2004 Southwest Oklahoma Entomology Report

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Entomology Activities

Insect monitoring is a key component in a successful IPM program. Trapping activities in 2004 was expanded to cover cotton growing region of Southwest and Northern Oklahoma. Trapping activities centered on the beet armyworm and the bollworm complex. Population trends, insect updates, and control tips are published in the Cotton Sentry and distributed to the state's cotton producers and consultants to help formulate management strategies to enhance profitability.

Like 2003, Bollgard™ technology was the focus of this year's research. Monetary support received throughout the year permitted this applied research to continue. Besides State IPM funds, I want to thank all the chemical companies for their contract research support. Special thanks go to the cotton producers for their support as cooperators and support through the Cotton Incorporated State Support Funds and the Southwest Research and Extension Center personnel for their assitance.

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Oklahoma Cotton Insect Report 2004

A total of 200,387 acres (Oklahoma Boll Weevil Eradication Organization figures) were planted and harvested in 2004. Poor growing conditions throughout June slowed plant development and jeopardized stands across the state. A cooler than normal summer reduced heat unit accumulations by 277 units (May 1st to October 1st). However, sufficient heat units occurred to produce a full crop. The state's production average is projected at 700 lbs. of lint per acre.

Despite widespread use of at-planting insecticides, thrips infestations built to damaging levels across the state. Cotton fleahopper infestations were non-existent in mid-to-late June. However, tremendous numbers inundated fields in late June as weed hosts dried up. Many fields received two insecticide applications to prevent significant yield loss.

Bt cotton continues to be very popular in Oklahoma. Bt cotton represented 51% of the cotton acreage (or approximately 102,752 acres) in 2004. Bollworm pressure was spotty emphasizing the importance of scouting. Conventional cotton received 1 or 2 insecticide applications to prevent worm damage. Populations spilled over into Bt cotton requiring over-sprays in approximately 22% of the fields.

Ongoing Research Projects

Several Bt cotton trials were conducted in 2004 to further evaluate the value of this technology under Oklahoma conditions. Since 1996, Bt cotton provided sufficient bollworm control and increased yields to compensate for rental fees under irrigation. During this 8-year period relying on the Bt technology enhanced profits by $ 62.95 per acre annually. For the first time in five years one of the Bt varieties' yield compensated for its rental fees under dryland conditions. St 4646 returned $2.08/acre over the rental fee. However, the slight profit coupled with the poor performance in past years does not warrant planting Bollgard™ varieties under upland dryland conditions that exist across the Rolling Plains of Oklahoma.

This was the ninth year that Heliothine infestations failed to reach levels in economic threshold trials to activate insecticide applications. Heliothine pressure remained below 5 larvae (> 3/8 inch long) per 100 terminals. Insecticide protection was planned if infestations approached 10 larvae (> 3/8 inch long) per 100 terminals. Biweekly tagging of eggs and newly hatched larvae revealed no Heliothine survival on tagged plants. All newly hatched larvae died before any of the larvae reached ½ inch long.

Research continued in 2004 to determine the impact of planting date. Previous research before boll weevil eradication started indicated that years with high boll weevil survival planting date is critical regardless of management scheme to raise profitable cotton. Early May planted cotton produced the highest yields compared to June planted cotton that sustained significant weevil damage. In 2004 slightly higher yields occurred in the June 4th planting. However, no significant difference occurred in either planting or insecticide treatments.

An insecticide comparison trial to control thrips on seedling cotton revealed no significant differences in yields between treatments. All treatments except Temik .5lb a.i./acre out-performed the untreated check and compensated for their cost. Cruiser treated seed showed the greatest monetary gain $18.00/acre while Temik .5lb a.i./acre lost $25.41/acre.

Bollworm / Tobacco Budworm and Beet Armyworm Monitoring

Bollworms/tobacco budworms are targets of many of the insecticide applications applied annually to cotton in Oklahoma. Monitoring moth activities helps determine species ratio and peak ovipositional activity for these insects. Traps were located near these farming communities – Altus, Hollis Manchester and Tipton. In addition to Heliothine activity, beet armyworm movements were also monitored at each location. Traps were maintained between June 1 and September 1, 2004.

Moth Pheromone Trap Catch Totals for Selected Regions of Oklahoma, Summer 2003.

Bollworm

Altus	Hollis	Manchester	Tipton
181	1,199	394	655

Tobacco Budworm

Altus	Hollis	Manchester	Tipton
112	107	4	378

Beet Armyworm

Altus	Hollis	Manchester	Tipton
108	82	18	144

Although both species do coexist and are considered the same, this species ratio is important since tobacco budworms exhibit a higher level of resistance to insecticides than bollworms. It is extremely important to detect fluctuations in species ratio of each ovipositional period and adjust insecticide recommendations accordingly. A total of 3,030 moths were captured between the week of June 1 and September 1. Bollworms comprised 80.2% of the total catch in 2004 (Figure 1).

Figure 1. Species composition of moths trapped across Oklahoma, Summer 2004.

