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The new site of *Diderma deplanatum* and *Diderma chondrioderma* in the Pogórze Wiśnickie Region (S Poland)

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The new site of two myxomycetes rare in Poland: *Diderma deplanatum* Fr. and *D. chondrioderma* (de Bary et Rostaf.) G. Lister is reported. They were found in the Bukowiec reserve, the Pogórze Wiśnickie Region.

Key words: *Myxomycetes*, *Diderma*, plasmodiocarp, red list, Poland.

THE AREA OF INVESTIGATION

The Bukowiec reserve is situated in the northern part of the Carpathian Foothills, in the Pogórze Wiśnickie Region. It extends from 390 till 465 m above sea level, on the north-western slope of the Bukowiec hill. The area of 5.31 ha is mostly occupied by the *Dentario glandulosae-Fagetum* accompanied by a small (0.33 ha) patch of the *Circaeo-Alnetum* association. The forest floor is characterized by a great amount of beech wood in different stages of decomposition. Most of stems and trunks are covered with a dense turf of mosses.

Since April 1997 till November 1998 studies on the occurrence and biodiversity of macrofungi in the reserve were carried out. A special attention was also paid to slime moulds growing in observed microsites. The most interesting among the species collected are *Diderma deplanatum* and *D. chondrioderma*.

THE DESCRIPTION OF COLLECTED MATERIAL

According to Neubert et al. (1995), *Diderma deplanatum* Fr. and *D. chondrioderma* (de Bary et Rostaf.) G. Lister belong to the subgenus *Diderma* within the genus *Diderma*, family *Didymiaceae*, order *Physarales* and subclass *Myxogasteromycetidae*.

The genus *Diderma* includes 72 species (Neubert et al. 1995) from which 22 are reported from Poland (Krzemieniewska 1960). Most of them are rare in the areas investigated up till now.

The taxonomic analysis of the collected material was based on: Lister and Lister (1925), Krzemieniewska (1960), Nannenga-Bremekamp (1991), Neubert et al. (1995).

Diderma deplanatum Fr.

[=*Leocarpus deplanatus* (Fr.) Fr. (Martin et Alexopoulos 1969), =*Chondrioderma physarioides* DC. Rost., =*Ch. deplanatum* Rost., =*Ch. mutabile* Schr., =*Diderma niveum* (Rost.) Macbr., =*D. niveum* Macbr. var. *deplanatum* Lister (Krzemieniewska 1960).]

On the 4th of April 1998, in the Bukowiec reserve the occurrence of 28 fructifications of *D. deplanatum* Fr. was recorded. They developed on the surface of a stem section (40 cm in diameter) completely covered with a moss *Plagiothecium denticulatum*; the moss' stems supported fructifications (Fig. 1). Round, depressed plasmodiocarps about 0.1–0.5 cm wide have double peridium. The outer egg-shell-like layer is white, thick and brittle. The inner layer is membranous, iridescent and dehisces irregularly. The interior of plasmodiocarp is filled with a mass of brown spores and capillitium. After the sporulation the orange base of fructification becomes visible. Sometimes this basal part arches in wide, flat pseudocolumella (Fig. 2). The colour of plasmodiocarp base is a very significant taxonomic feature allowing discrimination of this species. Dark purple-brown, elongated capillitial threads, 2–4 μm in diameter, are covered with bead-like thickenings. Their endings are smooth, hyalin, flattened and often connected one with another. Spores are covered with small warts and measure 8–10 μm (Fig. 3).

The development of *Diderma deplanatum* fructifications must have certainly taken place very soon before they were found. These plasmodiocarps could not come through winter months because of their transient wall.

In the slime moulds' collection of the Institute of Botany, the Jagiellonian University (KRA) there is a specimen of *D. deplanatum* – a duplicate delivered by dr Wanda Stojanowska. It was found on dry potato stalks, on the 20th of September 1970, in Biała Prudnicka, Lower Silesia (unpublished data). Jarocki (1924) also collected individuals of this species in September (12 IX 1923, 18 IX 1923, 22 IX 1923). Plasmodiocarps developed on leaves, oak bark and a moss *Leucodon sciuroides*.

Fig. 1. Plasmodiocarps of *Diderma deplanatum* in different stages of development formed on stems of *Plagiothecium denticulatum*.

Fig. 2. Inner part of *Diderma deplanatum* plasmodiocarp. The pseudocolumella and capillitium are visible.

