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Type studies in North American species of *Bolbitiaceae* belonging to the genera *Conocybe* and *Pholiotina*

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Abstract: 56 taxa described in the genera *Agaricus*, *Conocybe*, *Galera*, *Galerella*, *Galerula*, *Gastrocybe* or *Pholiotina*, which were considered to have affinities to *Bolbitiaceae*, are investigated and their taxonomic status is discussed. The new combinations *Agrocybe ludoviciana*, *Conocybe humicola*, *Conocybe pulchra*, *Pholiotina flava* and *Pholiotina plumbeitincta* are proposed. Microscopical drawings of all investigated type specimens are given.

Zusammenfassung: 56 aus Nord- und Mittelamerika in den Gattungen *Agaricus*, *Conocybe*, *Galera*, *Galerella*, *Galerula*, *Gastrocybe* oder *Pholiotina* beschriebene Taxa, die mit den *Bolbitiaceae* in Zusammenhang gebracht worden sind, werden behandelt und ihre taxonomische Zuordnung diskutiert. Die Neukombinationen *Agrocybe ludoviciana*, *Conocybe humicola*, *Conocybe pulchra*, *Pholiotina flava* und *Pholiotina plumbeitincta* werden vorgeschlagen. Mikroskopische Zeichnungen zu allen untersuchten Typusbelegen werden angefertigt.

The present study comprises taxa described from material originating from the USA, Mexico and Greenland; as many North American floras also include specimens from Cuba or Puerto Rico, types from the Caribbean were also included.

The descriptions of the present study are not always identical with the original diagnoses, as all microscopical measurements were excluded. If the diagnoses are short or uninformative, they were supplemented with details from the English descriptions or even replaced with the latter. The descriptions are therefore not identical with the original protologue but include all available information on the microscopical features of the taxa.

For a better orientation, the taxon name supposed to be actually valid according to our investigations is given in bold.

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The microscopical measurements are exclusively from investigations of the type specimens by the first author. Supplements from other sources are especially annotated.

Materials and methods

Microscopical investigations were performed with an Olympus BH-2 microscope, the drawings with a drawing tube at magnifications of 1:2500 (spores) or 1:1000 (other elements), and scaled down accordingly for the publication. The microscopic slides were prepared in L4 Congo red, NH_4OH or KOH. Spore colour was recorded from slides in KOH (sometimes in NH_4OH when no differences were observed between the latter and the former), with a fully open aperture diaphragm and using a blue filter. Ammonia reaction was performed using a commercial or slightly diluted solution; the slides were investigated for the formation of spicular crystals after 15-20 minutes and after ca 12 hours. Spore measurements are recorded from ten spores; usually eight spores were selected by chance, and the upper and lower limits were estimated by choosing one particularly large and one particularly small spore. Means of spore sizes were calculated from at least ten different spores. In lenticular spores, five were measured each in side and front view, respectively, but care was taken that spore sizes did not differ strongly. In lenticular spores, the length-breadth ratio was calculated from measurements front view and not from side view.

Enlargement of the microscopical figures: Spores x 2000, all others x 800.

List of treated taxa

alachuana (Fig. 1 a-e)

Galerula alachuana MURRILL 1940, Bull. Torrey Bot. Club **67**: 229
Galera alachuana (MURRILL) MURRILL 1940, Bull. Torrey Bot. Club **67**: 235
***Conocybe alachuana* (MURRILL) HESLER in WATLING & GREGORY 1981,** Bibl. Mycologica **82**: 89

Original description:

Pileus conic to convex, gregarious, 5-7 mm broad; surface dry, glabrous, striate, avellaneous-isabelline, isabelline on the small umbo, margin straight, entire; lamellae adnate, ventricose, broad, inserted, medium distant, entire, fulvous, with white lamellar edges; stipe tapering upwards, smooth, glabrous, stramineous, about 6 cm long and 1 mm or less thick.

Microscopical characters:

Spores: 11-13.5 x 7.5-9 x 6-7.5 µm, mean 11.9 x 8.0 x 7.0 µm, Q = 1.4-1.7, irregularly ellipsoidal to ellipsoidal-subcylindrical in front view, slightly lentiform and somewhat angular, with a thick wall and a large germ-pore, red brown in KOH.

Basidia: 4-spored, 17-21 x 10-12.5 µm.

Clamp connections: not observed.

Cheilocystidia: lecythiform, 15-21 x 6-8 µm, with a capitulum 2.5-4 µm in diam.

Stipe covering: roundish to capilliform, rather collapsed; no lecythiform caulocystidia present.

Pileipellis: hymeniform, consisting of roundish-stipitate elements up to 50 x 28 µm; pileocystidia not observed.

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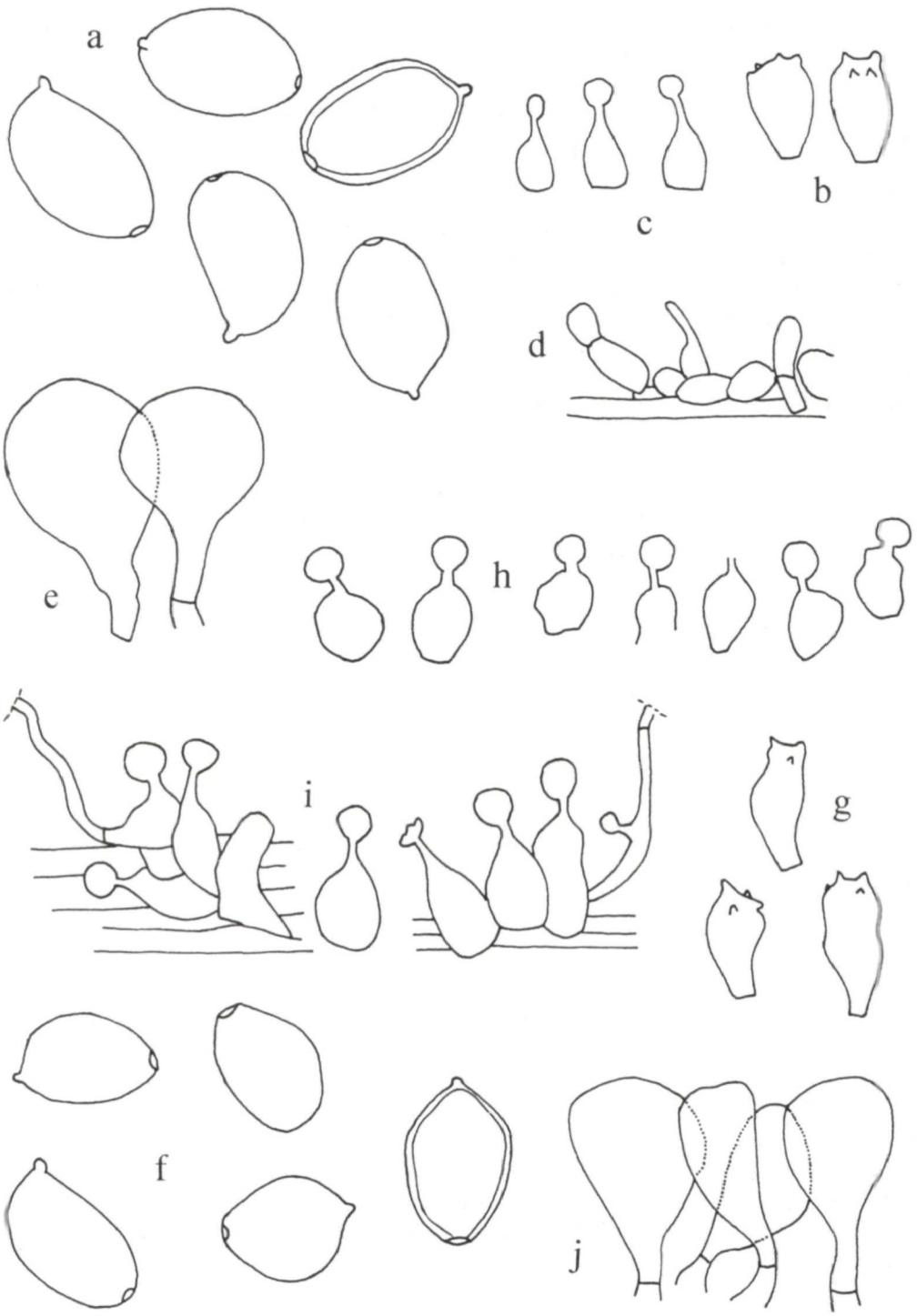


Fig. 1 *a-e*. *Galerula alachuana* (type). *a* Spores, *b* basidia, *c* cheilocystidia, *d* stipe covering, *e* elements of pileipellis. *f-j*. *Conocybe ammophila* (type). *f* Spores, *g* basidia, *h* cheilocystidia, *i* stipe covering, *j* elements of pileipellis.

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Specimen examined: USA: Florida, Alachua County, Gainesville, Planera Hammock, under deciduous trees, 21. 10. 1938, leg. W. A. MURRILL (FLAS, holotype).

The type consists of fragments of two fruitbodies and is moderately preserved; especially the stipe coverings are rather collapsed.

Conocybe alachuana is a member of sect. *Pilosellae* and is close to *Conocybe velutipes* (VELEN.) HAUSKN. & SVRČEK. However, the latter usually has much larger, robust fruitbodies with a darker pileus and is especially different by the shape of the spores. In both species the spores are lentiform, but the spores of *Conocybe velutipes* are regularly ellipsoidal in side and front view, whereas those of *Conocybe alachuana* are often subcylindric in front view and in side view flattened to slightly lemon-shaped. As such a spore shape was never observed in the numerous European collections of *Conocybe velutipes*, we consider *Conocybe alachuana* as a well-distinct species.

Conocybe fuscimarginata (MURRILL) SINGER has spores of similar size, which are never lentiform, and the fruitbodies are usually larger and have a paler, non-striate pileus. The spores of *Conocybe lenticulospora* WATLING are lentiform, but slightly smaller and paler in KOH; in addition, they are never subcylindrical in side view. In addition, *Conocybe fuscimarginata* and *C. lenticulospora* are usually found on dung or heavily manured soil.

ammophila (Fig. 1 f-j)

***Conocybe ammophila* M. LANGE 1957,** Medd.Grønland **148**: 9

Original description:

Pileus 1,2-3,5 cm latus, convexus, deinde planus, pallide ochraceus, nudus, carnosus; lamellae latae, subliberae, ochraceae; stipes cylindricus, basi inflatus, pallidus, carinatus.

Microscopical characters:

Spores: 9.5-11.5 x 6.5-7.5 x 6.0-7.0 µm, mean 10.7 x 6.9 x 6.3 µm, Q = 1.4-1.6, ellipsoidal, often slightly lentiform and rarely angular with ca 0.5 µm thick wall and a germ-pore up to 1.5 µm in diam., reddish brown in KOH.

Basidia: 4-spored, 22-26 x 8.5-11 µm.

Ammonia reaction: negative even after 12 hours.

Clamp connections: not observed.

Cheilocystidia: 17-27 x 7-11 µm, with capitulum 5-7 µm in diam.

Stipe covering: consisting almost exclusively of lecythiform elements, which are similar in shape to cheilocystidia, but up to 30 x 13 µm, with capitulum 4-8 µm in diam.; in-between some sparse non-lecythiform caulocystidia and hairs, especially in the middle of the stipe.

Pileipellis: hymeniform, consisting of roundish-stipitate elements up to 37 x 17 µm in diam., which are almost hyaline, at the base encrusted yellowish.

Specimen examined: Greenland: Søndre Strømfjorden, on sand bank along creek close to river, 1. 8. 1946, leg. M. LANGE (C, holotype).

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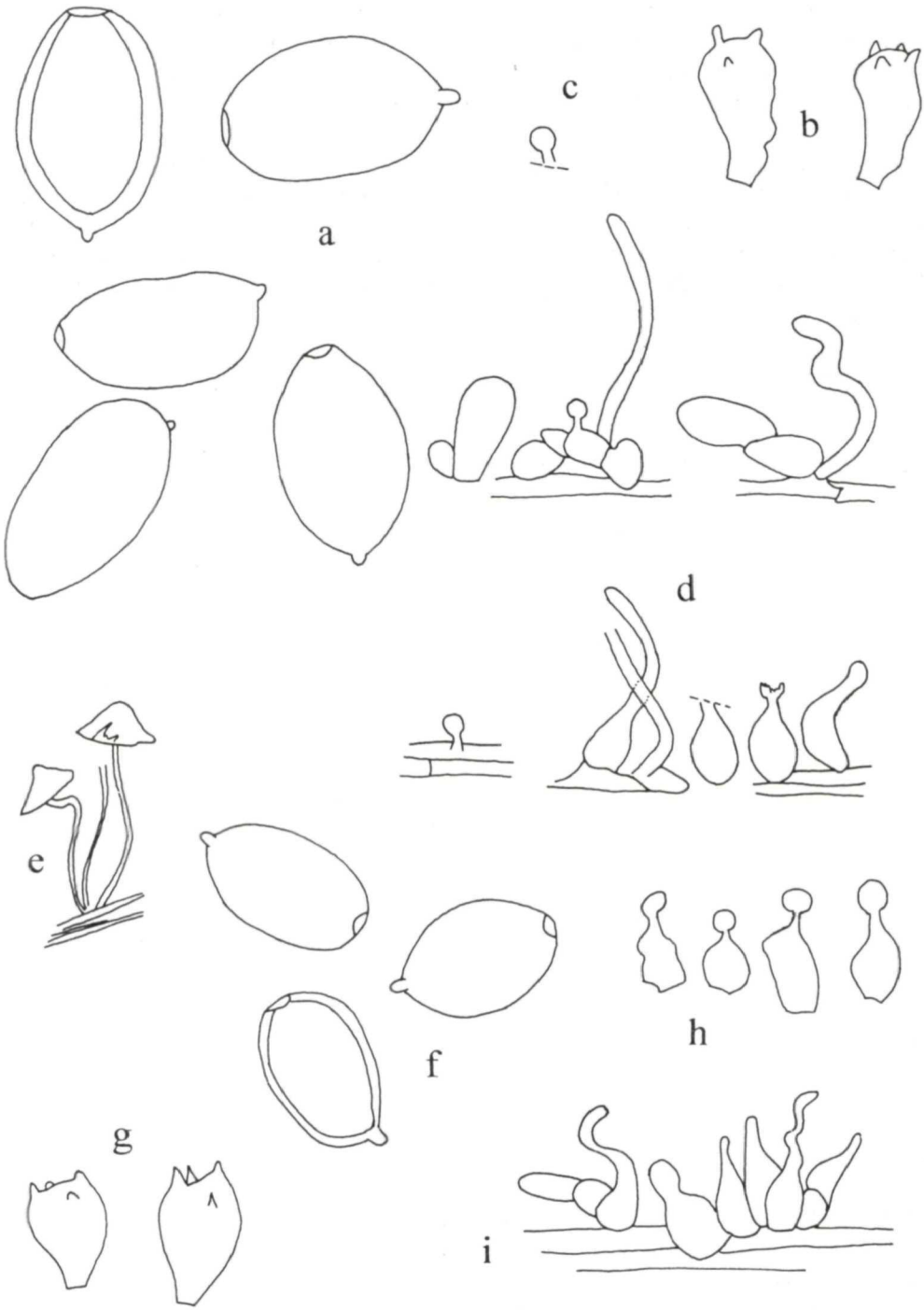


Fig. 2 *a-d. Galera bulbifera* (part of holotype). *a* Spores, *b* basidia, *c* isolated capitulum of cheilocystidium, *d* stipe covering. *e-i. Galerula caespitosa* (holotype). *e* Exsiccate (x 0,8), *f* spores, *g* basidia, *h* cheilocystidia, *i* stipe covering.

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The specimen consists of numerous well-preserved, partly broken fruitbodies, the investigation of which is only hampered by the attached sand. WATLING annotated in his previous investigation of the specimen "sect. *Conocybe* with capitate caulocystidia; good species in stirps *Leucopoda* which should be looked out for".

The combination: fruitbodies *Agrocybe*-like in habitus, lecythiform caulocystidia with large capitulum and slightly lentiform spores does not fit any other described species. The spore dimensions and spore colour in KOH as well as the cystidia with large capitulum are somewhat reminiscent of *Conocybe juniana* (VELEN.) HAUSKN. & SVRČEK, but clearly differ by the stout, compact habitus, the whitish stipe and the lentiform, partly slightly angular spores.

angusticeps

Galera angusticeps PECK 1897, Bull. Torrey Club **24**: 143
Galerula angusticeps (PECK) MURRILL 1917, North Amer. Flora **10**: 168
Galeropsis angusticeps (PECK) SINGER 1962, Sydowia **15**: 83
***Agrocybe angusticeps* (PECK) WATLING 1981,** Bibl. Mycologica **82**: 26

Original description:

Pileus thin, narrowly and irregularly conical or subcylindrical, obtuse acute or abruptly acuminate at the apex, even, glabrous, viscid and dark ochraceous when young and moist, nearly white when old and dry, the margin somewhat incurved and appressed to the stem; lamellae close, narrow, adnate, somewhat white-margined, more or less anastomosing, brownish-ferruginous when mature; stem slender, glabrous, hollow, equal or slightly thickened at the base, whitish or tinged with yellow, shining when dry. Pileus 8-15 lines long, 4-6 lines wide; stem 1.5-3 in. long, 1-1.5 lines thick.

WATLING (in WATLING & GREGORY 1981) combined the species into *Agrocybe*. The original description and the combination of SINGER (1962) into *Galeropsis* show that it is a gasteroid species which has nothing to do with *Conocybe* or *Pholiotina*. Therefore, we have not examined the type once again.

atkinsonii

see *procera*

besseyi

Galera besseyi PECK 1909, Bull. New York State Mus. Nat. Hist. **131**: 35
Galerula besseyi (PECK) MURRILL 1917, North American Flora **10**: 163
Conocybe besseyi (PECK) R. HEIM 1931, Le genre Inocybe: 65
***Cyttarophyllum besseyi* (PECK) SINGER 1936,** Ann. Mycol. **34**: 344

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Original description:

Pileus thin, ovate or oval, rarely subglobose, obtuse, glabrous, never expanding, isabelline or pale dingy ochraceous, the margin abruptly contracted and closely embracing the stem; lamellae thin, close, ascending, adnate, ferruginous brown; stem slender, slightly flexuous, hollow, glabrous, even or slightly striate, colored like the pileus. Pileus 2.5-6 lines long, 2-5 lines broad; stem 1-2 inches long, .5-1 line thick.

Sandy soil. Garden of the Gods, El Paso Co., Colorado. August 1908. C. E. BESSEY and E. A. BESSEY.

The description and especially the attached colour plate clearly show that *Galera besseyi* is not a member of *Conocybe* or *Pholiotina*. SINGER (1936) placed the species into *Cyttarophyllum*, which was later placed by him (SINGER 1986: 844) into the secotioid family *Galeropsidaceae*, which, however, has close affinities to the *Bolbitiaceae*. Therefore, we have not examined the type material.

bulbifera (Fig. 2 a-d)

Galera bulbifera KAUFFMAN 1918, *Agaricaceae* of Michigan: 496
***Conocybe bulbifera* (KAUFFMAN) ROMAGN. 1942,** Bull. Soc. Mycol. France **58**: 147

Original description:

Pileus 0.5-2.5 cm broad, oval-campanulate, obtuse, ferruginous-cinnamon when moist, hygrophanous, ochraceous and atomate when dry, rivulose-reticulate. Gills ascending-adnate, narrow, sublinear, close to crowded, ferruginous-cinnamon, sprinkled by ferruginous spores. Stem 6-15 cm long, 1.5-3 mm thick, strict when moist, equal above the bulbous base, pale ferruginous, hollow, glabrous-shining when dry, sometimes faintly striatulate. Odor none.

On horse dung; dung-hills in mixed woods.

Variable in size; solitary specimens attain the large size, while a patch of them is apt to be composed of smaller sizes. It has the appearance, in the large condition, of *G. ovalis*, but differs by the narrow gills etc. It is well marked by the gills, the bulblet at base of stem, and the spores. The whole plant is ferruginous-cinnamon when moist, and in large plants the pileus is finely rugose-reticulate.

Microscopical characters:

Spores: 13.5-16 x 8.5-10 x 7-8.5 µm, mean 15.0 x 9.4 x 7.8 µm, Q = 1.5-1.7, ellipsoidal in front view, slenderly ellipsoidal to faintly bean-shaped in side view, distinctly lentiform, with a wall up to 1 µm thick and a broad germ-pore up to 2 µm in diam., rusty-brown in KOH.

Basidia: 4-spored, 22-26 x 11-13.5 µm.

Clamp connections: not observed.

Cheilocystidia: entirely collapsed, only one capitulum with a diam. of 4 µm found.

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Stipe covering: collapsed; besides hairs and non-lecythiform elements distinctly lecythiform caulocystidia present, 12-19 x 7-8 µm, with capitulum 3-4 µm in diam.

Pileipellis: collapsed, but evidently a hymeniderm composed of roundish cells.

Specimen examined: USA: Michigan, New Richmond, on horse dung, 23. 9. 1912, leg. C. H. KAUFFMAN (MICH, portion of holotype).

The specimen examined consisted of two stipe fragments and of approximately one fifth of a pileus of reddish-brown colour. The date given on the type specimen does not correspond to that in WATLING & GREGORY (1981), which is given as 19. 9. 1912.

The results of our microscopical investigations confirm WATLING (1983) who considered the type of *Galera bulbifera* to be a member of sect. *Mixtae*, and who therefore described the new species *Conocybe elegans* for European collections previously determined as *Conocybe bulbifera*, as these clearly belong to sect. *Pilosellae*.

The dung-inhabiting *Conocybe bulbifera* is closely related with *C. pubescens* (GILLET) KÜHNER, but has smaller, more thick-walled and conspicuously lentiform spores (see HAUSKNECHT 2003). *Conocybe singeriana* HAUSKN. with a large, tuberous base of the stipe and similarly sized spores as *C. bulbifera* has no lecythiform elements on the stipe, and its spores are not lentiform and somewhat thinner-walled. Consequently we consider *Conocybe bulbifera* as a distinct species well separated from European members of sect *Mixtae*.

caespitosa (Fig. 2 e-i)

Galerula caespitosa MURRILL 1941, Mycologia **33**: 445
Galera caespitosa (MURRILL) MURRILL 1941, Mycologia **33**: 448
***Conocybe caespitosa* (MURRILL) WATLING 1977,** Kew Bull. **31**: 593

Original description:

Pileus hemispheric, not fully expanding, strictly caespitose, 1.5 cm. Broad; surface dry, pulverulent, glistening like mica, long-striate, uniformly pale rosy-isabelline or avellaneous, margin entire, even, fibrillose, incurved; context white, unchanging; lamellae adnatae, rather broad behind, medium distant, inserted, fimbriate on the edges, white, whitish when dry.

Microscopical characters:

Spores: 10.5-15.5 x 6.5-9 µm, mean 12.3-13.0 x 7.7-7.9 µm, Q = 1.3-2.1, ellipsoidal to subcylindrical-ellipsoidal, not lentiform, thick-walled with large germ-pore, orange-yellow in KOH.

Basidia: 2-3-4-spored, 18-27 x 12-15 µm.

Clamp connections: not observed.

Cheilocystidia: lecythiform, 15-22 x 7-10 µm, with capitulum 3-4.5 µm in diam., often with a long neck.

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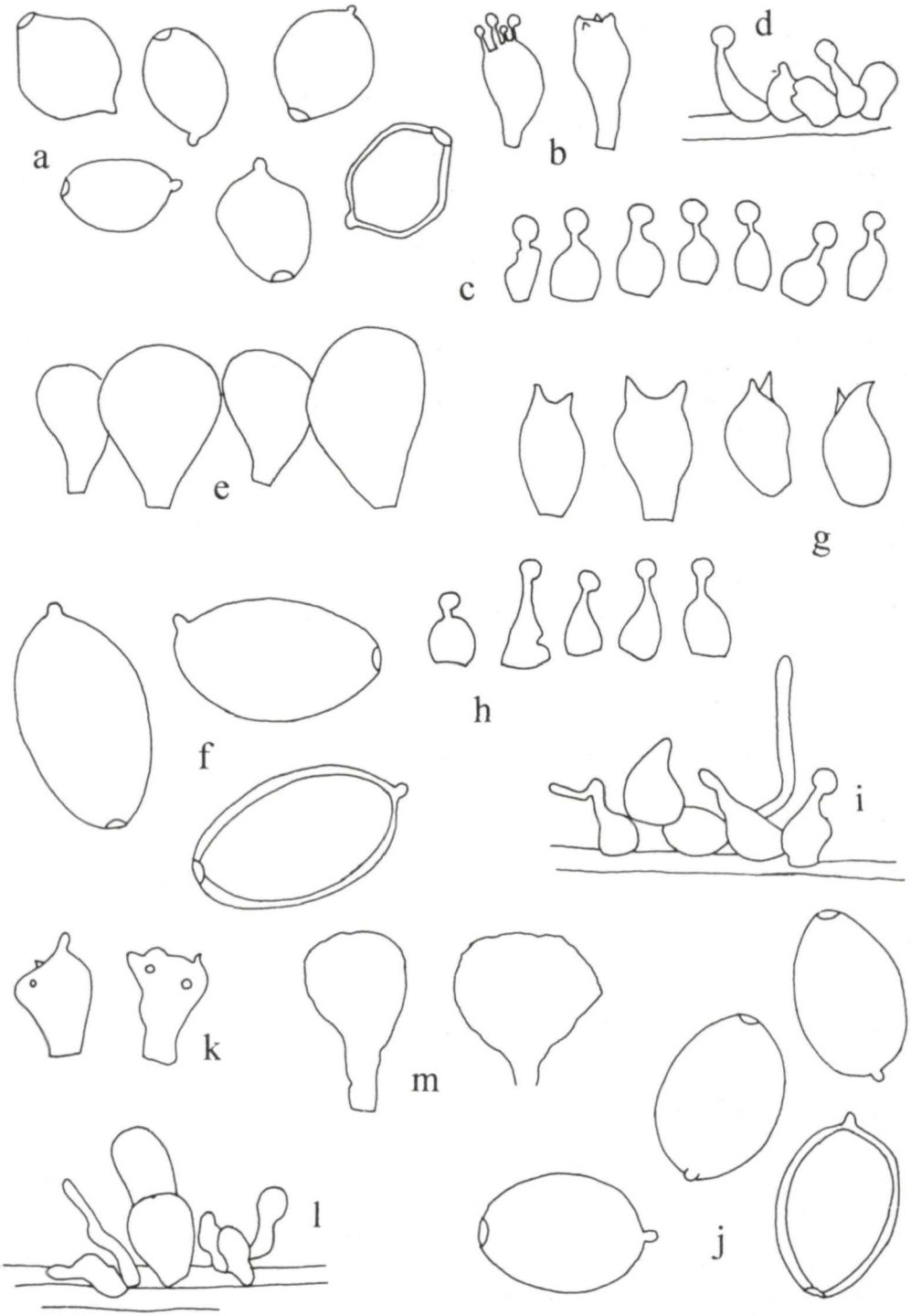


Fig. 3 *a-e. Galerula canalipes* (type). *a* Spores, *b* basidia, *c* cheilocystidia, *d* stipe covering, *e* pileipellis. *f-i. Galerula capillaripes* (type). *f* Spores, *g* basidia, *h* cheilocystidia, *i* stipe covering. *j-m. Agaricus crocosporus* (type). *j* Spores, *k* basidia, *l* stipe covering, *m* collapsed elements of pileipellis.

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Stipe covering: composed of non-lecythiform elements and hairs, no capitate caulocystidia found.

Pileipellis: hymeniform, composed of roundish elements (20-32 x 25-47 µm), in-between with hairs ca 2.5-3 µm thick.

Specimens examined: USA: Florida, Gainesville, under evergreen oaks, 29. 5. 1938, leg. W. A. MURRILL (FLAS, holotype); - - on sawdust, 6. 1. 1938, leg. W. A. MURRILL (FLAS, designated as „cotype").

The holotype consists of six fruitbodies, of which three were fasciculately united, very well preserved.

SINGER & HAUSKNECHT (1988: 120) supposed a close relationship with *Conocybe leucopus* KÜHNER & WATLING; however, a comparison of the microscopical features of both taxa showed a distinctly different stipe surface in *Conocybe caespitosa*, hence the former is a member of sect *Conocybe* whereas the latter a member of sect. *Pilosellae*. Within sect. *Pilosellae* there are several very rare or insufficiently known taxa with similar spore characteristics [e.g., *Conocybe crocospora* (BERK. & M. A. CURTIS) KÜHNER inval. from North America, *Conocybe peroxydata* (BERK.) REID from South Africa, and *Conocybe murinacea* WATLING from Europe], but the macroscopical features, especially the combination of striate, pale rose-isabelline pileus and the fasciculate growth distinguish *Conocybe caespitosa* from all other species. Although never collected again, we consider *Conocybe caespitosa* to be a well-distinct species.

canalipes (Fig. 3 a-e)

Galerula canalipes MURRILL 1942, Lloydia **5**: 147

Original description:

Pileus narrowly to broadly conic, gregarious, 2-3 cm broad; surface smooth, glabrous, hygrophanous, isabelline, dark-isabelline when young and remaining so on the umbo; margin entire, even, straight when young; context very thin, white, mild, odorless; lamellae adnexed, ventricose, crowded, inserted, medium broad, entire, white to isabelline and finally fulvous; stipe tapering upward from an onion-shaped base, slightly radicate, cartilaginous, stuffed, pallid to isabelline, pruinose to subglabrous, canaliculate for its entire length, 3-4 x 0.2-0.3 cm; bulb 5 mm in diameter.

