



Contributions to the macrofungal diversity of Hatay province, Turkey

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Abstract

In this study, an attempt has been made to determine macrofungal specimens collected from Hatay province in 2005-2008. After field and laboratory studies, 67 taxa belonging to 26 families and 2 divisions were identified. 4 taxa belong to Ascomycota and 63 to Basidiomycota. Also two of them, *Panaeolus reticulatus* Overh. and *Tricholoma chrysophyllum* A. Riva, C.E. Hermos. & Jul. Sánchez were determined as new records for Turkey.

Key words: Biodiversity, macrofungi, new records, Hatay, Turkey

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Hatay ili makrofungus çeşitliliğine katkılar

Özet

Bu çalışmada 2005-2008 yılları arasında Hatay ilinden toplanmış makrofungus örnekleri teşhis edilmiştir. Arazi ve laboratuvar çalışmaları sonrasında 26 familya ve 2 bölüme ait 67 takson teşhis edilmiştir. Bunlardan 4 tanesi Ascomycota bölümündeyken, 63 tanesi Basidiomycota bölümündedir. Ayrıca bunlardan iki tanesi; *Panaeolus reticulatus* Overh. ve *Tricholoma chrysophyllum* A. Riva, C.E. Hermos. & Jul. Sánchez Türkiye için yeni kayıttır.

Anahtar kelimeler: Bioçeşitlilik, Makrofungus, Yeni kayıtlar, Hatay, Türkiye

1. Introduction

Hatay is situated in C6 square in southern part of Turkey and bordered by Syria to the south, Osmaniye to the north, Gaziantep and Syria to the east and Mediterranean sea to the west (Figure 1). The research area falls in Mediterranean floristic region and possesses a semi-arid Mediterranean climate. The annual average temperature is 18.2 °C and the annual rainfall is about 1120 kg/m². The forest and shrub vegetation of the study area is especially *Pinus brutia* Ten., *P. pinea* L., *P. halepensis* Mill., *P. nigra* J.F. Arnold, *Abies cilicica* (Ant. et Kotschy) Carr., *Cedrus libani* A. Rich., *Juniperus oxycedrus* L., *J. excelsa* Bieb., *Cupressus sempervirens* L., *Quercus* L. spp., *Acacia* Mill. spp., *Sytrax officinalis* L., *Populus* L. spp., *Olea* L. spp. and *Acer* L. spp. The importance of the region is largely for macrofungal biodiversity because of its perfect climatic conditions, forest types and the fertile land.

There are only a small number of records in the literature on the mycota of Hatay (Baba et al., 2013, 2014). In these studies, 113 macrofungi taxa have been identified from Hatay. And also one study has been done on Myxomycetes of Hatay (Baba, 2012).

The aim of this study is to contribute to the mycobiota of Hatay and Turkey with newly recorded macrofungi.

2. Materials and methods

The specimens of this study were collected from different localities within Hatay province between 2005-2008 years (Figure 1). The field studies were conducted in autumn and spring, because of the climatic conditions which are

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Figure 1. Map of the Hatay

more suitable for growth of fungi. During field studies, morphological and ecological characteristics of the macrofungi samples were recorded and they were photographed. After field studies, specimens were taken to the laboratory. Then spore prints were obtained and spores were photographed. Specimens were identified with the help of relevant literature such as; Marchand, (1971-1986), Dennis (1981), Watling (1982), Moser (1983), Breitenbach and Kränzlin (1984-2000), Cappelli (1984), Pacioni (1985), Watling and Gregory (1987, 1989), Bresinsky and Besl (1990), Ellis and Ellis (1990), Hansen and Knudsen (2000), Kränzlin (2005), Knudsen and Vesterholt (2008) and Kibby (2012). Newly recorded taxa were checked with the relevant literature: (Sesli and Denchev, 2014; Akata et al., 2014; Güngör et al., 2014; 2015; Kaya and Uzun, 2015; Solak et al., 2007, 2015; Doğan and Kurt 2016). Nomenclature is given according to Index Fungorum (Kirk, 2011). The identified specimens are kept at the fungarium of Muğla Sıtkı Koçman University.

3. Results

In this study 67 taxa belonging to 26 families were identified. These taxa are presented with their localities, habitats, collection dates, and accession numbers.

ASCOMYCOTA

Helvellaceae

1. *Helvella lacunosa* Afzel.
Samandağ, Çamlıyayla village, in *P. brutia* forest, 8.12.2006, Solak 2956.
2. *Helvella leucomelaena* (Pers.) Nannf.
İskenderun, Belen- Kırıkhan way 5.km, in pine forest, 9.4.2006, Solak 1996.

