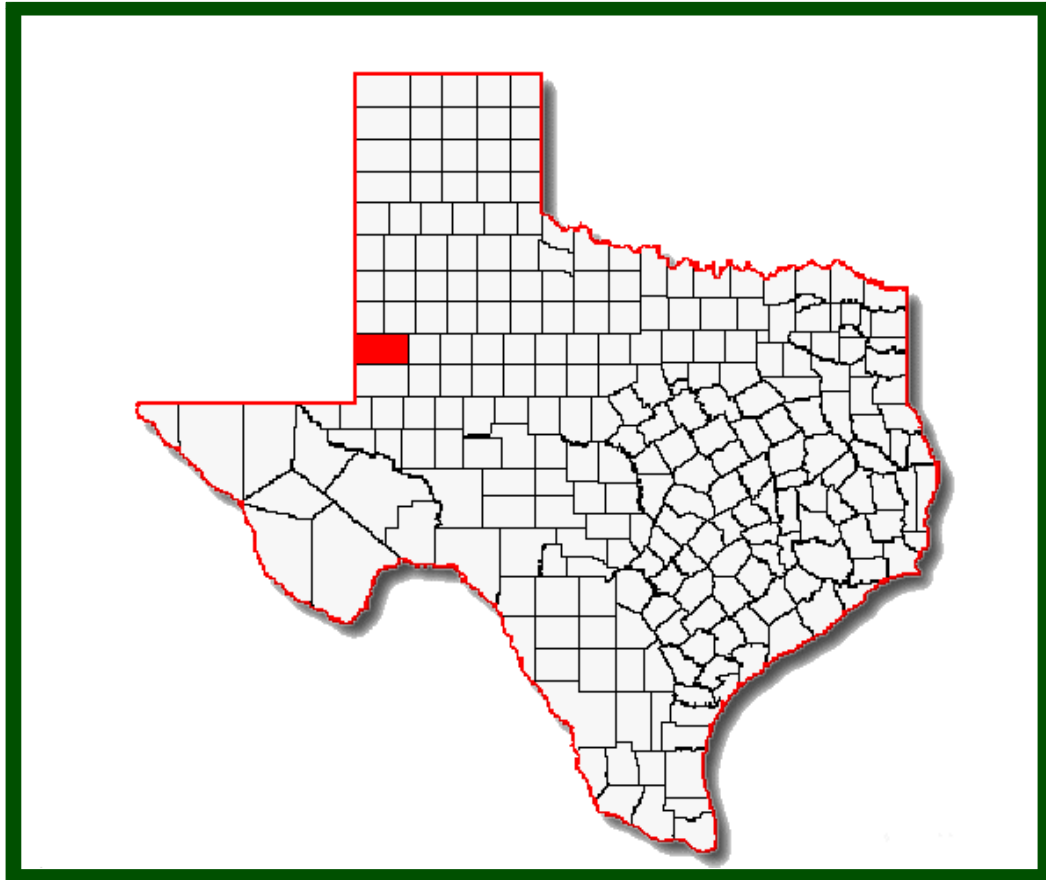


INTEGRATED PEST MANAGEMENT



Gaines County IPM Program 2008



**GAINES COUNTY
INTEGRATED PEST MANAGEMENT PROGRAM
2008 ANNUAL REPORT**

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Introduction

The Gaines County Integrated Pest Management (IPM) Program is part of the Texas IPM Program and serves as a multi-purpose education effort to provide the Gaines County agriculture industry with up-to-date information on all aspects of IPM. The Gaines County IPM Program is coordinated by Manda Cattaneo, Extension Agent – IPM. The local IPM Steering Committee (made up of growers, consultants, and agriculture industry representatives) is the fundamental, local support unit for the Gaines County IPM Program. This committee met on February 20th and December 3rd, 2008 to determine local priorities including education programming, applied research and result demonstration priorities, and to evaluate the 2008 Gaines County IPM Program.

In 2008 the Gaines County IPM Program ran a survey scouting program which encompassed cotton, peanut, and grain sorghum (milo) fields. This survey scouting program was funded by thirty-five business sponsors who brought in over \$13,500. Sixteen fields were scouted throughout the season for pest and beneficial populations, along with crop stage and development. The information gathered from these fields was used to write the Gaines County IPM Newsletter (See Appendix A) that was sent out to over 270 growers, ginners, crop consultants and agriculture industry representatives. The Gaines County IPM Program also conducted seven on-farm trials to evaluate cotton variety performance, disease management, insect management, and use of plant growth regulators. Results from these trials were provided to the growers in a book titled “2008 Gaines County, Texas Cotton, Peanut, and Wheat Research Reports.” Additionally, the Gaines County IPM Program held four field days to provide growers with up-to-date information on variety performance, pest management strategies, and crop management strategies. During 2008, the Extension Agent – IPM was interviewed by KWES 9 NewsWest 9 out of Midland, Texas. The news report was titled “Fungus Threatens Peanut Crop in Gaines County.”

Acknowledgements

Integrated Pest Management (IPM) Steering Committee

Shelby Elam	Jack Shanklin
Chuck Rowland	Raymond McPherson
Jody Anderson	Michael Todd
Jud Cheuvront	Shirley Savage
Scott Nolen	

2008 Gaines County Commissioners Court

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Commissioner, Precinct 1	Danny Yoakum
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2008 Gaines County IPM Program Sponsors and Contributors

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Dr. David Kerns
Dr. Randy Boman

Dr. Todd Baughman
Dr. Peter Dotray
Dr. Calvin Trostle
Greg Cronholm

Field Scout/Research Aide

Jim Belt

The field scout was responsible for the weekly monitoring and reporting of insect populations, disease status and crop development. He was also responsible with helping establish and collect data from research plots. Special appreciation is extended to the field scout for his service to the program.

Texas Pest Management Association

The support and assistance of David Oefinger, Executive Director of Texas Pest Management Association, is greatly appreciated.

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Gaines County Integrated Pest Management (IPM) Program

Relevance

Gaines County is the number one cotton and peanut producer in the state of Texas, with approximately 244,240 and 69,573 planted acres of cotton and peanuts in 2008, respectively. Additionally, there were approximately 99,956 acres of grain sorghum in 2008. These producers are being faced with increased crop production cost, increased scarcity of water, and increased plant disease prevalence. Therefore, the Gaines County IPM Steering Committee believes that crop water use and disease management, along with crop and pest monitoring, should be the main focus of the IPM Program. Additionally, water and economic development are two of the top three critical issues identified by the Texas Community Futures Forum for Gaines County.

For these reasons, the 2008 Gaines County IPM Program targeted cotton, peanut and grain sorghum producers and agriculture industry representatives to work with and to provide education on current crop and pest management tools and techniques in order to maintain yields and net profit.

Response

The 2008 Gaines County IPM Program developed the following activities to address these relevant issues:

- Gaines County IPM Newsletter (8 issues between June 13 and September 15, 2008)
- Weekly field scouting of IPM Program cotton and peanut fields to monitor crop development and monitor pest and beneficial populations (May thru September, 2008)
- Sorghum Field Day (July 9, 2008)
- Pecan Field Day (July 23, 2008)
- Cotton and Peanut Field Day (August 7, 2008)
- Viewing of Verticillium Wilt Trial Field Day (September 26, 2008)

Additionally, research trials were conducted on-farm to provide relevant, unbiased, and timely information to our local producers:

- Evaluation of 12 cotton varieties under Irrigation and non-Irrigated Production
- Evaluation of 11 cotton varieties under high and low Verticillium Wilt pressure
- Evaluation of 4 Plant Growth Regulators in an irrigated field
- Evaluation of insecticides, seed treatments, and Temik for early season thrips management
- Evaluation of thresholds for early season thrips management

Evaluation Results

An evaluation instrument (post survey approach) was utilized to measure programmatic impact of the Gaines County IPM Program.

Twenty-one individuals responded to the survey (53% response rate). Of those responding 15 were producers (71%), 1 ginner (5%), and 5 agriculture industry representatives (24%).

(93%) 14 of 15 producers said they plan to take action or make changes based on information provided by the Gaines County IPM Newsletter.

(100%) 15 of 15 producers said they anticipate benefiting economically as a direct result of what they learned from the IPM Program. Eight growers responded with the following dollar values per acre:

\$100 per acre (2 individuals)

\$50 per acre (2 individuals)

\$20 to \$30 per acre (3 individuals)

\$5 to \$8 per acre (2 individuals)

(95%) 20 of 21 respondents said the Gaines County IPM Newsletter was mostly or very valuable to their operations.

(94%) 17 of 18 respondents who attended the Cotton and Peanut Field Day said it was mostly or very valuable to their operations.

When asked what the most significant thing they learned or helped them the most:

38% of respondents said the information on crop stage and development.

29% of respondents said the information on disease identification and/or management.

14% of respondents said the information on crop pests and their management.

14% of respondents said the information on grain sorghum.

Table 1. The following percentages represent the number of individuals who said the Gaines County IPM Newsletter mostly or completely increased their knowledge of the following items:

	%	No. of Responses
Insect Pest Identification	87%	18 of 21
Economic thresholds to manage crop insect pests	76%	16 of 21
Disease identification	90%	19 of 21
Disease management	86%	18 of 21
Beneficial insect identification	75%	15 of 20
How Heat Units (H.U.) are related to crop development	86%	18 of 21
How to evaluate whether or not to apply a plant growth regulator	90%	18 of 20
How to evaluate crop maturity using Nodes Above White Flower	95%	19 of 20
General cropping conditions in Gaines County	95%	19 of 20

Results indicate that Gaines County producers, ginners, and agriculture industry representatives highly value the information provided by the Gaines County IPM Program. The following are testimonials from individual producers:

“Your newsletter is quite informative and will be useful in 2009. I have had to lay off my crop consultant due to a lack of rain which resulted in a poor crop in 2008.”

