

## New *Cercidospora* records for Turkey

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**Abstract:** Three lichenicolous species of *Cercidospora* are reported for the first time from Turkey: *Cercidospora crozalsiana* on *Squamarina lentigera*, *C. verrucosaria* on *Megaspora verrucosa*, and *C. weneri* on *Aspicilia desertorum*. Comments on their morphological and anatomical characters, habitats, and substrata and a short diagnosis are provided for each new record for Turkey. Microphotographs are also provided for each taxon.

**Key words:** *Ascomycota*, lichenicolous fungi, biodiversity

### Türkiye için yeni *Cercidospora* kayıtları

**Özet:** Üç likenikol *Cercidospora* türü Türkiye'den ilk kez rapor edildi: *Squamarina lentigera* üzerinde *Cercidospora crozalsiana*, *Megaspora verrucosa* üzerinde *C. verrucosaria* ve *Aspicilia desertorum* üzerinde *C. weneri*. Türkiye için yeni kayıt olan her tür için morfolojik ve anatomik karakterler, habitat ve substrat karakterleri ile ilgili yorumlar ve kısa tanımlamaları verilmiştir. Aynı zamanda her takson için mikrofotograflar verilmiştir.

**Anahtar sözcükler:** *Ascomycota*, likenikol mantarlar, biyoçeşitlilik

### Introduction

The genus *Cercidospora* Körb. includes fungi obligately growing on lichens and more rarely colonies of soil algae (Navarro-Rosinés et al., 2004). The lichenicolous species seem to be commensalistic to weakly pathogenic by suppressing the ascospore production in the host lichens especially when they infect the host ascomata. The species of the genus are abundant in the northern hemisphere but are also

known from South America (Navarro-Rosinés et al., 2004).

Interest in determining new taxa and new records of lichenicolous fungi has increased among lichenologists aiming to determine the lichenised fungi biodiversity in Turkey especially in the last 5 years (e.g. Candan & Halıcı, 2008; Halıcı, 2008a, 2008b; Halıcı et al., 2007, 2009; Candan et al., 2010). A key to the 117 known taxa of lichenicolous *Ascomycota* (including

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mitosporic fungi) of Turkey was provided by Halıcı (2008c). One hundred and sixty lichenicolous fungi species have been reported from Turkey as of the time of writing (Halıcı et al., 2010). In the course of studying the lichenicolous fungi in ANES (Anadolu University, Eskişehir, Turkey), we determined 3 new records of lichenicolous *Cercidospora* species for Turkey and provide notes on these species herein. Six *Cercidospora* species have been reported from Turkey in Halıcı (2008c); by adding these 3 species, the number of *Cercidospora* species is increased to 9 and the number of lichenicolous fungi species is increased to 163 in Turkey. From the *Cercidospora* species treated in Halıcı et al. (2008c), *C. solearispora* Calat., Nav.-Ros. & Hafellner has been recently validly published in Navarro-Rosinés et al. (2009).

## Materials and methods

The specimens detailed here are stored in the lichen herbarium of Erciyes University; their accession numbers are given in parentheses after the locality details. Specimens were examined in water, 10% KOH, Lugol's iodine (MERCK 9261) solutions. Ascospore measurements were determined in water. The descriptive notes provided below are based on the Turkish specimens examined.

## Species recorded

*Cercidospora crozalsiana* (H.Olivier) Nav.-Ros., Cl.Roux & Casares 1995 (Figure 1).

Host lichen: *Squamarina lentigera* (Weber) Poelt

Ascomata perithecia, 200-250  $\mu\text{m}$  diam., subglobose to globose, blue-green around the ostiole

