2012 Extension Cotton Project Annual Report

Southwest Research and Extension Center, Altus

In cooperation with the Oklahoma State University Integrated Pest Management Program

2012 Extension Cotton Report

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An effective cotton integrated pest management (IPM) program includes all aspects of production. This report contains summarized data from various applied research trials and demonstrations that address many different cotton production components. Due to the tough year, many field research projects were lost.

The effects of the extreme drought of 2011 were continued in Oklahoma in 2012. 2012 was “better than 2011” with “only” 57 days of high temperatures of 100 degrees or greater through September 15 at Altus. One year ago, we had reached an epic 99 days of those temperatures. The extreme drought experienced by producers in western Oklahoma has resulted in a very difficult situation with respect to cotton production. After record heat and drought in the summer of 2011, the area’s rainfall situation improved considerably beginning in October. For the months of October, 2011 through June, 2012, rainfall amounts at the Mesonet station located at the OSU Southwest Research and Extension Center totaled about 18 inches, compared to the 1971-2000 normal of about 21 inches (87% of normal for that time period). This resulted in some subsoil moisture accumulation, but little runoff in watersheds. This situation when coupled with historically anticipated inflow into Lake Lugert, provided reasonable expectation for cotton production in 2012. Some timely rainfall events in mid-May provided sufficient moisture to ensure stand establishment. Later, June precipitation was slightly above normal (5.12 inches vs. 4.32 inches for normal), and later planted fields emerged to excellent stands. In general, stand establishment in 2012 was excellent and cotton around the state successfully made it through this traditionally challenging period. Producers followed in-season best management practices such as timely glyphosate applications, insect monitoring and control, etc. The anticipated inflow into Lake Lugert did not materialize and extreme heat and drought once again occurred beginning in mid-July. **For the first time in its 60 plus year history, no irrigation water was released by the Lugert-Altus Irrigation District (LAID).** Excessive triple-digit temperatures did not break until mid-August. On many days, hot desiccating winds prevailed during this period. July rainfall was 77% of normal (1.54 inches vs. 2.00 inches), and August rainfall was only 48% of normal (1.36 inches vs. 2.83 inches). This situation resulted in the depletion of subsoil moisture by the crop, and without additional water, the 2012 crop essentially failed in the LAID and in other areas with severely declining groundwater based irrigation. We ended 2012 with over 90% of the state in the extreme/exceptional drought categories.

State climatologists indicate that 2012 ended being the hottest overall year on record. Cotton heat unit accumulation at Altus was 61, 14, 13, 8, and 14 percent above normal for the months of May, June, July, August and September. An early freeze/frost event on October 8 in western Oklahoma was a spoiler and likely terminated cotton fiber development in some later maturing fields. However, based on excellent September maturing weather, yield and quality were not devastated as would have occurred during a more normal year. On October 27, we had a killing freeze over much of the area. Producers were able to get winter wheat and cover crops established on the failed cotton acreage due to late September rainfall (2.3 inches). The bad news is that October (0.3) and November (0.4) rainfall at Altus produced a rather scant total of 0.7 inches. Normal rainfall for Altus for October (2.7), November (1.5) totals about 4.2 inches. December provided little relief with respect to precipitation.

According to USDA-National Agricultural Statistics Service (NASS), planted acres for 2012 were 305,000. The December, 2012 NASS report projected harvested acreage at 175,000. Bale production was also estimated at 150,000, with a yield of 411 lb/acre. As of January 11, 2013, the Abilene, TX, USDA-Agricultural Marketing Service (AMS) Classing Office had classed about 109,000 bales from Oklahoma. Color grades indicated that about 72% classing as an 11, 21 or 31 color (48% 11 or 21, about 24% 31). The early freeze likely affected color grades in some fields, and about 18% of the bales classed as a 12, 22, or 32 color. Leaf grades were good for this crop, with about 86% classing as a leaf grade 1, 2, or 3. Bark contamination was about 27%, which is not surprising considering the late September rainfall, early October freeze, and stripper harvesting of most acres. A total of 60% of the bales had a 35/32nds or longer staple, with about 36.5% classed with 36 or longer. Uniformity averaged 79.9%, but considering the year, and again, stripper harvesting of most acres, it is not surprising. Just over 11% was classed as low micronaire (less than 3.5), with another 5% in the high micronaire category (greater than 4.9). These low micronaire bales likely reflect the early frost/freeze negative impact on maturity in some later planted fields. The overwhelming majority of the bales (about 84%) were in the 3.5 to 4.9 range. Strength values held up very well, with the average of about 30.3 g/tex, with over 65% above 30 g/tex. Incidentally, the Oklahoma bales classed at Abilene thus far from the 2012 crop have the highest average staple and strength averages. The Abilene classing office serves east Texas, a portion of west Texas, Oklahoma, and Kansas.

We are very appreciative of the contributions made by the OSU IPM Program. Without their support and participation, much of this work would not be possible. We also appreciate the support from producers and ginners, County Extension Educators, Oklahoma Cooperative Extension Service, and the Oklahoma Agricultural Experiment Station. Cotton Incorporated, through the Oklahoma State Support Committee, has also provided assistance through partial funding of several projects. We also appreciate the assistance of the Oklahoma Cotton Council, because their continued support of our educational programs is critical to our success. A thank you is extended to the following entities, whose specific contributions make it possible to maintain and expand our research and demonstration programs and distribute results.

All-Tex Seed	AMVAC Chemical Co.	Cotton Incorporated
Americot/NexGen	BASF Corporation	Bayer CropScience
Cotton Growers Co-op, Altus	Crop Production Services	Delta and Pine Land
Dow AgroSciences	DuPont	Helena Chemical
Monsanto Company	Nichino America	Winfield Solutions
Worrell Farms		

We appreciate the interest, cooperation and support of all those involved in the cotton industry in Oklahoma and encourage your comments and suggestions for the improvement of our programs. This report can be accessed via the Internet at the following websites: http://www.cotton.okstate.edu and www.ntokcotton.org.

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& Caddo Research Station, Fort Cobb

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Producers and Cooperators

Western Oklahoma State College
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Mark Nichols - Altus
Gary and Luke Winsett - Altus
Roger Fischer - Frederick
Tony Cox – Wellington, TX
Danny Davis - Canute
Brent Cummins - Hollis
Jay Holsted - Carnegie
Humphreys Co-operative
Keeff Felty & Natalie Wheeler - Altus
Keith Graumann - Granite
Merlin Schantz - Hydro
John Schieber - Union City
Kelly Horton - Hollis
John McCullough - Tipton
Mark Thornbrough - Granite
Harvey Schroeder - Oklahoma Cotton Council

Table of Contents

Lost project summary.

Project Description	Locations	# of Locations
County Replicated Small Plot Trials	Jackson and Greer Counties	4
County RACE Large Plot Trials	Jackson, Tillman, Harmon, Washita and Canadian Counties	5
Bayer CAP Demonstrations	Jackson County	1
Monsanto Replicated FACT Trials	Jackson and Tillman Counties	3
Down Innovation Trial	Jackson	1
Weed Control in a Glytol/Liberty Link System	Jackson County	1
Syngenta Weed Control with Residuals	Jackson County	1
Helena Foliar	Jackson County	1
Yield Enhancements from Non-traditional Sources	Jackson County	1
PGR Strategies	Jackson County	1
Post-directed Herbicides for Late-season Control	Jackson County	1
Official Variety Trials (OVT's) all locations	Altus, Tipton and Chickasha	7
Total of all locations/projects lost		27

Variety Performance

Variety Related Projects

We supported two cotton variety testing programs in 2012: 1) Extension and 2) Experiment Station. **The Extension testing program includes both large plot (Replicated Agronomic Cotton Evaluation or <u>RACE</u>) and small plot (County Replicated Small Plot or <u>CRSP</u>) trials. These projects contained a limited number of entries and were conducted in producer-cooperator fields at varying locations and typically had 3 to 4 replicates.**

Extension cotton variety demonstrations were established in 9 cotton producing counties of Oklahoma. The majority of these trials were established under no-till or strip-till conditions.

A total of 9 RACE trials were initiated. The large-plot RACE trials were planted and harvested working directly with producer-cooperators in their fields using their commercial equipment. Usually, 7-8 entries (typically one entry per brand name replicated three times) were planted at each of these sites. We used a West Texas Lee weigh wagon and producer equipment for harvesting these large plot projects.

A total of 5 CRSP sites were planted in 3 counties. These consisted of 4 replicates of 12 total entries in each trial. OSU's small plot planting and harvesting equipment was used at each of these sites. Good to excellent stands were obtained at all locations. These included 3 irrigated (Altus, Granite, and Tipton) and 2 dryland sites (Altus and Granite). Both dryland sites failed due to drought, and the irrigated site located within the LAID and the one near Granite failed due to lack of irrigation. The surviving CRSP trial near Tipton was challenged by limited furrow irrigation.

The Official Variety Testing (<u>OVT</u>) program is conducted on research stations, so it is called the Experiment Station testing program. We planted OVT trials at the Oklahoma Agricultural Experiment Station Research Farms at Altus, Tipton, and Fort Cobb. Trials at the Altus and Tipton sites failed due to lack of irrigation water/drought. The only surviving OVT was at Fort Cobb. These trials typically have a large number of entries (38 at Fort Cobb in 2012), 4 replicates, and are small plot in design.

RACE and CRSP Methodology

It should be noted that Americot 1511 B2RF had a designation change that occurred on June 8th. Therefore, this germplasm was entered as Americot 1511 B2RF, but due to the name change it is reported as NexGen 1511 B2RF. Extension irrigated variety trials conducted in producer-cooperator fields in the far southwest corner of the state and along the I-40 corridor indicated that several of the newer entries performed very well under the considerable heat and dry conditions encountered in 2012. **All 2012 sites were stripper harvested.**

Plot weights for RACE trials were captured using a Lee weigh wagon with integral digital scales. A total of 9 sites (5 irrigated, 4 dryland) were planted in 2012. Good to excellent stands were obtained at all sites planted. All dryland projects failed. These locations included Union City (due to hail out shortly after emergence), Tipton, Hollis, and Canute (all due to drought). The one irrigated site located in the LAID failed due to lack of irrigation capability and thus drought. The remaining 4 irrigated sites included Hollis, and locations near the I-40 corridor including Erick, Hydro, and Carnegie.

Grab samples were taken from each individual plot from both RACE and CRSP trials and ginned on plot-type ginning equipment. Lint samples were submitted to the Texas Tech University Fiber and Biopolymer Research Institute (FBRI) for high volume instrument (HVI) analysis. Commodity Credit Corporation (CCC) Loan value was determined based on the 2012 loan chart using an Excel spreadsheet provided by Cotton Incorporated. It should be noted that color and leaf grades were standardized to 21 and 2, respectively at all sites due to the nature of our plot ginning equipment.

Failed RACE and CRSP sites are provided in Table 1. Some stand count data were obtained, and statistical analyses are presented. Site description information for surviving irrigated Extension variety trials is summarized in Table 2. This includes irrigation system type, planting and harvest dates, row spacing, seeding rate, plot size, trial comments, data acquired, and entries planted.

RACE Results

Harmon County Results (Tables 3 and 4)
Beckham County Results (Tables 5 and 6)
Custer County Results (Tables 7 and 8)
Caddo County Results (Tables 9 and 10)

Surviving on-farm irrigated trial yields were generally a function of available water and delivery efficiency in these fields. Test average yields ranged from a low of about 700 lb/acre in a furrow irrigated trial to over 1500 lb/acre in subsurface drip and in center pivot trials. Fiber properties at most sites were remarkably good. Based on 2012 irrigated trials, we can say that we have some excellent cotton genetics available, and these can do well in a tough year.

When averaged across three sites (Beckham, Caddo, and Custer) with the same entries planted, lint yields averaged 1273 lb/acre, and ranged from a low of 1106 to a high of 1462. Top performing varieties with respect to yield were PhytoGen 499WRF, Deltapine 1219B2RF, and NexGen 1511B2RF (see Table 11).

Storm resistance is an important characteristic in our region. A considerable range in this attribute was observed (see Table 12). Across three sites where the planted entries were the same, the highest levels of storm resistance were noted for FiberMax 1944GLB2, FiberMax 1740B2F and NexGen 4012B2RF (see below). Unfortunately these entries did not coincide with the top net value/acre performers, which indicates that more preharvest loss risk would be assumed by producers when planting these lower storm resistant types if adverse weather events occur.

Although not a top performer with respect to yield, there is no doubt that All-Tex Nitro 44 B2RF produced the highest fiber quality in all environments. This was observed across a wide range of conditions (Table 14).

RACE trial results from producer-cooperator fields indicated that variety selection is very important. When yield, loan value, ginning costs, and seed and technology fees are considered, the statistically significant difference in top and bottom variety performers with respect to net value/acre averaged $195 across three sites where the same entries were planted. Top performers with respect to net value/acre included PhytoGen 499WRF, Deltapine 1219B2RF, and NexGen 1511B2RF (see Table 15).

RACE Trial Results Combined Across Sites
Yield (Table 11)
Storm Resistance (Table 12)
Plant Height (Table 13)
CCC Loan Value (Table 14)
Net Value Per Acre (Table 15)
Micronaire (Table 16)
Staple (Table 17)
Strength (Table 18)
Uniformity (Table 19)

Tillman County Furrow Irrigated CRSP Results

The crop at this site was severely moisture stressed by the end of the season. The seeding rate was 52,000 seed/acre and it was planted and harvested using our Extension project small plot planter (4 row John Deere 1700 with cone attachment) and John Deere 482 plot stripper (without a field cleaner). This site struggled with diminishing irrigation capacity late in the season. Yield and quality were both negatively affected (Tables 20 and 21).

Yields averaged 696 lb/acre and ranged from a low of 481 to a high of 942 lb/acre. Net value/acre (here defined as after ginning and without seed and technology fees subtracted) averaged $444 and ranged from a low of $279 to a high of $588, a difference of $309/acre. PhytoGen 499WRF, Deltapine 1044B2RF, All-Tex Nitro 44 B2RF, PhytoGen 367WRF and Deltapine 1219B2RF statistically produced the highest and similar potential income in the trial.

Agronomic and fiber quality results for the Tillman County CRSP site can be found below. Final plant populations were not statistically different at this site and averaged 42,435 plants/acre. Plant height had a large range (24.6 to 33.5 inches) and averaged 28.8 inches. Storm resistance ranged from a low of 4.5 to a high of 7.2, and averaged 5.6. Micronaire averaged 4.0 and ranged from a low of 3.3 to a high of 4.4. It should be noted that micronaire values of 3.4 and less encounter discounts in the CCC Loan chart. Extreme late-season moisture stress may have resulted in fiber development termination which was manifested by low micronaire for some entries. Staple averaged 33.9 and ranged from a low 32.4 to a high of 36.1. The high moisture stress environment reduced staple length for all entries. Strength averaged 28.5 g/tex and ranged from a low of 24.4 to a high of 32.7. Uniformity averaged 80.2%, with All-Tex Nitro 44 B2RF exhibiting an extremely high 82.5%. This entry had the highest overall fiber quality in the trial.

Experiment Station Cotton Official Variety Trials

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The Experiment Station cotton official variety tests (OVTs) were planted at the Southwest Research and Extension Center at Altus Center (SWREC) (furrow irrigated), Southwest Agronomy Research Station at Tipton (dryland), and Caddo Research Station at Fort Cobb (center pivot irrigated) in 2012. Since the SWREC is located within Lugert-Altus Irrigation District, no irrigation was available in 2012. Therefore, both the Altus and Tipton locations failed due to drought.

The Fort Cobb site was planted on May 9 and was harvested on October 30 with a John Deere 482 plot stripper (without a field cleaner). This trial consisted of 4 replicates of 38 entries. Plot size was 4 rows by 30 ft in length. Rainfall, temperatures and other weather data are summarized in the Mesonet data for the site (see appendix for Fort Cobb Mesonet site). In-season center pivot irrigation totaled 16.75 inches. Irrigation totals in inches by month were:

May	1.00
June	2.00
July	5.50
August	4.75
September	3.75

2012 Methodology Change

It should be noted that the methodology for the OVT program was changed in 2012 as compared to previous years. **This methodology is similar to other experiment station stripper harvested OVT locations such as Dr. Jane Dever's Texas A&M AgriLife Research program at Lubbock. At harvest, grab samples were taken from each plot in 3 of the 4 replicates. These grab samples were used to determine the lint and seed turnout for each individual entry and were used to convert bur cotton plot weights to lint per acre. Lint from these grab samples was submitted to the Texas Tech University FBRI to obtain HVI data.** Additionally, 50-boll samples were taken from each plot in 3 of the 4 replicates and other data (including boll sample lint fractions, boll size, seed index, lint index, and seed per boll) were derived from those. Additional collected data included a visual estimate of storm resistance, which is important in our area.

Yields ranged from a low of 960 to a high of 1643 lb/acre. Fiber quality averages were excellent, as micronaire averaged 4.6 units, staple averaged 38.3/32nds inch, strength averaged 34.3 g/tex, and uniformity averaged 83.7%.

Fort Cobb OVT results can be found in Tables 22 and 23.

Table 1. Stand Count Data from Failed 2012 Extension On-Farm CRSP and RACE Trials

County Replicated Small Plot (CRSP) Trials				
Practice ==>	Irrigated	Irrigated	Dryland	Dryland
County ==>	Jackson	Greer	Greer	Jackson
Location ==>	Altus	Granite	Granite	Altus
Cooperator ==>	Felty	Thornbrough	Graumann	Winsett
Planting Date ==>	16-May	26-May	25-May	15-May
Status ==>	in LAID, failed	wells crashed, failed	drought, failed	drought, failed
Seed drop/acre	52,000	52,000	52,000	52,000
Entry				
PhytoGen 499 WRF	34,304	45,085	43,124	36,591
Deltapine 1219 B2RF	31,363	37,897	47,698	33,650
FiberMax 1944 GLB2	31,690	35,937	41,491	39,858
NexGen 1511 B2RF	38,878	37,571	48,025	34,630
Stoneville 5458 B2RF	49,332	40,511	43,124	40,837
Stoneville 4288 B2F	40,838	36,917	45,738	38,877
NexGen 4012 B2RF	35,611	.	40,511	35,611
NexGen 4010 B2RF	32,017	35,284	41,491	36,264
All-Tex Nitro 44 B2RF	43,451	.	47,698	39,204
All-Tex Edge B2RF	.	34,630	.	.
PhytoGen 375 WRF	.	.	43,451	36,917
Deltapine 1044 B2RF	42,798	51,945	47,372	36,591
PhytoGen 367 WRF	38,224	40,184	.	.
FiberMax 2484 B2F	36,917	.	.	.
FiberMax 9180 B2F	.	33,977	.	.
FiberMax 9170 B2F	.	.	44,758	34,957
NexGen 3348 B2RF	.	33,977	.	.
Test average	37,952	38,659	44,540	36,999
CV, %	15.9	25.6	14.1	19.5
OSL	0.004	0.365	0.685	0.952
LSD	8,709	NS	NS	NS

Replicated Agronomic Cotton Evaluation (RACE) Trials					
Practice ==>	Irrigated	Dryland	Dryland	Dryland	Dryland
County ==>	Jackson	Tillman	Harmon	Washita	Canadian
Location ==>	Altus	Tipton	Hollis	Canute	Union City
Cooperator ==>	Winsett	Fischer	Cummins	Davis	Schieber
Planting Date ==>	14-May	4-Jun	19-Jun	7-May, replanted 24-May	18-May
Status ==>	in LAID, failed	drought, failed	drought, failed	hail, drought, failed	hailed out
Seed drop/acre	40,000	27,500	30,000	26,000	35,000
Entry					
PhytoGen 499 WRF	29,621	27,116	26,136	No data	.
Deltapine 1219 B2RF	30,492	28,096	24,394	No data	No data
FiberMax 1944 GLB2	32,670	28,423	25,265	No data	No data
NexGen 1511 B2RF	27,878	27,443	22,215	No data	No data
Stoneville 5458 B2RF	.	25,809	20,909	.	.
Stoneville 4288 B2F	33,541	.	24,394	No data	No data
NexGen 4012 B2RF	30,928	26,463	.	No data	No data
NexGen 4010 B2RF	.	.	.	.	.
All-Tex Nitro 44 B2RF	26,136	25,809	.	No data	No data
All-Tex Edge B2RF	.	.	23,087	.	.
PhytoGen 375 WRF	28,750	.	.	.	.
Deltapine 1044 B2RF	32,234	28,423	.	No data	No data
FiberMax 1740 B2F	34,412	.	.	.	.
NexGen 3348 B2RF	.	.	20,038	.	.
PhytoGen 367 WRF	.	.	.	.	No data
Test average	30,666	27,198	23,305	--	--
CV, %	12.2	8.4	14.5	--	--
OSL	0.231	0.518	0.368	--	--
LSD	NS	NS	NS	--	--

Table 2. 2012 Extension On-Farm Cotton Variety Trials

	RACE Trials				CRSP Trial
	Irrigated				Irrigated
County and Location	Custer - Hydro	Caddo - Carnegie	Harmon - Hollis	Beckham - Erick	Tillman - Tipton
Cooperator	Merlin Schantz	Jay Holsted	Tony Cox	Darrel Gamble	John McCullough
Status	large plot	large plot	large plot	large plot	small plot
Irrigation Type	center pivot	center pivot	subsurface drip	center pivot	furrow
Replicates	3	3	3	3	4
Planting Date	18-May	17-May	24-Apr	10-May	3-May
Row Spacing	36 inches	36 inches	40 inches	40 inches	40 inches
Seeding Rate	47,000	50,000	48,000	59,000	52,000
Stand Count	x	x	x	x	x
Final Plant Height	x	x	x	x	x
Storm Resistance	x	x	x	x	x
Harvest Date	23-Oct	7-Nov	16-Oct	2-Nov	13-Nov
Harvested Plot Size	8 rows x 503 ft	8 rows x 788-1198 ft	8 rows x 1278 ft	4 rows x 1234 ft	2 rows x 25 ft
HVI Fiber Data	x	x	x	x	x
Comments	good irrigation	limited irrigation	good 40-inch drip irrigation	limited irrigation	limited furrow irrigation
Entries	PhytoGen499 WRF	PhytoGen499 WRF	PhytoGen499 WRF	PhytoGen499 WRF	All-Tex Nitro 44 B2RF
	Deltapine 1219 B2RF	Deltapine 1219 B2RF	Deltapine 1219 B2RF	Deltapine 1219 B2RF	Deltapine 1044B2RF
	FiberMax 1944 GLB2	FiberMax 1944 GLB2	FiberMax 1944 GLB2	FiberMax 1944 GLB2	Deltapine 1219B2RF
	Stoneville 4288 B2F	Stoneville 4288 B2F	Stoneville 5458 B2F	Stoneville 4288 B2F	FiberMax 1944GLB2
	All-Tex Nitro B2RF	All-Tex Nitro B2RF	All-Tex Nitro B2RF	All-Tex Nitro B2RF	FiberMax 2484B2F
	NexGen 1511 B2RF	NexGen 1511 B2RF	NexGen 1511 B2RF	NexGen 1511 B2RF	NexGen 1511B2RF
	NexGen 4012 B2RF	NexGen 4012 B2RF	NexGen 4012 B2RF	NexGen 4012 B2RF	NexGen 4010B2RF
Grower's choice	GC/FiberMax 1740 B2F	GC/FiberMax 1740 B2F	No GC planted	GC/FiberMax 1740 B2F	NexGen 4012B2RF
					PhytoGen 367WRF
					PhytoGen 499WRF
					Stoneville 4288B2F
					Stoneville 5458B2RF

Table 3. Harvest results from the Harmon County irrigated RACE trial, Tony Cox Farm, Hollis, OK, 2012.

Entry	Lint turnout	Seed turnout	Burr cotton yield	Lint yield	Seed yield	Lint loan value	Lint value	Seed value	Total value	Ginning cost	Seed/tech cost	Net value	
	---------- % ----------		----------- lb/acre -----------			--$/lb--	--------------------------- $/acre -----------------------------						
Deltapine 1219B2RF	33.2	51.6	4923	1636	2540	0.5765	942	317	1259	148	66	1046	a
PhytoGen 499WRF	32.7	49.2	5020	1644	2466	0.5758	945	309	1254	150	70	1033	a
FiberMax 1944GLB2	32.4	51.8	4948	1603	2560	0.5750	922	320	1242	149	71	1022	ab
NexGen 1511B2RF	34.4	49.5	4706	1617	2329	0.5707	924	291	1215	141	64	1010	ab
All-Tex Nitro 44 B2RF	29.5	51.5	5177	1529	2667	0.5817	886	332	1218	155	66	997	abc
Stoneville 5458B2F	30.8	51.1	4882	1506	2495	0.5673	857	314	1171	148	70	954	bc
NexGen 4012B2RF	30.6	51.0	4793	1465	2441	0.5718	837	305	1142	144	62	936	c
Test average	31.9	50.8	4921	1572	2500	0.5741	902	313	1215	148	67	1000	
CV, %	3.6	2.3	3.8	3.8	3.8	0.9	3.6	3.8	3.7	3.8	---	3.9	
OSL	0.0029	0.0883†	0.1739	0.0166	0.0323	0.0844†	0.0086	0.0329	0.0570†	0.1695	---	0.0379	
LSD	2.1	1.7	NS	105	171	0.0074	58	21	65	NS	---	69	

For net value/acre, means within a column with the same letter are not significantly different.
CV - coefficient of variation.
OSL - observed significance level, or probability of a greater F value.
LSD - least significant difference at the 0.05 level, † indicates significance at the 0.10 level, NS - not significant.
Note: some columns may not add up due to rounding error.

Assumes:
$3.00/cwt ginning cost.
$250/ton for seed.
Value for lint based on CCC loan value from grab samples and FBRI HVI results.
Color grades set to 21, leaf grades set to 2 for entire trial.

Table 4. Agronomic and fiber quality results from the Harmon County irrigated RACE trial, Tony Cox Farm, Holis, OK, 2012.

Entry	Final population	Final plant height	Storm resistance	Micronaire	Staple	Strength	Uniformity
	plants/acre	inches	1-9 visual scale*	units	32nds inch	g/tex	%
All-Tex Nitro 44 B2RF	34,412	31.9	7.0	4.0	37.9	32.0	83.2
Deltapine 1219B2RF	33,105	34.5	6.2	4.3	35.9	31.3	80.4
FiberMax 1944GLB2	29,621	30.1	5.7	4.4	36.2	29.5	80.8
NexGen 1511B2RF	29,621	32.5	4.2	4.5	35.4	30.2	82.4
NexGen 4012B2RF	35,719	39.0	7.2	4.2	35.3	29.0	81.2
PhytoGen 499WRF	32,234	37.4	4.8	4.4	36.1	31.5	82.6
Stoneville 5458B2F	32,670	29.8	5.2	4.7	35.3	29.8	80.7
Test average	32,483	33.6	5.7	4.4	36.0	30.5	81.6
CV, %	10.3	6.2	5.5	4.7	1.5	2.2	0.5
OSL	0.2915	0.0009	<0.0001	0.0401	0.0010	0.0011	<0.0001
LSD	NS	3.7	0.6	0.4	1.0	1.2	0.7

CV - coefficient of variation.

OSL - observed significance level, or probability of a greater F value.

LSD - least significant difference at the 0.05 level, † indicates significance at the 0.10 level, NS - not significant.

*Visual storm resistance scale: 1=loose, 9=tight.

Assumes:

Color grades set to 21, leaf grades set to 2 for entire trial.

Table 5. Harvest results from the Beckham County irrigated RACE trial, Darrel Gamble Farm, Erick, OK, 2012.

Entry	Lint turnout	Seed turnout	Burr cotton yield	Lint yield	Seed yield	Lint loan value	Lint value	Seed value	Total value	Ginning cost	Seed/tech cost	Net value	
	---------- % ----------		----------- lb/acre -----------			--$/lb--	--------------------------- $/acre -----------------------------						
PhytoGen 499WRF	32.4	47.6	3955	1281	1886	0.5810	745	236	980	119	86	775	a
Deltapine 1219B2RF	30.9	49.7	3716	1148	1845	0.5803	666	231	897	111	81	705	b
FiberMax 1944GLB2	30.4	49.6	3807	1156	1885	0.5802	671	236	907	114	88	705	b
NexGen 1511B2RF	30.3	44.5	3738	1132	1664	0.5715	647	208	855	112	79	663	b
Grower's FiberMax 1740B2F	30.2	48.1	3609	1089	1737	0.5783	630	217	847	108	86	653	bc
NexGen 4012B2RF	29.0	48.2	3440	999	1657	0.5797	579	207	786	103	77	607	cd
All-Tex Nitro 44 B2RF	26.5	47.6	3731	990	1775	0.5812	575	222	797	112	82	604	cd
Stoneville 4288B2F	26.8	49.1	3548	951	1742	0.5692	541	218	759	106	86	567	d
Test average	29.6	48.0	3693	1093	1774	0.5777	632	222	853	111	83	660	
CV, %	4.2	3.0	4.2	4.1	4.9	1.1	4.2	4.9	4.2	4.3	---	4.8	
OSL	0.0005	0.0138	0.0296	<0.0001	0.0268	0.2374	<0.0001	0.0249	<0.0001	0.0369	---	<0.0001	
LSD	2.2	2.5	269	78	152	NS	47	19	63	8	---	56	

For net value/acre, means within a column with the same letter are not significantly different.
CV - coefficient of variation.
OSL - observed significance level, or probability of a greater F value.
LSD - least significant difference at the 0.05 level, † indicates significance at the 0.10 level, NS - not significant.
Note: some columns may not add up due to rounding error.

Assumes:
$3.00/cwt ginning cost.
$250/ton for seed.
Value for lint based on CCC loan value from grab samples and FBRI HVI results.
Color grades set to 21, leaf grades set to 2 for entire trial.

Table 6. Agronomic and fiber quality results from the Beckham County irrigated RACE trial, Darrel Gamble Farm, Erick, OK, 2012.

Entry	Final population	Final plant height	Storm resistance	Micronaire	Staple	Strength	Uniformity
	plants/acre	inches	1-9 visual scale*	units	32nds inch	g/tex	%
All-Tex Nitro 44 B2RF	31,799	30.0	5.7	4.3	39.1	34.0	83.0
Deltapine 1219B2RF	37,026	34.2	4.0	4.2	38.0	34.9	81.7
FiberMax 1944GLB2	32,234	30.2	7.0	4.2	38.3	33.3	82.2
Grower's FiberMax 1740B2F	32,234	29.0	6.0	4.5	36.0	32.1	82.6
NexGen 1511B2RF	29,620	31.8	3.7	4.8	36.6	32.5	82.7
NexGen 4012B2RF	26,136	33.2	6.0	4.4	37.0	32.3	82.4
PhytoGen 499WRF	31,799	34.8	5.0	4.4	37.0	33.3	83.3
Stoneville 4288B2F	28,749	27.7	5.7	4.8	36.2	30.8	81.9
Test average	31,200	31.4	5.4	4.5	37.3	32.9	82.5
CV, %	9.0	7.7	6.6	4.6	1.6	1.7	0.1
OSL	0.0153	0.0261	<0.0001	0.0108	0.0002	<0.0001	0.0780†
LSD	4,921	4.2	0.6	0.4	1.1	1.0	0.9

CV - coefficient of variation.
OSL - observed significance level, or probability of a greater F value.
LSD - least significant difference at the 0.05 level, † indicates significance at the 0.10 level, NS - not significant.
*Visual storm resistance scale: 1=loose, 9=tight.

Assumes:
Color grades set to 21, leaf grades set to 2 for entire trial.

Table 7. Harvest results from the Custer County irrigated RACE trial, Merlin Schantz Farm, Hydro, OK, 2012.

Entry	Lint turnout	Seed turnout	Burr cotton yield	Lint yield	Seed yield	Lint loan value	Lint value	Seed value	Total value	Ginning cost	Seed/tech cost	Net value	
	---------- % ----------		----------- lb/acre -----------			--$/lb--	--------------------------- $/acre -----------------------------						
PhytoGen 499WRF	33.5	49.6	5287	1771	2623	0.5648	1000	328	1328	159	69	1101	a
Deltapine 1219B2RF	31.1	50.6	5413	1682	2741	0.5793	974	342	1317	162	64	1090	a
Stoneville 4288B2F	28.7	50.2	5244	1507	2633	0.5522	831	329	1160	157	68	935	b
NexGen 1511B2RF	32.1	46.0	4943	1589	2276	0.5412	858	285	1143	148	63	932	b
FiberMax 1944GLB2	31.9	50.3	4743	1512	2386	0.5562	841	298	1139	142	70	927	b
NexGen 4012B2RF	31.3	49.1	4775	1493	2346	0.5597	835	293	1128	143	61	924	b
Grower's FiberMax 1740B2F	32.7	49.3	4643	1517	2290	0.5413	821	286	1107	139	68	900	b
All-Tex Nitro 44 B2RF	28.2	47.9	4544	1281	2178	0.5807	744	272	1016	136	65	815	b
Test average	31.2	49.1	4949	1544	2434	0.5594	863	304	1167	148	66	953	
CV, %	3.0	2.2	7.7	7.5	7.7	1.7	7.3	7.7	7.4	7.7	---	7.9	
OSL	<0.0001	0.0030	0.0966†	0.0064	0.0212	0.0008	0.0040	0.0213	0.0082	0.1017	---	0.0056	
LSD	1.7	1.9	546	202	329	0.0169	111	41	151	NS	---	132	

For net value/acre, means within a column with the same letter are not significantly different.
CV - coefficient of variation.
OSL - observed significance level, or probability of a greater F value.
LSD - least significant difference at the 0.05 level, † indicates significance at the 0.10 level, NS - not significant.
Note: some columns may not add up due to rounding error.

Assumes:
$3.00/cwt ginning cost.
$250/ton for seed.
Value for lint based on CCC loan value from grab samples and FBRI HVI results.
Color grades set to 21, leaf grades set to 2 for entire trial.

Table 8. Agronomic and fiber quality results from the Custer County irrigated RACE trial, Merlin Schantz Farm, Hydro, OK, 2012.

Entry	Final population	Final plant height	Storm resistance	Micronaire	Staple	Strength	Uniformity
	plants/acre	inches	1-9 visual scale*	units	32nds inch	g/tex	%
All-Tex Nitro 44 B2RF	42,108	34.4	6.2	4.7	38.4	35.2	83.2
Deltapine 1219B2RF	36,784	32.0	5.2	4.7	38.0	35.0	81.9
FiberMax 1944GLB2	36,784	31.6	6.2	5.2	37.6	33.2	81.7
Grower's FiberMax 1740B2F	35,332	31.1	6.0	5.3	35.3	31.0	82.2
NexGen 1511B2RF	38,236	35.0	5.3	5.4	35.2	32.4	80.8
NexGen 4012B2RF	33,880	35.6	5.8	5.0	35.6	31.6	81.7
PhytoGen 499WRF	39,688	34.3	4.5	4.9	36.6	33.0	83.4
Stoneville 4288B2F	41,624	30.6	5.5	5.2	37.1	31.3	82.1
Test average	38,055	33.1	5.6	5.0	36.7	32.8	82.1
CV, %	12.1	4.9	9.3	2.9	1.9	2.1	0.8
OSL	0.3556	0.0090	0.0183	0.0001	0.0002	<0.0001	0.0055
LSD	NS	2.8	0.9	0.3	1.2	1.2	1.1

CV - coefficient of variation.

OSL - observed significance level, or probability of a greater F value.

LSD - least significant difference at the 0.05 level, † indicates significance at the 0.10 level, NS - not significant.

*Visual storm resistance scale: 1=loose, 9=tight.

Assumes:

$3.00/cwt ginning cost.

$250/ton for seed.

Color grades set to 21, leaf grades set to 2 for entire trial.

Table 9. Harvest results from the Caddo County irrigated RACE trial, Jay Holsted Farm, Carnegie, OK, 2012.

