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TWO NEW BLUING SPECIES OF *PSILOCYBE* FROM PUERTO RICO

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ABSTRACT

Psilocybe guilartensis (Sect. *Brunneocystidiatae*) and *P. portoricensis* (Sect. *Cordisporae*) are described as new species from the central mountain region of Puerto Rico. Previously only *P. cubensis* and *P. subcubensis* were known from the island. The new species are from similar subtropical humid mountainous zone covered by a mesophytic forest, where most hallucinogenic species of *Psilocybe* are distributed in tropical America.

INTRODUCTION

The enormous diversity of the fungi in the world makes completion of generic monographs difficult. The genus *Psilocybe* (Fr.) P. Kumm., so extensively studied in the world due to the association with psychotropic action, was monographed by Guzmán (1983) and 144 species were considered. Recently, Guzmán (1995) published a supplement to the monograph, in which he critically discussed another 29 species, and also 5 new species were described. However, revising some collections of *Psilocybe* gathered from Puerto Rico, the authors found two new species that are herein described. The only *Psilocybe* species previously known from Puerto Rico were the common tropical *P. cubensis* (Earle) Singer and *P. subcubensis* Guzmán, reported by Seaver & Chardon (1926) and Stevenson (1975) the first, and by Navarro & Betancourt (1992) both. To study the material, microscopical observations were made from slides mounted in 5 % KOH, Melzer's reagent or cotton-blue in lactophenol.

Localities explored in Puerto Rico for the two described species, are located in the central mountain zone (Cordillera Central) of the island, on the Caribbean side. Mean annual precipitation ranges from 2000 to 4000 mm, with a mean annual temperature of 19-25 °C. They are covered by a mesophytic forest, with *Cyathea* Kaulf., *Dacryodes* Vahl., *Euterpe* Gaertn, *Guarea* Allem. ex L., *Inga* Scop. and *Terminalia* L., among others, and coffee plantations (Birdsey & Jiménez, 1985; Ewel & Whitmore, 1973). This zone is part of the subtropical humid mountainous region of Latin America, considered by Guzmán (1983, 1995), the richest in hallucinogenic species of *Psilocybe*, which extends from the Yungas region (N of Argentina) to the mountains of Venezuela and Colombia at 1000-2000 m elevation through the Andes, reaching the central mountains of Mexico at 900-2000 m elevation. *Alnus* (Tourn.) L. is a common tree in this region, while *Quercus* (Tourn.) L. is only known from Colombia to Mexico and in various Caribbean islands. *Liquidambar* L., *Clethra* Gronov. ex L., *Carpinus* L., *Platanus* (Tourn.) L., *Cyathea* and coffee plantations are common in Mexican mesophytic forests. The Lesser Antilles localities at 500-1000 m elevation, where Pegler (1983) collected *P. plutonia* (Berk. & M.A. Curtis) Sacc., *P. caerulescens* Murrill and *P. yungensis* Singer, are also included in this subtropical region (Guzmán, 1986).

DESCRIPTION OF THE NEW SPECIES

Psilocybe guilartensis Guzmán, Tapia & Nieves-Rivera, sp. nov. Figs. 1-8

Pileus 10-20 (-30) mm latus, conicus vel campanulatus, vel acute papillatus, papilla ad 3 mm longa, laevis, subviscidus, hygrophanus, rufobrunneus vel brunneolus aut fulvus, subcaeruleus. Lamellae adnexae, brunneo-lilaceae. Stipes 50-65 (-80) x 1-1.5 mm, cylindricus, flexuosus, rufobrunneus, subcaeruleus. Sporae (5-) 5.5-6.5 x 5-5.5 x 4-5 µm, subrhomboideae vel subglobosae, tunica crassa, dilute fulvae. Basidia 21.5-32 x 5.5-7 µm, tetraspora. Pleurocystidia (16-) 18.5-25.5 x (7-) 8-9.5 (-10.5) µm, copiosa, dilute fulva vel brunneola, subfusoideus vel ventricosus, irregularis ramosus. Cheilocystidia 20-24 x (7-) 8-10 µm, ventricosus, subfusoides vel sublageniformis, similia cystidiis facie lamellarum colore. Epicutis gelatinosus. Fibulae adsum. Ad terram in silvis subtropicalibus. Puerto Rico, prope Adjuntas, Guilarte State Forest, Nieves-Rivera et al. s.n. holotypus Herb. MAPR; isotypus Herb. XAL.

