Entoloma in North America 2: the species described by C. H. PECK – type studies and comments[1]

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Abstract: Type studies are presented of the species described by C. H. PECK that belong to *Entoloma* sensu lato (*Basidiomycetes*, *Agaricales*). An attempt is made to clarify their taxonomic status. References are given to descriptions and/or illustrations in literature, and comments are given on related taxa.

Zusammenfassung: Typusstudien der Arten, die C. H. Peck beschrieben hat und die zu *Entoloma* s. l. (*Basidiomycetes*, *Agaricales*) gehören, werden präsentiert. Es wird versucht, ihren taxonomischen Status zu klären. Hinweise zu Beschreibungen und/oder Abbildungen in der Literatur sowie Bemerkungen zu verwandten Taxa werden gegeben.

My interest in North American *Entoloma* species goes back to 1984, when DAVID MALLOCH, Toronto Unversity, invited me to join him on a three weeks collecting trip to the subarctic tundra around Shefferville at the border of Quebec and Labrador, Canada. Many *Entoloma* species have been collected there, most of them still waiting to be identified. In connection with this trip, I spent a week in New York State, joining a foray with TIMOTHY J. BARONI and ROY HALLING. Back home, I realised that identification of my material offered problems. The monograph of HESLER (1967) despite the careful work of the author appeared difficult to use. Particularly information on the occurrence of clamp connections, presence and shape of cystidia, type, and pigmentation of the pileipellis was often lacking or difficult to interpret. Furthermore, most of the species encountered in the subarctic and temperate regions of eastern North America were not included in this work. Also the works of LARGENT (1977, 1994), LARGENT & BENEDICT (1970), and LARGENT & THIERS (1972), mainly focusing on western North America were of limited use.

Therefore I decided to start from the base, and in a first attempt to understand North American *Entoloma*, the types of HESLER, A. H. SMITH and MAZZER were studied (NOORDELOOS 1987). Due to a change of job, and other mycological projects, I had to abandon further ambitions to work on North American *Entoloma*. More than twenty years later, however, my interest was awoken again. Incidental identification requests from North American colleagues showed the lack of knowledge on the genus *En-*

[1] This paper is dedicated to Dr KEES BAS, who introduced me in mycology, on the occasion of his 80th birthday.

toloma, particularly in eastern Canada, even after the publication of DAVID LARGENT's impressive monograph of the western United States and Alaska (LARGENT 1994). But, when I accepted an invitation to join the Humber National History Societies Foray to Gros Morne National Park, Newfoundland, and Labrador in September 2005, I was physically confronted again with the interesting *Entoloma* flora of that region. More than 20 years later than my previous visit, with much more experience with the genus *Entoloma*, I was able to recognise both familiar European and typical American species. Several collections were made of species that appeared to be unknown or even new to science. The wish to publish on these collections urged me again to think about taking up my type studies. I digged up the notes I made on the types of C. H. PECK, borrowed from the New York State Museum in 1988-90, had a careful look at them again, and decided to publish them in order to make the information available for other mycologists. In order to provide maximal use of the information, also the original diagnoses are given, as well as references to literature and short notes on the specific status and taxonomic position of the taxa concerned. Some new combinations appeared to be necessary, and some of PECKs epithets may have priority over European names. More field work, and in some cases supplementary molecular studies will be nescessary to draw final conclusions.

Materials and methods

The types were studied using standard techniques, using a Leitz microscope with a drawing tube. Mounts were observed in a weak ammonia solution, or, if necessary in KOH of Congo Red to reveal the microscopic structures.

Taxonomic part

The species described by PECK are presented in alphabetic order according to species name.

abnormis

Leptonia abnormis PECK, J. Mycol. **14**: 2. 1908; *Leptoniella abnormis* (PECK) MURRILL, N. Amer. Fl. **10(2)**: 91.1917. – Fig. 1.

Selected literature: HESLER, Brittonia **15**: 326. 1963; 1967; LARGENT, Biblioth. Mycol. **55**: 160. 1977.

Original diagnosis: Pileus 20-25 mm broad, thin, convex, broadly umbilicate, hygrophanous, blackish brown, shining and obscurely striatulate on the margin when moist, dark grayish brown when the moisture has escaped. Lamellae subdistant, slightly rounded behind, adnexed, pinkish or pale flesh colored when mature. Stipe 25 × 2 mm, equal, hollow, glabrous, whitish. Terrestrial.

Holotype: USA, Massachusetts, Nov. 1907, E. MORRIS (NYS).

Observations on the holotype: The holotype consists of fragments of two specimens in relatively bad state. Spores 5.9-7.2 × 5.0-6.3 µm, average 6.6 × 5.6 µm, Q = 1.05-1.24, average Q = 1.15, many-angled, very thin-walled in side-view. Basidia 22-35 ×

7.5-11 µm, 4-spored, with clamp connections. Lamellar edge fertile. Cystidia absent. Hymenophoral trama regular, made up of cylindrical to inflated elements, 55-150(-170) × 4-12(-18) µm. Pileipellis a cutis of narrow, cylindrical hyphae, 4-10 µm wide with scattered, cylindrical, repent or slightly ascending terminal elements. Pigment brown, intracellular in pileipellis and upper pileitrama. Vascular hyphae present in pileitrama. Clamp connections abundant in hymenium, in covering layers and trama rather frequent, but not on all septa.

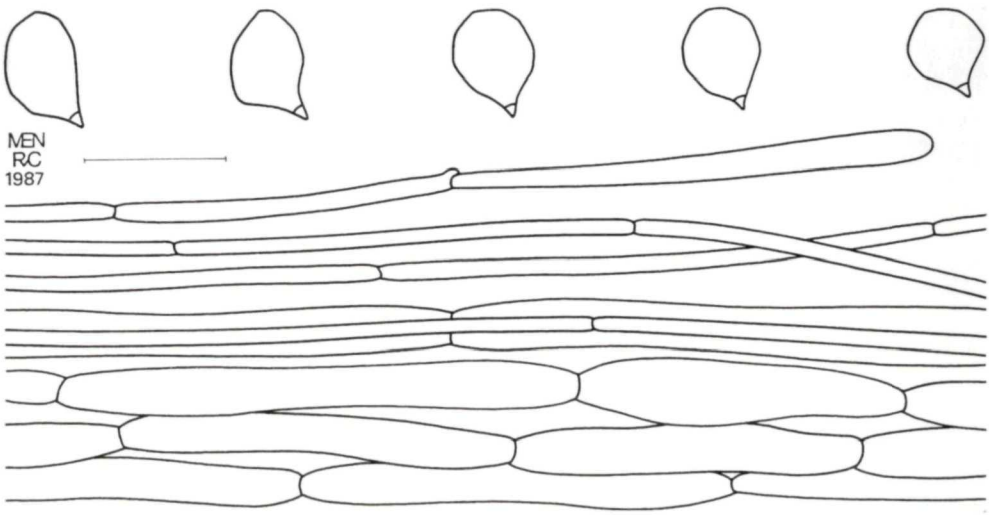

Fig. 1. *Leptonia abnormis*. Spores and pileipellis. – Bar: 10 µm (spores), 20 µm (all other figs.).

Notes: The depressed pileus, smooth, glabrous stipe, very small, poorly angled spores, short elements of trama, and hyphae with clamp connections are distinctive for subgenus *Entoloma*. *Leptonia abnormis* is very similar to *Entoloma vinaceum* (SCOP.) ARNOLDS & NOORDEL. from which it differs by the dark pileus and whitish stipe. Therefore a new combination is made:

***Entoloma abnormis* (PECK) NOORDEL., comb. nova**
Basionym: *Leptonia abnormis* PECK in J. Mycol. **14**: 2. 1908.

Entoloma trachyosporum LARGENT, with its varieties *trachyosporum* LARGENT, *purpureoviolaceum* LARGENT, and *vinaceum* REDHEAD & BARONI have similar spores. At first sight the spores resemble those of the genus *Rhodocybe*. However, SEM studies and a phylogenetic study using three molecular markers, showed that the species of sect. *Turfosa* (syn. sect. *Trachyospora*) definitely belong to the monophyletic genus *Entoloma*, and end up in the same basal clade as *Entoloma prunuloides*, type species of the genus (CO & al. 2009). *Entoloma fumosonigrum* PECK, *E. suave* PECK, and *E. tephreum* HESLER also belong to section *Turfosa*.

aeruginosa

Leptonia aeruginosa PECK, Bull. Torrey Bot. Club **26**: 65. 1899; *Leptoniella aeruginosa* (PECK) MURRILL, N. Amer. Fl. **10(2)**: 89. 1917. – *Entoloma subaeruginosum* COURTEC., Mycotaxon **27**: 128. 1986. – Fig 2.

Selected literature: COURTECUISSE, Mycotaxon **27**: 128. 1986; LARGENT, Biblioth. Mycol. **55**: 162. 1977.

Original diagnosis: Pileus thin, convex, umbilicate or centrally depressed 1.5-2.5 cm broad, surface striate, aerugineous, fading with age to an ashy-green hue; lamellae broad, subdistant, adnate, aerugineous, tinged with flesh-color when mature. Stipe slender, glabrous, hollow, concolorous, about 2.5 cm long and 2 mm thick. In shaded places in woods. Canada.

Holotype: J. DEARNESS, Aug. 1897, Ox-bow River, Canada.

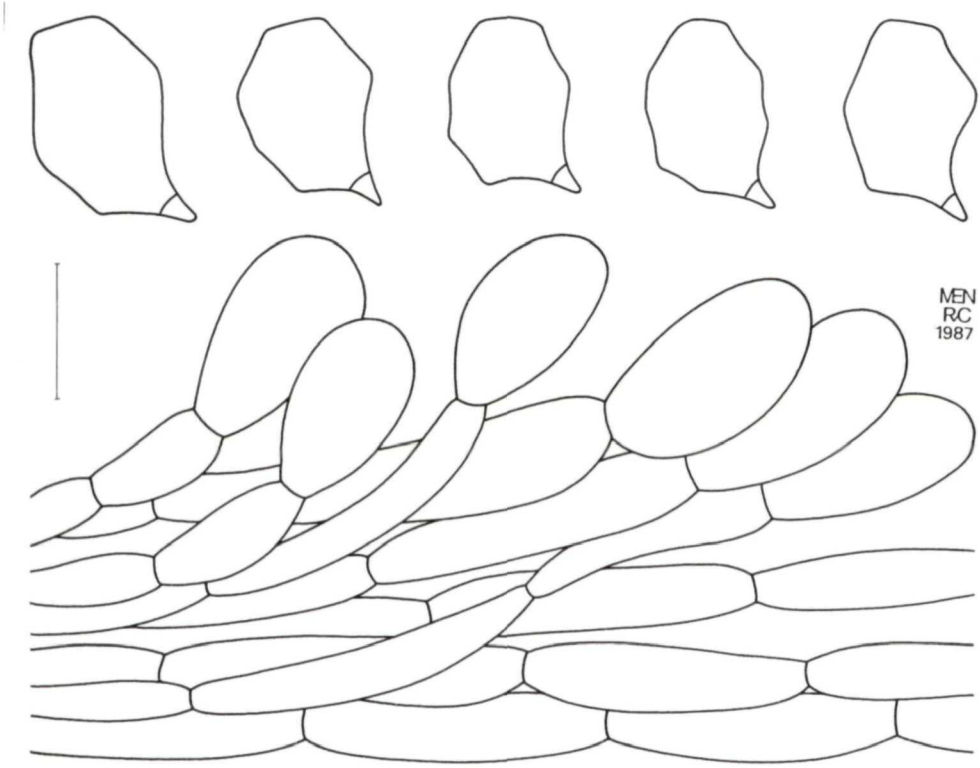

Fig. 2. *Leptonia aeruginosa*. Spores and pileipellis. – Bar: 10 µm (spores), 20 µm (all other figs.).

Observations on the holotype: The holotype consists of several specimens in a relatively good state. Spores 10.0-12.0 × 7.0-9.0 µm, average 10.6 × 8.1 µm, Q = 1.3-1.6, average 1.35, 5-6(-7)-angled in side-view. Basidia 24-40 × 9-14 µm, 4-spored, clampless. Lamellar edge fertile. Cystidia absent. Hymenophoral trama regular, made up of cylindrical elements, 70-200 × 5-18 µm. Pileipellis a cutis with transitions to a tricho-

derm, made up of (broadly) clavate terminal elements, 30-75 × 20-70 µm with pale intracellular pigment. Pileitrama regular, made up of 5-17 µm wide, cylindrical hyphae. Stipitipellis a cutis of parallel, cylindrical hyphae, 5-10 µm wide. Caulocystidia absent. Brilliant granules present in pileitrama. Clamp connections absent.

Notes: The type study is in agreement LARGENT (1977). The greenish tinges in pileus, lamellae, and stipe are distinctive for this species, which, also on account of the microscopical similarity, is close to *Entoloma incanum* (FR.: FR.) HESLER. However, PECK's description does not mention a blue-green discoloration of the stem when bruised, which is very characteristic for the European *E. incanum*. This species is recorded from the Pacific Northwest (RAMSEY 2003).

albinella

Leptonia albinella PECK, Bull. N. Y. State Mus. **1(2)**: 6. 1887; *Leptoniella albinella* (PECK) MURRILL, N. Amer Fl. **10**: 87. 1917; *Entoloma albinellum* (PECK) HESLER, Beih. Nova Hedwigia **23**: 26. 1967. – Fig. 3.

Selected literature: LARGENT, Northwest Sci. **48**: 58. 1974; LARGENT, Biblioth. Mycol. **55**: 157. 1977; LARGENT, Entolomatoid Fungi of the western United States and Alaska: 84. 1994.

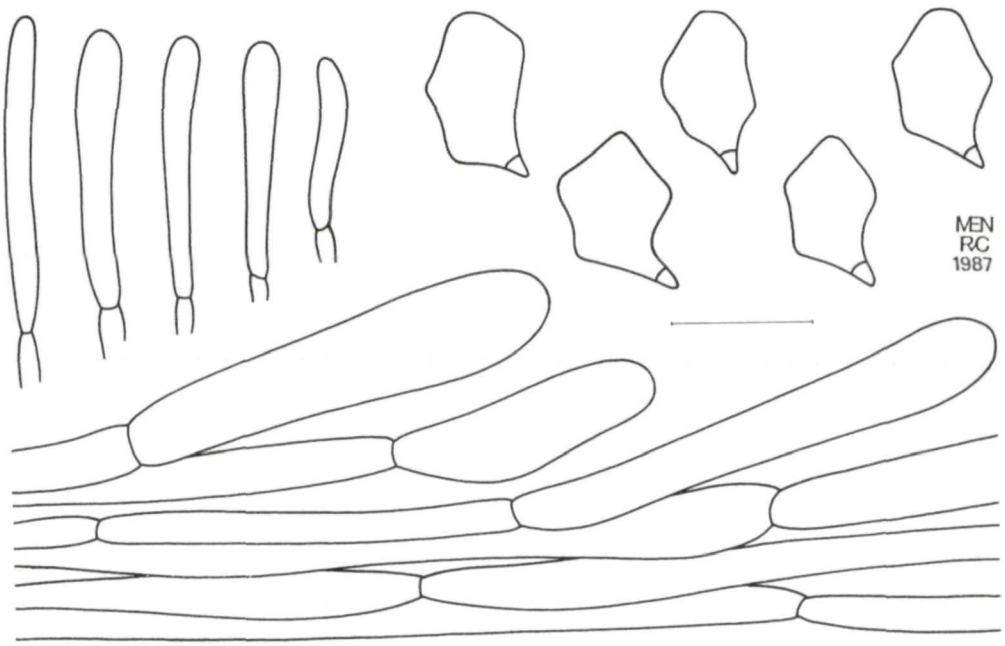

Fig. 3. *Leptonia albinella*. Cheilocystidia, spores and pileipellis. – Bar: 10 µm (spores), 20 µm (all other figs.).

Original diagnosis: Pileus submembranaceous, subconic or convex, subumbilicate, 1.2-2.5 cm broad, surface furfuraceous or minutely squamulose, hygrophanous, whit-

ish and striatulate on the margin when moist, white and shining when dry; lamellae narrow, crowded, adnexed, white, becoming incarnate; stipe equal, hollow, glabrous or slightly pruinose, whitish, 3.5-5 cm long, about 2 mm thick. In bushy places.

Holotype: Sandlake, 6 July, C. H. PECK (NYS).

Observations on the holotype: The holotype is in a very bad condition, and contains four fragments, mainly stipes, glued on paper and a sachet with pileus fragments. Spores 10.0-11.0 × 6.8-8.1 µm, average 10.5 × 7.5 µm, Q = 1.3-1.6, average Q = 1.45, 5-6 angled in side view with dihedral base. Basidia 22-48 × 8-11 µm, 4-spored, clamp-less. Lamellar edge sterile of *serrulatum*-type. Cheilocystidia 22-55 × 5-12 µm, cylindrical to subclavate, thin-walled, colourless. Pileipellis a cutis with transitions to a trichoderm, made up of inflated hyphae with clavate, repent or ascending terminal elements, 40-90 × 10-25 µm with very pale intracellular pigment. Brilliant granules present. Clamp connections absent.

Notes: LARGENT (1974 c) published a type study, and placed *Leptonia albinella* in subgenus *Paludocybe* sect. *Albidicaules* LARGENT. Indeed the morphological features (pileipellis, lack of clamps, presence of brilliant granules, and *serrulatum*-type of lamellar edge) clearly support this placement rather than in subgenus *Alboleptonia*. LARGENT (1994) gives another description based on additional material from Idaho with rare cheilocystidia.

albogriseus

Agaricus albogriseus PECK, Annual Rep. N. Y. State Mus. **31**: 33. 1879; *Clitopilus albogriseus* (PECK) SACC., Syll. Fung. **5**: 703. 1887; *Pleuropus albogriseus* (PECK) MURRILL, N. Amer. Fl. **10(2)**: 106. 1917; *Entoloma albogriseum* (PECK) REDHEAD in GROVES, Publ. Dep. Agric. Canad. 1112, edn **2**: 323. 1979.

Original diagnosis: Pileus firm, convex or slightly depressed in the centre, smooth, pale grey; lamellae moderately close, adnate or slightly decurrent, grayish, then flesh-coored; stem solid, colored like the pileus; spores angular, irregular, .0004-.0003' broad; odor farinaceous. Palnt 2-3' high, pileus 6-12" broad, stm 1"-2" thick. Ground in woods.

Holotype: No type specimen has been available for study. Type locality: Adirondack Mountains.

Notes: HESLER (1963: 352) did not study the type, which probably got lost. GROVES (1979) gives a description of *Clitopilus albogriseus* based on recent material from Canada. He states it is a common species. I have not attempted to get material of GROVES so far.

cinericola

Eccilia cinericola PECK, Bull. Torrey Bot. Club **34**: 347. 1907; *Alboleptonia sericella* var. *lutescens* forma *cinericola* (PECK) LARGENT & BENEDICT, Mycologia **62**: 450. 1970. – *Entoloma album* HESLER, Beih. Nova Hedwigia **23**: 176. 1967 non *Entoloma album* HIROE 1939. – Fig. 4.

Selected literature: LARGENT & BENEDICT, Mycologia **62**: 450-451. 1970.

Original diagnosis: Pileus 15-20 mm broad, thin, fragile, convex, becoming expanded and broadly umbilicate or centrally depressed, glabrous, slightly scabrous, white tinged with yellow becoming cream-colored with age. Lamellae thick, distant, broad, adnate or slightly decurrent, sometimes slightly sinuate, white becoming pink, dusted with the spores. Stipe 20-25 × 2 mm, subcartilagineous, fragile, hollow, slightly enlarged at the apex, white at first, becoming colored like the pileus. On dry, gravelly ground in and among short grass.

Holotype: USA, Massachusetts, Boston, 11 June 1907, S. DAVIS (NYS).

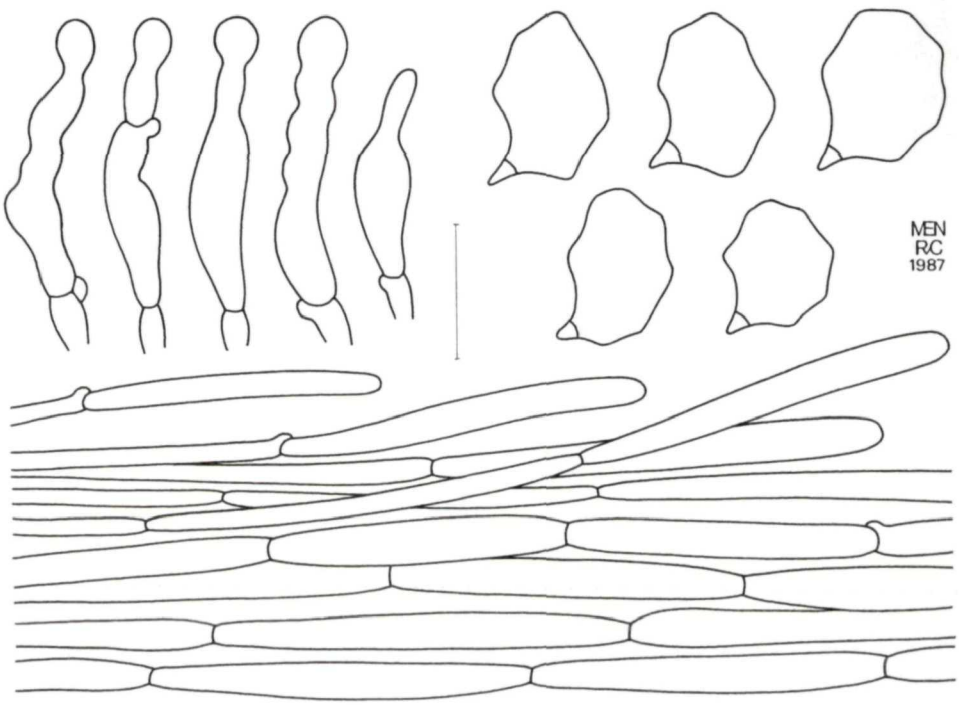

Fig. 4. *Eccilia cinericola.* Cheilocystidia, spores and pileipellis. – Bar: 10 µm (spores), 20 µm (all other figs.).

Observations on the holotype: The type consists of many, well-preserved specimens. Spores 10-12.5 × 7.5-10 µm, average 11.7 × 8.9 µm, Q = 1.2-1.5, average Q = 1.3, 5-7-angled in side-view. Basidia 25-40 × 8-12 µm, 4-spored, with clamp connections. Lamellar edge heterogeneous. Cheilocystidia 27-55 × 4-12 µm, lageniform to tibiiform, with clamp connections, numerous, but always mixed with basidia. Hymenophoral trama regular, made up of short, subcylindrical elements, 40-110 × 4-20 µm. Pileipellis a cutis with transitions to a trichoderm, made up of cylindrical hyphae, 4-17 µm wide. Caulocystidia present at apex of stipe, subcylindrical to clavate or strangulated, 20-45 × 5-12 µm. Pigment absent. Clamp connections numerous.

Notes: The white pileus and stipe, that slightly turns into yellow with age, and the great similarity in microscopical characters, range *Eccilia cinericola* under the synonyms of *Entoloma sericellum.* LARGENT & BENEDICT (1970) did not find clamp con-

nections in the type, and accordingly considered *L. cinericola* a clampless variety of *Alboleptonia sericella*. However, according to my own observations clamp connections are quite conspicuous at the base of the hymenial elements and in the trama of lamellae. So *L. cinericola* is a true synonym of *E. sericellum* and does not deserve an infraspecific rank. *Entoloma album* HESLER is identical (NOORDELOOS 1988).

clintonianus

Agaricus clintonianus PECK, Annual Rep. N. Y. State Mus. **24**: 67. 1872; *Nolanea clintoniana* (PECK) SACC., Syll. Fung. **5**: 723. 1887; *Leptonia clintoniana* (PECK) LARGENT, Northwest Sci. **48**: 58. 1974. – Fig. 4.

Original diagnosis: Pileus 25-35 mm broad, submembranaceous, broadly conic, sometimes expanded and wavy on the margin, white or light gray, a little darker and scabrous-squamulose on the disk, margin striate. Lamellae narrow, crowded, nearly free or easily separating from the stipe, whitish, becoming pale flesh-colored. Stipe 50-100 × 2 mm, equal, smooth, hollow, white, sometimes tinged yellow, with an abundant white mycelium at the base. In swamps.

Holotype: New York, Sandlake, C. H. PECK.

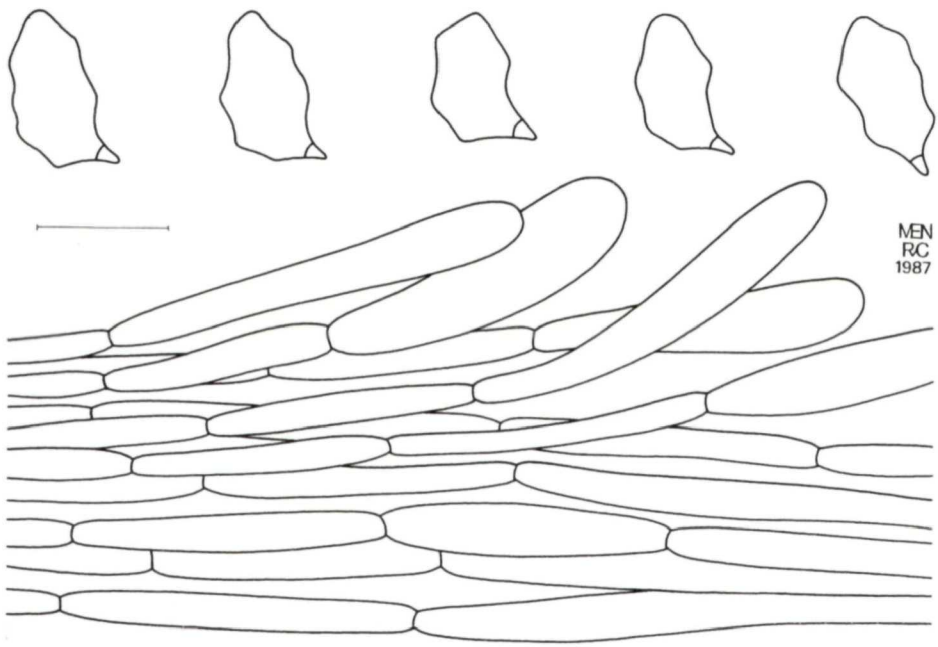

Fig. 5. *Agaricus clintonianus*. Spores and pileipellis. – Bar: 10 µm (spores), 20 µm (all other figs.).

Observations on the holotype: The holotype consists of three fragmented specimens, glued on pieces of paper and additional fragments in a sachet in a relatively bad state. Spores (8.0-)9.0-11.0 × 6.0-7.0 µm, average 10.1 × 6.7 µm, Q = 1.35-1.7, average Q = 1.5, many-angled in side-view with dihedral base. Basidia 25-40 × 10-12 µm, clampless. Lamellar edge fertile. Cystidia absent. Pileipellis a cutis with transitions to a

trichoderm, made up of inflated hyphae with clavate, up to 15 µm wide terminal elements. Pigment pale, intracellular in pileipellis. Vascular hyphae abundant in pileitrama. Clamp connections absent.

Notes: *Agaricus clintonianus* is a rather pale coloured *Leptonia*, which is placed in sect. *Albidicaules* by LARGENT. The spores are remarkably narrow. *Entoloma scabropelle* NOORDEL. from Europe is similar (NOORDELOOS 2004), but has darker colours and a fibrillose striate stipe. The characters of this species are so distinctive, that a new combination is made:

***Entoloma clintonianum* (PECK) NOORDEL., comb. nova**
Basionym: *Agaricus clintonianus* PECK, Annual Rep. N. Y. State Mus. **24**: 67. 1872.

conicus

Agaricus conicus PECK, Ann Rep. N. Y. State Mus. **24**: 66. 1872; *Nolanea conica* (PECK) SACC., Sylloge Fung. **5**: 723. 1887; *Entoloma conicum* (PECK) HESLER, Beih. Nova Hedwigia **23**: 102. 1967.

Original diagnosis: Pileus 8-20 mm broad, submembranaceous, conic, at length expanded, with a minute umbo or papilla, hygrophanous, dull watery cinnamon (10 YR 7/3-7/2 to 7.5 YR 7/4) and striatulate when moist, silky shining, subzonate, pale grayish-cinnamon when dry (10 YR 8/3-4). Lamellae crowded, rather narrow, nearly free, terminating before the margin of the pileus, bright flesh colored (7.5 YR 7-6/6). Stipe 50 × 1 mm, slender, straight, hollow, brown (according to painting distinctly more gray than pileus, about 10 YR 6-5/2, and distinctly fibrillose-striate), with white mycelium at the base. Among mosses and on rotten wood in swamps.

Holotype: USA, New York, Sandlake, Aug. 1872, NYS.

