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Effectiveness of DowAgrosciences transgenic B.t. corn on Mexican corn rootworm, 2002

Roy D. Parker and Brian D. Yanta
Extension Entomologist and County Extension Agent, respectively
Corpus Christi and Goliad, Texas
Ralph Ramsey, Jr. Farm, Goliad County

SUMMARY: The Dow AgroSciences transgenic B.t. corn inbred line evaluated was very effective in reducing root feeding damage by Mexican corn rootworm. Only 3 of 50 corn plant root systems evaluated had more than presence of feeding scars. The negative isoline corn roots had more than 1.5 nodes eaten to within 1.5 inches of the stalk, and although Force provided protection from rootworms, it was not as effective as the transgenic B.t. event.

OBJECTIVE: The study was conducted to determine effectiveness of a transgenic B.t. corn inbred line on Mexican corn rootworm compared to the negative isoline with and without Force soil insecticide treatment.

MATERIALS/METHODS: The field experiment was planted on the Ralph Ramsey, Jr. Farm near the intersection of Riverdale and Irby Roads (northwest of Goliad) on March 22, 2002. Planting equipment was a 2-row John Deere 7100 planter equipped with research cone planters. Treatments were arranged in a randomized complete block design in 3-row wide by 20-ft long plots with rows spaced on 38-inch centers and 5 replications. Exactly 31 seeds were planted in each row of the 3-row plots. Corn had been grown at the test site for many years and Mexican corn rootworm infestation the previous season had been heavy. The clay soil (23% sand, 28% silt, and 40% clay) contained 1.5% organic matter at 7.9 pH. Soil moisture at planting was excellent, but little rainfall occurred later. Soil temperature at the 4-inch depth was 66%F. Granular Force was banded over the open seed furrow. Herbicide was Bicep II Magnum (2.0 qt/acre) broadcast across all plots on the planting date. On Apr 16, Liberty herbicide was applied to transgenic B.t. plots to remove nonexpressing transgenic plants. Plants killed by Liberty herbicide amounted to 53.3%.

Treatments were assessed by (1) counting the number of plants in 8 row ft of each 3-row plot on Apr 24, and (2) digging 10 plants from the center row of each plot on May 16 for rootworm damage rating [see Table 1 footnotes for damage rating scales].

RESULTS/DISCUSSION: The negative isoline + Force treatment had a significantly greater plant stand than the other treatments (Table 1). Reasons for the reduced plant stand in the other 2 treatments are not known but could have occurred due to chinch bugs; they were not counted. Damaged roots by both rating scales revealed little more than the presence of Mexican corn rootworm feeding scars in the transgenic B.t. treatment. The negative isoline sustained an average loss of 1.75 nodes of roots (Table 1). Force provided fairly good protection, but root damage ratings by the 1-6 scale (old method) were significantly higher than found in the transgenic B.t. corn. The transgenic B.t. corn and negative isoline + Force treated corn were not

statistically different as scored by the 0-3 (new) scale. However, the numerical difference was 10 fold greater in the Force compared with the transgenic B.t. corn.

ACKNOWLEDGMENTS: Thanks are extended to Rudy Alaniz, Matt Matocha, and Mike Hiller, Demonstration Assistants, for their help. Hopkins Agricultural Services are acknowledged for use of the 2-row cone planter. Special thanks are extended to Ralph Ramsey, Jr. for providing land for this experiment. Dow AgroSciences are thanked for their support of the experiment.

Table 1. Evaluation of Dow AgroSciences transgenic B.t. corn on Mexican corn rootworm, Ralph Ramsey, Jr. Farm, Goliad, TX, 2002.

Corn type	Plants (1000's/acre)	Root damage rating	
		Old[a]	New[b]
Transgenic event	15.1 b	1.7 c	0.023 b
Negative isoline	16.2 b	4.7 a	1.73 a
Negative isoline + Force[c]	19.1 a	2.7 b	0.22 b
LSD (P = 0.05)	2.807	.490	.539
P > F	.0271	.0001	.0002

Means in a column followed by the same letter are not significantly different by ANOVA.

[a] Old method - Iowa State University 1 - 6 rating scale: 1 = no visible feeding damage up to 6 = 3 or more nodes of roots eaten to within 1.5 inches of the stalk.

[b] New method - Iowa State University 0 - 3 rating scale: 0 = no feeding damage, 1 = 1 node of roots eaten within 2 inches of the stalk, 2 = 2 nodes of roots eaten, and 3 = 3 or more nodes of roots eaten.

[c] Force 3G (5.0 oz/1000 row ft).

A Comparison of Monsanto's Corn Rootworm Transgenic Corn, Seed Treatments and a Soil Insecticide for Control of Mexican Corn Rootworm on Corn, 2002

Paul Aelvoet Farm, Medina County, 2002

Noel Troxclair and Wayne Scholtz
Extension Entomologist, Uvalde and County Extension Agent-Ag, Medina County, repectively

SUMMARY: A corn rootworm protected transgenic corn, seed treatments and Counter 20 CR soil insecticide applied at-planting in a T-band, and an untreated check were compared for control of Mexican corn rootworm on corn. The plots experienced light pressure from the Mexican corn rootworms. Root damage was evaluated using the Iowa node injury rating scale; highest mean root damage ratings of 0.17 occurred in the plots planted with XP6705AY_MON56420_16, a genetic isoline of the corn rootworm protected transgenic corn plus a seed treatment. Plants receiving this treatment had significantly greater root damage than did those in the plots planted with Counter, the Prescribe-treated seed, or another seed treatment, XP6705AY_MON47835-125. No other statistical difference in root damage ratings was observed among any other treatments.

PROBLEM: Farmers in the Winter Garden area continue to incur injury to field corn by Mexican corn rootworm, in some cases even when soil insecticides are used. Growers are often limited in their abilities to practice crop rotation on their corn ground and may sustain economic injury due to continuous planting of corn in some fields. We are continuing to monitor control of Mexican corn rootworm with soil insecticides and to evaluate new insecticides and rootworm control technologies as they are developed.

OBJECTIVES: This test was established on corn to compare the efficacy a corn rootworm protected transgenic corn and new seed treatments with those of proven soil insecticides and seed treatments for control of the Mexican corn rootworms in the Winter Garden area of Texas.

MATERIALS & METHODS: Treatments applied at-planting or as seed treatments were compared on 4-row by 33-ft plots replicated 4 times in a randomized complete-block design. The granular insecticide was applied at labeled rates, and seed treatments were applied, per company protocol, to the seed prior to the seed being shipped. Corn was planted on 36-inch row centers at 24,500 kernels/acre on 29 March, 2002, in a field south of County Road 532 and east of County Road 432, southwest of Hondo, Texas. Corn had been planted on the test site during the previous five seasons. We expected a heavy Mexican corn rootworm infestation based on a heavy adult population during the previous season. On 13 May, 2002, treatment effects were measured by digging 10 plants from the center two rows of each plot and examining the roots for Mexican corn rootworm damage.

RESULTS/DISCUSSION: Even with five years of continuous corn planting, Mexican corn rootworms developed populations sufficient to cause only light corn root damage ratings of 0.17 in the plots planted with the genetic isoline of the corn rootworm protected transgenic treated with an experimental seed treatment (Table 1). Root damage ratings in those plots were significantly greater than those found in Counter-treated, Prescribe-treated, and experimental seed treatment plots. Although there were small numerical differences in root damage ratings there was no statistically significant difference among any of the other treatments.

CONCLUSIONS: Counter and the Prescribe and MON47835_125 seed treatments provided protection from Mexican corn rootworm feeding since root damage ratings from these treatments were significantly lower than those from plots receiving the MON56420_16 experimental seed treatment.

ACKNOWLEDGMENTS: Special thanks are extended to Paul Aelvoet for providing labor, land and equipment for conducting this test and assistance in test establishment and evaluation. Wayne Scholtz, Rick Hoffman and Caleb Troxclair also are thanked for their assistance in the planting and evaluation portion of this study. Jorge Cuarezma and Monsanto Company are acknowledged for financial support of this trial.

