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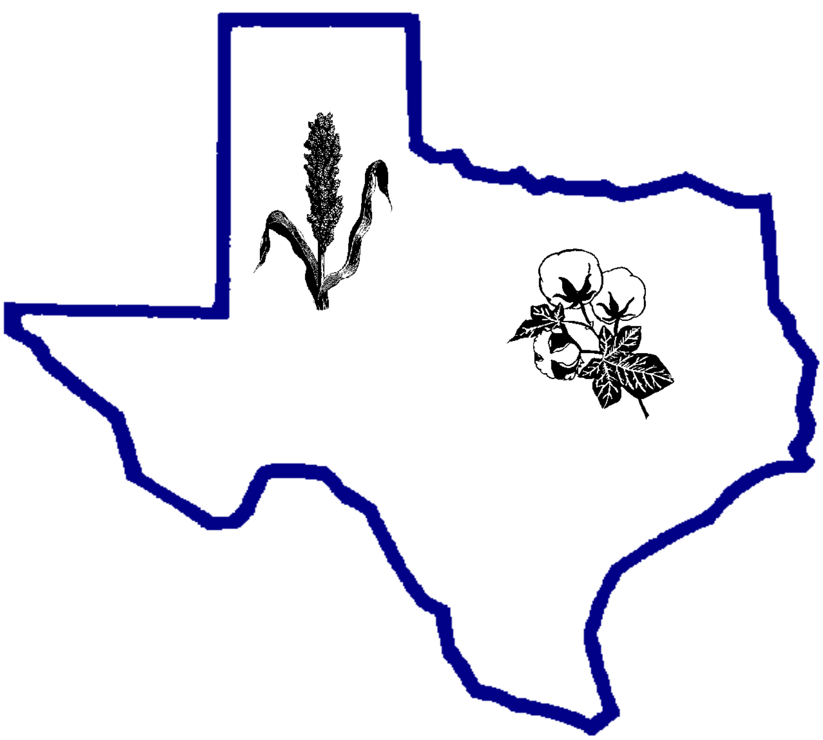
Results of Insect Control Evaluations on Corn, Sorghum and Cotton in Texas Coastal Bend Counties



Texas Cooperative Extension, Dr. Edward Hiler, Vice Chancellor and Director, The Texas A&M University System, College Station, Texas

FOREWORD

This report contains a summary of applied research/demonstration projects conducted by Texas Cooperative Extension dealing with the management of arthropod pests in the Coastal Bend Counties of Texas in 2001. It includes work with corn, sorghum, and cotton. Experiments were conducted with commercial agricultural producers in cooperation with county Extension agents, county row crop committees, agricultural consultants, and agribusiness companies. Eight of the experiments were conducted at the Texas Agricultural Experiment Station at Corpus Christi. The objectives of these studies were to find more cost effective ways to manage pests and to identify areas that require more study.

Coastal Bend farm cooperators are acknowledged for providing land, equipment, labor, time, ideas, and other assistance in support of these projects. The results obtained will be of benefit to all agricultural producers.

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. Readers should realize that results from one experiment may not represent conclusive evidence that the same response would occur where conditions vary.

This report contains 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 the economic returns.

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EVALUATION OF INSECTICIDES FOR CONTROL OF MEXICAN CORN ROOTWORM

Hernandez Farms, Goliad County, 2001

Roy D. Parker and Brian D. Yanta
Extension Entomologist and County Extension agent, respectively
Corpus Christi and Goliad, Texas

SUMMARY: Prescribe, clothianidin, Counter, Aztec, and Regent were evaluated for effectiveness in controlling Mexican corn rootworm. No statistical differences were detected in plant stands, root damage ratings, or yield. Root damage rating even in the untreated corn was low, but numerically, untreated corn had the greatest damage level.

OBJECTIVE: The field study was established to compare granular (Counter and Aztec), seed treatment (clothianidin and Prescribe), and liquid (Regent) insecticides for effectiveness in controlling Mexican corn rootworm.

MATERIALS/METHODS: Pioneer 3167 hybrid corn was planted near the San Antonio River on Riverdale Road northwest of Goliad, Texas on Mar 12, 2001 with an 8-row John Deere 2 vacumeter planter delivering 22,000 seed/acre. Treatments were arranged in a randomized complete block design in 4-row by 1,100 ft plots with rows on 38-inch centers and 3 replications. Corn had been grown on the site during the previous 5 years. The clay soil (3% sand, 72% clay, 25% silt) had a pH of 6.6 and organic matter content of 1.5%. Soil moisture for planting was excellent and soil temperature was 67°F at the 4-inch depth. Fertilizer analysis applied was 74-25-11 and herbicide consisted of Accent 75% ai (0.14 oz/acre) + Banvel 7.64 lb ai/gal (3.0 oz/acre) applied when corn was about 12 inches tall. Granular insecticides were banded over the open seed furrow, Regent was applied with a Redball Microtube (pink tubes) applicator in a total volume of 5 gpa at 42 psi, and seed treatments were applied by Gustafson Company.

Treatments were assessed by (1) counting the number of plants on 13.75 ft row in each of the center two rows in each plot on Apr 16, (2) digging 6 plants from the center 2 rows in each plot on May 9 for root damage rating using the Iowa State University 6 category system (1 = no visible damage up to 6 = 3 or more nodes of roots destroyed), and (3) harvesting entire plots with a commercial machine on Jul 28. Corn weights were adjusted to a standard at 15% moisture.

RESULTS/DISCUSSION: Treatments had no statistical effects on plant stand, root damage rating, or yield (Table 1). Mexican corn rootworm numbers were low as indicated by the root damage rating in untreated corn. Adverse effect on yield at this damage level (2.17) is not considered likely. Mexican corn rootworm pressure was so low that little information was obtained from the study.

ACKNOWLEDGMENTS: BASF, Bayer, Aventis, and Gustafson Companies are acknowledged for their support. Mark Kelling, Aventis, is thanked for his assistance in test establishment. Appreciation is expressed to the Hernandez family for providing land, equipment, and labor for conducting the study.

Table 1. Comparison of insecticides on corn for effect on Mexican corn rootworm, Hernandez Farm, Goliad County, TX, 2001.

Insecticide & formulation	Rate	Plants (1000's/acre)	Root damage rating[a]	Yield (bu/acre)
Prescribe 600F	1.36 mg AI/seed	18.0 a	2.03 a	70.4 a
Clothianidin 600F	1.25 mg AI/seed	17.3 a	1.70 a	74.7 a
Counter 20CR	6.0 oz/1000 ft	16.2 a	2.00 a	69.9 a
Aztec 2.1 G	6.7 oz/1000 ft	16.8 a	1.78 a	72.1 a
Regent 4SC	3.29 oz/acre	18.3 a	2.00 a	76.9 a
Untreated		18.2 a	2.17 a	70.5 a
LSD (P = 0.05)		NS	NS	NS
P > F		.3703	.3413	.2194

Means in a column followed by the same letter are not significantly different by ANOVA.
[a] Iowa State University 1-6 rating scale: 1 = no damage up to 6 = 3 or more nodes of roots destroyed.

EVALUATION OF INSECTICIDES FOR CONTROL OF SOIL INSECT PESTS IN CORN

A. J. and Tony Kutach Farm, Wharton County, 2001

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SUMMARY: Capture (T-band and in-furrow), Counter (T-band), and clothianidin and Prescribe (seed treatments) had no effect on corn plant stand. All insecticide treatments except the Capture T-band treatment had significantly lower plant damage ratings than the untreated corn 15 days after planting (DAP). All insecticide treatments had lower damage ratings than the untreated corn 22 DAP. Clothianidin had the lowest plant damage rating on both inspection dates but it was not statistically better than other insecticides. Capture (T-band) treated corn had significantly greater numbers of chinch bugs than all other treatments on the first inspection date (22 DAP). Fourteen days later, chinch bug numbers in both Capture treatments were statistically the same as in untreated corn; none of the insecticide treatments differed statistically. All tested insecticides provided root protection from the Mexican corn rootworm as indicated by root damage rating; numerically, the clothianidin treatment exhibited the least damage.

OBJECTIVE: This corn test was conducted to compare the effectiveness of granular in-furrow applied and seed treatment insecticides on soil insect pests.

MATERIALS/METHODS: Midland 798 hybrid corn was planted Apr 5, 2001 at 22,216 seed/acre on a silty clay loam soil (8% sand, 64% silt, 28% clay, 1.3% organic matter, pH 7.6) east of Iago, TX next to FM road 1096 on land farmed by A.J. and Tony Kutach. A 2-row John Deere MaxEmerge model 7100 research plot planter with seed boxes spaced on 38-inch centers was used to plant the test. Treatments were arranged in 2-row by 42 ft plots in a randomized complete block design with 4 replications. Corn had been planted on the site for 8 years. Soil conditions at-planting consisted of moist soil with a dry crust and 70°F soil temperature at a 4-inch depth. Fertilizer was 500 lb of 25-5-5 and herbicide was Bicep II 2.67 lb ai/gal (1.6 pt/acre). The plot was hand weeded twice during the testing period. Granular Counter and Capture were applied in a T-band with standard John Deere 6-inch banders and banders were oriented parallel with rows for the in-furrow treatments.

Treatments were assessed by (1) counting established plants on 13.75 ft row on each of the 2 rows in each plot on Apr 20, (2) assigning a visual plant damage rating (1 = no damage up to 5 = stunting, uneven plant growth, yellowing and thin stand) 15 and 22 DAP, (3) counting the number of chinch bugs around 5 plants per plot 22 and 36 DAP (plants were 24 inches tall 36 DAP), and (4) digging 2 plants from each row of plots (4 total) on May 24 for root damage analysis using the Iowa State University six category system (1 = no visible damage up to 6 = 3 or more nodes of roots destroyed).

RESULTS/DISCUSSION: Treatments had no measurable effect on plant stand establishment (Table 1). There were differences in plant damage ratings with greater damage in untreated and Capture (T-band) treated corn 15 DAP. Seven days later (22 DAP) all insecticide treatments had statistically lower damage than did the untreated corn. Clothianidin had the lowest plant damage rating on both dates. Chinch bugs present 22 DAP were significantly greater in the Capture T-band plots; none of the other treatments were statistically different. By 36 DAP, chinch bug numbers in Capture treatments were no different from the untreated corn. Damage by Mexican corn rootworm larvae was statistically greater in untreated corn than in any of the treatments. The clothianidin treatment had numerically the lowest damage from Mexican corn rootworm, but it was not statistically lower than the other insecticides.

ACKNOWLEDGMENTS: We extend thanks to Terry Mize, FMC Agricultural Products and Terry Pitts, Gustafson Company for supporting this project. Appreciation is expressed to the Kutach family for providing land for this study.

Table 1. Comparison of insecticides for effect on chinch bug and root damage by Mexican corn rootw
Kutach Farm, Wharton County, TX, 2001.

Insecticide & formulation	Rate[a]	Application method	Plants (1000's/acre)[b]	Plant da. rating[c]		Chinch bugs/5 plant	
				15 DAP	22 DAP	22 DAP	36 DA
Capture 1.5G	8.0	T-band	13.6 a	2.67 ab	2.38 b	9.0 a	3.8 a
Capture 1.5G	8.0	In-furrow	14.5 a	2.29 bc	2.56 b	2.5 b	5.3 a
Counter 15G	8.0	T-band	15.1 a	2.00 bc	1.94 bc	2.0 b	1.8 b
Clothianidin 600F	1.25	Seed trt.	14.9 a	1.79 c	1.25 c	0.5 b	1.3 b
Prescribe 600F	1.34	Seed trt.	14.1 a	2.08 bc	1.88 bc	0.5 b	0.8 b
Untreated			13.4 a	3.08 a	3.50 a	3.3 b	7.3 a
LSD (P=0.05)			NS	0.758	0.705	4.006	5.00(
P > F			.3489	.0057	.0001	.0009	.021(

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

[a] Rate for granular treatments expressed in oz formulated product per 1000 row ft and rate for see in mg AI/seed.

[b] Average of two counts (13.75 ft row each) made on 4/20.

[c] Plant damage ratings range from 1 = no damage up to 5 = stunting, uneven plant growth, yell Counts represent the average of 3 readings. DAP = days after planting

[d] Corn was 24 inches tall on 5/11.

[e] Iowa State University 1-6 damage rating scale: 1 = no damage up to 6 = 3 or more nodes of roots (

SEED AND GRANULAR INSECTICIDE COMPARISON ON CORN

Texas Agricultural Experiment Station, Nueces County, 2001

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SUMMARY: Insect pests were not detected, no differences were found in plant damage, and Cruiser treated corn had the lowest plant stand counts at all 3 rates evaluated. Plant stands were statistically or numerically lower in Cruiser plots than the other two insecticide treatments.

OBJECTIVE: The test objective was to evaluate the effects of Cruiser and Force ST (seed treatment) on chinch bug, southern corn rootworm, and other pest insects.

MATERIALS/METHODS: Corn was planted Mar 9, 2001 on the Meaney Annex of Texas Agricultural Experiment Station at Corpus Christi. A research plot cone planter set on 38-inch centers was used to plant the 2-row by 40 ft long plots. Treatments were arranged in a randomized complete block design with 4 replications. The soil with good planting moisture was a clay loam (50% sand, 26% silt, 24% clay) with 1.4% organic matter at a pH of 8.0. Cotton had been planted on the site in the previous season. Herbicide consisted of Atrazine 4L (1.0 qt/acre) + Dual II Magnum 7.64 lb ai/gal (1.0 pt/acre) which was broadcast on Mar 9. Fertilizer analysis was 95-32-0.

Treatments were evaluated by (1) counting the number of plants on 13.75 ft row on each of the 2-row plots on May 3 and (2) assigning a plant damage rating based on: 1 = no damage up to 5 = stunting, uneven plant growth, yellowing, and thin stand.

RESULTS/DISCUSSION: Rainfall was not sufficient to produce corn in this experiment and insect pests were not detected during the study. There were not differences in plant damage ratings among treatments but there were differences in plant stands (Table 1). Cruiser treated corn had noticeably lower numbers of plants which might have indicated phytotoxic effects had it not been for improved stands as the Cruiser rate increased. Additional evaluation should indicate whether Cruiser causes phytotoxic effects on corn.

ACKNOWLEDGMENTS: Thanks are extended to Brad Minton, Syngenta Crop Protection, for grant support in conducting this study.

Table 1. Evaluation of seed treatment and granular insecticides on corn, Texas Agricultural Experiment Station, Nueces County, TX, 2001.

Insecticide & formulation	Rate[a]	Application method[a]	Plants (1000's/acre)[b]	Plant damage rating[c]
Cruiser 5FS	1.27	ST	14.1 c	1.4 a
Cruiser 5FS	2.55	ST	16.5 bc	1.5 a
Cruiser 5FS	5.10	ST	17.9 ab	1.3 a
Force TX200CS	4.0	ST	20.1 a	1.5 a
Counter 20CR	6.0	IFG	20.2 a	1.5 a
Untreated			17.3 abc	1.6 a
LSD (P = 0.05)			3.461	NS
P > F			.0038	.3945

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

[a] Rates for seed treatments (ST) expressed in oz/cwt seed and rate for Counter in-furrow granule (IFG) expressed in formulated granular product per 1000 row ft.

[b] Average of two counts on 13.75 ft row from each row of the two row plots on 5/3.

[c] Plant damage ratings range from 1 = no damage up to 5 = stunting, uneven plant growth, yellowing, and thin stand.

COMPARISON OF TRANSGENIC B.t AND NON-TRANSGENIC PIONEER CORN HYBRIDS FOR EFFECTIVENESS ON MEXICAN CORN ROOTWORM

Hernandez Farms, Goliad County, 2001

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SUMMARY: Evaluation of a transgenic corn event expressing proteins from B.t. strain PS149B1 from Pioneer Hi-Bred International demonstrated a high degree of effectiveness against Mexican corn rootworm larvae when compared to the negative isoline. Although Pioneer is not planning to commercialize this event because of poor agronomic characteristics, seed was available to provide an early indication of protein activity against Mexican corn rootworm. The PS149B1 event, however, exhibited smaller, generally unthrifty plant growth compared to the negative isoline. The crop was destroyed before tasseling.

OBJECTIVE: The experiment was conducted to characterize the level of root protection from Mexican corn rootworm in a transgenic corn expressing proteins from B.t. strain PS149B1 compared to the negative isoline. Although Pioneer is not planning to commercialize this event because of poor agronomic characteristics, seed was available to provide an early indication of protein activity against Mexican corn rootworm.

MATERIALS/METHODS: The corn comparison was planted near the San Antonio River on Riverdale Road northwest of Goliad, Texas on Mar 16, 2001 with a 2-row John Deere 7100 planter equipped with research cone planters.

