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ENTOLOMA SUBGENUS NOLANEA IN THE NETHERLANDS AND ADJACENT REGIONS WITH A RECONNAISSANCE OF ITS REMAINING TAXA IN EUROPE

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(With 49 Text-figures)

Entoloma subgenus *Nolanea* (*emend.* Romagnesi 1978) is revised on account of personal observations and studies on collections from various herbaria. The types of European taxa, as far as they could be recovered, have been examined. Observations on extralimital taxa are included. The infrageneric classification of Romagnesi (1978) is followed in broad outline with some slight alterations: sect. *Papillata* is emended by including sections *Minuta* Romagn. and *Cosmeoxonema* Largent & Thiers. One new section, viz. sect. *Fernandae*, and four new subsections, viz. subsect. *Tristia*, *Icterina*, *Infularia*, and *Cheilocystidiata* are introduced. 54 Taxa are recognized, five of which are new: *Entoloma sericeum* var. *cinereo-opacum*, *E. fernandae* f. *eccilioides*, *E. chlorophyllum*, *E. globulifer*, and *E. sphaerocystis*. Several new combinations are proposed, viz. *Entoloma ambrosium*, *E. clandestinum*, *E. conferendum*, *E. conferendum* var. *pusillum*, *E. cuspidifer*, *E. hirtipes* var. *sericoides*, *E. inutile*, *E. infula*, *E. saccharіolens*, *E. sericeoides*, *E. sericeonitens*, *E. sericeum* f. *nolaniforme*, *E. solstitiale*, *E. verecundum*, and *Entoloma* sect. *Staurospora*, sect. *Turfosa*, subsect. *Cosmeoxonema*, subsect. *Fibulata*, and subsect. *Minuta*. For nomenclatural reasons two new names are introduced, viz. *Entoloma leptopus* to replace *Nolanea tenuipes* P. D. Orton and *E. foetulentum* to replace *Nolanea foetida* Killermann. Keys, descriptions and illustrations are given to all species accepted. In an appendix doubtful and excluded species are briefly discussed.

CONTENTS

INTRODUCTION

Fries (1821: 10) erected *Agaricus* tribus *Nolanea* for those pink-spored agarics with a mycenoid habit. The concept of this taxon was generally accepted by later mycologists, though on different taxonomical levels: as a subgenus by Quélet (1886: 63) in *Rhodophyllus*, and by Schroeter (1889: 63) in *Hyporrhodius*, or as a genus by Kummer (1871: 24) and Saccardo (1887: 716).

The mycenoid habit appeared to be a morphological criterion difficult to maintain for modern mycologists. Romagnesi (1978) emended the concept of *Nolanea* on the base of microscopical characters such as shape of spores, type and topography of pigments, and presence and topography of clamp-connections. Kühner (1977: 450) suggested the use of size and shape of tramal elements as a distinctive infrageneric character, a suggestion worked out by me in the present study. On account of these characters a more natural classification appears to be possible. In the concept of Romagnesi followed by me, subgenus *Nolanea* now comprises 'classical' species such as *Entoloma cetratum* (Fr.) Moser, *E. conferendum* (Britz.) Noordeloos (= *Nolanea staurospora* Bres.), and *E. papillatum* (Bres.) Dennis as well as species with a more tricholomatoid habit formerly placed in subgenus *Entoloma*, such as *E. sericeum* (Bull. ex Mérat) Quél. and *E. ameides* Berk. & Br., or with a collybioid habit, such as *E. icterinum*.

Nolanea is treated here as a subgenus in agreement with the classification of Romagnesi, as in my experience it is impossible to divide *Entoloma* sensu lato (or *Rhodophyllus*) into clear-cut genera. This is confirmed implicitly by the recent work on mostly extra-European taxa of *Entoloma* by Horak (1973, 1976 & 1978) and by Romagnesi & Gilles (1979). The criteria used by Largent & Benedict (1971: 35), such as the diameter of hyphae of the pileipellis, to distinguish genera cannot be maintained.

Subgenus *Nolanea* is closely related to subgenus *Entoloma* via sect. *Endochromonema* on one hand, and sect. *Turfosa* on the other, and with subgenus *Pouzaromyces* via sect. *Fernandae*. For further details and schemes of classification the reader is referred to a future paper (Noordeloos, 1980a; in preparation).

MATERIAL, METHODS AND PRESENTATION

Most species treated here have been studied by me in fresh as well as in dried condition. Macroscopic descriptions are thus in most cases based on personal observations completed by notes in descriptions of others. Many of the latter are supplied by Dr. C. Bas and Dr. R. A. Maas Geesteranus, who laid the base of a rather well documented set of Agaricales collections in the Rijksherbarium during the past 25 years. Unless otherwise stated, the colours of fresh specimens are compared with Munsell Soil Colour Charts, Baltimore.

Microscopical structures were observed and measured in water (fresh carpophores) or in a 10% ammonia solution, or in an ammoniac 1% Congo Red solution (dried specimens), usually under oil-immersion.

Spores, basidia and cystidia were observed and measured in squash preparations of minute parts of the lamellae. Hymenophoral trama has been examined in transversal sections as well as in squash preparations. The pigmentation of the upper layers of the pileus has been observed preferably after plasmolysis in radial sections of fresh carpophores. (For obtaining plasmolysis a saturated salt solution has been used.) In dried specimens it has been observed after boiling sections in ammonia solution or with the method described by Kühner & Romagnesi (1953: 177) after treatment with picroformol de Hollande observed in boiling Chloralhydrate. Part of the collections have been fixed in Carnoy solution and conserved in 70% alcohol. This material appeared to be very suitable for the study of pigmentation patterns too. However, observations on fresh material are preferable because they give the most reliable results, particularly in cases of pale, diffusely intracellular pigments.

Drawings were made with the aid of a drawing prisma. The magnifications of the figures are: carpophores, natural size; spores, × 1000; all other microscopical details, × 670.

Unless otherwise stated all collections studied are deposited in the Rijksherbarium, Leiden (L).

NOTES ON THE CHARACTERS USED IN THE KEYS

CLAMP-CONNECTIONS.—To have a criterion for the presence or absence of clamp-connections, the hymenium was selected. In most species of *Nolanea* clamp-connections are abundant in the hymenium, but only very sparse in other tissues. The best way to study clamp-connections is to stain them in ammoniac 1% Congo Red. One should be careful of proliferating clamps (see Bas, 1965: 355) and look preferably at the base of young basidia.

PIGMENTATION.—The type of pigmentation and its topography is considered a character of great importance. Three main types of pigmentation are to be distinguished, viz.:

(i). Intracellular.—Pigment present in plasma and/or vacuoles inside the hyphal elements. This pigment can be diffuse or present itself as smaller or larger granules or clots, which sometimes agglutinate. In plasmolysis this type of pigmentation becomes more distinct at the moment the plasma retires from the hyphal walls in one or more coloured globules, leaving a non-coloured zone between them and the hyphal wall.

(ii). Membranal.—Pigment present in the hyphal wall. In plasmolysis there is no difference to be seen in the location of the pigmentation in comparison to observations on the pigments in water.

(iii) Encrusting.—Pigments present on the outer wall of the hyphal elements in the form of minute to rather large crust-like patches, which sometimes form distinct patterns (e.g. a 'zebra' pattern). This type of pigmentation is usually easy to recognize also in dried collections. In some cases the encrustations are very minute and inconspicuous and should be looked for very carefully, particularly on the narrowest hyphae of pileipellis and pileitrama, and near the septa.

Combinations of different types of pigmentation frequently occur, particularly (i) and (ii), or (i) and (iii).

The following abbreviations are used:

Q.—Length-width ratio, usually given as follows: Q = 1.2–1.3–1.4, which means Q = between 1.2 and 1.4, with an average of 1.3. (The length of a spore is measured without the apiculus.)

L–D = 1–2–3 μm.—Length minus width between 1 and 3, with an average of 2 μm.

Lamellae L = 20–25, l = 1–3(–5).—20 to 25 entire lamellae per carpophore with 1–3, sometimes 5 short lamellae ('lamellulae') between each pair.

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TAXONOMIC PART

Entoloma (Fr.) Kumm. *emend.* Donk
subgenus **Nolanea** (Fr.) Noordeloos, *comb. nov.*

Agaricus L. ex Fr. trib. *Nolanea* Fr., Syst. mycol. 1: 10. 1821 (basionym). — *Agaricus* L. ex Fr. subgen. *Nolanea* (Fr.) Loud., Encl. Pl.: 998. 1829. — *Nolanea* (Fr.) Kumm., Führ. Pilzk.: 24. 1871. — *Rhodophyllus* Quél. subgen. *Nolanea* (Fr.) Quél., Enchir.: 63. 1886. — *Hyporrhodius* (Fr.) Schroet. subgen. *Nolanea* (Fr.) Schroet. *in* Cohn, KryptogFl. Schles. 3(1): 613. 1889. — Lectotype (Largent, 1974): *Agaricus hirtipes* Schum. ex Fr.

Latzinea O.K., Rev. Gen. Pl. 2: 857. 1891. — Holotype: *Agaricus pascuus* Pers. ex Fr.

Lanolea Nieuwl. *in* Amer. Midl. Nat. 4: 381. 1916. — Holotype: *Agaricus pascuus* Pers. ex Fr.

Arenicola Velen., Novitates mycologicae novissimae: 62. 1947. — Holotype: *A. flavispora* Velen.

Carpophores mycenoid, rarely tricholomatoid or omphalioid. Pileus conical to campanulate or semiglobose, generally finally expanding to convex rarely plano-convex, usually papillate or umbonate, rarely truncate or umbilicate, hygrophanous (but sometimes only very weakly), when moist usually translucently striate at least at margin, surface glabrous and smooth or minutely radially lustrously fibrillous with aeriferous fibrils or sometimes rugulose to minutely fluffy-scaly at centre. Lamellae narrowly adnate to almost free or emarginate, rarely broadly adnexed to subdecurrent, frequently with distinct grey or brown tinge when mature. Stipe slender, often more or less cartilagineous and easily snapping across but in some taxa fibrous and easily splitting lengthwise. Smell and taste often farinaceous-rancid.

Spores iso- to heterodiametrical, with basal facet or dihedral base, in extra-European (tropical) taxa often prismatical or cuboid. Cheilocystidia present or not. Pleurocystidia usually lacking. Hymenophoral trama regular, usually composed of long cylindrical cells attenuated towards septa ('fusiform'), often up to 450 μm long or more. Pileipellis two-layered; suprapellis a simple cutis made up of radially arranged cylindrical hyphae, often with (clavate) terminal and sometimes ascending cells, thus forming transitions to a trichodermium; subpellis of short inflated cells well developed or not. Pileitrama regular, in general composed of the same type of cells as the hymenophoral trama. Pigmentation variable: membranal, encrusting or intracellular or combinations of different types. Clamp-connections present or not, if present then usually abundant in hymenium and elsewhere rare or lacking.

KEY TO THE SECTIONS AND SUBSECTIONS OF SUBGENUS NOLANEA

1a. Spores cuboid or prismatical (cruciform-stellate). . . . . Sect. *Staurospora*, p. 445
b. Spores otherwise: (sub-)isodiametrical and 5–6-angled in side-view or distinctly heterodiametrical. 2
2a. Cheilocystidia present. 3
b. Cheilocystidia absent. 7
3a. Lamellae olivaceous-greenish. . . . . Subsect. *Icterina*, p. 514
b. Lamellae never olivaceous-greenish. 4
4a. Pigment minutely encrusting hyphae of pileipellis and pileitrama and simultaneously intracellular, particularly in hypoderm; cheilocystidia cylindrical-subcapitate, spores heterodiametrical. Sect. *Nolanea*, p. 438
b. Pigment either exclusively intracellular or exclusively membranal and encrusting. 5
5a. Pigment intracellular. . . . . Subsect. *Cheilocystidiata*, p. 510
b. Pigment membranal and encrusting. 6

6a. Cheilocystidia tibiiform or spheropedunculate; spores with dihedral base.
Subsect. *Cosmeoxonema*, p. 472
b. Cheilocystidia (sub-)cylindrical, sometimes subcapitate; spores with basal facet.
Subsect. *Papillata*, p. 453
7a. Clamp-connections present, rarely absent but then pigment never encrusting. 8
b. Clamp-connections absent; pigment of two types: coarsely encrusting and granular-intracellular.
Sect. Fernandae, p. 486
8a. Pigment minutely to coarsely encrusting hyphae of pileipellis and pileitrama, sometimes in addition intracellular, particularly in hypoderm. . . . . Sect. *Papillata* 9
b. Pigment diffuse and intracellular, sometimes in addition membranal, never encrusting.
Sect. *Endochromonema* 12
9a. Spores isodiametrical, Q = 1.0–1.1–1.2. 10
b. Spores heterodiametrical, Q ≥ 1.2 on the average per collection. 11
10a. Pigment exclusively and coarsely encrusting hyphae of pileipellis and pileitrama.
Subsect. *Cosmeoxonema*, p. 472
b. Pigment minutely encrusting as well as intracellular, particularly in hypoderm.
Subsect. *Fibulata*, p. 463
11a. Carpophores pale; lamellae white then pale pink; pileus often variable in shape from conical to plano-convex, with papilla or central depression; spores with distinct dihedral base.
Subsect. *Minuta*, p. 468
b. Carpophores moderately to strongly pigmented; lamellae always with distinct grey or brown tinge; pileus usually papillate; spores usually with basal facet. . . . . Subsect. *Papillata*, p. 453
12a. Stipe smooth, glabrous, as if polished. 13
b. Stipe fibrillous, often striate. 14
13a. Pileus blackish brown; spores thin-walled, multiangular-gibbose in outline.. Subsect. *Tristia*, p. 508
b. Pileus moderately dark brown; spores regularly 5–6–7-angled in outline with pronounced angles.
Subsect. *Infularia*, p. 503
14a. Pileus and stipe with lemon-yellow tinges and/or flesh with strong aromatic smell like orange blossom.
Subsect. *Icterina*, p. 514
b. Pileus and stipe never with lemon-yellow tinges, only sometimes yellow-ochraceous; smell never aromatic. . . . . Subsect. *Endochromonema*, p. 495

KEY TO THE SPECIES OF SUBGENUS NOLANEA

1a. Basidia in majority 2-spored. 2
b. Basidia in majority 4-spored. 4
2a. Clamp-connections absent; pigment membranal and intracellular; stipe without differentiated hairs. 3
b. Clamp-connections present; pigment minutely encrusting; stipe with capitate hairs, particularly at apex. . . . . *E. cuspidifer*, p. 461
3a. Carpophores mycenoid with conical, then slightly expanding pileus, usually with distinct umbo; stipe silvery striate; taste absent or slightly farinaceous. . . . . *E. cetratum*, p. 496
b. Carpophores small and thick-set; pileus soon expanding, with or without a slight umbo, sometimes even slightly depressed; stipe polished; taste strongly rancid-fishy. . . . . *E. farinogustus*, p. 497
4a. Spores cuboid or cruciform-stellate (see Figs. 4, 5, 6). 5
b. Spores otherwise; (sub-)isodiametrically 5–6-angled or distinctly heterodiametrical in side-view. 9
5a. Spores cruciform-stellate. 6
b. Spores cuboid. 7
6a. Carpophores small and slender; pileus up to 15 mm broad; stipe 1–1.5 mm thick; on decaying trunks of frondose trees. . . . . *E. conferendum* var. *pusillum*, p. 450
b. Carpophores more robust and terrestrial. . . . . *E. conferendum* var. *conferendum*, p. 446

7a. Spores 10.2–12.4 μm long; pileus blackish brown, strongly contrasting with pale stipe. *E. inodorum*, p. 520
b. Spores up to 10 μm long; pileus and stipe concolorous and paler. 8
8a. Stipe minutely pruinose at least at upper half, with large fusiform caulocystidia; pigment membranal, not encrusting. . . . . *E. prismatospermum*, p. 523
b. Stipe smooth, polished, without caulocystidia; pigment intracellular, sometimes in addition encrusting. *E. rhombisporum*, p. 450
9a. Spores isodiametrical, 5–6-angled in side-view, Q = 1.0–1.1–1.2. 10
b. Spores heterodiametrical, Q ≥ 1.2 on the average per collection. 18
10a. Cheilocystidia present, subcylindrical to tibiiform. . . . . *E. tibiicystidiatum*, p. 473
b. Cheilocystidia absent. 11
11a. Pigment membranal, not encrusting.. . . . . *E. occultopigmentatum*, p. 501
b. Pigment minutely to coarsely encrusting, sometimes in addition intracellular. 12
12a. Pigment minutely encrusting and in addition also intracellular, particularly in subpellis; in forests, rarely also in grassland. 13
b. Pigment moderately to coarsely encrusting; no trace of intracellular pigment; in grassland. . 14
13a. Pileus moderately dark grey-brown, often with ochraceous tinge, already when moist covered with loose aeriferous fibrils, strongly lustrous when dry; stipe strongly silvery striate; smell weak, not farinaceous. . . . . *E. nitens*, p. 466
b. Pileus fairly dark grey-brown, smooth; stipe smooth or sparsely striate; smell strongly farinaceous. *E. juncinum*, p. 464
14a. Pileus very obscurely striate when moist, very dark grey-brown, surface hoary with scattered silvery-fibrillous patches; lamellae dark grey (species reminding of *Tephrocybe* spp.). *E. sericeum* var. *cinereo-opacum*, p. 482
b. Pileus distinctly striate when moist, dark sepia or reddish brown. 15
15a. Pileus relatively thick-fleshed with faint umbo or central depression; stipe usually as long as diameter of pileus.. . . . . *E. sericeum* var. *sericeum* f. *sericeum*, p. 479
b. Pileus relatively thin-membranaceous; stipe considerably longer than diameter of pileus. . . 16
16a. Pileus distinctly umbilicate.. . . . . *E. sericeoides*, p. 483
b. Pileus usually distinctly papillate.. 17
17a. Spores 7.4–8.3(–9.3) × 5.7–7.4 μm, Q = 1.1–1.2–1.3, only very weakly angled, subglobose-ellipsoid in outline. . . . . *E. ortonii*, p. 459
b. Spores 7.4–10.4 × (6.4–)6.7–8.7(–9.3) μm, Q = 1.0–1.1–1.2, distinctly angled in side-view. *E. sericeum* var. *sericeum* f. *nolaniforme*, p. 480
18a. Cheilocystidia present. 19
b. Cheilocystidia absent. 30
19a. Lamellae olivaceous-greenish. . . . . *E. chlorophyllum*, p. 518
b. Lamellae without any olivaceous or greenish tinge.. 20
20a. Pileus very pale grey when moist, on drying pallescent to white, no pigment present; stipe white. *E. nivescens*, p. 524
b. Pileus and stipe distinctly pigmented. 21
21a. Cheilocystidia globuliform or spheropedunculate. 22
b. Cheilocystidia differently shaped.. 23
22a. Clamp-connections absent; pigment intracellular. . . . . *E. globulifer*, p. 513
b. Clamp-connections present; pigment minutely encrusting. . . . . *E. sphaerocystis*, p. 485
23a. Pigment intracellular.. 24
b. Pigment minutely to coarsely encrusting, sometimes particularly in subpellis in addition also intracellular.. 27
24a. Lamellae very dark brown; cheilocystidia in majority lecithiform to tibiiform.. . *E. inutile*, p. 512
b. Lamellae never dark brown; cheilocystidia differently shaped. 25
25a. Cheilocystidia cylindrical, sometimes subcapitate, up to 40 μm long. . *E. cryptocystidiatum*, p. 511
b. Cheilocystidia fusiform to slenderly lecithiform, usually considerably longer than 40 μm. . . 26

26a. Spores (10.0–)10.4–12.0 μm long; cheilocystidia 42–90(–120) × 7–14(–20) μm.
E. velenovskyi var. *velenovskyi*, p. 510
b. Spores (10.1–)11–15.9(–16.3) μm long; cheilocystidia (50–)70–149 × (6.2–)7.4–15.9 μm.
E. velenovskyi var. *longicystidiatum*, p. 511
27a. Pigment minutely encrusting; smell aromatical-fruity or like that of orange blossom; in grasslands.
E. sacchariolens, p. 474
b. Pigment minutely encrusting and in addition particularly in subpellis intracellular; smell farinaceous, rarely absent, never aromatical-fruity; in forests or grasslands. 28
28a. Spores (8.1–)8.5–12(–13.9) × (5.2–)5.8–7.5(–8.1) μm; stipe long and slender, much longer than diameter of pileus, 1–3(–5) mm thick; in forests, autumn. . . . . *E. leptopus*, p. 442
b. Spores 8.0–9.3(–9.5) μm wide; stipe considerably thicker, 3–7(–10) mm. 29
29a. Stipe much longer than diameter of pileus; pileus conical, only slightly expanding; in coniferous forests in spring, also in dune valleys and on grassy, open places in mixed forest in late autumn.
E. hirtipes var. *hirtipes*, p. 438
b. Stipe about as long as diameter of pileus; pileus more or less flattened; in grasslands.
E. hirtipes var. *sericoides*, p. 442
30a. Pigment intracellular, sometimes in addition membranal but never encrusting. 31
b. Pigment minutely to coarsely encrusting, sometimes in addition diffusely or granularly intracellular. 43
31a. Pileus with yellowish or brownish olivaceous tinge; often with strong, aromatic smell like that of *Hebeloma sacchariolens* or *Entoloma ameides*, like fruit, etc. 32
b. Pileus never with yellow-olivaceous or brown-olivaceous tinges; smell never aromatic like that of *Hebeloma sacchariolens*, etc. 33
32a. Pileus with yellow-olivaceous tinge. . . . . *E. icterinum*, p. 516
b. Pileus with brown-olivaceous tinge. . . . . *E. ambrosium*, p. 520
33a. Spores 5–7 μm wide. 34
b. Spores 7–9.5 μm wide. 37
34a. Spores 6–8 × 5–7 μm, Q = 1.15–1.2 on the average per collection, rather thin-walled, multiangular in side-view, slightly cyanophilous. . . . . *E. vinaceum* and varieties, see excluded species, p. 529
b. Spores 7–10 × 5–7 μm, Q = 1.3 on the average per collection, 5–7(–9)-angled in side-view, with relatively thick, non-cyanophilous walls. 35
35a. Pileus blackish brown; spores irregularly 6–9-angled-nodulose in side-view.
E. undulatosporum, p. 509
b. Pileus moderately dark brown, reddish brown or yellowish brown; spores rather regularly 5–6(–7)-angled in side-view. 36
36a. Stipe grey-brown to blackish brown; pileus moderately dark brown, often with ochraceous tinge; smell absent. . . . . *E. solstitiale*, p. 505
b. Stipe and pileus yellowish to reddish brown; smell strongly like that of chlorine.
E. chlorinosum, p. 507
37a. Stipe smooth, polished. 38
b. Stipe striate, with (aeriferous) silvery white fibrils. 39
38a. Stipe yellow; pileus pinkish brown or with reddish tinge. . . . . *E. verecundum*, p. 507
b. Stipe (dark) horn brown; pileus blackish brown. . . . . *E. triste*, p. 509
39a. Spores 8.3–11 μm long, Q = 1.1–1.25–1.4; in grasslands. 40
b. Spores 10–12 μm long, Q = 1.25–1.4–1.5; in forests. 41
40a. Pileus pale grey-brown with slight ochraceous tinge, with dark brown striae up to centre; lamellae grey, then brown-pink, thickish, broadly ventricose, exceeding the pileus. . . . *E. ventricosum*, p. 502
b. Pileus pale orange-brown with grey-brown striae up to centre; lamellae pale, then pink without any grey or brown tinge, of normal thickness, not exceeding the pileus. . . . . *E. calthionis*, p. 502
41a. Stipe entirely downy pruinose with cylindrical, sometimes subcapitate hairs; pileus and stipe very pale brown with yellow or grey tinge. . . . . *E. lanuginosipes*, p. 499
b. Stipe smooth or pruinose at apex or upper half only, rarely entirely pruinose, then pileus dark brown or date brown at least at limb. 42

42a. Pileus bicolorous; limb sepiaceous or date brown, centre yellowish; lamellae with ochraceous tinge. *E. cuneatum*, p. 498
b. Pileus unicolorous, reddish brown; lamellae pale when young, becoming pinkish brown with age. *E. pallescens*, p. 521
43a. Pigment of two types: (coarsely) encrusting the hyphae of pileipellis and pileitrama, in addition intracellular in form of granules or clots in hyphae of pileipellis and upper pileitrama; pileipellis a cutis, often with numerous, ascending terminal cells, forming a transition to a trichodermium, particularly at centre of pileus; clamps absent. 44
b. Pigment encrusting, exceptionally in addition with pale, diffusely intracellular pigment; pileipellis usually a simple cutis, occasionally with tufts of ascending hyphae at centre of pileus; clamps present. 51
44a. Stipe strongly silvery striate; pileus smooth, when moist translucently striate up to centre. 45
b. Stipe not striate but smooth or downy-pruinose, and then pileus rugulose-felted to subsquamulose, at least at centre, and striate at margin only. 46
45a. Pileus grey-brown with yellow or russet tinge, pale greyish ochraceous when dry; lamellae white, then pink without any brown or grey tinge; flesh rather brittle in pileus; spores 7.9–10.3(–10.8) × (6.3–)6.7–7.7(–8.0) μm; 2- and 4-spored basidia equally distributed in hymenium. . . *E. acidophilum*, p. 489
b. Pileus rather dark grey-brown, brown-grey on drying; lamellae pale brown-grey, then flesh-coloured pink; flesh in pileus more or less firm; spores 7.4–9.5(–10.6) × 5.8–6.9(–7.4) μm; basidia 4-spored. *E. argenteostriatum*, p. 490
46a. Spores rather strongly rounded and weakly angular in side-view, (6.5–)6.7–7.9(–8.1) × (5.3–)5.8–6.9 (—7.4) μm, Q = 1.1–1.2–1.3. . . . . *E. defibulatum*, p. 492
b. Spores larger and more pronouncedly angular in side-view, Q ≥ 1.25 on the average per collection. 47
47a. Stipe with distinct yellow tinge, quite different from colour of pileus.. . . *E. xanthocaulon*, p. 493
b. Stipe greyish-brownish, more or less with the same colour as the pileus, but usually paler. 48
48a. Spores (8.4–)9.0–11.4(–12.5) × (6.2–)6.9–7.7(–8.2) μm, Q = 1.3–1.45–1.7(–1.8). *E. cuniculorum*, p. 490
b. Spores not longer than 10.5 μm, and Q = 1.1–1.3–1.4. 49
49a. Pileus when young more or less conical, quickly expanding to convex or flattened, sometimes slightly depressed at centre, sometimes with small umbo, pale to moderately dark grey-brown; in grasslands. 50
b. Pileus acutely conical, not or only slightly expanding; blackish brown; gregarious in coniferous forests. *E. fractum*, p. 492
50a. Pileus strongly hygrophanous, when moist translucently striate up to centre, absolutely smooth and glabrous; stipe brilliant, smooth and glabrous. . . . . *E. psilopus*, p. 489
b. Pileus only weakly hygrophanous, when moist translucently striate at margin only, rugulose-fluffy or subsquamulose particularly at centre; stipe smooth, glabrous or minutely downy-woolly all over. *E. fernandae*, p. 487
51a. Smell strong, aromatic, like that of amylacetate or fruit, also reminding of *Hebeloma sacchariolens*; pileus and stipe pale ochraceous grey or brownish grey. . . . . *E. ameides*, p. 473
b. Smell absent or farinaceous-rancid. 52
52a. Pileus and stipe pale beige to pale brown; carpophores tiny and brittle; smell absent; on marshy places. 53
b. Pileus and stipe moderately to fairly dark brown, sepia, reddish brown or yellowish brown; in grasslands and smell farinaceous, or in forests and smell absent. 54
53a. Pileus usually (slightly) depressed at centre and with conspicuous dark spot, rarely with small papilla; lamellae pale pink; stipe glabrous, without differentiated hairs; spores (7.9–)8.0–10.4(–11.5) × (6.4–)6.8–8.1(–8.7) μm. . . . . *E. minutum*, p. 468
b. Pileus convex with or without small papilla, never depressed; lamellae with distinct grey-brown colour; apex of stipe with well differentiated, subcapitate hairs; spores 9.3–12(–14) × 7.2–9.3 μm. *E. tenellum*, p. 470

54a. Spores very obtusely angled, more or less rounded in outline, 7.4–8.3(–9.4) × 5.7–7.4(–8.0) µm, Q = 1.1–1.2–1.3; stipe strongly silvery striate; smell farinaceous. . . . . *E. ortonii*, p. 459
b. Spores more pronouncedly angled and slightly to considerably larger; stipe smooth or sparsely silvery striate.. 55
55a. Spores 7.9–10.4 × 6.6–8.6(–9.0) µm, Q = 1.1–1.2–1.3; lamellae never dark brown; stipe sparsely but distinctly silvery striate; smell farinaceous.. . . . . *E. lucidum*, p. 458
b. Spores with average Q per collection at least 1.25 and usually larger; if spores of same size then lamellae fairly dark brown, stipe never striate and smell absent. 56
56a. Pileus moderately dark reddish brown or ochraceous brown; lamellae pale, then pink, sometimes with brown or grey tinge; hyphae of hymenophoral trama never encrusted; smell absent.. . . . 57
b. Pileus very dark sepia, reddish brown or blackish brown; lamellae very dark brown when mature; usually the narrowest hyphae of the hymenophoral trama encrusted; smell farinaceous or absent. 58
57a. Lamellae with brown tinge when mature; spores 7.0–8.7 µm wide; stipe sparsely silvery striate. *E. sericeonitens*, p. 459
b. Lamellae white, then pink without brown or grey tinges; spores 5.8–7 µm wide; stipe smooth, polished. *E. infula*, p. 503
58a. Smell farinaceous-rancid; lamellae pale when young but soon very dark brown with pink tinge; stipe often paler than pileus and with some scattered silvery fibrils or smooth, polished; spores (9.0–)9.3–11.3(–13) × (6.7–)7.1–8.0(–8.5) µm, Q = 1.2–1.3–1.5(–1.6), with basal facet; in grasslands. *E. papillatum*, p. 454
b. Smell absent. 59
59a. Strictly vernal, appearing from March to the end of May; pileus moderately dark brown to very dark sepia; lamellae of normal thickness, not very much distant, paler than pileus; apex of stipe with well differentiated, cylindrical, sometimes subcapitate hairs; spores (8.1–)9.0–11.5(–12.0) × 7.0–9.3 µm, Q = 1.1–1.25–1.4, with dihedral base; in or near coniferous forests. . . . . *E. vernum*, p. 476
b. Appearing in late summer and autumn; pileus and stipe concolorous, very dark, almost blackish brown, often with reddish tinge; lamellae very distant and thickish, brown already when young, when mature almost as dark as pileus; stipe smooth, polished, without differentiated hairs; spores (7.8–)8.2–10.2(–10.6) × (5.7–)6.2–7.5(–7.9) µm, Q = 1.2–1.3–1.4(–1.5), with basal facet; in clearings in frondose forests, rarely also in grasslands. . . . . *E. clandestinum*, p. 456

SYNOPTICAL KEY TO THE SPECIES OF SUBGENUS NOLANEA

(numbers refer to those in the Synopsis on p. 439;
numbers in brackets means: characters present or not)

Pileus
colour
when moist very pale grey, becoming (almost) white on drying: (15), (18), (38), 59
with distinct olivaceous yellow or olivaceous brown tinge: 53, 54, 55
date brown with yellow papilla: 37
surface
hardly hygrophanous, not striate: 26, (27)
with slightly rugulose or fluffy centre: (3), (4), (5), (13), (14), (19), (21), (23), (49), (51), (53), (54)
centre minutely squamulose: 26, 27
shape
(acutely) conical, not or only slightly expanding: (1), 7, (10), 12, (16), 18, 20, 34, 35, (37), 43, (44), (45), 48, 57
with (slight) central depression or umbilicate: (6), (15), (21), 24, (26), 27, (36), (38), (39), (51), (53), (54)

Lamellae
  colour
    with greenish or olivaceous tinge: (53), 54
    white, then pink without any brown or grey tinge: (6), 15, 29, (34), (36), 40, 42, 43, 44, 45, (53), 56, 59
    very dark brown or grey-brown, only slightly tinged pink: 7, 8, (13), (21), (22), 23, 51, (57)
  shape
    with decurrent tooth: (15), 24, (26), 27, (53), (54)
    thickish: 8, 41, 54
    broadly ventricose, exceeding pileus: (4), (6), 12, (13), 15, (16), (22), (39), 41

Stipe
  colour
    white: 56, 59
    yellow or at least predominantly yellow: 5, 6, (15), (16), (18), 34, (35), (36), 38, (40), 45, (53)
  surface
    smooth, as if polished: 6, (7), 8, (26), 27, 28, 31, (34), 36, 42, 43, 44, 45, 47

Smell
  like chlorine: 44
  aromatic, like orange blossom, fruit, amylacetate, etc.: 18, 19, 54, 55
  raphanoid: 12
  absent: (4), (5), (7), 8, 15, 16, 20, (24), (25), 35, 37, (38), 41, 42, 43, 45, 46, 50, 51, 54, 56
  fetid, like rotten meat: 60
  farinaceous or farinaceous-rancid, like fish or cucumber: all other numbers

Spores
  shape
    cruciform-stellate: 4, 5
    cuboid: 6, 56, 58
    (sub-)isodiametrical, Q = 1.0–1.1–1.2: (9), (11), 13, 14, 17, 21, 22, 23, 24, 32, 39
    heterodiametrical: all other numbers
  size
    width not exceeding 7–7.5 μm: 3, 8, 11, 26, 27, 28, (29), 30, 32, 33, 34, 42, 43, 44, 47, (55)
    length not exceeding 8.5 μm: (11), 32, 34
    length not exceeding 10.5 μm: 6, 8, 9, 13, 14, (15), (17), (19), 21, 22, 23, 24, 26, 27, 28, 29, 30, 31, 32, 33, 39, (40), 42, 43, 44, (47), 50, 54, 58
    length always ≥ 9.5 μm: 1, 2, (5), (7), (10), 12, 16, 18, 19, (20), (31), 35, 37, 38, 45, 46, 48, 49, 51, (52), (54), 56, 57, 59

Basidia
  in majority 2-spored: 12, 35, 36
  clampless: 4, 5, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 52

Cheilocystidia
  present: 1, 2, 3, 6, 12, (16), 17, 19, 25, 48, 49, 50, 51, 52, 54, 59
  shape
    semiglobose, globuliform or spheropedunculate: 25, 52
    tibiiform: 17, 51
    irregularly cylindrical-flexuous, with attenuate apex or subcapitate, 50–90(–140) μm long, protruding: 48, 49, 54

Pigment
exclusively encrusting: 7, 8, 9, 10, 11, 12, (15), 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, (42)
exclusively intracellular: 4, 5, (6), 40, 41, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 56
encrusting and intracellular: 1, 2, 3, (6), 13, 14, (15), 26, 27, 28, 29, 30, 31, 32, 33, 34, (42)
membranal and intracellular: 35, 36, 37, 38, (39), 53, 54, 55, 57
exclusively membranal: (39), 58.

Stipitepellis with well-developed hairs
(sub-)capitate: 12, 16, 20
(sub-)cylindrical: (37), 38

SECTION NOLANEA

Rhodophyllus Quél. subsect. *Mammosi* Romagn. *in* Bull. Soc. mycol. Fr. **53**: 331. 1937. — *Rhodophyllus* Quél. sect. *Mammosi* (Romagn.) Romagn. *in* Bull. mens. Soc. linn. Lyon **43**: 331. 1974.

Characteristics.—Pigment encrusting the hyphae of pileipellis and pileitrama as well as diffusely intracellular, particularly in hypoderm; cheilocystidia present, cylindrical-subcapitate; spores heterodiametrical with basal facet; clamps at least in hymenium always present.

KEY TO THE SPECIES OF SECTION NOLANEA

1a. Spores on the average considerably less than 8 µm wide; stipe long and slender, 1–3(–5) mm thick; general habit *Mycena*-like; in forests. . . . . *E. leptopus*, p. 442
b. Spores on the average more than 8 µm wide; stipe if long then considerably thicker (3–7(–10) mm). 2
2a. Stipe much longer than diameter of pileus; pileus conical, only slightly expanding; in coniferous forests, frequent in spring but also in autumn, then also in dune valleys. *E. hirtipes* var. *hirtipes*, p. 438
b. Stipe about as long as diameter of pileus; pileus dark sepia and more or less flattened (resembling *E. sericeum*); in grasslands. . . . . *E. hirtipes* var. *sericoides*, p. 442

1. ENTOLOMA HIRTIPES (Schum. ex Fr.) Moser var. HIRTIPES—Figs. 1a–d

Agaricus hirtipes Schum. ex Fr., Syst. mycol. **1**: 206. 1821. — *Nolanea hirtipes* (Schum. ex Fr.) Kumm., Führ. Pilzk.: 95. 1871. — *Rhodophyllus hirtipes* (Schum. ex Fr.) Quél., Enchir.: 64. 1886. — *Entoloma hirtipes* (Schum. ex Fr.) Moser *in* Gams, Kl. KryptogFl., 4. Aufl. **2**(b/2): 206. 1978.

Agaricus acceptandus Britz. *in* Ber. naturw. Ver. Schwaben, Augsburg **26**: 140. 1881. — *Nolanea acceptanda* (Britz.) Sacc., Syll. Fung. **5**: 724. 1887.

MISAPPLIED NAMES.—*Nolanea mammosa* (L. ex Fr.) Quél. sensu Boud., Ricken, non Konr. & Maubl. nec P. D. Orton. ? — *Rhodophyllus mammosus* (L. ex Fr.) Quél. sensu Kühn. & Romagn.

Nolanea pascua (Pers. ex Fr.) Kumm. sensu Quél., Rea, Bres.

Nolanea majalis (Fr. ex Fr.) Konr. sensu Konr., Rea non Fr.

SELECTED ICONES AND DESCRIPTIONS.—Boud., Icones mycol. **1**: 49, pl. 97. 1906 (as *Nolanea mammosa*). — Cetto, Funghi Vero **1**: 247 (No. 100). 1975. — Konr. *in* Bull. Soc. mycol. Fr. **39**: 36, pl. 2, figs. 1–4. 1923 (as *N. majalis* Fr.). — Konr. *in* Bull. Soc. mycol. Fr. **45**: 47–49. 1929. — Konr. & Maubl., Icones sel. Fung., pl. 177, 1930. — J. Lange, Fl. agar. dan. **2**: 101, pl. 78 G. 1936. — P. D. Orton *in* Trans. Br. mycol. Soc. **43**: 329. 1960 (in key only). — Trimbach *in* Doc. mycol. **8**(29): 39–41. 1978.

TABLE I

Synopsis of the taxa of *Entoloma* subgenus *Nolanea* treated in the present work

CHARACTERISTICS.—Carpophores robust, pileus 30–70 mm broad, dark sepia or reddish brown; stipe 90–160 × 3–7(–10) mm, striate; smell strong, rancid-farinaceous; spores 10.4–13.4 (–14.5) × 8–9.3 μm; subcylindrical-subcapitate cheilocystidia present; on calcareous soils in coniferous forests and near coastal dunes, frequent in spring.

Pileus 30–70 mm broad, acutely conical then expanding to conico-campanulate, hemispherical or conico-convex with or without small umbo, with margin involute later straight, strongly hygrophanous, when moist rather dark sepia, date brown or reddish brown (centre e.g. 10 YR 3/2; 7.5 YR 3/2), towards margin slightly paler (7.5 YR 5/2, 5/4, 5/6), translucently striate up to one half of the radius, on drying pallescent to grey-brown (10 YR 4/2, margin to 10 YR 7/3), smooth, innately fibrillous, shining. Lamellae L = about 30, l = 3–5, adnate to almost free, broadly ventricose, pale then brownish pink (10 YR 7/3, 8/3 then 7.5 YR 8/4, 7/4, finally 5 YR 5/4), with eroded concolorous edge. Stipe 90–160 × 3–7(–10) mm, straight, usually slightly broadened at base, yellowish brown to sepia, with paler apex (apex 10 YR 7/2, 6/3; 2.5 Y 7/2, base 10 YR 4/3, 4/2), innately silvery striate, twisted, pruinose at apex, tomentose-hairy at base. Smell and taste strongly farinaceous-rancid or like cod-liver oil.

Spores 10.4–13.4(–14.5) × 8.1–9.3(–9.5) μm, Q = (1.25–)1.3–1.5(–1.6); L–D = (1.7–)2.3–3.7–5.0 μm; irregularly (5–)6(–7)-angled in side-view, with basal facet. Basidia 32–48 × 9–14 μm, 4-spored. Cheilocystidia 35–70 × 5.5–14 μm, subcylindrical to sublageniform, often subcapitate, numerous, sometimes mixed with basidia. Hymenophoral trama regular; cells subcylindrical to inflated, up to 350 μm long and 10–19(–25) μm wide. Pileipellis a cutis made up of radially arranged 4–11 μm wide cylindrical hyphae with intracellular pigment and minutely encrusted walls. Pileitrama regular; cells subcylindrical to inflated, 170–320 × 7.5–19 μm, with pale brown, often minutely encrusted walls. Clamp-connections frequent in hymenium, rare in other tissues.

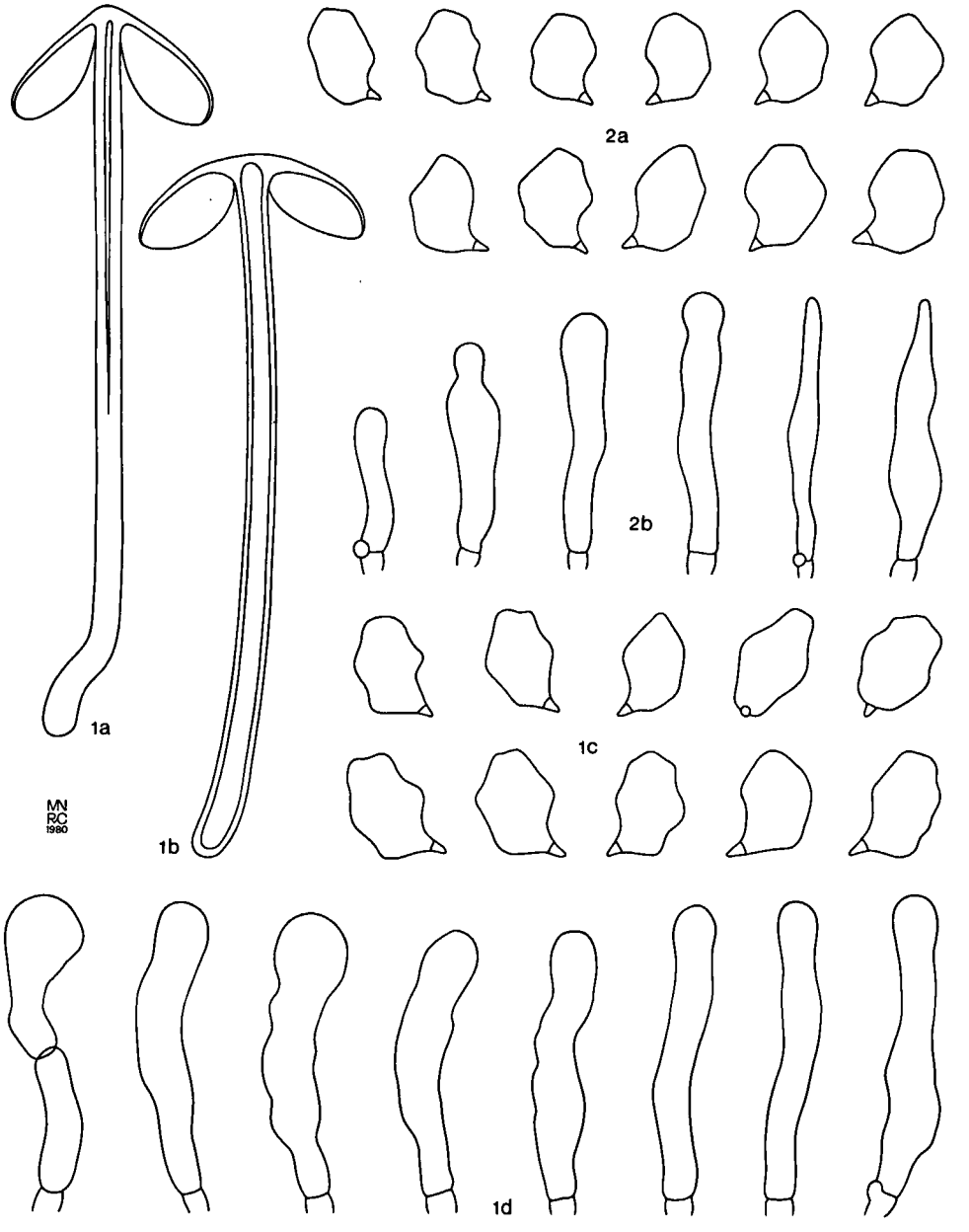
HABITAT & DISTRIBUTION.—In coniferous forests on calcareous soils and (in the Netherlands) in coastal dunes near frondose and coniferous trees. Common in central and northern Europe in spring, also recorded in autumn (Netherlands, Denmark).

COLLECTIONS EXAMINED.—NETHERLANDS: prov. Noord-Holland, IJmuiden, Midden Heerenduin, 6 Nov. 1976, *M. E. Noordeloos 251*; Overveen, 'Koningshof', 21 Nov. 1976, *J. van Brummelen*; prov. Zuid-Holland, Warmond, 'Huys te Warmont', 8 Nov. 1953, *R. A. Maas Geesteranus 9574*. NORWAY, Oppland, Jevnaker, Vangsaasen, 1 June 1969, *A. Eftestöl & G. Gulden* (O). — DENMARK, Isl. of Mön, 16 Oct. 1977, *M. E. Noordeloos 524*. — BELGIUM, prov. Namur, Rochefort, 3 May 1965, *H. S. C. Huijsman*. — GERMAN FEDERAL REPUBLIC, Bayern, Geltendorf, 3 May 1970, *A. Bresinsky* (M); Gnadenwald, 14 May 1951, *M. Moser 51/25* (M).

Orton (1960: 329) gives a key to *Entoloma hirtipes* and related species, mainly based on differences in spore size. In my experience these differences are not as clear-cut as Orton suggests. Particularly Orton's *N. hirtipes* and *N. mammosa* are difficult to distinguish. In the collections of *E. hirtipes* var. *hirtipes* studied I found a variation in spore dimensions covering the measurements given by Orton for both species, without correlations with such characters as size of the carpophore and striation-intensity of the stipe.

I found the size of the spores in typical *Nolanea tenuipes* to differ from the measurements given by Orton, though the difference between the latter and *E. hirtipes* var. *hirtipes* remains clear-cut indeed (see also below, p. 443).

The main distribution of var. *hirtipes* is in central and northern Europe particularly in hilly or mountainous areas in coniferous forests on calcareous soils, frequently in spring, but occasionally in autumn. Orton records *E. hirtipes* var. *hirtipes* from the same habitat in Scotland in late autumn. The Netherlands' collections cited were gathered in or near the coastal dunes also in late autumn. The habitat was not strictly coniferous forest but grassy spots near frondose



Figs. 1a–d. *Entoloma hirtipes* var. *hirtipes*. — Habit, spores and cheilocystidia (1a from *Noordeloos 251*; 1b from *van Brummelen, 21 Nov. 1976;* 1c–d from *Huijsman, 3 May 1965*).
Figs. 2a–b. *Entoloma hirtipes* var. *sericoides*. — Spores and cheilocystidia (2a–b from *Bas 5514*).

and/or coniferous trees. The size of the carpophores of these collections was somewhat small, but the large spores made me consider them to belong to var. *hirtipes*.

2. ENTOLOMA HIRTIPES (Schum. ex Fr.) Moser var. **sericoides** (Kühn.) Noordeloos, *comb. nov.*—Figs. 2a–b

Rhodophyllus mammosus (Fr.) var. *sericoides* Kühn. apud Kühn. & Romagn. *in* Rev. Mycol. **19**: 10. 1954. (Fl. anal.: 187. 1953, nom. nud.)

CHARACTERISTICS.—Carpophores thick-set, resembling *Entoloma sericeum* var. *sericeum* and occurring in the same habitat with that species; pileus and stipe rather dark grey-brown; smell farinaceous-rancid; spores 10–12.5 × 8–9.3 μm; cheilocystidia present cylindrical-sublageniform, often subcapitate; in poorly manured and extensively grazed grasslands in coastal dunes; autumn.

Pileus 15–38 mm broad, conico-convex soon flattening, with or without small umbo, with margin slightly involute, strongly hygrophanous, rather dark brown when moist (7.5 YR 2/2 to 5 YR 2/2), paler at margin, translucently striate up to one-third of the radius, on drying pallescent to grey-brown along radial streaks, glabrous, radially innately fibrillous, shining. Lamellae subdistant, deeply emarginate, pale grey then moderately dark grey-brown with pink tinge, paler towards slightly eroded edge. Stipe 25–45 × (1.5–)2–4 mm, grey-brown to dark brown-grey, pruinose-flocculose at apex, downwards silvery striate. Flesh in pileus and stipe concolorous with surface, on drying pallescent. Smell strong, like cod-liver oil. Taste rancid.

Spores 10–12.5 × 8.0–9.3 μm, Q = 1.2–1.3–1.5, L–D = 2–4 μm, 6–7-angled in side-view, with basal facet. Basidia 32–46 × 8.2–12 μm, 4-spored. Cheilocystidia 25–52 × 2.5–7 μm, (sub)-cylindrical to sublageniform, with rounded, sometimes subcapitate or attenuate tip. Hymenophoral trama regular, with cylindrical to inflated cells up to 270 × 9–21 μm, with hyaline, colourless walls. Pileipellis a simple cutis made up of radially arranged, 2.7–8 μm wide, cylindrical hyphae with intracellular pigment and sometimes minutely encrusted walls, gradually passing into pileitrama. Pileitrama regular with long cylindrical to inflated cells up to 290 × 6–19(–26) μm, with brown, minutely encrusted walls. Clamp-connections frequent in hymenium, rare elsewhere.

HABITAT & DISTRIBUTION.—In grasslands, in the Netherlands in extensively grazed meadows in old coastal dunes, rare. Also known from France (type-locality). September-November.

COLLECTIONS EXAMINED.—NETHERLANDS: prov. Zuid-Holland, Isl. Goeree, Westduinen, 11 Nov. 1976, *F. Tjallingii & G. J. M. G. Tjallingii-Beukers*; prov. Zeeland, Schouwen, Renesse, 'Zouten Haard', 10 Sept. 1970, *C. Bas 5514*.

Entoloma hirtipes var. *sericoides* differs from the type by habit, and from *E. leptopus* by the large spores. In the field it is easily confused with *E. sericeum*, with which it grows in the same habitat. Microscopically it is easily distinguished, however, by the large spores, the presence of cheilocystidia and two types of pigment.

3. **Entoloma leptopus** Noordeloos, *nom. nov.*—Figs. 3a–f

Nolanea tenuipes Orton *in* Trans. Br. mycol. Soc. **43**: 334. 1960 (basionym), non *Entoloma tenuipes* Murr 1917.

Rhodophyllus mammosus (L. ex Fr.) Quél. var. *obsoletus* Romagn. *in* Rev. Mycol. **19**: 7. 1954. (Fl. anal.: 188. 1953, nom. nud.)

