

## MISCELLANEOUS NOVELTIES ON POWDERY MILDEW FUNGI FROM POLAND

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**Abstract:** Eighteen remarkable powdery mildews collected in Poland are discussed. *Golovinomyces cichoracearum* (DC.) V. P. Gelyuta var. *latisporus* (U. Braun) U. Braun, *Erysiphe mayorii* S. Blumer var. *cicerbitae* U. Braun, and 23 powdery mildew fungus/host combinations are new to Poland. *Erysiphe hyperici* (Wallr.) S. Blumer on *Hypericum annulatum*, *Phyllactinia guttata* (Wallr.: Fr.) Lév. on *Betula ×oycoviensis* and *Podosphaera spiraeae* (Sawada) U. Braun & S. Takam. on *Spiraea ×vanhouttei* are reported from Europe for the first time. *Erysiphe howeana* U. Braun and *Podosphaera spiraeae* are probably spreading in Poland.

**Key words:** Erysiphales, powdery mildew fungi, host range, Poland

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### INTRODUCTION

Nineteen years have passed since Sałata's (1985) monograph on the powdery mildew fungi of Poland, and in this time knowledge of these fungi has significantly increased (Mułenko 1989, 1993, 1994; Mułenko *et al.* 1995; Sałata *et al.* 1993; Wołczańska 1995; Adamska *et al.* 1999; Dynowska *et al.* 1999; Czerniawska *et al.* 2000; Ruskiewicz 2000; Adamska 2001, 2002; Czerniawska 2001; Wołczańska & Oklejewicz 2001; Piątek 2000a, b, 2002, 2003a, b, 2004; Wołczańska & Mułenko 2002, 2003; Ruskiewicz-Michalska & Mułenko 2003; Ale-Agha *et al.* 2004). Even so, it is still possible to make remarkable collections of powdery mildews in Poland. Some older collections need to be reexamined and reallocated to other species; for example, some hosts of '*Erysiphe cichoracearum*' reported by Sałata (1985) may harbour other species. In this paper, several unusual powdery mildew fungi collected in Poland between 1998 and 2004 are included and discussed.

### MATERIAL AND METHODS

The host plants infected with powdery mildew fungi were collected from gardens, parks, roadsides, forests, grassland and other sites, taken to the laboratory, air-dried,

and examined by light microscopy. Observations and measurements of microscopic elements were made from slide preparations stained with a solution of phloxine in 5% KOH. The taxonomy and nomenclature of powdery mildew fungi are based on monographs and papers by Braun (1987, 1999) and Braun and Takamatsu (2000). The fruitbodies of the teleomorph, previously considered to be cleistothecia, are herein classified as chasmothecia, according to the suggestion of Braun *et al.* (2002). The names of host plants follow Mirek *et al.* (2002).

### ENUMERATION OF SPECIES

#### Family ERYSIPTACEAE Lév.

Ann. Sci. Nat., Bot. 3 sér. 15: 133. 1851.

#### Subfamily ERYSIPTOIDEAE

Tribe *CYSTOTHECEAE* (Katumoto) U. Braun

Beih. Nova Hedwigia 89: 39. 1987.

#### Subtribe *CYSTOTHECINAE*

*Podosphaera clandestina* (Wallr.: Fr.) Lév. var. *clandestina*

Ann. Sci. Nat., Bot., 3 sér. 15: 136. 1851.

SPECIMENS EXAMINED. On *Cydonia oblonga* Mill.: POLAND. BRAMA KRAKOWSKA GATE: Kraków, Botanical Garden, 25 Jun. 2004, leg. M. Piątek, KRAM F-54013 (anamorph).

Braun (1987) recorded four species occurring on *Cydonia*: *Podosphaera clandestina* (Wallr.: Fr.) Lév. var. *clandestina*, *P. leucotricha* (Ellis & Everh.) E. S. Salmon, *Phyllactinia guttata* (Wallr.: Fr.) Lév., and *Ph. mali* (Duby) U. Braun. Chasmothecia are not present in the collection reported in this paper; it was identified on the basis of morphological characters of the anamorph. *Phyllactinia guttata* and *Ph. mali* were immediately ruled out, as they form anamorphs of the *Ovulariopsis* type, while in the present material the anamorph belonged to the *Euoidium* type. The conidiophores were straight, with slender foot cells, up to 110 µm long, slightly attenuated at the very base, followed by 1–4 shorter cells. The conidia formed in chains were ellipsoid-ovoid, 23–31 × 10–14 µm. These characters agree well with those of *P. clandestina* var. *clandestina*. *Podosphaera leucotricha* has shorter, not slender foot-cells, and wider, broadly ellipsoid conidia. *Cydonia oblonga* is a new host for *P. clandestina* var. *clandestina* in Poland. Previously it was reported on some species of *Crataegus* (Sałata 1985).

