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Myxomycetes diversity in Adana Province (Turkey) with two new records

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Abstract

Samples were collected in Adana province during 2019–2021 and myxomycetes were cultured using the moist chamber technique. The samples consisted of rotten or live tree bark, leaves, rashes, vegetable, and animal material, which were considered likely to contain myxomycete spores. In adddition, natural myxomycete samples were collected at nine different stations. These 'natural samples' were immediately dried and potential spore-bearing material was kept in a warm and humid environment with the moist chamber technique. In total, 56 myxomycetes (205 samples; 148 by moist chamber technique and 57 'natural samples') were obtained representing six orders, 12 families, 24 genera and 56 species. Eight species were collected only in natural samples, 35 species were obtained only by moist chamber technique in the laboratory, and 13 species were obtained by both methods. Two myxomycetes as new records (*Licea rugosa* and *Physarum nivale*) and one new locality (*Cribraria lepida*) were identified in Turkey.

Keywords: Adana-Turkey, diversity, moist chamber culture, myxomycetes, new records

Introduction

Myxomycetes are a group of fungus-like organisms usually present in terrestrial ecosystems. They form a well-defined and homogenous group of approximately 1100 species (Lado 2005–2021). Myxomycetes are eukaryotic protists that grow on decaying organic material. Their life cycle includes spore, myxamoebae, swarm cells, multinucleate plasmodia and fruiting bodies. The fruiting bodies can grow anywhere under optimum conditions of adequate humidity, heat and rotting organic matter (Stephenson & Stempen 1994, Baba *et al*. 2021).

In Turkey, studies on myxomycetes are limited with 296 species identified (Baba 2021, Baba *et al*. 2021). Turkey is located in a temperate climate zone with a rich flora, and the myxomycetes are also expected to exhibit a rich diversity.

The present study was conducted in Adana province which is located in the Mediterranean Region in the south of Turkey (Fig. 1). The area of the province is 49% mountainous, 23% highland and 27% plain and flat area. The altitude increases towards the Taurus Mountains from south to north. The skirts of the Taurus Mountains take the form of a plain towards the Mediterranean (Kum & Çelik 2014, Baba *et al*. 2016). Adana has Mediterranean climate characteristics. The average amount of precipitation is 625 mm. Rainfall is 51% in winter, 26% in spring, 18% in autumn and 5% in summer (Kum & Çelik 2014, Baba *et al*. 2016).

Material and methods

Study area

Our field of study covered nine districts, including the center, outside the northern part of Adana. Myxomycete samples were collected at nine different stations predetermined in Adana province: Akçatekir (Pozantı), Aladağ, Botaş, Ceyhan, Karaisalı, Karataş, Seyhan, Yumurtalık and Yüreğir districts. Station altitude, coordinates, date data and description are presented in Table 1.

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FIGURE 1. Study area map.

TABLE 1. Information about collecting stations.

Localities	Altitude (m)	Coordinates	Research dates	Description
Akçatekir (Pozantı)	1270	37° 20' N- 34° 48' E	24.02.2021	Mixed forests
Aladağ	860	37° 32' N- 35° 23' E	04.11.2019	Mixed forests
Karaisalı	270	37° 15' N- 35° 03' E	24.02.2021	Mixed forests
Botaş (Ceyhan)	52	36° 52' N- 35° 55' E	28.05.2020	Hawthorn, poplar, willow, *Acacia*, *Eucalyptus*, plum, apricot
Ceyhan	30	37° 01' N- 35° 48' E	24.02.2021	Recreation area, hawthorn, poplar, willow, *Acacia*, *Eucalyptus*, plum, apricot, wheat and vegetable fields
Karataş	16	36° 33' N- 35° 23' E	04.11.2019	Recreation area, poplar, willow, *Acacia, Eucalyptus*, plum, apricot, wheat and vegetable fields
Seyhan	14	36° 58' N- 35° 15' E	04.11.2019	Mixed poplar, willow, *Acacia*, hawthorn
Yumurtalık	12	36° 45' N- 35° 43' E	28.05.2020	Hawthorn, poplar, willow, *Acacia*, *Eucalyptus*, plum, apricot, wheat and vegetable fields
Yüreğir	11	36° 54' N- 35° 25' E	04.06.2019	Recreation area, hawthorn, poplar, willow, *Acacia, Eucalyptus*, plum, apricot

Sample collection and identification

Myxomycetes fruit bodies collected in the field were transported to the laboratory in small cardboard boxes. Information on the collection location, station number, date, habitat characteristics, characteristics of the myxomycete material, colour, sporophore type and stage were noted. Plant material that was suspected to contain myxomycete sporophore samples such as bark, logs, debris and decaying leaves, pointers, cones, fruits, and residues were placed in small zipped storage bags and taken to the laboratory. Fructification was obtained with the moist chamber technique developed by Gilbert & Martin (1933).