Observations on the holotype: The holotype consists of six specimens glued on paper in a good state. Spores 8.0-9.5 × 6.5-7.5(-8.0) µm, average 8.7-7.2 µm, Q = 1.15-1.35, average Q = 1.2, in majority rather regularly 5-6 angled in side view, but a small fraction 4-angled, almost cuboid. Basidia 22-38 × 7-11 µm, 4-(rarely also 2-)spored, with clamp connections. Lamellar edge fertile. Cystidia absent. Hymenophoral trama regular, made up of long, fusiform elements, 170-400 × 8-25 µm. Pileipellis a thin cutis of narrow, cylindrical hyphae, 2-8 µm wide, with ascending, slightly inflated, up to 15 µm wide terminal elements. Pileitrama regular, made up of long, fusiform elements, 120-300 × 10-20 µm. Pigment minutely encrusting, in particular in upper pileitrama, in addition also pale brown, intracellular in upper layer of pileus. Clamp connections present in hymenium, elsewhere rare.

Notes: *Entoloma conicum* represent an older synonym of *Entoloma alboumbonatum* HESLER and *E. subquadratum* HESLER (LARGENT 1994, NOORDELOOS 1987).

cuspidatus

Agaricus cuspidatus PECK, Annual Rep. N. Y. State Mus. **24**: 64. 1872; *Entoloma cuspidatum* (PECK) SACC., Syll. Fung. **5**: 688. 1887. – Fig. 6.

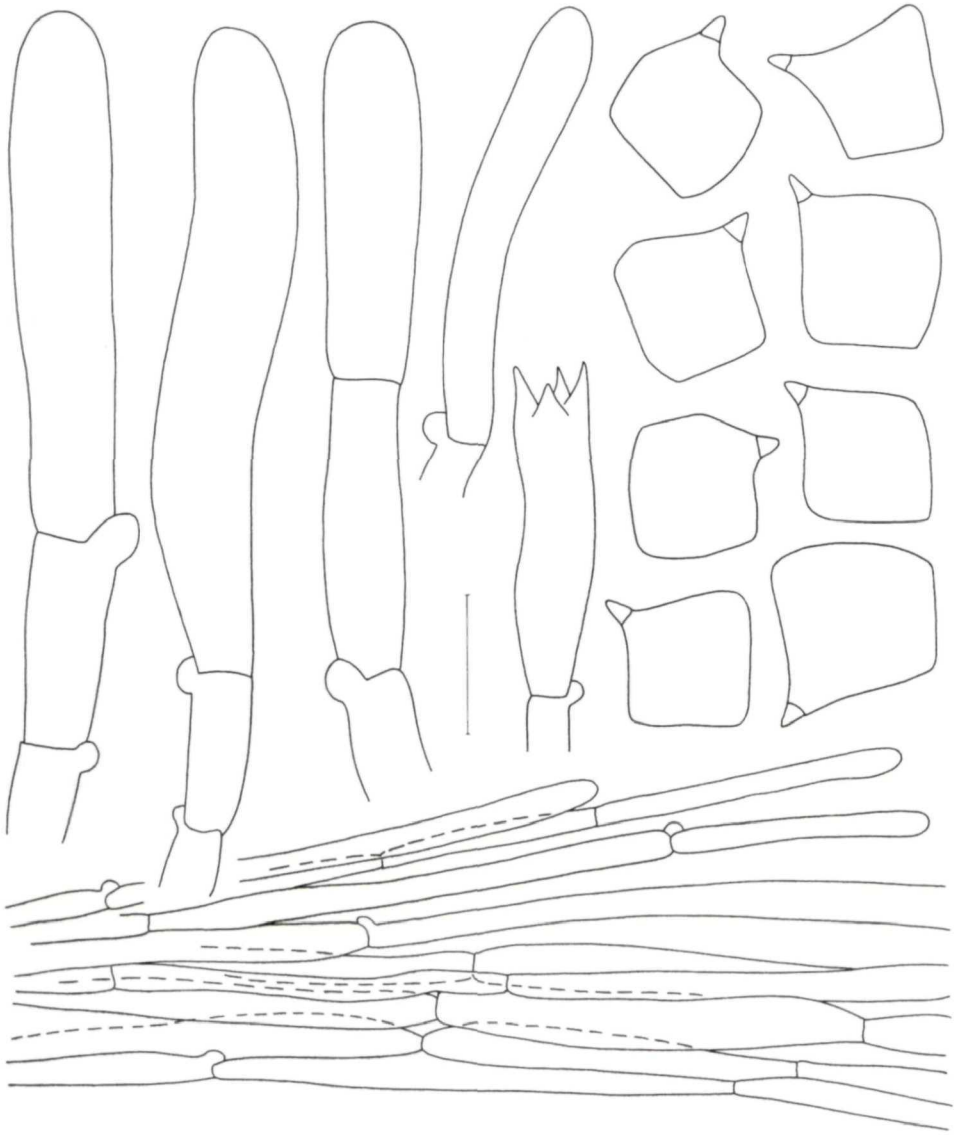

Fig. 6. *Agaricus cuspidatus*. Cheilocystidia, spores and pileipellis. – Bar: 10 µm (spores), 20 µm (all other figs.).

Original diagnosis: Pileus 9-12 lines broad, thin, conical or subcampanulate, smooth, shining, bearing an elongated papilla or cusp at the apex, yellow, the margin often irregular. Lamellae broad, subdistant, narrowed towards the stem, slightly emarginate and attached more or less denticulate on the edge, usually terminating a little before the margin. Stem 3-5 inch × 1-1.5 line, equal, hollow, fibrous, often twisted. Spores subglobose, irregular, 1/3000 inch in diam. In swamps and sphagnous marshes. Apparently closely allied to *A. murrayi*, but the pileus is not striate, and is distinguished by a remarkable cusp. The spores are a little larger than in *A. murrayi*.

Holotype: New York, Sandlake, Aug. 1871, C. H. PECK (NYS).

Observations on the holotype: The holotype consists of several, well-preserved specimens. Spores 9.0-11.7 × 8.0-11.7 µm, cuboid. Basidia 28-60 × 10-15 µm, with clamp connections. Lamellar edge sterile. Cheilocystidia cylindrical to clavate, often septate, 40-145 × 10-16 µm. Hymenophoral trama regular, made up of cylindrical elements, 100-250(-350) × 6-15(-20) µm. Pileipellis a simple cutis of 6-12 µm wide, cylindrical hyphae. Pigment pale brown, intracellular in pileipellis. Clamp connections numerous in all tissues.

Notes: *Entoloma cuspidatum* is considered a synonym of *E. murrayi* (BERK. & CURT.) SACC. HORAK (1976) published a description based on the types and additional collections from E Siberia, Borneo, and Japan, however, with considerably smaller spores (7-9.5 × 7-9.5 µm).

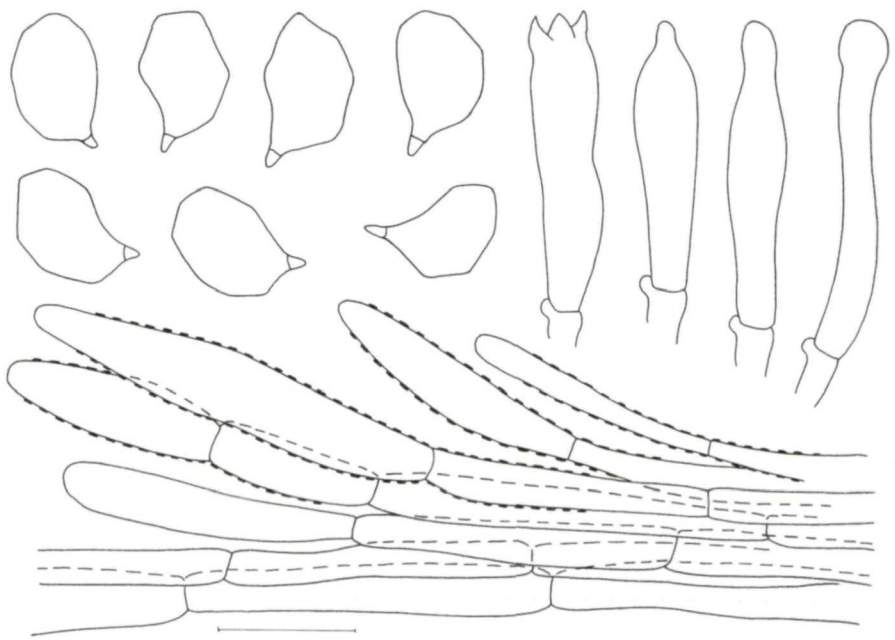

Fig. 7. *Agaricus cyaneus*. Spores, basidium, cheilocystidia and pileipellis. – Bar: 10 µm (spores), 20 µm (all other figs.).

cyaneus

Agaricus cyaneus PECK, Buff. Soc. Nat. Sci. **1**: 49. 1873 non *Agaricus cyaneus* BULL. 1783; *Entoloma cyaneum* [PECK→] SACC., Syll. Fung. **5**: 692. 1887. – *Entoloma violaceum* MURRILL, N. Amer. Fl. **10**: 115. 1917; *Entoloma tjallingiorum* NOORDEL., Persoonia **11**: 465. 1982. – Fig. 7.

Misapplied names: *Agaricus dichrous* sensu E. M. FRIES, Summa Veg. Scand. **2**: 287. 1849. – *Entoloma dichroum* sensu BRES., Icon. Mycol. **12**, pl. 554. 1929; sensu KONRAD & MAUBLANC, Icon. Sel. Fung. **2**, pl. 190., fig. 2. 1932. – *Rhodophyllus dichrous* sensu J. LANGE, Fl. Agar. Dan. **2**, pl. 72A. 1937; sensu ROMAGNESI, Bull. Soc.

Mycol. France **92**: 292. 1976. – *Agaricus placidus* sensu E. M. FRIES, Ic. Sel. Hymenomyc. 1, pl. 97, fig. 1. 1867.

Selected literature: LARGENT, Entolomatoid Fungi of the western United States and Alaska: 36-37. 1994; NOORDELOOS, Persoonia **11**: 465. 1982; NOORDELOOS, Fungi Europei **5**: 429-432, pl. 47a. 1992.

Original diagnosis: Pileus 20-30 mm broad, convex, not hygrophanous, not translucently striate, violet or bluish-purple to brownish violaceous, minutely squamulose; lamellae crowded, sinuate, whitish becoming pink with age; stipe 35-60 × 2-4 mm, cylindrical or slightly broadened downwards, hollow, violaceous at apex, squamulose, whitish at base. On decaying wood or humus in woods.

Holotype: USA, Sandaken-Worchester, C. H. PECK (NYS).

Observations on the holotype: The holotype consists of three specimens, glued on paper and a watercolour painting. Spores 7.5-9.5 × 5.5-6.5 µm, average 8.3 × 6.1 µm, Q = 1.3-1.6, average Q = 1.4, thin-walled, 6-8-angled in side-view. Basidia 35-50(-55) × 7.5-13 µm, 4-spored, with clamp connections. Lamellar edge heterogeneous with numerous cheilocystidia. Cheilocystidia 30-55 × 8-14 µm, subcylindrical to sublageniform. Pileipellis a trichoderm of cylindrical, septate hyphae, 7-14 µm wide with brown internally encrusted walls and brownish intracellular pigment. Stipitipellis a trichoderm of cylindrico-clavate caulocystidia, 35-95 × 7-16 µm with brownish-blue intracellular pigment and internal incrustations. Clamp connections present in hymenium and covering layers.

Notes: There is hardly any doubt that *Agaricus cyaneus* is the same fungus that was known to FRIES from Sweden as *Agaricus dichrous*. The watercolour painting accompanying the type collection, and the microscopical characters fit very well in the current concept of that species. NOORDELOOS (1982) demonstrated that *Agaricus dichrous* sensu FRIES represents a different species that the original, and introduced the name *Entoloma tjallingiorum* NOORDEL. This striking species is now known from several localities all over Europe (NOORDELOOS 2004). The violaceous-blue tinges in the pileus that eventually change into violaceous-brown, the violaceous-blue, finely squamulose stipe, the thin-walled, poorly angled spores, the size and shape of the cheilocystidia, and the typical pigmentation in the pileipellis with intracellular pigment and internally encrusted walls are characteristic and similar to PECK's species. Also LARGENT (1994) suggested the similarity between the European and North American taxa.

The nomenclatural history of the name *Entoloma cyaneum* is complicated because MURRILL, considering the homonymy of PECK's species with *Agaricus cyaneus* BULL. 1783, created the name *Entoloma violaceum* MURRILL to replace it. However, according to art. 72 of the International Code of Botanic Nomenclature, SACCARDO must be considered as the author of *Entoloma cyaneum*. In the above nomenclator, the name of PECK is put in square brackets to indicate the original author of the name. *Entoloma velatum* HESLER is similar, and differs mainly in the pigmentation pattern of the pileus (NOORDELOOS 1988). Further studies on the variability in this group are needed to establish sound specific concepts.

davisiana

Leptonia davisiana PECK, Bull. N. Y. State Mus. **157**: 49. 1912; *Leptoniella davisiana* (PECK) MURRILL, N. Amer. Fl. **10**: 92. 1917. – Fig. 8.

Original diagnosis: Pileus 10-25 mm broad, thin, fragile, submembranaceous, convex, becoming plane or broadly depressed, surface glabrous but slightly squamulose at the center, often widely striate when dry, blackish brown; lamellae thin, crowded, subventricose, adnexed, at first white, becoming pinkish and pulverulent from the spores; stipe 15-30 × 1-2 mm, slender, equal, glabrous, stuffed or hollow, concolorous.

Holotype: Massachusetts, Brooklyn, 2 & 3 Aug. 1911, S. DAVIS.

Observations on the holotype: The holotype consists of several specimens in a relatively good state; the fruitbodies are small, omphalioid, and very dark brown almost black. Spores 9.0-11.0 × 7.0-9.0 µm, average 9.7 × 8.3 µm, Q = 1.0-1.5, average Q = 1.2, subisodiametrical, 5-7-angled in side-view. Basidia 25-35 × 7-10 µm, 4-spored, with clamp connections. Lamellar edge fertile. Cystidia absent. Pileipellis an ixocutis with transitions to an ixotrichoderm, made up of 4-10 µm wide, cylindrical hyphae, at centre with inflated terminal elements, 12.5-15 µm wide. Pigment brown, intracellular. Clamp connections present.

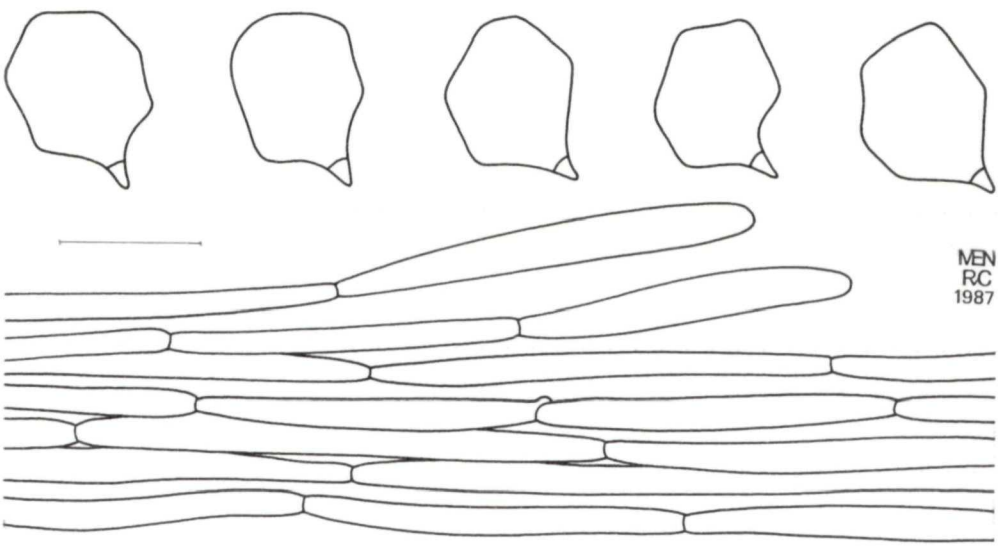

Fig. 8. *Leptonia davisiana*. Spores and pileipellis. – Bar: 10 µm (spores), 20 µm (all other figs.).

Notes: *Leptonia davisiana* is a member of section *Polita* because of the type of pileipellis with narrow, cylindrical, slightly gelatinised hyphae, abundant clamp connections, and the polished stipe. It keys out near *Entoloma politum* (PERS.) DONK, and probably is another synonym of this rather wide-spread northern temperate/boreal species. Compare also *Entoloma maculatum* HESLER (NOORDELOOS 1988).

davisii

Clitopilus davisii PECK, Bull. Torrey Bot. Club **36**: 153. 1909; *Entoloma davisii* (PECK) MURRILL, N. Amer. Fl. **10**: 120. 1917. – Fig. 9.

Original diagnosis: Pileus 30-40 mm broad, convex becoming nearly plane, subumbilicate when dry, gregarious, thin, creamy-white or buff, context white, odor and taste farinaceous, glabrous. Lamellae adnate or slightly decurrent, crowded, narrow, thin, white, becoming flesh-colored. Stipe 50-70 × 4-6 mm, slender, equal or slightly tapering upward, white or whitish, becoming brown or brownish with age, solid or stuffed, subbulbous, often with a white mycelium at the base. Terrestrial along path in forest on gravelly soil; gregarious.

Holotype: Massachusetts, Stow, 3 Sept. 1908, S. DAVIS (NYS).

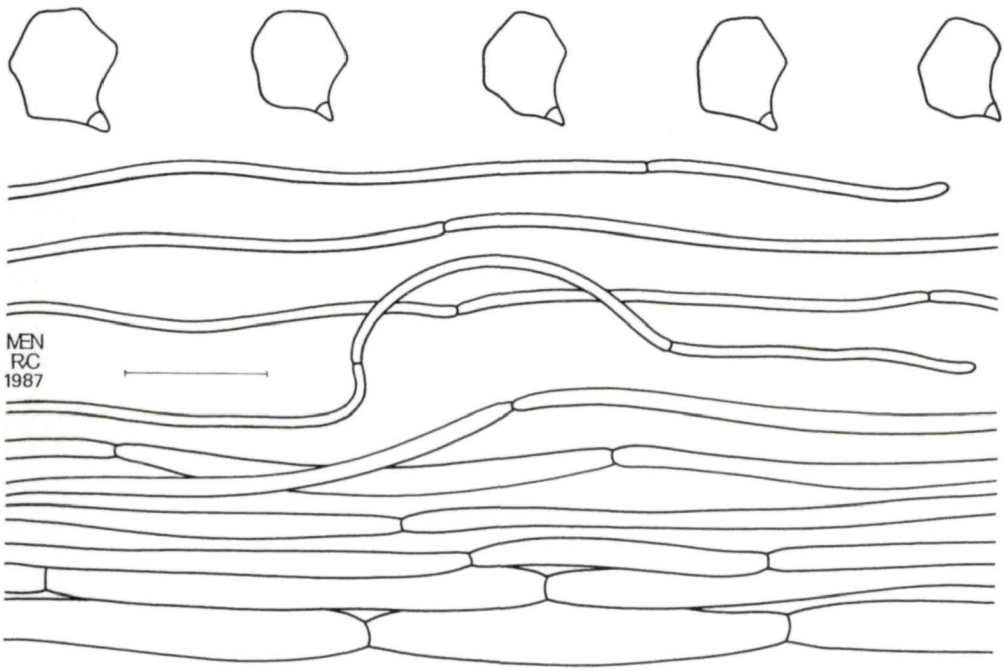

Fig. 9. *Clitopilus davisii*. Spores and pileipellis. – Bar: 10 µm (spores), 20 µm (all other figs.).

Observations on the holotype: The holotype consists of fragments of four to five specimens in a fairly bad state. Spores 7.0-7.5(-8.0) × 6.0-6.5 µm, average 7.1 × 6.3 µm, Q = 1.05-1.2, average Q = 1.15, 5-7-angled in side-view. Basidia 18-30 × 5-10 µm, 4-spored, with clamp connections. Lamellar edge fertile. Cystidia absent. Hymenophoral trama regular, made up of medium elements, 50-175 × 5-35 µm. Pileipellis an ixocutis of narrow, cylindrical hyphae, 1.5-7 µm wide. Pileitrama regular to subregular, made up of short elements, 40-90(-110) 3-14 µm. Pigment pale, intracel-

lular in pileipellis and upper pileitrama. Clamp connections abundant.

Notes: The type collection also includes two descriptions made by S. DAVIS, the collector of the fungus. It is remarkable that these descriptions deviate in a number of characters from the one published by PECK: According to DAVIS the pileus is very slightly hygrophanous and squamulose, and the lamellae are said to be decurrent. For that reason the collector suggested that this could represent a species in *Entoloma* sect. *Leptonidei*. However, the characters of the type collection are fairly well fitting into the macroscopic description of PECK, especially the pileipellis structure, so we must base our concept of this species on PECK's description. *Entoloma davisii*, most likely is a pale-coloured species in subgenus *Rhodopolia*.

delicatulus

Agaricus delicatulus PECK, Annual Rep. N. Y. State Mus. **24**: 66. 1872; *Nolanea delicatula* (PECK) SACC., Syll. Fung. **5**: 723. 1887. – Fig. 10 e.

Original diagnosis: Pileus 12 mm broad, submembranaceous, convex, becoming expanded, fragile; surface smooth, hygrophanous, striatulate when moist, silky when white, pinkish white. Lamellae subdistant, rather broad, ventricose, slightly attached, white, becoming flesh-colored. Stipe 50-75 × 1 mm, long, slender, smooth, hollow, subpellucid, white. In *Sphagnum* swamps.

Holotype: New York, Sandlake, Aug. C. H. PECK (NYS).

Observations on the holotype: The type is in a very poor state, and consists of a few fragments of some pilei and stipes, glued on paper and a few additional fragments in a convolute. Due to this state, the microscopic structures were difficult to observe. Spores (8.0-)9.5-11.0 × 6.5-8.0 µm, average 10.1 × 7.5 µm, Q = 1.2-1.5, average Q = 1.35, 5-8-angled in side-view. Intact basidia or cystidia not seen. No clamps seen. Pileipellis impossible to study.

Notes: From the poor data obtained from the type collection it is very difficult to form a good picture of *Agaricus delicatulus*. Without any doubt it belongs to subgenus *Alboleptonia*. LARGENT (1971) studied the type and succeeded in finding ventricose-rostrate cheilocystidia, 37.5-62.5 × 20-30 × 1.3-3.2 µm. He also failed in analysing the pileipellis. It seems reasonable to consider *Agaricus delicatulus* as a slender form of *Entoloma sericellum* (FR.) P. KUMM.

dysthales

Agaricus dysthales PECK, Annual Rep. N. Y. State Mus. **32**: 28. 1879; *Entoloma dysthales* (PECK) SACC., Syll. Fung. **9**: 83. 1891; *Nolanea dysthales* (PECK) MURRILL, N. Amer. Fl. **10**: 101. 1917; *Rhodopohyllus dysthales* (PECK) ROMAGN., Bull. Soc. Mycol. France **53**: 328. 1937; *Leptonia dysthales* (PECK) KONRAD & MAUBL., Les Agaricales **2**: 184. 1953; *Pouzarella dysthales* (PECK) MAZZER, Biblioth. Mycol. **46**: 105. 1976. – *Inocybe bucknallii* MASSEE, Ann. Bot. **18**: 473. 1904; *Asterosporina bucknallii* (MASSEE) REA, British Basidiomycetes: 213. 1922.

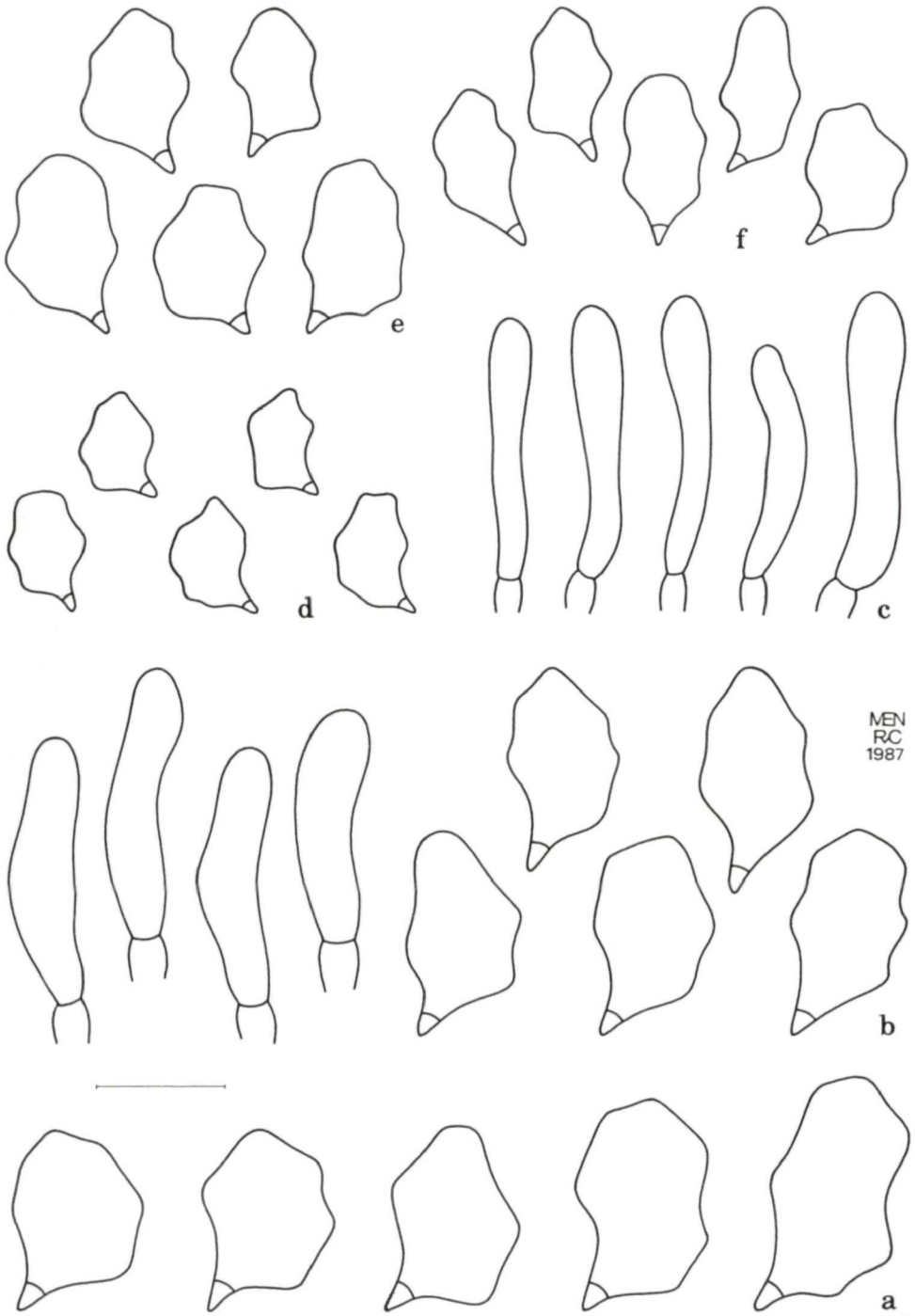

Fig. 10. *a Leptonia longistriata*, spores. *b Leptonia grisea*. Cheilocystidia and spores. *c, d Eccilia flavida*. Spores and cheilocystidia. *e Agaricus delicatulus*, spores. *f Agaricus fucifolius*, spores. – Bar: 10 µm (spores), 20 µm (all other figs.).

Misapplied names: *Nolanea babingtonii* sensu R. W. G. DENNIS, Trans. Brit. Mycol. Soc. **31**: 206. 1948; *Leptonia babingtonii* sensu P. D. ORTON, Trans. Brit. Mycol. Soc. **43**: 177. 1960. – *Rhodophyllus fumosellus* sensu J. LANGE, Dansk Bot. Arkiv **2(11)**: 36. 1921.

Excluded names: *Nolanea dysthales* sensu NATH. WINDAHL, Acta Horti Gotoburg. **16**: 142. 1946 (= *Entoloma dysthaloides* NOORDEL.); *Rhodophyllus dysthales* sensu O. VON SCHULMANN, Karstenia **5**: 31. 1960 (= *Entoloma dysthaloides* NOORDEL.).

Selected literature: MAZZER, Biblioth. Mycol. **46**: 105, figs. 27, 31, 35, 53-57. 1976; NOORDELOOS, Persoonia **10**: 215-219, figs. 7-12. 1979.

Original diagnosis: Pileus 6-12 mm broad, thin, submembranaceous, subconic, becoming convex or expanded, obtuse, surface furfuraceous or squamulose, striate, brown, becoming paler with age; lamellae broad, subdistant, ventricose, brown or grayish brown, becoming flesh-colored, stipe 25-35 × 2 mm, slender, equal, hollow, brownish, squamulose. On damp ground in woods.

Holotype: USA, New York, Catskill Mountains, 1879?, (NYS).

