



Some Mycetoza (Myxomycetes) Members from Zorkun High Plateau (Osmaniye)

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Zorkun Yaylası (Osmaniye)'ndan Bazı Mycetoza (Myxomycetes) Üyeleri

Abstract: Myxomycete samples collected from 4 different localities from Zorkun Plateau (Osmaniye-Turkey) between 2014-2016. As a result of field and laboratory studies 28 species belonging to 9 families and 16 genera were determined. Among them, seven species were collected only from nature, 16 were obtained by Moist Chamber Technique in laboratory, and 5 species were obtained both from nature and by Moist Chamber Technique. *Echinostelium minutum*, *Cribraria cancellata*, *Didymium difforme*, *Didymium squamulosum*, *Physarum album*, and *Arcyria cinerea* are the most common species. Ten species were found to be common and 12 are rare or occasional. Species/genus ratio (S/G) is 1.75. The determined species are given together with habitats, substrates, coordinates, collection dates, voucher numbers and prevalencies.

Key words: Myxomycete, Zorkun High Plateau, Osmaniye, Turkey

Özet: Miksomiset örnekleri 2014-2016 yılları arasında Zorkun Yaylasından (Osmaniye-Türkiye) 4 farklı lokaliteden toplandı. Arazi ve laboratuvar çalışmaları sonucunda 9 familya ve 16 cinse ait 28 tür tespit edilmiştir. Toplanan örneklerden 7 tür sadece doğal ortamdan, 16 tür Nem Odası Tekniği ile laboratuvar şartlarında ve 5 tür ise hem doğal ortamdan, hem de Nem Odası Tekniği ile elde edilmiştir. *Echinostelium minutum*, *Cribraria cancellata*, *Didymium difforme*, *Didymium squamulosum*, *Physarum album*, ve *Arcyria cinerea* en yaygın türlerdir. On tür yaygın, 12 tür de arasıra görülen olarak belirlenmiştir. Tür/Cins oranı 1.75 olarak bulunmuştur. Belirlenen türler habitat, substrat, konum koordinatı, toplanma tarihi, toplayıcı numaraları ve yaygınlık durumları ile birlikte listelenmiştir.

Anahtar Kelimeler: Miksomiset, Zorkun Yaylası, Osmaniye, Türkiye

1. Introduction

Mycetoza; plasmodial slime moulds; Myxomycetes; a small group of organisms with amorphous, multinucleate and protoplasmic mass and about 994 species world-wide (Lado, 2017). Two hundred and sixty two 262 species have been reported from Turkey (Sesli et al., 2016). Molecular and physiological studies support the classification of myxomycetes within eukaryotic organisms in the kingdom Protocista (Everhart and Keller, 2008). Plasmodial slime molds are generally found on decaying or living plant materials. Mostly cosmopolitan, several microhabitats for these species have also been reported in forest ecosystems.

Osmaniye is situated in the Eastern Mediterranean region of Turkey with a surface area of 3280 km², and surrounded by Gaziantep to the east, Hatay to the south, Adana to the west and Kahramanmaraş to the north. Southeastern parts are also bordered by the Amanos Mountains, extending from the port of Iskenderun to the east, while northwestern parts are bordered by Toros Mountains. Osmaniye has a Mediterranean climate. Summers are very hot and dry while the winters are cool and wet (Anonymous, 2017). The Zorkun high plateau is located in the most eastern side of the Mediterranean region within Osmaniye province (Turkey) (Figure 1). It is one of the most important and old high plateau of Osmaniye and Çukurova region at the northern slopes of the Amanos mountains. Its population reaches almost to 60.000 people during summer. Average altitude is about 1.550 meters. The Zorkun high plateau is of significant research interest because of different ecosystem types in both forests and agricultural lands. The highest point of the plaeau is Keldaz hill (2108 m). The vegetation of

Zorkun plateau is very rich; *Pinus brutia* and maquis are mixed with up to 600 meters. *Pinus brutia* forests are dominant between 600-900 meters. Between 900-1100 meters mixed populations of *Pinus nigra* and *Pinus brutia* are visible, together with *Carpinus orientalis*, *Buxus sempervirens* along stream sides. After 1300 meters *Quercus infectoria* takes the place of *P. brutia* together with *Pinus nigra*. Between the altitudes of 1400- 1800 meters, *Pinus nigra* is the most dominated tree in the region. *Fagus orientalis*, is distributed among *P. nigra* above 1800 meters. Some pure *Abies cilicica* populations also exist between 1900-2000 meters (Sevgi, 1984; Gürçınar and Yüceer, 1995).

