

## NEW DATA ON ANAMORPHIC FUNGI IN THE BIAŁOWIEŻA FOREST (NORTHEAST POLAND)\*

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**Abstract.** The paper presents new data on ten species of anamorphic fungi collected in the Białowieża Forest. One of them is new for Poland, two are parasite/host combinations new for science, one was collected on a host plant new for Poland, and the other fungi are rare, known from few localities. All of them are noted for the first time in the Białowieża Primeval Forest.

**Key words:** anamorphic fungi, Hyphomycetes, Coelomycetes, distribution, *Cercospora*, *Endoconospora*, *Marssonina*, *Passalora*, *Ramularia*, *Septoria*

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### INTRODUCTION

The Białowieża Forest in northeast Poland and Belarus is Europe's last remaining lowland primeval forest (Matuszkiewicz 1952). Its best-preserved part is protected in Białowieża National Park. Its unique character has made this region the site of many scientific studies, including mycological research. The earliest data on microscopic parasitic fungi date to the end of the 19<sup>th</sup> century and relate to representatives of Peronosporales, Erysiphales, Uredinales and Ustilaginomycotina (Błoński *et al.* 1888; Błoński & Drymmer 1889). Information about anamorphic fungi was provided considerably later. Lists of species from this group were published by Siemaszko (1923, 1925), Kućmierz (1967), Mułenko (1994a, b, 1996a, b, 1998), Mułenko *et al.* (2004), Wołczańska *et al.* (2004), Kozłowska and Mułenko (2005) and others. A paper by Mułenko *et al.* (2004) is especially noteworthy, as it describes a new species – *Cladosporium galii* Mułenko, Schubert & Kozłowska.

The present paper provides data on 10 new species for the Białowieża Forest. One of them

– *Septoria roemeriana* – has not been collected in Poland before. *Passalora galii* on *Galium schultesii* and *Cercospora zebrina* on *Trifolium campestre* are parasite/host combinations new to science. *Ramularia inaequale* is reported on *Hypochoeris radicata* for the first time in Poland. The other species are rare fungi in Poland.

### MATERIALS AND METHODS

All the species were collected in the Nizina Północnopodlaska lowland in the southwest part of the Białowieża Forest outside the National Park. Air-dried specimens were examined with a standard light microscope. Slide preparations were stained with cotton blue in lactic acid and warmed. The nomenclature of fungi is based on Brandenburger (1985), Braun (1995, 1998), Crous and Braun (2003) and Teterevnikova-Babajan (1987); names of plants follow Mirek *et al.* (2002). The species new for Poland is described and illustrated. The others are enumerated with full details of the new collections (forest section, habitat, date); there is also information on their previous records according to Mułenko *et al.* (2008). The examined collections are deposited in the herbarium of the Department of Botany and Mycology of Maria Curie-Skłodowska University in Lublin (LBL M).

\* This paper is dedicated to Professor Tomasz Majewski on the occasion of his 70<sup>th</sup> birthday.

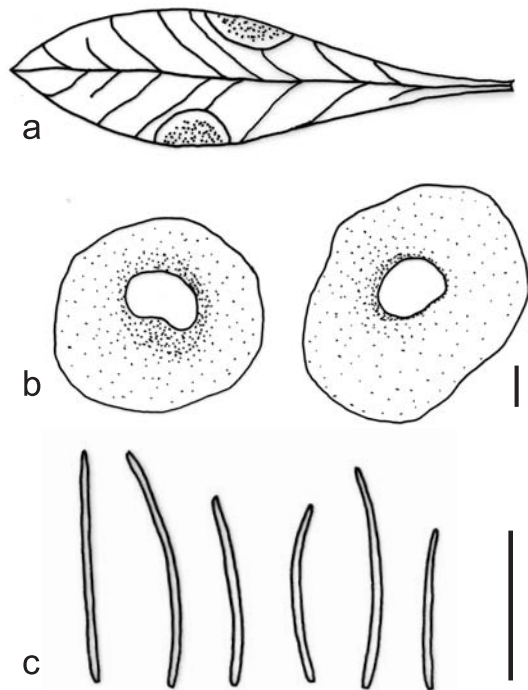
## RESULTS AND DISCUSSION

## SPECIES NEW FOR POLAND

*Septoria roemeriana* Moesz

Fig. 1

Leaf spots ellipsoidal or roundish, 6–10 mm in diameter, brown or brownish-black. Pycnidia numerous, gathered in the center of lesions, visible on both sides of leaves. Pycnidia 104–150  $\mu\text{m}$  in diameter, ostiole circular, 16–34  $\mu\text{m}$  wide, surrounded by a ring of darker cells. Conidia 1-celled, filiform: (16–)20–34  $\times$  1  $\mu\text{m}$ .



**Fig. 1.** *Septoria roemeriana* Moesz on *Daphne mezereum* L.: a – infected leaf; b – pycnidia; c – conidia; scale bars = 20  $\mu\text{m}$ .

