

## ***Myxomycetes* of Kestel Forest (Kadınhanı, Konya)**

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**Abstract:** The samples of *Myxomycetes* recorded in this study were collected from Kestel forest (Kadınhanı, Konya) in 2003 and 2004. As a result of field and laboratory studies, 7 families, and 32 taxa belonging to 11 genera were determined. Eight of these were collected in their natural habitat while 24 were isolated in moist chamber culture.

**Key Words:** *Myxomycetes*, Kestel, Kadınhanı, Konya, Turkey

### **Kestel Ormanlarının (Kadınhanı-Konya) Miksomisetleri**

**Özet:** Bu çalışmada kaydedilen *Myxomycetes* örnekleri 2003-2004 yılları arasında Kestel Ormanlarından (Kadınhanı-Konya) toplanmıştır. Arazi ve laboratuvar çalışmaları sonucu 7 familya ve 11 cinsine ait 32 takson tespit edilmiştir. Bunlardan 8 tanesi doğal ortamından toplanırken, 24 tanesi nemli oda kültüründe izole edilmiştir.

**Anahtar Sözcükler:** Miksomiset, Kestel, Kadınhanı, Konya, Türkiye

### **Introduction**

The Myxomycetes are extraordinary living organisms. Members of this class produce fructifications of incredibly varied forms, colours and sizes. Therefore, many mycologists are interested in myxomycetes. Turkey is an ideal location to study myxomycetes because it has natural and profuse vegetation and macro- and microclimates. The first records of myxomycetes were by Lohweg (1957, 1964), who worked on macrofungi. Härkönen & Uotila (1983), Härkönen (1987) and Lado (1994) published new records for Turkey in subsequent years. The number of myxomycete taxa known worldwide is about 1000 (Ergül & Oran, 2005). The first compilation of studies conducted on myxomycetes in Turkey was published by Ergül & Dülger (2000) under the title "*Myxomycetes* of Turkey". They reported around 102 taxa of myxomycetes in their report. Later, Sesli & Denchev (2005) made a compilation of myxomycetes and macromycetes in Turkey and about 177 taxa of myxomycetes were reported.

The purpose of this study was to determine the members of *Myxomycetes* in Kestel forest (Kadınhanı, Konya).

### **Description of Research Area**

Kestel forest, the study area, lies within Konya province and is bordered by the towns of Kadınhanı and Ladik-Sarayönü to the north, Derbent to the south-east and Selçuklu to the south-west. The elevation is between 1250 and 1767 m. It extends 35 km in the east-west direction and 25 km in the north-south direction. The location where the study was performed, which is mostly a rugged area, is surrounded by Cimboz Hill (1438 m), Yapraklıbaş Hill (1767 m), Kale Hill (1548 m), and Arıtışı Hill (1753 m). The area has a semi-dry and very cold Mediterranean climate. The vegetation of the area comprises trees such as *Pinus nigra* J.F. Arnold, *Quercus pubescens* Willd. and *Juniperus oxycedrus*. *Salix* sp. and *Populus* sp. are found near Ketele stream.

### **Materials and Methods**

The materials were collected from Kestel forest (Kadınhanı, Konya) during fieldwork at different times in 2003 and 2004, especially in spring and autumn months.

During the fieldwork, samples were collected from decayed tree bark, branches and logs, and the bark,

leaves and needles of living trees in the forest and on the stream banks. It was ensured that materials that might contain spores and plasmodium developed sporophores through the moist chamber technique (Gilbert & Martin, 1933). Natural and other samples were dried in petri dishes in laboratories. The microscopic (for example, spore size and ornamentation and the morphology of capillitium) and macroscopic (for example, the form, size and colour of the sporophore, stalk length) properties of all the samples were determined. Then the samples that were made ready for identification were identified with the aid of the taxonomic literature, namely Martin & Alexopoulos (1969), Neubert et al. (1993, 1995, 2000), Stephenson & Stempen (1994), Oran & Ergül (2004), and Ocak & Hasenekoğlu (2003a, 2003b, 2005). Citation of the names of authors presented is standardised according to the Authors of Fungal Names (Kirk & Ansell, 1992). Afterwards, the completed samples of myxomycetes were attached to cardboard and kept in cardboard containers. These samples are currently kept at Selçuk University Fungarium, Mushroom Research and Application Centre (Konya).

## Results

As a result of field and laboratory work, 32 taxa of *Myxomycetes* of 11 genera were determined. The taxa collected from the location of the study are listed below.

