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Corn Rootworm Insecticide Performance

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Abstract
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Introduction

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Materials and Methods

Corn was planted on 1 May in an area that had been planted to a corn rootworm beetle "catch crop" (high populations of late-planted corn) the previous year. The experimental design was a randomized complete block, with treatments applied to single 66-ft rows and replicated nine times. Granular and liquid planting-time insecticide formulations were applied with modified application equipment mounted on a four-row John Deere 7100 planter (30-inch row spacing). Liquid Furadan 4F post-emergence insecticide was applied with a small-plot bicycle sprayer. On 24 July, corn root systems were dug, washed, and rated for damage on the following Iowa State Node-Injury Scale: 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.). The Node-Injury scale allows us to additionally calculate a precise product performance consistency using individual root ratings. Product consistency equals the percentage of times a treatment limited feeding damage to 0.25 ($^{1}/_{4}$ of a node eaten) or less. It is very desirable to limit feeding damage to no more than a quarter node. With no more than $^{1}/_{4}$ node eaten, a plant will have an adequate root system to achieve its maximum yield potential, even under moisture stress conditions.

Results and Discussion

Table 1 lists results from the 2000 Nashua test, a 2000 summary from tests conducted throughout the state, and a multi-year (1998-2000) summary. The summaries provide the best overall product evaluations. In these summaries, only those replications that had sufficient larval feeding to challenge a product's performance are included. Replications that had an untreated check replication mean rating of less than 0.75 ($^{3}/_{4}$ node eaten) were deleted from the analyses. Also, the summaries help present the "big picture," because products were tested in a variety of soil types, tillages, fertilities, corn rootworm pressures, and environmental conditions.

A product consistency rating of 75% or higher is very acceptable. Over the years, most insecticides will not provide 100% consistency (the exception may be the transgenic seeds we are presently testing). The new seed treatments, ProShield and Prescribe, were ineffective in preventing corn rootworm feeding damage during this first year of testing. Neither product was significantly different from the CHECK. The other new product, Capture 2EC (a liquid pyrethroid) provided 75% consistency in the 2000 summary.

Table 1. Percentage of time products kept root injury below the economic injury level. Side-by-side comparisons of insecticide performance, Iowa State University.

		Product Consistency (%)[1]		
		Nashua Only	Six-Test Summary	15-Test Summary
Insecticide	Placement[2]	2000[3,6]	2000[4,6]	1998-2000[5,6]
Force 3G	Furrow	96 a	94 a	91 a
Aztec 2.1G	Furrow	100 a	91 a	88 a
Aztec 2.1G	T-band	100 a	96 a	87 ab
Force 3G	T-band	96 a	96 a	84 abc
Counter 20CR	T-band	85 ab	89 ab	79 abc
Counter 20CR	Furrow	81 ab	76 abc	76 abc
Fortress 5G	Furrow SB	70 abc	86 abc	73 bc
Capture 2EC	T-band	85 ab	75 abc	----
Lorsban 15G	T-band	70 abc	83 abc	70 cd
Furadan 4F	B'cast-nc	85 ab	67 bcd	70 cd
Fortress 5G	T-band SB	85 ab	95 a	69 cd
Lorsban 15G	Furrow	37 cd	65 cd	57 d
Thimet 20G	T-band	26 d	66 bcd	57 d
Regent 4SC	Furrow-M	85 ab	51 d	56 d
ProShield ST	ST	44 bcd	22 e	----
Prescribe ST	ST	41 cd	9 e	----
CHECK	----	30 cd	13 e	10 e

[1] Product consistency = percentage of time Iowa State Node-Injury rating was 0.25 ($^1/_4$ node eaten) or less.

[2] T-band & Furrow = granular insecticide applied at planting time;
B'cast-nc = liquid insecticide broadcasted during first 2 weeks of June, no cultivation;
SB = SmartBox application (all others are Noble application);
Furrow-M = microtube application, in-furrow.

[3] Nashua test (9 replications), 2000; 1.32 nodes eaten in the CHECK.

[4] Six tests (27 replications), throughout IA, 2000; 1.68 nodes eaten in the CHECK.

[5] Fifteen tests (69 replications), throughout IA, 1998-2000; 1.72 nodes eaten in the CHECK.

[6] Means sharing a common letter do not differ significantly according to Ryan's Q Test ($P \leq 0.05$).