Two-year summary of corn rootworm insecticides and YieldGard® Rootworm

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Abstract
Two integrated pest management strategies are commonly used to protect corn roots from corn rootworm injury: crop rotation and insecticides. If corn is not rotated, or if extended diapause northern corn rootworms occur in a field, a soil insecticide might be necessary to protect the roots in 2005. The reason we say it might be necessary is because many fields do not have a rootworm population of a sufficient size to cause economic damage. There are thousands of continuous cornfields across Iowa in which a rootworm insecticide is not used and is not necessary.

Keywords
Entomology

Disciplines
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Two-year summary of corn rootworm insecticides and YieldGard® Rootworm

Two integrated pest management strategies are commonly used to protect corn roots from corn rootworm injury: crop rotation and insecticides. If corn is not rotated, or if extended diapause northern corn rootworms occur in a field, a soil insecticide might be necessary to protect the roots in 2005. The reason we say it might be necessary is because many fields do not have a rootworm population of a sufficient size to cause economic damage. There are thousands of continuous cornfields across Iowa in which a rootworm insecticide is not used and is not necessary. But without field scouting information from the summer of 2004, it is difficult to know whether you will need a soil insecticide next spring. If an insecticide is used next year, protection of corn roots and yield should be two of the major considerations when selecting a product.

During the past two summers, corn rootworm insecticides and YieldGard Rootworm corn were evaluated in side-by-side trials at several locations across the state. These field trials measure performance in protecting corn roots under a wide range of environmental conditions. Performance is then measured in several ways. Roots are rated for corn rootworm injury and then the product is evaluated for its consistency, which is the percentage of times it adequately protected corn roots from economically damaging injury.

Roots are evaluated using the new Iowa State Node-Injury Scale, which rates roots from 0 to 3 nodes eaten. The Node-Injury Scale more accurately reflects the relationship of injury from the low end to the high end of the scale, compared with the old (and archaic) Iowa 1-6 scale. We use a node-injury score of 0.25 (1/4 node eaten back to within 11/2 inches of the stalk) or less to establish whether a product provided good root protection. We encourage you to view the interactive root rating page to better understand this root-injury rating system.

No product was 100 percent consistent in providing total root protection during 2003-2004 (see table). From a statistical standpoint, YieldGard Rootworm, Force 3G (in-furrow), Aztec 2.1G (in-furrow), and Aztec 4.67G (T-band SmartBox) had the best consistency in root protection. All products were equal in protecting against lodging except Cruiser seed treatment. There were no differences in plant populations across products.

Yields were similar, statistically speaking, across a number of products. As an example, the average YieldGard Rootworm yield was 171 bushels, yet it was not significantly different from Poncho seed treatment with 162 bushels, or any other yield followed by the small letter "a." Although there are no significant differences among some of these average yields, this does not prove that some of the products had no effect. There is always the possibility that there was a real treatment effect, but the experiments were not sensitive enough to detect differences at the 5 percent level of probability. As stated in the statistical book, Agricultural Experimentation, the conclusions you make concerning an experiment should be your own and should be based on more than statistical evidence. Another way of evaluating the
information is to consider the percent of time that the yield was significantly larger than the untreated check yield (last column).

There is an abundance of data to consider when selecting a corn rootworm product this winter. Other factors worthy of consideration might be cost, pounds of active ingredient being applied per acre, ease of handling, application equipment needed, other pests controlled, restricted use labeling, potential hazards to surface water, or spray drift.


