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Padus serotina (*Rosaceae*), a new host plant for some species of parasitic microfungi

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Four species of parasitic microfungi were collected recently on *Padus serotina* (Ehrh.) Borkh. (*Rosaceae*) in Poland. Three species, *Phyllactinia guttata* (Wallr. ex Fr.) Lév. (*Erysiphales*), *Monilia linhartiana* Sacc. (*Hyphomycetes*), and *Microsphaeropsis olivacea* (Bonord.) Höhn. (*Coelomycetes*), have not been reported before on the plant, and *Padus serotina* is a new host for them. *Monilia linhartiana* Sacc. is a new species for Poland. The fourth species, *Podosphaera tridactyla* (Wallr.) de Bary var. *tridactyla* (*Erysiphales*), is known only from three localities in Europe, and has been collected on the host plant in Poland for the first time.

Key words: parasitic fungi, *Erysiphales*, *Hyphomycetes*, *Coelomycetes*, distribution

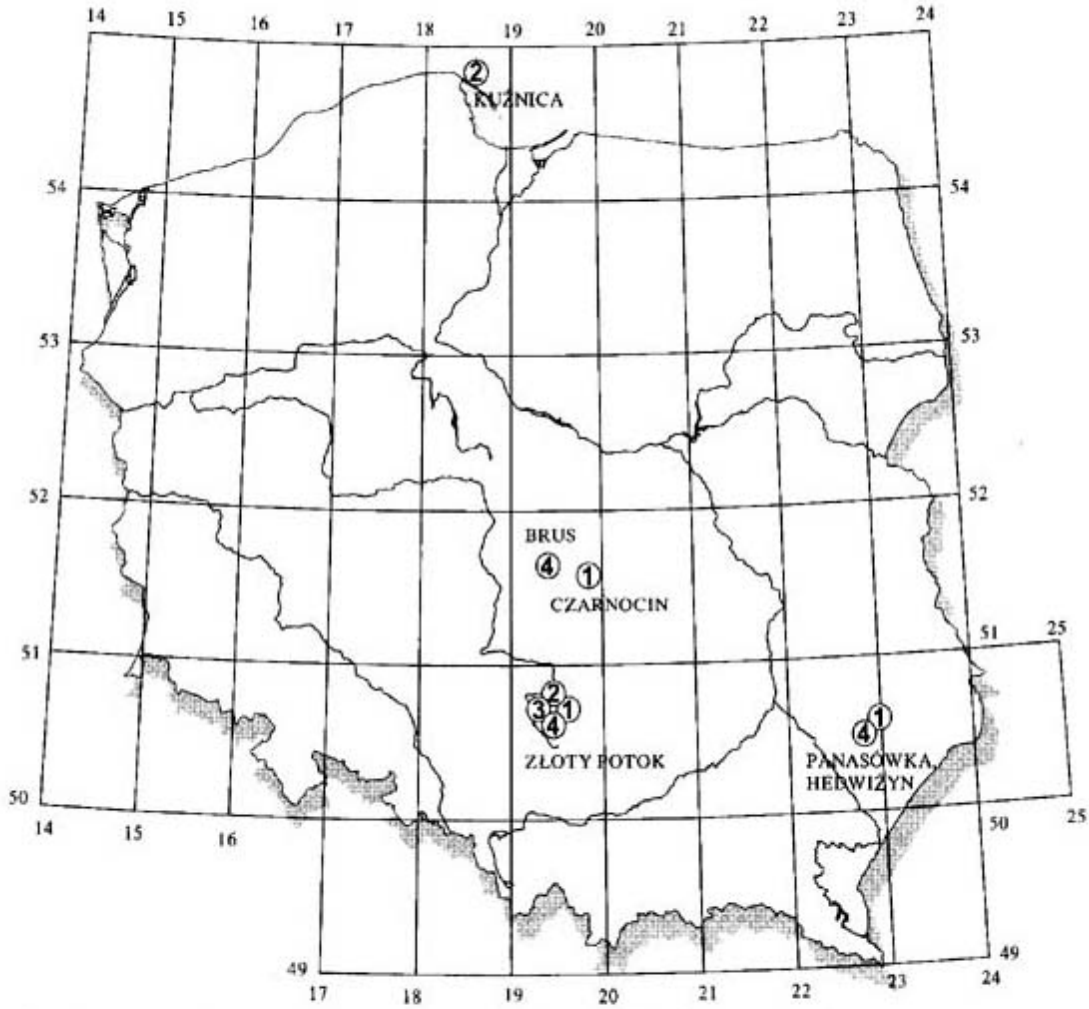
INTRODUCTION

The *Padus serotina* (Ehrh.) Borkh. is an element alien to Polish dendroflora, and originates from the southern and eastern parts of North America (Seneta and Dolatowski 2000). It was brought to Europe in 1629. The data on the introduction of the species to Poland come from 1813 from the garden planted by Stanisław Wodzicki (1759-1862), the father of Polish dendrology, in Niedźwiedź near Kraków. While *Padus serotina* initially used to be considered a hemiagriophyte, it is now believed to be a holoagriophyte, neophyte sensu Thellung (Hereźniak 1992), that is a species introduced in modern times, permanently established in original habitats in Polish flora, and a component of natural plant associations (Faliński 1969; Mirek et al. 1995).

Ecological properties of *Padus serotina*, such as its tolerance for soil fertility and moisture, or frost and shading resistance, not only influence its distribution in Poland but also contributed to its introduction into forest crops, on weak soils in particular. Currently, it occurs in a wild form, chiefly on dry, acidic soils. It is believed to be an

expansive and dangerous taxon as its densely growing thickets prevent tree seedlings from growing, make natural forest restocking difficult, and eliminate native plant species (Seneta and Dolatowski 2000).