Microscopical characters:

Spores: 8-9.5 x 6-6.5 x 5-5.5 µm, in front view almost mitra-shaped to almost hexagonal, in side view more or less ellipsoidal, distinctly lentiform, with double wall and a germ-pore up to 1.2 µm in diam., orange-yellow in KOH.

Basidia: 4-spored, 18-25 x 8.5-10 µm.

Clamp connections: not observed.

Cheilocystidia: lecythiform, 12-17 x 6-9.5 µm, with capitulum 3-4.5 µm in diam.

Stipe covering: collapsed, evidently composed only of lecythiform elements, which are similar to cheilocystidia; capitulum often absent.

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Pileipellis: hymeniform, composed of roundish-stipitate elements, 21-32 x 10-22 µm; pileocystidia not observed.

Specimen examined: USA: Florida, Magnesia Springs, on cow dung in low deciduous wood, 11. 2. 1939, leg. W. A. MURRILL (FLAS, holotype).

The type consists of fragments of presumably only one moderately preserved fruitbody; the base of the stipe is tuberous, but shows no marked root.

The microscopical characters of *Galerula canalipes* perfectly agree with those of *Conocybe antipus* (LASCH) FAYOD. As MURRILL (1942) described the stipe as "slightly radicate" and as also the habitat corresponds perfectly, there is no doubt that *Galerula canalipes* is a later synonym of *Conocybe antipus*, which is a rare but widely distributed species in Europe and North America.

capillaripes (Fig. 3 f-i)

Galera capillaripes PECK 1899, Bull. Torrey Bot. Club **26**: 66
Galerula capillaripes (PECK) MURRILL 1917, North American Flora **10**: 163
***Conocybe capillaripes* (PECK) WATLING 1977,** Kew Bull. **31**: 593

Original description:

Pileus subcampanulate, obtuse, a little broader than high, even, glabrous, hygrophanous, faintly striatulate and pale ferruginous when moist, paler or buff color when dry; lamellae rather broad, distant, adnate, pale ferruginous; stem very slender, flexuous, glabrous, colored like the pileus. Pileus 4-6 mm broad; stem 2-3 cm long, less than 1 mm thick.

Microscopical characters:

Spores: 12.5-15 x 7.5-9.5 µm, mean 14.1 x 8.6 µm, Q = 1.5-1.8, ellipsoidal, not lentiform, with thick wall and large, truncate germ-pore, rusty brown in KOH (only mature spores recorded as many spores were immature).

Basidia: 2-spored, 18-22 x 10-13.5 µm.

Clamp connections: not observed.

Cheilocystidia: lecythiform, 12-18 x 6.5-8 µm, with capitulum 2.5-3.5 µm in diam.

Stipe covering: composed of roundish, lageniform to capilliform elements, at the stipe apex with scarce lecythiform caulocystidia similar in shape to cheilocystidia but larger with capitulum up to 4 µm.

Pileipellis: hymeniform, composed of sphaeropedunculate to pyriform elements. Pileocystidia not observed.

Specimen examined: USA: Ohio, lawns and grassy places, May and June, leg. C. G. LLOYD (NYS, holotype).

The specimen consists of two long stipes and several small pileus fragments in poor condition. This was the reason why we examined the pileipellis only from a minute fragment and why we did not search for pileocystidia further on.

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PECK (1899) did not give a microscopical description of the stipe covering, and also HESLER (in his unpublished records) did not see lecythiform caulocystidia. In the original description, PECK (1899) supposed that *Conocybe capillaripes* could be mistaken for a "dwarf form" of *Galera tenera*; however, the structure of the stipe covering is different. *Conocybe capillaripes* is a member of sect. *Pilosellae*, with microscopical characters similar to those of *Conocybe siliginea* (FR.: FR.) KÜHNER or *Conocybe rickenii* (JUL. SCHÄFF.) KÜHNER. Considering the habitus, the species could be mistaken for a notably delicate form of *Conocybe siliginea*; however, the spores are smaller, the lamellae more distant and the pileus is slightly striate. In case additional records bring light into the variability of macroscopical features and spore size, it would not be surprising if *Conocybe capillaripes* were a later synonym of *Conocybe siliginea.*

crispa (Fig. 4 a-e)

Galera crispa LONGYEAR 1899, Bot. Gazette **28**: 272
Conocybe crispa (LONGYEAR) SINGER 1951, Lilloa **22**: 485
***Conocybe albipes* (OTTH) HAUSKN. var. *crispa* (LONGYEAR) HAUSKN. 1998,** Österr. Z. Pilzk. **7**: 106

Original description:

Pileus 1.5-3.5 cm broad, membranaceous, persistently conico-campanulate, subacute, uneven and somewhat rivulose, ochraceous-brown on disk, lighter toward the margin which becomes crenulate and upturned in older specimens, slightly pruinose at first, rugulose and a little paler when dry; lamellae slightly adnexed, not crowded, rather narrow, interspaced with anastomosing veins, much crisped, at first nearly white, then becoming ferruginous from the spores; stem 7-10 cm long, 0.1-0.3 cm thick, tapering from the somewhat bulbous base, yellowish white, pruinose at base, hollow, fragile.

Microscopical characters:

Spores: 11.5-16 x 7.5-9.5 µm, mean 13.0-13.6 µm, ellipsoidal, in front view partly slightly irregular or angular, not or only faintly lentiform, with 0.5-0.8 µm thick wall and a large germ-pore up to 2,5 µm in diam., in KOH reddish brown.

Basidia: 4-spored, 21-37 x 10-17.5 µm.

Clamp connections: not observed.

Cheilocystidia: lecythiform, 23-30 x 9.5-14 µm, with capitulum 4-6 µm in diam.

Pavement cells: present.

Stipe covering: composed of cylindrical, clavate or fusiform elements (up to 35 x 13 µm), at the stipe apex also some lecythiform caulocystidia similar to cheilocystidia present.

Pileipellis: hymeniform, composed of roundish-stipitate elements.

Specimens examined: USA: Plants of Michigan, Michigan State College [according to BESSEY (1944) the type locality], 29. 6. 1948, leg. & det. E. A. BESSEY (MSC); - - near Library Building, 30. 6. 1953, leg. & det. E. A. BESSEY (MSC).

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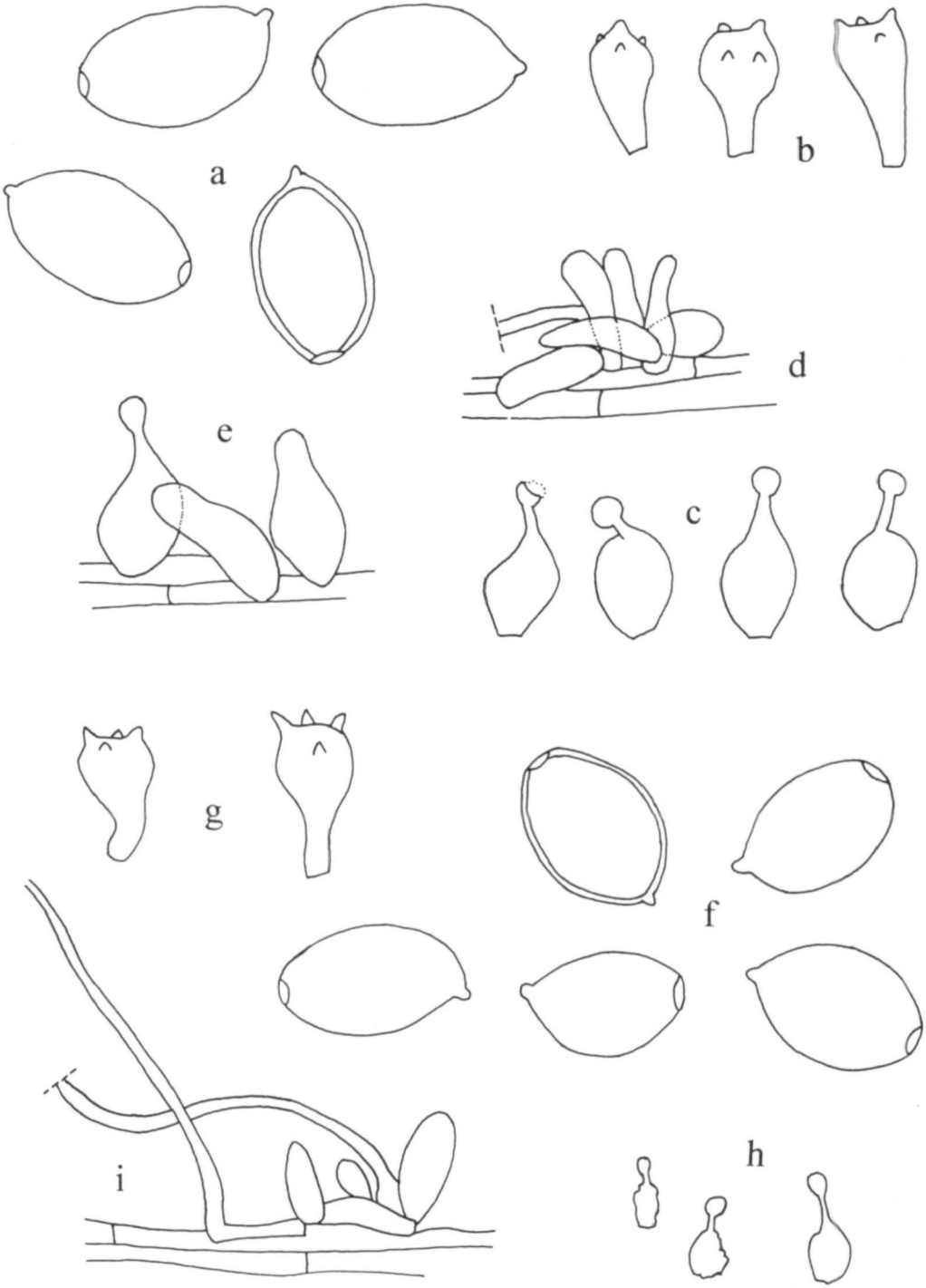


Fig. 4 *a-e*. *Galera crispa* (from type locality). *a* Spores, *b* basidia, *c* cheilocystidia, *d* stipe covering from the middle of stipe, *e* stipe covering from the stipe apex. *f-i*. *Galerula crispella* (type). *f* Spores, *g* basidia, *h* cheilocystidia, *i* stipe covering.

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Especially the collection from 30. 6. 1953 is in good condition, at the pileus the conspicuous wavy-curly lamellae are clearly visible. The microscopical analysis and also the commentary of the following paragraph are a translation from HAUSKNECHT (1998).

As already mentioned by WATLING (1992: 93), the type material of *Galera crispa* is lost; therefore, LONGYEARs collection 119533 was selected by him as neotype. We have never seen this collection, but two other collections of the type locality (see above). These fully agree in all essential features with the description given by WATLING (pers. comm.) for the neotype specimen, except for the basidia which carry four insted of two (to three) sterigmata.

The strong reasons given by HAUSKNECHT (1998) to propose that *Galera crispa* is only a variety of *Conocybe albipes* have meanwhile been confirmed by the DNA analyses of HALLEN & al. (2003). As long as there are no further molecular studies on North American and European material, it is therefore proposed that North American collections which have been determined as *Conocybe lactea* (LANGE) MÉTROD should bear the name *Conocybe albipes*, and North American collections of *Conocybe crispa* should be placed into *Conocybe albipes* var. *crispa*. However, meanwhile it has been demonstrated that European material described by HAUSKNECHT (1998) as var. *pseudocrispa* merits species rank; the new combination has been recently published as *Conocybe pseudocrispa* (HAUSKN.) ARNOLDS by ARNOLDS (2003).

crispella (Fig. 4 f-i)

Galerula crispella MURRILL 1942, Lloydia **5**: 148
***Conocybe crispella* (MURRILL) SINGER 1950,** Sydowia **4**: 132

Original description:

Pileus convex to subexpanded, never conic or plane, somewhat gregarious, 2-2.5 cm broad; surface dry, pallid, finely striate to the small isabelline disk, margin entire; context membranaceous, white, unchanging, mild, odorless; lamellae adnexed, rounded behind, narrow, close, inserted, entire, pallid.

Microscopical characters:

Spores: 11.5-13 x 8-9 x 7-8 µm, mean 12.4 x 8.3 x 7.5 µm, Q = 1.45-1.7, ellipsoidal, slightly lentiform, with ca 0.3-0.5 µm thick wall and a germ-pore up to 2 µm in diam., reddish brown in KOH.

Basidia: 4-spored, 21-28 x 10-13.5 µm. According to HESLER (unpublished notes) 24-28 x 9-11 µm.

Clamp connections: not found.

Cheilocystidia: mostly collapsed; some lecythiform elements with venter up to 8 µm wide and a capitulum 2-3.7 wide. HESLER (unpubl.) found cheilocystidia with 16-22 x 5-6 µm.

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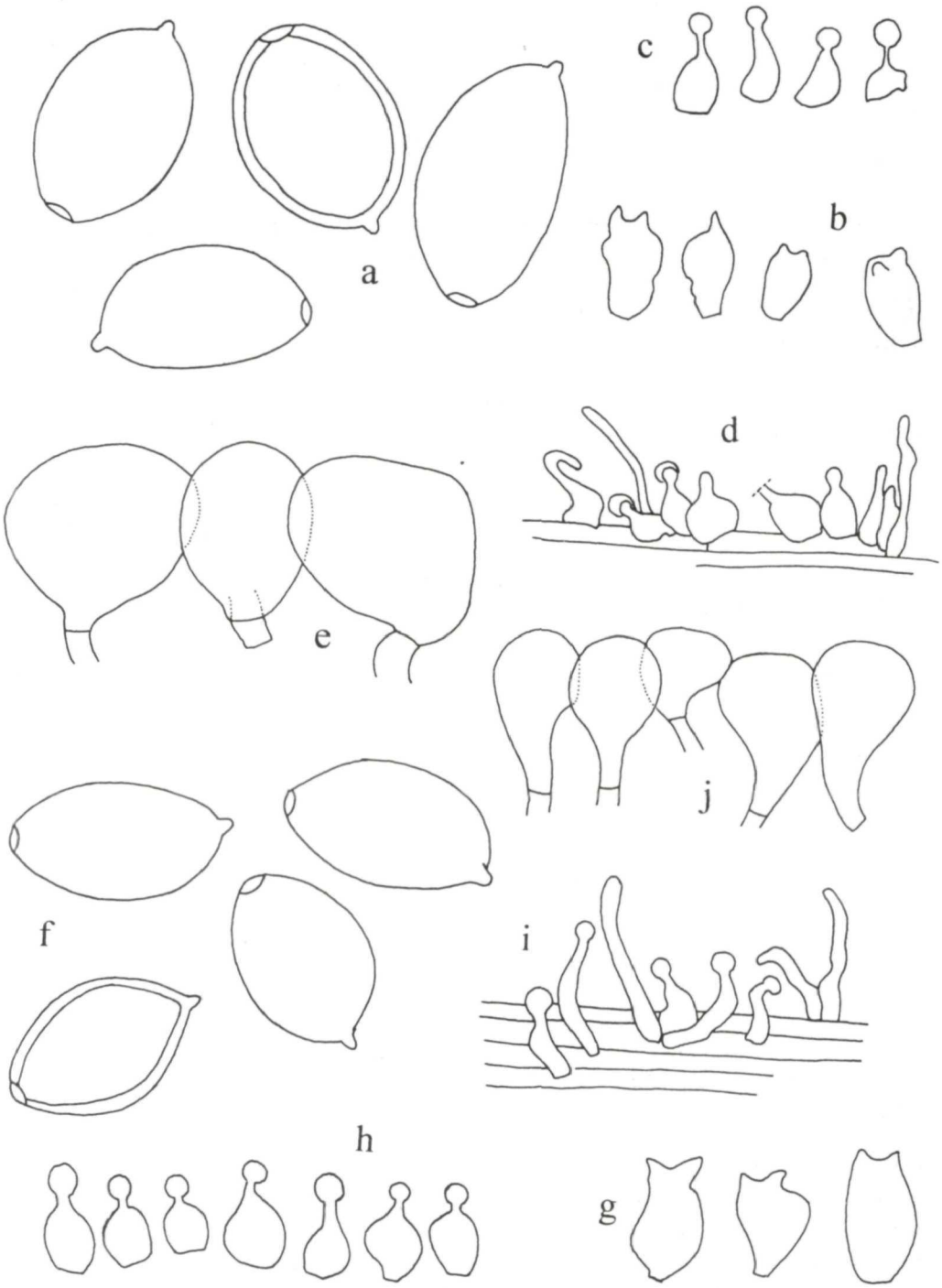


Fig. 5 *a-e*. *Galerula cryptocystis* (type). *a* Spores, *b* basidia, *c* cheilocystidia, *d* stipe covering, *e* elements of pileipellis. *f-j*. *Galerula curta* (type). *f* Spores, *g* basidia, *h* cheilocystidia, *i* stipe covering, *j* pileipellis.

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Stipe covering: only few hairs and non-lecythiform elements present, the stipe surface mostly collapsed. HESLER (unpubl.) recorded "stipe with some pin-shaped cystidia immixed", we could not find such elements even at the uppermost stipe apex.

Pileipellis: hymeniform, composed of roundish-pyriform, mostly collapsed elements.

Specimen examined: USA: Florida, Alachua County, Gainesville, on grass on open lawn, 5. 8. 1941, leg. W. A. MURRILL (holotype, FLAS).

The type consists of numerous small fragments of several pilei and the stipes in poor condition.

Conocybe crispella is a distinct member of sect. *Candidae* widely distributed especially in the tropics. Besides collections from the Pacific region and from flower pots and greenhouses in Europe (HAUSKNECHT 1997), the first author examined collections from Asia (Singapur), Africa (La Réunion, Mauritius, Seychelles) und Australasia (Fidschi, Vanuatu).

crocosporus (Fig. 3 j-m)

Agaricus crocosporus BERK. & M. A. CURTIS 1853, Ann. Mag. Nat. Hist. II, **12**: 421
Galera crocospora (BERK. & M. A. CURTIS) SACC., Sylloge Fungorum **5**: 866
Galerula crocospora (BERK. & M. A. CURTIS) MURRILL 1917, North American Flora **10**: 168
Conocybe crocospora (BERK. & M. A. CURTIS) KÜHNER 1935, Le genre *Galera*: 137, nom. inval. (no basionym cited)

Original description:

Pileus 2.5 cm broad or more, conic to convex, becoming depressed, sordid-brown, viscid, margin sulcate. Context thin. Lamellae adnate, pale-ferruginous, becoming saffron-yellow, numerous. Stipe 8-10 cm long, slender, white, silky-shining, fistulose, base thickened.

Microscopical characters:

Spores: 11.5-14.5 x 8.0-10.0 µm, mean 13.0 x 8.5 µm, Q = 1.4-1.6, regularly ellipsoidal, not lenticular, with thick wall and germ-pore up to 1.5 µm in diam., orange brown to dark brown in KOH.

Basidia: 4-spored, ca 16-19 x 12-14 µm.

Clamp connections: not found.

Cheilocystidia: completely collapsed; the specimen is heavily molded by a contaminating fungus, the lamellar edge completely spoilt. HESLER wrote in his unpublished notes "cheilocystidia 15-23 x 5-8 µm, flask-shaped, with a short neck and abrupt capitellum, inconspicuous and few (found only after several sections)".

Stipe covering: composed of non-lecythiform, roundish, cylindrical to shortly capilliform elements, no lecythiform elements found.

Pileipellis: some roundish-stipitate elements found, ca 30 x 18-26 µm in diam., mostly collapsed.

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Specimen examined: USA: South Carolina, on moist straw mat in house, August (K 102521, holotype).

The holotype consists of two molded fruitbodies in very poor condition.

Agaricus crocosporus undoubtedly belongs to *Conocybe*, sect. *Pilosellae*, stirps *Siliginea*. The large, ellipsoidal, non-lentiform spores and the pileus described as "sordid brown, viscid" place this taxon in the vicinity of *Conocybe fuscimarginata*, which has smaller, somewhat lighter spores.

Due to the very poor preservation of the type material we refrain from combining this species into the genus *Conocybe*.

cryptocystis (Fig. 5 a-e)

Galerula cryptocystis G. F. ATK. 1918, Proc. Amer. Phil. Soc. **57**: 368
***Conocybe cryptocystis* (G. F. ATK.) SINGER 1954,** Sydowia **8**: 125

Original description:

Gregaria, 6-10 cm alta; pileo ovali dein campanulato, 1,5-2,5 cm lato, ochraceo, ochraceo-fulvo vel ferrugineo, demum pallidiore, sparsim villoso; lamellis stipite adnexis, latis; stipite aequali, pileo concolore sed pallidiore, striato, sursum pruinoso, 2-4 mm crasso.

Microscopical characters:

Spores: 13.5-16.5 x 8.5-11 x 8-9.5 µm, mean 15.6 x 10.0 x 8.8 µm, Q = 1.45-1.65, ellipsoidal, conspicuously lenticular, mustard yellow in KOH with a ca 1.5-2 µm thick wall and a large, truncate germ-pore.

Basidia: 2(1)-spored, 12-17 x 7-10.5 µm.

Clamp connections: not observed.

Cheilocystidia: lecythiform, 14-17 x 6-8.5 µm, with capitulum 3-4.5 µm in diam.

Stipe covering: composed of lecythiform caulocystidia, 9-13 x 6-9 µm, with very small capitulum 2-2.5 µm in diam.; in-between abundant hairs up to 2 µm thick and some non-lecythiform elements.

Pileipellis: hymeniform, composed of roundish elements up to 33 x 30 µm, no pileocystidia present.

Specimen examined: USA: California, Santa Clara County, near Stanford University, on decayed horse manure, 30. 11. 1901, Pacific Slope Fungi No. 127, leg. C. F. BAKER (CUP, holotype).

The type consists of about four fruitbodies broken into many fragments in good condition. The microscopical analysis and the following comment are a translation from HAUSKNECHT (2003).

Conocybe cryptocystis was described by ATKINSON (1918) as a "common little fungus on decayed horse manure in old pastures", and should therefore be quite common in the western USA. The spore sizes measured by us are considerably smaller

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than given by ATKINSON (1918: 368) and are in-between *Conocybe merdaria* ARNOLDS & HAUSKN. (ARNOLDS & HAUSKNECHT 2003) and *Conocybe macrospora* (ATK.) HAUSKN. However, the spores are distinctly lenticular and in front view wider than those of both species, and also thicker-walled, but in KOH paler, mustard yellow and not reddish brown. In addition, no pileocystidia were found in the pileipellis of *Conocybe cryptocystis*, and the hymeniform elements of the pileipellis are overall wider. Due to the different spore characteristics we preclude conspecificity with *Conocybe merdaria* and *C. macrospora*.

curta (Fig. 5 f-j)

Galerula curta G. F. ATK. 1918, Proc. Amer. Phil. Soc. **57**: 1918
***Conocybe curta* (G. F. ATK.) WATLING 1981,** Bibl. Mycologica **82**: 103

Original description:

Gregaria, 4-6 cm alta; pileo campanulato dein subexpanso, 2-4 cm lato, 1-2 cm alto, obtuso, glabro, non striato, ochraceo vel ochraceo-fulvo demum ochroleuco; lamellis stipite adnexis, ellipsoideis, ochraceis; stipite aequali, glabro, striatulo, sursum pruinoso, cavo, 3-5 mm crasso.

Microscopical characters:

Spores: 11.5-16 x 7.5-10 µm, mean 13.9-14.0 x 8.5-8.7 µm, Q = 1.4-1.9, ellipsoidal, somewhat limoniform, not compressed, brownish orange in KOH with up to 1.5 µm thick wall and a conspicuous germ-pore.

Basidia: 2-spored, 17-22 x 11-13 µm.

Clamp connections: not observed.

Cheilocystidia: lecythiform, 13-19 x 5-10 µm, with capitulum 3-5 µm in diam.

Stipe covering: composed of lecythiform caulocystidia and capilliform elements, many of which ending in a conspicuous capitulum (12-22 x 3-6 µm, capitulum 2.5-3.5 µm in diam.), many without apical capitulum.

Pileipellis: hymeniform, composed of roundish-stipitate elements, 16-30 x 15-21 µm; no pileocystidia present.

Specimens examined: USA: New York, Ithaca, Buffalo Street, in grass at roadside, 20. 7. 1899, leg. G. F. ATKINSON 3210 (CUP, holotype); - - 13. 7. 1899, leg. G. F. ATKINSON (CUP, paratype).

The type consists of three well preserved fruitbodies, the stipes of which are broken. Also the paratype is in good condition. The microscopical analysis and the following commentary are a translation from HAUSKNECHT (2003).

Both investigated specimens originate from the same locality, they were collected in the interval of one week. The species shows a great similarity with a very robust, thick-stiped *Conocybe rickenii*, but has stipe covering of sect. *Mixtae* with many lecythiform elements between the stipe hairs. The spore size resembles that of *Conocybe merdaria*, from which it differs in size and habitus, the very pale, not hygrophaneous, non-striate pileus and the rather slightly limoniform spores.

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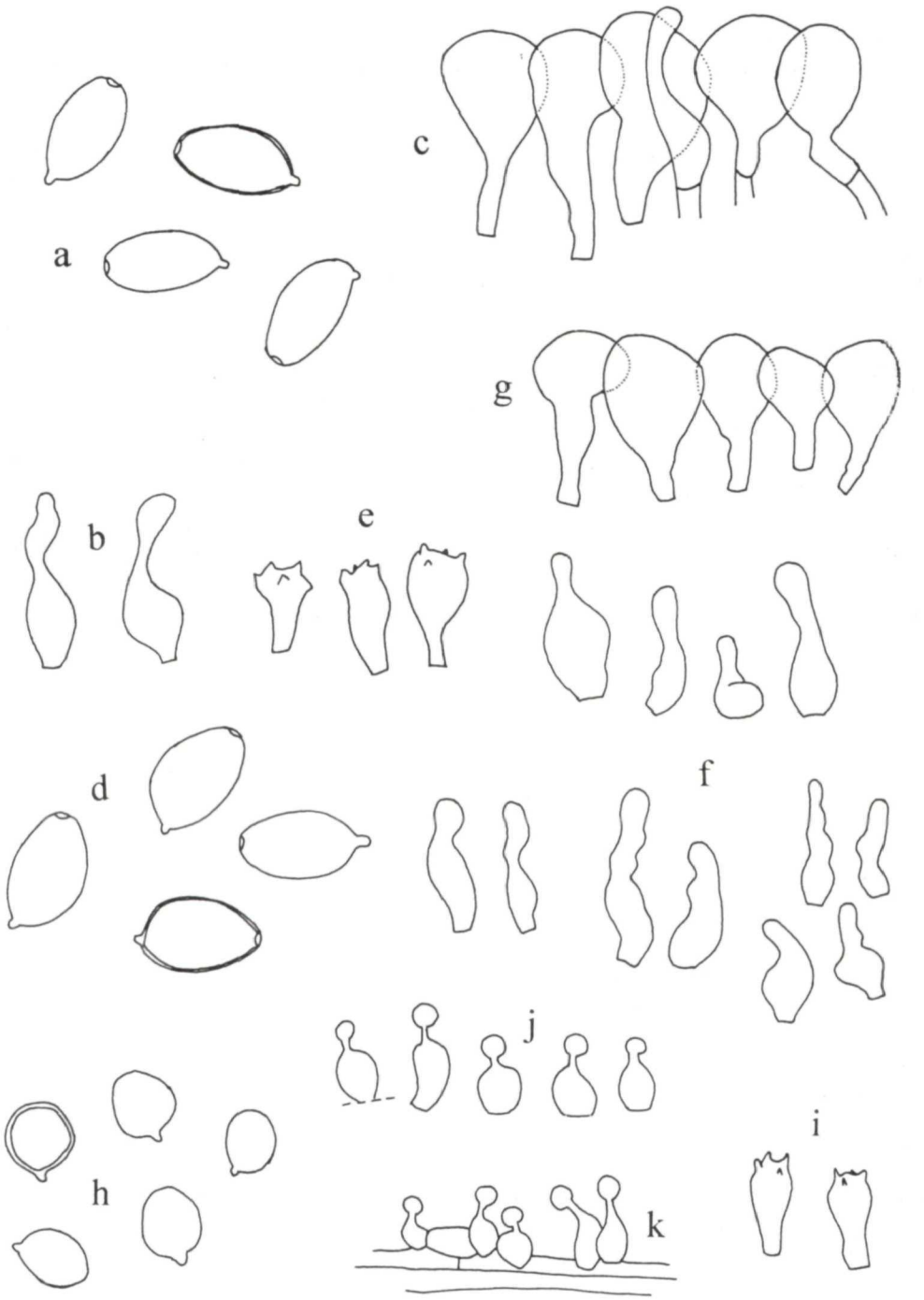


Fig. 6 *a-c. Galera cyanopes* (neotype). *a* Spores, *b* two cheilocystidia, *c* pileipellis. *d-g. Galerula cyanopus*. *d* Spores, *e* basidia, *f* cheilocystidia, *g* pileipellis. *h-k. Conocybe dennisii* (type). *h* Spores, *i* basidia, *j* cheilocystidia, *k* stipe covering.

