

Four new records for *Physarales* from Turkey

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Abstract: *Physarum didermoides* (Pers.) Rostaf., *Physarum gyrosum* Rostaf., *Didymium karstensii* Nann.-Bremek., and *Didymium trachysporum* G.Lister, taxa grown by moist chamber culture method, are 4 new records from Turkey.

Key words: *Physarales*, *Physarum*, *Didymium*, new record, Konya, Turkey

Türkiye'den *Physarales* için dört yeni kayıt

Özet: Nem odası tekniğiyle geliştirilen *Physarum didermoides* (Pers.) Rostaf., *Physarum gyrosum* Rostaf., *Didymium karstensii* Nann.-Bremek., *Didymium trachysporum* G.Lister taksonları Türkiye'den 4 yeni kayıttır.

Anahtar sözcükler: *Physarales*, *Physarum*, *Didymium*, yeni kayıt, Konya, Türkiye

Introduction

Myxomycetes (plasmodial slime moulds) are primitive phagotrophic eukaryotes that generally occur in association with decaying or living plant material in terrestrial forest ecosystems. The *Myxomycetes* life cycle involves 2 morphologically distinct stages: one consisting of uninucleate amoebae, with or without flagella, and the other a distinctive multinucleate structure, plasmodium (Martin et al., 1983). A significant number of *Myxomycetes* samples are cosmopolite organisms.

The climate and ecologic features of Turkey are very suitable for the growth of fungi (especially macrofungi and *Myxomycetes*). Nevertheless, the number of identified fungi species in Turkey does not

show parallelism. In recent years some macrofungi and *Myxomycetes* have been added to the Turkish myxobiota by some researchers (Dülger, 2008; Doğan & Karadelev, 2009; Alkan et al., 2010; Doğan et al., 2011). To date, only 1974 macrofungi and 222 *Myxomycetes* taxa have been determined in Turkey (Sesli & Denchev, 2010).

Materials and methods

The materials appropriate for the growth of *Myxomycetes* were collected in Hadim (Konya, Turkey) district on various occasions during the 2007 and 2008 field seasons (Figure 1). Tree bark, leaves, branches, and decayed wood pieces that

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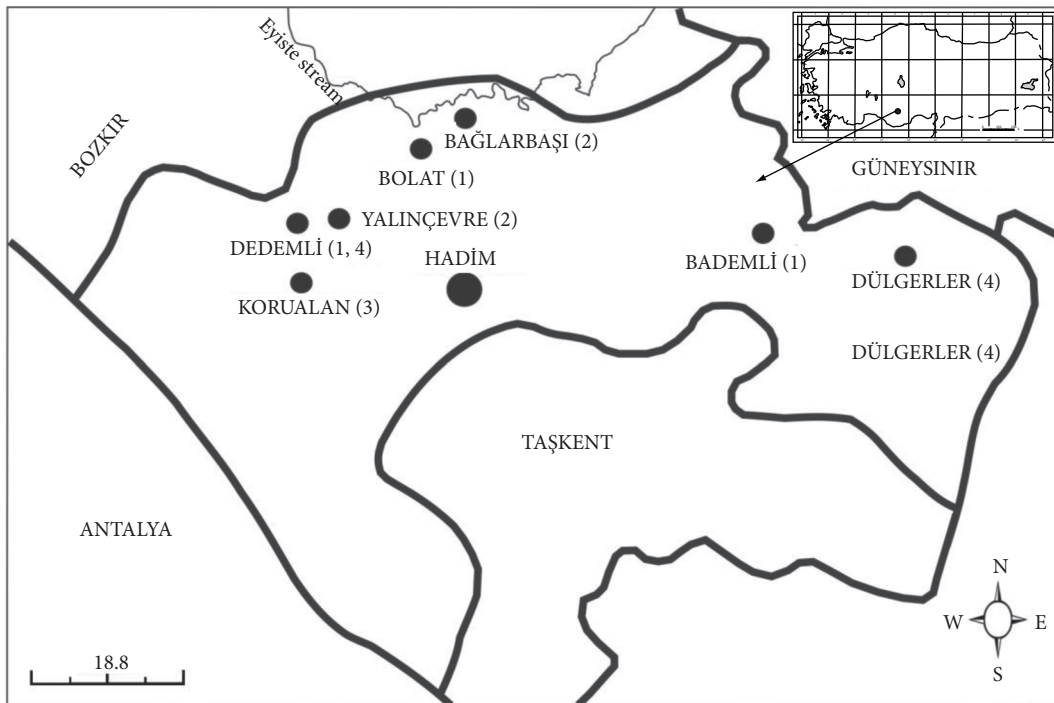


