

IOWA STATE UNIVERSITY
OF SCIENCE AND TECHNOLOGY

2008 EVALUATION OF INSECTICIDES AND
PLANT-INCORPORATED PROTECTANTS

DEPARTMENT OF ENTOMOLOGY
AMES, IOWA 50011-3140
LES LEWIS, CHAIR

INSECTS INVESTIGATED

Corn Rootworm

Wireworm

Seedcorn Maggot

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IOWA STATE UNIVERSITY

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TABLE OF CONTENTS

	<u>Page</u>
1. Research Personnel	1
2. Introduction and Objective	2
3. Testing Procedures and Evaluations.....	2
4. Product Test Information.....	10
5. Corn Rootworm Evaluation Tables	
<i>Ames</i>	
<i>Yield Study</i>	
Root Injury/% Consistency	11
Stand Count	12
Percent Lodging	13
Yield	14
<i>Crawfordsville</i>	
<i>Experimental Study</i>	
Root Injury/% Consistency	15
Stand Count	16
<i>Pioneer-Herculex XTRA Study</i>	
Root Injury/% Consistency	17
Stand Count/%Lodging/Yield.....	17
<i>Bayer Strip Study</i>	
Root Injury/%Consistency/%Lodging	18
Stand Count	18

Table of Contents (Continued)

Page

Nashua

Yield Study

Root Injury/% Consistency	19
Stand Count	20
Percent Lodging	21
Yield	22

Sutherland

Monsanto-Bayer Yield Study

Root Injury/% Consistency	23
Stand Count/% Lodging/Yield.....	23

6. Seed Treatment/Fungicide Evaluation Tables

Ames

Bayer Yield Study

Stand Count	24 & 25
Yield	26 & 27

Nashua

Bayer Yield Study

Stand Count	28 & 29
Yield	30 & 31

7. Wireworm Insecticide Evaluation Tables

Rhodes-ISU Farm

Wireworm Study

Stand Count	32
Percent Damage and Damage Rating...	33

8. Seedcorn Maggot Insecticide Evaluation Tables

Ames

Seedcorn Maggot Study

Stand Count	34
Percent Damage and Damage Rating...	34

9. Appendix I - Agronomic Information 35

10. Appendix II – Weather Data..... 40

11. Appendix III - Materials Tested 50

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INTRODUCTION

The corn rootworm species *Diabrotica virgifera virgifera* (western corn rootworm) and *D. barberi* (northern corn rootworm) 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 both 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)).

Wireworms are a very sporadic problem in Iowa, but their seed/seeding injury can sufficiently reduce plant stands to justify replanting entire fields or portions of fields "hot spots". The larvae can cause injury by both boring into and hollowing out the seed or by boring into/through the seedling stalk. Wireworms are the larval stage of the click beetle. These adult beetles lay their eggs in the soil of grassy areas or cultivated fields. The larvae require from one to as many as seven years to develop into the adult beetles. Most problems occur where corn follows perennial grass stands.

Seedcorn maggots are another very sporadic insect pest that can reduce plant

stands. They feed primarily on decaying organic matter in the soil, but can also feed on corn seeds. The adult flies lay eggs just below the soil surface in tilled ground. The legless maggots are yellowish white and ¼ inch when mature.

OBJECTIVE

The goal of this research program is to serve Iowa agriculture by monitoring and evaluating the performance of experimental insecticides, 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 2008. Corn rootworm (CRW) research fields are continually maintained on University farms located at: Ames, Johnson Farm; Crawfordville, S.E. Research and Demonstration Farm; Nashua, N.E. Research and Demonstration Farm; Sutherland, N.W. Research and Demonstration Farm. Each research field is divided into two sections, 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 females late in the season when other fields are maturing. In addition, two first year corn studies were established at the Johnson Farm and NE Research & Development Farm for the Seed treatment/Fungicide studies.

The wireworm study was conducted at the ISU Rhodes Farm near Rhodes, IA. This plot was established in a field that had a 20 year history of pasture ground. The seedcorn maggot study was conducted at the Johnson Farm and was established on previous year's soybean ground.

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 all studies except the Monsanto-Bayer Yield study was a randomized complete block (RCB) with four replications (i.e., blocks). Treatments in the yield study at both Ames (Tables 2-5) and Nashua (Tables 12-15) were paired rows 75-feet in length. The Bayer strip study (Tables 10 and 11) at Crawfordsville used paired rows 75 feet in length. The experimental study (Tables 6 and 7) at Crawfordsville used paired rows 50 feet in length with no yields taken. Treatments for the Pioneer Herculex XTRA study (Tables 8 and 9) at Crawfordsville were four rows wide with 50 feet per row. The Monsanto-Bayer Yield study (Tables 16 and 17) at Sutherland was a split plot design, with four replications (i.e., blocks). Treatments were eight rows wide and 75 feet in length.

Application techniques: Seeds were pre-bagged and planted with a four-row John Deere Max Emerge™ 7100 integral planter that had 30 inch row spacing. 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 poured into the steel cylinder and 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 that produce the binary Bt toxin Cry34/Cry35. In all cases, seeds were treated by the company with a 250 seed treatment, which targeted secondary soil-borne pests, such as wireworm and seedcorn maggot. For some treatments, plant-incorporated protectants were combined with conventional insecticides.

Granular application treatments: Granular insecticide formulations were applied with modified Noble® metering units mounted on the planter. The Noble units were calibrated in the laboratory to accurately deliver material at a tractor speed of 4 mph. Plastic tubes directed the granular treatments to either a 7-inch band ahead of the closing wheels (T-band, All-Terrain Banders), or to the seed furrow, placing all the insecticide 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.

Seed treatments: For all hybrids tested in the yield studies (Tables 2-5 & 12-15), Bayer strip study (Tables 10 and 11), Pioneer Herculex XTRA (Tables 8 and 9), and Monsanto-Bayer yield (Tables 16 and 17), the seed treatment (Poncho 250, Poncho 1250 or Cruiser Extreme 250) was commercially applied. In the experimental study (Tables 6 and 7), the seed treatments were applied over T.A. Seeds hybrid 555-02 by the company (Valent) who provided the seed. For the hybrid DKC61-73, which was used in this same experimental study, the seed treatment (Poncho250) was commercially applied to all seed.

Liquid application treatments: The liquid products, A14974 250 CS (experimental), and Capture LFR, were applied at planting with a compressed-air system built directly into the planter by Almaco manufacturing (Nevada, IA). This closed handling system consisted of three gallon product canisters equipped with quick disconnects. Both of these liquid treatments were applied either T-Band or Furrow using Teejet XR80015 spray nozzles at 21 psi to deliver 5 gallons per acre of finished spray.

SmartBox™ application treatments: AMV101G 5.8G, Aztec 4.67G, Counter 15G and 20G, Fortress 5G, and Fortress Plus 5G treatments were applied with modified SmartBox™ metering units. The commercial SmartBox™ 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™ metering units. All treatments were applied at 4 mph using the "fixed speed mode" on the SmartBox™ controllers.

Seed treatment/Fungicide Study

Field plot design: The experimental design in the Bayer yield study (Ames-Tables 18 and 19; Nashua-Tables 20 and 21) was a randomized complete block (RCB) with six replications respectively. The Bayer yield studies were conducted at both Ames & Nashua. They were eight rows wide and 35 feet in length.

Application techniques: The seed treatments were commercially applied. 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 treatment was applied with modified Noble® metering units mounted on the planter. There was only one treatment (Entry A/6-Aztec 2.1G) which was applied with these Noble® units.

Liquid application treatments: There were three fungicide treatments applied, (Entry A/4-Stratego PRO; Entry A/5-Quilt; Entry A/7-Stratego PRO + Bio Forge)

using a Hagie high-boy sprayer provided and operated by the ISU Plant Pathology Department. These fungicide applications were applied at Ames on August 11, 2008 and at Nashua on August 15, 2008. Corn was at the reproductive stage 2 at the time of application.

Wireworm Study

Field plot design: The experimental design for the wireworm study (Tables 22-24) was a RCB, with four replications and treatments applied to single 50 ft rows.

Application techniques: The seed treatment Kernel Guard Supreme (KGS) from Chemtura Corporation was applied at ISU by placing 225 g of seedcorn in a 1-gallon plastic jar and adding the correct amount of seed treatment formulation. The jar was then placed on a roller mill for mixing. All Valent seed treatments were applied over T.A. Seeds hybrid 685-02 by the company. No seed treatment was applied to the hybrid, Blue River Hybrid (BRH) 56M30. All seeds were pre-bagged and planted with the modified seed units as described earlier.

Wireworm baits: There were six wireworm baits ($\frac{1}{2}$ cup corn seed and $\frac{1}{2}$ cup wheat seed) planted throughout the study area. These baits were checked every two weeks. However, no wireworms were found, which indicates very low pressure at this site.

SmartBox™ application treatments: Granular insecticide treatments (AMV101G 5.8G, Fortress 5G, and Fortress Plus 5G) were applied to single 50-ft length rows with modified SmartBox™ metering units mounted on the planter as described earlier.

Seedcorn Maggot Study

Field plot design: The experimental design for this seedcorn maggot study (Tables 25 and 26) was a RCB, four replications, single 20-ft rows.

Application techniques: The corn planter with seed hoppers turned off and press wheels tied up, was used to pre-mark rows. Hoes were used to make shallow row furrows. Thirty corn seeds were carefully placed by hand (6 inch seed spacing) directly into the bait on May 12. Seeds planted had either no seed treatment (check, baited and unbaited), or seed treatments (Cruiser, Poncho 600, V-10170-1713 and V-10170-1729) applied over T.A. Seeds hybrid 685-02 by the company (Valent) who provided the seed. The baited and unbaited were planted to Blue River Hybrid (BRH) 56M30. Seeds were covered with soil and the soil firmed by hands and hoes.

Seedcorn Maggot baits: A meat and bone meal bait was used to attract ovipositing flies. The bait was hand applied ($\sim 1/3$ oz per row-ft) to the bottom of the open seed furrows on May 5 and then again on May 9. These furrows received 1.68 inches of rain on May 6. In addition, these furrows were kept moist through hand irrigation until planting.

Corn Rootworm Larval

Evaluations

Stand counts: The number of plants in either 17.5 or 44 row-ft was recorded (note distance in footnotes of stand count tables). These were taken both early and late in the growing season.

Root-Injury: After the majority of corn rootworms had finished feeding, five root

systems were dug from each treatment (five roots total were dug from the two-row treatment in the yield studies, experimental study, and Bayer strip study) likewise ten roots total were dug per treatment from rows one and four of the Pioneer Herculex XTRA study. With the Monsanto-Bayer yield study, five roots total were dug per treatment from rows two and five. 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. Roots were then soaked in water overnight, and subsequently washed with a pressurized water sprayer to remove the remaining soil. Roots were then laid out by replication and evaluated for rootworm feeding injury following Iowa State Node-Injury Scale (0-3):

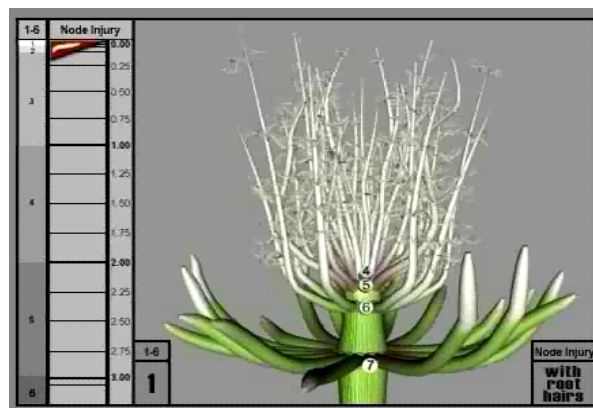
Node-Injury Scale (0-3):

- 0.00 - No feeding damage (lowest rating that can be given).
- 1.00 - One node (circle of roots), or the equivalent of an entire node, eaten back to within ~ 1½ inches of the stalk (soil line on the 7th node).
- 2.00 - Two nodes eaten.
- 3.00 - Three or more nodes eaten. (highest rating that can be 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 Iowa State University's Entomology web site at:



rootworm/nodeinjury/nodeinjury.html

Product consistency: The product consistency (%) was calculated for each treatment as 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).

Data on root protection by insecticides and plant incorporated protectants were analyzed with an analysis of variance (ANOVA). When significant differences among treatments were detected with ANOVA ($P < 0.05$), pairwise contrasts were conducted between means with Ryan's Q test.

Lodging counts: A plant was considered lodged if it was leaning at least 30 degrees from vertical. Lodging counts were taken at harvest time along with final stand count (note distance measured 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 at 15.5% moisture. Yield data were analyzed with ANOVA and pairwise comparisons conducted using Ryan's Q test.

COMMENTS ON INSECTICIDES AND PLANT INCORPORATED PROTECTANTS (PIP) PERFORMANCE

Tables list treatment rates as ounces a.i. per 1000 row-ft unless otherwise indicated in the footnotes.

CORN ROOTWORM EVALUATIONS

AMES (Johnson Farm)

Yield Study (Tables 2-5): The CRW feeding pressure in this study ranged from 0.00 (DKC61-69, YieldGard VT Triple) to 0.95 (Pioneer 33D13; which is a non-Bt isolate). There was less node injury than we had originally hoped. There were no significant differences for stand count, noting only a four plant difference among the 27 treatments. There were significant differences among treatments in node injury, product consistency and lodging. No differences were noted among yields.