Observations on the holotype: The holotype consists of three specimens glued on paper in relatively bad state. Spores (13.5-)14.0-18.5(-19.5) × (7.5-)8.0-9.5 µm, Q = 1.65-2.1, average Q = 1.85, irregular nodulose-angular, thick-walled, brownish. Basidia 35-60 × 10-16 µm, 4-spored, clampless. Lamellar edge fertile. Cheilocystidia 24-50 × 12.5-20 µm, broadly clavate, truncate or with conic apex, sometimes with rounded supporting cell, with brownish, slightly encrusted walls. Pileipellis a transition between a cutis and a trichoderm, made up of long, septate, thick-walled, encrusted hyphae, 10-35 µm wide at base, tapering towards apex to about 10-15 µm. Stipitipellis a transition between a cutis and a trichoderm, made up of long, septate, brownish encrusted, slightly tapering hairs, 12-35 µm wide at base, and 7-12 µm at apex. Clamp connections absent.

Notes: *Entoloma dysthales* is a well-known member of subgenus *Pouzarella* with dull brown colours, long hairs on pileus and stipe, and large spores. It is widely distributed in the temperate regions of the northern hemisphere, growing in damp places in woods (NOORDELOOS 1979, MAZZER 1976).

edulis

Leptonia edulis PECK, Bull. Torrey Bot. Club **22**: 201. 1895; *Leptoniella edulis* (PECK) MURRILL, N. Amer. Fl. **10**: 93. 1917; *Nolanea edulis* (PECK) LARGENT, Brittonia **23**: 239. 1971. – Fig. 11.

Selected literature: LARGENT, Entolomatoid Fungi of the western United States and Alaska: 264. 1994.

Original diagnosis: Pileus 10-35 mm broad, thin, convex or centrally depressed, with or without an umbo, dark gray, surface velvety, context having a nutty flavor. Lamellae rather broad, subventricose, adnexed, moderately crowded, at first whitish or light drab, becoming flesh-colored. Stipe 25-35 × 1-2 mm, slender, hollow, concolorous, often with an abundant, white, mycelioid tomentum at the base.

Holotype: California, Pasadena, 10 Jan. 1895, A. J. MACCLUTCHIE (NYS).

Observations on the holotype: The holotype consists of fragments of several specimens. Spores 8.0-9.5 × 7.5-8.5 µm, average 8.8 × 8.0 µm, Q = 1.0-1.2, average Q = 1.1, isodiametrical, 5-7-angled in side-view. Basidia 27-40 × 8-11 µm, 4-spored, with clamp connections. Lamellar edge fertile. Cystidia absent. Hymenophoral trama regular, made up of long, inflated elements, 90-350 × 4-20 µm. Pileipellis a cutis of narrow, cylindrical hyphae, 2-5 µm wide. Pileitrama regular, made up of cylindrical to fusiform elements, 110-300 × 5-22 µm. Pigment encrusting all hyphae of pileipellis and upper pileitrama. Clamp connections present and abundant in hymenium, elsewhere not seen.

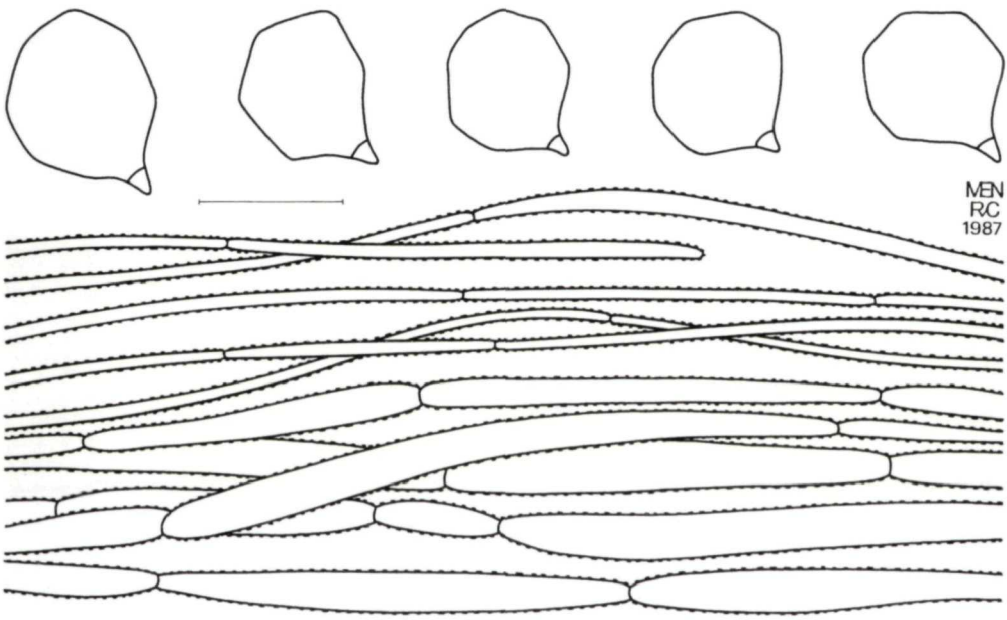

Fig. 11. *Leptonia edulis*. Spores and pileipellis. – Bar: 10 µm (spores), 20 µm (all other figs.).

Notes: HESLER (1963) reported the occurrence of cheilo- and pleurocystidia, but these structures were not found by LARGENT (1971) nor by the present author. LARGENT (1971) did not observe clamp connections in the type, but the present authors' observations revealed abundant clamp connections in the hymenium at the base of the basidia. However, LARGENT (1994) indeed reports the presence of clamp connections. *Entoloma edulis* is in many respects, especially the type of pileipellis, pigmentation, and shape of the spores very similar to *Entoloma sericeum* (BULL.) QUÉL. var. *cinereo-opacum* NOORDEL., from which it mainly differs by the velvety pileal surface, and the nutty smell and taste. Therefore it is considered as a good species in section *Cosmeo-exonema* of subgenus *Nolanea* and the new combination is proposed:

***Entoloma edulis* (PECK) NOORDEL., comb. nova**
Basionym: *Leptonia edulis* PECK, Bull. Torrey Bot. Club **22**: 201. 1895.

Entoloma terreum ESTEVE-RAV. & NOORDEL. from Spain is also similar, but has heterodiametrical spores (NOORDELOOS 2004).

ferruginans

Entoloma ferruginans PECK, Bull. Torrey Bot. Club **22**: 200. 1895. – Fig. 12.

Selected literature: LARGENT, Brittonia **23**: 240. 1971; LARGENT, Entolomatoid Fungi of the western United States and Alaska: 305. 1994; MURRILL, N. Amer. Fl. **10(2)**: 125. 1917.

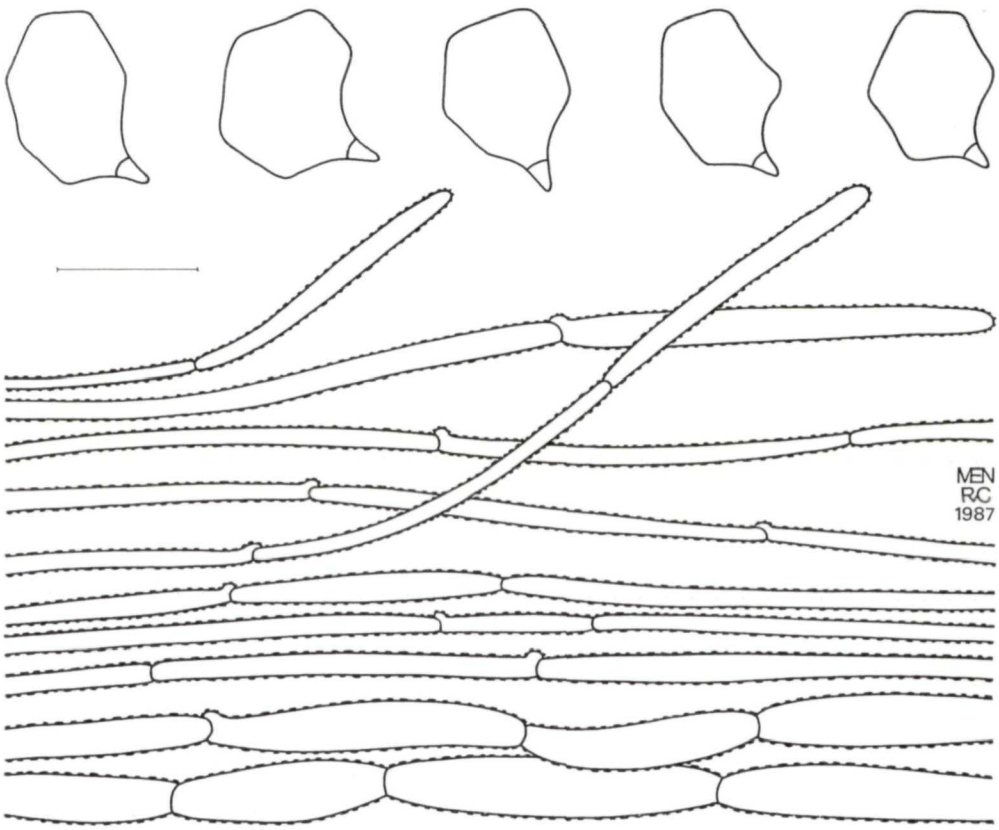

Fig. 12. *Entoloma ferruginans*. Spores and pileipellis. – Bar: 10 µm (spores), 20 µm (all other figs.).

Original diagnosis: Pileus 50-100 mm broad, fleshy, convex, obtuse or umbonate, often irregular, surface hygrophanous, glabrous, shining, finely striate at times, gray or lead-colored to almost black, context whitish, fibrous and colored at the surface, the odor and taste farinaceous in young plants, at length nauseating; lamellae 8-14 mm

broad, adnexed, easily splitting transversely, subcrowded, grayish-salmon, becoming clay-colored; stipe solid, glabrous, white to subconcolorous, blunt at the base or sometimes attenuate and radicate, 75-100 × 10-30 mm. On the ground under *Quercus*.

Holotype: California, Pasadena, 2 Oct. 1895, A. J. MCCLUTCHIE (NYS).

Observations on the holotype: The holotype consists of several, well-preserved specimens. Spores 8.0-10.0 × 7.0-8.0 µm, average 9.0 × 7.7 µm, Q = 1.0-1.2, average Q = 1.1, 6-7-angled in side-view. Basidia 20-45 × 8-12 µm, 4-spored, with clamp connections. Lamellar edge fertile. Cystidia absent. Hymenophoral trama regular, made up of short hyphal elements, 40-130 × 6-34 µm. Pileipellis an ixocutis of narrow, cylindrical hyphae, 2-7 µm wide. Pileitrama almost regular. Pigment abundant, brown, intracellular and also finely encrusting, especially the narrow hyphae of pileipellis. Vascular hyphae abundant in pileitrama. Clamp connections abundant in all tissues.

Notes: LARGENT (1994) gives a full modern description of the species, based on several collections from California, which differs slightly from the type study in the lack of incrusting pigment in the pileipellis. Accordingly it was classified in section *Nolanidea*. Considering the presence of incrusting pigment, I would rather place it in section *Rhodopolia*, stirps *Myrmecophilum*, close to *Entoloma myrmecophilum* (NOORDELOOS 1992, 2004, 2008), from which it mainly differs by the gray-salmon lamellae and stipe subconcolorous with pileus. *Entoloma griseorugulosum* NOORDEL. & FERN.-SASIA from Southern Europe differs by having a distinctly rugulose surface of the pileus, *Entoloma venosum* GILLET has narrower spores, and is associated with conifers. However, species delimitation in this group is very difficult.

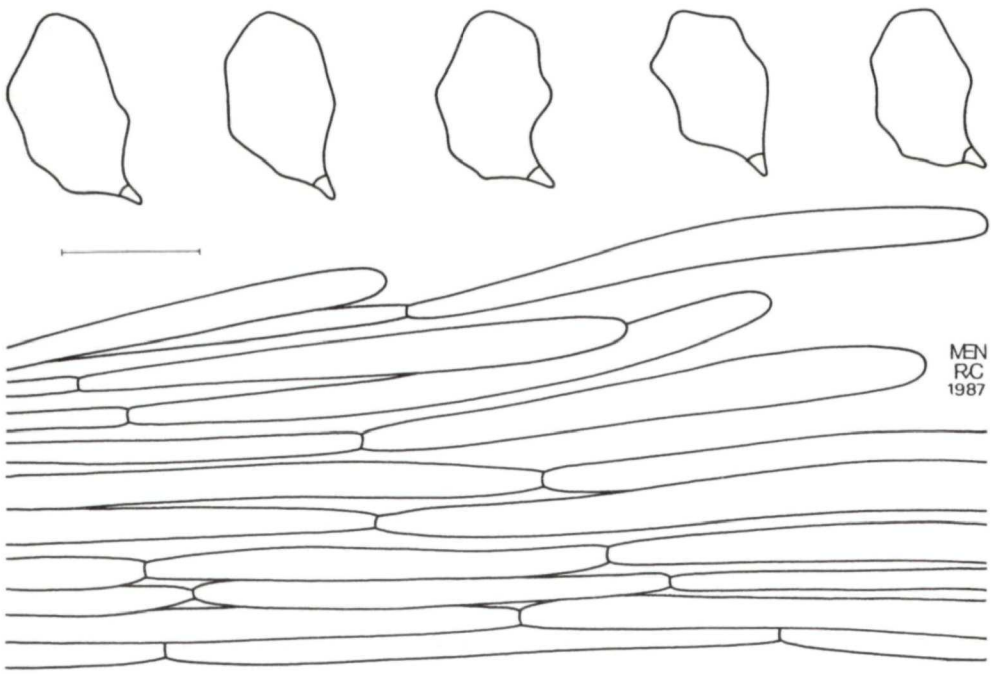

Fig. 13. *Nolanea fibrillosa*. Spores and pileipellis. – Bar: 10 µm (spores), 20 µm (all other figs.).

fibrillosa

Nolanea fibrillosa PECK, Annual Rep. N. Y. State Mus. **54**: 147. 1901. *Entoloma fibrillosum* (PECK) HESLER, Beih. Nova Hedwigia **23**: 127. 1967, non *Entoloma fibrillosum* MURRILL 1917. – *Entoloma fibrosum* HESLER, Mycologia **66**: 716. 1974; *Leptonia fibrosa* (HESLER) LARGENT, Biblioth. Mycol. **55**: 98. 1977. – Fig. 13.

Original diagnosis: pileus 12-20 mm broad, thin, fragile, campanulate or very convex, hygrophanous, brown, striatulate when moist, paler and somewhat shining when dry, fibrillose. Lamellae ascending, close, narrowed behind, adnexed, somewhat ventricose, whitish or pallid becoming salmon color. Stipe 10-20 × 1-2 mm, slender, glabrous, hollow, pallid. On damp or mossy ground in woods.

Holotype: New York, Floodwood, Aug. 1900, C. H. PECK (NYS).

Observations on the holotype: The holotype consists of fragments of one pileus and eight stipes in a relatively poor state. Spores 11.5-13.5 × 7-9 µm, average 12.5 × 8.1 µm, Q = 1.4-1.75, average Q = 1.55, 6-many-angled in side-view. Basidia 22-40 × 8-12.5 µm, 4-spored, with clamp connections. Lamellar edge fertile. Cystidia absent. Pileipellis a cutis with transitions to a trichoderm, made up of cylindrical to weakly inflated hyphae with fusiform or clavate terminal elements, 40-90 × 7-15 µm. Pigment brown, intracellular. Brilliant granules absent. Clamp connections abundant in hymenium.

Notes: The type is in a poor condition, but it became clear that real cystidia are lacking on the edge and sides of the lamellae, contrary to the observations of HESLER (1967), and LARGENT (1977), who apparently copied HESLER's notes. I also found numerous clamp connections in the hymenium. *Entoloma fibrosum* fits well in section *Tristia* of subgenus *Nolanea* on account of the dark, fibrillose pileus and spores which are more or less nodulose. *Entoloma triste* (VELEN.) NOORDEL. is a much darker species, *E. undulatosporum* ARNOLDS & NOORDEL. differs by having smaller spores.

flavida

Eccilia flavida PECK, Bull. Torrey Bot. Club **36**: 153. 1909. – Fig. 10 c, d.

Original diagnosis: Pileus thin, convex, umbilicate, 20-25 mm broad; surface glabrous, pale yellow, obscurely striate when dry; lamellae thin, somewhat crowded, decurrent; stipe 25-35 × 1.5-2 mm, slender, glabrous, hollow, concolorous or a little paler, commonly with white mycelium at the base.

Holotype: Massachusetts, Stow, 8 Nov. 1908, G. E. MORRIS (NYS).

Observations on the holotype: The holotype consists of entirely fragmented remnants of probably two specimens in a relatively good state. Spores 7.0-9.0 × 5.5-6.5 µm, average 8.2 × 5.7 µm, Q = 1.3-1.6, average Q = 1.45, 5-6(-7)-angled in side-view. Basidia 2-, and 4-spored, with clamp connections. Lamellar edge sterile of *serrulatum*-type. Cheilocystidia cylindrical, filamentous, 20-40 × 3-7 µm. Pileipellis a cutis of narrow, cylindrical hyphae, 2-9(-14) µm wide. Pigment difficult to locate, walls not encrusted, but uniformely yellow, also a poorly discernable intracellular pigment present. Clamp

connections present in hymenium, elsewhere not seen.

Notes: *Eccilia flavida* is difficult to place in the genus *Entoloma* on account of the omphalioid habit, sterile lamellar edge and basidia with clamp connections. It probably fits best in subgenus *Omphaliopsis* (NOORDELOOS 2004).

flavifolium

Entoloma flavifolium PECK, Bull. N. Y. State Mus. **105**: 21. 1906. – Fig. 14.

Original diagnosis: Pileus 30-50 mm broad, thin broadly convex or nearly plane, surface glabrous, hygrophanous, watery white and sometimes striatulate on the margin when moist, white when moisture has disappeared, context concolorous, the taste mild or slightly and tardily acrid; lamellae thin, crowded, rounded behind, adnexed, slightly eroded on the edges, pale yellow, becoming pinkish; stipe 35-50 × 4-8 mm, firm, equal, silky-fibrillose, stuffed or hollow, whitish with a white mealiness at the apex. Among fallen leaves in dense woods.

Holotype: New York, Essex City, Post Henry, 8 Aug. 1885, C. H. PECK (NYS).

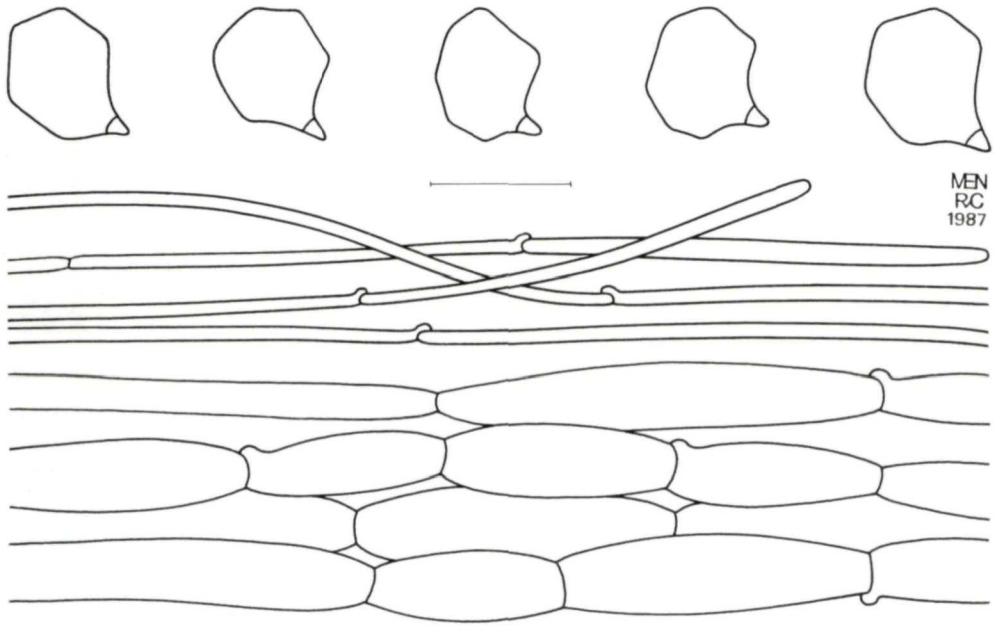

Fig. 14. *Entoloma flavifolium*. Spores and pileipellis. – Bar: 10 µm (spores), 20 µm (all other figs.).

Observations on the holotype: The holotype consists of three, well-preserved specimens. Spores 7.0-9.0 × 6.5-8.0 µm, average 8.1 × 7.2 µm, Q = 1.0-1.2, average Q = 1.1, 5-6-angled in side-view. Basidia 22-45 × 7.5-10 µm, 4-spored, with clamp connections. Lamellar edge fertile. Cystidia absent. Hymenophoral trama regular, made up of short elements, 40-160 × 5-20 µm. Pileipellis a cutis of narrow, cylindrical, 2-6 µm wide hyphae. Pileitrama regular, made up of short elements, 50-180 × 6-30 µm. Pigment practically absent, very pale intracellular in surface hyphae. Clamp connections

abundant in all tissues.

Notes: *Entoloma flavifolium* is a member of section *Rhodopolia*, stirps *Speculum*, and probably a mere form of *Entoloma speculum* (FR.) P. KUMM. with somewhat yellow-tinged lamellae.

flavobrunnea

Leptonia flavobrunnea PECK, Bull. Torrey Bot. Club **36**: 332. 1909. *Leptoniella flavobrunnea* (PECK) MURRILL, N. Amer. Fl. **10(2)**: 93. 1917. – Fig. 15.

Selected literature: LARGENT, Biblioth. Mycol. **55**: 71. 1977.

Original diagnosis: Pileus 10-25 mm broad, thin, fragile, convex, umbilicate or centrally depressed, decurved on the margin, sometimes becoming nearly plane, gragarious; surface subhygrophanous, minutely tomentose at the center, dark brown or reddish brown when young and moist, yellowish brown when dry; context having a slightly farinaceous taste; lamellae adnate or subdecurrent, somewhat crowded, pale lemon-yellow, becoming reddish-ocher or pinkish, sometimes transversily venose; stipe 50-75 × 2-3 mm, slender, fragile, flexuous, terete or compressed, stuffed or hollow, glabrous, fibrous, pallid or lemon-yellow, becoming brownish yellow, often curved and white at the base. In swamps under deciduous trees.

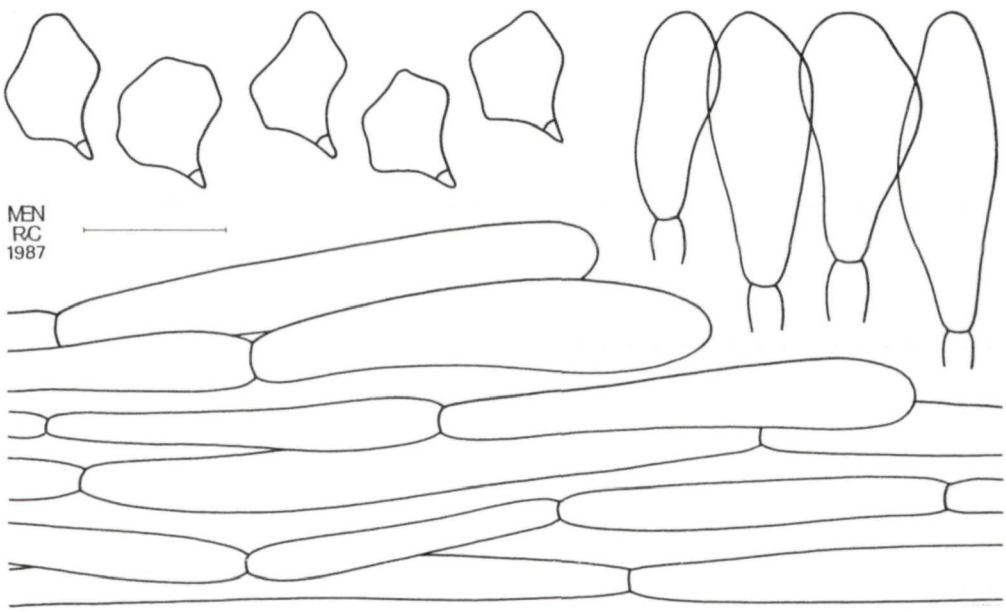

Fig. 15. *Leptonia flavobrunnea*. Spores, cheilocystidia and pileipellis. – Bar: 10 µm (spores), 20 µm (all other figs.).

Notes by the collector: "The color of the pileus is a dark-brown with a yellowish sheen that appears after drying. The color of the gills are a light grayish-lemon-yellow turning into a brownish-rosy from maturity of the spores. Gills are nearly if not truly

decurrent. Stem terete at first then compressed and slightly whitish at base. Scales exeedingly fine and lie flat pointing towards the margin of the pileus. Smell of both fresh and dried plant almost nil; scales are darker and more numerous in umbilicus which is quite broad. Gills sometimes wavy at margin, frequently whitish and transversily veined with raised ribs. Margin of pileus sometimes wavy and inclined to be revolute. Stem attenuated upwards in most plants and whitish and curved in the base. Stem brownish pallid, smooth then shiny. A new *Leptonia* Mrs MORRIS and I think!"

Holotype: Massachusetts, Stow, 24 Aug. 1908, E. MORRIS & S. DAVIS (NYS).

Observations on the holotype: The holotype is in good condition and consists of many, well preserved specimens. Spores 7.0-9.0 × 6.0-7.0 µm, average 8.4 × 6.7 µm, Q = 1.25-1.5, average Q = 1.3, 5-6(-7)-angled in side-view, rather complex, without distinct dihedral base. Basidia 24-40 × 8-11 µm, 4-spored, with clamp connections. Lamellar edge sterile with large, broadly clavate cheilocystidia, 20-48 × 10-20 µm with a thin, hyaline wall. Pileipellis a cutis with transitions to a trichoderm, made up of inflated hyphae, 5-12 µm with narrowly clavate terminal elements up to 20 µm wide. Pigment brown, intracellular, abundant in pileipellis. Clamp connections present in hymenium and also on some septa in pileipellis.

Notes: LARGENT (1977) placed *L. flavobrunnea* in section *Leptonia* on account of the type of pileipellis and hyphae with clamp connections. However, there is not much likeness with typical *Leptonia* species, such as *E. euchroum* or *E. placidum*. *Leptonia flavobrunnea* fits better in section *Griseorubida*, subsect. *Parvisporigerae* (NOORDELOOS 2004). *Entoloma moguntinum* NOORDEL. & PRÜFERT differs by a minutely rugulose, non-striate pileus, and sphaeropedunculate terminal elements in the pileipellis; *E. riofriense* ESTEVE-RAV. & NOORDEL. has more slender, (sub-)capitate cheilocystidia. *Entoloma weholtii* NOORDEL. has very similar clavate cheilocystidia, but differs by the almost glabrous, deeply translucently striate pileus, and the polished stipe surface. It appears a good species, for which the following new combinations is made:

***Entoloma flavobrunneum* (PECK) NOORDEL., comb. nova**
Basionym: *Leptonia flavobrunnea* PECK, Bull. Torrey Bot. Club **36**: 332. 1909.

flavoviride

Entoloma flavoviride PECK, Annual Rep. N. Y. State Mus. **41**: 64. 1888.

Original diagnosis: Pileus 12-20 mm broad, thin, at first broadly conical then convex or subconcave by the upcurving of the margin, dingy yellowish green, slightly silky and shining when dry. Lamellae broad, subdistant, ventricose, free or slightly adnexed, dingy or cinereous. Stem 25-75 × 2.5-5 mm, equal, hollow, fibrous striate, whitish. In low swampy woods. Karner, August.

Holotype: New York, Karner, Aug. 1907, C. H. PECK (NYS).

Observations on the holotype: The holotype consists of fragments of several specimens, partly glued on pieces of paper. Spores 10-14(-14.5) × 7-9(-10) µm, average 12.5 × 8.5 µm, 5-7-angled in side-view. Basidia 25-60 × 8-15 µm, 4-spored, clampless.

Lamellar edge heterogeneous. Cheilocystidia 40-70 × 12-25 × 2-6 µm, lageniform or clavate, numerous, mixed with basidia. Pleurocystidia similar to cheilocystidia, very sparse. Hymenophoral trama regular, made up of cylindrical elements, 40-110 × 5-16 µm with finely encrusted walls. Pileipellis a cutis with transitions to a trichoderm, made up of inflated hyphae with terminal elements 60-150 × 12-25 µm. Pigment membranal and finely encrusting the narrowest hyphae of pileipellis and pileitrama, in addition also pale, intracellular. Brilliant granules absent. Clamp connections absent.

Notes: *Entoloma flavoviride* belongs to subgenus *Pouzarella*, section *Versatilia*, and is probably identical with *Pouzarella splendens* MAZZER, a later synonym (NOORDELOOS 1988: 152).

fumosonigrum

Entoloma fumosonigrum PECK, Bull. N. Y. State Mus. **167**: 42. 1913. – Fig. 16.