All seeds provided by Pioneer were planted in 2-row by 20 ft plots in rows spaced 38 inches apart. Treatments were arranged in a randomized complete block design with 4 replications. Corn had been grown on the site during the previous 5 years. Soil was clay (3% sand, 72% clay and 25% silt) with a pH of 6.6 and organic mater content of 1.5%. Soil moisture for planting was adequate and soil temperature was 70°F at the 4-inch depth. Plots were destroyed on May 9 before tasseling.

Treatment effects were compared by (1) counting the number of plants on 13.75 ft row on each of the 2 rows in each plot on Apr 16, (2) assigning a plant vigor rating (1 = rapid growth and even plant stand up to 5 = stunted growth, small leaves and uneven stand) 31, 42 and 56 DAP (days after planting), and (3) digging 5 plants at random from each plot on May 2 and again on May 9 for Mexican corn rootworm damage evaluation using the Iowa State University 1-6 damage rating scale: 1 = no damage up to 6 = 3 or more nodes of roots destroyed.

RESULTS/DISCUSSION: Differences between the transgenic corn events and isoline were not found in plant stand but there were differences in plant vigor and root damage ratings (Table 1). The transgenic event exhibited slower growth, smaller plants, and a general unthrifty appearance during inspections 31, 42, and 56 DAP; differences were significant 42 and 56 DAP. We were not able to determine reasons for the growth habit observed. No diseases or insects appeared to be involved. Later we noted that root systems were also smaller but without apparent damage in the transgenic event. The Mexican corn rootworm infestation was moderately low in the test field but corn cultivars exhibited significantly different root damage ratings on May 2 and the readings a week later (May 9) were not statistically different at P = 0.05 with a reading of P = 0.0552. Obviously, transgenic event expressing proteins from PS149B1 was effective in providing a high degree of protection from Mexican corn rootworm larvae.

ACKNOWLEDGMENTS: Thanks are extended to Pioneer Hybrid International, Hopkins Agricultural Service, and the Hernandez Family for their support in conducting the study.

Table 1. Comparison of transgenic B.t. and non-transgenic Pioneer corn hybrids for effect on Mexican corn rootworm damage, Hernandez Farm, Goliad County, TX, 2001.

Corn hybrid	Plants[a] (1000's/acre)	Plant vigor rating[b] 31 DAP	42 DAP	56 DAP	Root damage ratings[b] 5/2	5/9
Transgenic event	27.6 a	2.8 a	3.5 a	4.1 a	1.25 b	1.35 a
Negative isoline	26.4 a	1.5 a	1.3 b	1.3 b	2.48 a	2.48 a
LSD (P = 0.05)	NS	NS	1.378	0.398	0.885	NS
P > F	.3198	.0957	.0138	.0002	.0217	.0552

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

[a] Plants were counted on 13.75 ft row in each plot on Apr 16.

[b] Plant vigor ratings: 1 = rapid growth and even plant stand up to 5 = stunted growth, small leaves and uneven stand. DAP = days after planting.

[c] Iowa State University 1-6 damage rating scale: 1 = no damage up to 6 = 3 or more nodes of roots destroyed.

EFFECT OF ROW SPACING AND PLANT POPULATION ON SORGHUM PRODUCTION

Robert Barlow Farm, San Patricio County, 2001

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SUMMARY: Only the highest plant populations on 38-inch rows were slightly less than the target populations. Plant height was generally shorter in the 19-inch row spacing treatments. Insect numbers were low and no differences were observed. Very dry conditions prevailed during the last half of the season, charcoal rot was increased, and yield potential was greatly reduced. Plant lodging from charcoal rot was not statistically different among treatments, but there was a numerical trend for more lodging as row spacings increased. Grain yields were not statistically different between any treatments. Net dollar value over seed cost was generally better for lower plant populations, especially at 48,000 plants/acre. However, the exception was at the 38-inch row spacing where plant populations were lower than those targeted. More attention should be paid to seeding rates because seed treatments like Concep and Gaucho can substantially increase seed costs. We did not observe the significant advantage for 19-inch row plantings that was found in 2000 on this farm.

OBJECTIVE: The field study was established to compare the effects of row spacing and plant population on insect numbers, sorghum growth characteristics, incidence of charcoal stalk rot, agronomic performance, and economic returns.

MATERIALS/METHODS: Dekalb DK52 hybrid sorghum seed (approximately 15,000 seed/lb) was planted Mar 16-17, 2001 on the Robert Barlow Farm southeast of Sinton, Texas, on 19-, 30- and 38-inch row spacings at target populations for each row spacing of 38, 48, 68, and 88 thousand plants/acre. Target populations from planted seed assumed a germination and establishment rate of 90%. The 12 treatments (row spacings and plant populations) were arranged in a randomized complete block design with 3 replications in 15-row (19-inch planting) and 8-row (30- and 38-inch plantings) by 2,640 ft plots. All treatments were planted flat (no beds). The 19- and 38-inch row spacing treatments were planted using a John Deere MaxEmerge model 7100 vacuum air planter equipped with 15 planter boxes spaced on 19-inch centers. The 38-inch row spacing treatments were achieved by closing the seed drop on every other seed hopper beginning with the second box on the planter. The 30-inch row spacing treatments were planted with an 8-row John Deere MaxEmerge Plus Vacumeter Planter. The Victoria clay soil (pH 7.9) was 67°F at the planting depth and moisture was excellent. Cotton had been planted on the test site the previous season. Fertilizer applied was 112-16-0. Frontier herbicide (6 lb ai/gal) was applied by air at 19.2 oz/acre on Mar 15. All plots were cultivated once on Apr 27. A special narrow row cultivator was used on the 19-inch rows. Rainfall, measured on the south end and middle of the plots was, 1.6 (May 7), 3.3 (May 21), and 0.05 (May 21) inches, respectively, for a total of 4.95 inches during the growing season.

Treatment effects were determined by (1) counting the number of plants on 0.001 acre at 3 sites in each plot on Apr 10, (2) estimating the number of yellow sugarcane aphids and greenbug s on 20 lower plant leaves in the center rows of each plot on May 15, (3) measuring plant height on 10 consecutive plants at each of 3 locations per plot on Jun 12, (4) estimating % lodging in each plot by visual observation on Jun 27, (5) determining charcoal rot infested plants by hand feel of 50 plants (with confirmation by stalk splitting) on each of the center two rows in each plot on Jun 27, and (6) harvesting 0.34, 0.24 and 0.31 acres per plot for 19-, 30- and 38-inch row spacings respectively from all but outside rows in each row spacing treatment with a commercial combine on Jun 30. Grain weights were adjusted to 14% moisture. Net grain value over seed cost was calculated using $2.28/lb for planting seed treated with Gaucho and Concep and $3.18/cwt grain value.

RESULTS/DISCUSSION: Field plant populations were relatively close to target populations except for the higher population on 38-inch rows (Table 1). Plant heights following heading were generally greater as row widths increased from 19- to 38-inches. In a similar 1999 study no differences in plant height and row width were observed. Cultivation of the 19-inch rows on Apr 27 appeared to be extremely close to plants and may have influenced plant height and other production factors (cultivation and no cultivation as treatments are planned for 2002).

Yellow sugarcane aphids and greenbugs were the only insects present in sufficient numbers to consider for evaluation and no differences were observed (Table 1). Numbers of greenbugs were very low across all treatments. Rainfall up to May 21 resulted in excellent growth and a good head but almost no additional rain was received resulting in premature plant death and charcoal rot. On Jun 27 (3 days before harvest) plant lodging caused by charcoal stalk rot was low with no statistical differences between treatments but there appeared to be a trend for increased numbers of lodged plants as row spacing increased. There also appeared to be a trend for more charcoal stalk rot (lodged and non-lodged plants) at the higher plant populations.

Grain moisture at harvest was similar across all treatments and there were no significant differences in grain yield (Table 2). The noted differences in bushel weights seemed to be random and could not be accounted for by row spacing or plant population. Net dollar value over seed cost tended to be greater for the lower plant populations. Dollar returns in the 38-inch row target populations did not follow the trends observed in 19- and 30-inch spacing treatments possibly because target populations were not achieved.

The significant advantage of 19-inch row planting observed in a 2000 study on the Barlow Farm was not duplicated in this study. However, we believe cultivation of the 19-inch rows may have adversely affected yields in that row spacing compared to the 30- and 38-inch spacings. We noted better dollar returns at the 48,000 plant population target except in the 38-inch spacing. The 48,000 plant population target in 2000 (actual 46,000) provided significantly more return due to decreased seed cost. This greater economic return can be attributed, in part, to seed treatments like Concep and Gaucho that significantly increased seed cost for the higher plant populations.

ACKNOWLEDGMENTS: We thank the Sorghum PROFIT Initiative Project funded by the Texas Legislature and the Texas Grain Sorghum Producers Association for their support. Appreciation is expressed to Robert Barlow for his time, land, and equipment in conducting this study and Darwin Anderson, Planters Coop at Odem for his assistance. Special acknowledgment is given Bubba Thomas for graciously providing the tractor and planter for the 30-inch row treatments.

Table 1. Row spacing and plant population effects on sorghum plant height, aphid numbers, and charcoal stalk rot, Robert Barlow Farm, San Patricio County, TX, 2001.

Row spacing	Plants (1000's/acre) target[a]	Plants (1000's/acre) actual	Plant height (inches)	No./20 plants YSA	No./20 plants GB	% lodging	% charcoal rot infested plants
19-inch	38	39	44.8 e	15.3 a	4.0 a	0.33 a	89.3 ab
	48	46	44.8 e	23.3 a	0.3 a	0.67 a	89.7 ab
	68	64	45.8 de	7.0 a	0.0 a	0.67 a	93.0 a
	88	83	46.4 cde	32.7 a	0.0 a	0.50 a	93.7 a
30-inch	38	36	46.1 cde	6.0 a	3.3 a	0.10 a	76.3 c
	48	48	47.3 bcd	10.7 a	0.0 a	0.73 a	89.3 ab
	68	67	47.6 bc	16.3 a	0.0 a	1.67 a	89.0 ab
	88	84	47.8 bc	13.0 a	0.0 a	0.40 a	93.3 a
38-inch	38	36	47.5 bcd	9.0 a	0.0 a	1.17 a	83.0 bc
	48	42	47.8 bc	13.7 a	0.0 a	0.67 a	87.7 ab
	68	57	50.2 a	13.0 a	0.0 a	1.40 a	92.0 a
	88	75	48.8 ab	21.0 a	0.0 a	3.00 a	94.0 a
LSD (P = 0.05)			1.715	NS	NS	NS	7.826
P > F			.0001	.6355	.6121	.0975	.0044

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

[a] Target seeding rates were 42.2, 53.3, 75.6, and 97.8 thousand seed per acre with target plant stand objectives of 38, 48, 68, and 88 thousand plants per acre (90% germination).

[b] YSA = yellow sugarcane aphid, GB = greenbug counts were made on 5/15.

Table 2. Row spacing and plant population effects in sorghum on grain production and dollar returns, Robert Barlow Farm, San Patricio County, TX, 2001.

Row spacing	Plants (1000's/acre) target[a]	Plants (1000's/acre) actual	% grain moisture	Bushel weight	Yield (lb/acre)	Net $ value over seed/harvest cost[b]
19-inch	38	39	14.0 a	49.0 bc	2284 a	54.97
	48	46	13.5 a	51.4 ab	2542 a	60.77
	68	64	13.2 a	51.5 ab	2363 a	54.74
	88	83	13.2 a	49.9 abc	2424 a	54.80
30-inch	38	36	13.8 a	53.9 a	2492 a	60.24
	48	48	13.4 a	54.1 a	2601 a	62.25
	68	67	13.3 a	52.6 ab	2537 a	59.15
	88	84	13.3 a	53.3 ab	2647 a	60.44
38-inch	38	36	13.8 a	53.7 a	2577 a	62.39
	48	42	13.6 a	53.3 ab	2527 a	60.38
	68	57	14.5 a	45.9 c	2609 a	60.97
	88	75	13.4 a	50.3 abc	2460 a	55.72
LSD (P = 0.05)			NS	4.683	NS	
P > F			.1787	.0414	.3970	

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

[a] Target seeding rates were 42.2, 53.3, 75.6, and 97.8 thousand seed per acre with target plant stand objectives of 38, 48, 68, and 88 thousand plants per acre (90% germination).

[b] Seed was Gaucho and Concep treated; the cost was $2.28/lb at a seed count of 15,000/lb and total acre cost was based on seeding rates provided in footnote “a”. Harvesting and hauling costs were figured at $0.65/cwt. Sorghum value was based on $3.18/cwt.

ROW SPACING AND PLANT POPULATION EFFECTS ON SORGHUM GROWN UNDER IRRIGATION

Clarence Chopelas Farm, San Patricio County, 2001

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SUMMARY: The 19-inch row planted sorghum produced significantly more grain than 38-inch row planting. It returned an average of $30.24 more per acre net value over seed and cultivation cost compared with 38-inch row plantings. Similar results were obtained on the same farm the previous 2 seasons.

OBJECTIVE: This field experiment was designed to evaluate the effects of row spacing and plant population on insect numbers, plant growth characteristics, and other sorghum production factors.

MATERIALS/METHODS: Pioneer 83G66 hybrid sorghum seed (16,500/lb) was planted on Mar 8, 2001 on the Clarence Chopelas Farm in western San Patricio County on land with a center pivot irrigation system. Two row spacings (19- and 38-inch) and three target plant population treatments (65, 85, and 105 thousand) were arranged in a randomized complete block design with 3 replications. Plots were 1,320 ft long with 24 rows in the 19-inch row plots and 12 rows in the 38-inch row plots. Target plant populations for each row spacing were 65, 85, and 105 thousand/acre. To achieve these populations, a 90% seed germination rate was used. The test was planted flat (no beds) with a 12-row model 1720 MaxEmerge plus vacumeter air planter; the 19-inch spacing was achieved by planting between the 38-inch rows. Soil at the site was a Victoria clay, pH 8.0, and conditions for seed germination were favorable. Cotton had been grown on the site the previous season. Fertilizer applied was 104-24-0-2 Zn-2 S on 12/9/00. Herbicide was Atrazine 90F (1.5 lb/acre). Only the 38-inch rows were cultivated. Rainfall was measured at the field site and consisted of 0.05 (Mar 14), 1.6 (Mar 27), 2.0 (May 7), 1.0 (May 21), and 0.6 (Jun 20) inches for a total of 5.25 inches during the season. Irrigation amounts and dates were 1.0 (Apr 29), 1.5 (May 23), 1.5 (Jun 8), and 1.5 (Jun 17) inches for a total of 5.5 inches.

Treatment effects were determined by (1) measuring soil moisture levels with Watermark brand sensors (read with a Watermark soil moisture meter) buried at 12-inch depths in the following actual plant population treatments: 19-inch, 46,000 plants; 19-inch 90,000 plants; 38-inch, 73,000 plants; and 38-inch, 112,000 plants, (2) evaluating plant populations on Apr 10 by counting plants on 0.001 acre at 3 locations in each plot, (3) counting yellow sugarcane aphids and greenbugs on 20 lower leaves in each plot on Apr 28, (4) estimating the number of corn leaf aphids in a total of 20 plant whorls/plot on Apr 28, (5) measuring height of 10 plants in 3 locations in each plot after blooming on Jul 12, and (6) harvesting 360 ft row of each plot with a commercial combine on Jul 3 (9 and 18 rows of the 38-inch and 19-inch row spacing treatments, respectively). Grain weights were adjusted to 14% moisture. Net grain value over seed cost was calculated using $0.958/lb for seed and $3.18/cwt grain value. Harvesting/hauling costs were calculated at $0.65/cwt.

RESULTS/DISCUSSION: Plant stands exceeded the target by an average of 8,000/acre except in the 19-inch row, 105 thousand plant stand target (Table 1). An incorrect planter sprocket range setting target resulted in only 46,000 plants/acre for that treatment. Aphid numbers during the only outbreak for the season were very low and no statistical differences were found. There were also no differences in plant heights.

Statistical differences were not found in grain moisture or bushel weight but significant differences were found in the yield data (Table 2). The 19-inch row sorghum produced significantly more grain. It returned an average of $30.24 more per acre net value over seed and cultivation cost compared with the 38-inch row planting. Similar results were obtained on the same farm the 2 previous seasons. Except for the mistake in seeding rate for the 19-inch, 105,000 plant stand target, no differences were found in the respective plant populations within each row spacing.

ACKNOWLEDGMENTS: We thank Clarence Chopelas for use of land, equipment and his time in conducting this experiment. We also thank the Sorghum PROFIT Initiative Project funded by the Texas Legislature and Texas Grain Sorghum Producers Association for their support.

Table 1. Aphid numbers and plant height in sorghum from row spacing and plant population treatments, Clarence Chopelas Farm, San Patricio County, TX, 2001.

