

Parasitic and saprotrophic fungi from Słowiński National Park

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In the years 1996–1997, the occurrence of parasitic and saprotrophic fungi was investigated in Słowiński National Park. A total of 209 plant species belonging to 37 families were studied, from which 270 species of fungi were isolated. The fungi most numerously represented were members of the *Deuteromycotina*, which occurred in 36% of the samples investigated. The members of the *Basidiomycotina* were found in 23% of the samples. Of the fungi recovered, many were quite rarely recorded in Poland. *Schyzothyrioma ptarmicae* found to be associated hitherto with *Achillea ptarmica* is a species new to the communities of fungi of Poland.

Key words: parasitic and saprotrophic fungi, Słowiński National Park.

INTRODUCTION

Słowiński National Park (SNP) is a unique area comprising rare plant communities distributed along the shore of the Baltic Sea (Ostrowski and Symonides 1994; Śpiewakowski and Śpiewakowska 1989). These include crowberry (*Empetro nigri-Pinetum*) and bog foresters (*Vaccinio uliginosi-Pinetum*), swampy birch woods (*Betuletum pubescentis*) and alder carr stands (*Carici elongatae-Alnetum*). The most distinctive sites of SPN are mobile dunes and deflation hollows with their vegetation.

The climate of SNP is highly affected by the immediate neighbourhood of the Baltic Sea (Śpiewakowski and Śpiewakowska 1989). Winters and autumns are relatively soft, springs late, and summers short and not very sweltering. The annual temperature range is the smallest in Poland and relative humidity is relatively high, usually over 80%. The mean annual air temperature ranges from 7.4 to 7.5°C. The coolest months are January (0.5°C) and February (1.1°C) and the hottest June (16.5°C) and August (16.4°C).

The mean number of days with ground frosts is 103 per year. The mean annual precipitation is 670 mm. The number of days of vegetative period ranges from 200–220. The most distinctive characteristic of the climate of SNP are strong winds from the south-west, south and north-west.

The vascular flora of SNP comprises ca 830 species, of which about 30% are locally rare. The knowledge of the occurrence of fungi in SNP is exceptionally poor. The data published mainly refer to macromycetes (Bujakiewicz 1986; Bujakiewicz and Lisiewska 1983; Hueck 1932 after Lisiewska 1983; Dominik 1952; Dominik and Pachlewski 1955; Lisiewska 1983). Additionally, Błaszowski (1993, 1995) found 15 species of arbuscular mycorrhizal fungi associated with dune plants of this area. Later, *Endogone maritima* Błasz. et al., an ectomycorrhizal or saprotrophic fungus, was found to be associated with plants of the 12 deflation hollow of the Łeba Spit (Błaszowski et al. 1998). However, there are no literature data available regarding the occurrence of saprotrophic and parasitic fungi of SNP.

Therefore, the aim of the present paper was to determine some saprotrophic and parasitic fungi in SNP in 1996.

MATERIALS AND METHODS

The investigations of saprotrophic and parasitic fungi were conducted at seven sites of SNP (Fig. 1).

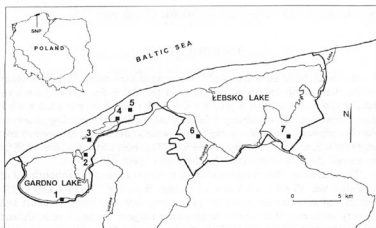


Fig. 1. The place of Słowiński National Park and sites of collection of plant materials, 1, 6 and 7 – meadows, 2, 4, 5 – forests, 3 – a woodland glade

Fragments of dead and diseased plants were collected from July to October 1996 and 1997. A total of 830 plant samples representing 209 species from 37 families were collected. The plants were determined according to S z a f e r et al. (1969) and the fungi after B r a u n (1987), K o c h m a n and M a j e w s k i (1970, 1973) and M a j e w s k i (1977, 1979). Nomenclature of the plants listed is according to M i r e k et al. (1995).

The fungi were identified based on the material either isolated directly from samples or following their incubation in wet chambers.