The work aims to make a contribution to the myxobiota of Turkey.

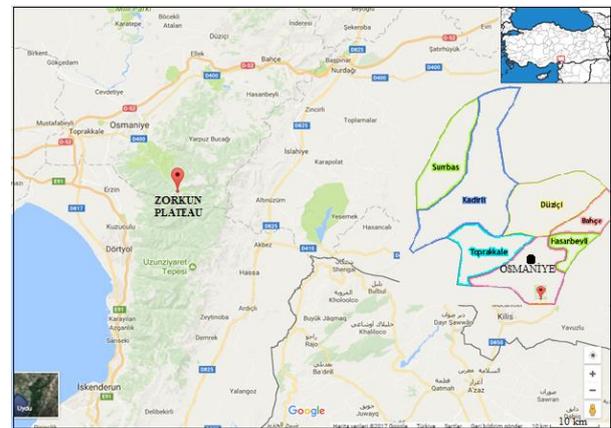


Figure 1. Map of Osmaniye and Zorkun high plateau

2. Materials and Method

Natural substrates and debris material, like bark of living trees, as well as decaying bark, wood, leaves and litter were collected from four different stations in Zorkun High Plateau. Natural mature fructifications were directly collected from the substratum and placed in cardboard herbarium boxes. Fructifications of some myxomycetes were obtained from the moist chamber culture in the laboratory. Collected plants materials were moistened with distilled water. The moist chambers were examined every day under a stereo-microscope. When fructification of myxomycetes were detected in the culture, the moist chamber was allowed to dry slowly and the myxomycetes were then dried for one week and prepared as fungarium material.

Microscopic and macroscopic features of the samples were determined in the laboratory. The morphological characters; fruiting bodies shape, size and colour, spore size and ornamentation, capillitium colour and branching, lime crystalsize and morphology, stalk colour and proportion were measured. The specimens were identified according to the relevant references (Martin and Alexopoulos, 1969; Neubert et al., 1993, 1995 and 2000). The samples are stored in fungarium of biology department.

3. Results

In this study 28 species (65 samples) belonging to 6 orders, 9 families and 16 genera were identified. Twenty three samples (7 species) were collected in field, 42 samples (16 species) were developed in moist chamber culture and 5 species were both collected from nature and obtained by moist chamber culture in laboratory.

Abundance indices were applied to all species collected from research area. These indices are categorised as Rare (for species < 0.5% of total number collections), Occasional (for species > 0.5% but < 1.5% of total), Common (for species > 1.5% but < 3.0% of total), and Abundant (for species > 3.0% of total) (Stephenson et al., 1993). In our study, 6 species were found to be abundant (A), 10 species were common (C), 12 species were occasional (O). The mean number of species per genus (S/G) was calculated from the data sets of study area as 1.75.

Mycetozoa

Protostelia

Protosteliida

Ceratiomyxaceae

1. *Ceratiomyxa fruticulosa* (O.F. Müll.) T. Macbr.

Derviş Pınarı, on conifer wood, 1500 m, 36°58'15" N; 36°0'56" E, 06.11.2014, Baba 18; Çift Mazı, on woody debris, 800 m, 37°01'10"N; 36°18'17"E, 26.01.2015, Natural, Baba 21, Common.

Myxogastria

Echinosteliida

Echinosteliaceae

2. *Echinostelium minutum* de Bary

Derviş Pınarı, on wood, 1500 m, 36°58'15"N; 36°0'56"E, 06.11.2014, Baba 2, 17, 45; Kent Ormanı, on *Pinus* sp. cone, 800 m, 37°01' 19" N; 36°16'30"E, 26.01.2015, Baba

11; Çift Mazı, on *Pinus* sp. bark, 800 m, 37°01'10"N-36°18'17"E, 26.01.2015, Baba 2, Abundant.

