

FIRST RECORD OF *PHYSARUM SPECTABILE* (MYXOMYCETES) IN RUSSIA
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Abstract

Gmoshinskiy V.I., Buchtoyarova N.Yu., Matveev A.V., 2017: First record of *Physarum spectabile* (Myxomycetes) in Russia. – Bot. Lith., 23(2): 107–110.

Physarum spectabile is reported from the Central Forest State Nature Biosphere Reserve (Nelidovsky district, Tver region), new to Russia. The short description of ecology and distribution of this rare species is provided. The morphology of the fruit bodies (sporocarps) of the species was examined by light microscopy and scanning electron microscopy (SEM), and images of relevant details are included.

Keywords: Amoebozoa, biodiversity, distribution, Myxogastria, rare species, Tver region.

Plasmodial slime molds (Myxogastria or Myxomycetes) are widespread unicellular organisms that are commonly assumed to have a sexual life cycle culminating with the formation of often macroscopic fruiting bodies (sporocarps) that efficiently disseminate spores. Species diversity of myxomycetes in Russia has been unevenly studied. The most studied areas are: Moscow, Leningrad, Tver, Volgograd and Novosibirsk regions, Krasnoyarsk and Primorye territories. Currently, over 400 species of myxomycetes have been reported from Russia (MATVEEV et al., 2016–2017).

The Central Forest State Nature Biosphere Reserve (CFSNBR) is located in the west of European Russia in the Upper Volga and Western Dvina (Daugava) river basins, in the southern part of Valdai Hills, where the southern taiga zone enters the mixed coniferous-broadleaved forests (NOVENKO et al., 2009). The Reserve aims to preserve the vast areas of European old-grown spruce-dominated forests. The flora of the Reserve is mainly comprised by the boreal species, which are widespread in the taiga zone.

The first study focusing on the biodiversity of myxomycetes of CFSNBR was carried out by Yu.K. Novozhilov in 1978–1979 (NOVOZHILOV, 1980). A regular study of the species diversity of

myxomycetes has been carried out on this territory since 2014. A total of 129 species was recorded during the short-term visits in 2014–2016 (BUCHTOYAROVA & GMOSHINSKIY, 2017).

Specimens were examined by the light microscope techniques using Leica DM500 (with camera ICC50 HD) and Leica M80 (with camera Leica IC80 HD) optical microscopes. Sizes of spores, capillitium and sporocarps were calculated by Leica Application Suite Ver. 3.0.0. Microscope examination was performed in 10% KOH. Spore surface and structure of capillitium were studied using scanning electron microscope (SEM) JSM-6380LA. All examined specimens are deposited in the collection of Myxomycetes (Department of Mycology and Algology, Faculty of Biology, Lomonosov Moscow State University, Moscow, Russia).

The species and specimens

Physarum spectabile Nann.-Bremek., Lado et G.Moreno

Specimens examined. Russia, Tver region, Nelidovsky district, near Bol'shoe Fedorovskoe village, in the south timberline of the 94th compartment, 56°27.380' N, 32°57.617' E, the area is character-

ized by woody and shrubby vegetation of *Picea abies* (L.) H.Karst., *Populus tremula* L. and *Corylus avellana* L. Specimen 7477 was collected on 14 September 2015, and specimen 6682 – on 27 November 2015. Both specimens were collected on highly rotten wood from the same piece of substrate, and we suppose that they belong to the same colony.

Specimen description: Sporangia sessile or short plasmodiocarps (Fig. 1a–b); crowded or scattered, sometimes heaped; flattened, pulvinate, on wide base; sporangia 0.5–0.7 mm across diameter, plasmodiocarps 1–2.5 × 0.5–0.7 mm, white. Peridium single, membranous, white or ash-gray (sometimes almost black at base), encrusted white granular lime (0.8 μm across diameter) in upper part. Hypothallus membranous, translucent, inconspicuous. Stalk and columella absent. Capillitium consisting of small-meshed net of colourless, fine tubes with many rounded, sometimes oblong and branched lime nodes (about 20 μm across diameter and 60–80 μm long), sometimes forming pseudocolumella (Fig. 1d). Spores dark brown or almost black in mass; dark purple-brown in transmitted light, angular in optical section,

with pale narrow lines, 12–14 μm in diam., densely ornamented regularly distributed warts (Fig. 1c, 2). Plasmodium not observed.

