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Onygena, A New Ascomycete Genus Record for Turkey

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ABSTRACT
The keratinophilic ascomycete genus, *Onygena* was reported for the first time from Turkey based on the collection and identification of *Onygena equina* (Willd.) Pers. species. The descriptive characters of the identified species are summarized and the collection localities were provided together with the photographs related to its macro and micro morphologies.

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Onygena, Türkiye İçin Yeni Bir Askomiset Cins Kaydı

ÖZET
Keratinofilik bir Askomiset cinsi olan, *Onygena, O. equina* türünün toplanıp isimlendirilmesine bağlı olarak Türkiye'den ilk kez rapor edilmiştir. Teşhisi yapılan türün betimleyici özellikleri özetlenmiş ve toplanma lokaliteleri, türün makro ve mikromorfolojisine ilişkin fotoğrafları ile birlikte verilmiştir.

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INTRODUCTION

Onygena Pers. is a keratinolytic genus within the family Onygenaceae. The members of the genus are characterized by a globose to rounded and usually stalked fruiting bodies, warty or smooth and brownish to lighter membranous peridium, globular 8-spored asci, more or less broadly ellipsoidal spores, and substrates of animal residues such as hairs, plumes, bones, hooves and horns (Ward, 1899; Medardi, 2006). Though 5 species of the genus were described (Kirk et al., 2008), none of them were reported from Turkey according to the current literature (Sesli and Denchev 2014; Solak et al. 2015) and the latest contributions (Kaşık et al., 2017; Akçay et al., 2018; Işık and Türkekul, 2018a,b; Kaya, 2015; Kaya et al., 2016; Kaya and Uzun, 2018; Kaygusuz et al., 2018; Sadullahoğlu and Demirel, 2018; Sesli, 2018; Uzun et al., 2018; Keleş, 2019; Şelem et al., 2019; Türkekul and Işık, 2019) presented after the checklists.

In this study, we present the first Turkish member of the genus *Onygena,* based on the collections of *Onygena equina* (Willd.) Pers. from the European part of Turkey. *Onygena equina,* commonly known as the horn stalkball, grows on putrefying hooves and horns, and can digest the keratin in those substrates. Though the fungus has so far been reported from Germany, Great Britain, France, Hungary, Italy, North America, Poland, Sweeden, Switzerland and Ukraine (Breitenbach and Kränzlin, 1984 Currah, 1985 Komorowska, 1986 Landvik et al., 1996), Kujawa et al (2012) regard this fungus as a threatened species due to its rarity in Poland.

The study aims to contribute to the macromycota of Turkey by recording a new genus.

MATERIALS and METHODS

Fruit bodies of *Onygena* were collected during a field trip in Şile district of İstanbul province on 15th

December of 2018. The morphological and ecological characteristics of the specimens were noted and they were photographed at their growing habitats. Then the sample was taken to the laboratory, dried in an air-conditioned room and prepared as fungarium material. A Nikon Eclipse Ci-S trinocular light microscope, coupled with a Nikon DS-Fi2 camera, and a Hitachi SU5000 scanning electron microscope were used for microscopic investigations. Comparing the obtained descriptive data related to the structure of fruit body and peridium, and the microscopy of the gleba, asci, and spores with the data given in literature (Ward, 1899; Breitenbach and Kranzlin, 1984; Currah, 1985; Hansen, 1998; Medardi, 2006; Roberts and Evans, 2011; Thompson, 2013), identification was performed. The sample was kept in Department of Biology, Kamil Özdağ Science Faculty, Karamanoğlu Mehmetbey University .

RESULTS

Ascomycota Caval.-Sm.

Onygenales Cif. ex Benny & Kimbr.

Onygenaceae E. Fisch.

Onygena equina (Willd.) Pers., Observ. mycol. (Lipsiae) **2**: 71 (1800) [1799]

Syn: [*Lycoperdon equinum* Sowerby, *Lycoperdon equinum* Willd., *Onygena equina* (Willd.) Pers. var. *equina, Onygena equina* var. *mougeotii* (Roum.) Sacc., *Onygena mougeotii* Roum.]

Macroscopic features: The mature fruit body resembles a miniature "button mushroom" with a head and a stalk. Head 1.5-4.3 mm in diameter, globose to subspherical, whitish to creamy whitish when young, ochraceous to light brownish when mature. Peridium thin, covered with whitish warts or scales which peel of partially or completely at maturity. Gleba of a darker mass, filling the cavity between the peridium and the stalk. Stalk 4-6(7) × 0.8-1.3 mm, cylindrical, some curved and some slightly tapered or enlarged toward the base, smooth, white, creamy white to very light brown (Figure 1).

Microscopic features: Asci 15-22 × 11-15 µm in diameter, globular to rounded, 8-spored. Paraphyses not observed.