Row spacing	Plants (1000's/acre) target[a]	actual	Number per 20 plants[c] YSA	GB	CLA	Plant height (inches)[d]
19-inch	65	74	0.67 a	3.67 a	66.6 a	50.2 a
	85	90	1.67 a	1.00 a	20.0 a	50.1 a
	105	46[b]	1.00 a	0.00 a	46.6 a	49.5 a
38-inch	65	73	0.33 a	5.33 a	73.4 a	51.1 a
	85	96	3.00 a	1.67 a	26.6 a	50.2 a
	105	112	0.00 a	2.67 a	26.6 a	48.4 a
LSD (P = 0.05)			NS	NS	NS	NS
P > F			.4462	.8259	.8037	.2304

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

[a] Target seeding rates were 72.2, 94.4, and 116.7 thousand seed per acre with target plant stand objectives of 65, 85, and 105 thousand plants per acre (90% germination).

[b] Proper setting on the planter was not made resulting in lower than target plant stand. An estimated seeding rate of 47,200 was calculated for this treatment where the proper planter range was not utilized.

[c] YSA = yellow sugarcane aphid, GB = greenbug, and CLA = corn leaf aphid. Counts were made when sorghum averaged 20-inches tall (4/28).

[d] Average height of 30 plants per plot (10 each at 3 sites per plot).

Table 2. Comparison of grain moisture at harvest, bushel weight and sorghum yields from row spacing and plant population treatments, Clarence Chopelas Farm, San Patricio County, TX, 2001.

Row spacing	Plants (1000's/acre) target[a]	actual	% grain moisture	Bushel weight	Yield (lb/acre)	Seed & cultivation cost $/acre[c]	Net $ value over seed/harvest cost[d]
19-inch	65	74	16.8 a	58.0 a	7221 a	4.19	178.50
	85	90	16.6 a	57.8 a	7174 a	5.48	176.02
	105	46[b]	16.8 a	57.0 a	6880 b	2.74	171.32
38-inch	65	73	17.0 a	56.8 a	6201 c	10.19	146.69
	85	96	16.7 a	57.3 a	6222 c	11.48	145.94
	105	112	16.4 a	57.8 a	6137 c	12.77	142.50
LSD (P = 0.05)			NS	NS	167		
P > F			.5843	.2319	.0000		

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

[a] Target seeding rates were 72.2, 94.4, and 116.7 thousand seed per acre with target plant stand objectives of 65, 85, and 105 thousand plants per acre (90% germination).

[b] Proper setting on the planter was not made resulting in lower than target plant stand. An estimated seeding rate of 47,200 was calculated for this treatment where the proper planter range was not utilized.

[c] The seed cost ($0.958/lb) was based on original seeding rates in footnote "a" at 16,500 seed/lb for Pioneer hybrid 83G66. Cultivation cost was considered to be $6.00/acre and only 38-inch rows were cultivated.

[d] Net $ value above seed, cultivation, and harvesting/hauling costs. Sorghum value based on $3.18/cwt. Harvesting and hauling costs were figured at $0.65/cwt.

ROW SPACING AND PLANT POPULATION EFFECTS ON SORGHUM PRODUCTION

Venture Farms, Refugio County, 2001

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SUMMARY: Row spacing had little effect on sorghum production in this study. The yield difference was only 117 lb/acre between the 20- and 40-inch rows.

OBJECTIVE: The field study was conducted to compare the effects on sorghum production of 20-inch and 40-inch row spacings at 3 plant population levels.

MATERIALS/METHODS: Dekalb DK45 hybrid sorghum (14,000 seed/lb) that was Concep and Gaucho treated was planted Mar 20, 2001 on the Lambert Ranch located north of Refugio. The test was planted flat (no beds) with a 24-row John Deere 1780 model planter with seeding units spaced on 20-inch centers. The 40-inch row spacing treatments were achieved by closing the seed drop on every other box on the planter. Three target plant populations of 48, 68, and 88 thousand/acre at both row spacings were arranged in a randomized complete block design with 3 replications. Plots were 12- or 6-rows for the 20- and 40-inch spacings, respectively, and all plots were approximately 1000 ft long. Soil at the site was a heavy clay and conditions for seed germination were favorable. Cotton had been grown in the field during the previous season. Fertilizer (N, P, K) was 99-0-0 plus 36 S. Aatrex 4L (1 lb/acre) was applied for weed control. The test was not cultivated.

Treatment effects were measured by (1) counting the plants on 20 row ft at each of 4 locations in the center 4 rows in each plot on May 2, (2) estimating the percentage plant lodging in each plot on Jul 7, and (3) harvesting 0.246 acres of each plot on Jul 12. Grain weights were adjusted to 14% moisture. Net grain value over seed cost was calculated using $2.28/lb for seed (Concep and Gaucho treated), $0.65 for harvesting and hauling, and $3.18/cwt grain value.

RESULTS/DISCUSSION: Target plant populations were not achieved and there was substantial variation which may have affected the test outcome (Table 1). Statistical differences were not found in plant lodging, grain moisture, or bushel weight. There were differences in yields. Solid evidence of a row spacing effect was not observed, which may have been confounded by variation in plant populations. Overall, there was only 117 lb/acre difference in grain yield between the 20- and 40-inch row spacing treatments. Increased seed costs due to the Concep and Gaucho resulted in just as good net dollar value over these costs at the lower seeding rates. Four of the 6 row- spacing tests conducted over the past two seasons demonstrated significantly greater yields on the narrow rows (19- or 20-inch compared with 38- or 40-inch rows).

ACKNOWLEDGMENTS: We thank the Sorghum PROFIT Initiative Project funded by the Texas Legislature and the Texas Grain Sorghum Producers Association for their support. Walt Franke is acknowledged for equipment, interest, and labor donated to conduct the study. A special thanks is extended to Tommy Bertling, Monsanto Company, for his service during harvest.

Table 1. Comparison of lodging, grain moisture at harvest, bushel weight, and sorghum yield from row spacing and plant population treatments, Venture Farms, Refugio County, TX 2001.

Row spacing	Plants (1000's/acre) target[a]	Plants (1000's/acre) actual	% lodging	% grain moisture	Bushel weight	Yield (lb/acre)	Net $ value[b]
20 - inch	48	42.7	2.33 a	14.0 a	55 a	4330 c	100.89
	68	54.2	2.00 a	12.8 a	55 a	4614 ab	104.43
	88	81.0	2.00 a	13.1 a	55 a	4574 bc	99.76
40 - inch	48	46.4	3.33 a	14.3 a	56 a	4461 bc	104.20
	68	59.4	5.00 a	14.3 a	56 a	4828 a	109.87
	88	69.8	4.00 a	14.0 a	55 a	4581 abc	99.94
LSD (P = 0.05)			NS	NS	NS	252	
P > F			.1901	.5404	.3449	.0238	

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

[a] Target seeding rates were 53.3, 75.6, and 97.8 thousand seed per acre with target plant stand objectives of 48, 68, and 88 thousand plants per acre (90% germination).

[b] All seed was Gaucho and Concep treated; the cost was calculated at $2.28/lb at a seed count of 14,000/lb with total cost based on target seeding rates provided in footnote "a". Harvesting and hauling costs were figured at $0.65/cwt. Sorghum value was based on $3.18/cwt.

EVALUATION OF ASGROW A571 AND DEKALB DK54 SORGHUM HYBRIDS GROWN ON TWO ROW SPACINGS AT THREE POPULATION LEVELS

Richard Raun Farm, Wharton County, 2001

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SUMMARY: Both hybrids provided substantially higher net dollar value over seed cost in the 20-inch plantings. Costs at the highest seeding rate tended to reduce dollar return. The intermediate plant population produced the most income over seed and harvest costs.

OBJECTIVE: The experiment was conducted to measure the effects on two sorghum hybrids grown on 20- and 40-inch row spacings, each at three plant population levels.

MATERIALS/METHODS: Asgrow A571 (approximately 12,000 seed/lb) and Dekalb DK54 (approximately 14,500 seed/lb) hybrid sorghum seed was planted Mar 21, 2001 on the Richard Raun Farm in west Wharton County about 8 miles north of Louise on 20- and 40-inch row spacings at 3 target seed rates of 45-50, 75-85, and 110-120 thousand/acre. The hybrid, row spacing, and seeding rate treatments were arranged in a randomized complete block design with 4 replications. Plots were 8 rows (20-inch planting) and 4 rows (40-inch planting) by 50 ft. The test was planted flat (no beds) with a Monosem vacuum air planter with seed boxes spaced on 20-inch centers. The 40-inch treatments were achieved by raising alternate seed hoppers. The soil was an Edna sandy loam with a pH of 6.5. Rice had been planted on the site the previous season. Total fertilizer analysis applied in 2 applications was 125-30-45. Herbicide applied was alachlor (2.0 lb ai/acre) + atrazine (0.5 lb ai/acre); subsequent weed pressure was low. Plots were not cultivated. Rainfall after planting consisted of 0.77 (Mar), 0.65 (Apr), 3.8 (May), 1.31 (Jun), and 3.7 (Jul) inches for a total of 10.23 inches during the growing season.

Treatments were evaluated by (1) counting the number of plants on 10 row ft in each plot on Apr 25, and (2) harvesting portions of plots with a 5-foot header combine on Jul 19. Grain weights were adjusted to the 14% moisture standard. Net grain value over seed cost was calculated using $2.12/lb for seed and $3.18/cwt grain value.

RESULTS/DISCUSSION: Target plant populations were not achieved but some separation was achieved (Tables 1 and 2). Seed cost increased substantially based on the average target seeding rates.

Grain yields in Asgrow A571 were significantly greater for 20-inch row spacing compared with 40-inch row spacing, except at the low population level (Table 1). Net value over seed and harvest/hauling costs averaged $126.65/acre in the 20-inch plantings and $101.29/acre in the 40-inch plantings.

Grain yield of Dekalb DK54 in the 20-inch middle plant population treatment was statistically greater than the 40-inch low plant population (Table 2). The 20-inch yield was numerically greater at all plant population levels. Net value over seed cost averaged $138.00/acre in the 20-inch plantings and $126.62/acre in the 40-inch plantings.

ACKNOWLEDGMENTS: Thanks are extended to the Sorghum PROFIT Initiative Project funded by the Texas Legislature and Texas Grain Sorghum Producers Association for their support. Appreciation is expressed to Richard Raun for land, equipment, and labor, and to Brad Minton, Syngenta Company, for providing harvesting equipment.

Table 1. Evaluation of Asgrow A571 sorghum hybrids at three populations on two row spacings, Richard Raun Farms, Wharton County, TX, 2001.

Row spacing	Plants (1000's/acre) target	actual	Yield (lb/acre) [a]	Seed cost ($/acre) [b]	Net $ value [c]
20-inch	45-50	50.4	5174 ab	8.39	122.51
	75-85	74.5	5884 a	14.13	134.73
	110-120	86.3	5653 a	20.32	122.71
40-inch	45-50	48.7	4561 b	8.39	107.00
	75-85	57.6	4528 b	14.13	100.43
	110-120	78.8	4615 b	20.32	96.44

Means in a column followed by the same letter are not significantly different by ANOVA ($P = 0.05$).

[a] $P > F$ value was .0036; LSD = 890 lb.

[b] Seed cost per acre was based on the average target seeding rate at a cost of $2.12/lb (Concep and Gaucho treated). Seed for Asgrow A571 was calculated at 12,000/lb.

[c] Net $ value over seed and harvesting/hauling ($0.65/cwt) costs. Sorghum value was based on $3.18/cwt.

Table 2. Evaluation of DK54 sorghum hybrids at three populations on two row spacings, Richard Raun Farms, Wharton County, TX, 2001.

Row spacing	Plants (1000's/acre) target	actual	Yield (lb/acre) [a]	Seed cost ($/acre) [b]	Net $ value [c]
20-inch	45-50	53.0	5965 ab	6.94	143.98
	75-85	83.1	6364 a	11.97	149.04
	110-120	94.2	5447 ab	16.81	120.99
40-inch	45-50	48.1	5099 b	6.94	122.07
	75-85	66.7	5699 ab	11.97	132.22
	110-120	80.4	5628 ab	16.81	125.58

Means in a column followed by the same letter are not significantly different by ANOVA (P = 0.05).

[a] P > F value was .0391; LSD = 953 lb.

[b] Seed cost per acre was based on the average target seeding rate at a cost of $2.12/lb (Concep and Gaucho treated). Seed for DK 54 was calculated at 14,500/lb.

[c] Net $ value over seed and harvesting/hauling ($0.65/cwt) costs. Sorghum value was based on $3.18/cwt.

REACTION OF SORGHUM HYBRIDS TO COUNTER, CRUISER, AND GAUCHO SYSTEMIC INSECTICIDES

Texas Agricultural Experiment Station, Nueces County, 2001

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SUMMARY: Few observable impacts were found due to Counter, Cruiser, and Gaucho systemic insecticide use on sorghum hybrids. Low pest numbers allowed observation of potential phytotoxic effects on the tested hybrids. Consistent effects on plant stands were not observed although significant differences were found in five hybrids. Counter and Gaucho seemed to adversely affect plant stands in a few hybrids. Six hybrids showed significant heading differences due to treatment, with the Counter treatment heading earlier than at least one other treatment in five hybrids. Only one hybrid had blooming rate differences. Yields varied significantly in four hybrids but, again, consistent insecticide effects were not found.

OBJECTIVE: The study was conducted to determine the effect of Counter, Cruiser, and Gaucho on sorghum hybrids; to evaluate their effectiveness in controlling insect pests; and to measure impact on yield.

MATERIALS/METHODS: Sorghum hybrids (Concep III treated) were planted Mar 14, 2001 on the Texas Agricultural Experiment Station at Corpus Christi. A research plot cone planter set on 38-inch centers was used to plant the 2-row by 50 ft long plots. Seed was prepackaged by the Syngenta Company. The experiment was arranged in a randomized complete block with 4 replications. Planting conditions consisted of excellent soil moisture and favorable soil temperature. Cotton had been planted on the site the previous season. Counter 20CR (3.0 oz/1000 ft row) was applied through electric driven Gandy boxes with standard John Deere 6-inch banders. Atrazine 4L (1 qt/acre) plus Dual II Magnum (7.64 lb ai/gal) at 1 pt/acre was broadcast over the test plot after planting. PENNCO iron (25% ferrous sulfate) at 1 gal/acre was applied on Apr 25 and May 1. Fertilizer applied was 95-32-0.

Treatment effects were assessed by (1) counting the number of plants on 13.75 ft row in both rows in each plot on Apr 2, (2) estimating heading and blooming rates on May 21, and (3) harvesting 13.75 ft from one of the two rows in each plot on Jul 9 (24 plots were harvested with a two row plot combine). Grain weights were adjusted for moisture to 14%.

RESULTS/DISCUSSION: Counter, Cruiser, and Gaucho systemic insecticide use had few observable impacts on plant stand, heading and blooming rates, or yield of the 18 hybrids (Table 1). Pest insect numbers were extremely low for the duration of the field study, allowing for observation of direct impact of insecticides on the hybrids. Two hybrids treated with Counter had reduced plant stands compared with all other treatments in 1 hybrid (J) and all treatments except Gaucho in another hybrid (O); Counter treated sorghum had a significantly better plant stand compared with the untreated plots in 1 hybrid (G). In 2 hybrids (P, R), Cruiser treated sorghum plant stands were significantly better than 1 other treatment. Significant differences occurred in heading rates in 6 hybrids. Most notable was earlier heading in Counter treated sorghum of 5 hybrids (D, H, I, K, L) compared with at least 1 other treatment. Blooming rate was significantly different in only 1 hybrid (K); Cruiser blooming rate was slower than Counter and the untreated sorghum in that case. Statistically significant yield effects were observed in 4 hybrids (A, B, N, S), but no 1 insecticide was consistently superior to another. Three of the 4 cases of increased yield involved an insecticide treatment being better than the untreated control.

ACKNOWLEDGMENTS: Appreciation is expressed to Syngenta Company for support of this field study.

Table 1. Effect of insecticide treatments on sorghum hybrids, Texas Agricultural Experiment Station, Nueces County, TX, 2001.

Hybrid	Insecticide & formulation [a]	Plants (1000's/acre)	% on 5/21 heading	% on 5/21 blooming	Yield (lb/acre)
A	Gaucho	60.3 a	88.8 a	92.5 a	1673 a
	Cruiser	76.0 a	92.5 a	91.3 a	1494 ab
	Counter	46.5 a	91.3 a	93.8 a	1151 ab
	UTC	64.5 a	87.5 a	88.8 a	973 b
LSD (P=0.05)		NS	NS	NS	640
P > F		.0892	.3550	.2669	.0498
B	Gaucho	67.0 a	65.0 a	80.0 a	2303 b
	Cruiser	90.0 a	62.5 a	76.3 a	2138 b
	Counter	77.5 a	71.3 a	81.3 a	2857 a
	UTC	90.3 a	61.3 a	76.3 a	2493 ab
LSD (P=0.05)		NS	NS	NS	548
P > F		.0903	.2591	.1274	.0290
C	Gaucho	76.8 a	96.3 a	96.3 a	2000 a
	Cruiser	68.5 a	95.0 a	95.0 a	2575 a
	Counter	75.8 a	95.0 a	96.3 a	2507 a
	UTC	82.0 a	90.0 a	95.0 a	2231 a
LSD (P=0.05)		NS	NS	NS	NS
P > F		.4606	.1942	.5488	.1080
D	Gaucho	55.3 a	48.0 b	72.5 a	2242 a
	Cruiser	69.8 a	47.5 b	72.5 a	2507 a
	Counter	58.0 a	62.5 a	80.0 a	3015 a
	UTC	49.8 a	51.3 ab	72.5 a	2341 a
LSD (P=0.05)		NS	11.924	NS	NS

Table 1. Continued.