Table 1. Comparison of corn rootworm transgenic corn, seed treatments and a soil insecticide for control of corn rootworms on corn, Paul Aelvoet Farms, Medina County, 2002.[a]

Treatment	Rate	Root damage[b]
XP6705AY_MON56420_16 (Exp.seedtrt)		0.16950 a
XP6705BG_MON56420_16 transgenic		0.11073 ab
XP6705AY	Check	0.10850 ab
XP6705AY_COUNTER_CR	5.4 lb/A	0.07951 b
XP6705AY_MON56420_134 Prescribe		0.07775 b
XP6705AY_MON47835_125 (Exp.seedtrt)		0.04200 b

[a] Based on Iowa node injury rating scale.

[b] Means within a data column followed by the same letter are not significantly different at the 0.01% level of probability by Anova and Duncan's Multiple range test.

Evaluation of a Pioneer transgenic B.t. corn hybrid for effect on Mexican corn rootworm, 2002

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Corpus Christi and Goliad, Texas
Jim Pettus Farm, Goliad County

SUMMARY: A Pioneer transgenic hybrid expressing Cry34Ab1 and Cry35Ab1 proteins from B.t. strain PS149B1 demonstrated a high degree of effectiveness against Mexican corn rootworm larvae when compared to the negative isoline or the negative isoline treated at planting with a full rate of Force. The transgenic B.t. hybrid had significantly less plant lodging and rootworm damage compared with the non-transgenic treatments.

OBJECTIVE: The experiment was designed to evaluate the effectiveness of a Pioneer transgenic hybrid in reducing damage caused by the Mexican corn rootworm.

MATERIALS/METHODS: A transgenic B.t. corn hybrid, negative isoline, and the negative isoline treated at-planting with Force 3G (5.0 oz/1000 row ft) were planted on the Jim Pettus Farm on Newton Powell Road northwest of Goliad on Mar 16, 2002 with a 2-row John Deere 7100 planter equipped with research cone planters. Treatments were arranged in a randomized complete block design in 3-row wide by 30-ft long plots with rows spaced on 38-inch centers and 4 replications. Equal numbers of seed (40) were planted in each plot row. Corn had been grown at the site for more than 5 years. The clay loam soil (23% sand, 42% silt, and 35% clay) contained 1.7% organic matter at 8.0 pH. Soil moisture at the surface was limited, requiring removal of dry soil to reach moisture. Soil temperature at the 4-inch depth was 61%F. Fertilizer applied was 84-18-7+1S. Granular Force was banded over the open seed furrow. Liberty herbicide was applied to transgenic B.t. corn plots on Apr 16 resulting in less than 1% loss of stand.

Treatments were measured by (1) counting the number of plants on 10 row ft from the center row of each plot on Apr 4, (2) counting the total number of plants and lodged plants in the center row of each plot on May 6, and (3) digging 5 plants from the center row of each plot on May 6 for rootworm damage analysis. Root damage ratings were then assigned using both the Iowa State University 1 - 6 and 0 - 3 rating systems.

RESULTS/DISCUSSION: Statistical differences were not found in plant stands, although numerically, the transgenic B.t. hybrid averaged 1,800 more plants/acre than the other two treatments (Table 1). The transgenic B.t. hybrid also demonstrated a very high degree of effectiveness against Mexican corn rootworm larvae when compared to the negative isoline or the negative isoline treated with Force 3G at-planting. The transgenic B.t. hybrid had significantly fewer lodged plants and less rootworm damage compared with the other treatments. Additionally, the B.t. hybrid plot plants were much taller and did not wilt to the degree of the other treatments. Rootworm damage in the untreated negative isoline was severe with about 2.5 nodes of roots eaten to within 1.5 or 2.0 inches of the stalk (Table 1). Although Force treated plots had much less damage (average of slightly over 1 root eaten to within 1.5 inches of the

stalk), plants were much shorter and wilted earlier each day compared to the transgenic B.t. hybrid.

ACKNOWLEDGMENTS: Thanks are extended to Pioneer Hi-Bred International, Hopkins Agricultural Services, Jim Pettus, and Fred Pena for their support in conducting the study.

Table 1. Comparison of transgenic B.t. and non-transgenic Pioneer corn hybrids for effect on Mexican corn rootworm, Jim Pettus Farm, Goliad County, TX, 2002.

Hybrid	Plants (1000's/acre)	% lodged plants	Root damage rating	
			Old[a]	New[b]
Transgenic event	17.3 a	1.8 c	2.05 c	0.08 c
Negative isoline	15.4 a	46.1 a	5.34 a	2.63 a
Negative isoline + Force[c]	15.6 a	17.6 b	3.06 b	0.48 b
LSD (P = 0.05)	NS	9.11	0.515	.364
P > F	.5244	.0001	.0001	.0001

Means in a column followed by the same letter are not significantly different by ANOVA.

[a] Old method - Iowa State University 1 - 6 rating scale: 1 = no visible feeding damage up to 6 = 3 or more nodes of roots eaten to within 1.5 inches of the stalk.

[b] New method - Iowa State University 0 - 3 rating scale: 0 = no feeding damage, 1 = 1 node of roots eaten within 2 inches of the stalk, 2 = 2 nodes of roots eaten, and 3 = 3 or more nodes of roots eaten.

[c] Force 3G (5.0 oz/1000 row ft).

Efficacy of Lead Transgenic Cry 3 Bb Corn Rootworm Event, Prescribe Seed Treatment and Standard Soil Insecticides; Counter CR and Force 3G on Mexican Corn Rootworm, North Central Texas, 2002

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Summary: A trial was conducted during 2002 in Northwest Navarro County to evaluate the efficacy of Cry3Bb Event (Corn Rootworm Protected + MON56420-1) in comparison to Prescribe seed treatment, Counter CR (20 G) and Force (3G) on Mexican Corn Rootworm, *Diabrotica virgiferazeae*.

The Cry3Bb Event was evaluated as MON863 + MON56420-1 in hybrid A and hybrid B as Isoline of hybrid A. The treatments; Prescribe, Counter CR and Force 3G were evaluated with hybrid B. Hybrid B also served as an untreated check and is designated as Isoline of hybrid A. There was no significant difference in plant population between any of the treatments and the untreated check. Additionally, there was no significant difference in plant height between the Corn Rootworm Protected + MON56420-1 and any of the treatments including the untreated check. There was, however, a significant difference in the percent plants lodged, (4.4) for the untreated check compared to (0) for the Corn Rootworm Protected + MON56420-1. Significantly less injury from Mexican Corn Rootworm feeding was observed to the roots of the Corn Rootworm Protected + MON56420-1 treatment than to Isoline of hybrid A + MON56420 and the untreated check.

Objective: The trial was designed to evaluate the efficacy of Monsanto's Cry3Bb Event (Corn Rootworm Protected + MON56420-1on Mexican Corn Rootworm in comparison to Prescribe seed treatment, Counter CR, Force 3G and an untreated check.

Materials & Methods: On March 13, 2002, a corn trial evaluating leading Monsanto transgenic lines with efficacy against Mexican Corn Rootworm was planted in Northwest Navarro County on the Van Perry Farm. Previously, the evaluation site had been planted to corn for 4 consecutive years. The trial was planted in 30 inch rows in a randomized complete block design with each treatment replicated 3 times. Plots measured 4 rows wide and 25 ft. in length. Border rows were planted with a John Deere 7300 vacuum planter. Soil insecticides were also applied with this planter. Treatments were planted with a one row plot planter. A fertility program consisted of 125 lbs./acre of actual nitrogen and 9 gal. of 9-22-6-0-15/acre. Weeds were controlled with Atrazine at the rate of 1.0 lb./acre and a post-emergence application of Peak.

Treatments included; Corn Rootworm Protected + MON56420-1, Isoline of hybrid A + MON56420, Isoline of hybrid A + Prescribe, Isoline of hybrid A + MON47835, Isoline of hybrid A, Isoline of hybrid A + Counter CR (20 G) at 6 oz./1000 ft. of row (t-band) and Isoline of hybrid A + Force (3G) at 5 oz./1000 ft. of row (t-band). Plant population counts were taken at growth stage V-4 by recording the number of plants from 50 ft. of row from each plot. Plant lodging ratings were taken by examining 10 plants at 3 locations (total of 30 plants) within each plot. A plant was counted as lodged, if leaning more than 30 degrees from vertical position.

