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NEW SPECIES OF *PSILOCYBE* FROM COLOMBIA AND DISCUSSION ON THE KNOWN SPECIES

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ABSTRACT

The hallucinogenic fungi ***Psilocybe antioquensis***, ***P. guatapensis***, ***P. heliconiae*** and ***P. subacutipilea*** are described as new species from the Antioquia Department, Colombia. In addition, a check-list of the known species of ***Psilocybe*** from Colombia is presented and discussed.

INTRODUCTION

In continuation of the studies on the Colombian Agaricales (Pineda *et al.*, 1988; Saldarriaga *et al.*, 1988; Velázquez *et al.*, 1989), and in particular on the genus ***Psilocybe*** (Guzmán, 1978, 1983), descriptions of four new species of ***Psilocybe*** and discussions on the known species are presented. The material was studied in slides mounted in KOH 5 %, Melzer's reagent and cotton-blue in lactophenol.

DESCRIPTION OF THE NEW SPECIES

Psilocybe antioquensis Guzmán, Saldarriaga, Pineda, Garcia et Velázquez, sp. nov. Figs. 1-5

Stipite longo pseudorhizomorphico a Psilocybe mexicana Heim et Psilocybe acutipilea (Speg.) Guzmán differt et Psilocybe galindoi Guzmán sporis brevibus, (6-) 8-10 (-10.6) x (4.5-) 5.5-6.5(-7) µm differt.

Basidiocarpia in pratis ad terram. In regione subtropicali. Colombia, prope Antioquia, Medellín-Amalfi, Porce, Puente Gabino, Guzmán 29562-B, holotypus Herb. HUA; isotypus Herb. XAL.

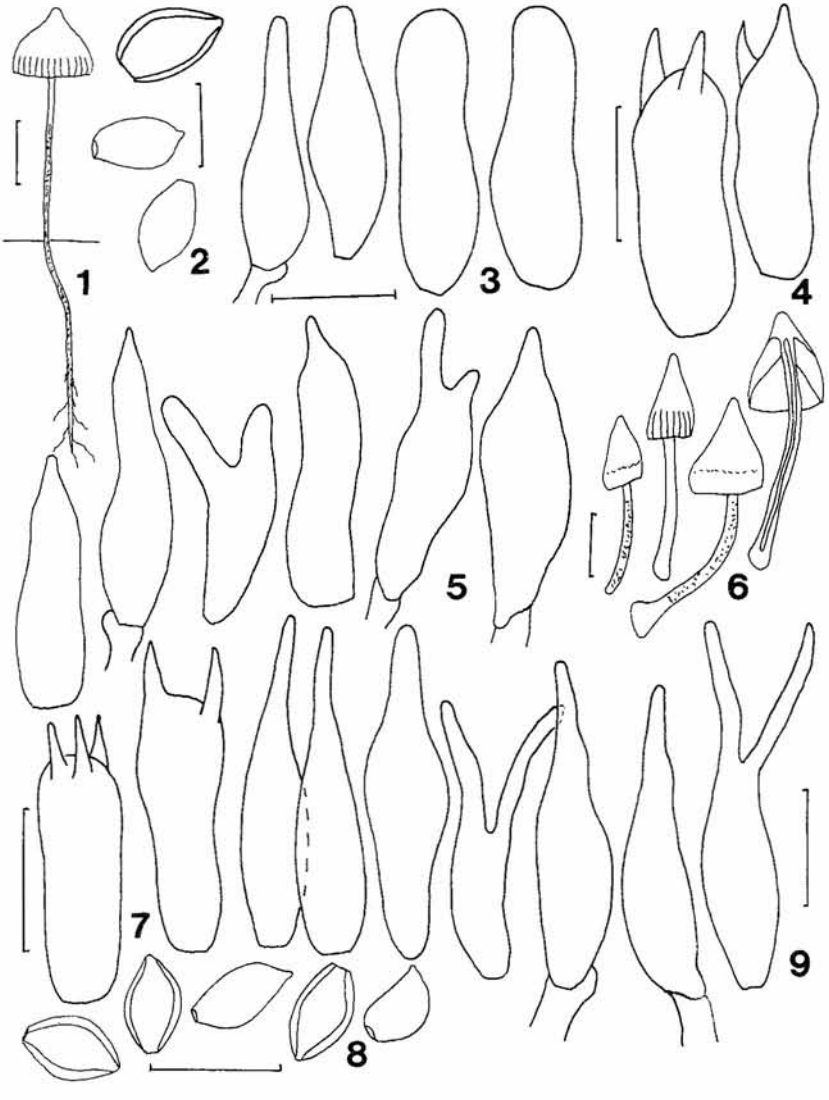
Pileus 5-12 mm in diameter, campanulate to subumbonate, subviscid or lubricous, glabrous, smooth or striate at the margin, hygrophanous, reddish-brown to fulvous, becoming straw color when dry. Lamellae sinuate, gray brownish to violaceous brown, with whitish subfloccose edge. Stipe 50-65 (including the pseudorhiza) x 0.8-2 mm, equal, flexuous, hollow, silky, but with floccose white fibrils toward the base, surface whitish to brownish or straw color, when injured turns reddish to darker, with a long pseudorhiza (± 3/4 part of the total length of the stipe). Veil silky-fibrillose, white, evanescent, leaving appressed fibrils on the margin of the pileus. Context thin, brownish in the pileus, whitish to reddish brown in the stipe, readily turning blue green when cut or injured. Odor and taste farinaceous. KOH stains readily pileus, stipe and context reddish brown. Spore print dark violaceous brown.

