

# IOWA STATE UNIVERSITY

OF SCIENCE AND TECHNOLOGY

## 2010 EVALUATION OF INSECTICIDES AND PLANT-INCORPORATED PROTECTANTS

DEPARTMENT OF ENTOMOLOGY

AMES, IOWA 50011-3140

LESLIE C. LEWIS, CHAIR

### INSECTS INVESTIGATED

Corn Rootworm    Black Cutworm    European Corn Borer    Corn Earworm  
Fall Armyworm

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# IOWA STATE UNIVERSITY

## 2010 EVALUATION OF INSECTICIDES AND PLANT INCORPORATED PROTECTANTS

### TABLE OF CONTENTS

|   | <u>Page</u> |
|---|-------------|
| <b>1. Research Personnel</b> .....                    | 1           |
| <b>2. Introduction and Objective</b> .....            | 2           |
| <b>3. Testing Procedures and Evaluations</b> .....    | 2           |
| <b>4. Studies Conducted</b> .....                     | 13          |
| <b>5. Corn Rootworm Evaluation Tables</b>             |             |
| <b>Ames</b>   |             |
| <i>Pioneer CMRA emergence cage study</i>              |             |
| Root Injury/Percent Consistency .....                 | 14          |
| Stand Count .....                                     | 14          |
| Percent Lodging .....                                 | 15          |
| Yield .....   | 15          |
| <i>Pioneer blended refuge study for corn rootworm</i> |             |
| Root Injury/Percent Consistency .....                 | 16          |
| Stand Count .....                                     | 16          |
| Percent Lodging .....                                 | 17          |
| Yield .....   | 17          |
| <b>Crawfordsville</b>                                 |             |
| <i>Yield Study</i>                                    |             |
| Root Injury/Percent Consistency .....                 | 18          |
| Stand Count .....                                     | 18          |
| Percent Lodging .....                                 | 19          |
| Yield .....   | 19          |

Table of Contents (Continued)

Page

**Nashua**

*Yield Study*

|                                       |    |
|---------------------------------------|----|
| Root Injury/Percent Consistency ..... | 20 |
| Stand Count .....                     | 20 |
| Percent Lodging .....                 | 21 |
| Yield .....                           | 21 |

*Monsanto-Smartstax CRW study*

|                                       |    |
|---------------------------------------|----|
| Root Injury/Percent Consistency ..... | 22 |
| Stand Count .....                     | 22 |
| Percent Lodging .....                 | 23 |
| Yield .....                           | 23 |

**Sutherland**

*Syngenta experimental hybrid yield and efficacy study*

|                                       |    |
|---------------------------------------|----|
| Root Injury/Percent Consistency ..... | 24 |
| Stand Count .....                     | 24 |
| Yield .....                           | 25 |

**6. Seed Treatment/Fungicide Evaluation Tables**

**Ames**

*Bayer Yield Study (Corn following Soybeans)*

|                   |       |
|-------------------|-------|
| Stand Count ..... | 26-27 |
| Yield .....       | 28-29 |

*Bayer Yield Study (Corn following Soybeans)*

|                   |       |
|-------------------|-------|
| Stand Count ..... | 30-31 |
| Yield .....       | 32-33 |

**Nashua**

*Bayer Yield Study (Corn following Corn)*

|                   |       |
|-------------------|-------|
| Stand Count ..... | 34-35 |
| Yield .....       | 36-37 |

*Bayer Yield Study (Corn following Corn)*

|                   |       |
|-------------------|-------|
| Stand Count ..... | 38-39 |
| Yield .....       | 40-41 |

**7. European Corn Borer Evaluation Tables**

**Ames**

*Pioneer blended refuge study for European corn borer*

|                         |    |
|-------------------------|----|
| Stand Count .....       | 42 |
| ECB Whorl Injury.....   | 42 |
| ECB Tunneling (cm)..... | 43 |
| Yield .....             | 43 |

**8. Black Cutworm Evaluation Tables**

**Ames**

*Dow AgroSciences Smartstax vs. HXX & RR2 corn traits study*

|                                  |    |
|----------------------------------|----|
| Stand Count/Mean Plants Cut..... | 44 |
|----------------------------------|----|

**9. Fall Armyworm Evaluation Tables**

**Ames**

*Dow AgroSciences Smartstax vs. HXX & RR2 corn traits study*

|                              |    |
|------------------------------|----|
| Stand Count .....            | 44 |
| FAW Scoring (0-9 Scale)..... | 44 |

**10. Corn Earworm Evaluation Tables**

**Sutherland**

*Dow AgroSciences Smartstax vs. HXX & Conv. corn traits study*

|  |    |
|--|----|
| Stand Count .....                            | 45 |
| Percent Damaged Kernels .....                | 45 |
| Kernel Area Consumed (cm <sup>2</sup> )..... | 45 |
| Total Damaged Ears .....                     | 45 |

**11. Appendix I - Agronomic Information .....** 46

**12. Appendix II – Weather Data.....** 53

**13. Appendix III - Materials Tested .....** 65

**14. Appendix IV - Research Pictures .....** 68

# IOWA STATE UNIVERSITY

## 2010 EVALUATION OF INSECTICIDES AND PLANT INCORPORATED PROTECTANTS

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### CORN PESTS RESEARCH PROJECT

#### DEPARTMENT OF ENTOMOLOGY

AMES, IOWA 50011-3140

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|  |  |
|--|--|
| Project Leader:                              | Aaron Gassmann   |
| Agricultural Specialist:                     | Patrick Weber  |
| Postdoctoral Research Associate:             | Jennifer Petzold   |
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| Technical Assistants:                        | Charlie Ethington<br>Christopher Perry<br>Sara Ann Hathaway<br>James Terry<br>Eric Van Buren |
| University Research<br>Farm Superintendents: | Kent Berns<br>Ryan Rusk<br>Kenneth Pecinovsky<br>Kevin VanDee                                |

## INTRODUCTION

The corn rootworm species, which includes the western corn rootworm *Diabrotica virgifera virgifera* and northern corn rootworm *D. barberi*, are the most damaging pests of corn *Zea mays* 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 may diminish yield by reducing plant growth and drought tolerance and by imposing harvesting losses due to 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 on soft doughy 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 (transgenic seedcorn that contains a gene from the naturally occurring soil bacterium *Bacillus thuringiensis* (Bt)).

In addition to corn rootworm, several above-ground lepidopteran pests feed on corn in Iowa. These include the European corn borer *Ostrinia nubilalis*, black cutworm *Agrotis ipsilon*, fall armyworm *Spodoptera frugiperda*, and corn earworm *Helicoverpa zea*. Over the last decade, Bt corn varieties have been made commercially available to protect corn from these pests.

## OBJECTIVE

The goal of this research program is to serve Iowa agriculture by monitoring and evaluating the performance of registered commercial insecticides and

transgenic corn hybrids. To achieve this goal, we maintain a viable, proactive, progressive and scientifically sound product evaluation program.

## TESTING PROCEDURES AND EVALUATIONS

**Field Sites:** Product efficacy study plots were established at four Iowa locations in 2009. Corn rootworm (CRW) research fields are continually maintained on University farms located at: Ames, Johnson Farm and the Field Extension and Education Laboratory (FEEL); Crawfordsville, S.E. Research and Demonstration Farm; Nashua, N.E. Research and Demonstration Farm; Sutherland, N.W. Research and Demonstration Farm and Lewis, S.W. Research and Demonstration Farm. Each research field is divided into two sections (except at the FEEL location), which annually alternate as test plot and late planted trap crop. The seed planted for the trap crop is a mixed maturity blend with a greater proportion of late-maturing varieties. This trap crop constitutes a favorable environment for adult female CRW late in the season when other fields are maturing. In addition, two first year corn studies and two second year corn studies were established at both Ames, Johnson Farm and Nashua, N.E. Research and Demonstration Farm for the Seed treatment/Fungicide studies.

**Table 1:** Lists the research conducted at each location, target pest, and other general plot information.

### Corn Rootworm Studies

**Field plot design:** The experimental design in most studies was a

randomized complete block. Treatments in the yield studies at both Crawfordsville (Tables 10-13) and Nashua (Tables 14-17) were paired rows 75-feet in length with four replications. Treatments for the Pioneer blended refuge study for corn rootworm at Ames (Tables 6-9) were four rows wide with 30 feet per row with four replications. The Pioneer CMRA emergence cage study (Tables 2-5) at Ames was eight row treatments that were 25 feet in length with six replications. The treatments in the Monsanto study at Nashua (Tables 17-20) were eight row treatments with 40 feet per row with four replications. Treatments for the Syngenta experimental hybrid yield and efficacy study at Sutherland (Tables 22-24) were four row wide treatments that were 20 feet in length with four replications.

**Application techniques:** Seeds were pre-bagged and planted with a four-row John Deere Max Emerge™ 7100 integral planter that had 30 inch row spacings. The standard planter fiberglass seed hoppers with attached “finger pickup mechanism,” 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 seeds were dumped into the steel cylinder. At the beginning of each replication, a hydraulic motor (attached to the planter’s drive shaft) was activated to deliver seed immediately into the ground. At the end of each replication,

this same hydraulic motor was activated to expel any unplanted seed.

**Plant-incorporated protectants:** Plant-incorporated protectants were evaluated in corn hybrids producing insecticidal toxins derived from the bacterium *Bacillus thuringiensis* (Bt). These included the Yieldgard hybrids of Monsanto that produce the Bt toxin Cry3Bb1 and the Herculex hybrids of Pioneer and Dow AgroSciences that produce the binary Bt toxin Cry34/Cry35.

**Seed treatments:** All the DeKalb hybrids evaluated in the yield studies (Crawfordsville, Tables 10-13; Nashua, Tables 14-17) were treated by the respective company with Poncho 250. All the Mycogen hybrids evaluated in the Yield Studies (Crawfordsville, Tables 10-13; Nashua, Tables 14-17) were treated by the respective company with Cruiser Extreme® 250. For the Pioneer blended refuge study for corn rootworm, (Ames, Tables 6-9) and Pioneer CMRA study (Ames, Tables 2-5) and Pioneer blended refuge study for European corn borer (Ames, Tables 33-36) all hybrids were treated with Cruiser Extreme® 250. For the blended refuge seeds planted in the Pioneer blended refuge study for corn rootworm and Pioneer blended refuge study for European corn borer all seeds were commercially treated with Poncho 1250. For the Monsanto Smartstax CRW study (Nashua, Tables 18-21), the Poncho 250 seed treatment was commercially applied. The Syngenta experimental hybrid yield and efficacy study (Sutherland, (Tables 22-24) these hybrids were treated with Cruiser Extreme® 250.

All these seed treatments target secondary soil-borne pests, such as

wireworm and seedcorn maggot. For some treatments, plant-incorporated protectants were combined with conventional insecticides.

**Granular application treatments:**

Force 3G granular insecticide was applied to one treatment in the Pioneer blended refuge study for corn rootworm, one treatment in the Pioneer blended refuge study for European corn borer studies with modified Noble<sup>®</sup> metering units mounted on the planter. Aztec 2.1G granular insecticide was applied to two treatments in the Yield studies at both Crawfordsville and Nashua with modified Noble<sup>®</sup> 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 in-furrow (Furrow). 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.

**Liquid application treatments:** The liquid product, Force 250 CS insecticide, was applied at planting with a compressed-air system built directly into the planter by Almaco manufacturing (Nevada, IA). The product was applied as “ounces per 1000 row feet”. This closed handling system consisted of 3-gallon product canisters equipped with quick disconnects. This liquid treatment was applied as a T-Band using Teejet

XR80015 spray nozzles at 21 psi to deliver 5 GPA of finished spray.

**Force 250 CS is a Restricted Use Pesticide.**

**SmartBox<sup>™</sup> application treatments:**

SmartChoice 5G, Aztec 4.67 and Counter 20G, treatments were applied with modified SmartBox<sup>™</sup> metering units. These products were applied as ounces per 1000 row feet. The commercial SmartBox<sup>™</sup> 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 slide 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 two controllers mounted in the tractor cab were used to operate the SmartBox<sup>™</sup> metering units. All treatments were applied at 4 mph using the “fixed speed mode” on the SmartBox<sup>™</sup> controllers.

**Seed treatment/Fungicide Study**

**Field plot design:** The experimental design in this Bayer yield studies (Ames-Tables 25-28; Nashua-Tables 29-32) was a randomized complete block with four replications respectively. Two hybrids were tested at each location (Ames, Nashua). A Roundup Ready 2 Hybrid and a Liberty Link Hybrid were tested. These treatments were eight rows wide, 35-feet in length.

**Application techniques:** The seed treatments were commercially applied, so the seed was ready to be counted and bagged for planting. All seeds were pre-bagged and planted with the modified seed units as described earlier in the corn rootworm studies section.

**Granular application treatments:** Granular insecticide formulations were applied with modified Noble<sup>®</sup> metering units mounted on the planter. There was only one treatment (A/4-Aztec 2.1G) which was applied with these Noble<sup>®</sup> units.

**Liquid application treatments:** There was one fungicide treatment (Stratego PRO-5 oz/A + Induce-0,125 %V/V) applied to five entries (A/3, A/4, A/5, A/6, and A/7) for four studies (Corn following Corn-Nashua, Corn following Soybeans-Ames) using a Hagie high-boy sprayer provided and operated by the ISU Plant Pathology department for the Ames and Nashua location studies. The fungicide application was applied to the Reproductive Stage 1 corn at Ames (Corn following Soybeans) on July 28, 2010, and at Nashua (Corn following Corn) on July 20, 2010.

### **European Corn Borer Study**

**Field plot design:** The experimental design in the Pioneer blended refuge study for European corn borer was a randomized complete block with four replications respectively. Five treatments were evaluated (Pioneer HXX alone, Pioneer RR2 with Force 3G applied at planting, T-band; Pioneer HXX pyramided alone, and with a 5% and 10% blended refuge (RR2)). These treatments were four rows wide, 30-feet in length. In all treatments, 5 plant

clusters were marked with stakes in each row. In the treatment with 5% blended refuge, three clusters of five plants were marked in each of the four rows. In the treatment with 10% blended refuge, five clusters of five plants each were marked in each of the four rows. In each of the plots, all plants in the middle two rows of the plot were infested with ECB. Also infested were rows 1 and 4 of the plots that contained the blended refuge.

**Application techniques:** The ECB larvae were obtained from the USDA-ARS Corn Insects and Crop Genetics Research Laboratory. We obtained eleven bottles of first instar larvae, mixed with corn grit and then infested each plant as described in the field plot design section. In infesting with first-generation ECB on June 25 and 29, the inoculum was applied into the whirl. Infesting with second-generation ECB was conducted on July 22 and 27, the inoculum was applied into the primary ear leaf collar. Inoculum was equal to 100 ECB per plant and administered with bazooka inoculators. On September 17 (approximately seven weeks after the last inoculum), thirty plants per treatment were sampled. Plants were split into three parts (top, shank, and bottom) with a curved linoleum knife. Total tunnel length (cm) and number of tunnels were scored for each plant part.

### **Black Cutworm Study**

**Field plot design:** The experimental design was a randomized complete block with four replications. Each treatment was four rows wide by 25 feet long. Three treatments (Mycogen RR hybrid, Mycogen Smartstax, and

Mycogen Herculex XTRA hybrid) were evaluated. These treatments were pre-packaged by Dow AgroSciences and were planted with the tractor mounted planter. On 2 June 2010, corn (V1, 2-4 inches tall), metal barriers, approximately 2.5 ft wide by 15 ft long (provided by Dow AgroSciences) were assembled in the field and placed over one row of corn, either the second or third row in the plot depending on the plant stand. There were twelve of these barriers placed in the study area.

**Application techniques:** The BCW insects were obtained from the USDA-ARS Corn Insects and Crop Genetics Research Laboratory. On 6/3/10 and then again on 6/4/10, (V1 stage, 2-4 inches tall corn), all plants within the metal barrier on each date were infested with two, L2-L3 BCW larvae/plant. At 7 and 14 days after the last infestation (DAI) corn plants were observed for cutting at ground level and counted then marked with a popsicle stick to designate it had been cut by the BCW insects.

### Fall Armyworm Study

**Field plot design:** The experimental design in this study was a randomized complete block with four replications. The treatments consisted of Mycogen conventional corn, Mycogen Smartstax and Mycogen Herculex XTRA. These treatments were four rows wide, 20-feet in length.

**Application techniques:** The FAW eggs (on paper towels) were obtained from Benzon Research Inc. These eggs were placed in air tight plastic containers and put in incubators for hatching. They were checked daily for

hatching progress and at approximately 85-90% hatch we mixed them with corn grit in the laboratory. On 1 July 2010, 10 consecutive plants in the middle two rows of each plot were marked with flags designating to be infested. On 2 July 2010, all of these marked plants were infested in the whorl with approximately 70 neonates (2 shots of neonates at 35 per shot). Corn was at stage, V9-V10 and 24-30 inches tall at infestation.

On 14 July 2010 (14 days after Infestation), all corn plants infested were evaluated for FAW injury using a 0-9 scale. The scale for injury used was 0 being no visible leaf feeding and 9 being whorl and furl leaves almost totally destroyed.

### Corn Earworm Study

**Field plot design:** The experimental design in this study was a randomized complete block with four replications. The treatments consisted of Mycogen conventional corn, Mycogen Smartstax and Mycogen Herculex XTRA. These treatments were four rows wide, 20-feet in length.

**Application techniques:** The CEW neonates were obtained from the USDA-ARS Corn Insects and Crop Genetics Research Laboratory. These neonates were mixed with corn grit at the field site (Sutherland, IA) on July 28, 2010. Prior to infestation, corn ear shoot bags were placed over the top ear shoot of all plants in row 2 and 3 of each plot. Bazooka inoculators were used to infest all ears in row 2 and 3 on July 28. Each plant was given two shots of inoculum for a total of 40 CEW larvae per ear.

On 20 August 2010 (23 days after infestation) 10 randomly selected

ears were sampled from the two center rows of each plot. From these ears we counted the numbers of kernels damaged, in addition, we measured with a caliper (in millimeters) the average kernel cap size, both length and width. In addition, we counted the number of rows of kernels around the ear and the number of kernels in an average row length. From these numbers collected, we calculated the percentage of damaged kernels per ear and per treatment.

### **Corn Rootworm Larval Evaluations**

**Stand counts:** The number of plants in either 17.5, or 20 row-ft was recorded (note distance in foot notes of stand count tables). These were taken early in the growing season.

The number of plants in 25 row-ft was recorded for both the Pioneer blended refuge study for corn rootworm and Pioneer blended refuge study for European corn borer. These were taken early in the growing season

**Root-Injury:** After the majority of corn rootworms had finished feeding, roots were dug from 7/22/10 through 8/02/10. Five root systems total were dug from each insecticide treatment from the two-row yield studies (Crawfordsville, Table 9 & Nashua, Table 13) likewise seven roots total were dug per treatment from rows two and seven of the Monsanto-Smartstax study (Nashua, Table 17). With the Pioneer CMRA emergence cage study, six roots total were dug per treatment from rows two and seven (Ames, Table 2). With the Pioneer blended refuge study for corn rootworm, 30 roots were dug from all treatments

except the 10% blended refuge treatment. Roots were dug out of rows 1 and 4 only (Ames, Table 6). With the Syngenta experimental hybrid yield and efficacy study, a total of six root systems total were dug from rows one and four of each treatment (Sutherland, Table 22). Prior to leaving the field, the roots were marked with a permanent marker with the plot number, study name and location. Excess soil was removed in the field as well. In Ames, roots were soaked in water overnight, and then a pressurized water spray was used to remove the remaining soil. Roots were then laid out by replications and were then evaluated for rootworm feeding injury on the following Iowa State Node-Injury Scale (0-3):

#### **Node-Injury Scale (0-3):**

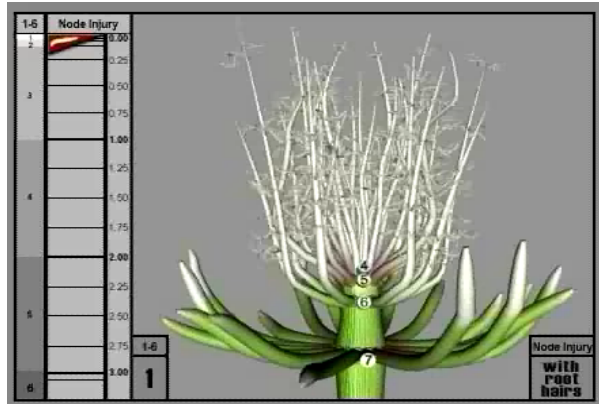
- 0.00 - No feeding damage (lowest rating that can be given).
- 1.00 - One node (circle of roots), or the equivalent of an entire node, eaten back to with-in ~ 1½ inches of the stalk (soil line on the 7<sup>th</sup> node).
- 2.00 - Two nodes eaten.
- 3.00 - Three or more nodes eaten.  
(Highest rating that can be given)

Damage in-between complete nodes eaten is noted as the percentage of the node missing, i.e. 1.50 = 1½ nodes eaten, 0.25 = ¼ of one node eaten, and so on.

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:

[rootworm/nodeinjury/nodeinjury.html](http://rootworm/nodeinjury/nodeinjury.html)



**Product consistency:** The percent 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 and plant incorporated protectants effectiveness, data were analyzed with standard ANOVA procedures. Ryan's Q test (REGWQ) was used to rank treatments means where significant differences ( $P > F \leq 0.05$ ) occurred.

**Lodging counts:** A plant was considered lodged if it was leaning at least 30 degrees from vertical. These were taken at harvest time along with final stand count numbers (note distance in footnotes of lodging count tables).

**Yields:** Studies that were taken to yield were machine harvested. Weights were

converted to bushels/acre of No. 2 shelled corn (56 lbs/bushels) at 15.5% moisture (noted in footnotes) and analyzed for treatment effects.

### COMMENTS ON INSECTICIDES AND PLANT INCORPORATED PROTECTANTS (PIP) PERFORMANCE

Tables list treatment rates as ounces active ingredient per 1000 row foot unless otherwise indicated in the footnotes.

### CORN ROOTWORM EVALUATIONS

#### AMES (Johnson farm)

**Pioneer CMRA emergence cage study (Tables 2-5):** With root injury and percent product consistency, HXX with pathogens was significantly different than the HXX alone, HX1 alone and with pathogens. Also, both HXX treatments were significantly different than the two HX1 treatments for both root injury and percent product consistency. With percent lodging, both the HXX treatments were significantly different than the HX1 alone treatment but was the same as the HX1 with pathogens treatment. There were no significant differences among stand counts or yields.

**Pioneer blended refuge study for corn rootworm (Tables 6-9):** RR2, either alone or with Force, tended to have lower stand counts than HXX and HXX with a 5% and 10% blended refuge of RR2. Root injury was lowest and percent product consistency greatest for RR2 with Force 3G. Both HXX alone, and HXX and RR2 in the 5% blended refuge showed similar, and intermediate, root injury and product

consistency. Product consistency was lowest and injury highest for RR2 in a pure stand. RR2 alone in a pure stand had significantly higher lodging than the other treatments. No significant differences in yield were detected among treatments.

The traited corn and insecticide licensees in this study include:

RR2 = Roundup Ready® Corn 2 gene.  
® Roundup Ready is a registered trademark used under license from Monsanto Company.

Force® 3G is a registered trademark of a Syngenta Group Company.

HXX = Herculex® XTRA technology. Herculex® Insect Protection technology by Dow AgroSciences and Pioneer Hi-Bred. ®Herculex and the HX logo are registered trademarks of Dow AgroSciences LLC.

Liberty Link® (LL), Ignite® and the Water Droplet logo are registered trademarks of Bayer.

#### **CRAWFORDSVILLE (S.E. R&D FARM)**

**Yield study (Tables 10-13):** Node injury was significantly higher and percent product consistency significantly lower, for the three isoline treatments (checks) than all other treatments (Table 1). Some differences in stand counts were noted among treatments (Table 2). There was lodging observed within this study (Table 3), although root injury on the untreated checks exceeded 1.25 nodes (Table 1). Yields were tended to be greater among treatments with rootworm protection compared to the untreated checks (Table 4). However,

no differences in yield were noted among the treatments with rootworm protection (Table 4).

#### **NASHUA (N.E. R&D FARM)**

**Yield study (Tables 14-17):** The three isoline treatments (checks) had significantly higher node injury and lower product consistency than the other treatments (Table 14). Percent lodging was significantly higher for the three isoline treatments (checks) and the Mycogen isoline with Aztec-SB insecticide applied (Table 16). Differences in yield were observed among hybrids and are detailed in Table 17.

#### **Monsanto Smartstax CRW study**

**(Tables 18-21):** With node-injury and percent product consistency, the RR2 hybrids alone and with Aztec 2.1G overtop had significantly greater injury than the rest of the treatments. The Smartstax treatment alone had significantly lower stand count than the Smartstax with Aztec 2.1G overtop, RR2 Hybrid alone and with Insecticide and YieldGuard VT Triple. However, Smartstax alone was no different regarding stand count as compared to the RR2/HXX/LL (Pioneer 33W84) treatment with and without insecticide overtop. The RR2 hybrid alone had significantly greater percent lodging than the remaining seven treatments. With yield, the RR2/HXX/LL (Pioneer 33W84) hybrid alone and with Aztec overtop was no different than Smartstax alone, YieldGuard VT Triple alone and with Aztec overtop, and the RR2 hybrid with Aztec overtop but was significantly different than the Smartstax with Aztec overtop and RR2 hybrid alone.

**SUTHERLAND (N.W. R&D FARM)****Syngenta experimental hybrid yield and efficacy study (Tables 22-24):**

Rootworm pressure was low so there were no differences among node-injury or percent product consistency (Table 22) in these experimental hybrids. The 95% MIR604 + HX1 + Bt11 + HXRW / 5% refuge without and with liquid Force® insecticide applied overtop had significantly higher mean stand counts than the remaining eight treatments (Table 23). Yield data was variable but the treatment MIR162+HX1+Bt11 alone was significantly different than the Non-Bt with liquid Force insecticide applied overtop but was no different from the rest of the treatments (Table 24).

