

New macrofungi records from Turkey and macrofungal diversity of Pozantı-Adana

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Abstract: The present study reports on macrofungi species collected from 2003 to 2012 in Pozantı. In the field and during laboratory studies, 157 taxa belonging to 2 divisions and 51 families were identified. Among them, 8 families and 12 taxa belong to Ascomycota, and 43 families and 145 taxa belong to Basidiomycota. Moreover, 10 taxa—*Dumontinia tuberosa*, *Lycoperdon lambinonii*, *Conocybe mesospora*, *Pholiotina striipes*, *Hebeloma sordidum*, *Antrodia ramentacea*, *Leucogyrophana romellii*, *Diplomitoporus flavescens*, *Alutaceodontia alutacea*, and *Tulasnella violea*—were found in the Turkish mycobiota for the first time.

Key words: Pozantı, macrofungi, new records, Turkey

1. Introduction

Despite the high level of macrofungal diversity, the first fungal systematic studies were started in the 1930s and focused on only wood-rotting fungi in Turkey (Doğan et al., 2005). After the 1980s, researchers were more focused on regional fungal diversity studies and started to get more results about the distribution of macrofungi in Turkey. After these studies, the number of the species was raised dramatically by means of the new fungal records published in different studies, and according to the literature there are 2158 taxa recorded for the Turkish mycobiota (Sesli and Denchev, 2008). Meanwhile, the first contribution as a new species (sp. nov.) for Turkey was *Tricholoma anatolicum* H.H.Dogan & Intini (Intini et al., 2003), followed by *Marasmius castaneophilus* Işıloğlu, Allı, Solak & Watling (Işıloğlu et al., 2009); *Morchella anatolica* Işıloğlu, Spooner, Allı & Solak (Işıloğlu et al., 2010); *Conocybe volviradicata* Watling, Işıloğlu & Baş Serm. (Watling et al., 2010); and *Lyophyllum turcicum* Sesli, Vizzini & Contu (Sesli et al., 2015), respectively. As we can see, if researchers were to investigate more various localities, they would get new and interesting results about macrofungal diversity. Therefore, important contributions will be added to the biodiversity of Turkey with these results.

The aim of the present study is to determine the macrofungal diversity of the Pozantı area and contribute to the Turkish mycobiota.

2. Materials and methods

The Pozantı district is located in the Central Taurus Mountains at the intersection of the roads that connect the Mediterranean and Central Anatolia regions (37°25'39"N, 34°52'16"E). The research area is surrounded by Karaisalı and Aladağ to the east, Ulukışla to the west, Tarsus to the south, and Çamardı to the north (Figure 1). The Pozantı district has two main watersheds. The Çakıt stream extends from south to north and the Körkün stream extends from west to east. The research area is surrounded by the transition zone between the Mediterranean and Irano-Turanian phytogeographic regions.

The altitude varies from 650 to 750 m and the area is surrounded by the Aladağ (3600 m), Bolkar (3585 m), Karanfil (3085 m), Akdağ (2424 m), Pozantı (2723 m), and Karınca (1840 m) mountains. Forest areas are located at the altitudes between 600 and 1800 m. *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* Labill., *J. oxycedrus* L. subsp. *oxycedrus*, *J. foetidissima* Willd., *J. excelsa* M.Bieb., and *Quercus* sp. are the dominant taxa of the forest vegetation.

Fungal specimens were collected between 2003 and 2012. Field studies were conducted mostly in the autumn and spring. Some chemical reagents (Melzer; KOH in 10%, 5%, 3%, or 2% solutions; cotton blue; IKI; etc.) were used for the macroscopic and microscopic studies. Hymenium, pileus, or body sections were prepared and measured

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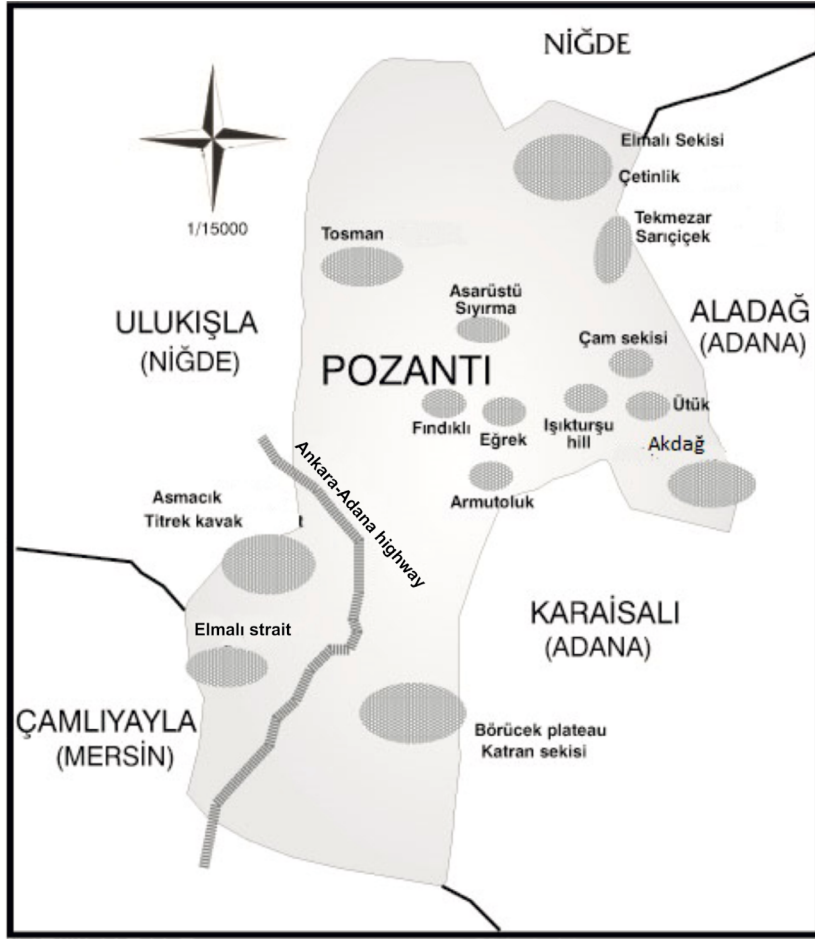


Figure 1. The study area.

by light microscope (Leica DM 750). The specimens were identified according to Eriksson and Ryvar den (1973–1978), Eriksson et al. (1978, 1984), Moser (1983), Breitenbach and Kränzlin (1984–2000), Julich (1984), Hjortstam et al. (1987, 1988), Candusso and Lanzoni (1990), Ryvar den 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). New records were checked according to Sesli and Denchev (2008), Doğan et al. (2012), Castellano and Türkoğlu (2012), Sesli and Helfer (2013), Güngör et al. (2013), Sesli (2014), and Solak et al. (2015). Taxa, family, and author citations are quoted according to Cannon and Kirk (2007), Kirk et al. (2008), Index Fungorum (<http://www.indexfungorum.org/Names/Names.asp>), and MycoBank (<http://www.mycobank.org>).

New records are given in Section 3, and collection localities, habitat information, and a species list are given in the Appendix.

3. Results

ASCOMYCOTA

Sclerotiniaceae

1. *Dumontinia tuberosa* (Bull.) L.M.Kohn (Figure 2)

Fruit bodies develop as a small ball with an apical opening at first and finally become flat and saucer-shaped, margin upward in part, surface smooth, size 8–25 mm, stalk 25–100 mm long, partly embedded in the ground. Fruit bodies light to dark brown, the stalk arises from a sclerotium and develops in the ground in association with rhizomes of *Anemone* (parasite). Sclerotia up to 15 mm long and irregular, black on the outside and white inside. Spores 11–16 × 6–8 µm, elliptical, smooth, some with 2 drops, hyaline. Asci eight-spored, cylindrical-clavate, 140–180 × 10–12 µm. Paraphyses cylindrical, thickened at the tips up to 3 µm.

Specimen examined: Locality 4, parasite, on *Anemone* sp. roots, HD7423.

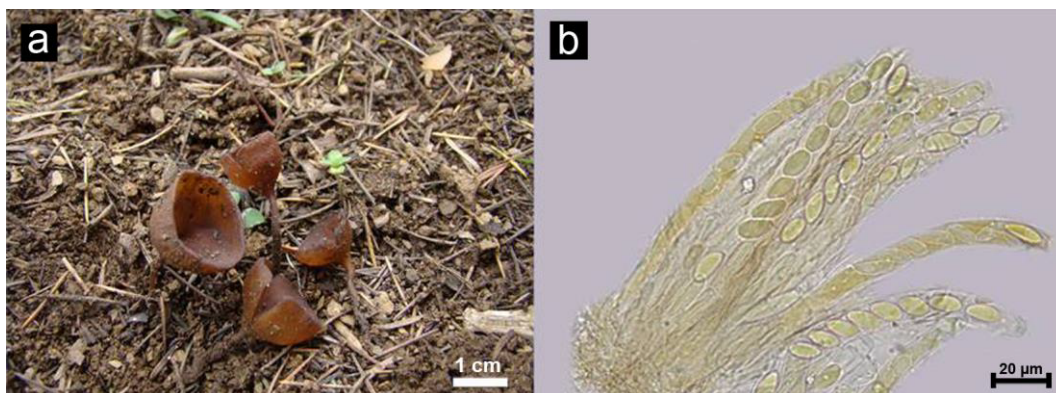


Figure 2. *Dumontinia tuberosa*: a- fruit bodies, b- asci with ascospores.