**SPECIMEN EXAMINED.** On *Daphne mezereum* L.: forest section 463A, thickets of the class *Prunetalia*, 2 Sept. 2002, leg. M. Wołkowycki (LBL M-9057).

**NOTES.** This species is known only from Romania, where it was noted on *Daphne blagayana* Freyer in two localities: Keresztényhavas Mount

near Braşov (Brassó) and Sinaia (Saccardo *et al.* 1931; Rădulescu *et al.* 1973). Sometimes Hungary is wrongly mentioned as a country where this species occurs, but Brassó is the Hungarian name of the city of Braşov in Romania. A very similar species which also infects leaves of *Daphne* is *Septoria naumovii* Lashzevsky. This species does not form any spots, it occurs on dead leaves, and pycnidial conidiomata are visible only on the lower side of leaves (Teterevnikova-Babajan 1987).

## NEW PARASITE/HOST COMBINATIONS

*Cercospora zebrina* Pass.

**SPECIMEN EXAMINED.** On *Trifolium campestre* Schreb.: forest section 460A, meadow of the *Arrhenatherion* alliance, 2 July 2002, leg. M. Wołkowycki (LBL M-9061).

**NOTES.** This species was noted in Poland at several localities on *Trifolium dubium* Sibth., *T. repens* L. and *Trifolium* sp. (Mułenko *et al.* 2008; Wołczańska 2010). Here it is noted on *Trifolium campestre* for the first time.

*Passalora galii* (Ellis & Holw.) Arx

**SPECIMEN EXAMINED.** On *Galium schultesii* Vest.: forest section 418B, oak-linden-hornbeam forest *Tilio-Carpinetum*, 13 June 2004, leg. M. Wołkowycki (LBL M-9062).

**NOTES.** This species was noted at several localities in Poland on *G. mollugo* L., *G. saxatile* L., *G. sylvaticum* L. and *G. uliginosum* L. (Mułenko *et al.* 2008). Here it is noted on *G. schultesii* for the first time.

*Ramularia inaequale* (Preuss) U. Braun

**SPECIMEN EXAMINED.** On *Hypochoeris radicata* L.: forest section 574C, fresh pine forest *Peucedano-Pinetum*, 21 June 2003, leg. M. Wołkowycki (LBL M-9063).

**NOTES.** This polyphagous species was noted in Poland on 16 host plants belonging to the Asteraceae family, and it occurs frequently here (Wołczańska 2005). *Hypochoeris radicata* is a new host for this fungus in Poland.



**Fig. 2.** a – *Septoria bidentis* Sacc. on *Bidens* sp.; b – *Septoria cerastii* Rob. & Desm. on *Cerastium holosteoides* Fr. emend. Hyl.; c & d – *Cercospora paridis* Eriksson on *Paris quadrifolia* L.; e – *Marssonina daphnes* (Rob. ex Desm.) Magn. on *Daphne mezereum* L.

#### RARE SPECIES IN POLAND

#### *Cercospora paridis* Eriksson

Fig. 2c, d

**SPECIMEN EXAMINED.** On *Paris quadrifolia* L.: forest section 413C, ash-alder forest *Fraxino-Alnetum*, 24 June 2004, leg. M. Wolkowycki (LBL M-9059).

**LITERATURE RECORDS.** On *Paris quadrifolia* L.: Osie village near Świecie village (Hennings 1892; Dominik 1936), Kazimierz Dolny village (Konopacka 1924), Zielonka Forest Inspectorate near Oborniki village (Zaleski *et al.* 1948).

**NOTES.** Only five species of microscopic phytopathogenic fungi occur on *Paris* in Europe

(Brandenburger 1985). Only two were noted in Poland: *Puccinia sessilis* Schneid. and *Cercospora paridis* Eriksson. Both species rarely occur on this host (Majewski 1979; Mułenko *et al.* 2008). All information about *Cercospora paridis* was published in the first half of the 20<sup>th</sup> century; the last data date to 1948 (Zaleski *et al.* 1948).

### *Endoconospora cerastii* Gjaerum

SPECIMEN EXAMINED. On *Cerastium holosteoides* Fr. *emend.* Hyl.: forest section 468C, roadside, 8 July 2002, *leg. M. Wolkowycy* (LBL M-9060).

LITERATURE RECORDS. On *Cerastium holosteoides*: Roztocze National Park (Chmiel *et al.* 1994), Pojezierze Łęczyńsko-Włodawskie lake district (Mułenko 1989).

NOTES. The genus *Endoconospora* was described by Gjaerum in 1971. There are two species known: *E. cerastii* Gjaerum in Europe and *E. indica* U. Braun & Hosagoudar in Asia (Braun & Hosagoudar 1993).