Plants in the regulated plots were detasseled to ensure isolation for preventing pollination of receptive plants outside of the trial area. The trial was destroyed by shredding on June 4, 2002.

Root injury ratings were taken when plants were in growth stages ranging from V15 to VT. On May 31, 2002, five randomly selected plants/plot were excavated with the entire root system and lower stalk intact. Roots were vigorously shaken to dislodge the bulk of attached soil. Roots from each plot were placed in a plastic bag and tagged for identification. The plastic bags were perforated, submerged in a metal stock tank filled with water and allowed to soak for 48 hours to dislodge remaining soil. Roots were removed from bags and thoroughly washed with a garden hose with attached nozzle. Once roots were free of soil and debris, they were carefully scrutinized for feeding by Mexican Corn Rootworm larvae and a root injury rating was assigned based on the 0 to3 Iowa State Node Injury Scale (Oleson 1998).

Results & Discussion: There was no significant difference relative to plant population and plant height in inches between the Corn Rootworm Protected + MON56420-1 and the other treatments including the untreated check (Table 1). Significant differences were observed with respect to percent lodged plants and root injury from Mexican Corn Rootworm feeding. A significantly higher number of lodged plants was observed in the untreated check (Isoline of hybrid A), compared to the Corn Rootworm Protected + MON56420-1 and Isoline of hybrid A + MON47835 treatments(Figure 1).
There were no lodged plants observed in the Corn Rootworm Protected + MON56420-1 and Isoline of hybrid A + MON47835 treatments. Significantly less root injury was observed in the Corn Rootworm Protected + MON56420-1, Isoline of hybrid A + Force 3G and Isoline of hybrid A +MON47835 treatments (Figure 2).

Acknowledgments: Much gratitude is expressed to Mr. Van Perry for serving as a cooperating demonstrator. Also, special thanks is due to Dr. Jorge Cuarezma, Area Market Development Manager, Monsanto and Dr. Bob Starke, Corn Insect Trait Technology Manager, Monsanto for providing technical information and research material. Appreciation is also extended to Dr. Allen Knutson, Professor and Extension Entomologist, Texas Cooperative Extension for assistance with root ratings and analysis of data.

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Table 1 follows on the next page.

Table 1. Plant population, percent lodged plants and mean root injury for lead transgenic corn rootworm event, Mexican Corn Rootworm Trial, Perry Farm, Navarro County, Texas 2002.

Treatment	Mean # Plants/50 row ft.*	Plant Height (in)	% Lodged Plants	Mean Root Injury ** 5 Plants/Plot
CRW Protected + MON56420-1	70.3 a	68.16 ab	0 b	0.56 c
Isoline of hybrid A + MON56420	73.0 a	66.47 ab	3.7 ab	1.84 a
Isoline of hybrid A + Prescribe	67.0 a	68.90 a	1.1 ab	1.07 abc
Isoline of hybrid A + MON47835	70.0 a	70.80 a	0 b	0.76 bc
Isoline of hybrid A	68.0 a	61.00 bc	4.4 a	1.75 ab
Isoline of hybrid A + Counter CR 20G 6 oz./1000 ft.row (t-band)	65.7 a	69.80 a	3.7 ab	1.41 abc
Isoline of hybrid A + Force 3G @ 5 oz./1000 ft. row (t-band)	64.0 a	70.30 a	2.2 ab	0.51 c

* Means with in rows followed by the same letter are not significantly different at alpha = 0.10, ANOVA. ** Mean root injury ratings taken from the 0 - 3 Iowa State Node-Injury Scale (Oleson 1998).

Section II: Insecticide efficacy testing

Evaluation of Aztec rates on corn for control of Mexican corn rootworm I, 2002

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Hernandez Farms, Goliad County, 2002

SUMMARY: Treatment differences were not found in plant stand or visual plant damage ratings. Root damage ratings were all lower in Aztec treated corn, but no differences due to Aztec rates were detected. Untreated corn sustained an average loss of 1.5 nodes of roots. Aztec treated corn had an average of less than 1 root eaten to within 1.5 inches of the stalk.

OBJECTIVE: The objective was to compare rates of Aztec for effectiveness on Mexican corn rootworm.

MATERIALS/METHODS: Pioneer 31B13 hybrid corn was planted on the "Pettus Farm" near FM 2043 northwest of Goliad on Mar 6, 2002 with an 8-row John Deere MaxEmerge 2 vacumeter planter delivering 20,500 seed/acre. Treatments were arranged in a randomized

complete block design in 4-row wide by 300 ft long plots with rows on 38-inch centers and 3 replications. Corn had been grown on the site for more than 5 continuous years. The clay loam soil (59% sand, 18% silt, and 23% clay) contained 1.6% organic matter and a 6.9 pH. Soil temperature at planting was 68%F at the 4-inch depth. Fertilizer applied was 84-28-12. Granular Aztec were banded over the open seed furrow.

Treatments were assessed by (1) counting the number of plants on 13.75 ft row in each of the center 2 rows in each plot on Apr 4, (2) assigning a plant damage rating [1 = no damage up to 5 = irregular plant growth, yellowing and unthrifty plants] to each plot on Apr 4, and (3) digging 6 plants from the center 2 rows in each plot for rootworm damage analysis on May 6. Plant roots were rated with two systems: old method - Iowa State University 1 - 6 rating scale: 1 = no visible feeding damage up to 6 = 3 or more nodes of roots eaten to within 1.5 inches of the stalk, and new method - Iowa State University 0 - 3 rating scale: 0 = no feeding damage, 1 = 1 node of roots eaten within 2 inches of the stalk, 2 = 2 nodes of roots eaten, and 3 = 3 or more nodes of roots eaten.

RESULTS/DISCUSSION: Differences were not found in plant stand or in a visual plant damage rating (Table 1). There appeared to be a numerical trend for increasing damage as Aztec rates decreased; untreated corn had the highest numerical plant damage rating. Root damage ratings were all significantly lower in Aztec treated corn compared to the untreated corn. There were no differences or trends in the Aztec rates evaluated. Yields were not obtained since corn was lost to drought conditions.

ACKNOWLEDGMENTS: Thanks are extended to the Hernandez family for providing land, equipment, and labor for conducting the study. Bayer Corporation is acknowledged for their support.

Table 1. Comparison of Aztec rates on corn for control of Mexican corn rootworm, Hernandez Farms, Goliad County, TX, 2002.

Treatment & formulation	Rate (oz/1000 ft)	Plants (1000's/acre)	Plant da. rating[a]	Root damage rating	
				Old[b]	New[c]
Aztec 2.1G	6.70	19.0 a	2.25 a	2.69 b	0.23 b
Aztec 2.1G	5.02	18.0 a	2.33 a	2.81 b	0.15 b
Aztec 2.1G	3.25	18.0 a	2.42 a	2.58 b	0.20 b
Untreated		18.3 a	2.75 a	4.50 a	1.53 a
LSD (P = 0.05)		NS	NS	0.38	0.37
P > F		.7793	.8647	.0001	.0003

Means in a column followed by the same letter are not significantly different by ANOVA.

[a] Damage ratings on Apr 4 ranged from 1 = no damage up to 5 = irregular plant growth, yellowing and unthrifty plants.

[b] Old method - Iowa State University 1 - 6 rating scale: 1 = no visible feeding damage up to 6 = 3 or more nodes of roots eaten to within 1.5 inches of the stalk.

[c] New method - Iowa State University 0 - 3 rating scale: 0 = no feeding damage, 1 = 1 node of roots eaten within 2 inches of the stalk, 2 = 2 nodes of roots eaten, and 3 = 3 or more nodes of roots eaten.

Evaluation of insecticides on corn for control of Mexican corn rootworm II, 2002

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SUMMARY: Prescribe, clothianidin, and Force provided effective control of Mexican corn rootworm. Insecticide treated corn roots averaged nearly 1 root eaten to within 1.5 inches of the stalk, whereas the corn roots in the untreated plots sustained over 2.5 of the nodes destroyed.

OBJECTIVE: The test objective was to compare the effectiveness of Prescribe, clothianidin and Force in controlling Mexican corn rootworm.