<table>
<thead>
<tr>
<th>Insecticide</th>
<th>Placement1</th>
<th>Node-Injury2,3,4</th>
<th>Product Consistency4,5,6</th>
<th>Percent Lodging4,7</th>
<th>Stand Count8,9</th>
<th>Yield (bu/acre)4,10</th>
<th>% Times Yield &gt; Check11</th>
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</thead>
<tbody>
<tr>
<td>Aztec 2.1G</td>
<td>Furrow</td>
<td>0.24 ab</td>
<td>82 ab</td>
<td>0 a</td>
<td>28.15</td>
<td>161 ab</td>
<td>20%</td>
</tr>
<tr>
<td>Aztec 2.1G</td>
<td>T-band</td>
<td>0.33 b</td>
<td>70 b</td>
<td>0 a</td>
<td>27.71</td>
<td>155 bc</td>
<td>20%</td>
</tr>
<tr>
<td>Aztec 4.67G</td>
<td>Furrow SB</td>
<td>0.29 ab</td>
<td>74 b</td>
<td>1 a</td>
<td>28.03</td>
<td>157 abc</td>
<td>20%</td>
</tr>
<tr>
<td>Aztec 4.67G</td>
<td>T-band SB</td>
<td>0.27 ab</td>
<td>81 ab</td>
<td>0 a</td>
<td>27.70</td>
<td>157 abc</td>
<td>20%</td>
</tr>
<tr>
<td>Capture 2EC</td>
<td>T-band</td>
<td>0.72 d</td>
<td>42 de</td>
<td>2 a</td>
<td>27.62</td>
<td>155 bc</td>
<td>20%</td>
</tr>
<tr>
<td>Cruiser ST</td>
<td>ST</td>
<td>1.34 e</td>
<td>10 fg</td>
<td>20 b</td>
<td>27.68</td>
<td>158 abc</td>
<td>20%</td>
</tr>
<tr>
<td>Force 3G</td>
<td>Furrow</td>
<td>0.26 ab</td>
<td>82 ab</td>
<td>0 a</td>
<td>27.50</td>
<td>164 ab</td>
<td>20%</td>
</tr>
<tr>
<td>Force 3G</td>
<td>T-band</td>
<td>0.26 ab</td>
<td>79 b</td>
<td>0 a</td>
<td>27.29</td>
<td>164 ab</td>
<td>40%</td>
</tr>
<tr>
<td>Fortress 2.5G</td>
<td>Furrow</td>
<td>0.38 bc</td>
<td>71 b</td>
<td>1 a</td>
<td>27.73</td>
<td>157 abc</td>
<td>20%</td>
</tr>
<tr>
<td>Fortress 5G</td>
<td>Furrow SB</td>
<td>0.61 cd</td>
<td>63 bc</td>
<td>2 a</td>
<td>27.68</td>
<td>158 abc</td>
<td>20%</td>
</tr>
<tr>
<td>Lorsban 15G</td>
<td>T-band</td>
<td>0.70 d</td>
<td>51 cd</td>
<td>2 a</td>
<td>28.09</td>
<td>156 bc</td>
<td>20%</td>
</tr>
<tr>
<td>Poncho 1250</td>
<td>ST</td>
<td>0.84 d</td>
<td>25 ef</td>
<td>3 a</td>
<td>27.24</td>
<td>162 ab</td>
<td>40%</td>
</tr>
<tr>
<td>YieldGard RW12</td>
<td>--</td>
<td>0.03 a</td>
<td>98 a</td>
<td>1 a</td>
<td>27.35</td>
<td>171 a</td>
<td>80%</td>
</tr>
<tr>
<td>CHECK</td>
<td>--</td>
<td>1.69 f</td>
<td>2 g</td>
<td>26 c</td>
<td>27.18</td>
<td>145 c</td>
<td>--</td>
</tr>
</tbody>
</table>

1 T-band and Furrow = insecticide applied at planting time; SB = SmartBox application; ST = seed treatment.

2 Means based on 170 root injury observations; replications with insufficient larval feeding pressure to challenge a product’s performance (UTC rep mean < 0.75 of a node injured) were deleted from the analysis (19 of 20 replications analyzed).
3 Iowa State Node-Injury Scale (0-3). Number of full or partial nodes completely eaten.

4 Means sharing a common letter do not differ significantly according to Ryan's Q Test (P £ 0.05).

5 Product consistency = percentage of times nodal injury was 0.25 (1/4 node eaten) or less.

6 Means based on 170 root injury observations.

7 Means based on 34 observations (plants lodged in 17.5 row-ft).

8 Means based on 34 observations (number of plants in 17.5 row-ft).

9 No significant differences between means (ANOVA, P £ 0.05).

10 Means based on 19 observations.

11 Percent of time that yield was statistically different from the untreated check for individual trials.

12 Corn hybrid DKC60-12 used in all YieldGard trials. DKC60-15 used in all insecticide treatment trials.

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Links: