

Macrofungi distribution of Cocakdere valley (Arslanköy, Mersin)

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Abstract: The present study reports on species of macrofungi collected from 2002 to 2005 in Cocakdere valley in the central Taurus mountains. This area is protected and is one of the important plant areas in Turkey. In the field and during laboratory studies 186 taxa belonging 2 divisions and 44 families were identified. Among them, 6 families and 10 species belong to *Ascomycota*, and 38 families and 186 species belong to *Basidiomycota*. Moreover, 4 taxa—*Cortinarius aureifolius*, *Inocybe hygrophorus*, *Ramaria suecica*, and *Scytinostroma portentosum*—were found in the Turkish mycobiota for the first time.

Key words: Cocakdere valley, macrofungi, new records, Turkey

Cocakdere vadisinin (Arslanköy-Mersin) makrofungus dağılımı

Özet: Bu çalışma Orta Toroslarda bulunan Türkiye'nin önemli bir bitki alanı ve koruma altında olan Cocakdere Vadisinde 2002-2005 yıllarında toplanan makrofungusları rapor etmektedir. Arazi ve laboratuvar çalışmaları sonucu iki bölüm ve 44 familyaya ait 186 takson belirlenmiştir. Bunlardan 6 familyaya ait 10 tür *Ascomycota*, 38 familyaya ait 176 tür de *Basidiomycota* bölümündendir. Ayrıca 4 takson, *Cortinarius aureifolius*, *Inocybe hygrophorus*, *Ramaria suecica*, *Scytinostroma portentosum*, Türkiye mikobiyotası için ilk kez bulunmuştur.

Anahtar sözcükler: Cocakdere vadisi, makrofunguslar, yeni kayıtlar, Türkiye

Introduction

The research area is located in the northern part of Mersin between Arslanköy and Çamlıyayla. Geographically this area is in south Anatolia and in the transition zone between the Mediterranean and Irano-Turanian phytogeographic regions. There are narrow straits near Cehennemdere that are approximately 16 km long and 1-6 km wide. The research area is bordered in the north-east by the Bolkar mountains, in the southeast by Kızıldağ and Beyyurdu, and in the southwest by Dümbelek mountain pass (Figure 1). The altitude is between

1000 and 1500 m at the bottom of the valley and between 1900 and 2300 m at the ridges. Among the forest vegetation the dominant taxa are *Abies cilicica* (Antoine & Kotschy) Carriere subsp. *cilicica*, *Cedrus libani* A.Rich., *Pinus nigra* J.F.Arnold subsp. *nigra* var. *caramanica* (Loudon) Businsky, *Pinus brutia* Ten. var. *brutia*, *Juniperus drupacea* Labil, *J. oxycedrus* L. subsp. *oxycedrus*, *J. foetidissima* Willd., *J. excelsa* M.Bieb., and *Quercus* sp.

Cocakdere valley is under preservation and has interesting characteristics in terms of both plant flora and phytogeography. There are a number of 600-year-

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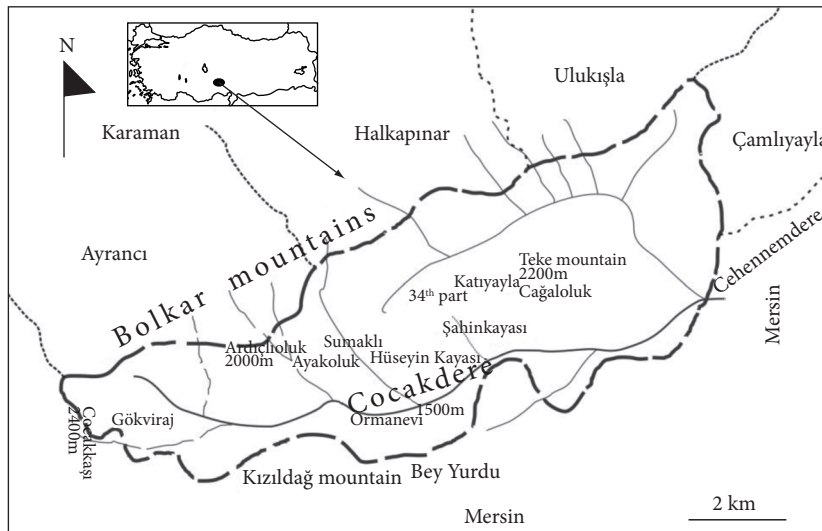


Figure 1. Map of the study area.

old monumental *Cedrus libani* and *Juniperus excelsa* trees. The area is also a natural gene origin for *Cedrus libani*. Cocakdere valley was selected as a research area because there has been no previous detailed study of the macrofungi in this area. Part of this study was presented as a poster at the XVth Congress of European Mycologists (Doğan et al., 2007a).

Materials and methods

The collection of fungal specimens was performed between 2002 and 2005. The field studies were conducted mostly in the autumn and spring; during these periods the climatic conditions are most suitable for carpophore formation.

A microscope and reagents (Melzer reagent, 5% KOH, cotton blue, IKI, etc.) were used for the identification of fungi. The determination of the recorded species was accomplished during the field trips or afterwards in the mycological laboratory.

The specimens were identified by referring to the following sources: Eriksson and Ryvardeen (1973-1978), Eriksson et al. (1981, 1984), Moser (1983), Breitenbach and Kränzlin (1984-2000), Jülich (1984), Hjortstam et al. (1987, 1988), Candusso and Lanzoni (1990), Alassio (1991), Ryvardeen and Gilbertson (1993), Candusso (1997), Basso (1999), Riva (2003a, 2003b), Neville and Poumarat (2004), Bernicchia (2005), Horak (2005), Muñoz (2005), Medardi (2006), Robich (2007), and Parra (2008). The new

records for Turkey were checked with the relevant literature: Doğan et al. (2005, 2007b), Doğan and Karadelev (2006, 2009), Solak et al. (2007), Sesli and Denchev (2008), Alkan et al. (2010), Demirel et al. (2010), and Kaya et al. (2010).

Taxa, family, and author citations were listed according to Cannon and Kirk (2007) and Kirk et al. (2008). Family and species names are listed in alphabetical order in the text.