“Thank you. You did a great job for us in your first year here and look forward to 2009 and onward. You brought a new excitement and energy to the IPM Program.”

Texas AgriLife Extension
Improving Lives. Improving Texas

Educational Activities

Newsletters

No. Issues Written.....	8
No. Non-Extension Clientele on Mailing List.....	83
No. Non-Extension Clientele on E-mail List.....	187
TV Interviews.....	1
Farm Visits.....	800
Scouts Trained.....	1
CEU Credits Offered.....	7
Pest Management Steering Committee Meetings.....	2
No. Applied Research/Demonstration Projects.....	8
No. Direct Ag. Contacts.....	1,253
Other Direct Contacts.....	85

Funds Leveraged

Grants and Contracts

No. Dollars as Cooperator/Collaborator.....	\$3,675.00
No. Dollars Received for Your Use.....	\$4,500.00
Support Dollars you Generated to Support other Educational Efforts.....	\$13,500.00
Retail Value of “In-Kind” Contributions (Cotton Seed and Chemicals).....	\$30,495.40
Total Dollars Generated for Your Program.....	\$52,170.40

**GAINES COUNTY
IPM PROGRAM
FINANCIAL REPORT 2008**

INCOME

Balance from 2007	25,708.04
Scouting Program Sponsors	13,500.00
Monsanto Cotton Research Trial (Location: Tim Neufeld's)	2,500.00
Bayer Cotton Research Trial (Location: Buddy Long's)	2,000.00
APRES Meeting Support from District Extension Plant Pathologist	621.45
Field Day Sponsorships	700.00
Thrips Research Project Cooperator with District Extension Entomologis	1,696.88
Interest	570.55
Total Income	<u>47,296.92</u>

EXPENSES

Administrative Fees	2,700.00
Dues & Subscriptions	44.12
Membership Paid	2,280.00
Bank and USB/Service Fee	17.48.
Postage	39.80
Scout Payroll	3,111.05
Travel	500.76
Tax Expenses Payroll	122.33
Mileage For Scout	2,236.56
Mileage For IPM Agent	8,077.84
Cell Phone Allowance for Scout	123.22
Equipment lease/ Purchases	324.74
Telephone	1,018.61
Conferences & Meetings	679.09
Auto Expenses	484.00
Miscellaneous	1,214.62
Office Supplies	710.12
Public Relations	165.95
Total Expenses	<u>23,832.81</u>

Balance as of December 31, 2008	23,464.11
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2008 Gaines County Crop Production Review

The 2008 cropping season began with minimal amounts of rain and excessively windy conditions. Several conventional tillage fields were blown out and replanted. Growers with minimum tillage fields and cover crops were also challenged by the dry windy conditions and blowing sand. Early season insect pest on cotton consisted of sparse thrips populations (Fig. 1). Damage caused by thrips was minimum compared to the damage caused by blowing sand. Crop development was slowed due to these excessively windy conditions along with a couple of weeks in June in which we had temperatures above 100 degrees.



Figure 1. Cotton damaged by thrips.

June

The first signs of disease were observed in mid-June. Cotton plants infected with Fusarium wilt, caused by the soilborne fungus, *Fusarium oxysporum* f. sp *vasinfectum*, were observed in scattered fields west of Seminole (Fig. 2). Plants infected by the black root rot fungus, *Thielaviopsis basicola*) were observed in a cotton field southwest of Seminole (Fig. 3).

Scattered rain storms in June provided some relief to the dry conditions. However, the rain storms also brought hail storms which caused severe damage to cotton and peanut fields throughout the county (Fig. 4). A majority of the hail damage occurred North and Northeast of Seminole. As a result several fields were failed and grain sorghum (milo) was planted as a second crop.



Figure 2. Cotton infected with Fusarium Wilt



Figure 3. Cotton infected with black root rot fungus.



Figure 4. Hail damaged cotton.

July

By the first of July, several cotton fields had out grown the wind and sand damage and were starting to grow and set fruit. Heat units were accumulating rapidly. By mid July cotton plants were starting to bloom and peanut plants were starting to form pods. Insect pressure remained low, with the exception of bollworm eggs which were found in cotton and peanut fields. A majority of the cotton acres in Gaines County are Bollgard, Bollgard II and Widestrike, therefore the “worm” larvae likely did not survive on these cotton plants.

During the second week of July Verticillium wilt, caused by the soilborn fungus *Verticillium dahliae*, started to show up in the southwestern part of the county in both cotton fields with and without a history of Verticillium wilt (Fig. 5). Cool temperatures, averaging around 87 degrees, during the first two week of July likely contributed to disease development. Southern blight, caused by the soilborne fungus *Sclerotiu rolfsii*, was also found in a peanut field in the southwestern part of the county (Fig. 6).

By the end of July those cotton fields had a good square set and several fields had reached peak bloom. On average, we were accumulating 21 heat units per day. Grain sorghum fields were averaging around 5 to 7 leaves. Fall armyworms and bollworms were being found in peanut, cotton and sorghum fields throughout the county. Peanut plants can withstand some foliage loss and only a few fields were treated. In sorghum the “worms” were feeding on the whorl stage causing a ragged appearance (Fig 7). Although this damage may not have been aesthetically pleasing, treatment was not economically feasible since worms are usually protected from insecticides while feeding in the whorl. Cotton aphids were found in low populations in a couple of cotton fields. While corn leaf aphids were being observed in high number in area sorghum fields. The corn leaf aphid rarely causes economic losses to sorghum and likely served for a food source for beneficial insects.

Verticillium wilt continued to be found in an increasing number of cotton fields and was starting to show up in peanut fields (Fig. 8). Sclerotinia blight, caused by *Sclerotinia minor*, was observed in a field in the western part of the county (Fig. 9). Several fields with a field history of Sclerotinia blight were treated during the following weeks. Alternaria blight was found in scattered fields in the western and eastern parts of the county (Fig. 10). Plants infected with this blight had the characteristic shepherds crook and the infected plants are often in a circular shape in the field.



Figure 5. Cotton infected with Verticillium wilt.



Figure 6. Desiccated peanut plant infected with southern blight.



Figure 7. Whorl stage “worm” damage on young sorghum plants and a picture of a fall armyworm showing the inverted Y on the head.



Figure 8. Peanut plant infected with Verticillium Wilt.



Figure 9. Bleaching and severe shredding of stems caused by Sclerotinia blight and black irregular shaped sclerotia of Sclerotinia.



Figure 10. Cotton plants killed by Alternaria blight.

August

During the first two weeks of August cotton plants had started to shed small bolls and squares and a majority of the fields ranged from 3 to 4 Nodes Above White Flower (NAWF). Once a plant reaches 5 NAWF the plant is considered cut-out. The hot dry conditions could have contributed to the fact that several cotton fields cut-out earlier this year than in previous years. Between May 1st and August 14th we had accumulated approximately 2018 heat units. Compared to 2004 and 2007 when we accumulated 1793 and 1395 heat units, respectively, during the same time period.

Grain Sorghum crops ranged from whorl stage to heading out and blooming. Fall armyworms and bollworms continued to be observed in high numbers in sorghum fields. Verticillium wilt was found in an increasing number of cotton and peanut fields. Sclerotinia blight was observed in more peanut fields. Pod rots caused by Phythium and Rhizoctonia were observed in scattered peanut fields.

September

By the first of September disease pressure had increased in cotton and peanut fields. Verticillium wilt was found in several cotton and peanut fields. Alternaria blight was noted in a few more cotton fields. Sclerotinia blight and pod rots were found in several peanut fields.

At this point the Fall armyworms and bollworms had become “headworms” because they were feeding on the heads of grain sorghum plants and had become a major concern (Fig. 11). The fields had a higher percentage of fall armyworms compared to bollworms. Cotton aphid populations had been found in some cotton fields. However, beneficial insect populations likely migrating from sorghum fields helped to keep these aphid populations below damaging levels.



Figure 11. Fall armyworm feeding in the head of a sorghum plant.

A cool wet period occurred during the second week of September resulted in increased disease pressure and slower crop development in all crops. Our exceptionally cool fall made for prolonged cotton boll opening. It takes approximately 850 heat units from white flower to open boll. During 2008 we accumulated 901 H.U. from August 1st to November 30th. Therefore, those flowers produced in the middle of August barely had enough heat units to form a mature open boll by the end of November. Additionally, an early freeze that occurred on October 24th further slowed crop development and resulted in reduced quality. Cotton quality was further reduced due to exceptionally barky cotton.

Cotton Research Trials

COMPARISON OF TWELVE COTTON VARIETIES UNDER CENTER PIVOT IRRIGATION AND DRYLAND CROP PRODUCTION

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Introduction

Gaines County is the largest producer of cotton in the state of Texas. Approximately thirty-five percent of the cotton planted in Gaines County is under dryland production. The remaining cotton is produced under center pivot irrigation with a majority of the fields produced with minimal amounts of irrigation water. In 2008 approximately 137,985 of the 244,240 acres of cotton planted in Gaines County were failed due to excessively dry conditions, hail, wind and blowing sanding. Therefore, growers deem it necessary to evaluate variety performance in order to maintain yields and net profits at a time when water availability is scarce and input cost are drastically increasing. New cotton varieties are continually being produced and marketed by various seed companies. The quick turn round in varieties has resulted in a limited amount of on-farm tests to evaluate these new varieties when they first enter the marketplace. As a result growers have limited data to base their seed selections on. Variety selection is one of the most important decisions a grower makes during a year. Variety selections should be based on yield and fiber qualities. Therefore, two large plot on-farm trials were conducted in Gaines County to evaluate twelve cotton varieties. The objectives of this research were to evaluate the performance of commercially available cotton varieties in fields with varying levels of water and compare the net returns between varieties in fields under center pivot irrigation and dryland production. Yield and fiber qualities were used to determine the net value per acre for each variety.