**SEED TREATMENT/FUNGICIDE STUDY****AMES (Johnson Farm)**

**Bayer Yield Study (Corn following Soybeans) (Tables 25 & 26):** No significant differences were observed for stand counts or yields.

**Bayer Yield Study (Corn following Soybeans) (Tables 27 & 28):** No significant differences were observed for stand counts or yields.

**NASHUA (N.E. R&D FARM)**

**Bayer Yield Study (Corn following Corn) (Tables 29 & 30):** For stand counts, the A/1 treatment was significantly different than the A/6 and A/2 treatments but was not significantly different than the A/3, A/4, A/5 & A/7 treatments. No significant differences were observed for yields.

**Bayer Yield Study (Corn following Corn) (Tables 31 & 32):** No significant

differences were observed for stand counts or yields.

**EUROPEAN CORN BORER EVALUATIONS****AMES (Johnson farm)****Pioneer blended refuge study for European corn borer (Table 33-36):**

There were no significant differences among stand counts or yield for any of the treatments. Regarding ECB whorl injury and average ECB tunneling (cm), the RR2 either alone or in a blended refuge was significantly different from HXX and HXX pyramided with YieldGard corn borer (either alone or in a blended refuge).

The traited corn and insecticide licensees in this study include:

RR2 = Roundup Ready® Corn 2 gene.  
® Roundup Ready is a registered trademark used under license from Monsanto Company.

Force® 3G is a registered trademark of a Syngenta Group Company.

HXX = Herculex® XTRA technology.  
Herculex® Insect Protection technology by Dow AgroSciences and Pioneer Hi-Bred. ®Herculex and the HX logo are registered trademarks of Dow AgroSciences LLC.

Liberty Link® (LL), Ignite® and the Water Droplet logo are registered trademarks of Bayer.

## **BLACK CUTWORM EVALUATIONS**

### **AMES (Johnson farm)**

**Smartstax vs. Herculex XTRA and RR2 corn traits study (Table 37):** For stand count the Smartstax treatment was significantly different than the two other treatments, HXT/RR2 and the RR hybrid. The average cut plants on the evaluation date of 11 June 2010 (7 DAI) all three treatments were significantly different from each other with the Smartstax treatment having no plants cut, the Herculex XTRA/RR2 having 1.25 plants cut and the RR Hybrid having 3.75 plants cut in 13 feet of row. For the evaluation date of 18 June 2010 (14 DAI) there were no significant differences among any of the treatments. On 25 June 2010 (21 DAI) there was no additional cutting observed.

## **FALL ARMYWORM EVALUATIONS**

### **Ames (Johnson farm)**

**Smartstax vs. Herculex XTRA and RR2 corn traits study (Table 38):** No significant differences were observed for stand counts. Regarding average Fall Armyworm scoring, the RR2 hybrid treatment was significantly different than the other two treatments of Smartstax and Herculex XTRA/RR2.

## **CORN EARWORM EVALUATIONS**

### **SUTHERLAND (N.W. R&D FARM)**

**Smartstax vs. Herculex XTRA and Conventional corn traits study (Tables 39-41):** No significant differences were observed for stand counts. Regarding total larvae, the Smartstax was significantly different from the HXX/RR2 treatment, but was not significantly different from the

conventional treatment. Regarding percent damaged, the Smartstax treatment had significantly less damaged kernels than the other two treatments of HXX/RR2 and conventional. With kernel area consumed and total damaged ears, the Smartstax was significantly different than the HXX/RR2 and conventional treatments.

## **CALIBRATION INFORMATION**

All Noble<sup>®</sup> units were laboratory calibrated and units were randomly spot-checked in the field prior to planting. SmartBox<sup>™</sup> 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 AND PICTURES OF RESEARCH PROJECTS**

Agronomic information and field insecticide history for each test plot location 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**. Pictures of various activities of research projects are listed in **Appendix IV**.

## **RESEARCH SUPPORT**

Many thanks to the Iowa Agriculture and Home Economics Experiment Station

and the following companies for providing support for the evaluation of insecticides and plant-incorporated protectants (Corn Pests Research Project): AMVAC Chemical Corporation, Bayer CropScience, Dow AgroSciences, Monsanto, Pioneer Hi-Bred International, Inc., Syngenta.

### **WAIVER OF ENDORSEMENT**

*This report deals with the relative ability of each treatment to protect corn from damage by soil insects. This 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 evaluation of insecticides and plant-incorporated protectants for 2010.

| Target Pest and<br>Test Location | Type of Studies <sup>1</sup>                             | Table<br>Numbers | Entries/<br>Test | Experimental<br>Unit Size |           |
|----------------------------------|--|------------------|------------------|---------------------------|-----------|
|                                  |  |                  |                  | Row<br>Length (ft)        | #<br>Reps |
| <b>Corn Rootworms</b>            |  |                  |                  |                           |           |
| Ames                             | Pioneer CMRA study                                       | 2-5              | 4                | 25                        | 6         |
|                                  | Pioneer blended refuge<br>study                          | 6-9              | 5                | 30                        | 4         |
| Crawfordsville                   | Yield  | 10-13            | 12               | 75                        | 4         |
| Nashua                           | Yield  | 14-17            | 12               | 75                        | 4         |
|                                  | Monsanto-Smartstax<br>CRW study                          | 18-21            | 8                | 40                        | 4         |
| Sutherland                       | Syngenta experimental<br>hybrid yield and efficacy       | 22-24            | 10               | 20                        | 4         |
| <b>Seed treatments/Fung.</b>     |  |                  |                  |                           |           |
| Ames                             | Bayer special yield (C-SB)                               | 25-26            | 6                | 35                        | 4         |
|                                  | Bayer special yield (C-SB)                               | 27-28            | 6                | 35                        | 4         |
| Nashua                           | Bayer special yield (C-C)                                | 29-30            | 6                | 35                        | 4         |
|                                  | Bayer special yield (C-C)                                | 31-32            | 6                | 35                        | 4         |
| <b>European Corn borer</b>       |  |                  |                  |                           |           |
| Ames                             | Pioneer blended refuge<br>study (SB's)                   | 33-36            | 5                | 30                        | 4         |
| <b>Black Cutworm</b>             |  |                  |                  |                           |           |
| Ames                             | Smartstax vs HXX & RR2<br>corn traits (SB's)             | 37               | 3                | 25                        | 4         |
| <b>Fall Armyworm</b>             |  |                  |                  |                           |           |
| Ames                             | Smartstax vs HXX & RR2<br>corn traits (SB's)             | 38               | 3                | 20                        | 4         |
| <b>Corn Earworm</b>              |  |                  |                  |                           |           |
| Ames                             | Smartstax vs HXX &<br>Conventional corn traits<br>(SB's) | 39-41            | 3                | 20                        | 4         |

<sup>1</sup>All Studies were conducted on "trap crop corn" ground unless noted otherwise in parenthesis. (C-SB) = test conducted on ground that was planted to soybeans in 2009; (C-C) test conducted on ground that was planted to corn in 2009. (SB's) = test conducted on ground that was planted to soybeans in 2009.

Table 2. Average root-injury and percent product consistency for evaluation of plant-incorporated protectants. Pioneer CMRA emergence cage study: Ames, IA, 2010<sup>1</sup>

| Hybrid/Treatment <sup>2</sup>              | Node-Injury <sup>3,4,5</sup> | Product Consistency <sup>6,7</sup> |
|--|------------------------------|------------------------------------|
| HXX with Bio-insecticide <sup>8,9,10</sup> | 0.15a                        | 81a                                |
| HXX  | 0.36 b                       | 47 b                               |
| HX1  | 0.97 c                       | 3 c                                |
| HX1 with Bio-insecticide <sup>8,9,10</sup> | 1.00 c                       | 11 c                               |

<sup>1</sup> Planted May 10, 2010; node injury evaluated July 29, 2010

<sup>2</sup> HXX = Herculex XTRA hybrid (Pioneer P1395XR); HX1 = Herculex 1 hybrid (Pioneer P1395HR)

<sup>3</sup> Chemical and check means based on 36 observations (6 roots/2 rows x 6 replications)

<sup>4</sup> Iowa State Node-Injury scale (0-3). Number of full or partial nodes completely eaten

<sup>5</sup> Means sharing a common letter do not differ significantly according to Ryan's Q Test ( $P \leq 0.05$ )

<sup>6</sup> Product consistency = percentage of times nodal injury was 0.25 (¼ node eaten) or less

<sup>7</sup> Means sharing a common letter do not differ significantly according to Ryan's Q Test ( $P \leq 0.05$ )

<sup>8</sup> Metarhizium pathogen applied at 208 grams per plot; Heterorhabditis bacteriophora pathogen solution applied at 30 ml per row

<sup>9</sup> Metarhizium pathogens broadcast over plots by hand before planting then were incorporated by tiller shortly thereafter

<sup>10</sup> Heterorhabditis bacteriophora was applied along each row approximately 6-9 inches from corn plants and 2 inches deep

Table 3. Average stand count for evaluation of plant-incorporated protectants. Pioneer CMRA emergence cage study: Ames, IA, 2010<sup>1</sup>

| Hybrid/Treatment <sup>2</sup>             | Stand Count <sup>3,4</sup> |
|---|----------------------------|
| HXX                                       | 30.50                      |
| HXX with Bio-insecticide <sup>5,6,7</sup> | 30.50                      |
| HX1                                       | 30.50                      |
| HX1 with Bio-insecticide <sup>5,6,7</sup> | 30.50                      |

<sup>1</sup> Planted May 10, 2010; evaluated June 8, 2010

<sup>2</sup> HXX = Herculex XTRA hybrid (Pioneer P1395XR); HX1 = Herculex 1 hybrid (Pioneer P1395HR)

<sup>3</sup> Means based on 24 observations (4 row trt x 25 row-ft/treatment x 6 replications)

<sup>4</sup> No significant differences between means (ANOVA,  $P \leq 0.05$ )

<sup>5</sup> Metarhizium pathogen applied at 208 grams per plot; Heterorhabditis bacteriophora pathogen solution applied at 30 ml per row

<sup>6</sup> Metarhizium pathogens broadcast over plots by hand before planting then were incorporated by tiller shortly thereafter

<sup>7</sup> Heterorhabditis bacteriophora was applied along each row approximately 6-9 inches from corn plants and 2 inches deep

Table 4. Average percent lodging for evaluation of plant-incorporated protectants. Pioneer CMRA emergence cage study: Ames, IA, 2010<sup>1</sup>.

| Hybrid/Treatment <sup>2</sup>             | % Lodging <sup>3,4</sup> |
|---|--------------------------|
| HXX with Bio-insecticide <sup>5,6,7</sup> | 14a                      |
| HXX                                       | 17a                      |
| HX1 with Bio-insecticide <sup>5,6,7</sup> | 28ab                     |
| HX1                                       | 44 b                     |

<sup>1</sup> Planted May 10, 2010; Lodging evaluated October 1, 2010

<sup>2</sup> HXX = Herculex XTRA hybrid (Pioneer P1395XR); HX1 = Herculex 1 hybrid (Pioneer P1395HR)

<sup>3</sup> Means based on 24 observations (4-rows x 20 row-ft/treatment x 6 reps)

<sup>4</sup> Means sharing a common letter do not differ significantly according to Ryan's Q Test ( $P \leq 0.05$ )

<sup>5</sup> *Metarhizium* pathogen applied at 208 grams per plot; *Heterorhabditis bacteriophora* pathogen solution applied at 30 ml per row

<sup>6</sup> *Metarhizium* pathogens broadcast over plots by hand before planting then were incorporated by tiller shortly thereafter

<sup>7</sup> *Heterorhabditis bacteriophora* was applied along each row approximately 6-9 inches from corn plants and 2 inches deep

Table 5. Average yield for evaluation plant-incorporated protectants. Pioneer CMRA emergence cage study: Ames, IA, 2010<sup>1</sup>

| Hybrid/Treatment <sup>2</sup>             | Yield <sup>3,4,5</sup> |
|---|------------------------|
| HX1 with Bio-insecticide <sup>6,7,8</sup> | 121                    |
| HX1                                       | 114                    |
| HXX with Bio-insecticide <sup>6,7,8</sup> | 113                    |
| HXX                                       | 92                     |

<sup>1</sup> Planted May 10, 2010; Harvested (mechanically) October 13, 2010

<sup>2</sup> HXX = Herculex XTRA hybrid (Pioneer P1395XR); HX1 = Herculex 1 hybrid (Pioneer P1395HR)

<sup>3</sup> Means based on 6 observations (4-rows x 20 row-ft/treatment x 6 reps)

<sup>4</sup> No significant differences between means (ANOVA,  $P \leq 0.05$ )

<sup>5</sup> Yields converted to 15.5% Moisture

<sup>6</sup> *Metarhizium* pathogen applied at 208 grams per plot; *Heterorhabditis bacteriophora* pathogen solution applied at 30 ml per row

<sup>7</sup> *Metarhizium* pathogens broadcast over plots by hand before planting then were incorporated by tiller shortly thereafter

<sup>8</sup> *Heterorhabditis bacteriophora* was applied along each row approximately 6-9 inches from corn plants and 2 inches deep

Table 6. Average stand count for evaluation of plant-incorporated protectants: Pioneer blended refuge study for corn rootworm: Ames, IA, 2010<sup>1</sup>

| Hybrid/Treatment <sup>2,3,4</sup>       | Stand Count <sup>5,6</sup> |
|---|----------------------------|
| HXX (Pure stand)                        | 44.50a                     |
| Blend (94% HXX blended refuge; 6% RR2)  | 44.25a                     |
| Blend (89% HXX; 11% RR2 blended refuge) | 43.00ab                    |
| RR2 + Force 3G - 0.12/T-band            | 40.75 b                    |
| RR2 (Pure stand)                        | 33.25 c                    |

<sup>1</sup> Planted May 10, 2010; evaluated June 2 & 3, 2010

<sup>2</sup> HXX = Herculex XTRA hybrid (Pioneer P0461XR); RR2 = Roundup Ready 2 hybrid (Pioneer P0461R)

<sup>3</sup> HXX = Herculex® XTRA technology. Herculex® Insect Protection technology by Dow AgroSciences and Pioneer Hi-Bred. ®Herculex and the HX logo are registered trademarks of Dow AgroSciences LLC.

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<sup>4</sup> Means based on 16 observations (4 row trt x 25 row-ft/treatment x 4 replications)

<sup>5</sup> Insecticide listed as ounces a.i. per 1,000 row-ft; T-band = Insecticide applied at planting time

<sup>6</sup> Means sharing a common letter do not differ significantly according to Ryan's Q Test ( $P \leq 0.05$ )

Table 7. Average root-injury and percent product consistency for evaluation of insecticides treatments and plant-incorporated protectants. Pioneer blended refuge study for corn rootworm: Ames, IA, 2010<sup>1</sup>

| Hybrid/Treatment <sup>2,3,4</sup>      | Node-Injury <sup>5,6,7</sup> | Product Consistency <sup>8,9</sup> |
|--|------------------------------|------------------------------------|
| RR2 + Force 3G - 0.12/T-band           | 0.08a                        | 90a                                |
| Blend (94% HXX blended refuge; 6% RR2) | 0.43 b                       | 33 b                               |
| Blend (94% HXX; 6% RR2 blended refuge) | 0.46 b                       | 42 b                               |
| HXX (Pure stand)                       | 0.46 b                       | 57ab                               |
| RR2 (Pure stand)                       | 1.07 c                       | 20 b                               |

<sup>1</sup> Planted May 10, 2010; node injury evaluated July 27, 2010

<sup>2</sup> HXX = Herculex XTRA hybrid (Pioneer P0461XR); RR2 = Roundup Ready 2 hybrid (Pioneer P0461R)

<sup>3</sup> RR2 = Roundup Ready® Corn 2 gene. ® Roundup Ready is a registered trademark used under license from Monsanto Company.

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<sup>4</sup> Chemical and check means based on 30 observations (5 roots/2 rows x 2 replications & 10 roots/2rows x 2 replications)

<sup>5</sup> Insecticide listed as ounces a.i. per 1,000 row-ft; T-band = Insecticide applied at planting time

<sup>6</sup> Iowa State Node-Injury scale (0-3). Number of full or partial nodes completely eaten

<sup>7</sup> Means sharing a common letter do not differ significantly according to Ryan's Q Test ( $P \leq 0.05$ )

<sup>8</sup> Product consistency = percentage of times nodal injury was 0.25 (¼ node eaten) or less

<sup>9</sup> Means sharing a common letter do not differ significantly according to Ryan's Q Test ( $P \leq 0.05$ )

Table 8. Average Lodging for evaluation of plant-incorporated protectants. Pioneer blended refuge study for corn rootworm: Ames, IA, 2010<sup>1</sup>

| Hybrid/Treatment <sup>2,3,4</sup>       | % Lodging <sup>5,6</sup> |
|---|--------------------------|
| Blend (94% HXX; 6% RR2 blended refuge)  | 0a                       |
| HXX (Pure stand)                        | 2a                       |
| RR2 + Force 3G - 0.12/T-band            | 3ab                      |
| Blend (89% HXX; 11% RR2 blended refuge) | 3ab                      |
| RR2 (Pure stand)                        | 13 b                     |

<sup>1</sup> Planted May 10, 2010; evaluated October 1, 2010

<sup>2</sup> HXX = Herculex XTRA hybrid (Pioneer P0461XR); RR2 = Roundup Ready 2 hybrid (Pioneer P0461R)

<sup>3</sup> HXX = Herculex® XTRA technology. Herculex® Insect Protection technology by Dow AgroSciences and Pioneer Hi-Bred. ®Herculex and the HX logo are registered trademarks of Dow AgroSciences LLC.

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<sup>4</sup> Insecticide listed as ounces a.i. per 1,000 row-ft; T-band = Insecticide applied at planting time

<sup>5</sup> Means based on 16 observations (4-rows x 25 row-ft/treatment x 4 reps)

<sup>6</sup> No significant differences between means (ANOVA,  $P \leq 0.05$ )

Table 9. Average yield for evaluation plant-incorporated protectants. Pioneer blended refuge study for corn rootworm: Ames, IA, 2010<sup>1</sup>

| Hybrid/Treatment <sup>2,3,4</sup>       | Yield <sup>5,6,7</sup> |
|---|------------------------|
| HXX (Pure stand)                        | 135                    |
| RR2 + Force 3G - 0.12/T-band            | 133                    |
| RR2 (Pure stand)                        | 131                    |
| Blend (89% HXX; 11% RR2 blended refuge) | 122                    |
| Blend (94% HXX; 6% RR2 blended refuge)  | 116                    |

<sup>1</sup> Planted May 10, 2010; machine harvested October 13, 2010

<sup>2</sup> HXX = Herculex XTRA hybrid (Pioneer P0461XR); RR2 = Roundup Ready 2 hybrid (Pioneer P0461R)

<sup>3</sup> HXX = Herculex® XTRA technology. Herculex® Insect Protection technology by Dow AgroSciences and Pioneer Hi-Bred. ®Herculex and the HX logo are registered trademarks of Dow AgroSciences LLC.

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<sup>4</sup> Means based on 4 observations (2-rows x 25 row-ft/treatment x 4 reps)

<sup>5</sup> Insecticide listed as ounces a.i. per 1,000 row-ft; T-band = Insecticide applied at planting time

<sup>6</sup> No significant differences between means (ANOVA,  $P \leq 0.05$ )

<sup>7</sup> Yields converted to 15.5% Moisture

Table 10. Average root-injury and percent product consistency for evaluation of insecticide treatments and plant-incorporated protectants. Yield study: Crawfordsville, IA. 2010<sup>1</sup>

| Treatment <sup>2,3</sup>             | Form. | Rate <sup>4</sup> | Placement <sup>5</sup> | Node-Injury <sup>6,7,8</sup> | Product Consistency <sup>9,10</sup> |
|--------------------------------------|-------|-------------------|------------------------|------------------------------|-------------------------------------|
| My-HXT <sup>2</sup> + SmartChoice-SB | 5G    | 0.18              | Furrow                 | 0.01a                        | 100a                                |
| My-SSX                               | ----- | -----             | -----                  | 0.02a                        | 100a                                |
| My-Iso + Aztec-SB                    | 4.67G | 0.14              | Furrow                 | 0.02a                        | 100a                                |
| My-HXT <sup>2</sup> + Counter-SB     | 20G   | 0.90              | Furrow                 | 0.02a                        | 95a                                 |
| YGVT3                                | ----- | -----             | -----                  | 0.03a                        | 100a                                |
| YGVT3 + Aztec                        | 2.1G  | 0.14              | Furrow                 | 0.03a                        | 100a                                |
| YGVT3 + Aztec                        | 2.1G  | 0.14              | T-Band                 | 0.05a                        | 100a                                |
| My-HXT <sup>1</sup>                  | ----- | -----             | -----                  | 0.05a                        | 100a                                |
| My-HXT <sup>2</sup>                  | ----- | -----             | -----                  | 0.06a                        | 95a                                 |
| DeKalb-Iso                           | ----- | -----             | -----                  | 0.90 b                       | 15 b                                |
| My-Iso                               | ----- | -----             | -----                  | 1.34 c                       | 0 c                                 |
| My-Conv                              | ----- | -----             | -----                  | 1.36 c                       | 0 c                                 |

<sup>1</sup> Planted April 22, 2010; evaluated July 30, 2010

<sup>2</sup> My-SSX = Mycogen Smartstax (Mycogen 2T784); My-HXT<sup>1</sup> = Mycogen brand Herculex XTRA (Mycogen 2T289); My-Conv = Mycogen brand Conventional (Mycogen 2T777) ; YGVT3 = YieldGard VT Triple (DKC61-69); DeKalb-Iso = DeKalb brand RR Isoline (DKC 61-72); My-HXT<sup>2</sup> = Mycogen brand Herculex XTRA (Mycogen 2T789); My-Iso = Mycogen brand Herculex I (Mycogen 2T783)

<sup>3</sup> My-Iso (Mycogen 2T783) is the isoline of My-HXT<sup>2</sup> (Mycogen 2T789)

<sup>4</sup> Insecticide listed as ounces a.i. per 1,000 row-ft

<sup>5</sup> Furrow & T-band = insecticide applied at planting time; SB = SmartBox application at planting time

<sup>6</sup> Chemical and check means based on 20 observations (5 roots/2 rows x 4 replications)

<sup>7</sup> Iowa State Node-Injury scale (0-3). Number of full or partial nodes completely eaten

<sup>8</sup> Means sharing a common letter do not differ significantly according to Ryan's Q Test ( $P \leq 0.05$ )

<sup>9</sup> Product consistency = Percentage of times nodal injury was 0.25 (¼ node eaten) or less

<sup>10</sup> Means sharing a common letter do not differ significantly according to Ryan's Q Test ( $P \leq 0.05$ )

Table 11. Average stand counts for evaluation of insecticide treatments and plant-incorporated protectants. Yield study: Crawfordsville, IA. 2010<sup>1</sup>

| Treatment <sup>2,3</sup>             | Form. | Rate <sup>4</sup> | Placement <sup>5</sup> | Stand Count <sup>6,7</sup> |
|--------------------------------------|-------|-------------------|------------------------|----------------------------|
| My-Iso + Aztec-SB                    | 4.67G | 0.14              | Furrow                 | 31.25a                     |
| My-Iso                               | ----- | -----             | -----                  | 31.25a                     |
| YGVT3 + Aztec                        | 2.1G  | 0.14              | Furrow                 | 29.50ab                    |
| DeKalb-Iso                           | ----- | -----             | -----                  | 28.50abc                   |
| My-HXT <sup>1</sup>                  | ----- | -----             | -----                  | 27.50abc                   |
| My-HXT <sup>2</sup>                  | ----- | -----             | -----                  | 27.00 bc                   |
| My-HXT <sup>2</sup> + SmartChoice-SB | 5G    | 0.18              | Furrow                 | 27.00 bc                   |
| YGVT3                                | ----- | -----             | -----                  | 26.75 bc                   |
| My-HXT <sup>2</sup> + Counter-SB     | 20G   | 0.90              | Furrow                 | 26.50 bc                   |
| YGVT3 + Aztec                        | 2.1G  | 0.14              | T-Band                 | 26.25 bc                   |
| My-SSX                               | ----- | -----             | -----                  | 25.00 bc                   |
| My-Conv                              | ----- | -----             | -----                  | 25.00 c                    |

<sup>1</sup> Planted April 22, 2010; evaluated June 7 and September 30, 2010

<sup>2</sup> My-SSX = Mycogen Smartstax (Mycogen 2T784); My-HXT<sup>1</sup> = Mycogen brand Herculex XTRA (Mycogen 2T289); My-Conv = Mycogen brand Conventional (Mycogen 2T777) ; YGVT3 = YieldGard VT Triple (DKC61-69); DeKalb-Iso = DeKalb brand RR Isoline (DKC 61-72); My-HXT<sup>2</sup> = Mycogen brand Herculex XTRA (Mycogen 2T789); My-Iso = Mycogen brand Herculex I (Mycogen 2T783)

<sup>3</sup> My-Iso (Mycogen 2T783) is the isoline of My-HXT<sup>2</sup> (Mycogen 2T789)

<sup>4</sup> Insecticide listed as ounces a.i. per 1,000 row-ft

<sup>5</sup> Furrow & T-band = insecticide applied at planting time; SB = SmartBox application at planting time

<sup>6</sup> Means based on 8 observations (2-row trt x 17.5 row-ft/treatment x 4 replications x 2 evaluations)

<sup>7</sup> Means sharing a common letter do not differ significantly according to Ryan's Q Test ( $P \leq 0.05$ )