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cyanopes (Fig. 6 a-c)

Galera cyanopes KAUFFMAN 1918, Mich. Geol. & Biol. Survey 26, Biol. Ser. **5, I**: 500
Pholiotina cyanopes (KAUFFMAN) SINGER in RUMACK & SALZMANN 1978, Mushroom Poisoning: 203
Conocybe smithii WATLING in BENEDICT, TYLER & WATLING 1967, Lloydia **30**: 152
***Pholiotina smithii* (WATLING) ENDERLE in ENDERLE & HÜBNER 1999,** Z. Mykol. **65**: 16

Original description (from WATLING in BENEDICT & al. 1967):

Pileus 3-10(-13) mm, obtusely conic soon expanding at the margin to become distinctly umbonate, ochraceous tawny, tawny cinnamon, darker at the disc which is usually more tawny, striate for 2/3 or more, hygrophanous, fading to pinkish buff or dingy tan on drying, glistening. Stipe 10-50(-70) x 0.75-1.0 mm (1.5 mm at base), slender slightly swollen at the very base, fragile, pure white then watery white and finally flushed with ochraceous pallid but only faintly so, base particularly tinged greenish grey or greyish blue but sometimes tinged above as well, finally quite ochraceous, fibrillose to glabrescent at base, smooth or faintly pubescent at very apex. Gills adnate soon receding, subdistant to crowded, narrow to moderately broad, ochraceous buff at first becoming cinnamon rust, margin ± concolorous with face, even or becoming minutely crenulate or flocculose. Flesh watery white; odour none; taste not distinctive. Habitat: scattered amongst mosses in boggy areas and wet ditches.

Microscopical characters:

Spores: 7-9 x 4-5 µm, mean 7.8 x 4.4 µm, Q = 1.6-1.9, slender ellipsoidal, not lentiform, thin-walled with conspicuous germ-pore, ochre yellow to rusty orange in KOH.

Basidia: 4-spored.

Cheilocystidia: mostly collapsed, two more or less fusiform elements with apical capitulum found, these 30-31 x 8-10 µm in size.

Stipe covering: completely collapsed; according to WATLING (in BENEDICT & al. 1967) similar to the cheilocystidia, but more variable.

Pileipellis: hymeniform, composed of roundish-stipitate elements, 28-40 x 14-20 µm, in-between sporadic pileocystidia similar to the cheilocystidia, but more slender.

Specimens examined: USA: Michigan, Washtenaw County, Chelsea, in huckleberry bog on mosses, 27. 7. 1909, leg. C. H. KAUFFMAN (MICH, designated as neotype). - Montana, Flathead Lake, Yellow Bay, near Biological Station, on soil among moss, 18. 7. 1989, leg. BAILEY (ZT; see HORAK & HAUSKNECHT 2002: 244).

The specimen designated as "part of neotype" consists of one strongly collapsed fruitbody, which has almost no intact lamellae.

WATLING (in BENEDICT & al. 1967) has seen fresh material of this species, which is rather common in North America, and he mentions the following differences to *Pholiotina cyanopus* (G. F. ATK.) SINGER: The lamellae are more cinnamon brown in *P. smithii*, the pileus is paler and moist more distinctly striate, the fruitbodies are more

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delicate and smaller, the spores narrower, the number of pileocystidia smaller and the cheilocystidia wider and have a less distinct capitulum. Unfortunately, the differences in spore size and form given in STAMETS (1999) are incorrect, as a comparison of both type specimens shows (means of both specimens almost identical). Also the different number of pileocystidia is not confirmed in our studies. Therefore, the only confirmed differences concern the somewhat wider cheilocystidia of *Pholiotina smithii* and some macroscopical differences. A detailed analysis of European material of sect. *Cyanopodinae* (SINGER) ARNOLDS is still missing, and as we know *Pholiotina smithii* only from herbarium specimens, we tentatively agree with WATLING (in BENEDICT & al. 1967) and consider that it is a distinct species. In case of conspecificity, *Pholiotina cyanopus* is the valid name due to priority reasons, as it has been published a few months earlier.

cyanopus (Fig. 6 d-g)

Galerula cyanopus G. F. ATK. 1918, Proc. Amer. Phil. Soc. **57**: 367
Conocybe cyanopus (G. F. ATK.) KÜHNER 1935, Le genre Galera: 128 (as "cyanopoda")
***Pholiotina cyanopus* (G. F. ATK.) SINGER 1950,** Acta Inst. Bot. Komarov Acad. Sci. URSS, Series **2, 6**: 425 (as "cyanopoda")

Original description:

Gregaria vel solitaria, 2-3 cm alta; pileo ovali, campanulato-convexo, dein expanso, obtuso, ad marginem striatulo, fragili, brunneo-ferrugineo, 5-10 mm lato; stipite 1-1,5 mm crasso, leniter bulboso, albo ad basem cyaneo, sursum pruinoso, deorsum leniter velutino, fragili.

Microscopical characters:

Spores: 7-9 x 4-5 µm, mean 7.8 x 4.6 µm, Q = 1.55-1.85, ellipsoidal, slightly limoniform, thin-walled with a small, but distinct germ-pore, ochre yellow in KOH.

Basidia: 4-spored, 15-20 x 7-10.5 µm.

Clamp connections: not found.

Cheilocystidia: 14-30 x 4-12 µm, very polymorphic, slightly utriform, cylindrical-lageniform with capitulum to almost slightly moniliform.

Pileipellis: hymeniform, composed of sphaeropedunculate elements, 21-31 x 13-18 µm, pileocystidia not observed, according to WATLING in BENEDICT & al. (1967) similar to cheilocystidia, but with a more distinctly capitulum-like apex.

Specimen examined: USA: New York, Ithaca, among grass on campus, Aug. 1912, leg. G. F. ATKINSON 23302 (CUP, holotype).

The holotype consists of fragments of about 8-12 fruitbodies in good condition, and all microscopical features could be observed.

Galerula cyanopus is another member of *Pholiotina*, subsect. *Cyanopodinae* (ARNOLDS 2003). It has been recorded from North America and Europe. The blueing of the stipe base is of quite variable intensity and may be easily overlooked. Then, the species can be determined by the combination of shape and size of cheilocystidia,

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shape and porus features of the spores and presence/absence of pileocystidia. For the differences to *Pholiotina smithii* which has not yet been reliably recorded for Europe, see discussion under *cyanopes*.

dennisii (Fig. 6 h-k)

***Conocybe dennisii* HAUSKN. in HORAK & HAUSKN. 2002,** Österr. Z. Pilzk. **11**: 214

Original description:

Pileus 3-5 mm diam., convex, umbo absent, centre and striation light ochraceous buff, ochraceous buff, smooth, pale elsewhere, hygrophanous, dry. Lamellae rather distant, emarginate-adnexed, narrow, pale brown. Stipe 6-10 x 0.2 mm (from dried specimen), cylindrical, filiform, equal, white over whole length, minutely pruinose, dry. Context fragile.

Microscopical characters:

Spores: 4.5-5.5 x 3.5-4 µm, mean 5.0 x 3.8 µm, Q = 1.3-1.55, roundish to submitriform in front view, subellipsoidal in lateral view, slightly lentiform, wall double, slightly thickened, germ-pore absent, pale orange-brown in KOH.

Basidia: 4-spored, 10-13 x 6.5-7.5 µm.

Clamp connections: present.

Cheilocystidia: lecythiform, 13-19 x 6.5-8.5 µm, with capitulum 2.5-4 µm diam.

Stipe covering: consisting of lecythiform caulocystidia 10-15 x 4-6 µm, capitulum 2.5-3.5 µm in diam., generally smaller than cheilocystidia.

Pileipellis: hymeniform, composed of clavate cells up to 20 µm in diam. Pileocystidia not observed.

Material examined: Trinidad and Tobago: Trinidad, St. Joseph, on soil among moss under *Bambusa* spec. (*Poaceae*), 14. 10. 1949, leg. R. W. G. DENNIS 176 (K, holotype).

The holotype consists of one small fruitbody in good condition.

The species belongs to the *Conocybe mesospora* complex, and it is clearly distinct from all known European and North American species by the combination of small, in front view slightly mitriform spores without a germ-pore, small fruitbodies and stipe covering consisting of only lecythiform elements (see HORAK & HAUSKNECHT 2002).

fibrillosipes (Fig. 23 h-k)

Conocybe fibrillosipes WATLING 1971, Persoonia **6**: 325

Original description:

Pileus 10-17 mm, convex, semiglobate, hardly expanding, rich dark tawny orange, ("tawny") tinted with „chestnut" particularly towards the disc, striate to half-way and covered particularly at margin with small, pale ochraceous fragments of appendiculate

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and marginal veil. Stipe 18-32 x 3-5 mm, distinctly "yellow ochre", stout, fibrillose-streaky to woolly floccose, particularly towards the base; veil peronate or present as mere flecks of membranous material towards the stipe-apex, then fibrillose-woolly, matt, giving a rough appearance below, floccules finally yellow ochraceous. Lamellae pale ochraceous then rusty tawny, fairly close. Flesh dark brown in pileus when fresh, slightly ochraceous in stipe-cortex, dark buff in stipe-centre, umber brown ("Saccardo's umber") in stipe base.

Microscopical characters:

Spores: 7.5-9.5 x 4-5.5 µm, mean 8.2 x 4.6 µm, Q = 1.6-2.0, ellipsoidal, in side view partly slightly bean-shaped, thin-walled with conspicuous, small germ-pore, pale yellow in KOH.

Basidia: 4-spored (no 2-spored observed), 18.5-22.5 x 7-8 µm.

Clamp connections: present at the basis of the basidia and in the trama.

Cheilocystidia: lageniform to lecythiform, usually with conspicuous capitulum, 20-35 x 7-9.5 µm, capitulum 3-6 µm wide.

Stipe covering: consisting of variable elements, cylindrical-ventricose to almost filamentous with capitate apex, often also lecythiform similar to the cheilocystidia or arranged in chains.

Pileipellis: hymeniform, composed of roundish-stipitate elements, 25-45 x 12-24 µm, in-between rarely pileocystidia similar to the cheilocystidia, but less ventricose.

Specimen examined: USA: Washington, Pend' Oreille County, Cusick, on roadside amongst herbaceous debris in conifer woodland, 12. 10. 1966, leg. R. WATLING (E, holotype).

The type material consists of about 25 well-preserved fruitbodies in various developmental stages.

WATLING (1971) based his description on a single collection, it should differ from *Pholiotina brunnea* (WATLING) BON mainly in its more compact habitus and its abundant, yellow velum. We had collections from Europe which are intermediate in habitus and velum between *Conocybe fibrillosipes* and typical *Pholiotina brunnea*. Also a collection from North Carolina (USA) could not be unequivocally assigned to one of these two taxa; it had a similarly rich velum like *Conocybe fibrillosipes* but a slender, thinner stipe like *Pholiotina brunnea*. Therefore, HORAK & HAUSKNECHT (2002) considered *Conocybe fibrillosipes* synonymous with *Pholiotina brunnea* from Europe. As microscopically there are no differences between collections with scarce and rich velum, respectively, on the one hand, and between those with a compact and slender stipe, respectively, on the other hand, we fully agree with conspecificity of both taxa after the study of the type collection.

It should be noted that *Conocybe brunnea* has been published in the same publication (WATLING 1971) only few pages ahead of *Conocybe fibrillosipes*; the former name has therefore priority.

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filipes (Fig. 7 a-e)

Galerula filipes G. F. ATK. 1918, Proc. Amer. Phil. Soc. **57**: 367
Conocybe filipes (G. F. ATK.) KÜHNER 1935, Le Genre Galera: 127 (invalid)
***Pholiotina filipes* (G. F. ATK.) SINGER 1950,** Acta Inst. Bot. Komarov Acad. Sci. URSS, Ser. **2, 6**: 435

Original description:

Gregaria, 4-6 cm alta; pileo ovali dein campanulato, obtuso, ochraceo, 3-6 mm lato; lamellis stipite late adnatis, dente decurrentibus, ochraceis vel ochraceo-fulvis; stipite aequali, bulbilloso, sursum pruinoso, 1 mm crasso.

Microscopical characters:

Spores: 7-9.5 x 4.5-5 µm, mean 8.3 x 4.8 µm, Q = 1.5-1.9, ellipsoidal, not lentiform, with double wall and a germ-pore up to 1 µm in diam., yellow to orange-yellow in KOH.

Basidia: 4-spored, ca 12-18 x 6-8 µm.

Clamp connections: not observed.

Cheilocystidia: 20-35 x 6-11 µm, lanceolate, irregularly fusiform ventricose base, usually collapsed and with broken tip (certainly many longer than 35 µm).

Stipe covering: consisting of caulocystidia similar to the cheilocystidia, but larger, up to 45 x 15 µm.

Pileipellis: hymeniform, consisting of roundish-stipitate elements, 25-35 x 14-20 µm; pileocystidia abundant, similar to cheilocystidia in shape, but much larger (up to 80 x 8 µm), sometimes yellowish pigmented.

Specimen examined: USA: New York, Essex County, Adirondack Mountains, North Elba, leg. C. H. PECK as *Galera capillaripes* (NYS, holotype).

The type collection consists of six to seven fragmented fruitbodies; especially the pilei are heavily broken and most cystidia collapsed.

If the original description and also the microscopical analysis are compared with *Pholiotina sulcatipes* (PECK) BON and *Pholiotina aberrans* (KÜHNER) SINGER, there is only one major difference against the former: the stipe base of *Pholiotina sulcatipes* has been described as "blue or green at the base". The spores and caulocystidia are almost similar, and both have abundant very large caulo- and pileocystidia. HAUSKNECHT (2001) synonymized the European *Pholiotina aberrans* with *Pholiotina sulcatipes*. This synonymy has not been accepted by some authors; they consider both taxa as different species (e.g., ARNOLDS 2004). In this case, the species of ATKINSON would have priority and European collections would have to be named *Pholiotina filipes*.

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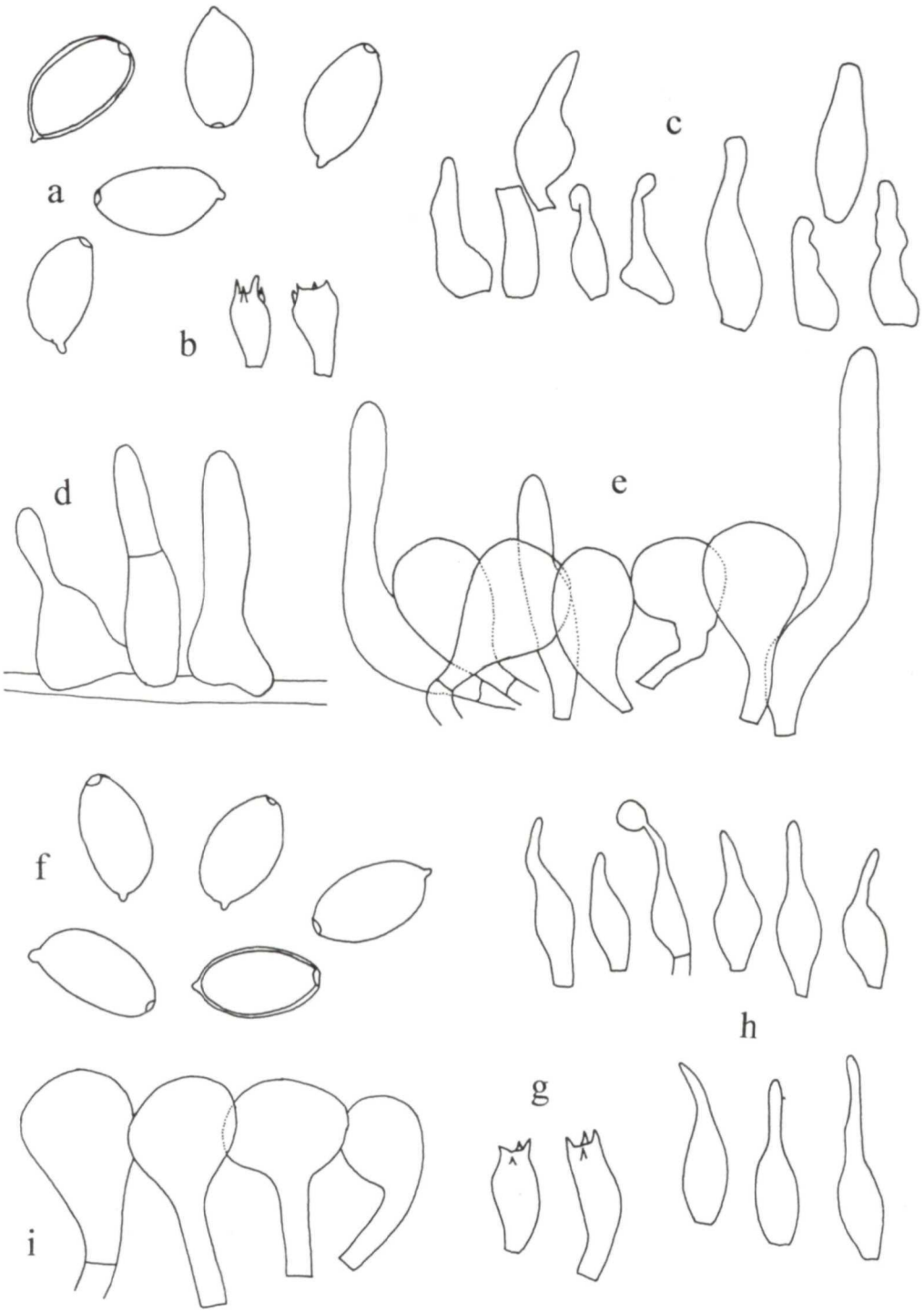


Fig. 7 *a-e*. *Galerula filipes* (type). *a* Spores, *b* basidia, *c* cheilocystidia, *d* caulocystidia, *e* pileipellis with numerous pileocystidia. *f-i*. *Conocybe fimicola* (type). *f* Spores, *g* basidia, *h* cheilocystidia, *i* pileipellis.

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fimicola (Fig. 7 f-i)

Conocybe fimicola WATLING 1971, Persoonia **6**: 335
***Pholiotina fimicola* (WATLING) ENDERLE 1997,** Z. Mykol. **63**: 32

Original description:

Pileus 10-25 mm conico-convexus, expanso-convexus vel obtuso-umbonatus, glaber humidus, striatus, jove sicco exstriatus, hygrophanus, ferrugineus jove sicco ochraceo-fulvus. Stipes 30-40 x 2-3 mm, aequalis, farctus, cinnamomeo-bubalinus ad basim ex luteolo-bubalinus postremo umbrinus, ad apicem fibrilloso-pruinosus ad basim appresso-fibrillosus; annulus medius, membranaceus, bubalinus, striatus, fugaceus. Lamellae adnatae, L 20-25, l 1-3, sordide fulvae, subconfertae. Caro tenuis, fragilis, ferruginea.

Microscopical characters:

Spores: 7-9.5 x 4-5 µm, mean 8.3-8.8 x 4.6-4.7 µm, Q = 1.7-2.0, ellipsoidal, slightly pip-shaped, not lentiform, with relatively thin wall and a germ-pore ca 1 µm in diam., yellow in KOH.

Basidia: 4-spored, 16-23 x 6.5-8.5 µm.

Clamp connections: present.

Cheilocystidia: 22-36 x 6-8.5 µm, fusiform-ventricose with a long, pointed beak, sometimes with an apical slime cap up to 6 µm in diam.

Pileipellis: hymeniform, consisting of pyriform to roundish-stipitate elements, 30-40 x 15-22 µm, pileocystidia absent.

Specimens examined: USA: Washington, Clallam County, Olympic NP., Lake Crescent, gregarious on mature pile of dung, 29. 5. 1939, leg. A. H. SMITH 13856 (MICH, holotype); - - 9. 6. 1939, leg. A. H. SMITH 14192 (MICH).

The holotype consists of fragments of one well-preserved fruitbody, the material from the second collection – from the type locality – is much more profuse. Microscopically, both agreed perfectly.

WATLING (1971) characterized his new species particularly by its habitat (dung inhabiting) and the features of the ring, but conceded that "the cheilocystidia shape would place it close to *Pholiotina filaris* (FR.) KÜHNER". The combination of ENDERLE (1997) was without commentary. Actually, *Pholiotina fimicola* and *Pholiotina filaris* cannot be distinguished macro- and microscopically, neither concerning the cheilocystidia nor the shape and size of the spores. One collection of the third author from Tennessee, Gatlinburgh, 1. 4. 2000, by no means dung inhabiting and determined as *Pholiotina filaris* by us, has features identical to *Pholiotina fimicola*, but it grew on bare soil at a roadside. On the other hand it is well-known that European collections of *Pholiotina filaris* often grow on mineral rich soil, under stinging-nettle or in leaf litter. Some collections of H.-J. HÜBNER originating from southern Germany grew on fresh compost soil, and there is not much difference to dung.

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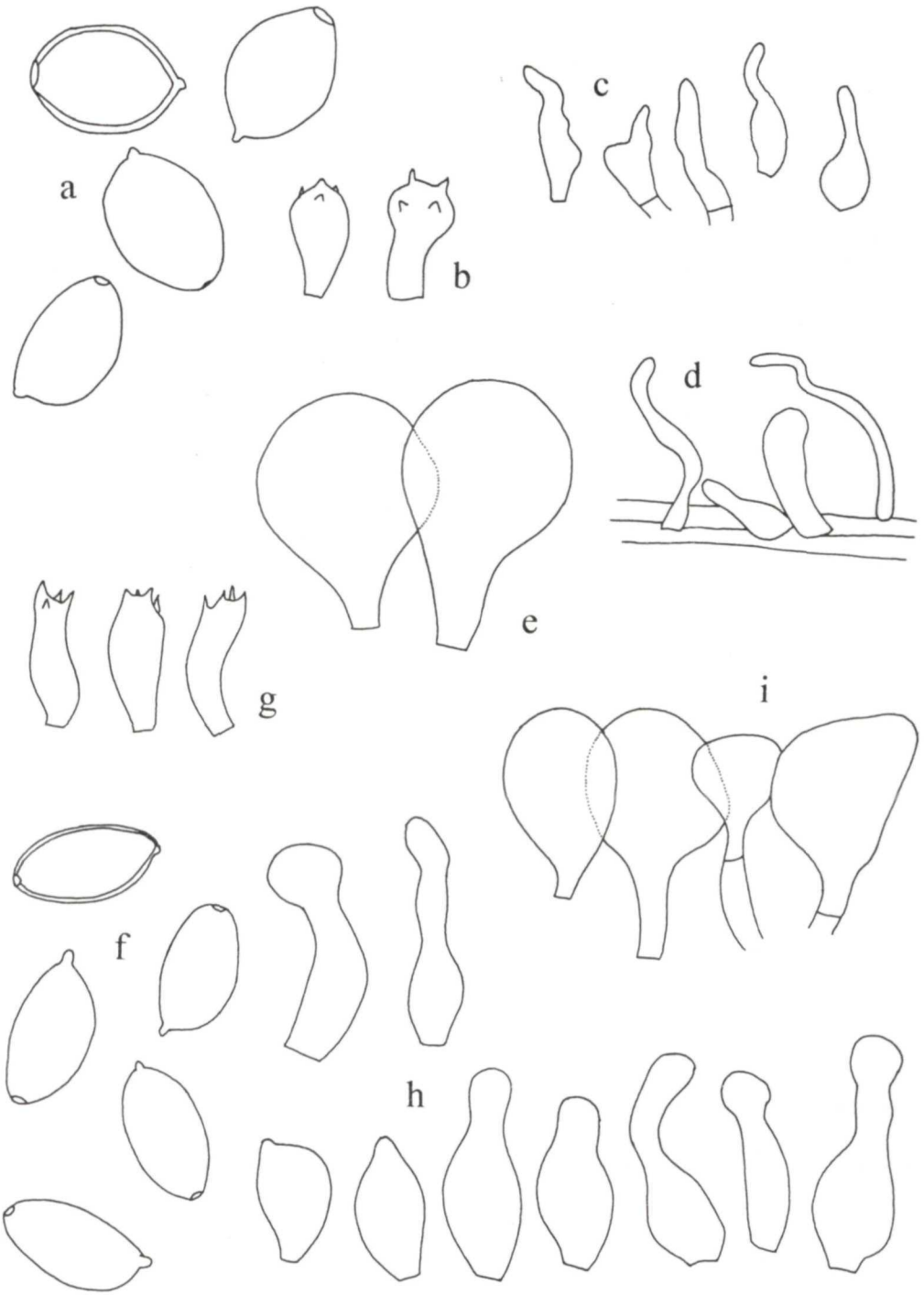


Fig. 8 *a-e*. *Galera flava* (type). *a* Spores, *b* basidia, *c* cheilocystidia, *d* elements of the stipe covering, *e* two elements of pileipellis. *f-i*. *Conocybe flexipes* (type). *f* Spores, *g* basidia, *h* cheilocystidia, *i* pileipellis.

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Despite these arguments it is advisable to wait with a definite statement on conspecifity of both taxa until further collections from North America admit evaluation of macro- and microscopical variabilty.

flava (Fig. 8 a-e)

Galera flava PECK 1893, Ann. Rep. New York State Mus. Nat. Hist. **45**: 79
Galerula flava (PECK) MURRILL 1917, North American Flora **10**: 166
Conocybe flava (PECK) KÜHNER 1935, Le Genre *Galera*: 137, nom. inval. (no basionym cited)
***Pholiotina flava* (PECK) HAUSKN., KRISAI-GREILH. & VOGLMAYR, comb. nova**
Basionym: *Galera flava* PECK 1893, Ann. Rep. New York State Mus. Nat. Hist. **45**: 79

Original description:

Pileus 12-24 mm broad, ovate or campanulate, obtuse, moist or subhygrophanous, yellow, atomate when dry, surface breaking up into squamules, finely plicate-striate to the middle. Context thin. Lamellae adnate, whitish then yellowish-cinnamon, close, narrow. Stipe 5-7.5 cm long, 2-4 mm thick, white or slightly tinged with yellow, with white mealy particles, slightly striate at top, equal or slightly tapering upward, hollow.

Microscopical characters:

Spores: 9.5-11.5 x 6-8 x 5.5-7 µm, mean 10.6 x 7.5 x 6.2 µm, Q = 1.3-1.5, ellipsoidal to slightly angular, conspicuously lentiform, with thick wall and distinct germpore, orange-yellow to rust-yellow in KOH.

Basidia: 4-spored, 19-22 x 10-12 µm.

Clamp connections: not observed.

Cheilocystidia: one lamellar fragment with some cheilocystidia found, these are fusiform-ventricose to slightly lageniform, 17-25 x 5-9 µm.

Stipe covering: consisting of some hairs and cylindrical-twisted elements, 18-40 x 2-7 µm.

Pileipellis: hymeniform, consisting of pyriform elements, ca 35-47 x 30 µm. No pileocystidia found.

Specimen examined: USA: New York, Tompkins County, Freeville, on damp vegetable mould in woods, July 1892 (NYS, holotype).

The type specimen is in very poor condition. It consists of sparse fragments of about two fruitbodies glued to paper.

HESLER (in his unpublished records) did not find cheilocystidia. The lamellar fragment investigated by us had altogether 8-10 cheilocystidia, of which five were in good condition and resembled in shape and size those of *Pholiotina mairei* (WATLING) ENDERLE, but the spores are completely different. It may be related to *Pholiotina coprophila*, from which it differs by completely different spores and cystidia. It should be mentioned here that within the genus *Pholiotina* lentiform, slightly angular spores are hitherto unknown for European and North American species.

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According to the original description, the pileus surface breaks up into squamules. However, according to the pileipellis structure this should only be the product of weather conditions. Also HESLER (unpubl.) did not find squamules in the exsiccate.

Although the type specimen is in very poor condition, we decided to combine *Galera flava* into *Pholiotina* due to the unique combination of distinctive microscopical features, the yellow pileus and the white stipe.

flexipes (Fig. 8 f-i)

Conocybe flexipes WATLING 1971, Persoonia **6**: 336
***Pholiotina flexipes* (WATLING) ENDERLE 1997,** Z. Mykol. **63**: 32

Original description:

Pileus 5-15 mm, conicus, convexo-expansus vel campanulatus vix plano-umbonatus, glaber, humidus, hygrophanus, striatus, pallide ochraceo-fulvus vel incarnato-bubalinus. Stipes 50-70 x 1-1,5 mm, aequalis, saepe flexuosus, ad apicem pallido-bubalinus, ad basim pallide ochraceo-fulvus ad apicem pruinosus, ad basim appresso-fibrillosus vel glaber annulus apicalis, membranaceus, pallidus vel pallido-bubalinus ad marginem crassus et plumosus. Lamellae confertae, adnatae, pallido-bubalinae postremo ochraceo-fulvae vel fulvae. Caro delicatula, pallido-ochracea.

Microscopical characters:

Spores: 8.5-11 x 4.5-6 µm, mean 9.7 x 5.3 µm, Q = 1.7-2.0, ellipsoidal to slightly drop-shaped, with slightly double wall and a germ-pore 0.5-0.8 µm in diam., yellow in KOH.

Basidia: 4-spored, 19-24 x 8-10.5 µm.

Clamp connections: common at the base of the basidia and in the trama.

Cheilocystidia: 30-40 x 8.5-14 µm, usually utriform, lageniform-capitate with up to 13 µm wide, capitate apex and a thick neck, rarely only lageniform; sporadically roundish up to 25 µm wide elements in-between.

