

SHORT COMMUNICATION

Gastón Guzmán · Taiga Kasuya

The known species of *Psilocybe* (Basidiomycotina, Agaricales, Strophariaceae) in Nepal

Received: October 20, 2003 / Accepted: March 12, 2004

Abstract *Psilocybe percevalii*, *P. pseudobullacea*, and *P. subcubensis* are reported for the first time from Nepal. Of these three the latter is the only species with neurotropic properties. Previously, only *P. montana* and *P. coprophila* have been reported from Nepal. *Psilocybe coprophila*, as reported from Nepal, probably represents *P. pseudobullacea*.

Key words Nepal · New records · *Psilocybe*

Shamanic ceremonies are very common in Nepal, and there was a suspicion that they use neurotropic fungi in such ceremonies, such as *Amanita muscaria* (L.: Fr.) Hooker or *Psilocybe* spp. (Mueller-Ebeling et al. 1998). However, the senior author did not find any use of neurotropic fungi during a stay in Nepal and his participation in some shamanic ceremonies. The fungi of Nepal, including *Psilocybe*, are not well studied, although Nepalese fungi have been studied since the 18th century (Berkeley 1854). Recently, Lakhanpal (1993) studied some Himalayan Agaricales, including those from Nepal, and Adhikari published several papers on Nepalese mushrooms (Adhikari 2000). Adhikari (2000) reported only two species of *Psilocybe* from Nepal [*P. montana* (Pers.: Fr.) P. Kumm. and *P. coprophila* (Bull.: Fr.) P. Kumm.], and Schroeder and Guzmán (1981) supposed that in Nepal there is either *P. cubensis* (Earle) Singer or *P. subcubensis* Guzmán, based on a sample that was gathered by Schroeder but unfortunately lost in transit.

The senior author explored four localities in Nepal: Kodari (in the north, close to Tibet), Kathmandu (in the center), Dhulikhel (to the east of Kathmandu), and Royal

Chitwan National Park (in the south, close to India), from approximately 2000 to 3000 m altitude. The first locality is in temperate bushes, the second and third in subtropical humid forests and meadows, and the last in a tropical evergreen forest. Of these four localities, he found *Psilocybe* only in Dhulikhel and Chitwan Park. The studied herbarium materials were observed by light microscopy, through slides mounted in 5% KOH solution. The collections were deposited in the Herbarium of Instituto de Ecología, Xalapa, Veracruz, Mexico (XAL). In the three measures of the spores, the first is length, the second width, and the third thickness.

Psilocybe percevalii (Berk. & Broome) Orton, Not. Royal Bot. Gard. 29:80, 1969. Figs. 1–4

A fimicolous or subfimicolous species, known in Europe and the United States (Guzmán 1983), this fungus has no neurotropic properties. The studied specimens presented basidioma with a pileus 20–35 mm wide, convex to subumbonate or subcampanulate, smooth, subviscid, pale ochraceous to brownish-orange. Lamellae adnate, violaceous-brown, with whitish edges. Stipe 50–70 × 3–6 mm, whitish to ochraceous. Veil well developed, forming a white, membranous annulus. Context pale ochraceous, unchanged, without odor and taste. Spores (13–) 15–17 × (8–) 9–10 μm, subellipsoid both in side and face view, thick-walled, dark yellowish-brown, with a broad germ pore. Basidia 30–42 × 12–14 μm, 4-spored, hyaline, subclavate. Pleurocystidia absent. Cheilocystidia 26–41 × 5–7.5 μm, hyaline, sublageniform or narrowly sublageniform. Trama regular. Subhymenium subcellular. Pileipellis a thick ixocutis. Subpellis (hypodermium) not well developed, with prostrated, yellowish hyphae. Clamp connections common.

Specimens examined: Dhulikhel, in the meadows, September 23, 2001, Guzmán 35078; September 24, 2001, Guzmán 35081 (both in XAL).

