



CORN

SECTION 5

Evaluation of a seed-blend (Pioneer Optimum AcreMax) to control corn rootworm larvae (*Diabrotica spp.*) in Illinois, 2008

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Location

We established one trial at the University of Illinois Agricultural Engineering Farm near Urbana (Champaign County).

Experimental Design and Methods

The experimental design was a randomized complete block with four replications. Plot size for each treatment was 10 ft (four rows) x 20 ft. For treatments that were not seed-blends, five randomly selected root systems were extracted from the first row of each plot on 5 August. For treatments that were seed-blends, one randomly selected, non-rootworm Bt refuge plant and the two plants on either side of the refuge plant (for a total of five plants) were extracted from the first row of each plot on 5 August. The root systems were washed and rated for corn rootworm larval injury using the 0 to 3 node-injury scale developed by Oleson et al. (2005) (Appendix I).

Yields were estimated by harvesting the center two rows of each plot on 20 October. Weights were converted to bushels per acre (bu/A) at 15% moisture.

Planting and Insecticide Application

The trial was planted on 22 May using a four-row, Almaco constructed planter with John Deere 7300 row units with Precision Planting finger pick-up style metering units. For treatments that were seed-blends, 3 seeds per row of a non-rootworm Bt hybrid (Pioneer 34P89) were planted by hand and marked with stakes. When plants entered the V1–V2 growth stages, refuge plants were thinned to 1 plant per row, resulting in a 2.5% refuge seed-blend.

Active ingredients for all chemical insecticides, except those with experimental numbers, are listed in Appendix II.

Agronomic Information

Agronomic information is listed in Table 5.1.

Climatic Conditions

Temperature and precipitation data are presented in Appendix III.

Statistical Analysis

Data were analyzed using ARM 7 (Agricultural Research Manager), revision 7.3.6. (Copyright© 1982–2007 Gylling Data Management, Inc., Brookings, SD).

Results and Discussion

The mean node-injury rating and yield for each treatment are provided in Table 5.2. The mean node-injury rating for the non-rootworm Bt hybrid was 2.86, indicating that corn rootworm larval feeding injury was heavy in the trial.

The mean node-injury ratings for the two seed-blend treatments and the rootworm Bt hybrid were significantly lower than the non-rootworm Bt hybrid. The two seed-blend treatments and the rootworm Bt hybrid provided a statistically similar level of protection against corn rootworm larval injury, with node-injury ratings that ranged from 0.74 to 0.79. No significant difference in the mean node-injury rating was observed between the seed-blend with EXP1 and the seed-blend with Poncho 1250.

The two seed-blend treatments and the rootworm Bt hybrid had significantly higher yields than the non-rootworm Bt hybrid. The two seed-blend treatments and the rootworm Bt

TABLE 5.1 + Agronomic information for evaluation of a seed-blend (Pioneer Optimum AcreMax) to control corn rootworm larvae, Urbana, University of Illinois, 2008

Planting date	22 May
Root evaluation date	5 August
Row spacing	30 inches
Seeding rate	35,000/acre
Previous crop	Trap crop (late-planted corn and pumpkins)
Tillage	Fall—chisel plow Spring—field cultivator



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hybrid had statistically similar yields. There was no significant difference in yield between the two seed-blend treatments, regardless of which seed-applied insecticide was used.

The seed-blend treatments evaluated in this trial provided a similar level of protection against corn rootworm larval injury and associated yield loss as the rootworm Bt hybrid.

TABLE 5.2 • Evaluation of a seed-blend (Pioneer Optimum AcreMax) to control corn rootworm larvae, Urbana, University of Illinois, 2008

Product	Rate ¹	% seed-blend	Mean node-injury rating ^{2,3,4}		Mean yield (bu/A) ⁵ 20 Oct
			5 Aug		
Hx I (Pioneer 34P89) ⁶ + Cruiser 250	— 0.25	100 —	2.86 a		83.83 b
Hx I (Pioneer 34P89) ⁶ + Cruiser 250	— 0.25	2.5 —	0.79 b		138.00 a
Hx XTRA (Pioneer 34P94) + EXP 1	— N/A	97.5 —			
Hx I (Pioneer 34P89) ⁶ + Cruiser 250	— 0.25	2.5 —	0.77 b		160.35 a
Hx XTRA (Pioneer 34P94) + Poncho 1250	— 1.25	97.5 —			
Hx XTRA (Pioneer 34P94) + Cruiser 250	— 0.25	100 —	0.74 b		159.33 a

¹ Rates of application for seed treatments are milligrams (mg) of active ingredient (a.i.) per seed.

² Mean node-injury ratings are based on the 0 to 3 node-injury scale (Oleson et al. 2005, Appendix I).

³ Mean node-injury ratings were derived from five root systems per treatment in each of four replications; a weighted means adjustment was used to determine the root ratings for the seed-blend treatments.

⁴ Means followed by the same letter do not differ significantly (P = 0.05, Duncan's New Multiple Range Test).

⁵ Corn was harvested from the center two rows of each plot and converted to bushels per acre (bu/A) at 15% moisture.

⁶ Pioneer 34P89 is the near-isoline of Pioneer 34P94.