

Myxomycetes of the nature reserve near Wałbrzych (SW Poland) Part I. List of taxa and quantitative analysis

WANDA STOJANOWSKA¹ and EUGENIUSZ PANEK²

¹Museum of Natural History, Wrocław University

Sienkiewicza 21, PL-50-335 Wrocław

²Department of Taxonomy and Phytosociology

Institute of Plant Biology, Wrocław University

Kanonia 6/8, PL-50-328 Wrocław

e-mail: paneke@biol.uni.wroc.pl

Stojanowska W., Panek E.: *Myxomycetes of the nature reserve near Wałbrzych (SW Poland). Part I. List of taxa and quantitative analysis.* Acta Mycol. 39 (1): 47-63, 2004.

A total number of 103 Myxomycetes taxa is known of the "Przełomy pod Książem" nature reserve. In 2002, 89 taxa were recorded in the reserve. The following families prevail: *Physaraceae* – 24.4%, *Arcyriaceae*, *Didymiaceae* and *Stemonitidaceae* – 15.8% each, *Trichiaceae* – 12.2%. Dominant genera are: *Physarum* – 14 species, *Arcyria* – 9, *Trichia* – 8, *Cribraria* and *Diderma* – 7 each. Three species were recorded for the first time in Poland: *Arcyria minuta*, *Cribraria persoonii* and *Symphytocarpus flaccidus*. The occurrence of *Didymium serpula* and *Lepidoderma tigrinum* in Lower Silesia was confirmed after 100 years.

Key words: Myxomycetes, slime moulds, nature reserve, Lower Silesia, Poland

INTRODUCTION

An interesting natural and cultural area is situated within the administrative limits of the city of Wałbrzych, between three districts in the city (Szcawienko, Podzamcze, Lubiechów) and the town of Świebodzice. While the castle in Książ, the biggest one in Lower Silesia, founded by the Silesian Piast dynasty in the first half of 13th century, is the main tourist attraction, the fragment of the marginal Sudeten fault in Pogórze Wałbrzyskie (the Wałbrzyskie Foothills), known as ravines, or gorges, in the vicinity of Książ, is of particular natural value. A nature reserve, "Przełomy pod Książem koło Wałbrzycha", was established in 2000. The reserve, 231.41 ha, lies in the municipalities of Wałbrzych and Świebodzice, and belongs to the forest inspectorate in Wałbrzych (Liberacka 2002). Some authors (Walczak et al. 2001; Rąkowski et al. 2002) believe the reserve to be a landscape nature reserve. It is situated inside a quadrangle delineated by coordinates: 16°16'40"E - 16°18'10"E and 50°50'00"N - 50°50'45"N. The reserve is part of the Książ Landscape, established

in 1981 (Rąkowski et al. 2002). The reserve comprises ravined fragments of the valleys of two rivers: Pelcznica (formerly Czarny Potok, Ogorzelec) and Szczawnik (Solniczanka) near Książ. Skiba (433 m above sea level) is the highest elevation in the area, separating the almost 80 m deep river valleys. The valleys, or more accurately gorges, are narrow and winding, frequently with almost vertical walls, several dozen meters high. A geologic study of the area is offered by Wiktor (1959). Its floristic composition was discussed by Berdowski and Hejno (1984). The following three plant associations are distinguished in the reserve: 1 – sub-mountainous alder forest (*Alnetum incanae*), occupying the lowest locations along the river beds, 2 – sub-continental linden-hornbeam forest (*Tilio-Carpinetum*) in the higher sites of the ravines (150-350 m above sea level), and 3 – acid mountainous beech forest (*Luzulo-Fagetum*) in the highest locations (200-400 m above sea level). The tree stand of the sub-mountainous alder forest, apart from *Alnus incana*, is composed of *Acer pseudoplatanus*, *A. platanoides*, *Picea excelsa*, *Salix viminalis*, *S. caprea* and *S. alba*. The following species occur in the forest: *Carpinus betulus* (frequently), *Quercus robur*, *Q. petraea*, *Tilia cordata*, *Acer platanoides*, *A. pseudoplatanus* and *Fagus sylvatica*. The stand in the acid beech forest consists primarily of *Fagus sylvatica*, *Acer pseudoplatanus*, *A. platanoides* and *Betula pendula*. Single individuals of *Pinus sylvestris* also occur in the area.

The aged individuals of *Taxus baccata* growing in the reserve are of dendrological interest. The circumference of the oldest tree, the 600 years old nature monument "Bolko," is 278 cm (Rąkowski et al. 2002). The tree grows in the Pelcznica gorge.

The prevailing climate is oceanic, sub-mountainous, with some features of the basin climate. It is changeable, cold and severe, with considerable differences between diurnal and nocturnal temperatures. A great number of foggy days and days with ground frost is one of its characteristic features (Berdowski and Hejno 1984).

The exposition of slopes, high relief, low and narrow inundation terraces, and frequent, sometimes violent, changes of river levels cause rock-slides and earth flows. It is very difficult, and most often impossible, to remove fallen trees, which results in a large number of stumps and logs in various states of decomposition in the reserve. This, in turn, creates conditions conducive to the development of slime moulds.

In 1962, Firich published a list of slime moulds collected in the area of the present-day reserve. Firich collected samples during one vegetative season (10 trips), and treated both gorges as a single area. After 40 years, in 2002, studies on the biota of myxomycetes in the same area were re-launched. Sampling was started at the end of May and completed in October. Field studies in the reserve were conducted at least twice a month. Primary attention was paid to ripe sporangia, but young developmental stages were also sampled and ripened in the laboratory. Field photographic documentation of nearly all the found species was compiled; various developmental stages, starting with plasmodia, were often photographed (Fig. 1). Bark samples were not collected, and cultures in the wet chamber were not carried out. Taxonomy, nomenclature and synonyms follow Neubert, Nowotny, Bauman 1993 and Neubert, Nowotny, Bauman and Marx (1995, 2000). For the identification of taxa, monographs by Krzemienińska (1960) and Martin and Alexopoulos (1969) were used. Specific names are followed by Firich's (1962) names in brackets.

The authors of photos: 3, 5, 9-12, 14 – J. Maciążek and 1, 2, 4, 6-8, 13, 15-16 – E. Panek.

