

**OBSERVATIONS ON SOME KNOWN SPECIES OF *PSILOCYBE*
(BASIDIOMYCOTINA, AGARICALES, STROPHARIAACEAE) FROM SPAIN
AND DESCRIPTION OF A NEW SPECIES**

por

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Summary. GUZMÁN, G. & M. L. CASTRO (2003). Observations on some known species of *Psilocybe* (*Basidiomycotina*, *Agaricales*, *Strophariaceae*) from Spain and description of a new species. *Bol. Soc. Micol. Madrid* 27: 181-187.

A list of the 15 known species of *Psilocybe* from Spain is presented. Moreover, *Psilocybe gallaeciae* is described as a new species from Galicia; it belongs to section *Mexicanae* and presents hallucinogenic properties, and it is also used recreationally. *Psilocybe calongei* is a synonym of *P. laetissima* described from Austria; it belongs to section *Atrobrunneae*. The second report of *P. semilanceata* from Galicia is presented; previously it was known only in the Pyrenees region where it is common and in the central part of Spain where it appears to be rare, and from an unknown locality in Galicia. *Psilocybe hispanica* is reported from a new locality in the Pyrenees of Aragon region, where it is very common. Both *P. semilanceata* and *P. hispanica* are used as recreational hallucinogenic fungi in Pyrenees and Galicia, respectively. An information on the probable use of these fungi in practices of witchcraft in the Middle Ages in the Pyrenees is also discussed.

Key words: *Psilocybe*, Spain, new records, new species, hallucinogenic fungi

Resumen. GUZMÁN, G. & M. L. CASTRO (2003). Observaciones sobre algunas especies conocidas de *Psilocybe* (*Basidiomycotina*, *Agaricales*, *Strophariaceae*) de España y descripción de una nueva especie. *Bol. Soc. Micol. Madrid* 27: 181-187.

Se presenta una lista de las 15 especies de *Psilocybe* conocidas en España. Además, *Psilocybe gallaeciae* se describe como nueva especie de Galicia, pertenece a la sección *Mexicanae* y presenta propiedades alucinógenas. Es usado como hongo recreacional. *Psilocybe calongei* se sinonimiza con *P. laetissima* descrito de Austria; pertenece a la sección *Atrobrunneae*. Se cita por segunda vez de Galicia a *P. semilanceata*, conocido únicamente de los Pirineos en donde es muy común y del Centro de España donde parece escaso, además de una localidad imprecisa de Galicia. Se presenta una nueva localidad para *P. hispanica* en los Pirineos Aragoneses, en donde es muy frecuente. Ambos *P. semilanceata* y *P. hispanica* son empleados como hongos alucinógenos en dicha región. Se comenta una información sobre el probable uso de estos hongos de los Pirineos, en rituales de brujería durante la Edad Media.

Palabras clave: *Psilocybe*, España, nuevas localidades, nuevas especies, hongos alucinógenos.