Original diagnosis: Pileus 30-50 mm broad, fleshy, thin, convex or nearly plane, surface dry, subglabrous, smoky-black, margin involute, context white, the taste disagreable; lamellae moderately crowded, sinuate-adnate, eroded on the edges, at first white, becoming pale pink; stipe 40-50 × 2-4 mm, slender, equal or slightly tapering upward, stuffed, glabrous or fibrillose, pruinose at the apex, concolorous or a little paler than pileus, with a white, mycelioid tomentum at the base, sometimes entirely white. In swamp under deciduous trees.

Holotype: Massachusetts, Stow, 13 Sept. 1911, S. DAVIS (NYS).

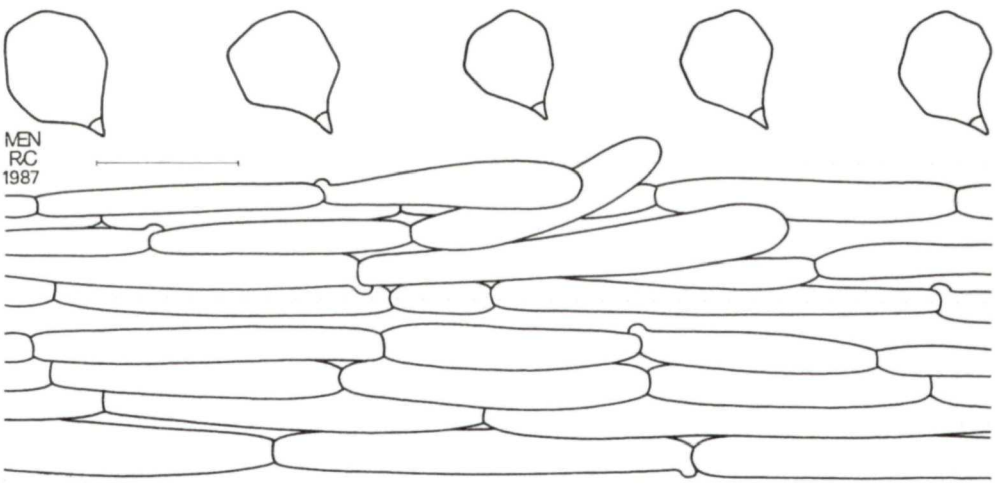

Fig. 16. *Entoloma fumosonigrum*. Spores and pileipellis. – Bar: 10 µm (spores), 20 µm (all other figs.).

Observations on the holotype: The holotype consists of seven well preserved specimens. Spores 7.0-8.0 × 6.5-7.0 µm, average 7.7 × 6.6 µm, Q = 1.05-1.3, average Q = 1.15, 5-8-angled in side-view, very thin-walled and weakly angled. Basidia 32-48 × 7-12 µm, 4-spored, with clamp connections. Lamellar edge fertile. Hymenophoral trama regular, made up of short, inflated elements, 35-120 × 7-22 µm. Pileipellis a cutis of narrow, 6-12 µm wide, cylindrical hyphae. Pileipellis probably two-layered: a thin cu-

tis of narrow hyphae, very difficult to observe in the type specimens covers the subpellis made up of short, inflated elements, 25-90 × 4-24 µm. Pigment abundant, brown, intracellular in pileipellis. Clamp connections abundant.

Notes: The habit, in combination with the small, isodiametrical, and weakly angled spores range *Entoloma fumosonigrum* in subgenus *Entoloma*, sect. *Turfosa*.

fuscifolius

Agaricus fuscifolius PECK, Bull. Buffalo Soc. Nat. Sci. **1**: 49. 1873; *Nolanea fuscifolia* (PECK) SACC., Syll. Fung. **5**: 720. 1887. – Fig. 10 f.

Original diagnosis: Pileus 6-12 mm broad, thin, conic or campanulate, papillate, surface smooth, hygrophanous, dark brown and striatulate when moist, grayish brown and shining when dry; lamellae ascending, rather crowded, narrowed towards each end, brown; stipe 25 × 1 mm, equal, stuffed, smooth, concolorous, with a white mycelium at base. On old logs in woods.

Holotype: New York, Maryland, Ortego Co., leg. C. H. PECK (NYS).

Observations on the holotype: The holotype consists of fragments of a few specimens in a rather poor state, glued on a piece of paper. Spores 8.5-12.5 × 5.5-7.2 µm, average 10.2 × 6.5 µm, Q = 1.25-2.0, average Q = 1.6, 5-8 angled, very irregular, sometimes almost nodulose with a rather acute apiculus. Basidia 4-spored. Lamellar edge fertile. Cystidia absent. Pileipellis a cutis of cylindrical hyphae, 4-12 µm wide. Trama of hymenophore and pileus with long fusiform elements. Pigment brown, encrusting in pileipellis, hymenophoral trama and stipitipellis. Clamps not seen with certainty due to bad state of the material.

Notes: The microscopical data, together with the impression of the water-colour painting suggest that *Nolanea fuscifolia* is very close to *Entoloma papillatum* (BRES.) HESLER.

fuscogrisellus

Agaricus fuscogrisellus PECK, Annual Rep. N. Y. State Mus. **39**: 40. 1891; *Nolanea fuscogrisella* (PECK) SACC., Syll. Fung. **5**: 88. 1891; *Rhodophyllus fuscogrisellus* (PECK) ROMAGN., Bull. Soc. Mycol. France **49**: 436. 1933; *Leptonia fuscogrisellus* (PECK) LARGENT, Biblioth. Mycol. **55**: 81. 1977. – Fig. 17.

Original diagnosis: pileus submembranous, convex, conic or campanulate, either with or without a central papilla, hygrophanous, grayish-brown and striatulate when moist, paler and shining when dry, but the disk or papilla often remaining dark colored; lamellae moderately close, subventricose, whitish, then flesh-colored; stem slender, brittle, glabrous, hollow, slightly pruinose or mealy at the top, pallid or livid, with a white mycelium at the base. Pileus 6 to 12 lines broad, stem 1.5-3 in long, 1 to 2 lines thick. Mossy ground in open places. Adirondack Mountains. Aug. This is more slender than *A. pascuus* to which it is related, and its stem is not fibrous and silky.

Holotype: New York, Adirondack Mountains, Forge, Aug. (1885?), C. H. PECK (NYS).

Observations on the holotype: The holotype consists of two not very well preserved specimens with conical pileus and an additional package with about 17 specimens. Spores 11-13 × 7.5-9 µm, average 11.7 × 8.0 µm, Q = 1.35-1.6, average Q = 1.45, 6-7-angled in side-view. Basidia 35-55 × 10-13 µm, 4-spored, with clamp connections. Lamellar edge heterogeneous. Cheilocystidia 40-70 × 15-35 µm, lageniform to broadly lageniform, scattered among the basidia. Hymenophoral trama regular, made up of long, fusiform elements, 130-360 × 5-20 µm. Pileipellis a cutis with transitions to a trichoderm, made up of 6-18 µm wide, inflated hyphae with clavate terminal elements, 90-150 × 4-18 µm. Pileitrama regular, made up of long, fusiform elements as in the hymenophoral trama. Pigment brown, abundant, intracellular in pileipellis and upper pileitrama. Brilliant granules absent. Clamp connections very abundant in all parts.

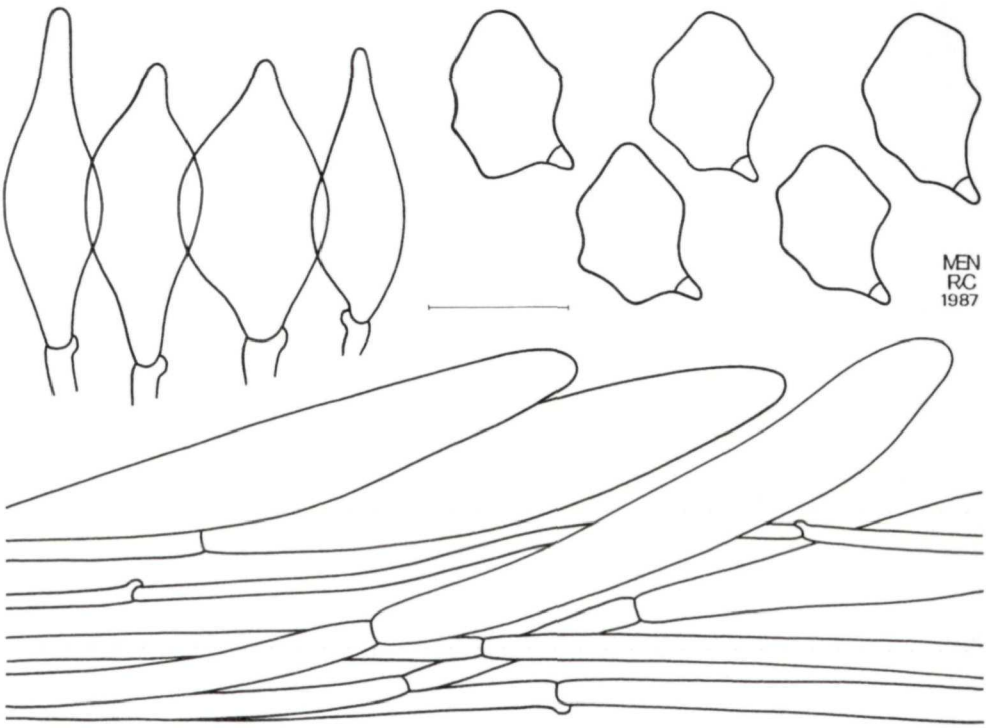

Fig. 17. *Agaricus fuscogrisellus*. Cheilocystidia, spores and pileipellis. – Bar: 10 µm (spores), 20 µm (all other figs.).

Notes: The macroscopical description does not indicate unevennes of the pileal surface. However, the microscopical structure of the pileipellis reveals that it must have been at least radially fibrillose. Therefore it is not surprising that LARGENT (1977: 81) places it in *Leptonia* sect. *Leptonia*. However, PECK compared it with *Agaricus pascuus*, a typical *Nolanea* species. In NOORDELOOS (2004) it keys out close to *Entoloma velenovskyi* NOORDEL. which has similar large spores and cheilocystidia.

gracilipes

Leptonia gracilipes PECK, Mycologia **5**: 69. 1913; *Leptoniella gracilipes* (PECK) MURRILL, N. Amer. Fl. **10(2)**: 92. 1917.

Selected literature: LARGENT, Entolomatoid Fungi of the western United States and Alaska: 148-149. 1994.

Original diagnosis: Pileus 10-20 mm broad, thin, membranous, hemispheric-convex or nearly plane, minutely papillate, becoming umbilicate, surface subscabrous, hygrophanous, striatulate when moist, striate when dry, blackish-brown when young, becoming paler with age; lamellae ascending or arcuate, adnexed, white at first, then pale flesh-colored; stipe 20-40 × 1-1.5 mm, equal or slightly tapering upward, slender, hollow, glabrous, mouse-gray, becoming blackish on drying, often with white mycelium at the base.

Holotype: Missing at NYS. Type-locality: Massachusetts, Stow.

Neotype (LARGENT 1977: 214): Massachusetts, Stow, date and leg. unknown, labelled *Leptoniella gracilipes* PECK in the MURRILL Herbarium (NY).

Notes: Neotype not studied. LARGENT (1977) provided the following data on the neotype: Spores 8-10 × 7-8 µm, average 9.3 × 7.3 µm, 5-6-sided in side-view. Basidia 26-35 × 8-10 µm, 4-spored, clampless. Lamellar edge entirely sterile. Cheilocystidia 37.5-52.5 × 10-15 µm, clavate. Pileipellis a trichoderm with transitions to a hymeniderm at centre, made up of clavate terminal elements, 30-65 × 12.5-28.7 µm. No information is given on the occurrence of clamp connections in the neotype. LARGENT (1994) gives a full description, which confirm its status as a good species in section *Cyanula* stirps *Asprellum*. It is very similar to *Entoloma poliopus* (ROMAGN.) NOORDEL. (NOORDELOOS 1992, 2004, 2008). Also *Entoloma nigrosquamosum* HESLER and *E. highlandense* HESLER are very similar (NOORDELOOS 1988).

grande

Entoloma grande PECK, Annual Rep. N. Y. State Mus. **50**: 101. 1897. – Fig. 18.

Selected literature: LARGENT, Entolomatoid Fungi of the western United States and Alaska: 309. 1994.

Original diagnosis: Pileus 100-150 mm broad, fleshy, thin towards the margin, convex, becoming nearly plane, generally umbonate, subcespitose, surface usually centrally rugulosely wrinkled, moist in wet weather, glabrous, yellowish-white, becoming brownish or grayish brown; context white, the odor and flavor farinaceous; lamellae broad, subdistant, slightly adnexed, becoming free or nearly so, often wavy or eroded on the edges; whitish, becoming pinkish; stipe 100-150 × 15-25 mm, equal, solid, slightly fibrous externally, mealy at apex. Terrestrial in woods.

Holotype: New York, Menands, Aug., leg. C. H. PECK (NYS).

Observations on the holotype: The holotype consists of several, well preserved specimens. Spores 8.0-9.0 × 6.5-8.0 µm, average 8.4 × 7.2 µm, Q = 1.05-1.3, average Q = 1.15, 5-7-angled in side-view. Basidia 36-45 × 9-14 µm, 2- and 4-spored, with clamp connections. Lamellar edge fertile. Cystidia absent. Hymenophoral trama regular, made up of inflated elements, 17-90 × 5-22 µm. Pileipellis an ixocutis of narrow, cylindrical hyphae, 2-8 µm wide, septa with clamp connections. Pileitrama regular, made up of inflated elements, 25-70(-110) × 4-20 µm. Pigment pale brown, intracellular in upper pileitrama. Vascular hyphae present in pileitrama. Clamp connections abundant in all tissues.

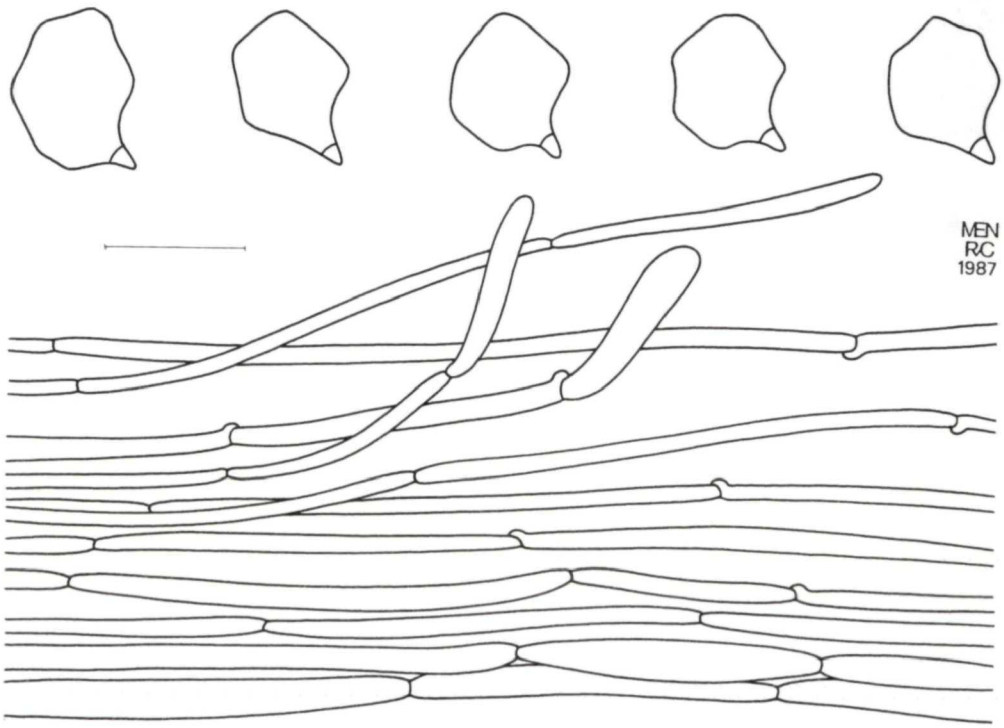

Fig. 18. *Entoloma grande*. Spores and pileipellis. – Bar: 10 µm (spores), 20 µm (all other figs.).

Notes: *Entoloma grande* must be placed in sect. *Rhodopolia* on account of its fairly stout, tricholomatoid habit, type of pileipellis, and isodiametrical spores. It is similar to *E. sinuatum* (BULL.) P. KUMM. from which it differs by the lack of yellow colour in the lamellae, and the farinaceous smell.

grayanus

Agaricus grayanus PECK, Annual Rep. N. Y. State Mus. **24**: 64. 1872; *Entoloma grayanum* (PECK) SACC., Syll. Fung. **5**: 698. 1887. – Fig. 19.

Original diagnosis: Pileus 40-50 mm, fleshy, convex, frequently wavy or irregular, hygrophanous, dull watery yellow when moist, smooth, shining and nearly white when dry. Lamellae plane, close, flesh-colored. Stem 50-75 × 5-8 mm, equal, solid, white. Spores subglobose, irregular, 1/3000 inch long. Gregarious, in old roads.

Holotype: New York, Sandlake, Aug., C. H. PECK (NYS).

Observations on the holotype: The holotype consists of several specimens in bad state, covered by moulds. Also a nice painting is present. Spores 8.0-10.5 × 7.0-9.0 µm, average 8.5 × 7.4, Q = 1.0-1.25, average Q = 1.15, 5-8-angled in side-view. Basidia 25-42 × 8-11 µm, 4-spored, with clamp connections. Lamellar edge fertile. Cystidia absent. Hymenophoral trama regular, made up of short elements, 40-100 × 9-18 µm. Pileipellis a cutis of narrow, cylindrical hyphae, 1-5 µm wide, subpellis well developed, made up of inflated elements, 20-70(-100) × 5-20 µm, gradually passing into pileitrama. Pileitrama regular, made up of short, inflated elements, 70-100 × 5-25 µm. Pigment pale, intracellular in pileipellis, especially in subpellis. Clamp connections abundant in all tissues.

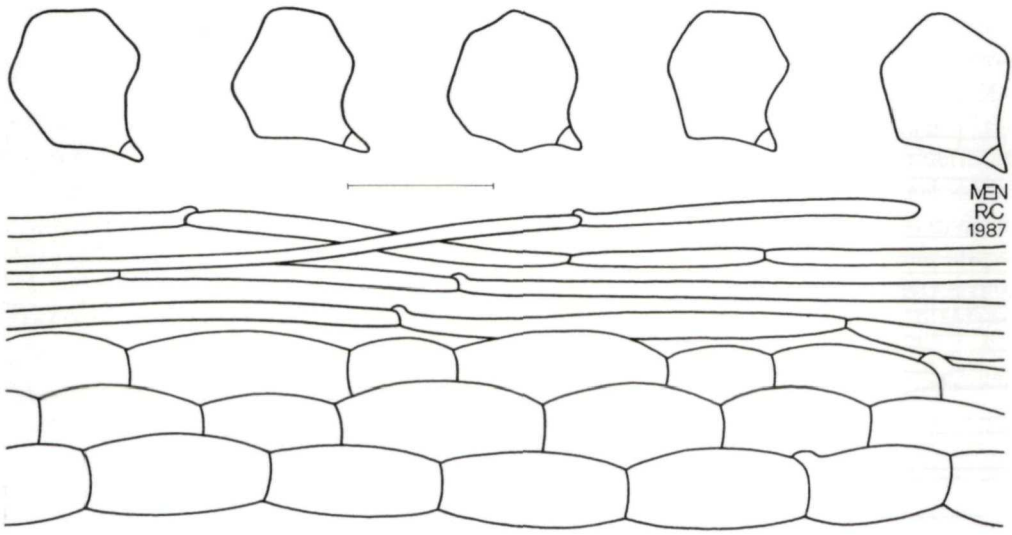

Fig. 19. *Agaricus grayanus*. Spores and pileipellis. – Bar: 10 µm (spores), 20 µm (all other figs.).

Notes: The type-plate depicts a medium *Entoloma* from sect. *Rhodopolia* with a white pileus tinged with gray, almost purely pink lamellae and a concolorous stipe. These characters, together with the microscopical data confirm that *Entoloma grayanum* is very close to *E. speculum* FR. It also resembles *E. grande* PECK, from which it mainly differs in the smaller basidiocarps.

grisea

Leptonia grisea PECK, Annual Rep. N. Y. State Mus. **45**: 79(19). 1893; *Leptoniella grisea* (PECK) MURRILL, N. Amer. Fl. **10(2)**: 91. 1917; *Entoloma griseum* (PECK)

HESLER, Beih. Nova Hedwigia **23**: 39. 1967 non *E. griseum* PECK 1904. – *Entoloma squamatum* HESLER, Mycologia **66**: 716. 1974. – Fig. 10 b.

Selected literature: COURTECUISSE, Doc. Mycol. **14 (54-55)**: 82. 1984; HESLER, Brittonia **15**: 335. 1963; HESLER, Beih. Nova Hedwigia **23**: 116. 1967; LARGENT, Entoloma-toid Fungi of the western United States and Alaska: 172-173. 1994.

Original diagnosis: Pileus 12-25 mm broad, broadly convex or plane, umbilicate, striatulate when moist, glabrous except the squamulose umbilicus, grayish brown. Lamellae broad, subdistant, grayish. Stem 40-65 × 2 mm, slender, hollow, glabrous, colored like the pileus. Among *Sphagnum* or on the ground in wet woods. This species is easily known by its nearly uniformly grayish color and its globose spores.

Holotype: New York, Lake Pleasant, Aug. 1892, C. H. PECK (NYS).

Observations on the holotype: The holotype consists of two fragments in a rather poor state. Spores 11-16 × 8-11 µm, average 13 × 9.7 µm, Q = 1.2-1.55, average Q = 1.4, 5-7-angled in side-view. Basidia 30-50 × 10-17 µm, 4-spored, with clamp connections. Lamellar edge fertile. Cystidia absent. Pileipellis a cutis with transitions to a trichoderm, made up of inflated, 9-20 µm wide hyphae, with clavate terminal elements, 30-100 × 10-35 µm. Pigment brown, intracellular in pileipellis and upper pileitrama. Clamp connections abundant in hymenium, also seen in covering layers.

Notes: The study of the type-collection deviates so much from that of LARGENT (1977: 262), that I have no doubt that LARGENT studied a carpophore belonging to another species in sect. *Cyanula*. This carpophore is no longer part of the type-collection. The remaining type-specimens clearly represent a species in subgen. *Leptonia* sect. *Leptonia* because of the trichodermal pileipellis and basidia with clamp connections. It comes very close to *Entoloma wynnei* (BERK. & BROOME) SACC., on account of the large spores, but it clearly differs from that species by the brown colour of the stipe, and the lack of cheilocystidia. Therefore I think that *Leptonia grisea* PECK is a good species. Since the epithet *griseum* has already been used in connection with *Entoloma* (see below), the correct name of this species is *Entoloma squamatum* HESLER (HESLER 1974).

griseum

Entoloma griseum PECK, Bull. N. Y. State Mus. **75**: 14. 1904. – Fig. 20.

Selected literature: COURTECUISSE, Doc. Mycol. **14 (54-55)**: 82. 1984; HESLER, Brittonia **15**: 335. 1963.

Original diagnosis: Pileus 25-75 mm broad, broadly campanulate or convex, fleshy, firm, obtuse or slightly umbonate, glabrous, often irregular, hygrophanous, grayish brown when moist, paler when dry. Lamellae adnexed, emarginate with a decurrent tooth, about 2 lines broad, pale pink. Stipe 1-2 inches long, 3-5 lines broad, equal or slightly tapering upward, silky fibrillose, pruinose or mealy at the top, stuffed or hollow, grayish white. Context whitish. Smell and taste farinaceous. Under spruce and balsam fir trees.

Holotype: USA, Lake Pleasant, 12 Aug. 1904, C. H. PECK (NYS).

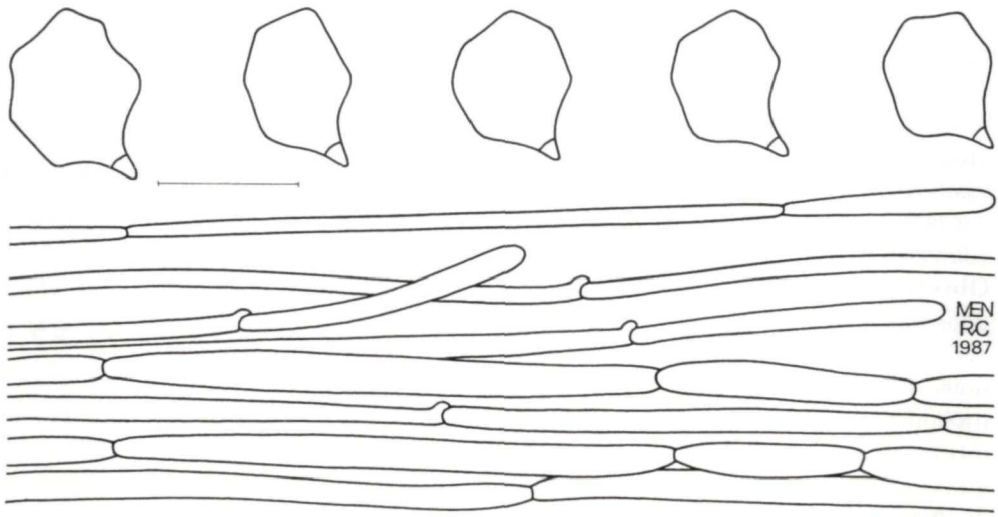

Fig. 20. *Entoloma griseum*. Spores and pileipellis. – Bar: 10 µm (spores), 20 µm (all other figs.).

Observations on the holotype: The holotype consists of four specimens in a rather bad state. The lamellae are remarkably dark cinnamon brown. Spores (7.5-)8.0-9.0 × 6.8-8.1 µm, average 8.3 × 7.2 µm, Q = 1.0-1.25, average Q = 1.15, 6-8-angled in side-view. Basidia 24-40 × 8-11 µm, 4-spored, with clamp connections. Lamellar edge fertile. Cystidia absent. Hymenophoral trama regular, made up of short elements, 40-95 × 6-22 µm. Pileipellis a cutis of narrow, cylindrical hyphae, 2-7 µm wide. Pileitrama regular, made up of short elements. Pigment brown, intracellular in pileipellis and upper pileitrama. Clamp connections abundant in all tissues.

Notes: *Entoloma griseum* keys out in section *Rhodopolia*, where it comes close to *E. grayanum* PECK.

howelii

Nolanea howelii PECK, Bull. N. Y. State Mus. **150**: 59. 1911; *Entoloma howelii* (PECK) DENNIS, Bull. Soc. Mycol. France **69**: 159. 1953; *Leptonia howelii* (PECK) DENNIS, Kew Bull. Add. Series **3**: 78. 1960. – Fig. 21.

Selected literature: LARGENT, Biblioth. Mycol. **55**: 108-109. 1977; LARGENT, Entolomatoid Fungi of the western United States and Alaska: 50. 1994.

Original diagnosis: Pileus 10-20 mm broad, conic or convex, thin, intensely blue, minutely tomentulose. Lamellae subdistant, adnate, broad, pale yellow or straw color, becoming flesh color. Stipe 40-60 × 1-2 mm, equal, hollow, colored like the pileus, gla-

brous but covered with white fibrils at the base. Among fallen leaves in damp places in thick woods.

Holotype: Indiana, Rockville, September 1910, S. HOWELL (NYS).

Observations on the holotype: The type collection is very poor, consisting of the remnants of one pileus and several stipes. Spores 10-12 × 6-8 µm, average 11.1 × 7.1 µm, Q = 1.45-1.85, average Q = 1.55, many-angled in side-view. Basidia 25-45 × 7-11.5 µm, 4-spored, clamp connections not seen with certainty because of the bad state of the material. Lamellar edge not studied. Pileipellis a cutis with transitions to a trichoderm, made up of inflated elements, up to 20 µm wide. Pigment intracellular in pileipellis. Brilliant granules present in pileitrama. Clamp connections not seen with certainty.

Notes: *Entoloma howelii* fits well in section *Cyanula*, close to *Leptonia convexa* LARGENT (= *Entoloma largentii* COURTEC., see LARGENT 1994).

