

Increased Crown Rot Resistance in the Field as a Result of Greenhouse Selection for Resistance to Fusarium Root and Crown Rot and Corresponding Severity of Tap Root Injury by Clover Root Curculio

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Fusarium root and crown rot complex (FRCR) reduces yield and persistence of alfalfa. Phenotypic recurrent selection in the greenhouse for FRCR resistance by J. Miller-Garvin (1994) resulted in a gain from selection of 15-44% resistance to FRCR as evaluated in a greenhouse screening. Field nurseries were planted with the objective of evaluating alfalfa populations selected for two or three cycles of FRCR resistance in the greenhouse. Fifteen populations planted in 6 replications of 35-plant rows, were transplanted to the field in the spring of 2000. Kalb et al. (1994) found a highly significant positive correlation between severity of lesions caused by clover root curculio (CRC) and the extent of root and crown rot attributable to FRCR in a survey of New York alfalfa fields, so the field nursery was transplanted into a field with a history of high CRC populations as well as FRCR to put maximum disease pressure on the transplants. Plant counts were taken several times for calculation of percent survival. In October 2002, each plant was scored for root shape, number of roots, CRC feeding damage, stem density, and FRCR resistance. Resistance to CRC ranged from 0.0 to 23.1 percent, resistance to FRCR ranged from 6.5 to 69.0 percent, and survival ranged from 77 to 100 percent. The correlation between FRCR rating and CRC rating was 0.22 ($p=0.07$, $df=68$). Three cycles of greenhouse selection for FRCR resistance resulted in significant improvements in FRCR resistance in the field. These results are from one field location. Another field nursery has been established to confirm these results. Plot trials will be established to document the effect of improved FRCR resistance on alfalfa persistence.

Kalb, D.W., G.C. Bergstrom, and E.J. Shields. 1994. Prevalence, severity, and association of fungal crown and root rots with injury by the clover root curculio in New York alfalfa. *Plant Dis.* 78: 491-495.

Miller-Garvin, J.E. and D.R. Viands. 1994. Selection for resistance to Fusarium root rot, and associations among resistances to six diseases in alfalfa. *Crop Sci.* 34: 1461-1465.