A stereomicroscope was used to study fructification structure, shape, colour, macroscopic measurements, lime colour and shape while a light microscope was used to observe the capillitium, pseudocapillitium, columella, shape, colour, size, capillitium ornamentation, branching shape, whether the columella is free or attached to the stem, pseudocapillitium features, spore shape, colour, size, and spore ornamentation. Myxomycetes were identified using guides and reference books (Martin & Alexopoulos 1969, Farr 1976, 1981, Thin 1977, Stephenson & Stempen 1994, Alexopoulos *et al*. 1996, Lado & Pando 1997, Ing 1999, Neubert *et al*. 1993, 1995, 2000).

Results

In the field and laboratory studies, 6 orders, 12 families, 24 genera and 56 species of myxomycetes were obtained from 205 samples. Fifty-seven samples were collected directly from natural areas and 148 samples were obtained using moist chamber technique in the laboratory. Eight species were collected directly from natural areas, 35 were obtained only by using the moist chamber technique and 13 species were found by both methods. Two myxomycetes as new records (*Licea rugosa* Nann.-Bremek. & Y. Yamam. and *Physarum nivale* (Meyl.) Mar. Mey. & Poulain) and one new locality (*Cribraria lepida* Meyl.) were identified in Turkey.

The ratio of the number of species to the number of genera (S/G) is used as an indicator of taxonomic diversity. Analysis of the prevalence of the 56 myxomycete species showed a S/G value of 2.33. Biodiversity, ecology and other information on obtained species are presented in Table 2.

Descriptions and distribution notes for two species newly and one new locality identified from Turkey are provided below.

TABLE 2. Individual number, locality, obtained form, density and abundance indices data of species.

Species	Frequency	Localities/substrate	Obtained form[1]	Density S/G	**Abundance**
Ceratiomyxa fruticulosa	5	Akçatekir 9 on bark, Akçatekir 22 on wood, Natural, Aladağ 29, on dead wood, Yumurtalık 45 on bark Natural, Yumurtalık 48 on bark and wood	N, MCT	2.44	C
Echinostelium minutum	5	Akçatekir 10, 13 on dead bark, Ceyhan 85 on wood, Yumurtalık 45 on bark, Yumurtalık 48 on bark and wood	MCT	2.44	C
***Cribraria lepida*	1	Karaisalı 30 on bark	MCT	0.49	R
Cribraria microcarpa	1	Ceyhan 98 on wood	MCT	0.49	R
Cribraria vulgaris	2	Akçatekir 9 on wood Natural, Ceyhan 98 on wood Natural	N	0.98	O
Licea castanea	2	Akçatekir 9 on bark Natural, Karataş 80 on debris,	N, MCT	0.98	O
Licea kleistobolus	4	Ceyhan 85 on wood, Karaisalı 31 on wood, Yumurtalık 48 on bark and wood, Yumurtalık 52 on bark	MCT	1.95	C
**Licea rugosa*	3	Ceyhan 98, 102 on bark, Yüreğir 41 on bark	MCT	1.46	O
Dictydiaethalium plumbeum	9	Akçatekir 9 on bark, Akçatekir 21 on wood and bark, Akçatekir 22 on wood, Ceyhan 88, 92 on wood, Ceyhan 95, 101 on dead bark, Karaisalı 32 on wood, Yumurtalık 45 on bark	MCT	4.39	A
Lycogala epidendrum	4	Ceyhan Erzin road 102, 103 on wood Natural, Karaisalı 34 on bark and debris Natural, Yumurtalık 76 on wood Natural	N	1.95	C
Arcyria cinerea	16	Akçatekir 8, 9, 10 on bark, Akçatekir 22, 24 on wood, Natural, Ceyhan 85 on wood Natural, Ceyhan Erzin road 102,103,104 on wood, Karaisalı 34 on bark and 36 on debris, Yumurtalık 45, 46 on bark Natural, Yumurtalık 48 on bark and 52 on wood, Yumurtalık 56 on bark Natural	N, MCT	7.80	A
Arcyria incarnata	8	Akçatekir 9, 22 on wood, Ceyhan 88 on bark, Yüreğir 41 on bark, Ceyhan 98, 102 on bark, Karaisalı 38 on wood Natural, Yumurtalık 55 on wood	N, MCT	3.90	A
Arcyria insignis	1	Yumurtalık 45	MCT	0.49	R
Arcyria obvelata	6	Karaisalı 34 on bark and 36, 37 on debris Natural, Yumurtalık 51, 55, 76 on wood Natural	N	2.92	C
Arcyria pomiformis	8	Akçatekir 4, 5, 13 on bark and wood, Karaisalı 34 on bark and 41, 42, 46 on debris, Yumurtalık 76 on wood	MCT	3.90	A
Perichaena chrysosperma	2	Akçatekir 9 on bark, Yumurtalık 55 on bark and wood	MCT	0.98	O
Perichaena corticalis	4	Akçatekir 22, 24 on wood, Ceyhan 107,108 on bark	MCT	1.95	C
Perichaena depressa	2	Karaisalı 35 on wood, Karataş 80 on bark	MCT	0.98	O
Perichaena vermicularis	4	Ceyhan 102 on herbivore dung, Karaisalı 34 on bark and 37 on debris, Yumurtalık 76 on wood	MCT	1.95	C