### Myxomycetes

#### Ceratiomyxales

#### Ceratiomyxaceae

##### 1. *Ceratiomyxa fruticulosa* (Müll.) T.Macbr.

Near Yavşanlı slope, alt. 1300 m, on decaying log of *Pinus nigra* L., 26.10.2003, GDemirel 62; near Hasanağa slope, on fallen barks and twigs of *Pinus nigra*, alt. 1300 m, 18.04.2004, GDemirel 90b,112b; Keçiyatağı slope, near Ketele stream on decaying log of *Pinus nigra*, alt. 1350 m (natural), GDemirel 122.

#### Liceales

#### Cribrariaceae

##### 2. *Cribraria argillacea* (Pers.) Pers.

Near Ketele stream, on dead trunk of *Pinus nigra*, alt. 1230 m (natural), 05.10.2003, GDemirel 3b; near picnic area, on decaying log of *Pinus nigra*, alt. 1230 m (natural), 05.10.2003, GDemirel 9; near Hasanağa slope,

on fallen wood of *Pinus nigra*, alt. 1300 m (natural), 18.04.2004, GDemirel 79c; picnic area, near Ketele stream, on decaying log of *Pinus nigra*, alt. 1200 m (natural), 19.10.2003, GDemirel 17.

##### 3. *Cribraria cancellata* (Batsch) Nann.-Bremek. var. *cancellata* (Batsch) Nann.-Bremek.

Cimboz hill, on decaying wood of *Pinus nigra*, alt. 1350 m, 19.10.2003, GDemirel 22c; Keçiyatağı slope, on dead trunk of *Pinus nigra*, alt. 1400 m, 26.06.2004, GDemirel 134; 140; 144a; 145.

##### 4. *Cribraria cancellata* (Batsch) Nann.-Bremek. var. *fusca* (Lister) Nann.-Bremek.

Cimboz hill, on decaying wood of *Pinus nigra*, alt. 1350 m, 19.10.2003, GDemirel 45c.

##### 5. *Cribraria intricata* Schrad.

Near Hasanağa slope, on decaying log of *Pinus nigra*, alt. 1200 m, 18.04.2004, GDemirel 112a.

##### 6. *Cribraria vulgaris* Schrad.

Near picnic area, on decaying wood of *Pinus nigra*, alt. 1200 m, 19.10.2003, GDemirel 21a.

#### Enteridiaceae

##### 7. *Lycogala epidendrum* (L.) Fr.

Near picnic area, on decaying wood of *Pinus nigra*, alt. 1200 m (natural), 19.10.2003, GDemirel 14; near Ketele stream on debris of *Pinus nigra*, alt. 1200 m (natural), 26.10.2003, GDemirel 71; 26.06.2004, GDemirel 150 (natural).

#### Liceaceae

##### 8. *Licea minima* Fr.

Keçiyatağı slope, on decaying wood of *Pinus nigra*, alt. 1400 m, 26.06.2004, GDemirel 129; on dead trunk of *Pinus nigra*, 26.06.2004, GDemirel 150b.

##### 9. *Licea pusilla* Schrad.

Keçiyatağı slope, on decaying wood of *Pinus nigra*, alt. 1400 m, 26.06.2004, GDemirel 150d.

##### 10. *Licea* sp.

**Description:** Sessile sporangia, gregarious, globose, black and iridescent, 0.5 mm in diameter. Peridium transparent. Spores black in mass, lilac-brown by transmitted light, warty, 9 to 11 µm in diameter.

Near Ketele stream, on decaying wood of *Pinus nigra*, alt. 1200 m, 05.10.2003, GDemirel 8b.

**Physarales****Physaraceae****11. Badhamia macrocarpa** (Ces.) Rostaf.

Near Ketele stream, on decaying wood of *Pinus nigra*, alt. 1200 m, 05.10.2003, GDemirel 8a.

**12. Badhamia panicea** (Fr.) Rostaf.

Near Ketele stream, on decaying bark of *Populus* sp. L., alt. 1200 m, 19.10.2003, GDemirel 60b.

**13. Physarum auriscalpium** Cooke

Cimboz hill, on decaying log of *Pinus nigra*, alt. 1300m, 19.10.2003, GDemirel 28.

**14. Physarum nutans** Pers.

Near Hasanağa slope, on decaying wood of *Pinus nigra*, alt. 1300 m, 18.04.2004, GDemirel 110 b.

**Trichiales****Trichiaceae****15. Arcyria cinerea** (Bull.) Pers.

Near Hasanağa slope, on fallen bark and twigs of *Pinus nigra*, alt. 1300 m, 18.04.2004, GDemirel 73; GDemirel 113; GDemirel 116.