Figure 1. Study area and taxa numbers.

could host plasmodium or spores were collected. After these materials were taken into the laboratory, moist chamber culture was applied. This technique is highly suitable for the growth of *Myxomycetes*, and collected materials were treated with this technique for 3 months or less (Ing, 1999). During the culture process the materials were moistened to prevent the *Myxomycetes* from drying out, and their development was followed by stereomicroscope. The developed *Myxomycetes* were extracted carefully from their substrate. The samples were placed on cartons and into boxes of the same size. Photos of sporophore and the microscopic features of the samples were taken. Diagnoses of the samples were carried out using Nannenga-Bremekamp (1991), Neubert et al. (1995), and Ing (1999) as sources. The *Myxomycetes* samples are kept at the Mycological Application and Research Centre Fungarium at Selçuk University.

Description of taxa

Short descriptions, habitats, localities, collection dates, personal accession numbers (*G.Demirel*), and images of the taxa are given.

Myceteae

Myxomycota

Myxomycetes

Myxogastromycetidae

Physarales

Physaraceae

Physarum didermoides (Pers.) Rostaf., Mon. 67 (1874).

Sporangia in groups, crowded, sessile on a narrow base or with short or long flaccid stalks, up to 1.5 mm long, sometimes nearly spherical to reniform, 0.3-0.5 mm long, about 0.2 mm wide, and up to 4.5 mm long, always rounded at the apex, always contracted at the base in the stalk forms. Hypothallus extended, membranous, sometimes strand-like, pale ochraceous. Stalk membranous, ochraceous, gradually merging into the hypothallus. Peridium consisting of 2 layers, which are usually free from one another, sometimes a part of the outer layer is missing in the upper half; the inner layer is membranous, colourless, often with an irregular wide-meshed net

impregnated with lime; outer layer either a smooth, brittle, or white lime crust, often breaking early and in that case the sporangia are grey. Capillitium a net with small mesh and many white, small, rounded lime nodes; at the point of connection with the peridium the tubes are often stiff and wider than between the lime nodes. Spores in mass, black, dark purple-brown in the transmitted light, 12-14 μm in diameter, covered with dark warts (Figure 2).

Konya: Hadim, Bolat, on bark of living *Ulmus* sp., 1432 m, 19.07.2008, *G.Demirel* 280. Konya: Hadim, Dedemli, on decayed wood (unidentified), 1450 m, 19.07.2008, *G.Demirel* 363. Konya: Hadim, Bademli, on bark of living *Juniperus* sp., 1076 m, 18.10.2008, *G.Demirel* 431.

Physarum gyrosum Rostaf., *Sluzowce monogr.* 111 (1874).

Plasmodiocarps in crowded rosette-like or reticulate groups, sessile, about 1.0 mm long, laterally compressed, usually curved, 0.2-0.4 mm wide, and up to a few mm long, grey or ash-coloured, sometimes curving up under a plasmodium as a very short stalk. Peridium single, encrusted with rosy lime, crumbling away at the apex. Capillitium with small and predominantly large—almost reaching from wall

to wall—elongate white lime nodes. Spores in mass, brown, pale lilac-brown in transmitted light, 7-9 μm in diameter, covered with very fine spinules, some of which are clustered (Figure 3). Plasmodium pale cream.