MISAPPLICATIONS.—*Rhodophyllus mammosus* var. *tenuis* (Fr.) Kühn. & Romagn. sensu Kühn. & Romagn. non Fr. — *Entoloma mammosum* (Fr.) Hesler sensu Moser.

SELECTED ICONES & DESCRIPTIONS.—Dähnke & Dähnke, 700 Pilze: 261. 1979 [as *E. mammosum*].

CHARACTERISTICS.—Carpophores slender, mycenoid; pileus 10–40(–45) mm broad, yellowish to reddish brown, often with discolor, darker papilla; stipe up to 110 × 1–3(–5) mm; smell usually strongly farinaceous-rancid; spores 8.5–12 × 5.8–7.5 μm; cylindrical-subcapitate cheilocystidia present; in deciduous forests; summer-autumn.

Pileus 9–40(–45) mm broad, conico-convex, campanulate or hemispherical then expanding to plano-convex, usually with distinct papilla, rarely more or less flattened, with margin slightly involute when young only, mostly straight, sometimes exceeding the lamellae, often splitting with age and more or less crenulate, strongly hygrophanous, when moist yellow-brown, grey-brown, leather-coloured or reddish brown, centre (papilla) frequently distinctly darker than rest (centre 10 YR 6/3, 5/3, 4/3, 4/2, 3/2, even 2/2; 7.5 YR 5/4, 4/2, 3/2 towards margin and interstriation distinctly paler, 10 YR 6/3, 6/4, 7/3, 7/4; 7.5 YR 6/4, 7/4), translucently striate up to centre, strongly pallescent on drying towards yellowish brown or greyish isabella (10 YR 7/2, 7/3, 8/3, 8/4), glabrous, strongly radially fibrillous-lustrous, at centre sometimes more or less fluffy-rugulose. Lamellae L = 20–30(–35), l = 1–3–5(–7), almost free or adnate-emarginate, ventricose, pale (brown) then pink finally brownish pink (10 YR 8/3; 7.5 YR 8/3, 8/4, 7/4, 6/4 to 6/6), with almost entire concolorous edge. Stipe 20–85(–110) × 1–3(–5) mm, straight-cylindrical, usually slightly broadened at base, solid then fistulose, pale brown, reddish brown or grey-brown, usually slightly paler than pileus (10 YR 7/4, 6/4, 6/3, 5/4, 5/6, 5/8; 7.5 YR 5/4), darker at base (10 YR 3/2; 7.5 YR 3/2), pruinose-flocculose at apex, downwards sparsely to abundantly fibrillously striate, never absolutely smooth, sometimes twisted, white-tomentose at base. Flesh thin-membranaceous, rather brittle in pileus, firmer to subcartilagineous in stipe, almost concolorous with surface, slightly pallescent on drying. Smell usually strongly like cucumber; rancid-farinaceous, particularly when cut, rarely absent. Taste strongly rancid, rarely indistinct.

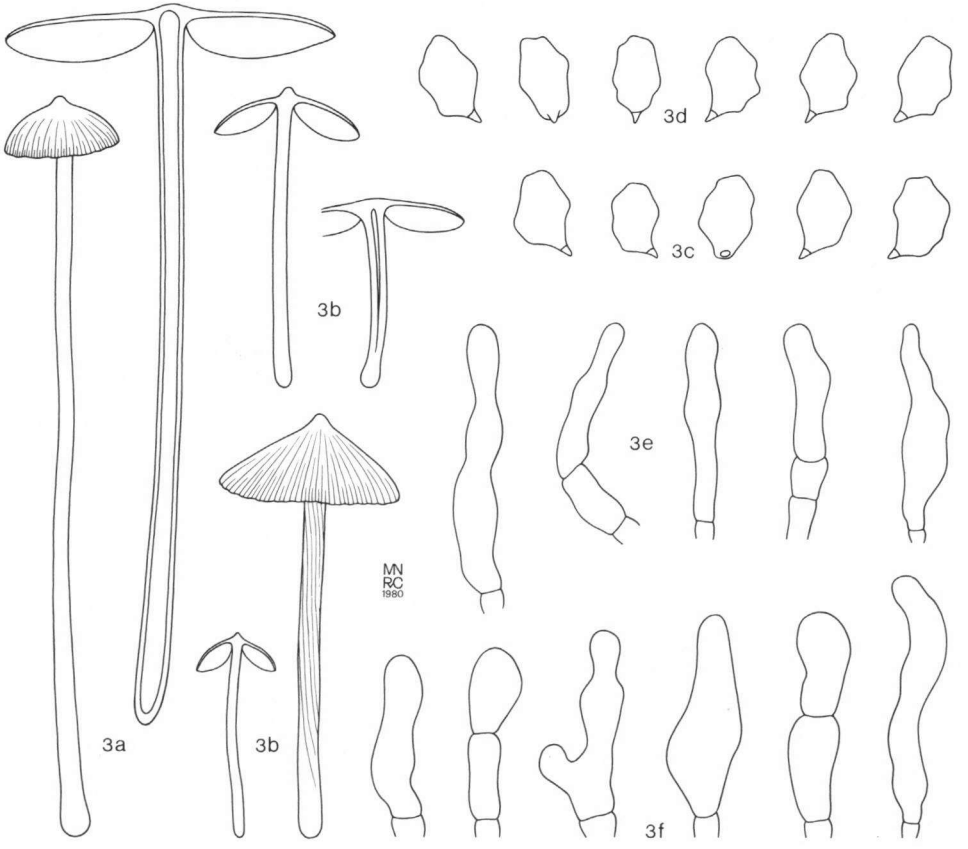
Spores (8.1–)8.5–12.0(–13.9) × (5.2–)5.8–7.5(–8.1) μm, Q = 1.2–1.45–1.6(–1.8), L-D = 2.5–4–6 μm, 7–8-angled in side-view, with basal facet, often with strong suprahilar depression. Basidia 24–40 × 7.5–13 μm, 4-(rarely 2-)spored. Cheilocystidia 25–52 × 4–10 μm, numerous, usually mixed with basidia, versiform, mostly cylindrical-subcapitate to flexuose or clavate, more rarely cylindrico-attenuate. Hymenophoral trama regular, composed of cylindrical to inflated cells up to 380 μm long and 14–34(–50) μm wide. Pileipellis a thin cutis made up of 3–9.5(–13.5) μm wide cylindrical hyphae with pale, often minutely encrusted walls, gradually passing into pileitrama or subpellis, composed of short, inflated cells 32–80 × 11.5–32 μm, with scarce to abundant intracellular pigment and with slightly coloured, sometimes minutely encrusted walls. Pileitrama regular, composed of cylindrical to inflated cells up to 470 μm long and up to 27 μm wide, with in upper layer usually pale, minutely encrusted hyphae (particularly the narrowest ones). Clamp-connections abundant in hymenium, elsewhere rare or lacking.

HABITAT & DISTRIBUTION.—Terrestrial on damp, humus-rich soils in frondose forests, common in the Netherlands, particularly in Alder and Ash-woods (*Alno-Padion* and *Ulmion-carpinifoliae* associations). Also known to occur in Belgium, Great Britain, France and Germany. July-November.

COLLECTIONS EXAMINED.—NETHERLANDS: prov. Drenthe, Roden E. of Vagevuur, 14 Sept. 1976, *M. E. Noordeloos 169*; prov. Gelderland, Winterswijk, Bek-en-Delle, 3 Sept. 1979, *J. Schreurs*; ditto, Willinks Weust, 20 Oct. 1977, *M. E. Noordeloos 553*; Daarlerveen, 1 Sept. 1979, *C. M. den Held-Jager*; Hierden, Hulshorst, Grote Water, 14 Oct. 1956, *A. Groeneweg*; prov. Utrecht, Leusden, Schoolsteegbosjes, 6 Aug. 1979, *J. Wisman 71*; Bunnik, Oud Amelisweerd, 22 July 1954, *R. A. Maas Geesteranus 9997*; prov. Noord-Holland, Kortenhoef, 11 July 1970, *J. Daams*; Noordwijkerhout, Vogelenzang, 19 Oct. 1958, *C. Bas 1618*; prov. Zuid-Holland, Voorschoten, estate 'ter Horst', 2 July 1974, *C. Bas 6313/14/15*; 7 Aug. 1974, *M. E. Noordeloos 25*; 3 Sept. 1974, *M. E. Noordeloos 42*; 28 Sept. 1977, *M. E.*

Noordeloos 472; 15 Aug. 1979, *M. E. Noordeloos 972*; Isl. of Voorne, Quackjeswater, 27 Oct. 1976, *M. E. Noordeloos 234*; Katwijk, Pan van Persijn, 17 Oct. 1969, *E. Arnolds 411*; prov. Zeeland, Domburg near Castle, 30 Oct. 1976, *M. E. Noordeloos 239*; prov. Noord-Brabant, Nuenen, Nuenense Broek, 15 Sept. 1979, *M. E. Noordeloos 1021*; Terheyden, Eendekooi, 28 Oct. 1978, *P. B. Jansen 78–453*; Drunen, along Channel, 23 Oct. 1969, *E. Arnolds 469*; prov. Limburg, Wijlre, 12 Oct. 1968 and 11 Nov. 1970, *P. B. Jansen*;Schelsberg, 8Nov.1974, *P.B.Jansen*; Gronsveld, Savelsbos, 28 Sept.1976, *M. E. Noordeloos 195/6*. GREAT BRITAIN, Sussex, Friston, 17 Nov. 1957, *P. D. Orton* (holotype, K). — BELGIUM, prov. Namur, Han-sur-Lesse, Fond d'Auffe, 2 Oct. 1977, *M. E. Noordeloos 474/5*. — FRANCE, dept. Oise, Orry-la-Ville, 3 Nov. 1976, *H. Romagnesi 76.170* (Herb. Romagn., PC).

NOTES ON THE HOLOTYPE.—The holotype consists of fragments of one specimen with the following microscopical characters. Spores (8.7–)9.3–11(–11.4) × 6.4–7.5(–8.1) µm (average spore 10.1 × 7 µm), Q = (1.2–)1.3–1.4–1.55, L–D = 2.4–3.0–4.0 µm, 6–8-angled in side-view, with blunt base (basal facet). Basidia 25–40 × 11.5–14 µm, 4-spored. Cheilocystidia 21–43 × 5–9(–11) µm, cylindrical sometimes subcapitate, frequent, mixed with basidia. Hymenophoral trama with cells up to 400 µm long and up to 26 µm wide, cylindrical or inflated. Pileipellis a simple cutis



Figs. 3a–f. *Entoloma leptopus*. — Habit, spores and cheilocystidia (3a from *Noordeloos 195*; 3b–c from *Scheurs, 20 Oct. 1977;* 3d, 3f from *Jansen, 8 Nov. 1974*; 3e from *Jansen, 11 Nov. 1970*).

made up of 3–11 μm wide, cylindrical hyphae with minutely encrusted walls. Pileitrama regular, with cells of similar size and shape as in hymenophoral trama. Clamp-connections seen in hymenium.

Entoloma leptopus is easy to distinguish from *E. hirtipes* and varieties by its different habitat, slender habit and small and narrow spores. Macroscopically the slender habit, discolor pileus with dark papilla and the habitat make it often easy to recognize *E. leptopus* in the field. The odourless form, described by Romagnesi (1954, l.c.) as *R. mammosus* var. *obsoletus* is, besides the lack of smell, not sufficiently different from the typical *leptopus* to justify a distinction on varietal level. Usually, however, the smell is quite strong and can be noticed from a distance.

Agaricus mammosus Fr. var. *tenuior* Fr., Icon. sel. pl. 98 fig. 4 (1874), is most probably the same as *Nolanea papillata* Bres. The interpretation of this taxon by Kühn. & Romagn. (1953, l.c.) may be considered a misapplication. (See also notes on *Agaricus mammosus* under the excluded names, p. 526).

Rhodophyllus hebes Romagn. is said to differ from *E. leptopus* by the different smell (farinaceous and not like cucumber or fish), the more flattened, subpapillate pileus and the more irregularly shaped spores. In a note following the diagnosis Romagnesi mentions, however, that there is a chain of forms connecting typical '*R. mammosus*' (= our *E. hirtipes* var. *hirtipes*) with *R. hebes*. Indeed I found the distinguishing characters mentioned above to be rather variable. Except in the type of *R. hebes* and in a few additional collections in Herb. Romagnesi I failed to find the extremely elongate spores as depicted by Romagnesi (1954: fig. 14). In *E. leptopus* in general, however, the shape of the spores is rather variable (see figs. 3c–d). There seems to be no reason either to consider the shape of the pileus in this case as a taxonomically valuable character. Moreover the difference in smell seems to be too subtle. Future studies are necessary to prove the difference between *E. leptopus* and *R. hebes*.

In the field *Entoloma leptopus* may be confused with *E. juncinum*, which has about the same colours particularly when dried up, and the same strong smell, but *E. juncinum* is easily distinguished microscopically by the lack of cheilocystidia and by the totally different spores.

Entoloma section **Staurospora** (Largent & Thiers) Noordeloos, *comb. nov.*

Nolanea (Fr.) Kumm. emend. Largent & Benedict sect. *Staurospori* Largent & Thiers *in* Northwest Sci. **46**: 37. 1972. — *Rhodophyllus* Quél. sect. *Staurospori* (Largent & Thiers) Romagn. *in* Bull. mens. Soc. linn. Lyon **43**: 330. 1974. — Holotype: *Entoloma conferendum* (Britz.) Noordeloos (= *Nolanea staurospora* Bres.).
Rhodophyllus Quél. subsect. *Staurospori* Romagn. *in* Bull. Soc. mycol. Fr. **53**: 331. 1937 (nom. nud.).

CHARACTERISTICS.—Spores cuboid or prismatical. Pigment membranal, encrusting and/or intracellular.

KEY TO THE SPECIES OF SECTION STAUROSPORA

1a. Spores prismatical-stellate; pigment intracellular. 2
b. Spores cuboid; pigment encrusting and/or intracellular. 3

2a. Carpophores small and slender; pileus up to 15 mm broad, stipe up to 1.5 mm wide; on rotten trunks of frondose trees. . . . . *E. conferendum* var. *pusillum*, p. 450
b. Carpophores more robust, terrestrial. . . . . *E. conferendum* var. *conferendum*, p. 446
3a. Spores large, 10.2–12.4 μm long; pileus blackish brown, strongly contrasting with pale, whitish stipe. *E. inodorum*, p. 520
b. Spores smaller, on the average less than 10 μm long; pileus and stipe paler and of same colour. . 4
4a. Stipe minutely pruinose at least at upper half, with large fusiform caulocystidia 60–75 μm long, pigment membranal (not encrusting).. . . . . *E. prismatospermum*, p. 523
b. Stipe smooth, pigment intracellular, sometimes also membranal and/or encrusting. *E. rhombisporum*, p. 450

4. **Entoloma conferendum** (Britz.) Noordeloos, *comb. nov.*
var. conferendum—Figs. 4a–d

Agaricus conferendus Britz. *in* Ber. naturw. Ver. Schwaben, Augsburg **26**: 140. 1881. — *Nolanea conferenda* (Britz.) Sacc., Syll. Fung. **5**: 723. 1887.

Nolanea staurospora Bres., Fungi trident. **1**: 18, pl. 20. 1882. — *Rhodophyllus staurosporus* (Bres.) J. Lange, Fl. agar. dan. **2**: 99, pl. 99A. 1936. — *Entoloma staurosporum* (Bres.) Horak *in* Sydowia **28**: 222. 1976 "1974/75".

Rhodophyllus staurosporus var. *typicus* Kühn. & Romagn., Fl. anal.: 187. 1953.

Rhodophyllus staurosporus var. *platyphyllus* Romagn. & Favre *in* Rev. Mycol. **3**: 77. 1938.

Nolanea staurospora var. *farinacea* Largent & Thiers *in* Northwest Sci. **46**: 37. 1972.

Nolanea staurospora var. *incrustata* Largent & Thiers *in* Northwest Sci. **46**: 38. 1972.

Agaricus dissidens Britz. *in* Ber. naturw. Ver. Schwaben, Augsburg **26**: 140. 1881, pl. 176, No. 27; pl. 188, No. 109. 1881. — *Nolanea dissidens* (Britz.) Sacc., Syll. Fung. **5**: 723. 1887.

Agaricus subpostumus Britz. *in* Ber. naturw. Ver. Schwaben, Augsburg **26**: 143, pl. 173, No. 38. 1881. — *Nolanea subpostuma* (Britz.) Sacc., Syll. Fung. **5**: 725. 1887.

Rhodophyllus rickenii Romagn. *in* Bull. Soc. mycol. Fr. **48**: 320. 1932. — *Rhodophyllus staurosporus* subsp. *rickenii* (Romagn.) Romagn. *in* Rev. Mycol. **2**: 86. 1937. — *Rhodophyllus staurosporus* var. *rickenii* (Romagn.) Kühn. & Romagn., Fl. anal.: 187. 1953. — *Nolanea rickenii* (Romagn.) Konr. & Maubl., Agaricales: 264. 1948.

Rhodophyllus rickenii var. *obscurior* Romagn. *in* Bull. Soc. mycol. Fr. **48**: 320. 1932. — *Rhodophyllus staurosporus* var. *obscurior* (Romagn.) Romagn. *in* Rev. Mycol. **2**: 86. 1937.

Rhodophyllus rickenii var. *subrugosus* Romagn. *in* Bull. Soc. mycol. Fr. **48**: 321. 1932. — *Rhodophyllus staurosporus* var. *subrugosus* (Romagn.) Romagn. *in* Rev. Mycol. **2**: 86. 1937.

Entoloma nothofagi Stevenson *in* Kew Bull. **16**: 234. 1962.

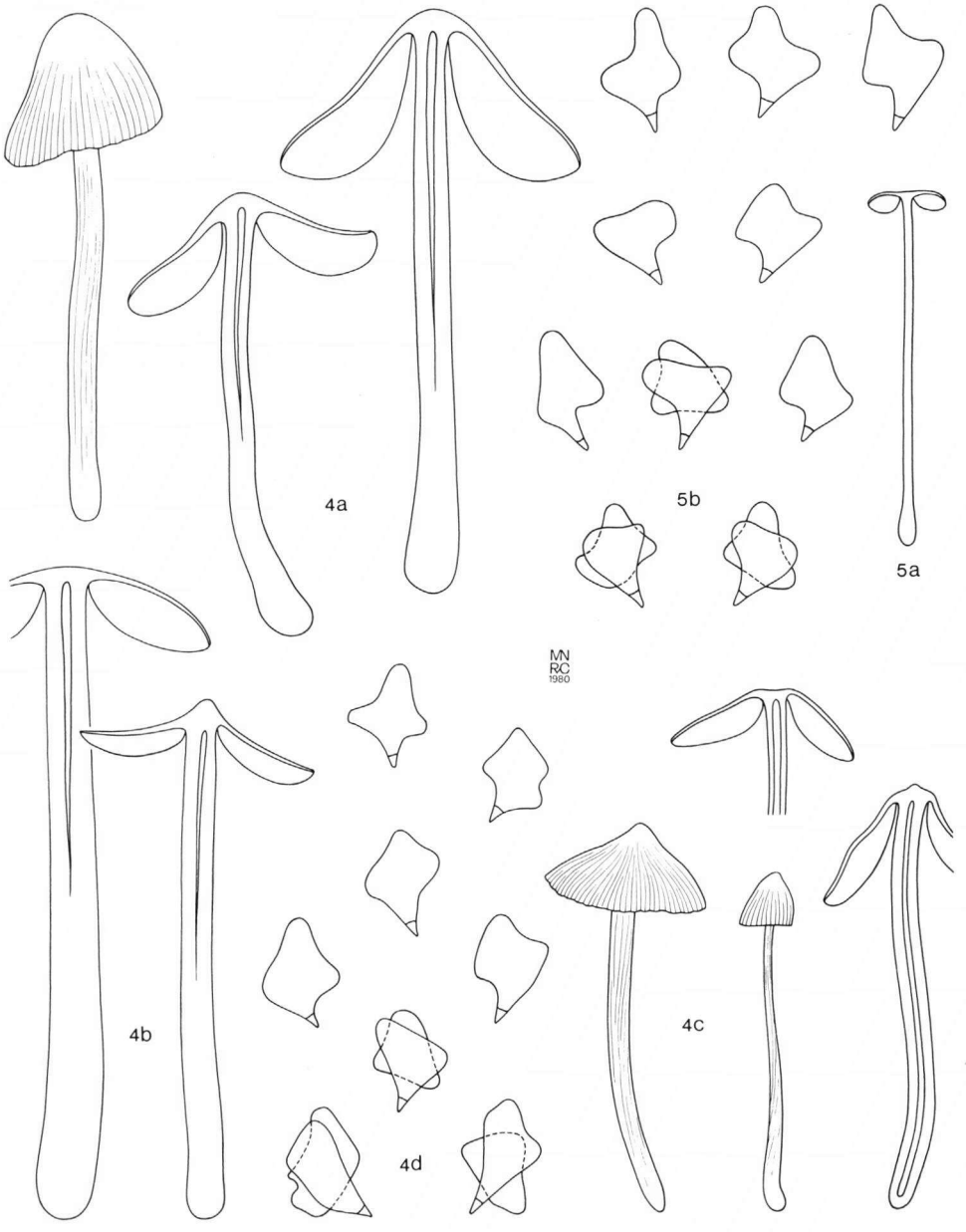
Entoloma botanicum Stevenson *in* Kew Bull. **16**: 236. 1962.

MISAPPLIED NAMES.—*Nolanea pascua* (Pers. ex Fr.) Kumm. sensu Britz., Cooke, Ricken non Bres., Boud., Rea. — *Nolanea proletaria* (Fr.) Gill. sensu Boud., Rea non Fr., Ricken nec Bres. — *Agaricus cetratus* Fr. sensu Britz. pro parte.

SELECTED ICONES AND DESCRIPTIONS.—Bresadola, Iconogr. mycol.: **12**: 584. 1929. — Cetto, Funghi Vero **2**: 248. 1976. — Horak, l.c. 1976. — Konrad *in* Bull. Soc. mycol. Fr. **45**: 49–50. 1929. — Konrad & Maublanc, Icon. sel. Fung., pl. 178 fig. 1. 1930. — J. Lange, Fl. agar. dan., pl. 77 fig. a. 1936. — F. H. Möller, Fungi Faeröes **1**: 239, fig. 111. 1945.

CHARACTERISTICS.—Pileus grey-brown, horn or reddish brown, strongly lustrous particularly when dry, usually with rugulose-felted centre; stipe striate with more or less aeriferous fibrils, often twisted; spores 4–5-angled in side-view, cruciform-stellate.

Pileus 23–50 mm broad, hemispherical or conical, then conico-campanulate to conico-convex, finally convex with or (mostly) without weak umbo, rarely acutely papillate, sometimes truncate,



Figs. 4a–d. *Entoloma conferendum* var. *conferendum*. — Habit and spores (4a from *Brand, 11 Oct. 1979;* 4b, 4d from *Bas 7605;* 4c from *Noordeloos 181*).

Figs. 5a–b. *Entoloma conferendum* var. *pusillum*. — Habit and spores (5a–b from *Noordeloos 178*).

with margin slightly involute when young, usually straight with age, sometimes splitting; strongly hygrophanous, when moist translucently striate often up to centre, at least up to one half of the radius of the pileus, dark grey-brown, sepia, also horn brown or more reddish brown, usually fairly dark at centre, becoming paler towards margin (centre 10 YR 2/2, 3/2, 3/3, 3/4; 7.5 YR 3/2 or 5 YR 2/2, 3/2, 4/2, towards margin 10 YR 5/4, 6/4, 6/3; 7.5 YR 5/2, 4/2 or 5 YR 5/4, 5/6, outermost margin 10 YR 7/4, 7.5 YR 7/4), on drying strongly pallescent to greyish brown or ochraceous-greyish with centre long remaining darker (centre 10 YR 5/2, 5/3, 5/4; 2.5 Y 5/4, rest 10 YR 6/3, 7/3, 8/3), strongly lustrous at centre often with aeriferous fibrils fluffy-rugulose to subsquamulose, sometimes on limb radially wrinkled. Lamellae L = 20–50, l = 1–3–5(–7), (almost) free, moderately to broadly ventricose, up to 10 mm broad, pale then pink often tinged grey or brown, becoming reddish brown with age (7.5 YR 7/4, 6/4; 5 YR 7/6, 7/4 towards 5 YR 6/4, 6/6), with entire or serrulate concolorous edge. Stipe 25–80 × 2–6.5 mm, cylindrical or flattened with longitudinal groove, with broadened to subbulbous base (up to 12 mm wide) or not, strongly silvery-fibrillously striate on yellowish brown to greyish brown background (upper half e.g. 2.5 YR 7/6 or 7/2, basal part 10 YR 4/2, 3/2 or 5/4 towards 2.5 Y 4/4), often twisted, apex sometimes minutely pruinose, base usually with white tomentum, rest glabrous, solid then fistulose. Flesh concolorous with surface but in fleshy specimens context distinctly paler, fibrillous, fairly brittle particularly in pileus. Smell spontaneously often weak or absent but usually distinctly farinaceous-rancid on cutting, rarely absent. Taste strong, disagreeably rancid-farinaceous, rarely more or less mild. Spore print (yellowish) red, 2.5 YR 6 or 5 YR 5/6.

Spores (7.9–)8.0–12.7(–13.9) × (7.0–)7.4–11.5(–12.7) μm, Q = 1.0–1.3–1.5(–1.6), L–D = 0–2.5–4 μm, rather variable in shape, mostly irregularly 4-angled in side-view with pointed, sharp angles causing a cruciform or stellate appearance, often the axe distorted or twisted, also transitions to 5–6-angled spore type occurring. Basidia 27–37 × 10.5–16.3 μm, 4-spored. Cystidia absent. Hymenophoral trama regular; cells cylindrical or very slightly inflated, never fusoid, 70–324 × 13.5–32(–35) μm, with hyalinous, colourless walls. Pileipellis a cutis with transitions to a trichodermium, particularly at centre of pileus, made up of repent to ascending cylindrical hyphae 6–12(–14) μm wide, with brown intracellular pigment, subpellis usually well developed, composed of chains of short inflated cells 40–100 × 18–40(–54) μm, with abundant intracellular pigment; pileitrama regular, hyphae cylindrical with cells 70–220 × 18–32 μm, usually colourless. Clamp-connections none.

HABITAT & DISTRIBUTION.—Euryoecious, viz. occurring in all sorts of habitats: grasslands, marshy places, in *Sphagnum*, in humus in both coniferous and frondose forests on different types of soil. Widespread, most probably cosmopolitan (Horak 1976: 222–224). In the Netherlands fairly common from spring to late fall.

COLLECTIONS EXAMINED.—NETHERLANDS: prov. Drenthe, Roden, Moltmakersstuk, 15 Sept. 1976, *M. E. Noordeloos 181/182*; Norg, along Peizerdiep, 16 Sept. 1976, *J. Schreurs*; prov. Overijssel, Gorssel, 't Joppe, 31 May 1954, *C. Bas 473*; Ommen, Eerder Achterbroek, 14 Oct. 1962, *C. Bas 2875*; Delden, estate 'Twickel', 9 Sept. 1972 and 7 Oct. 1977, *E. Kits van Waveren*; Oldenzaal, estate 'het Snippert', 19 Oct. 1972, *E. Kits van Waveren*; Denekamp, estate 'Singraven', 3 Oct. 1965, *E. Kits van Waveren*; prov. Gelderland, Winterswijk, Korenburgerveen, 29 Sept. 1973, *C. Bas 6173*; idem, Willinks Weust, 20 Oct. 1977, *M. E. Noordeloos 552*; idem, Wooldse Veen, 16 Oct. 1972, *J. Schreurs*; Overasselt, near 'de Diervoort', 26 Oct. 1960, *R. A. Maas Geesteranus 13491 & C. Bas 2315*; idem, 21 Oct. 1969, Hatertsebroek, *E. Arnolds*; Gietelo, estate 'de Poll', 6 May 1979, *G. Piepenbroek-Grooters & H. Piepenbroek 1168*; Brummen, Voorstonden, 17 Sept. 1978, *E. Batten*; Vorden, Dennendijk, 4/5 June 1960, *E. Kits van Waveren*; Voorst, estate 'het Hartelaar', 8 May 1978, *H. Piepenbroek & G. Piepenbroek-Grooters 1079*; Niimegen, Hatert, 26 Sept. 1973, *C. Bas 6175*; prov. Utrecht, Amersfoort, Woudenberg, estate 'de Boom', 12 Sept. 1953, *A. F. M. Reijnders*; prov. Noord-Holland, Isl. Texel, 'de Geul', 25 Oct. 1977, *M. E. Noordeloos 561*; idem, near Den Hoorn, 28 Oct. 1978, *M. E. Noordeloos 580*; Bergen, near 'Klompduin', 5 Oct. 1969, *E. Arnolds 391*; Kortenhoef, 'Oppad', 8 Sept. 1976, *M. E. Noordeloos 164*; Noordwijkerhout, estate 'Vogelenzang', 20 Oct. 1951, *R. A. Maas Geesteranus 8101*; prov. Zuid-Holland, Warmond, 'Huys te Warmont', 7 Nov. 1950, 13 Oct. 1951, 26 Oct. 1951, 23 Nov. 1951, and 3 Nov. 1953, *R. A. Maas Geesteranus 7623, 8082, 8121, 8179,*

9580; and 10 Oct. 1969, *E. Arnolds 397*; Isl. Voorne, Oostvoorne, Heveringen, 17 May 1968, *C. Bas 4979A*; Isl. Goeree, Westduinen, 11 Oct. 1979, *M. Brand*; prov. Noord-Brabant, Chaam, estate 'de Honsdonk', 19 Sept. 1956, *R. A. Maas Geesteranus 11717*; Zundert, 'de Krochten', 10 July 1956, *C. Bas 1049*; Drunen, along 'Drongelens kanaal', 20 Aug. 1972, *P. B. Jansen 72–227*; Bergen-op-Zoom, estate 'de Mattenburg', 25 Sept. 1971, *P. B. Jansen 71–193*; Baarle-Nassau, 2 May 1965, *P. B. Jansen 65–175*; Nw Ginneken, Goudbergven, 25 Aug. 1963, *P. B. Jansen 63–168*; prov. Limburg, Wijlre, 28 Oct. 1979, *C. Bas 7605*; Mook, 10 Oct. 1964, *E. Kits van Waveren*; Heerlen, Schelsberg, 8 Nov. 1974, *P. B. Jansen 74–280*. NORWAY, Oppland, Dombås-region near Fokstua, 2 Aug. 1977, *M. E. Noordeloos 370* and 5 Aug. 1977, *M. E. Noordeloos 388*. — GREAT BRITAIN: Wales, Lake Vyrnwy, 16 Sept. 1976, *E. Kits van Waveren*; Devonshire, New Forest, 14 Sept. 1971, *E. Kits van Waveren*. — BELGIUM: prov. Limburg, Genk, 21 May 1923, *Beeli 1140* (BR); Bévercé, 24 Sept. 1976, *P. B. Jansen*; prov. Luxemburg, 13 Oct. 1930, *Beeli 1880* (BR).

Entoloma conferendum is a very common and a very polymorphic species: it occurs in all kinds of habitats and has most probably a world-wide distribution (Horak 1976: 222).

It is well-known to all European mycologists. In Fries's time it was generally called '*Agaricus pascuus* Pers.', a collective species which comprised *E. conferendum* as well as *E. sericeum* and *E. vernum*. At present *A. pascuus* is generally considered a nomen dubium. No type collection is available in Herb. Persoon (Singer 1961: 36).

Bresadola (1882, l.c.) recognized *N. staurospora* as a species in its own right in the *A. pascuus*-complex, a view generally accepted by his contemporaries as well as by most modern mycologists. Looking through the plates of Britzelmayr I found on plate 179 as No. 26A a picture of *Agaricus conferendus* Britz. which is unmistakably identical with *N. staurospora* Bres. Unfortunately Britzelmayr's name for the species has been published one year before that of Bresadola, and therefore has priority. Consequently in the present work the well-known and widely used epithet *staurosporum* unfortunately has to be changed in *conferendum* Britz. In the same work of Britzelmayr two more older synonyms of *Nolanea staurospora* Bres. were encountered, viz. *A. dissidens* Britz. and *A. subpostumus* Britz.

Entoloma conferendum is a very variable species, in size and shape as well as in the colour of the carpophores. The pileus shows tinges varying from grey-brown to sepia, leather-brown or reddish brown, its surface may be smooth, but has more often a covering of loose aeriferous fibrils, particularly when dry, the centre is sometimes even fluffy-subsquamulose. The lamellae are usually tinged brown or grey and narrowly to rather broadly ventricose. The smell may be absent or farinaceous-rancid. This variability is reflected in the large number of varieties published. They are based upon (i) lack of smell and pale lamellae (var. *rickenii* Romagn.); (ii) a slightly darker pileus (var. *obscurior* Romagn.); (iii) the subfelted-subrugulose aspect of the pileus (var. *subrugosus* Romagn.); (iv) the broad lamellae (var. *platyphyllus* Romagn.-Favre); (v) the farinaceous smell (var. *farinacea* Largent). In the course of my investigations I found these differences not correlated with other taxonomically important characters and therefore consider these varieties as mere forms of var. *conferendum*.

A taxonomically more important case is that of *Nolanea staurospora* var. *incrustata* Largent & Thiers from California, described as having encrusting pigments only. I did not study the type of this variety but if it really belongs to the complex of *E. conferendum* this throws a new light upon the constancy of intracellular pigment as a character for that complex. Compare also the discussion under *E. rhombisporum*, p. 452.

Entoloma conferendum var. *pusillum* (= *Rhodophyllus xylophilus* J. Lange) is considered here a true variety on account of its habitat and slender habit.

The synonymy of *E. botanicum* and *E. nothofagi* is accepted on the strength of the evidence supplied by Horak (l.c.).

5. ENTOLOMA CONFERENDUM var. **pusillum** (Velen.) Noordeloos, *comb. nov.*—Figs. 5a–b

Nolanea pusilla Velen., České Houby: 626. 1921. — *Rhodophyllus pusillus* (Velen.) Romagn. *in* Bull. Soc. mycol. Fr. **53**: 332. 1937. — *Entoloma staurosporum* (Bres.) Horak var. *pusillum* (Velen.) Noordeloos in Persoonia **10**: 252. 1979.

Rhodophyllus xylophilus J. Lange *in* Dansk bot. Ark. **2**(11): 35. 1921 (non *Entoloma xylophilum* Speg.). — *Nolanea xylophila* (J. Lange) P. D. Orton *in* Trans. Br. mycol. Soc. **43**: 179. 1960.

CHARACTERISTICS.—Fruitbodies rather slenderly mycenoid, pileus up to 15 mm broad; stipe 21–50 × 1–1.5 mm, on rotten stumps of frondose trees; spores cruciform-stellate.

Pileus 10–15 mm broad, (conico-)convex to flattened with involute margin, later straight, hygrophanous, when moist translucently striate up to centre, yellowish brown or slightly reddish tinged (10 YR 6/4 to 7.5 YR 6/4), with darker centre (10 YR 4/4, 7.5 YR 4/4), on drying pallescent to ochraceous grey or pale brown (10 YR 7/3), smooth, dull or subsquamulose-rugulose at centre. Lamellae L = 24–25, l = 1(–3), absolutely free, ventricose, exceeding the pileus, pink (7.5 YR 7/4, 6/4 or 5 YR 7/4, 6/4) without any brown tinge, with entire concolorous edge. Stipe 21–50 × 1–1.5 mm, straight, cylindrical with slightly swollen base, pale yellow (2.5 Y 7/4), minutely pruinose at apex, rest silvery striate lengthwise. Smell and taste indistinct to farinaceous.

Spores (8.0–)9–12(–12.5) × 7–10.4(–11) μm, Q = 1.0–1.2–1.4(–1.5), L–D = 0–1.8–3.5(–5) μm, cruciform-stellate, rather irregular in shape, mostly with 4 angles, also transitions to asymmetrical 6-angled type. Basidia 22–45 × 10–15 μm, 4-(rarely 2-)spored. Cystidia absent. Hymenophoral trama regular; cells cylindrical, up to 150 × 4.5–12 μm. Pileipellis a cutis made up of cylindrical, 4.8–12 μm wide hyphae with cylindrical to clavate endcells up to 12(–15) μm wide with at centre of pileus transitions to a trichodermium with ascending terminal cells; intracellular pigment abundant, subpellis well-developed, composed of short inflated cells up to 25 μm wide. Pileitrama regular; cells up to 150 μm long, 12.5–24 μm wide. Clamp-connections absent.

HABITAT & DISTRIBUTION.—On rotten trunks of frondose trees such as *Betula*, *Alnus*, *Corylus* and *Fagus*. Known from Denmark (J. Lange, l.c.), Great Britain (Orton & al., 1960), the Netherlands, and Czechoslovakia.

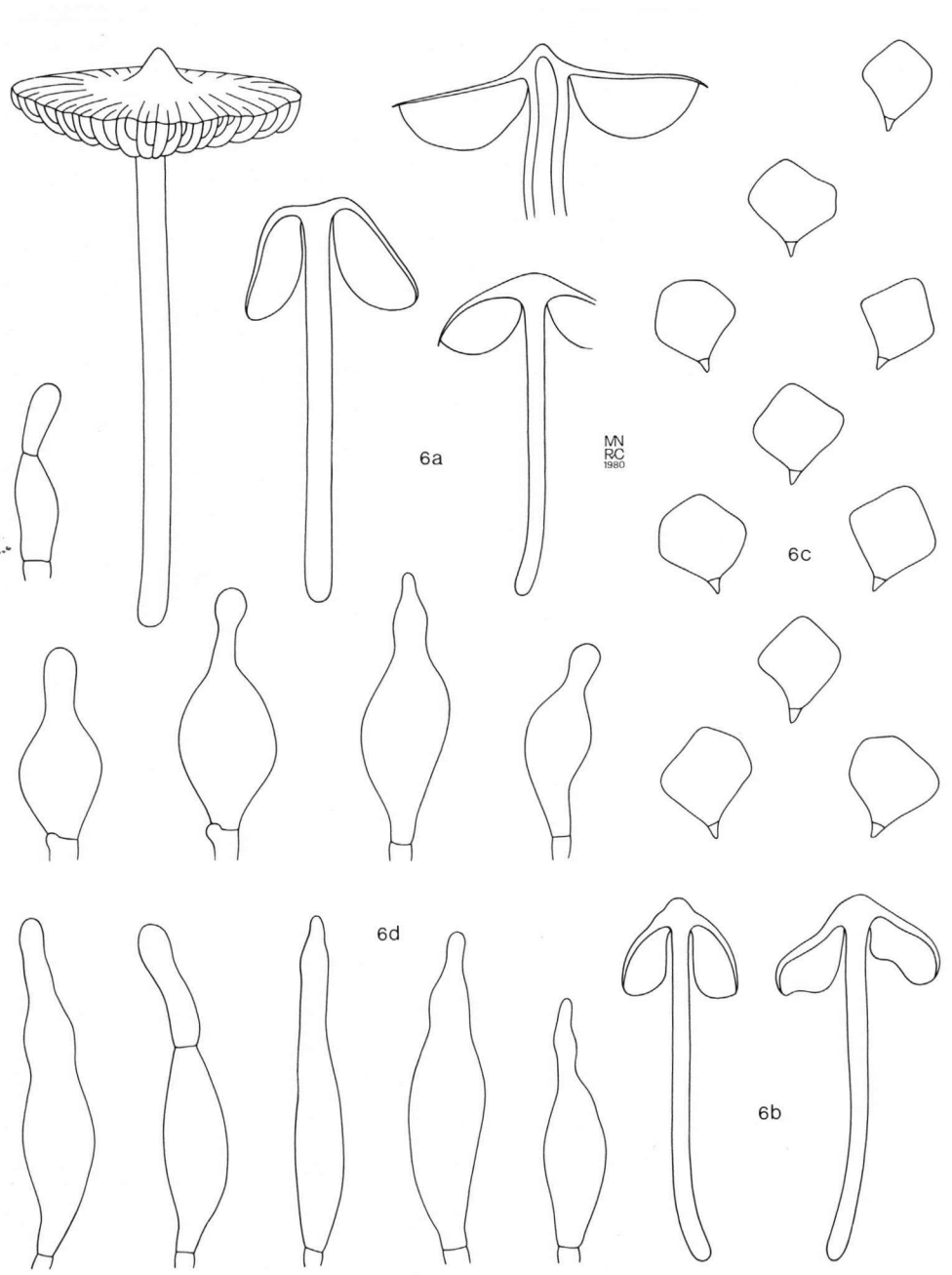
COLLECTIONS EXAMINED.—NETHERLANDS: prov. Drenthe, Roden, Mensingebos, 15 Sept. 1976, *M. E. Noordeloos 178*; prov. Noord-Holland, Bergen, Eeuwige Laan, 8 May 1958, *C. Bas 1420*.

DENMARK, Jylland, Vellin-plantage, 10 Nov. 1969, leg. *Mykol. Congress* (C). — CZECHOSLOVAKIA, Bohemia, Prague, Mnichovice, July 1919, *J. Velenovský* (holotype of *Nolanea pusilla*, PRC); idem, 27 July 1946, *V. Vacek* (PRM).

The microscopical characters of *Entoloma conferendum* var. *pusillum*, particularly the size and the shape of the spores, are similar to those of the type-variety. It is considered a variety, however, on account of the rather slender appearance and the habitat.

6. ENTOLOMA RHOMBISPORUM (Kühn. & Bours.) Horak—Figs. 6a–d

Leptonia rhombispora Kühn. & Bours. *in* Bull. Soc. mycol. Fr. **45**: 276. 1929. — *Rhodophyllus rhombisporus* (Kühn. & Bours.) Romagn., Rhodoph. Madag.: 36. 1941. — *Entoloma rhombisporum* (Kühn. & Bours.) Horak *in* Sydowia **28**: 228. "1974/1975" 1976.



Figs. 6a–d. *Entoloma rhombisporum*. — Habit, spores and cheilocystidia (6a, 6c–d from *Noordeloos 1070*; 6b from *Romagnesi, 26 Sept. 1974*).

CHARACTERISTICS.—Pileus conical or conico-campanulate with papillate or truncate-subdepressed centre, yellowish brown; stipe pale, yellowish, polished; spores cuboid; cheilocystidia lageniform-tibiiform.

Pileus 20–34 mm broad, truncate-conical or conico-campanulate with centre blunt or papillate or sometimes slightly depressed, later expanding to campanulate-convex or even flattened, then with large conical umbo, with straight margin, strongly hygrophanous, when moist dark yellowish brown (10 YR 4/4, 4/6) at centre and striae, interstriation and margin paler (10 YR 5/4), translucently striate up to three fourths of the radius, on drying pallescent to pale yellowish brown (2.5 Y 6/4, 7/4), but at centre remaining slightly darker, glabrous, smooth when moist, becoming coarsely radially fibrillose and shining on drying. Lamellae L = 20–25, l = 3–5, distant, almost free, triangular then ventricose, pink with yellow tinge (10 YR 7/6 or 6/6 to 7.5 YR 7/6 or 6/6), slightly pallescent on drying, sometimes very slightly transversely veined, with entire, concolorous edge sometimes exceeding the pileus. Stipe 30–60 × 2–4 mm, cylindrical, straight, sometimes somewhat broader at base, yellow to yellowish brown, with apex and sometimes also base paler (10 YR 5/4, 6/4 to 2.5 Y 5/4, apex and base 2.5 Y 6/4, 7/4 or entire stipe 5 Y 7/4), not fibrillous, smooth, glabrous, more or less shining, solid, then narrowly fistulose. Flesh slightly paler than surface, subcartilagineous in stipe, brittle in pileus. Smell absent or faint (in one specimen slightly fruity), distinctly farinaceous when cut. Taste farinaceous.

Spores 8.1–10.5(–10.6) × (7.0–)7.6–10.4 μm, Q = 1.0–1.1–1.2, L–D = 0–1–1.5 μm, cuboid, 4-(rarely 5-)angled in side-view. Basidia 35–52 × 10–17 μm, broadly clavate, 4-spored. Cheilocystidia 40–70 × 10.5–21 × 3.5–8.1 μm, lageniform to tibiiform with broadly swollen basal half and usually long, tapering, moniliform or capitate neck, thin-walled, colourless, numerous; edge usually homomorph. Hymenophoral trama regular; cells fusoid to cylindrical, (70–)135–297 × (3.5–)8–27(–30) μm, colourless, thin-walled. Pileipellis a thin cutis made up of 2–8 μm wide cylindrical hyphae with uniformly coloured, sometimes minutely encrusted walls and intracellular pigment, gradually passing into pileitrama or subpellis differentiated into a distinct layer of short inflated cells 70–120 × 10–32 μm. Pileitrama regular, cells cylindrical to inflated, 162–324 × 8–27 μm, intracellular pigment in upper layer, sometimes in addition minutely encrusted. Clamp-connections numerous in hymenium, less abundant to absent in other tissues.

HABITAT & DISTRIBUTION.—The Netherlands' collections were made in a moist valley in old coastal dunes on sandy soil with relatively low pH between *Salix repens*, *Menyanthes trifoliata* and *Sphagnum* species. It was originally described from a meadow without indication of type of vegetation. Favre (1948: 53) collected it in a *Sphagnum*-bog. Rare; known from France (type-locality), Switzerland, and the Netherlands.

COLLECTIONS EXAMINED.—NETHERLANDS, prov. Noord-Holland, Callantsoog, Nature-reserve 'Zwanewater', S. of the lakes, three different localities, 21 Oct. 1979, *M. E. Noordeloos 1070*, *1071* and *1075*.

FRANCE, Dordogne, Ch. de Rossignol, 26 Sept. 1974, *H. Romagnesi 74.263* (Herb. Romagn., PC).

Entoloma rhombisporum is fairly easily distinguished by its cuboid spores and the type of cheilocystidia. Macroscopically the species is characterized by the pale, polished and smooth stipe and the fibrillous pileus. The pigmentation of the pileus is remarkably variable: in all specimens examined the intracellular pigment in the pileipellis and particularly in the upper part of the trama is rather distinct. Some specimens of the Netherlands' collection cited above, however, in addition show distinct encrustations on some hyphae of the pileipellis and the pileitrama. Horak (1976: 230) studied the Favre collection and found only encrusting pigments. Unfortunately I failed to locate the type, nor did I study the Favre collection. In consequence of my own observations I am inclined to consider the pigmentation in *E. rhombisporum* very variable. Largent's (1977: 147) concept of *Leptonia rhombispora* is according to the description a

misinterpretation. His Californian collection differs a.o. in colour, smell, and type of pileipellis (the last mentioned character proves it to be a true *Leptonia*).

ENTOLOMA section PAPILLATA (Romagn.) Noordeloos *emend.* Noordeloos

Rhodophyllus subgen. *Nolanea* sect. *Papillati* Romagn. *in* Bull. mens. Soc. linn. Lyon **43**: 330. 1974. — *Entoloma* subgen. *Nolanea* sect. *Papillata* (Romagn.) Noordeloos *in* Persoonia **10**: 246. 1979. — Holotype: *Entoloma papillatum* (Bres.) Dennis.

CHARACTERISTICS.—Pigment encrusting at least the narrowest hyphae of pileipellis and pileitrama; diffusely intracellular pigment sometimes present too but then never dominant; spores iso- to heterodiametrical with variable base; clamp-connections present; cystidia usually absent.

Section *Papillata* Romagn. is emended by including both the sections *Minuta* Romagn. and *Cosmeoxonema* Largent & Thiers on the level of subsections. In the present concept sect. *Papillata* covers about the same species as sect. *Nolanea* sensu Largent (1974: 1003), except for the exclusion of *Entoloma hirtipes* and related species (= sect. *Nolanea* s. restr. mihi). For details the reader is referred to Noordeloos (1980b).

Subsection PAPILLATA

Spores heterodiametrical with average Q per collection at least 1.2, with basal facet; lamellae usually with distinct grey and/or brown tinge, at least in mature specimens.

KEY TO THE SPECIES OF SUBSECTION PAPILLATA

1a. Basidia 2-spored. . . . . *E. cuspidifer*, p. 461
b. Basidia 4-spored. 2
2a. Spores very obtusely rounded-angular, 7.4–8.3(–9.4) × 5.7–7.4(–8.0) µm, Q = 1.07–1.2–1.3; stipe strongly silvery striate. . . . . *E. ortonii*, p. 459
b. Spores more pronouncedly angular and slightly to considerably larger; stipe smooth or only sparsely silvery striate. 3
3a. Spores 7.9–10.4 × 6.6–8.6(–9.0) µm, Q = 1.1–1.2–1.3; lamellae never dark reddish brown; stipe innately but distinctly silvery striate; smell farinaceous. . . . . *E. lucidum*, p. 458
b. Spores with average Q per collection at least 1.3 and usually larger, if not so then lamellae fairly dark brown when mature, and stipe never striate and smell absent. 4
4a. Pileus moderately dark reddish brown or ochraceous- or greyish brown; lamellae pale then pink, sometimes with brown shade but hyphae of hymenophoral trama never encrusted; smell absent. . 5
b. Pileus fairly dark reddish or blackish brown; lamellae rather dark brown when mature; at least the narrowest hyphae of hymenophoral trama encrusted; smell farinaceous or absent. 6
5a. Lamellae tinged brown when mature; spores (8.7–)9.0–10.4 (–11.5) × (7.0–) 7.6–8.7 µm; stipe sparsely silvery striate. . . . . *E. sericeonitens*, p. 459
b. Lamellae white then pink, never with brown tinge; spores 7–9.3(–10) × 5.8–7 µm; stipe smooth as if polished. . . . . (see subsection *Infularia: E. infula*), p. 503

6a. Lamellae pale when young, becoming dark reddish brown with age, of normal thickness, moderately distant; stipe usually without the reddish tinge of the pileus and usually paler, smooth or with spread silvery fibrils lengthwise; spores (9.0–)9.3–11.3(–13) × (6.7–) 7.1–8.0(–8.5) μm; smell farinaceous.
E. papillatum, p. 454

b. Lamellae brown already when young, thickish and fairly distant; stipe concolorous with pileus, not striate, smooth; spores (7.8–)8.2–10.2(–10.6) × (5.7–)6.2–7.5(–7.9) μm; smell absent.
E. clandestinum, p. 456

7. ENTOLOMA PAPILLATUM (Bres.) Dennis—Figs. 8a–d

Nolanea papillata Bres., Fungi trident. **1**: 75, pl. 82. 1887. — *Rhodophyllus papillatus* (Bres.) J. Lange, Fl. agar. dan. **2**: 101. 1936. — *Entoloma papillatum* (Bres.) Dennis *in* Bull. Soc. mycol. Fr. **69**: 162. 1953. — *Nolanea mammosa* (L. ex Fr.) Quél. subsp. *papillata* (Bres.) Konr. & Maubl., Icon. sel. Fung. pl. 180 fig. 2. 1932.

Agaricus mammosus Fr. var. *tenuior* Fr., Icon. sel. **1**: 113, pl. 98 fig. 4. 1867.

Leptonia papillata Velen., České Houby: 622. 1921.

Leptonia mamillata Velen., České Houby: 622. 1921.

MISAPPLIED NAMES.—*Agaricus mammosus* L. ex Fr. sensu Cooke, Ill. Br. Fungi 363(377). 1876. — *Rhodophyllus mammosus* (L. ex Fr.) Quél. sensu J. Lange in Dansk bot. Ark. **2**(11): 36. 1921. — *Nolanea clandestina* (Fr.) Kummer sensu Bres. 1929, pl. 585 fig. 2; sensu Konr. & Maubl. 1936, pl. 178 fig. 2, non sensu Fr., J. Lange.