Morchellaceae

3. *Morchella crassipes* Schwein. & Cooke
İskenderun, Akçay, Akoluk village, in pine forest, 8.4.2006. Solak 1960.

Pezizaceae

4. *Sarcosphaera coronaria* (Jacq.) J. Schröt.
Dörtiyol, Çökek upland, in pine forest, 8.4.2006, Solak 1957; İskenderun, Akçay, Akoluk village, Bağlıca upland, in pine forest, 8.4.2006, Solak 1975.

BASIDIOMYCOTA

Agaricaceae

5. *Bovista nigrescens* Pers.
Kırıkhan, Dedeçınar village, in pine forest, 9.12.2006, Solak 3035.
6. *Bovista plumbea* Pers.

Yayladağı, Center, in meadows, 13.4.2008, Solak 3705.

7. *Coprinus comatus* (O.F. Müll.) Pers.
Yayladağ, in *P. brutia* forest, 8.12.2006, Solak 3016.
8. *Lycoperdon excipuliforme* (Scop.) Pers.
Samandağ, Çamlıyayla village, in *P. brutia* forest, 8.12.2006, Solak 2947.
9. *Lycoperdon perlatum* Pers.
Yayladağ, in picnic area, in *P. brutia* forest, 8.12.2006, Solak 3019; Dörtiyol, Çökek upland, in *P. brutia* forest, 16.11.2007, Solak 3418.
10. *Macrolepiota excoriata* (Schaeff.) M.M. Moser
Kırıkhan, Dedeçınar village, in pine forest, 9.12.2006, Solak 3033.
11. *Macrolepiota procera* (Scop.) Singer
Dörtiyol, Çökek upland, in *P. brutia* forest, 16.11.2007, Solak 3419.

Amanitaceae

12. *Amanita ovoidea* (Bull.) Link
İskenderun, Güzel yayla, in pine forest, 9.12.2006, Solak 3103.

Auriculariaceae

13. *Auricularia mesenterica* (Dicks.) Pers.

İskenderun, Akçay, Akoluk village, Bağlıca upland, on *Juglans* sp., 8.4.2006, Solak 1966.

Bankeraceae

14. *Phellodon melaleucus* (Sw. ex Fr.) P. Karst.
Samandağ, Çamlıyayla village, on *P. brutia* stump, 8.12.2006, Solak 2973.

Bolbitiaceae

15. *Conocybe apala* (Fr.) Arnolds
Kırıkhan-Gaziantep way 5 km, in meadow, 9.4.2006, Solak 2001.
16. *Conocybe coprophila* (Kühner) Kühner
Hassa, in meadow, 9.4.2006, Solak 2006.

Cortinariaceae

17. *Cortinarius decipiens* (Pers.) Fr.
Samandağ, Çamlıyayla village, in *P. brutia* forest, 8.12.2006, Solak 2953.

Gomphidiaceae

18. *Chroogomphus rutilus* (Schaeff.) O.K. Mill.
Yayladağı, Leylekli village, on sandy soil, 13.4.2008, Solak 3697; Belen, Sarımazı place, Güzel yayla, in pine forest, 8.4.2006, Solak 1979; Yayladağ, in picnic area, in *P. brutia* forest, 8.12.2006, Solak 3017; İskenderun, Güzel yayla, in pine forest, 9.12.2006, Solak 3100.

Hydnangiaceae

19. *Hydnum repandum* L.
Samandağ, Çamlıyayla village, in *P. brutia* forest, 8.12.2006, Solak 2977.
20. *Laccaria altaica* Singer
Yayladağ, in picnic area, in *P. brutia* forest, 8.12.2006, Solak 3018.

Hygrophoraceae

21. *Hygrocybe conica* (Schaeff.) P. Kumm.
Samandağ, Çamlıyayla village, in *P. brutia* forest, 8.12.2006, Solak 2987.
22. *Hygrophorus camarophyllus* (Alb. & Schwein.) Duméé, Grandjean & Maire
Samandağ, Çamlıyayla village, in *P. brutia* forest, 8.12.2006, Solak 2943.

Inocybaceae

23. *Inocybe geophylla* var. *geophylla* (Bull.) P. Kumm.
Samandağ, Çamlıyayla village, in *P. brutia* forest, 8.12.2006, Solak 2954.
24. *Inocybe phaeodisca* Kühner
Yayladağ, in picnic area, in meadows, 8.12.2006, Solak 3022.
25. *Inocybe praetervisa* Quél.
Samandağ, Çamlıyayla village, in *P. brutia* forest, 8.12.2006, Solak 2995.
26. *Inocybe rimosa* var. *rimosa* (Bull.) P. Kumm

40. *Panaeolus reticulatus* Overh.

