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Sphaerotheca parietariae (*Erysiphales, Ascomycota*), a new powdery mildew fungus in Europe

Abstract

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A new record of powdery mildew fungi, *Sphaerotheca parietariae* (Erysiphales, Ascomycota), is reported from the Ukraine for the first time. This species is new for the Mediterranean region and Europe. The fungus was recorded on a new host, *Parietaria officinalis* L. (*Urticaceae*), in the Crimean mountains (northeast of the Mediterranean region). The authors conclude that this species may occur in central and southern Europe and in the Mediterranean part of Asia.

Introduction

Sphaerotheca parietariae (Schwarzman) U. Braun et Simonyan (Erysiphales, Ascomycota) was originally described as *S. macularis* fo. *parietariae* Schwarzman from Uzbekistan, where it was found in 1949 on *Parietaria serbica* Panc. (syn. *P. chersonensis* (Lang et Szov.) Doerfl.; Urticaceae) (Vasyagina & al. 1961; Gaponenko & al. 1983). In addition, in the first of these monographs the authors mentioned another specimen, collected on the same host plant species in Kazakhstan. Later, in 1980, the species was recorded on *P. micrantha* Ledeb. in Armenia (Simonyan 1994).

Studies of the Armenian specimens gave Braun and Simonyan (Braun 1985) reason to raise this form to the species level. It differs from similar *S. macularis* s.str. in several characters, such as the appearance of mycelium (always effuse, not maculate), long and intensively colored appendages, the host range, and distribution. For a long time this species was not recorded, which confirmed Simonyan's (1994) opinion on its rareness. In Braun's (1995) monograph *S. parietariae* is not reported for Europe.

In a recent paper by Braun and Takamatsu (2000), the genus *Sphaerotheca* Lév. was included in *Podosphaera* Kunze. Thus, the authors proposed a new combination, *Podosphaera parietariae* (Schwarzman) U. Braun et S. Takamatsu. Since we only partly accept the major changes in the system of Erysiphales proposed by Braun and Takamatsu (2000), and disagree with the unification of these genera, we thus prefer to use the name *S. parietariae* for the fungus on *Parietaria* L. species.

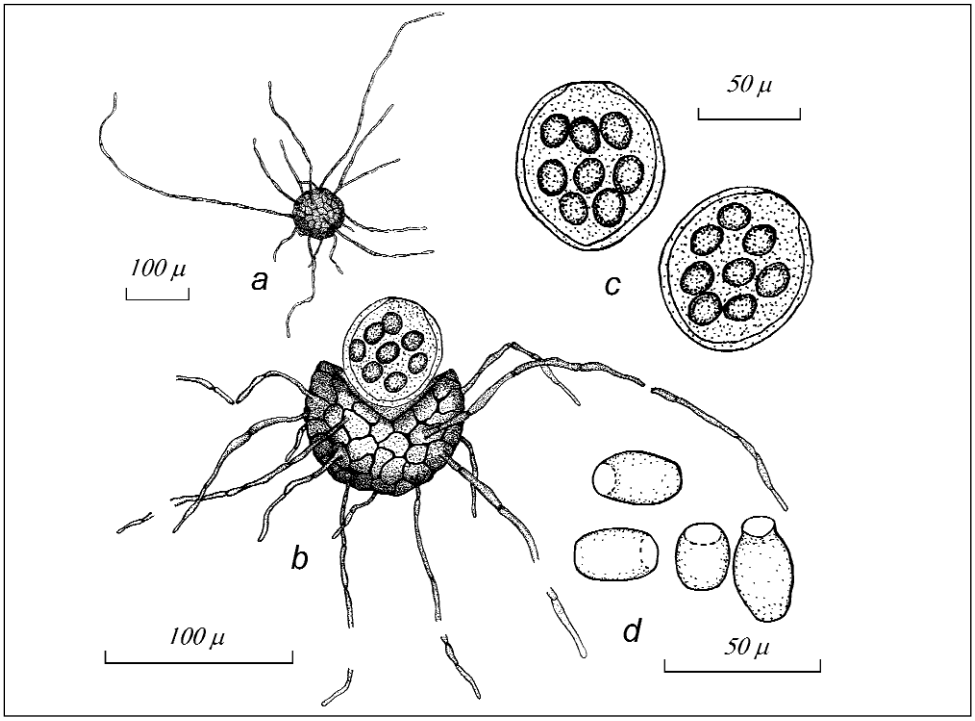

Fig. 1. *Sphaerotheca parietariae* (Schwarzman) U. Braun et Simonyan from *Parietaria officinalis* L.: a-b. cleistothecia; c. asci; d. conidia.

