

Hygrophoropsis macrospora (Basidiomycota, Boletales): a new record for the Balkan mycota

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Received: April 25, 2017 ▷ Accepted: May 27, 2017

Abstract. *Hygrophoropsis macrospora*, a less known fungus in Europe, is reported for the first time from the Balkan Peninsula (Bulgaria, Mt Vitosha). A concise description and illustrations of the studied specimen are provided.

Key words: Balkan Peninsula, boletes, Bulgaria, *Hygrophoropsidaceae*

Introduction

Genus *Hygrophoropsis* (J. Schröt.) Maire ex Martin-Sans (*Boletales*, *Hygrophoropsidaceae*) includes boletes with decurrent, forked gills and dextrinoid spores. The type species of this genus is *Hygrophoropsis aurantiaca* (Wulfen) Maire. Sixteen *Hygrophoropsis* species were known so far in the world (Kirk 2017). Five of them have been reported from Europe: the widespread *Hygrophoropsis aurantiaca* and less known *H. fuscosquamula* P.D. Orton, *H. macrospora* (D.A. Reid) Kuiper, *H. olida* (Quél.) Métrod and *H. rufa* (D.A. Reid) Knudsen (Krieglsteiner 2001; Kibby 2012; Holec & Kolařík 2013). *Hygrophoropsis olida* (with cyanophylous spores) is presently classified in the genus *Aphroditeola* Redhead & Manfr. Binder (*Hygrophoraceae*, *Agaricales*) as *Aphroditeola olida* (Quél.) Redhead & Manfr. Binder (Redhead 2013).

Only one species of *Hygrophoropsis*, *H. aurantiaca*, has been so far published for Bulgaria and it is known to occur in eight floristic regions of the country (Assyov & Denchev 2004; Denchev & Assyov 2010). *H. olida* has been also recorded in Bulgaria and currently accepted in genus *Aphroditeola* as mentioned above.

During the field studies held in September 2016 on the territory of Mt Vitosha, above the city of Sofia,

another species – *Hygrophoropsis macrospora* – has been found by the authors (Fig. 1). This is its first record for the Balkan Peninsula. Our collection consists of five mature fruitbodies.

Material and methods

The macromorphological features are described on the basis of fresh basidiomata. Microscopic examination was held on fresh and air-dried materials



Fig. 1. The locality in Mt Vitosha.

after rehydration in water. The micromorphological characters of the species were observed in water, in aqueous cotton blue and Congo red, under Olympus BX-41, Amplival and Boeco 180 T-SP LM. Amyloidity of the spores was tested with Melzer's reagent. Measurement values of basidia are presented in the minimum-maximum form. Spore size, counted from 50 basidiospores, was measured and calculated. Data about basidiospores included in the description are given as follows: (minimum–) mean $\pm 1\sigma$ (–maximum), l/w ratio, where the abbreviations are as follows: σ – standard deviation, l – spore length and w – spore width. Identification was confirmed by references to the works of Moser (1983); Singer (1986); Ryman & Holmasem (1992); Courtecuisse & Duhem (1995); Krieglsteiner (2001); Buczacki & al. (2012); Kibby (2012) and Holec & Kolařík (2013). The

microphotographs were taken by Olympus E330 and Canon PS A460 digital cameras. The specimen studied is kept at the Mycological Collection of the Institute of Biodiversity and Ecosystem Research, Bulgarian Academy of Sciences, Sofia (SOMF).

Results

Description of the species

***Hygrophoropsis macrospora* (D.A. Reid) Kuiper,**
Persoonia 16 (2): 231 (1996) (Plate I, Figs 2-5).
Syn. *Hygrophoropsis aurantiaca* var. *macrospora* D.A.
Reid, Fungorum Rariorum Icones Coloratae: 6 (1972).