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TABLE 2. (Continued)

Species	Frequency	Localities/substrate	Obtained form[1]	Density S/G	**Abundance**
Calomyxa metallica	3	Ceyhan 85, 88 on bark, Yumurtalık 54 on pine cone	MCT	1.46	O
Hemitrichia pardina	2	Ceyhan 90 on leaves and debris, Yumurtalık 76 on debris	MCT	0.98	O
Metatrichia vesparia	1	Yumurtalık 51 on bark	MCT	0.49	R
Trichia decipiens	4	Karaisalı 37, 38 on wood Natural, Karatas 80, 84 on bark, wood Natural	N	1.95	C
Trichia erecta	1	Botaş 78 on twig	MCT	0.49	R
Diachea leucopodia	4	Karatas 80, 84 on debris Natural, Yüreğir 41, 42 on twig Natural	N	1.95	C
Diderma hemisphaericum	9	Akçatekir 7, 21, 22 on twig Natural, Ceyhan 90, 91 on leaves, 92 on bark, 100 on debris, Ceyhan 101, 102 on twig Natural	N, MCT	4.39	A
Didymium annulisporum	1	Akçatekir 10 on leaves	MCT	0.49	R
Didymium bahiense	5	Karatas 80, 84, 85 on bark, wood and debris, Yumurtalık 68, 69 on bark, wood Natural	N, MCT	2.44	C
Didymium difforme	10	Akçatekir 10, 11 on wood Natural, Ceyhan 87, 103 on filter paper, Ceyhan 88 on leaves Natural, Yumurtalık 65, 66 on wood, 68, 69 bark and 70 debris	N, MCT	4.87	A
Didymium dubium	2	Ceyhan Erzin road 102 on wood, Karaisalı 34 on bark and debris	MCT	0.98	O
Didymium minus	1	Yumurtalık 62 on bark	MCT	0.49	R
Didymium serpula	4	Akçatekir 21 plastic petri dishes, 22 on filter paper, 23 on twig, Ceyhan 105 on bark	MCT	1.95	C
Didymium squamulosum	9	Aladağ 25, 26, 27 on bark Natural, Ceyhan 87, 103 on filter paper, 88 on leaves, Yumurtalık castle 68 on bark Natural, 69 on wood and 70 debris	N, MCT	4.39	A
Mucilago crustacea	1	Karataş 84 on bark Natural	N	0.49	R
Badhamia dubia	1	Yumurtalık 54 on pine cone	MCT	0.49	R
Badhamia foliicola	1	Kurtkulağı willage Ceyhan 94 on bark Natural	N	0.49	R
Badhamia goniospora	1	Aladağ 25 on bark	MCT	0.49	R
Craterium leucocephalum	4	Aladağ 25, 26, 27 on leaves Natural, Botaş 78 on twig Natural	N	1.95	C
Physarum album	3	Akçatekir 9, 10 on bark, Aladağ 25 on bark Natural	N, MCT	1.46	O
Physarum cinereum	4	Ceyhan 92, 93 plastic petri dishes, 101 on debris Natural, 102 herbivore dung	N, MCT	1.95	C

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TABLE 2. (Continued)

Species	Frequency	Localities/substrate	Obtained form[1]	Density S/G	**Abundance**
Physarum compressum	4	Aladağ 25, 26 on bark, Karaisalı 36, 37 on wood	MCT	1.95	C
Physarum globuliferum	1	Akçatekir 22 on wood	MCT	0.49	R
Physarum leucopus	3	Akçatekir 9 on twig, 22 on wood and filter paper, Ceyhan 92 on herbivore dung	MCT	1.46	O
**Physarum nivale*	1	Karataş 80 on debris	MCT	0.49	R
Physarum pusillum	8	Aladağ 25, 26 on bark, Akçatekir 9 on wood Natural, Akçatekir 10 on leaves, Ceyhan 91, 92 on bark, 98 on leaves, 99 on wood	N, MCT	3.90	A
Physarum robustum	1	Akçatekir 22 on wood	MCT	0.49	R
Comatricha ellae	5	Akçatekir 2, 13 on wood Natural, 20, 21 on bark, Ceyhan 90 on debris	N, MCT	2.44	C
Comatricha nigra	4	Akçatekir 3, 5 on wood and filter paper, Karaisalı 32 on wood Natural, Yumurtalık 54 on wood Natural	N, MCT	1.95	C
Comatricha pulchella	1	Ceyhan 95 on bark	MCT	0.49	R
Lamproderma arcyrioides	2	Akçatekir 7 on twig, Ceyhan 90 on debris	MCT	0.98	O
Lamproderma scintillans	3	Ceyhan 90 on debris, 97 on leaves, 107 on twig	MCT	1.46	O
Macbrideola cornea	4	Akçatekir 14, 15 on wood, Ceyhan 90 on debris, 97 on twig	MCT	1.95	C
Stemonitis axifera	3	Akçatekir 20, 21 on bark, Seyhan 43 on wood	MCT	1.46	O
Stemonitis fusca	1	Akçatekir 21 on twig	MCT	0.49	R
Stemonitopsis amoena	5	Akçatekir 2, 13 on wood, Ceyhan 90, 94 on debris, Seyhan 43 on wood,	MCT	2.44	C
Stemonitopsis hyperopta	1	Yumurtalık 51 on wood	MCT	0.49	R

*****: New records ****** New locality

[1] N: natural samples, MCT: moist chamber technique.

