First Report of Phytophthta vexans Causing Root and Collar Rot of Kiwifruit in Turkey

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DISEASE NOTES

Kiwifruit (Actinidia delicosa L.) production in Turkey began at the end of the 21st century and is increasing each year. Kiwifruit is mostly grown in the Marmara and Black Sea regions of Turkey. A survey was carried out in 2015 in three provinces of Turkey (Bursa, Kocaeli, and Yalova) to determine the provenance of fungal pathogens on kiwifruit. In eight kiwi orchards of three provinces, root and collar rot symptoms with reddish brown to dark brown lesions were observed on 2 to 20% of the kiwi vines. Above ground symptoms consisted of leaf necrosis, leaf curling, and a general decline of the plants. Isolations were made by exciting pieces of symptomatic root and collar regions. They were surface sterilized by dipping the pieces in 1% sodium hypochlorite for about 1 to 2 min and placing them on 1/4 strength potato dextrose agar (PDA) modified with streptomycin sulfate and neomycin. A number of Phytophthora-like colonies with spherical zoospores, ovoid to globose oogoni, and slow growing whitish mycelium, were isolated. All isolates produced sporangia with prominent papilla. One representative isolate was selected for each province for species level identification by DNA sequencing. Genomic DNA was extracted from mycelium with CTAB protocol (Xu and Leslie 1996). Extracted DNA templates were amplified and sequenced for rDNA internal transcribed spacer (ITS), the large subunit (LSU) rDNA, and cytochrome oxidase 1 (coxI) gene regions using ITS4/ITS6 (White et al. 1990), NLI/NL4 (Baten et al. 2014), and FMBSmol/OomCOILevup (Robideau et al. 2011) primer sets, respectively. NCBI BLAST results showed 99 to 100% similarity with the ITS, LSU, and coxI sequences of Phytophthta vexans in GenBank (KT337684.1, AY598713.1, HQ655090.1, AB690604, AB690608, HQ708447, KT692908.1, and KT692907.1, respectively). The sequences were submitted to GenBank and given accession numbers KY024339, KY024340, and KY024341 for ITS-5.8S gene rDNA; KY024342, KY024343, and KY024344 for LSU rDNA; and KY473919, KY473920, and KY473921 for coxI gene regions, respectively. To complete Koch's postulates, a pathogenicity test was performed on 1-year-old potted kiwifruit (cv. Hayward) plants. The isolates were grown on 1/4 strength PDA at 26°C for 7 days prior to inoculation. A 5-mm cork borer was used to produce injury at the interface of roots and stems of kiwifruit plants followed by 5-mm mycelial agar plugs, and covered with Parafilm. Five plants were treated with PDA plugs as controls.
Necrotic lesion development was first observed after 18 days of inoculation, and at 40 days, over 65% of inoculated plants exhibited symptoms similar to those observed in the field. However, control plants remained healthy and asymptomatic. Reisolation of the pathogen from the inoculated plants confirmed that *P. vexans* is the causal agent of root and collar rot of kiwifruit. To our best knowledge, this is the first report of *P. vexans* causing root and collar rot of kiwifruit in Turkey, and this report will serve as the foundation of future studies aiming for further characterization and management of root and collar rot of kiwifruit.

**References:**