***Podosphaera fusca*** (Fr.) U. Braun & N. Shishkoff in Braun & Takamatsu, *Schlechtendalia* 4: 29. 2000.

*Erysiphe fusca* Fr., *Syst. Mycol.* 3: 242. 1829. – *Sphaerotheca fusca* (Fr.) S. Blumer, *Beitr. Krypt.-Fl. Schweiz* 7(1): 117. 1933.

*Sphaerotheca erigerontis-canadensis* (Lév.) L. Junell, *Svensk Bot. Tidskr.* 60(3): 387. 1966.

SPECIMENS EXAMINED. On *Doronicum austriacum* Jacq.: POLAND. WESTERN CARPATHIANS, Tatra Mts: near summit of Sarnia Skala Mt., 22 Aug. 2003, leg. J. Cabala & M. Piątek, KRAM F-54010 (holomorph).

*Podosphaera fusca* parasitizes various species of the Asteraceae. Braun (1987) treated *Sphaerotheca fusca* (Fr.) S. Blumer broadly, but later (Braun & Takamatsu 2000) it was divided into two species: *P. fusca*, with small chasmothecia and asci with small oculi; and *P. xanthii* (Castagne) U. Braun & N. Shishkoff, with large chasmothecia and asci

with large oculi. Both species may be present on *Doronicum*, but the former is more common. The collection reported here, with small asci, 65–85 µm diam., represents *P. fusca*. A collection on *Doronicum austriacum* from Nosalowa Przełęcz pass in the Tatra Mts probably belongs to the same taxon, and is the only previous record of *P. fusca* on this host plant from Poland (Sałata 1985).

***Podosphaera spiraeae*** (Sawada) U. Braun & S. Takam.

*Schlechtendalia* 4: 31. 2000.

*Sphaerotheca spiraeae* Sawada, *Bull. Govt. Forest. Exp. Stat. Tokyo* 50: 104. 1951.

SPECIMENS EXAMINED. On *Spiraea × bumalda* Hort. ex Zabel: POLAND. KOTLINA SANDOMIERSKA BASIN: Tarnów, by Jasna St., near intersection with Słoneczna St., 27 Aug. 2002, leg. M. Piątek, KRAM F-52742 (anamorph); on *Spiraea japonica* L. f.: POLAND. KOTLINA SANDOMIERSKA BASIN: Kraków, by Duża Góra St., 14 July 2002, leg. M. Piątek, KRAM F-52746, 30 July 2002, leg. J. Cabala & M. Piątek, F-53426; Tarnów, by Jasna St., near intersection with Słoneczna St., 27 Aug. 2002, leg. M. Piątek, KRAM F-52750 (anamorphs); on *Spiraea × vanhouttei* Zabel: POLAND. KOTLINA SANDOMIERSKA BASIN: Tarnów, by Bitwy pod Monte Cassino St., 8 Oct. 2002, leg. M. Piątek, KRAM F-52748; Tarnów, by Słoneczna St., 8 Oct. 2002, leg. M. Piątek, KRAM F-52749; Tarnów, Planty Kolejowe park (by Dworcowa St.), 9 Oct. 2002, leg. M. Piątek, KRAM F-52747 (anamorphs).

*Podosphaera spiraeae* parasitizes various species of *Filipendula* and *Spiraea* (Braun 1987). Until recently this species was very rarely reported from Poland. Its first records originated from *Filipendula ulmaria* at two localities in the Tatra Mts (Mułenko *et al.* 1995). It was also found on *Spiraea* cfr. *japonica* in Kraków-Nowa Huta (Piątek 2000a), Lublin and Sandomierz (Wołczańska & Mułenko 2002). The new collections reported in this paper are from *Spiraea japonica*, as well as other ornamental *Spiraea* species, that is, *Spiraea × bumalda* and *Spiraea × vanhouttei*, which are new hosts for *Podosphaera spiraeae* in Poland; *Spiraea × vanhouttei* is a new host for Europe (Braun 1998; Piątek 2000a). The number of recent collections suggests that this powdery mildew may be an expanding fungus in Poland. It cannot have been

overlooked earlier, since it forms clearly visible, characteristic symptoms on leaves of host plants. Leaves infected with *Podosphaera spiraeae* are characteristically disfigured, distorted and often discolored to reddish. These characteristic symptoms are useful for identification of this species, above all in Europe where this powdery mildew only forms the anamorphic state. Other powdery mildew fungi that sometimes infect *Spiraea* spp., such as *Podosphaera clandestina* var. *clandestina* and *Podosphaera leucotricha*, do not produce such symptoms.