Entry	Lint turnout	Seed turnout	Burr cotton yield	Lint yield	Seed yield	Lint loan value	Lint value	Seed value	Total value	Ginning cost	Seed/tech cost	Net value	
	---------- % ----------		----------- lb/acre -----------			--$/lb--	--------------------------- $/acre -----------------------------						
PhytoGen 499WRF	31.9	49.3	4173	1332	2056	0.5782	770	257	1027	125	73	829	a
NexGen 1511B2RF	31.9	46.0	4237	1353	1949	0.5567	753	244	996	127	67	802	a
Deltapine 1219B2RF	31.1	51.2	4083	1271	2089	0.5748	731	261	991	123	68	801	a
Stoneville 4288B2F	27.8	52.9	3906	1085	2068	0.5775	626	258	885	117	73	695	b
All-Tex Nitro 44 B2RF	25.9	52.4	4048	1047	2120	0.5808	608	265	873	121	69	683	b
NexGen 4012B2RF	28.6	51.4	3862	1106	1984	0.5540	613	248	861	116	65	680	b
FiberMax 1944GLB2	29.8	48.3	3712	1108	1793	0.5738	635	224	859	111	74	674	b
Grower's FiberMax 1740B2F	30.9	48.9	3726	1153	1822	0.5292	610	228	837	112	73	653	b
Test average	29.8	50.0	3968	1182	1985	0.5656	668	248	916	119	70	727	
CV, %	3.4	2.6	2.3	2.3	2.4	2.4	3.3	2.3	2.9	2.2	---	3.4	
OSL	<0.0001	0.0002	<0.0001	<0.0001	<0.0001	0.0051	<0.0001	<0.0001	<0.0001	<0.0001	---	<0.0001	
LSD	1.8	2.2	161	48	82	0.0242	39	10	47	5	---	43	

For net value/acre, means within a column with the same letter are not significantly different.
CV - coefficient of variation.
OSL - observed significance level, or probability of a greater F value.
LSD - least significant difference at the 0.05 level, † indicates significance at the 0.10 level, NS - not significant.
Note: some columns may not add up due to rounding error.

Assumes:
$3.00/cwt ginning cost.
$250/ton for seed.
Value for lint based on CCC loan value from grab samples and FBRI HVI results.
Color grades set to 21, leaf grades set to 2 for entire trial.

Table 10. Agronomic and fiber quality results from the Caddo County irrigated RACE trial, Jay Holsted Farm, Carnegie, OK, 2012.

Entry	Final population	Final plant height	Storm resistance	Micronaire	Staple	Strength	Uniformity
	plants/acre	inches	1-9 visual scale*	units	32nds inch	g/tex	%
All-Tex Nitro 44 B2RF	40,172	31.4	5.0	3.7	39.0	34.2	83.0
Deltapine 1219B2RF	39,204	34.9	4.3	4.5	35.8	32.3	80.8
FiberMax 1944GLB2	40,172	31.0	7.0	4.7	36.0	30.8	81.7
Grower's FiberMax 1740B2F	44,044	29.4	6.7	5.0	34.1	30.2	81.3
NexGen 1511B2RF	38,236	33.6	5.3	4.9	35.4	31.4	82.1
NexGen 4012B2RF	40,656	34.8	5.7	4.0	35.7	31.0	81.2
PhytoGen 499WRF	42,592	35.6	5.7	4.6	35.9	32.4	82.5
Stoneville 4288B2F	39,204	28.5	5.0	4.8	36.3	30.6	81.6
Test average	40,535	32.4	5.6	4.5	36.0	31.6	81.8
CV, %	9.7	4.0	7.2	6.1	2.7	3.3	0.7
OSL	0.6672	<0.0001	<0.0001	0.0006	0.0026	0.0084	0.0057
LSD	NS	2.3	0.7	0.5	1.7	1.9	1.0

CV - coefficient of variation.
OSL - observed significance level, or probability of a greater F value.
LSD - least significant difference at the 0.05 level, † indicates significance at the 0.10 level, NS - not significant.
*Visual storm resistance scale: 1=loose, 9=tight.

Assumes:
$3.00/cwt ginning cost.
$250/ton for seed.
Color grades set to 21, leaf grades set to 2 for entire trial.

Table 11. Lint yield results from the OSU irrigated RACE trials, 2012.

Sorted by 3-Site Mean Ranking

County ==>	Beckham	Caddo	Custer	3-Site	Harmon	All-Site
Irrigation Type ==>	Pivot	Pivot	Pivot	Mean	Drip	Mean
Location ==>	Erick	Carnegie	Hydro		Hollis	
Cooperator ==>	Gamble	Holsted	Schantz		Cox	
Entry	----------------	----------------	Lint yield (lb/acre)	----------------	----------------	
PhytoGen 499WRF	1281	1332	1771	1462	1644	1507
Deltapine 1219B2RF	1148	1271	1682	1367	1636	1434
NexGen 1511B2RF	1132	1353	1589	1358	1617	1423
FiberMax 1944GLB2	1156	1108	1512	1258	1603	1345
Grower's FiberMax 1740B2F	1089	1153	1517	1253	--	--
NexGen 4012B2RF	999	1106	1493	1199	1465	1266
Stoneville 4288B2F	951	1085	1507	1181	--	--
All-Tex Nitro 44 B2RF	990	1047	1281	1106	1529	1212
Stoneville 5458B2F	--	--	--	--	1506	--
Test average	1093	1182	1544	1273	1571	1364
CV, %	4.1	2.3	7.5		3.8	
OSL	<0.0001	<0.0001	0.0064		0.0166	
LSD	78	48	202		105	

CV - coefficient of variation.
OSL - observed significance level, or probability of a greater F value.
LSD - least significant difference at the 0.05 level.

Table 12. Storm resistance results from the OSU irrigated RACE trials, 2012.   Sorted by 3-Site Mean Ranking

County ==>	Beckham	Caddo	Custer	3-Site	Harmon	All-Site
Irrigation Type ==>	Pivot	Pivot	Pivot	Mean	Drip	Mean
Location ==>	Erick	Carnegie	Hydro		Hollis	
Cooperator ==>	Gamble	Holsted	Schantz		Cox	
Entry	---------------------------------- Storm resistance (visual rating: 1 loose, 9 tight) --------------------------------------					
FiberMax 1944GLB2	7.0	7.0	6.2	6.7	5.7	6.5
Grower's FiberMax 1740B2F	6.0	6.7	6.0	6.2	--	--
NexGen 4012B2RF	6.0	5.7	5.8	5.8	7.2	6.2
All-Tex Nitro 44 B2RF	5.7	5.0	6.2	5.6	7.0	6.0
Stoneville 4288B2F	5.7	5.0	5.5	5.4	--	--
PhytoGen 499WRF	5.0	5.7	4.5	5.1	4.8	5.0
NexGen 1511B2RF	3.7	5.3	5.3	4.8	4.2	4.6
Deltapine 1219B2RF	4.0	4.3	5.2	4.5	6.2	4.9
Stoneville 5458B2F	--	--	--	--	5.2	--
Test average	5.4	5.6	5.6	5.5	5.8	5.5
CV, %	6.6	7.2	9.3	--	5.5	--
OSL	<0.0001	<0.0001	0.0183	--	<0.0001	--
LSD	0.6	0.7	0.9	--	0.6	--

CV - coefficient of variation.
OSL - observed significance level, or probability of a greater F value.
LSD - least significant difference at the 0.05 level.

Table 13. Plant height results from the OSU irrigated RACE trials, 2012. Sorted by 3-Site Mean Ranking

County ==> Irrigation Type ==> Location ==> Cooperator ==>	Beckham Pivot Erick Gamble	Caddo Pivot Carnegie Holsted	Custer Pivot Hydro Schantz	3-Site Mean	Harmon Drip Hollis Cox	All-Site Mean
Entry	---------- Plant height (inches) ----------					
PhytoGen 499WRF	34.8	35.6	34.3	34.9	37.4	35.5
NexGen 4012B2RF	33.2	34.8	35.6	34.5	39.0	35.7
Deltapine 1219B2RF	34.2	34.9	32.0	33.7	34.5	33.9
NexGen 1511B2RF	31.8	33.6	35.0	33.5	32.5	33.2
All-Tex Nitro 44 B2RF	30.0	31.4	34.4	31.9	31.9	31.9
FiberMax 1944GLB2	30.2	31.0	31.6	30.9	30.1	30.7
Grower's FiberMax 1740B2F	29.0	29.4	31.1	29.8	--	--
Stoneville 4288B2F	27.7	28.5	30.6	28.9	--	--
Stoneville 5458B2F	--	--	--	--	29.8	--
Test average	31.4	32.4	33.1	32.3	33.6	33.5
CV, %	7.7	4.0	4.9	--	6.2	--
OSL	0.0261	<0.0001	0.0090	--	0.0009	--
LSD	4.2	2.3	2.8	--	3.7	--

CV - coefficient of variation.
OSL - observed significance level, or probability of a greater F value.
LSD - least significant difference at the 0.05 level.

Table 14. Loan value results from the OSU irrigated RACE trials, 2012. Sorted by 3-Site Mean Ranking

County ==>	Beckham	Caddo	Custer	3-Site	Harmon	All-Site
Irrigation Type ==>	Pivot	Pivot	Pivot	Mean	Drip	Mean
Location ==>	Erick	Carnegie	Hydro		Hollis	
Cooperator ==>	Gamble	Holsted	Schantz		Cox	
Entry	------- Loan value ($/lb) -------					
All-Tex Nitro 44 B2RF	0.5812	0.5808	0.5807	0.5809	0.5817	0.5811
Deltapine 1219B2RF	0.5803	0.5748	0.5793	0.5781	0.5765	0.5777
PhytoGen 499WRF	0.5810	0.5782	0.5648	0.5747	0.5758	0.5750
FiberMax 1944GLB2	0.5802	0.5738	0.5562	0.5701	0.5750	0.5713
Stoneville 4288B2F	0.5692	0.5775	0.5522	0.5663	--	--
NexGen 4012B2RF	0.5797	0.5540	0.5597	0.5645	0.5718	0.5663
NexGen 1511B2RF	0.5715	0.5567	0.5412	0.5565	0.5707	0.5600
Grower's FiberMax 1740B2F	0.5783	0.5292	0.5413	0.5496	--	--
Stoneville 5458B2F	--	--	--	--	0.5673	--
Test average	0.5777	0.5656	0.5594	0.5676	0.5741	0.5719
CV, %	1.1	2.4	1.7	--	0.9	--
OSL	0.2374	0.0051	0.0008	--	0.0844†	--
LSD	NS	0.0	0.0	--	0.0074	--

CV - coefficient of variation.
OSL - observed significance level, or probability of a greater F value.
LSD - least significant difference at the 0.05 level, † indicates significance at the 0.10 level, NS - not significant.
Note: Color grades set to 21, leaf grades set to 2 for entire trial.

Table 15. Net value results from the OSU irrigated RACE trials, 2012. Sorted by 3-Site Mean Ranking

County ==>	Beckham	Caddo	Custer	3-Site	Harmon	All-Site
Irrigation Type ==>	Pivot	Pivot	Pivot	Mean	Drip	Mean
Location ==>	Erick	Carnegie	Hydro		Hollis	
Cooperator ==>	Gamble	Holsted	Schantz		Cox	
Entry	---------- Net value ($/acre) ----------					
PhytoGen 499WRF	775	829	1101	902	1033	935
Deltapine 1219B2RF	705	801	1090	865	1046	911
NexGen 1511B2RF	663	802	932	799	1010	852
FiberMax 1944GLB2	705	674	927	769	1022	832
NexGen 4012B2RF	607	680	924	737	936	787
Grower's FiberMax 1740B2F	653	653	900	735	--	--
Stoneville 4288B2F	567	695	935	732	--	--
All-Tex Nitro 44 B2RF	604	683	815	701	997	775
Stoneville 5458B2F	--	--	--	--	954	--
Test average	660	727	953	780	1000	848
CV, %	4.8	3.4	7.9	--	3.9	--
OSL	<0.0001	<0.0001	0.0056	--	0.0379	--
LSD	56	43	132	--	69	--

CV - coefficient of variation.

OSL - observed significance level, or probability of a greater F value.

LSD - least significant difference at the 0.05 level, † indicates significance at the 0.10 level, NS - not significant.

Table 16. MIcronaire results from the OSU irrigated RACE trials, 2012.   Sorted by 3-Site Mean Ranking

County ==>	Beckham	Caddo	Custer	3-Site	Harmon	All-Site
Irrigation Type ==>	Pivot	Pivot	Pivot	Mean	Drip	Mean
Location ==>	Erick	Carnegie	Hydro		Hollis	
Cooperator ==>	Gamble	Holsted	Schantz		Cox	
Entry	-------------	-------------	------------- Micronaire (units)	-------------	-------------	-------------
NexGen 1511B2RF	4.8	4.9	5.4	5.0	4.5	4.9
Grower's FiberMax 1740B2F	4.5	5.0	5.3	4.9	--	--
Stoneville 4288B2F	4.8	4.8	5.2	4.9	--	--
FiberMax 1944GLB2	4.2	4.7	5.2	4.7	4.4	4.6
PhytoGen 499WRF	4.4	4.6	4.9	4.6	4.4	4.6
NexGen 4012B2RF	4.4	4.0	5.0	4.5	4.2	4.4
Deltapine 1219B2RF	4.2	4.5	4.7	4.5	4.3	4.4
All-Tex Nitro 44 B2RF	4.3	3.7	4.7	4.2	4.0	4.2
Stoneville 5458B2F	--	--	--	--	4.7	--
Test average	4.5	4.5	5.1	4.7	4.4	4.5
CV, %	4.6	6.1	2.9	--	4.7	--
OSL	0.0108	0.0006	0.0001	--	0.0401	--
LSD	0.4	0.5	0.3	--	0.4000	--

CV - coefficient of variation.

OSL - observed significance level, or probability of a greater F value.

LSD - least significant difference at the 0.05 level, † indicates significance at the 0.10 level, NS - not significant.

Table 17. Staple results from the OSU irrigated RACE trials, 2012. Sorted by 3-Site Mean Ranking

County ==>	Beckham	Caddo	Custer	3-Site	Harmon	All-Site
Irrigation Type ==>	Pivot	Pivot	Pivot	Mean	Drip	Mean
Location ==>	Erick	Carnegie	Hydro		Hollis	
Cooperator ==>	Gamble	Holsted	Schantz		Cox	
Entry	------------------------	------------------------	Staple (32nds inch)	------------------------	------------------------	------------------------
All-Tex Nitro 44 B2RF	39.1	39.0	38.4	38.8	37.9	38.6
FiberMax 1944GLB2	38.3	36.0	37.6	37.3	36.2	37.0
Deltapine 1219B2RF	38.0	35.8	38.0	37.3	35.9	36.9
Stoneville 4288B2F	36.2	36.3	37.1	36.5	--	--
PhytoGen 499WRF	37.0	35.9	36.6	36.5	36.1	36.4
NexGen 4012B2RF	37.0	35.7	35.6	36.1	35.3	35.9
NexGen 1511B2RF	36.6	35.4	35.2	35.7	35.4	35.7
Grower's FiberMax 1740B2F	36.0	34.1	35.3	35.1	--	--
Stoneville 5458B2F	--	--	--	--	35.3	--
Test average	37.3	36.0	36.7	36.7	36.0	36.8
CV, %	1.6	2.7	1.9	--	1.5	--
OSL	0.0002	0.0026	0.0002	--	0.0010	--
LSD	1.1	1.7	1.2	--	1.0	--

CV - coefficient of variation.

OSL - observed significance level, or probability of a greater F value.

LSD - least significant difference at the 0.05 level, † indicates significance at the 0.10 level, NS - not significant.

Table 18. Strength results from the OSU irrigated RACE trials, 2012.

Sorted by 3-Site Mean Ranking

County ==>	Beckham	Caddo	Custer	3-Site	Harmon	All-Site
Irrigation Type ==>	Pivot	Pivot	Pivot	Mean	Drip	Mean
Location ==>	Erick	Carnegie	Hydro		Hollis	
Cooperator ==>	Gamble	Holsted	Schantz		Cox	
Entry	Strength (g/tex)					
All-Tex Nitro 44 B2RF	34.0	34.2	35.2	34.5	32.0	33.9
Deltapine 1219B2RF	34.9	32.3	35.0	34.1	31.3	33.4
PhytoGen 499WRF	33.3	32.4	33.0	32.9	31.5	32.6
FiberMax 1944GLB2	33.3	30.8	33.2	32.4	29.5	31.7
NexGen 1511B2RF	32.5	31.4	32.4	32.1	30.2	31.6
NexGen 4012B2RF	32.3	31.0	31.6	31.6	29.0	31.0
Grower's FiberMax 1740B2F	32.1	30.2	31.0	31.1	--	--
Stoneville 4288B2F	30.8	30.6	31.3	30.9	--	--
Stoneville 5458B2F	--	--	--	--	29.8	--
Test average	32.9	31.6	32.8	32.5	30.5	32.3
CV, %	1.7	3.3	2.1	--	2.2	--
OSL	<0.0001	0.0084	<0.0001	--	0.0011	--
LSD	1.0	1.9	1.2	--	1.2	--

CV - coefficient of variation.

OSL - observed significance level, or probability of a greater F value.

LSD - least significant difference at the 0.05 level, † indicates significance at the 0.10 level, NS - not significant.

Table 19. Uniformity results from the OSU irrigated RACE trials, 2012. Sorted by 3-Site Mean Ranking

County ==>	Beckham	Caddo	Custer	3-Site	Harmon	All-Site
Irrigation Type ==>	Pivot	Pivot	Pivot	Mean	Drip	Mean
Location ==>	Erick	Carnegie	Hydro		Hollis	
Cooperator ==>	Gamble	Holsted	Schantz		Cox	
Entry	---------- Uniformity (%) ----------					
PhytoGen 499WRF	83.3	82.5	83.4	83.1	82.6	83.0
All-Tex Nitro 44 B2RF	83.0	83.0	83.2	83.1	83.2	83.1
Grower's FiberMax 1740B2F	82.6	81.3	82.2	82.0	--	--
NexGen 1511B2RF	82.7	82.1	80.8	81.9	82.4	82.0
FiberMax 1944GLB2	82.2	81.7	81.7	81.9	80.8	81.6
Stoneville 4288B2F	81.9	81.6	82.1	81.9	--	--
NexGen 4012B2RF	82.4	81.2	81.7	81.8	81.2	81.6
Deltapine 1219B2RF	81.7	80.8	81.9	81.5	80.4	81.2
Stoneville 5458B2F	--	--	--	--	80.7	--
Test average	82.5	81.8	82.1	82.1	81.6	82.1
CV, %	0.1	0.7	0.8	--	0.5	--
OSL	0.0780†	0.0057	0.0055	--	<0.0001	--
LSD	0.9	1.0	1.1	--	0.7	--

CV - coefficient of variation.

OSL - observed significance level, or probability of a greater F value.

LSD - least significant difference at the 0.05 level, † indicates significance at the 0.10 level, NS - not significant.

Table 20. Harvest results from the furrow irrigated Tillman County small plot replicated trial, John McCullough Farm, Tipton, OK, 2012.

Entry	Lint turnout	Seed turnout	Bur cotton yield	Lint yield	Seed yield	Lint loan value	Lint value	Seed value	Total value	Ginning cost	Net value after ginning	
	---------- % ----------		----------- lb/acre -----------			--$/lb--	--------------------------- $/acre ------------------------------					
PhytoGen 499WRF	26.0	40.4	3624	942	1464	0.5448	513	183	696	109	588	a
Deltapine 1044B2RF	24.2	42.9	3554	861	1526	0.5417	469	191	659	107	553	a
All-Tex Nitro 44 B2RF	21.0	43.4	3746	785	1627	0.5770	454	204	657	112	545	a
PhytoGen 367WRF	22.4	41.0	3633	813	1488	0.5595	455	186	641	109	532	a
Deltapine 1219B2RF	25.1	42.6	3345	840	1425	0.5372	451	178	630	101	529	ab
Stoneville 5458B2RF	22.7	41.9	3075	699	1287	0.5070	355	161	516	92	424	bc
FiberMax 2484B2F	21.7	41.2	2796	607	1153	0.5648	343	144	487	84	403	c
NexGen 1511B2RF	22.2	38.7	2945	655	1140	0.5300	347	143	490	88	401	c
FiberMax 1944GLB2	20.6	42.2	2814	580	1186	0.5442	315	148	463	84	379	cd
NexGen 4010B2RF	19.6	41.4	2875	563	1190	0.5203	293	149	442	86	356	cd
Stoneville 4288B2F	19.3	44.3	2709	522	1199	0.5167	270	150	420	81	338	cd
NexGen 4012B2RF	19.3	41.5	2501	481	1037	0.4647	224	130	354	75	279	d
Test average	22.0	41.8	3135	696	1310	0.5340	374	164	538	94	444	
CV, %	9.3	4.4	12.3	12.6	12.5	2.7	14.4	12.5	13.8	12.3	14.1	
OSL	0.0050	0.0908†	0.0049	<0.0001	0.0030	<0.0001	<0.0001	0.0030	<0.0001	0.0047	<0.0001	
LSD	3.5	2.6	655	148	277	0.0247	91	35	126	20	106	

For net value/acre, means within a column with the same letter are not significantly different.
CV - coefficient of variation.
OSL - observed significance level, or probability of a greater F value.
LSD - least significant difference at the 0.05 level, † indicates significance at the 0.10 level, NS - not significant.
Note: some columns may not add up due to rounding error.

Assumes:
$3.00/cwt ginning cost.
$250/ton for seed.
Value for lint based on CCC loan value from grab samples and FBRI HVI results.
Color grades set to 21, leaf grades set to 2 for entire trial.

Table 21. In-season and fiber quality results from the furrow irrigated Tillman County small plot replicated trial, John McCullough Farm, Tipton, OK, 2012

Entry	Final population	Final plant height	Storm resistance	Micronaire	Staple	Strength	Uniformity
	plants/acre	inches	1-9 visual scale*	units	32nds inch	g/tex	%
All-Tex Nitro 44 B2RF	47,480	29.7	5.7	4.1	36.1	32.7	82.5
Deltapine 1044B2RF	40,946	28.1	4.5	4.4	34.0	29.1	80.4
Deltapine 1219B2RF	33,106	33.5	4.8	4.1	34.0	29.4	79.3
FiberMax 1944GLB2	43,996	28.5	7.2	3.7	34.2	27.6	79.1
FiberMax 2484B2F	47,045	28.6	5.7	4.1	35.0	29.5	80.2
NexGen 1511B2RF	41,817	28.0	5.8	4.2	33.5	29.5	80.9
NexGen 4010B2RF	45,302	29.1	5.8	3.7	33.1	27.4	80.5
NexGen 4012B2RF	46,174	29.1	7.2	3.3	32.4	24.4	79.1
PhytoGen 367WRF	39,204	27.6	4.5	4.1	34.6	29.5	80.1
PhytoGen 499WRF	38,768	32.1	5.2	4.4	33.9	30.7	81.6
Stoneville 4288B2F	41,817	24.6	5.0	3.8	33.1	25.8	78.8
Stoneville 5458B2RF	43,560	26.3	5.5	4.3	32.7	26.7	79.4
Test average	42,435	28.8	5.6	4.0	33.9	28.5	80.2
CV, %	13.2	8.6	18.2	4.8	1.6	3.1	0.7
OSL	0.1622	0.0223	0.0480	<0.0001	<0.0001	<0.0001	<0.0001
LSD	NS	4.2	1.7	0.3	0.9	1.5	1.0

CV - coefficient of variation.
OSL - observed significance level, or probability of a greater F value.
LSD - least significant difference at the 0.05 level, NS - not significant.
*Visual storm resistance scale: 1=loose, 9=tight.

Note: Color grades set to 21, leaf grades set to 2 for entire test.

Table 22. Yield and agronomic results from the OSU cotton official variety test, Caddo Research Station, Fort Cobb, OK 2012.

Entry	Lint yield	Grab sample turnout		Boll sample lint fraction		Boll size	Seed index	Lint index	Seed per boll	Storm resistance
		Lint	Seed	Picked	Pulled					
	lb/acre	-------------------------%	-------------------------			g seed cotton/boll	g wt 100 fuzzy seed	g wt lint from 100 fuzzy seed	count/boll	visual scale (1=loose, 9=tight)
PhytoGen PHY 499WRF	1643	28.1	40.4	44.2	33.8	5.0	10.3	8.4	26.4	4.4
Deltapine DP 0912 B2RF	1640	27.6	42.9	41.8	32.5	5.5	10.8	8.0	29.3	3.4
NexGen NG 1511 B2RF	1611	28.3	39.0	44.6	34.0	5.4	10.8	9.0	27.0	5.6
Monsanto MON11R154B2R2	1608	26.6	42.4	42.8	32.4	5.4	10.2	7.8	29.6	3.9
Stoneville ST 5458 B2RF	1584	27.0	43.2	41.2	32.2	5.9	11.2	8.0	30.1	4.9
Deltapine DP 1044 B2RF	1573	26.1	42.7	42.4	32.6	4.9	10.5	7.7	26.8	5.0
Deltapine DP 1321 B2RF	1569	27.9	41.3	43.4	33.0	5.2	10.7	8.5	26.4	4.6
Bayer CropScience BCSBX1346GLB2	1564	26.8	43.4	41.7	32.9	6.2	11.6	8.5	30.4	5.3
Dyna-Gro DG 2595 B2RF	1553	27.5	42.5	42.3	32.7	5.6	10.9	8.2	29.0	4.0
All-Tex AT 9CR253 B2RF	1514	26.9	42.9	43.0	32.5	5.4	11.0	8.5	27.5	6.5
All-Tex AT Nitro 44 B2RF	1483	27.4	42.6	40.5	30.8	5.4	11.4	7.9	27.9	5.5
Deltapine DP 1212 B2RF	1480	28.5	42.7	42.9	32.7	5.7	11.3	8.6	28.4	4.6
Croplan Genetics CG 3156 B2RF	1453	27.9	38.9	43.3	32.8	4.9	11.0	8.6	24.6	5.8
Deltapine DP 1359 B2RF	1429	25.7	41.6	43.6	33.3	5.0	9.8	7.8	28.4	4.4
Dyna-Gro DG 2285 B2RF	1426	27.2	41.6	42.6	32.6	5.8	11.3	8.7	28.3	6.1
All-Tex AT Epic RF	1423	24.8	42.8	42.2	31.2	5.4	11.1	8.3	27.4	6.1
Croplan Genetics CG 3787 B2RF	1422	26.6	40.9	44.7	33.3	5.1	9.7	8.0	28.7	4.0
Deltapine DP 1311 B2RF	1413	27.7	41.6	44.2	34.3	5.1	8.9	7.2	30.8	6.9
Deltapine DP 1219 B2RF	1412	27.1	42.3	42.4	32.8	4.9	10.0	7.5	27.4	4.4
FiberMax FM 1740B2F	1410	27.2	40.8	42.7	32.7	5.4	10.8	8.3	28.4	5.6
Dyna-Gro DG 2570 B2RF	1409	26.3	44.1	41.7	31.9	6.1	11.6	8.4	30.7	5.6
Bayer CropScience BCSBX1347 GLB2	1407	27.6	41.1	41.1	31.3	5.8	10.9	7.8	30.4	6.1
Bayer CropScience BCSBX1348 GLB2	1395	24.8	44.0	41.2	31.8	5.1	10.9	7.7	27.5	4.1
Deltapine DP 1032 B2RF	1393	26.6	39.1	44.2	34.4	5.2	10.2	8.1	28.4	4.3
FiberMax FM 1944GLB2	1372	25.6	44.3	40.2	31.1	6.1	11.5	7.9	31.0	5.5
PhytoGen PHY 367WRF	1346	25.1	43.0	42.6	31.6	4.8	10.4	7.8	26.6	3.5
Monsanto MON 11R136B2R2	1336	25.4	41.9	41.2	31.1	5.5	10.6	7.5	30.0	5.0
PhytoGen PHY 375WRF	1325	25.7	40.3	42.8	31.9	5.5	10.9	8.3	28.0	4.3
FiberMax FM 2011GT	1321	28.0	40.7	43.3	33.3	6.4	12.5	9.9	28.1	7.3
FiberMax FM 2484B2F	1270	27.4	42.5	41.9	32.6	5.0	11.1	8.3	25.5	6.1
NexGen NG 3348 B2RF	1241	24.9	45.4	39.2	30.1	5.8	12.6	8.2	28.1	6.1
All-Tex AT Edge B2RF	1229	25.7	44.5	39.8	30.3	5.4	10.9	7.2	29.7	6.0
FiberMax FM 9058F	1146	23.4	41.5	40.0	29.3	5.1	12.5	8.5	24.0	7.6
NexGen NG 4012 B2RF	1125	24.9	41.9	40.9	30.5	5.6	11.8	8.3	27.5	6.0
FiberMax FM 9180B2F	1115	24.0	42.9	39.5	29.6	6.0	12.2	8.0	29.3	7.1
Dyna-Gro DG 2610 B2RF	1090	23.3	39.3	42.8	30.9	5.1	10.1	7.7	28.1	4.5
NexGen NG 4010 B2RF	1012	22.6	42.6	39.7	29.3	5.2	11.1	7.4	28.3	5.9
PhytoGen PHY 725RF	960	22.4	41.4	39.3	28.7	5.3	11.9	7.8	26.8	4.3
Test average	1387	26.2	42.0	42.0	32.0	5.4	11.0	8.1	28.2	5.3
CV, %	15.2	3.3	3.1	2.2	2.7	5.2	5.2	5.0	5.8	12.6
OSL	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
LSD	296	1.7	2.1	1.5	1.4	0.5	0.9	0.7	2.7	0.9

CV - coefficient of variation.
OSL - observed significance level, or probability of a greater F value.
LSD - least significant difference at the 0.05 level.

Table 23. Fiber property results from the OSU cotton official variety test, Caddo Research Station, Fort Cobb, OK 2012.

Entry	Micronaire	Length	Staple	Strength	Uniformity	Elongation	Reflectance	Yellowness
	units	inches	32nds inch	g/tex	%	%	rd %	+b %
All-Tex AT 9CR253 B2RF	4.9	1.16	37.1	35.1	84.2	6.0	75.7	7.1
All-Tex AT Edge B2RF	4.9	1.21	38.6	35.2	82.6	5.8	65.7	5.9
All-Tex AT Epic RF	4.1	1.18	37.8	32.8	83.5	7.6	74.8	8.0
All-Tex AT Nitro 44 B2RF	4.9	1.24	39.6	36.6	84.0	6.5	65.5	6.4
Bayer CropScience BCSBX1346GLB2	4.6	1.20	38.4	35.3	84.4	6.6	69.5	7.3
Bayer CropScience BCSBX1347GLB2	4.8	1.19	38.1	31.1	82.9	4.3	67.9	6.5
Bayer CropScience BCSBX1348GLB2	4.4	1.22	39.1	30.9	82.1	4.7	72.5	6.8
Croplan Genetics CG 3156 B2RF	3.9	1.17	37.4	31.7	84.1	5.9	67.6	5.9
Croplan Genetics CG 3787 B2RF	4.5	1.21	38.6	31.3	84.7	7.1	74.9	7.4
Dyna-Gro DG 2595 B2RF	4.7	1.19	38.1	33.5	84.1	5.7	72.0	6.9
Dyna-Gro DG 2285 B2RF	4.8	1.18	37.7	32.3	84.0	7.1	71.6	7.5
Dyna-Gro DG 2570 B2RF	4.6	1.20	38.3	35.2	85.1	7.0	74.0	7.7
Dyna-Gro DG 2610 B2RF	3.9	1.20	38.5	31.3	84.5	7.4	75.6	7.7
Deltapine DP 0912 B2RF	5.2	1.15	36.8	33.9	84.2	6.3	70.1	6.9
Deltapine DP 1032 B2RF	4.6	1.20	38.3	32.8	82.8	5.7	72.8	7.0
Deltapine DP 1044 B2RF	4.7	1.16	37.0	32.7	82.5	7.1	70.6	7.0
Deltapine DP 1212 B2RF	5.0	1.21	38.7	35.1	84.2	7.4	68.3	7.2
Deltapine DP 1219 B2RF	4.4	1.22	39.1	35.8	83.3	5.8	73.1	6.7
FiberMax FM 1740B2F	5.2	1.18	37.9	35.9	83.9	5.2	72.5	7.3
FiberMax FM 1944GLB2	4.6	1.22	39.1	34.8	82.9	4.6	71.3	5.9
FiberMax FM 2011GT	5.0	1.18	37.6	33.8	83.8	5.2	71.3	6.9
FiberMax FM 2484B2F	4.7	1.19	38.0	35.9	82.0	5.0	73.1	6.4
FiberMax FM 9058F	4.2	1.26	40.3	34.8	84.4	4.5	71.2	6.5
FiberMax FM 9180B2F	4.8	1.18	37.8	34.8	85.4	5.3	70.9	6.3
Deltapine DP 1321 B2RF	5.0	1.19	38.2	33.8	84.6	7.8	70.1	7.2
Deltapine DP 1311 B2RF	4.1	1.19	38.0	33.8	83.9	7.1	71.6	6.4
Monsanto MON 11R136B2R2	4.3	1.27	40.6	35.0	82.7	6.1	71.9	6.6
Monsanto MON 11R154B2R2	4.5	1.21	38.6	37.9	83.5	5.9	72.1	7.1
Deltapine DP 1359 B2RF	4.2	1.21	38.7	36.8	83.0	5.8	74.2	7.7
NexGen NG 1511 B2RF	5.0	1.17	37.4	33.3	84.5	7.6	68.6	6.8
NexGen NG 3348 B2RF	4.2	1.18	37.6	34.1	83.4	5.6	69.3	7.1
NexGen NG 4010 B2RF	4.4	1.21	38.7	36.3	84.5	6.0	71.3	7.7
NexGen NG 4012 B2RF	4.6	1.19	38.0	35.1	83.4	5.1	70.1	7.2
PhytoGen PHY 367WRF	4.4	1.20	38.3	35.1	84.3	7.3	70.7	7.0
PhytoGen PHY 375WRF	4.5	1.17	37.4	32.7	83.6	6.1	71.3	6.9
PhytoGen PHY 499WRF	4.6	1.17	37.5	34.7	84.4	7.6	69.5	6.9
PhytoGen PHY 725RF	4.4	1.27	40.5	37.4	84.6	6.6	68.4	7.3
Stoneville ST 5458B2RF	5.2	1.16	37.2	34.5	82.0	5.6	67.3	7.3
Test average	4.6	1.20	38.3	34.3	83.7	6.2	71.0	7.0
CV, %	6.9	2.6	2.6	3.7	1.6	6.2	1.6	4.1
OSL	<0.0001	0.0004	0.0004	<0.0001	0.1960	<0.0001	<0.0001	<0.0001
LSD	0.5	0.05	1.6	2.1	NS	0.6	1.8	0.5

CV - coefficient of variation.
OSL - observed significance level, or probability of a greater F value.
LSD - least significant difference at the 0.05 level,NS - not significant.

Herbicide Resistant Weeds

Herbicide resistant weeds continue to plague the Cotton Belt. Someone in every cotton producing state either has confirmation or suspicion of their presence. Most of the farm magazines are still running stories about these nightmares. Although the majority is still from the southeast or mid-south, we (in Oklahoma) are aware that glyphosate resistant pigweed (palmer amaranth) has recently popped up in the High Plains of Texas. Since this is only a few hours' drive from our cotton production it's inevitable that we will soon join the club (if we haven't already). 2012 was another stressful year and several Oklahoma growers continued to experienced difficulty controlling pigweeds in their cotton. Some of the areas where we observed pigweed escapes definitely showed the expected signs of potential resistance…patchy control, live and dead weeds side by side, history of glyphosate only programs. There were several instances where we met with growers experiencing these pigweed escapes and prescribed the usual solutions…immediate physical removal and the integration of residual herbicides into their remaining weed control programs. In addition this was usually followed by a small wheel-barrow load of information about herbicide modes of action, residual herbicides available in cotton, and a refresher on the value of yellow herbicides in cotton. Following some of these fields throughout the summer we observed the various solutions that each grower chose to apply to their personal situation. Sometimes they removed the escapes by hand. Sometimes they burned down everything (cotton included) with paraquat and started over. And sometimes where the cotton was in very poor health they did nothing…choosing to deal with it later. Hopefully the growers that chose door number three rotated to wheat last fall and now have other means to control these weeds. If not let's hope they have their yellow herbicide in the barn already. We have always maintained that we are "fortunate" here in Oklahoma to still be in a situation that allows for the prevention of glyphosate resistant palmer amaranth (GRP) rather than having to actually deal with it in our fields. That clock has been ticking for some time now and it seems that after last year the game may be changing for some of us. Listening to multiple presentations from our counterparts in the southeast concerning GRP at the Beltwide Cotton Conference this year, a recurrent theme quickly became apparent. They actually were more positive this year compared to the last several because they have figured out how best to deal with the problem. Most every solution presented included two things…residual herbicide applications from preseason through layby and dependency on postermergence glufosinate (Liberty) herbicide applications. Their contention was that one or two residuals somewhere within their program was not enough and that the escapes had to be sprayed immediately with Liberty (when the pigweeds were very small) to successfully produce cotton. Furthermore, they specifically cited the need to overlap their residual herbicides in such a manner as to never allow the emergence of any pigweed in-season. Of course our (southwest growers) first response to that message was "man that has got to be expensive" not to mention troublesome, time consuming and frustrating. For us (in Oklahoma) there are some real issues if we consider operating the way they do in the southeast. Number one, especially lately, we have had a hard time banking on the necessary rain for the activation of post-applied residuals. Every herbicide that provides residual weed control must be incorporated into the soil profile in one manner or another…either by rainfall, overhead irrigation or mechanical incorporation. Secondly, since moisture is so hard to come by, many operations have reduced or eliminated tillage in hopes of conserving what little rainfall we do receive…and rightly so, no-till is very effective in cotton. This is the point where growers need to pause and consider their options as it relates to GRP. The simplicity and benefits of eliminating yellow herbicides quickly tipped the scales in favor of glyphosate only weed control programs. Glyphosate tolerant crops equals less tillage (no-till feasibility), no-till equals expansion, more acres equals more money. Life is good, at least until now! Fortunately, for most growers in Oklahoma, their "until now" moment hasn't occurred yet. For those not so lucky, the impact of GRP is much more than just a weedy field. It's challenging the existence of their entire operation. Primarily because many currently successful farming operations have been established (or salvaged) as a result of no-till (or minimum tillage). Once a grower determines that they must go back to depending on old, conventional style techniques (yellow herbicides, preemergence herbicides, hooded sprayers), reality sets in…"I'm not sure we can get over this many acres unless we're no-till." Now they are at the proverbial fork in the road. The real problem is not the fork in the road, the fork in the road is just the symptom. The real problem is that they missed their exit several miles back! Fortunately we still have the opportunity in Oklahoma to navigate down a safe, sustainable path if we make the right decisions now. If not…we know what to expect.

