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ADDITIONS TO COPRINUS SUBSECTION LANATULI

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Two new *Coprinus* taxa in subsection *Lanatuli*, *C. candidolanatus* and *C. lagopus* var. *vacillans*, are described with an updated key to the subsection.

In 1988 an unknown *Coprinus* species was found in the Netherlands, seemingly belonging to the subsection *Lanatuli* on account of the hairy veil, microscopically composed of chains of sausage-shaped elements. However, clusters of diverticulate elements were also found in the veil, a feature that makes the taxon intermediate between the subsections *Lanatuli* Sing. and *Alachuani* Sing. This anomaly in conjunction with the fact that only a small, single collection was in our possession led us to omit the species from a recent *Coprinus* study of the subsection *Lanatuli* (Uljé & Noordeloos, 1999). Recently a large number of basidiocarps similar to those of our initial find has been collected in Italy so we now describe the new species.

A second *Coprinus* taxon, frail and 'shaky on its legs' even in the young stage, has been known to the first author for a long time, although young specimens were so difficult to find that a good collection has only been made recently. This undescribed but rather common taxon, growing in lawns and having a very supple stipe, is here considered a new variety of *C. lagopus*.

An updated key to the species of subsection *Lanatuli* is included.

Coprinus candidolanatus Doveri & Uljé, *spec. nov.* — Fig. 1

Pileus primo ovoideus usque ellipsoideus, 3–6 × 2–4 mm, demum applanatus vel etiam revolutus, 6–12 mm latus, velo albo niveo, fibrilloso-lanato, in media parte denso, in parte extrema in suberectas fibrillas dehiscente omnino obductus. Cuticula in primordiis albidula, postea cinerascens in medio pileo castanea, radialiter fissurata. Lamellae ascendentes, densae, breves, ex albo nigricantes, cum albidiore margine. Stipes 20–60 × 0.8–1.2 mm, cylindratus, filiformis, alboniveus, fibrillosus, haud bulbosus, ad basim angustior at haud radicans. Odor nullus.

Sporae 7.3–10.7 × 4.8–7.2 µm, in adverso visu ellipsoideae vel ovoideae, perraro subcylindratae, a latere subapplanatae, laeves, fuscobadiae, cum poro germinativo medio, 1.3–1.5 µm lato. Basidia 18–34 × 7–10 µm, tetraspora, trimorpha, a 4–5 pseudoparaphysibus cincta. Cheilocystidia 22–70 × 17–30 µm, (sub)globosa, ovoidea, ellipsoidea, oblonga vel (sub)utriformia. Pleurocystidia 40–90 × 18–30 µm, ellipsoidea, ovoidea, oblonga, (sub)utriformia vel subcylindrata. Pileipellis cylindratis, ellipsoideis vel subglobosis, 10–60 × 10–25 µm, parallelis hyphis instructa. Velum ex duplici specie se ostendens, et contextis, subtilibus, incrustantibus, haud diverticulatis, 25–150 × 15–45 µm, cylindratis vel ellipsoideis vel etiam subglobosis hyphis, et parvioribus, 2–10 µm latis, haud contextis, subtilibus, valde curtis atque diverticulatis, cylindratis vel etiam (sub)globosis hyphis compositum. Fibulae absentes. Ex fimo cervino atque ovino crescens.

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Holotypus: 'Italy, Ferrara, Mesola wood, on deer dung in culture, 13 Apr. 1999, *A. Bizzi & G. Zecchin* (L)'.

Etymology: candidus, white and lanatus, woolly, referring to the white and woolly veil.

Pileus 3–6 × 2–4 mm when still closed, 6–12 mm when expanded, ovoid to ellipsoid, turning applanate at maturity or even revolute at deliquescence; cuticle whitish in early stages, later on greyish with pale ochre to brown disc, slightly grooved up to the centre, fully covered with a fibrous-woolly, snow-white veil, which appears crowded at the disc but at the periphery splits up in separate fibrils, which are slightly upturned at their ends. Lamellae, L = 14–22, l = 0–3, ascending, free, narrow, rather crowded, white in the early stages, later on blackening, with a pale edge. Stipe 20–60 × 0.8–1.2 mm, cylindrical-filiform, often wavy, neither tapering towards the apex nor bulbous, slightly narrowed near the base but without a true pseudorhiza, snow-white, at first covered with many veil fibrils, later on smooth. Context inconspicuous, devoid of particular smell and taste.

