2017 Extension Cotton Project Annual Report

Southwest Research and Extension Center, Altus

In cooperation with the Oklahoma State University Integrated Pest Management Program

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2017 Extension Cotton Project 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. Cotton Extension Team efforts included areas such as IPM and crop management during the entire 2017 growing season.

According to USDA-NASS, in 2017, 585,000 acres were planted with 555,000 acres expected to be harvested. This is nearly double the state average planted acreage. USDA projects Oklahoma Cotton production to total 1,060,000 bales. Yield is expected to average 917 pounds per acre, compared with 1,021 pounds last year. This would be the largest crop in terms of bale volume since 1933, but that crop was produced on 2.86 million harvested acres. This massive crop by local standards is severely taxing the ginning infrastructure in the state, and many gins will likely be running well into April and May. This is great news for the state, particularly the southwestern counties and is a badly needed economic “shot in the arm” due to current low wheat prices. The season ended with well below normal August temperatures, slightly below normal September temperatures, and a well above normal October until a regional killing freeze occurred on October 27 and 28. Irrigated fields that were planted on time in May were generally unaffected by the freeze, however, late June planted dryland fields encountered some maturity challenges. These dryland fields represented a small fraction of the overall planted acreage in 2017. Many dryland and irrigated producers generated record, or near record yields.

It is of utmost importance that growers make good decisions with respect to varieties planted. The Extension cotton crop management program is critical to this success. The USDA-AMS Classing Office at Abilene is reporting that color and leaf grades, staple, micronaire, strength, uniformity, and bark contamination have all been good to excellent for many producers. This is based on classing results for about 540,000 bales of Oklahoma cotton classed through February 16, 91% have been color grades 11, 21 or 31, with 57% with color grade 11 or 21 – the best possible. Leaf grades have averaged 2.4 with 56% exhibiting leaf grade 1 or 2 – the best quality possible. Bark contamination is present in about 9.4% of the bales classed thus far. Staple (fiber length) has averaged 36.7 32nds of an inch. This is outstanding. We have 58% of the crop with a 37 or longer staple, with an additional 22% classed as a 36. Uniformity average is 81.1%. Micronaire (a measure of maturity) averaged 4.2 units, with 94% in the 3.5-4.9 range. Currently our strength average is 30.2 g/tex, with 68% classed as 30 g/tex or higher. It is of utmost importance that growers make good decisions with respect to varieties planted. Incidentally, the Oklahoma-ginned bales classed at Abilene thus far from the 2017 crop have the longest average staple, uniformity and strength averages, and this again is a result of wise variety selection. 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, the Oklahoma Cooperative Extension Service, and the Oklahoma Agricultural Experiment Station. Cotton Incorporated, through the Oklahoma State Support Committee as well as the Core program, 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 and individuals whose specific contributions make it possible to maintain and expand our research and demonstration programs and distribute results.

Americot/NexGen	Amvac Chemical Corporation	BASF Corporation
Bayer CropScience	Cotton Growers Co-op – Altus	Carnegie Co-op Gin
Crop Production Services	Dow AgroSciences	DuPont
FMC Corporation	Helena Chemical	Monsanto/Deltapine
Humphreys Co-operative	Nichino America	Winfield United

OSU Southwest Research & Extension Center, Altus
& Caddo Research Station, Fort Cobb

Kaleb Kerr, Temporary worker	Robert Weidenmaier, Assistant Superintendent
Keegan Garrett, Temporary Worker	Harley Houston, Field Assistant
Rocky Thacker, Senior Superintendent	Brennan Leighton, Agriculturist
Toby Kelley, Assistant Superintendent	
Greg Chavez, Field Assistant	
Lynn Halford, Field Assistant	
Zach Crites, Temporary Worker	

County Extension Personnel

Gary Strickland, Jackson & Greer Counties	Brad Babek, Washita County
Aaron Henson, Tillman County	Greg Hartman, Beckham County
Charity Martin, Harmon County	David Nowlin, Caddo County
Ron Wright, Custer County	Travis Tacker, Kiowa County
Kyle Worthington, Canadian County	Dan Cook, Roger Mills County

Producers and Cooperators

Clint Abernathy - Altus	Mark Nichols - Altus
Justin Abernathy – Altus	Austin White - Davidson
Drew Darby - Duke	Keeff Felty – Altus
Merlin Schantz – Hydro	Harvey Schroeder - Oklahoma Cotton Council

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

Variety Performance

2017 Extension On-Farm Variety Testing

Extension on-farm large-plot replicated cotton variety trials are an important component in modern germplasm evaluation. Producer-cooperator and industry support for these trials is substantial. These trials enable growers to observe the newest genetics and transgenic traits on their operations, under their management conditions and are planted and harvested with their equipment. Multiple sites have provided excellent information on which growers can base important variety selection decisions. The objective of this project was to evaluate multiple cotton varieties in producer-cooperator fields under irrigated and dryland management systems.

Six large plot replicated trials (four Replicated Cotton Agronomic Evaluation (RACE) and 2 Cotton Incorporated Core funded Enhanced Cotton Variety Trials). These included three replicates at each site. All RACE sites were dicamba tolerant (DT) entries only, as producer-cooperators had planted only that technology on their operations in 2017. Several early releases containing XtendFlex technology (Monsanto's dicamba tolerance trait), and some experimental lines with Bollgard 3 Bt technology were planted at all sites. At one site, Enlist technology (DowDuPont's 2,4-D tolerance trait), and Bayer CropSciences' Glytol/Liberty Link varieties were included (see below). For the Replicated Agronomic Cotton Evaluation (RACE) trials, typically 6-8 entries (one entry per brand name, plus a grower choice option) were planted at each site, with 3 replicates used. The Cotton Incorporated Core program provided direct support for two trials, the Enhanced Variety Trials, which contained up to 10 entries and 3 replicates (Custer and Jackson Counties). A West Texas Lee weigh wagon (for boll buggies) or Western Forage Systems platform scale (for round modules) was utilized to capture plot weights. At harvest, grab samples were taken from each plot and ginned on research equipment at the Cotton Phenomics Laboratory at the Texas Tech University Fiber and Biopolymer Research Institute (FBRI). The FBRI also conducted high volume instrument (HVI) analyses and these data were used to compute the 2017 Commodity Credit Corporation (CCC) Loan value for each sample. Final plant heights and visual estimates of storm resistance were taken prior to harvest.

The HVI data include several important fiber property measurements. Fiber length (staple when expressed as 32nds), micronaire, strength, and uniformity are the fiber properties reported which partially determine the price per pound for lint. Fiber length was measured as the upper half mean (in inches). Those measurements were also converted into 32nds to determine staple. Uniformity was obtained by dividing mean length (also measured in inches) by the upper half mean length and expressing the result as a percentage. Micronaire is actually a confounded measurement of both fiber fineness and maturity. Micronaire was measured in standard micronaire units. Fiber strength was measured in grams-force per tex on a “beard of fibers” during HVI analysis.

Higher values for lint yield, lint turnout, staple, strength, and uniformity are generally more desirable than lower ones. Micronaire is acceptable anywhere within the “base” range of 3.5 to 4.9 inclusive. The “premium” range is between 3.7 and 4.2 inclusive. If micronaire falls in the “discount” range (below 3.5 or above 4.9), the price per pound of lint is reduced. Penalties tend to be more severe for micronaire values below 3.5 (especially below 3.0) than for those above 4.9. Therefore, producers should probably select varieties with micronaire values toward the upper half of the range, rather than the lower.

Assumptions for all sites include: $3.00/cwt ginning cost, $115/ton for gin-run seed, value for lint based on CCC loan value from grab samples and FBRI HVI results with color grades set to 21, leaf grades set to 2. Net value/acre was calculated by summing lint valued based on gross CCC Loan (lint yield times Loan value) and gin-run seed (valued at $115/ton) and then removing seed and technology fees and ginning costs. Analysis of variance was performed using SAS ver. 9.4 for Windows.

Replicated trials are used in order to obtain multiple independent observations of each variety’s performance in comparison with other entries. Statistical analyses of each characteristic reported are represented by “protected” LSD (least significant difference) values given at the bottom of each column in the table. If the difference between the characteristic of concern (i.e. yield, lint turnout, staple, etc) of any two varieties exceeds the LSD (0.05) value provided, then the chances are approximately 95 out of 100 that the difference is real and not a result of other factors such as random error.

Cultural practices and other information for each site are provided in Table 1. Data summaries for each individual location are provided in Tables 2-13, and an across site summary for lint yield is provided in Table 14.

The irrigated projects indicate that variety selection was important in all fields. Statistically significant differences in net value/acre ranged from $644 to $1000/acre in Custer County; $711 to $1078/acre in Jackson County (drip irrigated); $787 to $1072/acre in Tillman County; and $638 to $724/acre in Jackson County (furrow irrigated). These differences in performance are $356, $367, $285, and $86/acre for Custer, Jackson (drip), Harmon, and Jackson (furrow) Counties, respectively. Across the four trials, the average difference between top and bottom performers in net value/acre range was $273/acre.

Good to excellent yields were obtained in two no-till dryland trials. Fiber quality was excellent at the two sites. Statistically significant differences in net value/acre ranged from $298 to $374/acre in Tillman County and $428 to $612/acre in Jackson County. These differences in performance are $76 and $184/acre for Tillman and Jackson Counties, respectively. Across the two dryland sites, the average difference between top and bottom performers in net value/acre range was $130 /acre.

Results from these on-farm variety trials indicate that variety selection remains a critical decision for both irrigated and dryland producers in the state. Crop tours were publicized and held at all RACE and Cotton Incorporated Enhanced Variety Trial sites in late September and early October. Company representatives were invited to participate at the sites and provided updates on variety and technology pipeline issues. As more XtendFlex varieties become available and as the Enlist cotton varieties are launched in the next few years, variety testing will undoubtedly remain important to producers.

An important attribute producers should consider is storm resistance. Storm resistance ratings were visually scored just prior to harvest at all sites. These ratings range from 1 (bolls loose, with considerable seedcotton loss) to 9 (bolls very tight, with no seedcotton loss). The degree of storm tolerance that a grower can accept can vary from one operation to another. The most important consideration is to be aware of the storm tolerance of varieties planted. This is a major component of risk management. Visual storm resistance ratings are provided for each location.

Plant height is another varietal characteristic that producers should investigate. The plant heights provided were measured near the end of the growing season, prior to harvest aid applications. Excessive rainfall and/or irrigation coupled with high nitrogen fertility can result in varieties producing large plants in spite of high doses of mepiquat based plant growth regulators. Final plant height data for all locations are provided.

ACKNOWLEDGEMENTS

The authors thank our cooperators: Merlin Schantz, Clint Abernathy, Justin Abernathy, Mark Nichols, Drew Darby, and Austin White. We also thank all of the personnel at the Cotton Phenomics Laboratory at Texas Tech University-Fiber and Biopolymer Research Institute for timely assistance with ginning and HVI analyses.

Table 1. Cultural information for 2017 Extension large plot trial sites.

	Irrigated Cotton Inc Enhanced Variety	Irrigated Cotton Inc Enhanced DT Variety	Irrigated DT RACE		Dryland DT RACE	
Table numbers	2 and 3	4 and 5	6 and 7	8 and 9	10 and 11	12 and 13
County-location	Custer - Hydro	Jackson - Altus	Tillman - Tipton	Jackson - Duke	Tillman - Davidson	Jackson - Altus
Cooperator	Merlin Schantz	Clint Abernathy	Mark Nichols	Drew Darby	Austin White	Clint Abernathy
Herbicide system	RRF and LL	dicamba	dicamba	dicamba	dicamba	dicamba
Tillage system	strip till	no-till	no-till	conventional till	strip till	no-till
Planter/Harvest width	8/8	12/6	12/6	8/4	8/8	12/6
Planting date	26-May	9-May	12-May	15-May	12-Jun	7-Jun
Seeding rate (seeds/acre)	46,000	40,000	40,000	39,000	28,000	26,000
Row spacing (inches)	36	38	40	40	40	38
Replicates	3	3	3	3	3	3
Harvested plot width (rows)	8	6	6	4	8	6
Harvested plot length (ft)	670	2,200	~1100 (variable)	~750 (variable)	~725 (variable)	2,400
Harvest date	29-Nov	17-Nov	20-Nov	4-Nov	22-Nov	16-Nov
Comments	pivot irrigation	drip irrigation	pivot irrigation	furrow irrigation	--	--
Harvester type	picker	moduling picker	moduling picker	stripper w/fc	stripper w/fc	moduling picker
Entries	DP 1639 B2XF	DP 1646 B2XF	DP 1646 B2XF	DP 1646 B2XF	DP 1646 B2XF	DP 1646 B2XF
	DP 1612 B2XF	DP 1639 B2XF	DP 1639 B2XF	DP 1639 B2XF	DP 1639 B2XF	DP 1639 B2XF
		DP 1518 B2XF				
		DP 1612 B2XF				
	NG 5711 B3XF	NG 5711 B3XF	NG 5711 B3XF	NG 5711 B3XF	NG 5711 B3XF	NG 5711 B3XF
	NG 4689 B2XF	NG 4689 B2XF	NG 4689 B2XF	NG 4689 B2XF	NG 4601 B2XF	NG 4601 B2XF
	NG 3699 B2XF	NG 4545 B2XF				
		NG 3699 B2XF				
	CG 3475 B2XF	CG 3475 B2XF	CG 3475 B2XF	CG 3475 B2XF	CG 3475 B2XF	CG 3475 B2XF
		CL 9598 B3XF	CL 9598 B3XF	CL 9598 B3XF	CL 9598 B3XF	CL 9598 B3XF
	PHY 490 W3FE					
	PHY 300 W3FE					
	ST 5020 GLT					
	ST 5517 GLTP					
Grower's choice	--	--	DP 1518 B2XF	NG 4545 B2XF	DP 1522 B2XF	NG 4545 B2XF

Table 2. Harvest results from the Custer County irrigated Cotton Incorporated Enhanced Variety trial, Merlin Schantz Farm, Hydro, OK, 2017.

