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Notes on some lichenicolous fungi species from Turkey II

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Abstract: Nine species of lichenicolous fungi are reported from various provinces of Turkey. Five species of these (*Endococcus janae*, *Lichenochora aprica*, *Pronectria xanthoriae*, *Sarcopyrenia cylindrospora*, and *Zwackhiomyces cervinae*) are reported for the first time from Turkey. All these taxa, except *Zwackhiomyces cervinae*, are also new to Asia. Comments on their habitats and substrata and a short diagnosis are provided for each new taxon new to Turkey.

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

Türkiye’den bazı likenikol fungus türleri üzerine notlar II

Özet: Türkiye’nin çeşitli illerinden 9 likenikol fungus türü rapor edilmiştir. Bu türlerden beş tanesi (*Endococcus janae*, *Lichenochora aprica*, *Pronectria xanthoriae*, *Sarcopyrenia cylindrospora*, *Zwackhiomyces cervinae*) Türkiye’den ilk kez rapor edilmektedir. *Zwackhiomyces cervinae* hariç hepsi aynı zamanda Asya için de yeni kayıt durumundadır. Türkiye için yeni kayıt durumunda olan her taksonun kısa birer betimlemesi ve habitat, substratları hakkında yorumlar verilmiştir.

Anahtar sözcükler: *Ascomycota*, likenikol funguslar, *Coelomycetes*

Introduction

Attention paid to the lichenicolous fungi of Turkey increased after Hafellner & John (2006) compiled information on 63 taxa of lichenicolous fungi in Turkey. Halıcı (2008a) recently provided a key to 117 infrageneric taxa of lichenicolous *Ascomycota* including mitosporic fungi as well as their distribution in Turkey. After this key was published, some more additions have been reported (Candan & Halıcı, 2008; Halıcı, 2008b, 2008c; Knudsen & Kocourková, 2008; Vondrák & Kocourková, 2008) and the number of

infrageneric taxa of lichenicolous fungi known in Turkey reached 131. During herbarium studies in ANES and the herbarium of Erciyes University (Faculty of Science and Arts, Kayseri, Turkey), 5 more interesting species that are new to Turkey and 4 species that are new records for the provinces were determined and are summarised here. Thus, with this publication the number of infrageneric taxa of lichenicolous fungi known from Turkey reached 136. At least 250 taxa of lichenicolous fungi are expected from Turkey (Halıcı et al., 2007a).

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Materials and methods

One specimen detailed here is stored in the herbarium of Erciyes University (Faculty of Science and Arts, Kayseri, Turkey) and the others in ANES (Herbarium of Anadolu University, Science Faculty, Eskişehir, Turkey); their accession numbers are given in parentheses after the locality details. Specimens were examined in water, 10% KOH, and 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

Arthonia subfuscicola (Linds.) Triebel 1991

Host lichen: *Lecanora carpinea*

Previously only reported from İzmir province on the apothecia of *Lecanora carpinea* (Hafellner & John 2006). New to Ankara province.

Specimen studied: Ankara: Bala district, Beynam Forest, 39°40'N, 32°54'E, 1550 m, on the apothecia of *Lecanora carpinea*, on *Quercus* sp., 02 July 2003, M.Candan (ANES 11550).

Cercidospora macrospora (Uloth) Hafellner & Nav.-Ros. 2004

Host lichen: *Protoparmeliopsis muralis*

Previously reported from Ağrı (Hafellner & John, 2006), Kayseri (Halıcı et al., 2005), Niğde (Halıcı et al., 2007b) and Nevşehir provinces (Halıcı et al., 2006) on *Protoparmeliopsis muralis* and *Rhizoplaca melanophthalma*. New to Eskişehir province.

Specimen studied: Eskişehir: Bozdağ, Türkmen Hill, 39°54'N, 30°41'E, alt. 1500 m, on thallus of *Protoparmeliopsis muralis* siliceous rock, 21 November 2006, M.Candan & T.Tay (ANES 11555).

