

Full Length Research Paper

Macrofungal diversity of Nemrut Mount National Park and its environs (Adiyaman–Turkey)

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This study is based on the macrofungi collected from Nemrut Mount National Park and its environs. As a result of field and laboratory studies, 101 taxa belonging to 30 families and 66 genera in *Ascomycetes* and *Basidiomycetes* classes were identified.

Key words: Biodiversity, macrofungi, mushrooms, Adiyaman, Turkey.

INTRODUCTION

Nemrut Mount National Park takes place in Southeastern Anatolian region of Turkey within the boundaries of Adiyaman province in C7 square according to Davis' grid square system (Davis, 1965). The mount (2150 m) and its environs with a surface area of 13.850 hectare were declared a national park in 1989. Nemrut mount is mostly known as the 8th wonder of the world and added to the world culture heritage list by UNESCO in 1987 due to the gorgeous statues of which heights are up to 10 m and the tumulus (formed from fist size stones) on the summit of it measuring 50 m high and 150 m in diameter.

By the end of 2008, about 1814 taxa of macromycetes occurring in Turkey had been reported by foreign and Turkish researchers with 416 published studies (Sesli and Denchev, 2008) some of which were presented as regional (Sesli, 2007) or as general (Solak et al., 2007) checklists. But no records have been given from Nemrut Mount National Park and its surroundings (Figure 1) so far. To determine the macrofungal diversity of the area and to make a contribution to the macromycota of Turkey, this study was carried out.

The area has a Mediterranean climate according to Emberger's formula (Akman, 1999) and falls mainly in Irano-Turanian phytogeographical sectors within the holoarctic floral kingdom. Forest areas are characterised mainly by *Quercus* L. Among them some members of maquis such as *Pistacia* L., *Rhus* L. and *Paliurus* Mill and planted *Pinus brutia* ten. populations also exist. Along the stream sides and watery areas *Salix* L., *Populus* L., *Platanus* L., *Nerium* L., *Tamarix* L. form the main clumps of trees.

MATERIALS AND METHODS

The material of this study was collected from 26 localities (Table 1) within the boundaries of Nemrut Mount National Park and its environs during periodical field inventories between 2001 - 2009. Macroscopic characteristics and ecologic parameters of the specimens were recorded and color photographs were taken at field. Microscopic measurements were made from the slides prepared with 3% KOH. Specimens were identified using (Phillips, 1981; Moser, 1983; Breitenbach and Kränzlin, 1984 - 2005; Candusso and Lanzoni, 1990; Buczacki, 1992; Jordan, 1995; Bessette et al., 1997).

The samples are kept in Adiyaman University Education Faculty Adiyaman, Turkey.

RESULTS

As a result of this study, 101 taxa were identified. The systematics of the taxa is in accordance with Cannon and Kirk (2007), Kirk et al. (2008) and Index fungorum (www.speciesfungorum.org) and they are listed in alphabetical order.

For each taxon, habitat, locality, collection date, and accession numbers (K: Kaya) are given.

Ascomycetes

Pezizales

Helvellaceae

Helvella lacunosa Afzel.: Under *Populus* sp., locality 14, 30.04.2003, K. 2149.

Helvella leucomelaena (Pers.) Nannf.: In *Pinus brutia* forest, locality 13, 14.03.2009, K. 6061.