LIST OF TAXA

Abbreviations:

1; 2; 3 ... - number of records (only for rare or infrequent taxa)

V, VI ... X - months of occurrence; V-IX - occurs from May to September

P - Peleznica gorge

S - Szczawnik gorge

RL - Polish red-listed slime moulds

(1889) - recorded in the study area by Schroeter

(1962) - recorded in the study area by Firich

MYXOMYCETES

Ceratiomyxomycetidae

*Ceratiomyxales**Ceratiomyxaceae*

- Ceratiomyxa fruticulosa* (Müll.) Macbr. var. *fruticulosa* N. Am. - V-IX; P, S; (1889); (1962). On decaying wood of deciduous trees (*Acer platanoides*, *A. pseudoplatanus*, *Betula pendula*, *Carpinus betulus*, *Fagus sylvatica*, *Tilia cordata*, *Aesculus hippocastanum*) and coniferous trees (*Picea abies*, *Pinus sylvestris*), also on stumps overgrown with bryophytes. Appears in May and in the first half of June; occurs abundantly on nearly all stumps, logs and pieces of wood, often together with *Lycogala epidendrum*. Not frequent in September; not recorded in October. Firich (1962) reports 12 specimens together with var. *flexuosa*. The variety is no longer recognised in taxonomy.
- C. fruticulosa* var. *porioides* (Alb. et Schw.) A. Lister - VI, VIII-IX; P, S; (1962). On decaying wood of *Acer pseudoplatanus*, *Fagus sylvatica*, *Quercus robur*, *Q. petraea*, *Tilia cordata* and *Picea abies*. Less frequent than the previous variety (Fig. 2).

Myxogastromycetidae

*Liceales**Cribrariaceae*

- Cribraria argillacea* (Pers.) Pers. - VI-IX; P, S; (1962). On decaying wood of *Picea abies*.
- C. aurantiaca* Schrad. - VIII-IX; P, S. On decaying wood of *Tilia* and *Picea*.
- C. cancellata* (Batsch.) Nann.-Bremek - V, VIII-IX; P, S; (1889); (1962). Abundantly on decaying wood of *Tilia* and *Picea*.

- C. microcarpa* (Schrad.) Pers. emend. Nann.-Bremek – **I**; VIII; **P**; **RL**. On decaying wood of *Picea*. In Silesia known only from one site in the Kaczawskie Mountains; (Stojanowska 1972).
- C. persoonii* Nann.-Bremek. – **3**; VII, IX-X; **P**. First records in Poland. On decaying wood of *Tilia* and *Pinus*. Outside Europe, known from the USA and India.
- C. rufa* (Roth.) Rostaf. – VIII-X; **P**, **S**; (1962). On highly decayed wood of coniferous trees (*Picea*, *Pinus*) and deciduous trees (for example *Tilia*).
- C. vulgaris* Schrad. – VI-IX; **P**, **S**; (1962). On highly decayed wood of *Picea* and *Pinus*, and on logs and stumps overgrown with bryophytes.

Enteridiaceae

- Enteridium lobatum* (A. Lister) Farr. (*Liceopsis lobata* Torrend) – **RL**. Recently not found. Firich (1962) reports it as the first record in Poland. She found one specimen on wood of coniferous trees covered with bryophytes (August 1960). Known from Stolowe Mts. (Stojanowska 1983).
- E. lycoperdon* (Bull.) Farr var. *lycoperdon* (*Reticularia lycoperdon* Bull.) – **2**; VIII-IX; **P**; (1889). On decaying wood of *Fagus*, and a thickish twig on the forest ground. Solitary.
- Lycogala conicum* Pers. – **1**; VIII; **P**; (1962). On decaying wood of *Fagus*.
- L. epidendrum* (L.) Fr. var. *epidendrum* – V-X; **P**, **S**; (1889); (1962). The most abundant taxon; on decaying wood of almost all deciduous and coniferous trees, on bark; on stumps and logs overgrown with bryophytes.
- L. exiguum* Morgan – **2**; VI-VII; **S**; (1962). On decaying wood of *Acer platanoides*; on stumps overgrown with bryophytes.
- Tubifera ferruginosa* (Batsch.) J. F. Gmel. – V-VI, VIII-IX; **P**; (1889); (1962). On decaying wood of *Quercus*, *Pinus*, *Picea*, *Betula*, on stumps overgrown with bryophytes.

Liceaceae

- Licea minima* Fr. – Not found. Firich (1962) collected few small sporangia from wood of coniferous trees in September 1960.
- L. pusilla* Schrad. – **RL**. Not found. Firich (1962) found two specimens on wood of coniferous trees in August 1960.
- L. variabilis* Schrad. – **2**; X; **P**. Previously not reported from the study area. Rare in Silesia (Stojanowska 2000).

Trichiales

Arcyriaceae

- Arcyria affinis* Rostaf. – **2**; X; **P**, **S**; (1962). On decaying wood of *Tilia*.
- A. cinerea* (Bull.) Pers. – VI-IX; **P**, **S**; (1889); (1962). On decaying wood of deciduous and coniferous trees; on old logs overgrown with bryophytes; on fallen twigs.

