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Research article/Araştırma makalesi

The genus *Physarum* (Myxomycetes) checklist in Turkey

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Abstract

In this study we investigated of Turkey Myxomycetes (*Physarum* Genus). A key to the *Physarum* species of Turkey is also provided.

Key words: *Physarum,* checklist, myxomycetes, Turkey

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Türkiye *Physarum* (Myxomycetes) genusu listesi

Özet

Bu çalışmada Türkiye'de bugüne kadar tespit edilen *Physarum* genusuna ait Miksomisetlerin listesi verilmiştir. *Physarum* genusuna ait bir anahtar da verilmiştir.

Anahtar kelimeler: *Physarum,* listesi, Miksomiset, Türkiye

1. Introduction

Plasmodial slime moulds are characterized by an amorphous, multinucleate, protoplasmic mass called plasmodium and fruiting bodies. Myxomycetes are widespread and relatively diversed in their distribution throughout the world. Generally occur in association with decaying or living plant material in terrestrial forest ecosystems. (Stephenson, 2003).

Physarum is the most widely known genus among the myxomycetes, due to the fact that the species *Physarum polycephalum* Schwein. serves as a model organism for cell research. The single most important characteristics of the *Physarales* is the presence of lime (calcium carbonate) deposits which may ocur in the peridium, capillitium or stalk of the fruiting body (Stephenson and Stempen, 1994). The presence of lime is usually an obvious features, but under certain environmental conditions fruiting bodies are sometimes produced that have very little lime. Fruiting bodies produced by members of *Physarales* are most often sporangia, but some species produce plasmodiocarp or aethalia.

Physarum is one of the genera in Physaraceae (Physarales). Now 144 *Physarum* species are known all over the world (Lado, 2014) and in Turkey 28 species having been described (Baba, 2008; Baba et al., 2012; Baba et al., 2013; Sesli and Denchev, 2014).

2. Materials and methods

Physarum Pers., Neues Mag. Bot. 1: 88 (1794).

Fruiting body is a stalked or sessile sporangium or plasmodiocarp rarely almost aethaloid. Stalk when present ranging from short and stout to slender and relatively long grooved or smooth calcareous or limeless and translucent. Peridium consisting of one or two layers, the outermost layer calcareous. Columella present or absent, with or without calcareous deposits. Capillitium usually consisting of calcareous nodes connected by hyaline threads, these attached to the base and to the peridium, the nodes sometimes forming a pseudocolumella. Spores in mass black or dark brown (Stephenson, 2003; Ing, 1999). Twentyeight species of *Physarum* are known from Turkey (Table 1).

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Table 1. Key to the Turkey species of *Physarum*