Hybrid	Insecticide & formulation [a]	Plants (1000's/acre)	% on 5/21 heading	% on 5/21 blooming	Yield (lb/acre)
P > F		.0871	.0242	.1123	.2231
E	Gaucho	85.5 a	65.0 a	75.0 a	2331 a
	Cruiser	76.5 a	60.3 a	72.5 a	2404 a
	Counter	92.0 a	79.5 a	83.8 a	2909 a
	UTC	73.3 a	66.3 a	81.3 a	2418 a
LSD (P=0.05)		NS	NS	NS	NS
P > F		.1124	.1386	.2238	.4069
F	Gaucho	91.3 a	58.0 a	71.3 a	1903 a
	Cruiser	80.5 a	60.5 a	73.8 a	1730 a
	Counter	89.5 a	65.0 a	78.3 a	2295 a
	UTC	79.3 a	63.0 a	75.0 a	1905 a
LSD (P=0.05)		NS	NS	NS	NS
P > F		.4527	.4694	.2762	.1987
G	Gaucho	70.8 ab	90.0 a	95.0 a	1228 a
	Cruiser	67.0 ab	97.5 a	97.5 a	1548 a
	Counter	85.8 a	85.0 a	93.8 a	1558 a
	UTC	61.3 b	93.8 a	95.0 a	1064 a
LSD (P=0.05)		20.76	NS	NS	NS
P > F		.0471	.2045	.2045	.1521
H	Gaucho	74.8 a	41.8 b	63.8 a	2060 a
	Cruiser	86.3 a	43.0 b	63.8 a	1767 a
	Counter	74.8 a	50.0 a	67.5 a	2146 a
	UTC	83.3 a	39.3 b	70.0 a	1725 a
LSD (P=0.05)		NS	5.49	NS	NS

Table 1. Continued.

Hybrid	Insecticide & formulation [a]	Plants (1000's/acre)	% on 5/21 heading	% on 5/21 blooming	Yield (lb/acre)
P > F		.2258	.0034	.3099	.1756
I	Gaucho	58.8 a	57.8 ab	56.3 a	1775 a
	Cruiser	71.3 a	61.5 a	66.3 a	1914 a
	Counter	61.5 a	61.5 a	67.5 a	1660 a
	UTC	64.3 a	55.3 b	56.3 a	1847 a
LSD (P=0.05)		NS	5.332	NS[b]	NS
P > F		.3011	.0267	.0452	.4799
J	Gaucho	59.8 b	9.0 a	25.0 a	2675 a
	Cruiser	67.5 ab	17.0 a	37.5 a	3131 a
	Counter	48.0 c	16.8 a	37.5 a	3513 a
	UTC	68.5 a	15.8 a	37.5 a	3444 a
LSD (P=0.05)		7.874	NS	NS	NS
P > F		.0003	.1499	.2045	.0865
K	Gaucho	85.3 a	55.0 a	63.8 ab	2739 a
	Cruiser	68.0 a	32.5 b	43.8 b	2442 a
	Counter	69.5 a	60.0 a	83.8 a	2775 a
	UTC	82.5 a	56.8 a	77.5 a	2619 a
LSD (P=0.05)		NS	12.7	26.333	NS
P > F		.1077	.0012	.0121	.5087
L	Gaucho	80.0 a	82.5 b	85.0 a	1894 a
	Cruiser	90.0 a	82.5 b	86.3 a	1727 a
	Counter	68.5 a	91.3 a	88.8 a	1670 a
	UTC	77.3 a	83.8 b	86.3 a	1255 a
LSD (P=0.05)		NS	7.054	NS	NS

Table 1. Continued.

Hybrid	Insecticide & formulation [a]	Plants (1000's/acre)	% on 5/21 heading	% on 5/21 blooming	Yield (lb/acre)
P > F		.1145	.0223	.1361	.0965
N	Gaucho	69.0 a	19.5 a	37.5 a	2237 b
	Cruiser	73.5 a	26.3 a	37.5 a	2690 a
	Counter	64.0 a	29.3 a	50.0 a	2428 ab
	UTC	67.8 a	24.5 a	37.5 a	2208 b
LSD (P=0.05)		NS	NS	NS	414.5
P > F		.5077	.3253	.2045	.0364
O	Gaucho	53.8 bc	73.8 a	82.5 a	3236 a
	Cruiser	61.3 a	67.5 a	81.3 a	3075 a
	Counter	48.8 c	70.0 a	86.3 a	2979 a
	UTC	56.8 ab	66.3 a	87.5 a	3254 a
LSD (P=0.05)		6.315	NS	NS	NS
P > F		.0036	.2750	.3384	.3385
P	Gaucho	79.0 ab	30.0 a	43.8 a	2461 a
	Cruiser	84.0 a	22.5 a	37.5 a	2245 a
	Counter	68.5 ab	18.8 a	37.5 a	2810 a
	UTC	63.8 b	21.3 a	37.5 a	2408 a
LSD (P=0.05)		18.95	NS	NS	NS
P > F		.0521	.2176	.2045	.2869
Q	Gaucho	45.3 a	92.5 a	96.3 a	1990 a
	Cruiser	64.0 a	96.3 a	97.5 a	2118 a
	Counter	53.5 a	96.3 a	97.5 a	2101 a
	UTC	56.0 a	97.5 a	97.5 a	2068 a
LSD (P=0.05)		NS	NS	NS	NS

Table 1. Continued.

Hybrid	Insecticide & formulation [a]	Plants (1000's/acre)	% on 5/21 heading	% on 5/21 blooming	Yield (lb/acre)
P > F		.1537	.0722	.2045	.6001
R	Gaucho	50.3 b	68.8 b	86.3 a	2979 a
	Cruiser	71.5 a	77.5 a	87.5 a	2732 a
	Counter	69.8 ab	73.8 ab	87.5 a	3021 a
	UTC	69.3 ab	72.5 ab	86.3 a	2515 a
LSD (P=0.05)		21.09	6.665	NS	NS
P > F		.0597	.0349	.2045	.1853
S	Gaucho	67.8 a	87.5 a	91.3 a	2268 b
	Cruiser	62.5 a	88.8 a	87.5 a	2314 b
	Counter	66.5 a	91.3 a	91.3 a	2799 a
	UTC	63.5 a	85.0a	86.3 a	2164 b
LSD (P=0.05)		NS	NS	NS	302
P > F		.5670	.1153	.1545	.0017

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

[a] Gaucho 480FS (8.0 oz/cwt) and Cruiser 5FS (5.1 oz/cwt) were applied to seed, and Counter 20CR (3 oz/1000 ft row) was applied with a 6-inch bander.

[b] Although P = 0.0452, LSD did not separate.

COMPARISON ON SORGHUM OF SEED AND IN-FURROW APPLIED INSECTICIDES

Texas Agricultural Experiment Station, Nueces County, 2001

Roy D. Parker
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SUMMARY: An evaluation of Gaucho, Cruiser, Sorghum Guard, Counter, and Furadan on sorghum did not reveal clear evidence of product effectiveness. Insect pest levels were probably too low for an adequate evaluation.

OBJECTIVE: The field experiment was conducted to compare insecticides for effect on aphids and soil insect pests, and to determine their effect on grain yield.

MATERIALS/METHODS: Northrup King KS 585 hybrid sorghum seed (Concep II treated) was planted with a 4-row research cone planter on Mar 13, 2001 on the Meaney Annex of the Texas Agricultural Experiment Station at Corpus Christi. Plots with rows spaced on 38-inch centers were 4 rows by 40 ft and treatments were arranged in a randomized complete block design with 4 replications. Soil was in excellent condition for planting, consisting of a clay loam (50% sand, 26% silt, 24% clay) with 1.1% organic matter at a pH of 8.1. Cotton had been planted on the site in the previous season. Herbicide consisted of Atrazine 4L (1.0 qt/acre) + Dual II Magnum 7.6 lb ai/gal (1.0 pt/acre) broadcast on Mar 15. Fertilizer was 95-32-0. PENNCO iron (25% ferrous sulfate) at 1 gal/acre was applied on Apr 25 and May 1. The Furadan 4F (16.0 oz/acre) treatment was applied into the seed furrow with a CO_2 powered sprayer mounted on the planter and adjusted to deliver 9.1 gpa total volume at 36 psi through 8002 flat fan nozzles (1 per row turned parallel with the row) at a speed of 2.5 mph.

Treatments were assessed by (1) counting the number of plants on 13.75 ft row on each of the two center rows on May 3, (2) assigning a plant damage rating (1 = no apparent damage up to 5 = severe stunting, yellowing and uneven stand) on Apr 7 (25 DAP = days after planting) and on May 1 (49 DAP), (3) estimating corn leaf aphid (CLA) numbers/plant whorl on 5/2 (50 DAP), (4) determining number and percentage of leaves infested with yellow sugarcane aphids (YSA) and greenbugs (GB) by examining 20 leaves per plot on May 1 (49 DAP) and May 19 (67 DAP), (5) visually evaluating each plot for percentage heading and blooming on May 18, and (6) hand harvesting 10 row ft from each of the center two rows in each plot on Jul 6. Heads were subsequently processed on a research thrasher and weights were adjusted to a 14% moisture standard.

RESULTS/DISCUSSION: Cruiser treated sorghum damage rating was lower than that in the Gaucho and Sorghum Guard treatments 25 DAP, but by 49 DAP no differences were detected (Table 1). CLA numbers in plant whorls were significantly lower 50 DAP in the

Gaucho and Cruiser treatments compared with the remaining treatments. YSA numbers were significantly lower in Cruiser treated plots 49 DAP than in Sorghum Guard and Furadan plots, and the percentage infested leaves in the Cruiser treatment was lower than all other treatments on that date (Table 2). By 67 DAP (May 19) Cruiser treated sorghum still had fewer YSA than the Furadan treatment. Percentage YSA infested leaves 67 DAP were significantly lower in the Cruiser, Sorghum Guard, and Counter treatments compared with the untreated sorghum. Differences in GB numbers and infested leaves were not found 49 DAP (probably due to the very low numbers present), but by 67 DAP, GB numbers were significantly lower in Gaucho, Cruiser, and Counter treated sorghum compared with the Sorghum Guard treatment (Table 3). In all cases, YSA and GB numbers were well below what is considered economically damaging.

Differences in heading were observed, with Gaucho heading slower than the other treatments and blooming was also delayed (Table 4). However, Gaucho grain production was significantly better than the Cruiser and Sorghum Guard treatments, but it was not better than the untreated sorghum or other insecticide treatments.

Insect pressure was below economically damaging levels in the study. This probably led to a lack of clear cut evidence demonstrating efficacy of tested products.

ACKNOWLEDGMENTS: The assistance of Syngenta and Gustafson Companies are acknowledged for their support of this field study.

Table 1. Plant stand, plant damage rating, and corn leaf aphid numbers in sorghum treated with insecticides, Texas Agricultural Experiment Station, Nueces County, TX, 2001.

Insecticide & formulation	Rate	Plant stand (1000's/acre)	Plant damage rating [a] 25 DAP	Plant damage rating [a] 49 DAP	Corn leaf aphids/ whorl[b]
Gaucho 480FS	8 oz/cwt seed	66.9 a	3.5 a	2.5 a	6.0 b
Cruiser 5FS	5.1 oz.cwt seed	71.1 a	1.3 c	1.5 a	0.0 b
Sorghum Guard	5.34 oz/cwt seed	65.8 a	2.5 ab	2.5 a	72.5 a
Counter 20CR	3 oz/1000 ft	68.0 a	2.3 bc	2.0 a	96.3 a
Furadan 4F	16 oz/acre	66.9 a	2.0 bc	2.3 a	72.5 a
Untreated		67.6 a	1.5 bc	2.3 a	121.3 a
LSD (P = 0.05)		NS	1.135	NS	54.25
P > F		.6222	.0023	.1474	.0003

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

[a] Plant damage ratings range from 1 = no apparent damage up to 5 = severe stunting, yellowing and thin stand. DAP = days after planting.

[b] Corn leaf aphid counts were made by estimating their average number in 10 whorls per plot on May 2 (50 DAP).

Table 2. Yellow sugarcane aphid infestation in sorghum treated with insecticide, Texas Agricultural Experiment Station, Nueces County, TX, 2001.

Insecticide & formulation	Rate	Yellow sugarcane aphid: No. per 20 leaves, 49 DAP	No. per 20 leaves, 67 DAP	% infested leaves, 49 DAP	% infested leaves, 67 DAP
Gaucho 480FS	8 oz/cwt seed	13.5 ab	3.5 ab	12.5 a	6.3 ab
Cruiser 5FS	5.1 oz.cwt seed	1.8 b	0.0 b	2.5 b	0.0 c
Sorghum Guard	5.34 oz/cwt seed	15.5 a	3.8 ab	12.5 a	1.3 bc
Counter 20CR	3 oz/1000 ft	9.3 ab	0.0 b	12.5 a	0.0 c
Furadan 4F	16 oz/acre	16.3 a	6.5 a	13.8 a	3.8 abc
Untreated		13. 3 ab	5.3 ab	16.3 a	7.5 a
LSD (P = 0.05)		12.7	[a]	9.09	[a]
P > F		.0531	.0373	.0197	.0040

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

[a] The P > F is based on transformed data [square root]; it is inappropriate to list LSD values based on transformed data.

Table 3. Greenbug infestation in sorghum treated with insecticide, Texas Agricultural Experiment Station, Nueces County, TX, 2001.

Insecticide & formulation	Rate	Greenbug No. per 20 leaves 49 DAP	Greenbug No. per 20 leaves 67 DAP	Greenbug % infested leaves 49 DAP	Greenbug % infested leaves 67 DAP
Gaucho 480FS	8 oz/cwt seed	0.0 a	0.0 b	0.0 a	0.0 b
Cruiser 5FS	5.1 oz.cwt seed	3.3 a	0.0 b	2.5 a	0.0 b
Sorghum Guard	5.34 oz/cwt seed	0.0 a	16.3 a	0.0 a	7.5 a
Counter 20CR	3 oz/1000 ft	1.0 a	0.0 b	1.3 a	0.0 b
Furadan 4F	16 oz/acre	1.5 a	7.5 ab	1.3 a	2.5 b
Untreated		0.0 a	11.3 ab	1.3 a	3.8 ab
LSD (P = 0.05)		NS	[a]	NS	[a]
P > F.0807		.0807	.0196	.2024	.0073

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

[a] The P > F is based on transformed data [square root]; it is inappropriate to list LSD values based on transformed data.

Table 4. Heading, bloom rates and production of sorghum treated with insecticide, Texas Agricultural Experiment Station, Nueces County, TX, 2001.

Insecticide & formulation	Rate	Percentage on 5/18 Heading	Percentage on 5/18 Bloom	% grain moisture	Yield (lb/acre)
Gaucho 480FS	8 oz/cwt seed	45.0 b	76.3 c	11.0 a	1900 a
Cruiser 5FS	5.1 oz.cwt seed	78.8 a	91.3 a	10.2 a	1581 b
Sorghum Guard	5.34 oz/cwt seed	67.5 a	85.0 b	10.2 a	1517 b
Counter 20CR	3 oz/1000 ft	80.0 a	90.0 ab	10.6 a	1625 ab
Furadan 4F	16 oz/acre	80.0 a	85.0 b	10.3 a	1680 ab
Untreated		80.0 a	91.3 a	10.0 a	1612 ab
LSD (P = 0.05)		19.87	6.19	NS	307.6
P > F.0807		.0023	.0002	.1495	.0501

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

INSECTICIDE SEED TREATMENTS ON SORGHUM

Walter Kuck Farm, Lavaca County, 2001

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SUMMARY: Insect numbers were low throughout the duration of the study. Although it appeared that chinch bugs, thrips level (unknown impact), and possibly some root damage did occur, no statistical differences were found in any data including grain yields.

OBJECTIVE: The experiment was established on sorghum to evaluate the effects of Gaucho at two rates, Gaucho + Sorghum Guard, and Sorghum Guard by itself on insect pests and subsequent grain production.