[2]species represented by more than 3.0% of the total number of collections were considered as Abundant (A), those falling between 1.5% and 3.0% as Common (C), between 1.5% and 0.5% as Occasional (O) and those less than 0.5% as Rare (R) (Stephenson *et al.* 1993).

Class: Myxomycetes (Myxogastria)
Order: Liceida
Family: Cribrariaceae
Cribraria lepida Meyl. (Fig. 2) (new locality)

Description:—Sporophores stalked, scattered. Sporothecae erect or nodding, deep purple or violet-purple, 0.3–0.4 mm diam., spherical or slightly pyriform. Stalk up to 6–8 times the diameter of the sporotheca and usually 80–90% of the total height, dark purple, black, opaque in reflected light, orange-brown in transmitted light. Hypothallus thin, delicate. Peridium persists in the form of threads and a cup, contains dark purple granules up to 1–1.5 µm in diameter. Calyculus 25–35% of the sporotheca diameter, with a shallow calyculus occupying approximately one third of the

diameter of the sporotheca, finely dotted with calcic granules, the upper margin scalloped giving rise at the points to a fine net with a few thickened pulvinate nodes. The cup is purple, small, sometimes flat, saucer-shaped, edge of the calyculus is uneven, with projections passing into a network of well developed filaments. Nodules are pillow-shaped, elongated, curved, irregular in shape, with rounded edges, filled with dictydine granules and connected by thin threads. Peridial net with small, flat, rounded or angular nodes which are usually < 30 µm diam., flat, containing a single layer of calcic granules. Spore-mass violet. Spores spherical, pale lilaceous, densely verruculose, densely and minutely warted or smooth, 6–7 µm diam.