Pileus 10-20 (-30) mm diam, conic to campanulate, with an acute and elongate papilla (up to 3 mm), glabrous, smooth, translucent striate at the margin, subviscid, hygrophanous, reddish brown to brownish or tawny brown, bluing. Lamellae adnexed, dark violaceous brown, with concolorous edges. Stipe 50-65 (-80) x 1-1.5 mm, uniform, but slightly thickened at the base, flexuous, brownish red to somewhat blackish, bluing, irregularly covered with white minutely floccose fibrils, hollow. Veil absent at maturity. Context brownish, bluing. Spores (5-) 5.5-6.5 x 5-5.5 x 4-5 µm, subrhomboid or subglobose in face-view, subellipsoid in side-view, thick-walled, wall up to 1 µm thick, pale yellowish brown, with a broad plane and apical pore, and with a short basal appendage. Basidia 21.5-32 x 5.5-7 µm, 4-spored, subcylindric, medially subconstricted, hyaline. Pleurocystidia (16-) 18.5-25.5 x (7-) 8-9.5 (-10.5)

μm, abundant, light melleous, greyish brown or dark brownish, fusoid, subfusoid or vesiculose, at times with a short, thick, obtuse neck, sometimes irregularly branched and others capitate. Cheilocystidia 20-24 x (7-) 8-10 μm, vesiculose, subfusoid or sublageniform with a short tapering apex, as the pleurocystidia in color. Subhymenium scarcely differentiated, formed by hyaline to yellowish, thin-walled elements, 2.5-4 μm in diam, with incrusted, brownish pigment. Hymenophoral trama regular, with hyaline to yellowish hyphae, 2.5-9 μm diam, and inflated hyphae up to 16 μm diam, both thick-walled, walls up to 2 μm thick, with yellowish incrustations. Epicutis as a thin gelatinized layer of hyaline to yellowish pale hyphae, 1.5-3 μm diam. Hypodermium formed by hyaline to yellowish pale hyphae, 3.5-8 μm diam, thin walled, frequently with incrusted brownish pigment. Context with hyaline to yellowish hyphae, 4-8 μm diam with inflated elements up to 28 μm diam, thick-walled, walls up to 1.5 μm thick, with incrusted brownish pigment. Clamp-connections present.

Habitat and distribution. Gregarious or solitary on muddy clay brownish soil, along a trail, in a coffee plantation in a mesophytic forest. Known only from Puerto Rico.

Studied material. PUERTO RICO, Municipio Adjuntas, Guilarte State Forest, trail to Pico Monte Guilarte (18°07N, 66°47´W), 900 m alt., Sept. 1994, *Nieves-Rivera, Santos-Flores & Betancourt* s.n. (holotype MAPR; isotype XAL). Municipio Villalba, Toro Negro State Forest, trail to Torre 3 (18°10´N,66°30´W), 820-1015 m alt., Oct. 1994, *Nieves-Rivera, Santos-Flores & Betancourt s.n.* (MAPR; NY as *Psilocybe plutonia*).

Discussion. This species belongs to Sect. *Brunneocystidiatae* Guzmán by virtue of the color of the cystidia. It is close to *P. pleurocystidiosa* Guzmán from Mexico for the form, color and size of the pleurocystidia, and ecological distribution, but the cheilocystidia are 16-21 x 5-6 μm and the pileus is not papillated (Guzmán, 1983).