Subtribe *SAWADAEINAE* (U. Braun)  
U. Braun & S. Takam.

Schlechtendalia 4: 32. 2000.

***Sawadaea tulasnei*** (Fuckel) Homme

J. Fac. Agric. Hokkaido Imp. Univ. 38: 374. 1937.

SPECIMENS EXAMINED. On *Acer tataricum* L.: POLAND. BRAMA KRAKOWSKA GATE: Kraków, Botanical Garden, 18 Sept. 2003, leg. J. Cabala & M. Piątek, KRAM F-53440 (holomorph).

*Sawadaea tulasnei* occurs on various species of *Acer*, but in Poland it was reported only from *Acer platanoides* (Sałata 1985). *Acer tataricum* is a new host for this powdery mildew in Poland. The closely related species *Sawadaea bicornis* (Wallr.: Fr.) Homma was recorded on this host from four scattered localities (Sałata 1985). However, the collection reported here cannot be included in this latter taxon because it has mostly non-branched chasmothecial appendages and persistent, pannose coating of mycelium on the upper side of leaves, matching *Sawadaea tulasnei*. This powdery mildew was reported on *Acer tataricum* from Mordovia (Ryzhkin & Levkina 2000) and Hungary (Szabó 2003).

Tribe *ERYSIPHEAE*

Subtribe *ERYSIPHINAE*

***Erysiphe aquilegiae*** DC. var. *ranunculi* (Grev.)  
R. Y. Zheng & G. Q. Chen

Sydowia 34: 302. 1981.

SPECIMENS EXAMINED. On *Aconitum plicatum* Köhler ex Rchb.: POLAND. SUDETY MTS, Karkonosze Mts: near Strzecha Akademicka hostel, 17 July 2003, leg. J. Cabala & M. Piątek, KRAM F-53422 (anamorph).

*Erysiphe aquilegiae* var. *ranunculi* parasitizes various species of the Ranunculaceae (Braun 1987). Sałata (1985) listed 30 host plants for this species, and six have been added: *Ranunculus polyanthemos* (Romaszewska-Sałata & Mułenko 1983), *Caltha laeta*, *Ranunculus oreophilus* (Sałata et al. 1984), *Aconitum lasiocarpum* (Wolczańska & Oklejewicz 2001), *Ranunculus arvensis* (Adamska 2001) and *Consolida ajacis* (Czerniawska 2001a). The collections of '*Erysiphe ranunculi*' on *Paeonia officinalis* reported by Sałata (1985) belong to *Erysiphe paeoniae* R. Y. Zheng & G. Q. Chen (see below). *Aconitum plicatum* is for the first time reported as a host for *Erysiphe aquilegiae* var. *ranunculi* in Poland. However, two collections on *Aconitum firmum* from the Sudety Mts (Sałata 1985) probably should be attributed to this host, because this species does not occur in the Sudety Mts but is replaced by *Aconitum plicatum* (Zajac & Zajac 2001).

***Erysiphe begoniicola*** U. Braun & S. Takam.

Schlechtendalia 4: 5. 2000.

*Microsphaera begoniae* Sivan., Trans. Br. Mycol. Soc. 56(2): 304. 1971 (non *Erysiphe begoniae* R. Y. Zheng & G. Q. Chen).

SPECIMENS EXAMINED. On *Begonia ×hortensis* Graf & Zwicky: POLAND. BRAMA KRAKOWSKA GATE: Kraków, by Karmelicka St., 20 Sept. 2003, leg. M. Piątek, KRAM F-54009 (anamorph).