Herbicide Program Suggestions For Fighting/Preventing Glyphosate Resistant Pigweed In Oklahoma Cotton

Weed Control Programs in Glyphosate Tolerant Cotton Varieties (Roundup Ready Flex, GlyTol)

	Production System	Preplant Burndown or Incorporated	At-plant Burndown or Preemerge	Early to Mid-season Postemergence	Late-season Layby-Hoods
1	Minimum or No-till	Dicamba or 2,4-D + Glyphosate	Glyphosate + Prowl H20	Glyphosate + Staple LX	Aim + Direx
2	Minimum or No-till	Dicamba or 2,4-D + Valor + Glyphosate	Gramoxone SL + Direx	Glyphosate + Warrant	Glyphosate + Direx
3	Minimum or No-till	Dicamba or 2,4-D + Sharpen + Glyphosate	Glyphosate + Dual II Magnum	Glyphosate + Prowl H20	Caparol + MSMA
1	Conventional tillage	Treflan or Prowl H20	Caparol	Glyphosate + Staple LX	Valor + MSMA
2	Conventional tillage	Treflan or Prowl H20	Direx	Glyphosate + Warrant	Aim + Caparol
3	Conventional tillage	Treflan or Prowl H20	Staple LX	Glyphosate + Prowl H20	Direx + MSMA

Without the use of residuals Palmer amaranth can emerge all season long…plan ahead!


AGRICULTURE
Horseweed Control Suggestions In No-till Cotton
✓ Use an effective control strategy ...tank-mix with Glyphosate
Include 1.0 lb ai/acre - 2,4-D or 0.25 lb ai/acre - Dicamba
✓ Spray when weeds are small
-Rosettes are easiest to control
✓ Remember labeled plant back intervals
-30 days after 2,4-D
-21 days after 1" rainfall following Dicamba*
*Do not apply Dicamba in regions receiving less than 25" of average annual rainfall.
Don't Let Horseweed Get the Jump on Your Cotton . . .
Start Clean and Stay Clean!

Herbicide How-to:

Understanding Herbicide Mode of Action

Joe Armstrong
Extension Weeds Specialist

Oklahoma Cooperative Extension Fact Sheets are also available on our website at: **http://osufacts.okstate.edu**

The large number of herbicide options—new products, old products with new names, new formulations of old products, premixes, and generics—can make weed control a difficult and confusing task. In addition to knowing the crops in which a herbicide can be used, the weeds it will control, the appropriate rate, and any necessary adjuvants to include, it is also important to know and understand the herbicide's mode of action to design a successful weed management program.

What is "Mode of Action?"

The mode of action is the way in which the herbicide controls susceptible plants. It usually describes the biological process or enzyme in the plant that the herbicide interrupts, affecting normal plant growth and development. In other cases, the mode of action may be a general description of the injury symptoms seen on susceptible plants. In Oklahoma crop production, 11 different herbicide modes of action are commonly used, and each is unique in the way it controls susceptible plants. Some herbicide modes of action comprise several chemical families that vary slightly in their chemical composition, but control susceptible plants in the same way and cause similar injury symptoms.

Herbicides can also be classified by their "site of action," or the specific biochemical site that is affected by the herbicide. The site of action is a more precise description of the herbicide's activity; however, the terms "site of action" and "mode of action" are often used interchangeably to describe different groups of herbicides.

Why is it Important to Know the Mode of Action?

Knowing and understanding each herbicide's mode of action is an important step in selecting the proper herbicide for each crop, diagnosing herbicide injury, and designing a successful weed management program for your production system. Over-reliance on a single herbicide active ingredient or mode of action places heavy selection pressure on a weed population and may eventually select for resistant individuals. Over time, the resistant individuals will multiply and become the dominant weeds in the field, resulting in herbicides that are no longer effective for weed control. Simply rotating herbicide active ingredients is not enough to prevent the development of herbicide-resistant weeds. Rotating herbicide modes of action, along with other weed control methods, is necessary to prevent or delay herbicide-resistant weeds. Always read each product's label to determine the mode of action and best management practices for herbicide-resistant weeds.

Many weeds have developed "cross resistance" and are resistant to multiple herbicides within a single mode of action. Most waterhemp populations in Oklahoma, for example, are cross-resistant to both Scepter (chemical family: imidazolinone) and Classic (chemical family: sulfonylurea). Both of these herbicides are ALS inhibitors, but belong to different chemical families within the same mode of action. Therefore, it is important to not only rotate herbicide active ingredients but also to rotate modes of action to prevent herbicide-resistance weed populations from developing. One of the most effective ways to rotate herbicide modes of action is through crop rotation.

Weeds that have developed "multiple resistance" are resistant to herbicides from two or more modes of action. At this time, there are no weeds in Oklahoma that have been confirmed as resistant to multiple herbicide modes of action; however, instances of weeds with multiple resistance can be found in neighboring states. ALS-resistant, PPO-resistant, and glyphosate-resistant populations of waterhemp have been confirmed in Kansas. As well, Italian ryegrass populations in Arkansas have been confirmed to be resistant to both ALS- and ACCase inhibitor herbicides.

How can I Determine the Herbicide's Mode of Action?

Information regarding each product's mode of action can sometimes be found on the front of the herbicide label. Often, the herbicide is described as being a member of a particular numbered group. These numbers refer to a specific mode of action and were developed to consistently organize herbicides based on their mode of action. For example, "Group 1" herbicides are ACCase inhibitors and "Group 2" herbicides are ALS inhibitors. Some herbicides will list the mode of action somewhere in the general instructions or product description in the label. In other situations, products may not mention the mode of action anywhere in the label. If you are unsure of the herbicide's mode of action, contact your local county extension educator for clarification.

What are the Different Modes of Action? What are their Characteristics?

The following is a short description of the 11 most commonly used herbicide modes of action in Oklahoma crop

(Continued on page 4)

ACCase Inhibitors

Group	*Chemical family*	*Trade names*	*Active ingredient*
1	Arloxyphenoxypropionate “FOPs”	Assure II	quizalofop
		Hoelon[r]	diclofop
		Fusilade	fluazifop
		Puma	fenoxaprop
1	Cyclohexanedione “DIMs”	Select, Select Max, others	clethodim
		Poast, Poast Plus	sethoxydim
1	Phenylpyrazoline “DENs”	Axial XL	pinoxaden

ALS Inhibitors

Group	*Chemical family*	*Trade names*	*Active ingredient*
2	Imidazolinone “IMIs”	Beyond, Raptor	imazamox
		Cadre	imazapic
		Pursuit	imazethapyr
		Scepter	imazaquin
2	Sulfonylurea “SUs”	Accent	nicosulfuron
		Ally	metsulfuron
		Amber	triasulfuron
		Autumn	iodosulfuron
		Beacon	primisulfuron
		Classic	chloriumuron
		Express	tribenuron
		Glean	chlorsulfuron
		Harmony	thifensulfuron
		Maverick	sulfosulfuron
		Option	foramsulfuron
		Osprey	mesosulfuron
		Peak	prosulfuron
		Permit	halosulfuron
		Resolve	rimsulfuron
2	Triazolopyrimidine	FirstRate	cloransulam-methyl
		PowerFlex	pyroxsulam
		Python	flumetsulam
		Strongarm	diclosulam
2	Pyrimidinyl(thio)benzoate	Staple	pyrithiobac
2	Sulfonylaminocarbonyltriazolinones	Everest	flucarbazone
		Olympus	propoxycarbazone

Root Growth Inhibitors

Group	*Chemical family*	*Trade names*	*Active ingredient*
3	Dinitroaniline	Treflan, others	trifluralin
		Prowl, others	pendimethalin
		Sonalan	ethafluralin

Growth Regulators

Group	*Chemical family*	*Trade names*	*Active ingredient*
4	Phenoxy-carboxylic acid	many	2,4-D
		Butyrac, others	2,4-DB
			MCPA
4	Benzoic acid	Banvel, Clarity, Status, others	dicamba
4	Pyridine carboxylic acid	Stinger	clopyralid
		Starane	fluroxypyr
		Tordon[r], Grazon[r]	picloram
4	Quinoline carboxylic acid	Paramount	quinclorac

Photosynthesis Inhibitors (Photosystem II)

Group	*Chemical family*	*Trade names*	*Active ingredient*
5	Triazine	Aatrex[r], atrazine[r], others	atrazine
		Princep	simazine
		Caparol	prometryn
5	Triazinone	Sencor	metribuzin
		Velpar	hexazinone
5	Uracil	Sinbar	terbacil
6	Nitrile	Buctril, others	bromoxynil
6	Benzothiadiazinone	Basagran	bentazon
7	Urea	Linex, Lorox	linuron
		Karmex	diuron

Shoot Growth Inhibitors

Group	*Chemical family*	*Trade names*	*Active ingredient*
8	Lipid synthesis inhibitor, thiocarbamate	Eptam	EPTC
15	Chloroacetamide	Dual, Cinch, others	metolachlor
		Intro[r], Micro-Tech[r]	alachlor
		Harness[r], Degree[r], Surpass[r], others	acetochlor
		Outlook	dimethenamid-P
15	Oxyacetamide	Define	flufenacet

Aromatic Amino Acid Synthesis Inhibitors

Group	*Chemical family*	*Trade names*	*Active ingredient*
9	Glycine	Roundup, Touchdown, others	glyphosate

Glutamine Synthesis Inhibitors

Group	*Chemical family*	*Trade names*	*Active ingredient*
10	Phosphonic acid	Ignite, Liberty	glufosinate

Pigment Synthesis Inhibitors

Group	*Chemical family*	*Trade names*	*Active ingredient*
12	Pyridazinone	Zorial Rapid 80	norflurazon
13	Isoxazolidinone	Command	clomazone
27	Triketone	Callisto	mesotrione
		Laudis	tembotrione
		Impact	topramezone
27	Isoxazole	Balance[r]	isoxaflutole

PPO Inhibitors

Group	*Chemical family*	*Trade names*	*Active ingredient*
14	Diphenylether	Blazer	acifluorfen
		Reflex, Flexstar	fomesafen
		Cobra	lactofen
		Goal	oxyfluorfen
14	N-phenylphthalimide	Valor	flumioxazin
		Resource	flumiclorac
14	Thiadiazole	Cadet	fluthiacet
14	Triazolinone	Aim	carfentrazone
		Spartan, Authority	sulfentrazone

Photosynthesis Inhibitors (Photosystem I)

Group	*Chemical family*	*Trade names*	*Active ingredient*
22	Bipyridilium	Gramoxone Inteon[r], others	paraquat
		Reglone, others	diquat

[r] Restricted use pesticide.

production. The list of herbicides in the accompanying table (found on the inside pages) is not exhaustive and does not account for herbicide premixes that contain two or more active ingredients. If you have questions regarding mode of action, consult the individual product label and support literature from the manufacturer or contact your county agricultural Extension educator for more information.

ACCase Inhibitors (Group 1)

Inhibitors of the ACCase enzyme in plants are used strictly for grass control. As a result, they are used primarily in broadleaf crops or fallow situations, but there are also some products labeled for use in grass crops to control specific grass weeds. These herbicides are commonly referred to by the nicknames of their chemical families, "FOPs," "DIMs," and "DENs."

ALS Inhibitors (Branched-Chain Amino Acid Inhibitors) (Group 2)

ALS inhibitors, or branched-chain amino acid inhibitors, comprise the largest mode of action and include at least one herbicide used in nearly every crop produced in Oklahoma. Many herbicides in this mode of action fall into two chemical families: imidazolinones (or "IMIs") or sulfonylureas (or "SUs"), but there are three other chemical families within the ALS inhibitors. Cross resistance, or herbicide-resistance to multiple chemical families within a single mode of action, is common with ALS inhibitors.

Root Growth Inhibitors (Group 3)

Herbicides in this mode of action inhibit cell division, which stops roots from extending and are distinctive because of the yellow color of their formulations. They are applied preplant incorporated or preemergence in a wide range of agronomic crops, vegetables, turf, and ornamentals for control of grasses and small-seeded broadleaf weeds.

Growth Regulators (Group 4)

This mode of action, also known as synthetic auxins, includes many commonly used plant hormone-type herbicides in wheat, corn, sorghum, and pasture settings. These herbicides are generally selective for broadleaf control in grass crops; however, there are some uses for preplant and in-season weed control in broadleaf crops.

Photosynthesis Inhibitors—Photosystem II (Groups 5, 6, and 7)

These herbicides inhibit Photosystem II, part of the photosynthesis pathway, and are used in a variety of crops for control of grass and broadleaf weeds. Because of their extensive use for several decades, some weeds have developed resistance to these herbicides, particularly atrazine and metribuzin.

Shoot Growth Inhibitors (Groups 8 and 15)

Herbicides in this mode of action are soil-applied herbicides and control weeds that have not emerged from the soil surface. These herbicides generally control grass weeds and small-seeded broadleaf weeds.

Aromatic Amino Acid Inhibitors (Group 9)

The only herbicide included in this mode of action is glyphosate. There are many generic glyphosate and glyphosate-containing products available. Depending on the product, glyphosate can be formulated as ammonium, diammonium, dimethylammonium, isopropylamine, and/or potassium salts. Despite the different salt formulations available, it is important to know that the type of salt formulation does not affect weed control, but rather it indicates the way a particular glyphosate product is formulated. Glyphosate is a generally a non-selective herbicide and will severely injure or kill any living plant tissue that it comes in contact with. However, it can be used selectively in glyphosate-resistant crops, including corn, soybean, cotton, and canola. Like the ALS inhibitors, glyphosate controls susceptible plants by inhibiting amino acid synthesis; however, glyphosate and ALS inhibitors control susceptible plants in completely different ways and should not be considered to be the same mode of action.

Glutamine Synthesis Inhibitors (Group 10)

The only herbicide included in this mode of action is glufosinate. Glufosinate can be used as a non-selective burndown treatment or as an over-the-top postemergence application in Liberty Link® crops (glufosinate resistant).

Pigment Synthesis Inhibitors (Groups 12, 13, 27)

These herbicides are also called "bleachers" because of the characteristic white plant tissue that develops in susceptible plants after application. Several of the pigment synthesis inhibitors (mesotrione, isoxaflutole) are also referred to as HPPD-inhibitors, based on their site of action.

PPO Inhibitors (Groups 14)

PPO inhibitors may also be referred to as cell membrane disruptors and are usually "burner"-type herbicides. Some PPO-inhibitors can be applied preemergence, but most are used for postemergence weed control.

Photosynthesis Inhibitors—Photosystem I (Group 22)

Photosystem I inhibitors include paraquat and diquat and are used for non-selective weed control and crop desiccation prior to harvest. These herbicides are also referred to as "cell membrane disruptors" because of their contact activity.

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Entomology & Plant Pathology

Outreach - NTOKcotton.org, Cotton Comments Newsletter, Texas Cotton Resource DVD, and cotton.okstate.edu

The NTOK (North Texas, Oklahoma, and Kansas) program and website (www.ntokcotton.org) was supported by generation of timely articles on important issues during the growing season. Mr. Vic Schoonover provided 25+ news articles for release to local newspapers and these were also posted to the ntokcotton.org website.

In addition, the OSU Extension team generated a total of 13 editions of the Cotton Comments newsletters which were published and sent directly to 237 (vs. 167 in 2011) email recipients. Based on our surveys (a total of 53 recipients participated), an additional 99 clientele were forwarded the newsletter from the 53 who received it directly via email. This was a total of 336 newsletter recipients. This results in a total of 4,368 (13 editions x 336 recipients) contacts with clientele based on our best estimates.

These newsletters were also published to the ntokcotton.org website, along with other informational handouts and publications. Based on results from ipower.com website traffic analysis software, from January 1 through December 31, 2012, the number of unique visitors was 4,621. The total number of visits was 8,796, number of page downloads was 16,760, and total hits was 27,219.

Based on a returned survey size of 53 newsletter recipients, results provided some excellent information pertaining to the value and content. The recipients were asked to rate the newsletter on a scale of 1-5 (1 being not very useful) and 5 (being extremely useful). The result was an average ranking of 4.45 for usefulness. On the question of topics being "timely and discussed" the result was 4.43. For the question on whether the newsletter should be continued the result was 100%.

Also included in Oklahoma State Support-Cotton Incorporated funding for 2012 was the acquisition of 500 copies of the 2011 Texas Cotton Resource DVD. We worked with Dr. Gaylon Morgan, State Extension Cotton Specialist with Texas A&M AgriLife Extension Service, and were successful in acquiring these DVDs. A total of 127 copies were mailed directly to clientele across the state of Oklahoma on April 11. An additional 100 copies were distributed at various meetings during the spring and summer. We will continue to distribute this DVD during subsequent meetings in the state until the supply is exhausted.

We placed considerable content on a new website hosted by a campus server. We will support this website with our publications and newsletters in the future, and maintain the ntokcotton.org website for the Oklahoma Cotton Council. The new campus website can be found here:

http://cotton.okstate.edu. This website has a great appearance and we have provided various information tabs containing content or links for the following areas: Cotton Team, Cotton Comments Newsletters, Cotton Extension Annual Reports, Extensive Production Information Links, Variety Tests, Budgets, Irrigation, Sprayer Calibration, Weed Control, Weed Resistance Management, Plant Growth Regulators, Plant Growth and Development, Fertility, Insect Management, Diseases, Yield Estimation, Harvest Aids, Harvesting and Ginning, Fiber Quality, Crop Insurance, No-till Production, Producer Organization Links, Seed and Trait Company Links, Oklahoma Mesonet Tools, and Journal of Cotton Science.

Crop and Pest Conditions

According to USDA-NASS, about 305,000 acres were planted in Oklahoma in 2012, with only about 175,000 acres harvested. This was due to extreme drought conditions. The crop emerged as one of the best starts in recent years but lack of moisture and high temperatures in July and August resulted in a large number of abandoned acres.

Early thrips pressure did not develop, but cotton fleahopper populations were present and control spays were used in some fields. Stink bugs and Leaf-footed bugs appeared late but were confined only to areas with adequate irrigation. Population trends, insect updates, and control tips were published in the Cotton Comments Newsletter and distributed to the state's cotton producers and consultants to help formulate management strategies to enhance profitability.

Field surveys were conducted in 10 counties with a total of 24 fields. Insect pressure and plant development were recorded and reported in the newsletter. Field surveys were performed weekly.

Research Accomplishments

Trapping activities in 2012 covered cotton growing regions of Southwest Oklahoma. These activities were centered on beet armyworm and the bollworm/budworm complex. Moth trap counts indicated ratios were corn earworm at 78.3% and tobacco budworm at 21.7%.

Four insecticide product evaluation trials were attempted but due to poor soil moisture at all sites no yield data was collected. Excellent stands were obtained at all sites.

The Jackson County fleahopper and Bt overspray trials were to be irrigated and were planted in the Lugert-Altus Irrigation District (LAID). Due to insufficient spring inflow into Lake Lugert, no irrigation water was released in 2012. This was the first time this had happened in the 60 plus year history of LAID. The Tillman County fleahopper and Bt overspray locations were dryland and with the harsh conditions during July and August, the tests were failures. Both of the fleahopper trials (Jackson and Tillman Counties) consisted of several insecticides which were applied at matchhead square. Light fleahopper populations were encountered, and the tests failed due to moisture stress. Although treatments were applied, no conclusions can be drawn from this project due to lack of insect pressure and dry conditions.

The Bt overspray projects (in Jackson and Tillman Counties) were both sprayed but no heliothine populations were detected just prior to overspray applications. Both trials had several insecticides included. However, no populations were noted and no conclusions can be drawn from this project due to lack of insect pressure and dry conditions.

Bollworm / Tobacco Budworm and Beet Armyworm Moth Monitoring

The cotton bollworm/tobacco budworm complex has historically been the target of annual insecticide applications in Oklahoma cotton. Monitoring moth activities helps determine species ratio and the potential peak ovipositional activity for these insects. Traps were located near the communities of Altus, Ft Cobb, Hollis, Texola and Tipton. In addition to Heliothine activity, beet armyworm catches were also monitored at each location. Traps were maintained between June 1 and October 1, 2012.

Moth Pheromone Trap Catch Totals for Selected Regions of Oklahoma, Summer 2012.

Bollworm

Altus	Tipton	Hollis	Ft. Cobb	Texola
144	195	34	98	47

Tobacco Budworm

Altus	Tipton	Hollis	Ft.Cobb	Texola
38	57	16	31	4

Beet Armyworm

Altus	Tipton	Hollis	Ft. Cobb	Texola
61	55	34	26	32

Although both species do coexist and are considered the same by growers, the species ratio is important since tobacco budworms exhibit a higher level of resistance to insecticides than bollworms. Also, it would be important to know this ratio in the event of Bt cotton failures. It is extremely important to detect fluctuations in species ratio of each ovipositional period and adjust insecticide recommendations accordingly for non-Bt cotton fields. A total of 809 moths were captured between the weeks of June 1 and October 1. Bollworms comprised 78.3% of the total catch in 2012. In 2011, the species ratio was higher than normal for Tobacco budworms, but in 2012, this ratio reflected a fairly high percentage compared to the last 10 years. Beet armyworm trap catches were generally minimal during the growing season.

Figure 1. Species composition of moths trapped across Oklahoma, 2012.

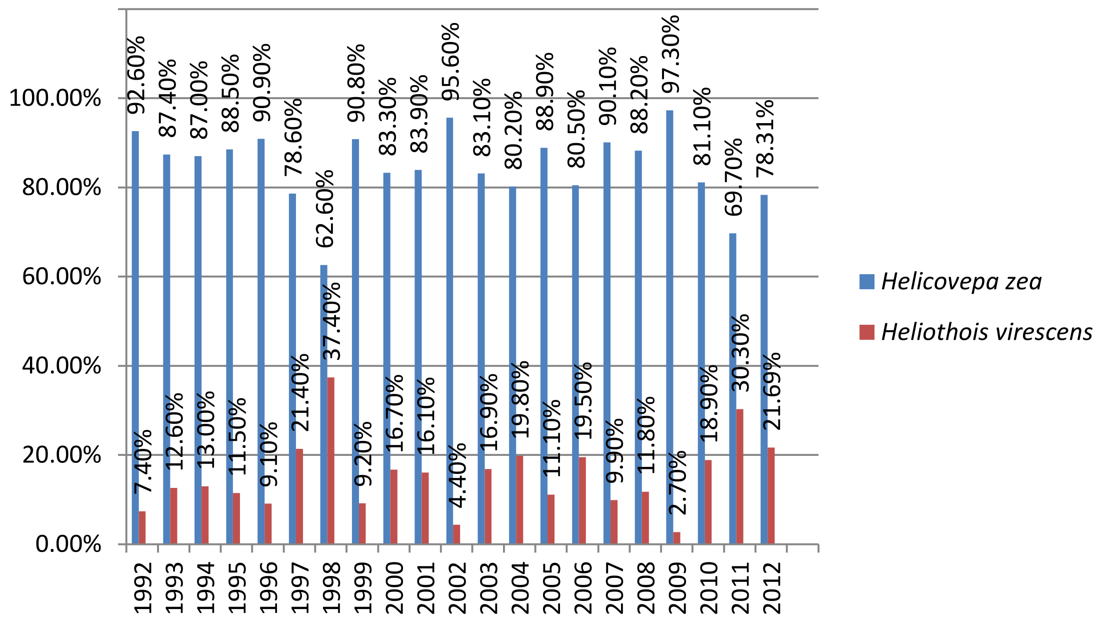


Figure 2. Cotton bollworm moth pheromone trap catches, 2012.

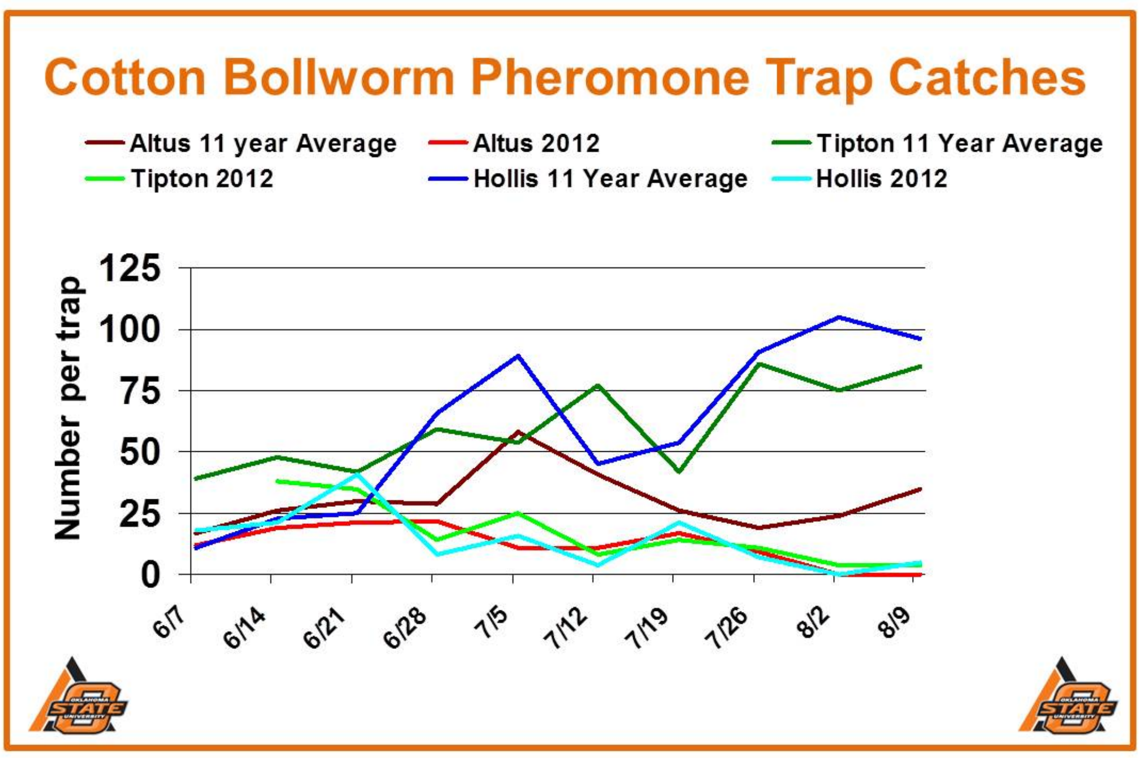


Figure 3. Tobacco budworm moth pheromone trap catches, 2012.

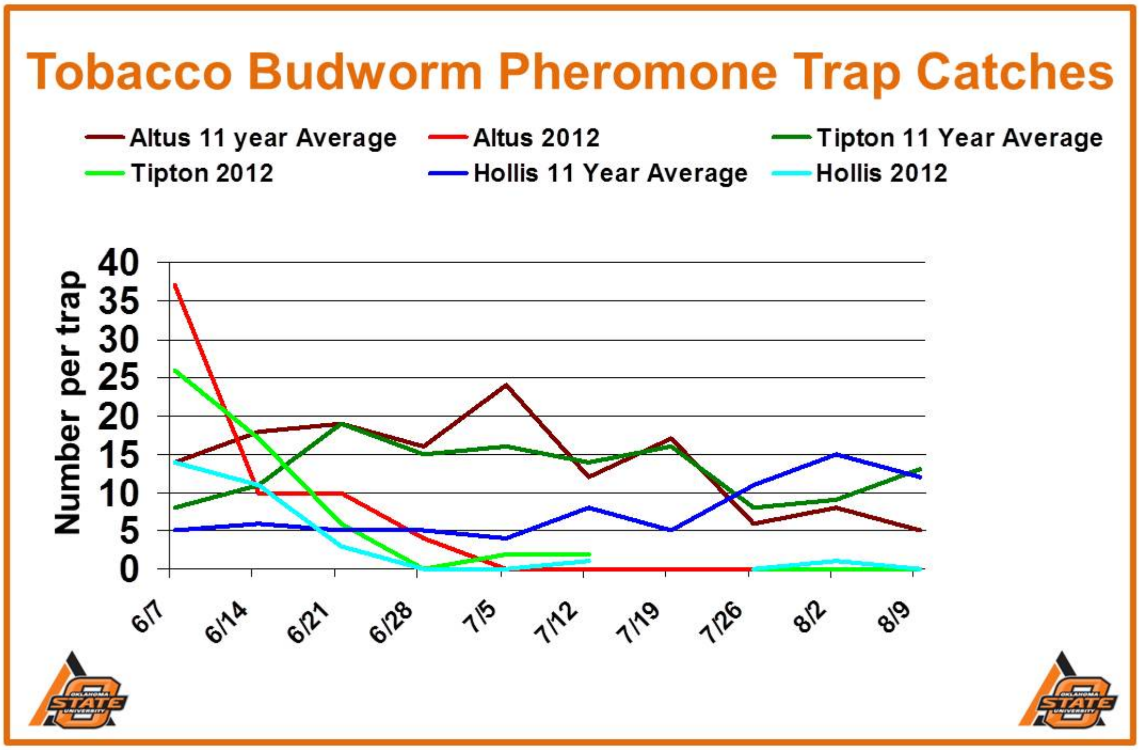
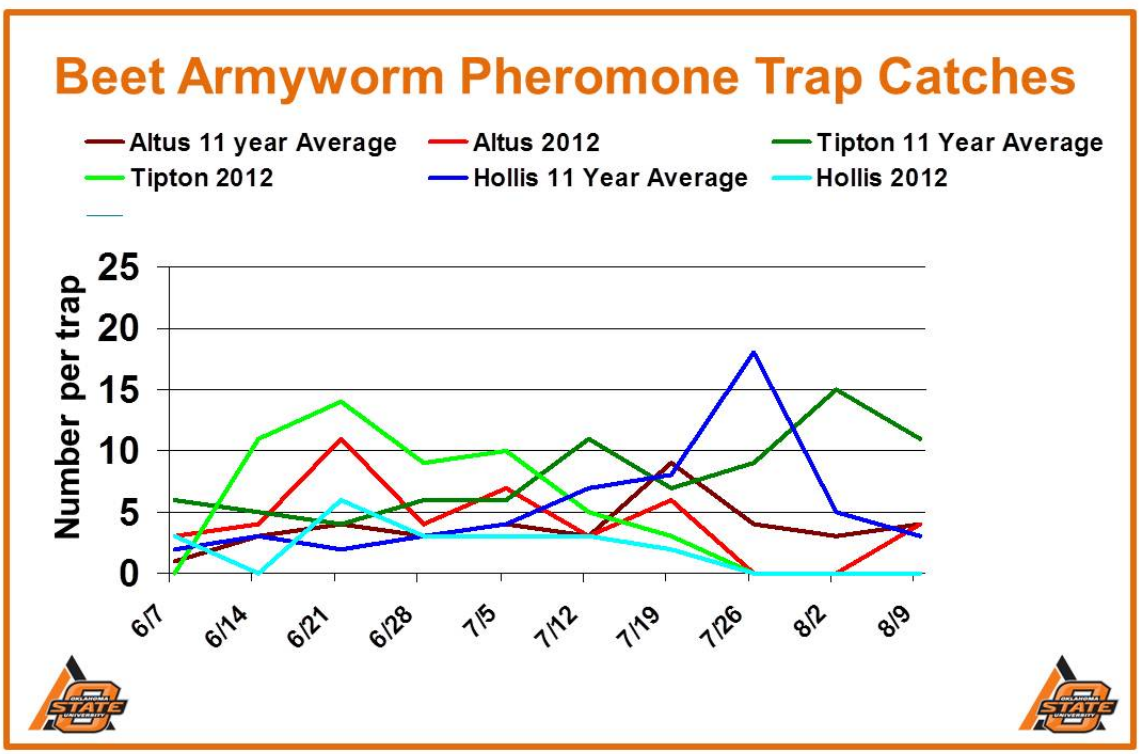


Figure 4. Beet armyworm moth pheromone trap catches, 2012.



Fleahopper Studies 2012

Trial ID:ID12NARAL Location:Tipton Project ID:Cotton Fleahopper 2012

Pest Name	Fleahopper	Fleahopper	Fleahopper	Fleahopper	Fleahopper
Rating Date	July 6	July 9	July 12	July 16	Jul 23
Sample Size, Unit	10 Plants	10 Plants	10 Plants	10 Plants	10 Plants
Trt-Eval Interval	Pre-count	3 Days after Application	6 Days after Application	10 Days after Application	17 Days after Application
Trt No. / Treatment Name / Rate / Rate Unit / Appl Code					
1 UNTREATED	0.3a	0.3a	0.0a	0.0a	0.3a
2 SIVANTO 5.2oz/a AB DYNE-AMIC 0.25% v/v AB	0.3a	0.0a	0.0a	0.3a	0.0a
3 SIVANTO 7oz/a AB DYNE-AMIC 0.25% v/v AB	0.0a	0.0a	0.3a	0.3a	0.0a
4 SIVANTO 10.5oz/a AB DYNE-AMIC 0.25% v/v AB	0.3a	0.0a	0.0a	0.0a	0.3a
5 INTRUDER 70 WP 0.7oz/a AB DYNE-AMIC 0.25% v/v AB	0.0a	0.0a	0.5a	0.8a	0.0a
LSD (P=.05)	0.58	0.34	0.56	0.64	0.51
Standard Deviation	0.38	0.22	0.37	0.42	0.33
CV	250.92	447.21	243.43	167.33	329.14
Bartlett's X2	0.0	0.0	0.06	0.0	0.0
P(Bartlett's X2)	.	.	0.807	.	.
Skewness	2.1231*	4.4721*	2.1231*	1.2505*	2.8879*
Kurtosis	2.7759*	20.0*	2.7759*	-0.4967	7.037*
Replicate F	1.294	1.000	0.375	0.286	0.615
Replicate Prob(F)	0.3213	0.4262	0.7727	0.8348	0.6181
Treatment F	0.529	1.000	1.500	2.143	0.692
Treatment Prob(F)	0.7166	0.4449	0.2634	0.1379	0.6114

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 ID:ID12NARAL Location:Altus Project ID:Cotton Fleahopper 2012

Pest Name				Fleahopper	Fleahopper	Fleahopper	Fleahopper	Fleahopper
Rating Date				July 6	July 9	July 12	July 16	Jul 23
Sample Size, Unit				10 Plants	10 Plants	10 Plants	10 Plants	10 Plants
Trt-Eval Interval				Pre-count	3 Days after Application	6 Days after Application	10 Days after Application	17 Days after Application
Trt No.	Treatment Name	Rate	Rate Unit	Appl Code					
1	UNTREATED				0.5a	0.5a	0.3a	0.5a	0.0a
2	SIVANTO DYNE-AMIC	5.2 0.25	oz/a % v/v	AB AB	1.0a	0.3a	0.0a	0.0a	0.0a
3	SIVANTO DYNE-AMIC	7 0.25	oz/a % v/v	AB AB	0.3a	0.0a	0.0a	0.0a	0.0a
4	SIVANTO DYNE-AMIC	10.5 0.25	oz/a % v/v	AB AB	0.5a	0.0a	0.0a	0.5a	0.0a
5	INTRUDER 70 WP DYNE-AMIC	0.7 0.25	oz/a % v/v	AB AB	0.3a	0.0a	0.3a	0.0a	0.0a
LSD (P=.05)					1.13	0.56	0.51	0.56	0.00
Standard Deviation					0.74	0.37	0.33	0.37	0.00
CV					147.2	243.43	329.14	182.57	0.0
Bartlett's X2					3.297	0.06	0.0	0.0	0.0
P(Bartlett's X2)					0.509	0.807	.	.	.
Skewness					1.0763*	2.1231*	2.8879*	1.6245*	.
Kurtosis					0.0828	2.7759*	7.037*	0.6985	.
Replicate F					0.615	0.375	0.615	1.000	0.000
Replicate Prob(F)					0.6181	0.7727	0.6181	0.4262	1.0000
Treatment F					0.692	1.500	0.692	2.250	0.000
Treatment Prob(F)					0.6114	0.2634	0.6114	0.1243	1.0000

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.