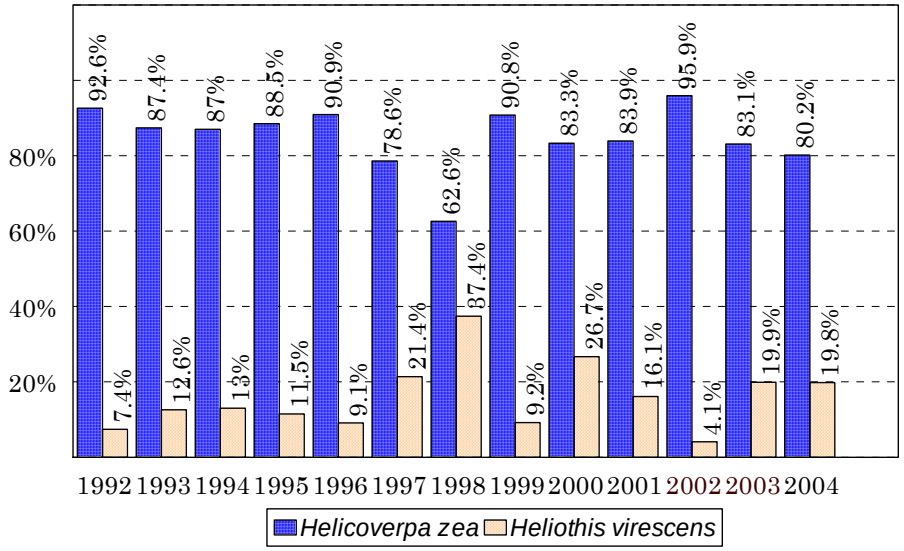
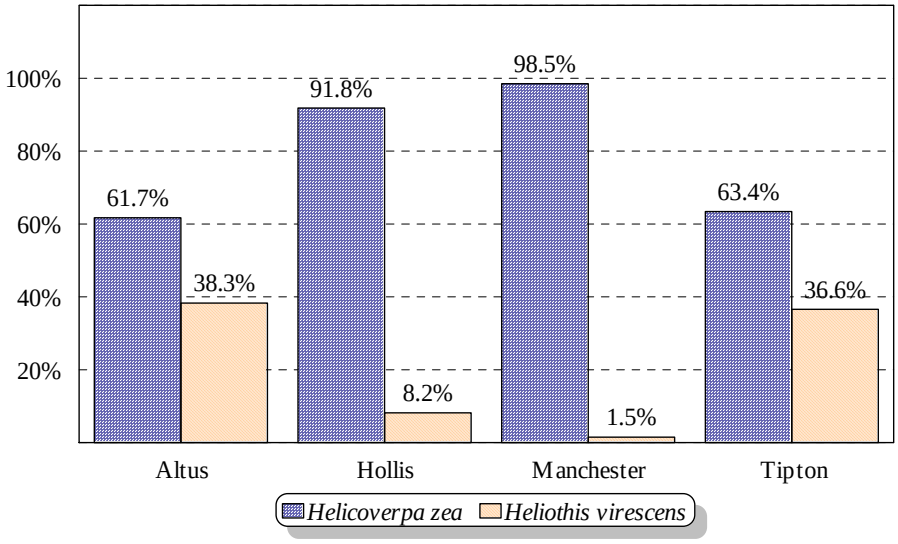


Figure 2. Species composition of trapped moths by production region, 2004.

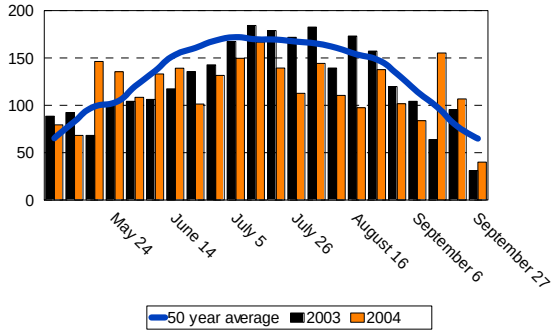


Growing Degree Days Accumulation For Select Locations Across Oklahoma, Summer 2004.

ALTUS

Growing Degree Days (GDD)

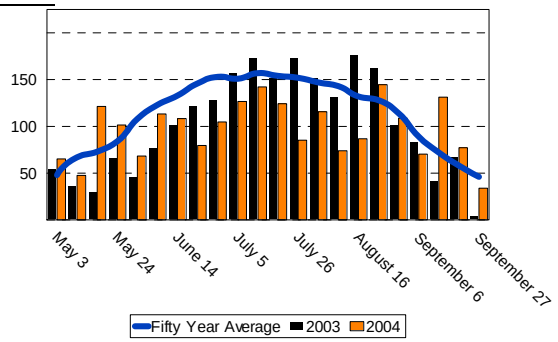
	50 year	2003	2004
May	397.0	382.3	537.7
June	570.5	499.8	505.3
July	846.7	772.3	568.4
August	628.2	715.6	591.5
September	423.6	360.2	385.9
Total	**2,866.0**	**2,730.2**	**2,588.8**



BLACKWELL

Growing Degree Days (GDD)

	50 year	2003	2004
May	312.0	166.7	403.7
June	510.0	383.4	406.0
July	767.0	715.4	478.5
August	550.0	671.6	529.9
September	333.0	344.8	314.7
Total	**2,472.0**	**2,281.9**	**2,132.8**



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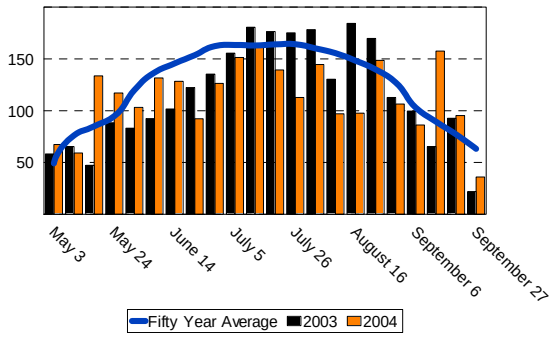
Growing Degree Days (GDD)

	50 year	2003	2004
May	351.9	306.8	480.2
June	559.0	432.6	478.6
July	812.3	745.2	567.6
August	596.4	727.3	607.6
September	437.5	356.1	361.1
Total	**2,757.1**	**2,568.0**	**2,495.1**



Economic Value of Bt Transgenic Cotton

Each year economic budgets and cost analysis are prepared to determine the value of Bt transgenic varieties and conventional varieties. These comparisons lumped varieties into two groups (Bt and conventional) regardless of maturity, variety type, or spray regime. Regardless of the management scheme or insect pressure Bt transgenic cotton yielded the best and increased profitability (return per acre) throughout the 8 year period 1996 – 2004. Growing Bollgard™ variety was worth $ 116.17 per acre in 2004. Since its introduction in 1996 this research indicates that the value of investing in Bt transgenic technology between 1996 – 2004 (Table 2) was $ 62.95 per acre (weighted average) or $ 27,418,753 (Bollgard™ acreage = 435,564 acres for 8 years).

Special thanks to Mr. A.L. Hutson retired Extension Economist for taking the time to analysis and development this economic assessment.

