

## STUDIES IN ENTOLOMA—10–13

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Some nomenclatural corrections are given as a consequence of the 1983-edition of the International Code of Botanical Nomenclature. The new combinations *Entoloma* sect. *Candida* (Romagn.) Noordel. and *E.* subgen. *Pouzarella* (Mazz.) Noordel. are made. Two new species are described in sect. *Griseorubida*, viz. *Entoloma griseorubidum* and *E. calaminare*. The new combination *E. indutoides* (P. D. Orton) Noordel. is made. Section *Cyanula* is emended to include all species of subgen. *Leptonia* with blue, brown, yellow, pink, and green colours. Several new taxa are described, viz. *Entoloma chalybaeum* f. *bisporigerum*, *E. lividocyanulum*, *E. huijsmanii*, *E. viaregale*, *E. pseudoturci*, *E. porphyrofibrillum*, and *E. scabropelle*. The new combinations *E. chalybaeum* var. *lazulinum* (Fr.) Noordel., *E. cyanulum* (Lasch) Noordel., and *E. cruentatum* (Quél.) Noordel. are made. On account of some recent collections from Denmark and Scotland a new species in sect. *Polita*, viz. *E. caeruleopolitum* Noordel. & Brandt-Pedersen, is described.

These studies in *Entoloma* are the result of continued monographic research in the genus *Entoloma*, mainly of subgenus *Leptonia*. A critical monograph of all European species of *Leptonia* will be published in future. Some critical and new taxa are presented here as a precursor of the Flora agaricina neerlandica, Part 1, which will contain the Entolomataceae.

The presentation of the text, including the abbreviations used, and the terminology are the same as in other publications on *Entoloma* by the author (Noordeloos, 1979, 1980, 1981 a, b, 1982). The magnifications in the text-figures are as follows: habit  $\times 1$ , spores  $\times 2000$ , basidia and cystidia  $\times 1000$ , pileipellis  $\times 500$ .

## ACKNOWLEDGEMENTS

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#### 10. ON SOME NOMENCLATORIAL CONSEQUENCES OF THE 'SYDNEY CODE'

In my paper on the infrageneric taxonomy of the genus *Entoloma* (Noordeloos, 1981a) I applied the autonymia-principle of the International Code of Botanical Nomenclature (ICBN) Art. 22 not only on the infrageneric taxa including the type-species of the genus, but also on the sections including the type-species of other subgenera. This is not in accordance with the latest version of the ICBN (Voss & al., 1983), and the following correction is necessary.

##### *Entoloma* sect. *Candida* (Romagn.) Noordel., *comb. nov.*

*Rhodophyllus* sect. *Candidi* Romagn. in Bull. mens. Soc. linn. Lyon 43: 327. 1974 (basionym). — Holotype: *R. sericellus* (Fr.: Fr.) Quéf.

*Entoloma* sect. *Albopletonia* sensu Noordel. in Persoonia 11: 146. 1981.

According to the ICBN, Art. 10.1, the type of a genus is the same as the type of the name of the type-species. Consequently the genus *Pouzaromyces* Pilát is typified by the type of the name *Agaricus fumosellus* Wint., and not by *Pouzaromyces fumosellus* (Wint.) Pilát sensu Pilát (= *Entoloma strigosissimum*). As it is almost certain that *Agaricus fumosellus* does not represent a species of *Entoloma* (Mazzer, 1976; Noordeloos, 1979) the name *Pouzaromyces* cannot be used to accommodate the group of species typified by *Entoloma strigosissimum*. For that reason I accept the name *Pouzarella* Mazz. for that group of species, but on the level of subgenus in the genus *Entoloma*.

*Entoloma* subgen. *Pouzarella* (Mazz.) Noordel., *comb. & stat. nov.* *Pouzarella* Mazz. in Bibliotheca mycol. 46: 69. 1976 (basionym). — Holotype: *E. nodosporum* (Atk.) Noordel.

Misapplied names.—*Entoloma* subgen. *Pouzaromyces* sensu Moser in Gams, Kl. Kryptog.-Fl., 4. Aufl., 2(b/2): 191. 1978; sensu Noordel. in Persoonia 10: 209. 1979; *Rhodophyllus* subgen. *Pouzaromyces* sensu Romagn. in Beih. Nova Hedwigia 59: 50. 1978 (prepublication) [based on *Pouzaromyces fumosellus* (Wint.) Pilát sensu Pilát, non Wint.].

#### 11. ON TWO NEW SPECIES IN SECT. GRISEORUBIDA

##### *Entoloma griseorubidum* (Kühn. ex) Noordel., *spec. nov.* — Fig. 1

*Rhodophyllus griseorubidus* Kühn. in Kühn. & Romagn., Fl. anal. Champ. sup.: 210. 1953 (nom. nud.).

Misapplied name.—*Eccilia griseorubella* (Lasch: Fr.) sensu Konr. & Maubl., Ic. sel. Fung., pl. 185-1. 1928; non Lasch nec Bres., J. Lange.

Pileus 20–32 mm latus, umbilicatus, haud vel paulisper hygrophanus, haud vel paulisper translucido-striatus, griseobrunneus, radialiter fibrillosus, centro subsquamuloso, lamellae adnatae-sub-

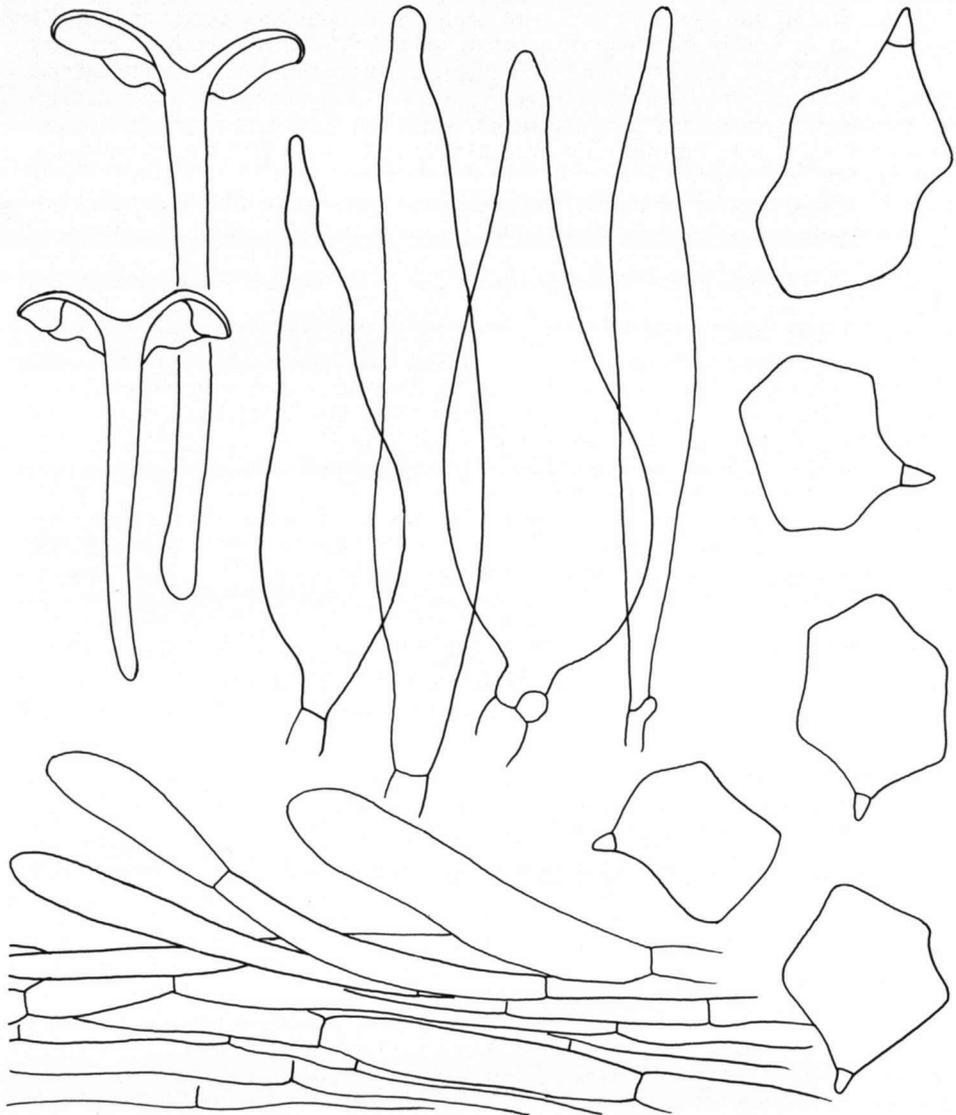


Fig. 1. *Entoloma griseorubidum*. — Habit, spores, cheilocystidia, and pileipellis (habit from *J. Trimbach*, 1982; all other figs from holotype).

decurrentes, albae demum roseae; stipes pileo concolor vel pallidior, striatus; odore saporeque nullis; sporae  $10-14 \times 8-11.3 \mu\text{m}$ , subisodiametricae; cheilocystidia numerosa,  $35-140 \times 7.5-23 \times 3.5-6 \mu\text{m}$ , lageniformia; pileipellis cutis transiens ad trichodermam elementis inflatis,  $10-25 \mu\text{m}$  latis pigmentis intracellulosis; fibulae ad basim basidiorum frequentes; in silvis. — Holotypus: *H. S. C. Huijzman*, 10-VII-1965, 'Neuchâtel, Marin, Switzerland' (L).

Pileus 20–32 mm broad, convex with depressed to umbilicate centre and involute margin, not or weakly hygrophanous, not or only slightly translucently striate, grey-brown (10 YR 3/2–4/3, EXPO E62–63), innately radially fibrillose, centre felted-granulose to subsquamulose. Lamellae, L = 18–36, l = 1–3, moderately distant, adnate-subdecurrent, segmentiform then ventricose, white then pink with fimbriate, concolorous edge which may turn brownish with age. Stipe 40–60 × 2–5 mm, cylindrical or slightly attenuated towards base, straight or slightly curved, concolorous with or slightly paler than pileus, apex somewhat scurfy-fibrillose, downwards fibrillose-striate, base white-tomentose. Flesh concolorous in cortex, inner part whitish. Smell and taste none.

Spores 9.9–14 × 8–11.3  $\mu$ m (averages 11.5–11.9 × 9.1–9.8  $\mu$ m), Q = 1.2–1.3, irregularly 5–9-angled in side-view, sometimes almost rectangular in outline with base difficult to interpret, not distinctly dihedral. Basidia 27–55 × 8.6–14  $\mu$ m, 4-spored, clamped. Cheilocystidia 35–110 × 7.5–23 × 3.5–6  $\mu$ m, lageniform, sometimes with more or less pointed apex, numerous, but mixed with basidia. Hymenophoral trama regular, made up of narrow cylindrical hyphae. Pileipellis a cutis with transitions to a trichoderm, made up of inflated cells, 10–25  $\mu$ m wide. Brilliant granules present or not in pileitrama. Clamp-connections abundant in hymenium.

**Habitat.**—In deciduous or mixed coniferous-deciduous forest.

**Collections examined.**—NETHERLANDS, prov. Groningen, 7 Jan. 1960, *G. Douwes*. — DENMARK, Amager isl. near Copenhagen, 7 July 1982, *Erik Rald* (C). — SWITZERLAND, NEUCHÂTEL, Marin, 10 July 1965, *H. S. C. Huysman* (holotype). — AUSTRIA, Tirol, Wörgl (Inntal), 7 Sept. 1982, *J. Trimbach*.

The collections described above agree perfectly well with *Eccilia griseorubella* as depicted by Konrad & Maublanc (l.c.) and also with the short diagnosis of Kühner in Kühner & Romagnesi (1953). I fully agree with Kühner that the fungus of Konrad & Maublanc does not agree with the original diagnosis of *Agaricus griseorubellus* Lasch and therefore deserves to be described as a new species. For comments on the name *Agaricus griseorubellus* see the discussion under *Entoloma huijsmanii*.

*Entoloma indutoides*<sup>1</sup> comes close to *E. griseorubidum* but differs in having dirty olivaceous tinges in pileus and stipe, and narrower spores.

### *Entoloma calaminare* Noordel., *spec. nov.* — Fig. 2

Pileus 17–18 mm latus conico-convexus vel truncatus, centro leviter depresso, haud hygrophanus, haud striatus, pallide griseo-ochraceus, valde radialiter fibrillosus; lamellae L = 18–20, l = 1–3, adnatae cum denticulo decurrento, pallide griseae demum roseo-griseae; stipes 25–50 × 1–2.3 mm, cylindraceus, pallide brunneus griseo tinctus, glabrus; odore saporeque nullis. Sporae 9.9–13.9 × 6.8–9  $\mu$ m, noduloso-angulatae; cheilocystidia 27–58 × 16–29  $\mu$ m, late ventricosa vel lageniformia; pileipellis cutis; pigmentis intracellulosis; fibulae presentes. Ad radicis graminosis in pascuis ad terram argillaceam calaminariam. — Holotypus: *M. E. Noordeloos* 729, 21-IX-1978, 'Cottessen, along river Geul, prov. Limburg, the Netherlands' (L).

