Diseases Caused by Fungi and Fungus-Like Organisms

First Report of Root Rot of *Polygonatum odoratum* Caused by *Fusarium acuminatum* in China

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Polygonatum odoratum (Mill.) Druce is used in traditional Chinese medicine and is also consumed as a vegetable. In July of 2020, a root rot was observed on *P. odoratum* in a commercial field located in Benxi city (41°23'32" N, 124°04'27" E), Liaoning province of China. About 35% of diseased plants in the field exhibited poor vigor, were stunted, and had yellow or brown leaves. Affected plants wilted and died. Roots of the plants were poorly developed, had brown lesions, and later rotted. To determine the causal agent, symptomatic roots with typical lesions were cut into small pieces, surface sterilized in 2% sodium hypochlorite (NaOCl) for 3 min, rinsed three times in sterile water, and plated onto potato dextrose agar (PDA) medium. After 5 days of incubation at 26°C, whitish-pink to red colonies growing from the root samples were observed and transferred to carnation leaf agar (CLA). Ten single conidia isolates obtained from the colonies on CLA were incubated at 26°C for 10 days. Abundant macroconidia were formed in sporodochia on CLA. Macroconidia were falcate, slender, distinctively curved in the bottom half of the apical cell, had 3 to 5 septa, and were 33.1 to 46.3 × 5.0 to 7.2 µm ($n = 50$). Chlamydospores formed in chains or single, measuring 13.8 to 14.5 µm in diameter. Microconidia were not observed on CLA. Morphologically, the isolates were identified as *Fusarium acuminatum* (Leslie and Summerell 2006). To confirm the species identity, the partial translation elongation factor 1 alpha (TEF1- α) gene and rDNA internal transcribed spacer (ITS) region of isolate YZ5-2 were amplified and

sequenced (O'Donnell et al. 2015; White et al. 1990). BLASTn analysis of both TEF sequence (MW423623) and ITS sequence (MW423626), revealed 100% (696/692 bp) and 99.64% (563/602 bp) sequence identity with *F. acuminatum* LC546967 and MF509746, respectively. Pathogenicity tests were carried out in the greenhouse. A conidial suspension (2×10^6 conidia per ml) of the isolate YZ5-2 was prepared from 7-day-old cultures grown in potato dextrose broth (PDB) on a shaker (140 rpm) at $26 \pm 1^\circ\text{C}$. Five 12-liter pots were filled with sterilized field soil and each pot was drenched with 300 ml of conidial suspension. Five control pots with sterilized field soil and 300 ml PDB were also included. Roots of 20 healthy *P. odoratum* plants were surface disinfected in 2% NaOCl for 3 min and rinsed with sterilized water. Prior to planting, 2 to 3 pinholes (1.5×1.0 mm) were made using a toothpick on the root surface of each plant, and they were then planted in each pot (two plants per pot). All 10 pots were maintained in a greenhouse at 22 to 26°C for 40 days. Plants grown in the pots inoculated with the conidial suspension were stunted, had yellowed leaves, and were wilted. The roots of the affected plants were rotted. Disease symptoms were similar to those observed in field. Noninoculated control plants had no symptoms. *F. acuminatum* was reisolated from inoculated plants and was identical to the original isolate. The experiment was repeated twice with similar results. To our knowledge, this is the first report of root rot of *P. odoratum* caused by *F. acuminatum* in China. The disease has since been observed on *P. odoratum* in fields in Liaoyang and Qingyuan cities in Liaoning Province of China, and it has become an important threat to *P. odoratum* production in China.

References:

- Leslie, J. F., and Summerell, B. A., eds. 2006. Page 122 in: The *Fusarium* Laboratory Manual. Blackwell Publishing, Ames, IA.
O'Donnell, K., et al. 2015. Phytoparasitica 43:583.
White, T. J., et al. 1990. Page 315 in: PCR Protocols: A Guide to Methods and Applications. Academic Press, San Diego, CA.

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