

## Some additions to the knowledge of Turkish Myxomycetes

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In early summer 1983 Myxomycetes and bark of trees for later culture in moist chambers were collected in West Turkey. Altogether 21 species of Myxomycetes were found. The following 12 species are new to Turkey: *Arcyria denudata* (L.) Wettst., *A. versicolor* Phill., *Ceratiomyxa fruticulosa* (Müll.) Macbr., *Collaria rubens* (A. Lister) Nann.-Brem., *Echinostelium elachiston* Alexop., *Hemitrichia clavata* (Pers.) Rost., *Lamproderma arcyrioides* (Sommerf.) Rost., *Physarum cinereum* (Batsch) Pers., *Stemonitopsis typhina* (Wiggers) Nann.-Brem., *Trichia alpina* (R. E. Fries) Meylan, *T. decipiens* (Pers.) Macbr., *T. favoginea* (Batsch) Pers.

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The Myxomycetes are a neglected group in the studies of Turkish fungi. Only one fairly thorough paper on Turkish Myxomycetes has been published (Härkönen & Uotila 1983). According to it, 31 species of Myxomycetes are known from Turkey.

Students of botany from the University of Helsinki made a botanical excursion to West Turkey on May 14–28, 1983, under the leadership of Dr. Pertti Uotila and Mr. Arto Kurtto. The itinerary is given by Uotila and Kurtto (1984). I took part in the excursion in order to collect Myxomycetes.

The excursion route can be seen in Fig. 1. At the time of the excursion, it was summer in the lowlands of Turkey and, as very dry weather prevailed, no fruit bodies of Myxomycetes were found. In the mountain regions, it was still spring, the ground was very moist and several specimens of Myxomycetes were collected.

All the collecting localities (mostly used for sampling vascular plants) are shown in Fig. 1. Specimens of Myxomycetes or bark from living trees for later cultivation in moist chambers were collected from the following 18 localities.

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|----|--|----|---|
| 11 | C1 <i>Izmir</i> : Davutlar National Park, end of the road<br>Alt. sea level–20 m<br>4–6 m tall virgin <i>macchia</i><br>May 17, 1983 | 12 | C1 <i>Muğla</i> : W shore of the Bafa Gölü, yard of a restaurant<br>Alt. ca. 40 m<br>May 17, 1983   |
|    |  | 15 | C1 <i>Muğla</i> : By the main road Gökova–Marmaris, ca. 15 km from Marmaris<br>Alt. ca. 70 m<br>Brook ravine with <i>Liquidambar orientalis</i><br>May 17, 1983       |
|    |  | 16 | C1 <i>Muğla</i> : Marmaris, ca. 4 km E of Marmaris<br>Alt. ca. sea level<br>Brookside with temporarily inundated <i>Liquidambar orientalis</i> forest<br>May 18, 1983 |
|    |  | 18 | C1 <i>Muğla</i> : Marmaris, near the town centre, in front of Hotel Halici<br>Alt. sea level<br>May 18, 1983  |
|    |  | 25 | B3 <i>Kütahya</i> : Afyon–Kütahya, 32 km from Kütahya<br>Alt. 1200 m<br><i>Juniperus excelsa</i> – <i>J. oxycedrus</i> scrub<br>May 19, 1983                          |
|    |  | 27 | B3 <i>Bilecik</i> : By the road Kütahya–Bozüyük; Otosan, ca. 4 km from Akpınar towards Kütahya<br>Alt. 880 m<br>May 20, 1983  |