- A. denudata* (L.) Wettst. - V-X; P, S; (1889); (1960). On decaying wood of deciduous and coniferous trees; on stumps overgrown with bryophytes.
- A. ferruginea* Sauter - I; X; P; (1962). On decaying wood of *Picea*. Species rare in the study area. Found by Firich on wood of a coniferous tree in August 1960.
- A. incarnata* (Pers.) Pers. - VII-IX; P, S; (1889); (1962). On decaying wood of deciduous trees (*Fagus*, *Betula*, *Quercus*, *Tilia*) and on fallen twigs.
- A. minuta* Buchet. (*Arcyria carnea* G. Lister) - I; VIII; P. First record in Poland. On unidentified decaying wood. Known in Europe from Belgium, Great Britain, Holland, Romania; outside Europe reported from North and South America, India, Japan, Madagascar. (Fig. 3).
- A. obvelata* (Oeder) Onsberg (*Arcyria nutans* (Bull.) Grev.) - VI-X; P, S; (1889); (1962). On decaying wood of deciduous trees (*Acer platanoides*, *Fagus*, *Tilia*, *Quercus*, *Alnus glutinosa*) and coniferous trees (*Picea*, *Pinus*) (Fig. 4).
- A. oerstedtii* Rostaf. - 2; IX-X; P. On a log and on a dry trunk of *Fagus*, 1.5 m above the ground.
- A. pomiformis* (Leers.) Rostaf. - VII-X; P, S; (1962). On decaying wood of deciduous trees (*Betula*, *Fagus*, *Tilia*, *Quercus* - frequently) and coniferous trees (*Pinus*); on fallen twigs; Schroeter (1889) reports it from the "Cisy" Castle in the vicinity of Książ.
- Metatrichia floriformis* (Schwein.) Nann.-Bremek. (*Trichia floriformis* (Schw.) G. Lister) - IX-X; P, S; (1962). On decaying wood of deciduous trees (*Fagus*, *Tilia*) and coniferous trees (*Picea*).
- M. vesparium* (Batsch.) Nann.-Bremek. (*Hemitrichia vesparium* (Batsch.) Macbr.) - VIII-X; P, S. On decaying wood of deciduous trees (*Acer pseudoplatanus*, *Fagus*, *Tilia*, *Quercus*), and on stumps overgrown with mosses. Old, last year's specimens were collected in June and July.
- Perichaena chryso sperma* (Curr.) A. Lister (*Ophiotheca chryso sperma* Curr.) - RL. Not found. Schroeter (1889) reports it from the vicinity of Książ. The species is rare in Poland, known only from botanic gardens (Krzemieniowska 1957, 1960).
- P. corticalis* (Batsch.) Rostaf. var. *corticalis* - 2; X; P. On fallen twigs (a. o. *Tilia*).
- P. depressa* Lib. - 2; X; P, S. On fallen twigs.

Trichiaceae

- Hemitrichia chryso spora* (A. Lister) A. Lister - RL. Obtained by Firich (1962) from a culture and reported as a new record in Poland. Not reported from other areas in Poland so far. Its occurrence in field conditions was not confirmed in this study.
- H. clavata* (pers.) Rostaf. - VIII-X; P, S; (1962). On decaying wood of deciduous trees (*Acer platanoides*, *A. pseudoplatanus*, *Fagus*, *Tilia*, *Quercus*, *Betula*, *Alnus*), and on wood of *Picea*.
- H. serpula* (Scop.) Rostaf. - 2; X; P, S; (1962). On decaying wood of *Fagus*, on a log of *Fagus* overgrown with moss (*Brachythecium rutabulum*) in the Pelcznica gorge; on a decaying log of *Acer pseudoplatanus* in the Szczawnik gorge. Only three specimens were collected.

- Oligonema schweinitzii* (Berk) Martin (*Oligonema nitens* Lib.) – **RL**. Not found. Firich (1962) collected one specimen at the end of August 1960 from wood of *Acer platanoides*. In Poland known from few sites in Silesia.
- Trichia affinis* de Bary – VII, IX-X; **P**; (1962). On decaying wood of deciduous trees (*Acer pseudoplatanus*, *Fagus*) and coniferous trees (*Picea*).
- T. botrytis* (J. F. Gmel.) Pers. – **I**; X; **P**; (1962). On decaying wood of deciduous trees (a. o. *Quercus*), on stumps overgrown with bryophytes.
- T. contorta* (Ditmar) Rostaf. var. *contorta* – **I**; IX; **S**. One specimen on bark of *Tilia*. Species rare in the study area.
- T. decipiens* (Pers.) Macbr. var. *decipiens* N. Am. – **I**; VI; **P**; (1962). On decaying wood of *Fagus*.
- T. decipiens* (Pers.) Macbr. var. *olivacea* Meylan – VI, VIII-IX; **P**, **S**; (1962). On decaying wood of deciduous trees (*Tilia*, *Fagus*), and on fallen twigs.
- T. favoginea* (Batsch) Pers. – VIII-X; **P**, **S**; (1962). On decaying wood of deciduous trees (*Tilia*, *Fagus*, *Quercus*, *Acer pseudoplatanus*, *Betula*) and coniferous trees (*Picea*); on stumps overgrown with bryophytes. Last year's specimens were collected in May and June. The earliest, very small groups of sporangia (even single sporangia) were found in July.
- T. persimilis* Karst. – IX-X; **P**, **S**; (1962). On decaying wood of deciduous trees (*Tilia*, *Fagus*); on stumps covered with bryophytes.
- T. scabra* Rostaf. VIII-X; **P**, **S**; (1889); (1962). On decaying wood of deciduous trees (*Acer pseudoplatanus*, *Betula*, *Fagus*, *Quercus*, *Tilia*) and coniferous trees (*Pinus*); on bark and logs overgrown with bryophytes. The earliest, small, single specimens occurred at the end of July.
- T. varia* (Pers.) Pers. – VIII-X; **P**, **S**; (1889); (1962). On decaying wood of almost all deciduous and coniferous trees (*Picea*, *Pinus*); on bark; on stumps overgrown with bryophytes.

Physarales

Didymiaceae

- Diachea leucopodia* (Bull.) Rostaf. – VI-X; **P**, **S**; (1889); (1962). Litter (dry leaves, fruits of *Tilia* and *Fagus*); on bark, fallen twigs, mosses, herbaceous plants, seedlings of *Acer*. Abundant in June, July and August. Sporadic occurrences in September and October.
- Diderma chondrioderma* (de Bary et Rostaf.) G. Lister – **I**; IX; **P**; **RL**. On decaying leaves. Collected in mid September. Species rare in Poland. Reported by Alexandrowicz from the vicinity of Warsaw (Krzymieniewska 1960), and recently by Miśkiewicz and Drozdowicz (1999) from the "Bukowiec" nature reserve (Carpathian Foothills), where it was found on the bark of *Alnus glutinosa*. First record in Silesia. (Fig. 5).
- D. deplanatum* Fr. – **I**; X; **S**; **RL**. Found only once. Occurs on a stump of *Picea* overgrown with bryophytes. Its white sporangia, or plasmodiocarps, rounded, semicircular or circular, surround bryophytes on which they grow. In Poland so far known from the region of Opole (Schroeter 1889; Stojanowska 2000;