MATERIALS/METHODS: Pioneer 83G66 hybrid sorghum seed (Concep III treated) was planted in 38-inch wide rows on Apr 12, 2001 with a 6-row John Deere MaxEmerge 7100 model planter. The test site was 4 miles east of Texas Highway 95 on FM 1891. Seed treatments included (1) Gaucho 480FS, (2) a mixture of 50% Gaucho treated and untreated seed, (3) the same 50% Gaucho mixture + Sorghum Guard, (4) Sorghum Guard, and (5) untreated seed. Treatments were planted in 3-row by approximately 600 ft plots arranged in a randomized complete block design with 3 replications. Planting conditions were 78°F soil temperature, excellent moisture in the clay loam soil (but rough soil conditions), soil pH of 8.0, and less than 2% organic matter. Corn had been planted on the site the previous season. Fertilizer applied was 84-28-12 + 3 lb zinc. Herbicide was Atrazine at 1 qt/acre.

Treatment effects were measured on May 2 by (1) counting the number of yellow sugarcane aphids (YSA), greenbugs (GB), and corn leaf aphids (CLA) on 20 lower leaves in the center row of each plot, (2) counting the number of chinch bugs around 10 plants per plot, (3) assigning a visual thrips level rating (1 = none up to 5 = 20 or more per plant), and (4) counting the number of southern corn rootworm damaged plants in 10 examined. A total of 543 row ft of each plot was harvested with a commercial combine on Aug 7. Grain weights were adjusted to the 14% moisture standard. Statistical analysis was done with a Microstat computer program.

RESULTS/DISCUSSION: YSA, GB, and CLA numbers did not attain high levels during the season nor were significant differences observed when their numbers peaked (Table 1). Although chinch bug numbers were not significantly different in the treatments, it seemed obvious that untreated sorghum contained greater numbers (Table 2). Although the role of thrips is unknown in sorghum, enough were present to assess their relatively numbers. Again, untreated sorghum contained greater numbers but not statistically more. Statistical differences were not found in overall plant damage rating or in grain yield. Again it seemed obvious that the sum total of damage from insects may have contributed to increased yields from the systemic insecticide Gaucho.

ACKNOWLEDGMENTS: Thanks are extended to the Walter Kuck Family for their interest, time, and equipment in conducting this study. Terry Pitts, Gustafson Company is acknowledged for his support.

Table 1. Plant stand and aphid numbers resulting from insecticide treated sorghum seed, Walter Kuck Farm, Lavaca County, TX, 2001.

Insecticide & formulation	Rate (oz/cwt seed)	Plants (1000's/acre)	Number/20 leaves [b]		
			YSA	GB	CLA
Gaucho 480FS	8.0	74.7 a	0.0 a	1.3 a	0.0
Gaucho 480FS	4.0[a]	59.7 b	6.0 a	0.0 a	0.0
Gaucho 480FS + Sorghum Guard	4.0[a] + 5.34	56.0 b	1.0 a	0.0 a	0.0
Sorghum Guard	5.34	73.3 a	12.3 a	0.0 a	0.0
Untreated		62.7 ab	7.0 a	2.0 a	0.0
LSD (P = 0.05)		12.29	NS	NS	
P > F		.0274	.1702	.3585	

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

[a] This treatment was a 50% mixture of Gaucho treated seed (8 oz/cwt) and untreated seed.

[b] Counts were made on May 2. YSA = yellow sugarcane aphid, GB = greenbug, and CLA = corn leaf aphid.

Table 2. Chinch bugs, thrips level, plant damage, and yields resulting from insecticide treated sorghum seed, Walter Kuck Farm, Lavaca County, TX, 2001.

Insecticide & formulation	Rate (oz/cwt seed)	Chinch bugs/ 10 plants	Thrips level rating[b]	% damaged plants[c]	Yield (lb/acre)
Gaucho 480FS	8.0	0.33 a	1.0 a	0.38 a	2938 a
Gaucho 480FS	4.0[a]	0.33 a	2.7 a	1.19 a	2845 a
Gaucho 480FS + Sorghum Guard	4.0[a] + 5.34	0.33 a	2.0 a	0.00 a	2843 a
Sorghum Guard	5.34	0.67 a	2.7 a	2.47 a	2327 a
Untreated		2.00 a	3.7 a	1.61 a	2609 a
LSD (P = 0.05)		NS	NS	NS	NS
P > F		.1031	.2090	.5794	.1726

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

[a] This treatment was a 50% mixture of Gaucho treated seed (8 oz/cwt) and untreated seed.

[b] Thrips level ratings (1 = none up to 5 = 20 or more/plant).

[c] Plants that were wilting due to root and crown damage.

COMPARISON OF SYSTEMIC INSECTICIDES ON SORGHUM

Darby and Howard Salge Farm, Bee County, 2001

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Corpus Christi and Beeville, Texas

SUMMARY: Gaucho, Cruiser, and Sorghum Guard applied as seed treatments, and Counter applied at-planting into the seed furrow reduced corn leaf aphid numbers, but the infestation was of such short duration and low numbers that economic damage was not expected nor did it occur. Yellow sugarcane aphid and greenbug numbers were low and differences were not observed. Differences were not found in plant stand, grain moisture, or grain yields. Although plant damage ratings were significantly different, the reason could not be determined. Insecticide was not needed on the crop this season.

OBJECTIVE: The study compared seed and granular insecticides on sorghum for effect on sorghum pests and impact on grain yield.

MATERIALS/METHODS: Northrup King KS 585 hybrid sorghum seed (Concep III treated) was planted on Mar 16, 2001 at 70,000 seed/acre on the Salge Farm, one mile east of FM 888 on FM 796 in Bee County with a 12-row John Deere MaxEmerge 2 airplanter. Plots were 6-rows by 495 ft on a row spacing of 30-inches. Treatments were arranged in a randomized complete block with 3 replications. Herbicide consisting of Dual II Magnum (7.64 lb ai/gal) + Roundup was applied in a 14-inch band at-planting at 1.5 pt/acre for weed control. Soil moisture at-planting was excellent and the soil temperature at the 4-inch depth was 66°F (very little rainfall was received during the season). Granular Counter was applied in a 6-inch band at-planting; Gaucho, Cruiser, and Sorghum Guard were seed treatments.

Treatment effects were measured by (1) counting yellow sugarcane aphid (YSA) and greendbug (GB) numbers on 20 lower plant leaves per plot 43 (Apr 28) and 55 (May 10) days after planting (DAP), (2) estimating the number of corn leaf aphids (CLA) per 20 plant whorls 43 and 55 DAP, (3) counting the number of plants on 10 row ft 43 DAP, (4) assigning a plant damage rating (1 = no damage up to 5 = severe stunting, yellowing, and uneven stand) at 43 DAP, and (5) harvesting entire plots with a commercial combine on Jul 13. Grain weights were converted to that at a 14% moisture standard.

RESULTS/DISCUSSION: YSA and GB numbers were low and no differences were found on inspection dates (Table 1). CLA numbers in Gaucho and Cruiser treatments were significantly lower than in Sorghum Guard, Counter, and the untreated sorghum 43 DAP , but by 55 DAP, CLA could not be found in any of the treatments. Duration of the CLA infestation was short. A treatment effect was not found for plant stand (Table 2). Although damage rating differences occurred, we were unable to determine why Gaucho and Sorghum Guard ratings were higher than the other treatments; there was no statistical difference between Cruiser and Sorghum Guard. Differences were also not detected in grain moisture at harvest or yield. The numerical difference between the highest yield (untreated) and the lowest yield (Sorghum Guard) was 258 lb/acre. Insecticides were not needed at this test site.

ACKNOWLEDGMENTS: Brad Minton, Syngenta and Terry Pitts, Gustafson companies are thanked for their support of this work. We appreciate the assistance, labor, and equipment provided by Darby and Howard Salge in conducting the field study.

Table 1. Aphid numbers in insecticide treated sorghum, Darby and Howard Salge Farm, Bee County, TX, 2001.

			Number/20 leaves (whorls for CLA) at indicated days after planting					
Treatment &	Rate	Application	YSA		GB		CLA	
formulation	(oz)	method[a]	43	55	43	55	43	55
Gaucho 480FS	8.0	ST	1.0 a	11.3 a	0.0 a	5.0 a	100 b	0
Cruiser 5FS	5.1	ST	3.0 a	6.0 a	0.0 a	0.7 a	100 b	0
Sorghum Guard	5.34	ST	12.0 a	8.7 a	12.3 a	32.3 a	1474 a	0
Counter 15G	3.0	BGAP	6.0 a	0.3 a	14.3 a	33.7 a	1440 a	0
Counter 15G	4.0	BGAP	5.7 a	8.3 a	12.7 a	11.0 a	1554 a	0
Untreated			6.7 a	3.3 a	6.7 a	2.3 a	1300 a	0
LSD (P = 0.05)			NS	NS	NS	NS	862.3	
P > F			.2979	.5768	.3508	.2139	.0061	

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

[a] ST = seed treatment (oz/cwt seed) and BGAP = banded granule at-planting (oz/1000 row ft).

[b] YSA = yellow sugarcane aphid, GB = greenbug, CLA = corn leaf aphid

Table 2. Plant stand, plant damage rating, grain moisture at harvest, and yield in insecticide treated sorghum, Darby and Howard Salge Farm, Bee County, TX, 2001.

Treatment & formulation	Rate (oz)	Application method[a]	Plants (1000's acre)	Plant damage rating[b]	% grain moisture	Yield (lb/acre)
Gaucho 480FS	8.0	ST	35.7 a	3.67 a	12.9 a	1160 a
Cruiser 5FS	5.1	ST	34.3 a	2.00 bc	12.9 a	1260 a
Sorghum Guard	5.34	ST	31.7 a	3.00 ab	13.6 a	1151 a
Counter 15G	3.0	BGAP	34.7 a	1.33 c	12.9 a	1293 a
Counter 15G	4.0	BGAP	35.0 a	1.67 c	13.1 a	1217 a
Untreated			34.3 a	2.00 bc	13.6 a	1409 a
LSD (P = 0.05)			NS	1.315	NS	NS
P > F			.5500	.0215	.2829	.1900

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

[a] ST = seed treatment (oz/cwt seed) and BGAP = banded granule at-planting (oz/1000 row ft).

[b] Plant damage ratings range from 1 = no apparent damage up to 5 = severe stunting, yellowing and uneven stand. Estimates were made on Apr 28 or 43 DAP.

SEED AND IN-FURROW SYSTEMIC INSECTICIDE EVALUATION ON COTTON

Texas Agricultural Experiment Station, Nueces County, 2001

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SUMMARY: Cruiser and Gaucho seed treatments, Temik and Thimet granular in-furrow treatments, and liquid Admire applied treatments were compared on cotton. Slightly higher, but not statistically significant, plant damage ratings were found in untreated cotton on 2 of the 3 inspection dates. No differences or trends were observed in aphid or thrips numbers, or cotton production.

OBJECTIVE: The experiment was conducted to compare systemic insecticides for effectiveness in controlling early season aphids and thrips, and to measure production response.

MATERIALS/METHODS: DPL 458BR variety cotton was planted Mar 26, 2001 on the Texas Agricultural Experiment Station, Meaney Annex at Corpus Christi at a rate of 4 seed/row ft with a 4-row research cone planter. Plots were 4 rows (38-inch centers) by 40-ft and treatments were arranged in a randomized complete block design with 4 replications. The soil was a sandy clay loam (52% sand, 16% silt, 32% clay) with a pH of 8.1 and organic matter content of 1.1%. Fertilizer applied was 95-32-0 and Treflan 4HFP (1 qt/acre) was incorporated for weed control on Dec 11, 2000. Electric driven Gandy boxes were used to deliver granular Temik and Thimet into the seed furrow. Liquid Admire was applied into the seed furrow through single 8002E nozzles oriented with the row in a total volume of 9.1 gpa at 36 psi and a speed of 2.5 mph. Pressure was provided by CO_2. Adage and Gaucho were applied as seed treatments.

The entire test was treated with Tracer 4SC (2 oz/acre) on Jun 15 and Jun 26. Malathion ULV (12 oz/acre) was applied several times by the Texas Boll Weevil Eradication Foundation. Cotton was defoliated with Dropp 50WP (0.1 lb/acre) + CottonQuik 2.28 lb/gal (3 pt/acre) in a total volume of 12 gpa.

Treatment effects were measured by (1) taking 5 plants from the 2 center rows in each plot 23 DAP (days after planting) to determine thrips numbers (plants were placed in alcohol, washed, filtered, and insects counted on filter paper under a microscope), (2) assigning visual plant damage ratings (1 = no damage up to 5 = severe stunting and leaf curling) on Apr 29, May 8, and May 19 or 34, 43, and 54 DAP, respectively, (3) estimating the number of cotton aphids by examination of 5 leaves taken from the center rows in each plot on May 8 (43 DAP) and May 19 (54 DAP), (4) counting plants on 13.75 ft row on 1 of the 2 center rows in each plot on Jul 20, and (5) harvesting by hand 13.75 ft row in each plot on Jul 31. Seed cotton was processed on a 10-saw Eagle laboratory gin.

RESULTS/DISCUSSION: No differences were found in plant damage ratings, or aphid and thrips numbers (Table 1). Numerically, plant damage ratings tended to be slightly higher in untreated cotton on 2 of the 3 inspections (34 and 54 DAP). Additionally, statistical differences were not found in plant population or any of the production factors measured (Table 2). Insect populations were not severe enough to cause damage that would affect boll and lint production.

ACKNOWLEDGMENTS: Thanks are extended to Aventis, BASF, Bayer, and Gustafson companies for product and/or monetary support of this research.

Table 1. Plant damage rating, aphid and thrips numbers in cotton treated with various seed and in-furrow applied systemic insecticides, Texas Agricultural Experiment Station, Nueces County, TX, 2001.

	Days after planting					
	Plant damage rating [a]			Aphids/5 leaves		Thrips/5 plants [b]
Treatment (rate)	34	43	54	43	54	
Cruiser 5FS (7.6 oz/cwt seed)	1.3 a	1.5 a	1.5 a	12.5 a	30.5 a	4.3 a
Gaucho 480FS (8.0 oz/cwt seed)	1.8 a	2.3 a	1.8 a	24.0 a	11.0 a	3.5 a
Temik 15G (4.0 oz/1000 ft row)	1.3 a	2.0 a	1.5 a	24.8 a	29.0 a	4.5 a
Thimet 20G (4.0 oz/1000 ft row)	1.8 a	2.5 a	2.0 a	34.8 a	19.0 a	4.0 a
Admire 2F (6.4 oz/acre)	1.8 a	2.3 a	1.5 a	35.0 a	11.8 a	3.5 a
Admire 2F (3.2 oz/acre)	2.3 a	2.3 a	2.0 a	26.3 a	17.8 a	2.5 a
Untreated	2.3 a	2.0 a	2.5 a	29.3 a	44.8 a	2.0 a
LSD (P = 0.05)	NS	NS	NS	NS	NS	NS
P > F	.4552	.8936	.3483	.9049	.1279	.3391

Means in a column followed by the same letter are not significantly different by ANOVA.
[a] Plant damage ratings: 1 = no damage up to 5 = severe stunting and leaf curling.

[b] Counts were made on 2 leaf cotton on Apr 19 (23 DAP). Immature thrips accounted for 10.3% of the total.

Table 2. Production of cotton treated with various seed and in-furrow applied systemic insecticides, Texas Agricultural Experiment Station, Nueces County, TX, 2001.

Treatment (rate)	Plants (1000's/acre)	Harvested bolls (1000's/acre)	% lint turnout	Bolls/ lint lb	Yield lb lint/acre
Cruiser 5FS (7.6 oz/cwt seed)	47.0 a	255 a	38.9 a	295 a	866 a
Gaucho 480FS (8.0 oz/cwt seed)	49.0 a	278 a	39.8 a	291 a	954 a
Temik 15G (4.0 oz/1000 ft row)	59.3 a	277 a	40.2 a	288 a	962 a
Thimet 20G (4.0 oz/1000 ft row)	47.0 a	253 a	39.0 a	298 a	850 a
Admire 2F (6.4 oz/acre)	50.0 a	258 a	39.4 a	292 a	887 a
Admire 2F (3.2 oz/acre)	53.3 a	267 a	38.9 a	305 a	875 a
Untreated	56.3 a	266 a	39.2 a	300 a	890 a
LSD (P = 0.05)	NS	NS	NS	NS	NS
P > F	.4966	.3186	.4953	.6824	.3171

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

COMPARISON OF TEMIK RATES FOR EFFECTIVENESS IN CONTROLLING INSECT PESTS AND IMPACT ON YIELD OF COTTON

Darby and Howard Salge Farm, Bee County, 2001

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SUMMARY: Thrips were statistically fewer at the middle rate and numerically fewer at the high rate of Temik evaluated compared to the untreated check. Aphid numbers at the same time were greater in the middle and high Temik use rates compared with the untreated cotton. Lint production was significantly greater at all Temik use rates compared to the untreated check, and positive dollar return ranged from $13.87-17.55/acre.