Pileus 17–18 mm broad, conico-convex, truncate with slightly depressed centre, with straight margin, not hygrophanous, not striate, pale greyish-ochraceous, strongly radially

<sup>1</sup>*Entoloma indutoides* (P. D. Orton) Noordel., *comb. nov.* — *Leptonia indutoides* P. D. Orton in Trans. Br. mycol. Soc. 43: 295. 1960 (basionym).

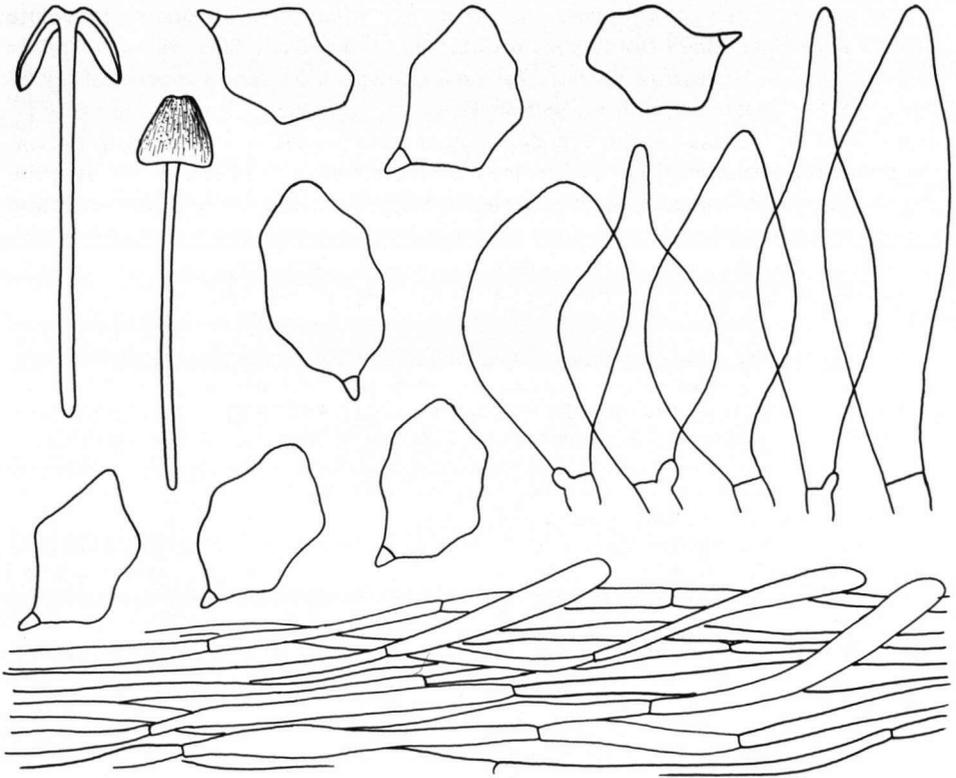


Fig. 2. *Entoloma calaminare*. — Habit, spores, cheilocystidia, and pileipellis (all figs from holotype).

fibrillose, reminiscent of a species of *Inocybe*, shining. Lamellae  $L = 18-20$ ,  $l = 1-3$ , adnate-emarginate with small decurrent tooth, triangular then ventricose, grey then grey-pink (10 YR 7/3–7/2 then 7.5 YR 8/4–7/2) with entire, concolorous edge. Stipe  $25-50 \times 1-2$  mm, cylindrical or slightly broadened at base, pale brown with slight grey tinge (10 YR 8/3–8/2), smooth, dull, base white tomentose. Flesh concolorous with surface, in stipe very brittle. Smell and taste none.

Spores  $9.9-13.9 \times 6.8-9 \mu\text{m}$  (averages  $10.9 \times 7 \mu\text{m}$ ),  $Q = 1.2-1.4-1.6$ , irregularly nodulose-angular with dihedral base. Basidia  $27-43 \times 10.5-14 \mu\text{m}$ , 4-spored, clamped. Cheilocystidia  $27-58 \times 16-29 \mu\text{m}$ , broadly ventricose-rostrate to lageniform, numerous. Hymenophoral trama regular, made up of narrow, cylindrical hyphae up to  $16 \mu\text{m}$  wide. Pileipellis a cutis with scattered trichodermal bundles of clavate cells up to  $12(-15) \mu\text{m}$  wide. Pigment intracellular, brown, most abundant in terminal cells of pileipellis, elsewhere very pale if present. Brilliant granules absent. Clamp-connections present in hymenium.

**Habitat.**—On grass-roots in grassland along river on clayey soil rich in zinc.

**Collection examined.**—NETHERLANDS, prov. Limburg, Cottesen along river Geul, 21 Sept. 1978, M. E. Noordeloos 729 (holotype, L).

On account of the conical pileus and the smooth stipe *Entoloma calaminare* comes close to *Entoloma cocles* from which it differs in having much paler colours of pileus and stipe, and in the narrow spores. *Entoloma calaminare* has also a superficial resemblance to *Entoloma* species from section *Versatilia*, from which it differs in many respects, however, such as covering of stipe, abundant clamp-connections and pigmentation. *Entoloma canosericeum* differs in having encrusted pigments in pileipellis and hymenophoral trama, dark coloured pileus and stipe and slightly smaller, more broadly ellipsoid spores.

## 12. ON SOME CRITICAL TAXA IN SECTION CYANULA

### *Entoloma* (subg. *Leptonia*) sect. *Cyanula* (Romagn.) Noordel. emend.

*Entoloma* sect. *Cyanula* (Romagn.) Noordel. in *Persoonia* 11: 452. 1982. — *Rhodophyllus* sect. *Cyanuli* Romagn. in *Bull. mens. Soc. linn. Lyon* 43: 328. 1974. — Holotype: *R. serrulatus* (Fr.: Fr.) Quéf.

*Leptonia* sect. *Chalybaeae* Konr. & Maubl., *Agaricales*: 261. 1948. — Lectotype (design. mihi): *L. lazulina* (F.) Quéf. (nom. nud., no lat. diagn.).

*Rhodophyllus* sect. *Fragiles* Romagn. in *Bull. mens. Soc. linn. Lyon* 43: 329. 1974. — Holotype: *R. euchlorus* (Fr.) Quéf.

*Rhodophyllus* sect. *Rufocarnei* Romagn., l.c.: 329. 1974. — Holotype: *R. rufocarneus* (Berk. & Br.) Romagn.

*Rhodophyllus* sect. *Fuliginosi* Romagn., l.c.: 329. 1974. — Holotype: *R. sarcitulus* Kühn. & Romagn.

*Leptonia* sect. *Roseicaules* Largent in *Mycologia* 66: 1013. 1974. — Holotype: *L. rosea* Longyear.

*Leptonia* sect. *Albidicaules* Largent., l.c.: 1012. — Holotype: *L. albinella* Peck.

*Leptonia* sect. *Viridicaules* Largent, l.c.: 1013. 1974. — Holotype: *L. incana* (Fr.) Gill.

*Leptonia* sect. *Cereicaules* Largent, l.c.: 1014. 1974. — Holotype: *L. longistriata* Peck.

*Leptonia* sect. *Chromocystotae* Largent in *Bibliotheca mycol.* 55: 130. 1977. — Holotype: *L. serrulata* (Fr.) Kumm.

Misapplied name. — *Leptonia* sect. *Paludocybe* Largent sensu Largent in *Mycologia* 66: 1013. 1974 [based on *L. lampropus* sensu P. D. Orton; non Fr.].

In the recent monographs of *Leptonia* (Largent, 1977) and *Rhodophyllus* (Romagnesi & Gilles, 1979) the species in subgenus *Leptonia* are arranged in sections mainly according to their colour. This resulted in a series of sections which appear rather 'unnatural' to me. I am convinced that for example the presence or absence of blue pigments does not justify a separation at sectional level, as presence or absence of these pigments is found in rather closely related species, like the *serrulatum*-group or the group of *Entoloma griseocyanum*. I am inclined to consider of greater importance the structure of lamella-edge which can be fertile in many species, or made up of a thick strand of parallel hyphae which bear cystidia in dense fascicules, like in *Entoloma serrulatum*. I definitely feel more comfortable in accommodating all clampless species of subgenus *Leptonia* in one large section, accepting differences in colour as an important feature to distinguish species, but not to distinguish higher taxa. Also a coloured lamella-edge, caused by pigmented cheilocystidia, used by Largent, l.c. to distinguish sect. *Chromocystotae* is

not accepted. Many species have pigmented cheilocystidia or not, sometimes even in one population (mycelium), and I do not consider this character as one of high taxonomic value. For all these reasons I have emended sect. *Cyanula* to include all species concerned. For a more detailed account of the characters used to distinguish taxa in subgenus *Leptonia* reference is made to a future monographic treatment of the subgenus by the author.

### 12.1. On the species in the group of *Entoloma chalybaeum*

The species in the group of *Entoloma chalybaeum* can be characterised by the following combination of characters: pileus some shade of blue, violaceous-blue or blackish blue, lamellae blue when young with concolorous or brown, never blue-black and serrulate edge; stipe blue with same colour of the pileus or paler, smooth, except for the pruinose apex in some taxa, and the basal mycelium.

In northwestern Europe three species were known in literature, viz. *E. chalybaeum* with non-translucent, entirely woolly squamulose pileus, *E. lazulinum* with a smoother, translucently striate pileus, and *E. cyaneoviridescens*, with in addition to the blue colours also sulphur-green tinges in the basidiocarp.

My studies of numerous collections from various parts of Europe resulted in the recognition of at least five taxa in this group, which can be distinguished as follows.

1. Lamella edge fertile, cheilocystidia absent . . . . . 2
2. Pileus and stipe, sometimes also lamellae with distinct sulphur-yellow tinges, basal mycelium of stipe sulphur-yellow . . . . . *E. cyaneoviridescens*
2. Pileus and lamellae bright blue without sulphur-yellow tinges, stipe blue often fading to greenish blue with age, basal mycelium white then bright ochraceous orange or reddish yellow  
*E. cruentatum*
1. Lamella edge entirely sterile with cylindrico-clavate cheilocystidia, which often have brown intracellular pigment . . . . . 3
3. Pileus distinctly translucently striate when moist, at least up to half the radius, (sub-)squamulose in central part only . . . . . 4
4. Basidia in majority 4-spored . . . . . *Entoloma chalybaeum* var. *lazulinum* f. *lazulinum*
4. Basidia in majority 2-spored . . . . . *Entoloma chalybaeum* var. *lazulinum* f. *bisporigerum*
3. Pileus not translucently striate when moist, entirely woolly-squamulose  
*Entoloma chalybaeum* var. *chalybaeum*

#### *Entoloma cruentatum* (Quél.) Noordel., *comb. nov.* — Fig. 3

*Nolanea coelestina* var. *cruentata* Quél. in C.r. Ass. fr. Av. Sci. (Grenoble, 1885): 446. 1886 (Champ. Jura & Vosges, suppl. 14) (basionym). — *Rhodophyllus coelestinus* var. *cruentatus* (Quél.) Quél., Enchir. Fung.: 65. 1886. — *Nolanea cruentata* (Quél.) Sacc. Syll. Fung. 5: 727. 1887.

Selected icones.— Quél. in C.r. Ass. fr. Av. Sci. (Grenoble, 1885) pl. 12, fig. 4. 1886 (Champ. Jura Vosges 14).

Pileus 5–30 mm broad, campanulate-conical then expanding finally flattened, almost always with minute but pronounced papilla, rarely papilla within slight central depression, with slightly involute margin when young, not hygrophanous, when moist distinctly translucently striate at least up to half the radius, dark indigo-blue or violaceous grey-



Fig. 3. *Entoloma cruentatum*. — Habit, spores, and pileipellis (Habit from Noordeloos 8350 and 8351 (\*), spores from Noordeloos 8350, pileipellis from Noordeloos 8351).

Fig. 4. *Entoloma cyaneoviridescens*. — Spores (from holotype).

blue at centre and on striae (Meth. 16F3, 18F4, 20F3–F5), slightly paler between the striae and at margin (Meth. 19E3, D4, C1 or Muns. 7.5 YR 5/2) minutely granulose all over when young, in mature specimens minutely granulose-squamulose at centre only, smooth or radially fibrillose-irgiate towards margin. Lamellae, L = 20–30, l = 1–3–5, adnate-decurrent to deeply emarginate, narrowly to broadly ventricose, blue grey then

with pink tinge, with concolorous, entire edge, sometimes veined on sides. Stipe 15–50 × 1–3 mm, cylindrical or flattened, sometimes distinctly broadened towards base, concolorous with or slightly paler than pileus, with age basal part often turning greenish, basal tomentum yellow-ochraceous to bright orange. Flesh concolorous with surface, in fleshy specimens with pale inner parts. Smell and taste inconspicuous.

