

## Six new genus records for Turkish Pezizales from Gaziantep Province

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Received: 02.09.2014 • Accepted: 15.12.2014 • Published Online: 04.05.2015 • Printed: 29.05.2015

**Abstract:** The genera *Hypotarzetta* Donadini, *Pseudombrophila* Boud., *Pustularia* Bonord., *Pyronema* Carus, *Tricharina* Eckblad (Pyronemataceae Corda), and *Thecotheus* Boud. (Ascobolaceae Boud. ex Sacc.) are recorded from Turkey for the first time based on the collections of *Hypotarzetta insignis* (Berthet & Rioussset) Donadini, *Pseudombrophila merdaria* (Fr.) Brumm., *Pustularia patavina* (Cooke & Sacc.) Boud., *Pyronema omphalodes* (Bull.: Fr.) Fuckel, *Tricharina gilva* (Boud. ex Cooke) Eckblad, and *Thecotheus pelletieri* (P. Crouan & H. Crouan) Boud., respectively. Short descriptions and photographs of the taxa related to their macro- and micromorphologies are provided.

**Key words:** Ascomycota, biodiversity, macrofungi, new records

### 1. Introduction

Pezizales is an order of the phylum Ascomycota with 1683 taxa belonging to 199 genera and 16 families (Kirk et al., 2008). The members of this order are generally saprobic, mycorrhizal, or parasitic on plants. Species grow on soil, wood, leaves, and dung, and most of them occur in temperate regions or at high altitudes. The order includes epigeous, semihypogeous, and hypogeous taxa. Many economically important ascomycetous fungi, such as morels, black and white truffles, and desert truffles, are also included in this group. Members of Pezizales are mainly characterized by stalked or sessile apothecial ascomata, operculate asci, and single-celled, bilaterally symmetrical, roughly spherical to ellipsoidal ascospores (Hansen and Pfister, 2006).

According to current checklists (Solak et al., 2007; Sesli and Denchev, 2008) 122 members of Pezizales within 41 genera and 11 families were recorded by the end of January 2014. Four new members were added to this list by Kaya (2015).

Gaziantep is located at the intersection of the Mediterranean and southeastern Anatolian regions. According to the data obtained from the Gaziantep meteorological station, annual precipitation is 578.8 mm and annual average temperature is 14.4 °C. Though the area is located at a phytogeographically transitional region, plant cover is generally dominated by Irano-Turanian elements.

This study aims to make a contribution to the mycobiota of Turkey by adding new genera records.

### 2. Materials and methods

The macrofungi samples were collected in 2014 from 4 localities during periodic fungal inventories within Gaziantep Province. Necessary morphological and ecological properties of the specimens were recorded and color photographs were taken at their natural habitats. They were then transferred to the fungarium, and macroscopic and microscopic investigations were carried out. The specimens were identified with the help of Seaver (1942), Waraitch (1976), Breitenbach and Kränzlin (1984), Yang and Korf (1985), Medardi (1991), Brummelen (1995), Fouchier and Neville (1998), Nagao et al. (2003), and van Vooren (2012). The samples are deposited at the Department of Biology, Faculty of Science, Karamanoğlu Mehmetbey University.

### 3. Results

#### 3.1. *Pyronemataceae* Corda

**3.1.1. *Hypotarzetta insignis*** (Berthet & Rioussset) Donadini, *Docums Mycol.* 15 (60): 49 (1985) [Syn. *Pustularia insignis* Berthet & Rioussset, Bull.; *Pustulina insignis* (Berthet & Rioussset) Korf & Berthet; *Tarzetia insignis* (Berthet & Rioussset) Korf & J.K. Rogers] (Figure 1).

Apothecium 6–12 cm across, cup-shaped and hypogeous grooving with a surmounting stipe when young, becomes stretched-bent, wavy, beaten back, and more or less sessile when old. Hymenium creamy white, ocher-yellow to very pale, almost white. Flesh thin, 1–2 mm, somewhat elastic, flexible, slightly brittle, whitish.

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**Figure 1.** *Hypotarzetta insignis*: a- ascocarps, b- ascus, c- paraphyses, d- ascospores.