Spores (6-) 8-10 (-10.6) x (4.5-) 5.5-6.5 (-7) μm, subrhomboid in face view, subellipsoid in side view, thick-walled, yellowish brown, with a broad germ pore. Basidia 20-30 x 6-8 μm, 4-spored, sometimes 2-spored, hyaline, ventricose but with a median constriction. Pleurocystidia 15-23 x 3-8 μm, rare, hyaline, fusoid-ampullaceous with a short neck, sometimes ventricose or subcylindric. Cheilocystidia 15-20 x 4-6 μm, common, hyaline, fusoid-ampullaceous, papillate or with a short neck sometimes bifurcate or branched. Epicutis a subgelatinized layer, composed of parallel, hyaline hyphae 3-9 μm wide. Gill trama parallel, with hyphae 6-11 μm wide, hyaline to yellowish. Clamp connections present.

Habitat and distribution. Solitary or in small groups, in soil in a meadow with grazing grasses, in subtropical zone, at 1100 m alt. Known only from the type locality.

Studied material. COLOMBIA, Departamento Antioquia, Municipio Porce, near the road Medellín to Amalfi, zone of Puente Gabino, Aug. 31, 1990, **Guzmán 29562-B** (holotype HUA, isotype XAL); **Guzmán 29560-B; 29567-B; 29569-B** (all in HUA and XAL).

Discussion. This species is close to ***P. galindoi*** Guzmán known only from Mexico, but that has longer spores [(8.1-) 9.6-12 (-14) μm



Figs. 1-9. Two species of *Psilocybe*, 1-5: *P. antioquensis*, 1: basidioma (note the pseudorhiza), 2: spores, 3: pleurocystidia, 4: basidia, 5: cheilocystidia. 6-9: *P. guatapensis*, 6: basidiomata, 7: basidia, 8: spores 9: cheilocystidia (all from the type). Scale bar =10 mm in 1 and 6, =10 μm otherwise.

long] (Guzmán, 1983). It is also close to ***P. mexicana*** Heim and ***P. acutipilea*** (Speg.) Guzmán, the first known from Mexico and Guatemala and the later from Brazil, but they do not have pseudorhiza (Guzmán, 1983). ***P. antioquensis*** as the other mentioned species belongs to Sect. Mexicana, where all the species are characterized by hallucinogenic propierties.