Spores [120, 4, 2] 7.3–10.7 × 4.8–7.2 µm; Q = 1.25–1.75; av. Q = 1.45–1.55; av. L = 8.7–9.6 µm, av. B = 5.8–6.5 µm, ellipsoid or ovoid, exceptionally subcylindrical in frontal view, sometimes slightly flattened at one side in side view, rounded at the base and apex, smooth, dark reddish brown in water, with central, 1.3–1.5 µm wide germ pore. Basidia 18–34 × 7–10 µm, 4-spored, trimorphous: 1) claviform, 2) spheropedunculate, and 3) subcylindrical with a distinct median narrowing (the longest ones). Each basidium surrounded by (3–)4–5(–6) pseudoparaphyses. Pleurocystidia 40–90 × 18–30 µm, ellipsoid, ovoid, oblong, (sub)utriform or subcylindrical, with a short basal peduncle. Cheilocystidia 22–70 × 17–30 µm, abundant, (sub)globose, ovoid, ellipsoid, oblong or (sub)utriform, with a short basal peduncle. Pileipellis a cutis, made up of cylindrical, ellipsoid or subglobose, parallel, 10–60 long and 10–25 µm wide elements. Veil made up of two kinds of hyphoid elements: the former arranged in hardly separable chains of cylindrical, ellipsoid or even subglobose elements, mainly thin-walled and hyaline, sometimes slightly thick-walled (walls up to 0.5 µm thick), in part rather strong yellowish encrusted, 25–150(–250) × 15–45 (–60) µm, not diverticulate, very rarely branched, with subglobose, ellipsoid, subcylindrical or fusoid terminal elements; the latter kind of veil made up of much narrower, 2–10(–15) µm wide elements, not arranged in chains, easily separable from each other, thin-walled, densely diverticulate, with up to 10 µm long, finger-like diverticula. Some to many of such elements very short and (sub)globose. Veil on the stipe made up especially of these diverticulate hyphae (diverticula up to 17 µm long, sometimes branched), but often also with remnants of '*Lanatuli*'-veil. Clamp-connections absent.

Habitat & distribution — On pure dung of deer and sheep, solitary or subfasciculate. Very rare. Only known from one locality in Italy and one in the Netherlands.

Collections examined. ITALY: Ferrara, Mesola wood, at least one hundred gregarious or crowded or even fasciculate specimens on fallow deer (*Dama dama*) dung in culture, 13 Apr. 1999, *A. Bizzi & G. Zecchin*, holotype (L), isotype (herb. MCVE no. 794). — THE NETHERLANDS: prov. Limburg, Bemelen, Bemelerberg, 3 Aug. 1988, *E.C. Vellinga* (coll. *Uljé 949*, L).

The two kinds of veil elements, the small basidiocarps, the habitat on dung, the rather broad spores with an average quotient of 1.45–1.55 and the absence of clamp-connections are the main characters to recognize *C. candidolanatus*. *Coprinus pseudoradiatus* Kühn. & Joss. ex Watling and *C. cinereus* (Schaeff.: Fr.) S.F. Gray are the other two coprophilous

