SECTION 3

Evaluation of Force 2.25CS to control corn rootworm larvae (*Diabrotica spp.*) in Illinois, 2007

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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. The plot size for each treatment was 10 ft (four rows) x 30 ft. Five randomly selected root systems were extracted from the first row of each plot on 9 July. 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). Percentage consistency (percentage of roots with a rating less than 1.0) was determined for each product.

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% moisture.

Planting and Insecticide Application

The trial was planted on 7 May using a four-row, Almaco constructed planter with John Deere 7300 row units with Precision Planting finger pick-up style metering units. Granular insecticides were applied through modified Noble metering units mounted to each row of the planter. Plastic tubes directed the insecticide granules to either a 5-inch, slope-compensating bander or into the seed furrow. Capture 2EC and Force 2.25CS were applied at a spray volume of 5 gal per acre using a CO_2 system with TeeJet 8001VS spray tips attached to stainless steel drop tubes. Regent 4SC was applied though microtubes at a spray volume of 5 gal per acre using a CO_2 system. All insecticides were applied in front of the planter's firming wheels. Cable-mounted tines were attached behind each of the planter row units to improve insecticide incorporation.

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

Agronomic Information

Agronomic information is listed in Table 3.1.

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, percentage consistency, and yield for each treatment are provided in Table 3.2. The mean node-injury rating in the untreated check (UTC) was 1.38, indicating that corn rootworm larval feeding injury was moderate to heavy in the trial.

The mean node-injury ratings for all insecticide treatments were significantly lower than the mean node-injury rating for the UTC. Regardless of placement (band or furrow), Aztec 2.1G, Capture 2EC, Force 3G, and Force 2.25CS all provided essentially the same level of protection against corn rootworm larval injury, with node-injury ratings that ranged from 0.04 to 0.19. The mean node-injury rating for Regent 4SC was significantly higher than the mean node-injury ratings for all other insecticide treatments. Percentage consistency was 90% or greater for all insecticide treatments, with the exception of Regent 4SC with a consistency rating of 55%.

TABLE 3.1 • Agronomic information for efficacy trial of Force 2.25CS to control corn rootworm larvae, Urbana, University of Illinois, 2007

Planting date	7 May
Root evaluation date	9 July
Row spacing	30 inches
Seeding rate	33,000/acre
Hybrid	DKC61-73
Previous crop	Trap crop (late-planted corn and pumpkins)
Tillage	Fall—chisel plow Spring—field cultivator

Based upon these and previous years' data, the liquid formulation of tefluthrin (Force 2.25CS) seems to provide an equivalent level of protection against corn rootworm larval injury as its granular counterpart, Force 3G.

All of the insecticide treated plots had significantly higher yields than the UTC. The Aztec 2.1G (furrow) and Capture 2EC (furrow) treated plots, both had significantly higher average yields than the plots treated with Regent 4SC.

TABLE 3.2 • Evaluation of Force 2.25CS for control of corn rootworm larvae, Urbana, University of Illinois, 2007

Product	Rate[1,2,3]	Placement	Mean node-injury rating[4,5,6] 9 July	% consistency[7]	Mean yield (bu/A),[6,8] 9 Oct
Aztec 2.1G	6.7	Band	0.04 c	100	208.353 ab
Aztec 2.1G	6.7	Furrow	0.04 c	100	214.280 a
Capture 2EC	0.075	Band	0.17 c	100	206.375 ab
Capture 2EC	0.075	Furrow	0.19 c	95	214.330 a
Force 3G	4	Band	0.16 c	90	202.428 ab
Force 3G	4	Furrow	0.08 c	100	208.223 ab
Force 2.25CS	0.12	Band	0.14 c	100	199.265 ab
Force 2.25CS	0.12	Furrow	0.13 c	100	197.470 ab
Regent 4SC	0.24	Furrow	0.68 b	55	184.910 b
UTC[9] (DKC61-73)	—	—	1.38 a	35	149.085 c

[1] Rates of application for granular insecticides are ounces (oz) of product per 1,000 ft of row.
[2] Rates of application for Capture 2EC and Force 2.25CS are ounces of active ingredient (oz a.i.) per 1,000 ft of row.
[3] The rate of application for Regent4SC is fluid ounces (fl oz) of product per 1,000 ft of row.
[4] Mean node-injury ratings are based on the 0 to 3 node-injury scale (Oleson et al. 2005, Appendix I).
[5] Mean node-injury ratings were derived from five root systems per treatment in each of four replications.
[6] Means followed by the same letter do not differ significantly (P = 0.05, Duncan's New Multiple Range Test).
[7] Percentage of roots with a node-injury rating <1.0.
[8] Corn was harvested from the center two rows of each plot and converted to bushels per acre (bu/A) at 15% moisture.
[9] UTC = untreated check.