New macrofungi records from Turkey and macrofungal diversity of Pozanti-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 İşloğlu, Allı, Solak & Watling (İsloloğlu et al., 2009); Morchella anatolica İşloğlu, Şpooner, Allı & Solak (İsloloğlu et al., 2010); Conocybe volviriricata Watling, İşloğlu & 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.

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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. cicalica, Cedrus libani A.Rich., Pinus nigra J.F.Arnold subsp. nigra var. caramanica (Loudon) Businsky, Pinus brutia Ten. var. brutia, Juniperus drupacea Labill., J. oxyzedrus L. subsp. oxyzedrus, 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.

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.
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 lycythiform, 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, thinvalled, 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 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.
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

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

**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 & Ryvarden (Figure 10)

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

**Figure 9.** *Diplomitoporus flavescens*: a- fruiting body, b- basidium and basidiospores.
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 × 1.5–2 μm, allantoid, smooth, thin-walled. Cystidia tubular variable in length about 50–75 × 4–6 μm.

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

Figure 11. *Tulasnella violea*: a- fruiting body, b- basidiospores, c- basidia.
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, Pholiota striipes, Hebeloma sordidum, Antrodia ramentacea, Leucogyrophana romellii, Diplomitoporus flavescens, Alutaceodontia alutacea, and Trysilaceum violeum) 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; I. 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 chrysoleucus 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 “Dedebürük”, R. fennica as “Kadın saç”, 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. rimosus, 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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References


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.
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.
11. Börüşek, 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. Börüşek, 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.
15. Elmalı Boğazı; 37°22′21″N, 34°45′37″E, 1609 m, 02.11.2010. Habitat: C. libani, A. cilicica subsp. cilicica.
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.
22. Fındıklı, (in cemetery); 37°30′00″N, 34°55′27″E, 1300 m, 25.03.2003. Habitat: J. foetidissima.
27. Sarıçık 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.
32. Ütkük; 37°27′55″N, 03°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. Location 6, saprobe, under Abies HD7381; Locality 18, under Abies, HD7463.

Discinaceae
2. Discina ancilis (Pers.) Sacc. Location 4, saprobe, under Abies, HD7424.

Helvellaceae
3. Helvella lacunosa Afzel.
   Locality 26, saprobe, under Abies, HD7048.

Helotiaceae

4. Hymenophyllum kalycifolium (Fr.) W.Phillips
   Locality 30, lignicolous, on Cedrus branch, HD3070.

5. Hymenophyllum immutabilis (Fuckel) Dennis
   Locality 11, saprobe, on Abies cone, HD6300, HD7766.

Morchellaceae

   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.

   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, HD6945.

11. Geopora sumneriana (Cooke) M.Torre
    Locality 20, mycorrhizal, under Cedrus, HD8185.

2.2. BASIDIOMYCOTA

Agaricaeae

12. Agaricus alpines (F.H.Møller) F.H.Møller
    Locality 9, saprobe, under Abies, HD6963, HD6965.

13. Agaricus comatus 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.

    Locality 6, saprobe, under Abies, HD6977; Locality 26, under Abies, HD7029.

20. Lepiota cristata (Bolton) P.Kumm.
    Locality 12, saprobe, under Abies, HD8212, HD8213.

    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.

    Locality 12, saprobe, under Abies, HD6345; Locality 6, under Abies, HD6276; Locality 11, under Abies, HD6279.

    Locality 11, saprobe, under Abies, HD6307, HD6286, HD6347; Locality 27, under Abies, HD6835; Locality 28, under Abies, HD6848.

    Locality 27, saprobe, under Abies, HD6943.

27. Lycoperdon pyriforme Schaeff.
    Locality 1, saprobe, under Abies, HD6949.

28. Lycoperdon radicatum Durieu & Mont.
    Locality 9, saprobe, under Abies, HD6969.

29. Lycoperdon uncinatum Pers.
    Locality 31, saprobe, under Cedrus, HD3037.

30. Macrolepiota gracilenta (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 procerca (Scop.) Singer
    Locality 12, mycorrhizal, under Abies, HD6357; Locality 27, under Abies, HD6847;
    Locality 28, under Abies, HD6970.

33. Tulostoma brumale (Pers.) Kühner & Maire
    Locality 6, under Abies, HD6272.

36. Lentinellus castoreus (Fr.) Kühner & Maire
    Locality 28, lignicolous, on Abies trunk, HD6940; Locality 26, on Abies stump, HD7058.

Bankeracese

37. Boletopsis leucomelaena (Pers.) Fayod
    Locality 6, mycorrhizal, under Abies, HD6274; Locality 21, under Abies, HD6284;
    Locality 25, under Abies, HD6937.

38. Hydnum laevis (Hornem.) P.Karst.
    Locality 11, mycorrhizal, on Abies root, HD6299.

    Locality 11, mycorrhizal, under Abies, HD6331;
    Locality 28, under Abies, HD6891.

