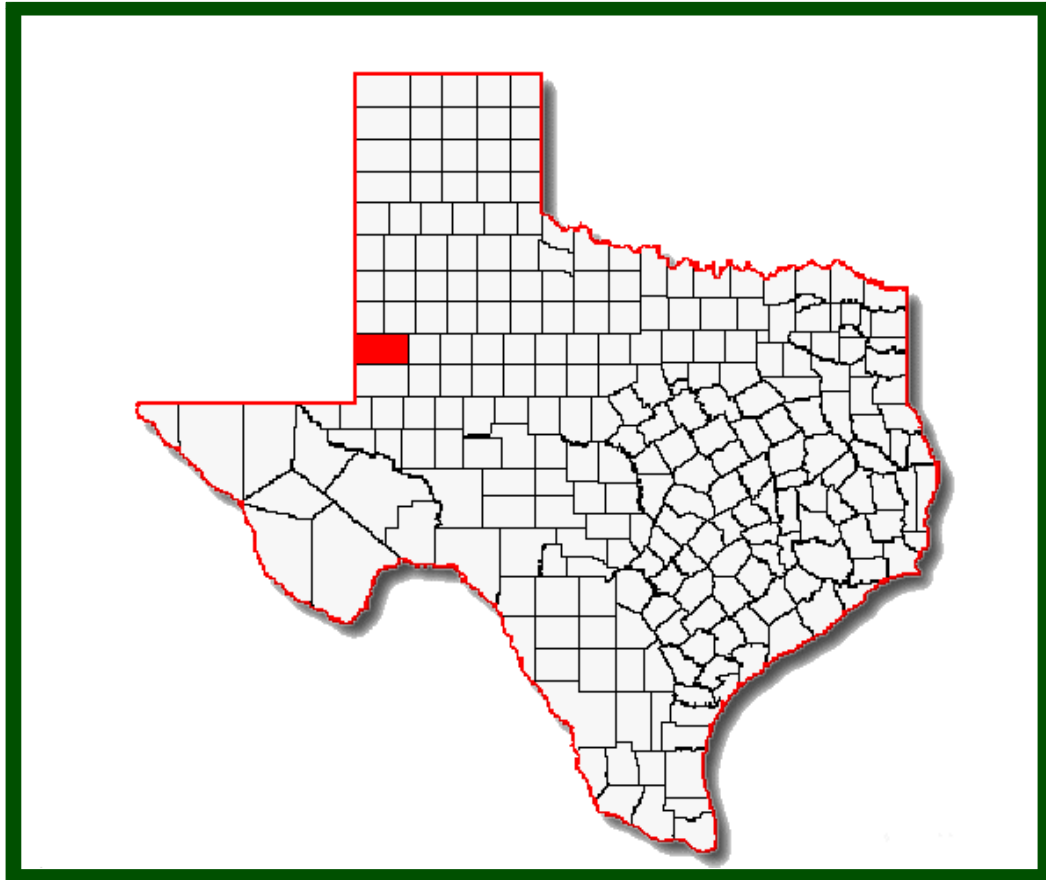


INTEGRATED PEST MANAGEMENT



Gaines County IPM Program 2008



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

Prepared by

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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

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

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Dr. Terry Wheeler
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
----------------------------------------	------------------

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.

References

Kirkpatrick, T. L. and C. S. Rothrock, ed. *Compendium of Cotton Diseases, Second Edition*. APS Press, 2001.

Kokalis-Burelle, N., D. M. Porter, R. Rodriguez-Kabana, D. H. Smith, and P. Subrahmanyam, ed. *Compendium of Peanut Diseases, Second Edition*. APS Press, 1997.

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.

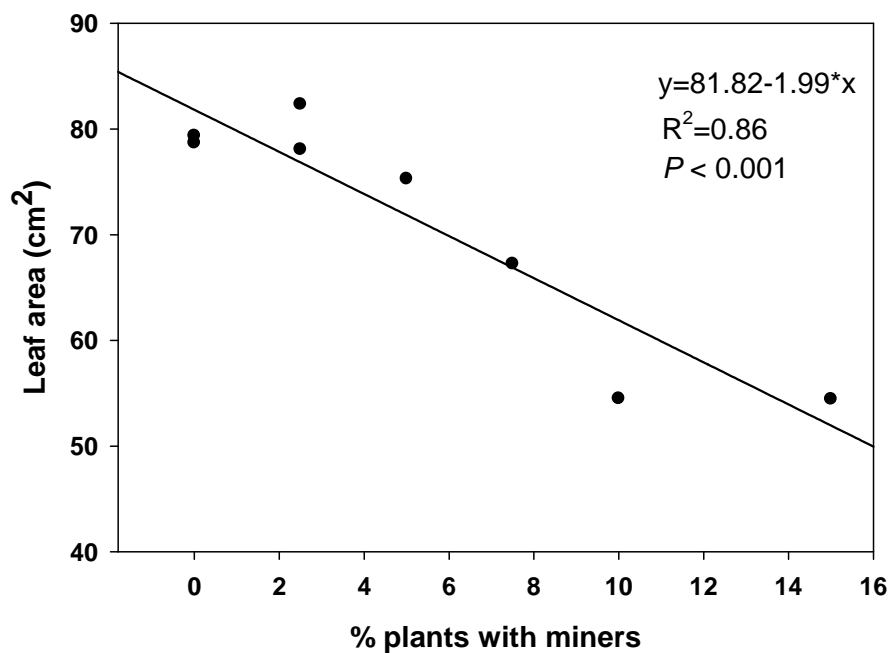


Figure 1. Simple linear correlation of plant damage expressed as leaf area to the percentage of plants with leaf mines.



**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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Castro/Lamb Counties, EA-IPM Lynn/Dawson Counties, EA-IPM Gaines County,
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:

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 do not represent conclusive evidence that the same response would occur where conditions vary.

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

GAINES COUNTY IPM NEWSLETTER

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<http://www.tpma.org>
<http://ipm.tamu.edu>

Volume I, No. 1

June 16, 2008

General Situation

Peanuts are starting to bloom and will start pegging. No diseases have been observed. Cotton stages range from 3 to 10 true leaves, with a majority of the cotton in averaging 4 to 6 true leaves. Several growers have commented that this is the windiest and driest season they have seen in several years. Mother nature has played a ruff game thus far and several conventional tillage fields have suffered from wind and sand damage. Some fields have been replanted. A majority of the minimum till fields are holding and looking good.



Figure 1. Minimum till field that was planted in late April

Thrips

At this point in the game we need to keep a close eye on thrips populations and damage. Seed treatments and temik have probably played out and foliar insecticides may be justified if the thrips action threshold has been reached (See Table 1).

Thrips feed on leaves and leaf buds and will cause a silvering on the underside of the leaves. Cupping of the leaves is also associated with thrips damage. Wind and blowing sand can cause similar plant damage. However, wind damage often has more of a ragged appearance and you will often see scorching on the leaf edges.



Figure 2. Cotton with thrips damage

Table 1. *Thrips* Action Threshold

Emergence to:	
1 true leaf	1 thrips per plant
2 true leaves	2 thrips per plant
3 true leaves	3 thrips per plant
4 true leaves	4 thrips per plant
5-7 leaves or squaring initiation	Treatment is rarely justified

Fleahoppers and Lygus

During the next two weeks a majority of the cotton will start squaring. Cotton fleahoppers and lygus could be a potential pest because they feed on young squares causing them to turn brown and die. Square retention should also be monitored in order to determine if you have an adequate fruit set.

Table 2. *Cotton fleahopper* action threshold is 25-30 cotton fleahoppers/100 terminals with:

Week of squaring	Square set
1 st week	< 90%
2 nd week	< 85%
3 rd week to 1 st bloom	< 75%
After 1 st bloom	Treatment is rarely justified

Table 3. *Lygus* action threshold using a standard 15-inch sweep net, sample 1-row at a time taking 15-25 weeps.

Cotton Stage	Sweep Net*
1 st two weeks of squaring	8 per 100 sweeps with unacceptable square set
3 rd week of squaring to 1 st bloom	15 per 100 sweeps with unacceptable square set

Grasshoppers

Grasshoppers have been reported in some parts of the county. The large jumbo grasshoppers can cause more damage than the smaller grasshoppers. Thus far we have only observed the smaller grasshoppers and we have not observed any significant damage. The damage associated with these grasshoppers has consisted of minimal feeding on the leaves and feeding along the side of stems causing the plants to break and die. The action threshold for the smaller grasshoppers is 10 per 3 row ft.



Figure 3. Young cotton with grasshopper damage

Mark Your Calendars

June 24th National Cotton Council is holding a meeting to review key provisions of the new Food, Conservation, and Energy Act of 2008 in Seagraves at the Civic Building. Please visit www.cotton.org for more details.

July 23rd Gaines County Pecan Meeting.

The Gaines County IPM Program is supported by various businesses. These businesses make it possible for us to keep you up to date on the current cotton and peanut crop stage and pest populations in Gaines County. Additionally, we have several on-farm research trials that will assist us in recommending cotton varieties based on water use and disease tolerance. We are also looking at the effect of seed treatments on early season insect pests and how the use of plant growth regulators can assist growers in their crop production. Please join me in thanking our sponsors by supporting their businesses.

