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A New Species Record from the Order of Pezizales; *Coprotus disculus*

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Abstract: The article reports new data on the occurrence of *Coprotus disculus* Kimbr., Luck-Allen & Cain collected in Hakkâri Province, Türkiye. The species was identified based on morphological data. The second record of the genus in Türkiye is reported. Macroscopic and microscopic characters and photographs are given, along with the collection information.

Key words: *Ascomycota*, Coprophilous, Fungi, *Pezizomycetes*, Türkiye.

Pezizales Ordosundan Yeni Bir Tür Kaydı; *Coprotus disculus*

Öz: Makale, Türkiye'nin Hakkâri ilinde toplanan *Coprotus disculus* Kimbr., Luck-Allen ve Cain'in oluşumu hakkında yeni verileri rapor ediyor. Türler morfolojik verilere göre tanımlanmıştır. Türkiye'de cinsin ikinci kaydı verilmiştir. Koleksiyon bilgileri ile birlikte makroskopik ve mikroskopik karakterler ve fotoğraflar verilmiştir.

Anahtar kelimeler: *Ascomycota*, Gübre Seven, Fungi, *Pezizomycetes*, Türkiye.

Introduction

An overview of the nomenclature, taxonomy, and systematics of the genus *Coprotus* Korf was recently published by Kuşan et al., (2018). The genus was validly published in 1967 (Kimbrough & Korf, 1967). Species of the genus occur on herbivore dung and are characterized by small, sessile, translucent, or whitish to yellow oblate to lenticular or discoid apothecia, with a reduced excipulum composed of angular to globose cells; operculate inamyloid 8-multispored asci; filiform, slightly to strongly curved paraphyses that can have carotenoid or lack pigmentation; and smooth ascospores without lipid bodies and containing de Bary bubbles in anhydrous conditions (Kimbrough et al., 1972, Melo et al., 2015, Kuşan et al., 2018). The species of the genus are widespread and have been reported from all continents but Antarctica, although most of the reports are from North America (Melo et al., 2015). It was previously placed in Ascodesmiaceae and recently included in the new family *Coprotaceae* U. Lindemann & Van Vooren (Van Vooren, 2021). The family only has two genera:

Coprotus, with 27 species, and *Boubovia* Svrček, with 7 species (Index Fungorum accessed 10 May 2022). Although the species have been traditionally considered saprobic on dungs and plant/woody debris, they have rarely been isolated from soil (Van Vooren, 2021). *Coprotus* does not show seasonal preference and apothecia are produced when temperature and moisture are adequate (Kimbrough et al., 1972). Recent studies based on DNA sequence analyses have shown that the genus occurs as endophytic and endolichenic in multiple hosts. The endophyte lifestyle is common and broadens the known ecology of the species (Healy et al., 2022).

Studies on *Ascomycetes* in Türkiye have gained quite a momentum in recent years (Acar & al., 2018, 2020; Işık & Türkeul 2018a, b; Kaya & Uzun 2018; Uzun & Kaya 2018, 2019, 2020; Kaya et al., 2018; Kabaktepe et al., 2019; Keleş, 2019; Sadullahoğlu & Uzun, 2020; Acar 2021; Çetinkaya & Uzun, 2021; Kaplan & al., 2021; Kesici & Uzun 2021). Despite this activity there have been no reports of the species of *Coprotus* in the checklist of Turkish fungi (Sesli et al., 2020). However, Akçay et al.



reported the first record of the genus in August 2022. Thus, our report of *Coprotus disculus* is an addition to the fungal diversity of Türkiye and the second time that the is reported in the country.

Material and Method

Fresh *Coprotus* ascomata were collected from Hakkâri Province in Türkiye in 2018. The samples were photographed with a Canon (EOS 60D) camera equipped with a Tokina 100 mm macro lens in the field. Macroscopic characters were recorded from fresh materials. Microscopic characters were observed in water with a Leica DM500 research microscope under oil immersion, at least 30 asci and ascospores were measured using the Leica Application Suite (version 3.4.0) program. The following references were used to identify and compare our collection with other species in the genus (Kimbrough et al., 1972; Doveri, 2007; Melo et al., 2015; Kušan et al., 2018). The specimen studied is deposited in the Fungarium of the Van Flora Application and Research Center of Van Yüzüncü Yıl University (VANF).

Results

Coprotus disculus Kimbr., Luck-Allen & Cain, Can. J. Bot. 50(5): 962 (1972) Figure 1-2

Apothecia 0.4–1 mm diam, scattered to subgregarious, superficial, sessile, translucent to white to yellowish, lenticular to discoid, at maturity white or becoming pale yellow, dirty white to light grey when dry. **Asci**: 75–120 × 9–16 µm, 8–spored, cylindrical, operculate, opens irregularly, rounded at apex. **Ascospores**: 11.3–14.2 × 5–8.3 µm, hyaline, ellipsoid to somewhat narrowing toward to apex, non-apiculate, usually uniseriate, irregular, sometimes biseriata. **Paraphyses**: 3–4 µm wide, filiform, hyaline, septate and without inclusions, slightly enlarged and curved at the apex. **Excipulum** of a *textura angularis* to *t. globulosa*; cells thin-walled, hyaline, toward the base globose, up to 18 µm diam, cortical cells at margin and flanks 7.8–12.2 × 6.5–10.5 µm.

