New data on larger ascomycetes (discomycetous fungi) in Bulgaria

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Abstract. In this article, 16 larger ascomycetes of the orders Helotiales, Rhytismatales and Pezizales are reported for Bulgaria. One of them, Octospora similis is a new record for the country. Seven species are of high conservation value and are included in the Red List of Fungi in Bulgaria. Four of them (Critically Endangered and Endangered) are listed also in the Red Data Book of the Republic of Bulgaria.

Key words: Ascomycota, Bulgaria, Helotiales, Pezizales, Rhytismatales

Introduction

Discomycetous fungi (Ascomycota) are subject of long-term studies in Bulgaria. The current diversity of all taxa within Helotiales and Pezizales known from the country until the year 2010 and included in earlier publications by different Bulgarian and foreign mycologists was compiled separately as comprehensive review lists by Dimitrova & Gyosheva (2009, 2010). Important new data with notes on the distribution of larger fungi, including discomycetous taxa in Bulgaria, were provided also by Dimitrova (2009), Gyosheva & Georgieva (2009), Gyosheva & Dimitrova (2011), and Assyov & al. (2012).

During field work in various parts of Bulgaria held mainly in 2013–2015 by the authors, the first national record of Octospora similis (marked in the text below with an asterisk) was made and supplemented with further new data and localities of 15 rarely recorded taxa.

Material and methods

The examination of fungi was mostly carried out on fresh specimens. Only two species were studied from dry specimens after short-time rehydration in water (Peziza michelii and Pseudoplectania sphagnophila). Sections of the ascoma were mounted in water solutions. Micromorphological characters were observed and measured in water under Olympus BX-41, Amplival and Boeco 180 T-SP LM. The amyloidity test was ascertained by Melzer’s reagent. Measurement values of the asci and spores are generally presented in the form of minimum-maximum values. Data about the ascospores included in the descriptions of Neottiella vivida (Nyl.) Dennis, Octospora leucoloma Hedw. var. leucoloma and O. similis (Kirschst.) Benkert are given as (minimum–) mean ± s (–maximum), Sl/Sw ratio, n, where abbreviations are as follows: s – standard deviation, Sl – spore length, Sw – spore width, n – the number of spores used. Spore measurements were taken further with the help of specialized software for digital images Carnoy 2.0 (©Peter Schols 2001). Identification was confirmed by using the works of Moser (1963), Dissing (1966), Dennis (1968), Breitenbach & Kränzlin (1981), Jacobson & al. (1998), Hansen & Knudsen (2000), and Olariaga & al. (2015). The known distribution of the taxa follows Dimitrova & Gyosheva (2009, 2010), where indicated.
Three taxa of the rare species were provided with descriptions, because all available information was presented only with chorological data in Bulgarian literature. The microphotographs were taken by Olympus E330 and Canon PS A460 digital cameras. All studied specimens are kept in the Mycological Collection of the Institute of Biodiversity and Ecosystem Research, Bulgarian Academy of Sciences, Sofia (SOMF). The threat status follows the Red List of Fungi in Bulgaria (Gyosheva & al. 2006). Names of authors of fungal taxa are abbreviated according to Kirk & Ansell (2004), including its online version derived from the Index Fungorum website.

Results

New and rare larger ascomycetes for Bulgaria

Helotiales

Geoglossaceae

Trichoglossum hirsutum (Pers. : Fr.) Boud. var. hirsutum (Plate I, Fig. 1)


Endangered (EN) species. New record for the Rila Mts. So far known only from Mt Vitosha and Central Rhodopi Mts – Chairski Ezera lakes (Dimitrova & Gyosheva 2010; Dimitrova 2015b).

Sclerotiniaceae

Ciboria rufofuscus Ciboria rufofuscus (O. Weberb.) Sacc.


The fungus was reported previously from a single locality in Bulgaria: Rila Mts, Generalska Pusija locality, above the village of Raduil, under Picea abies, 1355 m a.s.l., 02.07.2009, leg. & det. M. Gyosheva (SOMF 26598).


Spathularia flavida Spathularia flavida Pers. : Fr. (Plate I, Fig. 3)

Specimens examined: Western Balkan Range, Chuprene Reserve, near Gorski Ray chalet, in Picea abies (L.) Karst. forest, ca 1500 m a.s.l., 03.07.2014, leg. R. Natcheva, det. M. Gyosheva (SOMF 26596); Central Rhodopi Mts, Kupena Reserve, in a beech forest, 1318 m a.s.l., 01.07.2014, leg. & det. D. Stoykov (SOMF 26597).

The fungus is known from a single locality in Bulgaria: Western Rhodopi Mts – Beglika Reserve (Denchev & al. 2006), in coniferous forest.