RESULTS AND DISCUSSION

During the investigations, a total of 270 species of fungi were found. The fungi most numerous represented were members of the *Deuteromycotina*. They occurred in 36% of the samples investigated and constituted 44% of all the fungi found. The fungi of the *Basidiomycotina* were associated with 23% of the plant samples and constituted 30% of all the isolates. The members of the *Mastigomycotina* occurred rarely and were found in only 2% of the plant parts sampled. Their proportion was 6% of all the fungi found.

A list of 70 most interesting fungal species found is presented below. Among them are fungi rarely recorded in Poland. The sites of the occurrence of each fungus are indicated. Additionally, diagnostic descriptions of some species are provided.

OCCURRENCE OF FUNGI

The symbols of frequency of occurrence: 0 – rare, + – relatively frequent, ++ – frequent, +++ – very frequent.

PERONOSPORALES

- Albugo tragopogonis* (Pers.) S. F. Gray on *Tragopogon pratensis*: Dolgie Duże (0).
Peronospora conglomerata Fuck. on *Geranium dissectum*: Dolgie Małe (0).
Peronospora effusa (Grev.) Tul. on *Chenopodium album*: Gać (+++), Kluki (+).
Peronospora lotorum Syd. on *Lotus uliginosus*: Gardna Mała (+).
Peronospora Mayorii Gäum. on *Vicia cracca*: Kluki (0).
Peronospora parasitica (Pers.: Fr.) Fr. on *Capsella bursa-pastoris*: Gać (0).
Peronospora trifoliorum de Bary on *Melilotus albus*: Kluki (+); on *Trifolium pratense*: Retowo (+).
Peronospora violae de Bary on *Viola arvensis*: Retowo (+).
Plasmopara crustosa (Fr.: Fr.) Jørst. on *Aegopodium podagraria*: Czołpi-no (+++).
Plasmopara geranii (Peck) Berl. et De Toni on *Geranium molle*: Gardna Mała (0).

ERYSIPHALES

Erysiphe cichoracearum DC. var. *cichoracearum* on *Solidago virga-aurea*: Retowo (+); on *Helianthus tuberosus*: Gać (+).

Erysiphe cynoglossi (Wallr.) U. Braun on *Myosotis arvensis*: Kluki (+).

Erysiphe heraclei DC. on *Conium maculatum*: Retowo (+++).

Erysiphe mayorii Blumer var. *mayorii* on *Cirsium arvense*: Retowo (+), Gardna Mała (+).

Erysiphe urticae (Wallr.) Blumer in the *Oidium* sp., anamorphic stage on *Urtica dioica*: Gać (+).

Microsphaera alphitoides Griff. et Maubl. var. *alphitoides* on *Quercus sessilis*: Czołpino (+++), Kluki.

Microsphaera ornata U. Braun var. *europaea* on *Betula pubescens*: Czołpino (0).

In this paper we have the first information concerning the occurrence of *M. ornata* var. *europaea* in the Western Pomerania. Conidia of this fungus are usually cylindric, rarely ellipsoid, $26-32 \times 14-16 \mu\text{m}$. Cleistothecia $85-97 \mu\text{m}$ in diam, dark brown, formed on the upper and lower leaf surfaces, distributed evenly, infrequently in small groups. Appendages usually 6-8, short, hyaline, pale brown at the base, branched dichotomously at the ends. Asci usually 4-5, ovoid, $50-65 \times 30-40 \mu\text{m}$, with 5-6 ascospores. According to Braun (1987) and Sałata (1985), the conidia of *M. ornata* measure $28-38 \times 13-17 \mu\text{m}$ and $26-43 \times 11-16 \mu\text{m}$ (usually $28-35 \times 13-16 \mu\text{m}$), respectively. Sałata (1985) recorded 5-8 appendages, each of which was 3-4 times dichotomously branched; the cleistothecia contained 2-6 (usually 3-5) asci, measuring $46-70 \times 30-45 \mu\text{m}$ (usually $50-60 \times 35-40 \mu\text{m}$) and having (4-) 5-6 (-7) spores. The cleistothecia investigated by Braun (1987) had 4-10 (-13) appendages with 3-5 dichotomous branches each; the cleistothecia comprised 2-6 asci, measuring $40-65 \times 30-45 \mu\text{m}$, with 4-7 ascospores.

Microsphaera trifolii (Grev.) U. Braun var. *trifolii* on *Robinia pseudoacacia*: Gać (0); on *Trifolium repens*: Kluki (++), Gać (++); on *Trifolium arvense*: Kluki (++).