All the species of fungi collected on *Padus serotina* in this study also deserve special attention. The occurrence of *Phyllactinia guttata* on this plant has not been recorded either in North America or in Europe (Braun 1987; Farr et al. 1989). Another species of powdery mildew, *Podosphaera tridactyla* var. *tridactyla*, occurs on this host very rarely, and has so far been noted from few European countries (Braun 1995). Furthermore, the data provided by Sutton (1998) show that the plant is a new host for *Microsphaeropsis olivacea*. *Monilia linhartiana*, on the other hand, has been noted in a number of countries in Europe and in North America; it occurred, however, on other species of the genus *Prunus* (*P. padus* and *P. virginiana*) (Batra 1991). Thus, *Prunus serotina* is a new host for this species, and the fungus is a new species to Poland.



① – *Phyllactinia guttata*, ② – *Podosphaera tridactyla* var. *tridactyla*,
③ – *Monilia linhartiana*, ④ – *Microsphaeropsis olivacea*

Fig. 1. Distribution of localities of the fungi in Poland.

All species mentioned below are described in details and illustrated in the original papers cited below. Here we describe the extension of the distribution areas of the species and give the records in Poland (Fig. 1).

DESCRIPTION OF THE SPECIES

ERYSIPHALES

Phyllactinia guttata (Wallr. ex Fr.) Lev.

Mycelium on both surfaces of the leaves, amphigenous, thin, effuse and patchy, white. Hyphae flexuous, branched, septate. Conidia formed singly, clavate or fusiform-clavate, ca. 59-64 x 25-32 µm. Chasmothecia hypophyllous, scatered, numerous, very large ca. 240-300 µm in diam. Appendages 10-14, ca. 1-2.5 times as long as chasmothecium diam, equatorial. Penicillate cells simple to moderately branched, mostly about 45-58 µm long. Asci numerous, ca. 25-28, variable in shape, broadly clavate to slender, subcylindric, ca. 71-86 x 25-37 µm. Ascospores 2, ellipsoid-ovoid, ca. 25-42 x 15-25 µm.

This characteristic in general corresponds to those given by Braun (1995) and Sałata (1985). However the length of conidia is in accordance with the lower range of their measurements and size of chasmothecia is greater than that given in literature so far (Tab. 1).