Table 12. Average lodging for evaluation of insecticide treatments and plant-incorporated protectants. Yield study: Crawfordsville, IA. 2010<sup>1</sup>

| Treatment <sup>2,3</sup>             | Form. | Rate <sup>4</sup> | Placement <sup>5</sup> | % Lodging <sup>6,7</sup> |
|--------------------------------------|-------|-------------------|------------------------|--------------------------|
| My-SSX                               | ----- | -----             | -----                  | 0                        |
| My-HXT <sup>1</sup>                  | ----- | -----             | -----                  | 0                        |
| My-Conv                              | ----- | -----             | -----                  | 0                        |
| My-Iso                               | ----- | -----             | -----                  | 0                        |
| My-HXT <sup>2</sup>                  | ----- | -----             | -----                  | 0                        |
| My-Iso + Aztec-SB                    | 4.67G | 0.14              | Furrow                 | 0                        |
| My-HXT <sup>2</sup> + Counter-SB     | 20G   | 0.90              | Furrow                 | 0                        |
| My-HXT <sup>2</sup> + SmartChoice-SB | 5G    | 0.18              | Furrow                 | 0                        |
| DeKalb-Iso                           | ----- | -----             | -----                  | 0                        |
| YGVT3                                | ----- | -----             | -----                  | 0                        |
| YGVT3 + Aztec                        | 2.1G  | 0.14              | Furrow                 | 0                        |
| YGVT3 + Aztec                        | 2.1G  | 0.14              | T-Band                 | 0                        |

<sup>1</sup> Planted April 22, 2010; evaluated September 30, 2010

<sup>2</sup> My-SSX = Mycogen Smartstax (Mycogen 2T784); My-HXT<sup>1</sup> = Mycogen brand Herculex XTRA (Mycogen 2T289); My-Conv = Mycogen brand Conventional (Mycogen 2T777) ; YGVT3 = YieldGard VT Triple (DKC61-69); DeKalb-Iso = DeKalb brand RR Isoline (DKC 61-72); My-HXT<sup>2</sup> = Mycogen brand Herculex XTRA (Mycogen 2T789); My-Iso = Mycogen brand Herculex I (Mycogen 2T783)

<sup>3</sup> My-Iso (Mycogen 2T783) is the isoline of My-HXT<sup>2</sup> (Mycogen 2T789)

<sup>4</sup> Insecticide listed as ounces a.i. per 1,000 row-ft

<sup>5</sup> Furrow & T-band = insecticide applied at planting time; SB = SmartBox application at planting time

<sup>6</sup> Means based on 8 observations (2-row trt x 17.5 row-ft/treatment x 4 replications)

<sup>7</sup> No significant differences between means (ANOVA,  $P \leq 0.05$ )

Table 13. Average yield for evaluation of insecticide treatments and plant-incorporated protectants. Yield study: Crawfordsville, IA. 2010<sup>1</sup>

| Treatment <sup>2,3</sup>             | Form. | Rate <sup>4</sup> | Placement <sup>5</sup> | Bushels/<br>Acre <sup>6,7,8</sup> |
|--------------------------------------|-------|-------------------|------------------------|-----------------------------------|
| My-Iso + Aztec-SB                    | 4.67G | 0.14              | Furrow                 | 140a                              |
| My-HXT <sup>2</sup> + SmartChoice-SB | 5G    | 0.18              | Furrow                 | 131ab                             |
| My-SSX                               | ----- | -----             | -----                  | 122ab                             |
| My-HXT <sup>2</sup>                  | ----- | -----             | -----                  | 120ab                             |
| YGVT3                                | ----- | -----             | -----                  | 119abc                            |
| YGVT3 + Aztec <sup>9</sup>           | 2.1G  | 0.14              | Furrow                 | 114abc                            |
| My-HXT <sup>1</sup>                  | ----- | -----             | -----                  | 113abc                            |
| My-HXT <sup>2</sup> + Counter-SB     | 20G   | 0.90              | Furrow                 | 113abc                            |
| YGVT3 + Aztec                        | 2.1G  | 0.14              | T-Band                 | 112abc                            |
| My-Iso                               | ----- | -----             | -----                  | 112abc                            |
| My-Conv                              | ----- | -----             | -----                  | 105 bc                            |
| DeKalb-Iso                           | ----- | -----             | -----                  | 91 c                              |

<sup>1</sup> Planted April 22, 2010; machine harvested October 8, 2010

<sup>2</sup> My-SSX = Mycogen Smartstax (Mycogen 2T784); My-HXT<sup>1</sup> = Mycogen brand Herculex XTRA (Mycogen 2T289); My-Conv = Mycogen brand Conventional (Mycogen 2T777) ; YGVT3 = YieldGard VT Triple (DKC61-69); DeKalb-Iso = DeKalb brand RR Isoline (DKC 61-72); My-HXT<sup>2</sup> = Mycogen brand Herculex XTRA (Mycogen 2T789); My-Iso = Mycogen brand Herculex I (Mycogen 2T783)

<sup>3</sup> My-Iso (Mycogen 2T783) is the isoline of My-HXT<sup>2</sup> (Mycogen 2T789)

<sup>4</sup> Insecticide listed as ounces a.i. per 1,000 row-ft

<sup>5</sup> Furrow & T-band = insecticide applied at planting time; SB = SmartBox application at planting time

<sup>6</sup> Means based on 4 observations (2-row trt x 69 row-ft/treatment x 4 replications)

<sup>7</sup> Means sharing a common letter do not differ significantly according to Ryan's Q Test ( $P \leq 0.05$ )

<sup>8</sup> Yields converted to 15.5% Moisture

<sup>9</sup> Means based on 3 observations (2-row trt x 69 row-ft/treatment x 3 replications)

Table 14. Average root-injury and product consistency for evaluation of insecticide treatments and plant-incorporated protectants. Yield study: Nashua, IA. 2010<sup>1</sup>

| Treatment <sup>2,3</sup>             | Form. | Rate <sup>4</sup> | Placement | Node-Injury <sup>5</sup> | Product Consistency <sup>6,7</sup> |
|--------------------------------------|-------|-------------------|-----------|--------------------------|------------------------------------|
| My-HXT <sup>2</sup> + SmartChoice-SB | 5G    | 0.18              | Furrow    | 0.00a                    | 100a                               |
| YGVT3 + Aztec                        | 2.1G  | 0.14              | Furrow    | 0.01ab                   | 100a                               |
| My-HXT <sup>2</sup>                  | ----- | -----             | -----     | 0.02ab                   | 100a                               |
| YGVT3 + Aztec                        | 2.1G  | 0.14              | T-Band    | 0.02abc                  | 100a                               |
| My-HXT <sup>2</sup> + Counter-SB     | 20G   | 0.90              | Furrow    | 0.02abc                  | 100a                               |
| My-SSX                               | ----- | -----             | -----     | 0.03abcd                 | 100a                               |
| My-HXT <sup>1</sup>                  | ----- | -----             | -----     | 0.06 bcd                 | 100a                               |
| YGVT3                                | ----- | -----             | -----     | 0.08 cd                  | 100a                               |
| My-Iso + Aztec-SB                    | 4.67G | 0.14              | Furrow    | 0.10 d                   | 100a                               |
| DeKalb-Iso                           | ----- | -----             | -----     | 1.80 e                   | 0 b                                |
| My-Conv                              | ----- | -----             | -----     | 2.09 ef                  | 0 b                                |
| My-Iso                               | ----- | -----             | -----     | 2.20 f                   | 0 b                                |

<sup>1</sup> Planted April 21, 2010; evaluated August 4, 2010

<sup>2</sup> My-SSX = Mycogen Smartstax (Mycogen 2D692); My-HXT<sup>1</sup> = Mycogen brand Herculex XTRA (Mycogen X20625); My-Conv = Mycogen brand Conventional (Mycogen X29624); YGVT3 = YieldGard VT Triple (DKC61-69); DeKalb-Iso = DeKalb brand RR Isoline (DKC 61-72); My-HXT<sup>2</sup> = Mycogen brand Herculex XTRA (Mycogen 2T789); My-Iso = Mycogen brand Herculex I (Mycogen 2T783)

<sup>3</sup> My-Iso (Mycogen 2T783) is the isoline of My-HXT<sup>2</sup> (Mycogen 2T789)

<sup>4</sup> Insecticide listed as ounces a.i. per 1,000 row-ft

<sup>5</sup> Means sharing a common letter do not differ significantly according to Ryan's Q Test ( $P \leq 0.05$ )

<sup>6</sup> Product consistency = Percentage of times nodal injury was 0.25 (¼ node eaten) or less

<sup>7</sup> Means sharing a common letter do not differ significantly according to Ryan's Q Test ( $P \leq 0.05$ )

Table 15. Average stand counts for evaluation of insecticide treatments and plant-incorporated protectants. Yield study: Nashua, IA. 2010<sup>1</sup>

| Treatment <sup>2,3</sup>             | Form. | Rate <sup>4</sup> | Placement | Stand Count <sup>5,6</sup> |
|--------------------------------------|-------|-------------------|-----------|----------------------------|
| YGVT3                                | ----- | -----             | -----     | 35.25a                     |
| DeKalb-Iso                           | ----- | -----             | -----     | 35.25a                     |
| YGVT3 + Aztec                        | 2.1G  | 0.14              | T-Band    | 35.25a                     |
| My-HXT <sup>1</sup>                  | ----- | -----             | -----     | 35.00a                     |
| YGVT3 + Aztec                        | 2.1G  | 0.14              | Furrow    | 34.75a                     |
| My-Conv                              | ----- | -----             | -----     | 34.50a                     |
| My-Iso + Aztec-SB                    | 4.67G | 0.14              | Furrow    | 34.25a                     |
| My-SSX                               | ----- | -----             | -----     | 34.00ab                    |
| My-Iso                               | ----- | -----             | -----     | 33.50abc                   |
| My-HXT <sup>2</sup> + SmartChoice-SB | 5G    | 0.18              | Furrow    | 33.50abc                   |
| My-HXT <sup>2</sup>                  | ----- | -----             | -----     | 31.75 bc                   |
| My-HXT <sup>2</sup> + Counter-SB     | 20G   | 0.90              | Furrow    | 31.50 c                    |

<sup>1</sup> Planted April 21, 2010; evaluated May 28 & October 7, 2010

<sup>2</sup> My-SSX = Mycogen Smartstax (Mycogen 2D692); My-HXT<sup>1</sup> = Mycogen brand Herculex XTRA (Mycogen X20625); My-Conv = Mycogen brand Conventional (Mycogen X29624); YGVT3 = YieldGard VT Triple (DKC61-69); DeKalb-Iso = DeKalb brand RR Isoline (DKC 61-72); My-HXT<sup>2</sup> = Mycogen brand Herculex XTRA (Mycogen 2T789); My-Iso = Mycogen brand Herculex I (Mycogen 2T783)

<sup>3</sup> My-Iso (Mycogen 2T783) is the isoline of My-HXT<sup>2</sup> (Mycogen 2T789)

<sup>4</sup> Insecticide listed as ounces a.i. per 1,000 row-ft

<sup>5</sup> Means based on 16 observations (2-row trt x 17.5 row-ft/treatment x 4 replications x 2 evaluations)

<sup>6</sup> Means sharing a common letter do not differ significantly according to Ryan's Q Test ( $P \leq 0.05$ )

Table 16. Average percent lodging for evaluation of insecticide treatments and plant-incorporated protectants. Yield study: Nashua, IA. 2010<sup>1</sup>

| Treatment <sup>2,3</sup>             | Form. | Rate <sup>4</sup> | Placement | % Lodging <sup>5,6</sup> |
|--------------------------------------|-------|-------------------|-----------|--------------------------|
| My-SSX                               | ----- | -----             | -----     | 0a                       |
| YGVT3 + Aztec                        | 2.1G  | 0.14              | T-Band    | 0a                       |
| My-HXT <sup>1</sup>                  | ----- | -----             | -----     | 1a                       |
| YGVT3                                | ----- | -----             | -----     | 1a                       |
| YGVT3 + Aztec                        | 2.1G  | 0.14              | Furrow    | 2a                       |
| My-HXT <sup>2</sup> + Counter-SB     | 20G   | 0.90              | Furrow    | 3a                       |
| My-HXT <sup>2</sup>                  | ----- | -----             | -----     | 7a                       |
| My-HXT <sup>2</sup> + SmartChoice-SB | 5G    | 0.18              | Furrow    | 9a                       |
| My-Conv                              | ----- | -----             | -----     | 26 b                     |
| My-Iso + Aztec-SB                    | 4.67G | 0.14              | Furrow    | 31 b                     |
| DeKalb-Iso                           | ----- | -----             | -----     | 48 b                     |
| My-Iso                               | ----- | -----             | -----     | 54 b                     |

<sup>1</sup> Planted April 21, 2010; evaluated October 7, 2010

<sup>2</sup> My-SSX = Mycogen Smartstax (Mycogen 2D692); My-HXT<sup>1</sup> = Mycogen brand Herculex XTRA (Mycogen X20625); My-Conv = Mycogen brand Conventional (Mycogen X29624); YGVT3 = YieldGard VT Triple (DKC61-69); DeKalb-Iso = DeKalb brand RR Isoline (DKC 61-72); My-HXT<sup>2</sup> = Mycogen brand Herculex XTRA (Mycogen 2T789); My-Iso = Mycogen brand Herculex I (Mycogen 2T783)

<sup>3</sup> My-Iso (Mycogen 2T783) is the isoline of My-HXT<sup>2</sup> (Mycogen 2T789)

<sup>4</sup> Insecticide listed as ounces a.i. per 1,000 row-ft

<sup>5</sup> Means based on 8 observations (2-row trt x17.5 row-ft/treatment x 4 replications)

<sup>6</sup> Means sharing a common letter do not differ significantly according to Ryan's Q Test ( $P \leq 0.05$ )

Table 17. Average yield for evaluation of insecticides treatment and plant-incorporated protectants. Yield study: Nashua, IA. 2010<sup>1</sup>

| Treatment <sup>2,3</sup>             | Form  | Rate <sup>4</sup> | Placement | Bushels/Acre <sup>5,6</sup> |
|--------------------------------------|-------|-------------------|-----------|-----------------------------|
| YGVT3 + Aztec                        | 2.1G  | 0.14              | T-Band    | 226a                        |
| YGVT3                                | ----- | -----             | -----     | 221a                        |
| YGVT3 + Aztec                        | 2.1G  | 0.14              | Furrow    | 213ab                       |
| My-HXT <sup>2</sup> + SmartChoice-SB | 5G    | 0.18              | Furrow    | 203ab                       |
| My-HXT <sup>2</sup>                  | ----- | -----             | -----     | 199abc                      |
| My-HXT <sup>2</sup> + Counter-SB     | 20G   | 0.90              | Furrow    | 197abc                      |
| My-SSX                               | ----- | -----             | -----     | 187 bcd                     |
| DeKalb-Iso                           | ----- | -----             | -----     | 186 bcd                     |
| My-Iso + Aztec-SB                    | 4.67G | 0.14              | Furrow    | 185 bcd                     |
| My-HXT <sup>1</sup>                  | ----- | -----             | -----     | 184 bcd                     |
| My-Iso                               | ----- | -----             | -----     | 172 cd                      |
| My-Conv                              | ----- | -----             | -----     | 161 d                       |

<sup>1</sup> Planted April 21, 2010; machine harvested October 13, 2010

<sup>2</sup> My-SSX = Mycogen Smartstax (Mycogen 2D692); My-HXT<sup>1</sup> = Mycogen brand Herculex XTRA (Mycogen X20625); My-Conv = Mycogen brand Conventional (Mycogen X29624); YGVT3 = YieldGard VT Triple (DKC61-69); DeKalb-Iso = DeKalb brand RR Isoline (DKC 61-72); My-HXT<sup>2</sup> = Mycogen brand Herculex XTRA (Mycogen 2T789); My-Iso = Mycogen brand Herculex I (Mycogen 2T783)

<sup>3</sup> My-Iso (Mycogen 2T783) is the isoline of My-HXT<sup>2</sup> (Mycogen 2T789)

<sup>4</sup> Insecticide listed as ounces a.i. per 1,000 row-ft

<sup>5</sup> Means sharing a common letter do not differ significantly according to Ryan's Q Test ( $P \leq 0.05$ )

<sup>6</sup> Yields converted to 15.5% Moisture

Table 18. Average root-injury and percent product consistency for evaluation of insecticide treatments and plant-incorporated protectants. Monsanto Smartstax CRW study: Nashua, IA. 2010<sup>1</sup>

| Hybrid <sup>2</sup> | Treatment | Form. | Rate <sup>3</sup> | Placement <sup>4</sup> | Node                    |                                    |
|---------------------|-----------|-------|-------------------|------------------------|-------------------------|------------------------------------|
|                     |           |       |                   |                        | Injury <sup>5,6,7</sup> | Product Consistency <sup>8,9</sup> |
| Smartstax           | --        | --    | --                | ----                   | 0.00a                   | 100a                               |
| Smartstax           | Aztec     | 2.1G  | 0.14              | Furrow                 | 0.00a                   | 100a                               |
| RR2/HXX/LL          | Aztec     | 2.1G  | 0.14              | Furrow                 | 0.01a                   | 100a                               |
| VT Triple           | Aztec     | 2.1G  | 0.14              | Furrow                 | 0.01a                   | 100a                               |
| VT Triple           | --        | --    | --                | ----                   | 0.02ab                  | 100a                               |
| RR2/HXX/LL          | --        | --    | --                | ----                   | 0.05 b                  | 100a                               |
| RR2 hybrid          | Aztec     | 2.1G  | 0.14              | Furrow                 | 0.42 c                  | 33 b                               |
| RR2 hybrid          | --        | --    | --                | ----                   | 1.64 d                  | 0 c                                |

<sup>1</sup> Planted April 21, 2010; evaluated August 5, 2010

<sup>2</sup> RR2 hybrid- NC6214NRR1; VT Triple- DKC61-19; RR2/HXX/LL- Pioneer 33W84; Smartstax (VT3P/HXX)- NC6214QQR1

<sup>3</sup> Insecticide listed as ounces a.i. per 1,000 row-ft

<sup>4</sup> Furrow = Insecticide applied at planting time

<sup>5</sup> Chemical and check means based on 28 observations (7 roots/2 rows x 4 replications)

<sup>6</sup> Iowa State Node-Injury scale (0-3). Number of full or partial nodes completely eaten

<sup>7</sup> Means sharing a common letter do not differ significantly according to Ryan's Q Test ( $P \leq 0.05$ )

<sup>8</sup> Product consistency = percentage of times nodal injury was 0.25 (¼ node eaten) or less

<sup>9</sup> Means sharing a common letter do not differ significantly according to Ryan's Q Test ( $P \leq 0.05$ )

Table 19. Average stand count for evaluation of insecticide treatments and plant-incorporated protectants. Monsanto Smartstax CRW study: Nashua, IA, 2010<sup>1</sup>

| Hybrid <sup>2</sup> | Treatment | Form. | Rate <sup>3</sup> | Placement <sup>4</sup> | Stand                 |
|---------------------|-----------|-------|-------------------|------------------------|-----------------------|
|                     |           |       |                   |                        | Counts <sup>5,6</sup> |
| VT Triple           | Aztec     | 2.1G  | 0.14              | Furrow                 | 34.75a                |
| RR2 hybrid          | Aztec     | 2.1G  | 0.14              | Furrow                 | 34.50a                |
| Smartstax           | Aztec     | 2.1G  | 0.14              | Furrow                 | 34.25a                |
| RR2 hybrid          | --        | --    | --                | ----                   | 34.25a                |
| VT Triple           | --        | --    | --                | ----                   | 34.25a                |
| RR2/HXX/LL          | Aztec     | 2.1G  | 0.14              | Furrow                 | 33.75ab               |
| RR2/HXX/LL          | --        | --    | --                | ----                   | 32.75ab               |
| Smartstax           | --        | --    | --                | ----                   | 32.00 b               |

<sup>1</sup> Planted April 21, 2010; evaluated May 28 and October 7, 2010

<sup>2</sup> RR2 hybrid- NC6214NRR1; VT Triple- DKC61-19; RR2/HXX/LL- Pioneer 33W84; Smartstax (VT3P/HXX)- NC6214QQR1

<sup>3</sup> Insecticide listed as ounces a.i. per 1,000 row-ft

<sup>4</sup> Furrow = Insecticide applied at planting time

<sup>5</sup> Means based on 16 observations (4 row trt x 17.5 row-ft/treatment x 4 replications)

<sup>6</sup> No significant differences between means (ANOVA,  $P \leq 0.05$ )

Table 20. Average percent lodging for evaluation of insecticide treatments and plant-incorporated protectants. Monsanto Smartstax CRW study: Nashua, IA. 2010<sup>1</sup>

| Hybrid <sup>2</sup> | Treatment | Form. | Rate <sup>3</sup> | Placement <sup>4</sup> | % Lodging <sup>5,6</sup> |
|---------------------|-----------|-------|-------------------|------------------------|--------------------------|
| Smartstax           | --        | --    | --                | ----                   | 0a                       |
| Smartstax           | Aztec     | 2.1G  | 0.14              | Furrow                 | 0a                       |
| RR2/HXX/LL          | Aztec     | 2.1G  | 0.14              | Furrow                 | 0a                       |
| RR2/HXX/LL          | --        | --    | --                | ----                   | 2a                       |
| VT Triple           | --        | --    | --                | ----                   | 2a                       |
| VT Triple           | Aztec     | 2.1G  | 0.14              | Furrow                 | 2a                       |
| RR2 hybrid          | Aztec     | 2.1G  | 0.14              | Furrow                 | 3a                       |
| RR2 hybrid          | --        | --    | --                | ----                   | 59 b                     |

<sup>1</sup> Planted April 21, 2010; evaluated October 7, 2010

<sup>2</sup> RR2 hybrid- NC6214NRR1; VT Triple- DKC61-19; RR2/HXX/LL- Pioneer 33W84; Smartstax (VT3P/HXX)- NC6214QQR1

<sup>3</sup> Insecticide listed as ounces a.i. per 1,000 row-ft

<sup>4</sup> Furrow & T-band = insecticide applied at planting time; SB = SmartBox application at planting time

<sup>5</sup> Means based on 8 observations (2-row trt x 17.5 row-ft/treatment x 4 replications)

<sup>6</sup> Means sharing a common letter do not differ significantly according to Ryan's Q Test ( $P \leq 0.05$ )

Table 21. Average yield for evaluation of insecticides treatment and plant-incorporated protectants. Monsanto Smartstax CRW study: Nashua, IA. 2010<sup>1</sup>

| Hybrid <sup>2</sup> | Treatment | Form | Rate <sup>3</sup> | Placement <sup>4</sup> | Bushels/<br>Acre <sup>5,6,7</sup> |
|---------------------|-----------|------|-------------------|------------------------|-----------------------------------|
| RR2/HXX/LL          | Aztec     | 2.1G | 0.14              | Furrow                 | 231a                              |
| RR2/HXX/LL          | --        | --   | --                | ----                   | 220ab                             |
| Smartstax           | --        | --   | --                | ----                   | 217ab                             |
| VT Triple           | --        | --   | --                | ----                   | 215ab                             |
| VT Triple           | Aztec     | 2.1G | 0.14              | Furrow                 | 209abc                            |
| RR2 hybrid          | Aztec     | 2.1G | 0.14              | Furrow                 | 208abc                            |
| Smartstax           | Aztec     | 2.1G | 0.14              | Furrow                 | 199 bc                            |
| RR2 hybrid          | --        | --   | --                | ----                   | 188 c                             |

<sup>1</sup> Planted April 21, 2010; machine harvested October 13, 2010

<sup>2</sup> RR2 hybrid- NC6214NRR1; VT Triple- DKC61-19; RR2/HXX/LL- Pioneer 33W84; Smartstax (VT3P/HXX)- NC6214QQR1

<sup>3</sup> Insecticide listed as ounces a.i. per 1,000 row-ft

<sup>4</sup> Furrow & T-band = insecticide applied at planting time; SB = SmartBox application at planting time

<sup>5</sup> Means based on 4 observations (2-row trt x 35 row-ft/treatment x 4 replications)

<sup>6</sup> Means sharing a common letter do not differ significantly according to Ryan's Q Test ( $P \leq 0.05$ )

<sup>7</sup> Yields converted to 15.5% Moisture

Table 22. Average root-injury and percent product consistency for evaluation of insecticide treatments and plant-incorporated protectants. Syngenta experimental hybrid yield and efficacy study: Sutherland, IA. 2010<sup>1</sup>

| Treatment <sup>2,3</sup>                            | Rate <sup>4</sup> | Placement <sup>5</sup> | Node Injury <sup>6,7,8</sup> | Product Consistency <sup>9,10</sup> |
|---|-------------------|------------------------|------------------------------|-------------------------------------|
| 95% MIR604 + HX1 + Bt11 + HXRW / 5% refuge          |                   |                        | 0.01                         | 100                                 |
| 95% MIR604 + HX1 + Bt11 + HXRW / 5% refuge + Force® | 0.12              | T-band                 | 0.01                         | 100                                 |
| MIR604 + HXRW + HX1 + Bt11                          |                   |                        | 0.01                         | 100                                 |
| MIR604 + HXRW + HX1 + Bt11 + Force                  | 0.12              | T-band                 | 0.02                         | 100                                 |
| Non--Bt + Force                                     | 0.12              | T-band                 | 0.02                         | 100                                 |
| MIR162 + MIR604 + Bt11                              |                   |                        | 0.02                         | 100                                 |
| MIR162 + MIR604 + Bt11 + Force                      | 0.12              | T-band                 | 0.02                         | 100                                 |
| MIR162 + HX1 + Bt11 + Force                         | 0.12              | T-band                 | 0.03                         | 100                                 |
| MIR162 + HX1 + Bt11                                 |                   |                        | 0.10                         | 100                                 |
| Non-Bt  |                   |                        | 0.29                         | 75                                  |

