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# New Myxomycete Records for Turkey: One New Genus and Three New Species

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**Abstract:** In this study, 3 new species and 1 new genus were recorded for the first time and added to the list of Turkish Myxomycetes. These new records are *Dictydiaethalium* Rostaf. with *Dictydiaethalium plumbeum* (Schumach.) Rostaf. ex Lister, *Didymium melanospermum* (Pers.) T. Macbr., and *Symphytocarpus impexus* Ing & Nann.-Bremek.

**Key Words:** Turkey, Myxomycetes, new records

## Türkiye İçin Bir Yeni Cins ve 3 Yeni Tür Miksomiset Kaydı

**Özet:** Bu çalışmada 3 yeni tür ve 1 yeni cins Türkiye miksomiset florasına ilk kez dahil edilip kaydedilmektedir. Bu türler *Dictydiaethalium* Rostaf. Genus, *Dictydiaethalium plumbeum* (Schumach.) Rostaf., *Didymium melanospermum* (Pers.) T. Macbr., ve *Symphytocarpus impexus* Ing & Nann.-Bremek. türleridir.

**Anahtar Sözcükler:** Türkiye, Miksomiset, yeni kayıt

## Introduction

Turkey is an ideal location to study Myxomycetes because it has natural and profuse vegetation and a wide range of macro- and micro-climates. The number of Myxomycete taxa known worldwide is about 1000 (Ergul & Oran, 2005). Sesli and Denchev (2005) made a compilation of Myxomycetes and Macromycetes in Turkey and 177 taxa of Myxomycetes were reported (Demirel et al., 2006), and later Yağız and Afyon (2007) reported 216 taxa of Myxomycetes. For this reason there is a great need for an increase in the frequency of taxonomical and mycofloristical studies. By the increase in the number of similar studies it will be possible to fill in the gap and it may cause an increase in new Myxomycetes taxa for Turkey.

## Materials and Methods

The samples were collected from Manisa in 2006. The fructification of Myxomycetes was obtained using the

moist chamber technique in the laboratory. Several kinds of plant remains and bark from living trees were kept in an incubator at  $25 \pm 0.1$  °C illuminated artificially in a 12:12 h light:dark cycle. The cultures were moistened with distilled water adjusted with KOH to pH 7.0. After 2 days the pH of the moisture in the dishes was measured with pH sticks. The moist chamber was then examined every second or third day under a dissecting microscope. When developing Myxomycetes were found, the moist chamber was allowed to dry slowly and the Myxomycetes were dried for a week. All the chambers were then rewetted for another 4-week period and examined as before (Gilbert & Martin, 1933; Harkonen & Uotila, 1983).

The specimens were preserved also as permanent slides in Hoyer's medium. Both microscopic and macroscopic observations were performed for taxonomical approaches. In the meantime, some photographs from characteristic qualitative objects were

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taken. All data were evaluated comparatively for taxonomical purposes (Martin & Alexopoulos, 1969).

The Myxomycetes specimens were identified with the aid of the literature listed in the references (Martin & Alexopoulos, 1969; Neubert et al., 1993, 1995, 2000; Stephenson & Stempfen, 1994). These specimens are stored at the Herbarium of Celal Bayar University, Manisa, Turkey.

## Results

Class: Myxomycetes

Subclass: Myxogastromycetidae

Order: Liceales

Family: Enteridiaceae

Genus: *Dictydiaethalium* Rostaf.

*Dictydiaethalium plumbeum* (Schumach.) Rostaf. ex Lister, Mycet. 157. 1894.

Syn: *Fuligo plumbea* Schum.

*Reticularia plumbea* (Schum.) Fr.

*Ostracoderma spadiceum* Schw.

*Licea rugulosa* Wallr.,

*Licea applanata* Berk.,

*Lycogala lenticulare* Dur. & Mont.,

*Reticularia entoxantha* Berk.,

*Reticularia lurida* Berk. & Br.,

*Licea cinnabarina* Berk. & Br.,

*Licea tenuissima* Berk. & Br.,

*Dictydiaethalium applanatum* (Berk.) Rostaf.,

*Clathroptychium rugulosum* (Wallr.) Rostaf.,

*Ophiuridium dissiliens* Hazsl.,

*Dictydiaethalium dissiliens* Hazsl.,

*Clathroptychium cinnabarinum* (Berk. & Br.)