Pileus 8-14 mm in diameter, firstly conical-hemispherical later conical to campanulate, slightly umbonate, surface smooth, dull, radially fibrillose, hygrophanous, gray to red-brown when moist, with paler, ocher-brown concentric zones toward the margin, beige-brown when dry, margin acute (Figure 2a). Flesh gray-brown, without odor, taste mild. Lamellae dark brown when young, soon beige brown to black, broadly adnate, edges white-floccose. Stipe 40-70 × 1-3 mm, cylindrical, hollow or not, beige but lighter towards to apex. Spores 8-11 × 4.5-5.5 × 6-8 μm, rhomboid in frontal view, elliptical in lateral view, smooth, red-brown, with a distinct germ pore (Figure 2b).

Hatay, Maraş boğazı place, in pine forest, 9.12.2006. Solak 2995. P.

27. *Inocybe sindonia* (Fr.) P. Karst.
Samandağ, Çamlıyayla village, in *P. brutia* forest, 8.12.2006, Solak 2993.
28. *Inocybe splendens* var. *phaeoleuca* (Kühner) Kuyper
Samandağ, Çamlıyayla village, in *P. brutia* forest, 8.12.2006, Solak 2950.
29. *Inocybe whitei* (Berk. & Broome) Sacc.
Samandağ, Çamlıyayla village, in *P. brutia* forest, 8.12.2006, Solak 2949.

Mycenaceae

30. *Mycena abramsii* (Murrill) Murrill
Dörtüyl, Çökek upland, in pine forest, 16.11.2007, Solak 3421.
31. *Mycena aetites* (Fr.) Quel.
Dörtüyl, Çökek upland, *P. brutia* forest, 16.11.2007, Solak 3420.
32. *Mycena pelianthina* (Fr.) Quél.
Dörtüyl, Çökek upland, *P. brutia* forest, 16.11.2007, Solak 3423.

Pluteaceae

33. *Pluteus romellii* (Britzelm.) Sacc.
Hassa, under willow, 9.4.2006, Solak 2003.

Polyporaceae

34. *Fomes fomentarius* (L.) Fr.
İskenderun, Akçay, Akoluk village, Bağlıca upland, in pine forest, 8.4.2006, Solak 1967; Samandağ, Çamlıyayla village, on *Quercus* sp., 8.12.2006, Solak 2981.
35. *Hirschioporus pargamenus* (Fr.) Bondartsev & Singer
Samandağ, Çamlıyayla village, in *P. brutia* forest, 8.12.2006, Solak 2964.
36. *Lentinus tigrinus* (Bull.) Fr.
Hatay, Aktepe place, on cutten eucalyptus, 9.12.2006, Solak 3029.
37. *Polyporus arcularius* (Batsch) Fr.
İskenderun, Akçay, Akoluk village, on apricot tree, 8.4.2006, Solak 1962.
38. *Trametes versicolor* (L.) Lloyd
Dörtüyl, Çökek upland, on *Quercus* sp., 8.4.2006, Solak 1947; İskenderun, Akçay, Akoluk village, Bağlıca upland, on apple tree, 8.4.2006, Solak 1965; Dörtüyl, Çökek upland, in *P. brutia* forest, 21.4.2007, Solak 3207.

Psathyrellaceae

39. *Panaeolus semiovatus* (Sowerby) S. Lundell & Nannf.
Dörtüyl, Çökek upland, on dung, 8.4.2006, Solak 1952.

Basidia clavate, 25-30 × 10-12 µm, without a basal clamp (Figure 3c). Cheilocystidia cylindrical, 25-40 × 6-7 µm (Figure 3d). Grow solitary to gregarious in meadows, among grasses, in spring. Hassa, in meadow, 9.4.2006, Solak 2005.



Figure 2. *Panaeolus reticulatus* a- fruit bodies, b- basidiospores, c- basidium, d- cheilocystidia

Rhizopogonaceae

41. *Rhizopogon luteolus* Fr.
Belen, Gedik place, in pine forest, 8.4.2006, Solak 1988; Yayladağı, Leylekli village, in *P. brutia* forest, 8.12.2006, Solak 3003; on sandy soil, 13.4.2008, Solak 3696.
42. *Rhizopogon roseolus* (Corda) Th. Fr.
İskenderun, Belen- Kırıkhan way 5 km., in pine forest, 9.4.2006, Solak 1994; Yayladağı, in *P. brutia* forest, 8.12.2006, Solak 3011; Dörtüol, Çökek upland, in *P. brutia* forest, 21.4.2007, Solak 3208.