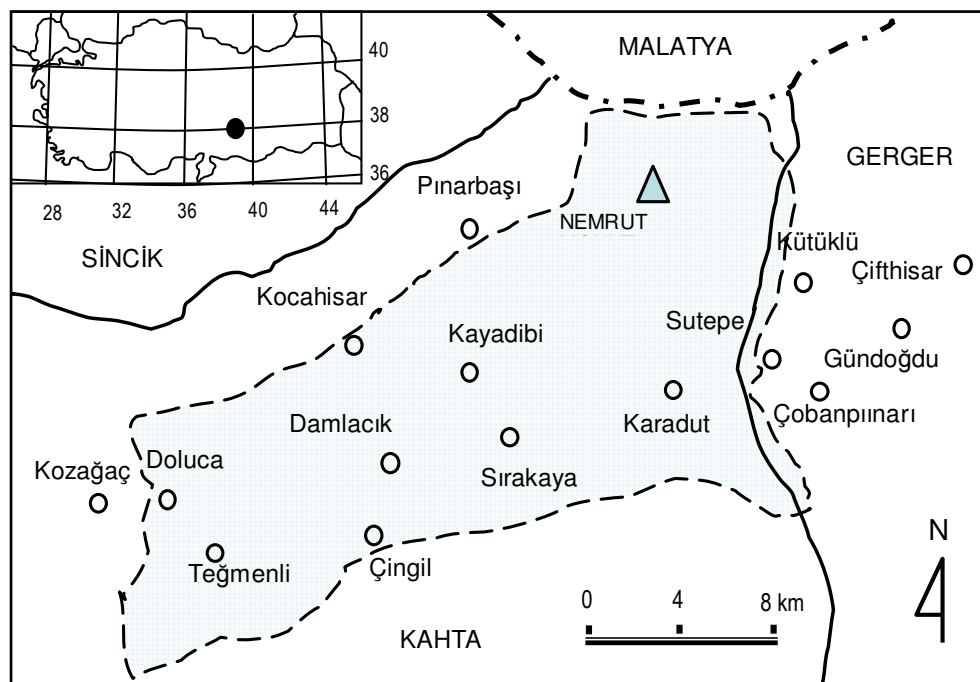


Figure 1. Macrofungi collection sites.

Table 1. Macrofungi collection localities.

No	Localities	Coordinates	Altitudes (m)
1	Gerger, Çavgür	37°57' N – 38°52' E	672
2	Gerger, Çifthisar	37°58' N – 38°54' E	577
3	Gerger, Dağdeviren	38°00' N – 38°58' E	643
4	Gerger, Gündoğdu	37°58' N – 38°53' E	599
5	Gerger, Gürgenli	37°58' N – 38°49' E	1152
6	Gerger, Kütüklü	37°57' N – 38°48' E	1085
7	Gerger, Sever	37°55' N – 38°48' E	872
8	Gerger, Sutepe	37°56' N – 38°49' E	879
9	Gerger, Sutepe	37°56' N – 38°48' E	1108
10	Kahta, above Karadut	37°56' N – 38°46' E	1209
11	Kahta, Around Nemrut road	37°57' N – 38°44' E	1581
12	Kahta, Burmapınar	37°56' N – 38°36' E	612
13	Kahta, Çingil	37°53' N – 38°38' E	909
14	Kahta, Damlacık	37°54' N – 38°39' E	764
15	Kahta, Doluca	37°35' N – 38°35' E	748
16	Kahta, Karadut	37°55' N – 38°46' E	1095
17	Kahta, Kayadibi	37°56' N – 38°42' E	1374
18	Kahta, Kocahisar	37°56' N – 38°38' E	603
19	Kahta, Kocahisar, Arsemia	37°56' N – 38°39' E	665
20	Kahta, Kocahisar, Değirmenbaşı	37°57' N – 38°39' E	703
21	Kahta, Kozağaç	37°53' N – 38°32' E	822
22	Kahta, Pınarbaşı	37°59' N – 38°41' E	940
23	Kahta, Sırakaya	37°55' N – 38°41' E	1230
24	Kahta, Teğmenli	37°54' N – 38°36' E	574
25	Kahta, Teğmenli, Keklik	37°52' N – 38°35' E	735
26	Kahta, Yassıkaya	37°55' N – 38°36' E	597

Helvella leucopus Pers.: Under *Populus* sp., locality 14, 18.04.2006, K. 3586.

Helvella queletii Bres.: Under *Populus* sp. on floodplain, locality 19, 30.04.2004, K. 2154.

Morchellaceae

Mitrophora semilibera (DC.) Lév.: Among leaf litter under *Populus* sp., locality 16, 12.04.2008, K. 5223.

Morchella rigida (Krombh.) Boud.: Under *Populus* sp., locality 14, 18.04.2006, K. 3590.

Verpa conica (O.F. Müll.) Sw.: Among grass on floodplain, locality 18, 18.04.2006, K. 3603.

Pezizaceae

Peziza granulosa Schumach.: On woody debris, locality 16, 12.04.2008, K. 5226.

Peziza violacea Pers.: On sandy ground among grass, locality 20, 12.03.2009, K. 6052.

