AgriLIFE EXTENSION
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- 2008-

Results of Insect Control Evaluations on Corn, Sorghum, Cotton & Pastures in Texas Coastal Bend Counties

TEXAS IPM
Partners with Nature

A TRIBUTE TO THE
TEXAS PEST MANAGEMENT ASSOCIATION

Integrated Pest Management (IPM) programs were formally implemented in Texas in 1972 with Federal and State help to gain grower acceptance and use of field scouting techniques, to promote the use of economic thresholds on which to base pest control decisions, and to utilize environmentally sound techniques for management of pests (arthropods, weeds, and diseases). The Texas Pest Management Association (TPMA) developed out of a need for a partnership of agricultural producers and public institution educators to promote IPM.

The TPMA partnership includes association with Texas AgriLife Extension, Texas Department of Agriculture, Texas Farm Commodity Organizations, USDA, US EPA, and IPM Centers, nationwide. These partnerships have been the key to success of State IPM efforts in finding solutions to pest problems. The Association is the only statewide, multi-commodity producer organization in the country whose only reason to exist is to enhance the implementation of IPM. Both TPMA and Extension IPM programs at the county level are represented by IPM Steering Committees which determine priorities focused on local issues.

In recognition of their work to promote IPM in this cooperative effort, TPMA was presented the Partnership Award from Texas AgriLife Extension. For those of us in the Texas AgriLife Extension Service, we acknowledge and thank TPMA for their continued support and counsel. TPMA has enhanced our work with the agricultural producers of the Coastal Bend Extension District with programs currently headquartered in Calhoun and Wharton counties.

TPMA Texas Pest Management Association

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 AgriLife Research and Extension Center, Corpus Christi for preparation of this report.

FOREWORD

This document contains reports of applied research/demonstration projects conducted by Texas AgriLife Extension Service dealing with management of arthropod pests and production practices. Objectives of the studies were to find cost effective ways to manage pests and to improve production. 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.

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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COMPARISON OF INSECTICIDES ON CORN FOR CONTROL OF SOIL INHABITING INSECT PESTS

Royce Chudej Farm, Lavaca County, 2008

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SUMMARY: All insecticides tested reduced chinch bug numbers, southern corn rootworm damaged plants, and damage to the root system as measured by two evaluation methods. As a result plant vigor was improved as measured 29 and 36 days after planting (DAP). Severe drought conditions limited corn production to an average of 49.9 bushels/acre. Although not statistically significant, insecticide treated plots produced an average of 2.54 bushels/acre more than the non-insecticide treated corn; furthermore, the numerical higher yield occurred in all insecticide treatments except one.

OBJECTIVES: Mexican corn rootworm infestation was severe at the test location in 2007 which prompted the decision to conduct the present study at this location. The objectives were (1) to measure the impact of seed, granular, and transgenic Bt corn for effectiveness on Mexican corn rootworm, (2) to compare transgenic Bt technology of a locally grown corn hybrid to the other treatments, and (3) to evaluate treatment effects on other insects.

MATERIALS/METHODS: The field experiment was planted on March 5, 2008 on the Royce Chudej Farm north of Komensky, Texas off FM Road 1295 about 1.5 miles on County Road 250 in Lavaca County. Corn had been planted at the test site for many years. A 2-row John Deere 7100 MaxEmerge planter equipped with research cone seed boxes was used to plant 21,944 seed/acre in 4-row by 40-foot plots with rows spaced on 30-inch centers and treatments arranged in a randomized complete block design containing 4 replications of 8 treatments. Hybrid corn seed 08HYBF14MEYF was planted into the clay loam soil (43% sand, 20% silt, 37% clay) at a depth of 1.5 inches. For comparison, a Bt corn rootworm hybrid (BH9014 VT3) was included in the test. The 7.4 pH soil contained 2.56% organic matter. Fertilizer applied before planting and as a side-dress amounted to 172-50-6-2S. Glyphosate was applied for weed control. Granular Aztec 2.1G (6.7 ounces/1000 row feet) was applied in a 6-inch “T-band” to appropriate plots.

Treatments were assessed by (1) determining stand by counting the number of plants on 10-row feet on each of the two center rows in plots on 3/19 and again on 4/03, (2) examining 10 plants/plot for chinch bugs on 4/27 [not reported since few were found], (3) counting the number of southern corn rootworm damaged plants on 10-row feet on each of the center rows in plots on 4/03, (4) assigning a vigor rating where 1 = excellent growth and no damage up to 5 = severe stunting, uneven growth and yellowing of plants on 4/03 and 4/10 [29 and 36 days after planting], (5) digging, cleaning, and evaluating roots of 6 plants from the two outer rows in each plot on 5/14 for rootworm damage using the Iowa State root-rating scale and the Iowa State node-injury scale, and (6) harvesting for yield 10-row feet from each of the center two rows/plot on 7/15. Corn samples were threshed on a laboratory machine, grain moisture was determined with a Dole tester, and corn weights were adjusted to a standard at 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.

RESULTS/DISCUSSION: Plant loss was significantly greater at 29 DAP compared with counts made 14 DAP, and the difference was attributed to southern corn rootworm (Table 1). In addition, we measured southern corn rootworm damaged live plants at 4,800/acre at 29 DAP. Southern corn rootworm damage alone of this magnitude in past tests with adequate water to make a good crop has resulted in significant yield loss. Additionally, vigor ratings reflected the damage observed in the non-insecticide treated corn.

All insecticide treatments provided excellent control of southern corn rootworm. Root damage ratings may have reflected the effect of southern corn rootworm instead of Mexican corn rootworm. Even though a heavy Mexican corn rootworm infestation was present in 2007, none were observed in the current study. Lack of any Mexican corn rootworm was surprising given past experience with this insect.

Grain moisture was similar from all treatments, and there were no significant differences in the yield data (Table 2). There were, however, substantial differences in the number of ears harvested from the various treatments. The differences in ear numbers and lack of yield impact from southern corn rootworm were more likely the result of the severe drought conditions since we have observed significant reductions in yields in previous tests due to this insect at similar infestation levels. Drought stress was a primary factor over insect damage and the stand reduction in non-insecticide treated plots may have favored higher yields at the lower plant stands in the non-insecticide treated corn.

ACKNOWLEDGMENTS: We thank Mr. and Mrs. Royce Chudej for providing the test location, their assistance with data collection, and their overall interest throughout conduct of the study. Russ Perkins, Bayer CropScience, is acknowledged for providing funding for the study. Thanks are also extended to Rudy Alaniz and Clint Livingston, Demonstration Assistants, for their help in conduct of the study.

Table 1. Plant stand, plant vigor, and rootworm damage in corn treated with various seed and granular insecticide treatments and comparison with a Mexican corn rootworm Bt-transgenic hybrid, Royce Chudej Farm, Lavaca County, TX, 2008.

	Plants/acre		SCR[4/] da. plants	Vigor rating[5/]		Root da. rating	
Treatment	14 DAP [3/]	29 DAP	(1000's/A)	29 DAP	36 DAP	1-6[6/]	0-3[7/]
Nontreated	26.8[a]	21.6[a]	4.8[a]	2.3[a]	4.5[a]	2.51[a]	0.12[a]
Poncho 1250	29.4[a]	29.6[a]	0.0[b]	1.5[bc]	1.9[b]	2.10[bc]	0.07[b]
Exp. 5B	25.7[a]	25.1[a]	0.0[b]	1.8[ab]	1.9[b]	2.15[b]	0.08[b]
Exp. 7	26.5[a]	26.8[a]	0.0[b]	1.6[bc]	1.4[bc]	1.79[cd]	0.05[b]
Aztec 2.1G[1/]	27.9[a]	27.0[a]	0.0[b]	1.6[bc]	1.4[bc]	1.75[d]	0.05[b]
BH 9014 VT3[2/]	24.4[a]	25.1[a]	0.4[b]	1.2[c]	1.0[c]	2.02[bcd]	0.07[b]
LSD (P = 0.05)	NS	NS	1.09	0.48	0.80	0.317	.037
P > F	.2888	.0965	.0001	.0059	.0001	.0015	.0185

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

1/ Aztec 2.1G (6.7 oz/1000 row ft).

2/ A Bt-transgenic corn rootworm hybrid treated with Poncho 250.

3/ DAP = Days After Planting

4/ SCR = southern corn rootworm

5/ Vigor ratings range from 1 = excellent growth and no damage up to 5 = severe stunting, uneven plant growth and yellowing plants. Evaluation was made 35 days after planting.

6/ Iowa State 1 - 6 root-rating scale: 1 = no visible feeding damage, 2 = feeding scars, 3 = at least 1 root eaten to within 1.5 inches of stalk, 4 = 1 complete node of root so eaten, 5 = 2 complete nodes of roots so eaten, and 6 = 3 or more nodes of roots so eaten.

7/ Iowa State 0 - 3 node-injury scale: 0 = no feeding , 1 = 1 node of roots eaten to within 1.5 inches of the stalk, 2 = 2 nodes of roots so eaten, and 3 = 3 or more nodes of roots so eaten.

Table 2. Production in corn treated with various seed and granular insecticide treatments and comparison with a Mexican corn rootworm Bt-transgenic hybrid, Royce Chudej Farm, Lavaca County, TX, 2008.

		Yield/acre	
Treatment	Grain moisture (%)	ears (1000's)	bushel
Nontreated	12.6[a]	17.9[c]	47.8[a]
Poncho 1250	12.8[a]	22.9[a]	52.1[a]
Exp. 5B	12.8[a]	20.6[abc]	52.8[a]
Exp. 7	12.8[a]	21.7[ab]	50.3[a]
Aztec 2.1G[1/]	12.6[a]	21.0[ab]	46.9[a]
BH 9014 VT3[2/]	12.9[a]	19.6[bc]	49.6[a]
LSD (P = 0.05)	NS	2.94	NS
P > F	.2033	.0400	.2662

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

[1/] Aztec 2.1G (6.7 oz/1000 row ft).

[2/] A Bt-transgenic corn rootworm hybrid treated with Poncho 250.

EVALUATION OF INSECTICIDES IN CORN FOR EFFECTIVENESS ON SOIL DWELLING INSECT PESTS

Lawrence Hinze Farm, Lavaca County and Kainer Dairy Farm, Fayette County, 2008

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SUMMARY: The major objective at the **Kainer Farm** was to measure the impact of treatments on Mexican corn rootworm following a very heavy infestation at the site in 2007, but their numbers turned out to be very low in 2008. The root damage observed may have been caused by another insect, possibly the southern corn rootworm. Root damage ratings were greater in the nontreated corn as measured by both the node-injury scale and root rating scale The effectiveness of materials was also measured on chinch bugs. All products significantly reduced chinch bug numbers, but Aztec was generally less effective than the seed treatments included in the study (Poncho and 3 experimental chemicals). The field was harvested for silage and yield was not obtained.

The objective at the **Hinze Farm** was to measure the impact of insecticide seed treatments and the granular insecticide Aztec on chinch bugs where their numbers were relatively high especially at 35 days after planting (DAP). The high rate of Poncho 1250, Poncho 500 + Aztec, Exp. B, Exp 7, and Exp. 5A + Aztec were generally more effective in reducing chinch bug numbers compared with other treatments at 35 DAP. Southern corn rootworm damaged plants were significantly greater in the non-insecticide treated corn, but there was not a significant reduction in plant stand. The chinch bug damage did result in less plant vigor in the nontreated corn. Due to extreme drought conditions yields were low with no statistical differences, although numerically, the lowest yield was in the non-insecticide treated corn. Examination of the ear production may explain, in addition to drought conditions, why yields were so variable among the replications within the same treatment; there should not have been such variation in the number of ears/acre. Under more favorable growing conditions we would expect to see increased yield due to chinch bug control.

OBJECTIVES: Field experiments were conducted in corn to measure the effect of insecticide seed treatments and granular Aztec for control of soil dwelling insect pests such as chinch bug, southern corn rootworm, and Mexican corn rootworm.

MATERIALS/METHODS: Agriculture Research Manager (ARM revision 6.1.13) software was used to conduct analysis of variance, and means were separated by least significant difference (LSD).

Kainer Farm Test – The field experiment was planted on March 15, 2008 on the Kainer Dairy Farm in a field on Hollas Lane off Highway 155 approximately 1 mile north of Weimar, Texas. Corn had been planted at the site in previous years. A 2-row John Deere 7100 MaxEmerge planter equipped with research cone seed boxes was used to plant 21,944 seed/acre in 4-row by

40-foot plots on 38-inch centers with treatments arranged in a randomized complete block design with 4 replications of each of 8 treatments. Hybrid corn (08HYBF114MEYF) was planted into the clay loam soil (39% sand, 22% silt, 39% clay) at a depth of 1.5 inches with a soil temperature of 59° F. The 7.5 pH soil contained 2.09% organic matter. Pre-plant fertilizer applied was 12-30-30 followed by sidedress of about 70 lb/acre nitrogen. Roundup was applied for weed control. Granular Aztec 2.1G (6.7 ounces/1000 row feet) was applied in a 6-inch "T-band" in appropriate plots. Four additional plots outside the replicated test were treated with Aztec applied at 8.0 ounces/1000 row feet.

Treatments were assessed by (1) counting the number of plants on 10 row feet in the center two rows of each plot on 3/25 and 4/3 [4/3 data presented], (2) assigning a vigor rating where 1 = excellent growth and no damage up to 5 = severe stunting, uneven growth any yellowing of plants on 4/10 [26 days after planting], (3) counting the number of chinch bugs on 10 plants/plot on 4/10, and (4) digging 6 plants from the outer two rows in each plot on 5/19 to evaluate for corn rootworm damage using the Iowa State root-rating scale and the Iowa State node-injury scale. The roots were washed throughly with high pressure water to expose the insect damage.

Hinze Farm Test – The field experiment was planted on March 13, 2008 on the Lawrence Hinze Farm approximately one mile east of Highway 95 along FM Road 1891 north of Shiner, Texas. Corn had been planted on the site for many years. A John Deere 2-row 7100 MaxEmerge planter equipped with research cone seed boxes was used to plant 21,944 seed/acre on 4-row by 40-foot plots on 38-inch centers with treatments arranged in a randomized complete block design with 4 replications of the treatments. Hybrid corn (08HYBF114MEYF) was planted into the sandy clay loam soil (53% sand, 20% silt, 27% clay). The 7.5 pH soil contained 2.03% organic matter. Fertilizer applied was 106-18-9-9S + 0.5 lb zinc. Roundup was applied for weed control. Granular Aztec 2.1G (6.7 ounces/1000 row feet) was applied in a 6-inch "T-band" to appropriate plots.

Treatments were assessed by (1) counting the number of plants on 10-row feet in each of the center two rows in plots on 3/27 and again 4/10 [4/10 data only presented], (2) counting the number of chinch bugs on 10 plants/plot on 4/3 and 4/17 or 14 and 35 days after planting, (3) determining the number of southern corn rootworm damaged plants in 10-row feet on each of the center rows in plots, (4) assigning a vigor rating in a similar fashion as outlined for the Kainer Farm test given above, and (5) harvesting for yield and counting the number of ears on 10-row feet for a total of 20 feet from the center two rows in each plot on 7/15. Ears were threshed on a laboratory machine, samples were weighed, moisture levels were determined with a Dole tester, and weights were converted to the standard of 15% moisture.

RESULTS/DISCUSSION: Kainer Farm Test – Significant differences were not observed in plant stands which indicated little activity by southern corn rootworm during early plant growth (Table 1). There was, however, significantly less vigor in non-insecticide treated plants which reflected the presence of chinch bugs. Chinch bug numbers were reduced in all insecticide treated plots with generally lower numbers in the insecticide treated seed plots compared with Aztec used alone. Root damage rating by two methods showed more damage in the non-insecticide treated corn compared to the other treatments. Very few adult Mexican corn rootworm beetles were observed leading us to speculate that the root damage which was observed may have been due to another root-feeding insect, possibly southern corn rootworm. Yield data was not obtained. No advantage was found in the outside test plots treated with the higher rate of Aztec (8.0 ounces/1000 feet). This finding was not unexpected given the very low level of Mexican corn rootworm present in the test.

Hinze Farm Test – Data collected on plant stand, southern corn rootworm, plant vigor, chinch bugs, and production is provided in Table 2. Southern corn rootworm damaged plants amounted to 2,400/acre in the non-insecticide treated corn which was significantly greater than that found in all other treatments. In fact, in five of the remaining 7 treatments no southern corn rootworm damaged plants were observed. Vigor was also significantly reduced in the non-insecticide treated corn which was judged to have been caused by southern corn rootworm and chinch bug. Aztec was generally not as effective as the seed treatments in reducing chinch bug numbers especially at 35 DAP. The number of harvested ears in plots should have been similar, but statistically significant differences were observed. The difference may have been due to damage caused by southern corn rootworm and chinch bug. Yields were very low due to an extended drought which probably affected our ability to find statistical differences. Noteworthy, although not significant, the lowest yield was found the non-insecticide treated corn.

ACKNOWLEDGMENTS: Thanks are extended to Russ Perkins, Bayer CropScience, for supporting both studies. Acknowledgment is given Mr. and Mrs. Lawrence Hinze and Gary Kainer for providing land on which to conduct the studies. Rudy Alaniz and Clint Livingston, Demonstration Assistants, are thanked for their assistance in planting, harvesting, and processing plot samples. Mr. David Little, B&H Genetics, is given special thanks for help he provided in locating the test sites and assisting with digging plants for root damage evaluation at the Kainer Farm.

Table 1. Evaluation of insecticides for control of chinch bug and Mexican corn rootworm, Kainer Farm, Fayette County, TX, 2008.

Treatment	Plants (1000's/A)	Vigor rating[2/]	Chinch bugs/10 plants 26 DAP[3/]	Root da. rating	
				1-6[4/]	0-3[5/]
Nontreated	20.8[a]	2.5[a]	13.0[a] 2.9	[a]	0.23[a]
Poncho 1250	20.3[a]	1.3[b]	2.3[c]	2.5[b]	0.11[b]
Poncho 250 + Aztec [1/]	20.6[a]	1.2[b]	2.8[bc]	2.1[bc]	0.09[b]
Exp. B	22.5[a]	1.5[b]	3.5[bc]	2.4[b]	0.09[b]
Poncho 500 + Aztec [1/]	21.0[a]	1.1[b]	2.0[c]	2.1[bc]	0.05[b]
Exp. 7	20.6[a]	1.2[b]	2.5[c]	2.2[bc]	0.07[b]
Exp. 5A + Aztec [1/]	21.0[a]	1.2[b]	3.0[bc]	2.0[c]	0.05[b]
Aztec [1/]	21.1[a]	1.3[b]	7.8[b]	1.9[c]	0.05[b]
LSD (P = 0.05)	NS	.061	5.05	0.422	0.083
P > F	.6881	.0021	.0018	.0012	.0025

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

[1/] Aztec rate 6.7 oz/1000 row ft.

[2/] Plant vigor ratings range from 1 = excellent growth and no damage up to 5 = severe stunting, uneven plant growth and yellowing plants.

[3/] DAP = Days After Planting

[4/] Iowa State 1 - 6 root-rating scale: 1 = no visible feeding damage, 2 = feeding scars, 3 = at least 1 root eaten to within 1.5 inches of stalk, 4 = 1 complete node of root so eaten, 5 = 2 complete nodes of roots so eaten, and 6 = 3 or more nodes of roots so eaten.

[5/] Iowa State 0 - 3 node-injury scale: 0 = no feeding , 1 = 1 node of roots eaten to within 1.5 inches of the stalk, 2 = 2 nodes of roots so eaten, and 3 = 3 or more nodes of roots so eaten.

Table 2. Evaluation of insecticides for control of chinch bug and southern corn rootworm, Hinze Farm, Lavaca County, TX, 2008.

Treatment	Plants (1000's/A)	SCR[2/] da. plts (1000's/A)	Vigor rating[3/]	Chinch bugs/10 plants		Yield/acre	
				14 DAP [4/]	35 DAP	ears [5/]	bu
Nontreated	19.5[a]	2.4[a]	3.3[a]	7.3[a]	17.5[a]	16.3[d]	24.8[a]
Poncho 1250	19.1[a]	0.0[b]	1.4[b]	1.5[c]	6.3[c]	18.9[a-d]	30.8[a]
Poncho 250 + Aztec [1/]	20.8[a]	0.0[b]	1.3[b]	1.5[c]	14.5[ab]	20.3[abc]	26.3[a]
Exp. B	21.1[a]	0.3[b]	1.6[b]	2.3[bc]	5.8[c]	21.8[a]	28.9[a]
Poncho 500 + Aztec [1/]	20.6[a]	0.0[b]	1.1[b]	1.8[bc]	4.8[c]	17.0[cd]	27.7[a]
Exp. 7	18.9[a]	0.0[b]	1.2[b]	1.3[c]	7.8[bc]	20.5[ab]	27.9[a]
Exp. 5A + Aztec [1/]	15.5[a]	0.0[b]	1.2[b]	0.3[c]	5.0[c]	18.4[bcd]	29.6[a]
Aztec [1/]	17.7[a]	0.3[b]	1.5[b]	4.0[b]	16.0[a]	18.1[bcd]	25.0[a]
LSD (P = 0.05)	NS	1.299	0.65	2.44	6.83	3.36	NS
P > F	.0624	.0114	.0001	.0002	.0013	.0402	.5553

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

[1/] Aztec rate 6.7 oz/1000 row ft.

[2/] SCR = southern corn rootworm

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

[4/] DAP = Days After Planting

[5/] Ears in 1000's/acre

EVALUATION OF BAYTHROID INSECTICIDE FOR INSECT CONTROL AND HEADLINE FUNGICIDE FOR EFFECT ON CORN YIELD

Keith Orsak & Chris Davelin Farm, Jackson County, 2008

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Corpus Christi and Edna, Texas

SUMMARY: Insecticide applications have been made to corn beginning at first silk for the past three years to measure the impact of these treatments on certain caterpillar pests and subsequent development of aflatoxin. No effects due to treatment were observed on these factors in 2006 and 2007. Headline fungicide was added to the test in 2008 as interest in such treatment has increased.

No differences were found in the number of corn earworms at two dates following treatments, but 8 days after treatment 2 (8 DAT-2) significantly more ear tip damage occurred in the nontreated corn compared with the Baythroid and Headline treatments. The reason for less ear tip damage in the Headline treatment cannot be explained. Following the first observation of ear tip damage, statistical differences were not found at 15 DAT-2 or at harvest although numerically more damage continued to be observed in nontreated corn. The amount of damage to ear tips was judged to be minimal and was not expected to have any affect on yield. Surprisingly, the Baythroid treated plots produced significantly more corn compared to the nontreated. This is the first time during the 3-year study that more yield was obtained from the insecticide treatment. This current test contained the least insect damage of the 3-year testing period, and the statistically significant yield increase may have been a chance occurrence. An expanded test is planned for 2009. Just as in all previous years, no differences were observed in aflatoxin levels nor were aflatoxin levels high.

A statistically significant difference was not found in yield due to Headline treatment. Furthermore, variation in plot data precluded the numerical yield increase even as a possible trend; one of the 3 replicates of the Headline treatment was responsible for the higher numerical yield. Additional tests with fungicide have been conducted along the Gulf Coast and our plan is to continue to evaluate such treatments in 2009.

OBJECTIVES: The study was conducted to determine if treatments had an effect on corn ear feeding caterpillars, stalk borers, aflatoxin level, or corn production.

MATERIALS/METHODS: B&H 9044 RR and Golden Acres GA 26Z25 non-Bt corn hybrids were planted on March 4, 2008 on the Keith Orsak Farm in Jackson County at the intersection of FM 1593 and CR 418 south of Edna, Texas. Two replications, less one nontreated plot, was the Golden Acres hybrid and the remaining replication was the BH Genetics hybrid. Seed was planted at 25,600 kernels/acre with a 12-row John Deere model 1720 vacuum planter. Two treatments of Baythroid XL 1EC (2.8 ounces/acre) were applied by air in a volume of 5.0 gpa at first silk on May 14 and again 7 days later on May 21. Headline (6.0 ounces/acre) + crop oil (1.0

quart/acre) was applied once on May 16 also in a total volume of 5.0 gpa. Plots averaged 61 rows wide (38-inch centers) by 1933 feet long. Treatments were arranged in a randomized complete block design with 3 replications.

Treatments were assessed by (1) examination of 20 ears in the center rows of plots 8 and 15 DAT-2 for presence of ear feeding caterpillars and damage, and stalks were examined for the presence of borers; (2) harvesting of 10 whole plants and an additional 10 ears in consecutive order from a row near the center of plots on June 24 to measure ear tip feeding, individual ear weight, and yield; (3) harvesting 8 rows through the length of the test near the center of plots on July 18 with a John Deere model 9770 STS combine and measuring yield with the harvester yield monitor; and (4) using a Vicam Series-4 Fluorometer Model V2 testing kit (Afla Test FGIS method) to measure the level of aflatoxin present in both hand and machine harvested samples. Bushel weights were determined, moisture levels were confirmed, and corn weights were converted to the standard 15% moisture. Agriculture Research Manager (ARM revision 6.1.13) software was used to conduct analysis of variance, and means were separated by LSD.

RESULTS/DISCUSSION: The only caterpillar pest observed in the test was corn earworm; results of their infestation and damage are shown in Table 1. The number of corn earworms detected on corn ears were not different due to treatment although numerically lower numbers were observed in Baythroid treated corn. The percentage of ears with tip damage, although limited to ear tips with very little kernel feeding, was significantly higher in nontreated compared with the other two treatments 8 DAT-2, and there was a numerical trend (not a statistical difference) for similar results in samples examined 15 DAT-2 and near harvest. Surprisingly, Headline treated corn also contained statistically less ear tip damage 8 DAT-2 and likewise contained numerically less damage in comparison to the nontreated corn on the other inspection dates.

Since ear tip feeding very seldom involved actual damage to kernels, yield differences were not expected. There was, however, statistically more corn produced in the Baythroid treatment compared with the nontreated corn in the machine harvest but not in the hand harvest data (Table 2). A significant difference between Headline and nontreated corn was not observed. Aflatoxin levels were very low (0-1.4 PPB in machine harvested corn and 0.5-0.8 PPB in hand harvested corn) with no statistical differences observed.

Two more years of testing are planned to determine if any impact can be made on yield or aflatoxin levels due to these type treatments.

ACKNOWLEDGMENTS: Thanks are extended to Keith Orsak and Chris Davelin for their help in organization of this field study. Gary Schwarzlose, Bayer CropScience, is acknowledged for providing the Baythroid, and Brian Vercellino, BASF Corporation, is thanked for providing the Headline used in the study. A special thanks is extended to Don Wright, Coastal Flying Service, for applying the chemicals. Special thanks are also extended to Chris Hajovsky for the care he took in plot harvest.

Table 1. Corn earworm numbers and damage to ear tips in corn treated with Baythroid insecticide or Headline fungicide, Keith Orsak and Chris Davelin Farm, Jackson County, TX, 2008.

	Corn earworm					
	Number per 20 ears		% ears with damage			Caterpillar ear tip da.
Treatment	8 DAT-2 [2/]	15 DAT-2	8 DAT-2	15 DAT-2	At harvest	(cm)[3/]
Baythroid XL 1EC 2.8 oz/acre	4.7[a]	3.0[a]	23.3[b]	48.3[a]	25.0[a]	0.28[a]
Headline 2.09EC 6 oz/acre [1/]	7.3[a]	4.3[a]	35.0[b]	45.0[a]	46.7[a]	0.75[a]
Nontreated	9.7[a]	5.3[a]	53.3[a]	70.0[a]	68.3[a]	1.58[a]
LSD (P = 0.05)	NS	NS	17.1	NS	NS	NS
P > F	.2195	.6982	.0203	.0649	.1347	.0515

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

[1/] Headline was applied only one time (5/16/08).

[2/] DAT-2 = Day After Treatment 2 of the Baythroid.

[3/] Measured by recording greatest length damage extended down from the ear tip in ears taken near harvest.

Table 2. Corn production and aflatoxin levels in corn treated with Baythroid insecticide or Headline fungicide, Keith Orsak and Chris Davelin Farm, Jackson County, TX, 2008.

			Bushels/acre		Aflatoxin (PPB)	
Treatment	Moisture %	Bushel weight	hand	machine	hand	machine
Baythroid XL 1EC 2.8 oz/acre	15.4[a]	53.8[a]	82.4[a]	96.8[a]	0.5[a]	1.4[a]
Headline 2.09EC 6 oz/acre [1/]	15.2[a]	53.5[a]	92.0[a]	92.4[ab]	0.7[a]	0.0[a]
Nontreated	15.9[a]	55.3[a]	83.3[a]	85.8[b]	0.8[a]	0.7[a]
LSD (P = 0.05)	NS	NS	NS	7.33	NS	NS
P > F	.3900	.4809	.7484	.0347	.9201	.4098

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

[1/] Headline was applied only one time (5/16/08).

EVALUATION OF CORN YIELD DATA FROM THE TEXAS GULF COAST MEASURING FIELD VARIATION

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SUMMARY: Decisions to use a certain field practice or plant a particular hybrid should not be based on comparisons that do not include a design where the treatments are replicated and randomized. There was a 17 bushel difference from the lowest to the highest yield across the entire field. In this evaluation yields comparing each field half planted with the same hybrid showed an 8 bushel/acre difference. When the field yields were analyzed as if 5 hybrids were being compared in 8-row plots with 4 replications (simulated), the statistical analysis indicated that there were no differences (just as it should). In this analysis there was a 4 bushels/acre range in the yield. The conclusion is that very little if anything can be learned without proper replication and randomization of field studies.

OBJECTIVE: Show that without proper experimental design yield data obtained in a row crop should not be used to judge differences among hybrids/varieties or comparison of other treatments.

MATERIALS/METHODS: The corn hybrid BH 8914VT3 was planted in a 21 acre field at a seeding rate of 24,800 into 38-inch rows on March 19, 2008. The field was considered to be one with uniform soil and production potential.