**16. Arcyria globosa** Schwein.

Near Yavşanlı slope, on decaying wood of *Pinus nigra* (natural), alt. 1300 m, 19.10.2003, GDemirel 19; Cimboz hill, on fallen debris of *Pinus nigra*, alt. 1350 m, 19.10.2003, GDemirel 34.

**17. Arcyria incarnata** (Pers.) Pers.

Near Ketele stream, on fallen debris of *Pinus nigra*, alt. 1200 m (natural), 26.10.2003, GDemirel 61a.

**18. Arcyria magna** Rex

Near Hasanağa slope, on decaying wood of *Pinus nigra*, alt. 1300 m (natural), 18.04.2004, GDemirel 76.

**19. Arcyria nutans** (Bull.) Grev.

Keçiyatağı slope, on decaying log of *Pinus nigra*, alt. 1350 m (natural), 28.07.2003, GDemirel 1a; near Yavşanlı slope, near picnic area, on decaying log of *Pinus nigra*, alt. 1250 m, 05.10.2006, GDemirel 12b; 19.10.2003, GDemirel 16; near Hasanağa slope, on fallen debris of *Pinus nigra*, alt. 1300 m, 18.04.2004, GDemirel 90a.

**20. Arcyria pomiformis** (Leers) Rostaf.

Near Yavşanlı slope, on decaying wood of *Pinus nigra*, alt. 1300 m, 19.10.2003, GDemirel 49.

**21. Arcyria stipata** (Schwein.) Lister

Near picnic area, Ketele stream, on decaying wood of *Pinus nigra*, alt. 1200 m, 26.10.2003, GDemirel 65.

**22. Trichia contorta** (Ditmar) Rostaf.

Near Yavşanlı slope, picnic area, on decaying wood of *Pinus nigra*, alt. 1200 m, 19.10.2003, GDemirel 18a.

**23. Trichia decipiens** (Pers.) T.Macbr.

Near Ketele stream, on fallen debris of *Pinus nigra*, alt. 1200 m, 26.10.2003, GDemirel 61b.

**24. Trichia lutescens** Lister

Cimboz hill, on decaying wood of *Pinus nigra*, alt. 1350 m, 19.10.2003, GDemirel 22b, GDemirel 45a, GDemirel 58a.

**25. Trichia varia** (Pers.) Pers.

Near Yavşanlı slope, on decaying wood of *Pinus nigra*, alt. 1250 m (natural), 26.10.2003, GDemirel 63; Hasanağa slope, on decaying wood of *Pinus nigra*, alt. 1300 m, 18.04.2004, GDemirel 110d.

**26. Trichia** sp.

**Description:** Sessile or occasionally short stalked sporangia, crowded together, cylindrical to ovoid, 0.5-1 mm in diameter, yellowish brown. Peridium persistent, membranous. Capillitium yellow, 4-10 (15)  $\mu$ m in diameter, widely spaced spiral bands, tips acute or branched and numerous free end. Spores yellow in mass, pale yellow by transmitted light, rough warty, 10 to 12  $\mu$ m in diameter.

Cimboz hill, on decaying wood of *Pinus nigra*, alt. 1300 m, 19.10.2003, GDemirel 58b.

**Stemonitales****Stemonitaceae****27. Comatricha laxa** Rostaf.

Keçiyatağı slope, on decaying log of *Pinus nigra*, alt. 1350 m, 28.07.2003, GDemirel 1b.

**28. Comatricha lurida** Lister

Cimboz hill, on fallen twigs of *Salix* sp., alt. 1350 m, 19.10.2003, GDemirel 29.