Psilocybe guatapensis Guzmán, Saldarriaga, Pineda, García et Velázquez, sp. nov. Figs. 6-9

Differt a Psilocybe cordispora Heim et P. mammillata (Murr.) Smith pileo 8-12 mm lato, subcampanulato, stipite subbulboso, pleurocystidia nullo, cheilocystidia 16-28 x 3-5 µm, lageniformia et sporis (5.5-) 6-6.5 (-7) x 4-5 µm. Basidiocarpia ad terram argillacea. In zona subtropicali. Colombia, prope Antioquia, Guatapé, Guzmán 29571-B, holotypus Herb. HUA; isotypus Herb. XAL.

Pileus 8-12 mm in diameter, acute-campanulate, mamillate, lubricous, glabrous, even to slightly sulcate in the margin, hygrophanous, reddish brown to yellowish brown or yellowish orange. Lamellae subadnate, grayish brownish with violaceous tinges and whitish edges. Stipe 25-40 x 2-3 mm, equally, but at base subbulbous, hollow, flexuous, whitish to yellowish brown, covered by white subfloccose scales. Veil arachnoid, white, evanescent, leaving small appendages at the pileus margin. Context whitish in the pileus, pale brownish in the stipe. Odor and taste farinaceous. Readily turning blue green when injured.

Spores (5.5-) 6-6.5 (-7) x 4-5 µm, subrhomboid in face view, subellipsoid in side view, thick-walled, yellowish brown, with a broad germ pore. Basidia 18-20 x 5-6 µm, 2-, 3 or 4-spored, hyaline, ventricose with a median constriction. Pleurocystidia absent. Cheilocystidia 16-28 x 3-5 µm, abundant, forming an sterile band at the edge of the gill, hyaline, fusoid-ventricose or lageniform with a short or long, simple or bifurcate neck. Epicutis subgelatinous with postrated, smooth, hyaline to yellowish brown hyphae. Hyphodermium with irregular hyphae 5-19 µm in diameter, hyaline or brownish yellow, with incrustations on the walls. Gill trama with parallel hyphae 4-11 µm broad, hyaline, incrusted with brownish yellow pigment. Clamp connections present.

Habitat and distribution. Caespitose and gregarious, in orange

brown clay soil covered by mosses, in a road embankment, in a subtropical forest with ***Podocarpus***, at 1850 m alt. Known only from the type locality.

Studied material. COLOMBIA, Departamento Antioquia, Municipio Guatapé, Finca Montepinar, Sept. 15, 1990, **Guzmán 29571-B** (holotype HUA, isotype XAL).

Discussion. This species is close to ***P. cordispora*** Heim known only from Mexico, but differs by the bulbous base of the stipe, the mamillate pileus, and the smaller cheilocystidia [(20-) 25-35 x 5-6 μm in ***P. cordispora***]. Other allied species is ***P. mammillata*** (Murr.) Smith, which lacks a bulbous stipe and differs also by its cheilocystidia 12-17 μm long (Guzmán, 1983). All these fungi, including ***P. guatapensis***, belong to Sect. Cordispora that have hallucinogenic properties.

Psilocybe heliconiae Guzmán, Saldarriaga, Pineda, García et Velázquez, sp. nov. Figs. 15-19

Differt Psilocybe wrightii Guzmán et P. brasiliensis Guzmán pleurocystidia subglobosa (11-) 14-17 x 5-7 (-9) μm et cheilocystidia longa (18-) 19-22 (-24) x (4-) 5-6 μm. Basidiocarpia ad terram, in sylva tropicali. Colombia, prope Antioquia, Nariño, Puente Linda, Parra s.n., holotypus Herb. HUA; isotypus Herb. XAL.