Abbreviations:

HD: Collection number of Hasan Hüseyin Doğan
*: new record.

Results

Ascomycota

Helotiales

Helotiaceae

Bisporella citrina (Batsch) Korf & S.E.Carp.; Sumaklı, in cedar forest, on twigs of cedar, 1450 m, 07.10.2005, *HD* 2083.

Pezizales

Helvellaceae

Helvella acetabulum (L.) Quél.; 34th part, in black pine forest, on soil, 1650 m, 07.06.2003, *HD* 1351; behind Ormanevi, in mixed cedar and fir forest, on soil, 07.06.2003, *HD* 1400.

Helvella leucomelaena (Pers.) Nannf.; Sumaklı, in black pine forest, on soil, 1450 m, 07.06.2003, *HD* 1373, in cedar forest, on soil, 07.06.2003, *HD* 1399.

Morchellaceae

Morchella vulgaris (Pers.) Boud.; 34th part, in cedar forest, on soil, 1650 m, 13.05.2004, *HD* 1819.

Morchella conica Krombh. var. **rigida**; Cağaloluk, in cedar forest, on soil, 1750 m, 06.06.2003, *HD* 1328.

Morchella deliciosa Fr.; 34th part, in cedar forest, on soil, 1600 m, 13.05.2004, *HD* 1742.

Morchella esculenta (L.: Fr.) Pers. var. **umbrina** (Boud) S.Imai; Ayakoluk, in black pine forest, on soil, 1700 m, 08.06.2003, *HD* 1414.

Pezizaceae

Sarcosphaera coronaria (Jacq.) J.Schröt.; behind Ormanevi, in cedar forest, on soil, 1750 m, 07.06.2003, *HD* 1403; 05.07.2003, *HD* 1417; Sumaklı, in cedar and fir forest, on soil, 1450 m, 07.06.2003, *HD* 1362; 34th part, in cedar forest, on soil, 1650 m, 13.05.2004, *HD* 1732.

Caloscyphaceae

Caloscypha fulgens (Pers.) Boud.; 34th part, in cedar forest, on soil, 1650 m, 13.05.2004, *HD* 1744.

Pyronemataceae

Geopora sumneriana (Cooke) M.Torre; 34th part, in cedar forest, on soil, 1650 m, 13.05.2004, *HD* 1741.

Basidiomycota

Agaricaceae

Agaricus bitorquis (Quél.) Sacc.; 34th part, in cedar forest, in grassy spot, 1650 m, 13.05.2004, *HD* 1749.

Agaricus campestris Scop.; Katiyayla, in cedar forest, in grassy spot, 1800 m, 08.06.2003, *HD* 1404.

Agaricus cupreobrunneus (Jul.Schäff. & Steer) Pilát; Sumaklı, in cedar forest, in grassy spot, 1450 m, 07.10.2005, *HD* 2099.

Agaricus luteomaculatus (F.H.Møller) F.H.Møller; Sumaklı, in *J. excelsa* forest, in grassy spot, 1450 m, *HD* 2088.

Agaricus urinasens (Jul.Schäff. & F.H.Møller) Singer var. **urinasens**; behind Ormanevi, in black pine forest, in needle litter, 1750 m, 07.06.2003, *HD*

1397; Şahin tepesi, in black pine forest, in grassy spot, 1600 m, 13.05.2004, *HD* 1809.

Agaricus moelleri Wasser; Şahin tepesi, in cedar forest, in grassy spot, 1600 m, 13.05.2004, *HD* 1739.

Bovista plumbea Pers.; Sumaklı, in cedar forest, in grassy spot, 07.10.2005, *HD* 2084.

Calvatia gigantea (Batsch) Lloyd; 34th part, in *J. excelsa* forest, in grassy spot, 1700 m, 13.05.2004, *HD* 1834.

Coprinus comatus (O.F.Müll.) Pers.; Cocakdere entrance, in grassy spot, 2400 m, *HD* 1775.

Crucibulum laeve (Huds.) Kambly; Ayakoluk, in cedar forest, on cedar twigs, 1600 m, 16.10.2004, *HD* 1849.

Cystodermella granulosa (Batsch) Harmaja; Hüseyin kayası, in mixed cedar and fir forest, in grassy spot, 1550 m, 22.10.2005, *HD* 2110.

Leucoagaricus carneifolius (Gillet) M.M.Moser; Hüseyin kayası, in cedar forest, in grassy spot, 1550 m, 22.10.2005, *HD* 2107.

Lepiota erminea (Fr.) Gillet; 34th part, in black pine forest, in grassy spot, 1650 m, 07.06.2003, *HD* 1347.

Lycoperdon caudatum J.Schröt.; Ayakoluk, in black pine forest, in grassy spot, 1700 m, 04.10.2003, *HD* 1434.

Lycoperdon lividum Pers.; 34th part, in cedar forest, in grassy spot, 1650 m, 13.05.2004, *HD* 1811.

Lycoperdon marginatum Vittad.; Hüseyin kayası, in cedar forest, in grassy spot, 1550 m, 22.10.2005, *HD* 2119.

Lycoperdon molle Pers.; 34th part, in cedar forest, in grassy spot, 1650 m, 13.05.2004, *HD* 1814; in fir forest, in grassy spot, *HD* 1816.

Lycoperdon umbrinum Pers.; Hüseyin kayası, in fir forest, in grassy spot, 1550 m, 22.10.2005, *HD* 2120.

Macrolepiota procera (Scop.) Singer var. **procera**; Sumaklı, in black pine forest, on soil, 1450 m, 07.10.2005, *HD* 2085.

Macrolepiota excoriata (Schaeff.) Wasser; Ayakoluk, in black pine forest, on soil, 1600 m, 16.10.2004, *HD* 1856.

Tulostoma brumale Pers.; Şahin tepesi, in cedar forest, on soil, 1600 m, 16.10.2004, *HD* 1849.

Tulostoma fimbriatum Fr.; 34th part, in cedar forest, on soil, 1650 m, 05.07.2003, *HD* 1425; Sumaklı, in *J. excelsa* forest, on soil, 1450 m, 10.10.2003, *HD* 1447.