- Stojanowska and Panek 2002) and from the nature reserve "Bukowiec" in the Carpathian Foothills (Miśkiewicz and Drozdowicz 1999) (Fig. 6).
- D. effusum* (Schwein.) Morgan var. *effusum* – VI-IX; P, S; RL. In litter and on seedlings of *Acer pseudoplatanus*; (Firich 1962). In Poland known from Silesia (Stojanowska 2000; Stojanowska and Panek 2002) and from the Ojców National Park (Drozdowicz 1992).
- D. radiatum* (L.) Morgan var. *radiatum* – I, X; P; RL. On decaying wood (unidentified); on bark and stumps overgrown with *Brachythecium rutabulum*. Not reported from the study area previously. In Silesia known from few sites (Stojanowska 2000) (Fig. 7).
- D. simplex* (Schroet.) G. Lister – RL. Not found. Schroeter (1889) reports it from the vicinity of Książ. In Silesia known from the Bialskie Mts. (Krawiec 1965); and outside Silesia reported in Poland from the province of Białystok (Krzemieniewska 1960).
- D. spumarioides* (Fr.) Fr. – I; VI; P. On a fallen twig. Reported by Schroeter (1889) from the vicinity of Książ.
- D. testaceum* (Schr.) Pers. – VII-IX; P, S. Abundantly in litter, on fallen beech twigs, mosses, and even on bare rock. Rare in Silesia (Stojanowska 2000) (Fig. 8).
- D. umbilicatum* Pers. var. *umbilicatum* – I; X; P. On logs overgrown with *Brachythecium salebrosum*. Previously not reported from the study area. In Poland known from few sites only. It was very often treated as *D. radiatum* var. *umbilicatum*.
- Didymium melanospermum* (Pers.) T. Macbr. var. *melanospermum* – VI, VIII, IX; P. Litter (dry leaves).
- D. nigripes* (Link) Fr. – I; VIII; P. Litter and small fallen twigs. (Fig. 9).
- D. serpula* Fr. (*Didymium complanatum* (Batsch.) Rostaf. – I; VI; P; RL. On a young leaf of *Rubus caesius*. Schroeter (1889) found it on a decaying leaf in the vicinity of Niemodlin (region of Opole) in July over 100 years ago. Its occurrence in Silesia was confirmed for the first time since his findings. In Poland known from the Białowieża Primeval Forest and from the Carpathian Foothills (Komorowska 1978; Krzemieniewska 1960) (Fig. 10).
- D. squamulosum* (Alb. et Schwein.) Fr. – I; VII; P; (1889); (1962). Only one specimen on a decomposing leaf.
- Lepidoderma tigrinum* (Schr.) Rostaf. – X; P, S; RL. Occurred quite numerously on decaying logs densely overgrown with *Orthodicranum montanum* in the second half of October. Neubert et al. (1995) emphasise the "specialised" moss selection of this slime mould. Its occurrence in Silesia was confirmed for the first time after over 100 years. Schroeter (1889) found it in the vicinity of Brynica (region of Opole). In Poland known from few sites only (Krzemieniewska 1960; Drozdowicz 1977). (Fig. 11).
- Mucilago crustacea* F. H. Wigg. var. *crustacea* (*Spumaria spongiosa* (Leys.) Jahn). Not found; Schroeter (1889) reports it from the vicinity of Książ.

Physaraceae

- Badhamia panicea* (Fr.) Rostaf. – I; X; S. On *Brachythecium rutabulum* growing on bark of a recently fallen tree (*Tilia*). Several flat conglomerations.
- B. utricularis* (Bull.) Berk. – I; IX, S. On a log of *Acer pseudoplatanus* covered with mosses. Firich (1962) reports a new species in Poland – *Badhamia magna* Peck. According to Martin and Alexopoulos (1969), *B. magna* is a synonym of *B. utricularis*.
- Craterium aureum* (Schumach.) Rostaf. – RL. Not found. Firich (1962) collected 2 specimens from highly decomposed litter and fallen twigs.
- C. leucocephalum* (Pers.) Ditmar var. *leucocephalum* – I; IX; P. Litter. Schroeter (1889) reports this species from the "Cisy" Castle in the vicinity of Książ.
- C. minutum* (leers) Fr. – VII-X; P, S; (1962). In litter and on fallen twigs.
- Fuligo leviderma* Neubert, Nowotny & Bauman (*Fuligo rufa* (Pers.) – VII-X; P, S; (1962). On wood of a recently fallen tree (*Tilia*); on decaying wood of *Fagus* and *Acer pseudoplatanus*; on stumps overgrown with bryophytes. Not numerous.
- F. septica* (L.) Wiggers var. *septica* – V-IX; P, S; (1962). On decaying wood of deciduous trees (*Fagus*, *Quercus*) and coniferous trees (*Picea*, *Pinus*); on stumps overgrown with bryophytes. Schroeter (1889) reports it from the entire region of Walbrzych.
- F. septica* var. *candida* (Pers.) R. E. Fr. – 2; VI, VIII; P, S; (1962). On logs. The variety is rare in the study area. Found in the Pelcznica gorge in June, and in the Szczawnik gorge in August. Only two specimens were found in 1962.
- F. septica* var. *rufa* (Pers.) R. E. Fr. – I; VI; P. On grasses and herbaceous plants. Altogether three aethalia originated from one plasmodium, covered with a light brown (beige), spumy and fragile peridium. The taxon may have not been reported from Poland so far as the variety *rufa* is a synonym of *Fuligo rufa* (Stojanowska 2000a) in Krzemieniewska's monograph (1960).
- Physarum bethelii* T. Macbr. et Lister – 2; VIII; X; P; RL; (1962). On wood of *Pinus* and on an unidentified piece of wood. Firich collected two specimens from bark of deciduous and coniferous trees in June 1960. She described the species as new in Poland.
- P. bivalve* Pers. – VII-VIII; P; (1889). In decomposing litter, together with *Diachea leucopodia*, *Craterium minutum* and *Diderma testaceum* (Fig. 12).
- P. cinereum* (Batsch) Pers. var. *cinereum* – VI, VIII; P, S; (1962). Highly abundant occurrence of the species was observed on twigs and needles of a small, fallen *Picea* tree in the Szczawnik gorge in mid June. It also occurs in litter, and on herbaceous plants (June and August in the Pelcznica gorge). Firich also collected one specimen in June 1960 (Fig. 13).
- P. citrinum* Schumach. – I; VII; P; (1962). On decaying wood of *Pinus*. In 1960, two specimens were collected from unidentified softwood.
- P. compressum* Alb. et Schwein. – I; VI, X; P. On a log overgrown with bryophytes (June), and on *Populus*, together with *Trichia varia* (October).
- P. flavicomum* Berk. – I; IX; P; RL. On *Tilia* log. Collected for the first time in Silesia in the "Łęczczok" nature reserve (Stojanowska and Panek 2002). In Poland known from two other sites. According to Krzemieniewska (1960), Krupa's