A John Deere model 9770 STS combine with a yield monitor calibrated with seed company weighing equipment was used to harvest 8 row strips across the entire field on July 20. Each of 20 harvested sets of 8-rows was 1.047 acres. Corn weights were converted to the standard 15% moisture level and rounded to the nearest whole bushel for ease of presentation.

RESULTS/DISCUSSION: Agricultural producers and others may make a decision to use some practice based on a certain treatment yielding more than another based on, for example, something no more than half of a field or single strips planted in hybrids for comparison. Others might state after hearing that five bushels was not significant: “Five bushels might not be significant to him but it certainly is to me.” To demonstrate the futility of comparing single yield readings of corn hybrids, a “uniform” field planted in the same hybrid was measured for yield in each 8 rows across the entire field (Fig.1). First, yields varied from a low of 79 bushels/acre to a high of 96 bushels/acre (17 bushel range). Second, even with the same hybrid one side of the field produced 8 bushels/acre more corn than did the other side. It is obvious from this example that comparing single strips whether narrow or wide cannot be relied upon to provide true information.

Now suppose a simulated test is conducted on the data by setting it up in a randomized complete block design as if hybrids A, B, C, D, and E were planted (Fig. 2). Remember, however, in this example it is the same hybrid throughout. A statistical analysis of the data in this case indicates that there are no difference in corn yield (Table 1). Furthermore, consider the fact that there is a 4 bushel/acre range in yield in the analysis. We can truly say that 4 bushels is not significant since it is in fact the same hybrid. In cases where different hybrids are actually compared in properly designed experiments, statements that no significance could be demonstrated even when the range in yield was substantial means that there was not enough consistent data in one direction to indicate confidently that one hybrid was better than another.

Yields (bu/A) across a corn field

79	83	83	81	84	82	85	84	89	88	89	89	96	91	91	90	95	93	91	92
← 84 bu →										← 92 bu →									

Fig. 1. Corn yields in bushels/acre from 8-row harvest strips across a field, Wharton County, TX, 2008.

Yields (bu/A) across a corn field
Simulated test layout

79	83	83	81	84	82	85	84	89	88	89	89	96	91	91	90	95	93	91	92
A	C	E	B	D	C	E	A	D	B	D	A	C	B	E	A	D	B	C	E
Rep 1					Rep 2					Rep 3					Rep 4				

Fig. 2. Corn yields in bushels/acre from 8-row harvest strips across a field but showing how a randomized complete block experiment (simulated) might be imposed, Wharton County, TX, 2008.

Table 1. Statistical analysis (simulated) of corn yields using the same hybrid as if these were different, Wharton County, TX, 2008.

Treatment	Yield bu/A[1/]
A	85[a]
B	88[a]
C	88[a]
D	89[a]
E	88[a]
LSD (P=0.05)	NS
P > F	.2500

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

[1/] 4 bushels/acre range in yield

EVALUATION OF VARIOUS SEED APPLIED INSECTICIDE, FUNGICIDE, AND HERBICIDE SEED PROTECTION COMBINATIONS FOR EFFECT ON INSECTS

Larry Vasbinder Farm, DeWitt County and Texas AgriLife Research and Extension Center, Nueces County, 2008

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SUMMARY: Experiments with the same treatments, one near Corpus Christi and the other near Nordheim, were conducted to evaluate effects of seed treated with various combinations of insecticide, fungicide, and chemicals to protect seed from herbicide. The primary data gathered related to pest insects.

Early season insects observed included yellow sugarcane aphid in both tests and chinch bug at the Corpus Christi location. Yellow sugarcane aphid numbers were relatively low on very small plants, and by the time they did increase, plants were large enough to sustain the higher populations without significant effect on grain production.

At the **Nordheim location** there were no statistical differences in yellow sugarcane aphid infested plants at 14 days after planting (DAP), but plots with no insecticide seed treatment were the only ones where infested plants were detected. However, significant differences in yellow sugarcane aphid infested plants were found at 27 and 35 days after planting (DAP). At 27 DAP in plots without insecticide and where Latitude was the only insecticide, greater percentages of the plants were infested with yellow sugarcane aphid. Similar results were found 35 DAP, but by that time the Latitude treatment did not differ statistically in infested plants from several of the other insecticide treatments.

At the **Corpus Christi location** treatment effects were noted for plant stand and plant vigor rating. The highest plant stands were in plots where no insecticide was applied, but these numbers were not always statistically higher than treatments containing insecticide. Plant vigor rating differences were not clear-cut enough to assess reasons for the differences, although the ratings were very stable for both 19 and 31 DAP. Chinch bug numbers were numerically greater in non-insecticide treated sorghum at 19 DAP, but by 31 DAP there were no differences or trends.

OBJECTIVES: The tests were conducted to compare various seed treatment packages for effect on insect pests, plant growth, and yield.

MATERIALS/METHODS: Pioneer Hybrid P86G08 sorghum seed with the various seed treatment combinations was planted on March 13 and 14, 2008 on the Larry Vasbinder Farm 0.4 miles south of the intersection of Helmers Road with Cabeza Road (Nordheim location) and Texas AgriLife Research and Extension Center - Meaney Annex (Corpus Christi location), respectively. The Nordheim location was planted with a John Deere 7100 2-row planter equipped with research cones to deliver packaged seed in each 26.5 foot plot. The Corpus Christi location was planted with a Blackland 6100 4-row planter equipped with research cones and set to deliver packaged seed for 40 foot plots. Treatments in both field studies were 4-row plots with 4 replications arranged in a randomized complete block experimental design. Corn had been planted on the Nordheim test site in 2007 and cotton had been planted on the Corpus Christi test site in 2007. Soil moisture at both sites was adequate for planting. At Nordheim the clay soil (39% sand, 18% silt, 43% clay) with 7.6 pH contained 2.48% organic matter. Fertilizer consisted of 89-30-13 + 7 zinc + 2 sulfur. At Corpus Christi the clay loam soil (44% sand, 18% silt, 38% clay) with 7.9 pH contained 1.54% organic matter. Fertilizer applied in December 2007 was 88-44-0 + 4 lb zinc. Herbicide consisted of Atrazine (1.0 quart/acre) applied in December 2007 for winter weed control and again at planting along with Dual II Magnum (1.3 pints/acre). In April Prowl (2.5 pints/acre) was applied with drop nozzles and soil incorporated.

Treatments were assessed by (1) counting the number of plants on 10-row feet in each of the center 2 rows in plots [14 DAP at Nordheim and 19 DAP at Corpus Christi], (2) examining 20 plants/plot for presence of yellow sugarcane aphid at 14, 27, and 35 DAP at Nordheim and 19 and 31 DAP at Corpus Christi, (3) counting the number of chinch bugs on 10 plants/plot at Corpus Christi 19 and 31 DAP, (4) estimating plant vigor [1= excellent growth and no damage up to 5= severe stunting, uneven plant growth and yellowing plants], and (5) harvesting 13.75 row-feet row by hand from one of the center rows in plots at Nordheim on July 1 and at Corpus Christi on June 27. Plot samples were threshed on a research machine and grain weights were adjusted to 14% moisture. Agriculture Research Manager (ARM revision 6.1.13) software was used to conduct analysis of variance, and means were separated by LSD for ease of presentation.

RESULTS/DISCUSSION: Insect infestations were generally low and they did not persist long enough to cause statistically significant differences in yield at either test location.

Nordheim location – Plant stands and yellow sugarcane aphid infestation information is given in Table 1. There were no differences in plant stands. At 14 DAP, although statistical differences were not observed in yellow sugarcane aphid infested plants, none were detected in any of the insecticide treated sorghum; whereas, 2.5% of the non-insecticide treated sorghum plants were infested. There were significant differences among treatments in percentages of yellow sugarcane aphid infested plants at 27 and 35 DAP. Significantly fewer infested plants were found 27 DAP in insecticide treatments except where Latitude was used alone as a planter box treatment compared with the non-insecticide treated sorghum. Four of the insecticide treatments still had statistically fewer infested plants compared with the non-insecticide treated sorghum at 35 DAP.

Differences were not found in plant vigor rating or grain production data (Table 2). Plant vigor was judged to be very good. Bushel weights and moisture levels were about the same in all treatments. There were no statistical differences in the yield data, but there was a possible trend in that 5 of the 7 insecticide treatments had higher production compared with plots without insecticide.

We conclude that the yellow sugarcane infestation was not sustained long enough or occur at high enough levels on small plants to cause statistically measurable yield loss. However, based on historical pest insect levels on young sorghum it would be wise to use a systemic insecticide at-planting.

Corpus Christi location – Statistical differences were found in plant stand and plant vigor rating (Table 3). It was not apparent what caused the reduced plant stands in certain treatment combinations as ingredient combination did not seem to be the cause. Although significant differences were not observed in yellow sugarcane aphid infested plants, the treatment that was not insecticide treated had the highest infestation rate at 19 DAP. In fact, only in the planter box applied insecticide treatment (Maxim + Concep III + Latitude) were infested plants detected at 19 DAP. By 31 DAP the yellow sugarcane aphid infestation had declined in all treatments including the non-insecticide treated plots. Differences in plant damage ratings were obvious and fairly consistent on both evaluation dates (19 and 31 DAP). Once again we were unable to explain these differences.

Chinch bug counts and yield information is shown in Table 4, but no statistical differences were observed in these data. None of the chinch bug numbers exceeded the economic treatment level of 40/100 plants. The non-insecticide treated sorghum had 23 chinch bugs/100 plants at 19 DAP, and by 31 DAP their numbers had declined to 13 chinch bugs/100 plants. A numerical increase (not statistically significant) in yield was found with all insecticide treated sorghum except for one treatment. The trend seemed to be strong enough to reflect the effect of insecticide, but insect numbers were simply not great enough to cause significant yield loss.

ACKNOWLEDGMENTS: Larry Vasbinder is thanked for providing land for the test site and his care of the plots during the season. Russ Perkins, Bayer CropScience, is thanked for providing support for the project. Rudy Alaniz and Clint Livingston, Demonstration Assistants, are also thanked for planting, harvesting, and processing the grain harvested from the tests. Hopkins Agricultural Services is thanked for providing the 2-row planter used at Nordheim.

Table 1. Seed treatment effects on sorghum plant population and yellow sugarcane aphid infestation, Larry Vasbinder Farm, DeWitt County, TX, 2008.

Treatment	Plants 1000's/acre[1/]	% yellow sugarcane aphid infested plants			
		14 DAP[2/]	27 DAP	35 DAP	Avg.
Cruiser + Concep III + Maxim + Apron	56.6^{a}	0.0^{a}	7.5^{b}	22.5^{bc}	10.0^{c}
Poncho + Concep III + Vortex + Allegiance	55.5^{a}	0.0^{a}	0.0^{b}	32.5^{ab}	10.8^{c}
Poncho + AE1789 + Vortex + Allegiance	56.9^{a}	0.0^{a}	0.0^{b}	10.0^{c}	3.3^{c}
Poncho + AE1789 + Maxim + Apron	54.2^{a}	0.0^{a}	2.5^{b}	25.0^{bc}	9.2^{c}
Poncho + Concep III + Vortex + Allegiance + Latitude	55.3^{a}	0.0^{a}	2.5^{b}	15.0^{bc}	5.8^{c}
Cruiser + Concep III + Maxim + Apron + Latitude	57.6^{a}	0.0^{a}	5.0^{b}	25.0^{bc}	10.0^{c}
Latitude + Concep III + Maxim + Apron	55.7^{a}	0.0^{a}	32.5^{a}	35.0^{ab}	22.5^{b}
Concep III + Maxim + Apron	57.8^{a} 2.5	^{a}	45.0^{a}	47.5^{a}	31.7^{a}
LSD (P = 0.05)	NS	NS	14.3	21.98	8.81
P > F	.9758	.4586	.0001	.0497	.0001

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

[1/] Average of counts on 10 row feet in each of the center 2 rows at 14 days after planting

[2/] DAP = Days After Planting.

Table 2. Seed treatment effects on sorghum plant vigor, grain moisture, bushel weight, and yield, Larry Vasbinder Farm, DeWitt County, TX, 2008.

Treatment	Plant vigor rating[1/]	Bushel weight (lb)	Grain moisture (%)	Yield lb/acre
Cruiser + Concep III + Maxim + Apron	1.6[a]	55.2[a]	15.2[a]	2323[a]
Poncho + Concep III + Vortex + Allegiance	1.3[a]	54.8[a]	16.1[a]	1945[a]
Poncho + AE1789 + Vortex + Allegiance	1.4[a]	55.1[a]	16.0[a]	2526[a]
Poncho + AE1789 + Maxim + Apron	1.2[a]	54.6[a]	16.5[a]	2385[a]
Poncho + Concep III + Vortex + Allegiance + Latitude	1.4[a]	54.8[a]	15.9[a]	2593[a]
Cruiser + Concep III + Maxim + Apron + Latitude	1.7[a]	55.0[a]	16.3[a]	2457[a]
Latitude + Concep III + Maxim + Apron	1.3[a]	54.5[a]	15.9[a]	2312[a]
Concep III + Maxim + Apron	1.7[a]	55.0[a]	15.7[a]	2212[a]
LSD (P = 0.05)	NS	NS	NS	NS
P > F	.1043	.9495	.8552	.8552

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

[1/] Vigor ratings range from 1 = excellent growth and no damage up to 5 = severe stunting, uneven plant growth and yellowing plants. Evaluation was made 35 days after planting.

Table 3. Seed treatment effects on sorghum plant population, yellow sugarcane aphid infestation, and plant vigor, Texas AgriLife Research and Extension Center, Nueces County, TX, 2008.

Treatment	Plants 1000's/ acre[1/]	% yellow sugarcane infested plants		Plant vigor rating [3/]	
		19 DAP [2/]	31 DAP	19 DAP	31 DAP
Cruiser + Concep III + Maxim + Apron	43.5[ab]	0.0[a]	0.0[a]	2.1[bc]	2.3[bc]
Poncho + Concep III + Vortex + Allegiance	37.5[bc]	0.0[a]	0.0[a]	1.8[c]	2.3[bc]
Poncho + AE1789 + Vortex + Allegiance	27.5[c]	0.0[a]	0.0a	3.1[a]	3.1[a]
Poncho + AE1789 + Maxim + Apron	35.6[bc]	0.0[a]	0.0a	2.9[ab]	2.9[ab]
Poncho + Concep III + Vortex + Allegiance + Latitude	40.6[ab]	0.0[a]	0.0a	1.9[c]	2.2[c]
Cruiser + Concep III + Maxim + Apron + Latitude	44.6[ab]	0.0[a]	0.3a	1.8[c]	2.0[c]
Latitude + Concep III + Maxim + Apron	51.0[a]	2.5[a]	0.0[a]	1.3[c]	1.8[c]
Concep III + Maxim + Apron	48.5[a]	5.0[a]	0.3[a]	1.8[c]	2.3[bc]
LSD (P = 0.05)	10.7	NS	NS	0.93	0.74
P > F	.0042	.1503	.5828	.0061	.0214

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

1/ Average of counts on 10 row feet in each of the center 2 rows at 19 days after planting.

2/ DAP = Days After Planting

3/ Vigor ratings range from 1 = excellent growth and no damage up to 5 = severe stunting, uneven plant growth and yellowing plants.

Table 4. Seed treatment effects in sorghum on chinch bug numbers, grain moisture at harvest, and yield, Texas AgriLife Research and Extension Center, Nueces County, TX, 2008.

Treatment	Chinch bugs/10 plants		Grain moisture (%)	Yield lb/acre
	19 DAP[1/]	31 DAP		
Cruiser + Concep III + Maxim + Apron	1.0[a]	2.8[a]	14.0[a]	3723[a]
Poncho + Concep III + Vortex + Allegiance	0.3[a]	1.5[a]	14.0[a]	3840[a]
Poncho + AE1789 + Vortex + Allegiance	0.3[a]	0.5[a]	14.1[a]	4288[a]
Poncho + AE1789 + Maxim + Apron	0.8[a]	0.5[a]	13.8[a]	3640[a]
Poncho + Concep III + Vortex + Allegiance + Latitude	0.3[a]	1.3[a]	14.0[a]	4152[a]
Cruiser + Concep III + Maxim + Apron + Latitude	1.5[a]	0.5[a]	14.0[a]	3955[a]
Latitude + Concep III + Maxim + Apron	1.3[a]	2.0[a]	14.1[a]	3962[a]
Concep III + Maxim + Apron	2.3[a]	1.3[a]	14.1[a]	3717[a]
LSD (P = 0.05)	NS	NS	NS	NS
P > F	.3527	.0798	.4125	.5685

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

[1/] DAP = Days After Planting

COMPARISON OF INSECTICIDE SEED TREATMENTS FOR CONTROL OF EARLY SEASON INSECTS ON SORGHUM

Larry Vasbinder Farm, DeWitt County and Texas AgriLife Research and Extension Center, Nueces County, 2008

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SUMMARY: Vasbinder Farm – Insecticide treated sorghum seed contained significantly fewer yellow sugarcane aphids than treatments without insecticide. The differences were found on inspections made 14, 27, and 35 DAP (days after planting). Additionally, plant vigor ratings were not significantly improved by insecticide treatment, but all of these treatments had a numerically better rating which appeared to reflect reduced insect numbers. Grain yields were very low due to drought conditions and what appeared to be a hybrid that was not adapted to the region.

Texas AgriLife Research Station – Significant differences were not found among treatments in yellow sugarcane aphid infested plants, although on each inspection date greater infestation was detected in non-insecticide treated sorghum. At 18 DAP chinch bug numbers did exceed the established treatment threshold of 40 bugs/100 plants in both treatments without insecticide; remaining treatments were below the treatment threshold. However, by 31 DAP their numbers had declined and no differences were found among treatments. Plant vigor ratings were best in the higher Cruiser rate plots and in STP1520 treated sorghum.

OBJECTIVES: The experiment was established to compare various rates of Cruiser seed treatment for effect on yellow sugarcane aphid, chinch bug, and other early season insect pests.

MATERIALS/METHODS: NK4420 hybrid sorghum seed with the various seed treatment combinations was planted on March 13 and 14, 2008 on the Larry Vasbinder Farm 0.4 miles south of the intersection of Helmers Road with Cabeza Road (Nordheim location) and Texas AgriLife Research and Extension Center - Meaney Annex (Corpus Christi location), respectively. The Nordheim location was planted with a John Deere 7100 2-row planter equipped with research cones to deliver packaged seed in each 26.5 foot plot. The Corpus Christi location was planted with a Blackland 6100 4-row planter equipped with the research cones and set to deliver packaged seed for 40 foot plots. Treatments in both field studies were 4-row plots with 4 replications arranged in a randomized complete block experimental design. Corn had been planted on the Nordheim test site in 2007 and cotton had been planted on the Corpus Christi test site in 2007. Soil moisture at both sites was adequate for planting. At Nordheim the clay soil (39% sand, 18% silt, 43% clay) with 7.6 pH contained 2.48% organic matter. Fertilizer consisted of 89-30-13 + 7 zinc + 2 sulfur. At Corpus Christi the clay loam soil (44% sand, 18% silt, 38% clay) with 7.9 pH contained 1.54% organic matter. Fertilizer applied in December 2007 was 88-44-0 + 4 lb zinc. Herbicide consisted of Atrazine (1.0 quart/acre) applied in December 2007 for winter weed control and again at planting along with Dual II Magnum (1.3 pints/acre). In April Prowl (2.5 pints/acre) was applied with drop nozzles and soil incorporated.

Treatments were assessed by (1) counting the number of plants on 10-row feet in each of the center 2 rows in plots [14 DAP at Nordheim and 19 DAP at Corpus Christi], (2) examining 20 plants/plot for presence of yellow sugarcane aphid at 14, 27, and 35 DAP at Nordheim and 19 and 31 DAP at Corpus Christi, (3) counting the number of chinch bugs on 10 plants/plot at Corpus Christi 19 and 31 DAP, (4) estimating plant vigor [1= excellent growth and no damage up to 5= severe stunting, uneven plant growth and yellowing plants], and (5) harvesting 13.75 row-feet row by hand from one of the center rows in plots at Nordheim on July 1 and at Corpus Christi on June 27. Plot samples were threshed on a research machine and grain weights were adjusted to 14% moisture. Agriculture Research Manager (ARM revision 6.1.13) software was used to conduct analysis of variance, and means were separated by LSD for ease of presentation.

RESULTS/DISCUSSION: Plant stands in the **Vasbinder Farm Test** were not affected by treatments, but differences were observed in yellow sugarcane aphid infested plants (Table 1). Insecticide treated sorghum seed plots contained lower levels of yellow sugarcane aphid infested plants on each inspection date (14, 27, and 35 DAP). Statistically less infestation was observed in 27 and 35 DAP counts, and this result was reflected in the 3-date average of infested plants. Statistical differences were not found in plant vigor rating, bushel weight, grain moisture at harvest, or yield (Table 2). However, all insecticide treatments had numerically a better plant vigor rating compared with no insecticide.

Just as in the Vasbinder Farm location, statistically significant differences were not found in plant stands in the **Texas AgriLife Research Station Test** (Table 3). Numerically, much higher yellow sugarcane aphid infestations were observed in no insecticide plots at 31 DAP. Significant differences were found in chinch bug numbers at 18 DAP. Their numbers exceeded the rescue treatment threshold of 40 bugs/100 plants only in the non-insecticide treatments. However, by 31 DAP chinch bug populations had not increased in the non-insecticide plots but were more evenly distributed among all treatments. Yellow sugarcane aphid and chinch bug numbers were not sustained long enough to statistically affect yield (Table 4) although all insecticide treated sorghum had a higher yield than the non-insecticide fungicide treated sorghum.

ACKNOWLEDGMENTS: We thank Larry Vasbinder for providing the test location and Brad Minton, Syngenta Crop Protection, Inc. for supporting the project. Rudy Alaniz and Clint Livingston, Demonstration Assistants, are acknowledged for their work in all aspects of conduct of the experiments. A special thanks is extended to Hopkins Agricultural Services for use of the two-row planter.

Table 1. Insecticide seed treatment effects on sorghum plant stand and yellow sugarcane aphid infestation, Larry Vasbinder Farm, DeWitt County, TX, 2008.

Treatment	Rate mg ai/seed	Plants 1000's/ acre	% yellow sugarcane aphid infested plants			
			14 DAP[1/]	27 DAP	35 DAP	Avg
Nontreated (no fungicide)		48.7[a]	5.0[a]	47.5[b]	50.0[a]	34.2[b]
Nontreated (fungicide)		55.5[a]	7.5[a]	70.0[a]	70.0[a]	49.2[a]
Cruiser 5FS	0.0624	54.7[a]	0.0[a]	5.0[c]	16.7[b]	7.2[c]
Cruiser 5FS	0.0784	54.7[a]	0.0[a]	0.0[c]	10.0[b]	3.3[c]
Cruiser 5FS	0.0940	58.0[a]	0.0[a]	7.5[c]	16.7[b]	8.1[c]
STP1520	0.0624	58.1[a]	0.0[a]	0.0[c]	11.3[b]	3.8[c]
LSD (P=0.05)		NS	NS	11.56	23.79	9.99
P > F		.2544	.1039	.0001	.0002	.0001

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

[1/] DAP = Days After Planting.

Table 2. Insecticide seed treatment effects on sorghum plant vigor and production factors, Larry Vasbinder Farm, DeWitt County, TX, 2008.

Treatment	Rate mg ai/seed	Plant vigor rating[1/]	Bushel weight (lb)	Grain moisture (%)	Yield lb/acre
Nontreated (no fungicide)		2.9[a]	48.3[a]	15.9[a]	1109[a]
Nontreated (fungicide)		2.7[a]	46.7[a]	15.9[a]	892[a]
Cruiser 5FS	0.0624	1.7[a]	50.8[a]	15.9[a]	1266[a]
Cruiser 5FS	0.0784	1.7[a]	49.5[a]	16.4[a]	1170[a]
Cruiser 5FS	0.0940	1.3[a]	49.2[a]	16.0[a]	1222[a]
STP1520	0.0624	1.8[a]	49.7[a]	15.9[a]	1108[a]
LSD (P=0.05)		NS	NS	NS	NS
P > F		.3299	.3054	.9412	.1903

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

[1/] Plant vigor ratings range from 1 = excellent growth and no damage up to 5 = severe stunting, uneven plant growth and yellowing plants.

Table 3. Insecticide seed treatment effects on sorghum plant stand, yellow sugarcane aphid infestation, and chinch bug, Texas AgriLife Research and Extension Center, Nueces County, TX, 2008.

Treatment	Rate mg ai/seed	Plants 1000's/ acre	% yellow sugarcane aphid infested plants		Chinch bugs/ 10 plants	
			18 DAP[1/]	31 DAP	18 DAP	31 DAP
Nontreated (no fungicide)		49.7[a]	2.5[a]	10.0[a]	10.0[a]	2.0[a]
Nontreated (fungicide)		41.1[a]	0.0[a]	12.5[a]	8.0[ab]	4.0[a]
Cruiser 5FS	0.0624	46.6[a]	0.0[a]	0.0[a]	1.5[c]	3.8[a]
Cruiser 5FS	0.0784	55.0[a]	0.0[a]	2.5[a]	3.0[bc]	6.3[a]
Cruiser 5FS	0.0940	44.2[a]	0.0[a]	0.0[a]	5.5[abc]	3.5[a]
STP1520	0.0624	61.7[a]	0.0[a]	0.0[a]	0.8[c]	1.8[a]
LSD (P=0.05)		NS	NS	NS	5.77	NS
P > F		.2256	.4509	.3611	.0217	.2792

Means in a column followed by the same letter are not significantly different by ANOVA.
1/ DAP = Days After Planting.

Table 4. Insecticide seed treatment effects on sorghum plant vigor, grain moisture at harvest, and yield, Texas AgriLife Research and Extension Center, Nueces County, TX, 2008.

Treatment	Rate mg ai/seed	Plant vigor rating		Grain moisture (%)	Yield lb/acre
		18 DAP[1/]	31 DAP		
Nontreated (no fungicide)		2.1[a]	2.8[a]	14.9[a]	3284[a]
Nontreated (fungicide)		2.3[a]	2.8[a]	14.8[a]	3176[a]
Cruiser 5FS	0.0624	1.4[a]	1.8[ab]	14.8[a]	3357[a]
Cruiser 5FS	0.0784	1.8[a]	1.8[ab]	14.8[a]	3292[a]
Cruiser 5FS	0.0940	1.6[a]	1.0[b]	14.6[a]	3453[a]
STP1520	0.0624	1.3[a]	1.0[b]	14.9[a]	3326[a]
LSD (P=0.05)		NS	1.19	NS	NS
P > F		.3720	.0172	.4942	.9667

Means in a column followed by the same letter are not significantly different by ANOVA.
1/ DAP = Days After Planting.

SCREENING OF DERMACOR INSECTICIDE SEED TREATMENT ON SORGHUM FOR EFFECT ON INSECTS

Kenneth Hanslik Farm, Victoria County and Texas AgriLife Research and Extension Center, Nueces County, 2008

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SUMMARY: Dermacor X100 (DPX-E2Y45) an experimental insecticide from DuPont Crop Protection has been shown to have remarkable effectiveness as a seed treatment on several pest insects of rice. Those results prompted the current evaluation on sorghum.

In the two sorghum studies reported herein evaluations were made for effectiveness of treatments on fall armyworm, corn earworm, sorghum webworm, Mexican rice borer, rice stink bug, and sorghum midge. Few statistically significant results were found on any of the measured parameters at either location. Plant vigor ratings at the Nueces County location were significantly better for the high Dermacor rate treatment 6 days after planting compared to the other seed treatments, but they were not significantly better than that found in the non-insecticide treated sorghum.

OBJECTIVES: Two tests were conducted to determine the level of insect control, crop vigor, and yield effect of Dermacor X100 seed treatment (DPX-E2Y45) on grain sorghum.

MATERIALS/METHODS: Pioneer sorghum hybrid 84G62 was planted at a seeding rate of 60,526/acre with a 4-row research cone planter on July 11 and 12 at the AgriLife Research and Extension Center (Nueces County dryland site) and at the Kenneth Hanslik Farm (Victoria County irrigated site), respectively. Soil moisture for planting at the Nueces County site was excellent, but the Victoria County site was irrigated after planting. No other irrigations were made during the growing season. Growing conditions were generally favorable for the remainder of the season with additional rainfall especially in Nueces County.

The tests were planted in a randomized complete block design with 4 replications of treatments in 4-row by 35-foot plots. At the Nueces County location the clay loam soil (44% sand, 18% silt, 38% clay) with 7.9% pH contained 1.54% organic matter. At the Victoria County location the soil was a Lake Charles clay. Herbicide used at both locations was Atrazine (1.0 quart/acre) applied after planting.

Treatments were assessed by (1) estimating plant vigor 6 days after planting [DAP] where 1 = excellent growth and no damage up to 5 = severe stunting, uneven plant growth and yellowing; (2) rating fall armyworm damage on multiple dates at each location using a modified Davis/Wiseman scale of 0-9 where 0 = no damage up to 9 = many leaves almost totally destroyed; (3) estimating % leaf loss at each site caused by fall armyworm just before heads emerged from the boot; (4) using a 2.5 gallon white plastic jug to shake 10 sorghum heads/plot into and counting the number of rice stink bugs, leaffooted bugs, fall armyworms, and sorghum webworms as appropriate at each test location; (5) estimating the amount of sorghum midge damage to grain at the Nueces County location; (6) examining 10 sorghum stalks from each plot for the presence of borer tunnels and borer larvae [all borers found at both locations were Mexican rice borer]; and (7) harvesting for yield 13.75 ft row in plots on October 28 only at the Victoria County site. The grain was dried for approximately 24 hours, threshed with a plot machine, but weights were not converted to a standard moisture level.

