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Volvariella acystidiata (*Agaricomycetes*, *Pluteaceae*), an African species new to Europe, with two new combinations in *Volvariella*

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Abstract — *Volvariella acystidiata*, an African species belonging to the *V. gloiocephala*-complex, is firstly reported from Europe on the basis of a collection made in northern Sardinia. This species is easily recognized by its medium size, white overall colour, large, ellipsoid to ovoid basidiospores and the lack of cystidia of any kind. The study includes a description, a photograph of fresh basidiomes and line drawings of relevant micro-anatomic traits.

Key words — *Basidiomycota, Agaricales,* taxonomy, biodiversity

Introduction

During a field mycological study of a grassy, anthropically disturbed, coastal site near Golfo Aranci (northern Sardinia), basidiomes of a small, white *Volvariella* resembling the very common *V. gloiocephala* (DC.) Boekhout & Enderle 1986, were collected. They grew on graminaceous debris at the edge of an internal road of the Residence "L' Eucalyptus" in the La Marinella gulf. After a careful study of the macro- and microscopic features we concluded that they were to be ascribed to *V. acystidiata*, a central-African species of the *V. gloiocephala*-complex thus far known only from Zaire (Heinemann 1975, Pathak 1975). The aim of the paper is to provide a full description of this rare and little known species.

Materials and methods

The description of macro- and microscopical features is drawn from notes taken on fresh material. Microscopical observations were made from material mounted in distilled water, Melzer's reagent, and Congo red. Spore size is expressed both as a range and mean

* corresponding author

value based on 30 randomly chosen spores. Author citations follow the IPNI Authors and Index Fungorum Authors of Fungal Names websites. Herbarium abbreviations are according to Holmgren & Holmgren (1998). All examined material is housed at TO (Herbarium generale del Dipartimento di Biologia Vegetale, Università degli Studi di Torino, Italy).

The new combinations were deposited in MycoBank.

Taxonomy

Volvariella acystidiata N.C. Pathak, Bull. Jard. Bot. Natl. Belg. 45: 195 (1975).

Figs. 1-2

Pileus 20–30 mm broad, not very fleshy, convex expanding to plano-convex, slightly (obtusely) umbonate, glabrous, without patches from the universal veil, slightly sticky, but very soon dry and shiny, short-striate on the margin (up to 10 mm), white, tinged yellowish near the centre and pale pink towards the margin. Lamellae close to moderately close, broad, ventricose, free to rotundate, pale pink then salmon-pink, with uneven edges. Stipe 30–40 × 2–3 mm, central, not solid, stuffed then hollow, subequal or slightly enlarged downwards, but not really bulbous, glabrous, sericeous, white, dry. Volva saccate, but narrow and shallow, sheathing only the stipe base, thin, white, non-lobed. Context moderately thick in the centre of the pileus, thin towards the margin, soft, white, unchanging. Smell faint, raphanoid. Taste similar. Spore-print salmon-pink.

Basidiospores 10.5–16.5 × 7.5–10.5 µm, on average 14.5 × 10 µm, Q = 1.4–1.6, pale pink, ovoid to ellipsoid, thick-walled, with several oil-drops, inamyloid, smooth, with a prominent apiculus (Fig. 2a). Basidia 45–70 × 10–13.5 µm, 2–4-spored, clavate (Fig. 2b); sterigmata up to 1.5 µm long; subhymenium cellular. Hymenophoral trama inversely bilateral, made up of hyaline, thin-walled, cylindrical hyphae. Cheilo- and pleurocystidia absent. Pileipellis a cutis of variously twisted hyphae, up to 7.5 µm wide, slightly gelatinized in the suprapellis (Fig. 2c). Clamp-connections absent everywhere. Thromboplerous hyphae not seen.

Habitat. Firstly recorded from central Africa (Zaire) on dry forest soil and dung; in Sardinia collected among graminaceous debris on sandy, grassy soil, not far from the sea. In autumn and winter.

Distribution. Known with certainty only from central Africa (Zaire) and Italy (Sardinia). Probably also present elsewhere, but possibly misidentified as *V. gloiocephala* f. *speciosa*, a very common agaric, generally considered unworthy of study.

material studied: ITALY: Sardinia, prov. Olbia-Tempio P., Golfo Aranci, loc. Golfo di Marinella, in grassy, sandy soil, on graminaceous debris (*Poaceae*), 2.XI.2009, leg. A. Vizzini and M. Contu (TO HG1973).

Figure 1. *Volvariella acystidiata*. Basidiomes (TO HG1973). Scale bar = 20 mm

Discussion

On describing *Volvariella acystidiata*, Pathak (1975) provided only a very short Latin diagnosis and presented no illustrations of either gross or micro-anatomical features. Shortly thereafter, Heinemann (1975) supplied a more detailed description of the species in French, regrettably based only on the poorly preserved type collection. A colour plate of the species can be found in Heinemann (1975: pl. XIV, fig. 1).

