

Macrofungi of Bekilli (Denizli) District

Sacit KÖSE¹, Kudret GEZER¹, İsa GÖKLER², Aziz TÜRKOĞLU^{1,*}

¹Pamukkale University, Education Faculty, Science Education Department, İncilipınar, Denizli - TURKEY

²Dokuz Eylül University, Education Faculty, Biology Education Department, İzmir - TURKEY

Received: 03.08.2005

Accepted: 10.04.2006

Abstract: The material of this study comprises macrofungi specimens collected from different localities in Bekilli (Denizli) in 1998 and 1999. As a result of field and laboratory studies, 61 taxa belonging to 2 classes (*Ascomycetes* and *Basidiomycetes*) and 28 families are reported.

Key Words: Macrofungi, Taxonomy, Denizli, Turkey

Bekilli (Denizli) İlçesinin Makrofungusları

Özet: Bu çalışmanın materyalini 1998-1999 yılları arasında Bekilli ilçesi (Denizli) ne ait farklı lokalitelerden toplanan makrofunguslar oluşturmaktadır. Arazi ve laboratuvar çalışmaları sonucu 2 sınıf (*Ascomycetes* ve *Basidiomycetes*) ve 28 familyaya ait 61 tür rapor edilmiştir.

Anahtar Sözcükler: Makrofunguslar, Taksonomi, Denizli, Türkiye

Introduction

Many taxonomic studies of the macrofungal flora of Turkey have been carried out and many others remain in progress. The studies carried out on macrofungi species between 1932 and 2004 have been reviewed, and as a result it was determined that there are approximately 1600 documented macrofungi species in Turkey (Sesli & Denchev, 2005). This research was extracted from Sacit Köse's MSc thesis, part of which (some wood decaying mushrooms and some edible mushrooms) was presented at the 1st International Symposium on Protection of the Natural Environment and Ehrami Karaçam (Gezer & Köse, 1999; Köse & Gezer, 1999). The aim of our study was to document the macrofungi species in the research area and thus provide additional data on the macrofungal flora of Turkey.

Bekilli is a town in the province of Denizli and is surrounded by Çal to the south, Karahallı (Uşak) to the north, Ulubey (Uşak) to the west, and Çivril to the east (Figure 1). The collection area was located in the Aegean region, which has a Mediterranean climate, according to

Akman (1990). The dominant vegetation of the region reflects the climatic characteristics. The study area is home to a number of trees, such as mixed black pine, cedar, juniper, and oak; these trees are dominant forest plants, while poplar and willow trees grow near the Büyük Menderes stream. The study area's climate and vegetation are very favourable to macrofungi.

Materials and Methods

The field study was conducted primarily in spring and autumn, since during these periods the climatic conditions are most suitable for carpophore formation. Macrofungi samples were removed from the ground with great care so as to avoid damage to the base and other parts (stipe, hymenium, etc.). Samples were placed in separate wicker containers to avoid mixing. Colour, locality, and characteristics of habitat, etc. were noted and photographed during collection. In the laboratory, morphological features and spore properties of both dry and fresh macrofungi specimens were studied and then identified according to Phillips (1981), Moser (1983),

*E-mail: azizturkoglu@yahoo.com

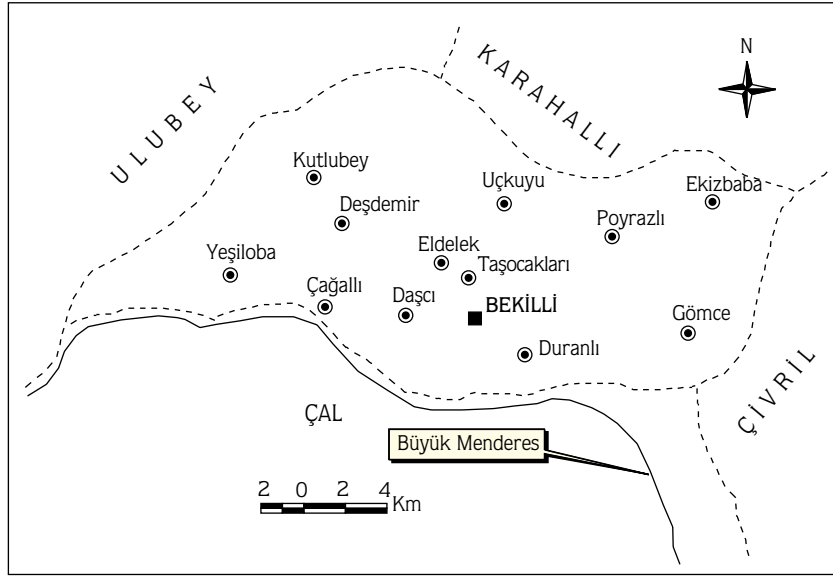


Figure 1. Collection areas

Breitenbach & Kränzlin (1984-1995), Bresinsky & Besl (1990), Ellis & Ellis (1990), Pacioni (1993), and Kirk et al. (2001). After the macrofungi samples were identified and dried, they were preserved in polythene bags containing 5 g of thymol crystals.

