The Effect of Weed Density, Root Senescence, and Egg Density on Western Corn Rootworm Larval Establishment, Survivorship, and Damage Potential

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ABSTRACT

Western corn rootworm, *Diabrotica virgifera virgifera* Leconte beetle emergence from and root damage to transgenic (Bt) maize (*Zea mays* L.) plants producing the Cry3Bb1 protein and isoline plants in the presence of varying *Setaria spp.* densities, egg densities, and *Setaria spp.* control times was evaluated in two separate field experiments. The nutritional value of senescing maize and *Setaria faberi* R.A.W. Herrm roots to neonate and second instar western corn rootworm larvae was evaluated in three separate greenhouse experiments. Greenhouse evaluations include glyphosate sprayed *S. faberi*, glyphosate sprayed maize, and maize severed below the growing point. Larval recovery, weight change, and adults emergence was monitored for each experiment. Results of the field experiment showed significantly greater root damage to the isoline hybrids than the transgenic hybrid. In one of sixteen comparisons with the transgenic hybrid, it produced significantly more beetles in the weedy plot than the weed-free plot. This is the first time this has been documented in a field situation. Results of the greenhouse experiments showed that once *S. faberi* was sprayed with glyphosate, it became nutritiously deficient to both neonate and second instar larvae within the first five days. Severed maize became nutritiously deficient between 5 and 10 d after the plant was killed. Glyphosate sprayed maize become nutritiously deficient between 10 and 15 d after the plants were sprayed. A minimal number of adults were recovered from any greenhouse treatment, except living maize or *S. faberi*.