Diseases Caused by Fungi and Fungus-Like Organisms

First Report of *Colletotrichum tropicale* Causing Anthracnose on Common Fig in Taiwan

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Ficus carica L., known as common fig, is one of the most profitable fruit crops in Taiwan. The fruit is harvested for a high-value market. Common fig can be eaten fresh or dried and processed to make different food products. In September 2015, an anthracnose-like disease was widely observed on common fig fruit planted in an orchard in Lukang Township (24°04'36" N, 120°27'15" E) in Changhua County, central Taiwan. Symptoms were sunken, water-soaked lesions covered with salmon-colored spore masses and were observed on all stages of fruit, especially when the fruit was ripe. Four fungal isolates were collected from four diseased fruit of different plants in the same orchard. Conidia were spread on 2% water agar, and a single conidium was separated by a hand-made glass needle. Fungal isolates were grown on potato dextrose agar (PDA) at 24 to 28°C with diffuse light. All four strains produced white, aerial, and cottony mycelia covered with abundant salmon-colored conidial masses on PDA. The conidia were hyaline, single celled, round cylindrical on both ends, and thin walled, and the contents were guttulate. The conidia were 15.4 (18.5 to 13.1) × 4.73 (5.8 to 3.6) μm (average [max. to min.]; length/width ratio = 3.25, *n* = 40). DNA was isolated from the representative isolate FC1 and used for amplification of partial sequences of the internal transcribed spacer (ITS), glyceraldehyde-3-phosphate dehydrogenase (GAPDH), actin (ACT), β-tubulin 2 (TUB2), manganese-superoxide dismutase (SOD2), calmodulin (CAL), chitin synthase 1 (CHS-1) (Weir et al. 2012), and the intergenic region of the *apn2* and *MAT1-2-1* (*ApMat*) genes (Sharma et al. 2013). A BLAST search against

the NCBI database revealed that FC1 gene sequences (GenBank accession nos. MT192648 [ITS], MT155819 [GAPDH], MT199873 [ACT], MT199874 [TUB2], MT815916 [SOD2], MT815917 [CAL], MW684717 [CHS-1], and MT221652 [ApMat]) displayed 99.1, 98.2, 99.3, 99.6, 99.5, 100.0, 92.8, and 100.0% nucleotide identity to the respective gene sequences of *Colletotrichum tropicale* CBS 124949 (ICMP18653) (JX010264, JX010007, JX009489, JX010407, JX010329, JX009719, JX009870, and KC790728). Multilocus phylogenetic analysis performed with reference sequences showed that the isolate FC1 clustered with *C. tropicale* in accordance with BLAST results. A conidial suspension (1 × 10⁶ conidia/ml) prepared from FC1 isolate was inoculated by spraying onto detached, ripe, healthy, nonwounded, and surface-disinfected common fig fruit (cv. China, *n* = 4). Fruits sprayed with sterile water were used as a control. Fruits were kept in a moist chamber (>90% relative humidity, 24 to 28°C) for 24 h and then maintained in the lab for an additional 5 days. The inoculated fruit developed lesions similar to the disease symptoms in the orchard. No symptoms were observed on fruit treated with water. *C. tropicale* was reisolated from symptomatic fruits and had similar morphological characteristics to FC1 isolate, thus fulfilling Koch's postulates. The experiment was repeated once showing similar results. The FC1 isolate of *C. tropicale* with the identification number BCRC FU31436 has been deposited at the Taiwan Bioresource Collection and Research Center. This fungus had previously been found on lotus and mango in Taiwan (Chen and Kirschner 2018; Wu et al. 2020), while the pathogenicity among the isolates from different origins is not yet known. To our knowledge, this is the first report of *C. tropicale* causing anthracnose on common fig fruit in Taiwan.

References:

- Chen, K.-L., and Kirschner, R. 2018. Mycol. Prog. 17:275.
- Sharma, G., et al. 2013. Fungal Divers. 61:117.
- Weir, B. S., et al. 2012. Stud. Mycol. 73:115.
- Wu, C.-J., et al. 2020. Eur. J. Plant Pathol. 157:1.

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