Table 1

Dimensions (in µm) of life stages of *Phyllactinia guttata* given by different authors

Author	Conidia (length and width)	Chasmothecia (diam)	Asci (length and width)	Ascospores (length and width)
Sałata (1985)	50-60 x 10-32	200-240	75-90 x 32-40	32-47 x 18-24
Braun (1995)	40-90 x (10-)15-25	150-250(-280)	60-100 x 25-40	25-45 x 14-25
The authors' data	**59-64 x 25-32**	**240-300**	**71-86 x 25-37**	**25-42 x 15-25**

Sampling sites:

1. Roztocze Region (SE Poland), near the Panasówka and Hedwiżyn villages, pine forest, rare on slightly infected leaves of several trees, in anamorphic stage only; 14.10.1992, leg. et det. W. Mułenko [LBLM-7138].
2. Central Poland, in the vicinity of the Czarnocin village near Łódź, mixed forest with *Quercus robur* L., often, on the strongly infected leaves of host plant, in anamorphic and teleomorphic stages; 03.09-11.11.1995, leg. et det. M. Ruszkiewicz (rev. U. Braun) [LOD 29 (PF), LOD 448 (PF), LOD 449 (PF)].
3. Częstochowa Upland (S Poland), in the vicinity of the the Złoty Potok village, "Parkowe" reserve, forest section 270a, mixed forest, rare on the slightly infected leaves of single trees; anamorphic and teleomorphic stages; 19.10.1999, leg et det. M. Ruszkiewicz [LOD 450 (PF)].

Notes: *Phyllactinia guttata* is a common polyphagous fungus. It occurs on various species of arborescent plants that belong to 51 families (Braun 1987). In Europe, it has been noted on 86 species belonging to 25 families (Braun 1995), and in Poland it has been recorded on 13 plant species that belong to 5 families: *Aceraceae*, *Betu-*

laceae, *Fagaceae*, *Oleaceae* and *Ulmaceae* (Sałata 1985). However, it was not noted on the members of the *Rosaceae* family. In the world, the fungus has been recorded on species that belong to 10 genera of representatives of *Rosaceae* (Braun 1987), but in Europe, it has been noted only on individuals of the genus *Rubus* (*R. caesius* L. and *R. fruticosus* L. s. lat.). It has not been recorded on representatives of the genus *Cerasus*, most closely related with *Prunus*, either.

Padus serotina is a new host for *Phyllactinia guttata*, and Poland is its only known place of occurrence on this host. The host plant is not infected by the species even in its native place of occurrence (North America) despite the presence of the parasite in this area (Farr et al. 1989). It seems that the climactic conditions in our zone are good for the development of both the well-established host and the parasitic fungus. Few localities known so far may come as a result of insufficient knowledge on the distribution of the fungus.

Podosphaera tridactyla (Wallr.) de Bary var. ***tridactyla***.

Mycelium amphigenous, arachnoid, thin, initially in subcircular patches, with time confluent and covering the entire surface of the leaves, evanescent. Conidia in chains (euoidium type), with fibrosine bodies, cylindrical to ellipsoid, 20-27 x 10-15 μm. Chasmothecia single, scattered, 83-85 μm in diam. Appendages few (1-8), in the upper half of chasmothecium, variable in length, 2-5 dichotomously branched. Asci broad-ellipsoid, 75-81 x 66-71 μm. Ascospores 8 in ascus, ellipsoid, 20-21 x 13-15 μm.

Sampling sites:

1. Częstochowa Upland (S Poland), in the vicinity of the Złoty Potok village, "Parkowe" reserve, forest section 271b, mixed forest and shrubs near the pond, very rare in anamorphic stage; 20.10.1998, leg. et det. M. Ruszkiewicz [LOD 451 (PF)]; forest compartment 270h, mixed forest, very rare on the single slightly infected leaves; anamorphic and teleomorphic stages; 23.09.1999, leg. et det. M. Ruszkiewicz [LOD 452 (PF)].
2. Hel Peninsula (N Poland), near Kuźnica village, pine forest, abundantly on some trees, in anamorphic stage; 10.09.1999, leg. et det. A. Wołczańska (LBLM-7140).

Notes: *Podosphaera tridactyla* is a circumglobal parasite of plants that belong to the family *Rosaceae*. It infects representatives of the genera *Amygdalus, Armeniaca, Cerasus, Padus, Persica*, *Spiraea* and *Prunus* s.str. The fungus was recorded on 18 species of plants of a broadly defined genus *Prunus* s. lat. in Europe (Braun 1995).