INTRODUCTION

The genus *Psilocybe* has received little attention in studies on Spanish fungi. There are only 15 known species, one of them endemic: *P. hispanica* Guzmán (2000), known only from Aragon. The other known species are: *P. calongei* Moreno & Esteve-Raventós (1988) from Madrid, also reported by ILLANA & al. (1989); *P. coprophila* (Bull. : Fr.) P. Kumm. from Coruña (FREIRE, 1982; CASTRO & FREIRE, 1982; CASTRO, 1985); *P. crobula* (Fr.) M. Lange [as *P. inquilina* var. *crobula* (Fr.) Høiland] from Malaga (ORTEGA & al., 1996); *P. cyanescens* Wakef. (STAMETS, 1996; GUZMÁN & al., 1998; reported not confirmed); *P. liniformans* Guzmán & Bas from Vizcaya (FERNÁNDEZ-SASIA, 2001); *P. luteonitens* (Vahl.: Fr.) Parker-Rhodes from Cataluña and Galicia (MORENO & al., 1986) and Coruña (FREIRE, 1982; CASTRO, 1985; MORENO & al., 1986); *P. merdaria* (Fr.) Ricken from Huelva (CALONGE & TELLERÍA, 1980), Salem and Belgida (MALENÇON & BERTAULT, 1971), Coruña (LOSA ESPAÑA, 1942; FREIRE, 1982; CASTRO, 1985), Basque Country (LASKIBAR & PALACIOS, 1990-1995); *P. montana* (Pers. : Fr.) P. Kumm. from Barcelona; *P. muscorum* (P. D. Orton) M.M. Moser from Pontevedra (CASTRO & al., 1997); *P. rhombispora* (Britz.) Sacc. from the Basque Country (PALACIOS & LASKIBAR, 1993-1995); *P. semilanceata* (Fr.) P. Kumm. from Pyrenees region and central part of Spain (BECKER, 1989; GUZMÁN, 2000; MORENO & al., 1986, PALACIOS, 1997; SAMORINI, 1994) and Galicia (FREIRE & al., 1994); *P. serbica* Moser & Horak (FREIRE & al., 1994); *P. squamosa* (Pers.: Fr.) P.D. Orton from several localities (GARCÍA ROLLÁN, 1971; LASKIBAR & PALACIOS, 1990-1995; MORENO & al., 1986) and Barcelona (ROCABRUNA & TABARES, 1988), and *P. strictipes* Singer & A.H. Smith (as *P. callosa* (Fr. : Fr.) Quél. s. Guzmán) from Pontevedra (CASTRO, 1995). On the other hand, the Herbarium of Real Jardín Botánico de Madrid (MA- Fungi) has registered: *P. coprophila* (Bull.: Fr.) P. Kumm. and *P. montana* (Pers.: Fr.) P. Kumm. from several localities, besides *P. calongei*, *P. semilanceata* and *P. tenax* (Fr.) Kühn. & Romang. non Rick., the latter considered by GUZMÁN (1983) as a doubtful species and also reported by CASTRO, 1985, from Lugo (Galicia).

This paper deals with a study of several collections of *Psilocybe* from Galicia and Huesca, with a description of new species, and discussion of two new records. Moreover, the status of *P. calongei* is discussed.

MATERIALS AND METHODS

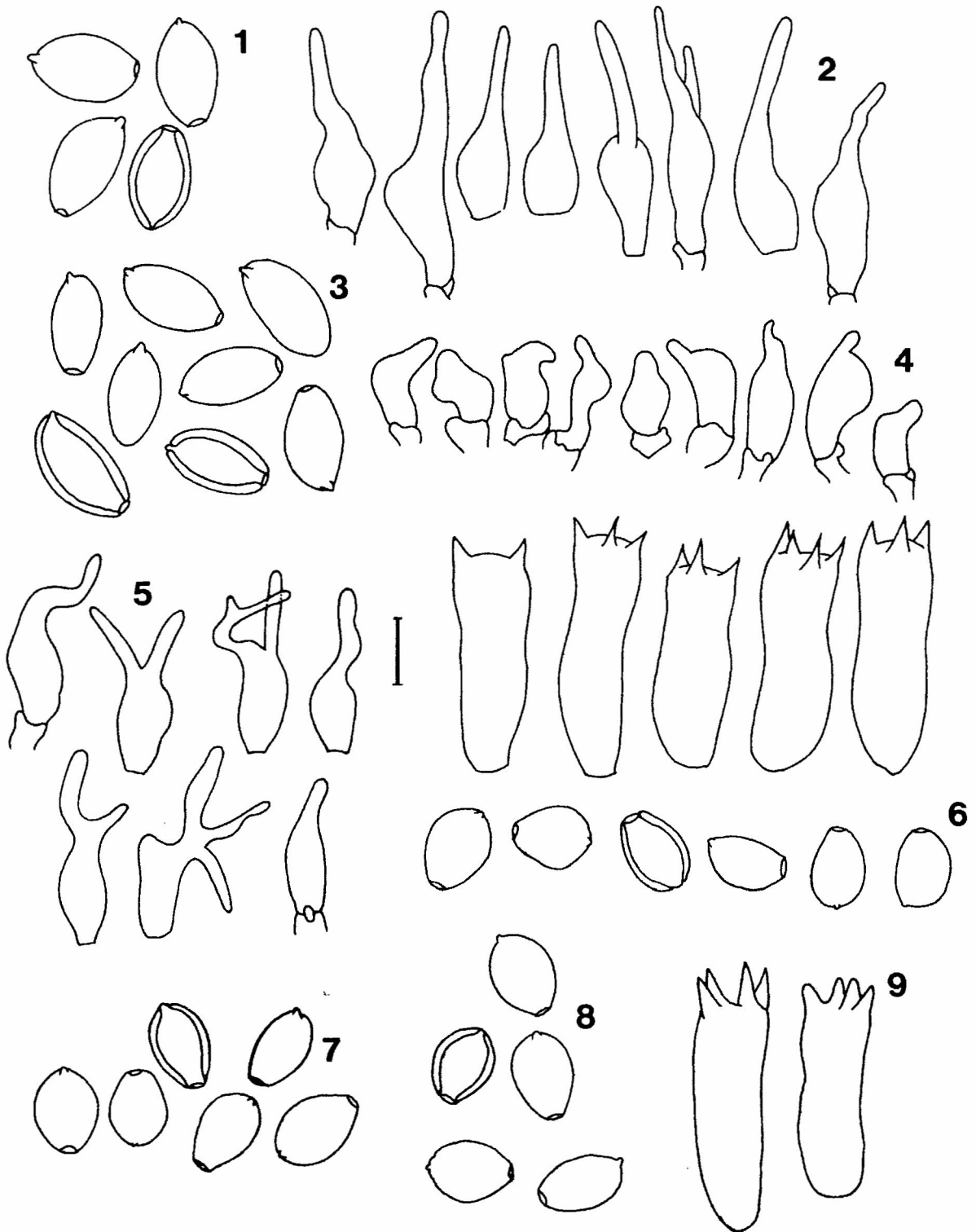
Fungi were gathered by friends of M.L. Castro and A. Lorenzo-García in Galicia and by I. Seral-Bozal in Huesca during 1999-2000. The microscopic observations were made in Mexico and in Vigo, with sections of the basidiomata mounted in 5% KOH, NH₄ OH, a mix of 1% Congo Red with 5% KOH in the slide, and Melzer solution, depending of the microscopic features being studied. The color of the microscopic features in the descriptions was taken in 5% KOH. The color abbreviations annotated in *P. gallaeciae* are from WANSCHER & KORNERUP (1991), and they were taken from dry specimens.