Stipe covering: not observed.

Pileipellis: hymeniform, consisting of roundish-stipitate elements, 20-45 x 15-25 µm; pileocystidia absent.

Specimen examined: USA: Washington, Pierce County, Mt. Rainier NP, in moss, decaying wood and detritus from herbaceous plants, 19. 10. 1952, leg. A. H. SMITH 41179 (MICH, holotype).

The type specimen consists of two well-preserved fruitbodies with conspicuously yellow colour in dried condition.

ENDERLE & HÜBNER (1999) in their publication of *Pholiotina utricystidiata* ENDERLE & HÜBNER shortly listed the differences of that species to *Pholiotina flexipes*. Except for the size of the fruitbodies and the in *Pholiotina flexipes* more distintly flexuous stipe, which we do not consider taxonomically significant, they regard the somewhat smaller spores and the cheilocystidia as distinguishing features.

Actually, both taxa are very close, and we would not consider the mentioned features sufficient enough to separate both taxa at the species level. However, after com-

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parison of both type specimens we found another distinguishing feature: not only are the spores of *Pholiotina utricystidiata* about 1-2 µm longer, but these are also thicker-walled and in KOH not yellow but yellowish-brown to rust-brown. We therefore do not consider both taxa conspecific.

floridana (Fig. 9 a-e)

Galerula floridana MURRILL 1941, Mycologia **33**: 445
Conocybe antipus (LASCH) FAYOD f. *floridana* (MURRILL) SINGER 1950, Sydowia **4**: 131

Original description:

Pileus conic to subexpanded, solitary, 2-5 cm broad; surface dry, smooth, glabrous, uniformly isabelline, margin entire, even, upturned with age; context thin, pallid, odorless; lamellae adnate or adnexed, narrow, close, unequal, entire, soon becoming pale fulvous; stipe long, slender, equal, smooth, glabrous, long-radicate, pallid, 7-10 x 0.1-0.3 cm.

Microscopical characters:

Spores: 8-9.5 x 5.5-7 x 5-5.5 µm, mean 8.3-8.6 x 6.2-6.4 x 5.3 µm, Q = 1.25-1.45, in front view angular-submitriform, in side view ellipsoidal, conspicuously lentiform, with double wall and large germ-pore, rust-orange to orange-brown in KOH.

Basidia: 4-spored, 16-19 x 7-10 µm.

Clamp connections: not observed.

Cheilocystidia: lecythiform, 14-18 x 6-9 µm, with capitulum 3-5.5 µm wide.

Stipe covering: consisting exclusively of lecythiform, often collapsed elements similar ot cheilocystidia, but often thinner, partly almost cylindrical with capitulum up to 4 µm wide.

Pileipellis: hymeniform, consisting of sphaeropedunculate elements, 22-36 x 19-24 µm. Pileocystidia not observed.

Specimens examined: USA: Florida, Gainesville, Sugarfoot Hammock, in sandy soil under trees, 5. 6. 1938, leg. W. A. MURRILL (FLAS, holotype); - Florida, Gainesville, in oak woods, 3. 6. 1938, leg. W. A. MURRILL (FLAS, designated as "cotype").

The type specimen consists of fragments of one moderately preserved fruitbody; particularly the stipe covering is heavily collapsed. The second specimen is somewhat better preserved and has a conspicuous, long root.

SINGER (1950) downgraded *Galera floridana* as a form of *Conocybe antipus* "with somewhat smaller spores". The spore size of both specimens fully corresponds with that of many collections from Europe; therefore, we consider *Galera floridana* to be a Synonym of *Conocybe antipus*.

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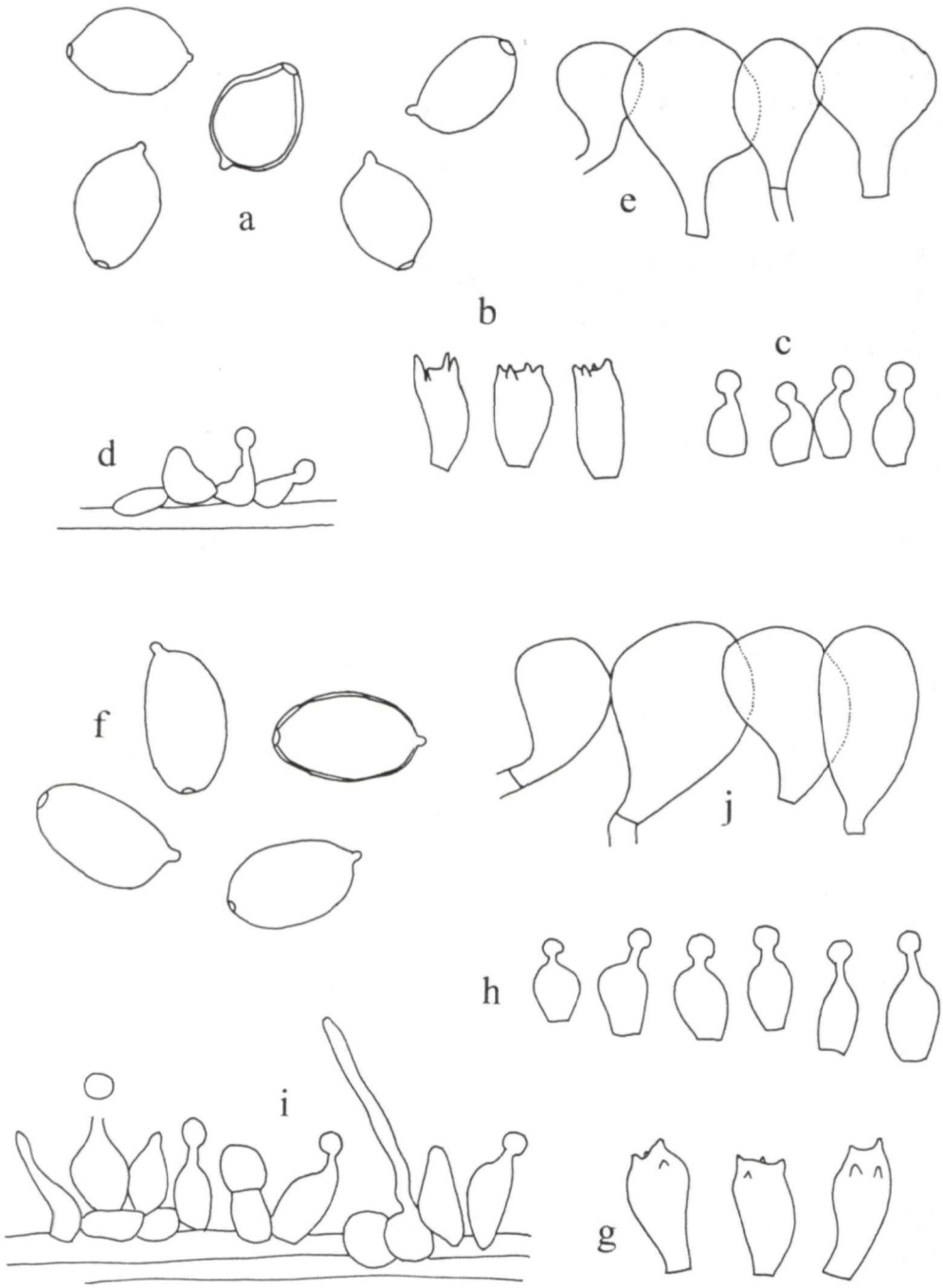


Fig. 9 *a-e. Galerula floridana* (type). *a* Spores, *b* basidia, *c* cheilocystidia, *d* stipe covering, *e* pileipellis. *f-j. Galera fragilis* (type). *f* Spores, *g* basidia, *h* cheilocystidia, *i* stipe covering, *j* pileipellis.

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fragilis (Fig. 9 f-j)

Galera fragilis PECK 1897, Bull. Torrey Bot. Club **24**: 144
Galerula fragilis (PECK) MURRILL 1917, North American Flora **10**: 164
***Conocybe fragilis* (PECK) SINGER 1950,** Acta Bot. Inst. Komarov Acad. Sci. URSS, Series **2, 6**: 438

Original description:

Pileus submembranous, very fragile, broadly campanulate, glabrous, dull flesh colour; lamellae ascending, adnate, subdistant, dark yellow or subochraceous, becoming ferruginous; stem slender, flexuous, hollow. Pileus 3-5 lines broad; stem 10-15 lines long, 0.5 line thick.

A very small and fragile plant.

Microscopical characters:

Spores: 8.5-10 x 5-6 µm, mean 9.1 x 5.4 µm, Q = 1.55-1.8, ellipsoidal, lentiform, with slightly double wall and a germ-pore up to 1.5 µm in diam., bright yellow to light orange-yellow in KOH.

Basidia: 4-spored, 18-22 x 9-11 µm.

Clamp connections: not observed.

Cheilocystidia: lecythiform, 14-21 x 6.5-9.5 µm, with capitulum 3.5-4.7 µm wide.

Stipe covering: consisting mainly of hairs and non-lecythiform elements; in-beetween up to 20 % lecythiform caulocystidia similar to cheilocystidia in shape and size.

Pileipellis: hymeniform, consisting of roundish-stipitate elements, 22-40 x 15-25 µm; no pileocystidia observed.

Specimen examined: USA: Kansas, Rooks County, among short grass in pastures, leg. E. BARTHOLOMEW 2313 (NYS, holotype).

The type material consists of hundreds of very small fragments of several well-preserved fruitbodies. The description given above is a translation from HAUSKNECHT (2003).

Conocybe fragilis belongs to sect. *Mixtae* due to its stipe covering. This taxon has long been misinterpreted in Europe; recently, ARNOLDS & HAUSKNECHT (2003) demonstrated that two different species are involved which are not even closely related with each other. All specimens from Europe identified as *Conocybe fragilis* are likely to be incorrectly determined; whether specimens from overseas (NATRAJAN & RAMAN 1983: India, WATLING 1992: Brazil, WATLING 1994: Malaysia) are conspecific with the type is questionable, as all authors assumed a stipe covering of sect. *Pilosellae*.

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Fig. 10 *a-d. Galerula fuscimarginata* (type). *a* Spores, *b* basidia, *c* cheilocystidia, *d* stipe covering. *e-i. Conocybe antipus* var. *humicola* (type). *e* Spores, *f* basidia, *g* cheilocystidia, *h* stipe covering, *i* pileipellis.

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fuscimarginata (Fig. 10 a-d)

Galerula fuscimarginata MURRILL 1942, Lloydia **5**: 148
***Conocybe fuscimarginata* (MURRILL) SINGER 1969,** Beih. Nova Hedwigia **29**: 210

Original description:

Pileus conic, not expanding, gregarious, about 1 x 1 cm; surface dry, smooth, glabrous, uniformely isabelline, margin even, entire, becoming brownish with age; context membranous; lamellae adnate, inserted, narrow, crowded, entire; stipe striate, pallid, enlarged and pubescent above, clavate at the base, 4-5 cm long, 1 mm or less thick.

Microscopical characters:

Spores: 10-12.5 x 6-8 µm, mean 11.2 x 6.8 µm, Q = 1.5-1.9 µm, ellipsoidal, not lentiform, with 0.3-0.5 µm thick wall and a germ-pore up to 1.5 µm in diam., rust-yellowish brown in KOH.

Basidia: 4-spored, 16-21 x 9-11 µm.

Clamp connections: not observed.

Cheilocystidia: lecythiform, 14-17 x 6-8 µm, with capitulum 3-4 µm wide.

Stipe covering: cosisting of hairs, roundish to fusiform-lageniform elements, the latter up to 55 x 11 µm; lecythiform caulocystidia absent.

Pileipellis: hymeniform, consisting of roundish-stipitate elements.

Specimen examined: USA: Florida, Alachua County, Gainesville, in partly shaded cultivated field, 12. 5. 1939, leg. W. A. MURRILL F 15977 (FLAS, holotype).

The type consists of fragments of altogether about five fruitbodies, the pilei almost not fragmented.

Conocybe fuscimarginata is widely distributed especially also in Europe. Its size can be much larger than the type specimen, with pilei up to 5 cm wide. There are no microscopical differences between the numerous European collections investigated by the first author and the type.

glabra (Fig. 11 a-i)

Galerula glabra MURRILL 1917, North American Flora **10**: 163
***Conocybe glabra* (MURRILL) WATLING 1976,** Kew Bull. **31**: 593

Original description:

Pileus conic to campanulate, not expanding, solitary, reaching 8 mm broad; surface moist, not striate, entirely smooth and glabrous, uniformly dull-isabelline with a fulvous tint; lamellae adnate or adnexed, attenuate behind, very regular, not crowded, somewhat ventricose, dull-isabelline to fulvous, whitish-pruinose on the edges; stipe slender, equal, smooth, glabrous, concolorous, paler and pruinose at the apex, 2.5 cm long, 0.5 mm thick.

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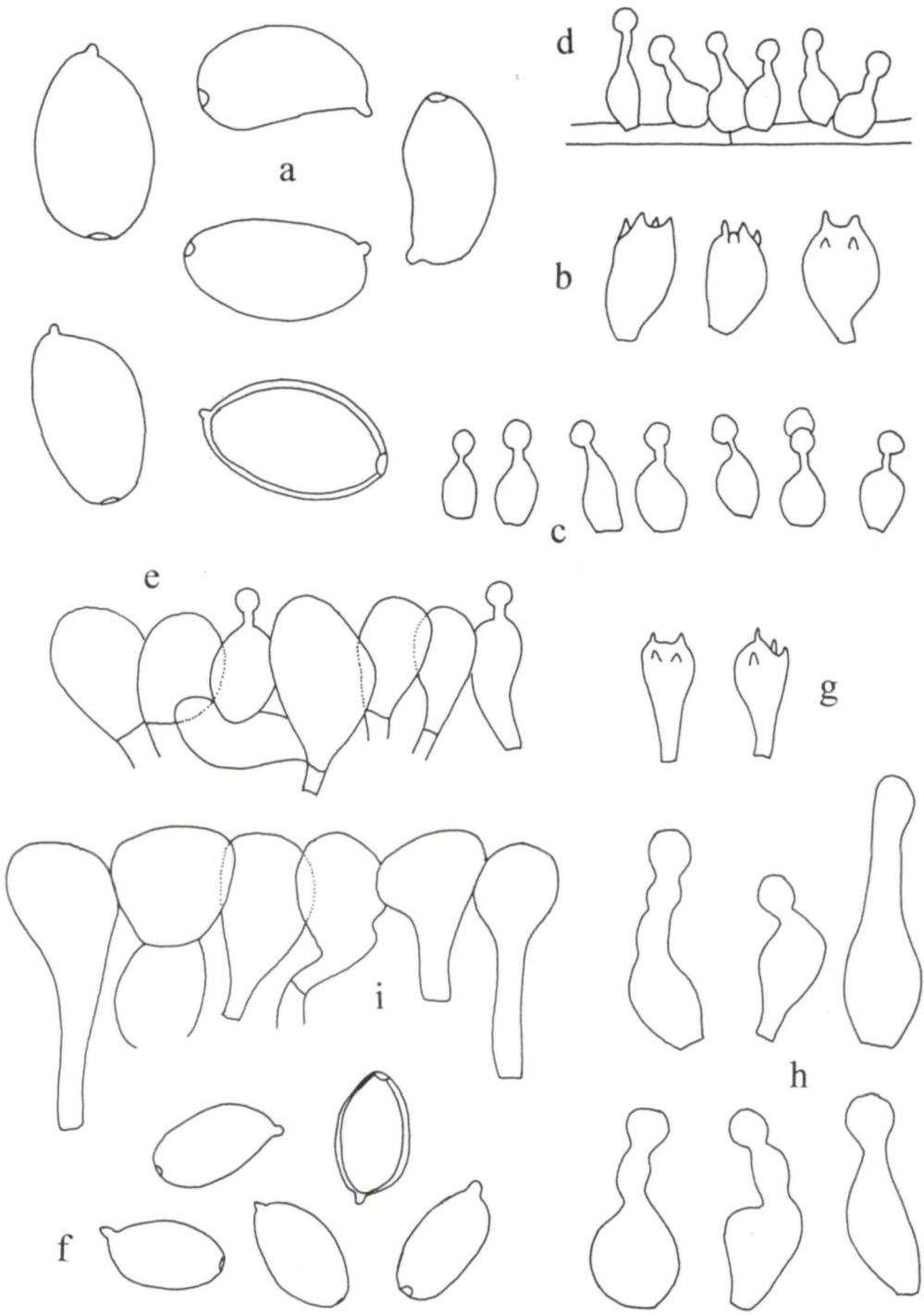


Fig. 11 *a-e*. *Galerula glabra* (holotype, small specimen). *a* Spores, *b* basidia, *c* cheilocystidia, *d* stipe covering, *e* pileipellis. *f-i*. *Galerula glabra* (holotype, larger specimen). *f* Spores, *g* basidia, *h* cheilocystidia, *i* pileipellis.

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Microscopical characters:

As already observed by HESLER (in herb.), the type consists of fragments of two fruitbodies, which clearly belong to two different taxa:

1) Small specimen (Fig. 11 a-e):
Spores: 12-14 x 7-8 x 6.5-7(-7.5) µm, mean 12.7 x 7.6 x 6.9 µm, Q = 1.6-1.8, ellipsoidal in front view, oblong-ellipsoidal to slightly bean-shaped in side view, thick-walled with germ-pore up to 1.5 µm in diam., rust- to orange-yellow in KOH.

Basidia: 4-spored, 18-21 x 10.5-13 µm.

Ammonia reaction: with regard to the very sparse type material not observed.

Clamp connections: rare.

Cheilocystidia: lecythiform, 15.5-20 x 6-9 µm, with capitulum 3.5-5 µm wide.

Stipe covering: consisting exclusively of lecythiform caulocystidia similar to cheilocystidia, but often with a longer, more slender neck.

Pileipellis: hymeniform, consisting of roundish-stipitate to broadly clavate elements, 18-35 x 10-18 µm, in-between numerous lecythiform pileocystidia (similar to cheilocystidia).

2) Larger specimen (Fig. 11 f-i):
Spores: 7.5-9.5 x 4.5-5.5 µm, mean 8.7 x 4.8 µm, Q = 1.7-2, ellipsoidal, not lentiform, slightly thick-walled with a germ-pore ca 1 µm in diam., ochre yellow in KOH.

Basidia: 4-spored, 19-21 x 7.5-9.5 µm.

Clamp connections: not observed.

Cheilocystidia: 28-56 x 11-16 µm, lageniform, utriform, with long, often repeatedly constricted neck and conspicuously capitate apex 5-8 µm wide.

Pileipellis: hymeniform, consisting of sphaeropedunculate elements, 20-50 x 15-22 µm, without pileocystidia.

Specimen examined: USA: New York State, Lake Placid, Adirondack Mountains, in soil on the side of a bank in the open, 17-29. Juli 1912, leg. W. A. & EDNA L. MURRILL (NY).

The collection date indicates that both fruitbodies have been collected on two days almost two weeks apart. The microscopical features given in the original description are from the smaller fruitbody; whether the macroscopical description is also from this is uncertain. The smaller fruitbody is a member of sect. *Conocybe*, closely related with the European taxa *Conocybe semiglobata* KÜHNER & WATLING and *Conocybe subxerophytica* SINGER & HAUSKN., but with different colours. In addition, the spores of the American taxon are slightly bean-shaped to irregularly impressed which we have never observed from European material.

The larger fruitbody is obviously a *Pholiotina* without velum. *Pholiotina flexipes* has similar microscopical features but is a member of the species with ring. The cheilocystidia of the European *Pholiotina utricystidiata* are also very similar, but it also has an annulate stipe and additionally larger spores.

HESLER (in his unpublished notes) asks the question whether this taxon should be "excluded". Since it cannot be ruled out that especially colour notes of the larger

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specimen have been included into the original diagnosis, we agree with HESLER and consider *Conocybe glabra* to be a nomen dubium.

humicola (Fig. 10 e-i)

Conocybe antipus (LASCH) FAYOD var. *humicola* THIERS 1959, Mycologia **51**: 529
***Conocybe humicola* (THIERS) HAUSKN., KRISAI-GREILH. & VOGLMAYR,** comb. & stat. nov.
Basionym: *Conocybe antipus* var. *humicola* THIERS 1959, Mycologia **51**: 529

Original description:

Pileus 0.9-1.3 cm broad, conic to subconic, unchanging or becoming convex with age, margin slightly incurved when young becoming straight when older, entire to eroded; surface moist, atomate, glabrous, striate to the disk when moist, evenly dark brown to umber to occasionally brown during all stages of development. Flesh thin (c. 2 mm), brittle, concolorous with the surface; taste and odor not distinctive. Lamellae close to subdistant, ascending-adnate to adnexed, becoming free with age, narrow, thin, light brown to pale fulvous at maturity; margin entire, concolorous with the gill faces; lamellulae of 1-2 lengths. Stipe 4-6.5 cm long, 0.5-1 mm broad at the apex, tapering slightly toward the apex, solid, translucent; surface glabrous except for white fibrils at the base, moist, olivaceous to yellow during all stages of development.

Microscopical characters:

Spores: 7.5-10 x 6-6.5 x 4.5-5 µm, mean 8.3 x 6.3 x 4.9 µm, Q = 1.2-1.5, in front view angular-mitriform, in side view ellipsoidal, conspicuously lenticular, with double wall and a large germ-pore, ochre-yellow in KOH.

Basidia: 2(-4)-spored, 14-18 x 7.5-9.5 µm.

Clamp connections: not observed.

Cheilocystidia: lecythiform, 13-17 x 6-10.5 µm, with capitulum 3-4.5 µm wide.

Stipe covering: consisting only of lecythiform caulocystidia similar to the cheilocystidia but with a longer, more slender neck and a capitulum 2-4 µm wide.

Pileipellis: hymeniform, consisting of roundish-stipitate elements, 22-35 x 14-19 µm; no pileocystidia observed.

Specimen examined: USA: Texas, Brazos County, near Wellbourne, in plant debris under oak, 18. 5. 1953, leg. H. D. THIERS 1883 (MICH, holotype).

The specimen consists of fragments of three to four fruitbodies in rather good condition; the stipe base is apparently not radicating.

Concerning shape and size, the spores of this taxon are within the range of variation of European collections of *Conocybe antipus*. Besides the differences listed in THIERS (1959), which concern the colour of pileus and stipe and the missing root, there is another difference which we consider even more important: the mostly two-spored basidia which bear spores of the same size. As already WATLING & GREGORY

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(1981: 93) note "probably worthy of specific rank", we propose a new combination at the species level.

intermedia (Fig. 12 a-d)

Pholiota intermedia A. H. SM. 1934, Ann. Mycol. **32**: 479
Conocybe intermedia KÜHNER 1935, Le genre Galera: 143
***Pholiotina intermedia* (A. H. SM.) SINGER 1936,** Beih. Bot. Centralblatt B, **56**: 170
Pholiota septentrionalis A. H. SM. 1935, Mycologia **27**: 227
Pholiotina septentrionalis (A. H. SM.) SINGER 1945, Notul. Syst. Sect. Crypt. Inst. Komarov Acad. Sci. **5**: 98

Original description:

Pileus 1-2 cm latus, obtuse conicus demum expansus, glaber, viscidus, hygrophanus, rufo-fulvus, striatus; lamellae confertae, angustae, adnatae, fulvae; stipes 1-2 cm longus, 2-3 mm crassus, ochraceus demum fulvus, fibrillosus, annulatus; annulus distans, reflexus, albus, striatus.

Microscopical characters:

Spores: 6-7.5 x 3.5-4.5 µm, mean 6.8 x 4.0 µm, Q = 1.5-1.9, ellipsoidal, not lentiform, partly slightly bean-shaped, thin-walled with a small germ-pore, pale yellow to yellow in KOH.

Basidia: 4-spored, 14-20 x 6-8 µm.

Clamp connections: not observed.

Cheilocystidia: "nine pin" shaped, 12-22(-30) x 5-7 µm, with capitulum 2.5-4 µm wide.

Pileipellis: hymeniform, consisting of clavate elements, 28-35 x 10-16 µm; no pileocystidia observed.

Specimen examined: USA: Michigan, Emmet County, Harbor Springs, Blisswood, on rotting maple wood, 19. 8. 1933, leg. A. H. SMITH (MICH, part of holotype).

The part of the type specimen made available to us consists of two complete and a half fruitbody which are well-preserved. The younger fruitbody has a broad, membranaceous ring spanning between pileus margin and stipe.

Pholiotina intermedia is very closely related with the European *Pholiotina brunnea* (WATLING) BON. It is widely distributed in North America (especially in Michigan) (WATLING 1971). WATLING (1971) has intensively studied this group and differentiates two taxa, which differ in velum features as well as colour and density of lamellae, and we fully agree with him.

intrusus (Fig. 12 e-h)

Cortinarius intrusus PECK 1896, Bull. Torrey Bot. Club **23**: 416
***Conocybe intrusa* (PECK) SINGER 1950,** Sydowia **4**: 133

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Original description:

Pileus fleshy, rather thin, convex, then expanded, glabrous, somewhat viscid when moist, even or radiately wrinkled on the margin, yellowish or buff, sometimes with a reddish tint, flesh white; lamellae thin, close, rounded behind, at first whitish or creamy white, then cinnamon, often uneven on the edge; stem equal or slightly tapering either upward or downward, stuffed or hollow, sometimes beautifully striate at the top only or nearly to the base, minutely floccose when young, soon glabrous, white; pileus 1-2.5 in. broad; stem 1-3 in. long, 3-6 lines thick.

Microscopical characters:

Spores: 5-7 x 4-5 µm, mean 6.0 x 4.7 µm, shortly ellipsoidal, Q = 1.1-1.35, not lentiform, with double wall, completely without germ-pore or callus, orange-yellow in KOH.

Basidia: 4-spored, 13-17 x 6-8 µm.

Clamp connections: present.

Cheilocystidia: 14-21 x 6.5-11.5 µm, with capitulum 3-4.5 µm wide.

Stipe covering: consisting only of lecythiform elements similar to cheilocystidia.

Pileipellis: hymeniform, consisting of roundish-stipitate, almost hyaline to yellowish elements, 30-40 x 20-28 µm; pileocystidia absent.

Specimen examined: USA: New Jersey, Haddonfield, in mushroom beds, manured soil in conservatories or in plant-pots, leg. MCILVAINE (NYS, holotype).

The holotype consists of ca four fruitbodies in rather good condition.

An extensive documentation of this species which has been recorded from greenhouses, flower cases or pots kept indoor and exceptionally also from gardens outdoor is given by WATLING (1977). It is the only member of sect. *Giganteae* SINGER and is widely distributed but rare at similar habitats also in Europe.

lateritia (Fig. 12 j-m)

Gastrocybe lateritia WATLING 1968, The Michigan Botanist: 19-24

Original description:

Pileus 5-25 (30) mm high x 2-10 (15) mm broad, ellipsoid-campanulate to conic, long, subacute, not expanding or hardly significantly so, greasy, tacky or viscid, membranous, pellucid-striate to disc, especially in immature specimens, then rapidly reduced to a gelatinous mass which adheres to the apex of the stipe, either retaining former shape or becoming amorphous, uniform or slightly darker at disk, light chocolate brown, darkening at maturity and in dried material more dark chestnut, even bay, polished. Stipe 50-100 (130) mm x 1-1.5(3) mm, pure white, shining, hardly discolouring, equal, flexuous or straight, slightly attenuated upwards, dry, smooth or sparsely pruinose (more so towards base) obscurely striate, fragile, easily collapsing, hollow. Gills rich rust-brown, well-formed with acute margin, branched, forked and interveined, the

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branches fusing with adjacent gill plates, thus forming a fairly regular honeycomb structure with smaller "locules" nearer the margin of the pileus. Flesh white in stipe, hardly discernible in pileus; smell and taste not noted.

In grass lawns, gregarious to solitary.

Microscopical characters:

Spores: 10.5-13 x 6-8 µm, mean 11.5 x 7.2 µm, Q = 1.5-1.75, ellipsoidal, not lentiform with thin, simple wall and a germ-pore 1-1.5 µm in diam., mature spores yellow in KOH.

Basidia: 4-spored, 19-28 x 11-14 µm.

Clamp connections: not observed.

Cheilocystidia: lecythiform, almost all collapsed, one intact cystidium measuring 14 x 9 µm, with capitulum 4.5 µm wide.

Stipe covering: presumably collapsed, no true caulocystidia observed, only some capilliform, slightly twisted elements.

Pileipellis: hymeniform, consisting of roundish cells covered by a thick, not stainable amorphous mucilage. Pileocystidia abundant, lecythiform, 25-30 x 4-6 µm, with capitulum 4-5,5 µm wide, yellow.

Specimen examined: USA: Michigan, Gratiot County, Ithaca, gregarious on grassy ground in a cemetery, 31. 8. 1947, leg. V. POTTER (MICH, holotype).

The part of the type specimen made available to us consists of fragments of one pileus and two stipes.

Gastrocybe lateritia is widely distributed but rare in North America, northern Africa and southern to southeastern Europe.