BASIDIOMYCOTA

Agaricaceae

2. *Lycoperdon lambinonii* Demoulin (Figure 3)

Fruiting bodies 2–6 × 1–4 cm, solitary or in groups. Hemispherical or pear-shaped, brown or ochraceous brown, connecting to the substrate with thick hyphae. Exoperidium with different ornamentation, granulose, thin and short (0.5–1 mm), fugacious, sometimes with convex spines, yellowish to yellowish brown or dark brown. Endoperidium hardly visible, gleba well developed, subgleba vesiculate or alveolate, 0.3–0.7 mm, light brown. Spores 3.5–5 µm, subglobose, asperulate, sterigmal remnants easily separable. Capillitium brown, elastic, 4–7 µm across.

Specimen examined: Locality 6, saprobe, under *Abies*, HD6964.

Bolbitiaceae

3. *Conocybe mesospora* Kühner ex Watling (Figure 4)

Pileus 1–3 × 2 cm hemispherical or convex at first, then expanding in a short time. Rust brown in the center, orange brown, light rust brown, lighter to edges. Lamellae adnate, partially sparse, rust yellowish to rust brown. Stipe 2–6 × 0.1–0.4 cm, cylindrical, bulbous at the base.

Light yellowish at first, light honey yellowish to orange brown when mature. Spores 6.5–11 × 3–7 µm, elliptical, with germ pore, pale orange yellowish. Cheilocystidia lecythiform, 15–18 × 6–10 µm.

Specimen examined: Locality 11, saprobe, under *Abies*, HD6336.

4. *Pholiotina striipes* (Cooke) Singer (Figure 5)

Pileus 1.5–6 mm × 2–2.5 cm, conical to campanulate when young, later convex to expanded with a distinct umbo. Center cacao brown when young and fresh, more pale to edge. Lamellae sinuate to adnate, rust brown when young, pale yellowish brown when mature. Stipe 2.5–9 × 0.2–0.8 cm, cylindrical, elastic, white and longitudinally fibrillose. Spores 6–10 × 3.5–5 µm, elliptical, brown, thin-walled, with a small germ pore. Cheilocystidia lanceolate 14–20 × 6–9 µm.

Specimen examined: Locality 11, saprobe, under *Abies*, HD6297; Locality 22, under *Abies*, HD6351.

Cortinariaceae

5. *Hebeloma sordidum* Maire (Figure 6)

Pileus 2.5–6 cm, hemispherical, convex to expanded spherical with a broad umbo, surface moist when wet, cream to clay-buff or almost cinnamon in the center, towards the

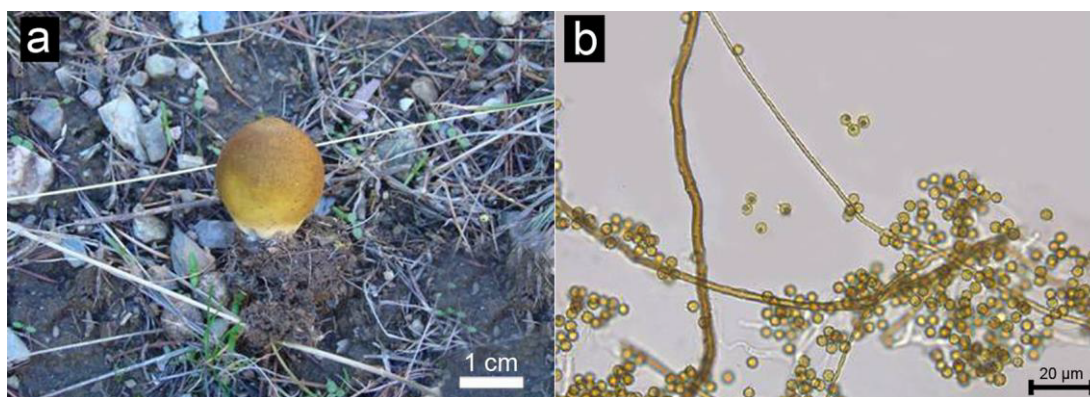


Figure 3. *Lycoperdon lambinonii*: a- fruiting body, b- basidiospores and capillitial threads.

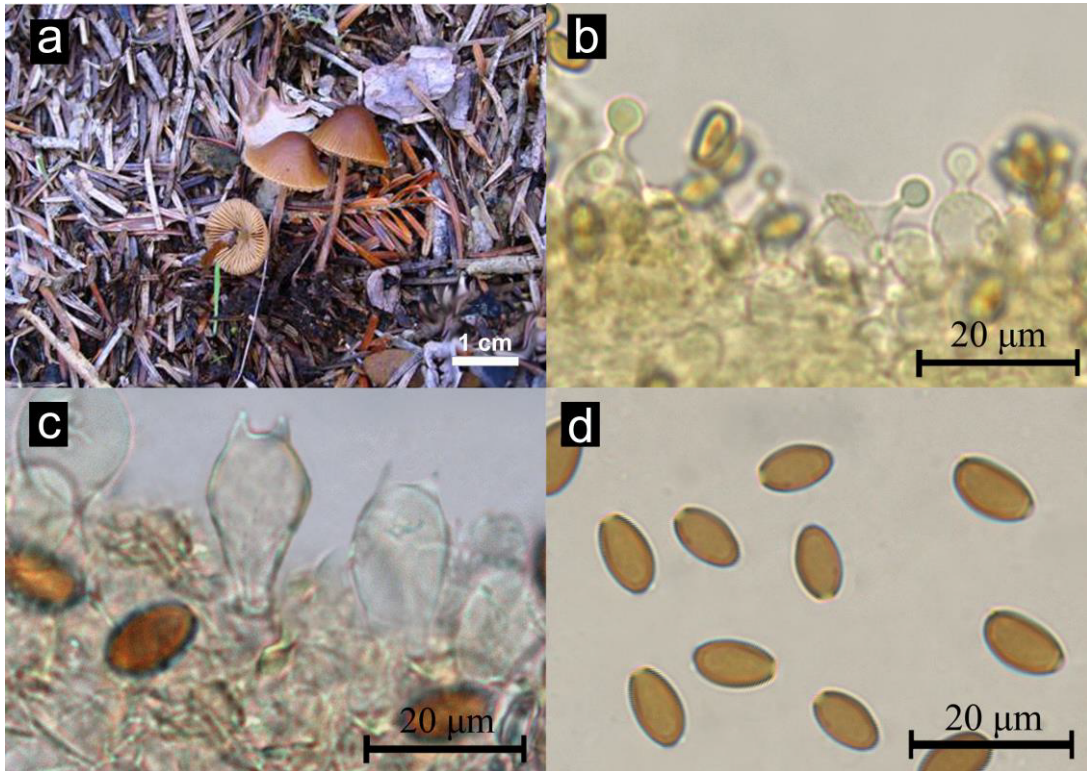


Figure 4. *Conocybe mesospora*: a- fruit bodies, b- cheilocystidia, c- basidia, d- basidiospores.

