

A NEW BLUING SPECIES OF *PSILOCYBE* FROM EUROPE

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(With 10 Text-figures)

A probably hallucinogenic new species, *Psilocybe liniformans*, is described. It is compared with *P. fimetaria*, *P. cyanescens*, *P. serbica*, *P. mairei*, *P. callosa*, and *P. semilanceata*.

Among the European species of *Psilocybe* only a few show bluish discolorations and are considered hallucinogenic, viz. *P. cyanescens* Wakef., *P. semilanceata* var. *caerulescens* (Cooke) Sacc. (= *P. cookei* Sing.), *P. serbica* Moser & Horak, and *P. fimetaria* (P. D. Orton) Watling.

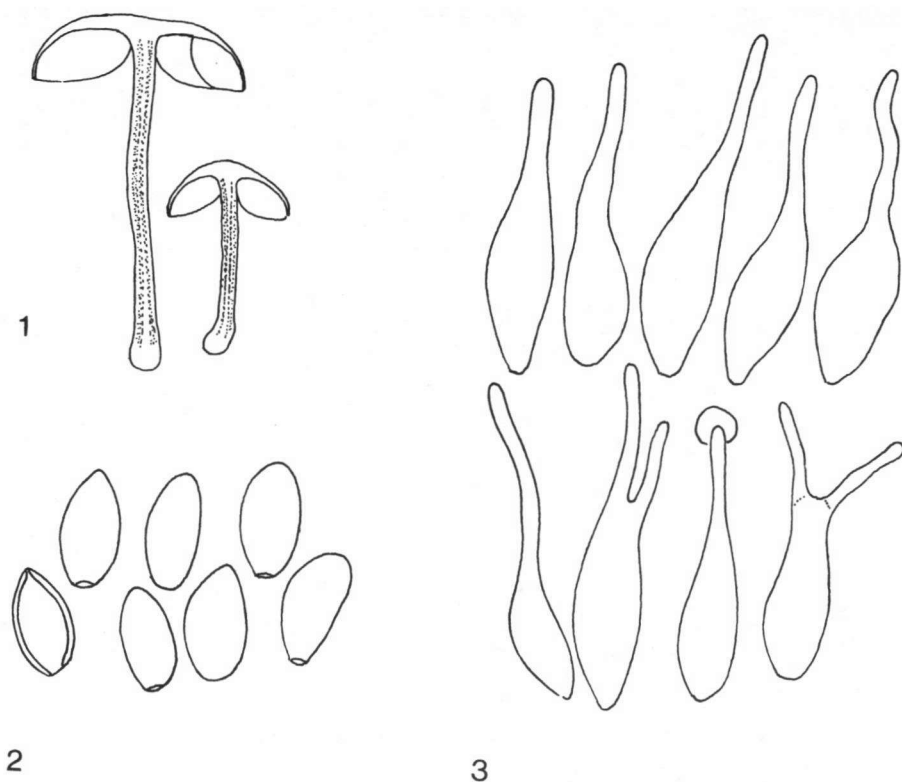
Recently *P. cyanescens* has been reported from the Netherlands (Tjallingii, 1976), a record checked by the present authors. On studying, however, another gathering of a bluing *Psilocybe* collected in the Netherlands, they found the latter to represent an apparently as yet unknown species, which is described below.

The present paper is to be considered a precursor of a world monograph on *Psilocybe* in preparation by the senior author. He expresses his thanks to the Guggenheim Memorial Foundation for the grant enabling him to do this monographic work. Thanks are also due to Mr. D. M. Dring, Drs. H. S. C. Huijsman, Dr. M. Moser, Dr. E. Horak, Dr. R. Singer and Dr. R. Watling for making herbarium specimens available for comparison.

Psilocybe liniformans Guzmán & Bas, *spec. nov.*—Figs. 1-10

Pileus 10-25 mm latus, convexus, interdum subumbonatus, sordide ochraceo-brunneus, leviter olivaceo-tinctus, levis, hygrophanus, viscidus, avelatus. Lamellae adnexae, obscure argillaceae vel purpureo-brunneae, margine pallida, elastica. Stipes 14-30 × 1-2 mm, albidus vel pallide brunneus, basi caerulescens. Sporae (12-)13-14.5(-16.5) × 7.5-10 μm, ellipsoideae vel leviter inaequilaterales, luteo-brunneae. Pleurocystidia nulla. Cheilocystidia 22-33 × 5.5-9 μm, copiosa, lageniformia, longicollia, hyalina. Subhymenium subhyalinum, pigmento flavo-brunneo intercellulari irregulariter disposito. Epicutis gelatinosa. Fimicola. Typus: 'C. Bas 5512, 10 Nov. 1970, Netherlands, Haamstede' (L; isotypus ENCB).