As demonstrated by HALLEN & al. (2003), the slimy pileus is caused by infection with bacteria from the *Chryseobacterium gleum/indologenes* group. DNA-investigations unambiguously placed *Gastrocybe lateritia* into sect. *Candidae* of *Conocybe*. As *Gastrocybe lateritia* may be a malformed, already described species of *Conocybe*, they did not propose a new combination within *Conocybe*. In case it proves to be a distinct species the epithet "lateritia" will have to be changed as it is a later homonym.

liratus (Fig. 13 a-d)

Agaricus liratus BERK. & M. A. CURTIS 1860, Proc. Amer. Acad. Arts & Sci. **4**: 116
Galera lirata (BERK. & M. A. CURTIS) SACC. 1887, Sylloge Fungorum **5**: 865
Conocybe lirata (BERK. & M. A, CURTIS) MURRILL 1912, Mycologia **4**: 248

Original description:

A. (*Galera*) *liratus*, BERK. & CURT.: pusillus; pileo umbilicato sulcato atomato rufo; stipite brevi; lamellis paucis latis adnatis. On the bark of Oak-trees, Mare Island, San Francisco Bay, California. – Resembles a *Marasmius*, with the habit of *A. corticola*.

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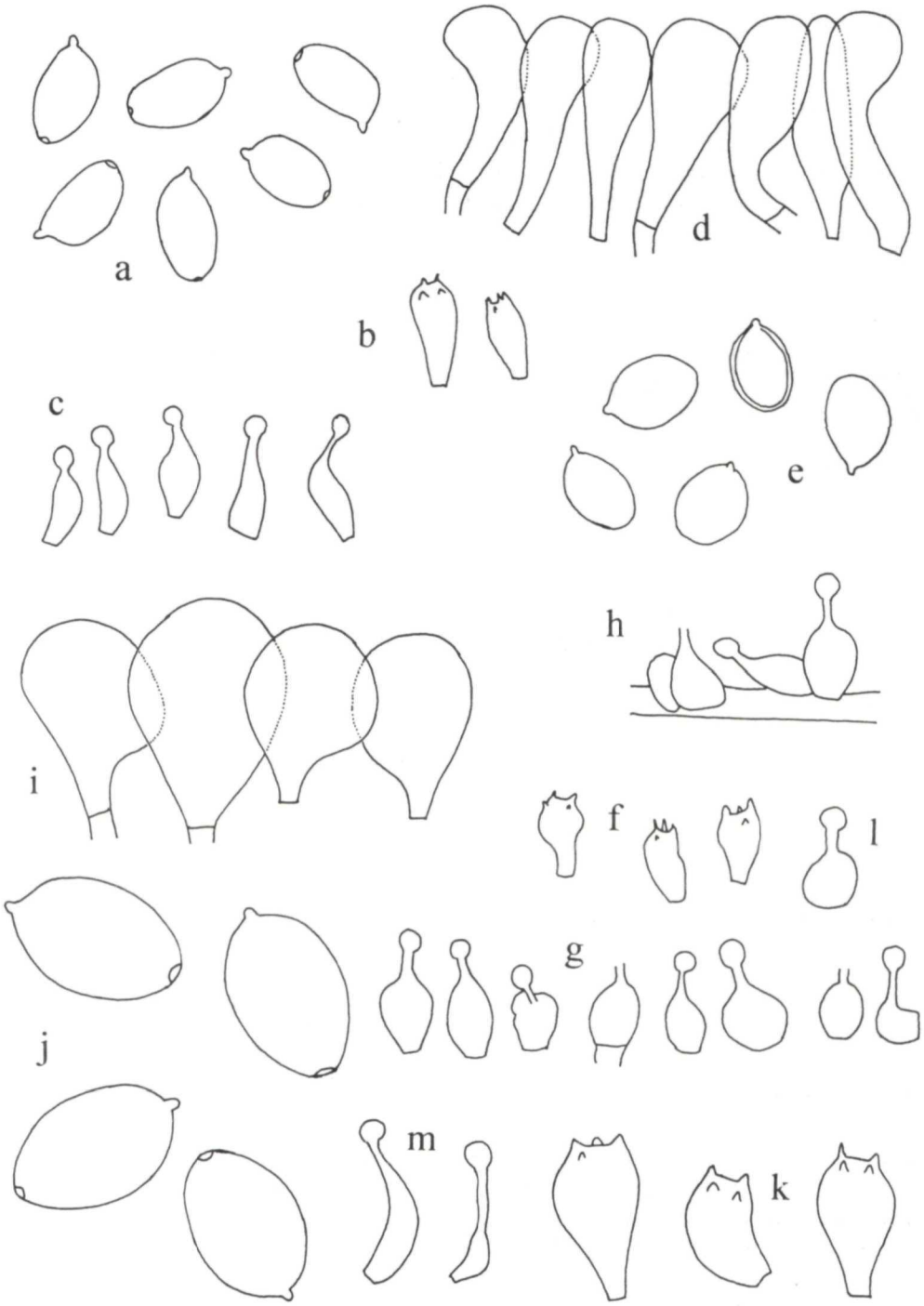


Fig. 12 *a-d. Pholiota intermedia* (part of holotype). *a* Spores, *b* basidia, *c* cheilocystidia, *d* pileipellis. *e-h. Cortinarius intrusus* (type). *e* Spores, *f* basidia, *g* cheilocystidia, *h* stipe covering, *i* pileipellis. *j-m. Gastrocybe lateritia* (type). *j* Spores, *k* basidia, *l* cheilocystidium, *m* pileocystidia.

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Microscopical characters:

Spores: 12-15 x 7-9 µm, mean 13.2 x 7.8 µm, Q = 1.45-2.1, ellipsoidal, thin-walled, without germ-pore, pale yellow to yellow in KOH.

Basidia: 4-spored, ca 30 x 10 µm, with sterigmata up to 5 µm long.

Clamp connections: present at the base of the basidia and in the trama.

Cheilocystidia: cylindrical-clavate to roundish, also elongated vesicular, 23-37 x 8-14 µm.

Stipe covering: not investigated.

Pileipellis: consisting of horizontal hyphae with erected end cells, 3-4 µm wide; pigment roughly encrusted.

Specimen examined: USA: California, San Francisco Bay, Mare Island, on bark of oak, ex Herb. HOOKER (WRIGHT), 16. 1. 1856 (K, holotype).

The type specimen consists of several fruitbodies of which two are comparatively well-preserved.

Due to the structure of the pileipellis, *Agaricus liratus* is not a member of the *Bolbitiaceae*, but belongs to the genus *Galerina*. In the monograph of SMITH & SINGER (1964) *Galera lirata* has not been listed; we could also find no species with completely smooth spores and similarly shaped cheilocystidia. However, we refrain from a combination in *Galerina* as important macroscopical features are unknown.

locellina (Fig. 13 e-j)

Galerula locellina MURRILL 1946, Lloydia **9**: 327
***Conocybe locellina* (MURRILL) WATLING 1976,** Kew Bull. **31**: 593

Original description:

Pileus conic, gregarious, about 4 cm broad; surface dry, isabelline, disk darker, margin closely striate, upturned at times; context thin, dull-isabelline, mild, odor slightly unpleasant; lamellae adnate, close, narrow, pallid, entire; stipe tapering upward from a clavate base, hollow, white, atomate and pubescent to mostly glabrous, 7-9 x 0.5-1 cm; volva limb entire, small, white, sometimes persisting.

Microscopical characters:

Spores: 10.5-16 x 8-9.5 x 6.5-8 µm, mean 12.4-12.9 x 8.3-8.5 x 7.2-7.4 µm, Q = 1.4-1.6, ellipsoidal to slightly angular, in front view also slightly navicular, lentiform, with thick wall and a large germ-pore, rust-orange yellow in KOH.

Basidia: 4-spored, 19-26 x 10-13 µm.

Clamp connections: not observed.

Cheilocystidia: lecythiform, 17-25 x 7-10 µm, with capitulum 2.5-4 µm wide.

Stipe covering: consisting only of hairs and non-lecythiform elements, hairs 3.5-5 µm wide, lecythiform elements absent.

Pileipellis: hymeniform, consisting of roundish-stipitate elements, 22-40 x 15-22 µm, in-between commonly capilliform pileocystidia.

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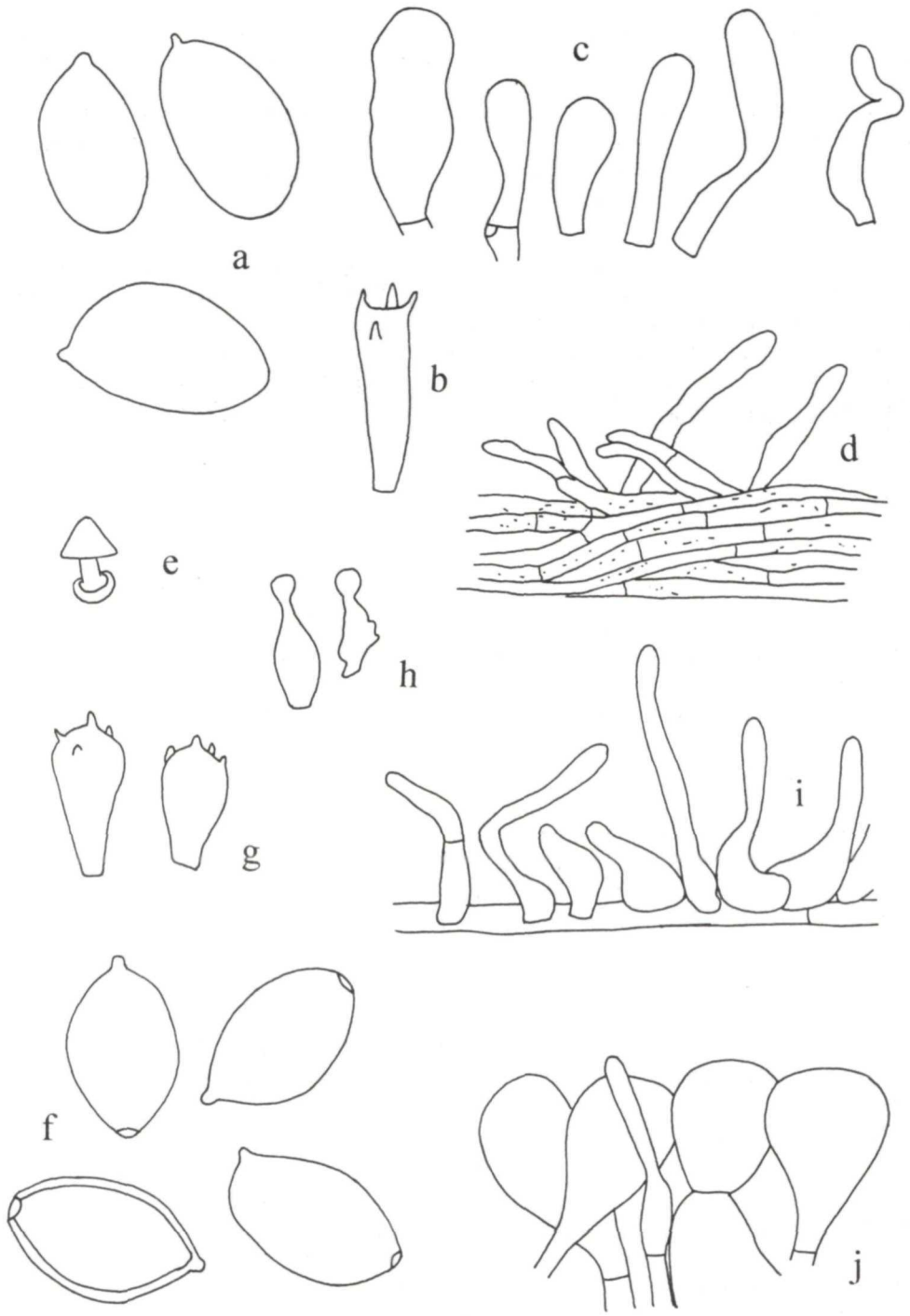


Fig. 13 *a-d. Agaricus liratus* (type). *a* Spores, *b* basidium, *c* cheilocystidia, *d* pileipellis. *e-j. Galerula locellina* (type). *e* young fruitbody redrawn from a drawing of MURRILL (x 0.8), *f* spores, *g* basidia, *h* cheilocystidia, *i* stipe covering, j pileipellis.

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Specimens examined: USA: Florida, Alachua County, Gainesville, on exposed sawdust from a stable, 19. 2. 1945, leg. W. A. MURRILL (FLAS, holotype); - - on manure pile, 19. 9. 1939, leg. W. A. MURRILL (FLAS).

The type material is fragmented into numerous pieces, but all microscopical structures are well-preserved. The drawing of a young fruitbody enclosed by MURRILL shows a wide, membranaceous volva at the stipe base, but no velar remnants at the pileus margin or at the stipe above the volva.

Conocybe locellina is a member of subgenus *Singerella* and is closely related to the European *Conocybe hornana* SINGER & HAUSKN. Striking macroscopical differences to the latter are the somewhat more dull pileus colour, the dense striation, the smooth and never wrinkled pileus surface, no velum residues at the pileus margin and especially the membranaceous, wide volva at the stipe base. The spores of *Conocybe hornana* are approximately of the same size but less lentiform and in front view hardly navicular.

ludovicianus (Fig. 14 a-g)

Gymnopilus ludovicianus MURRILL 1917, North American Flora **10**: 204
Flammula ludoviciana (MURRILL) KAUFFMAN 1926, Amer. J. Bot. **13**: 19
Conocybe ludoviciana (MURRILL) WATLING 1976, Kew Bull. **31**: 593
***Agrocybe ludoviciana* (MURRILL) HAUSKN., KRISAI-GREILH. & VOGLMAYR, comb. nova**
Basionym: *Gymnopilus ludovicianus* MURRILL 1917, North Amer. Flora **10**: 204

Original description:

Pileus 6-10 cm broad, depressed, pale-yellowish-tan, moist, not viscid, glabrous, margin non striate. Context white, mild. Lamellae adnate, pale cinnamon, narrow, crowded. Stipe 10-12 cm long, 10 mm thick, white, glabrous, cylindric, often curved, firm (veil not mentioned).

Microscopical characters:

Spores: 8.5-11 x 5.5-6.5 x 5-6 µm, mean 9.4 x 6.0 x 5.3 µm, ellipsoidal, slightly lentiform, in side view also bean-shaped, with double wall and a conspicuous germpore ca 1 µm in diam.

Basidia: 4-spored, 25-30 x 7-9 µm.

Clamp connections: common in the context.

Cheilocystidia: fusiform, cylindrical with slightly swollen venter to slightly utriform, 18-40 x 6-11.5 µm.

Pleurocystidia: similar to cheilocystidia, but not that polymorphic, more conspicuously fusiform with very acute tips, 22-45 x 8-10 µm.

Stipe covering: consisting of short, roundish to irregularly ellipsoidal elements.

Pileipellis: four-layered, consisting of roundish, oval, fusiform-ventricose to slightly capitate elements, pigment parietal and slightly encrusting.

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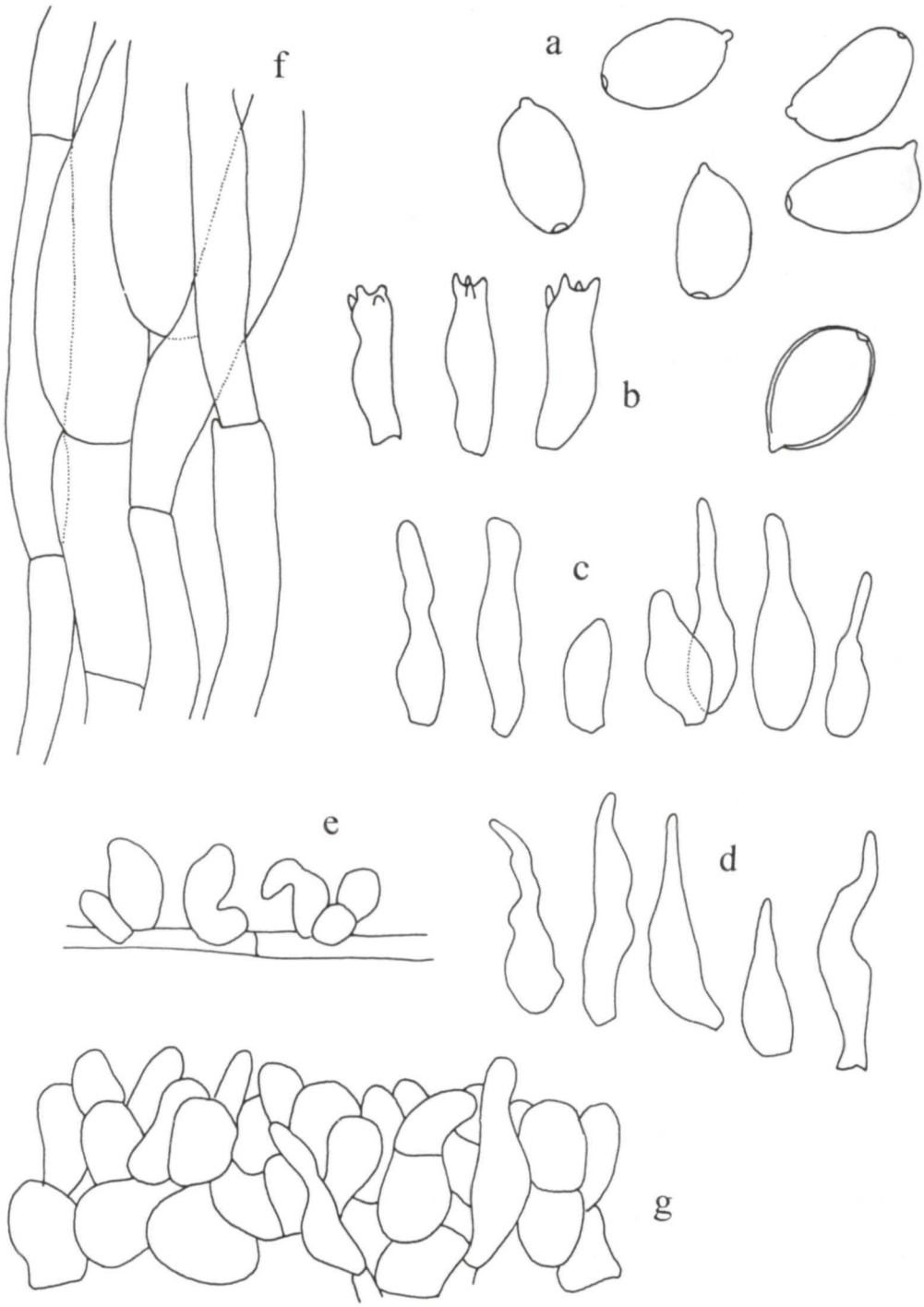


Fig. 14 *a-g*. *Gymnopilus ludovicianus* (type). *a* Spores, *b* basidia, *c* cheilocystidia, *d* pleurocystidia, *e* stipe covering, *f* section of gill trama, *g* pileipellis.

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Specimen examined: USA: Lousiana, New Orleans, City Park, on the base of living maple tree (*Acer*), leg. F. S. EARLE, 3. 9. 1908 (NY, holotype).

The type specimen consists of two fragmented fruitbodies in good condition.

The structure of the pileipellis, presence of pleurocystidia and growth at the basis of a living tree indicate that *Gymnopilus ludovicianus* is a member of the genus *Agrocybe*. Therefore, a new combination is proposed in *Agrocybe*.

magnispora (Fig. 15 a-e)

Galerula magnispora MURRILL 1943, Mycologia **35**: 530
***Conocybe magnispora* (MURRILL) SINGER 1950,** Sydowia **4**: 135

Original description:

Pileus convex, not expanding, gregarious, reaching 1.2 cm broad; surface moist, smooth, glabrous, isabelline, estriate, margin even, entire; context thin, odor not characteristic; lamellae adnate, broad, ventricose, medium distant, inserted, entire, soon becoming fulvous; stipe slightly enlarged below, hollow, smooth, glabrous, white, shining, 3-4.5 x 0.12-0.2 cm.

Microscopical characters:

Spores: 15-16.5 x 8.5-11 µm, mean 15.6 x 9.6 µm, Q = 1.5-1.7, ellipsoidal, not lentiform, thick-walled with a germ-pore up to 1.5 µm in diam., orange-brown in KOH.

Basidia: 4-spored, 25-30 x 12-16 µm.

Clamp connections: not observed.

Cheilocystidia: rather collapsed, ca 12-16 x 6.5-8 µm, with capitulum 2.5-4 µm wide.

Stipe covering: consisting only of non-lecythiform elements and hairs, hairs up to 60 µm long.

Pileipellis: hymeniform, consisting of sphaeropedunculate elements, 32-45 x 20-32 µm, not interspersed with pileocystidia.

Specimen examined: USA: Florida, Levy County, Gulf Hammock, on old cow dung, 8. 3. 1942, leg. W. A. MURRILL (FLAS, holotype).

The type material consists of numerous fragments, especially the lamellar edge with the cheilocystidia heavily collapsed.

MURRILL (1943) reports much larger spore sizes than measured by us (15-20 x 10-12 µm). Concerning the spore characteristics and stipe covering, *Conocybe magnispora* is similar to the European and African *Conocybe singeriana*, but there are some important differences. *Conocybe singeriana* is much larger, more robust, with a strongly bulbous stipe base, the pileus is darker coloured in fresh condition, moist always striate and strongly pubescent, the stipe never white. Microscopically, the many capilliform pileocystidia are conspicuous in *Conocybe hornana*; in the type of *Conocybe*

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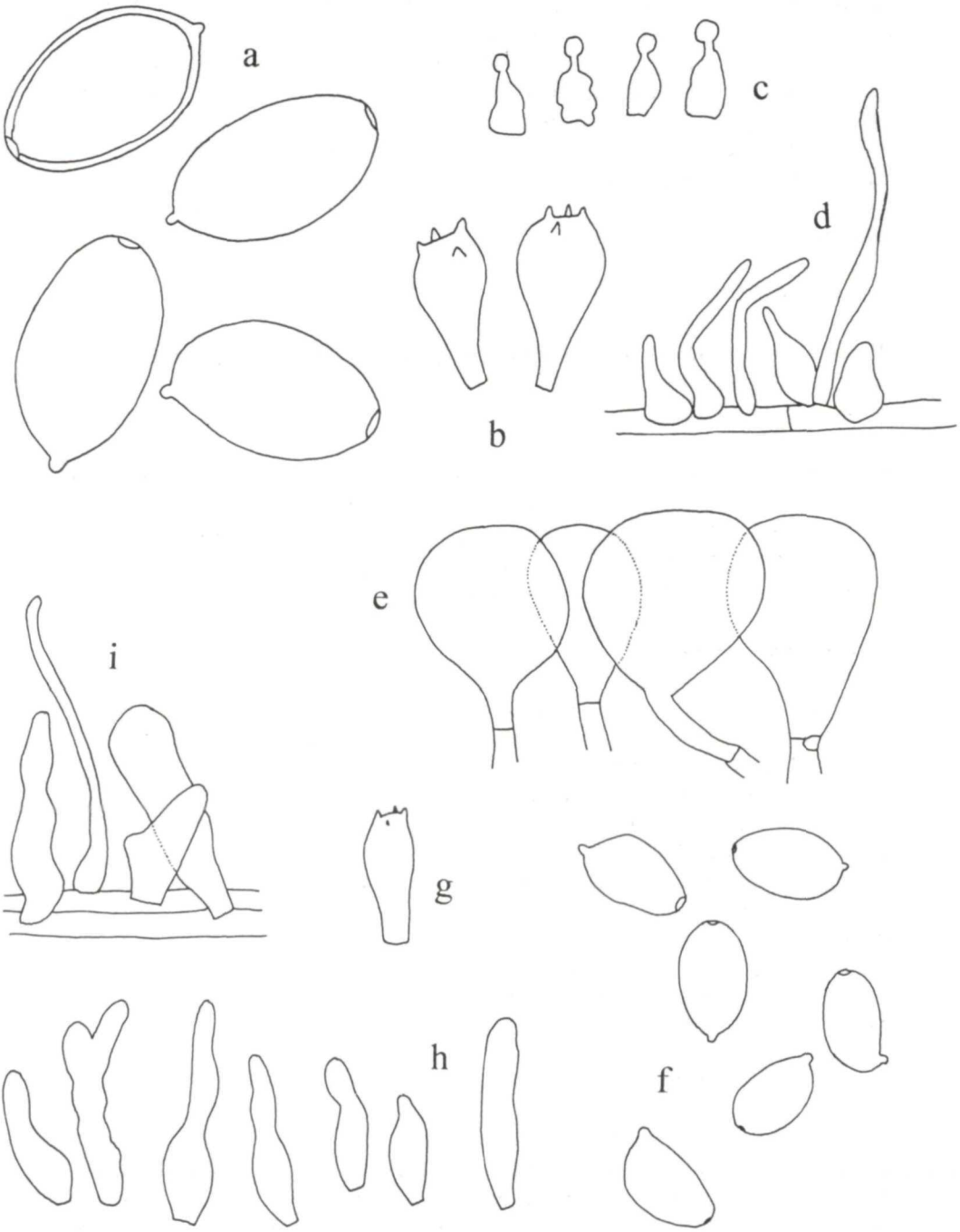


Fig. 15 *a-e. Galerula magnispora* (type). *a* Spores, *b* basidia, *c* cheilocystidia, *d* stipe covering, *e* pileipellis. *f-i. Pholiotina maireiaffinis* (type). *f* Spores, *g* basidium, *h* cheilocystidia, *i* stipe covering.

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magnispora and also in two other collections from the USA investigated by the first author, pileocystidia are always missing.

Conocybe pseudopubescens THOMAS, HAUSKN. & MANIMOHAN (THOMAS & al. 2001), described from India from elephant dung, has similarly delicate fruitbodies like *Conocybe magnispora*, but is different in brighter orange to orange white, conspicuously striate pilei, a similarly coloured, never white stipe and somewhat smaller, much thicker-walled, in KOH red-brown spores.

Conocybe magnispora was recently reported also from Europe (ARNOLDS & HAUSKNECHT 2003).

maireiaffinis (Fig. 15 f-i)

***Pholiotina maireiaffinis* SINGER 1989,** Fieldiana n. s. **21**: 106.

Original description:

Pileo flavido-ochraceo, hygrophano, siccando pallidiore, haud viscoso, in siccis breviter et debiliter sulcato, glabro, convexo, obtuso, centro interdum depresso, 10-15 mm lato. Lamellis ochraceobrunneis, confertis vel mediocriter confertis, ventricosis, latis, adnexis. Stipite albo, ad apicem minute pruinato, aequali, 8-21 x 1,3-2 mm. Velo nullo. Carne alba, interdum in basi stipitis fuscescente, inodora.

Microscopical characters:

Spores: 6.5-8.3 x 4-5 µm, mean 7.5 x 4.4 µm, Q = 1.6-2.0, ellipsoidal, not lentiform, thin-walled, with small, often hardly visible germ-pore, pale yellow in KOH.

Basidia: 4-spored, 18-20 x 6.5-9 µm.

Clamp connections: present.

Cheilocystidia: 20-40 x 6-8 µm, cylindrical, slightly lageniform, with rather obtuse apex, also slightly forked.

Stipe covering: consisting of capilliform, fusiform to clavate elements.

Pileipellis: due to the scarce type material not investigated. According to SINGER (1989) the pileipellis is hymeniform, consisting of roundish-stipitate elements, in-between few pileocystidia similar to cheilocystidia.

Specimen examined: USA: Illinois, Ogle County, White Pine State Park, on the ground of a forest track (*Quercus*, *Fraxinus*), 9. 10. 1976, leg. R. SINGER N 7591 (F).

The type consists of a single fragmented fruitbody.

According to SINGER (1989) it is close to *Pholiotina mairei* (WATLING) ENDERLE, but has larger fruitbodies, not lacrimating lamellae, somewhat broader spores and other cystidia. The most important difference should be the shape of the cheilocystidia, which in *Pholiotina mairei* are always more delicate with long, beak-shaped apex.