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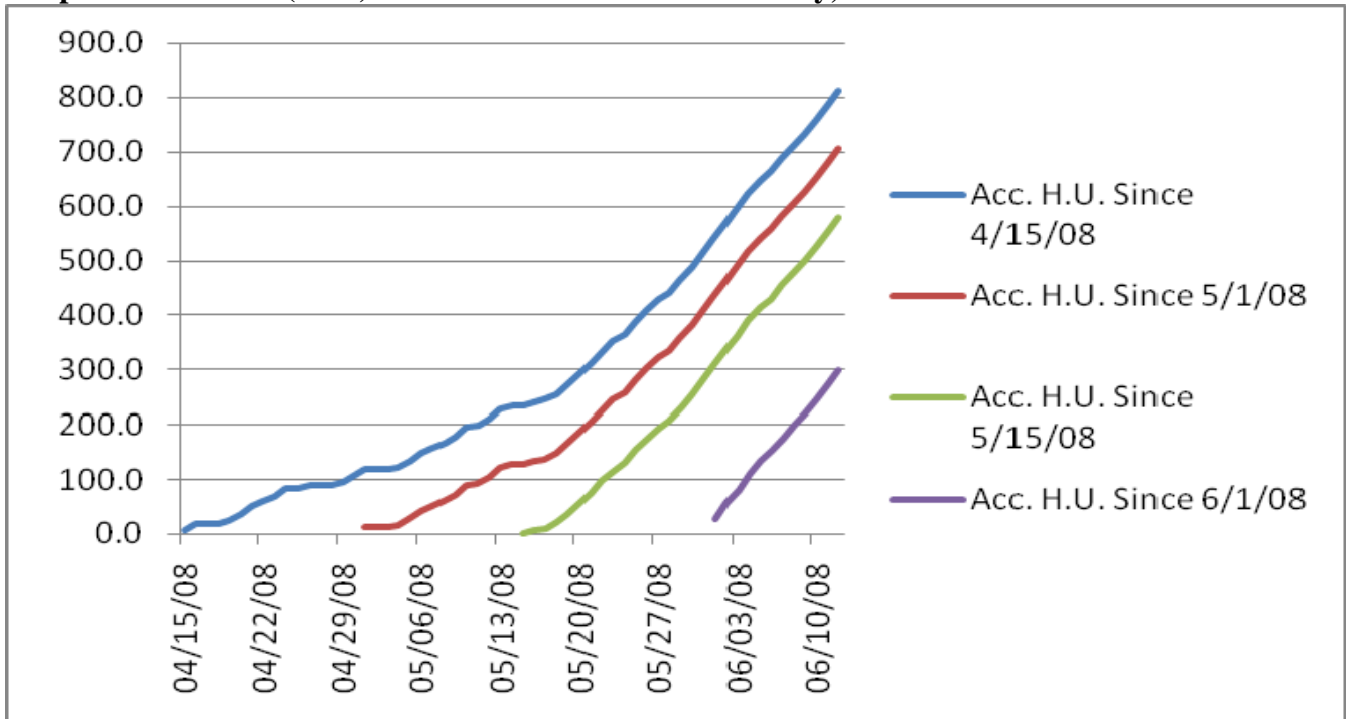
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Graph 1. Heat Unit (H.U.) Accumulation for Gaines County, Texas.

GAINES COUNTY IPM NEWSLETTER

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Volume I, No. 2

June 23, 2008

General Situation

Scattered rain storms have provided temporary relief in some fields. Several growers have had to cut their watering rates due to less water being available for pumping. Please see the attached "Rate of Water Use in Relation to Cotton Development". Hopefully this will help with your water management and maximize your yields.

Peanut plants continue to bloom and no diseases have been observed in peanuts. Cotton stages range from 4 to 12 true leaves, with a majority of the cotton averaging between 6 to 9 true leaves. Cotton plants infected with Fusarium wilt were observed in a field between Seminole and Hobbs. Cotton plants infected with black root rot were observed in a field southwest of Seminole.

A severe hail storm came through central and south central Gaines County this past Wednesday and caused severe damage to several cotton fields. Peanut fields also sustained damage but these fields should out grow the damage. However, these peanut fields should be monitored closely as they may be more susceptible to diseases.



Figure 1. Hail Damaged Cotton



Figure 2. Hail Damaged Peanuts

June 20th FOCUS on South Plain Agriculture (reported by Dr. Jason Woodward, Extension Plant Pathologist)

We are seeing **black root rot**, rootknot nematode, as well as Fusarium wilt. Symptoms of black root rot consist of severe stunting and necrosis and deterioration of the root system. There are currently no in-season tools available for control of black root rot. Management options are limited to seed applied fungicides. Plants infected with the black root rot fungus (*Thielaviopsis basicola*) may also be infected with the root-knot nematode (*Meloidogyne incognita*).



Figure 3. Cotton Infected with Fusarium Wilt

Plants exhibiting symptoms of **Fusarium wilt** were observed in a field in Gaines County. The disease is caused by the soilborne fungus *Fusarium oxysporum* f. sp. *vasinfectum* and is also found in association with the root-knot nematode. Initial symptoms of Fusarium wilt consist of a general wilt appearance that is more visible during the heat of the day.

A closer examination of infected plants will reveal yellowing or necrosis of the lower leaf margins. These symptoms are a result of the fungus clogging the vascular tissue, impeding the uptake and assimilation of water. Diseased plants will have a distinct

brown discoloration in the stem. We are currently screening cotton varieties for resistance/tolerance to Fusarium wilt, as well as evaluating seed treatments that may become commercially available. Results from these projects will be made available later in the season. One strategy that can reduce Fusarium wilt severity is proper nematode control.

Plant Growth Regulators

Cotton fields with good soil moisture and good nitrogen fertility or those cotton varieties which may have rapid growth should be monitored to determine if a plant growth regulator (PGR) should be applied in order to maintain an adequate vegetative/fruiting balance. PGR may also help to reduce plant height and height to node ratios.

Cotton Fruit Loss

Some square loss has been observed in scattered fields. All fields should be scouted thoroughly before insecticides are applied to determine if insects are present and causing the observed damage. Square loss could be caused by a number of factors including insects, environmental conditions and wind damage. Figure 4 is a square that has turned black and died, hence the name "blasted". Figure 5 is the scar left behind after the blasted square fell off the plant. Figure 6 is an atypical scar on a cotton plant in a minimum till field with thick wheat cover. This square was likely damaged by wind whipping the wheat into the cotton plant causing the square to be torn off the plant. This likely caused the elongated scar seen in Figure 6 versus the circular scar observed in Figure 5.



Figure 4. "Blasted" Cotton Square



Figure 5. Normal Scar on a Cotton Plant



Figure 6. Atypical Scar on a Cotton Plant

Mark Your Calendars

July 23rd

Gaines County Pecan Meeting.

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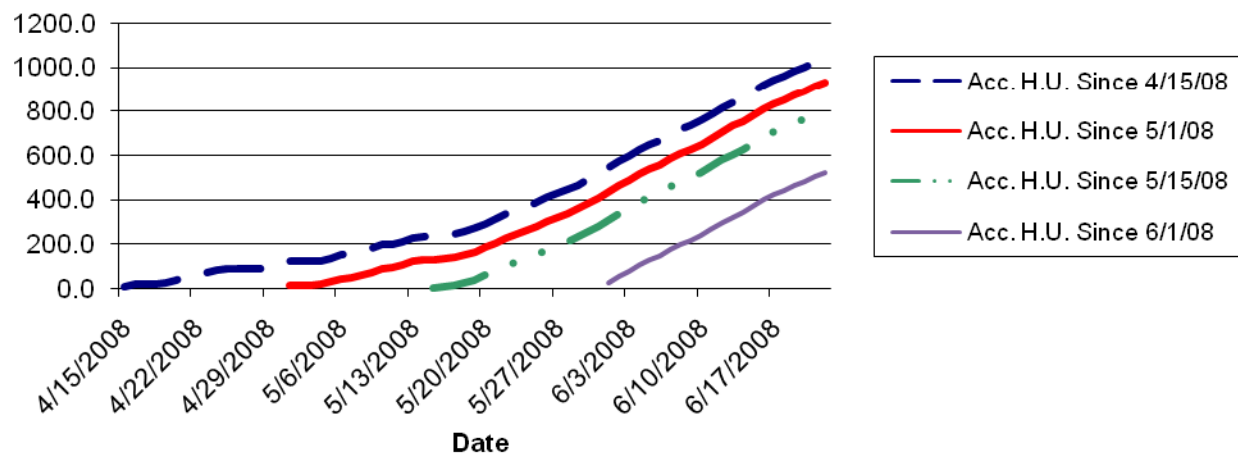
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2008 Cotton Heat Unit (H.U.) Accumulation Graph



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Volume I, No. 3

July 2, 2008

General Situation

Unfortunately Mother Nature has yet to have mercy on the area crops. During the last couple of weeks we have lost several more fields to hail. Being said, several growers have decided to plant grain sorghum in those fields that have been failed out. On July 9, we will have three sorghum field days at various locations to provide growers with a quick overview of sorghum production and management. Please see the attached flier for further details.