Spores 8.1–10.8(–11.5) × 6.3–8.1 μm (averages 9.3–10.0 × 7.0–7.7 μm), Q = 1.15–1.3–1.4–1.5, 5–6–7-angled in side-view with distinct dihedral base. Basidia 27–54 × 7–12.5 μm, 4-spored, clampless. Lamelle edge fertile. Cystidia absent. Hymenophoral trama regular, made up of cylindrical hyphae up to 16 μm wide. Pileipellis a cutis at margin, gradually passing into a trichoderm towards centre, made up of cylindrical to inflated hyphae, 7–17 μm wide, at centre almost hymenidermal, made up of clavate cells 30–70 × 12–20 μm. Pigment blue, intracellular in pileipellis and upper pileitrama. Vascular hyphae present and often abundant in pileitrama. Brilliant granules abundant in pileitrama. Clamp-connections absent.

**Habitat & distribution.**—In mossy grassland on acid soil. So far known from two different places in Scotland and from the Jura (France).

**Collections examined.**—GREAT BRITAIN, Scotland, Inverness-shire, Fort William, Glen Nevis, near Glen Nevis Youth Hostel, 18 Sept. 1983, *M. E. Noordeloos 8350, 8351*, idem 20 Sept. 1983, *M. E. Noordeloos 8353*; Perthshire, Blair Atholl, Struan Birchwood, 22 Sept. 1983, *M. E. Noordeloos 8371*.

Quélet (1886) described *Entoloma cruentatum* as a variety of *Nolanea coelestina*, because of the resemblance with regard to conical, papillate pileus and the blue colour of the entire basidiocarp. According to Quélet, one of the striking differences with *Nolanea coelestina* is the stipe-base which turns red on bruising (*cruentata* means smeared with blood). When I visited Scotland during the jubilee-foray of the Dutch Mycological Society, I found a very attractive species of *Leptonia*, close to *E. chalybaeum*, with a striking orange-red stipe-base when handled (sometimes the reddish pigment stained my fingers). It could easily be identified with Quélet's description, and especially the coloured plate of *Nolanea coelestina* var. *cruentata*. The Scottish fungus differs clearly from *Entoloma coelestinum* in my concept (Noordeloos, 1982), and I consider Quélet's taxon as a good species, closely related to *E. chalybaeum* and *E. cyaneoviridescens*.

*Entoloma cruentatum* differs from *Entoloma chalybaeum* in the absence of cheilocystidia, the papillate pileus, the slightly smaller spores, and the reddish stipe-base. *Entoloma cyaneoviridescens* comes very close to *E. cruentatum* in microscopical characters, but it clearly differs in having sulphur-yellow or sulphur-green colours in the basidiocarp. Thanks to the courtesy of Mr. P. D. Orton I was able to study his water-colour paintings of *Leptonia cyaneoviridescens*, and I am convinced Orton's species is a species in its own right.

*Entoloma cyanulum*<sup>2</sup> has about the same colour as *E. cruentatum*, but differs in having white then pale pink lamellae, white basal tomentum of the stipe, and much larger spores.

The reddish colour of the stipe-base, especially when handled, is found in two other species of sect. *Cyanula* in Europe, viz.: *Entoloma pyrospilum* and *E. turci*. *Entoloma*

<sup>2</sup>*Entoloma cyanulum* (Lasch) Noordel., *comb. nov.* — *Agaricus cyanulus* Lasch in *Linnaea* 4: 540. 1829 (basionym).

*pyrospilum* differs in having a depressed, pale brownish-glaucous pileus, similarly coloured stipe, and a sterile lamella edge. *Entoloma turci* is a dark brown species without any trace of blue with much larger spores and a sterile lamella edge. Also two species from North America have a red stipe-base, viz. *Leptonia inversa* Largent with a purplish black squamulose pileus, and *L. nigra* (Murr.) Murr. with a non-striate, entirely tomentose-scaly pileus, and a fibrillose-rimose stipe-surface.

*Entoloma cyaneoviridescens* (P. D. Orton) Noordel. — Fig. 4

*Leptonia cyaneoviridescens* P. D. Orton in Trans. Br. mycol. Soc. 43: 292. 1960. — *Entoloma cyaneoviridescens* (P. D. Orton) Noordel. in Persoonia 11: 470. 1982.

Pileus 8–17 mm broad, convex, then expanded, slightly umbilicate, deep ultramarine blue-black and tinged bright sulphur-greenish from centre out, margin sometimes tinged blue-violaceous, entirely minutely silky-tomentose at first, then minutely tomentose-scaly under lens (scales at centre denser and larger), sometimes appearing radially striate at margin from denser scales in radial streaks, translucently striate when moist, margin sometimes lacerate. Lamellae adnate, sometimes emarginate or with tooth, pale ultramarine-blue then glaucous-bluish tinged yellow-greenish especially near flesh of pileus, subcrowded, L = 18–20, l = 3–7, edge sometimes paler. Stipe 22–38 × 1–2 mm, equal or slightly swollen at base, often flexuose, ultramarine-blue-blackish fading to greenish blue or glaucous-greenish grey from base up, smooth, dull; apex sometimes slightly white pruinose, stuffed then hollow; base sulphur-yellow tomentose from the yellow mycelium. Flesh pale ultramarine-blue then greenish blue, sometimes paler in stipe-base, bluish white in centre of pileus and stipe. Smell none or slightly rancid-oily.

Spores 8.6–10.8 × 6.8–8.1  $\mu\text{m}$  (averages 9.6 × 7.5  $\mu\text{m}$ ), Q = 1.2–1.3–1.45, (5–)6-angled in side-view with dihedral base. Basidia 4-spored, clampless. Lamelle edge fertile, no cystidia found. Pileipellis a cutis of cylindrical 5–12  $\mu\text{m}$  wide hyphae, with trichodermal tufts of clavate cells, up to 18  $\mu\text{m}$  wide, denser and more frequent towards centre. Pigment intracellular, no trace of membranous or encrusting pigments seen. Pileitrama regular, made up of long cylindrical top inflated cells. Clamp-connections absent.

Collection examined. — GREAT BRITAIN, Scotland, Invernesshire, Glen Affric, Tomich, along river Affric, 18 Sept. 1958, P. D. Orton (holotype, K; isotype, E).

The macroscopical characters given above are adopted from the original description by Orton. The type-collection is in a bad state, but the microscopical characters reveal that *Entoloma cyaneoviridescens* is a good species in section *Cyanula*. I could not find the encrusted hyphae described by Orton (1960). Thanks to the generous hospitality of Mr. P. D. Orton during my stay in Scotland in August/September 1981 I was able to study his water-colour paintings of *Leptonia cyaneoviridescens*. The bright sulphur-greenish tinges of the basidiocarp are fairly characteristic, and sufficient evidence to distinguish this species from other species of subg. *Leptonia*. For a comparison with *Entoloma cruentatum* see above.

*Entoloma querquedula*, another species of *Leptonia* with greenish and blue tinges in pileus and stipe, differs in having much larger spores and a sterile lamellae-edge with blue intracellular pigment.

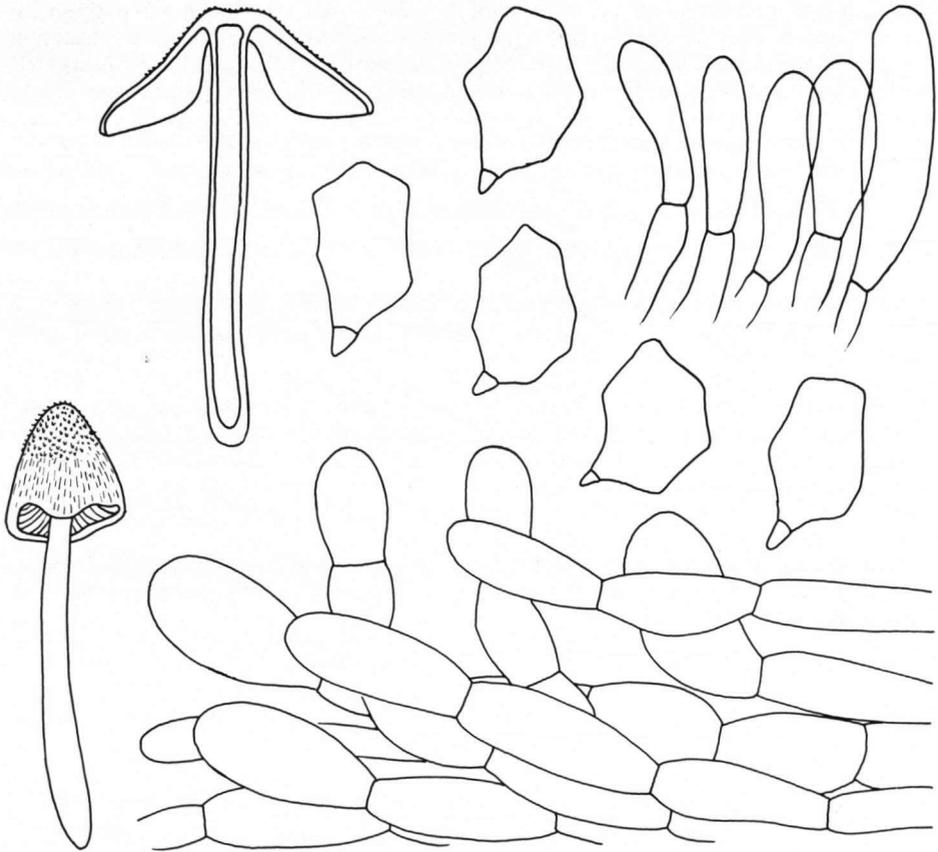


Fig. 5. *Entoloma chalybaeum* var. *chalybaeum*. — Habit, spores, cheilocystidia and pileipellis (habit from *Kuyper*, 1977; all other figs from *Boekhout*, 1982).

***Entoloma chalybaeum* (Fr.: Fr.) Noordel. var. *chalybaeum*. — Fig. 5**

*Agaricus chalybaeus* Fr., *Observ. mycol.* 2: 93. 1818. — *Agaricus chalybaeus* Fr.: Fr., *Syst. mycol.* 1: 203. 1821. — *Leptonia chalybaea* (Fr.: Fr.) Kumm., *Fürh. Pilzk.*: 96. 1871. — *Entoloma chalybaeum* (Fr.: Fr.) Noordel. in *Nord. J. Bot.* 2: 163. 1982.

Misapplied names. — *Rhodophyllus chalybaeus* (Pers.) Quél., *Enchir. Fung.*: 60. 1886 sensu Quél. non Pers. 1801.

*Agaricus columbarius* Bull. sensu Sowerby, *Col. Figs. Engl. Fungi* 2, pl. 161. 1799.

Excluded. — *Agaricus chalybaeus* Pers., *Syn. meth. Fung.*: 343. 1801 (= *Agaricus columbarius* Bull.).

Selected icones. — Bres., *Iconogr. mycol.* pl. 574. 1929 (as *L. chalybaea*). — Konr. & Maubl.,  *Ic. sel. Fung.* pl. 181, fig. 1. 1929 (as *L. chalybaea*). — Sowerby, *Col. Figs. Engl. Fungi* 2, pl. 161. 1799 (as *A. columbarius*).

Pileus 14–40 mm broad, conical or campanulate, sometimes truncate, usually not or only slightly depressed at centre, with involute margin, not very much expanding with age to conico-convex or convex, not hygrophanous, not or obscurely striate at margin only, rarely up to half the radius, dark indigo-blue, almost black at centre, towards margin slightly paler, then more brownish-violaceous blue, entirely velvety-tomentose breaking up in minute, radially arranged, adpressed to slightly reflexed squamules with age, sometimes glabrescent, marginal zone sometimes radially grooved. Lamellae,  $l = 20-40$ ,  $l = 1-3-5$ , deeply emarginate to almost free, ventricose, grey-violaceous or blue-violaceous when young, then greyish pink with entire, brownish edge. Stipe 20–50 × 2–3.5 mm, cylindrical with slightly to distinctly broadened base, sometimes flattened with longitudinal groove, dark (grey-)blue usually slightly to distinctly paler and brighter than pileus, minutely pruinose at apex, downwards normally smooth, in one collection with minute, rather spread white tomentum, base white tomentose. Flesh concolorous with surface, whitish in innermost part of pileus and stipe. Smell inconspicuous. Taste none or slightly bitter.

Spores 8.7–12.6 × 6.3–8.7  $\mu\text{m}$  (averages 10.4–10.5 × 6.9–7.3  $\mu\text{m}$ ),  $Q = 1.2-1.45-1.7$ , 6–9-angled in side-view with dihedral base. Basidia 27–51 × 8.7–14  $\mu\text{m}$ , 4-spored, clampless. Lamellae edge entirely sterile with dense clusters of clavate-cylindrical cheilocystidia, 34–75 × 5–18  $\mu\text{m}$ . Pileipellis a trichoderm, at centre almost a hymeniderm of clavate cells, up to 35  $\mu\text{m}$  wide. Pigment brown, intracellular in pileipellis and upper trama. Vascular hyphae present in pileitrama. Granules present in trama of lamellae and pileus. Clamp-connections absent in all tissues.

**Habitat & distribution.**—In poorly manured, semi-natural grassland. Collections seen from the Netherlands and Austria, but certainly more wide-spread, possibly more rare than var. *lazulinus*.