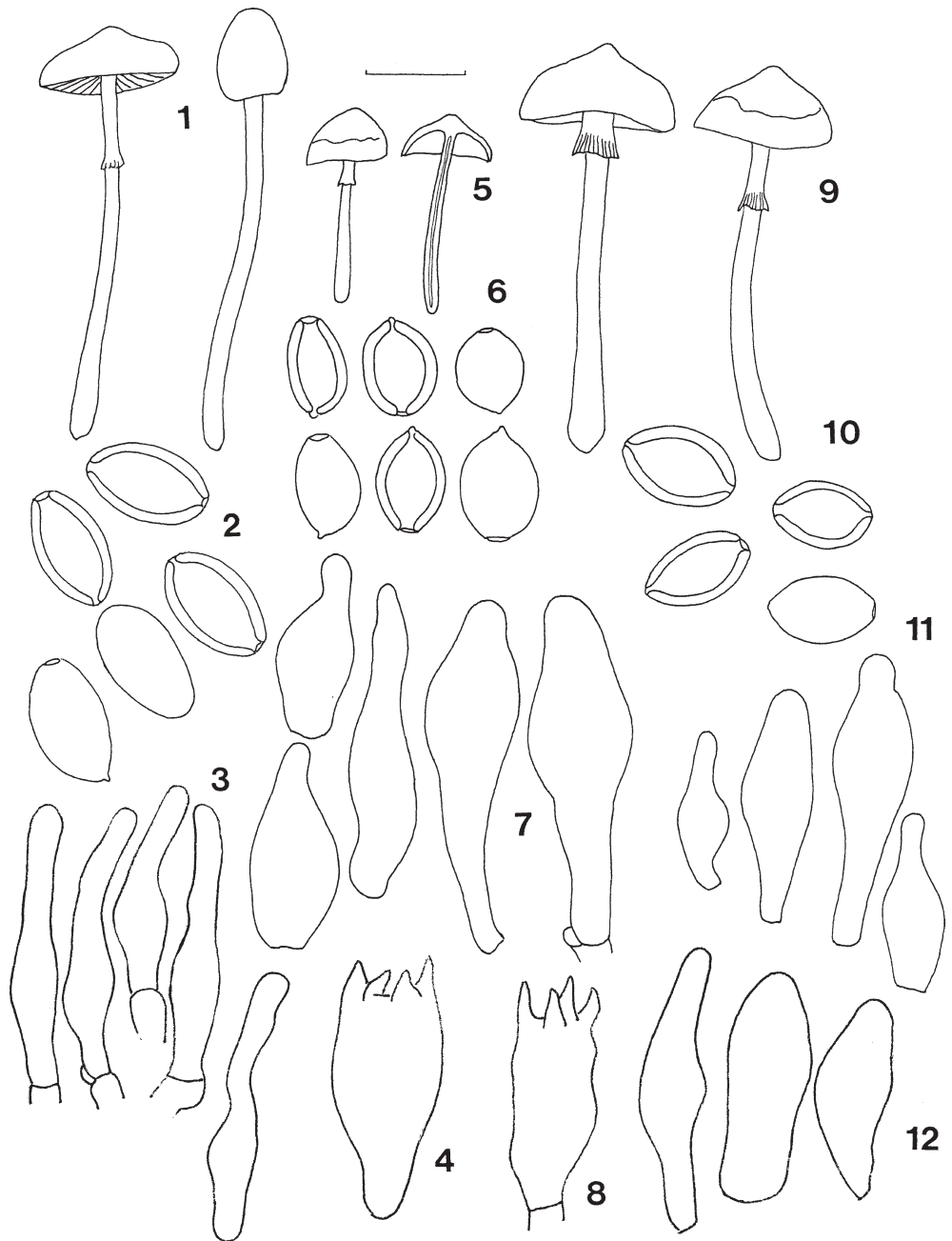
Psilocybe pseudobullacea (Petch) Pegler, Kew Bull. Add. Ser. 6, p. 473, 1977. Figs. 5–8

A common fimicolous species in Dhulikhel meadows, this species macroscopically resembles *P. coprophila*, but is dis-

G. Guzmán (✉)
Instituto de Ecología, Apartado postal 63, Xalapa, Veracruz 91000,
Mexico
e-mail: guzmang@ecologia.edu.mx

T. Kasuya
College of Agrobiological Resources, University of Tsukuba,
Tsukuba, Japan

Figs. 1–12. Basidiomata and microstructures of three *Psilocybe* species from Nepal. **1–4** *Psilocybe percevalii*. **1** Basidiomata. **2** Spores. **3** Cheilocystidia. **4** Basidium. **5–8** *P. pseudobullacea*. **5** Basidiomata. **6** Spores. **7** Pleurocystidia. **8** Basidium. **9–12** *P. subcubensis*. **9** Basidiomata. **10** Spores. **11** Cheilocystidia. **12** Pleurocystidia [1–4 Guzmán 35081; 5–8 Guzmán 35038; 9–12 Guzmán 35108]. Bars 1, 5, 9 17mm; 2–4, 6–8, 10–12 10µm



tinct from the latter by the presence of a well-developed annulus in *Psilocybe pseudobullacea*. This latter is only known from Sri Lanka (Guzmán 2000). Those materials reported by Guzmán (1983) from Mexico and Ecuador and by Pegler (1977) from Africa under the name of *P. pseudobullacea* belong to *P. pegleriana* Guzmán (Guzmán 2000). *Psilocybe coprophila* reported by Adhikari (2000) may be *P. pseudobullacea*, because the latter seems common in Nepal, but the former was not found by the senior author during expeditions in Nepal. The studied specimens of *P. pseudobullacea* present a pileus 10–20mm wide, convex to sometimes subumbonate, smooth but slightly striate at the margin, subviscid, hygrophanous, reddish-brown to yellowish-brown. Lamellae broadly adnate, with a short

