



CORN

SECTION 4

Evaluation of experimental and commercially available foliar-applied insecticides to control silk-feeding beetles in Illinois, 2011

Nicholas A. Tinsley, Ronald E. Estes, and Michael E. Gray

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 30 ft. Densities of silk-feeding beetles were estimated by counting the total number of beetles on 10 ears in each plot. After the application of insecticides, beetle densities were assessed on 22 and 27 July, and on 3 August (2, 7, and 14 days after treatment [DAT], respectively).

Planting, Insecticide Application, and Yield

The trial was planted on 20 May using a four-row, ALMACO constructed planter with John Deere 7300 row units. Seeds were planted in 30-inch rows at an approximate depth of 1.75 inches. Insecticides were applied on 20 July with a CO₂ backpack sprayer and a four-row boom. For treatments receiving a spray volume of 15 gallons per acre (gal/A), TeeJet TTJ60-1102VP spray tips were calibrated. For treatments receiving a spray volume of 1 gal/A, TeeJet TJ80-0017 spray tips were calibrated and a TeeJet 126 strainer was used. Active ingredients for all insecticides, including those not registered for commercial use, are listed in Appendix II.

Yields were estimated by harvesting the center two rows of each plot on 9 October. Weights were converted to bushels per acre (bu/A) at 15.5% moisture. To ensure uniform plant densities across all plots, plant populations in the harvested rows were thinned at the V7 growth stage to 34,000 plants per acre.

Agronomic Information

Agronomic information is listed in Table 4.1.

Climatic Conditions

Temperature and precipitation data are presented in Appendix III.

Statistical Analysis

Data were analyzed using ARM 8 (Agricultural Research Manager), revision 8.3.4 (Copyright© 1982–2011 Gylling Data Management, Inc., Brookings, SD).

Results and Discussion

Mean densities of silk-feeding beetles and yield are presented in Table 4.2. Although some beetles were observed on 20 July, the focus of this discussion will be on the densities of beetles on dates following the application of foliar insecticides.

Mean densities of Japanese beetles and northern corn rootworm beetles were very low across all sampling dates and never exceeded 0.8 beetles per 10 ears. No significant differences were observed between foliar insecticides or the untreated check (UTC) for densities of these beetles on any sampling date.

While no significant differences were observed in the mean number of western corn rootworm beetles between foliar insecticides or the UTC on 22 July (2 DAT), some differences were observed on subsequent sampling dates. On 27 July (7 DAT), low-volume Endigo ZCX and Warrior II had statistically similar mean numbers of western corn rootworm beetles as the UTC. No differences were observed among the remaining foliar insecticides, however, all had lower densities than the UTC. Although some significant differences were

TABLE 4.1 • Agronomic information for efficacy trial of experimental and commercially available foliar-applied insecticides to control silk-feeding beetles, Urbana, University of Illinois, 2011

Planting date	20 May
Harvest date	9 October
Hybrid	Pioneer P0916X
Row spacing	30 inches
Seeding rate	36,000/acre
Previous crop	Corn
Tillage	Fall—chisel plow Spring—field cultivator



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observed on 3 August (14 DAT), none of the insecticide treatments had a statistically different mean number of western corn rootworm beetles than the UTC.

No significant differences in yield were observed among the treatments.

TABLE 4.2 • Evaluation of experimental and commercially available foliar-applied insecticides to control silk-feeding beetles, Urbana, University of Illinois, 2011

