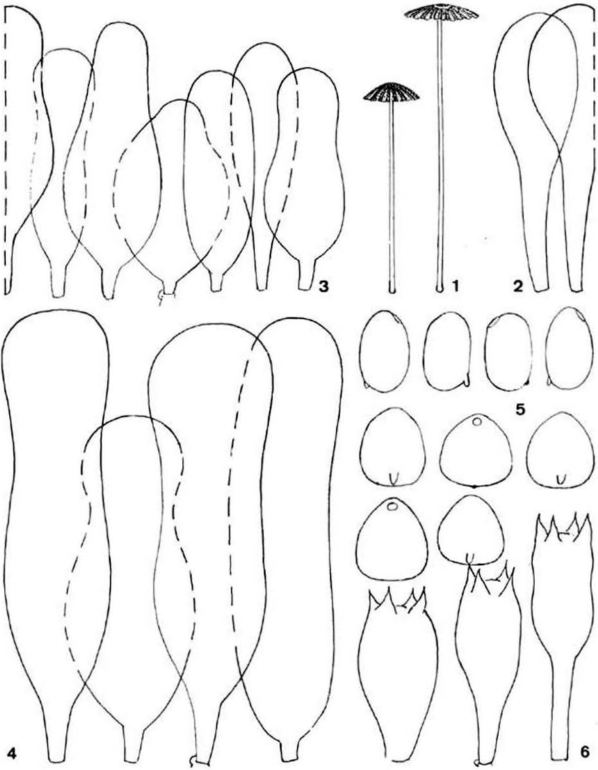

Figs. 1–6. *Coprinus hercules*. — 1. Basidiocarps. — 2. Cells of pileipellis. — 3. Cheilocystidia. — 4. Pleurocystidia. — 5. Spores. — 6. Basidia (Fig. 1 natural size, other Figs. × 1.000).

Spores [360/18/6] 12.4–17.2 × 11.3–15.2 × 8.2–10.8 µm, Q_1 1.04–1.15–1.28 (average Q_1 1.07–1.19), Q_2 1.48–1.59–1.70[*], rounded 3-angular to weakly 5- or even 7-angular in face view, strongly dorso-ventrically flattened and therefore oblongellipsoid in profile, with strongly (dorsally) excentric germ pore, sub micr. in water very dark red-brown, almost black, opaque. Basidia 22–51 × 13–16 µm, 4-spored. Cheilocystidia up to 50(–70) µm long, 10–23(–30) µm wide, from clavate or vesiculose with short broad neck to broadly utriform or broadly cylindrical, thin-walled, colourless. Pleurocystidia up to 105 µm long, 22–30 µm wide, more or less cylindrical to (sub)-utriform, thin-walled, colourless. Pileipelllis a hymeniderm of clavate to spheropedunculate cells 50–70(–100) µm long and up to 23 µm wide. Clamps present.

Habitat & distribution.—On open, regularly mown lawns on clayey soil of recreation areas. Known only from two localities, ca. 15 km apart, in the North of the prov. Zuid-Holland, but probably wide-spread.

Collections examined. — NETHERLANDS, prov. Zuid-Holland: Leiden, Leiden-Noord, 23 June, 16, 27 and 29 July, 10 August (type, L), 26 and 30 Sept., 13 Oct.; Langeraar, Van Wassenaerstraat, 1, 6 and 8 Aug.; all leg. *C. B. Uljé*, 1984 (herb. Uljé, except type).

Because of its glabrous pileus and stipe and the strongly flattened spores *Coprinus hercules* certainly belongs to the *C. plicatilis*-complex, in which it is the species with by far the broadest spores in face view (11.3–15.2 µm).

Coprinus plicatilis (Curt.: Fr.) Fr. and *C. leiocephalus* P. D. Orton differ in larger basidiocarps and smaller, but above all narrower spores in profile as well as in face view. Moreover, in these two species the number of lamellae is usually larger than 24, even in very small basidiocarps, whereas in *C. hercules* this number is usually ca. 20. This last character, together with the colour of the pileus, makes it possible to recognize *C. hercules* in the field. The colour of the pileus of other members of the *C. plicatilis*-complex growing on lawns is more grey than that of *C. hercules* of which the pileus remains brown for a long time, particularly around the centre.