CRAWFORDSVILLE (SE R&D Farm)

Experimental Study (Tables 6 & 7): There were two different hybrids used in this study due to each company requesting separate hybrids. With T.A. Seeds hybrid 555-02, node injury scores of all treatments were significantly lower than the CHECK. Similarly the hybrid DKC61-73, which was the CHECK, displayed significantly more damage than

the other five treatments. For either hybrid, there were no significant differences among treatments for stand count. No yields were taken in this study.

Pioneer-Herculex XTRA Study (Tables 8 & 9): In both node injury and product consistency, all treatments were significantly different from the CHECK-P33D13. No significant differences were present for yield.

Bayer Strip Study (Tables 10 & 11): In this study, the Aztec 2.1G furrow treatment and the Poncho 1250 seed treatment had significantly lower node injury than the CHECK. With percent lodging, the Aztec 2.1G furrow treatment was significantly better than either the Poncho 1250 treatment or CHECK. No significant difference was noted for stand count or yield.

NASHUA (NE R&D Farm)

Yield Study (Tables 12-15): Corn rootworm feeding pressure was moderately heavy with a range of 1.80 to 2.87 nodes injured in the CHECKS. All treatments, with the exception of Poncho 1250 seed treatment, had significantly lower node-injury scores than the CHECKS. The hybrid (DKC61-69, YieldGard VT Triple), had only a 0.08 node-injury rating and was not significantly greater than the treatments that added an insecticide on top of the YieldGard VT Triple. There was less than a three plant stand count difference among the 27 treatments, and treatments did not differ significantly. The percent lodging was significantly greater for the three unprotected isolines (DKC61-72, Mycogen 2J665 and Pioneer 35K03)

compared to the other 24 treatments. There was over a 100 bushel difference among the yields and significant difference among treatments.

SUTHERLAND (NW R&D Farm)

Monsanto-Bayer Yield Study (Tables 16 & 17): There were two hybrids tested in this study, Hybrid DKC 61-72 (isoline) and DKC 61-69 (YieldGard VT Triple). Both of these hybrids were either treated with Poncho 1250, treated with Aztec, or given no additional protection. Percent lodging was significantly higher for DKC 61-72 (Check) and DKC 61-72 treated with Poncho 1250 than for the other treatments. Yield was significantly higher for DKC 61-69 than DKC 61-72 regardless of soil insecticide treatment. No significant differences were noted among stand counts.

SEED TREATMENT/FUNGICIDE STUDY

AMES (Johnson Farm)

Bayer Yield Study (Tables 18 & 19): No treatment in this study showed any significant difference for stand counts. Some significant differences in yield were detected.

NASHUA (N.E. R&D Farm)

Bayer Yield Study (Tables 20 & 21): No significant differences were found for stand counts or yields.

WIREWORM AND SEEDCORN MAGGOT EVALUATIONS

Following stand counts, seeds/seedling were extracted from soil, inspected for feeding, and rated on the following 1-4 damage scale.

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

WIREWORM EVALUATIONS

RHODES (ISU Farm)

Wireworm Study (Tables 22-24):

Following stand counts, seeds/seedlings were carefully extracted from the soil, inspected for feeding, and rated on the 1-4 damage scale (described earlier). The pest pressure in this test was very minimal to non-existent. No seed/seedling damaged was noted in this study. Regarding stand counts, there were two hybrids tested in this study, T.A. Seeds hybrid 685-02 and BRH 56M30. Within hybrids, no significant differences in stand count were present.

SEEDCORN MAGGOT EVALUATIONS

Ames (Johnson farm)

Seedcorn Maggot Study (Tables 25 & 26):

Following stand counts, seeds/seedlings were carefully extracted from the soil, inspected for feeding, and rated on the 1-4 damage scale (described earlier). The pressure in this study was moderately heavy, with the baited check showing heavy, and significant, stand reduction compared with the other six treatments. The baited check showed 94% damaged seed/seedling compared to

0% damage for the treatment V-10170-1729. In addition, the baited check showed just under a 3.0 damage rating.

CALIBRATION INFORMATION

All Noble® units were laboratory calibrated and units were randomly spot-checked in the field prior to planting. SmartBox™ units were calibrated on the planter in accordance with the SmartBox Operator's Manual instructions. During calibration and planting, the flowability of each formulation was noted, as well as any other calibration problems. There were no calibration or delivery problems with any treatment.

AGRONOMIC INFORMATION,

WEATHER DATA AND

MATERIALS TESTED

Agronomic information and field insecticide history for each test plot 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**.

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: AMVAC Chemical Corporation, Chemtura Corporation, Bayer CropScience, Dow AgroSciences, FMC Corporation, Monsanto, Pioneer Hi-Bred International, Inc., Syngenta, and Valent U.S.A. Corporation.

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 2008.

Target Pest and Test Location	Type of Studies ¹	Table Numbers	Entries/ Test	Experimental Unit Size	
				Row Length (ft)	# Reps
Corn Rootworms					
Ames	Yield	2-5	27	75	4
Crawfordsville	Experimental	6,7	12	50	4
	Pioneer Herculex XTRA	8,9	4	50	4
	Bayer strip test	10,11	3	75	4
Nashua	Yield	12-15	27	75	4
Sutherland	Monsanto-Bayer yield	16,17	6	75	4
Seed treatments/Fung.					
Ames	Bayer yield (SB's)	18,19	7	35	6
Nashua	Bayer yield (SB's)	20,21	7	35	6
Wireworm					
Rhodes-ISU Farm	Wireworm(20 yr. pasture)	22-24	11	50	4
Seedcorn maggot					
Ames	Seedcorn maggot(SB's)	25,26	7	20	4

¹All Studies were conducted on "trap crop corn" ground unless noted otherwise in parentheses. (SB's) = test conducted on ground that was planted to soybeans in 2007; (20 yr. pasture) = test conducted on ground that had been in pasture for 20 years.

Table 2. Average root-injury and product consistency for evaluation of insecticide treatments and plant-incorporated protectants. Yield study: Ames, IA. 2008¹

Treatment ²	Form.	Rate ³	Placement ⁴	Node-Injury ^{5,6}	Product Consistency ^{7,8}
YGVT	-----	-----	-----	0.00 ^a	100 ^a
YGVT + Fortress-SB	5G	0.15	Furrow	0.01 ^{ab}	100 ^a
YGVT + Capture	LFR	0.09	Furrow	0.02 ^{abc}	100 ^a
YGVT + Aztec	2.1G	0.14	Furrow	0.02 ^{abc}	100 ^a
My-HxXTRA	-----	-----	-----	0.02 ^{abc}	100 ^a
YGVT + Poncho 1250	600FS	1.25	ST	0.03 ^{abcd}	100 ^a
My-HxXTRA + Fortress-SB	5G	0.15	Furrow	0.03 ^{abcd}	100 ^a
YGVT + Counter-SB	15G	0.90	Furrow	0.04 ^{abcd}	100 ^a
My-HxXTRA + Counter-SB	15G	0.90	Furrow	0.05 ^{abcde}	100 ^a
Aztec + DKC 61-72	2.1G	0.14	Furrow	0.08 ^{bcdef}	98 ^a
Aztec + BB ⁹ + DKC 61-72	2.1G	0.14	Furrow + ST	0.08 ^{bcdef}	100 ^a
Force + Pioneer 33D13	3G	0.12	Furrow	0.08 ^{bcdef}	100 ^a
YGVT + Aztec-SB	4.67G	0.14	Furrow	0.08 ^{bcdef}	95 ^a
Force + DKC 61-72	3G	0.14	Furrow	0.08 ^{bcdef}	100 ^a
Aztec + CB ⁹ + DKC 61-72	2.1G	0.14	Furrow + ST	0.10 ^{bcdef}	85 ^a
Capture + DKC 61-72	LFR	0.09	Furrow	0.11 ^{cdef}	95 ^a
Force + DKC 61-72	3G	0.14	T-Band	0.14 ^{cdef}	85 ^a
Capture + DKC 61-72	LFR	0.09	T-Band	0.16 ^{defg}	80 ^a
A14974 ¹⁰ + DKC 61-72	250CS	0.12	T-Band	0.18 ^{efgh}	80 ^a
Pi-HxXTRA	-----	-----	-----	0.22 ^{efgh}	85 ^a
Aztec + DKC 61-72	2.1G	0.14	T-Band	0.23 ^{efgh}	85 ^a
A14974 ¹⁰ + DKC 61-72	250CS	0.12	Furrow	0.40 ^{ghi}	55 ^{ab}
DKC 61-72 + Poncho1250	600FS	1.25	ST	0.43 ^{hi}	65 ^{ab}
AB ⁹ + DKC 61-72	-----	-----	ST	0.51 ^{ij}	25 ^{bc}
DKC 61-72	-----	-----	-----	0.68 ^{jk}	20 ^{bc}
Mycogen 2J665	-----	-----	-----	0.84 ^{jk}	55 ^{ab}
Pioneer 33D13	-----	-----	-----	0.95 ^k	5 ^c

¹ Planted May 16, 2008; evaluated July 23, 24, 25, 2008

² My-HxXTRA = Mycogen brand Herculex XTRA (Mycogen 2J669) ; Mycogen 2J665 (isoline)

Pi-HxXTRA = Pioneer brand Herculex XTRA (Pioneer 33D14); Pioneer 33D13 (isoline)

YGVT = YieldGard VT Triple (DKC61-69) ; DKC 61-72 (isoline)

³ Insecticide listed as ounces a.i. per 1,000 row-ft; seed treatment (ST) listed as mg a.i./seed

⁴ T-Band and Furrow = insecticide applied at planting time; SB = SmartBox application at planting time; ST = seed treatment

⁵ Iowa State Node-Injury Scale (0-3). Number of full or partial nodes eaten

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

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

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

⁹ AB, BB, CB = experimental seed treatments provided by Bayer CropScience

¹⁰ A14974 (liquid Force) = experimental insecticide provided by Syngenta

Table 3. Average stand counts for evaluation of insecticide treatments and plant-incorporated protectants. Yield study: Ames, IA. 2008¹

Treatment ²	Form.	Rate ³	Placement ⁴	Stand Count ^{5,6}
AB ⁷ + DKC 61-72	-----	-----	ST	33.00
Aztec + CB ⁷ + DKC 61-72	2.1G	0.14	Furrow + ST	32.40
YGVT	-----	-----	-----	32.20
Force + Pioneer 33D13	3G	0.12	Furrow	32.20
Aztec + DKC 61-72	2.1G	0.14	Furrow	31.80
YGVT + Poncho1250	600FS	1.25	ST	31.60
Force + DKC 61-72	3G	0.14	T-Band	31.60
Capture + DKC 61-72	LFR	0.09	T-Band	31.60
YGVT + Fortress-SB	5G	0.15	Furrow	31.40
YGVT + Aztec-SB	4.67G	0.14	Furrow	31.40
My-HxXTRA + Counter-SB	15G	0.90	Furrow	31.40
My-HxXTRA	-----	-----	-----	31.30
Aztec + DKC 61-72	2.1G	0.14	T-Band	31.30
YGVT + Counter-SB	15G	0.90	Furrow	31.30
Pi-HxXTRA	-----	-----	-----	31.20
DKC 61-72	-----	-----	-----	31.20
DKC 61-72 + Poncho 1250	600FS	1.25	ST	31.20
Force + DKC 61-72	3G	0.14	Furrow	31.00
YGVT + Capture	LFR	0.09	Furrow	30.90
YGVT + Aztec	2.1G	0.14	Furrow	30.80
Capture + DKC 61-72	LFR	0.09	Furrow	30.80
My-HxXTRA + Fortress-SB	5G	0.15	Furrow	30.70
Mycogen 2J665	-----	-----	-----	30.25
A14974 ⁸ +DKC 61-72	250CS	0.12	Furrow	30.00
Pioneer 33D13	-----	-----	-----	29.50
A14974 ⁸ + DKC 61-72	250CS	0.12	T-Band	29.20
Aztec + BB ⁷ + DKC 61-72	2.1G	0.14	Furrow + ST	29.00

¹ Planted May 16, 2008; evaluated June 16 & July 10, 2008

² My-HxXTRA = Mycogen brand Herculex XTRA (Mycogen 2J669) ; Mycogen 2J665 (isoline)

Pi-HxXTRA = Pioneer brand Herculex XTRA (Pioneer 33D14); Pioneer 33D13 (isoline)

YGVT = YieldGard VT Triple (DKC61-69) ; DKC 61-72 (isoline)

³ Insecticide listed as ounces a.i. per 1,000 row-ft; seed treatment (ST) listed as mg a.i./seed

⁴ T-Band and Furrow = insecticide applied at planting time; SB = SmartBox application at planting time; ST = seed treatment

⁵ Means based on 16 observations (2-row trt x 17.5 row-ft/treatment x 4 replications x 2 dates)

⁶ No significant differences between means (ANOVA, $P \leq 0.05$)

⁷ AB, BB, CB = experimental seed treatments provided by Bayer CropScience

⁸ A14974 (liquid Force) = experimental insecticide provided by Syngenta

Table 4. Average percent lodging for evaluation of insecticide treatments and plant-incorporated protectants. Yield study: Ames, IA. 2008¹