**Collections examined.**—NETHERLANDS, prov. Overijssel, Havelte, 'aerport', 16 Oct. 1982, *T. Boekhout*; prov. Gelderland, Nijmegen, Heumensoord, 26 Aug. 1977, *Th. W. Kuyper*; prov. Noord Holland, Isl. Texel, Nature reserve 'de Geul', 31 Aug. 1977, *M. E. Noordeloos* 425. — AUSTRIA, Parschallen am Attersee, 30 Sept. 1962, *C. Bas* 2757.

***Entoloma chalybaeum* (Fr.: Fr.) Noordel. var. *lazulinum***  
(Fr.) Noordel., *comb. & stat. nov.* — Fig. 6

*Agaricus lazulinus* Fr., Epicr.: 153. 1838 (basionym). — *Leptonia lazulina* (Fr.) Quél. in Mem. Soc. Emul. Montbéliard 2, 5: 344. 1872. — *Rhodophyllus lazulinus* (Fr.) Quél., Enchir. Fung.: 60. 1872. — *Entoloma lazulinum* (Fr.) Noordel. in Nord. J. Bot. 2: 162. 1982.

*Agaricus glaucus* Bull. ex D.C., Fl. franc. 2: 179. 1805 (later homonym of *A. glaucus* Batsch, Elenc. Fung. Cont. pr.: 123. 1786). — Lectotype: Bull., Herb. France pl. 521. 1792 (as *Agaricus glaucus*).

**Misapplied name.**—*Rhodophyllus cyanulus* Lasch sensu J. Lange, Fl. agar. dan. 2: pl. 77F. 1936.

**Selected icones & descriptions.**—Bres., Icon. mycol. pl. 570–2 (as *L. lazulina*). — J. Lange, Fl. agar. dan. 2, pl. 77F. 1936 (as *R. cyanulus*). — Phillips, R., Mushr. other Fungi.: 117. 1982. (as *L. lazulina*).

Pileus 6–35 mm broad, conical to campanulate, usually rounded, sometimes truncate, expanding to conico-convex or convex, usually slightly depressed at centre, not umbilicate, rarely with minute papilla in central depression, with margin strongly involute when young and longtime remaining so, not really hygrophanous but slightly pallescent and becoming brilliant on drying, distinctly translucently striate at least up to half the

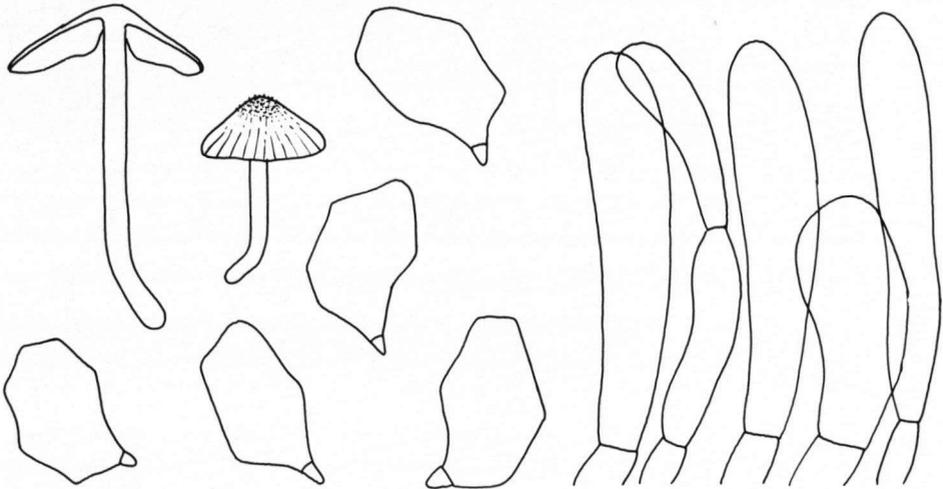


Fig. 6. *Entoloma chalybaeum* var. *lazulinum* f. *lazulinum*. — Habit, spores and cheilocystidia (all figs from Noordeloos 1810).

radius, frequently up to centre, bright ultramarine, indigo or grey-blue, at centre and on striae often blackish blue, towards margin and between striae (slightly) paler, often while expanding and also with age becoming more brownish especially towards margin, giving a violaceous total impression (eg. Meth. 20A4, 18F4, 15F3—4, when old towards 7F3—4 with blue tinge) when young entirely plushy-tomentulose then rugulose to reflexed fibrillose scaly at centre and smooth to radially fibrillose-irgiate towards margin. Lamellae  $L = 10-24$ ,  $l = (1-3)$ , moderately distant, adnate with decurrent tooth to adnexed or (deeply) emarginate, segmentiform to ventricose, sometimes veined on sides, (dark) ultramarine, blue grey or dark violaceous-blue when young then paler and with pinkish-grey tinge, finally brown-pink retaining the blue tint at margin of pileus, with entire, concolorous or brownish (rarely blackish-brownish) edge. Stipe  $20-45 \times 1.5-3$  mm, cylindrical, frequently slightly broadened at base, sometimes flattened with groove lengthwise, deep grey-blue, ultramarine or indigo-blue, initially more or less concolorous with pileus, later on usually paler, aged and weathered specimens often turn greenish-blue in basal part of stipe, apex minutely white pruinose, downwards smooth and polished or very minutely fibrillose striate, base with white tomentum. Flesh pale blue in pileus and stipe, in stipe of fleshy specimens whitish. Smell not distinctive. Taste none or slightly oily-rancid.

Spores  $8.5-12.2 \times 6.3-8.6 \mu\text{m}$  (averages  $9.6-10.8 \times 6.9-7.4 \mu\text{m}$ ),  $Q = 1.2-1.45-1.7$ , (5-)6-8(-9) angled in side-view with dihedral base. Basidia  $28.5-50 \times 8-12 \mu\text{m}$ , in majority 4-spored, clampless. Lamella edge generally entirely sterile made up of parallel hyphae which bear numerous cylindrical-clavate cheilocystidia,  $34-70 \times 5-15 \mu\text{m}$ , sometimes with pale brown intracellular pigment. Pleurocystidia none. Pileipellis a cutis at margin of  $12-18 \mu\text{m}$  wide inflated hyphae with trichodermal tufts of clavate terminal cells, up to  $25 \mu\text{m}$  wide, at centre a dense trichoderm to a hymeniderm of densely packed clavate cells up to  $35 \mu\text{m}$  wide. Pigment blue, intracellular in pileipellis and upper pileitrama. Pileitrama regular, made up of cylindrical to inflated cells up to  $25 \mu\text{m}$  wide with numerous brilliant granules. Vascular hyphae often numerous in upper pileitrama. Clamp-connections absent from all tissues.

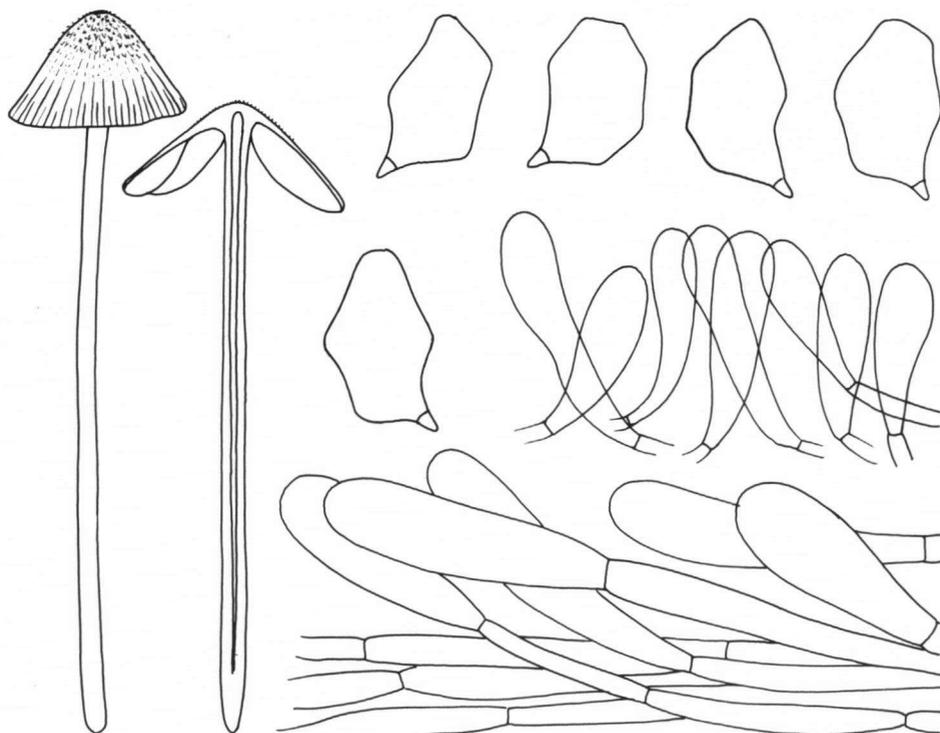


Fig. 7. *Entoloma chalybaeum* var. *lazulinum* f. *bisporigerum*. — Habit, spores, cheilocystidia, and pileipellis (all figs from holotype).

**Habitat & distribution.**—In grasslands on acidulous and calcareous soils. Wide-spread in Europe and fairly common.

**Collections examined.**—SWEDEN, Bohuslän, Valla, Syndsby, 20 Sept. 1977, *Stig Jacobsson* 77289. — GREAT BRITAIN, Devonshire, Membury, 3 Nov. 1957, *P. D. Orton* 1267 (E); Perthshire, Blair Atholl, Struan Birchwood, 22 Sept. 1983, *Steen Elborne* (*M. E. Noordeloos* 8370). — NETHERLANDS, prov. Zuid Holland, Isl. Voorne, Oostvoorne, near Biological Station Weeversduin, 14 Oct. 1960, *C. Bas* 2269; Prov. Gelderland, Staverden, Loam-pits, 25 July 1981, *Th. W. Kuyper* 1638. — GERMAN FEDERAL REPUBLIC, Rheinland-Pfalz, Gerolstein, Munterlei, Papenkeule, 23 Sept. 1980, *H. v.d. Aa*. — BELGIUM, prov. Namur, Ave-et-Auffe, Le Roptai, 21 Sept. 1974, *M. E. Noordeloos* 64 and 8 Oct. 1982, *M. E. Noordeloos* 1810.

***Entoloma chalybaeum* var. *lazulinum* forma  
*bisporigerum* Noordel., f. nov. — Fig. 7**

A f. *lazulina* differt in basidiis bisporigeris raro trisporigeris. — Holotypus: *H. Huyser* s.n., 6-X-1982, 'Drongelens kanaal, Helvoirt, prov. N. Brabant, Netherlands' (L).

Pileus 20–30 mm broad, truncate conical, deep grey-blue almost black at centre and on striate, deeply translucently striate up to half the radius, central part granulose-mi-

nutely squamulose, fibrillose towards margin. Lamellae deeply emarginate almost free, ventricose, blue-grey with slightly coloured, entire edge. Stipe blue almost with same colour as pileus, smooth.

Spores (9-)9.9–12.6(–13.5) × (6.8–)7.2–9.0(–9.5)  $\mu\text{m}$  (averages 11.4 × 8.4  $\mu\text{m}$ ), Q = 1.2–1.4–1.6. Basidia 2 rarely 3-spored, clampless. All other microscopical characters as in the type-forma.

*Agaricus chalybaeus* Pers., (Syn. meth. Fung.: 343. 1801) was created to replace *Agaricus columbarius* 'Sow' (Sowerby, 1799, pl. 161). It is clear from the description, however, that Sowerby identified his plate with *Agaricus colombarius* Bull. (Bulliard, 1789, pl. 413, fig. 1), and that he did not intend to publish a new name. Consequently *Agaricus chalybaeus* Pers. is typified by Bulliard's plate, and must be considered as a superfluous name when created.

*Agaricus colombarius* Bull., according to the type-plate is a species of *Entoloma* subgen. *Leptonia* with a conical then convex, blue, violaceous or grey, radially fibrillose, not striate pileus, free, ventricose, pale or blue-grey lamellae with or without a blue-coloured edge, and with a blue or grey, smooth stipe which is sometimes bulbous at base. This combination of characters does not fit with any of the species of *Leptonia* known to me, and I have the strong feeling that Bulliard depicted a mixture of species, including species like *Entoloma euchroum* and *E. serrulatum*, but also other species may have been included. It seems impossible to select one of the known species of *Leptonia* to fit with Bulliard's plate in a convenient way, and therefore I consider *Agaricus columbarius* Bull. as a nomen dubium, and accordingly also *Agaricus chalybaeus* Pers.