Product ¹	Rate ²	Spray volume ³	Mean no. Japanese beetles per 10 ears ^{4,5}				Mean no. northern corn rootworm beetles per 10 ears ^{4,5}			
			20 July (0 DAT ⁶)	22 July (2 DAT ⁶)	27 July (7 DAT ⁶)	3 Aug (14 DAT ⁶)	20 July (0 DAT ⁶)	22 July (2 DAT ⁶)	27 July (7 DAT ⁶)	3 Aug (14 DAT ⁶)
Endigo ZC	4.5	15	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
Endigo ZC	4.5	1	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
Endigo ZCX ⁹	4.5	15	0.0 a	0.3 a	0.0 a	0.0 a	0.3 a	0.0 a	0.0 a	0.0 a
Endigo ZCX ⁹	4.5	1	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
Voliam Xpress	9	15	0.0 a	0.0 a	0.0 a	0.0 a	0.3 a	0.0 a	0.0 a	0.0 a
Warrior II	1.92	15	0.3 a	0.0 a	0.0 a	0.5 a	0.0 a	0.0 a	0.0 a	0.0 a
Warrior II	1.92	1	0.0 a	0.0 a	0.0 a	0.8 a	0.3 a	0.0 a	0.0 a	0.0 a
UTC ¹⁰	—	—	0.3 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a

¹ Crop oil concentrate (COC) was added to foliar insecticide applications at a rate of 1% volume per volume of spray solution.

² Rates of application for foliar insecticides are ounces of product per acre (oz/A).

³ Spray volumes for foliar insecticides are gallons per acre (gal/A).

⁴ Means were derived from the numbers of beetles on 10 ears per treatment in each of four replications.

⁵ Means for the same insect, on the same date, and followed by the same letter do not differ significantly ($P = 0.05$, Duncan's New Multiple Range Test).

⁶ DAT = days after treatment (with insecticide).

⁷ Corn was harvested from the center two rows of each subplot and converted to bushels per acre (bu/A) at 15.5% moisture.

⁸ Means followed by the same letter do not differ significantly ($P = 0.10$, Duncan's New Multiple Range Test).

⁹ Endigo ZCX is not registered for commercial use.

¹⁰ UTC = untreated check.

TABLE 4.2 (CONTINUED) • Evaluation of experimental and commercially available foliar-applied insecticides to control silk-feeding beetles, Urbana, University of Illinois, 2011

Product ¹	Rate ²	Spray volume ³	Mean no. western corn rootworm beetles per 10 ears ^{4,5}				Mean yield (bu/acre) ^{7,8} 9 Oct
			20 July (0 DAT ⁶)	22 July (2 DAT ⁶)	27 July (7 DAT ⁶)	3 Aug (14 DAT ⁶)	
Endigo ZC	4.5	15	1.8 a	0.0 a	0.3 b	2.0 ab	242 a
Endigo ZC	4.5	1	2.0 a	2.3 a	0.8 b	6.5 a	232 a
Endigo ZCX ⁹	4.5	15	3.3 a	0.0 a	0.3 b	0.0 b	218 a
Endigo ZCX ⁹	4.5	1	3.8 a	1.3 a	6.3 a	4.5 ab	236 a
Voliam Xpress	9	15	2.5 a	0.0 a	0.5 b	1.3 b	221 a
Warrior II	1.92	15	2.3 a	0.0 a	0.3 b	0.5 b	236 a
Warrior II	1.92	1	1.3 a	0.8 a	2.3 ab	6.0 a	238 a
UTC ¹⁰	—	—	3.3 a	0.8 a	5.3 a	2.0 ab	223 a

¹ Crop oil concentrate (COC) was added to foliar insecticide applications at a rate of 1% volume per volume of spray solution.

² Rates of application for foliar insecticides are ounces of product per acre (oz/A).

³ Spray volumes for foliar insecticides are gallons per acre (gal/A).

⁴ Means were derived from the numbers of beetles on 10 ears per treatment in each of four replications.

⁵ Means for the same insect, on the same date, and followed by the same letter do not differ significantly ($P = 0.05$, Duncan's New Multiple Range Test).

⁶ DAT = days after treatment (with insecticide).

⁷ Corn was harvested from the center two rows of each subplot and converted to bushels per acre (bu/A) at 15.5% moisture.

⁸ Means followed by the same letter do not differ significantly ($P = 0.10$, Duncan's New Multiple Range Test).

⁹ Endigo ZCX is not registered for commercial use.

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