2005 EVALUATION OF INSECTICIDES
AND PLANT-INCORPORATED PROTECTANTS

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Insects Investigated

Corn rootworm   Wireworm   White Grub

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Introduction

The corn rootworms, *Diabrotica virgifera* *virgifera* (western corn rootworm) and *D. barberi* (northern corn rootworm), are the most serious pests of *Zea mays* (corn) in the United States Corn Belt. Eggs are laid in the soil during the fall and hatch the following spring. Larval feeding on corn roots in June not only causes physiological yield loss, but also results in harvesting losses because of plant lodging. Adult emergence from the soil is underway by early July and continues through late summer. Additional crop losses can be caused by the beetles feeding on the female flowers (silks) and soft kernels. In Iowa, crop rotation, where it fits cropping practices, remains the preferred method of control. However, it is also economically feasible to protect corn roots with insecticides and plant-incorporated protectants, i.e. transgenic seedcorn that contains naturally occurring soil bacterium *Bacillus thuringiensis* (*Bt*).

Wireworms are a sporadic problem in Iowa, but their seed/seeding injury can reduce plant stands to levels that justify replanting entire fields or portions of fields, i.e. “hot spots.” The larvae cause injury by either boring into and hollowing out the seed or by boring into or through the seedling stalk. Wireworms are the larvae of small- to medium-sized beetles, commonly called click beetles. These adult beetles lay their eggs in the soil of grassy areas or cultivated fields. The larvae require from one to as many as seven years to develop into adults. Most problems occur where corn follows perennial grass stands.

True white grubs (three-year life cycle) can also cause early-season stand reductions in corn by feeding on the roots. True white grubs are the larvae of scarab beetles, *Phyllophaga* spp. (June Beetles). Problems are usually found adjacent to areas bordered by cottonwood, poplar, or willow trees. In May and June the adult beetles emerge and fly to the trees to feed and mate. The females deposit the majority of their eggs near their food source and larvae hatch in 30–50 days. It is the next year, or the second year of their larval stage, when the greatest injury occurs.

Objective

Our goal is to serve Iowa agriculture by monitoring performance of registered insecticides and evaluating new chemical and transgenic tools that are more economical, efficacious, and environmentally compatible. Given this end, we maintain a viable, progressive, and scientifically sound product evaluation program.

Testing Procedures and Evaluations

Field Selection – Product efficacy test plots were established at eight Iowa locations in 2005. Corn rootworm (CRW) research areas are continually maintained on University farms located at: Ames-Johnson Farm, Crawfordsville-SE Research Farm, Nashua-NE Research Farm, and Sutherland-NW Research Farm. Each research area is divided into two sections that annually alternate as test plot and late-planted trap crop. The seed used for the trap crop is a mixed-maturity blend with a greater proportion of late-maturing varieties. The trap crop constitutes a favorable environment for egg laying late in the season when other fields are maturing.
White grub tests were established in perennial problem fields near Williams and Carlisle (both central IA).

Problem wireworm fields (east central IA), that had been monitored by a certified crop advisor for many years, were selected for test sites. Plots were established in the documented “hot spots.”

Table 1 lists the type of test(s) conducted at each location, target pest, and other general plot information. CRW treatments were tested in three different types of tests: (1) **Experimental Tests** - registered and developmental products applied at planting time; (2) **Yield Tests** - only registered and Experimental Use Permit products applied at planting time; (3) **Transgenic CRW Seed Tests** – developmental and/or registered transgenic seeds and registered products (applied to isoline seed).

**Field Plot Design and Application Techniques** - Experimental unit size and number of replications for each test are shown in Table 1.

**Corn Rootworm Tests:**
The experimental design in all CRW tests was a randomized complete block (RCB) with four replications. Treatments were applied to single 50-ft rows in the experimental tests, two 100-ft rows in the yield tests, and four 20–30-ft rows in the transgenic tests. Seeds were pre-bagged and planted with a 4-row John Deere Max-Emerge™ 7100 integral planter that had 30-inch row spacing. The standard planter fiberglass seed hoppers with attached “finger pickup mechanisms,” were replaced with modified units. On the new units, the metal plate that covered the “fingers” had been replaced with a 7/8-inch, clear Plexiglas plate. Inserted through the Plexiglas was a small stainless steel cylinder. The cylinder was positioned to deliver seed to the “pickup fingers.” At the beginning of each replication pre-bagged seed was dumped into the steel cylinder. At the end of each replication, a hydraulic motor (attached to the planter's drive shaft) was activated to expel any unplanted seed. Granular insecticide formulations were applied with modified Noble® metering units mounted on the planter. The Noble units were calibrated in the laboratory to accurately deliver material at a tractor speed of 4 mph. Plastic tubes directed the granular treatments to either a 7-inch band ahead of the closing wheels (T-band, All-Terrain Banders), or to the seed furrow, placing all the insecticide directly in-furrow (Furrow). Wind shields were positioned around each row to prevent insecticide displacement. The wind shields consisted of a metal "U-frame" positioned parallel to the ground, above and surrounding each row's press wheels; the open end was adjacent to the gauge wheels. Eleven-inch poly-bristle skirts were attached to the frame and the frame positioned so the bristle tips touched the ground. Each row was constantly monitored to ensure that insecticides were correctly applied at all times. Final incorporation was accomplished with drag chains mounted behind the closing wheels.

The seed applications of Cruiser®, Cruiser Extreme Pak®, and Poncho®, were done commercially.

Liquid A14776 200CS, Capture® 2EC, Lorsban® 4EC, Lorsban 75WG, and Regent® 4SC planting-time treatments were applied with a compressed-air system designed and built directly into the planter by Almaco manufacturing (Nevada, IA). This closed handling system consisted of 3-gallon product canisters equipped with quick disconnects. Pink microtubes were
used to apply Regent 4SC. Twenty-two psi was used to deliver the water carrier rate of 4 gallons per acre (GPA). Stainless steel tube guides, placed directly behind the seed-drop tubes, positioned the microtubes for these in-furrow treatments. All other liquid treatments were applied either T-band or furrow using TeeJet® XR80015 spray nozzles at 21 psi to deliver 5 GPA of finished spray.

Aztec® 4.67G and Fortress® 5G treatments were applied with modified SmartBox™ metering units. The commercial SmartBox™ metering units were removed from their large-base containers and sandwiched between a flat metal plate on the bottom and a custom-made, threaded plastic cap on the top. The bottom plate had been fabricated so that it could be slid in and out of the same planter mounting brackets used for the Noble units. An inverted 1000-ml Nalgene® bottle, screwed into the top cap, provided a secure and sealed container for insecticide. A short plastic tube attached to the dispenser opening of the metering unit could be connected to either the planter’s T-band or Furrow tubes. The controllers (2), mounted in the tractor cab, were used to operate the SmartBox metering units (2/controller). All treatments were applied at 4 mph using the “fixed speed mode” on the SmartBox controllers.

**Corn Rootworm Larval Injury and Damage Evaluations**

**Root-Injury** – Five root systems were dug from each insecticide treatment row in the experimental and transgenic tests; three roots per row were dug in the yield tests. Prior to transport back to Ames, roots were tagged for identification and excess soil was removed. In Ames, a pressurized water spray was used to remove the remaining soil. Roots were then evaluated for rootworm feeding injury on the following Iowa State node-injury scale (0–3):

**Node-Injury Scale (0–3)**

0.00 – No feeding damage (lowest rating that can be given)

1.00 – One node (circle of roots), or the equivalent of an entire node, eaten back to within ~ 1½ inches of the stalk (soil line on the 7th node)

2.00 – Two nodes eaten

3.00 – Three or more nodes eaten (highest rating that can be give)

Damage in-between complete nodes eaten is noted as the percentage of the node missing, e.g. 1.50 = 1½ nodes eaten and 0.25 = ¼ of one node eaten. The linear node-injury scale allows injury to be expressed intuitively and has proved useful in evaluating minor injury, especially
with transgenic seed corn. For an interactive guide to the node-injury scale, see the Iowa State University Entomology web site at:

http://www.ent.iastate.edu/pest/rootworm/nodeinjury/nodeinjury.html

A product consistency (%) was also calculated for each treatment. Product consistency equals the percentage of times a treatment limited feeding injury to 0.25 node or less. Greater injury can result in economic yield loss, especially when plants are moisture stressed.

To determine insecticide effectiveness, data were analyzed with standard ANOVA procedures. Ryan's Q Test (REGWQ) was used to rank treatment means where significant differences (P > F < 0.05) occurred.

**Stand Counts** - The number of plants in 17.5 row-ft was recorded.

**Lodging Counts** (Taken at harvest time) - A plant was considered lodged if it was leaning at least 30° from vertical. See individual table footnotes for length of row, or number of plants used to calculate percent lodging.

**Yields** - Both yield tests were machine harvested. Weights were converted to bushels/acre of No. 2 shelled corn at 15.5% moisture and analyzed for treatment effects.

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**Comments on Trials and Product Performance**

Tables list treatment rates as ounces a.i. per 1,000 row-ft unless otherwise indicated in the footnotes.

**AMES (central Iowa)**

**Experimental Test (Tables 2 & 3):** Because of light insect pressure (less than ¾ node eaten), there were no significant differences (s.d.) between treatments. There was no plant lodging in this test.

**Monsanto Transgenic Test (Table 4):** The two CRW transgenics as well as Force and Poncho 1250, were s.d. from the untreated check (UTC). Since Poncho 250 is not considered effective in reducing CRW injury, it is used as the UTC in this test.

**CRAWFORDSVILLE (SE Iowa)**

Drought conditions existed at Crawfordsville this year, with below normal rainfall amounts recorded April through August (see weather appendix for daily rainfall amounts).

**Yield Test (Tables 5–8):** This test had severe root injury with 2.40 nodes injured in the UTC. All treatments were s.d. from the UTC in node-injury scores, however the seed treatments Poncho and Cruiser as well as Regent, had root injuries greater than one node of roots. These three treatments, plus the UTC, were the only treatments that had lodging. In regards to yield, YieldGard Plus had a significantly higher yield than all other treatments. In a drought situation
it becomes very important for corn roots to reach moisture that is located much deeper in the ground. When evaluating root systems under “normal” growing conditions, a plant is able to take up adequate moisture, even when there is some root pruning. The node-injury scale describes pruning as a root eaten back to approximately 1.5 inches of the stalk. In a drought situation, not only root pruning, but also injury occurring at the tips may become important. Typically, when scoring root injury, only a portion of the entire root system (root lengths of approximately 10−15 inches) can be evaluated. Roots that may have grown deeper in the soil profile (four feet or more) are “pulled off” when the root ball/system is excavated. The ends of these “pulled off” roots are normally viewed as clean sharp breaks, with no dark discoloring at the break. A darkened and/or more ragged look at the break is indicative of rootworm feeding. When root pruning is observed, there are usually several to many root tips that also show injury. In a drought environment, these tip-injured roots (as well as the pruned roots) do not have the opportunity to reach moisture. In other words, in a drought environment, this tip feeding may be equivalent to root pruning, but only the pruning injury is recorded. Also, concerning the “pulled off” roots, they could have sustained injury between the point where they were broken off and the point where soil moisture could be utilized. With tip-injury added to pruning, a 0.11 score in a drought environment could be equivalent to a 1.00 score (or higher) in an “adequate moisture” environment. This hypothesis would help explain the significant yield differences seen between node-injury scores of 0.05 and 0.11. At the Crawfordsville location, I reanalyzed the product consistency data using a node-injury score of 0.02 or less as the bench mark for consistency. Per the node-injury scale description, a 0.02 score is defined as: “root system not perfect; scarring and/or channeling” (no tip feeding observed). YieldGard Plus had a 71 percent consistency using this bench mark and was s.d. from all other treatments (Table 5). The s.d. between treatments in regards to product consistency (using 0.02) and yield were identical (Table 8). The correlation of product consistency to yield was r=48 and r=73 using scores of 0.25 and 0.02, respectively.

**Pioneer and Dow Herculex RW Tests (Tables 9 & 10):** These were each separate tests, but were adjacent to the previously discussed yield test. The transgenic roots in each test had no tip feeding, only very minor scaring/channeling. Since these transgenics had not yet received EPA registration, plants were severely detasseled (plants cut off below ear level) prior to tasseling; no yield data available.

**NASHUA (NE Iowa)**

Weather conditions were considerably better (mainly rainfall amounts) at Nashua than at Crawfordsville. April through August rainfall amounts totaled 24.36 and 13.41 inches at Nashua and Crawfordsville, respectively (see weather appendix for daily rainfall amounts).

**Yield Test (Tables 11–14):** Rootworm injury was punishing, with the UTC having almost three nodes of roots eaten (2.88 node-injury score). There was no advantage to combining a seed treatment with an insecticide. Injury scores for an insecticide alone versus the same insecticide with a seed treatment were almost identical (same placement for insecticide); i.e. 0.26, 0.27, 0.30 scores for Aztec, Aztec+Poncho 1250, and
Aztec+Poncho 250, respectively. Regent node-injury scores were below one node at Nashua (0.71), as opposed to over one node at Crawfordsville (1.39); the additional moisture most likely helped activate this product. As seen in past years, Fortress treatments did not perform as well when compared to other locations; no answer for this drop in efficacy can be given. The increase in percent lodging basically mirrored the increase in node-injury scores when scores rose above 1.00 node eaten. Plants were standing well until a rain storm the night of July 17th caused plants to lodge. With adequate moisture, even products with considerable root injury were able to yield well (all treatments s.d. from the UTC). What is surprising is the significant yield advantage YieldGard Plus provided; 30+ bu/a over other treatments. A more detailed look at temperature and rainfall surrounding the critical pollination period, shows temperature in mid July hovering around the 90 degree with rainfall absent. This stress could have been enough to give the transgenic treatment an advantage. When the product consistencies were reanalyzed, I found that using a 0.10 node injury score as the bench mark (1-2 roots pruned on a root system), gave results that reflected the s.d. between treatments reported in the yield table (see Tables 11 & 14).

**SUTHERLAND (NW Iowa)**

*Experimental Test (Tables 15–17):* There was heavy rootworm feeding with 2.23 nodes injured in the UTC. The low rates of Poncho and Cruiser seed treatments are not labeled for control of rootworms, but were included in this test to see if they provided any reduction in root injury; they were not s.d. from the UTC. All seed treatments plus Regent failed to keep feeding injury below one node. All liquid treatments, regardless of placement, performed well. Plant lodging was essentially non existent in this test (≤3%).

**White Grub Evaluations**

**CARLISE**

**WILLIAMS (Tables 18–20)**

Following stand counts, seeds/seedlings were carefully extracted sections of each row and inspected for feeding, and rated on the following 1–4 damage scale:

1 - seed/seedling undamaged
2 - seed/seedling damaged, but plant established
3 - seed/seedling damaged, plant showing some signs of stress
4 - seed/seedling damaged, no plant or questionable establishment.

Feeding was light at the Carlisle location with most injured plants able to survive. Feeding was not observed in the untreated checks at the Williams location and the plot was not evaluated further. No s.d. were observed in stand count measurements at either location.

**Wireworm Evaluations**

**WEST LIBERTY-north (Tables 21 & 22)**

**WEST LIBERTY-south (Tables 23 & 24)**

The seed/seedling evaluations (scale described previously) revealed only very minor wireworm injury. Stand counts at both locations revealed no s.d. among treatments.
Calibration Information

Small pieces of foreign material had to be removed from several insecticide shipments received from AMVAC Chem. Corp. All Noble units were laboratory calibrated and units were randomly spot-checked in the field prior to planting. SmartBox units were calibrated on the planter in accordance with the SmartBox Operator's Manual instructions. During calibration and planting, the flowability of each formulation was noted, as well as any other calibration problems. There were no calibration or delivery problems with any treatment.