Pyronemataceae

Geopora arenicola (Lév.) Kers: Among grass on sandy soil, locality 22, 12.03.2009, K.6047; locality 14, 14.03.2009, K. 6065.

Basidiomycetes

Agaricales

Agaricaceae

Agaricus campestris L.: Among grass in *Quercus* sp. forest clearing, locality 8, 29.11.2008, K. 5591.

Bovista plumbea Pers.: In grass, locality 15, 12.03.2009, K. 6028.

Coprinus comatus (O.F. Müll.) Pers.: Among grass on floodplain, locality 18, 18.04.2006, K. 3591; locality 14, 12.11.2008, K. 5423.

Cyathus olla (Batsch) Pers.: On woody debris, locality 4, 16.11.2008, K. 5470.

Cystodermella granulosa (Batsch) Harmaja: Among leaf litter in *Quercus* sp. forest, locality 10, 21.11.2005, K. 3202.

Lepiota erminea (Fr.) Gillet: Among grass, locality 2, 16.11.2008, K. 5458.

Leucoagaricus leucothites (Vittad.) M.M. Moser ex Bon: Among grass in garden, locality 9, 08.11.2008, K. 5383.

Lycoperdon molle Pers.: Among grass in *Quercus* sp. forest, locality 10, 21.11.2005, K. 3201; locality 8, 29.11.2008, K. 5580.

Macrolepiota excoriata (Schaeff.) M.M. Moser: Among grass in *Quercus* sp. forest, locality 10, 21.11.2005, K. 3203.

Amanitaceae

Amanita vaginata var *alba* Gillet: Among grass in *Quercus* sp. forest, locality 3, 08.11.2008, K. 5410.

Bolbitiaceae

Conocybe albipes Hauskn.: On manured soil, locality 17, 30.04.2003, K. 2152; locality 12, 12.03.2009, K. 6033; locality 22, 12.03.2009, K. 6048.

Conocybe aporos Kits van Wav.: On damp soil among leaf litter, locality 1, 07.03.2009, K. 5936.

Conocybe arrhenii (Fr.) Kits van Wav.: On nutrient rich soil in woody debris, locality 24, 23.11.2007, K. 4971.

Conocybe macrocephala Kühner ex Singer: In grass, locality 21, 12.03.2009, K. 6027.

Conocybe moseri Watling: In grass on floodplain, locality 24, 19.04.2003, K. 2021.

Conocybe rickeniana P.D. Orton: In grass on floodplain, locality 18, 23.11.2007, K. 4974.

Galeropsis lateritia (Watling)G. Moreno, Heykoop & Illana: In grass on floodplain, locality 18, 23.11.2007, K. 4947.

Panaeolus papilionaceus var. *papilionaceus* (Bull.) Quél.: Among grass on floodplain, locality 18, 18.04.2006, K. 3600.

Entolomataceae

Entoloma sericeoides (J.E. Lange) Noordel.: Among leaf litter in garden, locality 1, K. 6098.

Hydnangiaceae

Laccaria amethystina Cooke: On loamy soil in garden, locality 6, 08.11.2008, K. 5393.

Inocybaceae

Crepidotus variabilis (Pers.) P. Kumm.: On *Populus* sp. twigs, 18.04.2006, locality 14, K. 3589.

Inocybe bongardii var. *pisciadora* (Donadini & Rioussset) Kuyper: In *Pinus brutia* forest, locality 13, 14.03.2009, K. 6059.

Inocybe calida Velen.: In grass on floodplain, locality 18, 23.11.2007, K. 4956.

Inocybe dulcamara (Alb. & Schwein.) P. Kumm.: Among leaf litter under *Salix* sp., locality 18, 23.11.2007, K. 4967.

Inocybe perbrevis (Weinm.) Gillet: On sandy soil on flood plain, locality 18, 23.11.2007, K. 4972.

Inocybe rimosa (Bull.) P. Kumm.: Under *Populus* sp., locality 14, 12.11.2008, K. 5422.

Phaeomarasmium erinaceus (Pers.) Scherff. ex Romagn.: On *Quercus* sp. stump, locality 8, 29.11.2008, K. 5572.

Tubaria conspersa (Pers.) Fayod: On soil in woody debris, locality 16, 12.04.2008, K. 5227.

