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Myxobiota of the İskenderun Gulf (Mediterranean Sea/Türkiye) and its Environment

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ABSTRACT

This study aims to determine the myxobiota of the İskenderun Gulf and its environment. This study was carried out on samples collected from 9 different stations in the İskenderun Gulf district in 2019-2022. Myxomycetes samples were collected from leaves, tree bark, and decayed and non-rotting plant materials. This aim is to detect both the myxobiota of this region and the halophytic myxomycetes species. The collected samples have developed myxomycete sporophores by using the moist chamber technique. In addition, myxomycetes which were developed in their natural environment were collected. As a result of the field and laboratory studies, 161 samples from different localities were collected and processed and 111 myxomycete samples were obtained from these samples. 41 species belonging to 6 ordo, 12 families, and 20 genera have been defined. 3 species were obtained only from the natural environment, 30 species were obtained only from moist chamber culture, and 8 species were obtained from both moist chamber culture and natural area. *Arcyria cinerea, Didymium difforme, D. squamulosum,* and *Physarum pusillum* were determined as abundant. While the number of species is rare in the seaside regions, it was observed that the further away from the sea, the number of species increased, especially in forest areas. *A. cinerea, D. difforme,* and *D. dubium* are the most common species on the beach and near the seaside. While cosmopolitan species were observed in abundance, Physarida members were found to be common in this results area. This study has contributed to the myxobiota of Türkiye.

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İskenderun Körfezi (Akdeniz/Türkiye) ve Çevresinin Myxobiota'sı

ÖZET

Bu çalışma İskenderun Körfezi ve çevresinin miksobiyatasının belirlenmesini amaçlamaktadır. Bu çalışma 2019-2022 yıllarında İskenderun Körfezi ve çevresinde 9 farklı istasyondan toplanan numuneler üzerinde yapılmıştır. Yaprak, ağaç kabuğu, çürümüş ve çürümeyen bitki materyalleri üzerinden miksomiset örnekleri toplandı. Amacımız hem bu bölgenin Myxobiota'sını hem de halofitik miksomiset türlerini tespit etmektir. Toplanan örneklerde nemli oda tekniği kullanılarak miksomiset sporoforları geliştirilmiştir. Ayrıca doğal ortamlarında gelişen miksomisetler de toplanmıştır. Arazi ve laboratuvar çalışmaları sonucunda farklı lokalitelerden 161 adet örnek toplanarak işlenmiş ve bu örneklerden 111 adet miksomiset örneği elde edilmiştir. 6 ordo, 12 familya ve 20 cinse ait 41 tür tanımlanmıştır. 3 tür sadece doğal ortamdan, 30 tür sadece nemli oda kültüründen, 8 tür hem nemli oda kültürü hem de doğal ortamdan elde edilmiştir. *Arcyria cinerea, Didymium difforme, D. squamulosum* ve *Physarum pusillum* bol olarak belirlendi. Denize kıyısı olan bölgelerde tür sayısı az bulunurken, denizden uzaklaştıkça özellikle ormanlık alanlarda tür sayısının arttığı gözlemlendi. *A. cinerea*, *D. difforme* ve *D. dubium*, sahilde ve deniz kıyısına yakın yerlerde en yaygın türlerdir. Kozmopolit türler bol miktarda gözlenirken çalışma alanımızda Physarida üyelerinin de yaygın olduğu görülmüştür. Bu çalışmada Türkiye miksobiyotasına katkı sağlanmıştır.