Coprinus miser P. Karst has much smaller spores. *Coprinus hemerobius* Fr. and *C. megaspermus* P. D. Orton differ in considerably more ellipsoid (= less flattened) spores with a central germ pore. *Coprinus nudiceps* P. D. Orton grows on dung, has initially yellow colours of pileus and gills and spores with a central germ pore.

Finally our species has to be compared with *C. galericuliformis* Watling, another species resembling *C. plicatilis* and *C. hercules*, but growing in woods, along paths in shady places and in cool glasshouses, especially on recently disturbed ground. Its spores resemble those of *C. hercules* fairly well in shape and in having an excentric germ pore, but are considerably smaller, viz. 10–12(–12.5) × 8.5–10.5(–11) × 6–7 µm.

Kühner & Romagnesi (1953: 377) included in their keys *C. galericuliformis* Losa with spores measuring 12–15 × 11–13 × 8–9 µm, referring to a description given by Locquin (1947: 87). However in his original description Losa España (1942: 154) gave the size of the spores as 10 × 6 µm. *Coprinus galericuliformis* sensu Locquin and Kühn. & Romagn. differs from *C. hercules* in lacking pleurocystidia and in having

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[*] $L - D_1 = 0.6 - 1.78 - 2.7$; $L - D_2 = 4.6 - 5.4 - 6.2$ µm; $D_1 - D_2$ on an average about 3.5 µm.

fusiform cheilocystidia and a pileus that does not expand beyond the hemispherical-campanulate stage.

Coprinus galericuliformis Losa is according to Losa España's illustrations a species with a habit rather different from the other species in the *C. plicatilis*-complex, viz. large (pileus 20 mm) and with a relatively short and thick, subfasciculate stipe.

It is regrettable that Watling did take up Losa España's invalid name for his species apparently without having studied authentic material. To us it seems possible that three different species are involved, viz. *C. galericuliformis* Watling, *C. galericuliformis* Losa (not validly published) and *C. galericuliformis* sensu Locquin (and consequently sensu Kühner & Romagnesi). None of these three 'species', however, seems identical with *C. hercules*.

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CHRYSOSPORIUM VALLENARENSE, SPEC. NOV.

C. A. N. VAN OORSCHOT* & E. PIONTELLI**

A new species of *Chrysosporium* Corda is described which has tuberculate conidia resembling those of the *Chrysosporium* anamorph of *Renispora flavissima* Sigler & al.

Chrysosporium vallenarense van Oorschot & Piontelli, *spec. nov.* — Fig. 1

Coloniae in agaro amylo solubili concoto 25°C extensione limitatae, primum albae, deinde flavescentes, pulverulentae, margine irregulari circumdatae; reversum dilute brunneum. Hyphae una parte inflatae praesentes. Hyphae 2.5–4.0 µm latae, hyalinae, septatae, leves. Conidia in ramulis saepe sympodialiter oriundis terminalia, raro intercalaria, obovoidea, late truncata, maturitate tuberculata (tuberculis raro inflatis praedita), dilute flava vel subhyalina, 3.5–5.5 × 5–7 µm. Chlamydosporae absentes. Temperatura optim 20–25°C, maxima 30°C.

Holotypus vivus et exsiccatus CBS 627.83, isolatus e vestigiis keratinosis in semi-deserto prope Vallenar in Chile, ab E. Piontelli, 1983.

Colonies on Ypps agar at 25°C restricted, initially white, becoming sulphur yellow, powdery; margin irregular; reverse pale brown. Racquet hyphae present. Hyphae 2.5–4.0 µm wide, hyaline, septate, smooth-walled. Conidia borne terminally on often sympodial branches, very rarely intercalary, obovoid, broadly truncate, becoming tuberculate (tubercles rarely swelling), pale yellow to subhyaline, 3.5–5.5 × 5–7 µm. Conidia in the fresh isolate developing longer tubercles of up to 1 µm and sometimes becoming subglobose. Chlamydospores absent.

