Diseases Caused by Fungi and Fungus-Like Organisms

Occurrence of Root and Stem Rot Caused by *Rhizoctonia solani* AG-4 HGI on *Torenia fournieri* in China

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Torenia fournieri (wishbone flower) is widely cultivated for ornamental and medicinal use in southern China. In July 2021, severe root and stem rot of *T. fournieri* was observed in approximately 70% of the 3,000 plants grown in an ornamental plant nursery under natural conditions in Guangzhou, Guangdong Province, China. Lesions on the roots and basal stems were water-soaked and dark brown. In late infection, the whole plant wilted and died. Eventually, infected plants lose their ornamental and economic value. Fifteen diseased samples were collected, and diseased tissues (4 × 4 mm) were surface sterilized in 1% NaOCl for 45 s, rinsed with sterile water, dried, and incubated for 3 days on potato dextrose agar (PDA) medium at 25°C in the dark. Pure cultures were obtained by transferring hyphal tips to new plates of PDA and incubated at 25°C for 5 days. A fungus was consistently isolated from symptomatic root and stem samples (100% isolation rate). The colonies on PDA medium were initially white and turned light brown with age, and no sclerotia was present after 15 days. Hyphae were 3.78 to 11.10 µm wide, and had a constriction at the base of hyphal branches, septa near the branch, and right-angled branching. Multinucleate hyphal cells (3 to 12 nuclei per cell) were determined by 4',6-diamidino-2-phenylindole staining (Yang et al. 2013).

These characteristics matched those described for *Rhizoctonia solani* (Sneh et al. 1991). A representative isolate LZ1 was chosen for molecular identification; the internal transcribed spacer (ITS) region was amplified using the primers ITS1/ITS4, and the resulting sequence (633 bp) was deposited in GenBank (accession no. MZ798228). A BLASTn search of the ITS sequence exhibited 99% identity with that of *R. solani* AG-4 HGI (MK430998). The phylogenetic analysis (neighbor-joining method and 1,000 bootstrap values) showed LZ1 was clearly assigned to the group of *R. solani* AG-4 HGI. For pathogenicity testing, 10 healthy *T. fournieri* plants (approximately 18-cm high) were planted into plastic pots filled with sterilized soil. Inoculum of *R. solani* was produced by adding a PDA agar plug (5 mm in diameter) from a 6-day-old colony to a flask with 150 ml of potato dextrose broth (PDB) that was shaken at 150 rpm at 25°C for 7 days, and poured evenly into the sterilized soil (50 ml per pot). Sterile PDB was poured on another 10 plants as controls. All the inoculated plants were placed in a greenhouse at 25°C with 70 to 90% humidity. After 14 days, rot symptoms of the roots and basal part of stems similar to those in the nursery were observed on all inoculated plants, while no visible symptoms were observed on the controls. We reisolated the fungal pathogen from the inoculated plants and identified it as *R. solani* AG-4 HGI by microscopy and the molecular characteristics mentioned above. *R. solani* AG-4 HGI was previously reported causing *Impatiens walleriana* stem rot and muskmelon fruit rot in Liaoning, China (Sun et al. 2015). To the best of our knowledge, this is the first report of *R. solani* AG-4 HGI causing root and stem rot on *T. fournieri* in China as well as worldwide. This finding expands the host range known for *R. solani* AG-4 HGI and will assist in developing effective control strategies for this disease to minimize losses.

References:

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