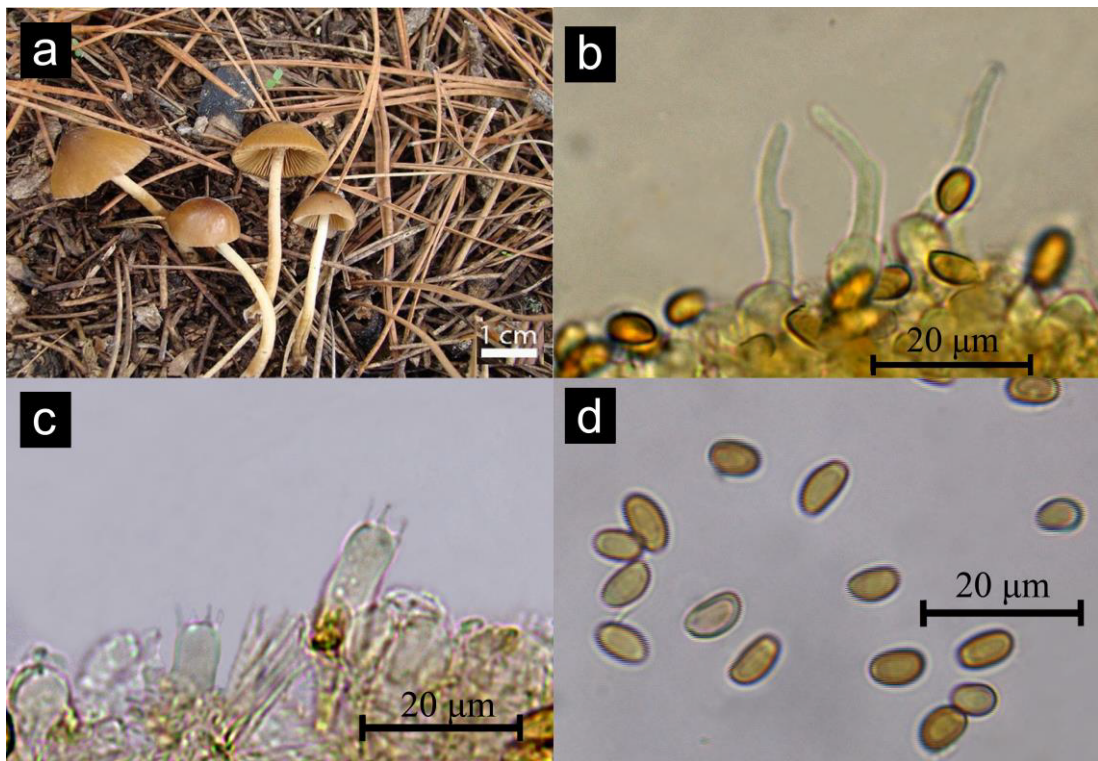


Figure 5. *Pholiotina striipes*: a- fruiting bodies, b- cheilocystidia, c- basidia, d- basidiospores.

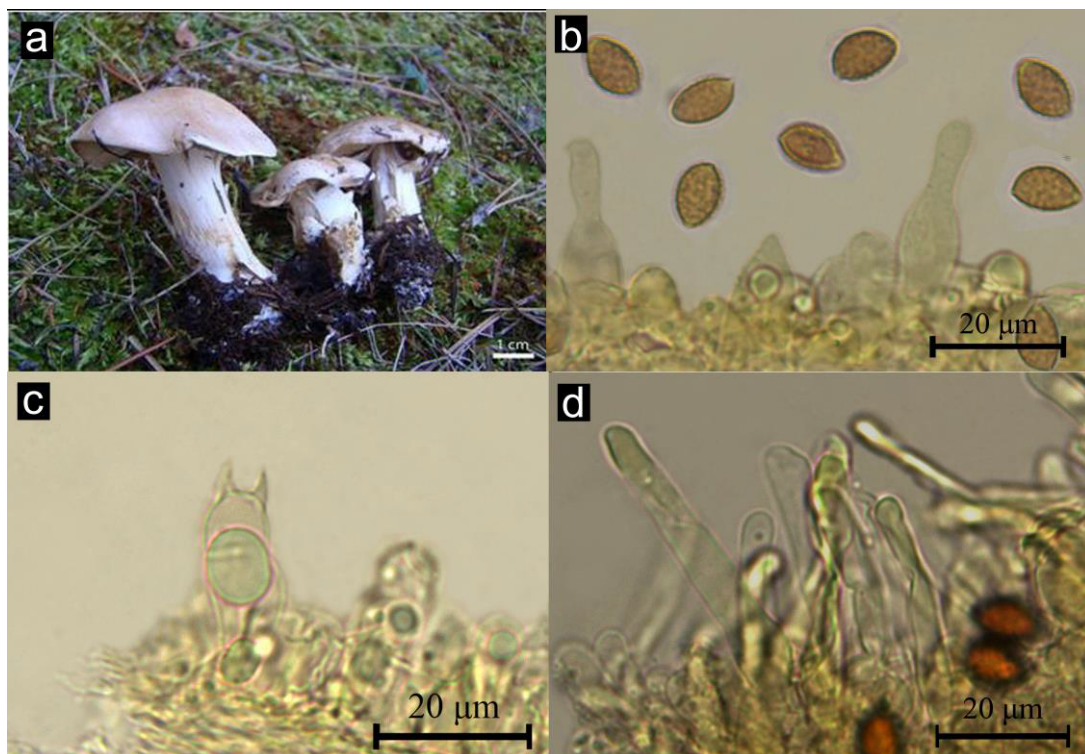


Figure 6. *Hebeloma sordidum*: a- fruiting bodies, b- cheilocystidia and basidiospores, c- basidia, d- cheilocystidia.

margin pale cream to pale or dark pinkish buff. Lamellae pale grayish buff at first, then clay-brown, edge paler, emarginate. Stipe 5–10 × 0.5–1.5 cm, cylindrical, slightly widened towards to base, longitudinally fibrillose, light cream, soon discoloring through clay-buff. Spores 8–12 × 5–7 µm, elliptical, ovoid, pale yellowish, ornamentation hardly visible. Cheilocystidia cylindrical 30–60 × 4–6 µm.

Specimen examined: Locality 26, mycorrhizal, under *Abies*, HD7041.

Fomitopsidaceae

6. *Antrodia ramentacea* (Berk. & Broome) Donk (Figure 7)

Basidiocarp annual, resupinate, 4 mm thick, small and globose, attached to substrate, easily separable and edge

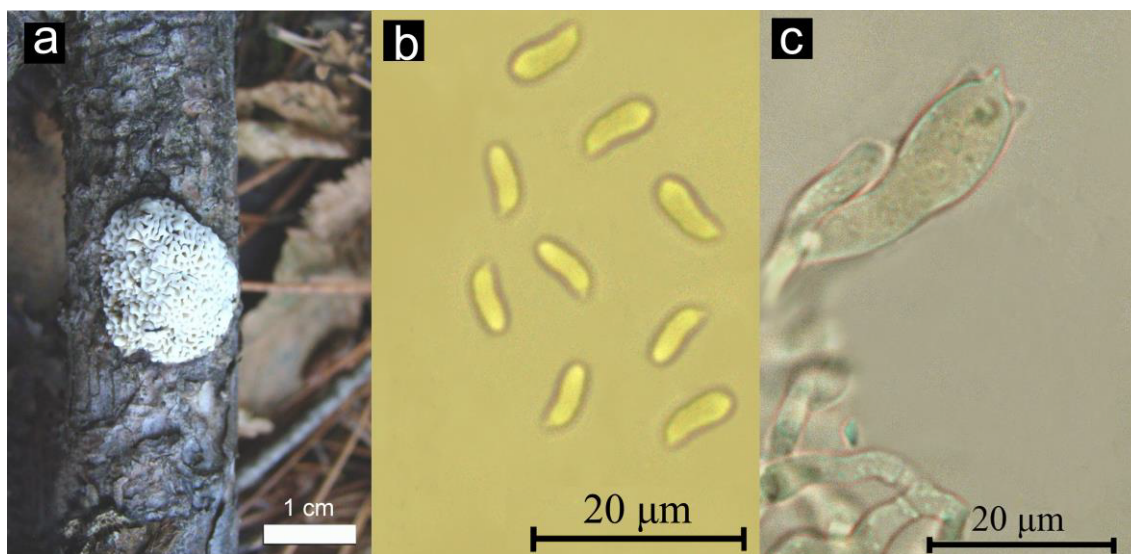


Figure 7. *Antrodia ramentacea*: a- fruiting body, b- basidiospores, c- basidium.

twisted when dry, inside fleshy and watery when young, stiff at maturity. Surface pored, pores white at first then straw yellow, angular, 1–2 per mm. Spores 9–11 × 4.5–5.5 μm, cylindrical, slightly elliptic, hyaline and thin-walled.

Specimen examined: Locality 6, lignicolous, on *P. nigra* branch, HD6268.

Hygrophoropsidaceae

7. *Leucogyrophana romellii* Ginns. (Figure 8)

Basidiocarp resupinate, tightly attached to substrate, surface meruloid hymenium, yellowish to orange brown, edges arachnoid, fibrillose. Spores 4.5–5.5 × 3–3.5 μm, elliptical, smooth, dextrinoid, cyanophilic.

Specimen examined: Locality 27, saprobe, on *Abies* bark, HD6827.

Polyporaceae

8. *Diplomitoporus flavescens* (Bres.) Domański (Figure 9)

Basidiocarp annual, adnate, tightly attached to substrate, 3 × 2 cm, firm, surface thin hairy, azonate, whitish at first, soon cream to pale straw yellow. Pores irregular, 2–4 pores per mm. Spores 5–7 × 2–3 μm, allantoid-cylindrical, hyaline, and smooth.

Specimen examined: Locality 28, lignicolous, on *Pinus nigra* branch, HD6926.