Pileus 20-30 mm in diam., subcampanulate, subumbonate, lubricous, glabrous, even to striate at the margin, brownish to chocolate brown, finally straw color, hygrophanous. Lamellae sinuate, yellowish, grayish brown to violet brown, with whitish edges. Stipe 35-45 x 4-5 mm, pale brown to yellowish brown, cylindric, slightly thickened at the base, somewhat flexuous, hollow or stuffed of white mycelium, subpruinose to floccose with whitish scales toward the base. Context whitish under the pileus, brownish in the stipe. Odor and taste farinaceous. All parts staining blue green when injured. KOH negative or stains the pileus pale brownish.

Spores 5-6.5 (-7.5) x 4-6 μm, subrhomboid or subellipsoid in face view, subellipsoid in side view, thick-walled, yellowish brown, with a broad germ pore. Basidia 18-20 x 5-6 μm, 2-, 3 or 4-spored, hyaline, ventricose with a median constriction. Pleurocystidia (11-) 14-17 x 5-7 (-9) μm, hyaline, subglobose or ventricose. Cheilocystidia (18-) 19-22

(-24) x (4-) 5-6 μm, abundant, hyaline, sublageniform, ventricose-fusoid or sometimes submoniliform, with a short neck or slightly mucronate at apex. Epicutis a subgelatinous layer, 80 μm thick, with subparallel hyaline hyphae of 2-3 μm in diam. Gill trama parallel, with hyaline hyphae. Clamp connections present.

Habitat and distribution. Solitary or caespitose, on soil in tropical rain forest, at 500-1000 m alt. Known only from the regions of Nariño and Caquetá in Antioquía Department, at Colombia. One of the studied specimens brought from Caquetá (**Parra & Echeverry 2**) grew at a flowerpot with ***Heliconia*** in a greenhouse in Medellín.

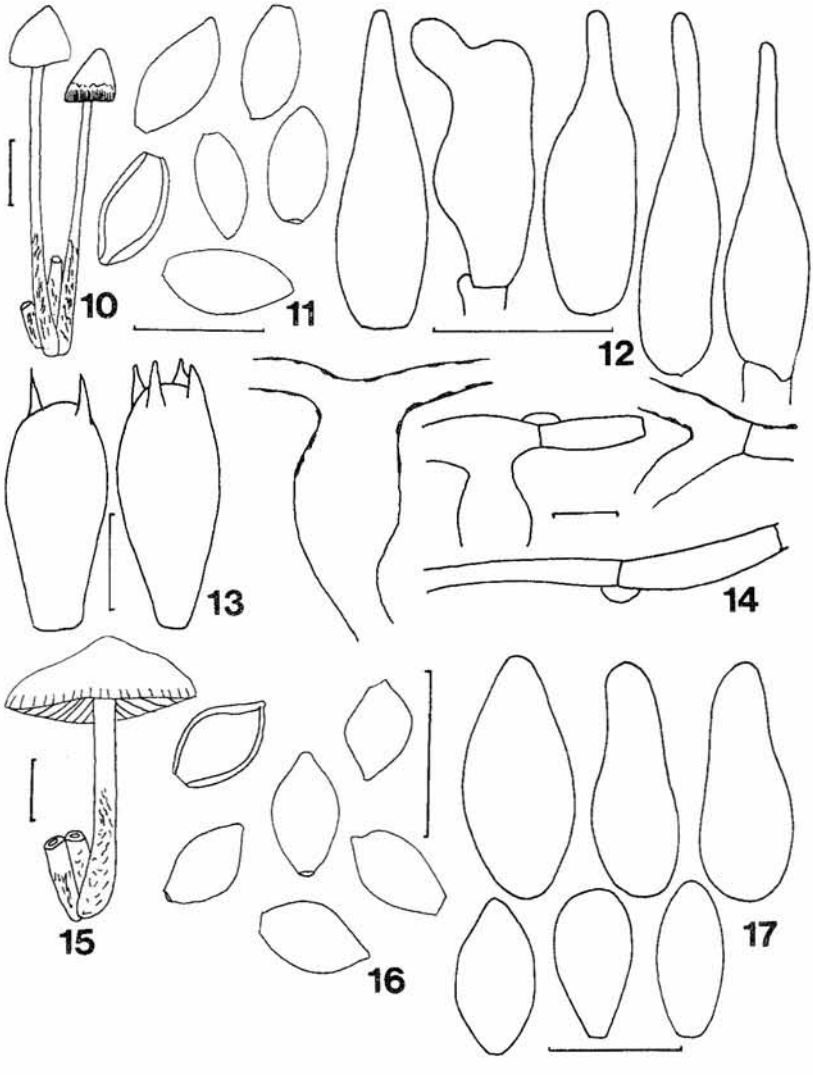
Studied material. COLOMBIA, Departamento Antioquia, Nariño region, Puente Linda, Sept. 15, 1990, **G. Parra** s.n. (holotype HUA, isotype XAL). Caquetá region, Aug. 30, 1990, **G. Parra & B. Echeverry 2** (HUA, XAL).