Figure 1. Ascocarps of *Onygena equina* on decaying cow horns and hooves

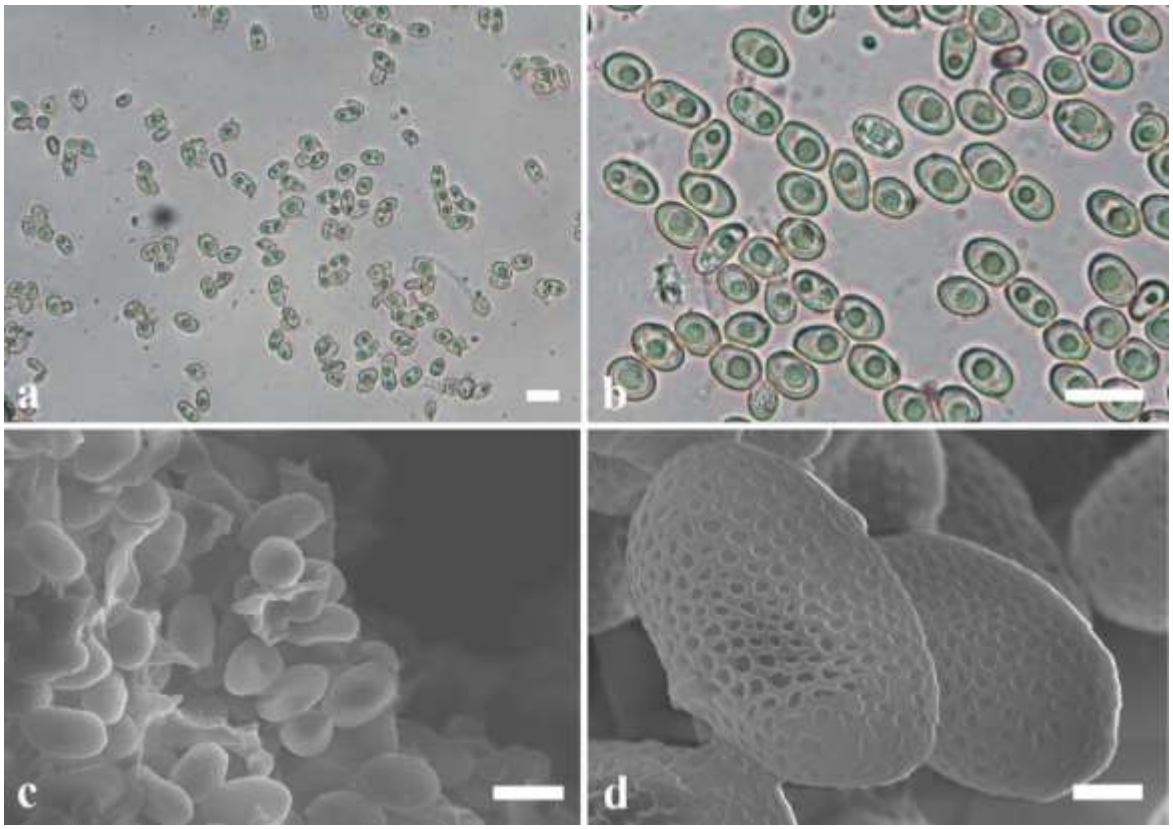

Figure 2. light microscope (a,b) and scanning electron microscope (c,d) images of ascospores of *Onygena equina* (bars- a,b: 10 µm, c: 5 µm, d: 1 µm)

Ascospores 7-9 × 4-5.5 µm, broadly elliptical, slightly tapered at one end, hyaline, with one or two oil droplets. Though the spores looks smooth under a light microscope, at higher magnification under scanning electron microscope a net-like ornament is visible (Figure 2).

Ecology: *Onygena equina* was reported to grow on decaying residues such as bones, horns and hooves of various domestic or wild animals such cattle, sheep, goat, and the antlers of deer (Ward, 1899; Breitenbach and Kranzlin, 1984; Medardi, 2006; Thompson, 2013).

Specimen examined: İstanbul, Şile, Esenceli village, in and outside of decaying horn pieces in *Quercus* sp. forest, 41°04′N-29°25′E, 225 m, 15.12.2018, Yuzun 7023.

DISCUSSION

The members of the genus *Onygena* are specialized to live on horny substances (Breitenbach and Kranzlin, 1984). *Onygena corvina* Albertini and Schweinitz and *O. equina* are the two most common species of the genus (Trudell and Ammirati, 2009) and very similar to each other (Beug et al., 2014), but *O. equina* has broader spores and larger head and a shorter stalk. *Onygena equina* occurs on the decaying horns and hooves of cattle and sheep while *O. curvina* usually found on owl pellets, bird carcasses, hair and wool (Trudell and Ammirati, 2009).

The characteristics of the determined species is generally in agreement with those given by Ward (1899), Breitenbach and Kranzlin (1984), Medardi (2006) and Thompson (2013), but the stalks of the Hansen (1998)'s samples seems to be longer.

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