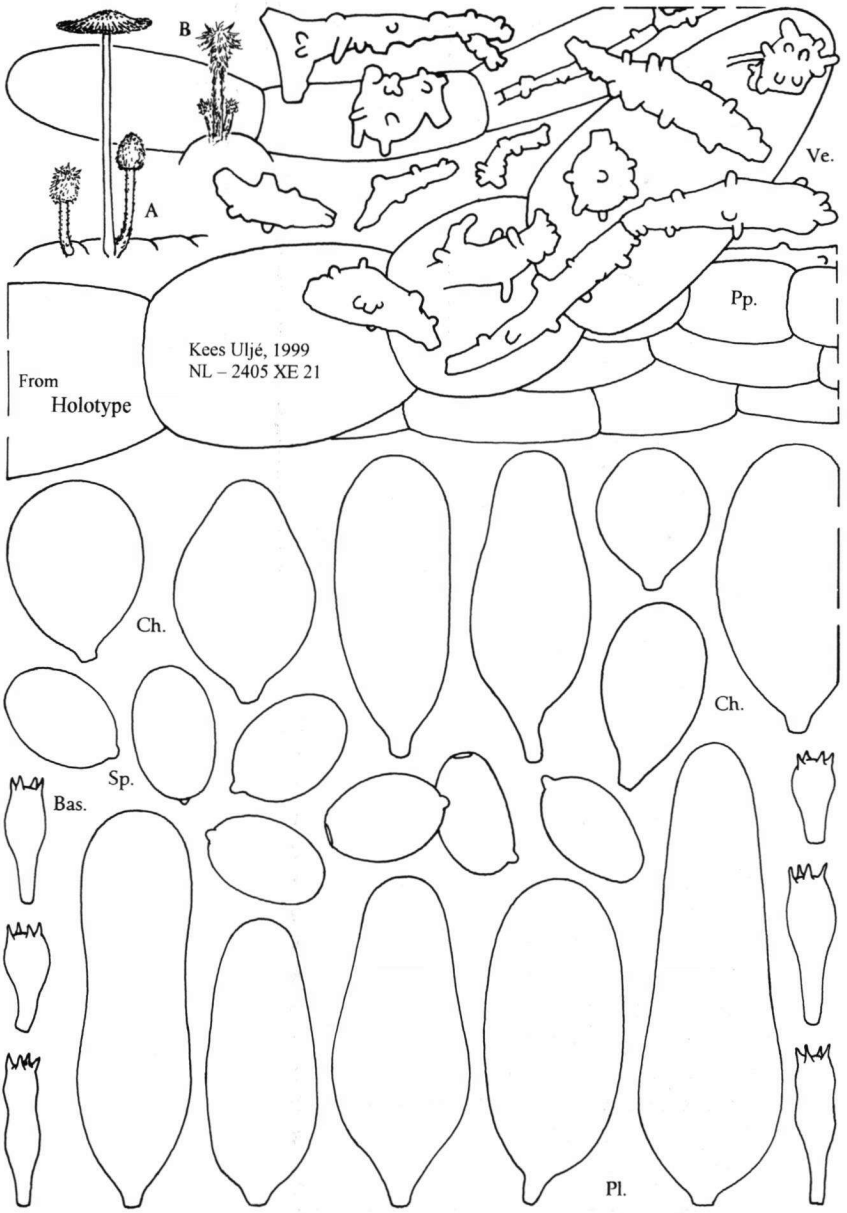

Fig. 1. *Coprinus candidolanatus.* All figures from holotype.

species with up to c. 11 µm long spores, but the former has narrower spores with an average quotient >1.6, while the latter possesses larger basidiocarps. Moreover, both these species, in contrast to our own, are provided with clamp-connections and only one kind of veil, that is to say with chains of sausage-shaped, non-diverticulate, elements.

Coprinus lagopus var. **vacillans** Uljé, *var. nov.* — Fig. 2, Plate 9

Pileus primo usque ad 18 × 8 mm, post expansionem usque ad 32 mm latus, albidulus at celeriter cinereus et in media parte sufflavus vel pallide ochraceus. Velum album, fibrillosum-floccosum, in suberectas fibrillas dehiscens, sicut pileus celeriter evanescens. Lamellae densae, ex albo nigricantes. Stipes 60–150 × 1–3 albus, primo ex fibrilloso-floccoso velo dense tectus, cavus, fragillimus, vacillans atque celeriter proclivis; stipitis basis clavata, usque ad 4 mm lata.