DISCUSSION

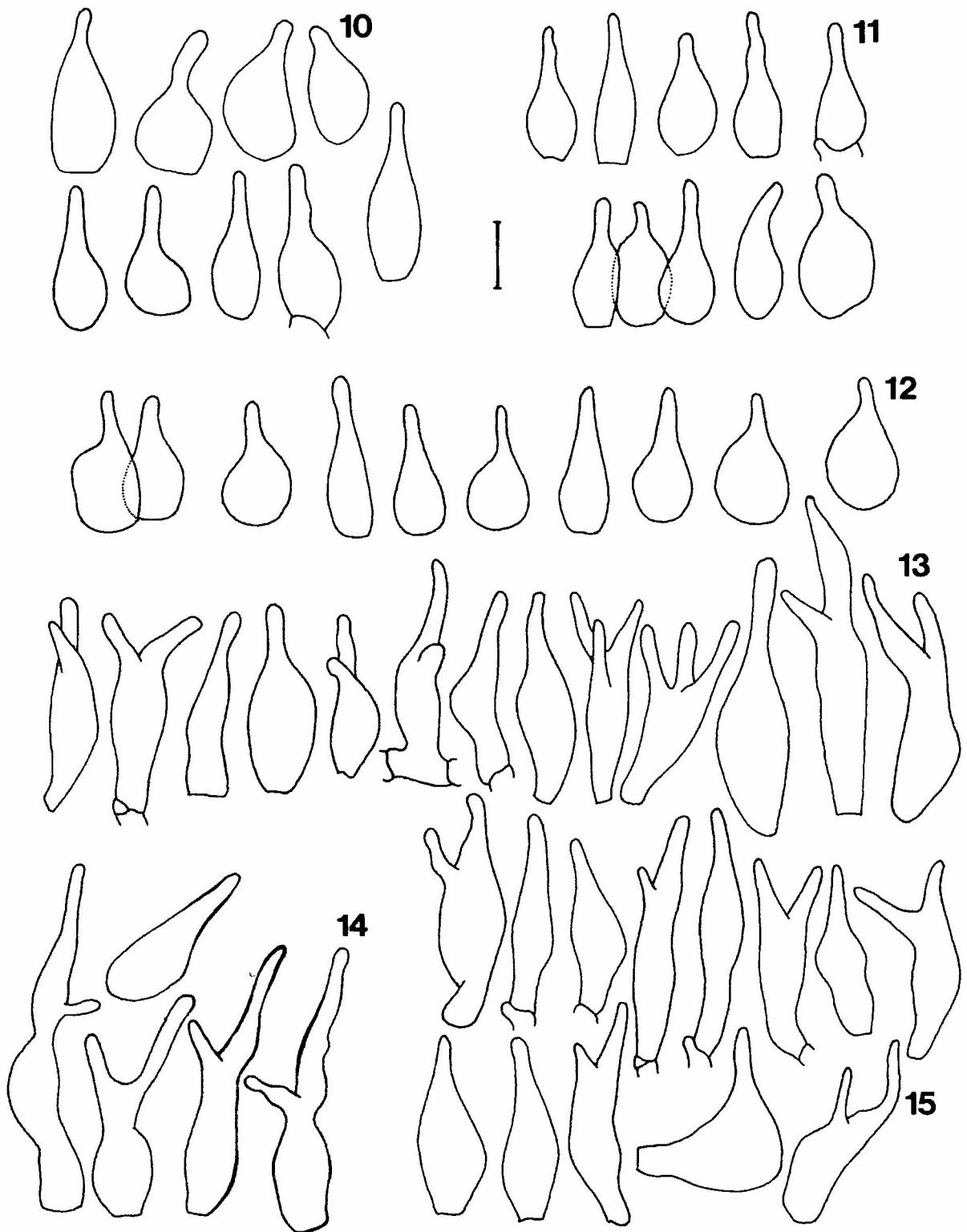
Psilocybe laetissima* versus *Psilocybe calongei

