VOLVOLEPIOTA AND MACROLEPIOTA – MACROLEPIOTA VELOSA, A NEW SPECIES FROM CHINA

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A new volvate Macrolepiota species from China, M. velosa, is described, and Volvoliopita is synonymized with Macrolepiota. Two new names in Macrolepiota are proposed, viz. M. pulchella for V. brunnea, and M. brunnescens for V. albida.

Keywords: distribution, taxonomy, systematics

While studying the agarics in the province of Yunnan, in southwestern China, the second author collected a peculiar species of the genus Macrolepiota Singer. The slender basidiocarps are provided with a volva, and veil remnants are present as whitish patches on the pileus on top of the dark brown squamules.

These characters, especially the presence of a volva, were used by Rick (1938) to distinguish the genus Lepiotella. Unfortunately, Lepiotella Rick is a homonym of Lepiotella (E.J. Gilbert) Konrad described in 1934. Singer (1953) examined Rick’s specimens of L. brunnea, the type species, and at that time called these ‘merely a volvate Macrolepiota (Lepiota of the procera-type).’ Later, Singer (1959) proposed the new name Volvoliopita for Lepiotella Rick. Heinemann & de Meijer (1996) also concluded that ‘Volvoliopita may not be fundamentally different from Macrolepiota by virtue of the volva, which is only more conspicuous in the former genus’, but nevertheless retained Volvoliopita as a separate genus.

Molecular investigations of the ITS-regions have shown that species with a volvate base and velar remnants on the pileus do indeed form a separate clade, but this clade is situated either within Macrolepiota in the strict sense or at the base of the Macrolepiota clade (Vellinga et al., 2003, the clade with Macrolepiota spec. nov. 1 and 4). The most obvious morphological difference between Volvoliopita and Macrolepiota is the presence of a volva in the former. Cylindrical cheilocystidia are found in Volvoliopita species and in M. clevelandii Grgr. The spores in Volvoliopita are relatively small, not exceeding 15 μm, whereas Macrolepiota species (Macrolepiota is taken in the emended sense of Vellinga et al., 2003) have spores 11 μm and longer (up to 28.5 μm long in M. clevelandii). The apparent absence of clamp-connections in Volvoliopita (though they are reported to be present in the stipe context (Singer, 1953)), is not unique; clamp-connections.
connections are difficult to find in *M. mastoidea* as well. More important are the similarities between the two: the trichodermal pileus covering (though with clavate and hyphal elements in *Volvolepiota brunnea* (Rick) Singer), the germ pore which is an interruption of the episporium, and the presence of a stipe covering. The differences do not warrant a separate genus, and *Volvolepiota* is accordingly considered a synonym of *Macrolepiota*, and the present new taxon is described as a member of the genus *Macrolepiota*.

A new name in *Macrolepiota* is necessary for *Volvolepiota brunnea*; *Macrolepiota pulchella* de Meijer & Vellinga, nom. nov., is proposed (basionym: *Lepiotella brunnea* Rick in Lilloa 2: 251. 1938, non *Macrolepiota brunnea* (Farlow & Burt) Wasseri, 1993).

*Macrolepiota brunnescens* Vellinga, nom. nov., is proposed for *V. albida* Singer (basionym: *Volvolepiota albida* Singer in Bol. Soc. Arg. Bot. 8: 12. 1959, non *Macrolepiota albida* (Beeli) Heinem., 1969). The name refers to the fact that the species is said to discoulour in all parts (Singer, 1959).

Volvate *Macrolepiota* species appear to be widespread, and are now known from northeast Australia, southwestern China, and South America. They seem to have a more tropical distribution than the other *Macrolepiota* species. *Macrolepiota procera* (Vittad.) Singer and allies are widespread in temperate regions, and so are species of the complex around *M. mastoidea* (Fr.: Fr.) Singer.

The macroscopic description of the new species from China is based on the field notes of the second author and his photographs of the material. For microscopic examination the material was revived in Congo Red in 10% ammonia solution. The notation [36, 3, 2] indicates that measurements were made on 36 spores in three samples in two collections. The following abbreviations are used: avl for average length, avw for average width, Q for quotient of length and width, and avQ for average quotient.

**Macrolepiota velosa** Vellinga & Zhu L. Yang, spec. nov. – Fig. 1.

Pileus squamis brunneis, et pennis volvatis albidis, stipites basi volvatus, spora 8.0-10.0 x 6.0-7.0 μm, cheilocystidia 44-68 x 4.5-7.5 μm, cylindracea, fibulatae non observatae. Typus hic designatus: “China, Yunnan Prov.: Jinghong, Damenglong, 14-VIII-1995, Z. L. Yang 2172 (Holotypus HKAS 29487; isotypus L).”

Pileus 7-9 cm, plano-convex with wide indistinct umbo, dark brown and tufted-plushy at centre, around centre with brown to dark brown squamules, sometimes with purplish tinge, on brownish to pale brownish or grey with purplish tinge, radially fibrillose background, and with white to dirty white membranous volval remnants as patches on the surface. Lamellae free and remote from stipe, not ventricose, whitish, with white cystidiose edge. Stipe 10-17 x 0.4-1.0 cm, cylindrical, widened at utmost base (up to 1.3 cm), brownish to purplish brown, paler at apex, finely fibrillose or squamulose, hollow. Annulus ascending, whitish on upperside with brown rim, and brownish underside. Volva limbate, white, membranous. Context in pileus white, in stipe white, with pinkish to brownish tinge. Smell indistinct. Taste indistinct or mild.

Spores [56, 5, 4] 8.0-10.0(-11.0) x 6.0-7.0 μm, avl x avw = 9.3 x 6.6 μm, Q = 1.3-1.5, avQ = 1.4, amygdaloid-ellipsoid in side-view, ellipsoid in frontal view, with thickened wall, with apical central germ pore, covered by a hyaline cap, congoophilous, cyanophilous, dextrinoid, and metachromatic in Cresyl Blue. Basidia 25-30 x 9.5-11.5 μm, 4-spored, without clamp connection. Lamella edge sterile, made up of tightly
Fig. 1. *Macrolepiota velosa* – Habitus, spores, basidia, cheilocystidia and pileus covering at centre of pileus. All from holotype. Bar 1 cm (habitus), 10 μm (microscopic structures).

packed cheilocystidia. Cheilocystidia 44-68 x 4.5-7.5 μm, cylindrical, some slightly widened at apex, with rounded apex, with greyish-granular contents, and refractive patch at apex. Pleurocystidia absent. Squamules on pileus made up of ellipsoid to subglobose brown-walled elements in chains; terminal elements up to 100 x 25 μm, often clavate or broadly clavate; some brown cylindrical hyphae, 5-8 μm in diameter present as well; squamules at centre rather regular (see Fig. 1), close to pileus margin more irregularly arranged, with a wider range of cell sizes. Velar patches made up of hyaline, non-coloured, cylindrical narrow hyphae, c. 2-4 μm wide. Stipitipellis a cutis of
brown-coloured hyphae with irregular loose-lying, cylindrical hyphae, c. 5-10 μm in diameter. Clamp-connections not observed at base of basidia, cheilocystidia, nor in pileus covering and velum remnants.

Habitat & distribution. – Solitary, terrestrial in dry monsoon forest, in tropical limestone monsoon forest, and in tropical seasonal forest, 600-800 m a.s.l. Probably not uncommon in Yunnan.


Macrolepiota pulchella resembles M. velosa, but differs in forming longer spores (10-14.5 x 6.0-7.5 μm, personal observations), shorter cheilocystidia (23-42 μm long), and pileus squamules made up of clavate elements and long, colourless emerging hyphae. Heinemann & de Meijer (1996) gave an extensive description of M. pulchella (as V. brunnea).

Macrolepiota eucharis Vellinga & Halling, described from the rainforest of northeastern Australia, differs in bigger spores (10.8-15.5 x 7.0-9.0 μm), wider and shorter cheilocystidia (25-53 x 5.0-12 μm), and a different structure of the pileus covering, lacking ellipsoid to globose or clavate elements.

The basidiocarps of Macrolepiota brunnescens, described from Argentina (as V. albida), are less slender than those of M. velosa; both species have velar patches on the pileus. The spores of M. brunnescens are 9.5-11 x 6.5-8.5(-10) μm (Heinemann & de Meijer, 1996), versus 8.0-10.0 x 6.0-7.0 μm in M. velosa. In addition, M. brunnescens is said to discolor brown in all parts (Singer, 1959).

Macrolepiota celandii Grgr. superficially resembles M. velosa because of the slender habit and the brown squamose pileus, but differs in the absence of a volva, the predominantly 2-spored basidia and the much bigger spores; even spores of 4-spored basidia measure 12.5-16.5 x. 8.5-10 μm; spores from 2-spored basidia are up to 28.5 x 15.5 μm.

Acknowledgments
Jan Frits Veldkamp was so kind as to provide the Latin diagnosis, and John Lennie gave linguistic advice. Dennis E. Desjardin was so kind as to review the manuscript before submission. This study is partially supported by the Funds of China's Yunnan Province for young and middle-aged talents in Science and Technology (No. 2000YP09).

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