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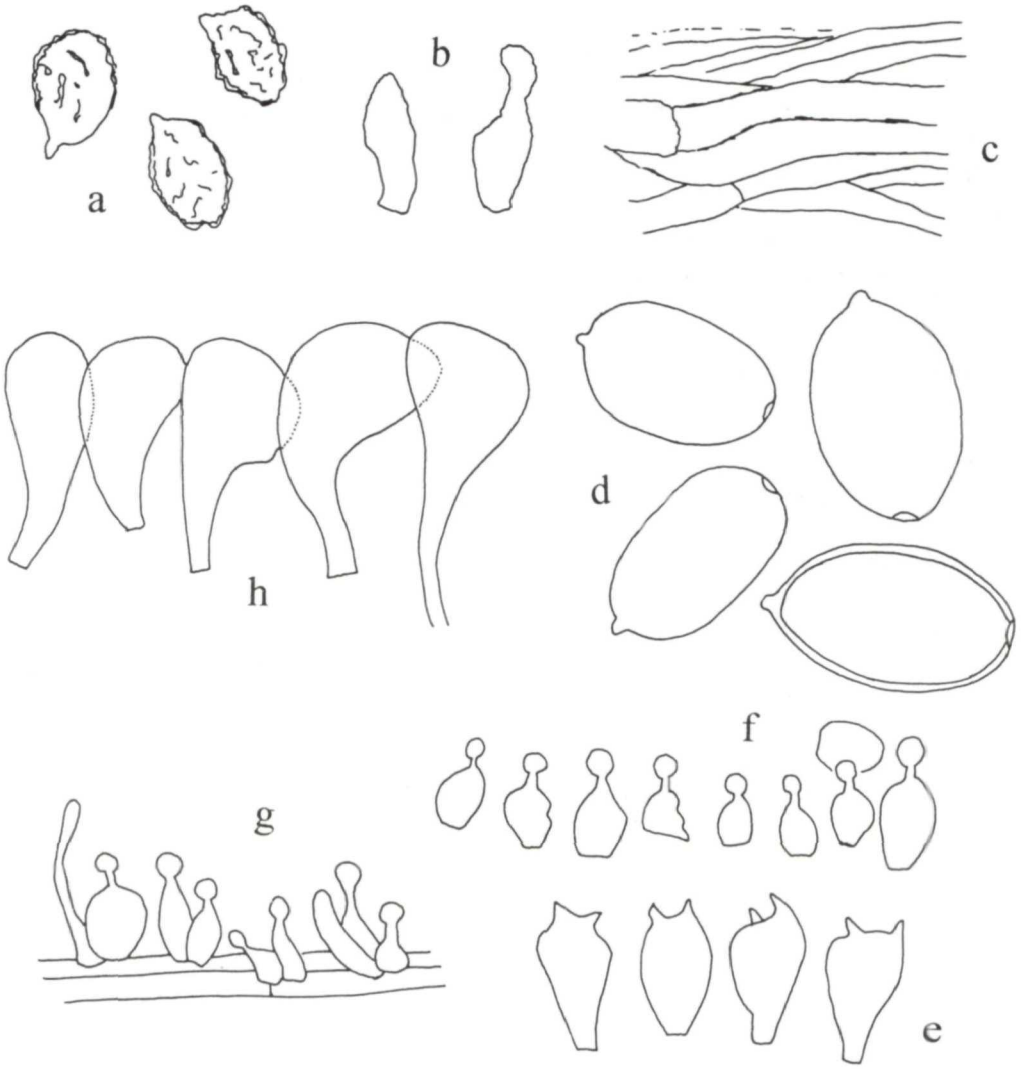


Fig. 16 *a-c*. *Agaricus martianus* (type). *a* Spores, *b* collapsed cheilocystidia (?), *c* pileipellis. *d-h*. *Galerula mexicana* (type). *d* Spores, *e* basidia, *f* cheilocystidia, *g* stipe covering, *h* pileipellis.

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martianus (Fig. 16 a-c)

Agaricus martianus BERK. & M. A. CURTIS 1869, J. Linn. Soc. **10**: 291
Galera martiana (BERK. & M. A. CURTIS) SACC. 1887, Sylloge Fungorum **5**: 864
Conocybe martiana (BERK. & M. A. CURTIS) SINGER 1955, Sydowia **9**: 402

Original description:

Helvolus; pileo tenui umbonato plano glabro; stipite gracili leviter sursum deorsumque incrassato; lamellis latis ventricosis laete ferrugineis liberis.

Pileus ¼ inch across; stem ¾ inch high, capillary. Spores bright ochraceous.

Microscopical characters:

Spores: 7-8.5 x 5-5.5 µm, mean 7.7 x 5.2 µm, ellipsoidal with prolonged apiculus, without germ-pore, sporadically with weak callus, with thick, very wrinkled-uneven, distinctly calyptrate wall, strongly yellow-brown in KOH.

Basidia: not observed.

Cheilocystidia: sparingly very collapsed, cylindrical-clavate to lageniform; ca 22-26 x 7-8 µm large elements present.

Stipe covering: entirely collapsed.

Pileus covering: a cutis of thin, lying hyphae with weak incrusting pigment, no pileocystidia present.

Material investigated: Cuba: on rotten wood, June, leg. C. WRIGHT no. 70 (K, holotype).

The type material consists of two separated pilei and two stipe fragments in very poor condition and is heavily molded by a contaminating fungus. The microscopical analysis given above and the following commentary are from HAUSKNECHT & KRISAI-GREILHUBER (1998).

Because of the structure of the pileus covering and also of the spore surface this is not a member of the *Bolbitiaceae*, but a representative of the genus *Galerina*. This was already stated by DENNIS (1953: 192), who placed the species in the vicinity of *Galerina triscopa* (FR.) KÜHNER.

Due to the poor condition of the type material and the missing information of cystidial features we consider a combination into *Galerina* not to be meaningful.

mexicana (Fig. 16 d-h)

Galerula mexicana MURRILL 1917, North Amer. Flora **10**: 169
Galera mexicana (MURRILL) SACC. & TROTT. 1925, Sylloge Fungorum **23**: 278
***Conocybe mexicana* (MURRILL) WATLING 1981,** Bibl. Mycologica **82**: 120

Original description:

Pileus 3 cm broad, subhemispheric, not umbonate, moist, uniformely ochroleucous (yellowish buffish), glabrous, not striate. Lamellae adnexed, isabelline, darker at matu-

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rity, subcrowded, broad, edges whitish and slightly crenulate. Stipe 11 cm long, 3 mm thick, stramineous, erect, equal, fistulose.

Microscopical characters:

Spores: 12.5-15.5 x 8-9.5 µm, mean 14.3 x 8.7 µm, Q = 1.55-1.75, ellipsoidal to broadly ellipsoidal, sporadically subcylindrical, not lentiform, thick-walled with conspicuous germ-pore, orange-brown in KOH.

Basidia: 2-(1-)spored, no 4-spored observed, 18-23 x 11-13 µm.

Clamp connections: present at the base of the basidia and the trama.

NH_3-reaction: negative even after 12 hours.

Cheilocystidia: lecythiform, 12-22 x 6-9 µm, with capitulum 2.5-5 µm in diam.

Stipe covering: consisting mainly of lecythiform caulocystidia, these usually smaller than the cheilocystidia, 11-19 x 5-9.6 µm, with capitulum 2-4 µm in diam.; additionally some short-cylindrical elements present.

Pileipellis: hymeniform, consisting of roundish-stipitate, almost colourless elements, 30-43 x 19-24 µm; pileocystidia not observed.

Specimen examined: Mexico: Jalapa, in grass by roadside, 12-20. 12. 1909, leg. W. A. & E. L. MURRILL 139 (NY, holotype).

The type specimen consists of one pileus and a stipe fragmented into two pieces in good condition. The microscopical analysis and the majority of the following commentary are a translation from HAUSKNECHT (2002 a).

This is the only two-spored member of the *Conocybe tenera*-group. DENNIS (1953: 192) doubted that *Conocybe mexicana* is a separate species and compared it with *C. semiglobata*. The microscopical description of MURRILL (1917) is too short to infer additional differences, and microscopically only the two-spored and the more broadly-ellipsoidal, sometimes subcylindrical spores are evident. Additional, well documented collections are necessary before a definitive statement about the status can be given.

michiganense (Fig. 17 a-e)

Psathyrella michiganense A. H. SM. 1941, Cont. Univ. Mich. **5**: 35

***Conocybe michiganensis* (A. H. SM.) WATLING 1975,** Notes Roy. Bot. Gard. Edinburgh **34**: 248

Description (from WATLING 1975: 248):

Pileus 10-25 mm broad, obtusely conic and with the margin depressed against the stipe when young, broadly conic or in age the margin flaring somewhat, moist, when young minutely pubescent from projecting hairs, soon glabrescent, opaque when young and moist, only very faintly striate at maturity, varying from sordid "tawny olive" to bistre or nearly black when the spores mature, sometimes the disk becoming "wood-brown" (Ridgway 1912) and the margin "avellaneous", hygrophanous atomate when faded, fading to sordid ashy brownish grey or greyish white, margin regular and non-striate or folded in age. Stipe 20-50 mm x 1-1.5 mm, equal, strictly rigid, tubular, densely white

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pubescent (under a lens) at first, soon glabrous or with scattered fibrillose flecks, whitish above, base sordid brown, in a yellowish or sordid brown over all except apex, base tinged reddish at times, occasionally longitudinally striate over the lower half. Flesh very thin and fragile; smell none and taste faintly of radish. Gills ascending adnate, not readily seceding, moderately close (23-37 reach the stipe), moderately broad, pale avellaneous when young slowly becoming fuscous brown, edges white.

Microscopical characters:

Spores: 9-10 x 6-7 µm, mean 9.5 x 6.5 µm, Q = 1.4-1.6, ellipsoidal, not lentiform, thick-walled and with conspicuous germ-pore, violaceous-brown, chocolate-brown in KOH.

Basidia: 4-spored, 19-21 x 9-10 µm.

Clamp connections: not observed.

Cheilocystidia: lecythiform, 15-22 x 7-10 mm, with capitulum 3-4.5 µm in diam.

Stipe covering: consisting of a mixture of hairs, clavate, cylindrical-ventricose and capilliform-capitate elements.

Pileipellis: hymeniform, consisting of roundish-stipitate elements, 32-43 x 16-30 µm; intermingled with many capilliform pileocystidia.

Specimen examined: USA: Michigan, Milford, on sawdust, 15. 9. 1939, leg. A. H. SMITH 10920 (MICH, part of holotype).

The part of the holotype accessible to us consists of three well-preserved fruitbodies.

Conocybe michiganensis has been originally placed into *Psathyrella* (SMITH 1941) due to the "fuscous" spore colour, which is highly exceptional for a member of *Bolbitiaceae*. WATLING (1975) investigated several collections of this species comparatively common in Michigan and combined it into *Conocybe*. He placed it into a new section *Conocybella* (SINGER) WATLING, with *Conocybe michiganensis* as type species. The species has up to date only been recorded from North America.

microspora (Fig. 17 f-i)

***Pholiotina microspora* SINGER 1989,** Fieldiana n. s. **21**: 107

Original description:

Pileo pallide brunneo, in umbone brunneo, hygrophano, leniter pellucide striato in humidis, glabro, nudo, convexo, umbonato, ± 13 mm lato. Lamellis ochraceis, confertis, mediocriter latis, rotundato-adnatis. Stipite albo, ad basin mox brunneo, ad apicem farinoso, subaequali, haud bulboso, 20 x 1,5 mm. Velo haud appendiculato in margine pilei sed annuliformi; annulo membranaceo, fugaci. Carne inodora, in basi stipitis brunnea.

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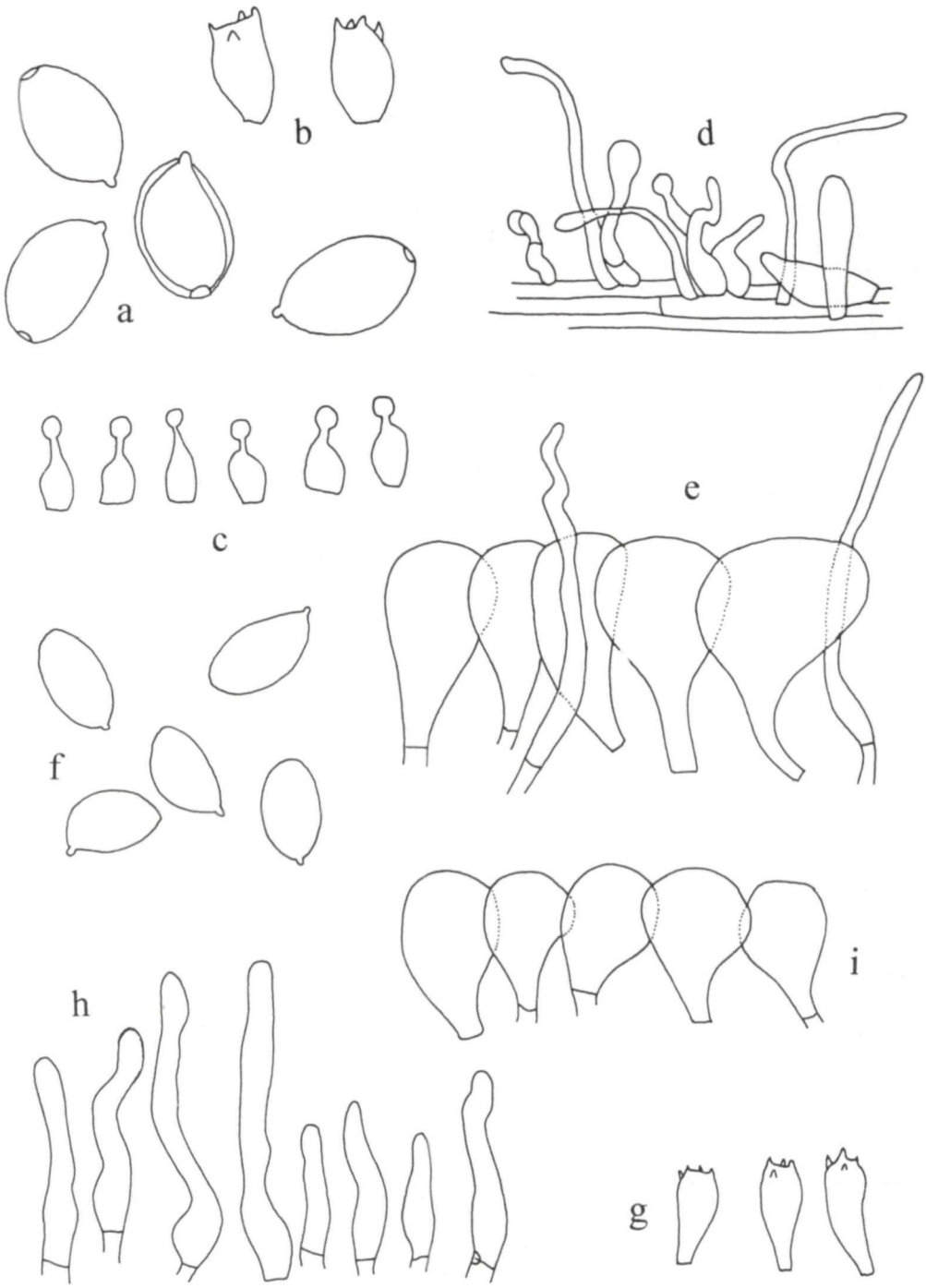


Fig. 17 *a-e*. *Psathyrella michiganense* (type). *a* Spores, *b* basidia, *c* cheilocystidia, *d* stipe covering, *e* pileipellis. *f-i*. *Pholiotina microspora* (type). *f* Spores, *g* basidia, *h* cheilocystidia, *i* pileipellis.

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Microscopical characters:

Spores: 6-8 x 3.5-4 µm, mean 7.0 x 3.9 µm, Q = 1.5-1.9, ellipsoidal, not lentiform, thin-walled, without germ-pore, at most with callus, pale yellow in KOH.

Basidia: 4-spored, 15-21 x 5-7 µm.

Clamp connections: present.

Cheilocystidia: 21-55 x 4-8 µm, cylindrical-lageniform with a long neck and an obtuse, rarely slightly capitate apex, partly with a slime cap.

Pileipellis: hymeniform, consisting of roundish-stipitate elements, 19-28 x 12-20 µm, no pileocystidia observed; pigment roughly encrusted.

Specimen examined: USA: Illinois, Cook County, Harms Woods, on dead stump of deciduous tree (*Acer* or *Quercus*), 16. 10. 1983, leg. R. SINGER N 5147 (F, holotype).

The type specimen consists of two well-preserved specimens; the ring-shaped velum is not present any more.

SINGER (1989) described the spore features as "poro germinativo truncato instructis", "dilute ferruginascente-ochraceo-brunneis". This disagrees with our observations (see above).

Pholiotina microspora has been considered by SINGER (1989) to be closely related with *Pholiotina intermedia* (presumably because both are lignicolous), but the cheilocystidia have a completely different shape. We consider it to be similar to a delicate *Pholiotina arrhenii* with a short stipe, but it has lighter coloured spores without a germ-pore (in *P. arrhenii* a germ-pore is always present, although it may be small), and also somewhat differently shaped cheilocystidia. Further collections from North America are necessary whether these differences are sufficient to separate these two taxa.

neoantipus (Fig. 18 a-j)

Galerula neoantipus G. F. ATK. 1918, Proc. Amer. Phil. Soc. **57**: 371
Conocybe neoantipus (G. F. ATK.) SINGER 1936, Ann. Mycol. **34**: 433

Original description:

Gregaria 3-7 cm alta; radix 2-5 cm; pileo campanulato-convexo, 1,5-2,5 cm lato; lamellis cum in *Galerula antipus*.

Cystidiis solum in acie lamellarum, numerosis, lecythiformibus, 15-30 x 6-9 µ; sporis quaternis, ellipsoideis, 12-17 x 6-9 µ.

Microscopical characters:

The type of *C. neoantipus* consists of three partly heavily fragmented fruitbodies (WATLING 1986: 92 recorded "two fragmentary basidiomes and several pieces of stipe, undoubtedly previously rooting"). These parts can with some troubles (usually with the differently sized spores which are on the stipe surface) be attributed to two if not three different taxa:

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Fig. 18. *Galerula neoantipus* (labelled with red ink as "*Galerula neoantipus* ATKINSON n. sp. type"). *a-c*. large pileus. *a* Spores, *b* basidia, *c* cheilocystidia. *d-g*. medium-sized pileus with stipe fragment. *d* Spores, *e* basidia, *f* cheilocystidia, *g* elements of stipe covering. *h*, *i*. small pileus with stipe fragment. *h* Spores, *i* elements of stipe covering. *j*. elements of stipe covering from light-coloured stipe fragment (presumably belonging to large pileus).

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1) large pileus (specimen very pale, stipe fragments rooting) (Fig. 18 a-c, j)
Spores: 11-13(-14.5) x 7-9 x 6.5-7.5 µm, mean 12.3 x 8.0 x 7.3 µm, Q = 1.5-1.8, ellipsoidal to inconspicuously angular, lenticular, with wall 1 µm thick and a germ-pore 1.5-2 µm in diam., yellowish brown in KOH.

Basidia: 4(2)-spored, 16-23 x 11-13 µm.

Clamp connections: not observed.

Cheilocystidia: lecythiform, 20-25 x 7.5-11 µm, with capitulum 3.7-6 µm in diam.

Stipe covering: strongly collapsed, but evidently consisting of lecythiform caulocystidia with a thin venter and a captitulum 4.5-5.5 µm wide, and with hairs up to 55 x 3 µm.

Pileipellis: hymeniform, consisting of roundish-stipitate elements.

2) medium-sized pileus (root not traceable, specimen much darker than large pileus) (Fig. 18 d-g)
Spores: 11-14.5 x 7.5-8.5 x 7-8 µm, mean 12.8 x 7.8 x 7.6, Q = 1.5-1.8, distinctly ellipsoidal and not lentiform, with wall 0.5-1 µm thick and a germ-pore 1.5-1.8 µm in diam., distinctly yellow-brown in KOH.

Basidia: 4-spored, 18-28 x 12-14 µm.

Clamp connections: not observed.

Cheilocystidia: lecythiform, 17-23 x 6.5-9 µm, with a capitulum 3.7-5 µm in diam.

Stipe covering: consisting only of lecythiform caulocystidia and some roundish to cylindrical elements, capitulum of caulocystidia 3.5-5 µm in diam.

Pileipellis: hymeniform, consisting of roundish-stipitate elements.

3) small pileus (darker coloured than 2, root not traceable) (Fig. 18 h, i)
Spores: 10.5-11.5 x 7-7.5 x 6.5-7 µm, mean 10.9 x 7.1 x 6.7 µm, Q = 1.4-1.7, only slightly lenticular and indistinctly angular, with wall up to 1 µm thick and a germ-pore 1.5-2 µm in diam., distinctly yellow-brown in KOH.

Basidia: strongly collapsed, ca 17 x 13 µm.

Clamp connections: not observed.

Cheilocystidia: lecythiform, ca 15-18 x 6-8 µm, with capitulum 3.5-4 µm in diam.

Stipe covering: consisting almost only of lecythiform elements with capitulum 3.5-4.5 µm in diam., capilliform elements not traceable.

Pileipellis: hymeniform, consisting of roundish-stipitate elements.

Specimen examined: USA: Vermont, Middleburg, on newly seeded lawn, leg. E. A. BURT (CUP, holotype).

The microscopical analysis given above and most of the following commentary are a translation from HAUSKNECHT (1996). From the above data it is apparent that the type consists of two or even three different taxa. This is not amazing as the habitat is characterized as "newly seeded lawn", as we know that in such habitats numerous species of *Conoybe* can grow simultaneously and intermingled. Comparing the results given above with the original diagnoses it is evident that the spore size strongly diverges

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from that given in ATKINSON (1918). Therefore, *Conocybe neoantipus* is considered as not interpretable and rejected as a nomen dubium.

pinguis (Fig. 19 a-d)

Conocybe pinguis WATLING 1971, Persoonia **6**: 338
***Pholiotina pinguis* (WATLING) ENDERLE 1997,** Z. Mykol. **63**: 32

Original description:

Pileus 15-35 mm, convexus postremo planus, primo viscidus, striatus glaber, castaneus postremo ochraceo-fulvus vel sordido-fulvus. Stipes 70-90 x 3-4 mm, aequalis ad basim leviter incrassatus, farctus, ad apicem albidus, ad basim obscuriore ochraceo-brunneus ad apicem fibrillosus vel fibrilloso-squamulosus; annulus crassus, membranaceus, apicalis, supra striatus. Lamellae confertae L 30 l 1-3, adnatae, bubalinae vel ochraceo-fulvae. Caro tenuis, concolora.

Microscopical characters:

Spores: 7-8.5 x 4-5.5 µm, mean 7.6 x 4.7 µm, Q = 1.4-1.9, ellipsoidal to slightly pip-shaped, thin-walled, with very inconspicuous to missing germ-pore, often only slight callus present, yellow in KOH.

Basidia: 4-spored, 18-22 x 8-11 µm.

Clamp connections: present.

Cheilocystidia: 20-45 x 6-12 µm, very polymorphic, cylindrical-ventricose, rarely cylindrical or slightly clavate, also twisted, very often with capitate apex (6-10 µm).

Pileipellis: hymeniform, cosisting of pyriform elements with a long pedicel, often also irregular or unilaterally flattened (like a golf-club), 30-48 x 7.5-17 µm, in-between cylindrical-ventricose pileocystidia.

Specimen examined: USA: Washington, Jefferson County, Olympic NP, Clearwater River, under *Alnus* debris, 9. 5. 1939, leg. A. H. SMITH 13260 (MICH, holotype).

The type specimen consists of one fragmented fruitbody, the ring is not visible any more.

Conocybe pinguis has spores almost identical with *Pholiotina arrhenii* (FR.) SINGER, but cheilocystidia of a completely different shape. Also the rather small and often peculiarly shaped elements of the pileipellis are conspicuous. WATLING (1971) also gives the glutinous pileus and the very conspicuous ring as species-specific characters. In Europe there are no similar species, therefore *Conocybe pinguis* is a separate, well-defined species.

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plicatellus (Fig. 19 e-h)

Agaricus coprinoides PECK 1873, Bull. Buffalo Soc. Nat. Sci. **1**: 52, non *Agaricus coprinoides* CORDA 1831
Agaricus plicatellus PECK 1878, Ann. Rep. New York State Mus. Nat. Hist. **29**: 66
Galera plicatella (PECK) EARLE 1903, Torreya **3**: 136
Galerula plicatella (PECK) MURRILL 1917, North Amer. Flora **10**: 164
Conocybe plicatella (PECK) KÜHNER 1935, Le genre *Galera*: 137
***Galerella plicatella* (PECK) SINGER 1951 „1949“,** Lilloa **22**: 490

Original description:

Pileus membranaceus, soon expanded, often split on the margin, plicate-sulcate to the small even disk, yellowish, inclining ochre; lamellae close, slightly rounded behind, concolorous; stem equal, hollow, minutely hairy-pruinose, white; plant 1‘ high, pileus 6‘ broad, stem ‚5‘‘ thick.

Microscopical characters:

Spores: 7-8.5 x 5-6 x 4.5-5 µm, mean 7.4 x 5.5 x 4.6 µm, Q = 1.3-1.45, in front view ventricose-ellipsoidal, rarely scarcely angular, in side view oblong ellipsoidal, with relatively thin wall and conspicuous germ-pore, yellow-brown in KOH.

Basidia: 4-spored, 18-20 x 8.5-10.5 µm.

Clamp connections: common in the trama.

Cheilocystidia: cylindrical, often with a ventricose basis and a long, slender neck, with blunt, rarely slightly capitate apex, 20-50 x 6.5-10 µm.

Stipe covering: consisting of some elements similar to the cheilocystidia.

Pileipellis: hymeniform, consisting of pyriform to sphaeropedunculate elements, 24-43 x 11-21 µm; no pileocystidia observed.

Specimen examined: USA: New York, Sterling, on grassy ground, without date (NYS, holotype).

The type consists of five fruitbodies partly glued on paper in well-preserved condition.

Galerella plicatella is the type species of the genus *Galerella* (HORAK 1968, SINGER 1986). This genus is considered to be a subgenus of *Conocybe* by some authors, e.g., WATLING & GREGORY (1981) or WATLING (1982). Recent investigations (ARNOLDS & HAUSKNECHT 2003) have shown that this is based on a misinterpretation of European collections, which have recently been described as *Pholiotina sulcata* ARNOLDS & HAUSKNECHT. Therefore, the genus *Galerella* with its type species *Galerella plicatella* is considered and retained as an independent genus (HORAK & HAUSKNECHT 2002, HAUSKNECHT & CONTU 2003).

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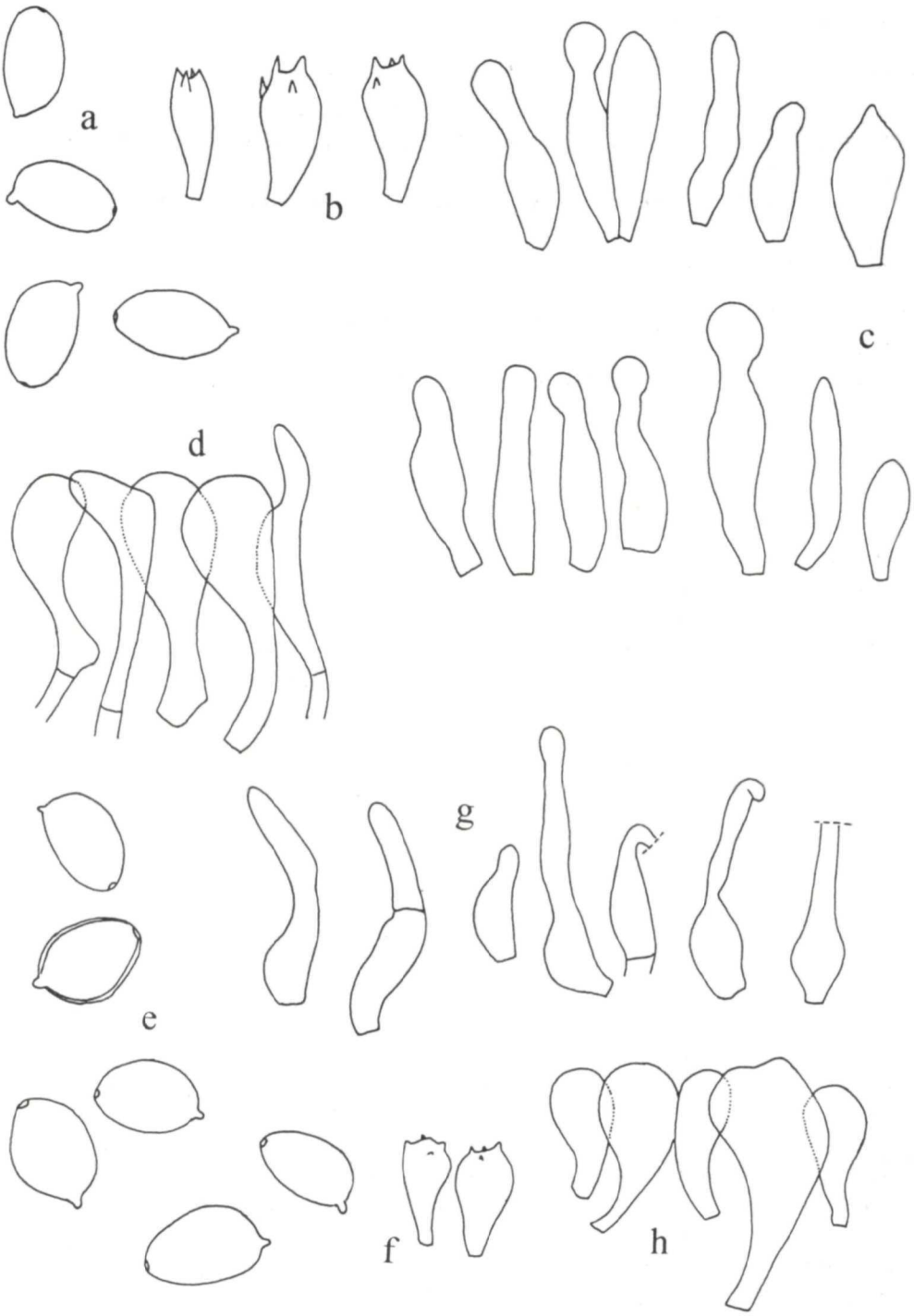


Fig. 19 *a-d. Conocybe pinguis* (type). *a* Spores, *b* basidia, *c* cheilocystidia, *d* pileipellis. *e-h. Agaricus plicatellus* (type). *e* Spores, *f* basidia, *g* cheilocystidia, *h* pileipellis.