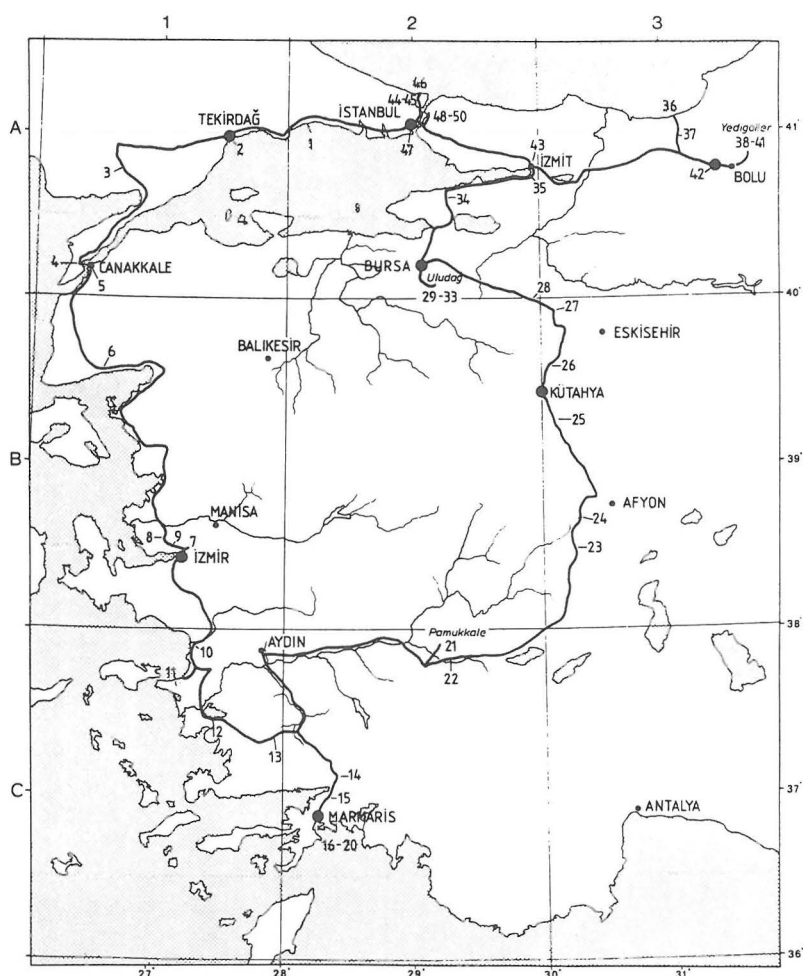


Fig. 1. The excursion route in Turkey on May 14–28, 1983. Collection sites indicated by numbers.

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|---|--|
| <p>29 A2(A) <i>Bursa</i>: Uludağ, S slope, by the road from Cekirke, ca. 5 km from Cekirke<br/>Alt. 410 m<br/>Mixed macchia and deciduous forest<br/>May 21, 1983</p> <p>30 A2(A) <i>Bursa</i>: Uludağ, S slope, by the main road ca. 10 km from Bursa<br/>Alt. 780–800 m<br/><i>Pinus brutia</i>–<i>Castanea sativa</i>–<i>Quercus</i> forest<br/>May 21, 1983</p> <p>31 A2(A) <i>Bursa</i>: Uludağ, by the gate of the National Park<br/>Alt. ca. 1300 m<br/><i>Pinus nigra</i> forest<br/>May 21, 1983</p> <p>32 A2(A) <i>Bursa</i>: Uludağ National Park, by the main road just below the watering place (Deve-</p> | <p>tasi piknik yeri)<br/>Alt. 1600–1700 m<br/><i>Abies nordmanniana</i> subsp. <i>bornmuelleriana</i> forest<br/>May 21, 1983</p> <p>33 A2(A) <i>Bursa</i>: Uludağ National Park, above the hotel area<br/>Alt. 1900–2100 m<br/>Open <i>Abies nordmanniana</i> subsp. <i>bornmuelleriana</i> forest with scattered <i>Fagus</i> on steep slope<br/>May 21, 1983</p> <p>34 A2(A) <i>Istanbul</i>: Orhangazi–Yalova, ca. 12 km S of Yalova, S of the road junction to Esadiye<br/>Alt. 200–260 m<br/>Deciduous forest in steep brook ravine<br/>May 22, 1983</p> |
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Table 1. List of Myxomycete specimens. For the numbers of localities, see page 2.

