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Studies in *Amanita* subsection *Vittadiniae* I— a new species from Colombian savanna

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This paper is dedicated to DR. CORNELIS BAS on the occasion of his eightieth birthday.

Abstract—*Amanita savannae* is described as new from the Departamento de Meta, Colombia.
Key words—*Amanita* subsect. *Limbatulae*, *Amanita* subsect. *Solitariae*, South America, taxonomy

Introduction

Amanita savannae is a member of the growing group of apparently nonmycorrhizal, or at least not obligately mycorrhizal, species in *Amanita* subsect. *Vittadiniae* Bas. The paper of Wartchow et al. (2007) can be considered a previous work in the present series. Previous work on *Amanita* of Colombia includes (Tulloss et al. 1992). Illustrations and brief descriptions of Colombian species of *Amanita* as well as other taxa can be found in (Franco-Molano et al. 2000).

Materials and methods

Methods used are those of Bas 1969 and Tulloss et al. (1992) as modified by Tulloss (1993, 1994, 2000, 2008). Color codes of the form 4A5 follow Kornerup and Wanscher (1978). Herbarium name abbreviations are confor-

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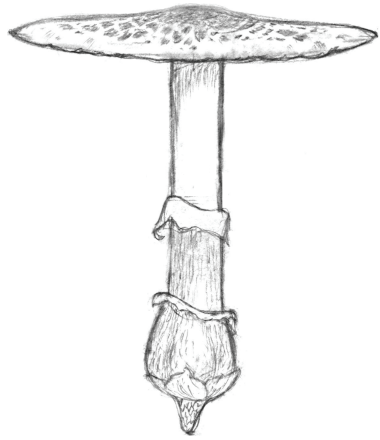

Fig. 1. *Amanita savannae* (holotype). Habit (×1.7), reconstructed from exsiccatum. Pencil sketch by Richard Rauh (NY).

mant with (Holmgren et al. 1990), with the exception of RET (Tulloss' herbarium). Abbreviations in author citations follow Kirk and Ansell (1992, 2008).

Taxonomic part

Amanita savannae Tulloss & Franco-Mol. **sp. nov.** **Fig. 1**

MYCOBANK **#** 511862

Pileus 12–30 *mm latus, albus vel griseobrunneus, convexus vel planus vel concavus, squamellulis tenuibus et brunneis insidens disci. Lamellae albae. Stipes* 13–30 × 4–7 *mm, pallidus, annulo albo, membranaceo, medio vel inferiori, bulbo subnapiformi. Fibulae praesentes. Sporae subglobosae vel late ellipsoideae, amyloideae, interdum globosae, interdum elongatae,* (6.5–) 7.2–10.8 (–13.5) × (6.0–) 6.2–8.5 (–9.5) *µm. Habitat in savanna humida. In subsectione Vittadiniis stirpis Vittadinii amplitudinae basidiocarpi, praesentia et forma bulbi basilaris stipitis, praesentia particula dextrinoidea in basidiis, et amplitudine et forma sporarum distinguenda. Holotypus*: Colombia, Dpto. del Meta, Mpio. Puerto Gaitan, Puente Arimena, sobre la carretera a Carimagua, 18.v.1992 A. E. Franco-Molano 850 (NY).

ETYMOLOGY: "of the savanna."

PILEUS: 12–30 mm wide, white to grayish brown (6B2), convex to planar to concave; *context* white, unchanging when cut or bruised, 2^{+} mm thick at stipe; *margin* nonstriate, appendiculate, decurved to inflexed at first, eventually flar-

ing upward, entire; *universal veil* as fine squamules, densest over disk, brown (6E5).

LAMELLAE: free, subclose, white, unchanging when cut or bruised, ventricose, not marginate, 2± mm broad; *lamellulae* attenuate, of at least two lengths.

STIPE: 13–30 (including bulb) × 4–7 mm, pallid, narrowing upward or downward or subcylindric, smooth and glabrous toward the apex, covered with rather fine and pallid fibrillose scales below annulus; *bulb* subnapiform; *context* white, unchanging when cut or bruised, solid; *partial veil* white, membranous, median to inferior, sometimes left in part on pileus margin or covering the outer portion of lamellae; *universal veil* distributed on the lower stipe as scales (see above) and in broken ring of pallid tissue around apex of bulb.

Odor mild. *Taste* not recorded.

MACROCHEMICAL TESTS: Spot test for tyrosinase (paracresol) - positive throughout basidiocarp after 30 min. Spot test for laccase (syringaldazine) - negative throughout basidiocarp. Test voucher: Franco-Molano 850.