Fig. 1. Plasmodium of *Diachea leucopodia*.

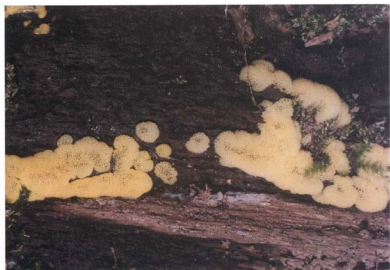


Fig. 2. *Ceratiomyxa fruticulosa* var. *porioides*.



Fig. 3. *Arcyria minuta*.



Fig. 4. *Arcyria obvelata*.

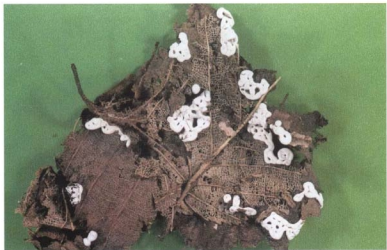


Fig. 5. *Diderma chondrioderma*.



Fig. 6. *Diderma deplanatum*.



Fig. 7. *Diderma radiatum*.



Fig. 8. *Diderma testaceum*.



Fig. 9. *Didymium nigripes*.



Fig. 10. *Didymium serpula*.



Fig. 11. *Lepidoderma tigrinum*.



Fig. 12. *Physarum bivalve*.



Fig. 13. *Physarum cinereum*.



Fig. 14. *Physarum gyrosom*.



Fig. 15. *Lamproderma arcyronema*.



Fig. 16. *Symphotocarpus flaccidus*.

- collection comes from a greenhouse. Drozdowicz (1992) reports this species from the Ojców National Park.
- P. globuliferum* (Bull.) Pers. – **I**; **IX**; **P**; (1962). On a fallen twig.
- P. gyrosom* Rostaf. – **I**; **IV**; **P**; **RL**. On a stump overgrown with bryophytes. Species rare in Poland, known from botanic gardens (Krzemieniewska 1960). Orzechowski (1966) collected it in the vicinity of Łódź. Schroeter (1889) reports two records in Silesia: the vicinity of Polanica and Wrocław. (Fig. 14).
- P. leucophaeum* Fr. – **VI-X**; **P**, **S**; (1889). On decaying hardwood (*Fagus*, *Acer pseudoplatanus*, *Tilia*, *Quercus*) and softwood (*Picea*); on pieces of bark (a. o. *Betula*); on fallen twigs. Species common in the study area.
- P. leucopus* Link. – **I**; **VIII**; **P**. On bark.
- P. nutans* Pers. var. *nutans* – **VI-X**; **P**, **S**; (1962). On decaying wood of deciduous trees (*Tilia*, *Fagus*, *Acer pseudoplatanus*, *Quercus*, *Betula*); on fallen twigs; on bark (*Betula*), sparsely in litter.
- P. penetrans* Rex. – **RL**; (1960). Not found. Collected from a trunk of *Quercus* at the end of August 1960.
- P. psittacinum* Ditmar var. *psittacinum* – **2**; **VI**; **P**; (1962). On decaying wood of *Fagus*, and on unidentified softwood. Firich also collected one specimen in June.
- P. sessile* Brandza – **RL**; (1962). Not found. Firich collected three specimens from litter at the end of August and in September 1960. She described her material as a species new in Poland. Not confirmed so far.
- P. virescens* Ditmar – **I**; **VI**; **S**; (1889); (1962). Lumps of yellow plasmodium were collected from fern fronds, mosses, and herbaceous plants in the Szczawnik gorge at the beginning of June. The lumps became brown after 3 hours. Sessile, yellow-green sporangia were formed over the next 24 hours. Firich collected her specimen in September 1960.
- P. viride* (Bull.) Pers. var. *viride* – **I**; **IX**; **P**; (1962). On wood of *Tilia*. Firich collected one specimen on softwood in June.
- P. viride* var. *aurantiacum* (Bull.) Lister – **I**; **VIII**; **P**. On wood of *Picea*. Together with *Lycogala epidendrum* and *Stemonitis fusca*.

Stemonitales

Stemonitidaceae

- Amaurochaete atra* (Alb. et Schwein.) Rostaf. – **I**; **VI**; **P**. One aethalium was collected from *Pinus* wood at the beginning of June. It was accompanied by *Arcyria denudata*. Species rare in Silesia (Stojanowska 2000). In Poland known from few sites only.
- Comatricha elegans* var. *elegans* (Racib.) G. Lister – **RL**; (1962). Recently not found. Firich obtained it from a culture.
- C. nigra* (Pers.) J. Schroet. – **2**; **VIII**, **X**; **P**, **S**; (1889); (1962). On wood of *Tilia* and *Quercus*. Species is rare in the study area.
- C. pulchella* var. *pulchella* (C. Bab.) Rostaf. – **I**; **VIII**; **P**; (1962). On decaying wood of *Fagus*. Firich collected it from softwood. Species is rare in Silesia (Stojanowska 2000).