Materials and Methods

Field trials were conducted in Gaines County, TX in 2008. Trial 1 had a seeding rate of 4.3 seed per row-foot and was planted on 16 May with 5 lb of Temik 15G placed in the furrow at planting. Trial 2 had a seeding rate of 2.75 seed per row-foot and was planted on 14 May. No Temik 15G was applied. Plots had 36 and 40 inch row spacing, respectively. Trial 1 was irrigated using a pivot irrigation system and Trial 2 was produced under dryland cropping practices in a plant 2 rows and skip 1 row pattern. Plots were 12-rows and 8-rows wide, respectively, and extended the length of the field. Twelve varieties were evaluated in each trial. Plots were arranged in a randomized complete block design with 3 replications. Within each test, the production practices were the same for all varieties. Both fields had a non-damaging level of the root-knot nematode (*Meloidogyne incognita*). Trial 1 and Trial 2 were harvested on 13 November and 28 October, respectively. On 24 October temperatures dropped below 30°F. All plots were weighed separately using a Lee weigh wagon. Sub-samples were taken from each plot. All sub-samples were weighed and then ginned using a sample gin with a lint cleaner, burr extractor and stick machine. Ginned lint was weighed and lint and seed turnouts were calculated. Lint yield and seed yield was determine by multiplying the respective turn out with field plot weights. Approximately 50 gram lint samples were randomly collected for fiber quality analysis. Fiber analysis was conducted by the Texas Tech University Fiber & Biopolymer Research Institute and Commodity Credit Corporation (CCC) lint loan values were determined for each plot. Lint value was determined by multiplying the loan value with the lint yield. Seed value was determined using a value of \$200/ton for seed. Ginning Cost was determined using \$3.00/cwt ginning cost. Seed and technology cost was calculated using the 2008 Seed Cost Comparison Worksheet courtesy of the Plains Cotton Growers Inc. Net value was determined by adding lint value and seed value and subtracting ginning cost and seed fees and technology fees. Statistical analysis of data was conducted using SAS 9.1 for windows, using PROC GLM.

Results and Discussion

Table 1. Harvest Results from Trial 1 under center pivot irrigation.

Entry ¹	Lint turnout	Seed turnout	Bur cotton yield	Lint yield	Seed yield	Lint loan Value ²	Lint value	Seed Value ³	Total value	Ginning Cost ⁴	Seed/ technology cost	Net Value ⁵	
	----- % -----		----- lb/acre -----			\$/lb				\$/acre			
NG 3348B2RF	39.3	59.3	2582	1007	1515	0.5568	560.67	151.56	712.22	77.45	55.01	579.76	a
FM 1740B2F	38.4	51.5	2435	935	1255	0.5662	529.79	125.49	655.28	73.04	59.96	522.28	b
FM 1880B2F	34.8	54.6	2473	860	1349	0.5723	491.74	134.90	626.64	74.19	59.96	492.49	b
DP 161B2RF	34.1	53.7	2235	764	1202	0.5685	434.13	120.27	554.40	67.06	58.42	428.92	c
DP 174RF	37.2	51.9	2003	746	1039	0.5667	422.27	103.88	526.15	60.10	49.79	416.26	cd
AM 1532B2RF	35.4	53.5	2063	732	1108	0.5742	419.95	110.76	530.70	61.89	56.94	411.87	cd
DP 141B2RF	33.8	54.3	2171	733	1177	0.5692	417.46	117.72	535.18	65.12	58.42	411.64	cd
PHY 375WRF	37.6	51.6	1928	726	993	0.5700	413.45	99.33	512.79	57.84	57.76	397.19	cd
PHY 485WRF	34.7	55.5	2039	708	1132	0.5667	401.24	113.22	514.46	61.17	57.76	395.52	cd
AT Summit B2RF	34.5	55.7	2007	695	1119	0.5702	396.29	111.88	508.17	60.22	54.19	393.76	cd
ST 5458B2RF	35.9	51.7	1991	714	1029	0.5710	407.69	102.88	510.57	59.74	59.43	391.40	cd
ST 4498B2RF	35.3	53.4	2000	707	1068	0.5487	387.49	106.82	494.31	59.99	59.43	374.88	d
Test average	35.9	53.9	2161	777	1165	0.5667	440.18	116.56	556.74	64.82	57.26	434.66	
CV, % ⁶	4.5	5.3	5.1	5.3	5.9	1.8	5.3	5.9	5.3	5.1	--	6.5	
OSL ⁷	0.0047	0.1048	<0.0001	<0.0001	<0.0001	0.2019	<0.0001	<0.0001	<0.0001	<0.0001	--	<0.0001	
LSD ⁸	2.7	NS	186	70	117	NS	39.69	11.66	50.19	5.58	--	47.53	

¹DP = Deltapine, NG = NexGen, FM = Fibermax, PHY = Phytogen, AM = Americot, AT = AllTex, ST = Stoneville. ² Value for lint based on CCC loan value from grab samples and FBRI HVI results. ³Seed value was determined using a value of \$200/ton for seed. ⁴Ginning Cost were determined using \$3.00/cwt ginning cost. ⁵For net value/acre, means within a column with the same letter are not significantly different at the 0.05 probability level. ⁶CV - coefficient of variation. ⁷OSL - observed significance level, or probability of a greater F value. ⁸LSD - least significant difference at the 0.05 level.

Table 2. HVI fiber property results from Trial 1 under center pivot irrigation.

Entry ¹	Micronaire units	Staple 32 ^{nds} inches	Uniformity %	Strength g/tex	Elongation %	Leaf grade	Rd reflectance	+b yellowness	Color grade color 1 color 2	
AM 1532B2RF	4.0	36.8	81.2	27.4	10.3	1.7	79.6	8.3	2.3	1.0
AT Summit B2RF	4.2	35.9	80.5	27.9	10.3	1.3	81.3	7.9	2.0	1.0
DP 141B2RF	4.1	35.2	80.5	27.8	10.7	1.3	79.6	8.7	2.0	1.0
DP 161B2RF	4.2	35.9	80.8	26.7	11.2	1.7	79.0	8.4	2.7	1.0
DP 174RF	4.1	35.7	79.9	27.1	10.3	1.7	79.9	8.2	2.3	1.0
FM 1740B2F	4.4	36.6	81.4	27.4	10.9	1.3	79.6	8.1	2.3	1.0
FM 1880B2F	4.4	35.3	80.5	27.2	11.3	1.3	80.6	8.3	2.0	1.0
NG 3348B2RF	4.1	35.4	80.0	27.2	10.3	1.0	79.8	8.3	2.3	1.0
PHY 375WRF	4.5	35.8	79.8	26.7	10.3	1.0	80.2	8.3	2.3	1.0
PHY 485WRF	4.5	36.0	80.4	28.3	10.2	1.3	78.4	8.9	2.3	1.0
ST 4498B2RF	4.0	35.5	79.8	27.2	10.8	1.0	77.1	9.7	2.0	1.7
ST 5458B2RF	4.1	36.1	80.1	27.6	10.2	1.0	79.1	8.2	2.3	1.0
Test average	4.2	35.9	80.4	27.4	10.6	1.3	79.5	8.5	2.2	1.1
CV, % ²	7.6	2.4	1.3	5.1	6.3	43.5	2.0	7.1	--	--
OSL ³	0.4183	0.5068	0.6844	0.9669	0.4222	0.7692	0.2598	0.1149	--	--
LSD ⁴	NS	NS	NS	NS	NS	NS	NS	NS	--	--

¹DP = Deltapine, NG = NexGen, FM = Fibermax, PHY = Phytogen, AM = Americot, AT – AllTex, ST = Stoneville. ²CV - coefficient of variation. ³OSL - observed significance level, or probability of a greater F value. ⁴LSD - least significant difference at the 0.05 level.

Table 3. Harvest Results from Trial 2 under dryland production.