OBJECTIVE: The field study was designed to (1) evaluate the effectiveness of Temik rates for control of early season pests and (2) to determine economic impact of various rates.

MATERIALS/METHODS: FiberMax 832 variety cotton seed was planted on Mar 26, 2001 at 15 lb/acre on the Salge Farm, 1 mile east of FM 888 on FM 796 in Bee County with a 12-row John Deere MaxEmerge 2 air planter. Plots were 12 rows by approximately 1,500 ft on a row spacing of 30-inches. Treatments of Temik 15G (3.0, 3.5, and 4.0 oz/1000 row ft) applied into the seed furrow and an untreated check were arranged in a randomized complete block with 3 replications. Sorghum had been planted on the land the previous season. Soil moisture at-planting was excellent and soil temperature was 69°F at the 4-inch depth, but rainfall before plant emergence greatly reduced the plant stand and later drought conditions reduced yield potential.

Treatment effects were monitored by (1) counting the number of thrips and aphids found on 3-true leaf stage cotton on Apr 25 (30 days after planting) by collecting 5 plants from the middle 2 rows in each plot and placing them in alcohol (plants were later washed and insects were collected on filter paper for microscopic examination), (2) harvesting 17.4 ft row by hand from the center 2 rows in each plot at 4 locations per plot, and (3) ginning seed cotton samples on a 10-saw Eagle laboratory machine to determine lint production.

RESULTS/DISCUSSION: Thrips nymphs and adults did not differ statistically among treatments 30 DAP on 3 true leaf cotton (Table 1). For total thrips, the middle Temik rate had statistically fewer thrips and the high rate had numerically fewer thrips than did untreated cotton. Aphid numbers were greater in the higher Temik use rate plots compared to the untreated cotton at the 3 true leaf stage. No differences were observed in plant stand in the harvest areas, but there were differences in some of the harvest parameters (Table 2). Significantly more bolls were harvested from the Temik treated plots. No differences were found in bolls/lint lb, and all Temik plots produced significantly more lint (78 lb/acre average) than did untreated cotton. No differences were found in lint production for the various Temik rates used. Economic returns expressed as dollar return over the untreated cotton for Temik ranged from $13.87 - 17.55/acre ($15.97/acre average).

The increased yields in this study reflect the long term results for use of systemic insecticides on cotton in the Texas Coastal Bend. The 78 lb/acre average increase in this study is about 18 lb/acre above that long term average. In previous studies, we have not found higher rates to offer better economic returns.

ACKNOWLEDGMENTS: Appreciation is expressed to Darby and Howard Salge for their time, labor, equipment, and interest in conducting this study. Aventis is acknowledged for their continued support of these type studies.

Table 1. Comparison of Temik rates on cotton for effect on thrips and aphids at the 3 true leaf stage, Darby and Howard Salge Farm, Bee County, TX, 2001.

Treatment (oz/1000 ft row)	Thrips/5 plants [a]			Aphids/5 plants [a]
	adults	nymphs	total	
Temik 15G (3.0)	7.3 a	7.7 a	15.0 a	32.3 b
Temik 15G (3.5)	3.3 a	0.7 a	4.0 c	108.3 ab
Temik 15G (4.0)	4.0 a	3.7 a	7.7 bc	236.0 a
Untreated	5.0 a	6.7 a	11.7 ab	68.3 b
LSD (P = 0.05)	NS	NS	6.113	130.1
P > F	.2321	.1056	.019	.0361

Means in a column followed by the same letter are not significantly different by ANOVA.
[a] Five plants were collected from the center two rows of each plot 30 days after planting.

Table 2. Comparison of Temik rates for effect on cotton production, Darby and Howard Salge Farm, Bee County, TX, 2001.

Treatment (oz/1000 ft row)	1000's/acre plants	harvested bolls	Bolls/ lint lb	Yield (lb lint/acre)	Return $ over untreated [a]
Temik 15G (3.0)	28.6 a	168 a	244 a	688 a	17.55
Temik 15G (3.5)	30.3 a	174 a	255 a	683 a	13.87
Temik 15G (4.0)	27.9 a	178 a	257 a	695 a	16.49
Untreated	26.5 a	152 b	248 a	611 b	
LSD (P = 0.05)	NS	10.4	NS	55.47	
P > F	.5716	.0034	.1333	.0329	

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

[a] Cotton value based on $0.50/lb for lint and $0.05/lb for seed; costs include Temik 15G ($3.35/lb) and harvesting/hauling/ginning fees ($0.21/lb lint).

COMPARISON OF SEED AND IN-FURROW APPLIED SYSTEMIC INSECTICIDES ON COTTON

Arthur Mahalitc and Sons Farm, Colorado County, 2001

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SUMMARY: Comparison of Cruiser, Gaucho, Temik, Thimet, and Admire did not reveal differences in plant damage ratings, thrips or aphid numbers, or cotton production in this study. However, there were numerical trends for increased lint yields in certain key treatments just as observed in past years.

OBJECTIVE: The field experiment was established to (1) compare the effects of insecticide treatments on thrips and aphids, (2) measure impact on plant emergence and damage protection, and (3) determine the effect on production parameters.

MATERIALS/METHODS: Paymaster PM1560B (transgenic B.t.) variety cotton was planted Apr 5, 2001 on the Mahalitc Farm south of Eagle Lake with an 8-row John Deere vacumeter planter. The seeding rate was 52,800/acre, rows were spaced on 36-inch centers, soil temperature at-planting was 72°F, and soil moisture conditions were excellent. Treatments were arranged in a randomized complete block design with 3 replications. Individual plots were 4 rows by approximately 1,634 ft; the Admire plots were 8 rows wide. Fertilizer analysis applied as a dry preplant, and side-dress anhydrous ammonia totaled 37-45-15+10S. Herbicide consisted of Cotoran 4L (0.66 pt/acre) + Dual Magnum 7.62 lb ai/gal (1.0 pt/acre). Wet soil was added to the mixture at 0.5 pt/acre. Terraclor Super X (terraclor at 2 lb ai/gal + terrazole at 0.5 lb ai/gal) was applied at 0.66 pt/acre into the seed furrow across all treatments in a total spray volume of 3 gpa. The Admire was placed in the tank with Terraclor for application into the seed furrow.

Treatments were assessed by (1) assigning plant damage ratings in each plot on Apr 27 (4 true leaves) and on May 11 (pinhead square) where 1 = no damage up to 5 = severe stunting and leaf curling, (2) counting the number of thrips and aphids found on 2 true leaf cotton by collecting 5 plants from the middle rows in each plot (plants were placed in alcohol, later washed and insects were collected on filter paper for microscopic examination), (3) harvesting by hand 14.5 ft row from each of 3 locations in the center rows of each plot on Aug 20, (4) counting the number of plants for stand determination in the harvested area, and (5) ginning seed cotton on a 10-saw Eagle laboratory machine to determine lint yield.

RESULTS/DISCUSSION: Significant differences were not found in treatments for plant damage rating and thrips or aphid numbers (Table 1). The Cruiser treatment plant population was significantly greater than all other treatments, but reasons for this difference were not apparent. No statistical differences were found in any of the measured production factors (green bolls at harvest, harvested bolls, percentage lint, or yield). Although it was not demonstrated statistically, certain key treatments such as Cruiser and Gaucho seed treatments and Granular Temik (4 oz/1000 row ft) had greater production.

ACKNOWLEDGMENTS: The Mahalitc Family is thanked for their continued interest, support, equipment, and labor in conducting this study. Appreciation is expressed to Aventis, Syngenta, Gustafson, BASF, and Bayer companies for monetary or product support in conducting the study.

Table 1. Plant damage rating and thrips numbers in cotton treated with various seed and in-furrow applied systemic insecticides, Arthur Mahalitc and Sons Farm, Colorado County, TX, 2001.

	Plant damage rating [a, b]		No./5 plants [c]		
Treatment (rate)	4/27	5/11	thrips	aphids	Plants (1000's/acre)
Cruiser 5FS (7.6 oz/cwt seed)	1.42 a	1.58 a	0.3 a	1.0 a	45.3 a
Gaucho 480FS (8.0 oz/cwt seed)	1.67 a	2.00 a	0.3 a	3.7 a	40.3 b
Temik 15G (4.0 oz/1000 ft row)	1.83 a	1.50 a	0.3 a	0.0 a	38.0 b
Temik 15G (3.0 oz/1000 ft row)	1.75 a	1.67 a	0.0 a	1.7 a	38.8 b
Thimet 20G (4.0 oz/1000 ft row)	1.67 a	1.33 a	0.3 a	0.7 a	39.0 b
Admire 2F (3.2 oz/acre)	1.67 a	1.67 a	0.7 a	5.0 a	40.5 b
Untreated	1.67 a	2.33 a	1.0 a	3.3 a	39.5 b
LSD (P = 0.05)	NS	NS	NS	NS	3.576
P > F	.9464	.2731	.3753	.1922	.0147

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

[a] Plant damage ratings: 1 = no damage up to 5 = severe stunting and leaf curling.

[b] Plant growth stages: Apr 27 = 4 true leaves and May 11 = pinhead square.

[c] Cotton growth stage: 2 true leaves

Table 2. Production of cotton treated with various seed and in-furrow applied systemic insecticides, Arthur Mahalitc and Sons Farm, Colorado County, TX 2001.

	Bolls (1000s'/acre)			
Treatment (rate)	green	harvested	% lint turnout	Yield lb lint/acre
Cruiser 5FS (7.6 oz/cwt seed)	56.2 a	319 a	39.2 a	1340 a
Gaucho 480FS (8.0 oz/cwt seed)	46.7 a	298 a	39.0 a	1267 a
Temik 15G (4.0 oz/1000 ft row)	61.7 a	306 a	39.8 a	1282 a
Temik 15G (3.0 oz/1000 ft row)	48.0 a	286 a	39.1 a	1165 a
Thimet 20G (4.0 oz/1000 ft row)	59.0 a	302 a	39.3 a	1217 a
Admire 2F (3.2 oz/acre)	57.2 a	271 a	39.6 a	1097 a
Untreated	50.5 a	289 a	39.6 a	1210 a
LSD (P = 0.05)	NS	NS	NS	NS
P > F	.9585	.3284	.2975	.0608

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

EVALUATION OF INSECTICIDES FOR CONTROL OF APHIDS IN COTTON

Texas Agricultural Experiment Station, Nueces County, 2001

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SUMMARY: Furadan, Bidrin at 2 rates, Calypso, Assail at 2 rates, and Centric at 2 rates were applied to cotton to determine their effectiveness in controlling cotton aphids. All insecticide treatments significantly reduced aphid numbers compared to the untreated check 3 DAT. By 6 DAT the aphid population had declined to zero in all plots, mostly due to attack by a parasitic fungus. As expected, no differences were found in lint yields.

OBJECTIVE: The field study was conducted to compare insecticides and to evaluate product rates for effectiveness in controlling cotton aphids.

MATERIALS/METHODS: DPL 20B was planted Mar 23, 2001 on the Texas Agricultural Experiment Station, Meaney Annex in Nueces County. Fertilizer applied was 95-32-0, and Treflan 4 HFP (1 qt/acre) was incorporated for weed control on Dec 11, 2000. Treatments were arranged in a randomized complete block design with 3 replications in 4-row by 40 ft plots with individual rows spaced on 38-inch centers. The entire study was oversprayed with Baythroid 2E (3.2 oz/acre) on May 22 to enhance development of an aphid population. Individual insecticide treatments were applied to the 4-row plots on May 29 with a self-propelled Lee Company Spider Sprayer Trac equipped with two, 4X hollow cone nozzles/row in a total volume of 8 gpa at 40 psi at a speed of 2.75 mph. Baythroid was applied after plots were inspected on Jun 4 in an attempt to create conditions for aphid increase.

Treatments were assessed by (1) examining 5 key leaves (normally the second leaf from the terminal) for aphids from the center 2 rows of each plot on May 29 (pretreatment count), Jun 1 (3 DAT) and Jun 4 (6 DAT), (2) harvesting by hand 13.75 ft row from 1 of the 2 center rows in each plot on Jul 23, and (3) counting the number of plants from the harvested area to determine plant stand. Seed cotton was processed on a 10-saw Eagle laboratory machine.

RESULTS/DISCUSSION: All insecticide treatments significantly reduced aphid numbers compared with pretreatment counts and the untreated cotton 3 DAT (Table 1). By 6 DAT, no live aphids remained in plots primarily due to a parasitic fungus. Although Baythroid was applied in an attempt to again increase aphid number, the attempt was not successful. Additionally, dry conditions resulted in premature crop cutout. As expected lint yields revealed no differences due to treatment. The aphid infestation was of short duration.

ACKNOWLEDGMENTS: FMC, Amvac Chemical, Bayer, Aventis, and Syngenta companies are acknowledged for their support of this experiment. Rudy Alaniz, Mike Hiller, and Matt Matocha, Demonstration Assistants, are thanked for their assistance in conducting the field study.

Table 1. Comparison of insecticides for control of aphids in cotton, Texas Agricultural Experiment Station, Nueces County, TX, 2001.

Treatment (rate)	Number aphids/leaf			Yield (lb lint/acre)
	pretreat.	3 DAT	6 DAT	
Furadan 4F (8.0 oz/acre)	51.3 a	0.00 b	0.0	663 a
Bidrin 8E (4.0 oz/acre)	44.3 a	1.00 b	0.0	721 a
Bidrin 8E (8.0 oz/acre)	45.3 a	2.67 b	0.0	699 a
Calypso 4SC (1.5 oz/acre)	54.7 a	1.00 b	0.0	715 a
Assail 70WP (0.87 oz/acre)	43.0 a	0.00 b	0.0	686 a
Assail 70WP (1.14 oz/acre)	41.7 a	0.00 b	0.0	754 a
Centric 40WG (2.0 oz/acre)	49.3 a	0.33 b	0.0	730 a
Centric 40WG (2.5 oz/acre)	51.0 a	0.67 b	0.0	729 a
Untreated	50.3 a	23.33 a	0.0	686 a
LSD (P = 0.05)	NS	2.804		NS
P > F	.9686	.0001		.8051

Means in a column followed by the same letter are not significantly different by ANOVA.
[a] DAT = days after treatment

FLEAHOPPER CONTROL ON OKRA LEAF AND STANDARD LEAF COTTON WITH ORTHENE

Texas Agricultural Experiment Station, Nueces County, 2001

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SUMMARY: The experiment was conducted to compare the effects of treating okra leaf (FM 832) and standard leaf (FM 958) cotton varieties to determine if one was more susceptible to fleahoppers. No susceptibility differences were detected; however, the fleahopper infestation level was moderate and did not occur until near first bloom. Additional tests are planned.

OBJECTIVE: The study was conducted to determine if the cotton varieties responded differently to fleahopper control by Orthene.

MATERIALS/METHODS: FM 832 (okra leaf) and FM 958 (standard leaf) cotton varieties were planted in 4-row by 40 ft plots on 38-inch rows on Apr 2, 2001 at the Texas Agricultural Experiment Station, Meaney Annex at Corpus Christi. Treatments were arranged in a randomized complete block design with 4 replications. Orthene 90S (4.12 oz/acre) was applied on May 29 and Jun 6 to the center 2 rows in each plot with a self-propelled Lee Company Spider Sprayer Trac. Applications were made in a total volume of 8 gpa through two, 4X hollow cone nozzles per row at 40 psi and 2.75 mph. The entire test was oversprayed with Tracer 4SC (2 oz/acre) on Jun 15 and 26 for bollworms/tobacco budworms. Fertilizer applied was 95-32-0 and Treflan 4 HFP (1 qt/acre) was incorporated for weed control on Dec 11, 2000.

Treatment effects were evaluated by (1) counting fleahoppers, lady beetles, and spiders on 20 plant terminals/plot before treatment on May 29, and 3 and 6 DAT-1, (days after treatment), and 3 and 8 DAT-2, (2) counting pirate bugs on 20 plant terminals 6 DAT-1, 3 DAT-2, and 8 DAT-2, (3) counting the number of plants in 13.75 ft row on each of the center 2 rows, (4) harvesting 13.75 ft row from each of the center 2 rows in plots on Aug 6. Seed cotton was ginned on a 10-saw Eagle laboratory machine. Lint samples were sent to the International Textile Center, Texas Tech University for fiber analysis.