	Number of specimens	Locality	Substrate	Specimens from moist chamber pH of the substrate	Incubation time in days
<i>Arcyria cinerea</i>	2	11, 16	Bark of <i>Pistacia</i> and <i>Liquidambar</i>	5.5	19–34
<i>A. denudata</i>	1	38	Decaying wood		
<i>A. pomiformis</i>	4	16, 18, 44	Bark of <i>Washingtonia</i> and <i>Quercus</i>	5–6	3–6
<i>A. versicolor</i>	5	32, 33	Decaying trunk of <i>Abies</i>		
<i>Ceratiomyxa fruticulosa</i>	1	40	Decaying wood		
<i>Collaria rubens</i>	1	18	Bark of <i>Washingtonia</i>	5.5	34
<i>Echinostelium elachiston</i>	4	12, 15, 16	Bark of <i>Pinus</i> and <i>Liquidambar</i>	5.5	6–13
<i>E. minutum</i>	7	12, 29, 31, 39, 44	Bark of <i>Pinus</i> , <i>Castanea</i> and <i>Quercus</i>	4.5–5.5	6–36
<i>Hemitrichia clavata</i>	3	38	Decaying wood, probably of <i>Fagus</i>		
<i>Lamproderma arcyrioides</i>	1	32	Litter on edge of melting snow		
<i>Licea kleistobolus</i>	3	11, 25, 30	Bark of <i>Pinus</i>	4.5–5	6–10
<i>Lycogala epidendrum</i>	3	38, 39, 41	Fallen trunk of <i>Fagus</i> ; decaying wood		
<i>Macbrideola cornea</i>	3	34	Bark of <i>Pistacia</i>	5–5.5	10–27
<i>Paradiacheopsis fimbriata</i>	4	29, 30	Bark of <i>Castanea</i> and <i>Pinus</i>	5–5.5	3–7
<i>Perichaena corticalis</i>	1	27	Bark of <i>Malus</i>	6	6
<i>Physarum auriscalpium</i>	1	16	Bark of <i>Liquidambar</i>	5.5	15
<i>P. cinereum</i>	1	25	Bark of <i>Juniperus</i>	6.5	34
<i>Stemonitopsis typhina</i>	2	38	Fallen trunk, probably of <i>Fagus</i>		
<i>Trichia alpina</i>	1	38	Fallen trunk, probably of <i>Fagus</i>		
<i>T. decipiens</i>	2	41	Decaying wood		
<i>T. favoginea</i>	2	31, 40	Decaying wood; decaying trunk of <i>Pinus</i>		

38 A3 Bolu: ca. 23 km from Bolu to Yedigöller,  
highest point of the road  
Alt 1680 m  
Open *Abies nordmanniana* subsp. *bornmuelleriana*–*Fagus* forest with patches of meadow  
May 23, 1983

Alt. ca. 800 m  
*Carpinus*–*Fagus* forest in bottom of the valley  
in surroundings of the lakes  
May 23, 1983  
40 A3 Bolu: Ca. 20 km from Bolu to Yedigöller  
Alt. 1400 m

39 A3 Bolu: Yedigöller National Park

*Abies nordmanniana* subsp. *bornmuelleriana*–

- Fagus* forest on steep slope  
May 23, 1983
- 41 A3 *Bolu*: Ca. 15 km from Bolu to Yedigöller  
Alt. 1200 m  
*Abies nordmanniana* subsp. *bornmuelleriana*–*Fagus* forest  
May 23, 1983
- 44 A2(E) *Istanbul*: Belgrad forest, Neset suyu,  
around the picnic place  
Alt. ca. 20 m  
Deciduous *Quercus* forest  
May 25, 1983

The bark material was used later in summer in Finland to establish 81 moist chamber cultures. The moist chambers were treated in the same way as described by Härkönen and Uotila (1983). The cultures were maintained for five weeks, after which the non-productive chambers were removed. No rewetting was done as earlier (Härkönen & Uotila 1983) and this time the yield of Myxomycetes was smaller.

### The species of Myxomycetes

The specimens of Myxomycetes found in the field during the excursion or later in the moist chambers totalled 53. They represent 21 species, 12 of which are new to Turkey. Representative specimens are deposited in the Botanical Museum of the University of Helsinki. The species are briefly discussed below. The notes on their distribution in the Mediterranean area and the areas around Turkey were compiled from Alexopoulos (1959), Almeida (1964, 1966, 1976, 1979, 1983), Brandza (1914, 1916, 1921, 1928), Faurel et al. (1965), Galán et al. (1984), Gràcia Barba (1977, 1979), Gràcia & Llimona (1980), Gràcia et al. (1981, 1982), Ladó (1985a, b), Ladó & Moreno (1976, 1978, 1980, 1981), Lado et al. (1980), Maire et al. (1926), Malençon & Bertault (1967), Nannenga-Bremekamp & Ladó (1985), Pidoplichka (1932), Pirola (1968), Pirola & Credaro (1971, 1975), Rammeloo (1973), Ramon (1968), Vasjagina et al. (1977), Zerov (1967). The notes on the general distribution (whether a species is considered cosmopolitan or not) are from Martin and Alexopoulos (1969).

The collecting sites and substrata of all the specimens are listed in Table 1.

### List of species

*Arcyria cinerea* (Bull.) Pers.

*A. denudata* (L.) Wettst.

One specimen from a mountain area. Cosmopolitan. New to Turkey.

*A. pomiformis* (Leers.) Rost.

*A. versicolor* Phill.