Entry	Lint turnout	Seed turnout	Bur 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 PHY 300 W3FE	38.3	54.4	5024	1926	2733	0.5559	1071	157	1228	151	77	1000	a
Deltapine DP 1639 B2XF	41.9	51.1	4070	1706	2079	0.5559	948	120	1068	122	76	869	b
Stoneville ST 5517 GLTP	36.1	55.8	4780	1727	2668	0.5466	944	153	1097	143	88	866	b
Deltapine DP 1612 B2XF	37.6	54.3	4263	1601	2313	0.5549	888	133	1022	128	74	820	bc
PhytoGen PHY 490 W3FE	37.7	53.8	4216	1590	2270	0.5492	873	131	1004	127	77	800	bc
Stoneville ST 5020 GLT	37.0	55.4	4130	1530	2287	0.5569	852	132	984	124	74	785	c
NexGen NG 3699 B2XF	36.7	56.1	4066	1493	2281	0.5557	830	131	961	122	73	766	c
NexGen NG 4689 B2XF	37.2	54.9	4011	1490	2200	0.5572	830	127	957	120	73	763	c
Croplan CG 3475 B2XF	37.9	55.0	3955	1500	2177	0.5556	833	125	958	119	77	762	c
NexGen NG 5711 B3XF	39.0	53.4	3430	1337	1831	0.5354	715	105	820	103	73	644	d
Test average	37.9	54.4	4194	1590	2284	0.5523	878	131	1010	126	76	808	
CV, %	1.5	1.8	5.2	5.2	5.3	1.5	4.9	5.3	4.9	5.2	--	5.3	
OSL	<0.0001	0.0004	<0.0001	<0.0001	<0.0001	0.0727	<0.0001	<0.0001	<0.0001	<0.0001	--	<0.0001	
LSD	1.0	1.7	377	142	206	0.0114†	73	12	85	11	--	74	

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.

$115/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 3. Harvest results from the Custer County irrigated Cotton Incorporated Enhanced Variety trial, Merlin Schantz Farm, Hydro, OK, 2017.

Entry	Final population	Final plant height	Storm resistance	Micronaire	Staple	Strength	Uniformity
	plants/acre	inches	1-9 visual scale*	units	32nds inch	g/tex	%
Croplan CG 3475 B2XF	39,567	37.3	4.0	4.3	39.0	31.2	84.4
Deltapine DP 1612 B2XF	41,382	35.8	4.0	4.1	39.3	31.0	83.5
Deltapine DP 1639 B2XF	36,663	39.4	3.7	4.3	38.6	32.5	83.4
NexGen NG 3699 B2XF	36,663	36.7	4.0	3.9	39.9	32.6	82.7
NexGen NG 4689 B2XF	42,108	40.3	4.0	4.2	39.1	34.3	84.2
NexGen NG 5711 B3XF	34,122	42.9	4.3	3.3	40.8	32.2	83.3
PhytoGen PHY 300 W3FE	43,560	37.8	4.3	3.9	38.6	31.1	83.3
PhytoGen PHY 490 W3FE	42,834	44.5	3.0	3.7	38.8	32.6	83.7
Stoneville ST 5020 GLT	38,478	36.8	3.7	4.1	41.2	32.1	84.1
Stoneville ST 5517 GLTP	40,293	37.1	5.0	3.6	39.1	31.0	81.7
Test average	39,567	38.9	4.0	3.9	39.4	32.0	83.4
CV, %	11.6	7.4	12.5	4.3	1.7	2.7	0.9
OSL	0.1184	0.0224	0.0152	<0.0001	0.0013	0.0044	0.0148
LSD	NS	5.0	0.9	0.3	1.2	1.5	1.3

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 4. Harvest results from the Jackson County irrigated Cotton Incorporated Enhanced Variety trial, Clint Abernathy Farm, Altus, OK, 2017.

Entry	Lint turnout	Seed turnout	Bur 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 DP 1646 B2XF	39.7	51.7	5209	2073	2694	0.5549	1150	155	1305	156	71	1078	a
Deltapine DP 1639 B2XF	40.2	51.1	4924	1981	2515	0.5562	1102	144	1246	148	66	1032	a
Deltapine DP 1518 B2XF	37.7	52.8	4933	1859	2605	0.5552	1032	150	1182	148	68	966	b
NexGen 5711 B3XF	37.2	54.6	4798	1786	2621	0.5552	992	151	1142	144	64	935	bc
NexGen NG 4689 B2XF	37.2	54.3	4808	1788	2613	0.5396	965	150	1116	144	64	908	bcd
NexGen NG 4545 B2XF	36.4	54.5	4822	1753	2629	0.5481	961	151	1112	145	60	907	bcd
Croplan CL 9598 B3XF	40.0	50.9	4471	1788	2277	0.5406	968	131	1098	134	67	897	cd
NexGen NG 3699 B2XF	35.5	54.8	4648	1648	2548	0.5556	916	146	1062	140	64	859	d
Deltapine DP 1612 B2XF	35.4	54.1	4248	1504	2298	0.5549	835	132	967	127	64	776	e
Croplan CG 3475 B2XF	35.6	53.6	3925	1398	2105	0.5541	774	121	896	118	67	711	f
Test average	37.5	53.3	4678	1758	2490	0.5514	969	143	1113	140	65	907	
CV, %	2.2	1.8	3.6	3.7	3.6	1.2	3.7	3.6	3.7	3.7	--	4.0	
OSL	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	0.0394	<0.0001	<0.0001	<0.0001	<0.0001	--	<0.0001	
LSD	1.4	1.6	290	111	153	0.0118	62	9	70	9	--	62	

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.
$115/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 5. Harvest results from the Jackson County irrigated Cotton Incorporated Enhanced Variety trial, Clint Abernathy Farm, Altus, OK, 2017.

Entry	Final population	Final plant height	Storm resistance	Micronaire	Staple	Strength	Uniformity
	plants/acre	inches	1-9 visual scale*	units	32nds inch	g/tex	%
Croplan CG 3475 B2XF	33,473	38.7	4.7	4.8	36.9	32.5	83.6
Croplan CL 9598 B3XF	27,971	38.7	4.0	4.9	39.4	32.5	84.2
Deltapine DP 1518 B2XF	36,224	39.7	5.0	4.7	38.7	31.5	83.8
Deltapine DP 1612 B2XF	30,263	36.3	5.0	4.8	37.8	32.2	83.7
Deltapine DP 1639 B2XF	30,263	44.7	4.0	4.6	38.3	32.9	84.1
Deltapine DP 1646 B2XF	27,512	39.7	4.0	4.4	41.0	31.1	83.4
NexGen 5711 B3XF	33,015	40.0	5.0	4.3	39.3	31.3	83.4
NexGen NG 3699 B2XF	27,053	38.0	4.0	4.7	39.6	34.5	83.2
NexGen NG 4545 B2XF	26,136	41.0	6.0	4.8	38.7	34.9	83.9
NexGen NG 4689 B2XF	30,722	41.0	6.0	5.0	37.9	35.0	83.3
Test average	30,263	39.8	4.8	4.7	38.7	32.8	83.7
CV, %	10.4	7.4	3.8	5.7	2.1	3.6	1.1
OSL	0.0186	0.1566	<0.0001	0.1251	0.0009	0.0032	0.9199
LSD	5,414	NS	0.3	NS	1.4	2.1	NS

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 6. Harvest results from the Tillman County irrigated RACE trial, Mark Nichols Farm, Tipton, OK, 2017.

Entry	Lint turnout	Seed turnout	Bur 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 ------------------------------						
Croplan CL 9598 B3XF	41.8	49.7	4983	2082	2476	0.5506	1146	142	1288	149	67	1072	a
Deltapine DP 1639 B2XF	41.0	49.8	4856	1991	2419	0.5532	1102	139	1241	146	66	1029	ab
Deltapine DP 1646 B2XF	40.7	50.6	4871	1981	2465	0.5501	1090	142	1232	146	71	1015	ab
NexGen NG 5711 B3XF	39.3	53.4	4708	1851	2513	0.5512	1020	145	1165	141	64	960	c
Deltapine DP 1518 B2XF	37.4	53.3	4909	1837	2616	0.5501	1010	150	1161	147	68	945	c
NexGen NG 4689 B2XF	37.8	53.3	4504	1702	2400	0.5541	943	138	1081	135	64	882	d
Croplan CG 3475 B2XF	37.4	53.1	4135	1546	2197	0.5509	852	126	978	124	67	787	e
Test average	39.3	51.9	4710	1856	2441	0.5514	1023	140	1164	141	67	956	
CV, %	2.1	1.3	2.6	2.5	2.6	0.4	2.5	2.6	2.6	2.5	--	2.7	
OSL	<0.0001	<0.0001	<0.0001	<0.0001	0.0002	0.3410	<0.0001	0.0002	<0.0001	<0.0001	--	<0.0001	
LSD	1.5	1.2	215	83	113	NS	42	7	53	6	--	46	

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.
$115/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 7. Harvest results from the Tillman County irrigated RACE trial, Mark Nichols Farm, Tipton, OK, 2017.

Entry	Final population	Final plant height	Storm resistance	Micronaire	Staple	Strength	Uniformity
	plants/acre	inches	1-9 visual scale*	units	32nds inch	g/tex	%
Croplan CG 3475 B2XF	35,719	44.0	4.0	4.6	36.7	30.6	82.9
Croplan CL 9598 B3XF	32,670	44.8	3.3	4.5	39.0	29.5	82.5
Deltapine DP 1518 B2XF	29,621	43.4	4.3	4.1	38.1	27.9	83.0
Deltapine DP 1639 B2XF	31,363	48.7	3.7	4.6	38.3	30.6	84.0
Deltapine DP 1646 B2XF	32,670	48.2	4.3	4.4	40.0	29.0	82.6
NexGen NG 4689 B2XF	39,204	46.7	4.0	4.7	37.8	32.2	83.3
NexGen NG 5711 B3XF	35,284	54.0	4.3	3.9	38.8	29.5	81.9
Test average	33,790	47.1	4.0	4.4	38.4	29.9	82.9
CV, %	8.5	6.4	8.3	5.6	2.0	4.7	0.9
OSL	0.0264	0.0142	0.0197	0.0125	0.0050	0.0526	0.1083
LSD	5,132	5.4	0.6	0.4	1.4	2.0†	NS

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 8. Harvest results from the Jackson County irrigated RACE trial, Drew Darby Farm, Duke, OK, 2017.

Entry	Lint turnout	Seed turnout	Bur 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 DP 1646 B2XF	36.0	46.9	4072	1464	1910	0.5501	806	110	915	122	69	724
Croplan CL 9598 B3XF	37.9	46.0	3754	1423	1726	0.5516	785	99	884	113	65	706
NexGen NG 4545 B2XF	34.2	50.8	4049	1384	2056	0.5462	756	118	874	121	59	694
Deltapine DP 1639 B2XF	34.7	45.8	4045	1405	1854	0.5497	772	107	879	122	65	693
NexGen NG 4689 B2XF	33.5	50.0	4097	1373	2048	0.5502	756	118	873	123	62	689
Croplan CG 3475 B2XF	33.2	50.6	3981	1321	2013	0.5511	728	116	843	119	65	659
NexGen NG 5711 B3XF	35.8	48.9	3581	1282	1752	0.5514	707	101	808	107	62	638
Test average	35.0	48.4	3940	1379	1909	0.5500	758	110	868	118	64	686
CV, %	2.6	1.0	4.4	4.4	4.4	0.6	4.7	4.4	4.7	4.3	--	5.1
OSL	0.0005	<0.0001	0.0232	0.0452	0.0013	0.5889	0.0752	0.0013	0.1309	0.0179	--	0.1433
LSD	1.6	0.8	309	108	151	NS	52†	9	NS	9	--	NS

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.
$115/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 9. Harvest results from the Jackson County irrigated RACE trial, Drew Darby Farm, Duke, OK, 2017.