Irrigated Bollgard™ Cotton Cost Comparison – 2004 1/

		Bollgard™	Conventional
Return			
Cotton	1440#	$792.00	1053# $579.15
Operating Inputs			
Seed	14#	$ 21.00	$ 21.00
BT Cost		45.02	---
Hoeing		15.00	15.00
Herbicide		16.00	16.00
Nitrogen		28.35	28.35
Phosphorus		7.40	7.40
Ginning		43.20	31.59
Harvest Aid		18.75	18.75
Spraying		17.00	17.00
Crop Insurance		22.00	22.00
Custom Harvest		129.60	94.77
Labor		25.75	25.75
Fuel, Lube & Repair		30.80	30.80
Boll Weevil		21.90	18.03
Irrigation		45.00	45.00
Operating Interest		7.54	6.19
Total Operating Cost		$494.31	$397.63
Returns to Land, Overhead Risk & Management		$297.69	$181.52

1/ Based on 26 replicated tests

Irrigated Bollgard™ Cotton Cost Comparison – 1996-04 1/

		Bollgard™		Conventional
Return				
Cotton	1,188#	$653.40	937#	$515.35
Operating Inputs				
Seed		$ 21.00		$ 21.00
BT Cost		45.02		---
Hoeing		15.00		15.00
Herbicide		16.00		16.00
Nitrogen		24.88		24.88
Phosphorus		6.00		6.00
Ginning		35.64		28.11
Harvest Aid		18.75		18.75
Spraying 2/		19.80		23.20
Crop Insurance		22.00		22.00
Custom Harvest		106.92		84.33
Labor		25.75		25.75
Fuel, Lube & Repair		28.00		28.00
Boll Weevil		19.35		16.87
Irrigation		45.00		45.00
Operating Interest		9.07		8.19
Total Operating Cost		$458.18		$383.08
Returns to Land, Overhead Risk & Management		$195.22		$132.27

1/ Based on 8 years of replicated data for 134 trials

Bollgard™ Variety Demonstration 2004

Cooperator: Terry White
Planting Date: May 5, 2004
Seeding Rate: 14.0 lbs/acre

Location: Harmon County
Heat units accumulated: 2,651
Four Irrigations: 7/ 9, 7/20, 7/ 31, and 8/ 13

Pesticide Usage:
Roundup WeatherMax (20 oz / acre) over-the-top application May 27
Vydate .185 lbs ai / acre + Pentia 0.025 lbs ai / acre June 14
Orthene .45 lbs ai / acre + Pentia 0.1025 lbs ai / acre July 3
Harvest Aid applied:
Prep (32 oz / acre) + Finish (8 oz / acre) + Ginstar (2 oz / acre) October 27

Table 1. Stand Densities, Retention Rates, and Lint Production White's Farm - Summer 2004.

Variety	Past Rankings[1]		Stand density plants/acre		% Retention		Lint Yield
	2002	2003	May 12	May 19	July 26	Aug 26	October 18
Stoneville 4892 BG/RR with Cruiser*	-	2	32,000	34,000	98.4	90	2,279
* Farmers choice on remaining portion of field.							
DP 444 BG/RR	-	-	29,000	34,000	98.4	89.3	1,828
SV5242 BG/RR	-	-	28,000	33,000	96.4	88.8	1,725
SV 5599 BG/RR	-	10	30,000	33,000	100.0	89.4	1,582
DPL 215 BG/RR	2	9	31,000	34,000	98.5	90.4	1,554
DPL 424 BGII/R	-	-	34.000	34,000	99.4	89.3	1,512
DP 555 BG/RR	8	1	31,000	32,000	98.3	87.8	1,476
DP 488 BG/RR	-	-	31,000	33,000	91.8	88.5	1,453
SV 4892 BG/RR	1	7	32,000	33,000	100.0	88.2	1,418
FM 991 BGII/R	-	-	31,000	34,000	97.1	87.3	1,416
SV 3539 BG/RR	-	8	34,000	34,000	98.4	87.4	1,425
FM 960 BGII/R	-	-	23,000	33,000	94.3	86.7	1,392
SV 4646 BGII/RR	-	-	31,000	34,000	98.6	86.6	1,366
DP 449 BG/RR	5	6	33,000	33,000	98.4	90.3	1,344
FM 960 BG/RR	-	-	32,000	34,000	92.4	85.1	1,296
SV 4793 RR	-	-	27,000	32,000	92.4	89.4	1,283
SG 521 RR	-	-	32,000	33,000	98.3	82.6	1,261
FM 991 BG/RR	-	-	38,000	36,000	96.0	88.0	1,244
FM 991 RR	-	-	33,000	33,000	87.5	82.5	1,156
FM 960 RR	-	-	29,000	33,000	93.8	84.4	1,110

[1] (-) indicates the variety was not included in 2002 and 2003 variety demonstration featuring 10 cotton varieties.

Trial Comments:

Top yielder was DP 444 BG/RR followed by SV 5424 BG/RR and SV 5599 BG/RR. Two Roundup ready varieties SV 4793 RR and Sure Grow 521 RR out produced Fibermax 991 BG/RR. Fibermax 960 RR was the lowest yielder producing only 1,110 lbs lint/acre.

Performance of Bollgard™ and Parental Varieties

Insect Code Rating Unit Rating Date	Stand Count /acre June 3	Bollworm eggs /10 plants August 10	Bollworm Larvae /10 plants August 10	Bollworm Damage Squares /10 plants August 10	Plant Height /5 plants August 16	1st Fruiting Site /5 plants August 16
Treatment						
ST 3539 BG/R	31,333	0	0	0	30	9
PARENT ST 2454 RR	**34,333**	**0**	**0**	**1**	**29**	**10**
ST 4646 BG/R	35,667	0	0	1	31	10
PARENT ST 4793 RR	**33,667**	**0**	**0**	**1**	**30**	**10**
ST 4892 BG/R	32,667	0	0	0	30	9
PARENT ST 4793 RR	**34,333**	**0**	**0**	**1**	**30**	**9**
LSD (P=.05)	4418.7	0.0	0.0	0.7	2.0	1.0
Standard Deviation	2429.0	0.0	0.0	0.4	1.1	0.6
CV	7.21	0.0	0.0	54.77	3.7	6.01

Insect Code Rating Unit Rating Date	% Retention /5 plants August 16	Nodes Above White Flower /5 plants August 16	Plant Height /5 plants September 14	1st Fruiting Site /5 plants September 14	% Retention /5 plants September 14	Yield Lint lbs/acre October 21
Treatment						
ST 3539 BG/RR	75	1	33	9	72	840
PARENT ST 2454 RR	**79**	**2**	**33**	**9**	**72**	826
Stoneville 4646 BG/R	79	2	33	9	70	1,022
PARENT ST4793 RR	**75**	**2**	**32**	**9**	**72**	934
Stoneville 4892 BG/R	77	2	33	9	70	1,185
PARENT ST 4793 RR	**76**	**2**	**33**	**9**	**69**	800
LSD (P=.05)	6.6	0.9	0.9	0.7	3.3	345.554
Standard Deviation	3.6	0.5	0.5	0.4	1.8	189.953
CV	4.71	25.55	1.58	4.18	2.6	20.31

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Trial Comments: All Bollgard™ varieties out produced their parental variety. However, ST3539 BG/RR failed to compensate for the technology rental fee.