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INTRODUCTION

Myxomycetes have been known worldwide for 300 years and 6 orders, 14 families, 68 genera, and approximately 1100 species have been identified until today (Lado, 2005-2023). Studies on myxomycetes first began with the description of the *Lycogala epidendrum* by Pankow in 1654. In 1887, De Bary distinguished between true slime molds and cellular slime molds according to plasmodium formation. This researcher showed both groups within Mycetozoa, reporting that true slime molds were closer to Protozoa than fungi (Alexopoulos et al., 1996). Plasmodial slime molds, also referred to as acellular or true slime molds, are considered a monophyletic taxon. In the current classification of living organisms, they are placed in the phylum Amoebozoa of the kingdom Protozoa as the class Myxomycetes or Myxogastrea (Adl et al., 2019). They are a group of amoeboid eukaryotes that produce fungus-like fruiting bodies (Leontyev et al., 2019). De Bary (1859) was the first to discover some protozoan properties of such organisms, calling them Mycetozoa (Rao & Chen, 2023). Myxomycetes are a group of eukaryotic microorganisms in terrestrial ecosystems, that are common in bark, woody debris, litter, lianas, bryophytes, dung, and soil (Liu et al., 2015). They are currently recorded in tropical, subtropical, temperate, and boreal forests, tundra, grasslands, deserts, and alpine snowbanks (Schnittler et al., 2017). However, in terms of the distribution of the world's climatic zones, the distribution in tropical and temperate climates is far more extensive than that of subtropical humid climates, and the species of myxomycetes in subtropical forests have not been sufficiently studied. Subtropical regions have a humid climate and diverse vegetation, and they are located in the transition region between tropics and temperate zones. Therefore, they should have abundant resources of myxomycete species (Li et al., 2021). The main influencing factors of species diversity of myxomycetes are divided into abiotic factors, such as temperature, humidity, altitude, water retention, and pH, and biological factors, such as vegetation type, bacterial composition, fungal composition (Liu et al., 2015; Xavier de Lima & de Holanda Cavalcanti, 2015).

Türkiye shows different climatic, topographic, and geological differences, it is located in an area where three different geographical regions such as the Mediterranean, Iran-Turan, and Euro-Siberia intersect, is in the transition zone between the European and Asian continents, is a gene center for many living things, it is rich in biodiversity since it has different habitats such as lakes, streams, swamps, mountains, and plains (FAO, 2019). Now the number of species has reached 309 today. These species belong to 6 orders, 13 families, and 45 genera (Baba & Sevindik, 2023). The Mediterranean Region is one of the seven geographical regions of Türkiye. It stretches along the Mediterranean coast in the south of Anatolia. İskenderun Gulf is the easternmost point of the Mediterranean, nestled between the provinces of Hatay and Adana (Figure 1). There are 9 districts in the Gulf, namely Karataş, Yumurtalık, and Ceyhan belonging to the province of Adana, and Erzin, Dörtyol, Payas, İskenderun, Belen, and Arsuz belonging to the province of Hatay.

Figure1. Study area
Şekil 1. Çalışma alanı

The town of Arsuz (36°24'43.88" N - 35°53'25.11" E) is located between the Amanos Mountains and the Mediterranean coast. District lands are generally covered with flat areas. High hills, valleys, and plateaus are covered with forests in the parts close to the Amanos Mountains. 50.5% of Arsuz district lands are mountains, 45.7% plains, and 5.3% plateaus. The highest point within the borders of the Arsuz district is Daz Hill with 1.755 meters and Çobandede Hill with a height of 1.722 meters. The most important streams of the district are Zilli and Arsuz Streams (Anonymous, 2021a).

Belen (36°27'36.90" N - 36°09'14.20" E) is a district of Hatay province in the Adana Section of the Mediterranean Region. Belen Pass, whose coordinates and altitude are one of the most important passes in Türkiye, is within the borders of the district and has rich forest areas. The altitude of the district center, which is 50 km away from Antakya, is approximately 700 meters. Since Belen is located within the borders of the Mediterranean Region, the air masses and

movements that are effective in the Mediterranean Region also affect the climatic characteristics of the district. The annual average temperature in Belen district is 16.8°C. The annual average rainfall is 697.5 mm in Belen. The month with the highest average precipitation in Belen is December (Anonymous, 2021a).

