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Products Evaluated for Corn Rootworm Management

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Abstract
Commercially available corn rootworm products were evaluated for their ability to protect corn-root systems from corn rootworm feeding injury (corn following corn tests). Products were also tested in the absence of corn rootworms (corn following soybean tests) to address the question, "Do corn rootworm transgenics have the same yield potential as their respective isolines?"

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Introduction

Commercially available corn rootworm products were evaluated for their ability to protect corn-root systems from corn rootworm feeding injury (corn following corn tests). Products were also tested in the absence of corn rootworms (corn following soybean tests) to address the question, "Do corn rootworm transgenics have the same yield potential as their respective isolines?"

Materials and Methods

Corn following corn tests. Plots were planted May 5 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 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. DKC60-18 was the corn hybrid used for the YieldGard Plus treatments (transgenic seed containing a Bt gene). DKC60-19, the non-Bt equivalent (near isoline) of the transgenic seed, was used with the granular and liquid insecticide treatments. Seed treatments were commercially applied to the near-isoline seed.

A test evaluating another corn rootworm transgenic seedcorn, Herculex XTRA, was planted adjacent to the previous test. The planting date and experimental design were identical to the previous test. Seed for Herculex XTRA was Pioneer 34A18. Pioneer 34A16 (a Herculex I conversion of 34A15) was used for the near-isoline seed.

Corn following soybean tests. Separate YieldGard Plus and Herculex XTRA tests were planted adjacent to each other on soybean ground on May 5. The experimental design for each test was a randomized complete block with two-row treatments, 100-ft in length, replicated four times. Evaluation dates were: stand counts, June 4; root injury, July 17; lodging counts, September 22; and machine yields, October 10.

Results and Discussion

YieldGard Plus tests (Tables 1a and 1b). There was moderately heavy corn rootworm feeding in the *corn-on-corn* test (CHECK=1.72 nodes eaten). All treatments had less root feeding than the CHECK. Node-injury scores for YieldGard Plus and Force (T-band) were not different. However, YieldGard Plus (transgenic seed) had higher yield than Force (applied to near-isoline seed). In the corn on soybean test, there were only a few roots that had feeding scars (no root pruning was observed). YieldGard Plus had a higher yield (+16 bu) than Force. In an identical test conducted at Crawfordsville, YieldGard Plus and Force had yields of 226 and 215, respectively. However, this 11-bushel difference was not statistically significant.

Herculex XTRA tests (Tables 2a and 2b). In the corn on corn test, Herculex XTRA and Force were not different from one another in any of the measurements taken. However, in the corn on soybean test, Herculex XTRA had a lower yield than both the Force and CHECK treatments (near-isoline seed). In identical tests at Crawfordsville, the corn on corn and corn on soybean node-injury scores and yields were not different.

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Table 1a. 2006 corn rootworm products evaluated at Nashua, IA–corn following corn test.

Treatment[a]	Placement[c]	Node-injury[d,e]	Product consistency[e,f]	Percent lodging[e]	Stand Ct ct.[7] 17.5 ft	Yield[e] (bu/a)
YieldGard Plus	Transgenic	0.01 a	100 a	0 a	31.13	214 a
Aztec 2.1G	T-band	0.06 a	100 a	0 a	30.50	175 b
Force 3G	T-band	0.06 a	100 a	0 a	29.63	177 b
Fortress 2.1G	Furrow	0.08 a	100 a	0 a	29.63	171 b
DEFCON 2.1G	T-band	0.08 a	100 a	0 a	29.13	178 b
DEFCON 2.1 G	Furrow	0.09 a	96 ab	0 a	29.00	176 b
Aztec 2.1G	Furrow	0.10 a	96 ab	0 a	30.25	170 b
Force 3G	Furrow	0.10 a	96 ab	0 a	29.50	177 b
Aztec 4.67G	T-band SB	0.14 a	92 ab	0 a	28.75	181 b
Regent 4SC	Furrow M	0.18 a	92 ab	0 a	28.88	173 b
Capture LFR	T-band	0.21 a	76 ab	0 a	29.63	180 b
Fortress 5G	Furrow SB	0.23 a	88 ab	0 a	28.25	173 b
Lorsban 15G	T-band	0.31 a	75 ab	0 a	29.50	178 b
Poncho ST	ST	0.35 a	67 bc	0 a	29.50	177 b
Cruiser ST	ST	0.63 b	46 c	0 a	28.38	176 b
CHECK	----	1.72 c	0 d	5 b	30.38	162 b

Table 1b. YieldGard Plus–corn following soybeans test.

YieldGard Plus	----	0.00 a	100	0	27.25	225 a
Force 3G	T-band	0.00 a	100	0	28.25	209 b
CHECK	----	0.01 b	100	0	28.25	198 c

Table 2a. 2006 Herculex XTRA–corn following corn test.

Treatment[b]	Placement[c]	Node-injury[d,e]	Product consistency[e,f]	Percent lodging[e]	Stand ct. 17.5 ft	Yield[e] (bu/a)
Herculex XTRA	----	0.03 a	100 a	5 a	28.88	210 a
Force 3G	T-band	0.21 a	92 a	0 a	30.38	202 a
CHECK	----	2.07 b	0 b	16 b	28.25	172 b

Table 2b. Herculex XTRA–corn following soybeans test.

Herculex XTRA	----	0.002 a	100	0	29.63	199 b
Force 3G	T-band	0.003 a	100	0	30.13	214 a
CHECK	----	0.012 b	100	0	28.63	216 a

[a]YieldGard Plus (DKC60-18); isoline seed for all other treatments (DKC60-19).
[b]Herculex XTRA (Pioneer 34A18); Force and CHECK (Pioneer 34A16 a Herculex I conversion of 34A15).
[c]T-band & Furrow=applied at planting; SB=SmartBox; ST=seed treatment; M=microtube.
[d]Iowa State Node-Injury Scale (0–3). Number of full or partial nodes completely eaten.
[e]Means sharing a common letter do not differ significantly according to Ryan's Q Test ($P \leq 0.05$).
[f]Product consistency=percentage of times nodal injury was 0.25 (¼ node eaten) or less.