Russulaceae

43. *Lactarius deliciosus* (L.) Gray
Yayladağı, Leylekli village, in *P. brutia* forest, 8.12.2006, Solak 3008; 3012; Kırıkhan, Dedeçınar village, in pine forest, 9.12.2006, Solak 3034.
44. *Lactarius deterrimus* Gröger
Samandağ, Çamlıyayla village, in *P. brutia* forest, 8.12.2006, Solak 2972; İskenderun, Güzel yayla, in pine forest, 9.12.2006, Solak 3098.
45. *Lactarius lacunarum* Romagn. ex Hora
Samandağ, Çamlıyayla village, in *P. brutia* forest, 8.12.2006, Solak 2974.
46. *Lactarius sanguifluus* (Poulet) Fr.
Samandağ, Çamlıyayla village, in *P. brutia* forest, 8.12.2006, Solak 2983.
47. *Russula delica* Fr.
İskenderun, Güzel yayla, in pine forest, 9.12.2006, Solak 3099.
48. *Russula medullata* Romagn.
İskenderun, Güzel yayla, in pine forest, 9.12.2006, Solak 3094.
49. *Russula norvegica* D.A. Reid
Hatay, Yayladağı, in *P. brutia* forest, 8.12.2006, Solak 3014.
50. *Russula torulosa* Bres.

Yayladağı, Leylekli village, in *P. brutia* forest, 8.12.2006, Solak 3010; İskenderun, Güzel yayla, in pine forest, 9.12.2006, Solak 3096.

51. *Russula vinosa* Lindblad
Samandağ, Çamlıyayla village, in *P. brutia* forest, 8.12.2006, Solak 2989; Yayladağı, Leylekli village, in *P. brutia* forest, 8.12.2006, Solak 3007; Hatay, Yayladağı, in *P. brutia* forest, 8.12.2006, Solak 3013.

Schizophyllaceae

52. *Schizophyllum commune* Fr.
Dörtüol, Çökek upland, on pine tree, 8.4.2006, Solak 1944; İskenderun, Akçay, Akoluk village, on *Juglans* sp., 8.4.2006, Solak 1964; Dörtüol, Çökek upland, on pine tree, 21.4.2007, Solak 3209.

Sclerodermataceae

53. *Pisolithus arhizus* (Scop.) Rauschert
Hatay, Aktepe place, in eucalyptus forest, 9.12.2006, Solak 3028.

Stereaceae

54. *Stereum hirsutum* (Willd.) Pers.
İskenderun, Akçay, Akoluk village, Bağlıca upland, on *Quercus* sp., 8.4.2006, Solak 1968; Hatay, Aktepe place, on cutten eucalyptus, 9.12.2006, Solak 3030.

Strophariaceae

55. *Agrocybe cylindracea* (DC.) Maire
Kırıkhan-Gaziantep way 5 km, on willow, 9.4.2006, Solak 2002; İskenderun, Müftüler village, on fig tree, 9.12.2006, Solak 3105.
56. *Agrocybe dura* (Bolton) Singer
Hassa, in meadows, 9.4.2006, Solak 2007.

Suillaceae

57. *Suillus bellinii* (Inzenga) Kuntze
Dörtüol, Çökek upland, in pine forest, 8.4.2006, Solak 1945; Belen, Sarımaçı place, Güzel yayla, in pine forest, 8.4.2006, Solak 1982.
58. *Suillus bovinus* (L.) Roussel
Samandağ, Çamlıyayla village, in *P. brutia* forest, 8.12.2006, Solak 2976; Yayladağı, Leylekli

village, in *P. brutia* forest, 8.12.2006, Solak 3008; İskenderun, Güzel yayla, in pine forest, 9.12.2006, Solak 3095.

Tremellaceae

59. *Tremella mesenterica* Retz.

İskenderun, Akçay, Akoluk village, Bağlıca upland, on *Juglans* sp., 8.4.2006. Solak 1963.

Tricholomataceae

60. *Clitocybe geotropa* (Bull.) Quél.

Samandağ, Çamliyayla village, in *P. brutia* forest, 8.12.2006, Solak 2944; Yayladağ, in picnic area, in *P. brutia* forest, 8.12.2006, Solak 3020.

61. *Clitocybe vermicularis* (Fr.) Quél.