Several abundant specimens, all collected from a high mountain area (1600–2000 m) on fallen trunks of *Abies nordmanniana* subsp. *bornmuelleriana*. Not common, earlier records from the Mediterranean region are from Moldavia, Morocco and Spain. New to Turkey.

*Ceratiomyxa fruticulosa* (Müll.) Macbr.

A cosmopolitan species. New to Turkey.

*Collaria rubens* (A. Lister) Nann.-Brem.

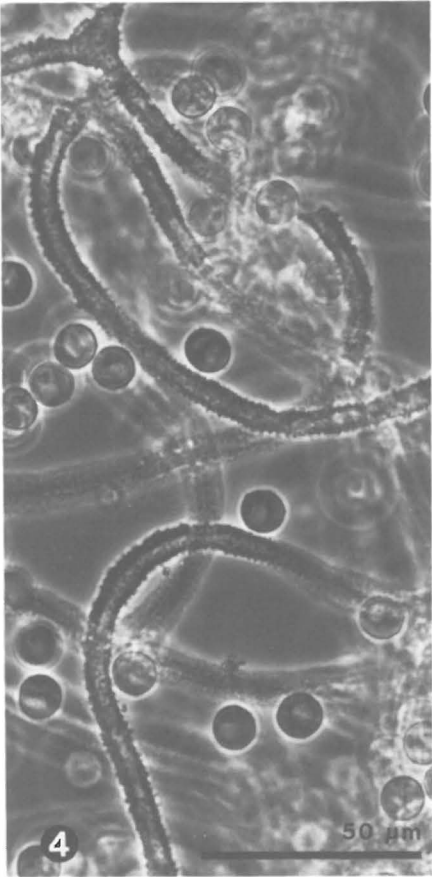
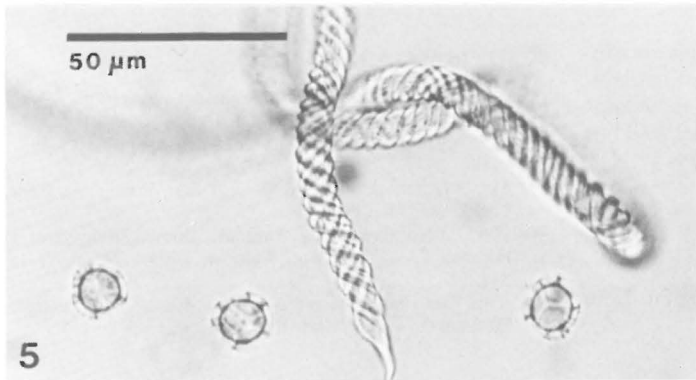
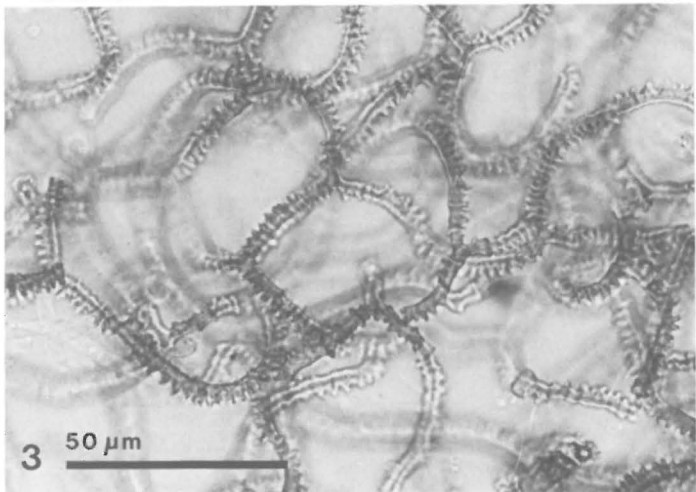
Bark from *Washingtonia* palm in a moist chamber yielded a rich colony of small sporangia. Even under the dissecting microscope, the small collar formed by the persistent lower part of the peridium can be seen. According to Martin and Alexopoulos (1969), not uncommon in Britain but rarely collected elsewhere. In the Mediterranean area reported from Spain. New to Turkey.

*Echinostelium elachiston* Alexop.

Sporangia 150–220 µm, erect or nodding. Stalk hair-like, containing granular material in the lower portion and becoming hyaline upwards. The sporangia are very fragile and the spore ball tends to drop off when a preparation is made. No capillitium. Some sporangia seem to lack a columella, some have a ball at the top. It is difficult to decide, whether there is a spore-like columella or whether one of the spores remains at the top of the stalk after all the others have dispersed (see Alexopoulos 1959). When all the spores have dispersed, a small collar can be seen at the top of the sporangium. Spores hyaline, smooth or very finely warted, having faint circular areas on the wall, 6–8.5 µm in diameter.