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Figs. 1-3. *Psilocybe liniformans*. — 1. Fruit-bodies, $\times 1$. — 2. Spores, $\times 1000$. — 3. Cheilocystidia, $\times 1330$ (Fig. 1. del. Bas. Figs. 2-3. del. Guzmán).

Pileus 10-25 mm in diam., convex to nearly plane, not papillate, sometimes slightly umbonate, hygrophanous, dull greyish ochraceous brown with slight olivaceous tinge (about Munsell* 10 YR 5/4 to 5/6), more reddish brown at centre (± 7.5 YR 7/4), drying ochraceous buff (2.5 Y 7/6) with more brownish buff centre (± 10 YR 5/8) and slightly greyish olivaceous buff margin (2.5 Y 6/4), in young specimens with a slightly bluish olivaceous tinge at margin, smooth, viscid, with separable pellicle, without any velar remnants. Lamellae adnexed, rather distant, broad, ventricose, fairly dark clay colour when young (between 10 YR 4/4 and 3/4) to purple brown (between 5 YR 3/2 and 3/3) with age; pallid, thickish edges detachable by a needle as an elastic thread. Stipe 14-30 \times 1-2 mm, cylindrical but with up to 4 mm broad subbulbous base, hollow, whitish to very pale brownish with pale apex, with greenish blue tinge at base, finally greyish-greenish blue up to apex, pruinose-granulose above, concolorously fibrillose below. Context glassy, dull brown, later pallid in stem, with amber brown layer under surface of pileus and nearly

* Munsell soil color charts. Munsell Color Company. Baltimore.

white core in stipe. Smell peculiar, strongly aromatic with foetid component when crushed. Taste weak, not unpleasant. Spore print not available.

Spores (12-)13-14.5(-16.5) \times 7.5-10 μ m, ellipsoid in face view, slightly inequilateral in side view, smooth, with thick wall yellowish brown in KOH and with distinct apical germ pore. Basidia 20-35 \times 6-10 μ m, 4-spored, hyaline in KOH, ventricose-subcylindrical, often with slight median constriction. Pleurocystidia absent. Cheilocystidia 22-33 \times 5.5-9 μ m, abundant, combined with underlying gelatinized hyphae to form a sterile, detachable, elastic thread, hyaline in KOH, lageniform, with more than 6 μ m long and 1.5-2.5 μ m wide neck, often forked, sometimes with hyaline, apical oil drop dissolvable in KOH. Subhymenium subhyaline, with yellow-brown pigment (observed in KOH) irregularly scattered among cells. Trama of lamellae regular, hyaline to brownish in KOH, made up of hyphae with elongate cells, without incrusting pigment. Epicutis gelatinized, consisting of embedded, parallel, thin, 1.5-3.3 μ m wide, hyaline hyphae. Hypoderm formed by hyphae with hyaline, up to 15 μ m wide elongate cells. Clamp-connections present.