Dörtüol, Çökek upland, in pine forest, 8.4.2006, Solak 1943; İskenderun, Akçay, Akoluk village,

65. *Tricholoma chrysophyllum* A. Riva

Fruitingbody 5-8 cm, fleshy, firstly hemispherical later conical to campanulate. Surface dull, dry, beige, olive green to brownish-green, with numerous, concolorous, appressed squamules. Margin inrolled when young later rounded (Figure 3a). Context firm, whitish with light yellow tinges under the cuticle and stipe base, darker in age or when touched, odour faintly farinaceous, taste sweetish. Lamellae chrome yellow to bright yellow, like edges. Stipe 1-4 × 1-2 cm, cylindrical, generally slightly bent, brownish-yellow but lighter towards to apex with lots of squamules. Spores 5-8 × 5-6 µm, subspherical to ovoid, monoguttulate, smooth, hyaline (Figure 3b). Basidia cylindrical to clavate, 40-50 × 7-8 µm (Figure 3c). Grow solitary to gregarious in meadows, among grasses, in winter.

Yayladağı, Leylekli village, in *P. brutia* forest, 8.12.2006, Solak 3009; İskenderun, Güzel yayla, in pine forest, 9.12.2006, Solak 3097.

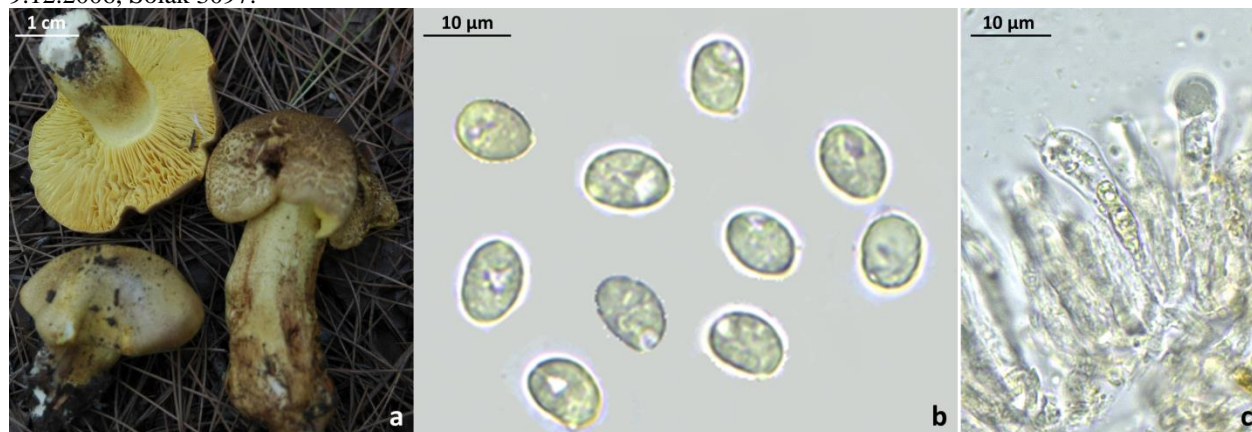


Figure 3. *Tricholoma chrysophyllum* a- fruit bodies, b- basidiospores, c- basidium

66. *Tricholoma fracticum* (Britzelm.) Kreisel

Samandağ, Çamliyayla village, in *P. brutia* forest, 8.12.2006, Solak 2982; Yayladağı, Leylekli village, in *P. brutia* forest, 8.12.2006, Solak 3006;

İskenderun, Güzel yayla, in pine forest, 9.12.2006, Solak 3101.

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

Hatay, Yayladağı, in *P. brutia* forest, 8.12.2006, Solak 3015.

4. Conclusions and discussion

In the first study on macrofungi of Hatay, 87 taxa were given by Baba et al., (2013). Four of the determined taxa belong to Ascomycota and rest of them to Basidiomycota. After them, only one study was carried out in this research area. In that study, Baba et al. (2014) determined 58 taxa, 2 of them belonging to Ascomycota and the rest of them in Basidiomycota. Also, Baba (2012) was recorded 44 myxomycete taxa from research area.

In this study, 67 taxa belonging to 26 families and 2 divisions were identified. 4 taxa belonged to Ascomycota and 63 to Basidiomycota. In our study most of the determined species belong to the families Russulaceae (13.4%), Tricholomataceae (11.9) Agaricaceae and Inocybaceae (10.4%), with the family Polyporaceae following.

As seen in the literature, there are little data on the macrofungi of Hatay, and the number of species reported in earlier studies is 113. The number of reported macrofungal taxa is too low; this study has added a further 46 species to the local Mycota. Thus, the number of total species recorded in Hatay so far is 159. Furthermore, *Panaeolus reticulatus*,

Tricholoma chrysophyllum are new records for Turkey. This study significantly contributes to the knowledge of the Turkish Mycota.

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