Discussion. The form and size of the pleurocystidia separate this species from ***P. wrightii*** Guzmán and ***P. brasiliensis*** Guzmán, the former only known from central Argentina and the second from the Sao Paulo Region in Brazil (Guzmán, 1983). These species including ***P. heliconiae*** belong to Sect. Cordispora.

Psilocybe subacutipilea Guzmán, Saldarriaga, Pineda, García et Velázquez, sp. nov. Figs. 10-14

Differt Psilocybe acutipilea (Speg.) Guzmán cheilocystidia 13-20 x 3.5-6 μm et habito caespitoso. Basidiocarpia in pratis ad terram, in regione subtropicali. Colombia, prope Antioquia, Medellín-Amalfi, Porce, Puente Gabino, Guzmán 29561-B, holotypus Herb. HUA; isotypus Herb. XAL.

Pileus 7-10 mm in diam., campanulate to subumbonate, subviscid to lubricous, glabrous, even to striate, hygrophanous, yellowish brown, grayish yellow to pale brownish. Lamellae subadnate, somewhat thick, grayish brown with violaceous tinges. Stipe 40-50 x 1-1.5 mm, cylindric, subbulbous, whitish yellow, smooth to floccose toward the base, without pseudorhiza. Context of the pileus whitish, thin. Odor and taste farinaceous. All the basidiomata turning blue-green when cut or bruised. KOH stains the pileus dark grayish brown, the stipe vinaceous brown and is negative in the context.



Figs. 10-17. Two species of *Psilocybe*, 10-14: *P. subacutipilea*, 10: basidiomata, 11: spores, 12: cheilocystidia, 13: basidia, 14: context hyphae. 15-17: *P. heliconiae*, 15: basidiomata, 16: spores, 17: pleurocystidia (all from the type). Scale bar =10 mm in 10 and 15, =10 μm otherwise.

Spores (7.5-) 8.5-9 (-11) x 5-6 (-7) μm, slightly subrhomboid in face view, subellipsoid in side view, with a thick yellowish brown wall and with a broad germ pore. Basidia 22-32 x 8-10 μm, 2-, 3- or 4-spored, hyaline, ventricose to subpiriform. Pleurocystidia absent. Cheilocystidia 13-20 x 3.5-6 μm, hyaline, vesiculose to sublageniform with a short neck less 8 μm long, sometimes irregular in form with a short lateral neck, abundant but the gill edge is heteromorphous and thick. Epicutis a gelatinous layer 25-30 μm thick, with irregular hyphae in diameter, 5-15 μm wide. Hypodermium with parallel hyphae, 2-9 μm in diam. Context of the pileus with subglobose elements, thick-walled (1-1.5 μm thick), with brown incrusted pigment. Gill trama parallel, hyphae irregular in diameter, hyaline or with brown pigment incrusted on the wall. Clamp connections present.