SELECTED ICONES & DESCRIPTIONS.—Arnolds & Noordeloos *in* Fung. rar. Icon. col. **12**, pl. 91 fig. d. 1980. — Bresadola, Iconogr. mycol., pl. 538. 1929. — Konr. & Maubl., Icon. sel. Fung., pl. 180 fig. 2. 1932. — J. Lange, Fl. agar. dan. **2**: 101, pl. 78D. 1936. — F. H. Möller, Fungi Faeröes **1**: 239. 1945. — Nathorst-Windahl *in* Friesia **8**: 14, fig. 1. 1966. — Einhellinger *in* Ber. bayer. bot. Ges. **41**: 106, figs. 19, 22, 23, and pl. 10f. 1969. — Gulden & M. Lange *in* Norw. J. Bot. **18**: 13. 1971. — Höyland *in* Blyttia 35: 149. 1977.

CHARACTERISTICS.—Pileus dark sepia brown to almost black or fairly dark reddish brown; lamellae white or pallid at first, then grey-pink, finally (dark) reddish brown, moderately distant, thin; stipe usually (slightly) paler than pileus and less reddish, pruinose at apex, downwards with scattered innate silvery fibrils; smell and taste often distinctly farinaceous; spores 9–12.7 μm long.

Pileus 6–28(–35) mm broad, acutely conical to conico-campanulate, rarely hemispherical or truncate-campanulate, expanding to conico-convex rarely convex, almost always with distinct papilla, with margin involute when young later straight, strongly hygrophanous, when moist dark sepia, blackish brown or reddish brown (10 YR 2/2, 3/2, 3/3, 4/4; 7.5 YR 3/2, 4/4; 5 YR 3/2 even 2.5 YR 3/2), not or only slightly paler at margin (10 YR 5/4, 6/4; 7.5 YR 4/4; 5 YR 5/4, 5/6), translucently striate often up to one half or two-thirds of the radius, on drying pallescent to (pale) sepia brown, often considerably less reddish than in moist state (7.5 YR 4/4, 4/2 or 6/4 at centre, rest 10 YR 5/3, 5/4, 6/3, 7/4, 7/6), smooth, shining, rarely minutely radially wrinkled. Lamellae L = 15–24, l = (1–)3–7(–9), moderately distant, thin, deeply emarginate to almost free, rarely adnate, triangular to broadly ventricose, pale grey or whitish when young, soon greyish pink, finally reddish brown (young 10 YR 8/3, 7/3, then 10 YR 4/4; 7.5 YR 6/4, 5/4, 4,4, 4/2 or 5 YR 7/3, 6/3, 5/3, 5/2, 4/3) with entire concolorous or slightly paler edge. Stipe 20–50 × 1–3 mm, cylindrical with base slightly swollen or not, straight or flexuose, sepia brown with paler apex, often missing red tinge of pileus (2.5 Y 7/6, 7/4; 10 YR 6/3, 5/3, 5/4, 5/6, 4/3, 4/2; 7.5 YR 3/2), pruinose-flocculose at apex, downwards with scattered, innate, silvery fibrils (hand lens), usually with white tomentum at base. Flesh thin-cartilagineous in pileus and stipe, concolorous with surface in pileus and cortex of stipe, paler in context of stipe. Smell usually strongly farinaceous, rarely weak. Taste farinaceous.

Spores (9.0–)9.3–11.3(–13) × (6.7–)7.1–8(–8.5) μm, Q = (1.15–)1.2–1.3–1.5(–1.6), L–D = 1.2–

2.5–5 μm, variable, regularly 6- to irregularly 6–8-angled in side-view, with basal facet. Basidia 32–50 × 8.5–13 μm, 4-spored. Cystidia absent. Hymenophoral trama regular, composed of long cylindrico-fusiform cells 170–400 × 10–28 μm, mixed with narrow cylindrical hyphae with minutely encrusted walls. Pileipellis a simple cutis made up of radially arranged cylindrical 4–9 (–12) μm wide hyphae with minutely to coarsely encrusted walls gradually passing into pileitrama or with weakly developed subpellis of relatively short inflated cells 60–100 × 12–30 μm, lower trama regular, with long cylindrical-fusiform cells up to 450 μm long and up to 29 μm wide with walls encrusted by brown pigment, and this particularly abundant and dark in hypodermal layer. Clamp-connections abundant in hymenium, rare elsewhere.

HABITAT & DISTRIBUTION.—In poorly manured, extensively grazed grasslands, more rarely in open places in forest, at roadsides etc., not uncommon and widespread in the temperate and boreal and (sub-)alpine zones of the northern (and probably also the southern, see below) hemisphere. May to November.

COLLECTIONS EXAMINED.—NETHERLANDS: prov. Friesland, Isl. of Vlieland, Kroonpolders, 1 Nov. 1976, *C. Bas 7147* and 2 Nov. 1976, *C. Bas 7151*; Isl. of Terschelling, Oosterend, Boschplaat, 30 July 1958, *C. Bas 1514*, Oosterend, Dazenplak, 3 Nov. 1978, *M. E. Noordeloos 845* and 5 Nov. 1978, *M. E. Noordeloos 862*; prov. Drenthe, Beilen, 17 Oct. 1974, *E. Arnolds 3245* (WBS); Gees, state forest, 5 June 1974, *K. Booy*; prov. Gelderland, Mook-Nijmegen, Heumensoord, 27 Aug. 1977, *T. Kuyper*. NORWAY, Oppland, Dombås, 5 Aug. 1977, *M. E. Noordeloos 393*. — GREAT BRITAIN, Wales, Lake Vyrnwy, 30 Aug. 1979, *E. Kits van Waveren*. — GERMAN FEDERAL REPUBLIC, Westphalen, Detmold, Merlsheim, 6 Oct. 1976, *C. Bas*. — FRANCE, dept. Oise, Coye-la-Forêt, 11 Sept. 1945, *H. Romagnesi 116* (Herb. Romagn., PC). — CZECHOSLOVAKIA, Bohemia, Mnichovice, July 1919, *J. Velenovský* (PRC, type of *L. mamillata*), ibidem, July 1919, *J. Velenovský* (PRC, type of *L. papillata*).

Entoloma papillatum is a species very variable in colour and habit as well as in size and shape of the spores. The presence of red tinges in pileus, stipe and lamellae makes it sometimes difficult to distinguish it from *E. clandestinum*. In the present work *E. clandestinum* is defined as a species with the following characters: fairly dark (red-)brown tinges in all parts of the carpophore, distant, thickish lamellae, a smooth stipe without innate silvery fibrils, and relatively small spores. As a consequence dark pigmented specimens of *E. papillatum* can be distinguished from *E. clandestinum* in having 'normally' thin lamellae, a minutely silvery striate stipe (hand lens) and (considerably) larger spores.

The strong resemblance between *E. papillatum* and *E. clandestinum* is reflected in the confusion in literature. As suggested by Romagnesi (Kühn. & Romagn., 1953: 186), Bresadola's (1929, pl. 585 fig. 2) plate of *Nolanea clandestina* most probably represents *Rhodophyllus papillatus* sensu J. Lange and Kühn. & Romagn., which interpretation comes very close to my own concept. In the Bresadola Herb. (S) 2 collections were found labelled as *E. clandestinum*, which appeared to fit in perfectly with our present concept of *E. papillatum*.

The plates and descriptions of Konrad & Maublanc (1936, pl. 178 fig. 2, as *Nolanea clandestinum*, and pl. 180 fig. 2, as *N. mammosa* var. *papillata*) illustrate the variability of *E. papillata*. In my opinion the first plate represents a dark, reddish tinged form of *E. papillatum* rather than *E. clandestinum*.

The only plates very well illustrating *E. clandestinum* in our concept can be found in J. Lange (1936, pl. 78C) and in Arnolds & Noordeloos (1980, pl. 91 fig. e).

The size and shape of the spores vary considerably in *E. papillatum*, often within one collection. This is illustrated in Fig. 8d and in earlier published figures (Noordeloos 1979a: 259, fig. 22 and 262, fig. 28). In the type of *Leptonia papillata* Velen. only the simplest type of spore is found, whereas in *L. mamillata* Velen. the more elongate-complex type is predominant.

Outside Europe *E. papillatum* has been recorded from the U.S.A. (Hesler, 1967: 100) and South America (Dennis, 1953: 162; Horak, 1978: 75). I did not study material from these localities, but judging from these descriptions it seems probable that *E. papillatum* also occurs outside the temperate-boreal regions of Europe.

8. **Entoloma clandestinum** (Fr.) Noordeloos, *comb. nov.*—Figs. 7a–e

Agaricus clandestinus Fr., Syst. mycol. **1**: 206. 1821 (basionym). — *Nolanea clandestina* (Fr.) Kumm., Führ. Pilzk.: 95. 1871. — *Rhodophyllus clandestinus* (Fr.) Quél., Enchir.: 64. 1886.

SELECTED ICONES AND DESCRIPTIONS.—Arnolds & Noordeloos *in* Fung. rar. Icon. col. **12**: pl. 91 fig. e. 1980. — J. Lange, Fl. agar. dan. **2**: 101, pl. 78C. 1936.

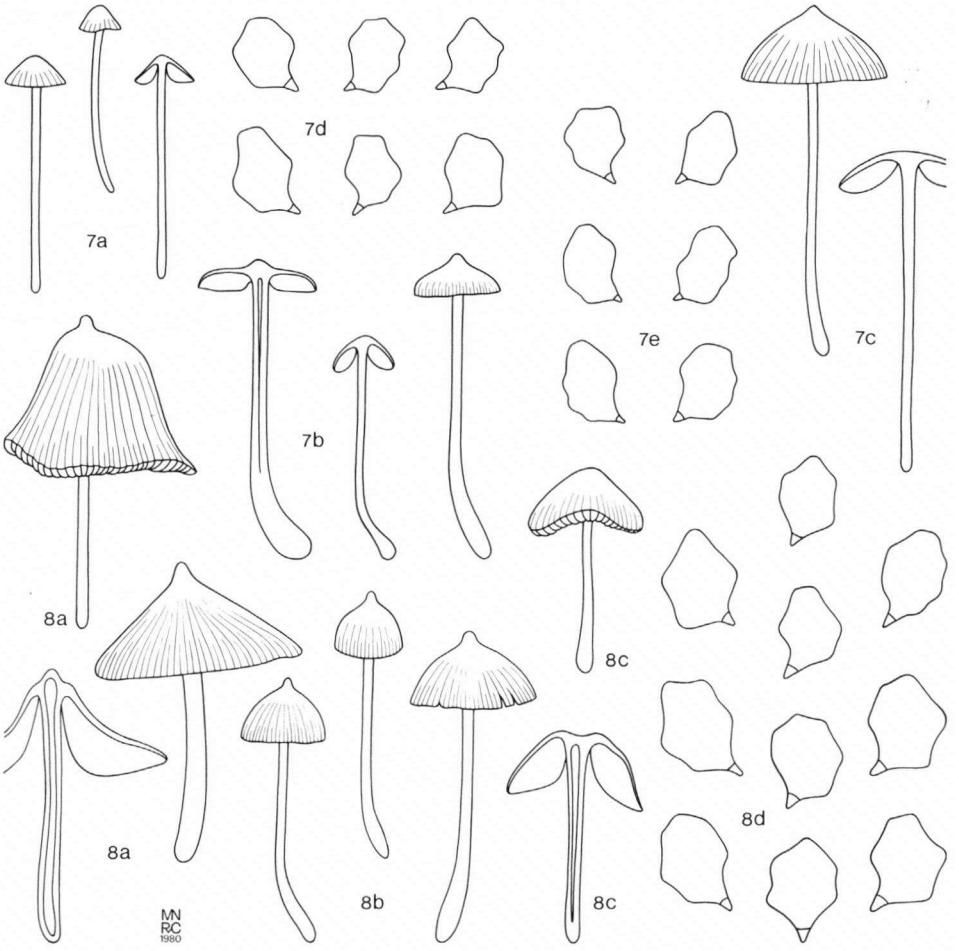
CHARACTERISTICS.—Pileus rather dark blackish brown often with distinct red tinge; lamellae distant, thickish, fairly dark brown already when young; stipe (sub-)concolorous with pileus; smell and taste indistinct; spores 7.8–10.2 μm long.

Pileus 6–22(–30) mm broad, conical or hemispherical, then slightly expanding to conico-convex, finally convex, with or without small papilla, with margin involute then expanding, hygrophanous, when moist rather dark blackish brown often with red tinge (2.5 YR 2.5/2; 5 YR 2/2–3/2; 7.5 YR 2/2–3/2; Meth. 6F4), not or only slightly paler at margin (e.g. 7.5 YR 4/4), mostly more or less unicolorous, translucently striate at least at margin, on drying pallescent to grey-brown (e.g. Meth. 6E6/5), glabrous, often ornated with minute warts or minutely radially wrinkled, shining. Lamellae L = 12–20, l = 1–3(–7), distant, thickish, variably inserted, broadly adnate or emarginate, uncinate to almost free, narrowly ventricose, up to 5 mm broad, dark grey-brown already when young, darkening with age, mostly without real pink tinge (7.5 YR 5/4, 5 YR 4/3; Meth. 6D5/E5, 6E5), sometimes veined, sometimes anastomosing, with concolorous or slightly paler edge. Stipe 18–40 × 1–2.3 mm, cylindrical, often flexuous, broadened towards base or not, concolorous with pileus or paler (Meth. 6E6; 5 YR 2.5/2, 3/3, 3/2, 3/1), not striate, not fibrillous, glabrous or at apex minutely pruinose, rarely entirely pruinose (*Noordeloos 187*), at base often with white tomentum, solid, then narrowly fistulose. Flesh thin-membranaceous but firm in pileus, concolorous with surface, in stipe firm and cartilagineous; cortex with same colour as surface, context paler. Smell and taste weak, inconspicuous, mild.

Spores (7.8–)8.2–10.2(–10.6) × (5.7–)6.2–7.5(–7.9) μm, Q = 1.2–1.3–1.4(–1.5), L–D = 1.5–2.5–3.5 μm, mostly rather regularly 6-angled in side-view, with basal facet. Basidia 30–50 × 8–15 μm, 2–4-spored. Cystidia absent. Hymenophoral trama regular, composed of fusiform cells (170–)220–450(–500) × 10–29 μm, with brown walls, sometimes with additional intracellular pigment. Pileipellis a simple cutis made up of 4.5–11 μm wide, cylindrical hyphae with coarsely encrusted walls. Pileitrama regular, composed of long, cylindrical to fusiform cells as in hymenophoral trama. Clamp-connections abundant in hymenium, rare or absent elsewhere.

HABITAT & DISTRIBUTION.—In frondose forest, often on clear spots, roadsides etc., but also in poorly manured grasslands. Rare but widespread. Recorded from the Netherlands, Denmark, Great Britain, German Federal Republic, France, Italy and Czechoslovakia. June-November.

COLLECTIONS EXAMINED.—NETHERLANDS: prov. Drenthe, Anloo, Gasterse duinen, 28 Oct. 1973, *E. Arnolds 3288* (WBS); prov. Gelderland, Winterswijk, Bek-en-Delle, 20 Sept. 1976, *M. E. Noordeloos 187*; prov. Noord-Holland, IJmuiden, Duin & Kruidberg, 29 Sept. 1975, *E. Kits van Waveren*; Aerdenhout, Naaldenveld, 2 Oct. 1975, *E. Kits van Waveren*; Castricum, 4 Oct. 1975, *E. Kits van Waveren*.



Figs. 7a–e. *Entoloma clandestinum.* — Habit and spores (7a from *Kits van Waveren, 2 Oct. 1975;* 7b, 7e from *Noordeloos 187;* 7c–d from *Kits van Waveren, 4 Oct. 1975*).

Fig. 8a–d. *Entoloma papillatum.* — Habit and spores (8a from *Noordeloos 421*; 8b from *Noordeloos 418*; 8c–d from *Noordeloos 420*).

GERMAN FEDERAL REPUBLIC, Bayern, Sugenburg bei Abensberg i.d. Hallertau, 10 Oct. 1968, *A. Einhellinger* (M). — FRANCE, dept. Oise, Lamorlaye, 24 Aug. 1950, *H. Romagnesi* (Herb. Romagn. 50.195, PC); loc. unknown, 14 Nov. 1977, anonym (Herb. Romagn. 77.378, PC). — ITALY (Trento?), Herb. Bres., June 1900 and July 1901 (S).

Entoloma clandestinum is closely related to *E. papillatum* but can be distinguished by the distant, thickish lamellae, smooth stipe, and smaller spores (see also the discussion under *E. papillatum*, p. 455).

9. ENTOLOMA LUCIDUM (P. D. Orton) Moser—Figs. 9a–e

Nolanea lucida P. D. Orton *in* Trans. Br. mycol. Soc. **43**: 331. 1960. — *Rhodophyllus lucidus* (P. D. Orton) Moser *in* Gams, Kl. KryptogFl. 3. Aufl., **2**(b/2): 166. 1967. — *Entoloma lucidum* (P. D. Orton) Moser *in* Gams, Kl. KryptogFl. 4. Aufl., **2**(b/2): 206. 1978.

CHARACTERISTICS.—Pileus and stipe dark sepia or horn brown; stipe striate; spores subisodiametrical, Q = 1.2 on the average per collection.

Pileus 18–32 mm broad, conico-convex soon expanding to convex, finally flattened, with faint papilla, with straight margin, strongly hygrophanous, when moist rather dark sepia or umber brown (10 YR 4/3, 3/3), paler towards margin (10 YR 5/3, 6/3), translucently striate at least up to one half of the radius, pallescent on drying to pallid grey-brown or ochraceous-grey (10 YR 7/3, 7/2), innately radially fibrillous, dull or shining. Lamellae L = up to 36, l = 1–3, adnate to almost free, segmentiform to ventricose, pallid grey then pinkish grey, finally brownish pink (7.5 YR 8/2, 8/4 then 7/4, 6/4, finally 5 YR 6/4), with concolorous, almost entire edge. Stipe 36–58 × 1.5–3 mm, cylindrical, mostly slightly curved and broadened at base, solid then narrowly fistulose, concolorous with or, particularly towards base, paler than pileus, strong brown to grey- or yellowish brown (10 YR 5/4, base 7/6), minutely silvery striate lengthwise. Flesh concolorous with surface in cortical layer, in context paler, brittle in pileus, more rigid in stipe but never cartilagineous. Smell and taste strong, rancid-farinaceous.

Spores 7.9–10.4 × 6.6–8.6(–9.0) μm, Q = 1.1–1.2–1.3, L–D = (0.6–)1.0–1.5–2 μm, (5–)6–7(–8)-angled in side-view, probably with basal facet. Basidia 24–40 × 9–15 μm, 4-, a few 2-spored. Cystidia absent. Hymenophoral trama regular; cells (140–)158–260 × 14–26 μm, mixed up with narrow, cylindrical hyphae. Pileipellis a cutis made up of 3–11(–20) μm wide cylindrical hyphae with brownish, sometimes minutely encrusted walls and sometimes with a pale, diffuse, intracellular pigment, gradually passing into pileitrama. Pileitrama regular, composed of inflated hyphae up to 32 μm wide with minutely encrusted walls. Clamp-connections abundant in hymenium, rare in other tissues.

HABITAT & DISTRIBUTION.—In grasslands, rare. Known from the Netherlands and Great Britain.

COLLECTIONS EXAMINED.—NETHERLANDS: IJsselmeerpolders, Oostelijk Flevoland, Roggebotszand, 1 July 1978, *J. Hoogschagen*; idem, Revebos, 14 June 1979, *G. J. M. G. Tjallingii-Beukers*; prov. Gelderland, Winterswijk, Korenburgerveen, 29 Sept. 1973, *C. Bas 6164*.

GREAT BRITAIN, Devon, Membury, 1 Nov. 1957, *P. D. Orton 1302* (K, holotype).

NOTES ON THE TYPE.—The type collection consists of two fragments of pilei, obviously belonging to two different carpophores with the following microscopical characters.

Spores of first specimen: (7.3–)7.9–10.2 × (6.6–)6.8–7.3(–8.6) μm, Q = 1.08–1.11–1.25, L–D = 0.6–1.1–1.7 μm; spores of second specimen: 7.9–10.2 × (6.3–)6.8–7.9(–8.5) μm, Q = 1.12–1.2–1.27, L–D = 1.0–1.8–2.7 μm. In both specimens the spores are irregularly 5–6–7-sided in side-view. Basidia 29–38 × 9–11,3 μm, 4-spored. Pileipellis a cutis made up of narrow cylindrical hyphae with minutely encrusted walls. Pileitrama regular, with long, subcylindrical to inflated cells with minutely encrusted walls, particularly those of the narrowest hyphae. Clamp-connections seen in hymenium.

Owing to the scarcity of material (most of the collections studied were poor in specimens) it is difficult to get a clear picture of the variability of *E. lucidum*. The dark colours and slightly more isodiametrical spores distinguish it from *E. minutum*.

Entoloma sericeonitens is very similar, but differs by the slightly more elongate spores and the aspect of pileal surface (see below).

10. **Entoloma sericeonitens** (P. D. Orton) Noordeloos, *comb. nov.*—Fig. 12

Nolanea sericeonitens P. D. Orton *in* Trans. Br. mycol. Soc. **43**: 333. 1960 (basionym).

CHARACTERISTICS.—Pileus reddish brown, strongly pallescent and fibrillous-aeriferous on drying; spores 9–11 × 7–8 μm, Q = 1.2–1.3–1.4.

Pileus up to 30 mm broad, conical to conico-campanulate, with margin straight at first but reflexed with age, hygrophanous, when moist reddish brown, slightly paler at margin, translucently striate up to centre, on drying strongly pallescent to pale grey-brown. Lamellae L = about 28, l = 1–3, almost free, ventricose, brownish pink, with concolorous edge. Stipe 50 × 2 mm, cylindrical, concolorous with pileus, slightly silky striate lengthwise, white tomentose at base. Flesh concolorous with surface, membranaceous-brittle. Smell and taste absent.

Spores (8.7–)9.0–10.4(–11.5) × (7.0–)7.6–8.7 μm, Q = 1.2–1.3–1.4, L–D = 1.0–2.0–3.0 μm, irregularly 6-angled in side-view, probably with basal bacet. Basidia 22–37 × 7.5–11.5 μm, 4-spored. Hymenophoral trama regular, with cells 180–300 × 15–23 μm, cylindrical to inflated. Pileipellis a simple cutis made up of radially arranged, cylindrical hyphae 4–8.7 μm wide with pale, minutely encrusted walls. Pileitrama regular with long, inflated cells 175–340 × 12–24 μm. Clamp-connections frequent in hymenium, scattered in trama of lamellae and pileus, rare in pileipellis.

HABITAT & DISTRIBUTION.—In grasslands (type); the Netherlands' collection was made on peaty soil. Rare; up till now known from the type locality and one locality in the Netherlands.

COLLECTIONS EXAMINED.—NETHERLANDS, prov. Gelderland, Winterswijk, Korenburgerveen, 29 Sept. 1973, *G. J. M. G. Tjallingii-Beukers.*

GREAT BRITAIN, Devon, Dawlish Warren, 12 Dec. 1956, *T. J. Wallace* (holotype, K).

NOTE ON THE TYPE.—The type collection consists of fragments of one specimen with the following characters.

Spores 9.0–11.0(–11.2) × 7.0–8.3(–8.7) μm, Q = 1.2–1.3–1.36, L–D = 1.7–2.3–3.0. Basidia 27–34 × 10.4–12.7 μm, 4-spored. Hymenophoral trama regular with cylindrical cells 190–370 × 11–24 μm. Pileipellis a thin cutis made up of parallel, 3–8(–11) μm wide, cylindrical hyphae with minutely encrusted walls, gradually passing into trama. Pileitrama regular, with the same long cylindrical-inflated cells as in hymenophoral trama. Clamp-connections present in hymenium.

Entoloma sericeonitens resembles *E. lucidum* very strongly. It differs by the slightly more reddish tinged pileus, the aeriferous aspect of dry pileus, the lack of smell and the slightly larger and more heterodiametrical spores. The shape of the spores, however, is shown to be rather variable in *E. lucidum*. Unfortunately the observations above are based on very poor material, the Netherlands' collection consisting of one specimen. Further studies are necessary to prove that both species are not conspecific.

Entoloma minutum differs from *E. sericeonitens* by the much paler pileus and lamellae and the distinctly dihedral base of the spores.

11. ENTOLOMA ORTONII Arnolds & Noordeloos—Fig. 10

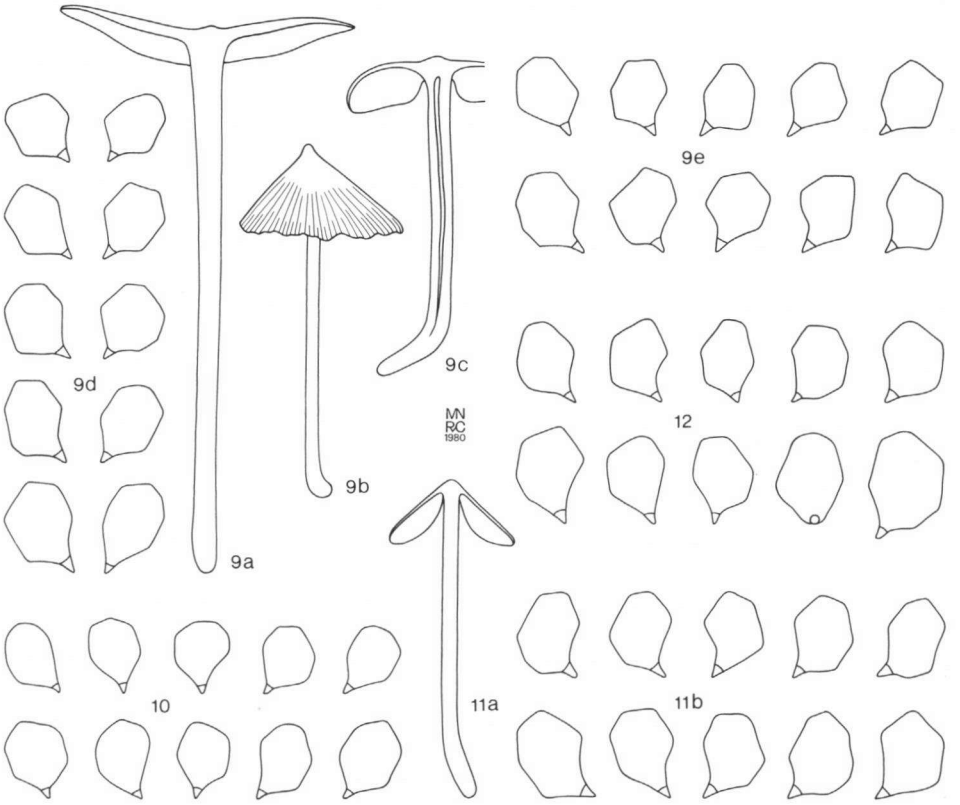
Entoloma ortonii Arnolds & Noordeloos *in* Persoonia **10**: 292. 1979 (name change). — *Nolanea farinolens* P. D. Orton *in* Trans. Br. mycol. Soc. **43**: 330. 1960. — *Rhodophyllus farinolens* (P. D. Orton) Moser *in* Gams, Kl. KryptogFl. 3. Aufl., **2**(b/2): 166. 1967. — *Entoloma farinolens* (P. D. Orton) Moser *in* Gams, Kl.

KryptogFl. 4. Aufl., 2(b/2): 206. 1978 (non *Entoloma farinolens* Horak, 1973).

SELECTED ICONES AND DESCRIPTION.—Arnold & Noordeloos *in* Fung. rar. Icon. col. **12**, pl. 92 fig. b. 1980.

CHARACTERISTICS.—Pileus flattened, never truly papillate; stipe strongly silky striate lengthwise; spores rather rounded-angular and thin-walled.

Pileus 24–35 mm broad, convex to plano-convex, sometimes with very weak umbo or slightly depressed at centre, with margin slightly involute at first then straight, hygrophanous, when moist dark grey-brown at centre (Meth. 5E6; 10 YR 3/2–4/2), paler towards margin (Meth. 5D5; 10 YR 4/3–5/3), translucently striate up to centre, when dry brown-grey to ochraceous grey, dull. Lamellae L = 18–23, l = 3–7, adnate or emarginate, segmentiform to subventricose, brown-grey with pink tinge (Meth. 5C4; 7.5 YR 8/4–6/4), paler towards edge. Stipe 50–95 × (2–)2.5–5 mm, cylindrical, sometimes flexuous, with or without broadened base, grey-brown (10 YR 6/4, 5/4, 4/4), strongly silvery striate lengthwise, sometimes twisted, pruinose at apex, white tomentose at



Figs. 9a–e. *Entoloma lucidum*. — Habit and spores (9a from *Bas 6164;* 9b, 9e from *Tjallingii-Beukers, 14 June 1979*; 9c from *Hoogschagen, 1 July 1978*; 9d from holotype).

Fig. 10. *Entoloma ortonii*. — Spores (from holotype).

Figs. 11a–b. *Entoloma sphaerocystis*. — Habit and spores (11a–b from holotype).

Fig. 12. *Entoloma sericeonitens*. — Spores (from holotype).

base. Flesh in pileus rather firm, tough, watery grey-brown, in stipe more fibrillous, rigid, grey- to ochraceous brown. Smell and taste strongly rancid-farinaceous.

Spores 7.4–8.5(–9.4) × 5.7–7.4(–8.0) μm, Q = 1.07–1.2–1.3(–1.4), L–D = (0.6–)1.5–1.7–2.3 μm, 5–6-angled in side-view, with very much rounded angles, probably with basal facet. Basidia 25–40 × 10.5–14 μm, 4-(rarely 2-)spored. Cystidia absent. Hymenophoral trama regular, with cylindrical to inflated cells up to 450 μm long and 32 μm wide. Pileipellis a thin cutis made up of 4–12 μm wide cylindrical hyphae with minutely encrusted walls and diffusely intracellular pigment. Pileitrama regular, with cells up to 500 μm long and 10–23 μm wide, in upper layers with pale brown, minutely encrusted walls. Clamp-connections present in hymenium.

HABITAT & DISTRIBUTION.—In grasslands or grassy spots in frondose forest, rare. Known from the Netherlands and Great Britain.

COLLECTIONS EXAMINED.—NETHERLANDS, prov. Drenthe, Anloo, CRM-reserve 'de Burgwallen', 4 July 1974, *E. Arnolds 3388* (WBS); prov. Zuid-Holland, Warmond, estate 'Huys te Warmont', 12 Oct. 1976, *C. Bas 7094*.

GREAT BRITAIN, Inverness-shire, Plodda Falls, 22 Aug. 1955, *P. D. Orton* (K, holotype).

NOTES ON THE TYPE.—The holotype collection consists of 5 specimens with the following microscopical characters.

Spores 7.3–8.5(–9.0) × (5.7–)6.2–6.8(–7.3) μm, Q = (1.08–)1.1–1.2–1.3(–1.4), L–D = (0.6–)0.9–1.3–2.3 μm, (5–)6-angled in side-view with very much rounded angles. Basidia (28.5–)31–40 × 8.1–10.5 μm, 4-spored. Cystidia absent. Pileipellis a thin cutis made up of 4–9 μm wide cylindrical hyphae with minutely encrusted walls. Clamp-connections frequent in hymenium.

Entoloma ortonii has very distinctive rounded-angular, thin-walled spores, which are also smaller than in *E. lucidum* and *E. sericeonitens*. *Entoloma juncinum* has more isodiametrical, more pronouncedly angled spores.

12. **Entoloma cuspidifer** (Kühn. & Romagn.) Noordeloos, *comb. nov.*—Figs. 13a–e

Rhodophyllus cuspidifer Kühn. & Romagn., Fl. anal.: 189. 1953. — *Nolanea cuspidifer* (Kühn. & Romagn.) P. D. Orton *in* Trans. Br. mycol. Soc. **43**: 179. 1960.

Agaricus junceus Fr. var. *cuspidatus* Fr., Icon. sel. **1**: pl. 99 fig. 2. 1875. — *Nolanea juncea* Fr. var. *cuspidata* (Fr.) Favre *in* Bull. Soc. mycol. Fr. **52**: 137. 1936. — *Rhodophyllus cuspidatus* (Fr.) Favre, Assoc. fong. hautsmarais: 44. 1948, non *R. cuspidatus* Pat. (1924) nec *Entoloma cuspidatus* (Peck, 1870) Sacc. 1887.

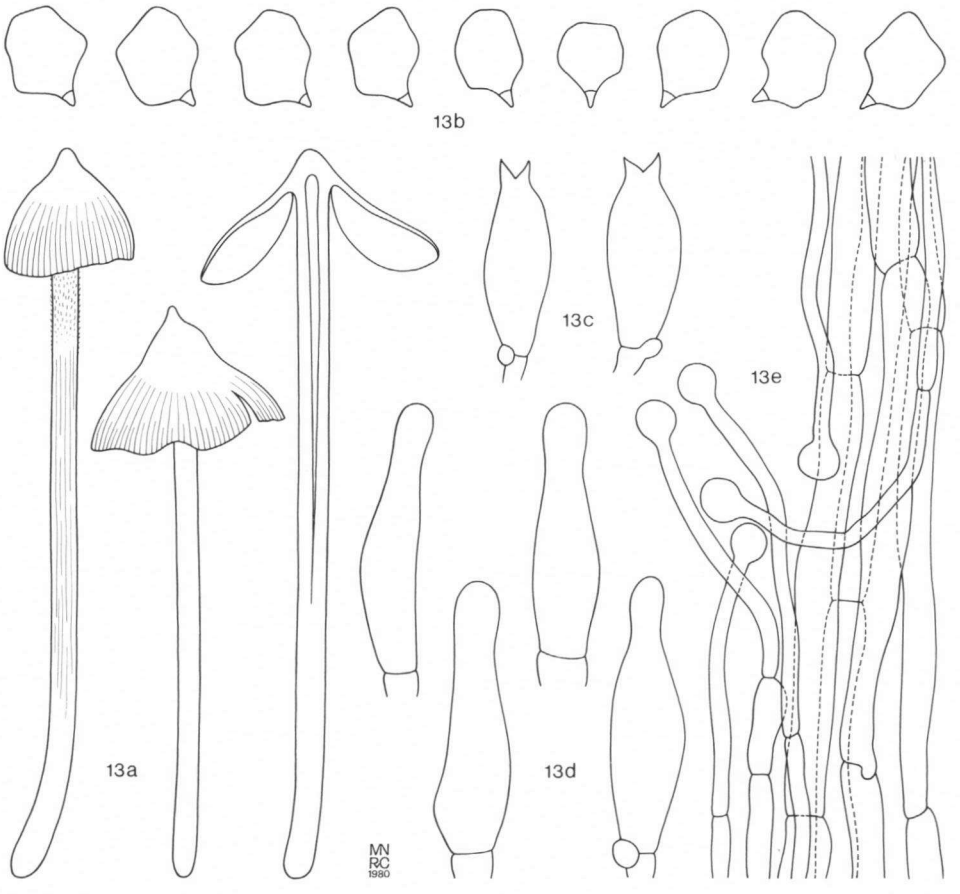
SELECTED DESCRIPTIONS.—Favre, l.c. 1948. — Einhellinger *in* Ber. bayer. bot. Ges. **47**: 125, fig. 4. 1976.

CHARACTERISTICS.—Pileus pointedly conical, only slightly expanding, sepia, strongly pallescent on drying; stipe paler with pruinose-subflocculose apex; basidia 2-spored; capitate hairs at apex of stipe.

Pileus 17–35 mm broad, up to 18 mm high, acutely conical with small papilla, only slightly expanding to conico-campanulate with age, with margin slightly inflexed but not involute when young, later straight, strongly hygrophanous, when moist translucently striate up to one half of the radius, (greyish) sepia to greyish bistre, only slightly paler at margin (10 YR 4/4, towards margin 10 YR 5/4–6/4, on drying pallescent to very pale brown (10 YR 7/4–7/3), with radial streaks from centre outward, when moist already with some radially arranged silvery fibrils, becoming strongly silvery fibrillous-silky on drying. Lamellae L = about 30, l = 3–5, (almost) free, triangular-ventricose, up to 7 mm broad, exceeding mature pilei, grey then grey-pink, finally with brown tinge (10 YR 7/2, 7/3, 7/4 then 7.5 YR 7/4 (6/4), with eroded concolorous

edge. Stipe 72–80 × 2.5–4 mm, cylindrical, straight, with equal base, paler and more yellow than pileus (10 YR 8/4, 7/4, 8/6), browner at base (10 YR 6/4, 5/4), upper 15 mm minutely pruinose-downy, downwards with a few longitudinal silvery fibrils, base white tomentose, solid, then narrowly fistulose. Flesh relatively firm in pileus and concolorous with surface, fibrillous in stipe, concolorous with surface in cortex, pale in context. Smell strongly raphanoid. Taste rancid-raphanoid.

Spores 10–13 × 9.3–11 μm, Q = 1.05–1.2–1.4, L–D = 1.2–2.5–4 μm, 5–6-sided in side-view, structure of base difficult to interprete. Basidia 25–41 × 9–15 μm, mostly broadly clavate, 2-spored, rarely 4-spored. Cheilocystidia usually absent, in one specimen scattered, 42–60 × 12–17 μm, clavate-subcapitate. Hymenophoral trama with long, only slightly inflated cells 280–380 × 14–32 μm. Pileipellis a poorly differentiated cutis made up of 2.5–10(–14) μm wide cylindrical hyphae with pale, very minutely encrusted walls. Subpellis composed of broad, relatively short cells about 135–170 × 32–42 μm, gradually passing into pileitrama. Pileitrama regular with much



Figs. 13a–e. *Entoloma cuspidifer*. — Habit, spores, basidia, cheilocystidia and stipitepellis. (All figs. from *Noordeloos 993*.)

longer cells, up to 450 μm long and 15–36 μm wide, with pale, sometimes slightly encrusted walls particularly in the narrowest hyphae near septa, in some superficial hyphae with additional diffuse, pale intracellular pigment. Stipitepellis with an arachnoid covering of 2–5 μm wide cylindrical branching hyphae with long terminal cells with a distinct capitulum 4–8 μm wide. Clamp-connections frequent in all tissues studied.

HABITAT & DISTRIBUTION.—In acid, peaty habitats, in *Sphagnum*, but in the Netherlands found in a marshy vegetation with *Salix repens*, *S. aurita*, and *Menyanthes trifoliata* in a dune valley near the coast; known to occur in Norway, Great Britain, France, Switzerland, and German Federal Republic.

COLLECTIONS EXAMINED.—NETHERLANDS, prov. Noord-Holland, Callantsoog, Nature-reserve 'Zwanewater', 25 Aug. 1979, *M. E. Noordeloos 993*.

NORWAY, prov. Telemark, Nesland near Rauland, 26 July 1975, *F. Tjallingii & G. J. M. G. Tjallingii-Beukers*. — GERMAN FEDERAL REPUBLIC, Bayern, Ascholding, Eglinger Moor, 3 Aug. 1976, *A. Einhellinger* (M).

Entoloma cuspidifer has been excellently delineated by Favre (1936, l.c.) in a description fitting perfectly our material. Also Einhellinger's (1976, l.c.) illustrations are well qualified. Both authors collected *E. cuspidifer* in Sphagneta. The Netherlands' locality has a different vegetation: marshy ground with *Salix repens*, *S. aurita*, *Menyanthes trifoliata*, and mosses, but without *Sphagnum*, in a dune area with a relatively low pH. Obviously *E. cuspidifer* is not restricted to *Sphagnum*, in contrast with many other agarics found on species of that genus of mosses.

The pale colours and two-spored basidia may cause confusion with *E. cetratum*, but the raphanoid smell and completely different spores make it easy to recognize *E. cuspidifer*. *Entoloma tenellum* Favre is closely related, but differs by the mostly 4-spored basidia and slightly different spores.

Entoloma subsection **Fibulata** (Largent) Noordeloos, *comb. nov.*
emend. Noordeloos

Nolanea (Fr.) Kumm. subsect. *Fibulatae* Largent *in* Mycologia **66**: 1008. 1974. — Type: *Nolanea juncea* (Fr.) Quél.

Pigment minutely encrusting hyphae of pileipellis and pileitrama, and at the same time diffusely intracellular pigment present particularly in subpellis of pileus; spores isodiametrical to subglobose, Q = 1.0–1.1–1.2.

Entoloma subsection *Fibulata* comprised in its original concept species which are treated here in subsection *Papillata* and section *Nolanea*. In the present work subsection *Fibulata* is emended by restricting it to those species in section *Papillata* which have isodiametrical spores and two types of pigment.

KEY TO THE SPECIES OF SUBSECTION FIBULATA

1a. Pileus moderately dark grey-brown or slightly ochraceous tinged grey-brown, not entirely smooth but already when moist with aeriferous silvery fibrils, becoming strongly lustrous fibrillous on drying; stipe strongly silvery striate lengthwise; smell weak, spermatical, not farinaceous.. . . *E. nitens*, p. 466

b. Pileus fairly dark grey-brown, smooth and glabrous, when moist becoming silvery shining, innately fibrillous on drying; stipe smooth or with some scattered silvery longitudinal fibrils; smell farinaceous-rancid. . . . . *E. juncinum*, p. 464

13. ENTOLOMA JUNCINUM (Kühn. & Romagn.) Noordeloos—Figs. 14a–d

Rhodophyllus juncinus Kühn. & Romagn. *in* Rev. Mycol. **19**: 5. 1954. — *Nolanea juncina* (Kühn. & Romagn.) P. D. Orton *in* Trans. Br. mycol. Soc. **43**: 179. 1960. — *Entoloma juncinum* (Kühn. & Romagn.) Noordeloos *in* Persoonia **10**: 255. 1979.

Nolanea globispora Velen., České Houby: 628. 1921; non *Entoloma globisporum* Morg.-Jones, 1971.

Nolanea zonata Velen., Novitates mycologicae novissimae: 78. 1947; non *Entoloma zonatum* Hesler, 1967.

MISAPPLIED NAMES.—*Rhodophyllus junceus* sensu J. Lange *in* Dansk bot. Ark. **2**: 37–38. 1921. — *Nolanea proletaria* sensu Ricken, Blätterpilze: 299, pl. 74 fig. 4. 1910.

CHARACTERISTICS.—Pileus rather dark brown, convex, weakly papillate or not, translucently striate when moist; lamellae rather dark brown with pink tinge; stipe concolorous with pileus, smooth, not or only weakly striate; spores isodiametrical.

Pileus (10–)15–35 mm broad, conico-convex soon expanding to plano-convex, obtuse or papillate, with margin slightly involute when young but soon straight, slightly undulating and/or splitting with age, strongly hygrophanous, when moist rather dark reddish or greyish brown at centre and on striae, slightly paler towards margin (centre 10 YR 3/2, 4/2, 3/3; 7.5 YR 3/2, 4/2, towards margin 10 YR 4/4, 5/3, 5/4, 6/3, 7/2; 7.5 YR 6/3, 5/3), translucently striate from margin up to one half of the radius at least, often up to centre; on drying strongly pallescent towards pale yellowish-greyish brown (10 YR 7/2, 7/3, 8/3, 8/4), glabrous, smooth or minutely fluffy-rugulose at centre when dry, sometimes with concentrical rings when drying. Lamellae L = 15–30, l = (1–) 3–7, deeply emarginate to almost free, ventricose, up to 7 mm broad, often exceeding the pileus, rather dark grey-brown with pink tinge with age (10 YR 5/3, 5/4; 7.5 YR 5/4, 6/4; 5 YR 5/3, 5/4, 6/3), with entire concolorous edge, on drying distinctly pallescent from edge upwards; rarely veined and/or anastomosing. Stipe 45–80 × 1–4 mm, cylindrical or flattened with longitudinal groove, sometimes flexuous, slightly broadened at base or not, concolorous or slightly paler than pileus, dark grey-brown or golden brown, sometimes with reddish tinge (10 YR 4/3, 3/4, 4/4; 7.5 YR 4/2, 3/2; 5 YR 4/2, 3/3), glabrous, sometimes minutely pruinose at apex, smooth and shining or innately silvery fibrillous under lens, often with white tomentum at base, solid then narrowly fistulose. Flesh when moist concolorous with surface, pallescent on drying, brittle in pileus, firm-subcartilagineous in stipe. Smell spontaneously farinaceous, sometimes weak but then distinct after cutting. Taste strongly farinaceous-rancid.

Spores 8.0–10.4 × (7.0–)7.2–9.0(–9.3) µm, Q = 1.0–1.1–1.2, L–D = 0.5–1.5 µm, 5–6-sided isodiametrical in side-view with pronounced angles and protruding apiculus; basal diedron sometimes well developed. Basidia 28–45(–56) × 10–16 µm, Q = 2.3–4.0, 4-spored. Cystidia absent. Hymenophoral trama regular, composed of cylindrical or inflated cells (170–)230–540 × 12.5–42 µm, mixed with narrow cylindrical hyphae. Pileipellis a thin cutis made up of 2.4–14 µm wide cylindrical hyphae with scattered fusiform to clavate terminal cells, up to 20 µm broad; with pale brown and minutely encrusted walls, sometimes with additional pale, diffuse intracellular pigment. Pileitrama regular, composed of long cylindrical to slightly inflated hyphae with cells up to 450 µm long and 12–32 µm wide, with pale, sometimes minutely encrusted walls. Clamp-connections frequent in hymenium, rare elsewhere.

HABITAT & DISTRIBUTION.—In humus-rich frondose forests, solitary; rarely also in grasslands. Widespread and locally constant and common. July-November.

COLLECTIONS EXAMINED.—NETHERLANDS: prov. Drenthe, Westerbork, 'de Reitema', E. of Elp, 13 Oct. 1976, *E. Arnolds 3648* (WBS); prov. Overijssel, Delden, along Springendaalse beek, 11 Sept.

1976, *J. Schreurs*; idem, estate 'Singraven', 18 June 1960 and 19 Sept. 1969, *E. Kits van Waveren*; idem, estate 'Twickel', 28 Sept. 1974, *E. Kits van Waveren*; Ommen, estate 'Stekkenkamp', 13 Sept. 1979, *J. Schreurs & T. Boekhout*; idem, near Castle, 18 Oct. 1969, *E. Kits van Waveren*; idem, near 'Ada's Hoeve', 26 Sept. 1964 and 19 Oct. 1969, *E. Kits van Waveren*; prov. Noord-Holland, Noordwijkerhout, Vogelenzang, 13 Nov. 1962, *C. Bas 2898*; idem, State Forest, 24 Nov. 1977, *M. E. Noordeloos 575*; Velzen, 'Duin en Kruidberg', 13 Nov. 1962, *C. Bas 2913*; Castricum, 'Naaldenveld', 19 Oct. 1964, *E. Kits van Waveren*; Overveen, 'Koningshof', 16 Nov. 1976, *M. E. Noordeloos 266*; Callantsoog, 'Zwanewater', 13 Nov. 1977, *C. Bas*; prov. Zuid-Holland, Isl. Goeree, Westduinen, Oct. 1979, *M. Brand*; prov. Noord-Brabant, Nuenen, Broeklanden, 15 Sept. 1979, *M. E. Noordeloos* 1020; Drunen, along Drongelens kanaal, 1 Nov. 1970, *P. B. Jansen 70–182*.

BELGIUM, prov. Namur, Rochefort, near Resteigne, 1 Oct. 1977, *M. E. Noordeloos 476*; St. Hubert, 'Poix', 24 Sept. 1975, *P. B. Jansen 75–243*. — GERMAN FEDERAL REPUBLIC, Teutoburgerwald, Detmold, Sandebeck, 5 Oct. 1976, *M. E. Noordeloos 214*; idem, Externsteinerwald, 7 Oct. 1976, *C. Bas*; idem, Beller Holz, 4 Oct. 1976, *M. E. Noordeloos 217, 218, 219*; idem, Merlsheimerwald, 6 Oct. 1976, *C. Bas*; Höxter, Elschenbergerwald, 8 Oct. 1976, *C. Bas*. — FRANCE, dept. Oise, Chantilly, 16 Aug. 1954, *H. Romagnesi 54.136* (lectotype, Herb. Romagn., PC); Chamont, 19 July 1953, *H. Romagnesi 53.95* (Herb. Romagn., PC); Montlognon, 18 Aug. 1954, *H. Romagnesi 54.145* (Herb. Romagn., PC); Luzarches, 24 Aug. 1946, *H. Romagnesi 46.271* (Herb. Romagn., PC). — CZECHOSLOVAKIA, Bohemia, Mnichovice, July 1919, *J. Velenovský* (lectotype of *Nolanea globispora* Velen., PRC); idem, July 1940, *J. Velenovský* (holotype of *Nolanea zonata* Velen., PRM 154454).

Entoloma juncinum is very well depicted by J. Lange (1936, pl. 79F) as *Rhodophyllus junceus* (Fr.) Quél. *Agaricus junceus* Fr., however, is a sphagnicolous species of subgenus *Leptonia*, close to *A. (Leptonia) asprellus*, characterized by a subumbilicate pileus with a villous to subsquamulose centre. *Nolanea juncea* sensu Ricken (1913: 300, No. 896) is probably the same taxon as J. Lange, l.c., had in mind. Ricken's description is somewhat hybridal; obviously he combined his own observations with those of Fries: 'Hut kegelig-ausgebreitet, warzig-zugespitzt aber auch mit genabeltem und fast schuppigem Scheitel.' In a note Ricken admits: 'Ich habe ihn nur streng kegelig, mit fast abgesetzter Warze beobachtet', and this suggests that Ricken's own observations refer to the species described here as *E. juncinum*.

Another description of Ricken (1913: 299, No. 892, pl. 74 fig. 4), viz. that of *Nolanea proletaria* Fr. likewise seems to refer to *E. juncinum*. Again it is not quite clear whether Ricken's interpretation is the same as Fries's, or not. Fries's descriptions (1836: 8; 1857: 292; 1874: 206) give a picture of a species with a grey campanulate pileus, with a blunt, villous, umber brown centre and with a smooth, fuligineous stipe. Fries refers to a drawing of Battarra (1755: pl. 18D) which may figure as type plate for his species. To me the Friesian concept remains obscure and does not agree with my view of *E. juncinum*, nor with any other species known by me.

Considering all this I think Kühner & Romagnesi (1954: 5) were right in giving *Rhodophyllus junceus* sensu J. Lange a new name, viz. *Rhodophyllus juncinus*.

Earlier synonyms of *E. juncinum*, viz. *Nolanea globispora* Velen. and *N. zonata* Velen. cannot be recombined in *Entoloma* for nomenclatural reasons (see Noordeloos, 1979b: 255).

In the field *E. juncinum* can be distinguished by the dark grey-brown, strongly striate, smooth pileus, the almost glabrous or minutely striate stipe, and often also by the strong mealy smell. *E. nitens* differs in the lustrous-fibrillous pileal surface, the strongly striate stipe, and in the colour of the pileus.

In forests, a habitat which is preferred by *E. juncinum*, such as *Alno-Padion* and *Ulmion*

carpinifoliae vegetations, this species can be found growing together with *E. leptopus*. The latter is easily distinguished by its heterodiametrical spores and the presence of cheilocystidia.