Helicobasidiales

Helicobasidiaceae

Helicobasidium compactum Boedijn; Şahin tepesi, in cedar forest, on wood debris, 1600 m, 13.05.2004. *HD* 1812.

Strophariaceae

Agrocybe dura (Bolton) Singer; Sumaklı, stream banks, in grassy spot, 1450 m, 07.06.2003, *HD* 1377.

Agrocybe vervacti (Fr.) Singer; Ayakoluk, stream banks, in grassy spot, 1700 m, 08.06.2003, *HD* 1413.

Galerina badipes (Fr.) Kühner; behind Ormanevi, in cedar forest, on grassy spot, 1700 m, 05.10.2002, *HD* 1233.

Gymnopilus penetrans (Fr.) Murrill; Ayakoluk, in cedar forest, on cedar twigs, 1750 m, 04.10.2003, *HD* 1430; Hüseyin kayası, in cedar forest, on cedar twigs, 1550 m, 22.10.2005, *HD* 2109.

Hebeloma album Peck.; Hüseyin kayası, in cedar forest, on soil, 1550 m, 22.10.2005, *HD* 2137.

Hebeloma eburneum Malençon; behind Ormanevi, in fir forest, on soil, 1750 m, 06.10.2002, *HD* 1239.

Hebeloma punctatum (Fr.) Gillet; 34th part, in cedar forest, on soil, 1650 m, 07.06.2003, *HD* 1342; behind Ormanevi, in fir forest, on soil, 1750 m, 07.06.2003, *HD* 1402.

Hebeloma mesophaeum (Pers.) Quél.; Hüseyin kayası, in cedar forest, on soil, 1550 m, 07.06.2003, *HD* 1357; in fir forest, on soil, 22.10.2005, *HD* 2136.

Hebeloma laterinum (Batsch) Vesterh.; Hüseyin kayası, in cedar forest, on soil, 1550 m, 22.10.2005, *HD* 2105.

Hebeloma sinapizans (Fr.) Sacc.; behind Ormanevi, in cedar forest, on soil, 1750 m, 05.10.2002, *HD* 1242.

Pholiota limonella (Peck) Sacc.; Hüseyin kayası, in cedar forest, on cedar bark, 1550 m, 22.10.2005, *HD* 2117.

Stropharia coronilla (Bull.) Quél.; Sumaklı, in fir forest, in grassy spot, 1450 m, 07.06.2003, *HD* 1378.

Bolbitiaceae

Conocybe fragilis (Peck.) Singer; Ayakoluk, stream banks, in grassy spot, 1750 m, 05.07.2003, *HD* 1427.

Panaeolus fimicola (Pers.) Gillet, behind Ormanevi, in cedar forest, in grassy spot, 1700 m, 13.06.2005, *HD* 2072.

Panaeolus guttulatus Bres.; Cağaloluk, in fir forest, in grassy spot, 1750 m, 06.06.2003, *HD* 1335; 34th part, in cedar forest, in grassy spot, 1650 m, 07.06.2003, *HD* 1346, 13.05.2005, *HD* 1797.

Panaeolus acuminatus (Schaeff.) Quél.; Sumaklı, in cedar forest, in grassy spot, 1450 m, 07.06.2003, *HD* 1368.

Cortinariaceae

Cortinarius albidus Peck. subsp. **europaeus** (M.M.Moser) Quadr.; Ayakoluk, in cedar forest, on soil, 1450 m, 08.06.2003, *HD* 1416.

***Cortinarius aureifolius** Peck; Hüseyin kayası, in fir forest, on soil, 1550 m, 07.06.2003, *HD* 1352; behind Ormanevi, in mixed black pine and cedar forest, on soil, 1750 m, 07.06.2003, *HD* 1398.

This species is well characterised by its conic to umbonate shape, small pileus (0.5-2 cm), and cinnamon-brown colour. Pileus is also thickly fibrous-tomentous, sometimes scaly. Lamellae warm yellow to rust to cinnamon coloured. Stipe 2-3 × 0.3-0.5 cm, yellow to brownish. Spores 10-12.5 × 5-5.5 µm verrucose, brownish (Figure 2).

Cortinarius balteatus (Fr.) Fr.; behind Ormanevi, in cedar forest, on soil, 1750 m, 05.10.2002, *HD* 1230.

Cortinarius elegantior (Fr.) Fr.; behind Ormanevi, in cedar forest, on soil, 1750 m, 05.10.2002, *HD* 1230; Hüseyin kayası, in cedar forest, on soil, 1550 m, 17.10.2004, *HD* 1861, 22.10.2005, *HD* 2138.

Cortinarius argutus Fr. var. **fraudulosus** (Britzelm.) Melot; Hüseyin kayası, in cedar forest, on soil, 1550 m, 22.10.2005, *HD* 2139.

Cortinarius cinnamomeoluteus P.D.Orton; Sumaklı, in cedar forest, on soil, 1450 m, 07.06.2003, *HD* 1363.

Cortinarius fraudulosus Britzelm.; behind Ormanevi, in cedar forest, on soil, 1750 m, 05.10.2002, *HD* 1243.

Cortinarius infractus Berk.; Hüseyin kayası, in cedar forest, on soil, 1600 m, 17.10.2004, *HD* 1857.

Cortinarius melanotus Kalchbr.; Sumaklı, in cedar forest, on soil, 1450 m, 07.10.2005, *HD* 2078.

Cortinarius saginus (Fr.) Fr.; Hüseyin kayası, in cedar forest, on soil, 1600 m, 17.10.2004, *HD* 1864.

Cortinarius subvalidus Rob.Henry; behind Ormanevi, in cedar forest, on soil, 1700 m, 10.10.2003, *HD* 1442.

Cortinarius venetus (Fr.) Fr. var. **montanus** M.M.Moser; Hüseyin kayası, in cedar forest, on soil, 1550 m, 22.10.2005, *HD* 2104.

Inocybaceae

Crepidotus mollis (Schaeff.) Staude; 34th part, on *Quercus* twigs, 1650 m, 13.05.2004, *HD* 1813.

Inocybe cookei Bres.; Çağaloluk, in cedar forest, on soil, 1750 m, 06.06.2003, *HD* 1333.

Inocybe fuscidula Velen var. **fuscidula**; Hüseyin kayası, in cedar forest, on soil, 1550 m, 22.10.2005, *HD* 2127.

