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NOTULAE AD FLORAM AGARICINAM NEERLANDICAM – XXXIV
Further notes on Psilocybe

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A key to the species is given of *Psilocybe* subgenus *Stercophila* (Romagn.) Noordel., with a full description of *Psilocybe dorsipora*, new to the Netherlands, and the status of subgenus *Stercophila* is discussed. Within subgenus *Hypholoma* section *Psilocyboides* four new subsections are presented, viz. subsect. *Elongatae*, subsect. *Marginatae*, subsect. *Tuberosae*, and subsect. *Ericaeae*. A key is given to the species of subsect. *Elongatae*, with comments on the species and full descriptions of *Psilocybe olivaceotincta* Kauffm., new to Europe, and a still unnamed dark-coloured species. New combinations within subgen. *Stropharia* and *Melanotus* are given.

I. SUBGENUS STERCOPHILA

The species of subgenus *Stercophila* [Romagn. ex Noordel., Persoonia 16 (1995) 127] are characterized by the presence of a slimy veil, which forms a sticky-glutinous layer on the surface of pileus and stipe. Additional characters of this group are the very dark, large spores with a very distinct germ pore. The best known species of this group is *Psilocybe semiglobata* (Batsch: Fr.) Noordel., a widespread and locally common dung-inhabiting species. Traditionally, this species has been placed in the genus *Stropharia*, mainly because of the presence of an annulus and the occurrence of chrysocystidia on the sides of the lamellae. *Psilocybe luteonitens* (Fr.: Fr.) Park.-Rhodes which is very similar in morphology and ecology, has no chrysocystidia, and was therefore placed in the genus *Psilocybe* sensu stricto by some authors. However, Romagnesi (1936) considered both taxa very closely related because of the glutinous veil on pileus and stipe, and placed them together in the genus *Stercophila*. Singer (1986) made *Stercophila* Romagn. a section of *Stropharia*. Noordeloos (1995), uniting the genera *Stropharia*, *Hypholoma* and *Psilocybe* sensu stricto in one large genus *Psilocybe*, gave *Stercophila* the rank of subgenus. Recently Esteve-Raventós & Barassa (1995) described a new species in this group, viz. *Stropharia dorsipora*, characterized by spores with an eccentrically placed germ pore. During the revision of this group for the Flora agaricina neerlandica, several collections of this species were detected in the herbaria from the Netherlands, Switzerland and California, which are described below. According to personal observations and those of Dr. I. Kytövuori (University of Helsinki, Finland), more taxa of subgenus *Stercophila* can be expected to occur in Europe.

An interesting species in this respect is *Pholiota myosotis* (Fr.: Fr.) Sing. This species, in the rather isolated subgenus *Phaeonematoloma* Sing., has very similar glutinous veil on pileus and stipe, pleurocystidia as chrysocystidia, and also very large spores, which, however, are red-brown in mass, not as dark as in the species around *Psilocybe semiglobata*, and have only a small, inconspicuous germ pore. Also the habitat is different, as it grows as saprophytic or possibly necrotrophic among *Sphagnum* in peat-bogs.

There are several examples in the Strophariaceae, where species with thin- and thick-walled spores, with or without distinct germ pore appear to be closely related. Good examples are *Psilocybe* section *Psilocybe*, where species with thin-walled spores (*P. inquilinus*, *P. crobula*) are closely related to *P. montana* with dark, thick-walled spores (Noordeloos et al., in prep.). In *Psilocybe* subgenus *Hypholoma* section *Psilocyboides* thin-walled spores occur in the group of *Psilocybe elongatipes*, which obviously are related to *P. ericaeum* and *P. udum* with thick-walled spores. It is to be expected that future experimental research would prove that *Pholiota myosotis* is closely related to the *Stercophila* group in *Psilocybe.*

KEY TO THE EUROPEAN SPECIES OF PSILOCYBE SUBGENUS STERCOPHILA

1. Chrysocystidia absent; basidia 2-spored ..... *Psilocybe luteonitens*
1. Chrysocystidia present; basidia 4-spored.
   2. Pileus brown with olivaceous tinge; lamellae brown with olivaceous tinge; spore print red-brown; among *Sphagnum* and other mosses in moist places (*Pholiota myosotis*)
   2. Pileus yellow to ochre, often rather pale; lamellae blackish brown when mature; spore print purplish black; on dung or on strongly manured soil.
      3. Spores with central germ pore; cheilocystidia 40–100 × 5.0–15 µm, cylindrical-flexuous to narrowly lageniform or lecithiform ..... *Psilocybe semiglobata*
      3. Spores with distinctly eccentric germ pore; cheilocystidia 20–40 × 3.5–10 µm, clavate to lageniform with broad, rounded apex ..... *Psilocybe dorsipora*

Psilocybe dorsipora (Esteve-Rav. & Barassa) Noordel., *comb. nov.* — Fig. 1

Basionym: *Stropharia dorsipora* Esteve-Rav. & Barassa, Rev. Iberoamer. Micol. 12 (1995) 70.

Pileus 5–25 mm, hemispherical to convex or conico-convex, finally expanding to irregularly (plano-)convex, yellowish white, straw-yellow to ochraceous yellow, sometimes with olivaceous tinge, with paler margin, viscid, dull to slightly shining. Lamellae, L = 18–26, l = 3–7, distant, broadly adnate, often with decurrent tooth, ventricose, greenish-whitish when young, then sordid purplish-grey, sometimes with olivaceous tinge, spotted, with white, fimbriate edge. Stipe 10–90 × 2–3 mm, cylindrical, slender, often with an up to 6 mm wide, (sub-)bulbous base, very pale yellowish at apex, yellow-olivaceous to brownish yellow below, with narrow, membranaceous, sticky annulus, at apex pruinose, slightly grooved, below annulus finely floccose on viscid surface. Smell farinaceous, particularly when bruised. Taste farinaceous. Spore print colour deep purple to violaceous black.