Sowerby, however, depicted quite another species, known by modern authors as '*Leptonia chalybaea* (Pers. ex Fr.) Kumm.' It is clear that these authors' names cannot be used for the species concerned. Fries (1815 and 1818) was aware of the discrepancy of the plate of Bulliard and Sowerby. *Agaricus chalybaeus* Fr., 1818 has as synonym '*Agaricus columbarius* Sowerb. t. 161 (excl. synonym)'. Fries (1815: 19) placed *Agaricus columbarius* Bull. in the synonymy of *Agaricus lampropus*. As Fries (1818) definitely excluded the type-plate of *Agaricus chalybaeus* Pers., one must consider *Agaricus chalybaeus* Fr. 1818 as a new species, and I select the plate and description of *Agaricus columbarius* sensu Sow., (1799) as the lectotype of this species. Fries sanctioned *Agaricus chalybaeus* Fr.: Fr. in 1821, and therefore the correct name for the species involved is now *Entoloma chalybaeum* (Fr.: Fr.) Noordel.; non *Agaricus chalybaeus* Pers., 1801.

Ever since Bulliard (1792) and Sowerby (1799), and strongly influenced by the works of Fries (1821, 1838), European mycologists have tried to distinguish two species of *Leptonia* with blue pileus, lamellae and stipe, and without a blue-black serrulate lamella edge, viz. '*Leptonia*' *lazulina* Fr. with a deeply striate, almost smooth pileus, except for the centre, and '*Leptonia*' *chalybaea* Pers. with a non-striate, entirely woolly-felted to subsquamulose pileus. Even nowadays Orton (1960) and Moser (1982) distinguish these taxa. Kühner & Romagnesi (1953) accepted a wider concept of '*Rhodophylus*' *lazulinus*, including *chalybaea*, and after close study of a number of collections from various parts of N.W. Europe, I am inclined to follow their suggestion. I have seen only few collections (e.g. *Th. W. Kuyper*, 26 Aug. 1977) which fully agree with *Leptonia*

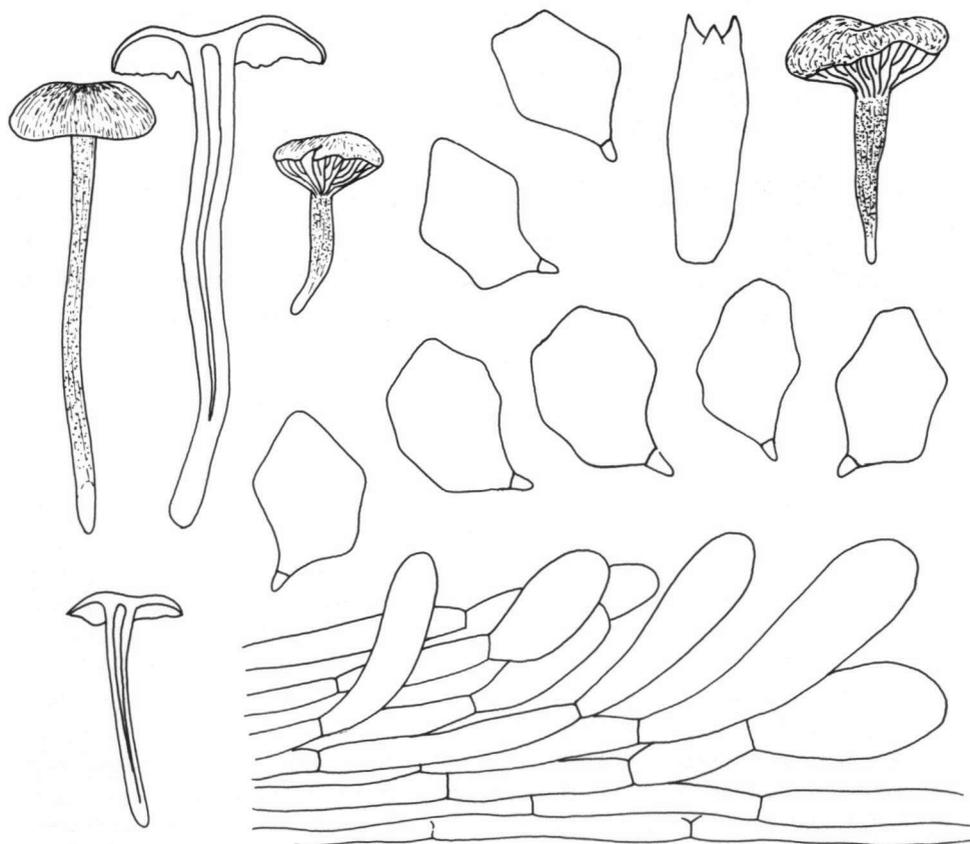


Fig. 8. *Entoloma viaregale*. — Habit, spores, basidium and pileipellis (all figs from holotype).

*chalybaea* as depicted by Konrad & Maublanc (1926) and Bresadola (1929), the other collections cited under *E. chalybaeum* var. *chalybaeum* show weak to distinct transitions to more typical *E. lazulinum* with deeply striate pileus. I have the strong impression that all intermediates occur from typical *E. lazulinum* into typical *E. chalybaeum*. Microscopically all collections studied are rather uniform. For the time being I reduce *Entoloma lazulinum* to a variety of *E. chalybaeum*, with the expectation that in future, with more collections, it will even be reduced to a mere form of *E. chalybaeum*.

*Leptonia nigra* (Murr.) Murr. comes very close to *E. chalybaeum* var. *chalybaeum*. According to Largent, the type-collection of *L. nigra* shows a sterile lamella-edge, which make it highly probably that it is synonymous with our *E. chalybaeum*. However, in the collections from California studied by Largent, the lamella edge appeared to be fertile, which make it highly improbable that Largent's concept of the species is in agreement with the original concept of Murrill.

12.2 On *Entoloma viaregale**Entoloma viaregale* Noordel., *spec. nov.* — Fig. 8

Pileus 10–30 mm latus, conicus, campanulatus vel subglobosus, demum convexus, haud vel leviter depressus, margine involuto demum recto, haud hygrophanus, haud striatus, atro-brunneus vel atro-sepiaceus, toto squamulosus; lamellae, L = 20–30, l = 1–3(–5), late adnatae vel subdecurrentes vel emarginate, segmentiformes, sordide incarnatae demum obscure brunneo-incarnatae; stipes 20–70 × 1.5–3 mm, cylindraceus vel compressus, chalybaeo-griseus expallens, tot albedo-pruinosis; odore saporeque farinaceis; spores (8.1–)8.7–11.5(–12.3) × (6.4–)7–8.1 μm; basidia tetrasporigera; cystidia nulla; pileipellis hymeniformis vel trichoderma elementis inflatis, pigmentis intracellulosis; fibulae absentes. — Holotypus: *M. E. Noordeloos 365*, 2 Aug. 1977, 'Kings' road, Fokstua, Dombås, Oppland, Norway' (L, isotypus in O).

Pileus 10–30 mm broad, conical to campanulate or hemispherical, then expanding with or without slightly depressed centre, with margin slightly enrolled when young later straight, not hygrophanous, not translucently striate, very dark blackish brown or blackish sepia, only slightly paler towards margin, entirely concentrically minutely squamulose with blackish brown squamules, densest around centre. Lamellae, L = 20–30, l = 1–3(–5), broadly adnate with decurrent tooth or slightly emarginate, segmentiform, sordid grey-white when young then rather dark brown-pink with subentire to serrulate, concolorous edge. Stipe 20–70 × 1.5–3 mm, cylindrical or compressed with longitudinal groove, slightly tapering towards base or subbulbous, pale to dark blue-grey becoming paler and more brownish with age, dull downy pruinose all over to substriate, base white tomentose (turning red when bruised in the holotype). Flesh concolorous with surface, pale in inner parts of fleshy specimens. Smell and taste distinctly farinaceous.

Spores (8.1–)8.7–11.5(–12.5) × (6.4–)7.0–8.1 μm (averages 9.2–10.9 × 7.2–7.6 μm), Q = (1.1–)1.2–1.3–1.4(–1.5), 5–7-angled in side-view with dihedral base. Basidia 4-spored, clampless. Lamella edge fertile, cystidia absent. Pileipellis a hymeniderm at disc, more trichodermal towards margin made up of strongly inflated, clavate terminal cells, 8–21 μm wide. Pigment intracellular, brown, abundant in pileipellis and upper pileitrama. Brilliant granules present or absent in pileitrama. Vascular hyphae present or absent in pileitrama. Clamp-connections absent.

Habitat & distribution.—Grassy roadside near *Betula* or *Picea* in subalpine woodland on sandy morene. Norway. Only known from the type-locality.

Collections examined.—NORWAY, Oppland, Dombås, Kongeveien to Fokstua, 750 m alt., 2 Aug. 1977, *M. E. Noordeloos 364, 365* (holotype), *368*, idem, 5 Aug. 1977, *M. E. Noordeloos 381, 382, 383*.

*Entoloma viaregale* belongs to the group of taxa related to *Entoloma anatinum*, characterized by a not hygrophanous, not striate, entirely felted-squamulose pileus and a stipe surface which is not polished-smooth. *Entoloma viaregale* is distinguished from other species in this group by having a rather dark brown pileus, pruinose-downy stipe and farinaceous smell.

12.3. On *Agaricus griseorubellus* and its interpretations

*Agaricus griseorubellus* was described by Lasch (1829) with the following characters.

'Pileo sericeo subcinereo, lamellis subdecurrentibus latiusculus subdistantibus cano-carneis; stipite farcto fibrilloso basi subincrassato. Descr. br. Pileus membranaceus subconvexus umbilicatus  $\frac{3}{4}$ –1½ unc. latus, subinde flexuosus, humidus subfusco-griseus, striatus, siccus griseus sericeo-fibrillosus, saepe lacerus. Lamellae 4–8 seriales, postice attenuatae, subtenues, integerrimae etiam latae. Stipes 1–1½ unc longus, 1–1½ linea crassus, subcinereus vel griseus apice leviter flocculosus, basi lanatus, fibrillosus, demum subcavus. Subfragilis. Odor farinae. In silvis umbrosis praesertim circa Coryli truncos, subgregariae. Aug.-Sept.'

This diagnosis gives room to various interpretations, but in my opinion it most likely depicts a species of *Entoloma* with a brownish grey, hygrophanous, translucent, smooth pileus which turns paler and becomes shiningly fibrillose on drying, with rather distant, broad, adnexed to subdecurrent lamellae and a fibrous, greyish stipe. Although it generally has been interpreted as a species of *Leptonia*, I see no reason why *Agaricus griseorubellus* should not belong to subgenus *Entoloma* as one of the small species in sect. *Rhodopolia* or *Polita*. As it will never be clear, I consider *Agaricus griseorubellus* as a nomen dubium.

As there exist at least three different interpretations of *Agaricus griseorubellus* Lasch in literature, there is need for a re-evaluation of these taxa.

'*Eccilia*' *griseorubella* sensu Konrad & Maublanc (Ic. sel. Fung., pl. 185 fig. 1. 1928) has been renamed by Kühner *Rhodophyllus griseorubidus* (nom. nud.). I have validated this name as *Entoloma griseorubidum* above.

There exist two other well-known interpretations of *Agaricus griseorubellus* in literature, viz. *Eccilia griseorubella* 'Fr.' sensu Bresadola (Iconogr. mycol. pl. 594. 1929) and *Rhodophyllus griseorubellus* sensu J. Lange (Fl. agar. dan. 2, pl. 80F. 1936). As I think that both are different from the original *Agaricus griseorubellus*, I describe them as new species below.

#### *Entoloma huijsmanii* Noordel., spec. nov. — Fig. 9

Misapplied name. — *Rhodophyllus griseorubellus* sensu J. Lange, Fl. agar. dan. 2, pl. 80F; non Lasch, nec Bres.

Pileus 10–30(–40) mm latus, convexus vel planus, umbilicatus, pallide vel medio griseo-brunneus vel corneus, translucido-striatus, centro squamuloso, margine fibrilloso-virgato vel glabro; lamellae, L = 20, l = 1–3–5, haud confertae, adnatae vel subdecurrentes, albiae demum pallide griseo-rosaea acie concolore; stipes 25–60 × 1–3 mm, cylindraceus vel compressus, griseo-violaceus, glaber; odore saporeque nullis; sporae (8.7–)9.3–13.5 × 6.2–8.3(–9)  $\mu$ m; basidia bisporigera vel tetrasporigera; cystidia nulla; pileipellis trichoderma, hyphis inflatis pigmentis intracellulosis; fibula nulla. — Holotypus: H. S. C. Huijsman, 9-VIII-1952, 'Estate Bijvank, Bergh, Beek, the Netherlands' (L).