Pezizales

Caloscyphaceae

Caloscypha fulgens Caloscypha fulgens (Pers. : Fr.) Boud. (Plate I, Figs 5-6)

Specimens examined: Rila Mts, Rilomanastirska Gora Reserve, in a mixed forest of Fagus sylvatica and Abies alba, on soil among mosses, ca 1440 m a.s.l., 30.04.2015, leg. & det. M. Gyosheva (SOMF 26599); Parangalitsa Reserve, in a spruce forest, among mosses, ca 1500 m a.s.l., 26.05.2015, leg. & det. M. Gyosheva (SOMF 26600).

Reported previously in Bulgaria from the Eastern Rila Mts, Pirin Mts and Western Rhodopes (Denchev & al. 2006; Dimitrova & Gyosheva 2009).
**Helvellaceae**

*Helvella lactea* Boud.

**Specimen examined:** Sofia region, near Elin Pelin town, on soil under *Populus* sp., 05.05.2014, leg. T. Nedin, det. M. Gyosheva (SOMF 26601).

*Critically Endangered* (CR) species, earlier known only from Mt Vitosha (Dimitrova & Gyosheva 2009; Petrova & Denchev 2015a).

**Pezizaceae**

*Peziza michelii* (Boud.) Dennis

**Specimen examined:** Central Balkan Range, Balgarka Nature Park, above Stanchov Han village, on soil, 10.06.2013, leg. Y. Marinov, det. M. Gyosheva (SOMF 26602).

*Endangered* (EN) species. Reported so far from the Southern Black Sea Coast, Western Balkan Range and Rila Mts (Dimitrova & Gyosheva 2009; Dimitrova 2015a).

*Plicaria endocarpoides* (Berk.) Rifai

**Specimen examined:** Vitosha region, Mt Vitosha, Bistrishko Branishte Reserve, in a fireplace, on soil among mosses, ca 1780 m a.s.l., 12.05.2014, leg. T. Nedin, det. M. Gyosheva (SOMF 26603).

The species has been reported earlier in an open-air fireplace only from Mt Vitosha (Dimitrova & Gyosheva 2009).

**Pyronemataceae**

*Lamprospora crouanii* (Cooke) Seaver (Plate II, Fig. 15)

**Ascomata** up to 3 mm in diameter, disc-shaped, hymenium smooth, orange, margin finely fimbriate, outer surface paler, whitish, with septate, pointed, hyaline hairs towards the tip; the basis buried in the ground. **Asci** (110-140–175 (-220) × 17–18.5 (-20) µm, 8-spored. **Paraphyses**, cylindrical, slightly clavate at the apex, up to (4.5-) 5–6 (-7.5) µm, with orange guttules. **Ascospores** (18.5-) 22.46±2.13 (-28.5) × (10.0-) 13.14±1.23 (-16.0) µm, (1.4-) 1.70±0.25 (-2.1), n=100, broadly ellipsoid, warted, hyaline, with a single large oil drop.

**Habitat.** On sandy soil, in groups among mosses (*Polytrichum* spp.), autumn-winter (Moser 1963; Dennis 1968; Hansen & Knudsen 2000).

**Specimen examined:** Mt Western Sredna Gora, above Gabra village, in a pine plantation, on sandy soil among *Polytrichum piliferum* Hedw., ca 950 m a.s.l., 15.10.2014, leg. & det. M. Gyosheva (SOMF 26605).

Reported so far from Sofia region (above Lokorsko village) and Mt Vitosha (Dimitrova & Gyosheva 2009).

**Octospora leucoloma** Hedw. var. *leucoloma* (Plate II, Figs 11-12)

**Ascomata** up to 2–3 mm in diameter, disc-shaped, hymenium smooth, yellowish-orange to orange, margin finely fimbriate, dentate, outer surface pale-ochraceous to orange, tomentose; underside mycelium attached to the substratum. **Asci** 125–140 (-160) × (12-) 15–16 (-17) µm, cylindrical, 8-spored. **Paraphyses** clavate, with yellow content. **Ascospores** (21.2-) 23.55±0.97 (-25.5) × (8.6-) 10.23±0.68 (-12.3) µm, (1.9-) 2.30±0.17 (-2.8), n=50, uniseriate, ellipsoid to broadly ellipsoid-fusoid, smooth, hyaline, with a single large oil drop.

**Habitat.** In groups, on sandy soil among *Bryum argenteum* Hedw., *B. dichotomum* Hedw. and other mosses, winter-spring (Dennis 1968; Dennis & Itzerott 1973; Jacobson & al. 1998; Hansen & Knudsen 2000; Eckstein & Eckstein 2009).

**Specimen examined:** Valley of Struma River, above Razhdak village, in the vicinity of Petrich town, on sandy soil among mosses (*Pleuridium acuminatum* Lindb.), ca 227 m a.s.l., 08.04.2013, leg. R. Natcheva, det. D. Stoykov (SOMF 26606).

This species was reported so far for Bulgaria from the Western Balkan Range, Rila Mts and Eastern Rhodopi Mts (Dimitrova & Gyosheva 2009).
Plate I.

