

ENTOLOMA SUBGENUS LEPTONIA IN NORTHWESTERN EUROPE—I.
Introduction and a revision of its section *Leptonia*

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An introduction is given to the taxonomy of *Entoloma* subgenus *Leptonia*, followed by a revision of its section *Leptonia*. Eleven species are recognized, fully described and illustrated, of which three are new, viz.: *Entoloma carbonicola*, *E. tjallingiorum* and *E. allochroum*.

Entoloma subgenus *Leptonia* represents a rather large group of taxa, often with bright colours, with a world-wide distribution. Most temperate-boreal and alpine-arctic species grow in grassland or other open vegetation and are typically saprophytes. Most tropical species, however, prefer the soil or rotten wood in forests (Horak, 1973, 1980; Largent, 1977; Romagnesi & Gilles, 1979).

Many species of *Leptonia*, particularly those of section *Cyanula* show bright colours such as blue, green, yellow or pink, and for this reason they are often collected and/or photographed or painted. Many taxonomic problems still exist, however, due, among other things, to the relative rarity of most species and their habitats, and the inconstancy of fruiting. Furthermore the infraspecific variation seems to play an important role in the taxonomic confusion.

The first attempts to sort out the problems in *Leptonia* were made by Kühner & Romagnesi (1953) and P. D. Orton (1960), but the first monograph of a restricted area was written by Largent (1977), viz. for the Pacific Coast of the United States. Unfortunately Largent was confronted with the poorly known European taxa which led inevitably to some misinterpretations. For that reason and because of the recent changes in the International Code of Botanical Nomenclature, I was forced to reject some of Largent's sectional names for nomenclatorial reasons (see below).

TYPIFICATION

In the present paper the lectotypification of the Friesian tribe *Leptonia* by *Agaricus euchrous* Pers.: Fr. is used, following Clements & Sheer (1931: 249) and Donk (1949: 159). The earlier lectotypification by *Agaricus anatinus* Lasch as proposed by Earle is rejected, as *Agaricus anatinus* did not belong to the original species enumerated by Fries (1821: 201-204). According to the 'Code' such a lectotype cannot be accepted. Earle's choice, however, was followed by Singer (1949, 1962, 1978).

I agree fully, however, with Romagnesi (1978: 32) that the choice of *Agaricus euchrous* is rather unfortunate, as this species has a somewhat isolated position in what is generally considered to

be, at least by the European authors, who only considered the temperate flora, a rather homogenous group of taxa. In other words, *Entoloma euchroum* is not a 'typical' *Leptonia*. On the other hand, I do not follow Romagnesi's suggestion of designating another species as lectotype of *Leptonia*, viz. *Agaricus serrulatus* Fr, because *A. euchroum* cannot be rejected as the lectotype of *Leptonia*, because it fully agrees with Fries' protologue. Furthermore it is a well-defined species, and typifies a fairly large section of temperate and (sub-)tropical species (Horak, 1980; Largent, 1977; Romagnesi & Gilles, 1979; the present work). The classical *Leptonia* species of European Authors are very comfortably accommodated in another section: sect. *Cyanula*¹, for which *Agaricus serrulatus* Fr. is the type-species.

KEY TO THE SECTIONS OF SUBGENUS *Leptonia* IN EUROPE

1. Clamp-connections present; pileipellis a cutis to a trichoderm of cylindrical, septate hyphae, with cylindrical or modified end-cells; stipe-surface often (innately) silvery fibrillose to fibrillose-squamulose; well-modified cheilocystidia often present. 2
1. Clamp-connections absent; pileipellis a trichoderm to a hymeniderm or cellular, terminal cells often strongly swollen to globose; stipe-surface often opaque, polished, rarely fibrillose-woolly; cheilocystidia, if present, usually basidioliform, more rarely strongly protruding from the hymenium
Section *Cyanula* (synonym: *L. subgen. Paludocybe* Largent)
2. Cheilocystidia enormous, filiform to fusoid; pileus usually conico-truncate or campanulate with central depression or umbilicus; basidiomes usually with greyish-brown colours . . . Section *Griseorubida*
2. Cheilocystidia, if present, not very much larger than basidia; pileus usually conical to conico-convex, with papilla or umbo, rarely depressed; basidiomes frequently with bluish or violaceous colour
Section *Leptonia*

MATERIAL, METHODS AND PRESENTATION

Material and methods are the same as used in earlier monographic treatments of other parts of the genus *Entoloma* (Noordeloos 1979, 1980, 1981b). For details please refer to these publications. As usual the magnification of the figures is as follows: habit, $\times 1$; spores, $\times 1000$; all other figures $\times 670$. Q stands for the length-width ratio of the spores: Q = 1.2 - 1.3 - 1.4 means Q between 1.2 and 1.4 with an average of 1.3.

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¹ *Entoloma* section *Cyanula* (Romagn.) Noordel., *comb. nov.*—*Rhodophyllus* sect. *cyanuli* Romagn. in Bull. mens. Soc. linn. Lyon 43: 328. 1974 (basionym).

TAXONOMIC PART

Entoloma SUBGEN. *Leptonia* (Fr.) NOORDELOOS SECT. *Leptonia* EMEND.

Rhodophyllus sect. *Leptoniarii* Romagn. in Bull. Soc. mycol. Fr. 53: 332. 1937 (nom. nud.; no latin diagnosis). — Lectotype (Noordel. 1981: 146): *Agaricus euchrous* Fr.

Leptonia sect. *Lampropodae* Konrad & Maublanc, Les Agaricales: 259. 1948 (nom. nud., no latin diagnosis). — Lectotype (design mihi): *Agaricus lampropus* Pers.: Fr.

Rhodophyllus sect. *Lampropodes* (Kühn. & Romagn., Fl. anal.: 208. 1953) ex Romagn. in Bull. mens. Soc. linn. Lyon 43: 328. 1974. — Holotype: *R. lampropus* (Pers.: Fr.) Quél.

Entoloma sect. *Paludocybe* (Largent) Noordel. in Persoonia 11: 147. 1981. — *Leptonia* subgen. *Paludocybe* Largent in Mycologia 66: 1011. 1974. — Holotype: *E. lampropus* (Pers.: Fr.) Hesl.

Leptonia sect. *Lepidocybe* Largent in Mycologia 66: 1017. 1974. — Holotype: *L. coelestina* (Fr.) P. D. Orton.

Habit tricholomatoid, mycenoid or collybioid; pileus usually conico-convex to plano-convex, with or without papilla or umbo, rarely depressed; lamellae almost free to emarginate or broadly adnate or with decurrent tooth; stipe fibrillose-striate, smooth or flocculose-scaly; cheilocystidia present or not; pileipellis more or less trichodermal, made up of cylindrical, septate hyphae, sometimes with swollen end-cells ('pileocystidia'); pigment intracellular, in some species in addition encrusting; clamp-connections present and often frequent in covering layers and hymenium; terrestrial or lignicolous, in grasslands or forests.

I have emended the concept of *Leptonia*, as presented in a previous publication (Noordeloos 1981a: 146) by including also species which have some encrusted hyphae in the pileipellis. This is found in *Entoloma allochromum* and *E. lampropus*, which are related to *E. dichroum*, and in *E. hispidulum*, and which general appearance closely fits into section *Leptonia*.

KEY TO THE SPECIES OF SECTION *Leptonia*

1. Stipe brownish, dark grey or yellowish 2
1. Stipe with some shade of blue, violaceous or purplish 3
2. Pileus grey with purple sheen; cheilocystidia clavate, often with mucronate apex; pigment intracellular; spores 9–11(–12) × 7–8.7 μm, Q = 1.1–1.3–1.4 1. *E. carbonicola*
2. Pileus brown, yellow-brown or brown-grey; cheilocystidia absent; spores 9.3–13(–14) × 6.5–8.5 μm, Q = 1.3–1.45–1.7(–1.9), irregularly nodulose-angular; pigment intracellular, sometimes in addition minutely encrusting the hyphae of the pileipellis 2. *E. hispidulum*
3. Basidiomes entirely violaceous-blue, including the lamellae, which often have a brownish-violaceous edge; smell ± sweet, reminding that of violets or soap; on *Quercus* or *Alnus*, less frequently on other deciduous trees, exceptionally also on coniferous trees 3. *E. euchroum*
3. Lamellae white then pink, sometimes with brown or grey, rarely blue tinge, but never entirely violaceous with brown-violaceous edge; smell none or farinaceous; usually on other substratum 4
4. Pileus and stipe with about the same dark indigo, blackish-blue or bright blue colour 5
4. Pileus with colour different from that of stipe 7
5. Stipe minutely punctate; growing terrestrial in coniferous forest 4. *E. cedretorum*
5. Stipe smooth or innately fibrillose never punctate nor minutely squamulose; in deciduous or mixed forest 6
6. Spores 6.5–8.6 × 5.5–6.0(–6.5) μm; cheilocystidia absent 5. *E. coelestinum*
6. Spores 8.0–11.3(–11.8) × 6.0–8.2 μm; cheilocystidia absent or present, cylindrical 6. *E. lepidissimum*
7. Pileus with a distinct lilaceous-violaceous tinge; spores large, 9.3–12.7 × 7–10 μm with rather pronounced and sharp angles 8
7. Pileus grey-brown, occasionally tinged blue; spores smaller and weakly angled 9

- 8. Stipe blue, steel-blue or indigo, innately fibrillose or smooth; pigment intracellular 7. *E. dichroum*
- 8. Stipe pale violaceous with dark violaceous-purple fibrillose-subsquamulose covering, especially in upper half; pigment intracellular in pileipellis, sometimes minutely encrusting in pileipellis and pileitrama 8. *E. allochroum*
- 9. Stipe flocculose-squamulose; basiodiomes (slenderly) tricholomatoid 9. *E. tjallingiorum*
- 9. Stipe smooth or innately fibrillose; basiodiomes slender, mycenoid or collybioid 10
- 10. On or near trunks of *Fagus sylvatica*; pileipellis with intracellular pigment, smell farinaceous 10. *E. placidum*
- 10. Terrestrial in grasslands or grassy spots; pileipellis with intracellular and encrusting pigment, especially in deeper layers, smell none 11. *E. lampropus*

1. *Entoloma carbonicola* Noordel., *spec. nov.*—Fig. 1

Pileus griseus violaceo-tinctus, haud hygrophanus, radialiter fibrillosus; lamellae rosea; stipes obscure griseus, subquamulosus; sporae 9-11(-12) × 7-8.7 μm; cheilocystidia abundantia, gracile vel late clavata apicibus acutis vel mucronatis; pileipellis trichoderma; pigmentis intracellulosis; fibulae presentes; ad terram turfosam ambustam. — Holotypus: *P. B. Jansen 60-169, 7-VIII-1960*; 'Netherlands, prov. Limburg, Ospel, Grote Peel' (L).