Schizophoraceae

9. *Alutaceodontia alutacea* (Fr.) Hjortstam & Ryvar den (Figure 10)

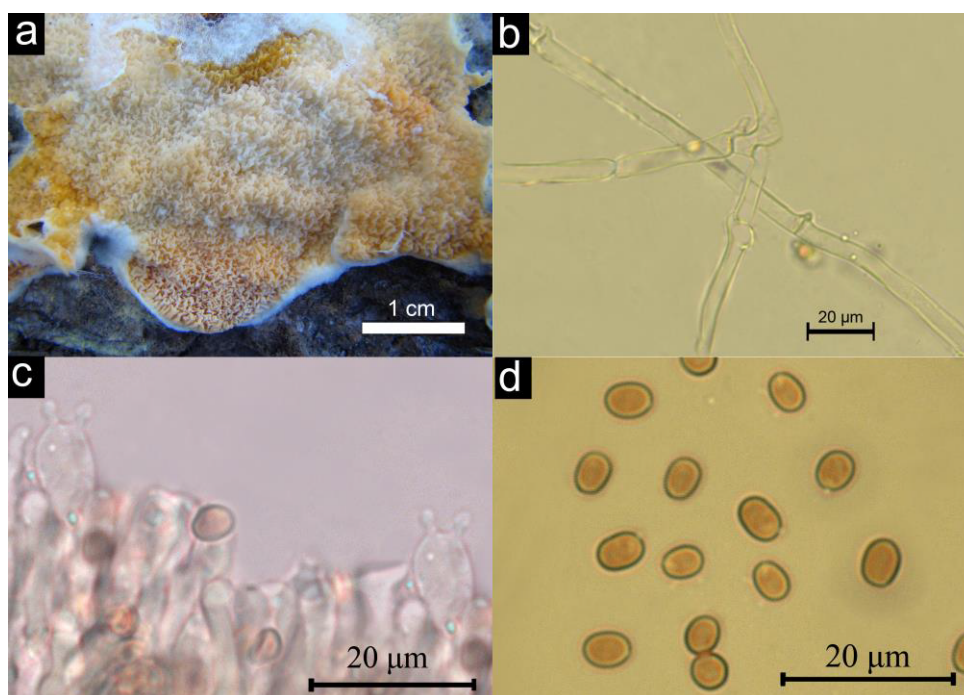


Figure 8. *Leucogyrophana romellii*: a- fruiting body, b- hyphae, c- basidia, d- basidiospores.

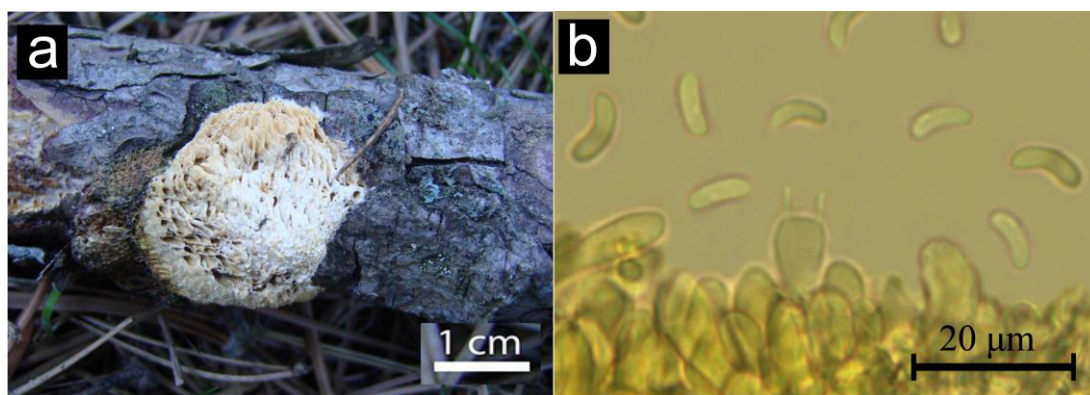


Figure 9. *Diplomitoporus flavescens*: a- fruiting body, b- basidium and basidiospores.

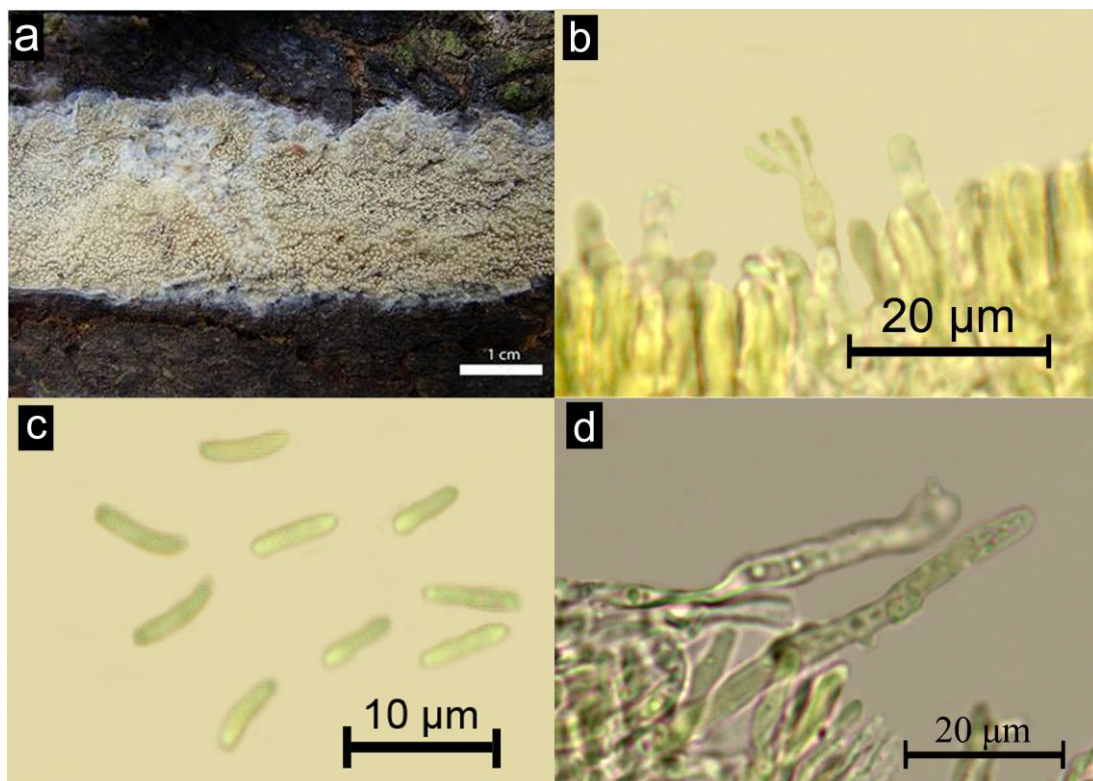


Figure 10. *Alutaceodontia alutacea*: a- fruiting body, b- basidia, c- basidiospores, d- cystidia.

Basidiocarp resupinate, flat to adnate, cream white when fresh, then distinctly dark yellow. Hymenium waxy granular or powdery toothy appearance at first, with small aculei (1 mm) at maturity. Spores $6-8 \times 1.5-2 \mu\text{m}$, allantoid, smooth, thin-walled. Cystidia tubular variable in length about $50-75 \times 4-6 \mu\text{m}$.

Specimen examined: Locality 20, saprobe, on *Abies* bark, HD8190.

Tulasnellaceae

10. *Tulasnella violea* (Quél.) Bourdot & Galzin (Figure 11)

Fruiting body thin and wax-like to farinose patch, one or to several cm in extent, lilac-violet when moist, more pink when dry, attached firmly to the substrate, surface smooth to slightly and irregularly tuberculate, margin irregular, distinctly bounded to thin and translucent.

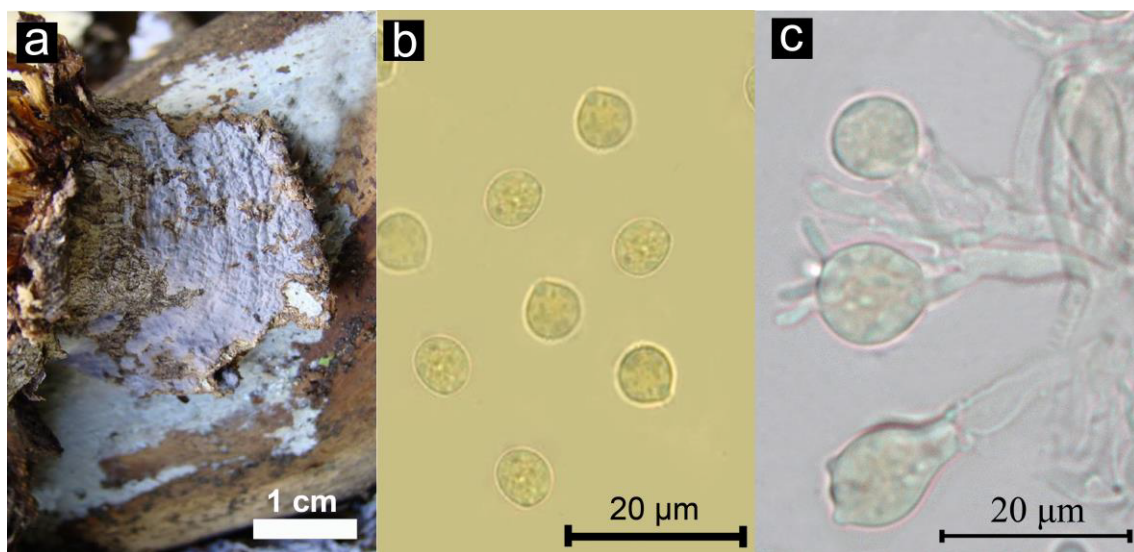


Figure 11. *Tulasnella violea*: a- fruiting body, b- basidiospores, c- basidia.

