Diseases Caused by Fungi and Fungus-Like Organisms

First Report of Seedling Blight of Maize Caused by *Fusarium asiaticum* in Northeast China

H.-Y. Dong,¹ P.-W. Qin,^{1,†} Z.-G. Gao,^{1,†} J. Xu,² and X.-D. Xu²

¹ College of Plant Protection, Shenyang Agricultural University, Shenyang 110866, China

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

Plant Dis. 105:1206, 2021; published online as <https://doi.org/10.1094/PDIS-08-20-1727-PDN>. Accepted for publication 9 November 2020.

Maize (*Zea mays* L.) is an important food and feed crop in northeast of China. In 2019, maize seedling blight with an incidence of up to 25% was found at the field in Fushun city of Liaoning Province. Typical symptoms of seedlings were yellowing, thinning, wilting, and dying. The leaves gradually became yellow from the base of the plant to the top. The root system was poorly developed. The primary roots were usually discolored and rotted. Faintly pink or puce-colored mold was found on seeds of the rotted seedlings. Symptomatic roots of diseased seedling were collected and surface disinfested with 70% ethanol for 1 min and then in 2% NaClO for 3 min, rinsed with sterilized water three times, cut into small pieces, and placed on potato dextrose agar (PDA) medium for 5 days at 25°C. Colonies on PDA were pink to dark red with fluffy aerial mycelium and red to aubergine pigmentation with age. The causal agent was transferred to carnation leaf agar medium and incubated at 25°C under a 12-h light/dark cycle. Twelve pure cultures were obtained from single conidia with an inoculation needle under stereomicroscope. The harvested macroconidia were hyaline, falcate with single foot cells, three to five septate, and 28.2 to 43.5 × 3.7 to 4.9 µm. Chlamydospores were globose to subglobose (5 to 13.5 µm). No microconidia were found. The perithecia were black, ostiolate, and subglobose. Asci were hyaline, clavate, measuring 58.1 to 83.9 × 7.7 to 11.9 µm, and contained eight ascospores. Morphological characters of the pathogen agreed well with descriptions of *Fusarium asiaticum* (Leslie and Summerell 2006;

O'Donnell et al. 2004). To confirm the identity, partial translation elongation factor 1 alpha (TEF1-a) gene and rDNA internal transcribed spacer (ITS) region of isolate MSBL-4 were amplified and sequenced (O'Donnell et al. 2015; White et al. 1990). BLASTn analysis of both the TEF1-a sequence (MT330257) and ITS sequence (MT322117) revealed 100% sequence identity with *F. asiaticum* KT380116 and KX527878, respectively. Isolate MSBL-4 was NIV chemotype as determined by Tri13F/DON, Tri13NIV/R (Chandler et al. 2003) assays. Pathogenicity studies were conducted on maize hybrid 'Liaodan 565'. Inoculum of *F. asiaticum* was prepared from the culture of MSBL-4 incubated in 2% mung bean juice on a shaker (150 rpm) at 25°C for 48 h. The 5-liter pots (10 pots) were filled with sterilized field soil, and five of them were mixed with conidial suspension (300 ml in each pot) at 2 × 10⁵ conidia/ml. Ten kernels per pot were surface disinfested in 2% sodium hypochlorite for 5 min, rinsed with sterilized water, and planted. Five pots were inoculated, and another five uninoculated pots served as controls. The pots were maintained in a greenhouse at 22 to 26°C for 40 days. Leaves of the plants in inoculated pots became yellowed, and the roots became discolored or necrotic rotted at 4 weeks after seedling emergence. All characteristics of the disease were similar to those observed in field. Noninoculated control plants had no symptoms. *F. asiaticum* was reisolated from inoculated plants and was identical to the original isolate. The experiment was repeated once with similar results. To our knowledge, this is the first report of seedling blight caused by *F. asiaticum* on maize in northeast China, and it has posed a threat to maize production in China.

References:

- Chandler, E. A., et al. 2003. *Physiol. Mol. Plant Pathol.* 62:355.
Leslie, J. F., and Summerell, B. A. 2006. Page 176 in: *The Fusarium Laboratory Manual*. Blackwell Publishing, Ames, IA.
O'Donnell, K., et al. 2004. *Fungal Genet. Biol.* 41:600.
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.

The author(s) declare no conflict of interest.

e-Xtra

Keywords: maize, seedling blight, *Fusarium asiaticum*

[†]Indicates the corresponding authors.

E-mail: 290703349@qq.com (P.-W. Q.) and Z.-G. Gao; 261150591@qq.com