2005

Corn Rootworm Insecticide Performance

James Oleson
Iowa State University

Jonathan Tollefson
Iowa State University

Corn Rootworm Insecticide Performance

Abstract
Commercially available corn rootworm insecticides are evaluated yearly for their ability to protect corn root systems from corn rootworm feeding injury. A two-year summary from five locations throughout Iowa is presented in this report.

Keywords
Agronomy

Disciplines
Agricultural Science | Agriculture | Entomology

Corn Rootworm Insecticide Performance

Jim Oleson, agricultural specialist
Jon J. Tollefson, professor and department chair
Department of Entomology

Introduction

Commercially available corn rootworm insecticides are evaluated yearly for their ability to protect corn root systems from corn rootworm feeding injury. A two-year summary from five locations throughout Iowa is presented in this report.

Materials and Methods

Nashua plots were planted May 5, 2004, in an area that had been a corn rootworm beetle "catch crop" (large populations of late-planted corn) the previous year. The experimental design was a completely randomized 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 pickup mechanisms") were used to handle the small amounts of prebagged seeds. DKC60-12 was the seed used for YieldGard Rootworm treatments. Cruiser and Poncho seed treatments (high rate for corn rootworm) were commercially applied to DKC60-15, the isoline of the transgenic seed. The isoline seed was also used with the granular and liquid insecticide treatments. Regent and Capture liquid treatments were applied at 4 and 5 gpa of finished spray, respectively. On July 19, 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; 2.00 equals two nodes eaten; and 3.00 equals three nodes eaten. Damage in between complete nodes eaten is noted as the percentage of the node missing (i.e., 0.25 = 1/4 of one node eaten, 0.50 = 1/2 node eaten, 1.25 = 1 1/4 nodes eaten, etc.). Plant stand and lodging counts were taken from 17.5 row-ft in each row of the two-row treatments on September 22. Plots were machine harvested on October 21.

Results and Discussion

Table 1a lists the results from the 2004 Nashua test. There was moderate rootworm feeding pressure with 1.68 nodes of roots eaten in the untreated check (CHECK). There were no significant differences in stand counts among treatments. Treatments that kept root injury less than one node of roots were significantly different from the CHECK. The Cruiser seed treatment was the only treatment not significantly different from the CHECK in percent lodging. Because of adequate moisture during the 2004 growing year, none of the treatment yields were significantly different from the CHECK.

In the two-year summary (Table 1b), node-injury values were based on the mean of 170 root systems. Treatments that kept node injury less than one node per root had very little lodging. The YieldGard RW treatment (transgenic seed containing a *Bt* protein) provided excellent protection from corn rootworm feeding. Product consistency was 98% and yields averaged 26 bushels/acre more than the CHECK.

Table 1a. 2004 evaluations for labeled corn rootworm treatments applied at planting time, Nashua, IA.

		Nashua (NE, IA)				
Treatment	Placement[1]	Node-injury[2,3]	Product consistency[3,4]	Percent lodging[3]	Stand count[5]	Yield (bu/a)[3]
Aztec 2.1G	Furrow	0.44 ab	50 a-d	0 a	29.00	190 ab
Aztec 2.1G	T-band	0.23 ab	83 ab	0 a	27.67	199 ab
Aztec 4.67G	Furrow SB	0.41 ab	50 a-d	0 a	28.33	203 ab
Aztec 4.67G	T-band SB	0.29 ab	70 abc	0 a	29.83	193 ab
Capture 2EC	Furrow	0.45 ab	43 a-d	0 a	28.17	205 ab
Capture 2EC	T-band	0.57 ab	43 a-d	0 a	28.50	205 ab
Cruiser 5FS	ST	1.66 d	10 d	18 bc	27.83	189 ab
Empower2 1.15G	Furrow	0.73 abc	27 bcd	0 a	27.17	206 ab
Empower2 1.15G	T-band	0.80 bc	47 bcd	4 a	28.33	190 ab
Force 3G	Furrow	0.34 ab	70 abc	0 a	29.17	209 ab
Force 3G	T-band	0.27 ab	70 abc	0 a	29.00	202 ab
Force 3G	T-band SB	0.43 ab	47 a-d	0 a	28.33	205 ab
Fortress 2.5G	Furrow	0.72 abc	40 bcd	1 a	28.50	191 ab
Fortress 5G	Furrow SB	1.54 d	8 d	11 ab	28.17	182 b
Lorsban 15G	T-band	1.38 cd	7 d	6 ab	29.33	201 ab
Poncho 1250	ST	0.77 abc	20 cd	6 ab	28.67	209 ab
Regent 4SC	Furrow-M	0.61 ab	53 a-d	7 ab	27.67	202 ab
YieldGard RW	Bt seed	0.02 a	100 a	0 a	27.83	217 a
CHECK	----	1.68 d	3 d	29 c	27.67	186 ab

Table 1b. 2003–2004 summary of products used for the control of corn rootworms (five locations).

Treatment	Placement[1]	Node-injury[2,3]	Product consistency[3,4]	Percent lodging[3]	Stand count[5]	Yield (bu/a)[3]
Aztec 2.1G	Furrow	0.24 ab	82 ab	0 a	28.15	161 ab
Aztec 2.1G	T-band	0.33 b	70 b	0 a	27.71	155 bc
Aztec 4.67G	Furrow SB	0.29 ab	74 b	1 a	28.03	157 abc
Aztec 4.67G	T-band SB	0.27 ab	81 ab	0 a	27.70	157 abc
Capture 2EC	T-band	0.72 d	42 de	2 a	27.62	155 bc
Cruiser ST	ST	1.34 e	10 fg	20 b	27.68	158 abc
Force 3G	Furrow	0.26 ab	82 ab	0 a	27.50	164 ab
Force 3G	T-band	0.26 ab	79 b	0 a	27.29	164 ab
Fortress 2.5G	Furrow	0.38 bc	71 b	1 a	27.73	157 abc
Fortress 5G	Furrow SB	0.61 cd	63 bc	2 a	27.68	158 abc
Lorsban 15G	T-band	0.70 d	51 cd	2 a	28.09	156 bc
Poncho 1250	ST	0.84 d	25 ef	3 a	27.24	162 ab
YieldGard RW	Bt seed	0.03 a	98 a	1 a	27.35	171 a
CHECK	----	1.69 f	2 g	26 c	27.18	145 c

[1] SB = SmartBox application; ST = seed treatment; M = microtube application.
[2] Iowa State node injury scale (0–3). Number of full or partial nodes completely eaten.
[3] Means sharing a common letter do not differ significantly according to Ryan's Q Test ($P \leq 0.05$).
[4] Product consistency = percentage of times nodal injury was 0.25 (1/4 node eaten) or less.
[5] No significant differences between means (ANOVA, $P \leq 0.05$).