Entry ¹	Lint turnout	Seed turnout	Bur cotton yield	Lint yield	Seed yield	Lint loan Value ²	Lint value	Seed Value ³	Total value	Ginning Cost ⁴	Seed/ technology cost	Net Value ⁵	
	----- % -----		----- lb/acre -----			\$/lb				\$/acre			
DP 174RF	34.6	44.9	1184	410	531	0.5435	223.63	53.09	276.72	35.52	36.25	204.95	a
DP 161B2RF	31.6	48.6	1242	393	603	0.5710	224.33	60.33	284.66	37.26	42.53	204.87	a
PHY 375WRF	33.5	44.7	1166	390	522	0.5450	213.14	52.22	265.36	34.98	42.05	188.33	ab
DP 141B2RF	31.8	48.0	1177	373	565	0.5557	207.28	56.48	263.76	35.29	42.53	185.94	ab
ST 4498B2RF	31.7	46.1	1143	364	529	0.5560	202.61	52.94	255.55	34.27	43.27	178.02	bc
FM 1740B2F	34.8	46.3	1059	368	491	0.5473	201.96	49.07	251.03	31.77	43.65	175.61	bc
AM 1532B2RF	31.0	47.5	1092	337	517	0.5657	191.10	51.71	242.81	32.74	41.45	168.61	bcd
FM 1880B2F	31.6	49.9	1061	335	529	0.5638	188.97	52.93	241.90	31.83	43.65	166.42	bcd
PHY 485WRF	30.5	47.3	1128	344	532	0.5418	187.16	53.22	240.38	33.83	42.05	164.50	bcd
ST 5458B2RF	33.9	47.3	1054	357	499	0.5162	184.99	49.92	234.92	31.62	43.27	160.03	cd
NG 3348B2RF	31.7	47.6	1034	327	493	0.5443	178.35	49.30	227.65	31.01	40.05	156.60	cd
AT Summit B2RF	31.0	48.5	992	308	481	0.5390	166.78	48.11	214.89	29.75	39.45	145.70	d
Test average	32.3	47.2	1111	359	524	0.5491	197.52	52.44	249.97	33.32	41.68	174.97	
CV, % ⁶	1.7	2.1	6.0	7.0	6.9	2.5	6.8	6.9	6.7	5.9	--	8.5	
OSL ⁷	<0.0001	<0.0001	0.0040	0.0017	0.0247	0.0055	0.0005	0.0244	0.0015	0.0040	--	0.0012	
LSD ⁸	0.9	1.7	112	42	61	0.0229	22.79	6.11	28.39	3.36	--	25.30	

¹DP = Deltapine, NG = NexGen, FM = Fibermax, PHY = Phytogen, AM = Americot, AT = AllTex, ST = Stoneville. ² Value for lint based on CCC loan value from grab samples and FBRI HVI results. ³Seed value was determined using a value of \$200/ton for seed. ⁴Ginning Cost were determined using \$3.00/cwt ginning cost. ⁵For net value/acre, means within a column with the same letter are not significantly different at the 0.05 probability level. ⁶CV - coefficient of variation. ⁷OSL - observed significance level, or probability of a greater F value. ⁸LSD - least significant difference at the 0.05 level.

Table 4. HVI fiber property results from Trial 2 under dryland production.

Entry ¹	Micronaire units	Staple 32 ^{nds} inches	Uniformity %	Strength g/tex	Elongation %	Leaf grade	Rd reflectance	+b yellowness	Color grade color 1 color 2	
AM 1532B2RF	4.3	35.6	80.5	28.0	10.2	2.3	78.0	8.6	2.7	1.0
AT Summit B2RF	4.3	34.0	81.0	26.9	10.5	1.7	77.1	8.7	3.0	1.0
DP 141B2RF	4.0	35.9	79.7	29.2	10.3	3.3	77.9	8.0	3.0	1.0
DP 161B2RF	4.4	36.0	80.1	30.7	9.6	2.0	78.2	8.2	3.0	1.0
DP 174RF	4.6	34.4	79.8	27.5	10.6	2.3	76.9	8.7	3.0	1.0
FM 1740B2F	4.7	34.1	80.7	28.3	9.7	1.0	78.5	8.6	2.7	1.0
FM 1880B2F	4.3	35.4	80.5	29.5	9.6	2.0	78.6	8.3	2.7	1.0
NG 3348B2RF	4.4	35.0	80.3	28.6	9.9	3.7	75.8	8.7	3.0	1.0
PHY 375WRF	4.5	34.1	80.6	27.8	10.0	1.7	77.4	8.5	3.0	1.0
PHY 485WRF	4.5	34.7	81.5	29.9	11.7	2.3	75.6	9.1	3.0	1.3
ST 4498B2RF	4.4	35.2	81.8	30.9	11.4	3.3	76.8	8.8	3.0	1.0
ST 5458B2RF	4.8	33.6	78.7	28.3	9.9	2.0	75.2	9.3	3.0	1.3
Test average	4.4	34.9	80.4	28.8	10.3	2.3	77.2	8.6	2.9	1.1
CV, % ²	3.4	1.1	0.8	1.8	2.9	34.9	1.0	3.1	--	--
OSL ³	0.0002	<0.0001	0.0012	<0.0001	<0.0001	0.0177	<0.0001	0.0002	--	--
LSD ⁴	0.3	0.6	1.1	0.9	0.5	1.4	1.3	0.5	--	--

¹DP = Deltapine, NG = NexGen, FM = Fibermax, PHY = Phytogen, AM = Americot, AT – AllTex, ST = Stoneville. ²CV - coefficient of variation. ³OSL - observed significance level, or probability of a greater F value. ⁴LSD - least significant difference at the 0.05 level.

In Trial 1, lint yield ranged from 695 to 1007 lb/acre (average of 777 lb lint/acre) (Table 1), while in Trial 2, lint yield ranged from 308 to 410 lb/acre (average of 359 lb lint/acre) (Table 3). In Trial 1, net value ranged from \$375 to \$580/acre (difference of \$205/acre) (Table 1), while in Trial 2, net value ranged from \$146 to \$205/acre (difference of \$59) (Table 3).

NexGen 3348B2RF ranked 1st of 12 varieties in Trial 1 (center pivot irrigated), but ranked 11th in Trial 2 (dryland production) (Table 1 & 3). Fibermax 1740B2RF and Fibermax 1880B2RF ranked 2nd and 3rd in Trial 1, but ranked 6th and 8th, respectively, in Trial 2. Deltapine 174RF, and Deltapine 161B2RF ranked 1st and 2nd in Trial 2, but ranked 5th and 4th in Trial 1. Phytogen 375WRF and Deltapine 141B2RF ranked 3rd, and 4th in Trial 2, but ranked 8th and 7th in Trial 1. Americot 1532 B2RF, Phytogen 485WRF, All-Tex Summit B2RF, and Stoneville 5458B2RF net values were not significantly different than the lowest net values in both of the trials (Table 1 & 3). Variety selection is one of the most important decisions a producer must make. Water use is one factor that can significantly impact variety performance. Continued evaluations of these varieties are needed.

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2008 COTTON VARIETY PERFORMANCE UNDER VERTICILLIUM WILT PRESSURE

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Abstract

Verticillium wilt, caused by the soilborne fungus, *Verticillium dahliae*, is an economically important disease of cotton in Gaines County, Texas. *V. dahliae* has a broad range of hosts, including peanuts, which are rotated with cotton in Gaines County. The cotton and peanut rotation results in a yearly increase in the concentration of inoculum in the soil. The objectives of this research were to evaluate the performance of commercially available cotton varieties in fields with varying levels of *Verticillium dahliae* inoculum and compare the net returns between varieties in fields with high and low Verticillium wilt pressure. Field trials were conducted in Gaines County, TX in 2008 to evaluate eleven cotton varieties. Deltapine 174RF and 161B2RF performed consistently well in both trials; whereas, Phytogen 375WRF performed poorly in both trials. Variety selection is one of the most important decisions a producer must make. Verticillium wilt is one factor that can significantly impact variety performance. Continued evaluations of these varieties are needed.

Introduction

Verticillium wilt, caused by the soilborne fungus, *Verticillium dahliae*, is an economically important disease of cotton in Gaines County, Texas. Symptoms of Verticillium wilt include stunting, brown flecks in the xylem tissue of the stem (Fig. 1), yellow mosaic pattern on leaves (Fig. 2), and eventually defoliation (Fig. 3) (Kirkpatrick, 2001). As a result, fiber and seed quality is reduced (Kirkpatrick, 2001). Cooler (below 90°F) wet environmental conditions favor Verticillium wilt development in host plants (Kirkpatrick, 2001). Crop rotation with a non-host is not a feasible management option since microsclerotia of *V. dahliae* persist in the soil for many years (Kirkpatrick, 2001). Additionally, *V. dahliae* has a broad range of hosts, including peanuts (Kokalis-Burelle, 1997), which are rotated with cotton in Gaines County. The cotton and peanut rotation results in a yearly increase in the concentration of inoculum in the soil. Therefore, planting cotton varieties with improved resistance or tolerance to Verticillium wilt is the most effective tool in managing this disease. The objectives of this study were to evaluate eleven commercially available cotton varieties in fields with varying levels of *V. dahliae* inoculum and to compare net returns between varieties in fields with high and low Verticillium wilt pressure.



Figure 1. Brown fleck in xylem tissue.



Figure 2. Mosaic appearance caused by necrosis of interveinal tissue and leaf margins



Figure 3. Defoliation starting at the base of the plant

Materials and Methods

Field trials were conducted in Gaines County, TX in 2008. Trial 1 had a seeding rate of 4 seed per row-foot and was planted on 5 May with 4 lb of Temik 15G placed in the furrow at planting. Trial 2 had a seeding rate of 3.5 seed per row-foot and was planted on 15 May. No Temik 15G was applied. Plots had 40 and 38 inch row spacing, respectively. Both trials were irrigated using a pivot irrigation system. Plots were 8-rows wide and extended the length of the field. Eleven varieties were evaluated in each trial. Plots were arranged in a randomized complete block design with 3 replications. Within each test, the production practices were the same for all varieties. The initial infection propagule, microsclerotia (ms) obtained from soil sampled in April, averaged 47.5 and 1.5/cm³ soil for trials 1 and 2, respectively. Both fields were infested with the root-knot nematode (*Meloidogyne incognita*). Trial 1 and Trial 2 were harvested on 9 October and 11 November, respectively. On 24 October temperatures dropped below 30°F, resulting in slower maturation in Trial 2. All plots were weighed separately using a Lee weigh wagon. Sub-samples were taken from each plot. All sub-samples were weighed and then ginned using a sample gin with a lint cleaner, burr extractor and stick machine. Ginned lint was weighed and lint and seed turnouts were calculated. Lint and seed yield were determined by multiplying the respective turn out with field plot weights. Approximately 50 gram lint samples were randomly collected for fiber quality analysis. Fiber analysis was conducted by the Texas Tech University Fiber & Biopolymer Research Institute and Commodity Credit Corporation (CCC) lint loan values were determined for each plot. Leaf grade was set at 3 and color grade was set at 21 for all observations in Trial 1 to more closely reflect field average. Leaf grade and color grade were not set in Trial 2 since fiber analyses were similar to the field averages. Lint value was determined by multiplying the loan value with the lint yield. Seed value was determined using a value of \$200/ton for seed. Ginning Cost was determined using \$3.00/cwt ginning cost. Seed and technology cost was calculated using the 2008 Seed Cost Comparison Worksheet courtesy of the Plains Cotton Growers Inc. Net value was determined by adding lint value and seed value and subtracting ginning cost and seed fees and technology fees. Statistical analysis of data was conducted using SAS 9.1 for windows, using PROC GLM.