Bt Cotton Heliothine Overspray

Trial ID:0112 Location:Altus Project ID:Cotton Overspray

Pest Name			Bollworm		Bollworm		Bollworm		Bollworm		Bollworm		Bollworm	
Description			Larvae		Damage		Damage		Damage		Larvae		Damage	
Rating Date			Aug-6-12		Aug-6-12		Aug-6-12		Aug-6-12		Aug-9-12		Aug-9-12	
Rating Type			10		25		25		25		10		25	
Rating Unit			PLANT		Squares		Bolls		Terminal		PLANT		Squares	
Trt-Eval Interval			5 Days after Application		5 Days after Application		5 Days after Application		5 Days after Application		8 Days after Application		8 Days after Application	
Trt No.	Treatment Name	Rate Rate Unit												
1	Prevathon	20fl oz/a	0.0	a	0.0	a	0.0	a	0.0	a	0.0	a	0.0	a
2	Belt	2fl oz/a	0.0	a	0.0	a	0.0	a	0.0	a	0.0	a	0.0	a
	Mustang MAX	6.5fl oz/a												
3	Besiege	6.5fl oz/a	0.0	a	0.0	a	0.0	a	0.0	a	0.0	a	0.0	a
4	Mustang MAX	3.6fl oz/a	0.0	a	0.0	a	0.0	a	0.0	a	0.0	a	0.0	a
5	Untreated	0.0fl oz/a	0.0	a	0.0	a	0.0	a	0.0	a	0.0	a	0.0	a
LSD (P=.05)			0.00		0.00		0.00		0.00		0.00		0.00	
Standard Deviation			0.00		0.00		0.00		0.00		0.00		0.00	
CV			0.0		0.0		0.0		0.0		0.0		0.0	
Bartlett's X2			0.0		0.0		0.0		0.0		0.0		0.0	
Replicate F			0.000		0.000		0.000		0.000		0.000		0.000	
Replicate Prob(F)			1.0000		1.0000		1.0000		1.0000		1.0000		1.0000	
Treatment F			0.000		0.000		0.000		0.000		0.000		0.000	
Treatment Prob(F)			1.0000		1.0000		1.0000		1.0000		1.0000		1.0000	

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.

Pest Name	Bollworm
Description	Damage
Rating Date	Aug-9-12
Rating Type	25
Rating Unit	Bolls
Trt-Eval Interval	8 Days after Application
Trt No. / Treatment Name / Rate / Rate Unit	
1 Prevathon 20fl oz/a	0.0a
2 Belt 2fl oz/a Mustang MAX 6.5fl oz/a	0.0a
3 Besiege 6.5fl oz/a	0.0a
4 Mustang MAX 3.6fl oz/a	0.0a
5 Untreated 0.0fl oz/a	0.0a
LSD (P=.05)	0.00
Standard Deviation	0.00
CV	0.0
Bartlett's X2	0.0
Replicate F	0.000
Replicate Prob(F)	1.0000
Treatment F	0.000
Treatment Prob(F)	1.0000

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 ID:0112 Location:Tipton Project ID:Cotton Overspray

Pest Name			Bollworm		Bollworm		Bollworm		Bollworm		Bollworm		Bollworm	
Description			Larvae		Damage		Damage		Damage		Larvae		Damage	
Rating Date			Aug-6-12		Aug-6-12		Aug-6-12		Aug-6-12		Aug-9-12		Aug-9-12	
Rating Type			10		25		25		25		10		25	
Rating Unit			PLANT		Squares		Bolls		Terminal		PLANT		Squares	
Trt-Eval Interval			5 Days after Application		5 Days after Application		5 Days after Application		5 Days after Application		8 Days after Application		8 Days after Application	
Trt No.	Treatment Name	Rate Rate Unit												
1	Prevathon	20fl oz/a	0.0	a	0.0	a	0.0	a	0.0	a	0.0	a	0.0	a
2	Belt	2fl oz/a	0.0	a	0.0	a	0.0	a	0.0	a	0.0	a	0.0	a
	Mustang MAX	6.5fl oz/a												
3	Besiege	6.5fl oz/a	0.0	a	0.0	a	0.0	a	0.0	a	0.0	a	0.0	a
4	Mustang MAX	3.6fl oz/a	0.0	a	0.0	a	0.0	a	0.0	a	0.0	a	0.0	a
5	Untreated	0.0fl oz/a	0.0	a	0.0	a	0.0	a	0.0	a	0.0	a	0.0	a
LSD (P=.05)			0.00		0.00		0.00		0.00		0.00		0.00	
Standard Deviation			0.00		0.00		0.00		0.00		0.00		0.00	
CV			0.0		0.0		0.0		0.0		0.0		0.0	
Bartlett's X2			0.0		0.0		0.0		0.0		0.0		0.0	
P(Bartlett's X2)			.		.		.		.		.		.	
Replicate F			0.000		0.000		0.000		0.000		0.000		0.000	
Replicate Prob(F)			1.0000		1.0000		1.0000		1.0000		1.0000		1.0000	
Treatment F			0.000		0.000		0.000		0.000		0.000		0.000	
Treatment Prob(F)			1.0000		1.0000		1.0000		1.0000		1.0000		1.0000	

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.

Pest Name	Bollworm
Description	Damage
Rating Date	Aug-9-12
Rating Type	25
Rating Unit	Bolls
Trt-Eval Interval	8 Days after Application
Trt Treatment Rate No. Name Rate Unit	
1 Prevathon 20fl oz/a	0.0a
2 Belt 2fl oz/a Mustang MAX 6.5fl oz/a	0.0a
3 Besiege 6.5fl oz/a	0.0a
4 Mustang MAX 3.6fl oz/a	0.0a
5 Untreated 0.0fl oz/a	0.0a
LSD (P=.05)	0.00
Standard Deviation	0.00
CV	0.0
Bartlett's X2	0.0
Replicate F	0.000
Replicate Prob(F)	1.0000
Treatment F	0.000
Treatment Prob(F)	1.0000

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.

Figure 5. Weekly nodes above white flower (NAWF) in surveyed irrigated fields, 2012.

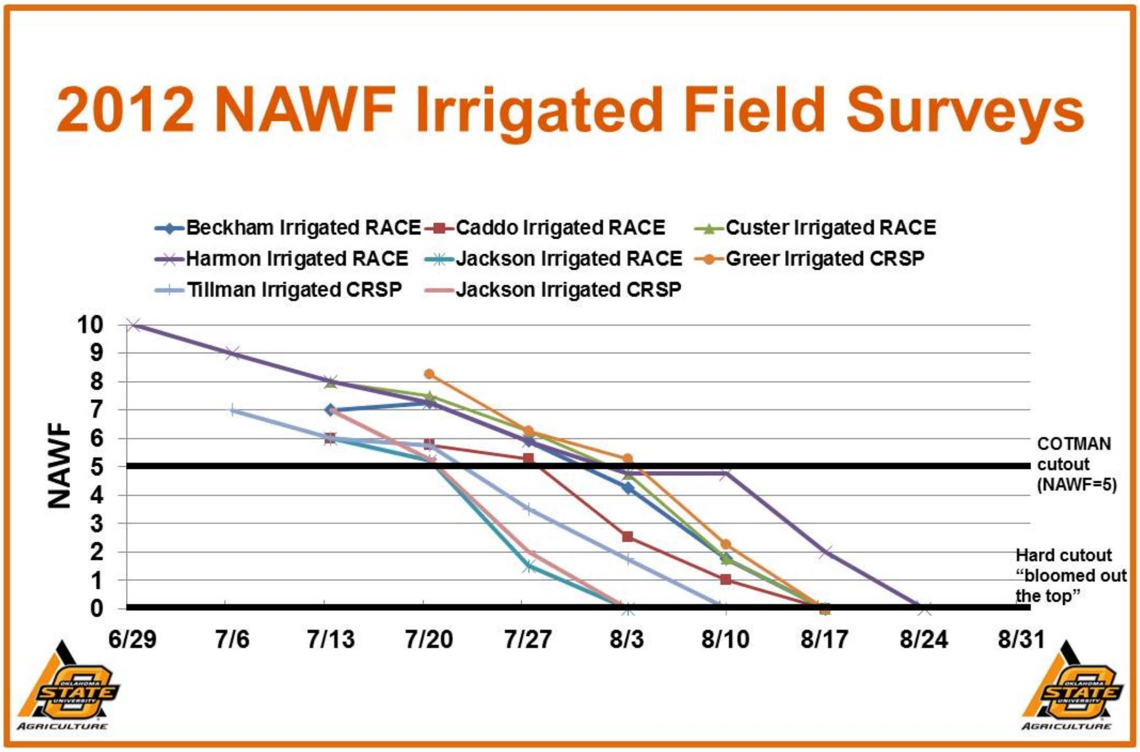
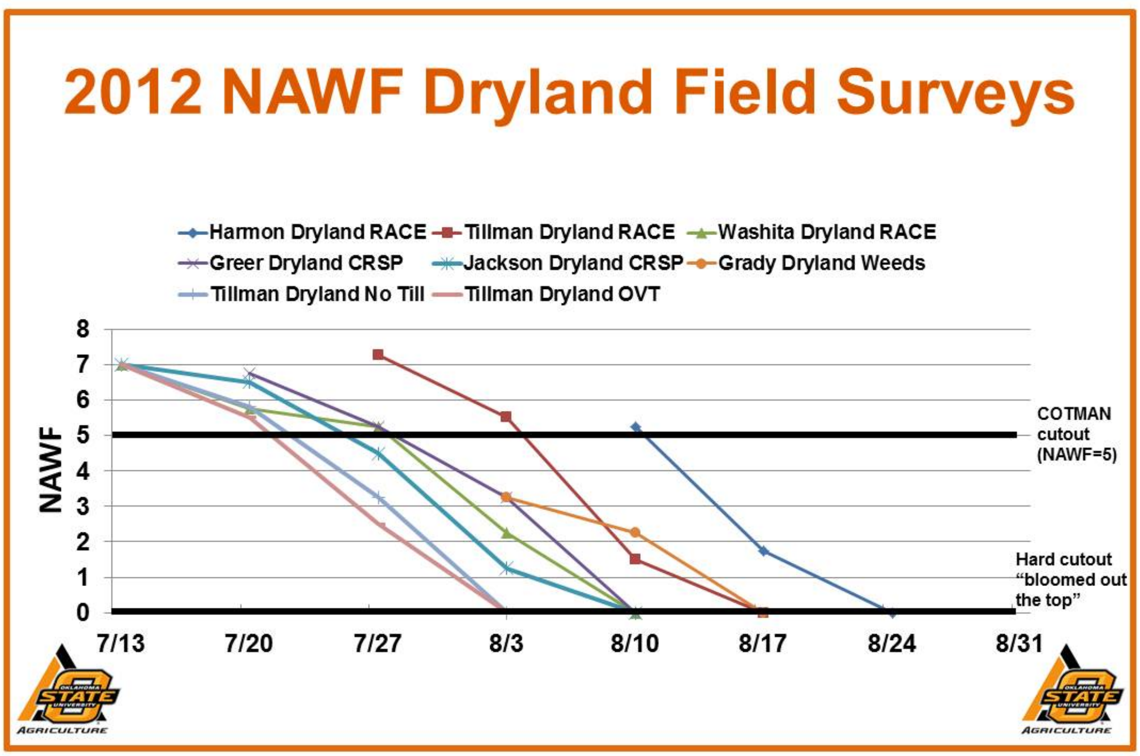


Figure 6. Weekly nodes above white flower (NAWF) in surveyed dryland fields, 2012.



COTTON INSECT LOSSES 2012

This report is sponsored by a grant from the Cotton Foundation.

Michael R. Williams, Chairman

Extension Entomologist Emeritus

Cooperative Extension Service

Mississippi State University

Mississippi State, MS 39762

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Arkansas --- Dr. Gus Lorenz
Arizona --- Dr. Peter Ellsworth
California --- Dr. Peter Goodell
Florida --- Dr. Mike Donahoe
Georgia --- Dr. Phillip Roberts
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Louisiana --- Dr. Roger Leonard
Mississippi --- Dr. Angus Catchot
Missouri --- Dr. Kelly Tindall
New Mexico --- Dr. Jane Pierce
North Carolina --- Dr. Jack Bacheler
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South Carolina --- Dr. Jeremy Green
Tennessee --- Dr. Scott Stewart
Texas --- Dr. David Kern
Virginia --- Dr. Ames Herbert

Background

This information was provided by state coordinators and was collected from surveys of county agents, extension specialists, private consultants and research entomologists. All data are averaged over a total reporting unit. For example, if a unit report represents 100 acres and an 8% loss on 25 of these acres, then in the table summary this shows up as a 2% loss. ((.08 ×25)/100). This type of averaging is used for all data reported including yields and costs of control. Because of averaging and rounding some individual state summary numbers listed as `0' are slightly larger. Costs are averaged to the nearest cent, bales and acres to the nearest whole number, other numbers are rounded to the nearest .001. Bales are calculated at 480 pounds.

OK all 2012

Data Input				
State	OK	Area	all	
Year	2012			
Total Acres	300,000			
Yield/acre (pounds)	185			
Price/lb	$0.65			
yield potential (pounds/acre)	593			
	Acres	%	Cost / trted ac	
Transgenic cotton (arthropods)	297,000	99%	$8.60	
Boll weevil eradication	300,000	100%	$2.00	
Pink Bollworm eradication	0	0%	$0.00	
Scouted Acres	45,000	15%	$6.50	
Seed Treatments (arthropods)	255,000	85%	$7.25	# apps
In-Furrow Applications	15,000	5%	$11.00	
insect applications by air	45,000	15%	$8.50	1.0
Insect apps by ground	150,000	50%	$5.50	2.0
scouting visits per week (arthropods)			1.0	

	Pounds/Ac	%	bales
% loss to weather	386	65.0%	241090
% loss to nonarthropods	6	1.0%	3709
%loss for other (chemical etc)	12	2.0%	7418
% loss to arthropods	5	0.8%	3066
total	408	68.8%	255,283

Transgenic cotton varieties

	% total AC	# acres	total cost/acre	Bt tactic cost/acre	% AC Sprayed	Sprayed* AC	# times	% bollworm**
Bollgard II cottons	97.0%	291,000	$40.84	$8.60	0.0%	0	0.0	0.0%
Widestrike cotton Varieites	1.0%	3,000	$41.32	$9.10	0.0%	0	0.0	0.0%
Twinlink cotton	0.0%	0	$0.00	$0.00	0.0%	0	0.0	0.0%
Other	0.0%	0	$0.00	$0.00	0.0%	0	0.0	0.0%
Total	98.0%	294,000	$40.84	$8.61	0.00%	0	0.0	0.0%
Transgenic Herbicide only	2.0%	6,000	$32.22	$0.00	0.0%	0	0.0	0.0%
non transgenic cotton	0.0%	0	$0.00	$0.00	0.0%	0	0.0	0.0%
Organic cotton	0.00%	0	$0.00	$0.00	0.0%	0	0.0	0.0%
Total	100.0%	300000	$40.67	$8.43	0.00%	0	0.0	0.0%

* #Sprayed Bt Acres for bollworm/budworm control ** percent population which is bollworm

Pima varieties

Varieties	% total AC	# acres	cost/AC		% AC Spraye	sprayed Ac	# times
GM varieties	0.0%	0	$0.00		0.0%	0	0.0
non transgenic	0.0%	0	$0.00		0.0%	0	0.0
Organic	0.0%	0	$0.00		0.0%	0	0.0

	% tot acres	# Acres
Number of Acres with NO foliar applications	25.0%	75000

Pest	Acres Infested	% Acres Infested	Acres Treated	% Acres Treated	# of apps/acres treated	Cost of 1 Insecticide	% loss per acre infested	# of apps per total cot acres	cost/acre	Overall % reduction	bales lost per pest	Loss + Cost	Loss + Cost/acre	% Total Loss + Cost
Boll Weevil	0	0.0%	0	0.0%	0.0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Bollworm/Budworm	0	0.0%	0	0.0%	0.0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Pink Bollworm	0	0.0%	0	0.0%	0.0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Cotton Fleahopper	135,000	45.0%	105,000	35.0%	1.0	$9.00	1.50	0.350	$3.15	0.68%	2,504	$1,206,382	$4.02	84.6%
Lygus	0	0.0%	0	0.0%	0.0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Cotton Leaf Perforator	0	0.0%	0	0.0%	0.0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Spider Mites	0	0.0%	0	0.0%	0.0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Thrips	30,000	10.0%	15,000	5.0%	1.0	$2.00	0.50	0.050	$0.10	0.05%	185	$60,862	$0.20	4.3%
Beet Armyworm	0	0.0%	0	0.0%	0.0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Fall Armyworm	0	0.0%	0	0.0%	0.0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
European Cornborer	0	0.0%	0	0.0%	0.0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Stink Bugs	15,000	5.0%	11,250	3.8%	1.5	$9.00	1.50	0.056	$0.51	0.08%	278	$94,386	$0.31	6.6%
Grasshoppers	9,000	3.0%	0	0.0%	0.0	$0.00	0.05	0.000	$0.00	0.00%	6	$1,736	$0.01	0.1%
Saltmarsh Caterpillars	0	0.0%	0	0.0%	0.0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Aphids	0	0.0%	0	0.0%	0.0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Banded Winged Whitefly	0	0.0%	0	0.0%	0.0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Silverleaf Whitefly (Bemesia)	0	0.0%	0	0.0%	0.0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Loopers	0	0.0%	0	0.0%	0.0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Southern Armyworms	0	0.0%	0	0.0%	0.0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Cutworms	0	0.0%	0	0.0%	0.0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Clouded Plant bugs	0	0.0%	0	0.0%	0.0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Leaf footed bug	75,000	25.0%	15,000	5.0%	1.0	$9.00	0.10	0.050	$0.45	0.03%	93	$62,681	$0.21	4.4%
other	0	0.0%	0	0.0%	0.0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
other	0	0.0%	0	0.0%	0.0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
other	0	0.0%	0	0.0%	0.0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
other	0	0.0%	0	0.0%	0.0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
								0.506	$4.21	0.83%	3,066	$1,426,047	$4.75	100.0%

Yield & Management Results	
Total Acres	300,000
Total bales Harvested	115,625
yield (lbs/acre)	185
Total bales Lost to Insects	3,066
Percent Yield Loss	0.83%
Yield w/o Insects (lbs/ac)	187
Ave. # Spray Applications	0.506
Bales lost all factors	255,283
% yield loss all factors	68.83%

Economic Results	Total	Per Acre
Foliar Insecticides Costs	$1,261,875	$4.21
At Planting Costs	$1,848,750	$6.16
Infurrow costs	$165,000	$0.55
Scouting costs	$292,500	$0.98
Eradication costs	$600,000	$2.00
Transgenic cotton	$2,554,200	$8.51
Total Costs	$6,722,325	$22.41
Yield Lost to insects	$956,453	$3.19
Total Losses + Costs	$7,678,778	$25.60

COTTON DISEASE LOSS ESTIMATE COMMITTEE REPORT

Compiled by: Don Blasingame and Mukund V. Patel, Extension Plant Pathologists, Retired, Mississippi State, MS 39762

Table 1. Estimated Reduction in 2012 Cotton Yield Resulting from Diseases.*

DISEASES	AL	AZ	AR	CA	FL	GA	LA	MS
Note: Table entries are % loss (top figure) and bales lost (lower figure)**								
Fusarium Wilt *F. oxysporium f. sp. vasinfectum*	1.00 8,302	-	0.05 694	0.70 3,414	-	Trace	1.00 5,111	Trace
Verticillium Wilt *V. dahliae*	1.00 8,302	1.50 10,568	-	0.20 975	-	-	Trace	Trace
Bacterial Blight *X. malvacearum*	Trace	-	Trace	-	-	Trace	Trace	0.20 2,172
Phymatrotrichum Root Rot *P. omnivorum*	-	0.50 3,523	-	-	-	-	Trace	-
Seedling Diseases Several fungi	4.50 37,358	0.30 2,114	2.50 34,718	1.50 7,315	0.10 244	0.50 17,308	2.00 10,222	1.50 16,293
Ascochyta Blight *A. gossypii*	0.50 4,151	-	-	-	2.00 4,889	Trace	Trace	Trace
Boll Rots	5.00 41,509	0.10 705	1.00 13,887	Trace	-	3.00 103,846	-	3.00 32,587
Nematode (Total)	5.50 45,660	2.50 17,613	5.00 69,437	0.20 975	6.00 14,668	13.00 450,000	7.00 35,778	5.00 54,311
Root-knot	*0.50* *4,151*	*2.50* *17,613*	*3.50* *48,606*	*0.20* *975*	*3.00* *7,334*	*10.00* *346,154*	*3.00* *15,333*	*1.00* *10,862*
Reniform	*5.00* *41,509*	-	*1.50* *20,831*	-	*3.00* *7,334*	*2.50* *86,538*	*4.00* *20,444*	*4.00* *43,449*
Others	-	-	-	-	-	*0.50* *17,308*	*Trace*	-
Leaf Spots And Others***	3.00 24,906	-	-	Trace	6.00 14,668	5.50 190,385	Trace	1.00 10,862
TOTAL PERCENT	**20.50**	**4.90**	**8.55**	**2.60**	**14.10**	**22.00**	**10.00**	**10.70**
BALES LOST	170,189	34,522	118,737	12,680	34,470	761,538	51,111	116,226
YIELDS IN BALES****	830,189	704,522	1,388,737	487,680	244,470	3,461,538 4	511,111	1,086,226

* Cotton disease loss estimates were made by extension and research plant pathologists and agronomists with cotton responsibilities in their respective states. ** Rounding errors present ***Leaf spots (*Alternaria, Cercospora, Phomopsis,* etc.) and various root rots.

**** Yield potential had not disease been present.

Cotton Disease Loss Estimate Committee

AL - Dr. Kathy Lawrence, Auburn University
AZ - Dr. Mary Olsen, University of Arizona
AR - Dr. Terry Kirkpatrick, University of Arkansas, Hope
CA - Dr. Robert Hutmacher, University of California
FL - Dr. Jim Marios, University of Florida, Quincy
GA - Dr. Bob Kemerait, University of Georgia, Tifton
LA - Dr. Patrick Colyer, LSU, Bossier City
MS - Dr. Gabe Scuimbato, Mississippi State University, Stoneville
MO - Dr. Al Wrather, University of Missouri
NM - Dr. Natalie Goldberg, New Mexico State University
NC - Dr. Steve Koenning, NC State University
OK - Dr. Randy Boman, Oklahoma State University, Altus
SC - Dr. John Muller, Clemson University, Blackville
TN - Dr. Melvin Newman, University of Tennessee, Jackson
TX - Dr. Jason Woodward, Texas A & M, Lubbock
VA - Dr. Patrick Phipps, Virginia Tech, Tidewater

COTTON DISEASE LOSS ESTIMATE COMMITTEE REPORT
Compiled by: Don Blasingame, and Mukund V. Patel, Extension Plant Pathologists, Retired, Mississippi State, MS 39762

Table 1. (continued) 2012

MO	NM	NC	OK	SC	TN	TX	VA	BALES LOST	AVG. % LOST
-	-	0.01 124	-	0.50 2,869	-	0.40 25,934	-	46,448	**0.23**
-	1.00 1,022	0.01 124	0.25 380	-	0.50 3,920	1.00 64,835	-	90,125	**0.34**
Trace	-	-	-	-	-	0.10 6,484	Trace	8,656	**0.02**
-	Trace	-	0.10 152	-	-	4.70 304,725	-	308,400	**0.33**
0.50 3,454	0.50 511	2.00 24,735	0.30 456	0.25 1,435	6.00 47,038	0.50 32,418	1.50 2,787	238,395	**1.53**
-	-	-	-	0.05 287	0.50 3,920	-	Trace	13,247	**0.19**
Trace	-	5.00 61,812	-	0.10 574	0.50 3,920	0.10 6,484	0.20 372	265,695	**1.13**
2.50 17,268	5.00 5,108	3.50 43,268	0.10 152	4.50 25,824	3.01 23,597	2.00 129,670	3.60 6,688	940,018	**4.28**
2.50 *17,268*	*5.00* *5,108*	*2.50* *30,906*	*0.10* *152*	*2.50* *14,346*	*0.01* *78*	*1.80* *116,703*	*2.00* *3,715*	*639,306*	***2.51***
-	-	*0.50* *6,181*	-	*1.00* *5,739*	*3.00* *23,519*	*0.20* *12,967*	*0.10* *186*	*268,698*	1.55
-	-	*0.50* *6,181*	-	*1.00* *5,739*	-	*Trace*	*1.50* *2,787*	*32,014*	**0.22**
-	0.50 511	0.50 6,181	0.50 759	0.50 2,869	0.20 1,568	0.20 12,967	0.50 929	266,605	**1.15**
3.00	**7.00**	**11.02**	**1.25**	**5.98**	**10.71**	**9.00**	**5.80**		**9.19**
20,722	7,151	136,233	1,899	33,858	83,962	583,516	10,775	**1,721,796**	
690,722	102,151	1,236,233	151,899	573,858	783,962	6,483,516	185,775	18,736,813	

Comments:

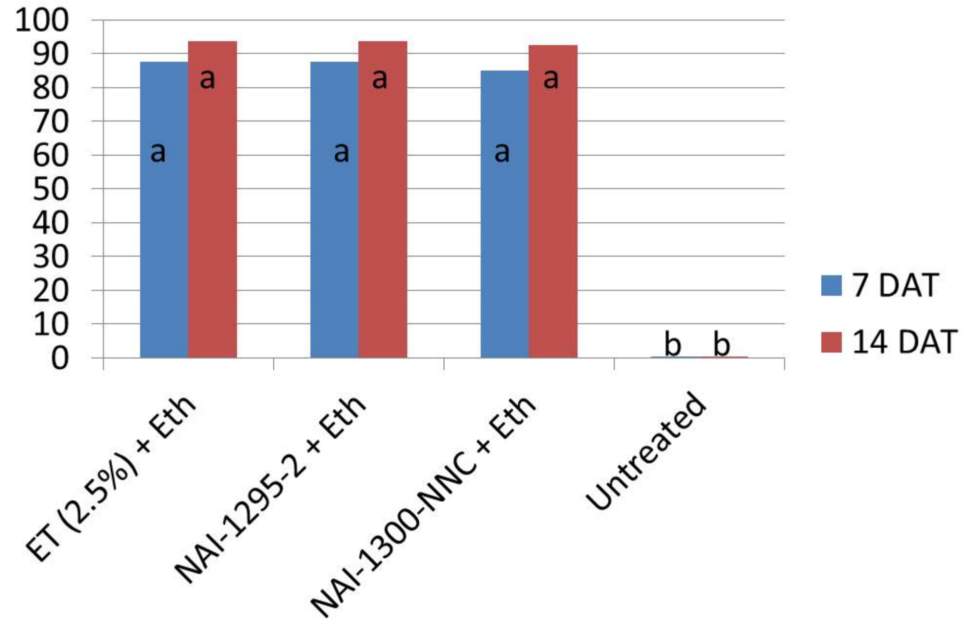
GA A ver warm spring and wet growing season resulted in significant damage to nematodes, boll rots, and Corynespora leaf spot.
NC Corynespora leaf spot was present.
SC An extensive outbreak of Target spot (*Corynespora cassiicola*) in August.
TN Extremely hot and dry during the middle of the growing season.
TX Late season Alternaria leaf spot was present.
VA Corynespora leaf spot was a problem on cotton and soybean.

December 2012

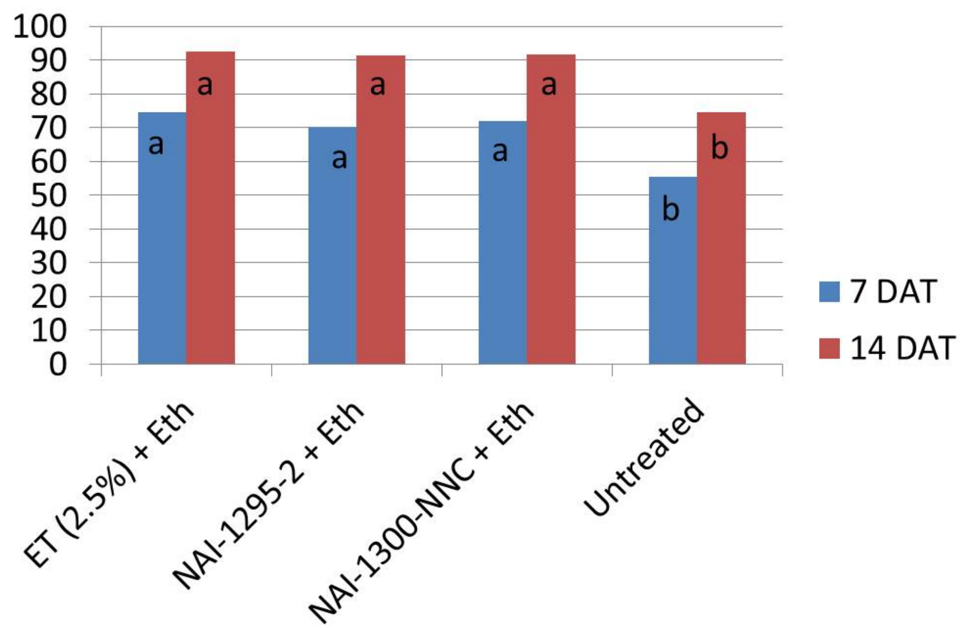
Harvest Aids

In addition to the variety testing work, we initiated several trials to test various new cotton inputs. Nichino America is investigating new formulations of their ET product. We had two harvest aid trials with 4 replicates that were established: 1) ET formulation trial I-early with 4 treatments applied at 45% open bolls on September 18th and 2) ET formulation trial II-late with 4 treatments applied at 65% open bolls applied on October 3rd. Unfortunately the second timing received damaging harvest aid drift from an adjacent field soon after application. Therefore only the results of the first timing are presented below.   A high-clearance, compressed air sprayer was used to make the application. A spray volume of 15 gallons per acre was applied at 55 psi through Turbo Teejet nozzles on 20 inch spacings. Defoliation and open boll evaluations were taken at 7 and 14 days after treatment. The existing formulation of ET was compared to two potential formulations (1295-2 and 1300). All treatments were tankmixed with ethephon and applied at 1 qt/a plus 1% v/v crop oil concentrate. These results are presented below. Similar defoliation was observed from both new formulations as compared to the existing 2.5% formulation. All treatments defoliated the cotton greater than 90% 14 days after treatment. Likewise, boll opening was equal among all three formulations at both observations. By 14 DAT open boll counts exceeded 90% in all treatments.

ET Formulations-Defoliation



ET Formulation-Boll Opening

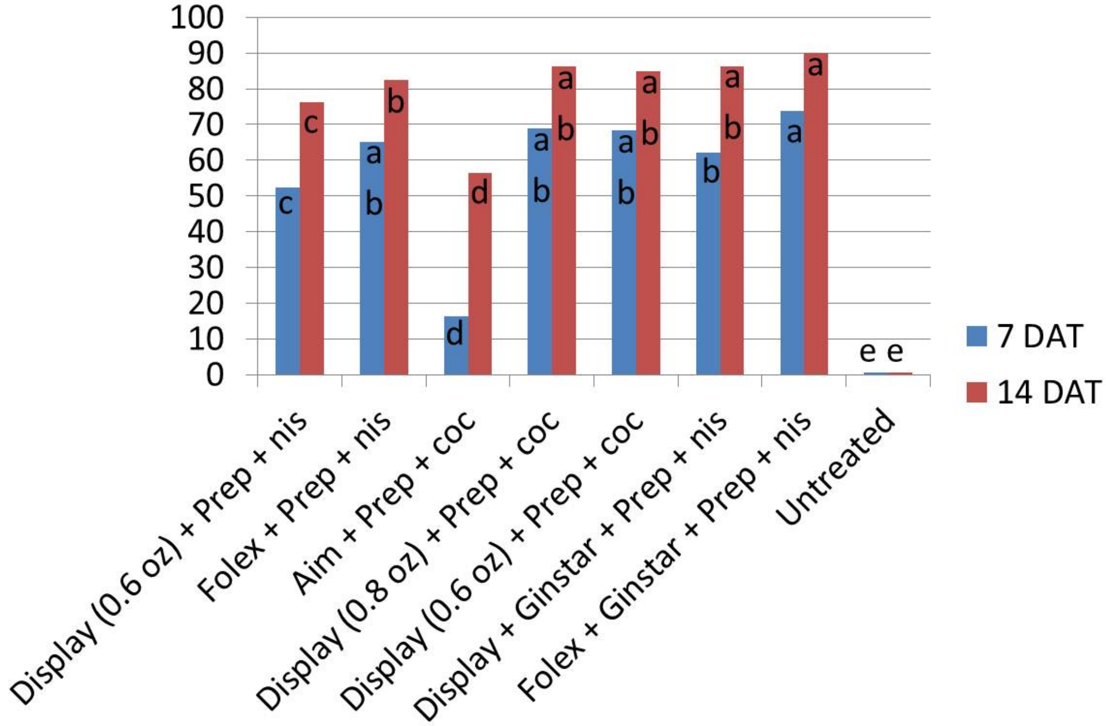


We also worked with FMC to investigate the efficacy of the new Display harvest aid product on irrigated cotton in west Jackson County (groundwater source outside of LAID). This is a premix of the active ingredients in Aim (carfentrazone ethyl) and Blizzard (fluthiacet-methyl). This Display trial consisted of 8 treatments applied at 45% open bolls on September 18th with 4 replicates. A high clearance, compressed air sprayer delivered 15 GPA through Turbo Teejet nozzles on 20 inch spacings. The details of the treatments evaluated are listed below. Display was applied at 0.6-0.8 oz/a with either Prep or Ginstar and either non-ionic surfactant (NIS) or crop oil concentrate (COC). These treatments were compared to Folex or Aim + Prep or Folex + Ginstar + Prep. Fourteen days after application Display defoliated cotton greater than 85-86% when tank-mixed with Prep and crop oil. Similar defoliation was observed from combinations including Ginstar. Only 76% defoliation was achieved when Display was tankmixed with Prep and a non-ionic surfactant. The least amount of defoliation was provided by the treatment of Aim + Prep + crop oil (56%). Open boll counts from treatments including Display were similar to those provided from all other treatments. No differences in boll opening were observed between any of the treatments evaluated at either observation date.

