

**A European find of *Hymenoscyphus dearnessii*
(Ascomycota, *Helotiales*) on *Reynoutria sachalinensis*
with notes on taxonomy and distribution**

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A European record of *Hymenoscyphus dearnessii* is published for the first time. The species was collected in the Czech Republic on dead stems of *Reynoutria sachalinensis*. It is described and briefly compared with other large-spored *Hymenoscyphus* species growing on herbs.

Key words: Czech Republic, *Hymenoscyphus*, taxonomy, distribution, fungi on allochthonous plants.

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Je publikován první evropský nález druhu *Hymenoscyphus dearnessii*. Druh byl sbírán v České republice na odumřelých lodyhách *Reynoutria sachalinensis*. Je uveden popis a krátké srovnání druhu s ostatními druhy rodu *Hymenoscyphus* s velkými sporami, rostoucími na bylinách.

INTRODUCTION

During an annually held field excursion of the Section for study of microscopic fungi of the Czech Scientific Society for Mycology, young, translucently yellow, stalked, cup-shaped apothecia were found on dead stems of *Reynoutria* and, according to the excipulum and apothecium structure, identified as *Conchatium* sp. Twelve days later it was recollected and its ascospores were observed and measured. It could not be identified with the monograph of the genus *Crocicreas* by Carpenter (1981).

Reynoutria sachalinensis (F. Schmidt) Nakai is a neophyte growing primarily in Eastern Asia, but the identity of the fungus was searched using literature of the whole world. It was finally identified as *Hymenoscyphus dearnessii* (Ellis et Everh.) Kuntze, a species not known from Europe. A thorough description and

drawing of this fungus was provided by White (1944), based on three specimens from Eastern North America including the type.

The aim of this paper is to publish the European record and to provide a description of local collections of this conspicuous species.

MATERIAL AND METHODS

Fresh apothecia were prepared and studied using tap water. Apothecia from herbarium specimens were rehydrated using tap water under an Olympus SZ-61 stereomicroscope, whereby a drop of 3% KOH was put on a piece of apothecium. The slides with material and KOH or tap water were used for measurements. Melzer's reagent (MLZ) and concentrated Lugol's solution (IKI: 1 % iodine and 3 % KI in water) were primarily used for examining the ascus porus reaction. The material was studied with an Olympus BX-51 microscope. Photographs were made using an Olympus Camedia C-5050 digital camera. Recent records of *Hymenoscyphus dearnessii* were searched using The Bibliography of Systematic Mycology. The studied specimens are deposited in the PRM herbarium (National Museum, Prague, Czech Republic).

RESULTS

Hymenoscyphus dearnessii (Ellis et Everh.) Kuntze

Figs. 1, 2

Phialea dearnessii Ellis et Everh., Proc. Acad. Nat. Sci. Philad. 45: 146, 1893. – *Hymenoscyphus dearnessii* (Ellis et Everh.) Kuntze, Revis. gen. pl. (Leipzig) 3(2): 485, 1898. – *Helotium dearnessii* (Ellis et Everh.) W.L. White, Mycologia 34(2): 167, 1942.

Description. Fresh apothecia at maturity up to 1.25 mm wide and 2.2 mm high, convex to plane discs; disc and outer surface of the cup yellow, stalk translucently juicy (yellow in the upper part to white below) and downy (with short hairs), in injured places the disc may get a brownish or brick colour. Ectal excipulum only at maturity without gelatinous substance among the hyphae, otherwise the hyphae have thick lateral walls and/or a gelatinous matter is present among the hyphae, as is the case in the genus *Conchatium*. Asci arising from simple septa, eight-spored, 97–116 × 9–10 µm (in 3 % KOH), porus without reaction in MLZ, blue in MLZ after KOH, dark grey-pink in IKI, blue to dark blue in IKI after KOH. Ascospores bi- to triseriate in fresh asci, in 3 % KOH biseriate, fusiform to cylindrical, curved, with acute upper end and gradually tapering lower end, 31–36 × 3.5 µm, mostly with one appendage at each end, sometimes with two appendages at the top; appendages 7.5–8 µm long at the top and 5–7.5 µm at the basis; in fresh state in water with up to 9–11 larger, serial refractive bodies lacking in the central, nuclear part of the spore;