İskenderun district (36°35'04.47" N - 36°10'36.10" E) was established on the skirts of the Nur Mountains, on an area of 5 km², on the edge of the Mediterranean. Coordinates and altitude Mediterranean climate are observed in İskenderun. The warmest month average is 32-34 °C, the coldest month average is 10-12 °C. The annual average temperature is 18 °C. The most precipitation falls in the winter, the least in the summer. Annual rainfall varies according to altitude. The average is between 600-1000 mm (Anonymous, 2021a).

Payas (36°44'39.42" N - 36°17'04.98" E) district center was established on a flat area on the Mediterranean coast. *Citrus* spp. production and agriculture are widespread. Its coordinates and altitude The most important streams of the district are Kozludere and Payas Streams. The Mediterranean climate is seen in the Payas district. Summers are hot and dry, and winters are cold and rainy (Anonymous, 2021a).

The district of Dörtyol (36°49'07.96" N - 36°17'10.17" E) is located in the North-South direction between the Nur Mountains (Amanos), which is the extension of the Eastern Taurus Mountains, and the İskenderun Gulf of the Mediterranean Sea, and consists of the Payas Alluvial plains. In its coordinates and altitude the climate is hot and dry in summer, mild and rainy in winter, and a typical Mediterranean climate prevails. Precipitation in the district is in the form of rain and it is one of the centers that receive the most precipitation after Rize in Türkiye. In the district, snow falls in high mountain areas (Anonymous, 2021a).

Erzin (36°57'13.90" N - 36°12'18.82" E) district, located on the western skirt of the Amanos mountains in the north of Hatay province, facing the Mediterranean Sea, in the triangle of Erzin, Adana Osmaniye Hatay, with its back abutting the Amanos mountains and its feet extending towards the Mediterranean. Coordinates and altitude in the district, which has a warm and rainy climate in winter, the temperature and humidity increase in summer. *Citrus* spp. production is widespread in Erzin, whose economy is largely based on agriculture (Anonymous, 2021a).

The town of Ceyhan (37°01'43.58" N - 35°48'44.88" E) is 43 km from Adana and 30 km from the Mediterranean. Coordinates away and altitude Climate is a typical Mediterranean climate. The amount of precipitation in the Ceyhan Plain is 600–750 mm. While it is between 750–1000 mm in mountainous areas, 50% of precipitation falls in winter, 27% in spring, 18% in autumn, and 5% in summer. The most important stream, the Ceyhan River, passes by the district and its length is 509 km. The vegetation of Ceyhan consists of maquis. Since Ceyhan is a large plain, forest areas have been destroyed and turned into agricultural areas. Located in the Ceyhan district of Adana, Botaş was established on the beach by the sea, and its beach is 50 meters wide and 400 meters long (Anonymous, 2021b).

Yumurtalık (36°46'07.05" N - 35°47'17.56" E) district, 81 km from Adana. It is located on the western shores of İskenderun Gulf in the southwest. It is a coastal settlement surrounded by the Mediterranean to the east and south of the district. Coordinates and altitude located in the center of the district, there is an extremely clear and clean natural beach, which is especially popular with local tourists in summer. The district also has a wide bay that gets shallower as you go in and consists of swamps in places. Yumurtalık Lagoon National Park, established on 16 December 2008, is a former National Park and today a nature conservation area in the Yumurtalık district of Adana province in the Mediterranean Region of Türkiye. The lagoon has a total area of 16,430 hectares. It creates a protected natural environment for the plant and animal species in the lake lagoons on the Seyhan-Ceyhan delta, especially for the rare plant species known as Aleppo pine (*Pinus halepensis* Mill.) (Anonymous, 2021b).

The district of Karataş (36°39'52.37" N - 35°15'33.21" E) was established within the natural borders of the Seyhan and Ceyhan rivers in the Eastern Mediterranean region of Adana. The lands of the district are located in the southern part of Adana Province, which protrudes towards the Mediterranean. The lands of the district, whose coordinates and altitude are located in Çukurova, have a completely flat plain land structure. The district has natural beaches on the Mediterranean coast. There are lagoons between the coastal dune banks and the sea (Anonymous, 2021b).