Treatment ²	Form	Rate ³	Placement ⁴	% Lodging ^{5,6}
Aztec + DKC 61-72	2.1G	0.14	Furrow	0a
Aztec + CB ⁷ + DKC 61-72	2.1G	0.14	Furrow + ST	0a
Aztec + BB ⁷ + DKC 61-72	2.1G	0.14	Furrow + ST	0a
Force + Pioneer 33D13	3G	0.12	Furrow	0a
YGVT + Capture	LFR	0.09	Furrow	0a
YGVT + Fortress-SB	5G	0.15	Furrow	0a
YGVT + Poncho 1250	600FS	1.25	ST	0a
Capture + DKC 61-72	LFR	0.09	T-Band	1a
Force + DKC 61-72	3G	0.14	Furrow	1a
YGVT + Aztec	2.1G	0.14	Furrow	1a
My-HxXTRA + Fortress-SB	5G	0.15	Furrow	2ab
YGVT + Aztec-SB	4.67G	0.14	Furrow	2ab
Force + DKC 61-72	3G	0.14	T-Band	3ab
YGVT	-----	-----	-----	3ab
Aztec + DKC 61-72	2.1G	0.14	T-Band	4ab
YGVT + Counter-SB	15G	0.90	Furrow	4ab
Pi-HxXTRA	-----	-----	-----	5ab
A14974 ⁸ + DKC 61-72	250CS	0.12	T-Band	10ab
AB ⁷ + DKC 61-72	-----	-----	ST	10ab
My-HxXTRA	-----	-----	-----	11abc
My-HxXTRA + Counter-SB	15G	0.90	Furrow	12abc
Capture + DKC 61-72	LFR	0.09	Furrow	13abc
DKC 61-72 + Poncho 1250	600FS	1.25	ST	18abc
A14974 ⁸ + DKC 61-72	250CS	0.12	Furrow	30abc
Pioneer 33D13	-----	-----	-----	34 bc
DKC61-72	-----	-----	-----	51 c
Mycogen 2J665	-----	-----	-----	57 c

¹ Planted May 13, 2008; evaluated October 1, 2008² My-HxXTRA = Mycogen brand Herculex XTRA (Mycogen 2J669) ; Mycogen 2J665 (isoline)

Pi-HxXTRA = Pioneer brand Herculex XTRA (Pioneer 33D14); Pioneer 33D13 (isoline)

YGVT = YieldGard VT Triple (DKC61-69) ; DKC 61-72 (isoline)

³ Insecticide listed as ounces a.i. per 1,000 row-ft; seed treatment (ST) listed as mg a.i./seed⁴ T-band & Furrow = insecticide applied at planting time; SB = SmartBox application at planting time; ST = seed treatment⁵ Means based on 8 observations (2-row trt x17.5 row-ft/treatment x 4 replications)⁶ Means sharing a common letter do not differ significantly according to Ryan's Q Test ($P \leq 0.05$)⁷ AB, BB, CB = experimental seed treatments provided by Bayer CropScience⁸ A14974 (liquid Force) = experimental insecticide provided by Syngenta

Table 5. Average yield for evaluation of insecticide treatments and plant-incorporated protectants. Yield study: Ames, IA. 2008¹

Treatment ²	Form	Rate ³	Placement ⁴	Bushels/ Acre ^{5,6,7}
Force + DKC 61-72	3G	0.14	T-Band	201
My-HxXTRA + Counter-SB	15G	0.90	Furrow	185
YGVT	-----	-----	-----	183
A14974 ⁹ + DKC 61-72	250CS	0.12	T-Band	180
Pi-HxXTRA	-----	-----	-----	179
A14974 ⁹ + DKC 61-72	250CS	0.12	Furrow	178
YGVT + Aztec	2.1G	0.14	Furrow	178
My-HxXTRA + Fortress-SB	5G	0.15	Furrow	177
YGVT + Aztec-SB	4.67G	0.14	Furrow	176
YGVT + Fortress-SB	5G	0.15	Furrow	176
Mycogen 2J665	-----	-----	-----	174
AB ⁸ + DKC 61-72	-----	-----	ST	173
Aztec + DKC 61-72	2.1G	0.14	Furrow	173
My-HxXTRA	-----	-----	-----	173
YGVT + Poncho 1250	600FS	1.25	ST	173
YGVT + Capture	LFR	0.09	Furrow	173
Aztec + BB ⁸ + DKC 61-72	2.1G	0.14	Furrow + ST	172
Capture + DKC 61-72	LFR	0.09	T-Band	171
DKC 61-72 + Poncho 1250	600FS	1.25	ST	171
DKC61-72	-----	-----	-----	169
Force + DKC 61-72	3G	0.14	Furrow	166
Aztec + CB ⁸ + DKC 61-72	2.1G	0.14	Furrow + ST	165
YGVT + Counter-SB	15G	0.90	Furrow	164
Aztec + DKC 61-72	2.1G	0.14	T-Band	153
Capture + DKC 61-72	LFR	0.09	Furrow	153
Force + Pioneer 33D13	3G	0.12	Furrow	151
Pioneer 33D13	-----	-----	-----	145

¹ Planted May 13, 2008; machine harvested October 28, 2008

² My-HxXTRA = Mycogen brand Herculex XTRA (Mycogen 2J669) ; Mycogen 2J665 (isoline)

Pi-HxXTRA = Pioneer brand Herculex XTRA (Pioneer 33D14); Pioneer 33D13 (isoline)

YGVT = YieldGard VT Triple (DKC61-69) ; DKC 61-72 (isoline)

³ Insecticide listed as ounces a.i. per 1,000 row-ft; seed treatment (ST) listed as mg a.i./seed

⁴ T-Band and Furrow = insecticide applied at planting time; SB = SmartBox application at planting time; ST = seed treatment

⁵ Means based on 3 observations (2-row trt x 68.75 row-ft/treatment x 3 replications)

⁶ No significant differences between means (ANOVA, P < 0.05)

⁷ Yields converted to 15.5% Moisture

⁸ AB, BB, CB = experimental seed treatments provided by Bayer CropScience

⁹ A14974 (liquid Force) = experimental insecticide provided by Syngenta

Table 6. Average root-injury and product consistency for evaluation of insecticide treatments and plant-incorporated protectants. Experimental study: Crawfordsville, IA. 2008¹

Treatment	Hybrid ²	Form.	Rate ³	Placement ⁴	Node-Injury ^{5,6}	Product Consistency ^{7,8}
Aztec	A	2.1G	0.14	Furrow	0.05a	100a
V-10170-1713	A	-----	1.25	ST	0.19ab	70ab
Counter	A	15G	1.20	Furrow	0.20ab	70ab
Poncho 600	A	600FS	1.25	ST	0.31 b	40ab
V-10170-1729	A	-----	1.25	ST	0.52 b	65ab
CHECK	A	-----	-----	-----	0.66 c	15 b
AMV101G-SB	B	5.8G	0.17	Furrow	0.03a	100a
Counter-SB	B	15G	1.20	Furrow	0.07ab	95a
Fortress-SB	B	5G	0.15	Furrow	0.13ab	85a
Counter-SB	B	20G	1.20	Furrow	0.31 b	70a
Fortress Plus-SB	B	5G	0.15	Furrow	0.32 b	70a
CHECK	B	-----	-----	-----	0.56 c	27a

¹ Planted May 9, 2008; evaluated July 18 & 21, 2008

² Hybrid (A) = T.A. Seeds hybrid 555-02 (RR2); Hybrid (B) = DKC61-73 (RR2/YGCB)

³ Insecticide listed as ounces a.i. per 1,000 row-ft; seed treatment (ST) listed as mg a.i./seed

⁴ T-band & Furrow = Insecticide applied at planting time; SB= SmartBox application at planting time; ST = seed treatment.

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

⁶ Iowa State Node-Injury Scale (0-3). Number of full or partial nodes completely eaten

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

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

Table 7. Average stand counts and yield for evaluation of insecticide treatments and plant-incorporated protectants. Experimental study: Crawfordsville, IA. 2008¹

Treatment	Hybrid ²	Form.	Rate ³	Placement ⁴	Stand Count ^{5,6}
Poncho 600	A	600FS	1.25	ST	28.75
Aztec	A	2.1G	0.14	Furrow	28.60
V-10170-1713	A	-----	1.25	ST	28.10
CHECK	A	-----	-----	-----	27.25
V-10170-1729	A	-----	1.25	ST	26.90
Counter	A	15G	1.20	Furrow	25.90
CHECK	B	-----	-----	-----	30.00
Fortress-SB	B	5G	0.15	Furrow	29.50
Fortress Plus-SB	B	5G	0.15	Furrow	29.25
AMV101G-SB	B	5.8G	0.17	Furrow	29.00
Counter-SB	B	15G	1.20	Furrow	27.90
Counter-SB	B	20G	1.20	Furrow	27.25

¹ Planted May 9, 2008; evaluated June 17, 2008

² Hybrid (A) = T.A. Seeds hybrid 555-02 (RR2); Hybrid (B) = DKC61-73 (RR2/YGCB)

³ Insecticide listed as ounces a.i. per 1,000 row-ft; seed treatment (ST) listed as mg a.i./seed

⁴ T-band & Furrow = insecticide applied at planting time; SB = SmartBox application;
ST = seed treatment

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

⁶ No significant differences between means (ANOVA, $P \leq 0.05$)

Table 8. Average root-injury and product consistency for evaluation of insecticide treatments and plant-incorporated protectants. Pioneer-Herculex XTRA study: Crawfordsville, IA. 2008¹

Hybrid	Placement ²	Node-Injury ^{3,4,5}	Product Consistency ^{5,6}
HXTRA-P33D14	-----	0.03a	100a
HXTRA-P33D14 w/4.5% Blended Refuge ^{7,8}	-----	0.07ab	100a
HXTRA-P33D14 w/4.5% Blended Refuge(P1250) ^{7,8}	ST	0.09 b	95a
CHECK-P33D13	-----	0.51 c	20 b

¹ Planted May 9, 2008; evaluated July 22, 2008

² ST = seed treatment

³ Chemical and check means based on 40 observations (10 roots dug from 2 rows x 4 replications)

⁴ Iowa State Node-Injury Scale (0-3). Number of full or partial nodes completely eaten

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

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

⁷ For each blended refuge treatment, eight Bt and two non-Bt roots were dug per replication

⁸ The blended refuge is the near isoline, Pioneer 33D13; (P1250) = Isoline seed treated with Poncho 1250

Table 9. Average stand counts, percent lodging and yield for evaluation of insecticide treatments and plant-incorporated protectants. Pioneer-Herculex XTRA Study: Crawfordsville, IA. 2008¹

Hybrid	Placement ²	Stand Count ^{3,4}	% Lodging ^{4,5}	Bushels Acre ^{6,7}
HXTRA-P33D14	-----	70.40 b	2	217
HXTRA-P33D14 w/4.5% Blended Refuge ⁸	-----	70.00 b	2	209
HXTRA-P33D14 w/4.5% Blended Refuge (P1250) ⁸	ST	70.70 b	3	206
CHECK-P33D13	-----	73.80a	9	197

¹ Planted May 9 – evaluation dates: stand counts June 17; lodging September 24; yield October 31, 2008

² ST = seed treatment

³ Means sharing a common letter do not differ significantly according to Ryan's Q Test ($P \leq 0.05$)

⁴ Means based on 16 observations (4 row trt x 44 row-ft/treatment x 4 replications)

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

⁶ Means based on 4 observations (4 rows x 42.75 row-ft harvested x 4 replications)

⁷ Yields converted to 15.5% Moisture

⁸ The blended refuge is the near isoline, Pioneer 33D13; (P1250) = Isoline seed treated with Poncho 1250

Table 10. Average root-injury, percent lodging and product consistency for evaluation of insecticide treatments and plant-incorporated protectants. Bayer strip study: Crawfordsville, IA. 2008¹

Treatment ²	Form.	Rate ³	Placement ⁴	Node-Injury ^{5,6,8}	% Lodging ^{7,8}	Product Consistency ^{8,9}
Aztec	2.1G	0.14	Furrow	0.24a	1a	75a
Poncho 1250	600FS	1.25	ST	0.36a	37 b	50a
CHECK	-----	-----	-----	0.85 b	63 b	5 b

¹ Planted: May 9, 2008; evaluation dates: root injury July 21; lodging September 24, 2008

² The insecticide application and seed treatment was applied over DKC61-72 (true isoline)

³ Insecticide listed as ounces a.i. per 1,000 row-ft; seed treatment (ST) listed as mg a.i./seed

⁴ Furrow = insecticide applied at planting time; ST = seed treatment

⁵ Chemical, seed treatment, and check means based on 20 observations (5 roots/2 row trt x 4 replications)

⁶ Iowa State Node-Injury Scale (0-3). Number of full or partial nodes completely eaten

⁷ Means based on 8 observations (2 row trt x 70 row-ft/treatment x 4 replications)

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

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

Table 11. Average stand counts and yield for evaluation of insecticide treatments and plant-incorporated protectants. Bayer strip study: Crawfordsville, IA. 2008¹

Treatment	Form.	Rate ²	Placement ³	Stand Count ^{4,5}	Bushels Acre ^{5,6,7}
CHECK	-----	-----	-----	30.00	185
Aztec	2.1G	0.14	Furrow	31.60	184
Poncho 1250	600FS	1.25	ST	29.90	183

¹ Planted May 9 – evaluation dates: stand counts June 17; yield October 31, 2008

² Insecticide listed as ounces a.i. per 1,000 row-ft; seed treatment (ST) listed as mg a.i./seed

³ Furrow = insecticide applied at planting time; ST = seed treatment

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

⁵ No significant differences between means (ANOVA $P \leq 0.05$)

⁶ Means based on 4 observations (2 row trt x 68.75 row-ft/treatment x 4 replications)