MATERIALS/METHODS: Dekalb DK697 hybrid corn was planted on the Jim Pettus Farm on Newton Powell Road northwest of Goliad on Mar 16, 2002 with a research type John Deere 7100 2-row cone planter equipped with granular insecticide boxes. Treatments were arranged in a randomized complete block design with 4 replications in 2-row wide by 30-ft long plots with rows on 38-inch centers. Corn had been grown at the site for more than 5 years. The clay loam soil (23% sand, 42% silt, and 35% clay) contained 1.7% organic matter and 8.0 pH. Soil moisture at the surface was limited, requiring removal of dry soil to reach moisture. Soil temperature at the 4-inch depth was 61%F. Fertilizer applied was 84-18-7+1S. Granular insecticide (Force) was banded over the open seed furrow.

Treatments were assessed by (1) counting the number of plants on 10 row ft in both rows of each plot on Apr 4, and (2) digging 5 plants from each plot on May 6 for rootworm damage analysis.

RESULTS/DISCUSSION: Plant stand and root damage ratings are provided in Table 1. Force treated corn had a significantly higher plant stand than untreated corn; whereas, none of the other insecticide treatments were statistically better than the untreated corn. However, plant stands of all insecticide treatments were numerically higher than the untreated corn. Root damage ratings (Iowa State 1 - 6 method) for the insecticides averaged 2.95 or almost an average of 1 root eaten to within 1.5 inches of the stalk. The untreated corn had a root damage rating of 5.59 or over 2.5 complete nodes of roots eaten to within 1.5 inches of the stalk. Data from the new rootworm damage scale were similar. As indicated by the untreated plots, there were very high numbers of Mexican corn rootworms at the site. Had it been possible to obtain yield data, insecticide treatments should have made more than 30 bu/acre more than untreated corn.

ACKNOWLEDGMENTS: Appreciation is expressed to Jim Pettus for providing land for conduct of this experiment and to Fred Pena for assistance in laying out the test area and his advice on where to locate the study. Gustafson and Syngenta companies are acknowledged for their help. A special thanks is given to Hopkins Agricultural Services for assistance in planting

and maintaining the experiment. They also erected an electric fence around the entire study area to deter wild hogs.

Table 1. Evaluation of insecticides on corn for control of Mexican corn rootworm, Jim Pettus Farm, Goliad County, TX, 2002.

Treatment & formulation[a]	Plants (1000's/acre)	Root damage rating	
		Old[b]	New[c]
Prescribe 600F	16.3 ab	2.72 b	.337 b
Clothianidin 600F	15.8 b	3.03 b	.414 b
Force 3G	19.4 a	3.10 b	.605 b
Untreated	14.1 b	5.59 a	2.600 a
LSD (P = 0.05)	3.32	.613	.4604
P > F	.0347	.0001	.0001

Means in a column followed by the same letter are not significantly different by ANOVA.

[a] Treatment rates: Prescribe 600F (1.36 mg AI/seed), clothianidin 600F (1.25 mg AI/seed), and Force 3G (5.0 oz/1000 row ft).

[b] Old method - Iowa State University 1 - 6 rating scale: 1 = no visible feeding damage up to 6 = 3 or more nodes of roots eaten to within 1.5 inches of the stalk.

[c] New method - Iowa State University 0 - 3 rating scale: 0 = no feeding damage, 1 = 1 node of roots eaten within 2 inches of the stalk, 2 = 2 nodes of roots eaten, and 3 = 3 or more nodes of roots eaten.

Evaluation of insecticides for control of chinch bug and Mexican corn rootworm on corn in Goliad and Wharton Counties, 2002

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SUMMARY: Plant stands were significantly better in insecticide treated corn at the Goliad County site and they were numerically better at the Wharton County site compared with untreated corn. With only two exceptions, early season visual plant damage ratings were higher (more damage) in untreated corn. Chinch bug numbers were reduced most consistently with Prescribe, clothianidin, and Cruiser; whereas, Counter and Aztec were somewhat inconsistent. Force provided no chinch bug control. All insecticides, except for the Prescribe and Cruiser treatments at the Goliad County location, had significantly lower Mexican corn rootworm root damage ratings than did untreated corn.

OBJECTIVE: The tests were established to determine the impact of selected insecticides on chinch bugs and Mexican corn rootworm.

MATERIALS/METHODS: Two experiments replicated 4 times in randomized complete block designs were planted Feb 20 and 22, respectively, on the David Foehner Farm (County Road 111) in Wharton County and the Ralph Ramsey, Jr., Farm (near the intersection of Riverdale and Irby Roads) in Goliad County. A northern corn hybrid (N58D1) was planted in 2-row wide by 30-ft long plots with rows spaced on 38-inch centers. Seed was planted at 48 kernels per row with a John Deere 7100 model MaxEmerge planter modified with research cone planters. Two ft wide alleys were cut between each replication following plant emergence. In the Goliad County experiment, the clay soil (23% sand, 28% silt, and 49% clay) contained 1.5% organic mater and had a 7.6 pH. In the Wharton County experiment, the Norwood silty clay loam soil (8% sand, 64% silt, and 28% clay) contained 1.3% organic matter and also had a 7.6 pH. Corn had been planted on the land at each location for at least the 5 previous years. Soil moisture conditions at-planting at both locations were good with soil temperatures at the 4-inch depth ranging from 62-64%F. On the day of planting, the herbicide Bicep II Magnum at 2.1 qt/acre was broadcast with a CO_2 backpback sprayer in a total spray volume of 11.4 gpa, at 30 psi and a speed of 2.5 mph. Nozzles were XR TeeJet 8001VS. Plots were hand weeded during the testing period. Treatments consisted of treated seed and soil applied granular insecticides. Granular materials were banded over the open seed furrow (6-inch bander). The entire test was destroyed following the date samples were obtained for rootworm damage analysis.

Treatments were assessed by (1) counting the number of plants on 13.75 ft row on both rows of plots on Mar 22 [Wharton County site], and Mar 24 [Goliad County site], (2) assigning a damage rating [1 = no damage up to 5 = stunting, uneven growth and yellowing] to each plot on Mar 22 [Wharton] and Mar 24 [Goliad], (3) counting the number of chinch bugs by digging around 10 plants per plot on Apr 5 and 15 [Wharton] and Mar 24 and Apr 10 [Goliad], and (4) digging 5 plants/plot for Mexican corn rootworm damage ratings on May 9 and 10, at the Wharton and Goliad County locations, respectively.

RESULTS/DISCUSSION: Plant stands in untreated corn were lower than in insecticide treatments at both test locations, but they were only statistically lower in the untreated corn at the Goliad County test site (Table 1). Except for Cruiser treated corn, plant damage ratings were significantly greater in untreated compared with insecticide treated corn at the Wharton site. At Goliad, insecticide treated corn, except for Counter and Force treatments, had lower damage ratings. Chinch bug counts on 2 dates at both test locations showed fewer numbers in the clothianidin, Cruiser, and Prescribe treatments. Counter and Aztec were about equally effective against chinch bugs. Force had little effect on chinch bug numbers. All insecticides were equally effective in reducing Mexican corn rootworm damage to the root system, but at the Wharton County location, Prescribe and Cruiser treated corn were statistically no different from the untreated corn (Table 1).

ACKNOWLEDGMENTS: Thanks are extended to Syngenta, Bayer, and Gustafson Companies for support of this work. A special acknowledgment is given to David Foehner and Ralph Ramsey, Jr. for allowing us to use land for conduct of the experiments. We thank Hopkins Agricultural Services for use of their 2-row planter. Rudy Alaniz and Mike Hiller, Demonstration Assistants, are thanked for their help.

Table 1. Comparison of insecticides for control of chinch bug and Mexican corn rootworm on corn, Goliad and Wharton counties, TX, 2002.

