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Research Article

Some Macrofungi Species of European Part of Turkey

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Abstract: This study aims to determine macrofungi species of Thrace, the European part of Turkey. Samples were collected between the years 1985 and 1997. A total of 67 species were identified and are listed here in.

Key Words: Macrofungi, Thrace, Turkey.

Türkiye'nin Trakya Bölgesi'nden Bazı Makrofungus Türleri

Özet: 1985-1997 yılları arasında, Türkiye'nin Trakya Bölgesi'nde çeşitli makrofungus örnekleri toplanmış ve tanıları yapılan 67 tür, liste halinde verilmiştir.

Anahtar Sözcükler: Makrofunguslar, Trakya, Türkiye.

Introduction

Macrofungi studies have long been of interest to scientists as well as the public due to their important roles in human life, such as their beneficial and harmful effects on forests, their use in the pharmacology industry, and the mass production of cultivated fungi in the food industry, as well as their vital role in biodegradation.

Despite the fact that a great deal of work has been conducted on Turkish macrofungi flora (1), there is still much to be done in all regions of Turkey. Some well known studies are mentioned in the text (2-4).

Studies on this subject, in fact, are being carried out in different countries (5-7), and new species for the world macrofungi flora have been recorded (8-10).

Thrace was chosen because there are few records in the literature. Although some reports (11-13) have been made on the European part of İstanbul, only one study (14) concerning forest areas of Thrace appears to have been reported in the literature. More species are expected to be found in the region in addition to the 42 species identified in this study.

The aim of this study is to determine macrofungi species in the research area and thus provide more data on the macrofungi flora of Turkey.

Desciption Of The Research Area

The thrace region (Figure 1) is 23.485 km^2 and it covers 3% of the superficies of the Turkish mainland.

The climate of Thrace is humid and semi-humid Mediterranean type (15). The rainfall in the region is 550-1500 mm. Hills above 1.035 m (i.e. Mahya Mountain) take up to 1400 mm rain, and in the town of Iğneada town the annual average is 962 mm. The annual average temperature is 8-15°C. The common soil types in the region are limeless brown soils and grumusols (16). There are a number of streams, lakes and saturated soils in region.

Thrace is in the Mediterraneann flora sector phytogeographically within the holoarctic flora kingdom (16). It is comprised of four main vegetation types: 1. humid forests, 2. dry forests, 3. antropogenic steppe, 4. maquis, pseudomaquis and coastal forests. The humid forest area is mainly characterised by *Fagus orientalis* Lipsky and partly by *Quercus* L. The forest floor is

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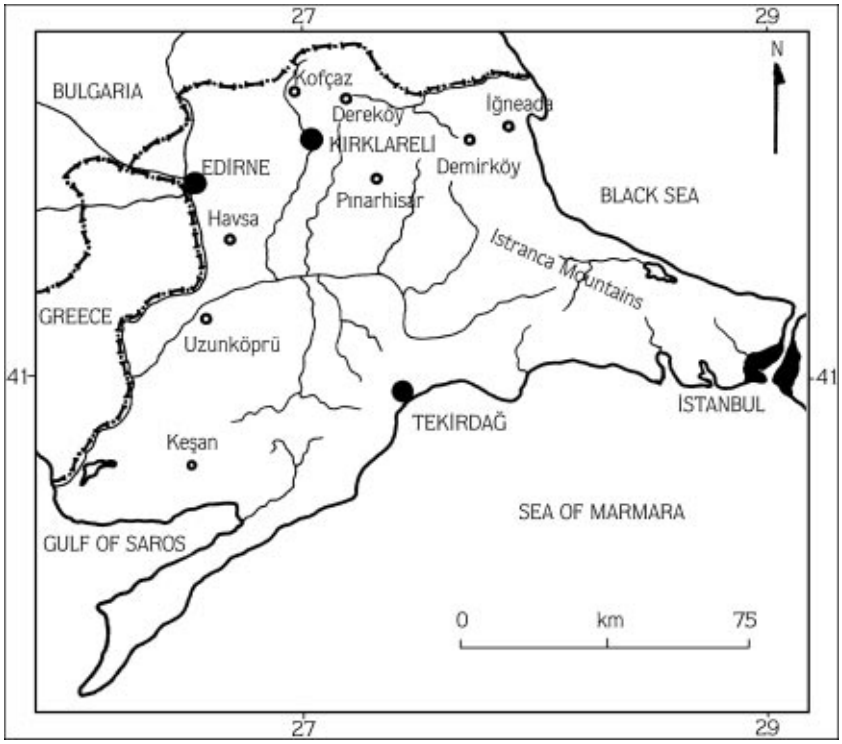