<sup>1</sup> Planted April 29, 2010; evaluated August 3, 2010

<sup>2</sup> MIR604 is the Agrisure® RW trait; MIR162 is the Agrisure Viptera™ trait for above-ground lepidopteran protection

<sup>3</sup> Refuge corn does not contain rootworm active Bt but does have Bt11; HXRW = Herculex® rootworm; Bt11 = Agrisure CB/LL trait for above-ground lepidopteran protection (e.g., corn borer); HX1 = Herculex I (lepidopteran protection)

<sup>4</sup> Insecticide listed as ounces a.i. per 1,000 row-ft

<sup>5</sup> T-band = Insecticide applied at planting time

<sup>6</sup> Chemical and check means based on 24 observations (6 roots/2 rows x 4 replications)

<sup>7</sup> Iowa State Node-Injury scale (0-3). Number of full or partial nodes completely eaten

<sup>8</sup> No significant differences between means (ANOVA,  $P \leq 0.05$ )

<sup>9</sup> Product consistency = percentage of times nodal injury was 0.25 (¼ node eaten) or less

<sup>10</sup> No significant differences between means (ANOVA,  $P \leq 0.05$ )

**Force® is a Restricted Use Pesticide.**

Table 23. Average stand counts for evaluation of insecticides treatment and plant-incorporated protectants. Syngenta experimental hybrid yield and efficacy study: Sutherland, IA. 2010<sup>1</sup>

| Treatment <sup>2,3</sup>                            | Rate <sup>4</sup> | Placement <sup>5</sup> | Stand Count <sup>6,7</sup> |
|---|-------------------|------------------------|----------------------------|
| 95% MIR604 + HX1 + Bt11 + HXRW / 5% refuge          |                   |                        | 29.00a                     |
| 95% MIR604 + HX1 + Bt11 + HXRW / 5% refuge + Force® | 0.12              | T-band                 | 29.00a                     |
| MIR604 + HXRW + HX1 + Bt11                          |                   |                        | 26.25 b                    |
| Non-Bt  |                   |                        | 24.75 bc                   |
| Non-Bt + Force                                      | 0.12              | T-band                 | 24.25 bc                   |
| MIR162 + MIR604 + Bt11 + Force                      | 0.12              | T-band                 | 23.50 c                    |
| MIR604 + HXRW + HX1 + Bt11 + Force                  | 0.12              | T-band                 | 23.50 c                    |
| MIR162 + MIR604 + Bt11                              |                   |                        | 23.00 c                    |
| MIR162 + HX1 + Bt11                                 |                   |                        | 22.75 c                    |
| MIR162 + HX1 + Bt11 + Force                         | 0.12              | T-band                 | 22.75 c                    |

<sup>1</sup> Planted April 29, 2010; evaluated June 15, 2010

<sup>2</sup> MIR604 is the Agrisure® RW trait; MIR162 is the Agrisure Viptera™ trait for above-ground lepidopteran protection

<sup>3</sup> Refuge corn does not contain rootworm active Bt but does have Bt11; HXRW = Herculex rootworm; Bt11 = Agrisure CB/LL trait for above-ground lepidopteran protection (e.g., corn borer); HX1 = Herculex I (lepidopteran protection)

<sup>4</sup> Insecticide listed as ounces a.i. per 1,000 row-ft

<sup>5</sup> T-band = insecticide applied at planting time

<sup>6</sup> Means based on 16 observations (4 row trt x 17.5 row-ft/treatment x 4 replications)

<sup>7</sup> Means sharing a common letter do not differ significantly according to Ryan's Q Test ( $P \leq 0.05$ )

**Force® is a Restricted Use Pesticide.**

Table 24. Average yield for evaluation of insecticides treatment and plant-incorporated protectants. Syngenta experimental hybrid yield and efficacy study: Sutherland, IA. 2010<sup>1</sup>

| Treatment <sup>2,3</sup>                           | Rate <sup>4</sup> | Placement <sup>5</sup> | Bushels<br>Acre <sup>6,7,8</sup> |
|--|-------------------|------------------------|----------------------------------|
| Non-Bt + Force                                     | 0.12              | T-band                 | 199a                             |
| 95% MIR604 + HX1 + Bt11 + HXRW / 5% refuge + Force | 0.12              | T-band                 | 195ab                            |
| 95% MIR604 + HX1 + Bt11 + HXRW / 5% refuge         |                   |                        | 187ab                            |
| Non-Bt   |                   |                        | 185ab                            |
| MIR162 + MIR604 + Bt11 + Force                     | 0.12              | T-band                 | 173ab                            |
| MIR604 + HXRW + HX1 + Bt11                         |                   |                        | 173ab                            |
| MIR604 + HXRW + HX1 + Bt11 + Force                 | 0.12              | T-band                 | 170ab                            |
| MIR162 + HX1 + Bt11 + Force                        | 0.12              | T-band                 | 170ab                            |
| MIR162 + MIR604 + Bt11                             |                   |                        | 167ab                            |
| MIR162 + HX1 + Bt11                                |                   |                        | 164 b                            |

<sup>1</sup> Planted April 29, 2010; machine harvested October 15, 2010

<sup>2</sup> MIR604 is the Agrisure® RW trait; MIR162 is the Agrisure Viptera™ trait for above-ground lepidopteran protection

<sup>3</sup> Refuge corn does not contain rootworm active Bt but does have Bt11; HXRW = Herculex® rootworm; Bt11 = Agrisure CB/LL trait for above-ground lepidopteran protection (e.g., corn borer); HX1 = Herculex I (lepidopteran protection)

<sup>4</sup> Insecticide listed as ounces a.i. per 1,000 row-ft

<sup>5</sup> T-band = insecticide applied at planting time

<sup>6</sup> Means based on 4 observations (2-row/trt x 17.5 row-ft/treatment x 4 replications)

<sup>7</sup> Means sharing a common letter do not differ significantly according to Ryan's Q Test ( $P \leq 0.05$ )

<sup>8</sup> Yields converted to 15.5% Moisture

**Force® is a Restricted Use Pesticide.**

Table 25. Average stand counts for planting-time seed treatments. Bayer special yield study:  
(Corn following Soybeans), Ames, IA. 2010<sup>1</sup>

| Entry/Treatment       | Form.  | Rate <sup>2</sup> | Placement <sup>3</sup> | Stand Counts <sup>4,5</sup> |       |
|-----------------------|--------|-------------------|------------------------|-----------------------------|-------|
| A/4.Vortex FL         | FS     | 0.324             | ST                     | 35.25                       |       |
| Allegiance FL         | FS     | 0.365             | ST                     |                             |       |
| Trilex flow Fungicide | FS     | 0.605             | ST                     |                             |       |
| Poncho Votivo         | FS     | 1ml/1000seeds     | ST                     |                             |       |
| Pro-ized Green Clnt   | FS     | 1.138             | ST                     |                             |       |
| Precise S Finisher    | AL     | 15.1              | ST                     |                             |       |
| TALC                  | WP     | 3.8               | ST                     |                             |       |
| Aztec                 | 2.1 GR | 0.14              | Furrow                 |                             |       |
| Stratego YLD          | EC     | 5.0               | R1                     |                             |       |
| Induce                | SL     | 0.125 %V/V        | R1                     |                             |       |
| A/7.Vortex FL         | FS     | 0.324             | ST                     |                             | 34.50 |
| Allegiance FL         | FS     | 0.365             | ST                     |                             |       |
| Trilex flow Fungicide | FS     | 0.605             | ST                     |                             |       |
| Poncho Votivo         | FS     | 1ml/1000seeds     | ST                     |                             |       |
| Pro-ized Green Clnt   | FS     | 1.138             | ST                     |                             |       |
| Precise S Finisher    | AL     | 15.1              | ST                     |                             |       |
| TALC                  | WP     | 3.8               | ST                     |                             |       |
| Stratego YLD          | EC     | 5.0               | R1                     |                             |       |
| Induce                | SL     | 0.125 %V/V        | R1                     |                             |       |
| A/3.Vortex FL         | FS     | 0.324             | ST                     | 34.50                       |       |
| Allegiance FL         | FS     | 0.365             | ST                     |                             |       |
| Trilex flow Fungicide | FS     | 0.605             | ST                     |                             |       |
| Poncho Votivo         | FS     | 1ml/1000seeds     | ST                     |                             |       |
| Pro-ized Green Clnt   | FS     | 1.138             | ST                     |                             |       |
| Precise S Finisher    | AL     | 15.1              | ST                     |                             |       |
| TALC                  | WP     | 3.8               | ST                     |                             |       |
| Stratego YLD          | EC     | 5.0               | R1                     |                             |       |
| Induce                | SL     | 0.125 %V/V        | R1                     |                             |       |
| A/2.Vortex FL         | FS     | 0.324             | ST                     |                             | 34.50 |
| Allegiance FL         | FS     | 0.365             | ST                     |                             |       |
| Trilex flow Fungicide | FS     | 0.605             | ST                     |                             |       |
| Poncho Votivo         | FS     | 1ml/1000seeds     | ST                     |                             |       |
| Pro-ized Green Clnt   | FS     | 1.138             | ST                     |                             |       |
| Precise S Finisher    | AL     | 15.1              | ST                     |                             |       |
| TALC                  | WP     | 3.8               | ST                     |                             |       |

(Continued on next page)

Table 25. Average stand counts for planting-time seed treatments. Bayer special yield study: (Corn following Soybeans), Ames, IA. 2010<sup>1</sup> (continued)

| Entry/Treatment       | Form. | Rate <sup>2</sup> | Placement <sup>3</sup> | Stand Counts <sup>4,5</sup> |
|-----------------------|-------|-------------------|------------------------|-----------------------------|
| A/6.Vortex FL         | FS    | 0.324             | ST                     | 34.25                       |
| Allegiance FL         | FS    | 0.365             | ST                     |                             |
| Trilex flow Fungicide | FS    | 0.605             | ST                     |                             |
| Poncho FS             | FS    | 0.75 mgAI/seed    | ST                     |                             |
| Poncho Votivo         | FS    | 1ml/1000seeds     | ST                     |                             |
| Pro-ized Purple Clnt  | FS    | 1.899             | ST                     |                             |
| L1463-B               | AL    | 18.93             | ST                     |                             |
| L1273-B               | AL    | 2.26              | ST                     |                             |
| TALC                  | WP    | 3.8               | ST                     |                             |
| Stratego YLD          | EC    | 5.0               | R1                     |                             |
| Induce                | SL    | 0.125 %V/V        | R1                     |                             |
| A/5.Vortex FL         | FS    | 0.324             | ST                     | 34.25                       |
| Allegiance FL         | FS    | 0.365             | ST                     |                             |
| Trilex flow Fungicide | FS    | 0.605             | ST                     |                             |
| Poncho Votivo         | FS    | 1ml/1000seeds     | ST                     |                             |
| Pro-ized Green Clnt   | FS    | 1.138             | ST                     |                             |
| Precise S Finisher    | AL    | 15.1              | ST                     |                             |
| TALC                  | WP    | 3.8               | ST                     |                             |
| Stratego YLD          | EC    | 5.0               | R1                     |                             |
| Induce                | SL    | 0.125 %V/V        | R1                     |                             |
| A/1.Maxim XL          | LS    | 0.63              | ST                     | 33.00                       |
| Apron XL              | ES    | 0.166             | ST                     |                             |
| Dynasty               | FS    | 0.584             | ST                     |                             |
| Pro-ized Red Clnt     | FS    | 1.14              | ST                     |                             |

<sup>1</sup> Planted May 17, 2010; evaluated June 4, 2010: Roundup Ready 2 Corn Hybrid planted in this study

<sup>2</sup> Seed treatment's listed as ounces product per 100 weight seed; Fungicide (R1) listed as oz/A=ounces per Acre; Insecticide (Furrow) listed as ounces a.i. per 1,000 row-ft

<sup>3</sup> ST = seed treatment; R1 = Reproductive Stage 1; Furrow = Insecticide applied at planting time; B = POST

<sup>4</sup> Means based on 16 observations (4 center rows x 17.5 row-ft x 4 replications)

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

Table 26. Average yields for planting-time seed treatments. Bayer special yield study: (Corn following Soybeans), Ames, IA. 2010<sup>1</sup>

| Entry/Treatment       | Form.  | Rate <sup>2</sup> | Placement <sup>3</sup> | Bushels/<br>Acre <sup>4,5,6</sup> |
|-----------------------|--------|-------------------|------------------------|-----------------------------------|
| A/4.Vortex FL         | FS     | 0.324             | ST                     | 190                               |
| Allegiance FL         | FS     | 0.365             | ST                     |                                   |
| Trilex flow Fungicide | FS     | 0.605             | ST                     |                                   |
| Poncho Votivo         | FS     | 1ml/1000seeds     | ST                     |                                   |
| Pro-ized Green Clnt   | FS     | 1.138             | ST                     |                                   |
| Precise S Finisher    | AL     | 15.1              | ST                     |                                   |
| TALC                  | WP     | 3.8               | ST                     |                                   |
| Aztec                 | 2.1 GR | 0.14              | Furrow                 |                                   |
| Stratego YLD          | EC     | 5.0               | R1                     |                                   |
| Induce                | SL     | 0.125 %V/V        | R1                     |                                   |
| A/1.Maxim XL          | LS     | 0.63              | ST                     | 189                               |
| Apron XL              | ES     | 0.166             | ST                     |                                   |
| Dynasty               | FS     | 0.584             | ST                     |                                   |
| Pro-ized Red Clnt     | FS     | 1.14              | ST                     |                                   |
| A/3.Vortex FL         | FS     | 0.324             | ST                     | 186                               |
| Allegiance FL         | FS     | 0.365             | ST                     |                                   |
| Trilex flow Fungicide | FS     | 0.605             | ST                     |                                   |
| Poncho Votivo         | FS     | 1ml/1000seeds     | ST                     |                                   |
| Pro-ized Green Clnt   | FS     | 1.138             | ST                     |                                   |
| Precise S Finisher    | AL     | 15.1              | ST                     |                                   |
| TALC                  | WP     | 3.8               | ST                     |                                   |
| Stratego YLD          | EC     | 5.0               | R1                     |                                   |
| Induce                | SL     | 0.125 %V/V        | R1                     |                                   |
| A/2 Vortex FL         | FS     | 0.324             | ST                     | 186                               |
| Allegiance FL         | FS     | 0.365             | ST                     |                                   |
| Trilex flow Fungicide | FS     | 0.605             | ST                     |                                   |
| Poncho Votivo         | FS     | 1ml/1000seeds     | ST                     |                                   |
| Pro-ized Green Clnt   | FS     | 1.138             | ST                     |                                   |
| Precise S Finisher    | AL     | 15.1              | ST                     |                                   |
| TALC                  | WP     | 3.8               | ST                     |                                   |
| A/7.Vortex FL         | FS     | 0.324             | ST                     | 185                               |
| Allegiance FL         | FS     | 0.365             | ST                     |                                   |
| Trilex flow Fungicide | FS     | 0.605             | ST                     |                                   |
| Poncho Votivo         | FS     | 1ml/1000seeds     | ST                     |                                   |
| Pro-ized Green Clnt   | FS     | 1.138             | ST                     |                                   |
| Precise S Finisher    | AL     | 15.1              | ST                     |                                   |
| TALC                  | WP     | 3.8               | ST                     |                                   |
| Stratego YLD          | EC     | 5.0               | R1                     |                                   |
| Induce                | SL     | 0.125 %V/V        | R1                     |                                   |

(Continued on next page)

Table 26. Average yields for planting-time seed treatments. Bayer special yield study: (Corn following Soybeans), Ames, IA. 2010<sup>1</sup> (continued)

| Entry/Treatment       | Form. | Rate <sup>2</sup> | Placement <sup>3</sup> | Bushels/<br>Acre <sup>4,5,6</sup> |
|-----------------------|-------|-------------------|------------------------|-----------------------------------|
| A/6.Vortex FL         | FS    | 0.324             | ST                     | 178                               |
| Allegiance FL         | FS    | 0.365             | ST                     |                                   |
| Trilex flow Fungicide | FS    | 0.605             | ST                     |                                   |
| Poncho FS             | FS    | 0.75 mgAl/seed    | ST                     |                                   |
| Poncho Votivo         | FS    | 1ml/1000seeds     | ST                     |                                   |
| Pro-ized Purple Clnt  | FS    | 1.899             | ST                     |                                   |
| L1463-B               | AL    | 18.93             | ST                     |                                   |
| L1273-B               | AL    | 2.26              | ST                     |                                   |
| TALC                  | WP    | 3.8               | ST                     |                                   |
| Stratego YLD          | EC    | 5.0               | R1                     |                                   |
| Induce                | SL    | 0.125 %V/V        | R1                     |                                   |
| A/5.Vortex FL         | FS    | 0.324             | ST                     | 178                               |
| Allegiance FL         | FS    | 0.365             | ST                     |                                   |
| Trilex flow Fungicide | FS    | 0.605             | ST                     |                                   |
| Poncho Votivo         | FS    | 1ml/1000seeds     | ST                     |                                   |
| Pro-ized Green Clnt   | FS    | 1.138             | ST                     |                                   |
| Precise S Finisher    | AL    | 15.1              | ST                     |                                   |
| TALC                  | WP    | 3.8               | ST                     |                                   |
| Stratego YLD          | EC    | 5.0               | R1                     |                                   |
| Induce                | SL    | 0.125 %V/V        | R1                     |                                   |

<sup>1</sup> Planted May 18, 2010; machine harvested October 13, 2010; Roundup Ready 2 Corn Hybrid planted in this study

<sup>2</sup> Seed treatment's listed as ounces product per 100 weight seed; Fungicide's (R1) listed as oz/A=ounces per Acre; Insecticide (Furrow) listed as ounces a.i. per 1,000 row-ft

<sup>3</sup> ST = seed treatment; R1 = Reproductive Stage 1; Furrow = Insecticide applied at planting time

<sup>4</sup> Means based on 4 observations (4 center rows x 30 row-ft x 4 replications)

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

<sup>6</sup> Yields converted to 15.5% Moisture

Table 27. Average stand counts for planting-time seed treatments. Bayer special yield study:  
(Corn following Soybeans), Ames, IA. 2010<sup>1</sup>

| Entry/Treatment       | Form.  | Rate <sup>2</sup> | Placement <sup>3</sup> | Stand Counts <sup>4,5</sup> |
|-----------------------|--------|-------------------|------------------------|-----------------------------|
| A/3.Raxil             | FS     | 0.265             | ST                     | 35.50                       |
| Allegiance FL         | FS     | 0.365             | ST                     |                             |
| Trilex flow Fungicide | FS     | 0.605             | ST                     |                             |
| Poncho Votivo         | FS     | 1ml/1000seeds     | ST                     |                             |
| Pro-ized Green Clnt   | FS     | 1.138             | ST                     |                             |
| Precise S Finisher    | AL     | 15.1              | ST                     |                             |
| TALC                  | WP     | 3.8               | ST                     |                             |
| Stratego YLD          | EC     | 5.0               | R1                     |                             |
| Induce                | SL     | 0.125 %V/V        | R1                     |                             |
| A/7.Raxil             | FS     | 0.265             | ST                     | 35.00                       |
| Allegiance FL         | FS     | 0.365             | ST                     |                             |
| Trilex flow Fungicide | FS     | 0.605             | ST                     |                             |
| Poncho Votivo         | FS     | 1ml/1000seeds     | ST                     |                             |
| Pro-ized Green Clnt   | FS     | 1.138             | ST                     |                             |
| Precise S Finisher    | AL     | 15.1              | ST                     |                             |
| TALC                  | WP     | 3.8               | ST                     |                             |
| Stratego YLD          | EC     | 5.0               | R1                     |                             |
| Induce                | SL     | 0.125 %V/V        | R1                     |                             |
| A/1.Maxim XL          | LS     | 0.63              | ST                     | 34.75                       |
| Apron XL              | ES     | 0.166             | ST                     |                             |
| Dynasty               | FS     | 0.584             | ST                     |                             |
| Pro-ized Red Clnt     | FS     | 1.14              | ST                     |                             |
| A/2.Raxil             | FS     | 0.265             | ST                     | 34.75                       |
| Allegiance FL         | FS     | 0.365             | ST                     |                             |
| Trilex flow Fungicide | FS     | 0.605             | ST                     |                             |
| Poncho Votivo         | FS     | 1ml/1000seeds     | ST                     |                             |
| Pro-ized Green Clnt   | FS     | 1.138             | ST                     |                             |
| Precise S Finisher    | AL     | 15.1              | ST                     |                             |
| TALC                  | WP     | 3.8               | ST                     |                             |
| A/4.Raxil             | FS     | 0.265             | ST                     | 34.25                       |
| Allegiance FL         | FS     | 0.365             | ST                     |                             |
| Trilex flow Fungicide | FS     | 0.605             | ST                     |                             |
| Poncho Votivo         | FS     | 1ml/1000seeds     | ST                     |                             |
| Pro-ized Green Clnt   | FS     | 1.138             | ST                     |                             |
| Precise S Finisher    | AL     | 15.1              | ST                     |                             |
| TALC                  | WP     | 3.8               | ST                     |                             |
| Aztec                 | 2.1 GR | 0.14              | Furrow                 |                             |
| Stratego YLD          | EC     | 5.0               | R1                     |                             |
| Induce                | SL     | 0.125 %V/V        | R1                     |                             |

(Continued on next page)

Table 27. Average stand counts for planting-time seed treatments. Bayer special yield study: (Corn following Soybeans), Ames, IA. 2010<sup>1</sup> (continued)

| Entry/Treatment       | Form. | Rate <sup>2</sup> | Placement <sup>3</sup> | Stand Counts <sup>4,5</sup> |
|-----------------------|-------|-------------------|------------------------|-----------------------------|
| A/6.Raxil             | FS    | 0.265             | ST                     | 34.25                       |
| Allegiance FL         | FS    | 0.365             | ST                     |                             |
| Trilex flow Fungicide | FS    | 0.605             | ST                     |                             |
| Poncho FS             | FS    | 0.75 mgAl/seed    | ST                     |                             |
| Poncho Votivo         | FS    | 1ml/1000seeds     | ST                     |                             |
| Pro-ized Purple Clnt  | FS    | 1.899             | ST                     |                             |
| L1463-B               | AL    | 18.93             | ST                     |                             |
| L1273-B               | AL    | 2.26              | ST                     |                             |
| TALC                  | WP    | 3.8               | ST                     |                             |
| Stratego YLD          | EC    | 5.0               | R1                     |                             |
| Induce                | SL    | 0.125 %V/V        | R1                     |                             |
| A/5.Raxil             | FS    | 0.265             | ST                     | 34.00                       |
| Allegiance FL         | FS    | 0.365             | ST                     |                             |
| Trilex flow Fungicide | FS    | 0.605             | ST                     |                             |
| Poncho Votivo         | FS    | 1ml/1000seeds     | ST                     |                             |
| Pro-ized Green Clnt   | FS    | 1.138             | ST                     |                             |
| Precise S Finisher    | AL    | 15.1              | ST                     |                             |
| TALC                  | WP    | 3.8               | ST                     |                             |
| Stratego YLD          | EC    | 5.0               | R1                     |                             |
| Induce                | SL    | 0.125 %V/V        | R1                     |                             |

<sup>1</sup> Planted May 18, 2010; evaluated June 4, 2010; Liberty Link Corn Hybrid planted in this study

<sup>2</sup> Seed treatment's listed as ounces product per 100 weight seed; Fungicide's (R1) listed as oz/A=ounces per Acre  
Insecticide (Furrow) listed as ounces a.i. per 1,000 row-ft

<sup>3</sup> ST = seed treatment; R1 = Reproductive Stage 1; Furrow = Insecticide applied at planting time

<sup>4</sup> Means based on 16 observations (4 center rows x 17.5 row-ft x 4 replications)

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

Table 28. Average yield for planting-time seed treatments. Bayer special yield study: (Corn following Soybeans), Ames, IA. 2010<sup>1</sup>

| Entry/Treatment       | Form. | Rate <sup>2</sup> | Placement <sup>3</sup> | Bushels/<br>Acre <sup>4,5,6</sup> |
|-----------------------|-------|-------------------|------------------------|-----------------------------------|
| A/3.Raxil             | FS    | 0.265             | ST                     | 151                               |
| Allegiance FL         | FS    | 0.365             | ST                     |                                   |
| Trilex flow Fungicide | FS    | 0.605             | ST                     |                                   |
| Poncho Votivo         | FS    | 1ml/1000seeds     | ST                     |                                   |
| Pro-ized Green Clnt   | FS    | 1.138             | ST                     |                                   |
| Precise S Finisher    | AL    | 15.1              | ST                     |                                   |
| TALC                  | WP    | 3.8               | ST                     |                                   |
| Stratego YLD          | EC    | 5.0               | R1                     |                                   |
| Induce                | SL    | 0.125 %V/V        | R1                     |                                   |
| A/1.Maxim XL          | LS    | 0.63              | ST                     | 151                               |
| Apron XL              | ES    | 0.166             | ST                     |                                   |
| Dynasty               | FS    | 0.584             | ST                     |                                   |
| Pro-ized Red Clnt     | FS    | 1.14              | ST                     |                                   |
| A/6.Raxil             | FS    | 0.265             | ST                     | 149                               |
| Allegiance FL         | FS    | 0.365             | ST                     |                                   |
| Trilex flow Fungicide | FS    | 0.605             | ST                     |                                   |
| Poncho FS             | FS    | 0.75 mgAl/seed    | ST                     |                                   |
| Poncho Votivo         | FS    | 1ml/1000seeds     | ST                     |                                   |
| Pro-ized Purple Clnt  | FS    | 1.899             | ST                     |                                   |
| L1463-B               | AL    | 18.93             | ST                     |                                   |
| L1273-B               | AL    | 2.26              | ST                     |                                   |
| TALC                  | WP    | 3.8               | ST                     |                                   |
| Stratego YLD          | EC    | 5.0               | R1                     |                                   |
| Induce                | SL    | 0.125 %V/V        | R1                     |                                   |
| A/5.Raxil             | FS    | 0.265             | ST                     | 147                               |
| Allegiance FL         | FS    | 0.365             | ST                     |                                   |
| Trilex flow Fungicide | FS    | 0.605             | ST                     |                                   |
| Poncho Votivo         | FS    | 1ml/1000seeds     | ST                     |                                   |
| Pro-ized Green Clnt   | FS    | 1.138             | ST                     |                                   |
| Precise S Finisher    | AL    | 15.1              | ST                     |                                   |
| TALC                  | WP    | 3.8               | ST                     |                                   |
| Stratego YLD          | EC    | 5.0               | R1                     |                                   |
| Induce                | SL    | 0.125 %V/V        | R1                     |                                   |
| A/2.Raxil             | FS    | 0.265             | ST                     | 144                               |
| Allegiance FL         | FS    | 0.365             | ST                     |                                   |
| Trilex flow Fungicide | FS    | 0.605             | ST                     |                                   |
| Poncho Votivo         | FS    | 1ml/1000seeds     | ST                     |                                   |
| Pro-ized Green Clnt   | FS    | 1.138             | ST                     |                                   |
| Precise S Finisher    | AL    | 15.1              | ST                     |                                   |
| TALC                  | WP    | 3.8               | ST                     |                                   |