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plumbeitincta (Fig. 20 a-e)

Galerula plumbeitincta G. F. ATK. 1918, Proc. Amer. Phil. Soc. **57**: 372
Conocybe plumbeitincta (G. F. ATK.) SINGER 1950, Sydowia **4**: 137
***Pholiotina plumbeitincta* (G. F. ATK.) HAUSKN., KRISAI-GREILH. & VOGLMAYR, comb. nova**
Basionym: *Galerula plumbeitincta* G. F. ATK. 1918, Proc. Amer. Phil. Soc. **57**: 372

Original description:

Gregaria, 3-5 cm alta; pileo convexo, dein campanulato, 1-1,5 cm lato, adolescente lubrico, substriato, plumbeitincto; lamellis stipite late adnatis, subdistantibus, ventricosis, ochraceo-cinnamomei; stipite albo dein plumbeitincto, sursum pruinoso, deorsum substriato, cavo, 2-3 mm crasso.

Microscopical characters:

Spores: 12-15 x 7-9 µm, mean 13.4 x 7.9 µm, Q = 1.6-1.8, distinctly ellipsoidal, not lentiform, thick-walled with a large germ-pore, orange-brown in KOH.

Basidia: 4-spored, 20-24 x 11-13 µm.

Clamp connections: not observed.

Cheilocystidia: predominantly lageniform with broad, distinct beak, sometimes subcylindrical-ventricose, some cystidia with capitulum, 17-27 x 7-10 µm.

Stipe covering: consisting of cylindrical to cylindrical-ventricose elements, up to 80 µm long and 17 µm wide.

Pileipellis: hymeniform, consisting of roundish-stipitate elements, up to 45 x 35 µm, intermingled with many pileocystidia similar to the cheilocystidia, but larger.

Specimen examined: USA: Michigan, Ann Arbor, Cascade Glen, on dung hills, leg. C. H. KAUFFMAN 565 (CUP, holotype).

The type specimen consists of hundreds of small fragments; nevertheless, hymenium, stipe and pileus structures are well preserved.

In the original diagnosis the cheilocystidia are described as "ampullaeformes, frequenter subcapitatae" (ATKINSON 1918), which led SINGER (1950: 137) to combine this species into *Conocybe*, presumably based on material from Europe which was later conceded by him (SINGER 1959). He then investigated the type specimen (SINGER 1959: 396) and described the cheilocystidia as "19.3-21.5 x 5-7.5 µm, varying from ampullaceous to capitate, many subcapitate, few truly capitate as in most species of *Conocybe* and few truly ampullaceous and non-capitate without any thickening in the apical region". However, in the following discussion he considers it arguable to retain it as an independent species within the genus *Conocybe*. Therefore, for a long time all European *Conocybe* collections with a more or less sordid brown to grey or blackish-grey pileus were identified as *Conocybe plumbeitincta*. This name was partly used for *Conocybe moseri* WATLING up to the 1990ties (RAITHELHUBER 1991: 219).

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Fig. 20 *a-e*. *Galerula plumbeitincta* (type). *a* Spores, *b* basidia, *c* cheilocystidia, *d* stipe covering, *e* elements of pileipellis. *f-i*. *Galerula procera* (type). *f* Spores, *g* basidia, *h* cheilocystidia, *i* stipe covering.

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The microscopical features of the species undoubtedly place it into the genus *Pholiotina*, very close to *Pholiotina coprophila* (KÜHNER) SINGER. Microscopically both taxa are scarcely discernible, but *Pholiotina coprophila* has completely different pileus and stipe colours and a never striate pileus. We therefore propose a combination into *Pholiotina*.

procera (Fig. 20 f-i)

Galerula procera G. F. ATK. 1918, Proc. Amer. Phil. Soc. **57**: 372
***Conocybe atkinsonii* WATLING 1981,** nom. nov., Bibliotheca Mycologica **82**: 9

Original description:

Gregaria, 10-12 cm alta; pileo campanulato, obtuso, ad marginem demum leniter expanso, 3-4,5 cm lato, 2-2,5 cm alto, ochraceo-fulvo, dein ochraceo vel pallide-ochroleuco, glabro, non striato; lamellis stipitis adnexis, ellipsoideis, ochraceis; stipite aequali, ad basem leniter crasso, recto vel flexuoso, glabro, striato, sursum pruinoso, pileo concolore sed pallidiore, 3-4 mm crasso.

Microscopical characters:

Spores: 14-18 x 9-10.5 x 8-10 µm, mean 15.9 x 9.5 x 9.1 µm, Q = 1.6-1.8, ellipsoidal, slightly lentiform, not angular, with wall more than 1 µm thick and a large, truncate germ-pore, reddish-brown in KOH.

Basidia: 4-spored, 20-24 x 12-14 µm.

Clamp connections: not observed.

Cheilocystidia: lecythiform, 15-21 x 6-11 µm, with capitulum 4-6.5 µm in diam.

Stipe covering: consisting of hairs, cylindrical, cylindrical-ventricose or roundish elements, no lecythiform caulocystidia present.

Pileipellis: hymeniform, consisting of roundish-stipitate elements.

Specimen examined: USA: New York, Ithaca, Buttermilk Gorge, on ground, in humus among leaves in moist woods, 23. 7. 1902, leg. C. H. KAUFFMAN 9910 (CUP, holotype).

The holotype consists of three fruitbodies in excellent condition.

WATLING (in WATLING & GREGORY 1981) proposed a new name for that species as the epithet "procera" was already assigned in *Conocybe* to another species [*Conocybe procera* (SINGER) WATLING, see WATLING & GREGORY 1981: 127].

The spore and stipe covering features of *Conocybe atkinsonii* are almost identical to *Conocybe singeriana*. The latter has more robust fruitbodies with a thicker stipe and a large bulbous stipe base; its pileus is always distinctly striate in moist condition, the cheilocystidia are somewhat smaller with a distinctly smaller capitulum, and it grows predominantly on dung and not on leaf litter in moist forests. Conspecificity cannot be ruled out at present; however, additional well-documented American collections from similar habitats are necessary before variability of the macroscopical features of *Conocybe atkinsonii* can be assessed.

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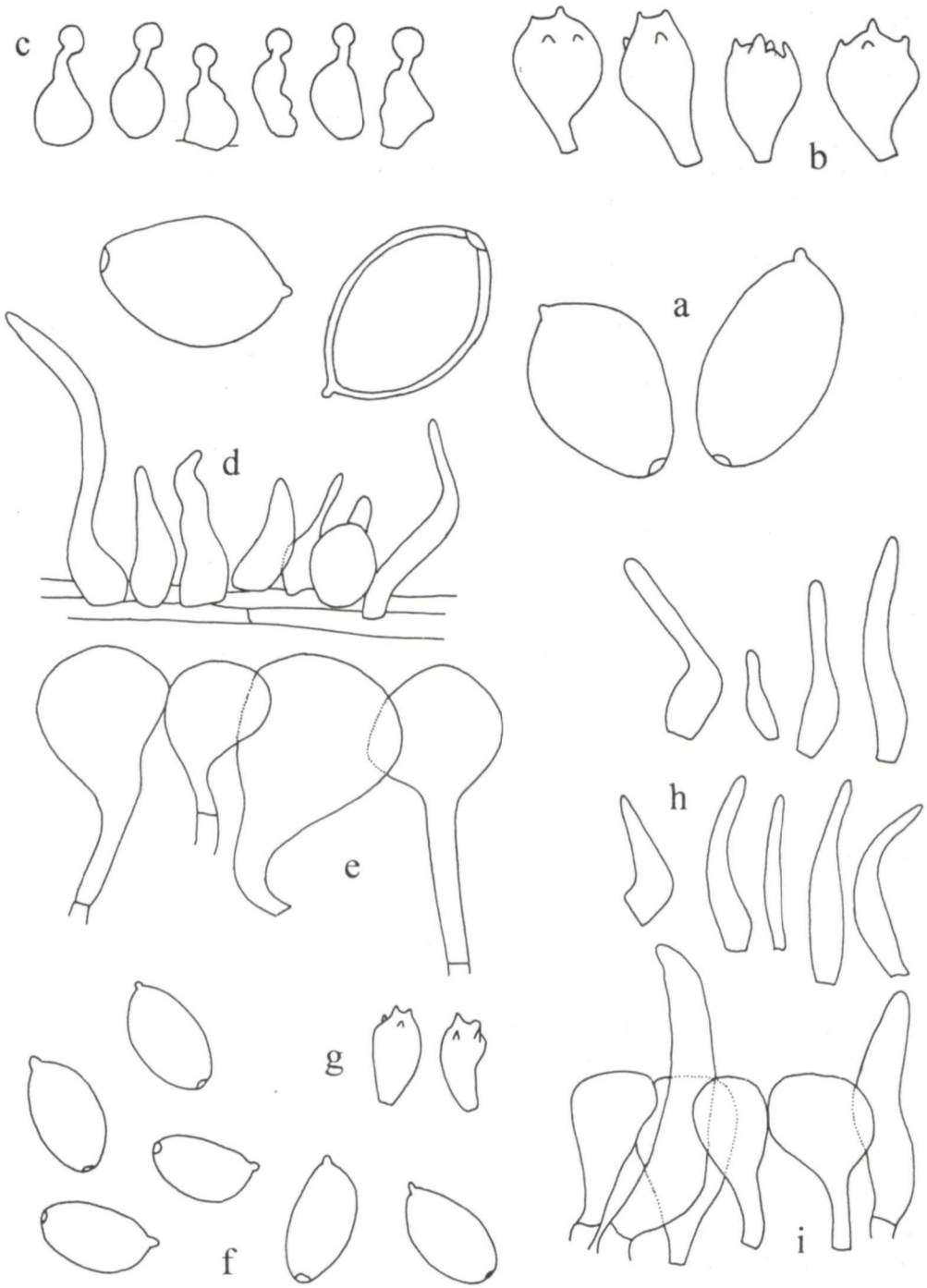


Fig. 21 *a-e. Galera pulchra* (type). *a* Spores, *b* basidia, *c* cheilocystidia, *d* stipe covering, *e* pileipellis. *f-i. Galera reticulata* (type). *f* Spores, *g* basidia, *h* cheilocystidia, *i* pileipellis.

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pulchra (Fig. 21 a-e)

Galera pulchra CLEM. 1896, Bot. Survey Nebraska **4**: 22
Conocybe pulchra (CLEM.) KÜHNER 1935, Le Genre Galera: 137 inval. (no basionym cited)
***Conocybe pulchra* (CLEM.) HAUSKN., KRISAI-GREILH. & VOGLMAYR, comb. nova**
Basionym: *Galera pulchra* CLEM. 1896, Bot. Survey Nebraska **4**: 22

Description (from SACCARDO & SYDOW 1899: 142):

Pileo conico, lato, membranaceo, centrum versus striato-sulcato, minute denseque scericeo-tomentoso; umbone distincto, ochraceo; stipite elongato cartilagineo, attenuato, fistuloso, longitudinaliter lineato-striato-pruinoso, ochroleuco; lamellis adnexis, angustis, linearibus, lentiter curvulis, ochraceis.

Pileus 2 ½ cm latus, 2 cm altus; stipes 7-8 cm longus, 2 mm crassus.

Hab. ad terram humosam, Nebraska Amer. bor.

Microscopical characters:

Spores: 12.5-15 x 8.5-9.0 x 7.5-8.5 µm, mean 14.0 x 8.7 x 7.8 µm, Q = 1.5-1.7, in front view ellipsoidal-submitriform, also slightly angular, in side view ellipsoidal, with thick wall and conspicuous germ-pore, slightly to distinctly lenticular, rusty-orange in KOH.

Basidia: 4-spored, 20-30 x 12-16 µm.

Clamp connections: present.

Cheilocystidia: lecythiform, 18-22 x 8-10 µm, with capitulum 4-6 µm in diam.

Stipe covering: consisting only of hairs and non-lecythiform elements; also at the apex of the stipe no lecythiform caulocystidia present.

Pileipellis: hymeniform, consisting of roundish-stipitate elements, 25-55 x 18-30 µm, pedicel 10-30 µm long, with encrusted pigment; pileocystidia not observed.

Specimen examined: USA: Nebraska, Lincoln, Otowanie Woods, Aug. 1890, leg. J. E. CLEMENTS (NEB, holotype).

The holotype consists of one fruitbody, the pileus of which is broken into two fragments in very good condition. The specimen is of conspicuous brightly ochre-yellow colour.

Unfortunately, we have not been able to obtain the original diagnosis, as we could not locate the journal in European libraries.

Conocybe pulchra is a member of sect. *Pilosellae* and should be close to *Conocybe velutipes*. However, it has substantially larger spores which are lenticular as in *Conocybe velutipes*, but in front view they are never regularly ellipsoidal but submitriform and sometimes slightly angular. In addition, the cheilocystidia, basidia and the elements of the pileipellis are larger than in the much more delicate European *Conocybe velutipes*. Also the bright colour of the exsiccate, which we have never observed in *Conocybe velutipes*, is conspicuous. Unfortunately, the macroscopical description is very scanty, and additional collections of *Conocybe pulchra* are necessary to investi-

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gate whether there are also differences in colour and striation of the pileus and whether the microscopical features given above are constantly different from *Conocybe velutipes*. At the moment we consider *Conocybe pulchra* to be a well separated species and therefore propose a combination into *Conocybe*.

reticulata (Fig. 21 f-i)

Galera reticulata PECK 1901, Ann. Rep. New York Stat. Mus. Nat. Hist. **54**: 150
Conocybe reticulata (PECK) WATLING 1977, Kew Bull. **31**: 593

Original description:

Pileus 1-2.5 cm broad, hemispheric or campanulate, obtuse, hygrophanous, cinnamon color when moist, creamy yellow or buff when dry, rugosely reticulate. Context white or whitish, thin, fragile. Lamellae ascending, yellowish, becoming bright ferruginous, close, narrow. Stipe 2.5-6 cm long, 2-4 mm thick, white, pruinose, apex striate, equal, hollow.

Microscopical characters:

Spores: 7-9 x 3.5-5 µm, mean 7.7 x 4.1 µm, Q = 1.76-2, ellipsoidal, slightly pip-shaped, not lentiform, thin-walled with germ-pore ca 1 µm in diam., yellow in KOH.

Basidia: 4-spored, 15-18 x 7-9 µm.

Clamp connections: not observed.

Cheilocystidia: fusiform, towards the tip gradually tapered, 20-40 x 3.5-8 µm.

Pileipellis: hymeniform, consisting of roundish-stipitate elements, 25-35 x 13-19 µm, intermingled with numerous pileocystidia similar to the cheilocystidia, but up to 50 x 11.5 µm.

Specimen examined: USA: New York, Ithaca, on mossy ground, November (NYS, holotype).

The type specimen consists of four fruitbodies glued on paper in good condition.

All macro- and microscopical features of *Galera reticulata* (probably except the strongly rugose pileus surface) are in perfect agreement with the European *Naucoria striaepes* COOKE, described 1885 from Great Britain. We therefore consider this taxon for a later synonym of *Pholiotina striipes* (COOKE) M. M. MOSER.

rugosa (Fig. 22 a-d)

Pholiota rugosa PECK 1897, Ann. Rep. New York State Mus. Nat. Hist. **50**: 102
***Pholiotina rugosa* (PECK) SINGER 1946,** Pap. Mich. Acad. Sci. **32**: 148
Pholiotina filaris (FR.) SINGER var. *rugosa* (PECK) SINGER 1950, Acta Inst. Bot. Komarov Acad. Sci. URSS, Ser. **2, 6**: 429
Conocybe rugosa (PECK) WATLING 1981, Bibl. Mycol. **82**: 133

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Original description:

Pileus thin, broadly conical or campanulate becoming expanded and often umbonate, hygrophanous, yellowish-red or ferruginous and striatulate on the margin when moist, pale yellow or buff and commonly rugose when dry; lamellae close, adnexed, yellowish-white or cream-colored becoming ferruginous or brownish-ferruginous with age, white and minutely denticulate on the edge; stem flexuose, equal or slightly thickened toward the base, hollow, fibrillose or sometimes squamulose below the annulus, pruinose or mealy above, pallid, the annulus membranous, white or whitish, radiately striate on the upper surface.

Pileus 6 to 12 lines broad; stem 1 to 2 in. long, 1 to 2 lines thick.

Microscopical characters:

Spores: 9.5-11.5 x 5-6 µm, mean 10.1 x 5.6 µm, Q = 1.55-2.0, ellipsoidal, not lentiform, with slightly double wall and a large germ-pore, ochre-yellow to ochre-brown in KOH.

Basidia: 4-spored, 19-26 x 8.5-11 µm.

Clamp connections: present at the base of the basidia and in the trama.

Cheilocystidia: cylindrical-lageniform with long neck and a blunt, rarely slightly capitate apex, 20-40 x 7-12 µm.

Pileipellis: hymeniform, consisting of roundish-stipitate elements, 40-55 x 22-35 µm; pileocystidia not observed.

Specimen examined: USA: New York, Adirondack Mountains, on ground among decaying chips, September, leg. C. H. PECK (NYS, holotype).

The type specimen consists of six to seven partly fragmented fruitbodies in good condition.

Pholiotina rugosa is very closely related with *Pholiotina filaris*, many authors consider both taxa conspecific. Differences may concern the larger fruitbodies and spores of *Pholiotina rugosa*, the wrinkled pileus surface should not be a good distinguishing feature. However, European specimens of *Pholiotina filaris* investigated by the first author are in no way homogeneous, as there are clearly two different types of cheilocystidia, one type being very similar to *Pholiotina rugosa*. Whether the shape of cheilocystidia is correlated with other features like size of fruitbodies or spores is yet unclear. We therefore prefer to maintain two separate species until more data are available.

siligineoides (Fig. 22 e-i)

***Conocybe siligineoides* R. HEIM 1957,** Rev. Mycol. Paris n. s. **22**: 197

Original description:

Pileus 1,3-2,3 cm latus, 0,9-1,9 cm altus, primum subhemisphaericus, dein conico-campanulatus, numquam extensus, colore pulchro fulvo aurantiaco rufo, glaber impolitusque, cum disco vix obscuriore, paulo plus aurantiaco, margine regulariter leviterque

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crenulato, arete albido, oris breviter sed clare striatis; hygrophanes. Stipes longus, gracilis, rigidus, aequalis, haud aut vix ad basim inflatus, 2-4,5 x 0,15 cm, albus pauloque farinosus ad apicem aurantiacus pallidus ad culmen, clarescens per aetatem, semper ad basim albus; stricte fistulosus; crescens etiam postquam pileus prope finem incrementi invenit. Lamellae potius distantes spissioresque, subadnexatae, strictae, lamellulis inaequalibus comitatae, concolores (brunneae-fulvae-subaurantiacae). Caro exilis, dilucida praesertim in pileo, fere sine colore, sapore subdulci, dein vix acrescenti.

Microscopical characters:

Spores: 12-14.5 x 7.5-9 µm, mean 13.8 x 8.3, Q = 1.5-1.85, ellipsoidal, sporadically slightly angular to subhexagonal, not lentiform, with a thick wall and a germ-pore up to 1.5 µm in diam., olive yellowish-brown in KOH (colour probably affected by storage in fixation liquid).

Basidia: 2-spored, 16-20 x 9-11 µm.

Clamp connections: not observed.

Cheilocystidia: lecythiform, 11-16 x 7-10 µm, with capitulum 3-4 µm in diam.

Stipe covering: consisting of a mixture of capilliform, non-lecythiform and lecythiform elements, the latter similar to cheilocystidia, but smaller, 12-16 x 5-7 µm, with capitulum 3-4 µm in diam.

Pileipellis: hymeniform, consisting of relatively small, roundish-stipitate elements, 19-23 x 9-13 µm, in-between sporadical capitate pileocystidia similar to the cheilocystidia, but with smaller venter.

Specimen examined: Mexico: Huantla de Jimenez, Rancho de Tenango, on living stumps of *Saurania* spec., end of June until 7. 7. 1955, leg. R. G. & V. P. WASSON (PC, holotype).

The type specimen is stored in a flask with fixation liquid and consists of two well-preserved fruitbodies. The microscopical analysis and the following discussion are a translation from HAUSKNECHT (2003).

The structure of the stipe covering not mentioned in the original description unequivocally places this species into sect. *Mixtae*. Within that section, *Conocybe merdaria* is quite similar in some features. However, the spores of *Conocybe siligineoides* deviate in being slightly angular in front view, and the pileipellis consists of the smallest elements we have up to date been able to observe in *Conocybe*; in addition, the habitat, a living stump, is completely different.

According to STAMETS (1999), this species has been used by the Aztecs for shamanistic purposes and should contain psilocybin. This could be further indication to consider *Conocybe siligineoides* as a separate species. Considering the present knowledge conspecifity with *Conocybe merdaria* appears very unlikely and is therefore rejected.

smithii

see under *cyanopes*

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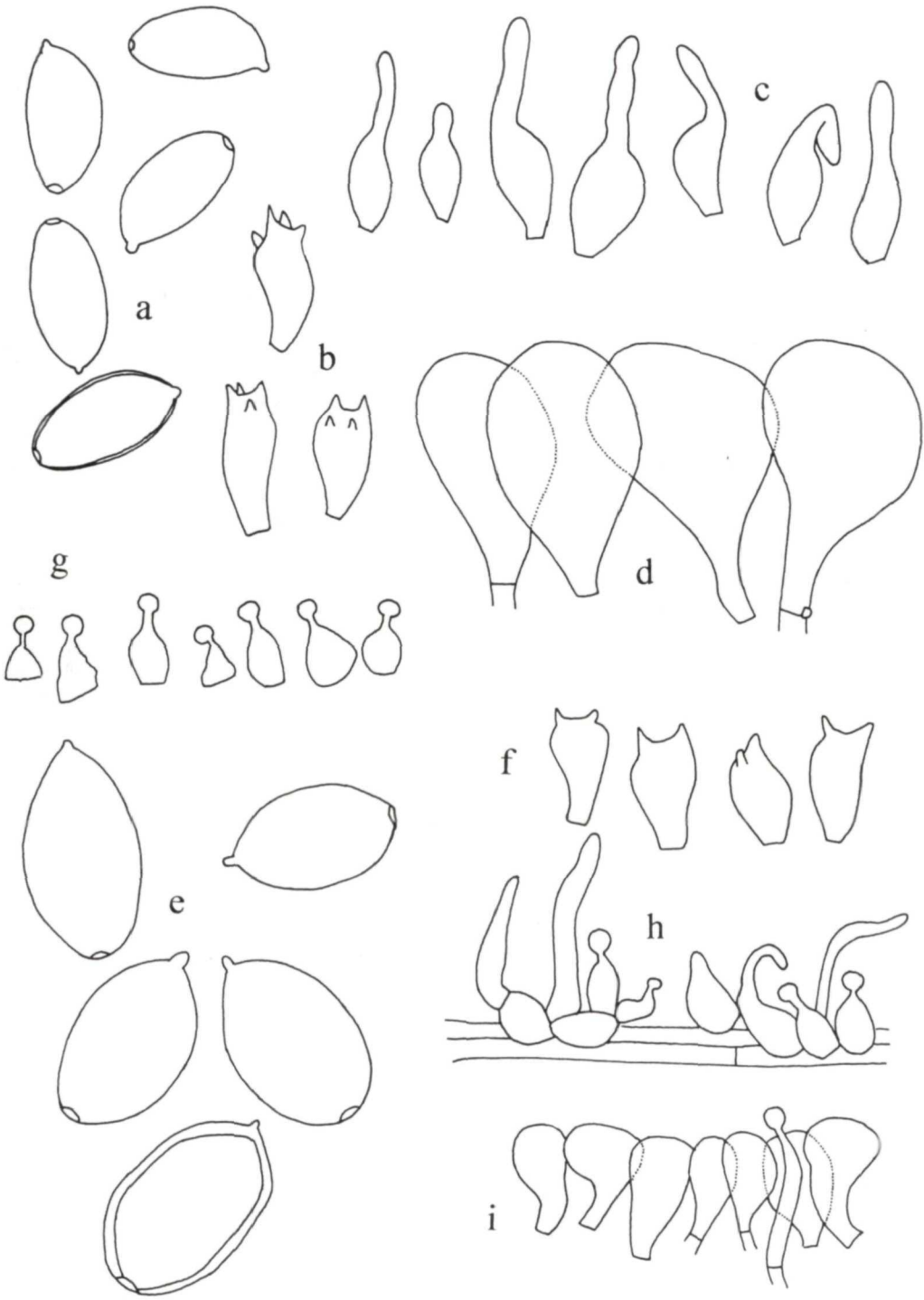


Fig. 22 *a-d. Pholiota rugosa* (type). *a* Spores, *b* basidia, *c* cheilocystidia, *d* pileipellis. *e-i. Conocybe siligineoides* (type). *e* Spores, *f* basidia, *g* cheilocystidia, *h* stipe covering, *i* pileipellis.

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Fig. 23 *a-c. Conocybe stercoraria* (part of type). *a* Spores, *b* basidia, *c* cheilocystidia. *d-g. Galerula subcrispa* (type). *d* Spores, *e* cheilocystidia (mostly collapsed), *f* stipe covering, *g* pileipellis. *h-k. Conocybe fibrillosipes* (type). *h* Spores, *i* basidia, *j* cheilocystidia, *k* pileipellis.

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stercoraria (Fig. 23 a-c)

Conocybe stercoraria WATLING 1971, Persoonia **6**: 334
***Pholiotina stercoraria* (WATLING) ENDERLE 1997**, Z. Mykol. **63**: 32

Original description:

Pileus 10-35 mm e convexo planus, humidus, hygrophanus, glabrus, fulvus vel ochraceo-brunneus, jove sicco pallido-flavidus vel incarnato-ochraceus; ad marginem interdum residuis veli obtectus. Stipes 50-60 x 1,5-2 mm, aequalis, cavus, fragilis, ochraceo-brunneus vel umbrinus, fibrilloso-striatus vel subglaber; annulus fugaceus, membranaceus, medius, albidus, instriatus infra flocculosus. Lamellae L 19-22, l 1-3 adnatae, albidae postremo ferrugineo-mellinae, subconfertae. Caro ochraceo-fulva vel ochraceo-brunnea jove sicco ochracea ad basim umbrinus.

Microscopical characters:

Spores: 9-10.5 x 5-5.5 µm, mean 9.7 x 5.2 µm, Q = 1.8-2, ellipsoidal-pip-shaped, not lentiform, with double wall and conspicuous germ-pore ca 1 µm in diam., orange-yellow in KOH.

Basidia: 4-spored, 20-24 x 8-10.5 µm.

Clamp connections: present.

Cheilocystidia: ventricose, with blunt to capitate apex, also utriform, 25-32 x 8.5-10.5 µm.

Stipe covering: above the ring similar to the cheilocystidia.

Pileipellis: hymeniform, consisting of roundish-stipitate elements.

Specimen examined: USA: Washington, Hok River near Spruce, Olympic NP., scattered on horse dung, 17. 5. 1939, leg. A. H. SMITH 13169 (MICH, holotype).

The specimen labeled "part of type" consists of one well-preserved fruitbody.

The close relationship with *Pholiotina utricystidiata* is apparent. ENDERLE & HÜBNER (1999) list as distinguishing features for *Pholiotina stercoraria* a more fugaceous, on the upside non-striate ring, somewhat shorter and minimally lentiform spores, smaller basidia and narrower, more elongated cheilocystidia as well as growth on dung.

As *Pholiotina utricystidiata* has meanwhile been found several times in Europe and also India (THOMAS & al. 2001) and more is known about their variability, some of these features have lost their distinguishing character, e.g., the size and shape of basidia and cheilocystidia, as well as the spore size. Therefore, the only features distinguishing both species are the features of the ring and the habitat. However, an additional feature concerns the spores, which in light microscopy are consistently darker in all collections of *Pholiotina utricystidiata* than in *P. stercoraria*. Therefore, also in this case additional American specimens are necessary to clarify the variability of *Pholiotina stercoraria*, before a final judgment about eventual conspecificity of both species can be given.