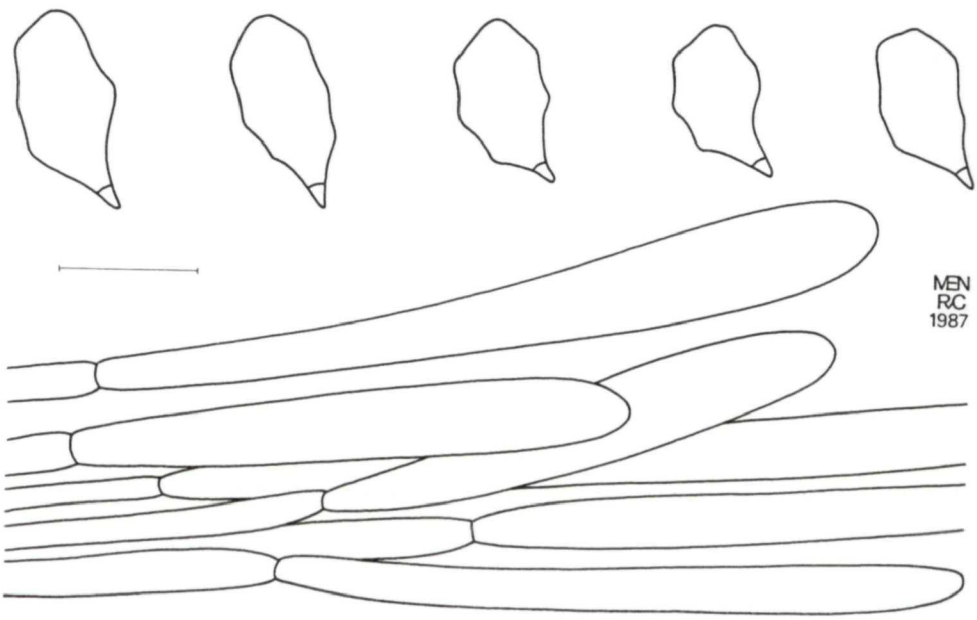

Fig. 21. *Nolanea howelii*. Spores and pileipellis. – Bar: 10 µm (spores), 20 µm (all other figs.).

longistriata

Leptonia longistriata PECK, Bull. N. Y. State Mus. **50**: 57. 1911; *Entoloma longistriatum* (PECK) NOORDEL., *Entoloma* North America **1**: 12. 1988. – *Rhodophyllus majusculus* KÜHNER & ROMAGN., Rev. Mycol. **19**: 6. 1954 (Compl. Fl. Anal. 1); *Leptonia majuscula* (KÜHNER & ROMAGN.) P. D. ORTON, Trans. Brit. Mycol. Soc. **43**: 178. 1960; *Entoloma sarcitulum* var. *majusculum* (KÜHNER & ROMAGN.) NOORDEL., Persoonia **12**: 462. 1985. – Fig. 10 a.

Selected literature: LARGENT, Entolomatoid Fungi of the western United States and Alaska: 172-173. 1994 (as *L. grisea*); NOORDELOOS, Fungi Europei **5**: 572-579, pl. 69. 1992.

Original diagnosis: Pileus 10-15 mm broad, conic or convex, submembranaceous, fragile, umbilicate, subhygrophanous, squamulose, striatulate nearly or quite to umbilicus both when moist and when dry, grayish brown; lamellae thin, fragile, subdistant, eroded or wavy on the edge, whitish becoming flesh-color; stem 30-50 × 1-2 mm, straight, slender, tough, glabrous, shining when dry, hollow, colored like the pileus with a white mycelium at the base. Ground by roadsides.

Holotype: S. DAVIS, 3 Aug. 1910, Stow, Massachusetts (NYS).

Observations on the holotype: The holotype consists of fragments of one specimen. Spores 10.5-12.5 × 7.0-8.0 µm, 6-7-angled in side-view with dihedral base. Basidia 25-40 × 8-12 µm, 4-spored, clampless. Lamellar edge sterile. Cheilocystidia 30-50 × 8-15 µm, clavate, colourless, thin-walled. Pileipellis a cutis with transitions to a trichoderm, with inflated terminal elements, 5-15 µm wide. Pigment brownish, intracelluar in pileipellis. Brilliant granules present in pileitrama. Vascular hyphae abundant in pileitrama. Clamp connections absent.

Notes: *Entoloma longistriatum* is a rather common and widespread species, occurring both in North America and Europe, where it has been known as *Entoloma sarcitulum* var. *majusculum* (KÜHNER & ROMAGN.) NOORDEL. (NOORDELOOS 1988).

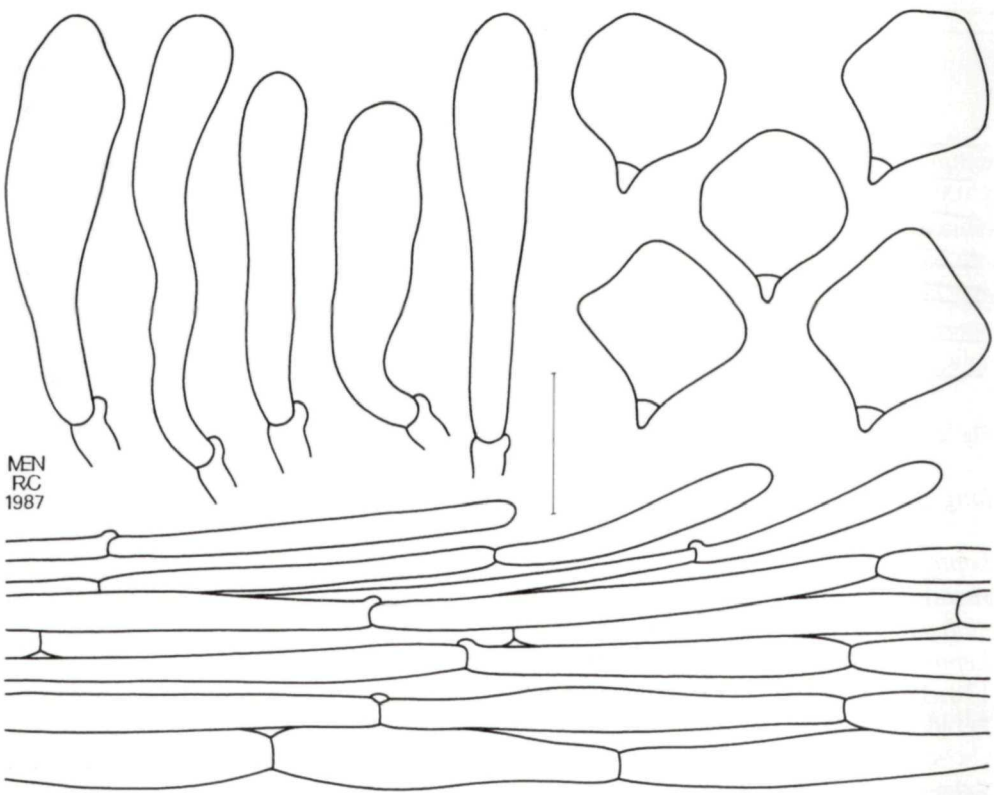

Fig. 22. *Entoloma luteum*. Cheilocystidia, spores and pileipellis. – Bar: 10 µm (spores), 20 µm (all other figs.).

luteum

Entoloma luteum PECK, Annual Rep. N. Y. State Mus. **54**: 146. 1901. – Fig. 22.

Selected literature: HESLER, Beih. Nova Hedwigia **23**: 21. 1967; HORAK, Sydowia **28**: 185-186. 1976.

Original diagnosis: Pileus 15-20 mm broad, thin, conical or subcampanulate, obtuse, squamulose at the apex, moist, yellow to smoky yellow, becoming a little paler as the moisture escapes, sometimes tinged with green. Lamellae ascending, moderately close, broad, whitish, becoming pale salmon color with age. Stem 65-80 × 2-4 mm, slender, equal, hollow, slightly fibrillose striate, colored like the pileus, with white mycelium at the base. Spores angular, commonly subquadrate, 10-12 µm long. On mossy ground in woods. The squamules on the cap are very minute and easily overlooked. This and the two preceding species (*E. variabile* PECK and *E. peckianum* BURT.), with *E. cuspidatum* and *E. salmoneum*, consitute a natural group of closely related species. In size and shape of pileus and the character of the stem they are very similar to each other, but they differ distinctly in the color of the pileus, and, this characters being quite constant, the specie are easily distinguished by it. The following synoptic table will show the prominent distinguishing characters of the species

Color of the pileus not changing with age	1
Color of the pileus changing with age	*E. variabile*
1. Pileus pale yellow generally cuspidate	*E. cuspidatum*
1. Pileus yellow, smoky yellow or greenish yellow	*E. luteum*
1. Pileus salmon color, often cuspidate	*E. salmoneum*
1. Pileus dark brown or blackish brown, umbonate	*E. peckianum*

Holotype: New York, Floodwood, Aug. 1900, C. H. PECK (NYS).

Observations on the holotype: The holotype consists of one intact and three fragmented specimens in a relatively good state. Spores 9.0-11.0 × 8.5-11.0 µm, cuboid. Basidia 22-40(-45) × 10-13 µm, 4-, rarely also 2-spored, with clamp connections. Lamellar edge entirely sterile. Cheilocystidia 45-125 × 7-20 µm, cylindrical to clavate. Hymenophoral trama regular, made up of long, cylindrical to inflated elements, 150-350 × 10-20 µm. Pileipellis a cutis of cylindrical hyphae, 5-11(-17) µm wide. Pigment pale brown, intracellular in pileipellis. Pileitrama regular, made up of cylindrical to inflated elements, 150-300 × 5-17(-25) µm. Clamp connections abundant.

Notes: As already noted by PECK, *Entoloma luteum* is a very close relative from *E. murrayi*, from which it mainly differs by the shape of the pileus. HORAK (1976) prefers to keep them separate for the time being.

micropus

Agaricus micropus PECK, Annual Rep. N. Y. State Mus. **31**: 33. 1879; *Clitopilus micropus* (PECK) SACC., Syll. Fung. **5**: 705. 1887; *Pleuropus micropus* (PECK) MURRILL, N. Amer. Fl. **10(2)**: 107. 1917; *Entoloma micropus* (PECK) HESLER, Beih. Nova Hedwigia **23**: 54. 1967. – Fig. 23.

Original diagnosis: Pileus 12-35 mm broad, thin, fragile, convex or centrally depressed, umbilicate, surface silky, gray, often with one or two narrow zones on the margin; context having a farinaceous taste and odor; lamellae rather narrow, crowded, adnate or slightly decurrent, gray, becoming salmon-colored with age; stipe reaching 25 × 2-4 mm, short, solid or with a slight cavity, often slightly thickened at the apex, pruinose, gray, with a white, mycelioid tomentum at the base. On the ground under trees.

Holotype: New York, Ticonderoga, C. H. PECK (NYS).

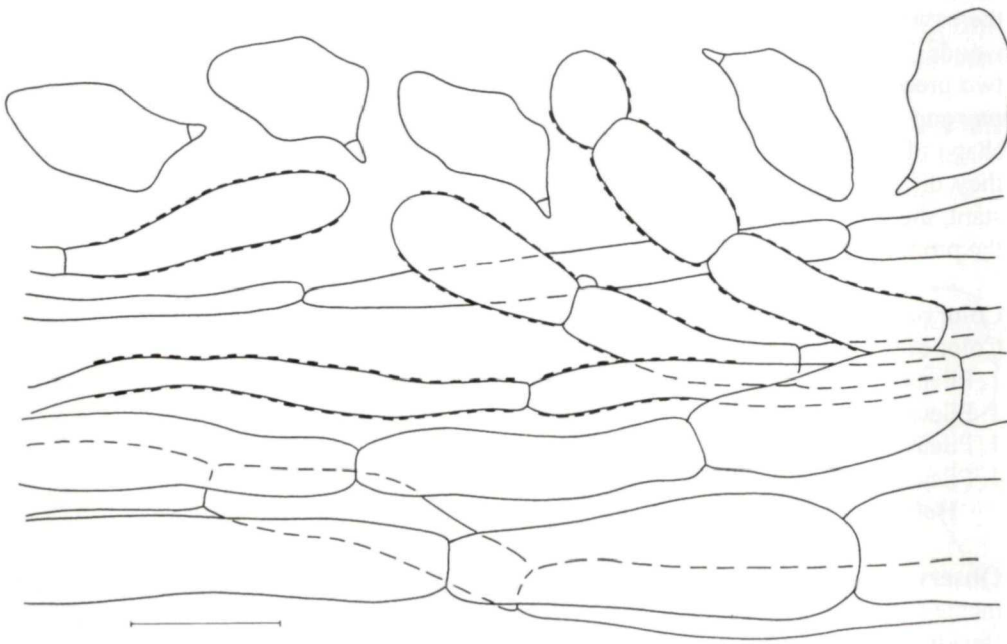

Fig. 23. *Agaricus micropus*. Spores and pileipellis. – Bar: 10 µm (spores), 20 µm (all other figs.).

Observations on the holotype: The holotype consists of numerous dried specimens, and some glued on paper in a rather well preserved state. The habit reminds that of *Entoloma rusticoides*, viz. omphalioid. Spores 10.0-12.0 × 6.0-7.0 µm, average 10.7 × 6.5 µm, Q = 1.35-1.7, average Q = 1.5, elongate, many-angled in side-view. Basidia 4-spored, with clamp connections. Lamellar edge probably fertile. Pileipellis a cutis with transitions to a trichoderm, made up of inflated, 9-20 µm wide hyphae with repent or slightly ascending clavate terminal elements, 40-100 × 7-20 µm. Pigment membranal and encrusting in pileipellis and upper pileitrama. Clamp connections present.

Notes: *Agaricus micropus* belongs to subgenus *Claudopus*, sect. *Undati* because of its omphalioid stature and encrusted pigments. It belongs to the form-group of *Entoloma undatum* (GILLET) M. M. MOSER.

minus

Entoloma minus PECK, Bull. N. Y. State Mus. **116**: 23. 1907. – Fig. 24.

Original diagnosis: Pileus 15-25 mm broad, very thin, convex, subconic of hemispheric, becoming convex, surface glabrous, grayish-brown, darker at the center; lamellae thin, crowded, at first ascending, sinuate, adnexed, whitish, becoming flesh-colored; stipe 25-35 × 2 mm, slender, glabrous, hollow, white. On the ground in woods.

Holotype: New York, Rensselaer County, East Schaghticoke, 1 & 8 Aug. 1906, C. H. PECK (NYS).

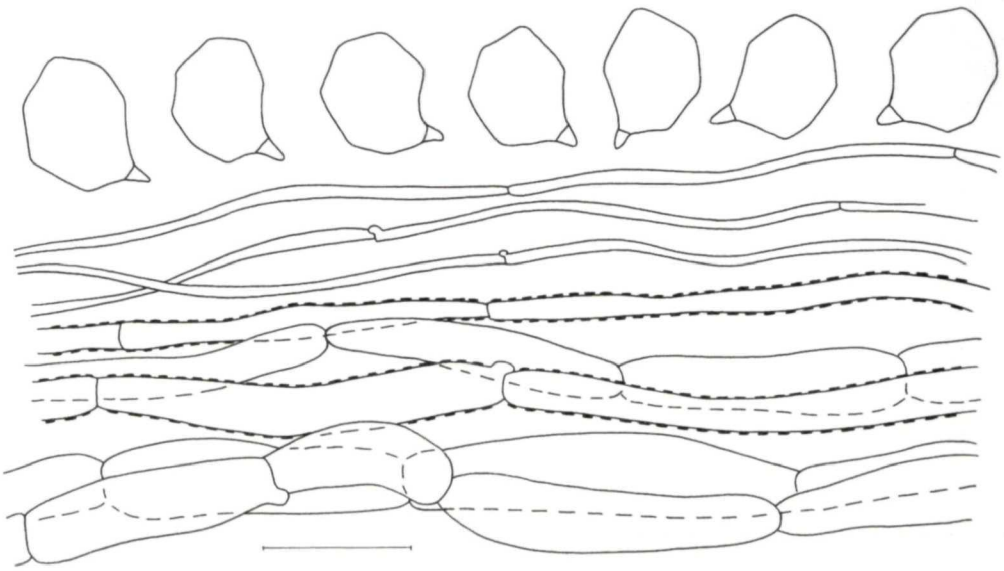

Fig. 24. *Entoloma minus*. Spores and pileipellis. – Bar: 10 µm (spores), 20 µm (all other figs.).

Observations on the holotype: The holotype consists of fragments of two specimens in a rather bad state: it is extremely difficult to reinflate the tissues. Spores 8.0-9.0 × 6.5-8.0 µm, average 8.1 × 7.2 µm, Q = 1.0-1.1-1.3, average Q = 1.2, subisodiametrical in outline, 5-7-angled in side-view. Basidia 24-40 × 7-11 µm, 4-spored, with clamp connections. Lamellar edge fertile. Cystidia absent. Pileipellis a cutis of narrow, cylindrical hyphae, 2-4 µm wide. Pileipellis regular, made up of short inflated elements, 30-100 × 4-20 µm. Pigment membranal and finely encrusting in pileipellis and upper pileitrama. Clamp connections abundant.

Notes: *Entoloma minus* belongs to subgenus *Entoloma* sect. *Rhodopolia*, on account of the regular structure of the trama with short elements, the pileipellis in form of a cutis and subisodiametrical, 5-7-angled spores. Its small stature, greyish brown pileus, white, glabrous stipe, and membranal/encrusting pigment are indicative that *Entoloma minus* PECK is very similar to *Entoloma sordidulum* (KÜHNER & ROMAGN.) P. D. ORTON, *Entoloma carolinianum* HESLER and *Entoloma pullum* HESLER, and may

well represent the oldest valid name for this common and widespread species (NOORDELOOS 1988).

mirabile

Entoloma mirabile PECK, Mycologia **5**: 68. 1913. – Fig. 25.

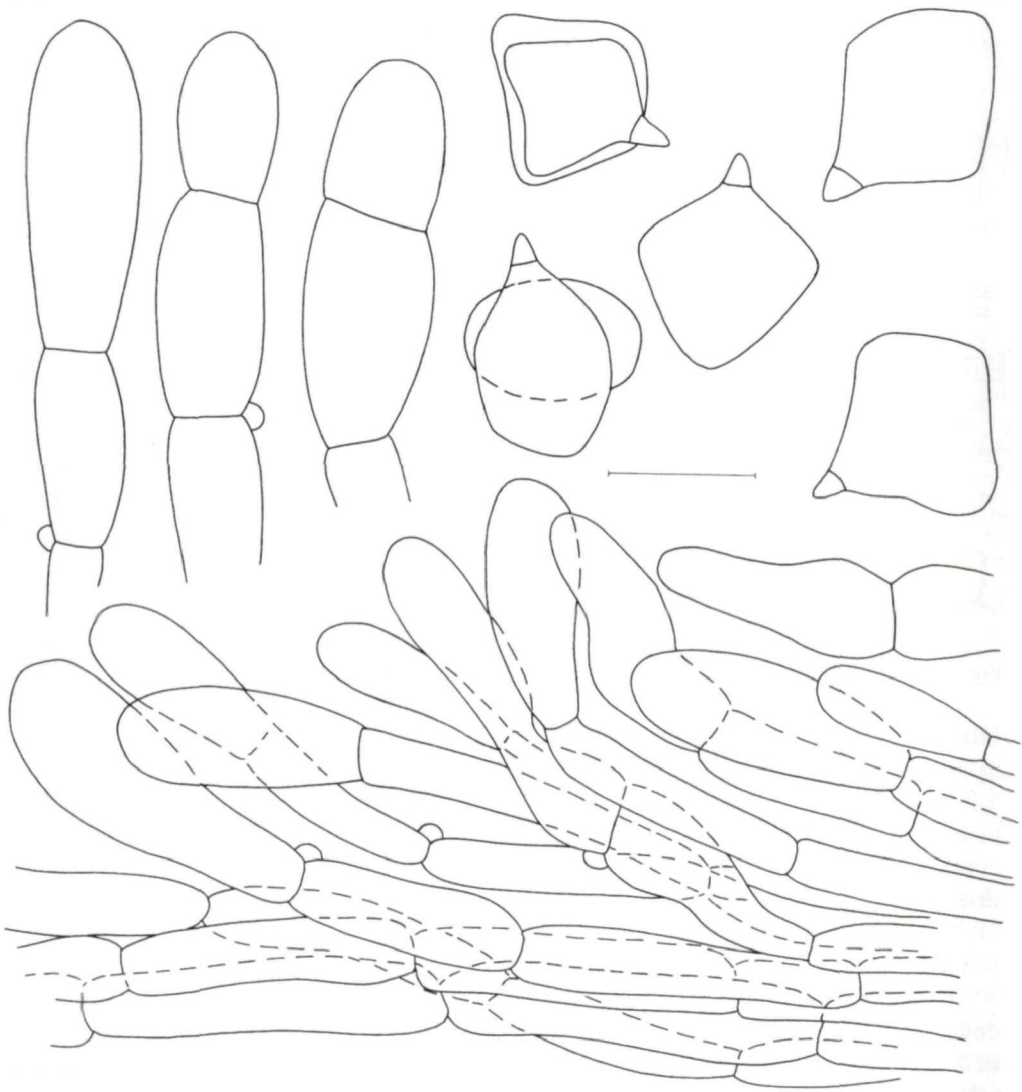

Fig. 25. *Entoloma mirabile*. Cheilocystidia, spores and pileipellis. – Bar: 10 µm (spores), 20 µm (all other figs.).

Original diagnosis: Pileus 20-30 mm broad, conic or subcampanulate, with a prominent umbilicate umbo, thin, submembranaceous, surface minutely furfuraceous or subsquamulose, blackish brown; lamellae arcuate, adnate, subdistant, whitish, becoming pink; stipe 30-50 × 2-4 mm, somewhat flexuous, equal, fibrillose, hollow, sometimes compressed and caniculate, brown, a little paler than the pileus, with white mycelium at the base. In swamps under maple trees.

Holotype: Massachusetts, Stow, 27 Aug. 1912, S. DAVIS (NYS).

Observations on the holotype: The holotype consists of fragments of five specimens in a good state: the lamellae are very dark brown, and have a white, fimbriate edge. Spores 10-13.5 × 10-11 µm, average 11.3 × 10.3 µm, Q = 1.0-1.4, average Q = 1.15, cuboid. Basidia 45-60 × 8-14 µm, 4-spored, with clamp connections. Lamellar edge sterile. Cheilocystidia large, septate, of inflated hyphae with clavate terminal element, 50-100 × 10-25 µm. Pileipellis a cutis with transitions to a trichoderm, made up of inflated hyphae with clavate terminal elements, 20-100 × 12-27 µm. Pigment abundant, brown, intracellular in pileipellis and upper pileitrama. Clamp connections abundant in hymenium, but elsewhere rare.

Notes: *Entoloma mirabile* belongs to subgenus *Inocephalus* on account of the furfuraceous to subsquamulose pileus and cuboid spores. It is not included in HORAK (1976).

modestum

Entoloma modestum PECK, Bull. Torrey Bot. Club **34**: 99. 1907; *Leptonia modesta* (PECK) LARGENT, Biblioth. Mycol. **55**: 120. 1977. – Fig. 26.

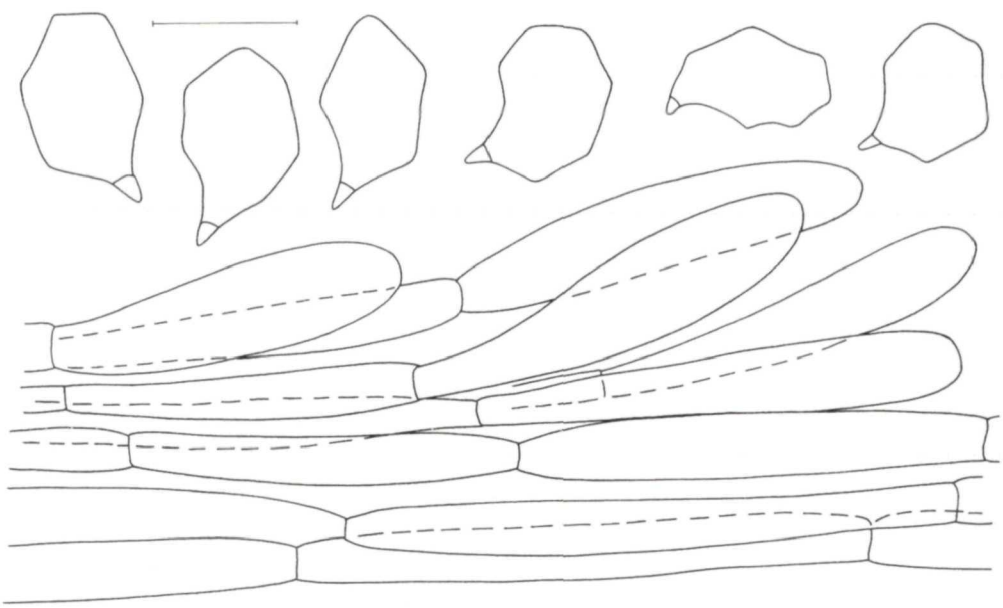

Fig. 26. *Entoloma modestum*. Spores and pileipellis. – Bar: 10 µm (spores), 20 µm (all other figs.).

Original diagnosis: Pileus 15-25 mm broad, thin, campanulate or convex, obtuse, surface glabrous, hygrophanous, dark smokey-brown and striatulate when moist, isabelline or pale grayish-brown when dry; lamellae rather broad, subdistant, adnate, at first pallid, becoming flesh-colored; stipe 25-40 × 2-4 mm, slender, equal, hollow, glabrous, concolorous. In damp, shaded places.

Holotype: Massachusetts, Stow, 30 May 1907, G. E. MORRIS & T. S. DAVIS (NYS).

Observations on the holotype: The holotype consists of several well-preserved specimens. Spores 10.0-11.5 × 7.5-9.0 µm, average 10.7 × 8.0 µm, Q = 1.25-1.45, average Q = 1.35, 5-6-angled in side-view. Basidia 22-40 × 9.5-11 µm, 4-spored, clampless. Lamellar edge fertile. Cystidia absent. Pileipellis a cutis with transitions to a trichoderm, made up of cylindrical to inflated, 8-17 µm wide hyphae with clavate terminal elements, 35-60(-75) × 12-30 µm. Pigment brown, intracellular in pileipellis. Stipitipellis a cutis of narrow, 3-14 µm wide, cylindrical hyphae. Clamp connections absent.

Notes: I agree with LARGENT (1977: 120) that the microscopical characters, especially those of the pileipellis combined with clampless hyphae, indicate that *Entoloma modestum* belongs to subgenus *Leptonia.* It seems also likely that the pileus, said to be glabrous by PECK, must have been some sort of fibrillose or squamulose. The dark brown colour of pileus and stipe, and the slight hygrophaneity of the pileus place *Entoloma modestum* in sect. *Cyanula*, close to *E. longistriatum* (PECK) NOORDEL. and *E. turci* (BRES.) M. M. MOSER.

multiformis

Nolanea multiformis PECK, Bull. N. Y. State Mus. **167**: 45. 1913; *Leptonia multiformis* (PECK) LARGENT, Biblioth. Mycol. **55**: 91. 1977. – Fig. 27.

Original diagnosis: Pileus 10-30 mm broad, fleshy, thin, convex, nearly plane or centrally depressed, fragile, gregarious, surface glabrous or slightly fibrillose, brown or blackish-brown, margin striatulate, becoming wavy, split or irregular with age; lamellae thin, subdistant, broad, adnate, white becoming pink; stipe 10-20 × 1-2 mm, equal, fragile, flexuous, glabrous or fibrillose, solid or hollow, white or brown. On grassy ground.

Holotype: Massachusetts, Brookline, 11 Sept. 1911, S. DAVIS (NYS).

Observations on the holotype: The holotype consists of several fragmented specimens in a rather poor state, completed with a description by S. DAVIS. Spores 9.0-12.5 × 7-9 µm, average 10.0 × 8.1 µm, Q = 1.1-1.45, average Q = 1.25, 5-7-angled in side-view. Basidia 27-43 × 8-11.5 µm, 4-spored, with clamp connections. Lamellar edge fertile. Cystidia absent. Pileipellis an (ixo-)cutis of cylindrical hyphae, 2-7 µm wide, subpellis well-developed, made up of inflated elements, 40-120 × 5-20 µm. Pigment abundant, brown, intracellular in upper layer of pileus, especially in the subpellis. Pileitrama regular, made up of cylindrical to inflated elements, 35-100 × 7-15 µm. Clamp connections abundant in all tissues.

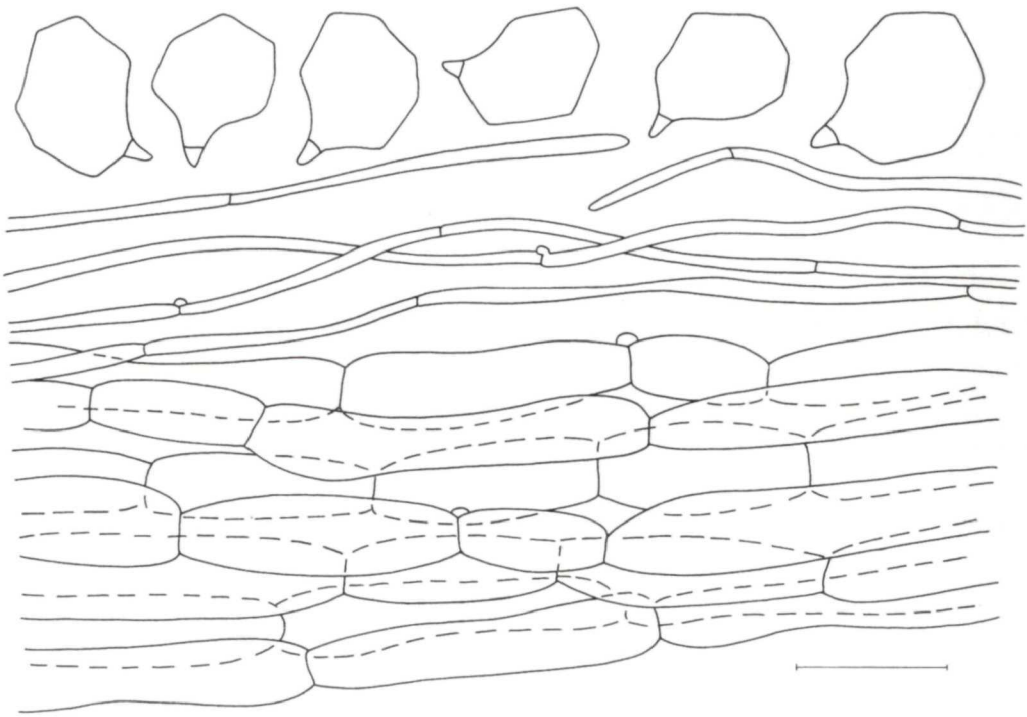

Fig. 27. *Nolanea multiformis*. Spores and pileipellis. – Bar: 10 µm (spores), 20 µm (all other figs.).

