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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

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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 Nashua Yield Test. Plots were planted on April 30 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 two-row treatments, 100-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 pre-bagged seed. DKC60-18, transgenic seed containing a Bt gene, was the corn hybrid used for the YieldGard Plus treatments. The seed treatments, both high and low rates, were commercially applied to DKC60-19, the non-Bt equivalent of the transgenic seed. The low seed treatment rate of Poncho 250 is not labeled for corn rootworm control, but was included in this test for “insecticide + seed treatment” versus “insecticide only” comparisons. 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 liquid treatments were applied at 5 gpa. On July 18, 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 of 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 a set bench mark. Plant stand and lodging counts were taken from 17.5 row-ft in each row. Yields were machine harvested on October 12.

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 Nashua Test (Table 1a). There was heavy rootworm feeding with 2.88 nodes of roots eaten in the untreated check (check). There were no significant differences among treatments for stand counts. There was no advantage to combining a seed treatment with an insecticide. Injury scores were almost identical for an insecticide alone versus the same insecticide (same placement) with a seed treatment (e.g., 0.26, 0.27, 0.30 scores for Aztec, Aztec + Poncho 1250, and Aztec + Poncho 250, respectively). YieldGard Plus provided a yield advantage of 30+ bushels/acre more than other treatments. Treatments that failed to keep node-injury scores below 1.00 experienced considerable plant lodging.

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, Nashua, IA.

Treatment	Placement ^a	Node-injury ^{b,c}	Consistency ^{c,d} injury ≤0.10	Percent lodging ^c	Stand count ^c	Yield (bu/acre) ^c
YieldGard Plus	<i>Bt</i> seed	0.02 a	79 a	1 a	25.63	252 a
Aztec 4.67G	Furrow SB	0.15 ab	63 b	0 a	27.00	219 bc
DEFCON 2.1G	Furrow	0.16 ab	58 b	0 a	27.63	214 bc
DEFCON 2.1G	T-band	0.18 ab	42 bc	0 a	27.38	204 bc
Aztec 2.1G	T-band	0.22 ab	29 bc	0 a	25.75	209 bc
Aztec 2.1G	Furrow	0.26 ab	38 bc	0 a	27.50	210 bc
Aztec+Poncho 1250	Furrow	0.27 ab	21 bc	0 a	27.63	220 b
Aztec+Poncho 250	Furrow	0.30 ab	21 bc	1 a	27.38	216 bc
Force+Poncho 1250	Furrow	0.33 ab	33 bc	0 a	27.13	216 bc
Force 3G	T-band	0.49 ab	21 bc	0 a	26.50	212 bc
Force 3G	Furrow	0.63 abc	0 c	0 a	27.88	206 bc
Regent 4SC	Furrow-M	0.71 abcd	4 c	1 a	27.00	202 bc
Fortress 5G ^f	Furrow SB	0.85 bcde	4 c	20 ab	25.00	204 bc
Fortress 2.5G	Furrow	1.27 cdef	13 c	56 cd	26.38	197 bc
Fortress 5G ^g	Furrow SB	1.28 cdef	0 c	26 abc	24.50	195 bc
Fortress+Poncho 250	Furrow	1.39 def	0 c	41 bcd	26.25	206 bc
Poncho 1250	ST	1.40 ef	8 c	16 ab	25.63	211 bc
Capture 2EC	T-band	1.54 efg	0 c	35 bcd	27.25	194 bc
Lorsban 15G	T-band	1.58 fg	0 c	30 abcd	26.38	203 bc
Poncho 250	ST	2.08 gh	0 c	59 de	27.38	195 bc
Cruiser 1.25 mg/seed	ST	2.27 h	0 c	86 e	25.75	189 c
CHECK	---	2.88 i	0 c	88 e	26.38	128 d

Table 1b. 2003–2005 summary of products used for corn rootworm management (7 locations).

Treatment	Placement ^a	Node-injury ^{b,c}	Consistency ^{c,d} injury ≤0.25	Percent lodging ^c	Stand count ^c	Yield (bu/acre) ^c
YieldGard RW	<i>Bt</i> 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 1250	ST	0.98 f	21 e	6 a	27.24	158 b
Cruiser 1.25 mg/seed	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 less than or equal to the injury score listed.

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

^f4.5 oz of product/1,000 row-ft.

^g3.7 oz of product/1,000 row-ft.