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Results of Insect Control Evaluations on Corn, Sorghum, and Cotton in Texas Coastal Bend Counties & Crop Hybrid/Variety Comparisons

Texas Cooperative Extension, Dr. Edward G. Smith, Director, The Texas A&M University System, College Station, Texas

A TRIBUTE TO THE SOUTH TEXAS COTTON AND GRAIN ASSOCIATION

The South Texas Cotton and Grain Association, headquartered in Victoria, Texas, has been an unwavering supporter of our Extension programs. The Association serves as an advocate for region agricultural producers from the local to the national level. It also has working relationships with other commodity associations, Texas Pest Management Association, National Cotton Council, Cotton Incorporated, grain handler groups, Texas Food and Fiber Council, and many others.

Direct help to Extension has included funds for county crop tours, special cotton and grain field days, IPM research projects, county demonstrations and applied research, Extension Agent IPM position support, and major educational events for the Gulf Coast region. The major regional educational programs for which they provided assistance and worked with us as a full partner include Coastal Bend Area Cotton Symposium (1979); Instrument Cotton Classing Conference (1982); South Texas Cotton Improvement Conference (1988); Chemicals, Agriculture and Our Environment Conference (1990); Texas Grain Improvement Conference (1991); Grain Sorghum for the 21st Century: Working Together as an Industry (1997); and Texas Gulf Coast Cotton Conference: Improving Yield, Quality, Marketing (2001).

The Association has been instrumental in gaining support for funding of many of our demonstration and research projects as they see it useful for area commercial agriculture. Various phases of the work reported herein had a link with the Association. The support of South Texas Cotton and Grain Association is acknowledged and greatly appreciated.

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REPORT PREPARATION

Special thanks are extended to Mrs. Stephanie A. Klock, Administrative Assistant for Entomology, Soil and Crop Sciences, and Agricultural Economics at the Texas A&M University Agricultural Research and Extension Center, Corpus Christi for preparation of this report.

FOREWORD

This document contains reports of applied research/demonstration projects conducted by Texas Cooperative Extension dealing with management of arthropod pests and production practices. Objectives of the studies were to find more cost effective ways to manage pests and to improve production practices. Experiments were conducted with commercial agricultural producers in cooperation with county Extension agents, county row crop committees, agricultural consultants, and agribusiness companies. Coastal Bend farm cooperators are acknowledged for providing land, equipment, labor, time, ideas, and other assistance in support of these projects.

Trade names of commercial products used in this report are included only 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. Results from one experiment may not represent conclusive evidence that the same response would occur where conditions vary.

A few reports contain calculations of added return over treatment costs based on numerical differences in yield. It must be kept in mind that the returns attributed to treatment are not absolute, i.e. the yield differences may have been the result of other variables not associated with the treatment. The reader should always consider the statistical analysis and data from multiple tests over space and time in making judgements concerning economic returns.

Texas Cooperative Extension hybrid/variety evaluations for canola, sunflower, corn, sorghum and cotton conducted at the Texas Agricultural Experiment Station, Corpus Christi are included. Special thanks are extended to Dr. Stephen D. Livingston, Extension Agronomist (retired), for leading some of these studies.

This report and others are available for previous years at the following web site http://agfacts.tamu.edu/~rparker. If you have comments or questions about the reports contained herein, contact:

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SUMMARY: At 36 DAP (days after planting) significantly fewer chinch bugs were found in 3 of the 7 treatments evaluated compared with their numbers in nontreated corn. The most effective treatments at 36 DAP included Poncho (1.25 mg ai/seed), experimental seed treatment 4C, and experimental seed treatment 4A + Aztec granular insecticide. Chinch bug numbers, for some unexplained reason, declined in nearly all treatments including the nontreated corn by 48 DAP. Even so, statistically fewer chinch bugs were found in Poncho (1.25 mg ai/seed) and the Gaucho + Regent seed treatment corn plots compared to the numbers in nontreated corn. Insect numbers were not high enough nor did they persist long enough to adversely affect yields.

OBJECTIVES: The experiment was designed to evaluate the effectiveness of seed and granular applied insecticides for control of chinch bug and any other soil dwelling arthropods and to measure the impact of the treatments on corn production.

MATERIALS/METHODS: The corn experiment was planted March 7, 2007 on the Casper Farm operated by Lawrence Hinze 1.5 miles north of Shiner. A John Deere 7100 MaxEmerge planter equipped with research cone seeding devices set on 38-inch row-centers was used to plant 4-row by 42 foot plots. The seeding rate for the SG1890HXXSGI-847 hybrid corn was 20-thousand per acre. Granular Aztec was applied in a 6-inch "T" band at-planting. Treatments were arranged in a randomized complete block design with 4 replications of each treatment.

Corn had been planted on the site for more than 10 years. Fertilizer applied was 44-24-8 + 2S along with 1.0 quart/acre of 15% zinc. The clay loam soil (44% sand, 16% silt, 40% clay) at 7.6 pH and 1.2% organic matter was somewhat dry at the planting depth. Within a few days after first plant emergence enough rain was received to germinate the remaining seed that had been placed into dry soil. Herbicides applied included Atrazine 4L (1.0 qt/acre) + Dual II Magnum (1.5 pt/acre). Liberty herbicide (1.0 qt/acre) was applied with a backpack sprayer when corn was 5 feet tall.

Treatments were assessed by (1) counting the number of plants in 13.75 feet on the center rows of each plot 36 DAP, (2) examining in each plot 20 plants and surrounding soil for chinch bugs 36 and 48 DAP, (3) digging 6 plants from the center rows of the nontreated corn for examination for Mexican corn rootworm [no rootworm damage was detected; therefore, no roots were obtained from other plots] and (4) harvesting corn from 10 row feet from each of the center 2 rows of plots on August 13. Bushel weight, grain moisture, and yield determinations were made following shelling on a laboratory threshing machine. Grain weights were adjusted to a 15% moisture content. Data were subjected to analysis of variance, and where the P value was 0.05 or less, means were separated by LSD (least significance) using Agriculture Research Manager software package (ARM revision 6.1.13).

RESULTS/DISCUSSION: Plant stands, chinch bug counts, and yield data are presented in Table 1. Significant differences were not found in plant population where the range in population varied 2-thousand plants/acre. Early attempts to count chinch bugs before 36 DAP were not successful due to very low numbers. However, statistical differences in chinch bug numbers were observed on both inspection dates (36 and 48 DAP). At 36 DAP Poncho (1.25 mg ai/seed), Experimental 4C, and Experimental 4A + Aztec treatments had significantly fewer chinch bugs than did the nontreated corn. Numerically, all other insecticide treatments averaged fewer chinch bugs compared with nontreated corn. By 48-DAP, Poncho (1.25 mg ai/seed) and Gaucho + Regent treatments contained significantly fewer chinch bugs compared to the nontreated corn. No differences or trends were observed in the yield data. Lack of yield differences is believed to reflect the low insect numbers in plots during the first 36 DAP followed by below-threshold numbers after that date. Poncho (1.25 mg ai/seed) was consistent in keeping chinch bugs at a very low level. In previous studies the lower rate of Poncho (0.25 mg ai/ seed) has been the most economical for chinch bugs, but where the price differential between the two rates has narrowed and chinch bug numbers are heavy, the higher rate is likely to be more economical.

ACKNOWLEDGMENTS: Thanks are extended to Mr. and Mrs. Lawrence Hinze for providing land for conduct of the field study. Bayer CropScience is acknowledged for supporting the study and providing most of the insecticide treatments. BASF is thanked for providing the Regent and their support. Special thanks are extended to Rudy Alaniz and Clint Livingston, Farm Demonstration Assistants, for help in conduct of the study.

Table 1. Comparison of at-plant insecticide treatments on corn for control of chinch bug, Lawrence Hinze Farm, Lavaca County, TX, 2007.

Treatment (rate)	Plants (1000's/acre)	Chinch bugs/20 plants 36 DAP[1/]	48 DAP	Avg	Yield bu/acre
Poncho 600FS (1.25 mg AI/seed)	19.5[a]	10.8[bc]	2.0[c]	6.4[b]	97[a]
Experimental 4C (1.8 mg AI/seed)	18.5[a]	4.3[c]	6.3[bc]	5.3[b]	97[a]
Aztec 2.1G (6.7 oz/1000 ft)	18.5[a]	17.3[ab]	18.3[a]	17.8[a]	95[a]
Poncho 600FS + Aztec 2.1G (0.25 mg AI/seed + 6.7 oz/1000 ft)	20.5[a]	17.5[a]	7.8[bc]	12.6[ab]	104[a]
Exp 4A + Aztec 2.1G (0.5 mg AI/seed + 6.7 oz/1000 ft)	18.5[a]	8.8[bc]	8.3[bc]	8.5[b]	91[a]
Poncho 600FS + Regent TS (0.25 + 0.17 mg AI/seed)	18.8[a]	15.5[ab]	10.8[abc]	13.1[ab]	99[a]
Gaucho 600FS + Regent IS (0.38 + 0.17 mg AI/seed)	19.0[a]	12.3[abc]	2.0[c]	7.1 [b]	97[a]
Nontreated	18.9[a]	22.5[a]	13.5[c]	18.0[a]	97[a]
LSD (P = 0.0NS	NS	10.56	9.08	8.26	NS
P > F	.7685	.0441	.0174	.0178	.8752

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

[1/] DAP = days after planting

CHINCH BUG CONTROL IN CORN WITH GRANULAR AND SEED APPLIED INSECTICIDES: TEST II

Texas Agricultural Experiment Station, Nueces County, 2007

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SUMMARY: Very few insect pests were detected in the test, but the data tended to indicate improvement in several measured parameters. The Poncho treated corn had significantly better vigor rating, and Poncho + Counter treated corn had a relative good vigor rating. It was not statistically better than most of the other treatments. These two treatments, although not statistically significant, also had the highest yields in the test.

OBJECTIVES: The field experiment on corn was conducted to evaluate the effectiveness of seed and granular applied insecticides for control of chinch bug and any other soil dwelling arthropods, and to measure the impact of the treatments on corn production.

MATERIALS/METHODS: Five seed treatments (Poncho, Experimental 4A and 4C from Bayer, Gaucho, and Regent) and granular Counter were compared on SG1890HXXSGI-847 hybrid corn in various combinations in a field experiment planted on the Texas Agricultural Experiment Station Meaney Annex at Corpus Christi. Corn was planted on March 6, 2007 with a 4-row John Deere 6100 buster type planter at 25 thousand kernels/acre through research cone seed distributors. Experimental plots were 4 rows by 40 feet and arranged in a randomized complete block design with 4 replications. Row spacing was 38-inch. Soil moisture at planting was excellent, and the soil temperature at the 3-inch depth was 62°F. The sandy clay loam soil (52% sand, 14% silt, 34% clay) with 7.7 pH contained 1.61% organic matter. Cotton had been grown on the site in the previous production season. Fertilizer consisted of 125-22-0 + 6.7 lb zinc. Herbicide applied after planting consisted of Atrazine 4L (1.0 quart/acre) on December 15, 2006, and Dual II Magnum (1.3 pint/acre) + Atrazine 4L (1.0 quart/acre).

Treatments were assessed by (1) counting the number of corn plants on 13.75 feet row in each of the center 2 rows in plots on March 20; (2) counting chinch bugs on 3 early dates, but only occasional insects were detected in the nontreated plots; (3) assigning a vigor rating [average of 3 individuals] on April 24 [1 = no damage up to 5 = severe stunting, uneven plant stand and height, wilting, and yellow color]; and (4) harvesting by hand and counting the number of ears on 10 row feet on each of the center 2 rows in each plot on August 7. Ears were threshed on a research machine, bushel weight and moisture readings were taken, and sample weights were converted to 15% moisture. The software Agriculture Research Manager (ARM revision 6.1.13) was used to conduct analysis of variance, and means when P=0.05 or less were separated by LSD (least significant difference).

RESULTS/DISCUSSION: Insect numbers were so low in nontreated corn that counts will not be reported. Plant stand, vigor rating, grain characteristics, and yield are provided in Table 1. The corn plant stands were higher than desired, and statistical differences were not observed. The vigor rating in Poncho seed treatment used alone was statistically better than all other ratings; reason for the different vigor ratings cannot be explained since so few insect pests were detected. Poncho + Counter also had a favorable vigor rating, but it was not statistically better than many of the other treatments including the nontreated corn. There were differences which could not be explained in bushel weights. No differences were observed in grain moisture content at-harvest or in yield data. However, the Poncho (alone) and Poncho + Counter treatments had the highest numerical yields in the experiment and the nontreated corn the lowest test yields. The P value for the yield data was 0.0642 (near the level we considered for statistical differences).

ACKNOWLEDGMENTS: Bayer CropScience and BASF are thanked for their support of this study. Rudy Alaniz and Clint Livingston, Farm Demonstration Assistants, are acknowledged for their work in planting, maintaining, and harvesting the experiment.

Table 1. Comparison of at-plant insecticide treatments on corn for control of soil dwelling insects, Texas Agricultural Experiment Station, Nueces County, TX, 2007.

Treatment (rate)	Plants (1000's/acre)	Vigor rating[1/]	Bushel weight	% grain moisture	Yield bu/acre
Poncho 600FS (1.25 mg AI/seed)	22.0[a]	1.17[c]	55.3[a]	17.6[a]	128[a]
Experimental 4C (1.8 mg AI/seed)	23.9[a]	2.87[ab]	54.9[abc]	17.9[a]	125[a]
Counter 15G (7.0 oz/1000 ft)	22.4[a]	3.17[ab]	54.6[abc]	17.4[a]	120[a]
Poncho 600FS + Counter 15G (0.25 mg AI/seed + 7.0 oz/1000 ft)	24.9[a]	2.25[b]	55.1[ab]	17.9[a]	130[a]
Exp 4A + Counter 15G (0.5 mg AI/seed + 7.0 oz/1000 ft)	22.8[a]	2.54[ab]	55.4[a]	17.8[a]	122[a]
Poncho 600FS + Regent TS (0.25 + 0.17 mg AI/seed)	22.9[a]	3.38[a]	54.1[bc]	17.3[a]	116[a]
Gaucho 600FS + Regent TS (0.38 + 0.17 mg AI/seed)	26.3[a]	2.95[ab]	54.5[abc]	17.5[a]	126[a]
Nontreated	26.3[a]	3.21[ab]	53.9[c]	16.7[a]	112[a]
LSD (P = 0.0NS	NS	1.038	1.00	NS	NS
P > F	.5183	.0053	.0492	.1925	.0642

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

[1/] Vigor ratings: 1 = no damage up to 5 = severe stunting, uneven plant stand and height, wilting, and yellow color.

CHINCH BUG CONTROL IN CORN WITH GRANULAR AND SEED APPLIED INSECTICIDES: TEST III

Texas Agricultural Experiment Station, Bee County, 2007

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SUMMARY: Insecticides were tested for effects on soil-dwelling arthropod pests. Very few pests were found in the test, and except for plant stand, statistical differences were not found in the data. The data set was so consistent for plant stand that it took only 2,200 plants/acre (LSD at the 5% probability level) for significant difference. Only the Counter, and Poncho + Counter treatments had plant stands significantly higher than the nontreated corn. No differences were observed in vigor ratings, but some of the more favorable vigor ratings were in the Poncho treated corn. Statistical differences were not found in bushel weight, grain moisture at-harvest, or yield. Yield, however, was numerically greater in all treatments compared with the nontreated corn (average 13.8 bushels/acre better).

OBJECTIVES: The field experiment was designed to evaluate the effectiveness of seed and granular applied insecticides for control of chinch bug and other soil dwelling arthropods, and to measure the impact of the treatments on corn production.

MATERIALS/METHODS: Five seed treatments (Poncho, Experimental 4A and 4C from Bayer, Gaucho, and Regent) and granular Counter were compared on SG1890HXXSGI-847 hybrid corn in various combinations in a field experiment planted on the Texas Agricultural Experiment Station at Beeville. The Counter was applied in a 6-inch T-band at planting with Nobel boxes. Corn was planted on April 5, 2007 with a 4-row John Deere 6100 buster type planter at 21 thousand kernels/acre through research cone seed distributors. Experimental plots were 4 rows by 40 feet and arranged in a randomized complete block design with 4 replications. Row spacing was 38-inch. Soil moisture at planting was excellent and the soil temperature at the 3-inch depth was 71°F. Sorghum had been grown on the site in the previous production season. Fertilizer consisted of 72-24-0 and herbicide consisted of Atrazine 4L (1.0 quart/acre) + Dual II Magnum (1.3 pints/acre) on April 5 followed by Prowl (0.75 quart/acre) + Atrazine 4L (1.0 quart/acre) on May 12.

Treatments were assessed by (1) counting the number of corn plants on 13.75 feet row in each of the center 2 rows in plots on April 23, (2) attempting to count chinch bugs on 3 early dates, but only occasional insects were detected in the nontreated plots, (3) assigning a vigor rating on May 12 [1 = no damage up to 5 = severe stunting, uneven plant stand and height, wilting, and yellow color], and (4) harvesting by hand 30 ears from the center 2 rows in each plot on August 8. Ears were threshed on a research machine, bushel weight and moisture readings were taken, and sample weights were converted to 15% moisture. The software Agriculture Research Manager

(ARM revision 6.1.13) was used to conduct analysis of variance, and means when P=0.05 or less were separated by LSD (least significant difference).

RESULTS/DISCUSSION: Insect counts were not recorded due to the low numbers found in nontreated corn on 3 early inspection dates. There were statistical differences in plant stands, but no other differences were found in the data perameters measured (Table 1). The LSD for plant stand was only 2,200/acre, but reasons for the differences could not be explained. Although not statistically significant, Poncho (1.25 mg ai/seed) had an excellent vigor rating only exceeded by Exp. 4C seed treatment. The lowest numerical yield was the nontreated corn at 90.1 bushels/acre; average insecticide treated corn yields were 13.8 bushels/acre better. The trend appears to favor insecticide treatment both from the vigor rating data and the yield data even though it could not be demonstrated statistically. There may have been low levels of insects present before heavy rainfall that occurred prior to inspections made for pest insects (chinch bugs), or there may have been other non-detected soil dwelling insects that contributed to possible losses in the nontreated corn.

ACKNOWLEDGMENTS: Bayer CropScience and BASF are thanked for their support of this study. Rudy Alaniz and Clint Livingston, Farm Demonstration Assistants, are acknowledged for their work in maintaining and harvesting the experiment. Special thanks are extended to Kenneth Schaefer, Senior Research Associate; Jeff Remmers, Research Associate; and Dr. Gary Odvody, Research Plant Pathologist for their assistance in planting the experiment and helping with other phases of the study.

Table 1. Comparison of at-plant insecticide treatments on corn for control of soil dwelling insects, Texas Agricultural Experiment Station, Bee County, TX, 2007.

Treatment (rate)	Plants (1000's/acre)	Vigor rating[1/]	Bushel weight	% grain moisture	Yield bu/acre
Poncho 600FS (1.25 mg AI/seed)	21.3[abc]	1.5[a]	53.6[a]	18.0[a]	106.7[a]
Poncho 600FS (0.25 mg AI/seed)	19.1[c]	2.3[a]	53.5[a]	17.5[a]	97.0[a]
Experimental 4C (1.8 mg AI/seed)	21.3[abc]	1.3[a]	53.3[a]	16.9[a]	107.3[a]
Counter 15G (7.0 oz/1000 ft)	21.8[a]	2.1[a]	53.5[a]	17.6[a]	108.3[a]
Poncho 600FS + Counter 15G (0.25 mg AI/seed + 7.0 oz/1000 ft)	22.3[a]	1.5[a]	53.1[a]	17.1[a]	105.6[a]
Exp 4A + Counter 15G (0.5 mg AI/seed + 7.0 oz/1000 ft)	21.1[abc]	2.3[a]	53.1[a]	17.5[a]	104.4[a]
Poncho 600FS + Regent TS (0.25 + 0.17 mg AI/seed)	21.6[ab]	2.0[a]	53.0[a]	16.8[a]	106.9[a]
Gaucho 600FS + Regent TS (0.38 + 0.17 mg AI/seed)	19.3[c]	3.0[a]	53.9[a]	17.3[a]	95.0[a]
Nontreated	19.5[bc]	2.5[a]	53.0[a]	17.0[a]	90.1[a]
LSD (P = 0.0NS	2.20	NS	NS	NS	NS
P > F	.0431	.1293	.7344	.6410	.3443

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

[1/] Vigor ratings: 1 = no damage up to 5 = severe stunting, uneven plant stand and height, wilting, and yellow color.

MEXICAN CORN ROOTWORM CONTROL AND YIELD PERFORMANCE IN LATE MATURITY SYNGENTA CORN HYBRIDS

M & M Farms, Wharton County, 2007

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SUMMARY: A heavy infestation of Mexican corn rootworm was expected to occur in the test site as the field had been in corn for more than 15 years, and they had infested the field in past years. In 2007, however, the rootworm infestation was very low which resulted in little data on the effectiveness of the Bt-rootworm hybrids tested. Statistically significant differences were not found in plant stand, root injury rating, root vigor, plant lodging, grain moisture at harvest, or yield. The only parameter with significant differences was bushel weight. Corn yield in the experiment were statistically equivalent, ranging from 138 to 149 bushels per acre.

OBJECTIVES: The experiment was conducted to compare Syngenta hybrids containing Bt-genes for effectiveness on Mexican corn rootworm, to evaluate the effectiveness of Force on a non-Bt corn rootworm hybrid, and to compare the treatments with a Garst Bt corn rootworm hybrid.

MATERIALS/METHODS: The field study was planted on the Neal Mahalitc Farm on County Road 231, which was 1-mile from the intersection with Highway 102 in Wharton County on March 22, 2007. Plots were 4 rows wide by 22 feet long with 4 buffer rows between treatments and 2 buffer rows on the outside of the test. A John Deere 7100 MaxEmerge 2-row planter equipped with research cone planters distributed seed at 19,360/acre on rows spaced 36 inches apart. Granular Force was applied at-planting in a T-band at the rate of 5.0 ounces of product per 1000 row feet. The soil temperature at the 3-inch depth was 70°F. Plots were arranged in a randomized complete block design with 4 replications.

The silt loam soil (25% sand, 54% silt, 21% clay) at pH 7.8 contained 2.12% organic matter. Corn had been grown on the site for more than 15 years. Herbicide applied on the planting date included Bicep II Magum (2.1 qt/acre) + Touchdown Total 4.17 (1.5 pints/acre).

Treatments were assessed by (1) counting the number of plants on 10-row feet row on each of the two center rows in each plot; (2) digging 6 plants from the outside 2 rows in each plot on May 17, cleaning the root systems, and scoring the root system using the Iowa State University 0-3 node injury scale; (3) assigning a root vigor rating on a 1-100 score; and (4) harvesting corn by hand from 10-row feet from each of the center 2 rows in plots on August 14. Ears were threshed on a research machine, bushel weight and moisture readings were taken, and sample weights were converted to 15% moisture. The software program Agriculture Research Manager (ARM revision 6.1.13) was used to conduct analysis of variance, and means were separated by LSD

(Least Significant Difference) when P=0.05 or less.

RESULTS/DISCUSSION: Table 1 provides information collected from test treatments. Little insect activity was observed in the test and the primary insect (Mexican corn rootworm) for which evaluations were made were almost non-existent. Significant differences were not found in plant stand, root injury, plant vigor, lodging, grain moisture at harvest, or yields. There were significant differences in bushel weight. Without a knowledge of the hybrid background, it is not possible to discuss possible reasons for these differences. Bushel weights ranged from 54.5 to 56.1. Root injury by Mexican corn rootworm tended to be numerically greater in the non-Bt hybrids without Force treatment. Yield levels were very good due to abundant rainfall during the season. Yields ranged from 138 to 149 bushels per acre.

ACKNOWLEDGMENTS: Thanks are extended to Syngenta Crop Protection, especially to Brad Minton and Brian Bacak for their assistance in planting the study. We acknowledge Neal Mahalitc for providing the test site and his cooperation with requirements of the study.

Table 1. Comparison of the effectiveness of Bt-rootworm hybrids from Syngenta Crop Protection with negative isoline hybrids, M&M Farms, Wharton County, TX, 2007.

Hybrid	Treatment[1/]	Plants no./10 ft	Root injury rating[3/]	Root vigor[4/]	Lodged plants %	Bushel weight	% grain moisture	Yield bu/acre
1	SPSWR0117	13.6[a]	.005[a]	89.3[a]	0.0[a]	56.1[a]	14.4[a]	138[a]
2	SPSWR0117	12.6[a]	.018[a]	92.2[a]	8.4[a]	54.5[c]	14.4[a]	144[a]
1 Neg ISO	SPS1007L[2/]	13.0[a]	.019[a]	89.1[a]	0.0[a]	55.8[ab]	14.3[a]	143[a]
1 Neg ISO	SPS10076	13.9[a]	.046[a]	86.4[a]	0.0[a]	56.1[a]	14.5[a]	147[a]
2 Neg ISO	SPS10076	13.6[a]	.027[a]	91.7[a]	5.1[a]	56.0[ab]	14.5[a]	149[a]
Commercial	Bt rootworm	12.6[a]	.071[a]	84.8[a]	1.7[a]	55.4[b]	14.1[a]	138[a]
LSD (P=0.05)		NS	NS	NS	NS	0.69	NS	NS
P > F		.7329	.2019	.0872	.2936	.0010	.4991	.8303

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

1/ All seed was treated with Cruiser 5FS (0.25 mg ai/seed).

2/ Treatment included Force 3G (5.0 oz/1000 row-feet)

3/ Node injury scale: 0 = no feeding damage, 1 = 1 node of roots eaten within 2 inches of the stalk, 2 = 2 nodes eaten, and 3 = 3 or more nodes of roots eaten.

4/ Highest vigor would be 100%.

INSECTICIDE APPLICATIONS TO CORN AT EARLY SILK TO MEASURE EFFECT ON CATERPILLAR PESTS AND AFLATOXIN LEVELS

Keith Orsak Farm, Jackson County, 2007

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SUMMARY: Application of Baythroid insecticide applied to non-Bt corn beginning at first silk followed by a second treatment 7 days later had no effect on corn earworm, fall armyworm, or sugarcane borer numbers or damage. Additionally, no differences were observed in corn production or aflatoxin levels in corn samples by hand or machine harvest. Numerically, the six measurements taken dealing with sugarcane borer were slightly greater in nontreated corn. Similar numerical results for the sugarcane borer were obtained in the 2006 study in Jackson County; the numerical differences were even greater in the previous study where several factors were near the significance level chosen of P=0.05.

This type field study has continued based on reports from a few corn producers that advantages were obtained from these treatments that they believed to due to reduction in ear feeding damage, and the fact that we observed slight reduction in sugarcane borer activity in a 2006 field study. More attention to sugarcane borer activity might be a more realistic way to time the insecticide treatments.

OBJECTIVES: The large scale field study was established to determine if ear feeding caterpillars and their damage could be reduced with two insecticide treatments applied one week apart beginning at first silk, and to measure impacts of these treatments on corn production and aflatoxin levels.

MATERIALS/METHODS: B&H 9044 RR corn hybrid (non-Bt) was planted on the Keith Orsak Farm in Jackson County on February 26, 2007 on the east side of Highway 172 about 2 miles south of the Highway 111 intersection. Seed was planted at 24,700 kernels/acre. Two treatments of Baythroid XL 1EC (2.8 ounces/acre) were applied by air in a volume of 3.0 gpa when silks were first emerging (May 11) and again 7 days later (May 18). Plots were 66 rows wide by the length of the field with 3 replications in a randomized complete block design.

Treatments were assessed by (1) examining 20 ears in the center rows of plots 6 DAT-2 [May 24] and 20 DAT-2 [June7] for presence of corn earworm, fall armyworm, or other caterpillar pests, (2) harvesting ten whole plants and another 10 ears in consecutive order from a row near the center of the plots on August 7, (3) examining harvested stalks and ears for damage caused by sugarcane borer, and fall armyworm, (4) measuring in centimeters the amount of ear tip damage caused by corn earworm and to some extent by fall armyworm, (5) determining yield from the harvested ears (20/plot), (6) harvesting corn near the center of plots with a commercial combine equipped with an electronic weight scale on August 13, and (7) using a Vicam Series-4 Fluormeter Model V2 testing kit (Afla Test FGIS method) to measure the level of aflatoxin present in both hand and machine harvest samples. Bushel weights were determined, moisture level of the grain was measured, and corn weights were converted to the standard 15%. The software Agriculture Research Manager (ARM revision 6.1.13) was used to conduct analysis of variance, and means were separated by LSD when P=0.05 or less.

RESULTS/DISCUSSION: Statistical differences were not found in corn earworm or fall armyworm numbers found in the ears 6 or 20 days after the 2nd Baythroid treatment (6 and 20 DAT-2) nor was any sugarcane borer damage found in leaf axils just above and below ear height (Table 1). Damage differences due to corn earworm and fall armyworm between the Baythroid and nontreated corn was less than that detected in the 2006 study in Jackson County. Sugarcane borer larvae; stalk holes; number stalk tunnels; and centimeters of stalk, shank, and ear tunneling (Table 2) were numerically greater for all 6 factors examined related to sugarcane borer. Significant differences were not found in bushel weight, grain moisture at-harvest, or yield by hand and machine harvest (Table 3). Aflatoxin levels were low in both hand and machine harvested samples.

ACKNOWLEDGMENTS: We thank Keith Orsak for providing a corn field in which to conduct the study, paying for aerial application of Baythroid, and his continued interest in study of caterpillars that attack non-Bt corn. Gary Schwarzlose, Bayer CropScience, is acknowledged for providing the Baythroid for the large plot field study. Thanks are also extended to Chris Davelin, Orsak Farm Manager, and to Coastal Flying Service for their assistance in conduct of the study. Rudy Alaniz and Clint Livingston, Farm Demonstration Assistants, are thanked for their help in processing corn samples.

Table 1. Comparison of corn earworm and fall armyworm numbers and degree of ear tip damage in Baythroid treated (at silking) and nontreated corn, Keith Orsak Farm, Edna, TX 2007.

	Number per 20 ears				
	Corn earworm		Fall armyworm		Caterpillar ear tip da.
Treatment	6 DAT-2[1/]	20 DAT-2	6 DAT-2	20 DAT-2	cm[2/]
Baythroid XL 1EC @ 2.8 oz/acre	3.7[a]	14.7[a]	0.0[a]	3.3[a]	2.5[a]
Nontreated	4.7[a]	10.0[a]	0.0[a]	1.7[a]	3.0[a]
LSD (P = 0.05)	NS	NS	NS	NS	NS
P > F	.7418	.6815	1.00	.5492	.3332

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

[1/] DAT - 2 = Days After Treatment 2 (Baythroid)

[2/] Measured by recording greatest length of damage from each ear tip.