Microsphaera vanbruntiana Gerard var. *sambuci-racemosae* U. Braun on *Sambucus racemosa*: Kluki (+).

Podosphaera myrtillina (Schub.: Fr.) Kunze var. *myrtillina* on *Vaccinium myrtillus*: Dolgie Małe (+), Czołpino (+).

Sawadaea bicornis (Wallr.: Fr.) Homma on *Acer pseudoplatanus*: Czołpino (+); on *Acer campestre*: Czołpino (+).

Sphaerotheca aphanis (Wallr.) Braun var. *aphanis* on *Rubus idaeus*: Dolgie Małe (+); on *Potentilla anserina*: Gardna Mała (0).

Sphaerotheca fusca (Fr.) Blumer on *Lapsana communis*: Retowo (+), Czołpino (++), Kluki (++), Gać (+); on *Melampyrum pratense*: Dolgie Małe (+), Dolgie Duże (+).

SPHAERIALES

- Claviceps purpurea* (Fr.) Tul. on *Anthoxanthum odoratum*: Kluki (+), Retowo (0); on *Arrhenatherum elatius*: Czołpino (+); on *Bromus inermis*: Kluki (+), Gać (+); on *Calamagrostis epigeios*: Gardna Mała (0); on *Elymus arenarius*: Czołpino (+).
- Pleiochaeta setosa* (Kirchn.) S. J. Hughes on *Cytisus nigricans*: Dolgie Małe (0).

HELOTIALES

- Pseudopeziza trifolii* (Biv.-Bern.: Fr.) Fuckel on *Melilotus albus*: Retowo (0); on *Trifolium dubium*: Kluki (+); on *Trifolium pratense*: Gardna Mała (+), Gać (+).
- Schizothyrioma ptarmicae* (Desm.) Höhnelt on *Achillea ptarmica*: Czołpino (0). This fungus was rarely recorded throughout the world (Ellis and Ellis 1987). This paper reports for the first time its occurrence in Poland. The fungus formed black, $0.4 \times 0.8 \mu\text{m}$ apothecia on the upper and lower surfaces of leaves of *A. ptarmica*. Asci contained 2–6 (usually 2), 1-septate, pale olive spores, measuring $3-5 \times 8-14 \mu\text{m}$.

UREDINALES

- Coleosporium tussilaginis* (Pers.) Berk. on *Melampyrum pratense*: Dolgie Małe (++) , Dolgie Duże (0).
- Puccinia cerinthes-agropyrina* Tranzsch. on *Myosotis caespitosa*: Kluki (0).
- Puccinia cnici-oleracei* Pers. ex Desm. on *Achillea millefolium*: Retowo (0); on *Achillea ptarmica*: Kluki (++) .
- Puccinia dioica* Magn. on *Carex leporina*: Czołpino (+), Kluki (0).
- Puccinia limosae* Magn. on *Lysimachia vulgaris*: Dolgie Duże (0).
- Puccinia littoralis* Rostr. on *Sonchus arvensis*: Dolgie Małe (0).
- Puccinia magelhaenica* Peyr. on *Arrhenatherum elatius*: Gać (+).
- Puccinia magnusiana* Körn. on *Phragmites communis*: Retowo (+++), Dolgie Duże (0).
- Puccinia Opizii* Bub. on *Carex muricata*: Czołpino (+).
- Puccinia pulverulenta* Grev. on *Epilobium adnatum*: Dolgie Małe (0).
- Puccinia variabilis* Grev. on *Taraxacum officinale*: Gardna Mała (++) .
- Pucciniastrum epilobii* Oth on *Epilobium hirsutum*: Czołpino (+).
- Triphragmium filipendulae* Pass. on *Filipendula hexapetala*: Gardna Mała (0).
- Uromyces euphorbiae-corniculati* Jordi on *Lotus uliginosus*: Gać (+).
- Uromyces inaequaltus* Lasch on *Silene inflata*: Dolgie Duże (0). According to Majewski (1977), this fungus was found to parasitize *S. chloranta* and *S. nutans*. There is no other record of the occurrence of *U. inaequaltus* on *S. inflata*.
- Uromyces punctatus* Schroet. on *Astragalus glycyphyllos*: Kluki (0).

