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New additions to Turkish Agaricales

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Abstract

Six members of Agaricales, *Chromocyphella muscicola* (Fr.) Donk (Chromocyphellaceae), *Crepidotus pallidus* (Berk. & Broome) Knudsen (Inocybaceae), *Mycena meliigena* (Berk. & Cooke) Sacc. (Mycenaceae), *Lachnella villosa* (Pers.) Donk (Niaceae), *Cryptomarasmius corbariensis* (Roum.) T.S. Jenkinson & Desjardin (Physalacriaceae) and *Typhula setipes* (Grev.) Berthier (Typhulaceae) are recorded for the first time from Turkey. The taxa are described briefly and photographs related to macro and micromorphologies are given.

Key words: new records, *Chromocyphella*, *Cryptomarasmius*, Agaricales, Turkey

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Türkiye Agaricales'lerine yeni ilaveler

Özet

Altı Agaricales üyesi, *Chromocyphella muscicola* (Fr.) Donk (Chromocyphellaceae), *Crepidotus pallidus* (Berk. & Broome) Knudsen (Inocybaceae), *Mycena meliigena* (Berk. & Cooke) Sacc. (Mycenaceae), *Lachnella villosa* (Pers.) Donk (Niaceae), *Cryptomarasmius corbariensis* (Roum.) T.S. Jenkinson & Desjardin (Physalacriaceae) and *Typhula setipes* (Grev.) Berthier (Typhulaceae) Türkiye'den ilk kez kaydedilmiştir. Taksonlar kısaca betimlenmiş ve makro ve mikro morfolojilerine ilişkin fotoğrafları verilmiştir.

Anahtar kelimeler: yeni kayıtlar, *Chromocyphella*, *Cryptomarasmius*, Agaricales, Türkiye

1. Introduction

Agaricales Underw. is a fungal order of the phylum *Basidiomycota* R.T.Moore. It is also known as gilled mushrooms, forming the most crowded order of *Agaricomycetes* Doweld with about 13000 described species belonging to 33 families 413 genera (Kirk et al., 2008). The order contains the most familiar types of mushroom species, ranging from the ubiquitous common mushroom to the deadly destroying angel as well as hallucinogenic fly agarics and bioluminescent mushrooms. Species of *Agaricales* are widespread and diverse on land ranging from desert, grassland, forests, tundra, and shorelines in tropical, temperate, and arctic-alpine habitats.

Until the February 2014, 1943 macrofungi species, majority of which belong to *Agaricales*, have been recorded from Turkey (Sesli and Denchev, 2014). Many contributions (Akata et al., 2014; Güngör et al., 2014; Acar et al., 2015; Doğan and Öztürk, 2015; Kaya, 2015; Sesli et al., 2015; Sesli and Moreau, 2015; Uzun et al., 2015; Akata et al., 2016; Demirel et al., 2016; Güngör et al., 2016; Öztürk et al., 2016; Sesli and Topçu Sesli, 2016a; 2016b; Sesli et al., 2016) were also made to this list till now. Here we present six basidiomycetous taxa within the order *Agaricales* as new records for the mycobiota of Turkey.

The study aims to make a contribution to the macrofungi of Turkey by adding new records.

2. Materials and methods

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Fungi samples were collected from localities within the boundaries of Gaziantep province in 2014. They were photographed in their natural habitats and necessary morphological and ecological properties were noted and then they were taken to the laboratory and macroscopic and microscopic investigations were carried out on them. Photographs related to microscopic structures were obtained under Nikon eclipse Ci trinocular light microscope by DS-Fi2 digital camera. Identification was performed with the help of Breitenbach and Kränzlin (1986;1991), Siepe (1991), Dâmon (2001), Piatek and Bujakiewicz (2004), Albuquerque et al. (2007), Dam and Boomsliuter (2009), Antonin and Noordeloos (2010), Friebe (2010), Derboven et al. (2012) and Jenkinson et al. (2014). Specimens are kept at Karamanoğlu Mehmetbey University, Kamil Özdağ Science Faculty, Department of Biology, Karaman, Turkey.

3. Results

Basidiomycota R.T. Moore

Agaricomycetes Doweld

Agaricales Underw.