- C. pulchella* var. *fusca* Lister – I; X; P. In litter. In Poland known from the Białowieża Primeval Forest and from the province of Białystok (Krzemieniewska 1960).
- Enerthenema papillatum* (Pers.) Rostaf. – I; VII; P; (1962). On decaying wood of *Fagus*.
- Lamproderma arcyrioides* (Sommerf.) Rostaf. (*L. violaceum* Rostaf.) – (1962). Not found. Firich described this taxon after Krzemieniewska (1960). She collected two specimens from a log of *Tilia* at the end of October 1960.
- L. arcyrioides* Rostaf. – VI-IX; P, S. On decaying hardwood (a. o. *Fagus*), and on fallen twigs (Fig. 15).
- L. columbinum* (Pers.) Rostaf. – 2; IX-X; P, S. One specimen was collected from *Dicranum scoparium* in the Szczawnik gorge in September. The second one was collected from *Tetraphis pellucida* in the Pelcznica gorge in October. Both sporangia were young and watery, and ripened in the laboratory after a few days. Species is rare in Silesia (Stojanowska 2000).
- Stemonitis axifera* (Bull.) T. Macbr. (*Stemonitis ferruginea* Ehrh.) – VI-VIII; P, S; (1889); (1962). On decaying wood of *Fagus*, *Acer pseudoplatanus*, *Carpinus*, *Tilia*; on bark; on logs overgrown with bryophytes.
- S. fusca* Roth. – VI-IX; P, S; (1889); (1962). On decaying wood of *Fagus*, *Acer platanoides*, *Quercus*, *Picea*; on stumps overgrown with bryophytes; on fallen twigs; in litter.
- S. pallida* Wingate – V-VIII; P, S. On decaying wood of *Fagus*; on stumps overgrown with bryophytes.
- S. smithii* T. Macbr. – VI, VIII; P, S; (1962). On decaying wood of *Tilia* and *Picea*.
- S. splendens* Rostaf. – RL; (1962). Not found. One specimen collected by Firich from the wood of *Acer* at the end of June. Rare species (Stojanowska 2000).
- Stemonitopsis hyperopta* (Meyl.) Nann.-Bremek (*Stemonitis hyperopta* Meylan) – VI, VIII, X; P, S; (1962). On decaying wood of *Acer pseudoplatanus*, *Betula* and *Picea*.
- S. typhina* var. *typhina* (F. H. Wigg.) Nann.-Bremek. (*Comatricha typhoides* (Bull.) Rostaf.) – VI-X; P, S; (1962). On decaying wood of deciduous trees. Most frequently on *Fagus*, rarely on *Carpinus*, *Tilia*, *Acer pseudoplatanus*; on logs overgrown with mosses.
- Symphytocarpus flaccidus* (Lister) Ing et Nann.-Bremek (*Stemonitis splendens* var. *flaccidus* Lister = *Stemonitis tubulina* Alb. et Schwein). (Krzemieniewska 1960) – I; VII; P. One specimen on almost fresh wood of *Quercus*. Recorded in Poland for the first time. Widely distributed in Europe and in the world (Fig. 16).

QUANTITATIVE ANALYSIS

General remarks and assumptions

Research on slime moulds in Silesia has so far attempted to describe changes occurring in the myxomycete biotas in a number of forest reserves and in the Botanic Garden of Wrocław University (Stojanowska 1977, 1980, 1992; Stojanowska and Panek 2002). The published studies on the issue provide comparative analyses

of the occurrence of slime moulds 15, 20 and 30 years since examinations were first conducted in the case of the reserves, and 100 years (Schroeter 1889) and 35 years (Krzemieniewska 1957) in the case of the Botanic Garden. The results and conclusions lack accuracy since the periods studied were either not full vegetative seasons or were not the same vegetative seasons. The duration of the investigations carried out in particular sites varied, consequently affecting the extent to which they were studied.

Firich's (1962) list of slime moulds from the area of the "Ravines" in the vicinity of the Książ Castle came to the attention of the present authors for a number of reasons. Firstly, her data referred to only one, full vegetative season. Secondly, the number of taxa collected over such a relatively short period of time was conspicuous and never repeated in Silesia. Thirdly, the collection included taxa new for Poland.

Inspired by this, the authors set out to re-launch field studies in the area. Efforts were made to conduct field observations under circumstances similar to those described by Firich (1962). The observations started at the end of May 2002, and the material was collected in both gorges at least once a month in the successive months of the vegetative season. The high frequency of field trips allowed for in-depth observations of factors influencing the development of slime moulds, as well as the estimation of changes that occurred in their biota after 40 years.

Frequency of the occurrence of slime moulds in the reserve

The first data concerning slime moulds of the study area can be found in Schroeter's work (1889). He reports the following 26 species of myxomycetes from the vicinity of Książ: *Arcyria cinerea*, *A. denudata*, *A. incarnata*, *A. obvelata*, *Comatricha nigra*, *Diachea leucopodia*, *Cribraria cancellata*, *Diderma simplex*, *D. spumarioides*, *Didymium squamulosum*, *Perichaena chrysosperma*, *Physarum bivalve*, *P. leucophaeum*, *P. virescens*, *Enteridium lycoperdon*, *Mucilago crustacea*, *Stemonitis axifera*, *Trichia scabra*, *T. varia*, *Tubifera ferruginosa*; from the Szczawnik gorge: *Ceratiomyxa fruticulosa* and two species from the vicinity of the nearby "Cisy" Castle. He reports three common species from the entire district of Walbrzych: *Fuligo septica*, *Lycogala epidendrum* and *Stemonitis fusca*. Our investigations did not confirm the occurrence of the following species in the reserve: *Diderma simplex*, *Mucilago crustacea* and *Perichaena chrysosperma*. A considerably more extensive list of slime moulds, jointly for both gorges (Pelcznica and Szczawnik), was published by Firich (1962). She reports 65 taxa collected in 1960, including two species obtained from cultures: *Comatricha elegans* and *Hemitrichia chrysospora*. Firich's list provides the number of recorded specimens for each taxon. In the present paper, such figures are given only for the taxa with a small number of records. The following species were identified as new for Poland in the group of species found in 1960: *Physarum bethelii*, *P. sessile*, *Enteridium lobatum*, *Hemitrichia chrysospora* and *Badhamia magna*. The occurrence of *Physarum bethelii* was confirmed recently, while *Badhamia magna*, in keeping with the monograph by Martin and Alexopoulos (1969), is treated as a synonym of *Badhamia utricularis*. Despite of our thorough search, 11 species were not found. In the vegetative season in 2002, 89 taxa, including 6 varieties of slime moulds, were found in the reserve. In the Pelcznica gorge, 89 taxa were collected, and in the Szczawnik gorge – 49 (Tab. 1). Species of the family Physaraceae prevailed (20 species – 24.4 % of the total number of species). The