decurrent tooth, dark violaceous-brown, with whitish edges. Stipe 20–35 × 0.5–1.5mm, whitish to pale gray or pale brownish. Annulus membranous, white. Context whitish to pale brown, unchanged. Odor and taste light fungoid. Spores (10.5–) 12–13 (–15) × (7.5–) 9–10 × 7.5–8 (–9)µm, subhexagonal in face view, subelliptical in side view, thick walled, dark yellowish-brown, with a broad germ pore. Basidia 23–35 × 9–13µm, 4-spored, hyaline, subclavate. Pleurocystidia (16–) 26–46 (–52) × (7–) 9–12 (–15)µm, hyaline, yellowish-brown toward the base, ventricose capitate with a narrow long or short base, or sublageniform. Cheilocystidia (18–) 21–30 (–34) × (5–) 7–10 (–13)µm, hyaline, ventricose subcapitate or ventricose-subglobose. Trama regular. Subhymenium subcellular. Pileipellis a thick

ixocutis, up to 20 µm thick, with hyaline, prostrated hyphae, 2.5–4 µm wide. Subpellis (hypodermium) subcellular. Clamp connections common.

Specimens examined: Dhulikhel, in the meadows, September 24, 2001, Guzmán 35030a; 35038; 35077 (all in XAL).

Psilocybe subcubensis Guzmán, Mycotaxon 7:248, 1978.

Figs. 9–12

A pantropical fimicolous and hallucinogenic fungus, this species is very close to *P. cubensis*, but the more robust basidioma and larger spores in *P. cubensis* separate both fungi, as well as the subtropical distribution of *P. cubensis*, contrary to *P. subcubensis*, which is common in the tropical lowlands. The studied specimens present a pileus 10–25 mm wide (vs. 40–80 mm in *P. cubensis*), subumbonate, hygrophanous, yellowish-brown, but with the center darker, smooth, subviscid, and bluing. Lamellae adnate or adnexed, dark grayish to deep violet gray, mottled, with whitish edges. Stipe 40–70 × 4–8 mm, white to yellowish, strongly bluing. Veil well developed, forming a membranous annulus, white. Context white, quickly staining blue when cut. Odor and taste strongly farinaceous. Spores (11–) 12–13 (–14) × (7–) 8–9 × 6–7 µm [vs. (12–) 13–16 (–18) × 8–10 (–11) × 7–9 µm in *P. cubensis*], subhexagonal in face view, subellipsoid in side view, thick walled, dark yellowish-brown, with a broad germ pore. Basidia 25–37 × 10–12 µm, 4-spored, hyaline, subclavate. Pleurocystidia 22–35 × 7–13 µm, sparse, ventricose with a narrow and short base, sometimes capitate or with a long neck and narrow base. Cheilocystidia 18–32 × (5.5–) 6.5–9 (–10) µm, ventricose, capitate or with a short or long neck and narrow or subcylindrical base. Trama regular. Subhymenium subcellu-

lar. Pileipellis a thick ixocutis, up to 60 µm thick. Subpellis poorly developed. Clamp connections common.

Specimens examined: Nepal Royal Chitwan National Park, near Sauraha, South of Rapti River, in the tropical evergreen forest, gregarious, on rhinoceros dung, dark place inside the jungle, October 8, 2001, Guzmán 35102; 35108 (both in XAL).

Acknowledgments The senior author thanks Claudia Mueller-Ebeling for allowing him to travel to Nepal in connection with two seminars on psychoactivity that she organized. Also, he is grateful to Christian Rättsch for the information given to him, and to Jonathan Ott for his help in one field trip. Florencia Ramírez-Guillén, María Eugenia Ramírez, Manuel Hernández, and Juan Lara Carmona helped the senior author with the microscopic, computer, and herbarium work. The second author is grateful to Drs. Makoto Kakishima and Jun'ichi Abe for reviewing the manuscript.

References

- Adhikari MK (2000) Mushrooms of Nepal. P.U., Kathmandu
- Berkeley MJ (1854) Decades XLI–XLIII. Indian Fungi. Hooker's J Bot Kew Garden Misc J 6:129–143
- Guzmán G (1983) The genus *Psilocybe*. Beih Nova Hedwigia 74:1–439
- Guzmán G (2000) New species and new records of *Psilocybe* from Spain, the U.S.A. and Mexico, and a new case of poisoning by *Psilocybe barrerae*. Doc Mycol 29(116):41–52
- Lakhanpal TN (1993) The Himalayan Agaricales. Status of systematics. Mushr Res 2:1–10
- Mueller-Ebeling C, Rättsch C, Bahadur-Shadi S (1998) Schamanismus und Tantra in Nepal. At, Aarau
- Pegler DN (1977) A preliminary agaric flora of East Africa. Kew Bull Add Ser 6. Kew, London
- Schroeder RF, Guzmán G (1981) A psychotropic fungus in Nepal. Mycotaxon 13:346–348