The cotton and peanut fields that have escaped the destructive weather are beginning to benefit from the much needed rainfall. Insect populations have remained low and no diseases have been observed. Peanut fields continue to bloom and have begun pegging. Pods have been observed in some fields (See *Figure 1*). Several cotton fields have out grown the wind and sand damage and are starting to grow and set fruit. Heat Units are accumulating rapidly. Last week we accumulated on average 20 heat units per day. It takes approximately 1064 heat units from the time of planting until first bloom (See *Table 1*). Cotton fields that were planted during the later part of April and earlier part of May have accumulated around 1000 to 1100 heat units. Therefore, we should be seeing blooms in these fields. However, plant development may have been slowed earlier in the season due to the wind and blowing sand along with the couple of weeks in which we had temperatures above 100 degrees.



Figure 1. Peanuts plants with pods starting to develop on the tip of the pegs.

Table 1. Cotton Development by Heat Units

Growth Interval	Accumulated Heat Units (DD 60's from planting required*)
Planting to:	
Stand establishment	78
Squaring	526
First bloom	1064
First open boll	1641
95% mature bolls	2271

* Calculated by the formula: $DD\ 60 = (Daily\ High + Daily\ Low) / 2 - 60$

The following information was provided by Calvin Trostle, Extension Agronomy, 806-746-6101, ctrostle@ag.tamu.edu 2 July 2008

If you are still making decisions on how to handle replanting of failed crops, especially cotton, or late planting, the primary discussion of options remains “2008 Alternative Crop Options after Failed Cotton & Late-Season Crop Planting for the Texas South Plains” as noted in last week’s FOCUS. It is available through county offices of Texas AgriLife Extension Service or online at <http://lubbock.tamu.edu/cotton/pdf/cropreplantoptions08.pdf>

Producers replanting to certain crops or certain maturities within several crops must move quickly in order to minimize the potential of a cool fall foiling proper crop maturity. Again, see the above document for guidelines on last recommended planting dates for numerous crops.

What are my replant options after Staple herbicide?

Essentially none. The only labeled options are 1) replanting cotton (too late for that), 2) STS soybeans, which I would not recommend in Gaines Co. (no seed available anyway), 3) wheat or other small grains in 120 days, and 4) cotton next year. Grain sorghum is not labeled after Staple for a minimum of 18 months.

How late can I plant particular maturities of grain sorghum in Gaines County?

Practical target cut off dates, which give a high probability of ensuring crops are not hurt by an early fall weather are:

- Medium-long maturity, June 30 (these hybrids appropriate for a minimum of 6-8” of irrigation)
- Medium, July 5
- Medium-early, July 10
- Early, July 15

Planting past these dates in general increases risk of failure to mature out the crop. Yields on many early maturity sorghum hybrids are low. For early July, each day planted earlier is worth two days of heat unit accumulation in early October for grain sorghum (DD50 basis).

General Grain Sorghum Seeding Rates

For failed cotton is going back to grain sorghum:

- Dryland, low soil profile moisture, target ~26,000 seeds/A (2.0 seeds/ft. on 40” rows)
- Dryland, high soil profile moisture, no more than 32,000 seeds/A (2.5 seeds/ft. on 40” rows)
- Limited irrigation (5-6”), low soil profile moisture, target ~40,000 seeds/A
- Limited irrigation (5-6”), high soil profile moisture, target ~50,000 seeds/A
- Full irrigation (12-16”), target 68,000-80,000 seeds/A.

Extension suggests you cap your seeding rates at 80,000 seeds/A in just about any high irrigation scenario, though by late June/early July consider up to 90,000-100,000 seeds/A for non-tillering hybrids.

The above are general guidelines. If you are debating whether to go with a higher seeding rate, then usually the safe bet is “Don’t”. Too high sorghum seeding rates actually hurt grain sorghum production when water is limiting.

Producers interested in a more precise target on grain sorghum seeding rates may consider the attached grain sorghum seeding rate calculator. Assumptions are made about 90-day rainfall, and then you include your current soil moisture estimate, as well as targeted irrigation level. This will adjust your seeding rate accordingly.

Updated Grain Sorghum Weed Control Guide & Mid-Season Weed Control Options

Extension agronomist Brent Bean, Amarillo, has updated his summary of weed control options for grain sorghum. It is available at

<http://lubbock.tamu.edu/sorghum/pdf/sorghumweedcontrolguide08.pdf>

The most common weed control inquiries from producers focus on the use of propazine (new in 2007 as Milo-Pro) or atrazine, metolachlor (e.g., Dual Magnum, Cinch, etc., which requires use of Concep treated seed), and 2,4-D or dicambas (including Clarity, Banvel).

Propazine Reformulated in 2008 for Improved Flowability

Propazine is a good choice on sorghum if returning to cotton in 2009. It is 'softer' on rotation to cotton. Some key points of the propazine label relative to atrazine are 1) labeled for sandy loam soils (but do not incorporate mechanically), and 2) no restriction of use if soil organic matter is less than 1%. Albaugh's label says no rotation to cotton for 12 months at the full rate of 1.2 quarts per acre, but seems to beg the question about rotation back to cotton if the rate is less than 1.2 quarts, and when that 2009 cotton could be planted. If you questions about this contact an Albaugh representative.

In 2007 producers spraying Milo-Pro had difficulties spraying propazine without plugging. Albaugh has reformulated any leftover and all new product. Albaugh staff report no spraying problems so far in 2008. The label still recommends, however, that you use a coarser screen, 50-mesh (not 100-mesh, a common size), keep pressure up 30-40, and use at least 10 gal/A by ground (minimum 3 gal/A by air). Maintaining strong agitation in the tank further minimizes any potential problems for propazine clogging screens and tips.

Avoid Mistakes with 2,4-D and Dicamba Injury to Grain Sorghum

Key to many herbicide options in grain sorghum after emergence is the stage of growth of sorghum when you wish to use the herbicide. Many labels note that applications can be made up to a certain height or leaf number (e.g. apply the dicamba herbicide Clarity prior to 15" tall, but use drop nozzles if sorghum is taller than 8"). Other herbicides will discuss application restrictions in terms of leaf number. Either restriction, height or leaf number, corresponds in part to the development of the growing point which switches over from producing leaves to initiating development of the spikelets and potential number of seed you may have for each head. The effort to guide herbicide applications such as dicamba and 2,4-D is to minimize any of these growth regulator type herbicides from getting in the whorl which could lead to 'blanking' or 'blasting' of the head hence no seed development.

Common problems over the past several years with these types of sorghum herbicide applications have been twofold: 1) spraying and getting too much herbicide on the sorghum plant and ultimately in the whorl; and 2) using hoods or directed spray (drop nozzles) that are not working the way they should and hence again putting too much herbicide on the plants. Consult your herbicide labels for additional details on your application.

A Final Note about Grain Sorghum in Gaines County Here are two things I have been told by producers in Gaines Co. about grain sorghum:

- 1) Plant 1 pound of seed for each 1,000 lbs. of grain sorghum yield goal;
- 2) Grain sorghum has never done that well here.

First, if the common mistakes I see in grain sorghum production see across the South Plains have occurred in Gaines Co., then the reasons that past grain sorghum has disappointed in Gaines Co. could include the following:

Too high seeding rate, especially for highly sandy soils which do have less water holding capacity.

I believe the rule of thumb in #1 above breaks down above 2 lbs./acre (which is about 28,000-32,000 seeds/acre for most hybrids). Too many plants, even in irrigated, means that fields transpire more moisture from unneeded leaves and stalks, leaving less moisture per plant to make grain. Many producers in the South Plains have learned that seeding rates of 60,000-75,000 seeds per acre (4-5 lbs./A) can readily produce yields at 8,000 lbs./A or more if the water and fertilizer inputs are taken care of.

Lack of N fertility—you can't get something from nothing; grain sorghum requires about 2 lbs. of N per 100 lbs. of yield.

Irrigation levels were low, or timing or irrigation was poor; in the sandy environment supplemental irrigation should produce in the range of 350-400 lbs./A of grain yield per inch of irrigation.

So for fields that haven't done that well in the past, whether in 2007 or 1987, I would ask how the fields were irrigated, were they fertilized, was the seeding rate too high, did we expect something for nothing? With grain sorghum contracts in the \$12/cwt. range then the inputs are much more easily justified. If you are still expecting 'something from nothing' but insist on planting grain sorghum, then you better cut the seeding rate down considerably.

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Volume I, No. 4

July 14, 2008

General Situation

The weather has quieted down around Gaines County. We have not received any more reports of cotton fields being hailed out. Cotton plants have started to bloom. Peanut plants continue to bloom and are starting to form more pods. Insect pressure has remained low.

Bollworm/Tobacco budworm eggs have been observed in cotton and peanut fields. A majority of the cotton acres in Gaines County are Bollgard, Bollgard II or Widestrike, therefore the larvae that are hatching should die after ingesting the Bt toxin. Scattered larvae have been observed in some peanut fields, however, very little damage has been observed. Peanut plants can tolerate some foliage loss and treatment for “worms” is rarely justified.

Verticillium wilt is starting to show up in the southwestern part of the county in cotton fields that do and do not have a history of Verticillium wilt. During the last two weeks our average daily high temperature was around 87 degrees. These cooler and humid conditions are favorable weather for disease development. Southern blight was found in a peanut field in the southwestern part of the county.