families Arcyriaceae, Didymiaceae and Stemonitidaceae were represented by 13 species each (15.8 %). 10 species belong to Trichiaceae (12.2 %). The remaining families were represented by fewer than 10 species: Cribrariaceae – 7, Enteridiaceae – 5; only 1 species represented Ceratiomyxaceae and Liceaceae each. 26 genera were identified. The following genera were most numerous in species: *Physarum* – 14, *Arcyria* – 9, *Trichia* – 8, *Cribraria* and *Diderma* – 7 each, *Stemonitis* and *Didymium* – 4 each. Between 1 and 3 species represented each of the 19 remaining genera. Only half of the slime moulds collected in the reserve belong to the group widely distributed in Poland while 46 taxa should be treated as rare as they were found in three sites (*Hemitrichia serpula*, *Lepidoderma tigrinum* and *Cribraria personii*), two sites or one site only. Some of them are common in Poland but rare only in the reserve, for example *Arcyria ferruginea*, *Comatricha nigra*, *Enteridium lycoperdon*, *Fuligo septica* var. *candida*, *Hemitrichia serpula* and *Trichia decipiens*. 11 species represent slime moulds rare in Poland, including red-listed species (Stojanowska and Drozdowicz 1992): *Cribraria microcarpa*, *Diderma chondrioderma*, *D. crustaceum*, *D. deplanatum*, *D. effusum*, *D. radiatum*, *Didymium serpula*, *Lepidoderma tigrinum*, *Physarum bethelii*, *P. gyrosum* and *P. flavicomum*. Nearly all of the above species (excluding *Cribraria microcarpa*) belong to the order Physariales, and the majority belong to the family Didymiaceae. Attention should be paid to *Didymium serpula* and *Lepidoderma tigrinum*, reported from Silesia by Schroeter (1889) over one 100 years ago. Three species new for Poland were found in the reserve: *Arcyria minuta*, *Cribraria personii* and *Symphytocarpus flaccidus*. During the vegetative season in 2002, 33 taxa new for the study area were collected. Together with Schroeter's (1889) and Firich's (1962) data, the list of slime moulds of the reserve "Przełomy pod Książem koło Wałbrzycha" increased to 103 taxa, including 6 varieties.

In part II of the present project, seasonality of the myxomycete biota will be discussed and the results of ecological analysis will be presented.

REFERENCES

- Berdowski W., Hejno M. 1984. Flora mchów Przełomu Pelcznicy pod Książem. Acta Univ. Wratisl. 666, Prace Bot. 29: 131-147.
- Drozdowicz A. 1977. Śluzowce rezerwatu leśnego Turbacz im. W. Orkana w Górcach. Zesz. Nauk. U.J. Prace Bot. 5: 157-167.
- Drozdowicz A. 1992. Slime moulds (Myxomycetes) of the Ojców National Park. Part 1. Floristic problems. Zesz. Nauk. U. J. Prace Bot. 24: 125-145.
- Firich M. 1962. Przyczynek do znajomości śluzowców Dolnego Śląska. Acta Soc. Bot. Pol. 31: 153-168.
- Komorowska H. 1978. Stan badań nad śluzowcami polskich Karpat. Wiad. Bot. 22 (1): 39-46.
- Krzemieniowska H. 1957. Spis śluzowców zebranych w latach 1955-1956 – A list of Myxomycetes collecteg in the years 1955-1956. Acta Soc. Bot. Pol. 26 (4): 785-811.
- Krzemieniowska H. 1960. Śluzowce Polski na tle śluzowców europejskich. PWN – Warszawa.
- Liberacka H. 2002. Nowe rezerwaty przyrody na Dolnym Śląsku. Ślęza – Dolnośląski Informator Przyrodniczy. Numer 2 – Lato. Fundacja Ekologiczna Ziemi Legnickiej „Zielona Akcja”: 19.
- Martin G. W., Alexopoulos C. J. 1969. The Myxomycetes. Univ. Iowa City.
- Miśkiewicz A., Drozdowicz A. 1999. The new site of *Diderma deplanatum* and *Diderma chondrioderma* in the Pogórze Wiśnickie Region (S Poland). Acta Mycol. 34 (2): 299-304.
- Neubert H., Nowotny W., Baumann K. 1993. Die Myxomyceten Deutschlands und des angrenzenden Alpenraums unter besonderer Berücksichtigung Österreichs. Band I. Karlheinz Baumann Verlag, Gomaringen.