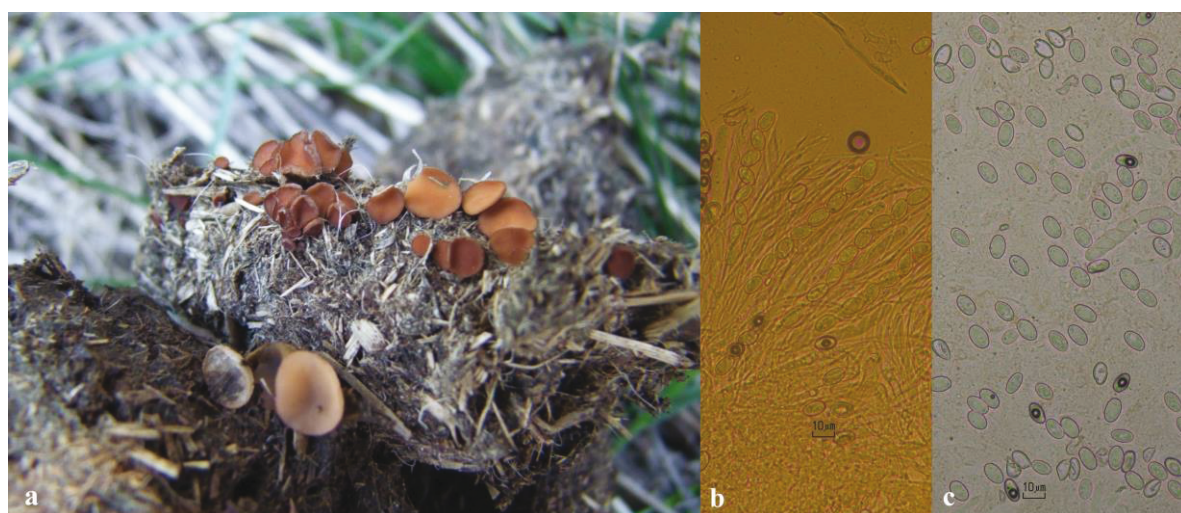
Odor strong, mushroomy, somewhat acidic. Spores  $24\text{--}27 \times 12\text{--}14 \mu\text{m}$ , ellipsoid, smooth, hyaline, with 2 guttules in fresh spores and a large one in mature ones. Asci  $370\text{--}400 \times 18\text{--}22 \mu\text{m}$ , cylindrical with a terminal operculum, tapering towards the base. Paraphyses  $2.5\text{--}3.5 \mu\text{m}$  wide, septate, filiform, often branched, sometimes anastomosing.

**Specimen examined:** İslahiye, Huzurlu high plateau, on soil in mixed forest,  $36^{\circ}58'N$ ,  $36^{\circ}30'E$ , 1430 m, 26.04.2014, K. 8866.

**3.1.2. *Pseudombrophila merdaria* (Fr.) Brumm.,** A World Monograph of the Genus *Pseudombrophila* (Pezizales, Ascomycotina), *Libri Botanici* 14: 45 (1995) [Syn. *Ascophanus merdarius* (Fr.) Boud., *Humaria merdaria* (Fr.) Sacc., *Peziza merdaria* Fr.] (Figure 2).

Apothecium 1–5 mm across, sessile to subsessile, at first subglobose then domed, disc-shaped. Hymenium smooth, flat, slightly concave, white-cream, pinkish-white, then cream-gray, pale-ocher, brick red, reddish-pinkish-gray. Outer surface tomentose, concolorous, or darker margin covered with dark brown hairs. Spores  $11\text{--}13 \times 6\text{--}7.5 \mu\text{m}$ , ellipsoid, smooth, thick-walled, hyaline. Asci  $120\text{--}150 \times 8\text{--}11.5 \mu\text{m}$ , cylindrical, gradually attenuated towards the base, rounded at the apex. Paraphyses  $1.5\text{--}2 \mu\text{m}$  in diameter, cylindrical-filiform, septate, branched at the bottom, slightly widened at the top.

**Specimen examined:** Nurdağı, İçerisu village, on decaying cow dung,  $37^{\circ}09'N$ ,  $36^{\circ}50'E$ , 590 m, 21.03.2014, K. 8703.



**Figure 2.** *Pseudombrophila merdaria*: a- ascocarps, b- asci and paraphyses, c- ascospores.

3.1.3. *Pustularia patavina* (Cooke & Sacc.) Boud. Hist. Class. Discom. Eur. (Paris): 53 (1907) [Syn. *Humaria patavina* (Cooke & Sacc.) Rehm; *Leucoscypha patavina* (Cooke & Sacc.) Svrček; *Neottiella patavina* (Cooke & Sacc.) Sacc.; *Peziza patavina* Cooke & Sacc., in Cooke] (Figure 3).

