

## New additions to Turkish *Helotiales* and *Orbiliales*

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### Abstract

*Aim of study:* Though hundreds of studies were conducted on the biodiversity of Turkish fungi, the mycobiota has not been determined yet. Probably thousands of researches are required to determine the overall mycobiota of Turkey. This study were also carried out upon this purpose and aims to make a contribution to the mycobiota of Turkey by adding new genera and species records.

*Area of study:* This study was carried out within the boundaries of İslahiye, Nurdağı and Şehitkamil districts of Gaziantep province.

*Material and Methods:* The macrofungi samples were collected from İslahiye, Nurdağı and Şehitkamil districts in the years 2014 and 2015. After obtaining required field data, they were transferred to the fungarium and investigated in terms of macroscopy and microscopy. Then they were identified with the help of relevant literature.

*Main results:* Five ascomycetous fungi species; *Bisporrella sulfurina* (Quél.) S.E. Carp. (*Helotiaceae* Rehm), *Lachnum fuscescens* (Pers.) P. Karst. (*Lachnaceae* Raitv.), *Cyclaneusma niveum* (Pers.) DiCosmo, Peredo & Minter (*Marthamycetaceae* H.O. Baral, G. Lantz, Hustad & Minter), *Hyalorbilia inflatula* (P. Karst.) Baral & G. Marson and *Orbilia aristata* (Velen.) Velen. (*Orbiliaceae* Nannf.), within the orders *Helotiales* and *Orbiliales* were determined. Tracing the current literature the taxa were found to be new for the mycobiota of Turkey.

*Research highlights:* Macrofungal biodiversity studies are necessary to be able to determine the mycobiota of Turkey.

**Keywords:** New records, *Helotiales*, *Orbiliales*, Gaziantep, Turkey.

## Türkiye *Helotiales*'leri ve *Orbiliales*'lerine yeni ilaveler

### Özet

*Çalışmanın amacı:* Türkiye mantarlarının biyoçeşitliliği ile ilgili yüzlerce çalışma yapılmış olmasına rağmen, mikobiyota henüz ortaya konamamıştır. Türkiye mikobiyotasının belirlenmesi için belki de binlerce araştırma yapılmalıdır. Bu çalışma da bu amaca yönelik olarak gerçekleştirilmiş olup yeni cins ve tür kayıtları ilavesiyle Türkiye mikobiyotasına katkı sağlamayı amaçlamaktadır.

*Çalışma alanı:* Bu çalışma Gaziantep'in İslahiye, Nurdağı ve Şehitkamil ilçe sınırları içinde gerçekleştirilmiştir.

*Materyal ve Yöntem:* Makromantar örnekleri 2014 ve 2015 yıllarında İslahiye, Nurdağı ve Şehitkamil ilçelerinden toplanmıştır. Gerekli arazi verileri derlendikten sonra, örnekler fungaryuma taşınıp, makroskopik ve mikroskopik incelemeleri gerçekleştirilmiştir. Sonra da ilgili literatür yardımıyla teşhisleri yapılmıştır.

*Temel Sonuçlar:* *Helotiales* ve *Orbiliales* takımları içinde yer alan beş askomiset mantar türü; *Bisporrella sulfurina* (Quél.) S.E. Carp. (*Helotiaceae* Rehm), *Lachnum fuscescens* (Pers.) P. Karst. (*Lachnaceae* Raitv.), *Cyclaneusma niveum* (Pers.) DiCosmo, Peredo & Minter (*Marthamycetaceae* H.O. Baral, G. Lantz, Hustad & Minter), *Hyalorbilia inflatula* (P. Karst.) Baral & G. Marson ve *Orbilia aristata* (Velen.) Velen. (*Orbiliaceae* Nannf.), Türkiye mikobiyotası için yeni kayıt olarak verilmiştir.

*Araştırma vurguları:* Türkiye mikobiyotasının belirlenebilmesi için makromantar biyoçeşitliliği çalışmaları gereklidir.

**Anahtar kelimeler:** Yeni kayıtlar, *Helotiales*, *Orbiliales*, Gaziantep, Türkiye.



## Introduction

*Helotiales* Nannf. and *Orbiliiales* Baral, O.E. Erikss. are two orders within the phylum Ascomycota. *Helotiales* contains approximately 3880 taxa within 501 genera and 10 families and the members are characterized with stipitate or sessile, disc formed, cup like or more rarely convex apothecial ascomata, thin walled asci with unseparable wall, and spores which are symmetric in longitude, generally hyaline, usually smooth, simple or septate in across (Akata et al., 2016a). On the other hand the species of *Orbiliiales* are characterized by generally convex, brightly coloured or translucent apothecial ascomata, small asci, small, hyaline, ovoid to ellipsoid, usually curved or even helical and mostly aseptate ascospores, and it contains 288 taxa belonging to 12 genera within the family *Orbiliaceae* Nannf. (Cannon and Kirk, 2007; Kirk et al., 2008).

