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Pathogenicity of *Hendersonia salsolae* on *Salsola kali* ssp. *ruthenica*

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A pathogen identified, as *Hendersonia salsolae* Moesz was isolated from foliar and stem lesions on Russian thistle [*Salsola kali* ssp. *ruthenica* (Iljin) Soó] seedlings collected in Szarkás, Hungary in 1996. Based on our field surveys and completed pathogenicity tests, it was established that this fungus is pathogenic on *Salsola kali* ssp. *ruthenica.* This is the first report about pathogenicity of *H. salsolae* and satisfaction of Koch's postulates.

Key words: *Hendersonia salsolae, Salsola* spp., pathogenicity, weed biocontrol.

In June 1996, we observed severe disease and death of young *Salsola kali* ssp. *ruthenica* (Iljin) Soó plants in Szarkás. The causal agent was identified as *Hendersonia salsolae,* a fungus that was first described by Gusztav Moesz (Moesz, 1926). Morphology of our fungus was similar to the original specimen deposited by Moesz in 1926 (Nº 14, 422, Herbarium of the Hungarian Natural History Museum, Budapest). Moesz described this fungus from leaves of *Salsola kali,* but its pathogenicity has not been tested up to now. The objective of this study was to determine pathogenicity and prove Koch's postulates.

Materials and Methods

Collection and isolation

During the early summer of 1996, seedlings of *Salsola kali* ssp. *ruthenica,* showing symptoms of dieback and lesions on stems and leaves were collected from Russian thistle-infected areas of Szarkás, Hungary.

Stem and leaf tissue pieces of plants with lesions were placed in a dew chamber for 24 hours and incubated under laboratory conditions. Conidia of *H. salsolae* produced in pycnidia on lesions were transferred with a sterile needle to Malt-Czapek agar (pH=7.0). Plant pieces of the remaining specimens of *Salsola* that did not produce fungal fructifications were surface sterilized with 0.5% NaOCl for 30 sec. Small pieces of tissue were excised, transferred to Petri dishes containing Malt-Czapek agar, and incubated at 21 ºC. Colonies growing from the tissue pieces were subcultured onto Malt-Czapek agar after 2 days. Specimens were deposited in the Herbarium of the Hungarian Natural History Museum, Budapest as Nº BP 91057.

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Pathogenicity test

Pathogenicity of *Hendersonia salsolae* was tested on *S. kali* ssp. *ruthenica* from Hungary. Test cultures were incubated on plates containing Malt-Czapek agar at 21 ºC, with 12 hours photoperiod for 12 days. Conidia were washed from the plates with sterile distilled water. Russian thistle seedlings (4- to 6-leaf stage, two/pot) and six-week-old potted plants (two/pot) were inoculated by spraying conidial suspension of *H. salsolae* 3×10^5 spores/ml to runoff with a hand-held atomizer. Control plants were sprayed with distilled water. After inoculation plants were covered with plastic bags to provide a moist period and placed in a dark growth chamber for 24 hour at 24 ºC. Plastic bags then were removed and plants were transferred to greenhouse at 18–28 ºC in natural light. There were 10 pots with seedlings and 5 pots with six-week-old plants per treatment. Treatments were replicated twice.

Results

Symptomatology

During our survey at Szarkás in June, 1996, we observed great number of dying seedlings. Symptoms on collected young plants were characterized by 0.5–4.0 mm diam., elongated, brown, necrotic spots on stems and leaves. Spots were surrounded with chlorotic or sometimes red halos. Pycnidia submerged in the necrotic tissue were observed on dead stems and leaves (Figs 1, 2). Similar symptoms developed on seedlings and young plants in pathogenicity tests.

Pathogenicity

Wilting was observed two weeks after inoculation of six-week-old *S. kali* plants. Leaves were discolored, became brownish with small necrotic lesions, and plants died three weeks after inoculation. Great number of pycnidia developed both on necrotic stems and leaves (Figs 3, 4). In the test with seedlings elongated, brown necrotic spots appeared on the hypocotyl six days after inoculation. Formation of pycnidia began at this time. Stem necrosis and constriction caused death of all seedlings in this test within ten days of incubation.

Discussion

Salsola species are introduced weed plants in the United States. In order to find pathogenic fungi for biological control, cooperative research has been carried out in the Plant Protection Institute of the Hungarian Academy of Sciences and in the USDA-ARS, Foreign Disease-Weed Science Research Unit. Within the framework of this project *Hendersonia salsolae* was recorded first time in the world after Moesz's publication, and in our tests, it was shown to be pathogenic. Moesz, who described the fungus, did not test

it for pathogenicity. This is the first report demonstrating that *H. salsolae* is a necrotrophic pathogen on *Salsola kali* ssp. *ruthenica.* Isolate of this fungus from Szarkás, Hungary will be evaluated in the United States for use in biological control of Russian thistle.

Literature

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