Diseases Caused by Fungi and Fungus-Like Organisms

Occurrence of *Dactylonectria torresensis* Causing Root Rot on *Astragalus membranaceus* in Northeastern China

Y. M. Guan, S. N. Zhang, Y. Y. Ma, Y. Zhang,[†] and Y. Y. Zhang[†]

Institute of Special Wild Economic Animal and Plant Science, Chinese Academy of Agricultural Sciences, Changchun, 130112, Jilin, China

Funding: This study was supported by the National Key R&D Program of China (2018YFD0201107), China Agriculture Research System (CARS-21), and Central Public-interest Scientific Institution Basal Research Foundation of Chinese Academy of Agricultural Sciences (No. 1610342020004, 1610342019018). Plant Dis. 105:1219, 2021; published online as <https://doi.org/10.1094/PDIS-02-20-0278-PDN>. Accepted for publication 27 November 2020.

Astragalus membranaceus Bunge (Fabaceae) is a perennial medicinal herb widely cultivated in China. In June 2018, root rot was observed on 2-year-old *A. membranaceus* plants in Chaoyangshan town (northeastern China). In a 40-ha field, over 40% of the plants exhibited root rot, and the infected area ranged from 10 to 70% of the roots. The roots first exhibited circular or irregular brown, sunken and necrotic lesions, and finally multiple lesions coalesced. The infected root surface was destroyed, showing rusty and dry rot. Symptoms were concentrated in the main roots (Carlucci et al. 2017). The aboveground parts of infected plants did not initially show symptoms but gradually wilted; 7.6% of the plants died when root decay became severe. Infected roots were not used for processing and were not marketable. Ten infected roots were collected from May to October 2018 from the above location. The diseased root tissue was cut into 25-mm³ pieces, immersed in 1% NaOCl for 2 min, rinsed three times with sterile water, and placed on water agar in Petri plates. After 15 days of incubation at 20°C, 11 single-spore isolates were obtained. Isolates HQ1 and HQ2 were randomly selected for morphological and molecular identification. Colonies grown for 10 days produced yellow, cottony to felty aerial mycelium on potato dextrose agar. Conidiophores originating laterally or terminally from the mycelium were solitary to loosely aggregated and unbranched or sparsely branched. Macroconidia predominated and

were cylindrical, with a tendency to gradually widen toward the tip; one to three septate; and 20.2 to 31.0 × 3.0 to 6.7 μm (*n* = 100). Microconidia had mostly zero to one septate and 8.6 to 16.7 × 1.9 to 5.1 μm (*n* = 100). Chlamydospores were rare, but occasional chlamydospore chains were observed. The isolates were tentatively identified as *Dactylonectria torresensis* (Cabral et al. 2012a). Further confirmation of the two isolates was conducted by DNA sequencing of the internal transcribed spacer (ITS, GenBank accession nos. MN558983 and MN558984), β-tubulin (*TUB*, MN561692 and MN561693), histone 3 (*HIS3*, MN561694 and MN561695), and translation elongation factor (*TEF*, MN561696 and MN561697) genes (Cabral et al. 2012b). These sequences had 99 to 100% match with *D. torresensis* (JF735362 for ITS, JF735492 for *TUB*, JF735681 for *HIS3*, and JF735870 for *TEF*). Phylogenetic trees based on analyses of a concatenated alignment of all loci grouped these isolates into the *D. torresensis* clade. The same two isolates were tested for pathogenicity. Healthy 2-year-old plants were taken from the field, and their roots were disinfected with 75% alcohol for 3 min, rinsed with sterile water three times, immersed in a 1 × 10⁵/ml spore suspension or sterile water (control) for 10 min, transferred to a tray filled with sterile sand, and placed in a greenhouse (12-h photoperiod, 25°C). Twelve plants grown in three pots were used for each isolate, and the same number of plants were inoculated as a control. This experiment was repeated three times. After 1 month, inoculated plant roots showed the same symptoms as those observed in the field, whereas the controls remained symptomless and no pathogen was recovered. The same fungus was reisolated from all the infected plants and confirmed by sequencing all of the above genes. This is the first report of *D. torresensis* causing root rot in *A. membranaceus* in China. The occurrence of this disease poses a threat, and management strategies need to be developed.

References:

- Cabral, A., et al. 2012a. Fungal Biol. 116:62.
- Cabral, A., et al. 2012b. Mycol. Prog. 11:655.
- Carlucci, A., et al. 2017. Phytopathol. Mediterr. 56:10.

The author(s) declare no conflict of interest.

e-Xtra

Keywords: *Astragalus membranaceus*, *Dactylonectria torresensis*, root rot

[†]Indicates the corresponding authors.

E-mail: Y. Zhang; zhangyue@caas.cn and Y. Y. Zhang; zyy1966999@yeah.net