Table. Similarity percentages of Pozantı with neighboring studies.

Studies	Number of identical taxa	Total taxa	Similarity percentage (%)
Işıloğlu and Watling (1992)	11	79	13.92
Işıloğlu & Öder (1995)	16	280	5.71
Kaşık et al. (2003)	20	94	21.28
Doğan et al. (2012)	28	186	15.05
Pozantı	5	157	3.18

Spores 6–8 × 5–6.5 µm, oval to subglobose, smooth, hyaline.

Specimen examined: Locality 20, saprobe, on *Abies* bark, HD8191.

4. Discussion

The total number of registered macrofungi is 157 in the research area. These fungi belong to 2 divisions and 51 families. Of these, 8 families and 12 taxa are in Ascomycota and 43 families and 145 taxa in Basidiomycota. Moreover, 10 taxa (*Dumontinia tuberosa*, *Lycoperdon lambinonii*, *Conocybe mesospora*, *Pholiotina striipes*, *Hebeloma sordidum*, *Antrodia ramentacea*, *Leucogyrophana romellii*, *Diplomitoporus flavescens*, *Alutaceodontia alutacea*, and *Tulasnella violea*) were found for the first time in the Turkish mycobiota. The study area supports an abundantly rich mycobiota that grows in various habitats, such as *Abies*, *Cedrus*, *Juniperus*, *Pinus*, and *Quercus* forests. Among these substrates, *A. cilicica* and *C. libani* are very suitable for the growth of macrofungi. Habitat distribution is as follows: *A. cilicica* 127; *C. libani* 37; *J. excelsa* 13; *P. nigra* 8; *J. foetidissima* 4; *Quercus* 2, and *Populus* 2.

The numbers of lignicolous and parasitic species are 15 and 10 on different trees, such as *Dumontinia tuberosa* on *Anemone*; *Antrodia juniperina*, *Fuscoporia torulosa*, and *Pyrofomes demidoffii* on *J. foetidissima*; *Fomitopsis pinicola*, *Omphalotus olearius*, and *Tricholomopsis rutilans* on *Abies*; *Phellinus chrysoloma* and *Phellinus hartigii* on *Cedrus*; and *Fomes fomentarius* on *Populus* and *Quercus*. Moreover, 83 species are saprobe, 45 are mycorrhizal, and 4 species are terricolous. Forty-two (27%) of the 157 taxa are edible while 114 (73%) are inedible. Among the 42 edible taxa, 11 are collected and consumed in the region by villagers. Members of the genus *Morchella* are known

as “Kuzu göbeği”, *T. claveryi* as “Domalan”, *M. procera* as “Dedebörük”, *R. fennica* as “Kadın saçı”, *O. melanotricha* as “Kamalak mantarı”, *P. ostreatus* as “Kavak mantarı”, *L. salmonicolor* as “Kanlıca”, and *T. anatolicum* as “Katran mantarı, sedir mantarı”. *E. hirtipes*, *I. hirtella*, *I. rimosa*, *I. sindonia*, *I. splendens*, *O. olearius*, *G. penetrans*, and *C. phyllophila* are the poisonous taxa of the region. No poisoning incidents were recorded officially in the research area.

There were a few studies that occurred in the research area in the past. According to the relevant literature, first data were given for *Coprinopsis atramentaria* (Bull.) Redhead, Vilgalys & Moncalvo by Işıloğlu and Watling (1992), and then Işıloğlu and Öder (1995) added three more species. The results of this work showed a few similarities with findings of the studies carried out in neighboring regions (Işıloğlu and Watling, 1992; Işıloğlu and Öder, 1995; Kaşık et al., 2003; Doğan et al., 2012). The number of identical taxa and similarity percentages of the neighboring studies are given in the Table. According to the Table, the similarity of the species numbers for Pozantı and relevant studies are only 5 (3.85%), and these species are *M. procera*, *P. ostreatus*, *R. luteolus*, *R. roseolus*, and *T. terreum*. The similarity rates from the study are 4.66% and 3.66% for the Mediterranean region (Işıloğlu and Watling, 1992; Işıloğlu and Öder, 1995), 7.96% for Yahyalı-Kayseri (Kaşık et al., 2003), and 8.16% for the Cocakdere valley (Doğan et al., 2012).

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Appendix.**1. Localities and habitats**

1. Akdağ; 37°25'51"N, 34°55'42"E, 1615 m, 01.11.2010. **Habitat:** *Cedrus libani*, *Abies cilicica* subsp. *cilicica*, *Juniperus foetidissima*, *Juniperus excelsa*, *Pinus nigra*.

2. Armutoluk; 37°25'54"N, 34°55'18"E, 1540 m, 26.04.2011. **Habitat:** *A. cilicica* subsp. *cilicica*, *C. libani*, *Quercus* sp.

3. Armutoluk; 37°27'55"N, 34°49'51"E, 1600 m, 26.04.2011. **Habitat:** *A. cilicica* subsp. *cilicica*, *C. libani*, *Quercus* sp.

4. Asarüstü, Sıyırma; 37°31'48"N, 34°54'06"E, 1607 m, 27.04.2011. **Habitat:** *A. cilicica* subsp. *cilicica*, *C. libani*, *Quercus* sp.

5. Asmacık, near spring source; 37°27'55"N, 34°49'51"E, 1590 m, 26.04.2011. **Habitat:** *A. cilicica* subsp. *cilicica*, *P. tremula*, *P. nigra*, *C. libani*, *Quercus* sp.

6. Asmacık, titrek kavak; 37°27'58"N, 34°49'55"E, 1380 m, 26.04.2011. **Habitat:** *A. cilicica* subsp. *cilicica*, *P. tremula*, *P. nigra*, *C. libani*, *Quercus* sp.

7. Asmacık, titrek kavak; 37°26'07"N, 34°55'44"E, 1380 m, 26.04.2011. **Habitat:** *A. cilicica* subsp. *cilicica*, *P. tremula*, *P. nigra*, *C. libani*, *Quercus* sp.

8. Asmacık; 37°27'56"N, 34°50'11"E, 1490 m, 17.10.2010. **Habitat:** *C. libani*, *A. cilicica* subsp. *cilicica*, *J. foetidissima*, *P. nigra*, *Quercus* sp., *Populus tremula*, *Ulmus minor*, *Carpinus betulus*.

9. Asmacık; 37°27'58"N, 34°50'38"E, 1532 m, 02.11.2010. **Habitat:** *C. libani*, *A. cilicica* subsp. *cilicica*, *J. foetidissima*, *J. excelsa*, *P. nigra*, *Quercus* sp., *Fagus orientalis*, *C. betulus*.

10. Asmacık; 37°26'58"N, 34°50'40"E, 1490 m, 17.10.2010. **Habitat:** *C. libani*, *A. cilicica* subsp. *cilicica*, *J. foetidissima*, *P. nigra*, *Quercus* sp., *P. tremula*, *U. minor*, *C. betulus*.

11. Börücek, Katran sekisi; 37°21'02"N, 34°50'18"E, 1422 m, 17.10.2010. **Habitat:** *C. libani*, *A. cilicica* subsp. *cilicica*, *J. foetidissima*, *P. nigra*, *Quercus* sp.

12. Börücek, Katran sekisi; 37°22'02"N, 34°52'18"E, 1420 m, 17.10.2010. **Habitat:** *C. libani*, *A. cilicica* subsp. *cilicica*, *J. foetidissima*, *P. nigra*, *Quercus* sp.

13. Çam sekisi; 37°33'20"N, 35°00'45"E, 1157 m, 27.04.2011. **Habitat:** *P. nigra*.

14. Eğrek; 37°26'39"N, 34°56'08"E, 1780 m, 30.11.2013. **Habitat:** *C. libani*, *A. cilicica* subsp. *cilicica*.

15. Elmalı Boğazi; 37°22'21"N, 34°45'37"E, 1609 m, 02.11.2010. **Habitat:** *C. libani*, *A. cilicica* subsp. *cilicica*.

16. Fındıklı Elma sekisi 1; 37°30'22"N, 34°57'23"E, 1424 m, 27.04.2011. **Habitat:** *A. cilicica* subsp. *cilicica*, *C. libani*, *Quercus* sp., *J. excelsa*, *J. foetidissima*.