Treatment & formulation	Rate	Plants (1000's/ acre)	Plant da. rating[a]	Chinch bugs/10 plants		Root damage rating	
				Date 1	Date 2	Old[b]	New[c]
- -Test 1, Goliad County - - - - - - - - - - - - - - - - - - -							
Prescribe 600F	1.34 mg AI/seed	20.0 a	1.6 c	0.0 b	8.8 b	3.50 b	0.69 b
Clothianidin 600F	1.25 mg AI/seed	20.1 a	1.5 c	0.0 b	4.3 b	3.17 b	0.63 b
Cruiser 5FS	10.3 oz/cwt seed	20.4 a	1.5 c	0.3 b	5.3 b	3.55 b	0.76 b
Counter 20CR	6.0 oz/1000 ft	18.0 a	2.9 ab	1.5 b	10.8 b	2.79 b	0.43 b
Aztec 2.1G	6.7 oz/1000 ft	18.1 a	2.1 bc	0.8 b	16.0 ab	2.63 b	0.33 b
Force 3G	5.0 oz/1000 ft	19.0 a	3.1 a	11.8 a	27.8 a	3.11 b	0.48 b
Untreated		13.4 b	3.5 a	13.8 a	27.0 a	5.50 a	2.50 a
LSD (P = 0.05)		3.30	0.89	6.78	12.40	1.152	.6587
P > F		.0099	.0003	.0006	.0023	.0012	.0001
- -Test 2, Wharton County - - - - - - - - - - - - - - - - - - -							
Prescribe 600F	1.34 mg AI/seed	18.9 a	2.2 b	0.3 b	2.8 c		1.15 ab
Clothianidin 600F	1.25 mg AI/seed	20.6 a	1.9 b	0.5 b	0.0 c		0.93 b
Cruiser 5FS	10.3 oz/cwt seed	19.1 a	2.8 ab	0.3 b	0.5 c		1.16 ab
Counter 20CR	6.0 oz/1000 ft	20.0 a	2.3 b	5.3 a	8.0 ab		0.91 b
Aztec 2.1G	6.7 oz/1000 ft	19.6 a	2.3 b	3.0 ab	3.8 bc		0.47 b
Force 3G	5.0 oz/1000 ft	21.1 a	1.9 b	6.0 a	12.5 a		0.62 b
Untreated		17.1 a	3.3 a	2.8 ab	3.5 bc		1.71 a
LSD (P = 0.05)		NS	.593	3.64	4.405		0.659
P > F		.2712	.0016	.0128	.0001		.0212

Means in a column followed by the same letter are not significantly different by

[a] Plant damage rating range from 1 = no damage to 5 = stunting, uneven growth and yellowing.

[b] Old method - Iowa State University 1 - 6 rating scale: 1 = no visible feeding damage up to 6 = 3 or more nodes of roots eaten to within 1.5 inches of the stalk.

[c] New method - Iowa State University 0 - 3 rating scale: 0 = no feeding damage, 1 = 1 node of roots eaten within 2 inches of the stalk, 2 = 2 nodes of roots eaten, and 3 = 3 or more nodes of roots eaten.

Evaluation of insecticides for control of chinch bug and Mexican corn rootworm on corn, 2002

Roy D. Parker and Shannon DeForest
Extension Entomologist and County Extension Agent, respectively
Corpus Christi and Hallettsville, Texas
Lawrence Hinze Farm, Lavaca County

SUMMARY: Chinch bugs were reduced significantly by clothianidin and numerically by Prescribe seed treatments compared to numbers in untreated corn. Aztec had no effect on chinch bug numbers. Significantly greater aflatoxin level was observed in untreated corn. All insecticides tested reduced Mexican corn rootworm damage, and yields were statistically improved with insecticide use.

OBJECTIVE: The experiment was established to evaluate new insecticide seed treatments (Prescribe and clothianidin) and granular Aztec on soil insects, especially Mexican corn rootworm.

MATERIALS/METHODS: B&H 8879 hybrid corn was planted on the Lawrence Hinze "Home Place" east of Texas Highway 95 on FM 1891 on Mar 5, 2002 with a 4-row IH87 blackland planter equipped with Noble granular boxes. The seeding rate was 19,000/acre. Treatments were arranged in a randomized complete block design with 3 replications of each treatment in 4-row wide by approximately 1,146 ft long plots. Rows were spaced on 38-inch centers. Corn had been grown on the site for at least 5 years. The sandy clay loam soil (55% sand, 14% silt and 31% clay) contained 1.5% organic matter with a 7.6 pH. Soil moisture at planting was excellent, and soil temperature was 68%F at the 4-inch depth. Fertilizer was 340 lb/acre of 110-30-10 + 10S + 2 qt of 15% zinc applied preplant 6 inches to the side of rows. Herbicide consisted of Bicep II Magnum (0.8 pt/acre) in a 10-inch band at-planting. Granular Aztec was applied in-furrow.

Treatments were assessed by (1) counting the number of plants on 13.75 ft row on each of the center 2 rows/plot on Apr 4, (2) counting chinch bugs by digging around 20 plants in the center 2 rows of plots on Apr 4, (3) assigning a chinch bug plant damage rating [1 = no damage up to 5 = severe stunting and plant death] on Apr 4, (4) digging 6 plants from the center 2 rows in each plot on May 10 for root damage rating using the Iowa State University 6 category system [1= no visible damage up to 6 = 3 or more nodes of roots eaten within 1.5 inches of the stalk] and the new 0-3 category system [0 = no feeding damage, 1 = 1 node of roots eaten within 2 inches of the stalk, 2 = 2 nodes so eaten, and 3 = 3 or more nodes so eaten], (5) harvesting entire plots with a commercial machine on Jul 29, and (6) using a Vicam aflatoxin testing kit [AflaTest-P] to measure aflatoxin from a corn sample in each plot [samples were frozen until tested]. Grain weights were adjusted to a standard at 15% moisture.

RESULTS/DISCUSSION: No differences were observed in plant stands, but insecticide treatments did affect chinch bugs (Table 1). Chinch bugs were reduced significantly by clothianidin and numerically by Prescribe seed treatments compared to numbers in untreated corn. Aztec had no effect on chinch bug numbers. No differences were observed in damage ratings. In fact, on a numerical basis, Prescribe treated corn had a higher damage rating. It may have been due to the different seed lot used in the test for that treatment. Significantly greater aflatoxin level

was observed in untreated corn (Table 2). Both root damage rating systems produced similar results. All insecticides had statistically lower root damage than did the untreated corn. Untreated corn sustained heavy damage with more than 1.5 nodes of roots destroyed. Insecticide treated corn averaged less than one root chewed within 1.5 inches of the stalk. Root damage ratings were also reflected in yield data. Untreated corn yields were 19.7 bu/acre less than the average of insecticide treated corn. Although not shown statistically, the 5.25 bu/acre advantage of clothianidin over Aztec and Prescribe may have been due to superior chinch bug control.

ACKNOWLEDGMENTS: We appreciate the support of Gustafson and Bayer CropScience in conducting this study. Thanks are expressed to Mr. & Mrs Lawrence Hinze for their interest, time, land and equipment.

Table 1. Effect of insecticide seed and granular treatments upon corn plant stands and chinch bug damage, Lawrence Hinze Farm, Lavaca County, TX, 2002.

Treatment & formulation	Rate	Plants (1000's/acre)	Chinch bug	
			No./20 plants	Damage rating[a]
Prescribe 600F	1.36 mg AI/seed	16.2 a	4.7 bc	2.92 a
Clothianidin 600F	1.25 mg AI/seed	17.5 a	0.3 c	1.75 a
Aztec 2.1G	6.7 oz/1000 ft	17.0 a	24.3 a	2.33 a
Untreated		17.2 a	17.3 ab	2.17 a
LSD (P = 0.05)		NS	14.4	NS
P > F		.3443	.0208	.0701

Means in a column followed by the same letter are not significantly different by ANOVA.

[a] Chinch bug damage rating based on: 1 = no damage up to 5 = severe stunting and plant death.

Table 2. Effect on corn of insecticide seed and granular treatments upon aflatoxin levels, Mexican corn rootworm damage, and yield, Lawrence Hinze Farm, Lavaca County, TX, 2002.

Treatment & formulation	Rate	Aflatoxin (ppb)	Root damage rating		Yield (bu/acre)
			Old[a]	New[b]	
Prescribe 600F	1.36 mg AI/seed	277 b	3.03 b	0.63 b	51.7 a
Clothianidin 600F	1.25 mg AI/seed	290 b	3.24 b	0.51 b	56.9 a
Aztec 2.1G	6.7 oz/1000 ft	337 b	2.33 b	0.13 b	51.6 a
Untreated		668 a	4.59 a	1.67 a	33.7 b
LSD (P = 0.05)		200.8	1.02	0.702	10.4
P > F		.0091	.0089	.0083	.0067

Means in a column followed by the same letter are not significantly different by ANOVA.