Basidioma pale-coloured, whitish- to ochre-yellowish. **Pileus** 20–40 mm in diameter, initially slightly

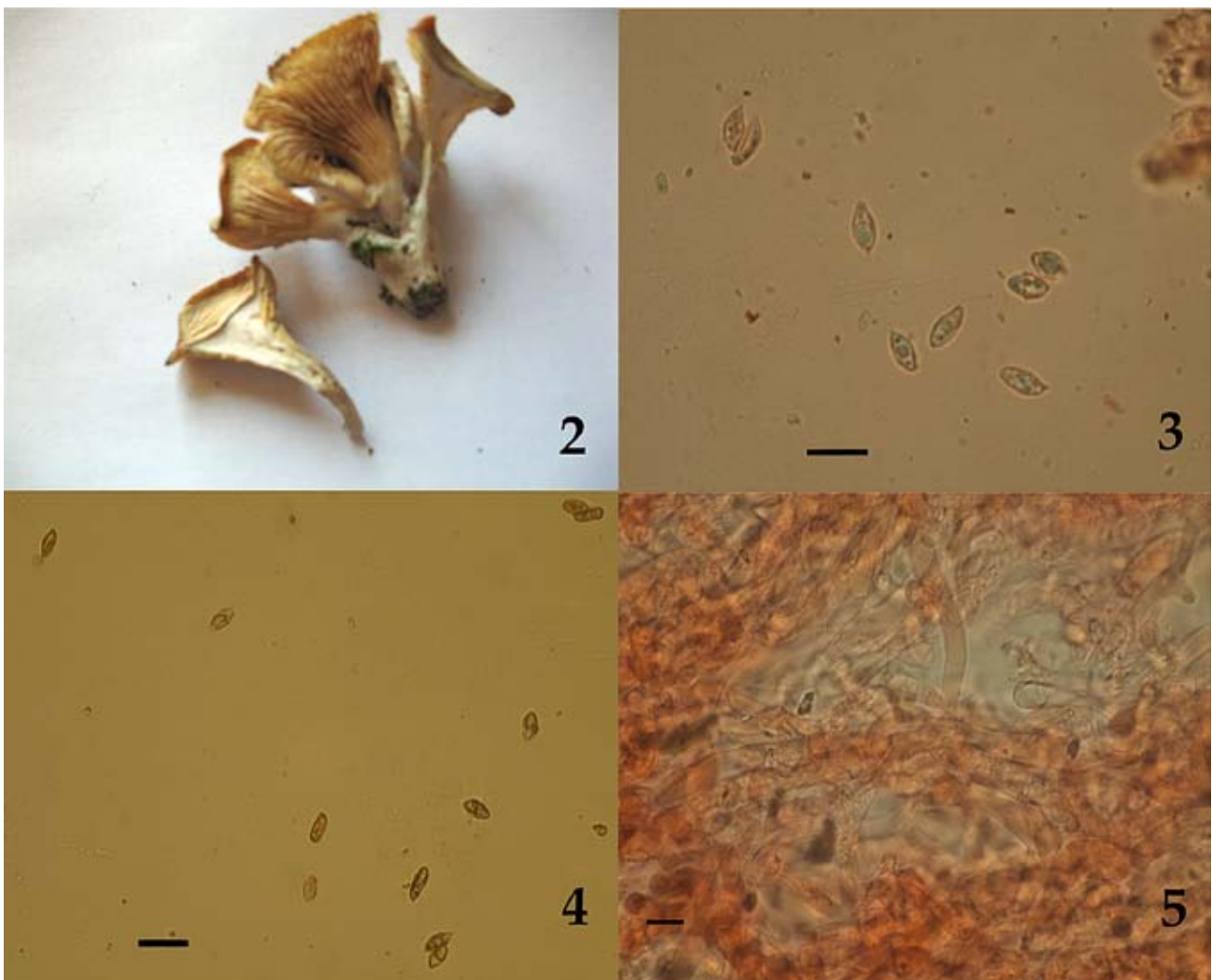


Plate I. *Hygrophoropsis macrospora*. Fig. 2. basidiomata ex situ; Fig. 3. basidiospores; Fig. 4. basidiospores in Melzer's reagent; Fig. 5. cuticular hyphae of pileipellis. Scale bars = 15 μ m.