Agriculture Research Manager (ARM revision 6.1.13) software was used to conduct analysis of variance. Means were separated by least significant difference (LSD) for ease of presentation.

RESULTS/DISCUSSION: Data obtained at each test site consisted of insects feeding before and after heading.

Victoria County site. Differences were not observed in plant vigor rating, fall armyworm damage or leaf feeding by fall armyworm (Table 1). Fall armyworm damage was assessed at 20, 31 and 52 DAP and averaged over that period. No significant differences were observed.

Measurements taken on headed sorghum with a beat bucket on rice stink bug, leaffooted bug, fall armyworm, corn earworm, and Mexican rice borer showed no differences among treatments (Table 2). Measurements on Mexican rice borer were especially disappointing given the effectiveness of Dermacor observed on rice. No differences were found in production factors (Table 3).

Nueces County site. Plant vigor ratings, fall armyworm damage on 4 dates, and leaf feeding by fall armyworm are provided in Table 4. Dermacor (0.03 mg ai/seed) + Cruiser treatment numerically had the best plant vigor rating.

No differences were observed in rice stink bug, leaffooted bug, fall armyworm, or sorghum webworm as measured in beat bucket counts (Table 5). Statistically, fewer corn earworm numbers were observed in Dermacor + Cruiser treatments compared with Cruiser used alone. No differences were observed in the number of Mexican rice borer found in sorghum stalks, but statistical differences were observed in the number of Mexican rice borer tunnels. These observed differences did not follow any kind of rate response to the Dermacor rates.

The conclusion is that the treatments had little, if any affect on insect pest numbers at either test site.

ACKNOWLEDGMENTS: Special thanks are extended to Kenneth Hanslik at Victoria for providing land and labor in connection with conduct of the study. DuPont Crop Protection is acknowledged for their monetary support of the project. Rudy Alaniz and Clint Livingston, Demonstration Assistants, are thanked for their help.

Table 1. Evaluation of seed treatments for effect on fall armyworm feeding on sorghum, Kenneth Hanslik Farm, Victoria County, TX, 2008.

Treatment	Rate mg ai/seed	Plant vigor rating[1/]	Fall armyworm damage at days after planting[2/] 20	31	52	Avg. rating	% leaf feeding
Dermacor[3/] + Cruiser 5FS	0.05 + 0.05	1.8[a]	1.4[a]	3.1[a]	3.3[a]	2.6[a]	5.8[a]
Dermacor + Cruiser 5FS	0.10 + 0.05	1.5[a]	2.9[a]	4.6[a]	3.5[a]	3.6[a]	6.3[a]
Dermacor + Cruiser 5FS	0.15 + 0.05	1.5[a]	2.0[a]	4.2[a]	5.3[a]	3.8[a]	7.0[a]
Dermacor + Cruiser 5FS	0.20 + 0.05	1.3[a]	2.2[a]	4.7[a]	5.5[a]	4.1[a]	7.8[a]
Dermacor + Cruiser 5FS	0.30 + 0.05	1.8[a]	1.5[a]	4.1[a]	4.3[a]	3.3[a]	6.8[a]
Cruiser	0.05	1.3[a]	2.4[a]	4.2[a]	3.0[a]	3.2[a]	5.5[a]
Nontreated		1.5[a]	1.5[a]	5.1[a]	4.0[a]	3.5[a]	6.5[a]
LSD (P = 0.05)		NS	NS	NS	NS	NS	NS
P > F		.8718	.2726	.6845	.5266	.3513	.9017

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

1/ Plant vigor ratings range from 1 = excellent growth and no damage up to 5 = severe stunting, uneven plant growth and yellowing plants. Ratings made 6 days after planting.

2/ Modified Davis/Wiseman damage rating (0 - 9 scale where 0 = no damage and 9 = many leaves almost totally destroyed).

3/ Dermacor X100

Table 2. Comparison of insecticide seed treatments on sorghum for effect on various insects, Kenneth Hanslik Farm, Victoria County, TX, 2008.

		Number insects/10 sorghum heads				Mexican rice borer (#/10 stalks)	
Treatment	Rate mg ai/seed	rice stink bug	leaf-footed bug	fall armyworm	corn earworm	tunnels	larvae
Dermacor[1/] + Cruiser 5FS	0.05 + 0.05	9.5[a]	0.0[a]	1.0[a]	4.3[a]	7.3[a]	7.3[a]
Dermacor + Cruiser 5FS	0.10 + 0.05	9.8[a]	0.5[a]	0.5[a]	3.3[a]	7.3[a]	5.0[a]
Dermacor + Cruiser 5FS	0.15 + 0.05	13.3[a]	0.0[a]	1.8[a]	5.0[a]	6.8[a]	4.3[a]
Dermacor + Cruiser 5FS	0.20 + 0.05	15.3[a]	0.0[a]	0.5[a]	5.8[a]	8.8[a]	5.3[a]
Dermacor + Cruiser 5FS	0.30 + 0.05	8.8[a]	0.3[a]	1.3[a]	6.0[a]	12.5[a]	8.0[a]
DPX-HGW86	0.30	13.3[a]	1.3[a]	0.8[a]	7.0[a]	7.8[a]	6.8[a]
Cruiser	0.05	10.0[a]	0.3[a]	0.8[a]	5.3[a]	8.3[a]	5.5[a]
Nontreated		11.5[a]	0.3[a]	0.3[a]	7.5[a]	10.3[a]	8.3[a]
LSD (P = 0.05)		NS	NS	NS	NS	NS	NS
P > F		.7349	.7545	3531	.8607	.2414	.3499

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

[1/] Dermacor X100

Table 3. Effect of insecticide seed treatments in sorghum on grain production, Kenneth Hanslik Farm, Victoria County, TX, 2008.

		Grain		
Treatment	Rate mg ai/seed	% moisture	bushel weight	Yield lb/acre
Dermacor[1/] + Cruiser 5FS	0.05 + 0.05	13.9[a]	57.0[a]	3726[a]
Dermacor + Cruiser 5FS	0.10 + 0.05	14.3[a]	57.4[a]	3894[a]
Dermacor + Cruiser 5FS	0.15 + 0.05	14.2[a]	57.4[a]	3509[a]
Dermacor + Cruiser 5FS	0.20 + 0.05	14.4[a]	57.1[a]	3887[a]
Dermacor + Cruiser 5FS	0.30 + 0.05	14.1[a]	56.6[a]	3832[a]
Cruiser	0.05	14.4[a]	57.8[a]	3945[a]
Nontreated		14.1[a]	55.1[a]	3518[a]
LSD (P = 0.05)		NS	NS	NS
P > F		.9903	.4466	.8318

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

[1/] Dermacor X100

Table 4. Evaluation of seed treatments for effect on fall armyworm feeding on sorghum, Texas AgriLife Research and Extension Center, Nueces County, TX, 2008.

			Fall armyworm damage at days after planting[2/]					
Treatment	Rate mg ai/seed	Plant vigor rating[1/]	20	24	28	55	Avg. rating	% leaf feeding
Dermacor[3/] + Cruiser 5FS	0.05 + 0.05	2.8[a]	5.3[a]	2.3[a]	3.4[a]	6.3[a]	4.3[a]	14.8[a]
Dermacor + Cruiser 5FS	0.10 + 0.05	3.3[a]	4.3[a]	2.4[a]	4.0[a]	6.8[a]	4.4[a]	13.3[a]
Dermacor + Cruiser 5FS	0.15 + 0.05	3.1[a]	1.0[a]	2.0[a]	3.9[a]	6.5[a]	3.4[a]	13.0[a]
Dermacor + Cruiser 5FS	0.20 + 0.05	2.5[a]	2.0[a]	3.5[a]	3.9[a]	6.8[a]	4.0[a]	15.3[a]
Dermacor + Cruiser 5FS	0.30 + 0.05	2.1[a]	3.8[a]	3.1[a]	4.7[a]	5.0[a]	4.2[a]	10.0[a]
Cruiser	0.05	3.6[a]	1.3[a]	1.9[a]	5.6[a]	7.0[a]	3.9[a]	14.8[a]
Nontreated		2.3[a]	2.3[a]	2.3[a]	3.0[a]	6.0[a]	3.4[a]	12.0[a]
LSD (P = 0.05)		NS	NS	NS	NS	NS	NS	NS
P > F		.3837	.4433	.2899	.7731	.2592	.6968	.0759

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

1/ Plant vigor ratings range from 1 = excellent growth and no damage up to 5 = severe stunting, uneven plant growth and yellowing plants. Ratings made 6 days after planting.

2/ Modified Davis/Wiseman damage rating (0 - 9 scale where 0 = no damage and 9 = many leaves almost totally destroyed).

3/ Dermacor X100

Table 5. Comparison of insecticide seed treatments on sorghum for effect on various insects, Texas AgriLife Research and Extension Center, Nueces County, TX, 2008.

		Number insects/10 sorghum heads						Mexican rice borer #/10 stalks	
Treatment	Rate mg ai/seed	rice stink bug	leaf-footed bug	fall armyworm	corn earworm	sorghum webworm	sorghum midge % damage	tunnels	larvae
Dermacor[1/] + Cruiser 5FS	0.05 + 0.05	2.8[a]	0.0[a]	0.3[a]	0.8[b]	28.5[a]	72.5[a]	11.5[ab]	8.0[a]
Dermacor + Cruiser 5FS	0.10 + 0.05	3.0[a]	0.0[a]	0.3[a]	1.3[b]	30.0[a]	62.8[a]	2.8[c]	2.0[a]
Dermacor + Cruiser 5FS	0.15 + 0.05	3.3[a]	0.0[a]	0.3[a]	1.3[b]	24.8[a]	53.5[a]	6.8[bc]	5.0[a]
Dermacor + Cruiser 5FS	0.20 + 0.05	3.3[a]	0.0[a]	0.8[a]	0.0[b]	22.5[a]	69.5[a]	13.0[a]	8.8[a]
Dermacor + Cruiser 5FS	0.30 + 0.05	3.0[a]	0.0[a]	1.5[a]	1.0[b]	37.8[a]	65.8[a]	11.8[ab]	7.3[a]
Cruiser	0.05	3.8[a]	0.0[a]	0.5[a]	3.5[a]	35.8[a]	65.5[a]	11.3[ab]	8.0[a]
Nontreated		4.0[a]	0.0[a]	0.0[a]	1.8[ab]	35.8[a]	79.3[a]	10.3[ab]	6.0[a]
LSD (P = 0.05)		NS	NS	NS	1.84	NS	NS	5.85	NS
P > F		.9844	1.00	.1450	.0292	.7086	.2387	.0215	.0749

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

[1/] Dermacor X100

COMPARISON OF INSECTICIDES ON SORGHUM FOR CONTROL OF RICE STINK BUG

Kenneth Hanslik Farm, Victoria County, 2008

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SUMMARY: Battalion (deltamethrin) used at the high rate and dimethoate effectively controlled the rice stink bug. It should be noted for the purposes of this study that Battalion was used at 5.1 ounces/acre above the maximum rate allowed by label. The experimental insecticide, ARY0504-029 had little, if any impact on rice stink bug.

OBJECTIVES: The field study was conducted to evaluate the effects of several insecticides on rice stink bug on sorghum.

MATERIALS/METHODS: The study was conducted on the Kenneth Hanslik Farm in Victoria County on sorghum in the milk to soft dough stage. Treatments were applied on September 3, 2008 with a Spider Trac ground sprayer through 4X hollow cone nozzles (2/row) at 40 psi in a total volume of 5.6 gpa while traveling at 4 mph. Plots were 6 rows by 35 feet with only the 4 center rows receiving treatment. Treatments were arranged in a randomized complete block design with 4 replications of the treatments.

Treatments were assessed by using a 2.5 gallon plastic jug as a “beat bucket” to dislodge insects from 10 sorghum heads per plot. These counts were made 3, 6, and 11 days after treatment (DAT).

Agriculture Research Manager (ARM revision 6.1.13) software was used to conduct analysis of variance. Means were separated by least significant difference (LSD) for ease of presentation.

RESULTS/DISCUSSION: At 3 and 6 DAT (days after treatment) statistically fewer rice bugs were observed in all insecticide treatments except for ARY0504-029 (Table 1). At 11 DAT similar differences were still being observed except by that time the ARY0504-029 + Battalion treatment was not different from the ARY0504-029 used alone. In this combination the Battalion rate applied was half that where Battalion was used alone. Dimethoate at the labeled rate and Battalion used at 5.1 ounces above labeled rate provided better control of rice stink bug.

By the time this test was conducted sorghum webworms were beginning to reach the final growth instar. No differences were found statistically in their numbers at any inspection date (Table 2). However, at 3 DAT the statistical P value was 0.0911, and the Battalion treated sorghum had numerically fewer numbers compared with other treatments. By 6 DAT no sorghum webworms were found in the Battalion (19.2 ounces/acre rate) treated plots.

ACKNOWLEDGMENTS: Thanks are expressed to Kenneth Hanslik for the test site in Victoria County. Joe Hickey, Arysta LifeScience, is acknowledged for his support of the project. Rudy Alaniz and Clint Livingston, Demonstration Assistants, are thanked for applying treatments and making the counts at 3 and 6 DAT.

Table 1. Comparison of insecticides on sorghum for effect on rice stink bug, Kenneth Hanslik Farm, Victoria County, TX, 2008.

Treatment	Rate oz/acre	Rice stink bug/10 heads				
		Pretrt.	3 DAT	6 DAT	11 DAT	Post-trt avg.
ARY0504-029 + Battalion 0.2EC	20.0 + 9.6	16.5[a]	3.5[bc]	3.5[b]	5.0[ab]	4.0[bc]
ARY0504-029	80.0	21.0[a]	5.5[ab]	7.0[a]	6.3[ab]	6.3[ab]
Battalion 0.2EC	19.2	16.3[a]	0.3[c]	1.0[b]	1.0[b]	0.8[c]
Dimethoate 4EC	12.0	16.3[a]	2.5[bc]	2.0[b]	3.8[b]	2.8[bc]
Nontreated		22.3[a]	9.5[a]	8.0[a]	11.0[a]	9.5[a]
LSD (P = 0.05)		NS	4.40	3.20	6.22	3.64
P > F		.8311	.0069	.0015	.0469	.0021

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

Table 2. Comparison of insecticides on sorghum for effect on sorghum webworm, Kenneth Hanslik Farm, Victoria County, TX, 2008.

Treatment	Rate oz/acre	Sorghum webworm/10 heads			
		Pretrt.	3 DAT	6 DAT	Post-trt avg.
ARY0504-029 + Battalion 0.2EC	20.0 + 9.6	4.5[a]	3.5[a]	0.5[a]	2.0[a]
ARY0504-029	80.0	4.8[a]	2.5[a]	1.5[a]	2..0[a]
Battalion 0.2EC	19.2	4.5[a]	1.0[a]	0.0[a]	0.5[a]
Dimethoate 4EC	12.0	5.3[a]	3.5[a]	1.0[a]	2.3[a]
Nontreated		6.0[a]	2.3[a]	2.3[a]	2.3[a]
LSD (P = 0.05)		NS	NS	NS	NS
P > F		.8796	.0911	.5856	.4248

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

COMPARISON OF INSECTICIDE TREATED AND NONTREATED MIDGE RESISTANT SORGHUM HYBRIDS

Texas AgriLife Research and Extension Center, Nueces County, 2008

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Summary: Five sorghum hybrids (four of which were judged to have a degree of resistance to sorghum midge) were evaluated with and without insecticide protection. Two of the midge resistant hybrids and the susceptible hybrid were judged to have acceptable head exertion; whereas, head exertion in two of the midge resistant hybrids was poor. Significantly greater sorghum midge damage was observed in the susceptible hybrid that was not treated with insecticide. Significantly less damage was found in the insecticide-treated susceptible hybrid compared to the nontreated susceptible hybrid, but it still contained significantly more damage than any of the midge resistant hybrids tested whether they were treated or not with insecticide. Yields were statistically greater in all but one (PHmid 27 no insecticide) of the midge resistant hybrids compared to the susceptible non-insecticide treated hybrid.

Two agronomically acceptable sorghum hybrids were identified with a degree of midge resistance (PHmid 26 and PHmid 27). The level of midge resistance, i.e. effectiveness under high numbers of sorghum midge, has not been determined. Additional studies are planned to confirm these results and to evaluate the hybrids under greater midge numbers. It is anticipated that insecticide treatments will still be required, but the insecticide will help to enhance the yield in the sorghum midge resistant hybrids.

OBJECTIVES: The field study was conducted to compare five sorghum hybrids with and without insecticide treatment to determine damage level by sorghum midge and to measure subsequent yield.

MATERIALS/METHODS: Five sorghum hybrids were planted late (April 17, 2008) in 8-row by 35 foot plots with a 4-row John Deere 6100 buster type planter equipped with research cones to distribute the seed in a randomized complete block design with 4 replications. Rows were spaced on 38-inch centers. The study was conducted at the Meaney Annex of the Texas AgriLife Research and Extension Center at Corpus Christi, Texas.

Baythroid XL (0.9 ounces/acre) was applied with a Spider Trac sprayer through 4X hollow cone nozzles (2/row) in a total volume of 5.6 gpa at 40 psi while traveling at 4 mph. Treatments were made on June 11 and 14 to the center 4 rows in each plot. Sorghum midge were observed in plots but counts were not made due to lack of time.

Treatments were assessed by (1) evaluating head exertion on June 18, (2) estimating midge damage in each plot on June 28 and July 3 [only the July 3 data are shown], (3) harvesting sorghum heads by hand on 13.75 feet of row in each plot on July 22, and (4) threshing the grain to determine yield with a research laboratory machine. Plot weights were converted to 14%

moisture.

Agriculture Research Manager (ARM revision 6.1.13) software was used to conduct analysis of variance, and means were separated by LSD for ease of presentation.

RESULTS/DISCUSSION: Soil conditions in the test were very dry following planting and affected heading on some hybrids more than others (Table 1). The experimental hybrids A8PR1013xTX2882 and ATX640xTX2882 had poor head exertion, but the remaining hybrids (PHmid 26 and 27, and Pioneer 85G85) generally had much better exertion. The greatest amount of sorghum midge damage occurred in the susceptible nontreated Pioneer 85G85 hybrid (77.3%) which was statistically more damage than the 39.4% damage in the same hybrid which was treated with Baythroid. Note that the damage even in the treated susceptible hybrid was quite high; this was due to the limited number of insecticide applications made to the crop. The sorghum midge damage level in the susceptible hybrid, whether treated or not, was much greater than found in the other 4 hybrids. Few statistical differences were observed in sorghum midge damage among the remaining hybrids whether treated with insecticide or not.

Sorghum midge counts were not made on a consistent basis. Sorghum midge numbers must be taken into account in future tests to determine how the hybrids perform under various midge numbers. The preliminary observation is that the two PHmid hybrids offer promise as acceptable hybrids for late planting where sorghum midge would be expected to cause significant damage.

As pointed out above, yields were low due to very dry conditions following planting. The two PHmid hybrids and the insecticide treated susceptible Pioneer 85G85 hybrid produced the highest yields with only the PHmid 27 hybrid not statistically different in yield from the insecticide treated ATX640xTX2882 hybrid.

Dollar return over the nontreated susceptible Pioneer 85G85 hybrid was most favorable for the PHmid 26 and PHmid 27 experimental hybrids both treated and nontreated with Baythroid. These two hybrids had more positive dollar return compared to the treated Pioneer 85G85 susceptible hybrid.

ACKNOWLEDGMENTS: John Jaster, Pioneer Hybrid International and Gary Peterson, Texas AgriLife Research, are thanked for supplying hybrid seed for the study. Rudy Alaniz and Clint Livingston, Demonstration Assistants, are acknowledged for their help in land preparation, planting, applying treatments, harvesting and processing samples, and other phases of work in connection with conduct of the field study.

Table 1. Head exertion, sorghum midge damage, and production of insecticide treated and nontreated grain sorghum hybrids, Texas AgriLife Research and Extension Center, Nueces County, TX, 2008.

Hybrid	Midge insecticide treatments[1/]	Head exertion rating[2/]	% midge damage[3/]	% grain moisture	Yield @14% lb/acre	$ return over susceptible nontreated[4/]
A8PR1013xTX2882	yes	2.0^{de}	1.7^{cd}	15.1^{a}	1481^{cd}	32.60
	no	1.6^{ef}	1.7^{cd}	15.0^{a}	1340^{de}	34.81
ATX640xTX2882	yes	1.3^{ef}	0.5^{d}	13.9^{ab}	1868^{bc}	61.98
	no	1.1^{f}	1.1^{cd}	13.9^{ab}	1041^{ef}	12.09
PHmid 26	yes	3.3^{bc}	2.5^{cd}	13.2^{b}	2135^{ab}	82.27
	no	3.3^{bc}	5.8^{cd}	13.2^{b}	2404^{a}	115.68
PHmid 27	yes	4.3^{a}	11.0^{c}	13.2^{b}	2405^{a}	102.98
	no	3.9^{ab}	8.1^{cd}	13.3^{b}	2139^{ab}	95.53
Pioneer 85G85	yes	2.9^{c}	39.4^{b}	13.9^{ab}	2059^{ab}	76.49
	no	2.8^{cd}	77.3^{a}	13.6^{b}	882^{f}	
LSD (P = 0.05)		0.83	9.87	1.23	434.5	
P > F		0.001	.0001	.0209	.0001	

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

1/ Baythroid XL (0.9 oz/acre) on June 11 and 14.

2/ Head exertion rating: 1 = poor up to 5 = excellent

3/ % midge damage = average estimates of 3 evaluators on July 3.

4/ Sorghum value based on $8.25/cwt; costs include Baythroid XL, ($282.00/gal), application ($4.50/acre x 2 = $9.00/acre), and harvesting/hauling custom rate ($0.65/cwt).

FALL ARMYWORM CONTROL ON WHORL STAGE SORGHUM

Ernest Bippert Farm, Kleberg County, 2008

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SUMMARY: More than 5 fall armyworm larvae/plant of various growth stages were found in whorl stage sorghum. These larvae were mostly concealed deep in the plant whorl making it difficult to contact them with insecticide. The decision was made to treat for the caterpillars followed by counts taken in the treated and nontreated plots 3, 6, and 10 days after treatment (DAT). At 3 DAT only 50% control had been achieved, but caterpillar numbers were declining rapidly in both treated and nontreated sorghum. At 6 DAT control level had increased to 69.4%, but by 10 DAT no fall armyworms could be found in the test. Nontreated sorghum was delayed a few days in heading, but by harvest time no visual differences were apparent.

Harvested sorghum revealed surprising results as significant differences were found for several measurements. Treated sorghum had lower harvest moisture, higher bushel weight, heavier seed, and higher yield all of which were statistically different from the nontreated sorghum. Dollar return favoring treatment was calculated to be $10.47/acre.

OBJECTIVE: The test was conducted to determine the level of fall armyworm control that could be achieved in whorl stage sorghum and to determine the economics of such treatment.

MATERIALS/METHODS: Dekalb DK3707 hybrid sorghum seed was planted on July 16, 2008 on the Ernest Bippert Farm just southeast of the Kingsville Naval Air Station. A 12-row planter delivered 58,000 seed/acre to the 36-inch rows. The sorghum followed wheat with both crops being grown under near no-till practice.

Pretreatment counts of fall armyworm revealed about 5 larvae of various sizes in the test area. Lannate LV (16.0 ounces/acre) + Baythroid XL (1.6 ounces/acre) was applied in 11 gpa spray volume delivered through 8004 air induction nozzles at 80 psi on August 15. Six replicates of each treatment were used to measure differences. Treatment were assessed by (1) examination of 10 plants at various locations in each treatment on August 18, 21, and 25 or 3, 6, and 10 DAT [days after treatment], and (2) harvesting 14.52 feet row by hand at two locations in each of 6 replicates in each treatment on October 28. Harvested heads were dried for approximately 48 hours in an air-forced dryer followed by threshing with plot equipment. Grain moisture, bushel weight, and plot weight in grams were measured. Grain weights were adjusted to the 14% standard moisture level. Weight of 100 seed adjusted to 14% moisture was also calculated.

Agriculture Research Manager (ARM revision 6.1.13) software was used to conduct analysis of variance. Means were separated by least significant difference (LSD) for ease of presentation.

RESULTS/DISCUSSION: Fall armyworm counts before and after treatment are shown in Table 1. Their numbers before treatment amounted to more than 5 per plant and had declined to 1 per plant in nontreated plots both at 3 and 6 DAT, and by 10 DAT no fall armyworm larvae were found in plants examined in either treatment. Control level achieved at 3 DAT was 50%, and by 6 DAT it had increased to 69%. No plant damage ratings were made. We were not sure if this level of control was enough to achieve a yield response.

The fact that no fall armyworm larvae could be found at 10 DAT may be the reason that the short control period actually resulted in observed yield response (Table 2). Confidence in the increased yield figure was enhanced by the significant differences found in grain moisture and bushel weight at harvest. Grain moisture was significantly lower and the bushel weight was significantly higher in the insecticide treated sorghum. Individual seeds from the insecticide treated sorghum adjusted to 14% moisture were significantly heavier than that from nontreated plots. The reduced weight appears to have resulted from leaf removal by fall armyworm. Dollar return over the nontreated sorghum amounted to $10.47/acre. Costs attributed to control included insecticide, application, and harvesting/hauling the extra sorghum as a result of increased yield.

ACKNOWLEDGMENTS: Thanks are extended to Ernest Bippert for his interest and help in conducting this study.

Table 1. Effect of insecticide applied for fall armyworm in pre-boot stage sorghum, Ernest Bippert Farm, Kleberg County, TX, 2008.

Treatment	Number fall armyworm/10 plants				Post trt. avg.
	Pretrt.	3 DAT[1/]	6 DAT	10 DAT	
Lannate LV + Baythroid XL (16 oz/acre + 1.6 oz/acre)	52.5[a]	5.0[b]	3.3[b]	0.0[a]	2.8[b]
Nontreated	50.5[a]	10.0[a]	10.8[a]	0.0[a]	6.9[a]
LSD (P = 0.05)	NS	2.10	2.10	NS	0.93
P > F	.7575	.0017	.0001	1.00	.0001

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

[1/] DAT = days after treatment

Table 2. Economic impact of insecticide treatment for fall armyworm on sorghum production, Ernest Bippert Farm, Kleberg County, TX, 2008.

Treatment	Grain moisture %	Seed wt.[1/] grams/100 seed	Bushel weight	Yield lb/acre	$ return over nontreated[2/]
Lannate LV + Baythroid XL (16 oz/acre + 1.6 oz/acre)	17.8[b]	3.1476[a]	55.2[a]	3541[a]	10.47
Nontreated	19.6[a]	2.9063[b]	53.4[b]	3202[b]	
LSD (P = 0.05)	1.50	0.1004	1.60	230.9	
P > F	.032	.0497	.032	.0130	

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

1/ Adjusted to 14% moisture

2/ Costs include Lannate LV ($60.00/gal) and Baythroid XL ($180.00/gal), application ($2.50/acre), and harvesting/hauling ($0.85/cwt). Grain value ($7.00/cwt).

PRELIMINARY REPORT ON INSECT PESTS IN BIOENERGY SORGHUMS GROWN IN SOUTH TEXAS

Texas Agrilife Research Stations, Weslaco, Corpus Christi, and College Station, 2008

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SUMMARY: Insects observed in bioenergy sorghums included corn flea beetle, lesser cornstalk borer, sugarcane rootstock weevil, and Mexican rice borer. Of these insects, sugarcane rootstock weevil and Mexican rice borer are of most potential concern although it is not known how much impact they might have on production. The primary damage by sugarcane rootstock weevil appears to be reduction in effective root mass. The Mexican rice borer tunneling effects are unknown, but the most damaging aspect of the borer may be the tendency of infested plants to lodge. This borer tends to girdle the stalk from the inside. Another borer that will probably occur in future years is the sugarcane borer; it does not cause as much girdling. The two borer species are of concern since the are more likely to occur in high numbers in crops that are grown during the July through October period.

OBJECTIVES: The objective of this work was to conduct a survey of insect pests present in bioenergy sorghums being evaluated in nurseries, and to report on those that might be of most concern in production systems.

MATERIALS/METHODS: Ten plants were examined for insect activity from randomly selected bioenergy sorghum entries in plant nurseries located at College Station, Corpus Christi, and Weslaco. At Corpus Christi in October, 3-4 stalks from 11 locations in the nursery were harvested, split, and examined for evidence of borer tunneling. Total stalk and tunnel lengths were measured.

RESULT/DISCUSSION: Bioenergy sorghum plots were examined for insect activity at College Station in July, at Corpus Christi in July - October, and at Weslaco in October. Insects included the corn flea beetle feeding on leaves at all sites, some evidence of lesser corn stalk borer in drier areas at College Station, sugarcane rootstock weevil at College Station and Corpus Christi, and Mexican rice borer at all three locations. Fall armyworm had been expected but was not observed.

Flea beetle feeding, although extensive, was not judged to be a serious problem since they were on lower leaves which were under dense canopy. There was nothing unusual about the presence of lesser corn stalk borer as it is likely to occur periodically at low levels in very dry soil. Effects of sugarcane rootstock weevil on plants are unknown and may need more study.

The insect of most concern at all three locations was the Mexican rice borer. In 2008 Mexican rice borer was observed in several grass crops (corn, rice, sorghum) at moderate to high numbers.

The greatest numbers were observed in plants during the August to October time period. At Corpus Christi average length of the total stalk tunneled ranged from 13.1-16.7%, and tunneling appeared to be equal in all the entries examined. Furthermore, 100% of the stalks examined were found to be infested. Although exact measurements were not taken at Weslaco, tunneling from Mexican rice borer was judged to be about the same as measured at Corpus Christi. The Mexican rice borer tends to girdle the stalk from the inside and thereby weaken stalks to the point that they lodge. Lodging that was observed in plots may have been the result of borer feeding. The sugarcane borer probably does not cause as much girdling; therefore, stalk feeding by this species may not result in the same level of girdling as caused by Mexican rice borer.

