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Elaphomyces anthracinus, a new hypogeous ascomycete record for Turkish mycota

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Elaphomyces anthracinus, Türkiye mikotası için yeni bir toprakaltı askomiset kaydı

Abstract: *Elaphomyces anthracinus* Vittad. is given as new record for the mycobiota of Turkey. The macro and micromorphological characters of the species are provided together with the collection locality, voucher number and the photographs related to its macro and micromorphologies.

Key words: Ascomycota, mycodiversity, hypogeous macrofungi, new record

Özet: *Elaphomyces anthracinus* Vittad. Türkiye için yeni kayıt olarak verilmiştir. Türün makro ve mikromorfolojik karakterleri, toplanma lokalitesi, toplayıcı numarası ve makro ve mikromorfolojilerine ait fotoğrafları ile birlikte verilmiştir.

Anahtar Kelimeler: Askomikota, mikoçeşitlilik, toprakaltı makromantarlar, yeni kayıt

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1. Introduction

Elaphomyces T. Nees is a widespread genus within the family *Elaphomycetaceae* (*Ascomycota*). Members of the genus generally bear the following characteristics: subglobose to globose spores, globose to subglobose 1-8 spored asci, a more or less powdery spore mass, fleshy to leathery peridium, a single chambered gleba, and globose to subglobose or irregular hypogeous ascomata (Castellano et al., 2016, 2018). They generally form ectomycorrhizal association, and widespread in temperate and subtropical forests.

Index Fungorum (2020) lists 73 conformed *Elaphomyces* taxa, six of which are also known to exist in Turkey. *Elaphomyces leucocarpus* Vittad. and *Elaphomyces muricatus* Fr. were the first two species of the genus to be reported in Turkey (Türkoğlu et al., 2015). Later on, four members of the genus (*E. citrinus* Vittad.; *E. cyanosporus* Tul. & C. Tul.; *E. granulatus* Fr. and *E. septatus* Vittad.) have also been presented from Turkey (Uzun and Kaya, 2019a,b; Uzun and Kaya, 2020).

In this paper *Elaphomyces anthracinus* is presented as the seventh member of the genus in Turkey, based on the collection from Tonya district of Trabzon province.

The current checklists on Turkish macromycota (Sesli and Denchev, 2014; Solak et al., 2015) and the last decade contributions to the hypogeous ascomycota of Turkey (Castellano and Türkoğlu, 2012; Türkoğlu and Castellano, 2014; Elliot et al., 2016; Alkan et al., 2018; Doğan et al., 2018; Kaygusuz et al., 2018; Uzun and Kaya, 2018; Uzun and Kaya, 2019c,d; Allı and Doğan, 2019; Berber et al., 2019; Yakar et al., 2019; Akata et al., 2020), indicate that this taxon has not been recorded from Turkey before.

The study aims to make a contribution to the macrofungal biodiversity of the Trabzon and Turkey.

2. Materials and Method

Fruit bodies of *E. anthracinus* were collected from Tonya district of Trabzon province. They were photographed at natural habitats, and notes were taken about the morphological and ecological characteristics. Then the specimen was carried to the fungarium, and dried in an air conditioned room. Microscopic studies were performed on dried specimen under a Nikon Eclipse Ci-S trinocular light microscope. The specimens were mounted in water and Melzer reagent. The samples were identified with the help of Hawker (1954), Moreno et al. (1991), Pegler et al. (1993), Arroyo et al. (2005), Montecchi and Sarasini (2000), Paz et al. (2017). The collected specimen are kept at Karamanoğlu Mehmetbey University, Science Faculty, Department of Biology, Karaman, Turkey.

3. Results

Ascomycota Caval.-Sm.

Eurotiomycetes O.E. Erikss. & Winka

Eurotiales G.W. Martin ex Benny & Kimbr.

Elaphomycetaceae Tul. ex Paol.

Elaphomyces anthracinus Vittad., Monogr. Tuberac. (Milano): 66 (1831).

Syn: [*Elaphomyces anthracinus* f. *talosporus* A. Paz & Lavoise; *Lycoperdastrum anthracinum* (Vittad.) Kuntze**]**

Macroscopic and microscopic features: Ascoma hypogeous, 19.5 mm in diameter, subglobose to globose, with carbonaceous exterior, umbilicate, lacking a true sterile base, minutely verrucose, or somewhat covered with binding soil particles, dark brown to black. Peridium 2-3 mm thick and composed of two layers. Thinner cortex carbonaceous, black, hard and slightly grainy. Inner peridium thick, whitish to pale grey or light brownish,

composed of subhyaline, filamentous hyphae. Gleba whitish or greyish at first, cottony, at maturity filled with a powdery mass of spores (Fig. 1). Glebal hyphae narrow and branched. Asci 30-50 µm diam., subglobose, thin-walled, usually with randomly 8-spored, evanescent. Ascospores 13-19 µm in diameter, globose, hyaline at first, pale to dark brown-blackish, nearly black when mature, and almost opaque at maturity, ornamented with numerous shallow alveoli (Fig. 2).