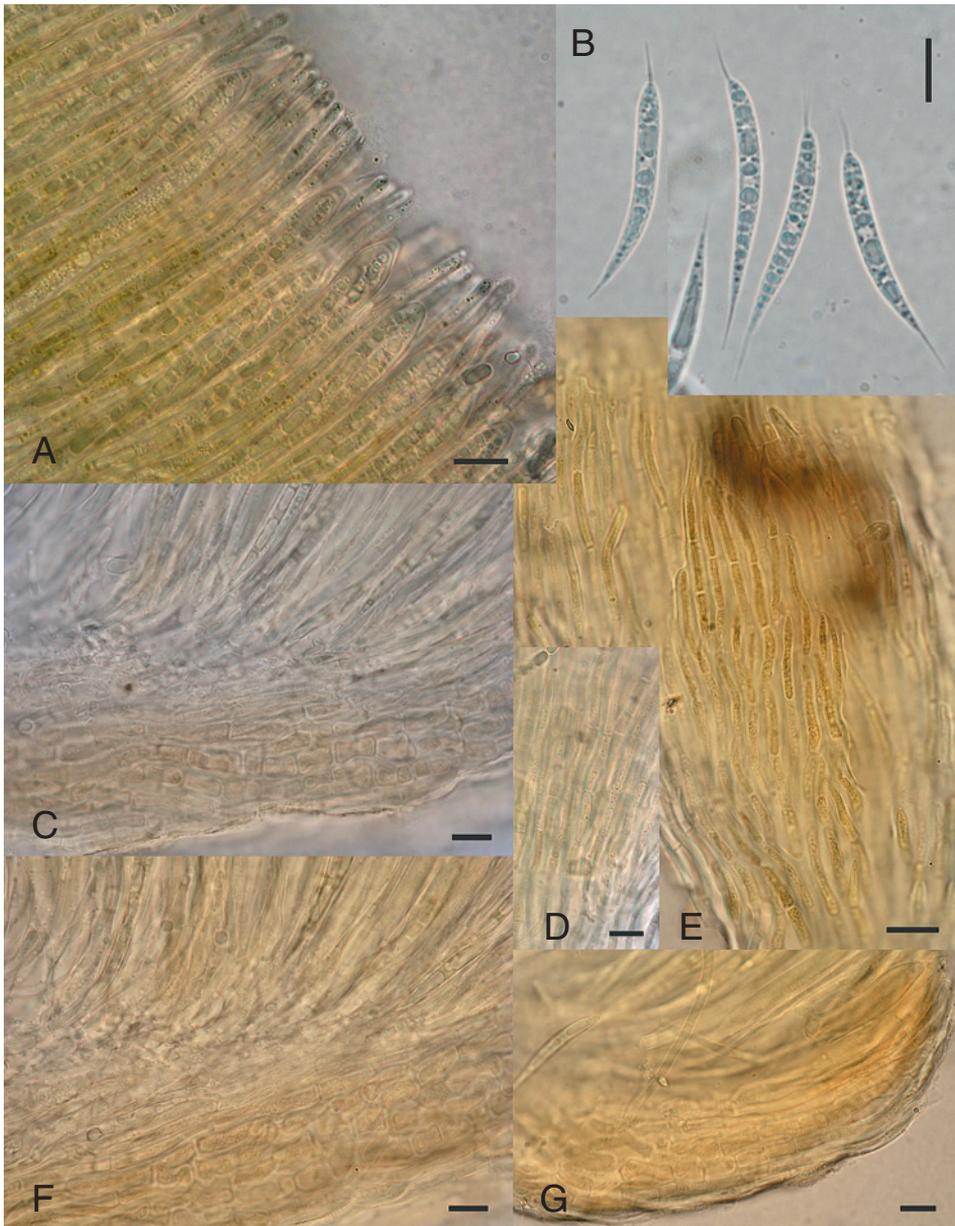


Fig. 1. *Hymenoscyphus dearnessii*. **A** – hymenium (KOH); **B** – ascospores (KOH); **C** – ectal excipulum (MLZ); **D** – outer surface (KOH); **E** – outer surface (MLZ); **F** – ectal excipulum (MLZ); **G** – ectal excipulum (MLZ). **A–D, F–G:** PRM 860619; **E:** PRM 860615. Scale bars = 10 μ m.