Spores (11.5–)13–21.5 × 7.0–10(–10.5) µm, Q = (1.5–)1.7–2.4, av. Q = 1.7–2.0, ellipsoid in side-view, ovoid in frontal view, with relatively small, up to 3.0 µm wide, eccentric germ pore. Basidia 20–40 × 8.0–12.5 µm, 4-spored, clamped. Lamella edge sterile. Cheilocystidia 20–40 × 3.5–10 µm, clavate to lageniform with broad, rounded apex. Pleuro-chrysocystidia abundant, 20–50 × 4.0–11.0 µm, clavate-mucronate. Pileipellis an up to 200 µm thick ixocutis of narrow, cylindrical, 2.0–7.0 µm wide hyphae, embedded in a hyaline, gelatinous matrix. Pigment yellow, parietal and finely incrusting the hyphae of pileipellis. Stipitipellis an ixocutis of narrow, cylindrical hyphae. Caulocystidia abundant at apex of stipe, 20–50 × 3.0–9.0 µm, subcylindrical to lageniform with rounded apex, often mixed with caulo-chrysocystidia similar to pleurochrysocystidia. Clamp-connections present in all tissues.

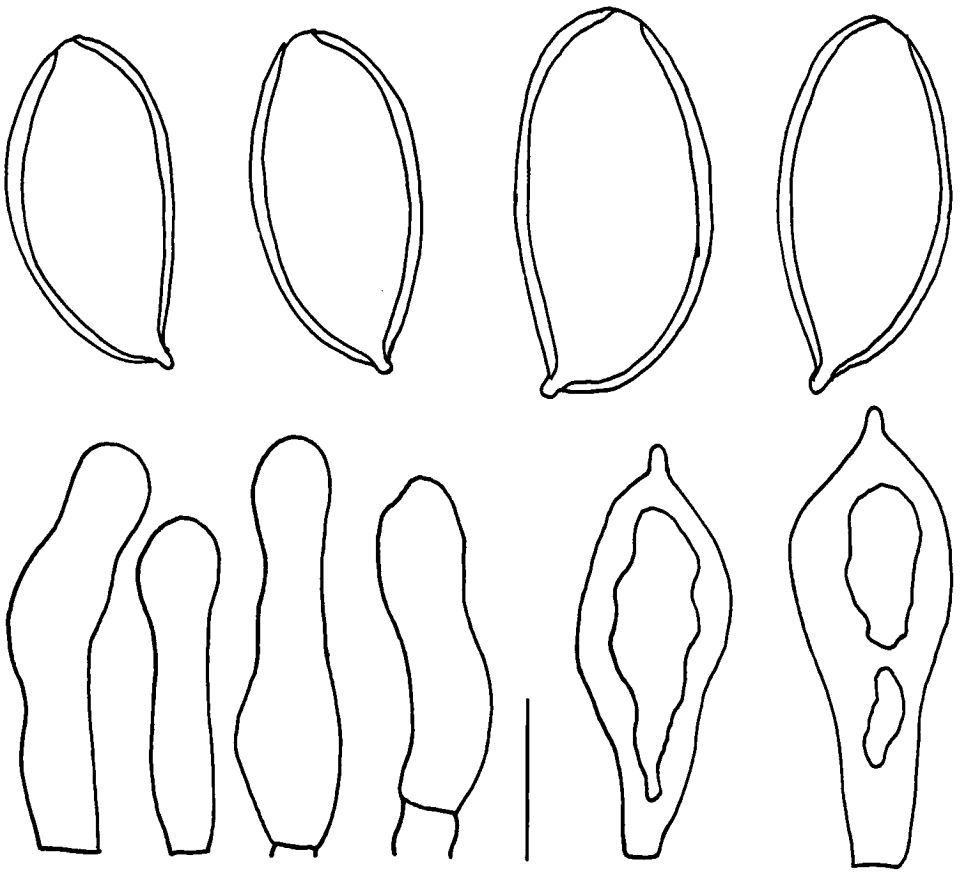

Fig. 1. *Psilocybe dorsipora*. Spores, cheilocystidia, and chrysocystidia (bar = 10 µm).

Habitat & distribution — Saprotrophic, gregarious on horse-dung in poorly manured grasslands and meadows. Rare, but widespread and probably overlooked. June–Nov. Widespread in Europe, but real distribution unknown. Also occurring in California.

Collections examined. NETHERLANDS: prov. Overijssel, Stokkum bij Markelo, northern bank Twentekanaal, 9-VI-1956, *C. Bas 1026* (L); Vorden, 5-VII-1959, *E. Kits v. Waveren* (L); prov. Noord-Holland, Den Helder, Van Ewijksluis, autumn 1972, *P. Polderman* (L); prov. Zuid-Holland, Katwijk aan Zee, 15-XI-1953, *R.A. Maas Geesteranus 9594* (L). — SWITZERLAND: Valais, Val d'Anniviers, 18-VII-1962, *J.Th. Koster 7101* (L). — USA: California, Lagunitas Creek, Marin County, 20-III-1939, *T.T. McCabe* (L).

