Diseases Caused by Fungi and Fungus-Like Organisms

First Report of Crown Rot Caused by *Rhizoctonia solani* AG 2-1 on Broccoli Rabe in Arizona

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Broccoli rabe or rapini (*Brassica rapa* subsp. *rapa*) is a leafy vegetable that is grown for its succulent shoots, which consist of terminal stems with attached leaves and unopened flower buds. In 2018, commercial broccoli rabe fields in Yuma County, Arizona, showed symptoms of a soilborne disease. Plants at the four- to eight-leaf stages were stunted. Older leaves became yellow, wilted, and eventually turned brown and dry. Younger leaves remained green but wilted. The plant crowns in contact with the soil were brown and necrotic, but roots appeared healthy. Plants eventually died. Diseased plants were randomly distributed and occasionally found in small clusters; disease incidence was as high as 10%. Symptomatic plants were surface disinfested, and tissues from the margins of the necrotic areas were placed on acidified corn meal agar. Fungal isolates that had identical morphologies were consistently recovered. Isolates formed coarse, brown hyphae that had right-angle branching, constrictions at branch points, cross walls at each branch, and dolipore septa. Older cultures formed sclerotia consisting of brown, loosely aggregated clumps of mycelia. Based on morphology, the isolates were identified as *Rhizoctonia solani* (Sneh et al. 1991). To test pathogenicity, inocula of three isolates were prepared by growing them on sterilized barley seed for 3 weeks. Four-week-old broccoli rabe plants (cultivar Spring) were inoculated by placing two to three

colonized barley seeds at the base of the crown below the soil line; 18 plants were inoculated per isolate. After 5 days, plants began to turn yellow. By 7 to 8 days, plants wilted; examination of the plants revealed a brown necrosis on the crowns that matched field symptoms. Isolations from inoculated plants resulted in the consistent recovery of fungi that were confirmed to be *R. solani*. Control broccoli rabe plants were inoculated with sterile barley seeds and did not develop any disease. The experiment was repeated, and the results were the same. In addition, broccoli plants (cultivar Sun King) were inoculated in the same manner and likewise developed a crown rot disease, from which the same pathogen was isolated. To confirm identification of the broccoli rabe isolate, DNA was extracted from fungal tissue pre- and postinoculation using the Qiagen DNeasy Plant Mini Kit and was amplified by PCR using the ITS1/ITS4 primers (White et al. 1990). The ITS loci from both the preinoculation isolate (MT153121) and the postinoculation isolate (MT153122) matched *Thanatephorus cucumeris* (teleomorph) strain AG 2-1 (KP662693.1) with 100% query cover and >99% identity. Based on these morphological and molecular data, the isolates were confirmed as *R. solani* AG 2-1. This appears to be the first confirmation of *R. solani* infecting broccoli rabe in Arizona. Occurrence of this disease on broccoli rabe could have epidemiological impacts on other hosts of *R. solani* grown in rotation, such as broccoli, cauliflower, and cilantro (Koike et al. 2017).

References:

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