*Phacellium alborosellum* (Desm.) U. Braun can also occur on *Cerastium* (Braun 1998). The symptoms on leaves are similar: yellowish spots with usually hypophyllous, white conidiomata. Differences are visible by LM. *Endoconospora* forms sporodochia and produces obconical, 1-celled conidia: 18–26 × 4–5.5 μm. *Phacellium* forms synnemata and ellipsoid, ovoid or subcylindric conidia, 1–2 (4)-celled: 10–40 × 3–10 μm.

### *Marssonina daphnes* (Rob. ex Desm.) Magn.

Fig. 2e

SPECIMEN EXAMINED. On *Daphne mezereum* L.: forest section 515D, oak-pine forest *Pino-Quercetum*, 27 August 2002, *leg. M. Wolkowycy* (LBL M-9058).

LITERATURE RECORDS. On *Daphne mezereum*: Botanical Garden in Kraków (Piątek & Wołczańska 2004), Kotlina Zakopiańska basin (Sałata *et al.* 1993), vicinity of Puławy (Jankowska-Barbacka 1931).

NOTES. Information about 18 species of *Marssonina* genus has been published in Poland. Almost all of them [except *M. juglandis* (Libert) Magnus and *M. rosae* (Libert) Diedicke] are rare, noted from only a few localities (Mułenko *et al.* 2008).

### *Septoria bidentis* Sacc.

Fig. 2a

SPECIMEN EXAMINED. On *Bidens* sp.: forest section 541B, roadside, 29 Aug. 2002, *leg. M. Wolkowycy* (LBL M-9064).

LITERATURE RECORDS. On *Bidens tripartita* L.: Samostrzel village on the Noteć river (Michalski 1986), Czarna Wieś and Wola Justowska villages near Kraków (Namysłowski 1906, 1914), Szczecin and vicinity (Madej 1963, 1974), Przasnysz village (Laubert 1921).

NOTES. Another two *Septoria* species can occur on *Bidens*: *S. balansae* Speg. and *S. stuckertiana* Speg. (Teterevnikova-Babajan 1987). Both were noted in South America and they differ distinctly from *S. bidentis*. *Septoria balansae* spores are smaller (12–18 × 0.5–1.0 μm) and the conidia of *S. stuckertiana* are broader (50–55 × 2–3 μm) than the spores of *S. bidentis* (30–60 × 1–2 μm).

### *Septoria cerastii* Rob. & Desm.

Fig. 2b

SPECIMEN EXAMINED. On *Cerastium holosteoides* Fr. *emend.* Hyl.: forest section 413A, ash-alder forest *Fraxino-Alnetum*, 20 May 2001, *leg. M. Wolkowycy* (LBL M-9065).

LITERATURE RECORDS. On *Cerastium arvense* L.: Kielce town (Moesz 1926); on *Cerastium holosteoides* Fr. *emend.* Hyl.: Krościenko village in Pieniny Mts. (Kućmierz 1976a, b, 1977), Dolina Jaworzynka valley in Tatra National Park (Mułenko *et al.* 1995), Gać village in Słowiński National Park (Adamska 2001); on *Cerastium semidecandrum* L.: Pojezierze Łęczyńsko-Włodawskie lake district (Mułenko 1989); on *Cerastium* sp.: Puławy town (Konopacka 1924).

NOTES. Other *Septoria* species have been described on *Cerastium* (Teterevnikova-Babajan 1987; Shin & Sameva 2004): *S. celanensis* D. Sacc. (= *S. commersoniana* Speg.), *S. caryophylli* Scalia, *S. ramularispora* Bubák and *S. cerastiicola* Rost. According to Jørstad (1965) this last species belongs to the genus *Selenophoma*. All of them differ from *S. cerastii* in the size and shape of conidia. There are also differences in the number of cells. Conidia of *S. caryophylli* (27–35 × 3.0–3.5 μm), *S. ramularispora* (18–45 × 2–3 μm) and *S. celanensis* (30–45 × 2.0–2.5 μm) are 2-celled, whereas the spores of *S. cerastii* are 5–6-celled and are distinctly thinner than the other spores: 20–50 ×

1.0–1.5  $\mu\text{m}$  (Saccardo & Saccardo 1906; Teter-  
evnikova-Babajan 1987; Shin & Sameva 2004).

### *Septoria hepaticicola* (Duby) Jørst.

SPECIMEN EXAMINED. On *Hepatica nobilis* Schreb.: forest section 384D, oak-linden-hornbeam forest *Tilio-Carpinetum*, 8 May 1990, leg. M. Wołkowycki (LBL M-9066).

LITERATURE RECORDS. On *Hepatica nobilis* Schreb.: Ojców National Park, on Góra Zamkowa mount in Pieskowa Skała (Kućmierz 1971, 1973), Zagórzany village (Namysłowski 1909, 1914), Osie village near Świecie village (Hennings 1892), Kazimierz Dolny vil-  
lage (Konopacka 1924), surroundings of Parkowe Re-  
serve in the Wyżyna Krakowsko-Częstochowska upland (Ruszkiewicz-Michalska 2006)

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