CHARACTERISTICS.—Pileus grey with slight violaceous tinge, not hygrophanous, not striate, radially fibrillose; lamellae pink; stipe dark grey, fibrillose to almost squamulose; cheilocystidia numerous, clavate, often with mucronate tip.

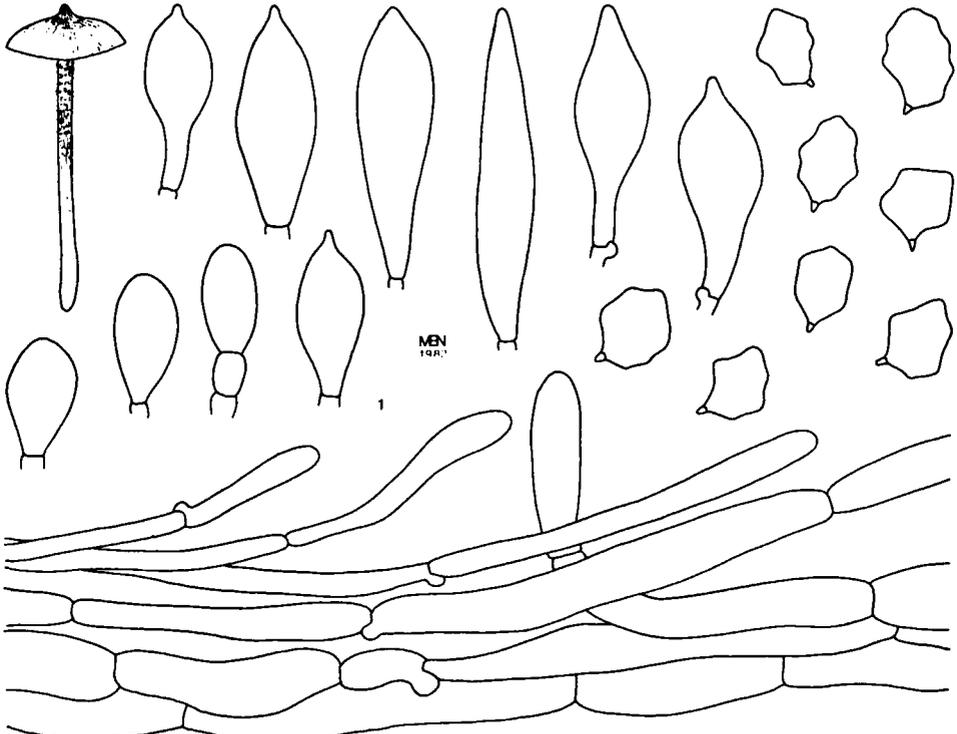


Fig. 1. *Entoloma carbonicola*. — Habit, spores, cheilocystidia and pileipellis (all figs from holotype).

Pileus 18 mm broad, conico-convex with pointed papilla, not hygrophanous, not striate, grey with slight violaceous tinge, fibrillose, somewhat shining; lamellae $L = 22$, $l = 3$, broadly adnate pink with concolorous edge; stipe 35×3 mm, cylindrical, grey with dark grey fibrils almost squamulose; smell and taste not known.

Spores $9-11(-12) \times 7-8.7 \mu\text{m}$, $Q = 1.1-1.3-1.4$, with dihedral base; basidia $22-37 \times 9-11.5 \mu\text{m}$, 4-spored, clamped; cheilocystidia $24-52 \times 10-17 \mu\text{m}$, slenderly to broadly clavate, frequently with a mucronate tip, numerous; pileipellis trichodermal made up of cylindrical hyphae $7-21 \mu\text{m}$ wide with intracellular pigment; clamp connections present in pileipellis and hymenium.

HABITAT & DISTRIBUTION.—On burnt, peaty soil, only known from the type-locality.

COLLECTION EXAMINED.—THE NETHERLANDS: prov. Noord Brabant, Ospel, Grote Peel, 7 Aug. 1960, *P. B. Jansen 60-169* (Holotype, L).

Entoloma carbonicola is a very distinctive species with its peculiar acute to mucronate cheilocystidia, grey-violaceous pileus, grey fibrillose-subsquamulose stipe and by its habitat.

2. ENTOLOMA HISPIDULUM (M. Lange) Noordel.—Fig. 2

Rhodopyllus hispidulus M. Lange in *Friesia* 3: 210. 1946.—*Entoloma hispidulum* (M. Lange) Noordel. in *Nord. J. Bot* 2: 159. 1982.

Leptonia inocybeoides P. D. Orton in *Trans. Br. mycol. Soc.* 43: 296. 1960.

?MISAPPLIED NAME.—*Agaricus resutus* Fr. sensu Cooke, Ill. *Br. Fungi* pl. 334(318). 1884-1886.

SELECTED DESCRIPTIONS & ILLUSTRATIONS.—Cooke, l.c. — Noordeloos, l.c. — Orton, l.c.

CHARACTERISTICS.—Basiodiomes small to medium-sized, reminiscent of a species of *Inocybe*; pileus grey-brown, densely fibrillose-scaly; lamellae pale then pink; stipe paler than pileus, greyish or yellowish, fibrillosely striate; spores polyangled-nodulose, $9.3-13(-14) \times 6.5-8.5 \mu\text{m}$, $Q = 1.3-1.45-1.7(-1.9)$.

Pileus 5-20 mm broad, conico-convex only slightly expanding with margin slightly involute when young, later straight, not hygrophanous, not striate, grey-brown (10 YR 6/4, 5/4, 5/2, 4/2, 3/2) with darker centre, densely fibrillose-scaly, centre often distinctly marked by clustered, uplifted scales ('calotte'), shining; lamellae $L = 14-26$, $l = 1-3$ (moderately) distant, free or narrowly adnexed, sometimes emarginate, narrowly ventricose, rarely transversely veined, sometimes somewhat thickish, white or pale grey then pink, when old often with brown or grey tinge, with concolorous, entire edge; stipe $16-55 \times 1-3$ mm, cylindrical, straight or flexuose, paler than pileus, yellowish or greyish brown (10 YR 7/3, 7/4, 6/4, 5/2, rarely 4/2) densely silvery striate lengthwise, apex often slightly pruinose, base white tomentose, sometimes with purplish-reddish tinge at base; flesh concolorous with surface, in inner part pale to white; smell none.

Spores $9.3-12(-14) \times 6.5-8.5 \mu\text{m}$, $Q = 1.3-1.45-1.7(-1.9)$, irregularly nodulose-angular, probably with dihedral base; basidia $27-55 \times 7-15 \mu\text{m}$, (2-)4-spored with clamp; cheilocystidia absent; hymenophoral trama made up of cylindrical to slightly inflated cells, $60-220 \times 7-27 \mu\text{m}$; pileipellis a trichoderm of cylindrical to clavate of fusoid cells, up to $35 \mu\text{m}$ wide with abundant brown intracellular pigment and in addition in some collections minutely encusted walls; clamp-connections abundant in hymenium and pileipellis.

HABITAT & DISTRIBUTION.—Terrestrial in grassland and in deciduous forests, usually on sandy, slightly calcareous soils, not uncommon, wide-spread, known to occur in Denmark, Great Britain, The Netherlands and Poland.

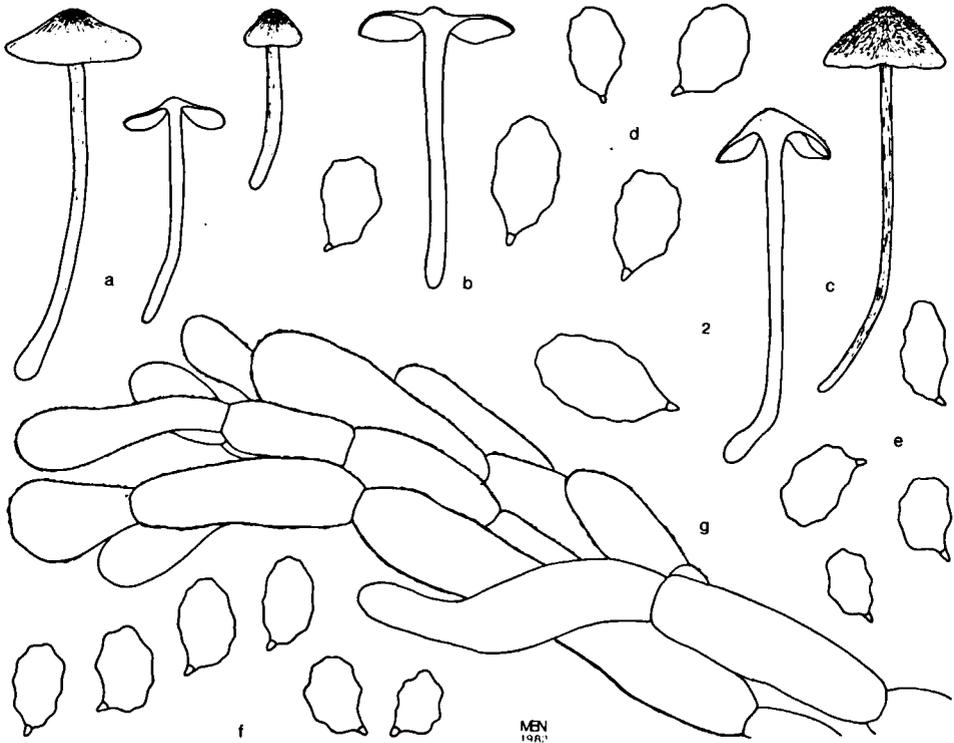


Fig. 2. *Entoloma hispidulum*. — Habit, spores, cheilocystidia and pileipellis (a, b, f from J. Schreurs, 8 oct. 1981; c, e, g from B. de Vries, 11 nov. 1976; d from holotype of *Leptonia inocybeoides*).