- Neubert H., Nowotny W., Baumann K., Marx H. 1995, 2000. Die Myxomyceten Deutschlands und des angrenzenden Alpenraums unter besonderer Berücksichtigung Österreichs. Band 2, 3. Karlheinz Baumann Verlag, Gomarigen.
- Orzechowski T. 1966. Śluzowce stwierdzone w okolicach Łodzi oraz w parkach łódzkich. *Fragm. Flor. Geobot.* 12 (2): 209-214.
- Rąkowski G., Smogorzewska M., Janczewska A., Wójcik J., Walczak M., Pisarski Z. 2002. Parki Krajobrazowe w Polsce. Inst. Ochr. Środ. – Warszawa.
- Schroeter J. 1889. Myxomycetes Wallroth. (In:) F. Cohn. Kryptogamen – Flora von Schlesien (3) 1. J. U. Kern's Verlag, Breslau: 91-133.
- Stojanowska W. 1972. Flora śluzowców Gór Kaczawskich na tle śluzowców Śląska. *Acta Univ. Wratisl.* 171, *Prace Bot.* 16: 9-75.
- Stojanowska W. 1977. Zmiany we florze śluzowców rezerwatu „Puszcza Śnieżnej Biaki”. *Acta Mycol.* 13 (1): 99-107.
- Stojanowska W. 1980. Sezonowa zmienność flory śluzowców w rezerwacie „Muszkowicki Las Bukowy”. *Fragm. Flor. Geobot.* 26 (1): 103-113.
- Stojanowska W. 1983. Myxomycetes Sudetów I. *Acta Mycol.* 19 (2): 207-243.
- Stojanowska W. 1992. Flora śluzowców Wrocławskiego Ogrodu Botanicznego. *Acta Univ. Wratisl.* 1358, *Prace Bot.* 48: 261-275.
- Stojanowska W. 2000. Rzadkie gatunki śluzowców (Myxomycetes) na terenie Śląska. *Acta Univ. Wratisl.* 2264, *Prace Bot.* 78: 165-175.
- Stojanowska W. 2000 a. *Fuligo leviderma* H. Neubert, W. Nowotny et K. Baumann spec. nov. (*Fuligo violacea* Pers.) – nowy gatunek dla flory śluzowców Polski. *Acta Univ. Wratisl.* 2264, *Prace Bot.* 78: 177-181.
- Stojanowska W., Drozdowicz A. 1992. Red List of threatened slime moulds (Myxomycetes) in Poland. (In:) K. Zarzycki, W. Wojewoda, Z. Heinrich (eds). List of threatened plants in Poland. 2. ed. W. Szafer Institute of Botany Polish Academy of Sciences. Kraków: 21-26.
- Stojanowska W., Panek E. 2002. Changes in the myxomycete biota of the „Łęczok” nature reserve near Racibórz (SW Poland). *Acta Mycol.* 37 (1/2): 13-28.
- Walczak M., Radziejowski J., Smogorzewska M., Sienkiewicz J., Gack-Grzesikiewicz E. and Pisarski Z. 2001. Obszary chronione w Polsce. Wyd. III. Inst. Ochr. Środ. – Warszawa.
- Wiktor A. 1959. Mięczaki strefy Przelomów pod Książem koło Wałbrzycha. *PTPN. Prace Kom. Biol.* 19 (6): 331-362.

Myxomycetes rezerwatu koło Wałbrzycha (SW Polska)

Część I. Wykaz gatunków i analiza ilościowa

Streszczenie

Rezerwat „Przelomy pod Książem koło Wałbrzycha” leży w obrębie Pogórza Wałbrzyskiego, na terenach gmin Wałbrzych i Świebodzice. Należy do nadleśnictwa Wałbrzych. Zajmuje powierzchnię 231,41 ha i wchodzi w skład utworzonego w 1981 roku „Książańskiego Parku Krajobrazowego”. Rezerwat obejmuje przełomowe odcinki rzek Pelcznicy i Szczawnika i odznacza się urozmaiconym urzeźbieniem. Obie doliny są głębokie, o wąskich dnach i – miejscami – o bardzo stromych, pionowych ścianach, porośniętych różnogatunkowym lasem.

Autorów niniejszego opracowania zainteresował spis śluzowców Firich (1962) z okolic Książa. Autorka z tego terenu podaje aż 65 taksonów zebranych w ciągu jednego sezonu wegetacyjnego, a wśród nich kilka gatunków nowych dla Polski. Badania prowadziła podczas 10 wyjazdów terenowych, traktując jednak obie doliny jako całość. Po 40 latach, w roku 2002, na terenie rezerwatu przystąpiono do ponownych badań tej grupą organizmów. Terminy obserwacji w trakcie sezonu wegetacyjnego starano się dopasować do poprzednich, tj. tych z roku 1962.

Pierwsze dane dotyczące śluzowców badanego terenu zaczerpnięto z opracowania Schroetera (1889). Autor podaje z okolic Książa 26 gatunków, spośród których trzech obecnie nie

odnaleziono. Firich (1962) wymienia 65 taksonów. Mimo dokładnych poszukiwań, nie odnaleziono 11 gatunków z jej listy. W sezonie wegetacyjnym 2002 r. w rezerwacie stwierdzono występowanie 89 taksonów, w tym 6 odmian. W Wąwozie Pelcznicy zebrano 83 taksony, natomiast w Wąwozie Szczawnika tylko 49. Dominują rodziny: Physaraceae – 20 gatunków (24,4 %), Arcyriaceae, Didymiaceae i Stemonitidaceae – po 13 gat. (15,8 %), Trichiaceae – 10 gat. (12,2 %). Do pozostałych rodzin należy poniżej 10 gatunków: Cribrariaceae -7, Enteridiaceae – 5 i po jednym gatunku do Ceratiomyxaceae i Liceaceae. Wśród wyróżnionych 26 rodzajów najbogatsze w gatunki są: *Physarum* – 14, *Arcyria* – 9, *Trichia* – 8, *Cribraria* i *Diderma* – po 7, *Stemonitis* i *Didymium* – po 4 gatunki. Pozostałe, tj. 19 rodzajów, są 3 lub 1 gatunkowe. Prawie połowa, bo 46 spośród zebranych w rezerwacie śluzowców to gatunki rzadkie, znalezione na 1-3 stanowiskach. Do rzadkich nie tylko w rezerwacie ale i w Polsce, umieszczonych na czerwonej liście (Stojanowska i Drozdowicz 1992) należy 11 gatunków: *Cribraria microcarpa*, *Diderma chondrioderma*, *D. crustaceum*, *D. deplanatum*, *D. effusum*, *D. radiatum*, *Didymium serpula*, *Lepidoderma tigrinum*, *Physarum bethelii*, *P. grossum*, *P. flavicomum*. Wszystkie (z wyj. *Cribraria microcarpa*) w. w. gatunki należą do rzędu Physarales, a 7 z nich do rodziny Didymiaceae. Z gatunków rzadkich na uwagę zasługują *Didymium serpula* i *Lepidoderma tigrinum* podawane ze Śląska przez Schroetera (1889) a odnalezione po przeszło 100 latach, oraz gatunki nowe dla Polski: *Arcyria minuta*, *Cribraria persoonii* i *Symphytocarpus flaccidus*. W sezonie wegetacyjnym 2002 roku zebrano 33 nowe dla badanego terenu taksony. W sumie (łącznie z danymi Firich (1962) i Schroetera (1889)) biota śluzowców rezerwatu liczy 103 taksony.

W części II opracowania przedstawiona zostanie sezonowość śluzowców i wyniki analizy ekologicznej.