Table 2. Sugarcane borer damage in insecticide treated (at silking) and nontreated corn, Keith Orsak Farm, Edna, TX 2007.

	Amount per 10 plants or ears					
				Cm tunneling		
Treatment	SCB[1/] larvae	Stalk holes	# tunnels	stalk	shank	ear
Baythroid XL 1EC @ 2.8 oz/acre	3.0[a]	54.7[a]	15.7[a]	73.0[a]	30.0[a]	0.0[a]
Nontreated	3.7[a]	65.3[a]	27.0[a]	102.2[a]	40.3[a]	3.0[a]
LSD (P = 0.05)	NS	NS	NS	NS	NS	NS
P > F	.7418	.6882	.4087	.4500	.3797	.1885

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

[1/] SCB = sugarcane borer

Table 3. Corn production from plots treated at silking for caterpillar pests, Keith Orsak Farm, Edna, TX 2007.

	Bushel weight		% grain moisture		Yield	Bushel/acre		Aflatoxin (PPB)	
Treatment	hand	machine	hand	machine	grams/ear	hand	machine	hand	machine
Baythroid XL 1EC @ 2.8 oz/acre	57.5[a]	58.5[a]	12.3[a]	12.5[a]	171.1[a]	123.9[a]	110.5[a]	0.7[a]	0.3[a]
Nontreated	57.5[a]	58.3[a]	11.7[a]	12.2[a]	176.1[a]	129.4[a]	108.4[a]	0.0[a]	2.7[a]
LSD (P = 0.05)	NS	NS	NS	NS	NS	NS	NS	NS	NS
P > F	1.000	.4226	.1613	.8675	.7929	.2151	.3746	.4266	.4226

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

EVALUATION OF BT-TRANSGENIC CORN HYBRIDS FROM SYNGENTA ON FALL ARMYWORM AND SUGARCANE BORER

Jimmy Hays Farm, Calhoun County, 2007

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SUMMARY: Corn hybrids developed by Syngenta were evaluated for effectiveness against fall armyworm and sugarcane borer. Damage by both caterpillar pests was significantly less in MIR162 and BT11 hybrids compared to the negative control hybrid for all measured factors. Application of one Warrior treatment to the negative control hybrid significantly reduced sugarcane borer numbers and damage compared to the non-insecticide treated negative control hybrid (Warrior was applied following evaluation of treatments for fall armyworm). BT11 + MIR604 hybrid was numerically less effective on both caterpillar species by a wide margin compared to any hybrid containing MIR162. Surprisingly, the BT11 hybrid had noticeably, but not statistically, less sugarcane borer damage than BT11 + MIR604. MIR604 is the designation for the Bt corn rootworm event.

OBJECTIVES: Test objectives were to (1) compare efficacy of Bt corn hybrids on fall armyworm, (2) evaluate effects of sugarcane borer on Bt corn hybrids as to protection from larval feeding, and (3) assess the effect of traits on yield under sugarcane borer pressure.

MATERIALS/METHODS: The corn test was planted May 23, 2007 on Foester Road just north of Highway 87 in Calhoun County on the Jimmy Hays Farm. It was planted late due to delay in shipment of seed. A 2-row John Deere MaxEmerge 7100 planter equipped with cone seeding devices was used to seed the 4-row by 22-feet plots. Rows were spaced on 38-inch centers. Thirty-five seed were planted per plot row. The test was arranged in a randomized complete block design with 4 replications of the 7 treatments. Alleys between plots were 3 feet. No other corn was planted or allowed to grow within 660 feet of this test except for an adjacent experimental corn test. These restrictions on the unregistered corn traits were imposed by the Federal Environmental Protection Agency and United States Department of Agriculture. Warrior Z 1CS (3.25 ounces/acre) was applied on June 29 with a hand sprayer to one of the non-Bt hybrid negative control treatments for control of sugarcane borer.

Treatments were assessed by (1) examining 20 plants in each plot for damage by fall armyworm on June 29 [37 days after planting], and (2) examining 10 whole plants from the center two rows of plots for the number of sugarcane borer larvae [pupae counted as larvae], feeding holes in stalks, centimeters of tunneling in stalks, and number of tunnels in stalks on July 25. It was not possible to obtain yield data due to lack of ear development caused by the very late planting date. Live larvae collected were placed in diet cups and subsequently sent to cooperators at Louisiana

State University for use in Bt resistance studies. Larvae from the Bt plant material were kept separate from those found in the non-Bt hybrids. The software Agriculture Research Manager (ARM revision 6.1.13) was used to conduct analysis of variance, and means were separated by LSD when P=0.05 or less.

RESULTS/DISCUSSION: Sufficient numbers of ears were not present to evaluate. The percentage of plants damaged by fall armyworm, sugarcane borer larval counts, number of stalk feeding holes, and number and length of sugarcane borer tunnels are provided in Table 1. Significantly greater numbers of plants were damaged in the negative control hybrid corn plots by fall armyworm than in any of the other treatments. Note that the Warrior treatment was not made until after the fall armyworm counts were made. The BT11 hybrid alone (statistically) and BT11 + MIR604 (numerically) contained more fall armyworm damage than any treatment containing MIR162. Treatment with Warrior significantly reduced sugarcane borer larval numbers, number of stalk feeding holes and tunnels, and length of sugarcane borer tunneling compared with that observed in the non-insecticide treated negative isoline corn. Generally, MIR162 provided superior protection of corn from sugarcane borer compared with BT11. Sugarcane borer larvae, number of stalk feeding holes and tunnels, and centimeters of tunneling were many fold greater in the negative control non-insecticide treated hybrid plots (Table 1).

ACKNOWLEDGMENTS: Syngenta Seeds, Inc. and Syngenta Crop Protection, Inc. are acknowledged for support of the project with labor, equipment, and funding. A special thanks is extended to Brian Bacak, Syngenta Crop Protection, and his brother Lowell Bacak for their assistance in planting the experiment. Rudy Alaniz and Clint Livingston, Farm Demonstration Assistants, are thanked for their help, and Jimmy Hays is credited with providing land for conduct of the study.

Table 1. Fall armyworm and sugarcane borer impact on corn hybrids, Jimmy Hays Farm, Calhoun County, 2007.

Treatment	FAW[2/] % da plants	Sugarcane borer (no. per 10 stalks) larvae	stalk holes	tunnels no.	tunnels cm
MIR162	0.0[c]	4.3[c]	3.0[b]	3.3[c]	14.1[c]
BT11 + MIR604	14.0[bc]	31.0[bc]	23.8[b]	15.0[c]	36.1[c]
BT11 + MIR162 + MIR604	4.0[c]	3.5[c]	6.8[b]	3.8[c]	3.1[c]
MIR162	0.0[c]	3.5[c]	4.8[b]	2.8[c]	7.2[c]
BT11	32.5[b]	6.8[c]	7.5[b]	4.3[c]	10.4[c]
Negative control	56.3[a]	222.5[a]	468.3[a]	104.5[a]	683.3[a]
Negative control[1/]	79.0[a]	74.0[b]	73.8[b]	39.5[b]	178.0[b]
LSD (P = 0.05)	23.4	62.89	120.38	15.19	140.7
P > F	.0001	.0001	.0001	.0001	.0001

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

[1/] Warrior Z 1CS (3.25 oz/acre) was applied on June 29. FAW counts were made before Warrior was applied.

[2/] FAW = fall armyworm

EFFICACY OF SYNGENTA BT CORN HYBRIDS ON FALL ARMYWORM AND SUGARCANE BORER

Jimmy Hays Farm, Calhoun County, 2007

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SUMMARY: Corn hybrids containing MIR162 were numerically, but not statistically, more effective in reducing damage from fall armyworm compared with BT11. The percentage of plants damaged by fall armyworm was not statistically different comparing BT11 and BT11 + MIR604 with one of the two negative controls (Warrior had not yet been applied to this negative control when the fall armyworm evaluations were made).

Statistical differences were not found in the number of sugarcane borer larvae in any of the Bt hybrids; however, MIR162 hybrids numerically had fewer larvae than did the BT11 hybrids. In comparison of the negative control hybrids, treatment with Warrior significantly reduced the number of stalk holes and tunnels, and amount of tunneling by sugarcane borer. MIR162 hybrids also had the least number of stalk holes, number of tunnels, and length of tunneling compared with BT11 hybrids. Average length of sugarcane borer tunnels was not different among the Bt hybrids, and all these factors were significantly greater in the negative control hybrid that was not Warrior treated. Sugarcane borer larval numbers and damage was extensive in the negative control hybrid. In the negative control hybrid (on a per plant basis) sugarcane borer larvae numbered 11.0, there were 39.8 stalk holes, 12.7 tunnels, and 90.9 centimeters of tunneling damage.

OBJECTIVES: Test objectives were to (1) compare efficacy of Bt corn hybrids on fall armyworm, (2) evaluate effects of sugarcane borer on Bt corn hybrids as to protection from larval feeding, and (3) assess the effect of traits on yield under sugarcane borer pressure.

MATERIALS/METHODS: The corn test was planted May 23, 2007 on Foester Road just north of Highway 87 in Calhoun County on the Jimmy Hays Farm. It was planted late due to delay in shipment of seed. A 2-row John Deere MaxEmerge 7100 planter equipped with cone seeding devices was used to seed the 2-row by 22-feet plots with rows spaced on 38-inch centers. Thirty-five seed were planted per plot row. The test was arranged in a randomized complete block design with 4 replications of the 6 treatments. Alleys between plots were 3 feet. No other corn was planted or allowed to grow within 660 feet of this test except for an adjacent experimental corn test due to restrictions on the unregistered corn traits imposed by the Federal Environmental Protection Agency and United States Department of Agriculture. Warrior Z 1CS (3.25 ounces/acre) was applied on June 29 with a hand sprayer to one of the non-Bt hybrid negative control treatments for control of sugarcane borer.

Treatments were assessed by (1) examining 20 plants in each plot for damage by fall armyworm on June 29 [37 days after planting], and (2) examining 10 whole plants from the center two rows of plots for the number of sugarcane borer larvae [pupae counted as larvae], feeding holes in stalks, centimeters of tunneling in stalks, and number of tunnels in stalks on July 25. It was not possible to obtain yield data due to lack of ear development caused by the very late planting date.

Live larvae collected were placed in diet cups and subsequently sent to cooperators at Louisiana State University for use in Bt resistance studies. Larvae from the Bt plant material were kept separate from those found in the non-Bt hybrids. The software Agriculture Research Manager (ARM revision 6.1.13) was used to conduct analysis of variance, and means were separated by LSD when P=0.05 or less.

RESULTS/DISCUSSION: Fall armyworm and sugarcane borer activity in tested corn hybrids is provided in Table 1. Significantly less fall armyworm damage was found in the Bt hybrids than in one of the negative control hybrid treatments. The same negative control hybrid (before Warrior treatment) was not statistically different in fall armyworm damage from hybrids containing BT11 which did not have MIR162. MIR162 treatments had numerically much less damage from fall armyworm.

Sugarcane borer larval numbers, holes in stalks caused by sugarcane borer, and tunneling activity was significantly reduced in the Bt hybrids compared with the negative control hybrid that was not treated with Warrior. Warrior treated negative control hybrid had significantly fewer sugarcane borer stalk holes, fewer numbers of tunnels, and less stalk tunneling compared with the negative control hybrid. However, the number of sugarcane borer larvae found in the Warrior treated negative control hybrid was not different from the nontreated negative control hybrid. Although not measured, our general observation was that a high percentage of sugarcane borer larvae in the Warrior treated negative control hybrid were small. Therefore, they represented a later generation not affected by the foliar insecticide. MIR162 hybrids, sometimes statistically and always numerically, had less sugarcane borer damage than Bt hybrids without the MIR162. Average length of the tunnels was not different among the Bt hybrids.

ACKNOWLEDGMENTS: Syngenta Seeds, Inc. and Syngenta Crop Protection, Inc. are acknowledged for support of the project with labor, equipment, and funding. A special thanks is extended to Brian Bacak, Syngenta Crop Protection and his brother Lowell Bacak for their assistance in planting the experiment. Rudy Alaniz and Clint Livingston, Farm Demonstration Assistants, are thanked for their help, and Jimmy Hays is credited with providing land for conduct of the study.

Table 1. Fall armyworm and sugarcane borer damage on non-transgenic and Bt-transgenic corn hybrids, Jimmy Hays Farm, Calhoun County, TX, 2007.

		Sugarcane borer (no. per 10 stalks)				
				tunnels		
Treatment	FAW[2/] % da plants	larvae	stalk holes	no.	cm	Avg lgth
MIR162	0.0[c]	1.0[b]	2.5[d]	1.5[d]	5.9[c]	1.8[c]
BT11 + MIR604	5.5[bc]	35.8[b]	102.3[bc]	34.8[cd]	129.8[c]	3.5[bc]
BT11 + MIR162 + MIR604	0.5[c]	7.3[b]	13.5[d]	8.0[cd]	18.3[c]	2.7[c]
BT11	4.8[bc]	38.0[b]	41.8[cd]	37.5[c]	89.4[c]	2.2[c]
Negative control	12.3[a]	110.3[a]	397.5[a]	126.8[a]	909.3[a]	7.5[a]
Negative control[1/]	7.3[ab]	126.0[a]	165.0[b]	74.8[b]	448.3[b]	5.8[ab]
LSD (P = 0.05)	6.21	39.51	85.7	34.26	167.69	2.32
P > F	.0076	.0001	.0001	.0001	.0001	.0005

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

[1/] Warrior Z 1CS (3.25 oz/acre) was applied on June 29. FAW counts were made before Warrior was applied.

[2/] FAW = fall armyworm

EFFECTIVENESS OF INSECTICIDES ON STORED CORN WITH RATES SELECTED BASED ON FOUR CENTS PER BUSHEL MAXIMUM COST

Final Four Months of a Fourteen Month Study

Texas Agricultural Experiment Station, Nueces County, 2007

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SUMMARY: In this study the tested rates of single insecticides or mixtures of insecticides were selected based on a maximum cost of $0.04/bushel. The previous report demonstrated that through the first 10 storage months, 4 of 6 insecticide treatments kept pest numbers at very low levels. These treatments included Actellic, Actellic + Diacon II, Spinosad (liquid), and Spinosad + Diacon II. This report summarizes data for months 11 through 14.

Additional insecticide treatments exceeded the rule-of-thumb damage threshold of 1.0 primary insect/quart sample during months 11 through 13. These treatments included Actellic used alone in month 11, Spinosad used alone in month 12, and by the sample date in month 13 all treatments had exceeded the threshold. Heavy insect numbers in the Spinosad dry formulation, Diacon II alone, and nontreated corn caused significant increase in grain temperature and moisture levels. Weight loss was no higher than 0.5% in Actellic, Actellic + Diacon, Spinosad, Spinosad + Diacon II through the 14-month storage period. The percentage dollar loss based on weight change from initial storage and change in grain grades were significantly greater in nontreated, Diacon II (alone) and Spinosad (dry formulation) treatments compared to the other treatments. Percentage loss in value in these three treatments ranged from 15.8% to 27.4% in month 12 and reached 30.7% to 50.5% by month 14. By contrast, percentage dollar loss for the remaining treatments ranged from 0.7% to 2.6% in month 12 and reached 4.9% to 5.4% in month 14.

The study demonstrated that several products used at reduced rates not to exceed $0.04/bushel would protect stored corn for about 12 months.

OBJECTIVES: The experiment was established to determine the effectiveness on stored corn of insecticides for pests based on maximum use rates which cost no more than $0.04/bushel.

MATERIALS/METHODS: Commercially cleaned corn that was in excellent condition was obtained from the Bee County Coop, Tynan, Texas. Corn measured in 50 lb increments was treated on January 24, 2006 in a small cement mixer by applying equivalent to 5 gallons of liquid volume/1000 bushels. Four 50 lb samples of each treatment were placed in 30 gallon plastic drums (200 lb total corn/drum). Drums were covered with 0.5-inch hardware cloth to keep out birds, rodents and other unwanted animals. Following treatment and loading of drums, Phostoxin applied at 1 pellet/30 gallon drum was placed into the center of the grain mass in early February.

Drums were then sealed with 6 ml polyethylene sheeting and tape. Drums were sealed for 5 days and then aerated for 5 days. Sampling of drums revealed no live insects after fumigation. Following aeration, 20 adult lesser grain borer and 10 each of rice weevil and red flour beetle specimens were added to each drum. Each treatment was replicated 4 times and drums, arranged in a randomized complete block design, were placed on a concrete floor at the Texas Agricultural Experiment Station, Corpus Christi, TX. Insects (natural infestation) from inside and outside the building had access to the experimental grain.

Treatments were assessed each month by (1) measuring the temperature with a 12-inch thermometer placed 11.5 inches deep into the middle of each drum, (2) probing grain at 6 locations/drum with a grain probe to obtain a one quart sample for insect inspection and moisture content, and (3) separating insects from the grain using a Seedburo Equipment Company sieve (8/64 - inch triangle holes). Insects were then counted under a Circline magnifier lamp. At intervals during the test period the corn was weighed and a sample was sent to the Corpus Christi Grain Exchange to determine quality factors. The software program Agriculture Research Manager (ARM revision 6.1.13) was used to conduct analysis of variance, and means were separated by LSD when P=0.05 or less.

RESULTS/DISCUSSION: Temperature and moisture readings from corn in storage from months 11-14 are provided in Table 1. With one exception, significantly greater temperatures were observed in the nontreated, Spinosad (alone) and Diacon II (alone) compared to the other treatments in each of the last 4 storage months. The presence of high numbers of insects caused the increased temperatures (Tables 2, 3, and 4). The most abundant pest insect was the rice weevil followed by various other stored grain beetles and lesser grain borer. The greatest number of lesser grain borer were found in the Actellic (alone) treatment. Weight loss and percentage loss in grain value are provided in Table 5. Losses in these two factors were also a reflection of the number of insect pests encountered. It is obvious that 3 of the insecticides or mixtures provided a 12-month protection period, whereas two materials (Spinosad dry and Diacon II) did not provide desired length of pest insect control. This is the 2nd experiment where a dry formulation of Spinosad failed to adequately control stored grain insects. Diacon II used alone was not expected to adequately control weevils (rice weevil) since the immature weevils do not contact the material; this insect growth regulator is only effective on immatures.

ACKNOWLEDGMENTS: Craig Jakob, Great Plains Chemical; Terry Pitts, formerly with Bayer CropScience; and Doug VanGundy, Wellmark International are acknowledged for their support of the experiment. Darwin Anderson, General Manager, Bee County Coop, is thanked for his continued input and interest. Rudy Alaniz, Mike Hiller, and Clint Livingston are thanked for their help.

Table 1. Temperature and moisture levels in corn during the final 4 months of storage, Texas Agricultural Experiment Station, Nueces County, TX, 2007.

Treatment	Rate/ 1000 bu	Storage month and month number post-treatment: temperature (°F) 11 Jan	12 Feb	13 Mar	14 Apr	moisture (%) 11 Jan	12 Feb	13 Mar	14 Apr
Spinosad 0.5% AI	11.2 lb	73.0[a]	65.0[ab]	86.3[a]	68.3[a]	12.2[a]	12.3[a]	13.2[a]	12.3[a]
Actellic 5E	6.83 oz	66.0[bc]	59.8[c]	73.0[c]	61.5[b]	11.0[b]	10.8[b]	10.8[c]	10.5[b]
Actellic 5E + Diacon II	3.86 oz + 3.50 oz	65.8[c]	59.5[c]	72.8[c]	62.5[b]	10.7[b]	10.6[b]	10.6[c]	10.5[b]
Spinosad 0.75 lb	9.6 oz	65.8[c]	59.3[c]	72.3[c]	61.3[b]	10.6[b]	10.8[b]	10.8[c]	10.5[b]
Spinosad 0.75 lb + Diacon II	5.43 oz + 3.50 oz	65.3[c]	59.5[c]	72.5[c]	61.3[b]	10.9[b]	10.5[b]	10.5[c]	10.6[b]
Diacon II	8.07 oz	73.5[a]	67.0[a]	82.0[b]	69.0[a]	12.2[a]	12.1[a]	13.1[ab]	12.3[a]
Nontreated		69.8[ab]	63.8[b]	80.5[b]	68.5[a]	12.1[a]	11.9[a]	12.6[b]	12.6[a]
LSD ($P = 0.05$)		3.85	3.21	3.65	1.46	0.39	0.58	0.50	0.62
$P > F$		.0003	.0001	.0001	.0001	.0001	.0001	.0001	.0001

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

Table 2. Total number pest insects and parasites (*Anisoptermalus calandrae* and *choetospila elegans*) in corn during the final 4 months of storage, Texas Agricultural Experiment Station, Nueces County, TX, 2007.

		Storage month and month number post-treatment								
		Total pest insects/qt				Parasites (beneficial)/qt [1/]				
Treatment	Rate/ 1000 bu	11 Jan	12 Feb	13 Mar	14 Apr	11 Jan	12 Feb	13 Mar	14 Apr	Total
Spinosad 0.5% AI	11.2 lb	77.5[a]	63.0[a]	65.0[a]	138.5[a]	.00[a]	.00[a]	0[a]	1.25[a]	1.25[a]
Actellic 5E	6.83 oz	1.3[c]	1.0[b]	3.0[c]	5.0[c]	.00[a]	.00[a]	0[a]	0.00[a]	0.00[a]
Actellic 5E + Diacon II	3.86 oz + 3.50 oz	0.5[c]	0.0[b]	2.5[c]	9.3[c]	.00[a]	.00[a]	0[a]	0.00[a]	0.00[a]
Spinosad 0.75 lb	9.6 oz	0.0[c]	1.5[b]	2.0[c]	2.8[c]	.00[a]	.00[a]	0[a]	0.00[a]	0.00[a]
Spinosad 0.75 lb + Diacon II	5.43 oz + 3.50 oz	0.5[c]	0.0[b]	2.8[c]	3.5[c]	.00[a]	.00[a]	0[a]	0.00[a]	0.00[a]
Diacon II	8.07 oz	66.3[ab]	52.5[a]	58.5[a]	99.0[b]	.25[a]	.00[a]	0[a]	5.00[a]	5.25[a]
Nontreated		41.0[b]	51.5[a]	36.8[b]	87.5[b]	.50[a]	.25[a]	0[a]	1.50[a]	2.25[a]
LSD (P = 0.05)		36.21	32.45	19.43	32.09	NS	NS	NS	NS	NS
P > F		.0003	.0004	.0001	.0001	.1794	.4552	1.00	.2603	.2655

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

[1/] Greater than 90% were *Anisoptermalus calandrae.*

Table 3. Rice weevil and lesser grain borer in corn during the final 4 months of storage, Texas Agricultural Experiment Station, Nueces County, TX, 2007.

		Storage month and month number post-treatment							
		Rice weevil beetle/qt				Lesser grain borer beetle/qt			
Treatment	Rate/ 1000 bu	11 Jan	12 Feb	13 Mar	14 Apr	11 Jan	12 Feb	13 Mar	14 Apr
Spinosad 0.5% AI	11.2 lb	73.5[a]	57.3[a]	62.0[a]	118.5[a]	0.0[a]	0.0[a]	0.0[a]	0.0[a]
Actellic 5E	6.83 oz	0.5[c]	0.3[b]	2.0[c]	4.3[c]	0.8[a]	0.8[a]	1.0[a]	0.8[a]
Actellic 5E + Diacon II	3.86 oz + 3.50 oz	0.5[c]	0.0[b]	2.5[c]	8.8[c]	0.0[a]	0.0[a]	0.0[a]	0.0[a]
Spinosad 0.75 lb	9.6 oz	0.0[c]	1.5[b]	2.0[c]	2.8[c]	0.0[a]	0.0[a]	0.0[a]	0.0[a]
Spinosad 0.75 lb + Diacon II	5.43 oz + 3.50 oz	0.3[c]	0.0[b]	2.8[c]	3.5[c]	0.0[a]	0.0[a]	0.0[a]	0.0[a]
Diacon II	8.07 oz	66.0[ab]	52.5[a]	57.8[a]	92.5[ab]	0.3[a]	0.0[a]	0.0[a]	0.0[a]
Nontreated		33.8[bc]	42.0[a]	23.5[b]	66.5[b]	0.3[a]	0.5[a]	0.3[a]	0.5[a]
LSD (P = 0.05)		36.72	33.49	19.69	31.85	NS	NS	NS	NS
P > F		.0005	.0016	.0001	.0001	.2158	.2413	.0786	.1838

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

Table 4. Rusty grain beetle and red flour beetles in corn during the final 4 months of storage, Texas Agricultural Experiment Station, Nueces County, TX, 2007.

		Storage month and month number post-treatment							
		Rusty grain beetle/qt				Red flour beetle/qt			
Treatment	Rate/ 1000 bu	11 Jan	12 Feb	13 Mar	14 Apr	11 Jan	12 Feb	13 Mar	14 Apr
Spinosad 0.5% AI	11.2 lb	1.5^{ab}	0.8^{b}	0.3^{a}	6.0^{a}	1.8^{ab}	4.0^{a}	2.8^{b}	11.0^{a}
Actellic 5E	6.83 oz	0.0^{b}	0.0^{b}	0.0^{a}	0.0^{a}	0.0^{b}	0.0^{b}	0.0^{b}	0.0^{b}
Actellic 5E + Diacon II	3.86 oz + 3.50 oz	0.0^{b}	0.0^{b}	0.0^{a}	0.0^{a}	0.0^{b}	0.0^{b}	0.0^{b}	0.0^{b}
Spinosad 0.75 lb	9.6 oz	0.0^{b}	0.0^{b}	0.0^{a}	0.0^{a}	0.0^{b}	0.0^{b}	0.0^{b}	0.0^{b}
Spinosad 0.75 lb + Diacon II	5.43 oz + 3.50 oz	0.0^{b}	0.0^{b}	0.0^{a}	0.0^{a}	0.3^{b}	0.0^{b}	0.0^{b}	0.0^{b}
Diacon II	8.07 oz	0.0^{b}	0.0^{b}	0.0^{a}	0.0^{a}	0.0^{b}	0.0^{b}	0.8^{b}	0.0^{b}
Nontreated		3.5^{a}	5.0^{a}	3.3^{a}	3.8^{a}	3.5^{a}	4.0^{a}	9.8^{a}	12.3^{a}
LSD (P = 0.05)		2.17	2.97	NS	NS	2.20	1.76	4.07	3.98
P > F		.0202	.0183	.1353	.3066	.0212	.0001	.0006	.0001

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

Table 5. Weight (from initial storage) and dollar value loss in corn during the final 4 months of storage, Texas Agricultural Experiment Station, Nueces County, TX, 2007.

		Storage month and month number post-treatment					
		% weight loss				% loss in $ value	
Treatment	Rate/ 1000 bu	11 Jan	12 Feb	13 Mar	14 Apr	12 Feb	14 Apr
Spinosad 0.5% AI	11.2 lb	3.1[a]	3.4[a]	4.8[a]	7.0[a]	27.4[a]	50.6[a]
Actellic 5E	6.83 oz	0.4[b]	0.3[b]	0.2[c]	0.4[c]	2.6[c]	4.9[c]
Actellic 5E + Diacon II	3.86 oz + 3.50 oz	0.4[b]	0.3[b]	0.3[c]	0.4[c]	1.5[c]	5.4[c]
Spinosad 0.75 lb	9.6 oz	0.5[b]	0.5[b]	0.1[c]	0.5[c]	1.7[c]	5.0[c]
Spinosad 0.75 lb + Diacon II	5.43 oz + 3.50 oz	0.5[b]	0.6[b]	0.1[c]	0.5[c]	0.7[c]	5.0[c]
Diacon II	8.07 oz	2.9[a]	3.3[a]	4.4[ab]	6.2[ab]	17.6[ab]	41.8[ab]
Nontreated		2.7[a]	2.8[a]	3.2[b]	4.6[b]	15.8[b]	30.7[b]
LSD (P = 0.05)		0.74	0.92	1.42	1.83	11.39	13.17
P > F		.0001	.0001	.0001	.0001	.0003	.0001

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

MONITORING CONDITION OF CORN STORED IN LARGE HERMETICALLY SEALED POLYETHYLENE BAGS

Preliminary Report

Jimmy Hays Farm, Calhoun County, 2007

Phoenix L. Rogers, Roy D. Parker, and Stephen P. Biles
County Extension Agent, Extension Entomologist, and County Extension Agent - IPM, respectively
Port Lavaca and Corpus Christi, Texas

SUMMARY: Increase in grain acreage led to shortages of storage space in on-farm and country elevators for the 2007 season. Several grain producers decided to invest in large plastic bags as an option for grain storage at harvest. The thinking behind the alternative was that harvest could proceed uninterrupted as local storage facilities ran short of space.

Ten bags of various lengths are being monitored on a monthly basis for temperature, bushel weight, grain moisture, and insects. At the end of 2.5 months temperature dropped 20°F, bushel weight did not change (56.1), moisture decreased nearly 2%, and no live insects had been detected (live insects were detected in samples taken during bag loading). However, rice weevils were found stuck to the back of tape used to seal inspection holes on the October 31 sampling date.

OBJECTIVES: The observations are being made to evaluate the feasibility of storing grain for long-term (10 or more months) in the polyethylene bags.

MATERIALS/METHODS: Ten bags from the Jimmy Hays Farm in Calhoun County were filled with corn between August 8-20, 2007. Samples were taken at loading and sent to the Corpus Christi Grain Exchange for grading and aflatoxin level determination. Subsequently, samples were obtained on September 17 and October 31 with a 5-foot grain probe. These samples were evaluated for insects, bushel weight, and moisture level. An electronic grain temperature probe was used to obtain readings from about the middle of bags.

RESULTS/DISCUSSION: The average temperature of grain being loaded was about 98°F and aflatoxin level averaged 11.5 ppb with a range of 3-25 ppb (Table 1). The higher readings were generally from corn harvested in poorer condition on the later dates of bagging. Bushel weight averaged 56.9 with a moisture content of 12.2%. Grain had dried somewhat between the time samples were taken and analysis. The actual bag moisture was slightly less than 14%. Lower bushel weights were found in 4 samples from the 2 bags loaded last (54.5). Averages of the grain characteristics at harvest are provided in Table 1 which overall was graded 1.3 yellow corn. Insects averaged 0.28/quart sample, but none were found in the subsequent 2 months. On October 31 grain temperature was about 20°F lower than at harvest, bushel weight had changed very little, but grain moisture had declined nearly 2.0%. Currently, we cannot explain the reason for the moisture differences. The general quality of the corn has not changed in over 2 months since storage.

ACKNOWLEDGMENTS: Thanks are extended to Jimmy Hays for his cooperation and interest in monitoring the corn.

Table 1. Characteristics of corn in large polyethylene storage bags, Jimmy Hays Farm, Calhoun County, TX, 2007.