Chromocyphellaceae Knudsen

Chromocyphella muscicola (Fr.) Donk

Synonym: *Arrhenia muscicola* (Fr.) Quél., *Calypotella muscicola* (Fr.) Quél., *Chaetocypha muscicola* (Fr.) Kuntze, *Cyphella fuscospora* Curr. ex Cooke, *Cyphella muscicola* Fr., *Cyphella muscicola* Fr., var. *muscicola*, *Phaeocyphella fuscospora* (Curr. ex Cooke) Rea, *Phaeocyphella muscicola* (Fr.) Rea.

Macroscopic and microscopic features: Fruiting body 1-5 mm across, cyphelloid to discoid, usually facing downwards, sessile or slightly stipulate, finely woolly, silky white. Hymenial surface smooth to slightly wrinkled, white when young later beige or brownish by spores (Figure 1a). Basidia $35-42 \times 8-9 \mu\text{m}$, cylindric to clavate (Figure 1b). Spores $7.5-9.5 \times 6.5-8.5 \mu\text{m}$, spherical to broadly elliptic, thick walled and finely warty generally with a clear apiculus (Figure 1c). *Chromocyphella muscicola* grows on or near dead or dying mosses or parasitic on living mosses on the bark of living trees (Dam and Boomsliuter, 2009).

Specimen examined: TURKEY—Gaziantep: İslahiye, Kuşçumustafa village, pine forest, on moss, 37°06'N-36°37'E, 890 m, 18.10.2014, K.9976.



Figure 1. *Chromocyphella muscicola*: a. basidiocarps, b. basidia, c. basidiospores

Inocybaceae Jülich

Crepidotus pallidus (Berk. & Broome) Knudsen

Synonym: *Calypotella pallida* (Berk. & Broome) Quél., *Chaetocypha bloxamii* (Berk. & W. Phillips) Kuntze, *Chaetocypha pallida* (Berk. & Broome) Kuntze, *Cyphella bloxamii* Berk. & W. Phillips, *Cyphella bloxamii* Berk. & W. Phillips, var. *bloxamii*, *Cyphella bloxamii* var. *disciformis* Pilát, *Cyphella pallida* Berk. & Broome, *Pellidiscus pallidus* (Berk. & Broome) Donk.

Macroscopic and microscopic features: Fruiting body 1-3.5 mm across, bowl shaped, attached to the substrate at the bottom, thin, soft and fragile, white to cream fibrous to fringed, margin somewhat turned into bowl. Hymenial surface smooth to somewhat rough, greyish white to yellowish cream when young, becomes ochraceous when mature (Figure 2a). Basidia $13-14 \times 5.5-6 \mu\text{m}$, cylindrical to clavate usually with four sterigmata (Figure 2b).

Spores $6.5\text{--}9 \times 3.5\text{--}5.5 \mu\text{m}$, elliptical to subamigdaliform (Figure 2c). *Crepidotus pallidus* grows on old leaves and twigs on marshy or damp ground (Derboven et al., 2012).

Specimen examined: TURKEY—Gaziantep: Nurdağı, Olucak village, mixed forest, on dead twigs, $37^{\circ}09'N\text{--}36^{\circ}40'E$, 980 m, 30.11.2014, K.10831.

Mycenaceae Roze

Mycena meliigena (Berk. & Cooke) Sacc.

Synonym: *Agaricus meliigena* Berk. & Cooke, *Mycena meliigena* f. *alba* Courtec., *Mycena meliigena* (Berk. & Cooke) Sacc. f. *meliigena*, *Prunulus meliigena* (Berk. & Cooke) Murrill.

Macroscopic and microscopic features: Pileus 4–9 mm across, hemispherical, parabolical to convex, depressed centrally, radially striate or sulcate, vinaceous red to red-brown (Figure 3a). Flesh thin. Lamellae concolorous with the pileus at first, become whitish to cream when mature, broad, adnate to subdecurrent. Stipe 10–18 $\times$ 0.3–1 mm, cylindric, usually bent upward, white pruinose especially toward the base. Cheilocystidia 15–25 $\times$ 6–15 μm , clavate, covered with unevenly spaced, simple or branched excrescences (Figure 3b). Basidia 30–35 $\times$ 10.5–13.5 μm clavate with 4 sterigmata and basal clamp. Spores 8–11 $\times$ 8–9.5 μm , subglobose, smooth, hyaline (Figure 3c). *Mycena meliigena* grows on bare, mossy, or lichen-covered bark of living hardwoods (Breitenbach and Kränzlin, 1991).