Entry	Final population	Final plant height	Storm resistance	Micronaire	Staple	Strength	Uniformity
	plants/acre	inches	1-9 visual scale*	units	32nds inch	g/tex	%
Croplan CG 3475 B2XF	33,105	23.9	4.7	4.5	37.2	30.1	83.5
Croplan CL 9598 B3XF	23,522	27.9	4.3	4.7	38.1	29.5	83.3
Deltapine DP 1639 B2XF	21,345	26.5	4.7	4.8	36.9	30.7	83.7
Deltapine DP 1646 B2XF	26,136	25.8	4.3	4.4	39.6	28.7	82.4
NexGen NG 4545 B2XF	27,443	27.1	5.3	4.8	36.3	30.0	82.3
NexGen NG 4689 B2XF	28,749	26.4	5.7	4.8	37.2	31.0	82.9
NexGen NG 5711 B3XF	20,909	27.9	4.7	4.1	39.0	29.6	82.1
Test average	25,887	26.5	4.8	4.6	37.8	29.9	82.9
CV, %	11.9	4.7	10.6	3.9	1.5	3.7	0.6
OSL	0.0042	0.0261	0.0446	0.0019	<0.0001	0.2766	0.0093
LSD	5,480	2.2	0.9	0.3	1.0	NS	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 10. Harvest results from the Tillman County dryland RACE trial, Austin White Farm, Davidson, OK, 2017.

Entry	Lint turnout	Seed turnout	Bur 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 DP 1646 B2XF	32.8	44.7	2401	787	1073	0.5507	433	62	495	72	49	374	a
Croplan CL 9598 B3XF	33.3	44.7	2355	784	1053	0.5467	429	61	489	71	47	372	a
Deltapine DP 1639 B2XF	32.9	43.6	2258	744	984	0.5462	406	57	463	68	46	349	ab
Croplan CG 3475 B2XF	29.7	45.8	2350	698	1076	0.5431	379	62	441	70	47	323	bc
Deltapine DP 1522 B2XF	31.2	47.4	2236	697	1060	0.5384	375	61	436	67	48	321	bc
NexGen NG 4601 B2XF	31.8	44.3	2099	668	930	0.5469	366	54	419	63	45	311	c
NexGen NG 5711 B3XF	31.3	47.8	2045	640	976	0.5429	348	56	403	61	45	298	c
Test average	31.8	45.5	2249	717	1022	0.5450	391	59	449	67	47	335	
CV, %	2.7	1.5	3.6	3.6	3.5	1.5	4.6	3.6	4.4	3.7	--	5.2	
OSL	0.0037	<0.0001	0.0010	<0.0001	0.0015	0.6468	0.0004	0.0019	0.0007	0.0012	--	0.0008	
LSD	1.6	1.3	143	47	64	NS	32	4	35	4	--	31	

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.
$115/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 11. Harvest results from the Tillman County dryland RACE trial, Austin White Farm, Davidson, OK, 2017.

Entry	Final population	Final plant height	Storm resistance	Micronaire	Staple	Strength	Uniformity
	plants/acre	inches	1-9 visual scale*	units	32nds inch	g/tex	%
Croplan CG 3475 B2XF	23,958	33.5	5.0	3.7	35.7	30.3	81.8
Croplan CL 9598 B3XF	23,523	34.5	5.0	4.2	36.0	29.5	82.6
Deltapine DP 1522 B2XF	25,700	36.7	5.3	3.8	35.3	30.2	81.7
Deltapine DP 1639 B2XF	25,265	36.9	4.3	4.4	36.1	32.6	82.7
Deltapine DP 1646 B2XF	24,393	37.0	5.3	3.7	38.1	29.7	81.3
NexGen NG 5711 B3XF	23,523	35.9	5.7	3.6	37.0	30.2	80.6
NexGen NG 4601 B2XF	24,829	36.3	5.0	3.7	36.0	29.7	81.0
Test average	24,456	35.8	5.1	3.9	36.3	30.3	81.7
CV, %	9.3	6.8	8.0	3.6	1.7	3.8	0.7
OSL	0.8506	0.5236	0.0433	<0.0001	0.0030	0.0849	0.0077
LSD	NS	NS	0.7	0.2	1.1	1.7†	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:

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

Table 12. Harvest results from the Jackson County dryland RACE trial, Clint Abernathy Farm, Altus, OK, 2017.

Entry	Lint turnout	Seed turnout	Bur 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 ------------------------------						
Croplan CL 9598 B3XF	43.9	50.0	2700	1186	1351	0.5551	658	78	736	81	44	612	a
NexGen NG 4545 B2XF	39.8	54.5	2748	1093	1498	0.5519	603	86	690	82	39	568	a
Deltapine DP 1646 B2XF	42.8	51.1	2309	989	1179	0.5537	548	68	616	69	46	501	b
Croplan CG 3475 B2XF	38.7	53.8	2414	935	1298	0.5497	513	75	589	72	44	472	bc
NexGen NG 5711 B3XF	39.9	53.1	2239	893	1188	0.5532	494	68	562	67	41	454	bc
NexGen NG 4601 B2XF	41.7	51.6	2146	896	1108	0.5514	494	64	557	64	41	452	bc
Deltapine DP 1639 B2XF	42.3	50.7	2022	856	1026	0.5529	473	59	532	61	43	428	c
Test average	41.3	52.1	2368	978	1235	0.5526	540	71	612	71	43	498	
CV, %	2.1	1.1	5.5	5.4	5.6	0.5	5.3	5.5	5.3	5.7	--	5.8	
OSL	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	0.4613	<0.0001	<0.0001	<0.0001	0.0001	--	<0.0001	
LSD	1.6	1.0	233	94	123	NS	51	7	58	7	--	51	

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.
$115/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 13. Harvest results from the Jackson County dryland RACE trial, Clint Abernathy Farm, Altus, OK, 2017.

Entry	Final population	Final plant height	Storm resistance	Micronaire	Staple	Strength	Uniformity
	plants/acre	inches	1-9 visual scale*	units	32nds inch	g/tex	%
Croplan CG 3475B2XF	22,927	33.4	4.3	4.3	36.6	30.9	83.7
Croplan CL 9598 B3XF	13,756	35.6	4.3	4.8	37.4	31.8	83.6
Deltapine DP 1639 B2XF	13,756	35.2	4.7	4.2	36.8	32.1	83.7
Deltapine DP 1646 B2XF	16,966	35.3	4.0	4.0	39.2	30.2	83.4
NexGen NG 5711 B3XF	20,634	34.3	5.0	4.3	38.2	31.1	83.7
NexGen NG 4545 B2XF	21,551	37.6	5.7	4.7	36.9	31.4	82.8
NexGen NG 4601 B2XF	21,092	34.4	4.3	4.5	37.6	32.6	83.4
Test average	18,669	35.1	4.6	4.4	37.5	31.5	83.5
CV, %	26.4	9.0	11.2	5.0	1.9	3.9	0.7
OSL	0.1824	0.7720	0.0317	0.0089	0.0082	0.3314	0.5413
LSD	NS	NS	0.9	0.4	1.3	NS	NS

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 14. Lint yield results from the Extension large plot trials, 2017.

County ==>	Custer	Jackson	Tillman	Jackson	Tillman	Jackson	3 Irrigated
Project Type ==>	CI EVT	DT CI EVT	DT RACE	DT RACE	DT RACE	DT RACE	Site
Irrigation Type ==>	Pivot	Drip	Pivot	Furrow	--	--	Mean
Location ==>	Hydro	Altus	Tipton	Duke	Davidson	Altus	for Common
Cooperator ==>	Schantz	Abernathy	Nichols	Darby	White	Abernathy	Entries
Entry		Lint yield (lb/acre)					
DP 1518 B2XF		1859	1837				
DP 1522 B2XF					697		
DP 1612 B2XF	1581	1504					
DP 1639 B2XF	1726	1981	1991	1405	744	856	1792
DP 1646 B2XF		2073	1981	1464	787	989	1839
NG 3699 B2XF	1570	1648					
NG 4545 B2XF		1753		1384		1093	
NG 4601 B2XF					668	896	
NG 4689 B2XF	1565	1788	1702	1373			1621
NG 5711 B3XF	1357	1786	1851	1282	640	893	1640
CG 3475 B2XF	1499	1398	1546	1321	698	935	1422
CL 9598 B3XF		1788	2082	1423	784	1186	1764
Test average	1550	1758	1856	1379	717	978	1680
CV, %	6.1	3.7	2.5	4.4	3.6	5.4	--
OSL	<0.0001	<0.0001	<0.0001	0.0452	<0.0001	<0.0001	--
LSD	142	111	83	108	47	94	--

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.

OSU Cotton Official Variety Tests - 2017

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Southwest Research and Extension Center, Altus

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The Oklahoma Agricultural Experiment Station cotton official variety tests (OVTs) were planted at the Southwest Research and Extension Center at Altus Center (SWREC) (furrow irrigated), Tipton Valley Research Center (dryland no-till), and Caddo Research Station at Fort Cobb (low elevation spray center pivot irrigated) in 2017.

Site information:

1) Altus conventional tillage furrow irrigated OVT – planted May 25, harvested November 2.
2) Tipton no-till dryland OVT – planted June 13, harvested November 6.
3) Fort Cobb no-till in terminated wheat cover - center pivot irrigated OVT – planted May 30, harvested November 27.

The trials consisted of four replicates of entries. Plot size was four rows wide by 30 ft at all sites. Row spacing at Altus and Tipton was 40 inches, whereas row spacing was 36 inches at the Fort Cobb site. Harvested area was the center two rows by the length of the plot. Trials were harvested with a brush-roll plot stripper without a field cleaner and grab sampled by plot (three replicates). Grab samples were ginned and lint samples were submitted for HVI analyses at the Cotton Phenomics Laboratory at the Fiber and Biopolymer Research Institute at Texas Tech University.

2017 OVT results for Altus (Tables 1 and 2), Tipton (Tables 3 and 4), and Fort Cobb (Tables 5 and 6) are presented below.

Table 1. Yield and agronomic results from the OSU cotton official variety test, Southwest Research and Extension Center, Altus, OK 2017.

Entry	Lint yield	Grab sample turnout		Storm resistance	Final plant height
		Lint	Seed		
	lb/acre	-------------------------%	-------------------------	visual scale (1=loose, 9=tight)	inches
PhytoGen PHY 300 W3FE	2048	28.0	43.4	6.0	39
PhytoGen PX4A54W3FE	2035	27.7	44.8	6.5	35
FiberMax FM 1830 GLT	1944	29.7	44.6	6.3	36
Deltapine DP 1646 B2XF	1916	31.7	43.4	5.8	43
PhytoGen 440 W3FE (PX4A62W3FE)	1911	27.3	44.0	5.0	37
Deltapine DP 1845 B3XF (MON16R341B3XF)	1908	29.7	42.4	7.5	41
Croplan CL 9598 B3XF (Winfield United 17XL8B3XF)	1870	31.6	41.5	5.5	40
NexGen NG 3406 B2XF	1867	28.8	46.8	6.3	37
Deltapine DP 1518 B2XF	1828	27.9	45.6	7.0	38
PhytoGen PHY 340 W3FE	1824	26.6	40.9	5.8	40
NexGen NG 5007 B2XF	1811	28.8	42.2	5.8	41
PhytoGen PX4A57W3FE	1800	27.2	41.0	5.8	39
PhytoGen PX2A31W3FE	1789	26.9	42.9	8.0	33
Deltapine DP 1044 B2RF	1787	27.0	48.1	6.8	38
Deltapine DP 1820 B3XF (MON16R324B3XF)	1785	29.9	42.2	6.5	40
Deltapine DP 1639 B2XF	1782	28.3	40.6	5.8	39
Stoneville ST 5517 GLTP	1781	27.1	46.5	6.8	40
MON16R346B3XF	1773	28.8	42.7	6.8	40
AMX1717B2XF	1751	27.0	44.7	4.8	41
PhytoGen PHY 490 W3FE	1746	26.1	43.8	5.5	42
Deltapine DP 1612 B2XF	1735	25.6	45.7	6.0	34
FiberMax FM 2334 GLT	1732	28.0	41.4	6.0	35
PhytoGen 480 W3FE (PX4A52W3FE)	1704	25.4	41.5	6.3	42
FiberMax FM 2007 GLT	1703	26.2	48.6	7.0	37
NexGen NG 4601 B2XF	1697	29.1	44.7	5.8	40
PhytoGen PX3A99W3FE	1689	25.9	43.5	5.8	39
FiberMax FM 1900 GLT	1678	26.7	44.5	7.0	36
NexGen NG 5711 B3XF (AMX1711B3XF)	1676	30.6	48.7	6.5	43
Deltapine DP 1549 B2XF	1655	27.3	44.2	6.5	43
Deltapine DP 1522 B2XF	1654	26.2	43.2	5.8	41
PhytoGen PX3A82W3FE	1650	24.8	42.7	5.8	38
NexGen NG 4545 B2XF	1649	26.1	45.8	6.8	41
FiberMax FM 1911 GLT	1648	28.5	47.2	8.0	33
PhytoGen PHY 330 W3FE	1631	24.4	39.3	6.5	39
PhytoGen PHY 499 WRF	1611	25.6	41.1	4.5	43
Croplan CG 3475 B2XF	1591	24.1	42.6	6.5	36
NexGen NG 4689 B2XF	1590	26.9	44.9	7.0	39
PhytoGen PX2A28W3FE	1565	24.2	41.9	6.5	36
Stoneville ST 5020 GLT	1557	26.1	46.1	6.5	39
PhytoGen PHY 450 W3FE	1533	25.0	45.5	6.0	41
NexGen NG 3699 B2XF	1526	23.5	42.6	6.8	38
MON16R123XF	1522	24.5	43.3	6.5	41
PhytoGen PX3A96W3FE	1391	21.4	39.3	5.0	38
PhytoGen PHY 764 WRF	1291	23.6	43.6	5.3	42
Test average	1719	26.9	43.7	6.2	39
CV, %	6.0	5.5	4.6	10.0	5.5
OSL	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
LSD	144	2.4	3.3	0.9	3