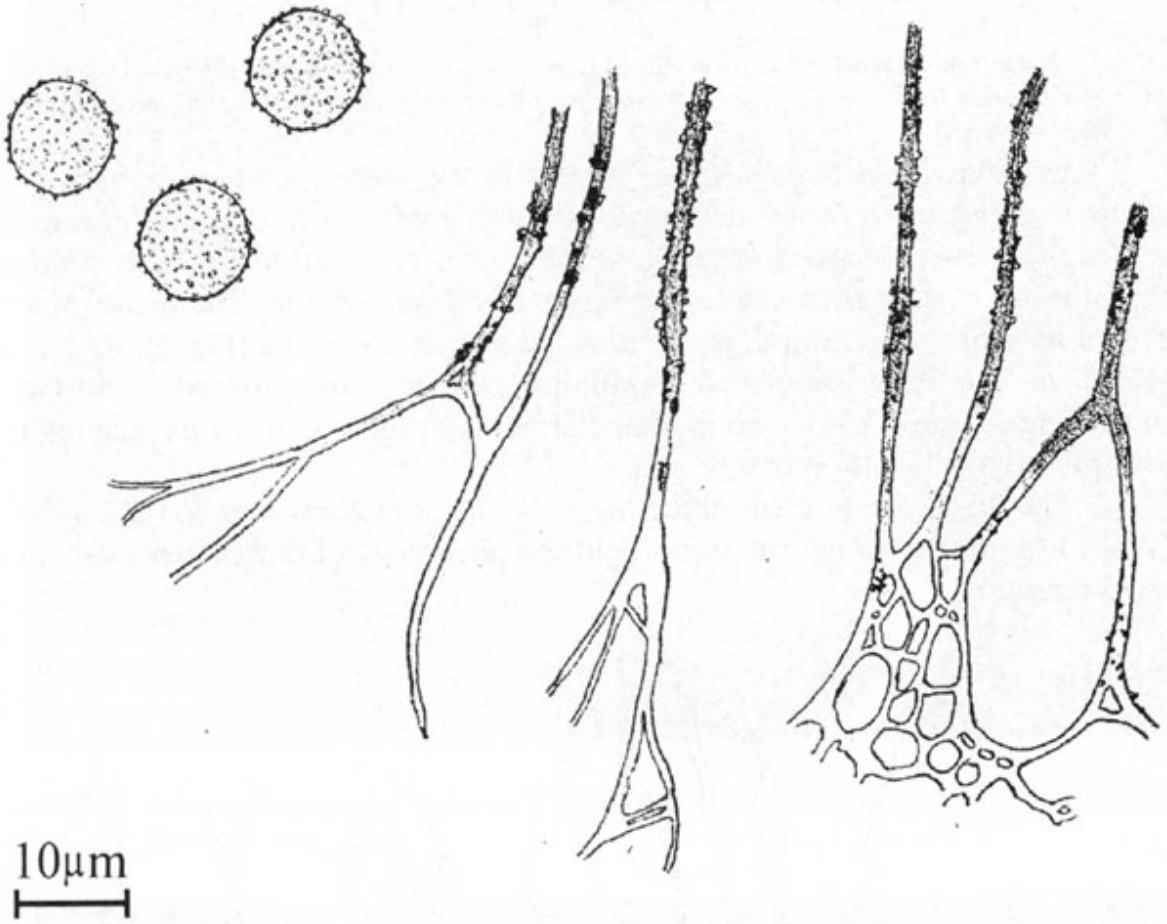

Fig. 3. Spores and capillitium of *Diderma deplanatum*

The time of its occurrence in the Bukowiec reserve could suggest that *Diderma deplanatum* belongs to the slime moulds developing in the early spring, on the border of melting snow layer. However, the beginning of the vegetation period in 1998 in the Bukowiec reserve was manifested in a quick melting of snow on the turn of February and March and relatively high air temperature in March and April. Additionally, the assembly of all records from the Bukowiec reserve, Biała Prudnicka and the Białowieża Primaeval Forest suggest a wider phenological spectrum of the species and give arguments for the necessity of investigations concerning the phenology of slime moulds.

The coloured picture of plasmodiocarp in the monograph of *Myxomycetes* by Lister and Lister (1925), fig. 89 d, describes well the shape of plasmodiocarp and the colour of pseudocolumella of *Diderma deplanatum*. Nannenga-Bremekamp (1991) gives a schematic drawing of fructification, capillitium and spores but does not pay attention to a very characteristic flat capillitium ending. The coloured picture of closed plasmodiocarp and drawing of microscopic features of capillitium and spores in Neubert et al. (1995), p. 48–49, match best the collected individuals. Less detailed drawing is showed in Martin and Alexopoulos (1969), plate XXXIV, fig. 311.