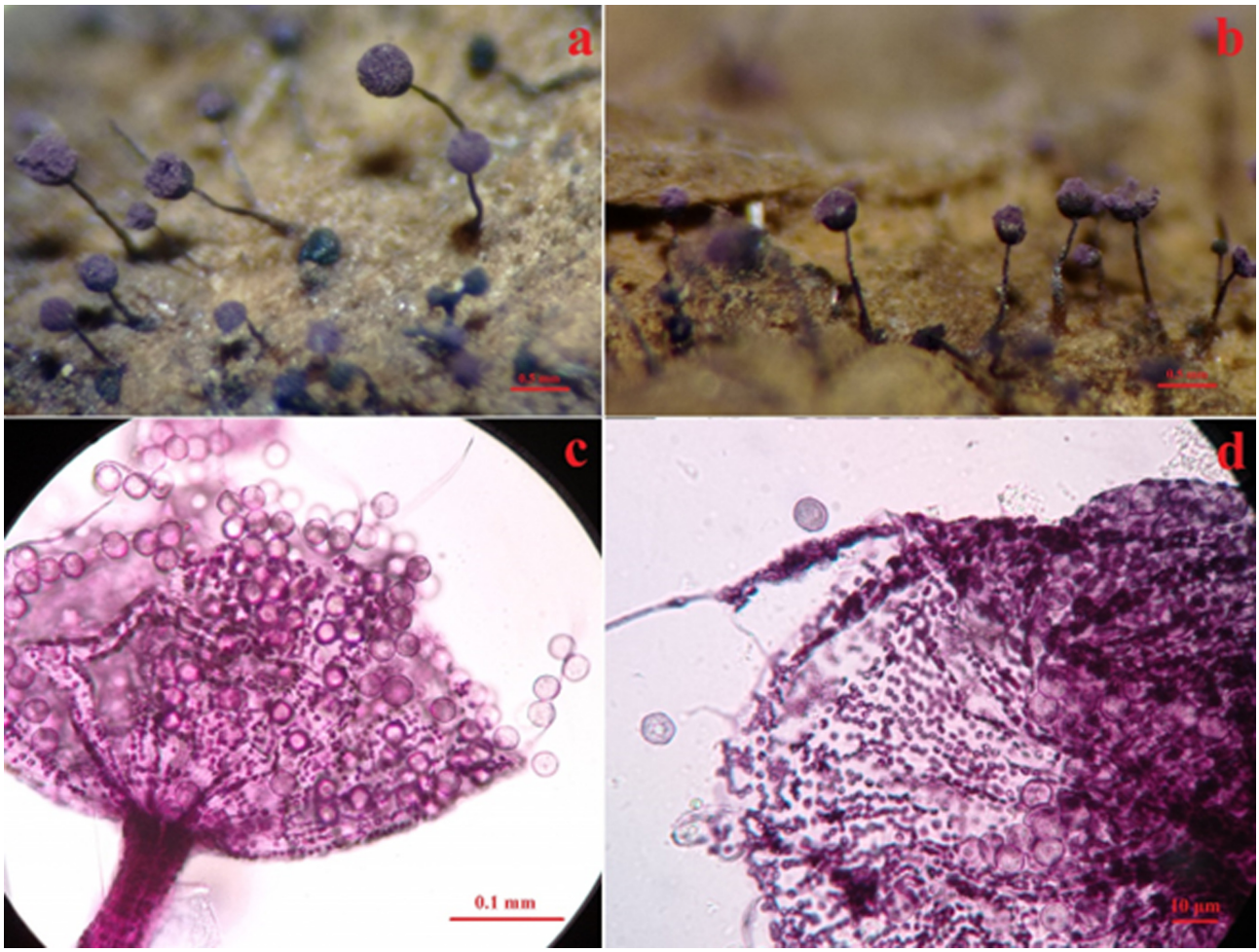


FIGURE 2. *Cribraria lepida*. a, b. Sporangium. c. Stalk, sporotheca, calyculus, dictydine granules and spores. d. Nodules, dictydine granules and spores.

Specimen examined:—Adana, Karaisalı on bark, moist chamber technique, 37° 15' N- 35° 03' E, 270 m, 24 Feb. 2021, Baba 30.

Distribution:—Argentina, Brazil, Croatia, France, Germany, Hawaii, Mexico, Nigeria, Panama, Puerto Rico, Sweden, Switzerland, Turkey (Karaman), USA.

Comments:—*Cribraria lepida* differs from the closely related species *C. violacea* in size and shape of the calyculus, the structure of the network of threads, and shape of the nodules. The latter has a deep cup-shaped calyculus, taking from 1/2 to 2/3 of the sporotheca, nodules large, flat, angular. Spores of *C. violacea* in transmitted light are lilac, and more brightly coloured than those of *C. lepida*. Examination of samples of *C. lepida* and *C. violacea* with a binocular microscope reveals that these species are similar only in colouration of sporocarps and differ greatly in shape and structure of peridium and sporotheca. (Ejale & Gill 1991, Vlasenko *et al*. 2016). *C. lepida* has the habit of *C. languescens* and the colour of *C. violacea* and the spore size is given as 5–6 µm (Martin & Alexopoulos 1969, Neubert *et al*. 1993). From the red-brown to purple-brown *C. languescens* already distinguishes the colour. *C. violacea* is smaller, usually ovoid, the network nodes are more than 50 µm in diameter, the cup takes up half or more of the sporocarps. *C. elegans* is red-violet, the total height remains below 2 mm, the granulation is coarser (Neubert *et al*. 1993). It differs from *C. violacea* in that it has a much shallower calyculus and has numerous thickened nodes, not a few flat nodes on the peridial net (Estrada-Torres *et al*. 2009, Ramírez-Ortega *et al.* 2017).

Family: Liceaceae
Licea rugosa Nann.-Bremek. & Y. Yamam. (Fig. 3) (new record)

Description:—Sporophores sporangiate, scattered, stalked, irregularly subglobose wrinkled, sometimes angular, dull, dark brown or black, up to 0.3 mm tall and up to 0.15 mm diam. Sporotheca irregularly subglobose, wrinkled, dull, dark brown or black, up to 0.15 mm diam. Hypothallus absent. Stalk 50% or more of the total height, very stout, only slightly narrower than the sporotheca, rugose, dull black, ochraceous-brown, filled with refuse matter. Peridium grey-brown, thin, papillose, obscured by an outer gelatinous layer containing particles, dehiscing into irregular fragments above and persistent lobes below. Spore-mass nearly black. Spores free, dark brown, olive brown with a pale area, 12–15 µm diam., smooth, globose, subglobose, wall thick with a thin area.