Apothecium 2–5 mm across, sessile, cup-shaped when young, later almost flat. Hymenium orange, outer surface concolorous with the hymenium and tomentose, edges crenulate with small whitish teeth. Presents a fine subiculum hypha with which it adheres to the substrate. Spores 23–24 × 10–10.8 µm, ellipsoidal to slightly fusiform, smooth, and 2 guttules, sometimes with a large guttule accompanied by other smaller ones. Asci 190–220 × 18–20 µm, cylindrical, 8-spored. Paraphyses cylindrical, forked, septate, and slightly thickened at the apex.

**Specimen examined:** Nurdağı, Gökçedere village, on mossy damp soil, 37°09'N, 36°42'E, 490 m, 15.03.2014, K. 8621.

3.1.4. *Pyronema omphalodes* (Bull.: Fr.) Fuckel, Jb. Nassau. Ver. Naturk. 23–24: 319 (1870) [Syn. *Aleuria omphalodes* (Bull.) Gillet; *Humaria omphalodes* (Bull.) Masee; *Peziza confluens* Pers.; *P. confluens* Pers.; *P. confluens* var. *lilacina* Pers.; *P. confluens* var. *rosella* (Ehrenb.) Pers.; *P. omphalodes* Bull.; *P. omphalodes* var. *aurantiolutea* Fr.; *P. rosella* Ehrenb.; *Pyronema confluens* Tul. & C. Tul.; *P. confluens* var. *inigneum* W.H. Br.; *P. omphalodes* var. *aurantiolutea* Sacc.; *P. omphalodes* var. *camerunense* Henn.; *P. omphalodes* var. *claviforme* Velen.; *P. omphalodes* var. *confluens* (Pers.) Tul.; *P. omphalodes* var. *incarnatorosea* Sacc.; *P. omphalodes* var. *lilacina* Pers.; *P. omphalodes* (Bull.) Fuckel var. *omphalodes*; *Tapesia omphalodes* (Bull.) Quél.] (Figure 4).

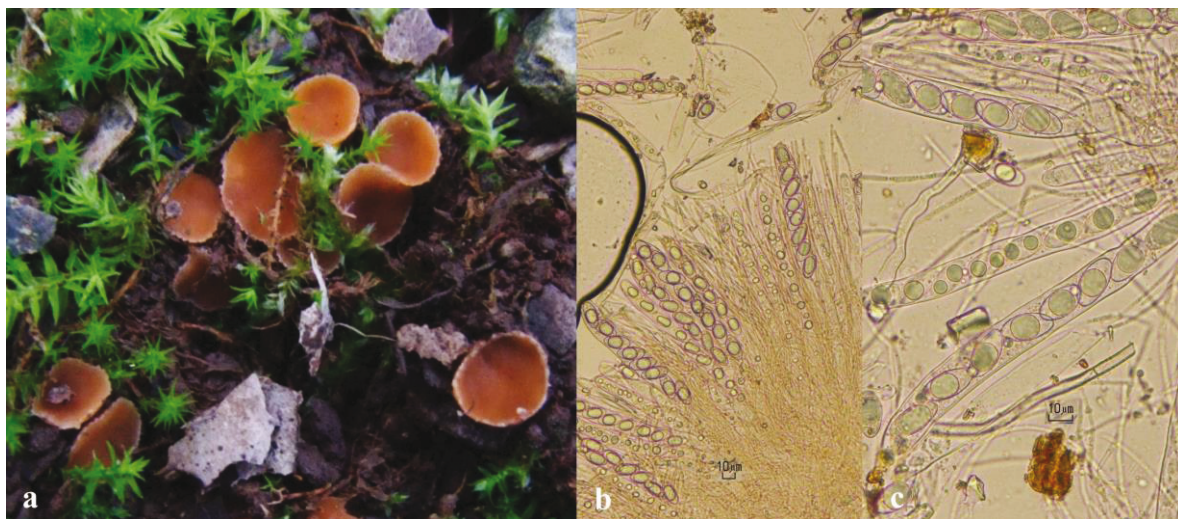


Figure 3. *Pustularia patavina*: a- ascomycetes, b- asci and paraphyses, c- ascospores in some portions of asci.