Bolbitiaceae

40. Conocybe pilosa (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. & Litsh.) Donk

   Locality 23, saprobe, on *J. excelsa* branch, HD1874.

**Clavariadelphaceae**

43. *Clavariadelphus truncatus* (Quél.) Donk

   Locality 26, mycorrhizal, under *Abies*, HD7027.

**Cortinariaceae**

44. *Cortinarius albidus* Peck.

   Locality 20, mycorrhizal, on *Cedrus*, HD8211.

45. *Cortinarius europaeus* (M.M. Moser) Bidaud, Moënne-Locc. & 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.


   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* (Bull.) Kühner

   Locality 28, parasite, on *Abies*, HD6861.

**Ganodermales**

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**


   Locality 20, lignicolous, on *Abies* trunk, HD8208.


   Locality 11, lignicolous, on *Abies* trunk, HD6285.

60. *Veluticeps abietina* (Pers.) Hjortstam & Telleria

   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.

**Hygrodiaceae**

66. *Ampulloclitocybe clavipes* (Pers.) Redhead, Lutzoni, Moncalvo & Vilgalys

   Locality 30, mycorrhizal, under *Abies*, HD3065.

67. *Hygrophorus discanthus* (Fr.) Rea

   Locality 26, mycorrhizal, under *Abies*, HD7052.

**Hymenochaetaeae**


   Locality 19, parasite, under *J. excelsa*, HD9844.


   Locality 21, lignicolous, on *J. excelsa* branch, HD1879.

70. *Phellinus chrysoloma* (Fr.) Donk

   Locality 20, parasite, on *Cedrus* trunk, HD8183.


   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 rimosula* (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.) Raithelh.

   Locality 19, saprobe, under *Cedrus*, HD8291.

80. *Baeospora myosura* (Fr.) Singer

   Locality 20, saprobe, on *Abies* remnants, HD8204.

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.

Locality 15, saprobe, under Abies, HD7008; Locality 26, under Abies, HD6990.

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, on Abies trunk, HD7061.

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 11, mycorrhizal, under Abies, HD8345; Locality 11, 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
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.

Locality 26, mycorrhizal, under Abies, HD7018.

108. Russula xerampelina (Schaeff.) Fr.
Locality 19, mycorrhizal, under Cedrus, HD8288; Locality 6, under Abies, HD8294.

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

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.

Sclerotermataceae
114. Pisolithus arhizus (Scop.) Rauschert
Locality 9, saprobe, on soil, HD8341.

Steraceae
115. Aleurodiscus cerussatus (Bres.) Höhn. & Litsch.
115. **Aleurodiscus dextrinoideocerussatus** Manjón, M.N.Blanco & G.Moreno
   Locality 21, saprobe, on *J. foetidissima* branch, HD1898.

116. **Stropharia coronilla** (Bull.) Quél.
   Locality 15, saprobe, under *Abies*, HD7000.

117. **Aleurodiscus dextrinoideocerussatus** Manjón, M.N.Blanco & G.Moreno
   Locality 21, saprobe, on *J. excelsa* branch, HD1898.

118. **Gymnopilus penetrans** (Fr.) Murrill
   Locality 28, saprobe, on *J. excelsa* branch, HD1898.

119. **Gymnopilus penetrans** (Fr.) Murrill
   Locality 11, lignicolus, on *Abies* remnants, HD6315.

120. **Stropharia coronilla** (Bull.) Quél.
   Locality 15, saprobe, under *Abies*, HD7000.

121. **Stropharia coronilla** (Bull.) Quél.
   Locality 15, saprobe, under *Abies*, HD7000.

122. **Suillus collinitus** (Fr.) Kuntze
   Locality 28, mycorrhizal, under *Abies*, HD6874, HD6922.

123. **Suillus granulatus** (L.) Roussel
   Locality 9, mycorrhizal, under *Pinus nigra*, HD7568.

124. **Suillus luteus** (L.) Roussel
   Locality 26, mycorrhizal, under mixed *Pinus* and *Abies*, HD7021, HD7066.

125. **Suillus luteus** (L.) Roussel
   Locality 26, mycorrhizal, under *Abies*, HD7020, HD7066.

126. **Suillus luteus** (L.) Roussel
   Locality 26, mycorrhizal, under *Abies*, HD7020, HD7066.

127. **Suillus luteus** (L.) Roussel
   Locality 26, mycorrhizal, under *Abies*, HD7020, HD7066.

128. **Suillus luteus** (L.) Roussel
   Locality 26, mycorrhizal, under *Abies*, HD7020, HD7066.

129. **Suillus luteus** (L.) Roussel
   Locality 26, mycorrhizal, under *Abies*, HD7020, HD7066.

130. **Suillus luteus** (L.) Roussel
   Locality 26, mycorrhizal, under *Abies*, HD7020, HD7066.