Results and Discussion

Extensive Verticillium wilt symptoms were observed by late July in Trial 1. A cool wet period occurred during the second week of September and soon after, defoliation was seen in 8 of the 11 varieties (Fig. 4). DP 174RF, DP 161B2RF, and DP 141B2F retained foliage whereas all other varieties were defoliated by late September.



Figure 4. Aerial photo of Trial 1 taken on September 23, 2008 prior to the application of harvest-aid chemicals.

Table 1. Harvest Results from Trial 1 planted in a field with an average inoculum level of 47.5 microsclerotia/cm³ soil.

Entry ¹	Lint turnout	Seed turnout	Bur cotton yield	Lint yield	Seed yield	Lint loan Value ²	Lint value	Seed Value ³	Total value	Ginning Cost ⁴	Seed/ technology cost	Net Value ⁵	
	----- % -----		----- lb/acre -----			\$/lb	-----	-----	-----	\$/acre -----	-----	-----	
DP 174RF	34.8	44.4	3842	1341	1706	0.5703	764.57	170.56	935.13	115.25	52.72	767.16	a
DP 161B2RF	34.0	49.6	3627	1235	1800	0.5743	709.17	180.00	889.16	108.82	61.86	718.49	a
NG 3348B2RF	34.0	47.8	3407	1154	1625	0.5582	644.28	162.47	806.75	102.22	58.25	646.28	b
FM 9180B2RF	32.5	48.9	3456	1122	1686	0.5743	644.21	168.61	812.82	103.67	63.48	645.66	b
DP 141B2RF	31.7	48.0	3684	1169	1767	0.5407	631.43	176.69	808.12	110.51	61.86	635.75	bc
FM 9063B2RF	32.9	50.0	3316	1086	1653	0.5737	622.95	165.33	788.27	99.47	63.48	625.32	bc
PHY 485WRF	31.8	48.0	3355	1064	1611	0.5568	592.53	161.14	753.67	100.66	61.16	591.85	bcd
AM 1532B2RF	31.6	47.2	3274	1034	1543	0.5633	582.48	154.27	736.75	98.23	60.29	578.23	cd
FM 1740B2RF	34.4	46.0	3179	1088	1456	0.5095	554.60	145.59	700.19	95.38	63.48	541.33	d
PHY 375WRF	33.8	44.2	2882	972	1271	0.5092	494.56	127.13	621.69	86.45	61.16	474.08	e
FM 1880B2RF	32.0	48.4	2965	948	1436	0.5082	482.42	143.58	626.00	88.94	63.48	473.57	e
Test average	33.0	47.5	3362	1110	1596	0.5490	611.20	159.58	770.78	100.87	61.02	608.89	
CV, % ⁶	3.8	2.1	4.2	5.0	3.7	1.7	5.3	3.7	4.8	4.2	--	5.7	
OSL ⁷	0.0282	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	--	<0.0001	
LSD ⁸	2.1	1.7	240	94	100	0.0159	55.26	10.01	63.23	7.19	--	59.31	

¹DP = Deltapine, NG = NexGen, FM = Fibermax, PHY = Phytogen, AM = Americot. ²Value for lint based on CCC loan value from grab samples and FBRI HVI results. ³Seed value was determined using a value of \$200/ton for seed. ⁴Ginning Cost were determined using \$3.00/cwt ginning cost. ⁵For net value/acre, means within a column with the same letter are not significantly different at the 0.05 probability level. ⁶CV - coefficient of variation. ⁷OSL - observed significance level, or probability of a greater F value. ⁸LSD - least significant difference at the 0.05 level.

Table 2. HVI fiber property results from Trial 1 planted in a field with an average inoculum level of 47.5 microsclerotia/cm³ soil.

Entry ¹	Micronaire units	Staple 32 ^{nds} inches	Uniformity %	Strength g/tex	Elongation %	Rd reflectance	+b yellowness
AM 1532B2RF	3.6	36.3	79.9	27.2	10.1	76.8	7.9
DP 141B2RF	3.3	36.6	79.8	29.6	9.5	77.2	7.5
DP 161B2RF	3.7	38.1	81.7	30.5	9.2	79.0	7.5
DP 174RF	3.9	36.8	81.2	27.5	10.1	75.8	8.0
FM 1740B2RF	3.3	34.3	79.2	27.9	10.1	80.4	7.2
FM 1880B2RF	3.0	35.3	78.8	28.9	9.8	80.5	6.9
FM 9063B2RF	3.8	37.5	80.9	30.4	9.1	79.4	7.0
FM 9180B2RF	3.7	37.1	80.8	31.1	9.4	78.1	6.8
NG 3348B2RF	3.6	35.5	81.2	29.0	9.8	74.8	7.5
PHY 375WRF	3.2	34.2	79.9	27.3	10.0	77.0	7.5
PHY 485WRF	3.8	35.2	81.1	29.0	11.2	75.7	7.7
Test average	3.5	36.1	80.4	28.9	9.8	77.7	7.4
CV, % ²	4.1	1.3	0.8	2.6	1.8	1.9	2.8
OSL ³	<0.0001	<0.0001	0.0004	<0.0001	<0.0001	0.0008	<0.0001
LSD ⁴	0.2	0.8	1.2	1.3	0.3	2.5	0.4

¹DP = Deltapine, NG = NexGen, FM = Fibermax, PHY = Phytogen, AM = Americot. ²CV - coefficient of variation. ³OSL - observed significance level, or probability of a greater F value. ⁴LSD - least significant difference at the 0.05 level.

Table 3. Harvest results from Trial 2 planted in a field with an average inoculum level of 1.5 microsclerotia/cm³ soil.

Entry ¹	Lint turnout	Seed turnout	Bur cotton yield	Lint yield	Seed yield	Lint loan Value ²	Lint value	Seed Value ³	Total value	Ginning Cost ⁴	Seed/ technology cost	Net Value ⁵
	----- % -----		----- lb/acre -----			\$/lb				\$/acre		
DP 174RF	34.6	47.6	3870	1338	1844	0.5443	727.48	184.39	911.87	116.12	48.56	747.19 a
DP 141B2RF	33.3	52.0	3855	1284	2005	0.5575	716.06	200.54	916.60	115.66	56.98	743.96 a
FM 1740B2RF	36.2	50.1	3533	1279	1768	0.5560	711.77	176.85	888.62	105.99	58.47	724.16 ab
DP 161B2RF	32.2	51.6	3773	1214	1947	0.5698	691.20	194.68	885.87	113.19	56.98	715.71 abc
FM 9180B2RF	33.3	52.5	3495	1164	1835	0.5725	666.43	183.43	849.85	104.86	58.47	686.52 bcd
PHY 485WRF	31.9	51.8	3666	1170	1896	0.5553	649.84	189.66	839.50	109.99	56.33	673.17 bcd
FM 1880B2RF	32.7	51.0	3696	1209	1885	0.5400	653.21	188.50	841.71	110.88	58.47	672.36 cd
FM 9063B2RF	32.3	51.9	3537	1143	1835	0.5653	646.20	183.46	829.65	106.11	58.47	665.07 cde
PHY 375WRF	36.4	49.3	3367	1224	1660	0.5300	649.48	165.99	815.46	101.03	56.33	658.11 de
AM 1532B2RF	32.2	50.6	3648	1174	1844	0.5393	631.94	184.44	816.39	109.46	55.54	651.40 de
NG 3348B2RF	33.5	51.9	3427	1148	1777	0.5173	593.93	177.64	771.57	102.80	53.65	615.13 e
Test average	33.5	50.9	3625	1213	1845	0.5498	667.05	184.51	851.55	108.73	56.20	686.62
CV, % ⁶	2.1	1.8	2.7	3.7	3.0	3.2	4.4	3.0	3.8	2.7	--	4.4
OSL ⁷	<0.0001	<0.0001	<0.0001	0.0004	<0.0001	0.0241	0.0004	<0.0001	0.0004	<0.0001	--	0.0005
LSD ⁸	1.2	1.5	169	77	94	0.0304	49.43	9.39	54.52	5.06	--	51.72

¹DP = Deltapine, NG = NexGen, FM = Fibermax, PHY = Phytogen, AM = Americot. ² Value for lint based on CCC loan value from grab samples and FBRI HVI results. ³Seed value was determined using a value of \$200/ton for seed. ⁴Ginning Cost were determined using \$3.00/cwt ginning cost. ⁵For net value/acre, means within a column with the same letter are not significantly different at the 0.05 probability level. ⁶CV - coefficient of variation. ⁷OSL - observed significance level, or probability of a greater F value. ⁸LSD - least significant difference at the 0.05 level.

Table 4. HVI fiber property results from Trial 2 planted in a field with an average inoculum level of 1.5 microsclerotia/cm³ soil.