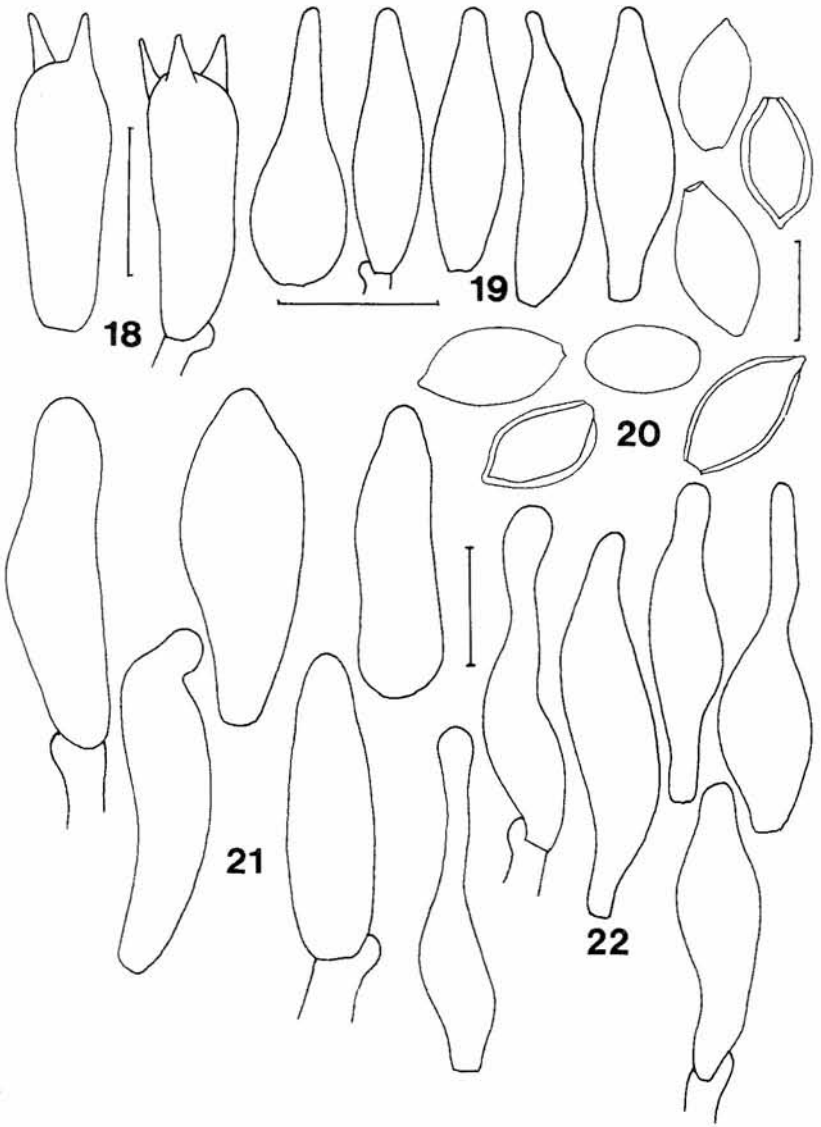
Habitat and distribution. Caespitose in soil, in a meadow with grazing grasses, in subtropical zone, at 1100 m alt. Known only from the type locality.

Studied material. COLOMBIA, Departamento Antioquia, Municipio Porce, near the road Medellín to Amalfi, zone of Puente Gabino, Aug. 31, 1990, **Guzmán 29561-B** (holotype HUA, isotype XAL).

Discussion. This species is close to ***P. acutipilea*** (Speg.) Guzmán known only from Brazil, of which it differs by the not papillate pileus and not caespitose habit and by the neck of the cheilocystidia (8-10 μm long) (Guzmán, 1983). *P. subacutipilea* belongs to Sect. Mexicana.