Agronomic Information, Weather Data, and Materials Tested

Agronomic information and field insecticide history for each test plot are listed in Appendix I. Weather data from the test site or the nearest Iowa Climatological Station are listed in Appendix II. Information on materials tested is listed in Appendix III.

Research Support

Our thanks to the Iowa Agriculture and Home Economics Experiment Station and the following companies for providing support for this research: AGRILIANCE LLC, AMVAC Chem. Corp., BASF Corp., Bayer Corp., Dow AgroSciences, FMC Corp., Helena Chemical Co., Monsanto Co., Pioneer Hi-Bred International, Inc., and Syngenta.

***************
This report deals with the relative ability of each treatment to protect corn from damage by soil insects. The information is not presented to endorse the use of any product and the name of Iowa State University should not appear in any advertising without prior written consent. Iowa State University, their respective officers, agents, or employees, have not made, and do not hereby make, any representation, warranty or covenant with respect to the use of these test results, nor will they be liable for any damages, losses, or claims, including those of an incidental or consequential nature, arising out of the use of these test results.

***************
Table 1. Iowa insecticide test information for 2005.

<table>
<thead>
<tr>
<th>Target Pest</th>
<th>Test Location</th>
<th>Type of Test</th>
<th>Entries/Row</th>
<th>Row Length (ft)</th>
<th># Reps</th>
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<tbody>
<tr>
<td>Corn Rootworms</td>
<td>Ames</td>
<td>Experimental</td>
<td>26</td>
<td>40</td>
<td>4</td>
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<tr>
<td></td>
<td></td>
<td>Monsanto Transgenic</td>
<td>5</td>
<td>30</td>
<td>3</td>
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<tr>
<td></td>
<td>Crawfordsville</td>
<td>Yield</td>
<td>17</td>
<td>100</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pioneer Transgenic</td>
<td>3</td>
<td>20</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dow Transgenic</td>
<td>3</td>
<td>20</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Nashua</td>
<td>Yield</td>
<td>22</td>
<td>100</td>
<td>4</td>
</tr>
<tr>
<td></td>
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<td>Experimental</td>
<td>26</td>
<td>50</td>
<td>4</td>
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<td>White Grub</td>
<td>Carlisle</td>
<td>White Grub</td>
<td>18</td>
<td>50</td>
<td>4</td>
</tr>
<tr>
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<td>50</td>
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<td>18</td>
<td>50</td>
<td>4</td>
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<td></td>
<td>West Liberty-South</td>
<td>Wireworm</td>
<td>18</td>
<td>50</td>
<td>4</td>
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</table>

1Two randomized check rows in wireworm and white grub tests.
Table 2. Average root-injury and product consistency for planting-time insecticide treatments. Experimental test, Ames, IA. 2005

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Form.</th>
<th>Rate</th>
<th>Placement</th>
<th>Node-Injury</th>
<th>Product Consistency</th>
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<tr>
<td>YieldGard Plus</td>
<td>Trans.</td>
<td>----</td>
<td>----</td>
<td>0.02</td>
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<td>0.185</td>
<td>Furrow</td>
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<td>100 a</td>
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<td>4.67G</td>
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<td>Furrow</td>
<td>0.03</td>
<td>100 a</td>
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<td>Force</td>
<td>3G</td>
<td>0.12</td>
<td>T-band</td>
<td>0.04</td>
<td>100 a</td>
</tr>
<tr>
<td>Capture</td>
<td>2EC</td>
<td>0.09</td>
<td>T-band</td>
<td>0.04</td>
<td>100 a</td>
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<tr>
<td>A14776</td>
<td>200CS</td>
<td>0.145</td>
<td>T-band</td>
<td>0.04</td>
<td>100 a</td>
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<tr>
<td>Poncho 1250</td>
<td>600FS</td>
<td>1.25 mg</td>
<td>ST</td>
<td>0.04</td>
<td>100 a</td>
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<td>A14776</td>
<td>200CS</td>
<td>0.18</td>
<td>T-band</td>
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<td>Furrow</td>
<td>0.06</td>
<td>100 a</td>
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<tr>
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<td>0.11</td>
<td>Furrow</td>
<td>0.06</td>
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<tr>
<td>Lorsban</td>
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<td>T-band</td>
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<td>100 a</td>
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<td>T-band</td>
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<td>T-band</td>
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<td>T-band</td>
<td>0.11</td>
<td>100 a</td>
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<tr>
<td>Cruiser Extreme</td>
<td>5FS</td>
<td>1.26 mg</td>
<td>ST</td>
<td>0.22</td>
<td>90 ab</td>
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<td>Poncho 250</td>
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<td>CHECK</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>0.71</td>
<td>60 ab</td>
</tr>
</tbody>
</table>

1 Planted April 28, 2005; evaluated July 11, 2005.
2 Ounces a.i. per 1,000 row-ft; Cruiser and Poncho ST listed as a.i. per seed.
3 T-band & Furrow = insecticide applied at planting time; SB = SmartBox application; ST = seed treatment; M = microtube application.
4 Chemical and check means based on 20 observations (5 roots/row x 4 replications).
5 Iowa State node-injury scale (0−3). Number of full or partial nodes completely eaten.
6 No significant differences between means (ANOVA, P < 0.05).
7 Means sharing a common letter do not differ significantly according to Ryan’s Q Test (P ≤ 0.05).
8 Product consistency = percentage of times nodal injury was 0.25 (¼ node eaten) or less.
9 Five gallons finished spray per 17,424 row-ft.
10 Four gallons water carrier per 17,424 row-ft.
Table 3. Average stand counts for planting-time insecticide treatments.  
Experimental test, Ames, IA.  2005

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Form.</th>
<th>Rate(^2)</th>
<th>Placement(^3)</th>
<th>Stand Count(^4)(^5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lorsban(^6)</td>
<td>75WG</td>
<td>0.90</td>
<td>T-band</td>
<td>29.00</td>
</tr>
<tr>
<td>Poncho 250</td>
<td>600FS</td>
<td>0.25 mg</td>
<td>ST</td>
<td>28.75</td>
</tr>
<tr>
<td>Cruiser</td>
<td>5FS</td>
<td>0.25 mg</td>
<td>ST</td>
<td>28.25</td>
</tr>
<tr>
<td>A14776(^6)</td>
<td>200CS</td>
<td>0.145</td>
<td>T-band</td>
<td>28.25</td>
</tr>
<tr>
<td>A14776(^6)</td>
<td>200CS</td>
<td>0.18</td>
<td>T-band</td>
<td>28.25</td>
</tr>
<tr>
<td>Poncho 1250</td>
<td>600FS</td>
<td>1.25 mg</td>
<td>ST</td>
<td>28.25</td>
</tr>
<tr>
<td>Capture(^6)</td>
<td>2EC</td>
<td>0.09</td>
<td>T-band</td>
<td>28.25</td>
</tr>
<tr>
<td>A14776(^6)</td>
<td>200CS</td>
<td>0.145</td>
<td>Furrow</td>
<td>28.00</td>
</tr>
<tr>
<td>Aztec</td>
<td>4.67G</td>
<td>0.14</td>
<td>Furrow SB</td>
<td>28.00</td>
</tr>
<tr>
<td>Fortress</td>
<td>2.5G</td>
<td>0.185</td>
<td>Furrow</td>
<td>28.00</td>
</tr>
<tr>
<td>A14776(^6)</td>
<td>200CS</td>
<td>0.11</td>
<td>T-band</td>
<td>27.75</td>
</tr>
<tr>
<td>A14776(^6)</td>
<td>200CS</td>
<td>0.18</td>
<td>Furrow</td>
<td>27.75</td>
</tr>
<tr>
<td>YieldGard Plus</td>
<td>Trans.</td>
<td>----</td>
<td>----</td>
<td>27.75</td>
</tr>
<tr>
<td>Force</td>
<td>3G</td>
<td>0.12</td>
<td>T-band SB</td>
<td>27.50</td>
</tr>
<tr>
<td>Aztec</td>
<td>2.1G</td>
<td>0.14</td>
<td>T-band</td>
<td>27.25</td>
</tr>
<tr>
<td>Fortress</td>
<td>5G</td>
<td>0.185</td>
<td>Furrow SB</td>
<td>27.25</td>
</tr>
<tr>
<td>Regent(^7)</td>
<td>4SC</td>
<td>0.12</td>
<td>Furrow-M</td>
<td>27.25</td>
</tr>
<tr>
<td>Lorsban</td>
<td>15G</td>
<td>1.20</td>
<td>T-band</td>
<td>27.25</td>
</tr>
<tr>
<td>A14776(^6)</td>
<td>200CS</td>
<td>0.11</td>
<td>Furrow</td>
<td>27.00</td>
</tr>
<tr>
<td>Force</td>
<td>3G</td>
<td>0.12</td>
<td>T-band</td>
<td>26.75</td>
</tr>
<tr>
<td>Lorsban(^6)</td>
<td>4E</td>
<td>1.20</td>
<td>T-band</td>
<td>26.75</td>
</tr>
<tr>
<td>CHECK</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>26.25</td>
</tr>
<tr>
<td>Cruiser</td>
<td>5FS</td>
<td>1.25 mg</td>
<td>ST</td>
<td>26.00</td>
</tr>
<tr>
<td>Force</td>
<td>3G</td>
<td>0.12</td>
<td>Furrow</td>
<td>25.00</td>
</tr>
<tr>
<td>Aztec</td>
<td>2.1G</td>
<td>0.14</td>
<td>Furrow</td>
<td>24.75</td>
</tr>
<tr>
<td>Cruiser Extreme</td>
<td>5FS</td>
<td>1.26 mg</td>
<td>ST</td>
<td>23.75</td>
</tr>
</tbody>
</table>

\(^1\) Planted April 28, 2005; evaluated June 1, 2005.
\(^2\) Ounces a.i. per 1,000 row-ft; Cruiser and Poncho ST listed as a.i. per seed.
\(^3\) T-band & Furrow = insecticide applied at planting time; SB = SmartBox application; ST = seed treatment; M = microtube application.
\(^4\) Means based on 4 observations (17.5 row-ft/treatment x 4 replications).
\(^5\) No significant differences between means (ANOVA, \(P < 0.05\)).
\(^6\) Five gallons finished spray per 17,424 row-ft.
\(^7\) Four gallons water carrier per 17,424 row-ft.
Table 4. Average root-injury, product consistency, percent lodging, and stand counts for planting-time corn rootworm treatments. Ames, IA. 20051

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Node-Injury 2,3,4</th>
<th>Product Consist. 4,5</th>
<th>% Lod. 6,8</th>
<th>Stand Count 7,8</th>
</tr>
</thead>
<tbody>
<tr>
<td>MON88017 + YGCB + RR2 + Poncho 250</td>
<td>0.01 a</td>
<td>100 a</td>
<td>0</td>
<td>27.83</td>
</tr>
<tr>
<td>YGRW + YGCB + RR2 + Poncho 250</td>
<td>0.03 a</td>
<td>100 a</td>
<td>0</td>
<td>27.50</td>
</tr>
<tr>
<td>YGCB + RR2 + Poncho 250 + Force 3G9</td>
<td>0.04 a</td>
<td>100 a</td>
<td>0</td>
<td>28.17</td>
</tr>
<tr>
<td>YGCB + RR2 + Poncho 1250</td>
<td>0.21 a</td>
<td>94 a</td>
<td>0</td>
<td>26.83</td>
</tr>
<tr>
<td>YGCB + RR2+ Poncho 250</td>
<td>0.81 b</td>
<td>39 b</td>
<td>0</td>
<td>29.67</td>
</tr>
</tbody>
</table>

1 Planted April 29; evaluations – stand counts June 1, root injury August 1, and lodging counts September 14, 2005.
2 Means based on 18 observations (center 2 rows of 4-row treatments evaluated; 3 roots/row x 3 replications).
3 Iowa State node-injury scale (0–3). Number of full or partial nodes completely pruned.
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 (¼ node eaten) or less.
6 Means based on 6 observations (number lodged/10 plants in each of 2 rows x 3 replications).
7 Means based on 6 observations (number plants/17.5 row-ft in each of 2 rows x 3 replications).
8 No significant differences between means (ANOVA, P ≤ 0.05).
9 Force applied T-band.
Table 5. Average root-injury and product consistency for planting-time insecticide treatments. Yield test, Crawfordsville, IA. 2005

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Form.</th>
<th>Rate(^2)</th>
<th>Placement(^3)</th>
<th>Node-Injury(^4,5,6)</th>
<th>Product Consistency(^7)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Injury ≤ 0.25</td>
<td>Injury ≤ 0.02</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Injury ≤ 0.02</td>
<td></td>
</tr>
<tr>
<td>YieldGard Plus</td>
<td>Trans.</td>
<td>----</td>
<td>----</td>
<td>0.05 a</td>
<td>100 a</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fortress</td>
<td>5G</td>
<td>0.225</td>
<td>Furrow SB</td>
<td>0.11 a</td>
<td>100 a</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fortress</td>
<td>5G</td>
<td>0.185</td>
<td>Furrow SB</td>
<td>0.15 a</td>
<td>96 ab</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fortress</td>
<td>2.5G</td>
<td>0.185</td>
<td>Furrow</td>
<td>0.16 a</td>
<td>96 ab</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aztec</td>
<td>2.1G</td>
<td>0.14</td>
<td>Furrow</td>
<td>0.19 a</td>
<td>92 ab</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DEFCON</td>
<td>2.1G</td>
<td>0.14</td>
<td>Furrow</td>
<td>0.23 a</td>
<td>92 ab</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Force</td>
<td>3G</td>
<td>0.12</td>
<td>T-band</td>
<td>0.24 a</td>
<td>83 ab</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aztec</td>
<td>2.1G</td>
<td>0.14</td>
<td>T-band</td>
<td>0.27 a</td>
<td>83 ab</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DEFCON</td>
<td>2.1G</td>
<td>0.14</td>
<td>T-band</td>
<td>0.30 a</td>
<td>71 ab</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aztec</td>
<td>4.67G</td>
<td>0.14</td>
<td>Furrow SB</td>
<td>0.35 a</td>
<td>79 ab</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capture(^9)</td>
<td>2EC</td>
<td>0.09</td>
<td>T-band</td>
<td>0.36 a</td>
<td>79 ab</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Force</td>
<td>3G</td>
<td>0.12</td>
<td>Furrow</td>
<td>0.42 a</td>
<td>63 ab</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lorsban</td>
<td>15G</td>
<td>1.2</td>
<td>T-band</td>
<td>0.43 a</td>
<td>58 b</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poncho 1250</td>
<td>600FS</td>
<td>1.25 mg</td>
<td>ST</td>
<td>1.16 b</td>
<td>13 c</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regent(^10)</td>
<td>4SC</td>
<td>0.12</td>
<td>Furrow-M</td>
<td>1.39 bc</td>
<td>8 c</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cruiser</td>
<td>5FS</td>
<td>1.25 mg</td>
<td>ST</td>
<td>1.63 c</td>
<td>6 c</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHECK</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>2.40 d</td>
<td>0 c</td>
</tr>
</tbody>
</table>


2 Ounces a.i. per 1,000 row-ft; Cruiser and Poncho ST listed as a.i. per seed.

3 T-band & Furrow = insecticide applied at planting time; SB = SmartBox application; ST = seed treatment; M = microtube application.