⁷ Yields converted to 15.5% Moisture

Table 12. Average root-injury and product consistency for evaluation of insecticide treatments and plant-incorporated protectants. Yield study: Nashua, IA. 2008¹

Treatment ²	Form.	Rate ³	Placement ⁴	Node-Injury ^{5,6}	Product Consistency ^{7,8}
YGVT + Capture	LFR	0.09	Furrow	0.00 ^a	100 ^a
YGVT + Aztec	2.1G	0.14	Furrow	0.01 ^{ab}	100 ^a
YGVT + Fortress-SB	5G	0.15	Furrow	0.03 ^{abc}	95 ^{ab}
YGVT + Counter-SB	15G	0.90	Furrow	0.06 ^{abcd}	100 ^a
My-HxXTRA + Fortress-SB	5G	0.15	Furrow	0.07 ^{abcde}	100 ^a
YGVT	-----	-----	-----	0.08 ^{abcde}	90 ^{ab}
My-HxXTRA	-----	-----	-----	0.09 ^{abcde}	95 ^{ab}
YGVT + Poncho1250	600FS	1.25	ST	0.10 ^{abcd}	95 ^{ab}
Aztec + DKC 6172	2.1G	0.14	T-Band	0.13 ^{bcdef}	85 ^{ab}
My-HxXTRA + Counter-SB	15G	0.90	Furrow	0.19 ^{cdef}	75 ^{ab}
Pi-HxXTRA	-----	-----	-----	0.22 ^{def}	80 ^{ab}
Aztec + CB ⁹ + DKC 61-72	2.1G	0.14	Furrow + ST	0.26 ^{efg}	70 ^{ab}
Aztec + DKC 6172	2.1G	0.14	Furrow	0.31 ^{fgh}	75 ^{ab}
Aztec + BB ⁹ + DKC 61-72	2.1G	0.14	Furrow + ST	0.31 ^{fgh}	75 ^{ab}
Force + DKC 6172	3G	0.14	T-Band	0.31 ^{fgh}	40 ^{abcd}
Force + Pioneer 35K03	3G	0.12	Furrow	0.34 ^{fgh}	60 ^{ab}
YGVT + Aztec-SB	4.67G	0.14	Furrow	0.35 ^{fgh}	55 ^{ab}
Capture + DKC 61-72	LFR	0.09	Furrow	0.55 ^{ghi}	35 ^{abcd}
Capture + DKC 61-72	LFR	0.09	T-Band	0.59 ^{ghi}	45 ^{abcd}
A14974 ¹⁰ + DKC 61-72	250CS	0.12	Furrow	0.61 ^{ghi}	35 ^{abcd}
Force + DKC 61-72	3G	0.14	Furrow	0.66 ^{hi}	35 ^{abc}
A14974 ¹⁰ + DKC 61-72	250CS	0.12	T-Band	0.70 ^{hi}	45 ^{abcd}
AB ⁹ + DKC 61-72	-----	-----	ST	1.02 ⁱ	35 ^{bcd}
DKC 61-72 + Poncho1250	600FS	1.25	ST	1.45 ^j	5 ^{cd}
DKC 61-72	-----	-----	-----	1.81 ^{jk}	0 ^d
Mycogen 2J665	-----	-----	-----	2.27 ^{kl}	0 ^d
Pioneer 35K03	-----	-----	-----	2.87 ^l	0 ^d

¹ Planted May 13, 2008; evaluated August 6, 7, 8, 2008

² My-HxXTRA = Mycogen brand Herculex XTRA (Mycogen 2J669); Mycogen 2J665 (isoline)

Pi-HxXTRA = Pioneer brand Herculex XTRA (Pioneer 35K04); Pioneer 35K03 (isoline)

YGVT = YieldGard VT Triple (DKC61-69); DKC 61-72 (isoline)

³ Insecticide listed as ounces a.i. per 1,000 row-ft; seed treatment (ST) listed as mg a.i./seed

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

ST = seed treatment

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

⁶ Iowa State Node-Injury Scale (0-3). Number of full or partial nodes completely eaten

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

⁸ Product consistency = Percentage of times nodal injury was 0.25 (¼ node eaten) or less

⁹ AB, BB, CB = experimental seed treatments provided by Bayer CropScience

¹⁰ A14974 (liquid Force) = experimental insecticide provided by Syngenta

Table 13. Average stand counts for evaluation of insecticide treatments and plant-incorporated protectants. Yield study: Nashua, IA. 2008¹

Treatment ²	Form	Rate ³	Placement ⁴	Stand Count ^{5,6}
Capture + DKC 61-72	LFR	0.09	T-Band	33.20
A14974 ⁸ + DKC 61-72	250CS	0.12	T-Band	33.20
DKC 61-72	-----	-----	-----	32.90
Force + DKC 61-72	3G	0.14	T-Band	32.90
Force + Pioneer 35K03	3G	0.12	Furrow	32.80
DKC 61-72 + Poncho 1250	600FS	1.25	ST	32.80
Aztec + CB ⁷ + DKC 61-72	2.1G	0.14	Furrow + ST	32.75
Pi-HxXTRA	-----	-----	-----	32.75
YGVT + Counter-SB	15G	0.90	Furrow	32.70
Capture + DKC 61-72	LFR	0.09	Furrow	32.70
YGVT	-----	-----	-----	32.70
YGVT + Aztec	2.1G	0.14	Furrow	32.60
A14974 ⁸ + DKC 61-72	250CS	0.12	Furrow	32.60
Pioneer 35K03	-----	-----	-----	32.50
Aztec + BB ⁷ + DKC 61-72	2.1G	0.14	Furrow + ST	32.40
Force + DKC 61-72	3G	0.14	Furrow	32.40
YGVT + Poncho 1250	600FS	1.25	ST	32.25
Aztec + DKC 61-72	2.1G	0.14	T-Band	32.10
AB ⁷ + DKC 61-72	-----	-----	ST	31.90
Aztec + DKC 61-72	2.1G	0.14	Furrow	31.90
YGVT + Fortress-SB	5G	0.15	Furrow	31.80
My-HxXTRA + Fortress-SB	5G	0.15	Furrow	31.70
YGVT + Capture	LFR	0.09	Furrow	31.60
Mycogen 2J665	-----	-----	-----	31.40
My-HxXTRA + Counter-SB	15G	0.90	Furrow	31.30
My-HxXTRA	-----	-----	-----	31.20
YGVT + Aztec-SB	4.67G	0.14	Furrow	30.70

¹ Planted May 13, 2008; evaluated June 4 and 24, 2008

² My-HxXTRA = Mycogen brand Herculex XTRA (Mycogen 2J669); Mycogen 2J665 (isoline)

Pi-HxXTRA = Pioneer brand Herculex XTRA (Pioneer 35K04); Pioneer 35K03 (isoline)

YGVT = YieldGard VT Triple (DKC61-69); DKC 61-72 (isoline)

³ Insecticide listed as ounces a.i. per 1,000 row-ft; seed treatment (ST) listed as mg a.i./seed

⁴ T-band & Furrow = insecticide applied at planting time; SB = SmartBox application at planting time; ST = seed treatment

⁵ Means based on 16 observations (2-row trt x 17.5 row-ft/treatment x 4 replications x 2 dates)

⁶ No significant differences between means (ANOVA, $P \leq 0.05$)

⁷ AB, BB, CB = experimental seed treatments provided by Bayer CropScience

⁸ A14974 (liquid Force) = experimental insecticide provided by Syngenta

Table 14. Average percent lodging for evaluation of insecticide treatments and plant-incorporated protectants. Yield study: Nashua, IA. 2008¹

Treatment ²	Form	Rate ³	Placement ⁴	% Lodging ^{5,6}
A14974 ⁸ + DKC 61-72	250CS	0.12	Furrow	0a
Aztec + DKC 61-72	2.1G	0.14	T-Band	0a
Aztec + DKC 61-72	2.1G	0.14	Furrow	0a
Aztec + BB ⁷ + DKC 61-72	2.1G	0.14	Furrow + ST	0a
Aztec + CB ⁷ + DKC 61-72	2.1G	0.14	Furrow + ST	0a
Capture + DKC 61-72	LFR	0.09	T-Band	0a
Capture + DKC 61-72	LFR	0.09	Furrow	0a
Force + DKC 61-72	3G	0.14	T-Band	0a
Force + DKC 61-72	3G	0.14	Furrow	0a
Force + Pioneer 35K03	3G	0.12	Furrow	0a
Pi-HxXTRA	-----	-----	-----	0a
YGVT	-----	-----	-----	0a
YGVT + Aztec	2.1G	0.14	Furrow	0a
YGVT + Aztec-SB	4.67G	0.14	Furrow	0a
YGVT + Capture	LFR	0.09	Furrow	0a
YGVT + Counter-SB	15G	0.90	Furrow	0a
YGVT + Fortress-SB	5G	0.15	Furrow	0a
YGVT + Poncho 1250	600FS	1.25	ST	0a
My-HxXTRA + Counter-SB	15G	0.90	Furrow	0a
My-HxXTRA + Fortress-SB	5G	0.15	Furrow	1a
My-HxXTRA	-----	-----	-----	3a
DKC 61-72 + Poncho 1250	600FS	1.25	ST	11ab
A14974 ⁸ + DKC 61-72	250CS	0.12	T-Band	15ab
AB ⁷ + DKC 61-72	-----	-----	ST	19ab
DKC 61-72	-----	-----	-----	31 b
Mycogen 2J665	-----	-----	-----	70 c
Pioneer 35K03	-----	-----	-----	81 c

¹ Planted May 13, 2008; evaluated September 26, 2008

² My-HxXTRA = Mycogen brand Herculex XTRA (Mycogen 2J669); Mycogen 2J665 (isoline)

Pi-HxXTRA = Pioneer brand Herculex XTRA (Pioneer 35K04); Pioneer 35K03 (isoline)

YGVT = YieldGard VT Triple (DKC61-69); DKC 61-72 (isoline)

³ Insecticide listed as ounces a.i. per 1,000 row-ft; seed treatment (ST) listed as mg a.i./seed

⁴ T-band & Furrow = insecticide applied at planting time; SB = SmartBox application at planting time; ST = seed treatment

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

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

⁷ AB, BB, CB = experimental seed treatments provided by Bayer CropScience

⁸ A14974 (liquid Force) = experimental insecticide provided by Syngenta

Table 15. Average yield for evaluation of insecticide treatments and plant-incorporated protectants. Yield study: Nashua, IA. 2008¹

Treatment ²	Form	Rate ³	Placement ⁴	Bushels/ Acre ^{5,6,7}
YGVT + Aztec	2.1G	0.14	Furrow	204a
YGVT	-----	-----	-----	203a
My-HxXTRA + Fortress-SB	5G	0.15	Furrow	201a
YGVT + Counter-SB	15G	0.90	Furrow	200a
YGVT + Poncho 1250	600FS	1.25	ST	198ab
My-HxXTRA + Counter-SB	15G	0.90	Furrow	193ab
YGVT + Fortress-SB	5G	0.15	Furrow	190abc
My-HxXTRA	-----	-----	-----	185abc
A14974 ⁹ + DKC 61-72	250CS	0.12	Furrow	184abc
Aztec + DKC 61-72	2.1G	0.14	T-Band	183abc
YGVT + Aztec-SB	4.67G	0.14	Furrow	179abcd
Capture + DKC 61-72	LFR	0.09	T-Band	176abcd
A14974 ⁹ + DKC 61-72	250CS	0.12	T-Band	175abcd
Aztec + DKC 61-72	2.1G	0.14	Furrow	175abcde
Force + DKC 61-72	3G	0.14	Furrow	174abcde
Aztec + BB ⁸ + DKC 61-72	2.1G	0.14	Furrow + ST	173abcde
Capture + DKC 61-72	LFR	0.09	Furrow	172abcde
DKC 61-72 + Poncho 1250	600FS	1.25	ST	172abcde
Aztec + CB ⁸ + DKC 61-72	2.1G	0.14	Furrow + ST	171abcde
AB ⁸ + DKC 61-72	-----	-----	ST	170abcde
Force + DKC 61-72	3G	0.14	T-Band	170abcde
YGVT + Capture	LFR	0.09	Furrow	168abcde
DKC 61-72	-----	-----	-----	161 bcde
Pi-HxXTRA	-----	-----	-----	152 cde
Force + Pioneer 35K03	3G	0.12	Furrow	143 de
Mycogen 2J665	-----	-----	-----	139 e
Pioneer 35K03	-----	-----	-----	101 f

¹ Planted May 13, 2008; machine harvested October 25, 2008

² My-HxXTRA = Mycogen brand Herculex XTRA (Mycogen 2J669); Mycogen 2J665 (isoline)

Pi-HxXTRA = Pioneer brand Herculex XTRA (Pioneer 35K04); Pioneer 35K03 (isoline)

YGVT = YieldGard VT Triple (DKC61-69); DKC 61-72 (isoline)

³ Insecticide listed as ounces a.i. per 1,000 row-ft; seed treatment (ST) listed as mg a.i./seed

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

ST = seed treatment

⁵ Means based on 4 observations (2-row trt x 68.75 row-ft/treatment x 4 replications)

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

⁷ Yields converted to 15.5% Moisture

⁸ AB, BB, CB = experimental seed treatments provided by Bayer CropScience

⁹ A14974 (liquid Force) = experimental insecticide provided by Syngenta

Table 16. Average root-injury and product consistency for evaluation of insecticide treatments and plant-incorporated protectants. Monsanto-Bayer yield study: Sutherland, IA. 2008¹