Date	Aflatoxin PPb	Temp. °F	Bu wt. lb	Moisture %	BCFM %	Da. Kernels %	Live insects #/qt	Grade
8/8-20[1/]	11.5	98.0	56.9	12.2[2/]	1.6	1.8	.28	1.3
9/17	-	87.5	55.9	13.9	-	-	.00	-
10/31	-	78.6	56.1	12.1	-	-	.00	-

1/ Loading period for 10 bags.
2/ Moisture reading decreased in the laboratory while waiting for analysis.

EFFECT OF DATE OF PLANTING ON YIELD AND AFLATOXIN CONTENT IN SOUTH TEXAS CORN

Texas Agricultural Experiment Station, Nueces County, 2007

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Corpus Christi, Texas

SUMMARY: Corn bushel weights declined and moisture content of harvested grain increased with later planting dates. Aflatoxin levels in corn planted from February 19 through March 19 on 4 dates were relatively low (43 ppb average). Although it could not be separated statistically, much higher aflatoxin levels (522 ppb average) were found in corn planted March 26 and April 2. Corn planted April 10 and 17 had very high aflatoxin levels (2175 ppb average) and the readings were significantly greater than the earlier planting dates. Statistical differences were not observed in corn yield over the planting date period; however, there seemed to be a peak in yield by the March 19 planting date. Following that date, yields were variable but tended to be lower. Late February and early March were regarded as the best planting date window at the location in 2007.

OBJECTIVES: The experiment was conducted to measure the impact of various planting dates on yield and aflatoxin levels in corn in order to delineate the optimum planting date range in the Corpus Christi area.

MATERIALS/METHODS: Asgrow RX940 RR hybrid corn was planted on various dates on the Texas Agricultural Experiment Station at Corpus Christi, TX with a 4-row John Deere 6100 buster type planter. The seeding rate was 20,634/acre. Cotton had been grown on the test site in 2006. Fertilizer consisted of 125-22-0 + 6.7 zinc; herbicide included Atrazine 4L (1.0 quart/acre) on December 15, 2006 followed by Dual II Magnum (1.3 pints/acre + Atrazine 4L (1.0 quart/acre) on the date of planting. Experimental plots were 4 rows wide by 40 feet long arranged in a randomized complete block design with 4 replications.

Treatments were assessed by (1) harvesting ears from 13.75 feet row from one of the center rows in plots on August 6 for ear count and yield determination, (2) threshing harvested ears on a research machine, and (3) measuring the amount of aflatoxin in samples using a Vicam Series-4 Fluorometer Model V2.0 testing kit (Alfa Test FGIS method). Grain weights were adjusted to the 15% moisture standard. The software program Agriculture Research Manager (ARM revision 6.1.13) was used to conduct analysis of variance, and means were separated by LSD when P=0.05 or less.

RESULTS/DISCUSSION: Corn ear count, bushel weight, grain moisture at harvest, aflatoxin level, and grain yield for each planting are provided in Table 1. Differences did not occur in number of ears harvested, but statistical differences were observed in all other data. Bushel weight decreased and grain moisture increased as planting dates progressed. Acceptable bushel weight readings were maintained through the March 26 planting date. Grain moisture readings increased because of the later planting dates. Aflatoxin levels remained relatively low through the March 19 planting date. Increase in aflatoxin level was noted for the March 26 and April 2 planting dates followed by a dramatic increase for the last two planting dates. Aflatoxin readings were 2000 ppb and 2350 ppb for the April 10 and 17 dates, respectively. Statistical differences were not found in yields among the planting dates, although they seemed to peak by about the March 19 planting date.

ACKNOWLEDGMENTS: Rudy Alaniz and Clint Livingston, Farm Demonstration Assistants, are acknowledged for their work in planting, maintaining, and harvesting the experiment.

Table 1. Effect of planting dates on corn production factors, Texas Agricultural Experiment Station, Nueces County, TX, 2007.

Planting date	Ears 1000's/acre	Bushel weight (lb)	Grain moisture %	Aflatoxin PPB	Yield lb/acre
Feb 19	28.5[a]	58.8[a]	15.9[e]	6.0[b]	103.5[a]
Feb 26	24.8[a]	58.6[ab]	16.3[de]	85.8[b]	108.8[a]
Mar 5	24.5[a]	57.8[b]	16.9[d]	63.0[b]	113.0[a]
Mar 19	29.3[a]	56.5[c]	17.2[d]	16.3[b]	118.0[a]
Mar 26	24.0[a]	55.9[cd]	19.2[c]	130.8[b]	99.7[a]
Apr 2	22.3[a]	55.4[d]	20.0[c]	912.5[b]	107.7[a]
Apr 10	29.3[a]	53.6[e]	21.3[b]	2000.0[a]	111.1[a]
Apr 17	25.8a	52.3[f]	22.2[a]	2350.0[a]	95.9[a]
LSD (P=0.05)	NS	0.93	0.86	975.43	NS
P > F	.1574	.0001	.0001	.0001	.0938

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

COMPARISON OF SYSTEMIC INSECTICIDE TREATMENTS AS SEED, GRANULAR, OR PLANTER BOX APPLIED ON SORGHUM AT TWO SOUTH TEXAS LOCATIONS

Texas Agricultural Experiment Station, Nueces and Bee Counties, 2007

Roy D. Parker
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SUMMARY: Two experiments, one near Corpus Christi and the other near Beeville, were conducted to evaluate systemic seed, planter box, or granular applied insecticides for control of aphids on sorghum. Eight of the treatments were common to both locations with one Counter rate and the nontreated no-fungicide treatment not included at the Beeville test location.

Insect infestations were relatively low at both locations; therefore, significant differences were infrequently observed. There were some differences and trends that should be mentioned. Plant vigor ratings at both test locations were consistently better (significantly so in Bee County) in treatments where Concep seed protectant was used. Additionally, percentages of plants in bloom 70 days after planting at the Bee County site and bushel weight at the Nueces County site were greatest in the treatments where Concep was used. Plant growth and development appears to have been adversely affected by alternative seed protection which may have affected some of the insect data. In the Nueces County test more yellow sugarcane aphids were actually found in many of the insecticide plots than detected in the non-insecticide treated plots. This result could not be explained. In the Bee County test yellow sugarcane aphid numbers at 24 DAP were significantly lower in all insecticide treatments except for the Lattitude planter box treatment. By 30 DAP in this test, there were no differences in yellow sugarcane aphid numbers. It was very unusual to find corn leaf aphid or greenbug numbers so low. Statistical differences did not occur in yield at either test location. Yellow sugarcane aphid, greenbug, and corn leaf aphid numbers were generally lower in the region compared with any year in memory.

OBJECTIVES: The field study was designed to compare systemic insecticides for effects on early season sorghum insect pests and to observe plant affects due to these same treatments with an alternative seed protectant for herbicides.

MATERIALS/METHODS: SG 99498 hybrid sorghum with the treatments was planted at the rate of 65 thousand seed/acre on March 6, 2007 at the Texas Agricultural Experiment Station Meaney Annex in Nueces County and on April 5, 2007 at the Beeville Station with a 4-row John Deere 6100 buster type planter. Seed was distributed through research cone planter equipment in plots which were 4 rows by 40 feet on 38-inch centers. Treatments were arranged in a randomized complete block design with 4 replications. Cotton had been planted on the land at the Nueces County site in 2006 but was destroyed due to severe drought. Sorghum had been planted in 2006 at the Bee County site, but it was also plowed out early due to lack of soil moisture. Soil moisture at planting in 2007 was excellent at both locations, and the soil temperature at the 3-inch depth was 62°F and 72°F, respectively, for the Nueces and Bee county sites. In Nueces County the sandy clay loam soil (52% sand, 14% silt, 34% clay) with 7.7 pH contained 1.6% organic matter. Fertilizer consisted of 125-22-0 + 6.7 lb zinc. In Bee County Atrazine 4L (1.0 quart/acre) + Dual II Magnum (1.3 pints/acre) was applied on April 5 followed by Prowl (0.75 quart/acre) + Atrazine 4L (1.0 quart/acre) on May 12.

Test 1 (Nueces County) – Treatments were assessed by (1) counting the number of plants on 13.75 feet of row on each of the two center rows in plots on March 21 [15 DAP], (2) assigning a visual plant vigor rating [1 = excellent growth and no damage up to 5 = severe stunting, uneven plant growth and yellowing] on April 24 [48 DAP], (3) estimating the % iron chlorosis in plots 48 DAP, (4) counting numbers of aphids on 20 leaves in each plot 52 DAP [very low numbers were detectable earlier and the population declined rapidly following the 52-day-after planting counts], (5) Harvesting 13.75 feet of row on each of the center two rows by hand and counting harvested heads in each plot on July 11, and (6) threshing harvested heads on a research machine, determining bushel weight, and measuring moisture content of the sorghum. Grain weight was adjusted to 14% moisture content.

Test 2 (Bee County) – Treatments were assessed by (1) counting the number of plants on 13.75 feet of row on each of the center two rows in plots, (2) examining 20 leaves/plot on April 29 [24 DAP] and again on May 5 [30 DAP] for infestation by yellow sugarcane aphid, greenbug, and corn leaf aphid, (3) assigning a visual plant damage rating as listed above in Test 1 on May 12 [37 DAP] and again on June 14 [70 DAP], (3) determining % bloom on June 14 [70 DAP], harvesting 13.75 feet of row from one of the center rows in each plot on August 7, and (4) processing harvested samples as listed under Test 1.

The software program Agriculture Research Manager (ARM revision 6.1.13) was used to conduct analysis of variance, and means were separated by LSD when P=0.05 or less.

RESULTS/DISCUSSION: Each experiment is summarized as follows:

Test 1 – Results are provided in Tables 1-3. At the Corpus Christi location the two treatments where seed was treated with Concep had numerically (not a statistical difference) a much better plant vigor rating. Significant differences were not found at this site for plant stand, amount of iron chlorosis, the number of heads harvested in a given area, grain moisture at harvest, or yield. No greenbugs or corn leaf aphids were detected which is very unusual. Statistically greater numbers of yellow sugarcane aphids and infested leaves were found in several of the insecticide treatments compared with plots without insecticide. The only time similar observations have been made in the past was where the nontreated plots had sustained so much damage that plants were very small with extensive damage to the point that they were no longer attractive or aphid reproduction could not be maintained. However, in this case noticeable damage was not present in the nontreated sorghum; consequently, the cause of higher numbers of yellow sugarcane aphid in insecticide treated sorghum could not be explained. Bushel weights were poor in the test with significant differences present. The two treatments where Concep seed was used had the highest bushel weight.

Test 2 – Results are provided in Tables 4-6. This test site was under severe stress due to excessive rainfall. Differences were not observed for plant stand, plant vigor 70 DAP (days after planting), numbers of yellow sugarcane aphids 30 DAP, numbers of greenbugs or corn leaf aphids, or any of the grain production factors. At 24 DAP yellow sugarcane aphid numbers were significantly lower in all insecticide treatments except for Lattitude treated seed. Poncho, Cruiser, and Counter treated sorghum generally had fewer yellow sugarcane aphids at 24 DAP than the other treatments. Just as in Test 1, plant vigor ratings 37 DAP were best in plots where Concep seed protectant was applied. The blooming rate was also earlier in the same two treatments. It appears that the experimental herbicide seed protectant adversely affected plant growth and development.

ACKNOWLEDGMENTS: Bayer CropScience and BASF are thanked for their support of this study. Rudy Alaniz and Clint Livingston, Farm Demonstration Assistants, are acknowledged for their work in planting, maintaining, and harvesting the experiments. Special thanks are extended to Kenneth Schaefer, Senior Research Associate; Jeff Remmers, Research Associate; and Dr. Gary Odvody, Research Plant Pathologist, for their assistance in planting the experiment at Beeville and helping with other phases involved in conduct of that study.

Table 1. Impact on plant stand, plant vigor, and expression of iron chlorosis in sorghum of systemic insecticides as seed or granular at-planting applied formulations with different herbicide seed protectants, Texas Agricultural Experiment Station, Nueces County, TX, 2007.

Treatment	Rate oz/cwt seed	Plants 1000's/acre	Plant vigor rating[4/]	% iron chlorosis
Nontreated (no fungicide)		51.9[a]	2.8[a]	33.8[a]
Nontreated		45.0[a]	2.5[a]	17.5[a]
Poncho 600FS	5.1	58.6[a]	2.5[a]	36.3[a]
Gaucho 480FS	8.0	52.8[a]	3.0[a]	20.0[a]
Poncho 600FS[1/]	5.1	55.3[a]	1.5[a]	28.8[a]
Cruiser 350SC	8.8	46.8[a]	2.8[a]	25.0[a]
Cruiser 350SC[1/]	8.8	65.6[a]	1.6[a]	10.5[a]
Counter 15G	[2/]	59.1[a]	2.6[a]	25.0[a]
Counter15G	[3/]	42.9[a]	2.6[a]	37.5[a]
Lattitude	5.0	54.3[a]	2.7[a]	29.3[a]
LSD (P = 0.05)		NS	NS	NS
P > F		.4016	.3456	.4444

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

[1/] Herbicide seed protectant Concep was used. All other treatments except nontreated (no fungicide) were treated with an experimental herbicide seed protectant.

[2/] Counter 15G applied at 6.0 lb/acre

[3/] Counter 15G applied at 3.5 lb/acre

[4/] Plant vigor rating: 1 = excellent growth and no damage up to 5 = severe stunting, uneven plant growth any yellowing plants. Evaluation was made 48 days after planting (DAP).

Table 2. Aphids in sorghum 49 days after planting as affected by systemic insecticides as seed or granular at-planting applied formulations with different herbicide seed protectants, Texas Agricultural Experiment Station, Nueces County, TX, 2007.

Treatment	Rate oz/cwt seed	Yellow sugarcane aphid: % infest leaves	Yellow sugarcane aphid: No./20 leaves	Greenbug/ 20 leaves	Corn leaf aphid/ 20 whorls
Nontreated (no fungicide)		33.8[d]	28.3[e]	0[a]	0[a]
Nontreated		38.8[cd]	32.3[de]	0[a]	0[a]
Poncho 600FS	5.1	58.8[a]	76.8[ab]	0[a]	0[a]
Gaucho 480FS	8.0	56.3[ab]	52.8[cd]	0[a]	0[a]
Poncho 600FS[1/]	5.1	57.5[ab]	53.3[bcd]	0[a]	0[a]
Cruiser 350SC	8.8	53.8[abc]	78.5[a]	0[a]	0[a]
Cruiser 350SC[1/]	8.8	53.8[abc]	64.3[abc]	0[a]	0[a]
Counter 15G	[2/]	41.3[bcd]	34.3[de]	0[a]	0[a]
Counter15G	[3/]	46.3[a-d]	33.0[de]	0[a]	0[a]
Lattitude	5.0	58.8[a]	68.3[abc]	0[a]	0[a]
LSD (P = 0.05)		17.31	23.51	NS	NS
P > F		.0404	.0002	1.00	1.00

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

[1/] Herbicide seed protectant Concep was used. All other treatments except nontreated (no fungicide) were treated with an experimental herbicide seed protectant.

[2/] Counter 15G applied at 6.0 lb/acre

[3/] Counter 15G applied at 3.5 lb/acre

Table 3. Impact on sorghum production of systemic insecticides as seed or granular at-planting applied formulations with different herbicide seed protectants, Texas Agricultural Experiment Station, Nueces County, TX, 2007.

Treatment	Rate oz/cwt seed	Sorghum heads @ harvest (1000's/acre)	Bushel weight	Grain % moisture	Yield lb/acre
Nontreated (no fungicide)		104.5[a]	48.5[bc]	13.9[a]	4060[a]
Nontreated		107.0[a]	48.8[bc]	13.9[a]	3869[a]
Poncho 600FS	5.1	118.8[a]	47.4[c]	13.8[a]	3804[a]
Gaucho 480FS	8.0	107.5[a]	47.6[c]	14.1[a]	3670[a]
Poncho 600FS[1/]	5.1	116.0[a]	49.5[ab]	13.9[a]	3852[a]
Cruiser 350SC	8.8	104.0[a]	47.6[c]	13.8[a]	3686[a]
Cruiser 350SC[1/]	8.8	128.0[a]	50.6[a]	13.7[a]	4164[a]
Counter 15G	[2/]	120.3[a]	48.9[bc]	13.7[a]	4107[a]
Counter15G	[3/]	98.0[a]	48.1[bc]	14.0[a]	3807[a]
Lattitude	5.0	119.8[a]	48.1[bc]	13.8[a]	3747[a]
LSD (P = 0.05)		NS	1.69	NS	NS
P > F		.6032	.0165	.5157	.6732

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

[1/] Herbicide seed protectant Concep was used. All other treatments except nontreated (no fungicide) were treated with an experimental herbicide seed protectant.

[2/] Counter 15G applied at 6.0 lb/acre

[3/] Counter 15G applied at 3.5 lb/acre

Table 4. Impact on plant stand, plant vigor and expression of iron chlorosis in sorghum treated with systemic insecticides as seed or granular at-planting applied formulations with different herbicide seed protectants, Texas Agricultural Experiment Station, Bee County, TX, 2007.

Treatment	Rate oz/cwt seed	Plants 1000's/acre	Plant vigor rating[3/] 37 DAP	Plant vigor rating[3/] 70 DAP[4/]	% bloom 70 DAP
Nontreated		49.1^{a}	2.5^{bc}	1.3^{a}	37.0^{a}
Poncho 600FS	5.1	36.3^{a}	3.8^{a}	2.5^{a}	10.0^{c}
Gaucho 480FS	8.0	42.4^{a}	3.5^{ab}	1.5^{a}	14.5^{bc}
Poncho 600FS[1/]	5.1	45.5^{a}	1.8^{c}	1.5^{a}	35.0^{a}
Cruiser 350SC	8.8	48.3^{a}	2.0^{c}	1.5^{a}	26.3^{abc}
Cruiser 350SC[1/]	8.8	44.3^{a}	2.0^{c}	1.3^{a}	33.8^{a}
Lattitude	5.0	45.9^{a}	3.3^{ab}	2.5^{a}	12.5^{c}
Counter 15G	[2/]	40.5^{a}	2.8^{abc}	1.5^{a}	32.0^{ab}
LSD (P = 0.05)		NS	1.22	NS	18.64
P > F		.2299	.0155	.0721	.0218

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

[1/] Herbicide seed protectant Concep was used. All other treatments except nontreated (no fungicide) were treated with an experimental herbicide seed protectant.

[2/] Counter 15G applied at 6.0 lb/acre

[3/] Plant vigor rating: 1 = excellent growth and no damage up to 5 = severe stunting, uneven plant growth and yellowing plants.

[4/] DAP = days after planting

Table 5. Aphids in sorghum 49 days after planting as affected by systemic insecticides as seed or granular at-planting applied formulations with different herbicide seed protectants, Texas Agricultural Experiment Station, Bee County, TX, 2007.

Treatment	Rate oz/cwt seed	Number per 20 plants at DAP[3/] Yellow sugarcane aphid 24		Yellow sugarcane aphid 30	30 DAP Greenbug	30 DAP Corn leaf aphid
Nontreated		17.0[a]	(85.0[a])[4/]	76.0[a]	2.3[a]	0[a]
Poncho 600FS	5.1	4.8[d]	(23.8[d])	36.0[a]	0.0[a]	0[a]
Gaucho 480FS	8.0	9.3[c]	(46.3[c])	62.8[a]	0.5[a]	0[a]
Poncho 600FS[1/]	5.1	6.8[cd]	(33.8[cd])	52.0[a]	0.5[a]	0[a]
Cruiser 350SC	8.8	4.3[d]	(21.3[d])	63.8[a]	0.0[a]	0[a]
Cruiser 350SC[1/]	8.8	10.3[bc]	(51.3[bc])	49.8[a]	0.0[a]	0[a]
Lattitude	5.0	13.8[ab]	(68.8[ab])	77.5[a]	1.5[a]	0[a]
Counter 15G	[2/]	3.0[d]	(15.0[d])	35.5[a]	0.3[a]	0[a]
LSD (P = 0.05)		4.42	22.08	NS	NS	NS
P > F		.0001	.0001	.0716	.2641	1.00

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

1/ Herbicide seed protectant Concep was used. All other treatments except nontreated (no fungicide) were treated with an experimental herbicide seed protectant.

2/ Counter 15G applied at 6.0 lb/acre

3/ DAP = days after planting

4/ ( ) = % infested plants at 24 DAP

Table 6. Impact on sorghum production of systemic insecticides as seed or granular at-planting applied formulations with different herbicide seed protectants, Texas Agricultural Experiment Station, Bee County, TX, 2007.

Treatment	Rate oz/cwt seed	Sorghum heads @ harvest (1000's/acre)	Bushel weight	Grain % moisture	Yield lb/acre
Nontreated		44.8[a]	43.3[a]	12.5[a]	2534[a]
Poncho 600FS	5.1	40.5[a]	43.5[a]	12.7[a]	2698[a]
Gaucho 480FS	8.0	41.5[a]	42.0[a]	12.0[a]	2488[a]
Poncho 600FS[1/]	5.1	44.3[a]	43.0[a]	12.5[a]	2679[a]
Cruiser 350SC	8.8	42.8[a]	41.9[a]	12.0[a]	2375[a]
Cruiser 350SC[1/]	8.8	42.8[a]	42.6[a]	12.1[a]	2808[a]
Lattitude	5.0	46.0[a]	42.6[a]	12.1[a]	2357[a]
Counter 15G	[2/]	41.5[a]	43.3[a]	12.0[a]	2853[a]
LSD (P = 0.05)		NS	NS	NS	NS
P > F		.9289	.9085	.3704	.5000

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

[1/] Herbicide seed protectant Concep was used. All other treatments except nontreated (no fungicide) were treated with an experimental herbicide seed protectant.

[2/] Counter 15G applied at 6.0 lb/acre

PLANTING DATE EFFECTS ON SORGHUM YIELD AND GRAIN CHARACTERISTICS IN NUECES COUNTY

Texas Agricultural Experiment Station, Nueces County, 2007

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SUMMARY: Sorghum production was measured in 7 planting dates beginning February 6 and ending April 7. The season was characterized by very cold conditions for the early planting dates followed by somewhat cooler than normal season. Following planting a sustained dry period lowered yield potential. Then rainfall was excessive which caused some grain to sprout in heads resulting in lower than normal bushel weight and additional yield loss.

Sorghum midge caused heavy damage to the April 7 planted sorghum, and it was surprising that they did not cause more damage in the sorghum planted 9 days earlier. Bushel weights generally declined with the later planting dates. All bushel weights were low due to excessive rainfall during the grain maturing period. Late February through mid-March appeared to be the best planting dates.

OBJECTIVES: The study was conducted (1) to evaluate the effect of planting date on sorghum growth and development, (2) to measure the impact of sorghum midge, and (3) to determine the most favorable planting dates based on yield.

MATERIALS/METHODS: A total of 7 planting dates were evaluated beginning February 6 and ending April 7 (no yield was obtained from an April 17 planting and was subsequently dropped from the study). The experiment was planted on the Texas Agricultural Experiment Station Meaney Annex. Asgrow A571 hybrid sorghum was seeded at 61,902 kernels/acre on 38-inch row spacing with research cone seed boxes using a John Deere 6100 buster type planter. Plots were 4 rows by 40 feet and were arranged in a randomized complete block design with 4 replications of each planting date. Fertilizer applied was 125-22-0 + 6.7 lb/acre zinc. Weed control was achieved with Atrazine 4L (1.0 quart/acre) applied in December 2006, and after planting, Atrazine 4L at the same rate + Dual II Magnum (1.3 pints/acre) was incorporated.

Treatments were assessed by harvesting 13.75 feet of row from one of the center two rows in each plot as grain moisture in each planting date averaged 14-16% moisture. Sorghum heads were also evaluated for midge damage by visual observation. Subsequently, sorghum heads were threshed on a research machine, moisture content was determined, and weights were adjusted to 14% moisture. Agriculture Research Manager (ARM revision 6.1.13) was used to conduct analysis of variance, and means were separated by LSD when P=0.05 or less.

RESULTS/DISCUSSION: Characteristics of sorghum heads and grain are provided in Table 1.

First, sorghum midge increased rapidly and caused extensive damage by the time the April 7 planted sorghum reached bloom. Second, in general, bushel weights decreased with later planting dates which reflected damage to the crop caused by extensive rainfall. Third, significant differences were found in grain production. The most favorable planting dates were February 16 through March 19. Since the season was so unusual with much more rainfall, these results may reflect a single season . Even so, the most favorable planting dates generally coincided with suggested dates of past years.

Often, planting 3-4 weeks later than other fields in a community will lead to high sorghum midge numbers and extensive damage in unprotected sorghum. Planting in late March should have led to high sorghum midge numbers based on surrounding plantings, but their numbers were not severe until the April 7 planted sorghum entered the bloom period. It reflected a general delay in high numbers of sorghum midge for the 2007 season throughout the Coastal Bend region.

ACKNOWLEDGMENTS: Rudy Alaniz and Clint Livingston, Farm Demonstration Assistants, are thanked for conduct of the experiment.

Table 1. Effect of planting date on sorghum production, Texas Agricultural Experiment Station, Nueces County, TX, 2007.

Planting date	% midge damage	Harvested heads 1000's/acre	Bushel weight (lb)	Yield lb/acre
Feb 6	3.3[b]	89.8[a]	51.4[a]	4192[b]
Feb 16	0.0[b]	76.0[ab]	49.1[bc]	4445[ab]
Feb 26	0.0[b]	90.8[a]	49.9[ab]	4428[ab]
Mar 8	0.0[b]	57.8[c]	49.9[ab]	4921[a]
Mar 19	0.0[b]	68.8[bc]	48.3[bc]	4688[a]
Mar 29	0.0[b]	78.3[ab]	47.3[c]	3211[c]
Apr 7	73.0[a]	58.3[c]	41.5[d]	1236[d]
LSD (P = 0.05)	5.90	15.01	2.19	495.8
P > F	.0001	.0005	.0001	.0001

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

EVALUATION OF SYSTEMIC INSECTICIDES APPLIED AS SEED OR IN FURROW TREATMENTS ON COTTON FOR CONTROL OF THRIPS, APHIDS, MITES, AND FLEAHOPPERS AT TWO COASTAL BEND LOCATIONS

Joseph Respondek Farm, DeWitt County and Texas Agricultural Experiment Station, Nueces County, 2007

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SUMMARY: Test 1 – Labeled and experimental insecticides were evaluated for effectiveness on early-season insects in cotton in DeWitt County. On 1-leaf stage cotton all insecticides had statistically fewer total thrips compared with the nontreated cotton. No statistical differences were found in comparison of products; however, it was noteworthy that fewer thrips were observed consistently in the A1593 experimental treatment at both plant growth stages. Differences were not found in aphid or mite numbers on the 1-leaf cotton, but aphid numbers were significantly higher in the nontreated cotton by the 4-leaf stage. Mites were consistently higher in the nontreated cotton. Likewise, all plant damage ratings were improved with insecticide with Temik trending to not be as good as the other insecticides. Statistically more fleahoppers were observed in the nontreated cotton compared with many of the remaining treatments in June 2 counts, but numbers in the insecticide treatments were still relatively high. Yield data was not obtained due to plant stand problems and excessive rainfall. Fiber characteristics were not affected by treatment except for uniformity.

Test 2 – The same experiment was also conducted in Nueces County. Thrips were very low at the site and no differences were observed in their numbers. At the 2-leaf stage of cotton growth, significantly more aphids were found in nontreated cotton, but their numbers were still considered low. Very few aphids remained by the 4-leaf stage. Plant damage ratings were variable, and there were statistical differences in 4-leaf cotton with nontreated cotton having the highest damage. When a standard turnout was applied to the seed cotton weights there were statistical differences, but after ginning no differences were found in lint weights.

OBJECTIVES: The experiment was conducted to compare the impact of various insecticide treatments on early season cotton insects.

MATERIALS/METHODS: In both tests DPL 555BR seed was distributed at 4.0/row foot in 38-inch rows with research cone seed boxes. Tests were arranged in a randomized complete block design with 4 replications of the treatments. Temik 15G was applied in-furrow by turning banders parallel with the rows. Soil moisture at both locations was excellent at depth, but the surface was very dry at the in the DeWitt County site and required a rain to germinate most of the seed.

In both studies treatments were assessed by (1) assigning a plant damage rating [1 = no damage up to 5 = severe stunting and leaf curling]; and (2) cutting 10 plants from plots at early leaf stages and placing them in 70% ethyl alcohol for later examination of filtrate under a microscope for thrips, aphids, mites, and ants. The software program Agriculture Research Manager (ARM revision 6.1.13) was used to conduct analysis of variance, and means were separated using LSD when P=0.05 or less.

Test 1 – The test was planted on the Joseph Respondek Farm just south of Nordheim, Texas on April 16, 2007. A 2-row John Deere MaxEmerge 7100 planter was used to plant plots which were 2 rows by 30 feet. Treatments were assessed by (1) harvesting 10 plants/plot at the 1- and 4-leaf stages on May 5 and May 15, respectively, for later examination for thrips, mites, aphids, and ants; (2) assigning a visual damage rating to each plot on May 15; and (3) counting the number of fleahoppers on 20 plants/plot on May 15, May 22, and June 2.

Test 2 – The test was planted on the Texas Agricultural Experiment Station Meany Annex in Nueces County on March 27, 2007. A 4-row John Deere 6100 buster type planter was used to plant plots 4 rows wide by 40 feet long. Soil temperature was 67°F at the 3-inch depth, and the soil was a sandy clay loam (52% sand, 14% silt, and 34% clay) which had 7.8 pH and an organic matter content less than 2%. Sorghum had been grown on the site the previous season. Fertilizer applied was 125-22-0 + 6.7 lb/acre zinc. Herbicide included Trilin 4 (1.0 qt/acre) in late October 2006, and after planting, Cotoran 4L (1.0 qt/acre) + Dual II Magnum 7.64 lb (1.0 pint/acre) was applied. The entire experiment was oversprayed with Centric 40 WG (2.0 oz/acre) on May 14, May 21, and June 4 for fleahopper, and on July 12 and August 6, Bidrin 8E (8.0 oz/acre) was applied for stink bug.

Treatments were assessed by (1) counting the number of plants on 13.75 feet row on each of the 2 center rows/plot on April 5; (2) harvesting 10 plants from each plot on April 18 [2-leaf] and again on May 1 [4-leaf] stages for later analysis for thrips, mites, aphids, and ants; (3) assigning a plant damage rating to plots on April 5 and on April 30; and (4) harvesting the center two rows in plots with a 2-row John Deere model 9900 spindle picker on September 13. Seed cotton samples were weighed and then ginned on a 10-saw Eagle laboratory machine. Lint samples were sent to the International Textile Center, Lubbock, Texas for fiber analysis.

RESULTS/DISCUSSION: Test 1 – All insecticide treatments significantly reduced thrips numbers about the same amount compared with counts in the nontreated cotton at the 1-leaf stage (Table1). Numerically, Temik and A15053 treated cotton contained the fewest number of thrips. Thrips numbers were much higher and mite populations had increased by the 4-leaf stage (Table 2). Again, significantly more thrips were found in the nontreated cotton, and numerically, the fewest thrips were in Temik and A15953 treated cotton. Although still low numbers, significantly more aphids were detected in nontreated cotton compared with all but one of the seed treatments. We have suspected some level of fleahopper control from several at-planting insecticides and continue to count them to determine what level of control is being achieved (Table 3). No differences were found on 4-leaf cotton on May 15 or a week later on May 22; however, by June

2 nymph numbers were significantly greater in the nontreated cotton. Even so, total numbers of nymphs and adults exceeded the treatment threshold by a wide margin. It appears that there is more effect on nymphs than adults. More careful study of this issue needs to be made. Four of the treatments contained significantly fewer fleahopper nymphs + adults compared to the nontreated cotton (Cruiser + Avicta, A14905, A14905 formulation 2, and A15953).

Test 2 – Thrips numbers at this location were very low at both the 2-leaf and 4-leaf stages of plant development, and no significant differences were observed (Table 4). At the 2-leaf stage, but not at the 4-leaf stage, aphid numbers were significantly greater in the nontreated cotton (Table 5). There were no obvious numerical trends among the insecticide treatments. Mite numbers were too low to assess. In 4-leaf cotton, for reasons we cannot explain, several insecticide treatments had a statistically more favorable plant damage rating compared with the nontreated cotton. No differences were found in plant populations, fleahopper numbers (nymphs and adults) on one date, and lint yield based on ginned percentage to calculate the lint production (Table 6). When measuring the seed cotton yield or likewise applying a single turnout percentage, several insecticide treated plots showed significantly higher yield. From an insect standpoint this occurrence does not seem likely and may only be due to chance. Cotton fiber characteristics indicated significant treatment effects on uniformity (Table 7).

ACKNOWLEDGMENTS: Thanks are extended to Joseph Respondek for providing a location for this study and to Syngenta Crop Protection for their support. Rudy Alaniz and Clint Livingston, Farm Demonstration Assistants, are acknowledged for their work in establishing and maintaining the studies. They are also thanked for harvest and processing samples in the Nueces County study. The Texas Food and Fiber Council is thanked for funding cost of cotton fiber analysis.

Table 1. Thrips in cotton treated with systemic insecticide applied as a seed or granular in-furrow treatment, Joseph Respondek Farm, DeWitt County, TX, 2007.

		Number thrips per 10 plants					
		1-leaf			4-leaf		
Treatment	Rate mg ai/seed	larva	adult	total	larva	adult	total
Temik 15G	[1/]	0.5[b]	0.0[b]	0.5[b]	0.5[b]	2.5[b]	3.0[b]
Cruiser 5FS + Avicta 4.17FS	.342 + .145	0.3[b]	0.3[b]	0.5[b]	1.8[b]	3.3[b]	5.0[b]
A14905	.54	0.0[b]	0.5[b]	0.5[b]	1.0[b]	4.3[b]	5.3[b]
A14905 (formulation 2)	.54	0.0[b]	0.3[b]	0.3[b]	2.0[b]	3.8[b]	5.8[b]
A 15953	.54	0.0[b]	0.0[b]	0.0[b]	1.3[b]	2.5[b]	3.8[b]
STP 15273 + STP 17217	.375 + .375	0.0[b]	0.5[b]	0.5[b]	1.5[b]	4.8[b]	6.3[b]
Cruiser 5SF	.342	0.0[b]	0.3[b]	0.3[b]	1.3[b]	5.3[b]	6.5[b]
Gaucho Grande 5FS	.375	0.0[b]	0.5[b]	0.5[b]	1.3[b]	5.3[b]	6.5[b]
Nontreated		19.5[a]	2.5[a]	22.0[a]	32.3[a]	13.5[a]	45.8[a]
LSD (P = 0.05)		10.75	0.95	11.27	8.56	4.36	8.30
P > F		.0153	.0005	.0083	.0001	.0009	.0001

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

[1/] Temik 15G (5.0 lb/acre)

Table 2. Aphids and mites in cotton treated with systemic insecticide applied as a seed or granular in-furrow treatment, Joseph Respondek Farm, DeWitt County, TX, 2007.

Treatment	Rate mg ai/seed	Number per 10 plants: 1-leaf aphids	1-leaf mites	4-leaf aphid	4-leaf mites	Plant da. rating[2/]
Temik 15G	[1/]	1.0[a]	0.0[a]	0.0[c]	0.0[a]	2.7[b]
Cruiser 5FS + Avicta 4.17FS	.342 + .145	1.0[a]	0.0[a]	0.0[c]	0.0[a]	2.0[bc]
A14905	.54	0.5[a]	0.0[a]	0.8[bc]	0.3[a]	1.3[c]
A14905 (formulation 2)	.54	0.5[a]	0.0[a]	0.5[bc]	0.3[a]	1.8[c]
A 15953	.54	0.8[a]	0.0[a]	0.0[c]	0.0[a]	1.9[bc]
STP 15273 + STP 17217	.375 + .375	0.0[a]	0.0[a]	2.8[ab]	0.0[a]	1.9[bc]
Cruiser 5SF	.342	0.8[a]	0.3[a]	0.5[bc]	0.0[a]	1.7[c]
Gaucho Grande 5FS	.375	2.3[a]	0.0[a]	1.5[bc]	0.0[a]	1.9[bc]
Nontreated		5.3[a]	0.3[a]	4.8[a]	1.0[a]	4.0[a]
LSD (P = 0.05)		NS	NS	2.58	NS	0.89
P > F		.1800	.5774	.0112	.5774	.0001

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

[1/] Temik 15G (5.0 lb/acre)

[2/] Plant damage rating: 1 = no damage up to 5 = severe stunting and leaf curling. Visual evaluation was made at the 4-true leaf stage on May 15.

Table 3. Fleahopper in cotton treated with systemic insecticide applied as a seed or granular in-furrow treatment, Joseph Respondek Farm, DeWitt County, TX, 2007.

			Fleahopper per 20 plants					
			May 22			June 2		
Treatment	Rate mg ai/seed	Fleahoppers/ 10 plants May 15	nymph	adult	total	nymph	adult	total
Temik 15G	[1/]	0.3[a]	0.0[a]	3.5[a]	3.5[a]	0.3[b]	8.0[a]	8.3[abc]
Cruiser 5FS + Avicta 4.17FS	.342 + .145	1.5[a]	0.0[a]	3.5[a]	3.5[a]	0.3[b]	5.5[a]	5.8[cd]
A14905	.54	1.3[a]	0.0[a]	3.0[a]	3.0[a]	0.3[b]	6.0[a]	6.3[bcd]
A14905 (formulation 2)	.54	1.3[a]	0.0[a]	6.0[a]	6.0[a]	0.5[b]	7.0[a]	7.5[bcd]
A 15953	.54	1.0[a]	0.0[a]	4.3[a]	4.3[a]	0.5[b]	3.5[a]	4.0[d]
STP 15273 + STP 17217	.375 + .375	0.3[a]	0.0[a]	4.8[a]	4.8[a]	1.8[b]	6.5[a]	8.3[abc]
Cruiser 5SF	.342	0.8[a]	0.0[a]	5.3[a]	5.3[a]	1.3[b]	7.3[a]	8.5[abc]
Gaucho Grande 5FS	.375	0.8[a]	0.0[a]	3.5[a]	3.5[a]	0.5[b]	9.3[a]	9.8[ab]
Nontreated		0.0[a]	0.0[a]	4.3[a]	4.3[a]	3.8[a]	7.8[a]	11.5[a]
LSD (P = 0.05)		NS	NS	NS	NS	1.54	NS	3.85
P > F		.1330	1.000	.7496	.7496	.0013	.1350	.0228

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

[1/] Temik 15G (5.0 lb/acre)

Table 4. Thrips in cotton treated with systemic insecticide applied as a seed or granular in-furrow treatment, Texas Agricultural Experiment Station, Nueces County, TX, 2007.

		Number thrips per 10 plants					
		2-true leaf			4-leaf		
Treatment	Rate mg ai/seed	larva	adult	total	larva	adult	total
Temik 15G	[1/]	0.0[a]	0.0[a]	0.0[a]	0.0[a]	0.5[a]	0.5[a]
Cruiser 5FS + Avicta 4.17FS	.342 + .145	0.0[a]	0.0[a]	0.0[a]	0.5[a]	0.5[a]	1.0[a]
A14905	.54	0.0[a]	0.0[a]	0.0[a]	0.5[a]	2.5[a]	3.0[a]
A14905 (formulation 2)	.54	0.0[a]	0.0[a]	0.0[a]	0.0[a]	1.0[a]	1.0[a]
A 15953	.54	0.0[a]	0.0[a]	0.0[a]	0.0[a]	2.0[a]	2.0[a]
STP 15273 + STP 17217	.375 + .375	0.0[a]	0.0[a]	0.0[a]	0.0[a]	1.5[a]	1.5[a]
Cruiser 5SF	.342	0.0[a]	0.3[a]	0.3[a]	1.0[a]	0.5[a]	1.5[a]
Gaucho Grande 5FS	.375	0.0[a]	0.3[a]	0.3[a]	0.0[a]	4.0[a]	4.0[a]
Nontreated		0.0[a]	0.3[a]	0.3[a]	0.0[a]	1.5[a]	1.5[a]
LSD (P = 0.05)		NS	NS	NS	NS	NS	NS
P > F		1.000	.6946	.6946	.1956	.3980	.3842

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

[1/] Temik 15G (5.0 lb/acre)

Table 5. Aphids and mites in cotton treated with systemic insecticide applied as a seed or granular in-furrow treatment, Texas Agricultural Experiment Station, Nueces County, TX, 2007.

		Number per 10 plants					
		2-leaf		4-leaf		Plant da. rating[2/]	
Treatment	Rate mg ai/seed	aphid	mite	aphid	mite	cotyledon	4-leaf
Temik 15G	[1/]	2.5[b]	0.0[a]	0.0[a]	0.0[a]	2.0[a]	3.0[ab]
Cruiser 5FS + Avicta 4.17FS	.342 + .145	1.8[b]	0.0[a]	0.5[a]	1.5[a]	2.0[a]	2.6[b]
A14905	.54	1.5[b]	0.5[a]	1.0[a]	2.0[a]	2.3[a]	2.3[bc]
A14905 (formulation 2)	.54	3.5[b]	0.0[a]	0.0[a]	4.5[a]	2.3[a]	1.6[c]
A 15953	.54	1.5[b]	0.5[a]	1.5[ac]	0.0[a]	2.3[a]	2.1[bc]
STP 15273 + STP 17217	.375 + .375	4.3[b]	0.0[a]	0.5[a]	0.0[a]	2.5[a]	2.8[ab]
Cruiser 5SF	.342	2.5[b]	1.0[a]	0.0[a]	0.5[a]	1.8[a]	2.2[bc]
Gaucho Grande 5FS	.375	0.8[b]	0.0[a]	3.0[a]	3.5[a]	2.0[a]	3.1[ab]
Nontreated		23.5[a]	0.0[a]	1.0[a]	0.5[a]	2.3[a]	3.7[a]
LSD (P = 0.05)		11.34	NS	NS	NS	NS	0.97
P > F		.0096	.4123	.4546	.3793	.6482	.0075

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

[1/] Temik 15G (5.0 lb/acre)

[2/] Plant damage rating: 1 = no damage up to 5 = severe stunting and leaf curling

Table 6. Plant damage rating fleahopper numbers and lint yield in cotton treated with systemic insecticide applied as a seed or granular in-furrow treatment, Texas Agricultural Experiment Station, Nueces County, TX, 2007.

Treatment	Rate mg ai/seed	Plants 1000's/acre	Fleahopper #/10 plants (4 leaf)	Yield (lb lint/acre) @ 36% turnout	Yield (lb lint/acre) @ actual turnout
Temik 15G	[1/]	44.8[a]	0.0[a]	1228[ab]	1236[a]
Cruiser 5FS + Avicta 4.17FS	.342 + .145	46.4[a]	0.0[a]	1199[a-d]	1188[a]
A14905	.54	46.3[a]	0.0[a]	1231[a]	1220[a]
A14905 (formulation 2)	.54	53.5[a]	0.0[a]	1155[bcd]	1171[a]
A 15953	.54	50.1[a]	0.0[a]	1216[abc]	1211[a]
STP 15273 + STP 17217	.375 + .375	50.4[a]	0.0[a]	1248[a]	1218[a]
Cruiser 5SF	.342	49.5[a]	0.0[a]	1135[d]	1144[a]
Gaucho Grande 5FS	.375	46.4[a]	0.0[a]	1201[a-d]	1193[a]
Nontreated		48.6[a]	0.0[a]	1152[cd]	1144[a]
LSD (P = 0.05)		NS	NS	73.2	NS
P > F		.9122	1.000	.0374	.2608

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

[1/] Temik 15G (5.0 lb/acre)

Table 7. Fiber characteristics in cotton treated with systemic insecticide applied as a seed or granular in-furrow treatment, Texas Agricultural Experiment Station, Nueces County, TX, 2007.

Treatment	Rate mg ai/seed	Micronaire	Length inches	Uniformity %	Strength g/tex	Elongation %
Temik 15G	[1/]	4.1[a]	1.10[a]	79.9[c]	27.1[a]	6.4[a]
Cruiser 5FS + Avicta 4.17FS	.342 + .145	4.1[a]	1.13[a]	80.1[bc]	27.3[a]	6.1[a]
A14905	.54	4.2[a]	1.13[a]	81.3[ab]	28.7[a]	6.4[a]
A14905 (formulation 2)	.54	4.2[a]	1.13[a]	80.6[bc]	26.8[a]	6.4[a]
A 15953	.54	4.2[a]	1.14[a]	82.3[a]	28.6[a]	6.4[a]
STP 15273 + STP 17217	.375 + .375	4.0[a]	1.12[a]	80.7[bc]	27.6[a]	6.3[a]
Cruiser 5SF	.342	4.1[a]	1.13[a]	81.3[ab]	27.0[a]	6.5[a]
Gaucho Grande 5FS	.375	4.0[a]	1.13[a]	80.8[bc]	26.4[a]	6.5[a]
Nontreated		4.1[a]	1.12[a]	79.8[c]	27.9[a]	6.3[a]
LSD (P = 0.05)		NS	NS	1.27	NS	NS
P > F		.4811	.0820	.0141	.2625	.2543

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

[1/] Temik 15G (5.0 lb/acre)

EVALUATION OF EXPERIMENTAL SEED AND GRANULAR INSECTICIDE TREATMENTS ON COTTON FOR CONTROL OF THRIPS, APHIDS, AND MITES AT TWO COASTAL BEND LOCATIONS

Larry Vasbinder Farm, DeWitt County and Texas Agricultural Experiment Station, Nueces County, 2007

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SUMMARY: Thrips numbers were significantly reduced by all seed and granular insecticide treatments in 2-leaf stage cotton and by 5 of the treatments in 4-leaf stage cotton in the DeWitt County test (Test 1); whereas, no differences were observed in their numbers in the Nueces County test (Test 2). Thrips numbers were too low for an adequate test at the 2nd location. Temik was numerically the most effective product on thrips in 2-leaf cotton, but Gaucho was numerically the most effective on thrips in 4-leaf cotton. Damage ratings were also significantly better for all the insecticide treatments at the DeWitt County location, but not at the Nueces County location, as expected, due to very low thrips in the Nueces County test. Mite numbers were very low at both locations with no differences at either leaf stage evaluated. Aphid numbers were significantly reduced by all insecticide treatments and at all leaf stages evaluated at both locations. Yield data was not obtained from the DeWitt County location, and no differences due to treatment were found in fiber characteristics or yield at the Nueces County location.

OBJECTIVES: Studies were conducted to evaluate the effect of various insecticide seed and one granular at-planting insecticide treatment on thrips, aphids, mites, and fleahoppers in cotton during the early part of the growing season.

MATERIALS/METHODS: Commercial cotton variety DPL 555 BR seed was sent to Valent Corporation for addition of the seed treatments. Seed was planted with research cone seed boxes at a rate of 4.0/row foot. In Nueces County a 4-row John Deere 6100 buster type planter was used to plant the test on March 22, and in DeWitt County a 2-row John Deere 7100 MaxEmerge planter was used to plant the test on April 16. Plots were 4 rows by 40 feet in Nueces County and 2 rows by 30 feet in DeWitt County. Both tests were on 38-inch rows and arranged in a randomized complete block design with 4 replications of each treatment. Temik was applied in-furrow at-planting with electric driven Gandy boxes with banders turned parallel to the rows. Soil moisture at both locations was excellent.

The soil at the Nueces County site was a sandy clay loam (52% sand, 14% silt, 34% clay) with a pH of 7.8. The organic matter content was less than 2%. Trilin 4 (1.0 qt/acre) was applied in October 2006 followed after planting with Cotoran 4L (1.0 qt/acre) + Dual II Magnum 7.64 lb (1.0 pint/acre). Centric 40 WG (2.0 oz/acre) was applied for fleahopper control on May 14, May 21, and June 4. On July 12 and August 12, Bidrin 8E (8.0 oz/acre) was applied for stink bug.

Treatments were assessed by (1) harvesting 10 plants/plot at the 1 or 2-leaf stage [April 10, Nueces County and May 5, DeWitt County] and at the 4-leaf stage [April 24, Nueces County and May 15, DeWitt County] which were placed in 70% ETOH for later examination for thrips, aphids, mites, and ants; (2) assigning a visual damage rating [1 = no damage up to 5 = severe stunting and leaf curling] on March 30 in Nueces County and May 15 in DeWitt County; and (3) harvesting the center 2 rows in the Nueces County test with a John Deere 9900 spindle picker on September 15. Seed cotton was weighed, a sample was taken for ginning on a 10-saw laboratory machine, and lint was sent to the International Textile Center, Lubbock, Texas for fiber analysis. The software program Agriculture Research Manager (ARM revision 6.1.13) was used to conduct analysis of variance, and means were separated using LSD when P=0.05 or less.

RESULTS/DISCUSSION: Test 1 – Larval, adult, and total thrips numbers were significantly fewer at the DeWitt County location for all insecticide treatments at the 2-leaf stage of cotton development compared to the nontreated cotton, but at the 4-leaf stage, 6 of the 11 seed treatments contained larval thrips numbers not different from the nontreated cotton (Table 1). There were no differences in adult thrips numbers among the treatments at the 4-leaf stage. Numerically the most effective seed treatment at the 2-leaf stage was Temik, but at the 4-leaf stage, Gaucho treated cotton had the fewest numbers of thrips. No differences were found in the number of mites at either of these leaf stages, but there were differences in aphid numbers at both leaf stages (Table 2). At both leaf stages aphid numbers were reduced by all the seed treatments; however, their numbers were considered low even in the nontreated cotton with fewer than 2/leaf. Plant damage ratings were dramatically different with Gaucho treated seed showing the most favorable rating.

Test 2 – Thrips and mite numbers, and plant damage ratings were very low at both leaf stages evaluated at the Nueces County location with no statistical differences (Tables 3 and 4). Aphid numbers were higher in this test, and statistically greater numbers were counted in nontreated cotton at both the 1-2 leaf and 4-leaf stages of development. Significant differences were not found in plant population, cotton fiber characteristics, or yield (Table 5).

ACKNOWLEDGMENTS: Thanks are extended to Larry Vasbinder for providing land to conduct the test in DeWitt County and to Valent Corporation for their support at both locations. Rudy Alaniz and Clint Livingston, Farm Demonstration Assistants, are acknowledged for their help with all phases of both studies. The Texas Food and Fiber Council is thanked for funding cost of cotton fiber analysis.

Table 1. Thrips in cotton treated with systemic insecticide applied as a seed or granular in-furrow treatment, Larry Vasbinder Farm, DeWitt County, TX, 2007.

		Number thrips/10 plants					
		2-leaf			4-leaf		
Treatment	Rate mg ai/seed	larva	adult	total	larva	adult	total
Gaucho 5FS	.375	0.8[bc]	0.5[bc]	1.3[c]	2.8[e]	1.0[a]	3.8[e]
Cruiser 5FS	.340	7.3[b]	1.5[bc]	8.5[b]	82.5[abc]	4.0[a]	86.5[abc]
V-10170 5FS 1673	.375	2.0[bc]	1.0[bc]	3.0[bc]	47.8[a-e]	5.3[a]	53.0[a-e]
V-10170 5FS 1667	.375	2.5[bc]	1.3[bc]	3.8[bc]	57.5[a-d]	4.5[a]	62.0[a-d]
V-10170 5FS 1668	.375	1.5[bc]	2.0[bc]	3.5[bc]	41.5[b-e]	3.0[a]	44.5[b-e]
V-10170 5FS 1672	.375	1.5[bc]	2.5[ab]	4.0[bc]	46.3[a-e]	4.8[a]	51.0[a-e]
V-10170 5FS 1669	.375	1.8[bc]	1.3[bc]	3.0[bc]	36.8[cde]	5.0[a]	41.8[cde]
V-10170 5FS 1669 + V-10195	.200 + .200	2.3[bc]	0.8[bc]	3.0[bc]	81.3[abc]	8.8[a]	90.0[abc]
V-10170 5SC 1669 + V-10195	.300 + .300	1.0[bc]	1.5[bc]	2.0[bc]	40.3[b-e]	5.0[a]	45.3[b-e]
V-10170 5SC 1669 + V-10211 98TC	.375 + 50	1.3[bc]	0.5[bc]	1.8[bc]	92.0[ab]	5.8[a]	97.8[ab]
Temik 15G	[1/]	0.3[c]	0.0[c]	0.3[c]	11.3[de]	3.0[a]	14.3[de]
Nontreated		31.5[a]	4.5[a]	36.0[a]	94.3[a]	5.5[a]	99.8[a]
LSD (P = 0.05)		6.56	2.03	6.87	52.64	NS	53.89
P > F		.0001	.0105	.0001	.0139	.3755	.0110

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

[1/] Temik 15G (3.5 lb/acre)

Table 2. Aphids and mites in cotton treated with systemic insecticide applied as a seed or granular in-furrow treatment, Larry Vasbinder Farm, DeWitt County, TX, 2007.

		Number per 10 plants				
		2-leaf		4-leaf		Plant da. rating[2/]
Treatment	Rate mg ai/seed	aphids	mites	aphid	mites	
Gaucho 5FS	.375	0.5[c]	0.0[a]	3.5[bcd]	0.0[a]	2.13[e]
Cruiser 5FS	.340	1.0[bc]	0.0[a]	5.3[b]	0.5[a]	2.34[de]
V-10170 5FS 1673	.375	0.8[c]	0.0[a]	3.5[bcd]	1.5[a]	2.25[de]
V-10170 5FS 1667	.375	1.5[bc]	0.0[a]	2.8[bcd]	1.5[a]	2.58[cde]
V-10170 5FS 1668	.375	1.5[bc]	0.0[a]	4.5[bc]	0.3[a]	2.58[cde]
V-10170 5FS 1672	.375	1.0[bc]	0.0[a]	2.5[bcd]	0.8[a]	2.59[cde]
V-10170 5FS 1669	.375	0.8[c]	0.0[a]	1.5[d]	2.0[a]	2.83[b-e]
V-10170 5FS 1669 + V-10195	.200 + .200	3.0[b]	0.0[a]	4.8[bc]	0.3[a]	3.46[b]
V-10170 5SC 1669 + V-10195	.300 + .300	0.3[c]	0.0[a]	2.3[cd]	0.3[a]	3.21[bc]
V-10170 5SC 1669 + V-10211 98TC	.375 + 50	1.8[bc]	0.0[a]	2.3[cd]	0.8[a]	3.00[bcd]
Temik 15G	[1/]	0.8[c]	0.3[a]	2.0[cd]	0.3[a]	2.54[cde]
Nontreated		5.5[a]	0.3[a]	12.0[a]	0.3[a]	4.63[a]
LSD (P = 0.05)		2.16	NS	2.82	NS	.812
P > F		.0015	.5658	.0001	.5370	.0001

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

[1/] Temik 15G (3.5 lb/acre)

[2/] Plant damage rating: 1 = no damage up to 5 = severe stunting and leaf curling. Visual evaluation was made at the 4-leaf stage on May 15.

Table 3. Thrips in cotton treated with systemic insecticide applied as a seed or granular in-furrow treatment, Texas Agricultural Experiment Station, Nueces County, TX, 2007.

Treatment	Rate mg ai/seed	Number thrips/10 plants					
		1-2 leaf			4-leaf		
		larva	adult	total	larva	adult	total
Gaucho 5FS	.375	.0[a]	.0[a]	.0[a]	0.8[a]	2.0[a]	2.8[a]
Cruiser 5FS	.340	.3[a]	.3[a]	.5[a]	0.3[a]	1.0[a]	1.3[a]
V-10170 5FS 1673	.375	.0[a]	.3[a]	.3[a]	0.8[a]	2.3[a]	3.0[a]
V-10170 5FS 1667	.375	.0[a]	.0[a]	.0[a]	1.5[a]	1.8[a]	3.3[a]
V-10170 5FS 1668	.375	.0[a]	.0[a]	.0[a]	0.5[a]	2.8[a]	3.3[a]
V-10170 5FS 1672	.375	.3[a]	.0[a]	.3[a]	0.3[a]	1.3[a]	1.5[a]
V-10170 5FS 1669	.375	.0[a]	.0[a]	.0[a]	0.5[a]	2.0[a]	2.5[a]
V-10170 5FS 1669 + V-10195	.200 + .200	.0[a]	.3[a]	.3[a]	1.0[a]	2.0[a]	3.0[a]
V-10170 5SC 1669 + V-10195	.300 + .300	.0[a]	.0[a]	.0[a]	1.3[a]	1.5[a]	2.8[a]
V-10170 5SC 1669 + V-10211 98TC	.375 + 50	.0[a]	.0[a]	.0[a]	1.0[a]	1.5[a]	2.5[a]
Temik 15G	[1/]	.0[a]	.3[a]	.3[a]	0.8[a]	2.0[a]	2.8[a]
Nontreated		.0[a]	.5[a]	.5[a]	2.5[a]	2.0[a]	4.5[a]
LSD (P = 0.05)		NS	NS	NS	NS	NS	NS
P > F		.5658	.7543	.8049	.5869	.9091	.6634

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

[1/] Temik 15G (3.5 lb/acre)

Table 4. Aphids, mites and plant damage rating in cotton treated with systemic insecticide applied as a seed or granular in-furrow treatment, Texas Agricultural Experiment Station, Nueces County, TX, 2007.

		Number per 10 plants				
		1-2 leaf		4-leaf		Plant da. rating[2/]
Treatment	Rate mg ai/seed	aphids	mites	aphid	mites	
Gaucho 5FS	.375	0.0[b]	0.0[a]	5.0[b]	1.0[a]	2.0[a]
Cruiser 5FS	.340	0.8[b]	0.0[a]	1.8[b]	1.5[a]	1.5[a]
V-10170 5FS 1673	.375	1.0[b]	0.0[a]	1.3[b]	0.5[a]	1.6[a]
V-10170 5FS 1667	.375	0.0[b]	0.3[a]	2.8[b]	0.8[a]	2.3[a]
V-10170 5FS 1668	.375	0.5[b]	0.0[a]	4.3[b]	2.0[a]	2.0[a]
V-10170 5FS 1672	.375	0.8[b]	0.0[a]	2.8[b]	0.5[a]	1.8[a]
V-10170 5FS 1669	.375	0.5[b]	0.0[a]	1.3[b]	0.5[a]	1.9[a]
V-10170 5FS 1669 + V-10195	.200 + .200	0.5[b]	0.3[a]	5.0[b]	0.5[a]	2.3[a]
V-10170 5SC 1669 + V-10195	.300 + .300	1.0[b]	0.0[a]	2.5[b]	0.3[a]	2.1[a]
V-10170 5SC 1669 + V-10211 98TC	.375 + 50	0.5[b]	0.0[a]	4.5[b]	1.3[a]	1.9[a]
Temik 15G	[1/]	0.3[b]	0.0[a]	7.8[b]	0.5[a]	1.9[a]
Nontreated		14.8[a]	0.0[a]	91.3[a]	1.8[a]	2.0[a]
LSD (P = 0.05)		5.25	NS	42.92	NS	NS
P > F		.0001	.4671	.0084	.2472	.6084

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

[1/] Temik 15G (3.5 lb/acre)

[2/] Plant damage rating: 1 = no damage up to 5 = severe stunting and leaf curling. Visual evaluation was made at the 4-leaf stage on March 30.

Table 5. Plant stand, fiber characteristics, and lint yield in cotton treated with systemic insecticide applied as a seed or granular in-furrow treatment, Texas Agricultural Experiment Station, Nueces County, TX, 2007.

Treatment	Rate mg ai/seed	Plants 1000's/ acre	Cotton fiber characteristics					Yield lb lint/ acre
			mic	lgth	unif	streng	elong	
Gaucho 5FS	.375	39.6[a]	4.2[a]	1.23[a]	80.5[a]	28.0[a]	6.6[a]	1034[a]
Cruiser 5FS	.340	43.5[a]	4.3[a]	1.23[a]	80.5[a]	27.0[a]	6.8[a]	1060[a]
V-10170 5FS 1673	.375	49.4[a]	4.4[a]	1.19[a]	79.7[a]	25.6[a]	6.8[a]	1084[a]
V-10170 5FS 1667	.375	37.6[a]	4.2[a]	1.22[a]	80.4[a]	26.9[a]	6.7[a]	995[a]
V-10170 5FS 1668	.375	35.4[a]	4.2[a]	1.21[a]	81.3[a]	27.7[a]	6.5[a]	1028[a]
V-10170 5FS 1672	.375	49.3[a]	4.2[a]	1.20[a]	79.9[a]	26.8[a]	6.5[a]	1094[a]
V-10170 5FS 1669	.375	44.9[a]	4.2[a]	1.20[a]	80.4[a]	26.7[a]	6.8[a]	996[a]
V-10170 5FS 1669 + V-10195	.200 + .200	40.5[a]	4.3[a]	1.24[a]	81.2[a]	27.7[a]	6.4[a]	1162[a]
V-10170 5SC 1669 + V-10195	.300 + .300	50.1[a]	4.2[a]	1.23[a]	81.2[a]	27.9[a]	6.7[a]	1078[a]
V-10170 5SC 1669 + V-10211 98TC	.375 + 50	47.5[a]	4.3[a]	1.21[a]	80.0[a]	26.8[a]	6.6[a]	1005[a]
Temik 15G	[1/]	43.4[a]	4.4[a]	1.22[a]	80.4[a]	28.3[a]	6.6[a]	1060[a]
Nontreated		36.1[a]	4.3[a]	1.21[a]	80.3[a]	25.8[a]	6.9[a]	1084[a]
LSD (P = 0.05)		NS	NS	NS	NS	NS	NS	NS
P > F		.3287	.8422	.2243	.8395	.5466	.3940	.5824

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

[1/] Temik 15G (3.5 lb/acre)

COMPARISON OF SYSTEMIC INSECTICIDES USED AT-PLANTING ON COTTON

Texas Agricultural Experiment Station, Nueces County, 2007

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SUMMARY: There was excessive field variation across the experiment in plant growth not associated with the experimental treatments. The plant growth stage at the time plants were cut for thrips, aphid, and mite counts was 4- to 6-leaves. Although there were no statistical differences in thrips, mite, and aphid numbers, the counts do not appear to be realistic. In other experiments under similar circumstances, aphids were generally higher in the nontreated cotton. The only statistically significant result was in the plant damage ratings, where cotton treated with Temik and Gaucho Grande had ratings lower than the other treatments. The greatest damage rating was in the nontreated cotton, indicating that the arthropod counts could not explain the results. The only difference in fiber characteristics was in uniformity where Cruiser treated cotton had significantly higher uniformity.

