
***Podosphaera salatai* sp. nov. (*Erysiphales*) from Georgia**

Vasyl P. Heluta^{1*}, Uwe Braun² and Mirian N. Gvritishvili³

¹M.G. Kholodny Institute of Botany of the National Academy of Sciences of Ukraine, 2 Tereshchenkivska St., Kyiv, 01601, Ukraine

²Martin-Luther-Universität, Institut für Geobotanik und Botanischer Garten, Herbarium, Neuwerk 21 D-06099 Halle, Germany

³Tbilisi Botanical Garden of the Georgian Academy of Sciences, 1 Botanikuri St., Tbilisi, 380005, Georgia

Heluta, V.P., Braun, U. and Gvritishvili, M.N. (2005). *Podosphaera salatai* sp. nov. (*Erysiphales*) from Georgia. *Fungal Diversity* 18: 89-94.

Podosphaera salatai sp. nov., a new powdery mildew species on *Cerasus incana* (*Rosaceae*) in Georgia (Transcaucasia), is described, illustrated, compared with allied species and discussed.

Key words: *Erysiphales*, Georgia, new species, *Podosphaera salatai*.

Introduction

Close phylogenetic relationships of species belonging to the genera *Podosphaera* Kunze and *Sphaerotheca* Lév. have been discussed (Neger, 1901; Jaczevskiy, 1927; Blumer, 1933; Golovin, 1947; Heluta, 1981; Braun, 1987). Recently, these genera were merged in one genus *Podosphaera* emend. (Braun and Takamatsu, 2000), based on results of molecular investigations (Saenz and Taylor, 1999; Takamatsu *et al.*, 2000), which was separated into the sections *Podosphaera* and *Sphaerotheca* (Lév.) U. Braun & N. Shishkoff. Section *Podosphaera* (= genus *Podosphaera* s.str.) contains 13 species (Braun, 1987; Chen and Yao, 1989). However, one of these species, *P. corni* Bunkina, must be excluded, since the type specimen of this species, re-examined by V.P. Heluta, proved to be a mixed collection composed of leaves of *Swida alba* (L.) Opiz without any trace of a powdery mildew teleomorph, and *Spiraea* sp. with anamorph and teleomorph of *P. clandestina* (Wallr.) Lév. Hence, *P. corni* has to be reduced to synonymy with *P. clandestina*. All previously known species of section *Podosphaera* are morphologically easily distinguishable from species of section *Sphaerotheca* by having ascomatal appendages that are stiff, equatorial or even apical, and are well differentiated from the mycelium. Species with ascoma appendages that are intermediate between *Podosphaera*

*Corresponding author: V.P. Heluta; e-mail: vhel@symbiosis.kiev.ua

and *Sphaerotheca* have not yet been reported. The new species described in this paper is a first example of a species intermediate between the two sections.

Materials and methods

Collections of the new species have been examined by standard light microscopy (Pereval, Carl Zeiss, Jena and Olympus, BX 50, Hamburg, Germany). The SEM micrographs have been prepared by means of a JSM-35 (Japan) SEM microscope. The specimens examined are deposited at HAL, KW and TGM (abbreviations according to Holmgren *et al.*, 1990).

Results and discussion

Podosphaera salatai Heluta, U. Braun & Gvrit., **sp. nov.** (Figs. 1, 2)

Etymology: epithet dedicated to the Polish mycologist Bogusław Salata, who monographed the *Erysiphales* of Poland.

Differt a *P. clandestina* appendicibus basalibus, longioribus (ad 400 µm longis) et flexuosis-tortuosis.

Holotype (designated here): Georgia, in the vicinity of Tbilisi, Delisi, on *Cerasus incana* (Pall.) Spach (*Rosaceae*), 18 November 2001, M.N. Gvritishvili (KW). Isotypus: TGM (Georgian State Museum).

Additional material examined (paratypes): Georgia, in the vicinity of Tbilisi, Delisi, river Gorge, on *C. incana*, 13 October 1990 and 13 November 1996, M.N. Gvritishvili; Delisi, 5 November 1997, 20 October 2002, 15 October 2003, 27 November 2003 and 7 December 2003, M.N. Gvritishvili; near Kustba lake, 17 November 1991, M.N. Gvritishvili (HAL, KW, TGM).