Seed Treatment Insecticide Trial

Insect Code Rating Unit Rating Date Trt-Eval Interval			Stand Count /acre May 20 7 DAP	Total Thrips /5 plants May 24 Precount	Total Thrips /5 plants May 27 3 DAT	Total Thrips /5 plants May 31 7 DAT	Total Thrips /5 plants June 7 14 DAT	Total Thrips /5 plants June 14 14 DAT	Stand Count /acre June 3 21 DAP
Treatment	Rate								
Cruiser	034	g ai/cwt	13000	0 b	0	0 b	3 b	2	31667
Bidrin	0.1	lb ai/a	12667	3 a	0	0 b	2 b	3	28000
Dynasty	32	g ai/unit	12667	0 b	0	1 b	4 ab	2	28667
Cruiser +	0.34	g ai/cwt							
Dynasty	32	g ai/unit	9000	3 a	1	2 b	3 b	3	30333
Orthene	1.0	lb ai/a	11333	2 a	0	0 b	3 b	3	28000
Untreated			11000	3 a	2	6 a	6 a	3	***30000***
Temik	0.5	lb ai/a	10667	1 b	1	0 b	2 b	2	28667
LSD (P=.05)			3166.0	1.5	1.3	2.8	2.4	1.8	5337.4
Standard Deviation			1779.5	0.9	0.7	1.6	1.3	1.0	3000.0
CV			15.51	51.27	128.56	116.69	39.52	39.04	10.23

Insect Code Rating Unit Rating Date Trt-Eval Interval			Fleahoppers /5 sweep June 14 32 DAP	Plant Height /5 plants August 16	1st Fruiting Site /5 plants August 16	% Retention /5 plants August 16	Nodes Above White Flower /5 plants August 16	Yield Lint lbs/acre October 21
Treatment	Rate							
Cruiser	034	g ai/cwt	0	30	9	82	1	1,200
Bidrin[1]	0.1	lb ai/a	1	30	10	84	2	1,180
Dynasty + Cruiser	32 0.34	g ai/unit g ai/cwt	0	29	9	82	1	1,177
Dynasty	32	g ai/unit	0	29	9	79	1	1,175
Orthene[1]	1.0	lb ai/a	0	30	9	82	2	1,170
Untreated			***0***	***29***	***9***	***80***	***1***	***1,143***
Temik	0.5	lb ai/a	0	30	10	83	1	1,118
LSD (P=.05)			0.8	3.8	0.9	4.4	0.6	136.6
Standard Deviation			0.5	2.1	0.5	2.4	0.3	76.8
CV			194.42	7.18	5.45	2.99	24.82	6.59
Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)								

[1] Treated May 24th 10 gpa finish spray.[2] Based on $0.50 lint price and $ 3.50 for spray application. Cost all per acre cost: Cruiser $10.50, Bidrin $ 1.18, Dynasty $5.00, Orthene $10.10 and Temik $12.41.

Trial Comments: Thrips numbers never approached the economic threshold of 3 thrips per plant. There were no significant differences in yields between treatments.

Comparison of Bollgard™ cotton Bollgard™ II and Bollgard™ Roundup varieties.

Insect Code	Stand Count	Stand Count	Bollworm eggs	Bollworm Larvae	Bollworm Damage Squares	Plant Height	1st Fruiting Site
Rating Unit	/acre	/acre	/10 plants	/10 plants	/10 plants	/5 plants	/5 plants
Rating Date	May 20	June 3	August 10	August 10	August 10	August 17	August 17
Treatment							
DPL 215 BG/RR	11,667	30,333	0	0	1	29	9
FM 960 BG/RR	12,000	30,000	0	0	0	29	10
DPL 424 BGII/RR	11,333	33,667	0	0	0	27	9
FM 960 BGII/RR	13,667	33,333	0	0	0	31	10
FM 991 BGII/RR	12,667	34,667	0	0	0	31	10
FM 991 BG/RR	11,333	36,667	0	0	0	31	10
SG 521 RR	10,000	36,000	0	0	1	30	9
FM 960 RR	12,667	28,333	0	0	1	31	10
FM 991 RR	11,333	34,000	0	0	1	31	9
LSD (P=.05)	3830.9	5496.6	0.0	0.0	0.9	2.7	0.7
Standard Deviation	2213.2	3175.4	0.0	0.0	0.5	1.6	0.4
CV	18.67	9.62	0.0	0.0	112.5	5.28	4.23

Insect Code	% Retention	Nodes Above White Flower	Plant Height	1st Fruiting Site	% Retention	Yield Lint
Rating Unit	/5 plants	/5 plants	/5 plants	/5 plants	/5 plants	lbs/acre
Rating Date	August 17	August 17	September 13	September 13	September 13	October 21
Treatment						
DPL 215 BG/RR	76	1	32	10	68	1,205
FM 960 BG/RR	80	2	33	10	69	1,156
DPL 424 BGII/RR	76	2	33	9	71	1,153
FM 960 BGII/RR	79	2	35	9	66	1,135
FM 991 BGII/RR	78	2	32	9	69	1,104
FM 991 BG/RR	80	2	34	10	70	1,093
SG 521 RR	75	2	33	10	68	1,039
FM 960 RR	76	2	33	7	69	999
FM 991 RR	74	2	34	9	69	923
LSD (P=.05)	6.0	0.9	2.4	3.0	5.8	182.336
Standard Deviation	3.4	0.5	1.4	1.7	3.3	105.337
CV	4.48	27.77	4.11	18.87	4.86	9.66
Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)						

Trial comments: Heliothines pressure was non-existent throughout the growing season. Low fruit retention was related to hail damage inflicted in July. There were no significant differences between varieties, but all Bollgard™ varieties produced greater yields to compensate for the technology rental fee.

