Octospora leucoloma (*Pyronemataceae*): a new bryoparasitic genus record for Turkish mycobiota

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Received: May 15, 2017 ▷ Accepted: June 13, 2017

Abstract. In the current study, *Octospora leucoloma*, known as a bryoparasitic fungus, is reported for the first time from Turkey at genus level. Macro- and microphotographs of the taxon are provided, along with a description.

Key words: *Ascomycota,* bryoparasitic fungi, new record, taxonomy

Introduction

Genus *Octospora* Hedw. has been proposed first by Hedwig (1789). It includes now approximately 100 taxa across the world (Kirk & al. 2008; Kirk & Cooper 2017). Its members are generally known as bryoparasitic fungi (Benkert 1993). In this direction, the important thing is that the fungi are often associated with specific mosses (Hansen & Knudsen 2000). Furthermore, the representatives of genus *Octospora* produce sessile to substipitate ascomata. They are cup or disc-shaped (0.1–1 cm in diameter), with vivid colours of yellowish, orange, reddish, or bluish. Asci are 4 or 8-spored. Ascospores are elliptical or fusoid, hyaline, with one or two guttules, smooth or ornamented (Yao & Spooner 1996; Hansen & Knudsen 2000).

Many studies have been carried out by the Turkish mycologists on macrofungal biodiversity, and approximately 2500 taxa have been reported. Of these, *Octospora* has not been represented with any taxa previously in Turkey (Sesli & Denchev 2008; Akata & Doğan 2015; Güngör & al. 2015; Karacan & al. 2015; Solak & al. 2015; Doğan & Kurt 2016; Kaya & al. 2016; Kaygusuz & al. 2016; Çolak & al. 2017). The purpose of this study was to contribute to the biodiversity of Turkey by reporting a new and interesting record for the country's mycobiota.

Material and methods

In the spring of 2017, some specimens of macrofungi were collected during a field trip to Çumra (Konya). The morphological and ecological characteristics of the samples were noted down and photographed in their natural habitats. After the field studies, the specimens were taken to the laboratory. Micromorphological characters were observed by light microscope using Melzer's reagent, Congo red and distilled water. At least 30 asci and ascospores from each ascoma were measured, and length and width ranges were recorded. The ascospore measurements include the extreme values given in parentheses and between them 98 % of confidence interval in 30 individual measurements.

The taxa were identified using literature on ascomycetous macrofungi (Hedwig 1789; Seaver 1942; Moser 1963; Dennis 1968; Dennis & Itzerrott 1973; Benkert 1998; Jacobson & al. 1998; Hansen & Knudsen

2000; Khare 2003; Eckstein & Eckstein 2009). The collections were deposited at the fungarium in the Süleyman Demirel University.

Results

A short description and photographs of *Octospora leucoloma* are given below. The systematics of the taxon is in accordance with Kirk & al. (2008) and Kirk & Cooper (2017).

Ascomycota Whittaker
Pezizomycetes O.E. Erikss. & Winka
Pezizales J. Schröt.
Pyronemataceae Corda

Octospora leucoloma Hedw., *Descr. micr.-anal. musc. frond.* (Lipsiae) 2: 13 (1789) (Fig. 1, a-e)

Syn: Humaria leucoloma (Hedw.) Sacc.; *Peziza leucoloma* (Hedw.) Pers.

Ascomata 0.1–0.3 cm in width, sessile, disc shaped, **hymenium** smooth, bright-orange-reddish, or apricot-colored, stalkless, **outer surface** whitish to pale-brownish-yellow, the edges curled inwards with a slightly dentate margin, distinctive white.

Asci 140–190 × 12–21 µm, cylindrical, operculate, non-amyloid, slightly clavate, containing eight uniseriately arranged spores. **Ascospores** (16.5) 17–21 (22) × 10–11.5 (12) µm, ellipsoid, usually one guttulate, hyaline and with a smooth surface. **Paraphyses** 3–4 µm in diameter below, enlarged above, reaching a diameter of 9–10 µm at their apices and with straight apices filled with numerous granules.