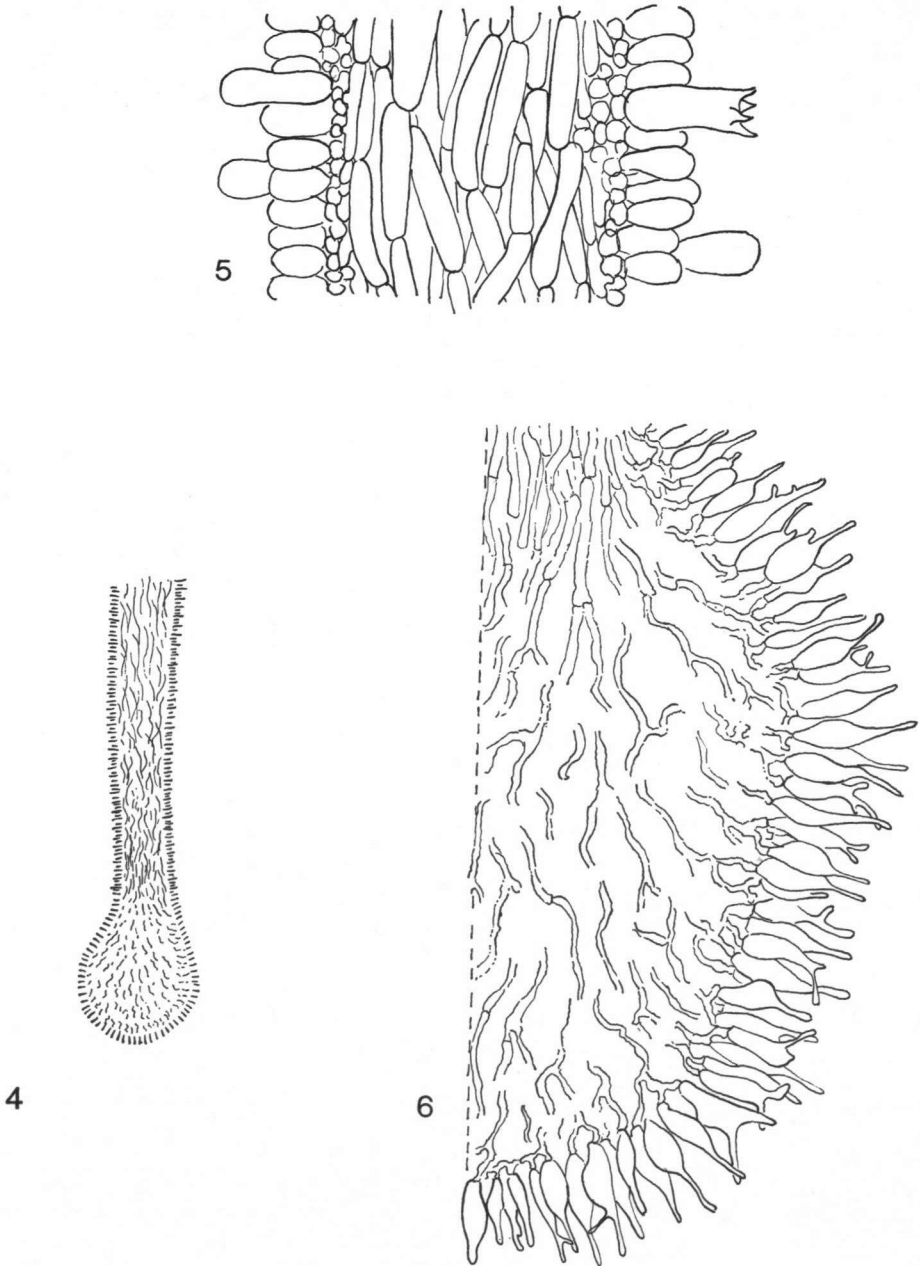
HABITAT & DISTRIBUTION.—Gregarious on horse dung on poor meadow in coastal dunes. Known only from type locality.

MATERIAL EXAMINED.—Netherlands, prov. Zeeland, Island of Schouwen, Haamstede, Duinhoeve, 10 Nov. 1970, *C. Bas 5512* (Type, L; Isotype, ENCB).

The species here described is close to *Psilocybe fimetaria* (P. D. Orton) Watling collected on horse dung also but with a well developed veil forming white fibrillose scales on and at the margin of the cap and a cortinate ring-zone on the stem, spores measuring 11-14(-15.5) \times 6.5-8.5(-9.5) μ m, and a non-gelatinized edge of the gill (see Orton, 1964: 59; type examined by senior author).

Psilocybe liniformans is also closely related to both *P. cyanescens* Wakef. and *P. serbica* Moser & Horak, but differs from the former in the shape of the cheilocystidia, and from the latter in the size of the spores. In fact, *P. cyanescens* has subfusiform-sublageniform cheilocystidia with necks not longer than 6 μ m (Fig. 8). *Psilocybe serbica* has long-necked cheilocystidia arising from hyphae running parallel to the edge of the gill, as the senior author observed in the type (Fig. 7); this last feature is not mentioned in the original description (Moser & Horak, 1968: 140). The spores of *P. serbica* measure (9-)10-11(-13) \times 5.5-6.5(-7.5) μ m.

Psilocybe liniformans is also related to *P. mairei* Sing. (= *Hypholoma cyanescens* Maire, *Geophila cyanescens* (Maire) Kühn & Romagn.), known only from North Africa, a species which according to Malençon & Bertault (1970: 334) has spores measuring 11-12(-13.5) \times 5.5-6.2 μ m, and lageniform cheilocystidia measuring 30-40 \times 6-8 μ m. Also *P. callosa* (Fr. ex Fr.) Quél. and *P. semilanceata* (Fr.) Kumm. have some relationship with *P. liniformans*. They have cheilocystidia and spores similar in shape to those of the latter species but the size of these cells is different. *Psilocybe callosa* has spores measuring (9.5-)10-12(-14.5) \times (6.5-)7-8.5 μ m, and cheilocystidia measuring 20-45 \times 4-7 μ m (Fig. 6) as the senior author observed in Huijsman's specimens at L (see Huijsman, 1961: 91). *Psilocybe semilanceata* has (11-)12-14(-15.5) \times 7-8 μ m large spores, and 28-35 \times 5-7 μ m large cheilocystidia (Fig. 10) as the senior author observed in Horak 63-41 at ZT (see Horak, 1968: 525). Moreover, both these species have a subumbonate or papillate pileus.