COMPARISON OF SEED TREATMENTS FOR CONTROL OF THRIPS ON COTTON

Jimmy Hays Farm, Calhoun County, 2008

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SUMMARY: All insecticides reduced thrips numbers at the 1-2 leaf stage compared with the numbers found in the nontreated cotton. Total thrips (larvae and adults) in this stage cotton were generally reduced the most in treatments containing Temik, and by the 4-leaf stage, Temik treated plots generally contained significantly fewer thrips compared with other insecticide treatments. Cotton aphid numbers were very low at the site numbering but 2.7/plant in nontreated cotton at the 1-2 leaf stage and were only slightly higher than that in several treatments at the 4-leaf stage of plant development. Spider mite and fire ant numbers were low throughout the study. Plant damage was significantly reduced by all insecticide treatments at both the 2-leaf and 4-leaf stages of development. The non-insecticide plots were the only ones that could be readily picked out due to thrips damage.

No differences were observed in fiber characteristics. Statistical differences were not found in lint production; however, six of the eight insecticide treatments produced more cotton lint than the nontreated. The average lint increase was 29.5 lb/acre**.** We have observed for many years similar results, i.e. an inability to show significant yield increase in single tests. However, when the tests, over time, are pooled, statistically significant yield increase can be demonstrated.

OBJECTIVES: The cotton study was conducted to measure the effect of insecticide treatments upon thrips, aphid, spider mite, and fleahopper numbers; to evaluate changes in plant growth due to treatment; and to measure the impact of treatments on lint production.

MATERIALS/METHODS: The experiment was planted on April 9, 2008 on the Jimmy Hays Farm just east of Highway 87 on Foester Road in Calhoun County, Texas. Corn had been planted on the site in 2007. A 2-row John Deere 7100 MaxEmerge planter equipped with research cone seed boxes was used to plant 55,024 seed/acre in 4-row by 19-foot plots on 38-inch centers with 3 replications of 9 treatments. FM 9063 B2F variety cotton was planted into the clay loam soil (38% sand, 24% silt, 38% clay). The 7.2 pH soil contained 2.07% organic matter. Warm soil conditions existed at planting. Glyphosate was applied for weed control. Temik 15G (5.0 lb/acre) was applied into the seed furrow.

Treatments were assessed by (1) counting the number of plants on 10-row feet from the center two rows in each plot, (2) evaluating plant vigor or damage where 1 = no damage up to 5 = severe stunting and leaf curling, (3) cutting 10 plants from each plot at the 1-2 leaf stage [April 29] and at the 4-leaf stage [May 8] and placing them in pint jars containing 70% ethyl alcohol for later examination by passing the liquid through filter paper, (4) counting the number of thrips, aphids, spider mites, and fire ants on the filter paper from the plant samples listed above, and (5) counting the number of plant nodes on 10 plants/plot at the 7-8 true leaf stage on May 22. One row of the center two rows in each plot was harvested with a 1-row International Harvester model 120A spindle picker on August 12. Seed cotton samples were weighed, a sample was taken for ginning on a 10-saw Eagle Laboratory machine, and a 30-gram sample was sent for fiber analysis to the Fiber and Biopolymer Research Institute at Lubbock, Texas.

Agriculture Research Manager (ARM revision 6.1.13) software was used to conduct analysis of variance. Means were separated by least significant difference (LSD) for ease of presentation.

RESULTS/DISCUSSION: Larval thrips numbers in 1-2 leaf cotton were reduced by all insecticide treatments, but this reduction was not found in total thrips numbers (Table 1). By the 4-leaf growth stage only treatments containing Temik had counts significantly lower than the plots where no insecticide was used. Significant difference in aphid numbers was only detected at 20 DAP (Table 2). In that case all insecticide treated cotton had fewer cotton aphids, but even in the nontreated cotton there were only 2.7 aphids/plant. Cotton aphids continued to decrease following 20 DAP. No differences were found in plant stand, total plant nodes at the 8-leaf stage, or in the damage rating at 14 DAP (Table 3). However, at 20 and 29 DAP, significantly more damage was noted in the nontreated cotton, and these were the only plots in which the damage was visually obvious.

Statistical differences were not found in fiber characteristics or lint production (Table 4). The same trend often observed, but not demonstrated statistically, of increased yield in insecticide treatments was found. In this case, the average yield increase in insecticide treated cotton was 29.5 lb lint/acre.

ACKNOWLEDGMENTS: Jimmy Hays is acknowledged for providing land for the test site and his help with conduct of the study. Gary Schwarlose, Bayer CropScience, is thanked for his support of this work. Rudy Alaniz and Clint Livingston, Demonstration Assistants, are thanked for their help with planting, harvest, and processing of the cotton. The Texas Department of Agriculture Food and Fibers Research Council is thanked for funding the cost for cotton fiber analysis.

Table 1. Number of thrips on cotton treated with systemic insecticide applied to seed, placed into the seed furrow, or combinations of both, Jimmy Hays Farm, Calhoun County, TX, 2008.

Treatment (rate)	Number thrips per 10 plants: 1-2 leaf (20 DAP)[1/] larva	adult	total	4-leaf (29 DAP) larva	adult	total	Total 2-date avg.
Aeris 5FS (0.75 mg ai/seed)	0.0^{b}	14.3^{bcd}	14.3^{a}	14.7^{abc}	6.3^{a}	21.0^{ab}	17.7^{bc}
Avicta CP 5FS (.49 mg ai/seed)	0.3^{b}	24.3^{ab}	24.7^{a}	23.7^{ab}	11.0^{a}	34.7^{a}	29.7^{ab}
Aeris 5FS + Temik 15G (0.75 mg ai/seed + 3.5 lb/acre)	0.0^{b}	9.0^{d}	9.0^{a}	2.0^{c}	2.3^{a}	4.3^{b}	6.7^{c}
Avicta CP 5FS + Temik 15G (.49 mg ai/seed + 3.5 lb/acre)	0.0^{b}	9.0^{d}	9.0^{a}	2.7^{c}	3.7^{a}	6.3^{b}	7.7^{c}
Temik 15G (3.5 lb/acre)	0.0^{b}	15.7^{bcd}	15.7^{a}	1.0^{c}	4.7^{a}	5.7^{b}	10.7^{c}
Temik 15G (5.0 lb/acre)	0.7^{b}	11.7^{cd}	12.3^{a}	2.7^{bc}	6.0^{a}	8.7^{b}	10.5^{c}
Gaucho Grande 5FS (0.375 mg ai/seed)	0.0^{b}	30.7^{a}	30.7^{a}	9.7^{bc}	11.0^{a}	20.7^{ab}	25.7^{ab}
Cruiser 5FS (0.342 mg ai/seed)	0.7^{b}	23.3^{abc}	24.0^{a}	19.7^{ab}	8.0^{a}	27.7^{a}	25.8^{ab}
Nontreated	18.3^{a}	15.0^{bcd}	33.3^{a}	30.3^{a}	5.7^{a}	36.0^{a}	34.7^{a}
LSD (P = 0.05)	8.91	12.39	NS	15.95	NS	18.56	14.98
P > F	.0075	.0203	.0934	.0075	.0610	.0075	.0058

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

[1/] DAP = Days After Planting

Table 2. Number of aphids and spider mites on cotton treated with systemic insecticide applied to seed, placed into the seed furrow, or combinations of both, Jimmy Hays Farm, Calhoun County, TX, 2008.

	Number aphids/10 plants		Number mites/10 plants	
Treatment (rate)	1-2 leaf (20 DAP)[1/]	4-leaf (29 DAP)	1-2 leaf (20 DAP)	4-leaf (29 DAP)
Aeris 5FS (0.75 mg ai/seed)	1.0[b]	2.3[a]	0.3[a]	0.3[a]
Avicta CP 5FS (.49 mg ai/seed)	1.0[b]	4.7[a]	0.3[a]	1.0[a]
Aeris 5FS + Temik 15G (0.75 mg ai/seed + 3.5 lb/acre)	0.7[b]	4.3[a]	0.3[a]	0.0[a]
Avicta CP 5FS + Temik 15G (.49 mg ai/seed + 3.5 lb/acre)	0.7[b]	1.3[a]	0.0[a]	0.3[a]
Temik 15G (3.5 lb/acre)	2.0[b]	2.0[a]	0.7[a]	0.7[a]
Temik 15G (5.0 lb/acre)	1.0[b]	1.3[a]	0.7[a]	1.0[a]
Gaucho Grande 5FS (0.375 mg ai/seed)	1.0[b]	4.7[a]	0.0[a]	0.0[a]
Cruiser 5FS (0.342 mg ai/seed)	3.3[b]	2.3[a]	0.0[a]	0.0[a]
Nontreated	26.7[a]	3.3[a]	0.3[a]	0.0[a]
LSD (P = 0.05)	11.08	NS	NS	NS
P > F	.0023	.4384	.6221	.6717

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

[1/] DAP = Days After Planting

Table 3. Plant population, total plant nodes at 7-8 true leaves, and damage ratings on cotton treated with systemic insecticide applied to seed, placed into the seed furrow, or combinations of both, Jimmy Hays Farm, Calhoun County, TX, 2008.

Treatment (rate)	Plants 1000's/ acre	Total plant nodes[1/]	Damage rating[2/] 14 DAP[3/]	20 DAP	29 DAP	3-date avg.
Aeris 5FS (0.75 mg ai/seed)	32.1[a]	8.2[a]	2.0[a]	1.5[b]	1.7[cd]	1.7[bcd]
Avicta CP 5FS (.49 mg ai/seed)	31.6[a]	8.2[a]	2.0[a]	1.4[b]	2.7[b]	2.0[b]
Aeris 5FS + Temik 15G (0.75 mg ai/seed + 3.5 lb/acre)	31.9[a]	8.8[a]	2.0[a]	1.2[b]	1.4[cd]	1.5[cd]
Avicta CP 5FS + Temik 15G (.49 mg ai/seed + 3.5 lb/acre)	38.1[a]	8.3[a]	1.8[a]	1.3[b]	1.6[cd]	1.6[cd]
Temik 15G (3.5 lb/acre)	30.7[a]	9.1[a]	1.5[a]	1.2[b]	1.6[cd]	1.4[d]
Temik 15G (5.0 lb/acre)	28.7[a]	8.5[a]	2.0[a]	1.2[b]	1.3[d]	1.5[cd]
Gaucho Grande 5FS (0.375 mg ai/seed)	26.2[a]	8.6[a]	2.0[a]	1.4[b]	1.9[bcd]	1.8[bcd]
Cruiser 5FS (0.342 mg ai/seed)	31.4[a]	8.3[a]	2.2[a]	1.4[b]	2.2[bc]	1.9[bc]
Nontreated	34.4[a]	8.1[a]	2.7[a]	3.7[a]	4.2[a]	3.5[a]
LSD (P = 0.05)	NS	NS	NS	0.54	0.78	0.41
P > F	.2132	.8574	.0927	.0001	.0001	.0001

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

[1/] Average number nodes counted on May 22 (7-8 true leaves).

[2/] Damage ratings range from 1 = no damage up to 5 = severe stunting and leaf curling.

[3/] DAP = Days After Planting

Table 4. Fiber characteristics and yield of cotton treated with systemic insecticide applied to seed, placed into the seed furrow, or combinations of both, Jimmy Hays Farm, Calhoun County, TX, 2008.

Treatment (rate)	Mic	Length inches	Unif. Ratio	Strength g/tex	Elong. %	Lint yield lb/acre
Aeris 5FS (0.75 mg ai/seed)	4.7[a]	1.15[a]	83.3[a]	30.9[a]	4.6[a]	590[a]
Avicta CP 5FS (.49 mg ai/seed)	4.6[a]	1.16[a]	82.5[a]	31.8[a]	3.6[a]	605[a]
Aeris 5FS + Temik 15G (0.75 mg ai/seed + 3.5 lb/acre)	4.7[a]	1.17[a]	83.2[a]	32.0[a]	4.5[a]	629[a]
Avicta CP 5FS + Temik 15G (.49 mg ai/seed + 3.5 lb/acre)	4.6[a]	1.18[a]	83.6[a]	31.4[a]	4.5[a]	640[a]
Temik 15G (3.5 lb/acre)	4.6[a]	1.15[a]	82.8[a]	30.6[a]	4.7[a]	691[a]
Temik 15G (5.0 lb/acre)	4.7[a]	1.14[a]	82.4[a]	31.1[a]	4.6[a]	593[a]
Gaucho Grande 5FS (0.375 mg ai/seed)	4.6[a]	1.16[a]	84.0[a]	31.7[a]	4.6[a]	627[a]
Cruiser 5FS (0.342 mg ai/seed)	4.8[a]	1.16[a]	82.9[a]	30.8[a]	4.6[a]	621[a]
Nontreated	4.6[a]	1.17[a]	82.1[a]	32.1[a]	4.4[a]	595[a]
LSD (P = 0.05)	NS	NS	NS	NS	NS	NS
P > F	.8991	.6882	.3157	.8246	.7083	.9608

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

SYSTEMIC INSECTICIDES FOR CONTROL OF EARLY SEASON INSECTS IN COTTON: TEST I

Jimmy Hays Farm, Calhoun County, 2008

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SUMMARY: Relatively high numbers of thrips infested 1-2 leaf through 4-leaf cotton, but aphid and spider mite numbers were low. All insecticide treatments reduced thrips numbers compared to the nontreated cotton. Furthermore, plant damage ratings generally reflected thrips levels as the nontreated cotton contained visibly more plant damage. These plots could be easily seen in each replication. Greatest thrips reduction occurred in the Temik treated cotton, but the average for the two count dates in the Temik plots were not significantly different from Gaucho Grande, Cruiser + EXC211 at 0.6 mg ai/seed, Cruiser + A12871, and Cruiser + A9364 (numbered compounds are experimentals). Fleahoppers were too low to determine if treatments had effect on their numbers.
Since the cotton was planted late (April 9) less damage from thrips was expected compared with planting under cooler conditions. That, in fact, was the case as statistically significant yield increases due to thrips control did not occur. Another factor contributing to lack of yield impact may have been the very dry conditions which prevailed during the season. However, it should be noted that all insecticide treatments evaluated, except one, produced more yield than the nontreated cotton.

OBJECTIVES: The cotton study was conducted to measure the effect of insecticide treatments on thrips, aphids, spider mites, and fleahoppers; to evaluate changes in plant growth due to treatment; and to measure the impact of treatments on lint production.

MATERIALS/METHODS: The experiment was planted on April 9, 2008 on the Jimmy Hays Farm just east of Highway 87 on Foester Road in Calhoun County, Texas. Corn had been planted on the site in 2007. A 2-row John Deere 7100 MaxEmerge planter equipped with research cone seed boxes was used to plant 55,024 seed/acre in 4-row by 19-foot plots on 38-inch centers with 3 replications of 9 treatments. Phytogen 485 WRF variety cotton was planted into the clay loam soil (38% sand, 24% silt, 38% clay). The 7.2 pH soil contained 2.07% organic matter. Warm soil conditions existed at planting. Glyphosate was applied for weed control. Temik 15G (5.0 lb/acre) was applied into the seed furrow.

Treatments were assessed by (1) counting the number of plants on 10-row feet in the center two rows in each plot, (2) evaluating plant vigor or damage where 1 = no damage up to 5 = severe stunting and leaf curling, (3) cutting 10 plants from each plot at the 1-2 leaf stage [April 29] and at the 4-leaf stage [May 8] and placing them in pint jars containing 70% ethyl alcohol for later examination by passing the liquid through filter paper, (4) counting the number of thrips, aphids, spider mites, and fire ants on the filter paper from the plant samples listed above, and (5) counting the number of fleahoppers on 10 plants per plot on May 21. One row of the center two rows in each plot was harvested with a 1-row International Harvester model 120A spindle picker on August 12. Seed cotton samples were weighed, a sample was taken for ginning on a 10-saw Eagle Laboratory machine, and a 30-gram sample was sent for fiber analysis to the Fiber and Biopolymer Research Institute at Lubbock, Texas.

Agriculture Research Manager (ARM revision 6.1.13) software was used to conduct analysis of variance. Means were separated by least significant difference (LSD) for ease of presentation.

RESULTS/DISCUSSION: Thrips numbers were relatively heavy as observed in the nontreated cotton on both inspection dates (Table 1). There were 5.8 and 13.0 thrips per plant in the non-insecticide treatment at the 1-2 and 4-leaf stages of plant development respectively. The average number of thrips per plant in the nontreated cotton across both inspection dates was 9.83/plant. The least number of thrips were generally found in Temik treated cotton although the numbers in this treatment were not always statistically lower than other insecticide treatments. No differences were found in aphid or spider mite numbers (Table 2), and numbers of these two arthropods remained very low. Damage ratings which reflected the thrips infestation are given in Table 3. It was easy to visually find the plots that were not treated with insecticide on inspection dates at 14, 20, and 29 days after planting (DAP). All insecticide treated cotton had excellent damage ratings, although there were some statistical differences among the various insecticides evaluated. Fleahopper numbers were too low to determine if treatments had any effect on their numbers, but even here the greatest numbers were in the non-insecticide cotton plots.

Cotton fiber characteristics and lint production data are given in Table 4. Treatments had no impact on fiber characteristics, nor were statistical differences found in the yield data. However, similar to the Nueces County test, the average numerical yield increase in insecticide treated cotton was measured at 38 lb lint/acre. Furthermore, all insecticide treatments, except one, produced more lint cotton than did the non-insecticide treated cotton.

ACKNOWLEDGMENTS: Jimmy Hays is acknowledged for providing land for the test site and his help with conduct of the study. Thanks are extended to Brad Minton and Brian Bacak, Syngenta Crop Protection, Inc., for support in the form of a planter, equipment, and funding. Rudy Alaniz and Clint Livingston, Demonstration Assistants, are thanked for their help with planting, harvest, and processing of the cotton. The Texas Department of Agriculture Food and Fibers Research Council is thanked for funding the cost for cotton fiber analysis.

Table 1. Number of thrips on cotton treated with systemic insecticide applied to seed or placed into the seed furrow, Jimmy Hays Farm, Calhoun County, TX, 2008.

Treatment (rate)	Number thrips per 10 plants						
	1-2 leaf (20 DAP)[1/]			4-leaf (29 DAP)			2-date avg.
	larva	adult	total	larva	adult	total	
Cruiser 5FS (.347 mg ai/seed)	0.0[b]	15.3[a]	15.3[b]	11.0[bc]	22.7[a]	33.7[b]	24.5[b]
Gaucho Grande 5FS (.375 mg ai/seed)	0.0[b]	21.3[a]	21.3[b]	7.3[bc]	8.7[a]	16.0[b]	18.7[bc]
Cruiser 5FS + EXC211 (.347 + 0.6 mg ai/seed)	0.0[b]	18.3[a]	18.3[b]	6.3[bc]	15.7[a]	22.0[b]	20.2[bc]
Cruiser 5FS + EXC211 (.347 + 0.9 mg ai/seed)	0.0[b]	22.7[a]	22.7[b]	13.7[bc]	20.0[a]	33.7[b]	28.2[b]
Cruiser 5FS + STP28271 (.347 + .0451mg ai/seed)	0.0[b]	15.7[a]	15.7[b]	25.0[b]	13.7[a]	38.7[b]	27.2[b]
Cruiser 5FS + A12871 (.347 + .0903 mg ai/seed)	0.0[b]	13.7[a]	13.7[b]	13.7[bc]	14.7[a]	28.3[b]	21.0[bc]
Cruiser 5FS + A9364 (.347 + .0451 mg ai/seed)	0.0[b]	14.7[a]	14.7[b]	8.0[bc]	18.7[a]	26.7[b]	20.7[bc]
Temik 15G (5.0 lb/acre)	0.7[b]	5.0[a]	5.7[b]	2.0[c]	8.7[a]	10.7[b]	8.2[c]
Nontreated	36.7[a]	21.3[a]	58.0[a]	111.0[a]	18.7[a]	129.7[a]	93.8[a]
LSD (P = 0.05)	17.92	NS	24.37	20.04	NS	29.92	13.8
P > F	.0074	.1712	.0191	.0001	.5274	.0001	.0001

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

[1/] DAP = Days After Planting

Table 2. Number of aphids and spider mites on cotton treated with systemic insecticide applied to seed or placed into the seed furrow, Jimmy Hays Farm, Calhoun County, TX, 2008.

	Number aphids/10 plants		Number mites/10 plants	
Treatment (rate)	1-2 leaf (20 DAP)[1/]	4-leaf (29 DAP)	1-2 leaf (20 DAP)	4-leaf (29 DAP)
Cruiser 5FS (.347 mg ai/seed)	1.3[a]	4.0[a]	0.0[a]	1.3[a]
Gaucho Grande 5FS (.375 mg ai/seed)	1.7[a]	4.0[a]	0.0[a]	1.0[a]
Cruiser 5FS + EXC211 (.347 + 0.6 mg ai/seed)	0.0[a]	1.3[a]	0.0[a]	0.0[a]
Cruiser 5FS + EXC211 (.347 + 0.9 mg ai/seed)	0.0[a]	2.3[a]	0.0[a]	1.0[a]
Cruiser 5FS + STP28271 (.347 + .0451mg ai/seed)	0.0[a]	4.3[a]	0.7[a]	0.3[a]
Cruiser 5FS + A12871 (.347 + .0903 mg ai/seed)	1.0[a]	2.0[a]	0.0[a]	2.3[a]
Cruiser 5FS + A9364 (.347 + .0451 mg ai/seed)	0.0[a]	2.7[a]	0.0[a]	2.7[a]
Temik 15G (5.0 lb/acre)	0.3[a]	3.7[a]	0.0[a]	1.0[a]
Nontreated	0.3[a]	1.7[a]	0.0[a]	1.7[a]
LSD (P = 0.05)	NS	NS	NS	NS
P > F	.4584	.8529	.4726	.5637

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

[1/] DAP = Days After Planting

Table 3. Plant population, damage ratings, and fleahopper numbers on cotton treated with systemic insecticide applied to seed or placed into the seed furrow, Jimmy Hays Farm, Calhoun County, TX, 2008.

Treatment (rate)	Plants 1000's/acre	Damage rating[1/] 14 DAP[2/]	Damage rating[1/] 20 DAP	Damage rating[1/] 29 DAP	Damage rating[1/] 3-date avg.	Fleahoppers/ 10 plants (42 DAP)
Cruiser 5FS (.347 mg ai/seed)	27.1[a]	1.8[bcd]	1.5[bc]	1.9[cd]	1.7[bcd]	0.3[a]
Gaucho Grande 5FS (.375 mg ai/seed)	28.4[a]	1.8[bcd]	1.7[b]	1.8[cd]	1.8[bcd]	0.7[a]
Cruiser 5FS + EXC211 (.347 + 0.6 mg ai/seed)	25.4[a]	2.2[ab]	1.3[bc]	2.3[bcd]	2.0[b]	0.0[a]
Cruiser 5FS + EXC211 (.347 + 0.9 mg ai/seed)	27.3[a]	2.0[abc]	1.5[bc]	2.7[b]	2.1[b]	0.7[a]
Cruiser 5FS + STP28271 (.347 + .0451mg ai/seed)	32.8[a]	1.5[cd]	1.2[c]	2.1[bcd]	1.6[cd]	0.7[a]
Cruiser 5FS + A12871 (.347 + .0903 mg ai/seed)	39.4[a]	1.8[bcd]	1.4[bc]	2.5[bc]	1.9[bc]	0.3[a]
Cruiser 5FS + A9364 (.347 + .0451 mg ai/seed)	26.8[a]	2.3[ab]	1.4[bc]	2.1[bcd]	1.9[bc]	0.3[a]
Temik 15G (5.0 lb/acre)	32.1[a]	1.3[d]	1.3[bc]	1.7[d]	1.4[d]	0.0[a]
Nontreated	25.2[a]	2.5[a]	3.7[a]	4.5[a]	3.6[a]	1.0[a]
LSD (P = 0.05)	NS	0.438	0.43	0.70	0.41	NS
P > F	.0932	.0365	.0001	.0001	.0001	.8059

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

[1/] Damage ratings range from 1 = no damage up to 5 = severe stunting and leaf curling.

[2/] DAP = Days After Planting

Table 4. Fiber characteristics and yield of cotton treated with systemic insecticide applied to seed or placed into the seed furrow, Jimmy Hays Farm, Calhoun County, TX, 2008.

Treatment (rate)	Mic	Length inches	Unif. Ratio	Strength g/tex	Elong. %	Lint yield lb/acre
Cruiser 5FS (.347 mg ai/seed)	4.8[a]	1.12[a]	85.1[a]	32.3[a]	6.7[a]	622[a]
Gaucho Grande 5FS (.375 mg ai/seed)	5.0[a]	1.10[a]	84.7[a]	30.6[a]	6.9[a]	679[a]
Cruiser 5FS + EXC211 (.347 + 0.6 mg ai/seed)	5.0[a]	1.11[a]	84.4[a]	31.6[a]	6.7[a]	638[a]
Cruiser 5FS + EXC211 (.347 + 0.9 mg ai/seed)	5.0[a]	1.12[a]	84.3[a]	31.3[a]	6.8[a]	612[a]
Cruiser 5FS + STP28271 (.347 + .0451mg ai/seed)	5.0[a]	1.09[a]	84.8[a]	29.6[a]	6.9[a]	643[a]
Cruiser 5FS + A12871 (.347 + .0903 mg ai/seed)	4.9[a]	1.10[a]	84.1[a]	31.6[a]	6.6[a]	549[a]
Cruiser 5FS + A9364 (.347 + .0451 mg ai/seed)	5.0[a]	1.10[a]	84.0[a]	30.4[a]	6.5[a]	616[a]
Temik 15G (5.0 lb/acre)	5.0[a]	1.11[a]	83.9[a]	30.9[a]	6.8[a]	643[a]
Nontreated	4.9[a]	1.10[a]	83.9[a]	30.8[a]	6.7[a]	587[a]
LSD (P = 0.05)	NS	NS	NS	NS	NS	NS
P > F	.9463	.4684	.2235	.0736	.9331	.2867

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

SYSTEMIC INSECTICIDES FOR CONTROL OF EARLY SEASON INSECTS IN COTTON: TEST II

Texas AgriLife Research and Extension Center, Nueces County, 2008

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SUMMARY: Thrips numbers were slightly above the established economic injury level in nontreated cotton at the 2-leaf stage, but by the 4-leaf stage their numbers were slightly below the economic injury level within the nontreated plots. However, some of the insecticide treatments contained slightly more thrips than that recognized as the economic injury level at the 4-leaf stage. Larval thrips numbers were significantly greater in the nontreated cotton at the 2-leaf stage, but no significant differences were ever found in adult thrips counts, total thrips counts, or the total thrips counts averaged over both inspection dates.

Cotton aphid numbers were significantly higher in nontreated cotton compared with all other treatments except for the Temik treatment in 4-leaf cotton (28 days after planting). There was a trend for fewer thrips in plots with high aphid numbers. Fire ants were numerically more abundant at 21 DAP in the nontreated cotton which seems to be a reflection of the greater numbers of aphids in these plots (fire ants tend to increase when aphids increase). Damage ratings were significantly greater in the nontreated cotton at 28 DAP, 41 DAP, and for the combined season average. The damage ratings appear to have been caused by the cotton aphid.

Differences were not found in spider mite numbers. No effects were noted on the cotton fleahopper.

Statistical differences were not found in fiber characteristics or in lint production. Strikingly, all insecticide treated cotton produced numerically more lint than cotton without seed or in-furrow insecticide. The insecticide treated cotton averaged 38 lb lint/acre more than the nontreated (exactly the same increase as in Test 1). Furthermore, using the 10% probability level instead of the selected 5% level, there would be significant difference in yield above the nontreated cotton for all but one of the insecticide treatments.

OBJECTIVES: The cotton study was conducted (1) to measure the effect of insecticide treatments upon thrips, aphids, spider mites, fire ants, and fleahoppers; (2) to evaluate changes in plant growth due to treatment; and (3) to measure the impact of treatments on lint production.

MATERIALS/METHODS: The experiment was planted on March 28, 2008 on the Meaney Annex of the Texas AgriLife Research and Extension Center at Corpus Christi, Texas. Sorghum had been planted on the site in 2007. A 4-row John Deere 6100 buster type planter equipped with research cone seed boxes was used to plant 55,024 seed/acre in 4-row by 40-foot plots on 38-inch centers with 4 replications of 9 treatments. Phytogen 485 WRF variety cotton was planted into the sandy clay loam soil (52% sand, 16% silt, 32% clay). The 7.8 pH soil contained 1.44% organic matter. Pre-plant fertilizer consisted of 88-44-0-4 ZN. Herbicide applied was Dual II Magnum 7.64 lb/gallon (1.0 pint/acre) + Cotoran 4L (1.0 quart/acre) on the planting date. Fusion 2.56 (12.0 ounces/acre) and Staple 3.2LX (2.6 ounces/acre) were also applied in May for weed control. Temik 15G (5.0 lb/acre) was applied into the seed furrow.

Treatments were assessed by (1) counting the number of plants on 10-row feet from the center two rows in each plot on April 14; (2) evaluating plant vigor or damage where 1 = no damage up to 5 = severe stunting and leaf curling on 4/14, 4/25, and 5/8; (3) cutting 10 plants from each plot at the 2 leaf stage [4/18] and at the 4-leaf stage [4/25] and placing them in pint jars containing 70% ethyl alcohol for later examination by passing the liquid through filter paper; (4) counting the number of thrips, aphids, spider mites, and fire ants on the filter paper from the plant samples listed above; and (5) counting the number of fleahoppers on 10 plants per plot on May 21 with cotton at the 11-leaf stage. The two center rows in each plot were harvested on August 5 with a 2-row John Deere 9900L spindle picker. Seed cotton samples were weighed, a sample was taken for ginning on a 10-saw Eagle Laboratory machine, and a 30-gram sample was sent for fiber analysis to the Fiber and Biopolymer Research Institute at Lubbock, Texas.