Inocybe fuscomarginata Kühner; Ayakoluk, stream banks, in grassy spot, 1750 m, 07.06.2003, *HD* 1411.

Inocybe gymnocarpa Kühner; behind Ormanevi, in cedar forest, on mossy spot, 1750 m, 07.06.2003, *HD* 1392, 10.10.2003, *HD* 1445, 13.05.2004, *HD* 1761.

Inocybe muricellata Bres.; behind Ormanevi, in cedar forest, on soil, 1750 m, 05.10.2002, *HD* 1232.

***Inocybe hygrophorus** Kühner; 34th part, in black pine forest, on soil, 1650 m, 07.06.2003, *HD* 1344.

Pileus 2-4 cm, cream whitish to yellow brown, finely radially fibrous. Lamellae whitish to grey yellowish or ochraceous. Stipe 3-7 × 0.5-1 cm, the same colour with pileus. Spores 9-10(-12) × 4-6 µm, elliptical to amygdaliform, smooth, light yellow (Figure 2).

Inocybe lacera (Fr.) P.Kumm var. **lacera**; Sumaklı, in cedar forest, on soil, 1450 m, 10.10.2003, *HD* 1441.

Inocybe leptocystis G.F.Atk.; Hüseyin kayası, in mixed cedar and black pine, on soil, 1550 m, 07.06.2003, *HD* 1354.

Inocybe perlata (Cooke) Sacc.; Şahin tepesi, in cedar forest, on soil, 1600 m, 13.05.2004, *HD* 1806.

Inocybe queletii Konrad; Sumaklı, in cedar forest, on soil, 1450 m, 07.06.2003, *HD* 1372.

Inocybe rimosa (Bull.) P.Kumm. var. **rimosa**; Sumaklı, in cedar forest, on soil, 1450 m, 07.06.2003, *HD* 1380; Şahin tepesi, in black pine forest, on soil, 1600 m, 06.06.2003, *HD* 1332, in cedar forest, on soil, 1600 m, 13.05.2004, *HD* 1782; Hüseyin kayası, in cedar forest, on soil, 1550 m, 22.10.2005, *HD* 2126, 2129.

Inocybe sambucina (Fr.) Quél.; Çağaloluk, in cedar forest, on soil, 1750 m, 06.06.2003, *HD* 1330; Ayakoluk, in cedar forest, on soil, 1700 m, 07.06.2003, *HD* 1412.

Inocybe scabra (O.F.Müll.) Quél.; Katıyayla, in cedar forest, on soil, 1800 m, 08.06.2003, *HD* 1408.

Inocybe whitei (Berk. & Broome) Sacc.; Şahin tepesi, in cedar forest, on soil, 1600 m, 13.05.2004, *HD* 1780.

Marasmiaceae

Baeospora myosura (Fr.) Singer; Ayakoluk, in black pine forest, on pine cone, 1600 m, 16.10.2004, *HD* 1845.

Gerronema albidum (Fr.) Singer; behind Ormanevi, in cedar forest, on soil, 1700 m, 05.10.2002, *HD* 1227.

Gymnopus confluens (Pers.) Antonín, Halling & Noordel.; 34th part, in cedar forest, on rotten wood remnants, 1650 m, 13.05.2004, *HD* 1731.

Gymnopus dryophilus (Bull.) Murrill.; Katıyayla, in cedar forest, in grassy spot, 1800 m, 08.06.2003, *HD* 1406.

Marasmius bulliardii Quél. f. **acicula** (S.Lundell) Noordel.; Şahin tepesi, in mixed fir and cedar forest, in grassy spot, 1600 m, 13.05.2004, *HD* 1799.

Physalacriaceae

Oudemansiella melanotricha (Dörfelt) M.M.Moser; Hüseyin kayası, in fir forest, under fir tree, 1550 m, 22.10.2005, *HD* 2128.

Strobilurus stephanocystis (Kühner & Romagn. ex Hora) Singer; 43rd part, in black forest, on pine cone, 1600 m, 13.05.2004, *HD* 1737.

Pleurotaceae

Pleurotus eryngii var. **ferulae** (Lanzi) Sacc.; 34th part, in *J. excelsa* forest, under *Ferula* sp., 13.05.2004, *HD* 1772; Ayakoluk, in *J. excelsa* forest, under *Ferula* sp., 1650 m, 13.06.2005, *HD* 2081.



Figure 2. a- Basidiocarp and b- basidiospores of *Cortinarius aureifolius*; c- basidiocarp and d- basidiospores of *Inocybe hygrophorus*; e- basidiocarp and f- basidiospores of *Ramaria suecica*; g- basidiocarp, h- basidiospores, and j- skeletal hyphae of *Scytinostroma portentosum*.

Pleurotus ostreatus (Jacq.) P.Kumm.; Ayakoluk, in fir forest, on fir trunk, 1700 m, 16.10.2004, *HD* 1871.

Amanitaceae

Amanita alba Pers.; Ayakoluk, in black pine forest, on soil, 1700 m, 04.10.2002, *HD* 1433.

Pluteaceae

Volvariella gloiocephala (DC.) Boekhout & Enderle; 34th part, in cedar forest, in grassy spot, 1650 m, 07.06.2003, *HD* 1375; Şahin tepesi, in cedar forest, in grassy spot, 1600 m, 13.05.2004, *HD* 1803.

Hygrophoraceae

Hygrocybe miniata (Fr.) P.Kumm.; Hüseyin kayası, in fir forest, in grassy spot, 1550 m, 22.10.2005, *HD* 2125.

Hygrophorus agathosmus (Fr.) Fr.; 34th part, in cedar forest, on soil, 1650 m, 13.05.2004, *HD* 1801.

Hygrophorus hypothejus (Fr.) Fr.; behind Ormanevi, in cedar forest, on soil, 1750 m, 05.10.2002, *HD* 1234.

Lyophyllaceae

Lyophyllum infumatum (Bres.) Kühner; Hüseyin kayası, in cedar forest, on soil, 1550 m, 22.10.2005, *HD* 2114.