Endococcus janae K.Knudsen 2008

Host lichen: *Acarospora fuscata*

E. janae, a species described very recently by Knudsen (2008), was collected on *Acarospora fuscata* on siliceous rocks in Turkey. All the characteristics of the Turkish specimen agree well with the original description. Weakly pathogenic as the ascomata production of the host is suppressed when infected. Asci constantly 4-spored, 35-40 × 17-18 µm.

Ascospores golden brown and simple when young, 1-septate, dark brown when mature, usually with a guttule in each cell, septum in mature spores very dark, (13-)14-16 × 6-7 µm.

Only reported on *Acarospora rhabarbarina* from Peru (Knudsen 2008), new to Turkey and Asia.

Specimen studied: Kayseri: Yahyalı, Aladağlar Milli Parkı, above Tahtacık Yayla, Kıldıravuk vicinity, 37°53'N, 35°16'E, alt. 2670 m, on thallus of *Acarospora fuscata* on siliceous rocks, 09 Sep. 2006, M.G.Halıcı (MGH 0.2145).

Lichenochora aprica Hafellner & Nik.Hoffm. 2000

Host lichen: *Aspicilia contorta* subsp. *hoffmanniana*

L. aprica was collected on the areoles and apothecia of *Aspicilia contorta* subsp. *hoffmanniana* on siliceous rocks. It causes black spots in the host. Perithecia aggregated in groups, 160-260 µm high, 130-230 µm wide. Ascomata in section filled with numerous oil droplets. Ostiolar channel with numerous periphyses that are slightly ramified, 3-4 µm thick. Asci functionally unitunicate, 60-95 × 18-26 µm. Ascospores pre-dominantly 1-septate, constricted at the septa, cells usually ± equal, but very variable, in some of the ascospores lower cells are slightly narrower and attenuated, (17-)19.5-26.5(-31) × (5.5-)6.5-8.5(-10) µm. A detailed description is provided by Hoffmann & Hafellner (2000).

Previously only reported from Italy on *Aspicilia calcarea* and *Aspicilia* sp. (Hoffmann & Hafellner, 2000). New to Turkey and Asia.

Specimen studied: Muğla: Ortaca, South of Ortaca, 36°47'N, 28°47'E, 150 m, on *Aspicilia contorta* subsp. *hoffmanniana* on exposed calcareous rock, 23 Apr. 1999, M.Candan (ANES 11538).

Pronectria xanthoriae Lowen & Diederich 1990

Host lichen: *Xanthoria fulva*

P. xanthoriae was collected on the thallus of *Xanthoria fulva* on *Pyrus* sp. Most characters of the Turkish specimen are similar to the original description given by Lowen and Diederich (1990), but the ascospores are shorter (15-16 × 4-5 µm vs. 17-24 × 4-5 µm) and smooth-walled, whereas in the original description it is reported that the ascospores are verruculose (it may be due to the young ascospores in

the Turkish specimen). Especially the length of the ascospores may be very variable in this species as it is reported in the Swedish specimen by Ihlen and Wedin (2005) as $15-30 \times 4-6 \mu\text{m}$.

Previously reported from many European countries on *Xanthoria parietina* (e.g. Lowen & Diederich, 1990; Hawksworth, 1994; Etayo, 1998; Motiejunaite, 2002; Ihlen & Wedin, 2005; Kocourková & von Brackel, 2005). It is reported here for the first time on a host different from *Xanthoria parietina*. New to Turkey and Asia.

Specimen studied: Malatya: Hekimhan, Yılanlı Mountain, east of Kurşunlu village, $38^{\circ}40'N$, $37^{\circ}52'E$, alt. 1840 m, on *Xanthoria fulva* on *Pyrus* sp., 19 Aug. 2005, M. Candan (ANES 11539).

