

First report of *Septoria* infection on *Cyclamen fatrense*

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Abstract: *Septoria cyclaminis* (Dothideomycetes) was found on leaves of *Cyclamen fatrense* (Primulaceae) as a new species both for the West Carpathians and Slovak mycobiota. Its description and illustration are given and its distribution is discussed.

Keywords: fungal biodiversity, Dothideomycetes, Mitosporic fungi, Slovakia.

Introduction

Anamorphic genus *Septoria* SACC. includes plant parasitic fungi causing diseases on a great number of cultivated and wild plants. They most frequently attack the leaves, seldom the flowers of plants, evoking the appearance of necrotic spots. These damages affect the vitality and biological productivity of the attacked plants. The *Septoria* species are plant pathogens, parasitizing on economically important cereals, grasses, vegetables, ornamental plants, medicinal plants, forest trees and shrubs and wild plants.

Cyclamen fatrense HALDA & SOJÁK is a perennial plant, subendemic in Veľká Fatra Mts., occurring in carbonate substrate of Veľká Fatra and Starohorské vrchy Mts., Slovakia. During our mycological research of Veľká Fatra Mts., among other fungi a *Septoria* parasitizing on the living leaves of the plants was

collected. This collection represents the first record of the fungus in Slovakia and in the West Carpathians.

Materials and methods

The infected host plants were collected in natural habitats, taken to the laboratory, air dried, and examined using standard light microscopy. Thin cross sections were made from infected leaves and observed in a drop of 50% lactic acid with lactophenol cotton blue. Observations were carried out using the Amplival microscope fitted with microphotographic equipment.

The fungus was isolated from pycnidia (pycnospores) on leaves of *Cyclamen fatrense* and cultivated in vitro. Pycnospores were placed under aseptic conditions on 2% potato dextrose agar (PDA) plates supplemented with 0.5 g L⁻¹ of streptomycin sulphate. Plates were incubated at 25 ± 1°C in dark for 14 days.

Pathogenicity was confirmed by wound-inoculating leaves of three plants of *C. fatrense* with a conidial suspension (ca. 2 × 10⁵ conidia/ml). Three non-inoculated plants served as a control. Inoculated plants were incubated at 15-17 °C day/night temperatures, misted for 6 days and during the next days spot symptoms on leaves were observed.

Description of the fungus

In natural habits the infected leaves have distinct round spots. The spots were circular to subcircular, 2-10 mm in diameter, grayish brown to yellowish brown with darker border zone (Fig. 1A, 1B.). On the surface of these spots were scattered conidiomata, which were pycnidial, amphigenous, mostly epiphyllous, dark brown to blackish, semi-immersed, 100-180 µm diam., and ostiolate. Conidia were subhyaline, filiform, subtruncate at the base, 18-28 x 1-1.5 µm (n=50), indistinctly uniseptate, rarely 2-3-septate, guttulate (Fig. 2). Based on the morphological characteristics the pathogen was identified as *Septoria cyclaminis* DURIEU & MONT. (TETEREVNIKOVA-BABAYAN 1987; VANEV ET AL., 1997; PRIEST, 2006).

Single conidial isolates were cultured on potato dextrose agar (Fig. 3). Mycelium of isolates of *Septoria cyclaminis* were slow growing and the upper side of colony was woolly, dark to light grey coloured. Black mycelial hyphae make thick and black stromatic mycelium. Pycnidial conidiomata with conidia were formed in cultures after at least two weeks of incubation. Pathogenicity of the fungus was confirmed by reinoculating the leaves of three seedlings with a conidial suspension (ca. 2×10⁵ conidia/ml). The plants were maintained in a glasshouse at 20/15° C and misted for the first 6 days. After 14 days, leaf spots, similar to those observed on naturally infected plants, started to develop on the leaves of inoculated plants (Fig. 4). *Septoria cyclaminis* was reisolated from leaf lesions of in vitro inoculated plants.

Locations of the fungus and their ecological characteristics

The natural fungus locations are situated on carbonate substrate in the forests at the 450-1270 m s.l. with vegetation belonging to *Carici albae-Fagetum* MOORE 1952 association. The fungus infection process started during the rainy period in autumn and disease process continued and developed during the period with the thick snow cover. After snow cover lost out in March and April, differentiated spots with fungus conidiomata on living leaves of *Cyclamen fatrense* were found.

The infected plants were observed in plant populations on all parts of studied territory. Up to 20 percent of plant populations are infected with the fungus. During the vegetative period the number of infected leaves decreased as a consequence of natural dying of old overwintering leaves. Despite fact that *Septoria* infections quantitative dominates comparing with phytophagous damages, do not represent serious danger for *Cyclamen fatrense*.

Specimens examined:

– on *Cyclamen fatrense* HALDA & SOJÁK - Veľká Fatra Mts. – Liptovské Revúce village, Suchá dolina valley, locations 268 b, c, 28 April 2006; – Suchá dolina valley, on the right side of valley 9 May 2006; – Starohorské vrchy Mts., Staré Hory, Veľká Vápenná dolina valley, locations 167, 168, 26 April 2006; – Motyčky village, in the forest near the road, 7 March 2008, leg. P. Turis, det. K. Bacigálová (SAV).

Septoria cyclaminis has been previously recorded on *Cyclamen purpurascens* MILL. (syn. *C. europaeum* L.) in Algeria, Austria, Czech Republic, Italy, Poland, Romania, Switzerland, and Yugoslavia. Moreover, the fungus was found on *C. hederifolium* AITON in Algeria, Bulgaria, Italy and Turkey, on *C. indicum* L. and *C. repandum* SM. in Italy, on *C. persicum* MILL. var. *persicum* forma *persicum* (syn. *C. latifolium* SM.) and *C. rohlfianum* ASCH. in Algeria, Iran, Jordan and Libya (FARR & ROSSMAN, 2009). According to our knowledge this is the first record of this fungus species on the host plant *C. fatrense* not only in the West Carpathian mountain region but also in the world wide importance. Representative specimens and an isolate are kept at the Mycological Herbarium of Institute of Botany, Slovak Academy of Sciences, Bratislava (SAV). A duplicate isolate (acc. ≠ KACC43938) is preserved in Korean Agricultural Culture Collection, Rural Development Administration (KACC).

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Fig. 1 A-B. Typical symptoms of *Septoria cyclaminis* on the leaf of *Cyclamen fatrense*. A – leaf surface, B – lower side of the leaf.



Fig. 2. Conidia of *Septoria cyclaminis* (bar = 10 μ m).



Fig. 3. Four weeks' old colony of *Septoria cyclaminis* on PDA.



Fig. 4. Leaf spots of *Cyclamen fatrense* artificially inoculated with *Septoria cyclaminis*.

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