Mycenaceae

Mycena aetites (Fr.) Quél.; 34th part, in cedar forest, in grassy spot, 1600 m, 13.05.2004, *HD* 1760.

Mycena leptcephala (Pers.) Gillet; Çağaloluk, in cedar forest, on rotten wood remnant of cedar, 1700 m, 06.06.2003, *HD* 1338; Sumaklı, in cedar forest, on rotten wood remnant of cedar, 1450 m, 07.06.2003, *HD* 1371; Hüseyin kayası, in cedar forest, on rotten wood remnant of cedar, 1450 m, 07.06.2003, *HD* 1355.

Mycena rosea (Schumach.) Gramberg; 34th part, in cedar forest, on rotten wood remnant of cedar, 1600 m, 13.05.2004, *HD* 1743.

Mycena stipata Maas Geest. & Schwöbel; behind Ormanevi, in cedar forest, on cedar remnants, 1700 m, 05.10.2002, *HD* 1224.

Xeromphalina caudicinalis (With.) Kühner & Maire; behind Ormanevi, in black pine forest, on needle litter, 1700 m, 05.10.2002, *HD* 1226; Çağaloluk, in cedar forest, on needle litter, 1700 m, 06.06.2003, *HD* 1337; Şahin tepesi, in cedar forest, on needle litter, 1600 m, 13.05.2004, *HD* 1745; Hüseyin kayası, in cedar forest, on needle litter, 1550 m, 22.10.2005, *HD* 2118.

Tricholomataceae

Arrhenia velutipes (P.D.Orton) Redhead, Lutzoni, Moncalvo & Vilgalys; 34th part, in cedar forest, on soil, 1600 m, 13.05.2004, *HD* 1798.

Clitocybe candicans (Pers.) P.Kumm.; Hüseyin kayası, in cedar forest, on soil, 1550 m, 22.10.2005, *HD* 2115.

Clitocybe costata Kühner & Romagn.; Sumaklı, in cedar forest, on soil, 1450 m, 10.10.2003, *HD* 1446.

Clitocybe erubescens Mont.; Sumaklı, in fir and cedar forest, on soil, 1450 m, 07.06.2003, *HD* 1366.

Clitocybe gracilipes Lamoure; behind Ormanevi, in cedar forest, in grassy spot, 1650 m, 13.06.2005, *HD* 2071.

Lepista nuda (Bull.) Cooke; behind Ormanevi, in cedar forest, on soil, 1650 m, 05.10.2002, *HD* 1222; Katıyayla, in black pine forest, on soil, 1800 m, 08.06.2003, *HD* 1405.

Lepista sordida (Schumach.) Singer; Çağaloluk, in cedar forest, on soil, 1700 m, 06.06.2003, *HD* 1339.

Leucopaxillus gentianeus (Quél.) Kotl.; Şahin tepesi, in black pine forest, on soil, 1600 m, 13.05.2004, *HD* 1759.

Melanoleuca excissa (Fr.) Singer var. **excissa**; 34th part, in cedar forest, on soil, 1600 m, 13.05.2004, *HD* 1752.

Melanoleuca graminicola (Velen.) Kühner & Maire; Sumaklı, in black pine forest, on soil, 1450 m, 07.06.2003, *HD* 1367; Şahin tepesi, in cedar forest, on soil, 1600 m, 13.05.2004, *HD* 1730.

Melanoleuca humilis (Pers.) Pat.; Ayakoluk, in cedar forest, in grassy spot, 1450 m, 05.07.2003, *HD* 1418.

Melanoleuca melaleuca (Pers.) Murrill; Çağaloluk, in fir forest, on soil, 1750 m, 06.06.2003, *HD* 1331; Şahin tepesi, in cedar forest, on soil, 1600 m, 13.05.2004, *HD* 1753.

Melanoleuca luteolosperma (Britzelm.) Singer; Şahin tepesi, in cedar forest, on soil, 1600 m, 13.05.2004, *HD* 1748.

Melanoleuca strictipes (P.Karst.) Jul.Schäff.; 34th part, in cedar forest, on soil, 1600 m, 13.05.2004, *HD* 1800.

Melanoleuca stridula (Fr.) Singer; 34th part, in cedar forest, on soil, 07.06.2003, *HD* 1343; Katıyayla, in cedar forest, on soil, 1800 m, 08.06.2003, *HD* 1407; Çağaloluk, in cedar forest, on soil, 1750 m, 06.06.2003, *HD* 1336.

Melanoleuca substrictipes Kühner; 34th part, in cedar forest, on soil, 1600 m, 13.05.2004, *HD* 1750.

Tricholoma apium Jul.Schäff.; behind Ormanevi, in cedar forest, on soil, 1750 m, 05.07.2003, *HD* 1239.

Tricholoma aurantium (Schaeff.) Ricken; Şahin tepesi, in cedar forest, on soil, 1600 m, 13.05.2004, *HD* 1754.

Tricholoma batschii Gulden; Sumaklı, in black pine forest, on soil, 1450 m, 05.10.2003, *HD* 1444.

Tricholoma caligatum (Viv.) Ricken; Ayakoluk, in black pine forest, on soil, 1700 m, 04.10.2003, *HD* 1432.

Tricholoma cedretorum (Bon) A.Riva var. **cedretorum**; Hüseyin kayası, in cedar forest, on soil, 1550 m, 17.10.2004, *HD* 1865, 22.10.2005, *HD* 2132.

Tricholoma columbetta (Fr.) P.Kumm.; Hüseyin kayası, in mixed cedar and fir forest, on soil, 1550 m, 22.10.2005, *HD* 2135.

Tricholoma focale (Fr.) Ricken; behind Ormanevi, in cedar forest, on soil, 05.10.2002, *HD* 1243b.

Tricholoma imbricatum (Fr.) P.Kumm.; behind Ormanevi, in black pine forest, on soil, 05.10.2002, *HD* 1236; 34th part, in black pine forest, on soil, 1600 m, 13.05.2004, *HD* 1759.

Tricholoma lascivum (Fr.) Gillet; Hüseyin kayası, under *Quercus* remnants, 1550 m, 22.10.2005, *HD* 2133.