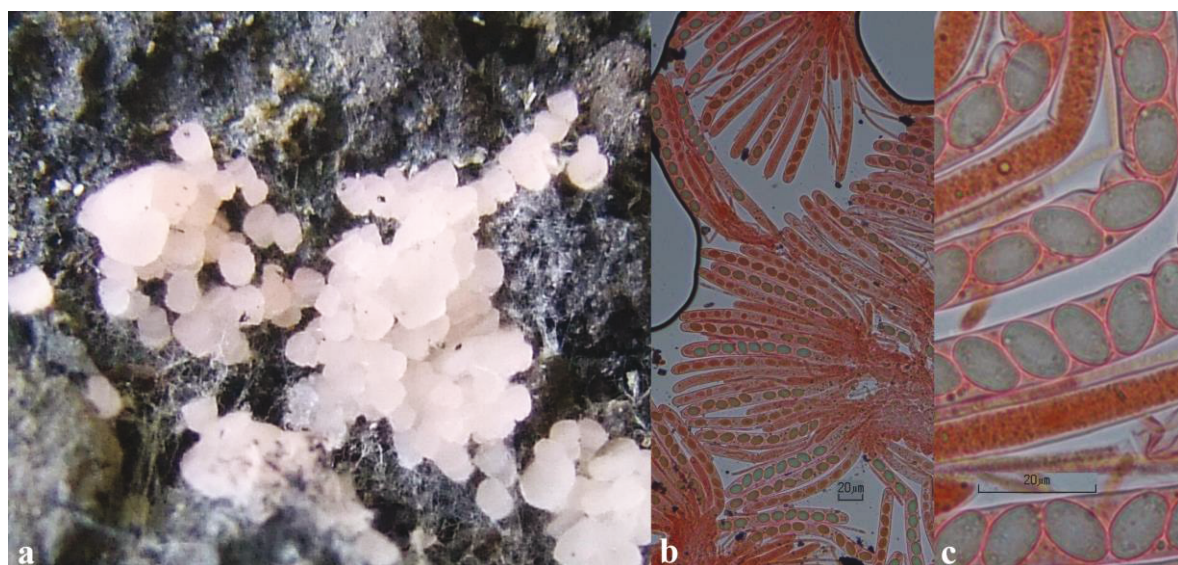


Figure 4. *Pyronema omphalodes*: a- ascomycetes, b- asci and paraphyses, c- ascospores in some portions of asci.

Apothecium 1–2 mm across, sessile, lenticular pulvinate, usually irregular due to the tight aggregation of several fruit bodies. Hymenium convex, pink-red. Flesh pink, fragile. Basal mycelium whitish, not visible in wet weather. Spores 10–13 × 6–8 µm, ellipsoid, smooth, hyaline, not guttulate. Asci 150–179 × 10–15 µm, cylindrical. Paraphyses filiform, cylindrical, slightly enlarged at the apex.

**Specimen examined:** Yavuzeli, Sarıbuğdaylı village, on poplar or willow ash, 37°17'N, 37°30'E, 562 m, 13.04.2014, K. 8859.

**3.1.5. *Tricharina gilva*** (Boud. ex Cooke) Eckblad, Nytt Mag. Bot. 15 (1–2): 60 (1968) [Syn. *Ascorhizoctonia gilva* Chin S. Yang & Korf; *Ciliaria lapidaria* (Cooke ex W. Phillips) Boud.; *Lachnea gilva* (Boud. ex Cooke) Sacc.; *L. hybrida* var. *lapidaria* (W. Phillips) Masee & Crossl.; *L. lapidaria* W. Phillips; *Patella gilva* (Boud. ex Cooke) Seaver; *Peziza gilva* Boud. ex Cooke; *P. hybrida* Cooke; *P. lapidaria* Cooke; *Sarcoscypha gilva* (Boud. ex Cooke) Cooke; *Tricharia gilva* (Boud. ex Cooke) Boud.; *Trichophaea gilva* (Boud. ex Cooke) Gamundí] (Figure 5).