4 Chemical and check means based on 24 observations (2-row treatment x 3 roots/row x 4 replications).

5 Iowa State node-injury scale (0–3). Number of full or partial nodes completely eaten.

6 Means sharing a common letter do not differ significantly according to Ryan’s Q Test (P ≤ 0.05).

7 Product consistency = percentage of times nodal injury was 0.25 (¼ node eaten) or less.

8 Product consistency = percentage of times nodal injury was 0.02 (only scarring or channeling – no root-tip injury) or less.

9 Five gallons finished spray per 17,424 row-ft.

10 Four gallons water carrier per 17,424 row-ft.
Table 6. Average stand counts for planting-time insecticide treatments. Yield test, Crawfordsville, IA. 2005

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Form.</th>
<th>Rate(^2)</th>
<th>Placement(^3)</th>
<th>Stand Count(^4,5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fortress</td>
<td>5G</td>
<td>0.185</td>
<td>Furrow SB</td>
<td>30.75</td>
</tr>
<tr>
<td>Aztec</td>
<td>4.67G</td>
<td>0.14</td>
<td>Furrow SB</td>
<td>30.63</td>
</tr>
<tr>
<td>Cruiser</td>
<td>5FS</td>
<td>1.25 mg</td>
<td>ST</td>
<td>30.50</td>
</tr>
<tr>
<td>Aztec</td>
<td>2.1G</td>
<td>0.14</td>
<td>Furrow</td>
<td>30.50</td>
</tr>
<tr>
<td>Force</td>
<td>3G</td>
<td>0.12</td>
<td>Furrow</td>
<td>30.38</td>
</tr>
<tr>
<td>Regent(^6)</td>
<td>4SC</td>
<td>0.12</td>
<td>Furrow-M</td>
<td>30.38</td>
</tr>
<tr>
<td>Capture</td>
<td>2EC</td>
<td>0.09</td>
<td>T-band</td>
<td>30.13</td>
</tr>
<tr>
<td>DEFCON</td>
<td>2.1G</td>
<td>0.14</td>
<td>Furrow</td>
<td>30.00</td>
</tr>
<tr>
<td>Fortress</td>
<td>5G</td>
<td>0.225</td>
<td>Furrow SB</td>
<td>30.00</td>
</tr>
<tr>
<td>Lorsban</td>
<td>15G</td>
<td>1.2</td>
<td>T-band</td>
<td>29.88</td>
</tr>
<tr>
<td>Fortress</td>
<td>2.5G</td>
<td>0.185</td>
<td>Furrow</td>
<td>29.75</td>
</tr>
<tr>
<td>Force</td>
<td>3G</td>
<td>0.12</td>
<td>T-band</td>
<td>29.63</td>
</tr>
<tr>
<td>DEFCON</td>
<td>2.1G</td>
<td>0.14</td>
<td>T-band</td>
<td>29.63</td>
</tr>
<tr>
<td>YieldGard Plus</td>
<td>Trans.</td>
<td>----</td>
<td>----</td>
<td>29.63</td>
</tr>
<tr>
<td>CHECK</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>29.25</td>
</tr>
<tr>
<td>Aztec</td>
<td>2.1G</td>
<td>0.14</td>
<td>T-band</td>
<td>29.13</td>
</tr>
<tr>
<td>Poncho 1250</td>
<td>600FS</td>
<td>1.25 mg</td>
<td>ST</td>
<td>28.88</td>
</tr>
</tbody>
</table>

\(^1\) Planted May 4, 2005; evaluated May 24, 2005.

\(^2\) Ounces a.i. per 1,000 row-ft; Cruiser and Poncho ST listed as a.i. per seed.

\(^3\) T-band & Furrow = insecticide applied at planting time; SB = SmartBox application; ST = seed treatment; M = microtube application.

\(^4\) Means based on 8 observations (2-row treatment x 17.5 row-ft/treatment x 4 replications).

\(^5\) No significant differences between means (ANOVA, P < 0.05).

\(^6\) Four gallons water carrier per 17,424 row-ft.

\(^7\) Five gallons finished spray per 17,424 row-ft.
Table 7. Average percent lodging for planting-time insecticide treatments. Yield test, Crawfordsville, IA. 2005

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Form</th>
<th>Rate $^2$</th>
<th>Placement $^3$</th>
<th>% Lodging $^4,5$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aztec</td>
<td>2.1G</td>
<td>0.14</td>
<td>Furrow</td>
<td>0 a</td>
</tr>
<tr>
<td>Aztec</td>
<td>4.67G</td>
<td>0.14</td>
<td>Furrow SB</td>
<td>0 a</td>
</tr>
<tr>
<td>Aztec</td>
<td>2.1G</td>
<td>0.14</td>
<td>T-band</td>
<td>0 a</td>
</tr>
<tr>
<td>Capture $^6$</td>
<td>2EC</td>
<td>0.09</td>
<td>T-band</td>
<td>0 a</td>
</tr>
<tr>
<td>DEFCON</td>
<td>2.1G</td>
<td>0.14</td>
<td>Furrow</td>
<td>0 a</td>
</tr>
<tr>
<td>DEFCON</td>
<td>2.1G</td>
<td>0.14</td>
<td>T-band</td>
<td>0 a</td>
</tr>
<tr>
<td>Force</td>
<td>3G</td>
<td>0.12</td>
<td>Furrow</td>
<td>0 a</td>
</tr>
<tr>
<td>Force</td>
<td>3G</td>
<td>0.12</td>
<td>T-band</td>
<td>0 a</td>
</tr>
<tr>
<td>Fortress</td>
<td>2.5G</td>
<td>0.185</td>
<td>Furrow</td>
<td>0 a</td>
</tr>
<tr>
<td>Fortress</td>
<td>5G</td>
<td>0.185</td>
<td>Furrow SB</td>
<td>0 a</td>
</tr>
<tr>
<td>Fortress</td>
<td>5G</td>
<td>0.225</td>
<td>Furrow SB</td>
<td>0 a</td>
</tr>
<tr>
<td>Lorsban</td>
<td>15G</td>
<td>1.2</td>
<td>T-band</td>
<td>0 a</td>
</tr>
<tr>
<td>YieldGard Plus</td>
<td>Trans.</td>
<td>----</td>
<td>----</td>
<td>0 a</td>
</tr>
<tr>
<td>Poncho 1250</td>
<td>600FS</td>
<td>1.25 mg</td>
<td>ST</td>
<td>9 a</td>
</tr>
<tr>
<td>Regent $^7$</td>
<td>4SC</td>
<td>0.12</td>
<td>Furrow-M</td>
<td>15 a</td>
</tr>
<tr>
<td>Cruiser</td>
<td>5FS</td>
<td>1.25 mg</td>
<td>ST</td>
<td>20 a</td>
</tr>
<tr>
<td>CHECK</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>50 b</td>
</tr>
</tbody>
</table>


$^2$ Ounces a.i. per 1,000 row-ft; Cruiser and Poncho ST listed as a.i. per seed.

$^3$ T-band & Furrow = insecticide applied at planting time; SB = SmartBox application; ST = seed treatment; M = microtube application.

$^4$ Means based on 8 observations (number lodged/10 plants in each of 2 rows x 4 replications).

$^5$ Means sharing a common letter do not differ significantly according to Ryan’s Q Test ($P < 0.05$).

$^6$ Five gallons finished spray per 17,424 row-ft.

$^7$ Four gallons water carrier per 17,424 row-ft.
<table>
<thead>
<tr>
<th>Treatment</th>
<th>Form.</th>
<th>Rate$^2$</th>
<th>Placement$^3$</th>
<th>Bushels/ Acre$^4$</th>
</tr>
</thead>
<tbody>
<tr>
<td>YieldGard Plus</td>
<td>Trans.</td>
<td>----</td>
<td>----</td>
<td>171 a</td>
</tr>
<tr>
<td>Force</td>
<td>3G</td>
<td>0.12</td>
<td>T-band</td>
<td>101 b</td>
</tr>
<tr>
<td>Fortress</td>
<td>5G</td>
<td>0.185</td>
<td>Furrow SB</td>
<td>101 b</td>
</tr>
<tr>
<td>Aztec</td>
<td>2.1G</td>
<td>0.14</td>
<td>Furrow</td>
<td>98 b</td>
</tr>
<tr>
<td>Aztec</td>
<td>4.67G</td>
<td>0.14</td>
<td>Furrow SB</td>
<td>96 b</td>
</tr>
<tr>
<td>Fortress</td>
<td>5G</td>
<td>0.225</td>
<td>Furrow SB</td>
<td>94 b</td>
</tr>
<tr>
<td>Capture$^6$</td>
<td>2EC</td>
<td>0.09</td>
<td>T-band</td>
<td>85 b</td>
</tr>
<tr>
<td>Force</td>
<td>3G</td>
<td>0.12</td>
<td>Furrow</td>
<td>85 b</td>
</tr>
<tr>
<td>Fortress</td>
<td>2.5G</td>
<td>0.185</td>
<td>Furrow</td>
<td>84 b</td>
</tr>
<tr>
<td>Poncho 1250</td>
<td>600FS</td>
<td>1.25 mg</td>
<td>ST</td>
<td>81 b</td>
</tr>
<tr>
<td>DEFCON</td>
<td>2.1G</td>
<td>0.14</td>
<td>Furrow</td>
<td>78 b</td>
</tr>
<tr>
<td>Aztec</td>
<td>2.1G</td>
<td>0.14</td>
<td>T-band</td>
<td>74 b</td>
</tr>
<tr>
<td>DEFCON</td>
<td>2.1G</td>
<td>0.14</td>
<td>T-band</td>
<td>73 b</td>
</tr>
<tr>
<td>Cruiser</td>
<td>5FS</td>
<td>1.25 mg</td>
<td>ST</td>
<td>66 b</td>
</tr>
<tr>
<td>Lorsban</td>
<td>15G</td>
<td>1.2</td>
<td>T-band</td>
<td>65 b</td>
</tr>
<tr>
<td>Regent$^7$</td>
<td>4SC</td>
<td>0.12</td>
<td>Furrow-M</td>
<td>64 b</td>
</tr>
<tr>
<td>CHECK</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>62 b</td>
</tr>
</tbody>
</table>

$^1$ Planted May 4, 2005; machine harvested October 7, 2005.

$^2$ Ounces a.i. per 1,000 row-ft; Cruiser and Poncho ST listed as a.i. per seed.

$^3$ T-band & Furrow = insecticide applied at planting time; SB = SmartBox application; ST = seed treatment; M = microtube application.

$^4$ Means based on 4 observations (91 ft x 2-row treatment x 4 replications).

$^5$ Means sharing a common letter do not differ significantly according to Ryan’s Q Test ($P < 0.05$).

$^6$ Five gallons finished spray per 17,424 row-ft.

$^7$ Four gallons water carrier per 17,424 row-ft.
Table 9. Average root-injury, product consistency, percent lodging, and stand counts for a planting-time insecticide treatment and a Pioneer hybrid with the Herculex RW gene. Crawfordsville, IA. 2005\(^1\)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Node-Injury (^{2,3,4})</th>
<th>Product Consistency (^4)</th>
<th>Percent Lod. (^{4,7})</th>
<th>Stand Count (^{8,9})</th>
</tr>
</thead>
<tbody>
<tr>
<td>Herculex RW + Poncho</td>
<td>0.02 a</td>
<td>100 a</td>
<td>100 a</td>
<td>0 a</td>
</tr>
<tr>
<td>Isoline + Force 3G T-band</td>
<td>0.32 a</td>
<td>75 b</td>
<td>0 b</td>
<td>1 a</td>
</tr>
<tr>
<td>Isoline Check</td>
<td>1.73 b</td>
<td>5 c</td>
<td>0 b</td>
<td>53 b</td>
</tr>
</tbody>
</table>

\(^{1}\) Planted May 4; evaluations – stand counts May 24, lodging counts and root injury July 13, 2005.

\(^{2}\) Means based on 40 observations (center 2 rows of 4-row treatment evaluated; 5 roots/row x 4 replications).

\(^{3}\) Iowa State node-injury scale (0–3). Number of full or partial nodes completely pruned.

\(^{4}\) 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 (¼ node eaten) or less.

\(^{6}\) Product consistency = percentage of times nodal injury was 0.02 (only scarring or channeling – no root-tip injury) or less.

\(^{7}\) Means based on 8 observations (number lodged/10 plants in each of 2 rows x 4 replications).

\(^{8}\) Means based on 8 observations (number plants/12 row-ft in each of 2 rows x 4 replications).

\(^{9}\) No significant differences between means (ANOVA, \(P \leq 0.05\)).
Table 10. Average root-injury, product consistency, percent lodging, and stand counts for planting-time Dow AgroSciences corn rootworm treatments. Crawfordsville, IA. 2005

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Node-Injury $^{2,3,4}$</th>
<th>Product Consistency $^4$</th>
<th>Percent Lod. $^{4,7}$</th>
<th>Stand Count $^{8,9}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Herculex RW + Cruiser 0.25</td>
<td>0.02 a</td>
<td>100 a</td>
<td>0 a</td>
<td>17.13</td>
</tr>
<tr>
<td>Isoline + Lorsban 15G T-band</td>
<td>0.46 a</td>
<td>58 b</td>
<td>3 b</td>
<td>0 a</td>
</tr>
<tr>
<td>Isoline Check</td>
<td>1.90 b</td>
<td>18 c</td>
<td>3 b</td>
<td>48 b</td>
</tr>
</tbody>
</table>


2 Means based on 40 observations (center 2 rows of 4-row treatment evaluated; 5 roots/row x 4 replications).

3 Iowa State node-injury scale (0–3). Number of full or partial nodes completely pruned.

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 (¼ node eaten) or less.

6 Product consistency = percentage of times nodal injury was 0.02 (only scarring or channeling – no root-tip injury) or less.