In grasslands *E. juncinum* frequently grows together with *E. papillatum*, which differs by having heterodiametrical spores.

Entoloma juncinum can be distinguished from small specimens of *E. sericeum* by slightly larger spores, less intensive membranal pigments and additional intracellular pigment.

14. ENTOLOMA NITENS (Velen.) Noordeloos—Figs. 15a–c

Nolanea nitens Velen., České Houby: 627. 1921. — *Rhodophyllus nitens* (Velen.) Kühn. & Romagn., Fl anal.: 190. 1953. — *Entoloma nitens* (Velen.) Noordeloos *in* Persoonia **10**: 252. 1979.

SELECTED ICONES AND DESCRIPTIONS.—Romagnesi *in* (Trav. mycol. déd. R. Kühner) Bull. mens. Soc. linn. Lyon **43** (Num. spéc.): 372–374. 1974. — Arnolds & Noordeloos *in* Fung. rar. Icon. col. **12**: pl. 93 fig. d. 1980.

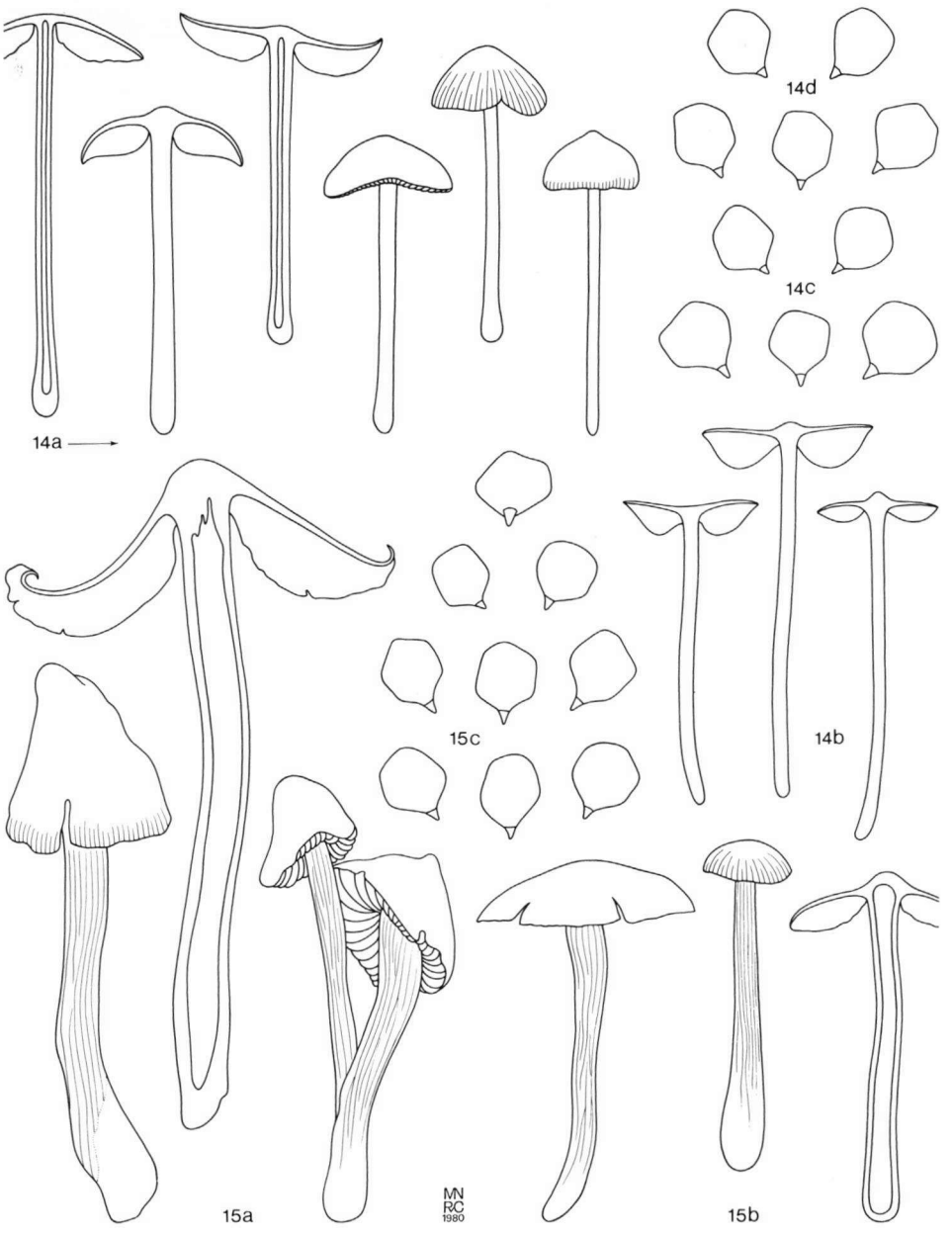
CHARACTERISTICS.—Pileus and stipe grey-brown with silvery fibrillous lustre, particularly when dry; spores isodiametrical.

Pileus 11–42 mm broad, at first conical, conico-campanulate or hemispherical, then expanding to convex or plano-convex, usually with small indistinct papilla, sometimes truncate, sometimes with small abrupt papilla, with straight margin, often reflexed and splitting with age, at first regularly shaped, later with undulating limb, hygrophanous, when moist grey-brown (10 YR 4/3, 4/4, 5/4, 5/3), slightly paler towards margin, translucently striate often up to one half of the radius or more, pallescent on drying to pale greyish brown or pale beige, sometimes slightly tinged ochre at centre (10 YR 6/2, 7/2, 6/3, 7/3); surface when moist with some minute aeriferous fibrils, when dry rather strongly radially satiny-lustrous, at centre sometimes becoming velvety-fluffy. Lamellae L = 20–30, l = 1–3(–5), moderately distant, narrowly to broadly adnate, sometimes deeply emarginate to almost free, segmentiform then ventricose, sometimes transversely veined, grey-brown, only in later stages tinged pink (10 YR 6/3, 6/4; 7.5 YR 6/4, 5/4), with concolorous entire edge. Stipe 40–70 × 2–4 mm, cylindrical or flattened with longitudinal groove, with or without broadened base, concolorous with moist pileus or paler, strongly silvery-aeriferous striate lengthwise, often twisted, minutely pruinose at apex, white tomentose at base, tomentum often covering basal third of stipe. Flesh in cortex of pileus and stipe concolorous with surface, pale and fibrous inside stipe, brittle in pileus, brittle-fibrous, easily splitting lengthwise in stipe. Smell weak, somewhat earthlike or subraphanoid (raphanoid-subspermatical according to Romagnesi, l.c.). Taste weak, more or less raphanoid, never farinaceous.

Spores 8.0–10.4 × (7.3–)7.5–9.3(–10.4) µm, Q = 1.0–1.1–1.2, L–D = 0–0.6–1.5 µm, 5–6-angled in side-view, with distinct basal diedron. Basidia 32–52(–60) × 9–14 µm, 4-spored. Cystidia absent. Hymenophoral trama regular, cells cylindrical to inflated, 200–340 × 12.5–27 µm, with hyaline, colourless walls. Pileipellis a cutis made up of 3.4–9 µm wide cylindrical hyphae with pale brown minutely encrusted walls. Subpellis sometimes more or less well differentiated, consisting of broad cylindrical cells 38–87 × 10–19 µm, with pale or moderately dark brown intracellular pigment. Pileitrama regular with long cylindrical or inflated cells up to 450 µm long and 10–24 µm wide, with pale, sometimes minutely encrusted walls, intermixed with narrow 3–7.5 µm wide cylindrical hyphae with minutely encrusted walls. Clamp-connections present in hymenium, rare or absent elsewhere.

HABITAT & DISTRIBUTION.—In frondose forests on rich loamy soils or in grassy vegetations, once found in juniper-heath (*Barkman 10071*). Rare but widespread, known from the Netherlands, France, and Czechoslovakia. April-November.

COLLECTIONS EXAMINED.—NETHERLANDS: prov. Overijssel, Ommen, estate 'Stekkenkamp', 13 Sept. 1979, *J. Schreurs & T. Boekhout*; Ommen, Junne, Junner Koeland, 5 Nov. 1976, *J. J. Barkman 10071*



Figs. 14a–d. *Entoloma juncinum*. — Habit and spores (14a, 14c from *Kits van Waveren, 18/19 Oct. 1969;* 14b, 14d from *Noordeloos 203*).

Figs. 15a–c. *Entoloma nitens*. — Habit and spores (15a from *de Bernon, April 1977*; 15b–c from *Noordeloos 316*).

(WBS); Delden, estate 'Twickel', 20 Aug. 1977, *M. E. Noordeloos 401*; idem, near Oldenzaal, Roderveld, 12 Oct. 1976, *E. Kits van Waveren*; prov. Noord-Brabant, Strijbeek, Goudbergven, 15 Aug. 1964, *P. B. Jansen*.

FRANCE, dept. Manche, Tallepied, 23 Aug. 1971, *H. Romagnesi 71.179* (Herb. Romagn., PC); idem, April 1977, *M. de Bernon*.

Entoloma nitens is close to *E. juncinum* from which it differs mainly by the lustrous aspect of the covering layers and the slightly paler, sometimes more ochraceous colour. Romagnesi (1974: 374) also emphasizes the difference in smell. In *E. nitens* the raphanoid smell can be strong, as I personally recorded (coll. *M. de Bernon, April 1977*), but is found to be weak, however, in some collections of both species and is therefore considered less indicative than the striking macroscopical differences.

In the field *E. nitens* can be confused with *E. lucidum* by the lustrous-fibrillose surface of the pileus, but the spores are distinctly isodiametrical.

Nolanea sericeonitens P. D. Orton, according to its author closely related to, if not identical with, *Rhodophyllus nitens* (Velen.) Kühn. & Romagn., has differently shaped spores and is considered here to be related to *E. lucidum* (see p. 458).

Entoloma subsection **Minuta** (Romagn.) Noordeloos, *comb. & stat. nov.*

Rhodophyllus Quél. section *Minuti* Romagn. *in* Bull. mens. Soc. linn. Lyon **43**: 331. 1974 (basionym). (*In* Bull. Soc. mycol. Fr. **53**: 330. 1937, nom. nud.) Typus: *Entoloma minutum* (P. Karst.) Noordeloos.

Carpophores small, pale grey-brown or flesh-coloured beige, pigments membranal and at least on some hyphae of pileipellis and pileitrama minutely encrusting; spores subisodiametrical to heterodiametrical with distinctly dihedral base.

KEY TO THE SPECIES OF SUBSECTION MINUTA

1a. Pileus usually distinctly depressed at centre; lamellae pale pink with or without slight grey shade; spores (7.9–)8.0–10.4(–11.5) × (6.4–)6.8–8.1(–8.7) µm; surface of stipe without differentiated hairs. *E. minutum* var. *minutum*, p. 468

b. Pileus usually convex with or without small papilla, never depressed; lamellae distinctly grey-brown with pink tinge; spores 9.3–12(–14) × 7.2–9.3 µm; apex of stipe with well-differentiated, subcapitate hairs. *E. tenellum*, p. 470

15. ENTOLOMA MINUTUM (P. Karst.) Noordeloos var. MINUTUM—Figs. 16a–c

Nolanea minuta P. Karst. *in* Meddn Soc. Fauna Fl. fenn. **5**: 10. 1879 (=Symb. ad Mycol. fenn. 6). — *Rhodophyllus minutus* (P. Karst.) J. Lange *in* Dansk bot. Ark. **2**: 37. 1921. — *Entoloma minutum* (P. Karst.) Noordeloos *in* Persoonia **10**: 248. 1979 (non *Eccilia minuta* Velen. 1921 nec *Claudopus minutus* Velen. 1929).

SELECTED ICONES AND DESCRIPTIONS.—Arnolds & Noordeloos *in* Fung. rar. Icon. col. **12**; pl. 93, figs. a, b. 1980. — Josserand *in* Bull. Soc. mycol. Fr. **53**: 213–215. 1937. — J. Lange, Fl. agar. dan. **2**: 102, pl. 79H. 1936. — Nathorst-Windahl *in* Friesia **8**: 13. 1966.

CHARACTERISTICS.—Carpophores rather small and thin-fleshed, brittle; pileus small and flattened, usually with central depression; pale flesh-coloured to pale grey-brown, remarkably translucently striate; stipe concolorous with pileus.

Pileus 6–25 mm broad, conical, soon expanding to (plano-)convex usually with slightly depressed, rarely minutely papillate centre, with straight margin, strongly hygrophanous, when moist pale flesh-colour beige to pale grey-brown with remarkably contrasting grey-brown striation and centre (centre and striae 10 YR 6/3, 6/4, 5/3; centre sometimes 7.5 YR 5/4; interstriation and margin 10 YR 7/6, 7/4, 8/4, 8/2), strongly pallescent on drying to pale grey-brown or sordid white (10 YR 8/3, 8/4), innately to aeriferously fibrillous-lustrous, shining, smooth or at centre, particularly in young specimens, slightly rugulose to fluffy-subsquamulose. Lamellae L = 13–22, l = 1–3, moderately distant, adnate to almost free, ventricose, often exceeding the pileus, white to pale grey, then pink with or without grey tinge (10 YR 8/4, 7/4 then 7.5 YR 7/2, 7/4), with concolorous, entire or slightly eroded edge. Stipe 25–65 × 1–1.5(–2) mm, cylindrical, straight, somewhat glassy hyalinous pale grey-brown or ochraceous-orange to greyish yellow, sometimes innately fibrillous to very slightly silvery striate lengthwise (lens), glabrous apex sometimes minutely pruinose, solid then narrowly fistulose. Flesh very thin-membranaceous, brittle, glassy, pale grey-brown or flesh-colour, concolorous with surface. Smell weak, never farinaceous. Taste none or slightly bitterish to subfarinaceous.

Spores (7.9–)8.0–10.4(–11.5) × (6.4–)6.8–8.1(–8.7) μm, Q = 1.1–1.25–1.4(–1.5), L–D = (1.2–)1.7–2.5(–4) μm, irregularly 5–6(–7)-angled in side-view, with distinctly dihedral base. Basidia (26–)27–40 × 9–12.5 μm, 4-spored. Cystidia absent. Hymenophoral trama regular, composed of long inflated-subcylindrical cells (198–)208–340(–511) × (10.2–)11.4–30.5(–37.5) μm, with pale, hyaline walls. Pileipellis a cutis made up of radially arranged repent cylindrical hyphae (2.7–)4–13.2(–15) μm wide, gradually passing into trama, scattered, with—particularly at centre—repent to ascending (clavate) terminal cells up to 17 μm wide. Pileitrama regular; hyphae strongly inflated, up to 34 μm wide; cells up to 340(–429) μm long, with pale, sometimes minutely encrusted walls and rarely also diffusely or granularly intracellular pigment. Clamp-connections frequent in hymenium, rare in other tissues.

HABITAT & DISTRIBUTION.—On damp soil, usually in forests of *Alnus*, *Betula*, *Salix*, more rarely in moist grasslands, widespread. Recorded from the Netherlands, Scandinavia, Great Britain, German Federal Republic, France, and Czechoslovakia.

COLLECTIONS EXAMINED.—NETHERLANDS: prov. Drenthe, Beilen, Holtherzand, 26 Sept. 1979, *E. Arnolds* (WBS); Vries, Taarlo, along Taarlose Diep, 4 July 1974, *E. Arnolds 3126* (WBS); Emmen, 12 Sept. 1974, *E. Kits van Waveren*; prov. Gelderland, Delden, 9 Oct. 1974, *E. Kits van Waveren*; Winterswijk, Korenburgerveen, 29 Sept. 1973, *C. Bas 6158 & 6159*; prov. Noord-Brabant, Bergen op Zoom, Zoomland, 5 July 1974, *P. B. Jansen 74–274*; Nieuw Ginneken, Goudbergven, 13 Sept. 1964, *P. B. Jansen 64–202*; Zundert, Lange Goren, 6 July 1963, *P. B. Jansen 63–175*.

FINLAND, Inari Lappland, Kevo, Kevonsuu, 15 Aug. 1978, *M. E. Noordeloos 683*. — GERMAN FEDERAL REPUBLIC, Bayern, Rosenau near Dingolfing, 14 Aug. 1967, *A. Einhellinger* (M).

The pigmentation of *Entoloma minutum* is difficult to study because of the pale colours of the pileus. Careful observations, however, reveal that the membranes of the hyphae in pileipellis and -trama are uniformly coloured (membranal pigmentation) and minutely encrusted at least in part of the hyphae, often the narrowest ones. Two collections studied (*Bas 6159* and *Arnolds, 26 Sept. 1979*) also showed an intracellular pigmentation, diffuse or in the form of granules, in some hyphae of the surface of the pileus.

Josserand (1937: 213–215, fig. 13) gave an excellent description of *E. minutum* but found the pigmentation to be 'vacuolaire', and this statement was repeated by Kühner & Romagnesi (1953: 183). Later Romagnesi changed his mind on this character (1954: 199 and 1974b: 331) and described it as 'membranaire parfois un peu incrustante.'

Einhellinger (1969: 106) described a collection from Bavaria with intracellular pigment. A study of this material revealed at least some encrusted hyphae in the upper layer of the pileus.[1].

The spores are found to be rather variable, e.g. within one collection from more or less isodiametrical to distinctly heterodiametrical. The first type reminds of the spores of *E. juncinum* and *E. nitens*, which species are easily distinguished by their different habit and dark pigmentation. The latter heterodiametrical type of spores resemble those of *E. tenellum* (see below).

Entoloma minutum var. *polymorphum* (Romagn.) Noordeloos (1979b: 248) differs from the type among others by the rather variable shape of the pileus and insertion of the lamellae. On account of the presence of the same characters I have placed *Nolanea depressa* Velen. in the synonymy of this variety. At present this variety is known only from France and Czechoslovakia. For a detailed description I refer to Romagnesi (1954: 197–199).

16. ENTOLOMA TENELLUM (Favre) Noordeloos—Figs. 18a–d

Rhodophyllus tenellus Favre, Assoc. fong. hauts-marais: 212. 1948. — *Nolanea tenella* (Favre) P. D. Orton *in* Trans. Br. mycol. Soc. **43**: 179. 1960. — *Entoloma tenellum* (Favre) Noordeloos *in* Persoonia **10**: 256. 1979.
Leptonia cinerascens Velen., České Houby: 623. 1921 (non *Entoloma cinerascens* Hesler, 1967).

CHARACTERISTICS.—Carpophores slender; pileus 5–13 mm broad, pale grey-brown; stipe concolorous, polished, apex pruinose with (sub-)capitate hairs; smell indistinct.

Pileus 5–13 mm broad, conico-convex, often with small papilla, with margin slightly involute, exceeding the lamellae, hygrophanous, when moist brown-grey to beige-grey (e.g. 10 YR 5/3), translucently striate up to two-thirds of the radius, strongly pallescent on drying to sordid white (10 YR 7/2), brilliantly shining, smooth, glabrous. Lamellae moderately distant, narrowly adnate to almost free, broadly ventricose, 2.5–3 mm broad, greyish brown with pink tinge (10 YR 5/2, 5/3), with entire, concolorous edge. Stipe 30 × 1.5–2 mm, straight, cylindrical, hyaline, ochraceous-yellow to grey-brown, minutely pruinose at apex, downwards smooth and shining. Flesh rather thin, firm-subcartilagineous, concolorous with surface. Smell and taste indistinct.

Spores (8.1–)9.3–12(–14) × 7.2–9.3 μm, Q = 1.1–1.25–1.5, L-D = 0.6–4(–5) μm, (5–)6–7(–8)-angled in side view, with dihedral base. Basidia 32–48 × 9.4–12 μm, 4-(rarely 2-)spored. Cystidia absent.[2] Hymenophoral trama regular, composed of cylindrical to inflated cells 180–270 × 12–22 μm. Pileipellis a cutis made up of cylindrical 2.7–14 μm wide hyphae with minutely encrusted walls. Stipitepellis a cutis with at apex of stipe cylindrico-capitate hairs 50–150 × 6.5–10 × 3.5–9 μm. Clamp-connections frequent in hymenium, rare elsewhere.

HABITAT & DISTRIBUTION.—In marshy vegetation with *Filipendula ulmaria* (Favre, l.c.). In the Netherlands found in a mossy vegetation on acid, sandy soil with *Juniperus communis* and in *Quercus* forest.

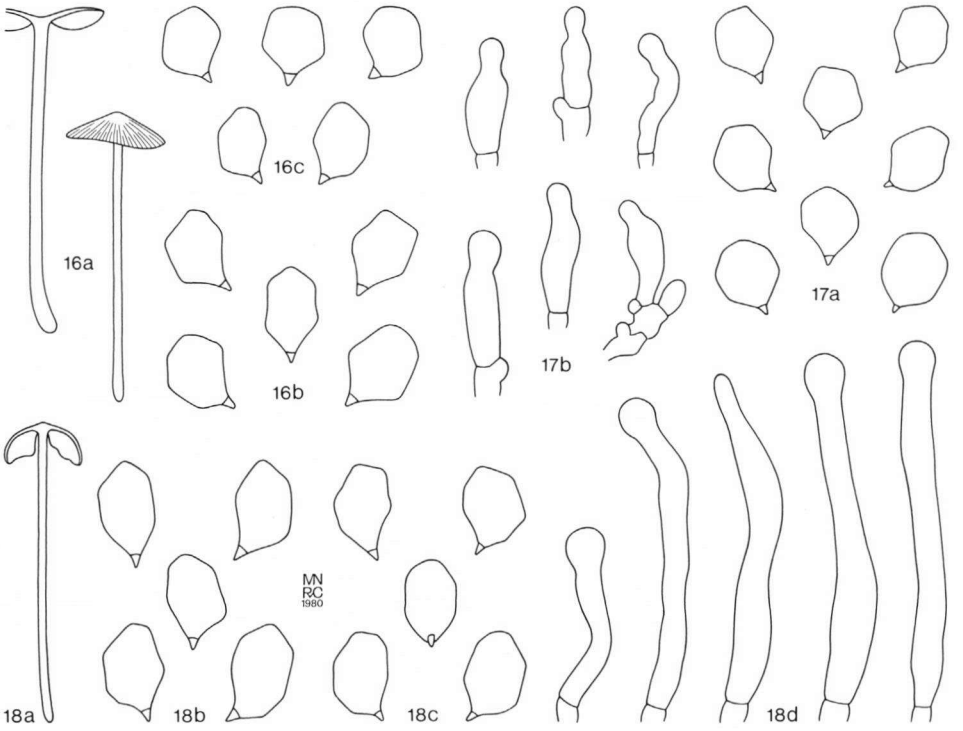
[1] I also failed to find any cheilo- and/or pleurocystidia in this collection from Bayern, Rosenau near Dingolfing, 14 Aug. 1967, *A. Einhellinger* (M).

[2] Cheilocystidia were said to be present but rare in the holotype, 36–58 × 7.5–11.5 μm, cylindrical-flexuose ('vermiformes'), scattered among basidia, rare. See discussion below.

COLLECTIONS EXAMINED.—NETHERLANDS: prov. Drenthe, Sleen, Slenerzand, 27 Oct. 1965, *A. K Masselink* (WBS); prov. Limburg, Mook, 12 Oct. 1965, *E. Kits van Waveren*.
SWITZERLAND, Grisons, Val Sesvenna, 14 Aug. 1943, *J. Favre* (lectotype, design. mihi, CHUR). — CZECHOSLOVAKIA, Bohemia, Bozkov, July 1919, *J. Velenovský* (holotype of *L. cinerascens*, PRC).

STUDY OF LECTOTYPE.—The lectotype consists of three specimens with the following microscopical characters.
Spores 9.3–11.5(–12) × (7.6–)8.1–9.3 μm, Q = 1.13–1.23–1.43, L–D = 1.2–2–3.4 μm, 6–8-angled in side-view, with distinctly dihedral base. Basidia 31–53 × 8–12 μm, 4-(rarely 2-)spored. Cheilocystidia not found. Hymenophoral trama regular, composed of long cylindrical to slightly inflated cells e.g. 230 × 17 μm. Pileipellis a thin cutis made up of 2.6–8 μm wide, cylindrical hyphae with minutely encrusted walls. Stipitepellis with some cylindrical-capitate hairs, 35–60 × 4–7.5 × 5–10 μm. Clamp-connections seen at base of basidia.

As no holotype is left at CHUR nor at G, I select the authentic collection of Val Sesvenna, 14 Aug. 1943, collected and named by J. Favre, as lectotype. In the lectotype the spore dimensions are slightly different from those given by Favre in the protologue, viz. 11–12.5 × 6–7.5 μm, thus



Figs. 16a–c. *Entoloma minutum*. — Habit and spores (16a–b from *Noordeloos 683*; 16c from *Jansen 74–274*).
Figs. 17a–b. *Entoloma tibiicystidiatum*. — Spores and cheilocystidia (17a–b from *Arnolds 456*).
Figs. 18a–d. *Entoloma tenellum*. — Habit, spores and hairs of stipe (18a–b, 18d from *Kits van Waveren, 12 Oct. 1965*; 18c from lectotype).

distinctly narrower. In the discussion following the description Favre (1948: 57) mentioned this collection. He said that he was unable to locate any cystidia in this collection. (I could not find any cystidia either, nor in the lectotype nor in the other collections studied.) The difference in spore size apparently did not impress him, as he did not mention it at all. He explicitly considered this collection to belong to *Nolanea tenella*.

Entoloma cuspidifer resembles *E. tenellum* in spore shape and covering of the stipe. The spores, however, are somewhat larger and born on bisporous basidia. Besides, the habit and colour of the carpophore are rather different.

Entoloma vernum has the same type of hairs on the stipe as *E. tenellum*, but differs among other things in the dark grey-brown colours and strictly vernal appearance.

Entoloma subsection **Cosmeoxonema** (Largent & Thiers) Noordeloos *comb. & stat. nov.*

Nolanea (Fr.) Kummer sect. *Cosmeoxonema* Largent & Thiers *in* Northwest Sci. **46**: 35. 1972. — *Rhodophyllus* Quél. sect. *Cosmeoxonema* (Largent & Thiers) Romagn. *in* Bull. mens. Soc. linn. Lyon **43**: 331 1974.

Pigment exclusively encrusting, often coarsely so, the hyphae of pileipellis and pileitrama; spores isodiametrical or heterodiametrical and then with distinctly dihedral base. Type: *Entoloma sericeum* (Bull. ex Mérat) Quél.

KEY TO THE SPECIES OF SUBSECTION COSMEOXONEMA

1a. Cheilocystidia present.. 2
b. Cheilocystidia absent. 3
2a. Cheilocystidia tibiiform; spores isodiametrical; smell farinaceous. . . . *E. tibiicystidiatum*, p. 473
b. Cheilocystidia cylindrical-subcapitate; spores heterodiametrical; smell sweet, like in *Hebeloma sacchariolens*.. . . . . *E. sacchariolens*, p. 474
c. Cheilocystidia sphaeropedunculate, subglobose or broadly clavate; spores heterodiametrical; smell absent. . . . . *E. sphaerocystis*, p. 485
3a. Spores isodiametrical, Q = 1.1 on the average per collection. 4
b. Spores heterodiametrical, Q ≥ 1.25 on the average per collection.· 7
4a. Pileus when moist very obscurely striate at margin only, very dark grey-brown, with scattered silvery fibrillous patches producing a hoary impression; lamellae predominantly with grey tinge (like in *Tephrocybe* spp.). . . . . *E. sericeum* var. *cinereo-opacum*, p. 482
b. Pileus distinctly striate when moist, sepia or reddish brown, smooth; lamellae reddish brown.. . 5
5a. Pileus relatively thick-fleshed, with faint umbo or flattened or slightly depressed; stipe usually as long as diameter of pileus, or shorter. . . . . *E. sericeum* var. *sericeum* f. *sericeum*, p. 479
b. Pileus thin-fleshed, stipe often distinctly longer than diameter of pileus. 6
6a. Pileus distinctly papillate.. . . . . *E. sericeum* var. *sericeum* f. *nolaniforme*, p. 480
b. Pileus distinctly umbilicate. . . . . *E. sericeoides*, p. 483
7a. Pileus fairly dark sepia brown ('bistre'); hyphae of pileipellis coarsely encrusted; spores bluntly angled; smell none; strictly vernal in or near coniferous forests. . . . . *E. vernum*, p. 476
b. Pileus pale to moderately dark grey-brown, hyphae of pileipellis minutely encrusted; spores pronouncedly angled; smell strong, sweet, like in *Hebeloma sacchariolens*; summer-autumn in grasslands. *E. ameides*, p. 473

17. ENTOLOMA TIBIICYSTIDIATUM Arnolds & Noordeloos—Figs. 17a–b

Entoloma tibiicystidiatum Arnolds & Noordeloos *in* Persoonia **10**: 294–295, figs. 23–26. 1979.

Pileus 10–15 mm broad, irregularly plano-convex without papilla, with straight margin, hygrophanous, when moist rather pale grey-brown, translucently striate, pallescent on drying. Lamellae fairly distant, almost free, pale salmon-pink. Stipe up to 38 × 2 mm, slender, cylindrical, pale grey-brown, silvery striate. Smell farinaceous. Spores (7.0–)7.9–10.5(–11) × (6.4–)6.8–9.3 μm, Q = 1.0–1.1–1.2(–1.3), isodiametrical. Basidia 4-(rarely 2-)spored. Cheilocystidia subcylindrical-subcapitate to tibiiform, (17–)20–35 × 6–8 × 2.5–5 μm, often with hyaline mucous cap covering the apex. Pileipellis a poorly differentiated cutis made up of 2.5–8 μm wide cylindrical hyphae gradually passing into trama, with membranal, often encrusting pigment. Clamp-connections present.

HABITAT.—In poorly fertilized hayfield (*Calthion palustris*) on wet, in winter inundated, peaty soil.

COLLECTIONS EXAMINED.—NETHERLANDS: prov. Drenthe, de Wijk, 'Reest valley', 15 Oct. 1979, *E. Arnolds 3663* (holotype, WBS; isotype, L); prov. Noord-Brabant, Udenhout, loam pits, 24 Oct. 1969, *E. Arnolds 456*.

The type of pigmentation and the spores of *E. tibiicystidiatum* suggest close relationship with *E. sericeum*, in particular with var. *sericeum* f. *nolaniforme*. It differs, however, so strikingly by the remarkably shaped cheilocystidia, that I consider it a distinct species.

18. ENTOLOMA AMEIDES (Berk. & Br.) Sacc.—Figs. 19a–b

Agaricus ameides Berk. & Br. *in* Ann. Mag. nat. Hist., Ser. III, **15**: 315. 1865 (Notices on Br. Fungi no. 999). — *Rhodophyllus ameides* (Berk. & Br.) Quél., Enchir.: 58. 1886. — *Entoloma ameides* (Berk. & Br.) Sacc., Syll. Fung. **5**: 686. 1887.

SELECTED ICONES.—Cooke, Ill. Br. Fungi pl. 329 (341). 1886. — Konr. & Maubl., Icon. sel. Fung. pl. 192. 1925.

SELECTED DESCRIPTIONS.—Einhellinger in Ber. bayer. bot. Ges. **41**: 102–103 figs. 17, 21; pl. 9a, 11c. 1969. — Konr. *in* Bull. Soc. mycol. Fr. **41**: 45–46. 1925; ibid. **45**: 52. 1929. — F. H. Möller, Fungi Faeröes **1**: 248. 1945.

CHARACTERISTICS.—Habit rather variable, entolomatoid to nolaneoid, rarely with umbilicate pileus and subdecurrent lamellae; pileus pale grey to grey-brown, at centre sometimes with ochre tinge; stipe pale grey-brown, silvery striate; smell strong and persistant, like that of *Hebeloma sacchariolens*.

Pileus 12–35 mm broad, 7–30 mm high, conical to conical-campanulate, only slightly expanding to conico-convex with pointed papilla, rarely plano-convex with pointed papilla, with margin involute when young, then straight, strongly hygrophanous, when moist pale grey-ochre to grey-brown (10 YR 6/2, 6/3, 5/2, 5/3, sometimes more like 10 YR 5/4), translucently striate up to one half of the radius, on drying pallescent to greyish, very pale brown, ochraceous, remaining darker at centre (centre 10 YR 5/4, margin 10 YR 7/4, 8/3), glabrous, lustrous. Lamellae L = 22–35, l = (1–)3, narrowly adnate-emarginate, almost free, ventricose, thickish, grey then pink, finally dark grey-brown with pink tinge (10 YR 7/2, 7/3, then between 10 YR 7/4 and 7.5 YR 7/4, finally more like 10 YR 6/3, 5/2 with pink tinge), slightly hygrophanous, pallescent on drying from edge towards back, with subserrulate, concolorous edge. Stipe 30–80 × 3–7 mm, cylindrical, often flexuous-twisted, solid, then fistulose, pale isabella-ochraceous as dry pileus (10 YR 8/2,

8/3 to 7/3, sometimes 8/4), brilliantly and innately fibrillously striate lengthwise, slightly pruinose at apex, smooth downwards, at base more or less white tomentose. Flesh concolorous with surfaces, relatively thin in pileus and brittle-fibrillous, easily splitting lengthwise in stipe. Smell rather strong like acetylaldehyde, *Hebeloma saccharіolens*. Taste sweet, like caramel.

Spores 9.3–11.5(–12) × 7.6–9.3 μm, Q = 1.1–1.25–1.4, L–D = 0.6–2–3.5 μm, 5–6-angled in side-view and with rather pronounced suprahilar depression, most probably with bluntly dihedral base. Basidia 35–42 × 10.5–16.3 μm, 4-spored, slenderly clavate. Cystidia absent. Hymenophoral trama regular, composed of cylindrical to slightly inflated cells up to 270 μm long and 8.5–26 μm wide. Pileipellis a thin cutis made up of 2.7–9 μm wide cylindrical hyphae with minutely encrusted walls. Pileitrama regular, composed of cylindrical or inflated hyphae with particularly in upper layers pale coloured, sometimes encrusted walls; cells 190–295 × 12–28 μm. Clamp-connections abundant in hymenium, also rarely seen in pileipellis.

HABITAT & DISTRIBUTION.—In hayfields and extensively grazed meadows, widespread but apparently rare. Known from the Netherlands, Scandinavia, Great Britain, Germany, and France.

COLLECTIONS EXAMINED.—NETHERLANDS, prov. Limburg, Wijlre, Dolsberg, 20 Sept. 1978, *M. E. Noordeloos 724*.

GREAT BRITAIN, Flintshire, Bodelwyddan, Sept. 1863, *Berkeley & Broome* (holotype, K). — FRANCE, Jura, Curtil, 14 Aug. 1941, *Métrod 1222* (PC).

The description given above is based on the Netherlands' collection which represents a slender, nolaneoid form of *Entoloma ameides*. The more typical form as depicted by Cooke (l.c.) has a more entolomatoid habit. Konrad (1925, 1929; l.c.) clearly illustrated the variability of this species. The plate of Konrad & Maublanc (1925, l.c.) gives an excellent impression of the colours of the Netherlands' collection; the plate of Cooke, however, is too much yellow. I was able to compare Cooke's plate with the original at Kew, which seems to be more 'natural' in colour. Comparing other plates in the same work, I came to the conclusion that, generally speaking, the *Entoloma* plates are printed in a somewhat too yellow tone.

The general appearance of *E. ameides* may be that of a member of subgenus *Entoloma*, but the type of pigmentation and structure of trama definitely place it in subgenus *Nolanea*, close to *E. sericeum* and *E. papillatum*.

Entoloma saccharіolens may be considered a slender form of *E. ameides*, but the slight difference in colour and the presence of cheilocystidia suggest that the former is a species in its own right. The spores, however, are remarkably similar. In this case more material is needed for a final decision about the value of cheilocystidia as a distinctive character.

19. **Entoloma saccharіolens** (Romagn.) Noordeloos, *comb. nov.*—Figs. 20a–c

Rhodophyllus saccharіolens Romagn. *in* Bull. mens. Soc. linn. Lyon **43**, No. spéc. (Trav. déd. R. Kühner): 385. 1974 (basionym).

CHARACTERISTICS.—Pileus grey-brown with ochraceous tinge, rather strongly aeriferously lustrous when dry; stipe silvery striate lengthwise; smell strong, sweet, like in *Hebeloma saccharіolens*; cheilocystidia present, cylindrical-subcapitate.

Pileus 20–24 mm broad, conico-convex, then expanding to plano-convex with blunt or subumbonate centre and marginal zone irregularly undulating with age, with outermost margin

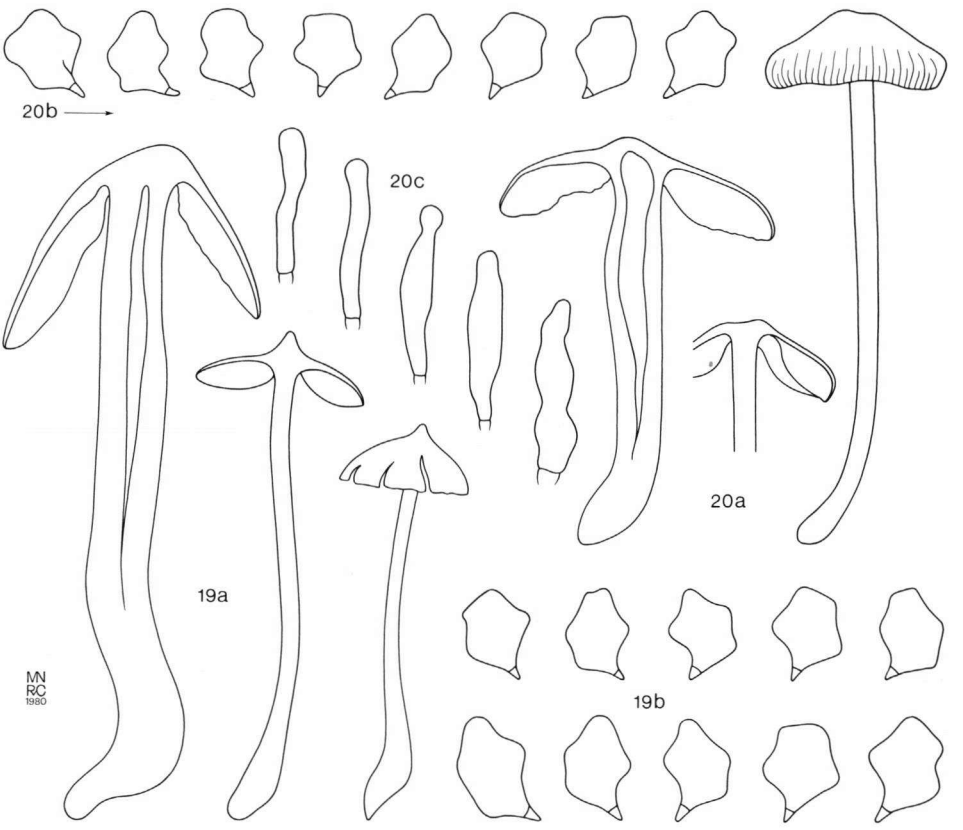


Fig. 19a–b. *Entoloma ameides.* — Habit and spores (19a–b from *Noordeloos 724*).
Figs. 20a–c. *Entoloma sacchariolens.* — Habit, spores and cheilocystidia (20a–c from *Bas 7623*).

involute, weakly hygrophanous, when moist brown with grey or sometimes ochraceous tinge (10 YR 4/2, 4/3, rarely 3/2), paler towards margin (10 YR 7/4, 7/6), translucently striate at margin only, pallescent on drying to greyish ochraceous (10 YR 8/3, 8/6), with surface already when moist with some aeriferous fibrils, becoming strongly lustrous-shining on drying; at centre often somewhat fluffy. Lamellae L = 21–30, l = 3–7, moderately distant, deeply emarginate to almost free, or adnate, segmentiform then narrowly ventricose, brown (10 YR 6/3), later with pink shade, slightly paler towards serrulate edge. Stipe 40–75 × 2–5 mm, cylindrical, often bent at base, concolorous with pileus, pruinose at apex, downwards glabrous, strongly silvery striate lengthwise, white tomentose at base, solid or narrowly fistulose. Flesh in cortex concolorous with surface, inner part paler, firm in pileus, more fibrous in stipe. Smell strong, sweet, like that of orange blossom or *Hebeloma sacchariolens*, sometimes weak, but then becoming more distinct after being kept for some time in a closed box. Taste unpleasant, soap-like.

Spores 9.3–10.5(–11.0) × 7.0–8.1 μm, Q = 1.15–1.3–1.4, L–D = 1.2–3.0 μm, 5–6-angled in side-view, with distinctly dihedral base. Basidia 28.5–35.0 × 10.5–12 μm, 4-(rarely 2-)spored. Cheilocystidia 25–45 × 3.5–8(–12.0) μm, cylindrical to clavate, sometimes subcapitate, scattered among basidia. Hymenophoral trama regular, with cylindrical to slightly inflated cells 140–325 × 5.7–18.0(–23) μm. Pileipellis a simple cutis made up of 1.5–3(–6) μm wide, cylindrical hyphae

with pale brown, sometimes minutely encrusted walls. Pileitrama regular, with cylindrical to inflated hyphae with cells up to 350 μm long and 7–28 μm wide, with pale, sometimes minutely encrusted walls. Clamp-connections frequent in hymenium, but very rare in trama.

HABITAT & DISTRIBUTION.—In *Salix repens* dominated dune meadow in old dune valley on slightly acid sand. Very rare; only known from one locality in the Netherlands and from the type-locality in France.

COLLECTIONS EXAMINED.—NETHERLANDS, prov. Noord-Holland, Callantsoog, nature-reserve 'Zwanewater', 5 Nov. 1977, *C. Bas 7623*.

FRANCE, dept. Oise, Luzarches, 18 July 1951, *H. Romagnesi 51.71* (holotype, Herb. Romagn., PC).

Entoloma sacchariolens is very closely related to *E. ameides*, but differs from the latter by the more ochraceous tinged colour of the pileus, the remarkably lustrous pileal surface, and by the cylindrico-subcapitate cheilocystidia. Normally the habit of *E. ameides* is more entolomatoid (= tricholomatoid) than that of *E. sacchariolens*, but slender specimens of *E. ameides* do also occur (see above). In addition to the characteristic smell, *E. sacchariolens* differs from other cystidiate members of subgenus *Nolanea* in the type of pigmentation (sect. *Nolanea* has two types of pigment, subsect *Cheilocystidiata* has intracellular pigment) and/or in size and shape of spores (compare *E. cryptocystidiatum* and *E. tibiicystidiatum*).

20. ENTOLOMA VERNUM Lundell—Figs. 21a–h

Entoloma vernum Lund. *in* Svensk bot. Tidskr. **31**: 193. 1937. — *Rhodophyllus vernus* (Lund.) Romagn. *in* Bull. Soc. mycol. Fr. **63**: 195. 1947. — *Nolanea verna* (Lund.) Kotl. & Pouz. *in* Česká Mykol. **26**: 221. 1972.

Rhodophyllus cuculatus Favre, Champ. supér. Zone alp.: 62. 1955. — *Nolanea cucullata* (Favre) P. D. Orton *in* Trans. Br. mycol. Soc. **43**: 179. 1960.

MISAPPLICATIONS.—*Nolanea pascua* sensu Bres., Iconogr. mycol. pl. 580. 1929. — *Nolanea erophila* sensu Velen., České Houby: 630. 1921.

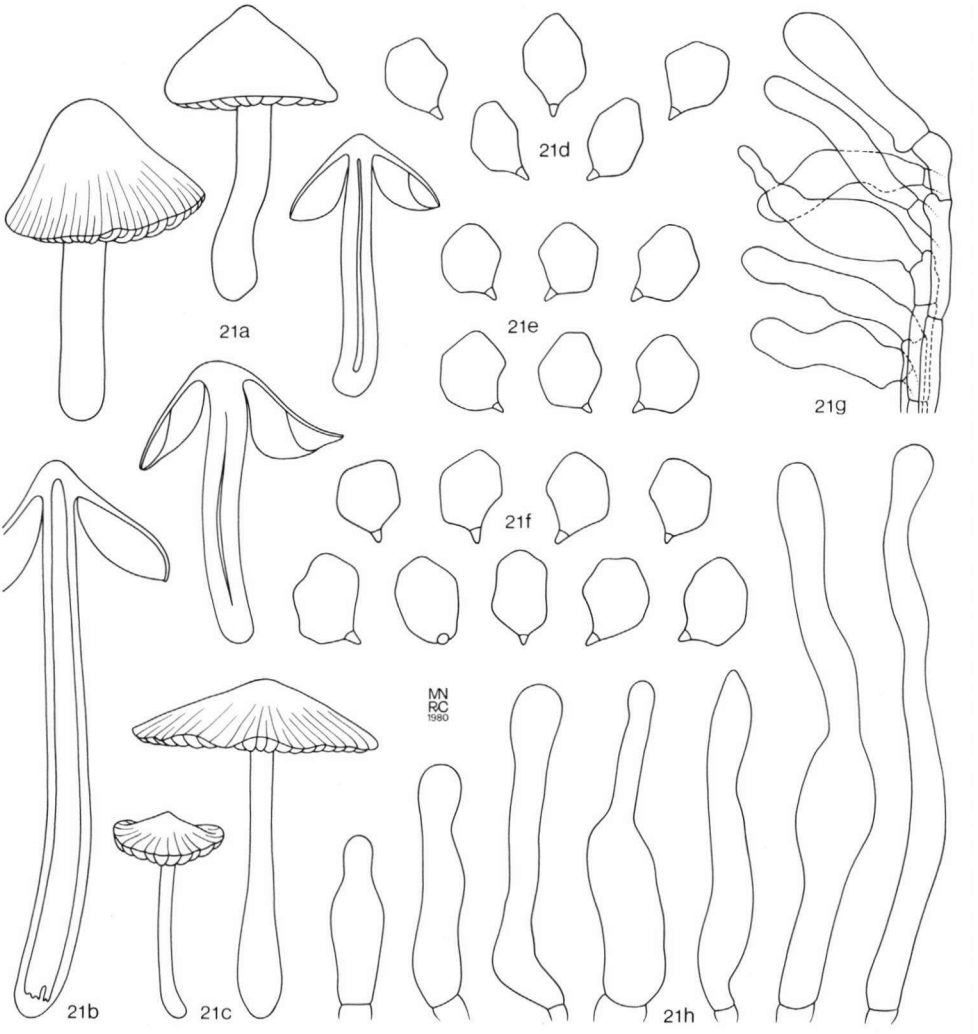
SELECTED ICONES AND DESCRIPTIONS.—Lund., l.c.: 191 fig. 3. 1937. — Herink *in* Česká Mykol. **10**: 1–9, pl. 21. 1956. — Ayer *in* Schweiz. Z. Pilzk. **52**: 17–19. pl. 1. 1974. — Mazzer *in* Mich. Bot. **16**: 195–200, figs. 1–6. 1977. — Cetto, Funghi Vero **2**: 247, pl. 532. 1976.

CHARACTERISTICS.—Strictly vernal; pileus rather dark sepia brown, reminding of *E. sericeum*; lamellae with brown tinge; smell absent.

Pileus 11–60 mm broad, acutely conical to conico-campanulate, only slowly expanding to convex, finally plano-convex, then usually with conical papilla, with margin slightly involute when young, later straight, exceeding lamellae and becoming lobed and undulate with age, strongly hygrophanous, when moist rather dark sepia, at centre even blackish brown, paler at margin (2.5 Y 3/2, 4/3, rarely 6/4; 10 YR 3/3, 3/2; Expo H62; Ség. 131, at margin 10 YR 5/4, 6/4; 2.5 Y 6/6; Ség. 134; Expo D62), translucently striate in fleshy specimens at least at margin, but in small membranaceous pilei frequently up to centre, on drying pallescent to golden or grey-brown, ochraceous grey or isabella (2.5 Y 6/4 to 6/6; 10 YR 6/4, 5/4; Expo B 61), shining, glabrous. Lamellae L = 19–40, l = 1–3(–5), adnexed to almost free, ventricose, up to 7 mm broad, pale grey-brown when young, later rather dark brown-pink or rusty brown (10 YR 6/4; 7.5 YR 7/4, 6/4; Expo E42), with concolorous entire or crenulate edge. Stipe 20–67 × 2–7 (base –10) mm, cylindrical, sometimes distinctly but gradually broadening towards base, sometimes flattened with longitudinal groove, solid to narrowly fistulose, concolorous with pileus or paler, then more or less ochraceous tinged, pruinose at apex (rarely pruinose all over in young specimens), downwards glabrous, innately fibrillose, not distinctly striate, white tomentose at base. Flesh

pale brown in pileus and stipe, in cortex more or less concolorous with surface, brittle. Smell none or faint and herbaceous. Taste mild.

Spores (8.1–)9.0–11.5(–12) × 7.0–8.7(–9.3) μm, Q = 1.1–1.25–1.4, L–D = 1–2.5 μm, 5–6–7-angled in side-view, with more or less distinctly dihedral base. Basidia 27–50 × 8.5–12.5(–16) μm, 4-spored, in some collections frequently with hyaline, thickened walls ('sklerobasidia'). Cystidia absent. Hymenophoral trama regular, composed of cylindrical to inflated cells up to 450 μm long and 7.5–28 μm wide, frequently with brown walls. Pileipellis a cutis made up of radially arranged



Figs. 21a–h. *Entoloma vernum.* — Habit, spores and hairs of stipe (21a, 21f, 21h from *Bas 1700*; 21b from *Noordeloos 317;* 21c from *Tjallingii, 8 April 1978;* 21d from type of *Rhodophyllus cucullatus;* 21e, 21g from holotype).

cylindrical hyphae 4–10(–11) μm wide,with minutely to coarsely encrusted walls. Pileitrama regular, with inflated hyphae, composed of up to 370 μm long and 6.5–29 μm wide cells with brown, encrusted walls, encrustations often coarse, particularly on narrowest hyphae. Apex of stipe with clusters of long, subcylindrical to clavate, frequently subcapitate hairs 23–120 × 4.5–15 × 5–11 μm. Clamp-connections frequent in hymenium, rare elsewhere.

HABITAT & DISTRIBUTION.—Terrestrial on grassy spots or in grasslands on sandy soil, preferably near coniferous trees (*Pinus*, *Juniperus*). Widespread and frequent in boreal and mountainous habitats; rare in the lowlands of western Europe. March-May.

COLLECTIONS EXAMINED.—NETHERLANDS: prov. Drenthe, Sleen, Sleener Zand, 13 April 1967, *J. J. Barkman 8372* (WBS); prov. Gelderland, Apeldoorn, 11 April 1966, *A. N. Koopmans*; Vierhouten, 5 April 1968, *J. van Brummelen 658*; prov. Zuid-Holland, Meyendel near entrance to 'Kijfhoek', 27 March 1959, *C. Bas 1700* and 19 April 1975, *C. Bas 6555*; IJsselmeerpolders, Zuidelijk Flevoland, beach area near Nykerkersluis, 8 April and 6 May 1978, *G. J. M. G. Tjallingii-Beukers*.

SWEDEN, prov. Upland, Ärentuna parish, 19 May 1933, *S. Lundell* (holotype, U; Fungi exsicc. suec. 402); idem, 22 May 1955, *H. Belin* and *L. Holm* (PC); Bälinge parish, Märsta skog, 4 and 8 May 1952, *H. Smith* (PC, Fungi exsicc. suec. 2010). — GERMAN FEDERAL REPUBLIC, Kreis Meppen, Haselünne, 4 May 1977, *B. de Vries* (WBS). — FRANCE, dept. Oise, Forêt de Fontainebleau, 1 May 1977, *M. E. Noordeloos 317*. — SWITZERLAND, Parc nat. Suisse, Col dal Fuorn, 19 May 1958, *Dr. Zimmerli* (holotype of *R. cucullatus* Favre, CHUR).