Currently 70 taxa of *Helotiales* within 43 genera exist in Turkey (Sesli and Denchev, 2008; Kaya, 2009; Akata and Kaya 2010; 2012; 2013; Akata et al., 2014a; 2014b; Uzun et al., 2014; 2015a; 2015b; Güngör et al., 2015a; 2015b; Akata et al., 2016b; Akçay and Uzun, 2016; Doğan and Kurt, 2016; Öztürk et al., 2016; Uzun et al., 2017a) while only five members of *Orbiliiales*, *Orbilium auricolor* (A. Bloxam) Sacc., *Orbilium curvatispora* Boud., *Orbilium luteorubella* (Nyl.) P. Karst., *Orbilium sarraziniana* Boud. and *Orbilium xanthostigma* (Fr.) Fr. (Akata and Doğan, 2015; Uzun et al., 2017b), have so far been recorded from Turkey.

The present study aims to make a contribution to Turkish mycobiota.

## Materials and methods

Samples of macrofungi were collected from İslahiye, Nurdağı and Şehitkamil districts of Gaziantep province between 2014 and 2015. During field studies the fruiting bodies were photographed where they grow and required characteristics for identification about their ecology and morphology were noted. Micromorphological studies were carried out under Nikon Eclipse Ci-S

trinocular light microscope. As chemical reagents or investigation media, distilled water, Meltzer's reagent and Congo red were used. Identification of the samples were performed by comparing the obtained data with DiCosmo et al. (1983), Breitenbach and Kränzlin (1984), Wang (2005), Hou et al. (2006), Zhang et al. (2009), Medel et al. (2013), Guo et al. (2014), Ivanová (2015) and Quijada et al. (2015). Dried fruit bodies are kept at Karamanoğlu Mehmetbey University, Kamil Özdağ Science Faculty, Department of Biology.

## Results

Kirk et al. (2008) and Index fungorum ([www.indexfungorum.org](http://www.indexfungorum.org); accessed 20 December 2016) were followed for the systematics of the taxa

*Helotiales* Nannf.

*Helotiaceae* Rehm

*Bisporella sulfurina* (Quél.) S.E.Carp. (1974).

**Syn:** *Calycella sulfurina* (Quél.) Boud., *Calycella sulfurina* var. *brassicae* Grélet, *Calycella sulfurina* (Quél.), Boud., var. *sulfurina*, *Calycina sulfurina* (Quél.) Kuntze, *Helotium sulfurinum* Quél.

**Macroscopic and microscopic features:** Apothecia 0.5-1.5 mm in diameter, cup, saucer to plate-shaped, bright to sulfur-yellow, hymenial surface smooth (Figure 1a). Asci 60-90 × 4-6 µm, cylindric clavate, conical at the apex, eight spored, spores usually biseriate (Figure 1b). Paraphyses filiform. Ascospores 8-12 × 2 µm, elliptical-fusiform, smooth, hyaline, mostly with one septum (Figure 1c). *Bisporella sulfurina* usually found on dead branches often in small dense clusters, and always associated with old fruit-bodies of fungal species belonging to the *Xylariales* (Hubregtse, 2017).

**Specimen examined:** TURKEY — Gaziantep: İslahiye, Kozdere village, on dead *Quercus* L. sp. twigs, 37°06'N-36°39'E, 550m, 15.03.2014, K.8642; Şehitkamil, Yeşilce village, 37°10'N-37°12'E, 1045 m, 29.11.2014, K.10738; 12.04.2015, K. 11706.