Liceida

Cribrariaceae

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

Keldaz hill, on woods, 2100 m, 36°51'12"N-36°22'58"E, 06.11.2014, Natural, Baba 19, 40, 41, Abundant.

4. *Cribraria microcarpa* (Schrad.) Pers.

Kent Ormanı, on wood, 800 m, 37°01'19"N-36°16'30"E, 26.01.2015, Baba 24; Derviş Pınarı, on conifer bark, 1500 m, 36°58'15"N-36°0'56"E, 06.11.2014, Natural, Baba 30, Common.

5. *Cribraria violacea* Rex

Çift Mazı, on conifer wood, 800 m, 37°01'10"N-36°18'17"E, 26.01.2015, Baba 11, Occasional.

Liceaceae

6. *Licea biforis* Morgan

Kent Ormanı, on *Pinus* sp. bark, 800 m, 37°01'19"N-36°16'30"E, 06.11.2014, Baba 26. Occasional.

7. *Licea castanea* G.Lister

Derviş Pınarı, on conifer bark, 1500 m, 36°58'15"N-36°0'56"E, 06.11.2014, Baba 30, Occasional.

8. *Licea minima* Fr.

Keldaz hill, on conifer barks, 2100 m, 36°51'12"N-36°22'58"E, 06.11.2014, Baba 9, 48, Common.

Reticulariaceae

9. *Lycogala epidendrum* (J.C.Buxb. ex L.) Fr.

Çift Mazı, on decaying bark, 800 m, 37°01'10"N-36°18'17"E, 26.01.2015, Natural, Baba 10, Occasional.

Physarida

Didymiaceae

10. *Didymium difforme* (Pers.) S.F.Gray

Kent Ormanı, in coniferous debris leaves, 800 m, 37°01'19"N-36°16'30"E, 26.01.2015, Baba 21, 29, 36, 47; Kent ormanı, on pomegranate bark, 800 m, 37°01'19"N-36°16'30"E, 26.01.2015, Natural, Baba 28; Çift Mazı, on leaves, 800 m, 37°01'10"N- 36°18'17"E, 26.01.2015, Baba 54, 78; Derviş Pınarı, on conifer leaves, 1500 meter, 36°58'15"N-36°0'56"E, 26.01.2015, Natural, Baba 22, 88, Abundant.

11. *Didymium squamulosum* (Alb. & Schwein.) Fr.

Çift Mazı, on leaves, 800 m, 37°01'10"N-36°18'17"E, 26.01.2015, Baba 54, 78; Derviş Pınarı, on conifer leaves, 1500 m, 36°58'15"N-36°0'56"E, 26.01.2015, Baba 22, 88, Abundant.

Physaraceae

12. *Physarum album* (Bull.) Chevall.

Çift Mazı, on woods, 800 m, 37°01'10"N-36°18'17"E, 26.01.2015, Natural, Baba 4, 71; Derviş Pınarı, on conifer barks, 1500 m, 36°58'15"N- 36°0'56"E, 26.01.2015, Baba 12, 18, Abundant.

13. *Physarum cinereum* (Batsch) Pers.

Çift Mazi, on debris barks, 800 m, 37°01'10"N-36°18'17"E, 26.01.2015, Baba 54, 78, Common.

14. *Fuligo septica* (L.) F.H. Wigg.

Kent ormanı, on grass leaves, 800 m, 37°01'19"N-36°16'30"E, 26.01.2015, Natural, Baba 51, 88, Common.

Stemonitida

Stemonitidaceae

15. *Collaria lurida* (Lister) Nann.-Bremek.

Çift Mazi, on conifer barks, 800 m, 37°01'10"N-36°18'17"E, 26.01.2015, Baba 8, 28, Common.

16. *Comatricha ellae* Härk.

Derviş Pınarı, on conifer barks, 1500 m, 36°58'15"N-36°0'56"E, 26.01.2015, Baba 41, Occasional.

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

Derviş Pınarı, on coniferous leaves, 1500 m, 36°58'15"N-36°0'56"E, 26.01.2015, Natural, Baba 26, Occasional.