Mycelium mainly hypophyllous, covered by the plexus of trichomes of the host plant, occasionally epiphyllous, then white, forming indistinct, thin patches. *Ascomata* usually hypophyllous, numerous, more or less immersed in the dense tomentum of the host leaves, more or less regularly dispersed, rarely epiphyllous and gregarious, 88-103 µm diam., subglobose, base somewhat concave; *peridial cells* irregularly shaped, 9-21 × 9-16 µm; *appendages* not very numerous, about 10, arising from the lower half of the ascoma or even from the base, horizontally spread, more or less appressed to the leaf surface, two to four times as long as the ascoma diameter (about 100-400 µm), 5-8 µm wide throughout, somewhat attenuated towards the apex, base geniculate-flexuous, up to three quarters of the appendages pigmented, brown, thin-walled, but base thick-walled (up to 0.8 µm), 3-4(-5)-septate, faintly verruculose, apex (0-)1-4(-5) times dichotomously branched, primary branches long (13-26 µm), straight to slightly curved, secondary branched 9-19 µm in length, ultimate branchlets dense, compact; with a single *ascus*, ellipsoid, 86-101 × 67-77 µm, sessile, thick-walled (3.2-4 µm), with thin-walled apical and

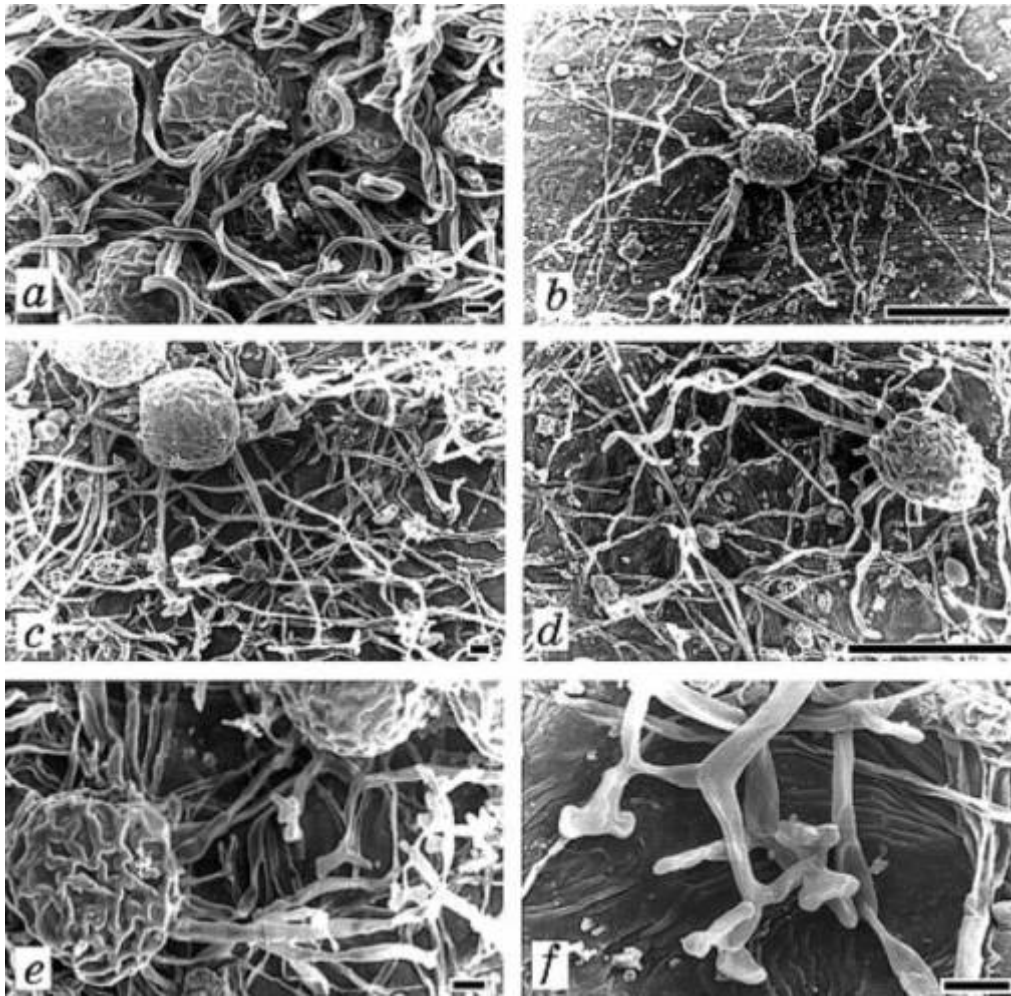


Fig. 1. *Podosphaera salatai* sp. nov. on *Cerasus incana*, SEM micrographs. **a.** Ascoma on the lower side of a leaf. **b-e.** Ascomata on the upper side. **f.** Apical part of an appendage. Bars: a, c, e, f = 10 μm ; b, d = 100 μm .

basal oculi, 13-19 μm diam., 8-spored; *ascospores* ellipsoid, 22-37 \times 13-17 μm .