Type locality: Gran Canaria, Canarian Islands; on cladodes of *Opuntia ficus-indica* (NANNENGA-BREMEKAMP et al., 1984).

Distribution. This species was described in 1984. Currently its distribution may be unclear. It has been reported from the United States (North Dakota*, New Mexico*, Colorado*, Oklahoma* (ROLLINS & STEPHENSON, 2013), Texas* (NDIRITU et al., 2009a); Latin America: Mexico* (ESTRADA-TORRES, 2009; LADO et al., 2007; LADO & WRIGLEY DE BASANTA, 2008; LIZÁRRAGA et al., 2016), Chile* (LADO et al., 2007; LADO & WRIGLEY DE BASANTA, 2008; LADO et al., 2013), Peru (LADO et al., 2016), Argentina* (LADO et al., 2016), Brazil* (LIMA & CAVALCANTI, 2017); Canary Islands (NANNENGA-BREMEKAMP et al., 1984; NDIRITU et al., 2009b; COMPAGNO et al., 2016); New Caledonia (KYLIN et al., 2013); La Réunion Island (Indian Ocean) (ADAMONYTÉ et al., 2011); Africa (Morocco*, Madagascar*) and Europe: Ukraine (YATSIUK et al., 2017), Norway*, Spain*.

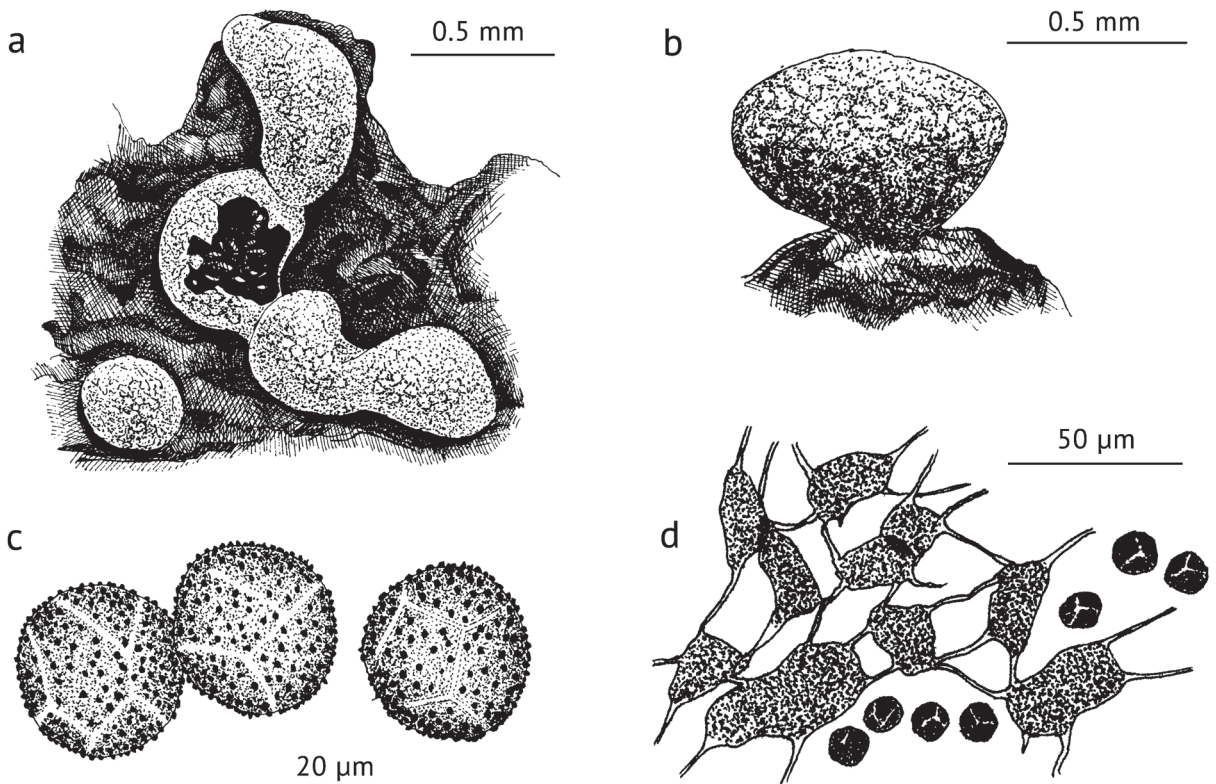


Fig. 1. *Physarum spectabile*: a – crowded fructifications, b – single sessile sporangium on restricted base, c – spores, d – capillitium.