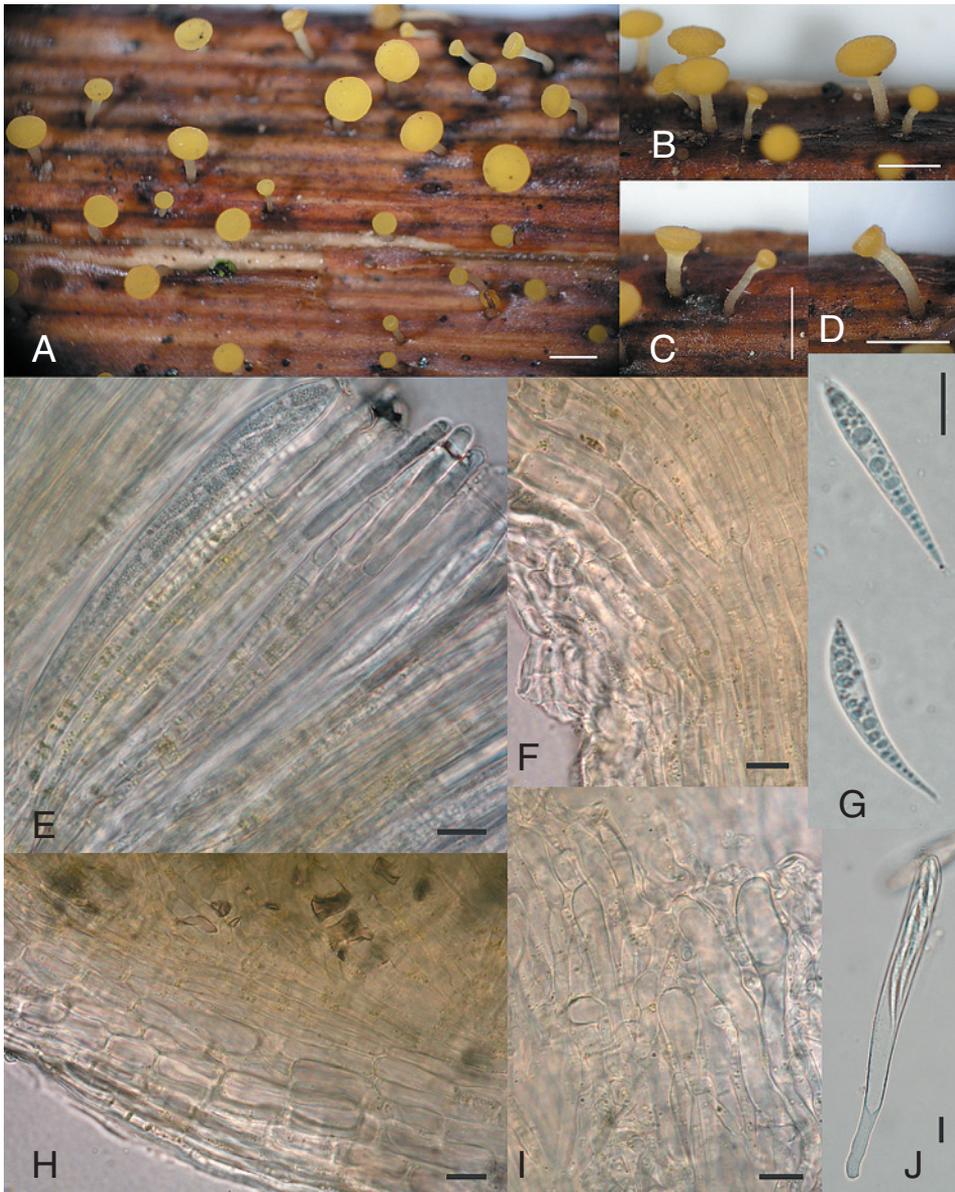


Fig. 2. *Hymenoscyphus dearnessii* in fresh state. **A–D** – fresh apothecia; **E** – hymenium (water); **F** – ectal excipulum at basis of cup (water); **G** – ascospores (water); **H** – ectal excipulum (water); **I** – inner tissue of stalk (water); **J** – ascus (water). **A–J**: PRM 860624. Scale bars: **A–D** = 1 mm; **E–J** = 10 μ m.

in the asci, fresh ascospores seem to be longitudinally striate. Paraphyses in 3 % KOH filiform, (2.5)3.5(4) μm wide, narrower in lower part, for ca. 8 μm exceeding the asci, smooth, very rarely with roughened apex, containing scattered small, yellow, refractive lipid bodies; in fresh state in water: in upper cells filled with refractive matter (this upper part also gets dark brown in IKI), lower cells containing small yellow lipid bodies, 3.5 μm wide in upper part, 2.5–3.5 μm in lower part, scarcely branched, exceeding the asci for 0–7 μm .

