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Coprinus doverii sp. nov., a unique new species of subsection *Setulosi* from central and southern Europe

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Abstract – A new species of *Coprinus*, *Coprinus doverii*, is described based on material collected in Hungary and Italy. This new species is a very peculiar member of subsection *Setulosi* because of the mitriform spores with two large nodules at each side. The taxonomic position of the new species and possible relationships with other members of the genus *Coprinus* sensu lato are discussed.

Key words—*Agaricales*, *Coprinaceae*, taxonomy

Introduction

Species of the genus *Coprinus* are rather well investigated in northern and western Europe due to the extensive work of Kees Uljé. In eastern and southern Europe, however, no extensive revisions were carried out. Other genera of *Agaricales* often show a good number of species that are geographically restricted to mediterranean or continental regions of Europe. There is, indeed, considerable unknown diversity, especially in species of subsection *Setulosi*, of the genus *Coprinus* sensu lato (Nagy 2005, unpubl.). In this paper we present a peculiar new species found twice in Hungary and once in Italy.

Materials and methods

The macroscopical description was made on fresh material growing on dung samples that were incubated in a moist chamber. Drawings of microscopic details were made based on microphotographs of dried material rehydrated in 10% NH_4OH; spore measurements are based at least on 20 samples from each collection. A notation like (20,2,1) after the word „spores" refers to the number of spores measured, the number of fruitbodies and the number of collections from which the spores were taken, respectively. Q_1 means the quotient of length divided by the breadth in face view, while Q_2 means the breadth in lateral view

being the denominator. Herbarium acronyms follow Holmgren & al. (1998). In this paper we follow a traditional concept of the genus *Coprinus* and not the one proposed by Redhead & al. (2001), because we feel it is premature to adopt at the moment and because unpublished phylogenetic results of the author fail to support that subdivision of coprinoid homobasidiomycetes in the family *Psathyrellaceae*. Collections have been deposited in the personal herbarium of the author, Francesco Doveri, L and BP.

Taxonomic description

Coprinus doverii L. Nagy sp. nov.

MycoBank # MB510304 **Figure 1.**

Pileus primo late ellipsoideus vel obtuse conicus, usque ad 1.5 x 2 mm, deinde hemisphaericus vel campanulatus, demum applanatus, usque ad 5 (7) mm diam., in primordiis olivaceo-fuscus, deinde concolor at ad marginem pallidior, demum ochraceus, oleagino suffusus, radialiter striatus, deinde fissuratus, brevipilosus. Lamellae stipitem non attinentes, densae, valde ventricosae, usque ad 0.3 mm altae, ex albo nigricantes. Stipes 0.2-0.6 x 10-25 mm, procerus, omnino pilosus, immutabiliter albidus. Sporae (20,2,1) 7-8.3 x 5-5.7 x 3.8-4.1 µm, in adverso visu mitriformes ad subhexangulae, rotunde quadrinodosae, superne angustiores, aliquando ad apicem rotundatae, a latere cylindratae ad subamygdaliformes, fuscobadiae, valde excentrico, 1.7-2 µm lato, poro germinativo praeditae. Basidia tetraspora, bimorpha, 17-25 x 6-7 µm. Cheilocystidia valde dispersa, plus minusve globosa, 10-14 µm diam. Pleurocystidia absentia. Pileocystidia 35-65 x 6-13 µm, lageniformia, rare incrustata, ad acutum apicem contracto, vel perraro cylindrato collo praedita. Caulocystidia pileocystidiis similia, in forma magis mutabilia, ad basim latioria, usque ad 16 µm diam. Sclerocystidia absentia. Velum in pileo oculis non subiectum, ex 11-25 µm latis, globosis, saepe refringentibus crystallis conspersis partibus compositum. Pileipellis in hymenidermae modum. Fibulae praesentes.

Holotype: HUNGARY, near Kecskemét: Nyír, on deer dung in xerothermous *Convallario-Quercetum roboris* association (both found in the field and incubated in moist chambers), approx 50 fruitbodies, 10.9.2006., leg.: L. Nagy & Zs. Gorliczai, herb.: BP.

Etymology: named after Francesco Doveri, who collected this fungus in Italy and made several important conrtibutions on various coprophilous fungi.

Description

Pileus up to 1.5 x 2 mm when still closed, mainly broadly elliptical to obtusely conical, becoming hemispherical to campanulate, flattened when fully mature, up to 5 (7) mm diam., dark olive-brown in primordial stages, with brown olive-brown centre and pale ochraceous margin later, uniformly dark ochraceous with faint olive tint when old; surface strongly translucently striate when young, becoming radially sulcate, shortly pilose. **Veil** macroscopically not observable, see below under microscopical features. **Lamellae** free, crowded, strongly ventricose, up to 0,3 mm broad, at first white, then blackish. **Stipe** 0.2–0.6 x 10–25 mm, slender, whitish also when old, pilose all over.

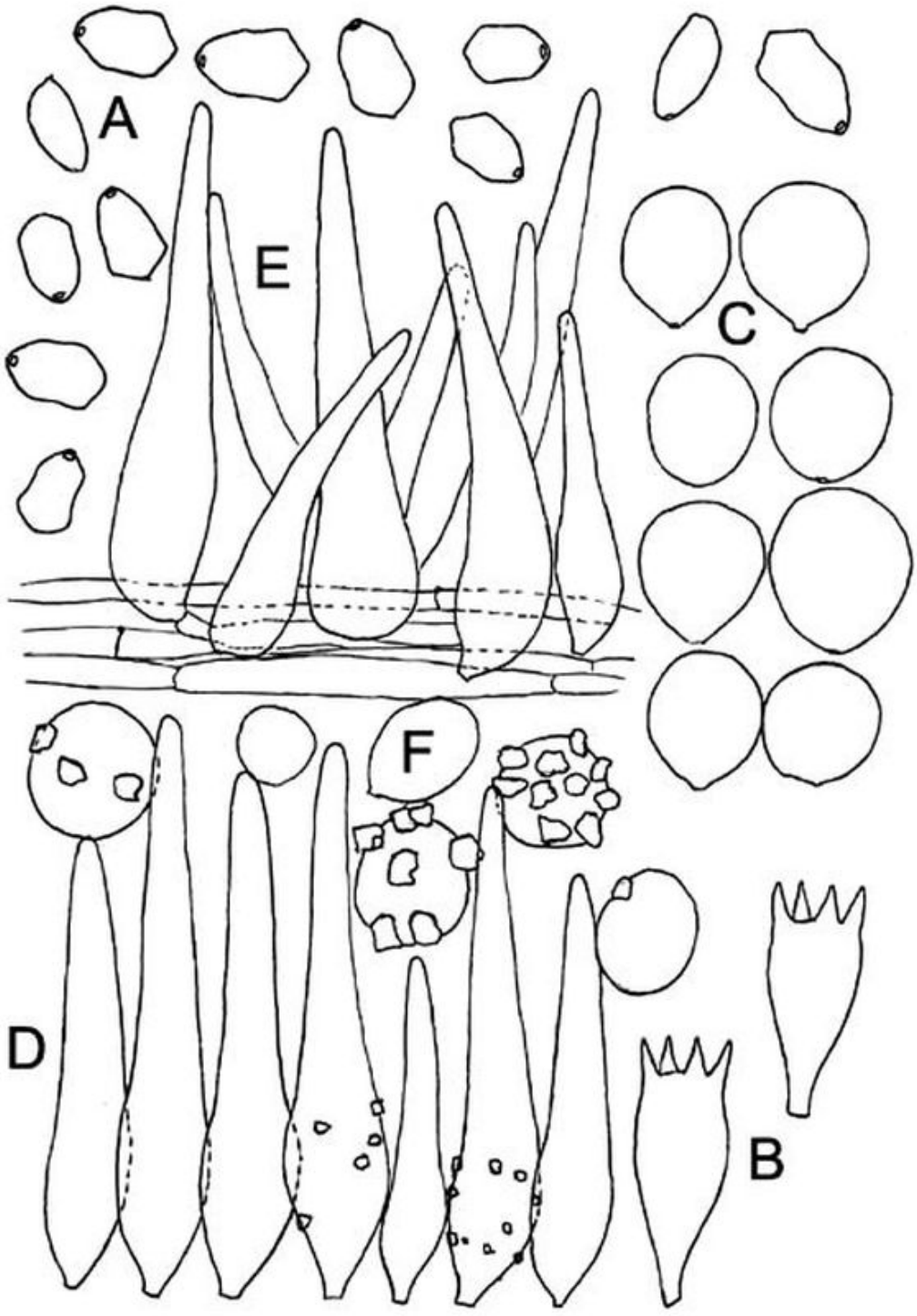

Figure 1. ***Coprinus doverii*** (Holotype) A: Spores, B: Basidia, C: Cheilocystidia, D: Pileocystidia, E: Caulocystidia, F: Velar spherocysts. (Magnification 2500x for spores, 2000x for other features)