Figs. 4-6. *Psilocybe limiformans*, cross-sections of gill. — 4. Schematic, $\times 12.5$. — 5. About 1 mm from edge, $\times 500$. — 6. Edge of gill, $\times 500$ (All Figs. del. Bas).

Psilocybe semilanceata var. *caerulescens* Cooke, raised by Singer (1973: 84) to specific rank under the name *P. cookei* Sing., probably is identical with the type variety of *P. semilanceata*. The senior author arrived at this opinion after studying several collections of *P. semilanceata* from Europe and North America, and the junior author agrees on the strength of many observations in the field. *Psilocybe semilanceata* has the base of the stem sometimes strongly, sometimes weakly, and sometimes not bluing at all.

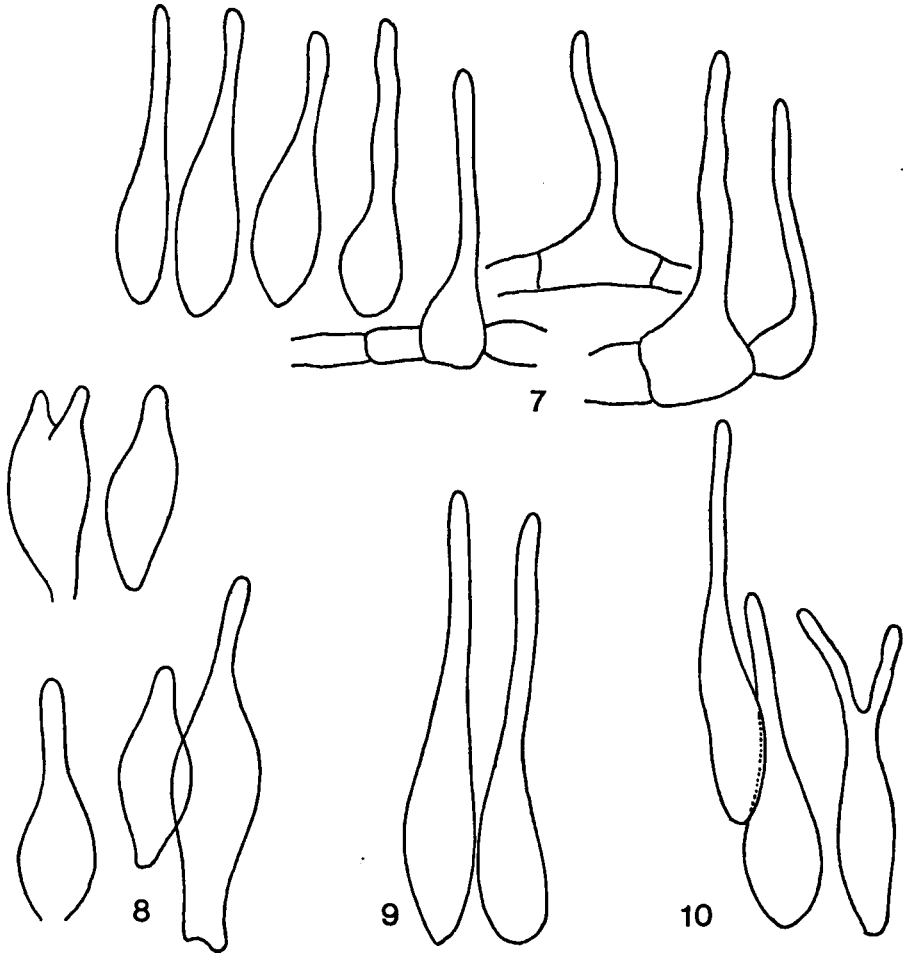


Fig. 7. *Psilocybe serbica*, cheilocystidia, $\times 1330$ (from type).

Fig. 8. *Psilocybe cyanescens*, cheilocystidia, $\times 1330$ (from *Tjallingii 4 Nov. 1975*, L).

Fig. 9. *Psilocybe callosa*, cheilocystidia, $\times 1330$ (from *Huijsman 28 Sept. 1960*, L).

Fig. 10. *Psilocybe semilanceata*, cheilocystidia, $\times 1330$ (from *Horak 63-41*, ZT).

(All Figs. del. Guzmán.).

This variation pattern may be observed in a single lot of fruitbodies apparently growing on one and the same mycelium. Rarely there is also a slight bluish tinge visible on the margin of the cap of fresh specimens. In some populations of Mexican species of *Psilocybe* as *P. mexicana* Heim and *P. jugensis* Sing. & Smith a similar variation is present.

Because of the strong relationships with hallucinogenic *Psilocybe* species it is very probable that also *P. liniformans* contains psilocybine.

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