Performance of Picker and Stripper Bollgard™ Varieties

Insect Code Rating Unit Rating Date	Stand Count /acre May 20	Stand Count /acre June 3	Bollworm eggs /10 plants August 10	Bollworm Larvae /10 plants August 10	Bollworm Damage Squares /10 plants August 10	Plant Height /5 plants August 17	1st Fruiting Site /5 plants August 17
Treatment							
ST 5242 BG/RRR	10,667	33,667	0	0	0 b	33	10
ST 4892 BG/RR	9,667	31,000	0	0	0 b	35	10
DP 444 BG/RR	11,333	35,667	0	0	0 b	32	10
ST 5599 BG/RR	10,333	34,667	0	0	0 b	35	10
DP 449 BG/RR	13,333	33,333	0	0	0 b	31	10
ST 4646 BIIR	12,333	29,667	0	0	0 b	32	9
FM 991 BG/RR	11,667	30,333	0	0	0 b	30	10
FM 960 BII/R	11,667	34,000	0	0	1 ab	34	10
FM 5045 BG/RR	10,333	30,667	0	0	1 ab	32	10
DP 555 BG/RR	12,000	35,333	0	0	0 b	39	10
FM 960 BR	12,333	35,667	0	0	0 b	34	10
SG 215 BG/RR	13,000	33,667	0	0	0 b	32	10
FM 991 BII/R	11,667	36,667	0	0	0 b	33	10
DP 424 BGII/RR	12,667	32,667	0	0	0 b	34	10
DP 488 BG/RR	11,333	33,667	0	0	0 b	30	10
ST 3539 BG/RR	12,333	36,333	0	0	0 b	30	10
LSD (P=.05)	3998.5	5743.1	0.0	0.0	0.4	5.182	0.44
Standard Deviation	2398.2	3444.6	0.0	0.0	0.3	3.108	0.26
CV	20.56	10.26	0.0	0.0	175.2	9.35	2.74

Insect Code Rating Unit Rating Date	% Retention /5 plants August 17	Nodes Above White Flower /5 plants August 17	Plant Height /5 plants September 13	1st Fruiting Site /5 plants September 13	% Retention /5 plants September 13	Yield Lint lbs/acre October 21
Treatment						
ST 5242 BG/RRR	82	2 ab	35	10	75	1,324
ST 4892 BG/RR	84	1 b	34	10	75	1,264
DP 444 BG/RR	82	2 ab	34	10	73	1,200
ST 5599 BG/RR	82	2 ab	34	10	74	1,199
DP 449 BG/RR	81	2 ab	33	9	74	1,172
ST 4646 BIIR	83	2 ab	33	10	74	1,145
FM 991 BG/RR	84	2 ab	34	10	76	1,140
FM 960 BII/R	83	2 ab	37	10	75	1,134
FM 5045 BG/RR	84	2 ab	33	10	73	1,124
DP 555 BG/RR	80	3 a	39	10	76	1,121
FM 960 BR	85	2 ab	35	10	74	1,102
SG 215 BG/RR	84	2 ab	34	10	74	1,092
FM 991 BII/R	82	2 ab	34	10	72	1,086
DP 424 BGII/RR	82	2 ab	37	10	73	1,085
DP 488 BG/RR	82	2 ab	35	10	74	1,082
ST 3539 BG/RR	82	2 ab	33	10	74	1,074
LSD (P=.05)	3.673	0.74	3.425	0.52	4.085	142.9
Standard Deviation	2.203	0.44	2.054	0.31	2.450	85.7
CV	2.65	21.31	5.84	3.22	3.28	7.48
Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)						
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.						

Trial comments: Heliothines pressure was non-existent throughout the growing season. There were no significant differences between varieties. Yields ranged from ST3539 1,074 lbs lint per acre to ST 5242 1,324 lbs lint per acre.

Influence Of Steward And Tracer Applications To Enhance Insect Protection In Bt Cotton

Insect Code	Stand Count	Stand Count	Bollworm eggs	Bollworm Larvae	Bollworm Damage Squares	Plant Height	1st Fruiting Site
Rating Unit	/acre	/acre	/10 plants	/10 plants	/10 plants	/5 plants	/5 plants
Rating Date	May 20	June 3	August 5	August 5	August 5	August 16	Augus t16
Treatment							
ST 4892 BG/RR	11,667	33,667 a	0	0	0	33	10
ST 4793 RR	11,667	32,000 b	0	0	1	32	10
LSD (P=.05)	2484.3	1434.3	0.0	0.0	1.4	6.5	1.3
Standard Deviation	707.1	408.2	0.0	0.0	0.4	1.8	0.4
CV	6.06	1.24	0.0	0.0	122.47	5.67	3.71

Insect Code	% Retention	Nodes Above White Flower	Plant Height	1st Fruiting Site	% Retention	Yield Lint
Rating Unit	/5 plants	/5 plants	/5 plants	/5 plants	/5 plants	lbs/acre
Rating Date	August 16	August 16	September 14	September 14	September 14	October 20
Treatment						
ST 4892 BG/RR	73	2	34	10	71	1,160 a
ST 4793 RR	73	2	34	10	67	970 b
LSD (P=.05)	3.8	2.8	8.3	1.3	14.3	109.475
Standard Deviation	1.1	0.8	2.4	0.4	4.1	31.160
CV	1.49	33.27	6.88	3.71	5.91	2.92

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Trial comments: Heliothines pressure was non-existent throughout the growing season. Neither variety required bollworm insecticide protection Low fruit retention was related to hail damage inflicted in July. There was significant yield difference between varieties. ST4892 BG/RR produced 190 lbs lint/acre more that ST 4793 RR easily compensating for the technology rental fee.