OBJECTIVES: The primary objective of the experiment was to evaluate various formulations of imidacloprid (Gaucho Grande and the 2 NUP numbered compounds), and to compare these with Temik and Cruiser treatments.

MATERIALS/METHODS: Four seed treatments were applied to DPL 555BR variety cotton seed which was planted at the Texas Agricultural Experiment Station Meany Annex on April 3, 2007. A 4-row John Deere 6100 buster type planter was used to plant the 4-row by 40 foot plots with treatments arranged in a randomized complete block design with 4 replications. The granular treatment was applied with electric driven Gandy boxes with banders turned parallel with rows to allow more material into the seed furrow. Soil temperature at the 3-inch depth at the time of planting was 70°F, and it was a sandy clay loam (52% sand, 14% silt, 34% clay) with a pH of 7.8. The organic matter content was less than 2%. Trilin 4 (1.0 qt/acre) was applied in October 2006 followed after planting with Cotoran (4L (1.0 qt/acre) + Dual II Magnum 7.64 lb (1.0 pint/acre). Centric 40 WG (2.0 oz/acre) was applied for fleahopper control on May 14, May 21, and June 4. On July 12 and August 12, Bidrin 8E (8.0 oz/acre) was applied for stink bug.

Treatments were assessed by (1) harvesting 10 plants/plot on April 3 at the 4-6 leaf stage [later than normal stage desired] and placing them in ETOH for later examination for thrips, aphids, mites, and fire ants; (2) estimating damage to plants using a scale where 1 = no damage up to 5 = severe stunting and leaf curling; (3) harvesting the center 2 rows in plots with a 2-row John Deere 9900 spindle picker on September 13; (4) weighing the seed cotton and selecting a sample to gin on a 10-saw Eagle laboratory machine for % lint turnout; and (5) sending lint samples to the International Textile Center, Lubbock, Texas for fiber analysis. The software program Agriculture Research Manager (ARM revision 6.1.13) was used to conduct analysis of variance, and means were separated using LSD when P=0.05 or less.

RESULTS/DISCUSSION: The plant stage at which plants were obtained for thrips and other insect counts may have been too late and varied for proper evaluation (4 to 6-leaf) which may have resulted in no significant difference in thrips, aphid, or mite numbers (Table 1). There were no observed trends in insect counts. The counts of all 3 arthropods were very low for the advanced stage at which plant samples were obtained. However, the damage ratings may be more valuable as it might reflect earlier events and effects of the various treatments. Temik and Gaucho Grande had consistently the least damage, and even the Temik treatment which did not separate statistically was within 0.1 of statistical separation from all the other treatments. Cruiser and the 2 NUP treatments did not separate statistically from the nontreated in damage rating.

Cotton fiber characteristics revealed only one factor where statistical differences were observed (Table 2). For reasons not apparent, the uniformity of fiber in the Cruiser treatment was significantly higher than all other test treatments. No differences were observed in lint production. Numerically, the nontreated cotton yield was the highest in the experiment.

ACKNOWLEDGMENTS: Thanks are extended to Rudy Alaniz and Clint Livingston, Farm Demonstration Assistants, for their help in conduct of this experiment. The Texas Food and Fiber Council is thanked for funding cost of cotton fiber analysis.

Table 1. Comparison of systemic insecticide formulations (seed and granular) for effects on early season cotton insect pests, Texas Agricultural Experiment Station, Nueces County, TX, 2007.

Treatment	Rate mg ai/seed	Number insects per 10 plants: Thrips larva	adult	total	Aphids	Mites	Plant da. rating[2/]
Temik 15G	[1/]	1.5[a]	19.0[a]	20.5[a]	1.0[a]	0.0[a]	2.1[bc]
Cruiser 5FS	.342	7.0[a]	12.5[a]	19.5[a]	1.0[a]	0.5[a]	2.7[ab]
Gaucho Grande 5FS	.375	12.0[a]	20.0[a]	32.0[a]	1.0[a]	1.5[a]	2.1[c]
NUP-05071	.375	6.0[a]	14.5[a]	20.5[a]	1.0[a]	1.5[a]	2.7[ab]
NUP-07066	.375	3.0[a]	14.0[a]	17.0[a]	4.5[a]	13.0[a]	2.9[a]
Nontreated	.375	9.0[a]	11.5[a]	20.5[a]	1.0[a]	4.5[a]	3.1[a]
LSD (P = 0.05)		NS	NS	NS	NS	NS	0.59
P > F		.3524	.4699	.5680	.5963	.2410	.0121

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

[1/] Temik 15G (3.5 lb/acre)

[2/] Plant damage rating: 1 = no damage up to 5 = severe stunting and leaf curling. Visual evaluation was made at the 4-leaf stage on May 15.

Table 2. Cotton fiber characteristics and yield from evaluation of systemic insecticide formulations (seed and granular), Texas Agricultural Experiment Station, Nueces County, TX, 2007.

Treatment	Rate mg ai/seed	Cotton fiber characteristics					Yield lb lint/acre
		mic	lgth	unif	streng	elong	
Temik 15G	[1/]	3.9[a]	1.15[a]	81.4[b]	26.3[a]	6.4[a]	1087[a]
Cruiser 5FS	.342	3.9[a]	1.15[a]	83.0[a]	28.0[a]	6.5[a]	1065[a]
Gaucho Grande 5FS	.375	3.8[a]	1.14[a]	80.4[b]	26.5[a]	6.4[a]	1043[a]
NUP-05071	.375	4.0[a]	1.14[a]	80.8[b]	27.5[a]	6.5[a]	1006[a]
NUP-07066	.375	3.9[a]	1.14[a]	80.7[b]	27.4[a]	6.4[a]	1097[a]
Nontreated	.375	3.8[a]	1.14[a]	81.2[b]	26.5[a]	6.6[a]	1182[a]
LSD (P = 0.05)		NS	NS	1.44	NS	NS	NS
P > F		.9299	.8437	.0210	.3327	.2774	.4178

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

[1/] Temik 15G (3.5 lb/acre)

COMPARISON OF INSECTICIDES AND EVALUATION OF USE RATES FOR CONTROL OF COTTON FLEAHOPPER

Texas Agricultural Experiment Station, Nueces County, 2007

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SUMMARY: Three insecticide treatments were applied to Stoneville 4554 B2RF variety cotton for control of cotton fleahopper beginning late in the 2nd week of squaring for comparison of various materials and use rates. The average of 7 post-treatment counts of fleahopper nymphs and adults revealed that their numbers were maintained below treatment threshold levels (15 per 100 plant terminals) by all insecticides except for Intruder (0.6 ounces/acre) and Orthene 97 (4.0 ounces/acre). Fleahopper numbers in these two treatments averaged slightly more that 15 per 100 plant terminals. During the same period fleahopper numbers in nontreated cotton averaged nearly 60 per 100 plant terminals. Lint production was significantly greater for all treatments, except for the Orthene treatment, compared to that for the nontreated cotton. However, the Orthene treatment yield level was still numerically 48 lb/acre above the nontreated cotton. Average yield increase for the remaining treatments over the nontreated cotton was 135 lb/acre. When the Orthene treatment was included, the average yield increase for insecticide use compared with the nontreated cotton was 120.2 lb/acre. A positive return was obtained with all insecticide treatments which ranged per acre from $7.69 (Orthene) up to $42.54 (Intruder 0.6 oz/acre). Intruder did not reduce fleahopper numbers as low as that noted in the Centric treatments nor were there statistical differences in lint production in the Centric and Intruder treated cotton. Fiber characteristics, except for micronaire, were not affected by treatment. Micronaire was lowest in nontreated cotton but not different from Intruder (0.6 oz/acre) and Orthene.

OBJECTIVES: The cotton study was conducted to compare the effects of insecticides on fleahopper numbers, plant fruiting characteristics, lint production, and economic impact.

MATERIALS/METHODS: Stoneville 4554 B2RF variety cotton was planted on April 3, 2007 at the Texas Agricultural Experiment Station Meaney Annex at 4.0 seeds/foot on 38-inch spaced rows with a 4-row John Deere 6100 buster type planter. Fertilizer applied was 125-22-0 + 6.7 lb zinc. Weed control included Trilin 4 (1.0 quart/acre) in late October 2006. After planting Cotoran 4L (1.0 quart/acre) + Dual II Magnum 7.64 lb (1.0 pint/acre) was applied. The plant growth regulator Pix (old product) was applied on June 28 (16 ounces/acre), July 12 (8 ounces/acre) and on July 26 (24 ounces/acre). Other than insecticide for fleahopper control, insecticide applied as an overspray to the entire test was Bidrin 8E (8.0 ounces/acre) on July 12 and August 6 for control of stink bugs, primarily *Euschistus quadrator*. This stink bug is often referred to as the little brown stink bug.

Plots were 8 rows wide by 40 feet long and treatments were replicated 4 times in a randomized complete block design. The insecticide treatments were applied to the center 4 rows in each plot so that an 8-row buffer of nontreated cotton was maintained between each insecticide treatment. Treatments were made with a self-propelled Spider Trac ground sprayer through 4X hollow cone nozzles (2/row) at 40 psi in a total volume of 5.7 gpa while traveling at 4 mph. The adjuvant Induce at 0.25% v/v was added to the spray mix. Three treatments were made for fleahopper control on May 16, 22, and June 4. The 1st treatment was made late in the 2nd week of squaring.

Treatments were assessed by (1) counting the number of fleahoppers on 20 plants in the center 2 rows of each plot on May 13 [pretreatment], May 19 [3 DAT-1 = days after treatment-1], May 22 [6 DAT-1], May 24 [2 DAT-2], May 31 [9 DAT-2], June 3 [12 DAT-2], June 8 [4 DAT-3], and June12 [8 DAT-3], (2) conducting plant mapping on June 24 using P-Map during the 4th week of bloom, (3) harvesting the center 2 rows of each plot with a 2-row model 9900 John Deere spindle picker on September 13, (4) weighing the seed cotton and ginning a sample from each plot on a 10-saw Eagle laboratory machine to determine lint percentages, and (6) submitting lint to the International Textile Center at Lubbock, Texas for fiber analysis. The software program Agriculture Research Manager (ARM revision 6.1.13) was used to conduct analysis of variance, and means were separated by LSD when P=0.05 or less.

RESULTS/DISCUSSION: Pretreatment counts across all plots revealed 12.5 nymph (Table 1) and 20.0 adult (Table 2) fleahoppers/100 plant terminals or an average of 32.5 nymphs + adults (Table 3). Nymphs considered alone were maintained below the treatment threshold level of 15/100 plants on all inspection dates except in the Intruder (0.6 ounce/acre) and Orthene treatments 12 DAT-2. Likewise, adults considered alone, were maintained below the threshold during the same period except for Intruder (0.6 ounce/acre) 8 DAT-3 and Orthene treatment at 4 and 8 DAT-3. Centric was the only treatment that maintained total fleahopper numbers below the treatment threshold on all inspection dates. Post treatment average of adults + nymphs were below the threshold for all products and rates except for Intruder (0.6 ounce/acre) and the Orthene treatment; however, both of these treatments maintained fleahoppers at significantly lower numbers than that found in the nontreated cotton.

Plant mapping revealed significantly greater numbers of squares, bolls, and retained fruit in insecticide treated cotton compared to nontreated cotton (Table 4). The percentage fruit retention in fruiting branch groups 1-5 and 6-10 was significantly lower in nontreated cotton. Furthermore, the percentage fruit retention on positions 1, 2, 3, and 4 was, with one exception, significantly higher in insecticide treated cotton (Table 5). Micronaire was the only fiber characteristic affected by fleahopper control (Table 6). Nontreated cotton had the lowest micronaire reading which was not statistically different from Intruder (0.6 oz/acre) or the Orthene treatment. These same 2 insecticide treatments also sustained the highest season average number of fleahoppers among the insecticides tested.

Lint production was significantly greater for all insecticide treatments compared with the nontreated cotton except for the Orthene treatment, but even the Orthene treated cotton produced substantially more lint (48 lb/acre) than the nontreated cotton (Table 5). Dollar returns above the nontreated based strictly on the numerical lint yield differences ranged from $7.69/acre for the Orthene treatment to a high of $42.54/acre for the Intruder (0.6 oz/acre) treatment. Cotton value was based on lint and seed production, and costs included insecticide, application, and processing charges for the extra production above the nontreated cotton (see footnote at the bottom of Table 5).

It was evident in this study that treatment for cotton fleahopper under the conditions encountered resulted in increased economic value. The average increase in the study across all insecticides, rates, and combinations was 120.2 lb lint/acre and 187.5 lb seed/acre.

ACKNOWLEDGMENTS: Rudy Alaniz and Clint Livingston, Farm Demonstration Assistants, are thanked for their work on all phases of this study. Special acknowledgment is given to Clint Livingston for understanding and use of the plant mapping program (P-Map). Without his expertise with this program, valuable data collection and presentation would not have been conducted. Syngenta, Dupont, and Valent companies are thanked for supplying insecticide for conduct of this project and for other help with this study. The Texas Food and Fiber Council is thanked for funding cost of cotton fiber analysis.

Table 1. Effect of various rates of insecticides on fleahopper **nymphs**, Texas Agricultural Experiment Station, Nueces County, TX, 2007.

Treatment[1/]	Rate oz/acre	Number/100 plant terminals								Post-treat averages
		Pretreat	3 DAT-1	6 DAT-1	2 DAT-2	9 DAT-2	12 DAT-2	4 DAT-3	8 DAT-3	
Centric 40WG	1.25	13.8[a]	0.0[c]	1.3[b]	0.0[b]	0.0[b]	7.5[bc]	5.0[b]	0.0[c]	2.0[bc]
Centric 40WG	2.00	13.8[a]	0.0[c]	0.0[b]	0.0[b]	0.0[b]	2.5[c]	0.0[b]	1.3[c]	0.5[c]
Intruder 70WP	0.60	12.5[a]	6.3[b]	5.0[a]	0.0[b]	0.0[b]	26.3[b]	1.3[b]	0.0[c]	5.5[bc]
Intruder 70WP	1.10	15.0[a]	1.3[bc]	1.3[b]	0.0[b]	1.3[b]	8.8[bc]	1.3[b]	2.5[bc]	2.3[bc]
Orthene 97 Pel	4.00	11.3[a]	0.0[c]	1.3[b]	0.0[b]	6.3[b]	21.3[bc]	8.8[b]	7.5[ab]	6.4[b]
Centric 40WG + Orthene 97 Pel	1.25 + 2.00	10.0[a]	1.3[bc]	1.3[b]	0.0[b]	0.0[b]	7.5[bc]	0.0[b]	0.0[c]	1.4[bc]
Nontreated		11.3[a]	12.5[a]	7.5[a]	27.5[a]	26.3[a]	100.0[a]	75.0[a]	12.5[a]	37.3[a]
LSD (P = 0.05)		NS	6.07	3.68	6.68	10.69	23.42	18.59	6.19	5.81
P > F		.6902	.0025	.0046	.0001	.0005	.0001	.0001	.0025	.0001

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

[1/] Treatments were applied on 5/16, 5/22, and 6/4.

Table 2. Effect of various rates of insecticides on fleahopper **adults**, Texas Agricultural Experiment Station, Nueces County, TX, 2007.

Treatment[1/]	Rate oz/acre	Number/100 plant terminals								Post-treat averages
		Pretreat	3 DAT-1	6 DAT-1	2 DAT-2	9 DAT-2	12 DAT-2	4 DAT-3	8 DAT-3	
Centric 40WG	1.25	21.3[a]	2.5[b]	2.5[b]	1.3[b]	8.8[a]	2.5[a]	3.8[a]	11.3[a]	4.6[c]
Centric 40WG	2.00	17.5[a]	0.0[b]	1.3[b]	1.3[b]	5.0[a]	10.0[a]	2.5[a]	7.5[a]	3.9[c]
Intruder 70WP	0.60	22.5[a]	8.8[b]	6.3[b]	1.3[b]	12.5[a]	10.0[a]	10.0[a]	21.3[a]	10.0[b]
Intruder 70WP	1.10	18.8[a]	1.3[b]	8.8[b]	0.0[b]	6.3[a]	7.5[a]	1.3[a]	12.5[a]	5.4[c]
Orthene 97 Pel	4.00	21.3[a]	7.5[b]	13.8[b]	1.3[b]	10.0[a]	11.3[a]	16.3[a]	20.3[a]	12.3[b]
Centric 40WG + Orthene 97 Pel	1.25 + 2.00	20.0[a]	0.0[b]	2.5[b]	1.3[b]	7.5[a]	7.5[a]	1.3[a]	13.8[a]	4.8[c]
Nontreated		18.8[a]	26.3[a]	31.3[a]	32.5[a]	11.3[a]	5.0[a]	17.5[a]	18.8[a]	20.4[a]
LSD (P = 0.05)		NS	9.88	13.97	15.04	NS	7.98	NS	NS	4.58
P > F		.9390	.0003	.0034	.0021	.8085	.2947	.0819	.0779	.0001

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

[1/] Treatments were applied on 5/16, 5/22, and 6/4.

Table 3. Effect of various rates of insecticides on fleahopper **nymphs and adults**, Texas Agricultural Experiment Station, Nueces County, TX, 2007.

Treatment[1/]	Rate oz/acre	Number/100 plant terminals								Post-treat averages
		Pretreat	3 DAT-1	6 DAT-1	2 DAT-2	9 DAT-2	12 DAT-2	4 DAT-3	8 DAT-3	
Centric 40WG	1.25	35.0[a]	2.5[bc]	3.8[b]	1.3[b]	8.8[b]	10.0[b]	8.8[b]	11.3[cd]	6.6[cd]
Centric 40WG	2.00	31.3[a]	0.0[c]	2.5[b]	1.3[b]	5.0[b]	12.5[b]	2.5[b]	8.8[d]	4.6[d]
Intruder 70WP	0.60	35.0[a]	15.0[b]	11.3[b]	1.3[b]	12.5[b]	36.3[b]	11.3[b]	21.3[bc]	15.5[bc]
Intruder 70WP	1.10	33.8[a]	2.5[bc]	10.0[b]	0.0[b]	7.5[b]	16.3[b]	2.5[b]	15.0[cd]	7.7[cd]
Orthene 97 Pel	4.00	32.5[a]	7.5[bc]	15.0[b]	1.3[b]	16.3[b]	32.5[b]	25.0[b]	33.8[a]	18.7[b]
Centric 40WG + Orthene 97 Pel	1.25 + 2.00	30.0[a]	1.3[bc]	3.8[b]	1.3[b]	7.5[b]	15.0[b]	1.3[b]	13.8[cd]	6.3[cd]
Nontreated		30.0[a]	38.8[a]	38.8[a]	60.0[a]	37.5[a]	105.0[a]	92.5[a]	31.3[ab]	57.7[a]
LSD (P = 0.05)		NS	13.98	15.29	9.49	17.69	26.55	25.23	11.26	9.47
P > F		.8067	.0002	.0014	.0001	.0173	.0001	.0001	.0007	.0001

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

[1/] Treatments were applied on 5/16, 5/22, and 6/4.

Table 4. Effect of fleahopper insecticide treatments on cotton plant fruiting characteristics, Texas Agricultural Experiment Station, Nueces County, TX, 2007.[2/]

		Number/plant			% fruit retention by branches		
Treatment[1/]	Rate oz/acre	squares	bolls	abscised fruit	1 - 5	6 - 10	all
Centric 40WG	1.25	18.9[a]	3.3[a]	3.9[b]	74.9[a]	94.6[a]	84.5[a]
Centric 40WG	2.00	20.6[a]	4.1[a]	4.5[b]	74.1[a]	94.4[a]	86.1[a]
Intruder 70WP	0.60	19.7[a]	2.7[a]	5.2[b]	68.1[a]	92.7[a]	81.2[a]
Intruder 70WP	1.10	19.2[a]	3.6[a]	5.6[b]	65.8[a]	93.8[a]	80.6[a]
Orthene 97 Pel	4.00	19.8[a]	3.3[a]	5.4[b]	68.9[a]	91.9[a]	77.8[a]
Centric 40WG + Orthene 97 Pel	1.25 + 2.00	19.9[a]	3.4[a]	5.9[b]	66.7[a]	91.7[a]	78.1[a]
Nontreated		13.5[b]	2.5[a]	12.4[a]	40.1[b]	66.4[b]	57.2[a]
LSD (P = 0.05)		2.79	1.32	2.88	13.66	8.54	NS
P > F		.0008	.2582	.0002	.0009	.0001	.0547

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

[1/] Treatments were applied on 5/16, 5/22, and 6/4.

[2/] Plant map during 4th week of bloom.

Table 5. Effect of fleahopper insecticide treatments on cotton fruit retention by position off main plant stem and lint production, Texas Agricultural Experiment Station, Nueces County, TX, 2007.

Treatment[1/]	Rate oz/acre	% fruit retention by position[2/] 1	2	3	4	Yield lb lint/acre	$ return over nontreated[3/]
Centric 40WG	1.25	88.4[a]	79.4[a]	85.7[a]	93.8[a]	1270[ab]	34.33
Centric 40WG	2.00	88.9[a]	77.0[a]	87.2[a]	88.9[a]	1258[ab]	18.91
Intruder 70WP	0.60	83.3[a]	71.0[a]	90.4[a]	90.2[a]	1283[ab]	42.54
Intruder 70WP	1.10	86.5[a]	69.9[a]	79.9[a]	86.2[a]	1256[ab]	18.63
Orthene 97 Pel	4.00	87.6[a]	70.9[a]	81.9[a]	79.0[a]	1185[bc]	7.69
Centric 40WG + Orthene 97 Pel	1.25 + 2.00	82.0[ab]	69.7[a]	87.8[a]	92.9[a]	1291[a]	40.60
Nontreated		75.7[b]	39.7[b]	37.4[b]	55.4[b]	1137[c]	
LSD (P = 0.05)		7.51	14.35	13.54	19.44	98.4	
P > F		.0188	.0004	.0001	.0079	.0333	

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

1/ Treatments were applied on 5/16, 5/22, and 6/4.

2/ Plant map during 4th week of bloom.

3/ Cotton value based on $0.55/lb for lint and $0.065/lb for seed using a factor of 1.56 time lint weight. Costs include Centric 40WG ($4.50/oz), Intruder 70WP ($8.00/oz), Orthene 97 Pel ($8.00/lb), and application ($2.50/acre). Harvesting/hauling/ginning cost for the extra lint above nontreated cotton was set at $0.21/lb lint.

Table 6. Effect of fleahopper control with various insecticides on cotton fiber characteristics, Texas Agricultural Experiment Station, Nueces County, TX, 2007.

Treatment[1/]	Rate oz/acre	Micronaire	Length inches	Uniformity %	Strength g/tex	Elongation %
Centric 40WG	1.25	4.7[a]	1.14[a]	83.4[a]	28.4[a]	8.2[a]
Centric 40WG	2.00	4.5[ab]	1.16[a]	83.9[a]	29.2[a]	7.9[a]
Intruder 70WP	0.60	4.4[abc]	1.16[a]	83.8[a]	29.1[a]	8.3[a]
Intruder 70WP	1.10	4.5[ab]	1.15[a]	83.3[a]	28.6[a]	8.0[a]
Orthene 97 Pel	4.00	4.3[bc]	1.17[a]	83.4[a]	28.3[a]	7.9[a]
Centric 40WG + Orthene 97 Pel	1.25 + 2.00	4.7[a]	1.16[a]	83.5[a]	28.7[a]	8.0[a]
Nontreated		4.1[c]	1.14[a]	82.8[a]	29.3[a]	7.8[a]
LSD (P = 0.05)		0.31	NS	NS	NS	NS
P > F		.0117	.3481	.7328	.8613	.1155

Means in a column followed by the same letter are not significantly different by ANOVA.
[1/] Treatments were applied on 5/16, 5/22, and 6/4.

TREATMENT TIMING FOR OPTIMUM CONTROL OF COTTON FLEAHOPPER

Texas Agricultural Experiment Station, Nueces County, 2007

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SUMMARY: Fleahopper numbers were above established treatment thresholds beginning in the first week of squaring. Three vegetative internodes were short due to cold weather so we suggested that fleahopper treatment would not be economical during the first week of squaring no matter what numbers were present. A field experiment was conducted to evaluate the consequences of the suggested delayed treatment. Fleahoppers were reduced to very low numbers following initiation of treatments for the insect. Cotton growth, fruit retention and location, final plant height, fiber micronaire, lint yield, and dollar returns were all affected by the treatments applied. Plants in the insecticide treated cotton averaged 11.5 inches less in height based on final field measurement, had significantly more squares and bolls when plant mapped during the 4th week of bloom, and produced significantly more cotton lint than the nontreated cotton. Plant mapping data at harvest revealed effects on internode length, number of main stem nodes, boll load location, and percentage boll retention at different locations on the plants. The lowest yield and dollar return among the insecticide treatments was the cotton treated 4 times beginning in the 1st week of squaring. This treatment produced a $43.16 per acre dollar return; whereas, the 3 remaining insecticide treatments averaged $86.90 per acre return over the nontreated cotton.

OBJECTIVES: The treatment timing study was conducted to determine how cotton plants would respond from the standpoint of fruiting and growth to the initiation of insecticide applications during various weeks of squaring. Another objective was to measure the impact of treatments on lint production and measure dollar return from each of the treatments compared to nontreated cotton.

MATERIALS/METHODS: Insecticide (Centric 40WG at 2.0 oz/acre) was applied to sets of plots for cotton fleahopper beginning at the end of the first week of squaring followed at about weekly intervals for 2 more weeks by initiation of treatments in previously nontreated cotton. All of these plots were also treated late in the 4th week of squaring (some blooms were present by this time). This scheme resulted in sets of plots receiving 2, 3, or 4 treatments depending upon the week treatments were initiated. Another treatment regime was based on our decision that treatment during the first week of squaring would not be economical due to short internode lengths even though fleahopper numbers were above the treatment threshold of 15/100 plant terminals. We also chose not to treat these plots during the 3rd squaring week due to low numbers of fleahoppers following the first of these treatments; therefore this experimental treatment was sprayed only during the 2nd and 4th week.

Fiber Max 835LLB2 and FM 832LL variety cotton was planted on March 27, 2007 at the Texas Agricultural Experiment Station Meaney Annex at 4 seeds/foot on 38-inch spaced rows. Fertilizer applied was 125-22-0 + 6.7 lb zinc. Weed control was maintained by applying Trilin 4 (1.0 quart/acre) in late October 2006. After planting, Cotoran 4L (1.0 quart/acre) + Dual II Magnum 7.64 lb (1.0 pint/acre) was applied. The plant growth regulator Pix was applied on June 28 (16 ounces/acre), July 12 (8 ounces/acre) and on July 26 (24 ounces/acre). Other than insecticide for fleahopper control, Bidrin 8E (8.0 ounces/acre) was applied on July 12 and August 6 for control of stink bugs, primarily *Euschistus quadrator*. This stink bug is often referred to as the little brown stink bug.

Plots were 8 rows wide by 40 feet long and treatments were replicated 4 times in a randomized complete block design. The insecticide treatments were applied to the center 4 rows in each plot (2 rows of each variety) so that an 8-row buffer of nontreated cotton was maintained between each insecticide treatment. Treatments were made with a self-propelled Spider Trac ground sprayer through 4X hollow cone nozzles (2/row) at 40 psi in a total volume of 5.7 gpa while traveling at 4 mph. The adjuvant Induce at 0.25% v/v was added to the spray mix. Treatments were applied to the various timing plots beginning May 10 (late in the 1^{st} week of squaring), May 16 (2^{nd} week of squaring), May 22 (3^{rd} week of squaring), and May 31 (4^{th} week of squaring - early bloom).

Treatments were assessed by (1) counting the number of fleahoppers on 10 plants each in the center 2 rows [20 plants/plot] on May 10 [pretreatment), May 13 [3 DAT-WK1], May 19 [3 DAT-WK2], May 22 [6 DAT-WK2], May 24 [2 DAT-WK3], May 31 [9 DAT-WK3], June 3 [3 DAT-WK4], June 8 [8 DAT-WK4], and June12 [12 DAT-WK4]; (2) conducting plant mapping on June 21 using P-Map during the 4^{th} week of bloom and again just before harvest on September 4; (3) harvesting separately the center 2 rows of each plot with a 1-row International spindle picker on September 9; (4) weighing the seed cotton and ginning samples from each plot on a 10-saw laboratory machine to determine lint percentages; and (6) submitting lint to the International Textile Center at Lubbock, Texas for fiber analysis. The software program Agriculture Research Manager (ARM revision 6.1.13) was used to conduct analysis of variance, and means were separated by LSD when P=0.05 or less.

RESULTS/DISCUSSION: Pretreatment fleahopper counts indicated an average of 15.6 nymphs (Table 1), and 15.3 adults (Table 2) for a combined total of 31.0 total fleahoppers/100 plant terminals (Table 3). First-week plots were treated the next day followed by treatments at approximately weekly intervals. Fleahoppers were subsequently maintained at very low numbers following the date of initial treatment. One treatment (treated in weeks 2 and 4) was not treated in week 3 because there were not enough fleahoppers to warrant the application for this IPM designated set of plots. Total fleahopper numbers were double or more the 15/100 plant treatment threshold generally recognized at an economically damaging population in the nontreated cotton throughout the study. This threshold appears to be appropriate under favorable growing conditions; that is, enough soil water to sustain the crop.

Post treatment averages of the total nymph and adult fleahoppers based on 8 inspection dates averaged more than 40 per 100 plant terminals in the nontreated cotton which was significantly greater numbers than in all other treatments (Table 3). Fleahopper numbers in the treatment initiated during the 3rd squaring week were also significantly greater than treatments initiated in the 1st or 2nd week; this number also exceeded the treatment threshold of 15 per 100 plant terminals.