[a] Old method - Iowa State University 1 - 6 rating scale: 1 = no visible feeding damage up to 6 = 3 or more nodes of roots eaten to within 1.5 inches of the stalk.

[b] New method - Iowa State University 0 - 3 rating scale: 0 = no feeding damage, 1 = 1 node of roots eaten within 2 inches of the stalk, 2 = 2 nodes of roots eaten, and 3 = 3 or more nodes of roots eaten.

Insecticides for control of chinch bug and Mexican corn rootworm on corn grown under conventional and reduced tillage systems, 2002

Roy D. Parker and Shannon DeForest
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Corpus Christi and Hallettsville, Texas
Lawrence Hinze Farm, Lavaca County

SUMMARY: Prescribe treated corn plant stand was reduced in conventional tilled plots compared with all other treatments except the Counter treatment in the reduced tillage treatment. Chinch bug numbers were generally lower in insecticide treatments compared with untreated corn, and about twice as many chinch bugs were found in conventional tilled plots. Damage by Mexican corn rootworm was very low. No differences were found in aflatoxin levels, although numerically slightly lower levels were observed under reduced tillage. Lack of timely rainfall resulted in low yields. Prescribe treated corn produced significantly less yield in both tillage systems. The reduced tilled corn treatments averaged 17.4 bu/acre more than conventionally tilled corn. Possibly the major reason for improved yields under reduced tillage was protection of plants from blowing sand.

OBJECTIVE: The field experiment was conducted to evaluate seed and granular applied insecticides on corn and to compare corn production in conventional and reduced tillage systems.

MATERIALS/METHODS: B&H 8879 hybrid corn was planted on the Lawrence Hinze farm on County Road 357B in Lavaca County on Mar 5, 2002 with a 4-row IH87 blackland planter equipped with Noble granular boxes. The seeding rate was 19,000/acre. Treatments were arranged in a randomized complete block design with 3 replications of each treatment in 4-row wide by approximately 800 ft long plots. Rows were spaced on 38-inch centers. Corn had been grown on the site for at least 5 years. The sandy loam soil (75% sand, 10% silt, and 15% clay) contained 0.85% organic matter with a 4.8 pH. Soil moisture at planting was excellent, and soil temperature was 68%F at the 4-inch depth. Fertilizer was 340 lb/acre of 110-30-10 + 10S + 2 qt of 15% zinc applied preplant 6 inches to the side of rows. Herbicide consisted of Bicep II Magnum (0.8 pt/acre) in a 10-inch band at-planting. Granular Counter was applied in-furrow.

Treatments were assessed by (1) counting the number of plants on 13.75 ft row on each of the center 2 rows/plot on Apr 4, (2) counting chinch bugs by digging around 10 plants in the center 2 rows of plots on Apr 5, (3) digging 6 plants from the center 2 rows in each plot on May 10 for root damage rating using the Iowa State University 6 category system [1= no visible damage up to 6 = 3 or more nodes of roots eaten within 1.5 inches of the stalk], and the new 0-3 category system [0 = no feeding damage, 1 = 1 node of roots eaten within 2 inches of the stalk, 2 = 2 nodes so eaten, and 3 = 3 or more nodes so eaten], (4) harvesting entire plots with a commercial machine on Jul 29, and (5) using a Vicam aflatoxin testing kit [Aflatest-P] to measure aflatoxin from a corn sample in each plot [samples were frozen until tested]. Grain weights were adjusted to a standard at 15% moisture.

RESULTS/DISCUSSION: The Prescribe treated plots may have been adversly affected by being of a different seed lot or at least different from that used in the remaining treatments. Rainfall following planting was limited, and as a result yields were reduced. Prescribe treated corn plant

stand was reduced in conventional tilled plots compared with all other treatments except the Counter treatment in reduced tillage (Table 1). Chinch bug numbers were generally lower in insecticide treatments compared with the untreated corn, and about twice as many were found in conventional tilled plots. No differences were found in aflatoxin levels, although numerically slightly lower levels were observed under reduced tillage. Damage from Mexican corn rootworms was very low (Table 2). Lack of timely rainfall resulted in low yields. Prescribe treated corn produced significantly less yield in both tillage systems. The reduced tilled corn treatments averaged 17.4 bu/acre more than conventionally tilled corn. Possibly the major reason for improved yields under reduced tillage was protection of plants from blowing sand and better water holding capacity.

ACKNOWLEDGMENTS: We appreciate the support of Gustafson, BASF Company, and Bayer CropScience in conducting this study. Thanks are expressed to Mr. & Mrs Lawrence Hinze for their interest, time, land, and equipment.

Table 1. Comparison of insecticides for control of chinch bug and aflatoxin level in corn grown under conventional and reduced tillage systems, Lawrence Hinze Farm, Lavaca County, TX, 2002.

Treatment & formulation[a]	Plants (1000's/acre)		Chinch bugs per 10 plants		Aflatoxin (ppb)	
- -Conventional tillage -						
Prescribe 600F	14.7	b	2.0	bcd	447	a
Clothianidin 600F	17.2	a	2.0	bcd	507	a
Counter 20CR	17.7	a	5.3	abc	443	a
Untreated	17.8	a	8.3	a	477	a
- -Reduced tillage -						
Prescribe 600F	17.0	a	0.3	d	383	a
Clothianidin 600F	17.0	a	1.3	cd	597	a
Counter 20CR	16.3	ab	1.0	cd	403	a
Untreated	17.7	a	6.7	ab	287	a
LSD (P = 0.05)	1.86		4.88		NS	
P > F	.0470		.0237		.1833	

Means in a column followed by the same letter are not significantly different by ANOVA.

[a] Treatment rates: Prescribe 600F (1.36 mg AI/seed), clothianidin 600F (1.25 mg AI/seed), and Counter 20CR (6.7 oz/1000 row ft).

Table 2. Comparison of insecticides for control of Mexican corn rootworm on corn grown under conventional and reduced tillage systems, Lawrence Hinze Farm, Lavaca County, TX, 2002.

Treatment & formulation[a]	Root damage rating		Yield (bu/acre)
	Old[b]	New[c]	
- -Conventional tillage -			
Prescribe 600F	1.33 a	.007b	21.2 d
Clothianidin 600F	1.22 a	.006b	28.4 c
Counter 20CR	1.17 a	.003b	30.8 c
Untreated	1.61 a	.015a	29.7 c
- Limited tillage -			
Prescribe 600F	1.28 a	.003b	38.2 b
Clothianidin 600F	1.28 a	.006b	49.3 a
Counter 20CR	1.39 a	.009ab	45.4 a
Untreated	1.67 a	.015a	46.6 a
LSD (P = 0.05)	NS	.0079	4.66
P > F	.0595	.0243	.0001

Means in a column followed by the same letter are not significantly different by ANOVA.

[a] Treatment rates: Prescribe 600F (1.36 mg AI/seed), clothianidin 600F (1.25 mg AI/seed), and Counter 20CR (6.7 oz/1000 row ft).

[b] Old method - Iowa State University 1 - 6 rating scale: 1 = no visible feeding damage up to 6 = 3 or more nodes of roots eaten to within 1.5 inches of the stalk.

[c] New method - Iowa State University 0 - 3 rating scale: 0 = no feeding damage, 1 = 1 node of roots eaten within 2 inches of the stalk, 2 = 2 nodes of roots eaten, and 3 = 3 or more nodes of roots eaten.

Evaluation of Cruiser and Prescribe Treated Corn Seed in Comparison to the Soil Insecticides; Counter CR and Force 3G on Mexican Corn Rootworm, North Central Texas, 2002

Glen C. Moore
Extension Agent-IPM
Cooperator: Van Perry

Navarro County

Summary: A trial was conducted during 2002 in Northwest Navarro County to measure the efficacy of Cruiser 5FS and Prescribe seed treatments in comparison to standard soil insecticides; Counter CR and Force 3G on Mexican Corn Rootworm, *Diabroctica virgiferazeae.* There was no significant difference in plant population between any of the treatments and the untreated check. Additionally, there was no significant difference in the percent lodged plants. There was, however, a significant difference in root injury from feeding by Mexican Corn Rootworm.