Diderma chondrioderma (de Bary et Rostaf.) G. Lister

[=*Didymium alexandrowiczii* (Rostaf.) Massee (Martin et Alexopoulos 1969), =*Didymium chondrioderma* De Bary et Rostaf., =*Chondrioderma alexandrowiczii* Rostaf., =*Diderma arboreum* G. Lister et Petch]

Eight individuals of *Diderma chondrioderma* were found on a bark of *Alnus glutinosa* twig. They developed as depressed plasmodiocarps covered with a double-walled peridium (Fig. 4). The outer egg-shell-like layer is white, smooth and closely adherent to the inner, membranous one. The inner, dark brown base part of plasmodiocarp does not form a columella (Fig. 5). Free or joined in the ends, branched capillitium threads are covered with big thickenings. Spores, 8 – 11 μm in diameter, are light brown in the passing light and are covered with warts (Fig. 6).

In the Bukowiec reserve specimens of *D. chondrioderma* were found on the 10th of May 1998. No information about the phenology of this species exists in the literature.

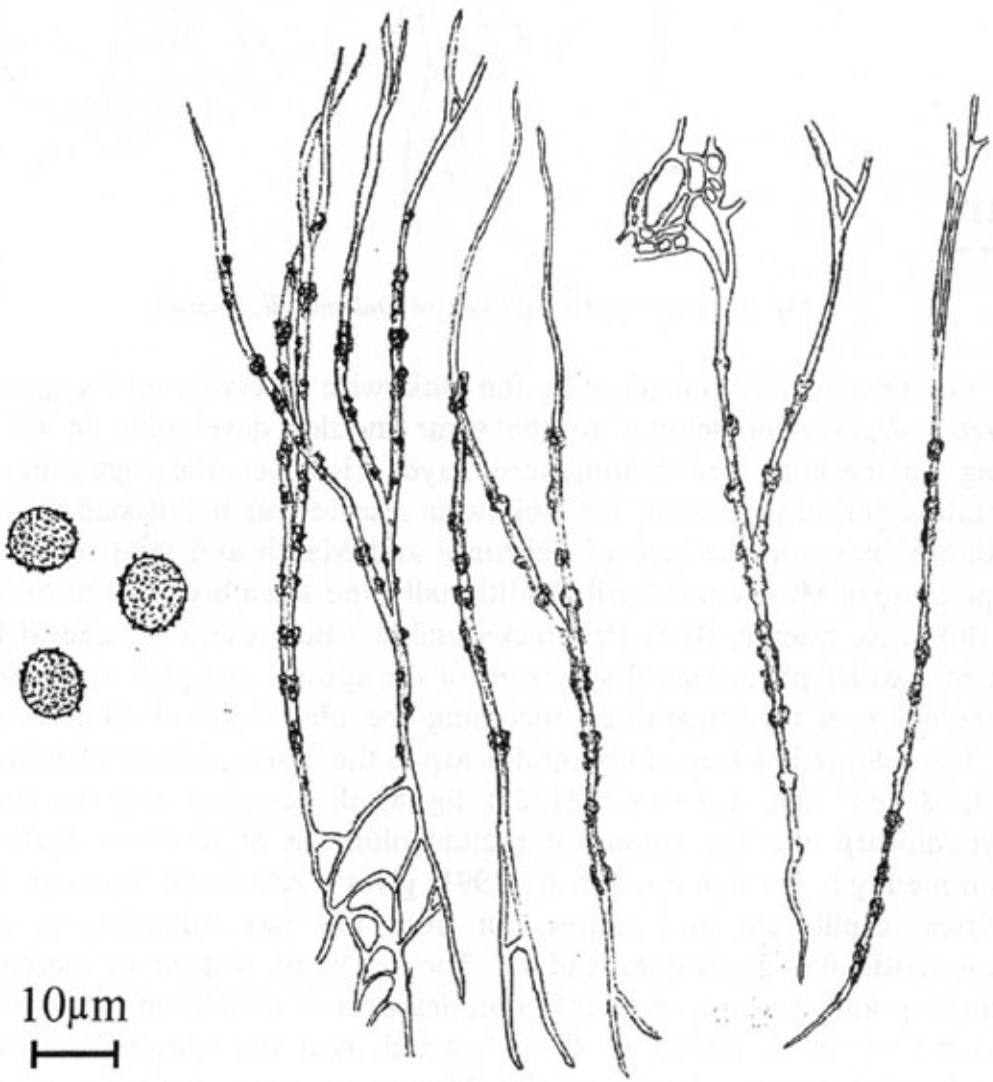

Fig. 6. Spores and capillitium of *Diderma chondrioderma*

Fig. 4. Plasmodiocarps of *Diderma chondrioderma* developed on a bark of an *Alnus glutinosa* twig.