Chasmothecia are lacking in the present collection, and the anamorph is a *Pseudoidium* with conidia formed singly, cylindrical, 42–50 × 15–20 μm. It agrees well with *Erysiphe begoniicola*, which is known to occur on numerous cultivated species of *Begonia* (Braun 1987). Host plants belonging to this genus may harbor two other powdery mildews: *Erysiphe begoniae* R. Y. Zheng & G. Q. Chen and *Golovinomyces orontii* (Castagne) V. P. Gelyuta. The latter forms an anamorph of the *Euoidium* type and is rarely reported from

species of *Begonia* (Braun 1987; Kiss 1994 – as *Erysiphe cichoracearum* DC.). *Erysiphe begoniae* forms an anamorph of the *Pseudoidium* type with shorter conidia, up to 38 µm long (Braun 1987). This species is known to occur in China, but recently a collection of *Oidium* sp. on *Begonia* with short conidia was found in Germany. It is not clear whether this anamorph belonged to *E. begoniae* (Braun 1998). This is the first record of *E. begoniicola* on *Begonia* ×*hortensis* from Poland, since Sałata (1985) reported it only from various localities on ‘*Begonia* spp.’ (cultivated).

### *Erysiphe berberidis* DC.

Fl. Fr. 2: 275. 1805.

*Microsphaera berberidis* (DC.) Lév., Ann. Sci. Nat., Bot., 3 sér. 15: 159 & 381. 1851.

SPECIMENS EXAMINED. On *Berberis amurensis* Rupr.: POLAND. BRAMA KRAKOWSKA GATE: Kraków, Botanical Garden, 22 Oct. 2002, leg. M. Piątek, KRAM F-53432 (holomorph); on ×*Mahoberberis neuberti* C. K. Schneid.: POLAND. BRAMA KRAKOWSKA GATE: Kraków, Botanical Garden, 23 Oct. 2002, leg. M. Piątek, KRAM F-53427 (anamorph), 28 Oct. 2003, leg. M. Piątek, KRAM F-53503 (holomorph).

*Erysiphe berberidis* is known to infect various species of the Berberidaceae (Braun 1987). In Poland it was previously reported on *Berberis vulgaris*, *Mahonia aquifolium* (Sałata 1985), *B. koreana*, and *B. thunbergii* (Dynowska *et al.* 1999). *Berberis amurensis* and ×*Mahoberberis neuberti* are new host plants for this species in Poland. The most interesting is ×*M. neuberti*. It is an artificial hybrid between *M. aquifolium* and *B. vulgaris*; its leaves resemble *Ilex aquifolium*, leading me to initially identify the host plant as *I. aquifolium* and the powdery mildew as an unknown species. A note from U. Braun led me to the correct identification. ×*M. neuberti* is often confused with *I. aquifolium* in gardens.

### *Erysiphe cruciferarum* Opiz ex L. Junell

Svensk Bot. Tidskr. 61(1): 217. 1967.

SPECIMENS EXAMINED. On *Erysimum pieninicum* (Zapał.) Pawł.: POLAND. WESTERN CARPATHIANS, Pieniny Mts: Krościenko nad Dunajcem, garden near

administration building of Pieniny National Park, 1 Aug. 2000, leg. U. Korzeniak, KRAM F-50349 (anamorph); on *Lepidium latifolium* L.: POLAND. BRAMA KRAKOWSKA GATE: Kraków, Botanical Garden, 28 Oct. 2003, leg. M. Piątek, KRAM F-53504 (anamorph).

*Erysiphe cruciferarum* has been found in Poland on a number of hosts from the Brassicaceae and Papaveraceae (Sałata 1985), and from other parts of the world it is also known on hosts of the Capparidaceae, Resedaceae and Fumariaceae (Braun 1987). *Lepidium latifolium* is a new host for this powdery mildew in Poland. On *Erysimum pieninicum* it was only known from the *locus classicus* of this Polish endemite in Czorsztyn (Sałata 1985), but now a new locality is reported, in a garden where the plant was cultivated. In Poland, *E. cruciferarum* is now known from 33 host plants.

### *Erysiphe howeana* U. Braun

Mycotaxon 14(1): 373. 1982.

SPECIMENS EXAMINED. On *Oenothera biennis* L.: POLAND. KOTLINA SANDOMIERSKA BASIN: Tarnów, by Jagiellońska St., 27 Aug. 2002, leg. M. Piątek, KRAM F-52762; WYSOCZYNY PODLASKO-BIALORUSKIE HIGH PLAINS: Hajnówka, sewage treatment plant property, 27 Sept. 2001, leg. M. Wołkowycki, KRAM F-53421 (anamorphs).