Agriculture Research Manager (ARM revision 6.1.13) software was used to conduct analysis of variance. Means were separated by least significant difference (LSD) for ease of presentation.

RESULTS/DISCUSSION: Thrips were counted 21 and 28 days after planting (DAP) at the 2- and 4-leaf stages, respectively (Table 1). In 2-leaf cotton, significantly more larval thrips were found in the nontreated plots, but although numerically more total thrips were found in the nontreated plots, they were not statistically greater than in the other treatments. By the 4-leaf stage differences were not observed, and numbers were only slightly above the established action threshold in some of the treatments. Cotton aphid numbers, although at high numbers for only a short period, were significantly greater in nontreated cotton compared with all other treatments except for the Temik treatment at the 4-leaf stage (Table 2). The aphids in nontreated cotton caused noticeable cupping of leaves and the nontreated cotton plots could be picked out visually. In fact, significantly higher damage ratings (Table 3) were found in the non-insecticide treated cotton at 28 DAP, 41 DAP, and for the 3-date average (17, 28, and 41 DAP). Thrips and aphid infestation levels were judged to be slightly above treatment action levels; therefore, little impact was expected on lint production.

Cotton fiber characteristics and lint production data are given in Table 4. There were no differences due to treatment in fiber characteristics or lint production at the 5% level of probability. However, lint production in all insecticide treated cotton exceeded that in the non-insecticide treated cotton; the average increase was 38 lb lint/acre. If the 10% probability level had been chosen, all but one of the insecticide treatments would have been judged to have statistically exceeded the nontreated cotton lint yield. It appears that thrips and the cotton aphid may have been responsible for the numerically better lint production in the insecticide treatments, again considering that we could not show it statistically at the 5% level.

ACKNOWLEDGMENTS: Thanks are extended to Brad Minton, Syngenta Crop Protection, Inc., for his funding support. Rudy Alaniz and Clint Livingston, Demonstration Assistants, are thanked for their help with planting, harvest, and processing of the cotton. The Texas Department of Agriculture Food and Fibers Research Council is thanked for funding the cost for cotton fiber analysis.

Table 1. Number of thrips on cotton treated with systemic insecticide applied to seed or placed into the seed furrow, Texas AgriLife Research and Extension Center, Nueces County, TX, 2008.

Treatment (rate)	Number thrips per 10 plants						
	2 leaf (21 DAP)[1/]			4-leaf (28 DAP)			2-date avg.
	larva	adult	total	larva	adult	total	
Cruiser 5FS (.347 mg ai/seed)	0.3[b]	8.5[a]	8.8[a]	13.5[a]	19.0[a]	32.5[a]	20.6[a]
Gaucho Grande 5FS (.375 mg ai/seed)	0.3[b]	12.5[a]	12.8[a]	29.0[a]	31.5[a]	60.5[a]	36.6[a]
Cruiser 5FS + EXC211 (.347 + 0.6 mg ai/seed)	0.3[b]	12.0[a]	12.3[a]	10.8[a]	15.5[a]	26.3[a]	19.3[a]
Cruiser 5FS + EXC211 (.347 + 0.9 mg ai/seed)	0.0[b]	10.5[a]	10.5[a]	25.0[a]	25.5[a]	50.5[a]	30.5[a]
Cruiser 5FS + STP28271 (.347 + .0451mg ai/seed)	0.3[b]	8.5[a]	8.8[a]	18.3[a]	24.5[a]	42.8[a]	25.8[a]
Cruiser 5FS + A12871 (.347 + .0903 mg ai/seed)	1.0[b]	12.0[a]	13.0[a]	22.8[a]	30.8[a]	53.5[a]	33. 3[a]
Cruiser 5FS + A9364 (.347 + .0451 mg ai/seed)	0.0[b]	11.5[a]	11.5[a]	21.0[a]	29.0[a]	50.0[a]	30.8[a]
Temik 15G (5.0 lb/acre)	0.5[b]	10.3[a]	10.8[a]	13.0[a]	17.3[a]	30.3[a]	20.5[a]
Nontreated	14.3[a]	8.0[a]	22.3[a]	16.8[a]	21.3[a]	38.0a	30.1[a]
LSD (P = 0.05)	5.74	NS	NS	NS	NS	NS	NS
P > F	.0005	.9283	.3756	.5485	.7771	.6382	.7688

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

[1/] DAP = Days After Planting

Table 2. Number of aphids, spider mites, and fire ants on cotton treated with systemic insecticide applied to seed or placed into the seed furrow, Texas AgriLife Research and Extension Center, Nueces County, TX, 2008.

	Number aphids/10 plants		Number mites/10 plants		Fire ants/10 plants	
Treatment (rate)	2 leaf (21 DAP)[1/]	4-leaf (28 DAP)	2 leaf (21 DAP)	4-leaf (28 DAP)	2 leaf (21 DAP)	4-leaf (28 DAP)
Cruiser 5FS (.347 mg ai/seed)	6.8[a]	92.8[b]	0.5[a]	2.8[a]	0.0[a]	1.3[a]
Gaucho Grande 5FS (.375 mg ai/seed)	17.0[a]	181.5[b]	0.8[a]	1.8[a]	1.3[a]	3.8[a]
Cruiser 5FS + EXC211 (.347 + 0.6 mg ai/seed)	9.5[a]	296.8[b]	0.8[a]	0.0[a]	0.3[a]	3.0[a]
Cruiser 5FS + EXC211 (.347 + 0.9 mg ai/seed)	4.3[a]	129.8[b]	2.3[a]	1.0[a]	0.0[a]	1.0[a]
Cruiser 5FS + STP28271 (.347 + .0451mg ai/seed)	10.0[a]	210.8[b]	3.8[a]	1.3[a]	0.3[a]	1.5[a]
Cruiser 5FS + A12871 (.347 + .0903 mg ai/seed)	14.5[a]	194.8[b]	0.8[a]	6.0[a]	0.8[a]	2.0[a]
Cruiser 5FS + A9364 (.347 + .0451 mg ai/seed)	7.5[a]	102.3[b]	6.0[a]	3.0[a]	0.0[a]	1.0[a]
Temik 15G (5.0 lb/acre)	14.5[a]	410.5[ab]	1.8[a]	0.3[a]	2.3[a]	1.5[a]
Nontreated	79.5[a]	696.5[a]	5.0[a]	1.0[a]	23.3[a]	1.5[a]
LSD (P = 0.05)	NS	318.8	NS	NS	NS	NS
P > F	.1302	.0147	.4568	.3668	.0706	.9498

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

1/ DAP = Days After Planting

Table 3. Plant population, damage ratings, and fleahopper numbers on cotton treated with systemic insecticide applied to seed or placed into the seed furrow, Texas AgriLife Research and Extension Center, Nueces County, TX, 2008.

Treatment (rate)	Plants 1000's/acre	Damage rating[1/] 17 DAP[2/]	28 DAP	41 DAP	3-date avg.	Fleahoppers/ 10 plants (50 DAP)
Cruiser 5FS (.347 mg ai/seed)	40.0[a]	1.4[a]	1.6[c]	1.4[b]	1.5[c]	1.3[a]
Gaucho Grande 5FS (.375 mg ai/seed)	43.7[a]	1.6[a]	2.0[bc]	1.5[b]	1.7[bc]	1.5[a]
Cruiser 5FS + EXC211 (.347 + 0.6 mg ai/seed)	34.9[a]	1.6[a]	2.0[bc]	1.4[b]	1.7[bc]	1.5[a]
Cruiser 5FS + EXC211 (.347 + 0.9 mg ai/seed)	50.9[a]	1.5[a]	1.8[c]	1.5[b]	1.6[bc]	1.3[a]
Cruiser 5FS + STP28271 (.347 + .0451mg ai/seed)	42.3[a]	1.8[a]	1.8[c]	1.8[b]	1.8[bc]	0.5[a]
Cruiser 5FS + A12871 (.347 + .0903 mg ai/seed)	47.1[a]	1.5[a]	1.7[c]	1.4[b]	1.5[bc]	1.0[a]
Cruiser 5FS + A9364 (.347 + .0451 mg ai/seed)	43.2[a]	1.2[a]	1.9[bc]	1.5[b]	1.5[bc]	1.0[a]
Temik 15G (5.0 lb/acre)	42.1[a]	1.3[a]	2.3[b]	2.0[b]	1.9[b]	1.5[a]
Nontreated	45.1[a]	1.5[a]	3.0[a]	3.6[a]	2.7[a]	1.3[a]
LSD (P = 0.05)	NS	NS	0.50	0.70	0.37	NS
P > F	.3535	.6320	.0001	.0001	.0001	.9665

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

1/ Damage ratings range from 1 = no damage up to 5 = severe stunting and leaf curling.

2/ DAP = Days After Planting

Table 4. Fiber characteristics and yield of cotton treated with systemic insecticide applied to seed or placed into the seed furrow, Texas AgriLife Research and Extension Center, Nueces County, TX, 2008.

Treatment (rate)	Mic	Length inches	Unif. Ratio	Strength g/tex	Elong. %	Lint yield lb/acre
Cruiser 5FS (.347 mg ai/seed)	4.8[a]	1.01[a]	83.3[a]	29.3[a]	10.4[a]	323[a]
Gaucho Grande 5FS (.375 mg ai/seed)	4.7[a]	1.01[a]	82.9[a]	28.7[a]	10.6[a]	308[a]
Cruiser 5FS + EXC211 (.347 + 0.6 mg ai/seed)	4.8[a]	1.02[a]	83.0[a]	29.0[a]	10.3[a]	333[a]
Cruiser 5FS + EXC211 (.347 + 0.9 mg ai/seed)	4.8[a]	1.01[a]	82.6[a]	28.3[a]	10.3[a]	315[a]
Cruiser 5FS + STP28271 (.347 + .0451mg ai/seed)	4.7[a]	1.01[a]	83.3[a]	28.6[a]	10.5[a]	327[a]
Cruiser 5FS + A12871 (.347 + .0903 mg ai/seed)	4.6[a]	1.01[a]	82.8[a]	27.7[a]	10.3[a]	315[a]
Cruiser 5FS + A9364 (.347 + .0451 mg ai/seed)	4.8[a]	1.01[a]	83.1[a]	28.7[a]	10.5[a]	327[a]
Temik 15G (5.0 lb/acre)	4.8[a]	1.00[a]	83.4[a]	28.6[a]	10.3[a]	327[a]
Nontreated	4.8[a]	1.02[a]	83.3[a]	28.5[a]	10.2[a]	284[a]
LSD (P = 0.05)	NS	NS	NS	NS	NS	NS
P > F	.4808	.8780	.9417	.6687	.7819	.0950

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

EVALUATION OF TREATMENTS APPLIED TO COTTON SEED

Texas AgriLife Research and Extension Center, Nueces County, 2008

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SUMMARY: No differences were found in thrips numbers at the 1-leaf growth stage, but by 4-leaf stage thrips numbers were statistically different, and although not always different from some of the other chemical treatments, their numbers were lowest in the Temik treated cotton. Differences were not observed in the low number of spider mites and fire ants. Aphid numbers, however, were statistically greater in the non-insecticide treated cotton at the 4-leaf stage. Fleahopper numbers were low and not different at the 4-leaf stage nor were plant vigor ratings different statistically. Finally, no differences or trends were observed in lint characteristics or yield.

OBJECTIVES: The test was established to compare effects of seed treatments on thrips, aphid, spider mite, fire ant, and fleahopper numbers; evaluate plant vigor; measure fiber characteristics; and determine effect on lint production.

MATERIALS/METHODS: The experiment was planted on April 3, 2008 on the Meaney Annex of the Texas AgriLife Research and Extension Center at Corpus Christi, Texas. Sorghum had been planted on the site in 2007. A 4-row John Deere 6100 buster type planter equipped with research cone seed boxes was used to plant 55,024 seed/acre in 4-row by 40-foot plots on 38-inch centers with 4 replications of 9 treatments. Phytogen 485 WRF variety cotton was planted into the sandy clay loam soil (52% sand, 16% silt, 32% clay). The 7.8 pH soil contained 1.44% organic matter. Pre-plant fertilizer consisted of 88-44-0-4 ZN. Herbicide applied was Dual II Magnum 7.64 lb/gallon (1.0 pint/acre) + Cotoran 4L (1.0 quart/acre) on the planting date. Fusion 2.56 (12.0 ounces/acre) and Staple 3.2LX (2.6 ounces/acre) were also applied in May for weed control. Temik 15G (5.0 lb/acre) was applied into the seed furrow.

Treatments were assessed by (1) counting the number of plants on 1 row/plot at the 1- and 4-leaf stages [4/17 and 5/2, respectively]; (2) estimating plant vigor on 4/17 [14 DAP] and again on 5/2 [29 DAP]; (3) cutting 5 plants per plot at the 1- and 4-leaf growth stages and placing into 70% ETOH for future counting of thrips, aphids, and spider mites collected on filter paper; and (4) counting the number of fleahoppers on 10 plants/plot on May 16 [43 DAP]. The two center rows in each plot were harvested with a 2-row John Deere 9900L spindle picker on August 5. Seed cotton samples were weighed, and a 30-gram sample was sent for fiber analysis to the Fiber and Biopolymer Research Institute at Lubbock, Texas.

Agriculture Research Manager (ARM revision 6.1.13) software was used to conduct analysis of variance. Means were separated by least significant difference (LSD) for ease of presentation.

RESULTS/DISCUSSION: Cotton planted late as in this test on April 4 in the Corpus Christi area is seldom adversely affected by thrips. In the study, thrips numbers were below the economic threshold at the 1-leaf stage with no statistical differences and only slightly above the threshold in 4-leaf stage cotton (Table 1). By the 4-leaf stage statistical differences did occur in thrips numbers (adults and total thrips), and as in many previous studies, Temik treated cotton had the fewest number of thrips.

Aphid populations were very low at the 1-leaf stage, but by the 4-leaf stage their numbers were very high and statistically greater in non-insecticide treated cotton compared to all other treatments (Table 2). The Temik treatment contained more aphids statistically than the remainder of the treatments. No differences were observed in spider mite and fire ant numbers nor were their numbers high in any treatment. Apparently aphid numbers did not persist for an extended because no differences were observed in plant vigor ratings (Table 3) although at the 4-leaf stage the vigor rating was lowest in the non-insecticide treated cotton; it corresponded to the high thrips numbers at that growth stage. Thrips numbers were low with no differences in 4-leaf stage cotton. Finally, treatments did not affect cotton fiber characteristics or lint production (Table 4). There were no observed trends in either the fiber characteristic or lint production data.

ACKNOWLEDGMENTS: Thanks are extended to Brad Minton, Syngenta Crop Protection, Inc., for his funding support. Rudy Alaniz and Clint Livingston, Demonstration Assistants, are thanked for their help with planting, harvest, and processing of the cotton. The Texas Department of Agriculture Food and Fibers Research Council is thanked for funding the cost for cotton fiber analysis.

Table 1. Number of thrips on cotton treated with various seed treatments or Temik applied with seed at-planting, Texas AgriLife Research and Extension Center, Meaney Annex, Nueces County, TX, 2008.

		Number thrips/5 plants				
		1-leaf (14 DAP)[1/]		4-leaf (29 DAP)		
Treatment	Rate	larva	adult	larva	adult	total
A15436 (Fungicide)	31.0 g ai/100 kg seed	0[a]	2.5[a]	12.3[a]	22.0[ab]	34.3[ab]
A15436 Temik 15G	31.0 g ai/100 kg seed 5.0 lb/acre	0[a]	1.8[a]	0.8[a]	7.8[c]	8.5[c]
A15436 Dynasty CST Cruiser 5FS Avicta 4.17 FS	31.0 g ai/100 kg seed 0.034 mg ai/seed 0.342 mg ai/seed 0.145 mg ai/seed	0[a]	1.3[a]	4.5[a]	20.8[ab]	25.3[ab]
A15436 Dynasty CST A16115A	31.0 g ai/100 kg seed 0.034 mg ai/seed 0.50 mg ai/seed	0[a]	0.5[a]	3.0[a]	28.3[a]	31.3[ab]
A15436 Dynasty CST A16115B	31.0 g ai/100 kg seed 0.034 mg ai/seed 0.50 mg ai/seed	0[a]	1.8[a]	5.8[a]	16.0[bc]	21.8[abc]
A15436 Dynasty CST A16115C	31.0 g ai/100 kg seed 0.034 mg ai/seed 0.50 mg ai/seed	0[a]	0.3[a]	6.5[a]	29.0[a]	35.5[a]
A15436 A16115 A15423	31.0 g ai/100 kg seed 0.50 mg ai/seed 0.024 mg ai/seed	0[a]	0.5[a]	4.8[a]	15.0[bc]	19.8[bc]
A15436 Allegiance LS Baytan 30 Trilex flowable STP15273 STP17217	31.0 g ai/100 kg seed 15 g ai/100 kg seed 5.0 g ai/100 kg seed 10.0 g ai/100 kg seed 0.375 mg ai/seed 0.375 mg ai/seed	0[a]	3.8[a]	5.5[a]	17.0[bc]	22.5[abc]
A15436 Cruiser 5FS	31.0 g ai/100 kg seed 0.342 mg ai/seed	0[a]	2.5[a]	5.8[a]	19.0[ab]	24.8[ab]
LSD (P=0.05)		NS	NS	NS	11.23	15.23
P > F		1.00	.1406	.1188	.0184	.0374

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

[1/] DAP = Days After Planting

Table 2. Number of aphids, spider mites and fire ants on cotton treated with various seed treatments or Temik applied with seed at-planting, Texas AgriLife Research and Extension Center, Meaney Annex, Nueces County, TX, 2008.

		Number/5 plants at DAP[1/]					
		Aphids		Mites		Fire ants	
Treatment	Rate	1-leaf 14	4-leaf 29	1-leaf 14	4-leaf 29	1-leaf 14	4-leaf 29
A15436 (Fungicide)	31.0 g ai/100 kg seed	6.8[ab]	1081.8[a]	0.0[a]	0.0[a]	1.8[a]	0.3[a]
A15436 Temik 15G	31.0 g ai/100 kg seed 5.0 lb/acre	7.3[a]	451.5[b]	0.0[a]	0.0[a]	0.3[a]	2.8[a]
A15436 Dynasty CST Cruiser 5FS Avicta 4.17 FS	31.0 g ai/100 kg seed 0.034 mg ai/seed 0.342 mg ai/seed 0.145 mg ai/seed	0.0[c]	87.5[c]	0.0[a]	0.0[a]	0.3[a]	0.3[a]
A15436 Dynasty CST A16115A	31.0 g ai/100 kg seed 0.034 mg ai/seed 0.50 mg ai/seed	0.3[c]	147.8[c]	0.0[a]	0.0[a]	0.0[a]	0.0[a]
A15436 Dynasty CST A16115B	31.0 g ai/100 kg seed 0.034 mg ai/seed 0.50 mg ai/seed	0.3[c]	27.0[c]	0.0[a]	0.3[a]	0.0[a]	0.0[a]
A15436 Dynasty CST A16115C	31.0 g ai/100 kg seed 0.034 mg ai/seed 0.50 mg ai/seed	2.0[bc]	81.5[c]	0.0[a]	0.0[a]	0.0[a]	0.0[a]
A15436 A16115 A15423	31.0 g ai/100 kg seed 0.50 mg ai/seed 0.024 mg ai/seed	0.0[c]	45.8[c]	0.3[a]	0.0[a]	0.0[a]	0.0[a]
A15436 Allegiance LS Baytan 30 Trilex flowable STP15273 STP17217	31.0 g ai/100 kg seed 15 g ai/100 kg seed 5.0 g ai/100 kg seed 10.0 g ai/100 kg seed 0.375 mg ai/seed 0.375 mg ai/seed	3.8[abc]	183.3[c]	0.0[a]	0.0[a]	1.8[a]	0.3[a]
A15436 Cruiser 5FS	31.0 g ai/100 kg seed 0.342 mg ai/seed	0.0[c]	67.5[c]	0.5[a]	0.0[a]	0.0[a]	0.0[a]
LSD (P=0.05)		4.96	257.3	NS	NS	NS	NS
P > F		.0158	.0001	.5538	.4613	.5250	.4863

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

[1/] DAP = Days After Planting

Table 3. Plant population, damage ratings, and fleahopper numbers on cotton treated with various seed treatments or Temik applied with seed at-planting, Texas AgriLife Research and Extension Center, Meaney Annex, Nueces County, TX, 2008.

		Plants (1000's/acre)		Plant vigor rating[2/]		Fleahoppers/ 10 plants at 43 DAP[1/]	
		Days after planting					
Treatment	Rate	14	29	14	29	nymph	adult
A15436 (Fungicide)	31.0 g ai/100 kg seed	44.2[a]	45.1[a]	82.5[a]	72.5[a]	0.0[a]	0.5[a]
A15436 Temik 15G	31.0 g ai/100 kg seed 5.0 lb/acre	40.2[a]	40.3[a]	80.0[a]	77.5[a]	0.3[a]	0.8[a]
A15436 Dynasty CST Cruiser 5FS Avicta 4.17 FS	31.0 g ai/100 kg seed 0.034 mg ai/seed 0.342 mg ai/seed 0.145 mg ai/seed	42.7[a]	43.9[a]	87.5[a]	82.5[a]	0.0[a]	0.3[a]
A15436 Dynasty CST A16115A	31.0 g ai/100 kg seed 0.034 mg ai/seed 0.50 mg ai/seed	37.5[a]	39.0[a]	92.5[a]	85.0[a]	0.0[a]	1.0[a]
A15436 Dynasty CST A16115B	31.0 g ai/100 kg seed 0.034 mg ai/seed 0.50 mg ai/seed	40.5[a]	43.1[a]	80.0[a]	80.0[a]	0.0[a]	1.3[a]
A15436 Dynasty CST A16115C	31.0 g ai/100 kg seed 0.034 mg ai/seed 0.50 mg ai/seed	40.3[a]	42.2[a]	80.0[a]	87.5[a]	0.0[a]	1.3[a]
A15436 A16115 A15423	31.0 g ai/100 kg seed 0.50 mg ai/seed 0.024 mg ai/seed	41.3[a]	42.9[a]	87.5[a]	92.5[a]	0.0[a]	1.3[a]
A15436 Allegiance LS Baytan 30 Trilex flowable STP15273 STP17217	31.0 g ai/100 kg seed 15 g ai/100 kg seed 5.0 g ai/100 kg seed 10.0 g ai/100 kg seed 0.375 mg ai/seed 0.375 mg ai/seed	41.5[a]	42.0[a]	85.0[a]	92.5[a]	0.0[a]	0.5[a]
A15436 Cruiser 5FS	31.0 g ai/100 kg seed 0.342 mg ai/seed	43.5[a]	44.5[a]	85.0[a]	87.5[a]	0.0[a]	0.3[a]
LSD (P=0.05)		NS	NS	NS	NS	NS	NS
P > F		.2500	.2191	.5964	.2262	.4613	.3685

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

[1/] DAP = Days After Planting

[2/] Plant vigor ratings range from 0-100 where 0 = poor up to 100 = outstanding growth and color characteristics.

Table 4. Fiber characteristics and yield of cotton treated with various seed treatments or Temik applied with seed at-planting, Texas AgriLife Research and Extension Center, Meaney Annex, Nueces County, TX, 2008.

		Fiber characteristics					
Treatment	Rate	mic	length inches	unif. ratio	strength g/tex	elong. %	Lint yield lb/acre
A15436 (Fungicide)	31.0 g ai/100 kg seed	5.0[a]	1.00[a]	83.0[a]	29.3[a]	7.1[a]	421[a]
A15436 Temik 15G	31.0 g ai/100 kg seed 5.0 lb/acre	5.0[a]	1.01[a]	82.7[a]	29.9[a]	7.6[a]	423[a]
A15436 Dynasty CST Cruiser 5FS Avicta 4.17 FS	31.0 g ai/100 kg seed 0.034 mg ai/seed 0.342 mg ai/seed 0.145 mg ai/seed	5.0[a]	1.00[a]	82.8[a]	30.2[a]	7.6[a]	455[a]
A15436 Dynasty CST A16115A	31.0 g ai/100 kg seed 0.034 mg ai/seed 0.50 mg ai/seed	4.9[a]	1.01[a]	83.4[a]	29.7[a]	7.6[a]	457[a]
A15436 Dynasty CST A16115B	31.0 g ai/100 kg seed 0.034 mg ai/seed 0.50 mg ai/seed	4.9[a]	1.00[a]	83.1[a]	29.9[a]	7.4[a]	421[a]
A15436 Dynasty CST A16115C	31.0 g ai/100 kg seed 0.034 mg ai/seed 0.50 mg ai/seed	4.9[a]	0.99[a]	83.0[a]	31.1[a]	7.4[a]	434[a]
A15436 A16115 A15423	31.0 g ai/100 kg seed 0.50 mg ai/seed 0.024 mg ai/seed	5.0[a]	1.01[a]	82.5[a]	31.0[a]	7.4[a]	460[a]
A15436 Allegiance LS Baytan 30 Trilex flowable STP15273 STP17217	31.0 g ai/100 kg seed 15 g ai/100 kg seed 5.0 g ai/100 kg seed 10.0 g ai/100 kg seed 0.375 mg ai/seed 0.375 mg ai/seed	5.0[a]	1.00[a]	83.3[a]	30.5[a]	7.3[a]	404[a]
A15436 Cruiser 5FS	31.0 g ai/100 kg seed 0.342 mg ai/seed	4.9[a]	1.01[a]	82.8[a]	30.8[a]	7.6[a]	428[a]
LSD (P=0.05)		NS	NS	NS	NS	NS	NS
P > F		.7099	.9081	.9240	.1517	.7070	.3659

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

EVALUATION OF INSECTICIDES FOR EFFECTIVENESS ON COTTON FLEAHOPPER AND IMPACT ON LINT PRODUCTION

Joseph Respondek Farm, DeWitt County, 2008

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SUMMARY: All insecticides provided significantly better control of cotton fleahopper (nymphs and adults) for up to 10 days after treatment (DAT) compared to numbers in nontreated cotton. The number of fleahoppers in the nontreated cotton was at least double the normal treatment threshold (15/100 plant terminals) on all inspection dates throughout the study period. There were significant differences among the insecticides with Carbine and Orthene not providing the level of control achieved by the other tested insecticides. Even so, the number of fleahoppers in these less effective treatments did not exceed the treatment threshold by a very large margin. Consistently, less difference among insecticides was observed on nymphs; all insecticides were effective on nymphs.

Production was severely limited because no rain was received during plant growth and the fruit development period. Effects on fiber characteristics were not observed except for fiber elongation, but those differences appear to be random with no relationship to treatments.

Under the weather conditions encountered, no yield impact due to fleahopper control was expected. In this case no statistical impact was noted on lint yield. However, 6 of the 7 insecticide treated plots produced numerically more lint averaging 25 lb/acre more than the non-insecticide treated cotton. Whether the trend for increased production had anything to do with fleahopper control is doubtful.

OBJECTIVES: The field study was conducted to compare the effects of various insecticides and in one case, use rates for control of cotton fleahopper. We also compared the impact of treatments on cotton fiber characteristics and lint production.

MATERIALS/METHODS: A seed mixture of several B2RF cotton varieties was planted April 22, 2008 on the Joseph Respondek Farm near the intersection of FM 2656 on FM 952 close to the community of Cotton Patch. The planter was an 8-row John Deere model 7100 and rows were spaced on 38-inch centers. Fertilizer applied was 74-25-7+2S at planting. Herbicide included Treflan (1.5 pints/acre) applied on March 28 followed with Roundup PowerMax on May 4 (17 ounces/acre) and on May 28 (22 ounces/acre). No over-spray insecticide was applied to the test the entire season nor were other significant insect pests present.

Plots were 8-rows by 40 feet but chemical treatments were applied only to the center 4 rows in each plot. 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 5.6 gpa while traveling at 4 mph. Induce at 0.25 v/v was added to the spray mix. Two treatments were made for fleahoppers initiated at the beginning of the 2^{nd} week of squaring with a treatment applied on May 28 and another treatment on June 3.

Treatments were assessed by counting the number of fleahoppers on 20 plants in the center 2 rows of each plot on May 27 [pretreatment], May 31 [3 DAT-1 = days after treatment-1], June 3 [6 DAT-1], June 6[3 DAT-2], June 9 [6 DAT-2], and June 13 [10 DAT-2]. Additionally, one row in the center of each plot was harvested with an International Harvester model 120A spindle picker on August 15. 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 8% to provide a more realistic reading of commercial ginning. Lint samples were sent to the Fiber and Biopolymer Research Institute, Texas Tech University, 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 for ease of presentation.

RESULTS/DISCUSSION: Fleahopper nymphs, adults, and total fleahopper numbers are provided in Tables 1-3. The number of nymphs (Table 1) were relatively low until counts were made 6 DAT-1; all insecticides provided excellent control of fleahopper nymphs throughout the evaluation period. In the nontreated plots cotton fleahopper nymph numbers exceeded the established treatment threshold on all dates beginning 6 DAT-1. Adult fleahopper numbers were high in pretreatment counts (Table 2). Insecticides reduced their numbers, but Carbine and Orthene were generally less effective compared with the other tested insecticides. All insecticides significantly reduced total (nymphs and adults) fleahopper numbers on all inspection dates following treatments (3, 6 DAT-1; 3, 6, 10 DAT-2) as shown in Table 3. Overall, Carbine and Orthene were not as effective as the other insecticide treatments. However, both Carbine and Orthene did maintain average post-treatment numbers below the economic threshold established of 15/100 plant terminals.

