

ASSESSMENT OF TRANSGENIC HERBICIDE AND INSECT RESISTANCE TRAITS IN MICHIGAN CORN. Kathrin Schirmacher, James J. Kells, and Christina D. DiFonzo, Graduate Student, and Professor, Department of Crop and Soil Sciences, Associate Professor, Department of Entomology, Michigan State University, East Lansing, MI 48824-1325.

Multiple resistance in stacked trait corn hybrids is becoming more prevalent and will be aggressively marketed in the near future. Field research was conducted in Michigan in 2004 and 2005 to determine the consistency of conventional and transgenic strategies for control of insects and weeds under a range of Michigan conditions. Field trials were conducted at four locations in both years. Locations with different pest infestations were chosen to determine if the resistance traits are justified under a range of infestation levels. Near-isogenic corn hybrid lines were used throughout the experiment to minimize agronomic differences between the hybrids. In 2004, two corn hybrids were used: 1) a hybrid containing the glyphosate-resistant trait (RR) and 2) a hybrid with the same base genetics which contains resistance to corn rootworm (CRW) in addition to RR (CRW/RR). During the 2004 growing season, a three-way stacked hybrid containing resistance to European corn borer (ECB) along with CRW/RR was approved for commercial production in the US. In 2005, we utilized near-isogenic hybrid lines containing RR/ECB and CRW/RR/ECB. All corn hybrids were planted in rows 0.76 m apart at a seeding rate of 74,000 seed ha⁻¹. Plots were four rows wide by 10.7 m long. The experimental design was a randomized complete block with four replications and 24 treatments. Treatments consisted of combinations of weed and corn rootworm management strategies. The weed management strategies involved preemergence (PRE) and postemergence (POST) (sequential and total POST) herbicide application and herbicide selections based on scouting. Corn rootworm management strategies included resistance in the hybrid, conventional soil-applied insecticides, and seed treatments.

Three corn plants were dug from each plot in late July to assess corn rootworm damage. Roots were rated on the new Iowa node-injury scale ranging from 0 (no damage) to 3 (highly damaged). Visual weed control evaluations were taken throughout the growing season and three permanent quadrats (0.76 m x 1 m) were established in the center row of each plot. Weed densities and weed biomass were determined from weeds present in the quadrats. Corn grain yield was obtained by mechanically harvesting the middle two rows of each plot.