As has been observed in other species of subsect. *Cosmeoxonema*, *E. vernum* appears to have a rather variable habit. This is reflected in literature. Smotlacha (1945: 67) and Herink (1956, l.c.) distinguish a robust, 'entolomatoid', and a slender, 'nolaneoid' form. The typical form of *E. vernum* as characterized by Lundell (1937, l.c.) is a rather robust fungus with a fleshy pileus and firm stipe. As a consequence the pileus is striate at the margin only. This form has its main distribution in the boreal and mountainous habitats of northern and central Europe. It is not uncommon in or near coniferous forests, for example in Sweden and in Czechoslovakia. According to Mazzer (1977, l.c.) this form is also frequently met with in the Great Lakes are in the northern United States.

In western Europe a slender form of *E. vernum* is observed (Fig. 21c) with a membranaceous, deeply striate pileus. The dimension of the pileus falls within the range of 11–35 mm with 19–25 entire lamellae. The apex of the stipe is frequently abundantly pruinose, which is microscopically reflected in the relative abundance of hairs. As there are no strict limits between the robust 'typical' form and the slender one, a distinction on varietal level does not seem justified.

Rhodophyllus cucullatus Favre comes very close to the slender form of *E. vernum* as described above. After microscopical investigation of the holotype, I consider it a synonym.

On account of the abundantly encrusted pileal hyphae and the dark colours of pileus and stipe *E. vernum* is placed in subsection *Cosmeoxonema* close to *E. sericeum*, from which it differs among other things in the heterodiametrical spores. *Entoloma papillatum* has a different spore shape, a farinaceous smell, and occurs in summer and autumn.

21. ENTOLOMA SERICEUM (Bull. ex Mérat) Quél.

Agaricus sericeus Bull. ex Mérat, Fl. Envir. Paris, 2nd Ed.: 78. 1821, non Schaeff. 1762, nec Pers. 1798. — *Entoloma sericeum* (Bull. ex Mérat) Quél. *in* Mém. Soc. émul. Montbéliard, Sér. II, **5**: 119. 1872. — *Rhodophyllus sericeus* (Bull. ex Mérat) Quél., Enchir.: 59. 1886. — *Nolanea sericea* (Bull. ex Mérat) P. D. Orton *in* Trans. Br. mycol. Soc. **43**: 179. 1960.

var. SERICEUM f. SERICEUM—Figs. 23a–f

Rhodophyllus sericeus var. *typicus* Kühn. & Romagn., Fl. anal.: 193. 1953.

SELECTED ICONES AND DESCRIPTIONS.—Ricken, Blätterpilze, pl. 72 fig. 5. 1913. — J. Lange, Fl. agar. dan. **2**: 97, pl. 76G, Gl. 1936. — Einhellinger *in* Ber. bayer. bot. Ges. **41**: 107, fig. 19. 1969.

CHARACTERISTICS.—General habit thick-set: length of stipe about equal to diameter of pileus; pileus soon more or less flattened without a pronounced papilla, moderately to dark brown, often tinged red, deeply striate when moist, strongly pallescent on drying; lamellae pale then brown, finally pinkish brown; stipe concolorous with or slightly paler than pileus, usually covered with aeriferous fibrils; smell strongly farinaceous-rancid; spores isodiametrical; pigment coarsely encrusting at least the narrow hyphae of pileipellis and -trama; clamp-connections present.

Pileus 12.5–70 mm broad, from conico-convex or hemispherical expanding to convex, with centre usually flattened, rarely papillate or slightly depressed, with at first involute but later on straight margin, usually undulating, and sometimes splitting with age, strongly hygrophanous, when moist moderately to rather dark sepia or date brown, sometimes with reddish tinge (10 YR 2/2, 3/2; 7.5 YR 3/2; 5 YR 3/2, 3/3), paler towards margin (10 YR 5/2, 5/4, 6/4; 7.5 YR 4/4, 5/2, 5/4, 6/4), translucently striate up to two-thirds of the radius, on drying strongly pallescent along radial streaks to pale sepia brown or ochraceous brown (10 YR 6/4, 7/3; 2.5 Y 7/2; 5 Y 7/3), smooth or minutely radially wrinkled or grooved, radially fibrillous, at centre sometimes slightly rugulose, shining. Lamellae L = 22–36, l = 3–5–7(–9), crowded to moderately distant, at first segmentiform but later usually (broadly) ventricose, rarely veined, adnate-emarginate, sometimes almost free, pale grey-brown at first, later with pink tinge, finally red-brown (10 YR 6/3 or 7.5 YR 6/4, then 7.5 YR 6/4, 5/4, 5/2; 5 YR 5/3), with irregular, concolorous edge. Stipe 13–55(–75) × (2–)2.5–6 mm, cylindrical or flattened, rarely slightly broadened at base, sometimes twisted, concolorous with or slightly paler than pileus (10 YR 6/3, 6/4, 5/3, 5/2; 7.5 YR 6/2, 5/2, 4/2), usually longitudinally striate with adpressed or loose silvery fibrils, rarely glabrous and more or less polished, sometimes pruinose at apex, often white tomentose at base. Flesh concolorous with surface or (in fleshy specimens) paler, fibrous, brittle in pileus, brittle to subcartilagineous in stipe. Smell and taste strongly farinaceous-rancid.

Spores (7.0–)7.4–10.4 × (6.4–)6.7–8.7(–9.3) μm, Q = 1.0–1.1–1.2(–1.25), L–D = 0–1–1.7 μm, variable in shape, from rather regularly 5-angled isodiametrical to irregularly 6–7(–8)-angled isodiametrical in side-view, with basal facet. Basidia 24–45 × 10.5–12.7(–17.5) μm, 4-spored. Cystidia absent. Hymenophoral trama regular, composed of cylindrical to inflated cells at least up to 240 but often up to 400 μm long and 14–30(–50) μm wide, intermixed with narrow, cylindrical, minutely encrusted hyphae. Pileipellis a thin cutis made up of 2.7–12 μm wide, cylindrical hyphae with minutely to coarsely encrusted walls; subpellis usually weakly developed and more intensively pigmented than suprapellis. Pileitrama regular with cylindrical to inflated cells up to 350(–400) μm long and 12–27(–33) μm wide. Clamp-connections present in hymenium, often difficult to find because of their proliferation. Vascular hyphae sometimes rather abundant in trama.

HABITAT & DISTRIBUTION.—In natural grasslands extensively grazed by cattle, as well as in lawns, meadows, and hayfields. Fairly common in western and northern Europe.

COLLECTIONS EXAMINED.—NETHERLANDS: prov. Friesland, Isl. of Terschelling, 30 Aug. 1958, *C. Bas 1513*; prov. Overijssel, Hengforderwaarden between Deventer and Olst, 12 Nov. 1977, *H. Piepenbroek & G. Piepenbroek-Grooters 1066*; prov. Gelderland, Doetinchem, in garden, 10 Jan. 1948, *H. S. C. Huijsman*; Wilp, on dyke, Nov. 1977, *H. Piepenbroek & G. Piepenbroek-Grooters 1053*; prov. Utrecht, Rhenen, along Oude Veenendaalseweg, 16 Sept. 1955, *C. Bas 878*; prov. Noord-Holland, Isl. of Texel, near Slufter, 29 Oct. 1971, *P. B. Jansen 71.194*; Wieringermeer, Robbenoordbos, 23 Oct. 1976, *C. Bas 7108A*; Castricum, Geeversduin, 13 Oct. 1954, *G. D. Swanenburg de Veye* and 21 Oct.

1956, *R. A. Maas Geesteranus 11856*; idem, Waterleidingduin, 10 Aug. 1952, *R. A. Maas Geesteranus 8902*; Velzen, Duin en Kruidberg, 3 Nov. 1965, *E. Kits van Waveren*; IJmuiden, Midden Heerenduin, 6 Nov. 1976, *M. E. Noordeloos 253*; Noordwijkerhout, dunes of Amsterdam Water Supply, 3 Oct. 1953, *C. Bas 667*; idem 29 Nov. 1953, *R. A. Maas Geesteranus 9610*; idem 4 Nov. 1976, *M. E. Noordeloos 250*; idem, State forest, 8 Dec. 1976, *M. E. Noordeloos 275*; Huizen, 18 Oct. 1976, *J. Frencken*; prov. Zuid-Holland: Katwijk a/Zee, 9 Nov. 1952, *R. A. Maas Geesteranus 9294*; Wassenaar, Meyendel, 17 Nov. 1974, *C. Bas 6511*; idem 16 Oct. 1979, *C. Bas 7572*; Wassenaar, estate 'Den Deyl', Maaldrift, 18 Sept. 1955, *R. A. Maas Geesteranus 10706*; prov. Zeeland: Walcheren, estate 'Zeeduin', 10 June 1937, *H. S. C. Huijsman 1262*; idem Vrouwenpolder, 31 Oct. 1976, *M. E. Noordeloos 244*; prov. Noord-Brabant: Drunen, Drunense Duinen, 15 Aug. 1976, *N. Hanegraaff-Lissenberg*; idem, along Drongelens Kanaal, 19 Dec. 1971, *P. B. Jansen 71-196*.

BELGIUM, prov. Namur, Ave-et-Auffe, near 'le Roptai', 6 Oct. 1977, *M. E. Noordeloos 495*. — GERMAN FEDERAL REPUBLIC, Westphalen, Detmold, Externsteine, 7 Oct. 1976, *M. E. Noordeloos 215*; idem, Merlsheim, 6 Oct. 1976, *G. J. M. G. Tjallingii-Beukers*.

For a discussion, see below under *E. sericeum* var. *sericeum* f. *nolaniforme*.

22. var. SERICEUM f. **nolaniforme** (Kühn. & Romagn.) Noordeloos, *comb. & stat. nov.*—Figs. 22a–d

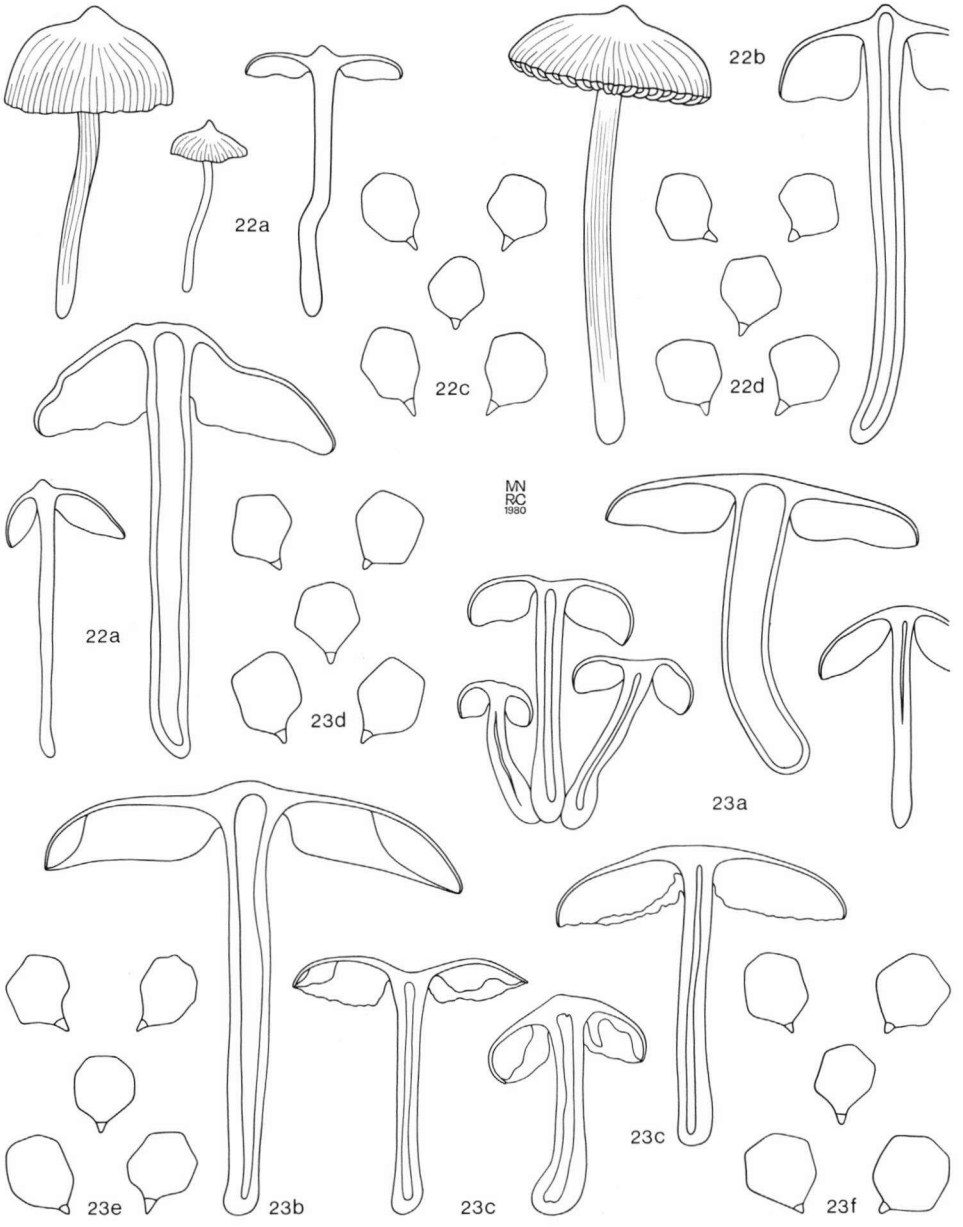
Rhodophyllus sericeus var. *nolaniformis* Kühn. & Romagn. *in* Rev. Mycol. **19**: 9. 1954.
SELECTED ICONES AND DESCRIPTION.—Arnolds & Noordeloos, *in* Fung. rar. Icon. col. **12**: pl. 92A. 1980.

CHARACTERISTICS.—Carpophores slender, mycenoid; pileus 15–37(–45) mm broad, usually pronouncedly papillate and with strongly involute margin; lamellae deeply emarginate to almost free; stipe 20–70 × 2–5 mm, paler than pileus, strongly silvery striate.

Pileus 15–37(–45) mm broad, conical then expanding to conico-convex, finally convex, usually pronouncedly papillate, sometimes with abrupt acutely conical papilla, rarely more or less flattened, with margin strongly involute when young and expanding only in later stages, strongly hygrophanous, when moist dark sepia or reddish brown (10 YR 2/1, 2/2, 3/2, 4/2, 4/3; 7.5 YR 3/2, 4/2), slightly paler towards margin (10 YR 5/3, 6/4, 7/4), translucently striate up to two-thirds of the radius, on drying strongly pallescent to greyish brown (10 YR 4/3, 5/4, 6/4, 7/4), lustrous-fibrillous. Lamellae L = 25–50, l = 3–5, moderately distant to fairly crowded, deeply emarginate to almost free, segmentiform to ventricose, pale, then pink with distinct grey or brown tinge, finally brown-pink (10 YR 7/3, 6/3 then 7.5 YR 4/2, 5/4, 6/4), with concolorous or slightly paler, slightly irregular to distinctly serrulate edge. Stipe 20–70 × 2–5 mm, cylindrical, grey-brown or yellowish brown (10 YR 3/2, 3/3, 4/3, 5/3, 6/4, 7/4), strongly silvery striate with aeriferous longitudinal fibrils, often white tomentose at base. Flesh concolorous with surface or slightly paler, brittle. Smell and taste strongly farinaceous-rancid.
Microscopical characters and habitat as in type form.

COLLECTIONS EXAMINED.—NETHERLANDS: prov. Friesland, Isl. of Vlieland, in meadow S. of Vianenslid, N. of Postweg, 2 Nov. 1976, *C. Bas 7148, 7149*; prov. Drenthe, Beilen, 8 Nov. 1977, *E. Arnolds*; prov. Gelderland: Arnhem, 25 Sept. 1978, *J. Hoogschagen*; Wilp, 9 Oct. 1977, *H. Piepenbroek & G. Piepenbroek-Grooters 1051, 1052*; prov. Noord-Holland: Callantsoog, nature reserve 'Zwanewater', 5 Nov. 1977, *C. Bas*; Velzen, Duin- en Kruidberg, 13 Nov. 1962, *C. Bas 2909*; prov. Zuid-Holland, Wassenaar, Den Deyl-Maaldrift, 18 Sept. 1955, *R. A. Maas Geesteranus 10707*.

Entoloma sericeum is rather variable species both in habit and in microscopical characters. The typical habit of *E. sericeum* is somewhat entolomatoid. Therefore many mycologists placed the species in subgenus *Entoloma*. In my opinion the type of pigmentation and the size and shape of



Figs. 22a–d. *Entoloma sericeum* f. *nolaniforme*. — Habit and spores (22a, 22c from *Bas 7149*; 22b, 22d from *Bas, 5 Nov. 1977*).

Figs. 23a–f. *Entoloma sericeum* f. *sericeum*. — Habit and spores (23a, 23d from *Noordeloos 244*; 23b, 23e from *Maas Geesteranus 10706;* 23c, 23f from *Noordeloos 259*).

the tramal elements make *E. sericeum* a true *Nolanea*. Nolaneoid forms of *E. sericeum* occur, and are distinguished here as forma *nolaniforme*. This form is frequently met with in the same habitat as *E. sericeum*, sometimes in separate groups and easily to distinguish from the typical form; sometimes even it is evident that both forms occur on the same mycelium, e.g. in one fairy ring. For the sake of convenience I decided to give the nolaneoid forms the rank of forma but I do not attach taxonomic value to it. There are no differences in microscopy between f. *sericeum* and f. *nolaniforme*.

A dark grey '*Entoloma sericeum*' with a non-striate pileus is distinguished as a new variety, viz. *E. sericeum* var. *cinereo-opacum* (see below).

The stipe of *E. sericeum* is usually covered with loose (aeriferous) fibrils which give the surface a striate appearance. Sometimes, however, specimens were found with a more or less glabrous and smooth stipe without these fibrils. Perhaps this is *Nolanea radiata* sensu Orton. I do not think that at least my collections of this form deserve a taxonomic rank, as there are no significant other differences with the typical form.[3]

The size and shape of the spores are rather variable, as indicated in the description above. The intensity of the pigmentation, particularly that of the pileipellis, is rather variable as well. Clamp-connections are often difficult to find due to proliferation (see Bas 1965: 355, 1969: 319), but careful observation always revealed clamp-connections at least at the base of the youngest basidia.

In the field *E. sericeum* can be confused with other grassland species such as *E. papillatum*, *E. hirtipes* var. *sericeoides* and *E. vernum*, but all these species have distinctly heterodiametrical spores. *Entoloma juncinum*, occurring sometimes in the same habitat, differs by the slender mycenoid habit, slightly different colours and the type of pigmentation.

23. ENTOLOMA SERICEUM var. **cinereo-opacum** Noordeloos, *var. nov.*—Figs. 25a–d

A var. sericeo differt pileo haud striato, obscure cinereo, opaco, superficie incana lamellisque obscure griseis. Typus: *M. E. Noordeloos 566*, 26 X 1977 'Westerslag, Isl. Texel, prov. Noord-Holland, Netherlands' (L).

CHARACTERISTICS.—Differs from *E. sericeum* var. *sericeum* by the non-striate, dark grey-brown to blackish brown pileus with minute white pruinum causing a hoary impression (lens), and by the grey lamellae.

Pileus 13–44 mm broad, obtusely rounded conical or conico-convex with flattened or slightly depressed, rarely subpapillate centre, with margin inflexed then straight, often undulating and slightly reflexed with age, strongly hygrophanous, when moist blackish brown (10 YR 2/1, 2/2, 3/1, 3/4; 7.5 YR 2/1, 3/1, 3/2; 5 YR 3/2, 3/3), non-striate or striatulate at margin only, with minute whitish pruinum causing a hoary impression (lens), sometimes zonate, on drying strongly pallescent to brown with ochre tinge particularly at centre (10 YR 5/2, 5/3; 7.5 YR 6/4, 5/4), dull.

[3] *Rhodophyllus radiatus* J. Lange in its original concept is another taxon, probably belonging to subgenus *Entoloma*, and is perhaps close to *Entoloma sordidulum* (Kühn. & Romagn.) P. D. Orton (see also under the excluded taxa, p. 528).

Lamellae L = 20–30, l = 3–9, distant, adnexed, broadly adnate or deeply emarginate to almost free, grey (10 YR 7/2, 6/2, 6/3), hardly tinged pink when mature, with concolorous, subserulate edge. Stipe 25–70 × 2–5 mm, cylindrical or flattened with longitudinal groove, grey-brown, almost concolorous with pileus (10 YR 3/2, 4/2, 4/3; 7.5 YR 6/4, 5/4), scarcely to abundantly silvery striate with aeriferous fibrils, not or minutely pruinose at apex, abundantly white tomentose at base. Flesh concolorous with surface, subcartilagineous. Smell strong, rancid-farinaceous. Taste unpleasant, rancid, farinaceous.

Spores (7.1–)8.0–10.0(–11) × 7.1–8.7(–10.0) µm, Q = 1.0–1.1–1.2(–1.3), L–D = 0.6–1.2–1.8 µm, obtusely 5–8-angled in side-view, probably with a basal facet. Basidia (27–)30–45(–52) × 10.5–15 µm, 4-spored. Cystidia absent. Hymenophoral trama regular, cells cylindrical, (75–)125–290 × 5.0–19 µm, brown, sometimes minutely encrusted. Pileipellis a thin cutis made up of cylindrical, 3.5–10 µm wide hyphae with brown encrusted walls. Subpellis usually well developed, composed of short, inflated cells 27–78 × 10.8–16 µm, with coarsely brown encrusted walls. Pileitrama regular; cells in deeper layers cylindrical, 70–300 × 8–14 µm, with brown encrusted walls. Vascular hyphae numerous in some specimens. Clamp-connections numerous in hymenium and in trama of pileus, rare elsewhere.

HABITAT & DISTRIBUTION.—On poorly grazed, not artificially fertilized dune meadows on the West-Friesian islands in the North of the Netherlands and the German Federal Republic. October-November.

COLLECTIONS EXAMINED.—NETHERLANDS: prov. Friesland, Isl. of Terschelling, Oosterend, Dazenplak, 3 Nov. 1978, *M. E. Noordeloos 846*; Isl. of Ameland, Nes, 8 Nov. 1979, *T. Kuijper 1387*; prov. Noord-Holland: Isl. of Texel, Westerslag, 26 Oct. 1977, *M. E. Noordeloos 566* (holotype); idem, nature reserve 'de Geul', 28 Oct. 1977, *M. E. Noordeloos 579*.

GERMAN FEDERAL REPUBLIC, Ost Friesland, Isl. of Borkum, in dunes between Südstrand and village, 29 Oct. 1977, *C. Bas 7251*.

Entoloma sericeum var. *cinereo-opacum* is easily distinguished from the type form by the predominantly grey colour of the entire carpophore and by the non-striate, more or less hoary pileus. So far it has only been found in dune meadows on the West-Friesian islands. It is remarkable that I failed to find this characteristic form in dune meadows in the western and south-western parts of the Netherlands. One collection, made by the late Mr. H. F. van der Laan in the new polders of the former Southern Sea (Oostelijk Flevoland, recreation grounds in 'de Abbert', 10 Nov. 1976), probably belongs to var. *cinereo-opacum* but there are some slight differences in colour of lamellae and stipe, more typical for var. *sericeum*.

The habit of *E. sericeum* var. *cinereo-opacum* shows the same variation as that of the type variety, and also includes entolomatoid as well as nolaneoid forms.

24. **Entoloma sericeoides** (J. Lange) Noordeloos, *comb. nov.*—Figs. 24a–c

Rhodophyllus sericeoides J. Lange, Fl. agar. dan. 5: 99, pl. 198E. 1940 (basionym).

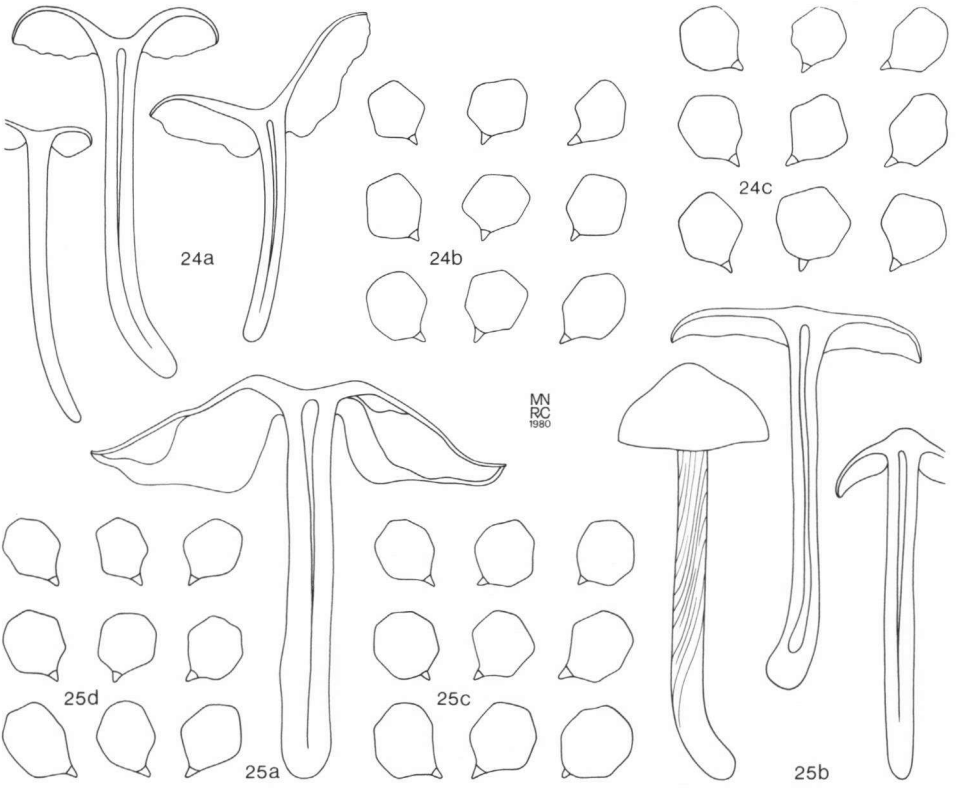
CHARACTERISTICS.—Pileus convex, moderately to deeply umbilicate, dark sepia; lamellae dark brown; stipe slightly paler than pileus, fibrillously striate; smell weak; spores isodiametrical; pigment encrusting.

Pileus 15–30 mm broad, convex with rather shallow to deep umbilicus, with involute margin expanding only in later stage, hygrophanous, when moist dark sepia brown in centre (10 YR 3/2

to 5 YR 3/2), towards margin slightly paler (about 7.5 YR 3/2–4/2), translucently striate up to half of the radius, on drying pallescent to moderately dark brown (10 YR 6/3), brilliantly shining. Lamellae L about 40, l = 3–5, crowded, broadly adnate with decurrent tooth to slightly ascending-emarginate, segmentiform to narrowly ventricose, brown, later with pink tinge (7.5 YR 6/4 to 5/4), with slightly irregular, concolorous edge. Stipe 35–40 × (2–)3–5 mm, cylindrical or tapering upwards, sometimes twisted, concolorous with dry pileus, shiningly fibrillously striate. Flesh cartilagineous; white. Smell indistinct or weakly farinaceous. Taste not tried.

Spores 7.3–9.3 × (5.8–)6.4–8.1 μm, Q = 1.0–1.1–1.2(–1.25), L–D = 0–1.0–1.7 μm, isodiametrically 5–6-angled in side-view, with basal facet. Basidia 30–36 × 10.4–11.5 μm, 4-spored. Cystidia absent. Hymenophoral trama regular; cells cylindrical, 120–200(–240) × 9.5–15 μm, with brown, sometimes minutely encrusted walls. Pileipellis a poorly differentiated cutis made up of radially arranged, cylindrical, 6–12 μm wide hyphae with (coarsely) encrusted walls, gradually passing into trama. Pileitrama regular with inflated cells up to 300 μm long and 6.5–20 μm wide. Clamp-connections not seen in hymenium, nor in other tissues.

HABITAT & DISTRIBUTION.—In extensively grazed grassland on dyke along river and in probably grassy clearing between *Fagus* forest and *Pinus* plantation. Recorded from the Netherlands and Denmark. Rare.



Figs. 24a–c. *Entoloma sericeoides*. — Habit and spores (24a–b from *Piepenbroek 1007*; 24c from holotype).

Figs. 25a–d. *Entoloma sericeum* var. *cinereo-opacum*. — Habit and spores (25a, 25d from holotype; 25b–c from *Bas 7251*).

COLLECTIONS EXAMINED.—NETHERLANDS, prov. Overijssel, Hengforder waarden between Olst and Deventer, 10 Oct. 1976, *H. Piepenbroek & G. Piepenbroek-Grooters 1007.*
DENMARK, Isl. of Fyn, Sönderskov near Kvaerndrup, 12 July 1938, *J. Lange* (holotype, C).

Entoloma sericeoides resembles *E. sericeum* very much in colour of the carpophore, type of pigmentation, and in the isodiametrical spores. The main differences are the deeply umbilicate pileus, the lack of clamp-connections in the hymenium, and the lack of a distinct farinaceous smell. Another collection from the Netherlands—prov. Zuid-Holland, Isl. of Goeree, 9 Nov. 1977, *G. J. M. G. Tjallingii-Beukers*—is quite similar to *E. sericeoides*, but differs by the strong farinaceous-rancid smell and the presence of clamp-connections in the hymenium, which makes it a form of *E. sericeum*. It is clear that more material is required for study before a more satisfactory decision can be made on the true status of *E. sericeoides*.

25. **Entoloma sphaerocystis** Noordeloos, *spec. nov.*—Figs. 11a–b, 49

Pileus 16 mm latus, conicus, hygrophanus, striatus, badius, expallens, fibrilloso-sericeus. Lamellae subliberae, ventricosae, roseae brunneo-tinctae. Stipes 32 × 1.5 mm, cylindraceus, fulvus. Odore nullo. Sporae 8.5–11 × 7–8.1 μm, Q = 1.15–1.25–1.4, 6–7-angulatae basi nominatur 'dihedral base'. Cheilocystidia (sub-)globosa, 25–38(–45) × 13–35 μm. Pileipellis cutis, hyphae 3.5–7.5 μm latae. Pigmentis incrustatus. Fibulae ad basim basidiorum frequentes. Typus: *J. Schreurs*, 19 VIII 1979, 'Willinks Weust, Winterswijk, prov. Gelderland, Netherlands' (L).

CHARACTERISTICS.—Carpophores mycenoid; pileus conical, reddish brown, pallescent and lustrous on drying; lamellae brownish pink; stipe minutely striate with some scattered silvery fibrils; spores 8.5–11 × 7–8.1 μm; cheilocystidia present, subglobose; pigment minutely encrusting; clamp-connections present.

Pileus 16 mm broad, conical with straight margin, hygrophanous, when moist reddish brown (7.5 YR 4/4, 5/4; 5 YR 4/4), paler at margin, translucently striate up to three fourths of the radius, on drying strongly pallescent to pale grey, strongly fibrillous with loose-lying fibrils, shining. Lamellae L = 24, l = 1–3, almost free, ventricose, brownish pink (7.5 YR 6/4, 5/4). Stipe 32 × 1.5 mm, cylindrical, subcartilagineous, pale yellowish brown (10 YR 5/4, 4/4), contrasting with pileus, almost smooth, with only very few silvery fibrils lengthwise. Flesh concolorous with surface. Smell absent.

Spores 8.5–11 × 7–8.1 μm, Q = 1.15–1.25–1.4, L–D = 1.7–2.0–2.3 μm, 6–7-angled in side-view, with dihedral base. Basidia 26–35 × 8–15 μm, 4-spored. Cheilocystidia 25–38(–45) × 13–35 μm, (sub-)globose, rarely broadly clavate, sometimes with thickened, colourless walls. Hymenophoral trama regular, cells 170–360 × 14–23 μm. Pileipellis a cutis made up of radially arranged, cylindrical hyphae with brown, sometimes minutely encrusted walls. Pileitrama regular, cells slightly inflated, up to 270 μm long, 12–31 μm wide, with brown walls particularly in upper layers. Clamp-connections abundant in hymenium.

HABITAT & DISTRIBUTION.—In hayfield on rich, loamy soil (type) and on branchlet of *Fraxinus excelsior* in frondose forest, up till now only known from two localities in the Netherlands.

COLLECTIONS EXAMINED.—NETHERLANDS: prov. Gelderland, Winterswijk, Willinks Weust, 19 Aug. 1979, *J. Schreurs* (holotype); prov. Noord-Brabant, Nieuw Ginneken, Ulvenhoutse bos, 27 Aug. 1979, *P. B. Jansen.*

Entoloma sphaerocystis differs from *E. globulifer*, which has about the same type of cheilocystidia, by the differently shaped spores, the type of pigmentation, and the presence of

clamp-connections. On account of the presence of membranal and minutely encrusting pigments *E. sphaerocystis* is placed in subsection *Cosmeoxonema*. Macroscopically there is some resemblance with *E. sericeonitens*, which differs by the spores with basal facet and the absence of cheilocystidia.

Entoloma section **Fernandae** Noordeloos, *sect. nov.*

Pigmentis duobus, pileipellis pileitramaeque hypharum tunicam valde incrustantibus, pariter in pileipelli intracellulosis-granulatis; sporis 5–6–7-angulatis cum structura nominatur 'dihedral base'; fibulae nullae. — Typus: *Entoloma fernandae* (Romagn.) Noordeloos.

Two types of pigment present: one encrusting the hyphae of pileipellis and pileitrama, the other intracellular in the form of (agglutinated) clots or granulae, particularly in the pileipellis; spores 5–6–7-angled in side view with distinctly dihedral base; clamp-connections absent. — Type: *Entoloma fernandae* (Romagn.) Noordeloos.

KEY TO THE SPECIES OF SECTION FERNANDAE

1a. Stipe strongly striate lengthwise (as in *E. conferendum*); pileus smooth, in moist state translucently striate up to centre.. 2
b. Stipe not striate but smooth or downy-woolly and then pileus rugulose-fluffy to subsquamulose and striate at margin only.. 3
2a. Pileus pale grey-brown with yellow or russet tinge, pale greyish-ochraceous when dry; lamellae white then pink without any brown or grey tinge; flesh in pileus rather brittle; spores 7.9–10.3(–10.8) × (6.3–) 6.7–7.7(–8.0) μm; basidia 2- and 4-spored. . . . . *E. acidophilum*, p. 489
b. Pileus rather dark grey-brown, brown-grey when dry; lamellae pale brown-grey, then sordid flesh colour; flesh in pileus more or less firm; spores 7.4–9.5(–10.6) × 5.8–6.9(–7.4) μm; basidia 4-spored. *E. argenteostriatum*, p. 490
3a. Spores rather strongly rounded-angular in side-view, (6.5–)6.7–7.9(–8.1) × (5.3–)5.8–6.9(–7.4) μm, Q = 1.1–1.2–1.3. . . . . *E. defibulatum*, p. 492
b. Spores slightly larger and more pronouncedly angular in side-view, Q ≥ 1.3 on the average per collection. 4
4a. Stipe with distinct yellow tinge quite different from colour of pileus. . . . *E. xanthocaulon*, p. 493
b. Stipe greyish-brownish, more or less with the same colour as pileus, though usually paler. . . . 5
5a. Spores (8.4–)9.0–11.4(–12.5) × (6.2–)6.9–7.7(–8.2) μm, Q = 1.3–1.45–1.7(–1.8). *E. cuniculorum*, p. 490
b. Spores not longer than 10.5 μm and Q = 1.1–1.3–1.4. 6
6a. Pileus when young more or less conical, quickly expanding to convex or flattened, sometimes slightly depressed at centre, sometimes with small umbo, pale to moderately dark grey-brown; in grasslands. 7
b. Pileus acutely conical, not or only slightly expanding, blackish brown; gregarious in coniferous forests. *E. fractum*, p. 492
7a. Pileus strongly hygrophanous, when moist translucently striate up to centre, absolutely smooth and glabrous; stipe brilliant, smooth and glabrous. . . . . *E. psilopus*, p. 489
b. Pileus weakly hygrophanous, when moist translucently striate at margin only, rugulose-fluffy particularly at centre, sometimes even subsquamulose; stipe mostly smooth and glabrous, rarely minutely downy-woolly all over. . . . . *E. fernandae*, p. 487

26. ENTOLOMA FERNANDAE (Romagn.) Noordeloos—Figs. 29a–b

Rhodophyllus fernandae Romagn. *in* Rev. Mycol. **1**: 162. 1936. — *Nolanea fernandae* (Romagn.) P. D. Orton *in* Trans. Br. mycol. Soc. **43**: 179. 1960. — *Entoloma fernandae* (Romagn.) Noordeloos *in* Persoonia **10**: 250. 1979.

SELECTED ICONES AND DESCRIPTIONS.—Romagn. l.c., pl. 9, fig. 3. 1936. — Arnolds & Noordeloos *in* Fung. rar. Icon. col. **12**, pl. 91 fig. b. 1980.

CHARACTERISTICS.—Pileus and stipe grey-brown; pileus only weakly hygrophanous, translucently striate at margin or not; surface of pileus subfelted-rugulose to minutely squamulose, particularly at centre.

Pileus 12–35 mm broad, conical or campanulate-convex, soon expanding to plano-convex, with or without a faint central depression, rarely with small papilla, with margin straight when young, but often irregularly undulating and/or splitting with age, weakly hygrophanous, when moist translucently striate at margin only or not, pale to moderately dark grey-brown sometimes with reddish tinge (10 YR 3/3–3/4, 7.5 YR 4/4, 10 YR 4/3, 5/3, 6/3 at centre), paler towards margin, slightly pallescent when dry, radially fibrillous-satiny becoming filthy rugulose or minutely squamulose, particularly at centre, often brilliantly shining. Lamellae L = 22–30, l = 1–3(–5), almost free, (sub-) ventricose, white, then (sordid) pink, finally brownish pink (7.5 YR 6/4, 5/4), with concolorous, slightly irregular edge. Stipe 20–45 × 2–4 mm, cylindrical or flattened, with longitudinal groove(s), tapering or slightly broadening downwards, concolorous with pileus or slightly paler, sometimes pruinose at apex and white tomentose at base, often tomentum covering basal half of stipe, remaining surface shining, sometimes very minutely downy-pubescent, rarely faintly striate near basal tomentum, solid, then fistulose. Flesh concolorous with surface, inner parts slightly paler and fibrous in stipe. Smell and taste farinaceous.

Spores (7.0–)7.4–9.0(–9.6) × (5.4–)5.7–7.0(–7.3) µm, Q = 1.15–1.3–1.4(–1.5), L–D = 1.0–1.7–2.3(–2.8) µm, mostly 6-angled in side-view, with distinctly dihedral base. Basidia 23–33(–34) × 8–14 µm, 4-(rarely 2-)spored. Cystidia absent. Hymenophoral trama regular, composed of inflated hyphae with cells (110–)210–320(–600) × 12–32(–37) µm. Pileipellis a cutis made up of repent, 3–20 µm wide cylindrical hyphae with numerous repent or slightly ascending terminal cells sometimes in chains of 2–3–4 cells, with often deep brown, coarsely encrusted walls and with intracellular clustered clots of brown pigment. Pileitrama regular, composed of cylindrical to slightly inflated cells 190–320 × 16–34 µm, mixed with narrow 2.3–7 µm wide cylindrical hyphae, with brown encrusted walls, in upper layer often also intracellular pigment as in pileipellis. Clamp-connections absent.

HABITAT & DISTRIBUTION.—Terrestrial on poor acid soils, frequently met with in *Calluna*-heaths on the pleistocene soils in central and eastern parts of the Netherlands; also found on peat but never been observed growing in or on living *Sphagnum*. Known to occur in Great Britain (P. D. Orton & al., 1960: 125), the Netherlands, France and in the German Federal Republic.

COLLECTIONS EXAMINED.—NETHERLANDS: prov. Drenthe, Roden, Moltmakersstuk, 15 Sept. 1976, *M. E. Noordeloos 177*; prov. Utrecht, Leusden, near Pyramide of Austerlitz, 25 Aug. 1979, *A. F. M. Reijnders*; idem 30 Aug. 1979, *M. E. Noordeloos 994*; prov. Noord-Holland, Callantsoog, Eendekooi, 10 Oct. 1979, *M. E. Noordeloos 1067*; Hilversum, 13 Aug. 1979, *J. Frencken*; Vogelenzang, A. D. W.-dunes, 15 Sept. 1979, *C. Bas 7477*; prov. Noord-Brabant, Nieuw Ginneken, Goudbergven, 23 Aug. 1954, *R A. Maas Geesteranus* 10120; Zundert, 'Krochten', 3 Sept. 1970, *C. Bas 5324*; Deurne, Peel, 23 Sept. 1961, *C. Bas 2446b*.

GERMAN FEDERAL REPUBLIC, Ost Friesland, Aurich, Ewiges Moor, 22 Aug. 1962, *C. Bas 2620*. — FRANCE, dept. Seine & Oise, Yerres, bois de l'Etoile, Aug. 1932, *H. Romagnesi 209* (holotype, Herb. Romagn., PC).

Entoloma fernandae belongs to a group of closely related species, in the present work all placed together in the new section *Fernandae*. Romagnesi (in Kühn. & Romagn. 1953: 193) placed *Rhodophyllus fernandae* in the subgenus *Entoloma* because of the habit of the type specimens. In my opinion, however, *E. fernandae* and related species are far better placed in subgenus *Nolanea* on account of the type of pigmentation and tramal structures. Within subgenus *Nolanea* section *Fernandae* seems to form a bridge to subgenus *Pouzaromyces* because of the tendency to form a trichoderm-like pileipellis, the type of pigmentation, and the lack of clamp-connections. For more details the reader is referred to a publication (in preparation) on the general taxonomy in *Entoloma* (Noordeloos, 1980b).

Almost in complete accordance with the original diagnosis *E. fernandae* is defined here as a species with a weakly hygrophanous, hardly striate pileus with fluffy to subsquamulose surface and a smooth, rarely pruinose-downy stipe. *Entoloma psilopus* differs by having a smooth, deeply striate pileus, whereas *E. acidophilum* and *E. argenteostriatum* differ by having a strongly silvery-fibrillous surface of the stipe.

27. ENTOLOMA FERNANDAE f. **eccilioides** Noordeloos, f. nov.—Figs. 30a–b

A forma typica differt lamellis decurrentibus atque statura Ecciliae. Typus: *M. E. Noordeloos 1073*, 20 X 1979, 'Eendekooi, Callantsoog, prov. Noord-Holland, Netherlands' (L).

Pileus 20 mm broad, convex with umbilicus, with margin slightly involute, faintly hygrophanous, when moist grey-brown (10 YR 4/4, 4/3) and translucently striate at margin only, on drying pallescent to pale grey-brown (10 YR 5/3, 5/4) with marginal zone grooved on back of lamellae, entirely minutely fibrillous-squamulose, particularly at centre. Lamellae L = 15, l = 7–9, distant, deeply decurrent, sordid flesh colour (7.5 YR 6/4, 5/4), with slightly thickened, concolorous edge. Stipe 20 × 2–3 mm, cylindrical, horn brown (10 YR 6/4, 7/4), pruinose at apex, downwards smooth, glabrous, shining. Flesh firm in stipe, brittle in pileus, slightly paler than surface. Smell strong, farinaceous.

Spores 8.1–9.0 × 5.8–7.0 μm, Q = 1.1–1.25–1.4, L–D = 1.2–1.8 μm, 6-angled in side-view, with distinctly dihedral base. Basidia 27–42 × 8.1–11 μm, 4-spored. Cystidia absent. Hymenophoral trama regular with cells up to 250 μm long and 9–17 μm wide. Pileipellis a cutis with transitions to a trichodermium, composed of 4–12 μm wide cylindrical hyphae with repent or slightly ascending, terminal, up to 17 μm wide cells with brown-encrusted and/or deeply brown coloured walls and intracellular clots of pigment. Pileitrama regular, with coarsely encrusted hyphae. Clamp-connections absent.

HABITAT & DISTRIBUTION.—Terrestrial in *Calluna*-heath on poor, acid sandy soil. So far only found in type locality near typical *Entoloma fernandae*.

COLLECTIONS EXAMINED.—NETHERLANDS, prov. Noord-Holland, Callantsoog, Eendekooi, 20 Oct. 1979, *M. E. Noordeloos* 1073 (holotypus, L.).

The eccilioid habit with long decurrent lamellae is considered so remarkable that the collection concerned is described as a new forma to draw attention to the fact that a species in subgenus *Nolanea* may have a strictly eccilioid appearance.

28. ENTOLOMA PSILOPUS Arnolds & Noordeloos

Entoloma psilopus Arnolds & Noordeloos *in* Persoonia **10**: 293–294, Figs. 19–22. 1979.

CHARACTERISTICS.—Pileus (dark) grey-brown and translucently striate up to centre; when moist smooth, glabrous. Stipe paler than pileus, grey-brown, smooth and not striate.

Pileus 8–23 mm broad, conical when young, then hemispherical, expanding, finally flattened, mostly not papillate, sometimes with weak papilla, often slightly depressed at centre when old, with margin straight, sometimes exceeding the lamellae, hygrophanous, when moist dark grey-brown at centre, paler towards margin (10 YR 3/2; M 6E6, 6E6/6F6, 6E6/7E6), translucently striate up to centre, on drying pallescent to pale grey-brown (10 YR 6/4, 7/4; M 6C4, 5C4), smooth, mostly dull but sometimes lustrous, glabrous. Lamellae L = about 20, l = 3–7, moderately crowded to rather distant, narrowly to broadly adnate or deeply emarginate, ventricose, white, then salmon pink or incarnate, sometimes slightly tinged brown (7.5 YR 7/4, 6/4; M 7A4/7B4, 7B4, 6B4), sometimes transversely veined, with entire, concolorous edge. Stipe 15–50 × 1–2.5(–3) mm, cylindrical, straight or flexuous, with base slightly broadened or not, solid, then fistulose, pale to rather dark grey-brown (10 YR 7/4, 6/4, base 5/4; M 4C4, 6C4, 6C4/D4, 6D5/E5), non-striate, smooth, with moderately to strongly developed tomentum at base. Flesh thin-membranaceous in pileus, rather firm or fragile in stipe but mostly more or less cartilagineous, concolorous with surfaces, in fleshy specimens inner part slightly paler and fibrous. Smell mostly distinctly farinaceous, sometimes spontaneously rather weak but then becoming distinct when cut. Taste weakly to distinctly farinaceous-rancid.

Spores (6.5–)7.0–9.1(–10.1) × 5.7–7.0(–7.5) μm, Q = 1.15–1.4, on the average between 1.25 and 1.3 per collection, L–D = 1.0–1.8–2.5 μm, 5–6-angled in side-view, with dihedral base. Basidia (20–)23–40(–44) × 8.5–12.5(–14) μm, 4-(rarely 2-)spored. Hymenophoral trama regular, composed of cylindrical to distinctly inflated cells (55–)176–450 × 7.6–32 μm, mixed up with 3–7 μm wide cylindrical hyphae. Pileipellis a poorly differentiated cutis made up of 2.9–8 μm wide cylindrical hyphae, at centre of pileus sometimes with some clavate cells 20–85 × 6–14(–18) μm, forming transitions to a trichodermium with brown encrusted walls and scattered to abundant, intracellular, mostly clustered clots of pigment. Pileipellis sometimes with subpellis of inflated cells 46–110 × 18–25 μm, passing into regular trama with cylindrical to inflated cells up to 250 μm long and up to 30 μm wide. Clamp-connections absent.

HABITAT & DISTRIBUTION.—Terrestrial on oligotrophic, pleistocene sands and holocene peat in the northeastern and southeastern parts of the Netherlands. July-November.

COLLECTIONS EXAMINED.—NETHERLANDS: prov. Friesland, Appelscha, 3 Oct. 1968, *R. Kramer* (WBS); prov. Drenthe, Westerbork, Mantingerzand, 3 Nov. 1976, *E. Arnolds 3734* (holotype); idem, Hullenzand, 3 Nov. 1976, *E. Arnolds 3732 & 3733* and 15 Oct. 1974, *E. Arnolds 3237* (WBS); Rolde, Eexterveld, Westerholt, N. E. of Anderen, 22 Sept. 1976, *E. Arnolds 3595* (WBS); prov. Overijssel, Rijssen-Markelo, 11 July 1972, *B. de Vries* (WBS); prov. Gelderland, Kootwijkerveld, Sept. 1970, *G. S. de Hoog*; prov. Noord-Brabant, Bergen op Zoom, Zoomland, 7 July 1974, *P. B. Jansen 74–272*; Alphen, 'Ooyevaarsnest', 26 July 1979, *P. B. Jansen 79–148*; prov. Limburg, Grote Peel reserve near Ospel, 22 Aug. 1972, *P. B. Jansen 72–213*.

Entoloma psilopus is easily distinguished from *E. fernandae* by the more hygrophanous, strongly striate, absolutely smooth pileus. *Entoloma xanthocaulon* differs by the yellow-tinged stipe.

29. ENTOLOMA ACIDOPHILUM Arnolds & Noordeloos

Entoloma acidophilum Arnolds & Noordeloos in Persoonia **10**: 285. 1979.

ICON AND DESCRIPTION.—Arnolds & Noordeloos *in* Fung. rar. Icon. col. **12**: pl. 91 fig. a. 1980.

CHARACTERISTICS.—Pileus 8–16 mm broad, conical or hemispherical, expanding to convex with or without small papilla, finally flattened, slightly depressed at centre, hygrophanous, pale grey-brown when moist, deeply translucently striate, on drying pallescent, smooth; lamellae L = 12–17, l = (1–)3–4, moderately distant, narrowly adnate to almost free, pale then pink; stipe 10–32(–53) × 1–2.5(–3) mm, pale greyish brown, silvery striate, apex sometimes pruinose; smell strongly farinaceous; spores 7.9–10.2(–10.8) × 6.3–7.5(–8.0) μm, Q = 1.15–1.3–1.4; basidia 2- and 4-spored; cystidia absent; pileipellis a poorly differentiated cutis made up of 4–10 μm wide hyphae gradually passing into pileitrama with brown, granularly intracellular pigment and minutely encrusted walls; clamp-connections absent.

HABITAT & DISTRIBUTION.—In grass on acid sandy soil near entrance of a rabbit-hole. Known from five localities in the provinces of Drenthe, Friesland and Noord-Brabant, Netherlands.

The pale, strongly hygrophanous pileus, distant lamellae and silvery striate stipe distinguish *Entoloma acidophilum* from *E. fernandae*. *Entoloma psilopus* has a more intensively pigmented pileus and a smooth, non-striate stipe. *Entoloma argenteostriatum* differs by the darker pileus, firm flesh and brown-tinged lamellae. So far the 2- and 4-spored basidia equally distributed in the hymenium of *E. acidophilum* are unique in section *Fernandae*.

Up to now the species has been found in three different localities in the province of Drenthe (Arnolds & Noordeloos, 1980, l.c.) and in addition in the province of Friesland, Heerenveen, Oranjewoud, 31 July 1979, *J. Wisman*, and in the province of Noord-Brabant, Bergen op Zoom, Zoomland, 5 July 1974, *P. B. Jansen 74–271*.