(Continued on next page)

Table 28. Average yield for planting-time seed treatments. Bayer special yield study: (Corn following Soybeans), Ames, IA. 2010<sup>1</sup> (continued)

| Entry/Treatment       | Form.  | Rate <sup>2</sup> | Placement <sup>3</sup> | Bushel/<br>Acre <sup>4,5,6</sup> |
|-----------------------|--------|-------------------|------------------------|----------------------------------|
| A/7.Raxil             | FS     | 0.265             | ST                     | 131                              |
| Allegiance FL         | FS     | 0.365             | ST                     |                                  |
| Trilex flow Fungicide | FS     | 0.605             | ST                     |                                  |
| Poncho Votivo         | FS     | 1ml/1000seeds     | ST                     |                                  |
| Pro-ized Green Clnt   | FS     | 1.138             | ST                     |                                  |
| Precise S Finisher    | AL     | 15.1              | ST                     |                                  |
| TALC                  | WP     | 3.8               | ST                     |                                  |
| Stratego YLD          | EC     | 5.0               | R1                     |                                  |
| Induce                | SL     | 0.125 %V/V        | R1                     |                                  |
| A/4.Raxil             | FS     | 0.265             | ST                     | 128                              |
| Allegiance FL         | FS     | 0.365             | ST                     |                                  |
| Trilex flow Fungicide | FS     | 0.605             | ST                     |                                  |
| Poncho Votivo         | FS     | 1ml/1000seeds     | ST                     |                                  |
| Pro-ized Green Clnt   | FS     | 1.138             | ST                     |                                  |
| Precise S Finisher    | AL     | 15.1              | ST                     |                                  |
| TALC                  | WP     | 3.8               | ST                     |                                  |
| Aztec                 | 2.1 GR | 0.14              | Furrow                 |                                  |
| Stratego YLD          | EC     | 5.0               | R1                     |                                  |
| Induce                | SL     | 0.125 %V/V        | R1                     |                                  |

<sup>1</sup> Planted May 18, 2010; machine harvested October 11, 2010; Liberty Link Corn Hybrid planted in this study

<sup>2</sup> Seed treatment's listed as ounces product per 100 weight seed; Fungicide's (R1) listed as oz/A=ounces per Acre  
Insecticide (Furrow) listed as ounces a.i. per 1,000 row-ft

<sup>3</sup> ST = seed treatment; R1 = Reproductive Stage 1; Furrow = Insecticide applied at planting time

<sup>4</sup> Means based on 4 observations (4 center rows x 30 row-ft x 4 replications)

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

<sup>6</sup> Yields converted to 15.5% Moisture

Table 29. Average stand counts for planting-time seed treatments. Bayer special yield study:  
(Corn following Corn), Nashua, IA. 2010<sup>1</sup>

| Entry/Treatment       | Form. | Rate <sup>2</sup> | Placement <sup>3</sup> | Stand Counts <sup>4,5</sup> |         |
|-----------------------|-------|-------------------|------------------------|-----------------------------|---------|
| A/1.Maxim XL          | LS    | 0.63              | ST                     | 34.00a                      |         |
| Apron XL              | ES    | 0.166             | ST                     |                             |         |
| Dynasty               | FS    | 0.584             | ST                     |                             |         |
| Pro-ized Red Clnt     | FS    | 1.14              | ST                     |                             |         |
| A/7.Vortex FL         | FS    | 0.324             | ST                     | 32.25ab                     |         |
| Allegiance FL         | FS    | 0.365             | ST                     |                             |         |
| Trilex flow Fungicide | FS    | 0.605             | ST                     |                             |         |
| Poncho Votivo         | FS    | 1ml/1000seeds     | ST                     |                             |         |
| Pro-ized Green Clnt   | FS    | 1.138             | ST                     |                             |         |
| Precise S Finisher    | AL    | 15.1              | ST                     |                             |         |
| TALC                  | WP    | 3.8               | ST                     |                             |         |
| Stratego YLD          | EC    | 5.0               | R1                     |                             |         |
| Induce                | SL    | 0.125 %V/V        | R1                     |                             |         |
| A/3.Vortex FL         | FS    | 0.324             | ST                     |                             | 31.50ab |
| Allegiance FL         | FS    | 0.365             | ST                     |                             |         |
| Trilex flow Fungicide | FS    | 0.605             | ST                     |                             |         |
| Poncho Votivo         | FS    | 1ml/1000seeds     | ST                     |                             |         |
| Pro-ized Green Clnt   | FS    | 1.138             | ST                     |                             |         |
| Precise S Finisher    | AL    | 15.1              | ST                     |                             |         |
| TALC                  | WP    | 3.8               | ST                     |                             |         |
| Stratego YLD          | EC    | 5.0               | R1                     |                             |         |
| Induce                | SL    | 0.125 %V/V        | R1                     |                             |         |
| A/5.Vortex FL         | FS    | 0.324             | ST                     | 31.50ab                     |         |
| Allegiance FL         | FS    | 0.365             | ST                     |                             |         |
| Trilex flow Fungicide | FS    | 0.605             | ST                     |                             |         |
| Poncho Votivo         | FS    | 1ml/1000seeds     | ST                     |                             |         |
| Pro-ized Green Clnt   | FS    | 1.138             | ST                     |                             |         |
| Precise S Finisher    | AL    | 15.1              | ST                     |                             |         |
| TALC                  | WP    | 3.8               | ST                     |                             |         |
| Stratego YLD          | EC    | 5.0               | R1                     |                             |         |
| Induce                | SL    | 0.125 %V/V        | R1                     |                             |         |

(Continued on next page)

Table 29. Average stand counts for planting-time seed treatments. Bayer special yield study: (Corn following Corn), Nashua, IA. 2010<sup>1</sup> (continued)

| Entry/Treatment       | Form.  | Rate <sup>2</sup> | Placement <sup>3</sup> | Stand Counts <sup>4,5</sup> |         |
|-----------------------|--------|-------------------|------------------------|-----------------------------|---------|
| A/4.Vortex FL         | FS     | 0.324             | ST                     | 31.50ab                     |         |
| Allegiance FL         | FS     | 0.365             | ST                     |                             |         |
| Trilex flow Fungicide | FS     | 0.605             | ST                     |                             |         |
| Poncho Votivo         | FS     | 1ml/1000seeds     | ST                     |                             |         |
| Pro-ized Green Clnt   | FS     | 1.138             | ST                     |                             |         |
| Precise S Finisher    | AL     | 15.1              | ST                     |                             |         |
| TALC                  | WP     | 3.8               | ST                     |                             |         |
| Aztec                 | 2.1 GR | 0.14              | Furrow                 |                             |         |
| Stratego YLD          | EC     | 5.0               | R1                     |                             |         |
| Induce                | SL     | 0.125 %V/V        | R1                     |                             |         |
| A/6.Vortex FL         | FS     | 0.324             | ST                     |                             | 30.75 b |
| Allegiance FL         | FS     | 0.365             | ST                     |                             |         |
| Trilex flow Fungicide | FS     | 0.605             | ST                     |                             |         |
| Poncho FS             | FS     | 0.75 mgAl/seed    | ST                     |                             |         |
| Poncho Votivo         | FS     | 1ml/1000seeds     | ST                     |                             |         |
| Pro-ized Purple Clnt  | FS     | 1.899             | ST                     |                             |         |
| L1463-B               | AL     | 18.93             | ST                     |                             |         |
| L1273-B               | AL     | 2.26              | ST                     |                             |         |
| TALC                  | WP     | 3.8               | ST                     |                             |         |
| Stratego YLD          | EC     | 5.0               | R1                     |                             |         |
| Induce                | SL     | 0.125 %V/V        | R1                     |                             |         |
| A/2.Vortex FL         | FS     | 0.324             | ST                     | 30.50 b                     |         |
| Allegiance FL         | FS     | 0.365             | ST                     |                             |         |
| Trilex flow Fungicide | FS     | 0.605             | ST                     |                             |         |
| Poncho Votivo         | FS     | 1ml/1000seeds     | ST                     |                             |         |
| Pro-ized Green Clnt   | FS     | 1.138             | ST                     |                             |         |
| Precise S Finisher    | AL     | 15.1              | ST                     |                             |         |
| TALC                  | WP     | 3.8               | ST                     |                             |         |

<sup>1</sup> Planted April 20, 2010; evaluated May 28, 2010: Roundup Ready Corn Hybrid planted in this study

<sup>2</sup> Seed treatment's listed as ounces product per 100 weight seed; Fungicide's (R1) listed as oz/A=ounces per Acre; Insecticide (Furrow) listed as ounces a.i. per 1,000 row-ft

<sup>3</sup> ST = seed treatment; R1 = Reproductive Stage 1; Furrow = Insecticide applied at planting time

<sup>4</sup> Means based on 16 observations (4 center rows x 17.5 row-ft x 4 replications)

<sup>5</sup> Means sharing a common letter do not differ significantly according to Ryan's Q Test ( $P \leq 0.05$ )

Table 30. Average yields for planting-time seed treatments. Bayer special yield study: (Corn following Corn), Nashua, IA. 2010

| Entry/Treatment       | Form.  | Rate <sup>2</sup> | Placement <sup>3</sup> | Bushels/<br>Acre <sup>4,5,6</sup> |
|-----------------------|--------|-------------------|------------------------|-----------------------------------|
| A/4.Vortex FL         | FS     | 0.324             | ST                     | 188                               |
| Allegiance FL         | FS     | 0.365             | ST                     |                                   |
| Trilex flow Fungicide | FS     | 0.605             | ST                     |                                   |
| Poncho Votivo         | FS     | 1ml/1000seeds     | ST                     |                                   |
| Pro-ized Green Clnt   | FS     | 1.138             | ST                     |                                   |
| Precise S Finisher    | AL     | 15.1              | ST                     |                                   |
| TALC                  | WP     | 3.8               | ST                     |                                   |
| Aztec                 | 2.1 GR | 0.14              | Furrow                 |                                   |
| Stratego YLD          | EC     | 5.0               | R1                     |                                   |
| Induce                | SL     | 0.125 %V/V        | R1                     |                                   |
| A/6.Vortex FL         | FS     | 0.324             | ST                     | 181                               |
| Allegiance FL         | FS     | 0.365             | ST                     |                                   |
| Trilex flow Fungicide | FS     | 0.605             | ST                     |                                   |
| Poncho FS             | FS     | 0.75 mgAl/seed    | ST                     |                                   |
| Poncho Votivo         | FS     | 1ml/1000seeds     | ST                     |                                   |
| Pro-ized Purple Clnt  | FS     | 1.899             | ST                     |                                   |
| L1463-B               | AL     | 18.93             | ST                     |                                   |
| L1273-B               | AL     | 2.26              | ST                     |                                   |
| TALC                  | WP     | 3.8               | ST                     |                                   |
| Stratego YLD          | EC     | 5.0               | R1                     |                                   |
| Induce                | SL     | 0.125 %V/V        | R1                     |                                   |
| A/5.Vortex FL         | FS     | 0.324             | ST                     | 178                               |
| Allegiance FL         | FS     | 0.365             | ST                     |                                   |
| Trilex flow Fungicide | FS     | 0.605             | ST                     |                                   |
| Poncho Votivo         | FS     | 1ml/1000seeds     | ST                     |                                   |
| Pro-ized Green Clnt   | FS     | 1.138             | ST                     |                                   |
| Precise S Finisher    | AL     | 15.1              | ST                     |                                   |
| TALC                  | WP     | 3.8               | ST                     |                                   |
| Stratego YLD          | EC     | 5.0               | R1                     |                                   |
| Induce                | SL     | 0.125 %V/V        | R1                     |                                   |
| A/7.Vortex FL         | FS     | 0.324             | ST                     | 177                               |
| Allegiance FL         | FS     | 0.365             | ST                     |                                   |
| Trilex flow Fungicide | FS     | 0.605             | ST                     |                                   |
| Poncho Votivo         | FS     | 1ml/1000seeds     | ST                     |                                   |
| Pro-ized Green Clnt   | FS     | 1.138             | ST                     |                                   |
| Precise S Finisher    | AL     | 15.1              | ST                     |                                   |
| TALC                  | WP     | 3.8               | ST                     |                                   |
| Stratego YLD          | EC     | 5.0               | R1                     |                                   |
| Induce                | SL     | 0.125 %V/V        | R1                     |                                   |

(Continued on next page)

Table 30. Average yields for planting-time seed treatments. Bayer special yield study: (Corn following Corn), Nashua, IA. 2010 (continued)

| Entry/Treatment       | Form. | Rate <sup>2</sup> | Placement <sup>3</sup> | Bushels/<br>Acre <sup>4,5,6</sup> |
|-----------------------|-------|-------------------|------------------------|-----------------------------------|
| A/3.Vortex FL         | FS    | 0.324             | ST                     | 173                               |
| Allegiance FL         | FS    | 0.365             | ST                     |                                   |
| Trilex flow Fungicide | FS    | 0.605             | ST                     |                                   |
| Poncho Votivo         | FS    | 1ml/1000seeds     | ST                     |                                   |
| Pro-ized Green Clnt   | FS    | 1.138             | ST                     |                                   |
| Precise S Finisher    | AL    | 15.1              | ST                     |                                   |
| TALC                  | WP    | 3.8               | ST                     |                                   |
| Stratego YLD          | EC    | 5.0               | R1                     |                                   |
| Induce                | SL    | 0.125 %V/V        | R1                     |                                   |
| A/2.Vortex FL         | FS    | 0.324             | ST                     | 171                               |
| Allegiance FL         | FS    | 0.365             | ST                     |                                   |
| Trilex flow Fungicide | FS    | 0.605             | ST                     |                                   |
| Poncho Votivo         | FS    | 1ml/1000seeds     | ST                     |                                   |
| Pro-ized Green Clnt   | FS    | 1.138             | ST                     |                                   |
| Precise S Finisher    | AL    | 15.1              | ST                     |                                   |
| TALC                  | WP    | 3.8               | ST                     |                                   |
| A/1.Maxim XL          | LS    | 0.63              | ST                     | 167                               |
| Apron XL              | ES    | 0.166             | ST                     |                                   |
| Dynasty               | FS    | 0.584             | ST                     |                                   |
| Pro-ized Red Clnt     | FS    | 1.14              | ST                     |                                   |

<sup>1</sup> Planted April 20, 2010; machine harvested October 7, 2010; Roundup Ready Corn Hybrid planted in this study

<sup>2</sup> Seed treatment's listed as ounces product per 100 weight seed; Fungicide's (R1) listed as oz/A=ounces per Acre; Insecticide (Furrow) listed as ounces a.i. per 1,000 row-ft

<sup>3</sup> ST = seed treatment; R1 = Reproductive Stage 1; Furrow = Insecticide applied at planting time

<sup>4</sup> Means based on 4 observations (4 center rows x 30 row-ft x 4 replications)

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

<sup>6</sup> Yields converted to 15.5% Moisture

Table 31. Average stand counts for planting-time seed treatments. Bayer special yield study:  
(Corn following Corn), Nashua, IA. 2010

| Entry/Treatment       | Form.  | Rate <sup>2</sup> | Placement <sup>3</sup> | Stand Counts <sup>4,5</sup> |
|-----------------------|--------|-------------------|------------------------|-----------------------------|
| A/7.Raxil             | FS     | 0.265             | ST                     | 33.75                       |
| Allegiance FL         | FS     | 0.365             | ST                     |                             |
| Trilex flow Fungicide | FS     | 0.605             | ST                     |                             |
| Poncho Votivo         | FS     | 1ml/1000seeds     | ST                     |                             |
| Pro-ized Green Clnt   | FS     | 1.138             | ST                     |                             |
| Precise S Finisher    | AL     | 15.1              | ST                     |                             |
| TALC                  | WP     | 3.8               | ST                     |                             |
| Stratego YLD          | EC     | 5.0               | R1                     |                             |
| Induce                | SL     | 0.125 %V/V        | R1                     |                             |
| A/6.Raxil             | FS     | 0.265             | ST                     |                             |
| Allegiance FL         | FS     | 0.365             | ST                     |                             |
| Trilex flow Fungicide | FS     | 0.605             | ST                     |                             |
| Poncho FS             | FS     | 0.75 mgAl/seed    | ST                     |                             |
| Poncho Votivo         | FS     | 1ml/1000seeds     | ST                     |                             |
| Pro-ized Purple Clnt  | FS     | 1.899             | ST                     |                             |
| L1463-B               | AL     | 18.93             | ST                     |                             |
| L1273-B               | AL     | 2.26              | ST                     |                             |
| TALC                  | WP     | 3.8               | ST                     |                             |
| Stratego YLD          | EC     | 5.0               | R1                     |                             |
| Induce                | SL     | 0.125 %V/V        | R1                     |                             |
| A/4.Raxil             | FS     | 0.265             | ST                     | 33.75                       |
| Allegiance FL         | FS     | 0.365             | ST                     |                             |
| Trilex flow Fungicide | FS     | 0.605             | ST                     |                             |
| Poncho Votivo         | FS     | 1ml/1000seeds     | ST                     |                             |
| Pro-ized Green Clnt   | FS     | 1.138             | ST                     |                             |
| Precise S Finisher    | AL     | 15.1              | ST                     |                             |
| TALC                  | WP     | 3.8               | ST                     |                             |
| Aztec                 | 2.1 GR | 0.14              | Furrow                 |                             |
| Stratego YLD          | EC     | 5.0               | R1                     |                             |
| Induce                | SL     | 0.125 %V/V        | R1                     |                             |
| A/3.Raxil             | FS     | 0.265             | ST                     | 33.25                       |
| Allegiance FL         | FS     | 0.365             | ST                     |                             |
| Trilex flow Fungicide | FS     | 0.605             | ST                     |                             |
| Poncho Votivo         | FS     | 1ml/1000seeds     | ST                     |                             |
| Pro-ized Green Clnt   | FS     | 1.138             | ST                     |                             |
| Precise S Finisher    | AL     | 15.1              | ST                     |                             |
| TALC                  | WP     | 3.8               | ST                     |                             |
| Stratego YLD          | EC     | 5.0               | R1                     |                             |
| Induce                | SL     | 0.125 %V/V        | R1                     |                             |

(Continued on next page)

Table 31. Average stand counts for planting-time seed treatments. Bayer special yield study: (Corn following Corn), Nashua, IA. 2010 (continued)

| Entry/Treatment       | Form. | Rate <sup>2</sup> | Placement <sup>3</sup> | Stand Counts <sup>4,5</sup> |
|-----------------------|-------|-------------------|------------------------|-----------------------------|
| A/5.Raxil             | FS    | 0.265             | ST                     | 33.25                       |
| Allegiance FL         | FS    | 0.365             | ST                     |                             |
| Trilex flow Fungicide | FS    | 0.605             | ST                     |                             |
| Poncho Votivo         | FS    | 1ml/1000seeds     | ST                     |                             |
| Pro-ized Green Clnt   | FS    | 1.138             | ST                     |                             |
| Precise S Finisher    | AL    | 15.1              | ST                     |                             |
| TALC                  | WP    | 3.8               | ST                     |                             |
| Stratego YLD          | EC    | 5.0               | R1                     |                             |
| Induce                | SL    | 0.125 %V/V        | R1                     |                             |
| A/1.Maxim XL          | LS    | 0.63              | ST                     | 33.00                       |
| Apron XL              | ES    | 0.166             | ST                     |                             |
| Dynasty               | FS    | 0.584             | ST                     |                             |
| Pro-ized Red Clnt     | FS    | 1.14              | ST                     |                             |
| A/2.Raxil             | FS    | 0.265             | ST                     | 32.00                       |
| Allegiance FL         | FS    | 0.365             | ST                     |                             |
| Trilex flow Fungicide | FS    | 0.605             | ST                     |                             |
| Poncho Votivo         | FS    | 1ml/1000seeds     | ST                     |                             |
| Pro-ized Green Clnt   | FS    | 1.138             | ST                     |                             |
| Precise S Finisher    | AL    | 15.1              | ST                     |                             |
| TALC                  | WP    | 3.8               | ST                     |                             |

<sup>1</sup> Planted April 20, 2010; evaluated May 28, 2010: Liberty Link Corn Hybrid planted in this study

<sup>2</sup> Seed treatment's listed as ounces product per 100 weight seed; Fungicide's (R1) listed as oz/A=ounces per Acre  
Insecticide (Furrow) listed as ounces a.i. per 1,000 row-ft

<sup>3</sup> ST = seed treatment; R1 = Reproductive Stage 1; Furrow = Insecticide applied at planting time

<sup>4</sup> Means based on 16 observations (4 center rows x 17.5 row-ft x 4 replications)

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

Table 32. Average yield for planting-time seed treatments. Bayer special yield study: (Corn following Corn), Nashua, IA 2010.

| Entry/Treatment       | Form.  | Rate <sup>2</sup> | Placement <sup>3</sup> | Bushels/<br>Acre <sup>4,5,6</sup> |
|-----------------------|--------|-------------------|------------------------|-----------------------------------|
| A/5.Raxil             | FS     | 0.265             | ST                     | 202                               |
| Allegiance FL         | FS     | 0.365             | ST                     |                                   |
| Trilex flow Fungicide | FS     | 0.605             | ST                     |                                   |
| Poncho Votivo         | FS     | 1ml/1000seeds     | ST                     |                                   |
| Pro-ized Green Clnt   | FS     | 1.138             | ST                     |                                   |
| Precise S Finisher    | AL     | 15.1              | ST                     |                                   |
| TALC                  | WP     | 3.8               | ST                     |                                   |
| Stratego YLD          | EC     | 5.0               | R1                     |                                   |
| Induce                | SL     | 0.125 %V/V        | R1                     |                                   |
| A/6.Raxil             | FS     | 0.265             | ST                     | 192                               |
| Allegiance FL         | FS     | 0.365             | ST                     |                                   |
| Trilex flow Fungicide | FS     | 0.605             | ST                     |                                   |
| Poncho FS             | FS     | 0.75 mgAl/seed    | ST                     |                                   |
| Poncho Votivo         | FS     | 1ml/1000seeds     | ST                     |                                   |
| Pro-ized Purple Clnt  | FS     | 1.899             | ST                     |                                   |
| L1463-B               | AL     | 18.93             | ST                     |                                   |
| L1273-B               | AL     | 2.26              | ST                     |                                   |
| TALC                  | WP     | 3.8               | ST                     |                                   |
| Stratego YLD          | EC     | 5.0               | R1                     |                                   |
| Induce                | SL     | 0.125 %V/V        | R1                     |                                   |
| A/4.Raxil             | FS     | 0.265             | ST                     | 190                               |
| Allegiance FL         | FS     | 0.365             | ST                     |                                   |
| Trilex flow Fungicide | FS     | 0.605             | ST                     |                                   |
| Poncho Votivo         | FS     | 1ml/1000seeds     | ST                     |                                   |
| Pro-ized Green Clnt   | FS     | 1.138             | ST                     |                                   |
| Precise S Finisher    | AL     | 15.1              | ST                     |                                   |
| TALC                  | WP     | 3.8               | ST                     |                                   |
| Aztec                 | 2.1 GR | 0.14              | Furrow                 |                                   |
| Stratego YLD          | EC     | 5.0               | R1                     |                                   |
| Induce                | SL     | 0.125 %V/V        | R1                     |                                   |
| A/7.Raxil             | FS     | 0.265             | ST                     | 190                               |
| Allegiance FL         | FS     | 0.365             | ST                     |                                   |
| Trilex flow Fungicide | FS     | 0.605             | ST                     |                                   |
| Poncho Votivo         | FS     | 1ml/1000seeds     | ST                     |                                   |
| Pro-ized Green Clnt   | FS     | 1.138             | ST                     |                                   |
| Precise S Finisher    | AL     | 15.1              | ST                     |                                   |
| TALC                  | WP     | 3.8               | ST                     |                                   |
| Stratego YLD          | EC     | 5.0               | R1                     |                                   |
| Induce                | SL     | 0.125 %V/V        | R1                     |                                   |

(Continued on next page)

Table 32. Average yield for planting-time seed treatments. Bayer special yield study: (Corn following Corn), Nashua, IA 2010. (continued)

| Entry/Treatment       | Form. | Rate <sup>2</sup> | Placement <sup>3</sup> | Bushels/<br>Acre <sup>4,5,6</sup> |
|-----------------------|-------|-------------------|------------------------|-----------------------------------|
| A/3.Raxil             | FS    | 0.265             | ST                     | 186                               |
| Allegiance FL         | FS    | 0.365             | ST                     |                                   |
| Trilex flow Fungicide | FS    | 0.605             | ST                     |                                   |
| Poncho Votivo         | FS    | 1ml/1000seeds     | ST                     |                                   |
| Pro-ized Green Clnt   | FS    | 1.138             | ST                     |                                   |
| Precise S Finisher    | AL    | 15.1              | ST                     |                                   |
| TALC                  | WP    | 3.8               | ST                     |                                   |
| Stratego YLD          | EC    | 5.0               | R1                     |                                   |
| Induce                | SL    | 0.125 %V/V        | R1                     |                                   |
| A/2.Raxil             | FS    | 0.265             | ST                     | 181                               |
| Allegiance FL         | FS    | 0.365             | ST                     |                                   |
| Trilex flow Fungicide | FS    | 0.605             | ST                     |                                   |
| Poncho Votivo         | FS    | 1ml/1000seeds     | ST                     |                                   |
| Pro-ized Green Clnt   | FS    | 1.138             | ST                     |                                   |
| Precise S Finisher    | AL    | 15.1              | ST                     |                                   |
| TALC                  | WP    | 3.8               | ST                     |                                   |
| A/1.Maxim XL          | LS    | 0.63              | ST                     | 171                               |
| Apron XL              | ES    | 0.166             | ST                     |                                   |
| Dynasty               | FS    | 0.584             | ST                     |                                   |
| Pro-ized Red Clnt     | FS    | 1.14              | ST                     |                                   |

<sup>1</sup> Planted May 18, 2010; machine harvested October 7, 2010; Liberty Link Corn Hybrid planted in this study

<sup>2</sup> Seed treatment's listed as ounces product per 100 weight seed; Fungicide's (R1) listed as oz/A=ounces per Acre  
Insecticide (Furrow) listed as ounces a.i. per 1,000 row-ft

<sup>3</sup> ST = seed treatment; R1 = Reproductive Stage 1; Furrow = Insecticide applied at planting time

<sup>4</sup> Means based on 4 observations (4 center rows x 30 row-ft x 4 replications)

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

<sup>6</sup> Yields converted to 15.5% Moisture

Table 33. Average stand count for evaluation of plant-incorporated protectants. Pioneer blended refuge study for European corn borer: Ames, IA, 2010<sup>1</sup>

| Hybrid/Treatment <sup>2,3,4</sup>              | Stand Count <sup>5</sup> |
|--|--------------------------|
| HXX x YGCB x RR2 with 5% blended refuge (RR2)  | 50.00                    |
| HXX x YGCB x RR2 with 10% blended refuge (RR2) | 49.50                    |
| HXX x YGCB x RR2                               | 49.25                    |
| RR2 + Force 3G - 0.12/T-band                   | 48.75                    |
| HXX x RR2                                      | 48.25                    |

<sup>1</sup> Planted May 17, 2010; evaluated June 3, 2010

<sup>2</sup> HXX = Herculex XTRA hybrid (Pioneer P0461XR); RR2 = Roundup Ready 2 hybrid (Pioneer P0461R); HXX x YGCB x RR2 = Pyramid Hybrid (Pioneer X03B434YXR)

<sup>3</sup> HXX = Herculex® XTRA technology. Herculex® Insect Protection technology by Dow AgroSciences and Pioneer Hi-Bred. ®Herculex and the HX logo are registered trademarks of Dow AgroSciences LLC.