If we compare the description of *Psilocybe calongei* Moreno and Esteve-Raventós (1988) from Madrid, with that of *P. laetissima* Hausknecht & Singer from Austria, we found that both species are actually the same fungus. The basidiomata features, such as the pileus, lamellae, stipe and veil are all the same, as are the microscopic features: spores, cheilocystidia and absence of pleurocystidia. HAUSKNECHT & SINGER (1986) described the pileus as semiglobose or obtusely conical to convex, subumbonate or umbonate, bright orange rust color or deep orange yellow to pale stramineous, subhygrophanous; lamellae adnate, pale grayish to light grayish violet or fuscidulous-violet; stipe whitish to pale stramineous with an ephemorous veil. Spores (9.5-) 10-12 (-14) x (5-) 6-7 (-8.5) µm and cheilocystidia 21-40 (-51) x (3-) 4-7 µm. This description matches with that of MORENO & ESTEVE-RAVENTÓS (1988), even in the habitat reported by both papers: on soil, in meadows. The only feature that does not seem to match in both species is the subpellis. HAUSKNECHT & SINGER (1986) described the subpellis as "a cutis (non-gelatinized), consisting of more or less interwoven,

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Figs. 1-9.- 1-2. *Psilocybe semilanceata*, 1: spores, 2: cheilocystidia (both from *J. Comesaña* "A"). 3-5. *P. hispanica*, 3: spores, 4: pleurocystidia, 5: cheilocystidia (all from *I. Seral-Bozal* s.n.). 6-9: *Psilocybe gallaeciae*, 6, 7, 8: spores; 9: basidia (6, 9: *F. Valeiras* "B"). Scale bar 10 μ m.



Figs. 10-15. *Psilocybe gallaeciae*, 10-11: pleurocystidia; 12-15: cheilocystidia (10, 13; holotype; 11-14: *F. Valeiras* "A"; 12, 15: *F. Valeiras* "B"). Scale bar 10 μ m

... hyphae ..., no subcellular elements present". On the other hand, MORENO & ESTEVE-RAVENTÓS (1988) described the subpellis as "whith subsphaerical to broadly cylindrical, clamped hyphae, -15 (-20) μm diam...". It is probable that the "subpellis" of these last authors is actually the context, named trama by HAUSKNECHT & SINGER (1986), that they described as having thick clamped hyphae. It is concluded that *P. laetissima* is the correct name of the Spanish fungus. *Psilocybe laetissima* was described from the region of Vienna, and according to the form of the thick-walled spores, non-staining basidioma and the poor development veil, the species belongs to the section *Atrobrunneae* Guzmán (GUZMÁN, 1983, 1995).

A new locality of *Psilocybe semilanceata* (figs. 1-2).

This fungus was known only from the Pyrenees region (Navarra, Aragon and Catalonia) although BECKER (1989) and MORENO & *al.* (1986) also reported it from the central part of Spain, where it seems to be rare. *Psilocybe semilanceata* grows on soil in alpine meadows, at 1600-2200 m altitude, where it is very common. In the Huesca alpine meadows (Pyrenees of Aragon), *P. coprophila*, *P. hispanica* and *P. luteonitens* are also common.