30. ENTOLOMA ARGENTEOSTRIATUM Arnolds & Noordeloos

Entoloma argenteostriatum Arnolds & Noordeloos *in* Persoonia **10**: 285–287, figs. 1–4. 1979.

CHARACTERISTICS.—Pileus 9–25 mm broad, conico-convex or convex, then expanding, with straight, often undulating margin, strongly hygrophanous, when moist dark grey-brown, translucently striate up to centre, on drying pallescent, smooth; lamellae moderately distant, variably inserted, pale brown-grey, then dingy flesh-coloured; stipe 23–32 × 1.8–4 mm, cylindrical or flattened, grey-brown paler than pileus, silvery and aeriferously striate lengthwise; smell strongly farinaceous-cucumberlike; spores 7.4–9.5(–10.6) × 5.8–6.9(–7.4) μm, Q = 1.2–1.35–1.5; basidia 4-spored; cystidia absent; pileipellis a cutis made up of 4–12(–13) μm wide hyphae with coarsely encrusted walls and granularly intracellular pigment; clamp-connections absent.

HABITAT & DISTRIBUTION.—In poor vegetation of short grass and moss (*Polytrichum piliferum*) on dry, acid sandy soil. Known only from the type locality in the province of Drenthe, Netherlands.

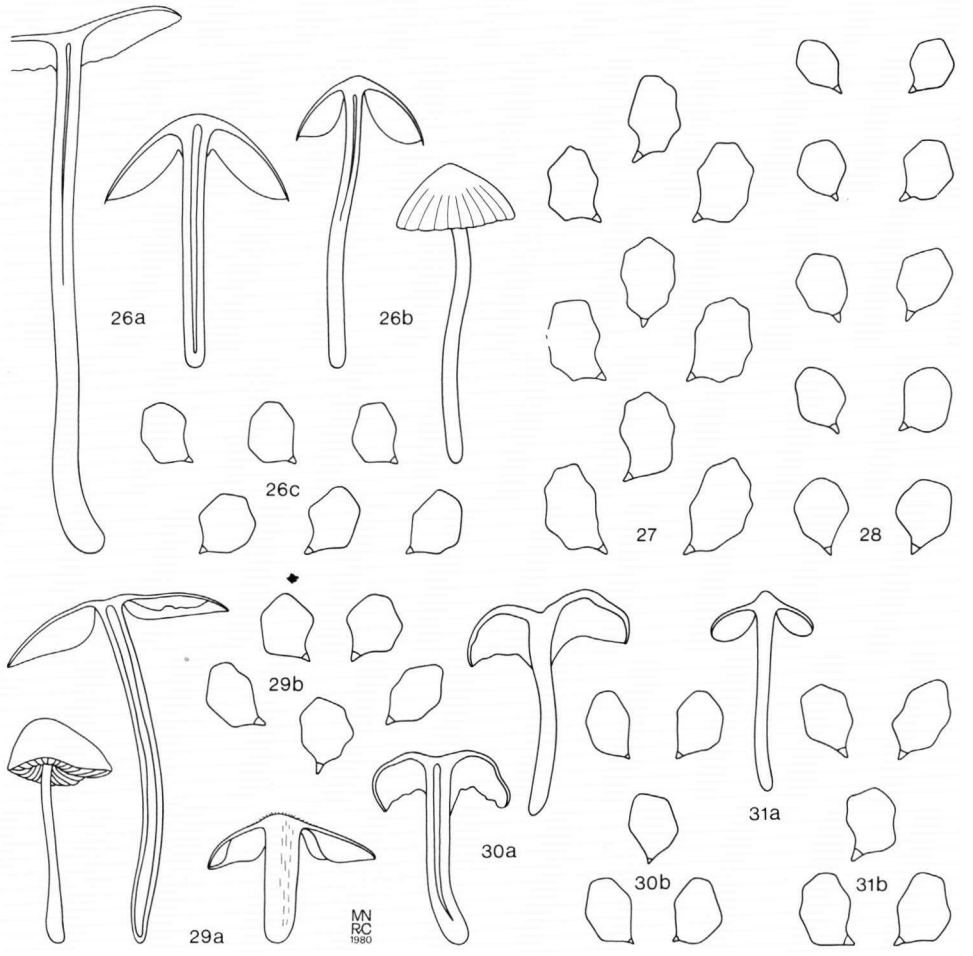
Entoloma argenteostriatum differs from *E. acidophilum* by the more intensively pigmented pileus, firm flesh and 4-spored basidia; from *E. fernandae* mainly by the entirely smooth, translucently striate pileus and strongly striate stipe. *Entoloma psilopus* differs by the smooth stipe.

So far *E. argenteostriatum* has only been found in the type locality and in a nearby locality: province of Drenthe, Spier, Reigersplas, 22 Sept. 1964, *J. J. Barkman* (WBS).

31. ENTOLOMA CUNICULORUM Arnolds & Noordeloos—Fig. 27

Entoloma cuniculorum Arnolds & Noordeloos *in* Persoonia **10**: 289–290, figs. 11–14. 1979.

CHARACTERISTICS.—Pileus 12–16 mm broad, bluntly conical or hemispherical with small papilla, with straight margin sometimes exceeding the lamellae, hygrophanous, when moist rather pale grey-brown, with dark brown striae up to centre, on drying pallescent; lamellae moderately distant, narrowly adnate, pale grey-brown then with pink tinge; stipe 20–32 × 1.5–2 mm, rather pale grey-brown, not striate, smooth; smell rather strongly farinaceous; spores (8.4–)



Figs. 26a–c. *Entoloma xanthocaulon.* — Habit and spores (26a from *Noordeloos 407;* 26b–c from *Noordeloos 400*).

Fig. 27. *Entoloma cuniculorum.* — Spores (from holotype).

Fig. 28. *Entoloma defibulatum.* — Spores (from holotype).

Figs. 29a–b. *Entoloma fernandae* f. *fernandae.* — Habit and spores (29a–b from *Noordeloos 177*).

Figs. 30a–b. *Entoloma fernandae* f. *eccilioides.* — Habit and spores (30a–b from holotype).

Figs. 31a–b. *Entoloma fractum.* — Habit and spores (31a–b from *Barkman 7164*).

9.0–11.4(–12.5) × (6.0–)6.2–7.7(–8.2) μm, Q = 1.3–1.45–1.7(–1.8); basidia 4-spored; cystidia absent; pileipellis a dry cutis made up of (4.5–) 6–14 μm wide cylindrical hyphae with brown encrusted walls and diffusely and/or granularly intracellular pigment; clamp-connections absent.

HABITAT & DISTRIBUTION.—In poor vegetation of moss-interspersed short grass, grazed by rabbits, on dry acid, sandy soil. Known only from two different localities in the province of Drenthe, Netherlands.

Entoloma cuniculorum is quite distinct in section *Fernandae* by its large and irregularly shaped spores. The smooth and non-striate stipe and the colours of pileus and stipe remind of *E. psilopus*.

The macroscopic characters seem to point to a relationship with some members of section *Papillata* but they are contradictory to the microscopic characters such as type of pigmentation and lack of clamps, which make it necessary to place *E. cuniculorum* in section *Fernandae*.

32. ENTOLOMA DEFIBULATUM Arnolds & Noordeloos—Fig. 28

Entoloma defibulatum Arnolds & Noordeloos *in* Persoonia **10**: 290–291, figs. 15–18. 1979.

CHARACTERISTICS.—Pileus 19–21 mm broad, conico-campanulate, then expanding, not papillate, hygrophanous, when moist dark grey-brown, paler towards margin, translucently striate up to centre, on drying pallescent, smooth; lamellae L = 16–21, l = 3–7, moderately distant, narrowly adnate to almost free, pale grey-brown, then with pink tinge; stipe 28–40 × 2 mm, cylindrical, rather dark greyish brown, finely striate under lens, apex minutely pruinose; smell and taste cucumber-like or farinaceous-rancid; spores (6.5–)6.7–7.9(–8.1) × (5.3–)5.6–6.8(–7.0) μm, Q = 1.1–1.2–1.3(–1.4); basidia 4-spored; cystidia absent; pileipellis a poorly differentiated cutis made up of (2.8–)5–12(–15) μm wide cylindrical hyphae with encrusted walls and granularly intracellular pigment; clamp-connections absent.

HABITAT & DISTRIBUTION.—In poor vegetation of moss and short grass on rather moist to rather dry acid peat or humus-rich sand. Known only from two different localities in the province of Drenthe, Netherlands.

Entoloma defibulatum differs from all other species in section *Fernandae* by the rather strongly rounded, only weakly angled spores. Macroscopically it resembles *E. psilopus* but the stipe appears to be minutely striate under a lens, although not so silvery striate as in *E. argenteostriatum* and *E. acidophilum*. The type of spores of *E. defibulatum* resembles that of *E. ortonii* but the latter species has clamped basidia, lacks intracellular pigment and has a quite different habit.

33. ENTOLOMA FRACTUM (Velen.) Noordeloos—Figs. 31a–b

Nolanea fracta Velen., Novitates mycologicae: 146. 1939. — *Entoloma fractum* (Velen.) Noordeloos *in* Persoonia **10**: 248. 1979.

Pileus 10–20 mm broad, acutely conical, hygrophanous, blackish at centre, blackish brown towards margin, translucently striate when moist, glabrous, subrugose at centre, margin acutely deflected. Lamellae crowded, white, then greyish pink, broad. Stipe 20–40 × 1–2 mm, concolorous with pileus, glabrous, fistulose.

Spores 6.8–7.9 × (4.5–)5.7–6.7 μm, Q = 1.1–1.2–1.4, L–D = 1.2–1.8–2.4 μm, 5–6-angled in side-view. Basidia 25–32 × 7.6–10.2 μm, 4-spored. Hymenophoral trama regular; cells cylindrical to inflated, up to 270 μm long and 10–24 μm wide, hyaline, thin-walled, colourless. Pileipellis a cutis with transitions to a trichodermium, composed of cylindrical to slightly inflated hyphae 7–17(–22) μm wide, at centre of pileus with tufts of clavate, terminal cells 32–60 × 8–22 μm, with brown encrusted walls and olivaceous-brown intracellular clots of pigment. Pileitrama regular with cylindrical to slightly inflated, brown encrusted hyphae. Clamp-connections absent.

HABITAT.—Terrestrial in *Pinus* forest on clayey soil.

COLLECTION EXAMINED.—CZECHOSLOVAKIA, Bohemia, Mnichovice, Struhařov, July 1936, *J. Velenovský* (holotype, PRM 154483).

A microscopical study of the type collection of this species revealed close relationship with *E. fernandae*. It differs from all species described above by the acutely conical, rather darkly pigmented pileus and by the habitat. In WBS one collection is present with the following characters suiting several important characters in Velenovský's description:

Pileus 14 mm broad, convex with conical papilla, dark grey-brown, not translucently striate, weakly hygrophanous, glabrous, smooth, strongly silky-shining. Lamellae almost free, ascending, ventricose, greyish pink with entire, concolorous edge. Stipe 40 × 1.5 mm, cylindrical, fistulose, glabrous, only minutely pruinose at apex, dark grey-brown, shining.

Spores 7.9–9.0 × 5.7–6.9 μm, Q = 1.25–1.3–1.4, L–D = 1.7–2.3 μm, 5–6-angled in side-view, with distinctly dihedral base. The material is in poorly dried state, therefore a critical study of the tissues appeared to be impossible. In the surface layer of the pileus, however, the pigmentation appeared to be clearly of two kinds: coarsely encrusting and granularly intracellular.

HABITAT.—In old *Pinus* forest on poor, acid sandy soil in open spot in dense moss layer of *Pleurozium schreberi*, *Dicranum scoparium*, *D. undulatum*, etc.

COLLECTION EXAMINED.—NETHERLANDS, prov. Drenthe, Lhee, state forest, 11 Oct. 1961, *J. J. Barkman 7164* (WBS).

On account of the shape of the pileus, the dark pigmentation as well as the habitat this collection, certainly representing a member of section *Fernandae*, might be considered to belong to *Entoloma fractum*. As the collection consists of only one specimen in a poor state, the occurrence of Velenovský's species in the Netherlands remains somewhat doubtful also because of the slight differences in macroscopy such as the non-striate pileus and the slightly larger and more elongate spores of the Netherlands' collection.

34. ENTOLOMA XANTHOCAULON Arnolds & Noordeloos—Figs. 26a–c

Entoloma xanthocaulon Arnolds & Noordeloos *in* Persoonia **10**: 299. 1979.

ICON AND DESCRIPTION.—Arnolds & Noordeloos *in* Fung. rar. Icon. col. **12**: pl. 91 fig. c. 1980

CHARACTERISTICS.—Pileus brown with pinkish or reddish tinge; stipe with distinct yellow tinge and therefore contrasting with the pileus.

Pileus 13–32 mm broad, conical, then expanding to convex, finally flattened, rarely with small papilla, sometimes with slight depression, with margin often slightly to distinctly involute and exceeding the lamellae, strongly hygrophanous, when moist pale to rather dark reddish or

pinkish brown (centre 10 YR 6/3, 5/3; 7.5 YR 4/2, 4/4, 3/2; 5 YR 3/3, paler towards margin, 10 YR 6/3, 6/4, rarely 7/3), translucently striate up to centre, on drying strongly pallescent to ochraceous-greyish (± 10 YR 7/2, 7/3), smooth, glabrous, shining. Lamellae L = (15–)20–30, l = (1–)3–5, adnate or emarginate, sometimes almost free, pale then pink, often without any grey or brown shade (7.5 YR 7/4), with entire concolorous edge. Stipe 20–50 × 1–3 mm, cylindrical, sometimes slightly broadened at base, with predominant yellow tinge (10 YR 7/4, 5/4; 2.5 Y 7/4, 6/4, 5/4), in colour remarkably different from pileus, smooth, polished, sometimes slightly pruinose at apex, white tomentose at base, solid then fistulose. Flesh thin-membranaceous, fragile, concolorous with surface. Smell and taste strongly farinaceous.

Spores 7.2–9(–9.3) × 5.7–7.4(–7.6) μm, Q = (1.1–)1.15–1.3–1.4, L–D = 1.2–1.9–3 μm, 5–6-angled in side-view, with distinctly dihedral base. Basidia 24–42 × 8–11.5(–12.6) μm, 4-(rarely 2-) spored. Hymenophoral trama regular with cylindrical to slightly inflated cells 159–370 × 11–32 μm. Pileipellis a thin cutis made up of 2.5–10(–11) μm wide cylindrical hyphae rarely with clavate terminal cells up to 12(–15) μm wide, with pale intracellular pigment, and that sometimes granular or even in large clots sticking to inner walls of hyphae and with additional brown, usually (coarsely) encrusted walls, subpellis well differentiated of short, broad cells 50–110 × 14–27 μm, gradually passing into pileitrama with cells up to 320 μm long and 12–31 μm wide, with brown encrusted walls. Clamp-connections absent.

HABITAT & DISTRIBUTION.—In mossy grasslands, usually on acid soils, not uncommon on the pleistocene sands and old coastal dunes. Known from several localities in the Netherlands. August-October.

COLLECTIONS EXAMINED.—NETHERLANDS: prov. Drenthe, Sleen, Sleenerzand, 9 Aug. 1971, *B. de Vries 1008* (WBS); Westerbork, E. of Eursinge, 27 Sept. 1974, *E. Arnolds 3182* (WBS); Beilen, along Oude Westerborkseweg near Holtherzand, 13 Oct. 1976, *E. Arnolds 3645* (holotype); idem, Terhorsterzand, 15 Oct. 1973, *P. Ypelaar* (WBS); Balinge, Balingerzand, 4 Sept. 1968, *B. de Vries 40* (WBS); prov. Overijssel, Delden, estate 'Twickel', 20 Aug. 1977, *M. E. Noordeloos 400*; Staphorst, 16 Oct. 1976, *M. E. Noordeloos 225*; prov. Utrecht, Baarn, Paleis Soestdijk, 8 Sept. 1979, *M. E. Noordeloos 1000*; prov. Zuid-Holland, Wassenaar, Meyendel, 24 Aug. 1977, *M. E. Noordeloos 408*.

The pigmentation in the pileus varies considerably. In pale forms the encrusting pigments can be entirely lacking from the pileipellis but then it is always distinct in the pileitrama. The intracellular pigments are always manifest.

The yellowish stipe distinguishes *E. xanthocaulon* from all other species in section *Fernandae*. There are, however, some other *Entoloma* species with yellowish stipes with which our species may be confused. *Entoloma verecundum* (Fr.) Noordeloos has absolutely no encrusting pigments in the pileus and larger spores; *E. vinaceum* var. *vinaceum* differs among other things by the spores that are smaller, thin-walled and polyangular in side-view, and also by a different pigmentation, viz. intracellular. It should be noted also that in contrast to *E. xanthocaulon* all these species have clamped basidia. *Entoloma rhombisporum* (Bres.) Horak has sometimes also two types of pigmentation (see p. 452), but its cuboid spores make confusion unlikely.

ENTOLOMA section ENDOCHROMONEMA (Largent & Thiers) Noordeloos

Nolanea (Fr.) Kumm. sect. *Endochromonema* Largent & Thiers *in* Northwest Sci. **46**: 36. 1972. — *Rhodophyllus* Quél. sect. *Endochromonema* (Largent & Thiers) Romagn. *in* Bull. mens. Soc. linn. Lyon **43**: 331. 1974. — *Entoloma* (Fr.) Kumm. sect. *Endochromonema* (Largent & Thiers) Noordeloos *in* Persoonia **10**: 246. 1979. — Holotype: *Entoloma cetratum* (Fr.) Moser.

CHARACTERISTICS.—With diffusely intracellular, sometimes very pale pigment and in addition pale membranal pigment[4]; spores heterodiametrical with dihedral base, rarely subisodiametrical.

Subsection ENDOCHROMONEMA

Pigment usually pale and inconspicuous, diffusely intracellular and in addition sometimes membranal; spores usually simple, never polyangular-nodulose; pileus grey-brown or ochraceous-fulvous, never blackish brown; stipe fibrillous, often striate, never with lemon yellow tinge; smell usually absent or faint, rarely farinaceous, never strongly aromatic like blossom or fruit.

Largent (1974: 1009) characterized this subsection by the presence of clamp-connections, and consequently erected a new subsection for those species in section *Endochromonema* without clamps, viz. subsect. *Efibulatae*. The type species of sect. *Endochromonema*, *E. cetratum* is, in the probably correct sense of European authors, a clampless species. This suggests that Largent's observations were based upon a misinterpretation. In the present work subsect. *Endochromonema* contains both clamped and non-clamped species. I did not study *Nolanea californica* (Murrill) Largent yet, the type species of subsect. *Efibulatae*, therefore I hesitate to put the name *Efibulatae* into the synonymy of subsect. *Endochromonema*.

KEY TO THE SPECIES OF SUBSECTION ENDOCHROMONEMA

1a. Basidia in majority 2-spored without clamps. 2
b. Basidia in majority 4-spored with clamps. 3
2a. Stipe silvery striate; fruitbody slender, mycenoid with conical then slightly expanding pileus, usually with distinct umbo; taste absent or faintly farinaceous; smell absent. . . . . *E. cetratum*, p. 496
b. Stipe smooth, glabrous; fruitbody thick-set, small; pileus quickly expanding, with or without a slight umbo, sometimes even slightly depressed; taste strongly farinaceous-rancid or fishy, smell weakly to distinctly farinaceous. . . . . *E. farinogustus*, p. 497
3a. Spores subisodiametrical, (7.4–)7.6–9.4(–9.6) × (6.4–)6.9–8.1(–8.6) μm, Q = 1.05–1.15–1.25. *E. occultopigmentatum*, p. 501
b. Spores distinctly heterodiametrical, Q on the average per collection ≥ 1.25. 4
4a. Spores 8.3–11 μm long, Q = 1.1–1.25–1.4; in grasslands. 5
b. Spores 10–12 μm long, Q = 1.25–1.4–1.5; in forests. 6
5a. Pileus pale orange-brown with grey-brown striation; lamellae pale, then pink without any grey or brown tinge, of normal thickness, not exceeding the pileus. . . . . *E. calthionis*, p. 502
b. Pileus pale grey-brown with slight ochre tinge, with dark brown striae; lamellae grey, then brown-pink, thickish, broadly ventricose, exceeding the pileus. . . . . *E. ventricosum*, p. 502
6a. Stipe downy-pruinose all over, with cylindrical often subcapitate hairs; pileus and stipe concolorous and pale. . . . . *E. lanuginosipes*, p. 499
b. Stipe glabrous or pruinose at apex only; pileus often dark brown; stipe paler. 7
7a. Pileus bicolorous: limb sepiaceous or date brown, centre paler, yellowish, lamellae ochraceous. *E. cuneatum*, p. 498
b. Pileus unicolorous, reddish brown, lamellae flesh pink, then brownish pink. . . *E. pallescens*, p. 521

[4] Except in *E. infula*, a species of uncertain taxonomical position, intermediate in this character between sect. *Endochromonema* and sect. *Papillata*.

35. ENTOLOMA CETRATUM (Fr.) Moser—Figs. 32a–c

Agaricus cetratus Fr., Syst. mycol. 1: 207. 1821. — *Nolanea cetrata* (Fr.) Kumm., Führ. Pilzk.: 95. 1871. — *Rhodophyllus cetratus* (Fr.) Quél., Enchir.: 64. 1886. — *Hyporrhodius cetratus* (Fr.) Schroet. *in* Cohn, KryptogFl. Schles. 3(1): 613. 1889. — *Entoloma cetratum* (Fr.) Moser *in* Gams, Kl. KryptogFl. 4. Aufl. 2(b/2): 206. 1978.

SELECTED ICONES AND DESCRIPTIONS.—Arnolds & Noordeloos *in* Fung. rar. Icon. col. 12: pl. 89 fig. a. 1980. — Konrad *in* Bull. Soc. mycol. Fr. 45: 51–52. 1929. — Konrad & Maublanc, Icon. sel. Fung., pl. 179 fig. 1. 1930. — J. Lange, Fl. agar. dan., pl. 78F. 1936. — Rea *in* Trans. Br. mycol. Soc. 12: 217. 1927. — Ricken, Blätterpilze: 297, pl. 74 fig. 1. 1913.

CHARACTERISTICS.—Habit mycenoid; pileus conical, only slightly expanding, ochraceous brown often with reddish tinge; lamellae ochraceous, then pink with brown tinge; stipe concolorous with or paler than pileus, silvery striate; smell weak, rarely slightly farinaceous; basidia 2-spored; clamp-connections absent.

Pileus 9–40(–50) mm broad, conical, then hemispherical to conico-campanulate, finally conico-convex, with broad rounded umbo, rarely truncate, with margin slightly inflexed when young, but straight later on, hygrophanous, pale ochraceous, horn brown or sepia often with reddish tinge, distinctly paler and more yellow towards margin (7.5 YR 4/4, 4/2, 5/4, rarely 3/2 at centre; margin 7.5 YR 7/4; 10 7/4, 8/4), translucently striate up to two thirds of the radius, on drying strongly pallescent to pale yellowish or ochraceous brown (10 YR 7/4, 7/6, 8/3, 8/4), when moist smooth, when dry with aeriferous, silvery lustre. Lamellae L = (15–)20–30, l = (1–)3–5(–7), narrowly adnate to almost free, triangular, then ventricose, up to 7 mm broad, yellowish-ochraceous, then pink, finally brownish pink (10 YR 7/4, then 7.5 YR 8/4, 7/4, 6/4, rarely 5/4), with irregularly crenulate concolorous edge. Stipe (20–)35–85 × (1.5–)2–4(–5) mm, cylindrical, gradually broadening towards base, sometimes flattened and/or twisted, pale yellow to yellowish red (2.5 Y 7/4, 7/6, 6/4, 5/4, or 10 YR 7/3, 7/4), strongly silvery striate lengthwise with aeriferous fibrils, white tomentose at base. Flesh concolorous, inner parts paler. Smell usually absent, rarely very slightly farinaceous. Taste indistinct or rarely with farinaceous or rancid aftertaste.

Spores (9.6–)10.2–13.4(–14) × 7.2–8.0(–9.3) µm, Q = 1.2–1.45–1.8, L–D = 2.4–4 µm, irregularly (5–)6–7(–8)-angled in side-view, with dihedral base. Basidia 27–45 × 8–12.5 µm, 2-(rarely a few 1- or 4-)spored. Cystidia absent. Hymenophoral trama regular with cylindrical cells 50–140 (–190) × 17–32 µm, with colourless walls. Pileipellis a thin cutis made up of radially arranged, cylindrical, 4–7(–10) µm wide hyphae, subpellis well developed, composed of inflated cells 52–90(–140) × 16–30 µm, with pale brown walls and in addition a very pale intracellular pigment. Pileitrama regular, composed of cylindrical cells up to 230 µm long and 7.5–21(–27) µm wide. Clamp-connections absent in all tissues.

HABITAT & DISTRIBUTION.—Terrestrial in humus in or near coniferous forests (*Picea abies*, *Pinus sylvestris*, *P. nigra*) and on heaths (*Ericetum*, *Empetretum*) on pleistocene sandy soils and in coastal dunes; fairly common throughout the year when weather conditions are favourable for the development of carpophores. Common also in entire western and northern Europe in comparable habitats.

COLLECTIONS EXAMINED.—NETHERLANDS: prov. Friesland, Isl. of Vlieland, state forest near village, 1 Sept. 1976, *C. Bas 7146*; prov. Drenthe: Gees, state forest, 9 May 1973, *K. Booy*; Spier, state forest, 18 Aug. 1960, *J. J. Barkman 6734* (WBS); Schoonloo, 19 Oct. 1977, *P. B. Jansen 77-312*; Berkenheuvel, 6 Nov. 1978, *A. E. Jansen*; prov. Overijssel, Rijssen, Friezenberg, 31 Oct. 1957, *R. A. Maas Geesteranus 12435*; prov. Gelderland: Nijmegen, Hatert, 26 Sept. 1954, *C. Bas 658*; Arnhem, state forest N. of town, 10 Nov. 1957, *E. Kits van Waveren*; Nieuw Milligen near Apeldoorn, state forest, 12 Nov. 1954, *C. Bas 737*; Otterloo, *Juniperus* reserve, 24/27 Oct. 1963, *J. J. Barkman 7664* (WBS); prov. Utrecht, Soestdijk, Paleis Soestdijk, 12 Oct. 1979, *E. Kits van Waveren*; prov. Noord-Holland: Isl. of Texel, de Koog, 27 Oct. 1977, *M. E. Noordeloos 567*; Bergen, 23 Oct. 1965, *J. van Brummelen 1956*;

Overveen, 'Koningshof', 16 Nov. 1976, *M. E. Noordeloos 269 & 270*; Vogelenzang, dunes of Amsterdam Water Supply, 4 Nov. 1976, *M. E. Noordeloos 246*; idem, estate 'Vogelenzang', 11 May 1977, *C. Bas*; prov. Noord-Brabant: Breda, Mastbos, 5 May 1965, *P. B. Jansen 65–178*; Dorst, 2 April 1957, *C. Bas 1199*; Nieuw Ginneken, Goudbergven, 28 Nov. 1964, *P. B. Jansen 64–204*; prov. Limburg, Schinveld, Schinvelderbos, 8 Sept. 1974, *P. B. Jansen 74–279*.

Entoloma cetratum is easily recognized in the field by the following combination of characteres: pileus and stipe with yellow-ochraceous tinges, silvery striate stipe, and habitat. The smell is usually indistinct; only in three collections examined the smell was more or less farinaceous. The taste is usually weak and mild but in the same three collections mentioned above it was distinctly farinaceous. *Entoloma farinogustus* differs from *E. cetratum* by the dwarfish habit, polished stipe and persistant and strong farinaceous-rancid taste. *Entoloma cuspidifer* resembles *E. cetratum* somewhat in colour of the carpophore but differs by many microscopic characters such as size and shape of spores, pigmentation, and presence of clamp-connections.

Nolanea testacea Bres., *Rhodophyllus putus* Romagn., and *R. fulviceps* Romagn. are insufficiently known extralimital species which seem to be closely related to, if not identical with, *E. cetratum*. More information is needed on the variability of *E. cetratum* in entire Europe to take a final decision on the taxonomical rank of these species (see p. 529).

Entoloma cetratum has been very well depicted by J. Lange (1936, l.c.), whose plate is representative for the Netherlands' collections; the specimens depicted by Konrad & Maublanc, l.c., are much less characteristic, but nevertheless their description suits my concept of *E. cetratum* very well, just as the description given by Ricken (1913, l.c.).

36. ENTOLOMA FARINOGUSTUS Arnolds & Noordeloos—Figs. 34a–b

Entoloma farinogustus Arnolds & Noordeloos *in* Persoonia **10**: 292. 1979.
ICON AND DESCRIPTION.—Arnolds & Noordeloos *in* Fung. rar. Icon. col. **12**: pl. 89 fig. b. 1980

CHARACTERISTICS.—Carpophores dwarfish; pileus 6–20 mm broad, pale ochraceous brown, flattened; lamellae pale, then pink without any grey or brown; stipe 11–28 × 1.5–3 mm, yellowish, polished; taste farinaceous-rancid; basidia 2-spored; clamp-connections absent.

Pileus 6–20 mm broad, when young bluntly conical or hemispherical, soon flattened with or without weak umbo, rarely slightly depressed, with straight margin, strongly hygrophanous, when moist pale ochraceous brown, at centre slightly darker orange-brown, translucently striate up to centre, on drying strongly pallescent to cream-colour or pinkish orange, smooth. Lamellae L = 20–25, l = 1–5, moderately distant, narrowly adnate, narrowly ventricose, pale, then pink without any grey or brown tinge, with concolorous, entire edge. Stipe 11–28 × (1.5–)2–3 mm, cylindrical, slightly broadened at base, yellowish or orange-brown, smooth as if polished, apex sometimes minutely pruinose. Smell weak, slightly farinaceous. Taste strongly farinaceous-rancid or like cod-liver oil.

Spores (8.7–)9.0–12(–12.4) × (6.4–)6.9–8.2(–9.5) μm, Q = (1.2–)1.25–1.35–1.5(–1.6), L–D = 1.7–2.5–4 μm, irregularly 6–8-angled in side-view, with dihedral base. Badidia 25–40 × 8–12 μm, 2-spored. Cystidia absent. Hymenophoral trama regular with cylindrical or slightly inflated cells (54–)64–200(–240) × 7.5–27 μm. Pileipellis a cutis made up of radially arranged cylindrical hyphae 4–12 μm wide, with pale membranal and intracellular pigment; subpellis well developed, composed of short and broad cells 24–85 × 13–28 μm. Pileitrama regular, with broad cylindrical cells up to 200 μm long and 8–25 μm wide. Clamp-connections absent.

HABITAT & DISTRIBUTION.—On the ground and on litter of grasses and *Calluna vulgaris* on dry sandy or slightly loamy soils. Known only from the province of Drenthe, Netherlands.

COLLECTIONS EXAMINED.—NETHERLANDS: prov. Drenthe, Dwingeloo, Dwingelose hei S. of Smitsveen, 17 Nov. 1976, *E. Arnolds 3775* (WBS; holotype, L); idem, 15 Oct. 1979, *B. de Vries* (WBS); Schoonloo, Schoonloër Strubben, 11 Oct. 1979, *A. E. Jansen 582* (WBS).

Entoloma farinogustus is closely related to *E. cetratum* by its bisporous basidia, size and shape of spores, and clampless hyphae. It is considered a distinct species on account of dwarfish habit, shape of pileus and polished stipe.

Eccilia bisporigera Orton differs by the dark grey-brown pileus, the usually slightly decurrent lamellae, and by the slightly broader and more irregularly shaped spores and abundant clamp-connections, which place it in subgenus *Entoloma*, close to *E. politus*.

37. ENTOLOMA cuneatum (Bres.) Moser—Figs. 35 a–c

Nolanea cuneata Bres., Fungi trident. **I**: 77, pl. 82 fig. 2. 1887. — *Entoloma cuneatum* (Bres.) Moser *in* Gams, Kl. KryptogFl. 4. Aufl. **2** (b/2): 205. 1978.

SELECTED DESCRIPTION.—P. D. Orton *in* Trans. Br. mycol. Soc. **43**: 330. 1960 (as *Nolanea cuneata*).

CHARACTERISTICS.—Habit mycenoid; pileus dark brown with contrasting yellow papilla; stipe yellowish, paler than pileus, entirely pruinose or at apex only, silvery striate; smell absent; spores (10.2–)10.6–12.4 × 7.4–8.4(–9.0) µm, Q = 1.25–1.4–1.5(–1.6); basidia 4-spored; clamp-connections present.

Pileus 23–56 mm broad, conical, expanding to conico-convex, then with small papilla, with straight margin, strongly hygrophanous, when moist rather dark (reddish) brown (5 YR 4/3, 4/4; Meth. 5E8), with contrasting yellowish-glassy, apex or papilla, translucently striate up to centre, on drying strongly pallescent to sordid ochaceous grey (10 YR 7/2, 8/4), smooth, lustrous. Lamellae L = up to 32, l = 1–3, moderately distant, almost free, narrowly ventricose, sordid ochraceous pink, finally more brownish pink (one collection: 5 YR 6/6), with concolorous or slightly paler, entire edge. Stipe 25–70 × 2–4 mm, cylindrical, sometimes slightly broadened towards base, yellowish to yellowish brown, paler than pileus, silvery striate lengthwise, at apex or at upper half, sometimes even entirely white pruinose. Flesh concolorous with or paler than surface. Smell and taste indistinct.

Spores (10.2–)10.6–12.4 × 7.4–8.4(–9.0) µm, Q = 1.25–1.4–1.5(–1.6), L–D = 2.5–4 µm, 5–6–7-angled in side-view, with dihedral base. Basidia 36–50 × 10.8–14.5 µm, 4-spored. Cystidia absent. Hymenophoral trama regular with cylindrical to strongly inflated cells (160–)220–514(–550) × 10.5–27 µm, with colourless walls. Pileipellis a cutis made up of 2.5–7(–9) µm wide cylindrical hyphae with pale diffusely intracellular and pale membranal pigment; subpellis not or only weakly developed. Pileitrama regular with cylindrical to inflated cells 270–650 × 12–35 µm, with pale intracellular pigment particularly in upper layers, rarely in addition with pale membranal, never with encrusting pigment. Vascular hyphae numerous in pileitrama. Stipitepellis at apex, rarely also downwards with numerous cylindrical or flexuous hairs with rounded, rarely subcapitate apex, up to 110 µm long and 4.5–6(–8) µm wide. Clamp-connections abundant in hymenium, rare or even seemingly absent elsewhere.

HABITAT & DISTRIBUTION.—In coniferous forests, probably with a preference to rich, calcareous soils. Rare. Known to occur in the Netherlands, Great Britain, and Italy.

COLLECTIONS EXAMINED.—NETHERLANDS, IJsselmeerpolders, Oostelijk Flevoland, Abbertsbos, 16 Oct. 1978 and 14 June 1979, *G. J. M. G. Tjallingii-Beukers.*

GREAT BRITAIN: Scotland, Isl. of Rhum, Spruce Woods, north shore of Lock, 30 Aug. 1969, *R. W. G. Dennis* (K); Wales, Lake Vyrnwy, 8 Sept. 1977, *E. Kits van Waveren*. — ITALY, Trentino, Dagario, 6 Aug. 1924, *G. Bresadola* (neotype: design. mihi, M).

DESCRIPTION OF THE NEOTYPE.—Ex Herb. Bres. no. 1198, Dagario, in herbidis, 6 Aug. 1924, *G. Bresadola* (M).

The neotype consists of one specimen in relatively good state with the following microscopical characters.

Spores 10.6–12.4 × (7.4–)7.9–8.4(–9.0) μm, Q = 1.3–1.4–1.55, L–D = 3.5–4 μm, mostly 6-angled in side-view, with dihedral base. Basidia 36–42 × 12–14.5 μm, 4-spored. Cystidia absent. Hymenophoral trama regular with long inflated cells 324–514(–540) × 16–25 μm. Pileipellis a dry cutis made up of 4.5–8 μm wide cylindrical hyphae with intracellular pigment. Pileitrama regular with strongly inflated cells 270–456 × 10.8–35 μm, some with intracellular pigment particularly in upper layer. Clamp-connections abundant, at least in hymenium.

In the Bresadola herbarium at Stockholm no authentic material of *Entoloma cuneatum* is left. Fortunately I found in the exsiccatae collection of the Bavarian mycologist Killermann (1870–1956) at Munich duplicates from the Bresadola herbarium, among other things the collection cited above, which I selected as a neotype. The microscopical characters fit the recent collections of the same species very well.

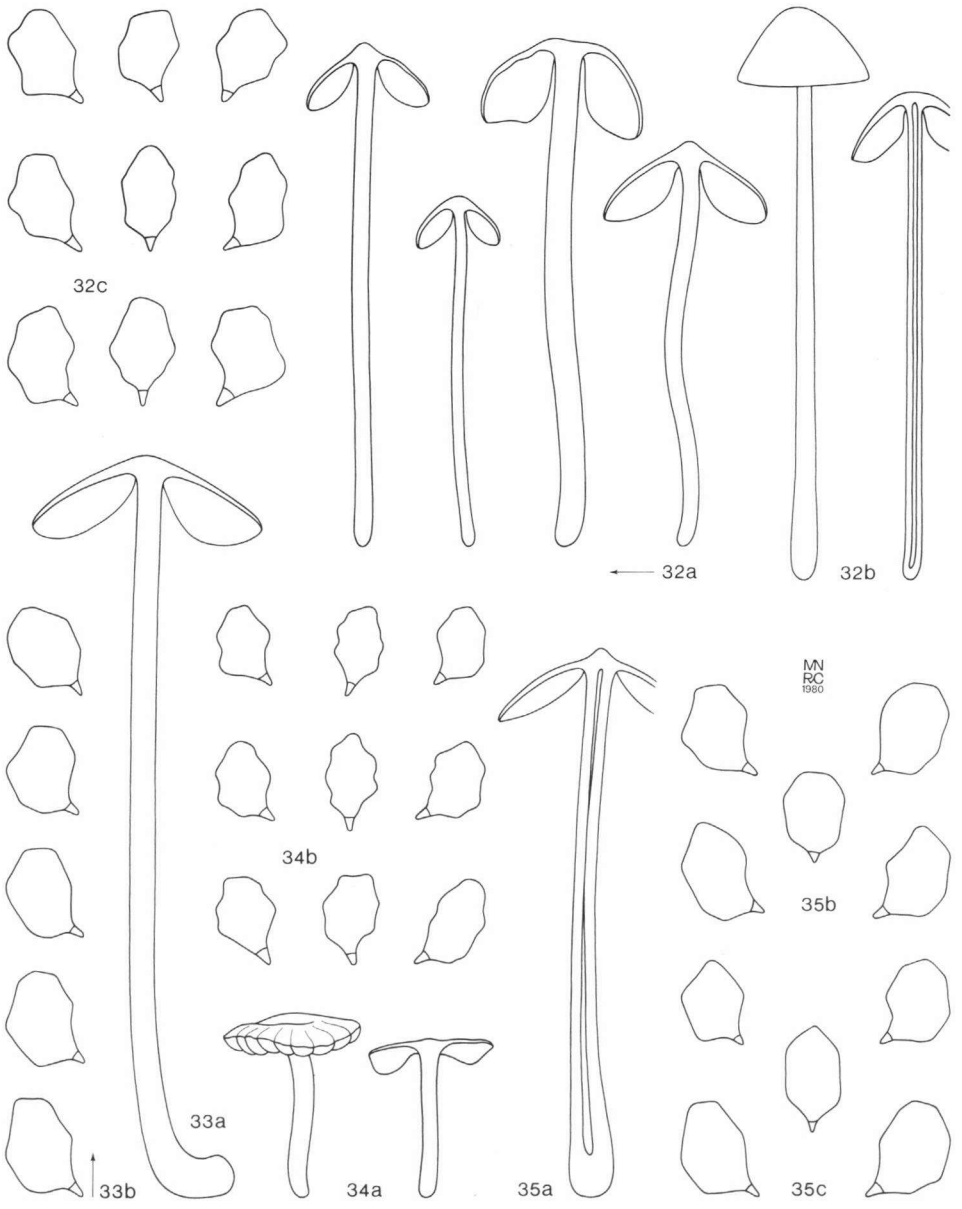
Entoloma cuneatum is very well characterized by its bicoloured pileus, by which it is easy to distinguish from *E. pallescens*, which in addition is much larger and has a different habitat and distribution. *Entoloma lanuginosipes* has a rather pale, unicoloured pileus and a constantly downy-pruinose stipe. The latter character, which I thought to be very characteristic when creating this new name for *Nolanea crassipes* Velen., is less unique than I thought as the collection from Wales, Lake Vyrnwy, leg *E. Kits van Waveren*, shows that typical *E. cuneatum* may possess an entirely pruinose stipe as well. For the time being I consider the difference in colour of the pileus sufficiently distinctive to maintain *E. lanuginosipes* as a species in its own right. Further examinations must prove the constancy of that character.

38. ENTOLOMA LANUGINOSIPES Noordeloos—Figs. 33a–b

Nolanea crassipes Velen., České Houby: 627. 1921; non *Entoloma crassipes* Petch, 1924. — *Entoloma lanuginosipes* Noordeloos *in* Persoonia **10**: 248. 1979 [change of name].

CHARACTERISTICS.—Pileus and stipe rather pale yellow(-brown); stipe minutely woolly-downy all over, particularly when dry; hairs on stipe rather long, cylindrical with rounded, attenuate or capitate apex.

Pileus 20–27 mm broad, conical, expanding to plano-convex with or without weak central depression, with straight margin, strongly hygrophanous, when moist pallid honey to yellow(-brown) (Expo C66–C74; 10 YR 7/6–6/4), translucently striate up to one half of the radius, on drying pallescent to pallid isabella-buff or yellow (2.5 Y 8/2, 8/4), strongly silky-shining. Lamellae L = about 30, l = 3(–5), fairly crowded, flesh-coloured pink (7.5 YR 7/4–6/4), with more or less entire, concolorous edge. Stipe 85–90 × 2–3 mm (in type up to 13 × 4–5 mm, base up to 13 mm), slightly broadened towards base, cylindrical or flattened, pale yellow (10 YR 7/8 to 2.5 Y 8/6), on drying pallescent, silvery striate and minutely downy-pruinose all over, with white



Figs. 32a–c. *Entoloma cetratum*. Habit and spores (32a from *Noordeloos 246;* 32b–c from *Kits van Waveren, 22 Oct. 1979*).

Figs. 33a–b. *Entoloma lanuginosipes*. — Habit and spores (33a–b from *Noordeloos 1032*).

Figs. 34a–b. *Entoloma farinogustus*. — Habit and spores (34a–b from *de Vries, 15 Oct. 1979*).

Figs. 35a–c. *Entoloma cuneatum*. — Habit and spores (35a–b from *Tjallingii*, 16 Oct. 1978; 35c from neotype).

tomentum at base. Flesh pale, concolorous with surface, inner part paler, subcartilagineous in stipe, brittle in pileus. Smell spontaneously weak, subfarinaceous when cut (in type: 'penetrantly acid'). Taste farinaceous or absent.

Spores 10.2–12.4(–12.7) × 7.4–9.0(–10.2), Q = (1.1–)1.2–1.4–1.5(–1.7), L–D = 2–4.5 μm, 6–7-angled in side-view, with distinctly dihedral base. Basidia 30–58 × 9–17.5 μm, 4-spored. Cystidia absent. Hymenophoral trama regular; cells fusoid, 200–435 × 12–21 μm. Pileipellis a simple cutis made up of 2.5–8(–10) μm wide cylindrical hyphae with pale coloured walls and rather pale diffusely intracellular pigment. Pileitrama regular, composed of cylindrical to inflated cells 280–520 × 12–32 μm, with colourless walls. Stipitepellis a cutis bearing numerous cylindrical hairs 43–163 × 4–10 μm, with rounded, attenuated or capitate apex. Clamp-connections abundant in hymenium, rare elsewhere.

HABITAT & DISTRIBUTION.—In frondose and coniferous forests, rare. Recorded from the Netherlands, German Federal Republic and Czechoslovakia.

COLLECTIONS EXAMINED.—NETHERLANDS, prov. Gelderland, Gietelo, Gietelse bos, 9 Oct. 1966, *C. Bas 4804*.

GERMAN FEDERAL REPUBLIC, Eifel, Gerolstein, 1 Oct. 1979, M. E. *Noordeloos 1032*. — CZECHOSLOVAKIA, Bohemia, Hvězda near Prague, April 1920, *O. Zvěřina* (holotype, PRC).

Entoloma lanuginosipes is quite a distinct species with its pale colours and entirely downy-pruinose stipe. Macroscopically it is very similar to *E. cetratum*, which differs by the glabrous stipe, 2-spored basidia and lack of clamp-connections. *Entoloma cuneatum* and *E. pallescens* have a dark brown pileus. See also the discussion under *E. cuneatum*, p. 499.

39. ENTOLOMA OCCULTOPIGMENTATUM Arnolds & Noordeloos

Entoloma occultopigmentatum Arnolds & Noordeloos *in* Persoonia **10**: 292. 1979.

ICON AND DESCRIPTION.—Arnolds & Noordeloos *in* Fung. rar. Icon. col. **12**: pl. 92 fig. c. 1980.

CHARACTERISTICS.—Robust species, pileus 25–56 mm broad, only weakly umbonate or slightly depressed, rather dark brown; stipe 30–100 × 2.5–8(–9) mm, grey-brown, silvery striate; smell farinaceous; spores isodiametrical; pigment membranal.

Pileus 25–56 mm broad, conico-convex to convex, finally flattened, with or without blunt umbo, rarely slightly depressed at centre, with slightly involute or straight margin, strongly hygrophanous, when moist rather dark brown (10 YR 2/2, 3/2; 5 YR 2/2), paler towards margin and translucently striate at least up to one half of the radius, on drying strongly pallescent to ochraceous-greyish brown (10 YR 6/4, 6/3, 7/2, 7/3), innately fibrillous, lustrous. Lamellae L = 24–60, l = 1–14, moderately distant to rather crowded, broadly adnate to deeply emarginate, rarely almost free, segmentiform to rather broadly ventricose, up to 9 mm broad, pale, sordid grey, then pink with brown tinge, finally flesh-coloured pink (7.5 YR 6/4, 5/4, finally 4/4), with concolorous, entire or slightly irregular edge. Stipe 30–100 × 2.5–8(–9) mm, cylindrical or flattened, straight or flexuous, sometimes gradually broadening towards base, pale to moderately dark grey-brown (10 YR 7/4, 6/4, 5/2, 4/3, 4/2), strongly silvery striate lengthwise, white tomentose at base. Flesh thin and relatively firm in pileus, brittle and fibrous in stipe, concolorous with surface. Smell and taste strongly farinaceous.

Spores (7.4–)7.6–9.4(–9.6) × (6.4–)7.0–8.1(–8.7) μm, Q = 1.0–1.1–1.2(–1.25), L–D = 0–1–1.7 μm, 4–5–6-angled in side-view, base difficult to interprete. Basidia 28.5–41 × 8.5–14 μm, 4-spored. Cystidia absent. Hymenophoral trama regular, composed of rather long, inflated cells up to 500(–700) μm long and up to 35 μm wide. Pileipellis a cutis made up of 3–7(–11) μm wide, cylindrical hyphae with pale membranal and rather diffusely intracellular pigment. Pileitrama

regular, composed of inflated cells up to 350 μm long and up to 27 μm wide, with pale brown walls and, particularly in upper layers pale, diffusely intracellular pigment. Clamp-connections abundant in hymenium, rare in other tissues.

HABITAT & DISTRIBUTION.— In grasslands (*Scirpetum sylvatici;* once found on poorly grazed dike); rare. So far known from three different localiteits in the Netherlands.

COLLECTIONS EXAMINED.—NETHERLANDS: prov. Drenthe, Vries, along Taarlose Diep, E. of Taarlo, 15 Sept. 1976, *E. Arnolds 3588* (holotype); prov. Noord-Holland, Schoorl, old sea dike near 'Schotsbrugsluis', 21 Oct. 1979, *M. E. Noordeloos 1074;* IJsselmeerpolders, Oostelijk Flevoland, Roggebotszand, 17 Oct. 1976, *G. Boezewinkel & H. J. W. Langevoord-Dull.*

Entoloma occultopigmentatum is a fairly robust grassland species. The dark brown pileus, strong farinaceous smell and isodiametrical spores may cause confusion with *E. sericeum*, but the the type of pigmentation is quite different. Because of the latter character *E. occultopigmentatum* is placed in section *Endochromonema*. It has some resemblance with *E. pallescens*, particularly in habit, but the isodiametrical spores prevent confusion.

40. ENTOLOMA CALTHIONIS Arnolds & Noordeloos

Entoloma calthionis Arnolds & Noordeloos *in* Persoonia **10**: 287. 1979.
ICON AND DESCRIPTION.—Arnolds & Noordeloos *in* Fung. rar. Icon. col. **12**: pl. 89 fig. c. 1980.

CHARACTERISTICS.—Pileus (10–)12–28 mm broad, obtusely conical to convex or flattened, with or without small umbo, with straight margin, hygrophanous, when moist pale brown or with orange tinge, with darker brown striation up to centre, smooth but innately radially fibrillous, lustrous; lamellae L = 22–27, l = 1–3(–5), crowded, free, ventricose, pink without any brown or grey tinge; stipe 22–47 × 1.5–3.5 mm, cylindrical, slightly broadened towards base, greyish to brownish yellow, silvery striate. Flesh concolorous, brittle; smell farinaceous; spores (8.5–)9–10.6(–11.5) × 7.2–8.5(–9.0) μm, Q = 1.1–1.25–1.4, 5–6-angled in side-view, with dihedral base; basidia 4-spored; cystidia absent; hymenophoral trama regular with cells 200–350 × 11–15 μm; pileipellis a dry cutis made up of 2–5 μm wide hyphae with pale intracellular pigment. Pileitrama regular; hyphae 7–17.5 μm wide. Clamp-connections abundant in hymenium.

HABITAT & DISTRIBUTION.—In *Calthion palustris* on moist soil. Known only from the type locality in the province of Drenthe in the Netherlands.

Entoloma calthionis resembles *E. cetratum* very much in colour, but differs by the habitat, slightly smaller and less elongate spores, the 4-spored basidia and the clamp-connections in the hymenium. *Entoloma ventricosum* differs by the grey tinges in all parts of the carpophore, veined, thickish lamellae and different habit.

41. ENTOLOMA VENTRICOSUM Arnolds & Noordeloos

Entoloma ventricosum Arnolds & Noordeloos *in* Persoonia **10**: 298. 1979.
ICON AND DESCRIPTION.—Arnolds & Noordeloos *in* Fung. rar. Icon. col. **12**: pl. 93 fig. c. 1980.

CHARACTERISTICS.—Pileus 13–24 mm broad, bluntly conical to convex, with slightly involute margin, hygrophanous, when moist grey-brown, on drying strongly pallescent to sordid

ochraceous-grey; lamellae L = 15–18, l = 1–3, narrowly adnate, rather strongly ventricose, exceeding the pileus, thickish, veined, grey, then brown-pink with flesh-coloured edge; stipe 30–48 × 2–3.7 mm, pale ochraceous grey-brown to dark grey-brown, smooth but very minutely longitudinally striate, white tomentose at base; flesh thin-membranaceous, concolorous with surface; smell and taste absent; spores (8.3–)9.1–11(–11.5) × 7–8.3 μm, Q = 1.15–1.25–1.4; basidia 4-spored; cystidia absent; hymenophoral trama regular with cells up to 650 μm long and up to 30 μm wide; pileipellis a thin cutis made up of 4–8 μm wide, cylindrical hyphae with pale diffusely intracellular pigment; pileitrama regular with cells up to 500 μm long and up to 32 μm wide. Clamp-connections abundant in hymenium.