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 2. Fiber property results for entries in the OSU cotton official variety test, Southwest Research and Extension Center, Altus, OK 2017.

Entry	Micronaire	Length	Staple	Strength	Uniformity	Elongation	Reflectance	Yellowness
	units	inches	32nds inch	g/tex	%	%	rd %	+b %
AMX1717B2XF	4.3	1.22	38.9	32.0	84.2	7.9	78.7	8.4
Croplan CG 3475 B2XF	4.3	1.18	37.8	33.2	84.3	9.4	77.4	8.9
Croplan CL 9598 B3XF (Winfield United 17XL8B3XF)	4.4	1.20	38.4	32.9	83.5	8.4	81.2	8.4
Deltapine DP 1044 B2RF	4.0	1.16	37.1	31.9	82.7	9.5	79.7	8.5
Deltapine DP 1518 B2XF	4.0	1.22	38.9	31.9	83.7	6.8	78.6	8.0
Deltapine DP 1522 B2XF	4.7	1.16	37.1	31.9	82.3	10.3	78.9	8.7
Deltapine DP 1549 B2XF	3.8	1.17	37.5	33.1	82.8	7.2	80.0	8.5
Deltapine DP 1612 B2XF	4.5	1.18	37.9	33.6	83.3	8.6	78.1	8.8
Deltapine DP 1639 B2XF	4.7	1.17	37.5	34.6	84.3	9.2	79.8	9.0
Deltapine DP 1646 B2XF	4.2	1.25	40.1	32.1	83.8	8.5	81.7	8.4
Deltapine DP 1820 B3XF (MON16R324B3XF)	4.2	1.27	40.7	36.9	84.4	6.3	81.4	8.2
Deltapine DP 1845 B3XF (MON16R341B3XF)	3.7	1.27	40.7	33.3	83.9	8.8	79.0	7.8
FiberMax FM 1830 GLT	4.2	1.26	40.4	34.2	83.8	5.9	80.7	8.0
FiberMax FM 1900 GLT	4.0	1.22	39.0	34.5	83.4	5.4	78.9	8.3
FiberMax FM 1911 GLT	3.9	1.19	38.1	32.5	82.9	6.7	80.8	7.8
FiberMax FM 2007 GLT	3.8	1.24	39.8	33.4	83.1	7.1	81.4	7.9
FiberMax FM 2334 GLT	4.4	1.25	39.9	34.2	84.6	6.0	81.3	8.4
MON16R123XF	3.8	1.27	40.5	34.9	84.5	6.3	79.4	8.7
MON16R346B3XF	4.0	1.27	40.7	33.2	83.5	9.5	80.6	8.0
NexGen NG 3406 B2XF	4.1	1.17	37.4	30.7	83.6	8.9	79.7	8.8
NexGen NG 3699 B2XF	4.0	1.25	39.9	34.0	82.8	6.8	79.9	8.6
NexGen NG 4545 B2XF	4.3	1.18	37.9	34.2	83.4	6.1	79.3	8.7
NexGen NG 4601 B2XF	4.3	1.20	38.5	34.4	83.9	7.7	81.6	8.6
NexGen NG 4689 B2XF	4.4	1.16	37.0	34.1	83.6	6.0	79.0	9.1
NexGen NG 5007 B2XF	4.2	1.18	37.8	30.7	82.9	8.9	80.4	9.0
NexGen NG 5711 B3XF (AMX1711B3XF)	3.8	1.22	39.0	33.9	83.9	8.4	80.6	9.0
PhytoGen 440 W3FE (PX4A62W3FE)	3.2	1.22	39.0	34.7	82.9	6.6	79.3	8.2
PhytoGen 480 W3FE (PX4A52W3FE)	3.8	1.19	38.2	32.7	83.3	8.8	80.6	8.6
PhytoGen PHY 300 W3FE	4.2	1.16	37.2	32.9	84.0	7.7	78.5	8.8
PhytoGen PHY 330 W3FE	3.7	1.22	38.9	32.9	83.1	6.8	78.2	8.4
PhytoGen PHY 340 W3FE	3.9	1.17	37.4	33.2	83.3	7.4	79.1	8.9
PhytoGen PHY 450 W3FE	3.8	1.14	36.6	34.4	83.3	9.0	78.6	8.9
PhytoGen PHY 490 W3FE	4.0	1.17	37.5	36.0	84.3	9.6	80.6	8.4
PhytoGen PHY 499 WRF	4.1	1.17	37.4	33.7	83.9	9.1	77.2	8.7
PhytoGen PHY 764 WRF	3.5	1.16	37.2	38.0	83.5	7.7	77.3	8.8
PhytoGen PX2A28W3FE	3.6	1.22	39.0	34.1	82.6	5.5	80.7	7.7
PhytoGen PX2A31W3FE	4.0	1.19	38.0	35.8	84.0	6.3	81.1	7.7
PhytoGen PX3A82W3FE	3.8	1.15	36.7	33.9	83.6	9.0	80.2	8.6
PhytoGen PX3A96W3FE	3.7	1.18	37.8	32.2	83.2	7.5	81.0	8.1
PhytoGen PX3A99W3FE	3.4	1.19	38.1	33.5	83.6	7.8	80.0	9.0
PhytoGen PX4A54W3FE	3.7	1.18	37.7	34.5	83.7	7.9	79.4	8.6
PhytoGen PX4A57W3FE	3.7	1.13	36.1	32.7	82.0	8.0	78.1	8.9
Stoneville ST 5020 GLT	4.4	1.24	39.7	33.9	84.9	8.3	78.7	8.8
Stoneville ST 5517 GLTP	3.7	1.18	37.8	33.6	82.6	7.2	80.8	8.0
Test average	4.0	1.20	38.4	33.6	83.5	7.7	79.7	8.5
CV, %	4.7	1.4	1.4	3.6	0.8	6.0	1.1	3.1
OSL	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
LSD	0.3	0.03	0.9	2.0	1.0	0.7	1.4	0.4

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.

Table 3. Yield and agronomic results from the OSU cotton official variety test, Tipton Valley Research Center, Tipton, OK 2017.

Entry	Lint yield	Grab sample turnout		Storm resistance	Final plant height
		Lint	Seed		
	lb/acre	-------------------------%	-------------------------	visual scale (1=loose, 9=tight)	inches
PhytoGen PHY 340 W3FE	1350	23.7	41.1	6.5	42
PhytoGen PHY 300 W3FE	1330	23.7	40.4	6.8	42
NexGen NG 5007 B2XF	1303	24.3	41.6	5.5	44
PhytoGen PHY 330 W3FE	1300	24.6	40.1	5.8	41
FiberMax FM 1900 GLT	1240	24.2	42.6	7.0	40
NexGen NG 4689 B2XF	1222	22.3	42.7	6.5	45
NexGen NG 3406 B2XF	1218	23.7	44.6	6.0	42
Deltapine DP 1822 XF (MON16R123XF)	1216	23.0	43.4	5.8	44
Deltapine DP 1612 B2XF	1216	23.4	45.2	6.3	42
Croplan CG 3475 B2XF	1196	24.4	44.3	6.0	44
FiberMax FM 1830 GLT	1175	23.2	41.7	6.0	41
FiberMax FM 2007 GLT	1172	22.6	45.0	7.3	40
Stoneville ST 5517 GLTP	1155	22.6	42.9	6.8	43
Stoneville ST 5020 GLT	1135	22.6	43.7	6.0	40
PhytoGen 480 W3FE (PX4A52W3FE)	1125	23.3	40.9	6.5	43
AMX1717B2XF	1100	22.3	43.1	4.3	44
NexGen NG 4601 B2XF	1073	25.8	39.4	5.0	40
FiberMax FM 1911 GLT	1062	23.7	43.1	8.0	37
FiberMax FM 2334 GLT	1056	23.3	40.6	6.5	40
PhytoGen PX3A96W3FE	1055	22.1	41.9	5.8	42
NexGen 5711 B3XF (AMX1711B3XF)	1047	24.4	42.5	6.8	46
NexGen NG 3699 B2XF	1046	21.9	43.9	5.3	42
NexGen NG 4545 B2XF	1041	22.0	43.8	5.5	43
Deltapine DP 1646 B2XF	1029	23.7	39.6	6.8	45
Croplan CL 9598 B3XF (Winfield United 17XL8B3XF)	1024	23.3	38.1	7.0	41
PhytoGen PX3A99W3FE	1015	21.2	40.9	7.0	47
PhytoGen PHY 490 W3FE	929	18.8	38.1	6.3	45
Deltapine DP 1549 B2XF	913	20.5	39.6	7.8	45
MON16R232B2XF	897	21.3	45.8	6.5	47
PhytoGen PHY 450 W3FE	741	16.6	38.7	6.8	41
Test average	1113	22.7	42.0	6.3	43
CV, %	12.8	8.8	3.9	12.6	7.1
OSL	<0.0001	0.0024	<0.0001	<0.0001	0.0007
LSD	201	3.3	2.6	1.1	4

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 4. Fiber property results for entries in the OSU cotton official variety test, Tipton Valley Research Center, Tipton, OK 2017.