It is presented here the second record of *P. semilanceata* in Galicia, now from Pontevedra, Nigrán, Chandebrito, with several specimens gathered by J. Comesaña, on 28 November 1997 (XAL). Previously it was reported by FREIRE & *al.* (1994) from Galicia but without locality. The material now studied agrees well with the concept of *P. semilanceata* according to GUZMÁN (1983). The spores are (10-) 11-14 (-15) \times (6.5-) 7-8 μm and the cheilocystidia 21-32 (-34) \times 5.5-7 (-8) μm , many of them irregularly branched.

A new locality of *Psilocybe hispanica*

This species was known only from the type locality in the Pyrenees of Aragon, in the north of Huesca, on horse dung, in an alpine meadow at 2300 m altitude (figs. 3-5).

It is reported here the second locality of *P. hispanica* in Aragon: Huesca, Tramacastillo de Tena, October 1999, I. Seral-Bozal (XAL). The studied material agrees well with the type in all the mean

features, except in the pleurocystidia (see below). It presents a spore print black violet, spores (11-) 12-14.5 (-15) \times 6.5-8 μm ; cheilocystidia (16-) 18-26 (-28) \times 5.5-7 μm , many of them irregularly branched; pleurocystidia rare, 10-20 \times 7-9 μm , hyaline, irregularly lageniform with a short neck or irregularly utriform, with or without a papilla; the pleurocystidia were not reported in the type description (GUZMÁN, 2000). It grows gregarious abundantly on horse dung, sometimes producing more than 25 basidiomata on the same dung. In the field, it is distinguished from *P. coprophila* by the bluing stipe. *Psilocybe hispanica* is very common in all the alpine meadows of the Pyrenees, at 1700-2300 m altitude, and has also penetrated the French part of the Pyrenees.

Psilocybe gallaeciae Guzmán & M.L. Castro sp. nov. (figs. 6-15)

Pileo (5-) 10-20 mm lato in sicco, convexus vel campanulatus, subpapillatus, rufobrunneo vel aurantio-brunneo, vel nigrello, hygrophano. *Lamellis adnatis vel subadnatis, rufobrunneus cum tinctus violaceus, marginis albidus. Stipe* 30-55 \times 1-2 mm in sicco, cum pseudorhiza ad -5 mm longe, brunneolo vel pileo concolore. *Sporis* (8.5-) 9.5-11 (-13) \times (6-) 7-7.5 (-9) \times 5.5-6.5 (-7) μm , oblonguis in facies, subrhombicis in frons. *Pleurocystidiis* (11-) 14-19 (-21.5) \times 5-8 (-9) μm , hyalinis, lageniformis vel late. *Cheilocystidiis* (15-) 17-30 (-40) \times (4-) 5-8 (-12) μm , hyalinis, auguste lageniformis, naequalitis ramosis. *Subhymenium cellularis. Trama subregular. Pilleipellis quam ixocutis. Subpellis subcellularis. Ad terram, graminicola. Hispania, La Coruña, Monfero, Caaveiro, 23-XI-1997. Typus* J. Comesaña "C" (XAL), isotypus MA-Fungi 56866; LOU-Fungi 17969).

Pileus (5-) 10-20 mm diam (in dry specimens), convex to subcampanulate, with a short conic papilla, smooth to sulcate-striate in dry, sometimes irregularly undulate or plicate at the margin, brown reddish (7C7-8 or 9F6-8) or brown orangish (8D5-7), hygrophanous to beige brown (6D4-5) toward the margin, in dry specimens blackish brown (9F4-5 or more black), with the center blackish red (10D8 or 10E8). *Lamellae* adnate or subadnate, thin, brown reddish violet

(10E4-5), with edges whitish and even. *Stipe* 30-55 x 1-2 mm in dry specimens, with a long pseudorhiza up to 5 mm long, uniform or slightly thick toward the base before the pseudorhiza or subbulbose, brownish pale (4A3-4) to brown reddish (7C8) or blackish (10F4-6), bluing, with white mycelium covering the base, hollow, smooth, but surface fibrillose. *Veil* non in the adults. *Context* concolorous with pileus whitish below. *Odor and taste* not checked, probably farinaceous. *Spore print* violet black.