*Erysiphe howeana* occurs on various species of the genera *Gaura* and *Oenothera* of the Onagraceae (Braun 1987). The native occurrence of this powdery mildew is in North America, from where it was described and where it forms chasmothecia (Braun 1982). At the beginning of the 20<sup>th</sup> century it was introduced to Europe, with the first localities in Switzerland (Kreisel & Scholler 1994), and at the end of 20<sup>th</sup> century it was recorded from South Africa (Gorter & Eicker 1985). Both in Europe and South Africa the species occurs in the anamorphic state only. This powdery mildew has been known from Poland for a long time, but under various other names. Sałata (1985) mentioned some collections of anamorphic powdery mildews from *Oenothera biennis* and *O. muricata*, and suggested that they probably belonged to *Erysiphe circaeae* L. Junell. It was also recorded from

Mielnik (Romaszewska-Sałata & Mułenko 1983), Stary Dwór in Mazury (Mikołajska & Dynowska 1986), Olsztyn (Dynowska *et al.* 1999) and Szczecin (Adamska 2002) under the names *Oidium* sp. and *E. circaeae*. The latter finding originated from *Oenothera versicolor*. The species is currently known from *Oenothera biennis*, *O. muricata* and *O. versicolor* at scattered localities over the whole area of Poland. It is probably an expanding fungus and further localities are to be expected as more field studies on powdery mildews are made at places where the host species are planted.

***Erysiphe hyperici*** (Wallr.) S. Blumer

Beitr. Krypt.-Fl. Schweiz 7(1): 106. 1933.

*Alphitomorpha hyperici* Wallr., Ann. Wetter. Ges., N.F. 4: 239. 1819.

*Microsphaera hypericacearum* U. Braun, Nova Hedwigia 34: 686. 1981.

SPECIMENS EXAMINED. On *Hypericum annulatum* Moris: POLAND. BRAMA KRAKOWSKA GATE: Kraków, Botanical Garden, 28 Oct. 2003, leg. M. Piątek, KRAM F-53505 (anamorph).

This powdery mildew was reported in Poland on five species of *Hypericum* (*H. hirsutum*, *H. maculatum*, *H. montanum*, *H. perforatum*, *H. tetrapterum*) and on the natural hybrid *H. perforatum* × *H. maculatum* (Sałata 1985). *Hypericum annulatum* is a new host plant in Poland for *Erysiphe hyperici*, and also a new host plant in Europe (see Braun 1995).

***Erysiphe mayorii*** S. Blumer var. *cicerbitae*

U. Braun

Mycotaxon 19: 382. 1984.

SPECIMENS EXAMINED. On *Cicerbita alpina* (L.) Wallr.: POLAND. SUDETY MTS, Karkonosze Mts: Wodospad Kamieńczyka waterfall, 15 July 2003, leg. J. Cabala & M. Piątek, KRAM F-54011 (holomorph).

This collection contains scattered immature chasmothecia with developed asci, but without any ascospores. Therefore it is impossible to check the number of ascospores per ascus. This collection is included in this taxon for two reasons. First, it differs from *Golovinomyces cichoracearum*,

which can also infect species of *Cicerbita*, by its more rounded chasmothecial cells. In *G. cichoracearum* these cells are irregularly sinuous (see Braun 1987), while in the present collection they are rather rounded. Second, it cannot be included in the nominative variety because of its different host spectrum (*Cirsium* spp. in *E. mayorii* var. *mayorii*). Mułenko (1993) reported '*Sphaerotheca fusca* (Fr.) Blumer emend. U. Braun' on *Cicerbita alpina* from the Polish part of the Tatra Mts. This species has much larger chasmothecial cells, of course, and cannot be identical with the collection from the Karkonosze Mts. According to the current taxonomic concept (Braun & Takamatsu 2000; see the discussion under *Podosphaera fusca*), the collection recorded by Mułenko (1993) seems to belong to *Podosphaera xanthii* (Castagne) U. Braun & N. Shishkoff, since the chasmothecia were rather large, 80–100 µm diam. *Erysiphe mayorii* var. *cicerbitae* is a taxon new to Poland, and rarely reported from France, Georgia, Iran, Romania, Spain, Switzerland and Russia (Braun 1987). Varietas *mayorii* is known in Poland on *Cirsium arvense* from scattered localities (Sałata 1985).

***Erysiphe paeoniae*** R. Y. Zheng & G. Q. Chen

Sydowia 34: 300. 1981.