Bollworm Economic Threshold Study – Bollgard™ Cotton

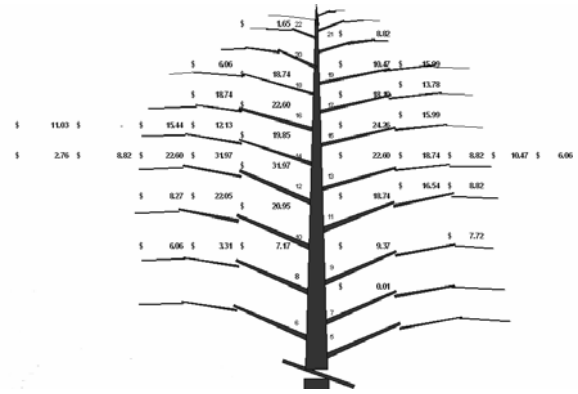
Insect Code	Stand Count	1st Fruiting Site	% Retention	Nodes Above White Flower	Bollworm eggs	Bollworm Larvae
Rating Unit	/acre	/5 plants	/5 plants	/5 plants	/10 plants	/10 plants
Rating Date	June 3	August 16	August 16	August 16	August 16	August 16
Treatment						
ST 4892 BG/RR	33,667	9	73	2	0	1
ST 4793 RR	34,667	10	80	2	0	1
ST 4646 BGII/RR	33,333	10	80	3	0	0
ST 4793 RR	32,000	9	78	2	0	0
PM 2280 BG/RR	33,000	10	77	2	0	0
PM 2326BG	33,333	10	80	2	0	1
PM 280	31,333	10	77	2	0	0
PM HS-26	34,000	10	75	2	0	1
LSD (P=.05)	4704.1	0.4	4.7	0.6	0.0	1.2
Standard Deviation	2685.9	0.2	2.7	0.4	0.0	0.7
CV	8.1	2.37	3.44	16.99	0.0	128.19

Insect Code	Bollworm Damage Squares	Plant Height	1st Fruiting Site	% Retention	Yield Lint	
Rating Unit	/10 plants	/5 plants	/5 plants	/5 plants	lbs/acre	
Rating Date	August 16	September 14	September 14	September 14	October 21	
Treatment						
ST 4892 BG/RR	2	36	9	68	1,155	a
ST 4793 RR	3	35	9	68	1,128	a
ST 4646 BGII/RR	1	35	9	67	1,122	a
ST 4793 RR	1	33	10	68	1,039	a
Paymaster 2280 BG/RR	1	35	9	69	1,028	a
Paymaster 2326BG	1	35	9	69	962	a
Paymaster 280	0	35	9	69	736	b
Paymaster HS-26	2	35	9	67	590	b
LSD (P=.05)	2.2	2.2	0.5	3.5	188.0	
Standard Deviation	1.2	1.2	0.3	2.0	107.4	
CV	93.3	3.58	2.88	2.95	11.07	
Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)						
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.						

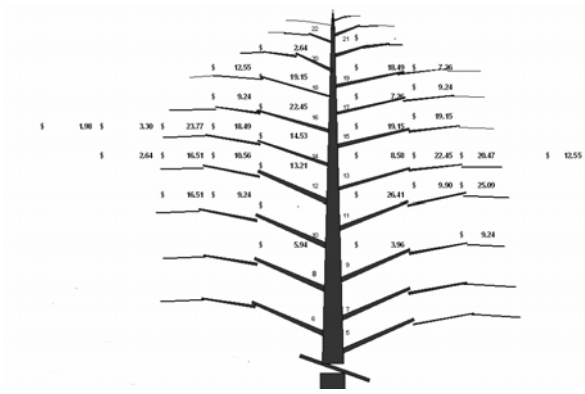
Trial comments: Heliothines pressure was non-existent throughout the growing season. Low fruit retention was related to hail damage inflicted in July. There were significant yield differences between varieties, all Bollgard™ varieties produced greater yields to compensate for the technology rental fee.

Irrigated Crop Termination

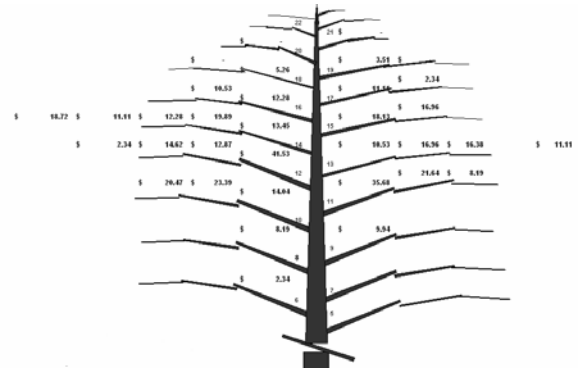
Insect Code Rating Unit Rating Date	Stand Count /acre June 3	Nodes Above White Flower /10 plants July 13	Nodes Above White Flower /10 plants July 20	Nodes Above White Flower /10 plants July 27	Nodes Above White Flower /10 plants August 5	Nodes Above White Flower /10 plants August 10	Yield Lint lbs/acre October 20
Treatment							
ST 4646 BGII/RR	33,667	6	6	4	3	3	1,130 a
ST 4793 RR	35,000	6	5	5	4	3	987 a
PM2326 BG/RR	30,333	6	6	4	3	3	894 ab
PM HS-26	34,667	7	6	4	3	2	666 b
LSD (P=.05)	7356.1	0.7	1.1	1.2	1.3	0.7	237.512
Standard Deviation	3681.8	0.4	0.6	0.6	0.7	0.4	118.877
CV	11.02	6.04	9.75	14.72	21.62	13.55	12.93
Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)							
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.							



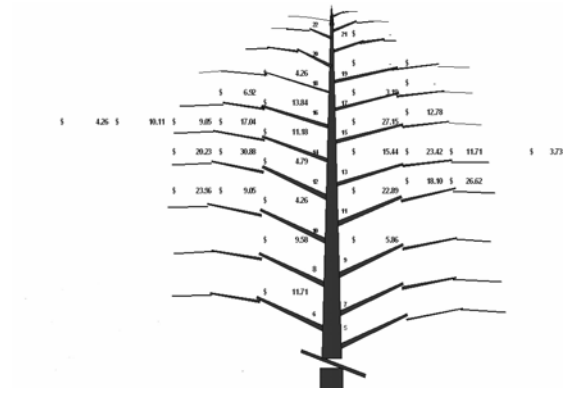
ST 4646 BGII/RR



ST 4793 RR



PM2326 BG/RR



PM HS-26

Average lint value = $ 459.63

BOLL CONTRIBUTION BY POSITION

1st Position -	34.4%
2nd Position -	27.5%
3rd Position -	22.8%
4th Position -	5.8%
5th Position -	6.8%

Fleahopper Trial

This cotton fleahopper trial started strong and was abruptly terminated by a hail storm July 6, 2004.