*Clathroptychium dissiliens* (Hazsl.) Berl.,

*Clathroptychium berkeleyi* Masee,

*Dictydiaethalium ferruginea* Nann.-Bremek.

Sporophores pseudoaethaloid (occasionally sporangiate or aethaliate fruiting bodies are encountered) composed of numerous cylindrical sporangia, 0.3-0.5 mm in diameter and 1-3 mm tall, dull yellow to yellowish or dark reddish brown; peridium membranous, not persisting in mature fruiting bodies except at the apices of the individual sporangia and in the junctions between adjacent sporangia, dehiscence occurring as a result of the breaking apart of the individual sporangial caps, each of which remains connected to the thread-like strands formed in the sporangial junctions; hypothallus thick, often extending beyond the margin of the fruiting body, silvery or pallid; spores olivaceous brown to yellow in mass, nearly colourless to pale yellow by transmitted light, minutely roughened, 8.5-11  $\mu$ m in diameter (Figure 1).

*Locality:* Saruhanlı-Eğrigöl forest, 440 m, on decaying debris of *Pinus brutia*, 03.12.2006, H. Baba 396.

*Distribution:* USA, Italy, France, Japan, Denmark, India.

Class: Myxomycetes

Subclass: Myxogastromycetidae

Order: Physarales

Family: Didymiaceae

Genus: *Didymium*

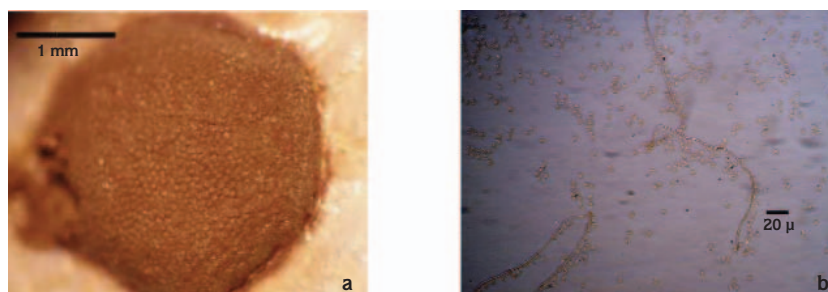


Figure 1. a) Stereomicroscopic view of *Dictydiaethalium plumbeum* b) Spores and capillitium.

*Didymium melanospermum* (Pers.) T. Macbr., N. Am. Slime-Moulds: 88; 1899.

Syn: *Physarum melanospermum* Pers.

Stalked or sessile sporangia, gregarious, subglobose or depressed, deeply umbilicate below, white or grey, 0.5-1 mm in diameter and up to 1 mm tall; peridium firm, dull brown or black, more or less densely covered with white lime crystals; stalk usually short, stout, rarely up to two-thirds of the total height, dull brown or black, often completely immersed in the umbilicate base of the sporangium; columella prominent hemi-spherical, dark or pallid, calcareous; capillitium consisting of sparingly branched pale to purple brown, sinuous threads varying from slender to robust, often bearing dark, nodular thickenings; spores black in mass, dull purplish brown by transmitted light, strongly warted or spinulose, 11-14  $\mu$  in diameter (Figure 2).

*Locality*: Turgutlu Ovacik plateau; 800 m, on living body of *Pinus brutia*, 28.08.2005, H.Baba 348 (natural).

*Distribution*: USA, Panama, Netherlands, Spain, Japan, China, Portugal, Finland, Czech Republic, France, Dominican Republic, Iceland.

Class: Myxomycetes

Subclass: Stemonitomycetidae

Order: Stemonitales

Family: Stemonitaceae

Genus: *Symphytocarpus*

*Symphytocarpus impexus* Ing & Nann.-Bremek. Proc. K. Ned. Akad. Wet. 70: 227; 1967.

Syn: *Stemonitis splendens* var. *confluens* Lister.

Sporophores pseudoaethaloid, crowded together, 0.5 mm in diameter and 5 mm in height, black or pale brown; hypothallus bright brown; sporangia sessile; peridium fugaceous; columella stout but narrowing upwards and ending into the capillitial net above, reddish brown to pale black in transmitted light; capillitium arising from the entire columella, primary branches stout and black branched and anastomosed free ends brown, covered with thin membranous or not; spores black in mass, lilac-brown, pale brown or black in transmitted light, fairly warted, 8-9  $\mu$  in diameter; plasmodium white (Figure 3).