Mapping of cotton fruit was accomplished during the 4th week of bloom (June 21) just before an extended rainy period (Tables 4-6). The number of bolls retained reflected when treatments had been made for fleahopper (Table 4 boll column). Significantly greater numbers of bolls were present where 4 treatments had been applied, but we had questions as to whether a portion of these bolls could be harvested due to 3 very short vegetative internodes. The fewest number of bolls were found in the nontreated and treatment initiated the 3rd week of squaring. Square numbers were significantly higher at this time in these same treatments. Fruit compensation with the help of 3rd week spray initiation was evident. The amount of abscised fruit reflected when and how many treatments were applied for fleahopper. Fruit retention measured by combined branch group sets (all) was not significantly different among any of the insecticide treatments, but it was statistically greater than that found in nontreated cotton. Numerically, the percentage fruit retention when only considering insecticide treated cotton was lowest where treatments were not initiated until the 3rd week of squaring.

The above results were also reflected in the % fruit retention and the number of bolls by fruiting position (Table 5). In fact, there was not a statistically significant difference between insecticide treatment initiated in the 3rd week and the nontreated for the number of bolls present on the first 3 positions off the main stem. Numerically, however, more bolls were present where insecticide had been applied beginning in the 3rd week compared with the nontreated cotton. It was surprising how close the data followed the treatment timing, and this trend was evident in almost all the data even when statistical differences were not found.

Plant measurements were conducted using P-Map procedures again on September 4 just before harvest (Tables 6 and 7). Plant height measurements both by P-Map and done in the field indicated much taller plants in the nontreated cotton with no statistical differences for the insecticide treated cotton. Average internodes were significantly longer in nontreated cotton and numerically shortest where 4 insecticide treatments were applied beginning in week 1. Numerically, and in 2 cases statistically, more main stem nodes were found in the nontreated cotton. Numerically, the greatest number of fruiting nodes were found in the nontreated cotton. Significantly more bolls were present on the first 10 fruiting branches in all the insecticide treated cotton. Increased numbers of bolls were set in nontreated cotton on fruiting branches 11-15 with significantly higher numbers of bolls on nontreated cotton on branches 16-25. Therefore, when all bolls were summed up on plants there were no differences in the boll count, but heavier bolls and possible improvement of harvest efficiency based on boll location was evident in the lint production data (Table 8).

Effect of fleahopper insecticide treatment timing on plant height, fiber characteristics, yield and dollar return are provided in Table 8. Plant height measured in the field at harvest confirmed that earliest treated cotton had the shortest cotton plants. Even with the 48 ounces of Pix applied, the nontreated cotton averaged 11.6 inches taller than the insecticide treated cotton in the field measured plant height data (there was not as much difference as measured by P-Map).

Significantly less cotton was harvested in the nontreated plots, and numerically, where treatments were initiated during the 1st squaring week yields were lower than the other treatments. This 4-treatment regime resulted in $43.16 per acre return over the nontreated cotton; whereas, the remaining treatments averaged $86.90 per acre return. Even though it was only a numerical difference in dollar return, it was demonstrated that treatments did not need to be initiated until the 2nd week of squaring and even waiting until the 3rd week, under conditions experienced this season, would have been an acceptable choice. Possibly more could have been learned from another set of plots treated only in the 4th week of squaring.

ACKNOWLEDGMENTS: Rudy Alaniz and Clint Livingston, Farm Demonstration Assistants, are thanked for their work on all phases of this study. Special credit is given to Clint Livingston for understanding and use of the plant mapping program (P-Map). Without his expertise with this program, valuable data collection and presentation would not have been accomplished. Syngenta is thanked for supplying insecticide for conduct of this project and for other help with this study. The Texas Food and Fiber Council is thanked for funding cost of cotton fiber analysis.

Table 1. Effect of insecticide treatment timing on fleahopper **nymphs**, Texas Agricultural Experiment Station, Nueces County, TX, 2007.

	Number/100 plant terminals									
Treatments by squaring week[1/]	Pretreat	3 DAT-Wk 1	3 DAT-Wk 2	6 DAT-Wk 2	2 DAT-Wk 3	9 DAT-Wk 3	3 DAT-Wk 4	8 DAT-Wk 4	12 DAT-Wk 4	Post-treat averages
1, 2, 3, 4	12.5[a]	1.3[a]	0.0[b]	0.0[b]	0.0[b]	1.3[a]	0.0[b]	0.0[b]	0.0[b]	1.7[c]
2, 3, 4	16.3[a]	10.0[a]	1.3[b]	0.0[b]	0.0[b]	1.3[a]	0.0[b]	0.0[b]	0.0[b]	3.2[bc]
3, 4	13.8[a]	5.0[a]	36.3[a]	23.8[a]	0.0[b]	0.0[a]	0.0[b]	2.5[b]	0.0[b]	9.0[b]
2, 4	16.3[a]	5.0[a]	0.0[b]	0.0[b]	0.0[b]	2.5[a]	0.0[b]	0.0[b]	1.3[b]	2.8[bc]
Nontreated	18.8[a]	8.8[a]	42.5[a]	27.5[a]	18.8[a]	15.0[a]	47.5[a]	36.3[a]	12.5[a]	25.3[a]
LSD (P = 0.05)	NS	NS	16.18	14.62	7.10	NS	11.43	12.26	2.81	6.49
P > F	.8302	.2554	.0001	.0015	.0002	.0612	.0001	.0001	.0001	.0001

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

[1/] Week 1 was in the first week of squaring. Centric 40WG was applied at 2 oz/acre during the weeks indicated.

Table 2. Effect of insecticide treatment timing on fleahopper **adults**, Texas Agricultural Experiment Station, Nueces County, TX, 2007.

Treatments by squaring week[1/]	Number/100 plant terminals									
	Pretreat	3 DAT-Wk 1	3 DAT-Wk 2	6 DAT-Wk 2	2 DAT-Wk 3	9 DAT-Wk 3	3 DAT-Wk 4	8 DAT-Wk 4	12 DAT-Wk 4	Post-treat averages
1, 2, 3, 4	15.0[a]	0.0[b]	2.5[a]	2.5[b]	0.0[b]	21.3[a]	1.3[a]	2.5[b]	7.5[b]	5.8[c]
2, 3, 4	10.0[a]	17.5[a]	5.0[a]	2.5[b]	2.5[b]	12.5[a]	1.3[a]	2.5[b]	15.0[ab]	7.6[c]
3, 4	17.5[a]	27.5[a]	13.8[a]	21.3[a]	0.0[b]	12.5[a]	1.3[a]	7.5[ab]	8.8[b]	12.2[b]
2, 4	17.5[a]	18.8[a]	2.5[a]	0.0[b]	0.0[b]	15.0[a]	0.0[a]	5.0[b]	12.5[b]	7.9[bc]
Nontreated	16.3[a]	18.8[a]	12.5[a]	27.5[a]	10.0[a]	21.3[a]	5.0[a]	12.5[a]	27.5[a]	16.8[a]
LSD (P = 0.05)	NS	10.45	NS	12.58	5.45	NS	NS	5.97	13.34	4.44
P > F	.3335	.0015	.0660	.0010	.0069	.7880	.1099	.0167	.0444	.0011

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

[1/] Week 1 was in the first week of squaring. Centric 40WG was applied at 2 oz/acre during the weeks indicated.

Table 3. Effect of insecticide treatment timing on fleahopper **nymphs and adults**, Texas Agricultural Experiment Station, Nueces County, TX, 2007.

	Number/100 plant terminals									
Treatments by squaring week[1/]	Pretreat	3 DAT-Wk 1	3 DAT-Wk 2	6 DAT-Wk 2	2 DAT-Wk 3	9 DAT-Wk 3	3 DAT-Wk 4	8 DAT-Wk 4	12 DAT-Wk 4	Post-treat averages
1, 2, 3, 4	27.5[a]	1.3[b]	2.5[b]	2.5[b]	0.0[b]	22.5[a]	1.3[b]	2.5[b]	7.5[b]	7.5[c]
2, 3, 4	26.3[a]	27.5[a]	6.3[b]	2.5[b]	2.5[b]	13.8[a]	1.3[b]	2.5[b]	15.0[b]	10.8[c]
3, 4	31.3[a]	32.5[a]	50.0[a]	45.0[a]	0.0[b]	12.5[a]	1.3[b]	10.0[b]	8.8[b]	21.3[b]
2, 4	35.0[a]	23.8[a]	2.5[b]	0.0[b]	0.0[b]	17.5[a]	0.0[b]	5.0[b]	13.8[b]	10.8[c]
Nontreated	35.0[a]	27.5[a]	55.0[a]	55.0[a]	28.8[a]	36.3[a]	52.5[a]	48.8[a]	40.0[a]	42.1[a]
LSD (P = 0.05)	NS	10.69	15.44	20.58	10.24	NS	10.96	11.12	13.80	7.57
P > F	.5244	.0003	.0001	.0001	.0002	.3162	.0001	.0001	.0015	.0001

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

[1/] Week 1 was in the first week of squaring. Centric 40WG was applied at 2 oz/acre during the weeks indicated.

Table 4. Effect of fleahopper insecticide treatment timing on cotton plant fruiting characteristics, Texas Agricultural Experiment Station, Nueces County, TX, 2007. **Plant map during 4th week of bloom (June 21).**

Treatments by squaring week[1/]	Number/plant			% fruit retention by branch groups			
	squares	bolls	abscised fruit	1-5	6-10	11-15	all
1, 2, 3, 4	18.2[b]	10.7[a]	8.2[d]	65.7[a]	82.9[a]	89.7[a]	79.7[a]
2, 3, 4	19.6[b]	8.1[b]	10.2[cd]	56.3[ab]	82.7[a]	91.6[a]	73.8[a]
3, 4	22.6[a]	4.8[c]	12.6[b]	45.5[b]	79.2[a]	90.5[a]	70.2[a]
2, 4	19.6[b]	7.6[b]	11.4[bc]	56.5[a]	75.8[a]	88.4[a]	76.0[a]
Nontreated	13.7[c]	3.5[c]	19.9[a]	29.7[c]	46.3[b]	73.3[b]	46.1[b]
LSD (P = 0.05)	2.66	1.73	2.39	10.98	7.79	9.19	10.46
P > F	.0002	.0001	.0001	.0001	.0001	.0051	.0001

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

[1/] Week 1 was in the first week of squaring. Centric 40WG was applied at 2 oz/acre during the weeks indicated.

Table 5. Effect of fleahopper insecticide treatment timing on cotton plant fruit retention by position off the main stem, Texas Agricultural Experiment Station, Nueces County, TX, 2007. **Plant map during 4th week of bloom (June 21).**

Treatments by squaring week[1/]	% fruit retention by position				Number bolls/plant by position		
	1	2	3	4	1	2	3
1, 2, 3, 4	86.7[a]	77.1[a]	68.7[a]	55.7[a]	6.4[a]	3.3[a]	0.9[a]
2, 3, 4	79.5[ab]	68.4[ab]	75.8[a]	67.4[a]	5.1[b]	2.2[b]	0.8[a]
3, 4	70.5[c]	61.7[b]	71.9[a]	74.9[a]	3.7[c]	0.7[c]	0.4[bc]
2, 4	78.2[b]	66.1[b]	67.7[a]	63.6[a]	5.0[b]	1.9[b]	0.6[ab]
Nontreated	61.0[d]	33.0[c]	34.4[b]	54.5[a]	2.9[c]	0.5[c]	0.1[c]
LSD (P = 0.05)	7.46	9.40	10.12	NS	1.11	0.61	0.33
P > F	.0001	.0001	.0001	.2265	.0002	.0001	.0014

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

[1/] Week 1 was in the first week of squaring. Centric 40WG was applied at 2 oz/acre during the weeks indicated.

Table 6. Effect of fleahopper insecticide treatment timing on cotton plant growth characteristics, yield, and dollar return, Texas Agricultural Experiment Station, Nueces County, TX, 2007.

	P-Map on June 21[2/]			P-Map on September 4[3/]		
Treatments by squaring week[1/]	Internode length (in.)	Plant height (in.)	NAWB[4/]	Internode length (in.)	Plant height (in.)	No. main stem nodes
1, 2, 3, 4	1.6[a]	34.4[b]	6.4[b]	1.41[c]	42.0[b]	29.7[ab]
2, 3, 4	1.7[a]	37.0[ab]	6.1[b]	1.48[bc]	44.1[b]	29.9[ab]
3, 4	1.7[a]	38.5[a]	6.5[b]	1.52[b]	44.8[b]	29.5[b]
2, 4	1.7[a]	37.1[a]	7.0[b]	1.47[bc]	42.5[b]	29.0[b]
Nontreated	1.7[a]	38.2[a]	8.3[a]	1.68[a]	51.6[a]	30.8[a]
LSD (P = 0.05)	NS	2.7	0.97	.069	3.06	1.09
P > F	.3138	.0477	.0034	.0001	.0001	.0474

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

1/ Week 1 was in the first week of squaring. Centric 40WG was applied at 2 oz/acre during the weeks indicated.

2/ Plant map during 4th week of bloom (June 21).

3/ Plant map just before harvest.

4/ NAWB = nodes above white bloom

Table 7. Influence of fleahopper treatments on cotton boll production and location on plants at harvest, Texas Agricultural Experiment Station, Nueces County, TX, 2007. **Plant map just before harvest (September 4).**

Treatments by squaring week[1/]	Bolls/plant	No. bolls by branch groups					% boll retention by branch groups				
		1-5	6-10	11-15	16-20	21-25	1-5	6-10	11-15	16-20	21-25
1, 2, 3, 4	10.9[a]	5.3[a]	4.1[a]	1.2[c]	0.2[b]	0.0[b]	38.0[a]	29.6[b]	10.2[c]	2.1[b]	0.5[b]
2, 3, 4	10.9[a]	3.9[b]	4.7[a]	1.9[bc]	0.4[b]	0.0[b]	28.4[bc]	34.6[a]	15.9[bc]	4.6[b]	0.4[b]
3, 4	10.9[a]	3.1[bc]	4.4[a]	2.7[ab]	0.6[b]	0.1[b]	23.2[c]	30.3[ab]	23.5[a]	7.4[b]	2.1[b]
2, 4	11.1[a]	4.0[b]	4.3[a]	2.3[ab]	0.4[b]	0.0[b]	30.9[ab]	30.1[ab]	19.7[ab]	5.7[b]	0.7[b]
Nontreated	11.0[a]	2.8[c]	2.5[b]	3.1[a]	1.9[a]	0.6[a]	21.7[c]	16.8[c]	21.6[ab]	17.0[a]	9.9[a]
LSD (P = 0.05)	NS	1.06	0.74	0.91	0.98	0.30	7.12	5.02	6.34	8.95	5.71
P > F	.9963	.0021	.0003	.0057	.0152	.0036	.0022	.0001	.0049	.0303	.0155

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

[1/] Week 1 was in the first week of squaring. Centric 40WG was applied at 2 oz/acre during the weeks indicated.

Table 8. Effect of fleahopper insecticide treatment timing on cotton plant growth characteristics, yield, and dollar return, Texas Agricultural Experiment Station, Nueces County, TX, 2007.

Treatments by squaring week[1/]	Plant height @ harvest	Mic	Length inches	Unif %	Strength g/tex	Elong %	Yield lb lint/acre	$ return over nontreated[2/]
1, 2, 3, 4	44.0[b]	4.8[a]	1.22[a]	84.2[a]	31.3[a]	6.5[a]	1446[a]	43.16
2, 3, 4	46.9[b]	4.8[a]	1.21[a]	84.2[a]	30.9[a]	6.5[a]	1523[a]	88.65
3, 4	46.8[b]	4.7[a]	1.22[a]	83.6[a]	31.7[a]	6.3[a]	1489[a]	85.14
2, 4	45.2[b]	4.8[a]	1.22[a]	84.0[a]	30.9[a]	6.4[a]	1493[a]	86.91
Nontreated	57.3[a]	4.6[b]	1.24[a]	84.1[a]	32.7[a]	6.3[a]	1244[b]	
LSD (P = 0.05)	3.97	0.17	NS	NS	NS	NS	165.1	
P > F	.0001	.0172	.2493	.6962	.4567	.3138	.0204	

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

[1/] Week 1 was in the first week of squaring. Centric 40WG was applied at 2 oz/acre during the weeks indicated.

[2/] Cotton value based on $0.55/lb for lint and $0.065/lb for seed using a factor of 1.56 times lint weight. Costs include Centric 40WG ($4.50/oz) and application ($2.50/acre). Harvesting/hauling/ginning cost for the extra lint above nontreated cotton was set at $0.21/lb lint.

BOLLWORM AND TOBACCO BUDWORM PHEROMONE TRAP CATCHES

Texas Agricultural Experiment Station, Nueces County, 2007

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SUMMARY: Pheromone traps for bollworm and tobacco budworm were inspected daily for 29 weeks beginning March 16 extending through October 4 at the Texas Agricultural Experiment Station near Corpus Christi, Texas. The abundance of bollworm far exceeded that of tobacco budworm in 2007; trap catch averaged 19.7 (bollworm) and 0.39 (budworm) moths/day. Trap captures in 2007 for bollworm were about the same as 2006, but tobacco budworm trap numbers, although still low, were more than 2.5 times greater than captured in 2006.

The most valuable aspect of pheromone trap operation in the years 2004 - 2007 was for a source of bollworm moths to be tested for susceptibility to pyrethroid insecticide. Increased tolerance to pyrethroid insecticide was observed about the same time that less effectiveness was observed in cotton fields in the region. The observation increased confidence in the decision to switch to other chemistry for control of field populations of the species. Greater susceptibility to pyrethroid insecticide was observed in moths captured in 2007.

OBJECTIVES: Pheromone traps were operated to measure the relative abundance of moths attracted to the traps and to obtain a supply of bollworm moths for testing susceptibility to pyrethroid insecticide.

MATERIALS/METHODS: Two Hardstack Moth-ZV 30-inch screen wire cone traps each were deployed and equipped with pheromone for the bollworm and tobacco budworm at the Texas Agricultural Experiment Station, Corpus Christi, Texas. Traps were checked daily from early March through early October, for each of the past 4 years. Pheromone was changed at least once monthly in traps. When enough bollworm moths were captured, they were tested for susceptibility to pyrethroid insecticide.

RESULTS/DISCUSSION: The average daily pheromone trap catch each week for bollworm and tobacco budworm is shown in Fig. 1 and 2. Abundance of bollworm far exceeded that of tobacco budworm. Trap catches in 2007 averaged 19.7 and 0.39 moths/day for bollworm and tobacco budworm respectively. No observable peaks of tobacco budworm were detected. In 2007 peak bollworm moth numbers occurred in weeks 5, 8, 14, 20, and 24. These peaks were lower than any of the preceding 3 years, especially from mid-season and beyond. Cotton field infestations reflected the predominance of bollworm compared to tobacco budworm captured in the pheromone traps.

Bollworm moths were used to measure susceptibility to pyrethroid insecticide. Increased tolerance was observed in these moths at about the same time it became more difficult to obtain a high level control of bollworm in cotton fields.

ACKNOWLEDGMENTS: Thanks are extended to Rudy Alaniz and Clint Livingston, Demonstration Assistants, for his help in maintaining traps, changing pheromone, counting and testing moths.

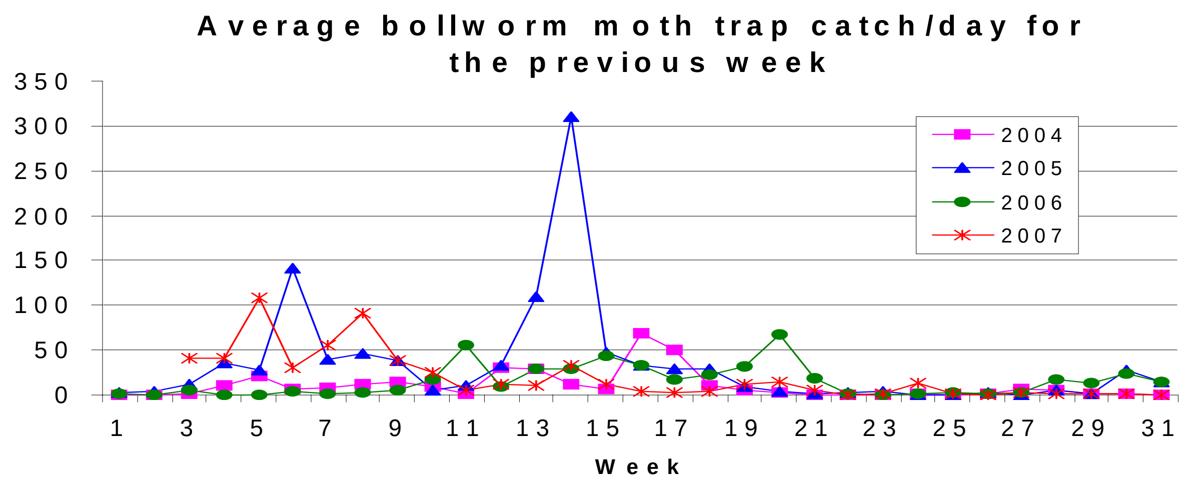

Fig. 1. Bollworm moths captured in pheromone traps, Texas Agricultural Experiment Station, Nueces County, TX. Week 1 = early March and week 29 = early October.

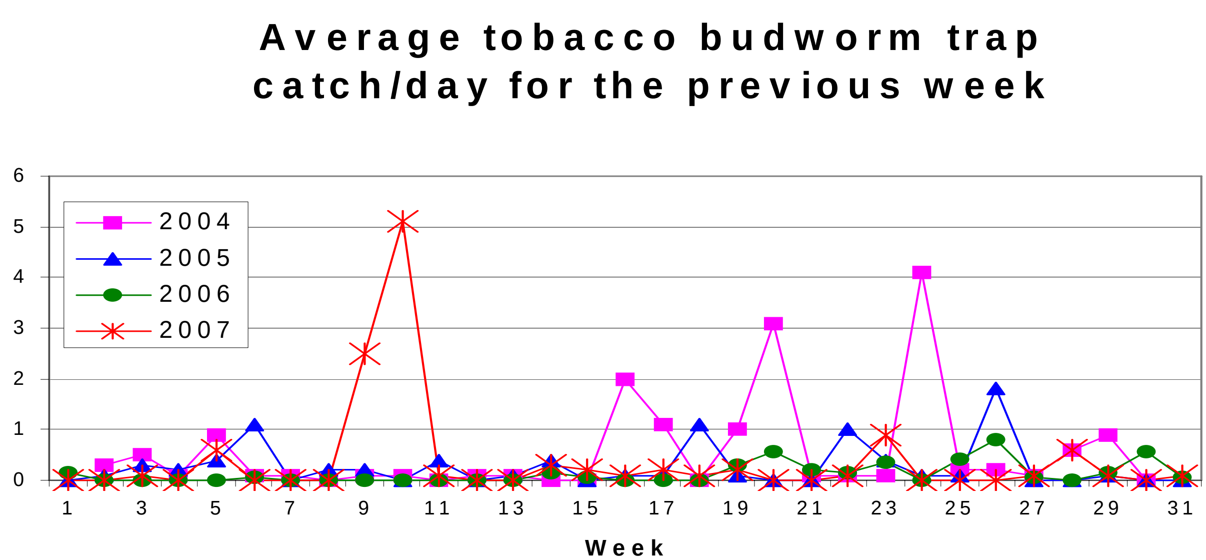

Fig. 2. Tobacco budworm moths captured in pheromone traps, Texas Agricultural Experiment Station, Nueces County, TX. Week 1 = early March and week 29 = early October.

PROBLEMS WITH MANAGEMENT OF BOLLWORM IN TEXAS COASTAL BEND COTTON FROM 2003 - 2007

Texas Agricultural Experiment Station, Nueces County, 2007

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SUMMARY: Beginning about 2003 it appeared that the bollworm (corn earworm/headworm) had became more difficult to control, especially in cotton, with pyrethroid insecticide. In 2004 we resumed testing of moths to pyrethroid insecticide using the adult vial test (AVT). This test was developed by insect toxicologists to monitor changes in susceptibility of insects to various insecticides. As a result of testing we began to recommend that only high labeled rates of the pyrethroids be used on sorghum and cotton; subsequently, it appeared that a higher level of field control was achieved.

The seasonal pattern of pyrethroid resistance in 2007 was similar to that observed in 2004 and 2005, with a very low percentage of the bollworm population exhibiting resistance in April, increasing to moderate/high levels of resistance in June followed by a rapid decrease to low resistance levels by late-summer and early fall. The intensity of pyrethroid resistance exhibited by bollworm in the Texas Lower Coastal Bend appeared to be lower than that seen in the previous 2 - 3 years, as the percentage of bollworm moth survival at the higher cypermethrin discriminatory dosages of 30 and 60 ug/vial was practically zero throughout the 2007 growing season. In addition average survival at 5 and 10 ug/vial dosages at any point during the season was generally lower than in the previous test years (2004-2006).

OBJECTIVES: AVT tests are conducted to determine change in susceptibility of bollworm to the pyrethroid class of insecticides.

MATERIALS/METHODS: During each of the crop seasons since 2004, resistance levels have been quantified by conducting the standardized bollworm adult vial test (AVT) using pheromone trap collected moths.

Moths collected early each morning from wire cone Hartstack traps baited with pheromone lures were immediately tested, or if there was a few hours delay in placing moths in vials, they were fed a 10% sugar-water solution for about one hour. One moth each was placed into insecticide coated 20 ml glass scintillation vials and held 24 hours for evaluation. For the past three years moths were exposed to cypermethrin concentrations of 0, 0.3, 1.5, 2.5, 3, 5, 10, 30, and 60 micrograms per vial. Vials were placed in a rack and held at room temperature (75-76°F) at a 45° angle with caps loosened. After 24 hours, moths in each vial were inspected and judged to be alive (able to fly), down but not dead, or dead. These data were recorded and sent to the Toxicology Laboratory, Department of Entomology, Texas A&M University, College Station, Texas for further analysis.

In 2007 a total of 1,260 moths were tested (126 moths/exposure level) over the period beginning April 2 through October 14. This number of moths was about half the number tested in 2006. Trap captures after mid-season were not adequate for more extensive testing.

RESULTS/DISCUSSION: The seasonal pattern of pyrethroid resistance in 2007 was similar to that observed in 2004 and 2005 (Fig. 1). In April very low percentages of the bollworm population exhibited resistance, but in early June it increased to moderate/high levels of resistance followed by a rapid decline to low resistance by mid-August to October. The intensity of resistance appeared to be below that experienced in previous years. Only 1 moth survived at the 30 ug/vial dose, and none survived at 60 ug/vial dose. Less pyrethroid was used on area sorghum which subsequently may have affected susceptibility to the pyrethroids in cotton. We believe pyrethroid use in sorghum affects the level of resistance in the bollworm population seen later in cotton from the offspring of caterpillars that survive treatment in sorghum. Except for 1 year (2006) the resistance levels declined after mid-July and were even lower in early-season the following year (2007). It appears that the altered genetic makeup of the resistant individuals is not favored in the environment.

ACKNOWLEDGMENTS: Appreciation is expressed to Dr. Patricia Pietrantonio and to Terry Junek, Department of Entomology, Texas A&M University, College Station, Texas for their support of this project. They provided all the materials necessary to carry out the vial study and processed the data for presentation. Dr. Pietrantonio is the leader for this project for the state of Texas.

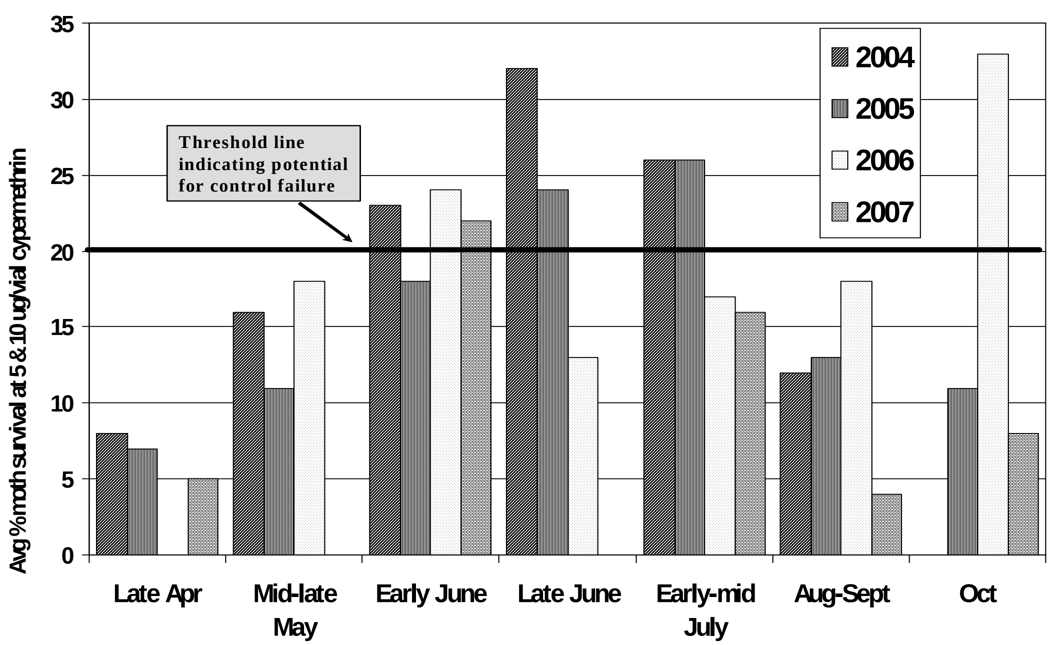

Fig. 1. Bollworm moth survival at 5 and 10 mg/vial cypermethrin in adult vial tests, in the years 2004-2007, Texas Agricultural Experiment Station, Nueces County.

EVALUATION OF PLANTING DATES FOR ALLTEX APEX VARIETY COTTON

Texas Agricultural Experiment Station, Nueces County, 2007

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SUMMARY: March through very early April cotton planting dates generally produced the highest cotton yields compared with late February and mid-April or later dates. The highest net returns were from all the March planting dates. Planting date had no effect on fiber length, uniformity, or elongation. Significant effects due to planting date were observed for micronaire and fiber strength. Except for the March 3 planting date, micronaire readings gradually declined with the later dates. Fiber strength varied throughout the season with the lowest strength recorded for the last planting date (April 23). These results were surely influenced by the unusual cool season and excessive rainfall. The season was characterized by excellent planting moisture followed by a dry period, and then excessive rainfall occurred during the months of July, August, and September.

OBJECTIVES: Cotton planting dates were evaluated to determine, the potential optimum time to have planted cotton in 2007 based on effects on yield and fiber quality.