Fig. 5. Base part of plasmodiocarp of *Diderma chondrioderma.* The capillitium and inner wall.

D. chondrioderma is illustrated in the monograph by Lister and Lister (1925) as *D. arboreum*. The black and white picture shows a plasmodiocarp with a well developed columella; this feature does not match the individuals found in the investigated area. The capillitium presented in this picture is branched and anastomosing in the ends, but smooth. A similar but less detailed illustration can be found in Martin and Alexopoulos (1969), plate XXXIV, ryc. 306. Fructification is presented there as an unstalked sporangium. Krzemieniewska (1960) illustrates this species on unclear black and white picture – Tab. VII, fot. 9. In the new monograph of *Myxomycetes* by Neubert et al. (1995) – page 43, there is a drawing of capillitium corresponding well to the individuals found in the Bukowiec reserve, but no pictures of fruiting bodies are enclosed.

THE OCCURRENCE OF *DIDERMA DEPLANATUM* AND *D. CHONDRIODERMA* IN POLAND AND IN THE WORLD

According to Schroeter (1889), *Diderma deplanatum* has already been recorded within actual borders of Poland. However, nowadays it is included in Poland into a category of extinct organisms (Ex) following a lack of the published data from the last 50 years (Stojanowska and Drozdowicz 1992). All the reported sites of this species in Poland are:

1. The environs of Opole, Lower Silesia (Schroeter 1889),
2. The Northern Reserve, the Białowieża Primaeval Forest (Jarocki 1924),
3. Biała Prudnicka, Lower Silesia (Stojanowska, unpublished data; the individuals collected in 1970 and deposited in the Herbarium of Wrocław University were identified by the author after the publication of the red list),
4. The Bukowiec reserve, Pogórze Wiśnickie Region.

According to Lister and Lister (1925) and Krzemieniewska (1960), *D. deplanatum* is known from Ireland, Denmark, Germany, Portugal, Switzerland and is reported as common in England. Neubert et al. (1995) mention the records of this species in the USA, Central America, India, Nepal, South Asia, Japan and New Zealand. *D. deplanatum* was also found in Africa (Ukkola 1998).

D. chondrioderma has been recorded in Poland on three sites:

1. Bielany near Warszawa (Aleksandrowicz 1872),
2. The Carpathians (Krzemieniewska 1960),
3. The Bukowiec reserve, the Pogórze Wiśnickie Region.

This species also belongs to the extinct organisms group (Ex) because of lack of published data from the last 50 years (Stojanowska and Drozdowicz 1992).

D. chondrioderma is a world widespread slime mould. It was recorded in Belgium, France, England, Finland, Romania, Portugal, Spain, Africa,

America, India, China, Japan, Australia, New Zealand, Galapagos and Poland (Neubert et al. 1995, Lister and Lister 1925, Martin and Alexopoulos 1969)

The current studies on slime moulds are not sufficient to define a potential occurrence and distribution of the members of this group in various regions of Poland. According to the new red list criteria (Czyżewska 1998) all species of slime moulds from the red list should be included in the DD (Data Deficient) group. This category is created for organisms, which are not known enough to estimate the risk of extinction on the basis on their occurrence. Only intensive, long-term observations concerning this problem may give more complex data on the biodiversity of the investigated regions and widen knowledge about the phenology of slime moulds.

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Nowe stanowisko *Diderma deplanatum* i *D. chondrioderma* na Pogórzu Wiśnickim

Streszczenie

Niniejsza praca przedstawia nowe stanowisko gatunków *Diderma deplanatum* i *D. chondrioderma* zlokalizowane w rezerwacie Bukowiec na Pogórzu Wiśnickim. W opracowaniu Stojanowskiej i Drozdowicz (1992) gatunki te zostały uznane za wymarłe lub zaginione (Ex). Nowe stanowisko wpływa więc na zmianę statusu tych gatunków, potwierdzając przedwojenne doniesienia dotyczące ich obecności na terenie Polski.