Entry	Micronaire	Length	Staple	Strength	Uniformity	Elongation	Reflectance	Yellowness
	units	inches	32nds inch	g/tex	%	%	rd %	+b %
AMX1717B2XF	4.0	1.21	38.7	31.4	83.8	7.3	73.8	9.4
Croplan CL 9598 B3XF (Winfield United 17XL8B3XF)	3.7	1.21	38.7	32.5	84.3	7.3	75.7	10.4
Croplan CG 3475 B2XF	4.1	1.16	37.1	33.4	83.2	8.7	75.1	9.4
Deltapine DP 1549 B2XF	3.2	1.19	38.1	33.3	81.7	6.0	75.2	9.7
Deltapine DP 1612 B2XF	3.9	1.21	38.6	33.1	83.4	7.7	76.3	8.8
Deltapine DP 1646 B2XF	3.5	1.25	40.1	29.6	81.8	7.0	75.7	9.5
Deltapine DP 1822 XF (MON16R123XF)	3.4	1.26	40.3	34.9	83.3	5.6	78.1	8.7
FiberMax FM 1830 GLT	3.8	1.25	39.9	33.3	83.3	5.2	76.1	9.0
FiberMax FM 1900 GLT	3.7	1.21	38.7	34.3	82.7	4.5	73.8	8.3
FiberMax FM 1911 GLT	3.6	1.20	38.5	31.4	81.3	6.0	77.4	7.7
FiberMax FM 2007 GLT	3.6	1.24	39.6	32.5	83.1	6.1	77.1	8.0
FiberMax FM 2334 GLT	3.5	1.24	39.6	32.6	83.0	5.4	75.3	9.7
MON16R232B2XF	3.7	1.19	38.2	35.8	83.6	6.6	73.9	10.4
NexGen 5711 B3XF (AMX1711B3XF)	3.6	1.21	38.7	33.8	82.7	7.2	77.3	9.4
NexGen NG 3406 B2XF	3.5	1.13	36.3	30.8	82.7	7.9	75.7	9.2
NexGen NG 3699 B2XF	3.3	1.20	38.5	31.7	82.4	5.6	74.6	9.8
NexGen NG 4545 B2XF	3.7	1.18	37.7	32.8	82.3	5.5	76.1	8.9
NexGen NG 4601 B2XF	3.9	1.20	38.3	34.8	83.5	6.6	77.6	9.1
NexGen NG 4689 B2XF	3.4	1.17	37.5	34.0	82.0	5.3	75.8	9.4
NexGen NG 5007 B2XF	3.9	1.18	37.8	29.9	82.5	7.9	78.7	9.2
PhytoGen 480 W3FE (PX4A52W3FE)	3.7	1.15	36.9	33.2	83.3	8.6	75.8	9.1
PhytoGen PHY 300 W3FE	3.8	1.16	37.0	33.4	82.6	6.9	75.5	8.9
PhytoGen PHY 330 W3FE	3.9	1.20	38.3	32.8	83.2	6.4	73.9	8.7
PhytoGen PHY 340 W3FE	3.9	1.20	38.3	34.1	83.9	6.0	75.1	9.2
PhytoGen PHY 450 W3FE	3.1	1.15	36.9	32.6	83.1	8.3	68.6	10.1
PhytoGen PHY 490 W3FE	3.3	1.18	37.7	35.1	84.0	8.0	69.1	9.9
PhytoGen PX3A96W3FE	3.6	1.20	38.4	32.2	82.4	6.4	77.8	8.3
PhytoGen PX3A99W3FE	3.4	1.17	37.4	32.7	82.0	7.4	77.2	9.3
Stoneville ST 5020 GLT	3.7	1.22	38.9	33.8	82.8	6.7	71.8	9.6
Stoneville ST 5517 GLTP	3.4	1.16	37.2	32.9	81.7	6.5	77.4	8.5
Test average	3.6	1.20	38.3	33.0	82.9	6.7	75.4	9.2
CV, %	9.0	2.1	2.1	4.7	0.9	7.9	4.1	9.0
OSL	0.0364	<0.0001	<0.0001	0.0011	0.0001	<0.0001	0.0398	0.0231
LSD	0.5	0.04	1.3	2.5	1.2	0.9	5.0	1.3

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.

Table 5. Yield and agronomic results from the OSU cotton official variety test, Caddo Research Station, Fort Cobb, OK 2017.

Entry	Lint yield	Grab sample turnout Lint	Grab sample turnout Seed	Storm resistance	Final plant height
	lb/acre	------------------------%	------------------------	visual scale (1=loose, 9=tight)	inches
Croplan CL 9598 B3XF (Winfield United 17XL8B3XF)	1484	28.3	40.0	4.8	28
FiberMax FM 1830 GLT	1401	26.8	42.2	5.5	27
PhytoGen PHY 340 W3FE	1395	25.3	39.0	6.3	26
PhytoGen PHY 300 W3FE	1382	24.9	39.7	7.0	27
Deltapine DP 1845 B3XF (16R341B3XF)	1355	26.0	40.7	6.5	27
Deltapine DP 1646 B2XF	1337	27.5	39.2	4.8	28
FiberMax FM 2334 GLT	1337	26.1	41.6	4.0	28
Stoneville ST 5517 GLTP	1337	24.2	42.6	5.5	28
MON16R346B3XF	1327	24.8	39.6	5.8	29
PhytoGen PX4A57W3FE	1324	25.2	37.4	6.3	28
PhytoGen PX3A99W3FE	1321	23.8	40.6	6.0	28
PhytoGen PHY 330 W3FE	1305	24.8	39.1	6.3	28
PhytoGen 480 W3FE (PX4A52W3FE)	1304	23.7	40.3	5.3	28
PhytoGen PHY 450 W3FE	1301	23.3	41.5	5.5	28
PhytoGen PHY 490 W3FE	1293	23.7	39.7	5.5	28
Deltapine DP 1820 B3XF (16R324B3XF)	1287	27.4	39.8	6.5	28
PhytoGen PHY 444 WRF	1271	26.1	40.5	6.0	29
PhytoGen PX4A54W3FE	1256	25.3	40.6	4.5	26
Deltapine DP 1639 B2XF	1250	26.2	38.8	4.0	28
Deltapine DP 1518 B2XF	1245	24.7	41.5	5.0	28
NexGen NG 3406 B2XF	1237	25.1	42.1	5.8	29
PhytoGen 440 W3FE (PX4A62W3FE)	1206	23.7	39.1	6.3	26
PhytoGen PX2A31W3FE	1178	24.2	41.6	8.0	24
Croplan CG 3475 B2XF	1170	25.5	42.7	5.8	26
NexGen NG 5007 B2XF	1169	25.3	41.2	3.8	29
NexGen NG 4601 B2XF	1164	25.5	39.4	5.3	28
FiberMax FM 2007 GLT	1137	23.9	44.6	6.0	25
PhytoGen PHY 312 WRF	1130	23.7	41.0	5.8	28
Deltapine DP 1044B2RF	1112	23.5	42.9	4.8	29
Stoneville ST 5020 GLT	1102	23.7	42.0	4.8	29
PhytoGen PX3A96W3FE	1092	22.7	41.8	5.0	28
PhytoGen PX2A28W3FE	1069	22.3	41.8	5.8	25
Deltapine DP 1522 B2XF	1059	24.8	41.4	4.8	28
PhytoGen PX3A82W3FE	1038	23.9	40.3	5.5	27
NexGen NG 5711 B3XF (AMX1711B3XF)	994	24.3	41.5	5.8	30
NexGen NG 4689 B2XF	993	23.3	41.6	6.8	29
FiberMax FM 1900 GLT	987	24.3	43.6	7.3	25
AMX1717B2XF	986	24.2	42.2	5.0	31
NexGen NG 3699 B2XF	935	23.2	43.0	6.8	29
NexGen NG 4545 B2XF	931	24.0	42.8	6.5	28
FiberMax FM 1911 GLT	885	24.1	42.3	8.0	26
Test average	1197	24.7	41.1	5.7	28
CV, %	12.9	3.0	2.2	13.6	8.2
OSL	<0.0001	<0.0001	<0.0001	<0.0001	0.0179
LSD	216	1.2	1.4	1.1	3

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 6. Fiber property results for entries in the OSU cotton official variety test, Caddo Research Station, Fort Cobb, OK 2017.

Entry	Micronaire	Length	Staple	Strength	Uniformity	Elongation	Reflectance	Yellowness
	units	inches	32nds inch	g/tex	%	%	rd %	+b %
AMX1717B2XF	3.8	1.21	38.8	30.6	83.0	6.8	74.0	7.3
Croplan CG 3475 B2XF	3.9	1.16	37.0	32.1	83.0	7.9	75.5	7.4
Croplan CL 9598 B3XF (Winfield United 17XL8B3XF)	4.1	1.19	38.2	29.4	81.6	7.4	77.0	7.0
Deltapine DP 1044B2RF	3.0	1.20	38.3	32.0	82.0	7.9	75.2	7.1
Deltapine DP 1518 B2XF	3.3	1.21	38.6	30.7	82.7	6.3	76.5	6.5
Deltapine DP 1522 B2XF	3.6	1.16	37.2	31.1	82.1	8.3	76.0	7.4
Deltapine DP 1639 B2XF	3.8	1.17	37.5	32.4	83.2	7.4	75.8	7.3
Deltapine DP 1646 B2XF	3.1	1.23	39.5	30.1	81.5	7.1	78.1	6.7
Deltapine DP 1820 B3XF (16R324B3XF)	3.9	1.24	39.8	33.5	83.0	5.2	77.2	7.0
Deltapine DP 1845 B3XF (16R341B3XF)	3.2	1.26	40.3	32.1	82.7	8.1	76.8	6.7
FiberMax FM 1830 GLT	3.6	1.25	39.9	32.0	83.2	5.2	77.8	6.6
FiberMax FM 1900 GLT	3.6	1.21	38.8	32.6	82.2	5.5	75.1	6.9
FiberMax FM 1911 GLT	3.2	1.18	37.7	32.5	82.2	6.3	77.8	7.3
FiberMax FM 2007 GLT	3.4	1.24	39.8	33.4	82.7	5.9	77.1	6.4
FiberMax FM 2334 GLT	3.7	1.25	40.1	32.3	83.2	5.6	77.8	6.8
MON16R346B3XF	3.1	1.26	40.4	30.9	82.7	8.2	76.3	6.6
NexGen NG 3406 B2XF	3.6	1.16	37.0	30.5	82.5	7.9	76.4	7.7
NexGen NG 3699 B2XF	3.5	1.20	38.3	30.4	80.4	5.7	75.7	7.5
NexGen NG 4545 B2XF	3.4	1.18	37.7	32.8	82.1	5.2	74.4	7.0
NexGen NG 4601 B2XF	3.6	1.19	38.1	32.9	82.4	6.7	77.3	6.9
NexGen NG 4689 B2XF	3.5	1.18	37.8	32.8	81.9	5.2	74.8	7.8
NexGen NG 5007 B2XF	3.6	1.15	36.7	28.5	80.3	7.5	76.9	7.4
NexGen NG 5711 B3XF (AMX1711B3XF)	2.9	1.20	38.5	29.7	79.5	6.5	75.7	7.4
PhytoGen 440 W3FE (PX4A62W3FE)	3.3	1.19	38.2	31.8	80.6	6.6	76.9	7.2
PhytoGen 480 W3FE (PX4A52W3FE)	3.4	1.17	37.4	31.1	82.5	7.2	77.1	7.7
PhytoGen PHY 300 W3FE	3.5	1.17	37.4	30.8	82.5	6.7	75.2	8.0
PhytoGen PHY 312 WRF	3.2	1.19	38.2	30.3	82.0	6.8	75.2	7.3
PhytoGen PHY 330 W3FE	3.5	1.18	37.9	31.9	82.1	6.5	75.5	7.8
PhytoGen PHY 340 W3FE	3.3	1.16	37.2	30.1	81.9	6.4	75.2	7.5
PhytoGen PHY 444 WRF	3.0	1.26	40.4	31.7	83.2	5.9	78.1	7.3
PhytoGen PHY 450 W3FE	3.7	1.14	36.5	34.2	82.9	8.3	75.6	7.8
PhytoGen PHY 490 W3FE	3.6	1.17	37.3	31.3	82.6	8.4	75.4	7.8
PhytoGen PX2A28W3FE	3.5	1.24	39.6	33.0	82.4	5.3	76.9	7.0
PhytoGen PX2A31W3FE	4.2	1.19	38.0	35.6	84.6	5.7	77.4	6.8
PhytoGen PX3A82W3FE	3.3	1.16	37.1	33.3	83.8	7.5	75.4	7.2
PhytoGen PX3A96W3FE	3.5	1.19	38.0	30.8	82.2	6.6	77.4	7.0
PhytoGen PX3A99W3FE	3.5	1.18	37.9	32.1	82.4	7.2	76.0	8.2
PhytoGen PX4A54W3FE	3.7	1.18	37.8	32.8	83.6	6.7	76.5	7.9
PhytoGen PX4A57W3FE	3.3	1.12	35.9	32.3	82.4	7.2	75.9	8.3
Stoneville ST 5020 GLT	3.4	1.23	39.3	31.2	82.1	7.0	74.7	7.1
Stoneville ST 5517 GLTP	3.4	1.18	37.7	34.0	81.8	6.4	77.1	7.1
Test average	3.5	1.19	38.2	31.8	82.3	6.7	76.3	7.3
CV, %	7.2	1.7	1.7	3.9	1.1	5.7	1.3	4.6
OSL	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
LSD	0.4	0.03	1.1	2.0	1.5	0.6	1.6	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, † indicates significance at the 0.10 level.

Industry Trials – New Germplasm and Traits

Additional large and small plot industry germplasm evaluation trials were also initiated at 10 sites. An 18-entry Bayer CropScience Agronomic Performance Trial was planted (SWREC) and harvested. This trial included 8 experimental lines.

Three Dow AgroSciences Innovation Trials in Custer and Jackson Counties (2 sites) were also planted and harvested. One of the Jackson County trials was planted under drip irrigation and the other was furrow irrigated. The Custer County site was center-pivot irrigated (see Tables 1-4 below).

In addition, small-plot Dow-DuPont PhytoGen advanced strains (4 replicates) were planted at the SWREC (9 entries, furrow irrigated), the Tipton Valley Research Center (3 lines, dryland no-till) and at the OSU Caddo Research Station in Caddo County (9 lines, pivot irrigated).