Liberty Link® (LL), Ignite® and the Water Droplet logo are registered trademarks of Bayer.

YGCB = YieldGard® Corn Borer gene. ®YieldGard and the YieldGard Corn Borer design are registered trademarks used under license from Monsanto Company. RR2 = Roundup Ready® Corn 2 gene. ® Roundup Ready is a registered trademark used under license from Monsanto Company. Force® 3G is a registered trademark of a Syngenta Group Company.

<sup>4</sup> Insecticide listed as ounces a.i. per 1,000 row-ft; T-band = Insecticide applied at planting time

<sup>5</sup> Means based on 16 observations (4 row trt x 25 row-ft/treatment x 4 replications)

Table 34. Average European corn borer whorl injury for evaluation of plant-incorporated protectants. Pioneer blended refuge study for European corn borer: Ames, IA, 2010<sup>1</sup>

| Hybrid/Treatment <sup>2,3,4</sup>                 | ECB whorl injury <sup>5,6,7</sup> |
|---|-----------------------------------|
| HXX x RR2   | 9.0a                              |
| HXX x YGCB x RR2                                  | 8.9a                              |
| HXX x YGCB x RR2 (with 5% blended refuge plants)  | 8.9a                              |
| HXX x YGCB x RR2 (with 10% blended refuge plants) | 8.9a                              |
| RR2 (10% blended refuge)                          | 6.7 b                             |
| RR2 (5% blended refuge)                           | 6.5 b                             |
| RR2 + Force 3G - 0.12/T-band                      | 6.4 b                             |

<sup>1</sup> Planted May 17, 2010; evaluated July 21, 2010

<sup>2</sup> HXX = Herculex XTRA hybrid (Pioneer P0461XR); RR2 = Roundup Ready 2 hybrid (Pioneer P0461R); HXX x YGCB x RR2 = Pyramid Hybrid (Pioneer X03B434YXR)

<sup>3</sup> HXX = Herculex® XTRA technology. Herculex® Insect Protection technology by Dow AgroSciences and Pioneer Hi-Bred. ®Herculex and the HX logo are registered trademarks of Dow AgroSciences LLC.

Liberty Link® (LL), Ignite® and the Water Droplet logo are registered trademarks of Bayer.

YGCB = YieldGard® Corn Borer gene. ®YieldGard and the YieldGard Corn Borer design are registered trademarks used under license from Monsanto Company. RR2 = Roundup Ready® Corn 2 gene. ® Roundup Ready is a registered trademark used under license from Monsanto Company. Force® 3G is a registered trademark of a Syngenta Group Company.

<sup>4</sup> Insecticide listed as ounces a.i. per 1,000 row-ft; T-band = Insecticide applied at planting time

<sup>5</sup> Means based on the Pioneer 9-1 rating scale for evaluating first generation ECB whorl injury (ECB1LF).

<sup>6</sup> Chemical and check means based on 30 observations (5 plants/1 row x 2 replications & 10 plants/2rows x 2 replications).

<sup>7</sup> Means sharing a common letter do not differ significantly according to Ryan's Q Test ( $P \leq 0.05$ )

Table 35. Average European corn borer tunneling (cm) for evaluation of plant-incorporated protectants. Pioneer blended refuge study for European corn borer: Ames, IA, 2010<sup>1</sup>

| Hybrid/Treatment <sup>2,3,4</sup>                 | Average ECB Tunneling (cm) <sup>5,6</sup> |
|---|---|
| HXX x YGCB x RR2                                  | 0.07a                                     |
| HXX   | 0.25a                                     |
| HXX x YGCB x RR2 (with 5% blended refuge plants)  | 0.29a                                     |
| HXX x YGCB x RR2 (with 10% blended refuge plants) | 0.35a                                     |
| RR2 (10% blended refuge)                          | 1.80 b                                    |
| RR2 + Force 3G - 0.12/T-band                      | 3.26 b                                    |
| RR2 (5% blended refuge)                           | 3.88 b                                    |

<sup>1</sup> Planted May 17, 2010; evaluated September 16, 2010

<sup>2</sup> HXX = Herculex XTRA hybrid (Pioneer P0461XR); RR2 = Roundup Ready 2 hybrid (Pioneer P0461R); HXX x YGCB x RR2 = Pyramid Hybrid (Pioneer X03B434YXR)

<sup>3</sup> Insecticide listed as ounces a.i. per 1,000 row-ft; T-band = Insecticide applied at planting time

<sup>4</sup> HXX = Herculex® XTRA technology. Herculex® Insect Protection technology by Dow AgroSciences and Pioneer Hi-Bred. ®Herculex and the HX logo are registered trademarks of Dow AgroSciences LLC.

Liberty Link® (LL), Ignite® and the Water Droplet logo are registered trademarks of Bayer.

YGCB = YieldGard® Corn Borer gene. ®YieldGard and the YieldGard Corn Borer design are registered trademarks used under license from Monsanto Company. RR2 = Roundup Ready® Corn 2 gene. ® Roundup Ready is a registered trademark used under license from Monsanto Company. Force® 3G is a registered trademark of a Syngenta Group Company.

<sup>5</sup> Chemical and check means based on 30 observations (5 plants/1 row x 2 replications & 10 plants/2 rows x replications)

<sup>6</sup> No significant differences between means (ANOVA,  $P \leq 0.05$ )

Table 36. Average yield for evaluation of plant-incorporated protectants. Pioneer blended refuge study for European corn borer: Ames, IA, 2010<sup>1</sup>

| Hybrid/Treatment <sup>2,3,4</sup>              | Yield <sup>5,6,7</sup> |
|--|------------------------|
| RR2 + Force 3G - 0.12/T-band                   | 204                    |
| HXX x YGCB x RR2 with 10% blended refuge (RR2) | 197 <sup>8</sup>       |
| HXX x YGCB x RR2                               | 192                    |
| HXX  | 191                    |
| HXX x YGCB x RR2 with 5% blended refuge (RR2)  | 169                    |

<sup>1</sup> Planted May 17, 2010; machine harvested October 13, 2010

<sup>2</sup> HXX = Herculex XTRA hybrid (Pioneer P0461XR); RR2 = Roundup Ready 2 hybrid (Pioneer P0461R); HXX x YGCB x RR2 = Pyramid Hybrid (Pioneer X03B434YXR)

<sup>3</sup> Insecticide listed as ounces a.i. per 1,000 row-ft; T-band = Insecticide applied at planting time

<sup>4</sup> RR2 = Roundup Ready® Corn 2 gene. ® Roundup Ready is a registered trademark used under license from Monsanto Company. Force® 3G is a registered trademark of a Syngenta Group Company.

HXX = Herculex® XTRA technology. Herculex® Insect Protection technology by Dow AgroSciences and Pioneer Hi-Bred. ®Herculex and the HX logo are registered trademarks of Dow AgroSciences LLC.

Liberty Link® (LL), Ignite® and the Water Droplet logo are registered trademarks of Bayer.

YGCB = YieldGard® Corn Borer gene. ®YieldGard and the YieldGard Corn Borer design are registered trademarks used under license from Monsanto Company.

<sup>5</sup> Means based on 4 observations (2-rows x 25 row-ft/treatment x 4 reps)

<sup>6</sup> No significant differences between means (ANOVA,  $P \leq 0.05$ )

<sup>7</sup> Yields converted to 15.5% Moisture

<sup>8</sup> Mean based on 3 observations (2-rows x 25 row-ft/treatment x 3 reps)

Table 37. Black Cutworm average stand counts and average number of plants cut in the evaluation of Dow AgroSciences Smartstax vs Herculex XTRA and RR2 hybrid, Ames, IA. 2010<sup>1</sup>

| Hybrid/Treatment <sup>2,3</sup> | Stand Counts <sup>4,5</sup> | Average Cut Plants <sup>6,7</sup> | Average Cut Plants <sup>8,9</sup> | Average Cut Plants <sup>10,11</sup> |
|---------------------------------|-----------------------------|-----------------------------------|-----------------------------------|-------------------------------------|
| Smartstax                       | 25.00 b                     | 0a                                | 0                                 | 0                                   |
| HXX/RR2                         | 26.50a                      | 1.25 b                            | 0                                 | 0                                   |
| RR Hybrid                       | 26.50a                      | 3.75 c                            | 0.50                              | 0                                   |

<sup>1</sup> Planted May 26, 2010; stand counts evaluated on June 3 & 11, 2010

<sup>2</sup> Infested with two L2-L3 Black Cutworm larvae on June 3 and 4, 2010 at V1 stage of corn, 2-4 inch tall

<sup>3</sup> RR hybrid- Mycogen 2T777; HXX/RR2-Mycogen Herculex XTRA 2K789; Smartstax - Mycogen 2T784

<sup>4</sup> Stand counts based on 8 observations (1 row/13 feet of row x 4 replications x 2 evaluation dates)

<sup>5</sup> Means sharing a common letter do not differ significantly according to Ryan's Q Test ( $P \leq 0.05$ )

<sup>6</sup> Evaluation on June 11, 2010, 7 days after last infestation (DAI)

<sup>7</sup> Means sharing a common letter do not differ significantly according to Ryan's Q Test ( $P \leq 0.05$ )

<sup>8</sup> Evaluation on June 18, 2010, 14 days after last infestation (DAI)

<sup>9</sup> No significant differences between means (ANOVA,  $P < 0.05$ )

<sup>10</sup> Evaluation on June 25, 2010, 21 days after last infestation (DAI)

<sup>11</sup> No significant differences between means (ANOVA,  $P < 0.05$ )

Table 38. Average stand counts and average Fall Armyworm scoring for the evaluation of Dow AgroSciences Smartstax vs Herculex XTRA and RR2 hybrid, Ames, IA. 2010<sup>1</sup>

| Hybrid/Treatment <sup>2,3</sup> | Stand Counts <sup>4,5</sup> | Average FAW Scoring <sup>6,7</sup> |
|---------------------------------|-----------------------------|------------------------------------|
| HXX/RR2                         | 31.00                       | 0a                                 |
| Smartstax                       | 30.25                       | 0a                                 |
| RR Hybrid                       | 29.00                       | 1.5 b                              |

<sup>1</sup> Planted May 26, 2010; stand counts evaluated on June 2, 2010

<sup>2</sup> Infested 20 plants/plot (center two rows x 10 plants per row) with two shots of FAW neonates (35 neonates/shot) on July 2, 2010 at V9-V10 stage of corn, 24-30 inch tall

<sup>3</sup> RR hybrid- Mycogen 2T777; HXX/RR2-Mycogen Herculex XTRA 2K789; Smartstax - Mycogen 2T784

<sup>4</sup> Stand counts based on 8 observations (2 rows/17.5 feet of row x 4 replications)

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

<sup>6</sup> Evaluation on July 16, 2010, 14 days after infestation (DAI)

<sup>7</sup> Means sharing a common letter do not differ significantly according to Ryan's Q Test ( $P \leq 0.05$ )

Table 39. Average stand counts for the evaluation of Dow AgroSciences Smartstax vs Herculex XTRA and conventional corn, Sutherland, IA, 2010<sup>1</sup>

| Hybrid/Treatment <sup>2</sup> | Stand Counts <sup>3</sup> |
|-------------------------------|---------------------------|
| Conventional                  | 28.75                     |
| Smartstax                     | 28.25                     |
| HXX/RR2                       | 27.50                     |

<sup>1</sup> Planted April 29, 2010; stand counts evaluated on June 15, 2010; Larvae size evaluated August 20, 2010

<sup>2</sup> Conventional- Mycogen X29624; HXX/RR2-Mycogen Herculex XTRA X20625; Smartstax - Mycogen 2D692

<sup>3</sup> Stand counts based on 16 observations (4 rows/17.5 feet of row x 4 replications)

Table 40. Average total kernels, damaged kernels, and percent damaged for the evaluation of Dow AgroSciences Smartstax vs Herculex XTRA and conventional corn, Sutherland, IA, 2010<sup>1,2</sup>

| Hybrid/Treatment <sup>3</sup> | Total Kernels/Ear <sup>4</sup> | Damaged Kernels/Ear <sup>4</sup> | % Damaged/Ear <sup>4,5</sup> |
|-------------------------------|--------------------------------|----------------------------------|------------------------------|
| Smartstax                     | 673                            | 3.0                              | 0.45a                        |
| HXX/RR2                       | 661                            | 10.5                             | 1.59 b                       |
| Conventional                  | 662                            | 10.8                             | 1.63 b                       |

<sup>1</sup> Planted April 29, 2010; evaluated August 20, 2010

<sup>2</sup> All corn ears in row 2 and 3 of each plot were infested on July 28, 2010 with 40 CEW insects per ear using Bazooka inoculators

<sup>3</sup> Conventional- Mycogen X29624; HXX/RR2-Mycogen Herculex XTRA X20625; Smartstax - Mycogen 2D692

<sup>4</sup> Mean total kernels, damaged kernels counts and % damaged based on 10 observations (10 ears/treatment)

<sup>5</sup> Means sharing a common letter do not differ significantly according to Ryan's Q Test ( $P \leq 0.05$ )

Table 41. Average kernel area (cm<sup>2</sup>) consumed and number of total damaged ears for the evaluation of Dow AgroSciences Smartstax vs Herculex XTRA and conventional corn, Sutherland, IA, 2010<sup>1,2</sup>

| Hybrid/Treatment <sup>3</sup> | Kernel Area Consumed (cm <sup>2</sup> ) <sup>4,5</sup> | Total Damaged Ears <sup>6,7</sup> |
|-------------------------------|--|-----------------------------------|
| Smartstax                     | 0.63a  | 12a                               |
| HXX/RR2                       | 2.40 b   | 38 b                              |
| Conventional                  | 2.69 b   | 40 b                              |

<sup>1</sup> Planted April 29, 2010; evaluated August 20, 2010

<sup>2</sup> All corn ears in row 2 and 3 of each plot were infested on July 28, 2010 with 40 CEW insects per ear using Bazooka inoculators

<sup>3</sup> Conventional- Mycogen X29624; HXX/RR2-Mycogen Herculex XTRA X20625; Smartstax - Mycogen 2D692

<sup>4</sup> Kernel area consumed based on 10 observations (10 ears/treatment)

<sup>5</sup> Means sharing a common letter do not differ significantly according to Ryan's Q Test ( $P \leq 0.05$ )

<sup>6</sup> Total damaged ears based on 40 observations (10 ears/trt x 4 replications)

<sup>7</sup> Means sharing a common letter do not differ significantly according to Ryan's Q Test ( $P \leq 0.05$ )

# APPENDIX I

## **Agronomic Information**

2010  
Field History Data

|                         | Ames, IA<br>Corn Rootworm Studies<br>(following trap crop)                              | Crawfordsville, IA<br>Corn Rootworm Studies<br>(following trap crop)                                    |
|-------------------------|---|---|
| Insecticide History     |   |   |
| 2009                    | No Insecticide (trap crop)  | No Insecticide (trap crop)  |
| 2008                    | No Insecticide (soybeans)   | Insecticide Test Plot   |
| 2007                    | Insecticide Test Plot   | No Insecticide (trap crop)  |
| 2006                    | No Insecticide (trap crop)  | Insecticide Test Plot   |
| Tillage                 | Fall-disk ripper;<br>Spring-field cultivation (2X)                                      | Fall-chisel;<br>Spring-disked and field cultivated  |
| Variety                 | Pioneer P1395XR,<br>Pioneer P1395HR,<br>Pioneer P0461XR,<br>Pioneer P0461R              | DKC61-69 & DKC61-72,<br>Mycogen 2T784, Mycogen 2T289,<br>Mycogen 2T777, Mycogen 2T789,<br>Mycogen 2T783 |
| Planting Date(s)        | May 10  | April 22  |
| Planting Rate           | 36,500 seeds/A  | 35,600 seeds/A  |
| Herbicide <sup>1</sup>  | 3 oz Balance Pro +<br>1 qt Atrazine +<br>1 pt Parallel-April 19;<br>5 oz Status-June 24 | 2.5 qt Harness Extra + 3 oz<br>Balance Pro-April 22   |
| Fertilizer <sup>2</sup> | <u>N</u> <u>P</u> <u>K</u>  | <u>N</u> <u>P</u> <u>K</u>  |
| Fall Applied            | ---    ---    ---   | ---    ---    ---   |
| Preplant                | 150    ---    ---   | 190    ---    ---   |
| Side-dress              |   |   |
| Dates                   |   |   |
| Stand Count             | June 2,3 & 8  | June 7  |
| Root Digging            | July 22,23  | July 26   |
| Lodging                 | October 1   | September 30  |
| Harvest                 | October 13  | October 8   |
| Soil Type               | Clay Loam   | Silty Clay Loam   |
| Soil Organic Matter %   | 3.7   | 5.1   |
| Soil pH                 | 5.6   | 4.9   |

<sup>1</sup> Expressed as formulation per acre.

<sup>2</sup> Expressed as pounds per acre. Spring-Preplant: 150 lbs actual nitrogen applied as urea on April 15 (Ames); Spring-Preplant 190 lbs actual nitrogen applied as anhydrous ammonia (82.5-0-0) on April 1 (Crawfordsville).

2010  
Field History Data

|                         | Nashua, IA<br>Corn Rootworm Studies<br>(following trap crop)  | Sutherland, IA<br>Syngenta Corn Rootworm Study<br>(following trap crop)  |
|-------------------------|---|--|
| Insecticide History     |   |  |
| 2009                    | No Insecticide (trap crop)  | No Insecticide (trap crop)   |
| 2008                    | Insecticide Test Plot   | Insecticide Test Plot  |
| 2007                    | No Insecticide (trap crop)  | No Insecticide (trap crop)   |
| 2006                    | Insecticide Test Plot   | Insecticide Test Plot  |
| Tillage                 | Fall-chopped stalks & chisel;<br>Spring-field cultivated  | Fall-chopped stalks & chisel;<br>Spring-disked & field cultivated  |
| Variety                 | DKC61-69 & DKC61-72,<br>Mycogen 2D692, Mycogen<br>X20625, Mycogen X29624,<br>Mycogen 2T789, Mycogen<br>2T783, Pioneer 33W84, DKC<br>NC6214NRR1, DKC61-19, DKC<br>NC6214QQR1 | Syngenta MIR162, MIR604, Bt11,<br>Herculex I, Herculex XTRA  |
| Planting Date(s)        | April 21  | April 29   |
| Planting Rate           | 35,600 seeds/A  | 35,600 seeds/A   |
| Herbicides <sup>1</sup> | 2.75 pt Harness-April 22;<br>2.5 pt Marksman-May 28   | 14 oz Outlook + 30 oz Atrazine-<br>April 30; ¾ oz Steadfast + ¼ oz<br>Accent + 2 oz Callisto + 2 lbs AMS<br>+ 16 oz COC-June 7 |
| Fertilizer <sup>2</sup> | <u>N</u> <u>P</u> <u>K</u>  | <u>N</u> <u>P</u> <u>K</u>   |
| Fall Applied            | ---    ---    ---   | ---    ---    ---  |
| Preplant                | 180    ---    ---   | 54    138    120   |
| Side-dress              |   | 150  |
| Dates                   |   |  |
| Stand Count             | June 1  | June 15  |
| Root Digging            | May 28  | July 28  |
| Lodging                 | October 7   | July 28  |
| Harvest                 | November 10   | October 15   |
| Soil Type               | Loam  | Silty Clay Loam  |
| Soil Organic Matter %   | 3.9   | 5.1  |
| Soil pH                 | 7.6   | 5.3  |

<sup>1</sup> Expressed as formulation per acre.

<sup>2</sup> Expressed as pounds per acre. Spring-preplant 180 lbs actual nitrogen applied as anhydrous ammonia (82.5-0-0) on April 4 (Nashua): Spring-preplant 54-138-120 applied on April 19 (Sutherland), 150 lbs N applied as 28% UAN on April 29 (Sutherland).

2010  
Field History Data

|                               | Sutherland, IA<br>Corn Earworm Study<br>(following corn)   | Ames, IA<br>Pioneer ECB OAM2 Study<br>(following soybeans) |
|-------------------------------|--|--|
| <b>Insecticide History</b>    |  |  |
| 2009                          | Corn   | No insecticide (SB's)                                      |
| 2008                          | Soybeans   | No insecticide (corn)                                      |
| 2007                          | Corn   | No insecticide (SB's)                                      |
| 2006                          | Corn   | No insecticide (corn)                                      |
| <b>Tillage</b>                |  |  |
|                               | Fall-chopped stalks & chisel<br>Spring-disked (2X) & field<br>cultivated (1X)  | Spring-field cultivation (2X)                              |
| <b>Variety</b>                |  |  |
|                               | Mycogen X29624,<br>Mycogen X20625,<br>Mycogen 2D692  | Pioneer P0461XR, Pioneer<br>P0461R, Pioneer X03B434YXR     |
| <b>Planting Date</b>          |  |  |
|                               | April 29   | May 17   |
| <b>Planting Rate</b>          |  |  |
|                               | 35,600 seeds/A   | 35,600 seeds/A   |
| <b>Herbicides<sup>1</sup></b> |  |  |
|                               | 14 oz Outlook + 30 oz Atrazine-<br>April 30; ¾ oz Steadfast + ¼ oz<br>Accent + 2 oz Callisto + 2 lbs<br>AMS + 16 oz COC-June 7 | 1 qt Parallel-April 21;<br>5 oz Status-June 24             |
| <b>Fertilizer<sup>2</sup></b> |  |  |
|                               | <u>N</u> <u>P</u> <u>K</u>   | <u>N</u> <u>P</u> <u>K</u>                                 |
| Fall Applied                  | ---    ---    ---  | ---    ---    ---  |
| Preplant                      | 36    92    90   | 150    ---    ---  |
|                               | 150    ---    ---  |  |
| <b>Dates</b>                  |  |  |
| Stand Count                   | June 15  | June 3   |
| ECB Scoring                   | -----  | July 21  |
| Stalk Rating                  | -----  | September 16   |
| CEW Evaluation                | August 20  | -----  |
| Harvest                       | -----  | October 13   |
| <b>Soil Type</b>              |  |  |
|                               | Silt   | Loam   |
| <b>Soil Organic Matter</b>    |  |  |
|                               | 3.9  | 4.1  |
| <b>Soil pH</b>                |  |  |
|                               | 5.7  | 5.8  |

<sup>1</sup> Expressed as formulation per acre.