Specimen examined: TURKEY—Gaziantep: İslahiye, Kuşçumustafa village, pine forest, on pine barks, $37^{\circ}06'N\text{--}36^{\circ}37'E$, 890 m, 18.10.2014, K.9969; Hasanlök village, mixed forest, on pine barks, $36^{\circ}54'N\text{--}36^{\circ}34'E$, 810 m, 19.10.2014, K.10034.



Figure 2. *Crepidotus pallidus*: a. basidiocarps, b. basidium, c. basidiospores



Figure 3. *Mycena meliigena*: a. basidiocarps, b. cheilocystidia c. basidiospores

Niaceae Jülich***Lachnella villosa*** (Pers.) Donk

Synonym: *Cyphella villosa* (Pers.) P. Crouan & H. Crouan f. *villosa*, *Cyphella villosa* subsp. *solenioides* P. Karst., *Cyphella villosa* (Pers.) P. Crouan & H. Crouan subsp. *villosa*, *Cyphella villosa* var. *cycadearum* Henn., *Cyphella villosa* (Pers.) P. Crouan & H. Crouan, var. *villosa*, *Dasyscyphus sessilis* Gray, *Henningsomyces villosus* (Pers.) Kuntze, *Lachnea villosa* (Pers.) Gillet, *Peziza granuliformis* Pers., *Peziza granuliformis* Pers., var. *granuliformis*, *Peziza granuliformis* var. *incarnata* (Pers.) Pers., *Peziza granuliformis* var. *villosa* (Pers.) Pers., *Peziza incarnata* Pers., *Peziza sessilis* Sowerby, *Peziza villosa* Pers., *Peziza villosa* var. *candida* Alb. & Schwein., *Peziza villosa* var. *incarnata* (Pers.) Pers., *Peziza villosa* Pers. var. *villosa*, *Sclerotium villosum* Tode, *Sclerotium villosum* Tode var. *villosum*, *Solenia villosa* (Pers.) Fr., *Solenia villosa* var. *eximia* Sacc. & Trotter, *Solenia villosa* var. *polyporoidea* Peck, *Solenia villosa* (Pers.) Fr. var. *villosa*, *Trichopeziza villosa* (Pers.) Fuckel.

Macroscopic and microscopic features: Fruiting body 0.4–1.3 mm across, disc to cup shaped, sessile to subsessile, surface densely covered with whitish hairs, margin inrolled when dry, hymenial surface smooth, whitish to pale greyish brown (Figure 4a), marginal hairs thick walled, hyaline, cylindrical and with fine granules (Figure 4b). Basidia $40\text{--}55 \times 10\text{--}12.5 \mu\text{m}$, clavate with four sterigmata. Spores $7\text{--}12 \times 5\text{--}8 \mu\text{m}$, amygdaliform, asymmetrical, smooth, thin-walled and usually with numerous oil drops (Figure 4c). *Lachnella villosa* grows on herbaceous plants and twigs of woody plants (Piatek and Bujakiewicz, 2004).

Specimen examined: TURKEY—Gaziantep: Oğuzeli, centre, poplar grove, on dead *Populus* L. sp. twig, $36^{\circ}58'N\text{--}37^{\circ}30'E$, 700 m, 13.12.2014, K.11066.



Figure 4. *Lachnella villosa*: a. basidiocarps, b. Basidiospores

Physalacriaceae Corner***Cryptomarasmius corbariensis*** (Roum.) T.S. Jenkinson & Desjardin

Synonym: *Agaricus corbariensis* Roum., *Marasmius corbariensis* (Roum.) Sacc.