Psilocybe dorsipora has recently been described from Spain (Esteve-Raventós & Barassa, 1995), based on only one collection. However, this taxon has been known already several years to Dr. I. Kytövuori (University of Helsinki) who showed the author maps with numerous localities from Fennoscandia during the Finnish-Estonian Mycological Meeting at Kevo, August 1995. Intrigued by this, the author studied collections labelled *P. semiglobata* in the Rijksherbarium and found some specimens of *P. dorsipora* from a wide geographical

range. *Psilocybe dorsipora* is very similar to *P. semiglobata* from which it mainly differs in the spores with a small, eccentric germ pore, and slightly smaller cheilocystidia with rounded to capitate apex. So far no clear macroscopic differences with *P. semiglobata* have been discovered, but some collections have a distinct farinaceous smell and taste, a feature that is unknown from *P. semiglobata*. Future morphological and experimental studies may hopefully throw more light on the specific delimitation.

II. SUBGENUS HYPHOLOMA SECTION PSILOCYBOIDES

Subgenus *Hypholoma* section *Psilocyboides* [(Sing.) Noordel., Persoonia 16 (1995) 127] is characterized by solitary basidiocarps or basidiocarps in small groups, on wood-chips or in vegetal debris, frequently also among mosses, often in peaty habitats.

KEY TO THE SUBSECTIONS

1. Basidiocarps growing on a lobate, brown sclerotium, 2–5 mm across on decayed wood or wood-chips ..... subsect. *Tuberosae*
1. Basidiocarps not growing from a sclerotium 2
   2. Spores pale, thin- or slightly thick-walled, with small, often indistinct germ pore; lamellae brown without or with very faint violaceous-purple tinge when mature, brown in exsiccate ..... subsect. *Elongatae*
   2. Spores dark, thick-walled, with distinct germ pore; lamellae dark violaceous-black when mature, also in exsiccates 3
      3. Veil present as white flocks adhering to margin of pileus and girdles and/or an annuliform zone on stipe ..... subsect. *Marginatae*
      3. Veil absent ..... subsect. *Ericaeae*

Psilocybe subsect. **Elongatae** Noordel., *subsect. nov.*

Sporae pallidae, tenuitunicatae vel leviter crassitunicatae, poro germinativo parvo; lamellae in statura maturitate haud vel leviter violaceo-tincto.

Holotypus: *Psilocybe elongata* (Pers.: Fr.) J. Lange.

Spores pale, thin- or slightly thick-walled, with small, often indistinct germ pore; lamellae brown without or with faint violaceous-purple tinge, brown in exsiccates.

Holotype species: *Psilocybe elongata* (Pers.: Fr.) J. Lange.

Psilocybe elongata can be recognized in the field by the yellow colour of the pileus and brownish lamellae, and microscopically by the relatively thin-walled spores with a small, often indistinct germ pore. *Psilocybe ericaoides*, which is similarly yellow-coloured, can easily be differentiated by the violaceous-grey tinges in the mature lamellae, caused by the thick-walled spores with distinct germ pore.

As noted by Singer (1986) the complex of *P. elongata* contains several very similar taxa, and is still in need of a revision. As a whole they can be distinguished from other species in sect. *Psilocyboides* by the lack of veil combined with relatively pale, thin-walled spores with small, often indistinct germ pore. Accordingly the mature lamellae are usually a shade of (grey-)brown, rarely with a slight violaceous-purple tinge. The group of *P. marginata*

(subsect. *Marginatae*) can be distinguished by the prominent veil, and thick-walled spores with distinct germ pore, and the species in subsect. *Ericaeae* have dark, thick-walled spores and grey-violaceous mature lamellae. *Psilocybe tuberosa* (Redh. & Kroeger) Walleyn is rather aberrant by its growth from sclerotia, and is therefore placed in its own subsection *Tuberosae*. Subsect. *Elongatae* contains several taxa, some of which occur both in Europe and in North America. Important diagnostic features to separate taxa are found in the size and shape of spores and cystidia and in the presence or absence of cheilochrysocystidia. Additional macroscopic features are mainly found in the presence or absence of yellow pigments in pileus and lamellae. Up to now about six taxa have been distinguished from Europe (Moser, 1983; Watling & Gregory, 1987), viz. *Psilocybe elongatipes*, *P. xanthocephalum*, *P. laeticolor*, *P. longisporum* and *P. politrichi*. In addition, Smith (1951) records some other related taxa from North America, viz.: *Hypholoma humidicola* (Murrill) A.H. Sm., and *Hypholoma olivaceotinctum* (Kauffm.) A.H. Sm.

While sorting out material for the Flora agaricina neerlandica it became evident that within subsection *Elongatae* also some dark coloured taxa could be found which were not known from Europe before. Both are characterized by having a dark pileus and lack of yellow tinges in the lamellae. One could be identified as *Psilocybe olivaceotincta* Kauffm., the other remains unnamed for the time being due to the poor state of the material.