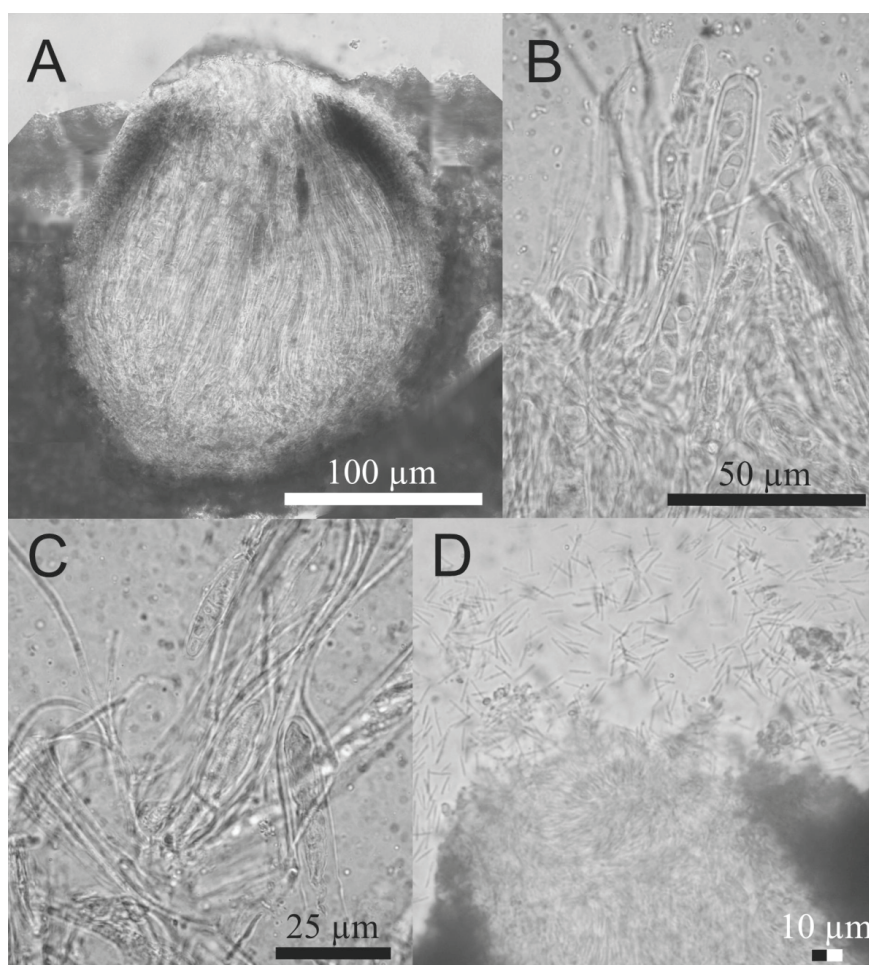


Figure 1. *Cercidospora crozalsiana*. A- perithecium, B- ascus with uniseriately arranged ascospores, C- pseudoparaphyses with an ascospore, D- conidia.

and pale brownish red in the lower part, immersed in the host thalli. Asci 4(6-)spored, 70-110(-130)  $\times$  11-14(-17)  $\mu\text{m}$ . Ascospores (24-)26-28(-30)  $\times$  (5-)6-7  $\mu\text{m}$ , 1-septate, hyaline, not constricted at the septa, not or rarely  $\pm$  heteropolar, with the lower part somewhat attenuate with regard to the upper one, with a thin gelatinous sheath, guttulate. Conidia hyaline, bacilliform, 7-8  $\times$  1  $\mu\text{m}$ . The Turkish specimen seems to be commensalistic as no visible damage was observed in the host lichen.

Although the conidia are longer (7-8  $\mu\text{m}$  vs. 3-5(-8)  $\mu\text{m}$ ), the Turkish specimen agrees quite well with the description provided by Navarro-Rosinés et al. (1995).

Specimen studied: Afyon: Dinar district, north-west of Karakuyu village, 38°05'N, 30°11'E, alt. 1040 m, on the thallus of *Squamarina lentigera* on calcareous rocks, 08.06.2008, M.Candan 0.6381 (ANES 13839).

*Cercidospora verrucosaria* (Linds.) Arnold 1874 (Figure 2).

Host lichen: *Megaspora verrucosa* (Ach.) Hafellner & V.Wirth

Ascomata perithecia, 200-230  $\mu\text{m}$ , ovoid to globose, immersed in the host thallus, exciple dark bluish brown around the ostiole, pale blue-greenish to colourless in the lower part. Asci 8-spored, (52-) 70-86

$\times$  9-11  $\mu\text{m}$ . Ascospores (17-)19-21(-24)  $\times$  (5-)6-7(-8)  $\mu\text{m}$ , 1-septate, hyaline, not constricted at the septum, slightly heteropolar, with a gelatinous sheath. Conidia not observed.

