

Puccinia scillae (Uredinales), a new species for Poland

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The paper presents a rust species new for Poland, that affects the ornamental plant *Scilla siberica* Haw. The distribution of the fungus and its host plants, both introduced and native in Europe, have been investigated. The data from neighbouring countries indicate that the parasite has been probably overlooked in Poland till now. There is a possibility, however, that the species is currently spreading in central and north-eastern Europe.

Key words: parasitic fungi, rust fungus, *Scilla siberica*, distribution, Central Poland

INTRODUCTION

Observations of the occurrence of phytopathogenic fungal species new for the Polish mycobiota or a new host of an already known pathogen have not been rare events in the last decade. Each year brings new records of such a kind. This concerns both groups so well documented in Poland as *Peronosporales*, *Erysiphales*, *Uredinales* and *Ustilaginales* (Mułenko and Matejko Gosztyła 1997; Madej, Błaszowski and Tadych 2001; Piątek 2003, 2004) as well as relatively less known sac fungi (*Ascomycotina*) and their anamorphs (Ruszkiewicz 2000; Wołczańska and Oklejewicz 2001; Chlebicki 2002; Ruszkiewicz-Michalska and Mułenko 2003; Adamska 2004). It is difficult to decide which of the new species were not recorded before just because of their ephemeral occurrence, an insufficient knowledge of a taxonomic group, and which taxa are true fast spreading invasive organisms. Data coming from neighbouring countries and several years of recordings in Poland, which allow to trace spreading of a species are very valuable. Best documented is the history of migration of pathogens of crop and ornamental plants, e.g. *Phytophthora infestans* (Mont.) de Bary, *Uncinula necator* (Schw.) Burrill, *Puccinia antirrhini* Diet. et Holw. (Ławrynowicz and Sałata 1992). Invasive taxa spreading in Poland are, e.g. *Microsphaera alphitoides* Griff. et Maubl. (Mułenko et al. 2005) and recently *Erysiphe flexuosa* (Peck) U. Braun [= *Uncinula flexuosa* Peck] (Piątek 2002; Wołczańska and Mułenko 2002)

whose migration has been recorded in other European countries, too (Ale-Agha et al. 2000; Zimmermannová-Pastirčáková et al. 2002). Spreading of several other species of unclear status has been observed in Central-Eastern Europe: e.g. powdery mildews *Erysiphe howeana* U. Braun and *Sphaerotheca spiraeae* Sawada (Piątek 2000, 2004; Wołczańska and Mułenko 2002) and rust *Melampsoridium hiratsukanum* S. Ito on *Alnus* spp. (Põldmaa 1997; Wołczańska 1999; Piątek, Ronikier and Miśkiewicz 2001).

FUNGUS DISTRIBUTION AND HOST RANGE

According to Gäumann (1959) *Puccinia scillae* Linhart [= *P. liliacearum* Duby ssp. *rossiana* Sacc.; *P. rossiana* (Sacc.) Lagerh.] is a species of *Micropuccinia* group occurring all over Europe. Müller (1977) presented the first description of spermogonia of that species and suggested to move it to *Hypopuccinia*. The presence of *P. scillae* has been confirmed in southern and southwestern Europe: in Austria (Scheuer and Poelt 1997; Scheuer 1998, 2000), Germany (Müller 1977; Brandenburger 1994; Krieglsteiner 1999), Greece (Panditou 1973), Hungary (Sydow P. and Sydow H. 1904; Bánhegyi et al. 1985), Italy (Trotter 1908), Romania (Săvulescu 1953), Switzerland (Fischer 1904), on the territory of the former USSR (Tranzschel 1939), and recently also in Estonia (Põldmaa 1999). In these territories it infects two from 15 European representatives of the genus *Scilla* (Tutin et al. 1996), namely *S. bifolia* L. s.l. (incl. *S. vindobonensis* Spta) and *S. siberica* Haw. [= *S. sibirica* Andrz.; *S. cernua* Red.]. This rust species, however, has not been found in most of the Central and Northern European countries: Poland (Majewski 1979; Majewski and Ruskiewicz-Michalska 2005 unpubl.), Lithuania (Minkevičius and Ignavičiūtė 1993), Denmark (Latin-Danish Taxon Database) and in Finland, Norway and Sweden (Farr et al. [n.d.]).