Tricholoma myomyces (Pers.) J.E.Lange; Sumaklı, in fir forest, on soil, 1650 m, 07.06.2003, *HD* 1394; behind Ormanevi, in cedar forest, in grassy spot, 1750 m, 07.06.2003, *HD* 1395, on soil, 1750 m, 05.07.2003, *HD* 1420; 34th part, in cedar forest, on soil, 1650 m, 07.06.2003, *HD* 1345, in grassy spot, 1700 m, 05.07.2003, *HD* 1421, 1600 m, 13.05.2004, *HD* 1815.

Tricholoma scalpturatum (Fr.) Quél.; 34th part, in cedar forest, on soil, 1600 m, 13.05.2004, *HD* 1808; Hüseyin kayası, in mixed fir and cedar forest, on soil, 1550 m, 22.10.2005, *HD* 2130.

Tricholoma sulphureum (Bull.) P.Kumm var. **sulphureum**; Hüseyin kayası, in cedar forest, on soil, 1550 m, 22.10.2005, *HD* 2131.

Auriculariales

Auriculariaceae

Auricularia auricula-judae (Bull.) Quél.; Şahin tepesi, on *Quercus* branch, 1600 m, 13.05.2004, *HD* 1805.

Boletales

Boletaceae

Boletus depilatus Redeuilh; 34th part, in cedar forest, on soil, 1600 m, 13.05.2004, *HD* 1818; Hüseyin kayası, in cedar forest, on soil, 1500 m, 17.10.2004, *HD* 1859.

Boletus impolitus Fr.; 34th part, under *Quercus*, 1600 m, 13.05.2005, *HD* 1835.

Boletus pulverulentus Opat; Hüseyin kayası, in cedar forest, on soil, 1650 m, 05.10.2003, *HD* 1438.

Boletus reticulatus Boud.; Hüseyin kayası, in cedar forest, on soil, 1650 m, 05.10.2003, *HD* 1439; Ayakoluk, in black pine forest, on soil, 1700 m, 16.10.2004, *HD* 1863.

Gomphidiaceae

Chroogomphus rutilus (Schaeff.: Fr.) O.K.Mill.; behind Ormanevi, in cedar forest, on soil, 1700 m, 05.10.2002, *HD* 1228, 1750 m, 07.06.2003, *HD* 1401; 34th part, in cedar forest, 1600 m, 13.05.2004, *HD* 1781; Sumaklı, in black pine forest, on soil, 1450 m, 07.06.2003, *HD* 1379.

Gomphidius glutinosus (Schaeff.) Fr.; Hüseyin kayası, in fir forest, on soil, 1500 m, 22.10.005, *HD* 2112.

Gomphidius maculatus (Scop.) Fr.; Hüseyin kayası, in fir forest, on soil, 1500 m, 22.10.005, *HD* 2112.

Rhizopogonaceae

Rhizopogon luteolus Fr. & Nordholm; 34th part, in black pine forest, in soil, 1650 m, 07.06.2003, *HD* 1349; Hüseyin kayası, in black pine forest, in soil, 1450 m, 07.06.2003, *HD* 1360; Sumaklı, in cedar forest, in soil, 1500 m, 07.10.2005, *HD* 2086.

Rhizopogon roseolus (Corda) Th.Fr.; Hüseyin kayası, in black pine forest, in grassy spot, 1550 m, 07.06.2003, *HD* 1391, in soil, 1550 m, 22.10.2005, *HD* 2134; Sumaklı, in cedar forest, in soil, 1500 m, 07.10.2005, *HD* 2086.

Sclerodermataceae

Scleroderma areolatum Ehrenb.; 34th part, in cedar forest, on soil, 1600 m, 13.05.2004, *HD* 1804.

Suillaceae

Suillus flavidus (Fr.) J.Presl.; Sumaklı, in black pine forest, on soil, 1450 m, 07.06.2003, *HD* 1374.

Suillus grevillei (Klotzsch) Singer; behind Ormanevi, in cedar forest, on soil, 1750 m, 05.10.2002, *HD* 1245; Şahin tepesi, in cedar forest, on soil, 1600 m, 13.05.2004, *HD* 1755.

Suillus luteus (L.) Roussel; behind Ormanevi, in black pine forest, on soil, 1750 m, 05.07.2003, *HD* 1420; Sumaklı, in cedar forest, on soil, 1600 m, 07.10.2005, *HD* 2090.

Cantharellales**Clavulinaceae**

Membranomyces spurius (Bourdot) Jülich; Ayakoluk, in cedar forest, on cedar branch, 1600 m, 04.10.2003, *HD* 1435.

Dacrymycetales**Dacrymycetaceae**

Dacrymyces minor Peck.; Hüseyin kayası, in fir forest, on fir branch, 1550 m, 22.10.2005, *HD* 2108.

Dacrymyces stillatus Nees; Şahin tepesi, in cedar forest, on cedar branch, 1600 m, 13.05.2004, *HD* 1785; Ayakoluk, in black pine forest, on black pine branch, 1700 m, 16.10.2004, *HD* 1846; Hüseyin kayası, in fir forest, on fir branch, 1550 m, 22.10.2005, *HD* 2123.

Hymenochaetales**Hymenochaetaceae**

Hymenochaete rubiginosa (Dicks.) Lév.; Hüseyin kayası, on *Quercus* branch, 1600 m, 12.06.2005, *HD* 1988.

Phellinus hartigii (Allesh. & Schnabl.) Pat.; 34th part, in fir forest, on fir trunk, 1650 m, 05.07.2003, *HD* 1423.

Phellinus vorax (Harkness) Černý; 34th part, in cedar forest, on cedar trunk, 1650 m, 07.06.2003, *HD* 1350; Katıyayla, in cedar forest, on cedar trunk, 1700 m, 05.07.2003, *HD* 1422; Hüseyin kayası, in cedar forest, on cedar trunk, 1550 m, 22.10.2005, *HD* 2124.

Porodaedalea pini (Brot.) Murrill; 34th part, in black pine, on black pine trunk, 1650 m, 07.06.2003, *HD* 1356, 1650 m, 13.05.2004, *HD* 1795; Sumaklı, in black pine forest, on black pine trunk, 1450 m, 07.06.2003, *HD* 1390; Hüseyin kayası, in black pine, on black pine trunk, 1500 m, 17.10.2004, *HD* 1854.