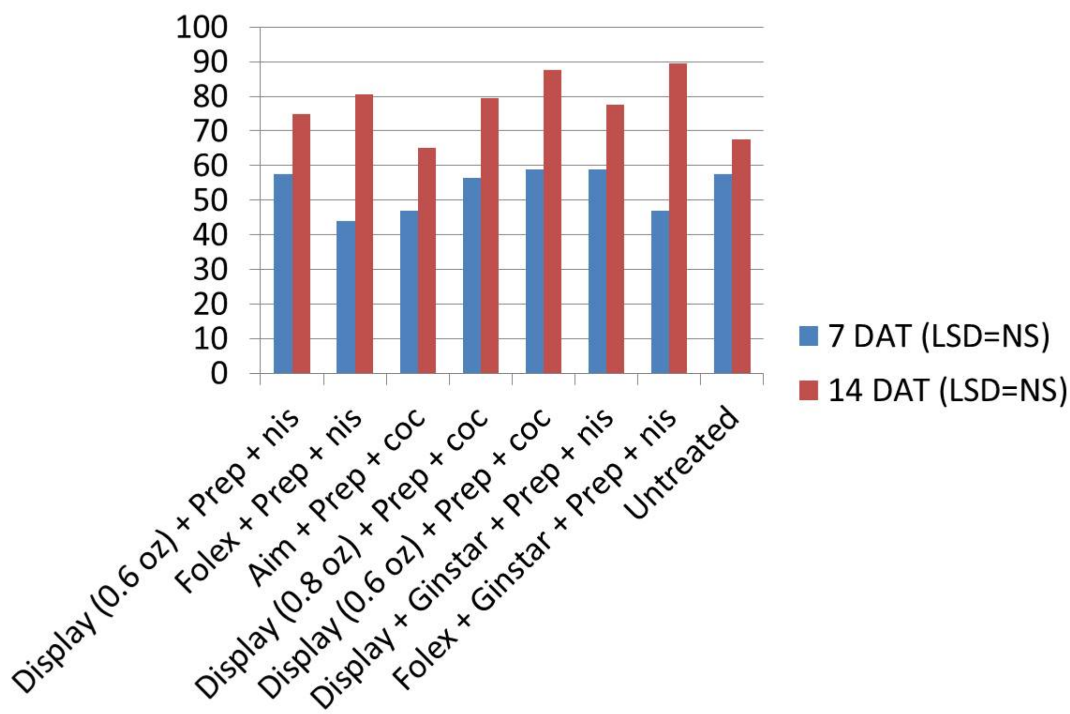
Treatment Structure for Display harvest aid trial.

Trt No.	Treatment Name	Rate	Rate Unit
1	Untreated Check		
2	Display	0.6	oz/a
	Prep	21	oz/a
	NIS	0.25	% v/v
3	Folex	12	oz/a
	Prep	21	oz/a
	NIS	0.25	% v/v
4	Aim	1	oz/a
	Prep	32	oz/a
	COC	1	% v/v
5	Display	0.8	oz/a
	Prep	32	oz/a
	COC	1	% v/v
6	Display	0.6	oz/a
	Prep	32	oz/a
	COC	1	% v/v
7	Display	0.4	oz/a
	Ginstar	5	oz/a
	Prep	21	oz/a
	NIS	0.25	% v/v
8	Folex	8	oz/a
	Ginstar	5	oz/a
	Prep	21	oz/a
	NIS	0.25	% v/v

Display Harvest Aid-Defoliation



Display Harvest Aid-Boll Opening



A harvest aid demonstration was initiated next to our Harmon County subsurface drip irrigated RACE trial on September 5th. This demonstration focused on tankmixing PPO inhibitor defoliants with Ginstar and Folex combinations. This consisted of 13 treatments. We held a combined variety (RACE, CAP) and harvest aid/harvesting meeting at this site with 27 in attendance. Several topics relating to harvest aids were addressed. The techniques for determining how to properly time a harvest aid application, the details of what harvest aid products do and how to properly utilize these products, and the overall performance of the treatments applied at the demonstration site. In addition we also took the opportunity to discuss weed resistance issues and options growers have to prevent weed resistance from developing in their fields. The treatments applied are listed in the table below. Plots were 4 rows wide and 150 feet long. All treatments were applied with a high-clearance compressed air, research sprayer at 15 GPA with Turbo Teejet nozzles on 20 inch spacings. Since these plots were not replicated no data was collected (strictly for demonstration purposes only).

Harmon County Harvest Aid Demonstration Treatments

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	Appl Code
1	Finish	6	L	32	oz/a	60%Open	A
	Def	6	L	16	oz/a	60%Open	A
2	Prep	6	L	32	oz/a	60%Open	A
	Def	6	L	16	oz/a	60%Open	A
3	Prep	6	L	32	oz/a	60%Open	A
	Ginstar	1.5	EC	6	oz/a	60%Open	A
4	Prep	6	L	32	oz/a	60%Open	A
	Ginstar	1.5	EC	3	oz/a	60%Open	A
5	Prep	6	L	24	oz/a	60%Open	A
	Display	2	EC	0.6	oz/a	60%Open	A
	NIS	100	L	0.25	% v/v	60%Open	A
6	Prep	6	L	24	oz/a	60%Open	A
	ET	0.208	EC	2	oz/a	60%Open	A
	COC	100	L	0.5	% v/v	60%Open	A
7	Prep	6	L	24	oz/a	60%Open	A
	Blizzard	0.91	EC	0.6	oz/a	60%Open	A
	NIS	100	L	0.25	% v/v	60%Open	A
8	Prep	6	L	24	oz/a	60%Open	A
	Ginstar	1.5	EC	3	oz/a	60%Open	A
	Display	2	EC	0.5	oz/a	60%Open	A
	NIS	100	L	0.25	% v/v	60%Open	A
9	Prep	6	L	24	oz/a	60%Open	A
	Ginstar	1.5	EC	3	oz/a	60%Open	A
	ET	0.208	EC	2	oz/a	60%Open	A
	Crop Oil	100	L	0.5	% v/v	60%Open	A
10	Prep	6	L	24	oz/a	60%Open	A
	Ginstar	1.5	EC	3	oz/a	60%Open	A
	Blizzard	0.91	EC	0.6	oz/a	60%Open	A
	NIS	100	L	0.25	% v/v	60%Open	A
11	Prep	6	L	24	oz/a	60%Open	A
	Def	6	L	8	oz/a	60%Open	A
	Display	2	EC	0.5	oz/a	60%Open	A
	NIS	100	L	0.25	% v/v	60%Open	A
12	Prep	6	L	24	oz/a	60%Open	A
	Def	6	L	8	oz/a	60%Open	A
	ET	0.208	EC	2	oz/a	60%Open	A
	Crop Oil	100	L	0.5	% v/v	60%Open	A
13	Prep	6	L	24	oz/a	60%Open	A
	Def	6	L	8	oz/a	60%Open	A
	Blizzard	0.91	EC	0.6	oz/a	60%Open	A
	NIS	100	L	0.25	% v/v	60%Open	A

Beltwide Cotton Conference Presentations

Project personnel were involved in several Beltwide Cotton Conference presentations in San Antonio, TX in January 2013.

Common groundsel is a weed that has become important in no-till cotton production in many fields in the southwestern part of the state. Weed control research data were presented at the conference.

Mr. Wesley Porter is a doctoral student working with Dr. Randy Taylor at OSU, and is a recipient of a Cotton Incorporated Fellowship. Mr. Porter was very busy implementing follow-up work concerning fiber quality issues related to stripper harvesting.

Working in collaboration with several researchers across the Cotton Belt, Dr. Randy Taylor led a project investigating the utility of using picker harvesters with yield monitors for determining yield in on-farm cotton variety trials.

In addition, two presentations were a continuation of work began by Dr. Boman in Texas in collaboration with USDA-ARS personnel and Texas Tech University graduate students and research personnel. Results from this work are still pertinent and important for Oklahoma producers.

Preplant Control of Common Groundsel in Oklahoma

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Introduction

Common groundsel has become a challenge in many no-till fields over the past few years. It is a winter annual that can emerge any time from late fall or winter through early spring. A unique characteristic of this weed is that it begins to flower soon after emergence in winter and will continue to grow and flower through cotton planting time. Similar to horseweed, the seeds of common groundsel disperse in the wind which results in rapid spread from uncontrolled areas (figure 1). Many grower's recent encounters have resulted in glyphosate applications followed by "horseweed-type" hormone (2,4-D or dicamba) treatments that often fall short the second time around. One common producer field observation is that frequently this weed tends to be found in conjunction with horseweed. Since horseweed continues to be one of the top weed pests that growers face in limited tillage production, one of our objectives was to evaluate the performance of standard horseweed recommendations for the control of common groundsel. In addition, very few labels cite control of this particular weed. Sharpen, paraquat and Harmony Extra XP are three products which list groundsel control on the label. Two trials were initiated in the spring of 2012 in order to better define current options available to growers.

Objectives

Evaluate the effectiveness of Sharpen, paraquat and Harmony Extra XP for control of common groundsel in a preplant burndown application.

Determine the effectiveness of hormone-based (horseweed type) treatments for the control of common groundsel prior to cotton planting.

Materials and Methods

Both studies were randomized complete block designs with four replications and were conducted on clay loam soils. Broadcast over-the-top applications were made with a compressed air, high-clearance sprayer with a spray volume of 10 gallons per acre (GPA). Separate treatments were applied at each of the two locations. Site 1 focused on the use of products listing groundsel on their label. Fifteen treatments were applied on February 16th, 2012 focusing on the performance of Sharpen, paraquat or Harmony Extra XP. Treatments at Site 2 more closely resembled local horseweed control programs focusing on the inclusion of 2,4-D or dicamba. These treatments were applied on February 29th, 2012. The common groundsel was past the ideal stage (< 3 inches) at both sites ranging from 3 to 6 inches in height at application. Treatments were applied at 28 psi with flat fan nozzles. Treatments from each site are listed in Figures 2-3 which also contain each trial's respective data.

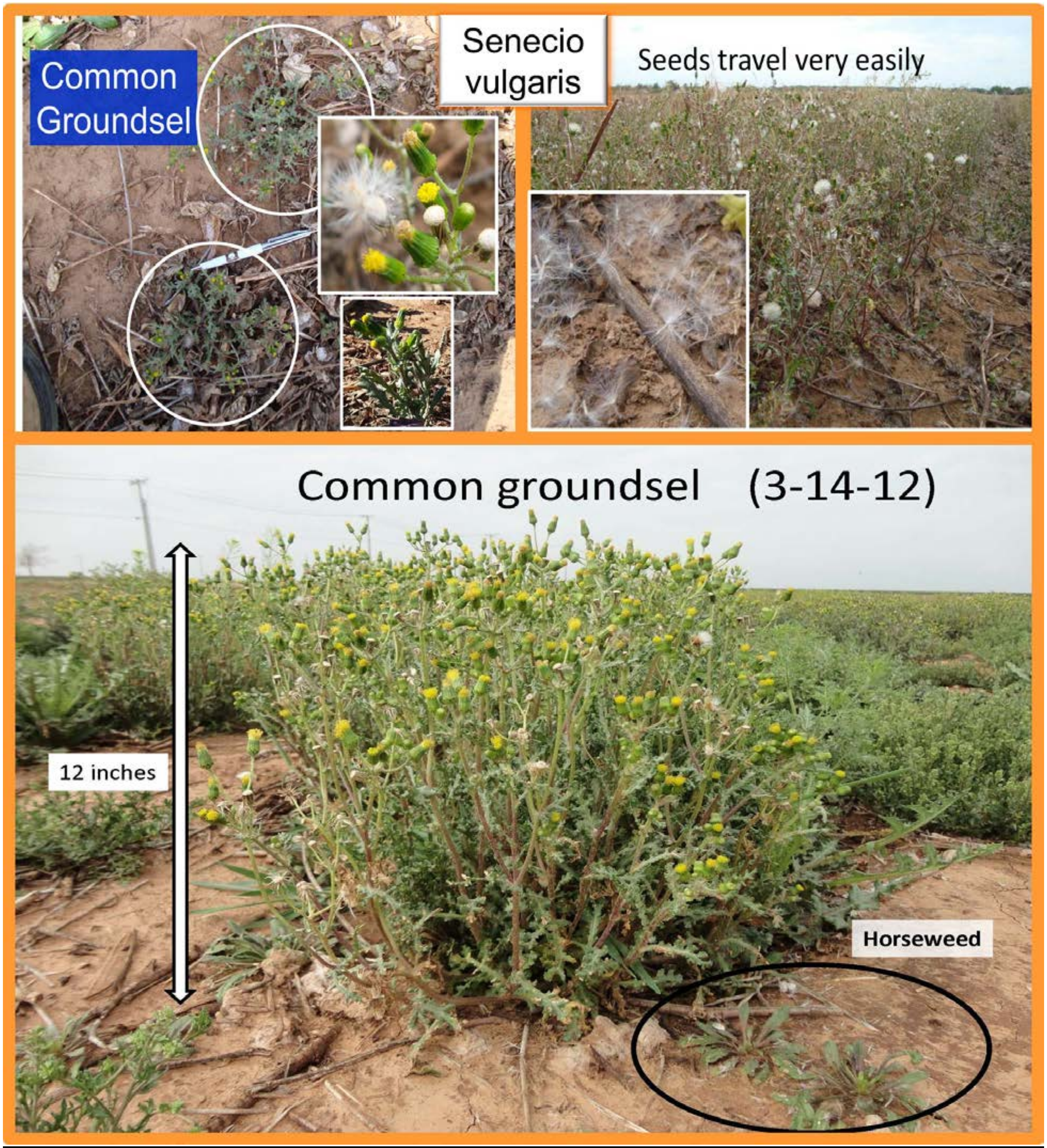
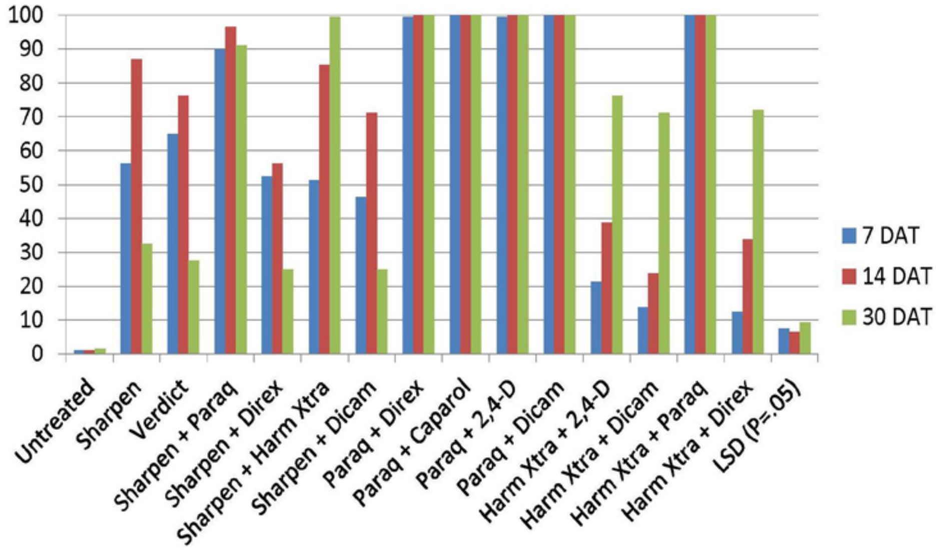


Figure 1. Common groundsel

Results and Discussion

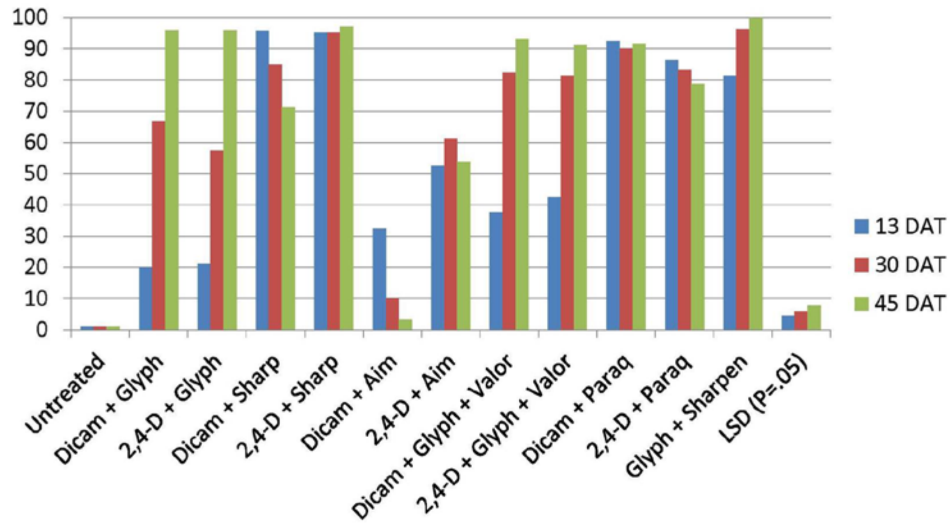
All treatments were evaluated at 7, 14 and 30 days after treatment (DAT). However, treatments at Site 2 were also evaluated 45 DAT. Data from the 7, 14 and 30 day observations for Site 1 are listed in figure 2. Although Sharpen or Verdict alone controlled common groundsel sufficiently (76-87%) at the 14 day observation, control diminished (to 28-33%) by 30 DAT. Tank-mixes of Sharpen with either Direx or dicamba provided similar control (25%) 30 DAT. Tank-mixes of Harmony Extra XP with either 2,4-D, dicamba or Direx controlled common groundsel 71-76% 30 DAT. When Sharpen was tank-mixed with Harmony Extra XP common groundsel control increased significantly (to 99.5%). Similar control was observed when Harmony Extra XP was tank-mixed with paraquat or when paraquat was tank-mixed with Direx, Caparol, 2,4-D or dicamba.

Data from the 14, 30 and 45 day observations are presented in figure 3 for Site 2. Dicamba (8 oz/a) + Aim (2 oz/a) did not sufficiently control common groundsel at any observation date (3-33%). When Aim was tank-mixed with 2,4-D (1 lb ai/a) control increased significantly at all observations (53-61%). Combinations of 2,4-D plus paraquat or Sharpen plus dicamba controlled common groundsel very effectively 14 DAT (86-96%). However, by 45 DAT this control diminished (to 71-78%). Dicamba (8 oz/a) or 2,4-D (1 lb ai/a) plus glyphosate (0.50 lb ai/a) controlled common groundsel 91-96% 45 DAT. The addition of Valor to these treatments (dicamba or 2,4-D plus glyphosate) did not significantly change control of common groundsel. Sharpen (1 oz/a) plus 2,4-D (1 lb ai/a) provided similar control of common groundsel at the 45 day observation (97%). Sharpen applied at 1 oz/a plus 0.75 lb ai/a of glyphosate only provided 81% control 14 DAT, however by 45 DAT control had increased to 100%.



Untreated
1 oz/a Sharpen + 17 lbs/100 gal amm. sulfate + 1% mso
5 oz/a Verdict + 17 lbs/100 gal amm. sulfate + 1% mso
1 oz/a Sharpen + 0.50 lb ai/a paraquat + 17 lbs/100 gal amm. sulfate + 1% mso
1 oz/a Sharpen + 32 oz/a Direx + 17 lbs/100 gal amm. sulfate + 1% mso
1 oz/a Sharpen + 0.50 oz/a Harmony Xtra XP + 17 lbs/100 gal amm. sulfate + 1% mso
1 oz/a Sharpen + 8 oz/a dicamba + 17 lbs/100 gal amm. sulfate + 1% mso
0.75 lb ai/a paraquat + 32 oz/a Direx + 1% coc
0.75 lb ai/a paraquat + 32 oz/a Caparol + 1% coc
0.75 lb ai/a paraquat + 1.0 lb ai/a 2,4-D + 0.25% nis
0.75 lb ai/a paraquat + 8 oz/a dicamba + 0.25% nis
0.50 oz/a Harmony Xtra XP + 1.0 lb ai/a 2,4-D + 0.25% nis
0.50 oz/a Harmony Xtra XP + 8 oz/a dicamba + 0.25% nis
0.50 oz/a Harmony Xtra XP + 0.75 lb ai/a paraquat + 0.25% nis
0.50 oz/a Harmony Xtra XP + 32 oz/a Direx + 1% coc

Figure 2. Common groundsel control with Sharpen, paraquat and Harmony Extra XP



Untreated
8 oz/a dicamba + 32 oz/a glyphosate(4lb) + 17lbs/100gal amm. sulfate + 0.25% nis
1.0 lb ai/a 2,4-D + 32 oz/a glyphosate(4lb) + 17lbs/100gal amm. sulfate + 0.25% nis
8 oz/a dicamba + 1.0 oz/a Sharpen + 17lbs/100gal amm. sulfate + 1% mso
1.0 lb ai/a 2,4-D + 1 oz/a Sharpen + 17lbs/100gal amm. sulfate + 1% mso
8 oz/a dicamba + 1oz/a Aim + 1% coc
1.0 lb ai/a 2,4-D + 1oz/a Aim + 1% coc
8 oz/a dicamba + 32 oz/a glyphosate(4lb) + 17lbs/100gal ammon. sulfate + 2 oz/a Valor + 1% coc
1.0 lb ai/a 2,4-D + 32 oz/a glyphosate(4lb) + 17lbs/100gal amm. sulfate + 2 oz/a Valor + 1% coc
8 oz/a dicamba + 0.50 lb ai/a paraquat + 0.25% nis
1.0 lb ai/a 2,4-D + 0.50 lb ai/a paraquat + 0.25% nis
48 oz/a glyphosate(4lb) + 1 oz/a Sharpen + 17 lbs/100 gal amm. sulfate + 1% mso

Figure 3. Common groundsel control with 2,4-D and dicamba

0.75 lb ai/a paraquat + 8 oz/a dicamba + 0.25% nis

Figure 4. Common groundsel control next to untreated plot

Summary

Sharpen applied alone (or when combined with dicamba) did not effectively control common groundsel. However, tank-mixing Harmony Extra XP with Sharpen did result in very effective control. Similarly, all treatments including paraquat were very effective at controlling common groundsel. This suggests that future work may be needed to explore potential paraquat rates that may be more economical but still remain effective. In addition, if choosing a tank-mix partner for Aim, these results suggest a much more effective relationship with 2,4-D as opposed to dicamba for common groundsel control.

Although Sharpen plus dicamba has been observed to be very effective at controlling common groundsel in the past, these results suggest that the weed size at application (larger than the recommended <3 inch stage) could have reduced the effectiveness of this treatment. Though many producers have found glyphosate alone to be very ineffective, these trials indicate that the inclusion of glyphosate (with either 2,4-D or dicamba) is beneficial since all treatments including glyphosate provided at least 90% control of common groundsel.

Partial funding provided through the Cotton Incorporated Oklahoma State Support Committee

TRACKING COTTON FIBER QUALITY THROUGHOUT A STRIPPER HARVESTER: PART II

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Abstract

Cotton fiber quality begins to degrade naturally with the opening of the boll and mechanical harvesting processes are perceived to exacerbate fiber degradation. Previous research indicates that stripper harvested cotton generally has lower fiber quality and higher foreign matter content than picker harvested cotton. The main objective of this project was to track cotton fiber quality and foreign matter content throughout the harvesting units and conveying/cleaning systems on a brush-roll stripper harvester. During 2011 seed cotton samples were collected at six locations including: 1) hand-picked from the field, 2) just after the brush rolls in the row unit, 3) just after the row units, 4) from the separation duct after the cotton was conveyed by the cross auger, 5) from the basket with the field cleaner by-passed, and 6) from the basket after the cotton was processed through the field cleaner. During 2012 the second location (just after the stripper rolls in the row unit) were eliminated from the collections. Seed cotton samples collected at each location were analyzed for foreign matter content and ginned to produce fiber for HVI and AFIS fiber analyses. Results independent of year effect were very similar from 2011 and 2012. Results show that the row unit augers and field cleaner are the most effective systems on a cotton stripper for removing foreign material. AFIS and HVI results indicate that the harvesting, conveying, and cleaning systems on a stripper harvester have a minimal effect on fiber length characteristics and the formation and size of neps. Leaf grade increased between the harvesting units and the field cleaner due to the breakup of foreign material caused by mechanical action in the conveying system. The field cleaner helped to reduce leaf grade back to the level observed at the stripper rolls. It is very important to note that independent of year effect the results presented in this paper show very similar trends between two harvest seasons. Thus the data represented is of high accuracy and the integrity was preserved between the two years. The results of this work indicate that the cross auger and pneumatic conveying systems on stripper harvesters could be redesigned to help improve seed cotton cleanliness while helping to preserve fiber quality.

Introduction

Cotton fiber quality begins to degrade with the opening of the boll (ICAC 2001). Mechanical harvesting processes increase the amount of foreign material contained in seed cotton at the gin and influences the quality of ginned lint. Stripper harvested seed cotton contains more foreign matter than picker harvested cotton(Kerby et al., 1986; Baker et al., 1994; Faulkner et al., 2011a), and the quality of stripper harvested fiber is often lower than that of picker harvested lint (Faulkner et al., 2011b). Unlike picker harvesters, which use spindles to remove seed cotton from open bolls, stripper harvesters use brushes and bats to indiscriminately remove seed cotton, bolls, leaves, and other plant parts from the stem of the plant. The harvesting efficiency of a picker is lower than that of a stripper harvester. Thus for a particular cotton crop, a picker harvests a different subset of the total fiber population than a stripper harvester. The difference in fiber quality between picker and stripper harvested cotton is dependent upon fiber maturity (Faulkner et al., 2011b). Micronaire and fiber length parameter differences between harvest methods are greater when fibers are immature and favor picker harvesting. When fibers are mature, fiber quality differences tend to be less between harvest methods.

Stripper harvesting is predominately confined to the Southern High Plains of the US due to several factors including: low humidity levels during daily harvest intervals, tight boll conformations and compact plant structures adapted to withstand harsh weather during the harvest season, and reduced yield potential due to limited rainfall and irrigation capacity. Cotton strippers typically cost about one-third the price of cotton pickers and have harvesting efficiencies in the range of 95 – 99% making them ideal for lower yielding cotton conditions (Williford et al. 1994).

Approximately 50% of the total number of cotton bales produced in the U.S. recently came from Texas and Oklahoma (USDA, 2011). A majority of the cotton harvested in these two states is done so with stripper harvesters.

Many studies have investigated the overall quality of stripper harvested cotton, quality of stripper harvested cotton versus picker harvested cotton, and a cost comparison of the two harvest methods (Faulkner et al. 2011 b and c, Kerby et al. 1986, Nelson, et al. 2006.). Several studies focused on the use of field cleaners and their effectiveness at removing foreign material (Brashears 2005, Smith and Dumas, 1982; Wanjura and Baker, 1979; Wanjura and Brashears, 1983; and Wanjura et al., 2011). All of these studies show that a field cleaner is an effective system for removing foreign material from stripper harvested cotton; however these studies do not address any other components of the stripper harvester. Brashears (1994) observed that attaching pieces of square key stock to the outer edge of the conveyor auger flights on a cotton stripper increased the amount of foreign material removed from harvested seed cotton but the influence of these modifications on fiber quality was not reported. To our knowledge, only the previous work by Porter et. al. (2011) addresses the influence of the individual harvesting and conveying systems of a stripper harvester on fiber quality. Thus, the objective of this work is to document cotton quality and foreign matter content at several sequential locations on a stripper harvester. The overall goal of this effort is to identify components and systems on the stripper that if redesigned, could help to improve the cleanliness and better preserve the quality of stripper harvested cotton.

Materials and Methods

In this study the term location refers to a location on the harvester not a location from within the actual field the fiber was collected from. The data collection for this project occurred at the Texas A&M Research and Extension Center north of Lubbock, TX. Two years of harvest data were collected including 2011 and 2012. During 2011 five locations on the harvester and a hand collected field stand of cotton were identified as points of interest from the fiber quality standpoint to begin the collection process. One location was eliminated during 2012 due to excessive dirt and debris incorporated into the machine and the excellent job performed by the row unit augers at removing this foreign matter. The same two varieties were harvested for this project in both years, FiberMax 9170 B2F, and Stoneville 5458 B2F. Two varieties were used only because they are common in the Southern High Plains for stripper harvested cotton. This study did not explore the varietal differences from the perspective of variety performance, only from machine effects on the fiber. One hundred rows of each variety were planted in a row irrigated field that was 775 feet long. The cotton was stripper harvested using a four row wide John Deere 7460, thus the collections for each replication occurred from within one 4-row wide 775 foot long strip. A total of eight 4-row wide passes were harvested from each variety: 5 passes for the machine location and hand harvested sample collections and three additional full length passes used to measure yield (Figures 2 and 3).

The six locations of interest were cotton handpicked from the field (1), after brush rolls (2), after the row unit/before the cross auger (3), after the cross auger (4), before the field cleaner (5), and from the basket (after field cleaner) (6) of the stripper after the cotton has been field cleaned (Table 1 (2011) and Table 2 (2012), Figures 1 and 4).

Table 1. Abbreviated equivalent of the machine locations used for fiber collection in 2011.

Machine Location	Numerical Equivalent
Hand Harvested	HH
After Brush Rolls	ASR
After Row Unit	ARU
After Cross Auger	ACA
Before Field Cleaner	BFC
After Field Cleaner	AFC

Table 2. Abbreviated equivalent of the machine locations used for fiber collection 2012.

Machine Location	Numerical Equivalent
Hand Harvested	HH
After Row Unit	ARU
After Cross Auger	ACA
Before Field Cleaner	BFC
After Field Cleaner	AFC

Figure 1. Locations cotton lint samples were collected from.

A total of five replications were conducted for each sampling location per variety as shown in Figures 2 and 3. Figures 2 and 3 are oriented in cardinal direction with North to the top, and represent the harvested strips and approximate field locations of the collection areas. For each replication, approximately 20-lb. of seed cotton was collected from each sampling location. In order to collect an adequate sample amount from the after brush roll, after row unit, and after cross auger locations, it was necessary to stop the harvester several times in the field. Only one replication per variety was collected from the after stripper roll location because with the row unit augers disabled the row unit filled with dirt and debris too quickly (Figure 6). Due to the excessive dirt and debris this collection area was eliminated from the 2012 machine collection locations. The row unit augers did an excellent job at removing the foreign matter introduced by the stripper rolls.

Variety	Replication	Approximate Collection Areas			
Stoneville	Yield Pass				
Stoneville	Rep 5	BFC/AFC	HH	ARU/ACA	
Stoneville	Rep 4	BFC/AFC	HH	ARU/ACA	
Stoneville	Rep 3	BFC/AFC	HH	ARU/ACA	
Stoneville	Yield Pass				
Stoneville	Rep 2	BFC/AFC	HH	ARU/ACA	
Stoneville	Rep 1	BFC/AFC	HH	ARU/ACA	ASR
Stoneville	Yield Pass				

FiberMax	**Yield Pass**				
FiberMax	**Rep 1**	**BFC/AFC**	**HH**	**ARU/ACA**	**ASR**
FiberMax	**Rep 2**	**BFC/AFC**	**HH**	**ARU/ACA**	
FiberMax	**Yield Pass**				
FiberMax	**Rep 3**	**BFC/AFC**	**HH**	**ARU/ACA**	
FiberMax	**Rep 4**	**BFC/AFC**	**HH**	**ARU/ACA**	
FiberMax	**Yield Pass**				
FiberMax	**Rep 5**	**BFC/AFC**	**HH**	**ARU/ACA**	

Figure 2. Field and variety layout for the collection strips 2011.

Variety	**Replication**	**Approximate Collection Areas**		
Stoneville	**Rep 1**	**BFC/AFC**	**HH**	**ARU/ACA**
Stoneville	**Yield Pass**			
Stoneville	**Rep 2**	**BFC/AFC**	**HH**	**ARU/ACA**
Stoneville	**Yield Pass**			
Stoneville	**Rep 3**	**BFC/AFC**	**HH**	**ARU/ACA**
Stoneville	**Rep 4**	**BFC/AFC**		**ARU/ACA**
Stoneville	**Yield Pass**			
Stoneville	**Rep 5**	**BFC/AFC**		**ARU/ACA**
FiberMax	**Rep 1**	**BFC/AFC**	**HH**	**ARU/ACA**
FiberMax	**Rep 2**	**BFC/AFC**	**HH**	**ARU/ACA**
FiberMax	**Yield Pass**			
FiberMax	**Rep 3**	**BFC/AFC**	**HH**	**ARU/ACA**
FiberMax	**Rep 4**	**BFC/AFC**		**ARU/ACA**
FiberMax	**Yield Pass**			
FiberMax	**Rep 5**	**BFC/AFC**		**ARU/ACA**
FiberMax	**Yield Pass**			

Figure 3. Field and variety layout for the collection strips 2012.

Figure 4. Clockwise from top left to bottom left are pictures representing the sampling locations: Before Field Cleaner, After Field Cleaner, Hand Harvested, After Brush Rolls, After Cross Auger, and After Row Unit.

Figure 5. The excessive dirt collected by the stripper rolls.

Simultaneous sampling of the harvested seed cotton at each location on the harvester was problematic from a safety and feasibility standpoint. Therefore, all samples from one location were collected from both varieties prior to collecting samples from the other locations. The following sequence of events was conducted to collect the seed cotton samples from each location for each rep:

1. Before field cleaner sample collection: The machine was operated at full load into the un-harvested cotton with the field cleaner bypassed so that the harvested cotton flowed directly into the basket and not through the field cleaner. After the machine traveled approximately 150 ft into the field, the harvester was stopped and a 20-lb. sample of seed cotton was collected in the basket. The remaining seed cotton in the basket was moved so that there was an empty location in the basket for the next sample to fall into.
2. After field cleaner sample collection: The bypass lever on the field cleaner was switched to allow the cotton to pass through the field cleaner before entering the basket. The harvester was operated at full load into the un-harvested cotton in the same rep as in step 1 for approximately 150 ft. The harvester was stopped and a 20-lb. sample of seed cotton was collected from the field cleaned cotton in the basket. The stripper basket was emptied and moved to the next replication. Steps 1 and 2 were completed for all reps in both varieties before samples were collected from other machine locations.

3. Hand harvested sample collection: a 20-lb. sample of seed cotton was hand harvested from each replication in both varieties after step 2.
4. After row unit and after cross auger sample collection: The right-hand section of the cross auger was removed from the header allowing the two right-hand row units to empty directly into the open auger trough. A large sack was connected to the bottom of the main cotton conveying duct to collect the cotton moved to the center of the header by the remaining left-hand section of the cross auger. With the main conveying fan disengaged and the row units and cross auger running, the stripper proceeded into the un-harvested cotton located after the hand harvested collection area. The machine was operated until the cross auger trough behind the right hand row units was full at which time the cotton was removed from the open auger trough and placed in a collection bag. This process was repeated until approximately 20 lb. of seed cotton was collected from the open right-hand auger trough (after row unit sample) and in the large sack attached to the base of the main cotton conveying duct (after cross auger sample). Step 4 was conducted for all replications in both varieties before step 5.
5. After stripper roll sample collection: The drive gears used to operate the two row unit augers in each row unit were removed from the harvester. The stripper was operated at full engine speed into the un-harvested cotton and stopped when the row unit auger troughs were full of harvested material. The material was removed from the row units and placed in a collection bag and this process was repeated until a total of 20-lb. of harvested material was collected. Step 5 was only conducted for one replication in each variety due to the excessive accumulation of soil and debris. As stated earlier this collection location was removed from the 2012 harvest season, so this step was not followed.

Cotton samples were hand collected from the field for gravimetric moisture analysis each time a collection replication occurred. In conjunction with each sample stop throughout the entire process, air temperature and relative humidity were recorded. Cotton samples collected from the field were transported back to the USDA-ARS Gin Lab at Lubbock for ginning. The samples were separated by variety and location, and then weighed. Once the samples were weighed they were transported to the top of the extractor-feeder/gin stand. Prior to ginning two hand fractionation samples were pulled from each of the samples during 2011 and only one sample was pulled during 2012. A moisture sample was collected from the extractor-feeder apron during ginning of each sample. Analysis of the hand fractionation samples and the moisture content samples were performed based on standard procedures outlined by USDA (Shepherd 1972). Each of the cotton samples collected in the field were processed through an extractor-feeder, 16-saw gin stand, and one stage of saw-type lint cleaning. The cleaned lint was weighed to obtain lint turnout. The trash collected from the extractor-feeder and seeds from the gin stand were collected and weighed. Two samples of the cleaned cotton lint from each sample were collected and sent to the Texas Tech University, Fiber and Biopolymer Research Institute in Lubbock, TX for HVI and AFIS fiber analysis. The Analysis of Variance (ANOVA) was performed using the Statistical Analysis System 9.3 program (SAS Institute Inc. Cary, NC). Least Squared Difference (Tukey $\alpha = 0.10$) were calculated for all of the parameters reported from the ginning and fiber quality data results.

Results and Discussion

Foreign Matter Content

Analysis of the ginning data showed a trend of increasing gin turnout and decreasing seed cotton trash content as the cotton was sampled on the harvester. A significant difference was not seen between varieties for the results of the gin data, thus all data presented represents both the Stoneville and FiberMax varieties. In the graphical and tabular representations of the data the machine location was assigned a numerical value to make it easier for analysis. Table 1 gives the numerical equivalent of the name.