PILEIPELLIS: lacking; pileus context intergrading with universal veil through region with elements more closely packed than lower in pileus context. PILEUS CONTEXT: filamentous, undifferentiated hyphae 1.2–9.8 µm wide, intergrading with narrow inflated cells, occasionally having intercalary inflated cells similar to the acrophysalides of this tissue, branching, walls thin or slightly thickened as in the acrophysalides; acrophysalides subfusiform to narrowly fusiform to clavate to fusiform-rostrate to narrowly clavate to elongate-ellipsoid, up to 169 × 26 µm, dominating, sometimes branching, with walls thin or thickened (up to 0.8 µm thick), often with subradial orientation; vascular hyphae 3.2–8.0 µm wide, branching, common; clamps observed. LAMELLA TRAMA: bilateral, with central stratum (w_{cs} = 25–35 µm) appearing dark and quite distinct at low magnification, with angle of divergence from very shallow to nearly perpendicular to the central stratum; filamentous, undifferentiated hyphae 1.8–6.0 µm wide, branching; terminal, inflated cells not observed; vascular hyphae not observed. SUBHYMENIUM: a branching structure of short uninflated hyphal segments, with w_{st}-near = 15 µm and w_{st}-far = 45 µm, rather small partially inflated to inflated (e.g., 10 × 8.5 µm) intercalary cells, and irregular (e.g., branched) elements, densely interwoven, with elements approaching bases of basidia at 45–90° angle, with most basidia arising from uninflated hyphal segments, but some (especially in regions that are generally more inflated) arising from small inflated cells. BASIDIA: 32–64 × 10.0–14.0 µm, 4-sterigmate, containing dextrinoid granules; clamps rather plentiful. UNIVERSAL VEIL: *On pileus*: extensively gelatinized, more yellow-brown than adjacent pileus context, with elements having periclinal orienta-

tion, with most extensively gelatinized regions red-brown and amorphous; filamentous, undifferentiated hyphae 2.5–6.2 µm wide, branching; inflated cells in chains, dominant, subfusiform to narrowly clavate, up to 53 × 21 µm, all badly damaged in material reviewed; vascular hyphae not distinguished due to extensive gelatinization. *On stipe base*: (from broken ring at bulb apex) slightly sordid in mass; filamentous, undifferentiated hyphae 3.0–8.5 µm wide, branching, plentiful; inflated cells in easily dissociated chains, dominant, elongate to cylindric to clavate to ellipsoid, up to 99 × 29 µm, with walls thin to slightly thickened to 0.8 µm thick; vascular hyphae not observed; clamps present. STIPE CONTEXT: longitudinally acrophysalidic; filamentous, undifferentiated hyphae 2.2–8.8 µm wide, dominating, branching; acrophysalides subfusiform to clavate, rather slender, up to 158 × 45 µm, with walls thin or slightly thickened; vascular hyphae 5.0–18.5 µm wide, branching; clamps present. PARTIAL VEIL: upper surface partially gelatinized; filamentous, undifferentiated hyphae 1.0–6.5 µm wide, branching, dominating, criss-cross interwoven; inflated cells terminal, unevenly distributed, subclavate to subfusiform, up to 114 × 36 µm, with slightly thickened walls; vascular hyphae not observed; clamps present.

BASIDIOSPORES: [140/7/1] (6.5–) 7.2–10.8 (–13.5) × (6.0–) 6.2–8.5 (–9.5) µm, (**L** = 7.6–9.2 (–10.2) µm; **L'** = 8.6 µm; **W** = 6.6–7.6 (–8.2) µm; **W'** = 7.2 µm; Q = (1.02–) 1.08–1.36 (–1.73); **Q** = 1.14–1.22 (–1.27); **Q'** = 1.19), hyaline, smooth, thin-walled, amyloid to somewhat palely amyloid, subglobose to broadly ellipsoid to ellipsoid, occasionally globose, occasionally elongate, often not adaxially flattened; apiculus sublateral, proportionately small to very small, cylindric; contents multiguttulate; color in deposit unknown.

ECOLOGY : Subgregarious to gregarious. At 120 m elev. In wet savanna, apparently without nearby woody plants, recently flooded by heavy rains.

MATERIAL EXAMINED: **COLOMBIA**: EL META—Mpio. Puerto Gaitan - Puente Arimena, sobre la carretera a Carimagua, 18.v.1992 A. E. Franco-M. 850 (holotype, NY; isotype, COL; isotype, RET).