All materials were deposited at Pamukkale University, Education Faculty, Laboratory of Science Department, in Denizli.

Results

Macrofungi consisting of 61 taxa belonging to 28 families were identified. These taxa, their localities, distributions, collection dates, and fungarium numbers are given below.

ASCOMYCETES

Morchellaceae

1. *Morchella conica* Pers.

Karapınar, in pine forest, 13.04.1998, Köse 98,

Hocalı, 15.05.1999, Köse 393.

2. *Morchella elata* Fr.

Karapınar, in pine forest, 11.03.1999, Köse 270.

3. *Morchella esculenta* (L.) Pers.

Karapınar, in pine forest, 30.04.1998, Köse 116.

Helvellaceae

4. *Helvella leucopus* Pers.

Eldelek village, under poplar, 07.03.1998, Köse 71,

Eldelek village, in oak trees, 22.04.1998, Köse 99.

5. *Helvella lacunosa* Afzel.

Eldelek village, in meadows, 22.04.1998, Köse 100,

Kızılyer, in meadows, 18.09.1998, Köse 143.

6. *Helvella spadicea* Schaeff.

Çamlık, in pine forest, 13.04.1998, Köse 91.

7. *Helvella acetabulum* (L.) QuéL.

Çamlık, under pine, 24.04.1998, Köse 115.

8. *Paxina leucomelas* (Pers.) Kuntze

Tata, near lake, 04.04.1998, Köse 85.

Pezizaceae

9. *Sarcosphaera coronaria* (Jacq.) J.Schröt.

Çoğuşlı village, stream bank, 08.04.1999, Köse 310.

Humariaceae

10. *Sepultaria sumnariana* (Cooke) Mass.

Çamlık, in pine forest, 11.04.1999, Köse 334.

BASIDIOMYCETES**Corticaceae**

11. *Stereum hirsutum* (Willd.) Pers.
Çoğuşlı village, on oak trees, 17.03.1998, Köse 159.

Polyporaceae

12. *Fomes fomentarius* (L.) J.J.Kickx
Çoğuşlı village, near Büyük Menderes stream, on poplar trunk, 07.03.1998, Köse 68, Karapınar, on poplar trunk, 05.12.1998, Köse 221.

13. *Laetiporus sulphureus* (Bull.) Murrill
Dere, on poplar, 20.05.1998, Köse 128,
Çoğuşlı village, stream bank, on poplar, 30.11.1998,
Köse 215.

14. *Polyporus squamosus* (Huds.) Fr.
Çoğuşlı village, stream bank, on willow trees,
07.03.1998, Köse 65.

15. *Trametes gibbosa* (Pres.) Fr.
Karapınar, on poplar trunks, 15.04.1999, Köse 370.

16. *Trametes versicolor* (L.) Lloyd
Çoğuşlı village, the bank of Büyük Menderes stream,
on willow trunks, 07.03.1998, Köse 70.

Ganodermataceae

17. *Ganoderma applanatum* (Pers.) Pat.
Karapınar, on poplar, 05.12.1998, Köse 216,
Karapınar, on willow trees, 07.03.1999, Köse 263.

Schizophyllaceae

18. *Schizophyllum commune* Fr.
Çoğuşlı village, the bank of Büyük Menderes stream,
on willow trees, 12.02.1998, Köse 27.

Hymenochaetaceae

19. *Phellinus tuberosus* (Baumg.) Niemelä
Çoğuşlı village, stream bank, on *Prunus* sp.,
07.03.1998, Köse 66, Karapınar, on *Prunus* sp.,
08.06.1999, Köse 421.

Tulostomataceae

20. *Tulostoma brumale* Pers.
Çamlık, under pine, 19.11.1998, Köse 181.