RESULTS/DISCUSSION: Fleahopper infestation was moderate and did not reach treatable levels until near first bloom. Orthene applied to okra leaf (FM 832) and standard leaf (FM 958) cotton cultivars in 2 treatments applied 8 days apart significantly reduced fleahopper and lady beetle but not spider and pirate bug (except one case) numbers (Tables 1, 2, 3, 4). No differences were found in the Orthene/cultivar treatment combinations in plant population, harvested bolls, green bolls at harvest, or bolls/lint lb (Table 5). FM 958 produced significantly more lint than FM 832 that was not treated for fleahoppers but not significantly more than Orthene treated FM 832. In a comparison of FM 832 Orthene treated and untreated, and FM 958 Orthene treated and untreated cotton, statistical differences were not found. In both cases numerically more lint was produced in the Orthene treated cotton. The FM 832 variety produced longer and, except for Orthene treated, stronger lint than the FM 958 variety (Table 6). A difference in susceptibility between the two cotton varieties was not found under the conditions in this study.

ACKNOWLEDGMENTS: Aventis Company is acknowledged for providing the FiberMax cotton variety seed, and Valent Company is thanked for providing the Orthene. The Texas Food and Fiber Commission, Austin, Texas paid for fiber analysis.

Table 1. Effect on fleahopper numbers of Orthene applied to okra leaf (FM 832) and standard leaf (FM 958) cotton varieties, Texas Agricultural Experiment Station, Nueces County, TX, 2001.

Variety	Orthene treated [a]	Total number fleahoppers/100 terminals				
		Pretrt.	3 DAT-1 [b]	6 DAT-1	3 DAT-2	8 DAT-2
FM 832	yes	28.8 a	2.8 b	5.0 b	11.3 ab	6.3 b
FM 958	yes	26.3 a	3.8 b	5.0 b	5.0 b	10.0 ab
FM 832	no	26.3 a	35.0 a	28.8 a	20.0 ab	18.8 a
FM 958	no	25.0 a	21.3 a	18.8 ab	28.8 a	17.5 a
LSD (P = 0.05)		NS	16.81	13.27	18.38	10.41
P > F		.4726	.0018	.0026	.0291	.0264

Means in a column followed by the same letter are not significantly different by ANOVA.
[a] Orthene 97 Pel applied at 4.12 oz/acre on May 29 and Jun 6.
[b] DAT = days after treatment

Table 2. Number of lady beetles after treatment with Orthene on okra leaf (FM 832) and standard leaf (FM 958) cotton varieties, Texas Agricultural Experiment Station, Nueces County, TX, 2001.

Variety	Orthene treated [a]	Lady beetles per 100 terminals			
		3 DAT-1 [b]	6 DAT-1	3 DAT-2	8 DAT-2
FM 832	yes	3.75 b	5.00 a	0.00 b	0.00 a
FM 958	yes	1.25 b	8.75 a	1.25 b	5.00 a
FM 832	no	13.75 a	8.75 a	3.75 ab	0.00 a
FM 958	no	12.50 a	13.75 a	7.50 a	3.75 a
LSD (P = 0.05)		6.29	NS	5.17	NS
P > F		.0011	.2223	.0157	.0604

Means in a column followed by the same letter are not significantly different by ANOVA.
[a] Orthene 97 Pel applied at 4.12 oz/acre on May 29 and Jun 6.
[b] DAT = days after treatment

Table 3. Number of spiders after treatment with Orthene on okra leaf (FM 832) and standard leaf (FM 958) cotton varieties, Texas Agricultural Experiment Station, Nueces County, TX, 2001.

Variety	Orthene treated [a]	Spiders per 100 terminals			
		3 DAT-1[b]	6 DAT-1	3 DAT-2	8 DAT-2
FM 832	yes	2.50 a	0.00 a	0.00 a	0.00 a
FM 958	yes	1.25 a	0.00 a	0.00 a	0.00 a
FM 832	no	1.25 a	1.25 a	3.75 a	2.50 a
FM 958	no	1.25 a	2.50 a	2.50 a	1.25 a
LSD (P = 0.05)		NS	NS	NS	NS
P > F		.7040	.1502	.2372	.1460

Means in a column followed by the same letter are not significantly different by ANOVA.
[a] Orthene 97 Pel applied at 4.12 oz/acre on May 29 and Jun 6.
[b] DAT = days after treatment

Table 4. Number of pirate bugs after treatment with Orthene on okra leaf (FM 832) and standard leaf (FM 958) cotton varieties, Texas Agricultural Experiment Station, Nueces County, TX, 2001.

Variety	Orthene treated [a]	Pirate bugs per 100 terminals			
		3 DAT-1[b]	6 DAT-1	3 DAT-2	8 DAT-2
FM 832	yes		0.00 b	0.00 a	0.00 a
FM 958	yes		0.00 b	1.25 a	2.50 a
FM 832	no		7.50 a	2.50 a	2.50 a
FM 958	no		5.00 ab	3.75 a	3.75 a
LSD (P = 0.05)			5.81	NS	NS
P > F			.0151	.2809	.2084

Means in a column followed by the same letter are not significantly different by ANOVA.
[a] Orthene 97 Pel applied at 4.12 oz/acre on May 29 and Jun 6.
[b] DAT = days after treatment

Table 5. Production factors after treatment with Orthene on okra leaf (FM 832) and standard leaf (FM 958) cotton varieties, Texas Agricultural Experiment Station, Nueces County, TX, 2001.

Variety	Orthene treated[a]	1000's/acre plants	1000's/acre harvested bolls	1000's/acre green bolls	Bolls/ lint lb	Yield (lb lint/acre)
FM 832	yes	53.1 a	233 a	1.75 a	266 a	876 ab
FM 958	yes	49.5 a	244 a	0.63 a	266 a	916 a
FM 832	no	49.5 a	241 a	2.13 a	283 a	843 b
FM 958	no	50.3 a	242 a	1.50 a	270 a	895 a
LSD (P = 0.05)		NS	NS	NS	NS	47.2
P > F		.5523	.5434	.0692	.1809	.0146

Means in a column followed by the same letter are not significantly different by ANOVA.
[a] Orthene 97 Pel applied at 4.12 oz/acre on 5/29 and 6/6.

Table 6. Cotton fiber characteristics in okra leaf (FM 832) and standard leaf (FM 958) varieties with and without Orthene treatment for fleahoppers, Texas Agricultural Experiment Station, Nueces County, TX, 2001.

Variety	Orthene treated[a]	Fiber characteristics Mic	Lgth	Ur	St	Elong
FM 832	yes	4.2 a	1.14 a	83.3 a	32.8 b	6.2 a
FM 958	yes	4.2 a	1.10 b	82.9 a	31.4 b	5.9 b
FM 832	no	4.0 a	1.15 a	84.0 a	34.6 a	6.2 a
FM 958	no	4.3 a	1.11 b	83.3 a	31.9 b	6.0 ab
LSD (P = 0.05)		NS	.023	NS	1.44	.273
P > F		.1075	.0008	.1174	.0012	.0493

Means in a column followed by the same letter are not significantly different by ANOVA.
[a] Orthene 97 Pel applied at 4.12 oz/acre on May 29 and Jun 6.

COMPARISON OF INSECTICIDES FOR CONTROL OF BOLLWORM AND TOBACCO BUDWORM ON NON-TRANSGENIC AND TRANSGENIC B.t. COTTON CULTIVARS

Texas Agricultural Experiment Station, Nueces County, 2001

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SUMMARY: The field study involved a comparison of 6 insecticides or combinations applied 2 times at a 7-day interval to non-transgenic (DPL 5415) and transgenic B.t. (DPL 33B) cotton varieties. Insecticides were generally equally effective in protecting squares and bolls from tobacco budworm in the non-transgenic cotton variety, but more caterpillar leaf feeding was found in Asana and Leverage treatments than in the other insecticide treatments. None of the insecticides were as effective as the transgenic B.t. variety in reducing square and boll damage. Boll damage was not statistically greater in insecticide treated DPL 5415 variety cotton. Mite and aphid damage was greatly reduced by Denim. Leverage reduced aphid damage and Asana treated cotton had increased aphid damage. Generally transgenic B.t. cotton produced more lint. Although insecticide treated, non-transgenic cotton yields were not statistically better than the untreated cotton, a numerical yield increase occurred in all cases (42-68 lb lint/acre). The transgenic B.t. variety averaged 62 lb lint/acre more than the average of the non-transgenic cotton variety. Although there were statistical differences in fiber characteristics it was hard to detect a consistent improvement due to treatment; staple length was consistently longer in the transgenic B.t. cotton variety.

OBJECTIVE: A comparison of insecticides on non-transgenic and transgenic B.t. cotton varieties was conducted to (1) evaluate efficacy of products on caterpillars, (2) determine impact on other cotton insects and, (3) measure effect on cotton production.

MATERIALS/METHODS: The experiment was conducted on the Texas Agricultural Experiment Station, Meaney Annex in Nueces County. Test varieties DPL 5415 and DPL 33B were planted Apr 6, 2001 in alternating 8-row plots and then subdivided for insecticide treatment in order that each foliar treatment was applied to 4 rows of DPL 5415 (non-transgenic) and 4 rows of DPL 33B (transgenic B.t.) cotton. Insecticide treatments were arranged in a randomized complete block design with 4 replications. Plots were 40 ft long, and rows were spaced on 38-inch centers. Fertilizer applied was 95-32-0 and Treflan 4HFP (1 qt/acre) was incorporated for weed control on Dec 11, 2000. Insecticides were applied to all 8 rows in each plot with a self-propelled Lee Company Spider Sprayer Trac on Jun 18 and Jun 25 in a total spray volume of 5.43 gpa through two, 4X hollow cone nozzles/row at 40 psi and 4 mph.

Treatments were assessed by (1) examining 20 terminals/plot on Jun 22 (4 DAT-1) for heliothine eggs, larvae, damage, spiders, and pirate bugs, (2) examining 20 approximately ½ grown squares/plot for caterpillar damage, (3) inspecting 20 bolls/plot on Jun 30 (5 DAT-2) for caterpillar damage, (4) assigning a visual caterpillar leaf damage score (1 = no damage up to 5 = 10% leaf loss), (5) estimating mite and aphid damage (1 = no damage up to 5 = severe damage), and (6) harvesting 1 entire row/plot with a spindle picker. Seed cotton samples were ginned on a 10-saw Eagle laboratory machine to determine percentage lint in order to calculate lint weights. Lint samples were sent to the International Textile Center, Texas Tech University for fiber analysis.

RESULTS/DISCUSSION: Tobacco budworm began to increase by mid-May. Although the egg lay was not high, a moderate caterpillar infestation developed and insecticide treatments were applied on Jun 18 and 25. No differences were found in numbers of eggs 4 days after the first treatment (4 DAT-1), but significant differences were found in numbers of larvae, damaged terminals, square damage, and number of spiders (Table 1). Larval numbers, except in Denim treatment, were significantly less in insecticide compared to untreated cotton in the DPL 5415 variety. Only in Asana, Tracer, and Steward treatments were larval numbers not statistically different from numbers in the DPL 33B variety (larvae were not found in the DPL 33B variety 4 DAT-1). More terminal damage was found in non-transgenic untreated cotton in all except the Denim treated non-transgenic cotton. Damaged square counts were greater in untreated DPL 5415 cotton compared with all other treatment combinations; no differences were found in insecticide treatments for either DPL 5415 or DPL 33B, but DPL 33B contained fewer worm damaged squares than any insecticide/DPL 5415 combination. Spider numbers were reduced by insecticides in most variety/treatment combinations.

By 5 DAT-2 (Jun 30) cotton was in full cutout with very few squares remaining; on that date treatment differences were observed in worm damaged bolls, caterpillar leaf feeding as well as mite and aphid damage (Table 2). Bolls damaged by tobacco budworm were significantly greater in the DPL 5415 untreated cotton, with less damage in DPL 5415 insecticide treated cotton and even less in all combinations of DPL 33B/insecticide treated cotton. Asana and Leverage treated cotton damaged boll counts in DPL 5415 cotton were not different from the DPL 33B treatments. Caterpillar leaf feeding ratings generally followed the same trend. Mite damage was least severe in the Denim treatments; only in Tracer (DPL 5415) and untreated DPL 33B treatments were mite ratings not different from the Denim treatment. Treatments where Asana was used had greater aphid damage ratings whereas Leverage and Denim had the lowest aphid damage rating.

Insecticide and cotton variety treatment effects on lint production and fiber characteristics are shown in Table 3. Untreated DPL 33B produced significantly more lint (121 lb/acre) than untreated DPL 5415. Tracer treated and Steward + Asana treated DPL 5415 cotton statistically produced as much lint as did any of the transgenic B.t. cotton variety (DPL 33B) treatments. Generally, insecticide treated DPL 5415 lint yields were not statistically different from most of the DPL 33B treatments. DPL 33B averaged 62 lb lint/acre more across all treatments compared with the average across all DPL 5415 treatments.

Fiber characteristics differences occurred in micronaire, staple length, fiber uniformity, and strength readings (Table 3). Generally, micronaire readings were lower, staple lengths longer, fiber uniformity slightly lower, and strength slightly greater for the DPL 33B cotton.

ACKNOWLEDGMENTS: Thanks are extended to DuPont, Bayer, Syngenta, and Dow Companies for their support of this experiment. The Texas Food and Fiber Commission, Austin, Texas paid for fiber analysis.

Table 1. Bollworm/tobacco budworm infestation and damage, and predator numbers **4 days after insecticide treatment 1[a]** in non-transgenic (DPL 5415) and transgenic B.t. (DPL 33B) cotton cultivars, Texas Agricultural Experiment Station, Nueces County, TX, 2001.

Treatment	Rate lb ai/acre	Number/100 terminals: eggs	larvae	damaged terminals	% damaged squares	Predators/100 terminals: spiders	pirate bugs
- -DPL 5415 (non-transgenic)- - - - - - - - - - - - - - - - - - - -							
Asana XL 0.66E	.06[b]	12.5 a	1.3 bc	5.0 cd	3.8 b	1.25 bc	2.5 a
Leverage 2.75E	.08	8.8 a	3.8 b	5.0 cd	6.3 b	1.25 bc	5.0 a
Tracer 4SC	.06	13.8 a	3.7 bc	5.0 cd	6.3 b	3.75 abc	0.0 a
Denim .16EC	.01	6.3 a	11.3 a	11.3 ab	12.5 a	0.00 c	5.0 a
Steward 1.25SC	.11	8.8 a	0.0 c	6.3 bc	3.8 b	1.25 bc	0.0 a
Steward + Asana	.09 + .036	6.3 a	5.0 b	3.8 cd	5.0 b	0.00 c	2.5 a
Untreated		8.8 a	15.0 a	16.3 a	13.8 a	5.00 ab	10.0 a
- -DPL 33B (transgenic B.t.)- -							
Asana XL 0.66E	.06[b]	11.3 a	0.0 c	0.0 d	0 c	0.00 c	0.0 a
Leverage 2.75E	.08	6.3 a	0.0 c	1.3 cd	0 c	3.75 abc	2.5 a
Tracer 4SC	.06	11.3 a	0.0 c	0.0 d	0 c	1.25 bc	5.0 a
Denim .16EC	.01	5.0 a	0.0 c	1.3 cd	0 c	0.00 c	5.0 a
Steward 1.25SC	.11	7.5 a	0.0 c	1.3 cd	0 c	0.00 c	2.5 a
Steward + Asana	.09 + .036	8.8 a	0.0 c	1.3 cd	0 c	2.50 bc	5.0 a
Untreated		10.0 a	0.0 c	0.0 d	0 c	7.50 a	2.5 a
LSD (P = 0.05)		NS	[c]	5.015	[c]	[c]	NS
P > F		.1084	.0001	.0001	.0001	.0020	.1678

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

[a] Treatments were applied on 6/18 and 6/25.

[b] Asana was applied by mistake at 1.5X the planned rate.

[c] The P > F is based on transformed data [square root ?x ? 1?]; it is inappropriate to list LSD values based on transformed data.

Table 2. Bollworm/tobacco budworm boll damage, caterpillar leaf feeding, and damage ratings for mites and aphids **5 days after insecticide treatment 2**[a] in non-transgenic (DPL 5415) and transgenic B.t. (DPL 33B) cotton cultivars, Texas Agricultural Experiment Station, Nueces County, TX, 2001.

Treatment	Rate lb ai/acre	% boll damage	Caterpillar leaf feeding rating [d]	Damage ratings [e]	
				mites	aphid
- -DPL 5415 (non-transgenic)- - - - - - - - - - - - - - - - - - - -					
Asana XL 0.66E	.06[b]	3.8 bc	2.25 bc	2.50 abc	2.75 ab
Leverage 2.75E	.08	2.5 bc	2.75 ab	3.00 a	1.25 de
Tracer 4SC	.06	5.0 b	1.75 cd	1.75 cd	2.00 c
Denim .16EC	.01	6.3 b	1.25 de	1.00 d	1.00 e
Steward 1.25SC	.11	6.3 b	1.25 de	2.00 bc	1.75 cd
Steward + Asana	.09 + .036	6.3 b	1.50 de	2.50 abc	2.75 ab
Untreated		16.3 a	3.25 a	2.50 abc	1.75 cd
- -DPL 33B (transgenic B.t.)- -					
Asana XL 0.66E	.06[b]	0.0 c	1.25 de	2.50 abc	3.25 a
Leverage 2.75E	.08	0.0 c	1.00 e	2.50 abc	1.00 e
Tracer 4SC	.06	0.0 c	1.25 de	2.25 abc	1.25 de
Denim .16EC	.01	0.0 c	1.00 e	1.00 d	1.00 e
Steward 1.25SC	.11	0.0 c	1.00 e	2.75 ab	2.25 bc
Steward + Asana	.09 + .036	0.0 c	1.00 e	2.75 ab	2.75 ab
Untreated		0.0 c	1.00 e	1.75 cd	1.25 de
LSD (P = 0.05)		[c]	.736	.792	.726
P > F		.0001	.0001	.0001	.0001

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

[a] Treatments were applied on 6/18 and 6/25.