Podosphaera salatai differs from all other species of *Podosphaera* sect. *Podosphaera* in having primitive, sometimes even mycelioid, tortuous basal appendages. The appendages arise from the peridium of the ascoma, initially turn towards the leaf surface, bend and run horizontally (parallel to the surface), some may rise up, but the branched apices remain below the level of the ascoma diameter. Appendages of ascomata formed on the lower surface of leaves are fully immersed in the plexus of trichomes of the host plant. Such

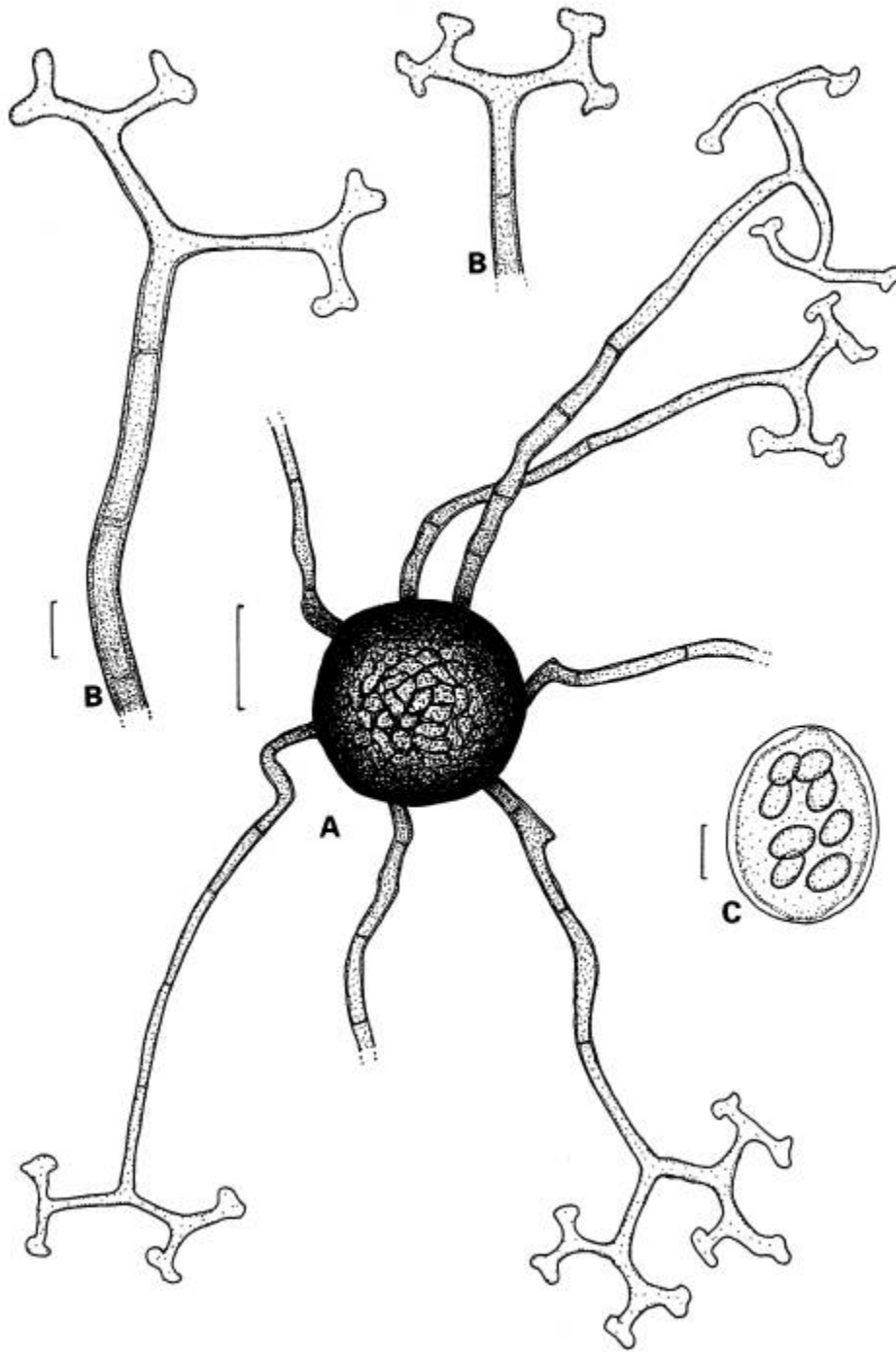


Fig. 2. *Podosphaera salatai* sp. nov. on *Cerasus incana*, drawing based on type material. **A.** Ascoma. **B.** Appendages. **C.** Ascus. Bars: A = 50 μ m; B = 10 μ m; C = 20 μ m.