HABITAT & DISTRIBUTION.—In poor grassland with much moss, grazed by sheep. Known only from the type locality in the province of Drenthe in the Netherlands.

Entoloma subsection **Infularia** (Romagn.) ex Noordeloos *emend.*

Rhodophyllus sect. *Infularii* Romagn. *in* Bull. Soc. mycol. Fr. **53**: 332. 1937 (nom. nud.).

Lamellis albidis demum roseis; stipite polito; sporis 5–6-angulatis cum structura nominatur 'dihedral base'. — Typus: *Entoloma infula* (Fr.) Noordeloos.

Lamellae white, then salmon pink without any grey or brown tinge; spores heterodiametrical, 5–6-angled in side-view, with distinctly dihedral base. — Type: *Entoloma infula* (Fr.) Noordeloos.

The original concept of sect. *Infularia* is emended by restricting it to the species in sect. *Endochromonema* with lamellae first white, then pink without any brown or grey tinge, with a polished stipe, and with heterodiametrical spores with a dihedral base.

KEY TO THE SPECIES OF SUBSECTION INFULARIA

1a. Pigment distinctly membranal-encrusting in hyphae of pileipellis and (particularly) of pileitrama, sometimes also diffusely intracellular . . . . . *E. infula*, p. 503
b. Pigment exclusively intracellular 2
2a. Stipe yellow; spores 9.3–11(–11.5) × 7–8.1 μm. . . . . *E. verecundum*, p. 507
b. Stipe brown; spores 7.5–9.3 × 5.4–7 μm 3
3a. Stipe grey-brown to blackish brown; smell absent. . . . . *E. solstitiale*, p. 505
b. Stipe yellowish brown to reddish brown; smell strong, like chlorine . . . *E. chlorinosum*, p. 507

42. **Entoloma infula** (Fr.) Noordeloos, *comb. nov.*—Figs. 37a–b

Agaricus infula Fr., Spicilegium: 8. 1836. — *Nolanea infula* (Fr.) Gill., Hymen. Fr.: 421. 1876. — *Rhodophyllus infula* (Fr.) Quél., Enchir.: 64. 1886.

SELECTED ICONES.—Arnolds & Noordeloos *in* Fung. rar. Icon. col. **12**: pl. 90 figs. a, d. 1980. — Ricken, Blätterpilze, pl. 74 fig. 9. 1913.

CHARACTERISTICS.—Pileus and stipe moderately dark ochraceous brown or greyish brown; stipe smooth; minutely encrusting pigment, sometimes combined with diffusely intracellular pigment.

Pileus 10–43 mm broad, at first conical, then conico-campanulate, later expanding to convex, finally plano-convex or more or less concave with strongly undulating margin, usually with

pronounced papilla, hygrophanous, when moist ochraceous- or greyish brown to sepia (Meth. 6D6, 6C5 to 6C6 or 6E6), translucently striate at least up to one half of the radius, on drying pallescent to ochre-grey (Meth. 5C5/C4), glabrous, smooth or minutely radially wrinkled ('chagriné'); shining. Lamellae L = 18–29, l = (1–)3(–7), crowded, narrowly adnate to free, ventricose, white, then salmon pink without any trace of grey or brown, with entire, concolorous edge. Stipe 17–78 × 1.5–3 mm, cylindrical, sometimes slightly broadened at base, concolorous with or slightly paler than pileus (Meth. 6C3, 6C5, 6D5, 6D4/C4), pruinose at apex, glabrous, polished or innately fibrillous downwards, not striate, white tomentose at base. Flesh membranaceous, usually rather firm, concolorous with surface or inner part paler. Smell absent or faint. Taste inconspicuous, mild.

Spores 7–9.3(–10) × 5.8–7 μm, Q = 1.15–1.3–1.4(–1.5), L–D = (0.6–)1.0–1.7–2.4 μm, (4–)5–6(–7)-angled in side-view, with dihedral base. Basidia 26–39 × 7.5–14 μm, 4-spored. Cystidia absent. Hymenophoral trama regular, cells cylindrical or slightly inflated, 220–520 × 5.6–20(–32) μm, with hyaline, colourless walls. Pileipellis a cutis made up of (2.7–)4.0–11 μm wide cylindrical hyphae with (minutely) encrusted walls and sometimes in addition diffusely intracellular pigment, with some scattered inflated terminal cells up to 17 μm wide. Subpellis sometimes more or less distinct, composed of cylindrical to inflated cells 32–89 × 12–17 μm, gradually passing into trama. Pileitrama regular with up to 250 μm long and 7–19(–23) μm wide cells with encrusted walls particularly in upper zones. Clamp-connections frequent in hymenium, rare elsewhere.

HABITAT & DISTRIBUTION.—In grasslands; rare, known to occur in Sweden, the Netherlands and France; probably widespread (lit.).

COLLECTIONS EXAMINED.—NETHERLANDS: prov. Drenthe, Vries, Taarlose Diep, 13 Oct. 1975, *E. Arnolds 3443* (WBS); Westerbork, CRM-reserve 'de Reitsma', 13 Oct. 1976, *E. Arnolds* (WBS); prov. Limburg, Canne, Cannerberg, 30 Oct. 1978, *E. Arnolds 4141* (WBS).

SWEDEN, Småland, Femsjö, S. of Källebo, 22 Sept. 1949, *S. Lundell & J. Stordahl* (Fungi exsicc. suec. 2013, PC; neotype, design. mihi). — FRANCE, dept. Oise, Chantilly, 28 Aug. 1951, *H. Romagnesi 51.210* (Herb. Romagn., PC).

OBSERVATIONS ON THE NEOTYPE.—Spores (7.6–)8.1–9.3(—10) μm, Q = 1.3–1.35–1.5, L–D = 1.7–2–2.7(–3) μm, 5–6-angled in side-view, with dihedral base. Basidia 25–36 × 8–11.5 μm, 4-spored. Cystidia absent. Hymenophoral trama with cylindrical to inflated cells up to at least 250 μm long and 7–15(–19) μm wide. Pileipellis a cutis made up of 3.5–6(–8) μm wide cylindrical hyphae with uniformly coloured, sometimes minutely encrusted walls. Subpellis more or less differentiated, composed of short cells 27–50 × 8–17 μm with brown encrusted walls. Pileitrama regular, composed of cells much longer and more cylindrical, 85–320 × 7–21 μm. Clamp-connections frequent in hymenium, rare in other tissues.

The macroscopical characters as indicated by Lundell agree in a satisfactory way with Fries's diagnosis and with my own observations. As the collection of Lundell & Stordahl was made at what may be considered the type locality, I selected this collection for neotype. Another collection in the exsiccatae series of Lundell & Nannfeldt, viz. no. 1133, studied by me, appeared to be quite close to *E. solstitiale* in my concept, as it showed intracellular pigment and similar spores. Unfortunately, detailed macroscopical characters on this collection are lacking. It is said to resemble the picture of J. Lange (1936, pl. 79G).

Leptonia pilatii Svrček is very likely a synonym of *Entoloma infula*. The macroscopical characters are similar. The dimensions of the spores as given by Svrček are slightly too great, probably because of including the measurements of the apiculus. I measured 7.0–9.3 × 5.8–7.2 μm (see Fig. 37a). Svrček placed the species in *Leptonia* on account of the (classical Friesian) characters as involute margin of pileus and rigid, polished stipe. I consider these characters subordinate to characters such as pigmentation, size and shape of tramal elements, and clamped

basidia. Concerning the latter characters *L. pilatii* is a typical *Nolanea*. The colour of pileus and stipe of *L. pilatii* is said to be 'rubro-fusco', which may range within the variation of *E. infula*.

Entoloma infula appears to be rather rare in the Netherlands, and probably outside this area as well. It seems to be restricted to a type of grassland of which, due to artificial fertilization, little is left. It may be confused with other species in subgenus *Nolanea* with pale lamellae, such as *E. minutum* and members of sect. *Fernandae*. The former differs by the pale carpophores and different size and shape of the spores. The latter have, among other things, quite an other type of pileipellis and pigmentation, though the spores are very similar.

43. **Entoloma solstitiale** (Fr.) Noordeloos, *comb. nov.*—Figs. 38a–b

Agaricus solstitialis Fr., Epicr.: 152. 1838. — *Leptonia solstitialis* (Fr.) Gill., Hymen. Fr.: 416. 1876. — *Rhodophyllus solstitialis* (Fr.) Quél., Enchir.: 60. 1886. — *Nolanea solstitialis* (Fr.) P. D. Orton *in* Trans. Br. mycol. Soc. **43**: 179. 1960.

EXCLUDED NAME.—*Leptonia solstitialis* sensu Ricken 1913 (? = *E. rhombisporum*).

SELECTED ICON.—Arnolds & Noordeloos *in* Fung. rar. Icon. col. **12**: pl. 90 fig. c. 1980.

CHARACTERISTICS.—Pileus acutely conical, only slightly expanding, brown; lamellae white, then pink; stipe rigid, polished, with grey tinge; pigment intracellular.

Pileus 10–24 mm broad, (acutely) conical, only slightly expanding, with small, often abrupt papilla, with margin first involute but later more straight, hygrophanous, when moist moderately dark brown, sometimes more ochraceous tinged (Meth. 6D6 to 6E6; 10 YR 5/4, 5/6, at centre towards 10 YR 3/4), slightly paler at margin, translucently striate up to three fourths of the radius, on drying pallescent to greyish brown or greyish yellow (Meth. 6D5; 10 YR 7/3 or 2.5 Y 7/2[8/2]), strongly radially fibrillous-canescent with some aeriferous fibrils, shining. Lamellae L = 30–35, l = (1–)3–9, fairly crowded, deeply emarginate to almost free, ventricose, first pale, then salmon pink without any grey or brown (Meth. 6B5, 7B5; 7.5 YR 8/4, 7/4), with entire, concolorous edge. Stipe 27–60 × 1–2 mm, slender, cylindrical, sometimes slightly broadened at base, solid, then narrowly fistulose, greyish or blackish brown — distinctly more grey than pileus — (Meth. 6E4; 10 YR 2/2, 3/2), paler at apex, glabrous, polished or with some innate fibrils, not striate, white tomentose at base. Flesh firm-subcartilagineous, concolorous with surface, in inner parts paler. Smell and taste mild, indistinct.

Spores 7.5–9.3 × (5.2–)5.4–7 μm, Q = (1.0–)1.2–1.35–1.6, L–D = (0–)1–2–3.5 μm, (4–)5–6-angled in side-view, with very distinctly dihedral base. Basidia 26–34(–35) × (6.2–)6.6–12 μm, 4-spored. Cystidia absent. Hymenophoral trama regular with cylindrical to inflated cells 90–220 × 7–15 μm. Pileipellis a cutis made up of cylindrical to slightly inflated hyphae 3–9.5 μm wide, with hardly any pigment. Subpellis only weakly developed, with cylindrical to inflated cells 27–72 × 6.5–15(–19) μm, with brown intracellular pigment. Pileitrama regular with cylindrical or more or less inflated hyphae composed of relatively short cells 75–190(–230) × 6–17 μm, with intracellular pigment in upper layers. Clamp-connections only seen in hymenium.

HABITAT & DISTRIBUTION.—In grasslands; rare. Recorded from the Netherlands, Sweden, Great Britain, and France.

COLLECTIONS EXAMINED.—NETHERLANDS: prov. Overijssel, Diepenveen, Hengforder waarden, 12 Nov. 1977, *H. Piepenbroek & G. Piepenbroek-Grooters 1068;* prov. Gelderland, Voorst, on dike 500 m S. of Wilp, 6 Oct. 1975, *E. Arnolds 3425* (WBS).

FRANCE, dept. Oise, Coye-la-Forêt, 27 Aug. 1945, *H. Romagnesi 208* (Herb. Romagn., PC).

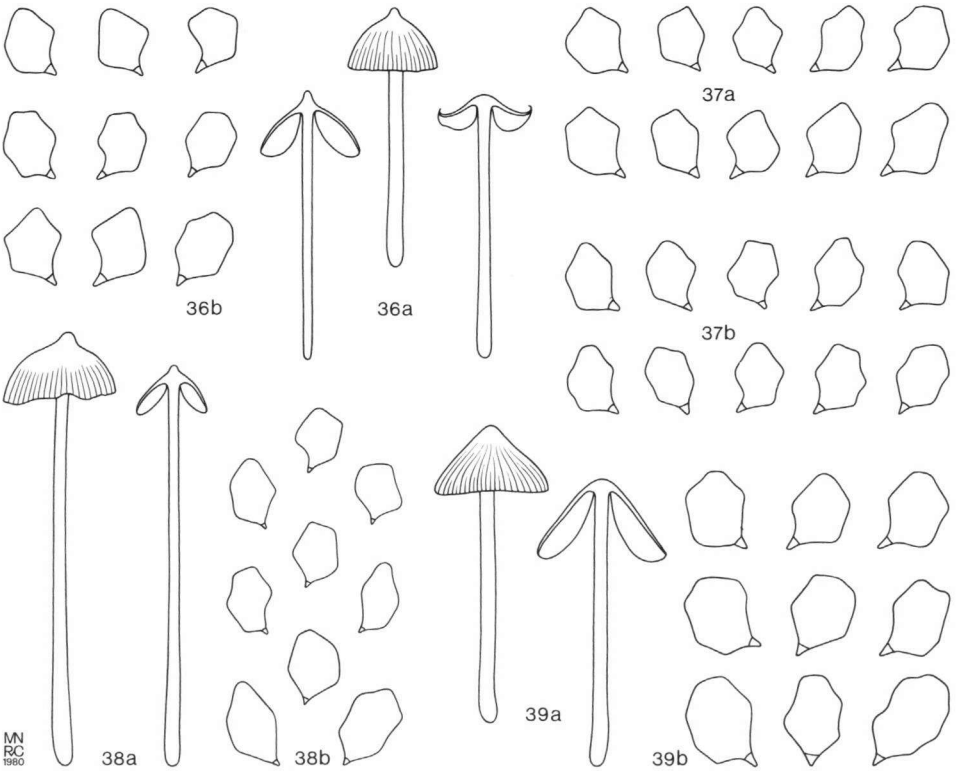


Fig. 36–b. *Entoloma chlorinosum*. — Habit and spores (36a–b from *Noordeloos 815*).
Figs. 37a–b. *Entoloma infula*. — Spores (37a from type of *Leptonia pilatii*; 37b from neotype).
Figs. 38a–b. *Entoloma solstitiale*. — Habit and spores (38a–b from *Piepenbroek 1068*).
Figs. 39a–b. *Entoloma verecundum*. — Habit and spores (39a–b from *Noordeloos 844*).

In *Entoloma solstitiale* the spore shape is slightly more variable than in *E. infula*. A certain amount of spores (which remains small, however, and may lack in some carpophores) appears to be more or less rhomboid or 4-angled in side-view, whereas the majority of the spores is 5–6-angled. These spores most probably led Kühn. & Romagn. (1953: 189) and Orton & al. (1960: 127) to identify the species with Ricken's plate of *Leptonia solstitialis* (1913, pl. 73 fig. 3). This plate, however, does not agree in a satisfactory way with Fries's diagnosis, particularly by the colours of pileus and stipe. Ricken's fungus is far more likely to be identical with *E. rhombisporum* (see p. 450).

The fungus as described above may be the same as the original *Agaricus solstitialis* Fr. But I never found the pileus to be slightly depressed as mentioned by Fries (e.g. in Kalchbrenner 1873, pl. 12 fig. 3). According to Fries there is always a papilla, even in the depression of the pileus. In other macroscopical characters my fungus is quite similar to that of Fries. For the same reasons as described above for *Leptonia pilatii*, Fries and many of his followers placed *A. solstitialis* in the (sub-) genus *Leptonia*.

Entoloma solstitiale is distinguished from *E. chlorinosum* by the different colours of pileus and stipe and the lack of a smell. *Entoloma infula* differs among other things by the encrusting pigments.

44. ENTOLOMA CHLORINOSUM Arnolds & Noordeloos—Figs. 36a–b

Entoloma chlorinosum Arnolds & Noordeloos *in* Persoonia **10**: 287. 1979.
ICON AND DESCRIPTION.—Arnolds & Noordeloos *in* Fung. rar. Icon. col. **12**: pl. 90 fig. b. 1980.

CHARACTERISTICS.—Pileus small, acutely conical or hemispherical, with papilla, yellowish brown or reddish brown; lamellae white, then pink; stipe 28–40 × 0.6–1.3 mm, concolorous with pileus, rigid, polished; smell strong, like chlorine; pigment intracellular.

Pileus 7–14 mm broad, acutely conical or hemispherical, with small, abrupt papilla, expanding to conico-campanulate, finally convex with small conical papilla, with margin straight but reflexed with age, hygrophanous, when moist (dark) yellowish brown or reddish brown (Meth. 5C7; 10 YR 3/3, 4/3, 4/4), slightly paler towards margin, translucently striate up to three fourths of the radius, on drying pallescent to pale yellowish brown (Meth. 5B5; 10 YR 5/4, 6/4), shining, sometimes with aeriferous fibrils, slightly fluffy particularly at centre. Lamellae L = 12–24, l = 0–1(–3), moderately distant, almost free, thin, broadly ventricose, white, then salmon (7.5 YR 7/4, becoming 6/4 with age), with entire concolorous edge. Stipe 28–40 × 0.6–1.3 mm, cylindrical, pale to moderately dark yellowish brown (Meth. 5B5, 5D5; 10 YR 4/3, 4/4), glabrous, smooth as if polished, white tomentose at base. Flesh thin, membranaceous-brittle in pileus, firm, rigid in stipe, concolorous with surface. Smell strong, like chlorine. Taste mild or somewhat soapy, not farinaceous.

Spores (6.8–)7.4–9.0 × (5.1–)5.2–6.8 μm, Q = 1.2–1.3–1.5, L–D = 1–2.5–3.6 μm, 5–6(–7)-angled in side-view, with distinctly dihedral base. Basidia 24–35 × 7.5–10 μm, 4-spored. Cystidia absent. Hymenophoral trama regular, with cylindrical to inflated cells 100–200 × (5–)8–15 μm. Pileipellis a simple cutis made up of repent 2–8 μm wide, cylindrical hyphae. Pileitrama regular, hyphae cylindrical with cells up to 260 μm long and up to 21 μm wide, with abundant intracellular pigment in upper layer. Clamp-connections abundant in hymenium, rare in other tissues.

HABITAT & distribution.—In grasslands; rare. The Netherlands.

COLLECTIONS EXAMINED.—Netherlands: prov. Groningen, Vlagtwedde, reserve 'Metbroek', 29 Oct. 1978. *M. E. Noordeloos 815;* prov. Drenthe, Anloo, Burgwallen, N. of Nieuwlanden, 24 Sept. 1974, *E. Arnolds 3168* (holotype, L; isotype, WBS).

Entoloma chlorinosum is closely related to *E. solstitiale* from which it differs by the colour of the stipe and the strong smell. It can easily be distinguished from other *Entoloma* species with similar smell (viz. *E. nidorosum*, '*Leptonia*' *pernitrosa* Orton, '*Rhodophyllus*' *nitriolens* Kühn.) by the nolaneoid habit, the size and the shape of the spores and of the tramal elements. Those species all belong to the subgenus *Entoloma* and will be treated in a future paper (Noordeloos, 1980a; in prep.).

45. **Entoloma verecundum** (Fr.) Noordeloos, *comb. nov.*—Figs. 39a–b

Agaricus rubellus Scop. subsp. *verecundus* Fr., Spicilegium: 6. 1836. — *Agaricus verecundus* (Fr.) Fr., Epicr.: 158. 1838. — *Nolanea verecunda* (Fr.) Gill., Hymen. Fr.: 422. 1876. — *Rhodophyllus verecundus* (Fr.) Quél., Enchir.: 64. 1886.

CHARACTERISTICS.—Pileus conical to conico-campanulate, pinkish brown, translucently striate up to centre; lamellae white, then pink; stipe yellowish, rigid, polished; pigment intracellular.

Pileus 17–22 mm broad, conical, then expanding to conico-campanulate, with straight margin, hygrophanous, pinkish brown (7.5 YR 5/4 at centre, towards margin 7.5 YR 6/4, 7/4), translucently striate up to centre, on drying strongly pallescent to ochraceous-pink, smooth, glabrous, shining. Lamellae L = 25, l = (1–)3(–5), almost free, ventricose, white, then pink (7.5 YR 7/2), with entire concolorous edge. Stipe 25–30 × 1.5–2 mm, cylindrical, straight, yellow (2.5 Y 7/4), smooth, polished, rigid. Flesh thin-membranaceous, rigid. Smell absent. Taste not tried.

Spores 9.3–11(–11.5) × 7.0–8.1 μm, Q = 1.1–1.3–1.5, L–D = 1.2–3.5 μm, 5–6–7-angled in side-view, with dihedral base. Badidia 28–35 × 11–14 μm, 4-spored. Cystidia absent. Hymenophoral trama regular with slightly inflated cells at least up to 240 μm long and 7–18 μm wide. Pileipellis a cutis made up of repent, cylindrical, 2.5–11 μm wide hyphae with some clavate terminal cells up to 16 μm wide, with pale, diffusely intracellular pigment, gradually passing into trama. Pileitrama regular with cells similar to those in hymenophoral trama. Clamp-connections abundant in hymenium, not seen in other issues.

HABITAT & DISTRIBUTION.—In extensively grazed dune meadow with *Salix reprens*; known from one locality in the Netherlands.

COLLECTION EXAMINED.—NETHERLANDS, prov. Friesland, Isl. of Terschelling, Oosterend, Dazenplak, 3 Nov. 1978, *M. E. Noordeloos 844*.

Entoloma verecundum with its remarkably pinkish brown pileus and yellowish stipe has disappeared from mycological literature since the beginning of this century. The plates of Fries (1874, pl. 99 fig. 5) and Cooke (1886, pl. 340 fig. a) are representative for my collection and made me identify it as *E. verecundum*. Konrad & Maublanc (1930: pl. 179) and Ricken (1913: 297) consider *E. verecundum* a synonym of *Rhodophyllus icterinus* and *Nolanea pleopodia* respectively, two taxa considered conspecific by me (see p. 516). *Entoloma verecundum* is distinguished from *E. icterinum* by the differently coloured pileus and slightly different spores. Other species of *Entoloma* with a yellow stipe, viz. *E. vinaceum* var. *vinaceum* and *E. xanthocaulon*, differ by smaller spores and an other type of pigmentation respectively.

Entoloma subsection **Tristia** Noordeloos, *subsect. nov.*

Pileo atrobrunneo; stipite polito; sporis irregulariter noduloso-angulatis; fibulis nullis. — Typus: *Entoloma triste* (Velen.) Noordeloos.

Pileus blackish brown; stipe smooth and glabrous; spores irregularly angular-gibbose in side-view; clamp-connections present. — Holotype: *Entoloma triste* (Velen.) Noordeloos.

KEY TO THE SPECIES OF SUBSECTION TRISTIA

1a. Spores 10.4–12(–14) × (7.0–)7.6–8.7(–9.0) μm. . . . . *E. triste*, p. 509
b. Spores (7.7–)7.9–10.8(–12) × (5.7–)6.0–6.8(–7.5) μm. . . . . *E. undulatosporum*, p. 509

46. ENTOLOMA TRISTE (Velen.) Noordeloos

Nolanea tristis Velen., České Houby: 630. 1921. — *Entoloma triste* (Velen.) Noordeloos *in* Persoonia **10**: 254. 1979.[5]

CHARACTERISTICS.—Pileus rather dark blackish brown; stipe paler; spores on the average 7.6–8.7 μm wide.

Pileus 10–20 mm broad, conical, finally expanding to convex, with umbo, hygrophanous, when moist blackish brown, not striate or only very obscurely striate at margin only, on drying pallescent, radially fibrillous, shining. Lamellae distant, greyish-ochraceous (with pink tinge?). Stipe 20 × 1.5 mm, horn brown at apex, darker towards base, paler than pileus, white tomentose at base. Smell absent.

Spores 10.4–12.0(–14.0) × (7.0–)7.6–8.7(–9.0) μm, Q = 1.2–1.35–1.5(–1.6), L–D = 1.7–2.6–3.4 μm, 6–8-angled in side view, with dihedral base. Basidia 27–38 × 12.5–14.5 μm, 4-spored. Hymenophoral trama regular; cells cylindrical to strongly inflated, up to 250 μm long and 10–23 μm wide. Pileipellis a cutis made up of 4–10 μm wide cylindrical hyphae, sometimes with clavate terminal cells up to 15 μm wide, with abundant intracellular pigment. Clamp-connections frequent in hymenium.

HABITAT & DISTRIBUTION.—The Netherlands' collection was made in a dried up fen, growing on dead *Sphagnum* in *Calluma* heath on acid, sandy soil. The type collection came from a grassy clearing in a coniferous forest. Rare; known only from the type locality in Czechoslovakia and one locality in the Netherlands.

COLLECTIONS EXAMINED.—NETHERLANDS, prov. Noord-Brabant, Nieuw Ginneken, Strijbeekse heide, 27 July 1960, *P. B. Jansen*.

CZECHOSLOVAKIA, Bohemia, Krč, May 1920, *J. Velenovský* (holotype, PRC).

The description given above is based on the Netherlands' collection. Unfortunately some important macroscopical notes are lacking, such as the colour of the lamellae and the aspect of the stipe-surface. The rest of the macroscopy and the microscopical characters lead me to consider this collection, made by the eminent amateur mycologist P. B. Jansen of Breda, conspecific with *Entoloma triste* (Velen.) Noordeloos.

The broad spores differentiate this species from *E. undulatosporum*. Both species are to be placed in sect. *Endochromonema* on account of their pigmentation pattern. The characteristic shape of the spores and the fairly dark colour of the pileus made me place them in a new subsection.

47. ENTOLOMA UNDULATOSPORUM Arnolds & Noordeloos

Entoloma undulatosporum Arnolds & Noordeloos *in* Persoonia **10**: 295–296, figs. 27–29. 1979.

CHARACTERISTICS.—Pileus 15–23 mm broad, convex, then flattened, not papillate, rather dark blackish brown, striate at margin only, on drying slightly pallescent, minutely radially rugulose. Lamellae moderately distant, grey-brown, then flesh-coloured grey. Stipe up to 27 × 1.8–2.8 mm,

[5] In combination with *Entoloma* the correct spelling of the epithet is '*triste*', and not '*tristis*'.

paler and more brown than pileus. Smell and taste farinaceous. Spores (7.7–)7.9–10.8(–12.0) × (5.7–)6.0–6.8(–7.5) µm, irregularly 6–9-angled-nodulose in side-view. Pileipellis a cutis made up of 3.8–15 µm wide cylindrical hyphae with abundant intracellular pigment. Clamp-connections frequent in hymenium.

HABITAT & DISTRIBUTION.—In poor non-fertilized meadow (*Lolio-Cynosuretum*) on dry, humus-rich sandy soil. Known only from type locality.

The narrow, slightly more irregularly angular spores and perhaps also the farinaceous smell and the habitat distinguish *E. undulatosporum* from *E. triste*.

Entoloma subsection **Cheilocystidiata** Noordeloos, *subsect. nov.*

Cheilocystidia adsunt, variabilibus; pigmentis intracellulosis. — Typus: *Entoloma velenovskyi* Noordeloos.

Cheilocystidia present, variable in shape; pigment intracellular. — Type: *Entoloma velenovskyi* Noordeloos.

KEY TO THE SPECIES OF SUBSECTION CHEILOCYSTIDIATA

1a. Cheilo- and pleurocystidia present, globuliform or sphaeropedunculate; clamp-connections absent. *E. globulifer*, p. 513
b. Cheilocystidia different; pleurocystidia absent; clampconnections present. 2
2a. Cheilocystidia in majority distinctly lecithiform with abrupt capitulum; lamellae very dark brown. *E. inutile*, p. 512
b. Cheilocystidia different; if (sub-)capitate, then lamellae never very dark brown. 3
3a. Cheilocystidia cylindrical, sometimes subcapitate, (8.1–)15–38(–42) µm long *E. cryptocystidiatum*, p. 511
b. Cheilocystidia fusiform-lageniform, usually much longer than 40 µm 4
4a. Spores (10–)10.4–12.0 µm long; cheilocystidia 42–90(–120) × 7–14(–20) µm *E. velenovskyi* var. *velenovskyi*, p. 510
b. Spores (10.1–)11–15.9(–16.3) µm long; cheilocystidia (50–)70–149 × (6.2–)7.4–15.9 µm *E. velenovskyi* var. *longicystidiatum*, p. 511

48. ENTOLOMA VELENOVSKYI Noordeloos var. VELENOVSKYI Figs. 41a–c

Nolanea conica Velen., České Houby: 623. 1921 (non *Entoloma conicum* (Peck 1872) Hesler 1967). — *Entoloma velenovskyi* Noordeloos *in* Persoonia **10**: 258–259. 1979 (change of name).

CHARACTERISTICS.—Pileus conical, only slightly expanding, with acute papilla, moderately dark grey-brown; stipe concolorous or slightly paler, smooth; spores 10–12.5 µm long; cheilocystidia lageniform, 42–90(–120) µm long.

Pileus 25 mm broad, conico-convex with acute papilla, with margin slightly involute, then straight, hygrophanous, when moist clay buff (7.5 YR 6/2, 5/2), translucently striate, on drying pallescent, silvery fibrillous, shining. Lamellae moderately distant, almost free, ventricose, clay pink (5 YR 7/3, 6/3). Stipe 60 × 3 mm, cylindrical, straight, buff, smooth, glabrous, white tomentose at base. Smell absent.

Spores (10–)10.4–12.0(–12.7) × 7.6–8.7(–9.3) µm, Q = 1.2–1.3–1.4(–1.5), L-D = 1.7–2.4–4.0 µm, 5–6–7-angled in side-view, probably with dihedral base. Basidia 34–42 × 10.5–12.7 µm, 4-

(rarely 2-)spored. Cheilocystidia 42–93(–120) × 7–14 μm, fusiform-lageniform, scattered among basidia. Hymenophoral trama regular, with elements 230–300 × 11–27 μm. Pileipellis a cutis made up of radially arranged, 4–10 μm wide, cylindrical hyphae with diffusely intracellular pigment. Pileitrama regular, composed of cylindrical to slightly inflated cells 210–320 × 12–32 μm. Clamp-connections frequent in hymenium, rare in trama and covering layers.

HABITAT & DISTRIBUTION.—In grasslands, rare. Known from the type locality and from one locality in the Netherlands.

COLLECTIONS EXAMINED.—NETHERLANDS, prov. Noord-Brabant, Drunen, along Drongelen canal, 20 Aug. 1972, *P. B. Jansen 72–226*.

CZECHOSLOVAKIA, Bohemia, Prague, Mnichovice, July 1919, *J. Velenovský* (lectotype, PRC).

Entoloma velenovskyi is fairly well characterized by the long attenuate cheilocystidia and the intracellular pigment.

49. ENTOLOMA VELENOVSKYI Noordeloos var. LONGICYSTIDIATUM Arnolds & Noordeloos

Entoloma velenovskyi Noordeloos var. *longicystidiatum* Arnolds & Noordeloos *in* Persoonia **10**: 296–298, figs. 30–33. 1979.

CHARACTERISTICS.—Differs from the type variety by the large, more fusiform and slender cheilocystidia and by the larger spores. Known only from the type locality in the province of Drenthe in the Netherlands.

50. ENTOLOMA CRYPTOCYSTIDIATUM Arnolds & Noordeloos

Entoloma cryptocystidiatum Arnolds & Noordeloos *in* Persoonia **10**: 287–288. 1979.

CHARACTERISTICS.—Pileus 20–32 mm broad, conico-convex with slightly involute margin, strongly hygrophanous, pale grey-brown, strongly striate, pallescent on drying, smooth; lamellae crowded, free, ventricose, pale brown-grey; stipe 47–53 × 1.5–2.5 mm, pale grey-brown, silvery striate; smell and taste indistinct; spores (8.5–)8.7–10(–10.2) × (7.5–)7.7–8.3 μm; cheilocystidia (8–)15–38(–42) × 4.8–7.0(–7.6) μm, cylindrical, sometimes flexuous, often subcapitate, sometimes with thickened, refringent apex, scattered among basidia, not protruding from hymenium; pileipellis a cutis made up of cylindrical, repent, 3.3–5.8 μm wide hyphae with pale diffusely intracellular pigment; clamp-connections frequent in hymenium.

HABITAT & DISTRIBUTION.—In non-manured hayfield (*Calthion palustris*) on rather eutrophic wet peaty soil. Known only from the type locality in the province of Drenthe, Netherlands.

COLLECTIONS EXAMINED.—NETHERLANDS, prov. Drenthe, Vries, Taarlo, Taarlose Diep, 3 Sept 1975, *E. Arnolds 3408* (holotype WBS, isotype L).

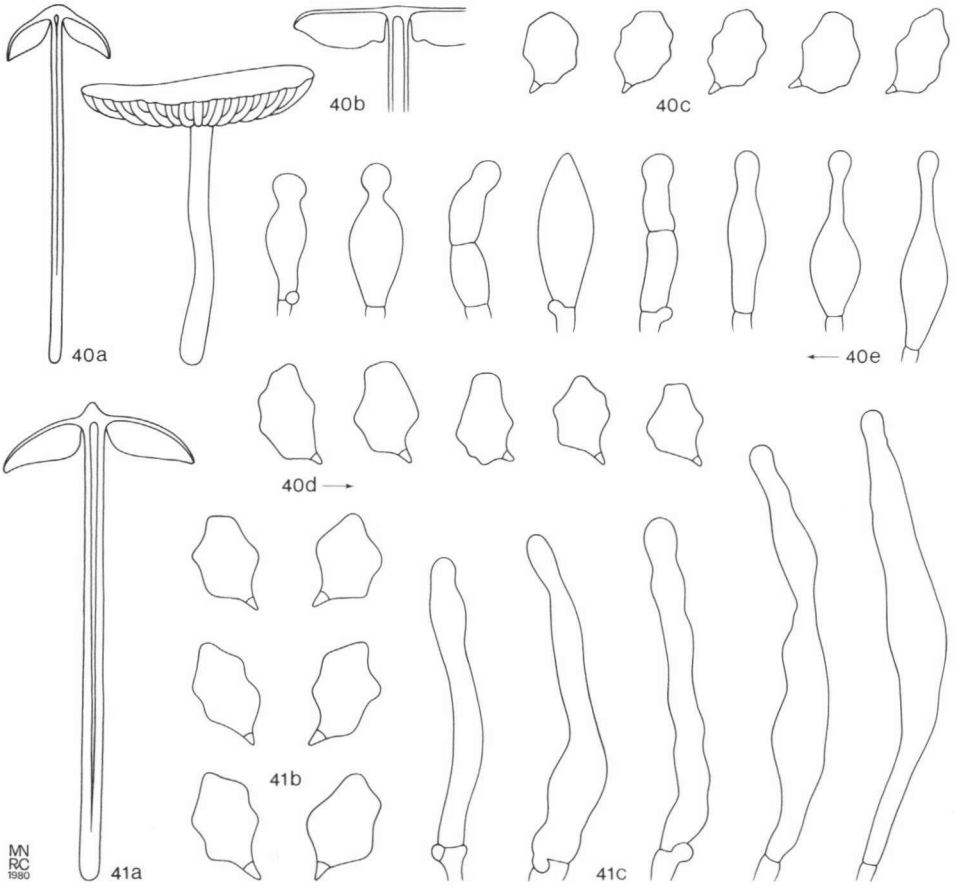
Entoloma cryptocystidiatum has been placed in subsect. *Cheilocystidiata* on account of the intracellular pigment and the dihedral base of the spores. It is better placed here than in sect. *Paramammosi* Romagn. as that section unites the species with cheilocystidia that are not cylindrical-subcapitate, spores with basal facet, and clampless basidia. *Entoloma hirtipes* and varieties differ among other things by the presence of two types of pigment and by differently shaped spores.

51. **Entoloma inutile** (Britz.) Noordeloos, *comb. nov.*—Figs. 40a–e

Agaricus inutilis Britz. *in* Ber. naturhist. Ver. Augsburg **30**: 16. 1890. — *Nolanea inutilis* (Britz.) Sacc. & Trav., Syll. Fung. **20**: 199. 1911. — *Rhodophyllus inutilis* (Britz.) Romagn. *in* Rev. Mycol. **1**: 160. 1937.

SELECTED ICONES AND DESCRIPTION.—Arnolds & Noordeloos *in* Fung. rar. Icon. col. **12**, pl. 93 fig. e. 1980. — Romagn. *in* Rev. Mycol. **1**: 160, pl. 12 fig. 2. 1937.

CHARACTERISTICS.—Pileus blackish brown; lamellae dark brown with pink tinge; stipe silvery striate; cheilocystidia numerous, lecithiform.



Figs. 40a–e. *Entoloma inutile*. — Habit, spores and cheilocystidia (40a, 40d–e from *Kits van Waveren, 26 Nov. 1966;* 40b–c from *Kramer, 3 Oct. 1968*).

Figs. 41a–c. *Entoloma velenovskyi* var. *velenovskyi*. — Habit, spores and cheilocystidia (41a–c from *Jansen 72-226*).

Pileus 12–30 mm broad, convex, then flattened with or without weak umbo or slightly depressed, with margin straight but often undulating with age, hygrophanous, when moist blackish brown (Meth. 6F6), slightly paler towards margin (Meth. 6E6), translucently striate up to two thirds of the radius, on drying pallescent, smooth or at centre slightly rugulose, shining. Lamellae crowded, L = 28–32, l = 1–3, almost free or narrowly adnate, ventricose, up to 5 mm broad, dark brown with pink shade (5 YR 5/4; Meth. 7D4/E4), with serrulate, concolorous or slightly paler edge. Stipe 25–40 × 2.5–4 mm, straight, pale to moderately dark brown, moderately to strongly striate with silvery fibrils, pruinose at apex, solid, then fistulose. Flesh in pileus concolorous with surface, in stipe paler, brittle. Smell and taste indistinct.

Spores (8.7–)9.3–11.5(–12.0) × 7–8.1 μm, Q = (1.15–)1.3–1.4–1.5, L–D = 1.7–3.5–5 μm, pronouncedly nodulose-angular in side-view, with dihedral base. Basidia 24–32 × 9.5–11.5 μm, 4-spored. Cheilocystidia 25–52(–80) × 6–14.5(–17) × 2.5–7 μm, versiform, mostly lecithiform but also subcylindrical-subcapitate or even clavate with conical apex, numerous. Hymenophoral trama regular, composed of fusiform cells 220–350 × 7.5–15(–22) μm, with intracellular pigment. Pileipellis a simple cutis made up of cylindrical, 3.5–14 μm wide hyphae, at centre of pileus sometimes with cylindrical to clavate, up to 18 μm wide, repent or ascending terminal cells, with intracellular pigment. Pileitrama regular with cylindrical to inflated hyphae, composed of cells up to 370 μm long and 7.5–16(–22) μm wide, with intracellular pigment particularly in upper layer, and sometimes additional membranal pigments; encrustations never seen. Clamp-connections abundant in hymenium, also observed in covering layers.

HABITAT & DISTRIBUTION.—In the Netherlands found on *Calluna* heaths on poor, acid sandy soils and in coastal dunes in *Quercus* forest; rare. October–November.

COLLECTIONS EXAMINED.—NETHERLANDS: prov. Friesland, Appelscha, 3 Oct. 1968, *R. Kramer* (WBS); prov. Drenthe, Beilen, E. of Holthe, 13 Oct. 1976, *E. Arnolds 3644* (WBS); prov. Noord-Holland, near Heemstede, Leyduin, 12 Nov. 1966, *E. Kits van Waveren.*

Entoloma inutile has rather distinctive dark lamellae and lecithiform cheilocystidia. The latter character and the striate stipe make it easy to distinguish it from *E. clandestinum.* Its taxonomical situation seems to be somewhat isolated. Orton (1960: 229–230) suggested a relationship with *E. jubatum* and allied species, probably on account of the shape of the cheilocystidia. *Entoloma jubatum* and related species are placed by me in subgenus *Trichopilus* Romagn., characterized among other things by the non-hygrophanous, non-striate, fibrillous-subsquamulose pileus. The Netherlands' collections of *E. inutile*, however, have a distinctly hygrophanous striate pileus which is smooth or only slightly rugulose at centre. This character, together with the nolaneoid habit, almost free lamellae, and type of pigmentation, made me decide to place *E. inutile* in *Nolanea* subsect. *Cheilocystidiata.*

Rhodophyllus sect. *Paramammosi* Romagn. does not seem to be suited to accommodate *E. inutile*, as this section is characterized by the combination of non-capitate cheilocystidia and clampless basidia. The species in *Rhodophyllus* sect. *Lecithiphori* Romagn. have a totally different habit, typical of subgenus *Eccilia.*

52. **Entoloma globulifer** Noordeloos, *spec. nov.*—Figs. 42a–c

Pileus 17–45 mm latus, conicus vel conico-campanulatus demum explanatus, papillatus, hygrophanus, in udo sepiaceus, in sicco pallescens, glaber. Lamellae confertae, subliberae, ventricosae, pallide brunneae demum incarnatae-brunneae. Stipes 40–85 × 2.5–6 mm, cylindraceus vel compressus, solidus, firmus, pileo concolor, innato fibrilloso-striatus. Caro tenax. Odore saporeque farinaceis.

Sporae 9–11.5(–12,4) × 6.8–7.9 μm, Q = 1.3–1.4–1.6. Basidia 2- vel 4-sporigera. Cheilo- et pleurocystidia

17–40 × 12–24 μm, globuliformia vel sphaeropedunculata. Trama lamellarum e elementis subfusiformibus 80–270 × 10–17 μm constantes. Pileipellis cutis differentiata, hyphae cylindraceae, 2.5–6 μm latae cum cellulis terminalibus clavatis intermixtae. Pigmentis intracellulosis in pileipelle dispersis. Fibulae nullae.

HABITAT: In graminosis inter *Salicem repentem* in dunis. — Typus: *M. E. Noordeloos 811*, 18 X 1978, 'Prov. Zuid-Holland, Isl. Goeree, West-duinen', Netherlands.

CHARACTERISTICS.—Carpophores robust; pileus 17–45 mm broad, conical then expanding, very dark sepia, pallescent; lamellae pale brown with pink tinge; stipe 40–85 × 2.5–6 mm; sepia or horn-brown, silvery striate; smell farinaceous; spores 9.0–11.3(–12.4) × 6.8–7.9 μm; cheilo- and pleurocystidia present, subglobose; pigment intracellular; clamp-connections absent.

Pileus 17–45 mm broad, conical to conico-campanulate, expanding to convex, finally flattened with broad, obtuse umbo, with outermost margin involute, with marginal zone irregularly undulating with age, hygrophanous, very dark sepia brown when moist, translucently striate at margin, often obscurely so (10 YR 3/3, 4/3, between striae and at margin paler: 10 YR 5/4, rarely 6/4), drying pale brown (10 YR 6/3 to 7/3), brilliantly shining when moist, when dry innately radially satiny-fibrillous, in exposed pilei often radially splitting and pileitrama showing. Lamellae L = 40–50, l = 1–3, fairly crowded, almost free, ventricose, pale brown, then pink with brown tinge (10 YR 6/3, then 7.5 YR 6/4 to 5/4), with more or less serrulate edge, concolorous with or slightly paler than sides. Stipe 40–85 × 2.5–6 mm, cylindrical or flattened, with rounded only slightly swollen base, firm, solid, subfistulose with age, sepia or horn brown (10 YR 6/4, 5/4), sometimes slightly pruinose at apex, downwards glabrous, innately silvery striate lengthwise, with white tomentum at base. Flesh rather firm-subcartilagineous particularly in pileus, but thin, except under papilla in largest specimens. Smell farinaceous. Taste strong, rancid, very unpleasant.

Spores 9.0–11.3(–12.4) × 6.8–7.9 μm, Q = 1.3–1.4–1.6, L–D = 2.4–4.8 μm, rather irregularly asymmetrical in side-view, with 5–7 pronounced angles, with weakly to distinctly dihedral base. Basidia 28–44 × 10.5–14 μm, Q = 2.3–2.9–3.7, 2- and 4-spored. Cheilo- and pleurocystidia broadly globuliform to sphaeropedunculate, 17–40 × 12–24 μm, sometimes slightly thick-walled, hyaline, colourless, scattered in hymenium, particularly abundant near edge of older specimens. Hymenophoral trama regular, composed of subfusiform to cylindrical cells 80–270 × 10–17 μm, with hyaline, colourless walls. Pileipellis a differentiated cutis made up of 2.5–6 μm wide cylindrical hyphae, intermixed with more or less ascending up to 12 μm wide terminal cells of underlaying hyphae, with abundant, brown intracellular pigment. Pileitrama regular, composed of cylindrical cells 120–315 × 10–23 μm, with intracellular pigment most abundant in upper layers. Clamp-connections absent.

HABITAT.—In *Salix repens* dominated grassland in old dune area, with *E. papillatum*, *E. staurosporum*, *Hygrophorus* spp. div., *Dermocybe uliginosa*, etc. Known only from the type locality.

COLLECTION EXAMINED.—NETHERLANDS, prov. Zuid-Holland, Isl. of Goeree, Westduinen, 18 Oct 1978. *M. E. Noordeloos 811* (holotype, L).

The type of pigmentation and the shape of the spores place *Entoloma globulifer* in sect *Endochromonema*. The absence of clamp-connections suggests relationship with *E. cetratum*. The unique cystidia, however, make *E. globulifer* a species in its own right in a somewhat isolated position. *Entoloma sphaerocystis* differs by the slender habit, encrusting pigments and differently shaped spores.

Entoloma subsection **Icterina** Noordeloos, *subsect. nov.*

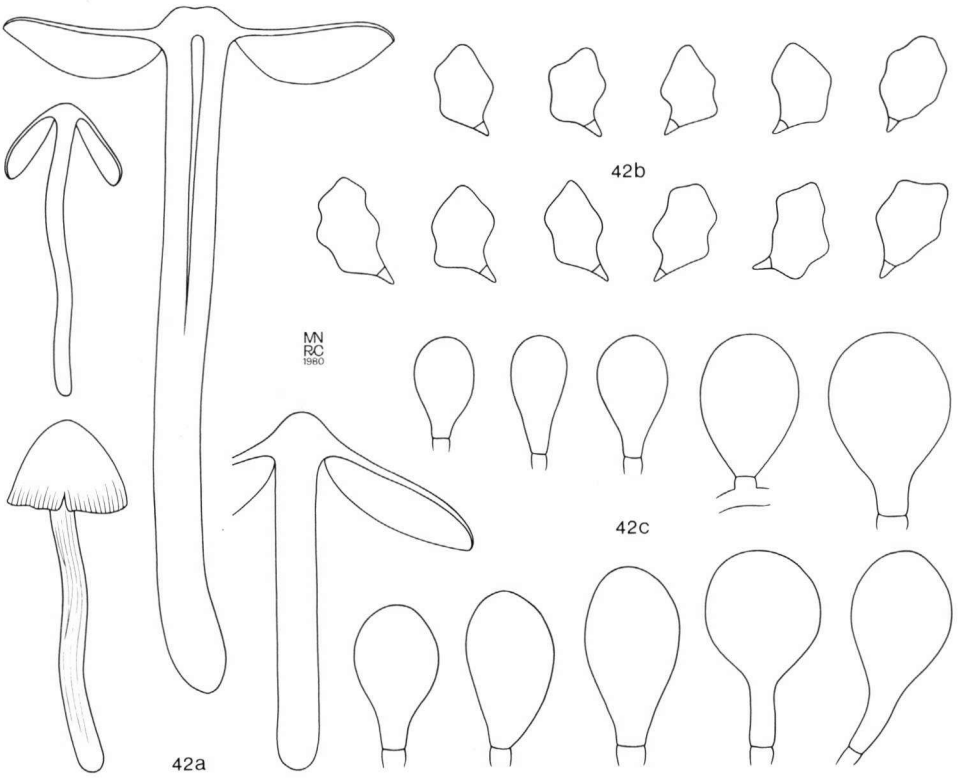
Nolanea sect. *Icterinae* Konr. & Maubl., Agaricales: 266. 1948 [not validly published; no Latin diagnosis].

Pileus tinctus luteolus vel olivaceus, statura variabilis, truncatus vel planus, subpapillatus vel subumbilicatus. Odor suavissimus frequens. — Typus: *Entoloma icterinum* (Fr.) Moser.

Pileus with yellow and/or olivaceous tinges, variable in shape: truncate-campanulate to flattened, subpapillate to subumbilicate; frequently with strong aromatic smell. — Type: *Entoloma icterinum* (Fr.) Moser.

KEY TO THE SPECIES OF SUBSECTION ICTERINA

1a. Pileus yellow, lemon yellow or olivaceous yellow, often with reddish brown flush at centre. . .
b. Pileus dark brown ('bistre') with olivaceous tinge (as in the pileus of *Naucoria centunculus*). *E. ambrosius*, p. 520
2a. Cheilocystidia scattered among basidia on edge of lamellae, long subylindrical-subcapitate to slenderly lageniform-tibiiform; lamellae pale green-olivaceous. . . . . *E. chlorophyllum*, p. 518
b. Cheilocystidia absent; lamellae white or pale yellow, then pink . . . . . *E. icterinum*, p. 516



Figs. 42a–c. *Entoloma globulifer*. — Habit, spores and cheilocystidia (42a–c from holotype).

53. ENTOLOMA ICTERINUM (Fr.) Moser—Figs. 44a–c

Agaricus icterinus Fr., Syst. mycol. 1: 207. 1821. — *Nolanea icterina* (Fr.) Kumm., Führ. Pilzk.: 95. 1871. — *Rhodophyllus icterinus* (Fr.) Quél., Enchir.: 64. 1886. — *Hyporrhodius icterinus* (Fr.) Schroet. *in* Cohn, KryptogFl. Schles. 3(1): 613. 1889. — *Entoloma icterinum* (Fr.) Moser *in* Gams, Kl. KryptogFl., 4. Aufl. 2(b/2): 205. 1978.

Rhodophyllus icterinus f. *gracillimus* J. Lange *in* Dansk bot. Ark. 2(11): 37. 1921.

Agaricus pleopodius Fr., Syst. mycol. 1: 207. 1821. — *Nolanea pleopodia* (Fr.) Gill., Hymen. Fr.: 420. 1876. — *Rhodophyllus pleopodius* (Fr.) Quél., Enchir.: 64. 1886.

SELECTED ICONES.—Fries. Icon. sel., pl. 99, fig. 4. 1874. — Ricken, Blätterpilze pl. 74, figs. 2, 5. 1913. — J. Lange, Fl. agar, dan. 2: pl. 78A. 1936. — Konr. & Maubl., Icon. sel. Fung., pl. 179 fig. 3. 1930.

CHARACTERISTICS.—Pileus with yellow and/or olivaceous tinge; stipe usually more reddish brown and contrasting with pileus; smell usually strong, aromatical.