Figure 1. Map of Thrace Region

characterized by *Rhododendron ponticum* L. and *Ilex aquifolium* L. *Quercus* forests are widely distributed in the humid forest area on the Northern slopes of Istranca Mountain, starting from 300 m down to the shore. Dry forests mainly occur on the southern slopes and plateaux at the southern skirts of the Istranca mountains, between an altitude of 200 to 500 or 600 m (16).

A typical vegetation section of the region can be seen between the village of Yeniceköy and the town of Demirköy. It is characterized by an agricultural area up to 450 m in the south, and *Ouercus* and *Carpinus* L. bushes at 450-600 m. The height and density of trees increase after 600 m. Major plants are *Quercus-Carpinus* and *Fagus* mixed forests. The proportion of *Fagus orientalis* Lipsky in the total flora increases and forms unions near the summit after an altitude of 700-750 m.

Materials and Methods

Macrofungi samples were removed from the ground with a great care to avoid damage to the base and other fragments. Soil was removed using a soft brush. Samples were placed in a separate wicker containers to avoid mixing. Colour, locality and characteristics of habitat etc. were noted during the collection. Insecticide spray was used for protecting fresh samples from insect larvae contamination. Samples were dried and preserved in polythene bags containing thymol crystal. In the laboratory, morphological features, especially the spore properties of dry and fresh macrofungi species, were identified using identification keys (17-19). The orders determined by Moser (17), Gams & Moser (20) and Breitenbach & Kranzlin (21) were followed in preparing the list. Davis's Grid Square System (22) is used in the citation of the specimens.

Samples are kept in the herbarium of Department of Biology, University of Trakya, Edirne, Turkey.

Results

Species found in the research area are given below. The numbers indicate the herbarium numbers.

ASCOMYCETES

Morchellaceae

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

A1E Edirne, Uzunköprü, Yeniköy village, 15.04.1995, 301.

BASIDIOMYCETES

Agaricaceae

2. **Agaricus arvensis** Schff. ex Fr.

A1 Edirne, Taşlısekban village, 01.11.1994, 275.

3. **A. bitorquis** (Quel). Sacc.

A1 Kırklareli, Demirköy, Sarpdere village, 18.10.1996, 304.

4. **A. campestris** Fr. ex. L.

A1E Edirne-Süleoğlu 12. Km., Süleoğlu

pasture, 25.06.1989, 155; Kırklareli, Kofcaz-Elmacık 3. km., 17.07.1989, 139.

5. **A. haemorrhoidarius** Kalchbr. & Schulz.

A1E Edirne, Süleoğlu, Taşlısekban Village, 01.11.1994, 296.

Bolbitiaceae

6. **Agrocybe aegerita** (Brig) Fayod.

A1E Edirne, Karaağaç, 30.06.1997, 312; Host: *Populus alba* (Aiton) Sm. A1E Edirne, Karaağaç, 30.06.1997, 314, Host: *Populus canescens*.

7. **Conocybe lactea** (J. Lange) Met.

A1E Kırklareli, Dereköy-Demirköy 22. km., Karanlık Mahallesi village, 09.09.1989, 181.

Coprinaceae

8. **Coprinus comatus** (Müll.) Pers.

A1E Edirne-Lalapaşa 4. Km. 31.10.1993, 273.

Lepiotaceae

9. **Macrolepiota mastoidea** (Fr.) Sing.

A1E Edirne, Süleoğlu, Taşlısekban Village, 01.11.1994, 296, 300.

10. **M. procera** (Scop.: Fr.) Sing.