Psilocybe portoricensis Guzmán, Nieves-Rivera & Tapia sp. nov. Figs. 9-12

Pileus 5-15 (-20) mm latus, campanulatus vel subpapillatus, subviscidus, laevis, hygrophanus, luteus fuscus vel coffeatus, subcaeruleus. Lamellae adnexae, brunneo-lilaceae. Stipes 45-50 (-60) x 0.5-1 mm, cylindricus, flexuosus, subfuscus vel rufobrunneus, subcaeruleus. Sporae 5-5.5 x 4-5 x 3-4 μm, subrhomboideae vel subglobosae, tunica crassa, dilute fulvae. Basidia 20-32 x 5-7 μm, tetraspora. Pleurocystidia 13.5-20 x 5-7 μm, frecuentes, hyalina, sublageniformis. Cheilocystidia 16-24 x 5-7 μm, hyalina, sublageniformis vel ramosa. Epicutis gelatinascens. Fibulae adsum. Ad terram in silvis subtropicalibus. Puerto Rico, prope Villalba, Toro Negro State Forest, Nieves-Rivera et al. s.n. holotypus Herb. MAPR; isotypus Herb. XAL.

Pileus 5-15 (-20) mm diam, campanulate to subpapillate, glabrous, smooth but striate towards the margin, subviscid, hygrophanous, dark buff to coffee brown, bluing. Lamellae adnexed, dark violaceous brown, with concolorous edges. Stipe 45-50 (-60) x 0.5-1 mm, uniform, smooth, brownish to dark brownish red, hollow,

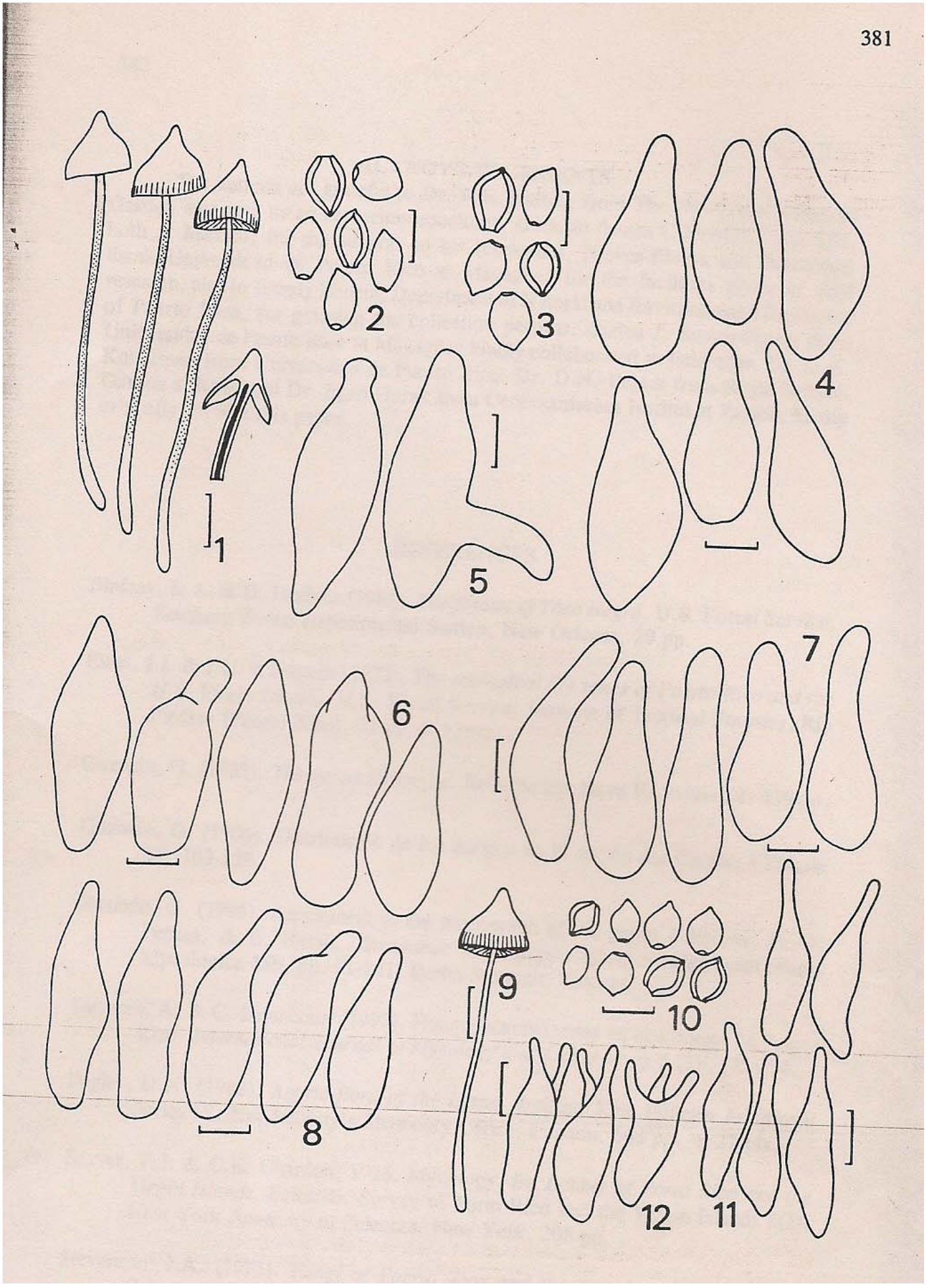
bluing. Veil ephemeral. Context brownish, bluing. Spores 5-5.5 x 4-5 x 3-4 μm, subrhomboid or subglobose in face-view, subellipsoid and slightly inaequilateral in side-view, thick-walled, wall up to 1 μm thick, pale yellowish brown, with a distinct plane and apical pore, and with a short basal appendage. Basidia 20-32 x 5-7 μm, 4-spored, subcylindric to clavate, hyaline. Pleurocystidia 13.5-20 x 5-7 μm, more or less abundant, hyaline, sublageniform with a long tapering apex. Cheilocystidia 16-24 x 5-7 μm, hyaline, sublageniform, with two or three regular or irregular long necks. Subhymenium subcellular, poorly differentiated, with hyaline, subcylindrical or subglobose, thin-walled elements, 2.5-5.5 μm in diam. Hymenophoral trama regular, with hyaline to yellowish hyphae, 4-9 μm in diam, with inflated hyphae up to 28 μm diam, thin- to thick-walled (wall up to 2 μm thick), irregularly incrusted with yellowish pigment. Epicutis an irregular, thin, gelatinized layer of pale yellowish hyphae, 1.5-3 μm diam. Hypodermium with cylindric to subglobose elements, 2.5-9.5 μm diam, hyaline to yellowish, thin-walled and with incrusted yellowish pigment. Context with cylindric to subglobose elements, 4-10 μm diam, hyaline to yellowish, thin- to thick-walled, with irregular yellowish incrustations. Clamp-connections present.