1a	Sporocarps primarily sporangiate and stipitate, sometimes accompanied by sessile sporangia or plasmodiocarp.	2
1b	Sporocarps sporangium, plasmodiocarps or pseudoaethalia, sessile or subsessile, sometimes attached by weak, stipe like extansions of the hypothallus.	3
2a	Sporocarps mostly without columella or pseudocolumella	9
2b	Sporocarps with columella or true pseudocolumella	15
3a	Peridium membranous, densely encrusted with ash-white lime, but frequently intermixed with nearly limeless forms	*P. notabile* T. Macbr.
3b	Peridium membranous, yellow, usually wrinkled or areolate	*P.decipiens* M.A. Curtis
4a	Sporocarps or short plasmodiocarps, yellow to orange, often faded to yellowish white.	*P. auriscalpium* Cooke
4b	Sporocarp bruish grey colour and occasionally with metallic lustre.	*P. confertum* T. Macbr.
5a	Spores 10-13 µm, medium brown, irregularly spinulose, peridium white to pale grey.	*P. bitectum* G. Lister
5b	Spores 7-10 µm in diam. Capillitial lime granules large, elongated.	*P. gyrosum* Rostaf.
6a	Spores dark purple-brown, 12-15 µm.	*P. didermoides* (Pers.) Rostaf.
6b	Spores pale lilaceous, 8.5-10 µm	*P. luteolum* Peck
7a	Spores dark brown to almost black. Mostly long plasmodiocarps. Peridium usually with much lime.	*P. vernum* Sommerf.
7b	Spores brown. Mostly short plasmodiocarps and sporocarps. Peridium with scattered lime bodies.	*P. cinereum* (Batsch) Pers.
8a	Capillitial lime white to pale yellowish. Spores dark purple brown	*P. contextum* (Pers.) Pers.
8b	Capillitium with numerous rounded or somewhat angular white nodes, varying in size but mostly small, connected by short hyaline threads.	*P. ovisporum* G. Lister
9a	Sporocarps stalked, 2-4 mm broad, obconic to turbinate with a depressed or umbilicate apex,	*P. javanicum* Racib.
9b	Sporocarps flattened, mostly long-stalked and nodding.	*P. album* (Bull.) Chevall.
10a	Stalk reddish brown, translucent, often thin. The base of the peridium thickened to form a reddish brown disc	*P. pusillum* (Berk. & M.A. Curtis) G. Lister
10b	Sporocarps sessile, gregarious, crowded. Peridium single, heavily encrusted with lime, rough	*P. licheniforme* (Schwein.) Lado
11a	Sporocarps white, columella present	*P. globuliferum* (Bull.) Pers.
11b	Sporocarps golden-yellow, rounded, stalk long, nodes small.	*P. galbeum* Wingate
12a	Spores 8-10 µm, bright violaceous brown, minutely punctate, peridium iridescent.	*P. flavicomum* Berk.
12b	Spores dark, 10-14 µm in diam. The capillitial lime granules small, rounded.	*P. compressum* Alb.& Schwein.
13a	Spores purple to violet-brown, 11-13 µm	
13b	Spores violet brown 9-13 µm in diam. Stalk often long, reddih to greyish brown.	*P. oblatum* T. Macbr.
14a	Peridial lime yellow, orange or ochraceous.	*P. viride* (Bull.) Pers.
14b	Sporocarps robust, or very short plasmodiocarps and then mostly accompanied by stalked sporocarps.	*P. leucophaeum* Fr.
15a	Stalk contains lime. Capillitial net widemeshed with large irregular lime bodies, which often form a pseudocolumella.	*P. leucopus* Link
15b	Stalk cylindrical, impregnated with lime, concolorous or darker, 50-80% of the total height	*P pulcherrimum* Berk & Ravenel
16a	Sporocarps hemispherical to spherical, upright with a short stalk. Mostly with a distinct pseudocolumella of white lime.	*P. robustum* (Lister) Nann.-Bremek.
16b	Sporocarps loosely gregarious, stipitate. Columella calcareous, well developed, white, conical, 30 % of the sporothecae.	*P. perfectum* M. Peck
17a	Capillitium abundant, elastic and expanding, the nodes white or yellow, angular, branched, sometimes forming a pseudocolumella	*P. famintzinii* Rostaf.

3. Results

Description of taxa
Regnum: Protista
Divisio: Myxomycota
Classis: Myxomycetes
Subclassis: Myxogastromycetidae
Ordo: Physarales
Familia: Physaraceae
Genus: *Physarum*

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4. Conclusions

Species of the genus *Physarum* is the most widely known genus among the myxomycetes in Turkey and world. Members of the *Physarum* genus are widely distributed throughout the different ecosystems and different substrates, such as *Abies*, *Alnus*, *Cedrus*, *Fagus*, *Fraxinus*, *Juglans*, *Juniperus*, *Liquidambar*, *Pinus*, *Platanus*, *Populus*, *Prunus*, *Picea*, *Salix*, *Quercus*, *Ulmus* sp. and *Malus* sp. (Yağız and Afyon, 2007b; Baba, 2012). With this study we investigated of Turkey Myxomycetes of *Physarum* genus and a key to the *Physarum* species of Turkey is also provided.

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