Geastrales**Geastraceae**

Geastrum fimbriatum Fr.; Sumaklı, in black pine forest, on soil, 1450 m, 10.10.2003, *HD* 1443; 34th part, in cedar forest, on soil, 1750 m, 05.07.2003, *HD* 1426; Şahin tepesi, in fir forest, on soil, 1600 m, 13.05.2004, *HD* 1756; Ayakoluk, in cedar forest, on soil, 1700 m, 16.10.2004, *HD* 1852.

Geastrum pectinatum Pers.; Ayakoluk, in black pine, on soil, 1700 m, 16.10.2004, *HD* 1853.

Geastrum rufescens Pers.; Hüseyin kayası, in black pine, on soil, 1550 m, 07.06.2003, *HD* 1358; Şahin tepesi, in cedar forest, on soil, 1600 m, 13.05.2004, *HD* 1733, Sumaklı, in cedar forest, on soil, 1550 m, 07.10.2005, *HD* 2089.

Myriostoma coliforme (Dicks.) Corda; Sumaklı, in *J. excelsa* forest, on soil, 1700 m, 12.10.2005, *HD* 1991.

Gomphales**Gomphaceae**

Gomphus clavatus (Pers.) Gray; Ayakoluk, in mixed cedar and fir forest, on soil, 1750 m, 04.10.2003, *HD* 1431.

Ramaria aurea (Schaeff.) Quél.; behind Ormanevi, in fir forest, 1750 m, 07.06.2003, *HD* 1396.

Ramaria flava (Schaeff.) Quél.; Cağaloluk, in cedar forest, on soil, 1750 m, 06.06.2003, *HD* 1329; Ayakoluk, in cedar forest, on soil, 1750 m, 04.10.2003, *HD* 1428; Şahin tepesi, in cedar forest, on soil, 1600 m, 13.05.2004, *HD* 1740; Hüseyin kayası, in fir forest, on soil, 1550 m, 22.10.2005, *HD* 2121.

Ramaria flavescens (Schaeff.) R.H.Petersen; Sumaklı, in cedar forest, on soil, 1450 m, 07.10.2005, *HD* 2077.

Ramaria gracilis (Pers.) Quél.; behind Ormanevi, in fir forest, on wood debris, 1700 m, 05.10.2002, *HD* 1233.

Ramaria largenti Marr & D.E.Stuntz; Hüseyin kayası, in fir forest, on soil, 1550 m, 22.10.2005, *HD* 2116.

***Ramaria suecica** (Fr.) Donk; 34th part, in cedar forest, 1650 m, 07.06.2003, *HD* 1341.

Fruiting body 3-8 cm tall, stipe 0.5-2 cm thick, brittle when dry, pale flesh colour to rosy ochraceous

or ochraceous, ends sometimes whitish. Spores 8-11 × 4-5 µm, verruculose (Figure 2).

Gloeophyllales

Gloeophyllaceae

Gloeophyllum abietinum (Bull.) P. Karst.; Hüseyin kayası, in black pine forest, on black pine twigs, 1450 m, 07.06.2003, *HD* 1353; Ayakoluk, in black pine forest, on black pine twigs, 1700 m, 08.06.2003, *HD* 1410.

Gloeophyllum sepiarium (Wulfen) P. Karst.; Sumaklı, in black pine forest, on black pine twigs, 1450 m, 07.06.2003, *HD* 1376.

Gloeophyllum trabeum (Pers.) Murrill; Hüseyin kayası, in black pine forest, on black pine twigs, 1600 m, 17.10.2004, *HD* 1866.

Polyporales

Meruliaceae

Bjerkandera adusta (Willd) P.Karst.; Şahin kayası, on poplar tree, 1400 m, 17.10.2004, *HD* 1870.

Phanerochaetaceae

Byssomerulius corium (Pers.) Parmasto; behind Ormanevi, in cedar forest, on rotten cedar remnants, 1700 m, 05.10.2002, *HD* 1243.

Fomitopsidaceae

Laricifomes officinalis (Vill.) Kotl. & Pouzar; Hüseyin kayası, in cedar forest, on cedar tree, 1800 m, 12.06.2005, *HD* 1990.

Phaeolus schweinitzii (Fr.) Pat.; Sumaklı, in black pine forest, on black pine, 1450 m, 07.10.2005, *HD* 2087.

Polyporaceae

Cinereomyces lindbladii (Berk.) Jülich; Katıyayla, on black pine bark, 1600 m, 04.10.2003, *HD* 1436.

Polyporus brumalis (Pers.) Fr.; Hüseyin kayası, on *Quercus*, 1600 m, 12.06.2005, *HD* 1987.

Polyporus squamosus (Huds.) Fr.; Hüseyin kayası, on *Quercus*, 1600 m, 17.10.2004, *HD* 1869.

Polyporus varius (Pers.) Fr.; Sumaklı, on *Quercus*, 1450 m, 07.10.2005, *HD* 2080.

Pycnoporus cinnabarinus (Jacq.) P.Karst.; 34th part, on *Quercus*, 1650 m, 13.05.2004, *HD* 1832.

Skeletocutis carneogrisea A.David; Sumaklı, on black pine remnants, 1450 m, 07.06.2003, *HD* 1376.

Trichaptum abietinum (Dicks.) Ryvarden; Cağaloluk, in mixed cedar and fir forest, on bark of fir, 1750 m, 06.06.2003, *HD* 1340.

Trametes hirsuta (Wulfen) Lloyd; Sumaklı, in fir forest, on fir trunk, 1500 m, 07.10.2005, *HD* 2082.

Tubulucrinaceae

Tubulicrinis subulatus (Bourdot & Galzin) Donk; 34th part, in black pine forest, on fallen black pine remnants, 1650 m, 13.05.2004, *HD* 1823.

Russulales

Bondarzewiaceae

Heterobasidion annosum (Fr.) Bref.; 34th part, under fir tree, 1650 m, 13.05.2005, *HD* 1820.

Russulaceae

Lactarius salmonicolor R.Heim & Leclair; behind Ormanevi, in cedar forest, on soil, 1700 m, 05.10.2002, *HD* 1229.