Habitat and distribution. Gregarious or solitary on muddy clay brownish soil or humus in a coffee plantation, along a trail, in a mesophytic forest. Known only from Puerto Rico.

Studied material. PUERTO RICO, Municipio Villlalba, Toro Negro State Forest, trail to Torre 3 (18°10´N, 66°30´W), 820-1015 m alt., Oct. 1994, Nieves-Rivera, Santos-Flores & Betancourt s.n. (holotype MAPR; isotype XAL).

Discussion. This species belongs to Sect. *Cordisporae* Guzmán by virtue of their smaller rhomboid spores, bluing feature and subtropical habitat. It is close to *Psilocybe subtropicalis* Guzmán, from Mexico and Guatemala, by the branched cheilocystidia, but that species has spores (5.5-) 6.5-7 (-8) μm long and collybioid habit (Guzmán, 1995). *P. plutonia* differs with pleurocystidia broadly ventricose, ventricose-mucronate or obpyriform, 17-26 (-30) x 9-12 μm (Guzmán, 1983, 1995).

Figs. 1-12.- **Figs. 1-8**: *Psilocybe guilartensis*, **1**: basidiomata, **2-3**: spores, **4-6**: pleurocystidia (*5*: a rare form), **7-8**: cheilocystidia (1-2, 4-5, 7: holotype; 3, 6, 8: Nieves-Rivera *et al.* s.n. from Toro Negro). **Figs. 9-12**: *Psilocybe portoricensis*, **9**: basidioma, **10**: spores, **11**: pleurocystidia, **12**: cheilocystidia (all from the holotype). Scale bar 10 mm in *1 & 9*; 5 μm in *2, 4, 5 & 6*; 6 μm in *3*; and 7 μm in *7, 8, 10, 11 & 12*.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