In Poland, *Podosphaera tridactyla* has been recorded on 7 species of plants that belong to two genera only, *Prunus* and *Padus* (Sałata 1985). As for the genus *Prunus*, the fungus often occurs only on *P. domestica* L., and only on *P. avium* Miller [= *Prunus padus* L.] in the case of the genus *Padus* (Sałata, l.c.).

The parasite has not been recorded on *Padus serotina* in Poland so far. A brief, preliminary note that the plant may be a new host for *Podosphaera tridactyla* in Poland has recently been given by Ruszkiewicz (2000). The data provided by Braun (1995) show that *Podosphaera tridactyla* on *Padus serotina* in Europe is quoted only in three localities: from Lithuania, Germany and the European part of Russia. As in the previous case, no data on the occurrence of *Podosphaera tridactyla* on this host in North America are available even though the fungus occurs on related

plant species of the family *Rosaceae* (*Prunus* spp., *Sorbus* spp. and *Spiraea* spp.) (Farr et al. 1989).

HYPHOMYCETES

Monilia linhartiana Sacc.

[= *Ovularia necans* Pass., *Oospora linhartiana* (Sacc.) Sumst., *M. peckiana* var. *angustior* Sacc., *M. angustior* (Sacc.) Reade].

Teleomorph: *Monilinia padi* (Woron.) Honey [= *Sclerotinia padi* Woron. ex Schroet.; *Helotiales, Ascomycota*].

Initially symptoms visible as small brownish black, drying spots on young leaves. Hyphae branched, septate, hyaline arize from subcuticular same-cells ectostroma, appearing as powdery effused mycelium. Colonies velvety to caseous, withish grey, between veins, initially only on the lower surface of the leaves and later sometimes on both surfaces. Conidiophores 1-3-celled, lower part pale brown, upper part hyaline, with 1-5 simple or branched conidial chains on the apex. Macroconidia born in chains on highly reduced 1-, 2-cells subcuticular ectostroma, ash grey in mass, ± sphaerical to limoniform, ca. (12-)15-18(-20) x (12-)14-15(-17) µm; disjunctors fusiform, 2.5-3 µm long.

According to Batra (1991) earlier descriptions of the fungus by Linhart (1883) on *Prunus padus* (12-18 x 8-15 µm), by Woronin (1895) on *Prunus padus* (15.4-17.6 x 11-12.1 µm), and by Batra (1991) on *Prunus virginiana* [(10-)12-15(-20) x (8-)9-10(-14) µm] are similar.

Sampling site:

1. Częstochowa Upland (S Poland), in the vicinity of the Złoty Potok village, "Parkowe" reserve, forest section 270h, mixed forest, rare on single slightly infected leaves of the trees; 20.10.1998, 29.09.1999, leg. et det. M. Ruszkiewicz (rev. U. Braun) [LOD 453 (PF), LOD 454 (PF)].

Notes: *Monilia linhartiana* is a fungus recorded on leaves and fruits of various species of the genus *Prunus* s.lat. (Brandenburger 1985; Batra 1991). It is a common species on *Prunus virginiana* and *Prunus padus* in North America (USA and Canada). There are no data, however, on infections of *P. serotina* or *P. pennsylvanica*, which occur together with other species of attacked trees. According to Batra (1991), in Europe the fungus parasitises only on *Prunus padus*; it was recorded on the plant in Belgium, Czech Republic, Finland, Germany, Hungary, Latvia, Russia and finally in Ukraine, where the fungus was noted by a Polish mycologist, Wróblewski, in 1916. *Prunus serotina* is a new host plant for *Monilia linhartiana*, and it is the first record of the fungus for Poland.

A number of other species of the genus *Monilia* that occur on representatives of the genera *Prunus* and *Padus*, and infect chiefly the fruits, and leaves or shoots less frequently, are known from Poland. Those are: *Monilia candida* Bon. (Rouppert and Wróblewski 1911), *M. cinerea* Bon. (Wodziczko 1911; Dominik 1936; Stec-Rouppertowa 1936; Michalski 1965; Romaszewska-Sałata and Mułenko 1983), *M. fructigena* Pers. (Wróblewski 1912; Fełenczak 1927;

Jankowska-Barbacka 1931; Michalski 1965), as well as *M. laxa* (Ehrenb.) Sacc. (Madej 1971).