COLLECTIONS EXAMINED.—DENMARK: Sjaelland, Maglemose, Gribskov 21 Oct. 1944, M. Lange (Holotype, C); Jutland, Tversted Plantage, 30 Oct. 1977, H. Knudsen (C). — GREAT BRITAIN: Devonshire, Dawlish Warren, 17 Nov. 1956, P. D. Orton 867 (holotype of *L. inocybeoides*, K). — NETHERLANDS: prov. Drenthe, Elp, 11 Nov. 1976, B. de Vries (WBS); Buurserzand, 2 Nov. 1963, J. J. Barkman (WBS); prov. Overijssel, Lemelerberg, 15 Nov. 1976, B. de Vries 3246 (WBS); IJsselmeerpolders, Oost Flevoland, Bremerbergbos, 1 Aug. 1981, Th. W. Kuyper 1655 (L); idem, 8 Oct. 1981, J. Schreurs (L). — POLAND, Łuka, 13 Oct. 1977, J. J. Barkman (WBS).

Entoloma hispidulum is easily recognized by its Inocybeoid habit and its rather large, irregularly nodulose-angular spores. The purple sheen at the stipe-base, as described by M. Lange, is a rather variable character. Some collections show it clearly, in others it is only visible in the flesh or it is covered by the basal tomentum. In some collections there was even no trace of a purple tinge found. This was certainly the case in the type-collection of *Leptonia inocybeoides*. For the time being I do not attach much taxonomic value to this character (compare also the variability of *Entoloma araneosum* in Noordel. 1979: 238). *Entoloma hispidulum* differs clearly from *E. araneosum* in a number of characters, in particular in the size and shape of the spores, clamped hyphae, pale lamellae, stipe-colour and surface of pileus and stipe. The type of pigmentation of *E. hispidulum*, however, reminds of that found in section *Versatilia* of subgenus

Pouzaromyces. With respect to this character *E. hispidulum* takes a rather isolated position in subgenus *Leptonia*.

Agaricus resutus Fr. may be identical with *E. hispidulum*. Fries (1838. 145; 1867. 105, pl. 92 fig. 2) suggests, however, a more robust species which is related to *A. jubatus* and *A. griseocyaneus*. The plate of Cooke (1884-6, pl. 334(318) as *A. resutus* Fr.) possibly depicts *E. hispidulum*, as it shows a rather slender, Inocybeoid, brownish species more like *E. hispidulum* than *Agaricus resutus*.

3. ENTOLOMA EUCHROUM (Pers.: Fr.) Donk.—Fig. 3

Agaricus euchrous Pers., Synopsis: 343. 1801. — *Agaricus euchrous* Pers.: Fr., Syst. 1: 203. 1821. — *Leptonia euchroa* (Pers.: Fr.) Kumm., Führ. Pilzk.: 96. 1871. — *Hyporrhodius euchrous* (Pers.: Fr.) Schroet. in Cohn, KryptogFl. Schles. 1: 615. 1889. — *Rhodophyllus euchrous* (Pers.: Fr.) Quél., Enchir.: 60. 1886. — *Entoloma euchroum* (Pers.: Fr.) Donk in Bull. Bot. Gard. Buitenzorg, ser. 3, 18: 157. 1949.

SELECTED DESCRIPTIONS & ILLUSTRATIONS.—Cooke, Ill. Br. Fungi III, pl. 356(334). 1884-6. — Jahn, H., Pilze an Holz: 210, pl. 185. 1979. — Lange, J., Fl. agar. dan. 2: 98 pl. 79A. 1936. — Romagnesi in Bull. Soc. mycol. Fr. 97, Atl. pl. 225. 1981.

CHARACTERISTICS.—Basidiomes entirely violaceous-blue; lamellae often slightly tinged brown near edge; smell sweetish, like soap or like that of violets; on dead or living deciduous, rarely coniferous trees.

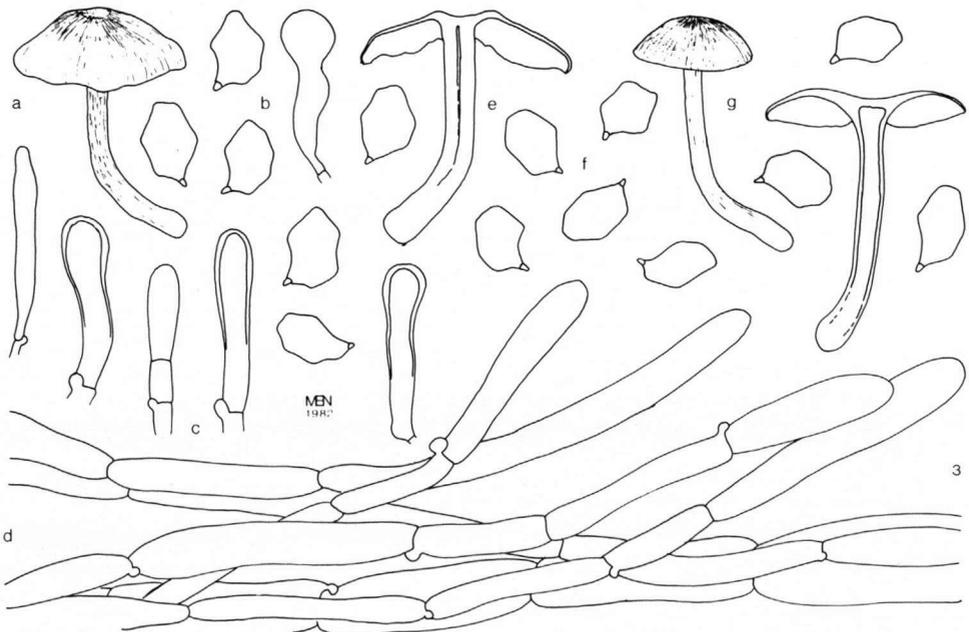


Fig. 3. *Entoloma euchroum*. — Habit, spores, cheilocystidia and pileipellis (a-d from *P. B. Jansen*, 25 nov. 1977; e from *M. E. Noordeloos* 812; f, g from *C. Bas* 1338).

Pileus 9–40 mm broad hemispherical or conico-convex then expanding, usually with more or less flattened centre, more rarely papillate or umbilicate, with slightly involute margin when young, later more or less straight, not hygrophanous, not striate or obscurely so at margin only, entirely blue-violaceous frequently with brownish-sepiaceous tinge, particularly at centre and with age, entirely flocculose-subsquamulose with slightly darker squamules on paler background (Meth. 17E3, 19E3 with tinges like 10 YR 4/3, background more like Meth. 17D2–18D2); lamellae $L=20-40$, $l=1-3$, adnate to adnexed, often with decurrent tooth, segmentiform to ventricose, pinkish grey-beige with distinct violaceous tinge to dark violaceous-brown with pink tinge, sometimes with brown colour at base and near the crenulate-fimbriate edge; stipe 20–60 × 1.5–5 mm, cylindrical sometimes with bulbous base, straight or bend towards base, solid to narrowly fistulose, with about the same colour as the pileus, pale to fairly dark violaceous covered with loose, darker fibrils, sometimes with sepia tinges towards base, with flocculose-subsquamulose apex, base sometimes white tomentose; flesh concolorous with surface; smell sweet, like that of violets or soap, fugaceous; taste soapy.

Spores (8–)9.3–11.5 × 5.8–8.1 μm , $Q=1.1-1.4-1.5$, probably with dihedral base; basidia 27–45 × 9–12 μm , 4-spored with clamp; cheilocystidia 22–47 × 6–12 μm , versiform, narrowly cylindrical to broadly clavate or obpyriform, thin-walled and colourless or with slightly to distinctly thickened, brownish wall, particularly at apex, rarely in addition with violaceous-brownish intracellular pigment, scarce to abundant, but edge never entirely sterile; hymenophoral trama regular, made up of cylindrical hyphae with violaceous intracellular pigment; pileipellis a trichoderm made up of cylindrical, 7–19 μm wide, septate hyphae with abundant blue-violaceous pigment; clamp-connections abundant in hymenium and in covering layers.

HABITAT & DISTRIBUTION.—On dead and living deciduous trees (*Quercus*, *Alnus*, *Sorbus*, *Corylus*, *Fraxinus*) exceptionally on coniferous tree (*Chamaecypar*), fairly common and widespread.