SPECIMENS EXAMINED. On *Paeonia officinalis* L.: POLAND. NIZINY ŚRODKOWOPOLSKIE LOWLANDS: Piątница near Legnica ('Liegnitz: Pfaffendorf'), in J. Schroeter, Pilze Schlesiens No. 2262, KRAM F-54021, F-54022, F-54023.

*Erysiphe paeoniae* was described by Zheng and Chen (1981) as a new species on *Paeonia* (Paeoniaceae), differing by its unique appendages from *Erysiphe aquilegiae* DC. occurring on hosts of the Ranunculaceae; the appendages are tortuous, irregular in shape and frequently irregularly branched. Sałata (1985) mentioned two collections of powdery mildew on *Paeonia officinalis*, from Piątница near Legnica and from Dzierżoniów, and referred them to '*Erysiphe ranunculi*.' Apparently he did not know the work of Zheng and Chen (1981). I had the opportunity to study the collection from Piątница near Legnica, which was distributed by Joseph Schroeter

in his exsiccatum 'Pilze Schlesiens No. 2262' as '*Erysibe Polygoni* (De Candolle),' and this specimen belongs to *Erysiphe paeoniae*. Braun (1987) already reported this species from Poland, without precise information on the localities, but evidently he based his report on specimens from that exsiccatum.

***Erysiphe trifolii* Grev. var. *trifolii***

Fl. Edin.: 459. 1824.

*Microsphaera trifolii* (Grev.) U. Braun var. *trifolii*, Nova Hedwigia **34**: 685. 1981.

SPECIMENS EXAMINED. On *Melilotus dentata* (Waldst. & Kit.) Pers.: POLAND. WYZYNA MAŁOPOLSKA UP-  
LAND: Owczary Reserve, near Busko Zdrój, 11 July 2004, leg. M. Piątek & J. Cabala, KRAM F-54085 (anamorph).

*Erysiphe trifolii* occurs on various species of the Fabaceae (Braun 1987). In Poland it was reported on 41 host plants. The collections on *Lupinus angustifolius*, *L. luteus*, *L. polyphyllus* and *L. mutabilis* may belong to *Erysiphe trifolii* var. *intermedia* (U. Braun) U. Braun & S. Takam., but the final conclusion must be supported by an examination of voucher specimens. *Melilotus dentata* is a new host for the nominative variety in Poland.

Tribe **GOLOVINOMYCETEAE** (U. Braun)  
U. Braun & S. Takam.

Schlechtendalia **4**: 32. 2000.

Subtribe **GOLOVINOMYCETINAE**

***Golovinomyces cichoracearum* (DC.) V. P. Gelyuta var. *cichoracearum***

Ukr. Bot. Ž. **45**(5): 62. 1988.

*Erysiphe cichoracearum* DC. var. *cichoracearum*, Fl. Fr. **2**: 274. 1805.

SPECIMENS EXAMINED. On *Bellis perennis* L.: POLAND. WYSOCZYNY PODLASKO-BIALORUSKIE HIGH PLAINS: Białowieża-Zastawa, 11 Aug. 2002, leg. M. Wołkowycki, KRAM F-53420 (anamorph); on *Cirsium pannonicum* (L. f.) Link: POLAND. BRAMA KRAKOWSKA GATE: Kraków, Botanical Garden, 26 Sept. 2002, leg. J. Cabala & M. Piątek, KRAM F-52743

(anamorph); on *Carduus glaucus* Baumg.: POLAND. WESTERN CARPATHIANS, Tatra Mts: Dolina ku Dziurze valley, 10 Sept. 2003, leg. M. Piątek, KRAM F-54012 (anamorph); on *Cirsium acaule* Scop.: POLAND. BRAMA KRAKOWSKA GATE: Kraków, Botanical Garden, 26 Sept. 2002, leg. J. Cabala & M. Piątek, KRAM F-52744 (anamorph); on *Silybum marianum* (L.) Gaertn.: POLAND. BRAMA KRAKOWSKA GATE: Kraków, Botanical Garden, 18 Sept. 2003, leg. J. Cabala & M. Piątek, KRAM F-53446 (holomorph).