Materials and methods

On 13 June 2001, during our investigations of flora in the ancient cave town of Mangup-Kale and its immediate outskirts (Ukraine, Autonomous Republic of Crimea, Bakhchysarai region, village Ternivka) close to the foot of the vertical precipice of Mangup-Kale Mount, V. Heluta discovered a plant community composed only of *P. officinalis* L.

Plants grew in conditions of considerable shading and moisture. In several places of this community, pestholes of powdery mildew were found. In their central parts both the anamorph and the teleomorph developed, whereas in peripheral parts only the anamorph was found. On the more illuminated and less wet table-like top of the mountain and in the town of Bakhchysarai (Crimea) all examined plants of *P. officinalis* were free of the fungus.

Results

As a result of our research, we have identified collected specimens as *S. parietariae* on a new host plant. The illustrations of ascomata, asci, and conidia of this species are given below (Fig. 1). Its characteristic features are based on specimens collected in Crimea. It should be noted that our material has a slightly more developed mycelium, smaller cleis-

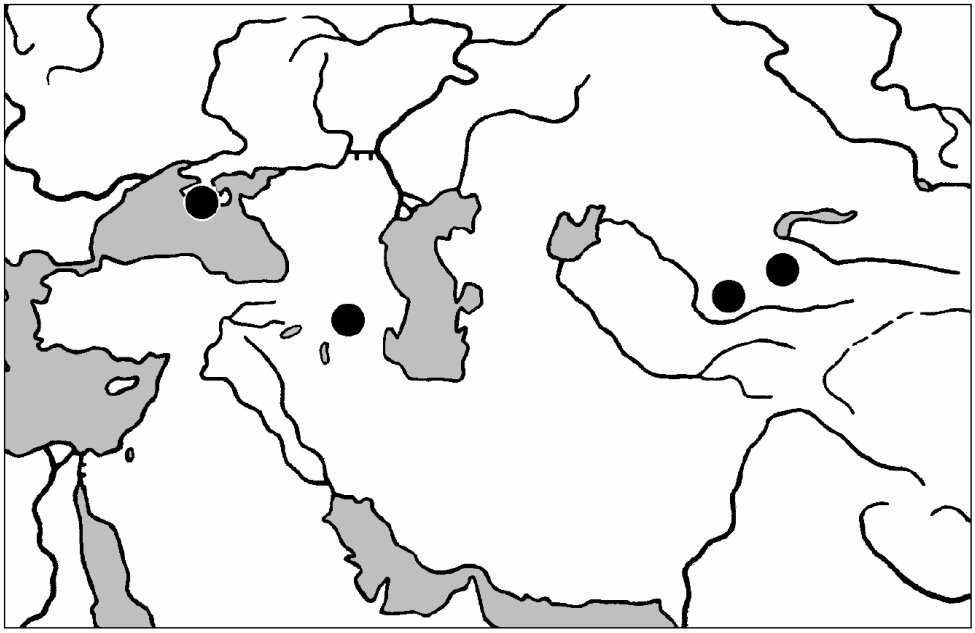

Fig. 2. Distribution of *Sphaerotheca parietariae* in Eurasia.

tothecia, and larger asci and ascospores than in the Armenian and Kazakhstanian specimens.

***Sphaerotheca parietariae* (Schwarzman) U. Braun et Simonyan in Braun, Zbl. Microbiol. 140: 161-170 (1985)**

Syn.: S*phaerotheca macularis* fo. *parietariae* Schwarzman in Vasyagina & al. Flora sporovykh rastenii Kazakhstana 3: 71 (1961). - *Podosphaera parietariae* (Schwarzman) U. Braun et S. Takamatsu, Schlechtendalia **4**: 30 (2000).

