Diseases Caused by Fungi and Fungus-Like Organisms

First Report of *Fusarium oxysporum* Causing Fusarium Dieback on *Archidendron clypearia* in China

M. L. Yin,^{1,†} H. X. Chen,¹ Y. Z. He,¹ X. Gao,¹ S. B. Huang,³ and J. Wang²

¹ Guangdong Province Key Laboratory for Innovative Development and Utilization of Forest Plant Germplasm, College of Forestry and Landscape Architecture, South China Agricultural University, Guangzhou, Guangdong 510000, China

² Guangdong Province Key Laboratory of Microbial Signals and Disease Control, and Integrative Microbiology Research Center, South China Agricultural University, Guangzhou, Guangdong 510000, China

³ Guangdong Eco-Engineering Polytechnic, Guangzhou, Guangdong 510000, China

Funding: Funding was provided by National Natural Science Foundation of China (31600025), Natural Science Foundation of Guangdong Province (2017A030313138 and 2020A1515010486), and Special Fund for Forestry Science and Technology Innovation of Guangdong Province (2019Kjcx02). Plant Dis. 105:500, 2021; published online as <https://doi.org/10.1094/PDIS-04-20-0892-PDN>. Accepted for publication 4 September 2020.

Archidendron clypearia (Jack) Benth. (common name: monkey-pod) (Fabaceae) is a perennial arbor tree used in traditional medicine to treat heat toxicity symptoms in China. The distribution of *A. clypearia* mainly includes Guangdong, Fujian, and Zhejiang Provinces in China and other countries in Southeast Asia. In 2018, ~30 monkey-pod trees were observed showing typical dieback symptoms in a commercial plantation (114°36'09.401"E, 22°58'38.553"N) of Huizhou, Guangdong Province. White cylindrical sawdust exudates from exit holes of ambrosia beetles were observed on trunks and main branches of diseased trees. Discoloration was seen around the exit holes by splitting the wood. Samples of symptomatic and asymptomatic tissues of branches, trunks, and roots were collected from 11 trees. The samples were disinfected with NaOCl solution containing 50 g/liter of chlorine for 60 s, rinsed three times with sterile distilled water, and placed on PDA at 25°C for 14 days. Beetles from exit holes of the infected tissues were identified as *Xyleborus affinis* by their cytochrome c oxidase I sequences (GenBank: MT921005 and 06) and morphological features. After 2-week incubation, 37 single-spore isolates were obtained (31 from galleries of branches and trunks; six from mycangia and body surfaces of beetles). Colonies on PDA were *Fusarium*-like, pale orange, floccose with abundant aerial mycelia, and growing at 3.0 to 4.5 mm/day at 25°C. Conidiophores from the aerial mycelia often had single phialides. Microconidia were hyaline, zero to one septate, (4 to) 6 to 12 (to 16) × 2 to 4 μm ($n = 100$). Macroconidia were hyaline, ellipsoidal to

falcate, two to four septate, (10 to) 25 to 45 (to 50) × 3 to 6 μm ($n = 100$), with basal foot cells shaped to pointed and apical cells tapered and curved. Two representative isolates (CYML367 and 368) were used for molecular identification and pathogenicity tests. The ITS, β-tubulin (TUB), and translation elongation factor-1α (TEF 1-α) regions were amplified with primers ITS1F/ITS4 (White et al. 1990), Bt2a/Bt2b (Glass and Donaldson 1995), and EF1-728F (Carbone and Kohn 1999)/EF-2 (O'Donnell et al. 1998), respectively. DNA extraction and PCR conditions followed Yin et al. (2019). Amplified fragments were sequenced. BLAST results demonstrated that fragment sequences of ITS (468 bp), TEF 1-α (616 bp), and TUB (295 bp) of CYML367 and 368 had 100% similarity to correspondence sequences from the *Fusarium oxysporum* Schlecht. emend. Snyder & Hansen species complex (MT032694, JF740777, MN451171, respectively). Sequences generated from this study were deposited into GenBank as MN826824 and 25 (ITS), MN839680 and 81 (TUB), and MN839682 and 83 (TEF 1-α). Pathogenicity tests were conducted on 2-year-old seedlings (60 to 70 cm height, 1.0 to 1.2 cm in diameter) of *A. clypearia* with the representative isolates. Ten seedlings were inoculated with each isolate. The stem surface was disinfected with 75% ethanol for 30 s, rinsed with sterilized water, wounded by removing part of the phloem and xylem, and placed with a mycelial plug (5-mm diameter) from the margin of a 7-day-old PDA plate with mycelia facing the cambium. Inoculated wounds were wrapped with medical sterile gauze to prevent desiccation and contamination. Control plants were inoculated with noncolonized PDA plugs. Inoculated and control plants were incubated at 25°C, 50% humidity, 12 h light/12 h dark cycle. After 3 weeks, all inoculated plants displayed *Fusarium* dieback symptoms similar to the original diseased trees. The average lesion lengths (1.2 to 1.7 cm) caused by two isolates were all significantly longer than the wounds in the negative controls ($P < 0.05$). The same fungus was reisolated from the symptomatic plants, fulfilling Koch's postulates. Further studies should be conducted on the potential vector association, transmission route, and management strategies of this pathogen on *A. clypearia* in growing regions of China. This is the first report of *F. oxysporum* causing dieback on *A. clypearia* in China.

References:

- Carbone, I., and Kohn, L. M. 1999. Mycologia 91:553.
- Glass, N. L., and Donaldson, G. C. 1995. Appl. Environ. Microbiol. 61:1323.
- O'Donnell, K., et al. 1998. PNAS 95:2044.
- White, T. J., et al. 1990. Page 315 in: PCR Protocols: A Guide to Methods and Applications. Academic Press, San Diego, CA.
- Yin, M. L., et al. 2019. MycoKeys 60:93.

The author(s) declare no conflict of interest.

e-Xtra

Keywords: fungi, monkey-pod dieback, *Fusarium oxysporum*

[†]Indicates the corresponding author.

E-mail: M. L. Yin; mingliang.yin@scau.edu.cn