The data from the beginning of the 20th century indicate that *P. scillae* was not found in the Czech Republic, either (Bubák 1906). According to Müller (1977) the first records of *P. scillae* in this area come from 1939 (unpublished) and from 1960. In his work Müller (l.c.) presented an analysis of the distribution of this rust species in Europe against the range of its two hosts: *Scilla bifolia* and *S. siberica*. He found *P. scillae* to be an Eastern-Central European species with a centre of occurrence in Ukraine. Only in this territory *P. scillae* has been found on both host species (Rouppert and Wróblewski 1910; Zweigbaumówna 1918; Wróblewski 1922; Wróblewski and Siemaszko 1933; Minter and Dudka 1996).

MATERIAL AND METHODS

Puccinia scillae was found in spring of 2004 and 2005 in the centre of Łódź city (Poland). It infected specimens of *Scilla siberica* cultivated as ornamental plant causing hypertrophic deformation of their leaves (Fig. 1).

SPECIMENS EXAMINED. On *Scilla siberica*: Central Poland, Łódź, Bp. M. Klepacz park (51.45°N/19.28°E), in the lawn, abundant, 10 May 2004, (teliospores), LOD 458; same host and locality, 8 April 2005, (spermogonia), LOD 459; same host and locality, 12 April 2005, (teliospores), LOD 506; leg. M. Michalski.



Fig. 1. The infected plants of *Scilla siberica* Haw.

other of the squills species found in Poland, the native *S. bifolia* (incl. ssp. *subtriphylla* [= *S. kladnii* Schur]), grows in the southern, mountainous part of Poland and it has a number of anthropogenic sites in Greater Poland and Western Pomerania (Zajac A. and Zajac M. eds 2001; Piękoś-Mirkowa and Mirek 2003).

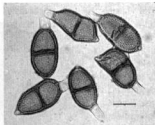


Fig. 2. Teliospores of *P. scillae* (bar = 20µm).

The morphological features and dimensions of teliospores (Fig. 2) correspond to the description given by Majewski (1979) and Brandenburger (1985).

S. siberica, originating from Western Asia, has been cultivated in Poland and sometimes it grows naturalized (Mirek et al. 2002; Rutkowski 2004). The

other of the squills species found in Poland, the native *S. bifolia* (incl. ssp. *subtriphylla* [= *S. kladnii* Schur]), grows in the southern, mountainous part of Poland and it has a number of anthropogenic sites in Greater Poland and Western Pomerania (Zajac A. and Zajac M. eds 2001; Piękoś-Mirkowa and Mirek 2003).

DISCUSSION

No representatives of *Uredinales* have been recorded on the genus *Scilla* until now in Poland (Majewski 1977, 1979; Majewski and Ruszkiewicz-Michalska 2005 unpubl.). In other European countries species of the genus *Scilla* L. and related genera, e.g. *Hyacinthoides* Med., *Chionodoxa* Boiss. and *Muscari* Mill., have been parasitised by *P. scillae* and two other widespread rusts: heteroaeicious *Puccinia scillae-rubrae* P. Cruchet [*P. piperi* Ricker ssp. *scillae-rubrae* (P. Cruchet) Cummins; *Aecidium scillae* Fuck] (Panditou 1973; Denchev 1995; Minter and Dudka 1996; Triebel 1995-2004; Minter et al. 2005) and *Uromyces muscari* (Duby) Graves [*U. scillarum* (Grev. ex Berk.) Wint.] (Panditou 1973; Brandenburger 1994; Reid 1985; Denchev 1995; Minter et al. 2005; Farr et al. [n.d.]). The last species has been reported in Poland on *Muscari* spp. (Majewski 1997) from Lower Silesia (Fig. 3).

Wróblewski (1916) described *Caecoma scillae* - an aecial stage of *Melampsora* sp. on *Scilla bifolia* coming from the territory of the Ukraine (Wierbiaż Niżny near Kolomya). The telial host of this parasite has not been known so far (Majewski

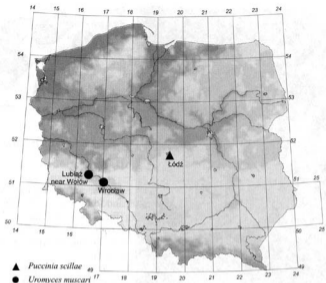


Fig. 3. Distribution of localities of the fungi in Poland.