*Locality*: Turgutlu Azitepe district; 100 m, on piece of branch and decaying wood under *Pinus* spp., 18.11.2006, H.Baba 1 (natural).

*Distribution*: USA, Netherlands, Spain, France.

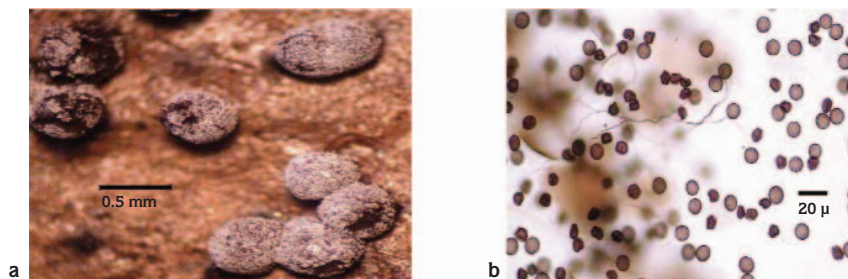


Figure 2. a) Stereomicroscopic view of *Didymium melanospermum* b) Spores and capillitium.

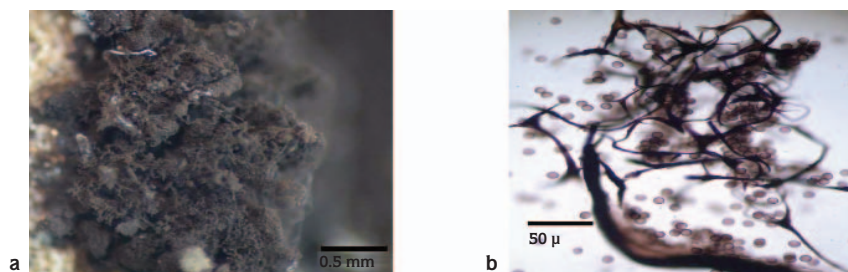


Figure 3. a) Stereomicroscopic view of *Symphytocarpus impexus* b) Columella, spore and capillitium.

## Discussion

In this study we have reported 3 new species and 1 genus for Turkish Myxomycetes: *Dictydiaethalium* with *Dictydiaethalium plumbeum*, *Didymium melanospermum*, and *Symphytocarpus impexus*.

Most species of Myxomycetes appear to be cosmopolitan, common inhabitants of decaying plant material throughout the world. They are particularly abundant in forested regions, where decaying logs, stumps, and dead leaves furnish a plentiful supply of potential substrates (Martin et al., 1969).

Gilbert and Martin (1933) accidentally discovered that the moist chamber technique was an excellent method for obtaining fructifications of the standard means for studies and inventories of Myxomycetes. It is applicable to almost any kind of substrate but has often been used for bark samples. Moist chamber cultures have yielded sporangia of species too small to be detected in the field and several new species have been described (Eliasson, 1991).

*Dictydiaethalium plumbeum*, a cosmopolitan species, usually living on decaying wood, is composed of closely compacted sporangia each with a separate wall, which is thickened at the junctions. The thinner portions of the wall disappear by maturity and the fructification becomes pseudoaethaloid. This fructification was obtained in moist chamber culture.

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The fact that some species of myxomycetes seem to be associated with forest floor litter is well known (Gray & Alexopoulos, 1968). *Didymium melanospermum* is collected almost exclusively from forest floor litter and thus is presumptively litter-inhabiting. While according to Stephenson and Stempen (1994) this species usually grows on decaying wood, twigs, and dead leaves, in our study it was collected on living bark and decaying wood of *Pinus brutia*. The distinguishing characteristics of this species are the robust, deeply umbilicate sporangia on short stalks. This fructification was obtained on natural substrata.

*Symphytocarpus impexus* is pseudoaethaloid, crowded together, black or pale brown, sporangia sessile, peridium fugaceous, covered with thin membranous or not; this fructification was obtained on natural substrata on piece of branch and decaying wood.

In conclusion, although the number of known Myxomycetes species in the world is 1000, only about 100 taxa have been reported using the moist chamber technique and naturally in Turkey (Dulger et al., 2005; Ergül & Oran, 2005).

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