An asterisk (*) after the name of country/state indicates that the occurrence data were provided by GBIF.

Substrates. In Latin America, this species forms sporocarps on plant debris (mainly on cacti and *Agave*) (NANNENGA-BREMEKAMP et al., 1984; POULAIN et al., 2011a), but in Europe, it develops on rotten wood and bark of dead trees (YATSIUK et al., 2017; GBIF).

Illustrations. NANNENGA-BREMEKAMP et al., 1983 (Figs 1, 2); ESTRADA-TORRES et al., 2009 (Figs 60, 61); POULAIN et al., 2011b (Pl. 296); LADO et al., 2016 (Figs 53–56); LIMA & CAVALCANTI, 2017 (Fig. 4J); YATSIUK et al., 2017 (Fig. 6c–h).

Notes. The distinctive feature of this species is evenly warted and angular dark spores with pale narrow lines. *Physarum atacamense* D.Wrigley, Lado et Estrada, *P. straminipes* Lister, and *Badhamia melanospora* Speg. are species with angular spores and appear on similar substrates. The first can be easily distinguished from the rest, because it usually forms sporocarps on long stipes and the spores have dark lines (spores of *P. spectabile* have pale lines) (WRIGLEY DE BASANTA et al., 2012). *Physarum straminipes* also has a yellow, weak stipes (continuous with hypothallus) and forms sporocarps on straw and another grass litter (ING, 1999). *Badhamia melanospora* has a completely different badhamioid capillitium with calcareous tubes in a network, not limeless tubes connecting small round lime nodes (CASTILLO et al., 1996; MORENO & OLTRA, 2010).

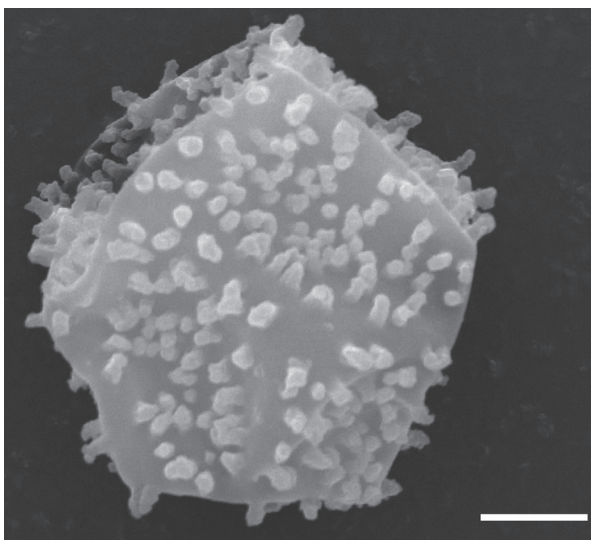


Fig. 2. *Physarum spectabile*: partially collapsed spore (SEM). Bar = 2µm.

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PIRMAS *PHYSARUM SPECTABILE* (MYXOMYCETES) RADIMO ATVEJIS RUSIJOJE

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Santrauka

Straipsnyje pateikiami duomenys apie pirmą *Physarum spectabile* radimo atvejį Rusijoje. Šis gleivūnas buvo aptiktas Tverės regiono Nelidovo rajone, valstybiniam biosferos rezervate. Trumpai aprašoma šios

retos rūšies ekologija ir paplitimas. *Physarum spectabile* vaisiakūniai buvo tirti šviesiniu ir skenuojančiu elektroniniu mikroskopais. Straipsnis iliustruotas vaisiakūnių detalių piešiniais ir nuotraukomis.