COLLECTIONS EXAMINED.—S W E D E N, Västergötland, W. of Tunhem, S. of Prestgarden, 12 Sept. 1944, *T. Nathorst-Windahl* (GB). — THE NETHERLANDS: prov. Drenthe, Rolde near Dusserbrug, 29 Sept. 1977, *J. Schreurs* (L); prov. Overijssel, Kuinre, Kuinderbos, 4 Oct. 1975, *M. E. Noordeloos* (L); Ommen, estate 'Stekkenkamp', sept. 1979, *J. Schreurs & T. Boekhout* (L); prov. Gelderland, Laag Keppel, 19 Sept. 1951, *H. C. v. d. Gaag* (L); Doetinchem, 't Zumpe', 5 Oct. 1978, *W. Anema* (L); Epe, 17 sept. 1967, *J. W. M. Osse* (L); Gorssel, estate 't Joppe', 30 Sept. 1951, *R. A. Maas Geesteranus 8022* (L); prov. Utrecht, 25 Oct. 1980, *G. Keizer* (L); prov. Noord Holland, 's-Gravenland, 5 Sept. 1960, *J. Daams* (L); Castricum, Geversduin, 29 Sept. 1954, *G. D. Swanenburg de Veye* (L); Isl. Voorne, estate Mildenburg, 18 Oct. 1978, *M. E. Noordeloos 812* (L); prov. Noord Brabant, Drunen, estate 'de Klinkaert', 10 Sept. 1957, *C. Bas 1338* (L); prov. Limburg, Valkenburg, Ravensbos, 30 Sept. 1950, *J. Daams* (L). — GERMAN FEDERAL REPUBLIC, Bentheim, Samerothwald, 25 Sept. 1977, *P. B. Jansen* (L); Bayern, Friesenerwarte, 17 Sept. 1981, *G. Wölfel* (L).

Entoloma euchroum is easily to recognize by its entirely blue-violaceous basidiomes and lignicolous habitat. It is the only species in sect. *Leptonia* with entirely violaceous lamellae sometimes with brownish edge and cannot be confounded with any of the other species. It is a relatively common species, frequently found on *Alnus* and *Quercus*, less often on other trees such as *Sorbus*, *Fraxinus* and *Carpinus*. Only once found on coniferous tree (*Chamaecypar* spec.) Another remarkable character of *E. euchroum* is the smell which can be fairly strong like flowers or soap.

4. *Entoloma cedretorum* (Romagnesi & Riousset) Noordel., *comb. nov.*

Rhodophyllus cedretorum Romagnesi & Riousset in Bull. Soc. mycol. Fr. 92: 299. 1976 (basionym).

CHARACTERISTICS.—Pileus 20–30 mm broad, truncate-conical then irregular with lobed margin, not hygrophanous, not striate, opaque, dark blue-black not changing with age, micaceous with minute granulose-pluchy covering becoming somewhat radially fibrillose-squamulose at margin but in general giving a smooth impression to the naked eye; lamellae adnate to almost free, ventricose, greyish cream then sordid grey-pink with entire, concolorous edge; stipe 60–70 × 3.5–5 mm, cylindrical sometimes flexuose, attenuated towards base, dark blue, paler and tinged yellow at base, minutely punctate or pluchy all over, base white tomentose; flesh thin, brittle, whitish in inner parts; smell none; spores (9–)10–12.5(–13) × 7.5–8(–10) μm with dihedral base; basidia 35–60 × 11.5–12.5 μm , 4-spored, clamped; cystidia none; pileipellis a trichoderm, made up of cylindrical, 8–14 μm wide hyphae with intracellular pigment; clamp-connections present in hymenium and pileipellis.

HABITAT & DISTRIBUTION.—Terrestrial in coniferous forest (*Cedrus* sp.), only known from the type-locality.

Entoloma cedretorum is a very distinct species with its dark blue pileus and stipe, punctate-pluchy stipe covering, fertile lamellar edge and habitat. *Entoloma lepidissimum* and *E. coelestinum* are smaller, have a smooth stipe and another habitat, and *E. coelestinum* has much smaller spores. *Entoloma tjallingiorum* has a grey-brown pileus and cheilocystidia.

5. *Entoloma coelestinum* (Fr.) Hesl.—Fig. 4

Agaricus coelestinus Fr., Epicr.: 158. 1838. — *Nolanea coelestina* (Fr.) Gill., Hymen. Fr.: 422. 1876. — *Rhodophyllus coelestinus* (Fr.) Quél., Enchir.: 65. 1886. — *Leptonia coelestina* (Fr.) P. D. Orton in Trans. Br. mycol. Soc. 43: 177. 1960. — *Entoloma coelestinum* (Fr.) Hesl., in Beih. Nova Hedwigia 23: 111. 1967.

EXCLUDED NAMES.—*Rhodophyllus coelestinus* ss. J. Lange in Dansk Bot. Ark. 2(11): 38. 1921; Kühn. & Romagn., Fl. anal.: 207. 1953; *Leptonia coelestina* ss. P. D. Orton, l.c.; *Entoloma coelestinum* ss. Hesl., l.c.

CHARACTERISTICS.—Pileus and stipe dark blackish blue or bright blue to steelblue, more or less of the same colour; spores small, 6.5–8.6 × 5.5–6.0(–6.5) μm ; terrestrial in mixed forest.

Pileus 4–10 mm broad, conical to conico-convex with or without distinct papilla, never umbilicate, with straight margin, not hygrophanous, not striate, dark (blackish) blue, coarsely radially fibrillose, centre almost scaly; lamellae L=6–8, I=0–1, distant, emarginate-adnate white then pink with concolorous, entire edge; stipe 20–40 × 1 mm, cylindrical, almost concolorous with the pileus or paler and more bright, smooth or slightly fibrillose lengthwise, base white tomentose; smell none.

Spores 6.5–8.6 × 5.5–6.0(–6.5) μm , Q=1.1–1.3–1.4, with distinct dihedral base; basidia 36–42 × 8–10 μm , 4-spored, clamped; cheilocystidia absent; pileipellis trichodermal, made up of cylindrical, septate, clamped hyphae; pigment intracellular; clamp-connections frequent in hymenium and pileipellis.

HABITAT & DISTRIBUTION.—Terrestrial in mixed forest; rare.

COLLECTION EXAMINED.—N O R W A Y: Nordland, Mo, 9 Sept. 1976, *E. Horak 76/141* (ETH).

The collection described above agrees perfectly with the diagnosis of Fries (1838: 158) who placed this species in *Nolanea* because of the conical pileus with straight margin. The present

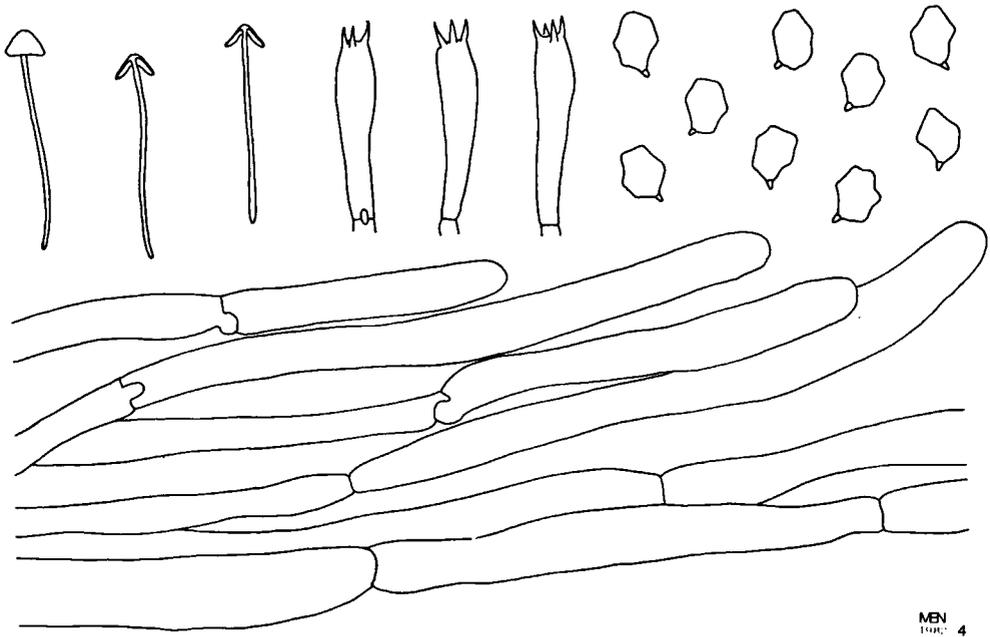


Fig. 4. *Entoloma coelestinum*.— Habit, basidia, spores and pileipellis (all figs from *E. Horak* 76/141).

author places it in subgenus *Leptonia* on account of the granular-subsquamulose pileus, type of pileipellis, attachment of the lamellae and the pigmentation. *Entoloma lepidissimum* is closely related, but differs clearly in having much larger and differently shaped spores. The interpretations of Lange, Kühner & Romagnesi, Orton and Hesler are different, all being species belonging to section *Cyanula*.

6. *Entoloma lepidissimum* (Svrček) Noordel., *comb. nov.*—Fig. 5

Leptonia lepidissima Svrček in *Česka Mykologie* 18: 205. 1964 (basionym).—*Rhodophyllus lepidissimus* (Svrček) Moser apud Gams, *Kl. KryptogFl.* 2 b/2, 4. Aufl.: 203. 1978.

CHARACTERISTICS.—Pileus and stipe dark blue; lamellae white then pink; stipe surface minutely striate, glabrous; spores $8.0-11.5(-11.8) \times 6.0-8.2 \mu\text{m}$.

Pileus 8–15 mm broad, broadly campanulate then expanding with papilla, with straight then uplifted margin and irregularly undulating with age, not hygrophanous, not striate, dark blue, weakly shining, radially fibrillose; lamellae $L = 16-25$, $l = 1-4$, moderately distant, emarginate, segmentiform to narrowly ventricose, white then pink with concolorous, entire edge; stipe 30–35 \times 1–2.3 mm, cylindrical, straight, concolorous with pileus, shining, fibrillose-striate, glabrous; smell none.