Marasmiaceae

Gymnopus dryophilus (Bull.) Murrill: On needle litter in *Pinus brutia* forest, locality 13, 12.11.2008, K. 5420; In leaf litter under *Quercus* sp., locality 7, 23.11.2008, K. 5522.

Macrocystidia cucumis (Pers.) Joss.: Among leaf litter, locality 4, 15.12.2007, K. 5078.

Marasmius anomalus Peck: In grass, locality 2, 15.12.2007, K. 5080.

Mycenaceae

Mycena galopus (Pers.) P. Kumm., var *galopus*: On remains of wood, locality 2, 16.11.2008, K. 5450.

Physalacriaceae

Armillaria mellea (Vahl) P. Kumm.: On *Populus* sp. stump, locality 6, 08.11.2008, K. 5386.

Xerula radicata (Relhan) Dörfelt: On decaying wood, locality 2, 16.11.2008, K. 5464.

Pleurotaceae

Pleurotus eryngii (DC.) Gillet: On remains of *Ferula* sp., locality 11, 30.04.2003, K. 2151; locality 12, 12.03.2009,

K. 6032.

Pleurotus ostreatus (Jacq.) P. Kumm.: On *Populus* sp. stump, Locality 9, 08.11.2008, K. 5382.

Pluteaceae

Pluteus romellii (Britzelm.) Lapl.: Around *Quercus* sp. stump, locality 15, 18.04.2006, K. 3604.

Pluteus salicinus (Pers.) P. Kumm.: On woody debris, locality 18, 23.11.2007, K. 4968.

Volvariella gloiocephala (DC.) Boekhout & Enderle: In grass on floodplain, locality 18, 23.11.2007, K. 4965.

Psathyrellaceae

Coprinellus disseminatus (Pers.) J.E. Lange: On buried wood, locality 16, 21.11.2005, K. 3199; locality 6, 08.11.2008, K. 5389; locality 23, 12.11.2008, K. 5429.

Coprinellus micaceus (Bull.) Vilgalys, Hopple & Jacq. Johnson: Around *Salix* sp. stump, locality 16, 21.11.2005, K. 3197; locality 7, 08.11.2008, K. 5380.

Coprinellus xanthothrix (Romagn.) Vilgalys, Hopple & Jacq. Johnson: On nutrient rich soil in garden, locality 6, 08.11.2008, K. 5398.

Coprinopsis atramentaria (Bull.) Redhead, Vilgalys & Moncalvo: Among grass on floodplain, locality 18, 18.04.2006, K. 3592; on nutrient rich soil in garden, locality 6, 08.11.2008, K. 5390.

Coprinopsis cinerea (Schaeff.) Redhead, Vilgalys & Moncalvo: On strawed dung, locality 24, 10.03.2002, K. 1513.

Coprinopsis nivea (Pers.) Redhead, Vilgalys & Moncalvo: On dung, locality 23, 30.04.2003, K. 2150.

Parasola auricoma (Pat.) Redhead, Vilgalys & Hopple: In grass on floodplain, locality 18, 18.04.2006, K. 3598.

Parasola kuehneri (Uljé & Bas) Redhead, Vilgalys & Hopple: In grass on floodplain, locality 18, 12.03.2009, K. 6044.

Parasola plicatilis (Curtis) Redhead, Vilgalys & Hopple: In grass on floodplain, locality 18, 23.11.2007, K. 4959.

Psathyrella ammophila (Durieu & Lév.) P.D. Orton: On sandy ground on floodplain, 24, 19.04.2003, K. 2022.

Psathyrella bipellis (Qué.) A.H. Sm.: In grass, locality 4, 07.03.2009, K. 5939.

Psathyrella candolleana (Fr.) Maire: Around *Salix* sp. stump, locality 18, 23.11.2007, K. 4961.

Psathyrella conopilus (Fr.) A. Pearson & Dennis: In grass on floodplain, locality 18, 23.11.2007, K. 4963.

Psathyrella marcescibilis (Britzelm.) Singer: In grass on floodplain, locality 18, 23.11.2007, K. 4957.

Psathyrella prona f. *cana* Kits van Wav.: On soil among grass, locality 18, 18.04.2006, K. 3593.