1977). This species was then recorded in other European countries (Majewski 1977; Brandenburger 1994).

P. scillae-rubrae has been recorded exclusively on *S. bifolia* so far whereas the spectrum of hosts of *U. muscari* is quite wide and includes several related taxa: *Scilla bithynica* Boiss., *S. peruviana* L., *S. puschkinoides* Regel (endemic to Central Asia), *S. verna* Huds., *Hyacinthoides hispanica* (Mill.) Rothm. [= *Scilla campanulata* Aiton], *H. non-scripta* (L.) Chouard ex Rothm. [= *Hyacinthus non-scriptus* L., *Scilla non-scripta* (L.) Hoffmanns. et Link], *Hyacinthus orientalis* L., *Muscari botryoides* (L.) Mill. [= *Hyacinthus botryoides* L.], *M. comosum* (L.) Mill. [= *Hyacinthus comosus* L.], *M. neglectum* Guss. ex Ten. [= *Hyacinthus racemosus* L.], *M. tenuiflorum* Tausch., and a few species of *Bellevalia*, *Chionodoxa*, *Leopoldia* and *Ornithogalum*. It corresponds to results of the research concerning taxonomical relations inside the genus *Scilla* and relationships between this taxon and other representatives of the family *Hyacinthaceae* (Fischer, Fereszty and Kiss 1985; Speta 1998; Wetchnig and Pfosser 2003). Genus *Scilla* is most probably of polyphyletic origin and it is closely related to *Hyacinthoides* Med. [= *Endymion* Dumort.], *Hyacinthus* L., *Chionodoxa* Boiss., *Ornithogalum* L. and *Muscari* Miller. Especially members of *Scilla* and *Hyacinthus* are extensively intermixed with each other and the only true *Scilla* species consisting of a monophyletic clade are those in the Mediterranean region (Pfosser and Speta 1999).

Geophytic occurrence of *Scilla* species and a poor mycological knowledge of its native communities (*Dentario glandulosae-Fagetum* association) and anthropo-

genic habitats (Ławrynowicz, Bujakiewicz and Mułenko 2004) may be a cause for the lack of earlier reports about the occurrence of *P. scillae* in Poland. That species was not reported from other countries, where *Scilla* species were cultivated and never wild-growing, e.g. in France, Scandinavia (Farr et al. [n.d.]), in Great Britain (The checklist of fungi of the British Isles 2005), New Zealand (Anonymous 2001-2005) and in United States of America (Farr et al. 1989; Farr et al. [n.d.]). The confirmation of phytopathologists' interest in the genus *Scilla* in these countries is reflected in records of other fungi parasitising it, e.g. *Fusicladium scillae* (Deighton) U. Braun (Anonymous 2001-2005), *Pythium* sp., *Septoria scillae* West. ex Kickx f., *Urocystis scillae* (Cif.) Zundel (Farr et al. [n.d.]) and *Ustilago vaillantii* L. R. Tul. et C. Tul. (Vánky 1994).

CONCLUSIONS

The occurrence of *Puccinia scillae* has probably been overlooked in Poland until now. Possibly it results from the insufficient level of research focused on anthropogenic habitats. The presented data from neighbouring countries, especially the recent records of that species from Estonia, suggest that *Puccinia scillae* may currently spread in the Central-Eastern part of the continent. This kind of conclusion should however be confirmed by further records from other countries, where it has not been observed yet. The expansion of this species may be associated with a worse condition of its hosts growing beyond their natural habitats in locations exposed to greater anthropopressure.

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Puccinia scillae (Uredinales), gatunek nowy dla Polski

Streszczenie

W pracy przedstawiono charakterystykę morfologiczną oraz analizę rozmieszczenia w Europie nowego dla Polski gatunku grzyba rdzawnikowego porażającego uprawianą w celach dekoracyjnych cebulicę *Scilla siberica*. Dane z krajów ościennych wskazują, że gatunek ten mógł być dotąd w Polsce niezauważony, co może wynikać ze słabego stopnia zbadania siedlisk o charakterze antropogenicznym. Niewykluczone, że *Puccinia scillae* rozprzestrzenia się obecnie w północno-wschodniej Europie, co potwierdzałyby jego ostatnie notowania z Estonii.