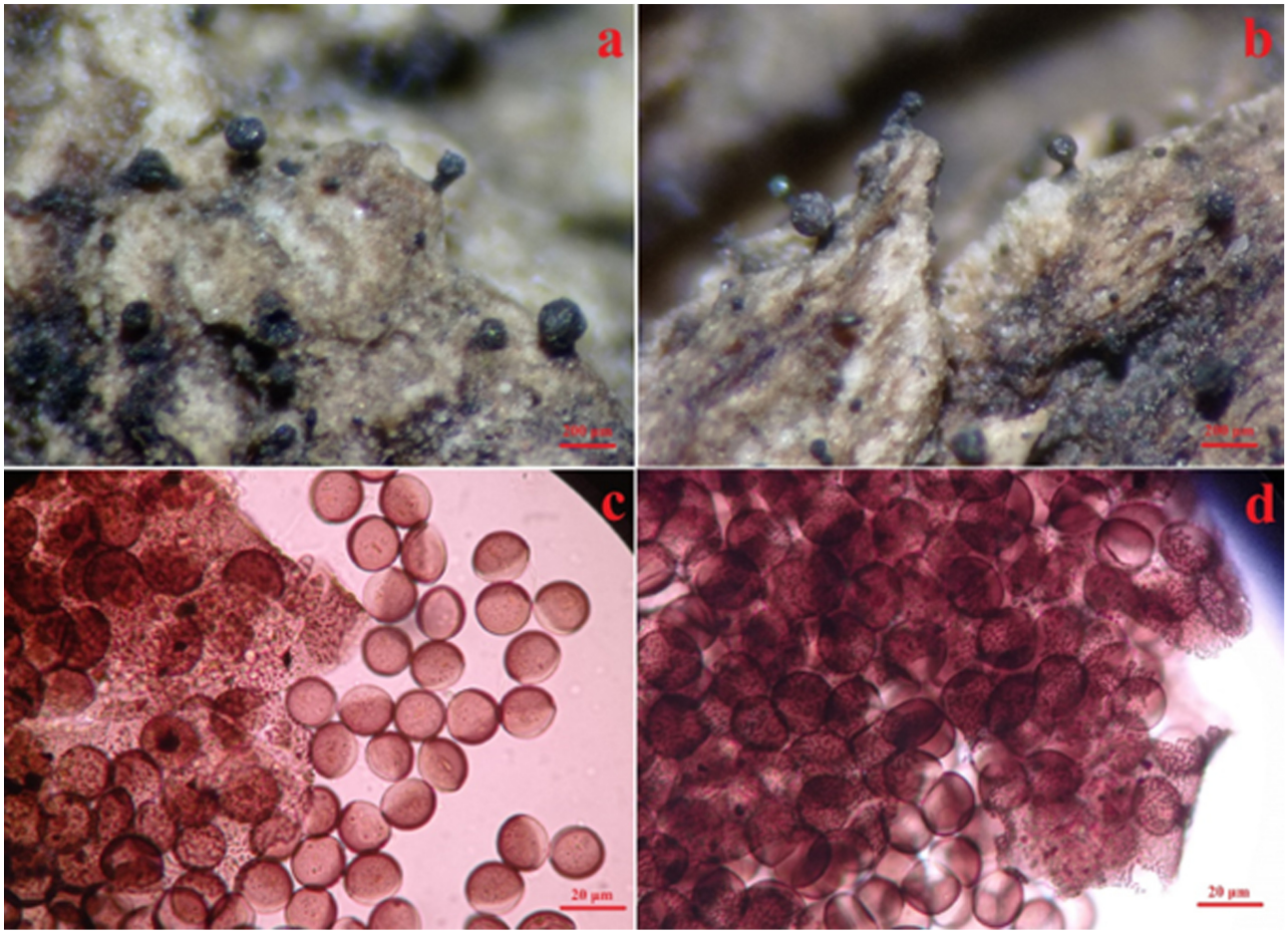


FIGURE 3. *Licea rugosa*. a, b. Sporangium. c, d. Irregular fragments of peridium and spores.

Specimens examined:—Adana, Ceyhan on bark, moist chamber, 37° 01’ N- 35° 48’ E, 30 m, 24 Feb.2021, Baba 98, 102. Adana, Yüreğir on bark, moist chamber, 36° 54’ N- 35° 25’ E, 11 m, 4 June 2019, Baba 41.

Distribution:—Germany, Japan, Mexico.

Comments:—The stalked sporocarp with wrinkled peridia differs from *L. pedicellata* and *L. erecta* in that it has dark brown, smooth spores with a thick wall showing a paler thin area. (Neubert *et al.* 1993). The sporotheca are globose when wet but very wrinkled when dry, with prominent ridges. The spores are similar to those of *L. parasitica* (11–13(–16) µm diam.), but the thinner area is less pronounced and the spores were completely smooth even when examined by SEM. The wrinkled sporotheca breaking into platelets instead of the lid of *L. parasitica* easily avoids any confusion even with sessile specimens. The plasmodium, visible in moist chamber cultures, is thick dull brown and appears as a continuous sludge on the bark surface like many large protoplasmodia combined. The original description of *L. rugosa* differentiated it from *L. pedicellata* on the basis of spore colour being dark brown and the smooth spores (De Basanta & Lado 2005).

Order: Physarida
Family: Physaraceae
Physarum nivale (Meyl.) Mar. Mey. & Poulain (Fig. 4) (new record)

Description:—Fructification sporocarps and highly clustered short plasmodiocarps sessile, irregularly round, 0.7–1.5 mm, sometimes curved kidney-shaped, or rarely short plasmodiocarps, 1.5–3 mm long, worm-shaped, base usually clearly indented. Sporotheca subglobous, more or less deformed by pressure of the group. Hypothallus indistinct. Peridium quite variable, with distinct limestone and whitish, or sometimes irregular scale-like, easily detachable lime flakes, sometimes completely free of lime, then shiny metallic blue or grey and looking like a sedentary species of *Lamproderma*, simple, like a calcified layer and rough, something greyish white, translucent, shiny membrane, more or less densely covered with calcareous scales. Columela absent. Capillitium well developed, a clear physaroid network of larger, round or elongated calcareous nodes and colourless, calcareous threads, densely networked, sometimes completely without calcareous nodes if there is a lack of calcareous tissue, formed by nodules of white lime, large, angular, grouped, sometimes forming a pseudocolumella, nodes profuse, consisting of very small, tight granules. Spores in mass dark brown. Spores sometimes almost blackish in transmitted light brown to dark brown, on one side ± significantly lighter and with a thinner wall in the area of the germ pore, always round, sometimes with indistinct groups of darker ones, 9–11 µm, warty or spinous.