Notes: Both HESLER (1967) and LARGENT (1977) placed this species in subgenus *Leptonia*, but the glabrous, depressed pileus, as well as the structure of pileipellis, short elements of the trama, and abundant clamps suggest that it better can be ranged in subgenus *Entoloma* section *Polita*. It is very similar to *Entoloma caccabus* (KÜHNER) NOORDEL.

murinum

Entoloma murinum PECK, Bull. Torrey Bot. Club **34**: 98. 1907. – Fig. 28.

Original diagnosis: Pileus 20-30 mm broad, thin, fragile, conic, convex or nearly plane, umbonate, surface dry, silky in appearance, glabrous to the touch, grayish-brown or mouse-colored, margin thin, often wavy and split, striate in dried specimens; lamellae thin, crowded, sinuate, adnate, white, becoming pale pink; stipe 20-35 × 1.5-2 mm, slender, brittle, equal or slightly tapering upward, straight or flexuous, hollow, white or whitish, becoming darker with age. Among long grass and *Sphagnum.*

Holotype: Massachusetts, Salmouth, 20 Sept. 1905, S. DAVIS (NYS).

Observations on the holotype: Spores 9.0-12.0 × 7-9.5 µm, average 11.0 × 8.7 µm, Q = 1.2-1.6, average Q = 1.35, mostly 5-angled in side-view. Basidia 20-35 × 10-15 µm,

4-spored, with clamp connections. Lamellar edge fertile. Cystidia absent. Pileipellis a cutis of narrow, cylindrical hyphae, 2-8 µm wide. Pileitrama regular, made up of rather long, fusiform elements, 90-270 × 10-30 µm. Pigment brown, intracellular in pileipellis and upper pileitrama. Clamp connections present in hymenium, rare or absent in other tissues.

Notes: *Entoloma murinum* belongs to subgenus *Nolanea* because of its general mycenoid habit, type of pileipellis and structure of the trama. The type of spores, intracellular pigment, and basidia with clamp connections range it in section *Endochromonema*, where is may be considered as a dark pigmented relative of *Entoloma cetratum* (FR.: FR.) M. M. MOSER with 4-spored basidia with clamp connections. *Entoloma pallescens* (P. KARST.) NOORDEL. and *E. cuneatum* (BRES.) M. M. MOSER are very similar. This group of taxa is widespread in the northern hemisphere, and needs revision, preferably supported with molecular data – see also LUDWIG (2007).

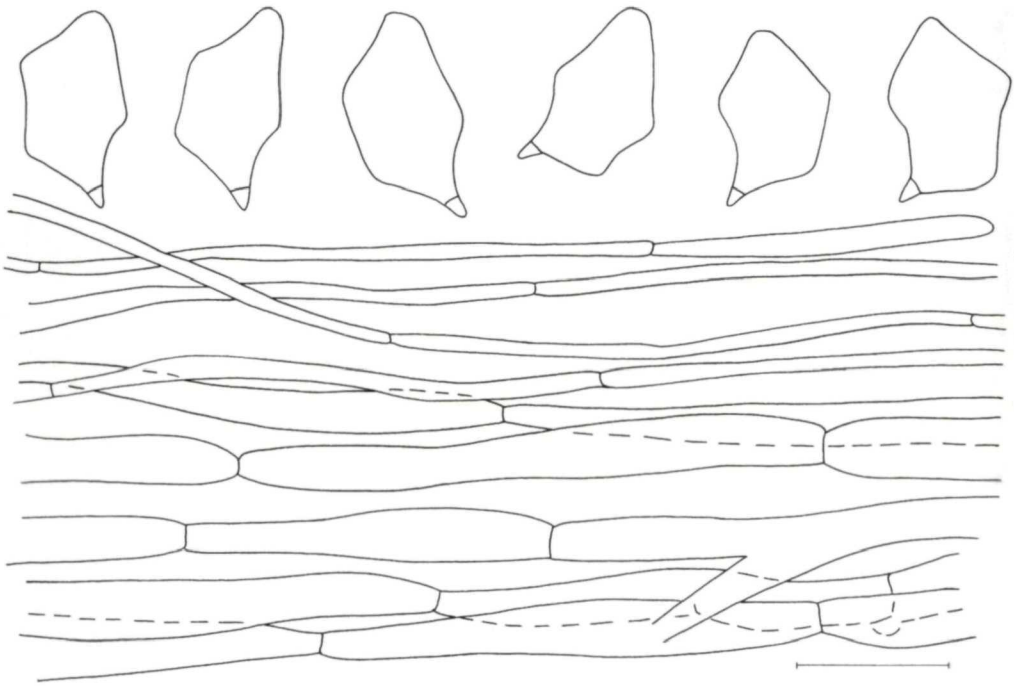

Fig. 28. *Entoloma murinum*. Spores and pileipellis. – Bar: 10 µm (spores), 20 µm (all other figs.).

nigricans

Eccilia nigricans PECK, Bull. Torrey Bot. Club **22**: 201. 1895; *Leptonia nigricans* (PECK) LARGENT, Brittonia **23**: 241. 1971.

Original diagnosis: Pileus thin, convex, umbilicate or centrally depressed, subzonate, unpolished, grayish-black; lamellae broad, distant, decurrent, light drab or brownish, becoming tinged with flesh-color; stem short, holow, grayish black, commonly with an

abundant white mycelium; spores angular, 0004 in. long, nearly as broad, containing a single large nucleus. Pileus 6-18 lines broad; stem about 1 in. long, .5 to 1 line thick. Grassy Ground, Pasadena, January.

Prof. MCCLUTCHIE's notes say that this plant has the odor and flavor of butternuts and that it is delicious when cooked. Also that when fresh the pileus is tomentose and the margin even, but these characters are not clearly shown in the dried specimens.

Holotype: California, Pasadena, 2 Jan. 1895, A. J. MCCLUTCHIE (NYS).

Observations on the holotype: The type has not been received for study.

Notes: According to LARGENT (1977: 202) *Eccilia nigricans* is close to *E. parkensis*, *E. rhodocylix*, and *E. nigrella*, but later, LARGENT (1994) he redescribed it on recent collections from California as a *Cyanula* series *Caesiocaules* with small, omphalioid, greyish-black basidiocarps.

nigricans

Entoloma nigricans PECK, Bull. Torrey Bot. Club **29**: 72. 1902. – Fig. 29.

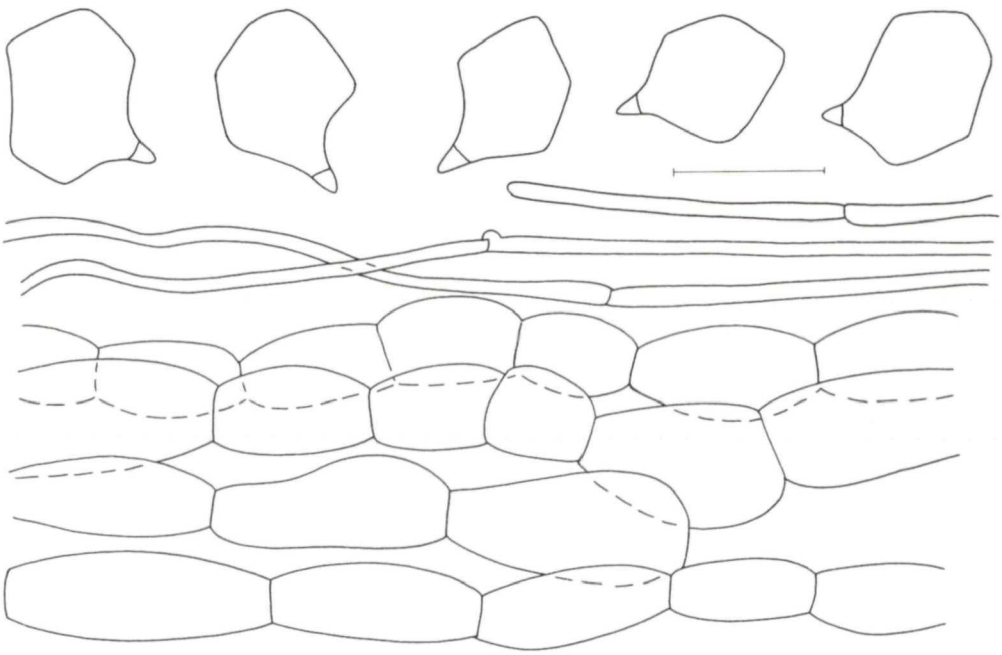

Fig. 29. *Entoloma nigricans*. Spores and pileipellis. – Bar: 10 µm (spores), 20 µm (all other figs.).

Original diagnosis: Pileus 30-40 mm broad, thin, convex, becoming irregularly expanded and centrally depressed, surface innately silky-fibrillose, shining, dark gray or blackish, the cuticle often radially cracking, margin somewhat striate or sulcate in dried specimens; lamellae broad, subdistant, sinuate, adnate, salmon-colored; stipe 25-50 ×

4-8 mm, equal, silky fibrillose, at first solid, becoming hollow, shining, white streaked with black, sometimes scurfy at the apex. In low ground in woods.

Holotype: Missouri, St Louis, 20 Oct. 1900, N. M. GLATTFELTER (NYS).

Observations on the holotype: The holotype consists of fragments of about three specimens in relatively bad condition. Spores 8-11.5 × 7.0-9.0 µm, average 9.7 × 7.8 µm, Q = 1.0-1.4, average Q = 1.25, subisodiametrical, 5-6-angled in side-view. Basidia 22-38 × 7-11 µm, 4-spored, with clamp connections. Lamellar edge fertile. Cystidia absent. Pileipellis an ixocutis of very narrow, 2-5 µm wide hyphae with thin, colorless walls, subpellis well-developed, made up of short elements, 25-90 × 11-25 µm. Pigment brown, intracellular, most abundant in subpellis. Clamp connections abundant.

Notes: *Entoloma nigricans* belongs to subgenus *Entoloma*, sect. *Rhodopolia*. *Entoloma griseoluridum* (KÜHNER) M. M. MOSER from Europe is somewhat similar, but with porphyry-brown to purple-brown colours.

nivea

Eccilia nivea PECK, Annual Rep. N. Y. State Mus. **49**: 18. 1897. *Alboleptonia sericella* var. *nivea* (PECK) LARGENT & BENEDICT, Mycologia **62**: 446. 1970.

Selected literature: LARGENT & BENEDICT, Mycologia **62**: 446-447. 1970.

Original diagnosis: Pileus 10-25 mm broad, thin, submembranaceous, hemispheric or very convex, slightly umbilicate, surface smooth, finely appressed-fibrillose, white; lamellae thin, rather broad, distant, arcuate, short-decurrent, white, becoming salmon-colored; stipe 20-50 × 1-2 mm, slender, fragile, equal or slightly tapering upward, glabrous, stuffed or hollow, white.

Holotype: New York, Selkirk, Sept., C. H. PECK (NYS).

Observations on the holotype: The holotype is completely gone; the box at NYS is empty.

Notes: LARGENT & BENEDICT (1970) studied the type of *Eccilia nivea*. It appears to be very similar to *Entoloma sericellum* (FR.: FR.) P. KUMM. A distinction on specific level of these taxa does not seem justified, however. See also NOORDELOOS (1987) for comments on the variability of *Entoloma sericellum*.

parva

Leptonia parva PECK, Annual Rep. N. Y. State Mus. **45**: 78(18). 1893; *Leptoniella parva* (PECK) MURRILL, N. Amer. Fl. **10(2)**: 89. 1917. – Fig. 30.

Selected literature: LARGENT, Biblioth. Mycol. **55**: 186-190. 1977; LARGENT, Entolomatoid Fungi of the western United States and Alaska: 126-127. 1994.

Original diagnosis: Pileus thin, convex or nearly plane, umbilicate, about 12 mm broad; surface slightly radiate-striate, violaceous-brown, darker and squamulose on the umbilicus. Lamellae subdistant, adnate, whitish tinges with flesh-color. Stipe slender,

glabrous, solid, concolorous, about 2.5 cm long, scarcely 2 mm thick. In woods. The color of the pileus is almost exactly the same like that of dark colored forms of *L. serrulata*, but its smaller size, whitish lamellae without darker serrulate edge, and stem not punctuate at the top separate it.

Holotype: USA, New York, Hamilton County, Lake Pleasant.

Observations on the holotype: The holotype material is very poor, and consists of three specimens glued on a piece of paper. Clearly visible are the arcuate-decurrent lamellae. Spores 9.0-10.0 × 6.0-7.2 µm, average 9.4 × 6.3 µm, Q = 1.2-1.75, average Q = 1.45, 5-7-angled in side-view. Basidia 4-spored, clampless, difficult to inflate. Lamellar edge fertile. Cystidia absent. Pileipellis a cutis with inflated hyphae, 10-17 µm wide with scattered trichodermal tufts of up to 20 µm wide, inflated terminal elements. Pigment brown, intracellular in pileipellis. Brilliant granules present. Vascular hyphae present. Clamp connections absent.

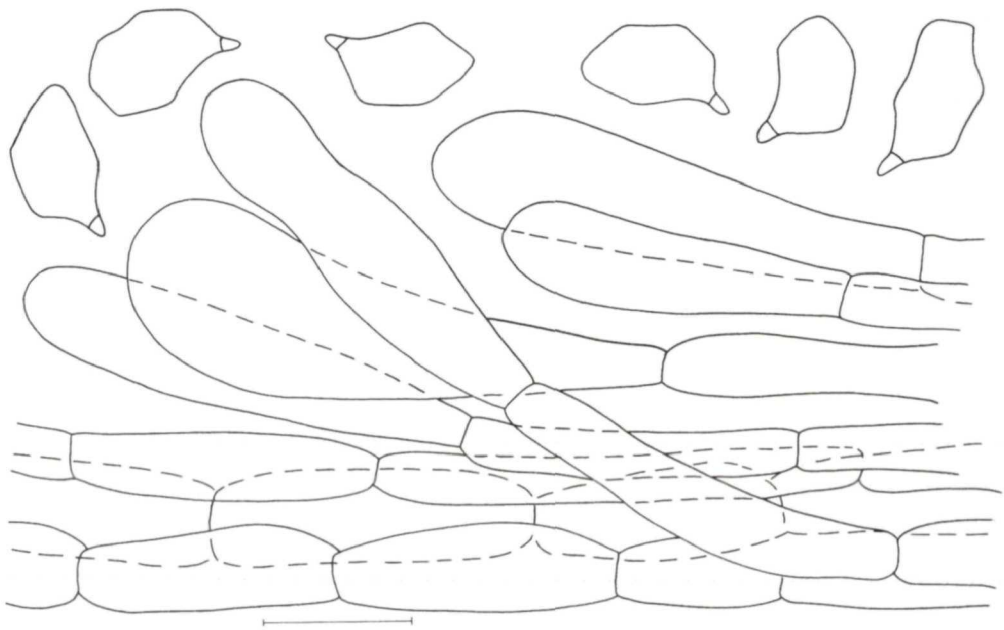

Fig. 30. *Leptonia parva*. Spores and pileipellis. – Bar: 10 µm (spores), 20 µm (all other figs.).

Notes: *Leptonia parva* is very similar to the European *Entoloma pseudocoelestinum* ARNOLDS in particular on account of the spore-size, fertile lamellar edge and violaceous brown, translucently striate pileus. Also the species complex around *Entoloma chalybaeum* (PERS.) ZEROVA and *E. decolorans* HORAK is very similar.

salmoneus

Agaricus salmoneus PECK, Annual Rep. N. Y. State Mus. **24**: 65. 1872; *Entoloma salmoneum* (PECK) SACC., Syll. Fung. **5**: 693. 1887. – Fig. 31.

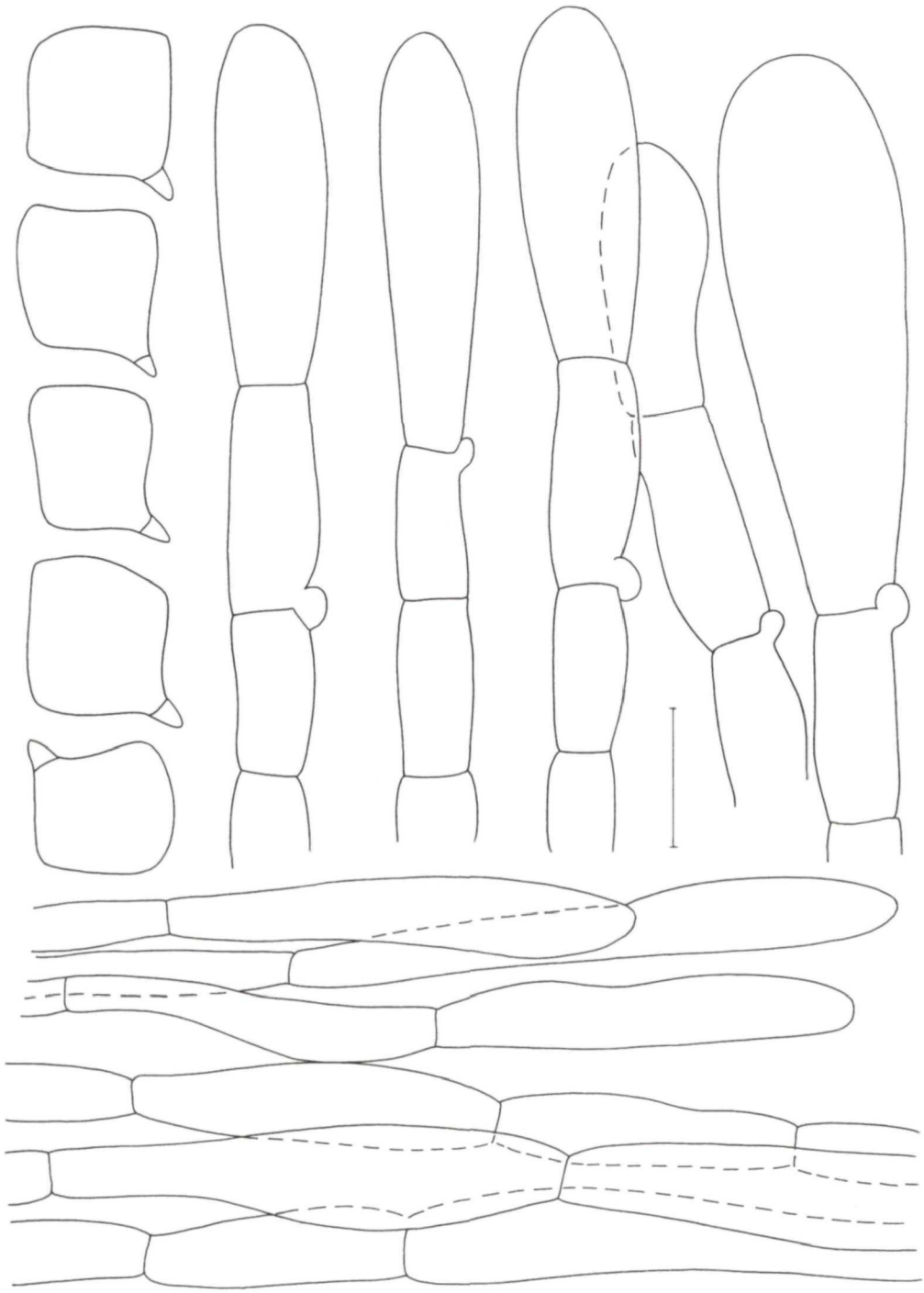

Fig. 31. *Agaricus salmoneus*. Spores, cheilocystidia and pileipellis. – Bar: 10 µm (spores), 20 µm (all other figs.).

Original diagnosis: Pileus 15-30 mm broad, thin, conic or campanulate, subacute or with minute papilla or small cusp at apex, gregarious, surface glabrous, moist, salmon-colored, margin sometimes uneven or lobed; lamellae broad, subdistant, ventricose, salmon-colored; stipe 75-150 × 2-4 mm, slender, equal, glabrous, hollow, concolorous. On damp ground in woods, especially under spruce and balsam fir trees or among mosses. It is with some hesitation that this is porposed as a species, its resemblance with the preceding one (*E. cuspidatus*) is close. The only difference is found in its colors and in the absence of a prominent cusp of that plant. In both species the pileus is so thin, that in well dried specimens, slender, dark, radiating lines on it, mark the position of the lamellae beneath, although in the living plants these are not visible.

Holotype: USA, New York, Sandlake, C. H. PECK (NYS).

Observations on the holotype: The holotype consists of several specimens glued on paper and an envelope containing dried specimens in relatively good state. Spores 9.0-11.0 × 9.0-11.0 µm, average 10.3 × 9.5 µm, Q = 1.0-1.2, average Q = 1.1, cuboid. Basidia 38-55 × 8-14 µm, 4-spored, with clamp connections. Lamellar edge sterile. Cheilocystidia 30-90(-110) × 9-15 µm, cylindrical to clavate, often septate, in dense clusters along lamellar edge. Hymenophoral trama regular, made up of long, fusoid elements, up to 300 × 10-35 µm. Pileipellis a cutis of cylindrical hyphae, 5-14 µm wide with scattered ascending cylindrical to clavate terminal elements, 50-90 × 10-20 µm. Pigment intracellular. Clamp connections numerous in hymenium, elsewhere present but rare.

Notes: According to HORAK (1976) *Agaricus salmoneus* is a synonym of *Nolanea quadrata* BERK. & M. A. CURTIS and *Rhodophyllus lactifluus* R. HEIM. The differences between *Entoloma salmoneum* and *E. luteum* PECK and *E. murrayi* (BERK & M. A. CURTIS) SACC. (see also *E. cuspidatum*) are also very small. Microscopically they appear to be identical, whereas the colour of the fruitbodies may vary from orange (*E. salmoneum*) to yellow in the two other taxa. Furthermore *E. murrayi* seems to be characterised by a cuspidate pileus.

scabrinellus

Agaricus scabrinellus PECK, Annual Rep. N. Y. State Mus. **33**: 19. 1883; *Entoloma scabrinellum* (PECK) SACC., Syll. Fung. **5**: 693. 1887. – Fig. 32.

Original diagnosis: Pileus 12-20 mm broad, thin, convex or nearly plane, papillate or with small umbo, surface minutely scabrous, dark brown, margin thin, incurved, slightly surpassing the lamellae. Lamellae broad, crowded, rounded behind, ventricose, adnexed, floccose on the edges, whitish becoming pink. Stipe 25 × 2 mm, equal, fibrillose, pruinose at the apex, paler than the pileus. In shaded, gravelly soil.

Holotype: New York, Wading River, Suffolk County, 1883, C. H. PECK (NYS).

Observations on the holotype: The holotype consists of fragments of four specimens glued on paper in a relatively bad state. Spores 8.0-10.0 × 5.5-6.5 µm, average 8.6 × 6.0 µm, Q = 1.2-1.6, average Q = 1.4, 6-7-angled in side-view. Basidia 25-38 × 7-10 µm, 4-spored, with clamp connections. Lamellar edge entirely sterile, made up of

clustered cheilocystidia. Cheilocystidia 20-55 × 6-20 µm, slenderly to broadly lageniform to lecythiform, usually with distinctly capitate neck. Pileipellis a cutis with transitions to a trichoderm, made up of long, inflated elements, 90-250 × 6-25 µm. Pigment abundant, brown, intracellular in pileipellis. Clamp connections abundant.

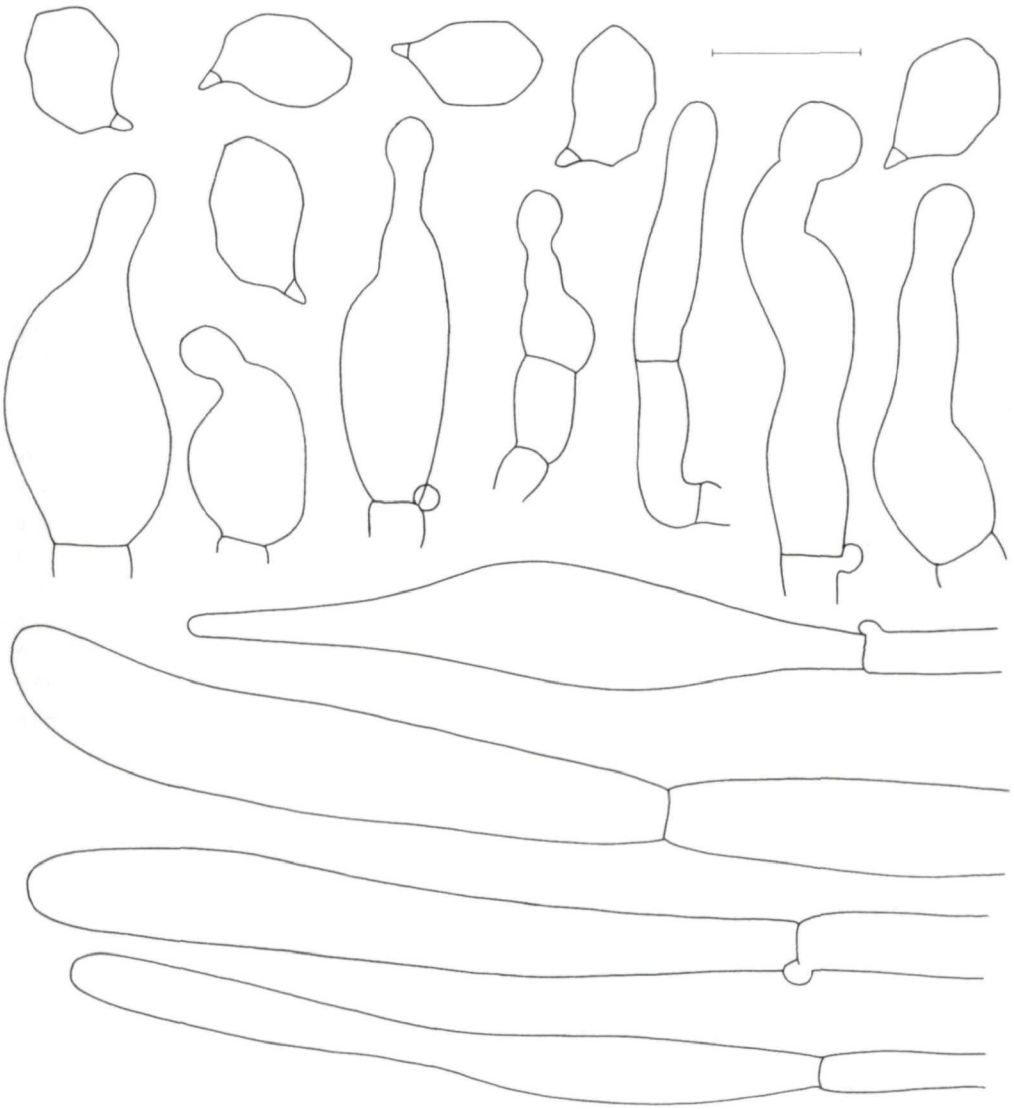

Fig. 32. *Agaricus scabrinellus*. Spores, cheilocystidia and pileipellis. – Bar: 10 µm (spores), 20 µm (all other figs.).

Notes: *Entoloma scabrinellum* belongs to subgenus *Trichopilus* on account of the general habit, minutely scabrous pileus, and presence of lecythiform cheilocystidia, hyphae with clamp connections and type of pileipellis. *Entoloma jubatum* (FR.) P. KARST. and *E. fuscotomentosum* F. H. MŒLLER, are very similar (LARGENT 1994, NOORDELOOS 2004).

sphagnophila

Eccilia sphagnophila PECK, Annual Rep. N. Y. State Mus. **54**: 147. 1901.

Original diagnosis: Pileus 6-10 mm broad, hemispheric or umbonate turbinate, glabrous, striate on the margin, dark brown. Lamellae broad, distant, very decurrent, whitish becoming slightly tinged with pink. Stem 30-40 × 10 mm, slender, glabrous, colored like the pileus. Spores 6-10 × 5-6 µm, angular. In marshes among *Sphagnum*.

Holotype: not received. Type locality: Floodwood, August.

Notes: HESLER (1963: 366) reported that the type consists of two fragments and is unsuitable for study. The original diagnosis does not give enough information to present a modern interpretation of the species.

strictior

Agaricus strictior PECK, Annual Rep. N. Y. State Cab. **23**: 88. 1872; *Entoloma strictius* (PECK) SACC., Syll. Fung. **5**: 698. 1887. – Fig. 33.