Sarcopyrenia cylindrospora (P.Crouan & H.Crouan) M.B.Aguirre 1990

Host lichen: *Aspicilia contorta* subsp. *hoffmanniana*

Large and conspicuous black perithecia ($350-600 \mu\text{m}$) are rather abundant on the areoles of *Aspicilia contorta* subsp. *hoffmanniana*. Perithecia mostly aggregated in groups, rarely arising singly, almost sessile on the areoles of the host. Algal cells present in inner ascoma-wall as reported by Kocourková (2000). Weakly pathogenic on the host. Asci cylindrical, 8-spored, $40-55 \times 5-8 \mu\text{m}$. Ascospores hyaline, 1-septate, with \pm rounded ends, bacilliform, $(19-22-33(-38) \times 2-2.5 \mu\text{m}$. Detailed descriptions were provided by Navarro-Rosinés and Hladún (1990) and Aguirre-Hudson (1991).

S. cylindrospora has a wide distribution in Europe on epilithic lichen species such as *Aspicilia contorta*, *Candelariella vitellina*, *Acarospora fuscata*, *Protoparmeliopsis muralis*, *Lecidea fuscoatra*, *Physcia caesia*, and *Rhizocarpon geographicum* (Navarro-Rosinés & Hladún, 1990; Aguirre-Hudson, 1991; Navarro-Rosinés et al., 1998; Kocourková, 2000). New to Turkey and Asia.

Specimen studied: Muğla: Marmaris, north of Marmaris, $37^{\circ}01'N$, $28^{\circ}25'E$, 50 m, on the thallus of *Aspicilia contorta* subsp. *hoffmanniana* on calcareous rocks, 24 Apr. 1999, M.Candan (ANES 11540).

Stigmidium congestum (Körb.) Triebel 1991

Host lichen: *Lecanora carpinea*

Previously only reported from İzmir province on the apothecia of *Lecanora chlarotera* (Hafellner & John, 2006) and Kayseri province on the apothecia of *L. intumescens* (Candan & Halıcı, 2008). Here, we report it on the apothecia of *Lecanora carpinea* from Bolu province.

Specimen studied: Bolu: Şerif Yüksel Araştırma Ormanı, $40^{\circ}39'N$, $31^{\circ}40'E$, 1050 m, 31.08.2007, leg. A.Türk & M.Candan (ANES 11552).

Stigmidium xanthoparmeliarum Hafellner 1994

Host lichen: *Xanthoparmelia stenophylla*

Ascospores hyaline, 1-septate, lower cell narrower and sometimes longer than the upper one, $11-14 \times 5-6 \mu\text{m}$; ascomata $60-80 \mu\text{m}$ diam. Hymenial gel I-; forming black necrotic patches that become grey at their central part. A detailed description is provided by Hafellner (1994).

Previously reported from İzmir province on *Xanthoparmelia* sp. (Hafellner & John, 2006). New to Eskişehir province

Specimen studied: Eskişehir: Bozdağ, east of Koskaya village, $39^{\circ}52'N$, $30^{\circ}32'E$, 1050 m, on thallus of *Xanthoparmelia stenophylla* siliceous rock, 28 Sept. 2005, E.T.Singer (ANES 10403).

Zwackhiomyces cervinae Calat., Triebel & Pérez-Ortega 2007

Host lichen: *Acarospora cervina*

Z. cervinae was collected from 2 localities on *Acarospora cervina* on calcareous rocks. All the characteristics of the Turkish specimen agree well with the original description, provided by Calatayud et al. (2007). We also observed pale brown overmature ascospores with a finely granulose surface, as noted by Calatayud et al. (2007). Weakly pathogenic as causing slight discolouration in the infected squamules.

Only reported from Spain and Iran on *Acarospora cervina* (Calatayud et al., 2007). Probably more common in continental areas of the northern hemisphere. New to Turkey.

Specimens studied: Elaziğ: Maden, southern slopes of Maden Mountain, 38°22'N, 39°38'E, 1200 m, on *Acarospora cervina* on calcareous rocks, 07 Aug. 2005, *M.Candan* (ANES 11541); Malatya: Doğanşehir, Malatya Mountains, west of Kurucuova village, 37°59'N, 38°03'E, 1410 m, on *Acarospora cervina* on calcareous rocks, 30 Jul. 2004, *M.Candan* (ANES 11542).

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