NOTES: This taxon is easily keyed to *Amanita* stirps *Vittadinii* using the keys of Bas (1969). The species most similar to *A. savannae* that is treated by Bas (1969) is *A. codinae* (Maire) Bertault (1955), described from the Mediterranean region. However, *A. codinae* has a rather thickset habit (pileus up to 130 mm wide) with a roughly cylindric stipe (up to 80 mm long) that lacks both a bulb and a point at the bottom; and it has much larger spores than does *A. savannae* with **Q** between 1.45 and 1.60.

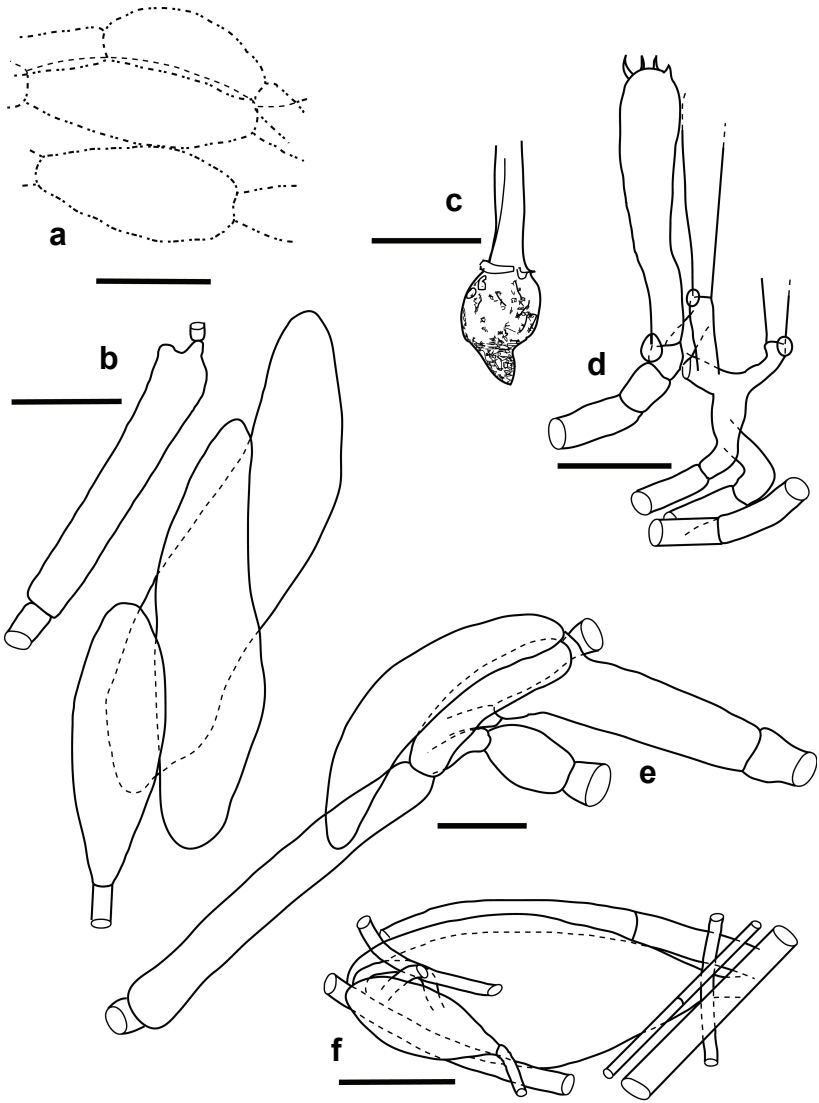

Fig. 1. *Amanita savannae* (holotype). a. Elements of gelatinized universal veil on pileus. b. Elements of universal veil from stipe base. c. Exsiccatum, stipe base. d. Elements of hymenium and subhymenium. e. Elements of pileus context subjacent to universal veil. f. Elements of partial veil. For stipe base, scale bar = 1 cm; for all microscopic drawings, = 20 µm.

Described from the State of Paraná, southern Brazil, *Amanita grallipes* Bas & de Meijer (1993) differs in being. larger (pileus up to 90 mm wide; stipe up to 120 mm long) with downward tapering stipe lacking a bulb, lamellae becoming golden yellow (4A6) in age, and smaller spores with higher **Q** value.

Among the remaining taxa of subsect. *Vittadiniae* described since the publication of (Bas 1969), the only other taxon with which *A. savannae* might be confused is *A. pleropus* (Kalchbr. & MacOwan) D. A. Reid (1975) described from South Africa (Reid & Eicker 1991, 1996). However, there are marked differences between the two species. *Amanita pleropus* has a universal veil with elements having anticlinal orientation. As a result the universal veil remnants on the pileus sometimes become "densely crowded, erect, hair-like spines or pyramidal warts." The African species also has larger spores (10.8–14.0 × 7.0–9.5 µm) with **Q** in the range of $1.5^{\pm}$.