Treatment	Hybrid ²	Form.	Rate ³	Placement ⁴	Node-Injury ^{5,6,7}	Product Consistency ^{7,8}
Poncho1250	DKC 61-69	600FS	1.25	ST	0.01a	100a
Aztec	DKC 61-69	2.1G	0.14	Furrow	0.02a	100a
CHECK	DKC 61-69	-----	-----	-----	0.03a	100a
Aztec	DKC 61-72	2.1G	0.14	Furrow	0.63ab	50 b
Poncho1250	DKC 61-72	600FS	1.25	ST	1.05 b	0 c
CHECK	DKC 61-72	-----	-----	-----	1.56 c	0 c

¹ Planted May 9, 2008; evaluated August 15, 2008

² Hybrids were YieldGard VTtriple (DKC 61-69) and the associated non-Bt near isoline (DKC 61-72)

³ Insecticide listed as ounces a.i. per 1,000 row-ft; seed treatment (ST) listed as mg a.i./seed

⁴ T-band & Furrow = Insecticide applied at planting time; ST = seed treatment

⁵ Chemical and check means based on 20 observations (5 roots/2 row treatment x 4 replications)

⁶ Iowa State Node-Injury Scale (0-3). Number of full or partial nodes completely eaten

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

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

Table 17. Average stand counts, percent lodging, and yield for evaluation of insecticide treatments and plant-incorporated protectants. Monsanto-Bayer yield study: Sutherland, IA. 2008¹

Treatment	Hybrid ²	Form.	Rate ³	Placement ⁴	Stand Counts ^{5,6}	% Lodging ^{6,7}	Bushels/Acre ^{8,9,10}
Poncho 1250	DKC 61-69	600FS	1.25	ST	29.40	0a	213a
Aztec	DKC 61-69	2.1G	0.14	Furrow	29.60	0a	212a
CHECK	DKC 61-69	-----	-----	-----	29.50	0a	208a
Aztec	DKC 61-72	2.1G	0.14	Furrow	30.75	1a	202 b
Poncho 1250	DKC 61-72	600FS	1.25	ST	30.75	12 b	202 b
CHECK	DKC 61-72	-----	-----	-----	29.60	35 c	195 b

¹ Planted May 9, 2008; evaluation dates: stand counts October 2; lodging October 2; yield October 30, 2008

² Hybrids were YieldGard VTtriple (DKC 61-69) and the associated non-Bt near isoline (DKC 61-72)

³ Insecticide listed as ounces a.i. per 1,000 row-ft; seed treatment (ST) listed as mg a.i./seed

⁴ T-band & Furrow = Insecticide applied at planting time; ST = seed treatment

⁵ No significant differences between means (ANOVA, $P \leq 0.05$)

⁶ Means based on 8 observations (2-row trt x 17.5 row-ft/treatment x 4 reps)

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

⁸ Means sharing a common letter do not differ significantly based on ANOVA ($P \leq 0.05$)

⁹ Means based on 4 observations (2-row trt x 70 row-ft/treatment x 4 reps)

¹⁰ Yields converted to 15.5% Moisture

Table 18. Average stand counts for planting-time seed treatments. Bayer yield study:
ISU Johnson Farm, Ames, IA. 2008¹

Entry/Treatment	Form.	Rate ²	Placement ³	Stand Counts ^{4,5}
A/4.Vortex FL	FS	0.324	ST	31.80
Allegiance FL	FS	0.365	ST	
Trilex flow Fungicide	FS	0.605	ST	
Poncho FS	FS	-----	----	
Pro-ized Purple Clnt	FS	1.9	ST	
L1463-B	AL	19	ST	
L1273-B	AL	2.26	ST	
TALC	WP	3.8	ST	
Stratego PRO	EC	4.0 oz/A	R2	
A/3.Vortex FL	FS	0.324	ST	
Allegiance FL	FS	0.365	ST	
Trilex flow Fungicide	FS	0.605	ST	
Poncho FS	FS	-----	----	
Pro-ized Purple Clnt	FS	1.9	ST	
L1463-B	AL	19	ST	
L1273-B	AL	2.26	ST	
TALC	WP	3.8	ST	
A/6.Vortex FL	FS	0.324	ST	31.10
Allegiance FL	FS	0.365	ST	
Trilex flow Fungicide	FS	0.605	ST	
Poncho FS	FS	-----	----	
Pro-ized Red Clnt	FS	1.14	ST	
L1463-B	AL	7.55	ST	
TALC	WP	3.8	ST	
Aztec	2.1G	0.14	Furrow	
A/5.Maxim XL	LS	0.63	ST	31.00
Apron XL	ES	0.166	ST	
Dynasty	FS	0.584	ST	
Cruiser 5FS	FS	-----	ST	
Pro-ized Red Clnt	FS	1.14	ST	
L1463-B	AL	7.55	ST	
TALC	WP	3.8	ST	
Quilt	SE	14 oz/A	R2	
A/1.Maxim XL	LS	0.63	ST	30.60
Apron XL	ES	0.166	ST	
Pro-ized Red Clnt	FS	1.14	ST	
Dynasty	FS	0.584	ST	

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Table 18. Average stand counts for planting-time seed treatments. Bayer yield study: ISU Johnson Farm, Ames, IA. 2008¹ (continued)

Entry/Treatment	Form.	Rate ²	Placement ³	Stand Counts ^{4,5}
A/7.Vortex FL	FS	0.324	ST	30.60
Allegiance FL	FS	0.365	ST	
Trilex flow Fungicide	FS	0.605	ST	
Poncho FS	FS	-----	----	
Pro-ized Purple Clnt	FS	1.9	ST	
L1463-B	AL	19	ST	
L1273-B	AL	2.26	ST	
TALC	WP	3.8	ST	
StrategoPRO+Biofrge	EC+XL	4 oz/A+1 pt/A	R2	
A/2.Vortex FL	FS	0.324	ST	
Allegiance FL	FS	0.365	ST	
Trilex flow Fungicide	FS	0.605	ST	
Poncho FS	FS	-----	----	
Pro-ized Red Clnt	FS	1.14	ST	
L1463-B	AL	7.55	ST	
TALC	WP	3.8	ST	

¹ Planted May 6, 2008; evaluated June 16, 2008

² Seed treatment's listed as ounces per 1,000 row-ft; Fungicide's (R2) listed as oz/A=ounces per Acre or pt/A= pints per Acre; Insecticide (Furrow) listed as ounces a.i. per 1,000 row-ft

³ ST = seed treatment; R2 = Reproductive Stage 2; Furrow = insecticide applied at planting time

⁴ Means based on 24 observations (4 center rows x 17.5 row-ft x 6 replications)

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

Table 19. Average yields for planting-time seed treatments. Bayer yield study: ISU Johnson Farm, Ames, IA. 2008¹

Entry/Treatment	Form.	Rate ²	Placement ³	Bushels/ Acre ^{4,5,6}
A/4.Vortex FL	FS	0.324	ST	226a
Allegiance FL	FS	0.365	ST	
Trilex flow Fungicide	FS	0.605	ST	
Poncho FS	FS	-----	----	
Pro-ized Purple Clnt	FS	1.9	ST	
L1463-B	AL	19	ST	
L1273-B	AL	2.26	ST	
TALC	WP	3.8	ST	
Stratego PRO	EC	4.0 oz/A	R2	
A/6.Vortex FL	FS	0.324	ST	208ab
Allegiance FL	FS	0.365	ST	
Trilex flow Fungicide	FS	0.605	ST	
Poncho FS	FS	-----	----	
Pro-ized Red Clnt	FS	1.14	ST	
L1463-B	AL	7.55	ST	
TALC	WP	3.8	ST	
Aztec	2.1G	0.14	Furrow	
A/3.Vortex FL	FS	0.324	ST	202ab
Allegiance FL	FS	0.365	ST	
Trilex flow Fungicide	FS	0.605	ST	
Poncho FS	FS	-----	----	
Pro-ized Purple Clnt	FS	1.9	ST	
L1463-B	AL	19	ST	
L1273-B	AL	2.26	ST	
TALC	WP	3.8	ST	
A/7.Vortex FL	FS	0.324	ST	198ab
Allegiance FL	FS	0.365	ST	
Trilex flow Fungicide	FS	0.605	ST	
Poncho FS	FS	-----	----	
Pro-ized Purple Clnt	FS	1.9	ST	
L1463-B	AL	19	ST	
L1273-B	AL	2.26	ST	
TALC	WP	3.8	ST	
StrategoPRO+Biofrge	EC+XL	4 oz/A+1 pt/A	R2	

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Table 19. Average yields for planting-time seed treatments. Bayer yield study: ISU Johnson Farm, Ames, IA. 2008¹ (continued)

Entry/Treatment	Form.	Rate ²	Placement ³	Bushels/ Acre ^{4,5,6}
A/2.Vortex FL	FS	0.324	ST	194ab
Allegiance FL	FS	0.365	ST	
Trilex flow Fungicide	FS	0.605	ST	
Poncho FS	FS	-----	----	
Pro-ized Red Clnt	FS	1.14	ST	
L1463-B	AL	7.55	ST	
TALC	WP	3.8	ST	
A/5.Maxim XL	LS	0.63	ST	189 b
Apron XL	ES	0.166	ST	
Dynasty	FS	0.584	ST	
Cruiser 5FS	FS	-----	ST	
Pro-ized Red Clnt	FS	1.14	ST	
L1463-B	AL	7.55	ST	
TALC	WP	3.8	ST	
Quilt	SE	14 oz/A	R2	
A/1.Maxim XL	LS	0.63	ST	181 b
Apron XL	ES	0.166	ST	
Pro-ized Red Clnt	FS	1.14	ST	
Dynasty	FS	0.584	ST	

¹ Planted May 6, 2008; machine harvested October 29, 2008

² Seed treatment's listed as ounces per 1,000 row-ft; Fungicide's (R2) listed as oz/A=ounces per Acre or pt/A= pints per Acre; Insecticide (Furrow) listed as ounces a.i. per 1,000 row-ft

³ ST = seed treatment; R2 = Reproductive Stage 2; Furrow = insecticide applied at planting time

⁴ Means based on 6 observations (4 center rows x 30 row-ft x 6 replications)

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

⁶ Yields converted to 15.5% Moisture

Table 20. Average stand counts for planting-time seed treatments. Bayer yield study:
Nashua, IA. 2008¹

Entry/Treatment	Form.	Rate ²	Placement ³	Stand Counts ^{4,5}
A/4.Vortex FL	FS	0.324	ST	32.60
Allegiance FL	FS	0.365	ST	
Trilex flow Fungicide	FS	0.605	ST	
Poncho FS	FS	-----	----	
Pro-ized Purple Clnt	FS	1.9	ST	
L1463-B	AL	19	ST	
L1273-B	AL	2.26	ST	
TALC	WP	3.8	ST	
Stratego PRO	EC	4.0 oz/A	R2	
A/2.Vortex FL	FS	0.324	ST	
Allegiance FL	FS	0.365	ST	
Trilex flow Fungicide	FS	0.605	ST	
Poncho FS	FS	-----	----	
Pro-ized Red Clnt	FS	1.14	ST	
L1463-B	AL	7.55	ST	
TALC	WP	3.8	ST	
A/6.Vortex FL	FS	0.324	ST	31.90
Allegiance FL	FS	0.365	ST	
Trilex flow Fungicide	FS	0.605	ST	
Poncho FS	FS	-----	----	
Pro-ized Red Clnt	FS	1.14	ST	
L1463-B	AL	7.55	ST	
TALC	WP	3.8	ST	
Aztec	2.1G	0.14	Furrow	
A/1.Maxim XL	LS	0.63	ST	31.70
Apron XL	ES	0.166	ST	
Pro-ized Red Clnt	FS	1.14	ST	
Dynasty	FS	0.584	ST	
A/3.Vortex FL	FS	0.324	ST	31.60
Allegiance FL	FS	0.365	ST	
Trilex flow Fungicide	FS	0.605	ST	
Poncho FS	FS	-----	----	
Pro-ized Purple Clnt	FS	1.9	ST	
L1463-B	AL	19	ST	
L1273-B	AL	2.26	ST	
TALC	WP	3.8	ST	

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Table 20. Average stand counts for planting-time seed treatments. Bayer Yield Study: Nashua, IA. 2008¹ (continued)

Entry/Treatment	Form.	Rate ²	Placement ³	Stand Counts ^{4,5}
A/7.Vortex FL	FS	0.324	ST	31.50
Allegiance FL	FS	0.365	ST	
Trilex flow Fungicide	FS	0.605	ST	
Poncho FS	FS	-----	----	
Pro-ized Purple Clnt	FS	1.9	ST	
L1463-B	AL	19	ST	
L1273-B	AL	2.26	ST	
TALC	WP	3.8	ST	
StrategoPRO+Biofrge	EC+XL	4 oz/A+1 pt/A	R2	
A/5.Maxim XL	LS	0.63	ST	
Apron XL	ES	0.166	ST	
Dynasty	FS	0.584	ST	
Cruiser 5FS	FS	-----	ST	
Pro-ized Red Clnt	FS	1.14	ST	
L1463-B	AL	7.55	ST	
TALC	WP	3.8	ST	
Quilt	SE	14 oz/A	R2	

¹ Planted May 12, 2008; evaluated June 6 & 24, 2008

² Seed treatment's listed as ounces per 1,000 row-ft; Fungicide's (R2) listed as oz/A=ounces per Acre or pt/A= pints per Acre; Insecticide (Furrow) listed as ounces a.i. per 1,000 row-ft