Spores $8.0-11.5(-11.8) \times 6.0-8.2 \mu\text{m}$, $Q = 1.2-1.3-1.5$, with dihedral base; basidia 22–50

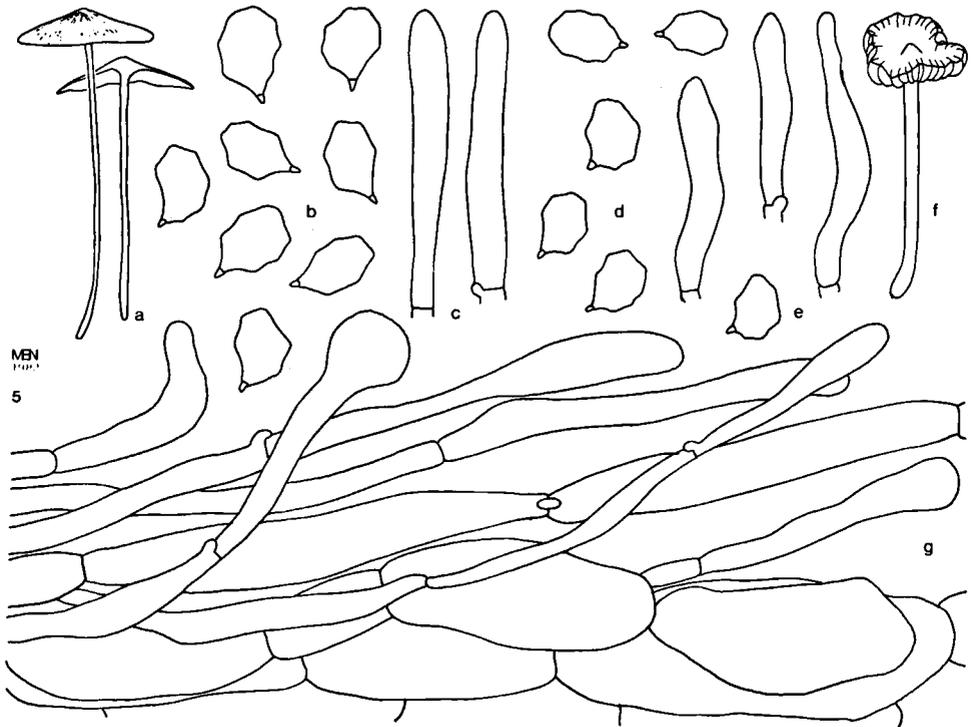


Fig. 5. *Entoloma lepidissimum*. — Habit, spores, cheilocystidia and pileipellis (a-c from holotype; d-g from *B. de Vries* 3245).

$\times 8-14 \mu\text{m}$, 4-spored with clamp; cheilocystidia $30-50 \times 5.8-15 \mu\text{m}$, cylindrical, very scattered, sometimes lacking; hymenophoral trama regular, made up of cylindrical elements, $70-200 \times 17-25 \mu\text{m}$; pileipellis a trichoderm of up to $20 \mu\text{m}$ wide cylindrical, septate hyphae, with cylindrical or slightly swollen, up to $23 \mu\text{m}$ wide terminal cells; pigment abundant, blue, intracellular; clamp-connections present in hymenium and pileipellis.

HABITAT & DISTRIBUTION.—On rotten twigs of *Alnus* in swamp-forest (holotype) and in dense moss vegetation (*Dicranum scoparium*, *Hypnum cupressiforme*) and *Mnium affine* in *Juniperus*-shrub; rare, known to occur in Czechoslovakia and German Democratic Republic.

COLLECTIONS EXAMINED.—GERMAN DEMOCRATIC REPUBLIC: Fähr Insel, 14 Oct. 1976, *B. de Vries* 3245 (WBS). — CZECHOSLOVAKIA, Bohemia merid., Vrabské near Cimelice, 20 Oct. 1963, *M. Svrček* (holotype, PRM 755801).

The distinctive features of *Entoloma lepidissimum* are its blue colours, pale lamellae, smooth stipe and perhaps the cheilocystidia. *E. coelestinum* differs in having smaller spores, and a granulose-subsquamulose pileal surface. *Entoloma cedretorum* is generally somewhat larger and has a punctate-plushy stipe-surface.

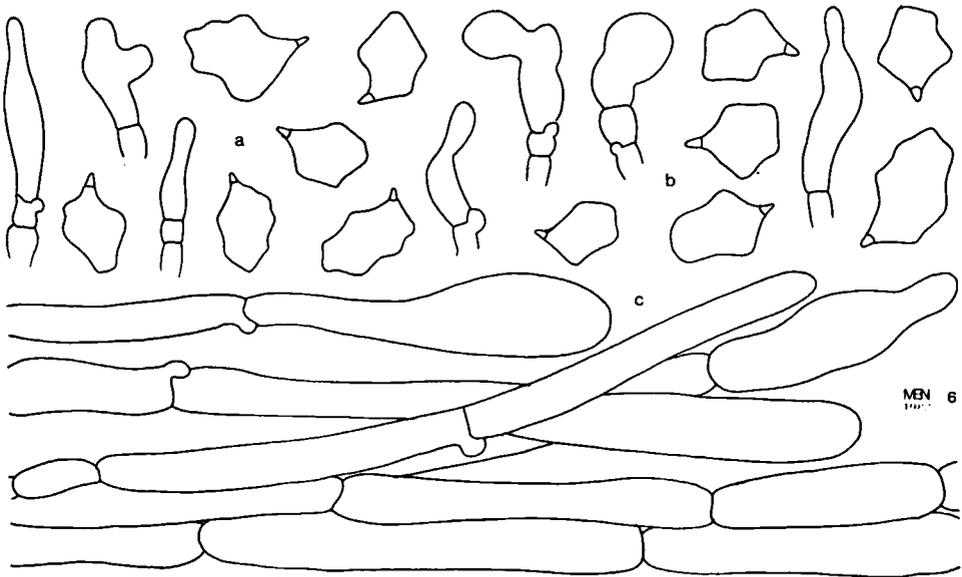


Fig. 6. *Entoloma dichroum*. — Spores, cheilocystidia and pileipellis. (a, c from *Tjallingii*, 6 nov. 1978; b from *Bresinsky* 238).

7. *Entoloma dichroum* (Pers.: Fr) Kumm.—Fig. 6

Agaricus dichrous Pers., Synopsis: 343. 1801. — *Agaricus dichrous* Pers.: Fr., Syst. 1: 202. 1821. — *Entoloma dichroum* (Pers.: Fr.) Kumm, Führ. Pilzk.: 97. 1871. — *Rhodophyllus dichrous* (Pers.: Fr.) Quél., Enchir.: 58. 1886.

EXCLUDED NAMES.—*Agaricus dichrous* ss. Fr., Summa veg. scand. 2: 287. 1849; Icon. sel. Hymen. 1: 105, pl. 92 fig. 3. 1867. — *Entoloma dichroum* ss. Bres., Icon. mycol. pl. 554. 1929; Konrad & Maublanc, Icon. sel. Fung., pl. 192. 1932. — *Rhodophyllus dichrous* ss. J. Lange, Fl. agar. dan. 2: 93, pl. 72A. 1936 (= *Entoloma tjallingiorum* Noordel.).

CHARACTERISTICS.—Pileus brownish with distinct violaceous-purple tinge; stipe dark grey-blue or violaceous blue, smooth; spores (9.0)9.3–12.0 × 7–9.3(–10), with rather pronounced, sharp angles, slightly thick-walled; pigment intracellular.

Pileus 7–55 mm broad, conical then convex finally plano-convex with or without papilla or umbo, never depressed, not hygrophanous, not striate, dark violaceous(brown) then sepia pinkish brown with purple tinge (Meth. 12F3, 13F3–4(2) then more like 10 YR 3/3–4 or 7.5 YR 4/2), entirely felted-squamulose, when young more granular-fibrillose with subsquamulose centre; lamellae L = about 25, l = 1–3, narrowly adnate-emarginate, triangular then ventricose, white then pink finally pinkish-brown (up to 7.5 YR 6/4–5/4) with entire, concolorous edge; stipe 20–60 × 2–5 mm, cylindrical, slightly broadened towards base (–8 mm), very dark grey-blue (19F3–4, 20F4–5) to violaceous-blue, usually distinctly different from colour of pileus, smooth, base white tomentose; flesh concolorous with surface, inner parts paler; smell none or slightly spermatocal.

Spores (9.0–)9.3–12.0 × 7–9.3(–10.0) μm, irregularly 6-many angled in side-view with rather pronounced, sharp angles, slightly thick-walled; basidia 27–50 × 7–15 μm, 4-spored with clamp;

cheilocystidia 20–42 × 5–16(–25) μm , irregularly cylindrical to almost corralloid, sometimes septate, with hyaline, colourless walls, scattered among basidia; pileipellis a trichoderm of up to 20 μm wide cylindrical, septate hyphae with cystidiform terminal cells, 35–110 × 20–42 μm ; pigment abundant, intracellular in pileipellis and upper pileitrama; clamp-connections abundant in all tissues.

HABITAT & DISTRIBUTION.—Terrestrial in mixed forest, rare. Known from The Netherlands, Belgium and Austria.

COLLECTIONS EXAMINED.—THE NETHERLANDS: prov. Noord Holland, Egmond, 24 Oct. 1978, *A. Aptroot* (L); prov. Gelderland, Bennekom, Bennekomsebos, 6 Nov. 1978, *F. Tjallingii* & *G. Tjallingii-Beukers* (L). — BELGIUM: prov. Limburg, Bévercé, along river Warche, 12 Aug. 1957, *C. Bas 1395* (L). — AUSTRIA, Hohe Tauern, Kesselfall im Kapruntal, (22–28) Aug. 1963, *A. Bresinsky 238* (M).