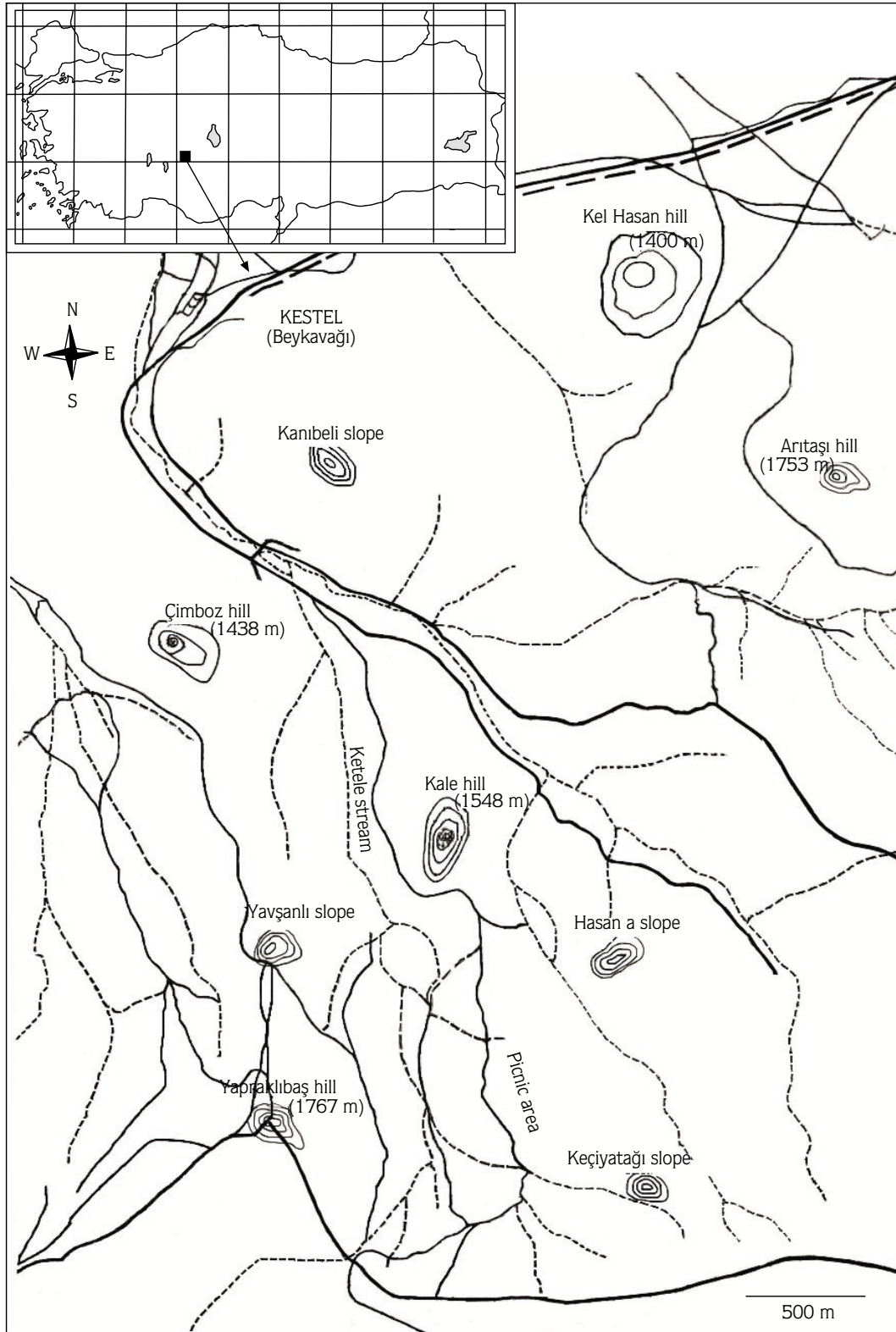


Figure 1. The research area (1/250,000).

**29. Comatricha nigra** (Pers.) J.Schröt.

Near Hasanağa slope, on fallen bark and twigs of *Pinus nigra*, alt. 1300 m, 18.04.2004, GDemirel 79b; Hasanağa slope, near source, on decaying wood of *Pinus nigra*, alt. 1200 m, 26.06.2004, GDemirel 150c.

**30. Comatricha pulchella** (C.Bab.) Rostaf.

Keçiyatağı slope, on fallen debris of *Pinus nigra*, alt. 1230 m, 28.07.2003, GDemirel 2; Yavşanlı slope, near picnic area, on decaying log of *Pinus nigra*, alt. 1200 m, 05.10.2003, GDemirel 3a, GDemirel 12a; near Ketele stream, on decaying log of *Pinus nigra*, alt. 1200 m, 26.10.2003, GDemirel 66; near Hasanağa slope, on fallen bark and twigs of *Pinus nigra*, alt. 1300 m, 18.04.2004, GDemirel 79c; GDemirel 80; GDemirel 81; GDemirel 90c; Keçiyatağı slope, on decaying log of *Pinus nigra*, alt. 1350 m, 26.06.2004, GDemirel 126; GDemirel 141.

**31. Enerthenema papillatum** (Pers.) Rostaf.

Near Hasanağa slope, on fallen twigs of *Pinus nigra*, alt. 1300 m, 18.04.2004, GDemirel 100b; GDemirel 104a; GDemirel 111.

**32. Stemonitis smithii** T.Macbr.

Yavşanlı slope, near picnic area, on decaying wood of *Pinus nigra*, alt. 1300 m, 19.11.2003, GDemirel 18b.

**Discussion**

The vegetation and climatic conditions of Kestel forest are favourable for the growth of myxomycetes. The list of species and the number of samples, their localities and substrates are shown in Table 1.