The present specimens look very much like those described by Härkönen and Uotila (1983 Fig. 9) as *Echinostelium* sp. The only difference from the present material is in the spores, which in the earlier specimens have distinct circular thickenings at points of spore to spore contact. I cannot say whether this is a constant character, since attempts to cultivate the species from spore to spore were unsuccessful.

The type specimen of *Echinostelium elachiston* (GR-194, State University of Iowa, Myxomycete collection) was compared with the present specimens. As the type specimen includes only a few sporangia, only one preparation was made from it. Only the



spore ball could be caught in it. The spore ball is surrounded by a very thin peridial membrane. The spores are hyaline, minutely warted (seen only with oil immersion lens), do not appear to have circular areas on the wall and are 6.5–8 µm in diameter.

Of all the described species of *Echinostelium*, the present specimens fit *E. elachiston* best, although some of the sporangia are taller than indicated in the description of the species. According to Martin and Alexopoulos (1969), it is widely distributed in Greece, and it now seems to belong to the Turkish flora also.

***E. minutum* de Bary**

Several typical specimens. One specimen has sporangia without any capillitium. The top of the stipe is rounded and one spore-like cell is stuck to it. Such sporangia occurred in Turkish material in the previous study as well (Härkönen & Uotila 1983; Fig. 11). This may be a distinct new taxon.

***Hemitrichia clavata* (Pers.) Rost.**

Widely distributed in the Mediterranean region. New to Turkey.

***Lamproderma arcyrioides* (Sommerf.) Rost.**

Strongly iridescent sporangia on litter at the margin of melting snow. Reported from Greece, Italy, Portugal, Morocco and Kazakhstan. New to Turkey.

***Licea kleistobolus* Martin**

***Lycogala epidendrum* (L.) Fries**

***Macbrideola cornea* (G. Lister & Gran) Alexop.**

***Paradiacheopsis fimbriata* (G. Lister & Gran) Hertel**

***Perichaena corticalis* (Batsch) Rost.**

***Physarum auriscalpium* Cooke**

***P. cinereum* (Batsch) Pers.**

A cosmopolitan species. New to Turkey.

***Stemonitopsis typhina* (Wiggers) Nann.-Brem.**

A cosmopolitan species. New to Turkey.

***Trichia alpina* (R.E. Fries) Meylan**

Dark brown pulvinate sporangia and short plasmodiocarps. Spores minutely spinulose, 13–16 µm in diameter. This species, which grows in high mountains near melting snow (Martin & Alexopoulos 1969) has been reported from Morocco. New to Turkey.

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

A cosmopolitan species. New to Turkey.

***T. favoginea* (Batsch) Pers.**

Widely distributed in the Mediterranean region. New to Turkey.

## Discussion

Including the taxa reported in Härkönen and Uotila (1983), 43 species of Myxomycetes are now known from Turkey. This is still a low number compared with those of the better known Mediterranean countries. Eleven of the present species developed in moist chambers from dormant spores collected with bark and only ten were found as fruit bodies, in spite of intensive searching. More species might have been found on an autumn excursion.

Rather little attention has been paid to the phenology of the Myxomycetes in the literature. Gray and Alexopoulos (1968) reported that, June, July and August are the most favourable months for collecting Myxomycetes in the Northern United States, whereas in Jamaica year-round collecting is possible. During the relatively short fruiting season in the north, *Ceratiomyxa fruticulosa* and *Lycogala epidendrum* are almost invariably the first species to appear in spring. Both were found in Turkey during the excursion.

Bjørnekaer and Klinge (1963) have tabulated the collecting times of all the Danish Myxomycete specimens obtained so far. Most specimens were collected from August to October. Of the 102 species listed, 33 have been found at least once in spring (from March to May). The following species have particularly many spring finds *Hemitrichia vesparium*, *Perichaena corticalis*, *Trichia persimilis*, *T. decipiens* and *T. varia*. In Finland, the following Myxomycetes often appear in spring: *Trichia persimilis*, *T. varia*, *T. decipiens*, *Arcyria nutans*, *A. incarnata*, *Comatricha nigra* and *Perichaena corticalis* (Härkönen 1974). Species of *Trichia* and *Arcyria* were abundantly represented in the Turkish material also, and six of the ten species found in the field belong to the family *Trichiaceae*. On the other hand, one of these is *T. decipiens*, which Eliasson (1981) considers a species clearly restricted to autumn.

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