<sup>2</sup> Expressed as pounds per acre. Spring-preplant 36-92-90 applied on April 19 (Sutherland), 150 lbs N applied as 28% UAN on April 29 (Sutherland). Spring-preplant 150 lbs actual nitrogen (urea) applied on April 15. (Ames)

2010  
Field History Data

|                               | Ames, IA<br>Bayer Yield study<br>(Following Soybeans) | Ames, IA<br>Bayer Yield study<br>(Following Soybeans) |
|-------------------------------|---|---|
| <b>Insecticide History</b>    |   |   |
| 2009                          | No insecticide (SB's)                                 | No insecticide (SB's)                                 |
| 2008                          | Warrior insecticide-POST (corn)                       | Warrior insecticide POST (corn)                       |
| 2007                          | Warrior insecticide-POST (SB's)                       | Warrior insecticide POST (SB's)                       |
| 2006                          | No insecticide (corn)                                 | No insecticide (corn)                                 |
| <b>Tillage</b>                | Spring-field cultivation (2X)                         | Spring-field cultivation (2X)                         |
| <b>Variety</b>                | Roundup Ready Hybrid                                  | Liberty Link Hybrid                                   |
| <b>Planting Date</b>          | May 17  | May 18  |
| <b>Planting Rate</b>          | 35,600 seeds/A  | 35,600 seeds/A  |
| <b>Herbicides<sup>1</sup></b> | 1 qt Parallel-April 21;<br>5 oz Status-June 24        | 1 qt Parallel-April 21;<br>5 oz Status-June 24        |
| <b>Fertilizer<sup>2</sup></b> | <u>N</u> <u>P</u> <u>K</u>                            | <u>N</u> <u>P</u> <u>K</u>                            |
| Fall Applied                  | ---   | ---   |
| Preplant                      | 130    ---    ---                                     | 130    ---    ---                                     |
| <b>Dates</b>                  |   |   |
| Stand Count                   | June 4  | June 4  |
| Root Digging                  | -----   | -----   |
| Lodging                       | -----   | -----   |
| Harvest                       | October 13  | October 13  |
| <b>Soil Type</b>              | Loam  | Loam  |
| <b>Soil Organic Matter %</b>  | 4.1   | 2.3   |
| <b>Soil pH</b>                | 5.8   | 7.1   |

<sup>1</sup> Expressed as formulation per acre.

<sup>2</sup> Expressed as pounds per acre. Spring-preplant 130 lbs actual nitrogen (urea) applied on April 13.

2010  
Field History Data

|                               | Nashua, IA<br>Bayer Yield study<br>(following corn) | Nashua, IA<br>Bayer Yield study<br>(following corn) |
|-------------------------------|---|---|
| <b>Insecticide History</b>    |   |   |
| 2009                          | No insecticide (corn)                               | No insecticide (corn)                               |
| 2008                          | No insecticide (SB's)                               | No insecticide (SB's)                               |
| 2007                          | No insecticide (corn)                               | No insecticide (corn)                               |
| 2006                          | No insecticide (SB's)                               | No insecticide (SB's)                               |
| <b>Tillage</b>                | Fall-chisel;<br>Spring-field cultivation            | Fall-chisel;<br>Spring-field cultivation            |
| <b>Variety</b>                | Roundup Ready Hybrid                                | Liberty Link Hybrid                                 |
| <b>Planting Date</b>          | April 20  | April 20  |
| <b>Planting Rate</b>          | 35,600 seeds/A                                      | 35,600 seeds/A                                      |
| <b>Herbicides<sup>1</sup></b> | 2.75 pt Harness-April 22;<br>2.5 pt Marksman-May 28 | 2.75 pt Harness-April 22;<br>2.5 pt Marksman-May 28 |
| <b>Fertilizer<sup>2</sup></b> | <u>N</u> <u>P</u> <u>K</u>                          | <u>N</u> <u>P</u> <u>K</u>                          |
| Fall Applied                  | ---    ---    ---                                   | ---    ---    ---                                   |
| Preplant                      | 180    ---    ---                                   | 180    ---    ---                                   |
| <b>Dates</b>                  |   |   |
| Stand Count                   | May 28  | May 28  |
| Root Digging                  | -----   | -----   |
| Lodging                       | -----   | -----   |
| Harvest                       | October 7   | October 7   |
| <b>Soil Type</b>              | Loam  | Loam  |
| <b>Soil Organic Matter %</b>  | 4.0   | 4.0   |
| <b>Soil pH</b>                | 6.6   | 6.6   |

<sup>1</sup> Expressed as formulation per acre.

<sup>2</sup> Expressed as pounds per acre. Spring-preplant 180 lbs actual nitrogen applied as anhydrous ammonia (82.5-0-0) on April 14.

2010  
Field History Data

|                               | Ames, IA<br>Black Cutworm<br>(following soybeans) | Ames, IA<br>Fall Armyworm<br>(following soybeans) |
|-------------------------------|---|---|
| <b>Insecticide History</b>    |   |   |
| 2009                          | No insecticide (SB's)                             | No insecticide (SB's)                             |
| 2008                          | No insecticide (corn)                             | No insecticide (corn)                             |
| 2007                          | No insecticide (SB's)                             | No insecticide (SB's)                             |
| 2006                          | No insecticide (corn)                             | No insecticide (corn)                             |
| <b>Tillage</b>                | Spring-field cultivation (2X)                     | Spring-field cultivation (2X)                     |
| <b>Variety</b>                | Mycogen 2T777; Mycogen 2T789; Mycogen 2T784       | Mycogen 2T777; Mycogen 2T789; Mycogen 2T784       |
| <b>Planting Date</b>          | May 26  | May 24  |
| <b>Planting Rate</b>          | 35,600 seeds/A                                    | 35,600 seeds/A                                    |
| <b>Herbicides<sup>1</sup></b> | 1 qt Parallel-April 21; 5 oz Status-June 24.      | 1 qt Parallel-April 21; 5 oz Status-June 24.      |
| <b>Fertilizer<sup>2</sup></b> | <u>N</u> <u>P</u> <u>K</u>                        | <u>N</u> <u>P</u> <u>K</u>                        |
| Fall Applied                  | ---    ---    ---                                 | ---    ---    ---                                 |
| Preplant                      | 150    ---    ---                                 | 150    ---    ---                                 |
| <b>Dates</b>                  |   |   |
| Stand Count                   | June 2  | June 4  |
| FAW Evaluation                | -----   | July 16   |
| BCW Evaluations               | June 11,18 & 25                                   | -----   |
| <b>Soil Type</b>              | Loam  | Loam  |
| <b>Soil Organic Matter %</b>  | 2.3   | 2.3   |
| <b>Soil pH</b>                | 7.1   | 7.1   |

<sup>1</sup> Expressed as formulation per acre.

<sup>2</sup> Expressed as pounds per acre. Spring-preplant 150 lbs actual nitrogen (urea) applied on April 15.

# APPENDIX II

## **Weather Data**

Ames<sup>1</sup>  
Rainfall and Temperature 2010

| Day        | May               |                  |                    | June              |                  |                    | July              |                  |                    |
|------------|-------------------|------------------|--------------------|-------------------|------------------|--------------------|-------------------|------------------|--------------------|
|            | Temp (°F)<br>High | Temp (°F)<br>Low | Rainfall<br>Inches | Temp (°F)<br>High | Temp (°F)<br>Low | Rainfall<br>Inches | Temp (°F)<br>High | Temp (°F)<br>Low | Rainfall<br>Inches |
| 1          | 69                | 45               | 0.02               | 85                | 57               | 0.60               | 82                | 60               |                    |
| 2          | 72                | 47               |                    | 74                | 59               |                    | 84                | 61               |                    |
| 3          | 67                | 42               | 0.09               | 79                | 55               | 0.04               | 88                | 66               |                    |
| 4          | 83                | 48               | 0.02               | 86                | 64               | 0.71               | 75                | 68               | 0.97               |
| 5          | 67                | 45               |                    | 82                | 57               | 0.20               | 77                | 68               | 0.07               |
| 6          | 65                | 39               | 0.24               | 81                | 54               |                    | 83                | 68               |                    |
| 7          | 55                | 41               |                    | 73                | 63               | 0.01               | 83                | 67               | 0.09               |
| 8          | 52                | 34               |                    | 79                | 62               | 0.66               | 80                | 65               |                    |
| 9          | 58                | 34               |                    | 82                | 59               | 0.01               | 86                | 63               |                    |
| 10         | 53                | 45               | 0.67               | 71                | 61               | 0.85               | 84                | 62               |                    |
| 11         | 53                | 45               | 0.36               | 85                | 65               | 0.17               | 81                | 67               | 0.12               |
| 12         | 50                | 42               | 1.34               | 82                | 66               | 1.22               | 77                | 66               | 0.24               |
| 13         | 55                | 45               | 0.11               | 70                | 61               | 0.83               | 85                | 65               | 0.01               |
| 14         | 69                | 41               |                    | 80                | 64               | 0.12               | 93                | 72               | 0.10               |
| 15         | 71                | 46               |                    | 76                | 60               | 0.01               | 83                | 66               |                    |
| 16         | 64                | 54               |                    | 83                | 56               |                    | 88                | 62               | 0.04               |
| 17         | 71                | 54               |                    | 89                | 63               | 0.43               | 91                | 66               |                    |
| 18         | 74                | 49               |                    | 79                | 60               | 0.47               | 84                | 64               | 0.63               |
| 19         | 75                | 52               |                    | 82                | 60               | 0.02               | 79                | 64               | 0.53               |
| 20         | 67                | 53               | 0.09               | 82                | 67               | 0.01               | 83                | 66               | 0.06               |
| 21         | 69                | 56               | 0.03               | 81                | 66               | 0.15               | 84                | 67               |                    |
| 22         | 84                | 53               | 0.01               | 90                | 67               | 0.09               | 90                | 70               | 0.28               |
| 23         | 84                | 71               |                    | 82                | 63               | 0.26               | 88                | 74               | 0.48               |
| 24         | 90                | 69               |                    | 81                | 62               |                    | 80                | 67               | 0.10               |
| 25         | 88                | 65               | 0.19               | 86                | 63               | 0.91               | 85                | 64               |                    |
| 26         | 82                | 62               |                    | 89                | 66               | 1.76               | 85                | 67               |                    |
| 27         | 84                | 57               | 0.01               | 80                | 66               | 1.57               | 90                | 71               |                    |
| 28         | 85                | 59               |                    | 78                | 62               |                    | 82                | 65               |                    |
| 29         | 85                | 60               |                    | 77                | 58               | 0.01               | 81                | 62               |                    |
| 30         | 88                | 59               | 0.09               | 80                | 56               |                    | 78                | 67               | 1.36               |
| 31         | 81                | 57               | 0.03               |                   |                  |                    | 86                | 67               | 0.01               |
| Mean/Total | 61.0              | 3.30             |                    | 71.1              | 11.11            |                    | 74.8              | 5.09             |                    |
| Normal     | 61.3              | 4.19             |                    | 70.4              | 4.76             |                    | 73.8              | 4.43             |                    |
| D.F.N.     | -0.3              | -0.89            |                    | 0.7               | 6.35             |                    | 1.0               | 0.66             |                    |

<sup>1</sup>Weather station located 5 miles WSW of test site.

Ames<sup>1</sup>  
Rainfall and Temperature 2010

| Day        | August    |      |                    | September |      |                    | October   |      |                    |
|------------|-----------|------|--------------------|-----------|------|--------------------|-----------|------|--------------------|
|            | Temp (°F) |      | Rainfall<br>Inches | Temp (°F) |      | Rainfall<br>Inches | Temp (°F) |      | Rainfall<br>Inches |
|            | High      | Low  |                    | High      | Low  |                    | High      | Low  |                    |
| 1          | 86        | 66   |                    | 80        | 64   | 0.05               | 77        | 45   |                    |
| 2          | 89        | 70   | 0.42               | 75        | 57   | 0.08               | 58        | 37   |                    |
| 3          | 88        | 70   | 0.71               | 70        | 53   | 0.01               | 60        | 34   |                    |
| 4          | 86        | 70   | 0.45               | 73        | 47   |                    | 64        | 37   |                    |
| 5          | 80        | 64   |                    | 80        | 55   | 0.02               | 71        | 38   |                    |
| 6          | 84        | 61   | 0.01               | 83        | 56   | 0.15               | 78        | 46   |                    |
| 7          | 86        | 66   | 0.30               | 73        | 54   |                    | 76        | 36   |                    |
| 8          | 92        | 70   | 2.72               | 76        | 46   |                    | 86        | 46   |                    |
| 9          | 85        | 70   | 1.34               | 73        | 61   |                    | 85        | 53   |                    |
| 10         | 89        | 69   | 3.42               | 70        | 61   | 0.51               | 81        | 52   |                    |
| 11         | 91        | 69   | 0.17               | 76        | 55   | 0.01               | 76        | 55   |                    |
| 12         | 93        | 73   | 0.01               | 86        | 53   |                    | 80        | 52   | 0.18               |
| 13         | 87        | 75   |                    | 82        | 56   | 0.01               | 67        | 43   |                    |
| 14         | 87        | 70   |                    | 82        | 54   |                    | 74        | 37   |                    |
| 15         | 78        | 61   |                    | 81        | 59   |                    | 66        | 40   | 0.64               |
| 16         | 82        | 58   |                    | 64        | 50   |                    | 72        | 44   |                    |
| 17         | 70        | 61   | 0.39               | 81        | 48   | 0.01               | 64        | 37   |                    |
| 18         | 81        | 58   | 0.01               | 65        | 47   | 0.50               | 62        | 40   |                    |
| 19         | 86        | 67   |                    | 55        | 45   | 0.29               | 63        | 36   |                    |
| 20         | 80        | 67   | 0.09               | 88        | 55   | 0.01               | 71        | 40   |                    |
| 21         | 90        | 69   |                    | 74        | 64   | 1.29               | 60        | 34   |                    |
| 22         | 90        | 68   |                    | 81        | 64   | 0.02               | 74        | 38   |                    |
| 23         | 87        | 67   | 0.01               | 77        | 55   | 0.71               | 71        | 56   | 0.09               |
| 24         | 77        | 59   | 0.01               | 70        | 53   |                    | 62        | 56   |                    |
| 25         | 77        | 55   | 0.01               | 53        | 45   | 0.64               | 68        | 49   | 0.01               |
| 26         | 82        | 54   |                    | 68        | 42   | 0.01               | 57        | 45   | 0.25               |
| 27         | 85        | 62   |                    | 71        | 42   |                    | 51        | 36   | 0.01               |
| 28         | 87        | 60   |                    | 73        | 54   |                    | 46        | 28   |                    |
| 29         | 91        | 62   |                    | 84        | 48   |                    | 63        | 23   |                    |
| 30         | 89        | 70   |                    | 74        | 53   |                    |           |      |                    |
| 31         | 86        | 67   | 3.17               |           |      |                    |           |      |                    |
| Mean/Total | 75.2      | 66.2 | 13.24              | 63.9      | 54.2 | 4.32               | 55.2      | 45.2 | 1.18               |
| Normal     | 71.5      | 61.5 | 4.55               | 64.2      | 52.2 | 3.00               | 52.2      | 42.2 | 2.37               |
| D.F.N.     | 3.7       | 3.7  | 8.69               | -0.3      | -0.3 | 1.32               | 3.0       | 3.0  | -1.19              |

<sup>1</sup>Weather station located 5 miles WSW of test site.

Crawfordsville<sup>1</sup>  
Rainfall and Temperature 2010

| Day        | April     |      |                    | May       |      |                    | June      |       |                    |
|------------|-----------|------|--------------------|-----------|------|--------------------|-----------|-------|--------------------|
|            | Temp (°F) |      | Rainfall<br>Inches | Temp (°F) |      | Rainfall<br>Inches | Temp (°F) |       | Rainfall<br>Inches |
|            | High      | Low  |                    | High      | Low  |                    | High      | Low   |                    |
| 1          | 80        | 49   |                    | 68        | 50   | 0.64               | 85        | 58    |                    |
| 2          | 69        | 47   |                    | 70        | 48   |                    | 79        | 61    | 1.40               |
| 3          | 63        | 40   | 0.58               | 72        | 46   | 0.69               | 81        | 62    | 0.02               |
| 4          | 69        | 41   |                    | 78        | 47   |                    | 84        | 62    | 0.10               |
| 5          | 72        | 41   | 0.37               | 69        | 45   |                    | 82        | 58    | 0.14               |
| 6          | 66        | 48   | 0.02               | 65        | 41   |                    | 81        | 55    | 0.53               |
| 7          | 55        | 37   | 0.15               | 53        | 42   | 1.00               | 77        | 58    |                    |
| 8          | 56        | 31   | 0.26               | 54        | 36   |                    | 79        | 60    | 0.22               |
| 9          | 68        | 33   |                    | 59        | 37   |                    | 81        | 60    | 0.38               |
| 10         | 72        | 43   |                    | 57        | 45   |                    | 81        | 61    |                    |
| 11         | 73        | 46   |                    | 55        | 45   | 1.22               | 85        | 66    | 0.49               |
| 12         | 78        | 47   |                    | 55        | 45   |                    | 79        | 67    | 0.90               |
| 13         | 82        | 49   |                    | 65        | 44   | 1.42               | 78        | 66    | 0.96               |
| 14         | 83        | 51   |                    | 67        | 45   | 0.02               | 79        | 64    | 1.04               |
| 15         | 76        | 50   |                    | 67        | 46   |                    | 79        | 62    |                    |
| 16         | 64        | 40   | 0.06               | 65        | 50   |                    | 84        | 60    | 0.44               |
| 17         | 66        | 33   |                    | 71        | 49   | 0.39               | 87        | 62    |                    |
| 18         | 68        | 37   |                    | 74        | 48   | 0.02               | 81        | 62    | 0.20               |
| 19         | 67        | 39   |                    | 74        | 50   |                    | 81        | 64    | 3.09               |
| 20         | 70        | 39   |                    | 68        | 53   |                    | 83        | 66    | 0.29               |
| 21         | 73        | 39   |                    | 72        | 55   | 0.33               | 85        | 65    |                    |
| 22         | 69        | 42   | 0.01               | 84        | 59   |                    | 89        | 64    | 0.90               |
| 23         | 60        | 48   |                    | 90        | 69   |                    | 86        | 64    | 0.71               |
| 24         | 63        | 52   | 0.53               | 90        | 67   |                    | 84        | 63    | 0.16               |
| 25         | 56        | 48   | 2.21               | 87        | 65   |                    | 87        | 64    |                    |
| 26         | 61        | 44   |                    | 84        | 61   | 0.41               | 88        | 66    | 0.49               |
| 27         | 63        | 39   | 0.13               | 85        | 58   |                    | 82        | 66    | 0.16               |
| 28         | 72        | 41   |                    | 85        | 55   |                    | 79        | 59    |                    |
| 29         | 79        | 53   |                    | 90        | 58   |                    | 79        | 56    |                    |
| 30         | 73        | 56   |                    | 89        | 61   |                    | 81        | 55    |                    |
| 31         |           |      |                    | 87        | 58   |                    |           |       |                    |
| Mean/Total | 56.2      | 4.32 |                    | 61.7      | 6.14 |                    | 72.0      | 12.62 |                    |
| Normal     | 51.5      | 3.64 |                    | 61.5      | 4.94 |                    | 70.8      | 4.63  |                    |
| D.F.N.     | 4.7       | 0.68 |                    | 0.2       | 1.20 |                    | 1.2       | 7.99  |                    |

<sup>1</sup>Weather station located at test site.

Crawfordsville<sup>1</sup>  
Rainfall and Temperature 2010

| Day        | July      |      |                    | August    |      |                    | September |      |                    |
|------------|-----------|------|--------------------|-----------|------|--------------------|-----------|------|--------------------|
|            | Temp (°F) |      | Rainfall<br>Inches | Temp (°F) |      | Rainfall<br>Inches | Temp (°F) |      | Rainfall<br>Inches |
|            | High      | Low  |                    | High      | Low  |                    | High      | Low  |                    |
| 1          | 83        | 57   |                    | 85        | 67   |                    | 81        | 62   | 2.36               |
| 2          | 86        | 57   |                    | 91        | 69   |                    | 79        | 57   | 0.10               |
| 3          | 88        | 62   |                    | 88        | 70   | 0.59               | 71        | 51   |                    |
| 4          | 81        | 70   |                    | 82        | 67   | 0.60               | 74        | 49   |                    |
| 5          | 83        | 70   |                    | 82        | 61   | 0.07               | 82        | 52   |                    |
| 6          | 86        | 70   | 0.22               | 84        | 60   |                    | 82        | 56   |                    |
| 7          | 83        | 69   | 0.57               | 87        | 67   |                    | 75        | 50   | 0.22               |
| 8          | 84        | 66   | 0.39               | 92        | 69   |                    | 76        | 49   |                    |
| 9          | 86        | 63   |                    | 90        | 70   | 0.69               | 76        | 55   |                    |
| 10         | 84        | 63   |                    | 91        | 69   | 0.12               | 75        | 55   |                    |
| 11         | 82        | 64   |                    | 91        | 69   | 0.77               | 79        | 54   | 0.52               |
| 12         | 84        | 63   | 0.05               | 92        | 71   |                    | 86        | 53   |                    |
| 13         | 89        | 66   | 0.48               | 88        | 70   | 0.57               | 85        | 58   |                    |
| 14         | 90        | 68   |                    | 86        | 67   | 1.11               | 82        | 54   |                    |
| 15         | 86        | 64   |                    | 81        | 62   |                    | 79        | 54   |                    |
| 16         | 89        | 64   |                    | 79        | 61   |                    | 69        | 51   |                    |
| 17         | 91        | 67   |                    | 74        | 61   |                    | 77        | 47   |                    |
| 18         | 84        | 66   | 0.07               | 85        | 62   | 0.30               | 64        | 52   | 0.48               |
| 19         | 80        | 64   |                    | 88        | 65   |                    | 67        | 51   | 1.84               |
| 20         | 85        | 66   | 0.76               | 87        | 68   |                    | 89        | 59   | 0.02               |
| 21         | 89        | 69   |                    | 87        | 67   | 0.11               | 83        | 63   |                    |
| 22         | 88        | 73   |                    | 89        | 65   |                    | 80        | 63   | 1.11               |
| 23         | 87        | 69   |                    | 84        | 60   |                    | 80        | 62   |                    |
| 24         | 85        | 67   | 0.60               | 80        | 54   |                    | 67        | 50   | 0.66               |
| 25         | 86        | 65   | 0.16               | 79        | 52   |                    | 56        | 44   |                    |
| 26         | 86        | 65   |                    | 81        | 53   |                    | 67        | 41   | 0.83               |
| 27         | 89        | 66   |                    | 85        | 58   |                    | 70        | 40   |                    |
| 28         | 87        | 63   |                    | 89        | 56   |                    | 75        | 46   |                    |
| 29         | 83        | 62   | 0.01               | 90        | 63   |                    | 79        | 44   |                    |
| 30         | 80        | 66   |                    | 86        | 68   |                    | 76        | 45   |                    |
| 31         | 87        | 67   | 0.64               | 84        | 67   |                    |           |      |                    |
| Mean/Total | 75.5      | 3.95 |                    | 74.9      | 4.93 |                    | 64.1      | 8.14 |                    |
| Normal     | 73.7      | 3.48 |                    | 72.2      | 4.69 |                    | 64.8      | 2.66 |                    |
| D.F.N.     | 1.8       | 0.47 |                    | 2.7       | 0.24 |                    | -0.7      | 5.48 |                    |

<sup>1</sup>Weather station located at test site.

Crawfordsville<sup>1</sup>  
Rainfall and Temperature 2010

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| Day | October           |     | Rainfall<br>Inches |
|-----|-------------------|-----|--------------------|
|     | Temp (°F)<br>High | Low |                    |
| 1   | 72                | 40  |                    |
| 2   | 59                | 36  | 0.06               |
| 3   | 61                | 32  |                    |
| 4   | 66                | 32  |                    |
| 5   | 73                | 35  |                    |
| 6   | 80                | 38  |                    |
| 7   | 78                | 40  |                    |
| 8   | 85                | 42  |                    |
| 9   | 87                | 48  |                    |
| 10  | 83                | 46  |                    |
| 11  | 80                | 47  |                    |
| 12  | 79                | 46  |                    |
| 13  | 69                | 42  |                    |
| 14  | 70                | 35  |                    |
| 15  | 68                | 37  |                    |
| 16  | 74                | 37  |                    |
| 17  | 66                | 37  |                    |
| 18  | 63                | 36  |                    |
| 19  | 66                | 33  |                    |
| 20  | 69                | 39  |                    |
| 21  | 62                | 32  |                    |
| 22  | 71                | 37  |                    |
| 23  | 69                | 55  | 0.67               |
| 24  | 66                | 54  | 0.19               |
| 25  | 70                | 49  |                    |
| 26  | 62                | 46  | 0.12               |
| 27  | 54                | 36  |                    |
| 28  | 47                | 26  |                    |
| 29  | 60                | 28  |                    |
| 30  | 63                | 35  |                    |
| 31  | 54                | 29  |                    |

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|            |      |       |
|------------|------|-------|
| Mean/Total | 53.7 | 1.04  |
| Normal     | 51.9 | 3.32  |
| D.F.N.     | 1.8  | -2.28 |

<sup>1</sup>Weather station located at test site.