Entoloma dichroum is a rather rare and variable species, which already gave rise to confusion about its identity early in the last century. When Fries (1821, l.c.) validated Persoon's species he had not seen it alive. Later he himself collected a species which he identified as *Agaricus dichrous* Pers., but with a question mark (1849: 287). In a footnote he expressed his doubts on his determination, but stated that he could not find a better name for his material. When comparing the description given by Persoon (1801: 343) with those of Fries (1849, l.c.; 1867, l.c.) it is obvious that two different species are concerned. Persoon described a species with a violaceous-purplish pileus and an almost smooth stipe, whereas Fries gives a picture of a species with a brown pileus and blue-violaceous, flocculose-scaly stipe. Unfortunately Fries' interpretation of *Agaricus dichrous* was followed by later mycologists and Persoon's was forgotten. While sorting out the herbarium specimens available to me it became clear that the material labelled as *Entoloma dichroum* represented a mixture of three taxa: one almost perfectly in agreement with Persoon's original species, one corresponding with Fries' misapplication and an undescribed one. As no synonym was available for Fries' taxon I described *Agaricus dichrous* sensu Fries as a new species, viz. *Entoloma tjallingiorum*, in honour of Dr. F. Tjallingii and Mrs. G. Tjallingii-Beukers, whose collection of the real *Entoloma dichroum* from Bennekom opened my eyes to the problems concerned with *Agaricus dichrous*, while the third one was described as new under the name *Entoloma allochroum*. The most important macroscopic differences between the three are the colour of pileus and stipe and the stipe-covering (see the key to the species, above) and microscopically *Entoloma tjallingiorum* is characterised by its thin-walled, weakly angled, almost nodulose spores, which collapse easily, while the other two have relatively thick-walled, pronouncedly angled spores. Compare the descriptions of *E. tjallingiorum* and *E. allochroum* below.

8. *Entoloma allochroum* Noordel., spec. nov.—Fig. 7

Pileus griseo-brunneus violaceo-tinctus; lamellae sordide griseo-roseae; stipes pallide vilaceus, violaceo-fibrilloso-squamulosus; sporae 9.3–12.7 × 7.0–9.3 μm , acute angulateae, crasse tunicatae; cheilocystidia sparsa; pileipellis trichoderma; pigmentis intracellulosis; fibulae abundantes; ad terram in horto.—Holotypus: *E. Kits v. Waveren*, 29-VII-1973, 'Aerdenhout, prov. Noord-Holland, Netherlands' (L).

CHARACTERISTICS.—Pileus greyish-brownish with violaceous tinge; stipe with violaceous-purple, fibrillose to subsquamulose covering; spores 9.3–12.7 × 7.0–9.3 μm , irregularly but

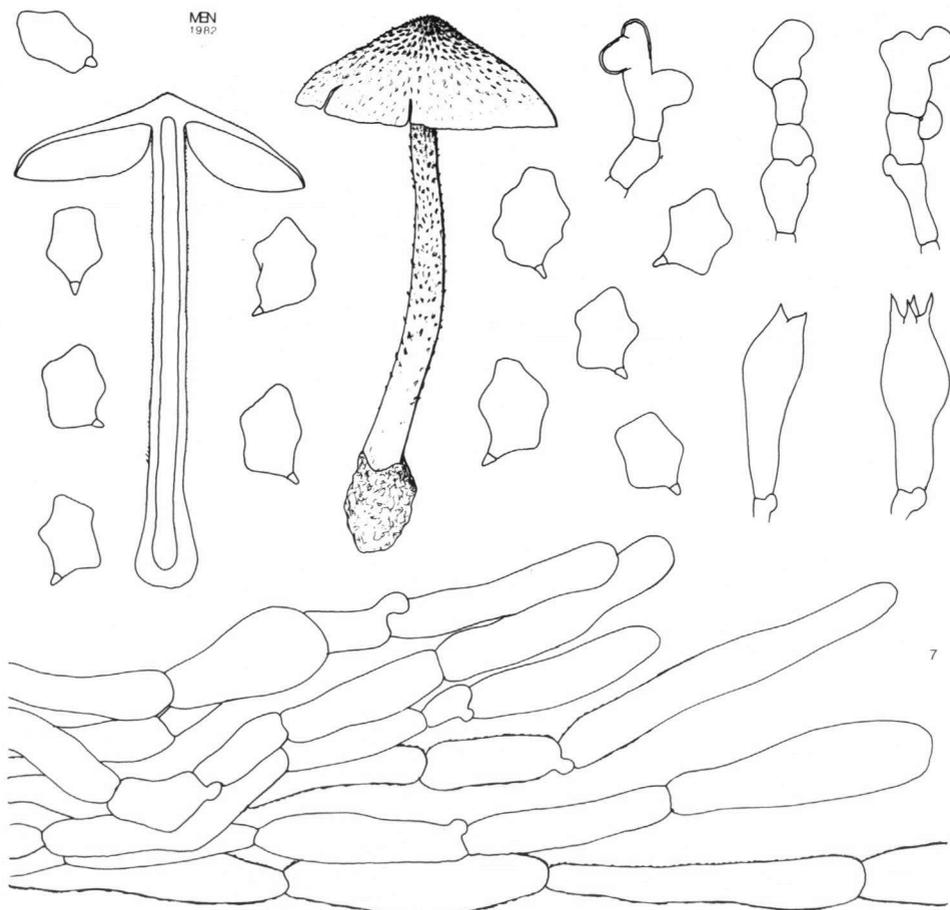


Fig. 7. *Entoloma allochromum*. — Habit, spores, cheilocystidia and pileipellis (all figs from holotype).

rather pronouncedly 6–9-angled in side-view, slightly thick-walled; pigment intracellular, in addition also minutely encrusting some hyphae of pileipellis and pileitrama.

Pileus 28–32 mm broad, about 10–12 mm high, expanded conical with slightly inflexed margin and weak umbo, hardly hygrophanous, translucently striate at margin only, with a slightly lilaceous, fairly dark grey-brown velvety covering broken up into minute granular greyish-brown flocculose warts on rather pale-pinkish-greyish background (covering 7.5 YR 3/2, 4/2, 5/2, background 7.5 YR 6/4 to 10 YR 5/3); lamellae fairly crowded, adnexed to free, moderately broad, (5–6 mm), slightly ventricose, pale brownish-pinkish sordid cream (7.5 YR 8/2 to 7/4) with slightly irregular, concolorous edge; stipe 53–60 × 3.5–4.5 mm, cylindrical with subclavate base, hollow, 7–10 mm broad at base, pale violaceous with dark purple-violaceous fibrillose covering and darker minute-fibrillose squamules, especially in upper half, with sordid white tomentum at base (seg. 689–688, fibrils and squamules 667–666); flesh glassy pale brownish grey in pileus, paler in stipe-apex with pale sordid wax-yellow tinge in stipe-base; smell and taste not distinctive.

Spores $9.3-12.7 \times 7.0-9.3 \mu\text{m}$, 6-9-angled with rather pronounced angles, slightly thick-walled; basidia $34-54 \times 9.5-11.5 \mu\text{m}$, (2-)4-spored, with clamp; cheilocystidia $30-55 \times 5-10 \mu\text{m}$, irregularly cylindrical to coralloid, septate, often slightly thick-walled, with clamp, scattered among basidia; pileipellis a trichoderm of cylindrical or swollen, septate hyphae with up to $40 \mu\text{m}$ wide terminal cells with abundant intracellular pigment, hyphal walls of some hyphae also minutely encrusted; pileitrama regular, made up of cylindrical up to $15 \mu\text{m}$ wide hyphae, occasionally with minute encrustations; stipitepellis a trichoderm made up of septate, cylindrical, $9-18 \mu\text{m}$ wide hyphae with lilaceous-purplish intracellular pigment; clamp-connections abundant in covering layers and in hymenium.

HABITAT & DISTRIBUTION.—Terrestrial in garden; only known from the type-locality.

COLLECTION EXAMINED.—THE NETHERLANDS; prov. Noord Holland, Aerdenhout, 29 Aug. 1973, *E. Kits v. Waveren* (holotype, L).

Entoloma allochromum has strong affinities with *E. tjallingiorum* from which it differs in the purplish violaceous colours in pileus and stipe, and by having rather thick-walled and pronouncedly angled, slightly larger spores. *Entoloma dichroum* has different colours and a glabrous stipe. See also the discussion under *E. dichroum* (p. 463).

9. *Entoloma tjallingiorum* Noordel., *spec. nov.*—Fig. 8

MISAPPLIED NAMES.—*Agaricus dichrous* sensu Fries, *Summa veg. scand.* 2: 287. 1849, *Icon. sel. Hymen.* 1: 105, pl. 92 fig. 3. 1867. — *Entoloma dichroum* sensu Bres., *Icon. mycol.*, pl. 554. 1929; sensu Konrad & Maublanc, *Icon. sel. fung.* pl. 190-2. 1932. — *Rhodophyllus dichrous* sensu J. Lange, *Fl. agar. dan.* 2: 93, pl. 72A. 1936; Romagnesi in *Bull. Soc. mycol. Fr.* 92: 229-301. 1976.

Agaricus placidus sensu Fries, *Icon. sel. Hymen.* 1: 109, pl. 97 fig. 1. 1867.

SELECTED DESCRIPTIONS & ILLUSTRATIONS.—Bres., l.c. — Fries, l.c. — Konrad & Maublanc, l.c. — J. Lange, l.c. — Romagnesi, l.c.

Pileus 20-50 mm latus, conico-convexus, expansus, umbonatus raro umbilicatus, haud hygrophanus, haud striatus; lamellae pallide dein roseae vel brunneo-roseae, interdum coeruleo tinctae; stipes 34-100 2.5-7(-10) mm, coeruleus vel violaceus, atro-coeruleo-fibrilloso-squamulosus; spora $9-11(-11.5) \times 5.8-7.5(-8) \mu\text{m}$, tenuitunicatae paulo angulatae; cheilocystidia sparsa vel abundantia, cylindracea vel irregulariter cylindraceo-flexuosa vel lageniformia; pileipellis trichoderma; pigmentis intracellulosi et leviter incrustantibus; fibulae abundantes; ad terram vel ad lignum putrescentem Quercos.—holotypus: S. Ryman, 4-X-1980, 'Predikstolen' prope Upsaliam, Suecica (UPS).