Lint characteristics and yield data are provided in Table 4. Fiber characteristics, except elongation, did not differ statistically. The statistical difference appears to be random with no relationship to treatments. No differences were found in lint production even though fleahopper numbers were above the established economic threshold followed in this cotton production area. No rainfall was received during the growing season until it was too late to affect production. For that reason we believe plants in plots that were not treated with insecticide were able to develop a more extensive root system and attained greater growth which resulted in heavier bolls as has been documented in previous tests conducted under severe drought conditions. We have learned that it is best to allow some fleahopper feeding and fruit loss for the first week of squaring, but that it is risky to delay treatments beyond that point since rainfall will result in significantly more lint production. However, if it does not rain, as was the case in the current experiment, little if any advantage can be expected from fleahopper control.

ACKNOWLEDGMENTS: Joseph Respondek is thanked for allowing use of his cotton field to conduct the study. DuPont Crop Protection and Bayer CropScience are thanked for providing partial monetary support for the study and the Texas Department of Agriculture, Food and Fibers Research Council are acknowledged for funding the cost of fiber analysis. Rudy Alaniz and Clint Livingston, Demonstration Assistants, are thanked for their work on all phases of the study.

Table 1. Fleahopper **nymphs** in insecticide treated cotton , Joseph Respondek Farm, Dewitt County, TX, 2008.

Treatment[1/] (rate)	Number per 100 plant terminals						
	Pretreat	3 DAT-1[2/]	6 DAT-1	3 DAT-2	6 DAT-2	10 DAT-2	Post treat. average
Centric 40WG (1.25 oz/acre)	3.8[a]	0.0[b]	2.5[b]	0.0[b]	0.0[b]	0.0[b]	0.5[b]
Intruder 70WP (0.6 oz/acre)	3.8[a]	0.0[b]	1.3[b]	0.0[b]	0.0[b]	1.3[b]	0.5[b]
Intruder 70WP (0.8 oz/acre)	3.8[a]	1.3[b]	1.3[b]	1.3[b]	0.0[b]	2.5[b]	1.3[b]
Intruder 70WP (1.1 oz/acre)	0.0[a]	0.0[b]	1.3[b]	0.0[b]	1.3[b]	1.3[b]	0.8[b]
Trimax Pro 4.44 (1.25 oz/acre)	1.3[a]	0.0[b]	6.3[b]	0.0[b]	0.0[b]	0.0[b]	1.3[b]
Carbine 50WG (1.7 oz/acre)	0.0[a]	0.0[b]	8.8[b]	1.3[b]	6.3[b]	8.8[b]	5.0[b]
Orthene 97 (4.0 oz/acre)	2.5[a]	1.3[b]	10.0[b]	1.3[b]	7.5[b]	7.5[b]	5.5[b]
Nontreated	6.3[a]	8.8[a]	57.5[a]	31.3[a]	33.8[a]	50.0[a]	36.3[a]
LSD (P=0.05)	NS	4.72	14.25	9.18	11.51	10.60	5.73
P > F	.4880	.0114	.0001	.0001	.0001	.0001	.0001

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

[1/] Treatments were applied on 5/28 and 6/3.

[2/] DAT = Days After Treatment.

Table 2. Fleahopper **adults** in insecticide treated cotton , Joseph Respondek Farm, Dewitt County, TX, 2008.

Treatment[1/] (rate)	Number per 100 plant terminals						
	Pretreat	3 DAT-1[2/]	6 DAT-1	3 DAT-2	6 DAT-2	10 DAT-2	Post treat. average
Centric 40WG (1.25 oz/acre)	20.0[a]	5.0[b]	0.0[c]	5.0[a]	1.3[b]	6.3[a]	3.5[d]
Intruder 70WP (0.6 oz/acre)	32.5[a]	3.8[b]	5.0[bc]	2.5[a]	3.8[b]	5.0[a]	4.0[cd]
Intruder 70WP (0.8 oz/acre)	17.5[a]	1.3[b]	6.3[abc]	2.5[a]	5.0[ab]	8.8[a]	4.8[cd]
Intruder 70WP (1.1 oz/acre)	20.0[a]	2.5[b]	7.5[abc]	1.3[a]	3.8[b]	7.5[a]	4.5[cd]
Trimax Pro 4.44 (1.25 oz/acre)	21.3[a]	1.3[b]	3.8[c]	1.3[a]	6.3[ab]	1.3[a]	2.8[d]
Carbine 50WG (1.7 oz/acre)	23.8[a]	13.8[b]	6.3[abc]	7.5[a]	10.0[a]	8.8[a]	9.3[b]
Orthene 97 (4.0 oz/acre)	17.5[a]	8.8[b]	15.0[a]	5.0[a]	5.0[ab]	3.8[a]	7.5[bc]
Nontreated	22.5[a]	30.0[a]	13.8[ab]	13.8[a]	10.0[a]	6.3[a]	14.8[a]
LSD (P=0.05)	NS	14.34	9.31	NS	5.26	NS	3.99
P > F	.3751	.0063	.0500	.0654	.0264	.5620	.0001

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

[1/] Treatments were applied on 5/28 and 6/3.

[2/] DAT = Days After Treatment.

Table 3. Fleahopper **nymph + adult** counts in insecticide treated cotton , Joseph Respondek Farm, Dewitt County, TX, 2008.

Treatment[1/] (rate)	Number per 100 plant terminals						
	Pretreat	3 DAT-1[2/]	6 DAT-1	3 DAT-2	6 DAT-2	10 DAT-2	Post treat. average
Centric 40WG (1.25 oz/acre)	23.8[a]	5.0[bc]	2.5[c]	5.0[b]	1.3[c]	6.3[bc]	4.0[c]
Intruder 70WP (0.6 oz/acre)	36.3[a]	3.8[bc]	6.3[c]	2.5[b]	3.8[bc]	6.3[bc]	4.5[c]
Intruder 70WP (0.8 oz/acre)	21.3[a]	2.5[bc]	7.5[c]	3.8[b]	5.0[bc]	11.3[bc]	6.0[c]
Intruder 70WP (1.1 oz/acre)	20.0[a]	2.5[bc]	8.8[bc]	1.3[b]	5.0[bc]	8.8[bc]	5.3[c]
Trimax Pro 4.44 (1.25 oz/acre)	22.5[a]	1.3[c]	10.0[bc]	1.3[b]	6.3[bc]	1.3[c]	4.0[c]
Carbine 50WG (1.7 oz/acre)	23.8[a]	13.8[b]	15.0[bc]	8.8[b]	16.3[b]	17.5[b]	14.3[b]
Orthene 97 (4.0 oz/acre)	20.0[a]	10.0[bc]	25.0[b]	6.3[b]	12.5[bc]	11.3[bc]	13.0[b]
Nontreated	28.8[a]	38.8[a]	71.3[a]	45.0[a]	43.8[a]	56.3[a]	51.0[a]
LSD (P=0.05)	NS	12.00	16.75	14.57	13.75	13.13	6.18
P > F	.3972	.0001	.0001	.0001	.0001	.0001	.001

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

1/ Treatments were applied on 5/28 and 6/3.

2/ DAT = Days After Treatment.

Table 4. Fiber characteristics and lint production in cotton treated with various insecticides for fleahopper, Joseph Respondek Farm, Dewitt County, TX, 2008.

Treatment[1/] (rate)	Micronaire	Length inches	Uniformity %	Strength g/tex	Elongation %	Yield lb lint/acre
Centric 40WG (1.25 oz/acre)	4.5[a]	1.07[a]	81.8[a]	28.0[a]	5.8[abc]	369[a]
Intruder 70WP (0.6 oz/acre)	4.4[a]	1.07[a]	82.1[a]	27.8[a]	5.5[c]	388[a]
Intruder 70WP (0.8 oz/acre)	4.5[a]	1.07[a]	81.8[a]	28.5[a]	5.9[ab]	397[a]
Intruder 70WP (1.1 oz/acre)	4.5[a]	1.06[a]	81.4[a]	28.2[a]	5.5[c]	370[a]
Trimax Pro 4.44 (1.25 oz/acre)	4.7[a]	1.05[a]	82.1[a]	27.4[a]	5.9[a]	379[a]
Carbine 50WG (1.7 oz/acre)	4.4[a]	1.08[a]	82.5[a]	28.7[a]	6.0[a]	408[a]
Orthene 97 (4.0 oz/acre)	4.4[a]	1.03[a]	81.3[a]	28.1[a]	5.6[bc]	354[a]
Nontreated	4.6[a]	1.05[a]	81.9[a]	29.0[a]	5.9[a]	356[a]
LSD (P=0.05)	NS	NS	NS	NS	0.36	NS
P > F	.1866	.1773	.6196	.2032	.0124	.7763

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

1/ Treatments were applied on 5/28 and 6/3.

2/ DAT = Days After Treatment.

EVALUATION OF INSECTICIDE TREATMENT TIMING FOR COTTON FLEAHOPPER

Joseph Respondek Farm, DeWitt County, 2008

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SUMMARY: Insecticide was applied for cotton fleahopper at varying intervals beginning in the first week of squaring with additional plots treated each week for a 4-week period. The week 1 plots were treated again in week 3 and week 2 plots were treated again in week 4. Fleahopper numbers were reduced to low levels following treatments. Greater fruit retention at position 1 and on the first 5 fruiting branches was observed in plots initially treated in weeks 1 and 2 compared to the nontreated cotton. Boll production was generally greater in these same fruiting sites, but no yield differences were observed. Numerically, the highest yield was obtained from the nontreated cotton. It is believed that early fruit removal by cotton fleahopper allowed plants to attain more root and vegetative growth under the severe drought which in turn resulted in a greater amount of lint per boll. Similar results have been observed before under similar dry conditions. Too early fleahopper control may result in lowered yield under drought conditions.

OBJECTIVES: The field study was designed to measure the impact of timing of insecticide treatment for the control of cotton fleahopper based on squaring week with subsequent impact on fruit load, position of retained fruit, lint production, and fiber characteristics.

MATERIALS/METHODS: A seed mixture of several B2RF cotton varieties was planted April 22, 2008 on the Joseph Respondek Farm near the intersection of FM 2656 on FM 952 close to the community of Cotton Patch. The planter was an 8-row John Deere model 7100 and rows were spaced on 38-inch centers. Fertilizer applied was 74-25-7+2S at planting. Herbicide included Treflan (1.5 pints/acre) applied on March 28 followed with Roundup PowerMax on May 4 (17 ounces/acre) and on May 28 (22 ounces/acre). No over-spray insecticide was applied to the test during the season nor were other significant insect pests present.

Plots were 8-rows by 40 feet but chemical treatments were applied only to the center 4 rows in each plot. 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 5.6 gpa while traveling at 4 mph. Induce at 0.25 v/v was added to the spray mix. Centric 40 WG (1.25 ounces/acre) was used for fleahopper control. Week 1 treatments were made May 28 and June 10; week 2 treatments were made June 3 and 17; week 3 treatment was made June 10; and week 4 treatment was made June 17. The week numbers correspond to the week of squaring.

Treatments were assessed by counting the number of fleahoppers on 20 plants in the center 2 rows of each plot on May 27 [pretreatment], May 31 [3 DAT-1 = days after treatment 1], June 3 [6 DAT-1], June 6 [3 DAT-2], June 9 [6 DAT-2], June 13 [3 DAT-3], June 17 [7 DAT-3], and June 26 [9 DAT-4]. Additionally, 6 plants were selected from the outer two rows in plots for plant mapping on July 1 when plants were in premature cutout at 4 nodes above white flower

(NAWF). The P-Map software program developed by Dr. Juan Landivar was used to summarize the mapping results. One of the center rows (38 feet) in each plot was harvested on August 15 with a 1-row International Harvester model 120A spindle picker. Seed cotton samples were weighed and a sample was obtained to determine lint percentage. These samples were ginned on a 10-saw laboratory Eagle machine, and a 30 gram lint sample was sent to the Fiber and Biopolymer Research Institute, Texas Tech University, 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 for ease of presentation.

RESULTS/DISCUSSION: Few cotton fleahopper nymphs were observed in pretreatment or 3 and 6 DAT-1 counts (Table 1), but pretreatment adult counts were generally double the normal treatment threshold of 15/100 plant terminals (Table 2). Total fleahopper counts are shown in Table 3. Treatment sequence included plots that were treated in weeks 1 and 3, weeks 3 and 4, week 3 only, and week 4 only. Fleahopper numbers were reduced to very low levels following treatments with appropriate delay in the reduction based on the squaring week the treatment was initiated. The sequence allowed various infestation levels to persist into the cotton squaring period. For example, post-treatment average number of fleahoppers are shown in Table 3 with post treatment referring to when the first set of plots (week 1) were treated. Statistically higher average numbers of fleahoppers were observed for each of the 4 treatment initiation weeks. Only the week 4 treatment counts did not differ from the nontreated post-treatment season averages. However, significantly fewer fleahoppers were found in the week 4 treatment counts made 9 DAT-4.

The biggest impact in the study may have been the total lack of rainfall through the production period. Significant rainfall was not received until the cotton plants were in complete cutout well after 4 NAWF. By July 1, when plant mapping was conducted, cotton was at 4 NAWF and average plant height was less than 18 inches. Very little plant growth occurred after this date with growth not more than an additional inch at harvest. Percentage fruit retention, primarily bolls, by fruiting position and fruiting branch groups is given in Table 4. Note that significantly more bolls were observed in week 1, 2, and 3 treatments compared with the week 4 treatment, and numerically fewer bolls were present in the nontreated cotton on the 1st fruiting position compared with the week 3 treatment. Fruit retention on the first 5 fruiting branches was significantly higher in the week 1 and 2 treatments compared with the week 4 treatment and the nontreated cotton. Other than fruit retention on position 1 and the first 5 fruiting branches, no other fruit retention differences were found. As expected, based on fruit retention, greater numbers of bolls were observed on the first fruit position and the first 5 fruit branches in the week 1 and 2 treatments (Table 5).

Statistical differences were not found in internode length, plant height, nodes above white flower, or yield (Table 6). Numerically, plant height tended to be slightly reduced in week 1 and 2 treatments compared with the nontreated cotton. In addition, there were numerically fewer NAWF in these same two treatments as would be expected on plants with the greatest number of bolls. Although no differences were observed in lint production, all insecticide treated cotton numerically had less yield compared with the nontreated cotton. This same result has been observed in other tests where rain was not received in a timely fashion (Parker and Buehring 2006). Fruit removed by the cotton fleahopper under the dry conditions probably allows for more plant growth to include the root system allowing for greater weight bolls. (See the number of bolls/plant column in Table 5 which appears to confirm this assessment.) Farmers in the dryland production regions who say they do not treat for cotton fleahopper "until it rains" are probably correct in that assessment in the driest of years; whereas, in cases where rainfall is received before cutout, earlier fleahopper control can result in substantial yield increases (Parker and Livingston 2003, and Parker 2007).

Fiber characteristics are listed in Table 7. No statistical differences were found in micronaire, fiber length, lint uniformity or fiber elongation. There were statistical differences in micronaire. The nontreated cotton had the highest micronaire followed by the treatments made only in weeks 3 and 4. The lower micronaire results would be expected on smaller plants where a higher number of fruiting sites were retained which was the case in this study.

ACKNOWLEDGMENTS: Joseph Respondek is thanked for allowing use of his cotton field to conduct the study. Texas Department of Agriculture, Food and Fibers Research Council are acknowledged for funding the cost of fiber analysis. Rudy Alaniz and Clint Livingston, Demonstration Assistants, are thanked for their work on all phases of the study.

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Table 1. Effect of insecticide treatment timing on fleahopper **nymphs**, Joseph Respondek Farm, DeWitt County, TX, 2008.

Treatment made in squaring week[1/]	Number per 100 plant terminals								Post-treat. average
	Pretreat	3 DAT-1	6 DAT-1	3 DAT-2	6 DAT-2	3 DAT-3	7 DAT-3	9 DAT-4	
1, 3	1.3[a]	0.0[a]	0.0[b]	7.5[bc]	6.3[b]	1.3[b]	0.0[b]	0.0[a]	2.1[c]
2, 4	2.5[a]	1.3[a]	18.8[a]	0.0[c]	1.3[b]	5.0[b]	1.3[b]	0.0[a]	3.9[c]
3	2.5[a]	3.8[a]	12.5[a]	27.5[a]	33.8[a]	0.0[b]	0.0[b]	0.0[a]	11.1[b]
4	2.5[a]	2.5[a]	20.0[a]	27.5[a]	32.5[b]	30.0[a]	31.3[a]	0.0[a]	20.5[a]
Nontreated	0.0[a]	3.8[a]	12.5[a]	20.0[ab]	23.8[a]	26.3[a]	26.3[a]	1.3[a]	16.2[a]
LSD (P = 0.05)	NS	NS	9.49	17.90	16.67	9.14	13.87	NS	4.89
P > F	.6272	.3219	.0047	.0188	.0026	.0001	.0004	.4449	.0001

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

[1/] Centric 40WG was applied at 1.25 oz/acre in the indicated squaring weeks.

Table 2. Effect of insecticide treatment timing on fleahopper **adults**, Joseph Respondek Farm, DeWitt County, TX, 2008.

Treatment made in squaring week[1/]	Number per 100 plant terminals								Post-treat. average
	Pretreat	3 DAT-1	6 DAT-1	3 DAT-2	6 DAT-2	3 DAT-3	7 DAT-3	9 DAT-4	
1, 3	25.0[a]	2.5[b]	0.0[b]	12.5[a]	6.3[a]	0.0[b]	0.0[b]	5.0[b]	3.8[c]
2, 4	31.3[a]	32.5[a]	31.3[a]	5.0[a]	2.5[a]	5.0[b]	1.3[b]	1.3[b]	11.3[b]
3	30.0[a]	31.3[a]	32.5[a]	13.8[a]	15.0[a]	1.3[b]	0.0[b]	1.3[b]	13.6[b]
4	28.8[a]	38.8[a]	38.8[a]	13.8[a]	12.5[a]	13.8[a]	6.3[ab]	2.5[b]	18.0[a]
Nontreated	33.8[a]	31.3[a]	31.3[a]	13.8[a]	10.0[a]	15.0[a]	12.5[a]	21.3[a]	19.3[a]
LSD (P = 0.05)	NS	13.21	11.83	NS	NS	7.80	7.61	4.61	3.24
P > F	.6210	.0006	.0001	.2479	.1338	.0027	.0152	.0001	.0001

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

[1/] Centric 40WG was applied at 1.25 oz/acre in the indicated squaring weeks.

Table 3. Effect of insecticide treatment timing on fleahopper **nymphs and adults**, Joseph Respondek Farm, DeWitt County, TX, 2008.

Treatment made in squaring week[1/]	Number per 100 plant terminals								Post-treat. average
	Pretreat	3 DAT-1	6 DAT-1	3 DAT-2	6 DAT-2	3 DAT-3	7 DAT-3	9 DAT-4	
1, 3	26.3[a]	2.5[b]	0.0[b]	20.0[ab]	12.5[bc]	1.3[b]	0.0[b]	5.0[b]	5.9[d]
2, 4	33.8[a]	33.8[a]	50.0[a]	5.0[b]	3.8[c]	10.0[b]	2.5[b]	1.3[b]	15.2[c]
3	32.5[a]	35.0[a]	45.0[a]	41.3[a]	48.8[a]	1.3[b]	0.0[b]	1.3[b]	24.6[b]
4	31.3[a]	41.3[a]	58.8[a]	41.3[a]	45.0[a]	43.8[a]	37.5[a]	2.5[b]	38.6[a]
Nontreated	33.8[a]	35.0[a]	43.8[a]	33.8[a]	33.8[ab]	41.3[a]	38.8[a]	22.5[a]	35.5[a]
LSD (P = 0.05)	NS	12.40	17.47	22.60	23.61	10.24	7.24	4.72	7.02
P > F	.7232	.0001	.0001	.0183	.0044	.0001	.0001	.0001	.0001

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

[1/] Centric 40WG was applied at 1.25 oz/acre in the indicated squaring weeks.

Table 4. Effect of fleahopper insecticide treatment timing on cotton plant fruit retention, Joseph Respondek Farm, DeWitt County, TX, 2008.

Treatment made in squaring week[1/]	% fruit retention by position				% fruit retention by branch group		
	1	2	3	4	1-5	6-10	11-15
1, 3	74.2[a]	43.8[a]	71.3[a]	25.0[a]	56.2[a]	75.6[a]	50[a]
2, 4	74.3[a]	48.7[a]	73.3[a]	0.0[a]	53.7[a]	81.1[a]	100[a]
3	69.4[ab]	44.1[a]	57.9[a]	75.0[a]	49.2[ab]	76.6[a]	75[a]
4	59.9[c]	38.6[a]	36.3[a]	25.0[a]	43.2[b]	71.6[a]	50[a]
Nontreated	65.6[bc]	40.7[a]	53.1[a]	75.0[a]	44.7[b]	72.8[a]	100[a]
LSD (P = 0.05)	6.82	NS	NS	NS	8.19	NS	NS
P > F	.0026	.5602	.3238	.1471	.0197	.3128	.2218

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

[1/] Centric 40WG was applied at 1.25 oz/acre in the indicated squaring weeks.

Table 5. Effect of fleahopper insecticide treatment timing on cotton boll location by position off the main stem, Joseph Respondek Farm, DeWitt County, TX, 2008.

Treatment made in squaring week[1/]	Bolls/ plant	Number of bolls/plant: Fruiting position 1	Fruiting position 2	Fruiting position 3	Branch groups 1-5	Branch groups 6-10	Branch groups 11-15
1, 3	5.8[a]	4.5[a]	1.1[a]	0.1[a]	4.4[a]	1.3[a]	0.0[a]
2, 4	5.5[ab]	4.2[a]	1.1[a]	0.2[a]	4.3[a]	1.2[a]	0.0[a]
3	4.0[c]	3.3[b]	0.5[a]	0.2[a]	3.5[b]	0.5[b]	0.0[a]
4	3.3[c]	2.7[b]	0.5[a]	0.1[a]	2.8[b]	0.5[b]	0.0[a]
Nontreated	4.3[bc]	3.4[b]	0.8[a]	0.1[a]	3.4[b]	1.0[ab]	0.0[a]
LSD (P = 0.05)	1.28	0.73	NS	NS	0.77	0.67	NS
P > F	.0066	.0010	.1461	.9622	.0033	.0495	.8899

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

[1/] Centric 40WG was applied at 1.25 oz/acre in the indicated squaring weeks.

Table 6. Effect of fleahopper insecticide treatment timing on cotton plant growth characteristics and yields, Joseph Respondek Farm, DeWitt County, TX, 2008.

Treatment made in squaring week[1/]	NAWF[2/]	Internode length	Plant height (in.)	Yield lb lint/acre
1, 3	3.8[a]	1.29[a]	17.8[a]	381[a]
2, 4	3.8[a]	1.25[a]	17.8[a]	375[a]
3	4.3[a]	1.28[a]	18.3[a]	343[a]
4	4.0[a]	1.21[a]	16.5[a]	342[a]
Nontreated	4.5[a]	1.25[a]	18.5[a]	389[a]
LSD (P = 0.05)	NS	NS	NS	NS
P > F	.4802	.8168	.1699	.4323

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

[1/] Centric 40WG was applied at 1.25 oz/acre in the indicated squaring weeks.

[2/] NAWF = nodes above white flower

Table 7. Effect of fleahopper insecticide treatment timing on cotton fiber characteristics, and dollar return, Joseph Respondek Farm, DeWitt County, TX, 2008.

Treatments by squaring week[1/]	Mic	Length inches	Unif %	Strength g/tex	Elong %
1, 3	4.4[c]	1.02[a]	81.8[a]	26.9[a]	5.9[a]
2, 4	4.4[c]	1.03[a]	87.3[a]	26.0[a]	5.8[a]
3	4.6[ab]	1.05[a]	81.7[a]	27.3[a]	5.6[a]
4	4.5[bc]	1.03[a]	81.8[a]	27.8[a]	5.5[a]
Nontreated	4.7[a]	1.07[a]	82.4[a]	28.1[a]	5.8[a]
LSD (P = 0.05)	0.15	NS	NS	NS	NS
P > F	.0105	.2205	.4439	.1273	.5421

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

1/ Centric 40WG was applied at 1.25 oz/acre in the indicated squaring weeks.

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.

COMPARISON OF INSECTICIDE TREATMENT TIMING AND NUMBER OF TREATMENTS FOR COTTON FLEAHOPPER UNDER A LOW LEVEL POPULATION

Venture Farms, Refugio County, 2008

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SUMMARY: It has been observed in previous studies that reduction of fleahopper numbers too early in the fruiting period (1st or 2nd week) can actually result in yield reduction especially if there is a dry period which limits plant growth during that period. This yield loss may occur because plants do not attain adequate growth both below and above ground due to fruit load restricting that growth. Subsequently cutout is premature. Additionally, in a very dry season, little yield advantage has been observed from fleahopper control when square sets are near 50% possibly for the same reason.

Cotton fleahoppers never attained high enough numbers in this study to be considered damaging. They exceeded 15/100 plant terminals only in the 6 DAT-3 (6 days after treatment) counts. Season average post-treatment total fleahopper numbers (nymphs + adults) all differed from each other statistically, with the highest number recorded from the nontreated plots at 12.5/100 plant terminals. It was another indication that fleahopper numbers were not high at the test site. Statistical differences were not observed in cotton fiber characteristics or lint production. Due to the low numbers of fleahoppers we were unable to establish timing effects of fleahopper treatments or measure any impact on cotton lint.

OBJECTIVES: The field study was conducted to evaluate the impact on cotton production of timing treatments for fleahopper control at various weeks of the squaring period.

MATERIALS/METHODS: The cotton variety DPL161B2RF was planted on 40-inch rows with a 12-row planter on Venture Farms east of the Bonnie View Community in Refugio County. Twelve row plots were selected and the center 4 rows of each 12-row pattern by 40 feet were used for treatments. 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 5.6 gpa while traveling at 4 mph. Induce at 0.25 v/v was added to the spray mix. Centric 40 WG (1.25 ounces/acre) was used for fleahopper control. Treatments were initiated in the 3rd week of squaring as follows: (1) Treatment 1 was applied in the 3rd, 4th, and 5th week of squaring [May 28, June 3, and June 10], (2) Treatment 2 was applied in the 4th and 5th week of squaring [June 3 and 10], and (3) Treatment 3 was applied in the 5th week of squaring [June 10].

Treatments were assessed by counting the number of fleahoppers on 20 plants in the center 2 rows of each plot on May 27 [pretreatment], May 31 [3 DAT-1 = 3 days after treatment 1], June 3 [6 DAT-1], June 6 [3 DAT-2], June 9 [6 DAT-2] and on June 16 [6 DAT-3].

One row in each plot was harvested with a 1-row International Harvester model 120A spindle picker. Seed cotton samples were weighed and a sample was obtained to determine lint percentage. These samples were ginned on a 10-saw Eagle laboratory machine, and a 30 gram lint sample was sent to the Fiber and Biopolymer Research Institute, Texas Tech University, 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 (least significant difference) for ease of presentation.

RESULTS/DISCUSSION: Cotton fleahopper numbers never reached damaging levels at the test site to include nymphs, adults, or the combination of the two stages (Tables 1, 2, 3). It was interesting to note that following each treatment week their numbers were reduced by insecticide treatment generally resulting in significantly fewer fleahoppers in Centric treated cotton. The season post-treatment average nymph + adult counts revealed increasing numbers of fleahoppers as fewer treatments were applied along with the delay in treatments during the squaring period, as would be expected, since some plots were treated either 3, 2, 1, or 0 times. In this case the post-treatment period is defined as all counts in all treatments made after the first treatment was applied in squaring week 3. The nontreated cotton averaged 12.5 total fleahoppers for the post treatment average. Due to the late occurrence of the fleahoppers in the later squaring weeks, their numbers were not considered damaging even in the non-insecticide cotton (Table 3). No differences or even trends were noted in cotton fiber characteristics or lint production (Table 4).

ACKNOWLEDGMENTS: Thanks are extended to Lee Hutchins, Crop Consultant, in helping to coordinate the field study. Walt Franke is thanked for providing the site for the study, and Wayne Schubert is acknowledged for his assistance. A special thanks is extended to Rudy Alaniz and Clint Livingston, Demonstration Assistants, for their work in all phases of the study.

Table 1. Effect of insecticide treatment timing on fleahopper **nymphs**, Venture Farms, Refugio County, TX, 2008.

Treatment made in squaring week[1/]	Treatment number	Number per 100 plant terminals						Post-treat. average
		Pretreat	3 DAT-1[2/]	6 DAT-1	3 DAT-2	6 DAT-2	6 DAT-3	
3, 4, 5	1	3.8^{a}	0.0^{a}	0.0^{a}	0.0^{a}	1.3^{a}	0.0^{b}	0.3^{c}
4, 5	2	1.3^{a}	3.8^{a}	11.3^{a}	0.0^{a}	0.0^{a}	0.0^{b}	3.0^{bc}
5	3	0.0^{a}	3.8^{a}	7.5^{a}	6.3^{a}	6.3^{a}	0.0^{b}	4.8^{ab}
Nontreated		2.5^{a}	3.8^{a}	6.3^{a}	7.5^{a}	8.8^{a}	11.3^{a}	7.5^{a}
LSD (P = 0.05)		NS	NS	NS	NS	NS	6.83	3.30
P > F		.0877	.4738	.0792	.0848	.1193	.0102	.0050

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

[1/] Centric 40WG was applied at 1.25 oz/acre in the indicated squaring weeks.

[2/] DAT = Days After Treatment

Table 2. Effect of insecticide treatment timing on fleahopper **adults**, Venture Farms, Refugio County, TX, 2008.