Studied specimens. Czech Republic: Central Bohemia, Benešov District, valley of Konopišský potok stream SE of the village of Žabovřesky, alt. ca. 340 m, 49° 47' 20.5" N, 14° 39' 35.1" E, on dead, fallen, previous year's stem of *Reynoutria sachalinensis*, 26 May 2012, leg. M. Chlebická, PRM 860615 (immature). – l.c., on previous year's stems of *Reynoutria sachalinensis*, 8 June 2012, leg. M. Chlebická, PRM 860619. – l.c., on previous year's stems of *Reynoutria sachalinensis*, 20 June 2012, leg. M. Chlebická, PRM 860624. – Central Bohemia, Benešov District, valley of Konopišský potok stream 700 m NE of Konopiště pond, alt. ca. 330 m, 49° 47' 04.9" N, 14° 39' 38.3" E, on previous year's stems of *Reynoutria sachalinensis*, 20 June 2012, leg. M. Chlebická, PRM 860620.

DISCUSSION

Taxonomy

The studied material agrees exactly with the description and detailed drawing provided by White (1944). *Hymenoscyphus dearnessii* is a species similar to *H. scutula* (Pers.) W. Phillips, from which it differs by longer ascospores. Another important difference is in the period of fructification. *H. dearnessii* is a spring to summer species. In the autumn there are only brown, dried and shrunk, dead apothecia at the locality, while *H. scutula* is an autumn species. The strong dark reaction of several upper cells of the paraphyses with IKI was observed also in fresh material of *H. scutula* (PRM 860662).

Similar species

Hymenoscyphus fucatus (W. Phillips) Baral et Hengstm. var. *fucatus* and *H. fucatus* var. *badensis* Hengstm. have ascospores with appendages, too. However, these varieties differ from *H. dearnessii* in ascospore size (24–36 \times 4–6 μm , average 29.1 μm , and 23–35 \times 4–5 μm , average 26.9 μm , respectively) and in asci arising from croziers (Hengstmengel 1996). According to White (1944) who examined two collections from the USA and the type from England, *H. fucatus* var. *fucatus* has apothecia hyaline-white when fresh, or sometimes yellowish stained, paraphyses 3–3.5 μm wide, asci arising from croziers, and ascospores with inconspicuous setulae. For measurements see Tab. 1. The paraphyses for a collection of *H. fucatus* var. *fucatus* from Germany are given as 1.5–2 μm wide by Hengstmengel (1996). *H. fucatus* var. *fucatus* is a species occurring on *Polygonum*

fructifying e.g. in September (White 1944). Another substrate, *Cicerbita alpina*, is reported by Svrček (1986).

Hymenoscyphus longisporus M.P. Sharma described from dead stems of *Geranium wallichianum* from India is similar to *H. dearnessii* in many characters. The five collections examined by Sharma (1991) are from the months of July and August. The apothecia are shallow-cupulate, sometimes discoid, the disc being concolorous with the upper part of the receptaculum, the stalk slightly tomentose, brown at the basis. All parts of the apothecia turn brown when drying. There is also similarity in the structure of the excipulum and stalk, and ascospores are multiguttulate (up to 7 guttules per spore). But there are also important differences. Apothecia of *H. longisporus* are described as cream-coloured to pale yellow or sometimes yellow. Its paraphyses were probably erroneously described as non-septate and they are only up to 1.5 µm wide according to the original description. Specimen PRM 860615 of *H. dearnessii* studied in this study, which contains immature apothecia, has paraphyses 2.5 µm wide. A less important character is that the ascospores of *H. longisporus* are reported to lack appendages. This may signalise younger material or the appendages may be missing in some collections. *H. dearnessii* has been also described having non-ciliate ascospores at first (White 1942). The presence of croziers at ascus bases was not examined by Sharma (1991). According to him, the basis is somewhat swollen.

Tab. 1. Sizes of asci, ascospores and paraphyses of *Hymenoscyphus dearnessii*, *H. fucatus* and *H. longisporus*.

	Asci (µm)	Ascospores (µm)	Paraphyses (µm)
<i>H. dearnessii</i>			
Saccardo (1895)	75–80 × 10	30–35 × 3	not given
White (1944)	100–108 × 9–13	30–35 × 4–4.5	3–3.5
Dennis (1964)	75–95 × 9–10	25–35 × 3–3.5	3
this study	97–116 × 9–10	31–36 × 3.5	(2.5)3.5(4)
<i>H. fucatus</i> var. <i>fucatus</i>			
White (1944)	118–135 × 12–15	24–34 × 5–6.8	3–3.5
Dennis (1956)	118–135 × 12–15	24–34 × 5–6.8	not given
Svrček (1986)	130–150 × 12–14	24–34 × 5–6	3–3.5
<i>H. fucatus</i> var. <i>badensis</i>			
Hengstmengel (1996)	83–101 × 9–10	(23)25–31(35) × 4–5	1.5–2
<i>H. longisporus</i>			
Sharma (1991)	98–150 × 8–11	24–35.5 × 3.5–5	1.5

