Diseases Caused by Fungi and Fungus-Like Organisms

First Report of Verticillium Wilt on Eggplant in Almería Province, Spain

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In autumn 2018, diseased eggplant plants (*Solanum melongena* L., cvs. Thelma, Amalia, Monarca, and Cristal) were observed in various greenhouses in Almería province, Spain, where eggplant is a significant crop (around 2,500 ha). The first symptoms developed 30 to 45 days after transplanting, on 5 to 15% of plants. Affected plants showed wilting, leaf chlorosis, leaf necrosis, and occasionally death and brown vascular discoloration. A fungus with verticillate conidiophores was consistently isolated from the vascular area of plants on potato dextrose agar (PDA). Four single-spore isolates (Be123, Be211, Be4P18, and Be531) were preliminarily identified on PDA as *Verticillium dahliae* for having the back of the colony without yellow or orange pigmentation, by the production of single-celled conidia (2.18 to 6.61 × 1.46 to 4.95 µm; average 3.92 × 2.69 µm) and microsclerotia (Inderbitzin et al. 2011). Molecular identification was performed by sequencing amplicons of the internal transcribed spacer region (ITS) rDNA, using the universal primers ITS5 and ITS4. The 563-bp amplicon exhibited 99.78% for Be123 or 100% for Be211 (GenBank accession no. MN636451), Be4P18, and Be531 identity with the sequence of *V. dahliae* HQ207004 (Inderbitzin et al. 2011). The pathogenicity of these four isolates was tested on eggplant cultivar Cristal in 1-liter containers filled with vermiculite in three separate tests carried out

in spring, summer and autumn of 2019 in the same greenhouse with the following mean temperatures: 12.7 to (19.6) to 30.9°C, first; 18.5 to (23.8) to 30.8°C, second; and 18.5 to (23.0) to 29.7°C, third. In all experiments, the same number of noninoculated seedlings served as controls. The seeds were sown in 2-cm-diameter rockwool cylinders. Inoculations were carried out 36 to 45 days after sowing by root immersion in a suspension in distilled water containing 0.9×10^6 to 2.3×10^6 conidia/ml for 30 min. Experimental units consisted of four single-plant containers, and isolates were arranged in a randomized complete block with three replicates. Symptoms were scored at various time points by a 0 to 5 scale in which 0 = no symptoms and 5 = plant dead or all leaves necrotic. The first symptoms were observed at 14, 11, and 8 days after inoculation for the spring, summer, and autumn experiments, respectively. Disease severity of the four isolates ranged from 4.08 to 4.67 (first), 0.58 to 1.25 (second), and 1.92 to 2.50 (third) 35 days after inoculation. Due to partial remission of symptoms, the disease severity of the four isolates ranged from 1.92 to 4.08 (first), 0.33 to 0.50 (second), and 0.58 to 1.25 (third), 71, 48, and 71 days after inoculation, respectively. Symptomatic plants exhibited yellowness, leaf necrosis, and brown vascular discoloration. Only 5.6 to 11.1% of inoculated plants died. Control plants remained asymptomatic. As indicated by morphology, *V. dahliae* was consistently recovered from symptomatic plants in all experiments. In Spain, *V. dahliae* has been previously isolated from eggplant in Valencia (Bergal et al. 2010), but Koch's postulates were not performed for this finding. Although the disease has been speculated to affect eggplant crops in greenhouses in this region for over 70 years, to our knowledge, this is the first report of *V. dahliae* causing disease on *S. melongena* in Almería province, Spain.

References:

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Inderbitzin, P., et al. 2011. PLoS One 6:e28341.

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