Growth temperatures: optimum 20–25°C, maximum 30°C.

Type strain, living and dried: CBS 627.83, ex keratinous substrate in semi-desert area, near Vallenar, Chile, E. Piontelli, 1983.

Chrysosporium vallenarense resembles the anamorph of *Renispora flavissima* Sigler. et al. in the tuberculate nature of the conidia. Mating tests with the + and – type strains of *R. flavissima* (CBS. 709.79 (+) and 708.79 (–)), using the conditions described by Sigler et al. (1979), were negative. The anamorph of *R. flavissima* has a maximum growth temperature of about 37°C, conidia which are mostly globose, 5–12 × 4–12 µm, and borne on hyphal branches which do not develop sympodially (van Oorschot, 1980).

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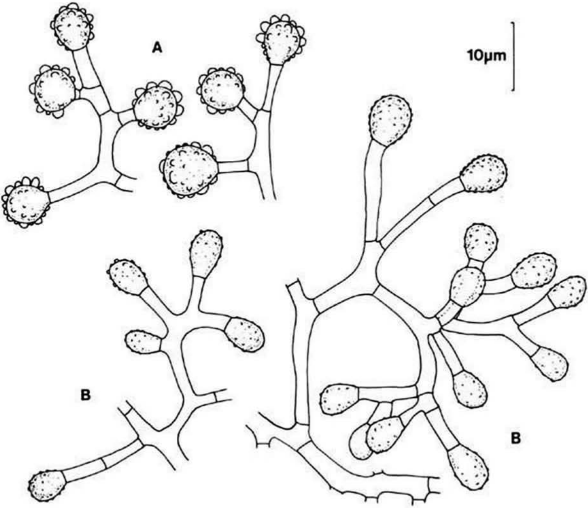

Fig. 1. *Chrysosporium vallenarense*. — A. In fresh isolate. — B. In subculture on Ypps agar.

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NOTES ON HYMENOSCYPHUS

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The author, working on a revision of the Dutch species of *Hymenoscyphus*, proposes six new combinations and a new name within this genus.

Some years ago I started to prepare a revision of the ascomycete genus *Hymenoscyphus* (Nees) ex S. F. Gray 1821 as far as occurring in the Netherlands. Until last year the work formed part of my education in biology at the university of Leiden. It was carried out under the supervision of Dr. J. van Brummelen (Rijksherbarium).

Provisional results, mainly based on specimens deposited in the Rijksherbarium, are showing the genus *Hymenoscyphus* (sensu Dennis, 1964) to be represented in the Netherlands by at least 23 different species and varieties distributed over five different groups.

In anticipation of the publication of more definitive results I wish to propose the following new combinations and new name:

Hymenoscyphus fructigenus var. **carpini** (Batsch) Hengstmengel, *comb. nov.*
Basionym: *Peziza carpini* Batsch, Elench. Fung., Contin. 1: 215, tab. 27, fig. 150a–f. 1786.

Hymenoscyphus fructigenus var. **coryli** (Feuill.) Hengstmengel, *comb. nov.*
Basionym: *Helotium fructigenum* forma *coryli* Feuill. in Roum., Fungi gall. exs.: n. 3727. 1886; in Rev. mycol. (Roum.) 8 (31): 149. 1886.
Synonym: *Hymenoscyphus rokebyensis* (Svrček) Matheis in Mitt. thurgau. naturf. Ges. 43: 157. 1979.

Hymenoscyphus suspectus (Nyl.) Hengstmengel, *comb. nov.*
Basionym: *Peziza suspecta* Nyl. in P. Karst., Fungi fenn. exs.: n. 740. 1868.

