

Long-term Effects of Alfalfa Weevil on Alfalfa Persistence

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The alfalfa weevil (*Hypera postica* Gyllenhal) often infests alfalfa (*Medicago sativa* L.) in parts of South Dakota. We initiated a field study in 1999 in south-central South Dakota to determine the long-term effects of alfalfa weevil on yield and persistence of alfalfa. Entries (released cultivars and experimentals) included four with grazing tolerance, two with resistance to the potato leafhopper, two purported to be alfalfa weevil tolerant, one supposedly with a high expression of *M. sativa* ssp. *falcata* characteristics, and three alfalfa varieties common to the region. Experimental design consisted of four replications of a randomized complete block in a strip-plot arrangement with alfalfa entry as the horizontal factor and insecticide application as the vertical factor. All entries were drill-seeded in plots 7.6-m wide and 18.2-m long at a rate of 13.5 kg PLS ha⁻¹ in the spring of 1999. Each replicate was divided in strips, with one-half being sprayed with cyfluthrin (Cyano (4-fluoro-e-phenoxyphenyl) methyl 3-(2,2-dichloroethenyl)-2,3-dimethyl cyclopropanecarboxylate) as needed to control the alfalfa weevil and the other half remaining unsprayed. Plant density was determined by excavating a 0.93-m² area from two locations in each plot at the time of the first harvest and in the fall when possible.

Alfalfa weevil pressure was greater in 2000 (3.27 to 6.70 alfalfa weevils stem⁻¹ on 16 May) than in any other year (averaging less than 2.0 alfalfa weevils stem⁻¹ by 1 June). There was an alfalfa entry X insecticide application interaction for yield in 2000 and 2003 because the yield of two or three entries increased slightly or remained the same regardless of insecticide application, while the yield of most entries declined significantly when left unsprayed. Alfalfa plant density declined over time as expected (Fig. 1). Plant density differed significantly among entries in 2000 (spring and fall), 2001 (fall), 2002 (spring), and 2004 (spring). Although other factors are involved in stand decline, alfalfa weevil did not appear to significantly affect persistence since plant density in sprayed plots decreased similarly to that in unsprayed areas.

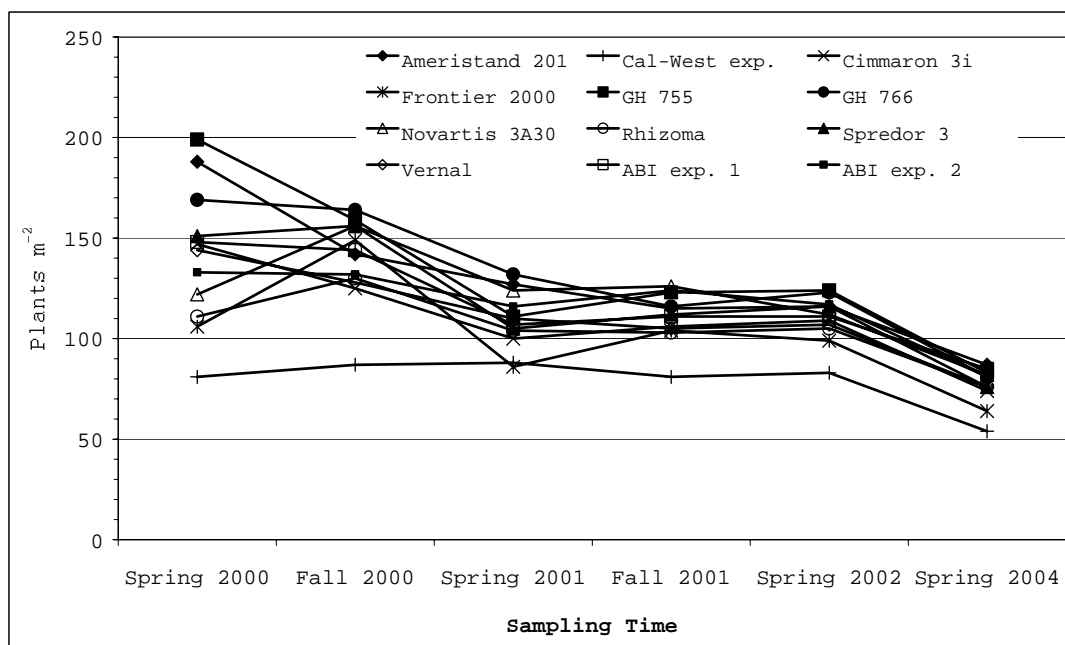


Fig. 1. Alfalfa plant density of 12 entries sampled from 2000-2004. Data are averaged across sprayed and unsprayed plots. Fisher's protected LSD (0.05) values are: 43, 28, 24, and 11 plants m⁻² for spring and fall 2000, fall 2001, and spring 2004, respectively for comparing entries within a sampling time. No significant differences were detected among entries in spring 2001 and spring 2002.