Basidiospores (65,4,3) 6.2–8.3 x 4.5–5.8 x 3.8–4.1 µm, on average 7.68 x 5.32 µm, Q_1 = 1.36–1.54, Q_2 = 1.8–2.1; in frontal view mitriform to subhexagonal with four, more or less rounded nodules with an apical half being narrower, sometimes with rounded apex, in lateral view cylindrical to subamygdaliform, medium dark red-brown, with strongly eccentric, 1.7–2 µm wide germ pore; **Basidia** 4-spored, dimorphic, 17–25 x 6–7 µm; **Cheilocystidia** very sparse, globose to balloon-shaped, 10–14 µm diam.; **Pleurocystidia** absent; **Pileocystidia** short, lageniform with tapering, exceptionally cylindrical neck and narrow, more or less acute tip, rarely somewhat encrusted, 35–65 x 6–13 µm; **Caulocystidia** similar to pileocystidia, more variable in shape, mainly broader in the basal part, up to 16 µm; **Sclerocystidia** absent, but some pileocystidia with slightly thickened walls are observable; **Veil** on pileus made up of 11–25 µm wide, globose elements, often covered with coarse, strongly refringent crystals; **Pileipellis** a hymeniderm; Clamp – connections present.

Habitat and distribution: Two of the collections found were growing on deer dung, in the third case, it was impossible to identify the animal from which the dung originated. Two collections were obtained by incubating the dung sample in moist chambers. The hungarian collections were made in xerothermous *Convallario – Quercetum roboris* association and in a swamp – forest (*Fraxino pannonicae – Alnetum*). To date this species is only known from Hungary and Italy.

COLLECTIONS EXAMINED: **HUNGARY**, **Near Kecskemét**: Nyír, 10.9.2006., leg.: L. Nagy & Zs. Gorliczai, herb.: BP (*Holotypus*); Tőserdő, 30 km E of Kecskemét, 20.10.2005., L. Nagy & Zs. Gorliczai, herb.: L.N.; **ITALY**: **Livorno**, F. Doveri, 16.04.2004., herb. Doveri 016.04 and L.

Discussion

This species is easily recognizable by the nodulose spores, coprophilous habitat and the presence of pileo- and caulocystidia. With the exception of *C. angulatus* Peck, a carbonicolus species, other taxa with nodulose spores can be found only in other sections, like *C. calosporus* Bas & Uljé in subsection *Lanatuli* and *C. iocularis* Uljé in subsection *Nivei*. The spores of *C. iocularis* are extremely similar to that of *C. doverii*, their separation is, however, straightforward, because *C. iocularis* has no pileo- and caulocystidia, but abundant granulose veil, central germ pore, habitat on lawns, and utriform cheilocystidia.

Within subsection *Setulosi* our species seems to possess an isolated position. In Uljé's (1991, 2005) practical key our species would key out near *C. angulatus* and *C. marculentus Britzelm.* The former has similar spores, but they are larger, has a carbonicolus habitat, much larger fruitbodies, and pleurocystidia. *C. marculentus* can grow on dung, but it is generally larger, has hexagonal spores,

which are, in addition larger and the neck of its pileocystidia is cylindrical with enlarged apex. Based on size of the spores, size and shape of the pileocystidia, and globose cheilocystidia, one could assume a relationship with the *brevisetulosus* group (*C. pellucidus* P. Karst., *C. brevisetulosus* Arnolds) but these species lack any veil, have central germ pore, and the spores have a typical pale colour.

In all our collections, the pileocystidia showed both tapering and cyrindrical neck. It is very difficult to assess the taxonomic importance of this otherwise intraspecifically constant character. Uljé (1991, 2005), although informally, used it to divide *Setulosi* species with elliptical spores into two larger groups. However, there are obviously very closely related species pairs combining both types of pileocystidia neck. Such an example is *C. callinus* M.Lange. & A. H. Sm. and *C. sclerocystidiosus* M.Lange. & A. H. Sm., the former having pileocystidia with tapering neck, somewhat less abundant sclerocystidia and insignificantly smaller spores. Of these differences, only the shape of the neck of pileocystidia seems to be a constant character. Our species is the first example having both types of pileocystidia neck within one species and even within a single fruitbody.

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