7 Means based on 8 observations (number lodged/10 plants in each of 2 rows x 4 replications).

8 Means based on 8 observations (number plants/12 row-ft in each of 2 rows x 4 replications).

9 No significant differences between means (ANOVA, $P < 0.05$).
Table 11. Average root-injury and product consistency for planting-time insecticide treatments. Yield test, Nashua, IA. 2005

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Form.</th>
<th>Rate²</th>
<th>Place.³</th>
<th>Node-Injury⁴,⁵,⁶</th>
<th>Product Consistency⁸</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Injury ≤ 0.25⁷</td>
<td>Injury ≤ 0.10⁶</td>
</tr>
<tr>
<td>YieldGard Plus</td>
<td>Trans.</td>
<td>----</td>
<td>----</td>
<td>0.02 a</td>
<td>100 a</td>
</tr>
<tr>
<td>Aztec</td>
<td>4.67G</td>
<td>0.14</td>
<td>F-SB</td>
<td>0.15 ab</td>
<td>96 a</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>63 b</td>
</tr>
<tr>
<td>DEFCON</td>
<td>2.1G</td>
<td>0.14</td>
<td>F</td>
<td>0.16 ab</td>
<td>92 ab</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>58 b</td>
</tr>
<tr>
<td>DEFCON</td>
<td>2.1G</td>
<td>0.14</td>
<td>T</td>
<td>0.18 ab</td>
<td>92 ab</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>42 bc</td>
</tr>
<tr>
<td>Aztec</td>
<td>2.1G</td>
<td>0.14</td>
<td>T</td>
<td>0.22 ab</td>
<td>75 abc</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>29 bc</td>
</tr>
<tr>
<td>Aztec+ Poncho 1250</td>
<td>2.1G</td>
<td>0.14</td>
<td>F</td>
<td>0.27 ab</td>
<td>83 abc</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>21 bc</td>
</tr>
<tr>
<td>Aztec+ Poncho 250</td>
<td>2.1G</td>
<td>0.14</td>
<td>F</td>
<td>0.30 ab</td>
<td>75 abcd</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>21 bc</td>
</tr>
<tr>
<td>Force+ Poncho 1250</td>
<td>3G</td>
<td>0.12</td>
<td>F</td>
<td>0.33 ab</td>
<td>67 abcd</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>33 bc</td>
</tr>
<tr>
<td>Force</td>
<td>3G</td>
<td>0.12</td>
<td>T</td>
<td>0.49 ab</td>
<td>54 bcde</td>
</tr>
<tr>
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<td></td>
<td>21 bc</td>
</tr>
<tr>
<td>Force</td>
<td>3G</td>
<td>0.12</td>
<td>F</td>
<td>0.63 abc</td>
<td>42 def</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0 c</td>
</tr>
<tr>
<td>Regent⁹</td>
<td>4SC</td>
<td>0.12</td>
<td>F-M</td>
<td>0.71 abcd</td>
<td>50 cde</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4 c</td>
</tr>
<tr>
<td>Fortress</td>
<td>5G</td>
<td>0.225</td>
<td>F-SB</td>
<td>0.85 bcde</td>
<td>17 efg</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4 c</td>
</tr>
<tr>
<td>Fortress</td>
<td>2.5G</td>
<td>0.185</td>
<td>F</td>
<td>1.27 cdef</td>
<td>25 efg</td>
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<td>13 c</td>
</tr>
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<td>5G</td>
<td>0.185</td>
<td>F-SB</td>
<td>1.28 cdef</td>
<td>0 g</td>
</tr>
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<td></td>
<td></td>
<td>0 c</td>
</tr>
<tr>
<td>Fortress+ Poncho 250</td>
<td>5G</td>
<td>0.185</td>
<td>F-SB</td>
<td>1.39 def</td>
<td>4 fg</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0 c</td>
</tr>
<tr>
<td>Poncho 1250</td>
<td>600FS</td>
<td>1.25 mg</td>
<td>ST</td>
<td>1.40 ef</td>
<td>8 fg</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8 c</td>
</tr>
<tr>
<td>Capture¹⁰</td>
<td>2EC</td>
<td>0.09</td>
<td>T</td>
<td>1.54 efg</td>
<td>4 fg</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0 c</td>
</tr>
<tr>
<td>Lorsban</td>
<td>15G</td>
<td>1.2</td>
<td>T</td>
<td>1.58 fg</td>
<td>0 g</td>
</tr>
<tr>
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<td></td>
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<td>0 c</td>
</tr>
<tr>
<td>Poncho 250</td>
<td>600FS</td>
<td>0.25 mg</td>
<td>ST</td>
<td>2.08 gh</td>
<td>4 fg</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0 c</td>
</tr>
<tr>
<td>Cruiser</td>
<td>5FS</td>
<td>1.25 mg</td>
<td>ST</td>
<td>2.27 h</td>
<td>0 g</td>
</tr>
<tr>
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<td></td>
<td></td>
<td></td>
<td>0 c</td>
</tr>
<tr>
<td>CHECK</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>2.88 i</td>
<td>0 g</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0 c</td>
</tr>
</tbody>
</table>

¹ Planted April 30, 2005; evaluated July 18, 2005.
² Ounces a.i. per 1,000 row-ft; Cruiser and Poncho ST listed as a.i. per seed.
³ T = T-band & F = Furrow: insecticide applied at planting time; SB = SmartBox application; ST = seed treatment; M = microtube application.
⁴ Chemical and check means based on 24 observations (2-row treatments x 3 roots/row x 4 replications).
⁵ Iowa State node-injury scale (0–3). Number of full or partial nodes completely eaten.
⁶ Means sharing a common letter do not differ significantly according to Ryan’s Q Test (P < 0.05).
⁷ Product consistency = percentage of times nodal injury was 0.25 (¼ node eaten) or less.
⁸ Product consistency = percentage of times nodal injury was 0.10 (1–2 roots pruned per root system) or less.
⁹ Four gallons water carrier per 17,424 row-ft.
¹⁰ Five gallons finished spray per 17,424 row-ft.
Table 12. Average stand counts for planting-time insecticide treatments. Yield test, Nashua, IA. 2005¹

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Form.</th>
<th>Rate²</th>
<th>Placement³</th>
<th>Stand Count⁴,⁵</th>
</tr>
</thead>
<tbody>
<tr>
<td>Force</td>
<td>3G</td>
<td>0.12</td>
<td>Furrow</td>
<td>27.88</td>
</tr>
<tr>
<td>DEFCON</td>
<td>2.1G</td>
<td>0.14</td>
<td>Furrow</td>
<td>27.63</td>
</tr>
<tr>
<td>Aztec+Poncho 1250</td>
<td>2.1G</td>
<td>0.14</td>
<td>Furrow</td>
<td>27.63</td>
</tr>
<tr>
<td>Aztec</td>
<td>2.1G</td>
<td>0.14</td>
<td>Furrow</td>
<td>27.50</td>
</tr>
<tr>
<td>Aztec+Poncho 250</td>
<td>2.1G</td>
<td>0.14</td>
<td>Furrow</td>
<td>27.38</td>
</tr>
<tr>
<td>DEFCON</td>
<td>2.1G</td>
<td>0.14</td>
<td>T-band</td>
<td>27.38</td>
</tr>
<tr>
<td>Poncho 250</td>
<td>600FS</td>
<td>0.25 mg</td>
<td>ST</td>
<td>27.38</td>
</tr>
<tr>
<td>Capture</td>
<td>2EC</td>
<td>0.09</td>
<td>T-band</td>
<td>27.25</td>
</tr>
<tr>
<td>Force+Poncho 1250</td>
<td>3G</td>
<td>0.12</td>
<td>Furrow</td>
<td>27.13</td>
</tr>
<tr>
<td>Aztec</td>
<td>4.67G</td>
<td>0.14</td>
<td>Furrow SB</td>
<td>27.00</td>
</tr>
<tr>
<td>Regent</td>
<td>4SC</td>
<td>0.12</td>
<td>Furrow-M</td>
<td>27.00</td>
</tr>
<tr>
<td>Force</td>
<td>3G</td>
<td>0.12</td>
<td>T-band</td>
<td>26.50</td>
</tr>
<tr>
<td>Lorsban</td>
<td>15G</td>
<td>1.2</td>
<td>T-band</td>
<td>26.38</td>
</tr>
<tr>
<td>Fortress</td>
<td>2.5G</td>
<td>0.185</td>
<td>Furrow</td>
<td>26.38</td>
</tr>
<tr>
<td>CHECK</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>26.38</td>
</tr>
<tr>
<td>Fortress+Poncho 250</td>
<td>5G</td>
<td>0.185</td>
<td>Furrow SB</td>
<td>26.25</td>
</tr>
<tr>
<td>Cruiser</td>
<td>5FS</td>
<td>1.25 mg</td>
<td>ST</td>
<td>25.75</td>
</tr>
<tr>
<td>Aztec</td>
<td>2.1G</td>
<td>0.14</td>
<td>T-band</td>
<td>25.75</td>
</tr>
<tr>
<td>Poncho 1250</td>
<td>600FS</td>
<td>1.25 mg</td>
<td>ST</td>
<td>25.63</td>
</tr>
<tr>
<td>YieldGard Plus</td>
<td>Trans.</td>
<td>----</td>
<td>----</td>
<td>25.63</td>
</tr>
<tr>
<td>Fortress</td>
<td>5G</td>
<td>0.225</td>
<td>Furrow SB</td>
<td>25.00</td>
</tr>
<tr>
<td>Fortress</td>
<td>5G</td>
<td>0.185</td>
<td>Furrow SB</td>
<td>24.50</td>
</tr>
</tbody>
</table>

¹ Planted April 30, 2005; evaluated May 26, 2005.

² Ounces a.i. per 1,000 row-ft; Cruiser and Poncho ST listed as a.i. per seed.

³ T-band & Furrow = insecticide applied at planting time; SB = SmartBox application; ST = seed treatment; M = microtube application.

⁴ Means based on 8 observations (2-row treatment x 17.5 row-ft/treatment x 4 replications).

⁵ No significant differences between means (ANOVA, P < 0.05).

⁶ Five gallons finished spray per 17,424 row-ft.

⁷ Four gallons water carrier per 17,424 row-ft.
Table 13. Average percent lodging for planting-time insecticide treatments.
Yield test, Nashua, IA. 2005

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Form.</th>
<th>Rate$^2$</th>
<th>Placement$^3$</th>
<th>%</th>
<th>Lodging$^4,5$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aztec</td>
<td>2.1G</td>
<td>0.14</td>
<td>Furrow</td>
<td>0 a</td>
<td>a</td>
</tr>
<tr>
<td>Aztec</td>
<td>2.1G</td>
<td>0.14</td>
<td>T-band</td>
<td>0 a</td>
<td>a</td>
</tr>
<tr>
<td>Aztec</td>
<td>4.67G</td>
<td>0.14</td>
<td>Furrow SB</td>
<td>0 a</td>
<td>a</td>
</tr>
<tr>
<td>Aztec + Poncho 1250</td>
<td>2.1G</td>
<td>0.14</td>
<td>Furrow</td>
<td>0 a</td>
<td>a</td>
</tr>
<tr>
<td>DEFCON</td>
<td>2.1G</td>
<td>0.14</td>
<td>Furrow</td>
<td>0 a</td>
<td>a</td>
</tr>
<tr>
<td>DEFCON</td>
<td>2.1G</td>
<td>0.14</td>
<td>T-band</td>
<td>0 a</td>
<td>a</td>
</tr>
<tr>
<td>Force</td>
<td>3G</td>
<td>0.12</td>
<td>Furrow</td>
<td>0 a</td>
<td>a</td>
</tr>
<tr>
<td>Force</td>
<td>3G</td>
<td>0.12</td>
<td>T-band</td>
<td>0 a</td>
<td>a</td>
</tr>
<tr>
<td>Force + Poncho 1250</td>
<td>3G</td>
<td>0.12</td>
<td>Furrow</td>
<td>0 a</td>
<td>a</td>
</tr>
<tr>
<td>Aztec + Poncho 250</td>
<td>2.1G</td>
<td>0.14</td>
<td>Furrow</td>
<td>1 a</td>
<td>a</td>
</tr>
<tr>
<td>Regent$^6$</td>
<td>4SC</td>
<td>0.12</td>
<td>Furrow-M</td>
<td>1 a</td>
<td>a</td>
</tr>
<tr>
<td>YieldGard Plus</td>
<td>Trans.</td>
<td>----</td>
<td>----</td>
<td>1 a</td>
<td>a</td>
</tr>
<tr>
<td>Poncho 1250</td>
<td>600FS</td>
<td>1.25 mg</td>
<td>ST</td>
<td>16 ab</td>
<td></td>
</tr>
<tr>
<td>Fortress</td>
<td>5G</td>
<td>0.225</td>
<td>Furrow SB</td>
<td>20 ab</td>
<td></td>
</tr>
<tr>
<td>Fortress</td>
<td>5G</td>
<td>0.185</td>
<td>Furrow SB</td>
<td>26 abc</td>
<td></td>
</tr>
<tr>
<td>Lorsban</td>
<td>15G</td>
<td>1.2</td>
<td>T-band</td>
<td>30 abcd</td>
<td></td>
</tr>
<tr>
<td>Capture$^7$</td>
<td>2EC</td>
<td>0.09</td>
<td>T-band</td>
<td>35 bcd</td>
<td></td>
</tr>
<tr>
<td>Fortress + Poncho 250</td>
<td>5G</td>
<td>0.185</td>
<td>Furrow SB</td>
<td>41 bcd</td>
<td></td>
</tr>
<tr>
<td>Fortress</td>
<td>2.5G</td>
<td>0.185</td>
<td>Furrow</td>
<td>56 cd</td>
<td></td>
</tr>
<tr>
<td>Poncho 250</td>
<td>600FS</td>
<td>0.25 mg</td>
<td>ST</td>
<td>59 de</td>
<td></td>
</tr>
<tr>
<td>Cruiser</td>
<td>5FS</td>
<td>1.25 mg</td>
<td>ST</td>
<td>86 e</td>
<td></td>
</tr>
<tr>
<td>CHECK</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>88 e</td>
<td></td>
</tr>
</tbody>
</table>

---

1 Planted April 30, 2005; evaluated September 29, 2005.

2 Ounces a.i. per 1,000 row-ft; Cruiser and Poncho ST listed as a.i. per seed.

3 T-band & Furrow = insecticide applied at planting time; SB = SmartBox application; ST = seed treatment; M = microtube application.

4 Means based on 8 observations (number lodged/10 plants in each of 2 rows x 4 replications).

5 Means sharing a common letter do not differ significantly according to Ryan’s Q Test (P ≤ 0.05).

6 Four gallons water carrier per 17,424 row-ft.

7 Five gallons finished spray per 17,424 row-ft.
Table 14. Average yield for planting-time insecticide treatments. Yield test, Nashua, IA. 2005¹

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Form.</th>
<th>Rate²</th>
<th>Placement³</th>
<th>Bushels/ Acre⁴,⁵</th>
</tr>
</thead>
<tbody>
<tr>
<td>YieldGard Plus</td>
<td>Trans.</td>
<td>----</td>
<td>----</td>
<td>252 a</td>
</tr>
<tr>
<td>Aztec+Poncho 1250</td>
<td>2.1G</td>
<td>0.14</td>
<td>Furrow</td>
<td>220 b</td>
</tr>
<tr>
<td>Aztec</td>
<td>4.67G</td>
<td>0.14</td>
<td>Furrow SB</td>
<td>219 bc</td>
</tr>
<tr>
<td>Aztec+Poncho 250</td>
<td>2.1G</td>
<td>0.14</td>
<td>Furrow</td>
<td>216 bc</td>
</tr>
<tr>
<td>Force+Poncho 1250</td>
<td>3G</td>
<td>0.12</td>
<td>Furrow</td>
<td>216 bc</td>
</tr>
<tr>
<td>DEFCON</td>
<td>2.1G</td>
<td>0.14</td>
<td>Furrow</td>
<td>214 bc</td>
</tr>
<tr>
<td>Force</td>
<td>3G</td>
<td>0.12</td>
<td>T-band</td>
<td>212 bc</td>
</tr>
<tr>
<td>Poncho 1250</td>
<td>600FS</td>
<td>1.25 mg</td>
<td>ST</td>
<td>211 bc</td>
</tr>
<tr>
<td>Aztec</td>
<td>2.1G</td>
<td>0.14</td>
<td>Furrow</td>
<td>210 bc</td>
</tr>
<tr>
<td>Aztec</td>
<td>2.1G</td>
<td>0.14</td>
<td>T-band</td>
<td>209 bc</td>
</tr>
<tr>
<td>Force</td>
<td>3G</td>
<td>0.12</td>
<td>Furrow</td>
<td>206 bc</td>
</tr>
<tr>
<td>Fortress+Poncho 250</td>
<td>5G</td>
<td>0.185</td>
<td>Furrow SB</td>
<td>206 bc</td>
</tr>
<tr>
<td>DEFCON</td>
<td>2.1G</td>
<td>0.14</td>
<td>T-band</td>
<td>204 bc</td>
</tr>
<tr>
<td>Fortress</td>
<td>5G</td>
<td>0.225</td>
<td>Furrow SB</td>
<td>204 bc</td>
</tr>
<tr>
<td>Lorsban</td>
<td>15G</td>
<td>1.2</td>
<td>T-band</td>
<td>203 bc</td>
</tr>
<tr>
<td>Regent⁶</td>
<td>4SC</td>
<td>0.12</td>
<td>Furrow-M</td>
<td>202 bc</td>
</tr>
<tr>
<td>Fortress</td>
<td>2.5G</td>
<td>0.185</td>
<td>Furrow</td>
<td>197 bc</td>
</tr>
<tr>
<td>Poncho 250</td>
<td>600FS</td>
<td>0.25 mg</td>
<td>ST</td>
<td>195 bc</td>
</tr>
<tr>
<td>Fortress</td>
<td>5G</td>
<td>0.185</td>
<td>Furrow SB</td>
<td>195 bc</td>
</tr>
<tr>
<td>Capture⁷</td>
<td>2EC</td>
<td>0.09</td>
<td>T-band</td>
<td>194 bc</td>
</tr>
<tr>
<td>Cruiser</td>
<td>5FS</td>
<td>1.25 mg</td>
<td>ST</td>
<td>189 c</td>
</tr>
<tr>
<td>CHECK</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>128 d</td>
</tr>
</tbody>
</table>

¹ Planted April 30, 2005; machine harvested October 12, 2005.