According to the data obtained, 32 taxa of myxomycetes belonging to 7 families and 11 genera were determined. The families with the highest number of taxa are *Trichiaceae* (37.5%), *Stemonitaceae* (18.8%) and *Cribrariaceae* (15.6%). These families are followed by *Physaraceae* (12.5%), *Liceaceae* (9.4%), *Enteridiaceae* (3.1%) and *Ceratiomyxaceae* (3.1%).

In conclusion, the most widespread families are *Trichiaceae*, *Stemonitaceae* and *Cribrariaceae*. These families constitute 71.9% of the taxa of myxomycetes in the study area.

The taxonomic states of the families of *Trichiaceae* and *Stemonitaceae* in Turkey found in other studies (Oran & Ergül, 2004; Ocak & Hasenekoğlu, 2005) show similarity to the results of our study.

There are some species that were both found growing naturally and were grown in the moist chamber, namely *Ceratiomyxa fruticulosa*, *Arcyria globosa*, *Arcyria nutans*, and *Trichia varia*. *Cribraria argillacea*, *Lycogala epidendrum*, *Arcyria incarnate*, and *Arcyria magna* were only found growing naturally on substratum. *Ceratiomyxa fruticulosa*, *Cribraria argillacea*, *Arcyria nutans*, and *Comatrichia pulchella* are the most common species observed (Table 1). *Comatrichia lurida* (on fallen twigs of *Juniperus* sp.) and *Badhamia panicea* (on decaying bark of *Populus* sp.) are observed only as single specimens (Table 1). Other taxa except for *Comatrichia lurida* and *Badhamia panicea* are observed on conifers (Table 1).

On the other hand, according to habitat, taxa of *Liceales*, *Trichiales* and *Stemonitales* usually grow on coniferous wood (Martin & Alexopoulos, 1969). The taxa of these order distributions show a parallelism with habitat in our research area, because the most widespread trees in Kestel forest are coniferous.

Materials were also gathered from the Kelhasan and Kale hills, which were among the stations within the study area. However, no changes were observed although the moist chamber technique was also applied to these materials.

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Table 1. The species of *Myxomycetes* in the research area, their sample number, localities and substrates.

taxa	number of sample	number of localities	substrates
<i>Arcyria cinerea</i>	4	2	c, e
<i>A. globosa</i>	2	1, 6	b, h
<i>A. incarnata</i>	1	4	h
<i>A. magna</i>	1	2	b
<i>A. nutans</i>	4	1, 2, 3	a, h
<i>A. pomiformis</i>	1	1	b
<i>A. stipata</i>	1	5	b
<i>Badhamia macrocarpa</i>	1	4	b
<i>B. panicea</i>	1	4	i
<i>Ceratiomyxa fruticulosa</i>	4	1, 2, 3	a, d, e
<i>Cribraria argillacea</i>	4	2, 4, 5	a, g, f
<i>C. cancellata</i> var. <i>cancellata</i>	2	3, 6	b, g
<i>C. cancellata</i> var. <i>fusca</i>	1	6	b
<i>C. intricata</i>	1	2	a
<i>C. vulgaris</i>	1	5	b
<i>Comatricha laxa</i>	1	3	a
<i>C. lurida</i>	1	6	j
<i>C. nigra</i>	3	2	b, d, e
<i>C. pulchella</i>	9	1, 2, 3, 4	h, a, d, e
<i>Enerthenema papillatum</i>	3	2	e
<i>Lycogala epidendrum</i>	3	4, 5	b, h
<i>Licea</i> sp.	1	4	b
<i>L. minima</i>	2	3	b, g
<i>L. pusilla</i>	1	3	b
<i>Physarum auriscalpium</i>	1	6	a
<i>P. nutans</i>	1	2	b
<i>Stemonitis smithii</i>	1	1	b
<i>Trichia</i> sp.	1	6	b
<i>T. contorta</i>	1	1	b
<i>T. decipiens</i>	1	4	h
<i>T. lutescens</i>	3	6	b
<i>T. varia</i>	2	1, 2	b

Abbreviations: Type of substrates a = coniferous decaying log, b = coniferous decaying wood, c = coniferous decaying bark, d = coniferous fallen bark, e = coniferous fallen twig, f = fallen wood, g = dead trunk, h = debris, i = poplar decaying bark, j = juniper fallen twigs; localities number 1. Yavşanlı Slope, 2. Hasanağa Slope, 3. Keçiyatağı Slope, 4. Near Ketele Stream, 5. Picnic Area, 6. Cimboz Hill.

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