Sporae 9.6–13.8 × 6.3–8.3 µm, ellipsoideae vel ovoideae, interdum oblongae, satis vel aliquando valde fuscobadiae, cum poro germinativo medio, circiter 2 µm lato. Basidia 21–37 × 8–11 µm, tetraspora, a 3–6 pseudoparaphysibus cincta. Pleurocystidia 50–100 × 25–45 µm, (sub)utriformia, oblonga, ellipsoidea vel subcylindrata. Cheilocystidia 40–95 × 22–40 µm, (sub)utriformia, oblonga, ellipsoidea vel (sub)globosa. Pileipellis oblongis, saepe brevibus hyphis instructa. Velum contextis hyphis, 25–125 × 8–40 µm, compositum. Stipitis cortex 130–240 µm crassus. Fibulae adsunt. In secatis herbidis solitarius vel aliquando gregarius crescens.

Holotypus: 'Alphen aan den Rijn, Zegersloot-Zuid, 12 June 1999, *C.B. Uljé 1286* (L)'.

Etymology: vacillans, swinging to and fro.

Pileus up to 18 × 8 mm when still closed, up to 32 mm when expanded, first whitish, soon grey with cream or pale ochre centre below a pure white, hairy-floccose veil that splits up in hairy flocks and, as well as the pileus, very soon disappears. Lamellae, L = c. 35–45, l = 0–3, crowded, free, at first white, soon grey to black. Stipe 60–150 × 1–3 mm, pure white, at first densely covered with bristly, hairy-floccose veil, hollow, very fragile and soon laying down; base up to 4 mm wide, clavate.

Spores [180, 9, 4] 9.6–13.8 × 6.3–8.3 µm; Q = 1.35–2.05, av. Q = 1.55–1.80; av. L = 10.7–12.5 µm, av. B = 6.7–7.9 µm, ellipsoid or ovoid, less frequently oblong, medium-brown, sometimes very dark red-brown, with rounded base and apex, and c. 2 µm wide, central germ pore. Basidia 21–37 × 8–11 µm, 4-spored, surrounded by 3–6 pseudoparaphyses. Pleurocystidia 50–100 × 25–45 µm, (sub)utriform, oblong, ellipsoid or subcylindrical. Cheilocystidia 40–95 × 22–40 µm, (sub)utriform, oblong, ellipsoid or subglobose. Pileipellis a cutis, made up of elongate, often short elements. Veil made up of 25–125 × 8–40 µm, hyphoid elements in chains. Wall of the stipe 130–240 µm thick. Clamp-connections present, c. 3–4 µm in diameter.

Habitat & distribution — Rather common in short-mown lawns, solitary, seldom a few together. Known only from Alphen aan den Rijn (the Netherlands), from several lawns.

Collections examined. THE NETHERLANDS: prov. Zuid-Holland, Alphen aan den Rijn, Zegersloot-Zuid, 7 June 1988, *C.B. Uljé 1280*; ibidem, 8 Sept. 1995, *C.B. Uljé*; ibidem, 10 June 1999, *C.B. Uljé*; ibidem, 12 June 1999, *C.B. Uljé 1286* (holotype, L); Zoetermeer, van Tuylpark, 10 Aug. 1999, *C.B. Uljé*.

The very fragile basidiocarps, the habitat, the usually somewhat less slender spores (often slightly wider than broader) than in *C. lagopus* var. *lagopus* Fr.: Fr., and the thin wall of the stipe are the main characters by which to recognize *C. lagopus* var. *vacillans*. It is difficult to collect young basidiocarps in the field by reason of the very rapid developing and wilting of the pileus. Although the pure (silvery) white stipe is very fragile, it does not disappear as quickly as the pileus and stipes can be found, often in great number, lying on the ground with a black, snotty remnant of the pileus at their extremities. The stipe bends down as soon as it starts to grow, even while the pileus is still closed. Microscopically the wall of the stipe is often thinner than 200 µm, though sometimes reaching 240 µm, whereas in *C. lagopus* var. *lagopus* it usually lies between 200 and 450 µm. Nonetheless, most microscopical features are rather similar to *C. lagopus* so we prefer at the moment to describe it as a new variety rather than to erect a new species.