² Ounces a.i. per 1,000 row-ft; Cruiser and Poncho ST listed as a.i. per seed.

³ T-band & Furrow = insecticide applied at planting time; SB = SmartBox application; ST = seed treatment; M = microtube application.

⁴ Means based on 4 observations (91 ft x 2-row treatment x 4 replications).

⁵ Means sharing a common letter do not differ significantly according to Ryan’s Q Test (P ≤ 0.05).

⁶ Four gallons water carrier per 17,424 row-ft.

⁷ Five gallons finished spray per 17,424 row-ft.
Table 15. Average root-injury and product consistency for planting-time insecticide treatments. Experimental test, Sutherland, IA. 2005

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Form.</th>
<th>Rate</th>
<th>Placement</th>
<th>Node-Injury</th>
<th>Product Consistency</th>
</tr>
</thead>
<tbody>
<tr>
<td>YieldGard Plus</td>
<td>Trans.</td>
<td>----</td>
<td>----</td>
<td>0.03 a</td>
<td>100 a</td>
</tr>
<tr>
<td>Fortress</td>
<td>2.5G</td>
<td>0.185</td>
<td>Furrow</td>
<td>0.13 a</td>
<td>100 a</td>
</tr>
<tr>
<td>Fortress</td>
<td>5G</td>
<td>0.185</td>
<td>Furrow SB</td>
<td>0.23 a</td>
<td>90 ab</td>
</tr>
<tr>
<td>Lorsban</td>
<td>4E</td>
<td>1.20</td>
<td>T-band</td>
<td>0.29 a</td>
<td>85 ab</td>
</tr>
<tr>
<td>Aztec</td>
<td>2.1G</td>
<td>0.14</td>
<td>T-band</td>
<td>0.29 a</td>
<td>75 ab</td>
</tr>
<tr>
<td>A14776</td>
<td>200CS</td>
<td>0.11</td>
<td>T-band</td>
<td>0.31 a</td>
<td>80 ab</td>
</tr>
<tr>
<td>Force</td>
<td>3G</td>
<td>0.12</td>
<td>T-band</td>
<td>0.32 a</td>
<td>70 abc</td>
</tr>
<tr>
<td>Force</td>
<td>3G</td>
<td>0.12</td>
<td>T-band SB</td>
<td>0.38 a</td>
<td>60 abcd</td>
</tr>
<tr>
<td>A14776</td>
<td>200CS</td>
<td>0.18</td>
<td>T-band</td>
<td>0.43 a</td>
<td>50 abcd</td>
</tr>
<tr>
<td>A14776</td>
<td>200CS</td>
<td>0.145</td>
<td>Furrow</td>
<td>0.46 a</td>
<td>40 abcd</td>
</tr>
<tr>
<td>A14776</td>
<td>200CS</td>
<td>0.11</td>
<td>Furrow</td>
<td>0.46 a</td>
<td>40 abcd</td>
</tr>
<tr>
<td>Lorsban</td>
<td>75WG</td>
<td>0.90</td>
<td>T-band</td>
<td>0.46 a</td>
<td>40 abcd</td>
</tr>
<tr>
<td>Force</td>
<td>3G</td>
<td>0.12</td>
<td>Furrow</td>
<td>0.47 a</td>
<td>50 abcd</td>
</tr>
<tr>
<td>A14776</td>
<td>200CS</td>
<td>0.145</td>
<td>T-band</td>
<td>0.48 a</td>
<td>45 abcd</td>
</tr>
<tr>
<td>Lorsban</td>
<td>15G</td>
<td>1.20</td>
<td>T-band</td>
<td>0.53 a</td>
<td>50 abcd</td>
</tr>
<tr>
<td>A14776</td>
<td>200CS</td>
<td>0.18</td>
<td>Furrow</td>
<td>0.60 a</td>
<td>35 bcd</td>
</tr>
<tr>
<td>Aztec</td>
<td>2.1G</td>
<td>0.14</td>
<td>Furrow</td>
<td>0.64 a</td>
<td>30 bcd</td>
</tr>
<tr>
<td>Capture</td>
<td>2EC</td>
<td>0.09</td>
<td>T-band</td>
<td>0.69 a</td>
<td>30 bcd</td>
</tr>
<tr>
<td>Aztec</td>
<td>4.67G</td>
<td>0.14</td>
<td>Furrow SB</td>
<td>0.72 a</td>
<td>40 abcd</td>
</tr>
<tr>
<td>Poncho 1250</td>
<td>600FS</td>
<td>1.25 mg</td>
<td>ST</td>
<td>1.50 b</td>
<td>5 d</td>
</tr>
<tr>
<td>Regent</td>
<td>4SC</td>
<td>0.12</td>
<td>Furrow-M</td>
<td>1.53 b</td>
<td>10 cd</td>
</tr>
<tr>
<td>Cruiser Extreme</td>
<td>5FS</td>
<td>1.26 mg</td>
<td>ST</td>
<td>1.99 bc</td>
<td>0 d</td>
</tr>
<tr>
<td>Poncho 250</td>
<td>600FS</td>
<td>0.25 mg</td>
<td>ST</td>
<td>2.03 bc</td>
<td>0 d</td>
</tr>
<tr>
<td>CHECK</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>2.23 c</td>
<td>0 d</td>
</tr>
<tr>
<td>Cruiser</td>
<td>5FS</td>
<td>1.25 mg</td>
<td>ST</td>
<td>2.24 c</td>
<td>0 d</td>
</tr>
<tr>
<td>Cruiser</td>
<td>5FS</td>
<td>0.25 mg</td>
<td>ST</td>
<td>2.24 c</td>
<td>0 d</td>
</tr>
</tbody>
</table>

2 Ounces a.i. per 1,000 row-ft; Cruiser and Poncho ST listed as a.i. per seed.
3 T-band & Furrow = insecticide applied at planting time; SB = SmartBox application; ST = seed treatment; M = microtube application.
4 Chemical and check means based on 20 observations (5 roots/row x 4 replications).
5 Iowa State node-injury scale (0–3). Number of full or partial nodes completely eaten.
6 Means sharing a common letter do not differ significantly according to Ryan’s Q Test (P ≤ 0.05).
7 Product consistency = percentage of times nodal injury was 0.25 (¼ node eaten) or less.
8 Five gallons finished spray per 17,424 row-ft.
9 Four gallons water carrier per 17,424 row-ft.
Table 16. Average stand counts for planting-time insecticide treatments.
Experimental test, Sutherland, IA. 2005\(^1\)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Form.</th>
<th>Rate(^2)</th>
<th>Placement(^3)</th>
<th>Stand Count(^4,5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Force</td>
<td>3G</td>
<td>0.12</td>
<td>T-band</td>
<td>29.75</td>
</tr>
<tr>
<td>A14776(^6)</td>
<td>200CS</td>
<td>0.18</td>
<td>T-band</td>
<td>29.75</td>
</tr>
<tr>
<td>YieldGard Plus</td>
<td>Trans.</td>
<td>----</td>
<td>----</td>
<td>29.75</td>
</tr>
<tr>
<td>Cruiser</td>
<td>5FS</td>
<td>1.25 mg</td>
<td>ST</td>
<td>29.25</td>
</tr>
<tr>
<td>Cruiser Extreme</td>
<td>5FS</td>
<td>1.26 mg</td>
<td>ST</td>
<td>29.25</td>
</tr>
<tr>
<td>Force</td>
<td>3G</td>
<td>0.12</td>
<td>T-band SB</td>
<td>29.00</td>
</tr>
<tr>
<td>CHECK</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>28.75</td>
</tr>
<tr>
<td>A14776(^6)</td>
<td>200CS</td>
<td>0.11</td>
<td>Furrow</td>
<td>28.50</td>
</tr>
<tr>
<td>Aztec</td>
<td>4.67G</td>
<td>0.14</td>
<td>Furrow SB</td>
<td>28.50</td>
</tr>
<tr>
<td>Lorsban</td>
<td>15G</td>
<td>1.20</td>
<td>T-band</td>
<td>28.50</td>
</tr>
<tr>
<td>Cruiser</td>
<td>5FS</td>
<td>0.25 mg</td>
<td>ST</td>
<td>28.25</td>
</tr>
<tr>
<td>Regent(^7)</td>
<td>4SC</td>
<td>0.12</td>
<td>Furrow-M</td>
<td>28.25</td>
</tr>
<tr>
<td>A14776(^6)</td>
<td>200CS</td>
<td>0.145</td>
<td>T-band</td>
<td>28.00</td>
</tr>
<tr>
<td>Fortress</td>
<td>2.5G</td>
<td>0.185</td>
<td>Furrow</td>
<td>28.00</td>
</tr>
<tr>
<td>Capture(^6)</td>
<td>2EC</td>
<td>0.09</td>
<td>T-band</td>
<td>28.00</td>
</tr>
<tr>
<td>A14776(^6)</td>
<td>200CS</td>
<td>0.145</td>
<td>Furrow</td>
<td>28.00</td>
</tr>
<tr>
<td>Aztec</td>
<td>2.1G</td>
<td>0.14</td>
<td>Furrow</td>
<td>27.75</td>
</tr>
<tr>
<td>Aztec</td>
<td>2.1G</td>
<td>0.14</td>
<td>T-band</td>
<td>27.75</td>
</tr>
<tr>
<td>Poncho 1250</td>
<td>600FS</td>
<td>1.25 mg</td>
<td>ST</td>
<td>27.75</td>
</tr>
<tr>
<td>Force</td>
<td>3G</td>
<td>0.12</td>
<td>Furrow</td>
<td>27.25</td>
</tr>
<tr>
<td>Poncho 250</td>
<td>600FS</td>
<td>0.25 mg</td>
<td>ST</td>
<td>27.25</td>
</tr>
<tr>
<td>Fortress</td>
<td>5G</td>
<td>0.185</td>
<td>Furrow SB</td>
<td>27.00</td>
</tr>
<tr>
<td>Lorsban(^6)</td>
<td>75WG</td>
<td>0.90</td>
<td>T-band</td>
<td>27.00</td>
</tr>
<tr>
<td>A14776(^6)</td>
<td>200CS</td>
<td>0.18</td>
<td>Furrow</td>
<td>26.50</td>
</tr>
<tr>
<td>Lorsban(^6)</td>
<td>4E</td>
<td>1.20</td>
<td>T-band</td>
<td>26.25</td>
</tr>
<tr>
<td>A14776(^6)</td>
<td>200CS</td>
<td>0.11</td>
<td>T-band</td>
<td>26.00</td>
</tr>
</tbody>
</table>

\(^1\) Planted May 6, 2005; evaluated May 31, 2005.

\(^2\) Ounces a.i. per 1,000 row-ft; Cruiser and Poncho ST listed as a.i. per seed.

\(^3\) T-band & Furrow = insecticide applied at planting time; SB = SmartBox application; ST = seed treatment; M = microtube application.

\(^4\) Means based on 4 observations (17.5 row-ft/treatment x 4 replications).

\(^5\) No significant differences between means (ANOVA, P < 0.05).

\(^6\) Five gallons finished spray per 17,424 row-ft.

\(^7\) Four gallons water carrier per 17,424 row-ft.
Table 17. Average percent lodging for planting-time insecticide treatments.
Experimental test, Sutherland, IA. 2005

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Form.</th>
<th>Rate²</th>
<th>Placement³</th>
<th>% Lodging⁴,⁵</th>
</tr>
</thead>
<tbody>
<tr>
<td>A14776⁶</td>
<td>200CS</td>
<td>0.145</td>
<td>T-band</td>
<td>0</td>
</tr>
<tr>
<td>A14776⁶</td>
<td>200CS</td>
<td>0.18</td>
<td>T-band</td>
<td>0</td>
</tr>
<tr>
<td>A14776⁶</td>
<td>200CS</td>
<td>0.145</td>
<td>Furrow</td>
<td>0</td>
</tr>
<tr>
<td>A14776⁶</td>
<td>200CS</td>
<td>0.11</td>
<td>T-band</td>
<td>0</td>
</tr>
<tr>
<td>A14776⁶</td>
<td>200CS</td>
<td>0.18</td>
<td>Furrow</td>
<td>0</td>
</tr>
<tr>
<td>A14776⁶</td>
<td>200CS</td>
<td>0.11</td>
<td>Furrow</td>
<td>0</td>
</tr>
<tr>
<td>Aztec</td>
<td>4.67G</td>
<td>0.14</td>
<td>Furrow SB</td>
<td>0</td>
</tr>
<tr>
<td>Aztec</td>
<td>2.1G</td>
<td>0.14</td>
<td>Furrow</td>
<td>0</td>
</tr>
<tr>
<td>Aztec</td>
<td>2.1G</td>
<td>0.14</td>
<td>T-band</td>
<td>0</td>
</tr>
<tr>
<td>Capture⁶</td>
<td>2EC</td>
<td>0.09</td>
<td>T-band</td>
<td>0</td>
</tr>
<tr>
<td>Cruiser Extreme</td>
<td>5FS</td>
<td>1.26 mg</td>
<td>ST</td>
<td>0</td>
</tr>
<tr>
<td>Force</td>
<td>3G</td>
<td>0.12</td>
<td>T-band</td>
<td>0</td>
</tr>
<tr>
<td>Force</td>
<td>3G</td>
<td>0.12</td>
<td>T-band SB</td>
<td>0</td>
</tr>
<tr>
<td>Force</td>
<td>3G</td>
<td>0.12</td>
<td>Furrow</td>
<td>0</td>
</tr>
<tr>
<td>Fortress</td>
<td>5G</td>
<td>0.185</td>
<td>Furrow SB</td>
<td>0</td>
</tr>
<tr>
<td>Lorsban⁶</td>
<td>4E</td>
<td>1.20</td>
<td>T-band</td>
<td>0</td>
</tr>
<tr>
<td>Lorsban⁶</td>
<td>75WG</td>
<td>0.90</td>
<td>T-band</td>
<td>0</td>
</tr>
<tr>
<td>Lorsban</td>
<td>15G</td>
<td>1.20</td>
<td>T-band</td>
<td>0</td>
</tr>
<tr>
<td>Poncho 250</td>
<td>600FS</td>
<td>0.25 mg</td>
<td>ST</td>
<td>0</td>
</tr>
<tr>
<td>Regent⁷</td>
<td>4SC</td>
<td>0.12</td>
<td>Furrow-M</td>
<td>0</td>
</tr>
<tr>
<td>YieldGard Plus</td>
<td>Trans.</td>
<td>----</td>
<td>----</td>
<td>0</td>
</tr>
<tr>
<td>Fortress</td>
<td>2.5G</td>
<td>0.185</td>
<td>Furrow</td>
<td>1</td>
</tr>
<tr>
<td>Poncho 1250</td>
<td>600FS</td>
<td>1.25 mg</td>
<td>ST</td>
<td>1</td>
</tr>
<tr>
<td>CHECK</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>2</td>
</tr>
<tr>
<td>Cruiser</td>
<td>5FS</td>
<td>1.25 mg</td>
<td>ST</td>
<td>3</td>
</tr>
<tr>
<td>Cruiser</td>
<td>5FS</td>
<td>0.25 mg</td>
<td>ST</td>
<td>3</td>
</tr>
</tbody>
</table>