A replicated small-plot Monsanto FACT trial was conducted at the OSU SWREC. This trial had 21 entries and was replicated three times. A total of 20 Americot/NexGen advanced strains lines (replicated 3 times) were planted and harvested at the SWREC. Additionally, a CPS/All-Tex advanced strains trial was also conducted at the SWREC. This project had 10 entries and was replicated 3 times (see Table 5 below).

Data were provided to these industry sponsors and all of these trials will assist companies in investigating performance of their cotton genetics in Oklahoma. This activity provides Oklahoma cotton growers an opportunity to have advanced strains lines that perform well in the state to be moved forward into commercial varieties that can be planted in the state. With the rate of technology and germplasm development, this is an important consideration.

Table 1. Lint yield results from PhytoGen Innovation Trial entries across multiple OSU testing sites in 2017.

Table Number ==>	2	3	4	--	--	--	--
County ==>	Custer	Jackson	Jackson	Jackson	Caddo	Tillman	Multi-Site
Irrigation Type ==>	Pivot	Drip	Furrow	Furrow	Pivot	Dryland	Mean
Trial Type ==>	Innovation	Innovation	Innovation	OVT	OVT	OVT	
Location ==>	Hydro	Olustee	Altus	Altus	Fort Cobb	Tipton	
Cooperator ==>	Schantz	Abernathy	OSU SWREC	OSU SWREC	OSU CRS	OSU TVRC	
Planting Date ==>	26-May	10-May	24-May	25-May	30-May	13-Jun	
Harvest Date ==>	24-Nov	17-Oct	3-Nov	2-Nov	27-Nov	6-Nov	
Entry	----------	----------	----------	Lint yield (lb/acre)	----------	----------	----------
PhytoGen PHY 300 W3FE	1497	1824	2006	2048	1382	1330	1681
PhytoGen PHY 330 W3FE	1506	1811	1912	1631	1305	1300	1577
PhytoGen PHY 340 W3FE	1523	1819	1860	1824	1395	1350	1629
PhytoGen PHY 450 W3FE	1371	1742	1731	1533	1301	741	1403
PhytoGen PHY 490 W3FE	1419	1677	1788	1746	1293	929	1475
Test average	1463	1775	1859	1756	1335	1130	1553
CV, %	6.0	4.9	7.7	5.7	14.8	14.7	--
OSL	0.2562	0.2624	0.2471	0.0001	0.9057	0.0005	--
LSD	NS	NS	NS	154	NS	257	--

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.

Table 2. Results from the Blaine County irrigated PhytoGen Innovation trial, Merlin Schantz Farm, Hydro, OK, 2017.

Entry	Lint yield		Lint turnout	Lint loan value*	Lint value	Final plant stand	Plant height	Visual storm resistance rating	Micronaire	Staple	Strength	Uniformity
	lb/acre		%	$/lb	$/acre	plants/acre	inches	1-9, 9 best	units	32nds inch	g/tex	%
PhytoGen PHY 340 W3FE	1523	a	37.2	0.5302	809	43,076	41	5.0	3.4	38.2	30.7	82.2
PhytoGen PHY 330 W3FE	1506	a	36.6	0.5347	806	39,688	42	4.7	3.5	38.8	30.7	83.6
PhytoGen PHY 300 W3FE	1497	a	34.6	0.5347	801	37,268	37	5.7	3.6	38.4	30.1	84.0
PhytoGen PHY 490 W3FE	1419	a	35.8	0.5301	752	43,076	44	4.3	3.5	38.6	32.1	83.7
PhytoGen PHY 450 W3FE	1371	a	34.7	0.5424	744	42,592	41	5.0	3.7	37.3	31.3	83.3
Test average	1463		35.8	0.5344	782	41,140	41	4.9	3.5	38.3	31.0	83.4
CV, %	6.0		1.6	2.9	7.8	4.7	10.2	10.8	6.5	1.2	4.2	0.8
OSL	0.2562		0.0016	0.8522	0.5512	0.0222	0.4263	0.1176	0.6501	0.0307	0.4625	0.0708
LSD	NS		1.0	NS	NS	3668	NS	NS	NS	0.9	NS	1.0†

For lint yield, lb/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.

* Assumes color grades set to 21, leaf grades set to 2 for entire trial.

Table 3. Results from the Jackson County irrigated PhytoGen Innovation trial, Clint Abernathy Farm, Olustee, OK, 2017.

Entry	Lint yield		Lint turnout	Lint loan value*	Lint value	Final plant stand	Plant height	Visual storm resistance rating	Micronaire	Staple	Strength	Uniformity
	lb/acre		%	$/lb	$/acre	plants/acre	inches	1-9, 9 best	units	32nds inch	g/tex	%
PhytoGen PHY 300 W3FE	1824	a	38.7	0.5311	967	38,236	35	6.0	5.0	37.5	31.1	83.8
PhytoGen PHY 340 W3FE	1819	a	39.2	0.5474	996	27,588	38	6.7	4.8	38.4	31.1	84.6
PhytoGen PHY 330 W3FE	1811	a	39.8	0.5414	979	32,428	34	6.0	4.8	38.7	32.7	85.2
PhytoGen PHY 450 W3FE	1742	a	35.7	0.5462	951	36,300	37	6.0	4.7	36.7	33.9	84.3
PhytoGen PHY 490 W3FE	1677	a	35.8	0.5509	923	35,332	38	5.0	4.5	39.1	35.0	85.4
Test average	1775		37.9	0.5434	963	33,977	36	5.9	4.8	38.1	32.7	84.6
CV, %	4.9		3.2	3.5	3.8	15.6	3.8	4.4	10.3	3.5	3.7	2.0
OSL	0.2624		0.0078	0.7353	0.2216	0.2182	0.0169	0.0007	0.7579	0.2862	0.0169	0.7656
LSD	NS		2.3	NS	NS	NS	3	0.5	NS	NS	2.3	NS

For lint yield, lb/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.

* Assumes color grades set to 21, leaf grades set to 2 for entire trial.

Table 4. Results from the Jackson County irrigated PhytoGen Innovation trial, Southwest Research and Extension Center, Altus, OK, 2017.

Entry	Lint yield		Lint turnout	Lint loan value*	Lint value	Final plant stand	Plant height	Visual storm resistance rating	Micronaire	Staple	Strength	Uniformity
	lb/acre		%	$/lb	$/acre	plants/acre	inches	1-9, 9 best	units	32nds inch	g/tex	%
PhytoGen PHY 300 W3FE	2006	a	30.4	0.5427	1089	35,719	31	6.0	4.5	35.8	30.8	81.8
PhytoGen PHY 330 W3FE	1912	a	30.2	0.5524	1056	27,007	32	5.7	4.3	37.0	31.6	81.9
PhytoGen PHY 340 W3FE	1860	a	30.4	0.5527	1028	32,234	32	5.7	4.2	36.9	31.5	81.8
PhytoGen PHY 490 W3FE	1788	a	30.3	0.5564	995	30,928	38	5.0	4.2	37.6	34.9	83.4
PhytoGen PHY 450 W3FE	1731	a	28.4	0.5449	944	34,848	34	5.0	4.2	35.4	32.5	82.8
Test average	1859		29.9	0.5498	1022	32,147	33	5.5	4.3	36.5	32.3	82.3
CV, %	7.7		1.8	0.8	8.0	9.1	6.4	5.8	5.0	1.4	2.7	1.1
OSL	0.2471		0.0099	0.0274	0.3144	0.0392	0.0206	0.0156	0.5005	0.0037	0.0034	0.1567
LSD	NS		1.0	0.0085	NS	5483	4	0.6	0.4	0.9	1.6	1.6

For lint yield, lb/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.

* Assumes color grades set to 21, leaf grades set to 2 for entire trial.

Table 5. Results from the irrigated CPS All-Tex B2XF advanced strains trial, OSU Southwest Research and Extension Center, Altus, OK, 2017.

Entry	Lint yield		Lint turnout	Vigor 14-Jun	Open bolls 12-Oct	Visual storm resistance rating 1-Nov	Micronaire	Length	Strength	Uniformity
	lb/acre		%	1-5, 5 best	%	1-9, 9 best	units	inches	g/tex	%
1202D	1966	a	32.0	4.0	37	7.0	4.2	1.20	33.8	83.5
Dyna-Gro DG 3385B2XF	1871	ab	31.5	4.3	60	5.0	4.3	1.16	30.6	83.6
1202B	1801	ab	34.4	2.0	13	6.7	4.1	1.19	35.8	84.6
Dyna-Gro DG 3560B2XF	1725	bc	32.5	1.7	37	6.3	4.7	1.25	36.4	85.4
Dyna-Gro DG 3214B2XF	1704	bc	30.8	3.7	63	4.0	4.4	1.21	31.2	83.8
C-515-7B	1702	bc	31.1	2.3	57	7.0	4.1	1.19	32.4	83.8
1202A	1698	bc	33.5	3.7	17	6.3	4.0	1.22	35.4	84.3
44-514-5B	1553	cd	28.8	3.0	63	6.7	4.5	1.24	33.6	85.0
Check	1463	de	30.3	1.3	60	4.0	4.2	1.18	34.0	83.5
1204C	1295	e	26.8	2.0	47	5.7	3.7	1.20	30.9	83.4
Test average	1678		31.1694	2.8	45	5.9	4.2	1.2	33.4	84.1
CV, %	6.3		2.7	19.6	18.2	8.9	4.3	1.4	2.8	0.9
OSL	<0.0001		<0.0001	<0.0001	<0.0001	<0.0001	0.0007	<0.0001	<0.0001	0.0318
LSD	181		1.4	0.9	14	0.9	0.3	0.03	1.6	1.3

For lint yield, lb/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.

Choosing Which Cotton Varieties to Grow

Randy Boman
Research Director and Cotton Extension Program Leader
Southwest Research and Extension Center, Altus

Variety Selection

Selecting productive cotton varieties is not an easy task, especially in Oklahoma where weather can literally make or break a crop. Producers need to compare several characteristics among many different varieties, then key the characteristics to typical growing conditions. The growing environment from year to year cannot be controlled, but varieties can be selected based on desired attributes. It is very important to select and plant varieties that fit specific fields. Do not plant the entire farm with a single variety, and try relatively small acreages of new varieties before extensive planting. When it comes to variety selection in Oklahoma, several factors are important to consider.

Maturity (Earliness)

Scrutinizing the relative maturity rankings provided by seed companies will be beneficial. Don't expect a mid- to full-season cotton variety to perform well in a short-season environment, where an early or early- to mid-season variety might work best. Many longer season cotton varieties are better adapted to areas with longer growing seasons, although significant gains in yield may sometimes be obtained in years with warm September and October temperatures. Longer season varieties will typically do much better when planted earlier, then provided an excellent finish. For later plantings, early- to mid-season maturity varieties may be better. For late plantings or replant situations, early maturity varieties may be better. Relative maturity for most varieties gets compressed when moisture stress occurs. With drought stress, maturity of longer season varieties will not be expressed to the degree that would generally be noted when under high water and fertility regimes.

Pounds

Yield potential is probably the single most important agronomic characteristic, because pounds do drive profitability and provides for the safety net of higher actual production history (APH) in case of catastrophic loss of acres. The benefit this can provide from the crop insurance perspective is important in our high risk area. Yield stability across environments is going to be important, and finding a variety that has the ability to provide high yield across varying water inputs is critical.

Fiber Quality

Producers should also consider lint quality. Progress has been made in terms of fiber quality during the last several years. Significant improvements have been seen in overall fiber quality packages associated with modern varieties. Staple is generally good to excellent for most new varieties. Many things can affect crop micronaire, including overall environment, planting date, variety, early season fruit loss with later compensation, excessive late season irrigation or rainfall, seedling disease, early season set-backs due to hail damage, blowing sand, thrips, etc. Fiber strength has also significantly improved and many newer varieties tend to be at least 30 g/tex. Length uniformity can be affected by staple, maturity and harvest method (picker harvested is typically higher than stripper harvested). Higher maturity fiber generally results in better uniformity. Leaf grade can be affected by density of leaf hairs on specific varieties in some years. Generally, cool, wet fall conditions can lead to lower quality leaf grades for varieties which tend to be hairy. In drier harvesting environments, these differences tend to diminish.

Color grades are basically a function of weathering or exposure of the fiber on the plant to wet conditions. The highest quality that a cotton boll can have is on the day that it opens. After that, if conditions favor microbial growth (warm, wet conditions). An early freeze can affect immature cotton by reducing its color grade. Bark contamination is generally also driven by significant late season rainfall followed by a freeze. In some years, this can't be easily managed if stripper harvested. Conversely, picker harvesting can significantly reduce or eliminate bark contamination.