COELOMYCETES

Microsphaeropsis olivacea (Bonord.) Höhn.
[= *Coniothyrium olivaceum* Bonord. apud Fuckel]

Teleomorph: *Paraphaeosphaeria michotii* (Westend.) O. E. Erikss., *Pleosporales*, *Ascomycota*.

Mycelium immersed, branched, septate, hyaline to pale brown. Conidiomata pycnidial, globose, darkbrown, unilocular, immersed into plant tissue, 200-300 μm in diam; wall thin, composed of brown, thin-walled textura angularis. Ostiole single, circular, central. Conidiogenous cells 4-6 x 3-4 μm. Conidia oval to elipsoid, aseptate, pale brown, smooth, thin-walled, 5-7 x 2-5 μm (the description is with agreement to Sutton 1998).

Sampling sites:

1. Roztocze Region (SE Poland), near the Panasówka and Hedwiżyn villages, pine forest, often; 14.10.1992, leg. et det. W. Mułenko [LBLM 7139].
2. Częstochowska Upland (S Poland), in the vicinity of the Złoty Potok village, "Parkowe" reserve, forest 270h, mixed forest, rare on single slightly infected leaves of the trees; 20.10.1998, leg. et det. M. Ruszkiewicz [LOD 455 (PF)].
3. Central Poland, in the vicinity of Brus near Łódź, shrubs at the roadside, abundantly on some trees; 24.08.2002, leg. et det. M. Ruszkiewicz-Michalska [LOD 456 (PF)].

Notes: *Microsphaeropsis olivacea* is a cosmopolitan fungus, both a parasite and a saprobe, recorded in various habitats across the world. It has been collected both on live plant organs and on their dead remains, as well as in water and in soil. Sutton (1998) lists over 20 genera of plants on whose organs the fungus has so far been collected, while Farr et al. (1989) report four further genera from the USA. It was also recently noted in Cuba on *Saccharum officinarum* L. (Minter, Hernandez and Portales 2001).

The species was noted in different parts of Poland on 5 plant species: *Juglans regia* L., *Juglandaceae* (Madej 1967, 1974); *Acer pseudoplatanus* L., *Aceraceae* (Truszkowska 1984); on *Frangula alnus* Miller, *Rhamnaceae* (Mułenko 1989); *Huperzia selago* (L.) Bernh. ex Schrank et Mart, *Lycopodiaceae* and *Sarothamnus scoparius* (L.) Wimm., *Fabaceae* (Chlebicki 1989).

The fungus has not been noted on *Prunus serotina* (*Rosaceae*) before, and the plant is a new host for this parasite.

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Padus serotina (*Rosaceae*), nowa roślina żywicielska dla kilku gatunków mikroskopijnych grzybów patogenicznych

Streszczenie

Czeremcha amerykańska – *Padus serotina* (Ehrh.) Borkh. – jest holoagriofitem, gatunkiem obcym w dendroflorze Polski, ekspansywnym i niebezpiecznym, często eliminującym rodzime gatunki roślin. W trakcie badań terenowych prowadzonych ostatnio w Polsce zebrano na tej roślinie cztery interesujące i rzadkie gatunki grzybów pasożytniczych. W pracy podano ich szczegółową charakterystykę oraz rozmieszczenie na świecie.

Padus serotina jest nowym żywicielem dla trzech gatunków pasożytów: *Phyllactinia guttata* (Wallr. ex Fr.) Lév. (*Erysiphales*), *Monilia linhartiana* Sacc. (*Hyphomycetes*) i *Microsphaeropsis olivacea* (Bonord.) Höhn. (*Coelomycetes*). Czwarty gatunek, *Podosphaera tridactyla* (Wallr.) de Bary var. *tridactyla* (*Erysiphales*), należy do gatunków bardzo rzadko występujących na tej roślinie. Notowany był na pojedynczych stanowiskach w trzech krajach europejskich: na Litwie, w Niemczech oraz wschodniej części Rosji.