Nidulariaceae

21. *Cyathus olla* (Batsch) Pers.
Tata Lake, on willow trunks, 01.05.1998, Köse,
Gezer, Türkoğlu 118.

Geastraceae

22. *Geastrum triplex* Jungh.
Zıntı, in grass, 02.01.1998, Köse 19,
Hocalı, in grass, 29.11.1998, Köse 214,
Çamköy, forest, 07.02.1999, Köse 245.
23. *Geastrum sessile* (Sowerby) Pouzar
Hocalı, in mixed forest of pine and oak, 18.10.1998,
Köse 160.

Ramariaceae

24. *Ramaria stricta* (Pers.) Quél.
Karapınar, in pine forest, 05.12.1998, Köse 227,
Tata Lake, under pine, 11.04.1999, Köse 348.

Lycoperdaceae

25. *Lycoperdon perlatum* Pers.
Zıntı, in pine forest, 23.05.1998, Köse 133.
26. *Lycoperdon molle* Pers.
Hocalı district, in grass, 2.11.1998, Köse 213.

Rhizopogonaceae

27. *Rhizopogon luteolus* Fr.
Çamköy, in pine forest, 06.09.1998, Köse 140,
Tata Lake, in pine forest, 10.02.1998, Köse 22.
28. *Rhizopogon roseolus* (Corda) Th.Fr.
Eldelek village, in pine forest, 15.05.1998, Köse 122,
Zıntı, in pine forest, 23.05.1998, Köse 132.

Suillaceae

29. *Suillus bellinii* (Inzenga) Watling
Hocalı, in pine forest, 29.11.1998, Köse 208,
Karapınar, in pine forest, 05.12.1998, Köse 220.
30. *Suillus granulatus* (L.) Snell
Eldelek village, in pine forest, 19.05.1999, Köse 391.

Boletaceae

31. *Boletus erythropus* Pers.
Tata Lake, in grass, 01.05.1998, Köse, Gezer,
Türkoğlu 117.

Hocalı district, in pine forest, 20.05.1998, Köse 126.

32. *Boletus impolitus* Fr.

Hocalı district, in grass, 15.05.1999, Köse 381.

33. *Boletus radicans* Pers.

Hocalı district, in grass, 20.05.1998, Köse 124.

Gomphidiaceae

34. *Chroogomphus rutilus* (Schaeff.) O.K.Mill.

Zıntı district, in pine forest, 02.01.1998, Köse 182,

Karapınar, in pine forest, 05.12.1998, Köse 217.

Pleurotaceae

35. *Lentinus tigrinus* (Bull.) Fr.

Çoğuşlı village, stream bank, on willow trees, 18.04.1998, Köse 105.

36. *Pleurotus eryngii* (DC.) Gillet

Duranlı, on *Eryngium* sp., 15.10.1998, Köse 156,

Asar district, on *Ferula* sp., 15.10.1998, Köse 179.

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

Çoğuşlı village, near stream, on poplar, 07.03.1998, Köse 80,

Karapınar district, on poplar, 05.12.1998, Köse 224.

Tricholomataceae

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

Hocalı district, under oak trees, 29.11.1998, Köse 211.

39. *Laccaria laccata* (Scop.) Fr.

Dere district, under oak trees, 20.05.1998, Köse 129.

40. *Lepista nuda* (Bull.) Cooke

Hocalı district, in pine forest, 29.11.1998, Köse 195.

41. *Mycena strobilicola* J.Favre & Kühner

Karapınar, in pine forest, 05.12.1998, Köse 222.

42. *Oudemansiella radicata* (Relhan) Singer

Çoğuşlı village, near stream, on willow trees, 25.06.1998, Köse 137,

Hocalı district, on oak trees, 29.11.1998, Köse 207.

43. *Tricholoma terreum* (Schaeff.) Qu_I.

Zıntı district, 18.10.1998, Köse 161,

Hocalı district, 15.02.1999, Köse 253.

Pluteaceae

44. *Pluteus salicinus* (Pers.) P.Kumm.

Tata Lake, 01.05.1998, on poplar, Köse, Gezer, Türkoğlu 121.

45. *Volvariella bombycina* (Schaeff.) Singer

Karapınar, on poplar, 25.09.1998, Köse 144.

Lepiotaceae

46. *Macrolepiota procera* (Scop.) Singer

Hocalı district, near the road, 29.10.1998, Köse 171.

Agaricaceae

47. *Agaricus bitorquis* (J.E.Lange) Pilát.

Dere district, in grass, 07.03.1999, Köse 267.