Entry ¹	Micronaire units	Staple 32 ^{nds} inches	Uniformity %	Strength g/tex	Elongation %	Leaf grade	Rd reflectance	+b yellowness	Color grade color 1 color 2	
AM 1532B2RF	3.9	34.7	78.0	26.4	10.1	1.3	80.5	7.8	2.3	1.0
DP 141B2RF	3.6	35.7	78.4	28.8	9.5	2.7	79.9	8.0	2.7	1.0
DP 161B2RF	4.0	36.3	79.8	28.9	9.3	2.0	80.5	7.9	2.0	1.0
DP 174RF	3.7	34.6	78.5	26.2	10.3	2.3	78.2	8.8	2.3	1.0
FM 1740B2RF	4.0	34.5	80.3	27.9	9.7	1.7	79.9	8.4	2.3	1.0
FM 1880B2RF	3.5	34.5	78.3	28.8	9.3	2.0	79.9	8.0	2.3	1.0
FM 9063B2RF	3.9	35.9	78.9	29.6	9.2	2.3	81.5	7.8	2.0	1.0
FM 9180B2RF	4.2	36.3	81.2	29.9	9.2	2.3	80.7	7.7	2.3	1.0
NG 3348B2RF	3.9	33.9	79.3	27.3	9.4	3.0	75.5	9.7	3.0	1.7
PHY 375WRF	3.7	33.7	79.5	27.6	9.8	2.0	79.2	8.1	3.0	1.0
PHY 485WRF	4.1	35.1	82.1	29.5	11.3	3.3	77.7	8.3	3.0	1.0
Test average	3.9	35.0	79.5	28.3	9.7	2.3	79.4	8.2	2.5	1.1
CV, % ²	4.4	1.9	1.3	2.5	2.4	31.0	1.0	5.2	--	--
OSL ³	0.0010	0.0006	0.0019	<0.0001	<0.0001	0.0917	<0.0001	0.0007	--	--
LSD ⁴	0.3	1.1	1.8	1.2	0.4	NS	1.3	0.7	--	--

¹DP = Deltapine, NG = NexGen, FM = Fibermax, PHY = Phytogen, AM = Americot. ²CV - coefficient of variation. ³OSL - observed significance level, or probability of a greater F value. ⁴LSD - least significant difference at the 0.05 level.

In Trial 1, lint yield ranged from 948 to 1341 lb/acre (average of 1110 lb lint/acre) (Table 1), while in Trial 2, lint yield ranged from 1143 to 1338 lb/acre (average of 1213 lb lint/acre) (Table 3). Verticillium wilt incidence was minimal in Trial 2 and did not impact yield (personal observation).

In Trial 1, net value ranged from \$474 to \$767/acre (difference of \$293/acre) (Table 1), while in Trial 2, net value ranged from \$615 to \$747/acre (difference of \$132/acre) (Table 3). Varieties that performed consistently in both trials included Deltapine 174RF and 161B2RF; whereas, Phytogen 375WRF performed poorly in both trials (Tables 1 and 3). Fibermax 1740B2RF ranked 9th of 11 varieties in Trial 1 (high pressure field), but had the 3rd highest net value in Trial 2 (low pressure field). NexGen 3348B2RF ranked 3rd in Trial 1, but had the lowest net value in Trial 2. Deltapine 141B2RF ranked 5th in Trial 1, but had the 2nd highest net value in Trial 2. Variety selection is one of the most important decisions a producer must make. Verticillium wilt is one factor that can significantly impact variety performance. Continued evaluations of these varieties are needed.

Acknowledgements

We would like to acknowledge and thank Max McGuire and Michael Todd for planting, maintaining and harvesting these trials. We would also like to thank Jody Anderson for his assistance in planting and harvesting these trials and Ronnie Wallace for assisting us in measuring plot acreages.

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EVALUATION OF PLANT GROWTH REGULATORS ON A MEDIUM TO SHORT COTTON VARIETY

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Introduction

Fibermax 9063B2RF height and growth habit is characterized as medium to short¹. In comparison Fibermax 1880B2RF is characterized as medium-tall and having a vigorous growth habit¹. Plant growth regulators (PGR) are often applied to Fibermax 1880B2RF in an effort to control height. Fibermax 9063B2RF was planted on approximately 58% of the acres in Gaines County and PGRs are often applied during the season. Several PGR are being market for use on cotton. The objectives of this research was to evaluate the performance of commercially available PGRs on a medium to short cotton variety, Fibermax 9063B2RF, in a large plot on-farm trial. Yield and fiber qualities were used to determine the seed yield, lint yield, and lint loan values per acre for each PGR treatment. Additionally, plant mapping was conducted in order to compare plant height and number of nodes under the various applications.

Materials and Methods

An on-farm field trial was conducted in Gaines County, TX in 2008. The trial was planted on 15 May and had a seeding rate of 3.5 seed per row-foot. The trial was irrigated using a center pivot irrigation system. Plots were 8-rows wide with a 38 inch row-spacing and extended the length of the field. Four plant growth regulators (PGR) and an untreated check were evaluated in the trial (Table 1). Plots were arranged in a randomized complete block design with 3 replications. The production practices were the same for all treatments. The PGRs were applied on 2 July with flat fan nozzles and a spray volume of 16.7 gallons per acre. A pre-treatment, post-treatment and final plant mapping was conducted on 2 July, 23 July, and 2 October, respectively. Plant mapping included plant height and number of nodes for 10 plants per plot. Additionally, nodes above white flower (NAWF) was included in the post-treatment plant mapping on 23 July. The trial was harvested on 12 November. All plots were weighed separately using a Lee weigh wagon. Sub-samples were taken from each plot. All sub-samples were weighed and then ginned using a sample gin with a lint cleaner, burr extractor and stick machine. Ginned lint was weighed and lint and seed turnouts were calculated. Lint yield and seed yield was determine by multiplying the respective turn out with field plot weights. Approximately 50 gram lint samples were randomly collected for fiber quality analysis. Fiber analysis was conducted by the Texas Tech University Fiber & Biopolymer Research Institute and Commodity Credit Corporation (CCC) lint loan values were determined for each plot. Statistical analysis of data was conducted using ARM 8, using LSD.

Table 1. Plant Growth Regulators, Application Rates, and estimated cost per acre.

PGR	Rate/acre	\$/acre
Stance	3 fl oz	\$3.00
Pentia	4 fl oz	\$1.50
Mepex	4 fl oz	\$0.52
Mepex Gin Out	4 fl oz	\$1.19
Untreated Check	-	0

Results

Table 2. Plant height (Ht), Number (No.) Nodes, and Nodes Above White Flower (NAWF).

Treatment	Rate	Unit	Plant Mapping						
			----- July 2 -----		----- July 23 -----			----- October 2 -----	
			Plant Ht	No. Nodes	Plant Ht ¹	No. Nodes	NAWF	Plant Ht	No. Nodes
Stance	3	fl oz/a	7.10	10.88	12.58 b	15.27	7.27	19.63	21.30
Pentia	4	fl oz/a	6.38	10.20	12.74 b	14.60	6.53	20.43	21.13
Mepex	4	fl oz/a	6.81	10.50	14.04 b	15.37	7.07	19.97	21.30
Mepex Gin Out	4	fl oz/a	6.65	10.23	13.06 b	14.70	6.57	20.53	21.07
Untreated	4	fl oz/a	7.28	10.57	16.43 a	16.00	7.87	23.37	22.10
Test Average			6.84	10.48	13.77	15.19	7.06	20.79	21.38
CV, % ²			5.68	2.6	6.24	4.26	10.46	6.9	4.82
OSL ³			0.1195	0.0814	0.003	0.1474	0.2486	0.0743	0.7452
LSD ⁴			NS	NS	1.62	NS	NS	NS	NS

¹Means within a column followed by the same letter do not significantly differ (P=.05, LSD). ²CV - coefficient of variation. ³OSL - observed significance level, or probability of a greater F value. ⁴LSD - least significant difference at the 0.05 level.

Table 3. Harvest Results.

Treatment	Rate	Unit	Seed turnout	Lint turnout	Seed yield	Lint yield	Lint loan Value ¹
Stance	3	fl oz/a	0.50	0.31	2144.35	1341.64	0.5758 ab
Pentia	4	fl oz/a	0.50	0.32	1968.79	1262.79	0.5773 a
Mepex	4	fl oz/a	0.50	0.32	2029.41	1316.19	0.5787 a
Mepex Gin Out	4	fl oz/a	0.49	0.32	2056.81	1345.10	0.5727 b
Untreated	4	fl oz/a	0.49	0.32	1906.32	1245.57	0.5728 b
Test Average			0.5	0.32	2021.14	1302.26	0.58
CV, % ²			1.66	1.27	4.25	4.2	0.37
OSL ³			0.1937	0.1547	0.0712	0.1741	0.0314
LSD ⁴			NS	NS	NS	NS	0.004

¹Means within a column followed by the same letter do not significantly differ (P=.05, LSD). ²CV - coefficient of variation. ³OSL - observed significance level, or probability of a greater F value. ⁴LSD - least significant difference at the 0.05 level.

Table 4. HVI fiber property results.