A1E Edirne, Trakya University, Medicinal Faculty Garden, 30.05.1990, 267; A1E Kırklareli, Demirköy-Pınarhisar 12. Km, 09.10.1988, 110.

11. **M. rhacodes** (Vitt.) Sing.

A1E Edirne, Trakya University, Medicinal Faculty Garden, 21.11.1990, 277.

Strophariaceae

12. **Pholita destrulus** (Brond.) Quel.

A1E Edirne, Karaağaç, 01.09.1996, 316. Host: *Populus canescens*.

Pluteaceae

13. **Volvoriella bombycina** (Schaeff.: Fr.) Sing.

A1E Edirne, Karaağaç, 30.05.1990, 315. Host: *Populus canescens*.

Amanitaceae

14. **Amanita caesarea** (Scop.: Fr.) Pers.

A1E Edirne, Keşan, Akhoca village, 27.9.1996, 266, Host: *Quercus* sp.; A1E Edirne, Keşan, Hamzabeyli village, 18.9.1996, 268.

15. **A. muscaria** (L. ex Fr.) Hooker.

A1E Kırklareli, Demirköy, Sarpdere village, 18.10.1996, 283.

Tricholomataceae

16. **Armillaria mella** (Vahl.) Fr. Syn.: *Armillariella mellea (Vahl: Fr.) Karsten*.

A1E Pınarhisar-Kırklareli 6. km, 20.07.1989, 133. Host: Quercus sp.; A1E Kırklareli, Vize, Soğucak village, 28.10.1990, 272; A1E Edirne, 1993, 288.

17. **Armillariella tabescens** (Scop.: Fr.) Sing.

A1E Edirne, Environment of Kooperatifevleri district, 04.04.1989, 153, Host: *Quercus* sp.

18. **Laccaria amethystina** (Bull.) Murr.

A1E Kırklareli, Demirköy-Pınarhisar, 15. km, 9.10.1988, 114. Under of *Pinus nigra* Arn. subsp. *pallasiana* (Lamb.) Holmboe.

19. **Marasmius oreades** (Bolt.: Fr.) Fr.

A1E Edirne-Kırklareli 13. Km. İskenderköy village, 16.05.1991, 287; A1E Kırklareli, İğneada, Longos Forest (Natural), 18.07.1985, 28; A1E Kırklareli, Demirköy-Pınarhisar 13. km, 09.10.1988, 116; A1E Edirne-Havsa 7. km, 19.04.1987, 137; A1E Edirne-Kapıkule 3. km, 01.12.1987, 144.

20. **Omphalotus olearius** (DC.: Fr.) Sing.

A1E Edirne, Lalapaşa, Hamzabeyli village, 18.09.1996, 265.

21. **Panellus stypticus** (Bull.: Fr.) Karst.

A1E Kırklareli, Demirköy-İğneada 7. Km, 07.04.1990, 259 Host: *Quercus cerris* L.

Russulaceae

22. **Lactarius deliciosus** (Fr.) S.F.Gray.

A1E Kırklareli-Edirne, 15. km. İnece village, 21.12.1986, 140. Host: *Pinus nigra* subsp. *pallasiana*.

23. **L. piperatus** (Scop) Fr.

A1E Kırklareli, Kofcaz, Environment of Kula village, 16.07.1985, 3; A1E Kırklareli, Demirköy, Environment of Sarpdere village, 17.07.1985, 24; A1E Demirköy-Kırklareli 7. km, 18.07.1985, 60; A1E Kırklareli, Demirköy-Balaban 5. km, 09.09.1989, 157.

24. **Russula aurata** (With.) F.r.

A1E Dedenin Çeşmesi, Dereköy-Kırklareli, 17.07.1985, 13. Host: *Quercus* sp.; A1E Kırklareli, Kofcaz, Kocayazı village 16.07.1985, 46; A1E Kırklareli, Demirköy-Pınarhisar 7. km, 18.07.1985, 58; A1E Kırklareli, Dereköy-Demirköy 22. km. (Karanlık Mah.), 09.09.1989, 168; A1E Kırklareli, Demirköy-İğneada 6. km, 10.9.1989, 191.