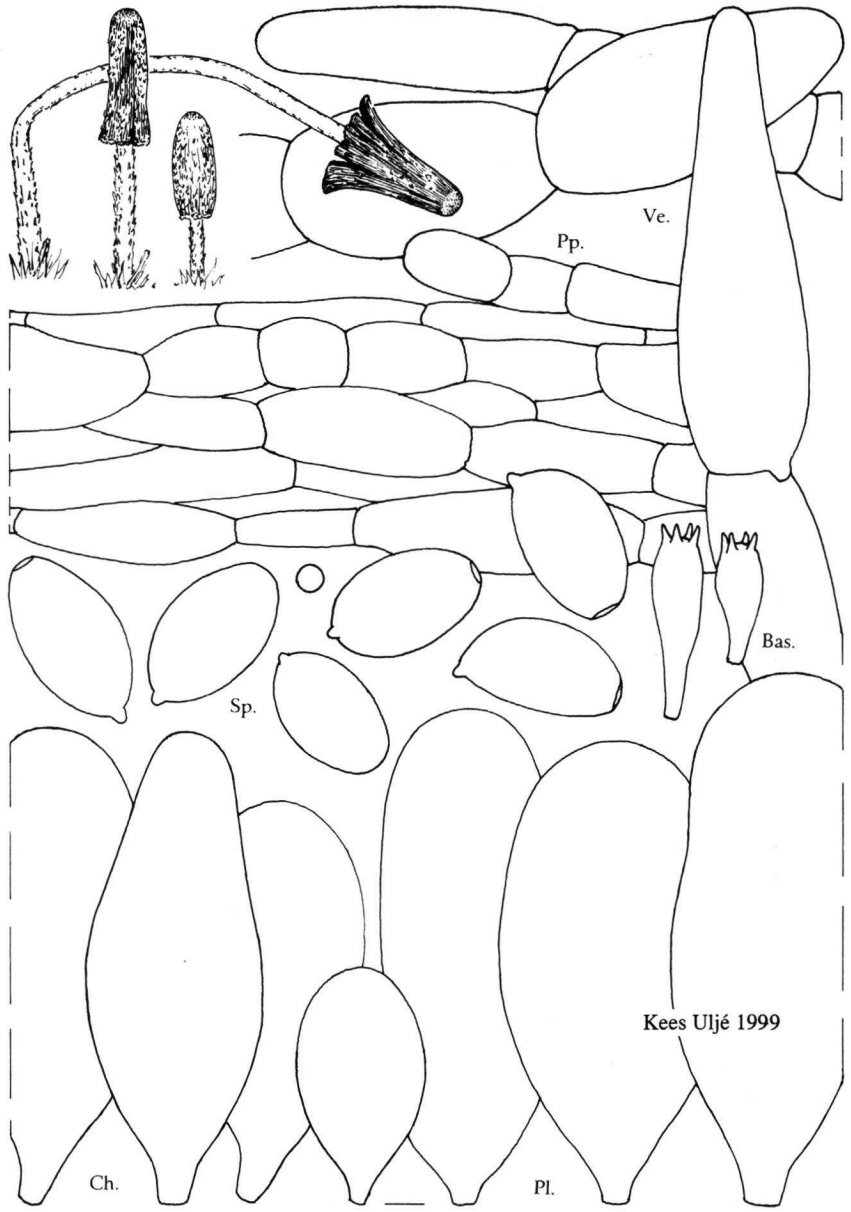

Fig. 2. *Coprinus lagopus* var. *vacillans*. All figures from holotype.