18. *Comatricha nigra* (Pers. ex J.F. Gmel.) J. Schröt.

Derviş Pınarı, on conifer woods, 1500 m, 36°58'15"N-36°0'6"E, 26.01.2015, Baba 2, Occasional.

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

Derviş Pınarı, on conifer woods, 1500 m, 36°58'15"N-36°0'56"E, 26.01.2015, Natural, Baba 8, Occasional.

20. *Macbrideola cornea* (G. Lister & Cran) Alexop.

Derviş Pınarı, on conifer barks, 1500 m, 36°58'15"N-36°0'56"E, 26.01.2015, Baba 10, Occasional.

21. *Stemonitopsis amoena* (Nann.-Bremek.) Nann.-Bremek.

Derviş Pınarı, on conifer woods, 1500 m, 36°58'15"N-36°0'56"E, 26.01.2015, Baba 22; Çift Mazi, on barks, 800 m, 37°01'10"N-36°18'17"E, 26.01.2015, Baba 12, Common.

Trichiida

Arcyriaceae

22. *Arcyria cinerea* (Bull.) Pers.

Derviş Pınarı, on conifer woods, 1500 m, 36°58'15"N-36°0'56"E, 26.01.2015, Natural, Baba 22, 47, 58; Çift Mazi, on barks, 800 m, 37°01'10"N-36°18'17"E, 26.01.2015, Natural, Baba 12, 56; Keldaz hill, on conifer barks, 2100 m, 36°51'12"N-36°22'58"E, 06.11.2014, Baba 9, 48, 59, Abundant.

23. *Arcyria incarnata* (Pers.) Pers.

Derviş Pınarı, on conifer woods, 1500 m, 36°58'15"N-36°0'56"E, 26.01.2015, Baba 22, Occasional.

24. *Arcyria pomiformis* (Leers) Rostaf.

Derviş Pınarı, on conifer woods, 1500 m, 36°58'15"N-36°0'56"E, 26.01.2015, Baba 22; Çift Mazi, on debris

barks, 800 m, 37°01'10"N-36°18'17"E, Baba 26, Common.

25. *Arcyria obvelata* (Oeder) Onsberg

Çift Mazi, on woody debris, 800 m, 37°01'10"N; 36°18'17"E, 26.01.2015, Natural, Baba 54, 78, Common.

Trichiaceae

26. *Perichaena corticalis* (Batsch) Rostaf.

Kent ormanı, on debris barks, 800 m, 37°01'19"N-36°16'30"E, 26.01.2015, Baba 54, 78, Common.

27. *Perichaena depressa* Lib.

Çift Mazi, on debris barks, 800 m, 37°01'10"N-36°18'17"E, 26.01.2015, Baba 42, Occasional.

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

Çift Mazi, on debris, 800 m, 37°01'10"N-36°18'17"E, 26.01.2015, Natural, Baba 5, Occasional.

4. Discussions

Our research is the first study on myxomycetes of Osmaniye. Totaly 28 species were determined for Osmaniye myxobiota. *Echinostelium minutum*, *Cribraria cancellata*, *Didymium difforme*, *Didymium squamulosum*, *Physarum album*, and *Arcyria cinerea* are the most common species (Abundant) in research area, and they comprised the 50.7% of all the samples. Many studies have also reported that the above-mentioned species are cosmopolitan on different substrates (Alexopoulos et al., 1996; Ergül and Akgül, 2011; Stephenson, 2014; Baba et al., 2016). The most common genera to be determined in the region was *Arcyria*. Then comes *Comatricha*, *Didymium*, *Echinostelium* and *Physarum*. Comprising 5 genera and 7 species, Stemonitidaceae was the largest family (25%) in the region.

The myxomycete samples are generally determined on dead and decaying coniferous wood, bark, leaves and debris materials (Ing and Haynes, 1999; Ergül et al., 2005; Ko et al., 2010; Baba and Özyiğit, 2017). The majority of the samples were also collected from similar substrates and in our study. In research area the percentage of lignicolous myxomycetes is 34%, corticolous myxomycetes is 40%, foliicolous myxomycetes is 23%.