25. **R. olivaceae** (Schff. ex Secr.) Fr.

A1E Kırklareli, Dereköy-Demirköy 9. km. (Karadere village), 09.09.1989, 169.

Astraeceae

26. **Astraeus hygrometricus** Pers.

A1E Edirne, Lalapaşa, between Dereköy-Karatepe village, 09.05.1990, 291. Host: *Carpinus betulus* L.

Sclerodermataceae

27. **Scleroderma verrucosum** (Bull.) Pers.

A2E İstanbul, Garden of Cağaloğlu Lyceum, 16.11.1989, 269.

Lycoperdaceae

28. **Bovista pila** Berk & Curt.

A1E Kırklareli, Demirköy-Pınarhisar 4. km, 09.10.1988, 105.

29. **Calvatia utriformis** (Bull.) Jaap.

A1E Kırklareli, Sarpdere Village-Balaban Village 14. km. 09.09.1989, 173.

30. **Lycoperdon molle** Pers.

A1E Pınarhisar-Kırklareli, 6. km. 01.07.1989, 150.

31. **L. perlatum** Pers.

A1E Pınarhisar-Kırklareli, 6. km. 26.03.1988, 143; A1E Kırklareli, Kofcaz, Kocayazı village, 18.07.1985, 42.

Polyporaceae

32. **Bjerkandera adusta** (Fr.) Kar.

A1E Edirne, Karaağaç, 11.10.1993,

295. Host; *Populus nigra* L. A1E Kırklareli, İğneada, Longos Forest, 10.09.1989, 188.

33. **Coriolus versicolor** (L. ex Fr.) Quel.

A1E Kırklareli, Dereköy-Demirköy 22. km. (Karanlık Mah.), 09.09.1989, 179. Host: *Fraxinus ornus* L. A1E Kırklareli, İğneada, Longos Forest, 10.09.1989, 182.

34. **Daedaleopsis confragosa** (Bolt.: Fr.) Schroet.

A1E Kırklareli, Vize, Vaçinadere, 14.02.1990, 255 Host: *Salix alba* L.

35. **Fomes fomentarius** (Linn.) Fr.

A1E Kırklareli, Vize, Papanadere, 20.04.1990, 270. Host: *Tilia* L.; A1E Kırklareli, Vize, Sakagölü Coast, 25.04.1990, 278; A1E Kırklareli, Pınarhisar, Kaynarca Town, Kurtdere, 13.05.1990, 298; A1E Kırklareli, Dereköy-Demirköy 9. km. (Karadere Village), 09.09.1989, 167; A1E Kırklareli, Demirköy, Sarpdere Village, 16.07.1985, 147; A1E Kırklareli, Demirköy-Pınarhisar 13. km, 09.10.1988, 131; A1E Kırklareli, Geçitağzı-Dereköy 3. km, 17.07.1985, 74.

36. **Fomitopsis cytisina** (Berk.) Bond & Sing. (Syn.: *Perenniopora fraxinea* (Fr.) Ryv.

A1E Edirne, Karaağaç, 30.06.1997, 318. Host: *Robinia pseudacacia* L. A1E Edirne, Karağaç, 30.06.1997, 309. Host: *Robinia pseudacacia* L.

37. **Lenzites warnieri** (Dur. & Mont.

A1E Kırklareli, Vize, Saka Lake, 12.01.1990, 165. Host: *Quercus* sp.

38. **Panus stipticus** (Bull. ex Fr.) Fr.

A1E Kırklareli, Vize, Papanadere, 15.02.1990, 257. Host: *Quercus petraea* (Mattuschka) Liebl.

39. **P. tigrinus** (Bull. ex Fr.) Sing.

A1E Edirne, Söğütlük Forest (Natural), 18.05.1990, 282. Host: *Salix alba*. L. A1E Edirne, Frontier Guard, 22.10.1993, 290.

40. **Polyporus arculearius** (Batsch). Fr.