Treatment	Rate	Fleahoppers per 10 sweeps				Percent control	
		Precount		3 DAT			
		Bollgard	Conventional	Bollgard	Conventional	Bollgard	Conventional
Intruder Crop Oil	0.018 lb ai/a 1.0 pt/a			0.00 b	0.00 b	100.00 a	100.00 a
Intruder Crop Oil	0.025 lb ai/a 1.0 pt/a			0.00 b	0.00 b	100.00 a	100.00 a
Intruder Crop Oil	0.038 lb ai/a 1.0 pt/a			0.33 b	1.67 b	97.22 a	88.89 a
Intruder Vydate Crop Oil	0.018 lb ai/a 0.25 lb ai/a 1.0 pt/a			0.33 b	0.67 b	97.22 a	91.67 a
Intruder Vydate Crop Oil	0.025 lb ai/a 0.25 lb ai/a 1.0 pt/a			0.33 b	0.33 b	97.22 a	98.41 a
Intruder Vydate Crop Oil	0.038 lb ai/a 0.25 lb ai/a 1.0 pt/a			0.67 b	0.00 b	94.44 a	100.00 a
Vydate	0.25 lb ai/a			0.00 b	2.00 b	100.00 a	86.67 a
Vydate Crop Oil	0.25 lb ai/a 1.0 pt/a			0.00 b	0.00 b	100.00 a	100.00 a
Centric Crop Oil	0.05 lb ai/a 1.0 pt/a			0.33 b	0.00 b	97.22 a	100.00 a
Orthene Crop Oil	0.312 lb ai/a 1.0 pt/a			0.33 b	0.00 b	97.22 a	98.41 a
Untreated		21	27	13.00 a	14.67 a	0.00 b	0.00 b
LSD (P=.05)				1.275	4.105	7.141	17.256
Standard Deviation				0.749	2.410	4.193	10.131
CV				53.71	134.81	4.7	11.56
Grand Mean				1.39	1.79	89.24	87.64
Bartlett's X2				5.486	14.377	2.644	10.276
P(Bartlett's X2)				0.483	0.013*	0.755	0.036*
Replicate F				0.703	1.132	0.903	0.981
Replicate Prob(F)				0.5071	0.3422	0.4211	0.3922
Treatment F				79.535	9.678	150.028	25.414
Treatment Prob(F)				0.0001	0.0001	0.0001	0.0001

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Finish spray 10 gal/acre

Response of Hail Damage Cotton to Different Fertilize Regimes

Insect Code			Plant Height	1st Fruiting Site	% Retention	Nodes Above White Flower	Plant Height
Rating Unit			/5 plants	/5 plants	/5 plants	/5 plants	/5 plants
Rating Date			August 23	August 23	August 23	August 23	September 13
Treatment		Rate					
Coron 10 Actual N/a	4.25	gal/a	36	10	77 a	3	37 a
Apollo 1 qt/acre	1	qt/a	33	10	74 b	2	34 ab
Spraymaster 1pt/100	16	oz/100 gal					
Check			32	9	73 b	2	32 b
LSD (P=.05)			3.8	0.3	1.7	0.5	2.9
Standard Deviation			1.7	0.1	0.7	0.2	1.3
CV			4.98	1.49	0.99	11.04	3.69

Insect Code			1st Fruiting Site	% Retention	Yield Lint
Rating Unit			/5 plants	/5 plants	lbs/acre
Rating Date			September 13	September 13	October 20
Treatment		Rate			
Coron 10 Actual N/a	4.25	gal/a	10	71 a	781
Apollo 1 qt/acre	1	qt/a	10	63 b	585
Spraymaster 1pt/100	16	oz/100 gal			
Check			10 a	58 b	494
LSD (P=.05)			0.3	6.4	247.088
Standard Deviation			0.1	2.8	109.013
CV			1.35	4.44	17.57
Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)					
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.					

Trial comments: There was a significant difference in retention rate between treatments. Yield response is probably related to the different retention rates than response to the fertilizer regimes.

Variety Fibermax 860 RR
May 20 Bidrin 0.1 lbs AI/acre
June 15 Vydate 6.5 oz ai/acre
Coron 10 lbs Actual N
Over all the field
July 21 and August 2 Treatments was applied
Coron 25-0-0
Apollo 90 15-15-5-5s

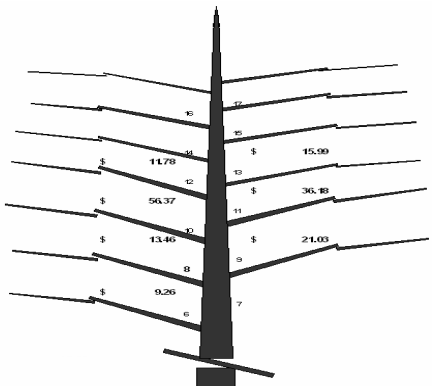
Performance of Bollgard™ and Parent Varieties Under Dryland Conditions

Insect Code Rating Unit Rating Date	Stand Count /acre June 2	1st Fruiting Site /5 plants July 26	% Retention /5 plants July 26	Nodes Above White Flower /5 plants July 26	% Retention /5 plants August 23	Yield Lint Lint/acre September 21
Treatment						
ST 4646 BG II/RR	35,000	10	83	2	47	439
PARENT ST 4793 RR	**37,667**	**10**	**85**	**1**	**50**	**403**
PM 2326 BG/RR	37,333	10	85	1	45	419
PARENT PM HS-26	**35,333**	**10**	**88**	**1**	**42**	**438**
DP 2280 BG/RR	38,333	10	88	1	50	482
PARENT PM 280	37,667	10	90	2	45	458
LSD (P=.05)	2608.2	1.0	8.1	1.1	12.6	129.499
Standard Deviation	1433.7	0.5	4.5	0.6	6.9	71.186
CV	3.89	5.2	5.13	52.02	14.84	16.17
Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)						
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.						

