Diseases Caused by Fungi and Fungus-Like Organisms

First Report of Damping-Off on *Cucumis melo* Caused by *Pythium irregulare* in South Korea

Mi-Jeong Park,[†] Chang-Gi Back, and Jong-Han Park

Horticultural and Herbal Crop Environment Division, National Institute of Horticultural and Herbal Science, Rural Development Administration, Wanju 55365, Republic of Korea

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Muskmelons (*Cucumis melo* L.) are among the most popular cucurbits worldwide and are cultivated in Korea for their sweet and juicy taste. In April 2018, wilting and damping-off symptoms were observed in melon seedlings planted in a greenhouse located in Jeonju, South Korea (35°52'37.7"N, 127°05'10.6"E). Seven days after planting, approximately 10% of the 10,000 seedlings at the two-true-leaf stage were wilted, and brown, water-soaked lesions were observed on stems and roots at or below soil level in wet soil. Plants in advanced stages of this disease wilted completely, damped off, and died. Sections (10 mm²) from 10 diseased stems were surface disinfected with 1% sodium hypochlorite for 30 s, followed by 70% ethanol for 30 s, and rinsed in sterilized distilled water for 1 min. Each section was placed on water agar medium. A small block of agar containing a single hyphal tip of the fungus was taken from the margin of the colony on water agar under the microscope and transferred to new medium. Pure fungal cultures with same growth pattern were obtained from all the sections. A representative culture sample was deposited in the Korean Agricultural Culture Collection (accession no. KACC 48924). On potato dextrose agar (PDA), colonies were white and cottony with a rosette pattern. The isolate grew between 5 and 35°C, with an optimum range of 25 to 30°C, and fully colonized a PDA plate in 3 days. The main hyphae were 2 to 5 µm in width. Hyphal swellings were globose to subglobose, or irregular, intercalary, or terminal, and 10 to 20 µm in diameter. Oogonia were globose, terminal, or intercalary, and 15 to 20 µm in diameter. Antheridia were one to two per oogonium and were mostly monoclinalous, sometimes diclinalous. Oospores were globose, mostly aplerotic, sometimes plerotic, and 15 to 19 µm in diameter. On the basis of this morphological

data, the isolate was tentatively identified as *Pythium irregulare* Buisman (Van der Plaats-Niterink 1981). For molecular identification of the isolate, genomic DNA was extracted from the mycelial mats, and the ITS rDNA and *cox2* gene regions were amplified using primers ITS1/ITS4 (White et al. 1990) and Cox2-F/Cox2-RC4 (Choi et al. 2015), respectively. Sequences from this isolate have been submitted to GenBank with accession numbers MN955406 and MN953048. NCBI BLAST searches showed 99% identity to *P. irregulare* CBS 250.28 (ex-neotype culture) in both ITS rDNA (AY598702, 944/946 base pairs) and *cox2* gene (GU071760, 552/556 base pairs) sequences. A pathogenicity test of the isolate was performed on 4-week-old muskmelon seedlings (Earl's Talent cultivar). The underground portions of each plant were inoculated with hyphal suspensions of the isolate, which were poured into each pot. Plants treated with sterile water served as controls. After inoculation, plants were maintained in a glass greenhouse at 25°C. The soil in each pot was continuously kept moist. Five days after inoculation, inoculated seedlings showed characteristic symptoms of damping-off disease. Infected seedlings wilted, and water-soaked lesions appeared on the lower stems, near the soil line. The symptoms observed in this pathogenicity test were similar to those observed in the greenhouse. Control plants displayed no symptoms. The pathogenicity test was repeated twice. The same organism was reisolated from inoculated plants, confirming Koch's postulates. *P. irregulare* is known to have a broad host range, including cucurbits (Farr and Rossman 2020). Occurrences of disease caused by *P. irregulare* on melons have been previously recorded in regions of North America, including the United States and Canada. To our knowledge, this is the first report of damping-off caused by *P. irregulare* on melons in Korea. The pathogen presents a potential threat to South Korean melon seedling production.

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[†]Indicates the corresponding author.
E-mail: mijpark@korea.kr (M.J.P.)