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Products Evaluated for Corn Rootworm Management

Abstract

Commercially available corn rootworm products are evaluated yearly for their ability to protect corn-root systems from corn rootworm feeding injury. This report presents results from 2005 plus a three-year summary from locations throughout Iowa.

Keywords

Entomology

Disciplines

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Products Evaluated for Corn Rootworm Management

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Introduction

Commercially available corn rootworm products are evaluated yearly for their ability to protect corn-root systems from corn rootworm feeding injury. This report presents results from 2005 plus a three-year summary from locations throughout Iowa.

Materials and Methods

2005 Sutherland test. Plots were planted on May 6 in an area that had been a corn rootworm beetle “catch crop,” with high populations of late-planted corn the previous year. The experimental design was a randomized complete block with one-row treatments, 50 ft in length, replicated four times. A four-row John Deere 7100 planter with 30-in. row spacing was used to plant the plots at 29,900 seeds/acre. Specially designed seed hoppers with standard “finger pick-up mechanisms” were used to handle the small amounts of prebagged seed. DKC60-18, was the corn hybrid used for the YieldGard Plus treatments (transgenic seed containing a Bt protein). The seed treatments (high rates for corn rootworm) were commercially applied to DKC60-19, the non-Bt equivalent of the transgenic seed. The non-Bt seed was also used with the granular and liquid insecticide treatments. Liquid Regent 4SC microtube treatments were applied at 4 gpa of finished spray. Capture 2EC, Lorsban 4E, and Lorsban 75WG liquid treatments were applied at 5 gpa. On July 25, following the majority of corn rootworm feeding, corn-root systems were dug, washed, and rated for injury on the Iowa State node-injury scale: 0.00 equals no feeding; 1.00 equals one node (circle or roots), or the equivalent of an entire node, eaten back to within approximately 1.5 in. of the stalk (or soil

line if roots originate from above-ground nodes); 2.00 equals two nodes eaten; and 3.00 equals three nodes eaten. Damage caused by eating in between complete nodes is noted as the percentage of the node missing (e.g., 1.25 = 1 1/4 nodes eaten). A product consistency (%) was also calculated for each treatment. Product consistency equals the percentage of times a treatment limited feeding injury to 0.25 node or less. Plant stand and lodging counts were taken from 17.5 row-ft in each row. Yields were not calculated in this test.

2003–2005 Summary. Treatments were applied to two 100-ft rows, replicated four times. Plots were machine harvested. In 2003 and 2004, the YieldGard RW hybrid was DKC60-12 and the non-Bt seed was DKC60-15. In 2005, the YieldGard Plus hybrid was DKC60-18 and the non-Bt was DKC60-19.

Results and Discussion

2005 Sutherland test (Table 1a). There was heavy rootworm feeding with 2.23 nodes of roots eaten in the untreated check (CHECK). There were no significant differences between treatments in regards to stand counts. Although the CHECK and several treatments had more than one root node eaten (the point where lodging drastically increases; see Table 1b), plants in this test essentially did not lodge. Neither of the Cruiser seed treatments was significantly different from the check in the node-injury scores.

2003–2005 Summary (Table 1b). Node-injury scores were based on the mean of 218 root systems/treatment. YieldGard RW provided excellent protection from corn rootworm feeding. YieldGard averaged 21–33 bushels more grain than any of the insecticide or seed treatments and 53 bushels more than the CHECK.

Table 1a. 2005 evaluation of labeled corn rootworm products applied at planting time, Sutherland, IA.

Treatment	Placement ^a	Node-injury ^{b,c}	Product consistency ^{c,d}	Percent lodging ^e	Stand count ^e
YieldGard Plus	Bt seed	0.03 a	100 a	0	29.75
Fortress 2.5G	Furrow	0.13 ab	100 a	1	28.00
Fortress 5G	Furrow SB	0.23 ab	90 ab	0	27.00
Aztec 2.1G	T-band	0.29 ab	75 ab	0	27.75
Lorsban 4E	T-band	0.29 ab	85 ab	0	26.25
Force 3G	T-band	0.32 ab	70 ab	0	29.75
Force 3G	T-band SB	0.38 ab	60 abc	0	29.00
Lorsban 75WG	T-band	0.46 ab	40 abc	0	27.00
Force 3G	Furrow	0.47 ab	50 abc	0	27.25
Lorsban 15G	T-band	0.53 ab	50 abc	0	28.50
Aztec 2.1G	Furrow	0.64 ab	30 bc	0	27.75
Capture 2EC	T-band	0.69 ab	30 bc	0	28.00
Aztec 4.67G	Furrow SB	0.72 b	40 abc	0	28.50
Poncho 1250	ST	1.50 c	5 c	1	27.75
Regent 4SC	Furrow M	1.53 c	10 c	0	28.25
Cruiser Extreme Pak	ST	1.99 cd	0 c	0	29.25
Cruiser	ST	2.24 d	0 c	3	29.25
CHECK	---	2.23 d	0 c	2	28.75

Table 1b. 2003–2005 summary of products used for corn rootworm management at seven locations.

Treatment	Placement ^a	Node-injury ^{b,c}	Product consistency ^{c,d}	Percent lodging ^e	Stand count ^e	Yield (bu/acre) ^c
YieldGard RW	Bt seed	0.03 a	99 a	1 a	27.44	183 a
Aztec 2.1G	Furrow	0.24 ab	82 b	0 a	28.14	159 b
Aztec 4.67G	Furrow SB	0.28 bc	78 b	1 a	28.28	157 b
Force 3G	T-band	0.29 bc	76 bc	0 a	27.54	162 b
Aztec 2.1G	T-band	0.30 bc	75 bc	0 a	27.90	151 bc
Force 3G	Furrow	0.35 bcd	72 bc	0 a	28.02	159 b
Fortress 2.5G	Furrow	0.49 cd	68 bc	10 a	27.84	153 bc
Fortress 5G	Furrow SB	0.57 de	61 c	4 a	27.62	155 b
Lorsban 15G	T-band	0.80 ef	44 d	6 a	28.10	150 bc
Capture 2EC	T-band	0.80 ef	42 d	7 a	27.96	151 bc
Poncho ST	ST	0.98 f	21 e	6 a	27.24	158 b
Cruiser ST	ST	1.53 g	8 ef	31 b	27.71	152 bc
CHECK	----	2.00 h	2 f	40 c	27.38	130 c

^aSB=SmartBox application; ST=seed treatment; M=microtube application.

^bIowa State node-injury scale (0–3). Number of full or partial nodes completely eaten.

^cMeans sharing a common letter do not differ significantly according to Ryan's *Q* Test ($P \leq 0.05$).

^dProduct consistency=percentage of times nodal injury was 0.25 (1/4 node eaten) or less.

^eNo significant differences between means (ANOVA, $P \leq 0.05$).