Significantly less root injury was observed from the Force 3G treatment than in the untreated check. Numerically, less root injury was observed from Cruiser 5FS, Prescribe and Counter CR than the untreated check, however, there was no significant difference.

Objective: The trial was designed to assess the efficacy of corn seed treatments; Cruiser 5FS and Prescribe relative to standard soil insecticides and an untreated check on Mexican Corn Rootworm.

Materials & Methods: On March 13, 2002, a Mexican Corn Rootworm management trial was planted on the Van Perry Farm in Northwest Navarro County, Texas. The field had been planted to corn for four consecutive years. The trial was planted in 30 inch rows in a randomized complete block design with 3 replications. Plots measured 4 rows by 25 ft. in length. Soil insecticide treatments were applied to designated plots using a John Deere 7300 vacuum planter. The planter was also used to lay-off the trial width of 32 rows and ensure the precise 30 inch row spacing. Treatments were planted using a one row plot planter. The corn hybrid was Pioneer 31R88. A fertility program consisted of 125 lbs./acre of actual nitrogen and 9 gal. of 9-22-6-0.15/acre. Weeds were controlled Atrazine at the rate of 1.0 lb./acre and a post emergence application of Peak at 8 ozs./acre.

Treatments included; Cruiser 5FS at 400g ai./100 Kg, Prescribe at 1.34 mg./kernal, Counter CR (20G) at 6 ozs./1000 ft. of row(t-band), Force 3G at 5 ozs./1000 ft. of row(t-band) and an untreated check. Plant population counts were taken at V-4 by recording the number of plants from 50 ft. of row from each plot. Plant lodging ratings were taken by examining 10 plants at 3 locations(total of 30 plants)within each plot. Plants were counted as lodged, if leaning more than 30 degrees from vertical position.

Root injury ratings were taken when plants were in growth stages ranging from V15 to VT. On May 31, 2002 five randomly selected plants/plot were excavated with the entire root system and lower stalk intact. Roots were vigorously shaken to dislodge the bulk of attached soil. Roots from each plot were placed in a plastic bag and tagged for identification. The plastic bags were perforated, submerged in a stock tank filled with water and allowed to soak for 48 hours to dislodge remaining soil. Roots were removed from bags and thoroughly washed with a garden hose with attached nozzle. Once roots were free from soil and debris, they were closely scrutinized for feeding by Mexican Corn Rootworm larvae and a root injury rating was assigned based on the 0 to 3 Iowa State Node Injury Scale (Oleson 1998).

Results & Discussion: There was no significant difference in plant population between any of the treatments and the untreated check. Mean plant height in inches for Cruiser 5FS and the untreated check was significantly less than recorded for Counter CR, Force 3G and Prescribe. There was no significant difference in the percent of plants lodged between any of the treatments and the untreated check (Table 1). Numerically, the least root injury was observed with Force 3G, which was significantly different from the untreated check (Figure 1). Although numerical differences in root injury was observed between Cruiser 5FS, Prescribe and Counter CR, they were not significantly different than the untreated check.

Acknowledgments: Much appreciation is due Mr. Van Perry for serving as cooperating demonstrator. Special thanks is expressed to Mr. Tony Driver, Syngenta for technical support and

grant and aid. Much gratitude is due Dr. Allen Knutson, Professor and Extension Entomologist for assistance with root ratings and data analysis.

Disclaimer Clause: Trade names of commercial products used in this report are included for better understanding and clarity. Reference to commercial products or trade names is made with the understanding that no discrimination is intended and no endorsement by the Texas A&M University System is implied. Readers should realize that results from one experiment do not represent conclusive evidence that the same response would occur where conditions vary.

Table 1. Mean plant population, percent lodged plants and root injury ratings for Crusier 5FS and Prescribe seed treatments vs. soil insecticides; Counter CR and Force 3G, Mexican Corn Rootworm Trial, Perry Farm, Navarro County, Texas 2002.

Treatment	**Plant population Mean # of Plants per 50 ft. of row**	**Mean Plant Height (in)**	**% Lodged Plants**	**Root Injury Rating* Mean/5 Plants****
Cruiser 5FS 400g ai/100 Kg	72 a	57 c	3 ab	1.01 abc
Prescribe	67 a	69 a	1 ab	1.07 abc
Counter CR 20G 6 oz./1000 row ft. (t-band)	66 a	70 a	3 ab	1.41 abc
Force 3G 5 oz./1000 row ft. (t-band)	64 a	70 a	2 ab	0.50 c
Untreated Check	68 a	61 bc	4 a	1.75 ab

* Means followed by the same letter are not significantly different at alpha =0.10, ANOVA
* *Root injury ratings taken at growth stages V18 through VT and assessed from the 0 to 3 Iowa State Node Injury Scale(Oleson 1998).

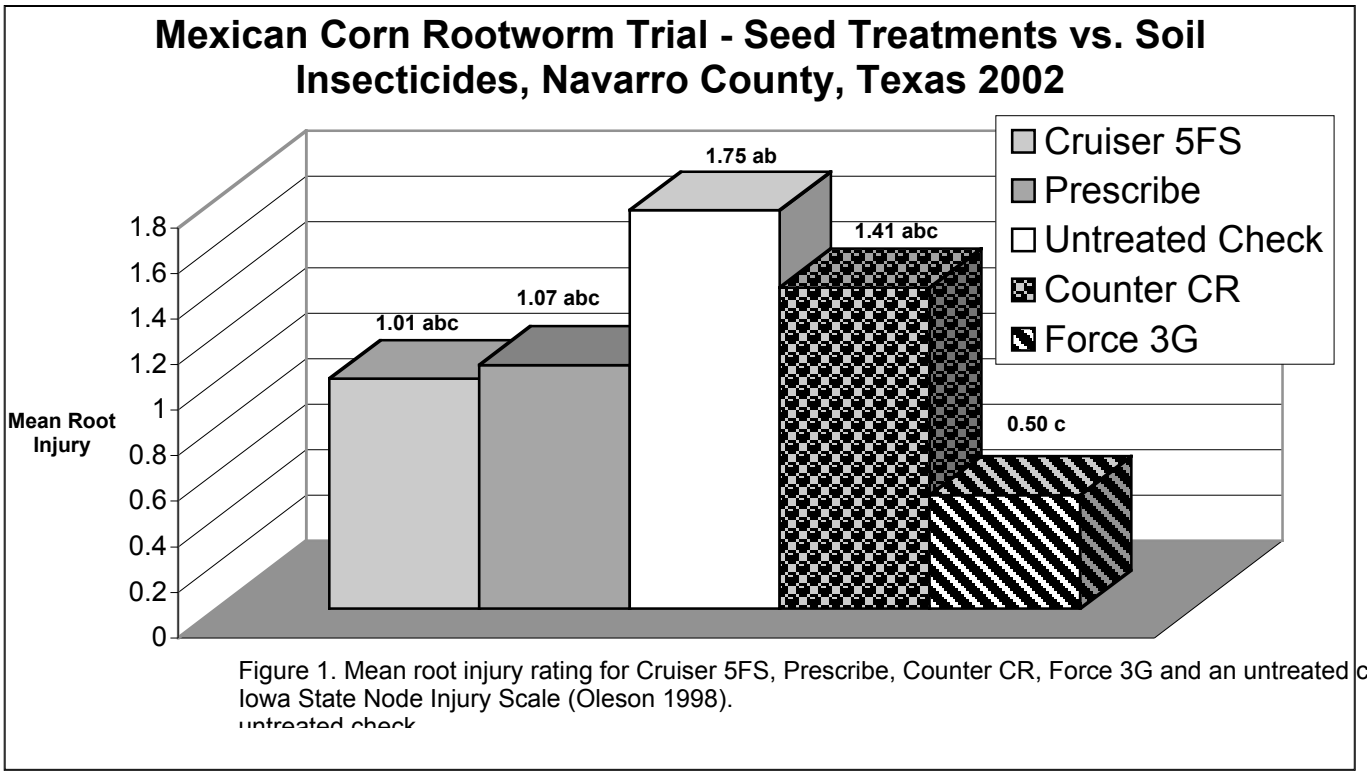


Figure 1. Mean root injury rating for Cruiser 5FS, Prescribe, Counter CR, Force 3G and an untreated c
Iowa State Node Injury Scale (Oleson 1998).
untreated check