This is a cosmopolite species with a wide distribution in Europe, North America, Canary Islands, and New Zealand (Navarro-Rosinés et al., 2009). European specimens on *Megaspora verrucosa* var. *mutabilis* (the corticolous variety of *Megaspora verrucosa*) are mentioned in the literature as *C. mutabilicola* Calat. et al., nom. nud. (Navarro-Rosinés et al., 2004). While the ascospore sizes are given as (14.5-)15.5-19.5(-23)  $\times$  (4.5-)5-6(-7)  $\mu\text{m}$  for the European species growing on muscicolous or terricolous specimens of *Megaspora verrucosa*, European specimens growing on the corticolous variety have ascospores in the range of (15.5-)18-24(-25)  $\times$  5-7  $\mu\text{m}$  (Navarro-Rosinés et al., 2009). The Turkish specimen seems to be commensalistic as no visible damage was observed in the host lichen. Navarro-Rosinés et al. (2009) discussed whether these 2 fungi growing on the muscicolous and corticolous varieties of *Megaspora verrucosa* merit being considered as separate taxa. Here we see that the Turkish specimen growing on the terricolous specimens of *Megaspora verrucosa* has more similar ascospore sizes with the European specimens growing on the corticolous variety.

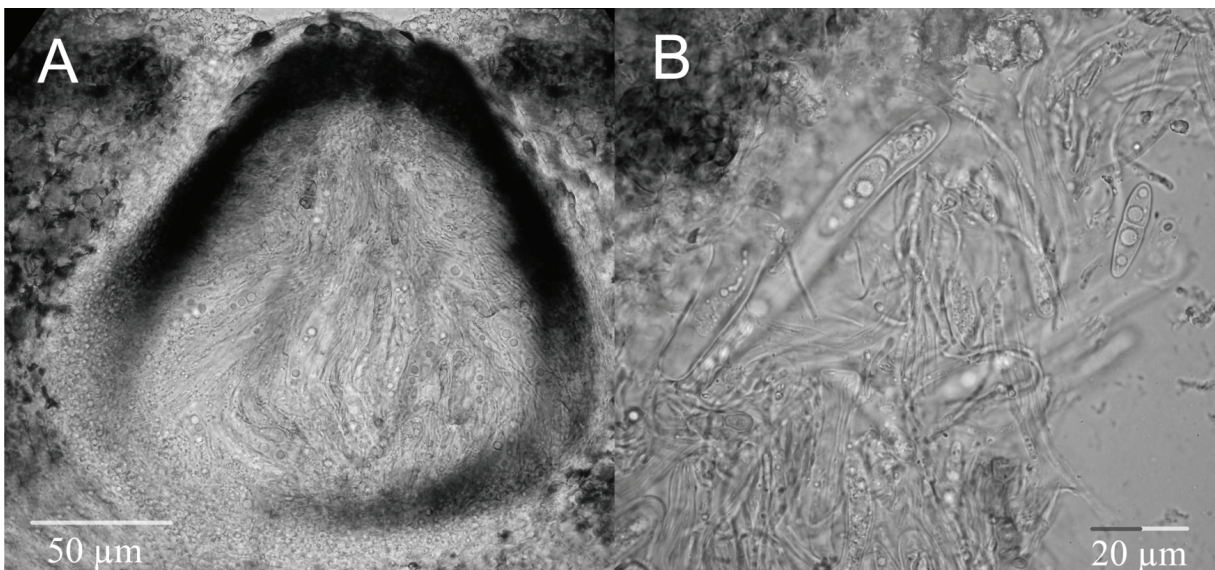


Figure 2. *Cercidospora verrucosaria*. A- perithecium, B- ascus and ascospores.

Specimen studied: Denizli: Çivril, Akdağ Nature Park, Akdağ Hill and Büyük Gedik Hill, 38°20'N, 29°57'E, 2070 m, on thallus of *Megaspora verrucosa* on soil and dry plant debris, 05.06.2008, M.Candan 0.6943 (ANES 13840).

*Cercidospora weneri* Nav.-Ros., Calat. & Hafellner 2009 (Figure 3).

Host lichen: *Aspicilia desertorum* (Kremp.) Mereschk.