TILLETIALES

- Tilletia controversa* Kühn in Rabenh. on *Agropyron repens*: Gać (+ +), Kluki (+); on *Triticum vulgare*: Kluki (0).
Urocystis agropyri (Preuss) Schröt. on *Agropyron repens*: Gać (+ +), Kluki (+ +), Retowo (+).
Urocystis tritentalis (Berk. et Br.) Lindeb. on *Tritentalis europaea*: Dołgie Duże (0).

USTILAGINALES

- Ustilago grandis* Fries on *Phragmites communis*: Retowo (0).
Ustilago striiformis (Westend.) Niessl on *Alopecurus pratensis*: Kluki (+); on *Lolium perenne*: Retowo (0).

MONILIALES

- Alternaria sonchi* J. J. Davis in J. A. Elliott on *Sonchus arvensis*: Dołgie Małe (0).
Cercospora tragopogonis Ellis et Everh. on *Tragopogon pratensis*: Dołgie Duże (+).
Cladosporium herbarum (Pers.: Fr.) Link on *Triticum vulgare*: Gać (+).
Didymaria linariae Pass. on *Linaria vulgaris*: Dołgie Małe (+).
Ramularia dubia Riess on *Chenopodium album*: Kluki (+), Gać (+).
Ramularia gei (Eliasson) Lindr. on *Geum urbanum*: Dołgie Duże (+ +).
Ramularia heraclei (Oudem.) Sacc. on *Heracleum sphondylium*: Retowo (0), Kluki (+), Czołpino (+), Gać (+ +).
Ramularia knautiae (Massal.) Bubak on *Knautia arvensis*: Dołgie Duże (+).
Ramularia montana Speg. on *Epilobium parviflorum*: Dołgie Małe (0).
Ramularia rubella (Bonord.) Nannf. on *Rumex conglomeratus*: Gać (+), Kluki (+).
Ramularia taraxaci P. Karst. on *Taraxacum officinale*: Gać (+ +), Kluki (+), Retowo (+), Czołpino (0).
Ramularia ulmariae Cooke on *Filipendula hexapetala*: Gardna Mała (+).

SPHAEROPSIDALES

- Ampelomyces quisqualis* Ces. on *Erysiphe depressa* (Wallr.) Schlecht.: Kluki (+); on *Erysiphe artemisiae*: Gać (+); on *Erysiphe cichoracearum* var. *cichoracearum*: Kluki (+), Retowo (0).
Phyllosticta convallariae Pers.: Fr. on *Convallaria maialis*: Kluki (+ +).
Phyllosticta geranii Ellis et Everh. on *Geranium pusillum*: Gać (+); on *Geranium robertianum*: Retowo (+).
Phyllosticta violae Desmaz. on *Viola arvensis*: Dołgie Małe (+).
Septoria epilobii Westend. on *Epilobium montanum*: Dołgie Małe (+).
Septoria gei Rob. et Desmaz. on *Geum urbanum*: Dołgie Duże (0).
Septoria polygonorum Desmaz. on *Polygonum minus*: Kluki (+).
Septoria stellariae Rob. et Desmaz. on *Stellaria media*: Retowo (+ +).
Septoria ulmariae Oudem. on *Filipendula hexapetala*: Gardna Mała (0).
Stagonospora arenaria (Sacc.) Sacc. on *Elymus arenarius*: Czołpino (+ +).

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Grzyby pasożytnicze i saprotroficzne ze Słowińskiego Parku Narodowego

Streszczenie

W latach 1996–1997 przeprowadzono badania nad występowaniem grzybów pasożytniczych i saprotroficznych w Słowińskim Parku Narodowym. Łącznie zbadano 209 gatunków roślin, na których stwierdzono obecność 270 gatunków grzybów. Najliczniej reprezentowani byli przedstawiciele *Deuteromycotina* występujący w 36% pobranych próbach. Obecność *Basidiomycotina* stwierdzono w 23% prób. Wśród rozpoznanych grzybów wiele było dotychczas rzadko notowanych w Polsce. Nowym dla Polski grzybem okazała się *Schizophyrioma ptarmicae*, którą znaleziono na *Achillea ptarmica*.