17. Fındıklı Elma sekisi 1; 37°30'05"N, 34°57'17"E, 1422 m, 27.04.2011. **Habitat:** *A. cilicica* subsp. *cilicica*, *C. libani*, *Quercus* sp., *J. excelsa*, *J. foetidissima*.

18. Fındıklı Elma sekisi 2, Çetinlik; 37°30'05"N, 34°57'17"E, 1422 m, 27.04.2011. **Habitat:** *A. cilicica* subsp. *cilicica*, *C. libani*, *Quercus* sp., *J. excelsa*, *J. foetidissima*.

19. Fındıklı Elma sekisi Çetinlik; 37°29'56"N, 34°58'49"E, 1570 m, 29.10.2011. **Habitat:** *A. cilicica* subsp. *cilicica*, *C. libani*, *J. excelsa*, *J. foetidissima*.

20. Fındıklı Elma sekisi Çetinlik; 37°30'08"N, 34°58'12"E, 1700 m, 20.05.2012. **Habitat:** *C. libani*, *A. cilicica* subsp. *cilicica*, *P. nigra*.

21. Fındıklı, Elma sekisi; 37°30'17"N, 34°57'19"E, 1400 m, 03.11.2004. **Habitat:** *J. excelsa*, *J. foetidissima*, *A. cilicica* subsp. *cilicica*, *C. libani*.

22. Fındıklı (in cemetery); 37°30'00"N, 34°55'27"E, 1300 m, 25.03.2003. **Habitat:** *J. foetidissima*.

23. Fındıklı, Tosman; 37°30'42"N, 34°55'25"E, 1400 m, 03.11.2004. **Habitat:** *J. excelsa*, *J. foetidissima*, *A. cilicica* subsp. *cilicica*, *C. libani*.

24. Fındıklı; 37°30'25"N, 34°56'30"E, 1200 m, 29.10.2011. **Habitat:** *A. cilicica* subsp. *cilicica*, *C. libani*, *J. excelsa*, *J. foetidissima*.

25. Işıkturşu hill; 37°30'38"N, 034°57'29"E, 1400 m, 04.11.2004. **Habitat:** *J. excelsa*, *J. foetidissima*, *A. cilicica* subsp. *cilicica*, *C. libani*.

26. Katran sekisi; 37°21'14"N, 34°50'48"E, 1430 m, 02.11.2010. **Habitat:** *C. libani*, *A. cilicica* subsp. *cilicica*, *J. foetidissima*, *J. excelsa*, *P. nigra*.

27. Sarıçiçek Plateau; 37°26'13"N, 34°56'57"E, 1466 m, 01.11.2010. **Habitat:** *C. libani*, *A. cilicica* subsp. *cilicica*, *J. foetidissima*, *J. excelsa*, *P. nigra*.

28. Sarıçiçek, tek mezar; 37°25'45"N, 34°57'38"E, 1432 m, 01.11.2010. **Habitat:** *C. libani*, *A. cilicica* subsp. *cilicica*, *J. foetidissima*, *J. excelsa*, *P. nigra*.

29. Tosman; 37°31'04"N, 034°55'18"E, 1430 m, 25.11.2009. **Habitat:** *A. cilicica* subsp. *cilicica*, *P. nigra*, *C. libani*.

30. Tosman; 37°31'11"N, 34°55'20"E, 1430 m, 25.11.2007. **Habitat:** *A. cilicica* subsp. *cilicica*, *C. libani*, *J. excelsa*, *J. foetidissima*, *P. nigra*.

31. Tosman; 37°32'11"N, 34°56'20"E, 1430 m, 25.11.2009. **Habitat:** *A. cilicica* subsp. *cilicica*.

32. Ütük; 37°27'55"N, 034°49'51"E, 1461 m, 26.04.2011. **Habitat:** *A. cilicica* subsp. *cilicica*, *C. libani*, *Quercus* sp.

2. Species List**2.1. ASCOMYCOTA****Caloscyphaceae****1. Caloscypha fulgens (Pers.) Boud.**

Locality 6, saprobe, under *Abies* HD7381; Locality 18, under *Abies*, HD7463.

Discinaceae**2. Discina ancilis (Pers.) Sacc.**

Locality 4, saprobe, under *Abies*, HD7424.

Helvellaceae

3. *Helvella lacunosa* Afzel.
Locality 26, saprobe, under *Abies*, HD7048.
- Helotiaceae**
4. *Hymenoscyphus calyculus* (Fr.) W.Phillips
Locality 30, lignicolous, on *Cedrus* branch, HD3070.
5. *Hymenoscyphus immutabilis* (Fuckel) Dennis
Locality 11, saprobe, on *Abies* cone, HD6300, HD7766.
- Morchellaceae**
6. *Morchella conica* Krombh.
Locality 7, mycorrhizal, under *Abies*, HD7391; Locality 3, under *Cedrus*, HD7394; Locality 2, under *Cedrus*, HD7408; Locality 32, under *Cedrus*, HD7409; Locality 17, under *Abies*, HD7442, 7446; Locality 18, under *Abies*, HD7456.
7. *Morchella esculenta* (L.) Pers.
Locality 16, mycorrhizal, under *Abies*, HD7450.
8. *Morchella elata* Fr.
Locality 20, mycorrhizal, under *Abies*, HD8210.
- Pezizaceae**
9. *Terfezia claveryi* Chatin
Locality 24, mycorrhizal, under *Helianthemum*, HD6017.
- Pyronemataceae**
10. *Geopora arenicola* (Lév.) Kers
Locality 3, saprobe, under *Abies*, 26.04.2011, HD7399.
11. *Geopora sumneriana* (Cooke) M.Torre
Locality 20, mycorrhizal, under *Cedrus*, HD8185.
- 2.2. BASIDIOMYCOTA**
- Agaricaceae**
12. *Agaricus altipes* (F.H.Møller) F.H.Møller
Locality 9, saprobe, under *Abies*, HD6963, HD6965.
13. *Agaricus comtulus* Fr.
Locality 28, saprobe, under *Abies*, HD6907.
14. *Agaricus semotus* Fr.
Locality 20, saprobe, under *Cedrus*, HD8201.
15. *Agaricus sylvicola* (Vittad.) Peck
Locality 28, saprobe, under *Abies*, HD6917, 6929.
16. *Crucibulum laeve* (Huds.) Kambly
Locality 11, saprobe, on *Cedrus* remnant, HD6292.
17. *Cystodermella granulosa* (Batsch) Harmaja
Locality 30, saprobe, under *Abies*, HD3051.
18. *Lepiota castanea* Quél.
Locality 26, saprobe, under *Abies*, HD7070.
19. *Lepiota clypeolaria* (Bull.) P.Kumm.
Locality 6, saprobe, under *Abies*, HD6977; Locality 26, under *Abies*, HD7029.
20. *Lepiota cristata* (Bolton) P.Kumm.
Locality 12, saprobe, under *Abies*, HD8212, HD8213.
21. *Lepiota felina* (Pers.) P.Karst.
Locality 12, saprobe, under *Abies*, HD6294.
22. *Lepiota subincarnata* J.E.Lange
Locality 6, saprobe, under *Abies*, HD7200.
23. *Leucoagaricus serenus* (Fr.) Bon & Boiffard
Locality 12, saprobe, under *Abies*, HD8214, 8215.
24. *Lycoperdon lividum* Pers.
Locality 12, saprobe, under *Abies*, HD6345; Locality 6, under *Abies*, HD6276; Locality 11, under *Abies*, HD6279.
25. *Lycoperdon perlatum* Pers.
Locality 11, saprobe, under *Abies*, HD6307, HD6286, HD6347; Locality 27, under *Abies*, HD6835; Locality 28, under *Abies*, HD6848.
26. *Lycoperdon pratense* Pers.
Locality 27, saprobe, under *Abies*, HD6943.
27. *Lycoperdon pyriforme* Schaeff.
Locality 1, saprobe, under *Abies*, HD6949.
28. *Lycoperdon radicum* Durieu & Mont.
Locality 9, saprobe, under *Abies*, HD6969.
29. *Lycoperdon umbrinum* Pers.
Locality 31, saprobe, under *Cedrus*, HD3037.
30. *Macrolepiota gracilentia* (Krombh.) Wasser
Locality 11, saprobe, under *Abies*, HD6302; Locality 28, under *Abies*, HD6931.
31. *Macrolepiota mastoidea* (Fr.) Singer
Locality 28, saprobe, under *Abies*, HD6925.
32. *Macrolepiota procera* (Scop.) Singer
Locality 12, mycorrhizal, under *Abies*, HD6357; Locality 27, under *Abies*, HD6847; Locality 6, under *Abies*, HD6970.
33. *Tulostoma brumale* Pers.: Pers
Locality 21, saprobe, under *J. excelsa* HD1905.
- Atheliaceae**
34. *Athelia fibulata* M.P.Christ.
Locality 11, saprobe, on *Abies* remnant, HD6321.
- Auriscalpiaceae**
35. *Lentinellus castoreus* (Fr.) Kühner & Maire
Locality 6, lignicolous, on *Abies* trunk, HD6272.
36. *Lentinellus vulpinus* (Sowerby) Kühner & Maire
Locality 28, lignicolous, on *Abies* stump, HD6940; Locality 26, on *Abies* stump, HD7058.
- Bankeraceae**
37. *Boletopsis leucomelaena* (Pers.) Fayod
Locality 6, mycorrhizal, under *Abies*, HD6274; Locality 21, under *Abies*, HD6284; Locality 25, under *Abies*, HD6937.
38. *Hydnellum caeruleum* (Hornem.) P.Karst.
Locality 11, mycorrhizal, on *Abies* root, HD6299.
39. *Sarcodon glaucopus* Maas Geest. & Nannf.
Locality 11, mycorrhizal, under *Abies*, HD6331; Locality 28, under *Abies*, HD6891.
- Bolbitiaceae**
40. *Conocybe pilosella* (Pers.) Kühner
Locality 11, saprobe, on grass, HD6318.
41. *Conocybe rickeniana* P.D.Orton
Locality 11, saprobe, on grass, HD6339; Locality 26, on grass, HD7076; Locality 20, under *Abies*, HD8205.