Description of *Verticillium Wilt* from the August 10, 2007 FOCUS on South Plain Agriculture (reported by Dr. Jason Woodward, Extension Plant Pathologist)

The fungus causing this disease is capable of residing in the soil for an extremely long time. Initial infections take place early in the season, and development of the diseases is favored by cool air and soil temperatures. As the disease progresses, the fungus blocks water channels. Infected cotton plants have a yellowing of leaves between the veins, which may result in premature defoliation. These



Figure 1. Verticillium wilt on cotton

symptoms may be similar in appearance to Fusarium wilt. Management options for Verticillium wilt are limited. A major factor in management of Verticillium wilt is the concentration of the pathogen (fungal inoculum) in the soil. When soil populations are low, very little (if any) disease may be present in the field; however, as the soil population increases and the disease incidence increases and

severe yield losses may be experienced. Therefore, it is important to 1) know which wilt pathogen you are dealing with, and 2) know the density of the pathogen in the soil. Within the season,

Verticillium can be identified in the laboratory by examining stem sections from the bottom 2-3 inches of the stem. In order to determine soil populations, more detailed study is required. Composite soil samples can be collected in the fall and winter, and assayed for Verticillium. If soil populations are excessive, information generated from variety testing becomes very important. In the case of severely infested fields, crop rotation with a non-host may be necessary.

This year we have three on-farm trials in Gaines County which are screening for tolerant/resistant cotton varieties. The results from these trials will be sent out at the end of the season.

Southern Blight

Southern blight, caused by the soilborne fungus *Sclerotium rolfsii*, has coarse, initially persistent white fungus strands that develop at a moderate rate on all plant parts and on the soil surface, often in a flat-fan pattern (See Figure 3). Nearby plant tissue becomes desiccated due to digestion by the fungus, and the mycelium disintegrates gradually over several days or weeks. On this white fungus growth, mostly-round sclerotia (seed-like long-term survival structures) age from white to tan to black and are almost never found inside stems, pods, or seeds. Southern blight is favored by warm weather. Control methods include: Rotate to avoid peanut after peanut if possible. Plant irrigated peanuts on a raised bed at least 4 inches high. Use a variety with partial resistance if available. Avoid very high seeding rates in problem fields (early development of a dense canopy retains humidity that favors the southern blight fungus). Do not throw soil onto peanut plants during cultivation. Control foliar diseases with fungicides to prevent leaf shed. Several fungicides can contribute to southern blight control. Multiple applications as preventative treatments in problem fields are suggested rather than single applications or rescue treatments after southern blight injury has occurred.

This information was obtained from the Texas AgriLife Extension Service, Texas Peanut Production Guide.



Figure 2. Dark brown streaks in the stem of a cotton plant with Verticillium wilt



Figure 3. Desiccated peanut plants infected with Southern Blight

The following information was provided by Calvin Trostle, Extension Agronomy, 806-746-6101, ctrostle@ag.tamu.edu ----- Grain Sorghum—Gaines/Yoakum Co. Follow-up

Below is a summary of the most common questions during our grain sorghum producer updates last Wednesday.

Is it too late to still plant grain sorghum?

As of July 9th quite a few producers were still planting. For Gaines Co. that meant that 'safe' dates for planting medium maturity hybrids were past, and as of this writing (7/14) for counties like Gaines, Dawson, Howard, Martin we have reached the point that ideally all medium-early maturity grain sorghums should already be planted. Our last recommended planting date for **early** maturity grain sorghum is July 15 for this southern area though some plantings later still have potential. An early maturity grain sorghum—which has lower yield potential—at a typical ~85 days to maturity will flower by about Sept. 10-15, and is pushing it in the cool weather in the first week of October to full maturity.

I have quite a bit of pigweed in my young sorghum. What are my options?

The two herbicides that have the best activity on pigweed are 2,4-D (regulated in Gaines Co.; cannot be applied at this point) and dicamba (Banvel, Clarity), but both have specific guidelines on their application to reduce the potential for injury on grain sorghum. Banvel may not be applied when the sorghum is more than 15" tall (and must use drop nozzles after 8" tall). This is to minimize the contact of the dicamba with the plant and especially to keep the herbicide out of the whorl lest the developing head be injured and result in 'blasting' or failure to develop grain later in the season.

Some producers following the label guidelines still report injury, and in fact dicamba often does result in leaf rolling and leaning of plants, but they usually grow out of it in 10-14 days. This application of dicamba is best for weeds that are <3" tall. For buster planted grain sorghum pigweed is often the worst down in the furrow with the grain sorghum, and in this case the producer needs to ensure dicamba application at a time when the small sorghum can be sprayed over the top. Once you move to drop nozzles, you can't get enough where the weeds are.

For crisis situations (pigweed 12" or more, or as tall as the sorghum) where late attempts are made to salvage the sorghum crop then sweeps and herbicide with hooded and layby sprayers might be attempted to knock the pigweed back. There are no easy options at this point.

The 2008 grain sorghum weed control options guide from Texas AgriLife Extension Service is on the web at <http://lubbock.tamu.edu/sorghum/pdf/sorghumweedcontrolguide08.pdf>

Should I even consider post-emerge atrazine in my grain sorghum if I may go to fall wheat or 2009 cotton?

According to Brent Bean, extension weed scientist, Amarillo (806.677.5610, bbean@ag.tamu.edu), atrazine over the top when sorghum is 6-12" tall is effective for good weed control. POST is often the best way to put atrazine out, and some producers find that applying over the top when sorghum is shorter is also successful. Use crop oil, pigweed should be less than 6" tall, but expect minimal grass control. Atrazine, however, is not labeled for coarse soils and for soils with less than 1% organic matter.

Propazine (Milo-Pro) which is labeled for sandy loams and any level of organic matter is not labeled for POST applications.

Rotation after atrazine to wheat is not labeled until the following year, and injury may be anticipated unless high rainfall, high irrigation levels occur. In contrast, propazine is labeled at 120 days to wheat though some of our Texas A&M weed scientists disagree on the potential for injury to wheat.

Producer experience suggests that cotton injury from atrazine can be a gamble especially if rates are not reduced to at or below ¾ lb./A and in dry years. The last thing we would want is to inhibit our 2009 cotton due to atrazine residues. Some atrazine labels are vague about cotton the next

year, and others say no cotton the next year if applied after June 20 and/or specify a minimum amount of rainfall + irrigation (often >20") to reduce risks to next season's cotton. The rotation restriction to cotton for propazine is 12 months at the full rate of 1.2 quarts per acre.

I have nutgrass/nutsedge in my grain sorghum. What are my options?

Gaines Co. fields in sorghum that have significant yellow and purple nutsedge might consider an application of Permit (halosulfuron), which controls yellow nutsedge and should have good activity on purple as well. Sorghum stage should be 2-leaf to layby. Control of pigweed would not be expected unless tank mixed with 2,4-D or dicamba. Crop rotation restrictions are 2, 4, and 6 months to wheat, cotton, and peanut, respectively.

I have a lot of volunteer wheat in my grain sorghum. What are my options?

There are no good options here. Sweeps are the best bet, but most of the fields in Gaines Co. with this problem are meant to be conservation tillage, and have a lot of stubble which we would prefer to not disturb. Sorghum and wheat are in the same grass family. There isn't any herbicide that can distinguish between the two. Some of these problem fields are dryland where wheat was planted for cover, then went to seed. Since wheat is a cool season grass, the return to open sunny weather with highs in the mid-90s should enable the sorghum to eventually pull ahead, but some fields are currently nearly a carpet of volunteer wheat, and if the sorghum stands are there and sorghum prices remain strong then perhaps we reconsider the sweeps.

Going forward options to manage wheat in grain sorghum fields are to use Dual Magnum herbicide (Concep seed safener required), which has significant grass control, and perhaps a tillage to trigger wheat germination with later sorghum planting during a warmer time of the summer.

I applied Pursuit or Cadre in my 2007 crop. Will that affect grain sorghum?

Potentially yes. The rotation for both herbicides to grain sorghum is 18 months. For questions about other cotton and peanut herbicides in your grain sorghum field contact Dr. Peter Dotray, Extension weed scientist, 806.746.6101, pdotray@ag.tamu.edu

My dryland sorghum looks pretty thin. Is it thick enough to make a decent crop, should I replant, or should I let it go?

We looked at a dryland buster-planted field at Denver City that had 18,000 plants/acre or 1.4 plants per foot of row. Yes, it looked thin, but it was a good stand for a dryland field. With the likelihood of at least a little tillering, this field pending favorable rainfall and modest N fertility could readily deliver a 3,000 lbs./A yield potential, but the population is low enough that it is much less likely to burn up in a very dry year and still produce a dryland yield worth harvesting.

What kind of fertility should I put on my grain sorghum?

The rule of thumb for N is 2 lbs. of N per 100 lbs. of yield goal. For applications with a ground rig when you put it all out, it should be on within about 30 days of planting (irrigated and watered in). If making pivot application, then probably at least half of the N should be on by 30 days, and all but perhaps the last 10% completed before boot stage. Phosphorus requirement in grain sorghum is modest, about 3/8 lb. per 100 lbs. of yield goal. Unless you have a yield goal of 5,000 lbs./A or more, then mid-season applications are not a priority.

