PUBLIC ABSTRACT

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Graduation Term: Fall

Graduation Year: 2006

Title: Impact of Alternate Host Phenology and Alternate Host-Transgenic Corn Interactions on the Western Corn Rootworm (Coleoptera: Chrysomelidae).

The western corn rootworm is a major pest of maize in the North American Corn Belt, costing farmers an estimated one billion dollar loss annually in yield reduction and pesticide costs. The latest control tactic is the deployment of genetically engineered maize, containing insecticidal protein-coding genes from the soil bacterium, *Bacillus thuringiensis* Berliner (Bt), which provides the maize with antibiosis against rootworm larval feeding. To sustain this management tactic, effective insect resistance management (IRM) programs are necessary. An understanding of the effect of alternate hosts (especially grassy weeds) on rootworm population dynamics is critical to the formulation of effective IRM programs.

Thus, my research objectives were to evaluate: (1) the effects of alternate host plant phenology on the survivorship, growth, development of larvae; (2) the effect of initial feeding of larvae on an alternate host followed by movement to rootworm-resistant transgenic corn on beetle emergence and reproductive fitness of emerged female beetles, and; (3) the effects of host plant phenology on larval host-searching behavior.

The results indicated that host plant phenology affects larval survival and host-search behavior. In greenhouse trials, larvae had significantly greater survival on younger grassy weeds (4 to 6 weeks old) versus older grassy weeds. Initial feeding on alternate hosts followed by movement to Bt maize increased beetle emergence from Bt maize. These findings imply that western corn rootworm larvae recognize and are capable of utilizing younger weeds as hosts. Phenological changes in grassy weeds could encourage movement of larvae from weeds to transgenic Bt maize.