ENGELKES, CHERYL A.[1], CAROL E. WINDELS[2], and TODD E. CYMBALUK[2], [1]Biocontrol Plant Disease Lab, USDA-ARS, Bldg. 011A, Room 275-W, Beltsville, MD 20705, and [2]Northwest Experiment Station, University of Minnesota, Crookston, MN 56716. Susceptibility of sugarbeet plants of different ages to Rhizoctonia root and crown rot.

ABSTRACT

Rhizoctonia solani AG-2-2 causes root and crown rot of sugarbeet throughout the season. Field trials were conducted in 1990 and 1991 to determine the effect of plant age at time of inoculation (6-, 8-, 10-, and 12-wk after planting) on two cultivars (Maribo Ultramono, susceptible; ACH 184, tolerant) inoculated with two isolates of R. solani AG-2-2 (from sugarbeet and pinto bean). Two procedures were followed to inoculate plants at the four ages. In one procedure, seeds were planted on May 14, 1990 and May 9, 1991; these plants were inoculated at 2-wk intervals when 6-, 8-, 10, and 12-wk old (consecutive inoculation). In the other procedure, seeds were planted at 2-wk intervals and plants were inoculated on July 30, 1990 and August 1, 1991 when plants were 6-, 8-, 10-, and 12-wk old (simultaneous inoculation). The plot was irrigated (2.5 cm) within 24 hr after inoculation. Plants were evaluated for root rot (0-7 scale: 0=healthy, 7=root surface 100% rotted and plant dead) at 2-wk intervals for 2- to 8-wk after inoculation.

At 8 wk after inoculation, root rot indices were about two disease ratings higher in 1991 than in 1990, but are presented for 1991 since data followed similar trends. Root rot indices averaged 7.0, 6.5, 5.2, and 4.3 for plants inoculated when 6-, 8-, 10-, and 12-wk-old, respectively, in the consecutive inoculation. Root rot indices averaged 6.8, 6.3, 5.8, and 4.3 for plants inoculated when 6-, 8-, 10-, 12-wk old, respectively, in the simultaneous inoculation. Maribo Ultramono had an average root rot index of 6.5 and ACH 184 averaged 5.1; these values were the same for the consecutive and simultaneous inoculations. When data are averaged across plant age and cultivar, the isolate from pinto caused more root rot (6.4) than the isolate from sugarbeet (5.2); these values were the same for the consecutive and simultaneous inoculations. However, virulence of isolate affected host resistance. The isolate from pinto bean averaged root rot ratings of 5.8 and 5.0 on Maribo Ultramono and ACH 184, respectively. The isolate from sugarbeet averaged root rot ratings of 4.1 and 3.3 on Maribo Ultramono and ACH 184, resepctively.

On potato-dextrose agar, the isolate from pinto bean grew 0.01-8.0 mm/24 hr faster than the isolate from sugarbeet at 25-35 C. Average weekly air temperatures were in this range in 5 of 8 wk following the consecutive and simultaneous inoculations in both seasons.

Based on time of inoculation, tolerance to Rhizoctonia root and crown rot increased with increasing root age for both cultivars under conditions favorable for disease development, even though AG-2-2 isolates differed in virulence.