A1E Edirne, Trakya University, Medicinal Faculty Garden, 11.05.1990, 279. Host: *Quercus* sp. A1E Kırklareli, Kofcaz, Kula Village, 16.07.1985, 56.

41. **P. brumalis** (Pers.) Fr.

A1E Kırklareli, Demirköy, Sarpdere village, 17.07.1985, 22.

42. **P. elegans** (Bull.) Fr.

A1E Kırklareli, Dereköy-Demirköy 22. Km. (Karanlık Mah.), 09.09.1989, 175.

43. **P. sulphureus** (Bull. ex Fr.) Fr. Syn.: *Laetiporus sulphureus* (Bull. ex.) Murr.

A1E Edirne, Trakya University, Medicinal Faculty Garden, 30.05.1990, 264. Host: *Robinia pseudacacia*; A1E Edirne, 30.05.1990, 274; A1E Edirne, Söğütlük Forest, 18.05.1990, 294; A1E Edirne, Trakya University, Medicinal Faculty Garden, 11.5.1990, 297; A1E Edirne, Karağaç 30.06.1997, 308. Host: *Salix* L.

44. **P. squamosus** (Huds.) Fr.

A1E Kırklareli, Pınarhisar, Kaynarca Town, Kurtdere, 13.05.1990, 183. Host: Acer L. A1E Pınarhisar-Kırklareli, 6. km, 22.08.1989, 156.

45. **P. varius** Fr.

A1E Kırklareli, Pınarhisar, Yeniceköy village (Mahya Mountain), 18.07.1985, 04 (Host: *Quercus* sp.)

46. **Trametes hirsuta** (Fr.) Pilat

A1E Kırklareli, Vize, Papanadere, 15.02.1990, 256.

47. **T. versicolor** (L.: Fr.) Pilat

A1E Kırklareli, Vize, Papanadere, 15.02.1990, 258; A1E Edirne, Trakya University, Medicinal Faculty Garden, 21.11.1990, 302.

Gomphidiaceae

48. **Chroogomphus rutilus** (Schaeff. ex Fr) O.K.M.

A1E Kırklareli, Demirköy-Pınarhisar, 10. km. 09.10.1988, 108. Host: *Pinus nigra* subsp. *pallasiana*.

Boletaceae

49. **Boletus chrysenteron** (Bull.) Fr.

A1E Kırklareli, Dereköy-Demirköy 9. km. (Karadere village) 09.09.1989, 190.

50. **B. radicans** Pers.

A1E Kırklareli, Demirköy-Pınarhisar, 12. km, 10.09.1989, 159; A1E Kırklareli, Demirköy-Pınarhisar, 4. km. 10.09.1989, 160; A1E Kırklareli, Dereköy-Demirköy 9. km. (Karadere village, 09.09.1989, 164).

51. **B. versicolor** Rostk.

A1E Kırklareli, İğneada Town, Longos Forest, 10.09.1989, 189.

52. **Suillus bovinus** (L.: Fr.) O. Kuntze.

A1E Kırklareli, İğneada (Limanköy), 17.06.1985, 101.

Xerocomaceae

53. **Xerocomus subtomentosus** (L. ex Fr.) Quel.

A1E Edirne, Süleoğlu, Taşlısekban village, 01.11.1994, 284. Host: *Quercus* sp.

Pleurotaceae

54. **Pleurotus cornucopiae** (Paul) Quel.

A1E Kırklareli, Demirköy-Pınarhisar 3. km, 09.10,1988, 104. Host: *Fraxinus* L.

Clavariaceae

55. **Clavaria flava** (Schaeff) Fr.

A1E Demirköy-Kırklareli 7. km, 18.07.1985, 62.

56. **C. formosa** (Pers) Fr.

A1E Kırklareli, Demirköy-Balaban 5. km, 09.09.1989, 161.

Ganodermataceae

57. **Ganoderma adspersum** (Schulz.) Donk.

A1E Edirne, Söğütlük Forest, 29.04.1996, 324. Host: *Fraxinus* sp.

58. **G. lucidum** (Leyss.: Fr.) Karst.