48. *Agaricus bisporus* (Lge.) Sing.

Çoğuşlı village, the bank of stream, 17.10.1998, Köse 157,

Çamlık, 19.11.1998, Köse 185.

49. *Agaricus campestris* L.

Hocalı district, in grass, 29.11.1998, Köse 205.

Coprinaceae

50. *Coprinus atramentarius* (Bull.) Fr.

Dere district, in grass, 20.05.1998, Köse 125.

51. *Coprinus comatus* (O.F.Müll.) Gray

Karapınar, the bank of Büyük Menderes stream, 11.10.1998, Köse 145,

Dere district, 20.01.1998, Köse 123.

52. *Coprinus disseminatus* (Pers.) Gray

Dere district, under poplar, 20.05.1998, Köse 131.

53. *Coprinus micaceus* (Bull.) Fr.

Çoğuşlı village, the bank of Büyük Menderes stream, 15.10.1998, Köse 152.

54. *Panaeolus semiovatus* (Sowerby) S.Lundell & Nannf.

Dere district, in grass, 01.06.1998, Köse 136.

Bolbitiaceae

55. *Agrocybe cylindracea* (DC.) Gillet

Çoğuşlı village, on poplar, 27.10.1998, Köse 169,

Dere district, on willow, 08.04.1999, Köse 313.

Strophariaceae56. *Hypholoma fasciculare* (Huds.) Quél.

Dere district, on poplar, 27.10.1998, Köse 170.

Cortinariaceae57. *Inocybe rimosa* (Bull.) P.Kumm.

Eldelek village, in pine forest, 01.01.1998, Köse, Türkoğlu 13,

Hocalı district, in pine forest, 29.11.1998, Köse 212.

58. *Inocybe geophylla* (Pers.) P.Kumm.

Dere district, in pine forest, 20.05.1998, Köse 130,

Hocalı district, in pine forest, 29.11.1998, Köse 206.

Russulaceae59. *Russula delica* Fr.

Kızılyer, in pine forest, 01.05.1998, Köse, Gezer, Türkoğlu 119,

Eldelek village, in pine forest, 23.05.1998, Köse 134,

Daşçı district, in pine forest, 23.05.1998, Köse 135.

60. *Lactarius deliciosus* (L.) Gray

Hocalı district, in pine forest, 20.10.1998, Köse 168.

61. *Lactarius deterrimus* Gröger

Çamlık, in pine forest, 30.10.1998, Köse 172.

Discussion and Conclusion

In this study, 61 macrofungi taxa belonging to 28 families collected in Bekilli were reported. Ten of these belong to *Ascomycetes* and 51 to *Basidiomycetes*. The distribution of the 61 species into families is as follows: *Tricholomataceae* 6, *Polyporaceae* 5, *Helvellaceae* 5, *Coprinaceae* 5, *Morchellaceae* 3, *Pleurotaceae* 3, *Boletaceae* 3, *Agaricaceae* 3, *Russulaceae* 3, *Suillaceae* 2, *Cortinariaceae* 2, *Geastraceae* 2, *Lycoperdaceae* 2, *Rhizopogonaceae* 2, *Pluteaceae* 2, *Bolbitiaceae* 1, *Strophariaceae* 1, *Gomphidiaceae* 1, *Schizophyllaceae* 1, *Hymenochaetaceae* 1, *Lepiotaceae* 1, *Corticaceae* 1, *Pezizaceae* 1, *Humariaceae* 1, *Ganodermataceae* 1, *Tulostomataceae* 1, *Nidulariaceae* 1, and *Ramariaceae* 1.

In comparison with earlier studies carried out near our research area, there were some similarities in terms on the species growing in the region (Işiloğlu & Öder, 1995; Afyon, 1996; Solak et al., 1999; Gezer, 2000) (Table 1). This may have been because of similarities in vegetation, climate, and plant flora.

Table 1. Distribution species according to families.