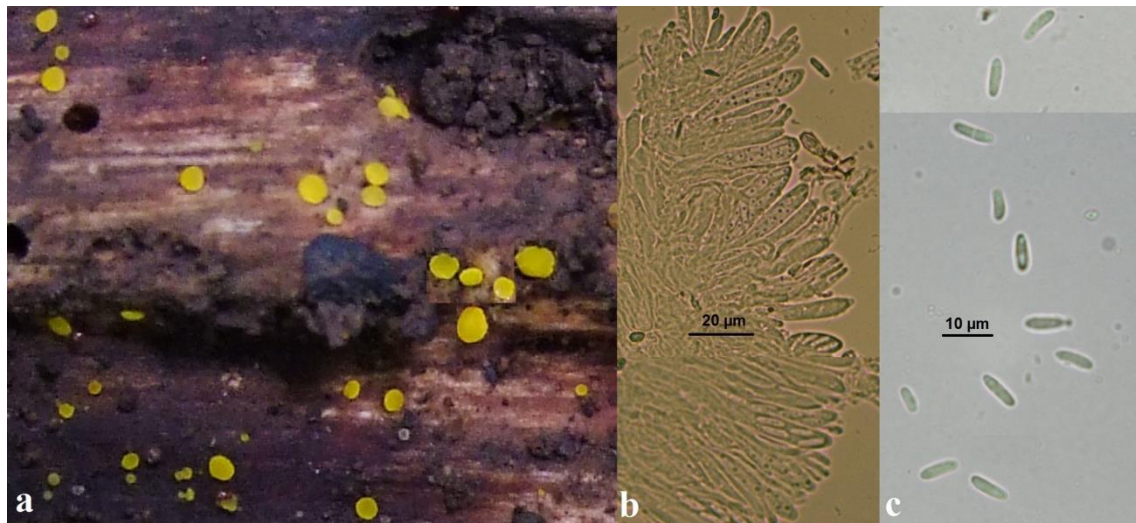


Figure 1. *Bisporella sulfurina*: a. ascocarps, b. asci and paraphyses, c. ascospores.

#### *Lachnaceae* Raitv.

*Lachnum fuscescens* (Pers.) P.Karst. (1885).

**Syn:** *Atractobolus brunneolus* (Desm.) Kuntze, *Atractobolus fuscescens* (Pers.) Kuntze, *Brunnipila fagicola* (W.Phillips) Baral, *Brunnipila fuscescens* (Pers.) Baral, *Dasyascyphus brunneolus* (Desm.) Sacc., *Dasyascyphus brunneolus* (Desm.) Sacc., var. *brunneolus*, *Dasyascyphus brunneolus* var. *fagicola* (W.Phillips) Sacc., *Dasyascyphus fagicola* (W.Phillips) Le Gal, *Dasyascyphus fuscescens* (Pers.) Gray, *Dasyascyphus fuscescens* var. *fagicola* (W.Phillips) Dennis, *Dasyascyphus fuscescens* (Pers.) Gray, var. *fuscescens*, *Lachnea brunneola* (Desm.) Gillet, *Lachnea brunneola* var. *brasiliensis* Bres., *Lachnea brunneola* (Desm.) Gillet, var. *brunneola*, *Lachnella brunneola* (Desm.) Sacc., *Lachnella brunneola* (Desm.) Sacc., var. *brunneola*, *Lachnella brunneola* var. *fagicola* W.Phillips, *Lachnella fuscescens* (Pers.) W.Phillips, *Lachnum brunneolum* (Desm.) P.Karst., *Lachnum fagicola* (W.Phillips) Raitv., *Lachnum fuscescens* (Pers.) P.Karst., var. *fuscescens*, *Peziza brunneola* Desm., *Peziza fuscescens* Pers., *Stictis fagicola* W. Phillips.

**Macroscopic and microscopic features:** Apothecia 0.3-1.3 mm in diameter, cup to saucer-shaped, short stipitate, white to ochre-whitish, covered with whitish to light-brownish hairs which are 80-90 µm long, septate, finely encrusted and with a crystal

structure at the tips (Figure 2c), hymenial surface smooth (Figure 2a). Asci 40-60 × 4-6.5 µm, cylindrical, eight spored, usually spores irregularly biseriate (Figure 2b). Paraphyses lanceolate. Ascospores 7-9 × 2-2.5 µm, fusiform, smooth, hyaline (Figure 2d). *Lachnum fuscescens* grows on fallen leaves of *Fagus* L. and *Quercus* L. (Breitenbach and Kränzlin, 1984).

**Specimen examined:** TURKEY — Gaziantep: Nurdağı, Olucak village, on dead *Quercus* L. sp. twigs, 37°10'N-36°40'E, 950 m, 10.04.2015, K.11681.

**Marthamycetaceae** H.O.Baral, G.Lantz, Hustad & Minter

*Cyclaneusma niveum* (Pers.) DiCosmo, Peredo & Minter (1983).

**Syn:** *Lophodermium gilvum* Rostr., *Naemacyclus niveus* (Pers.) Fuckel ex Sacc., *Propolis nivea* (Pers.) Fr., *Schmitzomia nivea* (Pers.) De Not., *Stictis nivea* Pers.

**Macroscopic and microscopic features:** Apothecia 1-1.5 mm in diameter, subepidermal, elliptical when fully open, raising the epidermis forming two parallel longitudinal barriers, hymenial surface smooth, waxy (Figure 3a). Asci 110-140 × 11-15 µm, subcylindrical-clavate, eight spored. Paraphyses cylindrical, some forked, thickened at the apex (Figure 3b). Ascospores 80-130 × 2.5-3.5 µm, filiform to needle-shaped, smooth, septate, slightly curved (Figure 3c). *Cyclaneusma niveum*



grows on needles of *Pinus nigra* Arnold, *P. halepensis* Miller and *P. pinaster* Aiton (Gadgil, 1984).

