

INTERACTION OF SUGARBEET HOST RESISTANCE AND *RHIZOCTONIA SOLANI* AG-2-2 IIIB STRAINS

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ABSTRACT

Rhizoctonia root rot caused by *Rhizoctonia solani* can cause serious economic losses in sugarbeet fields. Preliminary evidence suggests there could be interactions between different strains and resistance sources. Thus, field studies were conducted during 2010 and 2011 to determine if nine *R. solani* AG-2-2 IIIB strains varied for virulence when compared with a non-inoculated check and interacted with five sugar beet lines (four resistant lines: FC718, FC703, FC708CMS, and FC709-2 and a susceptible check: FC901/C817). The nine *Rhizoctonia solani* AG-2-2 IIIB strains (F30, F36, F321, F503, F508, F517, F521, F548, and F551) used in these studies had been isolated in Idaho or Oregon. The studies were arranged in a randomized complete block design with six replications. The 2010 study was conducted in Kimberly, ID in a field previously cropped to dry beans. The field was managed using standard commercial cultural practices. The plots were planted on 3 May as single rows 3 m long and 0.6 m apart and irrigated with solid set handlines. The plots were thinned at the four-leaf growth stage to 117,374 plants/ha on 12 Jun. The plants were inoculated by placing 0.6 g of ground barley inoculum in the crown of each plant at the eight-leaf growth stage on 23 Jun. No soil was pushed into the crown by cultivation following inoculation, but the irrigation scheduled for this week did occur 2 hr after inoculation. On 14 Sep, the first ten plants in the row were dug and evaluated to determine the number of dead plants and the percentage of root surface discoloration (dry black tissue). The roots were also bisected through the root lesion to establish the percentage of internal root mass involved in fungal (dry black rot) and bacterial root rot (wet rot). The study was repeated in 2011 using the same methods as in the 2010 study. All strains were virulent on the susceptible check, FC901/C817, and had a similar ranking ($r = 0.80$ to 0.97 ; $P = 0.0096$ to < 0.0001) regardless of disease variable. Line FC709-2 was resistant (strain responses were not different from non-inoculated check; $P \geq 0.1042$) to all strains, while the strain responses resulted in weak interactions with less resistant lines in 14 of 19 variable-year combinations. The ranking of strains compared across lines within a disease variable was frequently correlated, but when compared across disease variables the strain ranking tended to differ. For lines FC718, FC703, and FC708CMS, only 4 of 21, 5 of 21, and 3 of 10 rank comparisons were significant, respectively. Since most commercial sugarbeet cultivars contain low to intermediate resistance to *Rhizoctonia* root rot, the strain used to screen should be given consideration in order to maintain consistent responses between nurseries and commercial fields.