Hymenoscyphus sparsus (Boud.) Hengstmengel, *comb. nov.*
Basionym: *Helotium sparsum* Boud., Hist. classific. discomyc. Europe: 111. 1907.

Hymenoscyphus whitei Hengstmengel, *nom. nov.*
Replaced name: *Hymenoscyphus translucens* (White) Arendholz, orph.-tax. Unters.: 78, tab. 10, fig. 2, 3, 5. 1979 [≡ *Helotium translucens* White in Farlowia 1 (1): 149, fig. 6. 1943]; non *Hymenoscyphus translucens* (Gill. ex Pat.) Kuntze, Revis. gen. pl. 3 (2): 486. 1898.

Hymenoscyphus consobrinus (Boud.) Hengstmengel, *comb. nov.*
Basionym: *Helotium consobrinum* Boud., Hist. classific. discomyc. Europe: 114. 1907.

Hymenoscyphus epiphyllus var. acarius (P. Karst.) Hengstmengel, *comb. nov.*

Basionym: *Peziza epiphylla* var. *acaria* P. Karst., Monogr. Peziz. fenn.: 143. 1869.

Synonym: *Peziza sulphurata* Fr., Syst. mycol. 2 (1): 72. 1822. [≡ *Peziza sulphurea* Schum., Enum. pl. Saell. 2: 428. 1803, non Batsch 1783, nec Pers. 1794].

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BOOKS RECEIVED BY THE RIJKSHERBARIUM LIBRARY

E. Arnolds (Ed.). *Veranderingen in de paddestoelenflora* ('Changes in the mycoflora', Dutch with English summary). (Wetenschappelijke Mededelingen K.N.N.V. 167, Stichting Uitgeverij K.N.N.V., Hoogwoud, postal account 13028.) Pp. 101, 8 Text-figs., 28 Tables, 64 Distribution-maps. Price: Dfl. 17.50.

Revised texts of a series of lectures given at a symposium on changes in the Netherlands' macromycetes flora held in 1984. Perhaps for the first time it is demonstrated beyond doubt and in several ways that radical changes in the compositions of the macromycetes flora take place. Particularly populations of ectotrophic mycorrhizal fungi on poor soils are decreasing and in some cases even disappearing. But also among saprophytes and parasites important changes in quantity and distribution are recorded.

Possible causes of these changes are discussed. Acid deposition and nitrification are supposed to be the major evildoers.

M. Bon. *Les tricholomes du France et d'Europe occidentale*. (Encyclopédie mycologique 36, Editions Lechevalier, Paris 1984.) Pp. 324, 70 Text-figs., 4 Col. Pls. Price: Fr. 450.-.

This is a re-publication (with some alterations) of a series of papers on tricholomataceous fungi by M. Bon published before in the Documents mycologiques. Besides *Tricholoma* also the genera *Callistosporium* and *Tricholomopsis* are treated. Keys are provided. Species-concepts are rather narrow. The descriptions are ample and usually illustrated with drawings of habit, spores and pileipellis-structure. The colours of the plates (21 taxa depicted) differ rather strongly from those published in the Documents mycologiques.

B. Cetto. *Der grosse Pilzführer. Band 4*. (BLV Verlagsgesellschaft München/Wien/Zürich. 1984.) Pp. 697, 429 Col. Pls. Price: DM 64.-.

The german edition of the fourth volume of Cetto's 'I funghi dal vero', which with 429 coloured photographs brings the total number of species of macromycetes and myxomycetes illustrated in this serial work close to 1700. Once again the pictures given represent a cross-section of the macromycetes and myxomycetes. Besides common species also rare and very rare species are included. An index to all four volumes is added.

E. Gerhardt. *Pilze Band 1: Lamellenpilze, Täublinge, Milchlinge und andere Gruppen mit Lamellen.* (BLV Verlagsgesellschaft, München/Wien/Zürich. 1984.) Pp. 319, 141 Text-figs., 323 Col. Pls. Price: DM. 36.-.