³ ST = seed treatment; R2 = Reproductive Stage 2; Furrow = insecticide applied at planting time

⁴ Means based on 48 observations (4 center rows x 17.5 row-ft x 6 replications x 2 dates)

⁵ No significant differences between means (ANOVA, $P \leq 0.05$)

Table 21. Average yield for planting-time seed treatments. Bayer yield study: Nashua, IA. 2008¹

Entry/Treatment	Form.	Rate ²	Placement ³	Bushels/ Acre ^{4,5,6}
A/4.Vortex FL	FS	0.324	ST	194
Allegiance FL	FS	0.365	ST	
Trilex flow Fungicide	FS	0.605	ST	
Poncho FS	FS	-----	----	
Pro-ized Purple Clnt	FS	1.9	ST	
L1463-B	AL	19	ST	
L1273-B	AL	2.26	ST	
TALC	WP	3.8	ST	
Stratego PRO	EC	4.0 oz/A	R2	
A/1.Maxim XL	LS	0.63	ST	
Apron XL	ES	0.166	ST	
Pro-ized Red Clnt	FS	1.14	ST	
Dynasty	FS	0.584	ST	
A/3.Vortex FL	FS	0.324	ST	189
Allegiance FL	FS	0.365	ST	
Trilex flow Fungicide	FS	0.605	ST	
Poncho FS	FS	-----	----	
Pro-ized Purple Clnt	FS	1.9	ST	
L1463-B	AL	19	ST	
L1273-B	AL	2.26	ST	
TALC	WP	3.8	ST	
A/2.Vortex FL	FS	0.324	ST	180
Allegiance FL	FS	0.365	ST	
Trilex flow Fungicide	FS	0.605	ST	
Poncho FS	FS	-----	----	
Pro-ized Red Clnt	FS	1.14	ST	
L1463-B	AL	7.55	ST	
TALC	WP	3.8	ST	
A/7.Vortex FL	FS	0.324	ST	
Allegiance FL	FS	0.365	ST	
Trilex flow Fungicide	FS	0.605	ST	
Poncho FS	FS	-----	----	
Pro-ized Purple Clnt	FS	1.9	ST	
L1463-B	AL	19	ST	
L1273-B	AL	2.26	ST	
TALC	WP	3.8	ST	
StrategoPRO+Biofrge	EC+XL	4 oz/A+1 pt/A	R2	

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Table 21. Average yield for planting-time seed treatments. Bayer yield study: Nashua, IA. 2008¹ (continued)

Entry/Treatment	Form.	Rate ²	Placement ³	Bushels/ Acre ^{4,5,6}
A/6.Vortex FL	FS	0.324	ST	172
Allegiance FL	FS	0.365	ST	
Trilex flow Fungicide	FS	0.605	ST	
Poncho FS	FS	-----	----	
Pro-ized Red Clnt	FS	1.14	ST	
L1463-B	AL	7.55	ST	
TALC	WP	3.8	ST	
Aztec	2.1G	0.14	Furrow	
A/5.Maxim XL	LS	0.63	ST	171
Apron XL	ES	0.166	ST	
Dynasty	FS	0.584	ST	
Cruiser 5FS	FS	-----	ST	
Pro-ized Red Clnt	FS	1.14	ST	
L1463-B	AL	7.55	ST	
TALC	WP	3.8	ST	
Quilt	SE	14 oz/A	R2	

¹ Planted May 12, 2008; machine harvested November 5, 2008

² Seed treatment's listed as ounces per 1,000 row-ft; Fungicide's (R2) listed as oz/A=ounces per Acre or pt/A= pints per Acre; Insecticide (Furrow) listed as ounces a.i. per 1,000 row-ft

³ ST = seed treatment; R2 = Reproductive Stage 2; Furrow = insecticide applied at planting time

⁴ Means based on 6 observations (4 center rows x 30 row-ft x 6 replications)

⁵ No significant differences between means (ANOVA, $P \leq 0.05$)

⁶ Yields converted to 15.5% Moisture

Table 22. Average stand counts for planting-time insecticide treatments. Wireworm study: Rhodes-ISU Farm, Rhodes, IA. 2008¹

Treatment ²	Form.	Rate	Placement ³	Stand Counts ^{4,5}
Cruiser+KGS ⁶	5FS	0.25 mg ai/sd+225g/100kg	ST	30.75
Poncho	600FS	0.25 mg ai/sd	ST	30.70
CHECK	-----	-----	----	30.30
V-10170-1729	5FS	0.25 mg ai/sd	ST	30.30
V-10170-1713	5FS	0.25 mg ai/sd	ST	30.00
Poncho+KGS ⁶	600FS	0.25 mg ai/sd+225g/100kg	ST	29.40
Cruiser	5FS	0.25 mg ai/sd	ST	27.40

¹ Planted May 19, 2008; evaluated June 16 & 23 and July 1, 2008

² These seed treatments were applied over Hybrid TA685-02

³ ST = Seed treatment

⁴ Chemical and check means based on 12 observations (17.5 row-ft/treatment x 4 replications x 3 dates)

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

⁶ KGS = Kernel Guard Supreme seed treatment from Chemtura Corporation, applied by ISU

Table 23. Average stand counts for planting-time insecticide treatments. Wireworm study: Rhodes-ISU Farm, Rhodes, IA. 2008¹

Treatment ²	Form.	Rate ³	Placement ⁴	Stand Counts ^{5,6}
Fortress Plus-SB	5G	0.15	Furrow	30.25
AMV101G-SB	5.8G	0.17	Furrow	30.10
Fortress-SB	5G	0.15	Furrow	29.90
CHECK	-----	-----	-----	29.70

¹ Planted: May 19, 2008; evaluated June 16 & 23 and July 1, 2008

² These insecticide applications were applied over a conventional hybrid, Blue River Hybrid # 56M30

³ Granular formulations expressed as ounces a.i. per 1,000 row-ft

⁴ Furrow = insecticide applied at planting time; SB = Smartbox application at planting time

⁵ Chemical and check means based on 12 observations (17.5 row-ft/treatment x 4 rep. x 3 dates)

⁶ No significant differences between means (ANOVA, P < 0.05)

Table 24. Average percentage of damaged seeds/seedlings and damage ratings for planting-time insecticide treatments. Wireworm study: Rhodes-ISU Farm, Rhodes, IA. 2008¹

Treatment ²	Form.	Rate ³	Placement ⁴	% Damage ^{5,6}	Damage Rating ^{5,6,7}
Fortress Plus-SB	5G	0.15	Furrow	0	1.00
AMV101G-SB	5.8G	0.17	Furrow	0	1.00
Fortress-SB	5G	0.15	Furrow	0	1.00
CHECK	-----	-----	-----	0	1.00
Cruiser	5FS	0.25 mg ai/sd	ST	0	1.00
Poncho	600FS	0.25 mg ai/sd	ST	0	1.00
V-10170-1729	5FS	0.25 mg ai/sd	ST	0	1.00
V-10170-1713	5FS	0.25 mg ai/sd	ST	0	1.00
CHECK	-----	-----	-----	0	1.00
Cruiser+KGS ⁶	5FS	0.25 mg ai/sd+225g/100kg	ST	0	1.00
Poncho+KGS ⁶	600FS	0.25 mg ai/sd+225g/100kg	ST	0	1.00

¹ Planted May 19, 2008; evaluated July 1, 2008

² The first three insecticides were applied over a conventional hybrid, Blue River Hybrid # 56M30, the CHECK was also planted to this same hybrid; The next seven seed treatments were applied over T.A. Seeds hybrid 685-02. The CHECK was also planted to this hybrid and treated with fungicide only

³ Granular formulations expressed as ounces a.i. per 1,000 row-ft

⁴ ST = seed treatment; Furrow = insecticide applied at planting time

⁵ Means based on 20 observations (one 5-plant evaluation/treatment x 4 replications)

⁶ No significant differences between means (ANOVA, $P < 0.05$); Pressure was very light to minimal at this site

⁷ Rating scale: (1) seed/seedling undamaged, (2) seed/seedling damaged but plant established, (3) seed/seedling damaged, plant showing some signs of stress, (4) seed/seedling damaged, no plant or questionable establishment

Table 25. Average stand counts for planting-time insecticide treatments. Seedcorn maggot study: ISU Johnson Farm, Ames, IA. 2008¹

Treatment ^{2,3}	Form.	Rate ⁴	Placement ⁵	Stand Counts ^{6,7}
V-10170-1729	5FS	0.25	ST	21.25a
Poncho 600	600FS	0.25	ST	20.00a
Cruiser	5FS	0.25	ST	20.00a
V-10170-1713	5FS	0.25	ST	19.00a
CHECK	-----	-----	-----	15.00a
Unbaited	-----	-----	-----	20.75a
Baited	-----	-----	-----	6.20 b

¹ Row furrows baited May 5 & re-baited May 9, 2008; hand planted on May 12; stand counts June 5, 2008

² The first four seed treatments were applied over T.A. Seeds hybrid 685-02, the CHECK was also planted to this hybrid

³ For the baited and unbaited check, we used a conventional hybrid, fungicide applied only, Blue River Hybrid #56M30

⁴ Seed treatments (ST) listed as mg a.i./seed

⁵ ST = seed treatment

⁶ Means based on 4 observations (15 row-ft/treatment x 4 replications)

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

Table 26. Average percentage of damaged seeds/seedlings and damage ratings for planting-time insecticide treatments. Seedcorn maggot study: ISU Johnson Farm, Ames, IA. 2008¹

Treatment ^{2,3}	Form.	Rate ⁴	Placement ⁵	%Damage ^{6,7}	Damage Rating ⁸
V-10170-1729	5FS	0.25	ST	0a	1.00a
V-10170-1713	5FS	0.25	ST	10a	1.05a
Cruiser	5FS	0.25	ST	26ab	1.15a
Poncho 600	600FS	0.25	ST	28ab	1.25a
CHECK	-----	-----	-----	53 b	1.60a
Unbaited	-----	-----	-----	33ab	1.23a
Baited	-----	-----	-----	94 c	2.88 b

¹ Row furrows baited May 5 & re-baited May 9, 2008; hand planted May 12; evaluated for damage on June 5 & 6, 2008

² The first four seed treatments were applied over T.A. Seed hybrid 685-02. The CHECK was also planted to this hybrid and treated with fungicide only

³ For the baited and unbaited check, we used a conventional hybrid, fungicide applied only, Blue River Hybrid #56M30

⁴ Seed treatments (ST) listed as mg a.i./seed

⁵ ST = seed treatment

⁶ Means based on 20 observations (one 5-plant evaluation/treatment x 4 replications)

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

⁸ Rating scale: (1) seed/seedling undamaged, (2) seed/seedling damaged but plant established, (3) seed/seedling damaged, plant showing some signs of stress, (4) seed/seedling damaged, no plant or questionable establishment

APPENDIX I

Agronomic Information

2008
Field History Data

	Ames, IA Corn Rootworm Studies (following trap crop)	Crawfordsville, IA Corn Rootworm Studies (following trap crop)
Insecticide History		
2007	No Insecticide (trap crop)	No Insecticide (trap crop)
2006	No Insecticide (soybeans)	Insecticide Test Plot
2005	Insecticide Test Plot	No Insecticide (trap crop)
2004	No Insecticide (trap crop)	Insecticide Test Plot
Tillage	Fall: Disk ripper; Spring: (2X) Field cultivation	Fall: Chisel; Spring: Field cultivation
Variety	DKC61-69 & DKC61-72; Mycogen 2J665, Mycogen 2J669; Pioneer 33D13 & 33D14	DKC61-72 & DKC61-73; T.A. Seeds hybrid 555-02; Pioneer 33D13 & Pioneer 33D14
Planting Date	May 16	May 9
Planting Rate	35,600 seeds/A	35,600 seeds/A
Herbicide ¹	2 qt Harness/Atrazine- May 5; 0.76 oz Beacon -June 30.	2 qt Harnesss Extra + 3 oz Balance Pro- May 10; 1 qt Laddok S-12 + 0.75 qt Atrazine + 1 pt COC-June 18
Fertilizer ²	<u>N</u> <u>P</u> <u>K</u>	<u>N</u> <u>P</u> <u>K</u>
Fall Applied	0 40 120	--- --- ---
Spring-Preplant	147 --- ---	175 --- ---
Dates		
Cultivation	None	None
Stand Count	June 16, July 10, October 1	June 17
Root Digging	July 22 & 23	July 17
Lodging	October 1	September 24
Harvest	October 28	October 31
Soil Type	Clay Loam	Silty Clay Loam
Soil Organic Matter %	---	5.10
Soil pH	---	4.90

¹ Expressed as formulation per acre.

² Expressed as pounds per acre. Spring-Preplant: 147 lbs actual nitrogen applied as urea on May 1 (Ames); Spring-Preplant 175 lbs actual nitrogen applied as anhydrous ammonia (82.5-0-0) on May 5 (Crawfordsville).