Treatment	Rate	Unit	Micronaire	Length	Uniformity	Strength ¹	Elongation	Leaf	Rd ¹	+b
Stance	3	fl oz/a	4.33	1.173	81.07	31.03 ab	8.9	2.3	81.6 a	7.47
Pentia	4	fl oz/a	4.37	1.17	81.1	30.6 bc	9.03	1.7	81.37 a	7.87
Mepex	4	fl oz/a	4.33	1.187	82.03	31.9 a	8.8	2.3	80.83 ab	7.93
Mepex Gin Out	4	fl oz/a	4.5	1.153	80.87	30.7 bc	9.1	2	80.2 b	8.03
Untreated	4	fl oz/a	4.33	1.14	80.57	29.7 c	9.23	2.3	80.27 b	7.93
Test Average			4.37	1.16	81.13	30.79	9.01	2.13	80.85	7.85
CV, % ²			3.84	2.42	1.09	1.9	3.39	24.21	0.67	4.45
OSL ³			0.7013	0.3631	0.4027	0.0194	0.4975	0.4609	0.0443	0.3827
LSD ⁴			NS	NS	NS	1.10	NS	NS	1.03	NS

¹Means within a column followed by the same letter do not significantly differ (P=.05, LSD). ²CV - coefficient of variation. ³OSL - observed significance level, or probability of a greater F value. ⁴LSD - least significant difference at the 0.05 level.

The untreated plant height was significantly taller than the four treatments on July 23, 2008 (Table 2). There were no other dates in which plant height, number of nodes, or Nodes Above White Flower (NAWF) differed (Table 2). There was not a significant difference in seed turnout, lint turnout, seed yield, or lint yield (Table 3). Significant differences were observed in strength and Rd (Table 4).

Discussion

Stance, Pentia, Mepex and Mepex Gin Out performed similarly in this test. These products were applied to a cotton variety that is characterized as medium to short. This was an exceptionally dry and windy year which resulted in slower growth and development. These products may perform differently when precipitation is not a limiting factor. Additionally, results from this trial should not be extended to varieties that are characterized as having a vigorous growth habit. More tests need to be conducted in order to evaluate these products across varieties and across years.

Acknowledgements

We would like to acknowledge and thank Michael Todd for planting, maintaining and harvesting these trials. We would also like to thank Jody Anderson for his assistance in harvesting this trial and Ronnie Wallace for assisting in measuring plot sizes to determine acreages. Additionally, we would like to thank Brady Laney for her assistance in the application of the PGR and Jim Belt for their assistance in plant mapping.

References

¹Bayer CropScience FiberMax Cotton on-line Seed Variety Guide for the Southwest.
http://www.bayercropscienceus.com/products_and_seeds/seeds/fibermax.html

EVALUATION OF AT-PLANTING INSECTICIDES FOR THRIPS CONTROL IN COTTON, SEMINOLE 2008

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This test was conducted in a commercial cotton field near Seminole, TX. The field was planted in 'FiberMax 9063B2F' on 13 May on 40-inch rows at and seeding rate of approximately 46,000 seeds/acre. The field was irrigated using a pivot irrigation system. The test was a RCB design with four replications. Plots were 2-rows wide \times 100 ft in length. Treatments, application type and timing are listed in Table 1. In-furrow insecticides were applied at planting with the seed using a granular-insecticide metering box at a depth of 1.5 inches. Adult and immature WFT were sampled by visually inspecting 10 whole plants per plot. Samples were taken on 23 and 28 May, and 2 and 9 Jun. LMs were estimated by recording the number of infested plant from 10 plants per plot. Plant height and leaf area was estimated on 9 Jun by collecting 10 plants per plot. Height was determined by measuring the distance from the cotyledons to the terminal. Leaf area was estimated using a leaf area indexer. All plots were hand harvested on 31 Oct using a HB stripper. An area of 1/1000th acre was harvest from the center two rows of each plot. Samples were ginned at the Texas AgriLife Research and Extension Center in Lubbock. Data were analyzed with PROC MIXED, and means were separated using an F-protected LSD ($P \leq 0.05$).

At 10 and 15 DAP, WFT numbers were low and there were no significant differences among treatments for adult, immature, total WFT per plant, or percentage of LM mined plants (Table 2).

By 20 DAP, the WFT population had increased and at this time there were still no significant differences among treatments for adult WFT or LMs, but all of the insecticide treatments had fewer immature WFT than the untreated, and Temik at 3.5 lbs had fewer total WFT than the untreated (Table 3). The reduction of immature WFT in the insecticide treated plot relative to the untreated indicates that all of the treatments were effective at 20 DAP in preventing thrips colonization.

At 27 DAP the WFT population had decline sharply and there were no difference in the number of WFT among treatments. However, all of the treatments that included Temik had a lower percentage of LM mined plants than the untreated, but did not differ from Cruiser or Avicta CC. Aeris, Cruiser and Avicta CC did not differ from the untreated in the percentage of LM mined plants.

No differences were detected in plant height, square set or yield, but Avicta CC, Cruiser, and the treatments containing Temik, all had a greater leaf area than the untreated (Table 4). A simple linear regression analysis indicated that leaf area was correlated with the percentage of plants with leaf mines (Fig 1), but there was no correlation with yield.

Data from Farwell, TX in 2007 suggested that as few as 0.5 WFT per plant can reduce cotton yield during the first few weeks after plant emergence under cool conditions. This test was

conducted under very warm conditions, and the plants may have been able outgrown the damage caused by the thrips and/or leaf miners. Leaf miners have been noted as very common in some seedling cotton throughout the High Plains. More data is needed before it can be determined if this pest impacts yield. Under cool conditions, it may impact cotton similar to thrips.

Table 1. Insecticide components, rates and application type.

Treatment/formulation	Rate mg(AI)/seed	Application type
Untreated check	--	--
+ Dynasty CST 125FS	+ 0.03	seed
Aeris ^b	-- ^b	seed
+ Trilex Advanced ^c	+ 1.6 fl-oz/100 lb seed	seed
Avicta Complete Cotton ^a	-- ^a	seed
Cruiser 5FS	0.34	seed
+ Dynasty CST 125FS	+ 0.03	seed
Temik 15G	3.5 lbs/ac	in-furrow
+ Dynasty CST 125FS	+ 0.03	seed
Temik 15G	5.0 lbs/ac	in-furrow
+ Dynasty CST 125FS	+ 0.03	seed
Temik 15G	3.5 lbs/ac	in-furrow
+ Aeris ^b	-- ^b	seed
+ Trilex Advanced ^c	+ 1.6 fl-oz/100 lb seed	seed

^aAvicta Complete Pak is a mixture of Avicta 500FS at 0.15 mg(AI)/seed, Cruiser 5FS at 0.34 mg(AI)/seed, and Dynasty CST 125FS at 0.03 mg(AI)/seed.

^bAeris is a mixture of Gaucho Grande 5FS at 0.375 mg(AI)/seed and thiodicarb at 0.375 mg(AI)/seed.

^cTrilex Advanced is a mixture of trifloxystrobin 8.55%, triadimenol 4.27% and metalaxy 12.82%.

Table 2. Mean number of WFT at 10 and 15 DAP.

Treatment/ formulation ^a	Rate mg(AI)/seed ^a	23 May – cotyledon stage (10 DAP)				28 May – 1 true leaf stage (15 DAP)			
		WFT per plant			% mined plants	WFT per plant			% mined plants
		adults	immatures	total		adults	immatures	total	
Untreated check	--	0.10a	0.00a	0.10a	0.0a	0.15a	0.13a	0.28a	5.0a
Aeris	--	0.00a	0.00a	0.00a	0.0a	0.08a	0.00a	0.08a	2.5a
Avicta CC	--	0.00a	0.00a	0.00a	0.0a	0.08a	0.00a	0.08a	0.0a
Cruiser 5FS	0.34	0.00a	0.00a	0.00a	3.0a	0.05a	0.03a	0.08a	0.0a
Temik 15G	3.5 lb/ac	0.00a	0.00a	0.00a	0.0a	0.05a	0.00a	0.05a	0.0a
Temik 15G	5.0 lbs/ac	0.00a	0.00a	0.00a	0.0a	0.00a	0.00a	0.00a	0.0a
Temik 15G + Aeris	3.5 lbs/ac + --	0.03a	0.00a	0.03a	0.0a	0.15a	0.03a	0.18a	0.0a

Values in a column followed by the same letter are not different based a Proc Mixed analysis with an F protected LSD ($P \geq 0.05$). ^aSee Table 1 for full listing of treatment components and rates.

Table 3. Mean number of WFT at 20 and 27 DAP.

Treatment/ formulation ^a	Rate mg(AI)/seed ^a	2 Jun – 2 true leaf stage (20 DAP)				9 Jun – 5 true leaf stage (27 DAP)			
		WFT per plant			% mined plants	WFT per plant			% mined plants
		adults	immatures	total		adults	immatures	total	
Untreated check	--	0.54a	0.40a	0.94a	12.5a	0.05a	0.01a	0.08a	11.3a
Aeris	--	0.38a	0.00b	0.38a	7.5a	0.10a	0.00a	0.10a	12.5a
Avicta CC	--	0.20a	0.08b	0.28a	0.0a	0.20a	0.00a	0.20a	5.0ab
Cruiser 5FS	0.34	0.30a	0.03b	0.33a	5.0a	0.08a	0.00a	0.08a	5.0ab
Temik 15G	3.5 lb/ac	0.28a	0.03b	0.30b	5.0a	0.20a	0.00a	0.20a	2.5b
Temik 15G	5.0 lbs/ac	0.53a	0.00b	0.53ab	0.0a	0.13a	0.00a	0.20a	0.0b
Temik 15G + Aeris	3.5 lbs/ac + --	0.20a	0.08b	0.28a	2.5a	0.13a	0.05a	0.18a	0.0b

Values in a column followed by the same letter are not different based a Proc Mixed analysis with an F protected LSD ($P \geq 0.05$). ^aSee Table 1 for full listing of treatment components and rates.