MATERIALS/METHODS: The test was planted on the Texas Agricultural Experiment Station at Corpus Christi beginning February 28 and ending April 23. The goal was to plant every 7-10 days, but soil and weather conditions sometimes interfered with timely planting. The greatest gap was a 13-day period from March 8 to March 21. Alltex Apex B2RF variety seed was received early enough to initiate the test. The test was planted with a 4-row John Deere 6100 buster type planter on rows with 38-inch centers utilizing research cone planters to distribute 4.0 seed/foot. Treatments were 2 rows wide by 40 feet and arranged in a randomized complete block design with 4 replications. The clay loam soil had a pH of 7.8, fertilizer applied was 125-22-0 + 6.7 lb zinc/acre. Trilin 4 (1.0 qt/acre) was applied in October 2006 followed after planting with Cotoran 4L (1.0 qt/acre) + Dual II Magnum 7.64 lb (1.0 pint/acre). Centric 40 WG (2.0 ounces/acre) was applied 3 times at various dates corresponding with the fruiting period of the cotton. On July 12 and August 12, Bidrin 8E (8.0 oz/acre) was applied for stink bug.

Treatments were assessed by harvesting 1-row in each plot with an International spindle picker. Seed cotton was weighed, and a sample was taken for ginning on a 10-saw Eagle laboratory machine for lint turnout (%). The lint percentages were adjusted down by 6% to provide a closer estimate of yield if cotton was ginned commercially. Lint samples were sent to the International Textile Center at Lubbock, Texas for fiber analysis. A cotton loan valuation program (2007) developed by Larry Falconer, Extension Economist, and Jeanne Reeves, Project Manager-Cotton Incorporated, was used to calculate loan values and net returns. The software program Agriculture Research Manager (ARM revision 6.1.13) was used to conduct analysis of variance, and means were separated using LSD when P=0.05 or less.

RESULTS/DISCUSSION: Fiber characteristics for each planting date revealed statistical differences in 2 of the 5 measurements (Table 1). Micronaire readings, except for March 8, gradually declined with later planting dates. Three of the earlier planting dates had micronaire readings of 4.6 or 4.7; whereas, the remaining readings were 4.2 to 4.5. Strength readings were variable over the planting dates with some of the lower strength levels occurring in later planted cotton. Generally strength was lower than desired for all planting dates.

There were no differences in lint turnout (%) but significant differences were found in lint yield (Table 2). The March and first planting in April produced the highest yields with little difference in any of the March planting dates. No difference was found in lint loan value for any planting date, but numerically, the April 23 planting date had the lowest loan value. Significant differences in net returns generally followed what was observed in lint yield. The March planting dates had the highest net returns.

ACKNOWLEDGMENTS: Appreciation is expressed to Rudy Alaniz and Clint Livingston, Farm Demonstration Assistants, for conducting the experiment. The Texas Food and Fiber Council is thanked for funding cost of cotton fiber analysis.

Table 1. Comparison of fiber characteristics by planting dates for Alltex Apex variety cotton, Texas Agricultural Experiment Station, Nueces County, TX, 2007.

Planting date	Micronaire	Length inches	Uniformity %	Strength g/tex	Elongation %
Feb 28	4.7[a]	1.20[a]	84.3[a]	27.0[ab]	7.4[a]
Mar 8	4.3[cd]	1.22[a]	84.4[a]	28.3[a]	7.2[a]
Mar 21	4.6[ab]	1.21[a]	83.2[a]	26.0[bc]	7.3[a]
Mar 26	4.6[ab]	1.23[a]	83.8[a]	27.0[ab]	7.1[a]
Apr 2	4.5[abc]	1.20[a]	82.8[a]	26.0[bc]	7.3[a]
Apr 10	4.4[bcd]	1.22[a]	83.6[a]	27.4[ab]	7.2[a]
Apr 17	4.3[cd]	1.22[a]	83.8[a]	26.4[bc]	7.3[a]
Apr 23	4.2[d]	1.22[a]	83.5[a]	25.1[c]	7.6[a]
LSD (P = 0.05)	0.27	NS	NS	1.49	NS
P > F	.025	.5832	.4091	.0268	.0432

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

Table 2. Comparison of turnout, loan value, lint yield and net return by planting dates for Alltex Apex variety cotton, Texas Agricultural Experiment Station, Nueces County, TX, 2007.

Planting date	Lint % turnout	Yield lb lint/acre	Loan value ¢/lb	Net return $/acre
Feb 28	36.4^{a}	985^{ab}	54.15^{a}	443^{ab}
Mar 8	34.7^{a}	1139^{a}	54.15^{a}	507^{a}
Mar 21	35.3^{a}	1110^{a}	54.05^{a}	495^{a}
Mar 26	36.2^{a}	1108^{a}	54.05^{a}	497^{a}
Apr 2	35.8^{a}	1091^{a}	54.00^{a}	488^{a}
Apr 10	34.5^{a}	1002^{ab}	54.05^{a}	445^{a}
Apr 17	34.9^{a}	977^{ab}	54.05^{a}	435^{ab}
Apr 23	34.3^{d}	837^{b}	53.75^{a}	369^{b}
LSD (P = 0.05)	NS	168.0	NS	74.7
P > F	.5197	.0432	.8796	.0372

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

COMPARISON OF SELECTED COTTON VARIETIES BASED ON SEED COST IN A LARGE PLOT PLANTING

Bill and Randy Wright Farm, Nueces County, 2007

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SUMMARY: Six cotton varieties were planted in 24-row plots of sufficient size to make one module/plot with each variety replicated 3 times. Varieties were compared for level of defoliation and regrowth, fiber characteristics, lint production, and lint value net of seed cost. Generally, the FiberMax varieties had better defoliation/regrowth ratings, consistently high fiber characteristics, and higher value lint on a per pound basis than the other varieties. PHY 440W, FM 800B2R, and FM 832LL produced significantly more lint and had a higher lint value net of seed cost. The FM832 (brown bag), even though relatively low in yield, had excellent value net of seed cost. Savings that might have accrued due to more efficient weed control with the Roundup or Liberty Link systems were not taken into consideration in the study. Additionally, advantages of transgenic-Bt for caterpillar control were not considered; very few caterpillar pests were present in the study. The only insect for which insecticide was applied was the cotton fleahopper.

OBJECTIVE: Cotton varieties were compared for ease of defoliation, fiber characteristics, yield level, value of lint, and returns net of seed cost.

MATERIALS/METHODS: Six cotton varieties were planted March 23-24, 2007 on the Bill and Randy Wright Farm southeast of Robstown between County Roads 69 and 67 about 0.5 miles south of the intersection with Highway 44. An 8-row International Harvester 92 air planter distributed 4 seed/row foot (55,024/acre) in plots 24 rows wide by 4960 feet long with rows on 38-inch centers (8.654 acres/plot). Varieties were replicated 3 times in a randomized complete block design. Two insecticide treatments were applied for fleahoppers during the early fruiting period.

Treatments were assessed by (1) assigning a defoliation rating [average of 2 estimates] on August 30 where 1 = high level of defoliation with reduced regrowth up to 5 = poor defoliation and abundant regrowth, (2) harvesting entire plots with 4-row John Deere model 9965 spindle pickers on September 13 [2 plots], 15 [1 plot], and 22-24 [15 plots], (3) pulling seed cotton samples from corners of modules and ginning these samples on a 10-saw Eagle laboratory machine to obtain laboratory lint turnout [% lint] and sending samples to the International Textile Center for fiber analysis, (4) obtaining module weights and using a gin adjusted lint turnout figure to calculate lint yields, and (5) ginning each of the 18 modules at Smith Gin in Odem. Except for plots 17-19 which were harvested first followed by a rainy period, modules of the same variety were ginned together. This procedure allowed us to obtain cotton fiber characteristics from most of the bales

Table 1. Comparison of cotton varieties for defoliation effects and fiber characteristics, Bill and Randy Wright Farm, Nueces County, TX, 2007.

Variety	Defoliation rating[1/]	Mic	Length	Unif %	Strength g/tex	Elong[2/] %
DP 143B2RF	5.0[a]	4.1[c]	1.14[c]	78.9[c]	26.0c	6.8[bc]
FM 800B2R	1.7[c]	4.2[bc]	1.16[a]	82.0[a]	29.9a	6.4[c]
FM 832LL	1.4[c]	4.2[bc]	1.15[b]	81.6[b]	29.7[a]	6.5[bc]
PHY 485WRF	3.8[b]	4.5[a]	1.09[d]	82.0[a]	27.9[b]	8.0[a]
PHY 440W	2.0[c]	4.3[b]	1.10[d]	81.9[ab]	27.3[b]	7.9[a]
FM 832	1.3[c]	4.2[bc]	1.17[a]	82.1[a]	30.5[a]	6.9[b]
LSD (P=0.05)	0.70	0.19	.009	0.44	1.21	0.43
P > F	.0001	.0079	.0001	.0001	.0001	.0001

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

1/ Defoliation rating: 1 = high level of defoliation and reduced regrowth up to 5 = poor defoliation and abundant regrowth.

2/ Fiber characteristics based on averages of bales in modules excluding the first and last bale ginned in a variety sequence. Elongation: Data from International Textile Center, Lubbock, Texas. Remainder of the fiber characteristic data is from the USDA, Corpus Christi Cotton Classing Office.

Table 2. Comparison of cotton varieties for yield, lint value, and returns net of seed cost, Bill and Randy Wright Farm, Nueces County, TX, 2007.

Variety	Yield lb lint/acre	% bales with color grade 41 or better	Lint value $ lb	Lint value $ acre	Seed cost $/acre	$ lint value net of seed cost
DP 143B2RF	475[d]	0	.4627[b]	219.78	67.03	152.75
FM 800B2R	621[ab]	100	.5457[a]	338.88	51.68	287.20
FM 832LL	619[ab]	67[1/]	.5262[a]	325.72	34.51	291.21
PHY 485WRF	553[bc]	0	.4803[b]	265.60	63.39	202.21
PHY 440W	663[a]	0	.4806[b]	318.64	31.81	286.83
FM 832	540[cd]	67[1/]	.5321[a]	287.33	4.59	282.74
LSD (P=0.05)	71.2		.0303			
P > F	.0017		.0005			

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

[1/] Seed cotton was subjected to rain during harvest and tarping of modules in the 3rd replication. Color grade in all the other two modules was 41.

TREATMENT OF SHREDDED AND STANDING COTTON STALKS WITH 2,4-D AT TWO SPRAY VOLUMES

Texas Agricultural Experiment Station, Nueces County, 2007

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SUMMARY: In southern Texas fruiting cotton throughout the year can serve as food and egg laying sites for the boll weevil. Therefore, the Technical Advisory Committee for the Texas Boll Weevil Eradication Foundation unanimously approved and relayed to the Foundation Board the following statement: "Without an effective stalk destruction program in south and east Texas zones, boll weevil eradication cannot be completed." Complete kill of cotton stalks by plowing, pulling, or by other means has been difficult. Several years ago it was learned that 2,4-D could be used effectively on shredded or standing stalks to prevent regrowth and subsequent production of fruit. Questions still remained as to effectiveness of 2,4-D on shredded versus standing stalks and the total spray volumes required.

In the current study, essentially no differences were found in effectiveness of 2,4-D (1.0 quart/acre) for killing regrowing cotton plants whether they were shredded or left standing. Non-sprayed cotton in the study, whether shredded or left standing, had developed squares by the 4th week after harvest, but no fruit and very little green growth was found on 2,4-D treated cotton. One week following treatment, the 5.0 gallon/acre spray volume rate was slightly more effective than the 10 gallon/acre rate, but by the end of the 2nd week no differences in effective growth suppression could be found. Several producers do suggest, however, that a 1.5 quart/acre rate of 2,4-D be used to assure a high kill rate.

OBJECTIVES: The study was undertaken to compare the effectiveness of 2,4-D at 2 different volumes on shredded versus standing cotton stalks.

MATERIALS/METHODS: FM 9063B2F variety cotton was planted on March 26, 2007 on the Texas Agricultural Experiment at Corpus Christi. Fertilizer applied was 125-22-0 + 6.7 lb/acre zinc. The Orelia clay soil with high pH (7.9-8.1) contained less than 2.0% organic matter. Excessive rainfall in July, August, and September resulted in cotton stalks 6 to 7 feet tall. Four days following harvest appropriate plots were shredded (September 25, 2007) and 2,4-D (1.0 quart/acre) + 0.25 vv surfactant was applied to the shredded as well as non-shredded plots. The application to the shredded cotton stalks was made within an hour following the shredding operation. Treatments were replicated 4 times in a randomized complete block design. Plots were 8 rows wide on 38-inch centers by 40 feet long, and 6 rows in each plot were treated as appropriate with either 5 or 10 gallons total volume of spray mixture/acre. Nozzles (8001XR spray tips) spaced at 19-inch intervals across the boom delivered the spray volumes while traveling at 4.5 mph for the 5 gpa rate and 2.25 mph for the 10 gpa rate. The spray boom had to drag over the standing stalks even with it at maximum height.

Treatments were assessed on a weekly basis for 8 weeks following treatment for the presence of green bud and leaf growth. Stalks were also cut to determine how high up the stalk green tissue could be detected.

RESULTS/DISCUSSION: The shredding operation resulted in bark being torn for several inches down the lower stalk and splitting of the inner stem (Fig. 1). Based on earlier studies, it was found that treatment within a few hours after shredding resulted in a more effective kill of stalks; it may be due to increased uptake of 2,4-D. By 22 DAT (days after treatment) it was evident that both spray volume rates of 2,4-D (5 and 10 gpa) had successfully prevented regrowth of standing cotton stalks (Fig. 2). Only green stem tissue could be found near the ground line on a fraction of the stalks. Surprisingly, kill of standing stalks was as good as that found in shredded stalks. By 22 and 29 DAT it was evident that shredded stalks were not likely to regrow to the point of producing fruit (Fig. 3). By 15 days after the treatment date, nontreated cotton stalks of both shredded and standing stalks exhibited heavy sprouting and by 29 DAT plants in all these plots had produced many pinhead squares. To prevent potential for boll weevil feeding and reproduction the nontreated plots were plowed to kill plants following the 29 DAT evaluation. A summary of the results is given in Table 1 in which even the treated plants contained green tissue but it was evident that regrowth was not likely to occur and even if it did, production of squares was not likely. More effective kill of standing stalks was observed by the 5th week after treatment compared with the treated shredded stalks.

Based on a diesel cost of $2.75/gallon, the Mississippi State University Budget Generator (MSBG) calculated the cost of stalk pulling at $4.00/acre and stalk shredding at $8.00/acre ($12.00/acre total) for farmer owned equipment. The MSBG calculator figures the cost of application with a large, farmer owned sprayer at $1.75/acre. Custom rate for fertilizer and chemical application is listed at $4.00/acre (this figure possibly should be increased). The current cost of 2,4-D used in the test was $3.12/quart. Therefore, the cost for shredding + 2,4-D + farmer owned spraying = $12.87; cost for treating standing stalks with farmer owned sprayer + 2,4-D = $4.87; cost for applying 2,4-D with shredding = $11.12/acre.

ACKNOWLEDGMENTS: Rudy Alaniz and Clint Livingston, Farm Demonstration Assistants, are acknowledged for establishing the study.

Table 1. Summary of the results of applying 2,4-D to shredded and standing cotton stalks, Texas Agricultural Experiment Station, Nueces County, TX, 2007.

		Green tissue		
Treatment	DAT[1/]	Present	% plants	Cotton fruit
Shredded	8	Yes		No
	15	Yes		No
	22	Yes		No
	29	Yes		Yes
	36	[2/]		-
Shredded 10 gpa (2,4-D)	8	Yes		No
	15	Yes		No
	22	Yes		No
	29	Yes	(20%)	No
	36	Yes		No
Shredded 5 gpa (2,4-D)	8	Yes		No
	15	Yes		No
	22	Yes		No
	29	Yes	(20 - 60%)	No
	36	Yes		No
Standing	8	Yes		No
	15	Yes		No
	22	Yes		No
	29	Yes		Yes
	36	[2/]		-
Standing 10 gpa (2,4-D)	8	Yes		No
	15	Yes		No
	22	Yes		No
	29	No		No
	36	No		No
Standing 5 gpa (2,4-D)	8	Yes		No
	15	Yes		No
	22	Yes		No
	29	No		No
	36	No		No

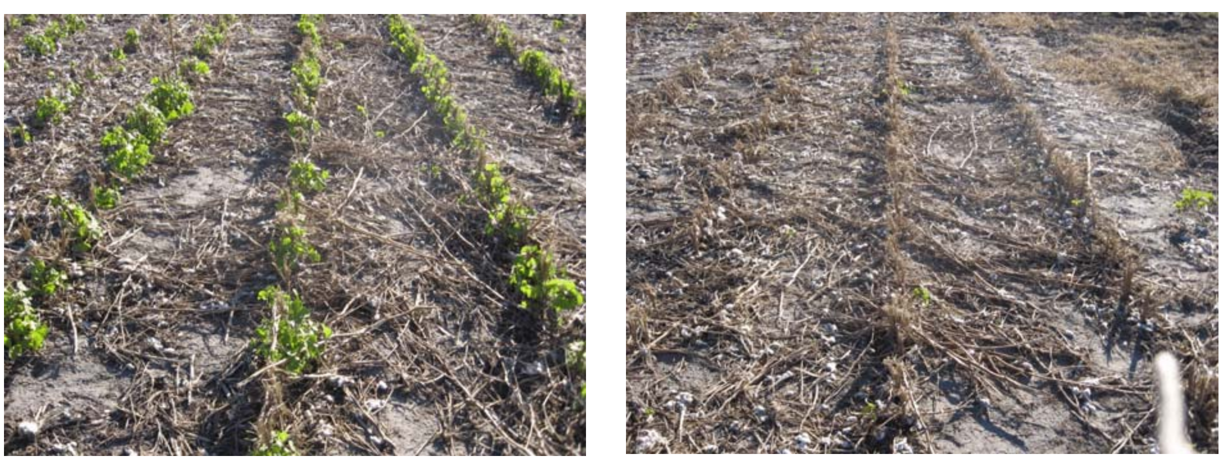
[1/] DAT = days after treatment

[2/] Plowed out after evaluation 29 DAT (days after treatment).

Fig. 1. Cotton stalks immediately after shredding showing how bark is stripped which may enhance uptake of 2,4-D.

A B C

Fig. 2. Effect of 2,4-D on standing cotton stalks 22 days after treatment. (A) no treatment, (B) 5 gpa volume, (C) 10 gpa volume.



A B

Fig. 3. Effect of 2,4-D on shredded cotton stalks 29 days after treatment (A) no treatment, (B) 5 gpa volume.

BOLL WEEVIL NUMBERS IN PHEROMONE TRAPS IN NUECES AND SAN PATRICIO COUNTIES COMPARING YEARS BEFORE AND DURING THE ERADICATION PROGRAM

Texas Cooperative Extension, Nueces and San Patricio Counties, 2007

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SUMMARY: This year marked the 10th full season of the boll weevil eradication program in the South Texas/Winter Garden Boll Weevil Eradication Zone. The original plan of elimination of the boll weevil from the region in a 6-7 year period was not achieved due to two primary reasons. First, zones to the northeast and south did not have eradication programs until recent years. Second, it is much more difficult to eradicate the boll weevil under the subtropical climate that exists here. Boll weevil resurgence was noted in several areas late in the 2007 season due to excessive rainfall in July, August, and September which interfered with trap monitoring and timely application of insecticide. The 2006 season marked the first year that Texas Cooperative Extension operated traps did not catch boll weevils for the entire year; however, a single boll weevil was captured in the line in far western Nueces County in 2007. Additionally, trap captures in the zone in 2007 were more than 10 times above that recorded in 2006 through the month of October. The only good news is that there were large numbers of fields where not a single boll weevil was captured in 2007, and continued reduction of boll weevils in the Lower Rio Grande Valley Zone should begin to be noticed in this region in the next 2 years. Currently, however, this zone must find a way to limit continued colonization and reproduction within the zone.

OBJECTIVES: Traps have been operated at the same locations since 1998 to help measure the impact of eradication on relative boll weevil population levels.

MATERIALS/METHODS: A total of 18 traps were operated at 3 locations from 1988 - 2001. Since 2002 a total of 24 traps have been in place. Traps are deployed as follows: Welder Wildlife Foundation north of Sinton (10 traps), south of Orange Grove and east of Alfred (5 traps) and west of Clarkwood (9 traps). Traps were inspected weekly and pheromone + insecticide strip were changed every other week through 2005. In 2006 traps were inspected every other week. The data used before eradication was collected by Segers et al. during a 6-year period (1977-1982).

RESULTS/DISCUSSION: Early season boll weevil numbers were actually higher in 1998, the first full season of boll weevil eradication (BWE), compared with the pre-eradication trap captures (Table 1). A series of warm winters is believed to have contributed to increased boll weevil activity just before and in the early years of BWE. The BWE program was operated as a “fall” treatment program in the South Texas/Wintergarden zone in 1996 and 1997. During the mid-season of 1999 boll weevils increased to greater numbers than 1998 for the last 5 months of the year. Favorable weather conditions, rainfall that resulted in poor stalk destruction, and relatively high thresholds for treatments all contributed to this increase. In 2000 a more aggressive treatment program was initiated; and boll weevil numbers steadily declined based on the month by month comparison until the 2004 season. In 2004, boll weevil numbers for the season averaged 8.3 times the numbers captured in pheromone traps in 2003. However, a reduction was noted for the 2005 season, and no boll weevils were captured in 2006 in the TCE traps. One boll weevil was captured in our trap line in October in 2007, but great resurgence was noted in the zone as a whole.

A summary of boll weevil numbers captured in BWE Foundation traps through October is shown in Table 2. Greater than 10 times more weevils have been captured in the zone through the month of October. Areas of most concern include Uvalde, Robstown, and Kingsville. The continued rainfall in July, August, and September and the very late cotton season all contributed to the boll weevil outbreak. Much effort will be required to bring these numbers down. Stalk destruction remains a major key as to whether the insect can be eliminated from the zone. Cotton plants must be destroyed in all locations to include ditch banks, field margins, in other crop fields, along roadsides, in pastures where gin trash is fed to livestock, and any other location where they grow.

ACKNOWLEDGMENTS: Appreciation is expressed to Dr. Charles Allen, Program Director and Wil Baucom, Zone Manager, Texas Boll Weevil Eradication Foundation, for providing some of the data for this report.

Table 1. Boll weevils per pheromone trap per month, Texas Cooperative Extension operated traps.

Month	1977-82 (6 yr avg)[a]	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Jan	5.3	0.22	0.22	9.93	0.00	.05	.00	.00	.00	.00	.00
Feb	5.5	0.27	0.00	1.60	0.00	.00	.00	.00	.04	.00	.00
Mar	7.7	3.00	0.33	1.72	0.11	.10	.00	.04	.00	.00	.00
Apr	7.4	30.94	0.00	1.27	0.11	.05	.00	.00	.04	.00	.00
May	2.8	22.00	0.00	0.83	0.17	.05	.00	.00	.00	.00	.00
Jun	4.9	5.10	0.06	0.67	0.00	.00	.00	.00	.00	.00	.00
Jul	188.9	49.50	2.06	11.33	0.35	.00	.00	00	.00	.00	.00
Aug	645.7	48.40	45.00	14.04	0.94	.17	.04	.21	.04	.00	.00
Sep	309.7	2.28	40.90	1.39	0.11	.00	.00	.08	.00	.00	.00
Oct	165.4	1.39	5.72	0.72	0.06	.00	.00	.00	.00	.00	.04
Nov	55.3	0.28	28.30	0.50	0.11	.00	.00	.00	.00	.00	-
Dec	15.7	0.22	13.67	0.03	0.00	.00	.00	.00	.00	.00	-
Average	117.9	13.60	11.40	3.67	0.16	.035	.0033	.0275	.010	.00	

[a] Traps operated by Segers et al.

Table 2. Boll weevil pheromone trap catches, year to date through October, Texas Boll Weevil Eradication Foundation.

	Year								
Location	1999	2000	2001	2002	2003	2004	2005	2006	2007
Uvalde	1.92	0.13	0.03	0.034	0.468	3.02	1.149	0.179	3.699
Robstown	1.34	1.47	0.06	0.022	0.048	0.14	0.020	0.003	0.395
Sinton	1.16	0.84	0.03	0.003	0.004	0.01	0.001	.00001	0.015
Kingsville	0.88	1.77	0.45	0.802	0.423	1.96	0.460	.089	0.393
Victoria	1.61	1.00	0.34	0.266	0.214	0.11	0.009	.002	0.002
Zone total	1.35	1.14	0.16	0.135	0.138	0.66	0.215	.042	0.776

POST-EMERGENCE CONTROL OF DEVIL'S CLAW, *PROBOSCIDES LOUISIANICA*, IN COTTON

King Ranch Farms, Kleberg County, 2007

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BACKGROUND: Devils claw was first observed in the Texas Coastal Bend as a result of custom harvesting equipment (cotton pickers) coming from the Texas High Plains. First observed in Kleberg and Nueces Counties, devils claw is now a problem weed in cotton in at least nine Lower Gulf Coast Counties (Bee, Cameron, Hidalgo, Jim Wells, Kleberg, Nueces, Refugio, San Patricio, Willacy). The seed is produced in the claws (seed pods) which contain four compartments per section. Each section contains up to 8 seed. A large devils claw plant can span an area 16 feet in diameter and can produce as many as 40-50 pods. The seed are large and the claws harden to provide a strong armor which can protects the seed for multiple years in low rainfall areas. Devils claw has been an elusive post emergence weed problem in cotton for the last 25 years. It usually requires hoe-hands to take-out the escape plants. The vines and pods are sticky and can foul and clog cotton harvesting equipment. Early season control with Staple has been the most widely used post-emergence product, but it is expensive and multiple treatments limit rotational crops. The dinitroanaline herbicides (Treflan, Prowl) are ineffective as a base treatment against devils claw, and cultivation leaves escape plants to become established within the cotton row. Devils claw continues to emerge throughout the cotton growing season, with new plants emerging with each rainfall event.

MATERIALS AND METHODS: Conventional FM 832 cotton was planted 4 April 2007 on the Laureles Division of the King Ranch in Kleberg County, Texas. Herbicides used included 3.6 pt/A Prowl applied with the fertilizer and cultivated immediately afterwards. An application of 1 lb/A diuron was made behind the planter. One in-season cultivation was made when the cotton was PHS (pinhead square).

The OT (over the top) and PDS (post directed spray) treatments were initiated on 17 May, when the cotton was still squaring. Plots were four rows x 160 feet, and were comprised of 38-inch rows. On 16 May 2007 devils claw plants were present ranging in size from the cotyledon stage to a maximum of 25 inches in diameter. Most of the larger devils claw plants were in-the-row, having been missed by the recent cultivation. Dry weather in April-May did not provide as many seedling devils claw plants as desired for the study. Colored flags were used to mark plant sizes ranging from cotyledon to 3.9 inches, 4.0 to 6.9 inches, 7.0 to 9.9 inches, 10 to 15.9 inches, and 16 inches or greater in plant diameter. This flagging (296 flags) was accomplished in all plots designated for treatment with four replicates of each plant size. In the OT studies treatments were applied in a total spray volume of 12 gpa at 25 psi through 11003 air induction nozzles at a speed of 5.25 mph. PDS treatments under hoods were applied at a spray volume of 14 gpa at 30 psi through 8002 nozzles at a speed of 4.2 mph. Treatments where drops were used had 8003XR nozzle tips at a pressure of 25 psi at a travel speed of 5.0 mph and a volume of 14 gpa.

Over-the-Top (OT) Treatments.

1. 0.15 oz/A Envoke + 0.25% v/v Induce
2. 0.20 oz/A Envoke + 0.25% v/v Induce
3. 0.25 oz/A Envoke + 0.25% v/v Induce
4. 3.2 oz/A Staple + 0.25% v/v Induce
5. 4.0 oz/A Staple + 0.25% v/v Induce
6. 5.0 oz/A Staple + 0.25% v/v Induce
7. 0.1 oz/A Envoke + 3.0 oz/A Staple + 0.25% v/v Induce

Early Season Post-Directed-Spray (PDS) Treatments.

8. 1.5 lb/A Suprend + 0.25% v/v Induce
9. 1.5 lb/A Suprend + 2.5 pt/A MSMA + 0.25% v/v Induce
10. 1.5 lb/A Suprend + 2.4 pt/A Caparol 4L + 0.25% v/v Induce

Lay-by Treatments with dolphin Redball lay-by hoods.

11. 2.0 oz/A Valor + 1 pt/A RUWM
12. 2.0 pt/A Ignite + 2.5 lb/A AMS
13. 2.0 pt/A LaybyPro + 2.5 lb/A AMS
14. 1.0 pt/A GramoxoneMax + COC
15. 1.0 oz/A Permit + COC
16. 1.0 oz/A Valor + COC

Statistical analysis was made by ARM to the 28-DAT and 22 DAT ratings only. At 13 and 18 DAT, it was too early to rate the larger devils claw plants. Product costs were obtained and were averaged from three chemical dealership in the Nueces/San Patricio County Region.

RESULTS AND DISCUSSION: OT and PDS plots were evaluated for percent control on 4 June (18 DAT) and 13 June (28 DAT). Each plant size was rated as completely dead, or its injuries were described (yellowing, stunting, suckering, top-burned-out, number of old leaves surviving). At 18 DAT some plants appeared close to death and expired prior to the 28 DAT rating. The 28-day evaluation was sufficient to determine if suckers would develop from the larger damaged devils claw plants or it they had died.

The 18-day evaluation was useful; however, in seeing which product combinations worked first in terminating devils claw. Several damaged plants still contained some signs of life (green tissue in the stem or one or more leaves remaining). All four flagged plants had to be dead to receive a 100% control rating. Almost every treatment killed one or more plants in all size ranges. The percentages less that 100% were assigned based on life signs still observed in the remaining plants. Most flags identified clusters of weeds of similar size and plant age. Usually 8-10 plants in a given plant size were used in assigning percent damage.

Control of devils claw <16 inches in plant diameter. At 28 DAT nearly all OT and PDS treatments were effective on devils claw plants up to 16 inches in diameter. Control began to decrease significantly for the larger plants (beginning at 10 to15.9 inches in weed diameter. The 0 to 3.9-inch plants were easiest to destroy. The smaller the plant; generally, the higher the percent control observed. Most of the control ratings improved with the 28 DAT ratings. Control of devils claw did not significantly improve by increasing the rates of Envoke or Staple (Tables 1 and 2). The labeled rate was observed to be sufficient and most economical to use.

Control of 16+ inch diameter plants. Envoke and Staple in combination were only slightly better than the lower labeled rates of Envoke (0.15 oz/A) and Staple (3.2 oz/A), applied individually. For plants larger than 16 inches, the best product combinations were (1) Envoke at 0.15 oz/A w/ Induce, (2) the 3.2 oz/A rate of Staple w/Induce, (3) the 5.0 oz/A rate of Staple w/Induce, and (4) Envoke at 0.1 oz/A + 3.0 oz/A Staple w/ Induce (28 DAT ratings). See Table 2. These treatments provide 87.5%, 93.8, 98.3%, and 97.8%, respectively.

