Diseases Caused by Fungi and Fungus-Like Organisms

Duohua Huangjing (*Polygonatum cyrtoneura*) Seedling Basal Stem Rot Caused by *Fusarium redolens* in China

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Duohua huangjing (*Polygonatum cyrtoneura* Hua), an herbal medicine, is mostly planted in several provinces in China. In April 2020, a severe disease causing about 40% seedling loss was found in the Huangjing seedling base in Shiyan city, Hubei Province. The symptoms included softening and decay of the roots and stem bases, a progressive yellowing and wilting of leaves, and finally complete rotting. Small pieces of symptomatic stems (0.5 cm in length) and leaves (0.5 × 0.5 cm in size) were surface sterilized with 75% ethanol for 30 s, followed by 0.1% HgCl₂ for 1 min, rinsed three times with sterile water, and then dried with sterilized absorbent paper. The sections were placed on potato dextrose agar (PDA) medium containing 10 µg/ml of ampicillin and incubated at 25°C in the dark. After 3 days incubation, eight isolates with the same colony morphology were subcultured and purified by hyphal tip isolation. Macroconidia were sickle-shaped, 15.8 to 32.3 × 3.1 to 5.6 µm (*n* = 25), and three to five septate. Microconidia were oval or kidney-shaped, 5.2 to 11.4 × 2.0 to 3.2 µm (*n* = 25), and zero to one septate. To confirm the identity of the pathogen, molecular identification was performed

with strain HJCD1. Following DNA extraction, PCR was performed using the TSINGKE 2×T5 Direct PCR Mix kit. Target areas of amplification were the internal transcribed spacer (ITS) and translation elongation factor 1α (TEF-1α) using ITS1/4 (White et al. 1990) and EF1/EF2 (Taylor et al. 2016), respectively. Following BLAST searches and phylogenetic reconstruction, the ITS region (GenBank MW485770.1) showed 99% identity with those of *Fusarium redolens* in GenBank (KU350713.1) and the TEF-1α (GenBank MW503930.1) showed 100% identity with *F. redolens* in GenBank (MK922537.1). Pathogenicity tests were performed to fulfill Koch's postulates. Huangjing seedlings were rinsed with sterile water, wiped clean with sterile absorbent paper, and transferred to a tray covered with wet filter paper to maintain high humidity. The surfaces of leaves and basal stems were inoculated with mycelial plugs of *F. redolens* HJCD1. Controls were inoculated with sterile PDA plugs. Inoculated seedlings were sealed with plastic wrap, and then cultivated in a 25°C growth chamber with 16 h of light per day. The pathogen-inoculated plants exhibited etiolation and typical wilt symptoms after 4 days, whereas no symptoms were observed in the control plants. *F. redolens* was reisolated from the infected tissues, and colony morphology and ITS sequences of reisolates were the same as that of HJCD1. The pathogen has been reported previously in American ginseng in China (Fan et al. 2021), lentil in Pakistan (Rafique et al. 2020), and wild rocket in the UK (Taylor et al. 2019). However, to the best of our knowledge, this is the first report of *F. redolens* causing seedling basal rot on Duohua huangjing in China.

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