KEY TO THE SPECIES IN SUBSECTION ELONGATAE IN EUROPE

1. Spores small, 7.0–9.0 × 4.0–5.5 µm; lamella edge yellow-green, with a mixture of chrysocystidia and leptocystidia ..... *Psilocybe polytrichi*
1. Spores larger, length ranging from 8.5–14(–14.5) µm; lamella edge not yellow-green, with or without chrysocystidia.
   2. Pileus moderately dark to dark brown with olivaceous tinges, at centre sometimes reddish brown.
      3. Cheilochrysocystidia abundant; spores (9.0–)10.0–14.0(–14.5) × 4.5–6.0(–6.5) µm; pileus very dark brown-olivaceous with paler margin ..... *Psilocybe spec.*
      3. Cheilochrysocystidia absent; spores 8.5–11.0(–11.5) × (4.5–)5.0–5.5(–6.0) µm; pileus moderately dark to dark brown-olivaceous with more brown to orange brown centre ..... *Psilocybe olivaceotincta*
   2. Pileus pale yellowish at margin, at centre reddish brown.
      4. Lamellae pale grey, without yellow tinges when young; cheilochrysocystidia absent; spores narrow, oblong, 5.5–6.5(–7.0) µm wide ..... *Psilocybe laeticolor*
      4. Lamellae with yellow tinges when young; cheilochrysocystidia present; spores slightly broader, (6.0–)6.5–8.0 µm wide.
         5. Spores amygdaliform in side-view ..... *Psilocybe xanthocephala*
         5. Spores ellipsoid-oblong in side-view ..... *Psilocybe elongata*

NOTES ON THE SPECIES

Psilocybe elongata (Pers.: Fr.) J. Lange, Dansk bot. Ark. 9 (11) (1936) 30.

This species widely occurs in the peaty areas of the temperate-boreal zones of Europe and North America.

Örstadius & Huhtinen (1996) claim that *Psilocybe gilletii* P. Karst. is a synonym of *P. elongata*. However, in the original description, the spore size is different (9.5–11 × 5.5–6.5 µm) and cheilochrysocystidia absent. This indicates that probably another taxon might be involved.

Hypholoma humidicola (Murrill) A.H. Sm. is very similar (Smith, 1951). It is said to differ in having longer pleurochrysocystidia and another habitat. Considering the rather large variability found in the size and shape of pleurochrysocystidia in European material the differences in size as indicated by Smith may appear insignificant. The difference in habitat (*Sphagnum*-bogs for *Psilocybe elongata*, among moss in coniferous forest for *Hypholoma humidicola*) may also be of minor importance. Several collections of *Psilocybe elongata* have been made in damp places in coniferous forest in the Netherlands, without *Sphagnum*.

Psilocybe laeticolor (F.H. Moeller) Noordel., Persoonia 16 (1995) 129.

This species is distinguished by the lack of yellow tinges in the lamellae and narrow spores. It has only been found a few times in the Netherlands, in mossy grasslands on peaty soil, but without *Sphagnum*. So far it has been recorded from the Faeröes, Scotland and the Netherlands. Moeller (1945) described also *Naematoloma subfusisporum* which is very similar, but differs in even narrower, fusiform spores. So far this taxon is only known from the type-locality.

Psilocybe xanthocephala (P. D. Orton) Noordel., Persoonia 16 (1995) 129 — Fig. 2

Hypholoma xanthocephalum P.D. Orton, Notes R. bot. Gdn Edinb. 41 (1984) 586.
Selected descriptions and figures. Watl. & Gregory, Br. Fung. Fl. 5 (1987) 18–19.

Pileus 10–30 mm, convex, expanding with age, sometimes umbonate, with deflexed then straight margin, hygrophanous, deeply translucently striate, saffron, pale yellow to ochraceous, sometimes with sienna tinge at centre, often with rather persistently darker olivaceous, lemon-yellow, or pale citrine-olivaceous margin when moist, pallescent on drying. Lamellae moderately crowded, adnate-emarginate, lemon-yellow, then with brown-olivaceous tinges, finally violaceous grey, with pruinose, white edge. Stipe 30–65 × 1–4 mm, cylindrical, yellow in upper part, reddish brown below, pruinose-floccose at apex, downwards silky-striate; at base white tomentose. Spore print dark fawn, purplish-date or brown-vinaceous.

Spores 9.0–11.5(–12) × 6.0–8.0 µm, Q = 1.4–1.6, av. Q = 1.5, ellipsoid-amygdaliform in side-view with only slightly thickened wall and small, indistinct germ pore. Basidia 4-spored. Lamella edge sterile. Cheilocystidia 30–45 × 5.0–8.0 µm, lageniform to utriform with 3.5–6.0 µm wide, obtuse neck; chrysocystidia along edge and on sides, 30–50 × 6.0–15 µm, clavate or lageniform, scattered to fairly abundant. Pileipellis a cutis of narrow cylindrical hyphae, 2.0–6.0 µm wide; subpellis made up of inflated elements, up to 15 µm wide with yellow, incrusting pigment. Caulocystidia scattered, 20–60 × 4.0–10 µm, subcylindrical to narrowly lageniform. Clamp-connections abundant.

Habitat & distribution — Saprotrophic, solitary or in small groups, originally described from bare clayey soil, also known from dense humus layer in *Juniperus* heath with *Molinia* and *Eriophorum*. Known from the southern parts of England and Germany.