Storm Resistance

Storm resistance is still a concern for growers in our area. Even though many producers have adopted less storm-resistant cotton varieties during the last several years, and generally done well with them, the overall management system the producer adopts can be important. Under significant moisture stress on dryland, some newer varieties may provide an unacceptable level of storm resistance, especially if the field is left to a freeze. Producers planning to execute a sound harvest aid program as soon as the crop is mature can probably grow some fields with less storm-resistant cotton. However, having large acreages of varieties with low storm resistance might be a prescription for disaster if the right environmental conditions align at harvest. Do not plan to leave looser cotton varieties in the field until a freeze conditions the plants for harvest. Unacceptable pre-harvest lint loss is likely to result. Higher storm resistance varieties are better adapted to our harvesting conditions and they are more likely to survive damaging weather prior to harvest without considerable seedcotton loss. Inquire about the storm resistance of any variety on your potential planting list. If choosing a variety with low storm resistance, plan and budget ahead for a good harvest aid program that will achieve an early harvest. Good storm resistance data are now being provided by most companies and we visually evaluate all Extension and research variety trials for this attribute. For those planning to harvest with spindle pickers, varieties with higher storm resistance may possibly result in reduced picker harvesting efficiency.

Disease and Nematode Resistance/Tolerance

Producers should not plant the entire farming operation to one cotton variety. A question should be "do I have plant diseases or Root knot nematodes in this specific field?" Although we have not been able to identify substantial acreage with this pest in Oklahoma, varietal tolerance or resistance will be critical for management. It is important to know which disease is present. If there is a problem with a wilt disease, but don't know what it is, then have the problem identified. If known Verticillium wilt pressure is present, then take a look at Texas A&M AgriLife Research and Extension testing data from several locations investigating variety performance under constraints from this particular disease. The same should be considered for Fusarium wilt/Root-knot nematode issues. Many times varieties which do well under Verticillium wilt pressure may not be the same ones which are resistant with Fusarium or Root-knot nematode. Bacterial blight is an occasional problem in the region, and the only way to manage this disease is planting resistant or immune genetics. There are several varieties that can provide high levels of resistance/immunity. To determine the disease reaction of many currently available varieties, visit the Texas A&M AgriLife Research and Extension Center website at: http://lubbock.tamu.edu

Biotech Trait Types

Producers need to ask themselves several questions. "Do I want a herbicide-tolerant variety, and if so, which system?" Weed control has been catapulted forward by the advent of transgenic Roundup Ready® Flex, GlyTol®, Liberty Link®, and Glytol® plus Liberty Link® (stacked) cotton varieties. The agronomic capabilities of glyphosate-tolerant cotton varieties continue to improve and the weed control system it enables is very effective, if properly executed. The Liberty Link® system has thus far been more widely adopted in other regions, perhaps due to our hot and dryl early season environments in some years. The widely anticipated GlyTol®, the proprietary glyphosate tolerance trait from Bayer CropScience (BCS) has been approved by regulatory agencies and has been launched. In 2013, there were several varieties with GlyTol®/Liberty Link® stacked technologies.

As for insect protection, for several years now, Monsanto's Bollgard® II and Dow AgroSciences' Widestrike® technologies have provided outstanding lepidopteran pest control. In 2014, TwinLink® Bt from BCS will be available. Based on local pricing, these technologies have been widely planted on Oklahoma cotton acres. Because of the lack of disruption of beneficial arthropods by insecticides used to target bollworms, etc., aphids will likely not be flared, which is of considerable value. In the near future, Bollgard® II, Widestrike®, and TwinLink® technologies will be "stacked" with an additional Bt trait (Syngenta's VIP 3A) to improve the control spectrum of caterpillar pests and for resistance management issues.

Variety Testing Publications

If disease issues are not concerning, then scrutinize all possible university trial data available to see how a specific variety has performed across a series of environments, and if possible, across years. It is best to consider multi-year and multi-site performance averages when they are available. However, due to the rate of varietal release, many new varieties are sold that have not undergone multi-year university testing, or perhaps no university testing at all. The 2012 and to a certain degree, 2013 variety testing programs were adversely affected by drought and results are available here: http://cotton.okstate.edu/variety-tests

SeedMatrix is a recently developed web-based application that enables users to analyze test plot data from multiple sites in a simple format. SeedMatrix allows the user to analyze variety trial data on cotton, wheat, corn and soybean. The application can analyze the data to find best varieties based on multiple criteria selections, including geography, soil texture, irrigation type, as well as technology traits. Although it is always best to identify varieties that perform well locally, sometimes a tool such as this is useful to help identify yield and fiber quality stability across a large number of sites. It can be found here: https://seedmatrix.com

Seed and Technology Cost

Cost should not necessarily be the primary reason for selecting a variety, but it is important. The value of a high yielding cotton variety with biotech traits to ease management requirements across a large number of acres is a serious consideration. According to USDA-AMS Cotton Varieties Planted - 2012 Crop, the Abilene Classing Office indicated producers planted about 100 percent of the acreage to Roundup Ready® Flex varieties, and about 98 percent to Bollgard® II or Widestrike® Bt technologies. The Plains Cotton Growers Seed Cost Comparison Worksheet can certainly be useful for planning purposes, and they annually update the Microsoft Excel spreadsheet. This file can be used within your Web browser, or downloaded and saved to your computer. About 100 varieties of many types can be found in the spreadsheet. The user can select up to 10 varieties to simultaneously compare total seed and technology fee costs based on a specific seeding rate. The row spacing and seed per row-ft can be entered by the user. This then calculates a seed drop on a per acre basis. Based on published pricing for the various seed varieties and technology fees, the cost per acre is automatically calculated. It should be noted that the pricing used in the spreadsheet does not include premium seed treatments or any incentive program that might be provided by the various companies. The Seed Cost Comparison Worksheet is available here: www.plainscotton.org

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Entomology & Plant Pathology

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

The NTOK (North Texas, Oklahoma, and Kansas) program and website (www.ntokcotton.org), was maintained for the Oklahoma Cotton Council. This project was supported by generation of timely information on important issues during the growing season. For the ntokcotton.org website, and based on results from ipower.com website traffic analysis software, from January 1 through December 31, 2017, the number of unique visitors was 14,692 with 24,046 documents delivered.

The OSU Extension Cotton Team published thirteen newsletters which were directly sent to 451 email recipients. A yearly survey was sent to all recipients, and a total of 34 responded. It was evident based on this survey and respondents, that an additional 399 people were forwarded the newsletter. Therefore, the best estimate we have for direct distribution of the newsletters would total about 850. The best estimate we have for direct distribution of the newsletter is a total of 11,050 (13 editions x 850 recipients). The recipients were asked to rate the newsletter on a scale of 1 to 5 (1 being not very useful) and 5 (being extremely useful). The result for the newsletter's usefulness was 4.58%. With respect to the question of "topics being timely and discussed" the result was 4.70%. When asked whether the newsletter was to be continued the result was 100% of respondents.

We placed considerable content on the www.cotton.okstate.edu website hosted by a campus server since it was initiated in 2012. We supported this website with our publications and newsletters. 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.

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. In addition to copies initially distributed in 2012, more copies were distributed at various meetings during 2017. We will continue to distribute this DVD during subsequent meetings in the state until the supply is exhausted.

Surveys of Crop and Pest Conditions

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. Due to personnel reductions and budget constraints, program fields and counties were reduced in 2017. Field surveys were conducted in four counties in a total of fourteen fields. Insect pressure as well as plant development were recorded and reported in the newsletter. Field inspections were performed weekly.

Plant development was also recorded and reported in the newsletter. As part of the COTMAN program, the nodes above white flower (NAWF) criterion was tracked at each location (Figures 1 and 2) to assist producers in the identification of the last cohort of bolls that should likely make harvestable lint at each site. This assists with the termination of insecticides for late season pests, and helps determine irrigation termination and harvest aid application dates.

Figure 1. Weekly nodes above white flower (NAWF) in surveyed irrigated fields in 2017.

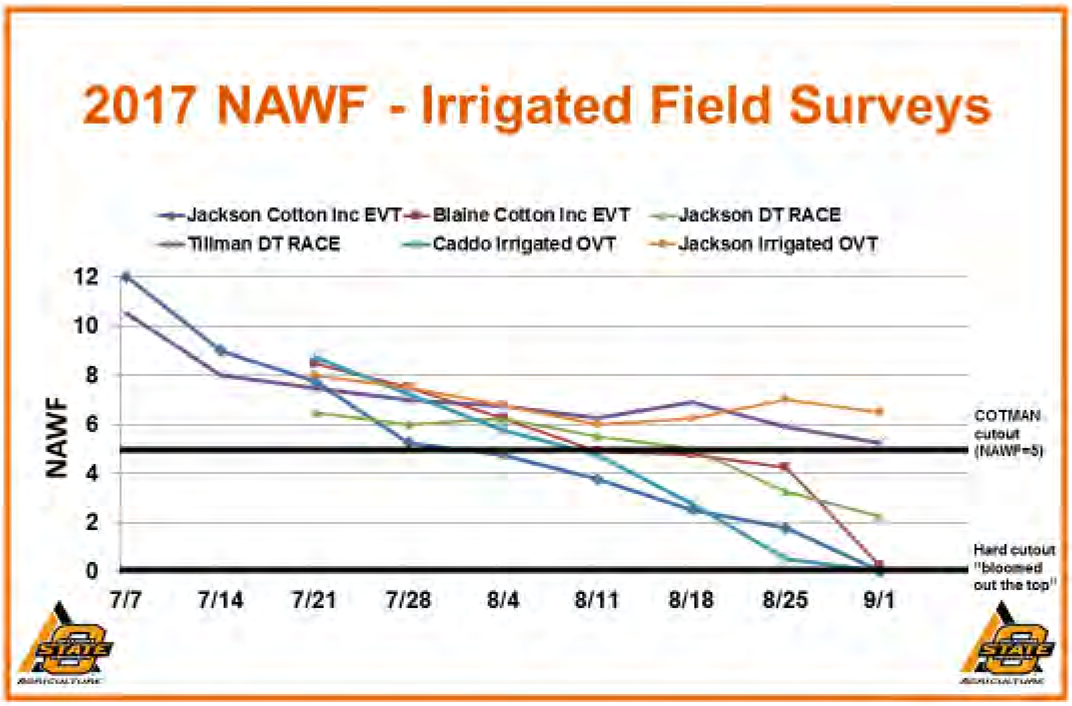
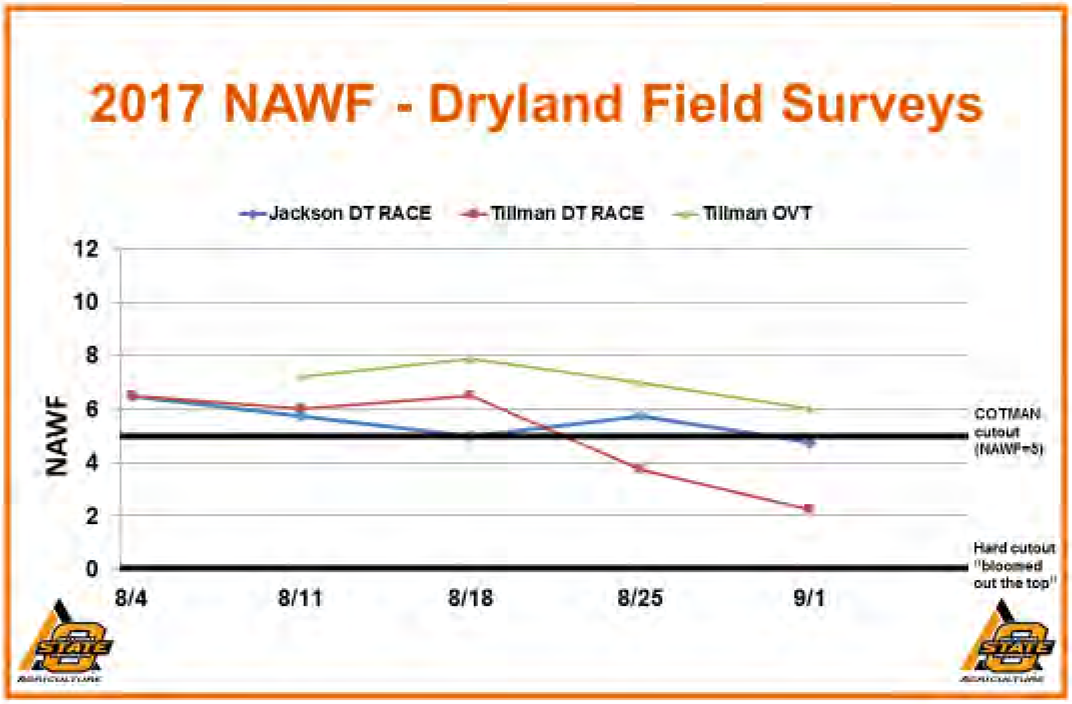


Figure 2. Weekly nodes above white flower (NAWF) in surveyed dryland fields in 2017.