Table 4. Effects of seed applied and in-furrow treatments targeting thrips on seedling cotton growth, development and yield.

Treatment/ formulation ^a	Rate mg(AI)/seed ^a	9 Jun			31 Oct
		Plant height (cm)	Leaf area (cm ² /plant)	Percent square set	Yield (lbs-lint/ac)
Untreated check	--	6.00a	60.03c	97.08a	1062.75a
Aeris	--	6.24a	67.23bc	100a	975.32a
Avicta CC	--	6.86a	78.68a	98.38a	931.98a
Cruiser 5FS	0.34	6.83a	83.34a	97.97a	1012.06a
Temik 15G	3.5 lb/ac	6.60a	75.28ab	94.70a	1106.34a
Temik 15G	5.0 lbs/ac	6.56a	79.35a	97.36a	1236.88a
Temik 15G + Aeris	3.5 lbs/ac + --	6.46a	78.07a	97.08a	1056.85a

Values in a column followed by the same letter are not different based a Proc Mixed analysis with an F protected LSD ($P \geq 0.05$).

^aSee Table 1 for full listing of treatment components and rates.

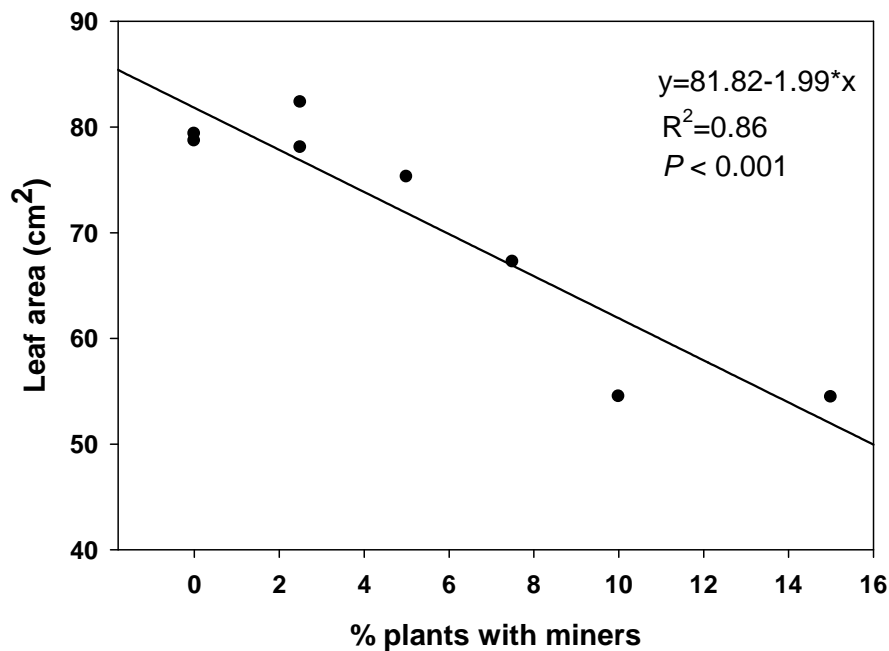


Figure 1. Simple linear correlation of plant damage expressed as leaf area to the percentage of plants with leaf mines.



Boll Damage Survey of Bt and non-Bt Cotton Varieties in the South Plains Region of Texas 2007-08

Cooperators: Texas AgriLife Extension Service

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EA-IPM Hale/Swisher Counties, EA-IPM Hockley/Cochran Counties, EA-IPM
Lubbock County and EA-IPM Terry/Yoakum Counties**

South Plains

Summary:

Late-season boll damage surveys were conducted in 2007 and 2008 to evaluate the amount of Lepidoptera induced damage in Bt cotton varieties relative to non-Bt cotton varieties. Additional, data was collected on the number of insecticide applications required for these varieties to manage lepidopterous pests. Boll damage was light in 2007; however, more damaged bolls were found in the non-Bt fields (3.11%) than in the Bollgard (0.52%) and Bollgard II (0.25%) fields, but did not differ from the Widestrike fields (1.29%). Very few insecticide applications were made targeting bollworm in any of the 2007 survey fields and there were no significant differences among variety types. None of the Bt cotton fields were treated for bollworms, whereas 9% on the non-Bt field received a single insecticide application. Late season bollworm damage in 2008 was similar to 2007. All of the Bt cotton variety types had significantly fewer damaged bolls than the non-Bt varieties and none of the Bt varieties required insecticide applications for lepidopterous pests, but unlike 2007, more non-Bt cotton was treated for bollworm and/or beet armyworms in 2008 (41% of the fields received a single insecticide application).

Objective:

The objective of this study was to compare the qualitative value of Bollgard II, Widestrike and Bollgard insect control traits in grower fields relative to each other and to non-Bt cotton varieties.

Materials and Methods:

In 2007 and 2008, boll damage surveys were conducted to quantify bollworm damage in late season Bt and non-Bt cotton varieties. Although the source of the damage is not

certain, most of it is suspected to have come from cotton bollworms although beet armyworms were present in some fields in 2008. Two of the non-Bt were treated for a mixed population of bollworms and beet armyworms in Bailey County in 2008. The survey was conducted late season because Bt levels in mature/senescent cotton tends to deteriorate relative to rapidly growing plants. Thus, late season would represent the time period when Bt levels would be less intensely expressed and damage would be more likely to occur.

Grower fields of non-Bt, Bollgard, Bollgard II and Widestrike cotton were sampled throughout the South Plains region of Texas (Table 1). Samples were taken after the last possible insecticide applications and before approximately 20% of the boll were open. Three distinct areas were sampled within each field, and 100 consecutive harvestable bolls were sampled from each location. Each field by variety type served as a replicate. Bolls were considered damaged if the carpal was breached through to the lint. The insecticide history in regard to insecticides targeting bollworms was recorded.

All data were analyzed using PROC MIXED and the means were separated using an F protected LSD ($P \leq 0.10$).

Results and Discussion:

In 2007, damage was very light across all of the field types. However, more damaged bolls were found in the non-Bt fields (3.11%) than in the Bollgard (0.52%) and Bollgard II (0.25%) fields, but did not differ from the Widestrike fields (1.29%) (Table 2). Damage in the Widestrike fields did not differ from the Bollgard and Bollgard II fields. The fact that Widestrike did not differ from the non-Bt fields does not appear to indicate a lack of efficacy, but probably indicates a lack of area wide bollworm pressure. Very few insecticide applications were made targeting bollworm in any of the 2007 survey fields and there were no significant differences among variety types. None of the Bt cotton fields were treated for bollworms, whereas 9% on the non-Bt field received a single insecticide application.

Late season bollworm damage in 2008 was similar to 2007. All of the Bt cotton variety types had significantly fewer damaged bolls than the non-Bt varieties (Table 3). There were no differences in boll damage among the Bt types. Similar to 2007, none of the Bt varieties required insecticide applications for bollworms, but unlike 2007, more non-Bt cotton was treated for bollworms and/or beet armyworms in 2008 (41% of the fields received a single insecticide application).

Based on these data, Bt cotton appears to continue to be highly effective in preventing boll damage by lepidopterous pests in the South Plains region of Texas.

Acknowledgments:

Appreciation is expressed to the Monsanto Company for financial support of this project.

Disclaimer Clause:

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Table 1. Number of fields sampled by county and Bt trait in 2007-08.

County	Non-Bt	Bollgard	Bollgard II	Widestrike
Year 2007				
Bailey	0	3	1	0
Castro	4	0	3	0
Dawson	1	3	2	4
Floyd	3	0	4	0
Gaines	0	0	0	1
Hale	7	0	6	3
Hockley	3	2	2	2
Lubbock	1	5	2	1
Parmer	2	1	0	1
Terry	1	0	3	4
TOTAL	22	14	23	16
Year 2008				
Bailey	5	0	5	0
Castro	6	0	6	1
Dawson	0	0	0	2
Gaines	4	0	3	10
Hale	3	0	2	1
Hockley	5	5	5	3
Lubbock	6	0	5	0
TOTAL	29	5	26	17

Table 2. Percentage of damaged bolls and insecticide applications for non-Bt and various Bt technology varieties grown in the South Plains of Texas, 2007.

Variety type	n ^a	% damaged bolls ^b	Mean no. sprays per site ^c
Non-Bt	22	3.11 a	0.09 a
Bollgard	14	0.52 b	0.00 a
Bollgard II	23	0.25 b	0.00 a
WideStrike	14	1.29 ab	0.00 a

Means in a column followed by the same letter are not significantly different based on an F protected Mixed Procedure LSD ($P \leq 0.10$).

^aNumber of fields sampled.

^bPercentage of damaged bolls from three locations in each field, 100 bolls sampled per locations, 300 bolls per field.

^cMean number of insecticide applications targeting lepidopterous pests per site.

Table 3. Percentage of damaged bolls and insecticide applications for non-Bt and various Bt technology varieties grown in the South Plains of Texas, 2008.

Variety type	n ^a	% damaged bolls ^b	Mean no. sprays per site ^c
Non-Bt	29	3.16 a	0.41 a
Bollgard	5	0.53 b	0.00 b
Bollgard II	26	0.04 b	0.00 b
WideStrike	17	0.18 b	0.00 b

Means in a column followed by the same letter are not significantly different based on an F protected Mixed Procedure LSD ($P \leq 0.10$).

^aNumber of fields sampled.

^bPercentage of damaged bolls from three locations in each field, 100 bolls sampled per locations, 300 bolls per field.

^cMean number of insecticide applications targeting lepidopterous pests per site.

Appendix A

2008 Gaines County IPM Newsletters

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