convex, plano-convex to applanate, finely tomentose, creamy-whitish to pale-ochraceous, ochre-yellowish. Margin undulate, continuously involute. **Gills** thin, close, decurrent down the stipe, forked, whitish, pale-ochraceous to yellowish. **Stipe** 20–50 × 5–10 mm, central, cylindrical, smooth, concolorous with the pileus, white tomentose towards the base. **Context** thin, soft, whitish. Smell not distinctive. **Basidia** 32.5–37.5 (-40) × 7.5–8 µm, cylindrical-clavate, 4-spored, with basal clamp. **Basidiospores** (8.5-) 11.45 ± 1.26 (-13) × (4.2-) 4.83 ± 0.28 (-5.5) µm, l/w ratio (1.5-) 2.37 ± 0.28 (-2.8) µm, cylindrical or ellipsoid, variable, smooth, hyaline, with drops, dextrinoid (red-brown in Melzer's solution). **Cystidia** absent. **Pileipellis** consisting of smooth, hyaline, irregular hyphae, 5–10 (-12) µm thick, septa often with clamp connection.

Habitat. On acid soil, in damp grassy communities, usually among rushes (*Juncus* spp.) and in spruce forests, among *Sphagnum*, September–November (Krieglsteiner 2001, Buczacki & al. 2012; Kibby 2012). The species was reported on damp soil, under *Alnus glutinosa* (L.) Gaerth. and *A. incana* (L.) Moench by Glejdura (2013).

Specimen examined: Bulgaria: Vitosha region, Mt Vitosha, Bistrishko Branishte Biosphere Reserve, on acid soil, in a damp grassy community dominated by *Calamagrostis arundinacea* (L.) Roth, near a spruce forest, ca 1776 m a.s.l., 42.577502° N, 23.301536° E, 27.09.2016, leg. & det. M. Gyosheva, D. Stoykov (SOMF 29719).

General distribution. *Hygrophoropsis macrospora* is a very seldom recorded species. It was reported so far from northern, central and western parts of Europe: Austria, Britain, France, Germany, Netherlands, Slovakia (Krisai-Greilhuber 1999; Krieglsteiner 2001; Kibby 2012; Glejdura 2013). It is known as a temperate and boreal species (Krieglsteiner 2001).

Comments. *H. macrospora* is similar to another pale species from this genus, *H. fuscosquamula*, but it is well distinguished by the longer basidiospores and absence of dark-brownish hairs on the pileus surface. Both species occur in the same habitats. *H. macrospora* has been known as synonym of the other pale-coloured taxon, *Hygrophoropsis pallida* (Peck) Kreisel, regardless of the differences in the micromorphological characters. The spores of *H. pallida*, according to Knudsen & Vesterholt (2008), are ovate-ellipsoid and shorter: 6–10 × 4–5 µm. This species was regarded as not validly published, pointed out in the pro-

posed new combination *Hygrophoropsis macrospora* (D.A. Reid) Kuiper (see Kuiper 1996). Compared with other species of the genus, the length of the spores (up to 13 µm) is the main micromorphological character of *H. macrospora*. A great number of spores from our collection exceeded in length 12 (-13) µm. These values of the spore measures correspond well to the data from the original description of *Hygrophoropsis aurantiaca* var. *macrospora* by Reid (1972), and of *H. macrospora* by Buczacki & al. (2012) (Table 1).

Table 1. Basidiospore size of *Hygrophoropsis macrospora* comparative data.

Authors	Studied specimens	Spore length (µm)	Spore width (µm)
Reid (1972)		8.0–11.0 (-13)	3.0–4.5 (-5.0)
Krieglsteiner (2001)		7.5–11.0	4.0–5.0
Buczacki & al. (2012)		8.0–12.0	4.5–6.0
Kibby (2012)		7.0–10.0	3.5–4.5
Glejdura (2013)		8.0–11.0	4.0–5.5
SOMF 29719 (Bulgaria)		8.5–12.0 (-13)	4.2–5.5

H. macrospora has high conservation value in Europe. It has been added to the candidates for the European Red List of Fungi since 1999 (Koune 1999). The species is mentioned as relevant for assessment on the compiled European Red List of Macrofungi by the Working Group of the European Council for Conservation of Fungi.

Our record of *H. macrospora* is probably so far the southernmost European find of this species. The locality of this fungus is in the high mountain area (the coniferous forests belt of Mt Vitosha).

Acknowledgements. The work of both authors is carried out within the framework of the project "Taxonomy, conservation and sustainable use of fungi".

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