¹ Planted May 6, 2005; evaluated October 6, 2005.
² Ounces a.i. per 1,000 row-ft; Cruiser and Poncho ST listed as a.i. per seed.
³ T-band & Furrow = insecticide applied at planting time; SB = SmartBox application; ST = seed treatment; M = microtube application.
⁴ Means based on 4 observations (lodged plants/10 plants x 4 replications).
⁵ No significant differences between means (ANOVA, P < 0.05).
⁶ Five gallons finished spray per 17,424 row-ft.
⁷ Four gallons water carrier per 17,424 row-ft.
Table 18. Average stand counts for planting-time insecticide treatments. White grub test, Carlisle, IA. 2005\(^1\)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Form.</th>
<th>Rate(^2)</th>
<th>Placement(^3)</th>
<th>Stand Count(^4,5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGST 02002</td>
<td>ST</td>
<td>1.5 oz/42# sd</td>
<td>ST</td>
<td>34.00</td>
</tr>
<tr>
<td>Aztec</td>
<td>2.1G</td>
<td>0.14</td>
<td>Furrow</td>
<td>33.75</td>
</tr>
<tr>
<td>Poncho 250+03001</td>
<td>600FS</td>
<td>ST+1.5 oz mat./42# sd</td>
<td>ST</td>
<td>33.25</td>
</tr>
<tr>
<td>Poncho 250</td>
<td>600FS</td>
<td>0.25 mg/seed</td>
<td>ST</td>
<td>33.00</td>
</tr>
<tr>
<td>Agrox Premiere</td>
<td>ST</td>
<td>1.5 oz mat./42# sd</td>
<td>ST</td>
<td>32.50</td>
</tr>
<tr>
<td>Fortress</td>
<td>2.5G</td>
<td>0.08</td>
<td>Furrow SB</td>
<td>32.50</td>
</tr>
<tr>
<td>Regent</td>
<td>500 FS</td>
<td>0.32 mg/seed</td>
<td>ST</td>
<td>32.25</td>
</tr>
<tr>
<td>Cruiser 250+03001</td>
<td>5FS</td>
<td>ST+1.5 oz mat./42# sd</td>
<td>ST</td>
<td>32.25</td>
</tr>
<tr>
<td>Fortress</td>
<td>5G</td>
<td>0.08</td>
<td>Furrow SB</td>
<td>32.25</td>
</tr>
<tr>
<td>CHECK</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>32.25</td>
</tr>
<tr>
<td>Force</td>
<td>3G</td>
<td>0.15</td>
<td>Furrow</td>
<td>32.00</td>
</tr>
<tr>
<td>Regent</td>
<td>6.2 FS</td>
<td>0.32 mg/seed</td>
<td>ST</td>
<td>32.00</td>
</tr>
<tr>
<td>Fortress</td>
<td>5G</td>
<td>0.15</td>
<td>Furrow SB</td>
<td>32.00</td>
</tr>
<tr>
<td>Fortress</td>
<td>2.5G</td>
<td>0.15</td>
<td>Furrow SB</td>
<td>31.75</td>
</tr>
<tr>
<td>AGST 03001</td>
<td>ST</td>
<td>1.5 oz mat./42# sd</td>
<td>ST</td>
<td>31.50</td>
</tr>
<tr>
<td>Cruiser</td>
<td>5FS</td>
<td>0.25 mg/seed</td>
<td>ST</td>
<td>31.25</td>
</tr>
</tbody>
</table>

\(^1\) Planted April 26, 2005; evaluated June 2, 2005.
\(^2\) Granular formulations expressed as ounces a.i. per 1,000 row-ft.
\(^3\) ST = seed treatment; Furrow = insecticide applied at planting time; SB = SmartBox.
\(^4\) Insecticide means based on 4 observations (20 row-ft/treatment x 4 replications); check means based on 8 observations (20 row-ft/treatment x 2 random check rows x 4 replications).
\(^5\) No significant differences between means (ANOVA, P \(<\) 0.05).
<table>
<thead>
<tr>
<th>Treatment</th>
<th>Form.</th>
<th>Rate(^2)</th>
<th>Placement(^3)</th>
<th>Dam.(^4,5)</th>
<th>Damage Rating(^6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fortress</td>
<td>5G</td>
<td>0.08</td>
<td>Furrow SB</td>
<td>0</td>
<td>1.00</td>
</tr>
<tr>
<td>Agrox Premiere</td>
<td>ST</td>
<td>1.5 oz mat./42# sd</td>
<td>ST</td>
<td>5</td>
<td>1.05</td>
</tr>
<tr>
<td>Fortress</td>
<td>2.5G</td>
<td>0.08</td>
<td>Furrow SB</td>
<td>5</td>
<td>1.05</td>
</tr>
<tr>
<td>Force</td>
<td>3G</td>
<td>0.15</td>
<td>Furrow</td>
<td>10</td>
<td>1.10</td>
</tr>
<tr>
<td>Aztec</td>
<td>2.1G</td>
<td>0.14</td>
<td>Furrow</td>
<td>10</td>
<td>1.10</td>
</tr>
<tr>
<td>Fortress</td>
<td>5G</td>
<td>0.15</td>
<td>Furrow SB</td>
<td>10</td>
<td>1.10</td>
</tr>
<tr>
<td>Cruiser</td>
<td>5FS</td>
<td>0.25 mg/seed</td>
<td>ST</td>
<td>15</td>
<td>1.15</td>
</tr>
<tr>
<td>Fortress</td>
<td>2.5G</td>
<td>0.15</td>
<td>Furrow SB</td>
<td>15</td>
<td>1.15</td>
</tr>
<tr>
<td>Cruiser 250+03001</td>
<td>5FS</td>
<td>ST+1.5 oz</td>
<td>ST</td>
<td>20</td>
<td>1.20</td>
</tr>
<tr>
<td>AGST 03001</td>
<td>ST</td>
<td>1.5 oz mat./42# sd</td>
<td>ST</td>
<td>20</td>
<td>1.35</td>
</tr>
<tr>
<td>AGST 02002</td>
<td>ST</td>
<td>1.5 oz mat./42# sd</td>
<td>ST</td>
<td>20</td>
<td>1.40</td>
</tr>
<tr>
<td>Regent</td>
<td>6.2 FS</td>
<td>0.32 mg/seed</td>
<td>ST</td>
<td>25</td>
<td>1.30</td>
</tr>
<tr>
<td>Poncho 250</td>
<td>600FS</td>
<td>0.25 mg/seed</td>
<td>ST</td>
<td>30</td>
<td>1.55</td>
</tr>
<tr>
<td>CHECK</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>33</td>
<td>1.48</td>
</tr>
<tr>
<td>Poncho 250+03001</td>
<td>600 FS</td>
<td>ST+1.5 oz</td>
<td>ST</td>
<td>35</td>
<td>1.66</td>
</tr>
<tr>
<td>Regent</td>
<td>500 FS</td>
<td>0.32 mg/seed</td>
<td>ST</td>
<td>40</td>
<td>1.55</td>
</tr>
</tbody>
</table>

\(^1\) Planted April 26, 2005; evaluated June 2, 2005.

\(^2\) Granular formulations expressed as ounces a.i. per 1,000 row-ft.

\(^3\) ST = seed treatment; Furrow = insecticide applied at planting time; SB = SmartBox.

\(^4\) Insecticide means based on 20 observations (5 plants evaluated/treatment x 4 replications); check means based on 40 observations (5 plants evaluated/treatment x 2 random check rows x 4 replications).

\(^5\) No significant differences between means (ANOVA, P < 0.05).

\(^6\) Rating scale: (1) seed/seedling undamaged, (2) seed/seedling damaged but plant established, (3) seed/seedling damaged, plant showing some signs of stress, (4) seed/seedling damaged, no plant or questionable establishment.
Table 20. Average stand counts for planting-time insecticide treatments. White grub test, Williams, IA. 2005

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Form.</th>
<th>Rate(^2)</th>
<th>Placement(^3)</th>
<th>Stand Count(^{4,5})</th>
</tr>
</thead>
<tbody>
<tr>
<td>Force</td>
<td>3G</td>
<td>0.15</td>
<td>Furrow</td>
<td>34.00</td>
</tr>
<tr>
<td>Poncho 250</td>
<td>600FS</td>
<td>0.25 mg/seed</td>
<td>ST</td>
<td>33.50</td>
</tr>
<tr>
<td>Fortress</td>
<td>5G</td>
<td>0.15</td>
<td>Furrow SB</td>
<td>33.25</td>
</tr>
<tr>
<td>Fortress</td>
<td>2.5G</td>
<td>0.08</td>
<td>Furrow SB</td>
<td>33.00</td>
</tr>
<tr>
<td>Fortress</td>
<td>5G</td>
<td>0.08</td>
<td>Furrow SB</td>
<td>32.75</td>
</tr>
<tr>
<td>Cruiser 250+03001</td>
<td>5FS</td>
<td>ST+1.5 oz mat./42# sd</td>
<td>ST</td>
<td>32.50</td>
</tr>
<tr>
<td>AGST 03001</td>
<td>ST</td>
<td>1.5 oz mat./42# sd</td>
<td>ST</td>
<td>32.25</td>
</tr>
<tr>
<td>AGST 02002</td>
<td>ST</td>
<td>1.5 oz mat./42# sd</td>
<td>ST</td>
<td>32.00</td>
</tr>
<tr>
<td>Agrox Premiere</td>
<td>ST</td>
<td>1.5 oz mat./42# sd</td>
<td>ST</td>
<td>31.75</td>
</tr>
<tr>
<td>Fortress</td>
<td>2.5G</td>
<td>0.15</td>
<td>Furrow SB</td>
<td>31.75</td>
</tr>
<tr>
<td>Cruiser</td>
<td>5FS</td>
<td>0.25 mg/seed</td>
<td>ST</td>
<td>31.25</td>
</tr>
<tr>
<td>Regent</td>
<td>500 FS</td>
<td>0.32 mg/seed</td>
<td>ST</td>
<td>31.25</td>
</tr>
<tr>
<td>Poncho 250+03001</td>
<td>ST+1.5 oz mat./42# sd</td>
<td>ST</td>
<td>31.25</td>
<td></td>
</tr>
<tr>
<td>Aztec</td>
<td>2.1G</td>
<td>0.14</td>
<td>Furrow</td>
<td>31.00</td>
</tr>
<tr>
<td>CHECK</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>30.88</td>
</tr>
<tr>
<td>Regent</td>
<td>6.2 FS</td>
<td>0.32 mg/seed</td>
<td>ST</td>
<td>30.75</td>
</tr>
</tbody>
</table>

\(^1\) Planted May 2, 2005; evaluated June 10, 2005.

\(^2\) Granular expressed as ounces a.i. per 1,000 row-ft.

\(^3\) ST = seed treatment; Furrow = insecticide applied at planting time; SB = SmartBox.

\(^4\) Insecticide means based on 4 observations (20 row-ft/treatment x 4 replications); check means based on 8 observations (20 row-ft/treatment x 2 random check rows x 4 replications).

\(^5\) No significant differences between means (ANOVA, P < 0.05).
Table 21. Average stand counts for planting-time insecticide treatments. Wireworm test (north field), West Liberty, IA. 2005

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Form.</th>
<th>Rate $^2$</th>
<th>Placement $^3$</th>
<th>Stand Count $^{4,5}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regent</td>
<td>6.2 FS</td>
<td>0.32 mg/seed</td>
<td>ST</td>
<td>33.75</td>
</tr>
<tr>
<td>Fortress</td>
<td>5G</td>
<td>0.08</td>
<td>Furrow SB</td>
<td>33.50</td>
</tr>
<tr>
<td>Cruiser 250+03001</td>
<td>5FS</td>
<td>ST+1.5 oz mat./42# sd</td>
<td>ST</td>
<td>33.25</td>
</tr>
<tr>
<td>Aztec</td>
<td>2.1G</td>
<td>0.14</td>
<td>Furrow</td>
<td>32.50</td>
</tr>
<tr>
<td>Agrox Premiere</td>
<td>ST</td>
<td>1.5 oz mat./42# sd</td>
<td>ST</td>
<td>32.25</td>
</tr>
<tr>
<td>AGST 02002</td>
<td>ST</td>
<td>1.5 oz mat./42# sd</td>
<td>ST</td>
<td>32.25</td>
</tr>
<tr>
<td>AGST 03001</td>
<td>ST</td>
<td>1.5 oz mat./42# sd</td>
<td>ST</td>
<td>32.25</td>
</tr>
<tr>
<td>Regent</td>
<td>500 FS</td>
<td>0.32 mg/seed</td>
<td>ST</td>
<td>32.00</td>
</tr>
<tr>
<td>Fortress</td>
<td>2.5G</td>
<td>0.15</td>
<td>Furrow SB</td>
<td>32.00</td>
</tr>
<tr>
<td>Cruiser</td>
<td>5FS</td>
<td>0.25 mg/seed</td>
<td>ST</td>
<td>31.50</td>
</tr>
<tr>
<td>Poncho 250</td>
<td>600FS</td>
<td>0.25 mg/seed</td>
<td>ST</td>
<td>31.00</td>
</tr>
<tr>
<td>Fortress</td>
<td>5G</td>
<td>0.15</td>
<td>Furrow SB</td>
<td>31.00</td>
</tr>
<tr>
<td>Poncho 250+03001</td>
<td>600FS</td>
<td>ST+1.5 oz mat./42# sd</td>
<td>ST</td>
<td>30.75</td>
</tr>
<tr>
<td>CHECK</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>30.75</td>
</tr>
<tr>
<td>Force</td>
<td>3G</td>
<td>0.15</td>
<td>Furrow</td>
<td>30.75</td>
</tr>
<tr>
<td>Fortress</td>
<td>2.5G</td>
<td>0.08</td>
<td>Furrow SB</td>
<td>30.00</td>
</tr>
</tbody>
</table>

$^1$ Planted April 25, 2005; evaluated June 8, 2005.

$^2$ Granular formulations expressed as ounces a.i. per 1,000 row-ft.

$^3$ ST = seed treatment; Furrow = insecticide applied at planting time; SB = SmartBox.

$^4$ Insecticide means based on 4 observations (20 row-ft/treatment x 4 replications); check means based on 8 observations (20 row-ft/treatment x 2 random check rows x 4 replications).

