SECTION 3

Evaluation of Force 2.25CS to control corn rootworm larvae *(Diabrotica spp.)* in Illinois, 2008

Ronald E. Estes, Joshua R. Heeren, Nicholas A. Tinsley, Kevin L. Steffey, 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. The plot size for each treatment was 10 ft (four rows) x 40 ft. Five randomly selected root systems were extracted from the first row of each plot on 21 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 of lodged plants (plants leaning at 45° or less from the soil surface) was determined on 22 September.

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. Plant populations in the harvested rows had been thinned to 28,000 plants per acre at the V6–V8 growth stage.

Planting and Insecticide Application

The trial was planted on 25 April 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. 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 7.4.2. (Copyright© 1982–2007 Gylling Data Management, Inc., Brookings, SD).

Results and Discussion

The mean node-injury rating, percentage lodging, and yield for each treatment are provided in Table 3.2. The mean node-injury rating in the untreated check (UTC) was 0.96, indicating that corn rootworm larval feeding injury was low to moderate in the trial.

The mean node-injury ratings for all insecticide treatments were significantly lower than the mean node-injury rating for the UTC, with the exception of Force 3G and Capture LFR 1.5EC, both applied in-furrow. Aztec 2.1G (Band), Force 3G (Band), and Force 2.25CS (Band) all provided excellent protection against corn rootworm larval injury, with node-injury ratings that ranged from 0.01 to 0.02. All three of these

TABLE 3.1 • Agronomic information for efficacy trial of Force 2.25CS to control corn rootworm larvae, Urbana, University of Illinois, 2008

Planting date	25 April
Root evaluation date	21 July
Row spacing	30 inches
Seeding rate	33,000/acre
Hybrid	Pioneer 34P89
Previous crop	Trap crop (late-planted corn and pumpkins)
Tillage	Fall—chisel plow Spring—field cultivator

treatments had significantly lower node-injury ratings than Force 3G applied in-furrow. Lodged plants (plants leaning at 45° or less from the soil surface) were found only in plots treated with Capture LFR.

Average yields were relatively low in the trial, ranging from 115 to 137 bushels per acre. Although there was more than a 20 bushel difference between the highest and lowest average yields, the differences in yield for all treatments were not statistically significant.

TABLE 3.2 • Evaluation of Force 2.25CS for control of corn rootworm larvae, Urbana, University of Illinois, 2008

Product	Rate[1,2]	Placement	Mean node-injury rating[3,4,5] 21 July	% lodging[5] 22 Sept	Mean yield (bu/A)[6,7] 20 Oct
Aztec 2.1G	6.7	Band	0.01 c	0 c	137.78 a
Aztec 2.1G	6.7	Furrow	0.39 bc	0 c	116.65 a
Capture LFR 1.5EC	0.075	Band	0.37 bc	25 ab	115.15 a
Capture LFR 1.5EC	0.075	Furrow	0.57 abc	10 bc	119.35 a
Force 3G	4	Band	0.01 c	0 c	135.23 a
Force 3G	4	Furrow	0.68 ab	0 c	137.88 a
Force 2.25CS	0.12	Band	0.02 c	0 c	129.55 a
Force 2.25CS	0.12	Furrow	0.12 bc	0 c	123.58 a
UTC[8]	—	—	0.96 a	0 c	132.70 a

[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] Mean node-injury ratings are based on the 0 to 3 node-injury scale (Oleson et al. 2005, Appendix I).
[4] Mean node-injury ratings were derived from five root systems per treatment in each of four replications.
[5] Percentage of plants leaning at 45° or less from the soil surface.
[6] Means followed by the same letter do not differ significantly ($P = 0.05$, Duncan's New Multiple Range Test).
[7] Corn was harvested from the center two rows of each plot and converted to bushels per acre (bu/A) at 15% moisture.
[8] UTC = untreated check.