A popular pocket-guide with good coloured photographs of more than 300 european agarics accompanied by concise descriptions, and notes on ecology and possible confusions. In the introductory chapters (39 pp.) sexuality, microscopic characters, and preparation-technics are treated and a glossary and a colour-table (28 colours) particularly for spore dust colours are given. Keys are lacking, but a list of short characteristics of the families and drawings of a representative species of each genus are provided.

D. H. Jennings & A. D. M. Rayner (Editors). *The ecology and physiology of the fungal mycelium*. (British Mycological Society Symposium 8. Cambridge University Press, London, New York, New Rochelle, Melbourne, Sydney. 1984.) Pp. XVI + 564, 168 Text-figs., 31 Tables. Price: $ 57.50.

A collection of 23 papers on an important but much neglected subject in mycology, the vegative mycelium.

Hyphal growth and interactions, behaviour and ecology of mycelia in nature, formation and functioning of mycelial cords, the vegatative mycelium of mycorrhizal roots (even connecting different hosts), intermycelial recognition systems and interspecific interaction of mycelia are but some of the fascinating aspects of fungal mycelia treated and making this book an important source of information on the biology of fungi.

M. Joserand. *La description des champignons supérieurs*, 2e ed. (Encyclopédie mycologique 37, Editions Lechevalier, Paris. 1983.) Pp. 399, 273 Text-figs. Price: Fr. 450.-.

The first edition of this work was published in 1952 and has proved its value to many both French and non-French mycologists. This second edition has been revised and brought more up to date by (according to the author) around 400 minor and major corrections and additions. The first c. 160 pages contain what probably is the most complete guide for collecting, describing, studying and preserving fungi existing. The second part is an often extensively reasoned (French) glossary of descriptive terms for macromycetes.

E. Kits van Waveren. *The Dutch, French and British species of Psathyrella*. (Persoonia Suppl. Vol. 2, Rijksherbarium Leiden. 1985.) Pp. 300, 448 Text-figs. Price: Dfl. 92.50 (Dfl. 85.- if paid into postal account 111768 of the Rijksherbarium).

In the general part (35 pp.) many aspects of taxonomic studies in *Psathyrella* are amply discussed. In the taxonomic part keys, descriptions and comprehensive synonymy are given of 2 subgenera, 12 sections, 2 subsections, 99 species ans 24 infraspecific taxa. Nearly all species and infraspecific taxa are profusely illustrated with line-drawings. Altogether 17 new taxa are described and 13 new names introduced.

M. Locquin. *Mycologie générale et structurale* (Masson, Paris. 1984.) Pp. XXVII + 551, 47 Text-figs. Price: Fr. 480.

Besides a few introductory chapters this work consists of two main parts, one called 'General Mycology' on the other 'Structural Mycology'. The first part is subdivided in chapters on (i) Taxonomic methods (treating nomenclature, numerical taxonomy, multivariable analyses and phyllogenetic classifications); (ii) Classification of the Mycota down to families; (iii) Paleomycological considerations on the evolution of fungi. In the classification the ranks designated to various taxa are unusual high; e.g. the classical genus *Hygrophorus* equals Locquin's order Hygrophorales including four families and 10 genera, the classical genus *Amanita* Locquin's order Amanitales including 3 families 12 genera.

The second part contains chapters on ecology of fungi, mathematic methods in connection with morphogenesis, laboratory technics, microscopical technics, comparative biochemistry and biochemical methods, metabolites, spore differentiations, etc.

This book has a rather difficult structure; it is a mixture of practical and methodical information and theoretical and philosophical considerations.

M. M. Pulido. *Estudios en Agaricales Colombianos*. (Biblioteca Jose Jeronimo Triana No. 7. Museo de historia natural, Instituto de ciencias naturales, Bogota. 1983.) Pp. 143, 37 Text-figs. Price not known.

Some decades of species of agaricoid fungi collected in Columbia are fully described and illustrated. Some distribution maps are given.

INDEX

New names are in **bold-face** type. Subdivisions of genera are indicated by the sign §, illustrations by an asterik (*) added to the page number.