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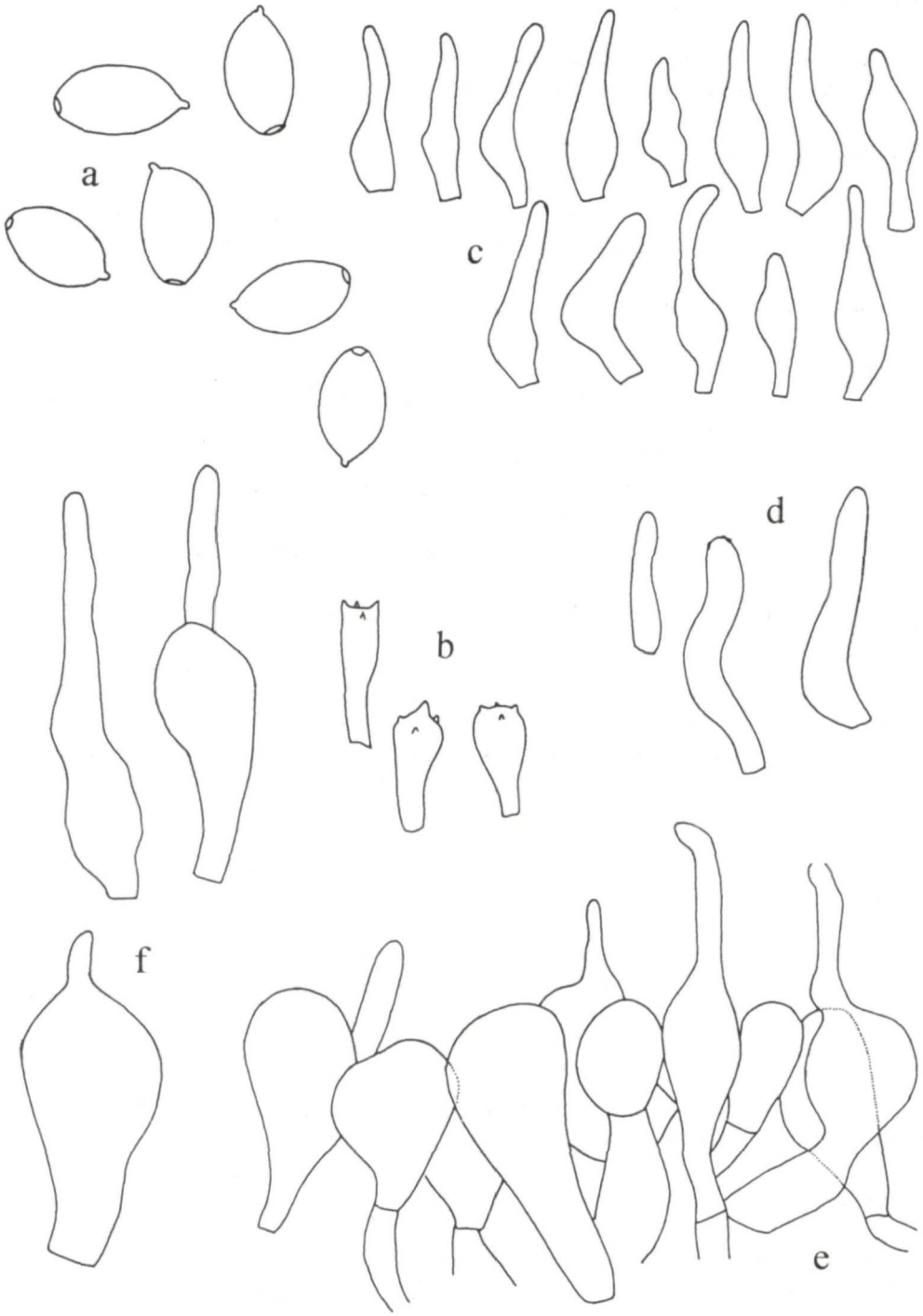


Fig. 24 *a-f. Agaricus sulcatipes* (type). *a* Spores, *b* basidia, *c* cheilocystidia, *d* caulocystidia, *e* pileipellis, *f* pileocystidia.

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subcrispa (Fig. 23 d-h)

Galerula subcrispa MURRILL 1942, Lloydia **5**: 148
***Conocybe subcrispa* (MURRILL) SINGER 1950,** Sydowia **4**: 139

Original description:

Pileo conico ad expanso depressoque 7 mm lato, pallido, disco isabellino, praesulcato; lamellis adnexis, angustatis, subdistantibus; stipes 5-6 cm longo, albo, bulboso.

Microscopical characters:

Spores: 12.5-18.5 x 8-10 µm, mean 15.3 x 8.6 µm, Q = 1.7-2.2, ellipsoidal, often elongated with almost cylindrical-parallel walls, not lenticular, with wall up to 0.8 µm thick and a germ-pore up to 2 µm wide, yellow-brown in KOH.

Basidia: rather certainly 4-spored; no intact basidia but only tetrads of accumulated immature basidiospores could be observed, indicating 4-spored basidia.

Clamp connections: sporadically present.

Cheilocystidia: lecythiform, some fragments (ca 18-20 x 7-8 µm) with conspicuous capitulum 2-4.5 µm wide observed.

Stipe covering: consisting only of non-lecythiform elements and hairs up to 50 x 4 µm.

Pileipellis: hymeniform, consisting of roundish-pyriform elements up to 31 x 21 µm, in-between abundant pileocystidia similar to cheilocystidia, but partly larger (up to 32 x 13 µm) with a thicker neck.

Specimen examined: USA: Florida, Alachua County, Gainesville, in grassy lawn under long-needled pine, 26. 7. 1939, leg. W. A. MURRILL (FLAS, holotype).

The type specimen consists of ca four stipes and several small pileus fragments in poor condition. The microscopical analysis and the major part of the following discussion are a translation from HAUSKNECHT (1998).

Conocybe subcrispa is a member of sect. *Candidae*. Its fruitbodies are much more delicate and have a longer stipe than *Conocybe albipes* var. *crispa*, in addition regular lamellae and longer, differently shaped spores. *Conocybe crispella* has roughly similar colours like *C. subcrispa* and also delicate fruitbodies, but much smaller, regularly ellipsoidal-ovate spores with a Q of 1.35-1.7, compared to 1.7-2.2 in *Conocybe subcrispa*. Therefore, the latter is a separate species, which according to our knowledge is up to date only known from two North American collections (HAUSKNECHT 1998).

sulcatipes (Fig. 24 a-f)

Agaricus sulcatipes PECK 1884, Ann. Rep. New York State Mus. Nat. Hist. **35**: 132
Galera sulcatipes (PECK) SACC. 1887, Sylloge Fungorum **5**: 866
Galerula sulcatipes (PECK) MURRILL 1917, North American Flora **10**: 166
***Pholiotina sulcatipes* (PECK) BON 1991,** Doc. Mycol. **21/83**: 39

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Original description:

Pileus thin, ovate, then conical or subcampanulate, hygrophanous, chestnut-colored and generally striatulate on the margin when moist, becoming paler when dry; lamellae ascending, subdistant, adnate, whitish, becoming ferruginous-cinnamon, stem slender, straight or flexuous, equal, hollow, rather tenacious, striate-sulcae, silky, floccose-pruinose toward the base, white, often tinged with blue or green at the base. Plant gregarious, 1.5-3‘ high, pileus 5‘‘-8‘‘broad, stem 1‘‘ thick.

Microscopical characters:

Spores: 7-9 x 4-5.5 µm, mean 8.0 x 4.8 µm, Q = 1.6-1.8, ellipsoidal, not lentiform, slightly thick-walled and with a conspicuous germ-pore ca 1 µm in diam., yellowish-brown in KOH.

Basidia: 4-spored, 13-24 x 8-12 µm.

Clamp connections: abundant, everywhere in the trama.

Cheilocystidia: fusiform to cylindrical-ventricose, with acute but not conspicuously differentiated beak, 25-40 x 6.5-9.5 µm.

Stipe covering: with numerous caulocystidia similar to cheilocystidia, but often larger and cruder.

Pileipellis: hymeniform, consisting of pyriform to roundish-stipitate elements, 26-55 x 9-25 µm, in-between numerous pileocystidia up to 95 x 16 µm.

Specimen examined: USA: New York, East Berne, on pile of buckwheat bran in woods, August 1893, leg. C. H. PECK (NYS, holotype).

The type consists of three pressed fruitbodies glued on paper and of five to six additional loose fruitbodies in good condition. The microscopical drawings are taken from HAUSKNECHT (2001).

Pholiotina sulcatipes is a well-defined species; concerning conspecificity with the European *Pholiotina aberrans* (KÜHNER) SINGER we refer to the different concepts of HAUSKNECHT (2001) and ARNOLDS (2004).

tenerella (Fig. 25 a-e)

Galera tenerella G. F. ATK. 1909, Ann. Mycol. **7**: 369
Galerula tenerella (G. F. ATK.) MURRILL 1917, North Amer. Flora **10**: 164

Original description:

Plants growing close together, 5-7 cm high; pileus 3-4 mm high and broad; stem 1-1.5 mm thick. Entire plant ochraceous. Pileus thin, campanulate, smooth, covered with a very thin and delicate filamentous whitish bloom. Gills subelliptical, narrow, adnexed, edge whitish. Stem even, pruinose above, and over entire length when young and fresh.

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Microscopical characters:

Spores: 14.5-15.5 x 9-10.5 x 8.5-9 µm, mean 14.8 x 9.5 x 8.6 µm, Q = 1.4-1.6, ellipsoidal, slightly lentiform, with wall 0.3-0.7 µm thick and a germ-pore 1.5-2 µm in diam., rust- to orange-brown in KOH.

Basidia: 2-spored, 19-23 x 10-13 µm.

Clamp connections: present at the base of the basidia and in the trama.

Stipe covering: consisting of capilliform, roundish to fusiform-lageniform elements; no lecythiform caulocystidia present.

Pileipellis: hymeniform, consisting of roundish-stipitate elements, 20-30 x 11-18 µm, in-between abundant capilliform pileocystidia up to 5 µm wide.

Specimen examined: USA: New York, Ithaca, Cornell Conservatory, on dung in pots in palm house, 1. 4. 1906, leg. G. F. ATKINSON (CUP, holotype).

The holotype specimen consists of two rather fragmented fruitbodies in good condition.

SINGER (1950) considers *Galera tenerella* conspecific with *Conocybe ambigua* WATLING; however, the completely different shape and the much darker spores do not favour this. The microscopical features of this taxon are almost identical with *Conocybe siliginea* (FR.: FR.) KÜHNER sensu HAUSKNECHT & PASSAUER (1997). In comparison to the neotype selected in HAUSKNECHT & PASSAUER (1997), the spores are slightly thinner-walled and more distinctly lentiform; however, in our opinion these differences are not sufficient to accept *Galera tenerella* as a separate species or variety/form of *Conocybe siliginea*. We therefore consider both taxa as conspecific.

teneroides (Fig. 25 f-j)

Agaricus teneroides PECK 1878, Ann. Rep. New York State Mus. **29**: 39
Galera teneroides (PECK) SACC. 1887, Sylloge Fungorum **5**: 861
Galerula teneroides (PECK) MURRILL 1917, North American Flora **10**: 166

Original description:

Pileus thin, campanulate or expanded, gregarious, 1-2.5 cm broad; surface hygrophanous, brownish-cinnamon when moist, paler when dry; lamellae narrow, crowded, yellowish-cinnamon; stipe straight, slender, hollow, concolorous, 2.5-5 cm long, about 1 mm thick.

Microscopical characters:

Spores: 6-8 x 3.5-4.5 µm, mean 7.4 x 4.2 µm, Q = 1.6-1.9, ellipsoidal, slightly pip-shaped, not lentiform, thin-walled, without or with inconspicuous germ-pore, often only with callus.

Basidia: 4-spored, 12-16 x 6-9 µm.

Clamp connections: present.

Cheilocystidia: lecythiform, 13-18 x 6-9.5 µm, with capitulum 4-5.5 µm in diam.

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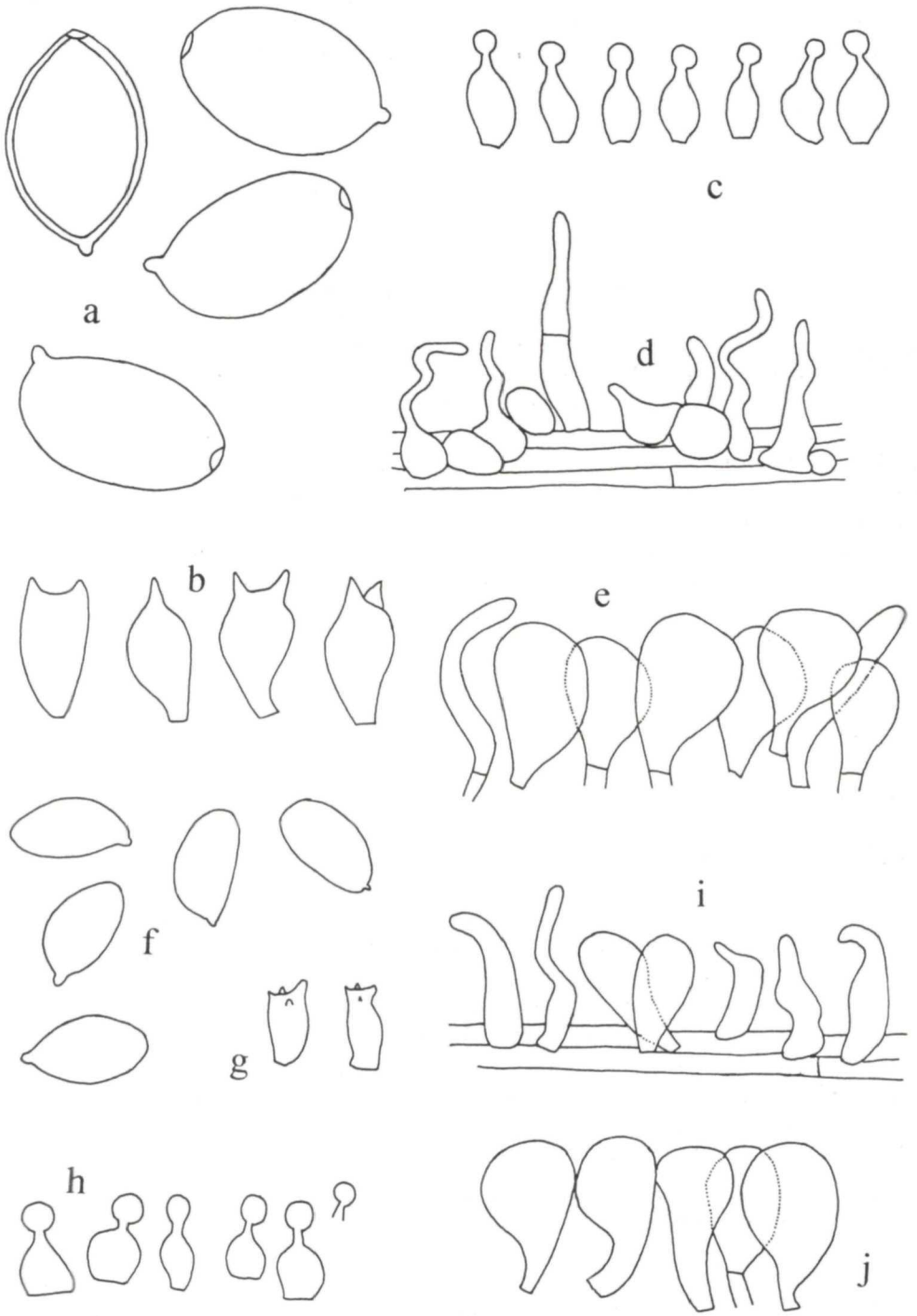


Fig. 25 *a-e. Galera tenerella* (type). *a* Spores, *b* basidia, *c* cheilocystidia, *d* stipe covering, *e* pileipellis. *f-j. Agaricus teneroides* (type). *f* Spores, *g* basidia, *h* cheilocystidia, *i* stipe covering, *j* pileipellis.

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Stipe covering: consisting of differently shaped elements, often with capilliform extensions; lecythiform caulocystidia completely absent.

Pileipellis: hymeniform, consisting of roundish-stipitate elements, 22-32 x 13-18 µm, no pileocystidia observed.

Specimen examined: USA: New York, Lewis County, Greig, on soil or manure in woods, 4. Sept., leg. C. H. PECK (NYS, holotype).

The type specimen consists of seven to eight partly fragmented fruitbodies in adequate condition.

WATLING & GREGORY (1981) consider *Agaricus teneroides* PECK to be synonymous to *Conocybe rickeniana*, which is not supported by the smaller cheilocystidia with comparatively smaller capitula and especially by the stipe covering. The microscopical features observed by us place this taxon into sect. *Pilosellae*, it has all features of *Conocybe pallidospora* KÜHNER & WATLING and would therefore have priority due to the prior date of publication. However, as the epithet "teneroides" has already been used for another species within *Conocybe* [*Conocybe teneroides* (J. E. LANGE) KÜHNER 1935, = *Pholiotina teneroides* (J. E. LANGE) SINGER], it cannot be used and *Conocybe pallidospora* remains the valid name.

SEM-pictures of the spores of *Agaricus teneroides* show a very faintly rugulose spore surface, which has not yet been observed in European collections of *Conocybe pallidospora*. However, this slight roughness is so faint that it is probably an artefact of storage of the type material about 130 years old. We therefore do not ascribe importance to this feature.

tetrasporoides (Fig. 26 a-d)

***Conocybe tetrasporoides* HAUSKN. 2003,** Österr. Z. Pilzk. **12**: 78.

Original description (translated from HAUSKNECHT 2003):

Pileus 2-10 mm wide, flat hemispheric to flat convex, hygrophanous, but not striate, young and in fresh condition orange-brown, pale yellow, cream, later altogether cream to yellowish-white, margin almost whitish; pileus surface smooth, somewhat micaceous. Lamellae sinuate, moderately distant to distant, ventricose; first cream, then ochre to pale white-coffee-brown, with smooth, somewhat paler lamellar edge. Stipe 15-45 mm long, ca 1 mm thick, base not to slightly enlarged, not rooting, first whitish, cream-white, then above the base darker, ochre to light yellow-brown; at the apex white-pruinose, otherwise very finely striate. Trama very thin, translucently white to yellowish, without smell, with strong radish-like taste.

Microscopical characters:

Spores: 9-14 x 5.5-8.5 µm, mean 10.9 x 6.5 µm, Q = 1.6-2.1, fusiform-ellipsoidal, ellipsoidal-pip-shaped, lenticular, with comparatively thin wall and conspicuous germpore ca 1 µm in diam., light orange-yellow to ochre-yellow in KOH.

Basidia: 4-spored, sporadically 2-spored, clavate-stipitate, 20-25 x 8.5-11 µm.

Clamp connections: present.

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Fig. 26 *a-d. Conocybe tetrasporoides* (type). *a* Spores, *b* basidia, *c* cheilocystidia, *d* stipe covering. *e-h. Agaricus tortipes* (type). *e* Spores, *f* basidium with immature spores, *g* cheilocystidia, *h* strongly collapsed elements on the pileipellis (velum?).

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NH_3-reaction: negative.

Cheilocystidia: lecythiform, 15-23 x 6-9 µm, with capitulum 2.5-4 µm in diam.

Stipe covering: consisting of lecythiform caulocystidia, non-lecythiform, cylindrical to capilliform elements; in some regions lecythiform elements rarer, in others in dense clusters present especially near to the stipe apex.

Pileipellis: hymeniform, consisting of roundish-stipitate elements, 35-60 x 25-42 µm; pileocystidia not observed.

Specimen examined: USA: Tennessee, Knox County, Knoxville, University of Tennessee, in park lawn, 29. 7. 1996, leg. I. KRISAI-GREILHUBER & H. VOGLMAYR (WU 17104, holotype).

The macro- and microscopical descriptions given above only refer to the type collection from Tennessee and have been translated from HAUSKNECHT (2003). The type consists of six well-preserved fruitbodies.

Conocybe tetrasporoides is a member of sect. *Mixtae* and is close to *Conocybe ambigua* WATLING. It differs from the latter in 4-spored basidia, smaller spores, smaller fruitbodies with a lighter coloured, completely non-striate pileus.

tortipes (Fig. 26 e-h)

Agaricus tortipes MONT. 1856, Sylloge Crypt.: 119
Galera tortipes (MONT.) SACC. 1887, Sylloge Fungorun **5**: 867
Galerula tortipes (MONT.) MURRILL 1917, North American Flora **10**: 167
Conocybe tortipes (MONT.) WATLING 1981, Bibl. Mycologica **82**: 146

Original description:

Pileus submembranaceus vel carnosulus, convexo-campanulatus, helvolus, disco laevis, margine recto crenulato-fisso striatus, 3 ½ cm altus, 4 cm latus. Stipes procerus, subcartilagineus, fistulosus, fragilis, flexuosus, tortilis, striatus, 15 cm et quod excedit longus, 5 mm medio crassus, basi subincrassatus, pileo concolor, intus in exsiccato specimine fuscus. Lamellae tridymae, lineares, 2 mm vix latae, postice adnexae, antice attenuatae, tandem cinnamomeae, acie pallidae.

Obs. Figura 1 tabulae 1 Elenchi Fungorum Batschii hanc nostram in memoria revocact speciem. Vi coloris nonnullis forsan ad Bolbitium eam referendam censebunt, quam opinionem, repugnante defectu tramae inter strata hymenii, defendi non posse manifestum est. Insuper sporae Coprinorum desiderantur. Si autem sporis albis usa, Agarico collino affinis fuisset.

Microscopical characters:

Spores: 6.5-7.5 x 4-4.5 µm, mean 6.8 x 4.3 µm, Q = 1.6-1.7, ellipsoidal, not lentiform, thin-walled, without germ-pore, violet-beige-grey in KOH.

Basidia: 4-spored, ca 17 x 8 µm.

Clamp connections: not observed.

Cheilocystidia: clavate-vesicular, cylindrical-clavate, 20-47 x 6-12.5 µm.

Stipe covering: entirely collapsed, no conspicuous elements observed.

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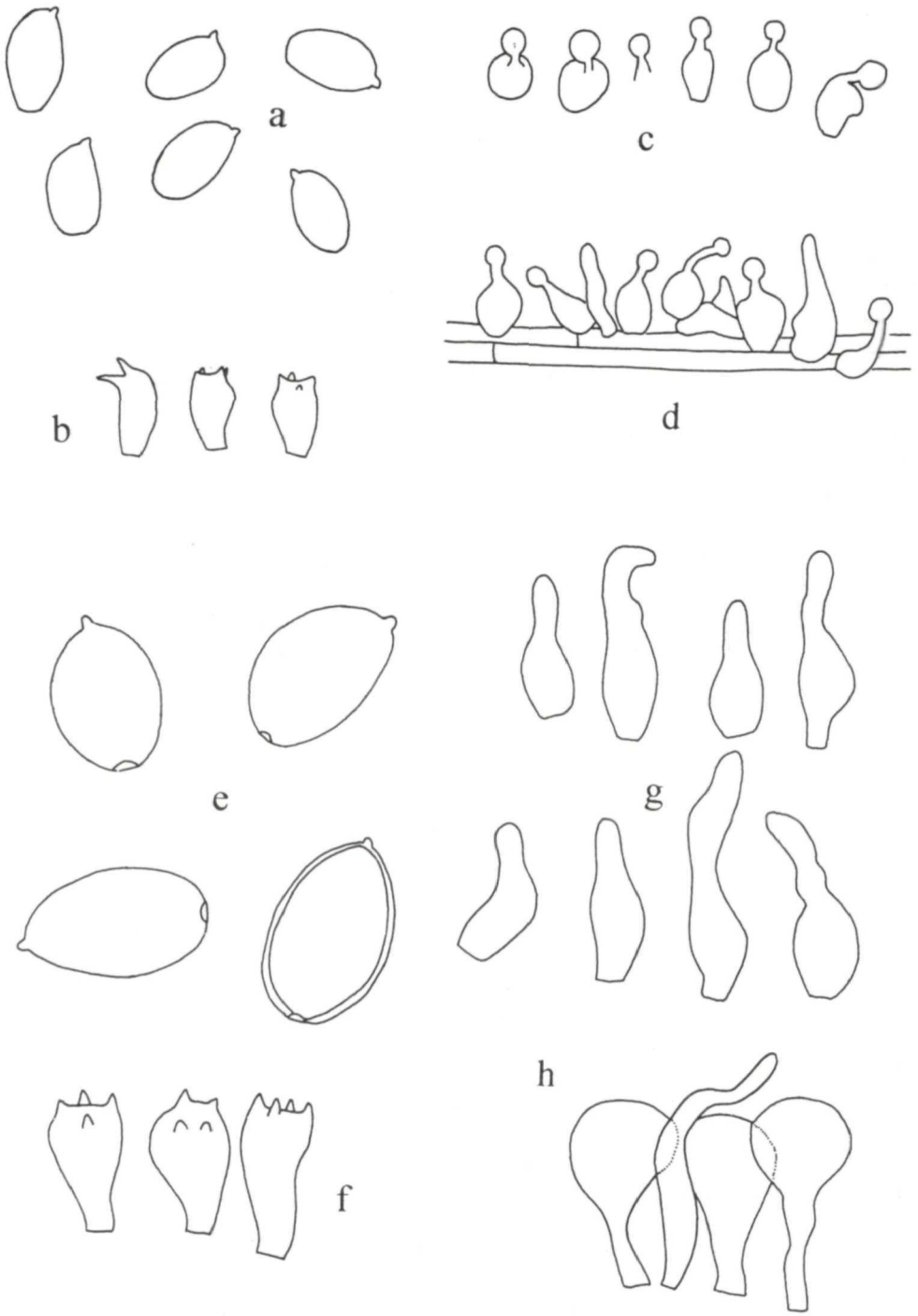


Fig. 27 *a-d. Conocybe tuxlaensis* (type). *a* Spores, *b* basidia, *c* cheilocystidia, *d* stipe covering. *e-h. Galera viscosa* (type). *e* Spores, *f* basidia, *g* cheilocystidia, *h* pileipellis.

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Pileipellis: structure not detectable; some roundish, strongly collapsed elements up to 45 x 40 µm observed, which could be parts of the velum or of the pileipellis.

Specimen examined: USA: Ohio, Columbus, leg. J. P. F. MONTAGNE 378 (PC, holotype).

The type consists of one large fruitbody in very poor condition, most elements collapsed and heavily molded.

Due to the spore colour in KOH and the shape of the cheilocystidia, *Agaricus tortipes* has to be excluded from *Bolbitiaceae*. Most likely it is a member of *Strophariaceae* or of the genus *Psathyrella*; but the rather stiff, contorted stipe militates against the latter. We therefore consider *Conocybe tortipes* as a dubious taxon.

tuxlaensis (Fig. 27 a-d)

***Conocybe tuxlaensis* SINGER 1989,** Fieldiana n. s. **21**: 105

Original description:

Pileo grisello-ochreo vel ochraceo-subgriseo, hygrophano, glabro, per medium radium pellucide striato et leniter sulculato, convexo, obtuso, 6 mm lato. Lamellis subferrugineo-ochraceo-brunneis, acie albis, latis, subliberis, subconfertis vel mediocriter distantibus. Stipite pallide brunneo, subglabro, subaequali, 11 x 0,5 mm. Carne tenui, inodora.

Microscopical characters:

Spores: 5-7.5 x 3.5-4 µm, mean 6.2 x 3.7 µm, ellipsoidal, thin-walled, with callus or very faintly visible germ-pore, light orange in KOH.

Basidia: 4(2)-spored, 15-20 x 7-8.5 µm.

Clamp connections: present.

Cheilocystidia: lecythiform, 15-20 x 5-9 µm, with slender neck and capitulum 3-4.5 µm in diam.

Stipe covering: consisting of a mixture of hairs, elongated-roundish and lecythiform elements, the latter being dominant (in the type ca 70 %). The capitate caulocystidia similar to those of *Conocybe subpallida* ENDERLE and measuring 15-35 x 4.5-8 µm, with capitulum 1.5-5 µm wide.

Pileipellis: hymeniform, consisting of roundish-stipitate elements; with lecythiform pileocystidia.

Specimen examined: Mexico: Veracruz, Estación Biológica de los Tuxlas, singular in tropical rain forest, 23. 6. 1969, leg. R. SINGER M 8185 (F, holotype).

The holotype consists of one singular, tiny fruitbody in good condition.

The results of our microscopical analyses are not fully congruent with those of SINGER (1989), especially the details on the spores deviate – see HAUSKNECHT (2002 b). Although the type specimen originate from a tropical rain forest, this species has been reported from Europe several times (HAUSKNECHT 2002 b). A microscopically

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similar species which may be confused with it is *Conocybe pilosella* (PERS.: FR.) KÜHNER with much larger fruitbodies and a completely different stipe covering.

viscosa (Fig. 27 e-h)

Galera viscosa CLEM.
Galerula viscosa (CLEM.) G. F. ATK. 1918, Proc. Amer. Phil. Soc. **57**: 368

Original description (label of the type specimen):

Galera viscosa CLEM., Cryptogamae Formationum Coloradensium, F. E. & E. S. CLEMENTS. 380. *Galera viscosa* n. sp., saprophilus copiosus ad fimum vaccinum udumque in piceto raro Picea-Pseudotsuga hylio. Cameron Glen 2800 m, 25. 8. 1906.

Microscopical characters:

Spores: 10.5-13.0 x 7-8 µm, mean 11.6 x 7.4 µm, Q = 1.4-1.6, ellipsoidal, not lentiform, with double wall and large germ-pore, bright yellow to orange-yellow in KOH.

Basidia: 4-spored, 21-26 x 10-13.5 µm.

Clamp connections: present.

Cheilocystidia: 22-45 x 9-11 µm, usually lageniform with long beak, which is sometimes slightly moniliform, rarely lageniform with ventricose base.

Pileipellis: hymeniform, consisting of roundish-stipitate elements, 33-40 x 18-22 µm, with numerous capilliform to slightly lageniform pileocystidia.

Specimen examined: USA: Colorado, Cameron Glen, 2800 m s. m., on cow dung, 25. 8. 1906, leg. F. E. & E. S. CLEMENTS (E, holotype).

The type specimen consists of three well-preserved fruitbodies which contain rests of dung at the stipe base.

Galerula viscosa has been published as part of distributed exsiccata, therefore the printed label represents the original description. Unfortunately it has not been possible for us to find out the date of distribution of the respective fascicle.

Already WATLING & GREGORY (1981) assume that *Galerula viscosa* is an older name for the European *Pholiotina coprophila* (KÜHNER) SINGER and should be combined into the genus *Pholiotina*. All microscopic features, the appearance of the well-preserved specimen and also the habitat perfectly agree with *Pholiotina coprophila*. As we have not yet been able to locate the printed herbarium schedae and the date of distribution, we refrain from a combination into *Pholiotina*.

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