**Specimen examined:** TURKEY —

Gaziantep: Şehitkamil, Dülükbaba city park, pine forest, on dead *Pinus brutia* L. needles, 37°07'N-37°19'E, 1110 m, 06.12.2014, K. 10934.



Figure 2. *Lachnum fuscescens*: a. ascocarps, b. asci and paraphyses, c. hairs, d. ascospores

**Orbiliiales** Baral, O.E. Erikss.

**Orbiliaceae** Nannf.

*Hyalorbilia inflatula* (P.Karst.) Baral & G.Marson (2001).

**Syn:** *Calloria inflatula* (P.Karst.) W.Phillips, *Hyalinia inflatula* (P.Karst.) Boud., *Orbilina inflatula* (P.Karst.) P.Karst., *Orbilina inflatula* (P.Karst.) P.Karst., var. *inflatula*, *Orbilina inflatula* var. *loniceræ* Rehm, *Peziza inflatula* P.Karst.

**Macroscopic and microscopic features:**

Apothecia 1-3 mm in diameter, cupulate, disc

to plate-shaped, sessile or short stipitate, water-whitish, translucent, hymenial surface smooth (Figure 4a). Asci 23-26 x 3.5-4 µm, cylindrical, truncate, rounded at the apex, eight spored (Figure 4b). Paraphyses cylindrical, hyaline. Ascospores 4-7 x 0.8-1.2 µm, cylindrical to fusiform, straight or slightly curved, hyaline (Figure 4c). *Hyalorbilia inflatula* grows on rotten wood and bark of woody plants (Liu et al., 2006).



Figure 3. *Cyclaneusma niveum*: a. ascocarps, b. asci and paraphyses, c. ascospores.



Figure 4. *Hyalorbilia inflatula*: a. ascocarps, b. asci and paraphyses, c. ascospores.

**Specimen examined:** TURKEY — Gaziantep: İslahiye, Tandır village, Huzurlu high plateau, mixed forest, on *Quercus* L. sp. twigs, 36°57'N-36°30'E, 1140 m, 01.11.2014, K.10385.

*Orbilia aristata* (Velen.) Velen. (1947).

**Syn:** *Orbilia occulta* var. *aristata* Velen.

**Macroscopic and microscopic features:**

Apothecia 0.5-1.5 mm in diameter, disc shaped, sessile, centrally attached to the substrate, dark yellow, orange to orange brown, margin crenulate, hymenial surface smooth (Figure 5a). Asci 45-55 × 6-8 µm, cylindrical to clavate, eight spored. Paraphyses cylindrical, distinctly enlarged at the apex (Figure 5b). Ascospores 16-22 × 2.2-3.6 µm, composed of a head and a tail, head ellipsoid-naviculiform, tail cylindrical, some slightly bulbous at the end (Figure 5c). *Orbilia aristata* grows on bark of woody plants.

**Specimen examined:** TURKEY — Gaziantep: Nurdağı, Belpınar village, on bark of dead *Pinus brutia* L. twigs, 37°12'N-36°46'E, 540 m, 09.03.2014, K.8596.

### Discussion

With this study, five new fungi species, *Bisporella sulfurina* (Quél.) S.E.Carp., *Lachnum fuscescens* (Pers.) P.Karst. *Cyclaneusma niveum* (Pers.) DiCosmo,

Peredo & Minter, *Hyalorbilia inflatula* (P. Karst.) Baral & G.Marson and *Orbilia aristata* (Velen.) Velen., belonging to the families *Helotiaceae*, *Lachnaceae*, *Marthamycetaceae* and *Orbiliaceae* within the orders *Helotiales* and *Orbiliales*, were given as new records for the mycobiota of Turkey. Among them, *Hyalorbilia inflatula* is the first member of the genus *Hyalorbilia* Baral & G. in Turkey.

With the addition of three helotioid and two orbilioid records, current species number of *Helotiaceae*, *Lachnaceae*, *Marthamycetaceae* (*Helotiales*) and *Orbiliaceae* (*Orbiliales*) in Turkey increased to 19, 12, 2 and 7 respectively.

Although the color of *Bisporella sulfurina* is quite characteristic, it is easy to confuse it with *B. citrina* (Batsch) Korf & S.E. Carp. or some yellow members of *Hymenoscyphus* Gray, but *B. citrina* has larger apothecia and the members of *Hymenoscyphus* differs with distinct stipes.

Though *Cyclaneusma niveum* is similar to *Cyclaneusma minus* (Butin) DiCosmo, Peredo & Minter, it has larger ascomata, asci and ascospores than *C. minus* (Ivanová, 2015).

*Orbilia aristata* is similar to *O. brevicauda* Y.Zhang, Baral & K.Q.Zhang in spore shape, but differs from *O. brevicauda* with larger ascospores.





Figure 5. *Orbilia aristata*: a. ascocarps, b. asci and paraphyses, c. ascospores.

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