REVISED KEY TO THE SPECIES OF SUBSECTION LANATULI

(For nomenclature and full descriptions see Uljé & Noordeloos, 1999)

1. Spores with rounded-conical nodules ..... *C. calosporus*
1. Spores smooth.
   2. Basidia 2-spored.
      3. On dung; veil with some ellipsoid or subglobose elements; average spore breadth < 7.8 µm ..... *C. bicornis*
      3. On compost or saw-dust; veil without ellipsoid or subglobose elements; average spore breadth > 7.8 µm ..... *C. scobicola*
   2. Basidia 4-spored.
      4. Growing on or near *Ammophila arenaria* in yellow outer dunes .... *C. ammophilae*
      4. Habitat otherwise.
         5. Veil of centre of pileus thick-walled, wall up to 1 µm thick ..... *C. pachydermus*
         5. Veil of centre of pileus thin-walled, wall < 0.5 µm thick.
            6. Veil cream, ochre, yellow, orange or orange-red.
               7. Pileus with beautiful rust-coloured or orange-red veil, visible at least at base of stipe, soon slimy ..... *C. erythrocephalus*
               7. Veil cream, yellowish or ochre, not slimy.
                  8. Veil cream or pale ochre; spores very broadly fusiform, av. Q < 1.5; on wood, often in wounds of trees; terminal elements of veil up to c. 40 µm wide, not yellowish encrusted ..... *C. spelaiophilus*
                  8. Veil distinctly yellowish or ochre; spores ellipsoid to ovoid, av. Q > 1.5; on clayey soil, mud or wood-chips; terminal elements of veil up to c. 20(–25) µm wide, strongly yellowish encrusted .. *C. ochraceolanatus*
            6. Veil white, silvery grey or grey.
               9. Average spore length < 9.2 µm.
                  10. Average spore breadth > 5.8 µm.
                     11. Medium species; spores with av. Q < 1.3; not on dung; veil with elements of one kind: sausage-shaped in chains ..... *C. jonesii*
                     11. Small species; spores with av. Q > 1.3; on dung; veil with two kinds of elements: sausage-shaped and diverticulate *C. candidolanatus*
                  10. Average spore breadth < 5.8 µm.
                     12. On dung or mixed dung; spores with av. Q > 1.6; spores ellipsoid, tending to cylindrical ..... *C. pseudoradiatus*
                     12. On wood-chips, soil mixed with pieces of wood or vegetable refuse; spores with av. Q < 1.6; spores ellipsoid, tending to rhomboid ..... *C. geesterani*
               9. Average spore length > 9.2 µm.
                  13. Average spore length < 10.8 µm.
                     14. Veil whitish or greyish, hairy-floccose; spores ovoid or ellipsoid; on dung, mixed dung or compost-heaps.
                        15. Veil with one kind of elements, sausage-shaped in chains; pileus up to 30 mm when expanded; number of lamellae > 35; spores 8.4–11.8 × 5.8–7.8 µm ..... *C. cinereus*

15. Veil with two kinds of elements; pileus up to 12 mm when expanded; number of lamellae < 30; spores 7.3–10.7 × 4.8–7.2 µm ..... *C. candidolanatus*

14. Veil whitish, cream or pale ochre, in small flocks; spores very broadly fusiform; in wounds of often living trees or on stumps *C. spelaiophilus*

13. Average spore length > 10.8 µm.

16. Average spore breadth > 8.2 µm ..... *C. macrocephalus*

16. Average spore breadth < 8.2 µm.

17. On dung or dung mixed with straw or hay; average spore breadth > 7.8 µm; spores ellipsoid, tending to cylindrica *C. radiatus*

17. On soil, often mixed with rotten pieces of wood, wood-chips, compost-heaps or vegetable refuse; average spore breadth < 7.8 µm; spores ellipsoid.

18. Veil on pileus thin, cobwebby, looking silky; average spore breadth < 6.7 µm ..... *C. krieglsteineri*

18. Veil on pileus abundant, hairy fibrillose; average spore breadth > 6.7 µm.

19. Stipe very fragile, bending down before pileus expands; exclusively in lawns; stipe wall < 250 µm thick ..... *C. lagopus* var. *vacillans*

19. Stipe rather firm, upright; usually on wood-chips and vegetable refuse; less frequent in lawns; stipe wall up to 450 µm thick ..... *C. lagopus* var. *lagopus*

REFERENCE

Uljé, C.B. & M.E. Noordeloos. 1999. Studies in Coprinus V – Coprinus section Coprinus. Revision of subsection Lanatuli Sing. Persoonia 17: 165–199.