A2E İstanbul, Yıldız Park, 11.07.1996, 285; A1E Kırklareli, Kofcaz, Kocayazı, 16.07.1985, 1. Host: *Quercus* sp. A1E Kırklareli, İğneada, Longos Forest, 18.07.1985, 41; A1E Kırklareli, Demirköy-Pınarhisar 4. km, 09.10.1988, 106; A1E Dereköy (Bounds)-Kırklareli 1. km, 09.09.1989, 166; A2E İstanbul, Yıldız Park, 01.08.1997, 313.

59. **G. resinaceum** Boud.

A1E Edirne, Frontier Guard, 22.10.1993, 286. Host: *Populus* sp; A1E

Edirne, Trakya University Garden, 04.07.1991, 290; A1E Edirne, Karaağaç, 30.06.1997, 311. Host: *Populus alba*.

Hymenochaetaceae

60. **Inonotus hispidus** (Bull.) ex Fr.) Karst.

A1E Kırklareli, Demirköy-Pınarhisar 13. km, 09.10.1988, 130. Host: *Malus Miller*. A1E Edirne, Söğütlük Forest, 29.06.1997, 307. Host: *Morus alba* L. A1E Edirne, Söğütlük Forest, 30.06.1996, 320. Host: *Morus alba*.

61. **I. cuticularis** (Fr.) Karst.

A1E Edirne, Söğütlük Forest, 30.07.1995, 321. Host: *Juglans regia* L.

62. **I. midus-pici** Pil.

A1E Edirne, Söğütlük Forest, 29.04.1996, 323. Host: *Juglans regia*.

63. **Phellinus configrus** (Pers.: Fr.) Pat.

A1E Edirne, Karaağaç, 30.05.1990, 319. Host: *Robinia pseudacacia*.

64. **P. pilatii** Cerny. Sulogtr.

A1E Edirne, Karağaç 30.05.1990, 313. Host: *Populus canescens*.

65. **P. torulosus** (Pers.) bourd & Galzin.

A1E Edirne, Karaağaç, 30.06.1997, 310. Host: *Robinia pseudoacacia*. A1E Edirne, Karaağaç, 01.09.1996,317) (Host: *Robinia pseudoacacia*.)

Stereaceae

66. **Stereum hirsutum** (Will. ex Fr.) S.F. Gray.

A1E Kırklareli, Demirköy-İğneada 20. Km., 07.04.1990, 260. Host: *Quercus* sp.

67. **S. insignitum** Quel.

A1E Kırklareli, İğneada, Longos Forest, 10.09.1989, 176.

Discussion

Most of the species determined in this study were collected in natural areas of the Istranca (Yıldız) Mountains. It was found that the distribution of macrofungi species was low in the hot and dry season whilst they were rich in numbers in spring and autumn season in relation to humid climate as well as the richness of the flora in these seasons (16, 23, 24).

Although *Amanita* Pers. species are known to be mainly distributed in forest areas, they can also be found in pasture lands, meadows and even agricultural areas in low numbers (9). However, in this study, all samples were collected from forest areas.

The macrofungi flora of Turkey is similar to that of Europe, with some small differences. Macrofungi species growing on trees are particularly similar (25).

As a food supply, macrofungi collection by local people is not common. However, local residents have reported that huge numbers of macrofungi are collected by non-residents for trade (24).

A total of 3.086 macrofungi poisoning incidents in Turkey were reported between 1970 and 1985, causing 90 deaths. There has been no such report to date concerning Thrace. However, a poisonous species, *Amanita muscaria*, found in the vicinity of the town of Demirköy, represents a danger for public health. Furthermore, in the surrounding area of the region, for instance in İstanbul, about 200 poisoning incidents were reported between 1990 and 1994, causing 20 deaths (26). The main reason for a high macrofungi poisoning rate is little knowledge of residents on poisonous species. By contrast, In Europe, the number of people poisoned by macrofungi consumption is too low, for instance, in England, this number is two or less in a year (26). This clearly shows that people should be more aware of danger of eating such macrofungi collected in the field. In this context, we hope that this study contributes to macrofungi flora of Turkey as well as providing information on the species distributed in the area in order to prevent such poisoning incidents.

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