

First discovery of the European *Psilocybe magica* (*Agaricales, Strophariaceae*) in America

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This paper deals with the first record of the European species *Psilocybe magica* from the North American continent. It was found growing in troops among mosses in a coniferous forest, in North Cascades National Park (Washington State, U.S.A.). Its infraspecific variation and relationships with *Psilocybe montana* are discussed.

Key words: fungi, systematics, non-hallucinogenic species, *Psilocybe*.

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V článku je publikován první název z Evropy popsáného druhu *Psilocybe magica* v severní Americe. Druh byl nalezen v jehličnatém lese v národním parku North Cascades (stát Washington, USA). Je diskutována variabilita druhu a jeho vztah k *Psilocybe montana*.

INTRODUCTION

Psilocybe magica Svrček (Svrček 1989) was originally described from former Czechoslovakia (Central Bohemia) and subsequently reported from Denmark, United Kingdom (Scotland), Sweden and The Netherlands (Boekhout et al. 2002, Bon and Roux 2003, Horak 2005, Noordeloos 2001). However, it was not known to occur outside Europe. In 2004 an inventory of the macrofungi of the Stehekin Watershed of the North Cascades National Park in Washington State, U.S.A., was initiated by Trappe. The headwaters of Stehekin Watershed arise at the crest of North Cascade Mountains west of the Strait of Juan de Fuca. Moisture-bearing storms from the Pacific Ocean pass through the Strait to encounter the Cascades unabated, resulting in heavy precipitation, mainly in winter. The vegetation forms a gradient from an *Abies/Tsuga/Picea* forest at the headwaters to a xeric *Pinus/Pseudotsuga* forest at the outlet of the Stehekin River into Lake Chelan.

Guzmán and Trappe (2005) reported new records and a new species of *Psilocybe* from Washington State, mainly from the North Cascades National Park, updating the earlier knowledge of the genus in Washington in the world monograph by Guzmán (1983) and its supplement (Guzmán 1995). The present paper deals with the first North American record of an additional *Psilocybe* species from this area, viz. *P. magica*, which was originally described from Central Europe.

MATERIALS AND METHODS

The specimens were dried on a portable, electric, forced air food dehydrator at ca. 30 °C. Hand sections of basidiomata were mounted in a 5% KOH solution for microscopic study. Size of the spores included measurements of the length, width and thickness. Specimens are deposited in the Herbaria of the North Cascades National Park (NCNP), Oregon State University Department of Botany (OSC), Mycological Collection of the Instituto de Ecología at Xalapa, Mexico (XAL) and the National Herbarium of the Netherlands at Leiden (L). An additional study of the topotype of *P. magica* was also considered, because it was not possible to study the holotype.

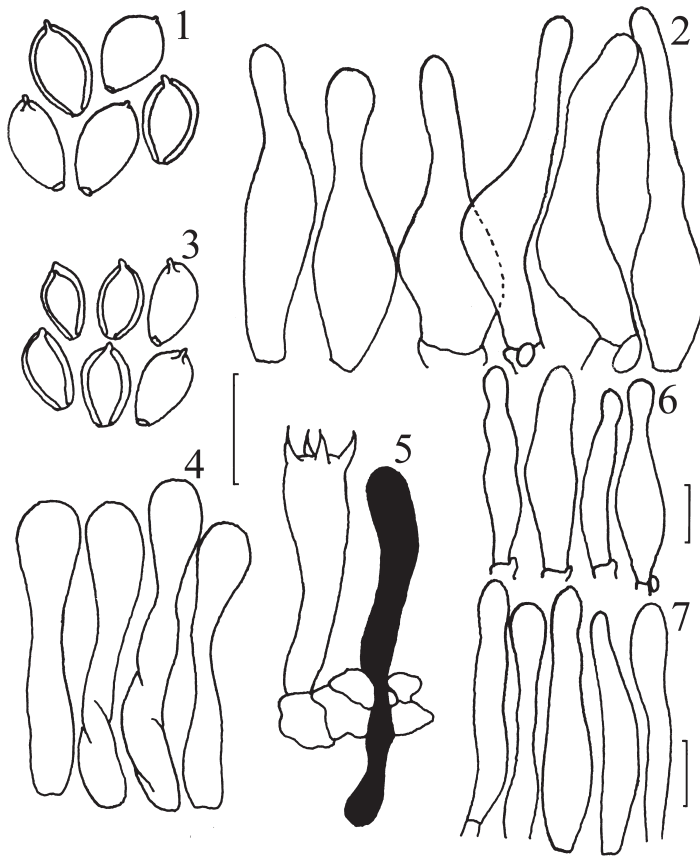
RESULTS

Psilocybe magica Svrček, Česká Mykol. 43: 82, 1986.