appendages easily break off during the preparation of specimens for microscopic examinations, so that this fungus may be confused with *Sphaerotheca* species (Gvritishvili *et al.*, 2000). However, if ascomata are removed using an adhesive tape, one can find appendages typical for this species among plant trichomes. They are often more tortuous with less developed apices than those from the upper leaf surface. *Podosphaera salatai* is the morphologically least advanced species among the known species of *Podosphaera* sect. *Podosphaera*, which is probably phylogenetically related to other representatives of this section occurring on host plants of the *Rosaceae*, above all to *P. clandestina*, which differs in having stiff, seta-like, equatorial or even apical appendages, which are horizontally spread, often curved upwards or they are even erect.

Acknowledgements

We thank Mrs. S. Voityuk (Taras Shevchenko Kyiv National University) and Dr. O. Krakhmalny (M.G. Kholodny Institute of Botany of the National Academy of Sciences of Ukraine) for their kind assistance in preparing SEM micrographs, and Dr S. Mosyakin (M.G. Kholodny Institute of Botany) for the correction of the manuscript.

References

- Blumer, S. (1933). Die Erysiphaceen Mitteleuropas mit besonderer Berücksichtigung der Schweiz. Beiträge zur Kryptogamenflora der Schweiz 7: 1-483.
- Braun, U. (1987). A monograph of the Erysiphales (powdery mildews). Nova Hedwigia, Beiheft 89: 1-700.
- Braun, U. and Takamatsu, S. (2000). Phylogeny of *Erysiphe*, *Microsphaera*, *Uncinula* (*Erysiphaceae*), and *Cystotheca*, *Podosphaera*, *Sphaerotheca* (*Cystothecaceae*) inferred from rDNA ITS sequences – some taxonomic consequences. Schlechtendalia 4: 1-33.
- Chen, Z.-X. and Yao, Y.-J. (1989). A new species of *Podosphaera* (Erysiphaceae). Acta Mycologica Sinica 8: 256-258.
- Golovin, P.N. (1947). Evoliutsiya i filogeniya muchnisto-rosiannykh gribov. Byulleten' Sredne-Aziatskogo Gosudarstvenno Universiteta 25: 109-125.
- Gvritishvili, M., Nakhutsrishvili, I., Svanidze, T., Murvanishvili, I. and Dekanoidze, N. (2000). Fungal biodiversity of Georgia. In: *Biological and Landscape Diversity of Georgia*. Tbilisi. WWF Georgia Country Office: 97-114.
- Heluta, V.P. (1981). Mesto roda *Podosphaera* Kunze v skheme vozmozhnykh filogeneticheskikh vzaimosvyazey rodov muchnisto-rosiannykh gribov. Novosti Sistematiki Vysshikh i Nizshikh Rastenii 1979 (1980): 200-209.
- Holmgren, P.K., Holmgren, N.H. and Barbett, L.C. (1990). *Index herbariorum, Part. 1: The Herbaria of the World*. 8th edn. Regnum vegetabile 120: 1-163.
- Jaczevskiy, A.A. (1927). Karmanny opredelitel' gribov. Vypusk vtoroy. Muchnisto-rosiannye griby. Leningrad.
- Neger, F.W. (1901). Beiträge zur Biologie der Erysipheen. Flora 88: 333-370.

- Saenz, G.S. and Taylor, J.W. (1999). Phylogeny of the Erysiphales (powdery mildews) inferred from internal transcribed spacer ribosomal DNA sequences. *Canadian Journal of Botany* 77: 150-168.
- Takamatsu, S., Hirata, T. and Sato, Y. (2000). A parasitic transition from trees to herbs occurred at least twice in tribe Cystothecae (Erysiphaceae): evidence from nuclear ribosomal DNA. *Mycological Research* 104: 1304-1311.

(Received 8 June 2004; accepted 25 November 2004)