Treatment made in squaring week[1/]	Treatment number	Number per 100 plant terminals						Post-treat. average
		Pretreat	3 DAT-1[2/]	6 DAT-1	3 DAT-2	6 DAT-2	6 DAT-3	
3, 4, 5	1	1.3[a]	0.0[a]	0.0[a]	1.3[a]	1.3[a]	1.3[a]	0.8[a]
4, 5	2	2.5[a]	1.3[a]	1.3[a]	0.0[a]	1.3[a]	0.0[a]	0.8[a]
5	3	3.8[a]	2.5[a]	5.0[a]	1.3[a]	2.5[a]	2.5[a]	2.8[a]
Nontreated		2.5[a]	1.3[a]	5.0[a]	6.3[a]	5.0[a]	7.5[a]	5.0[a]
LSD (P = 0.05)		NS	NS	NS	NS	NS	NS	NS
P > F		.2797	.5493	.1097	.1595	.4782	.1953	.0693

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

[1/] Centric 40WG was applied at 1.25 oz/acre in the indicated squaring weeks.

[2/] DAT = Days After Treatment

Table 3. Effect of insecticide treatment timing on fleahopper **nymphs and adults**, Venture Farms, Refugio County, TX, 2008.

Treatment made in squaring week[1/]	Treatment number	Number per 100 plant terminals						Post-treat. average
		Pretreat	3 DAT-1[2/]	6 DAT-1	3 DAT-2	6 DAT-2	6 DAT-3	
3, 4, 5	1	5.0[a]	0.0[a]	0.0[b]	1.3[bc]	2.5[bc]	1.3[b]	1.0[d]
4, 5	2	3.8[a]	5.0[a]	12.5[a]	0.0[c]	1.3[c]	0.0[b]	3.8[c]
5	3	3.8[a]	6.3[a]	12.5[a]	7.5[ab]	8.8[ab]	2.5[b]	7.5[b]
Nontreated		5.0[a]	5.0[a]	11.3[a]	13.8[a]	13.8[a]	18.8[a]	12.5[a]
LSD (P = 0.05)		NS	NS	9.06	7.42	6.83	10.58	2.00
P > F		.6310	.2389	.0326	.0082	.0084	.0096	.0001

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

[1/] Centric 40WG was applied at 1.25 oz/acre in the indicated squaring weeks.

[2/] DAT = Days After Treatment

Table 4. Cotton fiber characteristics and lint production from variously timed insecticide treatments for cotton fleahopper, Venture Farms, Refugio County, TX, 2008.

	Cotton fiber characteristics					
Treatments by squaring week[1/]	Mic	Length (inches)	UR %	Strength g/tex	Elong. (%)	Yield lb lint/acre
3, 4, 5	4.9[a]	1.09[a]	82.5[a]	28.0[a]	5.1[a]	611[a]
4, 5	4.9[a]	1.10[a]	82.4[a]	28.8[a]	5.1[a]	714[a]
5	5.0[a]	1.10[a]	83.1[a]	28.2[a]	5.2[a]	638[a]
Nontreated	4.8[a]	1.09[a]	82.2[a]	27.9[a]	5.0[a]	639[a]
LSD (P = 0.05)	NS	NS	NS	NS	NS	NS
P > F	.9253	.7411	.4318	.6651	.7499	.6138

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

[1/] Centric (40WG) was applied at 1.25 oz/acre in the indicated squaring weeks.

MONITORING OF RESISTANCE LEVELS IN THE BOLLWORM TO PYRETHROID INSECTICIDE IN THE COASTAL BEND OF TEXAS

Texas AgriLife Research and Extension Center, Nueces County, 2008

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SUMMARY: In 2003 it became apparent that the bollworm (corn earworm and headworm) was becoming more difficult to control in cotton with reduced rates of pyrethroid insecticide. In 2004 we initiated testing of moths for pyrethroid resistance via the adult vial test (AVT). The AVT test is used by insect toxicologists to monitor changes in susceptibility of insects to insecticide. It was confirmed that higher resistance to the PYRETHROID insecticides was indeed the case, especially in June and early July in cotton. We suspected that this situation was in part a result of earlier use of this class of insecticide in sorghum whereby the offspring of survivors with increased resistance to pyrethroids could be found in cotton.

For several years the seasonal pattern of pyrethroid resistance was similar in that low percentages of resistant bollworms were present in April, increased somewhat in May, exceeded a threshold level where we expected to see some field failure in the June to early July period, followed by a decline in resistance levels in August to September. In 2007 the average survival at the 5 and 10 µ/vial dosages at any point during the season was generally lower than in the previous test years (2004-2006). In 2008 we observed an even further decline in survival, and at no point during the season did survival at the 5 and 10 µ/vial dosage exceed 20% (our guess of where to expect field failures with the high labeled rates of pyrethroid insecticides). There may be two reasons for the decline in resistance level to include (1) increased use of chemistry other than pyrethroid for control of headworms in sorghum and (2) a higher percentage of BollGard II and Widestrike cotton varieties grown in the region.

OBJECTIVES: AVT tests were conducted to determine change in susceptibility of bollworm/corn earworm/headworm to the pyrethroid insecticide class.

MATERIALS/METHODS: 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. Moths were exposed to cypermethrin concentrations of 0, 0.3, 1.0, 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 2008 a total of 2,010 moths were tested (201 moths/exposure level) over the period beginning March 21 through September 25.

RESULTS/DISCUSSION: Resistance of bollworm to pyrethroid insecticide in 2008 was greatly reduced over that obtained in the previous 4-year test period (Fig. 1). In fact there was little change in the survival level at the 5 and 10 μ/vial for the entire season. In part, we believe the return to susceptibility was due to use of chemistry other than pyrethroids for control of headworms in sorghum early in the season and a much higher percentage of BollGard II and Widestrike transgenic Bt cotton varieties in the region. Subsequently, it led to much less pyrethroid use on area crops. We encourage the continued use of alternate chemistry on sorghum so that the pyrethroid class of insecticide can be effectively used on conventional and BollGard cotton varieties.

ACKNOWLEDGMENTS: Appreciation is expressed to Dr. Patricia Pietrantonio and to Brad Hopkins, 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 more in depth presentation. Dr. Pietrantonio is the leader for this project for the state of Texas.

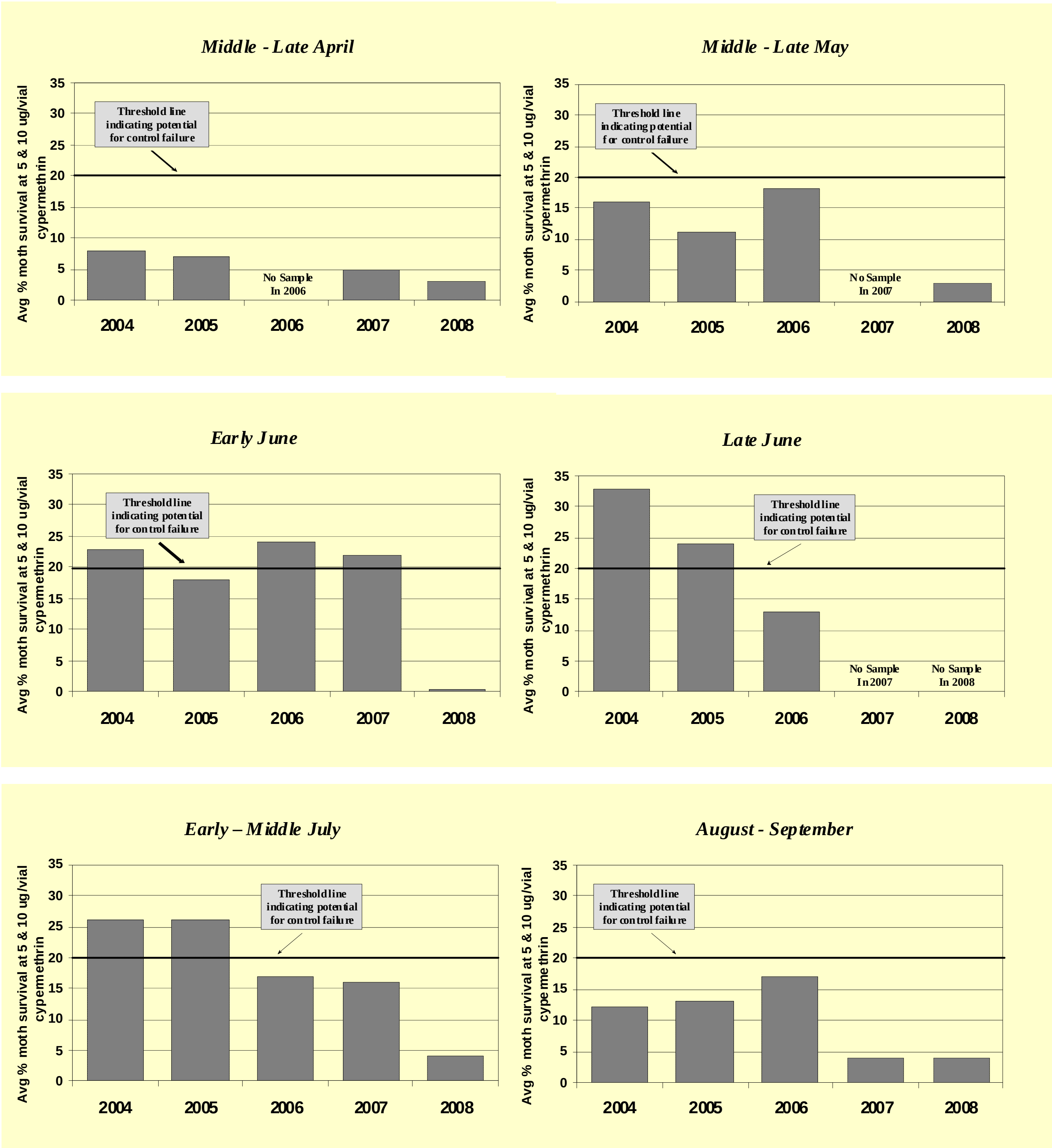

Fig. 1. Bollworm moth survival at 5 and 10 µ/vial cypermethrin in adult vial tests (AVT) in the years 2004 - 2008, Texas AgriLife Research and Extension Center, Nueces County.

BOLLWORM AND TOBACCO BUDWORM PHEROMONE TRAP CATCHES

Texas AgriLife Research and Extension Center, Nueces County, 2008

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SUMMARY: Pheromone traps for bollworm and tobacco budworm were inspected daily for 30 weeks beginning March 1 extending through September 26 at the Texas AgriLife Research and Extension Center near Corpus Christi, Texas. The abundance of bollworm far exceeded that of tobacco budworm in 2008; trap catch averaged 16.3 (bollworm) and 0.09 (budworm) moths/day. Trap captures in 2008 for bollworm were slightly lower than 2007, but tobacco budworm trap numbers were more than 4.3 times less than captured in 2007.

The most valuable aspect of pheromone trap operation in the years 2004 - 2008 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 and they were even more susceptible in 2008.

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 AgriLife Research and Extension Center, Corpus Christi, Texas. Traps were checked daily from early March through late September. 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 2008 averaged 16.3 and 0.09 moths/day for bollworm and tobacco budworm respectively. No observable peaks of tobacco budworm were detected. In 2008 major peaks in moth numbers occurred in weeks 6 and 11. These peaks were lower than any of the preceding 4 years. Cotton field infestations reflected the predominance of bollworm compared to tobacco budworm captured in the pheromone traps. Furthermore, bollworm infestations in cotton were generally lower than any of the previous 20 years.

ACKNOWLEDGMENTS: Thanks are extended to Rudy Alaniz and Clint Livingston, Demonstration Assistants, for their help in maintaining traps

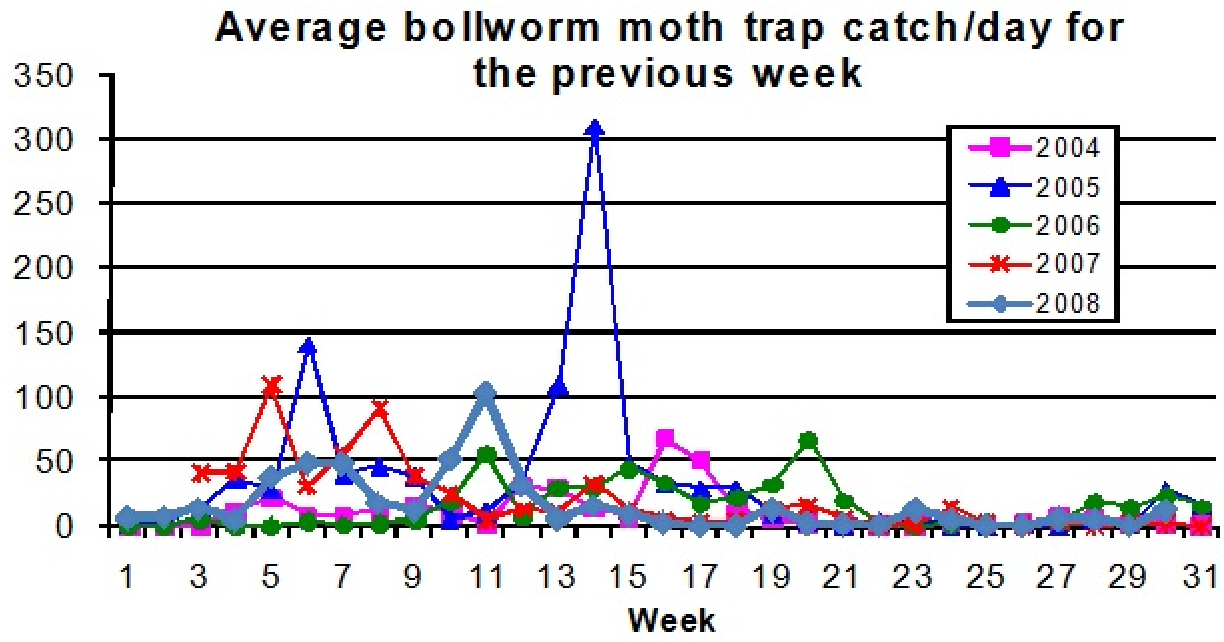

Fig. 1. Bollworm moths captured in pheromone traps, Texas AgriLife Research and Extension Center, Nueces County, TX. Week 1 = early March

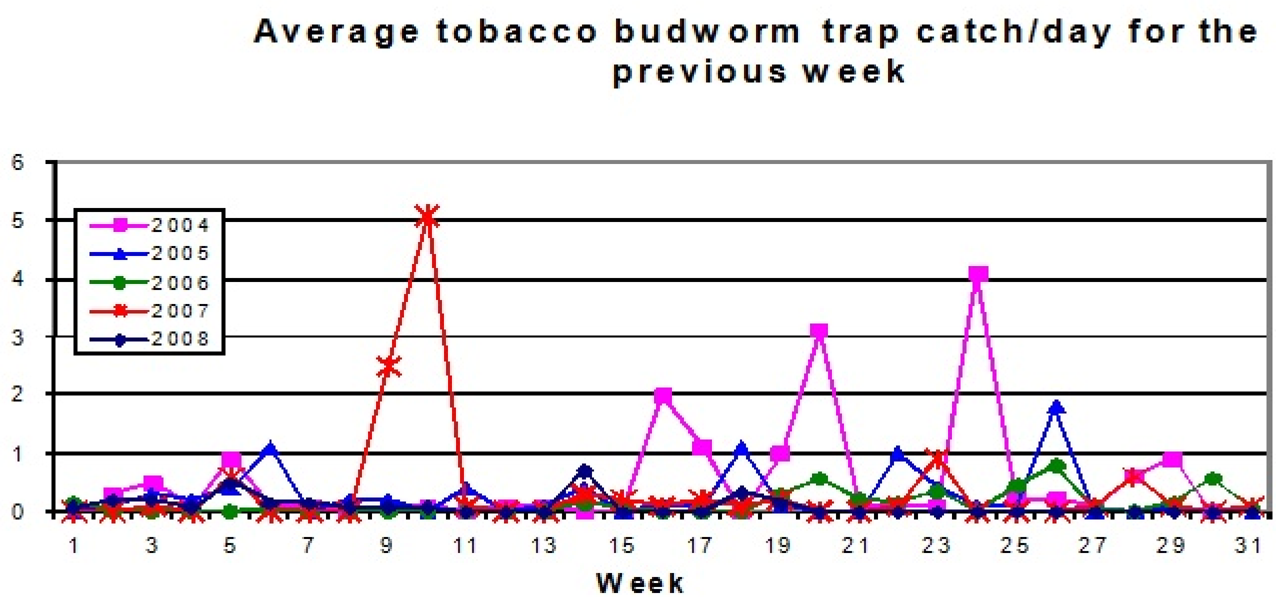

Fig. 2. Tobacco budworm captured in pheromone traps, Texas AgriLife Research and Extension Center, Nueces County, TX. Week 1 = early March

BOLL WEEVIL NUMBERS IN PHEROMONE TRAPS IN NUECES AND SAN PATRICIO COUNTIES BEFORE AND DURING ERADICATION

Texas AgriLife Extension Service, Nueces and San Patricio Counties, 2008

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SUMMARY: The last two years have not been favorable for the boll weevil eradication program in the South Texas/Winter Garden Zone. It all began in 2007 when rain almost every day prevented timely treatments and airplanes were not available as needed to apply insecticide. As a result the number of boll weevils captured this season has already exceeded the numbers caught as long ago as 2001 in the Extension traps located near Clarkwood in Nueces County, at the Welder Wildlife Foundation in San Patricio County, and near Alfred in Jim Wells County. In these traps, the Alfred area traps account for all but 1 weevil captured this season.

For the Zone as a whole, areas of most concern include the Winter Garden region and the general southwest area of the Zone (Jim Wells, Kleberg, southwest Nueces counties). In other areas boll weevil numbers remain low. There is major concern with cotton growing in crops other than cotton where boll weevil reproduction is taking place.

OBJECTIVES: Boll weevil pheromone traps have been operated at the same locations since 1998 to help measure the impact of eradication on the number of boll weevils captured from year-to-year.

MATERIALS/METHODS: A total of 18 traps were operated at 3 locations from 1988 - 2001. From 2002-2007 a total of 24 traps were used. In 2008, a total of 18 traps were 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 (3 traps). Traps were inspected weekly and pheromone + insecticide strip were changed every other week through 2005. Since 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: Boll weevil catch for Texas AgriLife Extension Service operated pheromone traps for the years 1977-82 and each year from 1998 through 2008 is provided in Table 1. There was a large increase in 2008 in the number of weevils captured in traps operated near Alfred, Texas (western Nueces into Jim Wells counties). Only 1 boll weevil was captured in the remaining traps; it was captured before cotton emerged in early spring. The outbreak was due to nearly daily rainfall in 2007 which interfered with timely treatments and lack of enough airplanes to carry out the program in some areas of the eradication zone.

Boll weevil pheromone trap catches for each district office of the South Texas/Winter Garden Boll Weevil Eradication Zone for the year through October are given in Table 2. Note that there was an increase in trapped numbers for 2008 for each office. Wilson County was added to the Victoria office which accounted for nearly all of their increased numbers. Problems still exist in the Uvalde area where significant reproduction occurred in 2008.

ACKNOWLEDGMENTS: Appreciation is expressed to Dr. Charles Allen, Program Director and Darrell Dusek, 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 AgriLife Extension Service operated traps.

Month	1977-82 (6 yr avg)[a]	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Jan	5.3	0.22	0.22	9.93	0.00	.05	.00	.00	.00	.00	.00	.00
Feb	5.5	0.27	0.00	1.60	0.00	.00	.00	.00	.04	.00	.00	.00
Mar	7.7	3.00	0.33	1.72	0.11	.10	.00	.04	.00	.00	.00	.17
Apr	7.4	30.94	0.00	1.27	0.11	.05	.00	.00	.04	.00	.00	1.17
May	2.8	22.00	0.00	0.83	0.17	.05	.00	.00	.00	.00	.00	1.00
Jun	4.9	5.10	0.06	0.67	0.00	.00	.00	.00	.00	.00	.00	.17
Jul	188.9	49.50	2.06	11.33	0.35	.00	.00	00	.00	.00	.00	.22
Aug	645.7	48.40	45.00	14.04	0.94	.17	.04	.21	.04	.00	.00	.22
Sep	309.7	2.28	40.90	1.39	0.11	.00	.00	.08	.00	.00	.00	.44
Oct	165.4	1.39	5.72	0.72	0.06	.00	.00	.00	.00	.00	.04	.39
Nov	55.3	0.28	28.30	0.50	0.11	.00	.00	.00	.00	.00	.00	.00
Dec	15.7	0.22	13.67	0.03	0.00	.00	.00	.00	.00	.00	.17	-
Avg.	117.9	13.60	11.40	3.67	0.16	.035	.0033	.0275	.010	.00	.02	

[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	2008
Uvalde	1.92	0.13	0.03	0.034	0.468	3.02	1.149	0.179	3.699	5.478
Robstown	1.34	1.47	0.06	0.022	0.048	0.14	0.020	0.003	0.395	0.524
Sinton	1.16	0.84	0.03	0.003	0.004	0.01	0.001	.00001	0.015	0.067
Kingsville	0.88	1.77	0.45	0.802	0.423	1.96	0.460	.089	0.393	0.473
Victoria	1.61	1.00	0.34	0.266	0.214	0.11	0.009	.002	0.002	0.113
Zone total	1.35	1.14	0.16	0.135	0.138	0.66	0.215	.042	0.776	1.107

EVALUATION OF PLANTING DATES FOR FM 835LLB2 VARIETY COTTON GROWN UNDER DRYLAND CONDITIONS IN THE TEXAS COASTAL BEND

Texas Agrilife Research and Extension Center, Nueces County, 2008

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SUMMARY: Fibermax 835LLB2 variety cotton was evaluated for production characteristics at 6 planting dates beginning February 27 and ending April 17. Seed germination and plant emergence ranged from 6 days (April dates) to 17 days (February date). Final plant stands ranged from 11.1 thousand (2/27 planting date) to 31.6 thousand plants/acre (4/7 planting date).

Dry conditions resulted in earlier than desired maturity with nodes above white flower measurements on 6/18 of 0 to 6.6 with increasing nodes at later planting dates. Final plant heights were short and ranged from 21.3 to 24.8 inches just before defoliant was applied for the respective planting dates. Internode lengths were also short and averaged 1.1 inches.

Harvested bolls were found only on the 1st planting date beyond fruiting branch 10 which is attributed to less competition in the very low plant stand. First position bolls accounted for a minimum of 44.4% of the harvested bolls and few bolls were harvested beyond the 2nd position. Surprisingly, a large number of bolls were produced on vegetative branches in the 4/7 planting date and may have accounted for the high yield obtained from that planting date. Overall there were no significant differences in total boll production or lint/boll, but combined, the greatest number of bolls and the fewest required for a pound of lint were found in the two highest production planting dates (3/10 and 4/7). Micronaire tended to increase with later planting dates, fiber length was variable, % fiber elongation was best for the middle planting dates, and there were no statistical differences in fiber uniformity or strength readings. Timing of rainfall that matched plant demand for boll filling appears to have had the greatest impact on yield and fiber characteristics. Lint production was significantly higher in 3/10 and 4/7 planting dates.

A similar study in 2007 under much more favorable growing conditions showed March 8 through April 10 to be favorable planting dates as far as lint production. Significant rainfall occurred later in the 2007 season which accounted for the extended favorable production period, and rainfall again influenced favorable production in 2008 for the April 7 planting date. Since the boll weevil is not present to limit production as in past years and with transgenic Bt cotton varieties, lint production from much later planting dates compared with past years is possible, but the later planting dates tend to mature later exposing the crop to higher potential for rain interference at harvest. Therefore, we believe the probable best planting dates for cotton in this region to be in the 2nd and 3rd weeks of March, possibly a week later than when the boll weevil affected late fruit production.

OBJECTIVES: The study was designed to determine for progressive planting dates (1) plant stands and vigor, (2) plant structure and fruiting characteristics, (3) lint and seed yields, and (4) fiber characteristics.

MATERIALS/METHODS: The test was planted on the Texas AgriLife Research and Extension Center at Corpus Christi, Texas beginning February 27 and ending April 17. The FM 835LLB2 variety cotton seed had Gaucho Grande applied at the standard rate. Planting were made on 2/27, 3/10, 3/20, 3/28, 4/07, and 4/17. Cotton was planted at 55,000 seed/acre with a 4-row John Deere 6100 buster type planter on rows with 38-inch centers. The study was arranged in a RCB design with 4 replications of each planting date. Plots were 4 rows wide by 160 feet long. The study was arranged so that each planting date could be defoliated and harvested separately with a 2-row John Deere model 9900L spindle picker. Harvested seed cotton was weighed, a sample was obtained for ginning on a 10-saw Eagle laboratory machine, and lint was sent to the Fiber and Biopolymer Research Institute at Lubbock, Texas for analysis.

Treflan (1.0 quart/acre) was applied in a total spray volume of 20 gpa and incorporated on 10/30/07 and again on 5/12/08. Fertilizer applied 12/11/07 consisted of 88-44-0 + 4 zinc. Following each planting date, Dual II Magnum (1.0 pints/acre) + Cotoran (1.0 quarts/acre) was applied to the plots. Ignite (29 ounces/acre on 4/24) and Staple LX (2.6 oz/acre on 5/26) were applied for weed control. Intruder 70WP (0.6 ounces/acre) was applied on May 8 for aphids and fleahoppers, and Comite II (16 ounces/acre) was applied on June 10 for spider mites. No other treatments were made for arthropod pests.

Agriculture Research Manager (ARM revision 6.1.13) software was used to conduct analysis of variance. Means were separated by least significant difference (LSD) for ease of presentation.

RESULTS/DISCUSSION: Days to emergence were generally shorter as planting dates extended into the season (Table 1). For example, the first planting date was subjected to such cool conditions that it was 17 days to emergence, and the final plant stand was slightly over 11 thousand plants/acre. By the last planting date, stands were reduced due to very dry soil.

Rainfall was very limited following planting until the first week in July. Between 3/10 and 5/16 rain exceeding 0.1 inch/day amounted to 2.36 inches which fell on 3/10, 4/26, and 5/16. Due to the dry conditions nodes above white flower (NAWF) as measured on 6/18 for each planting date indicated that cotton at all planting dates except the last were in full cutout (Table 1).

Plant mapping (P-MAP) was carried out the day before defoliants were applied to each two pair of planting dates. A selected summary of plant mapping data is given in Tables 1 and 2. Final plant height varied from 21.3 inches (3/20 planting date) to 24.8 inches (3/10 planting date). Generally the taller plants, except for the first planting date with low plant stand, produced the most lint. Differences in internode length, number of vegetative nodes, and number of fruiting branches all had significant differences among the planting dates. Internode lengths were considered short, averaging 1.1 inches at harvest. The number of vegetative nodes tended to increase with planting date.

Boll production on an acre basis was affected by final plant stand and planting date (Table 2). In the early planting date, boll production was reduced because of the low plant population which was generally less than half that of the remaining planting dates. The 3/10 planting date took advantage of favorable growing conditions as far as soil moisture was concerned, and coupled with a relatively good plant population, it produced significantly more bolls on fruiting branches 1-5 and retained the highest number of 1st position bolls compared with many of the other planting dates. In addition, the number of bolls required to produce a pound of lint was less in this planting date compared with all but the final date. However, yield from the final date was reduced due to the low total boll production on an acre basis. Interestingly, total boll production figures were not statistically different for any of the planting dates. It is a delicate balance between plant population and available water when the demand is high for plant growth and boll production that determines yield potential in dryland Texas Coastal Bend cotton. It is best to determine the most favorable time to plant based on good soil temperatures and weather forecast matched with long term probability for rainfall. Generally the favorable planting period, somewhat confirmed by this study, would be the second and third weeks of March.

Harvest dates, cotton fiber characteristics, premature senescence rate, and lint production information is given in Table 3. The long dry period followed by rainfall during the high nutrient demand boll filling period resulted in premature leaf senescence throughout the Lower Gulf Coast. This planting date study provided opportunity to measure rates of leaf senescence. There was significantly decreasing evidence of the senescence syndrome as planting dates were extended into the season which matched what was observed in area fields and which appeared to be best associated with the reduced numbers of first position bolls/acre as the season progressed.

Significant effects of panting date were noted in fiber characteristics, some of which could be explained and others that were affected by combination of plant stand, fruit retention, and the date of significant rainfall (Table 3). Higher retention of bolls generally resulted in reduced micronaire, but staple length did not follow a particular pattern. Fiber elongation readings were generally most favorable in the middle planting dates.

The final two planting dates did respond to the late rainfall where bolls were heavier, but retention was not as high. The 2nd planting date produced the greatest number of total and 1st position bolls, and the greatest lint yield, but the 2nd planting date yield was not statistically different from the 4/7 planting date. Apparently the 4/7 planting date took advantage of late rainfall.

ACKNOWLEDGMENTS: Appreciation is expressed to Cotton Incorporated for funding this project (08-306TX). Thanks are extended to Rudy Alaniz and Clint Livingston, Demonstration Assistants, for help in establishing and maintaining the study site. The Texas Food and Fiber Council is thanked for funding cost of cotton fiber analysis.

Table 1. Plant growth characteristics in cotton from six planting dates, Texas AgriLife Research and Extension Center, Nueces County, TX, 2008.

Planting date	Days to emergence	Final plant stand (1000's/acre)	NAWF[1/] 6/18	Inches: Plant[2/] height	Inches: Internode[2/] length	Plant vegetative nodes[2/]	Fruiting branches[2/]
2/27	17	11.1[d]	1.7[c]	24.6[ab]	1.05b	5.1[c]	18.3[a]
3/10	8	27.2[ab]	0.0[d]	24.8[a]	1.31[a]	5.4[bc]	13.6[c]
3/20	6	23.2[bc]	1.6[c]	21.3[c]	1.05[b]	5.2[c]	15.5[b]
3/28	7	30.3[a]	2.0[c]	21.6[c]	1.22[a]	6.1[ab]	11.6[d]
4/07	6	31.6[a]	3.8[b]	24.1[ab]	1.00[b]	6.3[a]	17.8[a]
4/17	6	21.7[c]	6.6[a]	22.2[bc]	0.99[b]	5.9[abc]	16.6[ab]
LSD (P=0.05)		5.164	1.16	2.53	0.165	0.78	1.79
P > F		.0001	.0001	.0260	.0038	.0260	.0001

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

1/ NAWF = nodes above white flower

2/ P-map conducted day of defoliation (7/14 for planting dates 2/27 & 3/10; 7/21 for planting dates 3/20 & 3/28; and 8/4 for planting dates 4/7 & 4/17).