In this context, it has been determined that no studies have been carried out on myxomycetes, especially on the coastline. In this study, the myxomycete diversity of the research area was revealed, and the species that spread in saline environments were determined in line with the results obtained.

MATERIAL and METHOD

Research Area

9 districts located in the Gulf of İskenderun, especially in the coastal area, are homogeneously determined (Konacık, Arsuz, Büyükdere, Belen, Karaağaç, İskenderun, Sarıseki, Denizciler, Azganlık, Karayılan, Payas, Yakacık, Dörtyol, Yeşilkent, Yeniyurt, Kurtkulağı village, Ceyhan, Botaş coast, Erzin free

zone, Yumurtalık, Yumurtalık lagoon forest and Karataş) plant substrates and natural samples collected especially from the seaside and its immediate surroundings were used as materials. Trips were organized to the land between February 2019 and January 2022, covering all four seasons.

Samplings and Identifications

In the context of field studies, various samples of myxomycetes were gathered from different regions within the İskenderun Gulf district. These samples were carefully extracted from their original environments using a cutting tool and subsequently transported to the laboratory in small carton boxes. Samples were collected from various sources, such as tree bark, cut tree stumps, rotting leaves, twigs, cones, fruits, and vegetable residues, with the intention of excluding myxomycetes and sporophore materials. These samples were carefully placed in individual lock storage bags and subsequently transported to the laboratory for further analysis. Subsequently, within the laboratory setting, the researchers successfully achieved fructification formation using the Moist Chamber Technique, as established by Gilbert & Martin in 1933. In the application of the Moist Chamber Technique, a dual layer of sterile filter paper was positioned a top of the petri dishes or transparent storage containers. Subsequently, the samples were placed on the filter paper, followed by the addition of distilled water. The anticipated outcome was the gradual expansion of the samples throughout 24 to 48 hours. Efforts have been made to acquire sporophores through the utilization of a stereomicroscope, with periodic observations conducted under diffuse lighting conditions. The samples were prepared by placing one or two layers of blotting paper in the petri dishes containing storage containers, followed by air-drying at ambient temperature. Following the completion of the drying process, the material transformed fungarium material (Baba et al., 2020). The study involved a comprehensive investigation of various aspects of the spore, including its general structure, shape, color, macroscopic measurements, capillitium, presence of pseudocapillitium and columella (if present), as well as detailed analysis of its shape, measurements, color, size, and spore ornamentations. The identification of specimens was conducted through the utilization of reference books (Martin & Alexopoulos, 1969; Farr, 1981; Thind, 1977; Martin et al., 1983; Neubert et al., 1993; Neubert et al., 1995; Neubert et al., 2000; Stephenson & Stempen, 1994; Lado & Pando, 1997; Ing, 1999). The fungarium materials of the identified samples are stored in the laboratory of the Department of Biology of HMKU Faculty of Science and Arts.

RESULTS and DISCUSSION

In the study conducted in the district of İskenderun Gulf (Adana, Hatay) in 2019-2021, 161 samples from different localities were collected and processed in the laboratory. A total of 111 myxomycete samples were obtained from these samples. As a result of the identification of myxomycete samples obtained from the natural environment and moist chamber culture, 41 species belonging to 6 ordos, 12 families and 20 genera have been defined. 3 species were obtained only from the natural environment, 30 species were obtained only from moist chamber culture, and 8 species were obtained from both moist chamber culture and natural area.

The taxa determined by the field studies are listed. Habitat, geographical location, sample numbers, way of obtaining methods, and substrates of the samples are indicated.