This powdery mildew is widespread on various host plants of the Asteraceae (Braun 1987). Sałata (1985) listed 89 species of host plants, from the Asteraceae and from other families. Only those belonging to the Asteraceae may be treated as hosts of *Golovinomyces cichoracearum*, and the remaining plants are hosts of other powdery mildews. For example, collections of powdery mildew from *Cucumis sativus*, *Cucurbita pepo* or *Viola tricolor* probably belong to *Golovinomyces orontii* (Castagne) V. P. Gelyuta. The collections of powdery mildew from *Echinops exaltatus* and *E. sphaerocephalus* represent a separate species, *Golovinomyces echinopsis* (U. Braun) V. P. Gelyuta, although the host plants are members of the Asteraceae (Piątek 2000a). Thirty new host plants for *G. cichoracearum* var. *cichoracearum* were recorded by various authors after the publication of Sałata's (1985). In this paper, three additional hosts new to Poland are recorded: *Bellis perennis*, *Cirsium pannonicum* and *Silybium marianum*. The collection of *Oidium* sp. on *Bellis perennis* from Biała Piska (Dynowska *et al.* 1999) may belong to this species. The finding on *Carduus glaucus* is the third in Poland. Previously it was recorded from the Dolina Białego valley and the Dolina Jaworzynka valley in the Tatra Mts (Mułenko *et al.* 1995). On *Cirsium acaule* it was already found in the vicinity of Pyrzyce (Sałata 1985).

***Golovinomyces cichoracearum* (DC.) V. P. Gelyuta var. *latisporus* (U. Braun) U. Braun**

Schlechtendalia **3**: 51. 1999.

*Erysiphe cichoracearum* DC. var. *latispora* U. Braun, Mycotaxon **18**(1): 117. 1983.

SPECIMENS EXAMINED. On *Helianthus annuus* L.: POLAND. KOTLINA SANDOMIERSKA BASIN: Kraków,

by Sadzawka St., 17 Sept. 2003, *leg. J. Cabala & M. Piątek*, KRAM F-53437 (anamorph); on *Helianthus tuberosus* L.: POLAND. KOTLINA SANDOMIERSKA BASIN: Szczucin, ca 31 km N of center of Tarnów, 17 Aug. 1998, *leg. M. Piątek*, KRAM F-52644; BRAMA KRAKOWSKA GATE: Kraków, Botanical Garden, 24 Sept. 1998, *leg. M. Piątek*, KRAM F-53431 (holomorphs); on *Rudbeckia laciniata* L.: POLAND. WYSOCZYNY PODLASKO-BIALORUSKIE HIGH PLAINS: Hajnówka, 12 Aug. 1990, *leg. M. Wolkowycki*, KRAM F-53423; Puszcza Białowieska primeval forest, forest tract 463A, edge of alder forest, 2 Sept. 2002, *leg. M. Wolkowycki*, KRAM F-53424 (anamorphs); on *Rudbeckia laevigata* Pursh: POLAND. BRAMA KRAKOWSKA GATE: Botanical Garden, 28 Oct. 2003, *leg. M. Piątek*, KRAM F-53502 (anamorph); on *Rudbeckia triloba* L.: POLAND. BRAMA KRAKOWSKA GATE: Kraków, Botanical Garden, 28 Oct. 2003, *leg. M. Piątek*, KRAM F-53501 (anamorph).

Braun (1987, 1999) recognized five varieties within *Golovinomyces cichoracearum*: var. *cichoracearum*, var. *fischeri* (S. Blumer) U. Braun, var. *latisporus* (U. Braun) U. Braun, var. *poonensis* (Kamat) U. Braun, and var. *transvaalensis* (G.J.M. Gorter & Eicker) U. Braun. *Golovinomyces cichoracearum* var. *latisporus* differs from the other varieties by the shape and size of the conidia, which are broadly ellipsoid to doliiiform, and with a length/width ratio below 2. According to Braun (1987), it occurs on various species of *Ambrosia*, *Helianthus*, *Iva* and *Rudbeckia*. From Poland, '*Erysiphe cichoracearum*' was reported on *Helianthus tuberosus* from Lublin (Sałata 1985), Słowiński National Park (Adamska *et al.* 1999), Drawsko Landscape Park (Czerniawska *et al.* 2000) and the Botanical Garden in Kraków (Piątek 2000b); on *Rudbeckia laciniata* it was reported from Mielnik (Romaszewska-Sałata & Mułenko 1983), Lublin (Sałata 1985) and Drawsko Landscape Park (Czerniawska 2001a). These plants may be potential hosts for *G. cichoracearum* var. *latisporus*. In fact, a reexamined collection from Kraków's Botanical Garden on *Helianthus tuberosus* (Piątek 2000b) represented this variety. The records in the present paper are the first clear reports of this variety in Poland at all. *Golovinomyces cichoracearum* var. *latisporus* is currently known on *Helianthus annuus*, *H. tuberosus*, *Rudbeckia laciniata*, *R. laevigata* and

*R. triloba* in scattered localities in southern and eastern Poland.