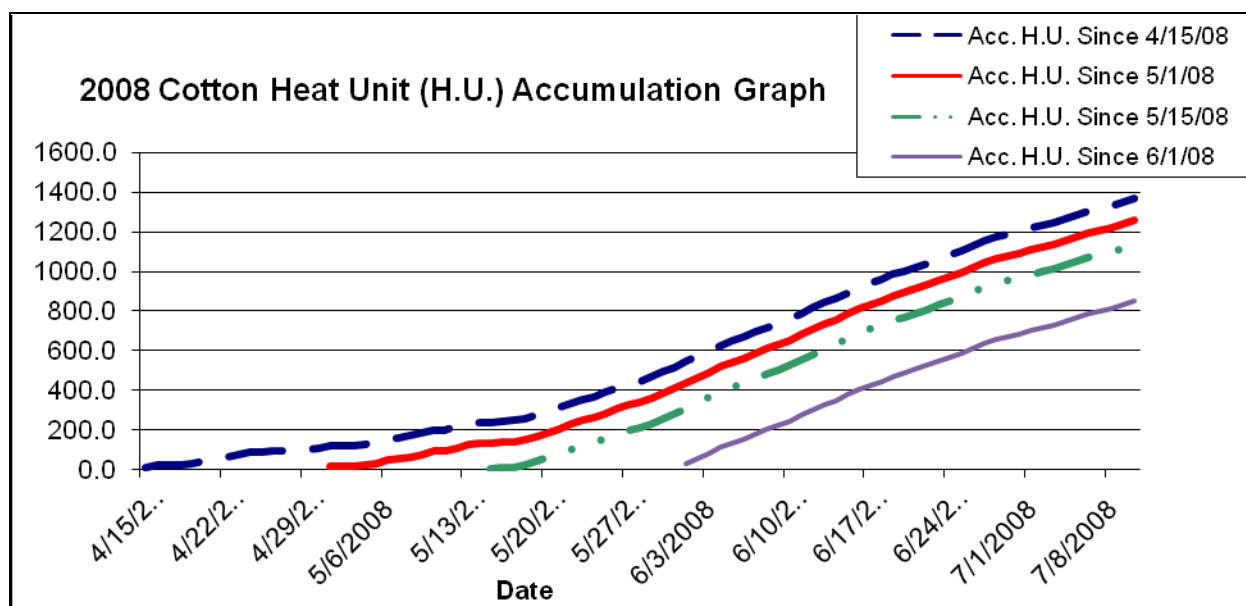
Grain sorghum is very sensitive to iron deficiency induced by high pH soils, especially caliche soils. If you soil has a lot of caliche and a whitish cast to the field, then iron deficiency will probably occur, and expensive foliar feeding is about the only way to address it.

Is irrigating grain sorghum 4-6" enough?

Several producers indicated that they would seek to limit their irrigation on grain sorghum to 4-6". The potential return on irrigation of sorghum per 1" of water is higher than it has ever been, and

potential gross returns per 1" currently are similar to cotton—with a crop that has much less input cost! As a rule of thumb grain sorghum, provided that adequate N fertility is in place, yields approximately 350-425 lbs. per inch of rainfall or irrigation. Producers with seed drops above ~45,000 seeds/A or stands above 39,000 plants/acre (e.g., 3 plants per foot) and medium or longer maturity grain sorghum hybrids may consider higher irrigation levels. One field in our July 10 tour had 40,000 plants per acre with Pioneer 84G62 medium-long hybrid. This hybrid has excellent yield potential, and is best managed in sandy Gaines Co. with at least 8" and preferably more inches of irrigation. This hybrid is frequently irrigated with up to 15" in the northwest South Plains with yields usually topping 8,000 lbs./A at that level of irrigation.

Four to six inches, however, is a good target for irrigation on medium maturity and shorter grain sorghums with modest plant populations about 25,000 to 32,000. If the crop is looking good later in the season, I would not hesitate to irrigate more as the return should be very good.



Mark Your Calendars

July 23, 2008

Pecan Field Day

(Please see attached Flier)

July 23, 2008

Taking the Bull by the Horns: Pricing Your Cotton in a Volatile Market

Presented by the Texas AgriLife Extension. This workshop is a part of the Cotton Profitability project sponsored by the Cotton State Support Committee.

Texas A&M Center at Lubbock, ½ Mile East of I-27 on Highway 1294

Instructors: John Robinson, Jay Yates, Jeff Pate, Jackie Smith and guest instructor Kelli Merritt.

To Register: Call Wendy at 806-746-6101 to reserve a seat. Pay \$20 fee at the door. (Checks only please.) Lunch and handouts provided.

Please join me in Thanking our Sponsors for the Grain Sorghum Field Day

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GAINES COUNTY IPM NEWSLETTER

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Volume I, No. 5

July 29, 2008

General Situation

Aphids have been found in low numbers in a couple of cotton fields. Fall armyworms and bollworms are being found throughout the county in peanuts, cotton, and grain sorghum. Please see that attached "Worm ID Key." This key will be valuable when trying to determine which type(s) of "worms" you are dealing with in your fields.

Verticillium wilt continues to be found in an increasing number of cotton fields and is starting to show up in peanut fields (See *Figure 1*). Leaf spot and Sclerotinia have been observed in peanut fields. Alternaria blight has been observed in two cotton fields. Fields should be scouted weekly to detect disease development.



Figure 1. Peanut plant infected with Verticillium Wilt

During the last two weeks, on average, we have accumulated 21 heat units per day. It takes approximately 300 to 350 heat units for a square to develop into a bloom. Those cotton fields that have not suffered from weather related damage have a good square set. Water is one of the keys in maintaining this fruit load. Several of these fields are in peak bloom or will be within the next couple of weeks. Cotton plants will use the most water during peak bloom. Area grain sorghum fields are averaging around 5 – 7 leaves.

Fall Armyworms in Grain Sorghum

Fall armyworms and bollworms have been observed in area grain sorghum (milo) fields. Fall armyworms have an inverted Y on their heads as seen in *Figure 2*. Generally speaking, sorghum in the 2 - 3 leaf stage (shorter than 6 inches) may need to be treated if worm populations are sufficient to cause significant damage to the plants. Applications of insecticides during the whorl stage could increase the likelihood of secondary pest outbreaks. After the 2 – 3 leaf stage, the growing point or sorghum head is less accessible by "worms" until it reaches the pre-boot stage, when the head is towards the top of the whorl. The sorghum head can be identified by cutting the stalk vertically. Once the sorghum reaches the pre-boot stage growers should scout fields consistently to determine if worms are feeding on the developing sorghum head and later on the emerged head.

To find "worms" in whorl stage sorghum, pull the whorl leaf from the plant and unfold it. Frass or larval excrement is present where larvae feed within the whorl. Damaged leaves unfolding from the whorl are ragged with "shot holes." Although this may look dramatic, leaf damage usually does not reduce yields greatly, and control of larvae during the whorl stage is seldom economically justified. Also, larvae within the whorl are somewhat protected from insecticides. Insecticide application may be justified if larval feeding reduces leaf



Figure 2. "Worm" damage on 7 leaf stage sorghum and a picture of a fall armyworm showing the inverted Y on the head

area by more than 30% or is damaging the developing rain head or growing point with the whorl.

Some more helpful tips on fall armyworm control can be gained from the Plains Pest Management Newsletter written by Greg Cronholm, Extension Agent in Hale & Swisher Counties. In the newsletter Greg made the following suggestions: When aerial application is used it should be followed immediately with a center pivot application of water, where water is applied so it will wash some of the chemical into the whorl. If chemigation units are available for center pivots, then very high levels of control can be achieved. On row watered corn or sorghum, ground rig applications may be used where 15 to 20 gallons per acre are applied and nozzles are directed over the top of the row.

Irrigated Grain Sorghum

At 30 to 35 days (around 7 fully expanded leaves) after planting the growing point starts to differentiate. During this point the growing point changes from vegetative to reproductive, and the seed panicle begins to form inside the stalk. If sorghum is being grown under irrigation, it is important that the crop not be allowed to stress as the beginning of this stage when the maximum number of seed per plant is being set. Seed number per plant accounts for 70% of sorghum's final grain yield.

Corn Leaf Aphids in Sorghum

Corn leaf aphids have been observed in area sorghum fields (See *Figure 3*).

These insects can be found in large numbers deep in the whorl of the middle leaf of pre-boot sorghum, but also occur on the undersides of leaves. These aphids



Figure 3. Corn leaf aphids with dark bluish-green oval-shaped body with black legs, cornicles and antennae

suck plant juices but **do not** inject toxin as do greenbugs and yellow sugarcane aphids. The most apparent feeding damage is yellow mottling of leaves that unfold from the whorl. This insect rarely causes economic loss to sorghum. In fact, they maybe considered helpful. Beneficial insects such as lady beetles are often attracted to feed on corn leaf aphids. When corn leaf aphid numbers rapidly decline at sorghum heading, the beneficial insects are present to suppress greenbug and other insect pests. These beneficial insects also can move to adjacent crops, such as cotton, and help manage insect pests in those crops.