Figure 1. Lead CRW-Protected Corn Event Evaluation
Lodged Plants

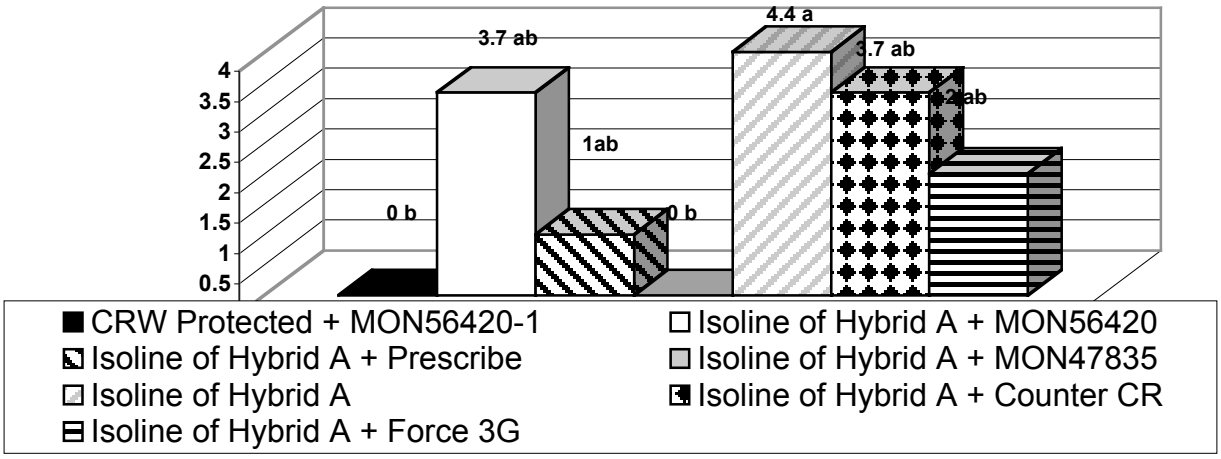
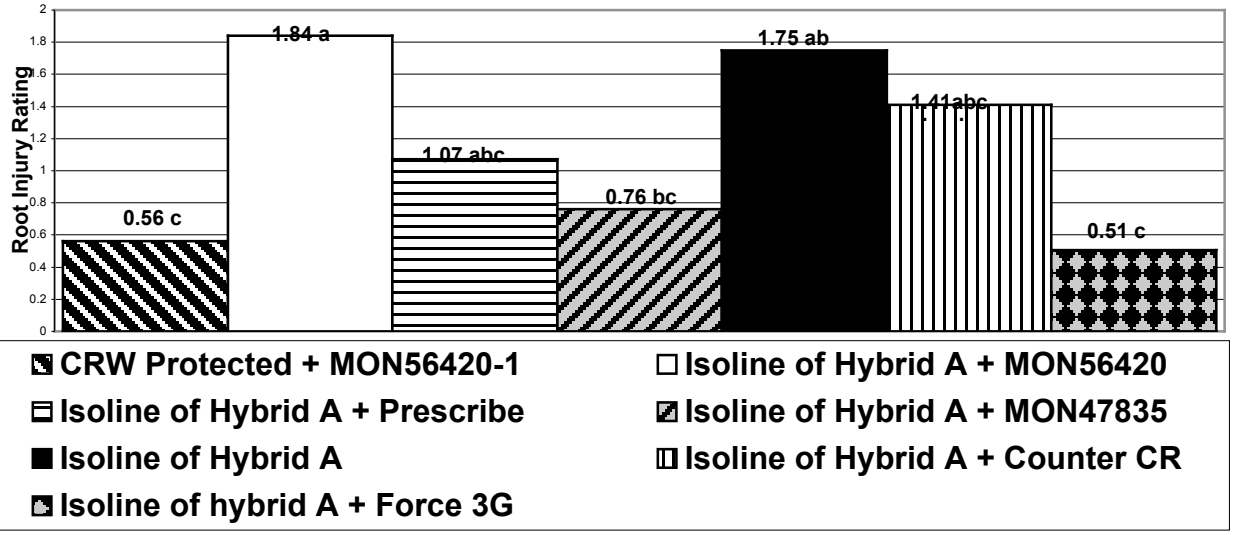


Figure 2. Performance of Lead CRW-Protected Corn Event against Mexican Corn Rootworm, Navarro Co. Perry Farm, 2002



Comparison of Seed Treatments and Soil Insecticides for Control of Mexican Corn Rootworm on Corn, 2002

Paul Aelvoet Farm, Medina County, 2002

Noel Troxclair and Wayne Scholtz
Extension Entomologist, Uvalde and County Extension Agent-Ag, Medina County, repectively

SUMMARY: Soil insecticides, Aztec 2.1 G, Counter 20 CR, Force 3.O G, applied at-planting in a T-band, Prescribe and Clothianidin seed treatments, each at a single rate, and untreated checks were compared for control of Mexican corn rootworm on corn. The plots experienced light pressure from the Mexican corn rootworms. Root damage was evaluated using the Iowa node injury rating scale; mean root damage ratings of 0.15 occurred in the untreated control plots. Statistical differences were observed between the untreated plots and all insecticide treatments with no statistical difference observed among the insecticide treatments.

PROBLEM: Farmers in the Winter Garden area continue to incur injury to field corn by Mexican corn rootworm, in some cases even when soil insecticides are used. Growers are often limited in their abilities to practice crop rotation on their corn ground and may sustain economic injury due to continuous planting of corn in some fields. We are continuing to monitor control of Mexican corn rootworm with soil insecticides and to evaluate new insecticides and rootworm control technologies as they are developed.

OBJECTIVES: This test was established on corn to compare the efficacy of proven soil insecticides and seed treatments for control of the Mexican corn rootworms in the Winter Garden area of Texas.

MATERIALS & METHODS: Treatments applied at-planting or as seed treatments were compared on 4-row by 33 ft plots replicated 4 times in a randomized complete-block design. The granular insecticides were applied at labeled rates, and seed treatments were applied at labeled rates to the seed prior to the seed being shipped. Corn was planted on 36-inch row centers at 24,500 kernels/acre on 29 March, 2002, in a field south of County Road 532 and east of County Road 432, southwest of Hondo, Texas. Corn had been planted on the test site during the previous five seasons. We expected a heavy Mexican corn rootworm infestation based on a heavy adult population during the previous season. On 13 May, 2002, treatment effects were measured by digging 10 plants from the center two rows of each plot from all plots and examining the roots for Mexican corn rootworm damage.

RESULTS/DISCUSSION: Even with five years of continuous corn planting, Mexican corn rootworms developed populations sufficient to cause only light corn root damage ratings of 0.148 in the untreated control plots (Table 1). Damage ratings in the untreated plots were significantly greater than those found in any insecticide-treated plots. Root damage ratings were not significantly different among any of the insecticide treatments.

CONCLUSIONS: All insecticide treatments provided protection from Mexican corn rootworm feeding since root damage ratings from all insecticide treatments were significantly lower than those from the untreated control plots.

ACKNOWLEDGMENTS:
Special thanks are extended to Paul Aelvoet for providing labor, land and equipment for conducting this test and assistance in test establishment and evaluation. Wayne Scholtz, Rick Hoffman and Caleb Troxclair also are thanked for their assistance in the planting and evaluation portion of this study. Bayer Corporation is acknowledged for their financial support.

Table 1. Comparison of soil insecticides and seed treatments for control of corn rootworms on corn, Paul Aelvoet Farms, Medina County, 2002.[a]

Treatment	Rate	Root damage[b]
Untreated	-	0.148 a
Aztec 2.1 G	6.1 lb /A	0.040 b
Prescribe 600F	1.36 mg a.i./cwt	0.026 b
Clothianidin 600F	1.25 mg a.i./cwt	0.024 b
Counter 20 CR	5.4 lb /A	0.023 b
Force 3 G	4.5 lb /A	0.020 b

[a] Based on Iowa node injury rating scale.

[b] Means within a data column followed by the same letter are not significantly different at the 0.01% level of probability by Anova and Duncan's Multiple range test