Gin turnout was highest for the hand harvested location with an average of approximately 37%. This was expected since only fiber and seed was intentionally removed from the plants. There was minimal trash incorporated into the hand harvested fiber. The second location which occurred after the brush rolls had removed the cotton from the plants had the lowest gin turnout with an average of about 12%. The row unit augers were disabled during this data collection, and a large amount of dirt, dust, and debris was picked up by the row units and conveyed into the row unit auger troughs. It was very easy to see the amount of debris removal that the row unit augers are aiding in. After the row unit once the cotton had entered the cross auger trough, gin turnout increased to near double that of the after brush roll location, or about 25%. The difference in turnout between locations 2 and 3 indicates that the row unit augers are quite effective at removing debris. Next, the cross auger collection area, there is about a percent or two drop in the average in gin turnout. The mechanical conveyance occurring from the cross auger is affecting the gin turnout of the cotton over that of the cotton collected from the cross auger trough. However from locations 3 to 5 there is very little change. At the fifth location, the cotton was allowed to flow up the separation duct, by pass the field cleaner and then was collected. An average 5% increase is seen in the gin turnout when the cotton is allowed to pass through the field cleaner. Thus, the field cleaner is the only point on the machine that significantly influences the turnout after the row unit augers. Therefore, there is potential for machine redesign somewhere between these locations 3 to 5 to increase gin turn out and reduce overall trash content. The field cleaner is effective in achieving a gin turnout level statistically equivalent to that of hand harvested cotton. If the overall turnout could be increased earlier in the machine the field cleaner would have the opportunity to increase the level to that of hand harvested cotton.

Percent trash and gin turnout, based on total sample weight, is shown in figures 6 for 2011 and figure 7 for 2012. The trash was collected from the extractor feeder before the gin stand. The hand harvested and field cleaned cotton has the lowest percent trash. Again the row unit auger collection area had the highest percentage of trash in 2011.

Figure 6 below is the statistical groupings based on machine location. It can be seen that use of the field cleaner made it is possible to obtain statistically similar gin turnouts and lower trash contents to that of hand harvested cotton. The non-field cleaned, cross auger, and after brush roll cotton had statistically similar gin turnouts and trash contents. The cotton collected from the row unit was in its own statistical group having a very high trash content and low gin turnout. No varietal differences were observed in the data collected from ginning the fiber samples. Even though statistical analysis has not been performed on the 2012 data the trends are very similar to those observed during 2011.

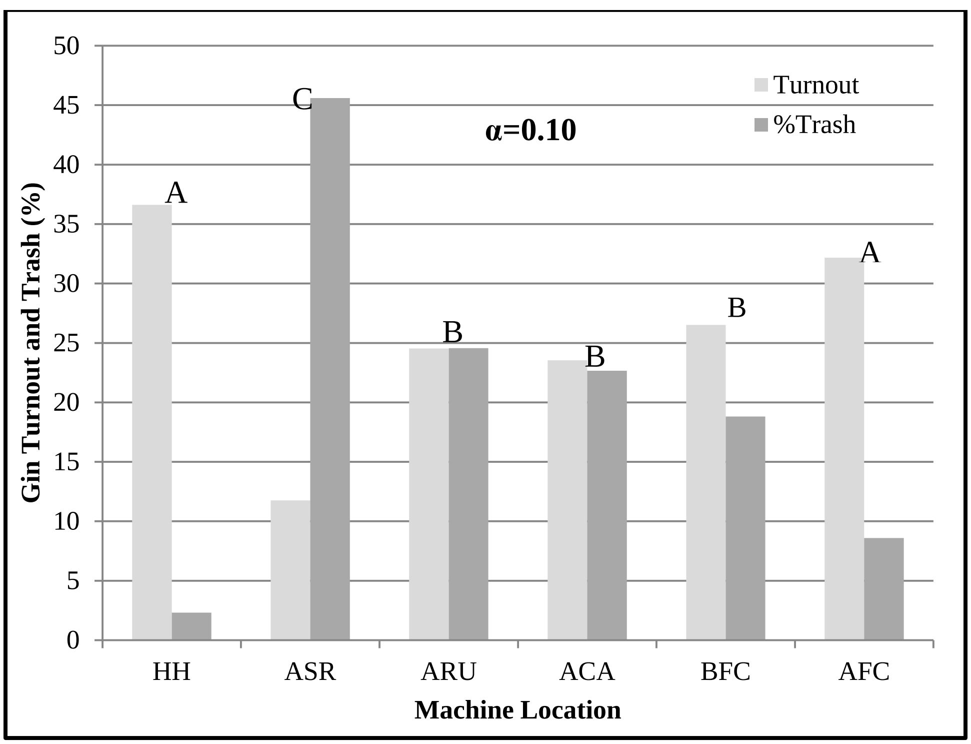

Figure 6. Statistical groupings of 2011 gin data as reported from gin turnout and trash weight.

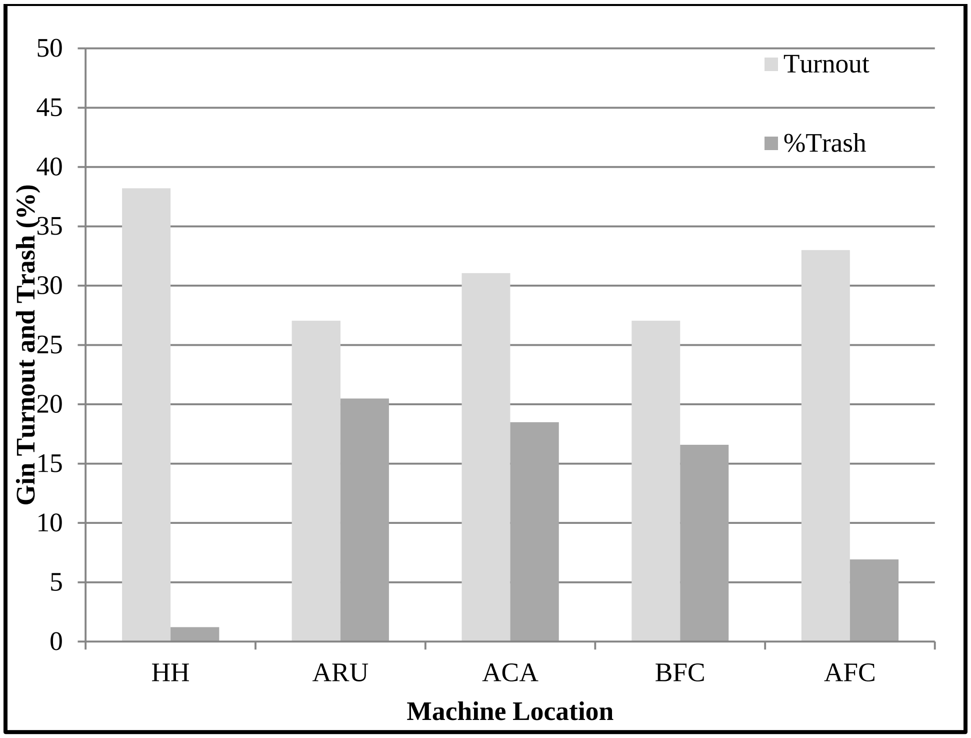

Figure 7. 2012 gin data as reported from gin turnout and trash weight.

The results of hand fractionation analysis on samples collected at each location are shown in Figures 8 and 9 (2011 and 2012 respectively). The bars in the figures represent the total percentage of trash and the contribution from each type of foreign material is illustrated in each bar. Consistent with the rest of the gin data, total trash was reduced throughout the machine. It is apparent that the row unit augers do a very good job of reducing fine trash in the cotton. Once past the row units, burs consistently make up the highest percentage of trash with fine trash falling at a close second. The data shown in Figure 8 indicate that the field cleaner performs well at removing total trash and even in removing fine trash and burrs from the samples. The data represented in this graphs shows that an effort to remove burrs and fine trash is most important since they compose the highest amount of the total trash collected from the fiber samples. The main difference between the data from 2011 and 2012 is in the shift from the secondary percentage of foreign matter being fine trash in 2011 to being mainly burrs in 2012. There was a very large dust storm one day before harvest in 2011 causing the fiber to have an abnormally high amount of fine trash. This was not the case in 2012.

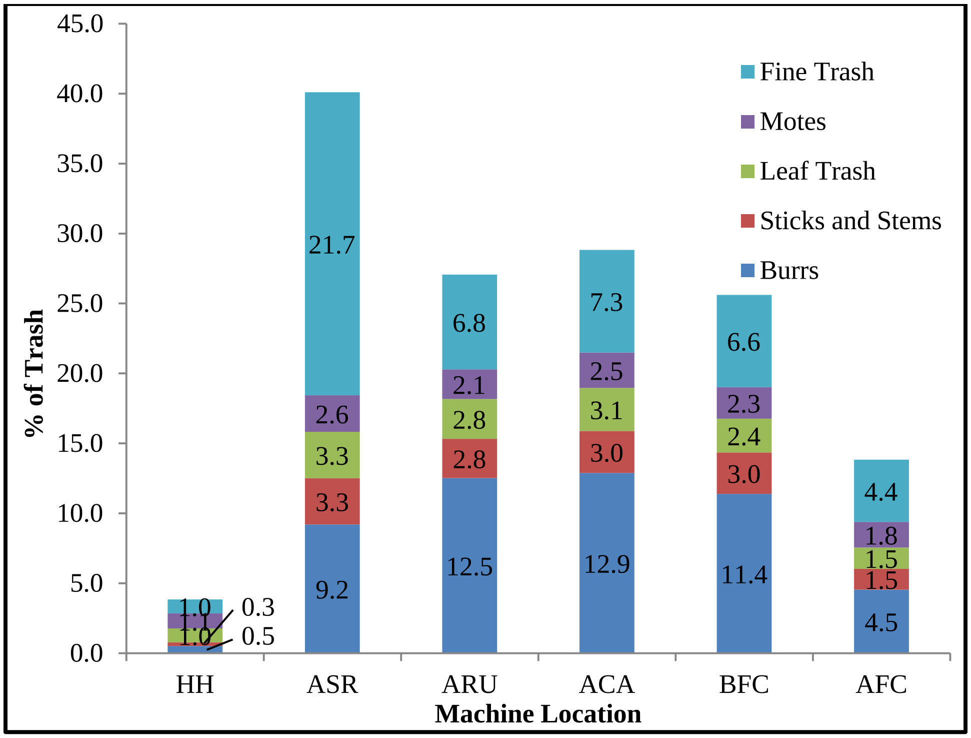

Figure 8. Hand fractionation results 2011.

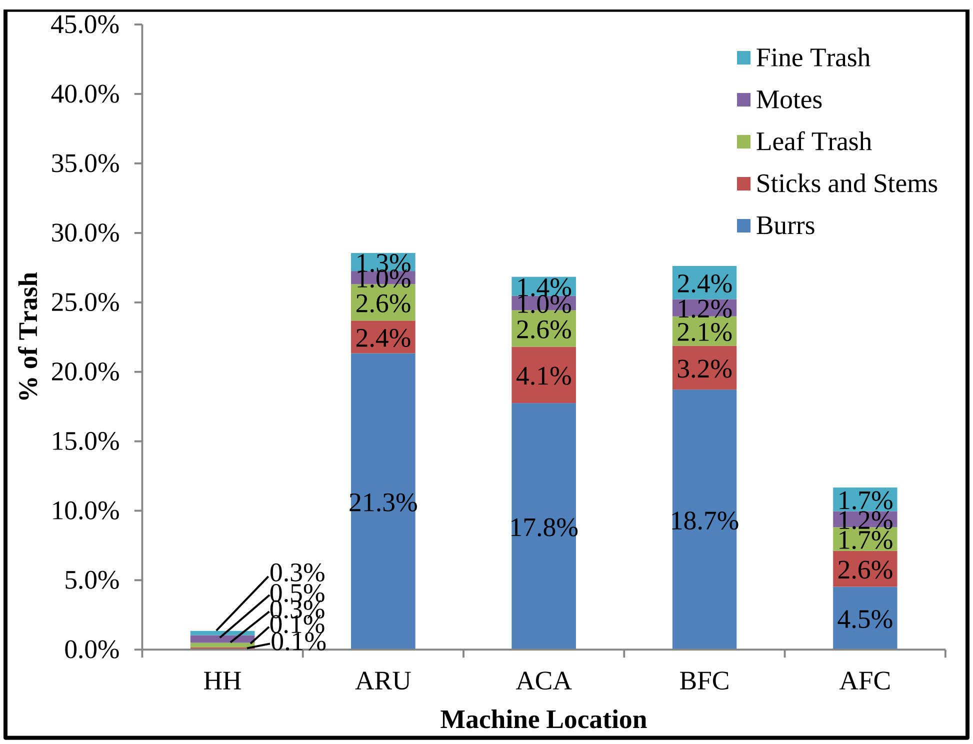

Figure 9. Hand fractionation results 2012.

The Stoneville variety had and average micronaire of approximately 5.2 while the FiberMax had an average micronaire of approximately 4.3 in 2011. In 2012 the Stoneville variety had an average micronaire of 4.0 and the FiberMax had an average of 3.7. Independent of year effect and the varietal differences there is no significant difference in fiber micronaire between machine locations. Micronaire is an estimate of maturity and fineness thus should not be significantly affected by mechanical handling. Therefore the micronaire results are consistent with what is expected.

Leaf grade increased throughout sampling locations HH through ACA because the mechanical action imparted on the cotton during harvesting and conveying causes leaf trash and other foreign material to be broken up and further mixed into the fiber (Figures 10 and 11). The field cleaner removed some of the foreign material contained in the seed cotton and helped to reduce leaf grade. However the final grade of the field cleaned cotton was double that of hand harvested cotton and equivalent to the cotton fiber collected from the row units. The fiber collected from the row units has not been mechanically conveyed through the rest of the machine, thus the leaf trash was not mechanically incorporated into it.

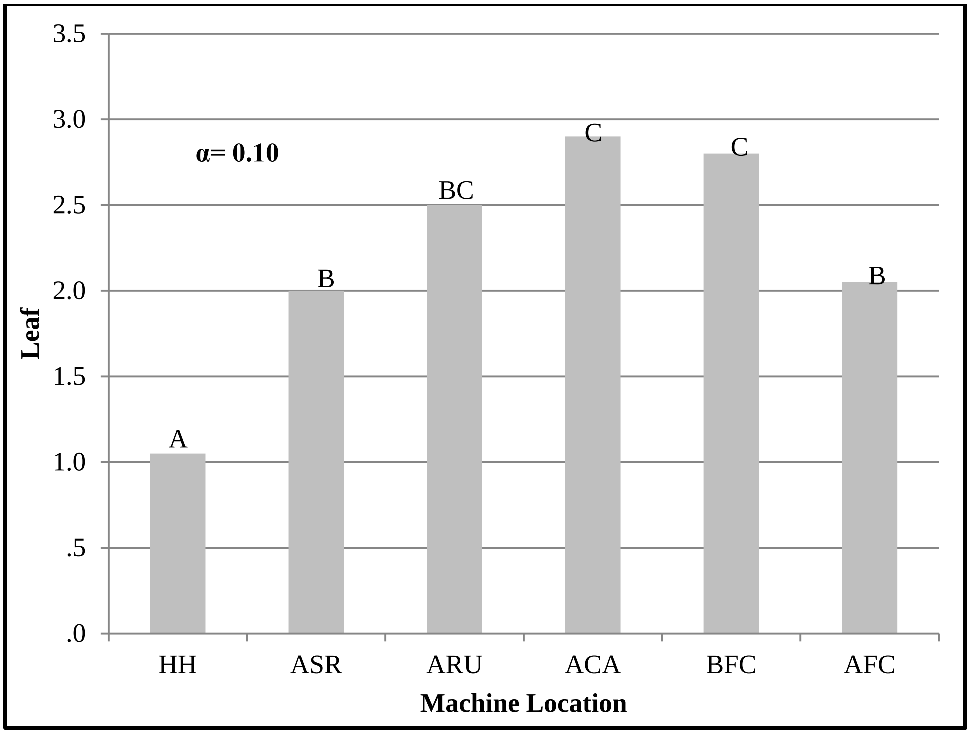

Figure 10. Leaf grade represented by sampling location 2011.

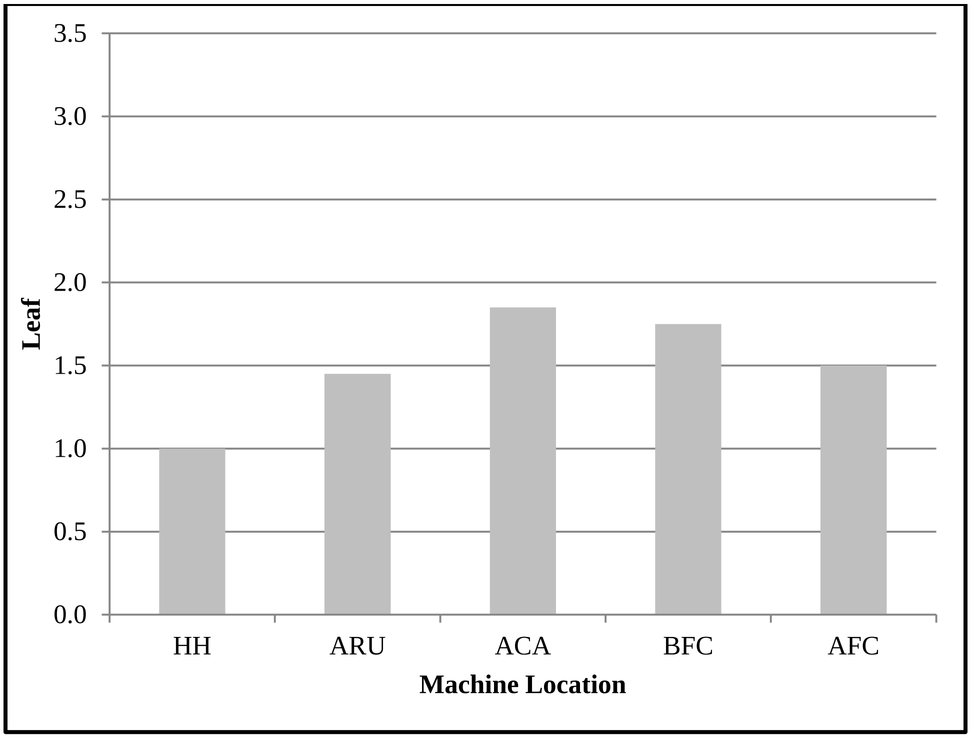

Figure 11. Leaf grade represented by sampling location 2012.

AFIS trash and dust content (Figures 12 and 13) follow similar trends to each other throughout the machine. The levels have a general increase throughout sample locations until the cotton is pneumatically conveyed and then passed through the field cleaner. The pneumatic conveyance of the cotton through the separation duct allows for some of the dust and larger/heavier trash to fall out. The removal of the larger/heavier trash means the green boll separator is doing its designed job function. Even more of the trash and dust was removed when the cotton passed through the field cleaner. However, enough trash and dust was not removed by the field cleaner to lower it back to the level of hand harvested cotton.

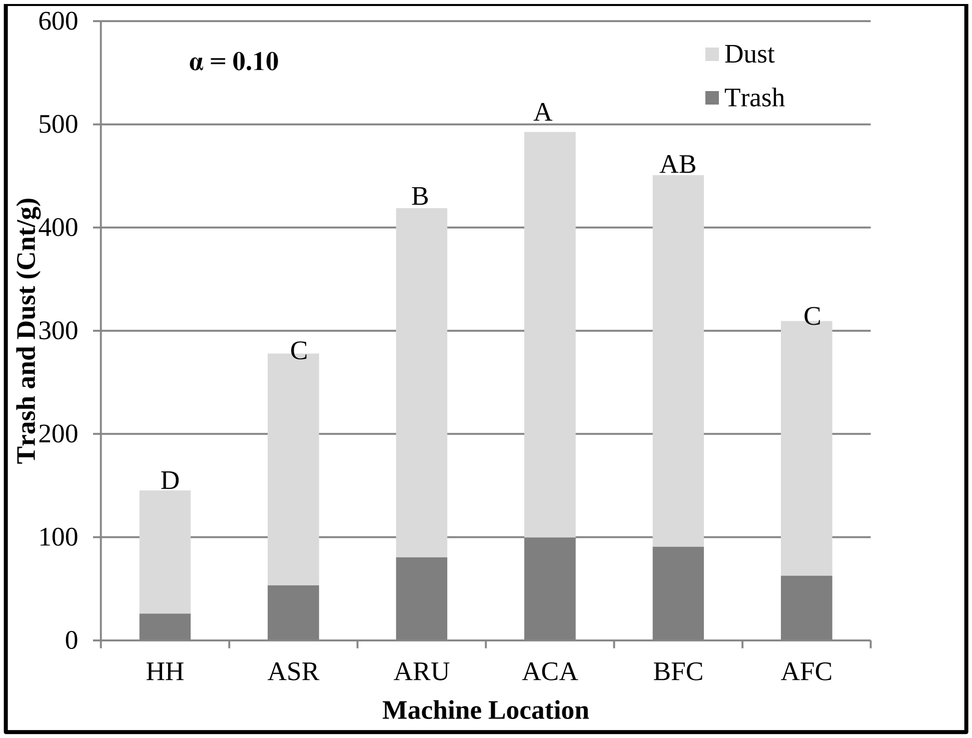

Figure 12. Trash and Dust Content 2011.

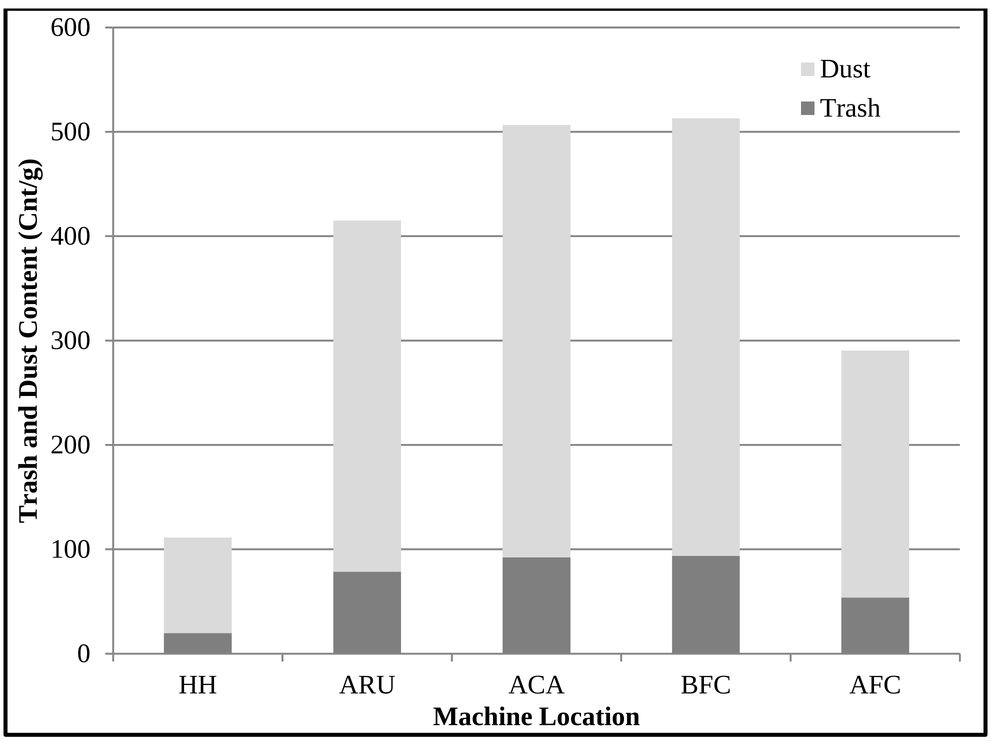

Figure 13. Trash and Dust Content 2012.

Fiber Quality as Affected by Harvesting

Two parameters that would seem to have been affected by mechanical handling of cotton fiber are Nep size and Nep content. However, even though visible differences can be observed no clear statistical correlations with sampling location were observed in either harvest year for the nep size (Figures 14 and 15) or nep content (Figures 16 and 17) data.

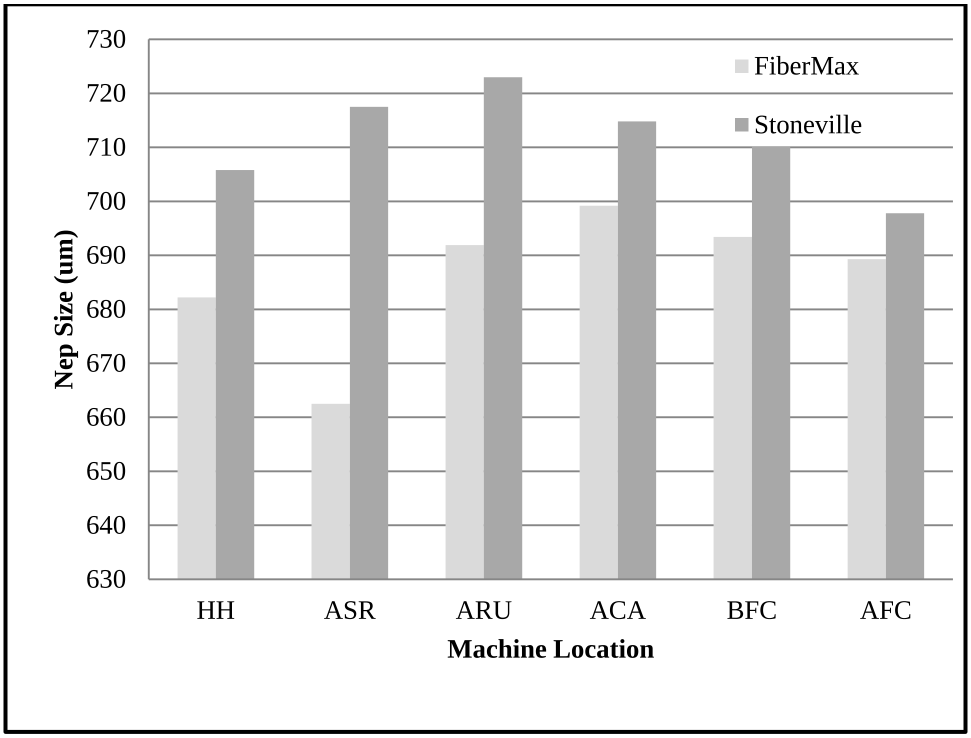

Figure 14. Nep size 2011.

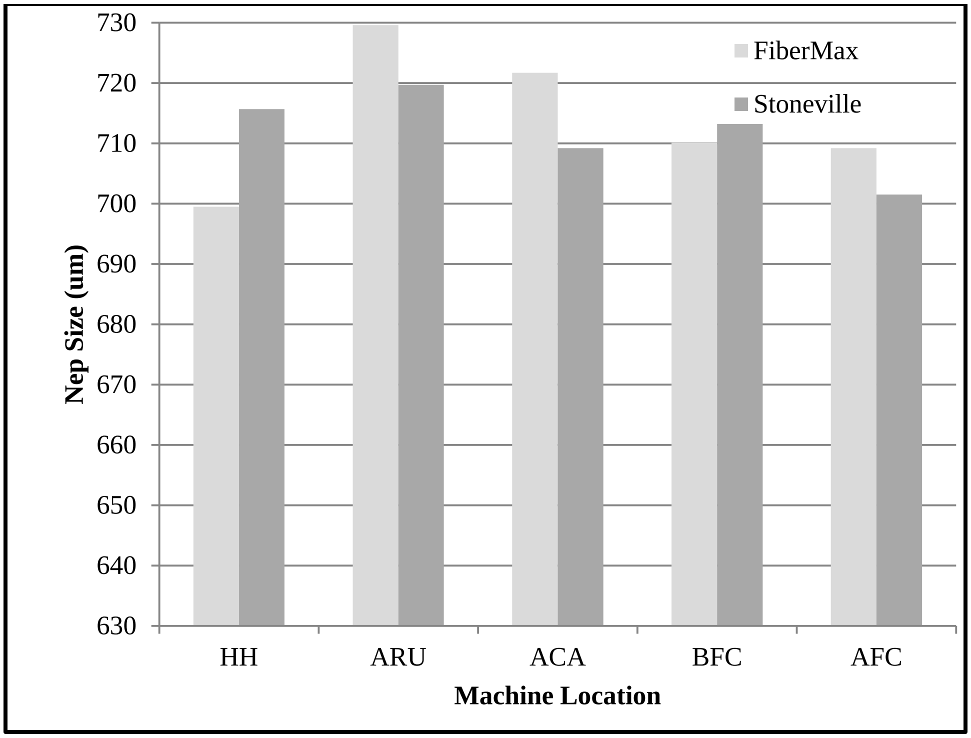

Figure 15. Nep size 2012.

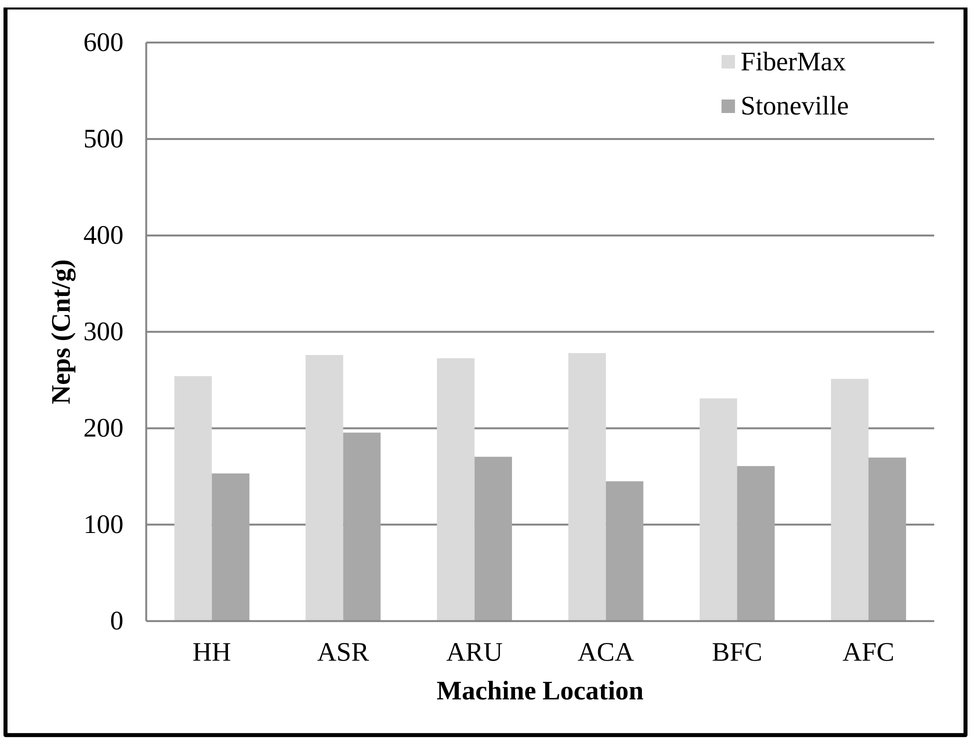

Figure 16. Neps per Gram 2011.

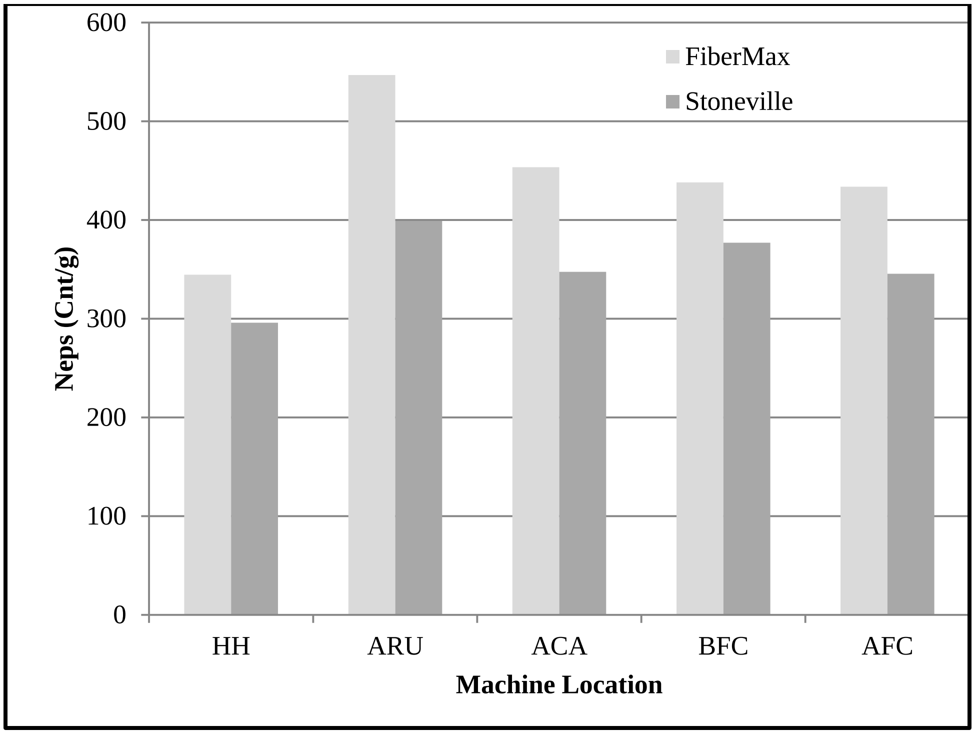

Figure 17. Neps per Gram 2012.

As can be seen below in Figures 18 and 19, fiber length as reported by the HVI has no statistically significant correlation with the machine sample location. The fiber lengths are equally distributed across each of the sample locations with small varietal differences. There were insignificant year effects observed in the fiber length data.

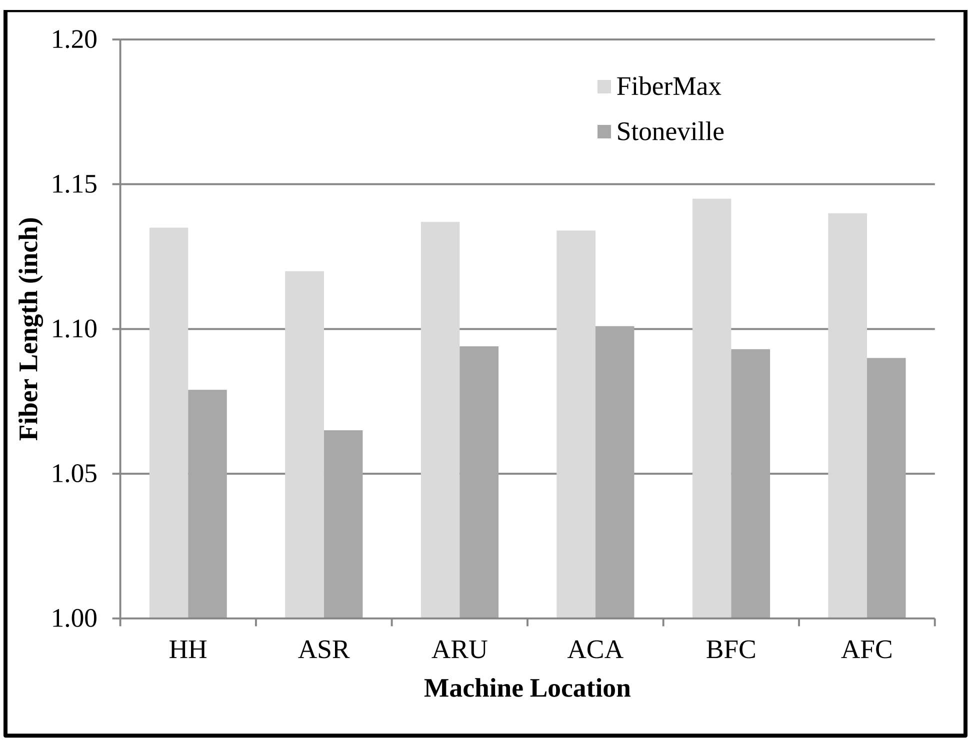

Figure 18. Fiber length as reported by the HVI 2011.