Bollworms and Fall Armyworms in Peanuts

Bollworms and fall armyworms have been observed in peanut fields. Peanut plants can withstand some foliage loss. Fields should be scouted to determine the number of worms per linear row foot. The threshold for Spanish peanuts is approximately 6 to 8 medium to large larvae per foot of row. Runner type peanuts have more foliage and can tolerate a few more worms. We have not observed any fields that warrant insecticide treatments.

Bollworms in Cotton

Bollworms and bollworm eggs have been observed in cotton fields. Non-Bt and Bt cotton (which could have some damage) should be scouted on a weekly basis. Eggs will generally be found in the upper third part of the plant. The larvae will hatch out of the eggs and begin feeding on the

small tender leaves and small squares before moving down the plant. Insecticide treatments should not be based on the presence of eggs or first signs of crop damage. When small worms are in the upper third of the plant, they are most vulnerable to natural mortality and predators. Once worms are larger than ½ inch, natural mortality decreases and insecticides are less effective.

Sclerotinia Blight in Peanuts

Sclerotinia blight, caused by *Sclerotinia minor*, has been observed in a field in the western part of the county. Sclerotinia blight is characterized in early stages by non-persistent small white tufts of cottony-like fungal growth at leaf axils on the stems near the ground line (See Figure 4). Later stages of the disease show up as bleaching and severe shredding of the stem (See Figure 5) accompanied by the production of many small, black irregular-shaped sclerotia that resemble mouse droppings in size, shape and color (See Figure 6). Confusion of this disease with southern blight, caused by the fungus *Sclerotium rolfsii*, can be costly because chemicals that control southern blight have little if any effect on *Sclerotinia minor*. Please refer the July 14, 2008 Gaines County IPM Newsletter for pictures and description of southern blight.



Figure 4. Small white tuft of cottony-like fungal growth of Sclerotinia blight



Figure 5. Bleaching and severe shredding of stem caused by Sclerotinia blight



Figure 6. Black irregular-shaped sclerotia that resemble mouse droppings in size, shape and color

Alternaria Blight in Cotton

Infected areas in a field exhibiting stem blight are relatively small and have a distinct circular appearance, resembling a lightning strike. Plants within these areas appear wilted and desiccation of leaves is apparent. Infections originate on the leaf margin and progress down the vein, petiole, and stem. The terminals of infected plants die and may exhibit a Shepherd's crook resulting ultimately in complete plant death. This information is from Jason Woodward's, Texas AgriLife Extension Plant Pathologist, presented at the 2007 Beltwide Cotton Conference, titled "Occurrence of Alternaria Stem Blight and Leaf Spot of Cotton in West Texas."



Figure 7. Cotton plants killed by Alternaria Blight



Figure 8. Cotton plant showing symptoms of being infected with Alternaria blight (the terminal is wilted but at this point the root system is still healthy)

Information for this newsletter was obtained from the following publications:

- Texas AgriLife Extension Service, “Managing Insect and Mite Pests of Texas Sorghum”
- Texas AgriLife Extension Service publication “Sorghum Growth and Development”
- Texas AgriLife Extension Service, “Texas Peanut Production Guide”
- Texas AgriLife Extension Service, “Managing Cotton Insects in the High Plains, Rolling Plains, and Trans Pecos Areas of Texas”

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Volume I, No. 6

August 16, 2008

General Situation

The hot dry weather has had an impact on this year's crops. After moisture, the most important factor in the development of squares and bolls is temperature. The heat unit (H.U.) concept is a way to measure the relationship between cotton development and temperature. This year we accumulated approximately 2018 heat units between May 1st and August 14th. In 2004 and 2007 we had accumulated approximately 1793 and 1395 heat units, respectively for the same period of time. This could be one of the main contributing factors as to why the cotton plants have cutout earlier this year than in previous years.

Cotton fields range from 2 to 7 Node Above White Flower (NAWF), with a majority of the fields at 3 to 4 NAWF. The fields with 6 to 7 NAWF tend to be the later planted fields, fields that were hailed on earlier in the season, or fields with exceptionally good water.

During the last two weeks cotton plants have started to shed small bolls and squares. This is a natural process in which the plant is adjusting its fruit load to match the supply of water and nutrients.

Growers with conventional cotton varieties (non-Bt) should keep a close eye on their fields. Bollworm, fall armyworms, and beet armyworms could migrate from sorghum and peanut fields and lay eggs in cotton fields. The lush (greener or actively growing) cotton will be more attractive to these moths. Bollgard, Bollgard II and Widestrike fields should also be scouted weekly to determine if the fields have treatable "worm" populations.

Grain sorghum (Milo) crop stages range from being in the whorl stage to heading out and blooming. Fall armyworms and bollworms continue to be observed in high numbers in sorghum fields. We have observed a lot of bollworm and fall armyworm moths in several cotton and sorghum fields. Eggs and egg masses have also been observed. Treatments should not be based on the presence of adults and/or eggs. Fields should be scouted on a weekly basis to determine if larvae populations are increasing/decreasing and if they will cause economical damage at the current crop stage.



Figure 1. Fall armyworm feeding on the developing sorghum head

Verticillium wilt continues to be found in an increasing number of cotton and peanut fields. Sclerotinia and leaf spot have also been observed in more peanut fields. Pod rots caused by Phythium and Rhizoctonia have been observed in scattered peanut fields. White grubs have been observed at low population levels in scattered fields. We have not observed any damage associated with these low population levels and no fields have been treated. Fields should be scouted weekly to detect disease and insect development.

Nodes Above White Flower (NAWF)

The Nodes Above White Flower (NAWF) is a technique that growers and consultants can use to chart cotton's growth during the bloom period. NAWF is a reflection of the amount of "horsepower" the plant has left. If the boll load consumes almost all of the nutrients provided by the roots and leaves, or if stress reduces the nutrient supply, then little excess supply will be available for continued terminal growth. Under these conditions, the NAWF will lessen as the squares in the top of the plant develop into blooms. This information is from the *Cotton Physiology Today*, Newsletter of Cotton Physiology Education Program – National Cotton Council.



Figure 2. Upper most first position white flower

To determine NAWF, count the number of nodes above the upper most 1st position white flower (See Figure 2). The cotton plant is "cutout" when it reaches 4 or 5 NAWF. Before cutout approximately 100 flowers will produce 1 pound of seed cotton. After cotton reaches cutout, the number of flowers needed to produce 1 pound of seed cotton increases dramatically. The flowers produced after cutout contribute less to yield because the bolls are smaller and boll retention is reduced.

"Worms" in Grain Sorghum

Fall armyworms and corn earworms (a.k.a. bollworms) continue to consume leaves in the whorl stage sorghum. Although this damage may look bad, it is likely more of an aesthetic damage than economical damage. These fields should be monitored closely to determine if the "worms" are feeding on the growing point. For whorl stage sorghum, the growing point can be located by cutting the stalk vertically and looking for the developing sorghum head (See Figure 3). Once the sorghum has headed out, bollworms and fall armyworms larvae can feed on developing grain. Natural mortality of small worms is normally very high. Moths can lay several hundred eggs on sorghum grain heads before or during flowering, but only a few larvae survive. Natural factors suppressing these insects include predators, parasites, pathogens and cannibalism among larvae. You can use the tables below to determine if you have reached an economic injury level in your sorghum fields.

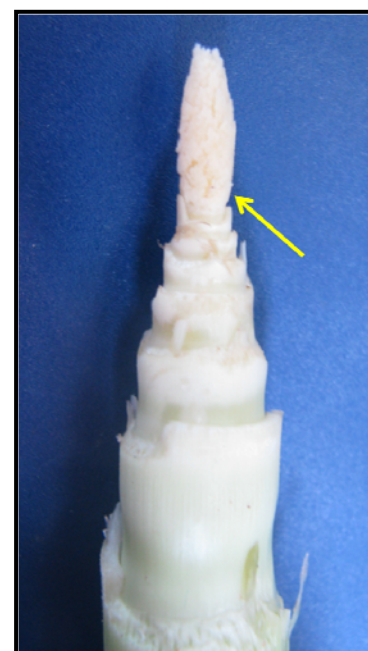


Figure 3. Developing sorghum head in whorl stage sorghum

Table 1. Economic injury level for medium-size ($\frac{1}{4}$ to $\frac{1}{2}$ inch) bollworms or fall armyworms shown as the number of larvae per acre. When the number of larvae per acre exceeds the number in the table at a given cost of control and value of grain per cwt, the value of the protected grain exceeds the cost of control.

Control Cost \$/Acre	Grain Value (\$/100 lbs)		
	8.00	9.00	10.00
6	38,250	35,500	31,250
8	51,500	47,500	41,750
10	64,500	58,500	51,500
12	77,750	70,500	62,000

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Table 2. Economic injury level for large-size (longer than ½ inch) bollworms or fall armyworms shown as the number of larvae per acre. When the number of larvae per acre exceeds the number in the table at a given cost of control and value of grain per cwt, the value of the protected grain exceeds the cost of control.