Russula claroflava Grove; Hüseyin kayası, in cedar forest, on soil, 1550 m, 22.10.2005, *HD* 2143.

Russula nobilis Velen; Hüseyin kayası, in fir forest, on soil, 1550 m, 22.10.2005, *HD* 2142.

Russula ochroleuca (Pers.) Fr.; Hüseyin kayası, in cedar forest, 1600 m, 17.10.2004, *HD* 1862, in fir forest, on soil, 1550 m, 22.10.2005, *HD* 2141; behind Ormanevi, in cedar forest, on soil, 1650 m, 13.06.2005, *HD* 2079.

Russula vesca Fr.; behind Ormanevi, in cedar forest, on soil, 1750 m, 05.10.2002, *HD* 1235; Hüseyin kayası, in cedar forest, on soil, 1550 m, 22.10.2005, *HD* 2140.

Lachnocladiaceae

***Scytinostroma portentosum** (Berk. & M.A.Curtis) Donk; 34th part, in black pine forest, on black pine bark, 1650 m, 13.05.2004, *HD* 1764.

Fruiting body resupinate, 1 mm thick and several centimetres in extent, surface smooth, dull, cream coloured to ochreous. Skeletal hyphae thick-walled, branched, dextrinoid. Spores 5-5.5 (6) µm, globose, smooth hyaline (Figure 2).

Stereum hirsutum (Willd) Pers.; Hüseyin kayası, on *Quercus* stump, 1600 m, 05.10.2003, HD 1437.

Thelephorales

Bankeraceae

Boletopsis leucomelaena (Pers.) Fayod; Hüseyin kayası, in cedar forest, on soil, 1700 m, 17.10.2004, HD 1860, 22.10.2005, HD 2122.

Sarcodon glaucopus Maas Geest. & Nannf.; Ayakoluk, in cedar forest, on soil, 1500 m, 16.10.2004, HD 1858.

Sarcodon imbricatus (L.) P.Karst.; Ayakoluk, in cedar forest, on soil, 1750 m, 04.10.2003, HD 1429; Şahin tepesi, in cedar forest, on soil, 13.05.2005, HD 1746.

Hydnellum caeruleum (Hornem.) P.Karst.; Sumaklı, in black pine forest, on fallen wood remnants of black pine, 1450 m, 10.10.2003, HD 1440; Hüseyin kayası, in cedar forest, on fallen wood remnants of cedar, 1550 m, 22.10.2005, HD 2106.

Hydnellum scrobiculatum (Fr.) P.Karst.; Şahin tepesi, in cedar forest, on fallen wood remnants of cedar, 1600 m, 16.10.1004, HD 1867.

Trechisporales

Hydnodontaceae

Pseudohydnum gelatinosum (Scop.) P.Karst.; Hüseyin kayası, in cedar forest, on cedar twigs, 1550 m, 22.10.2005, HD 2111.

Discussion

The total number of registered macrofungi is 186 in the research area. These fungi belong to 2 divisions and 44 families. Of these, 10 species are in *Ascomycota* and 176 in *Basidiomycota*. Moreover, 4 of the 186 taxa—*Cortinarius aureifolius*, *Inocybe hygrophorus*,

Ramaria suecica, and *Scytinostroma portentosum*—are new to the Turkish mycobiota.

The species numbers for the common families are as follows: *Agaricaceae*, 22; *Tricholomataceae*, 17; *Inocybaceae*, 16; and *Cortinariaceae* and *Strophariaceae*, 12 each. The other families have fewer than 10 species.

The study area supports an abundantly rich mycobiota that grows in various habitats, such as black pine forest, fir forest, cedar forest, oak forest, and *Juniperus* forest. Among these substrates cedar and black pine stands are very suitable for the growth of macrofungi. Habitat distribution according to species numbers is as follows: cedar stands, 107 species; black pine stands, 37 species; fir stands, 25 species; cedar and fir stands, 8 species; *Juniper* stands, 5 species; stream banks, 4 species; cedar and black pine stands, 2 species; *Quercus* stands, 10 species; and poplar stands, 1 species.

The number of lignicolous species are 41 in the research area and 11 of them are parasites on different trees, for example: *Heterobasidion annosum* and *Phellinus hartigii* on fir, *Laricifomes officinalis* and *Phellinus vorax* on cedar, *Porodaedalea pini* and *Phaeolus schweinitzii* on black pine, and *Polyporus squamosus* and *Pycnoporus cinnabarinus* on oak. Moreover, 116 species are terricolous and 22 are mycorrhizal.

When compared, the results of this work showed few similarities with findings of the studies carried out in neighbouring regions (Işiloğlu & Öder, 1995; Kaşık et al., 2003; Doğan & Öztürk, 2006). The number of identical taxa and similarity percentages of the neighbouring studies were given in the Table.

According to the Table, the similarity of the species numbers for all studied localities was only 8 (1.04%), and these species were *Helvella acetabulum*

Table. Similarity percentages of Cocakdere valley with neighbouring studies.

Studies	Number of identical taxa	Total taxa	Similarity percentage (%)
Cocakdere valley	8	186	1.04
Karaman (Doğan & Öztürk, 2006)	26	202	3.41
Mediterranean region (Işiloğlu & Öder, 1995)	11	280	1.44
Yahyalı (Kayseri) (Kaşık et al., 2003)	8	94	0.9

(L.) Quél., *Bjerkandera adusta* (Willd.) P.Karst, *Chroogomphus rutilus* (Schaeff.) O.K.Mill., *Coprinus comatus* (O.F.Müll.) Pers., *Lepista nuda* (Bull.) Cooke, *Ramaria flava* (Schaeff.) Quél., *Stropharia coronilla* (Bull.) Quél., and *Suillus luteus* (L.) Roussel. The similarity rate from the study in the Karaman region was 3.41% (26 species), the rate from the Mediterranean region was 1.44% (11 species), and the rate from Yahyalı (Kayseri) was 0.9% (8 species). However, 110 species were identified only in Cocakdere valley. Cocakdere valley is under protection and cutting down trees is not allowed. As a

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- result, it is very suitable to the growth of macrofungi. This may explain the difference that exists between Cocakdere valley and neighbouring regions.
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