Pileus 10–30(–40) mm broad, convex then planoconvex usually deeply umbilicate, weakly hygrophanous, pale to moderately dark grey-brown or hornbrown, when moist translucently striate up to centre, centre granulose-subsquamulose, margin radially fibrillose-virgate to (almost) smooth. Lamellae, L = about 20, l = 1–3–5, adnate or subdecurrent, triangular-segmentiform then (sub-)ventricose, white or very pale grey then pink with or without a faint grey tinge, with entire, concolorous edge. Stipe 25–60 × 1–3 mm, cylindrical or flattened, grey-violaceous with slight tendency to blue in some

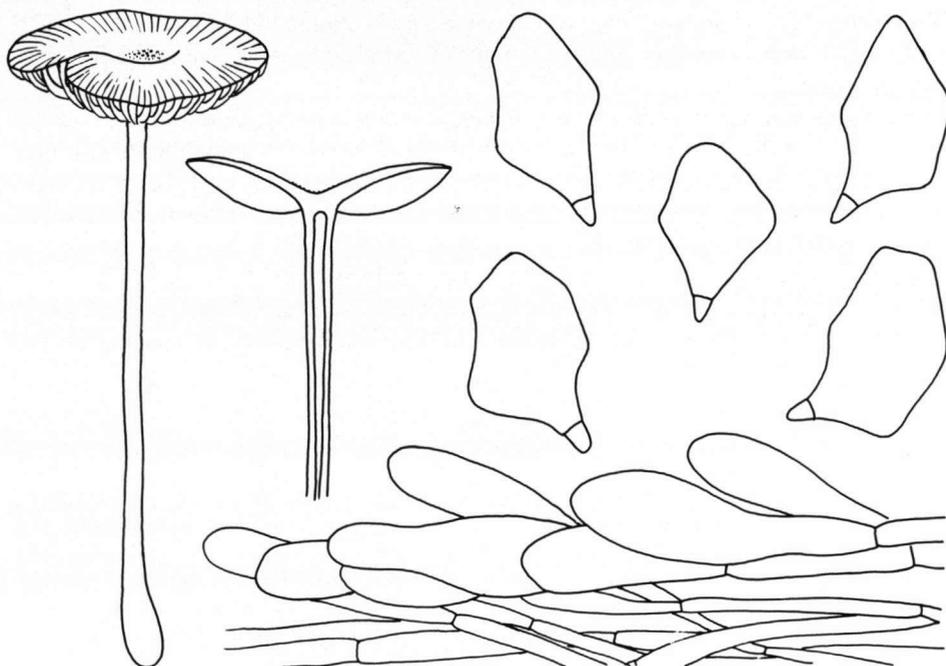


Fig. 9. *Entoloma huijsmanii*. — Habit, spores, and pileipellis (all figs from holotype).

collections (Meth. 6D4–6D3, 7D3–7E4 or like Lange, pl. 80F, l.c.), smooth or in upper part violaceous-pruinose and downwards with blackish-violaceous fibrils, dull, base white tomentose-villose. Flesh concolorous with surface in cortex, inner parts paler. Smell and taste inconspicuous.

Spores (8.7–)9.3–13.5 × 6.2–8.3(–9.0)  $\mu\text{m}$  (averages 10–12 × 6.9–7.8  $\mu\text{m}$ , Q = 1.2–1.45–1.6(–1.7), irregularly 6–9-angled in side-view with dihedral base. Basidia 2-spored or mixed 2- and 4-spored, clampless. Lamella edge fertile, cystidia absent. Pileipellis a trichoderm at centre, made up of broadly swollen clavate cells up to 30  $\mu\text{m}$  wide, towards margin more like a cutis of inflated hyphae and terminal cells, up to 20  $\mu\text{m}$  wide. Pigment brown intracellular in pileipellis. Pileitrama regular, made up of cylindrical to slightly or broadly inflated cells, up to 26  $\mu\text{m}$  wide. Brilliant granules present or absent in pileitrama. Clamp-connections absent. Vascular hyphae may be present in pilei- and hymenophoral trama.

**Habitat & distribution.**—In dry grassland and open places in forest. Rare (?). Known to occur in Denmark, the Netherlands, France and Switzerland.

**Collections examined.**—DENMARK, Jutland, Langaa, 12 Sept. 1982, *T. Brandt-Pedersen* 82–155. — NETHERLANDS, prov. Gelderland, Beek, Bergh, estate Bijvanck, 9 Aug. 1952, *H. S. C. Huijsman* (holotype); Buren, Leemputten, 7 Sept. 1977, *M. E. Noordeloos* 440. — FRANCE, dept. Doubs, les Brenots, 4 Aug. 1969, *H. S. C. Huijsman*. — SWITZERLAND, Neuchâtel, Schwarzgraben, 12 Aug. 1960, *H. S. C. Huijsman*; idem, La Rusille, Bois du Chassagne, 12 Aug. 1976, *H. S. C. Huijsman*.

*Entoloma huijsmanii* is named after H. S. C. Huijsman, honorary member of the Netherlands Mycological Society, to honour his great stimulating influence of Netherlands and French Mycology, and for the gift of his valuable herbarium to the Rijksherbarium, Leiden.

*Entoloma huijsmanii* differs from *E. lividocyanulum* in having larger spores, 2-spored or mixed 2- and 4-spored basidia, darker pileus and violaceous tinges in the stipe. It may be identical with *Rhodophyllus griseorubellus* forma, as depicted by J. Lange, Fl. agar. dan. pl. 80F, but the stipe-colour of that picture slightly deviates, and there is no authentic material left of Lange's fungus.

*Rhodophyllus asprellus* sensu J. Lange differs among other things in having almost free, dark-coloured lamellae, blue stipe, and 4-spored basidia. *Entoloma viaregale* and *E. anatinum* differ in having a much darker, entirely woolly-velvety or squamulose, not striate pileus.

### *Entoloma lividocyanulum* (Kühn. ex) Noordel., *spec. nov.* — Fig. 10

*Rhodophyllus lividocyanulus* Kühn. in Kühn. & Romagn. in Rev. Mycol. 19: 37. 1954 (nom. inval., no full reference to basionym). — *Leptonia lividocyanula* (Kühn.) P. D. Orton in Trans. Brit. mycol. Soc. 43: 105. 1960 (nom. inval.).

Misapplied name. — *Eccilia griseorubella* 'Fr.' sensu Bres., Iconogr. mycol. 12, pl. 594, 1929; non Lasch.

Selected icones. — Bresadola, l.c.; Dähncke & Dähncke, 700 Pilze: 259. 1979 (excellent picture!).

Pileus 10–35 mm latus, convexus demum explanatus, umbilicatus, flavobrunneus, glabrus solido in centro granuloso-subsquamuloso; lamellae adnatae vel subdecurrentibus, pallidae; stipes caeruleus, in brunneo vergens; sporae (7.2–)8.1–9.9(–10.8) × 6.5–7.2 μm; basidia 4-sporigera; cystidia nulla; pileipellis cutis vel trichoderma, pigmentis intracellulosis; fibula nulla. — Holotypus; *M. E. Noorde-loos 8366*, 22-IX-1983, 'Struan Birchwood, Blair Atholl, Perthshire, Scotland. (L).

Pileus 10–35 mm broadly convex then flattened, (deeply) umbilicate with enrolled margin, especially when young, not distinctly hygrophanous, when young sepia then rather pallid yellow brown with darker brown granulose-subsquamulose centre ('calotte'), translucently striate almost up to centre, margin smooth or radially fibrillose-irregular. Lamellae, L = 20–36, l = 3–5–7, moderately crowded, adnate to subdecurrent, triangular then segmentiform, white then pale pink with concolorous, entire edge. Stipe 25–60 × 1–3(–4.5) mm, cylindrical or compressed with longitudinal groove, moderately dark to rather pale blue often fading to more or less brownish tinge with age, smooth or pruinose at apex, base white tomentose. Flesh concolorous with surface, but also in old, faded specimens with distinct blue tinge in stipe-cortex, inner part of relatively fleshy specimens pallid. Smell and taste inconspicuous or slightly herbaceous.

Spores (7.2–)8.1–9.9(–10.8) × 6.5–7.2(–8.1) μm (averages 8.2–9.4 × 6.4–7.1 μm), 5–6-angled in side-view with dihedral base. Basidia 25–54 × 6.5–10.5 μm, 4-spored, clampless. Lamella edge fertile, cystidia absent. Pileipellis a trichoderm of clavate cells, 7.5–30 μm wide at centre, towards margin gradually passing into a cutis of cylindrical to slightly inflated hyphae, up to 22 μm wide. Pigment intracellular in pileipellis and sometimes also in pileitrama. Brilliant granules usually present and abundant in pileitrama. Clamp-connections absent.

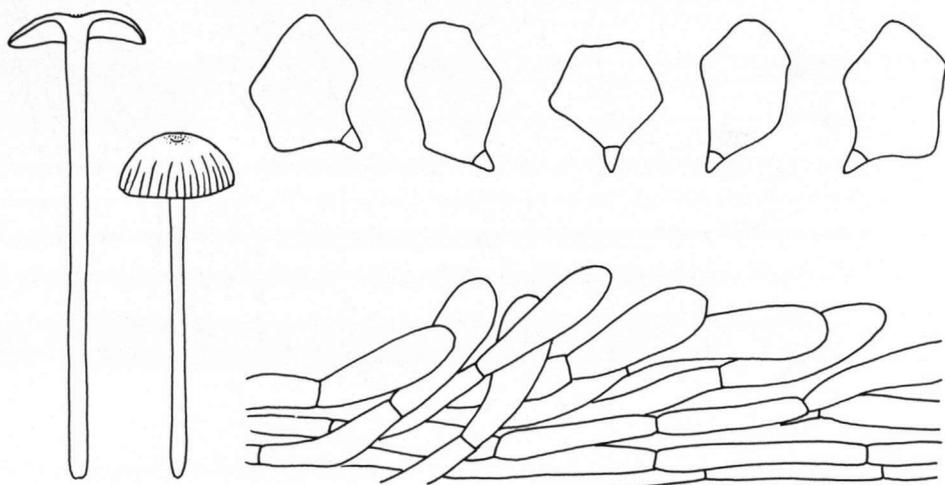


Fig. 10. *Entoloma lividocyanulum*. — Habit, spores, and pileipellis (all figs from holotype).

**Habitat & distribution.**—In grasslands usually on more or less calcareous soil, wide-spread, not uncommon.

**Collections examined.**—NORWAY, Hedmark, Auma, Hamndalseter, 11 July 1979, *M. E. Noordeloos* 958. — SWEDEN, Medelpad, Selanger s.n., Lembydsgaard, 4 Sept. 1980, *H. Lindström*. — GREAT BRITAIN, Scotland, Perthshire, Blair Atholl, Struan Birchwood, 22 Sept. 1983, *M. E. Noordeloos* 8365, 8366. — NETHERLANDS, prov. Limburg, Heijthuisen, 'De Grootte Moost', 20 Aug. 1967, *C. Ph. Verschueren*. — GERMAN FEDERAL REPUBLIC, Ulm, old cemetery, 6 Aug. 1982, *M. Enderle*. — AUSTRIA, Tirol, Jenbach, Falzthurntal, 9 Sept. 1982, *M. E. Noordeloos* 1716; idem Dristenautal, 6 Sept. 1982, *H. Marxmüller*; Innsbruck, Gnadenwald, 9 Sept. 1982, *J. Schreurs*.

*Entoloma lividocyanulum* is a very characteristic species with its pale colours, deeply striate almost smooth pileus, small spores and fertile lamella edge.

#### 12.4. On some new species in the group of *E. turci*

The group of taxa around *E. turci* is characterized by brown colours of the basidiocarp, a not striate, often entirely fibrillose-squamulose pileus and stipe surface which is smooth or flocculose-striate to flocculose-squamulose or villose. Three new taxa have been found during my studies in *Leptonia* which are described below.

#### *Entoloma pseudoturci* Noordel., *spec. nov.* — Fig. 11

Pileus 8–50 mm latus, convexus vel conicus, truncatus, centro depresso, haud hygrophanus, haud striatus, obscure umbrinus vel sepiaceus, toto villosus demum centro squamulosus, margine fibrilloso-virgatulo. Lamellae late adnatae vel leviter emarginatae, pallidae demum rosaeae brunneo tinctae. Stipes 25–50 × 2–3(–4) mm, flavobrunneus vel griseobrunneus. Sporae 7.5–11 × 6–7(–8)  $\mu$ m.

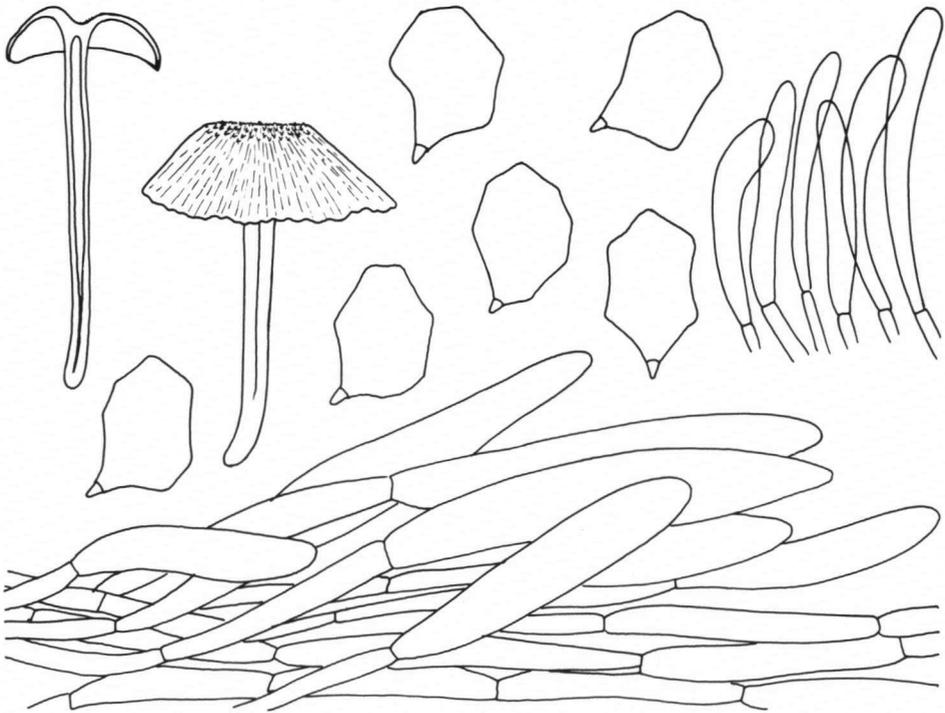


Fig. 11. *Entoloma pseudoturci*. — Habit, spores, cheilocystidia, and pileipellis (all figs from holotype).