Table 2. Cotton boll production and position of open bolls on plants at harvest from six planting dates, Texas AgriLife Research and Extension Center, Nueces County, TX, 2008.

	Number bolls/acre (1000's)									
	Fruiting branch group			Fruiting position						Bolls/lint lb
Planting date	1-5	6-10	11-15	1		2	3	Veg Br[3/]	Total	
2/27	91.1[b]	61.8[a]	10.8[a]	111.6[bc]	(59.8[a])[2/]	48.2[a]	4.0[a]	28.3[a]	192.1[a]	368.2[a]
3/10	145.9[a]	52.4[ab]	0.0[b]	172.6[a]	(54.4[ab])	18.2[b]	7.5[a]	6.5[a]	204.8[a]	318.9[a]
3/20	122.0[ab]	35.9[bc]	0.0[b]	140.2[ab]	(49.8[bc])	17.7[b]	0.0[a]	34.0[a]	192.1[a]	387.7[a]
3/28	133.0[a]	17.1[c]	0.0[b]	130.3[bc]	(44.9[c])	18.4[b]	1.4[a]	46.8[a]	196.9[a]	366.0[a]
4/07	121.5[ab]	16.2[c]	0.0[b]	120.8[bc]	(44.4[c])	14.3[b]	2.7[a]	81.2[a]	218.9[a]	344.1[a]
4/17	90.4[b]	14.5[c]	0.0[b]	99.0[c]	(51.2[bc])	5.8[b]	0.0[a]	20.6[a]	125.5[a]	264.9[a]
LSD (P=0.05)	32.86	22.37	44.11	39.52	7.78	21.55	NS	NS	NS	NS
P > F	.0136	.0010	.0004	.0195	.0059	.0157	.4908	.1457	.4351	.6753

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

1/ P-map conducted day of defoliation (7/14 for planting dates 2/27 & 3/10; 7/21 for planting dates 3/20 & 3/28; and 8/4 for planting dates 4/7 & 4/17).

2/ Numbers in ( ) indicated percentage retention of 1st fruiting position bolls.

3/ Vegetative branches

Table 3. Premature senescence, fiber characteristics, and lint production in cotton from six planting dates, Texas AgriLife Research and Extension Center, Nueces County, TX, 2008.

		Cotton fiber characteristics						
Planting date	Harvest date	Mic	length inches	Unif. %	Strength g/tex	Elong. %	% premature senescence	Yield lb lint/acre
2/27	7/21	4.0[c]	1.12[a]	83.2[a]	32.1[a]	4.6[c]	91.5[a]	519[b]
3/10	7/21	3.8[c]	1.12[a]	83.7[a]	31.4[a]	4.9[abc]	99.0[a]	652[a]
3/20	7/28	4.0[c]	1.10[ab]	82.6[a]	30.5[a]	5.1[ab]	77.5[b]	491[b]
3/28	7/28	4.3[b]	1.08[b]	82.5[a]	31.1[a]	5.2[a]	25.8[c]	529[b]
4/07	8/11	4.7[a]	1.08[b]	82.6[a]	31.1[a]	5.2[a]	0.5[d]	611[a]
4/17	8/11	4.6[a]	1.13[a]	82.9[a]	31.3[a]	4.8[bc]	0.0[d]	476[b]
LSD (P=0.05)		0.21	0.035	NS	NS	0.36	8.75	74.6
P > F		.0001	.0175	.3518	.5957	.0199	.0001	.0008

Means in a column followed by the same letter are not significantly different by ANOVA.
[1/] Estimates were made on July 10.

EVALUATION IN REGROWTH RESPONSE OF 42 COTTON VARIETIES TREATED WITH 2,4-D FOLLOWING SHREDDING

Texas AgriLife Research and Extension Center, Nueces County, 2008

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SUMMARY: All cotton varieties were effectively destroyed with 2,4-D (1.0 quart/acre) applied within 2 hours following destruction with a rotary shredder. Readings were taken for a period of 46 days post-shredding with only a few cotton varieties showing any kind of regrowth response during that time. The varieties with the most regrowth included, in order of rating from the most to the least regrowth included DPL 555, 141, 121, 174; Apex; and FM 9058. Under favorable growing conditions it might be advisable to apply 1.5 quart/acre of 2,4-D to these 6 cotton varieties as they appeared to be more difficult to control than the other 36 evaluated.

OBJECTIVES: Use of 2,4-D (1.0 quart/acre) applied to standing cotton stalks or within a few hours following shredding has become standard practice along the Gulf Coast of Texas. It is not known if varieties differ in response to the 2,4-D. The current study was initiated to evaluate that response.

MATERIALS/METHODS: A large cotton variety test consisting of 42 entries was planted on the Meaney Annex of the Texas AgriLife Research and Extension Center on March 18, 2008 with a 4-row John Deere 6100 buster type planter equipped with research cones to deliver seed to 2-row by 40 foot plots on rows with 38-inch centers (later cut to 35 foot plots). The test was arranged in a randomized complete block design with 4 replications. Plants generally emerged to a stand in 7 days.

The soil was sandy clay loam (52% sand, 16% silt, 32% clay) with 7.8 pH and 1.44% organic matter. Fertilizer applied totaled 88-4-0+4 Zn. Herbicide applied was Dual II Magnum 7.64 lb/gallon (1.0 pint/acre) + Cotoran 4L (1.0 quart/acre) at planting. Fusion 2.56 lb (12.0 ounces/acre) and Staple 3.2 LX (2.6 ounces/acre) were applied in May for additional weed control.

Cotton was harvested with a 1-row International Harvester model 120A spindle picker on July 31 followed by shredding of stalks. Within 2 hours following shredding 2,4-D amine (1.0 quart/acre) was applied with a tractor mounted sprayer in a total volume of 20 gpa through 8003 air induction nozzles at 40 psi traveling at 4 mph.

Treatments were assessed at 11, 25, 39, and 46 days post-shredding. Scoring of regrowth was based on a scale where 1 = no green color, 2 = slight green with small leaf, 3 = green leaf and stalk, 4 = visible green leaves, and 5 = fruiting plants.

Agriculture Research Manager (ARM revision 6.1.13) software was used to conduct analysis of variance. Means were separated by least significant difference (LSD) for ease of presentation.

RESULTS/DISCUSSION: Growing conditions during the season were relatively dry with maximum plant size of 25 inches or less. Rainfall did occur near harvest which more-or-less filled the profile. We thought the moisture would be conducive to rapid regrowth without treatment.

Regrowth was slow to occur in all 42 cotton varieties with only a few varieties showing much green color (Table 1). Even in the few green varieties there was no sign that they would produce fruit in the 46-day inspection period. Six varieties showing the most green color included DPL 555, 141, 121, 174, Apex, and FM 9058. An outside check plot did show more regrowth but had not reached the squaring stage in the 46 day evaluation period although it was nearing the fruiting stage by that time.

ACKNOWLEDGMENTS: Rudy Alaniz and Clint Livingston, Demonstration Assistants, are acknowledged for preparing the field for evaluation.

Table 1. Regrowth rating in cotton varieties treated with 2,4-D, Texas AgriLife Research and Extension Center, Nueces County, TX, 2008.

Cotton variety	Regrowth rating[1/]				Cotton variety	Regrowth rating[1/]			
	8/11	8/25	9/8	9/15	AVG.		8/11	8/25	9/8	9/15	AVG.
PHY 485	1.9[a]	1.3[a]	1.0[a]	1.0[a]	1.3[b-e]	FM 840	1.4[a]	1.0[a]	1.0[a]	1.0[a]	1.1[cde]
PHY 375	1.7[a]	1.3[a]	1.0[a]	1.0[a]	1.2[cde]	FM 9180	1.4[a]	1.0[a]	1.3[a]	1.0[a]	1.2[cde]
DPL 141	1.8[a]	2.0[a]	1.8[a]	1.0[a]	1.6[ab]	FM 1880	1.6[a]	1.3[a]	1.3[a]	1.0[a]	1.3[b-e]
DPL 164	1.6[a]	1.0[a]	1.0[a]	1.0[a]	1.2[cde]	FM 832	1.3[a]	1.0[a]	1.0[a]	1.0[a]	1.1[de]
APEX	1.9[a]	1.8[a]	1.3[a]	1.0[a]	1.5[abc]	DPL 121	2.1[a]	2.0[a]	1.5[a]	1.0[a]	1.6[ab]
PHY 440	1.3[a]	1.3[a]	1.0[a]	1.0[a]	1.1[cde]	DPL 515	1.7[a]	1.0[a]	1.3[a]	1.0[a]	1.2[cde]
PHY 315	1.8[a]	1.0[a]	1.0[a]	1.0[a]	1.2[cde]	DPL 445	1.4[a]	1.0[a]	1.0[a]	1.0[a]	1.1[cde]
PHY 425	1.7[a]	1.0[a]	1.0[a]	1.0[a]	1.2[cde]	DPL 555	2.3[a]	2.0[a]	1.8[a]	1.0[a]	1.8[a]
PHY 370	1.5[a]	1.0[a]	1.3[a]	1.0[a]	1.2[cde]	DPL 455	1.7[a]	1.3[a]	1.0[a]	1.0[a]	1.2[cde]
DPL 143	1.7[a]	1.0[a]	1.0[a]	1.0[a]	1.2[cde]	DPL 117	1.5[a]	1.0[a]	1.0[a]	1.0[a]	1.1[cde]
TAMCOT 22	1.3[a]	1.0[a]	1.0[a]	1.0[a]	1.1[de]	DPL 174	2.3[a]	1.8[a]	1.5[a]	1.0[a]	1.6[ab]
STV 5327	1.8[a]	1.8[a]	1.0[a]	1.0[a]	1.4[a-e]	DPL 161	1.6[a]	1.3[a]	1.3[a]	1.0[a]	1.3[b-e]
STV 4427	1.2[a]	1.0[a]	1.0[a]	1.0[a]	1.0[e]	ALL-TEX 6W102	1.7[a]	1.3[a]	1.3[a]	1.0[a]	1.3[b-e]
STV 4554	2.1[a]	1.5[a]	1.0[a]	1.0[a]	1.4[a-e]	ALL-TEX 7824	2.1[a]	1.3[a]	1.3[a]	1.0[a]	1.4[a-e]
STV 4498	1.9[a]	1.3[a]	1.0[a]	1.0[a]	1.3[b-e]	ALL-TEX 7AZ1	1.5[a]	1.0[a]	1.3[a]	1.0[a]	1.2[cde]
FM 1735	1.3[a]	1.0[a]	1.0[a]	1.0[a]	1.1[de]	ALL-TEX 7B35	1.4[a]	1.0[a]	1.0[a]	1.0[a]	1.1[cde]
FM 9063	1.6[a]	1.0[a]	1.0[a]	1.0[a]	1.2[cde]	ALL-TEX 7A18	1.4[a]	1.0[a]	1.0[a]	1.0[a]	1.1[cde]
FM 1740	1.9[a]	1.0[a]	1.0[a]	1.0[a]	1.2[cde]	DOWNER COTTON 1374	1.4[a]	1.0[a]	1.3[a]	1.0[a]	1.2[cde]
FM 835	1.4[a]	1.0[a]	1.3[a]	1.0[a]	1.2[cde]	DOWNER COTTON 1254	1.6[a]	1.0[a]	1.3[a]	1.0[a]	1.2[cde]
FM 9058	2.1[a]	1.3[a]	1.5[a]	1.0[a]	1.5[a-d]	DOWNER COTTON 1469	1.5[a]	1.0[a]	1.3[a]	1.0[a]	1.2[cde]
FM 955	1.2[a]	1.0[a]	1.0[a]	1.0[a]	1.0[e]	DOWNER COTTON 1256	1.5[a]	1.5[a]	1.3[a]	1.0[a]	1.3[b-e]

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

[1/] Regrowth ratings: 1 = no green color, 2 = slight green with small leaf, 3 = green leaf and stalk, 4 = visible green leaves, 5 = fruiting plants.

GRASSHOPPER AND FALL ARMYWORM CONTROL WITH BAYTHROID AND SEVIN IN BERMUDA GRASS PASTURE

Herbert B. Schumann Farm, Austin County, 2008

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SUMMARY: Grasshopper numbers declined naturally and did not occur in consistent enough numbers to allow proper evaluation of the insecticides tested. Fall armyworms were affected by the treatments at 14 days after treatment (DAT) as their numbers were significantly greater in the nontreated grass plots compared with the three insecticide treatments. By 19 DAT they remained in insecticide treated plots, but their numbers had declined to zero in the nontreated grass. Fall armyworm numbers continued to decline and by 28 DAT very few were still present.

OBJECTIVES: The field study was established to evaluate the newly labeled Baythroid for use on pasture, rangeland, grass for seed, and grass for hay for control of grasshoppers and armyworms.

MATERIALS/METHODS: The grasshopper control study was established on June 27, 2008 on the Herbert Schumann Farm north of Bellville, Texas in Austin County in a field of coastal bermuda grass. The site was a reclaimed peanut field with an acid, sandy soil. It was judged to be excellent habitat for grasshopper egg laying. Insecticide treatments were applied with a Terrigator sprayer equipped with a global positioning system for navigation and a 60-foot boom with nozzles spaced on 60-inch centers. A total spray volume of 20 gpa at a pressure of 20-25 psi was applied through flat fan nozzles.

Treatments were assessed by counting on May 20 (7 days before treatment) the number of grasshoppers and fall armyworm in 5 sweeps with a 15-inch net at two locations in each of the 4 plots and after application on July 3, 11, 16, and 25.

RESULTS/DISCUSSION: Grasshopper numbers in the Sevin treatment were significantly greater in the plots where Sevin was to be applied (Table 1), and by 6 DAT their numbers had declined in all plots, possibly due to natural enemies including disease causing agents. No differences were observed in grasshopper numbers on any of the inspection dates through 28 DAT.

It appeared that fall armyworm numbers were reduced by all insecticides when counted 14 DAT (Table 2). Statistically more grasshoppers were found in the nontreated grass when the 14 DAT counts were made. By 19 DAT more fall armyworms were observed in the Baythroid (1.8 oz/acre) treatment, and by 28 DAT very few fall armyworms could be found. Sevin treated plots averaged significantly fewer fall armyworm compared with any of the other treatments.

Overall, very little useful information was obtained from the study as both the grasshopper and fall armyworm population declined in all treatments including the nontreated grass after the 14 DAT counts.

ACKNOWLEDGMENTS: Gary Schwarlose, Bayer CropScience, is thanked for supplying the Baythroid and Sevin for treating very large plots. We acknowledge Dr. Herbert Schumann for providing the site for the study and his continued interest in assessing insect affects on forage grass.

Table 1. Grasshopper numbers following treatment with insecticide, Herbert B. Schumann Farm, Austin County, TX, 2008.

			Grasshoppers/5 sweeps					
Treatment	Rate oz/acre	$ cost/ acre[1/]	Pretreat	6 DAT[2/]	14 DAT	19 DAT	28 DAT	Post trt. Avg.
Baythroid XL 1E	2.8	6.13	5.5^{b}	0.3^{a}	1.3^{a}	8.0^{a}	4.5^{a}	3.5^{a}
Baythroid XL 1E	1.8	3.94	5.0^{b}	0.3^{a}	1.0^{a}	4.6^{a}	3.6^{a}	2.4^{a}
Sevin 4 XLR	32.0	9.50	25.3^{a}	0.0^{a}	4.4^{a}	8.0^{a}	2.6^{a}	3.8^{a}
Nontreated			2.6^{b}	0.8^{a}	3.3^{a}	0.6^{a}	2.0^{a}	1.7^{a}
LSD (P = 0.05)			8.20	NS	NS	NS	NS	NS
P > F			.0005	.0691	.2252	.1871	.3763	.3215

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

1/ Insecticide cost/acre; does not include application cost.

2/ DAT = Days After Treatment

Table 2. Fall armyworm numbers following treatment with insecticide, Herbert B. Schumann Farm, Austin County, TX, 2008.

			Fall armyworm/5 sweeps					
Treatment	Rate oz/acre	Grass dry wt (grams)	Pretreat	6 DAT[1/]	14 DAT	19 DAT	28 DAT	Post trt. Avg.
Baythroid XL 1E	2.8	222	0.0^{a}	0.0^{a}	10.1^{b}	3.0^{b}	0.0^{a}	3.3^{ab}
Baythroid XL 1E	1.8	267	0.0^{a}	0.0^{a}	8.9^{bc}	10.1^{a}	0.0^{a}	4.8^{a}
Sevin 4 XLR	32.0	525	0.0^{a}	0.0^{a}	0.4^{c}	2.5^{b}	0.3^{a}	0.8^{b}
Nontreated		415	0.0^{a}	0.0^{a}	19.1^{a}	0.0^{b}	0.0^{a}	4.8^{a}
LSD (P = 0.05)			NS	NS	8.79	5.30	NS	2.80
P > F			1.00	1.00	.0071	.0105	.0877	.0321

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

1/ DAT = Days After Treatment

USE OF THE HERBICIDE ENVOKE APPLIED ALONE OR WITH PROWL FOR EFFECTIVENESS ON WEEDS IN COTTON

Texas AgriLife Research and Extension Center, Nueces County, 2008

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SUMMARY: Envoke alone and Envoke + Prowl applied 121 days before planting, or Envoke (0.05 ounces/acre) applied alone at 48 days before planting were equally effective in providing weed control. The control level with Envoke applied at 48 days before planting was numerically better than Prowl applied alone at 121 days before planting based on the average weed control readings taken on the last 3 inspection dates. A major impact in this study may have been the lack of rainfall after the initial treatments (121 days before planting) until March 6 when 1.24 inches was received. Due to the extended drought, weed pressure was very low until the readings taken on March 12 (113 days after the initial treatments were applied). Additional testing will be necessary to gain understanding as to effectiveness and crop safety of the Envoke.

OBJECTIVES: To determine if the addition of Envoke as a pre-plant stand alone herbicide or as an addition to Prowl would improve the level of weed control in cotton.

MATERIALS/METHODS: The test was conducted on the Texas AgriLife Research and Extension Center at Corpus Christi, Texas. Individual plots were 4 rows on 38-inch centers by 40 feet. Treatments were arranged in a randomized complete block design with 4 replications. At 121 days before planting (November 20, 2007) the first three herbicide treatments were applied and at 48 days before planting (February 1, 2008) Envoke at 0.05 ounces/acre was applied. All herbicides were broadcast with Spider Trac ground equipment while traveling at 5.5 mph. Spray nozzles used were 8003 XR at a 19-inch interval boom spacing, the pressure was 25 psi, and the total spray volume was 12.5 gpa. Prowl was lightly incorporated with 1 pass of a disk, and Envoke was applied to the soil surface.

The cotton variety Stoneville 4554 B2RF was planted on March 20 and immediately after Roundup (1.0 quart/acre) was applied to kill weeds that had emerged by that date.

Treatments were assessed by (1) estimating percentage of the ground covered by weeds at 30, 62, and 73 days after the first 3 treatments were applied, (2) estimating percentage weed control at 113, 149, and 171 days after the first 3 treatments were applied, and (3) counting the number of emerged cotton plants to determine stands on 10-row feet in the center two rows of plots on April 15.

Agriculture Research Manager (ARM revision 6.1.13) software was used to conduct analysis of variance. Means were separated by least significant difference (LSD) for ease of presentation.

RESULTS/DISCUSSION: Weeds which were present at the test site included henbit, sunflower, purple nightshade, smellmelon, false ragweed, pigweed, purslane and Texas panicum. Results of herbicide treatments are provided in Table 1. Following the treatments made 121 days before planting, field inspections were made 30, 62, 73, 113, 149, and 171 days after treatment (DAT). Due to very dry conditions few weeds were found, and no differences were detected in treatments compared to the nontreated plots until 113 days after the initial 3 treatments were applied. The only significant rainfall that was received (1.48 inches) came March 6-10. Weed control measurements taken on March 12 began to show significant differences in the herbicide treatments, and by May 9 Envoke alone and, Envoke + Prowl applied at 121 days before planting, and Envoke applied 48 days before planting had significantly better weed control than did the Prowl applied alone at 121 days before planting. Estimated weed control levels for the average of 113, 149, and 171 days after the original three treatments were applied gave weed control levels over a 58 day period. The only difference in the level of control measured at 171 days after the original treatments and the 3-date average was that there was not a statistical difference between Prowl used alone applied at 121 days before planting and Envoke (0.05 ounces/acre) applied at 48 days before planting. No crop injury was noted by any of the herbicide treatments.

This test should have included an evaluation of Prowl and Prowl + Envoke applied at 48 days before planting. In addition, results may have been quite different if significant rainfall had occurred earlier, especially following the initial 3 treatments.

ACKNOWLEDGMENTS: Thanks are extended to Tony Driver, Syngenta Crop Protection, for support of the study and to Rudy Alaniz and Clint Livingston, Demonstration Assistants, for carrying out the study.

Table 1. Levels of weed control in cotton with herbicides applied either 121 or 48 days before planting, Texas AgriLife Research and Extension Center, Nueces County, TX, 2008.

Herbicide	Plants 1000's/A 4/15	DAT 1, 2, 3[4/] 30 (12/20)[5/]	62 (1/21)	73 (2/1)	113 (3/12)	149 (4/17)	171 (5/9)	avg.
		% plant cover			% weed control			
Envoke[1/] (0.1 oz/acre)	26.9[a]	0.0[a]	0.0[a]	0.8[a]	92.6[a]	83.8[a]	82.5[a]	86.3[a]
Envoke + Prowl[2/] (0.1 + 48.0 oz/acre)	27.9[a]	0.0[a]	0.0[a]	0.5[a]	83.8[ab]	88.8[a]	83.8[a]	85.4[a]
Prowl[2/] (48.0 oz/acre)	27.0[a]	0.0[a]	0.0[a]	0.8[a]	63.1[b]	83.8[a]	47.5[b]	64.8[b]
Envoke[3/] (0.05 oz/acre)	26.1[a]	0.0[a]	0.0[a]	1.0[a]	63.8[b]	83.8[a]	76.3[a]	74.6[ab]
Nontreated	23.9[a]	0.0[a]	0.0[a]	1.0[a]	00.0[c]	00.0[b]	00.0[c]	00.0[c]
LSD (P = 0.05)	NS	NS	NS	NS	23.71	10.76	16.39	12.44
P > F	.4990	-	-	.4449	.0001	.0001	.0001	.0001

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

1/ Pre-emergence 121 days before planting.

2/ Prowl 3.3EC incorporated followed by surface application of Envoke at 121 days before planting.

3/ Pre-emergence 48 days before planting (73 DAT'S 1-3).

4/ DAT 1, 2, 3 = Days After Treatments 1, 2, 3 applied.

5 Number in ( ) month/day.

COMPARISON OF TOMATO VARIETIES GROWN IN ARANSAS COUNTY DURING THE SPRING PRODUCTION SEASON

Green Acres Demonstration Garden, Texas AgriLife Extension Service, Aransas County, 2008

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SUMMARY: Better Boy, Celebrity Bush, and Bonnie Original tomato varieties were grown to evaluate various production, visual appeal, and taste characteristics. Statistically significant differences were not found in plant height or yield on any evaluation date. Total season production per plant averaged 16.2 pounds with a range for the 4 replications in the varieties of 14.7 pounds (Celebrity Bush) to 17.8 pounds (Better Boy). There were also no differences in the total number of tomatoes produced by the 3 varieties. A visual appeal and taste test was conducted for color, aroma, flavor, and texture. Except for flavor, no differences were found by the evaluation panel. Flavor was judged by the panel to be slightly lower for the Celebrity Bush variety.

Additional testing with the same varieties grown in the fall is needed. Followup testing for at least a 3-year period is needed to better evaluate the varieties. The visual and taste test panel should be increased to at least 20 people.

OBJECTIVES: Three tomato varieties were compared to determine growth rate, tomato production (number and weight), and consumer acceptance.

MATERIALS/METHODS: Three commercially available tomato varieties were selected and planted at the Green Acres Demonstration Garden at the Texas AgriLife Extension Service office at Rockport, Texas on February 8, 2008 . Plants were arranged in a randomized complete block experimental design with 4 replications of each variety. Each replication was separated by a grass walkway and border tomato plants were grown on the end of each replicate to achieve equal plant competition for available nutrients, sunlight, and water.

Better Boy, Celebrity Bush, and Bonnie Original varieties were chosen because they were all readily available for sale at local retailers. The availability aspect of this study was very important, as most hobby gardeners purchase plants locally.

All tomatoes in the study were planted on their sides, per recommendations made by Extension Horticulturist Tom LeRoy, in order to provide them with more of a root base in our sandy South Texas soils. Row covers were also utilized to help protect the young, tender plants until they were well established.

Treatments were assessed by (1) measuring plant height on 7 dates beginning February 8 and ending May 7; (2) harvesting, weighing, and counting tomatoes on 22 separate dates during the production season; and (3) conducting a visual appeal and taste test on each variety by a panel of 7 individuals. Tomatoes were sliced and presented in that form as uniform as possible. Ratings varied from 1 (least desirable classification) up to 9 (most desirable classification). Selection of fractions between whole numbers could be made by panel members. Specific criteria were given each taste panel member beginning with visual preference. Then each panel member were instructed to eat a bite of cracker and drink from a bottle of water. Then panel members were instructed to taste each tomato sample by chewing it slowly and answering questions dealing with aroma, flavor, and texture. Panel members could also add additional written comments. The process of eating cracker and drinking water was repeated between samples.

Agriculture Research Manager (ARM revision 6.1.13) software was used to conduct analysis of variance, and means were separated by least significant difference (LSD) for ease of presentation. Note: for the flavor ranking we decided to accept a value slightly higher than the 0.05 significance level (95% confidence level); the value in this case was 0.0597.

RESULTS/DISCUSSION: Differences were not found in the growth rate, final plant height or number of tomatoes produced (Table 1). None of the plant height readings were close to being statistically different. The final average height ranged from 57.3 to 59.5 inches for the varieties.

Initial harvest was made on April 30 and the last tomatoes were harvested on June 16, for a total of 22 harvest days. Harvest data is summarized in Table 2 showing production during various weeks of the season. Total yield produced by each variety is also shown in Table 2; there were no significant differences detected. Total production averaged 16.2 pounds across all tomato plants in the study.

The evaluation panel found no differences in color (visual preference), aroma, texture, or overall score (Table 3). There was a slight preference for the flavor of Better Boy and Bonnie Original over Celebrity Bush. The P value in this case was 0.0597 which was actually slightly above the value of 0.05 normally accepted for significant difference.

ACKNOWLEDGMENTS: Thanks are extended to Aransas/San Patricio Master Gardener Mr. Bob Crawford for his leadership in conducting this intensive study, Extension Entomologist Dr. Roy Parker for his data analysis and write-up, as well as, the Aransas County Commissioner's Court for their ongoing support of our educational programs.

Table 1. Plant growth rate and number of tomatoes produced by commercial varieties, Green Acres Demonstration Garden, Texas AgriLife Extension Service, Aransas County, TX, 2008.

	Plant height (inches)							
Variety	2/08	3/06	3/14	3/27	4/03	4/16	5/07	Total tomatoes
Better Boy	4.0[a]	11.9[a]	24.0[a]	37.8[a]	44.3[a]	53.0[a]	57.3[a]	66.3[a]
Celebrity Bush	4.0[a]	13.0[a]	21.5[a]	35.8[a]	45.5[a]	52.8[a]	59.5[a]	56.0[a]
Bonnie Original	4.0[a]	13.1[a]	23.8[a]	36.3[a]	46.1[a]	52.0[a]	59.3[a]	66.3[a]
LSD (P = 0.05)	NS	NS	NS	NS	NS	NS	NS	NS
P > F	1.00	.6148	.7437	.9011	.9406	.9887	.9530	.6876

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

Table 2. Tomato production by commercial varieties, Green Acres Demonstration Garden, Texas AgriLife Extension Service, Aransas County, TX, 2008.

	Tomato harvest (ounces) at week ending							
Variety	5/03	5/10	5/17	5/24	5/31	6/07	6/21	Total
Better Boy	12.5[a]	14.3[a]	76.4[a]	99.9[a]	29.3[a]	19.5[a]	32.3[a]	284.3[a]
Celebrity Bush	7.3[a]	27.0[a]	61.4[a]	76.4[a]	25.8[a]	8.8[a]	28.1[a]	234.8[a]
Bonnie Original	2.9[a]	13.6[a]	63.0[a]	103.3[a]	27.9[a]	1.8[a]	46.3[a]	258.3[a]
LSD (P = 0.05)	NS	NS	NS	NS	NS	NS	NS	NS
P > F	.2869	.2455	.7091	.5057	.9598	.0924	.1598	.4648

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

Table 3. Tomato variety visual and taste test ratings, Green Acres Demonstration Garden, Texas AgriLife Extension Service, Aransas County, TX, 2008.

	Evaluation factor[1/]				
Variety	Color	Aroma	Flavor	Texture	Overall score
Better Boy	7.7[a]	7.1[a]	7.2[a]	7.3[a]	29.3[a]
Celebrity Bush	7.7[a]	7.4[a]	6.4[b]	6.9[a]	28.4[a]
Bonnie Original	7.5[a]	6.9[a]	7.4[a]	7.3[a]	29.1[a]
LSD (P = 0.05)	NS	NS	0.72	NS	NS
P > F	.9166	.6720	.0597[2/]	.6270	.7069

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

[1/] Higher numbers indicate more favorable rating.

[2/] The P > F value was so close to 0.05 level that we accepted it as statistically significant.

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