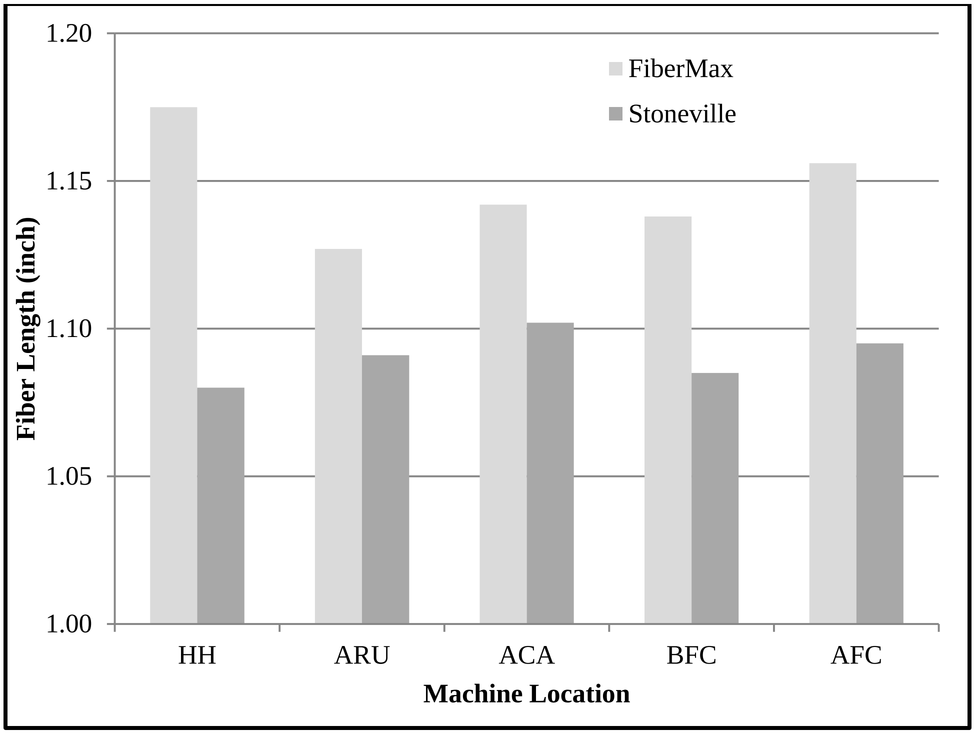

Figure 19. Fiber length as reported by the HVI 2012.

Differences among sample locations were observed for length uniformity (Figures 20 and 21) and strength. There was some variation observed in uniformity between sampling locations. The uniformity tended to increase at later sampling locations, but is not really consistent across locations or years. The uniformity was significantly lower in 2012 and the general trend through the sampling locations was slightly different than that observed in 2011.

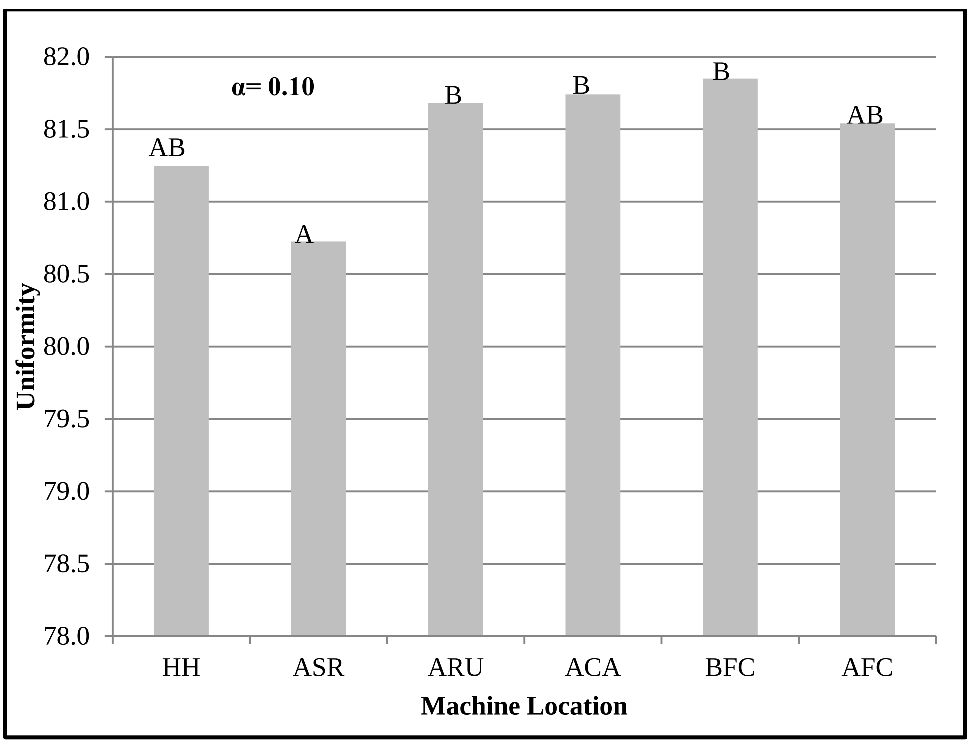

Figure 20. Fiber Uniformity 2011.

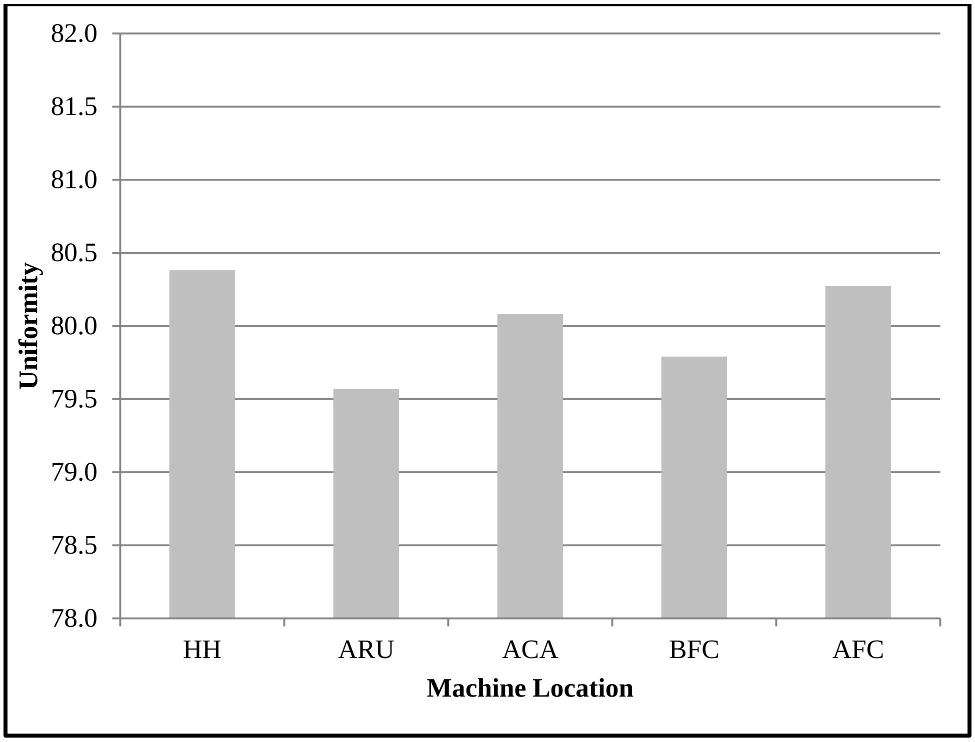

Figure 21. Fiber Uniformity 2012.

Natural variations were observed in the fiber strength as the fiber was conveyed throughout the harvester. The trend does not follow an expected trend where fiber strength would be hypothesized to decrease as the fiber is exposed to more mechanical handling. However, the data show that the fiber strength increases as the fiber is handled until the fiber is moved through the conveyance duct and into the field cleaner. The use of the field cleaner seems to reduce the fiber strength but not back to that observed in the hand harvested samples. One possible explanation for the variation of fiber strength observed is mechanical handling of the fiber is breaking or destroying the weak points in the fibers as seen in the cotton boll. The remaining fibers then have a higher overall strength since the weaker fibers have been removed from the sample at the tested machine locations. The mechanical action of the field cleaner appears to damage and weaken some of the fibers as they are allowed to pass through it. However, this is not confirmed, the differences observed could just be natural variation in the fiber.

Differences were observed among sampling locations for AFIS short fiber content (SFC) by weight (Figures 22 and 23). It was observed that the SFC was higher during the 2012 harvest season. However it is not assumed that the observed differences in SFC are due to machine conveyance and fiber interactions. The variances observed in SFC can be attributed to natural variations in cotton fiber length. The abnormally high level of SFC at machine location two can be attributed to the reduced number of samples collected at this area. It was expected that short fiber content would increase throughout the harvest process as the fibers are handled and exposed to additional mechanical action; however, this trend was not observed.

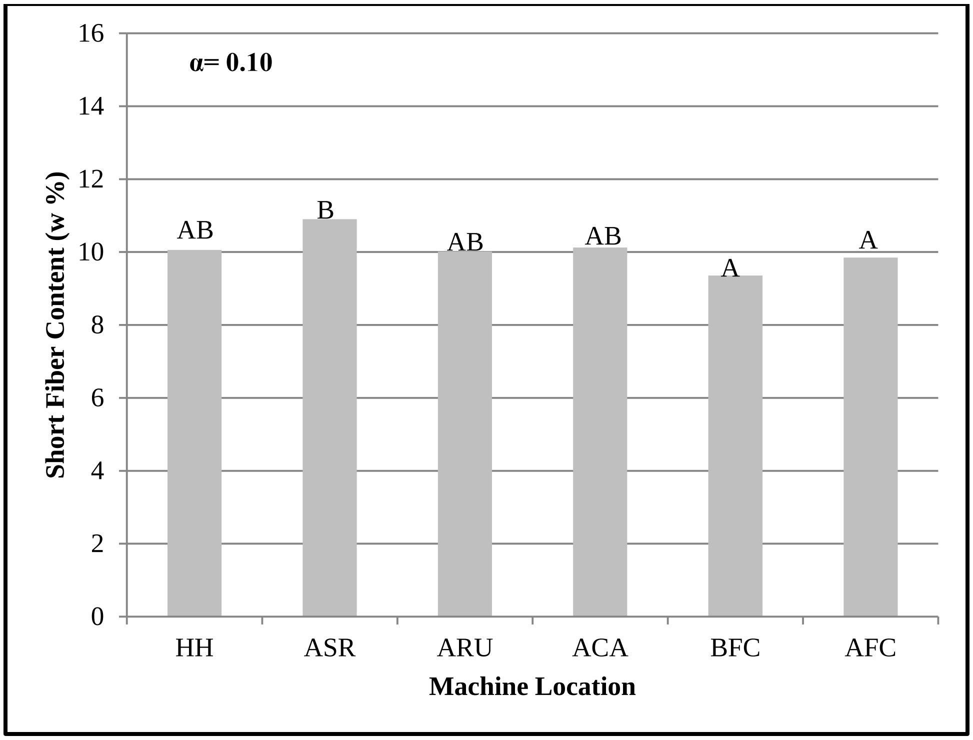

Figure 22. Short Fiber Content 2011.

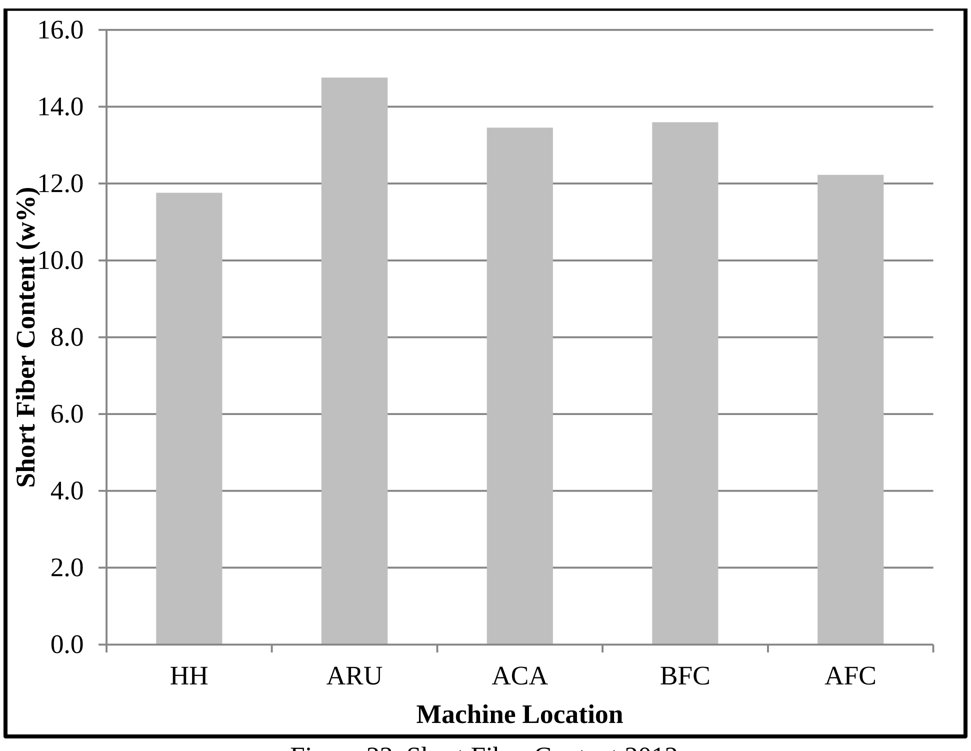

Figure 23. Short Fiber Content 2012.

Summary

The goal of this work was to identify individual components and systems on a cotton stripper harvester that, if redesigned, could improve seed cotton cleanliness and better preserve fiber quality. Two harvest seasons were collected and analyzed for relevant fiber quality parameters. This data has given a very good and accurate foundation for fiber quality and foreign matter content throughout individual cleaning and conveying components on a stripper harvester. Seed cotton samples were hand harvested in the field and collected at five sequential locations on a cotton stripper harvester. The samples were analyzed for foreign matter content and HVI and AFIS fiber quality. Seed cotton total foreign matter content was highest after the stripper rolls before the cotton was conveyed out of the row units by the row unit augers. The row unit augers decreased total foreign matter content in the seed cotton by removing a substantial amount of fine trash comprised mostly of soil and small plant parts. Total foreign matter content remained at a consistent level during conveyance in the cross auger until the harvested seed cotton was processed through the field cleaner. The field cleaner decreased total foreign matter content by removing burs and some fine trash. Leaf grade and AFIS trash and dust content measurements follow similar trends where parameter levels increase on the stripper from the stripper rolls until the inlet to the field cleaner. Leaf grade, AFIS trash, and AFIS dust content were decreased by the field cleaner back to levels observed just after the stripper rolls. HVI and AFIS fiber analysis results indicated that the harvesting and conveying systems on the cotton stripper did not have a detrimental impact on fiber length characteristics or on the formation or size of neps. Year effect was observed between the 2011 and 2012 harvest seasons. However, independent of the year effect very similar trends were observed in a majority of the fiber quality parameters reported in this document, meaning consistency of data collection and analysis is represented. Thus valid conclusions can be drawn about each of the individual components of the machine selected for fiber sampling.

The results of this work indicate that a location between the row units and field cleaner could be selected for potential redesign. Specifically the cross auger and pneumatic conveying system on the stripper could be redesigned to provide additional seed cotton cleaning and fiber quality preservation on the harvester. Pneumatic conveyance of seed cotton requires a substantial amount of engine power that could be reduced if mechanical conveyors were implemented.

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Disclaimer

Mention of trade names or commercial products in this manuscript is solely for the purpose of providing specific information and does not imply recommendation or endorsement by the U.S. Department of Agriculture.

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USING YIELD MONITORS TO EVALUATE COTTON VARIETY TESTS

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Grain yield monitors have successfully been used to harvest variety and hybrid trials when certain guidelines were followed. However, there has been concern regarding cotton yield monitors and the way that they measure flow rate. A Beltwide effort was initiated to assess yield monitor performance in replicated variety trials with the objective of determining the source of yield monitor errors and developing protocols for using yield monitors to accurately harvest cotton variety trials. Data were collected from at least seven trials across six states. The trials were conducted with field scale plots containing at least six varieties. Yield was measured with the yield monitor and a reference scale. The reference scale varied among locations, but was an accepted device to measure variety yield. Other items were measured on each plot to assess potential sources of error between the yield monitor and reference scale. These included lint turnout, moisture content, and average boll mass.

EFFECT OF FIBER MATURITY ON FIBER LENGTH DISTRIBUTION AND YARN EVENNESS PROPERTIES

R. Manandhar[1], E. F. Hequet[1,2], N. Abidi[1], B. Kelly[1], R. K. Boman[3], J. Wanjura[4]

1. Fiber and Biopolymer Research Institute, Plant and Soil Science, Texas Tech University, Lubbock, Texas. 2. Texas A & M AgriLife Research, Lubbock, Texas. 3. Oklahoma State University. 4.USDA-ARS

Abstract

Sixty four commercial bales of cotton were harvested from eight different locations of West Texas from 2008 through 2010. For each location, 4 bales were harvested with a picker harvester and 4 bales with a stripper harvester. Picker harvested cottons were ginned with a picker sequence while stripper harvested cottons were ginned with a stripper sequence. 2008 and 2009 cottons were less mature compared to 2010 cottons. Each bale produced was sampled and the lint was tested on both HVI and AFIS. Then, the lint was processed through our short staple spinning facility to produce carded and combed ring spun yarn (30Ne).The yarns produced were tested on Statimat DS and UT5. The results obtained show that most of the fibers removed during processing (opening, carding, combing) were short and very immature. Therefore, the common hypothesis of independence between fiber length and fiber maturity within-sample needs to be revisited. In most of the cases, HVI testing did not allow us to discriminate between the two harvesting methods while the AFIS did. AFIS provides crucial information that can supplement HVI data and could allow us to better predict yarn quality.

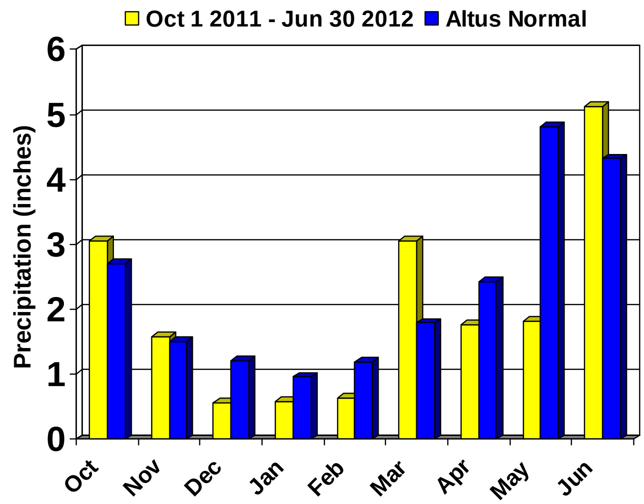
COTTON PROFITABILITY AS INFLUENCED BY CULTIVAR, IRRIGATION AND NITROGEN LEVEL, AND HARVESTING SYSTEM

William Keeling[1], Jeff W. Johnson[2], Chenggang Wang[2] and Randy K. Boman[3]

(1)Texas AgriLife Research, Lubbock, TX, (2)Texas Tech University, Lubbock, TX, (3)Oklahoma State University Southwest REC, Altus, OK

Cotton (*Gossypium hirsutum* L.) is an important crop in the United States that is grown across the country stretching from California in the west to Virginia in the east. Increased production costs, fluctuating market prices, and shifting mill demand has resulted in more uncertainty in the cotton market, increasing the importance of cotton quality with respect to overall profitability. The Texas High Plains (THP) region has historically grown lower yielding and grade cotton that has utilized stripper harvesting methods. Advances in genetics, crop management, and irrigation efficiency have improved the yield and quality of cotton grown in the region. The objectives of this research were to increase profitability through the optimal combination of cultivar selection, irrigation and nitrogen level, and harvesting method at the farm level. Specific objectives were to determine if it is more profitable to adopt a picker harvesting system over the currently used stripper harvesting system, whether an increased irrigation and nitrogen level had an impact on overall profitability, and if choosing a picker type cultivar over a stripper type cultivar would increase gross margin. Yields, cotton prices, and gross margin were estimated for cultivar selection, irrigation and nitrogen levels, and harvesting system. The results from this analysis show that producers can increase their gross margin with higher irrigation levels and proper cultivar selection, but do not benefit from nitrogen levels above recommended practices. Producers in the THP do not necessarily benefit from switching to a picker harvesting system over the traditional stripper harvesting system. This study highlights the importance for producers to effectively manage inputs and their corresponding levels for overall profitability.

Altus Normal (1971-2000) and Mesonet October 2011 – June 2012 Rainfall



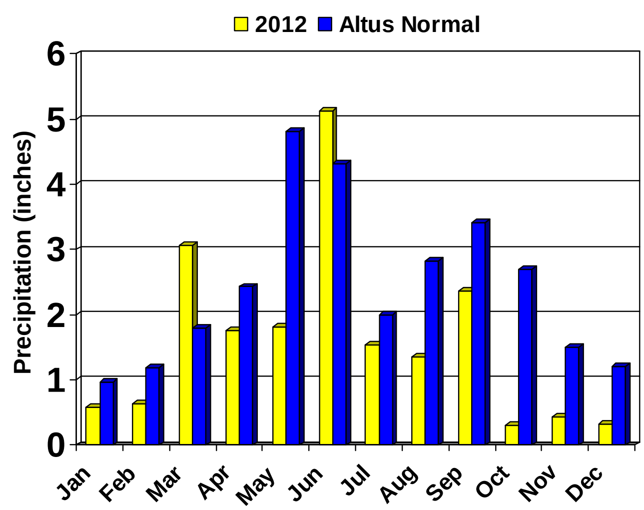
Altus Actual From October 1 – June 30 18.18”

Altus Normal From October 1 – June 30 20.91”

87% of normal

Source: http://agweather.mesonet.org/index.php/data/section/climate

Altus Normal (1971-2000) and Mesonet 2012 Rainfall

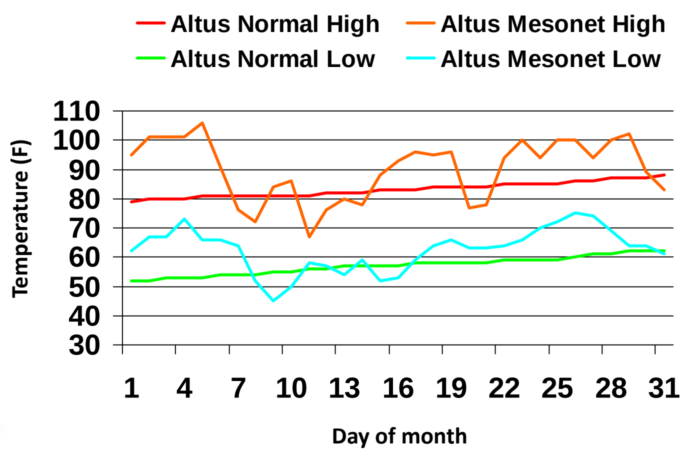


Altus Normal From January 1 – May 31 11.18”

Altus Actual From January 1 – May 31 7.86”
70% of normal

Source: http://agweather.mesonet.org/index.php/data/section/climate

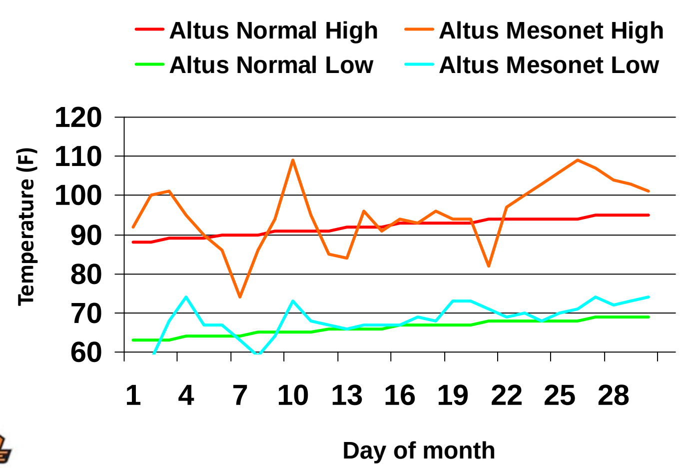
Altus
Normal (1971-2000) and Mesonet
Air Temperatures
May 2012



Heat Units

Normal: 314
2012: 506
% of normal: +61

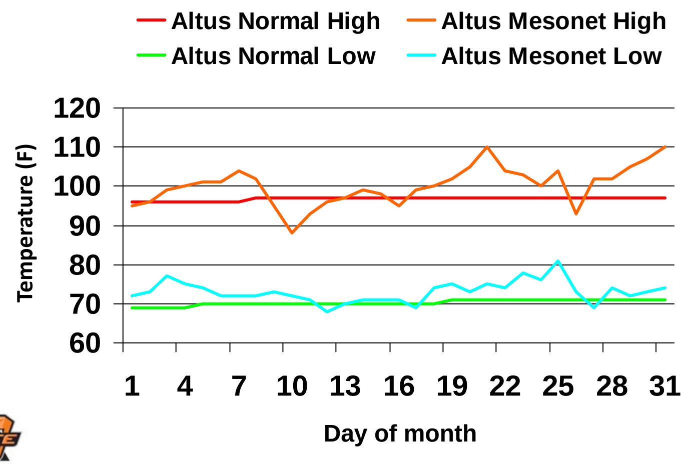
Altus
Normal (1971-2000) and Mesonet
Air Temperatures
June 2012



Heat Units

Normal: 575
2012: 655
% of normal: +14

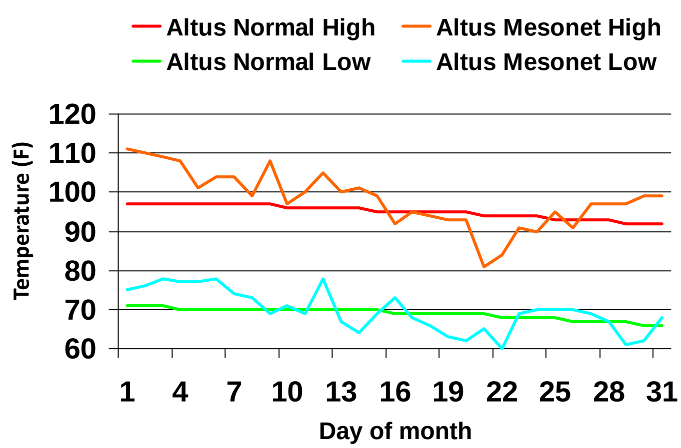
Altus
Normal (1971-2000) and Mesonet
Air Temperatures
July 2012



Heat Units

Normal: 730
2012: 825
% of normal: +13

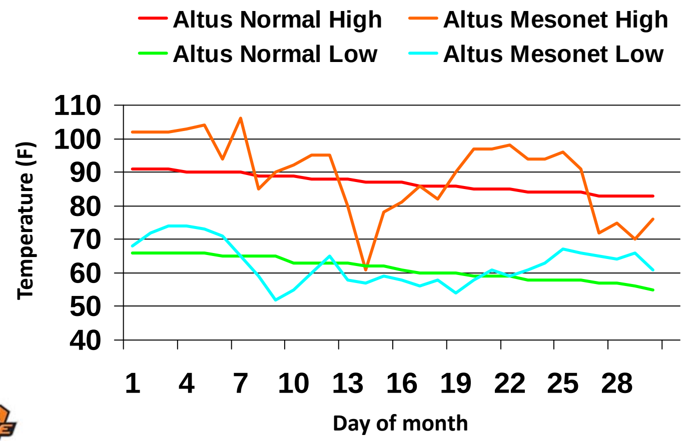
Altus
Normal (1971-2000) and Mesonet
Air Temperatures
August 2012



Heat Units

Normal: 683
2012: 741
% of normal: +8

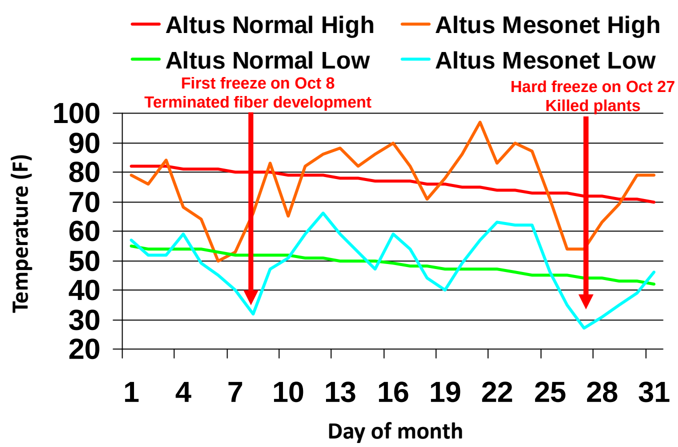
Altus
Normal (1971-2000) and Mesonet
Air Temperatures
September 2012



Heat Units

Normal: 424
2012: 485
% of normal: +14

Altus
Normal (1971-2000) and Mesonet
Air Temperatures
October 2012

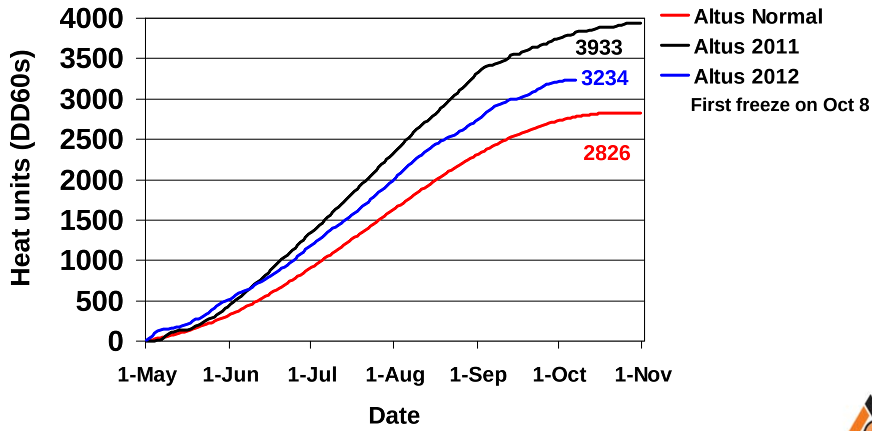


Heat Units

Normal: 102
2012: 24

% of normal through first freeze on Oct 8: - 40

Altus
30-Yr Normal, 2011 and 2012
Cotton Heat Unit Accumulation



MESONET CLIMATOLOGICAL DATA SUMMARY | May 2012 | Time Zone: Midnight-Midnight CST
(FTCB) Fort Cobb | Nearest City: 4.0 NNW Fort Cobb | County: Caddo
Latitude: 35-08-55 | Longitude: 98-27-57 | Elevation: 1385 feet

DAY	TEMPERATURE (F)				DEG DAYS		HUMIDITY (%)			RAIN (in)	PRESSURE (in)		WIND SPEED (mph)			SOLAR (MJ/m2)	4" SOIL TEMPERATURES			
	MAX	MIN	AVG	DEWPT	HDD	CDD	MAX	MIN	AVG		STN	MSL	DIR	AVG	MAX		SOD	BARE	MAX	MIN
1	88	61	74.3	63.4	0	10	91	45	71	0.02	28.30	29.76	SSE	18.7	35.5	24.76	NA	73.5	78	69
2	88	67	76.2	66.1	0	13	90	50	72	0.00	28.31	29.77	SSE	17.8	32.0	26.03	NA	75.3	83	69
3	95	69	80.2	65.6	0	17	86	32	64	0.00	28.35	29.82	SSE	15.1	32.7	25.76	NA	78.9	87	71
4	95	70	79.1	62.6	0	18	88	24	61	0.00	28.36	29.82	SSE	12.0	34.8	17.90	NA	79.1	86	74
5	97	69	82.0	64.9	0	18	77	32	58	0.00	28.30	29.76	SE	16.1	33.0	27.36	NA	81.2	90	73
6	89	68	78.1	61.9	0	14	92	28	62	0.00	28.33	29.79	SSE	11.4	32.1	20.27	NA	81.3	87	77
7	68	62	64.5	55.3	0	0	83	55	72	0.00	28.52	30.00	N	14.2	29.4	8.76	NA	75.6	79	72
8	72	51	63.2	43.3	3	0	80	31	50	0.00	28.61	30.09	NNE	9.2	21.8	19.00	NA	73.6	80	69
9	80	46	64.4	42.0	2	0	90	19	51	0.00	28.57	30.04	NW	4.9	17.5	29.11	NA	75.4	86	66
10	82	48	67.6	44.8	0	0	84	23	49	0.00	28.45	29.91	SE	7.7	26.0	26.34	NA	76.3	84	69
11	66	58	60.3	55.8	3	0	97	56	86	1.36	28.51	29.98	NE	10.1	24.8	2.78	NA	69.1	76	65
12	72	57	63.5	57.4	1	0	97	58	81	0.12	28.70	30.18	NE	9.7	21.9	18.13	NA	67.4	72	64
13	76	56	65.2	54.6	0	1	94	40	71	0.00	28.73	30.21	N	6.5	16.2	26.54	NA	68.5	75	62
14	78	56	66.4	53.8	0	2	94	33	67	0.00	28.66	30.13	ESE	4.3	15.5	21.46	NA	69.7	76	64
15	86	56	70.3	50.9	0	6	92	20	57	0.00	28.59	30.07	WSW	5.5	17.4	28.97	NA	71.5	80	64
16	88	54	71.7	50.8	0	6	90	19	55	0.00	28.56	30.04	ESE	5.3	16.9	28.40	NA	74.8	85	66
17	92	57	75.4	52.3	0	9	89	21	51	0.00	28.46	29.93	SE	10.9	26.5	28.70	NA	76.9	86	68
18	87	64	76.2	54.4	0	11	73	30	49	0.00	28.35	29.81	SSE	18.7	39.6	27.79	NA	77.9	85	72
19	86	63	75.9	61.1	0	10	96	44	61	0.56	28.37	29.84	SSE	20.4	37.7	25.25	NA	78.5	85	73
20	73	60	64.5	59.9	0	1	95	68	86	1.45	28.65	30.13	NNE	7.5	28.7	9.55	NA	71.3	77	69
21	81	61	69.7	60.1	0	6	96	46	73	0.12	28.69	30.17	NE	5.6	18.6	24.43	NA	73.0	81	67
22	88*	62*	73.5*	58.6*	0*	10*	92*	35*	62*	0.00*	28.46*	29.93*	SSE*	11.5*	26.6*	NA	NA	72.6*	78*	68*
23	95	68	81.1	59.9	0	16	78	29	52	0.00	28.11	29.57	SSE	21.3	41.9	28.62	NA	73.7	79	69
24	89	72	78.4	62.3	0	15	85	30	61	0.00	28.09	29.54	S	11.6	34.1	26.00	NA	77.8	85	72
25	93*	72*	82.2*	68.2*	0*	18*	90*	42*	65*	0.00*	28.30*	29.76*	SSE*	19.2*	39.0*	25.96*	NA	79.8	86	74
26	93	73	81.7	64.8	0	18	82	31	59	0.00	28.43	29.90	SSE	16.8	34.6	23.25	NA	81.2	86	77
27	92	71	80.3	62.2	0	17	76	34	55	0.00	28.37	29.84	SSE	19.3	35.9	24.29	NA	80.7	86	76
28	96	69	81.3	62.2	0	18	82	21	56	0.00	28.35	29.81	S	9.1	31.3	27.99	NA	83.9	93	77
29	92	61	76.8	64.4	0	12	92	45	67	0.00	28.38	29.84	SE	9.9	40.5	28.41	83.8	84.6	92	78
30	90	63	75.3	58.7	0	12	89	35	59	0.01	28.35	29.81	SSE	15.3	44.1	21.42	81.3	82.0	87	78
31	78	59	69.3	53.2	0	4	84	32	59	0.00	28.46	29.93	NNE	12.7	35.4	26.28	79.7	80.2	86	75
	85*	62*	73.2*	57.9*	<- Monthly Averages ->						28.44*	29.91*	SSE*	12.2*	44.1*	23.32*	81.6*	76.3*	83*	71*

Temperature - Highest: 97*
Lowest: 46*

Degree Days - Total HDD: 9*
Total CDD: 278*

Rainfall: Monthly Total: 3.64* in.
Greatest 24 Hr: 1.45* in.