Specimen Examined: **TÜRKİYE, Hakkâri, Şemdinli, Derya village input, 37° 21'271"N, 44° 31'282"E, 1525 m, on the dung of cow, 28.03.2018, VANF Acar. 1014.**



Figure 1. Fresh ascomata of *Coprotus disculus*. **Scale bar = 1 mm**

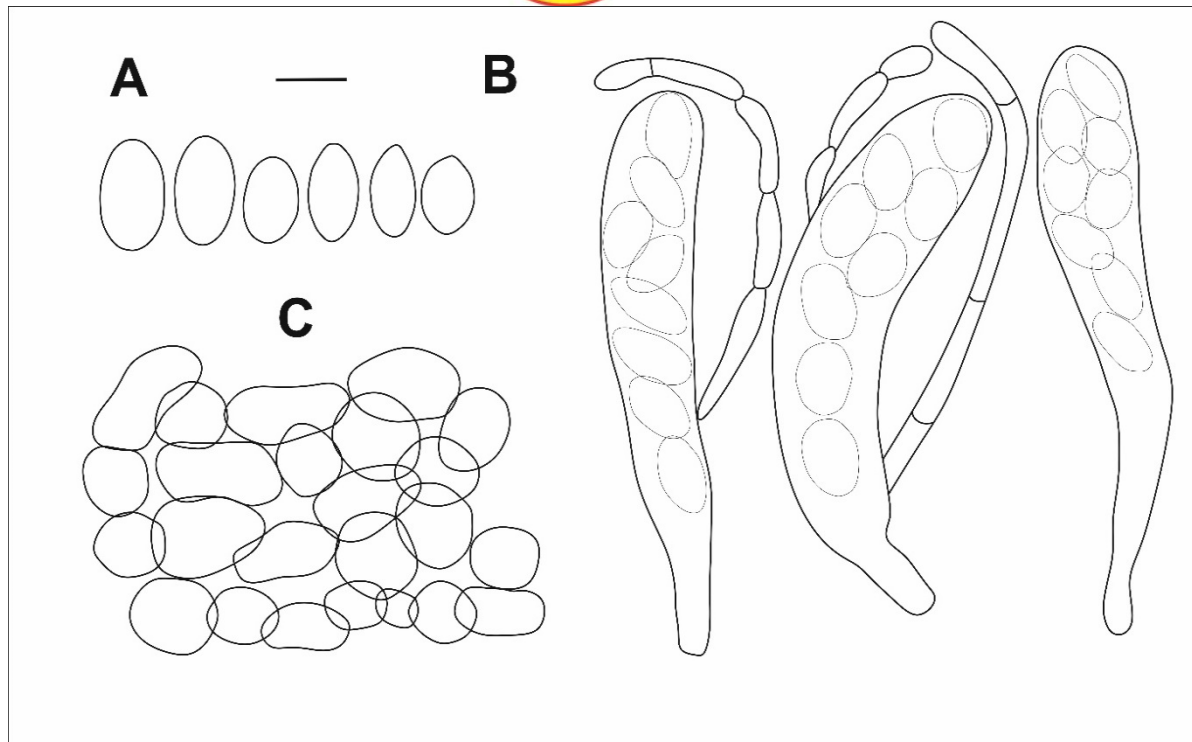


Figure 2. Drawing showing the micromorphology features of *Coprotus disculus*. **A.** Ascospores, **B.** Asci and Paraphyses, **C.** Ectal excipulum. Scale bar: 10 µm

Discussions

In the Kimbrough's monograph of the genus *Coprotus* (Kimbrough et al., 1972), he included 18 species and divided them into 2 groups. The first group are species with apothecia and paraphyses containing carotenoid pigments, the second group contains species with whitish apothecia, becoming pale yellow with age or drying, and paraphyses lacking carotenoids (Doveri, 2012). Our collection belongs to the latter.

Coprotus disculus has been reported from deer, horse, cow, goat and rodent dungs from Africa, North America, Europe and South America (Kimbrough et al. 1972; Melo et al., 2015). The original description describes asci measuring 75–90 × 10–15 µm and ascospores 12–13.5 × 5– 8 µm (Kimbrough et al. 1972). The last description we were able to find is from goat dung in Brazil, and has similar values for asci and ascospores, respectively 80–90 × 12.5–14 µm and 12.5–13.5 × 5– 8 µm (Melo et al., 2015). Although asci in our sample were longer, 75–120 × 9–16 µm, the measurements are overlapped and the ascospore range, 11.3–14.2 × 5–8.3 µm, as well as all other morphological features fit well with previous reports (Kimbrough et al., 1972; Melo et al., 2015). *Coprotus disculus* is differentiated from several species in the genus by its whitish apothecia without

carotenoid pigments in the paraphyses, that is in group two mentioned above. The most similar species with colourless apothecia, 8-spored asci and similar ascospores measures are *C. leucopocillum* and *C. dextrinoideus* (Kimbrough et al., 1972). Our collection from Türkiye has asci of similar length as *C. leucopocillum* and *C. dextrinoideus* (80–110 µm, 80–125 µm), but both species have wider asci (15–22 µm vs 18–24 µm) than *C. disculus*. Furthermore, ascospores are bigger in *C. leucopocillum* (14–18 × 7.5–11.5 µm), and although ascospores length is similar between in *C. dextrinoideus* and *C. disculus* (11–13 µm vs 11.3–14 µm), the ascospores of the former are broader (7.5–10 µm vs 5–8.3 µm). Therefore, even if we found morphological variation in asci length in comparison to previous reports, we believe that *C. disculus* is the appropriate identification of our collection.

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