$^5$ No significant differences between means (ANOVA, $P \leq 0.05$).
Table 22. Average percentage of damaged seeds/seedlings and damage ratings for planting-time insecticide treatments. Wireworm test (north field), West Liberty, IA. 2005\(^1\)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Form.</th>
<th>Rate(^2)</th>
<th>Placement(^3)</th>
<th>% Dam.(^4,5)</th>
<th>Damage Rating(^6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agrox Premiere</td>
<td>ST</td>
<td>1.5 oz mat./42# sd</td>
<td>ST</td>
<td>4</td>
<td>1.04</td>
</tr>
<tr>
<td>Fortress</td>
<td>5G</td>
<td>0.08</td>
<td>Furrow SB</td>
<td>4</td>
<td>1.04</td>
</tr>
<tr>
<td>Poncho 250+03001</td>
<td>600FS</td>
<td>ST+1.5 oz</td>
<td>ST</td>
<td>8</td>
<td>1.08</td>
</tr>
<tr>
<td>Fortress</td>
<td>2.5G</td>
<td>0.15</td>
<td>Furrow SB</td>
<td>8</td>
<td>1.08</td>
</tr>
<tr>
<td>Regent</td>
<td>500 FS</td>
<td>0.32 mg/seed</td>
<td>ST</td>
<td>8</td>
<td>1.13</td>
</tr>
<tr>
<td>Poncho 250</td>
<td>600FS</td>
<td>0.25 mg/seed</td>
<td>ST</td>
<td>13</td>
<td>1.13</td>
</tr>
<tr>
<td>Force</td>
<td>3G</td>
<td>0.15</td>
<td>Furrow</td>
<td>13</td>
<td>1.13</td>
</tr>
<tr>
<td>Fortress</td>
<td>2.5G</td>
<td>0.08</td>
<td>Furrow SB</td>
<td>13</td>
<td>1.17</td>
</tr>
<tr>
<td>CHECK</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>15</td>
<td>1.15</td>
</tr>
<tr>
<td>AGST 03001</td>
<td>ST</td>
<td>1.5 oz mat./42# sd</td>
<td>ST</td>
<td>17</td>
<td>1.17</td>
</tr>
<tr>
<td>Cruiser 250+03001</td>
<td>5FS</td>
<td>ST+1.5 oz</td>
<td>ST</td>
<td>17</td>
<td>1.17</td>
</tr>
<tr>
<td>Cruiser</td>
<td>5FS</td>
<td>0.25 mg/seed</td>
<td>ST</td>
<td>17</td>
<td>1.17</td>
</tr>
<tr>
<td>Regent</td>
<td>6.2 FS</td>
<td>0.32 mg/seed</td>
<td>ST</td>
<td>21</td>
<td>1.21</td>
</tr>
<tr>
<td>AGST 02002</td>
<td>ST</td>
<td>1.5 oz mat./42# sd</td>
<td>ST</td>
<td>25</td>
<td>1.25</td>
</tr>
<tr>
<td>Aztec</td>
<td>2.1G</td>
<td>0.14</td>
<td>Furrow</td>
<td>25</td>
<td>1.29</td>
</tr>
<tr>
<td>Fortress</td>
<td>5G</td>
<td>0.15</td>
<td>Furrow SB</td>
<td>25</td>
<td>1.33</td>
</tr>
</tbody>
</table>

\(^1\) Planted April 25, 2005; evaluated June 2, 2005.

\(^2\) Granular formulations expressed as ounces a.i. per 1,000 row-ft.

\(^3\) ST = seed treatment; Furrow = insecticide applied at planting time; SB = SmartBox.

\(^4\) Insecticide means based on 24 observations (6 plants evaluated/treatment x 4 replications); check means based on 48 observations (6 plants evaluated/treatment x 2 random check rows x 4 replications).

\(^5\) No significant differences between means (ANOVA, P < 0.05).

\(^6\) Rating scale: (1) seed/seedling undamaged, (2) seed/seedling damaged but plant established, (3) seed/seedling damaged, plant showing some signs of stress, (4) seed/seedling damaged, no plant or questionable establishment.
Table 23. Average stand counts for planting-time insecticide treatments. Wireworm test (south field), West Liberty, IA. 2005¹

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Form.</th>
<th>Rate²</th>
<th>Placement³</th>
<th>Stand Count⁴,⁵</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regent 500 FS</td>
<td>0.32 mg/seed</td>
<td>ST</td>
<td>35.50</td>
<td></td>
</tr>
<tr>
<td>AGST 03001 ST</td>
<td>1.5 oz mat./42# sd</td>
<td>ST</td>
<td>35.50</td>
<td></td>
</tr>
<tr>
<td>Agrox Premiere ST</td>
<td>1.5 oz mat./42# sd</td>
<td>ST</td>
<td>35.25</td>
<td></td>
</tr>
<tr>
<td>Poncho 250+03001 ST</td>
<td>ST+1.5 oz mat./42# sd</td>
<td>ST</td>
<td>34.75</td>
<td></td>
</tr>
<tr>
<td>Fortress 2.5G</td>
<td>0.08</td>
<td>Furrow SB</td>
<td>34.75</td>
<td></td>
</tr>
<tr>
<td>Fortress 2.5G</td>
<td>0.15</td>
<td>Furrow SB</td>
<td>34.50</td>
<td></td>
</tr>
<tr>
<td>Regent 6.2 FS</td>
<td>0.32 mg/seed</td>
<td>ST</td>
<td>34.25</td>
<td></td>
</tr>
<tr>
<td>Poncho 250 600FS</td>
<td>0.25 mg/seed</td>
<td>ST</td>
<td>34.25</td>
<td></td>
</tr>
<tr>
<td>Cruiser 250+03001 5FS</td>
<td>ST+1.5 oz mat./42# sd</td>
<td>ST</td>
<td>34.25</td>
<td></td>
</tr>
<tr>
<td>Cruiser 5FS</td>
<td>0.25 mg/seed</td>
<td>ST</td>
<td>34.25</td>
<td></td>
</tr>
<tr>
<td>Fortress 5G</td>
<td>0.08</td>
<td>Furrow SB</td>
<td>34.00</td>
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</tr>
<tr>
<td>Force 3G</td>
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<td>Furrow</td>
<td>34.00</td>
<td></td>
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<tr>
<td>AGST 02002 ST</td>
<td>1.5 oz mat./42# sd</td>
<td>ST</td>
<td>33.67</td>
<td></td>
</tr>
<tr>
<td>Aztec 2.1G</td>
<td>0.14</td>
<td>Furrow</td>
<td>33.50</td>
<td></td>
</tr>
<tr>
<td>CHECK</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td></td>
</tr>
<tr>
<td>Fortress 5G</td>
<td>0.15</td>
<td>Furrow SB</td>
<td>32.50</td>
<td></td>
</tr>
</tbody>
</table>

¹ Planted May 4, 2005; evaluated June 8, 2005.
² Granular formulations expressed as ounces a.i. per 1,000 row-ft.
³ ST = seed treatment; Furrow = insecticide applied at planting time; SB = SmartBox.
⁴ Insecticide means based on 4 observations (20 row-ft/treatment x 4 replications); check means based on 8 observations (20 row-ft/treatment x 2 random check rows x 4 replications).
⁵ No significant differences between means (ANOVA, \( P < 0.05 \)).
Table 24. Average percentage of damaged seeds/seedlings and damage ratings for planting-time insecticide treatments. Wireworm test (south field), West Liberty, IA. 2005

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Form.</th>
<th>Rate&lt;sup&gt;2&lt;/sup&gt;</th>
<th>Placement&lt;sup&gt;3&lt;/sup&gt;</th>
<th>% Dam.&lt;sup&gt;4,5&lt;/sup&gt;</th>
<th>Damage Rating&lt;sup&gt;6&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGST 02002</td>
<td>ST</td>
<td>1.5 oz mat./42# sd</td>
<td>ST</td>
<td>0</td>
<td>1.00</td>
</tr>
<tr>
<td>Regent</td>
<td>6.2 FS</td>
<td>0.32 mg/seed</td>
<td>ST</td>
<td>5</td>
<td>1.05</td>
</tr>
<tr>
<td>Agrox Premiere</td>
<td>ST</td>
<td>1.5 oz mat./42# sd</td>
<td>ST</td>
<td>5</td>
<td>1.05</td>
</tr>
<tr>
<td>Force</td>
<td>3G</td>
<td>0.15</td>
<td>Furrow</td>
<td>5</td>
<td>1.05</td>
</tr>
<tr>
<td>Fortress</td>
<td>2.5G</td>
<td>0.08</td>
<td>Furrow SB</td>
<td>5</td>
<td>1.05</td>
</tr>
<tr>
<td>Fortress</td>
<td>5G</td>
<td>0.08</td>
<td>Furrow SB</td>
<td>5</td>
<td>1.10</td>
</tr>
<tr>
<td>Regent</td>
<td>500 FS</td>
<td>0.32 mg/seed</td>
<td>ST</td>
<td>10</td>
<td>1.10</td>
</tr>
<tr>
<td>Aztec</td>
<td>2.1G</td>
<td>0.14</td>
<td>Furrow</td>
<td>10</td>
<td>1.10</td>
</tr>
<tr>
<td>Poncho 250</td>
<td>600FS</td>
<td>0.25 mg/seed</td>
<td>ST</td>
<td>10</td>
<td>1.10</td>
</tr>
<tr>
<td>Cruiser 250+03001</td>
<td>5FS</td>
<td>ST+1.5 oz</td>
<td>ST</td>
<td>10</td>
<td>1.10</td>
</tr>
<tr>
<td>Poncho 250+03001</td>
<td></td>
<td>ST+1.5 oz</td>
<td>ST</td>
<td>10</td>
<td>1.10</td>
</tr>
<tr>
<td>Fortress</td>
<td>5G</td>
<td>0.15</td>
<td>Furrow SB</td>
<td>10</td>
<td>1.10</td>
</tr>
<tr>
<td>Cruiser</td>
<td>5FS</td>
<td>0.25 mg/seed</td>
<td>ST</td>
<td>10</td>
<td>1.10</td>
</tr>
<tr>
<td>Fortress</td>
<td>2.5G</td>
<td>0.15</td>
<td>Furrow SB</td>
<td>10</td>
<td>1.15</td>
</tr>
<tr>
<td>CHECK</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>18</td>
<td>1.18</td>
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<tr>
<td>AGST 03001</td>
<td>ST</td>
<td>1.5 oz mat./42#sd</td>
<td>ST</td>
<td>20</td>
<td>1.30</td>
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</table>

<sup>1</sup> Planted May 4, 2005; evaluated June 8, 2005.

<sup>2</sup> Granular formulations expressed as ounces a.i. per 1,000 row-ft.

<sup>3</sup> ST = seed treatment; Furrow = insecticide applied at planting time; SB = SmartBox.

<sup>4</sup> Insecticide means based on 20 observations (5 plants evaluated/treatment x 4 replications); check means based on 40 observations (5 plants evaluated/treatment x 2 random check rows x 4 replications).

<sup>5</sup> No significant differences between means (ANOVA, P < 0.05).

<sup>6</sup> Rating scale: (1) seed/seedling undamaged, (2) seed/seedling damaged but plant established, (3) seed/seedling damaged, plant showing some signs of stress, (4) seed/seedling damaged, no plant or questionable establishment.
APPENDIX I

Agronomic Information
## 2005 Field History Data

<table>
<thead>
<tr>
<th></th>
<th>Ames, IA</th>
<th>Crawfordsville, IA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Corn Rootworm</strong></td>
<td></td>
<td><strong>Corn Rootworm Tests</strong></td>
</tr>
<tr>
<td><strong>Experimental &amp; Monsanto Tests</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insecticide History</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2004</td>
<td>No Insecticide (trap crop)</td>
<td>No Insecticide (trap crop)</td>
</tr>
<tr>
<td>2003</td>
<td>No Insecticide (soybeans)</td>
<td>Insecticide Test Plot</td>
</tr>
<tr>
<td>2002</td>
<td>Insecticide Test Plot</td>
<td>No Insecticide (trap crop)</td>
</tr>
<tr>
<td>2001</td>
<td>No Insecticide (trap crop)</td>
<td>Insecticide Test Plot</td>
</tr>
<tr>
<td>Tillage</td>
<td>Fall chisel; spring cult.</td>
<td>Fall chisel; spring cult. May 3</td>
</tr>
<tr>
<td>Variety</td>
<td>DKC60-18/DKC60-19 in Exp.</td>
<td>DKC60-18/DKC60-19 in yield</td>
</tr>
<tr>
<td></td>
<td>(see p. 51 for Monsanto test)</td>
<td>test (see p. 51 for Pioneer</td>
</tr>
<tr>
<td></td>
<td></td>
<td>and Dow tests)</td>
</tr>
<tr>
<td>Planting Date</td>
<td>April 28 &amp; April 29</td>
<td>May 4</td>
</tr>
<tr>
<td>Planting Rate</td>
<td>29,900</td>
<td>29,900</td>
</tr>
<tr>
<td>Herbicide¹</td>
<td>2 qt Harness Extra - April 25 on both test; 3 oz Calisto + 2/3 oz Accent - June 16 on Exp. test; 1 qt Glystar Plus - June 16 on Monsanto test</td>
<td>2.5 pt Dual II Magnum - May 5; 1 qt Laddok S-12 - May 27</td>
</tr>
<tr>
<td>Fertilizer²</td>
<td>N  P  K</td>
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</tr>
<tr>
<td>Fall Applied</td>
<td>--- 60 90</td>
<td>165# NH3 – March 9</td>
</tr>
<tr>
<td>Preplant</td>
<td>164 --- ---</td>
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<tr>
<td>Dates</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cultivation</td>
<td>None</td>
<td>None</td>
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<tr>
<td>Stand Count</td>
<td>June 1</td>
<td>October 13</td>
</tr>
<tr>
<td>Root Digging</td>
<td>July 11</td>
<td>July 8</td>
</tr>
<tr>
<td>Lodging</td>
<td>October 18</td>
<td>October 13</td>
</tr>
<tr>
<td>Harvest</td>
<td>---</td>
<td>October 19</td>
</tr>
<tr>
<td>Soil Type</td>
<td>Clay Loam</td>
<td>Silty Clay Loam</td>
</tr>
<tr>
<td>Soil Organic Matter %</td>
<td>---</td>
<td>4.70</td>
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<tr>
<td>Soil pH</td>
<td>---</td>
<td>5.10</td>
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</tbody>
</table>

¹ Expressed as formulation per acre.
² Expressed as pounds per acre.
### 2005

#### Field History Data

<table>
<thead>
<tr>
<th></th>
<th>Nashua, IA</th>
<th>Sutherland, IA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Corn Rootworm</td>
<td>Corn Rootworm</td>
</tr>
<tr>
<td>Yield Test</td>
<td>Experimental Test</td>
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#### Insecticide History

<table>
<thead>
<tr>
<th>Year</th>
<th>History</th>
<th>History</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>No Insecticide (trap crop)</td>
<td>No Insecticide (trap crop)</td>
</tr>
<tr>
<td>2003</td>
<td>Insecticide Test Plot</td>
<td>Insecticide Test Plot</td>
</tr>
<tr>
<td>2002</td>
<td>No Insecticide (trap crop)</td>
<td>No Insecticide (trap crop)</td>
</tr>
<tr>
<td>2001</td>
<td>Insecticide Test Plot</td>
<td>Insecticide Test Plot</td>
</tr>
</tbody>
</table>

#### Tillage

- Nashua: Fall chisel Nov. 22; spring field cult. April 29
- Sutherland: Chopped stalks & disked April 8; disked April 26

#### Variety

- Nashua: DKC60-18/DKC60-19
- Sutherland: DKC60-18/DKC60-19

#### Planting Date

- Nashua: April 30
- Sutherland: May 6

#### Planting Rate

- Both: 29,900

#### Herbicide

<table>
<thead>
<tr>
<th>Year</th>
<th>Herbicide</th>
<th>Herbicide</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>3.66 pt Guardsman Max – May 5; 8 oz Clarity – June 1</td>
<td>2.25 oz Balance + 20 oz Outlook – May 10; 2.4 pt Prowl + 2/3 oz Accent + 1.25 qt Atrazine - June 2</td>
</tr>
</tbody>
</table>

#### Fertilizer

<table>
<thead>
<tr>
<th>Application</th>
<th>N</th>
<th>P</th>
<th>K</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall Applied</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Preplant</td>
<td>130</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Postplant</td>
<td>43</td>
<td>---</td>
<td>---</td>
</tr>
</tbody>
</table>