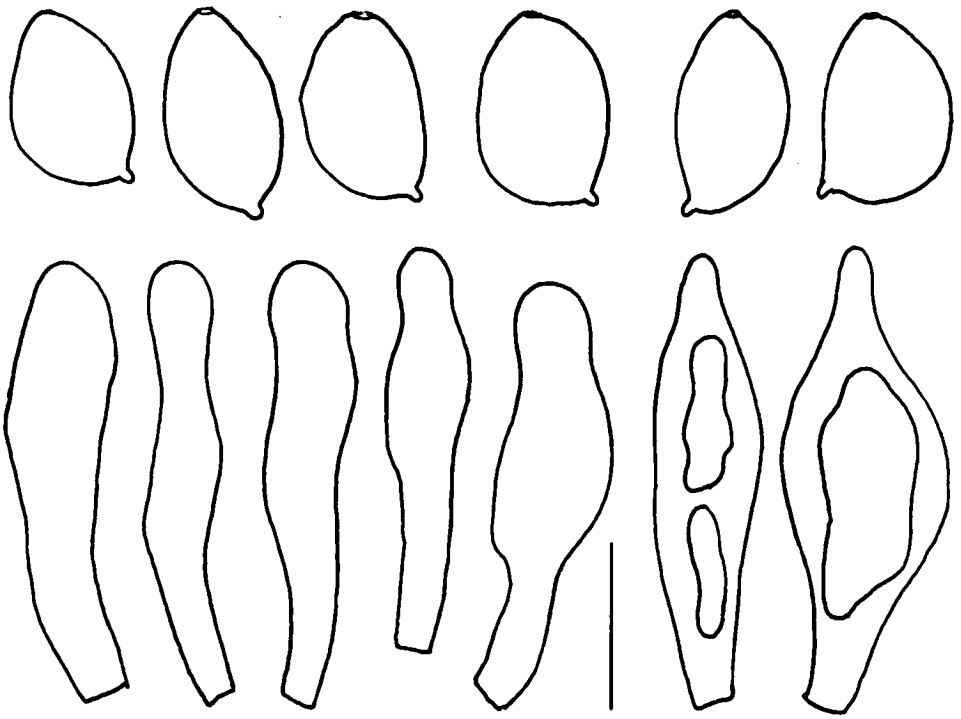

Fig. 2. *Psilocybe xanthocephala*. Spores, cheilocystidia, and chrysocystidia (bar = 10 µm).

This species is very similar to *Psilocybe elongata* differing mainly by the amygdaliform spores.

Psilocybe polytrichi (Fr.: Fr.) Pears. & Dennis, Trans. Br. mycol. Soc. 31 (1948) 184.

This species has the smallest spores in this group. It can be recognized in the field by its yellow-green lamella edge. It has been recorded from both Europe and North America.

Psilocybe olivaceotincta Kauffm., Pap. Mich. Acad. Sci. 5 (1926) 144 — Fig. 3

Hypholoma olivaceotinctum (Kauffm.) A.H. Sm., Mycologia 43 (1951) 488. — *Hypholoma intermedium* Arnolds, nom. prov. in Ecol. Coenol. Macrofungi Grassl. Heathl. Drenthe, Netherlands 2 (1983 '1982') 392.

Type-study of *Psilocybe olivaceotincta* Kauffm.
USA, Oregon, Clackamas, Mt Hood, 6 Oct. 1922, C. H. Kauffman (holotype, MICH).

One basidiocarp (part of the holotype) has been received for study. The following characters have been observed:

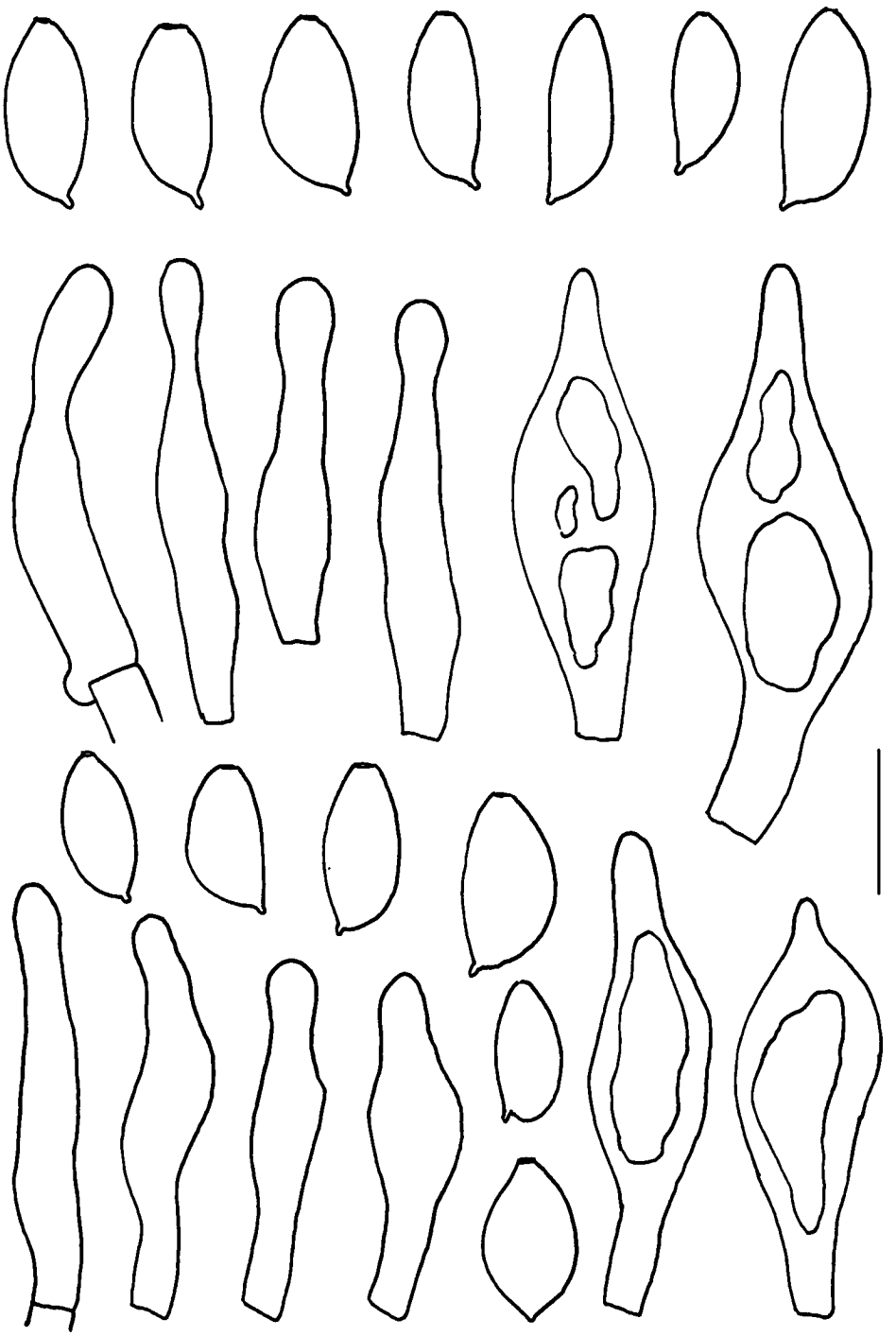

Fig. 3. *Psilocybe olivaceotincta*. Spores, cheilocystidia, and chrysocystidia (bar = 10 µm; upper figures from holotype, lower figures from *Sullock-Enzlin 96010*).

Spores 10.5–12×4.0–6.0 µm, av. 11.1 × 5.3 µm, Q = 1.9–2.3(–2.8), av. Q = 2.2, elongate to subcylindrical, often somewhat fusiform, occasionally with narrower conical apex, thin-walled, yellow-brown in ammonia, with small, hardly visible apical germ pore. Basidia 20–32 × 8.0–11 µm, 4-spored, clamped. Lamella edge sterile, consisting of leptocystidia and scattered chrysocystidia. Cheiloleptocystidia 28–40 × 5.5–9.0 µm, narrowly lageniform to utriform with 4.0–6.0 wide, rounded to subcapitate apex. Cheilo- and pleurochrysocystidia similar, 44–77 × 14–18 µm, clavate-mucronate or lageniform, with yellow-brown content. Pileipellis a cutis of 2.0–4.0 µm wide hyphae, subpellis well-differentiated, compact, made up of globose elements, up to 22 µm wide. Clamp-connections abundant.

Description of the Netherlands' collections:

Pileus 12–18 mm, convex then plano-convex with flattened centre, sometimes with small umbo, with deflexed margin, hygrophanous, when moist moderately dark to dark brown-olivaceous (K. & W. 4D4; Mu. 10 YR 4/3–4) with more brown to orange brown centre (5D7; 7.5 YR 5/6–4/4), paler towards margin, translucently striate up to 3/4 of radius, strongly pallescent on drying to greyish-ochre, slightly greasy to touch when moist. Lamellae, L = 18–20, l = 3–7, moderately distant, narrowly adnate, ventricose, up to 3 mm wide, pale grey then brownish grey, finally violaceous-grey, with white, strongly contrasting, floccose edge. Stipe 30–60 × 1–2 mm, cylindrical, sometimes curved towards base, pale ochre-cream at very apex, pale brown to reddish brown below, pruinose at apex, subglabrous, innately fibrillose below. Veil absent. Context concolorous with surface. Smell indistinct or somewhat unpleasant, dusty. Taste indistinct. Spore print purplish grey.

Spores 8.5–11.0(–11.5) × (4.5–)5.0–5.5(–6.0) µm, Q = 1.5–2.0, av. Q = 1.7–1.8, ellipsoid-oblong, sometimes slightly amygdaliform in side view, with rather thin, pale brown to violet-brown walls in water, with small, apical germ pore. Basidia 13–25 × 6.0–8.0 µm, 4-, rarely 2-spored, clamped. Lamella edge sterile, without chrysocystidia. Cheiloleptocystidia 20–40 × 7.0–15 µm, lageniform to utriform, often with rather brown basal part and moderately long to long, blunt to capitate neck, thin-walled. Pleurochrysocystidia rare to abundant, 20–53 × 5.0–16 µm, clavate-mucronate to lageniform with 4.0–8.0 µm wide, blunt to subcapitate neck, thin-walled, with yellowish content in KOH. Pileipellis a narrow cutis or ixocutis of cylindrical, 1.0–4.0 µm wide hyphae; subpellis well-differentiated, compact, made up of strongly inflated, globose or irregularly shaped elements, 10–30 (–40) × 7.0–17(–20) µm with yellow-brown intracellular pigment and minutely incrusted walls. Stipitipellis a cutis of narrow, cylindrical, minutely incrusted, 2.0–7.0 wide hyphae. Caulocystidia abundant at apex of stipe, subcylindrical to lageniform, 15–35 × 4.0–13 µm, thin-walled, colourless. Clamp-connections abundant in all tissues.

Habitat & distribution — Saprotrophic, single or in small groups, on decaying grasses in short grassland moist sandy soil (Cynosuro-Lolietum) and in moist place on dead fragments of *Phragmites australis*. Very rare, only known from two localities in the north of the Netherlands.

Collections examined. NETHERLANDS: prov. Groningen, Winsum, Potmaer, 25-V-1996, *R.A.F. Sullock-Enzlin 96010* (L); prov. Drenthe, Beilen, 20-X-1975, *E.J.M. Arnolds 3461* (WBS).

Psilocybe olivaceotincta clearly belongs to the complex of *P. elongata* on account of the relatively thin-walled, medium-sized spores, but differs from that species by the relatively dark colour of the pileus and lack of yellow tinges in the lamellae, narrow spores, and lack

of cheilochrysocystidia. Our collections fit rather well with the description given by Smith (1951), but more material and study of North American collections is needed to get a better impression of the variability of the various taxa within this species complex. *Psilocybe laeticolor* and *Hypholoma humidicola* (Murrill) A.H. Sm. are also very similar, but differ by paler basidiocarps.

Psilocybe spec. — Fig. 4

Pileus 20 mm broad, conico-convex with straight margin, hygrophanous, when moist translucently striate at margin, very dark olivaceous-brown with paler, yellowish-olivaceous marginal zone, strongly pallescent to pale alutaceous when dry, not viscid, smooth, glabrous. Lamellae, L = 28, l = 1, moderately distant, narrowly adnate almost free, ventricose, up to 4 mm broad, olivaceous-yellow (2.5 Y 4/4), with entire, concolorous edge. Stipe 30 × 2 mm, cylindrical, straight, narrowly fistulose, olivaceous-yellow (2.5 Y 4/4) with slightly paler apex and slightly darker base, smooth, dull.

Spores (9.0–)10.0–14.0(–14.5) × 4.5–6.0(–6.5) µm, in average 12.3 × 6.0 µm, Q = 1.9–2.1, av. Q = 2.0, ellipsoid to amygdaliform in side-view with relatively pallid, thin wall, with small, distinct germ pore. Basidia 2- and 4-spored, clamped. Lamella edge sterile, consisting of chrysocystidia and leptocystidia. Leptocheilocystidia, 22–30 × 7.0–15 µm, utriform to lageniform with long, blunt or subcapitate neck. Cheilo- and pleurochrysocystidia abundant, 30–70 × 5.0–14 µm, clavate-mucronate, often with brown, thickened wall and dark yellow brown inclusions. Pileipellis a narrow cutis of cylindrical hyphae, 3–10 µm wide, subpellis well-differentiated, made up of inflated, up to 20 µm wide elements. Clamp-connections present in all tissues.

Habitat & distribution — Solitary in grazed dune meadow with *Salix repens* on acid sand. Only found once.

Collection examined. NETHERLANDS: prov. Friesland, Vlieland, Lange Paal, 22 Oct. 1994, *N. Dam* (L).

The present collection is microscopically very similar to *Psilocybe elongata*, with respect to the abundant cheilochrysocystidia, and size and shape of the spores. However, macroscopically the dark colour of the fruit-body is very aberrant. So far no description in literature has been found that fits with the present collection. The material is too poor, however, to give a formal description as a new species.

Psilocybe subsect. **Ericaeae** Noordel., *subsect. nov.*

Sporae obscure violaceo-brunneae, crassitunicatae poro germinativo distincto; lamellae in statura maturitate violaceo-tincto, in exsiccatae sordide brunneae.

Holotypus: *Psilocybe ericaea* (Pers.: Fr.) Quél.

Spores thick-walled with distinct, often rather large germ pore; lamellae dark brown with violaceous grey to greyish olivaceous tinge when mature, dark chocolate or grey-brown in exsiccates.

Holotype: *Psilocybe ericaea* (Pers.: Fr.) Quél.

European species: *Psilocybe ericaea, P. ericaeoides, P. subericaea, P. uda.*

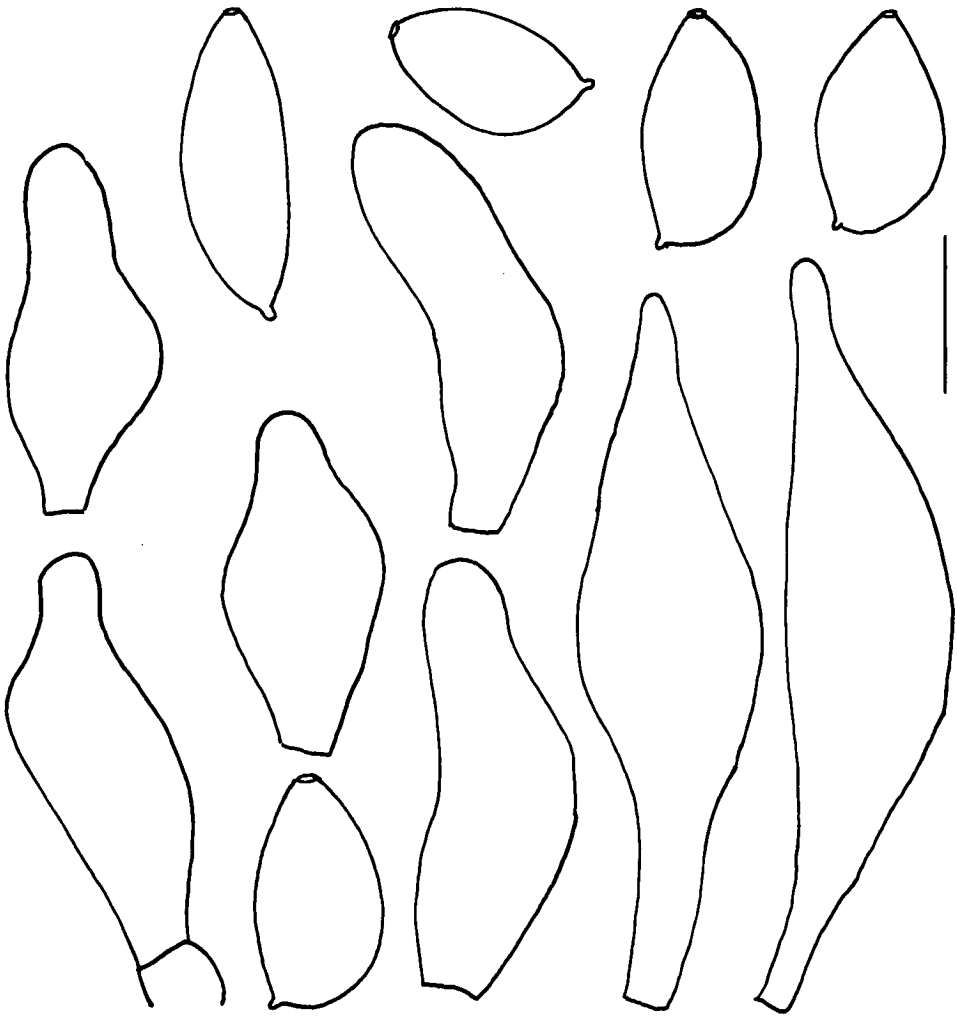

Fig. 4. *Psilocybe* spec. Spores, cheilocystidia, and chrysocystidia (bar = 10 µm).