ETYMOLOGY.—Named in honour of Dr. F. Tjallingii and Mrs. G. Tjallingii-Beukers, honorary members of the Netherlands' Mycological Society, for their invaluable stimulation of amateur mycology in the Netherlands.

CHARACTERISTICS.—Pileus grey-brown, sometimes with blue or blue-violaceous tinge, entirely squamulose; stipe blue or violaceous with blackish-blue fibrillose-squamulose covering; spores thinwalled and weakly angled; pigment intracellular and encrusting.

Pileus 20-50 mm broad, conico-convex or trapezoidal with or without weak umbo or with slightly umbilicate centre, with margin involute when young then more or less straight, not hygrophanus, not striate, dark grey-brown with or without blue patches or blue tinge especially near margin, coarsely radially fibrillose-squamulose or woolly squamulose all over; lamellae subdistant, normally thick or slightly thickish, sometimes transversely veined, segmentiform to ventricose, white then sordid pink, sometimes tinged blue, especially near edge, but edge never distinctly marked; stipe $34-100 \times 2.5-7(-10)$ mm, cylindrical often broadened towards base,



Fig. 8. *Entoloma tjallingiorum*. — Habit, spores, cheilocystidia and pileipellis (a, b, c, h from *Bas* 6502; d, g from *Nathorst-Windahl* 2231; e from holotype; f from *Wölfel*, 15 sept. 1979).

dark blue-grey or indigo at apex, downwards more greyish or violaceous-blue, with blackish-blue fibrillose-squamulose covering, especially in upper part, base sordid white tomentose; flesh beige with violaceous-blue tinge in pileus and cortex of stipe, often more greyish in stipe; smell not distinctive; taste somewhat bitterish.

Spores $9-11(-11.5) \times 5.8-7.5(-8.0) \mu\text{m}$, $Q = 1.2-1.4-1.5$, weakly angled, thinwalled; basidia $27-43 \times 8-12 \mu\text{m}$, 4-spored with clamp; cheilocystidia $20-55 \times 6-13 \mu\text{m}$, versiform, cylindrical to clavate or irregularly cylindrico-flexuose to slenderly lageniform, scattered among basidia, often scarce, with thin, colourless or thickened, brownish walls, especially at apex, occasionally with some bluish or brownish intracellular pigment; pileipellis a trichoderm made up of cylindrical hairs with cylindrical to somewhat swollen terminal cells, $7-24 \mu\text{m}$ wide with

abundant brown intracellular pigment and also frequently some encrusted hyphae; lactiferous hyphae numerous in pileitrama of some collections; clamp-connections numerous in all tissues studied.

HABITAT & DISTRIBUTION.—Terrestrial or on rotten wood (*Quercus*) in deciduous and mixed forest, wide-spread but rare.

COLLECTIONS EXAMINED.—NORWAY: Oppland, Lunner, Søndre Oppdalen, 12 Jun. 1978, *T. E. Brandrud* (O); Akershus, Ski, Finstadskogen, 4 Oct. 1953, *F.-E. Eckblad* (O). — SWEDEN, Småland, Femsjö, 23 Sept. 1940, *T. Nathorst-Windahl 2231* (GB); Uppland, Bondkyrka, Predikstolen, 4 Oct. 1980, *S. Ryman* (Holotype, UPS). — DENMARK, Sjælland, Roskilde, Boserup Skov, 13 Oct. 1955, *M. Lange* (C); Jutland, Oksholm skov near Göl, 15 Oct. 1975, *H. Knudsen* (C). — NETHERLANDS, prov. Noord Holland, 2 Nov. 1974, *C. Bas 6502* (L). — GERMAN FEDERAL REPUBLIC, Bayern, Forchheim, 15 Sept. 1979, *G. Wölfel* (L).

While studying the collections available of *E. tjallingiorum* I found that the lamellae sometimes show a distinct bluish or brownish tinge, especially near the edge. They are never, however, entirely blue. Microscopically this is caused by a combination of intracellular and membranal pigment in the cheilocystidia. Romagnesi (1976: 302) described *Rhodophyllus dichrous* var. *corsicus* for a taxon close to *E. tjallingiorum* with entirely sterile lamellar edge with thick-walled pigmented cheilocystidia. For the moment I do not attach a taxonomic value to this character, at least not on varietal level.

For a discussion on related taxa see p. 463.

10. *Entoloma placidum* (Fr.) Noordel.—Fig. 9

Agaricus placidus Fr., Syst. 1: 202. 1821. — *Leptonia placida* (Fr.) Kumm., Führ. Pilzk.: 96. 1871. — *Rhodophyllus placidus* (Fr.) Quél., Enchr.: 60. 1886. — *Entoloma placidum* (Fr.) Noordel. in *Persoonia* 11: 150. 1981.

EXCLUDED NAME.—*Agaricus placidus* sensu Fries, Icon. sel. Hymen. 1: pl. 97–1. 1867 (= *E. tjallingiorum* Noordel.).

SELECTED DESCRIPTIONS & ILLUSTRATIONS.—J. Lange, Fl. agar. dan. 2, pl. 76B. 1936 (as *R. placidus* var. *gracilis*). — Noordeloos, in *Nord. J. Bot.* 2: 161. 1982. — Krieglsteiner in *Zeitschr. Mykol.* 48: 52. 1982.

CHARACTERISTICS.—Basidiomes collybioid; pileus dark grey-brown entirely squamulose, not striate; lamellae pink; stipe deep blue, glabrous, shiningly innately fibrillose-striate smell farinaceous; on dead trunks of *Fagus sylvatica*.

Pileus 25–30 mm broad, convex then expanded, usually shallowly depressed, with straight margin, not hygrophanous, not striate, entirely minutely squamulose with dark brown squamules on grey background (10 YR 4/2, 3/2, centre 2/2, background 6/2,5/2); lamellae L=20–30, l=3–7, broadly adnate, sometimes slightly emarginate or with small decurrent tooth, segmentiform, pink; stipe 45–55 × 2–3 mm, cylindrical, slightly broadened towards base, often slightly rooting, dark indigo or bluish grey, apex minutely pruinose, downwards glabrous, innately fibrillose striate lengthwise, shining, base white tomentose; flesh in cortex concolorous with surface; smell distinctly farinaceous when crushed.

Spores 8–11(–11.5) × 5.8–7.6 μm, Q=1.2–1.35–1.6, 6–8-angled with dihedral base; basidia 23–46 × 7–16 μm, 4-spored; cheilocystidia none; hymenophoral trama regular, made up of 6–22 μm wide, cylindrical hyphae; pileipellis a trichoderm made up of 7–17 μm wide cylindrical hyphae, some with swollen terminal cell, with abundant intracellular pigment, subpellis usually well-developed, made up of inflated cells, 65–120 × 11–22 μm; clamp-connections frequent in hymenium and covering layers.

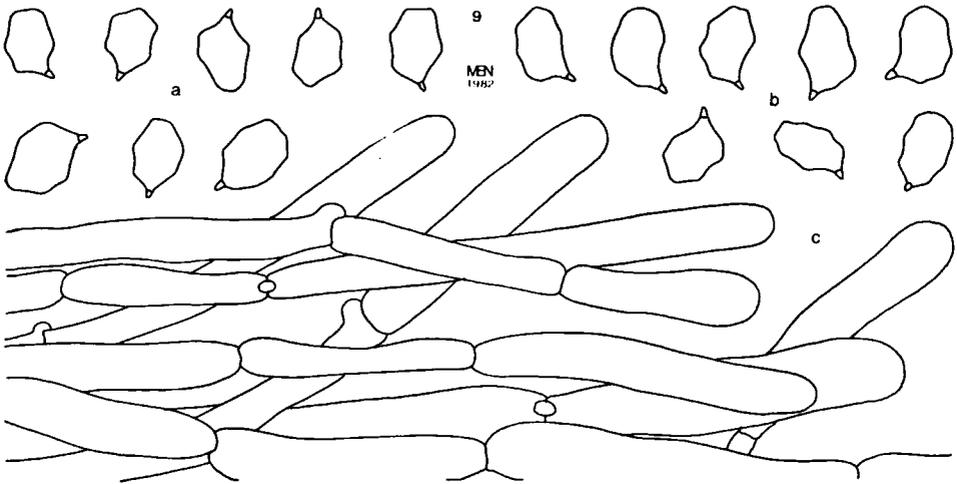


Fig. 9. *Entoloma placidum*. — Spores and pileipellis (a, c from *Einhellinger*, 15 aug. 1978; b from *Hansen*, 16 sept. 1980).

HABITAT.—On and around rotten trunks of *Fagus sylvatica*, rare but wide-spread.

COLLECTIONS EXAMINED.—DENMARK, Isl. Falster, Corzelitze Skov, 7 km. E. of Nykøbing, 16 Sept. 1980, *Lise Hansen* (L). — GERMAN FEDERAL REPUBLIC, Bayern, Schwäbische Alb bei Harburg N. of Donauwörth, 15 Aug. 1978, *A. Einhellinger* (M); Württemberg, S. of Weilheim, 28 Aug. 1981, *Krieglsteiner 206/81* (Herb. Krieglsteiner et filii).

The dark grey-brown squamulose pileus, glabrous, blue stipe, farinaceous smell and habitat are distinctive for *Entoloma placidum*. *Entoloma lampropus* is closely related, but differs in having slightly different colours, a different pigmentation pattern in the pileipellis, and in the lack of a farinaceous smell and habitat. *E. tjallingiorum* and *E. allochroum* differ among other things in having a flocculose scaly stipe-surface and differently shaped spores.

In another publication (Noordeloos, 1982: 160, fig. 14) I erroneously depicted cheilocystidia for *E. placidum*, which are not mentioned in the text, however. After reexamination of the collection from Denmark, I came to the conclusion that I confused basidioles with real cystidia.