***Golovinomyces orontii*** (Castagne) V. P. Gelyuta

Ukr. Bot. Ž. **45**(5): 63. 1988.

*Erysiphe orontii* Castagne, Suppl. Cat. Pl. Mars.: 52. 1851.

SPECIMENS EXAMINED. On *Campanula* sp.: POLAND. BRAMA KRAKOWSKA GATE: Kraków, Botanical Garden, 18 Sept. 2003, *leg. J. Cabala & M. Piątek*, KRAM F-53441 (anamorph); on *Saintpaulia ionantha* J. C. Wendl.: POLAND. BRAMA KRAKOWSKA GATE: Kraków, Czerwony Prądnik, in a private home, 20 Apr. 2002, *leg. A. Ronikier*, KRAM F-53449 (anamorph).

*Golovinomyces orontii* parasitizes a wide range of host plants from various families (Braun 1987). The list of hosts for this powdery mildew in Poland is not yet complete, because many specimens of '*Erysiphe cichoracearum*' by Sałata (1985) and other authors need to be reexamined and probably reallocated to *G. orontii* (see also discussion under *G. cichoracearum* var. *cichoracearum*). In any case, *Campanula* sp. and *Saintpaulia ionantha* are new host plants for this powdery mildew in Poland. Interestingly, the mycelium of *G. orontii* on *Saintpaulia ionantha* occurred on flowers, an untypical place for powdery mildews.

Subtribe *NEOERYSIPHINAE* (U. Braun)  
U. Braun & S. Takam.

Schlechtendalia **4**: 32. 2000.

***Neoerysiphe galeopsidis*** (DC.) U. Braun

Schlechtendalia **3**: 50. 1999.

*Erysiphe galeopsidis* DC., Fl. Fr. **6**: 108. 1815.

SPECIMENS EXAMINED. On *Rosmarinus officinalis* L.: POLAND. KOTLINA SANDOMIERSKA BASIN: Kraków, Nowa Huta-Centrum A, 20 Feb. 2002, *leg. H. Komorowska*, KRAM F-53429 (anamorph).

In his world monograph of powdery mildew fungi, Braun (1987) reported only two species occurring on *Rosmarinus*: *Erysiphe galeopsidis* DC. and *Leveillula taurica* (Lév.) Arnaud. *Erysiphe galeopsidis* was transferred to the new genus *Neoerysiphe* U. Braun as *N. galeopsidis* (DC.)

U. Braun (Braun 1999). The type of anamorph in the collection reported here suggests that it belongs to the latter species. The most distinctive character of *N. galeopsidis*, and the genus *Neoerysiphe* in general, is the striate structure of the conidial surface, revealed by scanning electron microscopy (Cook *et al.* 1997; Gorter 1987). *Neoerysiphe galeopsidis* on *Rosmarinus officinalis* was previously known in Europe only from Germany and France (Braun 1995), and this host must be rare for the powdery mildew.

Tribe *PHYLLACTINIEAE* (Palla) R. T. A. Cook,  
Inman & Billings

*Schlechtendalia* 3: 52. 1999.

Subtribe *PHYLLACTININAE*

*Phyllactinia guttata* (Wallr.: Fr.) Lév.

*Ann. Sci. Nat., Bot.*, 3 Sér. 15: 144. 1851.

SPECIMENS EXAMINED. On *Betula ×oycoviensis* Besser: POLAND. BRAMA KRAKOWSKA GATE: Kraków, by Lubicz St., 1 Oct. 2002, leg. M. Piątek, KRAM F-52763 (holomorph).

*Phyllactinia guttata* occurs on various host genera of woody plants. *Phyllactinia berberidis* Palla, reported by Sałata (1985) as a separate species, is conspecific with *Ph. guttata* (Braun 1987). In Poland this powdery mildew is known on the following species of *Betula*: *B. carpatica*, *B. humilis*, *B. obscura*, *B. pendula* and *B. pubescens* (Sałata 1985; Romaszewska-Sałata *et al.* 1986). There have been no reports on *B. ×oycoviensis*. This is the first record of this host from Poland, and probably the first report at all.

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