Original diagnosis: Pileus 30-50 mm broad, submembranaceous, broadly convex or expanded, umbonate, surface glabrous, shining, hygrophanous, grayish-brown and generally striatulate on the margin when moist, paler when dry; lamellae broad, rounded behind, adnexed or nearly free, rather distant, whitish becoming flesh-colored; stipe 50-100 × 2-4 mm, straight, equal or slightly tapering upward, silky fibrillose or glabrous, hollow, concolorous or a little paler, often with a dense mycelioid tomentum at the base. In damp places in woods or their borders.

Holotype: New York, Albany, C. H. PECK (NYS).

Observations on the holotype: The holotype consists of six specimens in a bad state, partly fragmented and glued on paper. Spores 11.0-12.0 × 7.0-8.5 µm, average 11.5 × 8.0 µm, Q = 1.2-1.6, average Q = 1.4, 5-7-angled in side-view. Basidia 35-55 × 8-14 µm, 4-spored, with clamp connections. Lamellar edge (in part?) sterile. Cheilocystidia numerous, lageniform to lecythiform, 25-50 × 7-12 µm. Pileipellis a thin cutis of narrow, 2-9 µm wide, cylindrical hyphae. Pileitrama regular, made up of long, inflated, fusiform elements, 100-350 × 10-25 µm. Pigment minutely encrusting all hyphae of pileipellis and upper pileitrama. Clamp connections present in hymenium.

Notes: The type collection appeared to be heterogeneous. One aberrant specimen without cheilocystidia, and with isodiametrical spores has therefore been excluded. *Entoloma strictius* belongs to subgenus *Nolanea* sect. *Nolanea*, on account of the encrusted pigment and presence of lageniform to lecythiform cheilocystidia. The published type-plate inforced this opinion. It keys out close to the European *Entoloma hebes* (ROMAGN.) TRIMBACH, of which it may represent an older synonym (NOORDELOOS 2004).

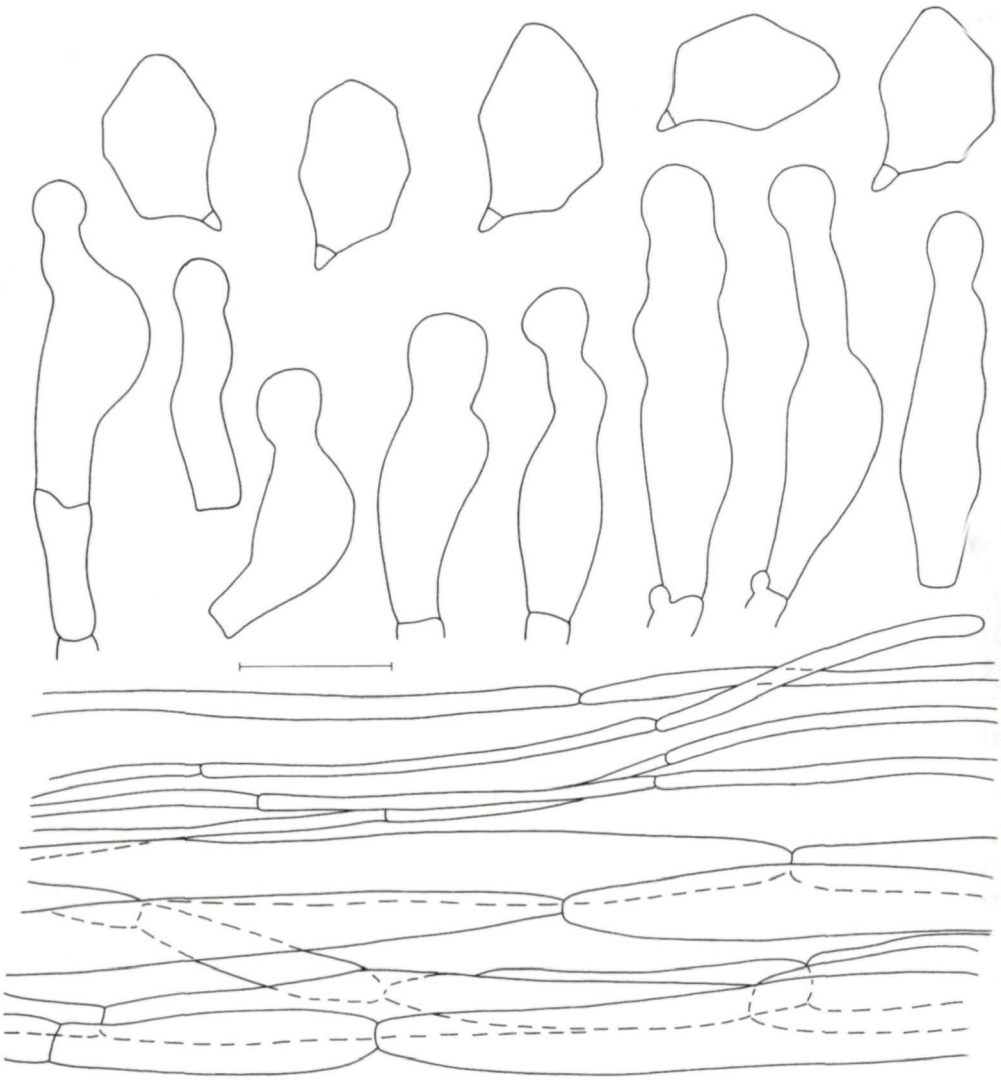

Fig. 33. *Agaricus strictior*. Spores, cheilocystidia and pileipellis. – Bar: 10 µm (spores), 20 µm (all other figs.).

suave

Entoloma suave PECK, J. Mycol. **14**: 2. 1908. – Fig. 34.

Original diagnosis: Pileus 25 mm broad, thin, broadly convex, umbilicate, surface glabrous, grayish-brown, margin decurved; lamellae rather crowded, slightly rounded behind, adnexed, yellowish, becoming flesh-colored; stipe about 25 × 2-3 mm, equal or nearly so, glabrous, stuffed, whitish or pale yellow. On old stumps in swampy

places.

Holotype: Massachusetts, Boston, Hammonds Pond, 16 Nov. 1907, E. MORRIS (NYS).

Observations on the holotype: The holotype consists of one, well-preserved specimen of which ¼ of the pileus is missing. Spores 5.5-7.0 × 5.0-6.0 µm, average 6.1 × 5.4 µm, Q = 1.0-1.2, average Q = 1.1, very thin-walled, weakly nodulose-angular. Basidia 20-35 × 5-11 µm, 4-spored, with clamp connections. Lamellar edge fertile. Cystidia absent. Pileipellis a cutis of 2-7 µm wide, cylindrical hyphae. Pileitrama regular, made up of short, inflated elements, 30-70 × 12-30 µm, mixed with narrow, cylindrical hyphae, 4-9 µm wide. Pigment pale brown, intracellular in upper layer of pileus. Clamp connections present in all tissues.

Notes: The more or less collybioid stature of this fungus, the small, weakly angled spores, hyphae with clamp connections, structure of pileipellis and pileitrama place *Entoloma suave* in subgenus *Entoloma* sect. *Turfosa*. It is very similar to *E. vinaceum* (SCOP.) ARNOLDS & NOORDEL. var. *vinaceum* on account of the grayish brown pileus and yellowish, glabrous stipe.

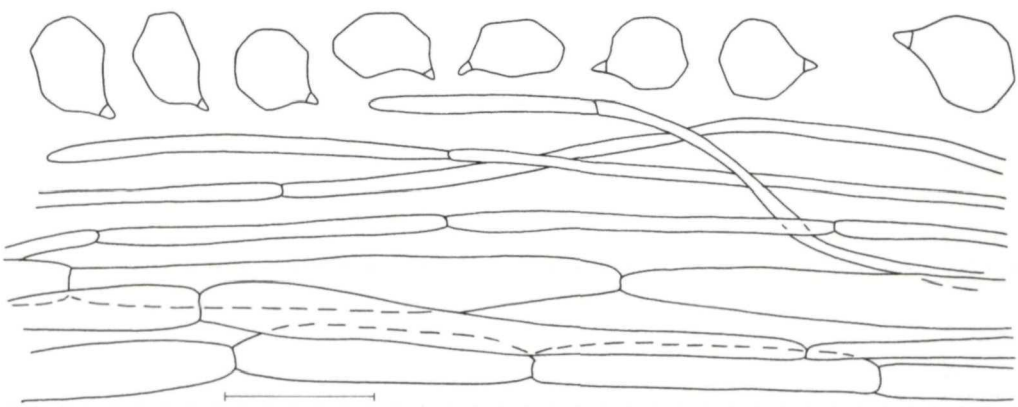

Fig. 34. *Entoloma suave*. Spores and pileipellis. – Bar: 10 µm (spores), 20 µm (all other figs.).

suaveolens

Nolanea suaveolens PECK, Bull. N. Y. State Mus. **122**: 23. 1908; *Leptonia suaveolens* (PECK) LARGENT, Biblioth. Mycol. **55**: 261. 1977. – Fig. 35.

Original diagnosis: Pileus 12-20 mm broad, submembranaceous, convex, umbilicate, surface obscurely fibrillose or unpolished, indistinctly striate on the margin, smoky-brown; context of dried specimens having an agreeable aromatic odor; lamellae thin, unequal, crowded, whitish becoming dingy-pink; stipe 35-50 × 1 mm, slender, glabrous, hollow, brown. In woods.

Holotype: New York, Sandlake, 25 July 1907, C. H. PECK (NYS).

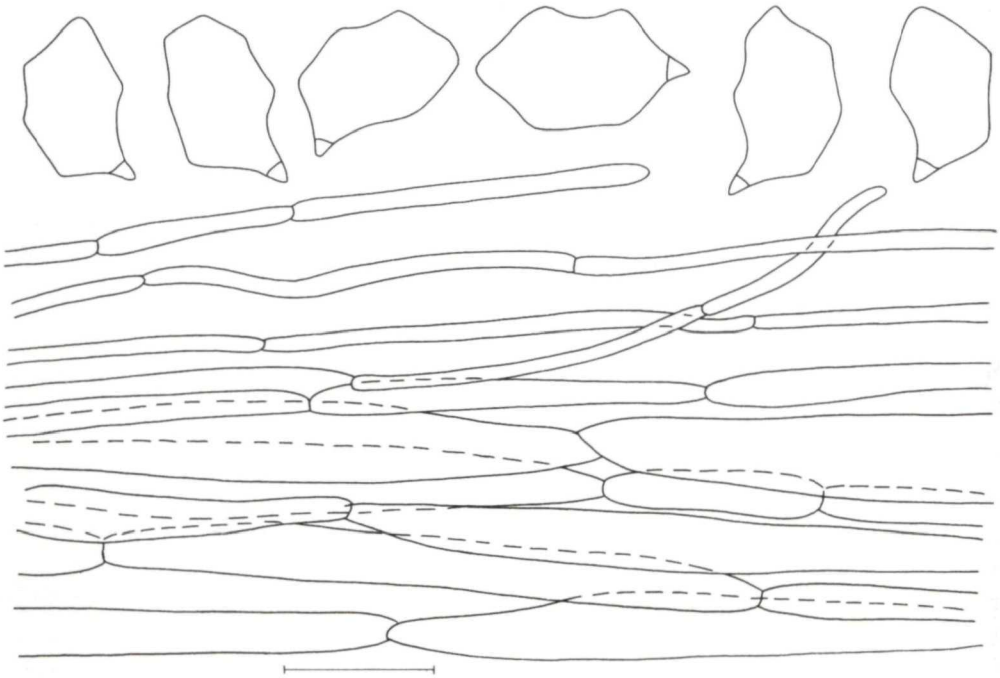

Fig. 35. *Nolanea suaveolens*. Spores and pileipellis. – Bar: 10 µm (spores), 20 µm (all other figs.).

Observations on the holotype: The holotype consists of several specimens riddled by insects; almost all lamellae have been destroyed. Spores 10.0-13.0 × 7.0-9.0 µm, average 10.8 × 7.9 µm, Q = 1.25-1.5, average Q = 1.4, 5-6-angled in side-view. Basidia 20-38 × 9-12 µm, 4-spored, with clamp connections. Lamellar edge fertile. Cystidia absent. Hymenophoral trama regular, made up of long, fusiform elements, 140-290 × 10-17 µm. Pileipellis a cutis of 2-5 µm wide, cylindrical hyphae. Pileitrama regular, made up of long, fusiform elements, 100-350 × 10-25 µm. Pigment membranal and intracellular in pileipellis and pileitrama, never encrusting. Clamp connections present, at least in hymenium.

Notes: *Nolanea suaveolens* belongs to subgenus *Nolanea* section *Endochromonema* on the evidence of its microscopical characters, especially the cutis-like structure of the pileipellis, membranal-intracellular pigmentation, and basidia with clamp connections. It can be considered as a dark pigmented, 4-spored relative of *Entoloma cetratum* (FR.: FR.) M. M. MOSER with clamp connections characterised by a strong aromatic smell. LARGENT (1977: 261) also published a type study. He did not find clamp connections, and interpreted the pileipellis differently. As a result he classified it as a *Leptonia* species.

subacus

Eccilia subacus PECK, Annual Rep. N. Y. State Mus. **49**: 18. 1879.

Original diagnosis: Pileus 6-25 mm broad, thin, submembranaceus, conic, convex or expanded, broadly depressed, umbilicate or truncate, smooth and shining when fresh, densely pruinose when dry, white. Lamellae thin, distant, adnate or slightly decurrent, white becoming pinkish. Stem 20-50 × 1-2 mm, slender, fragile, equal or slightly tapering upward, glabrous, stuffed or hollow, white. Gregarious, growing among grass and bushes.

Holotype: not studied; type locality: Massachusetts, Stow, Sept., leg. S. DAVIS.

Notes: HESLER (1963: 366) did not study the type either, which presumably is no longer in existence. According to PECK this species is very closely related to *Eccilia acus* A. H. SM., differing by the even margin of the pileus, the adnate to decurrent lamellae, and the absence of a true umbilicus. MURRILL (1917) lists it as a synonym of *Eccilia nivea* PECK (= *Entoloma sericellum*).

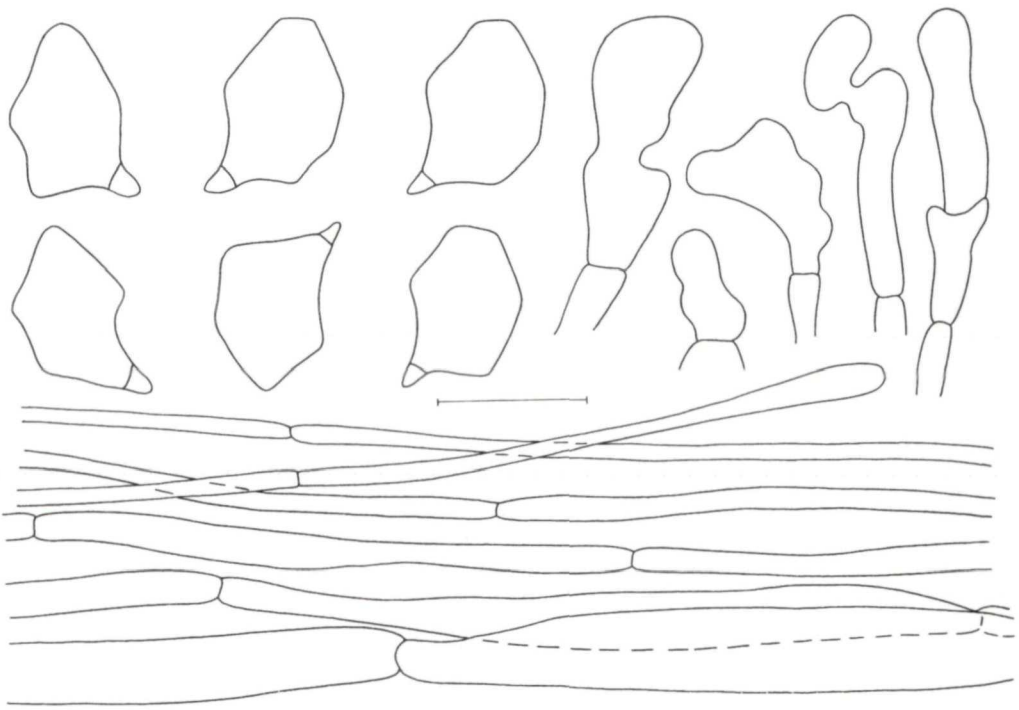

Fig. 36. *Clitopilus subplanus*. Spores, cheilocystidia and pileipellis. – Bar: 10 µm (spores), 20 µm (all other figs.).

subplanus

Clitopilus subplanus PECK, Bull. N. Y. State Mus. **122**: 18. 1908; *Pleuropus subplanus* (PECK) MURRILL, N. Amer. Fl. **10(2)**: 103. 1917. – Fig. 36.

Original diagnosis: Pileus 25-35 mm broad, broadly convex or nearly plane, slightly depressed at the center or distinctly umbilicate, surface glabrous, white or grayish-white; context white; stipe 25-35 × 2-4 mm, slender, glabrous, terete or compressed, stuffed or hollow, concolorous. Among fallen leaves and decaying vegetable matter in woods.

Holotype: New York, Renselaer County, Sandlake, 25 July 1907, C. H. PECK (NYS).

Observations on the holotype: The holotype consists of two well-preserved specimens; the fruitbodies have an omphalioid stature, with deeply decurrent lamellae, umbilicate pileus, and have an overall ochraceous colour. Spores 10.0-12.5 × 6.5-8.0 µm, average 10.8 × 7.2 µm, Q = 1.2-1.6, average Q = 1.35, 5-7-angled in side-view. Basidia 18-36 × 7-11 µm, 4-spored, with clamp connections. Lamellar edge heterogeneous to completely sterile. Cheilocystidia 18-40 × 7-15 µm, irregularly coralloid. Pileipellis a cutis of narrow, 2-9 µm wide, cylindrical hyphae. Pileitrama regular, made up of cylindrical elements, 60-180 × 5-17 µm. Pigment minutely encrusting the hyphae of pileipellis and upper pileitrama. Clamp connections present.

Notes: *Clitopilus subplanus* represents a species of subgenus *Claudopus* on account of the omphaloid stature and encrusted pigments. The presence of clamp connections and heterodiametrical spores indicate that it is related to *Entoloma undatum* (GILLET) M. M. MOSER from which it clearly differs by its pale colour of the pileus and stipe, and presence of well-differentiated cheilocystidia. A new combination is proposed:

***Entoloma subplanum* (PECK) NOORDEL., comb. nova**
Basionym: *Clitopilus subplanus* PECK, Bull. N. Y. State Mus. **122**: 18. 1908.

subserrulata

Leptonia subserrulata PECK, Annual Rep. N. Y. State Mus. **51**: 288. 1898; *Leptoniella subserrulata* (PECK) MURRILL, Mycologia **9**: 188. 1917; *Entoloma subserrulatum* (PECK) HESLER, Beih. Nova Hedwigia **23**: 141. 1967. – Fig. 37.

Original diagnosis: Pileus 15-30 mm broad, thin, convex or campanulate, umbilicate, surface grayish-white, darker colored and squamulose on the umbilicus, margin obscurely striate; lamellae thin, crowded, adnate, at first white, bluish black and minutely denticulate on the edges; stipe 50-75 × 2 mm, slender, rather long, hollow, glabrous, whitish or pallid. On low, damp ground in woods.

Holotype: New York, Gansevoort, July 1897, C. H. PECK.

Observations on the holotype: The holotype consists of about eight specimens, most of them glued on paper, some loose in the box, in a relatively good state. Spores 9.0-11.5 × 7.0-8.0 µm, average 10.5 × 7.4 µm, Q = 1.25-1.6, average Q = 1.45, 5-7-angled in side-view. Basidia 20-35 × 8-14 µm, 4-spored, clampless. Lamellar edge sterile, of *serrulatum*-type, with numerous clustered subcylindrical cheilocystidia, 20-50 × 5-15 µm, forming a sterile band of hyphae along the edge with intensely blue, intracellular pigment. Pileipellis a cutis with transitions to a trichoderm, made up of inflated hyphae, 9-17 µm wide with scattered or clustered suberect, clavate terminal elements, 25-95 ×

10-30 µm. Pigment pallid, intracellular. Clamp connections absent.

Notes: *Entoloma subserrulatum* belongs to subgenus *Leptonia* section *Cyanula* stirps *Serrulatum*. It is distinguished by the lack of distinct blue tinges in pileus and/or stipe, although in the type-material a blue line is visible along the margin of the pileus. It is very similar to *Entoloma carneogriseum* (BERK. & BROOME) NOORDEL. and *Agaricus serrulatus* var. *expallens* FR.

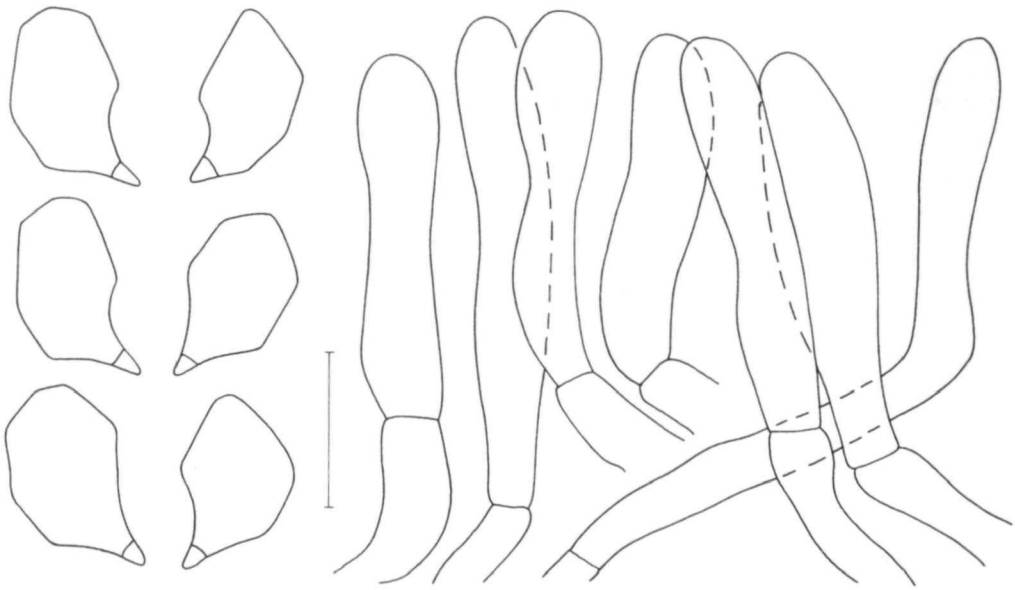

Fig. 37. *Leptonia subserrulata*. Spores and cheilocystidia. – Bar: 10 µm (spores), 20 µm (all other figs.).

subtruncatum

Entoloma subtruncatum PECK, Bull. N. Y. State Mus. **54**: 145. 1901. – Fig. 38.

Original diagnosis: Pileus 20-30 mm broad, subconic, thin, truncate or slightly umbilicate, solitary or gregarious, surface glabrous, hygrophanous, pale yellowish-ochraceous and striatulate when moist, paler and subshining when dry, the pellicle separable, margin incurved; lamellae thin, broad, adnexed, moderately crowded, unequal, whitish becoming tinged with pink; stipe 30-80 × 2-5 mm, slender, equal or slightly attenuated upward, terete or compressed, hollow, silky fibrillose, pale yellow, with a whitish, myceloid tomentum at the base. Under pine trees.

Holotype: Massachusetts, Stow, Nov. 1910, S. DAVIS (NYS).

Observations on the holotype: The holotype consists of numerous, well-preserved specimens. Spores 10.0-12.0 × 7.0-8.0 µm, average 10.8 × 7.6 µm, Q = 1.3-1.6, average Q = 1.45, 5-7-angled in side-view. Basidia 30-50 × 7-11 µm, 2-spored, clampless. Lamellar edge fertile. Cystidia absent. Hymenophoral trama regular, made up of long,

fusiform elements, 120-300 × 8-32 µm. Pileipellis a cutis of 2-9 µm wide, cylindrical hyphae. Pileitrama regular, made up of long, fusiform elements, 90-350 × 7-3 µm. Pigment hardly visible, membranal and probably also pallid, intracellular. Clamp connections absent.

Notes: *Entoloma subtruncatum* is in all respects perfectly similar to *E. cetratum* (FR.: FR.) M. M. MOSER in subgenus *Nolanea* sect. *Endochromonema*. Distinctive are the pale ochraceous colour of the fruitbodies and the clampless, 2-spored basidia with spores averaging about 11 × 7.5 µm (NOORDELOOS 1980).

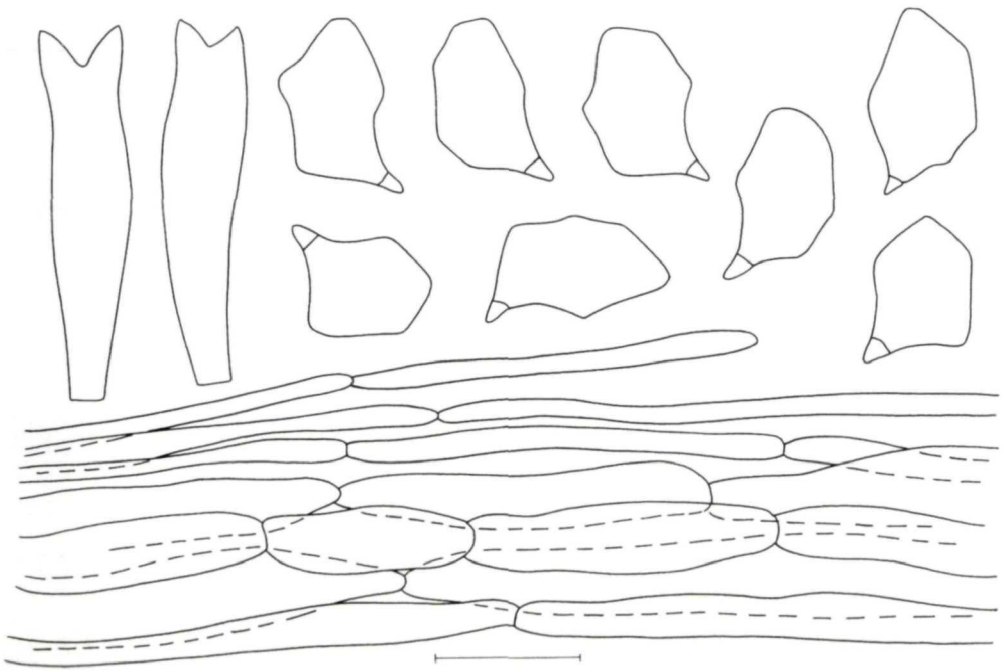

Fig. 38. *Entoloma subtruncatum*. Basidia, spores and pileipellis. – Bar: 10 µm (spores), 20 µm (all other figs.).

subvilis

Clitopilus subvilis PECK, Annual Rep. N. Y. State Mus. **40**: 53. 1887; *Leptoniella subvilis* (PECK) MURRILL, N. Amer Fl. **10(2)**: 93. 1917. – *Agaricus rhodopolius* var. *umbilicatus* PECK, Annual Rep. N. Y. State Mus. **38**: 109. 1885. – Fig. 39.

Original diagnosis: Pileus 15-30 mm broad, thin, centrally depressed or umbilicate, surface hygrophanous, dark brown when moist, grayish-brown and silky shining when dry, margin decurved, striatulate when moist; context having a farinaceous taste; lamellae subdistant, adnate or slightly decurrent, whitish when young, becoming flesh-colored; stipe 50-80 × 2-4 mm, slender, brittle, rather long, stuffed or hollow, glabrous, concolorous or a little paler. On damp soil in thin woods.

Holotype: New York, Karner, Albany, Oct. 1884, C. H. PECK (NYS).

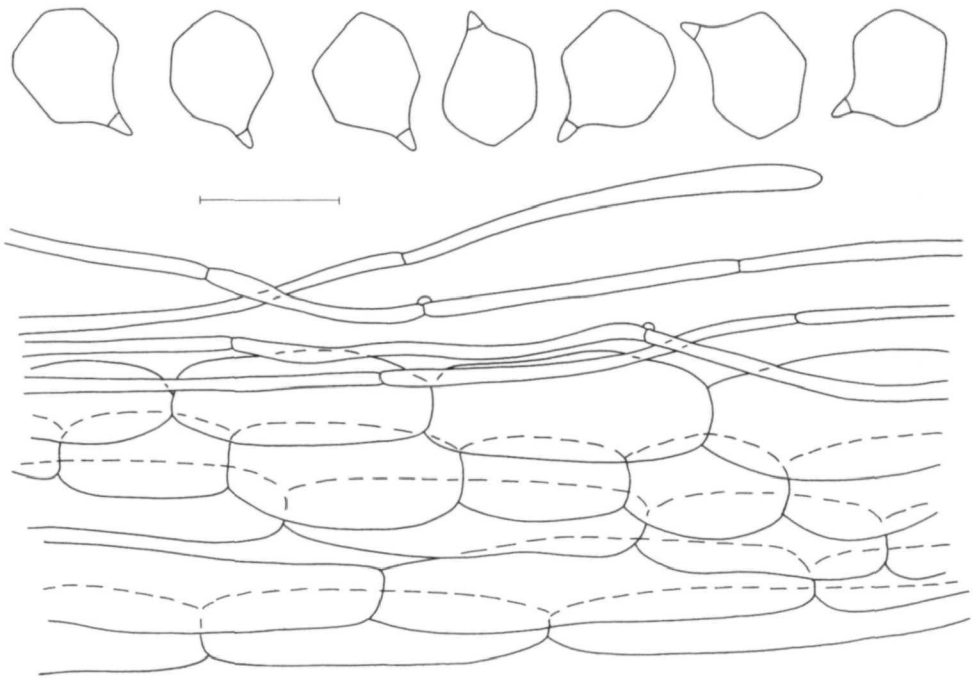

Fig. 39. *Clitopilus subvilis*. Spores and pileipellis. – Bar: 10 µm (spores), 20 µm (all other figs.).