2008
Field History Data

	Nashua, IA Corn Rootworm Studies (following trap crop)	Sutherland, IA Corn Rootworm Studies (following trap crop)
Insecticide History		
2007	No Insecticide (trap crop)	No Insecticide (trap crop)
2006	Insecticide Test Plot	Insecticide Test Plot
2005	No Insecticide (trap crop)	No Insecticide (trap crop)
2004	Insecticide Test Plot	Insecticide Test Plot
Tillage		
	Fall-chopped stalks & chisel; Spring-field cultivation	Fall-chopped stalks & chisel; Spring-disk & field cultivation
Variety		
	DKC61-69 & DKC61-72; Mycogen 2J665, Mycogen 2J669; Pioneer 35K03 & 35K04	DKC61-69 & DKC61-72
Planting Date		
	May 13	May 9
Planting Rate		
	35,600 seeds/A	32,000 seeds/A
Herbicides¹		
	21 oz. Outlook -May 14; 2.5 pt. Marksman -June 4; 1 qt Basagran+ 28%UAN -July 9.	2 pt harness + 8 oz Outlook -May 10; 22 oz Roundup Weathermax + 2 oz Callisto + 8 oz Atrazine+ 8 oz AMS -June 18.
Fertilizer²		
	<u>N</u> <u>P</u> <u>K</u>	<u>N</u> <u>P</u> <u>K</u>
Fall Applied	--- --- ---	--- --- ---
Preplant	180 --- ---	36 92 00
Side-dress		150 --- ---
Dates		
Cultivation	none	none
Stand Count	June 4 & 24; September 26	July 9 & 16; October 2
Root Digging	August 5	August 14
Lodging	September 26	October 2
Harvest	October 25	October 30
Soil Type		
	Loam	Galva Silty Clay Loam
Soil Organic Matter %		
	3.85	5.1
Soil pH		
	7.6	5.3

¹ Expressed as formulation per acre.

² Expressed as pounds per acre. Spring-preplant 180 lbs actual nitrogen applied as anhydrous ammonia (82.5-0-0) on May 1 (Nashua); Spring pre-plant-dry fertilizer applied (36-92-00)-April 24; Spring-side-dress fertilizer applied (28% N), 150 lbs on May 14 (Sutherland).

2008
Field History Data

	Ames, IA Johnson Farm Seedcorn Maggot Study	Rhodes, IA ISU Rhodes Farm Wireworm Study
Insecticide History		
2007	No insecticide (soybeans)	Pasture
2006	No insecticide (corn)	Pasture
2005	No insecticide (soybeans)	Pasture
2004	No Insecticide (corn)	Pasture
Tillage	Spring-field cultivated(2X)	Spring- plowed (1X), field cultivated-(3X).
Variety	T.A. Seeds hybrid 685-02; Blue River Hybrids 56M30	Blue River Hybrids 56M30; T.A. Seeds hybrid 685-02
Planting Date	May 12 (Hand planted)	May 19
Planting Rate	30 seeds/20 ft-row	35,600 seeds/A
Baited	May 5 & 9	May 21
Baited Product	1/3 oz/row-ft bone & meat meal	½ cup corn seed, ½ cup wheat seed, soaked in water for 24 hours, then planted.
Herbicide	None	64 oz Glyphosate-April 29.
Fertilizer ¹		
Fall Applied	<u>N</u> <u>P</u> <u>K</u> --- --- ---	<u>N</u> <u>P</u> <u>K</u> --- --- ---
Side-dress	--- --- ---	150 --- ---
Dates		
Stand Count	June 5	June 16 & 23, July 1
Seed/Seedling- Evaluation	June 5 & 6	July 1

¹ Expressed as pounds per acre. Spring-150 lbs (34-0-0) applied side-dress on May 20 as Ammonium Nitrate through a broadcast seeder (ISU Rhodes Farm).

2008
Field History Data

	Ames, IA Seed treatment/Fungicide study (following soybeans)	Nashua, IA Seed treatment/Fungicide study (following soybeans)
Insecticide History		
2007	Warrior insecticide (SB's)	Furadan insecticide (SB's)
2006	No insecticide (corn)	No insecticide (corn)
2005	No insecticide (SB's)	No insecticide (SB's)
2004	No insecticide (corn)	No insecticide (corn)
Tillage	Spring-field cultivated(2X)	Fall-chisel; Spring-field cultivated
Variety	Unknown	Unknown
Planting Date	May 6	May 12
Planting Rate	35,600	35,600
Herbicides¹	2 qts Harness Xtra-May 5; 18 oz Roundup PowerMax + 3 oz Laudis + 1% AMS-June 30.	21 oz. Outlook-May 14; 22 oz Roundup PowerMax + 1% AMS-June 30.
Fertilizer²	<u>N</u> <u>P</u> <u>K</u>	<u>N</u> <u>P</u> <u>K</u>
Fall Applied	--- --- ---	--- --- ---
Preplant	121 --- ---	180 --- ---
Dates		
Cultivation	None	None
Stand Count	June 16	June 4 & 24
Root Digging	-----	-----
Lodging	-----	-----
Harvest	October 29	November 5
Soil Type	Loam	Loam
Soil Organic Matter %	7.3	3.95
Soil pH	4.4	6.58

¹ Expressed as formulation per acre.

² Expressed as pounds per acre. Spring-preplant 180 lbs actual nitrogen applied as anhydrous ammonia (82.5-0-0) on May 1 (Nashua); Spring-preplant 121 lbs actual nitrogen (urea) applied on May 5 (Ames).

APPENDIX II

Weather Data

Ames¹
Rainfall and Temperature 2008

Day	May			June			July		
	Temp (°F) Low	Temp (°F) High	Rainfall Inches	Temp (°F) Low	Temp (°F) High	Rainfall Inches	Temp (°F) Low	Temp (°F) High	Rainfall Inches
1	53	75		59	83		57	84	
2	41	66	0.49	62	77	0.51	67	86	
3	40	57	0.01	58	70	1.63	57	78	
4	36	71		61	71	0.08	57	79	
5	44	76		63	82	1.01	58	81	
6	51	81	1.68	64	74	0.10	67	88	0.01
7	49	64	0.03	62	87		68	92	0.51
8	44	66		64	76	1.06	67	83	0.19
9	50	66		58	76	0.22	64	83	
10	49	61	0.27	55	82	0.01	68	86	0.17
11	40	59	0.01	62	82	2.17	71	87	0.38
12	42	69		60	79	0.24	58	76	0.02
13	47	64		58	76		55	81	
14	41	66		56	85		58	88	
15	45	71		61	82	0.01	66	90	
16	46	76		55	74		69	82	
17	57	81		56	78		66	89	1.45
18	48	68		58	82		66	79	0.01
19	50	74	0.04	60	83		64	82	1.17
20	46	68		57	86		66	89	
21	41	72		61	83	0.26	64	82	1.02
22	51	62		60	81		63	82	0.01
23	50	60	1.00	57	82		61	78	0.05
24	48	65	0.04	63	78		61	69	0.74
25	58	86	0.05	62	88		66	80	
26	59	79		62	73	1.99	65	83	
27	46	61	0.42	64	84	0.07	62	85	1.59
28	47	64		57	73	0.02	67	84	0.01
29	52	66	1.90	60	79		69	86	0.58
30	60	78	1.19	58	80		66	85	
31	56	80					67	87	0.01
Mean/Total	58.7	75.0	7.13	69.7	83.0	9.38	73.6	84.0	7.93
Normal	60.0	75.0	4.16	68.9	83.0	5.14	73.8	84.0	4.90
D.F.N.	-1.3		+2.97	+0.8		+4.24	-0.2		+3.03

¹Weather station located 2 miles SE of test site

Ames¹
Rainfall and Temperature 2008

Day	August			September			October		
	Temp (°F)		Rainfall Inches	Temp (°F)		Rainfall Inches	Temp (°F)		Rainfall Inches
	Low	High		Low	High		Low	High	
1	65	83		63	87		43	61	
2	61	82		58	82		37	69	
3	69	95		51	66		45	67	
4	73	90	0.05	50	66		41	70	
5	59	81		47	70	0.03	56	77	
6	58	78		48	66	0.01	60	77	0.53
7	63	82		48	70		45	63	0.69
8	58	81		45	59	0.13	41	71	
9	63	84		43	68	0.01	46	68	
10	62	79		52	72	0.11	47	74	
11	56	76		61	75	0.80	52	78	
12	61	72	0.49	62	67	0.51	61	76	
13	58	83	0.14	59	75	0.04	45	67	0.28
14	62	78		52	61		38	55	0.14
15	59	77	0.01	44	67		38	58	0.37
16	57	80		47	80		34	58	
17	59	81		52	84		43	48	0.04
18	58	84	0.01	57	80		36	56	
19	60	85		55	79		44	72	
20	61	81		53	80		37	62	
21	65	71	0.01	53	77		31	50	0.05
22	67	86		58	73	0.04	42	49	0.56
23	60	77		61	82	0.44	40	48	0.26
24	54	76		58	80	0.01	35	47	0.20
25	53	77		54	79		35	64	0.01
26	54	76		57	82		35	50	0.07
27	57	77	0.22	55	80		26	41	
28	61	83	0.66	53	70		22	50	
29	52	81		48	68	0.49	32	63	
30	56	83		42	66		35	72	
31	57	83					44	74	
Mean/Total	70.3		1.59	63.3		2.61	51.6		3.20
Normal	71.2		4.70	64.2		2.98	50.4		2.62
D.F.N.	-0.9		-2.48	-0.9		-0.37	+1.2		+0.58

¹Weather station located 2 miles SE of test site

Crawfordsville¹
Rainfall and Temperature 2008

Day	May			June			July		
	Temp (°F)		Rainfall Inches	Temp (°F)		Rainfall Inches	Temp (°F)		Rainfall Inches
	Low	High		Low	High		Low	High	
1	51	77		56	86		55	84	
2	50	71	0.17	60	84	0.01	64	85	0.67
3	40	60	0.01	58	74	0.98	57	76	
4	34	69		62	80		55	78	
5	46	78		69	87	0.03	55	80	
6	50	81		64	82	0.36	64	87	0.01
7	53	70	0.34	62	89	0.02	69	91	0.56
8	48	67		66	85	0.36	67	83	0.84
9	46	67		60	75	0.23	60	83	
10	44	67	0.86	54	82	0.16	66	87	
11	42	60	1.83	67	83		71	87	
12	37	67		64	83	1.67	58	78	0.09
13	51	68	0.02	60	79	0.03	56	80	
14	45	69		58	85		56	87	
15	42	65		61	83	0.04	65	88	
16	41	76		57	74		69	84	
17	53	81		52	78		66	87	
18	46	68		57	84		68	80	0.01
19	46	69	0.19	55	85		67	85	0.47
20	45	69		59	86		66	88	0.01
21	42	72		63	85		64	84	0.71
22	44	66		59	82		62	83	
23	48	59	0.52	56	83		58	79	
24	47	69		62	85	0.03	63	71	0.18
25	57	83	0.50	66	87	1.24	66	80	
26	62	81	0.03	64	76	0.03	62	82	
27	48	65	0.19	66	82	0.40	61	85	0.17
28	45	69		63	79	0.08	64	85	
29	49	74		60	79		68	85	
30	62	80	0.72	57	83		66	85	
31	60	83					65	86	
Mean/Total	59.3		5.38	71.4		5.67	73.2		3.81
Normal	62.0		5.72	71.3		3.67	75.8		3.34
D.F.N.	-2.7		-0.34	+0.1		+2.00	-2.6		+0.47

¹Weather station located at test site

Crawfordsville¹
Rainfall and Temperature 2008

Day	August			September			October		
	Temp (°F)		Rainfall Inches	Temp (°F)		Rainfall Inches	Temp (°F)		Rainfall Inches
	Low	High		Low	High		Low	High	
1	64	86		63	88		39	62	
2	59	83		59	86	0.02	37	66	
3	67	89	0.16	55	65	0.02	38	67	
4	73	92		52	61	1.63	36	69	
5	60	85	0.38	46	70		49	76	
6	58	81		49	68	0.01	54	79	
7	58	82		48	71	0.01	47	62	0.58
8	54	82		44	58	0.91	41	70	0.01
9	60	82	0.14	42	69	0.06	41	70	
10	57	78		46	73		41	76	
11	53	77		59	76	0.05	48	79	
12	58	74		65	71	1.64	59	80	
13	57	84		62	76	2.14	48	75	0.04
14	60	81		53	64	0.59	42	60	
15	56	79		44	65	0.01	39	56	0.44
16	54	80		44	77		33	58	
17	57	82		50	83		35	49	0.01
18	55	84		55	80		34	57	
19	60	87		53	78		41	69	
20	61	82		53	81		35	64	
21	64	72	0.39	52	78	0.04	30	55	
22	68	84		56	78		42	52	0.03
23	59	80	0.08	59	82		40	47	0.28
24	53	77		54	81		37	47	0.04
25	51	77		50	81		34	61	0.01
26	52	77		55	82		33	52	0.01
27	54	78		53	81		27	42	0.01
28	64	83	1.99	53	75		23	48	0.16
29	52	82		49	70	0.39	27	62	
30	53	82		43	64		32	71	
31	57	83					40	75	
Mean/Total	69.9		3.14	63.3		7.52	50.9		1.62
Normal	69.9		3.33	61.6		2.58	53.8		2.82
D.F.N.	0.0		-0.19	+1.7		+4.94	-2.9		-1.20