Control Cost \$/Acre	Grain Value (\$/100 lbs)		
	8.00	9.00	10.00
6	7,250	6,500	5,750
8	9,750	9,000	7,750
10	12,250	11,250	9,750
12	14,750	13,500	11,750

Peanut Pod Rots (Pythium and Rhizoctonia)

Diseases caused by these two groups of fungi can occur alone or together. Pythium fungi contribute to root rot, wilting, stunting, plant death, and pod rot (pod breakdown). Symptoms of Pythium infection may include a wet black decay sometimes covered with a loose white fungus mat; sloughing outer root layer, and greasy dark brown-black pod lesions. Rhizoctonia fungi cause disease on roots, lower stems, pods, pegs, limbs, and leaves. Symptoms of Rhizoctonia infection may include sunken red-brown dry-textured lesions on the hypocotyl (stem below cotyledons), stem (girdled seedlings), and limbs, and dry dull surfaced light/dark brown pod lesions. Cultural practices should be address rather than managing the problem solely with fungicides. Cultural practices include: avoid fields with known histories of these diseases; rotate with unrelated crops; plant on raised beds; improve drainage in low areas.

White Grubs in Peanuts

White grubs, the immature stage of the June beetle (See *Figure 4*), feed on the secondary or feeder roots of the plant, leaving the tap root intact. Plants appear to die of drought stress because there are no hair roots left to draw water. The beetle larvae do not travel far horizontally, but they do move a great deal vertically within the soil moisture profile. White grub populations are usually found in pockets within a field.



Figure 4. White grub

Plant Diseases and Tolerant/Susceptible Varieties

Growers have very few options in controlling some of the plant diseases that we are faced with in Gaines County. Currently, Dr. Terry Wheeler, Dr. Jason Woodward, myself and others have several on-farm field trials looking at tolerant/susceptible varieties. The results from these trials will be available at the end of the year. I encourage growers to utilize these results because we are seeing varying levels of susceptibility to these diseases. *Figure 5* is a picture of two different varieties of cotton. The variety in the top portion of the picture is more susceptible to Fusarium wilt and it had several dead plants. The other variety had no dead plants associated with Fusarium wilt.

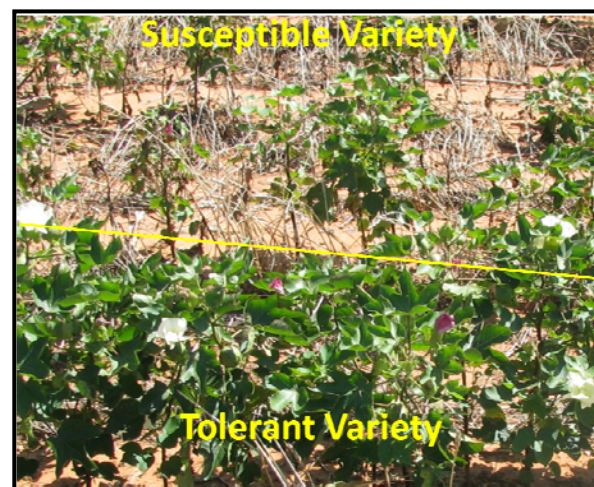


Figure 5. Susceptible and tolerant varieties of cotton in a field infected with Fusarium Wilt

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Unwanted Pesticides or Used Motor Oil? Bring them to this FREE collection event for proper disposal!

**September 23, 2008 - 8 a.m. to 1 p.m.; Dawson County Fair Barn, 1200 Court C, Lamesa TX
Contact: Jeff Wyatt at 806-872-3444**

Information for this newsletter was obtained from the following publications:

- Physiology Today, Newsletter of the Cotton Physiology Education Program – National Cotton Council. July 1991, Vol. 2, No. 8.
- Texas AgriLife Extension Service, “Texas Cotton Production, Emphasizing Integrated Pest Management”
- Texas AgriLife Extension Service, “Managing Insect and Mite Pests of Texas Sorghum”
- Texas AgriLife Extension Service, “Texas Peanut Production Guide”
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Volume I, No. 7

September 2, 2008

General Situation

As the end of the 2008 cotton season draws near, several growers may be wondering which white flowers will make? It takes approximately 850 Heat Units (H.U.) from white flower to open boll. During the last four years we have accumulated approximately 369 H.U. during the month of September (See *Table 1*). Therefore, the white flowers we see today will likely not have a chance to develop into an open boll.

Table 1. Heat Units accumulated during September for the corresponding years.

Year	H.U. Accumulated
2004	324
2005	472
2006	262
2007	418
Average	369

Disease pressure has increased in cotton and peanut fields. Verticillium Wilt continues to be found in several cotton and peanut fields. Alternaria has been noted in a few more cotton fields. Sclerotinia and “Pod Rots” have been found in several more peanut fields. Several of these disease spread rapidly during cool wet weather. Therefore, growers should be extra vigilant because of the cool wet weather we had during Labor Day Weekend and the cooler week that is being forecasted for the first week of September. Positive disease identification is necessary to ensure maximum economic returns from chemicals. Signs and symptoms can be similar for two or more soilborne diseases and effective fungicides may differ greatly for cost.



Figure 1.



Figure 2.

Figure 1. (upper left) Verticillium wilt showing up in cut-out cotton.

Figure 2. (upper right) Sclerotinia blight white tufts of cottony-like fungal growth at leaf axils. Later stages of the disease show up as bleaching and severe shredding of the stem accompanied by the production of small black sclerotia that resemble mouse droppings.



Figure 3. Photo by Jason Woodward



Figure 4. Photo by Jason Woodward

Figure 3. (lower left) Pythium pod rot wet causing wet black decay.

Figure 4. (lower right) Rhizoctonia fungi causing dry dull surfaced light/dark brown pod lesions.

Grain Sorghum Headworms and Sampling for Headworms

Headworms are a major concern right now as several of the sorghum fields in Gaines County have headed out. These fields should be scouted on a regular basis to determine if “worm” populations have reached an economic injury levels.

Begin sampling for headworms after the sorghum head has emerged and continue at 5-day intervals until the hard dough stage. To sample headworms, grasp the stalk just below the sorghum head, bend the head into a clean, white, 5-gallon bucket, and vigorously beat the head against the side of the bucket. Headworms will fall into the bucket where they can be seen and counted. Sample at least 30 grain heads, selected at random from across the field. In field larger than 40 acres, sample at least one grain head per acre. Record the number of **small** (less than ¼ inch long), **medium** (¼ to ½ inch long) and **larger** (longer than ½ inch) headworms found in the samples. Divide the total number of medium or large headworms by the number of heads sampled to get the average number of headworms per head. Then multiple the average number of headworms per head by the number of heads per acre to calculate the number of headworms per acre. Using the tables provided in the August 16, 2008 Gaines County IPM Newsletter growers can determine if they have reached an economic injury level in their sorghum fields. For example; If growers are estimating their grain to be valued at \$10 per cwt and if control cost is approximately \$8 per acre, then the economic injury level for **medium** size worms is 41,750 bollworms or fall armyworms per acre. For **large** bollworms or fall armyworms at the same grain value and control cost, the economic injury level is 7,750 per acre. **Larger** worms will consume more grain, therefore it takes less worms to reach the economic injury level. **Small** worms consume very little grain and about 80 percent of them die in this stage. Therefore, small larvae should not be considered in determining the economic injury level. If most headworms are **small** in size, then sample the field again in 3 to 4 days.

Cotton Aphids

Cotton aphid populations have been found in some cotton fields. Most cotton aphid populations remain low and virtually undetectable. A few fields have seen an increase in cotton aphid numbers. However, the beneficial insects are responding quickly and none of the fields have been treated for aphids. These beneficial insects may have migrated from neighboring grain sorghum fields where they were feeding on corn leaf aphids (which rarely cause economic loss to sorghum). *Figures 5 through 8* are beneficial insects. These beneficial insects will also feeding on “worm” eggs and small worms. Therefore, before applying an insecticide the impact of beneficial insects on pest populations in your field and neighboring fields should be considered.



Figure 5. Ladybird beetle larvae



Figure 6. Parasitized aphids



Figure 7. Lacewing larvae



Figure 8. Syrphid fly pupa

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Irrigation Termination

Sprinkler irrigation should be continued for 1 to 2 weeks after first open boll or until 20 percent of the bolls are open. The goal is to provide adequate moisture for the last harvestable bolls to mature. Please refer to “2008 Late Season Irrigation Management for Cotton in the Texas Southern High Plains” publication for further information regarding late season irrigation.

Increasing Harvest Aid Efficacy

A good target would be to have the soil profile nearly depleted as harvest aid season begins. First, this reduces excessive pumping for unnecessary water applications, and second the moisture stress can actually aid in establishing a physiological state that results in some older leaf shed. Cotton generally responds better to harvest aid application when there is some moisture stress on the plants. If excessive moisture is available, defoliation of some varieties becomes more difficult, as is often encountered in years when substantial late rainfall occurs. This information is from the August 22, 2008 FOCUS on South Plain Agriculture (reported by Dr. Randy Boman, Extension Agronomist).