Konya: Hadim, Yalınçevre, on bark of living *Juniperus* sp., 1680 m, 19.07.2008, *G.Demirel* 310. Konya: Hadim, Bağbaşı, Eyiste stream, on bark of living *Malus* sp., 1097 m, 27.10.2007, *G.Demirel* 69b.

Didymiaceae

Didymium karstensis Nann.-Bremek., *Acta Bot. Neerl.* 13: 246 (1964).

Sporangia in groups, short stalked, about 0.5-0.7 mm tall and 0.7-1 mm wide, with a wrinkled surface, white. Hypothallus discoid, stalk short, up to 0.2 mm long, brittle, white. Peridium 2 layered, at least at the base, the outer distant, a thin, wrinkled, smooth crystalline lime shell; the inner membranous, encrusted with lime at the base, colourless. Columella a small, limy thickening at the base of the sporangium, capillitium tubules sparsely branched and sparingly anastomosing, colourless. Spores in mass, dark brown, purple-brown in transmitted light, 10-12 μm in diameter, covered with warts and ridges, along which the spore will split (Figure 4).

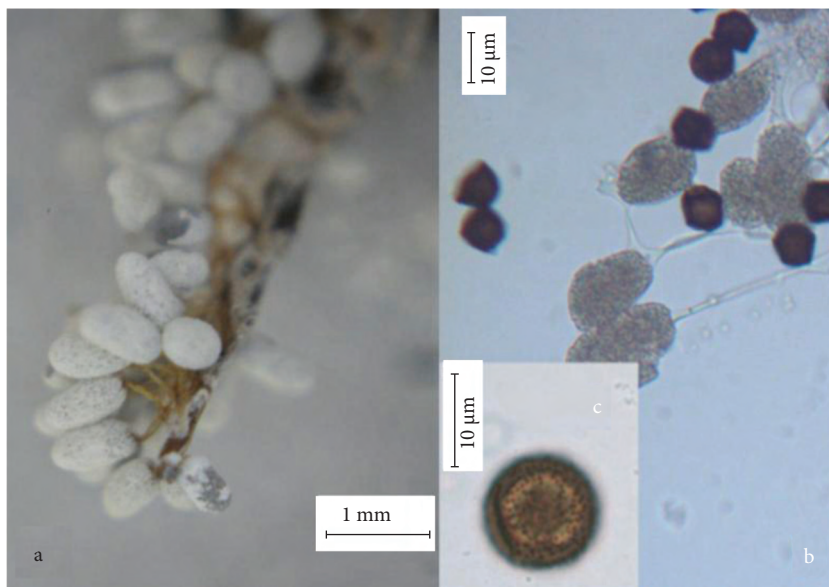


Figure 2. *Physarum didermoides*: a- sporangium, b- capillitium and spores, c- spores.