Basidia 4-sporigera, haud fibulata. Acies lamellarum steriles vel heteromorpha cheilocystidiis cylindraceis vel clavatis. Pileipellis hymenoderma vel trichoderma pigmentis brunneis intracellulosis. Fibulae nullae. Habitat in graminosis. — Holotypus: *C. Bas 7668*, 14-IX-1980, 'Dunes of Amsterdam Watersupply, Vogelenzang, prov. Noord-Holland, the Netherlands' (L).

Pileus 8–50 mm broad, truncate-conical or convex, with depressed centre, with involute margin when young then more or less straight, not hygrophanous, not translucently striate or faintly striate at margin only, dark (reddish) brown or sepiaecous, sometimes tinged grey (Muns. 10 YR 3/3, 4/3, 4/4, 5/3, 6/5; 7.5 YR 5/4) with darker centre (towards 10 YR 3/2) entirely minutely velvety-peluchy when young then centre fibrillose-squamulose with adpressed or slightly uplifted, small squamules, towards margin fibrillose-irrigate with adpressed fibrils. Lamellae, L = 20–25, l = 1–3–7, broadly adnate sometimes slightly emarginate, segmentiform to ventricose, pallid, almost white when young then pale brown pink (7.5 YR 8/4, 7/4) with concolorous, entire edge. Stipe 25–50 × 2–3(–4) mm, cylindrical slightly broadened at base or slightly tapering downwards, sometimes flexuose, pale yellow-brown or grey-brown often more grey or with metallic tinge towards base, paler than pileus, smooth and polished or substriate with some scattered aeriferous longitudinal fibrils, base white tomentose. Flesh concolorous with surface, inner parts paler. Smell none or faintly aromatic-fruity or flowerlike. Taste none or slightly acrid.

Spores  $7.5-11 \times 6-7(-8) \mu\text{m}$  (averages  $8.5-9.5 \times 6.5-7 \mu\text{m}$ ),  $Q = 1.1-1.7$ ,  $Q = 1.35-1.4$ ,  $6-7(-8)$ -angled in side view with dihedral base. Basidia  $28-45 \times 7-14 \mu\text{m}$ ,  $4(-2-3)$ -spored, clampless. Lamella edge entirely sterile or heteromorphous with cylindrico-clavate cheilocystidia  $3-11.5 \mu\text{m}$  wide. Hymenophoral trama regular with long, slightly to broadly inflated cells up to  $250 \times 4-19 \mu\text{m}$ . Pileipellis a trichoderm, almost hymenidermal at centre, made up of inflated hyphae with clavate terminal cells,  $45-115 \times 7.5-25(-35) \mu\text{m}$ . Pigment brown, intracellular in pileipellis. Stipitepellis at apex of stipe with cylindrical hairs,  $25-75 \times 8-17 \mu\text{m}$ . Brilliant granules few, but present in pileitrama. Clamp-connections absent.

**Habitat & distribution.**—In moist dune-valleys among grass and moss in calcareous coastal dunes (the Netherlands), in xerophytic grassland on calcareous soil (Belgium) and in subalpine meadow grazed by sheep (Norway).

**Collections examined.**—NORWAY, Hedmarken, Auma near Tynset, Hamndalseter, 12 July 1979, *M. E. Noordeloos* 972. — NETHERLANDS, prov. Noord Holland, Vogelenzang, dunes of Amsterdam Watersupply, 14 Sept. 1980, *C. Bas* 7668 (holotype); idem, 6 Sept. 1983, *I. Wijtenbrug* (in Herb. C. Ulje); prov. Noord Brabant, Helvoirt, along Drongeles Kanaal, 1 Oct. 1983, *H. Huyser*. — BELGIUM, prov. Namur, Ave-et-Auffe, Le Roptai, 8 Oct. 1982, *M. E. Noordeloos* 1811.

*Entoloma pseudoturci*, as the name suggests, is closely related to *E. turci*, from which it differs in the consistently smaller spores (in *E. turci*;  $9-13.5 \times 6-9 \mu\text{m}$  (averages  $10-11.5 \times 7-8 \mu\text{m}$ ),  $Q = 1.25-1.75$ ,  $Q = 1.4-1.5$ ), and the lack of red tinges in the stipe-base and flesh when bruised.

### *Entoloma porphyrofibrillum* Noordel., *spec. nov.* — Fig. 12

Pileus 35–65 mm latus, convexus-umbilicatus, haud hygrophanus, haud striatus, griseoporphyraceus, radialiter fibrillose-tomentosus centro squamuloso; lamellae adnatae-emarginatae, incarnatae acie serrulata, concolore; stipes 60–85  $\times$  3–4 mm, fibrosus, pileo subconcolorus, fibrilloso-flocculosus cum fibrillis porphyraceo-griseis; sporae 10–13.5  $\times$  6–8  $\mu\text{m}$ . Acies lamellarum steriles, cheilocystidiis cylindraceutis vel clavatis. Pileipellis trichoderma hyphis inflatis ad 15  $\mu\text{m}$  latis pigmentis intracellulosis. Fibula nulla. Habitat in graminosis. — Holotypus: *J. Schreurs* s.n., 19 Aug. 1979, 'Willinks Weust, Winterswijk, prov. Gelderland, the Netherlands' (L).

Pileus 35–65 mm broad, convex, deeply umbilicate, with almost straight margin, not hygrophanous, not translucently striate, grey-porphyraceous with purplish tinge strongly radially fibrillose-tomentose centre breaking up in squamules, becoming strongly radially fibrillose almost rimose towards margin when old. Lamellae, L about 30, l = 3–5–7, crowded, adnate-emarginate, sometimes broadly adnate-uncinate with small decurrent tooth, segmentiform to subventricose, pale yellowish pink (Muns. 7.5 YR 7/4) with strongly serrate, concolorous edge. Stipe 60–85  $\times$  3–4 mm, cylindrical slightly broadened towards base, apex whitish-creamy, smooth, downwards densely fibrillose-flocculose striate with grey-porphyraceous fibrils, subconcolorous with pileus, base white tomentose. Flesh fibrous, brittle, pallid with slight purple tinge in pileus. Smell and taste none.

Spores 10–13.5  $\times$  6–8  $\mu\text{m}$  (averages 11–12  $\times$  6.5–7.0  $\mu\text{m}$ ),  $Q = 1.4-2$ ,  $Q = 1.6-1.65$ , irregularly many-angled almost nodulose in side-view with dihedral base. Basidia 32–54  $\times$  8–14  $\mu\text{m}$ , (2–)4-spored, clampless. Lamella edge entirely sterile with dense bundles of parallel hyphae with tufts of cylindrico-irregularly clavate cheilocystidia 15–40  $\times$  5–12(–15)  $\mu\text{m}$ . Hymenophoral trama regular, made up of inflated cells up to

45  $\mu\text{m}$  wide. Pileipellis a trichoderm at centre, more like a cutis with transitions to a trichoderm towards margin, made up of inflated terminal cells 7–15  $\mu\text{m}$  wide. Pigment intracellular in pileipellis. Pileitrama regular, made up of inflated hyphae with pale yellow walls (in KOH). Brilliant granules absent. Clamp-connections absent.

*Habitat*.—In grassland with mosses, *Juniperus communis* near-by on slightly decalcified and thus acidulous soil, deeper soil heavy calcareous loam. Only known from the type-locality.

*Collections examined*.—NETHERLANDS, prov. Gelderland, Winterswijk, estate Willinks Weust, 19 Aug. 1979, *J. Schreurs* (type) and 13 July 1980, *J. Schreurs*.

This beautiful robust *Leptonia* species, which I have seen in perfect and fresh state, has a very remarkable colour, more or less similar to *Entoloma porphyrophaeum*. It also resembles the plate of J. Lange (1936, pl. 73E, as *Rhodophyllus griseocyaneus* forma). The real *E. griseocyaneum* differs in having a blue stipe, reddish brown pileus, differently shaped spores and fertile lamella edge. *Entoloma porphyrophaeum* differs in having a conical pileus with broad umbo, capitate cheilocystidia and clamped hyphae, which place it in subgenus *Trichopilus*. So far it is only known from the Netherlands, but Lange's plate cited above suggest that it also occurs in Denmark.

#### *Entoloma scabropelle* Noordel., *spec. nov.* — Fig. 13

Pileus 12–40 mm latus, conico-campanulatus demum expansus leviter papillatus raro depressus, margine involuto demum recto, haud hygrophanus, haud striatus, pallide flavobrunneus toto obscure brunneo fibrilloso-squamulosus demum scabrosus; lamellae, L = 20–24, L = 3–5–7, emarginatae, ventricosae, pallidae demum rosae acie concolore; stipes 20–45  $\times$  3–5 mm, cylindraceus vel compressus, dilute griseobrunneus, ad apicem scabroso-flocculosus basin versus albo arachnoideus. Caro pallida. Odore nulla.

Sporae (8–)9–12  $\times$  (6–)7–8(–9)  $\mu\text{m}$ . Basidia bi- vel tetrasporigera. Acies lamellarum fertilis. Pileipellis trichoderma versus marginem vel hymeniderma in centro, cellulis fusoidis-clavatis 50–120  $\times$  8–22  $\mu\text{m}$  pigmentis intracellulosis. Fibulae nullae. *Habitat* in graminosis. — *Holotypus*: *M. E. Noordeloos* 955, 11-VII-1979, 'Hamndalseter, Auma, Hedmarken, Norway' (L).

Pileus 13–40 mm broad, conico-campanulate broadly umbonate with enrolled margin then expanding with weak umbo or with slightly depressed centre with straight margin, not hygrophanus, not translucently striate, dark felted squamulose with brown fibrils when young (Muns. 10 YR 5/4, 4/4, 4/3, 3/2), when mature breaking up in radially arranged, rather coarse squamules, showing paler background in-between the radial rows (10 YR 8/3, 7/3, 6/4, 5/4), shining with an almost micaceous sheen. Lamellae, L = 20–24, l = 3–5–9, deeply emarginate, ventricose, sometimes anastomosing, pale cream (10 YR 8/2, 8/3) then pallid pink (7.5 YR 8/2, 8/4) with concolorous, entire edge, staining brown on sides and edge when bruised. Stipe 20–45  $\times$  3–5 mm, cylindrical or compressed with longitudinal groove, base sometimes broadened, pale creamy at apex downwards greyish brown (10 YR 6/2, 6/3, 5/3), apex scurfy-flocculose downwards densely covered with white-arachnoid-aeriferous fibrils. Flesh subcartilagineous, easily splitting lengthwise in stipe, firm in pileus, white. Smell and taste none.

Fig. 12. *Entoloma porphyrofibrillum*. — Habit, spores, cheilocystidia and pileipellis (all figs from holotype).