[b] Asana was applied by mistake at 1.5X the planned rate.

[c] The P > F is based on transformed data [square root ?x ? 1?]; it is inappropriate to list LSD values based on transformed data.

[d] Caterpillar leaf feeding ratings range from 1 = no feeding up to 5 = greater than 10% leaf surface loss.

[e] Damage ratings range from 1 = no damage up to 5 = severe damage.

Table 3. Lint yield and fiber characteristics in non-transgenic (DPL 5415) and transgenic B.t. (DPL 33B) cotton cultivars treated for bollworm/tobacco budworm with various insecticides, Texas Agricultural Experiment Station, Nueces County, TX, 2001.

Treatment[a]	Rate lb ai/acre	Yield lb lint/acre	Fiber characteristics Mic	Lgth	Ur	St	Elong
- -DPL 5415 (non-transgenic)- - - - - - - - - - - - - - - - - - - -							
Asana XL 0.66E	.06[b]	812 b-d	4.43 a-c	1.075 b-d	83.35 a-c	29.70 a-c	6.5 a
Leverage 2.75E	.08	790 cd	4.58 ab	1.083 a-d	83.65 a-c	29.43 bc	6.5 a
Tracer 4SC	.06	835 a-d	4.68 a	1.083 a-d	83.80 ab	29.13 bc	6.4 a
Denim .16EC	.01	802 b-d	4.55 ab	1.088 a-d	83.75 a-c	29.78 a-c	6.6 a
Steward 1.25SC	.11	802 b-d	4.38 b-d	1.098 a-c	83.48 a-c	30.25 ab	6.5 a
Steward + Asana	.09 + .036	816 a-d	4.43 a-c	1.065 d	82.45 d	29.88 a-c	6.3 a
Untreated		748 d	4.68 a	1.090 a-d	83.60 a-c	29.63 a-c	6.6 a
- -DPL 33B (transgenic B.t.)- -							
Asana XL 0.66E	.06[b]	886 ab	4.28 c-e	1.105 a	83.80 ab	30.40 ab	6.6 a
Leverage 2.75E	.08	840 a-d	4.48 a-c	1.100 ab	83.90 a	30.13 a-c	6.6 a
Tracer 4SC	.06	851 a-c	4.43 a-c	1.070 cd	83.03 b-d	28.75 c	6.7 a
Denim .16EC	.01	820 a-d	4.45 a-c	1.093 a-d	83.28 a-c	29.58 bc	6.5 a
Steward 1.25SC	.11	906 a	4.15 de	1.088 a-d	83.40 a-c	31.08 a	6.5 a
Steward + Asana	.09 + .036	869 a-c	4.03 e	1.083 a-d	83.25 a-c	30.25 ab	6.5 a
Untreated		869 a-c	4.40 b-d	1.095 a-c	82.98 cd	29.03 bc	6.7 a
LSD (P = 0.05)		93.4	.266	.029	.797	1.459	NS
P > F		.0142	.0001	.0377	.0055	.0237	.1056

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

[a] Treatments were applied on 6/18 and 6/25.

[b] Asana was applied by mistake at 1.5X the planned rate.

EVALUATION OF TRANSGENIC COTTON CULTIVARS

Texas Agricultural Experiment Station, Nueces County, 2001

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SUMMARY: Bollgard cotton cultivars provided protection from bollworm/tobacco budworm. In this case the majority species was tobacco budworm. Only 1 worm damaged boll was found in Bollgard II plots on 3 inspection dates but it was not statistically better than the Bollgard cultivars. Yield data did not show conclusive evidence of additional yield from the Bollgard cultivars. This result may be a function of cultivar and the pest infestation may not have been sufficient to provide a noticeable yield advantage for the Bollgard cultivars. Numerically, 33BII produced the greatest lint yield.

OBJECTIVE: The objectives of the study were to (1) collect insect efficacy data on the Bollgard II cotton cultivars compared with Bollgard and near isogenic lines of non-Bollgard cultivars, (2) compare cultivars for lint production, and (3) determine lint fiber characteristics of the cultivars.

MATERIALS/METHODS: Cotton cultivars were planted Mar 23, 2001 on the Texas Agricultural Experiment Station Meaney Annex at Corpus Christi with a 4-row research cone planter. The cultivars evaluated were contained within a Delta and Pineland Company advanced strain study of early and full season cotton cultivars. Plots were 2 rows (38-inch centers) by 40-ft and entries were arranged in a randomized complete block design with 4 replications. To comply with testing requirements for the Bollgard II cultivars, 12 row buffers on the sides and 40-ft buffers on the ends of the experiment were planted. Buffer rows and the cotton experiment were destroyed following the season. The soil was a sandy clay loam (52% sand, 16% silt, 32% clay) with a pH of 8.1 and organic matter content of 1.1%. Fertilizer applied was 95-32-0 and Treflan 4 HFP (1qt/acre) was incorporated for weed control on Dec 11, 2000. Caparol 4L (1 qt/acre) + Dual Magnum 7.62 lb ai/gal (1 pt/acre) was applied Mar 23 for additional weed control. The entire test was treated with Tracer 4SC (2.9 oz/acre) on Jun 26. This treatment was applied after bollworms/tobacco budworms had reached the last instar. Malathion ULV (12 oz/acre) was applied several times by the Texas Boll Weevil Eradication Foundation. Cotton was defoliated with Dropp 50 WP (0.1 lb/acre) + CottonQuik 2.28 lb/gal (3 pt/acre) in a total volume of 12 gpa.

Treatment effects were measured by (1) rating each plot for plant vigor on Apr 20 (2-4 leaf stage) where 1 = rapid growth up to 5 = poor growth, (2) counting plants on 10 row ft in each plot on Apr 20, (3) examining 25 plant terminals in each plot on Jun 16 (3^{rd} week of bloom) and Jun 24 for the number of bollworm/tobacco budworm eggs, larvae, and damage in terminals, and damaged squares, (4) examining 25 bolls in each plot for worm damage on Jun 16, 24, and 30, (5) assigning an aphid damage rating (1 = no damage up to 5 = severe leaf curling and stunted plants) to each plot on May 12, and (6) harvesting 1 entire row/plot with a spindle picker on Aug 1-2. Seed cotton samples were transported to Delta and Pineland Company in Mississippi for ginning.

RESULTS/DISCUSSION: The numbers of bollworm/tobacco budworm eggs, larvae in terminals, and worm damaged terminals are shown in Table 1. Except for egg numbers in 125BGII on Jun 16, no differences were found in egg numbers on plants. Greater numbers of small larvae were found in the terminals of 5415RR on Jun 16 and by Jun 24 additional differences among treatments were found in larval numbers. Greater terminal damage occurred in the 5415RR cultivar on Jun 16 and by Jun 24 terminal damage in non-Bollgard cultivars was significantly greater than in Bollgard cultivars.

No differences were detected in damaged square counts on Jun 16, but on Jun 24 non-Bollgard cultivars contained significantly more damage squares than did the Bollgard cultivars (Table 2). Likewise, damaged boll counts were greater in non-Bollgard cultivars on Jun 24 and 30. No damaged bolls were found in Bollgard II cultivars on Jun 16 or Jun 24, and only 1 damaged boll was detected in 33BII on Jun 24. Differences were found in aphid damage ratings.

Plant vigor rating, plant population, and fiber characteristics are provided in Table 3. Emergence vigor was not different although SG747 ended up with a significantly greater plant stand. Numerous differences occurred in fiber characteristics. Fairly high micronaire readings were found in all cultivars (125BGRR, SG747 and 5415RR exceeded 4.9). Generally, the picker full season cultivars had longer staple length.

Yield, value of lint/lb and gross revenue/acre are provided in Table 4. Cultivars 33B and 33BII produced significantly more lint than did 125BGII, 125BGRR or 33BIIRR. The trend was for RR (Roundup Ready) cultivars to yield less. Lint values were greater for 125BGII, 33BIIRR, 33B, and 33BII than for 125BGRR, SG747, 125BGII (line), and 5415RR. Gross revenue was generally greater for the full season cultivars.

Although boll damage exceeded 10% in non-Bollgard cultivars (SG747 and 5415RR), lint yields were not lower than Bollgard cultivars.

ACKNOWLEDGMENTS: Thanks are extended to Rudy Alaniz, Mike Hiller, and Matt Matocha, Demonstration Assistants, for their help in conducting this study. Appreciation if expressed to Monsanto, and Delta and Pineland Companies for their assistance.

Table 1. Eggs and larvae in terminals and terminal damage by bollworm/tobacco budworm in cotton cultivars, Texas Agricultural Experiment Station, Nueces County, TX, 2001.

	Number/100 terminals					
	eggs		larvae		damage	
Cultivar	6/16	6/24	6/16	6/24	6/16	6/24
- -Picker early season - - - - - - - - - - - - - - - - - - -						
125BGII	14 a	9 a	0 b	2 abc	0 b	1 b
125BGRR	7 ab	7 a	0 b	1 bc	0 b	1 b
SG747	7 ab	5 a	1 b	7 ab	2 b	18 a
125BGII (line)	3 b	5 a	0 b	0 c	1 b	3 b
- -Picker full season -						
33BIIRR	8 ab	11 a	1 b	0 c	0 b	1 b
33B	4 b	13 a	0 b	1 bc	0 b	1 b
33BII	10 ab	5 a	0 b	0 c	0 b	1 b
5415RR	6 ab	11 a	4 a	7 a	6 a	12 a
LSD (P = 0.05)	8.388	NS	[a]	[a]	[a]	[a]
P > F	.0433	.1213	.0031	.0088	.0021	.0001

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

[a] The P > F is based on transformed data [square root]; it is inappropriate to list LSD values based on transformed data.

Table 2. Damaged squares and bolls by bollworm/tobacco budworm, and aphid damage ratings in cotton cultivars, Texas Agricultural Experiment Station, Nueces County, TX, 2001.

Cultivar	% damaged squares		% damaged bolls			Aphid damage rating[a]
	6/16	6/24	6/16	6/24	6/30	
-Picker early season-						
125BGII	0 a	0 b	0	0 b	0 b	1.50 d
125BGRR	0 a	0 b	0	1 b	1 b	2.75 bc
SG747	0 a	13 a	0	10 a	12 a	2.75 bc
125BGII (line)	0 a	0 b	0	0 b	0 b	3.50 ab
-Picker full season-						
33BIIRR	1 a	0 b	0	0 b	0 b	4.00 a
33B	0 a	0 b	0	0 b	2 b	4.00 a
33BII	0 a	0 b	0	1 b	0 b	2.25 cd
5415RR	1 a	9 a	0	8 a	9 a	3.50 ab
LSD (P = 0.05)	NS	[b]		[b]	[b]	1.233
P > F	.1242	.0001		.0006	.0001	.0006

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

[a] Aphid damage ratings: 1 = no damage up to 5 = severe leaf curling and stunted plants.

[b] The P > F is based on transformed data [square root]; it is inappropriate to list LSD values based on transformed data.

Table 3. Plant population, plant vigor rating, and fiber characteristics in cotton cultivars, Texas Agricultural Experiment Station, Nueces County, TX, 2001.

Cultivar	Plant vigor rating[a]	Plants (1000's/acre)	Fiber characteristics Mic	Lgth	Ur	St
- -Picker early season - - - - - - - - - - - - - - - - - - -						
125BGII	3.0 a	58.7 b	4.7 bc	34.3 bc	81.4 ab	27.8 abc
125BGRR	3.0 a	59.9 b	5.0 ab	33.5 d	81.6 a	26.5 cd
SG747	3.0 a	72.2 a	5.1 a	33.8 cd	81.3 ab	27.0 abcd
125BGII (line)	3.0 a	59.4 b	4.7 bc	33.8 cd	80.6 b	25.0 d
- -Picker full season -						
33BIIRR	3.1 a	49.5 b	4.9 abc	35.3 a	81.8 a	28.5 abc
33B	2.9 a	51.3 b	4.7 c[b]	35.3 a	81.1 ab	29.1 a
33BII	3.0 a	56.3 b	4.8 bc	34.5 b	81.5 ab	26.9 bcd
5415RR	3.0 a	60.1 b	5.2 a	34.8 ab	81.8 a	28.9 ab
LSD (P = 0.05)	NS	10.816	.258	.702	.853	2.161
P > F	.4840	.0021	.0004	.0001	.0229	.0021

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

[a] Ratings were made in each plot on 4/20 when plants were in the 2-4 true leaf stage. Ratings ranged from 1 = rapid growth up to 5 = poor growth.

[b] The actual value was 4.675

Table 4. Lint yield value per lb and gross revenue in cotton cultivars, Texas Agricultural Experiment Station, Nueces County, TX, 2001.

Cultivar	Yield (lb lint/acre)	$ per acre Price/lb	Gross revenue/acre
- - - - - - -Picker early season - - - - - - -			
125BGII	561 b	.5368 a	301.45 b
125BGRR	578 b	.4893 bc	286.96 b
SG747	616 ab[a]	.4675 c	300.52 b
125BGII (line)	603 ab	.5030 b	304.03 b
- - - - - - -Picker full season - - - - - - -			
33BIIRR	549 b	.5394 a	297.71 b
33B	689 a	.5466 a	376.92 a
33BII	692 a	.5395 a	373.45 a
5415RR	631 ab	.4955 bc	313.61 ab
LSD (P = 0.05)	102.7	.028	64.85
P > F	.0105	.0001	.0064

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

[a] Missing data calculation was made for replication I.

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

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SUMMARY: There has been a steady yearly decline in boll weevil numbers captured in pheromone traps since initiation of eradication in the South Texas/Wintergarden Eradication zone. The average monthly decline comparing pre-eradication numbers to 2001 has been 98.8%.

OBJECTIVE: Pheromone traps were operated to evaluate the impact of boll weevil eradication on relative population levels.

MATERIALS/METHODS: A total of 18 traps were operated at 3 locations beginning in 1998. 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. The data used before eradication was collected by Segers et al. during a 6-year period (1977-1982).

RESULTS/DISCUSSION: Early season boll weevil numbers were actually higher in 1998, the first full season of boll weevil eradication (BWE), compared with the pre-eradication trap captures (Table 1). A series of warm winters is believed to have contributed to increased boll weevil activity just before and in the early years of BWE. The BWE program was operated as a "fall" treatment program in the South Texas/Wintergarden zone in 1996 and 1997. During the mid-season of 1999 boll weevils increased to greater numbers than 1998 for the last 5 months of the year. Favorable weather conditions, rainfall that resulted in poor stalk destruction, and relatively high thresholds for treatments all contributed to this increase. In 2000 a more aggressive treatment program was initiated; since that time boll weevil numbers have steadily declined based on the month by month comparison. Since program initiation, the average trap catch/month for the year has steadily declined. The average decline per month in 2001 compared with the pre-eradication 6-year average has been 99.13%.

Eradication is more difficult and costly compared with areas to the north due to our sub-tropical climate which allows boll weevil reproduction anytime cotton is present during the year.

ACKNOWLEDGMENTS: Thanks are extended to Rudy Alanis and Mike Hiller for inspecting traps on certain dates during the year.

Table 1. Boll weevils per pheromone trap per month, Texas Cooperative Extension operated traps, 1998-2001.

Month	1977-82 (6 yr avg) [a]	1998	1999	2000	2001
Jan	5.3	0.22	0.22	9.93	0.00
Feb	5.5	0.27	0.00	1.60	0.00
Mar	7.7	3.00	0.33	1.72	0.11
Apr	7.4	30.94	0.00	1.27	0.11
May	2.8	22.00	0.00	0.83	0.17
Jun	4.9	5.10	0.06	0.67	0.00
Jul	188.9	49.50	2.06	12.89	0.35
Aug	645.7	48.40	45.00	14.04	0.94
Sep	309.7	2.28	40.90	1.39	0.11
Oct	165.4	1.39	5.72	0.72	0.06
Nov	55.3	0.28	28.30	0.50	0.11
Dec	15.7	0.22	13.67	0.03	0.00
Average	117.9	13.60	11.40	3.80	0.16

[a] Traps operated by Segers et al.

12-03-01