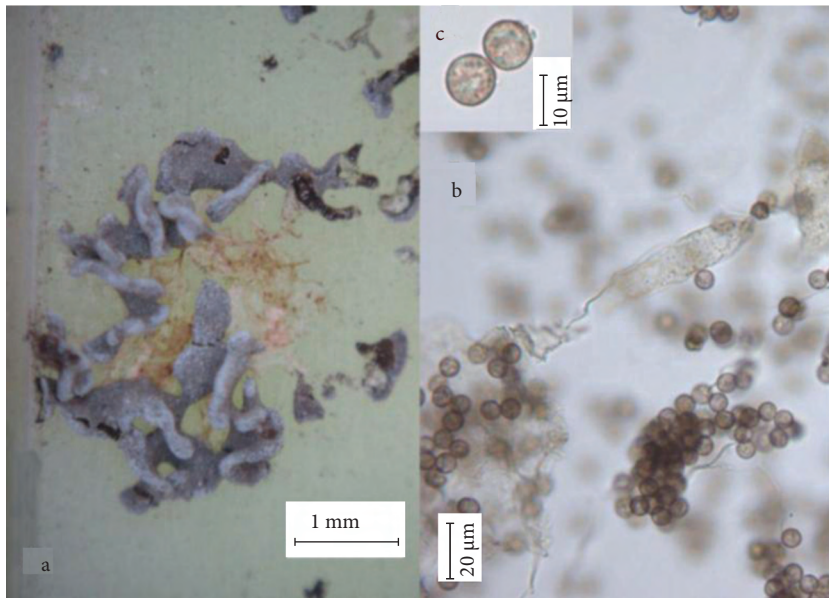


Figure 3. *Physarum gyrosum*: a- plasmodiocarp, b- capillitium and spores, c- spores.

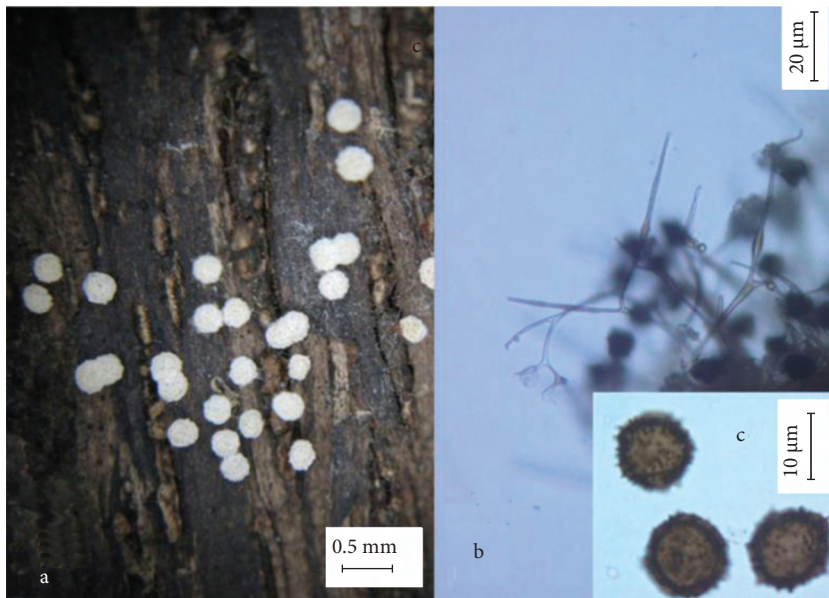


Figure 4. *Didymium karstensisii*: a- sporangium, b- capillitium and spores, c- spores.

Konya: Hadim, Korualan, on decaying wood of *Salix* sp., 1720 m, 19.07.2008, G.Demirel 253.

Didymium trachysporum G.Lister, Essey Nat. 20: 113 (1923).

Plasmodiocarps in small groups, sessile on a wide base, slightly convex above, 0.2-0.6 mm wide and up to 5 mm long, elongated, pale grey. Hypothallus inconspicuous, peridium double, outer layer a white,

brittle lime shell, rough, dusted with white lime crystals; the inner membranous and colourless, appressed to the outer layer; dehiscence irregular. Capillitium tubules sparse branched, colourless. Spores in mass, black, purple-brown in transmitted light, paler on one side, 10-12 µm in diameter, covered with much dispersed large dark warts, sometimes these are connected into an interrupted reticulum (Figure 5).

