

# Corn Rootworm Insecticide Performance

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## Introduction

Commercially available corn rootworm insecticides are evaluated yearly for their ability to protect corn root systems from corn rootworm feeding injury. Three newly registered products, Cruiser<sup>®</sup> and Poncho<sup>®</sup> seed treatments (at the rootworm rate) and YieldGard<sup>®</sup> Rootworm (transgenic seed containing a *Bt* protein), are included in the tests. 2003 data from tests conducted at the Nashua, Sutherland, and Crawfordsville farms are presented in this report.

## Materials and Methods

Nashua plots were planted April 26, 2003, in an area that had been a corn rootworm beetle “catch crop” (high populations of late-planted corn) the previous year. The experimental design was a randomized complete block with 2-row treatments 100-ft in length, replicated four times. A four-row John Deere 7100 planter with 30-inch 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 pre-bagged seeds. DKC60-12 was the seed used for YieldGard<sup>®</sup> Rootworm treatments. Cruiser<sup>®</sup> and Poncho<sup>®</sup> seed treatments 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. On July 17, corn root systems were dug, washed, and rated for damage on the following 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 two inches 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.). Stand counts were taken on June 3. Lodging counts were taken on September 22, and the plot was machine harvested October 21.

## Results and Discussion

Table 1a. lists the results from the 2003 Nashua test. There was heavy rootworm feeding pressure with 2.46 nodes of roots eaten in the untreated CHECK. There were no significant differences in stand counts. Due to limited rainfall during July and August (Table 2), yields were much lower than normal. Only two treatments, YieldGard Rootworm and Force 3G applied T-band, had significantly higher yields than the CHECK. Stalk lodging that occurred with the Cruiser ST (33%) was not significantly different from the CHECK (34%).

The Crawfordsville location had rootworm feeding pressures and growing conditions similar to Nashua. YieldGard Rootworm and Cruiser ST had significantly higher yields than the CHECK. The Cruiser ST plants did not lodge at this location.

In stark contrast to the Crawfordsville and Nashua locations, Sutherland had adequate moisture through July (critical time for pollination). Even though there were significant differences between treatments in regard to Node-Injury, there were no significant yield differences. As we have seen in previous tests, where there is only moderate root injury (1.24 nodes eaten in the CHECK), significant yield differences normally do not occur when there is adequate moisture and no or very little plant lodging.

**Table 1a. 2003 evaluations for labeled corn rootworm treatments applied at planting time.<sup>1</sup>**

Treatment	Placement	Nashua (NE, IA)		
		Node-injury <sup>2,3</sup>	% lodging	Yield (bu/a)
Aztec 2.1G	Furrow	0.23 ab	0 a	120 a-c
Aztec 2.1G	T-band	0.59 b-e	0 a	110 bc
Aztec 4.67G	Furrow SB	0.30 a-c	0 a	117 a-c
Aztec 4.67G	T-band SB	0.38 a-d	0 a	111 bc
Capture 2EC	T-band	1.16 f	0 a	119 a-c
Counter 20CR	Furrow	0.78 c-f	0 a	111 bc
Counter 20CR	T-band	0.86 d-f	1 a	114 a-c
Cruiser 5FS	ST	1.84 g	33 b	121 a-c
Force 3G	Furrow	0.31 a-c	0 a	121 a-c
Force 3G	T-band	0.39 a-d	0 a	128 ab
Fortress 2.5G	Furrow	0.62 b-e	1 a	116 a-c
Fortress 5G	Furrow SB	0.91 ef	0 a	114 a-c
Lorsban 15G	T-band	1.23 f	3 a	107 bc
Poncho 1250	ST	1.07 ef	0 a	126 a-c
YieldGard RW	Transgenic	0.03 a	0 a	133 a
CHECK	----	2.46 h	34 b	106 c

**Table 1b.**

Treatment	Placement	Sutherland (NW, IA)			Crawfordsville (SE, IA)		
		Node-injury(0-3)	% lodging	Yield (bu/a)	Node-injury(0-3)	% lodging	Yield (bu/a)
Aztec 2.1G	Furrow	0.14 ab	0 a	202 ab	0.32 a	0 a	115 bc
Aztec 2.1G	T-band	0.12 ab	0 a	191 ab	0.58 a	0 a	109 bc
Aztec 4.67G	Furrow SB	0.16 ab	0 a	199 ab	0.28 a	0 a	103 c
Aztec 4.67G	T-band SB	0.10 ab	0 a	196 ab	0.37 a	0 a	114 bc
Capture 2EC	T-band	0.45 bc	0 a	201 ab	1.31 b	16 ab	90 c
Counter 20CR	Furrow	0.05 a	0 a	198 ab	0.51 a	0 a	99 c
Counter 20CR	T-band	0.04 a	0 a	188 b	0.25 a	0 a	98 c
Cruiser 5FS	ST	1.07 d	0 a	199 ab	1.15 b	0 a	134 ab
Force 3G	Furrow	0.11 ab	0 a	201 ab	0.50 a	0 a	118 a-c
Force 3G	T-band	0.08 a	0 a	196 ab	0.38 a	0 a	120 a-c
Fortress 2.5G	Furrow	0.13 ab	0 a	196 ab	0.25 a	0 a	120 a-c
Fortress 5G	Furrow SB	0.11 ab	0 a	211 a	0.36 a	0 a	110 bc
Lorsban 15G	T-band	0.19 ab	0 a	193 ab	0.49 a	0 a	104 bc
Poncho 1250	ST	0.58 c	0 a	208 ab	1.45 b	0 a	105 bc
YieldGard RW	Transgenic	0.01 a	0 a	197 ab	0.16 a	0 a	144 a
CHECK	----	1.24 d	1 b	191 ab	2.14 c	32 b	100 c

<sup>1</sup> Sutherland planted May 2, Crawfordsville May 14, and Nashua April 26.

<sup>2</sup> Iowa State Node-Injury Scale (0–3). Number of full or partial nodes completely eaten. Means based on 40 roots.

<sup>3</sup> Means sharing a common letter do not differ significantly according to Ryan's Q Test ( $P \leq 0.05$ ).

**Table 2. 2003 rainfall amounts**

	Crawfordsville		Nashua		Sutherland	
	Rainfall	DFN*	Rainfall	DFN	Rainfall	DFN
April	2.59	+0.55	3.84	+0.43	1.78	-1.04
May	6.48	+2.63	3.89	-0.45	3.80	+0.10
June	4.30	+0.03	6.09	+1.18	8.12	+3.69
July	1.77	-2.43	2.99	-1.68	5.51	+1.40
August	0.87	-2.89	0.49	-4.39	0.44	-4.19
TOTALS	16.01	-2.11	17.30	-4.91	19.65	-0.04

\*Deviation from normal.