Ascomata perithecia, subglobose to globose, 220-400 × 170-280 µm, immersed in the host thalli; exciple dark blue-greenish to slightly brown in the upper half, close to the ostiole and colourless towards the base. Asci (2-)4-spored, (88-)100-114 × 9-12 µm. Ascospores (24-)28-36(-40) × 6-7 µm, 1-septate, hyaline, not or only slightly constricted at the septum, slightly heteropolar, with the lower cell somewhat attenuate with regard to the upper one, frequently slightly curved, guttulate, with a gelatinous sheath. Conidiomata globose, 200-250 µm, conidia hyaline, bacilliform, 11-14 × 1-1.5(-2) µm. The Turkish specimens seem to be commensalistic as no visible damage was observed in the host lichen.

*Cercidospora weneri* is a recently described species on *Aspicilia calcarea*, *A. contorta*, and *A. desertorum* from Lebanon, Spain, France, and Greenland (Navarro-Rosinés et al., 2009). The species is most similar to *C. crozalsiana*, a species known on *Squamarina* spp.

The authors of *C. weneri* distinguished this species from *C. crozalsiana* by sometimes observed 3-septate ascospores versus constantly 1-septate ascospores in *C. crozalsiana*. However, we were able to find conidiomata in Turkish specimens and we observed that *C. weneri* is also clearly distinguished from *C. crozalsiana* by having obviously longer conidia (11-14 µm vs. 3-5(-8) µm). It is also interesting that the ascomata and ascospores in Turkish specimens are bigger than the measurements given in the original description (Ascospores: (24-)28-36(-40) × 6-7 µm vs. (18-)22-31(-34.5) × (4.5-)5-6(-7) µm; Ascomata: 220-400 × 170-280 µm vs. 150-260 µm) (Navarro-Rosinés et al., 2009).

Specimens studied: Denizli: Çivril, Akdağ Nature Park, Akdağ Hill and Büyük Gedik Hill, 38°20'N, 29°57'E, 2070 m, on thallus of *Aspicilia desertorum* on small limestone, 05.06.2008 M.Candan 0.9486 (ANES 13841); Sivas: Gürün, Uzunyayla, Ziyaret Geçidi, steppe vegetation, 38°52'N, 36°51'E, 1900 m, on thallus of *Aspicilia desertorum* on small limestone, 09.07.2010, M.Candan 1.3478 (ANES 13838).

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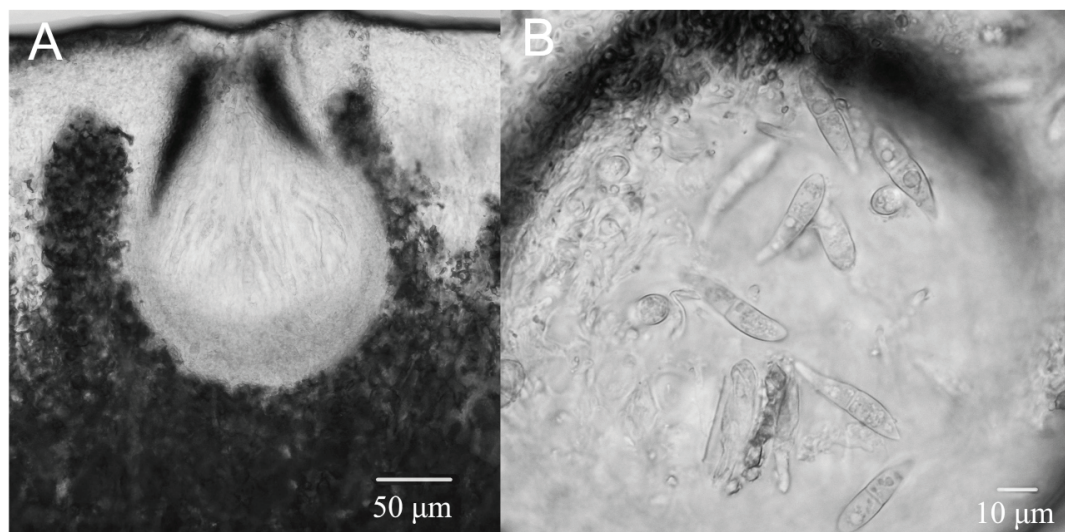


Figure 3. *Cercidospora weneri*. A- perithecium immersed in the host thallus, B- ascospores.

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