Observations on the holotype: The holotype consists of numerous specimens in a rather good state; part of them glued on a piece of paper. Spores 8.0-9.5 × 6.5-8.0 µm, average 8.6 × 7.3 µm, Q = 1.0-1.2, average Q = 1.1, subisodiametrical in outline, 5-6-angled in side-view. Basidia 22-43 × 7.5-10 µm, 4-spored, with clamp connections. Lamellar edge fertile. Cystidia absent. Hymenophoral trama regular, made up of short, inflated elements, 35-90(-110) × 7-22 µm. Pileipellis a cutis of narrow, 4-10 µm wide, cylindrical hyphae, subpellis more or less distinct, made up of short, inflated elements. Pigment abundant, brown, intracellular in subpellis and upper pileitrama. Clamp connections abundant.

Notes: The hygrophanous, glabrous, dark brown pileus, adnate to subdecurrent lamellae, and concolorous, polished stipe, combined with the microscopical characters as there are a simple, cutis-like pileipellis of narrow hyphae, intracellular pigment, and hyphae with clamp connections place *Clitopilus subvilis* in subgenus *Entoloma* sect. *Polita*. On account of the isodiametrical spores it comes very close to *Entoloma politum* (PERS.: FR.) DONK, from which it mainly differs by having a farinaceous taste.

transformata

Leptonia transformata PECK, Bull. N. Y. State Mus. **116**: 32. 1907; *Leptoniella transformata* (PECK) MURRILL, N. Amer. Fl. **10(2)**: 87. 1917. – Fig. 40.

Selected literature: LARGENT, Biblioth. Mycol. **55**: 155-156. 1977.

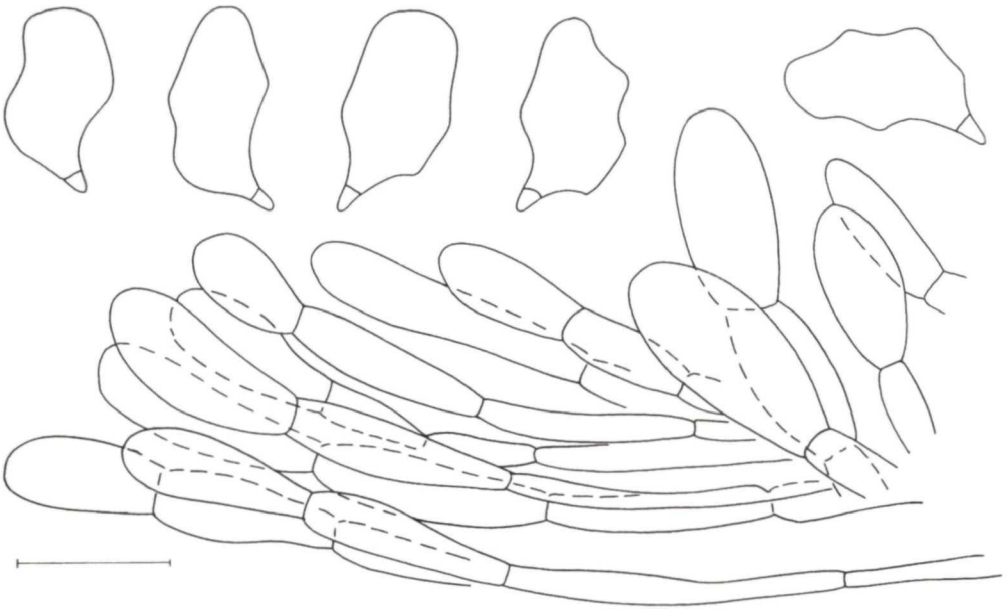

Fig. 40. *Leptonia transformata*. Spores and pileipellis. – Bar: 10 µm (spores), 20 µm (all other figs.).

Original diagnosis: Pileus 10-20 mm broad, thin, submembranaceous, slightly convex or nearly plane, often umbilicate, surface silky-tomentose, dry or slightly moist in wet weather, white, becoming blackish or blackish-brown on drying, margin striatulate, at first incurved, sometimes becoming wavy or split when old; context white, the taste farinaceous; lamellae sinuate, adnexed, crowded, unequal, ventricose, white, becoming pink; stipe 25-50 × 1-2 mm, long, slender, straight or flexuous, equal or slightly narrowed upward, pruinose at the apex, glabrous and shining at the base, subcartilagineous, stuffed or hollow, white, becoming blackish or blackish-brown on drying, with white mycelium at the base. In bushy places.

Holotype: Massachusetts, Falmouth, 10 July 1906, S. DAVIS (NYS).

Observations on the holotype: The holotype consists of a rich collection of well-preserved specimens. Spores 11.0-13.0 × 6.0-8.0 µm, average 12.0 × 7.2 µm, Q = 1.45-1.8, average Q = 1.7, irregularly elongate-angular in side-view with 6-9 angles. Basidia 25-37 × 8-12 µm, 4-spored, with clamp connections. Lamellar edge fertile. Cystidia absent. Hymenophoral trama regular, made up of rather short, inflated elements, 30-90 × 9-20 µm. Pileipellis a cutis with transitions to a trichoderm, made up of inflated, 10-25 µm wide hyphae with clavate, (sub-)erect, terminal elements, 25-70 × 10-27 µm. Pigment very abundant, brown, intracellular. Clamp connections absent.

Notes: *Leptonia transformata* is a rather aberrant species with its white carpophores that turn blackish on drying. Microscopically it fits well in subgenus *Leptonia* section *Cyanula*. The large, nodulose-angular spores are distinctive. Therefore a new combination is made:

***Entoloma transformatum* (PECK) NOORDEL., comb. nova**
Basionym: *Leptonia transformata* PECK, N. Y. State Mus. Bull. **116**: 32. 1907.

undulatellus

Agaricus undulatellus PECK, Annual Rep. N. Y. State Mus. **31**: 33. 1879; *Leptonia undulatella* (PECK) SACC., Syll. Fung. **5**: 708. 1887; *Leptoniella undulatella* (PECK) MURRILL, N. Amer. Fl. **10(2)**: 90. 1917. – Fig. 41.

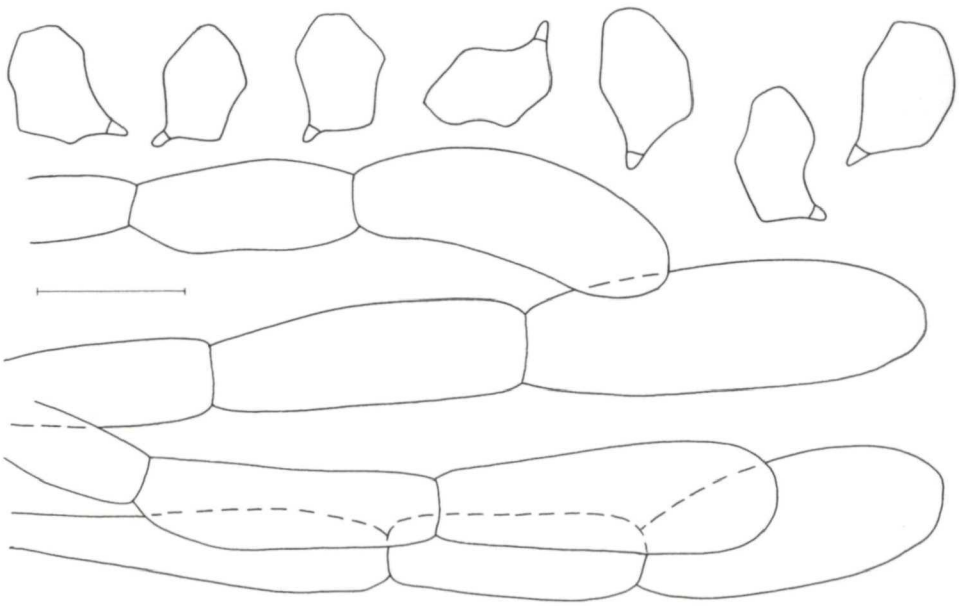

Fig. 41. *Agaricus undulatellus*. Spores and pileipellis. – Bar: 10 µm (spores), 20 µm (all other figs.).

Selected literature: LARGENT, Biblioth. Mycol. **55**: 256. 1977; LARGENT, Entolomatoid Fungi of the western United States and Alaska: 180-181. 1994.

Original diagnosis: Pileus 12-25 mm broad, membranaceous, convex, surface minutely scurfy, squamulose on the disk, hygrophanous, grayish-brown and striatulate when moist, wavy on the margin; lamellae rounded behind, nearly free, subdistant, whitish, becoming tinged with flesh-color; stipe 25 mm long, slender, glabrous, concolorous, usually curved. On decaying prostrate trunes of trees.

Holotype: New York, Griffins, Pine Hill, C. H. PECK (NYS).

Observations on the holotype: The holotype consists of four specimens, glued on paper and some additional fragments, all in a rather poor state. Spores 8.0-10.5 × 5.5-7.0 µm, average 9.0 × 6.2 µm, Q = 1.3-1.65, average Q = 1.45, 5-7-angled in side-view. Basidia 22-38 × 7-11 µm, 4-spored, clampless. Lamellar edge fertile. Cystidia absent. Pileipellis a cutis with transitions to a trichoderm, made up of septate, inflated hyphae, 10-30 µm wide. Pigment abundant, brown, intracellular. Clamp connections absent.

Notes: *Agaricus undulatellus* belongs to section *Cyanula*, and, on account of the gray-brown translucently striate pileus and concolorous stipe it comes very close to

stirps *Sarcitulum* and stirps *Turci*. The fertile lamellar edge and small spores seem to be distinctive for this taxon that may be considered as a good species. *Entoloma squamodiscum* HESLER, and *E. rimosum* HESLER, considered as synonyms of *Leptonia undulatella* var. *floridana* (MURRILL) LARGENT by LARGENT (1977) are different species (NOORDELOOS 1988). Therefore a new combination is made:

***Entoloma undulatellum* (PECK) NOORDEL., comb. nova**
Basionym: *Agaricus undulatellus* PECK, Annual Rep. N. Y. State Mus. **31**: 33. 1879.

unicolor

Eccilia unicolor PECK, Bull. Torrey Bot. Club **34**: 90. 1907.

Original diagnosis: Pileus 10-25 mm broad, thin, membranaceous, conic or very convex, becoming expanded, umbilicate, surface glabrous, silky, shining, hygrophanous, yellowish-brown and striatulate on the margin when moist, becoming paler or brownish-orange on drying; lamellae unequal, thin, narrow, crowded, arcuate, decurrent, sometimes serrate on the edges, concolorous; stipe 30-60 × 1-3 mm, externally cartilagineous, straight or flexuous, glabrous, shining, stuffed, pruinose at the apex, concolorous or a little paler, with a whitish myceloid tomentum at the base. On gravelly soil in waste places.

Holotype: Massachusetts, Falmouth, 31 July 1906, S. DAVIS (NYS).

Observations on the holotype: The holotype is in a very bad condition, and consists of fragments of two specimens. Spores 7.5-11.0 × 5.5-7.0 µm, average 9.3 × 6.1 µm, Q = 1.25-1.75, average Q = 1.5, 5-7-angled in side-view. Basidia 22-35 × 6.5-10 µm, 4-spored, clampless. Lamellar edge fertile. Cystidia absent. Pileipellis a cutis of rather narrow, 2-7.5 µm wide, cylindrical hyphae. Pigment brown, intracellular in pileipellis and upper pileitrama. Clamp connections not observed.

Notes: *Eccilia unicolor* is a small, brown, omphalioid species which may well be ranged in subgenus *Paraleptonia* (NOORDELOOS 1987, 1992, 2004).

validipes

Leptonia validipes PECK, Mycologia **5**: 70. 1913; *Leptoniella validipes* (PECK) MURRILL, N. Amer. Fl. **10(2)**: 91. 1917; *Leptonia gracilipes* PECK var. *validipes* (PECK) LARGENT, Biblioth. Mycol. **55**: 218. 1977. – Fig. 42.

Original diagnosis: Pileus 20-30 mm broad, thin, membranaceous, convex, slightly depressed at center or subumbilicate, fragile, gregarious, surface minutely squamulose, dark gray or grayish-brown; lamellae thin, crowded, entire on the edges, adnate, white and smooth, becoming pink and dusted with the spores; stipe 30-60 × 2-3 mm, stout but fragile, pruinose at the apex, flexuous, hollow, sometimes twisted, often bent at the base, pale violet-gray above, white below with white mycelium at the base. On humus in swamps.

Holotype: Massachusetts, Stow, 15 Aug. 1912, S. DAVIS (NYS).

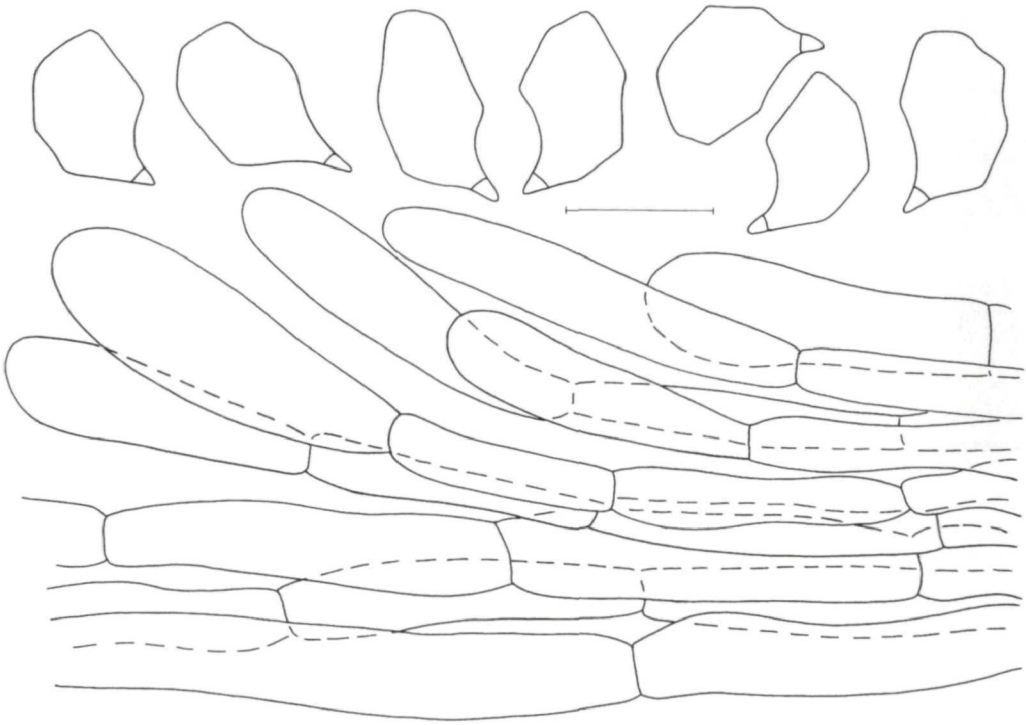

Fig. 42. *Leptonia validipes*. Spores and pileipellis. – Bar: 10 µm (spores), 20 µm (all other figs.).

Observations on the holotype: The holotype consists of fragments of four specimens in a bad state, glued on paper. Spores 10.5-13.0 × 7-8 µm, average 11.6 × 7.9 µm, Q = 1.3-1.7, average Q = 1.45, irregularly 5-7-angled in side-view. Basidia 27-42 × 9-13.5 µm, 4-spored, clampless. Lamellar edge fertile. Cystidia absent. Pileipellis a cutis with transitions to a trichoderm, made up of inflated hyphae with clavate terminal elements, 50-90 × 17-30 µm. Pigment abundant, brown, intracellular. Vascular hyphae present. Brilliant granules present. Clamp connections absent.

Notes: *Leptona validipes* belongs to section *Cyanula*, and keys out in stirps *Asprellum* in NOORDELOOS (1987, 1992, 2004). Its main characteristics are the non-striate, dark coloured pileus, pale violet-gray stipe, large spores, and fertile lamellar edge. *Entoloma asprellum* (FR.) FAYOD differs by having a deeply translucently striate pileus, but is very similar in other respects. *Leptonia validipes* also has some resemblance to *Entoloma huijsmanii* NOORDEL., but that species differs by having a translucently striate pileus that is squamulose at center only. The species in stirps *Anatinum* are also close, but those usually have a fibrillose to subsquamulose stipe surface. LARGENT (1977) considers *Leptonia validipes* as a variety of *Leptonia gracilipes* PECK. I agree both taxa are close, but *Leptonia gracilipes* differs in a number of important characteristics, such as a striate pileus, grey stipe, small spores and sterile lamellar edge. LARGENT (1994) however, ranged *Leptonia validipes* under the synonyms of *L. asprella*.

variabile

Entoloma variabile PECK, Annual Rep. N. Y. State Mus. **54**: 145. 1901. – Fig. 43.

Original diagnosis: Pileus 15-30 mm broad, thin, conic, ovate to subcampanulate, umbonate, obtuse or subumbilicate, surface moist, slightly fibrillose, pale yellow when young, becoming reddish brown with age, either whoolly or at the center only; lamellae ascending, rather crowded, broad in front, often eroded on the edges, white or whitish, becoming pale salmon-colored; stipe 75-125 × 2-4 mm, long, slender, hollow, slightly fibrillose striate, whitish or pallid, sometimes becoming reddish brown with age, often with a whitish mycelium at the base. In *Sphagnum* marshes.

Holotype: New York, Floodwood, Aug. 1900, C. H. PECK (NYS).

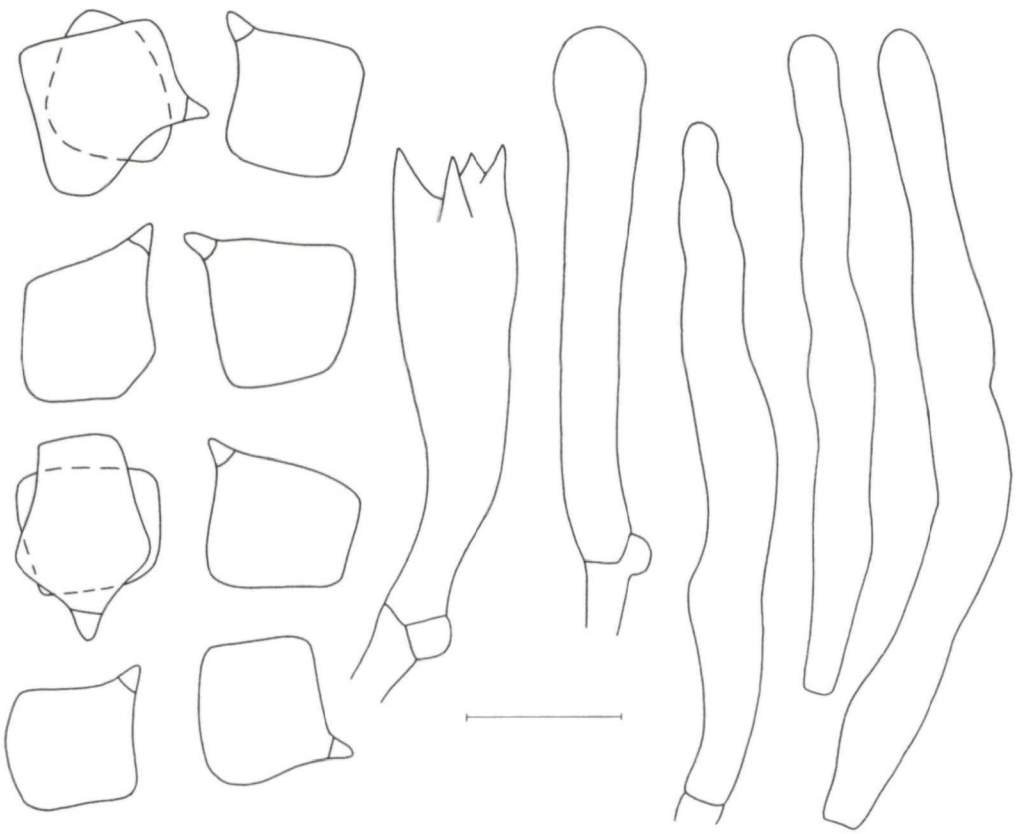

Fig. 43. *Entoloma variabile*. Spores, basidium and cheilocystidia. – Bar: 10 µm (spores), 20 µm (all other figs.).

Observations on the holotype: The holotype consists of many well-preserved specimens. Spores 9.0-12.5 × 8.0-11.0 µm, average 10.2 × 9.0 µm, Q = 1.0-1.2, average Q = 1.1, cuboid to subcruciform. Basidia 35-48 × 9-12 µm, 4-spored, with clamp connections. Lamellar edge heterogeneous. Cheilocystidia 50-90 × 5-14 µm, strangulate-subcylindrical, scattered among the basidia. Hymenophoral trama regular, made up of long, cylindrical or inflated elements, 75-250 × 5-17(-25) µm. Pileipellis a cutis of narrow, cylindrical, 5-12 µm wide hyphae. Pileitrama regular, made up of long, cylindrical elements, 120-400 × 5-30 µm. Pigment yellow-brown, intracellular, abundant in pileipellis and upper pileitrama. Clamp connections present in hymenium.

Notes: *Entoloma variabile* is close to *E. conferendum* (BRITZELM.) NOORDEL. in section *Staurospora,* from which it differs by the presence of cystidia and a relatively large percentage of cuboid spores. HORAK (1976) did not study the type.

watsonii

Agaricus watsonii PECK, Annual Rep. N. Y. State Mus. **28**: 45. 1876; *Eccilia watsonii* (PECK) SACC., Syll. Fung. **5**: 732. 1887; *Leptonia watsonii* (PECK) LARGENT, Mycologia **66 a**: 1018. 1974. – Fig. 44.

Original diagnosis: Pileus 10-20 mm broad, hemispheric or convex, umbilicate, surface striatulate, brown, darker and with minute blackish-brown scales on the umbilicus; lamellae distant, arcuate, decurrent, whitish, becoming flesh-colored; stipe 25 × 1-2 mm, equal, smooth, shining, brownish or pallid. On the ground in woods.

Holotype: New York, Fulton County, Northhampton, Aug., C. H. PECK (NYS).

Observations on the holotype: The holotype is in a very poor condition and consists of two stipes and a fragment of one pileus only. Spores 7.5-10.0 × 7.0-9.0 µm, average 8.7 × 7.7 µm, Q = 1.0-1.3, average Q = 1.15, usually 4-sided, more or less quadrangular in outline, subcuboid, rarely 5-angled in side-view. Basidia 27-42 × 8.5-11 µm, 4-spored, with clamp connections. Lamellar edge heterogeneous. Cheilocystidia 35-70 × 12-25 µm, neck 5-15 µm, lageniform to lecythiform, abundant, but mixed with basidia. Pleurocystidia 55-120 × 10-30 µm, lageniform. Pileipellis difficult to study, but probably trichodermal at centre, terminal elements clavate, 25-90 × 12-30 µm. Pigment brown, intracellular. Clamp connections observed in hymenium.

Notes: LARGENT (1974 a) studied the type of *Agaricus watsonii*, and concluded that it represents a good species of *Leptonia*, which he placed in section *Rhamphocystotae* on account of the well-differentiated cheilocystidia. However, the present author wants to restict section *Rhamphocystotae* for those species of *Leptonia* without clamp connections that have well-differentiated cheilocystidia, such as *Entoloma subcorvinum* HESLER and *E. olivaceosquamosum* HESLER The present type study revealed the presence of clamp connections at the base of the basidia. Also the presence of pleurocystidia and the peculiar, almost cuboid spores place *Agaricus watsonii* in the vicinity of *Entoloma insolitum* NOORDEL. in subgenus *Paraleptonia* section *Insolita*. Both species have an omphalioid stature, dark brown colours, a pileipellis of rather broad, inflated elements, basidia with clamp connections, and lageniform to lecythiform cheilo- and pleurocystidia. *Entoloma insolitum* differs from *Agaricus watsonii* mainly in the size and shape of the spores.

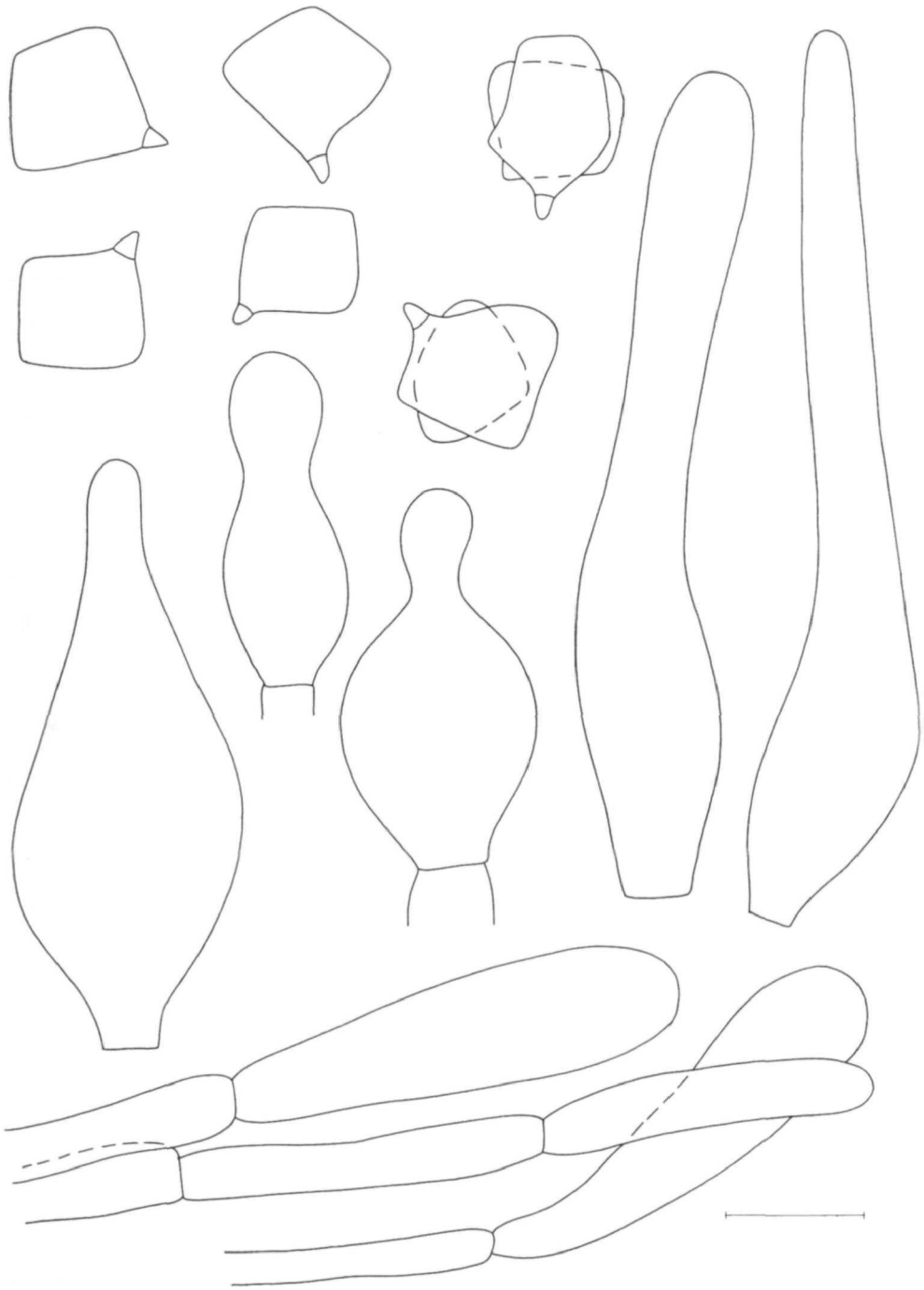

Fig. 44. *Agaricus watsonii*. Spores, cheilocystidia, pleurocystidia and pileipellis. – Bar: 10 µm (spores), 20 µm (all other figs.).

Therefore a new combination is proposed:

***Entoloma watsonii* (PECK) NOORDEL., comb. nova**
Basionym: *Agaricus watsonii* PECK, Annual Rep. N. Y. State Mus. 28: 45. 1876.

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