For the lay-by treatments, all product combinations provided adequate control on devils claw plants up to 16 inches in diameter (Tables 3 and 4). The Ignite treatment was slightly less effective on plant sizes ranging from 10 to 15.9 inches in diameter.

The treatments providing the best results (Table 4) on larger plants were 1.0 oz/A Permit + COC (82.5%), and 2.0 oz/A Valor + 1 pt/A RUWM (73.8%), and 2.0 oz/A Ignite 280SL (87.5%). The Ignite treatment did not kill the larger devils claw plants, but blasted out the top leaving 1-2 leaves behind. Some of these plants produced suckers (new growth from the plant base) by 22 DAT and some did not. Layby Pro and Gramoxone Max provided only limited control and suckers were present at 22 DAT. The 2.0 pt/A Layby Pro + 2.5 lbs AMS (41.3%) was not significantly different from the other treatments, but the 1.0 pt/A Gramoxone Max + COC (27.0%) was significantly less. Only these four aforementioned lay-by treatments appear to be effective and economical in making a final chemical application to prevent devils claw from producing seed. Those new devils claw plants being produced throughout the cotton growing season after the last cultivation or chemical application made by the producer, can be eliminated through cotton stalk destruction (shredding and two 2,4-D applications). These are adequate measures to destroy devils claw plants prior to seed production.

WARNING: Weather conditions and soil moisture were very favorable for growth of devil's claw plants in this study and may have resulted in improved activity of herbicides which otherwise would not be expected to provide the levels of control obtained here. For example, Envoke in a dozen studies at 0.15 oz/A achieved from 0-87% control with the majority of studies providing control in the range of 30-50%. In the previous studies increased rates of Envoke did slightly improve control.

CONCLUSIONS:

1. The 0.15 oz/A rate of Envoke (OT) was superior (control and price) to 0.2 and 0.25 oz/A rates of Envoke applied OT. No significant advantages were observed by increasing product rate.
2. Rates of 4.0 and 5.0 oz/A Staple did not provide better control than the 3.2 oz/A rate except

on 16+ inch devils claw plants. The lower and medium rate of Staple took longer to damage the medium size devils claw, but at 28 DAT differences in control were insignificant.

3. The highest rate of control of 16+ inch devils claw was obtained with the highest rate of Staple (5.0 oz/A + Induce) and the 0.1 oz/A Envoke + 3.0 oz/A Staple combination, which was very expensive.
4. Of the post-directed spray treatments, the 1.5 lb/A rate of Suprend + 2.4 pt/A Caparol was the best of three treatments, providing full control of devils claw up to 15.9 inches in diameter, but all PDS sprays were ineffective (<50% control) thereafter.
5. Suprend at 1.5 lb/A applied post directed, had almost no effect on 16+ inch devils claw.
6. Suprend at the 1.5 lb/A rate + 2.5 pt/A MSMA yellowed 16+ inch devils claw, but did not keep it from flowering and producing seed pods.
7. Suprend at the 1.5 lb/A rate + 2.4 pt/A Caparol blasted the growing points from the 16+ inch devils claw, but the plants put out suckers and were flowering at 28 DAT.
8. Envoke and/or Staple combinations blast the terminals of the 16+ inch devils claw, but the damaged plants produced suckers which flowered later. Usually, two fully expanded lower leaves did not die and these sustained growth of many 10 to 16- inch devils claw plants.
9. All lay-by treatments with hoods were successful up to the 16-inch diameter plants. The larger plants were controlled well with the 1.0 oz/A Permit + COC (82.5%) and the 2.0 pt/A Ignite 280 + 2.5 lb/A AMS (87.5%) . Moderate control was provided with the 2.0 oz/A Valor + 1 pt/A RUWM (73.8%) treatment and with 1.0 oz/A Valor + COC (66.3%). Nothing worked "excellent" (>85%) on 16+ inch devils claw plants of the lay-by treatments evaluated.
10. To prevent seed production, it is imperative to treat devils claw plants before they are 16 inches in diameter.

FUTURE WORK: Staple LX has a limitation of 5.1 fl OZ/A per growing season for continuous cotton and 3.2 fl OZ/A per application. Limits are lower in drier regions of Texas. While it is effective to employ Staple LX in an application as long as you can move application equipment through the cotton, it is limited in cost. To keep the cost and rotational restrictions low and to mix chemistry to avoid weed resistance, tank mixes become important. Staple cannot be applied with Dual Mag. The use of Cotoran with Staple pre-emergence, and Staple with MSMA or DSMA post-emergent was not investigated.

Envoke is limited to 0.4 OZ/A per growing season and cannot be applied with other herbicides or fertilizer. Further, it antagonizes the use of graminicides when tankmixed, and these must be applied 7 days later in their own application event. Envoke does not interfere with glyphosate as an OT herbicide treatment for grasses in RR or Flex cotton systems.

The current study did not employ transgenic cotton, because so much FM 832 cotton is currently grown in Kleberg, Nueces and San Patricio Counties. The effectiveness of Ignite 280 and RUWM, in combination with other herbicides, performed well in the lay-by treatments up to and including 16-inch+ devils claw. A similar study using a transgenic cotton and employing the Flex and Ignite systems would provide additional information where these cotton varieties are grown in areas with significant devils claw populations.

CREDITS: The following individuals are recognized for exceptional help in conducting this study:

1. Credit is extended to Knox Trammell, King Ranch Farms, for helping to select an excellent location to study devils claw in conventional cotton. Without such a strong population of target weeds, this study would not have been possible.

2. Credit for site preparation, mixing and application of products with spray equipment is extended to Rudy Alaniz, Farm Demonstration Aid, and Clint Livingston, Technician II, both of Texas Cooperative Extension at the TAMU Corpus Christi Research and Extension Center.
3. Credit is also extended to Cotton Incorporated and the Project Review Committee for selecting this project for 2007. Thank you for your on-going support to cotton growers everywhere.

Table 1. Percent control at 18 DAT of Devil's Claw, *Proboscidea louisianica*, in FM 832 cotton using seven OT herbicide combinations and three combinations applied with drop-nozzles to five plant sizes, Texas Cooperative Extension, Laureles Division of King Ranch Farms, Kleberg County, Texas, 2007.

Treatment[1,2]	Diameter of Devils Claw in Inches					Product[3]
	0-3.9	4.0-6.9	7.0-9.9	10.0-15.9	16.0+	($)
0.15 oz/A Envoke	95.0[a]	97.5[a]	98.8[a]	97.5[a]	85.0[a]	11.70
0.2 oz/A Envoke	100.0[a]	85.0[a]	100.0[a]	77.5[ab]	47.5[ab]	15.60
0.25 oz/A Envoke	92.5[a]	77.5[a]	87.5[a]	55.0[b]	62.5[ab]	19.50
3.2 oz/A Staple	100.0[a]	100.0[a]	93.8[a]	100.0[a]	66.3[ab]	20.74
4.0 oz/A Staple[4]	98.8[a]	93.8[a]	97.5[a]	97.5[a]	83.8[a]	25.92
5.0 oz/A Staple[4]	100.0[a]	100.0[a]	100.0[a]	98.8[a]	93.8[a]	32.40
0.1 oz/A Envoke + 3.0 oz/A Staple	95.0[a]	88.8[a]	80.0[a]	100.0[a]	81.3[a]	27.24
1.5 lb/A Suprend	100.0[a]	93.8[a]	76.3[a]	30.0[c]	32.5[ab]	14.85
1.5 lb/A Suprend + 2.5 pt MSMA	100.0[a]	75.0[a]	75.0[a]	100.0[a]	15.0[b]	21.50
1.5 lb/A Suprend + 2.4 pt/A Caparol	100.0[a]	100.0[a]	87.5[a]	100.0[a]	45.0[ab]	18.90

[1] All treatments included 0.25% v/v Induce as surfactant.
[2] Treatments including Suprend were applied as directed sprays using drop nozzles.
[3] Cost of product only. Does not include application or surfactant.
[4] 4.0 fl oz/A and 5.0 fl oz/A are outside of DuPont's labeled rates. No more than 3.8 fl oz/A is recommended in any single application and not greater than 5.1 fl oz/A in a growing season.

WARNING: Weather conditions and soil moisture were very favorable for growth of devil's claw plants in this study and may have resulted in improved activity of herbicides which otherwise would not be expected to provide the levels of control obtained here. For example, Envoke in a dozen studies at 0.15 oz/A achieved from 0-87% control with the majority of studies providing control in the range of 30-50%. In the previous studies increased rates of Envoke did slightly improve control.

Table 2. Percent control at 28 DAT, of Devil's Claw, *Proboscidia louisianica*, using seven OT and three post-directed-spray herbicide combinations in FM 832 cotton to five plant sizes, Texas Cooperative Extension, Laureles Division of King Ranch Farms, Kleberg County, Texas, 2007.

Treatment[1,2]	Diameter of Devil's Claw in Inches					Product[3]
	0-3.9	4.0-6.9	7.0-9.9	10.0-15.9	16.0+	($)
0.15 oz/A Envoke	95.8[a]	100.0[a]	100.0[a]	100.0[a]	87.5[a]	11.70
0.2 oz/A Envoke	100.0[a]	98.0[a]	100.0[a]	77.5[a]	51.3[ab]	15.60
0.25 oz/A Envoke	100.0[a]	77.0[a]	94.5[a]	48.8[b]	66.3[ab]	19.50
3.2 oz/A Staple LX	100.0[a]	100.0[a]	100.0[a]	100.0[a]	93.8[a]	20.74
4.0 oz/A Staple LX[4]	98.8[a]	100.0[a]	100.0[a]	100.0[a]	82.5[a]	25.92
5.0 oz/A Staple LX[4]	100.0[a]	100.0[a]	100.0[a]	98.8[a]	98.3[a]	32.40
0.1 oz/A Envoke + 3.0 oz/A Staple LX	100.0[a]	100.0[a]	98.8[a]	100.0[a]	97.8[a]	27.24
1.5 lb/A Suprend	100.0[a]	86.3[a]	76.3[a]	30.0[b]	5.0[c]	14.85
1.5 lb/A Suprend + 2.5 pt MSMA	100.0[a]	75.0[a]	77.5[a]	100.0[a]	18.8[bc]	21.50
1.5 lb/A Suprend + 2.4 pt/A Caparol	100.0[a]	100.0[a]	87.5[a]	100.0[a]	60.0[ab]	18.90

[1] All treatments included 0.25% v/v Induce as surfactant.

[2] Treatments including Suprend were applied as directed sprays using drop nozzles.

[3] Cost of product only. Does not include application or surfactant.

[4] 4.0 fl oz/A and 5.0 fl oz/A are outside of DuPont's labeled rates. No more than 3.8 fl oz/A is recommended in any single application and NGT 5.1 fl oz/A in a growing season.

WARNING: Weather conditions and soil moisture were very favorable for growth of devil's claw plants in this study and may have resulted in improved activity of herbicides which otherwise would not be expected to provide the levels of control obtained here. For example, Envoke in a dozen studies at 0.15 oz/A achieved from 0-87% control with the majority of studies providing control in the range of 30-50%. In the previous studies increased rates of Envoke did slightly improve control.

Table 3. Percent control at 13 DAT of Devil's Claw, *Proboscides louisianica*, in FM 832 cotton, using six lay-by treatments applied with dolphin Redball hoods in cotton at four plant sizes, Texas Cooperative Extension, Laureles Division of King Ranch Farms, Kleberg County, Texas, 2007.

Treatment	Diameter of Devil's Claw in Inches				Product[1]
	0-5.9	6.0-9.9	10.0-15.9	16.0+	($)
2.0 oz/A Valor + 1 pt/A RUWM	90.0	100.0	80.0	TB[2] ST[2]	14.75[3]
2.0 pt/A Ignite 280 + 2.5 lb/A AMS	90.0	85.0	65.0	TB, ST	13.75[3]
2.0 pt/A LaybyPro + 2.5 lb/A AMS	100.0	100.0	85.0	TB	9.00
1.0 pt.A Gramoxone Max + COC	100.0	100.0	100.0	TB	5.00
1.0 oz/A Permit + COC	95.0	100.0	95.0	TB	16.00
1.0 oz/A Valor + COC	95.0	70.0	95.0	TB	8.50

1 Cost of bulk product only. Does not include application.

2 TB = Top blasted-out; ST = Stunting

3 Both RUWM and Ignite 280 contain their own surfactant. Must add surfactant cost (COC and AMS) to the other four treatments to accurately compare chemical input costs.

Table 4. Percent control at 22 DAT of Devil's Claw, *Proboscides louisianica*, in FM 832 cotton, using six lay-by treatments applied with dolphin Redball hoods in cotton to four plant sizes, Texas Cooperative Extension, Laureles Division of King Ranch Farms, Kleberg County, Texas, 2007.

Treatment	Diameter of Devil's Claw in Inches				Product[1]
	0-5.9	6.0-9.9	10.0-15.9	16.0+	($)
2.0 oz/A Valor + 1 pt/A RUWM	100.0[a]	100.0[a]	96.3[a]	73.8[ab]	14.75[2]
2.0 pt/A Ignite 280 + 2.5 lb/A AMS	98.8[a]	90.0[a]	90.0[b]	87.5[a]	13.75[2]
2.0 pt/A LaybyPro + 2.5 lb/A AMS	100.0[a]	100.0[a]	100.0[a]	41.3[ab]	9.00
1.0 pt.A Gramoxone Max + COC	100.0[a]	100.0[a]	98.8[a]	27.0[b]	5.00
1.0 oz/A Permit + COC	98.8[a]	100.0[a]	100.0[a]	82.5[a]	16.00
1.0 oz/A Valor + COC	98.8[a]	78.8[a]	98.8[a]	66.3[ab]	8.50

1 Cost of product only. Does not include application or adjuvant/surfactant.

2 Both RUWM and Ignite 280 contain their own surfactant. User of this table must add surfactant costs (COC and AMS) to the other four treatments to accurately compare chemical input costs.

WARNING: Weather conditions and soil moisture were very favorable for growth of devil's claw plants in this study and may have resulted in improved activity of herbicides which otherwise would not be expected to provide the levels of control obtained here. For example, Envoke in a dozen studies at 0.15 oz/A achieved from 0-87% control with the majority of studies providing control in the range of 30-50%. In the previous studies increased rates of Envoke did slightly improve control.

Crop Hybrid/Variety Comparisons

Table 1. Bloom dates, percent moisture at harvest and seed yields observed with nine **canola** hybrids, Texas Cooperative Extension, Texas A&M Research and Extension Center, Nueces County, Texas, 2007.

Company	Hybrid	Bloom date (full)	Moisture (%)	Lodging (%)	Oil (%)	Yield[1] (lbs/ac)
Cargill	03H631	3/10	13.0	0	43.8[a]	1927.6[a]
Cargill	03H252	3/11	13.1	0	41.6[a]	1767.6[ab]
Cargill	06H992	3/7	12.9	0	43.3[a]	1644.0[ab]
Hyola	357mag	3/5	12.9	0	41.6[a]	1617.2[ab]
Cargill	06H991	3/9	13.4	0	42.0[a]	1585.3[ab]
Cargill	06H990	3/11	13.3	0	42.4[a]	1567.8[ab]
DeKalb	52-10	3/25	14.3	11.7	39.6[a]	1412.5[b]
DeKalb	38-25	3/30	15.0	12.7	40.9[a]	1388.8[b]
IS	7145	3/25	15.1	66.6	41.6[a]	1343.6[b]
Average			13.7	10.1	41.9	1583.8

[1] Yield per acre is reported in pounds per acre adjusted to 10% moisture. Test was replicated 3X in a RCB.

Planting date:	6 November 2006
Emergence date:	13 December 2006
Fertility	135-0-0
Herbicide:	None
Row Width:	8 inches
Plot Size:	16' x 30'
Soil Type:	Orelia silty clay
Planting rate:	12 plants/feet^2
Harvest date:	30 April and 7 May 2007

Table 2. Evaluation of seven oilseed **sunflower** hybrids, Texas Cooperative Extension, Texas A&M Research and Extension Center, Nueces County, Texas, 2007.

Company	Hybrid	Bloom Date	Population (1000s/A)	Ave Moisture[1] (%)	Yield[2,3] (lbs/A)
Croplan	343 DMR HO	-	23.00	10.10	1571.2[a]
Croplan	378 DMR HO	-	13.75	9.11	1503.1[a]
Triumph	660 Clearfield	-	19.75	10.07	1443.1[a]
Triumph	645	-	21.75	8.09	1393.9[a]
Triumph	672 SS	-	15.75	12.29	1266.3[ab]
Croplan	385 NS	-	18.00	9.07	1101.9[ab]
Triumph	678 SS	-	12.25	13.61	921.5[b]
Average			17.75	10.33	1314.4

[1] Low seed moisture is an indication of the earliness of the hybrid grown.

[2] Sunflower yields adjusted to 9 percent moisture for safe storage.
Plots arranged in RCB with 4 replications. Data analyzed using ARM: LSD 471.0 lbs, SD 210.30 and CV 16.0

[3] Percent oil and protein not assessed

NOTE: DMR = Downey Mildew Resistant
SS = Short Stature
NS = NuSun (Approved oil list for use by FritoLay)
HO = High Oleic Oil

Planting date: 28 February 2007
Planting Rate: 20,634 plt/A
Emergence date: 9 March 2007
Fertility: 75-0-0 + 6 Zn
Herbicide: None
Row Width: 38 inches
Plot Size: 16' x 35'
Soil Type: Orelia silty-clay
Rainfall: March-June = 8.31 inches
Harvest Date: 19 June 2007

Table 3. **Corn** yield performance factors for eleven hybrids, Texas Cooperative Extension, Texas A & M Research and Extension Center, Nueces County, Texas, 2007.

Company	Hybrid	Plants (1000's/A)	Moisture (%)[1/]	Bu. wt. lb/bu	Yield bu/A
BH Genetics	BH8717	23.5[a]	14.0[bc]	57.1[d]	127.8[a]
Asgrow	RX940	23.3[a]	14.1[bc]	60.3[a]	126.8[a]
Golden Acres	2989	22.0[a]	14.2[bc]	59.0[b]	125.1[a]
Croplan	851TS	27.0[a]	13.9[bc]	57.6[cd]	125.1[a]
Garst	8377	25.0[a]	13.8[c]	57.8[cd]	123.6[a]
DeKalb	DKC66-80	26.3[a]	13.8[bc]	57.8[cd]	122.2[a]
NC+	6125	21.3[a]	14.4[ab]	58.8[b]	120.0[a]
DeKalb	DK69-71	23.3[a]	14.7[a]	60.0[a]	118.4[a]
BH Genetics	8895+	19.5[a]	14.0[bc]	58.0[c]	110.2[a]
Integra Seeds	9674	22.8[a]	13.7[c]	56.4[e]	108.5[a]
Triumph	TRI802	21.0[a]	13.2[d]	56.1[e]	93.6[a]
LSD (P=0.05)		5.35	0.53	0.69	22.83
P>F		.1935	.0005	.0001	.1232

Means in a column followed by the same letter are not significantly different by ANOVA.
[1/] Mean separation is correct, rounding resulted in numbers with different letters.

Planting date: 28 February 2007
Planting rate: 24,000/A
Emergence date: 7 March 2007
Row width; 38-inches
Plot size: 16' x 35'
Fertilizer: 73-13-0 + 6 Zn
Herbicide: 1 qt/A atrazine
Soil type: Orelia silty clay
Previous crop: Cotton
Rainfall: February-June = 8.39 inches
Harvest date: 6 August 2007

Table 4. Grain yields and performance factors for eight **sorghum** hybrids, Texas Cooperative Extension, Texas A&M Research and Extension Center Meaney Farm Annex, Nueces County, Texas, 2007.

Company	Hybrid	Population (1000 plt/A)	Moisture (%)	BW lbs/bu	Yield[1,2] lbs/A
Pioneer	84G62	61.8[a]	16.5[a]	55.5[b]	4850[a]
NC+	7R34	58.5[a]	16.5[a]	53.9[c]	4616[ab]
DeKalb	DKS 37-07	55.0[a]	16.4[a]	53.6[cd]	4591[ab]
BH Genetics	BH 3822	67.3[a]	16.5[a]	54.0[c]	4562[ab]
Golden Acres	GA 3545	58.5[a]	15.4[c]	51.3[e]	4460[ab]
Triumph	TR463	54.0[a]	15.8[bc]	52.4[de]	4382[abc]
Asgrow	A 571	62.0[a]	16.5[a]	57.0[a]	4237[bc]
Garst	5464	59.0[a]	16.1[ab]	52.3[de]	3916[c]
Average		59.5	16.1	53.8	4452

[1] Yield per acre is reported in pounds per acre adjusted to 14% moisture. Test was replicated 4X in a RCB design.

[2] Means followed by the same letter do not significantly differ (P=.05, LSD=500.6, CV 7.64, LSD 340.3, P > F = 0.0343)

Planting date:	6 Feb 2007
Planting rate:	60,000/A
Emergence date:	16 Feb 2007
Row width:	38 inches
Plot size:	16' x 35'
Fertilizer:	75-13-0 + 6 Zn
Herbicide:	1 qt/A atrazine
Soil type:	Orelia silty-clay/loam
Previous crop:	Cotton
Rainfall:	February-June = 8.39 inches
Harvest date	29 June 2007

Table 5. **Cotton** lint characteristics, yield, loan value, and acre value of varieties, Texas Cooperative Extension, Texas A&M Research and Extension Center, Nueces County, Texas, 2007.

Variety	Mic	Leng	Unif	Streng	Elong	Yield lb lint/A	Net loan (¢/lb)	Net return ($/acre)
DP 455 BR	4.4^{d-j}	1.15^{n-s}	82.1^{i-o}	28.1^{f-n}	6.5^{r-w}	1564^{a}	53.75	681
PHY 375 WRF	4.4^{g-n}	1.14^{o-s}	82.9^{b-n}	28.9^{b-m}	7.0^{j-o}	1547^{ab}	54.00	677
HQ 212 CT	4.7^{bcd}	1.14^{p-t}	82.5^{e-o}	29.5^{a-j}	7.1^{i-m}	1447^{abc}	54.00	625
PHY 370 WR	4.6^{b-e}	1.10^{u}	81.8^{k-o}	28.8^{b-n}	7.4^{e-h}	1427^{a-d}	53.10	604
DP 445 BR	4.5^{b-h}	1.15^{n-s}	83.1^{a-l}	28.1^{f-n}	8.0^{abc}	1420^{a-e}	54.00	622
FM 835 LLB2	4.7^{bcd}	1.21^{c-i}	82.8^{b-n}	28.5^{d-n}	6.8^{m-s}	1410^{a-f}	54.00	602
DP 174 RF	4.4^{e-k}	1.18^{h-l}	82.3^{f-o}	27.3^{k-o}	7.2^{h-k}	1408^{a-f}	53.75	615
PHY 310 R	4.6^{b-g}	1.12^{stu}	82.4^{e-o}	28.5^{d-n}	7.3^{f-i}	1395^{b-g}	53.75	602
FM 820 F	4.5^{c-i}	1.24^{a}	84.1^{ab}	30.5^{a-d}	6.4^{t-w}	1368^{c-h}	54.55	591
PHY 440 W	4.4^{f-m}	1.13^{q-t}	82.5^{d-o}	27.0^{l-o}	8.0^{ab}	1364^{c-h}	54.00	586
PHY 485 WRF	4.6^{b-g}	1.17^{j-o}	83.4^{a-i}	29.5^{a-j}	7.9^{a-d}	1340^{c-i}	54.25	575
ST 4427 B2RF	4.4^{e-l}	1.14^{p-t}	82.7^{b-n}	27.6^{i-o}	6.6^{q-w}	1318^{c-j}	54.00	570
PHY 315 RF	4.3^{i-p}	1.13^{q-t}	81.5^{no}	28.1^{f-n}	7.3^{g-j}	1305^{c-k}	53.95	566
PHY 480 WR	4.5^{c-i}	1.16^{l-q}	83.4^{a-i}	29.9^{a-h}	7.8^{a-e}	1299^{c-k}	54.25	559
FM 960 B2R	4.8^{ab}	1.21^{d-i}	83.8^{a-e}	29.5^{a-j}	5.8^{y}	1285^{d-l}	54.25	553
DP 515 BR	4.4^{d-j}	1.14^{o-s}	82.1^{h-o}	26.8^{no}	6.9^{k-q}	1283^{d-l}	53.75	551
FM 832 LL	4.5^{c-i}	1.19^{f-j}	83.0^{a-m}	30.8^{abc}	6.3^{wx}	1268^{e-l}	54.45	552
LINWOOD	4.9^{a}	1.11^{tu}	83.6^{a-g}	30.3^{a-e}	7.3^{f-i}	1267^{e-l}	54.35	554
ST 4357 B2RF	4.2^{j-q}	1.21^{a-h}	83.7^{a-f}	27.6^{i-o}	7.5^{e-h}	1264^{e-l}	54.30	546
FM 800 B2R	4.6^{b-g}	1.23^{a-d}	83.3^{a-i}	30.1^{a-f}	6.5^{s-w}	1254^{f-l}	54.25	539
AT SUMMI B2RF	4.3^{h-o}	1.13^{r-u}	83.0^{a-l}	26.8^{mno}	7.9^{a-d}	1240^{g-l}	54.20	533
CG 4020 B2RF	4.3^{g-n}	1.20^{e-j}	83.4^{a-i}	26.8^{mno}	7.3^{f-i}	1234^{h-l}	54.00	532
DP 161 B2RF	4.1^{m-q}	1.21^{a-h}	83.2^{a-k}	30.2^{a-f}	6.8^{m-s}	1220^{h-l}	54.45	530
FM 958 LL	4.5^{d-i}	1.20^{e-j}	83.3^{a-i}	30.9^{ab}	5.9^{xy}	1219^{h-l}	54.10	519
PHY 425 RF	4.5^{c-i}	1.16^{k-q}	84.1^{ab}	29.4^{a-k}	8.0^{a}	1219^{h-l}	54.45	530
ST 5327 B2RF	4.5^{d-i}	1.16^{k-p}	84.0^{abc}	29.0^{b-l}	7.3^{f-i}	1219^{h-l}	54.10	531
DP 117 B2RF	4.6^{b-g}	1.20^{e-j}	84.3^{a}	30.2^{a-f}	6.9^{k-q}	1206^{i-m}	54.35	521
AT APEX B2RF	4.2^{l-q}	1.22^{a-f}	83.3^{a-j}	26.8^{mno}	7.2^{h-l}	1190^{i-m}	54.20	513
FM 840 B2F	4.7^{abc}	1.24^{ab}	83.8^{a-e}	29.0^{b-l}	7.0^{i-n}	1188^{i-m}	54.10	511
DP 164 B2RF	4.1^{opq}	1.22^{a-g}	83.1^{a-l}	29.9^{a-g}	6.7^{n-t}	1185^{i-m}	54.45	513
FM 955 LLB2	4.8^{ab}	1.19^{g-k}	82.5^{e-o}	28.2^{e-n}	6.5^{s-w}	1179^{j-m}	53.75	495

Variety	Mic	Leng	Unif	Streng	Elong	Yield lb lint/A	Net loan (¢/lb)	Net return ($/acre)
TAMCOT 22	4.4^{g-n}	1.15^{m-r}	81.9^{j-o}	25.9^{o}	7.4^{e-h}	1175^{j-m}	53.75	502
DP 147 RF	4.2^{m-q}	1.21^{b-h}	81.6^{mno}	29.0^{b-l}	6.4^{t-w}	1170^{j-n}	53.95	501
DP 141 B2RF	4.1^{pq}	1.24^{abc}	82.6^{c-o}	29.1^{b-k}	6.9^{j-p}	1149^{k-o}	54.35	501
DP 121 RF	4.5^{b-h}	1.14^{o-s}	83.9^{a-d}	30.1^{a-f}	7.7^{b-f}	1149^{k-o}	54.20	495
DP 167 RF	4.0^{q}	1.22^{a-g}	83.0^{a-l}	29.8^{a-h}	6.6^{p-v}	1134^{l-o}	54.45	490
ST 4554 B2RF	4.4^{e-k}	1.14^{o-s}	83.0^{a-l}	28.2^{e-n}	7.9^{abc}	1133^{l-o}	54.00	490
DP 143 B2RF	4.2^{l-q}	1.23^{a-e}	81.3^{o}	28.6^{d-n}	6.3^{vw}	1132^{l-o}	53.95	484
FM 958	4.6^{b-f}	1.16^{l-q}	82.2^{g-o}	28.7^{c-n}	6.3^{vw}	1060^{m-p}	53.75	457
FM 1880 B2F	4.3^{g-n}	1.23^{a-d}	82.8^{b-n}	27.9^{g-o}	6.9^{l-r}	1052^{m-p}	54.00	453
CG 3520 B2WRF	4.4^{e-l}	1.18^{j-n}	82.3^{g-o}	25.9^{o}	7.6^{c-f}	1013^{nop}	53.75	426
AT TOP PICK	4.4^{e-l}	1.18^{i-m}	82.9^{b-m}	29.6^{a-i}	7.3^{g-j}	1010^{op}	54.25	428
FM 9058 F	4.1^{n-q}	1.20^{e-j}	81.7^{l-o}	27.5^{j-o}	6.3^{uvw}	997^{op}	53.95	427
FM 9063 B2F	4.5^{d-i}	1.21^{b-h}	82.6^{c-o}	27.8^{h-o}	6.7^{o-u}	992^{op}	54.00	422
MAROON	4.4^{f-m}	1.17^{j-n}	83.3^{a-j}	28.6^{d-n}	7.1^{i-m}	963^{p}	54.00	403
AT TITAN B2RF	4.2^{k-q}	1.21^{c-i}	83.4^{a-i}	28.4^{d-n}	7.5^{e-h}	959^{p}	54.20	405
PHY 745 WRF	4.3^{i-p}	1.16^{k-p}	83.6^{a-h}	31.4^{a}	7.6^{d-g}	598^{q}	54.75	263
LSD (P=.05)	0.23	0.029	1.41	2.13	0.35	157.6		
P > F	0.0001	0.0001	0.0002	0.0001	0.0001	0.0001		

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

Planting date: March 22, 2007
Planting rate: 61,900/acre
Row width: 38-inch
Plot size: 2 rows x 40 feet
Fertilizer: 125-22-0 + 6.7 lb zinc
Herbicide: Trilin (10/2006) and Cotoran + Dual after planting
Rainfall: February - August 10 = 27.92 inches
Harvest date: September 10, 2007 with a 1-row I. H. Spindle picker

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