Psathyrella prona f. *picta* (Romagn.) Kits van Wav.: In grass on floodplain, locality 18, 23.11.2007, K. 4950.

Psathyrella vinosofulva P.D. Orton: In grass on floodplain, locality 18, 23.11.2007, K. 4958.

Schizophyllaceae

Schizophyllum commune Fr.: On *Morus* sp. stump, 4, 23.11.2008, K. 5512.

Strophariaceae

Agrocybe aegerita (V. Brig.) Singer: On *Populus* sp.

stump, locality 16, 21.15.2005, K. 3200; locality 7, 02.12.2007, K. 5076.

Agrocybe pediades (Fr.) Fayod: In grass, locality 26, 19.04.2003, K. 2017.

Agrocybe splendida Cléménçon: In grass on floodplain, locality 18, 18.04.2006, K. 3596.

Galerina cinctula P.D. Orton: Among grass in *Pinus brutia* forest clearing, locality 13, 12.11.2008, K. 5417.

Hebeloma pallidoluctuosum Gröger & Zschiesch.: In grass under *Salix* sp., locality 18, 23.11.2007, K. 4953.

Pholiota aurivella (Batsch) P. Kumm.: On *Salix* sp. stump, locality 16, 08.11.2008, K. 5375.

Pholiota gummosa (Lasch) Singer: On decaying *Populus* sp. stump, locality 6, 08.11.2008, K. 5387.

Psilocybe coprophila (Bull.) P. Kumm.: On decaying dung, locality 1, 07.03.2009, K. 5935.

Psilocybe montana var. *macrospora* Noordel. & Verduin: Among grass in *Quercus* sp. forest, locality 8, 29.11.2008, K. 5590.

Stropharia ambigua (Peck) Zeller: Among leaf litter in *Quercus* sp. forest, locality 8, 29.11.2008, K. 5567.

Stropharia caerulea Kreisel: Among grass in *Quercus* sp. forest, locality 8, 29.11.2008, K. 5601.

Stropharia coronilla (Bull.) Qué.: In grass, locality 25, 19.04.2003, K. 2009.

Tricholomataceae

Arrhenia spathulata (Fr.) Redhead: On moss, locality 8, 29.11.2008, K. 5596.

Lepista nuda (Bull.) Cooke: Among leaf litter on floodplain, locality 18, 12.03.2009, K. 6040; Among needle litter in *Pinus brutia* forest, locality 13, 14.03.2009, K. 6062.

Melanoleuca excissa (Fr.) Singer: In grass, locality 18, 23.11.2007, K. 4943.

Omphalina rivulicola (J. Favre) Lamoure: Among moss on floodplain, locality 18, 19.04.2003, K. 2016.

Omphalina velutipes P.D. Orton: On sandy ground on flood plain, locality 18, 18.04.2006, K. 3602.

Pseudoclitocybe cyathiformis (Bull.) Singer: Among grass in *Quercus* sp. forest, locality 5, 03.12.2008, K. 5687.

Boletales

Boletaceae

Boletus queletii Schulzer: Among grass in *Quercus* sp. forest, locality 5, 08.11.2008, K. 5401.

Diplocystidiaceae

Astraeus hygrometricus (Pers.) Morgan: Among leaf litter in *Quercus* sp. forest, locality 8, 29.11.2008, K. 5575.

Paxillaceae

Omphalotus illudens (Schwein.) Bresinsky & Besl: On *Quercus* sp. stump, locality 8, 29.11.2008, K. 5589.

Paxillus involutus (Batsch) Fr.: In grass, under *Populus* sp., locality 14, 12.11.2008, K. 5427.

Rhizopogonaceae

Rhizopogon luteolus Fr.: In *Pinus brutia* forest, locality 13, 12.11.2008, K. 5415.

Table 2. Similarity percentages of neighboring studies with Nemrut Mount National Park and its environs.

Study	Number of identical taxa	Total taxa	Similarity percentage (%)
Işiloğlu and Öder (1995)	24	54	44.44
Işiloğlu (1997)	26	44	59.09
Kaya et al. (2004)	37	56	66.07
Kaya (2005)	41	76	53.95
Kaya et al. (2009)	53	110	48.18

Suillaceae

Suillus luteus (L.) Roussel: *Pinus brutia* forest, locality 13, 12.11.2008, K. 5416.