Annotated List of Species

Domain: Eukaryota
Kingdom: Protista
Phylum: Amoebozoa
Infraphylum: Mycetozoa

1. Classis: Protostelia
Order: Protosteliida
Family Ceratiomyxaceae
Genus: *Ceratiomyxa*

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

Distribution of species: Arsuz, on wood, Baba 10.

2. Classis: Myxogastria or Myxomycetes
Order: Echinosteliida
Family Echinosteliaceae
Genus: *Echinostelium*

2. ***Echinostelium minutum*** de Bary

Distribution of species: Karatas beach, on wood, Baba 137; Yumurtalık lagoon forest, on debris, Baba 102.

Order Liceida
Family Cribrariaceae
Genus: *Cribraria*

3. ***Cribraria argillaceae*** (Pers. ex J.F. Gmel.) Pers.

Distribution of species: Karataş beach, on wood, Baba 147.

4. ***C. violaceae*** Rex

Distribution of species: Yumurtalık lagoon forest, on wood, Baba 100.

Family Dictydiaethaliaceae
Genus: *Dictydiaethalium*

5. ***Dictydiaethalium plumbeum*** (Schumach.) Rostaf.

Distribution of species: Arsuz, on bark, Baba 6; Karatas beach, on wood, 129; Kurtkulağı village

Ceyhan, on wood, Baba 85.

Family Liceaceae
Genus: *Licea*

6. ***Licea kleistobolus*** G.W. Martin

Distribution of species: Yumurtalık lagoon forest, on wood, Baba 99.

Family Reticulariaceae
Genus: *Lycogala*

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

Distribution of species: Yumurtalık lagoon forest, on wood, natural, Baba 96.

Order Trichiida
Family Arcyriaceae
Genus: *Arcyria*

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

Distribution of species: Karaağaç, on wood, natural, Baba 15; Konacık, on wood, natural, Baba 106; Yumurtalık lagoon forest, on wood, Baba 92, 95, 98; on debris, Baba 92, 98, 99, 104.

9. ***A. incarnata*** (Pers. ex J.F. Gmel.) Pers.

Distribution of species: Yumurtalık lagoon forest, on wood, Baba 105.

10. ***A. insignis*** Kalchbr. & Cooke,

Distribution of species: Denizciler, on debris, Baba 28; Karataş beach, on wood, Baba 129; Konacık, on wood, Baba 106; Yumurtalık lagoon forest, on wood, Baba 105.

11. ***A. obvelata*** (Oeder) Onsberg

Distribution of species: Yumurtalık lagoon forest, on wood, natural, Baba 101.

12. ***A. pomiformis*** (Leers) Rostaf.

Distribution of species: Yumurtalık lagoon forest, on wood, Baba 94, 99.

Genus: *Perichaena*

13. ***Perichaena chrysosperma*** (Curr.) Lister

Distribution of species: Payas, on dung, Baba 44. Yumurtalık lagoon forest, on bark, Baba 105.

14. ***P. depressa*** Lib.

Distribution of species: Kurtkulağı village Ceyhan, on wood, Baba 85; Yumurtalık lagoon forest, on wood, natural, Baba 101.

Family Dianemataceae
Genus: *Calomyxa*

15. ***Calomyxa metallica*** (Berk.) Nieuwl.

Distribution of species: Yumurtalık lagoon forest, on wood, Baba 94, Kurtkulağı village Ceyhan, on wood, Baba 85.

Family Trichiaceae
Genus: *Metatrichia*

16. ***Metatrichia vesparia*** (Batsch) Nann.-Bremek. ex G.W. Martin & Alexop.

Distribution of species: Yumurtalık lagoon forest, on wood, Baba 91.

Genus: *Trichia*

17. ***Trichia favoginea*** (Batsch) Pers.

Distribution of species: Dörtyol beach, on wood, Baba 57.

Order Physarida
Family Didymiaceae
Genus: *Diderma*

18. ***Diderma hemisphaericum*** (Bull.) Hornem.

Distribution of species: Denizciler, on twig, Baba 24; Karataş beach, on debris, Baba 128.