Psilocybe subsect. **Marginatae** Noordel., *subsect. nov.*

Basidiomata cum velo copioso; sporae ad 10 µm longae, crassitunicatae, poro germinativo distinctae. Holotypus: *Psilocybe marginata* (Pers.: Fr.) Noordel.

Veil well-developed, visible as appendiculate patches along the pileal margin and annuliform zone to small annulus on stipe; on wood; spores smaller than 10 µm, thick-walled, with distinct germ pore.

Holotype: *Psilocybe marginata* (Pers.: Fr.) Noordel.

Only one species in Europe.

III. NEW COMBINATIONS

1. Subgenus **Stropharia**

Some authors distinguish *Psilocybe pseudocyanea* and *P. ochrocyanea* as two different species (Bon, 1972), Glowinski & Gumbinger (1982), Orton (1976). However, the differences given are difficult to use. Environmental factors, such as height of the vegetation, and exposure to sunlight seem to have great effect on the macromorphology of the basidiocarps. Jahnke (1984) demonstrated that strains of both taxa have a DNA homology close to 100%, which supports the contention that only one genetic taxon is involved. For that reason both taxa are distinguished here as forms of one, variable species:

Psilocybe pseudocyanea forma **ochrocyanea** (Bon) Noordel., *comb. & stat. nov.*

Basionym: *Stropharia ochrocyanea* M. Bon, Doc. mycol. 3 (1) (1972) 28.

2. Subgenus **Melanotus** (Pat.) Noordel., *comb. nov.*

Basionym: *Melanotus* Pat., Essai taxon. (1900) 175.

While preparing the manuscript for *Psilocybe* subgenus *Melanotus* for the Flora agaricina neerlandica vol. 4, it appeared to be necessary to make the following new combination:

Psilocybe phillipsii forma **megaspora** (Mos.) Vellinga, *comb. nov.*

Basionym: *Melanotus phillipsii* forma *megaspora* Mos., Fung. rar. Ic. col. 7 (1978) 28.

The range of the spore length of *Psilocybe phillipsii* f. *phillipsii* covers 5.5–7.0 (–7.5) µm, while forma *megaspora* has spores 7.0–9.0 µm long. The latter is much rarer than the typical forma.

IV. NEW TAXA IN SECTION PSILOCYBE

Extensive studies in section *Psilocybe*, combining morphology with genetic and molecular characteristics have been performed by S.J. Verduin as a PhD student under supervision of the present author. The results of this study have been incorporated in the flora, and will also be published extensively in a future paper [Noordeloos, et al., Persoonia 17 (in prep.)]. Since some new taxa will be presented in volume 4 of the Flora agaricina neerlandica, the Latin diagnoses are given here.

Psilocybe montana var. **macrospora**, Noordel. & Verduin, *var. nov.*

A varietate typica differt spores magis grandis, 8.5–11(–11.5) × 6.0–8.5 × 5.0–7.0 µm.
Holotypus: *Arnolds 6677*, 5-X-1995; 'the Netherlands, Beilen, Holthe, Schepping' (L).

Psilocybe subviscida var. **velata** Noordel. & Verduin, *var. nov.*

A varietate typica pileo velo appendiculato ornato vel sporis crassitunicatis differt.
Holotypus: S. Verduin & M.E Noordeloos, 28-VII-1996, United Kingdom, Scotland, Perthshire, Dunked, Trochry, Borelick Farm (V 136, L).

Psilocybe micropora Noordel. & Verduin, *spec. nov.*

Pileus 5–16 mm latus, conico-convexu demum expansus margine deflexus, hygrophanus, margine striatus, fulvus, siccus cum velo appendiculato vel fibrilloso-arachnoideo; lamellae, L = 20–26, l = 5–7, moderate distantes, late adnatae vel leviter decurrentes, fuligineae; stipes 10–25 × 1–2 mm, cylindriceus, flexuosus, flavobrunneus versus basim obsucioir; fibrillosus.

Sporae 5.5–7.5(–8.0) × 4.5–6.0 × 4.0–5.5 µm, ovoideae vel mitriformae, tenuitunicatae, cum poro germinativo obscuro. Basidia 15–24 × 6.0–9.0 µm, tetrasporigera, fibulata; aceis lamellarum sterilis; cheilocystidia 17.5 × 23 × 4.5–6.0 µm, lageniformia, tenuitunicata. Pileipellis cutis hyphis cylindraceis constituis; fibulae abundantes. Habitat in pratis inter muscos (*Rhytidiadelphus squarrosus, R. squarrosus*, et *Brachythecium rutabulum*).

Holotypus: *'M.E. Noordeloos 9710* (*Verduin 236*), 30-VI-1997, the Netherlands, Wassenaar, Estate Zuidwijck'(L).

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