The mean number of species per genus (S/G) is 1.75 in our area. As Simberloff (1970) and others have pointed out, a low value for S/G implies a higher overall diversity. According to Stephenson et al. (1993) this rate in Southern India is 2.24 and 4.13 in North America. Alexopoulos (1970) reported that species diversity of myxomycetes is lower in tropical forests than temperate forests (Tee et al., 2014).

With this study, 28 myxomycete species were determined from Zorkun High Plateau, and a considerable contribution was made to the myxobiota of Osmaniye province and Turkey.

References

- Alexopoulos CJ, Mims CW, Blackwell M (1996). *Introductory Mycology*. John Wiley and Sons, Inc, California University USA.
Anonymous (2017). <http://www.dmi.gov.tr/veridegerlendirme/il-ve-ilceler-istatistik.aspx?m=Osmaniye>

- Baba H, Zumre M, Gelen, M (2016). An Investigation on North Adana (Turkey) Myxomycetes. *Chiang Mai Journal of Science* 43(1): 54-67.
- Baba H, Özyiğit İİ (2017). Three new rare Myxomycetes (Mycetozoa) records from Hatay, Turkey. *Fresenius Environmental Bulletin* 26(8): 4907-4910.
- Ergül CC, Dülger B, Akgül H (2005). Myxomycetes of Mezit stream Valley of Turkey. *Mycotaxon*, 92: 239-242.
- Ergül CC, Akgül H (2011). Myxomycete diversity of Uludağ national park, Turkey. *Mycotaxon* 116: 479.
- Everhart SE, Keller HW (2008). Life history strategies of corticolous myxomycetes: the life cycle, plasmodial types, fruiting bodies, and taxonomic orders. *Fungal Diversity* 29: 1-16.
- Gürçınar Y, Yüceer NS (1995). Çukurova Bölgesindeki yaylaların Genel Çevre Sorunları Zorkun yaylası Orneği. *Çukurova Üniv, Müh. ve Mim. Dergisi* 10(1,2): 79-90.
- Ing B, Haynes C (1999). Corticolous myxomycetes from Belize. *Kew Bulletin* 54(3): 723-730.
- Ko KTW, Tran HTM, Stephenson SL, Mitchell DW, Rojas C, Hyde KD, Lumyong S, Bahkali AH (2010). Myxomycetes of Thailand. *Sydowia* 62: 243-260.
- Lado C (2005-2017). CSIC (An online nomenclatural information system of Eumycetozoa) October 20, 2017 <http://www.nomen.eumycetozoa.com>.
- Martin GW, Alexopoulos CJ (1969). *The Myxomycetes*. University of Iowa, Iowa City.
- Neubert H, Nowotny W, Baumann K (1993). *Die Myxomyceten Vol. 1. Ceratiomyxales, Echinosteliales, Liceales und Trichiales*. In verlag karlheinz baumann, gomaringen, Germany.
- Neubert H, Nowotny W, Baumann K (1995). *Die Myxomyceten Vol. 2. Physarales*. In Verlag karlheinz baumann, gomaringen, Germany.
- Neubert H, Nowotny W, Baumann K (2000). *Die Myxomyceten Vol. 3 Stemonitales*. In verlag karlheinz baumann, gomaringen Germany.
- Sesli E, Akata I, Denchev TT, Denchev CM (2016). Myxomycetes in Turkey, a checklist. *Mycobiota* 6: 1-20.
- Sevgi C (1984). Adana İlinin Kuzeydoğu Kesiminde yaylacılık. *Ege Coğrafya Dergisi* 2(1): 177-197.
- Stephenson SL, Kalyanasundaram I, Lakhanpal TN (1993). A comparative biogeographical study of Myxomycetes in the Mid-Appalachians of Eastern North America and two regions of India. *Journal of Biogeography* 20(6): 645-657.
- Stephenson SL (2014). A comparative species listing of myxomycetes from tropical (Philippines) and temperate (United States) forests. *Mycosphere* 5(2): 299-311.
- Tee DC, Mad R, Tran HTM, Ko KTW, Stephenson SL (2014). A comparative species listing of myxomycetes from tropical (Philippines) and temperate (United States) forests. *Mycosphere* 5(2): 299-311.

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