Families	Afyon 1996	Işiloğlu & Öder 1995	Solak et al. 1999	Gezer 2000	Bekilli
<i>Morchellaceae</i>	3	3	6	3	3
<i>Helvellaceae</i>	2	3	5	1	5
<i>Pezizaceae</i>		1	1	2	1
<i>Humariaceae</i>					1
<i>Hymenochaetaceae</i>			3	4	1
<i>Tulostomataceae</i>			1		1
<i>Nidulariaceae</i>			1		1
<i>Corticaceae</i>			2		1
<i>Schizophyllaceae</i>	1	1		1	1
<i>Polyporaceae</i>	7	5	5	3	5
<i>Ganodermataceae</i>		1		1	1
<i>Geastraceae</i>			2	1	2
<i>Ramariaceae</i>		5			1
<i>Lycoperdaceae</i>	2	3	6	4	2
<i>Rhizopogonaceae</i>		2	2	2	2
<i>Suillaceae</i>					2
<i>Boletaceae</i>	4	11	2	3	3
<i>Gomphidiaceae</i>		1	1	1	1
<i>Pleurotaceae</i>		3	1	1	3
<i>Tricholomataceae</i>	2	24	35	21	6
<i>Pluteaceae</i>		1	1	1	2
<i>Lepiotaceae</i>		7	3	2	1
<i>Agaricaceae</i>	4	4	1	2	3
<i>Coprinaceae</i>	3	9	1	6	5
<i>Bolbitiaceae</i>	1	3	2	1	1
<i>Strophariaceae</i>	2	7	5	4	1
<i>Cortinariaceae</i>	1	7	2	2	2
<i>Russulaceae</i>	6	16	5	7	3
Total	38	117	93	73	61

Forty of these 61 macrofungi species found in the area are edible, but only 15 of them are known and eaten by the local population. *Morchella elata*, *M. esculenta*, *M. conica*, *Rhizopogon roseolus*, *R. luteus*, *Lactarius deliciosus*, *L. deterrimus*, *Pleurotus ostreatus*, *P. eryngii*, *Agaricus bitorquis*, *A. bisporus*, *A. campestris*, *Helvella leucopus*, *H. lacunosa*, and *Russula delica* are commonly eaten. We documented 3 poisonous species: *Hypholoma*

fasciculare, *Inocybe fastigiata*, and *I. geophylla*. There have been no reports of deaths from mushroom poisoning in this area because local people collect only well-known edible mushrooms.

With this study of the macrofungi flora of Bekilli, we have added macrofungi species to the Turkish Macrofungi Flora.

References

- Afyon A (1996). Isparta Yöresinde Belirlenen Bazı Makroskobik Mantarlar. *Turk J Bot* 20: 161-164.
- Akman Y (1990). *İklim ve Biyoiklim*, Ankara: Palme Yayıncılık.
- Breitenbach J & Kränzlin F (1984-1995). *Fungi of Switzerland*, (Volume 1-4). Luzerne: Verlag mykologia.
- Brensinsky A & Besl HA (1990). *Colour Atlas of Poisonous Fungi*. London: Wolfe Publishing.
- Ellis B & Ellis JP (1990). *Fungi without Gills (Hymenomyces and Gastromyces)*, London: Chapman and Hill.
- Gezer K & Köse S (1999). Bekilli (Denizli) Yöresindeki Bazı Odun Tahripçisi Makrofungus Türleri Üzerinde Taksonomik Araştırmalar. *1st International Symposium on Protection of Natural Environment and Ehrami Karaçam*, 23-25th September 1999, Kütahya, 200-208
- Gezer K (2000). Contributions to the Macrofungi Flora of Antalya Province. *Turk J Bot* 24: 293-296.
- Işiloğlu M & Öder N (1995). Contributions to the Macrofungi of Mediterranean Turkey. *Turk J Bot* 19: 603-609.
- Kirk PM, Cannon PF, David JC & Stalfers JA (2001). *Ainsworth & Bisby's Dictionary of the Fungi*, London: CABI Publishing.
- Köse S & Gezer K (1999). Bekilli (Denizli) Yöresindeki Bazı Yenen Makrofungus Türleri Üzerinde Taksonomik Araştırmalar. *1st International Symposium on Protection of Natural Environment and Ehrami Karaçam*, 23-25th September 1999, Kütahya, 192-199.
- Moser M (1983). *Keys to Agarics and Boleti*, Stuttgart: Gustav Fischer Verlag.
- Pacioni G (1993). *Mushrooms and Toadstools*, London: MacDonald Ltd.
- Phillips R (1981). *Mushrooms and Other Fungi of Great Britain and Europe*, London: Pan Books Ltd.
- Sesli E & Denchev CM (2005). Checklist of the Myxomycetes and Macromyces of Turkey. *Mycologia Balcania* 2: 119-160.
- Solak MH, Işiloğlu M, Gücin F & Gökler İ (1999). Macrofungi of İzmir Province. *Turk J Bot* 23: 383-390.