- Botryobasidiaceae**
 42. *Botryobasidium subcoronatum* (Höhn. & Litsch.) Donk
 Locality 23, saprobe, on *J. excelsa* branch, HD1874.
- Clavariadelphaceae**
 43. *Clavariadelphus truncatus* (Qué.) Donk
 Locality 26, mycorrhizal, under *Abies*, HD7027.
- Cortinariaceae**
 44. *Cortinarius albidus* Peck.
 Locality 20, mycorrhizal, under *Cedrus*, HD8211.
 45. *Cortinarius europaeus* (M.M.Moser) Bidaud, Moënne-Loec & Reumaux
 Locality 11, mycorrhizal, under *Abies*, HD7202.
46. *Galerina sideroides* (Bull.) Kühner
 Locality 6, lignicolous, on *Abies* remnants, HD6973.
47. *Hebeloma birrus* (Fr.) Sacc.
 Locality 26, mycorrhizal, under *Abies*, HD7065.
48. *Hebeloma leucosarx* P.D.Orton
 Locality 26, mycorrhizal, under *Abies*, HD7031.
49. *Hebeloma mesophaeum* (Pers.) Qué.
 Locality 26, mycorrhizal, under *Abies*, HD7080.
- Entolomataceae**
 50. *Entoloma hirtipes* (Schumach.) M.M.Moser
 Locality 3, saprobe, under *Abies*, HD7395.
51. *Rhodophana nitellina* (Fr.) T.J. Baroni & Bergemann
 Locality 20, saprobe, under *Cedrus*, HD8189.
- Fomitopsidaceae**
 52. *Antrodia juniperina* (Murrill) Niemelä & Ryvarden
 Locality 18, parasite, on *J. foetidissima*, HD7452.
53. *Fomitopsis pinicola* (Sw.) P.Karst.
 Locality 28, parasite, on *Abies*, HD6861.
- Ganodermataceae**
 54. *Ganoderma carnosum* Pat.
 Locality 19, lignicolous, on *Abies*, HD8057.
- Geastraceae**
 55. *Geastrum coronatum* Pers.
 Locality 21, saprobe, under *Cedrus*, HD1906.
56. *Geastrum fimbriatum* Fr.
 Locality 30, saprobe, in *Cedrus* forest, HD8062.
57. *Geastrum pectinatum* Pers.
 Locality 21, saprobe, under *J. excelsa*, HD1903.
- Gloeophyllaceae**
 58. *Gloeophyllum abietinum* (Bull.) P.Karst.
 Locality 20, lignicolous, on *Abies* trunk, HD8208.
59. *Gloeophyllum sepiarium* (Wulfen) P.Karst.
 Locality 11, lignicolous, on *Abies* trunk, HD6285.
60. *Veluticeps abietina* (Pers.) Hjortstam & Tellería
 Locality 9, lignicolous, on *Abies* trunk, HD6993;
 Locality 26, on *Abies* trunk, HD7053.
- Gomphaceae**
 61. *Gomphus clavatus* (Pers.) Gray
 Locality 28, mycorrhizal, under *Abies*, HD6882;
 Locality 9, under *Abies*, HD6971.
62. *Ramaria fennica* (P.Karst.) Ricken
 Locality 28, mycorrhizal, under *Cedrus*, HD6988.
63. *Ramaria lutea* Schild
 Locality 20, mycorrhizal, under *Cedrus*, HD8209.
- Hydnodontaceae**
 64. *Litschauerella clematidis* (Bourdot & Galzin) J.Erikss. & Ryvarden
 Locality 23, saprobe, on *J. excelsa* branch, HD1881.
65. *Subulicystidium longisporum* (Pat.) Parmasto
 Locality 20, saprobe, on *Abies* remnants, HD8204.
- Hygrophoraceae**
 66. *Ampulloclitocybe clavipes* (Pers.) Redhead, Lutzoni, Moncalvo & Vilgalys
 Locality 30, mycorrhizal, under *Abies*, HD3065.
67. *Hygrophorus discoxanthus* (Fr.) Rea
 Locality 26, mycorrhizal, under *Abies*, HD7052.
- Hymenochaetaceae**
 68. *Fuscoporia torulosa* (Pers.) T.Wagner & M.Fisch.
 Locality 19, parasite, under *J. excelsa*, HD9844.
69. *Hymenochaete fuliginosa* (Pers.) Lév.
 Locality 21, lignicolous, on *J. excelsa* branch, HD1879.
70. *Phellinus chrysoloma* (Fr.) Donk
 Locality 20, parasite, on *Cedrus* trunk, HD8183.
71. *Phellinus hartigii* (Allesch. & Schnabl) Pat.
 Locality 32, parasite, on *Cedrus* trunk, HD7411.
- Inocybaceae**
 72. *Inocybe amblyospora* Kühner
 Locality 20, mycorrhizal, under *Abies*, HD8186,
 HD8192, HD8193.
73. *Inocybe hirtella* Bres.
 Locality 20, Pozanti, mycorrhizal, under *Cedrus*
 HD8187.
74. *Inocybe rimosa* (Bull.) P.Kumm.
 Locality 9, mycorrhizal, under *Cedrus*, HD8343.
75. *Inocybe sindonia* (Fr.) P.Karst.
 Locality 20, mycorrhizal, under *Abies*, HD8194.
76. *Inocybe splendens* R.Heim
 Locality 9, mycorrhizal, under *Abies*, HD6962.
- Lentariaceae**
 77. *Kavinia alboviridis* (Morgan) Gilb. & Budington
 Locality 18, saprobe, on *Abies* remnants, HD9484,
 HD9485.
- Lyophyllaceae**
 78. *Lyophyllum decastes* (Fr.) Singer
 Locality 19, saprobe, under *Cedrus*, HD8291.
79. *Rugosomyces onychinus* (Fr.) Raithelth.
 Locality 30, saprobe, under *Cedrus*, HD3054.
- Marasmiaceae**
 80. *Baeospora myosura* (Fr.) Singer
 Locality 11, saprobe, on *Abies* cone, HD6323.
81. *Marasmiellus pseudogracilis* (Kühner & Maire) Singer

Locality 11, saprobe, on decayed *Abies* remnants, HD6317.

Meruliaceae

82. *Hyphoderma obtusum* J.Erikss.

Locality 20, saprobe, on decayed *Abies* remnants, HD8195.

83. *Hyphoderma occidentale* (D.P.Rogers) Boidin & Gilles

Locality 26, saprobe, on *Abies* trunk, HD7059.

Mycenaceae

84. *Hemimycena pithya* (Fr.) Dörfelt

Locality 26, saprobe, on decayed *Abies* remnants, HD7047.

85. *Mycena pura* (Pers.) P.Kumm.

Locality 15, saprobe, under *Abies*, HD7008; Locality 26, under *Abies*, HD7061.

86. *Mycena xantholeuca* Kühner

Locality 15, saprobe, on *Abies* remnants, HD7013.

87. *Panellus mitis* (Pers.) Singer

Locality 30, saprobe, on *Cedrus* bark, HD3050.

88. *Xeromphalina campanella* (Batsch) Kühner & Maire

Locality 11, saprobe, on *Abies* needle remnants, HD6283, HD7203; Locality 20, on *Cedrus* stump, HD8182.

Omphalotaceae

89. *Omphalotus olearius* (DC.) Singer

Locality 11, parasite, on *Abies* trunk, HD6333.

90. *Rhodocollybia butyracea* (Bull.) Lennox

Locality 9, saprobe, under *Abies*, HD6990.