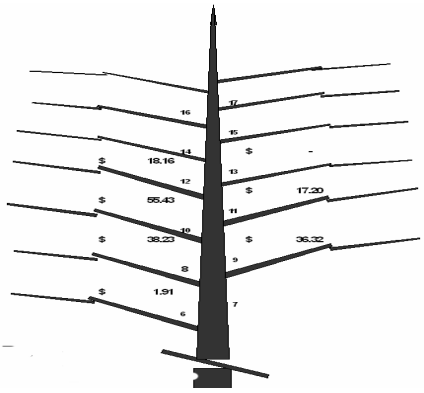
Trial comments: Enhanced yields in 2004 were related to better growing conditions and timely rainfall. This is the first year that a Bollgard™ variety ST 4646 actually paid for the technology rental fee. However, the increase in profit $2.08 per acre is not great an enough incentive to recommend planting Bollgard™ varieties under upland dryland conditions that exist across the Rolling Plains of Oklahoma.

Dryland Crop Termination

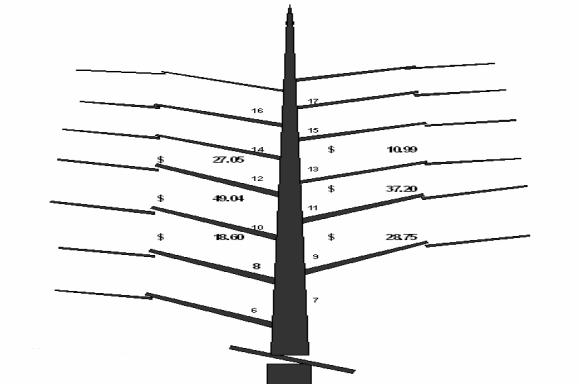
Insect Code	Stand Count	Stand Count	Nodes Above White Flower	Nodes Above White Flower	Nodes Above White Flower	Nodes Above White Flower	Yield Lint
Rating Unit	/acre	/acre	/10 plants	/10 plants	/10 plants	/10 plants	lbs/acre
Rating Date	May 19	June 2	July 13	July 20	July 27	August 5	September 21
Treatment							
PM2326 BG/RR	16,333	34,000	6	5	3	1	311
DP 33 B	16,000	37,000	6	5	3	1	287
DP 5415	16,000	34,000	6	5	2	0	287
PM HS-26	16,000	35,000	5	4	2	0	281
LSD (P=.05)	3782.1	5502.0	0.9	1.1	1.3	1.0	44.230
Standard Deviation	1893.0	2753.8	0.4	0.6	0.7	0.5	22.138
CV	11.77	7.87	7.9	11.85	28.57	66.67	7.58
Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)							
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.							



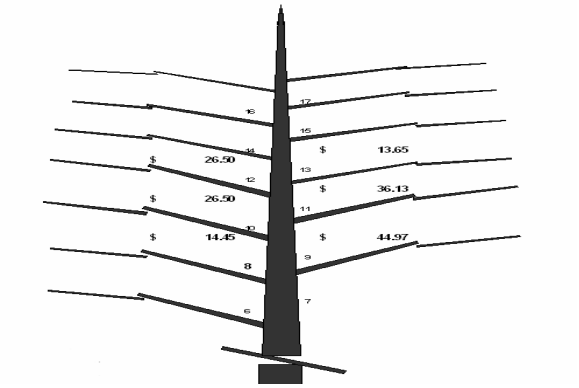
PM HS-26



PM2326 BG/RR



DP 33 B



DP 5415

Average lint value = **$ 145.75**

Boll Contribution by position 1st Position - 100.0%

Impact of Planting Date and Different Insect Control Strategies on Dryland Cotton Production

Insect Code Rating Unit Rating Date	Stand Count /acre June 16	1st Fruiting Site /5 plants July 26	% Retention /5 plants July 26	Nodes Above White Flower /5 plants July 26	1st Fruiting Site /5 plants August 23	% Retention /5 plants August 23	Yield Lint lbs/acre September 21
Treatment							
Paymaster HS-26 Planted May 12 Untreated	36,333	8 ab	79 ab	1 b	8	46	360
Paymaster HS-26 Planted June 4 Untreated	33,000	8 ab	95 a	5 a	8	37	368
Paymaster HS-26 Planted May 12 Vydate Pinhead 6/17	36,000	7 ab	89 ab	1 b	8	40	360
Paymaster HS-26 Planted June 4 Vydate Pinhead 7/8	34,000	6 b	88 ab	6 a	7	51	348
Paymaster 280 Planted May 12 Untreated	34,333	8 ab	74 b	2 b	8	47	326
Paymaster 280 Planted June 4 Untreated	33,333	9 a	94 a	6 a	7	52	348
Paymaster 280 Planted May 12 Vydate Pinhead 6/17	34,333	9 a	73 b	1 b	7	58	325
Paymaster 280 Planted June 4 Vydate Pinhead 7/8	32,667	9 a	85 ab	5 a	8	45	352
LSD (P=.05)	4756.2	1.6	10.9	0.8	1.7	18.5	154.500
Standard Deviation	2715.7	0.9	6.2	0.5	0.9	10.6	88.216
CV	11.39	11.16	7.38	13.62	12.41	22.49	25.3
Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)							
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.							

Trial comments: Heliothines pressure was non-existent throughout the growing season. Significant differences in fruit retention occurred July 26, 2004. Highest retention rate occurred in untreated checks planted June 4, 2004. There were no significant differences between planting dates and treatments. Slightly higher yields resulted for both PM HS-26 and PM 280 planted June 4, 2004.

Production Practices for Entomology Trials Summer 2004

Planted Date: May 13
Planting method: Cone type planter
Seeding rate: 18.6 lbs/acre
Insecticide applied in 10 gallon Finish Spray except for
May 20 Bidrin 0.1 lbs AI/acre except for **Seed Treatment Insecticide Trial**

June 15 Vydate 0.25 ai/acre

In-season Fertilize applied:in 10 gallon Finish Spray
June 15 Coron 10 lbs Actual N
July 14 Coron 10 lbs Actual N except for
Response of Hail Damage Cotton to Different Fertilize Regimes

Harvest aid applied in 12 gallon Finish spray
September 27
Finish 1 pint /acre
Ethephon 1 pint/acre
Ginstar 2.0 oz prod/acre

Irrigations: July 22, August 2 August 11 August 23