Spores (8.5-) 9.5-11 (-13) x (6-) 7-7.5 (-9) x 5.5-6.5 (-7) μm , compressed, in face-view oblong or subellipsoid, in frontal-view subrhomboid, thick-walled, brown yellowish with a conspicuous germ pore. *Basidia* (19-) 20-28 (-33) x (7-) 8-9.5 μm , 4-spored, hyaline, subcylindrical, with a median constriction. *Pleurocystidia* (11-) 14-19 (-21.5) x 5-8 (-9) μm , hyaline, common, lageniform or broadly lageniform, with the neck short or up to 8 μm long. *Cheilocystidia* (15-) 17-30 (-40) x (4-) 5-8 (-12) μm , hyaline, common, narrowly lageniform, frequently irregularly branched with two or three necks, up to 15 μm long. *Subhymenium* cellular, with hyaline and smooth to encrusted of brown yellowish pigment, 3-8 μm wide elements. *Trama* subregular, with hyaline, cylindrical to inflated hyphae, 3-30 μm wide, some of them encrusted by brown yellow pigment. *Pileipellis* an ixocutis 16-24 μm thick, with 1.5-5 μm wide, hyaline. *Subpellis* (hypopileipellis) hyaline to encrusted of brown yellowish pigment, slightly cellular, with hyphae 2-4 μm wide and inflated elements 8-10.5 μm wide. *Clamp connections* common.

Habitat and distribution. Gregarious in soil, in grassland and gardens. Known only from Galicia, Spain, where it is common.

Studied material. SPAIN, La Coruña, Monfero, Caaveiro, 23 November 1997, *J. Comesaña* "C" (holotype XAL, isotype MA-Fungi 56866, LOU-Fungi 17969). Pontevedra, Vigo, 5 November 1999, *J. Pérez* (LOU-Fungi 17970; XAL); *F. Valeiras* "B" (LOU-Fungi 17968; XAL); Campus Universitario, As Lagoas-Marcosende, 6 October 2000, *I. Otero & J.M. Perdiz* (LOU-Fungi 17967; 10 October 2001, *J. Granda* (LOU-Fungi 17972);

5 November 1999, *F. Valeiras* "A" (XAL); Nigrán, Chandebrito, 23-28 November 1997, *J. Comesaña* "B" (XAL); 5 November 1999, *F. Valeiras* "A" (XAL); Gondomar, Pinzas, Donas, 9 November 2001, *X. Bellón et al.* (LOU-Fungi 17971); November 2000, *A. Lorenzo-García* 2 (XAL); Grove, October 2000, *I. Seral-Bozal* (XAL); Pontevedra, without locality, October 1998, *J. Ott* 98-002 (XAL).

Psilocybe gallaeciae belongs to section *Mexicanae* Guzmán, following GUZMÁN (1983) for the form and size of their thick-walled spores, and its bluing basidioma. For the pseudorhiza it is closely related to *P. galindii*, GUZMÁN (1983) from Mexico and *P. antioquiensis*, GUZMÁN & al (1994) from Colombia, but those species have cheilocystidia 14-19 μm long and 15-20 μm long, respectively. *Psilocybe mexicana* R. Heim has neither pseudorhiza nor pleurocystidia, and it is known only from Mexico and Guatemala. This is the first record of a species of the section *Mexicanae* found in Europe. Their members are known from Mexico, U.S.A. (Florida), Colombia, Brazil and Thailand (GUZMÁN, 1995). The local Galician people use *P. gallaeciae* recreationally for its hallucinogenic properties. *Psilocybe serbica* reported by FREIRE & al. (1994) from Galicia, without any description, probably is *P. gallaeciae*. *Psilocybe serbica* belongs to section *Semilanceatae* and it is known only from central Europa (GUZMÁN, 1983).

THE HALLUCINOGENIC SPECIES

From the 15 known species of *Psilocybe* in Spain, only *P. semilanceata*, *P. hispanica* and *P. gallaeciae* have hallucinogenic properties. They are used as recreational by young people in the Pyrenees region and in Galicia. It is interesting to observe that in Valle de Tena, in the Pyrenees of Aragon, was found (Seral-Bozal, pers. comm.) a medallion from the XVII Century, with a devil and some toadstools carved on it; the toadstools are related to hallucinogenic fungi, and may be belonging to *P. hispanica* or *P. semilanceata*. This is in relationship with the practicing of witchcraft, very common in that valley in the Middle Ages.

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