#### Dates

- Cultivation: none
- Stand Count: May 26
- Root Digging: July 18
- Lodging: Sept. 29
- Harvest: October 12
- Soil Type: Loam

#### Soil

- Organic Matter %: 3.85
- pH: 7.6

---

1Expressed as formulation per acre.
### 2005

#### Field History Data

<table>
<thead>
<tr>
<th></th>
<th>West Liberty (North), IA Wireworm Test</th>
<th>West Liberty (South), IA Wireworm Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insecticide History</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2004</td>
<td>No insecticide (soybeans)</td>
<td>No insecticide (soybeans)</td>
</tr>
<tr>
<td>2003</td>
<td>Corn (Agrox seed trt.)</td>
<td>Corn (Poncho 250 seed trt.)</td>
</tr>
<tr>
<td>2002</td>
<td>No insecticide (soybeans)</td>
<td>No insecticide (soybeans)</td>
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<tr>
<td>2001</td>
<td>No insecticide (corn)</td>
<td>No insecticide (corn)</td>
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<tr>
<td>Tillage</td>
<td>No-till</td>
<td>No-till</td>
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<tr>
<td>Variety</td>
<td>DKC60-19</td>
<td>DKC60-19</td>
</tr>
<tr>
<td>Planting Date</td>
<td>April 25</td>
<td>May 4</td>
</tr>
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<td>29,900</td>
</tr>
<tr>
<td>Herbicide (^1)</td>
<td>Bicep Mag II</td>
<td>4 qt FieldMaster</td>
</tr>
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<td>Fertilizer (^2)</td>
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<tr>
<td>Fall Applied</td>
<td>N  52 90</td>
<td>Manure in 2003</td>
</tr>
<tr>
<td>Preplant</td>
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<td>130 ---</td>
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<tr>
<td>Dates</td>
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<td></td>
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<tr>
<td>Stand Count</td>
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<td>June 10</td>
</tr>
<tr>
<td>Seed/Seedling Eval.</td>
<td>June 8</td>
<td>June 10</td>
</tr>
<tr>
<td>Soil Type</td>
<td>Muscatine</td>
<td>Garwin</td>
</tr>
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<td>Soil Organic Matter %</td>
<td>2.8</td>
<td>3.2</td>
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<td>Soil pH</td>
<td>---</td>
<td>6.7</td>
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</table>

\(^1\)Expressed as formulation per acre.

\(^2\)Expressed as pounds per acre.
### 2005 Field History Data

<table>
<thead>
<tr>
<th>Carlise, IA</th>
<th>Williams, IA</th>
</tr>
</thead>
<tbody>
<tr>
<td>White Grub Test</td>
<td>White Grub Test</td>
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</table>

#### Insecticide History

<table>
<thead>
<tr>
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<th>Williams, IA</th>
</tr>
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<tbody>
<tr>
<td>2004</td>
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<td>No insecticide (soybeans)</td>
</tr>
<tr>
<td>2003</td>
<td>Corn; replant corn (Aztec)</td>
<td>Poncho 250 (corn)</td>
</tr>
<tr>
<td>2002</td>
<td>No insecticide (soybeans)</td>
<td>No insecticide (soybeans)</td>
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<tr>
<td>2001</td>
<td>No Insecticide (corn)</td>
<td>No insecticide (corn)</td>
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#### Tillage

<table>
<thead>
<tr>
<th>Carlise, IA</th>
<th>Williams, IA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Field cultivated</td>
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#### Variety

<table>
<thead>
<tr>
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<th>Williams, IA</th>
</tr>
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<td>DKC60-19</td>
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#### Planting Date

<table>
<thead>
<tr>
<th>Carlise, IA</th>
<th>Williams, IA</th>
</tr>
</thead>
<tbody>
<tr>
<td>April 26</td>
<td>May 2</td>
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#### Planting Rate

<table>
<thead>
<tr>
<th>Carlise, IA</th>
<th>Williams, IA</th>
</tr>
</thead>
<tbody>
<tr>
<td>29,900</td>
<td>29,900</td>
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#### Herbicide<sup>1</sup>

<table>
<thead>
<tr>
<th>Carlise, IA</th>
<th>Williams, IA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.6 pt Dual</td>
<td>2 pt Harness - May 4</td>
</tr>
<tr>
<td>3 oz Callisto</td>
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#### Fertilizer<sup>2</sup>

<table>
<thead>
<tr>
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<th>Williams, IA</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>P</td>
<td>P</td>
</tr>
<tr>
<td>K</td>
<td>K</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Carlise, IA</th>
<th>Williams, IA</th>
</tr>
</thead>
<tbody>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>185</td>
<td>150</td>
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#### Dates

<table>
<thead>
<tr>
<th>Carlise, IA</th>
<th>Williams, IA</th>
</tr>
</thead>
<tbody>
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<td>June 2</td>
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<tr>
<td>Seed/Seedling Eval.</td>
<td>June 2</td>
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</table>

#### Soil Type

<table>
<thead>
<tr>
<th>Carlise, IA</th>
<th>Williams, IA</th>
</tr>
</thead>
<tbody>
<tr>
<td>---</td>
<td>Webster/Clarion</td>
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</tbody>
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<sup>1</sup>Expressed as formulation per acre.

<sup>2</sup>Expressed as pounds per acre.
APPENDIX II

Weather Data
<table>
<thead>
<tr>
<th>Day</th>
<th>April Temp (°F)</th>
<th>Rainfall Inches</th>
<th>May Temp (°F)</th>
<th>Rainfall Inches</th>
<th>June Temp (°F)</th>
<th>Rainfall Inches</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>34 58</td>
<td></td>
<td>29 53 0.02</td>
<td>59 73 T</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>29 54</td>
<td></td>
<td>33 45 T</td>
<td>52 78 0</td>
<td></td>
<td></td>
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<tr>
<td>3</td>
<td>29 60</td>
<td></td>
<td>25 52</td>
<td>55 84 0</td>
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</tr>
<tr>
<td>4</td>
<td>36 73</td>
<td></td>
<td>25 57</td>
<td>62 81 0.22</td>
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<tr>
<td>5</td>
<td>45 80</td>
<td></td>
<td>27 69 T</td>
<td>62 82 0.02</td>
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<td></td>
</tr>
<tr>
<td>6</td>
<td>52 76</td>
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<td>48 74</td>
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<td>7</td>
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<td>60 82</td>
<td>69 90 0</td>
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<tr>
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<td>38 68</td>
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<td>57 82</td>
<td>66 77 0.52</td>
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<tr>
<td>10</td>
<td>49 77</td>
<td></td>
<td>52 74</td>
<td>65 82 0.02</td>
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Normal     47.5  3.06  60.0  4.16  68.9  5.14  
D.F.N.     +6.2  +1.32 -2.4  +0.48 +4.0  +0.29  

¹Weather station located 2 miles SE of test site.
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Normal 73.8 4.90 71.2 4.70 64.2 2.98
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^1Weather station located at test site.
Carlisle<sup>1</sup>
Rainfall and Temperature 2005

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Mean/Total  56.0  4.73  60.2  5.17  74.6  4.72
Normal      50.6  3.58  64.9  4.25  70.8  4.57
D.F.N.      -5.4  +1.15 -4.7  +0.92  +3.8  +0.15

<sup>1</sup>Weather station located at test site.
Crawfordsville\textsuperscript{1}
Rainfall and Temperature 2005

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\textsuperscript{1}Weather station located at test site.
Crawfordsville¹
Rainfall and Temperature 2005

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¹Weather station located at test site.
Nashua¹
Rainfall and Temperature 2005

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¹Weather station located at test site.
## Nashua¹

### Rainfall and Temperature 2005

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Normal     47.4  2.82  59.5  3.70  69.1  4.43
D.F.N.     +4.5  +0.19 -2.3  -0.24 +2.2  +1.29

1Weather station located at test site.
## Sutherland
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1Weather station located at test site.
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| Normal     | 52.1 | 3.75 | 63.4 | 4.52 | 72.8 | 4.82 |
| D.F.N.     | +4.6 | -0.79| -3.2 | -2.90| +2.9 | -1.92|

\(^1\)Weather station located at Iowa City.
Williams¹
Rainfall and Temperature 2005

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</tr>
</tbody>
</table>

Mean/Total 52.5 4.05 56.6 3.05 72.2 6.26
Normal 47.6 3.09 60.2 4.13 69.4 5.23
D.F.N. +4.9 +0.96 -3.6 -1.08 +2.8 +1.03

¹Weather station located at Webster City.
APPENDIX III

Materials Tested
<table>
<thead>
<tr>
<th>Common or code name</th>
<th>Formulation</th>
<th>Chemical name or trait/event</th>
<th>Company</th>
</tr>
</thead>
<tbody>
<tr>
<td>A14776</td>
<td>200CS</td>
<td>tefluthrin</td>
<td>Syngenta</td>
</tr>
<tr>
<td>Agrox Premiere</td>
<td>Hopperbox ST</td>
<td>diazionon-lindane-captan-metalaxyl</td>
<td>AGRILIANCE LLC</td>
</tr>
<tr>
<td>AGST 02002</td>
<td>Hopperbox ST</td>
<td>NA</td>
<td>AGRILIANCE LLC</td>
</tr>
<tr>
<td>AGST 03001</td>
<td>Hopperbox ST</td>
<td>imidacloprid &amp; metalaxyl</td>
<td>AGRILIANCE LLC</td>
</tr>
<tr>
<td>Aztec</td>
<td>4.67G</td>
<td>tebupirimphos &amp; cyfluthrin</td>
<td>AMVAC Chem. Corp.</td>
</tr>
<tr>
<td>Aztec</td>
<td>2.1G</td>
<td>tebupirimphos &amp; cyfluthrin</td>
<td>Bayer Corp.</td>
</tr>
<tr>
<td>Capture</td>
<td>2EC</td>
<td>bifenthrin</td>
<td>FMC Corp.</td>
</tr>
<tr>
<td>Cruiser</td>
<td>Commercially applied seed trt (0.25 or 1.25 mg/seed)</td>
<td>thiamethoxam</td>
<td>Syngenta</td>
</tr>
<tr>
<td>Cruiser Extreme Pak (Cruiser, Maxim XL &amp; Dynasty)</td>
<td>Seed trt (1.26 mg/seed)</td>
<td>thiamethoxam, fludioxonil, mefenoxam and aozoxystrobin (applied as separate components)</td>
<td>Syngenta</td>
</tr>
<tr>
<td>DEFCION</td>
<td>2.1G</td>
<td>tebupirimphos &amp; cyfluthrin</td>
<td>Helena Chem. Co.</td>
</tr>
<tr>
<td>YieldGard Plus (DKC60-18 with seed trt)</td>
<td>Transgenic seedcorn (YGRW+YGCB+RR2) + commercially applied Poncho 250</td>
<td>Cry3Bb1 (MON 863) + Cry1Ab (MON810) + Roundup Ready Corn 2 + fludioxonil &amp; mefenoxam fungicides + clothianidin seed trt (0.25 mg/seed)</td>
<td>Monsanto Co.</td>
</tr>
<tr>
<td>DKC60-19 seedcorn (no seed trt)</td>
<td>DKC60-19 (isoline of DKC60-18)</td>
<td>Cry1Ab (MON810) + Roundup Ready Corn 2 + fludioxonil &amp; mefenoxam fungicides</td>
<td>Monsanto Co.</td>
</tr>
<tr>
<td>Force</td>
<td>3G</td>
<td>tefluthrin</td>
<td>Syngenta</td>
</tr>
<tr>
<td>Fortress</td>
<td>2.5G</td>
<td>chlorethoxyfos</td>
<td>AMVAC Chem. Corp.</td>
</tr>
<tr>
<td>Fortress</td>
<td>5G</td>
<td>chlorethoxyfos</td>
<td>AMVAC Chem. Corp.</td>
</tr>
<tr>
<td>Herculex RW (Pioneer) with Poncho 250 seed trt</td>
<td>Pioneer Background – NA</td>
<td>Cry34Ab1 &amp; Cry35Ab1 + LibertyLink gene + clothianidin seed trt (0.25 mg/seed)</td>
<td>Pioneer Hi-Bred International, Inc.</td>
</tr>
<tr>
<td>Herculex RW (Dow) with Cruiser seed trt</td>
<td>Dow Background – NA</td>
<td>Cry34Ab1 &amp; Cry35Ab1 + LibertyLink gene + thiamethoxam seed trt (0.25 mg/seed)</td>
<td>Dow AgroSciences</td>
</tr>
<tr>
<td>Common or code name</td>
<td>Formulation</td>
<td>Chemical name or trait/event</td>
<td>Company</td>
</tr>
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<td>---------------------</td>
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<tr>
<td>Lorsban</td>
<td>15G</td>
<td>chlorpyrifos</td>
<td>Dow AgroSciences</td>
</tr>
<tr>
<td>Lorsban</td>
<td>4E</td>
<td>chlorpyrifos</td>
<td>Dow AgroSciences</td>
</tr>
<tr>
<td>Lorsban</td>
<td>75WG</td>
<td>chlorpyrifos</td>
<td>Dow AgroSciences</td>
</tr>
<tr>
<td>MON88017 + YGCB + RR2 + Poncho 250</td>
<td>Transgenic Seedcorn</td>
<td>Cry3Bb1 (ZMIR39) + Cry1Ab (MON 810) + Roundup Ready Corn 2 (NK603- glyphosate) + clothianidin seed trt (0.25 mg/seed)</td>
<td>Monsanto Co.</td>
</tr>
<tr>
<td>Poncho 250</td>
<td>Commercially applied seed trt (0.25 mg/seed)</td>
<td>clothianidin</td>
<td>Bayer</td>
</tr>
<tr>
<td>Poncho 1250</td>
<td>Commercially applied seed trt (1.25 mg/seed)</td>
<td>clothianidin</td>
<td>Bayer</td>
</tr>
<tr>
<td>Regent</td>
<td>4SC</td>
<td>fipronil</td>
<td>BASF</td>
</tr>
<tr>
<td>Regent seed treatment</td>
<td>500FS</td>
<td>fipronil</td>
<td>BASF</td>
</tr>
<tr>
<td>YGRW + YGCB + RR2 + Poncho 250</td>
<td>Transgenic Seedcorn</td>
<td>Cry3Bb1 (MON 863) + Cry1Ab (MON 810) + Roundup Ready Corn 2 (NK603- glyphosate) + clothianidin seed trt (0.25 mg/seed)</td>
<td>Monsanto Co.</td>
</tr>
<tr>
<td>YGRW + YGCB + RR2 + Poncho 250 + Force 3G</td>
<td>Transgenic Seedcorn</td>
<td>Cry3Bb1 (MON 863) + Cry1Ab (MON 810) + Roundup Ready Corn 2 (NK603- glyphosate) + clothianidin seed trt (0.25 mg/seed) + tefluthrin</td>
<td>Monsanto Co.</td>
</tr>
<tr>
<td>YGCB + RR2 + Poncho 1250</td>
<td>Transgenic Seedcorn</td>
<td>Cry1Ab (MON 810) + Roundup Ready Corn 2 (NK603- glyphosate) + clothianidin seed trt (1.25 mg/seed)</td>
<td>Monsanto Co.</td>
</tr>
<tr>
<td>YGCB + RR2 + Poncho 250</td>
<td>Transgenic Seedcorn</td>
<td>Cry1Ab (MON 810) + Roundup Ready Corn 2 (NK603- glyphosate) + clothianidin seed trt (0.25 mg/seed)</td>
<td>Monsanto Co.</td>
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</table>