Dextrinoid (or possibly dextrinoid) contents of basidia or spores is a character reported for two other species in *Amanita* sect. *Lepidella—A. mutabilis* Beardslee (Bas 1969, Tulloss 1984), belonging to subsect. *Limbatulae* Bas and *A. westii* (Murrill) Murrill (Bas 1969, Tulloss and Lewis 1994), belonging to subsect. *Solitariae* Bas. This paper provides the first report of dextrinoid granules in *Amanita* subsect. *Vittadiniae*. These granules apparently occur rarely outside of *Amanita* subgen. *Lepidella* (E.-J. Gilbert) Beauseign. emend. Corner & Bas; they have been noted by Tulloss (unpub. data) in *A. umbrinolutea* var. *flaccida* D. A. Reid (1987) of *Amanita* sect. *Vaginatae* (Fr.) Quél. sensu Yang (1997) and others. Such granules were considered of taxonomic importance in the case of *A. mutabilis*; however, whether or not they are genetically determined is an open issue.

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Literature cited

Bas C. 1969. Morphology and subdivision of *Amanita* and a monograph of its section *Lepidella.* Persoonia 5: 285–579.

Bas C, de Meijer AAR. 1993. *Amanita grallipes*, a new species in *Amanita* subsection *Vittadiniae* from southern Brazil. Persoonia 15: 345–350.

Bertault R. 1955. Une espèce à réhabiliter: *Amanita (Aspidella) codinae* (R. Maire) Bertault comb. nov. = *Lepidella codinae* R. Maire. Bull. Trimestriel Soc. Mycol. France 71(1): 27-32.

Franco-Molano AE, Aldana-Gómez R, Halling RE. 2000. Setas de Colombia (Agaricales, Boletales y otros hongos). Colciencias, Univ. Antioquia. vi+156 pp.

Holmgren PK, Holmgren NH, Barnett LC. 1990. Index herbariorum. Part I. The herbaria of the world, 8th ed. Regnum Veg. 120: 1–693.

Kirk PM, Ansell AE. 1992. Authors of fungal names. Index Fung. Suppl: i–viii, 1–95.

Kirk PM, Ansell AE. 2008. Authors of fungal names. in Index Fungorum, [http://www.indexfungorum.org/Names/AuthorsOfFungalNames.asp] accessed 24 May 2008.

Kornerup A, Wanscher JH. 1978. Methuen handbook of colour. (Methuen, London). 252 pp.

Reid DA. 1975. Type studies of the larger basidiomycetes described for southern Africa. Contrib. Bolus Herb. 7: 1–255.

Reid DA. 1987. New or interesting records of British hymenomycetes VII. Notes Roy. Bot. Gard. Edinburgh 44: 503-540.

Reid DA, Eicker A. 1991. South African fungi: the genus *Amanita*. Mycol. Res. 95(1): 80–95.

Reid DA, Eicker A. 1996. South African fungi. 4. *Amanita pleropus* (Kalchbr. & MacOwan) D. A. Reid, a further collection of this South African species. S. African J. Bot. 62(3): 167-168.

Tulloss RE. 1984. Distribution and taxonomic notes on *Amanita mutabilis*. Mycologia 76: 555–558.

Tulloss RE. 1993. *Amanita pachysperma*, *Amanita subvirginiana*, and *Amanita virginiana* (taxonomy and distribution) with notes on description of the lamella trama in *Amanita*. Mycotaxon 49: 449–475.

Tulloss RE. 1994. Type studies in *Amanita* section *Vaginatae* I: Some taxa described in this Century (studies 1–23) with notes on description of spores and refractive hyphae in *Amanita*. Mycotaxon 52: 305–396.

Tulloss RE. 2000. Note sulla metodologia per lo studio del genere *Amanita* (*Agaricales*). Boll. Gruppo Micol. G. Bresadola 43(2): 41–58.

Tulloss RE, Lewis DP. 1994. *Amanita westii*—taxonomy and distribution. A rare species from states bordering on the Gulf of Mexico. Mycotaxon 50: 131–138.

Tulloss RE, Ovrebo CL, Halling RE. 1992. Studies on *Amanita* (*Amanitaceae*) from Andean Colombia. Mem. New York Bot. Gard. 66: 1–46.

Wartchow F, Tulloss RE, Cavalcanti MAQ. 2007. The discovery of *Amanita lilloi* in Brazil. Mycotaxon 99: 167–174.

Yang ZL. 1997. Die *Amanita*-Arten von Südwestchina. Biblioth. Mycol. 170: i–ii, 1–240.