¹Weather station located at test site

Nashua¹
Rainfall and Temperature 2008

Day	May			June			July		
	Temp (°F)		Rainfall Inches	Temp (°F)		Rainfall Inches	Temp (°F)		Rainfall Inches
	Low	High		Low	High		Low	High	
1	47	63	0.02	53	83		56	84	
2	43	68	0.56	56	72	0.20	61	84	0.01
3	37	55		57	63	0.39	57	77	
4	33	69		56	71		56	80	
5	41	74		63	82	1.42	58	82	
6	47	82	0.71	63	73	0.97	66	88	0.11
7	46	62		60	88	0.75	67	89	1.40
8	41	66		64	73	2.95	65	83	
9	49	63	0.01	60	75		59	83	0.06
10	43	57	0.19	55	79		65	87	
11	41	59		64	78	0.40	70	88	0.10
12	36	65		64	79	1.39	58	77	
13	45	63	0.01	57	76		54	80	
14	42	66		56	84	0.26	55	87	
15	40	70		59	75		65	88	
16	43	77		54	74		67	83	
17	48	79	0.03	50	77		67	87	1.92
18	41	65		56	79		66	80	
19	46	66	0.01	53	83		64	82	1.93
20	43	68		63	85		64	87	0.01
21	38	70		60	81	0.02	63	82	0.09
22	41	71		57	79		60	82	
23	48	66	0.10	55	79		58	78	
24	47	70		63	84		62	69	
25	58	78	0.43	61	88	0.04	66	81	
26	55	78		62	76	0.02	59	82	
27	45	58		62	83	0.45	61	83	0.19
28	45	69		56	71	0.12	64	85	0.02
29	49	56	2.24	56	77		69	86	
30	56	77		56	78		66	87	
31	55	79	0.03				67	86	0.14
Mean/Total	56.4		4.33	68.3		9.38	72.7		5.96
Normal	60.2		4.47	69.3		5.07	72.7		4.75
D.F.N.	-3.8		-0.14	-1.0		+4.31	0.0		+1.21

¹Weather station located at test site

Nashua¹
Rainfall and Temperature 2008

Day	August			September			October		
	Temp (°F)		Rainfall Inches	Temp (°F)		Rainfall Inches	Temp (°F)		Rainfall Inches
	Low	High		Low	High		Low	High	
1	61	82		64	87		39	59	
2	56	82		58	86		35	65	
3	66	84		50	67		39	62	
4	70	85	0.03	48	60	0.16	35	66	
5	60	82		43	72	0.05	50	68	
6	56	80	0.01	46	67		53	77	
7	58	79		49	71	0.06	44	62	1.48
8	55	81		46	61	0.14	39	70	
9	62	81	0.10	39	69		37	65	
10	54	76		45	71		47	74	
11	49	77		58	77	0.53	51	78	
12	59	75		62	67	0.02	59	80	
13	57	83		60	75	0.06	41	71	0.17
14	59	83	0.86	52	64	0.09	35	56	0.20
15	57	78		47	65		35	56	0.46
16	54	80		45	80		31	56	
17	58	82		48	82		38	48	0.06
18	57	84		55	81		30	57	
19	60	86		55	79		44	70	
20	64	83		52	81		36	59	
21	64	71	0.05	52	80		31	52	0.01
22	68	83		57	74		41	48	0.09
23	55	74		63	82	0.10	42	46	0.14
24	49	75		56	78	0.76	39	51	0.01
25	52	77		49	79		35	62	
26	51	77		56	82		32	52	0.04
27	53	76		55	77		24	41	
28	61	83	0.38	53	72		21	49	
29	51	80		49	68	0.50	27	59	
30	54	85		40	63		33	70	
31	58	83					39	70	
Mean/Total	69.0		1.42	62.8		2.47	49.7		2.61
Normal	70.5		4.99	61.4		3.21	49.5		2.57
D.F.N.	-1.5		-3.57	+1.4		-0.74	+0.2		+0.04

¹Weather station located at test site

ISU Rhodes Farm¹
Rainfall and Temperature 2008

Day	May			June			July		
	Temp (°F)		Rainfall Inches	Temp (°F)		Rainfall Inches	Temp (°F)		Rainfall Inches
	Low	High		Low	High		Low	High	
1	36	67		56	82		58	80	
2	54	74		63	84		68	83	
3	40	67	0.20	57	76	1.28	59	86	
4	35	57		60	70		58	78	
5	43	70		60	71	0.55	59	80	
6	51	78		63	83	1.85	66	80	
7	55	80	2.00	62	75		70	88	0.38
8	45	64		62	87	1.16	69	92	0.35
9	49	66		61	74	1.04	62	82	
10	48	64		55	78	0.50	62	85	
11	40	61	0.50	60	81		71	88	0.62
12	38	58		63	81	2.30	62	88	
13	39	67		61	77		55	75	
14	40	64		59	78		59	81	
15	43	65		60	86		67	88	
16	45	70		56	83		71	89	
17	52	78		51	74		68	84	1.70
18	45	83		58	77		65	87	
19	50	68		60	82		65	78	0.85
20	46	72	0.10	60	84		65	81	0.97
21	39	67		61	85		65	86	0.10
22	44	71		58	84		63	82	
23	49	62	0.87	58	82		62	82	0.18
24	48	59	0.23	61	80		61	79	0.30
25	48	65		64	79		61	68	
26	60	85	0.24	64	88	2.00	63	78	
27	46	81	0.40	65	71	0.50	62	80	0.05
28	46	55	0.24	56	84	0.52	66	85	
29	47	64	0.14	60	73	0.05	66	83	0.05
30	53	70	4.00	56	78		65	85	
31	55	79					69	86	
Mean/Total	57.4		8.92	69.7		11.75	73.4		5.55
Normal	59.8		4.25	69.5		5.26	73.5		4.96
D.F.N.	-2.4		+4.67	+0.2		+6.49	-0.1		+0.59

¹Weather station located 9 miles NW of test site at Colo

Sutherland¹
Rainfall and Temperature 2008

Day	May			June			July		
	Temp (°F)		Rainfall Inches	Temp (°F)		Rainfall Inches	Temp (°F)		Rainfall Inches
	Low	High		Low	High		Low	High	
1	47	76		58	84		56	84	
2	40	52	0.70	62	76	0.09	57	81	
3	33	56		58	68	0.92	49	76	
4	32	69		59	75	0.28	54	81	
5	41	75		62	77	0.27	63	81	0.21
6	53	78	0.58	58	74		66	85	0.16
7	44	63		62	83	0.44	66	86	0.32
8	41	64		57	73	0.49	62	81	
9	45	61	0.02	55	74		60	84	
10	39	53	0.44	53	82		65	86	0.10
11	34	59		62	80	1.17	72	91	
12	41	72		58	74	0.05	58	77	
13	42	62		51	75		55	82	
14	42	65		55	87		55	86	
15	42	70		60	78		62	87	
16	45	78		49	75		63	84	
17	48	79		49	79		68	82	0.10
18	43	69		57	81		65	81	
19	50	81		59	82		63	82	0.34
20	42	68		57	85		58	85	0.25
21	36	71		56	81		63	80	0.14
22	53	64		56	80		60	80	
23	50	60	0.64	54	79		61	74	0.10
24	49	64	0.32	59	81	0.11	63	78	0.39
25	59	83		59	85		65	84	
26	52	71		63	77	0.76	58	80	
27	43	55	0.39	59	79	0.14	66	81	
28	45	61		55	70	0.11	68	84	
29	53	64	2.38	56	77		68	87	
30	57	76		52	79		64	85	
31	54	81	0.11				65	86	
Mean/Total	56.4		5.58	67.7		4.84	72.2		2.11
Normal	59.5		3.70	69.1		4.43	73.3		4.11
D.F.N.	-3.1		+1.88	-1.4		+0.41	-1.1		-2.00

¹Weather station located at test site

Sutherland¹
Rainfall and Temperature 2008

Day	August			September			October		
	Temp (°F)		Rainfall Inches	Temp (°F)		Rainfall Inches	Temp (°F)		Rainfall Inches
	Low	High		Low	High		Low	High	
1	59	83		66	85		40	64	
2	57	81		46	73	1.45	34	70	
3	69	93	0.09	43	67		40	68	
4	66	80		44	70		44	72	
5	60	82	0.16	44	62	0.06	55	75	
6	59	80		47	66	0.01	62	76	0.39
7	56	80		47	68	0.01	38	65	0.60
8	54	81		42	66	0.27	36	72	
9	60	84		39	68		37	66	
10	63	79		55	72		49	75	
11	62	76	0.52	58	76	0.58	52	68	
12	59	82		56	64		63	76	
13	56	82		52	73	0.08	34	67	0.39
14	56	82		41	59	0.03	34	55	
15	56	76		36	72		34	54	
16	55	80		45	81		26	56	
17	53	80		48	84		41	48	0.19
18	58	83		52	79		33	58	
19	58	82		52	79		48	66	
20	56	80		53	80		32	59	
21	61	71		55	79		31	44	0.08
22	56	82		62	75	0.01	41	43	2.19
23	48	75		56	77	0.11	39	41	0.25
24	47	76		46	78		36	49	
25	48	76		57	80	0.23	34	64	0.02
26	53	76		60	83		32	49	
27	62	75	0.50	48	75		22	40	
28	50	80	0.01	47	73	0.35	19	53	
29	46	81		40	69		27	63	
30	53	82		36	72		37	73	
31	59	83					35	66	
Mean/Total	68.4		1.28	61.3		3.19	49.7		4.11
Normal	71.0		4.63	61.8		3.08	48.7		1.93
D.F.N.	-2.6		+3.35	-0.5		+0.11	+1.0		+2.18

¹Weather station located at test site

APPENDIX III

Materials Tested

Materials Tested in 2008 Iowa State University Efficacy Studies			
Common/code name	Formulation	Chemical name	Company
A1,A2,A3,A4,A5,A6,A7 Seed corn	---	See tables "18,19" & "20, 21"	Bayer CropScience
A14974	250CS	tefluthrin	Syngenta
AMV 101G	5.8G	chlorethoxyfos	AMVAC Chem. Corp.
Aztec	4.67G	tebupirimphos & cyfluthrin	AMVAC Chem. Corp.
Aztec	2.1G	tebupirimphos & cyfluthrin	Bayer CropScience
Counter	15G	terbufos	AMVAC Chem. Corp.
Counter	20G	terbufos	AMVAC Chem. Corp.
Capture	LFR	bifenthrin	FMC Corp.
Cruiser	Commercially applied seed trt (0.25 or 1.25 mg/sd)	thiamethoxam	Syngenta
DKC61-69 (YieldGard Plus with commercial seed trt)	Transgenic seedcorn (YGRW+YGCB+RR2) + commercially applied Poncho 250	Cry3Bb1 and Roundup Ready (MON88017) + Cry1Ab (MON810) + fludioxonil & mefenoxam fungicides + clothianidin seed trt (0.25 mg/seed)	Monsanto
DKC61-69 (YieldGard Plus with commercial seed trt)	Transgenic seedcorn (YGRW+YGCB+RR2) + commercially applied Poncho 1250.	Cry3Bb1 and Roundup Ready (MON88017) + Cry1Ab (MON810) + fludioxonil & mefenoxam fungicides + clothianidin seed trt (1.25 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
DKC61-72	DKC61-72 (RR2) "true isoline seed" of DKC61-69 + commercially applied Poncho 1250.	Roundup Ready Corn 2 + fludioxonil & mefenoxam fungicides + clothianidin seed trt (1.25 mg/seed)	Monsanto
DKC61-73 (with commercial seed trt)	DKC61-73 (YGCB+RR2) "near isoline seed" of DKC61-69).	Cry1Ab (MON810) + Roundup Ready Corn 2 + fludioxonil & mefenoxam fungicides + clothianidin seed trt (0.25 mg/seed)	Monsanto
Force	3G	tefluthrin	Syngenta
Fortress	2.5G	chlorethoxyfos	AMVAC Chem. Corp.

Materials Tested for 2008 (Continued)			
Common/code name	Formulation	Chemical name	Company
Fortress Plus	5G	chlorethoxyfos	AMVAC Chem. Corp.
Herculex XTRA (Pioneer33D14) with Poncho 250 seed trt	Pioneer Background	Cry34AB1 & Cry35Ab1(DAS-59122-7) + Cry1F + mefenoxam fungicide + Clothianidin seed trt (0.25 mg/seed)	Pioneer Hi-Bred International, Inc.
Herculex XTRA (Pioneer35K04) with Poncho 250 seed trt	Pioneer Background	Cry34AB1 & Cry35Ab1 (DAS-59122-7) + Cry1F + mefenoxam fungicide + Clothianidin seed trt (0.25 mg/seed)	Pioneer Hi-Bred International, Inc.
Herculex RW (Mycogen 2J669) with Cruiser Extreme 250 seed trt	Dow Background	Cry34AB1 & Cry35Ab1 (DAS-59122-7) + LibertyLink gene + thiamethoxam seed trt (0.25 mg/seed)	Dow AgroSciences
Kernel Guard Supreme	225 gms/100 Kg seed	Permethrin	Chemtura Corp.
Mycogen 2J665	Mycogen 2J665 “true isoline seed” of Mycogen 2J669	Thiamethoxam seed trt (0.25 mg/seed)	Dow AgroSciences
Pioneer 33D13 seedcorn.	Pioneer 33D13 “true isoline seed” of Pioneer 33D14	mefenoxam fungicide + Clothianidin seed trt (0.25 mg/seed)	Pioneer Hi-Bred International, Inc
Pioneer 35K03 seedcorn.	Pioneer 35K03 “true isoline seed” of Pioneer 35K04	mefenoxam fungicide + Clothianidin 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
Seed treatment “AB” (experimental)	Commercially applied	---	Bayer CropScience
Seed treatment “BB” (experimental)	Commercially applied	---	Bayer CropScience
Seed treatment “CB” (experimental)	Commercially applied	---	Bayer CropScience
V-10107-1713	5FS	---	Valent U.S.A. Corp.
V-10107-1729	5FS	---	Valent U.S.A. Corp.