Humidity - Highest: 97*
Lowest: 19*

Number of Days With:
Tmax ≥ 90: 11* Rainfall ≥ 0.01 inch: 7*
Tmax ≤ 32: 0* Rainfall ≥ 0.10 inch: 5*
Tmin ≤ 32: 0* Avg Wind Speed ≥ 10 mph: 19*
Tmin ≤ 0: 0* Max Wind Speed ≥ 30 mph: 17*

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Monthly data generated on Tuesday, July 31, 2012 at 14:14 UTC

MESONET CLIMATOLOGICAL DATA SUMMARY   June   2012   Time Zone: Midnight-Midnight CST
(FTCB) Fort Cobb   Nearest City: 4.0 NNW Fort Cobb   County: Caddo
Latitude: 35-08-55   Longitude: 98-27-57   Elevation: 1385 feet

DAY	TEMPERATURE (F) MAX	MIN	AVG	DEWPT	DEG DAYS HDD	CDD	HUMIDITY (%) MAX	MIN	AVG	RAIN (in)	PRESSURE (in) STN	MSL	WIND SPEED (mph) DIR	AVG	MAX	SOLAR (MJ/m2)	4" SOIL TEMPERATURES SOD	BARE	MAX	MIN
1	76	57	64.1	50.6	0	2	79	41	62	0.00	28.51	29.98	E	9.6	26.8	19.84	77.1	77.6	82	74
2	88	56	72.6	58.6	0	7	87	39	64	0.00	28.40	29.87	E	8.6	20.5	27.12	79.2	79.9	88	72
3	92	64	78.5	66.5	0	13	94	45	69	0.05	28.35	29.82	SSE	10.6	38.7	24.23	81.2	82.4	88	76
4	88	70	78.8	66.5	0	14	86	46	67	0.00	28.39	29.86	ESE	9.6	25.7	20.84	82.2	83.4	90	79
5	91	68	74.8	66.0	0	14	94	39	77	0.12	28.38	29.84	E	7.5	36.0	17.78	81.3	82.8	90	79
6	77	66	70.7	66.2	0	6	94	70	86	0.02	28.41	29.87	ESE	8.6	28.0	13.83	77.7	78.3	82	76
7	75	62	68.0	62.0	0	3	95	56	82	0.02	28.55	30.02	E	8.9	24.5	16.54	75.8	76.5	81	73
8	83	55	71.3	58.0	0	4	96	40	66	0.00	28.51	29.99	SE	7.2	20.8	29.18	77.6	79.0	88	71
9	90	61	76.7	63.3	0	11	92	42	66	0.00	28.32	29.78	SSE	14.0	33.0	27.43	79.7	81.3	88	75
10	97	73	83.5	66.5	0	20	80	32	59	0.00	28.21	29.67	SSE	18.7	38.0	27.28	82.3	83.6	90	78
11	91	70	80.2	68.3	0	15	94	35	69	0.00	28.40	29.87	NE	10.8	27.6	20.45	83.0	84.3	90	80
12	83	67	74.7	63.7	0	10	91	40	70	0.07	28.60	30.08	ESE	9.4	34.9	17.33	80.1	81.6	86	79
13	81	67	73.1	65.1	0	9	92	57	77	0.31	28.49	29.96	SE	13.0	55.7	18.85	77.3	78.3	82	74
14	94	69	80.8	68.8	0	16	92	43	70	0.00	28.39	29.86	SSE	15.3	35.7	25.53	79.5	80.5	88	74
15	89	66	78.1	66.2	0	13	91	47	69	0.00	28.47	29.94	SE	12.6	28.0	25.80	82.1	83.3	90	77
16	94	71	79.1	67.8	0	17	90	37	71	0.00	28.52	29.99	SE	9.9	34.2	21.22	83.5	84.7	92	79
17	92	70	79.5	65.6	0	16	96	32	66	0.00	28.44	29.91	SSE	10.9	40.1	22.46	83.2	84.4	90	80
18	94	68	81.1	65.4	0	16	93	40	62	0.00	28.29	29.75	SSE	18.2	35.7	29.14	83.8	84.9	91	79
19	91	72	81.4	65.6	0	17	86	40	61	0.00	28.33	29.80	SSE	20.8	42.0	28.20	84.7	85.7	91	81
20	90	74	80.8	67.4	0	17	85	44	66	0.00	28.42	29.88	SSE	19.4	36.5	18.88	84.1	85.0	89	82
21	78	68	71.8	68.1	0	8	97	72	88	2.77	28.57	30.05	SSE	7.5	26.2	8.14	77.0	79.1	84	76
22	89	69	78.5	70.0	0	14	97	51	77	0.00	28.51	29.99	ESE	5.8	12.9	24.49	80.6	80.7	88	74
23	95	70	83.2	66.1	0	18	94	32	60	0.00	28.43	29.89	SSE	11.9	25.3	29.53	81.3	80.7	85	76
24	98	68	83.6	62.8	0	18	88	26	54	0.00	28.48	29.95	SSE	7.6	19.8	29.25	81.6	81.3	89	74
25	101	70	85.9	63.6	0	20	87	23	53	0.00	28.45	29.91	SE	5.3	12.7	29.15	83.5	85.5	96	76
26	104	68	86.9	63.0	0	21	86	20	50	0.00	28.37	29.83	SE	6.8	15.8	28.90	85.2	88.8	98	80
27	101	74	87.1	67.3	0	23	86	29	55	0.00	28.43	29.90	SE	10.6	24.6	28.32	86.3	90.1	98	83
28	101	70	86.9	61.0	0	21	77	22	45	0.00	28.50	29.97	SSE	11.3	24.9	28.78	86.8	89.9	97	83
29	99	70	86.0	59.9	0	19	77	22	44	0.00	28.45	29.92	S	12.0	25.1	29.17	87.6	90.3	97	84
30	96	70	83.9	64.3	0	18	85	27	55	0.00	28.40	29.87	SE	10.7	24.4	28.82	88.3	90.6	97	84
	91	67	78.7	64.5	<- Monthly Averages ->						28.43	29.90	SSE	11.1	55.7	23.88	81.8	83.1	89	78

Temperature - Highest: 104
Lowest: 55

Degree Days - Total HDD: 0
Total CDD: 420

Rainfall: Monthly Total: 3.36 in.
Greatest 24 Hr: 2.77 in.

Humidity - Highest: 97
Lowest: 20

Number of Days With:
Tmax ≥ 90: 19   Rainfall ≥ 0.01 inch: 7
Tmax ≤ 32: 0   Rainfall ≥ 0.10 inch: 3
Tmin ≤ 32: 0   Avg Wind Speed ≥ 10 mph: 16
Tmin ≤ 0: 0   Max Wind Speed ≥ 30 mph: 12

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* Denotes incomplete record

Monthly data generated on Thursday, August 30, 2012 at 14:15 UTC

MESONET CLIMATOLOGICAL DATA SUMMARY July 2012 Time Zone: Midnight-Midnight CST
(FTCB) Fort Cobb Nearest City: 4.0 NNW Fort Cobb County: Caddo
Latitude: 35-08-55 Longitude: 98-27-57 Elevation: 1385 feet

DAY	TEMPERATURE (F) MAX	MIN	AVG	DEWPT	DEG DAYS HDD	CDD	HUMIDITY (%) MAX	MIN	AVG	RAIN (in)	PRESSURE (in) STN	MSL	WIND SPEED (mph) DIR	AVG	MAX	SOLAR (MJ/m2)	4" SOIL TEMPERATURES SOD	BARE	MAX	MIN
1	92	70	82.4	65.4	0	16	87	38	58	0.00	28.48	29.95	SSE	11.4	28.0	29.75	88.5	90.7	97	85
2	91	73	82.6	65.7	0	17	80	40	58	0.00	28.51	29.98	S	13.5	29.1	24.02	87.8	89.6	94	85
3	94	75	84.2	63.0	0	19	75	25	52	0.00	28.48	29.95	SSE	13.7	33.8	27.28	88.1	89.9	96	85
4	96	74	85.0	64.3	0	20	77	31	52	0.00	28.46	29.93	SSE	12.7	26.8	26.64	88.5	90.4	96	85
5	97	75	85.6	63.2	0	21	68	29	49	0.00	28.50	29.97	SSE	11.4	24.2	27.03	88.7	91.0	97	85
6	97	72	85.4	61.8	0	19	75	26	48	0.00	28.53	30.00	SSE	7.8	19.9	28.38	89.6	92.3	100	86
7	97	70	83.5	64.5	0	19	83	26	56	0.00	28.55	30.03	ESE	6.3	22.4	24.29	89.6	92.4	99	87
8	95	69	82.6	64.1	0	17	90	29	58	0.00	28.54	30.02	ESE	6.0	22.2	26.40	89.5	92.6	99	86
9	95	72	80.8	68.2	0	18	89	35	68	0.00	28.52	30.00	NNE	8.8	26.2	23.08	89.3	92.2	98	87
10	89	72	78.5	69.1	0	15	92	50	75	0.10	28.54	30.01	NNE	9.8	29.3	22.63	87.9	90.2	96	87
11	94	70	80.9	62.3	0	17	93	27	58	0.00	28.53	30.00	NNE	6.5	18.7	27.01	86.5	88.8	97	82
12	95	66	81.0	61.6	0	16	91	24	57	0.00	28.51	29.98	E	4.9	16.7	28.17	87.5	91.0	99	84
13	95	68	82.4	63.5	0	16	90	25	57	0.00	28.53	30.00	SE	5.3	16.5	27.32	88.6	92.8	100	86
14	96	68	82.6	64.1	0	17	89	30	57	0.00	28.54	30.01	SE	6.3	24.1	26.76	89.3	93.5	101	87
15	94	67	80.8	63.2	0	16	89	30	59	0.00	28.52	30.00	ESE	7.6	21.0	28.09	89.2	93.3	100	87
16	92	69	80.9	64.0	0	16	92	32	60	0.00	28.47	29.93	SSE	10.4	27.0	26.22	88.9	92.5	98	87
17	95	70	83.1	62.8	0	18	84	28	54	0.00	28.44	29.91	SSE	11.6	39.2	27.38	88.7	91.9	98	87
18	98	71	86.0	63.8	0	19	86	28	51	0.00	28.49	29.96	S	9.1	24.7	26.55	89.4	92.8	99	87
19	102	74	87.5	60.9	0	23	74	20	45	0.00	28.54	30.02	SSW	7.2	21.4	28.66	90.5	94.4	101	88
20	105	73	89.3	59.7	0	24	73	16	41	0.00	28.53	30.01	WSW	5.3	15.4	27.75	91.6	95.7	103	89
21	102	71	87.0	57.5	0	22	83	14	42	0.00	28.51	29.98	ENE	7.7	24.1	28.81	91.7	95.7	102	90
22	98	74	86.0	63.0	0	21	68	27	48	0.00	28.52	29.99	ESE	8.8	25.7	27.70	91.2	95.1	101	90
23	98	78	86.3	64.8	0	23	71	31	51	0.00	28.54	30.02	SSE	12.2	26.2	26.77	91.4	94.8	100	90
24	96	75	85.6	64.3	0	21	74	31	51	0.00	28.49	29.96	SSE	12.6	27.4	26.37	91.1	94.1	99	89
25	99*	80*	89.3*	62.3*	0*	24*	61*	25*	43*	0.00*	28.37*	29.83*	S *	15.3*	31.6*	NA	91.4*	94.2*	99*	90*
26	97	74	86.2	63.4	0	21	73	30	48	0.00	28.41	29.87	WSW	8.4	23.9	19.00	91.1	93.6	99	89
27	99	68	84.1	64.7	0	18	89	28	56	0.00	28.53	30.00	SSE	6.2	21.1	26.01	91.2	94.3	101	88
28	99	72	87.0	64.5	0	21	89	24	51	0.00	28.58	30.06	S	7.7	22.4	26.45	92.1	95.4	101	90
29	102	74	89.2	57.8	0	23	66	18	37	0.00	28.53	30.00	S	7.7	22.5	26.91	92.3	95.8	102	90
30	103	73	89.3	55.6	0	23	65	16	34	0.00	28.47	29.94	S	8.2	18.6	27.49	92.4	96.0	103	90
31	107	72	91.4	55.8	0	25	73	14	34	0.00	28.44	29.91	SSE	7.2	18.6	26.85	93.1	96.8	104	90
	97*	72*	84.7*	62.9*	<- Monthly Averages ->						28.50*	29.97*	SSE*	8.9*	39.2*	26.53*	89.9*	93.0*	99*	87*

Temperature - Highest: 107*
Lowest: 66*

Degree Days - Total HDD: 0*
Total CDD: 605*

Rainfall: Monthly Total: 0.10* in.
Greatest 24 Hr: 0.10* in.

Humidity - Highest: 93*
Lowest: 14*

Number of Days With:
Tmax ≥ 90: 30* Rainfall ≥ 0.01 inch: 1*
Tmax ≤ 32: 0* Rainfall ≥ 0.10 inch: 1*
Tmin ≤ 32: 0* Avg Wind Speed ≥ 10 mph: 10*
Tmin ≤ 0: 0* Max Wind Speed ≥ 30 mph: 3*

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Monthly data generated on Sunday, September 30, 2012 at 14:10 UTC

MESONET CLIMATOLOGICAL DATA SUMMARY   August 2012   Time Zone: Midnight-Midnight CST
(FTCB) Fort Cobb   Nearest City: 4.0 NNW Fort Cobb   County: Caddo
Latitude: 35-08-55   Longitude: 98-27-57   Elevation: 1385 feet

DAY	TEMPERATURE (F) MAX	MIN	AVG	DEWPT	DEG DAYS HDD	CDD	HUMIDITY (%) MAX	MIN	AVG	RAIN (in)	PRESSURE (in) STN	MSL	WIND SPEED (mph) DIR	AVG	MAX	SOLAR (MJ/m2)	4" SOIL TEMPERATURES SOD	BARE	MAX	MIN
1	109	74	92.0	57.4	0	26	68	13	35	0.00	28.39	29.85	S	6.6	18.9	27.42	94.0	98.0	105	91
2	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.00	28.31	29.78	SSW	9.7	25.7	27.85	94.4	98.2	104	92
3	106	80	94.0	54.0	0	28	50	14	28	0.00	28.30	29.77	S	12.8	28.7	25.55	94.0	97.1	102	92
4	105	81	92.8	58.8	0	28	53	19	34	0.00	28.42	29.89	SSW	11.6	24.8	26.43	94.4	97.2	103	92
5	97	74	84.6	63.3	0	21	74	30	51	0.00	28.65	30.13	NE	9.2	25.4	25.33	94.2	96.7	103	91
6	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.00	28.58	30.05	E	5.1	15.5	20.61	93.6	96.2	102	91
7	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.68	28.48	29.95	SE	9.0	34.6	23.74	91.5	93.9	100	89
8	98	72	84.0	64.3	0	20	84	25	55	0.00	28.50	29.97	NNE	6.5	28.4	26.08	88.2	89.7	98	82
9	100	69	86.0	60.8	0	20	91	22	49	0.00	28.48	29.95	NNE	8.9	21.3	26.01	87.3	91.4	100	83
10	91	69	79.8	54.8	0	15	68	23	45	0.00	28.54	30.02	NE	8.9	21.4	25.04	85.6	89.9	97	83
11	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.00	28.50	29.97	SE	8.0	20.5	24.40	85.7	89.3	97	82
12	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.00	28.45	29.91	N	8.6	28.8	23.62	87.5	91.0	99	85
13	93	64	79.6	55.4	0	14	78	23	46	0.00	28.56	30.03	NNE	6.7	17.5	25.76	87.7	90.9	99	84
14	90	66	76.4	58.5	0	13	83	34	56	0.00	28.46	29.93	ESE	10.4	27.6	12.65	84.9	87.2	91	84
15	95	68	81.6	66.2	0	17	96	33	64	0.00	28.41	29.88	SSE	10.4	27.0	23.20	86.2	88.2	95	82
16	94*	75*	83.1*	64.4*	0*	19*	77*	35*	55*	0.00*	28.49*	29.96*	SSE*	10.3*	32.1*	NA	87.4*	89.3*	95*	85*
17	89	67	76.8	54.1	0	13	54	33	46	0.00	28.55	30.02	NE	8.4	22.1	20.40	86.3	88.2	94	83
18	76	64	70.6	61.3	0	5	95	47	74	0.80	28.47	29.94	E	8.1	37.5	10.26	81.6	82.6	88	77
19	85	59	72.6	55.3	0	7	98	26	61	0.00	28.52	29.99	N	7.6	21.6	26.80	78.9	77.0	82	73
20	87	60	74.1	52.3	0	8	83	20	50	0.11	28.54	30.02	ENE	5.6	15.8	25.02	79.2	78.5	88	70
21	83	65	72.3	62.2	0	9	92	47	72	0.00	28.59	30.07	S	5.9	18.2	22.15	79.9	80.1	87	75
22	84	58	72.5	61.8	0	6	99	49	72	0.00	28.59	30.07	SSE	8.2	22.4	19.18	77.9	79.4	86	73
23	88	69	77.6	61.5	0	13	80	42	58	0.00	28.51	29.98	SSE	12.6	25.5	14.03	77.8	79.8	85	75
24	86	69	77.9	67.1	0	13	93	53	71	0.38	28.40	29.87	SSE	13.4	29.1	15.80	78.0	78.7	82	76
25	90	70	78.1	68.0	0	15	97	50	72	1.11	28.36	29.83	SSE	11.5	56.0	17.35	77.8	78.5	85	74
26	90	68	78.2	69.0	0	14	97	40	76	0.01	28.53	30.00	ESE	3.5	10.7	25.00	80.5	81.3	89	75
27	90	69	79.0	67.3	0	14	96	42	70	0.00	28.61	30.09	NE	6.7	20.8	25.08	82.5	81.4	86	77
28	90	69	78.5	61.5	0	14	83	28	59	0.00	28.59	30.06	NE	8.7	22.4	25.50	81.2	80.0	87	74
29	90	61	76.1	54.8	0	11	85	24	53	0.00	28.51	29.98	ENE	6.3	22.1	25.31	79.6	80.2	89	72
30	92	60	77.3	57.8	0	11	81	30	55	0.00	28.43	29.90	NE	7.2	23.7	25.34	78.7	81.5	90	73
31	96	66	80.7	60.9	0	16	88	26	56	0.00	28.45	29.92	NNW	5.3	18.1	24.93	80.7	84.8	93	77
	92*	68*	79.9*	60.5*	<- Monthly Averages ->						28.49*	29.96*	SSE*	8.4*	56.0*	22.86*	85.1*	87.0*	94*	81*

Temperature - Highest: 109*
Lowest: 58*

Degree Days - Total HDD: 0*
Total CDD: 391*

Rainfall: Monthly Total: 3.09* in.
Greatest 24 Hr: 1.11* in.

Humidity - Highest: 99*
Lowest: 13*

Number of Days With:
Tmax ≥ 90: 18*   Rainfall ≥ 0.01 inch: 6*
Tmax ≤ 32: 0*   Rainfall ≥ 0.10 inch: 5*
Tmin ≤ 32: 0*   Avg Wind Speed ≥ 10 mph: 8*
Tmin ≤ 0: 0*   Max Wind Speed ≥ 30 mph: 4*

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* Denotes incomplete record

Monthly data generated on Wednesday, October 31, 2012 at 14:09 UTC

MESONET CLIMATOLOGICAL DATA SUMMARY September 2012 Time Zone: Midnight-Midnight CST
(FTCB) Fort Cobb Nearest City: 4.0 NNW Fort Cobb County: Caddo
Latitude: 35-08-55 Longitude: 98-27-57 Elevation: 1385 feet

DAY	TEMPERATURE (F) MAX	MIN	AVG	DEWPT	DEG DAYS HDD	CDD	HUMIDITY (%) MAX	MIN	AVG	RAIN (in)	PRESSURE (in) STN	MSL	WIND SPEED (mph) DIR	AVG	MAX	SOLAR (MJ/m2)	4" SOIL TEMPERATURES SOD	BARE	MAX	MIN
1	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.00	28.51	29.98	ESE	4.4	12.1	24.24	82.8	86.9	95	79
2	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.00	28.46	29.93	S	6.5	20.8	20.11	83.1	87.2	93	81
3	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.00	28.44	29.90	S	7.8	19.3	20.89	84.0	88.3	95	82
4	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.00	28.41	29.87	SE	6.4	26.6	19.28	84.9	89.0	96	83
5	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.00	28.41	29.87	SE	7.7	46.3	19.87	85.6	89.4	97	84
6	95	70	80.9	65.3	0	17	90	31	62	0.12	28.45	29.92	S	6.9	29.4	22.59	85.3	88.6	97	81
7	99	67	79.8	61.4	0	18	81	26	57	0.02	28.44	29.91	NNE	13.1	42.4	17.30	83.2	86.8	91	83
8	83	54	70.0	46.3	0	3	73	21	47	0.00	28.69	30.17	N	8.9	25.3	25.10	80.3	83.1	90	77
9	89	49	70.2	44.9	0	4	89	16	47	0.00	28.66	30.13	NW	4.2	12.6	24.61	79.7	81.9	91	74
10	89	55	72.3	46.9	0	7	82	20	45	0.00	28.60	30.08	S	7.3	23.8	24.68	80.0	82.2	90	75
11	90	59	76.4	48.9	0	10	72	24	40	0.00	28.53	30.00	SSE	13.1	29.6	23.64	79.8	81.8	88	76
12	91	66	77.7	56.6	0	13	68	29	50	0.00	28.52	29.99	SSE	13.1	28.7	22.82	80.7	82.7	89	77
13	77	57	62.7	55.8	0	2	95	50	79	0.07	28.72	30.20	N	13.6	30.5	4.80	77.0	77.4	82	73
14	59	56	57.5	54.9	7	0	95	85	91	0.03	28.79	30.27	NNE	11.9	24.9	3.83	71.2	69.8	73	68
15	72	58	63.3	57.4	0	0	96	62	82	0.00	28.70	30.18	NW	5.0	12.5	12.25	72.2	71.7	78	68
16	77	57	66.0	58.9	0	2	98	52	80	0.00	28.56	30.03	SSE	5.7	23.5	14.38	73.4	73.6	79	69
17	84	53	67.3	58.2	0	3	99	39	77	0.01	28.45	29.92	ESE	5.8	26.2	19.61	75.3	75.8	84	69
18	79	55	65.8	45.5	0	2	80	21	53	0.00	28.62	30.10	NNE	8.3	34.9	22.62	76.1	76.7	83	71
19	88	52	70.4	48.7	0	5	79	29	50	0.00	28.56	30.04	S	10.9	26.8	22.05	75.4	76.2	83	70
20	92	56	74.2	53.5	0	9	86	24	53	0.00	28.49	29.96	S	7.8	20.1	20.47	76.9	78.1	85	72
21	97	59	77.3	50.2	0	13	83	14	45	0.00	28.47	29.94	W	7.0	24.1	20.67	77.9	79.5	86	73
22	93	59	76.0	50.2	0	11	79	22	45	0.00	28.59	30.07	NE	8.2	22.7	20.85	78.6	80.2	87	74
23	87	59	70.3	46.8	0	8	68	26	44	0.00	28.66	30.14	SE	8.3	20.3	17.89	77.7	78.8	84	74
24	93	62	78.8	53.0	0	12	77	24	44	0.00	28.50	29.97	SW	12.6	32.2	18.12	78.0	79.3	85	75
25	93	65	79.5	58.7	0	14	90	32	52	0.31	28.40	29.86	SSW	15.7	35.1	20.17	79.5	80.9	86	77
26	90	64	75.6	63.8	0	12	93	36	69	0.11	28.47	29.94	S	12.9	39.3	20.16	77.4	78.2	86	72
27	69	63	66.2	63.7	0	1	96	83	92	0.65	28.63	30.10	ENE	7.4	23.2	5.80	73.4	73.1	77	71
28	75	63	68.7	64.4	0	4	98	71	87	0.00	28.61	30.08	ENE	4.6	14.0	11.17	73.4	72.6	76	69
29	69	66	67.1	65.2	0	2	97	88	94	0.88	28.56	30.03	NNE	6.3	20.6	3.43	72.0	71.1	72	69
30	75	57	66.0	58.8	0	1	96	44	80	0.10	28.48	29.95	NNE	6.6	16.6	13.89	70.8	69.9	74	67
	84*	59*	71.2*	55.1*	<- Monthly Averages ->						28.55	30.02	S	8.6	46.3	17.91	78.2	79.7	86	74

Temperature - Highest: 99*
Lowest: 49*

Degree Days - Total HDD: 7*
Total CDD: 174*

Rainfall: Monthly Total: 2.30 in.
Greatest 24 Hr: 0.88 in.

Humidity - Highest: 99*
Lowest: 14*

Number of Days With:
Tmax ≥ 90: 10* Rainfall ≥ 0.01 inch: 10
Tmax ≤ 32: 0* Rainfall ≥ 0.10 inch: 6
Tmin ≤ 32: 0* Avg Wind Speed ≥ 10 mph: 9
Tmin ≤ 0: 0* Max Wind Speed ≥ 30 mph: 7

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* Denotes incomplete record

Monthly data generated on Friday, November 30, 2012 at 14:10 UTC

MESONET CLIMATOLOGICAL DATA SUMMARY — October 2012
(FTCB) Fort Cobb
Latitude: 35-08-55
Nearest City: 4.0 NNW Fort Cobb
Longitude: 98-27-57
Time Zone: Midnight-Midnight CST
County: Caddo
Elevation: 1385 feet

DAY	TEMPERATURE (F) MAX	MIN	AVG	DEWPT	DEG DAYS HDD	CDD	HUMIDITY (%) MAX	MIN	AVG	RAIN (in)	PRESSURE (in) STN	MSL	WIND SPEED (mph) DIR	AVG	MAX	SOLAR (MJ/m2)	4" SOIL TEMPERATURES SOD	BARE	MAX	MIN
1	79	51	64.5	51.4	0	0	95	32	67	0.00	28.47	29.93	NNW	8.7	26.4	17.96	68.1	66.4	71	62
2	74*	52*	62.5*	44.9*	2*	0*	85*	22*	56*	0.00*	28.52*	29.99*	N *	6.4*	21.9*	NA	67.4*	65.6*	72*	61*
3	80	48	64.6	49.9	1	0	90	34	63	0.00	28.47	29.94	SSE	8.8	25.7	19.89	66.4	65.1	71	59
4	67	57	61.5	49.6	3	0	89	56	65	0.00	28.64	30.12	NNE	10.7	27.5	4.16	64.5	63.5	65	62
5	61	47	54.8	41.8	11	0	72	48	62	0.00	28.69	30.17	NE	12.8	25.7	9.19	61.6	61.6	65	59
6	49	43	45.9	33.1	19	0	71	45	61	0.00	28.79	30.27	NE	13.2	26.9	4.13	56.3	56.4	59	54
7	49	34	43.3	32.2	23	0	97	38	67	0.00	28.81	30.29	NNE	5.5	17.8	8.01	54.4	54.5	58	52
8	65	30	48.2	34.5	17	0	98	30	65	0.00	28.64	30.12	SSE	7.9	30.0	20.09	54.6	55.5	64	48
9	78	45	61.4	47.4	3	0	89	32	63	0.00	28.46	29.92	SSE	11.8	30.0	17.93	59.0	60.9	69	54
10	64	52	57.9	40.8	7	0	69	36	54	0.00	28.69	30.17	ENE	10.0	28.7	6.27	59.7	61.6	64	59
11	81	57	67.6	60.5	0	4	92	58	79	0.00	28.60	30.08	SSE	8.5	24.9	10.05	63.4	65.2	71	61
12	81	68	71.2	67.2	0	9	97	68	88	0.25	28.61	30.08	SSE	8.6	24.3	7.73	67.6	68.4	72	66
13	81	59	70.0	62.2	0	5	97	41	77	1.10	28.38	29.85	S	15.0	38.7	6.41	67.6	67.7	71	63
14	78	52	64.2	45.5	0	0	83	25	55	0.00	28.57	30.04	N	8.2	25.1	18.55	63.8	62.9	68	58
15	83	48	64.9	47.7	0	1	94	24	60	0.00	28.55	30.02	S	7.2	22.9	18.28	63.1	62.1	68	57
16	81	55	68.5	53.1	0	3	80	36	60	0.00	28.24	29.70	S	11.8	26.2	17.97	63.6	62.7	68	58
17	76	47	65.3	44.5	4	0	90	21	51	0.00	28.19	29.65	NNW	11.4	38.1	18.00	63.6	64.1	70	60
18	71	40	54.7	29.0	10	0	75	15	43	0.00	28.51	29.98	NW	9.1	27.1	18.52	58.8	59.8	67	54
19	77	44	58.2	27.5	5	0	64	14	35	0.00	28.47	29.94	NW	8.7	26.0	18.33	57.6	59.5	68	53
20	81	49	64.5	48.0	0	0	89	34	57	0.00	28.29	29.75	SSE	7.7	19.9	17.39	60.3	62.7	71	56
21	93	64	76.9	63.1	0	14	94	29	66	0.00	28.26	29.72	S	15.2	32.0	16.79	66.1	68.8	76	63
22	83	66	72.7	61.0	0	10	86	37	68	0.00	28.38	29.85	S	13.3	38.8	8.08	67.7	69.9	73	68
23	88	65	74.8	65.6	0	11	96	46	75	0.00	28.37	29.84	S	13.4	33.4	15.73	69.0	71.2	78	66
24	80	66	72.1	64.9	0	8	96	62	79	0.00	28.34	29.81	S	15.2	31.3	10.32	69.5	71.2	75	68
25	69*	45*	56.5*	44.7*	8*	0*	82*	48*	65*	0.00*	28.53*	30.00*	NNE*	15.1*	32.7*	NA	65.7*	67.4*	70*	61*
26	51	36	42.5	29.4	22	0	86	37	61	0.00	28.87	30.35	NNE	15.7	33.3	16.16	57.8	58.4	63	55
27	52	29	40.7	25.9	24	0	89	28	59	0.00	28.81	30.30	NNE	4.8	16.4	16.99	55.8	55.4	63	50
28	62	28	44.1	28.4	20	0	94	26	59	0.00	28.76	30.24	SE	3.9	13.2	16.36	55.7	55.4	63	49
29	67	34	49.6	30.7	14	0	82	24	53	0.00	28.71	30.18	SSE	6.9	22.2	16.20	56.1	56.3	64	50
30	78	37	57.2	37.0	7	0	95	22	52	0.00	28.52	29.99	SW	6.3	20.3	15.93	57.8	58.6	66	52
31	75	41	57.6	40.2	7	0	87	27	56	0.00	28.55	30.03	NW	4.9	12.9	15.78	59.7	60.6	68	55
	73*	48*	59.9*	45.2*	<- Monthly Averages ->						28.54*	30.01*	S *	9.9*	38.8*	14.04*	62.0*	62.6*	68*	58*

Temperature - Highest: 93*
Lowest: 28*

Degree Days - Total HDD: 207*
Total CDD: 65*

Rainfall: Monthly Total: 1.35* in.
Greatest 24 Hr: 1.10* in.

Humidity - Highest: 98*
Lowest: 14*

Number of Days With:
Tmax ≥ 90: 1* Rainfall ≥ 0.01 inch: 2*
Tmax ≤ 32: 0* Rainfall ≥ 0.10 inch: 2*
Tmin ≤ 32: 3* Avg Wind Speed ≥ 10 mph: 14*
Tmin ≤ 0: 0* Max Wind Speed ≥ 30 mph: 10*

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* Denotes incomplete record

Monthly data generated on Thursday, December 06, 2012 at 14:10 UTC

Evaluating Field Trial Data

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Field Trials can provide helpful information to producers as they compare products and practices for their operations. But field trials must be evaluated carefully to make sure results are scientifically sound, not misleading and indicate realistic expectations for on-farm performance.
This fact sheet is designed to give you the tools to help you determine whether data from a field trial is science fact or science fiction.

What are the best sources of field trial data?

Field trials are conducted by a broad range of individuals and institutions, including universities, ag input suppliers, chemical and seed companies and growers themselves. All are potentially good sources of information.

What are the common types of field trials?

Most field trials fall into one of two categories: side-by-side trials (often referred to as strip trials) or small-plot replicated trials. Side-by-side trials are the most common form of on-farm tests. As the name suggests, these trials involve testing practices or products against one another in plots arrayed across a field, often in strips the width of the harvesting equipment.
These strips should be replicated across the field or repeated at several locations to increase reliability.
Small-plot replicated trials often are conducted by universities and companies at central locations because of the complexity of managing them and the special planting and harvesting equipment often required.
Replicated treatments increase the reliability of an experiment. They compare practices or products against one another multiple times under uniform growing conditions in several randomized small plots in the same field or location.
Small-plot replicated trials also may be conducted on farmers' fields where special conditions exist, for example, a weed infestation that does not occur on an experiment station.

Are side-by-side plots more valuable than small-plot replicated trials, or vice versa?

Both types of plots can provide good information. The key is to evaluate the reliability of the data. It is also important to consider the applicability of the trial to your farming operation.

When is plot data valid, and when isn't it?

There isn't a black-and-white answer to that questions. But there are good rules of thumb that can help guide you. Consider these three field trial scenarios:

Scenario 1:

A single on-farm side-by-side trial comparing 10 varieties. Each variety is planted in one strip the width of the harvesting equipment and is 250 to 300 feet long.

What you can learn:

This trial will allow you to get a general feel for each variety or hybrid in the test, including how it grows and develops during the season.
However, this trial, by itself, probably won't be able to reliably measure differences in yield. This is because variability within the field, even if it appears to be relatively uniform, may be large enough to cause yield variations that mask genetic difference among the varieties. Other varietal characteristics, such as maturity or micronaire in cotton, can also be masked by soil variation.

Scenario 2:

Yield data from side-by-side variety trials conducted on the same varieties on multiple farms in your region.

What you can learn:

When data from multiple side-by-side trials are considered together, reliability increases. In this case, the more trials comparing the same varieties, the better. As you go from three to five to 10 or more locations, the certainty goes up that yield differences represent genetic differences and not field variability. Be aware, however, that small differences between treatments (in this case varieties) may still be within the margin of random variability of the combined trial and may not indicate actual genetic differences. One treatment will almost always be numerically higher. Statistical analysis helps determine if differences are significant (consistent).

Scenario 3:

A university-style small-block replicated trial comparing the same 10 varieties.

What can you learn:

Data from such trials, if they are designed well and carried out precisely, generally are reliable. This is, the results generally determine the yield potential of crop varieties. However, it is still important to consider whether results are applicable to your farming operation and are consistent with other research.

How do I know whether differences in yield, for example, are real and not caused by field variability or sloppy research?

Scientists use statistical analysis to help determine whether differences are real or are the result of experimental error, such as field variation. The two most commonly used statistics are **Least Significant Difference (LSD)** and the **Coefficient of Variation (CV)**, both of which can provide insight on the validity of trial data. If these values aren't provided with trial results, ask for them.

Least Significant Difference (LSD) is the minimum amount that two varieties must differ to be considered significantly different. Consider a trial where the LSD for yield is four bushels per acre. If one variety yields 45 bushels per acre and another yields 43 bushels per acre, the two are not statistically different in yield. The difference in their yields is due to normal field variation, not to their genetics. In this example, a variety that yields 45 bushels per acre is significantly better than those yielding less than 41 bushels per acre. In many research trials, LSDs are calculated at confidence level of 75 to 95 percent. For example, a confidence level of 95 percent means you can be 95 percent certain that yield differences greater than the LSD amount are due to genetics and not to plot variability.

Coefficient of Variation (CV) measures the relative amount of random experimental variability not accounted for in the design of a test. It is expressed as a percent of the overall average of the test.

For measuring yield differences, CV's of up to five percent are considered excellent; 5.1 to 10 percent are considered good; and 10.1 to 15 percent are fair.

A high CV means there must be larger differences among treatments to conclude that significant differences exist. The bottom line: <u>When considering yield test data, be skeptical when the CV exceeds 15 percent.</u>

Is a one-year test valid, or are several years of results necessary to know whether one product or practice is superior to another?

In an ideal world, having several years of tests to verify use of a practice or product is best. But where changes are rapid, such as with crop varieties, having university data from multiple years isn't always possible.

When multi-year university data aren't available, pay more careful attention to statistical measures like CV and LSD, and the number of locations and testing environments.

Multi-year data on yield and performance can also be requested from the developers of new products prior to university testing. In either case, be cautious about making major production changes and trying large acreages of a given variety based on one year's data.

How should I evaluate trial results that are markedly different from other research in my area?

When research results are at odds with the preponderance of scientific evidence, examine the new research with extra care.

Pay special attention to factors that might have influenced the outcome, such as soil type, planting date, soil moisture and other environmental conditions, and disease, insect and weed pressures. For example, was the growing season unusually wet or unusually dry? When was it dry or wet? What was the crop growth stage when it was wet or dry?

Was there a disease that affected one variety or hybrid more than another one? Were there insect problems? Could this have influenced the trial's outcome and its applicability to your operation? If you determine that unusual circumstances affected the outcome, be cautious about how you use the results.

Some applied research trial reports may involve treatments not consistent with current labeling for some specific products. The user is responsible for determining that the intended use is consistent with the label of the product being used. Use pesticides safely. Read and follow label directions. The information given herein is for educational purposes only. Reference of commercial products or trade names is made with the understanding that no discrimination is intended and no endorsement by the Cooperative Extension Service is implied.

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