Information for this newsletter was obtained from the following publications:

- “2008 Late Season Irrigation Management for Cotton in the Texas Southern High Plains”
http://lubbock.tamu.edu/focus/Focus2008/August_29/2008_Late_Season_Irrigation.pdf
- Texas AgriLife Extension Service, “Texas Cotton Production, Emphasizing Integrated Pest Management”
- Texas AgriLife Extension Service, “Managing Insect and Mite Pests of Texas Sorghum”
- Texas AgriLife Extension Service, “Texas Peanut Production Guide”
- Texas AgriLife Extension Service, “Managing Cotton Insects in the High Plains, Rolling Plains, and Trans Pecos Areas of Texas”

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GAINES COUNTY IPM NEWSLETTER

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September 15, 2008

General Situation

This cool wet weather means two things for our crops: Increased disease pressure and slower crop development. I have received reports of rain fall amounts ranging from 2 to 5+ inches. During the last week our maximum temperatures ranged from the high 60s to the low 80s. Our minimum temperatures ranged from the upper 50s to low 60s. This cooler wet weather is perfect conditions for disease development. *Sclerotinia*, *Verticillium*, and pod rots (*Pythium* and *Rhizoctonia*) continue to be found in several fields. Growers need to be diligent about scouting fields weekly or more often to monitor disease development.

Since *August 15th* we have accumulated 365 Heat Units (H.U.) on our cotton crop. So what does this mean for our cotton crop? Well it takes approximately 750 to 850 H.U. for a boll to mature. In other words we have accumulated approximately half of the H.U. required to develop those bolls which were flowers around *August 15th*.

Fall Armyworm Control in Grain Sorghum

Fall armyworms and bollworms (a.k.a. corn earworms) continue to be found feeding on sorghum heads. **Growers should continue scouting for headworms through the hard dough stage.** The fields that I have checked in Gaines County have a higher percentage of fall armyworms than bollworms. One thing to keep in mind is that fall armyworms are harder to kill than bollworms. This being said, if your field has a high percentage of fall armyworms than you may want to consider using a higher rate of a pyrethroid.

Growers who are considering adding **Lorsban** (for greenbug or sorghum midge) should note that there is a **30 day pre-harvest** interval for sorghum grown for grain, forage, fodder, hay or silage when Lorsban is used at the 1 pint (or less) per acre rate. There is a 60 day pre-harvest interval when Lorsban is used at a rate higher than 1 pint per acre. This information is from the *September 5th* edition of the *Focus on South Plain Agriculture*, reported by Dr. Patrick Porter.

Sorghum Growth and Development

Flowering typically begins when yellow anthers appear at the tip 5 to 7 days after panicle exertion. Over the next 4 to 9 days, anthers appear incrementally and develop down the panicle (See *Figure 1*).

After flowering, plant development centers on grain formation. Sugars, amino acids and proteins produced in the leaves and roots are rapidly transported to the kernel and converted to starch and protein. Seed development progresses from **milk** to **soft dough** to **hard dough** to **physiological maturity** over a 25 (under warm temperatures) to 45 (under cooler temperatures) day period after flowering, depending on variety and environmental conditions



Figure 1. This sorghum head is almost finished blooming. The top portion of the sorghum head has already bloomed and the yellow anthers are near the base of the sorghum head.

(temperatures). Kernels reach their maximum size (volume) about 10 days after flowering – the **milk stage**. The seed is soft, and a white-like liquid is obtained when kernels are squeezed. The **soft dough** stage occurs 15 to 25 days after flowering, when approximately 50 percent of the grain weight is accumulated – the kernel can be squeezed between the fingers with little or no liquid present. As a rule of thumb, if good soil moisture is still available to the plant – at least 1-2” – then terminate irrigation near soft dough stage. The **hard dough** stage occurs when the grain cannot be compressed between the fingers. The seed is physiologically mature when a **black-layer** appears immediately above the point of kernel attachment in the floret near the kernel base. The kernel is approximately 30 to 35 percent moisture and attains its full dry weight when the black-layer appears.

Gaines County 2008 Grain Sorghum Crop Development

Like cotton, growers can use a **heat unit (H.U.) formula** to monitor grain sorghum development in relation to the amount of useful energy available to plants each day. However, grain sorghum can tolerate lower temperatures and uses 50 degrees as the base temperature in the formula (cotton's base temperature is 60 degrees). The following formula is used to determine the amount of heat units accumulated during a day:

$$\text{H.U.} = (\text{daily max air temp} + \text{daily low air temp} / 2) - \text{base temperature}$$

Table 1. Accumulated H.U. from planting to successive growth stages for a short season grain sorghum variety. The last column depicts the approximate date in which sorghum planted on July 1, 2008 in Gaines County accumulated the corresponding heat units.

Growth Stage	Accumulated H. U. for short season varieties	Date July 1 st planted sorghum reached corresponding H.U.
Planting		
Emergence	200	July 8 th
3-leaf	500	July 19 th
4-leaf	575	July 21 st
5-leaf	660	July 24 th
Panicle Initiation	924	August 1 st
Flag Leaf Visible	1287	August 13 th
Boot	1683	August 29 th
Heading	1749	September 1 st
Flowering	1849	September 5 th
Soft Dough	2211	-
Hard Dough	2508	-
Black Layer	2673	-

Since *September 5th* we have accumulated an average of 19 H.U. per day. At this rate the sorghum planted on *July 1st* should reach the black layer stage in approximately 33 days.

Grain can be harvested at 20% moisture without mechanical damage but must be dried to below 14 percent. Grain can be harvested at **13 to 14% to avoid dockage** depending on the delivery point.

Harvest Aid Applications

Nodes above cracked boll (NACB) is a tool that can be used to time harvest aid applications. If the uppermost first position-cracked boll is within three nodes of the uppermost harvestable first position boll then no lint weight will be lost if a defoliant-type harvest aid is applied at that time.

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However, if the uppermost harvestable first position boll is four or more nodes above the uppermost first position cracked boll, then potential for some lint loss exists. The lint loss potential increase as the NACB increases. Micronaire reduction generally follows a similar pattern when using the nodes above cracked boll criterion. When defoliant type chemical are applied, some slight subsequent fiber development may occur before defoliation. If applying desiccants, more bolls must be mature in order to reduce the risk of fiber weight loss or reduction of micronaire, thus two to three NACB would be a better target.

Harvest aids are basically classed in three categories – desiccants, defoliants, and boll openers.

Desiccants (paraquat formulations such as Gramoxone Inteon, Firestorm, and various tank-mixes) dry down the plant by causing the cells to rupture. The old “rule of thumb” is that desiccants are normally applied when approximately 80 percent of the productive bolls are open, or at 2-3 nodes above cracked boll. Gramoxone Inteon and Firestorm are similar products that have paraquat as the active ingredient, however, they differ in the pounds of active ingredient per gallon. **Defoliants** (Ginstar, Def/Folex, Harvade, Aim 2EC, Blizzard, ET 2.5%EC, Resource, Dropp, FreeFall, sodium chlorates, paraquat at low rates and other products) result in initiation of an abscission layer at the base of the leaf petiole where it attaches to the stem. The natural abscission layer formation process is enhanced by the defoliant, which results in leaf drop. In order to obtain maximum leaf drop, defoliants require fairly healthy and active leaves which still properly function and are not severely drought stressed (tough and leathery). **Boll openers** (Prep and other generic products such as Ethephon 6, SuperBoll, Boll’d) and boll openers-defoliants (such as Finish 6 Pro and FirstPick which are ethephon products with additional synergists cyclanilide and AMADS, respectively) enhance boll opening to allow for more timely harvesting of the crop. These chemical affect natural plant processes associated with boll opening, but do not increase the rate of boll or fiber maturation. This information was obtained from the *2008 High Plains and Northern Rolling Plains Cotton Harvest-Aid Guide*.

Cotton Lint Development

The greatest impact of premature crop termination and cold weather is not on seed but on lint. The primary effect on lint is on thickening rather than lengthening. Since fibers elongate before they thicken, staple length is minimally influenced by premature crop termination or cold pre-harvest weather. Additionally, fiber lengthening can occur at colder temperatures because the optimum temperature for lengthening is 10 degrees colder than for fiber thickening. Once fibers reach their final length they thicken with daily rings of cellulose. Unlike a tree that grows outward by depositing new rings on the outside of the previous year’s growth, cotton fibers deposit new daily rings inwards. The daily rings alternate in direction as they fill in the hollow part of the fiber or lumen. When the lint is mature, the lumen is a small hollow core. The last stage of boll development starts with the formation of the abscission zone between the burs. Drying then causes strands in the boll wall or carpel to tighten and subsequently bend backwards opening the boll. As the boll opens, the lint dries and crimps due to collapse of the lumen and constriction in alternating layers of cellulose. Crimping of the lint causes it to fluff and intertwine allowing it to be spun into yarn. Boll drying can occur without leaves on the plant and under cold temperatures.

Cutting short the deposition of growth rings has several important quality implications. The most apparent effect is reduced maturity. With reduced maturity fibers, will be lighter and the 50 grain micronaire sample will therefore be composed of many more fibers. Thus air movement through the chamber will be reduced causing a low micronaire reading. This information is from the *Cotton Physiology Today Newsletter*.

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- *Cotton Physiology Today*, Newsletter of the Cotton Physiology Education Program – National Cotton Council, October 1989.
- September 5, 2008 *Focus on South Plains Agriculture*, Volume 47, No. 16
- Texas AgriLife Extension Service, “2008 High Plains and Northern Rolling Plains Cotton Harvest-Aid Guide”
- Texas AgriLife Extension Service, “Sorghum Growth and Development”
- Texas AgriLife Extension Service, “Texas Peanut Production Guide”
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