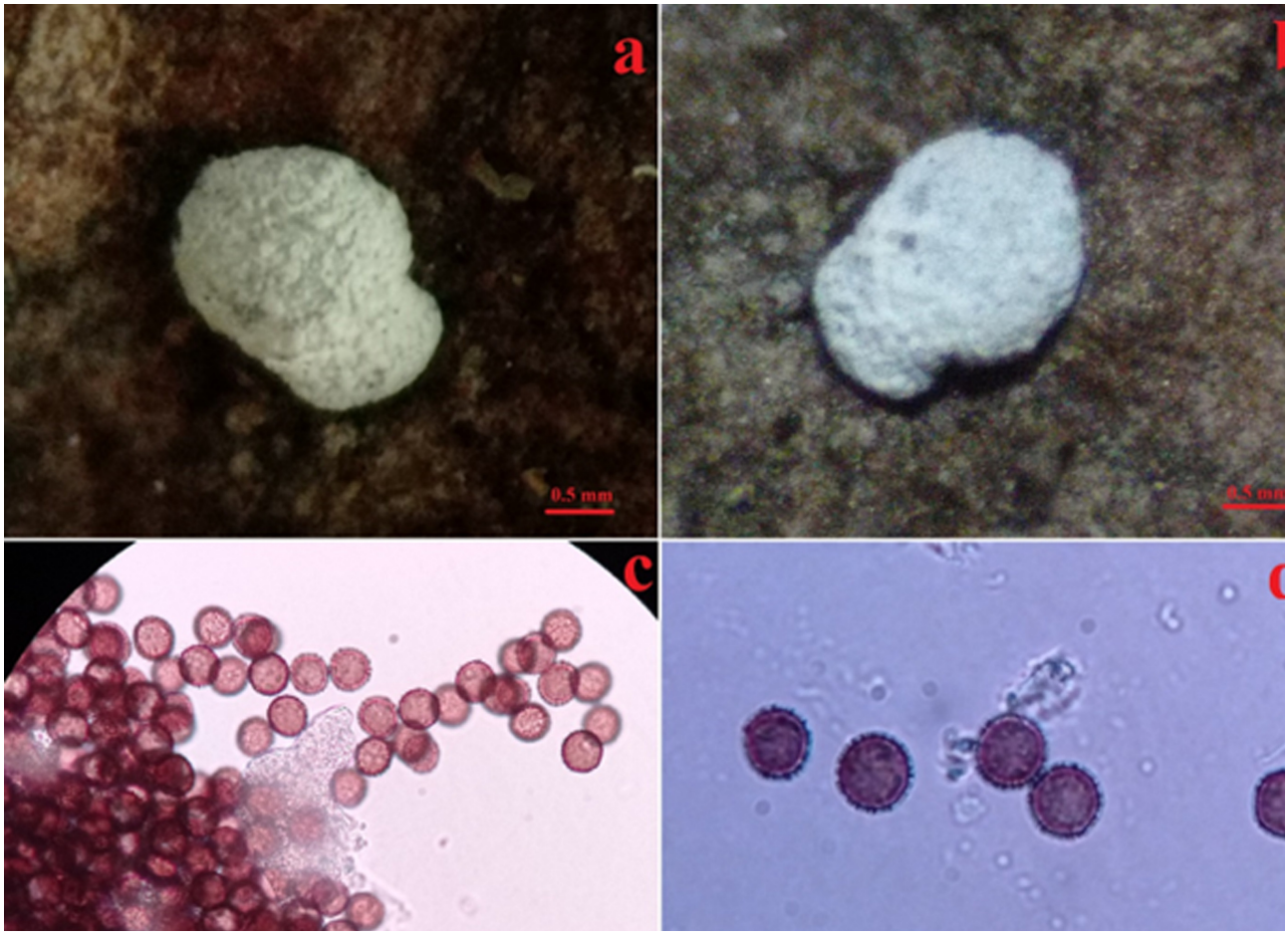


FIGURE 4. *Physarum nivale* a, b. Sporocarp. c. Physaroid capillitium and spores. d. Spores.

Specimen examined:—Adana, Karataş on debris, moist chamber, 36° 33’ N- 35° 23’ E, 16 m, 4 Nov. 2019, Baba 80.

Distribution:—Germany.