Elaphomyces anthracinus grows in soil and decaying leaves of many trees in deciduous or coniferous forest, commonly under *Fagus* L. and *Quercus* L. species (Moreno et al., 1991; Pegler et al., 1993; Montecchi and Sarasini, 2000; Arroyo et al., 2005).

Specimen examined: Trabzon, Tonya, İskenderli village, in soil and decaying leaves under *Fagus orientalis* Lipsky, *Rhododendron ponticum* L. and *Quercus* sp. 40°55′N-39°14′E, 760 m, 12.11.2016, Yuzun 5463.

4. Discussions

Elaphomyces anthracinus was given as new record for Turkish mycobiota as the seventh member of the genus *Elaphomyces*. In general, macro and micromorphology are in agreement with those given in literature.

Figure 1. Ascocarp of *Elaphomyces anthracinus*

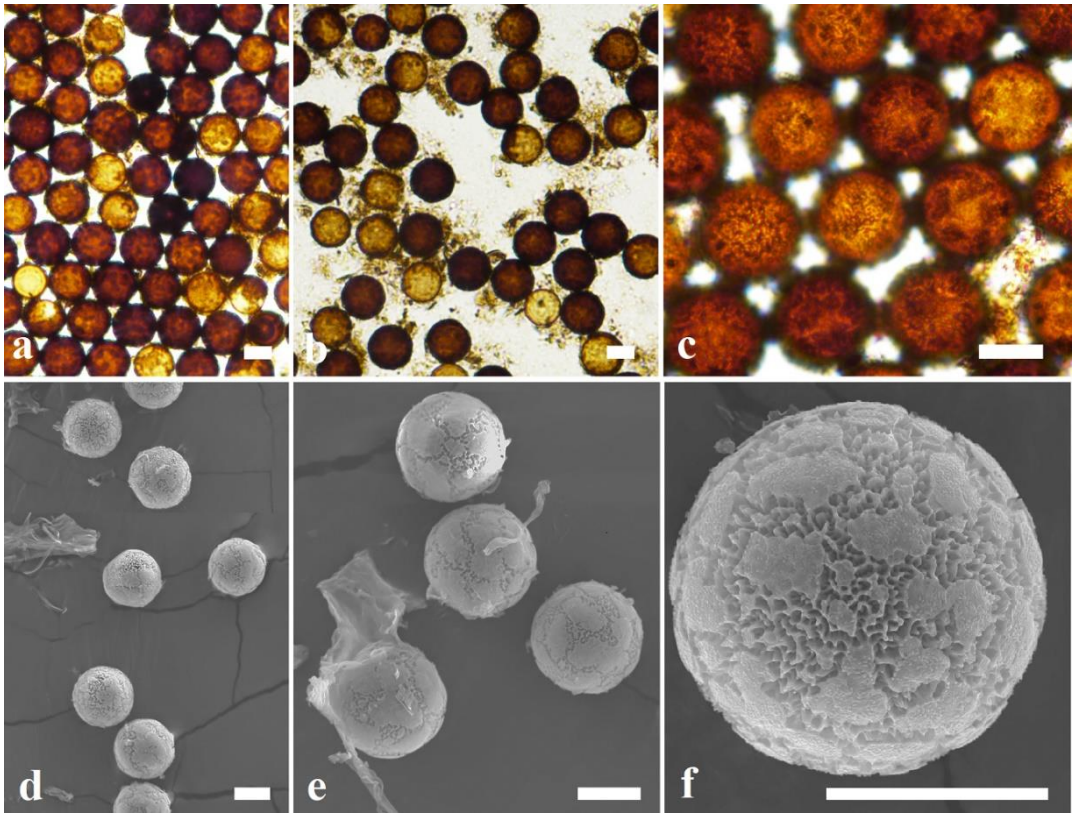

Figure 2. Light microscope (a-c) and SEM (d-f) images of the ascospores of *Elaphomyces anthracinus* (bars: 10 µm)

Since the fruit bodies of *E. anthracinus* recall the traditional charcoal balls, macroscopical identification does not offer any difficulty. The very small and blackish spores also distinguish *E. anthracinus* from the other *Elaphomyces* species with blackish and almost smooth surface.

Regarding the previous Turkish collections of *Elaphomyces*, five of them, *E. cyanosporus, E. granulatus, E. leucocarpus, E. muricatus* and *E. septatus*, have notably larger spores (with a minimum size of 19 µm), and can easily be distinguished from *E. anthracinus*. On the other hand, the sixth one, *E. citrinus*, has much more smaller spores (10.5-12.5 µm) compared to *E. anthracinus*.

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