Genus: *Didymium*

19. ***Didymium annulisporum*** H.W. Keller & Schokn.

Distribution of species: Kurtkulağı village Ceyhan, on bark, Baba 85.

20. ***D. bahiense*** Gottsb.

Distribution of species: Karaağaç, on twig, Baba 16, 17, 18; Karataş, on bark, Baba 140, 145; Konacık, on wood, Baba 108.

21. ***D. difforme*** (Pers.) Gray

Distribution of species: Botaş beach, on debris, Baba 78; Denizciler, on bark, Baba 24, 29; Erzin free zone, on filter paper, Baba 70; Karaağaç, on petri dishes, Baba 16; Karatas beach, on bark, Baba 132, Konacık, on dung, Baba 109; Kurtkulağı village Ceyhan, on dung, Baba 81, Yumurtalık lagoon forest, on wood, natural, Baba 105.

22. ***D. dubium*** Rostaf.

Distribution of species: Arsuz, on bark, Baba 5, Ceyhan, on debris, Baba 86, Ceyhan Erzin road, on debris, natural, Baba 89, Karaağaç, on twig, Baba 12; Karatas beach, on wood, Baba 127, Payas, on bark, Baba 40, Kurtkulağı village, on bark, natural, Baba 84.

23. ***D. melanospermum*** (Pers.) T. Macbr.

Distribution of species: Karaağaç, on twig, Baba 14, Payas, on filter paper, Baba 43.

24. ***D. minus*** (Lister) Morgan

Distribution of species: Yumurtalık lagoon forest, on wood, Baba 102.

25. ***D. squamulosum*** (Alb. & Schwein.) Fr. & Palmquist

Distribution of species: Arsuz, on filter paper, Baba 7, on wood, natural, Baba 10, Denizciler, on wood, natural, Baba 24, Konacık, on petri dishes, Baba 109, Kurtkulağı village Ceyhan, on petri dishes, Baba 86, Yumurtalık lagoon forest, on debris, Baba 90, 98, 101, 105.

Genus: *Mucilago*

26. ***Mucilago crustacea*** P. Micheli ex F.H. Wigg.

Distribution of species: Karataş, on wood, natural, Baba 144.

Family Physaraceae

Genus: *Badhamia*

27. ***Badhamia dubia*** Nann.-Bremek.

Distribution of species: Yumurtalık lagoon forest, on bark, Baba 94.

28. ***B. foliicola*** Lister

Distribution of species: Kurtkulağı village Ceyhan, on debris, Baba 88.

29. ***B. macrocarpa*** (Ces.) Rostaf.

Distribution of species: Belen, on debris, Baba 35.

Genus: *Physarum*

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

Distribution of species: Erzin region 3, on wood, natural, Baba 61; Yumurtalık lagoon forest, on dung, Baba 104, 105.

31. ***P. bethelii*** T. Macbr. ex G. Lister

Distribution of species: Dörtyol beach, on wood, Baba 58.

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

Distribution of species: Erzin free zone, on petri dishes, Baba 67; Payas beach, on wood, Baba 44, 48; Yumurtalık lagoon forest, on dung, Baba 104, 105.

33. ***P. compressum*** Alb. & Schwein.

Distribution of species: Arsuz, on wood, Baba 5, 10; Konacık, on filter paper, Baba 106.

34. ***P. melleum*** (Berk. & Broome) Massee

Distribution of species: Arsuz, on wood, Baba 4.

35. ***P. pusillum*** (Berk. & M.A. Curtis) G. Lister

Distribution of species: Arsuz, on wood and debris, Baba 5, 7, 9, 10; Botaş beach, on wood, Baba 74; Denizciler, on debris, Baba 25; Karaağaç, on wood, natural, Baba 14; Karatas, on wood, Baba 125; Kurtkulağı village Ceyhan, on debris, Baba 85, Payas, on wood, Baba 44, Yumurtalık lagoon forest, on wood, natural, Baba 104.