Peniophoraceae

91. *Gloiothele citrina* (Pers.) Ginns & G.W.Freeman

Locality 6, on *Abies* trunk, HD6974; Locality 27, saprobe, on *Abies* trunk, HD6819, HD8461.

Physalacriaceae

92. *Hymenopellis radicata* (Relhan) R.H. Petersen

Locality 9, mycorrhizal, under *Abies*, HD7201.

93. *Oudemansiella melanotricha* (Dörfelt)

M.M.Moser

Locality 9, mycorrhizal, under *Abies*, HD8345; Locality 11, under *Abies*, HD6291;

Locality 28, under *Abies*, HD6906.

Pleurotaceae

94. *Pleurotus ostreatus* (Jacq.) P.Kumm.

Locality 28, lignicolous on *Abies* stump, HD6941.

Pluteaceae

95. *Pluteus atromarginatus* (Konrad) Kühner

Locality 11, lignicolous, on *Abies* trunk, HD6327.

96. *Pluteus nanus* (Pers.) P.Kumm.

Locality 11, lignicolous, on *Abies* remnants, HD6335.

Polyporaceae

97. *Fomes fomentarius* (L.) J.Kickx f.

Locality 6, parasite, on *Populus*, HD8363; Locality 9, on *Quercus* HD8383.

98. *Pyrofomes demidoffii* (Lév.) Kotl. & Pouzar

Locality 16, parasite on *J. foetidissima*, HD7431;

Locality 22, on *J. foetidissima*, HD1284.

99. *Trametes gibbosa* (Pers.) Fr.

Locality 6, lignicolous, on *Populus* trunk, HD8058.

100. *Trichaptum abietinum* (Dicks.) Ryvarden

Locality 20, lignicolous, on *Abies* trunk, HD8207.

Psathyrellaceae

101. *Coprinellus micaceus* (Bull.) Vilgalys, Hoppole & Jacq. Johnson

Locality 11, saprobe, on grass, HD16016.

102. *Psathyrella candolleana* (Fr.) Maire

Locality 12, saprobe, under *Abies*, HD6346.

Rhizopogonaceae

103. *Rhizopogon luteolus* Fr.

Locality 20, mycorrhizal, under *Pinus* HD8196.

104. *Rhizopogon roseolus* (Corda) Th.Fr.

Locality 28, mycorrhizal under *Abies*, HD6933;

Locality 28, under *Cedrus*, HD8198.

Russulaceae

105. *Lactarius salmonicolor* R.Heim & Leclair

Locality 11, mycorrhizal, under *Abies*, HD16017.

106. *Russula queletii* Fr.

Locality 26, mycorrhizal, under *Abies*, HD7019, HD7068.

107. *Russula torulosa* Bres.

Locality 26, mycorrhizal, under *Abies*, HD7018.

108. *Russula xerampelina* (Schaeff.) Fr.

Locality 19, mycorrhizal, under *Cedrus*, HD8288; Locality 6, under *Abies*, HD8294.

Sebacinaceae

109. *Sebacina grisea* (Pers.) Bres.

Locality 23, saprobe, on *J. excelsa* branch, HD1878.

110. *Sebacina incrustans* (Pers.) Tul. & C.Tul.

Locality 21, saprobe, on *J. excelsa* branch, HD1892.

Schizophoraceae

111. *Hyphodontia breviseta* (P.Karst.) J.Erikss.

Locality 11, saprobe, on *Abies* trunk, HD7204.

112. *Hyphodontia juniperi* (Bourdot & Galzin) J.Erikss. & Hjortstam

Locality 21, saprobe, on *J. excelsa* bark, HD1887.

Schizophyllaceae

113. *Schizophyllum commune* Fr.

Locality 28, lignicolous, on *Abies* trunk, HD8371; Locality 12, on *Abies* bark, HD6301.

Sclerodermataceae

114. *Pisolithus arhizus* (Scop.) Rauschert

Locality 9, saprobe, on soil, HD8341.

Stereaceae

115. *Aleurodiscus cerussatus* (Bres.) Höhn. & Litsch.

Locality 21, saprobe, on *J. foetidissima* branch, HD1876, HD1883, HD1896.

116. *Aleurodiscus dextrinoideocerussatus* Manjón, M.N.Blanco & G.Moreno

Locality 21, saprobe, on *J. excelsa* branch, HD1898.

Strophariaceae

117. *Gymnopilus penetrans* (Fr.) Murrill

Locality 11, lignicolus, on *Abies* remnants, HD6315.

118. *Stropharia coronilla* (Bull.) Quél.

Locality 15, saprobe, under *Abies*, HD7000.

Suillaceae

119. *Suillus collinitus* (Fr.) Kuntze

Locality 28, mycorrhizal, under *Abies*, HD6874, HD6922.

120. *Suillus granulatus* (L.) Roussel

Locality 9, mycorrhizal, under *Pinus nigra*, HD7568.

121. *Suillus luteus* (L.) Roussel

Locality 26, mycorrhizal, under mixed *Pinus* and *Abies*, HD7021, HD7066.

Tricholomataceae

122. *Arrhenia lobata* (Pers.) Kühner & Lamoure ex Redhead

Locality 26, saprobe, on moss under *Abies*, HD7038.

123. *Clitocybe brumalis* (Fr.) Quél

Locality 6, mycorrhizal, under *Abies*, HD6979.

124. *Clitocybe foetens* Melot

Locality 27, mycorrhizal, under *Abies*, HD8337; Locality 9, under *Abies*, HD8340.

125. *Clitocybe odora* (Bull.) P.Kumm.

Locality 27, mycorrhizal, under *Quercus*, HD6832.

126. *Clitocybe phyllophila* (Pers.) P.Kumm.

Locality 27, mycorrhizal, under *Abies*, HD8338.

127. *Lepista nuda* (Bull.) Cooke

Locality 6, mycorrhizal, under *Abies*, HD6980; under *Cedrus*, HD8342.

128. *Leucopaxillus gentianeus* (Quél.) Kotl.

Locality 19, mycorrhizal, under *Pinus*, HD8289.

129. *Melanoleuca friesii* (Bres.) Bon

Locality 6, saprobe, under *Abies*, HD7380.

130. *Melanoleuca graminicola* (Velen.) Kühner & Maire

Locality 19, saprobe, under *Cedrus*, HD8292; Locality 9, under *Abies*, HD8293, HD8339.

131. *Melanoleuca melaleuca* (Pers.) Murrill
Locality 26, saprobe, under *Abies*, HD7020; Locality 20, under *Cedrus*, HD8188.

132. *Melanoleuca stridula* (Fr.) Singer

Locality 20, saprobe, under *Cedrus*, HD8184.

133. *Melanoleuca subpulverulenta* (Pers.) Singer

Locality 20, saprobe, under *Cedrus*, HD8199.

134. *Tricholoma anatolicum* H.H.Doğan & Intini

Locality 30, mycorrhizal, under *Cedrus*, HD3043; Locality 11, under *Cedrus*, HD6311;

Locality 28, under *Cedrus*, HD6910; Locality 6, under *Cedrus*, HD6983.

135. *Tricholoma atosquamosum* Sacc.

Locality 28, saprobe, under *Abies*, HD6877.

136. *Tricholoma cedretorum* (Bon) A.Riva

Locality 30, mycorrhizal, under *Cedrus*, HD8234.

137. *Tricholoma gausapatum* (Fr.) Quél.

Locality 19, mycorrhizal, under *Cedrus*, HD8290; Locality 8, under *Cedrus*, HD8346.

138. *Tricholoma saponaceum* (Fr.) P.Kumm.

Locality 26, saprobe, under *Abies*, HD7054.

139. *Tricholoma terreum* (Schaeff.) P. Kumm.

Locality 30, saprobe, under *Cedrus*, HD3063.

140. *Tricholoma triste* (Scop.) Quél.

Locality 30, saprobe, under *Cedrus*, HD3055.

141. *Tricholoma virgatum* (Fr.) P.Kumm.

Locality 30, saprobe, under *Abies*, HD3079.

142. *Tricholomopsis rutilans* (Schaeff.) Singer

Locality 11, parasite, on *Abies* stump, HD6326.

Tubariaceae

143. *Tubaria furfuracea* (Pers.) Gillet

Locality 26, saprobe, *Abies* remnants, HD7016.

144. *Tubaria hiemalis* Romagn. ex Bon

Locality 26, saprobe, on *Abies* remnants, HD7036.

Tubulicrinaceae

145. *Tubulicrinis calothrix* (Pat.) Donk

Locality 23, saprobe, on *J. excelsa* branch, HD1888.

146. *Tubulicrinis medius* (Bourdot & Galzin) Oberw.

Locality 25, saprobe, on *J. excelsa* branch, HD1939.

147. *Tubulicrinis subulatus* (Bourdot & Galzin) Donk

Locality 23, saprobe, on *J. excelsa* branch, HD1873.