Figs. 1–7

Pileus 5–10 mm wide, convex, slightly viscid, hygrophanous, orangish brown, fading to pale brown. Lamellae broadly adnate with decurrent tooth, dark brown. Stipe 12–22 × 1–1.5 mm, light orangish-brown, smooth to somewhat striate and covered by scattered, small, floccose white, appressed scaly velar remnants. Basidiospores 7–9(–10) × 4.5–5 × 4–5 μm (n: 25), oblong or subrhomboid in face-view, subellipsoid in side-view, yellowish-brown, with 0.8–1 μm thick wall, and a wide germ pore. Basidia 20–36 × 5–6 μm, hyaline, 4-spored. Pleurocystidia absent. Cheilocystidia (18–)22–32(–35) × (5.5)6–8(–9) μm, sublageniform or tibiiform, with obtuse apex, 2–5 μm wide. Subhymenium with yellow oleiferous hyphae which protrude through the hymenium, as observed also in *P. montana* (Guzmán 1983). Hymenophoral trama regular to subregular, with hyphae and subcellular elements, 5–20 μm wide, with incrustated walls. Pileipellis as a ixocutis 25–60 μm thick or more, made up of hyaline 2–4 μm wide hyphae. Subpellis with inflated elements, 8–18 μm wide, incrustated with yellowish-brown pigment. Clamp connections present.

Habitat. Terrestrial, gregarious in troops, among mosses, in a clearing of a xeric *Pinus ponderosa*-*Pseudotsuga menziesii* forest.



Figs. 1-7. *Psilocybe magica*. **1, 3:** spores. **2, 4, 6, 7:** cheilocystidia. **5:** basidia and an oleiferous hypha in the hymenium. 1-2: coll. Trappe 30614; 3-5: topotype (PRM 842947); 6: from Noordeloos (2001); 7: from Svrček (1989). Scale bar: 10 μ m.

Material studied. U.S.A., Washington, Chelan Co., Lake Chelan National Recreation Area, High Bridge Campground, 19 April 2005, leg. J.M. Trappe 30614 (L, NCNP, OSC, XAL).

Additional specimen studied. Czech Republic, Central Bohemia, Voznice, near Dobříš, shore of Dolní rybník pond, 8 Aug. 1988, leg. M. Svrček (topotype, PRM 842947).

DISCUSSION

In our material no veil remnants were observed on the pileus. This seems contradictory with the observations of Svrček (1989) and Noordeloos (2001) who described white appendiculate scales or flocks near and along the pileal margin, which disappear with age. However, the presence of velar remnants on the stipe

surface in our material are indicative that veil was present in young stages. Heavy rains in the days preceding collection probably washed off the veil remnants on the pilei and left only fragments on the stipe. *Psilocybe magica* is very close to *Psilocybe montana* (Pers.: Fr.) P. Kumm., but the two species differ mainly in the shape and size of cheilocystidia, which in *P. montana* are narrowly lageniform, with the apex 2–3.5 µm wide, whereas *P. magica* has cheilocystidia variable from sublageniform or tibiiform to flexuose-cylindric or moniliform, with apex 2–5(–8) µm wide, as observed in the topotype and in the descriptions by Svrček (1989) and Noordeloos (2001) (see figs. 2, 4, 6 and 7). Furthermore, Noordeloos (2001) stressed the appendiculate veil on the cap margin of *P. magica* as a good field character to distinguish it from *P. montana*. Both *P. magica* and *P. montana* belong to section *Psilocybe* in the current classification of the genus (Guzmán 1983, 1995; Noordeloos 2001). None of them stain blue when bruised and are therefore considered non-hallucinogenic fungi according to the criterion of Guzmán (1983).

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REFERENCES

- BOEKHOUT T., STALPERS J., VERDUIN S. J. W., RADEMAKER J. and NOORDELOOS M. E. (2002): Experimental taxonomic studies in *Psilocybe* sect. *Psilocybe*. – *Mycological Research* 106: 1251–1261.
- BON M. and ROUX P. (2003): Clé analytique de la famille *Strophariaceae* Singer & A.H. Smith. – *Documents Mycologiques* 33(129): 3–56.
- GUZMÁN G. (1983): The genus *Psilocybe*. – Beihefte zur Nova Hedwigia 74, 439 pp. + 40 pls., Cramer, Vaduz.
- GUZMÁN G. (1995): Supplement to the monograph of the genus *Psilocybe*. – In: Petrini O. and Horak E. (eds.), *Taxonomic monographs of Agaricales*, Bibliotheca Mycologica 159: 91–141, Cramer, Berlin.
- GUZMÁN G. and TRAPPE J. M. (2005): The hallucinogenic and nonhallucinogenic species of the genus *Psilocybe* Fayod (Basidiomycotina) in Washington State, USA: new records and a new species. – *International Journal Medicinal Mushrooms* 7: 583–589.
- HORAK E. (2005): Röhrlinge und Blätterpilze in Europa. – 555 p., Spectrum Akademischer Verlag, Heidelberg.
- NOORDELOOS M. E. (2001): Studies in *Psilocybe* sect. *Psilocybe*. – *Österreichische Zeitschrift für Pilzkunde* 10: 115–180.
- SVRČEK M. (1989): *Psilocybe (Deconica) magica* sp. nov. – *Česká Mykologie* 43: 82–84.