Stemonitida

Stemonitidaceae

Genus: *Comatricha*

36. ***Comatricha ellae*** Härk.

Distribution of species: Arsuz, on wood, Baba 4; Botaş, on debris, Baba 74.

37. ***C. nigra*** (Pers. ex J.F. Gmel.) J. Schröt.

Distribution of species: Konacık, on wood, natural, Baba 102, Erzin region 3, on wood, Baba 70; Yumurtalık lagoon forest, on wood, natural, Baba 94.

Genus: *Macbrideola*

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

Distribution of species: Yumurtalık lagoon forest, on wood, Baba 91, 95.

Genus: *Stemonitis*

39. ***Stemonitis axifera*** (Bull.) T. Macbr.

Distribution of species: Yumurtalık lagoon forest, on wood, Baba 94.

Genus: *Stemonitopsis*

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

Distribution of species: Erzin Region 5, on wood, Baba 67.

41. ***S. hyperopta*** (Meyl.) Nann.-Bremek.

Distribution of species: Yumurtalık lagoon forest, on wood, Baba 91, 104.

Analysis of the prevalence of 41 species and 20 genera demonstrated that the S/G value was determined as 2.05. A low rate of these results indicates that taxonomic diversity is high (Stephenson et al., 1993). It was reported that S/G values in temperate or tropical regions are between 2.2 and 4.6 (Stephenson et al., 2000). The present study findings were consistent with the findings of other studies conducted in the Mediterranean region. The ratio of the number of species to the number of genera (S/G) is used as an indicator of taxonomic diversity. In previous studies in Türkiye, this rate was found to be 2.7 in Northern Adana (Baba et al., 2016), 1.75 in Osmaniye (Baba, 2017), 2.6 in Gaziantep (Baba et al., 2021b) and 2.75 in Batman (Baba et al., 2021c) in the vicinity of İskenderun Gulf. In the 9 districts where we collected samples in the İskenderun Gulf, we see that the microbiota diversity in this results area is rich, since the sea level, warm, and humidity ratios are suitable for myxomycete development, as well as forested and scrub areas are common.

The distribution of the species determined in this results area is Physarida 18 species, Trichiida 10 species, Stemonitida 6 species, Liceida 5 species the other two orders have one species. In the study conducted in Afyon/Türkiye, Physarida (24%), Trichiida (27%), and Stemonitida (30%) were found (Ocak, 2015). Trichiida (16.7%), Stemonitida (16.7%), and Physarida (57%) were found in Gaziantep/Türkiye (Baba et al., 2021b). Liceida (40%), Trichiida (26%), Physarida (6.7%), and Stemonitida (22%) were found in Northern Adana/Türkiye (Baba et al., 2016).

In this study, Physaraceae 9, Didymiaceae 9, Arcyriaceae 7, Stemonitidaceae 6, Trichiaceae 2, Cribrariaceae 2, Liceaceae, Echinosteliaceae, Dictydiaethaliaceae, Reticulariaceae, Dianemataceae and Ceratiomyxaceae 1 species were determined. In previous studies in Türkiye, the most common families are Stemonitidaceae, Physaraceae, Arcyriaceae, Trichiaceae, and Didymiaceae. 72.4% of the species in Manisa (Baba & Tamer, 2007), 78% in Hatay (Baba et al., 2013), 70% in Adana (Baba et al., 2016) and 74.1% in Konya (Yağız & Afyon, 2007) are these families. In these results, the rate of these 5 families was found to be 80%. Stemonitidaceae, Physaraceae, Didymiaceae, and Arcyriaceae family's rate were 88% in Gaziantep (Baba et al., 2021b). The results show parallelism with previous studies in Türkiye.

