Diseases Caused by Fungi and Fungus-Like Organisms

First Report of *Fusarium oxysporum* Causing Wilt on Coriander in China

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Coriander (*Coriandrum sativum* L.), which belongs to the family Apiaceae, is a medicinal and aromatic plant. In China, coriander is widely cultivated in several parts as a vegetable crop. During August 2019 to June 2020, wilting symptoms were observed on coriander (cultivar ‘Tiegán’) in a commercial plantation, with disease incidence of approximately 25 to 40% in Xiajiawang village (118.88°E, 35.46°N) of Linyi city, Shandong province, China. Symptoms included wilting and leaf yellowing, plant stunting, root rot, and vascular discoloration of the stem bases and roots. A total of eight symptomatic plants were uprooted and collected from three fields. To determine the cause of the disease, symptomatic root tissues were excised, surface disinfected with 75% ethanol for 30 s, followed by three washes with sterile distilled water, and then placed on potato dextrose agar (PDA) and incubated at 28°C for 6 days. In total, 10 cultures were obtained and purified by single-spore subcultures on PDA for morphological identification. The morphology of multiple colonies was consistent and originally white, later becoming light to dark purple in color with abundant aerial hyphae. Macroconidia were hyaline and falcate, straight to slightly curved, three to four septate, 27.86 to 34.23 × 4.07 to 6.13 μm (*n* = 30), with apical cells curved and basal cells foot shaped. Microconidia were hyaline, oval or ellipsoid, zero to one septate, with a flat base, measuring 5.67 to 9.37 × 3.66 to 5.40 μm (*n* = 30). These morphological characteristics resembled those of *Fusarium oxysporum* (Leslie and

Summerell 2006). Genomic DNA was extracted from fungal mycelium using the Plant Genomic DNA Kit (Tiangen, China). The nuclear ribosomal internal transcribed spacer (ITS), translation elongation factor 1-α (TEF-1α), and mitochondrial small subunit (mtSSU) genes were amplified with primer pairs ITS1/ITS4 (White et al. 1990), EF1Ha/EF2Tb (O’Donnell et al. 1998), and NMS1a/NMS2b (Li et al. 1994). The resulting ITS (550-bp), TEF1-α (681-bp), and mtSSU (692-bp) sequences of isolate QC20091601 were deposited in GenBank (accession nos. MW900439, MW692008, and MW711738, respectively). BLAST analysis demonstrated 100% identities to the ITS, TEF-1α, and mtSSU sequences of *F. oxysporum* (MN856370.1, MN507110.1, and MN386808.1), respectively. According to the morphological and molecular identification, the fungus was identified as *F. oxysporum*. In the pathogenicity test, healthy coriander plants (cv. Tiegán) at the four-true-leaf stage were inoculated by dipping the roots into a conidial suspension of 1 × 10⁷ conidia/ml for 10 min. Plants dipped in sterile distilled water served as controls. All treated plants were placed in a greenhouse maintained at temperature of 30°C and 80% relative humidity. Ten days later, inoculated plants developed typical symptoms of leaf yellowing, wilting, and vascular discoloration, which were identical to those observed in the fields, whereas the control plants remained healthy. *F. oxysporum* was reisolated from the symptomatic roots, and its identity was confirmed by polymerase chain reaction with the primers described above, fulfilling Koch’s postulates. To our knowledge, this is the first report of *F. oxysporum* as a pathogen on coriander in China. *F. oxysporum* is a destructive plant pathogen with an unusually broad host range and worldwide distribution, so prevention and control measures should be taken in advance.

References:

- Leslie, J. F., and Summerell, B. A. 2006. The *Fusarium* Laboratory Manual, 1st Ed. Blackwell, Oxford, U.K.
- Li, K. N., et al. 1994. Appl. Environ. Microbiol. 60:4324.
- O’Donnell, K., et al. 1998. Fungal Genet. Biol. 23:57.
- White, T. J., et al. 1990. Page 315 in: PCR Protocols: A Guide to Methods and Applications. Academic Press, San Diego, CA.

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