Habit and habitat: Gregarious or in small groups, on soil among moss, *Bryum argenteum* Hedw., in spring. Eckstein & Eckstein (2009) stated that *O. leucoloma* lived as obligate parasite on *Bryum argenteum* and *B. dichotomum* Hedw. It is reported by Khare (2003) that it may also be associated with *Funaria* and *Leptobryum* (Hedwig 1789; Seaver 1942; Benkert

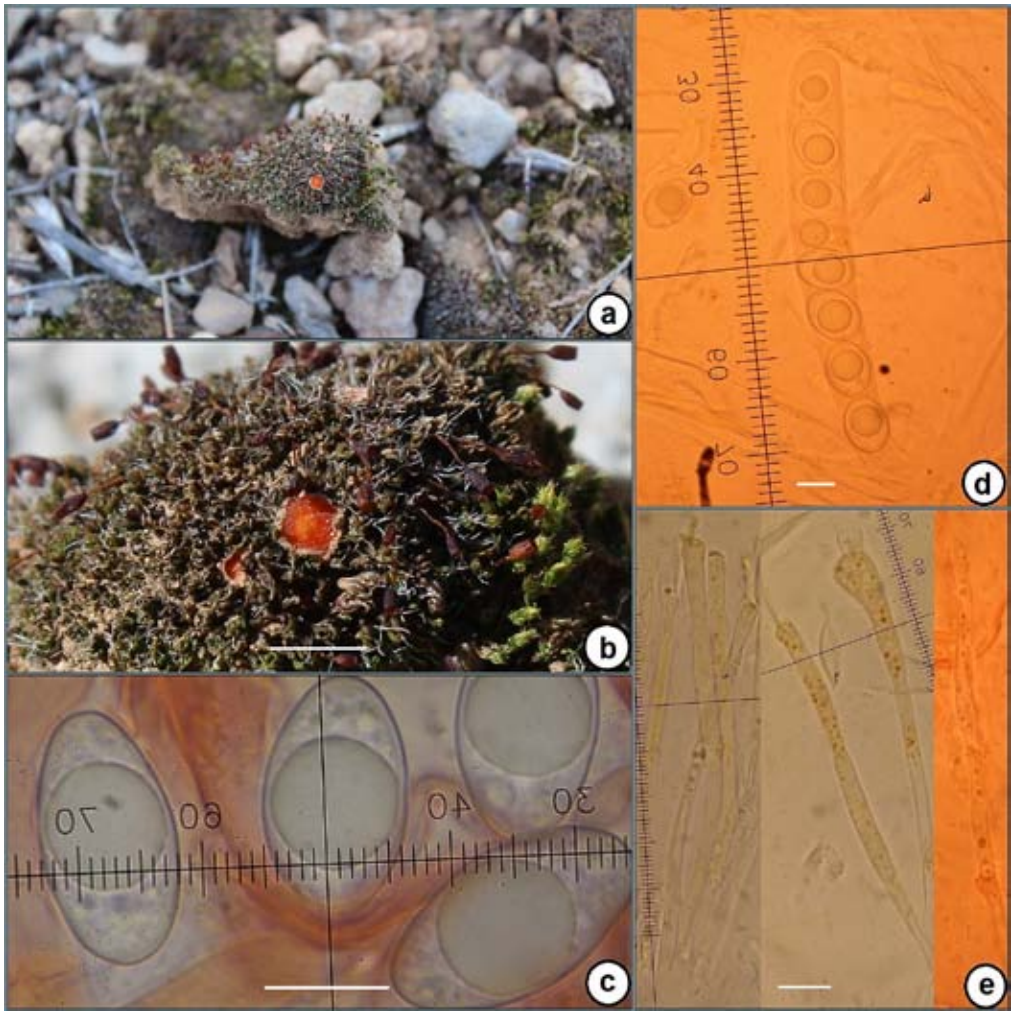

Fig. 1. *Octospora leucoloma:* **a**-**b**) ascomata; **c**) ascospores (in Congo red); d) ascus (in Congo red); **e**) paraphyses (in Melzer's reagent and Congo red) (Scale bars: b=5 mm; c, d, e = 10 µm).

1998; Hansen & Knudsen 2000; Khare 2003; Eckstein & Eckstein 2009).

Specimen examined: Turkey, Konya Province, Çumra District, Apa village graveyard, on the ground among mosses *Bryum argenteum*, 1040 m a.s.l., 26.04.2017, leg & det. Ö. F. Çolak (ÖFÇ *1270*).