In this study the most common genera are *Didymium* (7 species), *Physarum* (6 species), and *Arcyria* (5

species). The most common genera were reported as *Cribraria, Arcyria, Stemonitis, Physarum, Comatricha, Licea,* and *Trichia* in Adana (Baba et al., 2016). The most common genera were reported *Arcyria, Comatricha, Didymium, Echinostelium,* and *Physarum* in Osmaniye (Baba, 2017). The most common genera were reported as *Didymium*, *Badhamia, and Physarum* in Gaziantep (Baba et al., 2021b). The most common genera were reported as *Didymium*, *Physarum, Badhamia, Comatricha, and Licea* in Batman (Baba et al., 2021c). It is important that these genera contain the most common species, as well as having cosmopolitan species, as well as having a large number of species. The lime (calcium carbonate) contained in the genus Physarida may also cause them to tolerate sea salt on the beach.

Da silva & Cavalcanti (2010) reported 4 species of Abundant (Over %7), 2 species of Common (5-7%), 5 species of Occasional (2-4%), and 30 species of Rare (0.5-1 %) (Table 1).

Table 1. Abundance class of species
Çizelge 1 Türlerin bolluk sınıfı ……..

Abundance class	Species
Abundant (Over %7)	*Arcyria cinerea*, *Didymium difforme, D. squamulosum, Physarum pusillum*
Common (5-7%)	*Didymium dubium, D. bahiense*
Occasional (2-4%)	*Arcyria insignis, Comatricha nigra, Dictydiaethalium plumbeum, Physarum album, P. cinereum*
Rare (0.5-1 %)	*Arcyria incarnata, A. obvelata, A. Pomiformis, Badhamia dubia, B. Foliicola, B. macrocarpa, Calomyxa metallica, Ceratiomyxa fruticulosa, Comatricha ellae, Cribraria argillaceae, C. Violaceae, Diderma hemisphaericum, Didymium annulisporum, D. melanospermum, D. minus, Echinostelium minutum, Licea kleistobolus, Lycogala epidendrum, Macbrideola cornea, Metatrichia vesparia, Mucilago crustacea, Perichaena chrysosperma, P. depressa, Physarum bethelii, P. compressum, P. melleum, Stemonitis axifera, Stemonitopsis amoena, S. hyperopta, Trichia favoginea*

In this study, *Arcyria cinerea, Didymium difforme, D. squamulosum, and Physarum pusillum* were abundant species. It has been reported that these species are the most common species in studies conducted in the immediate environment. In a study conducted in Northern Adana/Türkiye, *Arcyria pomiformis, Ceratiomyxa fruticulosa, Cribraria argillaceae, C. cancellata, C. vulgaris, Enerthenema papillatum, Lycogala epidendrum* and *Trichia favoginea* were reported to be most common species (Baba et al., 2016). In the study conducted in Batman/Türkiye, *Didymium annulisporum, D. diffform, D. megalosporum, D. squamulosum,* and *Lamproderma arcyrioides* were reported to be the most common species (Baba et al., 2021c). Also, previous studies have reported that *Arcyria cinerea, Didymium difforme,* and *D. squamulosum* can grow on all kinds of substrates and in almost all parts of the world. Geographically, *E. minutum, A. cinerea, A. denudata,* and *D. difforme* are prevalent globally on all types of substrates (Martin & Alexopoulos 1969; Stephenson & Stempen, 1994; Alves et al., 2010; Baba, 2012; Baba, 2015; Ergül et al., 2016).

CONCLUSION

In this study, 41 species of 12 families and 20 genera were determined. While the number of species is rare in the seaside regions, It was observed that the further away from the sea, the number of species increased, especially in forest areas. While cosmopolitan species were observed in abundance, Physarida members were found to be common in this results area. The above species can be said to be Halophilic species. However, there is a need for more research, morphological, systematic, and physiological studies on this subject.

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Contribution Rate Statement Summary of Researchers

The authors declare that they have contributed equally to the article.

Conflict of Interest

The authors of the article declare that there is no conflict of interest between them.

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