Mycelium on leaves, petioles, stems and calyces of host plants, thin, well conspicuous only on the upper site of leaves. Anamorph is *Euoidium*. Conidia ellipsoid, rarely doliform, 22.5–29.0 x 16.0–19.0 µm, occasionally long, cylindrical, 40-43 x 13.5-14.5 µm. Cleistothecia on all green parts of the host, numerous, often completely covering the leaf surface forming brown layer, globe-shaped, brown to deep-brown, 66-96 µm in diam. Cells of peridium small, obscure, 5.5–16 µm in diam. Appendages numerous, about 20, arising from the basal as well as the upper half of the cleistothecium, interlacing with each other or with appendages of other cleisthotecia and forming brown felt, flexuous in the basal part and then mainly straight, setiform, simple, occasionally irregularly branched, septate, with distance between septa 13.5–40 µm, smooth, thin-walled, coloured, brown below paler above, 4-6 µm wide, very long, 80-440 µm. One ascus in cleistothecium, broadly ellipsoid almost spherical, not stalked, thick-walled with wall 2.7-4 µm and thinning near the upper pole, 70.0–88.0 x 65.5–75.0 µm, (5-7) 8-spored. Spores ellipsoid or obtuse ovoid, 17.0–28.5 x 12.0–27.0 µm.

Discussion and conclusion

Data in the literature (Vasyagina & al. 1961; Gaponenko & al. 1983; Braun 1985, 1987; Simonyan 1994) attest that *S. parietariae* was known only from three localities in Central Asia and Transcaucasia (Fig. 2). Our find is the fourth, so it seems to really be a very rare powdery mildew fungus. In addition to *S. parietariae*, other species of Erysiphales on representatives of *Parietaria* L. are known: *Golovinomyces greeneanus* (U. Braun) Heluta (USA), *G. cichoraceorum* (DC.) Heluta (Azerbaijan, Great Britain, Germany), *Leveillula taurica* (Lév.) G. Arnaud (Israel, Italy), and *Oidium* sp. (Great Britain, Portugal, Romania) (Rayss,1940; Blumer 1967; de Sequeira 1981; Bontea 1985; Amano,1986; Braun 1987).

Information about *Oidium* sp. is very interesting because its specimens should be an anamorph of both representatives of the genus *Golovinomyces* (U. Braun) Heluta and *S. parietariae*. Thus, the species we collected in Crimea probably should be present in other European countries where representatives of the genus *Parietaria* occur. This fungus should be sought first of all in Romania, Portugal, France, and Italy, where *Oidium* sp. has been recorded on *Parietaria* spp. (de Sequeira 1981; Bontea 1985; Amano 1986).

The known geographical distribution of *S. parietariae* (Armenia, Kazakhstan, Uzbekistan, and Crimea) testifies to the fact that the relationship of this fungus to the ancient Mediterranean region originated in the place of the Tethys. It is a region with a warm and dry climate, but this fungus prefers shady and comparatively humid places, mainly in mountainous regions.

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References

Amano, K. 1986: Host range and geographical distribution of the powdery mildew fungi. — Tokyo.

Blumer, S. 1967: Echte Mehltaupilze (*Erysiphaceae*). Ein Bestimmungsbuch für die in Europa vorkommenden Arten. — Jena.

Bontea, V. 1985: Ciuperci parazite si saprofite din România. Vol. 1. — Bucureşti.

Braun, U. 1985: Miscellaneous notes on the genus *Sphaerotheca*. I. Zbl. — Microbiol. **140:** 161-170.

— 1987: A monograph of the Erysiphales (powdery mildews). — Berlin; Stuttgart.

— 1995: The powdery mildews (Erysiphales) of Europe. — Jena; Stuttgart; New York.

— & Takamatsu, S. 2000: Phylogeny of *Erysiphe*, *Microsphaera*, *Uncinula* (Erysipheae), and *Cystotheca, Podosphaera, Sphaerotheca* (Cystotheceae) inferred from rDNA ITS sequences: Some taxonomic consequences. — Schlechtendalia **4**: 1-33.

de Sequeira, M.P.S. 1981: Erysiphaceae Lusitaniae VII. — Agronomia Lusitana **41**(2): 93-112.

Gaponenko, N.I., Akhmedova, F.G. & Ramazanova, S.S. 1983: Fungal flora of Uzbekistan. Vol. 1. Powdery mildew fungi. — Tashkent: FAN.

Rayss, T. 1940: Nouvelle contribution a l'etude de la mycoflore de Palestine (Deuxième partie). — Palestine Journal of Botany, Jerusalem Series **1**(4): 313-335.

Simonyan, S.A. 1994: Mycoflora of Armenia. Vol. 7. Powdery mildew fungi (*Erysiphales*). — Yerevan.

Vasyagina, M.P., Kuznetzova, M.N., Pisareva, M.F., et Schwarzman, S.R. 1961: Flora of non-vascular plants of Kazakhstan. Vol. 3. — Powdery mildew fungi. Alma-Ata: AS Kaz. SSR.

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