Doubtlessly, *V. acystidiata* belongs to the *V. gloiocephala* complex based on its very large basidiospores and slightly sticky pileus surface, but it is easily separated from the white form of *V. gloiocephala*, viz. f. *speciosa* (Fr.) Contu 1998, by the complete lack of cheilo- and pleurocystidia. We carefully examined all four specimens in our collection for the possible occurrence of even an occasional hymenial sterile element, but we were not able to find any. *V. gloiocephala*, by contrast, shows many large, versiform, clavate, ventricose to subfusiform cystidia, on both face and edge of lamellae (Shaffer 1957 as "*Volvariella speciosa* (Fr.) Sing."; Orton 1974, 1986; Boekhout 1990; Boekhout & Enderle 1986). Another white species of the *V. gloiocephala* complex, *V. cookei* Contu 1998, also shares an only slightly sticky pileus surface and a white volva, but it is readily distinguished by its conspicuous cystidia, which are clavate with a very long and thin appendage, and the smaller basidiospores (Contu 1998, 2004).

Other white, medium-sized species of *Volvariella* are *V. nivea* T.H. Li & Xiang-L. Chen 2009 (Li et al. 2009), *V. nauseosa* (see below), *V. strangulata* (see below), and *V. pusilla* (Pers.) Singer 1951. However, they are easily distinguished

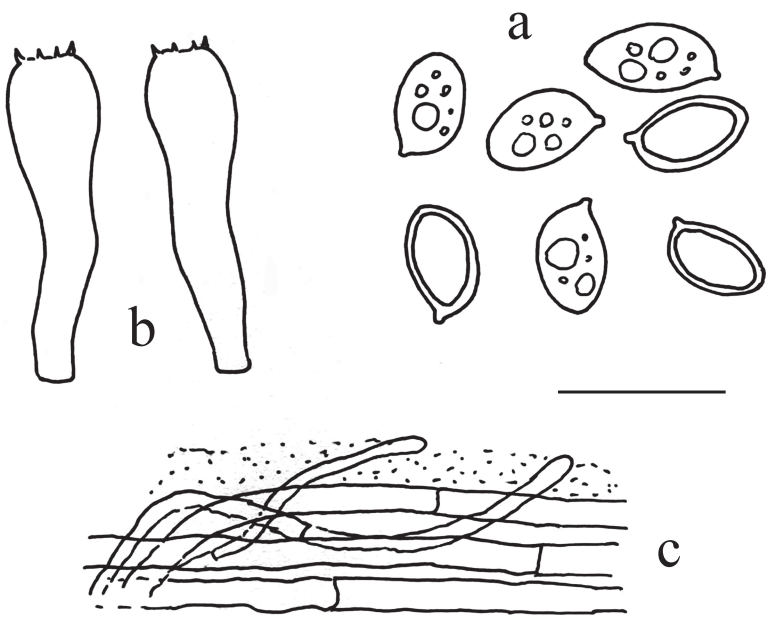

Figure 2. *Volvariella acystidiata*. Microscopical features (TO HG1973).
a. Basidiospores. **b**. Basidia. **c**. Pileipellis. Scale bar = 20 µm

especially by the obvious, well-developed cystidia and smaller basidiospores.

The diminutive members of the genus also showing white tinges to the pileus are even more easily separated by their smaller basidiospores and occurrence of cystidia (Shaffer 1957; Orton 1974, 1986; Heinemann 1978; Boekhout 1986, 1990; Boekhout & Enderle 1986).

New combinations in *Volvariella* Speg.

Volvariella nauseosa (Romagn.) Vizzini & Contu, **comb. nov.**
MycoBank MB 515695
Basionym: *Volvaria nauseosa* Romagn., Rev. Mycol. (Paris) 2: 93 (1937).

This very rare species has been recently collected in Slovenia (mat. in herb. priv. M. Contu). It is distinguished by the mainly fusiform cystidia and a spore size bigger than that of *V. pusilla*; otherwise it is very similar in habit.

Volvariella strangulata (Romagn.) Vizzini & Contu, **comb. nov.**
MycoBank MB 515696
Basiomym: *Volvaria strangulata* Romagn., Bull. trimest. Soc. Mycol. Fr. 94(4): 371 (1979, "1978").

Moser (2001) published a recent Austrian record of this rather uncommon agaric with a colour photograph depicting fresh basidiomes. M.C. had the chance to study an Italian collection made by Ledo Setti (fragm. in herb. priv. M. Contu) that agrees perfectly with the protologue (Romagnesi 1979).

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