131. **Suillus luteus** (L.) Roussel
   Locality 26, mycorrhizal, under *Abies*, HD7020, HD7066.

132. **Suillus luteus** (L.) Roussel
   Locality 26, mycorrhizal, under *Abies*, HD7020, HD7066.

133. **Suillus luteus** (L.) Roussel
   Locality 26, mycorrhizal, under *Abies*, HD7020, HD7066.

134. **Suillus luteus** (L.) Roussel
   Locality 26, mycorrhizal, under *Abies*, HD7020, HD7066.

135. **Suillus luteus** (L.) Roussel
   Locality 26, mycorrhizal, under *Abies*, HD7020, HD7066.

136. **Suillus luteus** (L.) Roussel
   Locality 26, mycorrhizal, under *Abies*, HD7020, HD7066.

137. **Suillus luteus** (L.) Roussel
   Locality 26, mycorrhizal, under *Abies*, HD7020, HD7066.

138. **Suillus luteus** (L.) Roussel
   Locality 26, mycorrhizal, under *Abies*, HD7020, HD7066.

139. **Suillus luteus** (L.) Roussel
   Locality 26, mycorrhizal, under *Abies*, HD7020, HD7066.

140. **Suillus luteus** (L.) Roussel
   Locality 26, mycorrhizal, under *Abies*, HD7020, HD7066.

141. **Suillus luteus** (L.) Roussel
   Locality 26, mycorrhizal, under *Abies*, HD7020, HD7066.

142. **Suillus luteus** (L.) Roussel
   Locality 26, mycorrhizal, under *Abies*, HD7020, HD7066.

143. **Suillus luteus** (L.) Roussel
   Locality 26, mycorrhizal, under *Abies*, HD7020, HD7066.

144. **Suillus luteus** (L.) Roussel
   Locality 26, mycorrhizal, under *Abies*, HD7020, HD7066.

145. **Suillus luteus** (L.) Roussel
   Locality 26, mycorrhizal, under *Abies*, HD7020, HD7066.

146. **Suillus luteus** (L.) Roussel
   Locality 26, mycorrhizal, under *Abies*, HD7020, HD7066.

147. **Suillus luteus** (L.) Roussel
   Locality 26, mycorrhizal, under *Abies*, HD7020, HD7066.

148. **Suillus luteus** (L.) Roussel
   Locality 26, mycorrhizal, under *Abies*, HD7020, HD7066.

149. **Suillus luteus** (L.) Roussel
   Locality 26, mycorrhizal, under *Abies*, HD7020, HD7066.

150. **Suillus luteus** (L.) Roussel
   Locality 26, mycorrhizal, under *Abies*, HD7020, HD7066.

151. **Suillus luteus** (L.) Roussel
   Locality 26, mycorrhizal, under *Abies*, HD7020, HD7066.

152. **Suillus luteus** (L.) Roussel
   Locality 26, mycorrhizal, under *Abies*, HD7020, HD7066.

153. **Suillus luteus** (L.) Roussel
   Locality 26, mycorrhizal, under *Abies*, HD7020, HD7066.

154. **Suillus luteus** (L.) Roussel
   Locality 26, mycorrhizal, under *Abies*, HD7020, HD7066.

155. **Suillus luteus** (L.) Roussel
   Locality 26, mycorrhizal, under *Abies*, HD7020, HD7066.

156. **Suillus luteus** (L.) Roussel
   Locality 26, mycorrhizal, under *Abies*, HD7020, HD7066.

157. **Suillus luteus** (L.) Roussel
   Locality 26, mycorrhizal, under *Abies*, HD7020, HD7066.

158. **Suillus luteus** (L.) Roussel
   Locality 26, mycorrhizal, under *Abies*, HD7020, HD7066.

159. **Suillus luteus** (L.) Roussel
   Locality 26, mycorrhizal, under *Abies*, HD7020, HD7066.

160. **Suillus luteus** (L.) Roussel
   Locality 26, mycorrhizal, under *Abies*, HD7020, HD7066.

161. **Suillus luteus** (L.) Roussel
   Locality 26, mycorrhizal, under *Abies*, HD7020, HD7066.

162. **Suillus luteus** (L.) Roussel
   Locality 26, mycorrhizal, under *Abies*, HD7020, HD7066.

163. **Suillus luteus** (L.) Roussel
   Locality 26, mycorrhizal, under *Abies*, HD7020, HD7066.

164. **Suillus luteus** (L.) Roussel
   Locality 26, mycorrhizal, under *Abies*, HD7020, HD7066.

165. **Suillus luteus** (L.) Roussel
   Locality 26, mycorrhizal, under *Abies*, HD7020, HD7066.

166. **Suillus luteus** (L.) Roussel
   Locality 26, mycorrhizal, under *Abies*, HD7020, HD7066.