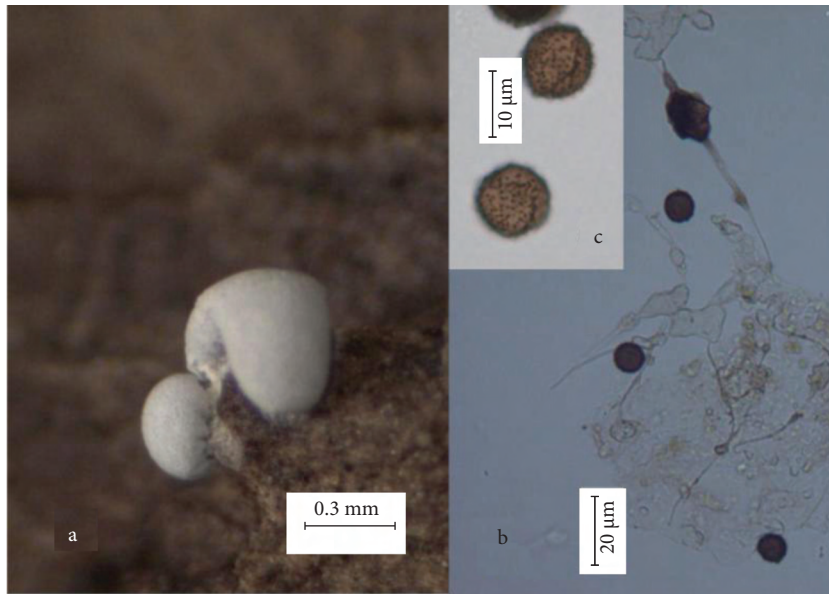


Figure 5. *Didymium trachysporum*: a- plasmodiocarp, b- capillitium and spores, c- spores.

Konya: Hadim, Dedemli, on bark of living *Morus* sp., 1520 m, 19.07.2008, G.Demirel 348. Konya. Hadim, Dülgerler, on bark of living *Quercus* sp., 1350 m, 19.10.2008, G.Demirel 500.

Discussion

There are 21 *Physarum* taxa and 15 *Didymium* taxa in Turkey (Sesli & Denchev, 2010). According to relevant literature (Yağız & Afyon, 2007), *Didymium* genus was collected from different substrates, such as *Abies*, *Crateagus*, *Juglans*, *Juniperus*, *Picea*, *Pinus*, *Populus*, *Quercus*, *Sorbus*, and *Ulmus*. We collected the species of this genus from the bark of *Morus* sp., *Quercus* sp., and *Salix* sp.

The genus *Physarum* was collected from different substrates, such as *Abies*, *Alnus*, *Cedrus*, *Fagus*, *Fraxinus*, *Juglans*, *Juniperus*, *Liquidambar*, *Pinus*, *Platanus*, *Populus*, *Prunus*, *Picea*, *Salix*, and *Quercus* (Yağız & Afyon, 2007). Our findings are different from the literature; we collected the species of this genus from the bark of *Ulmus* sp. and *Malus* sp., which is similar to *Juniperus*.

Physarum didermoides may be similar to *Mucilago crustacea* var. *crustacea*, but the former species can be separated from *M. crustacea* var. *crustacea* by

the presence of lime crystalline on the peridium. *Physarum didermoides* also differs from *Physarum lividum*, because the sporangia (not prolate)—and always sessile—has a single peridium and spores with a pale area on one side (Nannenga-Bremekamp, 1991; Neubert et al., 1995; Ing, 1999).

The fruiting bodies of *Physarum gyrosum* are quite unlike those of most other members of the genus *Physarum*, and some authors (e.g., Ing, 1999) have argued that this species is more appropriately placed in the genus *Fuligo* (as *F. gyrosa*) (Stephenson, 2003). Lister considered this species as a transitional form between *Fuligo* and *Physarum* (Nannenga-Bremekamp, 1991).

Didymium karstensis differs from *D. squamulosum* in the base of the sporangium, the double peridium with the layers dehiscing independently, and the nonumblicate base (Martin & Alexopoulos, 1979; Nannenga-Bremekamp, 1991).

Didymium trachysporum is similar to *D. comatum*, *D. difforme*, *D. tubulatum*, and *D. listeri*; however, it can be recognised by the coarse warts on the spores (Nannenga-Bremekamp, 1991). *D. trachysporum* is different from *D. Annulisporum*; it features a peridium appearing as a single, dark brown spores, and a surface uniformly covered by

truncate processes, which appear echinulate under light microscopy (Neubert et al., 1995).

With this study 4 new *Myxomycetes* were added to the myxobiota of Turkey.

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Acknowledgements

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