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# Applying reduced rates of corn rootworm insecticides

## **Abstract**

Many farmers throughout the Midwest are applying soil insecticides for rootworm control at a rate below that stated on the insecticide label. This type of rate is called a reduced rate. The motivation behind using a reduced rate is primarily to save money by lowering the cost of growing corn. However, many farmers also are asking whether a reduced rate will provide the same amount of protection as the labeled rate.

## **Keywords**

Entomology

## **Disciplines**

Agricultural Science | Agriculture | Entomology

# INTEGRATED CROP MANAGEMENT

## **Applying reduced rates of corn rootworm insecticides**

Many farmers throughout the Midwest are applying soil insecticides for rootworm control at a rate below that stated on the insecticide label. This type of rate is called a reduced rate. The motivation behind using a reduced rate is primarily to save money by lowering the cost of growing corn. However, many farmers also are asking whether a reduced rate will provide the same amount of protection as the labeled rate.

### **Has Iowa State University tested the performance of reduced rates?**

During 1998 and 2000 at five locations across Iowa, several insecticides were evaluated at reduced rates. Counter, Force Lorsban, and Thimet were applied at full and 3/4-label rates. Aztec was applied at full and 1/2-label rates.

During 1994-1998, liquid Furadan 4F was applied during the first 2 weeks of June on postemergence corn. The full rate was applied as a broadcasted treatment over the row. A 1/4-rate was applied as a 7-inch band at the base of the plant. A nozzle was positioned on each side of the row to achieve this basal treatment. The same amount of active ingredient per unit area of soil was applied with each treatment. Thirteen gallons per acre of finished spray was applied in each treatment. Treatments were incorporated by cultivation in all but the 1998 test (no incorporation).

### **How were insecticides rated?**

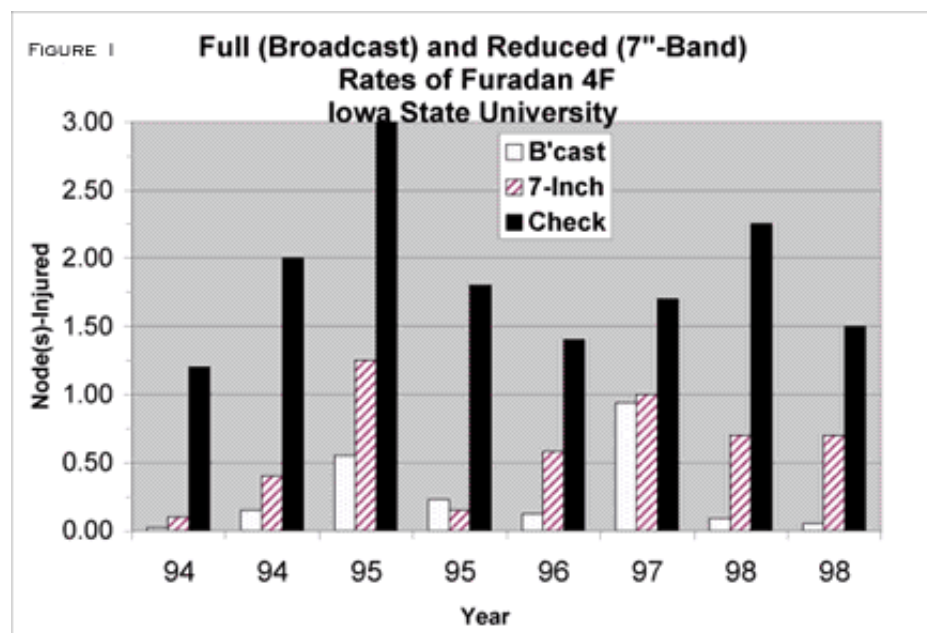
After the majority of corn rootworm feeding was finished (mid-July), corn root systems were dug, washed, and rated for damage on the following Iowa State Node-Injury Scale: 1.00 equals one node (circle or roots), or the equivalent of an entire node, eaten back to within approximately 2 inches of the 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 (e.g., 0.25 = 1/4 of one node eaten, 0.50 = 1/2 node eaten, and 1.25 = 1 1/4 nodes eaten).