Among other *Hymenoscyphus* species, *H. pileatus* (P. Karst.) Kuntze is a large-spored species with ascospores $16\text{--}32 \times 2.5\text{--}4 \mu\text{m}$, but it occurs on decaying culms of grasses and fructifies in autumn (Karsten 1871). According to Dennis (1964), *H. pileatus* may also occur on dead stems of herbs.

Helotium macrosporum Velen., described from herbs, was revised by Svrček (1986). It is an autumn species with broader ascospores ($29\text{--}34 \times 5\text{--}6 \mu\text{m}$) identified by Svrček (1986) as *H. scutula* var. *fucatus* W. Phillips.

Hymenoscyphus consobrinus (Boud.) Hengstm., occurring on stems of various herbs in July – August (–Sept.) has smaller ascospores ($17\text{--}21(23) \times 3.5\text{--}4 \mu\text{m}$) of non-scutuloid shape and is close to *H. fructigenus* (Bull.) Gray (Baral in Baral & Krieglsteiner 1985).

Distribution

In the Czech Republic (CR), it is the first find of *Hymenoscyphus dearnessii*. Its distribution on other localities of *Reynoutria* in the CR is still unknown. Lizoň (1992) did not report the species from Slovakia. Two unpublished finds of *H. dearnessii* from 2004 are known from Germany (Baral, in litt., as *H. cf. dearnessii*), both on *Reynoutria* spp. The species thus seems to be specific for *Reynoutria* (*Polygonaceae*) in Europe. The finds of *H. dearnessii* from Canada are from *Steironema ciliatum* (*Primulaceae*), collected there in 1890 and 1938 (White 1944).

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REFERENCES

- BARAL H.-O., KRIEGLSTEINER G.J. (1985): Bausteine zu einer Askomyzeten-Flora der BR Deutschland: In Süddeutschland gefundene Inoperculate Discomyzeten mit taxonomischen, ökologischen und chorologischen Hinweisen. – Beih. Z. Mykol. 6: 1–160.
- CARPENTER S.E. (1981): Monograph of *Crocicreas* (Ascomycetes, *Helotiales*, *Leotiaceae*). – Mem. New York Bot. Gard. 33: 1–290.
- DENNIS R.W.G. (1956): A revision of the British *Helotiaceae* in the herbarium of the Royal Botanic Gardens, Kew, with notes on related European species. – Mycol. Pap. 62: 1–216.

- DENNIS R.W.G. (1964): Remarks on the genus *Hymenoscyphus* S.F. Gray, with observations on sundry species referred by Saccardo and others to the genera *Helotium*, *Pezizella* or *Phialea*. – *Persoonia* 3(1): 29–80.
- HENGSTMENGEL J. (1996): Notes on *Hymenoscyphus* II – On three non-fructicolous species of the ‘fructigenus group’ with croziers. – *Persoonia* 16(2): 191–207.
- KARSTEN P.A. (1871): *Mycologia fennica. Pars prima. Discomycetes.* – *Bidrag Kännedom Finlands Natur Folk* 19: 1–263.
- LIZOŇ P. (1992): The genus *Hymenoscyphus* (*Helotiales*) in Slovakia, Czechoslovakia. – *Mycotaxon* 45: 1–59.
- SACCARDO P.A. (1895): *Sylloge fungorum omnium hucusque cognitorum.* Vol. XI. – 753 p. Patavii.
- SHARMA M.P. (1991): Diversity in the Himalayan *Hymenoscyphus* S.F. Gray: An Overview. – In: Khullar S.P., Sharma M.P., eds., *Himalayan Botanical Researches*, p. 107–211, New Delhi.
- SVRČEK M. (1986): A taxonomic revision of inoperculate Discomycetes described by J. Velenovský in the genus *Helotium*, preserved in National Museum, Prague. – *Sborn. Nár. Mus. v Praze, Řada B, Přír. Vědy* 40[1984]: 129–215.
- WHITE W.L. (1942): Studies in the genus *Helotium*. I. A review of the species described by Peck. – *Mycologia* 34(2): 154–179.
- WHITE W.L. (1944): Studies in the genus *Helotium*, IV. Some miscellaneous species. – *Farlowia* 1(4): 599–617.