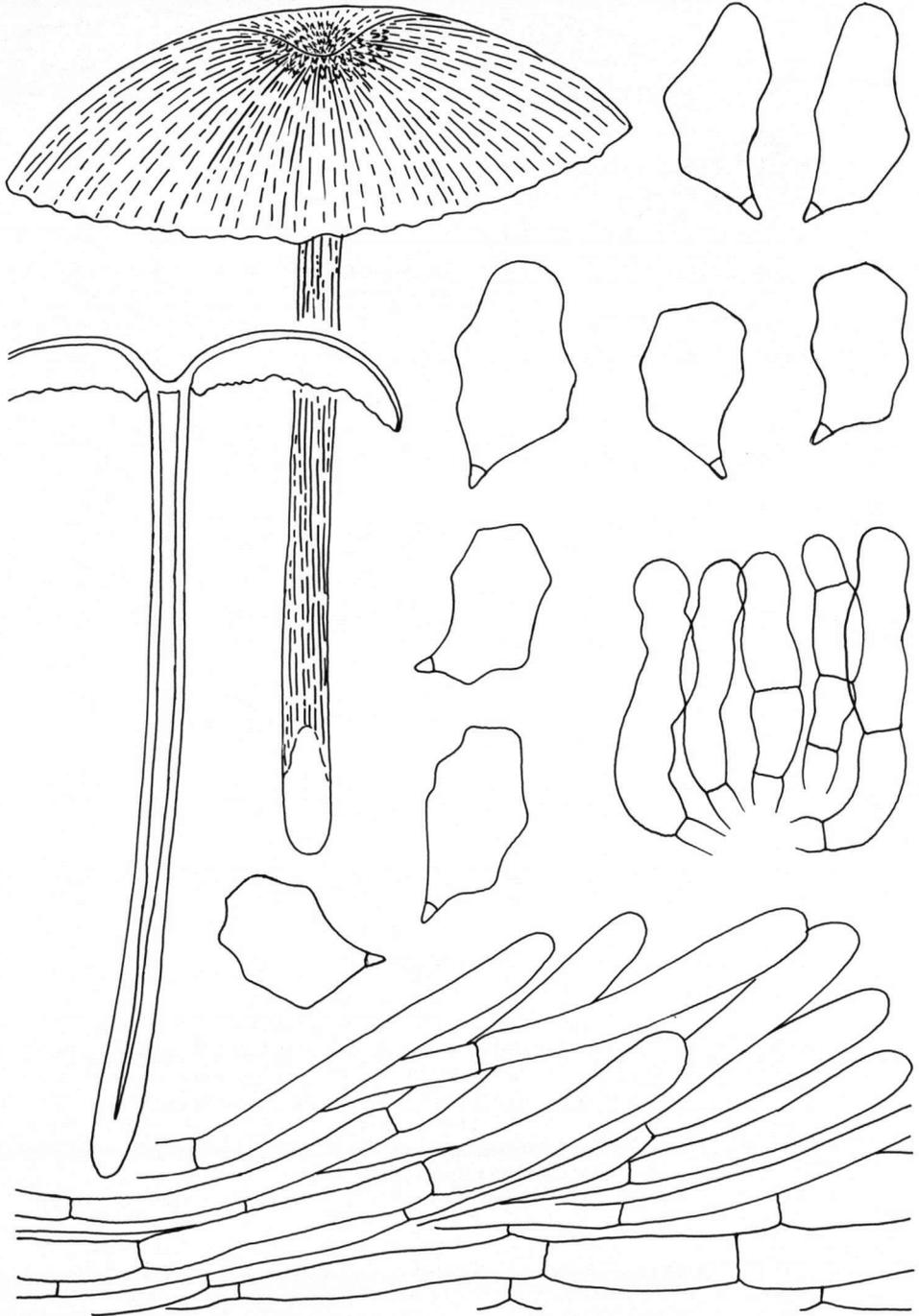




Fig. 13. *Entoloma scabropelle*. — Habit, spores, and pileipellis (all figs from holotype).

Spores  $(8.1-9-11.5 \times 6.5-8(-8.5) \mu\text{m})$  (averages  $10-10.5 \times 7.5-8 \mu\text{m}$ ),  $Q = 1.15-1.3-1.45(-1.7)$ , 5-7-angled in side-view with dihedral base. Basidia  $30-50 \times 8-14 \mu\text{m}$ , 2- and 4-spored, clampless. Lamellae edge fertile. Hymenophoral trama regular, made up of cylindrical cells,  $40-120 \times 5-32 \mu\text{m}$ . Pileipellis hymeniderm at centre, towards margin a transition between cutis and trichoderm, made up of fusoid-inflated cells,  $50-110 \times 8-22 \mu\text{m}$ . Pigment brown, intracellular in pileipellis. Brilliant granules absent or very scarce in pileitrama. Clamp-connections absent.

**Habitat & distribution.**—In subalpine mossy meadow grazed by sheep. Only known from the type-locality.

**Collections examined.**—NORWAY, Hedmarken, Auma near Tynset, Hamndalseter, 11 July 1979, *M. E. Noordeloos* 955 (holotype), and 12 July 1979, *M. E. Noordeloos* 963.

*Entoloma scabropelle* belongs to the group of *Rhodophyllus griseocyaneus* in Kühner & Romagnesi (1953). It differs from *E. griseocyaneum* in colour and slightly smaller spores; *E. turci* is much darker, has an almost smooth stipe, larger spores, and a sterile lamella edge. *Entoloma resutum* has a smooth stipe, clamped hyphae and is placed by me in subgenus *Inocephalus*.

### 13. ON A NEW SPECIES IN SUBG. ENTOLOMA SECT. POLITA

#### *Entoloma caeruleopolitum* Noordel. & Brandt-Pedersen, *spec. nov.* — Fig. 14

Pileus 8–25 mm latus, conicus demum expansus depressus vel obsolete papillatus, hygrophanus, translucido-striatus, obscure violaceo-brunneus, purpureo-brunneus vel porphyraceo-brunneus, centro obscuriore, in sicco pallescens, glaber; lamellae distantes, late adnatae, leviter emarginatae, obscure griseae, costatae; stipes 40–60 × 2–5 mm, cylindraceus vel compressus, caeruleus demum griseo-brunneus violaceo-tinctus, apice pruinato vel glabro, toto politus; carne violaceo-caerulea; sporae 8–10(–11) × 6.5–8  $\mu\text{m}$ , 6–9-angulatae; basidia tetrasporigera, fibulata; acies lamellarum fertiles; cystidia nulla; pileipellis ixocutis hyphis cylindraceis, 3–8(–11)  $\mu\text{m}$  latis pigmentis intracellulosis, brunneis; fibulae abundantes. Habitat inter muscos vel in graminosis in Piceeto vel Ericeto, Dania, Scotica. — Holotypus: *T. Brandt-Pedersen 82.268*, 18-X-1982, 'Hövild Forest, Silkeborg, Central Jylland, Denmark' (C); isotypus, L).

Pileus 8–25 mm broad, conical to convex or flattened, usually shallowly depressed, sometimes slightly papillate, hygrophanous, translucently striate when moist, sometimes very obscurely striate in dark-coloured specimens, dark violaceous-brown, purplish-brown or porphyraceous brown (e.g. Muns. 5 YR 3/2–3/3), sometimes almost black at centre, pallescent on drying, smooth. Lamellae, L = about 20, l = 3–5–7, distant, broadly adnate-slightly emarginate or with small decurrent tooth, dark grey to grey-brown with pink tinge (e.g. 5 YR 4/3, 5/3) often costate-veined on sides, with entire, concolorous edge. Stipe 15–60 × 2–5 mm, cylindrical or compressed with longitudinal groove, often tapering towards base, sky-blue (Meth. 16F(4)3–2) (reminiscent of the stipe-colour of *Entoloma nitidum*) when old often with brown tinge or violaceous-brown, apex pruinose or not, rest smooth and polished, shining. Flesh dark grey in pileus, in stipe with blue tinge. Smell and taste none.

Spores 8–10(–11) × 6.5–8  $\mu\text{m}$ , (averages 9–9.5 × 7–7.5  $\mu\text{m}$ ), Q = 1.1–1.2–1.3, subisodiametrical 6–7-angled in side-view. Basidia 2–4-spored with clamp. Lamellae edge fertile, cystidia absent. Hymenophoral trama regular, made up of short subcylindrical cells, 30–145 × 4–15(–20)  $\mu\text{m}$  with clamped septae. Pileipellis an ixocutis of narrow, cylindrical, 3–8(–11)  $\mu\text{m}$  wide hyphae with slightly gelatinized walls, subpellis well-developed, made up of up to 24  $\mu\text{m}$  wide cylindrical cells. Pigment brown-violaceous, intracellular in pileipellis. Clamp-connections abundant.

Habitat & distribution.—Between moss in *Picea*-plantations and on sawdust (Denmark), in subalpine *Calluna*-heath among grass and moss (Scotland).

Collections examined.—DENMARK, Jylland, Silkeborg, Hövild Skov, 18 Oct. 1982, *T. Brandt-Pedersen 82.268* (holotype, C, isotype, L); idem, Addit Skov, 22 Oct. 1982, *H. Knudsen* (C), idem Velling Skov, 19 Oct. 1982, *T. Brandt-Pedersen 82.297* (C); Sjaelland, Saerløse Overdrev, 2 Oct. 1982, *S. Klug-Andersen* (C). — GREAT BRITAIN, Scotland, Perthshire, Cairnwell, 27 Sept. 1983, *H. Knudsen* (C, L).

The blue stipe with shinningly polished surface, and the small shape of the basidiocarps remind of species of subgenus *Leptonia* sect. *Cyanula*. However, the smooth,

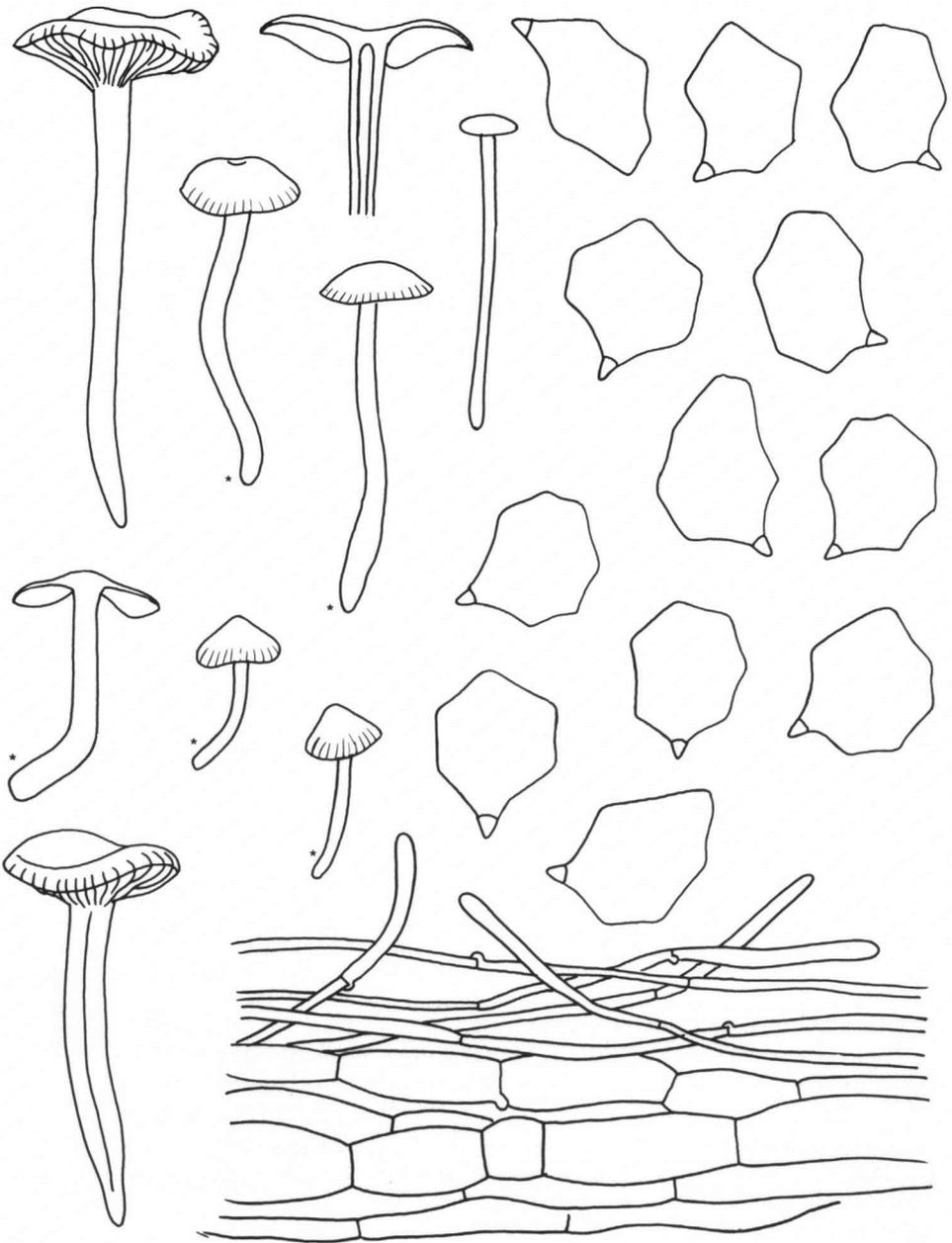


Fig. 14. *Entoloma caeruleopolitum*. — Habit, spores, and pileipellis (Habit with \* from Noordeloos 8385, all other figs from holotype).

hygrophanous pileus, type of pileipellis, structure of hymenophoral trama, subsodiometrical spores and numerous clamp-connections place *Entoloma caeruleopolitum* in subgenus *Entoloma* sect. *Polita*. Blue colours are rare in the subgenus, but occur in *Entoloma nitidum* and *E. madidum* in sect. *Entoloma*, and in *Entoloma vinaceum* var. *violipes* in sect. *Turfosa*. *Entoloma caeruleopolitum* is distinguished from the first two species in the brown colour of the pileus, the slender habit, and the polished stipe. It differs from the last mentioned species mainly in size and shape of spores. *Entoloma caeruleopolitum* may be identical with *Entoloma turbidum* var. *macrius* Karst. which was described as having a red-brown pileus and blue stipe, occurring in coniferous forests (Karsten, 1879: 266). Unfortunately the diagnosis is very short, and the type is lacking at H, so the identity of *Entoloma turbidum* var. *macrius* remains obscure. Anyway, I consider *Entoloma caeruleopolitum* not closely related with *E. turbidum* in the sense of modern authors.

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