Apothecium 3–9 mm across, sessile, deep cup-shaped when young, later open, almost flattened and wavy. Hymenium smooth, yellow-orange when young, light ocher to pale brownish in age. Outer surface weakly furfuraceous, hairs marginal, 170–380 µm long, subhyaline to pale brown, 3–8-septate. Spores 12.5–15.2 × 7.2–9.5 µm, broadly ellipsoid, smooth, hyaline, eguttulate. Asci 130–180 × 11.2–16.8 µm, cylindrical, narrowing towards the base. Paraphyses slender, septate, 2–2.5 µm broad, branched near base, slightly enlarged at apex.

**Specimen examined:** İslahiye, Huzurlu high plateau, on fir ash, 36°58'N, 36°29'E, 1730 m, 26.04.2014, K. 8872.

### 3.2. *Ascobolaceae* Boud. ex Sacc.

**3.2.1. *Thecotheus pelletieri*** (Crouan) Boud. Anns Sci. Nat., Bot., sér. 5 10: 235 (1869) [Syn. *Ascobolus pelletieri* P. Crouan & H. Crouan; *Ascophanus pelletieri* (P. Crouan & H. Crouan) Quél.; *Ryparobius pelletieri* (P. Crouan & H. Crouan) Sacc.] (Figure 6).

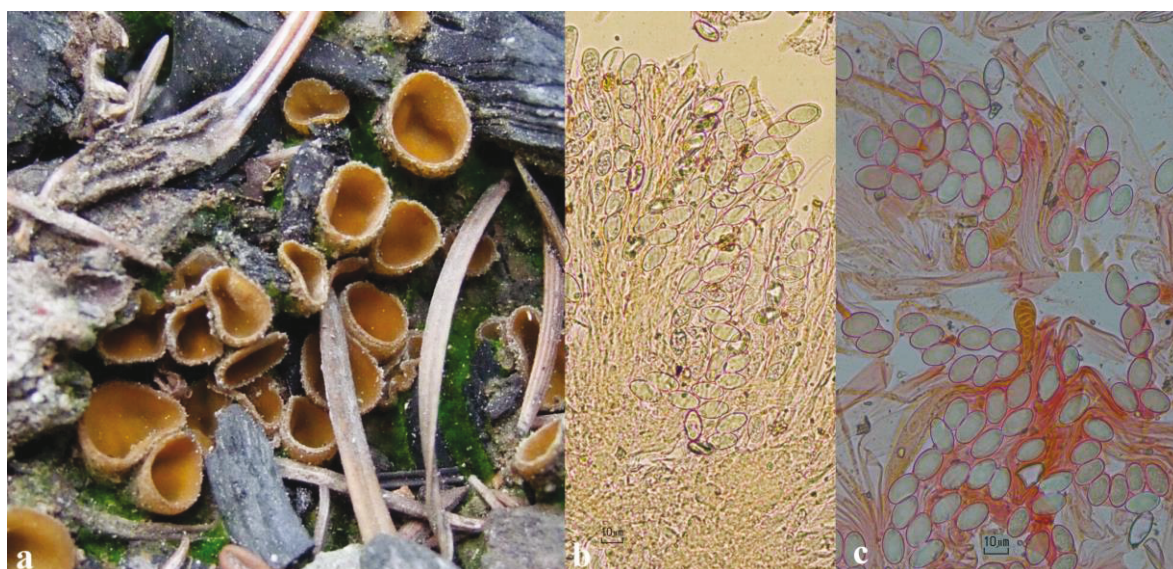
Apothecium 1–2 mm, subconical when young, the top gradually expanding, finally short-cylindrical or rarely approaching discoid, white or whitish, externally more or less pruinose. Hymenium plane or slightly convex. Spores 35–38 × 23–24 µm, ellipsoid, the ends strongly narrowed, 3–4-seriate or irregularly disposed in the ascus. Asci 300–350 × 50–60 µm, broadly cylindrical to clavate, tapering below. Paraphyses slender.