11. *Entoloma lampropus* (Fr.) Hesl.—Fig. 10

Agaricus lampropus Fr., Syst. 1: 203. 1821. — *Leptonia lampropus* (Fr.) Quél. in Mém. Soc. Emul. Montbéliard, sér. II, 5: 121. 1872. — *Rhodophyllus lampropus* (Fr.) Quél., Enchir.: 60. 1886. — *Entoloma lampropus* (Fr.) Hesl. in Beih. Növa Hedwigia 23: 154. 1967.

EXCLUDED NAMES.—*Rhodophyllus lampropus* sensu J. Lange, Fl. agar. dan. 2, pl. 76C. 1936 [= *E. corvinum* (Kühn) Noordel.].

Leptonia lampropus sensu Bres., Icon. Mycol. XII, pl. 570-1. 1929; P. D. Orton in Trans. Br. mycol. Soc 43, suppl.: 105. 1960 [= *E. sodale* (Kühn.) Noordel.].

CHARACTERISTICS.—Basidiomes small to medium-sized; pileus (blackish-)brown; stipe blue, fibrillose striate; pigment intracellular and encrusting; in grassland.

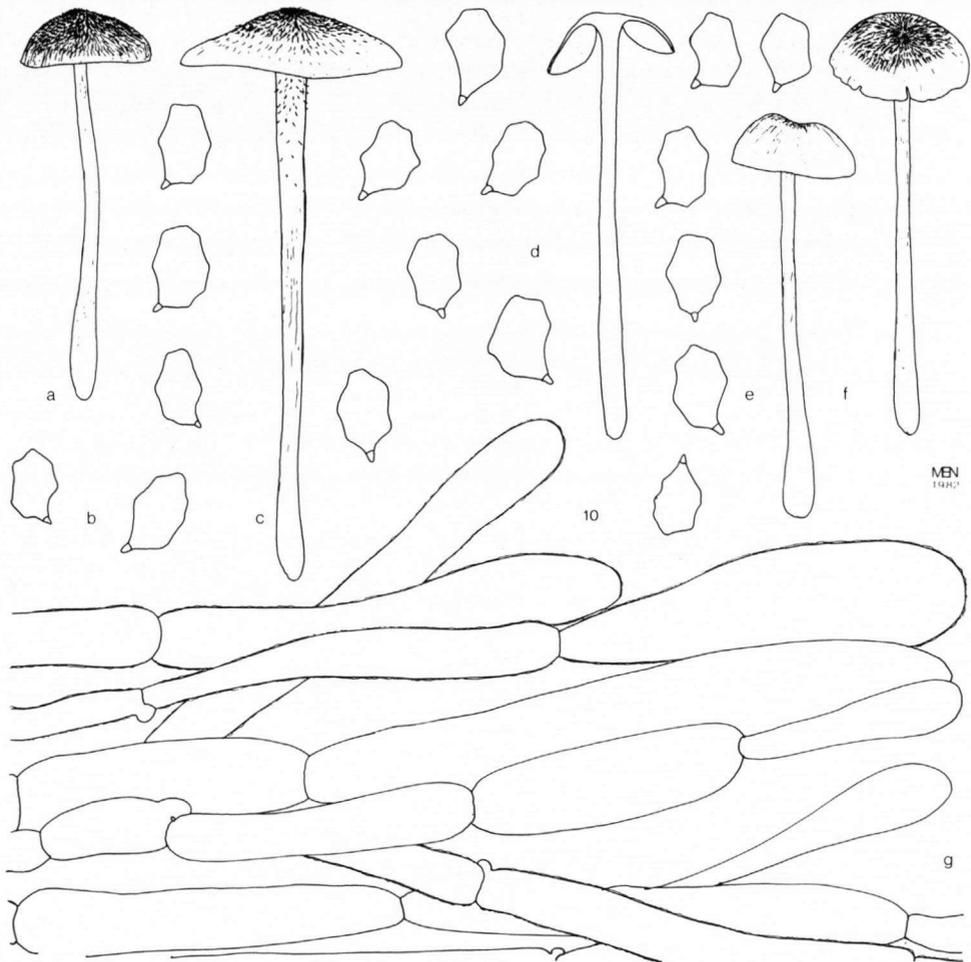


Fig. 10. *Entoloma lampropus*. — Habit, spores, cheilocystidia and pileipellis (a, d from J. J. Barkman 10386; c from J. J. Barkman 10036; b, g from A. K. Masselink, 10 nov. 1975; e, f from H. Marxmüller 79124).

Pileus 10–27 mm broad, hemispherical then expanding, usually not distinctly depressed or umbilicate, not hygrophanous, not striate with (strongly) involute margin when young, dark brown to blackish (eg. Expo F21, E62, F61, F90) darker, almost blackish at centre, paler towards margin (D42), entirely radially squamulose with small, uplifted squamules, most dense at centre; lamellae moderately distant, narrowly adnate, deeply emarginate, sometimes with decurrent tooth, narrowly ventricose, white then pale greyish or brownish pink with concolorous, smooth edge; stipe 50–60 × 1–3.5 mm, cylindrical usually broadened towards base, sometimes also broadened towards apex, adpressedly fibrillose striate with dark blue fibrils on steelblue background, apex white or blue flocculose, downwards smooth, base densely white tomentose; smell not distinctive; taste none or slightly bitter.

Spores 8.4–11.5 × 6–8.3 μm , $Q = 1.2\text{--}1.4\text{--}1.6(-1.7)$, irregularly 6–9-angled in side-view with dihedral base; basidia 23–45 × 7.5–12 μm , 4-spored with clamp; cheilocystidia absent;

hymenophoral trama regular, made up of cylindrical elements; pileipellis a trichoderm made up of cylindrical hairs, 8–25 μm wide, septate, with abundant intracellular pigment and in addition more or less distinctly encrusted walls; clamp-connections frequent in hymenium and covering layers.

HABITAT & DISTRIBUTION.—In grassland and *Juniperus communis* vegetations, and open places in forests, rare, wide-spread.

COLLECTIONS EXAMINED.—S W E D E N, Skåne, Röstange Anderstorp, 10 Oct. 1975, *A. K. Masselink* (WBS); Hallnadsåsen, Hulrugerud, 6 Oct. 1975, *A. K. Masselink* (WBS).—D E N M A R K, Jutland, near Kalundborg, 4 Oct. 1975, *J. J. Barkman 10036* (WBS), Silkeborg, Glery Vissingkloster, 25 Oct. 1975, *J. J. Barkman 10386* (WBS). — G R E A T B R I T A I N, Scotland, Invernesshire, Rothiemurchus forest reserve, 22 Aug. 1960, *P. D. Orton 2300* (E). — F R A N C E, Valenciennes, F. de Mormal, 7 Sept. 1979. *H. Marxmüller 79124* (L).

Fries (1821: 203) described *Agaricus lampropus* in stirps *Leptonia*, close to *A. placidus* with the following characteristics: 'pileo demum umbilicate fibrillosos-griseo, lamellis adnatis albido-griseus, stipite coeruleo' thus a species with grey pileus and blue stipe. This species has been variously interpreted. The most important are those of J. Lange (1936, pl. 76C); Bresadola (1929, pl. 570–1) and Kühn. & Romagn. (1953: 208). I agree with P. D. Orton (1960: 105) that Lange's interpretation must be rejected, as it represents a *Leptonia* with blue pileus. The other two interpretations both agree more or less satisfactorily with the protologue, but they are definitively different from each other. I decided to follow Kühn & Romagnesi in their interpretation of *Agaricus lampropus* Fr., being a species with relatively dark pileus, greyish lamellae and a strong resemblance, also microscopically, with *E. placidum*. To my opinion this interpretation comes closer to the original than that of Bresadola, which is the same as Orton's species. The latter, with the correct name *E. sodale* (Kühn. & Romagn.) Noordel. is a clampless species with large inflated cheilocystidia, and belongs to sect. *Cyanula* close to *E. asprellum*.

Entoloma lampropus differs from *E. placidum* in pigmentation patterns, habitat, slightly different colours and lack of a farinaceous smell.

APPENDIX

While preparing keys to the Nordic Macromycete Flora, which will be published towards the end of 1982, and keys to sect. *Cyanula* in Europe, the following new combinations appeared to be necessary:

Entoloma caesiocinctum (Kühn.) Noordeloos, *comb. nov.*—basionym: *Rhodophyllus caesiocinctus* Kühn in Rev. mycol. 19: 4. 1954.

Entoloma catalaunicum (Sing.) Noordeloos, *comb. nov.*—basionym: *Leptonia catalaunica* Sing. in Annls mycol. 34: 428. 1936.

Entoloma caeruleum (P. D. Orton) Noordeloos, *comb. nov.*—basionym: *Leptonia caerulea* P. D. Orton in Trans. Br. mycol. Soc. 43: 290. 1960.

Entoloma cyaneoviridescens (P. D. Orton) Noordeloos, *comb. nov.*—basionym: *Leptonia cyaneoviridescens* P. D. Orton in Trans. Br. mycol. Soc. 43: 292. 1960.

Entoloma ianthinum (Romagn. & Favre) Noordeloos, *comb. nov.*—basionym: *Rhodophyllus ianthinus* Romagn. & Favre in Rev. Mycol. 3: 76. 1938.

Entoloma lepiotosmus (Romagn.) Noordeloos, *comb. nov.*—basionym: *Rhodophyllus lepiotosmus* Romagn. in Rev. mycol. 19: 5. 1954.

Entoloma nigroviolaceum (P. D. Orton) Noordeloos, *comb. nov.*— basionym: *Leptonia nigroviolacea* P. D. Orton in *Trans. Br. mycol. Soc.* **43**: 296. 1960.

Entoloma querquedula (Romagn.) Noordeloos, *comb. nov.*—basionym: *Rhodophyllus querquedula* Romagn. in *Rev. mycol.* **19**: 8. 1954.

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