Disease Notes

Diseases Caused by Fungi and Fungus-Like Organisms

Rhizoctonia solani AG 2-2 IIIB Causing Root Rot of Onion in Idaho

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In September of 2018, onion plants (*Allium cepa* cv. Joaquin) grown in one field in southwest Idaho were observed to have roots with brown discoloration over 10 to 20% of the total root surface area. Approximately 10% of plants over a 1-ha area were affected, and these plants were visually about 50% smaller than the typical bulb size present in the field. To determine the causal agent, 3-mm pieces of symptomatic roots from four plants were placed in sodium hypochlorite (2%) for 1 min, followed by two rinses in sterile water, and plated onto water agar medium amended with penicillin G (0.2 g/liter) and streptomycin sulfate (0.8 g/liter). After 3 days at 21°C, fungal colonies with septate hyphae with right-angled branching resembling *Rhizoctonia solani* were observed in over half of the 16 isolations attempted. Species identity was confirmed through rDNA internal transcribed spacer sequencing, as described previously (Woodhall et al. 2013), with DNA obtained from a single representative hyphal tip culture grown on potato dextrose agar (PDA), which was designated isolate ON3. The resulting sequence (MT672318) was 100% identical (678/678 bp) to a sequence previously identified as *R. solani* AG 2-2 IIIB on GenBank (FJ492137). Pathogenicity of the culture was determined by inoculating ten 20-day-old plants (cv. Joaquin) grown in premium potting

compost (Scotts) with a single, fully colonized 10-mm² plug taken from a 2-week-old PDA culture of isolate ON3. A further nine plants were inoculated with sterile PDA plugs as controls. Plants were grown in the greenhouse at 21°C in a 16-h light regime. After 24 days, each plant was assessed for root rot disease as described previously (Misawa et al. 2017). Root rot was observed on nine of the inoculated plants. Mean diseased root area was 32% of the total root surface, with a minimum of 5% and a maximum of 100% diseased root area and a standard deviation equal to 39.6%. No root browning was observed on any of the control plants. Isolations were attempted from nine symptomatic plants, and *R. solani* was successfully isolated from seven plant samples onto water agar. Sequencing was used to confirm identity as AG 2-2 IIIB. To our knowledge, this is the first report of *R. solani* AG 2-2 IIIB affecting onions in Idaho. Previous work in the Pacific Northwest recovered *R. solani* AG2-1, 3, 4, and 8 and also BNR AG A from stunted onions (Patzek et al. 2013). In Japan, Misawa et al. (2017) found AG 2-2 IIIB to be pathogenic to Welsh onion (*Allium fistulosum*). In Idaho, *R. solani* AG 2-2 IIIB was previously reported causing disease in sugar beets (Strausbaugh et al. 2011) and potatoes (Woodhall et al. 2012). Growers should consider crop rotation strategies or soil treatments if *R. solani* AG 2-2 IIIB is causing disease in their crops.

References:

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