Comments:—This species is similar to P. vernum but this usually has lighter spores that are evenly light brown in colour in transmitted light, plasmodiocarps and a rather reddish-brown mass of spores under magnification (Kuhnt 2014). Poulain *et al*. (2011) separated this taxon from *P. vernum* by greyish colour of the peridium covered by scattered lime flakes, the darker spore mass, a well developed badhamioid capillitium with large, angular nodes densely stuffed

with granules (0.5–2 μm in diam.) which are not very distinct in outline and the appearance of the spores which are darker but have a paler side and show a more regular ornamentation of warts (Novozhilov *et al*. 2013). The main features are the occurrence in the nivicolous environment, more rounded sporocarps in outline, absence of extensive plasmodiocarps, very dark spore mass under the microscope and spores which are lighter on one side.

Discussion

The ratio of the number of species to the number of genera (S/G) is used as an indicator of taxonomic diversity. Analysis of the prevalence of the 56 myxomycete species showed a S/G value of 2.33. A low rate indicates that taxonomic diversity is high and a high rate indicates that the taxonomic diversity is low. S/G values in temperate or tropical regions are between 2.2 and 4.6 (Stephenson 2000). The present ratio was consistent with the findings of other studies conducted in the Mediterranean region. Biodiversity, ecology and other information on obtained species are presented in Table 2.

Abundance indices were assigned to all of the species represented among the collections from a particular study area (Table 1.). The abundance indices are Rare (for species represented by < 0.5% of the total number of all collections recorded from the study area being considered), Occasional (species represented by > 0.5% but < 1.5% of the total), Common (species represented by > 1.5% but < 3.0% of the total), and Abundant (species represented by > 3.0% of the total). Consequently, these indices are indications of the relative abundances of the various species found in a particular study area (Stephenson 2014). When looking at the abundance ratios of the 56 species; 13 (23.2%) were Occasional (O), 18 (32.1%) were Common (C), 8 (14.3%) were Abundant (A) and 17 (30.4%) were Rare (R) in our study area.

The percentages of species in various orders were as follows: Protosteliida (1.78%), Echinosteliida (1.78%), Liceida (14.2%), Trichiida (25%), Physarida (39.3%) and Stemonitida (17.9%). While it was found that Physarida members were the most prevalent (22), Echinosteliida and Protosteliida, which belong to a single taxon, were registered as the least prevalent (1 species). Stemonitidaceae, Physaraceae, Didymiaceae and Arcyriaceae families included 41 of the 56 species. This rate was 73.2% across our samples. 22 samples were identified in two families in Physarida; 12 Physaraceae species (*Badhamia* 3, *Craterium* 1, *Physarum* 8), 10 Didymiaceae species (*Diachea* 1, *Diderma* 1, *Didymium* 7, *Mucilago* 1), 14 Trichiida species, 9 Arcyriaceae species (*Arcyria* 5, *Perichaena* 4), 1 Dianemataceae (*Calomyxa* 1), 4 Trichiaceae species (*Hemitrichia* 1, *Metatrichia* 1, *Trichia* 2) and 10 Stemonitida and Stemonitidaceae species (*Comatrichia* 3, *Lamproderma* 2, *Macbrideola* 1, *Stemonitis* 2, *Stemonitopsis* 2). Liceida has 8 different species in four families: 3 Cribrariaceae (*Cribraria* 3), 1 Dictydiaethaliaceae (*Dictydiaethalium* 1), 3 Liceaceae (*Licea* 3), 1 Reticulariaceae (*Lycogala* 1). Echinosteliida and Protosteliida were in one family and one species: 1 Echinosteliacea (*Echinostelium* 1), 1 Ceratiomyxaceae (*Ceratiomyxa* 1). The prevalence of the related groups were consistent with previous studies conducted in Turkey (Ocak 2015, Ergül *et al*. 2016, Baba *et al*. 2019, 2020).

In myxomycetes studies conducted in Turkey, it was reported that the most prevalent species were *Arcyria, Badhamia, Didymium*, and *Physarum* (Ocak 2015, Ergül *et al*. 2016, Baba *et al*. 2019, 2020). In the present study, it was observed that *Physarum*, *Didymium, Arcyria* and *Perichaena* included the maximum number of species. The generally most rare samples in Turkey, namely *Calomyxa*, *Dictydiaethalium, Diderma, Macbrideola, Metatrichia, Stemonitopsis* and *Lamproderma* were represented by one species each in the present study.

In the present study, *Arcyria cinerea, A. incarnata, A. pomiformis, Dictydiaethalium plumbeum, Diderma hemisphaericum, Didymium difforme, D. squamulosum, Physarum pusillum* species were observed many times. Small species were obtained only with the moist chamber technique. *A. cinerea, Diderma hemisphaericum, Didymium difforme, D squamulosum* and *P. pusillum* were obtained both naturally and with the moist chamber technique. These species are common in all geographies (Martin & Alexopoulos 1969, Stephenson & Stempen 1994, Ocak 2015, Baba *et al*. 2020). Analysis of the geographical distribution of myxomycetes demonstrated that above abundant species were prevalent globally on all types of substrates (Stephenson & Stempen 1994).

As a result of this research, 56 more species were identified in Adana province and added to Adana and Turkey myxobiota. In addition, two new records and one new locality have been added to Turkey myxobiota.

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