Disease Note

Diseases Caused by Fungi and Fungus-Like Organisms

First Report of *Macrophomina phaseolina* Causing Charcoal Root Rot of Hebe (*Veronica cupressoides*, *V. ochracea*, and *V. pinguifolia*) in Oregon, U.S.A.

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Hebes (*Veronica* spp. in the section *Hebe*) are ornamental perennials and shrubs grown for their flowers and symmetric, evergreen leaves. They are uncommon in U.S. horticulture and are only produced by a few nurseries regionally (Oregon and Washington). In June, July, and August (2016 to 2021), stems on 1- to 5-year-old *Veronica cupressoides*, *V. ochracea*, and *V. pinguifolia* in five landscape plantings around Benton County, OR (17 plants total, locations 2 to 37 km apart), began to wilt, turn brown, and die. At least nine of the plants originated from a single nursery. Initially, just one or two stems per plant were affected, but eventually the entire plant died. Stem tissues were discolored brown to black internally, and the roots were dry and necrotic. Leaves turned brown and brittle but remained attached. Stems from each plant were disinfested in 0.5% NaOCl (1 min), rinsed in 70% ethanol, and dried (2 min). Pieces (5 mm²) were then plated onto 1/2 strength potato dextrose agar amended with streptomycin (50 mg/liter) and incubated in the dark at 20°C. Three to 5 days later, grayish-white cultures producing black microsclerotia (75 × 110 µm, *n* = 50) grew out of all samples. No spores were produced. All isolates were identified as *Macrophomina phaseolina* by morphology and by ≥99% homology (566 to 570/571 nt) to the internal transcribed spacer sequence (primers ITS1 and ITS4) from the type specimen (GenBank KF766195) (Hyde et al. 2014). Three representative sequences were deposited in GenBank (MZ726450 to MZ726452). Inoculum was prepared from these isolates by growing cultures in 250 ml of potato

dextrose broth on a shaker (125 rpm at 25°C). After 2 weeks, the broth was decanted, and the fungal biomass was air dried for 3 days at 25°C before grinding into a powder with a mortar and pestle. Three plants each of 6-month-old *V. ochracea* ‘James Stirling’, *V. cupressoides* ‘McKean’, and *V. pinguifolia* ‘Sutherlandii’ were inoculated with each isolate by rinsing the soil off the roots with tap water, trimming off 0.5 cm of the roots, and then soaking the root ball in a slurry of 1 g of dried inoculum in 500 ml of 0.2% water agar (WA) for 10 min (Gaige et al. 2010). Three plants of each species that were soaked in plain 0.2% WA served as negative controls. Afterward, plants were potted into soilless media (Metro-Mix 840, Sun Gro Horticulture, Agawam, MA) in 8.9-cm square pots and arranged in a completely randomized design in a greenhouse set at 28/24°C day/night. The experiment was conducted three times. One to 3 months later, inoculated plants began to turn yellow, wilt, and die, whereas all control plants remained healthy. The same pathogen was reisolated from 90% of the inoculated plants, but never from negative controls. *M. phaseolina* was reported on strawberry in southern Oregon in 2014 (Pscheidt and Ocamb 2021) but has not been reported from locations further north in the state where soil temperatures are cooler. It is unusual that *M. phaseolina* was isolated from an uncommon host at five different locations in an area of the state where the pathogen was not known to occur. Based on this, and on the number of infected plants originating from a single source, it seems likely that *M. phaseolina* was accidentally spread on contaminated plants produced by the nursery industry, where the warmer temperatures in production greenhouses would provide a more conducive environment for the pathogen’s growth and spread. Growers should keep watch for symptoms of this pathogen in their nurseries.

References:

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