Macroscopic and microscopic features: Pileus 2–9 mm across, convex, hemispherical to plano-convex, obtuse or with a small central umbo, dark brown in the center, degrading towards yellowish in the margin, surface smooth with deep radial grooves. Flesh thin, membranaceous. Lamellae distant, white, cream to yellow-cream. Stipe $10\text{--}30 \times 0.2\text{--}0.3 \text{ mm}$, filiform, black, slightly pruinose (Figure 5a). Basidia $23\text{--}30 \times 8\text{--}9.5 \mu\text{m}$, clavate, with four sterigmata (Figure 5b). Pileipellis is made up of broadly fusiform to subglobose diverticulately warted elements (Figure 5c). Some of the cheilocystidia, like pileipellis, clavate to pyriform $10\text{--}24 \times 5\text{--}12 \mu\text{m}$, hyaline with a variable number of small, pale yellow-brown $2.5 \times 1 \mu\text{m}$ large warts. Spores $8\text{--}10 \times 3.5\text{--}5.5 \mu\text{m}$, ellipsoid to subcylindrical (Figure 5d). *Cryptomarasmius corbariensis* grows on rot leaves of broad-leaved plants such as *Olea* L., *Myrtus* L. and *Quercus* L. (Lantieri et al., 2009).

Specimen examined: TURKEY—Gaziantep: Nizip, Sekili village, cemetery, on dead *Olea* L. sp. leaves, $36^{\circ}58'N\text{--}37^{\circ}40'E$, 600 m, 14.12.2014, K.11114.



Figure 5. *Cryptomarasmius corbariensis*: a. basidiocarps, b. Basidiospores

Typhulaceae Jülich

Typhula setipes (Grev.) Berthier

Synonym: *Clavaria gyrans* Batsch, *Clavaria setipes* Grev., *Cnazonaria setipes* (Grev.) Corda, *Pistillaria setipes* Grev., *Typhula grevillei* Fr., *Typhula gyrans* (Batsch) Fr., *Typhula gyrans* var. *grevillei* (Fr.) Massee, *Typhula gyrans* (Batsch) Fr. var. *gyrans*.

Macroscopic and microscopic features: Fruiting body 2-4 × 0.2-0.5 mm, consists of a fertile head and a sterile stalk, head 0.5-1 × 0.2-0.5 mm, whitish to cream colored, capitate, smooth. Stipe 2-2.2 × 0.2 mm, cylindrical, whitish with a thickened and reddish brown base, always much longer than the head (Figure 6a). Basidia 22-30 × 5-6 µm, slenderly conical with two to four sterigmata (Figure 6b). Spores 7-9 × 3-3.5 µm, elliptical, smooth, hyaline (Figure 6c). *Typhula setipes* grows on decaying fallen leaves of various hardwoods (Breitenbach and Kränzlin, 1986).

Specimen examined: TURKEY—Gaziantep: Yavuzeli, Halilbaşlı village, stream side, on dead *Populus* L. sp. twig, 37°16'N-37°31'E, 560 m, 02.11.2014, K.10497; Oğuzeli, centre, roadside, poplar grove, on dead *Populus* L. sp. leaves, 36°58'N-37°30'E, 700 m, 13.12.2014, K.11059, K.11063.



Figure 6. *Typhula setipes*: a. basidiocarps, b. basidia, c. basidiospores

4. Conclusions and discussion

With this study, *Chromocyphella muscicola* (Fr.) Donk, *Crepidotus pallidus* (Berk. & Broome) Knudsen, *Mycena meliigena* (Berk. & Cooke) Sacc., *Lachnella villosa* (Pers.) Donk, *Cryptomarasmius corbariensis* (Roum.) T.S. Jenkinson & Desjardin and *Typhula setipes* (Grev.) Berthier were added as new records for the mycobiota of Turkey.

Chromocyphella muscicola is the first member of *Chromocyphellaceae* Knudsen in Turkey. *Cryptomarasmius corbariensis* is also the first member of the genus *Cryptomarasmius* T.S. Jenkinson & Desjardin. *Lachnella albobioscens* (Alb. & Schwein.) Fr., and *Typhula fistulosa* (Holmsk.) R.H. Petersen are the second members of the genera *Lachnella* Fr. and *Typhula* (Pers.) Fr. respectively. With the addition *L. villosa* and *T. setipes*, the existing

members of both genera increased to two. Meanwhile the current taxa numbers of the genera *Crepidotus* (Fr.) Staude and *Mycena* (Pers.) Roussel also increased to 11 and 63 respectively.

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