General distribution: *O. leucoloma* was reported so far for Bulgaria from the Western Balkan Range, Rila Mts and Eastern Rhodopi Mts (Dimitrova & Gyosheva 2009; Stoykov & al. 2015); it is also reported from the Pacific Northwest (Larsen 1980).

Discussion

Octospora leucoloma is identified as a new record for the Turkish mycobiota at genus level (Sesli & Denchev 2008; Solak & al. 2015). *Octospora excipulata* (Clem.) Benkert (13–15 µm) differs from *O. humosa* (Fr.) Dennis (11–13 µm) and *O. leucoloma* (10–12 µm) by its width of the spores. The ascoma (0.3–1 cm) of *O. humosa* is broader (larger) than of *O. leucoloma* (0.1–0.3 cm). The three indicated species, with longer than 18 µm spores are distinguished from two other species – *O. rustica* (Velen.) J. Moravec (13–16 µm) and *O. rubens* (Boud.) M.M. Moser (15–18 µm) – by their spore size (Hansen & Knudsen 2000; Beug & al. 2014).

The species of genus *Neottiella* (Cooke) Sacc. are very similar to *Octospora* species (colour of ascomata and the same habitats). However, the ascomata of *Neotiella* members have outside hairs that can be seen only under the microscope (Breitenbach & Kränzlin 1984). *Lamprospora* De Not., which is another similar genus, generally has globose and ornamented spores (Hansen & Knudsen 2000).

A comparative analysis of asci and ascospore sizes of the Turkish specimen of *Octospora leucoloma* and data given by other authors are presented in Table 1. The size of ascus derived from our specimen conforms to the data given by Stoykov & al. (2015). The ascospore measurements obtained in our study are generally supported by the studies done by other authors. The asci and ascospore sizes of the Turkish specimen of *O. leucoloma* show no significant difference, as compared to the data published by other authors (Table 1).

According to recent studies, twenty-three genera (*Aleuria* Fuckel, *Anthracobia* Boud., *Cheilymenia* Boud., *Genea* Vittad., *Geopora* Harkn., *Geopyxis* (Pers.) Sacc., *Humaria* Fuckel, *Hypotarzetta* Donadini, *Lamprospora* De Not., *Melastiza* Boud., *Neottiella* (Cooke) Sacc., *Otidea* (Pers.) Bonord., *Picoa* Vittad., *Pseudombrophila* Boud., *Pyronema* Carus, *Scutellinia* (Cooke) Lambotte, *Rhodoscypha* Dissing & Sivertsen, *Sepultariella* Kutorga, *Sowerbyella* Nannf., *Stephensia* Tul. & C. Tul., *Tarzetta* (Cooke) Lambotte, *Trichariana* Eckblad, and *Trichophaea* Boud.) belonging to the *Pyronemataceae* family have been reported earlier in Turkey. In the present study, *Octospora* is reported as the 24th member of the family *Pyronemataceae* in the country (Sesli & Denchev 2008; Uzun & al. 2010; Akata & al. 2011, 2012; Allı & al. 2011; Akata & Kaya 2013; Solak & al. 2014; Türkoğlu & Castellano 2014; Kaya 2015; Kaya & Uzun 2015; Solak & al. 2015; Güngör & al. 2016; Şen & al. 2016).

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Table 1. Comparison of microscopic morphology of *Octospora leucoloma*.

	Size of ascus (µm)	Size of ascospore (µm)	References
O. leucoloma	140–190 × 12–21	16.5–22 × 10–12	This study
O. leucoloma (as *Octospora leucoloma* var. *leucoloma*)	125–160 × 12–17	21.2–25.5 × 8.6–12.3	Stoykov & al. 2015
O. leucoloma	–	18–24 × 11–15	Beug & al. 2014
*O. leucoloma (*as *Octospora leucoloma* var. *leucoloma*)	–	21.5–24.5 × 11–12	Eckstein & Eckstein 2009
O. leucoloma	–	18–23.5 × 10.5–12.5	Hansen & Knudsen 2000
O. leucoloma	250 × 20	18–24 × 12–15	Larsen 1980
O. leucoloma (as *Humarina leucoloma*)	200–250 × 20	18–24 × 12–15	Seaver 1942

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