**Fig. 1.** *Trichoglossum hirsutum* var. *hirsutum* – ascomata in situ; **Fig. 2.** *Mitrula paludosa* – ascomata in situ; **Fig. 3.** *Spathularia flavida* – ascomata in situ; **Fig. 4.** *S. rufa* – ascomata in situ; **Fig. 5.** *Caloscypha fulgens* – ascomata in situ; **Fig. 6.** *C. fulgens* – mature ascomata in situ; **Fig. 7.** *Otidea alutacea* – ascomata ex situ; **Fig. 8.** *O. onotica* – ascomata in situ.
Plate II.

**Fig. 9.** Neottiella vivida – ascomata in situ; **Fig. 10.** N. vivida – paraphyses and ascospore (scale bar = 15 µm); **Fig. 11.** Octospora leucoloma var. leucoloma – ascomata in situ; **Fig. 12.** O. leucoloma – asci and paraphyses (scale bar = 20 µm); **Fig. 13.** Octospora similis – ascomata in situ; **Fig. 14.** O. similis – ascus and part of the hymenium (scale bar = 15 µm); **Fig. 15.** Lamprospora crouanii – asci and ascospores (scale bar = 15 µm); **Fig. 16.** Pseudoplectania sphagnophila – ascomata in situ.
**Notes.** According to Benkert (1998b), *O. leucoloma* var. *leucoloma*, along with the 4-spored taxon *O. leucoloma* var. *tetraspora* (Fuckel) Benkert, have been assumed to parasitize on *Bryum argenteum*. Eckstein & Eckstein (2009: 226) listed *O. leucoloma* as obligate parasite on *Bryum argenteum* and *B. dichotomum*.

*Octospora similis* (Kirschst.) Benkert (Plate II, Figs 13-14)

Ascomata up to 2 mm in diameter, hemisphaerical, orange-reddish, margin and outer surface paler. **Ascii** up to 250–260 × 15–16 μm, 8-spored, cylindrical. **Paraphyses** up to 5–6 μm at the top, clavate, straight or curved towards the apex. **Ascospores** (15.0–) 17.9±1.48 (−20.0) × (11.0–) 13.3±1.11 (−15.0) μm, (1.2–) 1.34±0.1 (−1.5), n=50, broadly ellipsoid to sub-globose, hyaline, with a large, central guttule, warted.


**Specimen examined:** Rila Mts, on the southwestern slope of peak Slavov Vrah, in a spring fen, on decay plant debris, among mosses *Warnstorffia exannulata* (Schimp.) Loeske, and *Carex* sp., ca 2043 m a.s.l., 02.06.2013, leg. R. Natcheva & D. Ivanova, det. M. Gyosheva & D. Stoykov (SOMF 26591).

**Note.** The size of ascospores derived from our material conforms with the data given in Benkert (1998a). According to Currah & Davey (2006), *O. similis* (Kirschst.) Benkert infects the rhizoids of the *Bryum* species.

*Otidea alutacea* (Pers.) Massee (Plate I, Fig. 7)

**Specimen examined:** Eastern Forebalkan, Staro Selo village, on soil, in a pine plantation, close to several very young oak individuals, 18.10.2015, leg. & det. D. Stoykov (SOMF 26608).

**Vulnerable (VU)** species, earlier known in Bulgaria from the Danube Plain, Balkan Range, Vitosha region (Mt Vitosha), and Rila Mts (Dimitrova & Gyosheva 2009).

*Otidea onotica* (Pers.: Fr.) Fuckel (Plate I, Fig. 8)

**Specimen examined:** Rila Mts, above Govedartsi village, Mokrata Polyanla locality, in a coniferous forest (*Picea abies, Pinus sylvestris* and *Abies alba*), among *Hylocomium splendens* (Hedw.) Schimp., ca 1200 m a.s.l., 19.09.2014, leg. & det. D. Stoykov & M. Gyosheva (SOMF 26609).

**Vulnerable (VU)** species, so far known in Bulgaria from the Black Sea Coast, Vitosha region, West Frontier Mts (Mt Osogovska), Pirin Mts, Rila Mts (Paralgalitsa Reserve, Borovets locality), and Rhodopi Mts (Dimitrova & Gyosheva 2009).

**Sarcosomataceae**

*Pseudoplectania sphagnophila* (Pers.: Fr.) Kreisel (Plate II, Fig. 16)

**Specimen examined:** Western Rhodopi Mts, Chairski Ezena locality, on a peat island in lake Kadireviya Gyol, among *Sphagnum magellanicum* Brid., ca 1433 m, 02.06.2013, leg. R. Natcheva & D. Ivanova, det. M. Gyosheva (SOMF 26607).

The species was reported only once for Bulgaria, from the Central Rhodopi Mts, near Smolyanski Ezera locality and Lednitsa Cave (Dimitrova & Assyov 2004; Dimitrova & Gyosheva 2009)

**Note.** The examined material shows no significant difference, as compared to the data published by Dimitrova & Assyov (2004: 2), e.g. paraphyses up to 3 μm, asci at about 190–220 × 11.5–13 μm, ascospores (9.5–) 10–11.5 (−12) μm.

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**References**