**Specimen examined:** İslahiye, Huzurlu high plateau, on cow dung, 36°58'N, 36°28'E, 1450 m, 02.05.2014, K. 8927.

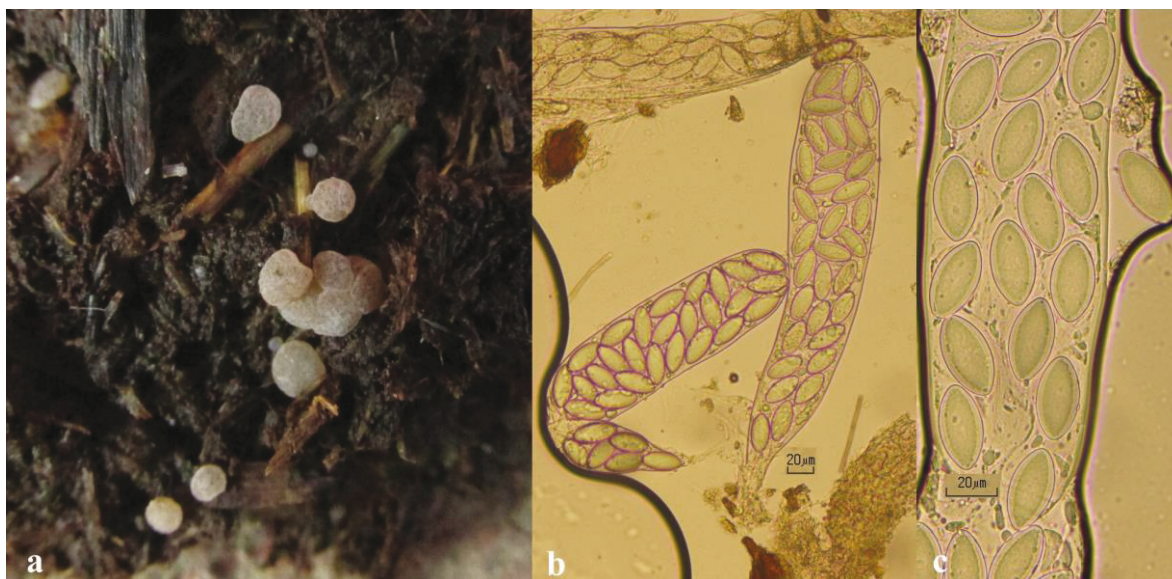
## 4. Discussion

At the end of August 2014, 126 members of Pezizales within 42 genera and 11 families were known in Turkey (Solak et al., 2007; Sesli and Denchev, 2008; Kaya, 2015). With the current study, *Hypotarzetta insignis*, *Pseudombrophila merdaria*, *Pustularia patavina*, *Pyronema omphalodes*, *Tricharina gilva*, and *Thecotheus pelletieri* are added to the list as new records at the genus level, and the total taxa and genus number in the order Pezizales increases to 132 and 48, respectively.

*Pseudombrophila merdaria* is close to *Pseudombrophila petrakii* (Sacc.) Brumm by its brown apothecia and striate ascospores. However, the ornamentation of ascospores is



**Figure 5.** *Tricharina gilva*: a- ascocarps, b- asci and paraphyses, c- ascospores.



**Figure 6.** *Thecotheus pelletieri*: a- ascocarps, b- asci, c- ascospores.

much more prominent in *P. petrakii*, while the apothecia of *P. merdaria* only have a single type of hairs (Wang and Chang, 2010).

*Pustularia patavina* is similar to some specimens of *Tricharina gilva* and *T. praecox* in terms of morphology, but differs from *P. patavina* in terms of their hymenial colors and smaller spore sizes. *T. gilva* has a pale orange hymenium, while *T. praecox* has a yellow-brown hymenium (Yang and Korf, 1985).

*Pyronema omphalodes* is similar to *P. domesticum* in terms of occurrence on burned ground and closely compressed and formless manner of growth. However, the former has smaller spores and a more pinkish color (Breitenbach and Kränzlin, 1984).

*Thecotheus pelletieri* is the only multisporous (32-spored) species of the genus and can very easily be

separated, on the basis of this character, from the rest of its species (Waraitch, 1976; Nagao et al., 2003). It is the first 32-spored ascomycetous member of Pezizales in Turkey.

In general, the observed macro- and micromorphological properties of the newly recorded taxa are in agreement with the literature (Seaver, 1942; Yang and Korf, 1985; Medardi, 1991; Fouchier and Neville, 1998). We measured the apothecia of *Pustularia patavina* as 2–5 mm across, although van Vooren (2012) had measured them as approximately 11 mm. Breitenbach and Kränzlin (1984) gave the apothecial dimension of *Tricharina gilva* as 2–5 mm, while our observation was 3–9 mm.

#### Acknowledgment

The authors would like to thank TÜBİTAK (KBAG 212T112) for supporting this project financially.

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