Pileus 10–35 mm broad, campanulate or paraboloid, often truncate, then expanding to convex, finally flattened to concave, often with subumbilicate or subpapillate centre, with margin slightly involute or straight, rarely exceeding the lamellae, at marginal zone often slightly sulcate and/or undulating with age, hygrophanous, when moist pale to moderately dark yellow, olivaceous yellow or lemon yellow, at centre often darker and more brown-tinged, paler towards margin (5 Y 7/6, 6/6, 6/4; 2.5 Y 7/6, 6/6, 6/4, 5/4, at centre 5 Y 5/6, 10 YR 5/4, margin 2.5 Y 8/6), translucently striate up to one half of the radius, on drying pallescent to pale yellow or olivaceous yellow (5 Y 8/6, 8/4; Meth. 2A5/6), smooth when moist, on drying with radially arranged aeriferous fibrils, sometimes becoming subsquamulose at centre. Lamellae moderately distant, L = 20–30, l = 0–3, usually adnate or emarginate, sometimes broadly adnate with decurrent tooth, segmentiform, then ventricose, up to 6.5 mm broad, white, then pale yellow, finally pink, often with slight brown tinge when old (5 Y 8/2; 2.5 Y 8/6, 8/4; 10 YR 8/6, 8/4, then 7.5 YR 8/4, 7/6), with entire or subserrulate, concolorous edge. Stipe 20–80 × 2–4(–4.5) μm, cylindrical, often slightly broadened at base, straight or flexuous, pale yellowish or greyish brown at apex, downwards more flesh-coloured or pinkish brown, at base often with purplish tinge, more rarely entirely yellowish olivaceous and concolorous with pileus (10 YR 8/4, 8/6, 7/4, 7/6, base 7.5 YR 7/6, 6/6, 5/6, rarely 5 Y 6/4 to 2.5 Y 6/4), minutely pruinose to flocculose at apex, downwards smooth or minutely striate with scattered silvery white fibrils, (often abundantly) white tomentose at base. Flesh subcartilagineous or brittle, yellow-olivaceous in pileus, pale in centre of stipe. Smell strongly aromatical (like amylacetate, fruity, often compared with that of *Entoloma ameides*, *Hebeloma sacchariolens* or *Inocybe pyriodora*), rarely indistinct. Taste weak or nasty-unpleasant.

Spores (8.1–)8.7–11(–11.5) × (6.3–)7.0–8.1(–9.0) μm, Q = (1.15–)1.2–1.35–1.5, L–D = (1.4–)1.7–2.4–4 μm, 5–6-angled in side-view, with pronounced angles, with dihedral base. Basidia 32–52 × 9.5–16 μm, 2–4-spored. Cystidia absent. Hymenophoral trama regular with cylindrical to inflated cells 120–300 × 11.5–17(–21) μm, often with pale intracellular pigment. Pileipellis a cutis made up of radially arranged, 4–17 μm wide cylindrical hyphae with scattered clavate terminal cells 40–92 × 6–25 μm; subpellis with strongly inflated, up to 50 μm wide cells with intracellular pigment. Pileitrama regular with cylindrical to inflated hyphae with cells up to 320 μm long and 11–30 μm wide, often with pale yellowish walls and, particularly in upper layer, intracellular pigment. Clamp-connections abundant in hymenium, more rare and scattered in other tissues.

HABITAT & DISTRIBUTION.—Terrestrial, on rich humus, particularly at places with much nitrogen such as gardens, waste-places etc., often near *Urtica dioica*; common; recorded from Western Europe. July–November.

COLLECTIONS EXAMINED.—NETHERLANDS: prov. Drenthe, Beilen, in garden. Aug. 1977, *H. S. C. Huijsman;* prov. Overijssel: Hengelo, 24 Oct. 1956, *M. G. J. Meijer;* Delden, near Hotel Carelshaven, 12 Oct. 1975, *E. Kits van Waveren;* Twello, Noordijk, 13 Oct. 1957, *E. Kits van Waveren;* prov. Gelderland: Rheden, Nov. 1953, *Mrs. Schutte;* Valburg near Nijmegen, estate Oosterhout, 25 Sept. 1954, *C. Bas 644;* prov. Utrecht: Leusden, 16 Sept. 1978, *J. Wisman 60;* Amersfoort, estate 'de Treek', 11

Oct. 1958. *E. Kits van Waveren;* Breukelen, estate 'Over Holland', 28 July 1962, *E. Kits van Waveren;* prov. Noord-Holland, Vogelenzang, estate 'Vogelenzang', 11 Nov. 1953, *R. A. Maas Geesteranus 9533;* Castricum, 30 Sept. 1975, *E. Kits van Waveren;* Amsterdam, Amsterdamse bos, 21 July 1960, *E. Kits van Waveren;* Laren, Gooiersgracht, 1 Oct. 1975, *P. A. A. van Winden;* Kortenhoef, near Kerklaan, 21 Nov. 1970, and near 'de Zuwe', 1 Nov. 1970, *J. Daams;* 's-Gravenland, estate 'Boekesteyn', 28 Aug. 1956, *J. Daams;* prov. Zuid-Holland: Leidschendam, Veenzijdse Polder, 29 Oct. 1969, *C. Bas 5163;* Voorschoten, estate 'Ter Horst', 12 Sept. 1974, *M. E. Noordeloos 48*, and 1 Oct. 1974, *M. E. Noordeloos & A. E. Jansen;* Leiden, in garden, 17 Nov. 1963, *C. Bas 4033;* idem, 16 Oct. 1966 and 22 Nov. 1966, *C. Bas 4819 a & b;* Oegstgeest, estate 'Oud Poelgeest', 26 Aug. 1956, *C. Bas 1064;* prov. Noord-Brabant: Breda, in garden Meerten Verhoff str., 14 Oct. 1967, *P. B. Jansen 67–206;* in garden Paul Windhausenweg 26, 10 Nov. 1974, *P. B. Jansen 74–275;* 11 Oct. 1978, *P. B. Jansen 78–276* and 30 Nov. 1974, *A. E. Jansen 57;* idem, Liesbos, 19 Aug. 1967, *P. B. Jansen 67–208;* Dorst, loam pits, 24 Aug. 1968, *R. A. Maas Geesteranus 15266;* Nuenen, Nuenense Broek, 15 Sept. 1979, *M. E. Noordeloos 1019;* prov. Limburg: Echt, estate 'De Doordt', 6 Oct. 1962, *C. Bas 2820;* Gronsveld, Savelsbos, 27 Aug. 1979, *J. Schreurs;* Gulpen, 14/20 Sept. 1970, *E. Kits van Waveren.*

BELGIUM, prov. Brabant, Oppem, S. E. of Brussels, Wegembeek, 1 Nov. 1960, *P. Heinemann* (BR).

Entoloma icterinum is a rather variable species (Kits van Waveren, 1977: 54–59). Distinctive characters are the yellowish olivaceous tinges in the pileus and the aromatic smell. In literature this smell has been described in various ways: 'burnt sugar' (Quél., 1872: 248); fruity: 'ananas' (J. Lange, 1936: 102); amylacetate or 'bonbons anglais' (Kühn. & Romagn., 1953: 184). Others compare the smell with that of *Hebeloma sacchariolens.* Kits van Waveren (pers. comm.) suggests that it is identical with that of *Entoloma ameides* (Berk. & Br.) Sacc., which I can confirm. In my experience the intensity of the smell is rather variable as well: some collections were smelled before they actually were found, others showed no distinct smell when collected, but after some hours in a closed box they emitted their delicate perfume quite distinctly. Temperature is also of great importance with regard to the intensity of the smell: low temperatures prevent the perception of the smell which becomes distinct when the carpophores are warmed up. This can easily be demonstrated when fresh collections have been kept in the refrigerator for some time.

Fries (1821: 207, 1857: 296, 1874: 207), nor Gillet (1876: 421–422), Cooke (1886, pl. 338), Quélet (1888: 171) or Rea (1922: 404, 405) do mention the smell of *Entoloma icterinum.* This may suggest that either the smell was absent or it was ignored or considered of minor importance. Only Ricken (1913: 297) positively stated that '*Nolanea*' *icterina* is inodorous.

Some authors like Moser (1967: 167, and 1978: 208) consider *Entoloma icterinum* to be distinct from *Agaricus pleopodius* Fr. The differences between *Agaricus icterinus* and *A. pleopodius* are according to Fries:

A. icterinus	*A. pleopodius*
Pileus campanulate, then convex, not umbilicate, centre sometimes blunt, sometimes umbonate.	Pileus conical, then expanding, subumbonate.
Lamellae pale, then yellow, finally pink.	Lamellae white, then pink.
Stipe concolorous with pileus or darker and more brown, entirely pruinose or at apex only.	Stipe pale, yellowish, pruinose at apex only.

Moser adds to these differences the lack of an aromatic smell in '*Rhodophyllus*' *pleopodius* and a difference in spore size, viz. 10–12 × 6–8 μm in *E. icterinum* and 9–11 × 7–8 μm in *R. pleopodius*. As I tried to point out in the discussion above, the lack of a distinct smell cannot be used as a distinctive character. My own observations and those of Kits van Waveren (1977, l.c.) and P. van Winden (1978: 9–10) do not permit a distinction between *E. icterinum* and *Agaricus pleopodius* on specific level.

The shape of the pileus and the sizes of the carpophores are rather variable in *Entoloma icterinum* often within one collection, and show 'typical' *E. icterinum* as well as *A. pleopodius* characters. In addition the lamellae in *E. icterinum* are usually purely white when young; the yellow tinge may appear to be rather pale and is sometimes only suggested when the colour of the pileus shines through the flesh; finally the smell may be present or not in both forms. Spore size in *Entoloma icterinum* is found to cover a range which comprizes both sizes given by Moser, and cannot be used to distinguish the two forms.

54. **Entoloma chlorophyllum** Noordeloos, *spec. nov.* — Figs. 43a–c

Pileus 15–27 mm latus, campanulato-truncatus, centro leviter depressus interdum papillatus, hygrophanus, in udo olivaceus, in sicco pallescens. Lamellae distantes, crassiusculeae, chlorino-olivaceae. Stipes 50 × 2–4 mm, deorsum bulbosus, olivaceus vel olivaceo-brunneus, argenteo-striatus. Odore nulla.

Sporea (8.6–)9.3–10.4 × 7.0–8.1(–8.7) μm. Basidia 4-sporigera. Cheilocystidia cylindracea vel flexuosa vel lageniformes, interdum capitata, Pileipellis cutis; hyphae cylindraceae, 6–21 μm latae. Pigmentis intracellulosis pariter in hypharum tunicam, haud incrustantibus. Fibulae presentes. Habitat ad humum in hortum. — Holotypus: *J. J. Barkman 6888*, 27 X 1960, 'Wijster, prov. Drenthe, Netherlands' (WBS).

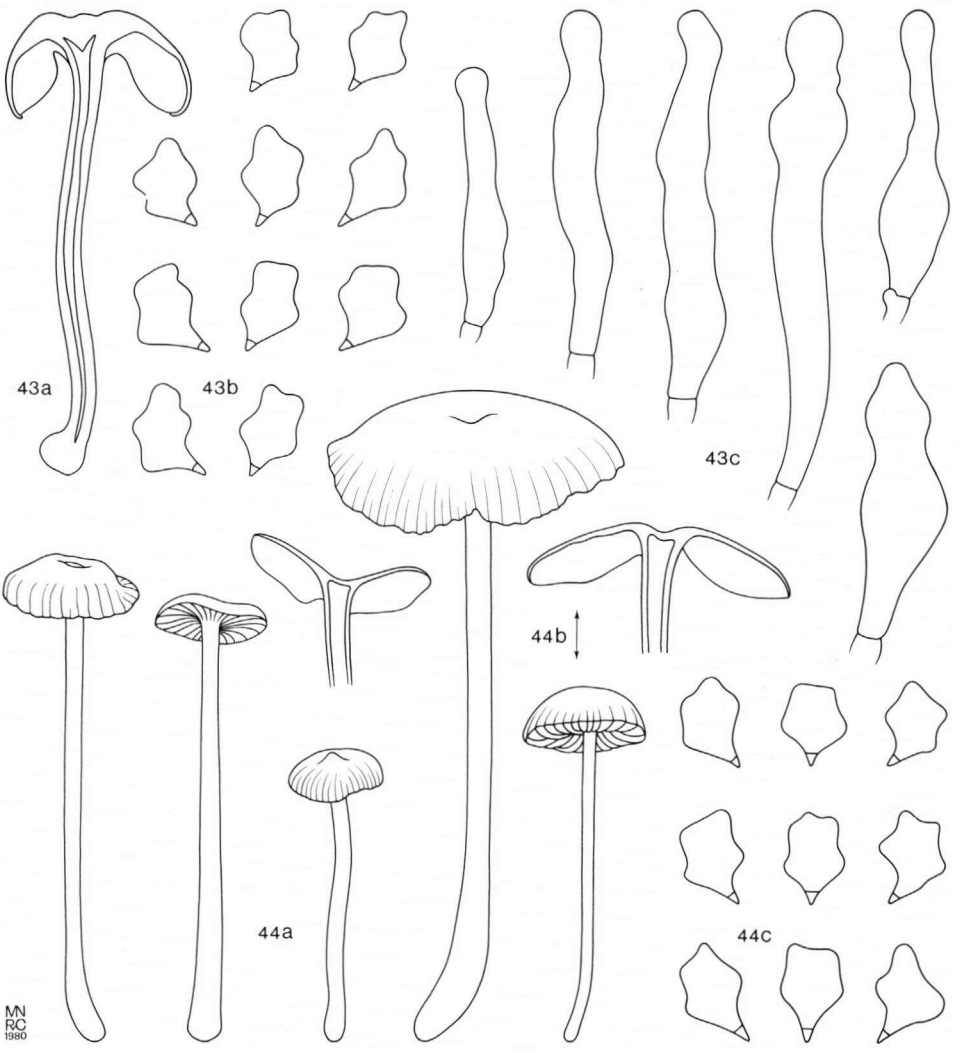
CHARACTERISTICS.—Pileus olivaceous, weakly hygrophanous, minutely radially fibrillous; lamellae pale olivaceous; flesh inodorous; cheilocystidia present.

Pileus 15–27 mm broad, truncate-campanulate with slight central depression and sometimes with small papilla, with slightly involute margin, weakly hygrophanous, when moist olivaceous-greenish (5 Y 6/6) with slightly darker centre, slightly pallescent on drying, non-striate, minutely radially fibrillous with whitish pruinum at centre, somewhat dull or shining. Lamellae distant, thickish, ventricose, 3–5 mm broad, adnate with small decurrent tooth, pale olivaceous-green. Stipe 50 × 2–4 mm, cylindrical with abruptly swollen base up to 6 mm wide, olivaceous brown at apex, downwards more brown, flocculose at apex, downwards densely covered with silvery fibrils, often twisted, white tomentose at base. Flesh dark olivacous when moist, pallescent on drying. Smell absent. Taste not recorded.

Spores (8.6–)9.3–10.4 × 7.0–8.1(–8.7) μm, Q = (1.07–)1.2–1.3–1.4, L–D = (0.6–)1.2–3.5 μm, 5–6-angled in side-view, with pronounced angles, with dihedral base. Basidia 32–50 × 10–13.5 μm, 4-spored. Cheilocystidia 52–85(–140) × 10.5–17.5 μm, cylindrical-flexuous with (sub-)capitate apex to slenderly lageniform-tibiiform, scattered among basidia. Hymenophoral trama regular, composed of cylindrical to inflated cells up to 270 μm long and 12–18(–23) μm wide, probably with pale intracellular pigment and pale yellow, non-encrusted walls. Pileipellis a cutis made up of radially arranged, 6–21 μm wide cylindrical hyphae with repent or ascending terminal cells with yellowish brown intracellular pigment. Pileitrama regular, composed of cylindrical or slightly inflated, up to 28 μm wide hyphae with yellow-brown walls. Vascular hyphae numerous. Clamp-connections frequent in hymenium, rare in other tissues.

HABITAT & DISTRIBUTION.—On humus in garden; known only from type locality.

COLLECTION EXAMINED.—NETHERLANDS, prov. Drenthe, Wijster, in lawn on humus, 27 Oct. 1960, *J. J. Barkman 6888* (holotype, WBS).



Figs. 43a–c. *Entoloma chlorophyllum*. — Habit, spores and cheilocystidia (43a–c from holotype).
Figs. 44a–c. *Entoloma icterinum*. — Habit and spores (44a from *Kits van Waveren, 20 Sept. 1970;* 44b–c from *Kits van Waveren, 26 July 1962*).

Entoloma chlorophyllum is very well characterized by the olivaceous tinges in the lamellae and the enormous protruding cheilocystidia. In many characters such as the habit, the type of pigmentation, the predominantly olivaceous colour of the pileus and particularly the size and the shape of the spores, *E. chlorophyllum* resembles *E. icterinum* very much. For this reason I place *E. chlorophyllum* in subsection *Icterina*. It appears to be better in its place here than in subgenus *Leptonia*, also with regard to the strongly fibrillous-striate stipe and the clamped basidia.

In the field, *E. chlorophyllum* was taken by the collector for *E. versatilis*. The latter, however, has differently shaped cystidia and spores, and lacks clamp-connections in the hymenium.

EXTRALIMITAL SPECIES

55. **Entoloma ambrosium** (Quél.) Noordeloos, *comb. nov.*

Rhodophyllus ambrosius Quél. *in* C. r. Ass. franç. Av. Sci. **24** (2): 618. 1896 (basionym). — *Pouzarella ambrosia* (Quél.) Mazzer *in* Bibltca mycol. **46**: 83. 1976.

CHARACTERISTICS.—Pileus campanulate-convex, dark olivaceous brown, hygrophanous; lamellae pale grey-brown, then pink; stipe paler than pileus and more reddish brown, not really striate; smell strong, fragrant, like orange blossom.

Pileus about 14 mm broad, campanulate-convex without papilla, with involute margin, slightly undulating, rather dark olive brown ('bistre olive'), translucently striate, strongly pallescent on drying, when moist surface minutely granular (under lens), becoming strongly lustrous on drying. Lamellae distant, thickish, free, slightly ventricose, pale grey-brown, then pink with entire or slightly irregular, concolorous edge. Stipe 60 × 3 mm, cylindrical, somewhat flexuous, distinctly broadened towards base, narrowly fistulose, brown, slightly paler than pileus and more reddish, not striate but with scattered minutely silvery fibrils under lens, in some places nearly pruinose. Flesh thickish in pileus and concolorous with surface, in stipe paler, whitish. Smell strong, like orange blossom.

Spores 7.5–10(11.5) × 6–8 μm, 5–7-angled in side-view, with dihedral base. Basidia 35–50 × 9–11.7 μm, 4-spored. Cystidia absent. Hymenophoral trama regular; hyphae 7.5–18 μm wide. Pileipellis a thin cutis with narrow hyphae; subpellis with inflated, sometimes up to 43 μm wide hyphae. Pigment uniformly membranal, not encrusting. Clamp-connections present in hymenium, rare in other tissues.

HABITAT.—Among mosses, near *Pinus sylvestris*; rare, known only from France.

COLLECTION EXAMINED.—FRANCE, dept. Oise, Coye-la-Forêt, 22 Nov. 1951, *G. Robert & P. Causse* (Herb. Romagn., PC).

Entoloma ambrosium is easily recognized by its dark pileus, coloured as in *Naucoria centunculus*, and by its aromatic smell. It seems to be rather rare. The description given above is a translation of that of Romagnesi (1974a: 365–368) who found only one, probably juvenile specimen. For line drawings I refer to Romagnesi (1974a, l.c.). The microscopic characters are very similar to those of *E. icterinum*, which has a more yellow tinged pileus.

56. ENTOLOMA INODORUM (Velen.) Noordeloos

Nolanea inodora Velen., České Houby: 629. 1921. — *Entoloma inodorum* (Velen.) Noordeloos *in* Persoonia **10**: 251. 1979.

Pileus 10–30 mm broad, campanulate-convex with abrupt papilla, strongly hygrophanous, blackish brown, translucently striate when moist, on drying pallescent to grey, strongly silky

shining, smooth. Lamellae crowded, emarginate, white, then reddish. Stipe long, 1–2 mm broad, transparent, white, not shining, distinctly powdered at apex, hollow, fragile. Smell absent or weakly unpleasant-sourish.

Spores 10.2–12.4 × 8.3–9.7 μm, Q = 1.1–1.15–1.25, L–D = 1–2 μm, irregularly cuboid-4-angled in side-view. Clamp-connections present. Pigment intracellular in upper layers of pileus.

HABITAT & DISTRIBUTION.—In grass on sunlit hill, Czechoslovakia. Known only from type locality.

COLLECTION EXAMINED.—CZECHOSLOVAKIA, Bohemia, Myslin, July 1919, *J. Velenovský* (holotype, PRC).

The rather dark pileus strongly contrasting with the whitish stipe as well as the large spores make *E. inodorum* easy to distinguish from all other cuboid-spored *Entoloma's* in Europe. For details on the type collection of this rather remarkable species the reader is referred to Noordeloos, 1979b: 251.

57. ENTOLOMA PALLESCENS (P. Karst.) Noordeloos—Figs. 45a–d

Nolanea pascua var. *pallescens* P. Karst., Hattsv. **1**: 280. 1879. — *Nolanea pallescens* (P. Karst.) P. Karst. *in* Meddn Soc. Fauna Flora fenn. **16**: 94. 1890 (Symb. Myc. fenn. 29). — *Entoloma pallescens* (P. Karst.) Noordeloos *in* Persoonia **10**: 251. 1979.

Nolanea pallescens var. *procera* P. Karst. *in* Meddn Soc. Fauna Flora fenn. **16**: 64. 1890.

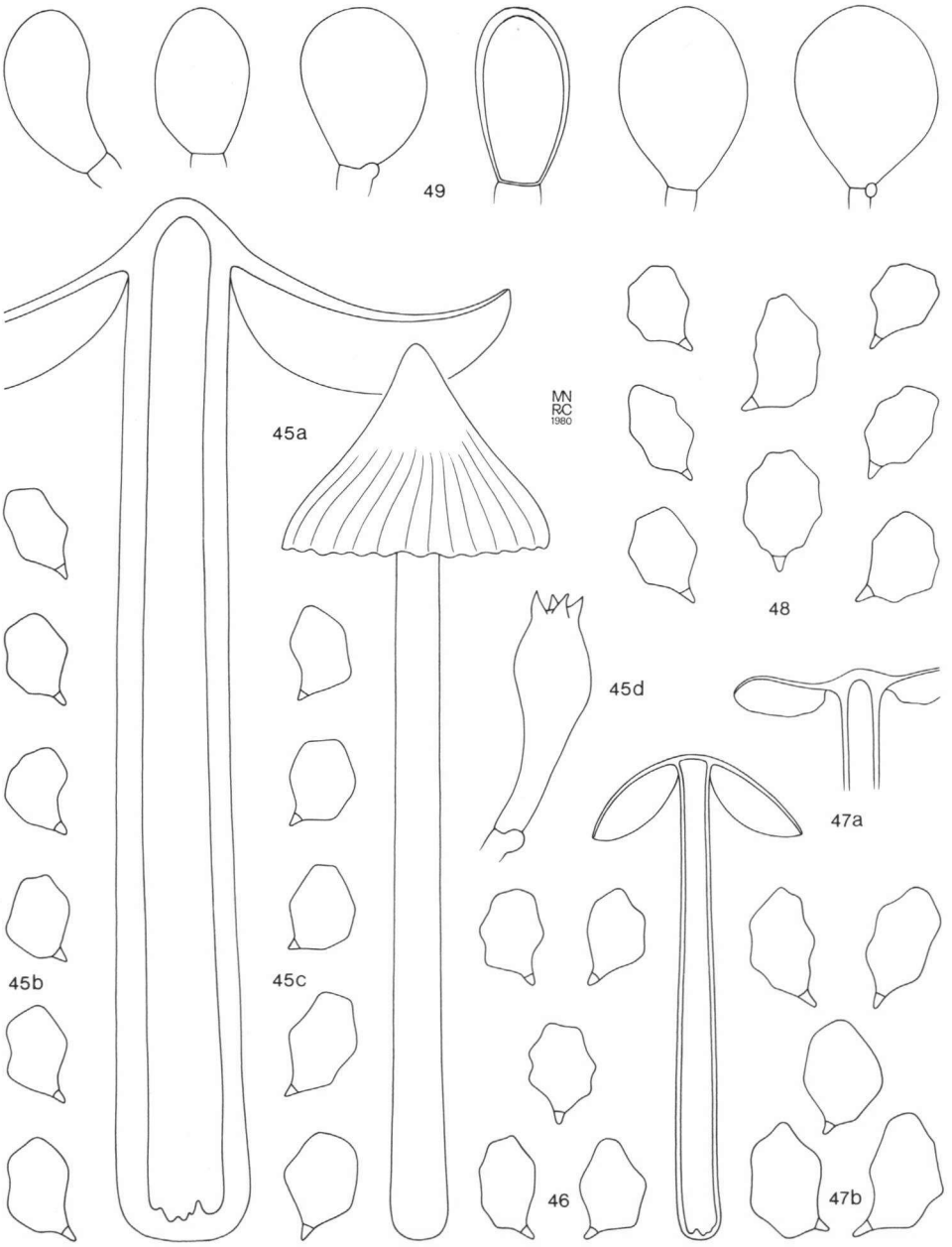
Nolanea majalis Velen., Novitates mycologicae novissimae: 147. 1939.

CHARACTERISTICS.—Carpophores medium-sized to rather large; pileus up to 75 mm broad, conical to conico-campanulate, only slightly expanding, yellowish brown to reddish brown, strongly pallescent on drying; lamellae pale, then brown, finally reddish brown; stipe up to 150 mm long and 4–11(–14) mm broad, concolorous with pileus or distinctly paler, strongly silvery striate lengthwise; pigment membranal and intracellular; basidia 4-spored, with clamp.

Pileus 25–75 mm broad, acutely conical or conico-campanulate, only slightly expanding, rarely flattened, with conical papilla, with margin slightly involute when young, finally straight, often with plicate marginal zone particularly when young and not expanded; strongly hygrophanous, when moist yellowish brown to reddish brown, darkening with age and when water-soaked (10 YR 6/6; 7.5 YR 5/6, 4/4, finally 7.5 YR 3/2), slightly paler towards margin (10 YR 6/6; 7.5 YR 6/8), translucently striate up to three fourths of radius; on drying strongly pallescent to pale brown, smooth, glabrous, innately fibrillous, shining. Lamellae L = up to 50, l = 3–5, almost free, ventricose, pale, then brown, finally reddish brown (10 YR 7/6, 6/6, then 7.5 YR 5/6, 4/4, 3/2), with slightly eroded, concolorous edge. Stipe up to 150 × 4–11(–14) mm, cylindrical or gradually broadening towards base, pale to moderately dark brown, usually paler than pileus (10 YR 6/5, 5/4, 3/4; 7.5 YR 3/2), strongly silvery striate lengthwise, often twisted, white-tomentose at base. Flesh fairly brittle, concolorous with surfaces or slightly paler in inner parts. Smell faint. Taste mild.

Spores (9.3–)10.0–12.0 × (7.0–)7.4–8.1(–9.0) μm, Q = 1.2–1.4–1.5, L–D = 1.7–2.5–4.0 μm, 5–6–7-angled in side-view, with distinctly dihedral base. Basidia 32–52 × 10.5–14 μm, 2–4-spored. Cystidia absent. Hymenophoral trama regular, with cells 160–340(–460) × (3.5–)7–16(–27) μm. Pileipellis a cutis made up of 3.5–10 μm wide cylindrical hyphae with brown walls and pale diffusely intracellular pigment. Pileitrama regular, composed of strongly inflated cells 230–450 × 12–32 μm. Clamp-connections abundant in hymenium, rare elsewhere.

HABITAT & DISTRIBUTION.—In subboreal and submountainous coniferous forest. In Norway found in mixed forest of *Picea abies*, *Pinus sylvestris* and scattered *Betula pubescens* with



Figs. 45a–d. *Entoloma pallescens*. — Habit and spores (45a–b, 45d from *Noordeloos 975*; 45c from neotype).

Fig. 46. *Rhodophyllus fulviceps*. — Spores (from holotype).

Figs. 47a–b. *Entoloma foetulentum*. — Habit and spores (47a–b from holotype).

Fig. 48. *Rhodophyllus putus*. — Spores (from holotype).

Fig. 49. *Entoloma sphaerocystis*. — Cheilocystidia (from holotype).

understory of *Vaccinium vitis-idaea* and *Linnea borealis*; May–October. Known to occur in Finland, Norway and Czechoslovakia.

COLLECTIONS EXAMINED.—FINLAND, Tavestia australis, Tammela, Syrjä, Mustiala-W, 6 Oct. 1889, *P. A. Karsten* (neotype, design. mihi, Herb. Karsten, H). — NORWAY: Östfold, Moss, Jelöya, 28 May 1972, *Gro Gulden 181/72* (O); Hedmark, Tynset, Bygdemuseum, 21 July 1979. *M. E. Noordeloos 975*. — CZECHOSLOVAKIA, Bohemia, Mnichovice near Prague, 12 May 1937, *J. Velenovský* (holotype of *Nolanea majalis* Velen., PRM).

In the Karsten Herbarium at Helsinki only one collection is available of *Nolanea pallescens* P. Karst., collected and named by the author. It consists of one specimen in good state and was selected by me as a neotype. The neotype collection has the following microscopical characters:

Spores (10.0–)10.4–12.1(–12.7) × (6.9–)7.4–8.5(–9) μm, Q = (1.25–)1.3–1.4–1.5, L–D = 2.3–4.0 μm, 5–6(–7)-angled in side-view, with dihedral base. Basidia 35–42 × 10.5–14.0 μm, 4-spored. Hymenophoral trama regular with strongly inflated cells 226–340(–460) × 17–27 μm, with thin, colourless walls. Pileipellis a cutis made up of cylindrical, up to 10 μm wide hyphae with pale intracellular pigment and pale brown coloured walls; no encrustations seen. Pileitrama regular, with strongly inflated cells 230–450 × 12–32 μm. Clamp-connections abundant in hymenium; elsewhere not seen.

Entoloma pallescens is closely related to *E. cuneatum* and *E. cetratum*. From *E. cuneatum* it differs by the unicoloured pileus, different habitat and probably also by the more robust habit. *Entoloma cetratum* is usually smaller, and in addition has bisporous, clampless basidia.

Entoloma pallescens occurs in the same habitat and seems to have more or less the same distribution as *E. hirtipes* var. *hirtipes*. The latter species, however, is strictly vernal, has cheilocystidia, larger spores, and a strong rancid-farinaceous smell.

58. ENTOLOMA PRISMATOSPERMUM (Romagn.) Horak

Rhodophyllus prismatospermus Romagn. *in* (Trav. mycol. déd. R. Kühner) Bull. Soc. linn. Lyon **43** (No. spéc.): 386. 1974. — *Entoloma prismatospermum* (Romagn.) Horak *in* Sydowia **28**: 216. 1976 ("1974/75").

Pileus 5–9 mm broad, conical, then expanding to convex with or without distinct papilla, with margin involute when young, then straight, hygrophanous, hardly striate when moist, pale grey-brown with darker papilla and paler margin, on drying pallescent, glabrous, satiny lustrous. Lamellae fairly distant, thickish, with 1–3 lamellulae between each pair, slightly ascending, broadly adnate to uncinate, narrow, up to 1.5 mm broad, greyish to grey-brown without any pink tinge, with whitish edge. Stipe (10–)20–30 × 1–2 mm, cylindrical, thickened to subbulbous at base, fairly pale grey-brown to pearl grey, becoming browner with age, paler towards base or with white mycelium, minutely flocculose at apex, more sparsely so towards base. Flesh thin, grey-brown in pileus, pale in stipe. Smell and taste farinaceous-rancid.

Spores 7.5–9 × (6–)7–8.5 μm, 3–4-angled in side-view, prismatical-cuboid with fairly blunt angles. Basidia 50–60 × 12–14 μm, 4-spored. Cheilocystidia numerous, fusiform often with broadly swollen basal part, 60–75 × 9–12 μm. Pileipellis a simple cutis made up of 3.5–7 μm wide cylindrical hyphae with pale yellow, non-encrusted walls without any intracellular pigment. Stipitepellis with caulocystidia similar to cheilocystidia. Clamp-connections found in hymenium.

COLLECTION EXAMINED.—FRANCE, dept. Oise, Neuville-en-Hez, 5 Sept. 1956, *H. Romagnesi 56.146* holotype, (Herb. Romagn., PC).

The description given above is a concise translation of the original diagnosis. For full details and line drawings the reader is referred to Romagnesi, l.c.: 369–372. *Entoloma prismatospermum* is known only from its type locality. It differs from all other cuboid-spored species of *Entoloma* in Europe by its characteristical cheilo- and caulocystidia and simple pigmentation. *Entoloma inodorum* differs among other things by the larger and more cuboid spores, and *E. rhombisporum* by differently shaped cheilocystidia, a smooth stipe and a different pigmentation. Romagnesi suggested that the small size of the carpophores in *E. prismatospermum* might be due to the young state of the type collection.

INSUFFICIENTLY KNOWN AND EXCLUDED TAXA

alba.—*Nolanea alba* Velen., České Houby: 629. 1921. — *Entoloma nivescens* Noordeloos in Persoonia **10**: 246. 1979 (name change).

CHARACTERISTICS.—Pileus 20–40 mm broad, obtusely convex, sometimes weakly umbonate with undulating, crenulate margin, distinctly hygrophanous, when moist pale grey and translucently striate, on drying pallescent to white, smooth, shining; lamellae broadly ventricose, white, then pink, with denticulate edge; stipe about 40–80 × 2–4 mm, white, smooth, furfuraceous at apex only; flesh inodorous; spores (9.0–)9.6–10.8(–11.3) × 6.8–7.9 µm; basidia 4-spored; cheilocystidia 40–55 × 7–9 µm, cylindrical-subcapitate; pileipellis a cutis made up of 4–11 µm wide cylindrical hyphae without pigment; clamp-connections abundant in hymenium.
HABITAT & DISTRIBUTION.—Under *Corylus;* Czechoslovakia; rare.

COLLECTION EXAMINED.—CZECHOSLOVAKIA, Bohemia, Mnichovice, collis Rlechač, July 1940, *J. Velenovský* (neotype, PRM).

Entoloma nivescens seems to be closely related to *E. hirtipes* var. *hirtipes* and *E. leptopus* by size and shape of the spores and the cheilocystidia. The very pale colur makes it a species of its own kind, which needs rediscovery.

araneosa.—*Nolanea araneosa* Quél. *in* Bull. Soc. bot. Fr. **23**: 327. 1876. — Belongs to subgenus *Pouzaromyces* (see Noordeloos 1979a: 234).

babingtonii.—*Nolanea babingtonii* (Blox. apud Berk. & Br.) Sacc., Syll. Fung. **5**: 717. 1887. — Nomen dubium (see Noordeloos 1979a: 241).

brassicolens.—*Nolanea brassicolens* Reid *in* Trans. Br. mycol. Soc. **48**: 518. 1965.

This fungus has to be transferred to subgenus *Entoloma* on account of size and shape of the 'barrel'-shaped cells forming the hymenophoral and pileal trama. In addition the habit suggests relationship with members of the *Entoloma nidorosum* complex. It will be treated in a future paper (Noordeloos, 1980a).

dysthales.—*Nolanea dysthales* (Peck) Murrill *in* North Am. Fl. **10**: 101. 1917. — Belongs to the subgenus *Pouzaromyces* (see Noordeloos, 1979a: 215).

foetida.—*Nolanea foetida* Killermann, Pilze Bayern **2**: 55. 1925. — Figs. 47a–b.

Characteristics.—Pileus 20–30 mm broad, campanulate or hemispherical, then expanding to convex with weak umbo, thin-fleshed, hygrophanous, when moist fulvous, striate, on drying pallescent; lamellae almost free, rusty brown when mature (ferrugineous); stipe about 60 × 2–4 mm, cylindrical, straight or slightly broadening towards base, concolorous with pileus; smell strong, foetid, like that of a putrefying cadaver; spores 11–13.9(–15.0) × (7.1–)7.6–9.3 μm, Q = 1.25–1.5–1.7(–2.0), L–D = 2.5–4.0–6.5 μm, irregularly 6–8-angled in side-view, with dihedral base; basidia 24–37(–42) × 8.0–12.7 μm, 4-spored. Cystidia absent. Pileipellis a cutis made up of 4.7–10.4 μm wide cylindrical hyphae with membranal pigment. Clamp-connections seen in hymenium. Vascular hyphae numerous in pileitrama.

HABITAT & DISTRIBUTION.—In forest between decaying needles of *Pinus;* known only from Bavaria (German Federal Republic).

COLLECTION EXAMINED.—GERMAN FEDERAL REPUBLIC, Bavaria, near Regensburg, 1 June 1913, *S. Killermann* (holotype, M).

Nolanea foetida belongs undoubtedly to subsection *Endochromonema*. Killermann considered it to be closely related to *Entoloma cetratum*. Though the macroscopical characters and the habitat are similar, *Nolanea foetida* cannot be reduced to a form or variety of *Entoloma cetratum* as there are in addition to the foetid smell some striking microscopical differences, respectively (i) the larger and more irregularly shaped spores; (ii) the 4-spored basidia; (iii) the presence of clamp-connections in the hymenium. The last two characters indicate relationship with *E. cuneatum* and *E. pallescens*. Recombination of Killermann's epithet would result in a later homonym of *Entoloma foetidum* Hesl. 1967. Therefore the following new name is introduced: **Entoloma foetulentum** Noordeloos, *nom. nov.* (basionym *Nolanea foetida* Killermann, Pilze Bayern **2**: 55. 1925).

fulviceps.—*Rhodophyllus fulviceps* Romagn. *in* Bull. Soc. mycol. Fr. **48**: 321. 1932. — Fig. 46.

CHARACTERISTICS.—Pileus 13–15 mm broad, hemispherical or convex, expanding, not umbonate, hygrophanous, when moist brown with reddish ochraceous tinge, with paler margin, translucently striate, pallescent on drying; lamellae rather distant, free, very strongly ventricose, pinkish brown; stipe 30–45 × 1.8 mm, cylindrical, reddish or yellowish, shining, not striate, white tomentose at base; flesh reddish, inodorous; spores (9.3–)10.0–11.5 × 7.6–8.1(–8.7) μm, Q = 1.2–1.4–1.5, L–D = 1.5–2.5–4.0 μm, (5–)6–7(–8)-angled in side-view, with dihedral base; basidia 2-spored; clamp-connections not seen.

HABITAT & DISTRIBUTION.—In (frondose?) forest between mosses. Known only from the type locality.

COLLECTION EXAMINED.—France, dept. Seine & Oise, Yerres, April 1932, *H. Romagnesi 129* (holotype, herb. Romagn., PC).

The type collection is in a very poor state; the tissues are difficult to study. I failed to find intact basidia, but they seem to be mostly 2-spored and clampless. *Rhodophyllus fulviceps* most probably represents a form of *Entoloma cetratum*.

hirta.—*Nolanea hirta* Velen. *in* Mykologia **6**: 28. 1929. — Belongs to subgenus *Pouzaromyces* (see Noordeloos, 1979a: 223).

limosella.—*Nolanea limosella* P. D. Orton *in* Notes R. bot. Gdn Edinb. **29**: 108. 1969.

CHARACTERISTICS.—'Cap 12–24 mm, conico-convex then expanded rather acutely umbonate, later often depressed around umbo, dark sepia-horn, paler when dry, smooth, when moist striate at margin, when dry silky shiny and sometimes rugulose at centre sub lente. Gills adnate often slightly emarginate, whitish then pale brownish pink, not crowded, L = 18–22, l = 1–(3), rather narrow at first then ventricose near stem, edge even, fairly thick. Stem 15–30/2–3 mm, equal or +/− clavate, pale grey-horn, apex almost white and white pruinose, remainder whitish silky striate, stuffed, base white tomentose. Flesh concolorous, white in centre of cap and stem. Smell fairly strong, mealy, especially when cut. Spores nodulose oblong-angular, (10)11–13/7–9 μm. Basidia 2-spored. Cystidia absent.'
HABITAT.—On mud at edge of pond.

Judging from the description *Nolanea limosella* is very close to *Entoloma cetratum* but has the colours of *E. cuspidifer*. That species, however, has differently shaped spores, viz. more broadly ellipsoid to subisodiametrical. The type collections at K and E contain fragments of a brown-spored agraric which evidently has been put erroneously under this label. I was therefore unable to study critically the microscopical characters of *Nolanea limosella*, and for the moment consider it a nomen dubium.

mammosus.—*Agaricus mammosus* L. ex Fr., Spicilegium: 7. 1836. — *Nolanea mammosus* (L. ex Fr.) Quél. *in* Mém. Soc. Emul. Montbéliard, Sér. II, **5**: 122. 1872 (Champ. Jura Vosges 1). — *Rhodophyllus mammosus* (L. ex Fr.) Quél., Enchir.: 64. 1886. — *Hyporrhodius mammosus* (L. ex Fr.) Schroet. *in* Cohn, KryptogFl. Schles. **3** (1): 614. 1889. — *Entoloma mammosum* (L. ex Fr.) Hesler *in* Beih. Nova Hedwigia **23**: 185. 1967.

Fries (1836: 7) placed *Agaricus mammosus* in tribus *Nolanea* close to *A. pascuus* Pers. ex Fr. and *A. clandestinus* Fr., apparently considering the polished, smooth stipe the most important difference with *A. pascuus;* Fries had this character printed in italics. His *A. clandestinus* differs from *A. mammosus* by the dark coloured lamellae. Furthermore Fries referred to the plates of Schaeffer (1800, pl. 254) and Batsch (1783, pl. 5), both depicting a small *Nolanea* with a moderately dark brown pileus and a smooth, shining stipe.

Another character mentioned by Fries a few years later (1838: 156) is the peculiar smell. This may be considered important, as Fries seemingly had no good sense for odours. Unfortunately in this case he did not indicate the nature of it.

Considering this, I came to the conclusion that among the different interpretations of *Agaricus mammosus* Fr. in literature, that of Konrad (1923: 36 and 1929: 50) comes closest to that of Fries. This interpretation might be the same as P. D. Orton's (1960: 329). I did not study authentic material neither from Konrad nor from P. D. Orton, and I was unable to establish the occurrence of this taxon in the Netherlands.

Rhodophyllus mammosus sensu Kühn. & Romagn. (1953: 188) is conspecific with *Entoloma hirtipes* (Schum. ex Fr.) Moser.

Agaricus mammosus var. *tenuior* Fr., Icon. sel. **1**: 113, pl. 98 fig. 4. 1867 is the same as *Entoloma papillatum* (Bres.) Dennis (see p. 454).

nivescens.—*Entoloma nivescens* Noordeloos *in* Persoonia **10**: 246. 1979. See under *Nolanea alba* Velen. on p. 524.

pascuus.—*Agaricus pascuus* Pers., Synopsis: 427. 1801. — *Agaricus pascuus* Pers. ex Fr., Syst. mycol. **1**: 205. 1821. — *Nolanea pascua* (Pers. ex Fr.) Kumm. Führ. Pilzk.: 95. 1871. — *Rhodophyllus pascuus* (Pers. ex Fr.) Quél., Enchir.: 63. 1886. — *Hyporrhodius pascuus* (Pers, ex Fr.) Schroet. *in* Cohn, KryptogFl. Schles. **3** (1): 614. 1889. — *Entoloma pascuum* (Pers. ex Fr.) Donk *in* Bull. bot. Gdns Buitenzorg, ser. 3, **18**: 158. 1948.

Agaricus pascuus is a collective species, comprizing at least three common grassland-species, viz. *E. conferendum*, *E. sericeum*, and *E. vernum*. As the protologue does not permit an exact definition it is considered a nomen dubium (see p. 449).

pseudotelamonia.—*Entoloma pseudotelamonia* Noordeloos *in* Persoonia **10**: 263. 1979. — *Telamonia brevipes* Velen., České Houby: 458. 1921, non *Entoloma brevipes* Murrill 1917.

CHARACTERISTICS.—General habit that of a species of *Telamonia* (Cortinariaceae); pileus 20–40 mm broad, more or less flattened or with weakly depressed centre, hygrophanous, when moist very dark chestnut brown, centre almost black, not striate, pallescent on drying; lamellae somewhat crowded, deeply emarginate, sordid white, then ochraceous, finally reddish brown; stipe about as long as diameter of pileus, 10 mm thick, brown, with white striation, base with ochraceous 'veil'; flesh brownish, inodorous; spores 8.2–9.7(–10.3) × (7.7–)8.2–8.7(–9.3) µm, Q = 1.0–1.05–1.1(–1.15), isodiametrically 5(–6)-angled in side-view; basidia 4-spored, with cystidia absent; pigment encrusting.

HABITAT.—In coniferous forest; known only from type locality.

COLLECTION EXAMINED.—CZECHOSLOVAKIA, Bohemia, Mnichovice, August 1915, *J. Velenovský* (holotype; PRC, bottle 183).

Entoloma pseudotelamonia is microscopically very much like *E. juncinum* but differs from the latter by the different habit, the dark pigmented, flattened, often depressed pileus and by the habitat.

putus.—*Rhodophyllus putus* Romagn. *in* Bull. Soc. mycol. Fr. **48**: 322. 1932. — Fig. 48.

CHARACTERISTICS.—Pileus 15–25 mm broad, variable in shape, campanulate or convex, sometimes flattened or with reflexed margin, with or without umbo, hygrophanous, when moist reddish bistre, sometimes with ochraceous tinge, translucently striate, on drying pallescent to ochraceous or pale reddish brown; lamellae relatively distant, not ventricose, white, then pale pink with slight brown tinge; stipe 36–60 × 2–3 mm, cylindrical, smooth, not striate, shining, whitish or pale reddish brown, much paler at apex; flesh pale reddish, fragile; smell absent; spores (9.3–)10–12(–12.7) × 7.6–8.1(–9.3) μm, Q = 1.25–1.3–1.6, L–D = 2–3.5–4.5 μm, irregularly 6–8-angled in side-view, with dihedral base; basidia 2-spored, without clamp-connections; cystidia absent; pigment probably membranal, no encrustations seen.

HABITAT & DISTRIBUTION.—In forest; known only from type locality.

COLLECTION EXAMINED.—FRANCE, dept. Seine & Oise, Yerres, May 1937, *H. Romagnesi 127* (holotype; herb. Romagn., PC).

Rhodophyllus putus undoubtedly belongs to the *Entoloma cetratum* complex. The smooth, shining stipe resembles that of *E. farinogustus* which differs, however, by colour, habit, strongly farinaceous-rancid taste, and by habitat.

radiatus.—*Rhodophyllus elaphinus* var. *radiatus* J. Lange *in* Dansk bot. Ark. **2** (11): 31. 1921. — *Rhodophyllus radiatus* (J. Lange) J. Lange, Fl. agar. dan. **2**: 96. 1939. — *Nolanea radiata* (J. Lange) P. D. Orton *in* Trans. Br. mycol. Soc. **43**: 179. 1960.

Rhodophyllus radiatus in its original sense represents a species that belongs to subgenus *Entoloma*, and is close to *R. sordidulus* Kühn. & Romagn. *Nolanea radiata* sensu P. D. Orton seems to be another taxon, close to *E. sericeum* (see p. 482).

robiniae.—*Nolanea robiniae* Velen., Novitates mycologicae novissimae: 78. 1947. — *Entoloma robiniae* (Velen.) Noordeloos *in* Persoonia **10**: 252. 1979.

CHARACTERISTICS.—Carpophores slender, mycenoid; pileus 6–8 mm broad, hemispherical to convex, with sulcate margin, not umbonate, pale greyish ochraceous when moist; lamellae crowded, almost free, pale, then pink; stipe long, 1 mm thick, shining, striate, twisted, with basal tomentum; spores 9.0–10.2(–11.0) × 7.4–7.9 μm, Q = 1.2–1.3–1.4, 5–6-angled in side-view, with blunt base (basal facet?); basidia 4-spored, with clamp-connection; cystidia absent; pigment membranal (?); subpellis cellular, strongly developed.

HABITAT & DISTRIBUTION.—In *Robinia pseudoacacia* forest; known only from type locality.

COLLECTION EXAMINED.—CZECHOSLOVAKIA, Bohemia, Mnichovice, July 1940, J. Velenovský (holotype, PRM).

The slender mycenoid habit and pale colours of *E. robiniae* are very distinctive. Furthermore the habitat and the strongly developed subpellicular layer in the pileus are characteristic. This species belongs to subsection *Endochromonema*, close to *E. cuneatum*, *E. lanuginosipes* and *E. pallescens*.

setulosa.—*Nolanea setulosa* Velen., Novitates mycologicae: 147. 1939.

Identical with *Entoloma hirtum* (Velen.) Noordeloos in subgenus *Pouzaromyces* (see Noordeloos, 1979a: 223).

strigosissima.—*Nolanea strigosissima* Rea *in* Trans. Br. mycol. Soc. **6**: 325. 1920.

Belongs to subgenus *Pouzaromyces* (see Noordeloos, 1979a: 211).

testacea.—*Nolanea cetrata* var. *testacea* Bres., Fungi trident. **1**: 77, pl. 83 fig. 1. 1887. — *Nolanea testacea* (Bres.) P. D. Orton *in* Trans. Br. mycol. Soc. **43**: 179. 1960.

The 2-spored taxon to which P. D. Orton applied this epitheton represents a form or variety of *Entoloma cetratum* with reddish date brown pileus, gathered under *Betula* and *Corylus* and on a *Calluna* heath, near *Betula*. There is some doubt whether this is the same as the original '*testacea*' depicted by Bresadola, with 4-spored basidia. I failed to locate the type or other authentic material.

This case again illustrates the need of careful collecting and comparison of *E. cetratum*-like fungi in all sorts of habitats in western and northern Europe, to get a clear picture of the variability of this species. It might then appear to be a very polymorphic one, including such forms as *Nolanea testacea*, *Rhodophyllus fulviceps* Romagn., *R. putus* Romagn., and perhaps even *E. farinogustus* Arnolds & Noordeloos.

versatilis.—*Nolanea versatilis* (Fr.) Gill., Hymenom. Fr.: 418. 1874.

Belongs to subgenus *Pouzaromyces* (see Noordeloos, 1979a: 230).

vinaceus.—*Agaricus vinaceus* Scop., Fl. carn. **1**: 444. 1772. — *Agaricus vinaceus* Scop. ex Fr., Epicr.: 157. 1838. — *Nolanea vinacea* (Scop. ex Fr.) Kumm., Führ. Pilzk.: 95. 1871. — *Rhodophyllus vinaceus* (Scop. ex Fr.) Quél., Enchir.: 64. 1886. — *Entoloma vinaceum* (Scop. ex Fr.) Arnolds & Noordeloos *in* Persoonia **10**: 298. 1979.

Entoloma vinaceum and its varieties *fumosipes* Arnolds & Noordeloos and *violeipes* Arnolds & Noordeloos are considered to belong to subgenus **Entoloma** section **Turfosa** (Kühn. & Romagn. ex Romagn.) Noordeloos, *comb. nov.* [basionym *Rhodophyllus* sect. *Turfosi* Kühn. & Romagn. ex Romagn. *in* (Trav. mycol. déd. R. Kühner) Bull. mens. Soc. linn. Lyon **43** (Num. spéc.): 387. 1974].

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New names are in bold-face type. Subdivisions of genera are indicated by the sign §, illustrations by an asterisk (*)