Cantharellales**Clavulinaceae**

Clavulina coraloides (L.) J. Schröt.: Among leaf litter on floodplain, locality 4, 02.12.2007, K. 5077.

Hymenochaetales**Hymenochaetaceae**

Inonotus hispidus (Bull.) P. Karst.: On *Juglans* sp. trunk, locality 14, 19.10.2008, K. 5277.

Phellinus pomaceus (Pers.) Maire: On *Prunus* sp. stump, locality 16, 12.04.2008, K. 5225.

Polyporales**Meruliaceae**

Bjerkandera adusta (Willd.) P. Karst.: On *Populus* sp. stump, locality 14, 12.11.2008, K. 5424; locality 1, 07.03.2009, K. 5933.

Polyporaceae

Fomes fomentarius (L.) J.J. Kickx: On *Populus* sp. stump, locality 14, 19.10.2008, K. 5275; locality 9, 08.11.2008, K. 5381.

Funalia trogii (Berk.) Bondartsev & Singer: On *Populus* sp. stump, locality 16, 21.11.2005, K. 3198.

Lentinus tigrinus (Bull.) Fr.: Around *Salix* sp. stump, locality 14, 19.10.2008, K. 5274.

Trametes versicolor (L.) Lloyd: On *Populus* sp. stump, locality 16, 12.04.2008, K. 5224.

Russulales**Russulaceae**

Russula subterfurcata Romagn.: Among grass in *Quercus* sp. forest clearing, locality 3, 08.11.2008, K. 5408.

Stereaceae

Stereum hirsutum (Willd.) Pers.: On *Salix* sp. stump, locality 6, 08.11.2008, K. 5392.

DISCUSSION

In this study, 101 macrofungi taxa belonging to 30 families and 66 genera were identified. The taxa included 10 *Ascomycota* (4 *Helvellaceae*, 3 *Morchellaceae*, 2 *Pezizaceae* and 1 *Pyronemataceae*) and 91 *Basidiomycota* (17 *Psathyrellaceae*, 12 *Strophariaceae*, 9 *Agaricaceae*, 8 *Bolbitiaceae*, 8 *Inocybaceae*, 6 *Tricholomataceae*, 4 *Polyporaceae*, 3 *Marasmiaceae*, 3 *Plutea-*

ceae, 2 *Hymenochaetaceae*, 2 *Paxillaceae*, 2 *Physalacriaceae*, 2 *Pleurotaceae*, 1 *Amanitaceae*, 1 *Boletaceae*, 1 *Clavulinaceae*, 1 *Diplocystidiaceae*, 1 *Entolomataceae*, 1 *Hydnangiaceae*, 1 *Meruliaceae*, 1 *Mycenaceae*, 1 *Rhizopogonaceae*, 1 *Russulaceae*, 1 *Schizophyllaceae*, 1 *Stereaceae* and 1 *Suillaceae*). 50 of the total taxa are included in 15 genera (8 *Psathyrella*, 6 *Conocybe*, 5 *Inocybe*, 4 *Helvella*, 3 *Agrocybe*, 3 *Coprinellus*, 3 *Coprinopsis*, 3 *Parasola*, 3 *Stropharia*, 2 *Omphalina*, 2 *Peziza*, 2 *Pholiota*, 2 *Pleurotus*, 2 *Pluteus* and 2 *Psilocybe*) and the rest of them are included in the other 51 genera each with only one taxon.

Agaricus campestris, *Coprinus comatus*, *Armillaria mellea*, *Pleurotus ostreatus* and *Agrocybe aegerita* are known as edible mushrooms by local residents. Among them the most popular one is *Coprinus comatus* and collected and consumed during both spring and autumn. The rest of the taxa are not known by locals. No poisoning incidents were recorded from the area depending on consumption of macrofungi.

When compared, the results of this work show similarities with the findings of the studies carried out in neighboring regions. Number of identical taxa and similarity percentages of neighboring studies are given in Table 2. These similarities could be because of the similarities between the habitats and flora.

This is the first study for the research area and with this study macrofungal composition of the Nemrut Mount National Park and its environs has been determined and some contributions made to the knowledge of Turkish mycoflora.

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