Nashua<sup>1</sup>  
Rainfall and Temperature 2010

| Day        | April     |       |                    | May       |       |                    | June      |      |                    |
|------------|-----------|-------|--------------------|-----------|-------|--------------------|-----------|------|--------------------|
|            | Temp (°F) |       | Rainfall<br>Inches | Temp (°F) |       | Rainfall<br>Inches | Temp (°F) |      | Rainfall<br>Inches |
|            | High      | Low   |                    | High      | Low   |                    | High      | Low  |                    |
| 1          | 85        | 50    |                    | 68        | 48    |                    | 85        | 55   |                    |
| 2          | 68        | 43    |                    | 72        | 47    |                    | 77        | 57   | 0.12               |
| 3          | 63        | 33    |                    | 65        | 43    |                    | 79        | 55   |                    |
| 4          | 64        | 44    |                    | 84        | 45    | 0.21               | 82        | 63   | 0.45               |
| 5          | 67        | 35    |                    | 65        | 44    |                    | 80        | 56   | 0.59               |
| 6          | 51        | 45    |                    | 62        | 41    |                    | 78        | 53   |                    |
| 7          | 49        | 39    |                    | 53        | 39    | 0.14               | 79        | 53   |                    |
| 8          | 50        | 29    |                    | 50        | 35    | T                  | 72        | 61   | 0.28               |
| 9          | 67        | 27    |                    | 56        | 31    | 0.01               | 79        | 58   |                    |
| 10         | 63        | 40    |                    | 57        | 44    | 0.62               | 72        | 59   | 0.26               |
| 11         | 68        | 40    |                    | 49        | 42    | 0.50               | 85        | 64   | 0.65               |
| 12         | 56        | 46    |                    | 50        | 42    | 1.18               | 78        | 63   | 0.64               |
| 13         | 75        | 46    |                    | 56        | 44    | 0.35               | 68        | 62   | 0.15               |
| 14         | 81        | 51    | 0.03               | 68        | 40    |                    | 70        | 62   | 0.01               |
| 15         | 79        | 51    | 0.29               | 71        | 42    |                    | 77        | 59   | 0.26               |
| 16         | 61        | 40    |                    | 68        | 52    |                    | 82        | 58   |                    |
| 17         | 63        | 32    |                    | 72        | 51    |                    | 86        | 63   | 1.26               |
| 18         | 68        | 35    |                    | 70        | 46    |                    | 74        | 62   | 0.37               |
| 19         | 64        | 43    |                    | 78        | 46    |                    | 79        | 56   |                    |
| 20         | 69        | 39    |                    | 74        | 50    | 0.10               | 82        | 63   |                    |
| 21         | 73        | 41    |                    | 64        | 53    | 0.02               | 80        | 64   | T                  |
| 22         | 71        | 40    |                    | 81        | 51    |                    | 89        | 60   |                    |
| 23         | 59        | 48    | 0.23               | 86        | 70    |                    | 81        | 61   | 1.67               |
| 24         | 66        | 51    | 0.55               | 92        | 71    |                    | 82        | 60   |                    |
| 25         | 52        | 49    | 0.01               | 87        | 66    |                    | 85        | 61   | 0.54               |
| 26         | 59        | 46    |                    | 83        | 60    | T                  | 86        | 66   |                    |
| 27         | 59        | 39    |                    | 83        | 53    |                    | 81        | 66   | 1.34               |
| 28         | 67        | 34    |                    | 85        | 54    |                    | 72        | 56   |                    |
| 29         | 80        | 53    |                    | 88        | 56    |                    | 74        | 53   |                    |
| 30         | 68        | 55    | 1.11               | 91        | 60    |                    | 78        | 52   |                    |
| 31         |           |       |                    | 80        | 57    | 0.01               |           |      |                    |
| Mean/Total | 53.8      | 2.22  |                    | 60.2      | 3.14  |                    | 69.2      | 8.59 |                    |
| Normal     | 47.5      | 3.57  |                    | 59.2      | 4.52  |                    | 68.5      | 4.62 |                    |
| D.F.N.     | 6.3       | -1.35 |                    | 1.0       | -1.38 |                    | 0.7       | 4.97 |                    |

<sup>1</sup>Weather station located at test site.

Nashua<sup>1</sup>  
Rainfall and Temperature 2010

| Day        | July      |      |                    | August    |       |                    | September |       |                    |
|------------|-----------|------|--------------------|-----------|-------|--------------------|-----------|-------|--------------------|
|            | Temp (°F) |      | Rainfall<br>Inches | Temp (°F) |       | Rainfall<br>Inches | Temp (°F) |       | Rainfall<br>Inches |
|            | High      | Low  |                    | High      | Low   |                    | High      | Low   |                    |
| 1          | 80        | 58   |                    | 86        | 63    |                    | 79        | 63    |                    |
| 2          | 83        | 58   |                    | 92        | 69    | 0.05               | 78        | 55    | 0.30               |
| 3          | 87        | 65   |                    | 87        | 71    |                    | 66        | 48    |                    |
| 4          | 76        | 69   | 1.22               | 86        | 69    |                    | 70        | 43    |                    |
| 5          | 77        | 68   | 0.02               | 78        | 60    |                    | 79        | 47    | T                  |
| 6          | 83        | 69   |                    | 81        | 57    |                    | 81        | 56    | 0.20               |
| 7          | 81        | 67   | 1.02               | 85        | 64    |                    | 71        | 50    |                    |
| 8          | 79        | 65   |                    | 91        | 68    |                    | 72        | 42    | 0.07               |
| 9          | 84        | 60   |                    | 87        | 69    | 1.14               | 73        | 55    | 0.14               |
| 10         | 83        | 65   |                    | 89        | 69    | 0.40               | 78        | 56    |                    |
| 11         | 79        | 65   | 0.02               | 91        | 66    |                    | 74        | 55    |                    |
| 12         | 77        | 63   | T                  | 92        | 72    |                    | 86        | 50    |                    |
| 13         | 83        | 63   |                    | 87        | 72    |                    | 78        | 51    |                    |
| 14         | 92        | 72   | 0.14               | 87        | 68    |                    | 79        | 50    | 0.05               |
| 15         | 82        | 64   |                    | 77        | 59    | 0.01               | 82        | 58    |                    |
| 16         | 86        | 64   |                    | 80        | 54    |                    | 66        | 51    | 0.09               |
| 17         | 89        | 60   | T                  | 69        | 59    | T                  | 78        | 49    | 0.03               |
| 18         | 83        | 66   | 0.05               | 80        | 60    |                    | 61        | 48    | 0.03               |
| 19         | 78        | 61   | T                  | 85        | 64    |                    | 58        | 48    |                    |
| 20         | 84        | 59   |                    | 85        | 67    | T                  | 89        | 52    | 0.12               |
| 21         | 85        | 62   |                    | 88        | 65    |                    | 74        | 61    | 0.03               |
| 22         | 84        | 70   | 1.42               | 89        | 63    |                    | 70        | 58    | 0.37               |
| 23         | 87        | 69   | 0.31               | 86        | 65    |                    | 79        | 56    |                    |
| 24         | 80        | 64   | 1.91               | 75        | 54    | T                  | 67        | 48    | 0.27               |
| 25         | 83        | 61   |                    | 73        | 51    |                    | 52        | 43    |                    |
| 26         | 84        | 64   |                    | 79        | 49    |                    | 65        | 39    |                    |
| 27         | 89        | 70   |                    | 85        | 59    |                    | 72        | 38    |                    |
| 28         | 80        | 62   | 0.41               | 86        | 60    |                    | 71        | 49    |                    |
| 29         | 80        | 59   |                    | 91        | 60    |                    | 83        | 46    |                    |
| 30         | 77        | 65   | 0.54               | 87        | 70    |                    | 72        | 49    |                    |
| 31         | 85        | 63   |                    | 84        | 66    | 1.42               |           |       |                    |
| Mean/Total | 73.3      | 7.06 |                    | 73.8      | 3.02  |                    | 61.9      | 1.70  |                    |
| Normal     | 71.9      | 4.62 |                    | 69.7      | 4.67  |                    | 62.0      | 3.17  |                    |
| D.F.N.     | 1.4       | 2.38 |                    | 4.1       | -1.65 |                    | -0.1      | -1.47 |                    |

<sup>1</sup>Weather station located at test site.

Nashua<sup>1</sup>  
Rainfall and Temperature 2010

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| Day | October           |     | Rainfall<br>Inches |
|-----|-------------------|-----|--------------------|
|     | Temp (°F)<br>High | Low |                    |
| 1   | 75                | 41  | 0.03               |
| 2   | 55                | 35  |                    |
| 3   | 61                | 31  |                    |
| 4   | 65                | 34  |                    |
| 5   | 72                | 36  |                    |
| 6   | 77                | 45  |                    |
| 7   | 78                | 41  |                    |
| 8   | 86                | 46  |                    |
| 9   | 89                | 55  |                    |
| 10  | 81                | 52  |                    |
| 11  | 81                | 51  |                    |
| 12  | 81                | 50  |                    |
| 13  | 66                | 40  |                    |
| 14  | 73                | 34  |                    |
| 15  | 65                | 36  |                    |
| 16  | 71                | 42  |                    |
| 17  | 63                | 36  |                    |
| 18  | 60                | 36  |                    |
| 19  | 63                | 32  |                    |
| 20  | 71                | 38  |                    |
| 21  | 56                | 32  |                    |
| 22  | 68                | 31  |                    |
| 23  | 35                | 55  | 0.05               |
| 24  | 62                | 54  |                    |
| 25  | 65                | 53  |                    |
| 26  | 64                | 42  | 0.35               |
| 27  | 48                | 38  |                    |
| 28  | 40                | 24  |                    |
| 29  | 58                | 21  |                    |
| 30  | 62                | 33  |                    |
| 31  | 50                | 29  |                    |

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|            |      |       |
|------------|------|-------|
| Mean/Total | 53.1 | 0.43  |
| Normal     | 49.2 | 2.68  |
| D.F.N.     | 3.9  | -2.25 |

<sup>1</sup>Weather station located at test site.

Sutherland<sup>1</sup>  
Rainfall and Temperature 2010

| Day        | April     |     |                    | May       |     |                    | June      |     |                    |
|------------|-----------|-----|--------------------|-----------|-----|--------------------|-----------|-----|--------------------|
|            | Temp (°F) |     | Rainfall<br>Inches | Temp (°F) |     | Rainfall<br>Inches | Temp (°F) |     | Rainfall<br>Inches |
|            | High      | Low |                    | High      | Low |                    | High      | Low |                    |
| 1          | 82        | 45  |                    | 67        | 41  |                    | 82        | 57  | 0.16               |
| 2          | 65        | 37  |                    | 69        | 37  |                    | 73        | 49  |                    |
| 3          | 64        | 29  |                    | 65        | 36  |                    | 80        | 46  |                    |
| 4          | 63        | 37  |                    | 82        | 42  |                    | 84        | 61  | 0.50               |
| 5          | 63        | 33  |                    | 60        | 36  |                    | 77        | 55  | 0.04               |
| 6          | 50        | 40  | 0.03               | 55        | 34  |                    | 79        | 54  |                    |
| 7          | 52        | 32  | 0.23               | 47        | 38  | 0.58               | 71        | 59  |                    |
| 8          | 57        | 25  |                    | 53        | 32  |                    | 75        | 58  | 0.40               |
| 9          | 71        | 31  |                    | 58        | 30  |                    | 80        | 54  |                    |
| 10         | 63        | 32  |                    | 52        | 43  | 0.08               | 74        | 58  |                    |
| 11         | 70        | 31  |                    | 46        | 41  | 1.16               | 80        | 63  | 2.31               |
| 12         | 63        | 48  | 0.12               | 47        | 41  | 0.25               | 73        | 59  |                    |
| 13         | 78        | 48  | 0.10               | 52        | 42  | 0.19               | 66        | 58  | 0.50               |
| 14         | 69        | 56  |                    | 69        | 38  |                    | 66        | 59  | 0.28               |
| 15         | 69        | 46  | 0.26               | 71        | 42  |                    | 71        | 56  |                    |
| 16         | 60        | 36  |                    | 71        | 44  |                    | 85        | 52  |                    |
| 17         | 63        | 32  |                    | 72        | 48  |                    | 89        | 64  |                    |
| 18         | 65        | 34  |                    | 77        | 46  |                    | 82        | 58  | 0.23               |
| 19         | 68        | 40  |                    | 77        | 44  |                    | 83        | 55  |                    |
| 20         | 71        | 38  |                    | 75        | 49  |                    | 81        | 64  |                    |
| 21         | 73        | 42  |                    | 71        | 54  | 0.11               | 80        | 64  | 0.30               |
| 22         | 73        | 39  |                    | 87        | 56  |                    | 87        | 64  | 0.15               |
| 23         | 56        | 44  |                    | 89        | 71  |                    | 77        | 60  | 2.79               |
| 24         | 72        | 52  |                    | 92        | 65  |                    | 79        | 56  |                    |
| 25         | 54        | 46  |                    | 80        | 54  |                    | 86        | 61  |                    |
| 26         | 47        | 41  | 0.35               | 82        | 55  |                    | 89        | 66  | 1.41               |
| 27         | 62        | 36  | 0.38               | 86        | 49  |                    | 80        | 62  | 4.55               |
| 28         | 69        | 40  |                    | 88        | 53  |                    | 76        | 55  |                    |
| 29         | 76        | 53  |                    | 89        | 60  |                    | 75        | 51  |                    |
| 30         | 66        | 45  | 0.15               | 72        | 49  |                    | 80        | 54  |                    |
| 31         |           |     |                    | 81        | 43  | 0.08               |           |     |                    |
| Mean/Total | 52.4      |     | 1.62               | 58.0      |     | 2.45               | 68.2      |     | 13.62              |
| Normal     | 47.3      |     | 3.25               | 59.9      |     | 3.58               | 69.2      |     | 4.60               |
| D.F.N.     | 5.1       |     | -1.63              | 1.9       |     | -1.13              | -1.0      |     | 9.02               |

<sup>1</sup>Weather station located at test site.

Sutherland<sup>1</sup>  
Rainfall and Temperature 2010

| Day        | July      |       |                    | August    |      |                    | September |      |                    |
|------------|-----------|-------|--------------------|-----------|------|--------------------|-----------|------|--------------------|
|            | Temp (°F) |       | Rainfall<br>Inches | Temp (°F) |      | Rainfall<br>Inches | Temp (°F) |      | Rainfall<br>Inches |
|            | High      | Low   |                    | High      | Low  |                    | High      | Low  |                    |
| 1          | 82        | 60    |                    | 84        | 64   | 0.45               | 76        | 55   |                    |
| 2          | 84        | 61    |                    | 84        | 64   | 0.48               | 70        | 54   | 0.16               |
| 3          | 85        | 69    |                    | 84        | 66   |                    | 68        | 48   |                    |
| 4          | 78        | 67    |                    | 84        | 65   |                    | 73        | 44   |                    |
| 5          | 79        | 65    |                    | 78        | 59   |                    | 78        | 53   |                    |
| 6          | 84        | 66    | 0.24               | 83        | 57   |                    | 76        | 53   |                    |
| 7          | 80        | 61    |                    | 84        | 64   |                    | 70        | 48   |                    |
| 8          | 80        | 59    | 0.69               | 90        | 69   |                    | 69        | 45   |                    |
| 9          | 83        | 57    |                    | 80        | 67   | 0.66               | 73        | 58   | 0.99               |
| 10         | 84        | 59    |                    | 87        | 68   | 0.84               | 67        | 58   |                    |
| 11         | 82        | 63    |                    | 91        | 69   |                    | 77        | 50   | 0.26               |
| 12         | 74        | 61    | 0.09               | 89        | 68   |                    | 85        | 51   |                    |
| 13         | 84        | 61    |                    | 86        | 68   | 0.06               | 77        | 50   |                    |
| 14         | 89        | 63    |                    | 84        | 59   |                    | 79        | 54   |                    |
| 15         | 83        | 56    |                    | 77        | 56   |                    | 79        | 56   |                    |
| 16         | 87        | 59    |                    | 80        | 52   |                    | 65        | 51   |                    |
| 17         | 90        | 61    |                    | 75        | 59   |                    | 73        | 52   |                    |
| 18         | 82        | 64    |                    | 77        | 59   |                    | 57        | 42   |                    |
| 19         | 79        | 62    | 0.16               | 84        | 66   |                    | 56        | 45   | 0.25               |
| 20         | 84        | 61    | 0.28               | 85        | 68   | 0.05               | 88        | 52   |                    |
| 21         | 82        | 59    |                    | 90        | 65   |                    | 76        | 59   | 0.09               |
| 22         | 85        | 67    | 4.40               | 88        | 66   |                    | 78        | 54   |                    |
| 23         | 86        | 66    | 0.08               | 84        | 65   |                    | 73        | 51   | 0.74               |
| 24         | 80        | 61    |                    | 76        | 52   | 0.69               | 67        | 48   | 0.64               |
| 25         | 81        | 58    |                    | 76        | 50   |                    | 67        | 47   |                    |
| 26         | 82        | 62    | 0.32               | 80        | 54   |                    | 67        | 42   | 0.68               |
| 27         | 88        | 70    |                    | 80        | 56   |                    | 77        | 45   |                    |
| 28         | 78        | 61    | 0.23               | 83        | 59   |                    | 75        | 49   |                    |
| 29         | 75        | 61    |                    | 86        | 62   |                    | 78        | 50   |                    |
| 30         | 83        | 64    | 2.26               | 79        | 72   |                    | 73        | 45   |                    |
| 31         | 89        | 63    |                    | 82        | 61   | 0.16               |           |      |                    |
| Mean/Total | 72.4      | 60.3  | 8.75               | 72.6      | 64.3 | 3.39               | 61.6      | 50.3 | 3.81               |
| Normal     | 72.7      | 61.0  | 4.35               | 70.6      | 61.0 | 4.13               | 62.3      | 50.0 | 2.84               |
| D.F.N.     | - 0.3     | - 0.7 | 4.40               | 2.0       | 3.3  | -0.74              | -0.7      | 0.3  | 0.97               |

<sup>1</sup>Weather station located at test site.

Sutherland<sup>1</sup>  
Rainfall and Temperature 2010

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| Day        | October   |     | Rainfall<br>Inches |
|------------|-----------|-----|--------------------|
|            | Temp (°F) |     |                    |
|            | High      | Low |                    |
| 1          | 79        | 45  |                    |
| 2          | 59        | 37  |                    |
| 3          | 61        | 32  |                    |
| 4          | 33        | 37  |                    |
| 5          | 75        | 44  |                    |
| 6          | 77        | 43  |                    |
| 7          | 75        | 32  |                    |
| 8          | 88        | 49  |                    |
| 9          | 82        | 51  |                    |
| 10         | 80        | 49  |                    |
| 11         | 79        | 49  |                    |
| 12         | 72        | 40  |                    |
| 13         | 65        | 35  |                    |
| 14         | 70        | 34  |                    |
| 15         | 67        | 32  |                    |
| 16         | 67        | 37  |                    |
| 17         | 60        | 34  |                    |
| 18         | 60        | 33  |                    |
| 19         | 63        | 31  |                    |
| 20         | 70        | 35  |                    |
| 21         | 61        | 29  |                    |
| 22         | 76        | 36  |                    |
| 23         | 73        | 54  |                    |
| 24         | 58        | 52  |                    |
| 25         | 63        | 49  | 0.14               |
| 26         | 49        | 40  | 0.62               |
| 27         | 44        | 34  |                    |
| 28         | 44        | 23  | 0.05               |
| 29         | 65        | 24  |                    |
| 30         | 60        | 34  |                    |
| 31         | 50        | 31  |                    |
| Mean/Total | 52.3      |     | 0.81               |
| Normal     | 50.1      |     | 2.12               |
| D.F.N.     | 2.2       |     | -1.31              |

# APPENDIX III

## **Materials Tested**

| <b>Materials Tested in 2010 Iowa State University Efficacy Studies</b> |   |  |                   |
|--|---|--|-------------------|
| <b>Common/code name</b>  | <b>Formulation</b>  | <b>Chemical name</b>   | <b>Company</b>    |
| A1,A2,A3,A4,A5,A6,A7   | N/A   | See tables "25 thru 32"  | Bayer CropScience |
| Aztec  | 2.1G  | tebupirimphos & cyfluthrin   | Bayer CropScience |
| Aztec  | 4.67G   | tebupirimphos & cyfluthrin   | AMVAC Chem. Corp. |
| Counter  | 20G   | terbufos   | AMVAC Chem. Corp. |
| Cruiser  | Commercially applied seed trt (0.25 mg/sd)  | thiamethoxam   | Syngenta          |
| Cruiser Extreme 250  | Commercially applied seed trt (0.25 mg/sd)  | thiamethoxam+ three fungicides (Maxim XL+Apron XL and Dynasty)   | Syngenta          |
| DKC61-69 (YieldGard Plus with commercial seed trt)                     | Transgenic seedcorn (YGRW+YGCB+RR2) + commercially applied Poncho 250             | Cry3Bb1 (MON 863) + Cry1Ab (MON810) + Roundup Ready Corn 2 + fludioxonil & mefenoxam fungicides + clothianidin seed trt (0.25 mg/seed) | Monsanto          |
| DKC61-72   | DKC61-72 (RR2) "true isoline seed" of DKC61-69 + commercially applied Poncho 250. | Roundup Ready Corn 2 + fludioxonil & mefenoxam fungicides + clothianidin seed trt (0.25 mg/seed)                                       | Monsanto          |
| Force  | 3G  | tefluthrin   | Syngenta          |
| Force  | 250CS   | tefluthrin   | Syngenta          |
| Mycogen 2T784 (Smartstax) with Cruiser Extreme 250 seed trt            | Dow Background  | Cry34AB1 & Cry35Ab1 + Cry1F + Cry38b1 + Cry1A.105 + Cry 2Ab2 + RR2 + Liberty Link + thiamethoxam seed trt (0.25 mg/seed)               | Dow Background    |
| Mycogen 2D692 (Smartstax) with Cruiser Extreme 250 seed trt            | Dow Background  | Cry34AB1 & Cry35Ab1 + Cry1F + Cry38b1 + Cry1A.105 + Cry 2Ab2 + RR2 + Liberty Link + thiamethoxam seed trt (0.25 mg/seed)               | Dow Background    |
| Mycogen 2T777  | Mycogen 2T777 "true isoline seed" of Mycogen 2T789                                | Roundup Ready 2 Corn + Thiamethoxam seed trt (0.25 mg/seed)  | Dow AgroSciences  |
| Mycogen X29624 (Conventional)  | Dow Background  | Thiamethoxam seed trt (0.25 mg/seed)   | Dow AgroSciences  |
| Mycogen 2T789 (Herculex/RR) with Cruiser Extreme 250 seed trt          | Dow Background  | Cry34AB1 & Cry35Ab1 + Cry1F + RR2 + thiamethoxam seed trt (0.25 mg/seed)   | Dow AgroSciences  |
| Mycogen X20625 (Herculex/RR) with Cruiser Extreme 250 seed trt         | Dow Background  | Cry34AB1 & Cry35Ab1 + Cry1F + RR2 + thiamethoxam seed trt (0.25 mg/seed)   | Dow AgroSciences  |
| NC62-14NRR1  | RR2 + commercially applied Poncho 250   | Roundup Ready 2 Corn + mefenoxam fungicide + Clothianidin seed trt (0.25 mg/seed)  | Monsanto          |

| <b>Materials Tested for 2010 (Continued)</b>                    |  |   |                                     |
|---|--|---|-------------------------------------|
| <b>Common/code name</b>   | <b>Formulation</b>   | <b>Chemical name</b>  | <b>Company</b>                      |
| NC6214QQR1  | Transgenic seedcorn (CRW/RR2(VT)) +BT (VT)+CRW (HXRW)+BT (HX1) commercially applied Poncho 250 | Cry3Bb1 & RR2 (MON 88017) + Cry1A.105&Cry2Ab2(MON89034) +Cry34Ab1&Cry35Ab1(DAS59122) +Cry1F&LL(TC1507)+ fludioxonil & mefenoxam fungicides + clothianidin seed trt (0.25 mg/seed) | Monsanto                            |
| Pioneer P0461XR (Herculex XTRA) with Cruiser 250 seed treatment | Pioneer Background   | Cry34AB1 & Cry35Ab1 + Cry1F + mefenoxam fungicide + thiamethoxam seed trt (0.25 mg/seed)  | Pioneer Hi-Bred International, Inc. |
| Pioneer P0461R (RR2) with Poncho 1250 seed treatment            | Pioneer P0461R “true isoline seed” of Pioneer P0461XR  | Roundup Ready Corn 2 + mefenoxam fungicide + thiamethoxam seed trt (1.25 mg/seed)   | Pioneer Hi-Bred International, Inc  |
| Pioneer X03B434YXR (pyramid) with Cruiser 250 seed treatment    | Pioneer Background   | Cry34Ab1 & Cry35Ab1 + Cry1F + Cry1Ab + mefenoxam fungicide + thiamethoxam seed trt (0.25 mg/seed)   | Pioneer Hi-Bred International, Inc  |
| Pioneer 33W84 (RR2/HXX/LL) with Cruiser 250 seed treatment      | Pioneer Background   | Cry34Ab1 & Cry35Ab1 + Cry1F + RR2 + Liberty Link + mefenoxam fungicide + thiamethoxam seed trt (0.25 mg/seed)   | Pioneer Hi-Bred International, Inc  |
| Pioneer P1395HR (HX1) with Cruiser 250 seed treatment           | Pioneer P1395HR “near isoline seed” of Pioneer P1395XR   | mefenoxam fungicide + Clothianidin + s thiamethoxam seed trt (0.25 mg/seed)   | Pioneer Hi-Bred International, Inc  |
| Pioneer P1395XR (Herculex XTRA) with Cruiser 250 seed treatment | Pioneer Background   | Cry34AB1 & Cry35Ab1 + Cry1F + mefenoxam fungicide + thiamethoxam seed trt (0.25 mg/seed)  | Pioneer Hi-Bred International, Inc. |
| Poncho 250  | Commercially applied seed trt (0.25 mg/seed)   | clothianidin  | Bayer CropScience                   |
| Poncho 1250   | Commercially applied seed trt (1.25 mg/seed)   | clothianidin  | Bayer CropScience                   |
| SmartChoice   | 5G   | Chlorethoxyfos  | AMVAC Chem. Corp                    |

# APPENDIX IV

## Research Pictures