THE KNOWN SPECIES OF *PSILOCYBE* FROM COLOMBIA

Guzmán (1978, 1983), Guzmán and Varela (1978), Pulido (1983), Saldarriaga *et al.* (1988) and Velázquez *et al.* (1989) reported 13 species of ***Psilocybe*** from Colombia. Adding the four species described in the present paper, it makes a total of 17 taxa for Colombia (table 1). Ten of these species are hallucinogenic but are not used for ceremonial purposes by the ethnic groups, which is in contrast to the situation in Mexico (Guzmán, 1984). However, Schultes and Bright (1979) supposed that the Colombian Indians once used the hallucinogenic mushrooms, according to Indian gold pectorals and gold figures found in precolombian sites in Colombia, that resemble mushrooms and probably indicate the use of the sacred mushrooms.



Figs. 18-22. Two species of *Psilocybe*, 18-19: *P. heliconiae*, 18: basidia, 19: cheilocystidia (both from the type). 20-22: *P. cubensis*, 20: spores, 21, pleurocystidia, 22: cheilocystidia (from Guzmán 29568-B). Scale bar =10 μm.

Table 1. The known species of ***Psilocybe*** in Colombia, including the four new species described here

* ***P. antioquensis*** Guzmán, Saldarriaga, Pineda, García & Velázquez
P. argentina (Speg.) Singer (Guzmán, 1978; 1983; Guzmán & Varela, 1978; Pulido, 1983)
P. bullacea (Bull.: Fr.) Kummer (Guzmán, 1978; 1983; Guzmán & Varela, 1978)
P. castanella var. ***subhyperella*** (Singer) Guzmán (Singer, 1973; Guzmán, 1978; 1983)
* ***P. colombiana*** Guzmán (Guzmán, 1978, 1983; Guzmán & Varela, 1978; Pulido 1983)
P. coprophila (Bull. Fr.) Kummer (Guzmán, 1983; Pulido 1983)
* ***P. cubensis*** (Earle) Singer (Guzmán, 1983; Pulido, 1983) (figs. 20-22)
P. fimicola Guzmán (Guzmán, 1978; 1983; Guzmán & Varela, 1978)
P. guatapensis Guzmán, Saldarriaga, Pineda, García & Velázquez
* ***P. heliconiae*** Guzmán, Saldarriaga, Pineda, García & Velázquez
P. montana (Pers.: Fr.) Kummer (Guzmán, 1978; 1983; Guzmán & Varela, 1978; Pulido, 1983)
P. phyllogena (Peck) Peck (Guzmán, 1983; Pulido, 1983)
* ***P. pintonii*** Guzmán (Guzmán, 1978, 1983; Guzmán & Varela, 1978; Pulido, 1983)
* ***P. subacutipilea*** Guzmán, Saldarriaga, Pineda, García & Velázquez
* ***P. subcubensis*** Guzmán (Guzmán, 1978, 1983; Guzmán & Varela, 1978; Saldarriaga *et al.*, 1988; Velázquez *et al.*, 1989)
* ***P. yungensis*** Singer & Smith (Guzmán, 1983)
* ***P. zapotecorum*** Heim emend. Guzmán (Guzmán, 1983; Pulido, 1983)

* hallucinogenic species

Except ***P. fimicola*** that is a coprophilous fungus only known from a site in a páramo (Guzmán, 1983), ***Psilocybe argentina, P. coprophila, P. cubensis*** (figs. 20-22) and ***P. subcubensis*** seem to bee the most frequent ones in Colombia, due to their coprophilous habitat. *P. argentina* is known from high altitude (páramos) and the others from meadows in the regions subtropical and tropical. ***P. cubensis*** and ***P. subcubensis*** are used as recreation by young people at the Medellín region, where they are known as "hongo rey". So far ***P. colombiana***, ***P. pintonii***, ***P. fimicola*** and the four new species are known only from Colombia.

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