Historically, corn lodging (as a result of corn rootworm feeding), has been kept to a minimum if no more than one node of roots has been eaten (1.00 node-injury rating). If there is adequate moisture, yield potentials have normally been reached if no more than half of a node of roots has been eaten (0.50 node-injury rating).

### **How did the reduced rates perform?**

We were not able to detect any differences in the performance of any product at either the full rate or reduced rate (Table 1). Although there was a wide range of performance, as noted in the product consistency column, statistically we could not separate the differences. Therefore, the data suggest that all products probably worked equally well in protecting roots from insect injury during this 2-year study.

In the Furadan reduced-rate study, the 1/2 rate of Furadan liquid kept feeding below one node in all but one instance at eight different locations over 5 years (Fig. 1). However, potential yield loss was prevented only 37 percent of the time with the reduced rate, as opposed to 75 percent of the time with the full rate.



### What is the position of the insecticide manufacturers?

Manufacturers of insecticides are under no legal obligation to guarantee the performance of their products when they are used below the minimum labeled rate. The farmer assumes the risk of performance when using a reduced rate.

### What if a farmer wants to use reduced rates anyway?

It is not illegal to use less pesticide. Farmers should consider several other factors before experimenting with reduced rates. First, all insecticide boxes on the planter must be calibrated before planting so that the exact rate can be applied. Second, reducing the rate to half the labeled rate may be pushing the performance expectations too far. Third, if reduced rates are used, always plant some test strips at the full-labeled rate, along with an untreated strip, so that root protection and yields can be evaluated. Fourth, start out small and test it on only a few acres to determine whether it fits into the farming operation.

**Table 1. Summary of reduced insecticide rates.**

				Node-Injury <sup>c,d</sup>	
			Product		

Insecticide	Placement <sup>a</sup>	Rate	Consistency (%) <sup>b,c</sup>	Full	Partial (%)
Counter 20CR	T-band	Full	98a	0	06a
Force 3G	T-band	3/4	98a	0	07ab
Fortress 5G	T-band SB	Full	98a	0	09ab
Lorsban 15G	T-band	Full	93a	0	12ab
Fortress 5G	Furrow SB	Full	92a	0	13ab
Counter 20CR	Furrow	3/4	90a	0	11ab
Counter 20CR	T-band	3/4	90a	0	12ab
Force 3G	T-band	Full	90a	0	12ab
Aztec 2.1G	T-band	Full	90a	0	13ab
Force 3G	Furrow	Full	90a	0	13ab
Lorsban 15G	T-band	3/4	90a	0	15ab
Counter 20CR	Furrow	Full	88a	0	16ab
Aztec 2.1G	Furrow	Full	86a	0	16ab
Thimet 20G	T-band	3/4	83a	0	22ab
Aztec 2.1G	Furrow	1/2	83a	0	23ab
Force 3G	Furrow	3/4	81a	0	19ab
Lorsban 15G	Furrow	Full	79a	0	21ab
Aztec 2.1G	T-band	1/2	79a	0	23ab
Thimet 20G	T-band	Full	79a	0	25ab
Furadan 4F	B'cast-nc	Full	71a	0	35ab
Regent 4SC	Furrow-M	Full	67a	0	53b
Check	--	--	11b	1	64c

Data are from Iowa State University corn rootworm efficacy tests (five locations, 1998 and 2000).. Side-by-side comparisons in 14 replications; chemical means based on 42 observations; multiple check means based on 126 observations; replications that did not have sufficient larval feeding to challenge a product's performance (UTC < 0.75 of a node injured) were deleted from these analyses (14 of 20 replications analyzed).

<sup>a</sup>T-band and Furrow, insecticide applied at planting time; SB, SmartBox application; B'cast-nc, liquid insecticide broadcasted post-planting, no cultivation; Furrow-M, microtube application, in-furrow (water carrier rate of 1

gallon/acre in 1998; 4 gallons/acre in 2000).

<sup>b</sup>Product consistency is percentage of times Node-Injury Scale rating was 0.25 (1/4 node eaten) or less.

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

<sup>d</sup>Iowa State Node-Injury Scale (0-3); Full, number of nodes completely eaten; partial, percentage of a node (or an additional node) eaten.

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