Diseases Caused by Fungi and Fungus-Like Organisms

First Report of Panicle Rot Caused by *Fusarium asiaticum* on Foxtail Millet in China

F.-X. Kong,¹ H.-J. Zhang,^{1†} Z. Liu,¹ G.-Q. Chen,¹ and J. Xu²

¹ Institute of Dry land Agriculture and Forestry, Liaoning Academy of Agricultural Sciences, Chaoyang 122000, China

² Institute of Plant Protection, Liaoning Academy of Agricultural Sciences, Shenyang 110161, China

Funding: This work was supported by the project of Liaoning millet breeding and cultivation (2019DD206731). Plant Dis. 106:1062, 2022; published online as <https://doi.org/10.1094/PDIS-04-21-0856-PDN>. Accepted for publication 2 September 2021.

Foxtail millet (*Setaria italica* [L.] P. Beauv.) is one of the most important nutritious food crops. It is used for wine and health products in China. In August of 2019, panicle rot symptoms with up to 85% of panicles infected were observed on foxtail millet (cultivar Chaogu 8) in a commercial field located in Chaoyang city of Liaoning Province, China. Typical disease symptoms included brown spots on spikelets at early stages and brown-colored withering and rot of whole panicles at late stages, with the symptoms being more severe at the tip of the panicles. Under high humidity conditions, pink or salmon-colored molds developed on panicles. Symptomatic spikelet pieces were surface-disinfested with 70% ethanol for 1 min followed by 2% NaOCl for 3 min, rinsed with sterilized water three times, and placed on potato dextrose agar (PDA) medium at 25°C. After 5 days, colonies turned pink to dark red with fluffy aerial mycelium and pigmentation with age. Ten pure cultures were obtained from single conidia of mycelium grown on carnation leaf agar (CLA) medium at 25°C under a 12-h light-dark cycle, using an inoculation needle under a stereomicroscope. Macroconidia were hyaline, falcate with foot cells, 3 to 5 septate, and 28.5 to 44.0 µm × 3.8 to 4.9 µm in size. Chlamydospores were globose to subglobose (5.4 to 13.8 µm). No microconidia were produced on CLA. Black, ostiolate, subglobose perithecia were formed on CLA after 1 month of incubation at 20°C under a 12-h light-dark cycle. Morphological characteristics of the fungus were in agreement with the

description of *Fusarium asiaticum* (Leslie and Summerell 2006; O'Donnell et al. 2004). To validate this identification, partial translation elongation factor 1 alpha (TEF1-a) gene, and rDNA internal transcribed spacer (ITS) region of five isolates were amplified and sequenced (O'Donnell et al. 2015; White et al. 1990). Identical sequences were obtained, and the sequence of one representative isolate (JGF-3) was submitted to GenBank. BLASTn analysis of both TEF sequence (MW685833) and ITS sequence (MW423687) revealed 100% sequence identity with *F. asiaticum* KT380120 and MT322117, respectively. Pathogenicity tests were conducted on cultivar Chaogu 8 of foxtail millet. Inoculum was prepared from the culture of JGF-3 incubated in 2% mung bean juice on a shaker (140 rpm) at 25°C for 48 h. Conidial suspension (5 × 10⁵ conidia per ml) was prepared and sprayed onto the panicles of 20 plants at the initial flowering stage and 20 additional plants that were sprayed with distilled water served as the noninoculated controls. Treated plants were covered with plastic bags for 48 h and maintained at a greenhouse with day and night temperatures of 26 and 24°C, respectively. Two weeks after inoculation, all inoculated panicles exhibited symptoms similar to the symptoms observed in the field. No symptoms were observed in the noninoculated control plants. The experiment was repeated twice with similar results. *F. asiaticum* was reisolated from the inoculated plants and its morphological characteristics matched those of the original isolates; the fungus was not reisolated from the noninoculated plants. To our knowledge, this is the first report of *F. asiaticum* causing panicle rot of foxtail millet in China. To date, the disease has been observed to be present in Fuxin and Tieling cities of Liaoning Province. Panicle rot can become an important disease in foxtail millet in China.

References:

- Leslie, J. F., and Summerell, B. A., eds. 2006. Page 176 in: The *Fusarium* Laboratory Manual. Blackwell Publishing, Ames, IA.
O'Donnell, K., et al. 2015. Phytoparasitica 43:583.
O'Donnell, K., et al. 2004. Fungal Genet. Biol. 41:600.
White, T. J., et al. 1990. Page 315 in: PCR Protocols: A Guide to Methods and Applications. Academic Press, San Diego, CA.

The author(s) declare no conflict of interest.

e-Xtra

Keywords: fungi, field crops, etiology, *Fusarium asiaticum*, foxtail millet

[†]Indicates the corresponding author.
H.-J. Zhang; ymming123@126.com