Research Accomplishments

Cotton Bollworm / Tobacco Budworm and Beet Armyworm Monitoring

The bollworm/tobacco budworm complex has been the target of insecticide applications applied annually to a few acres of non-Bt cotton. Monitoring moth activities helps determine species ratio and peak ovipositional activity for these insects.

Traps were located near the communities of Altus, Ft Cobb, Hollis, 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, 2017. Although both species do coexist and are considered the same by growers, this 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 if necessary.

A total of 2,173 moths were captured between the weeks of June 1 and October 1 in 2017. This is an increase of 77.0% percent of 2016 trap totals. Bollworms comprised 80.7% of the total catch in 2017.

Table 1. Moth Pheromone Trap Catch Totals for Selected Regions of Oklahoma, Summer 2017.

		Bollworm	
Altus	Tipton	Hollis	Ft. Cobb
486	613	423	233
		Tobacco Budworm	
Altus	Tipton	Hollis	Ft.Cobb
122	171	102	230
		Beet Armyworm	
Altus	Tipton	Hollis	Ft. Cobb
15	30	23	24

Figure 3. Species composition of moths trapped across Oklahoma, Summer 2017.

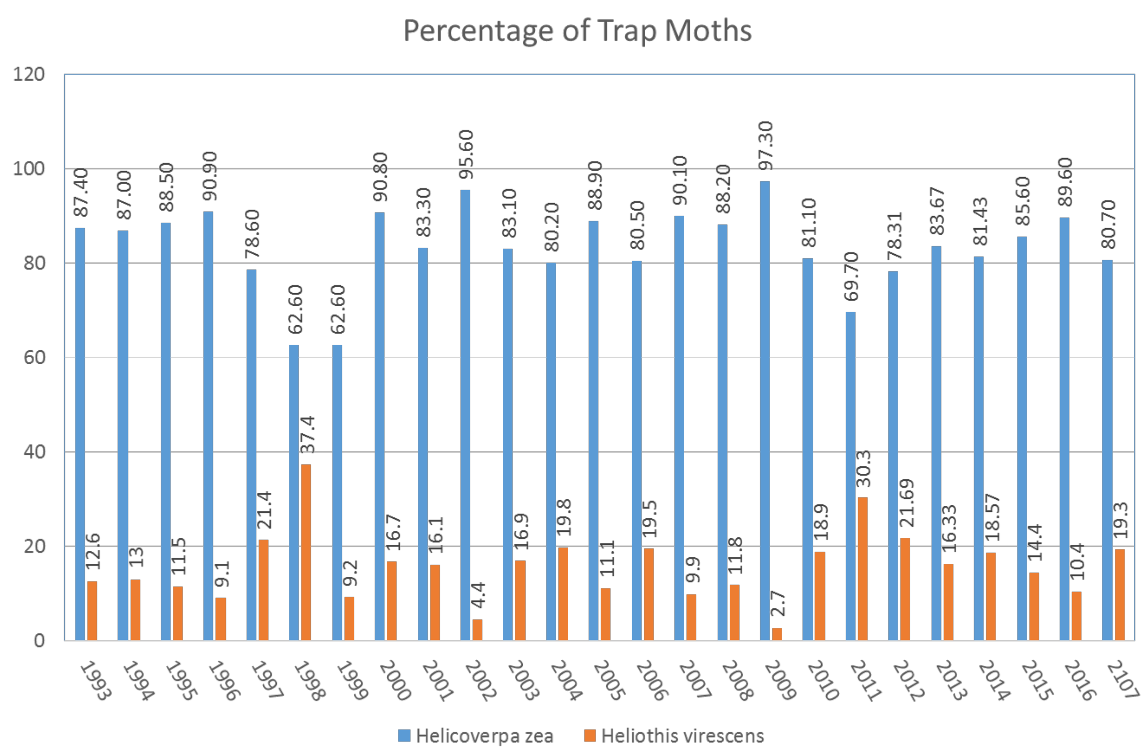


Figure 4. Cotton bollworm moths trapped by week across Oklahoma, Summer 2017.

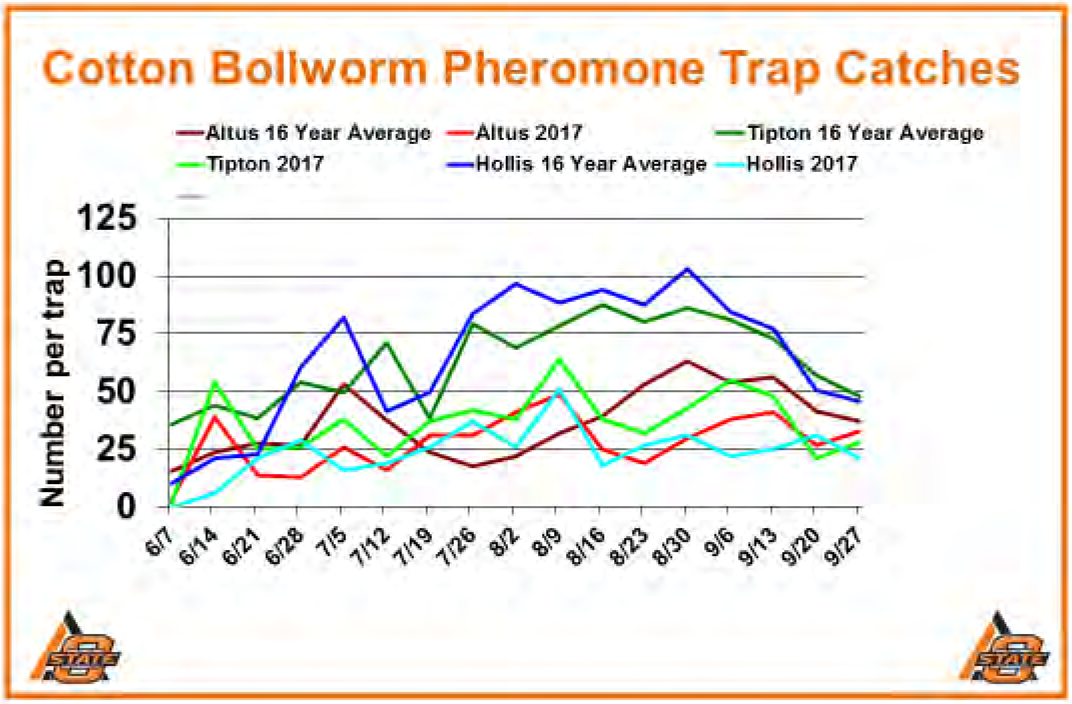


Figure 5. Tobacco budworm moths trapped by week across Oklahoma, Summer 2017.

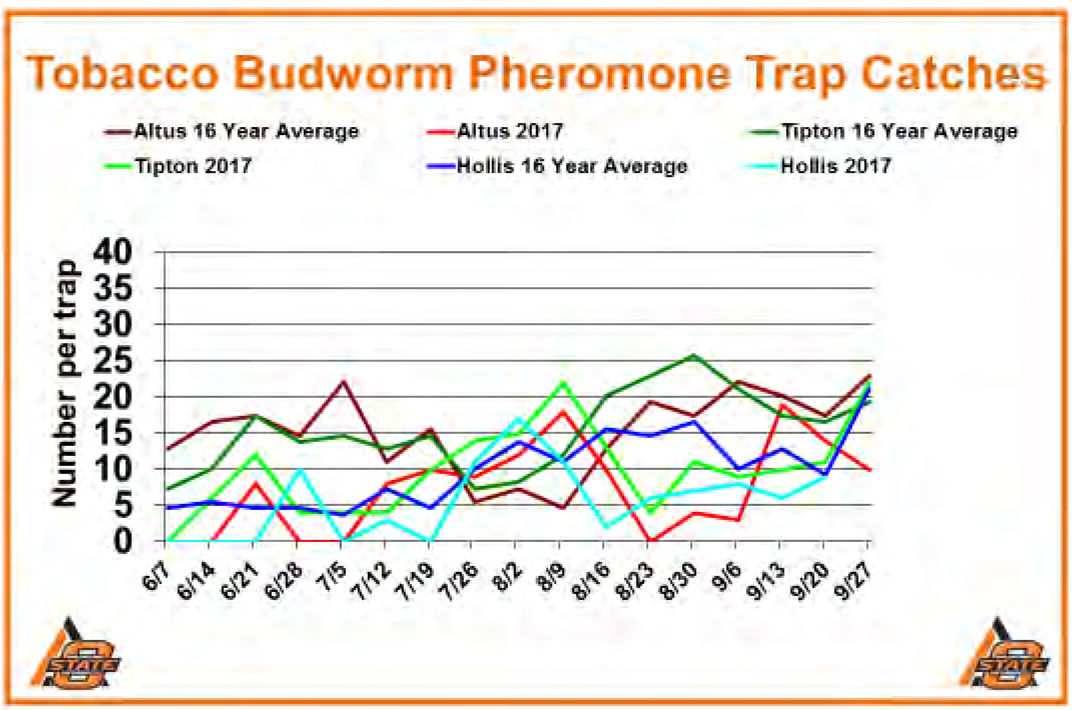
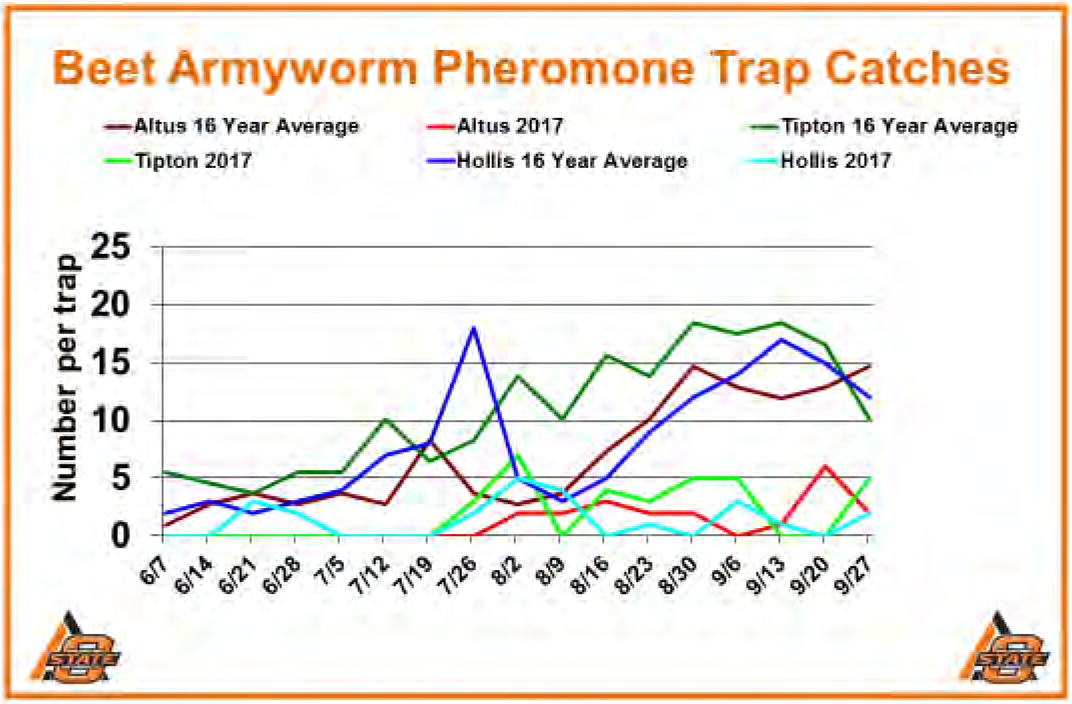


Figure 6. Beet armyworm moths trapped by week across Oklahoma, Summer 2016.



Insecticide Evaluation Trials

Two Bayer CropScience trials were established at the OSU Research and Extension Center at Altus. These trials included various experimental seed treatments and in-furrow treatments using the new Velum product. The trials consisted of 7 treatments and 8 treatments. All trials were replicated 4 times, with observational data collected and yields determined. Pending outcome of projects conducted across the Cotton Belt, at this time Bayer CropScience has requested that this information not be published.

Dow Widestrike III, Bollgard 3, and TwinLink Plus Bt Observation Trials – Important Tool in Cotton Insect Resistance Management

The objectives of these trials were to evaluate germplasm performance and to observe Widestrike III, Bollgard 3 and Twinlink Plus performance compared to older Bt technologies. Although worm pressure was low, these observations of triple-Bt stacked traits provided important information concerning the efficacy of the products and variety performance. Working with industry, three Dow AgroSciences Innovation Trials in Custer and Jackson Counties (2 sites) were planted and harvested. One of the Jackson County trials was planted under furrow irrigation, the other under drip irrigation, while the Custer County site was center-pivot irrigated. All entries contained Widestrike III triple-stacked Bt technology (Cry1A + Cry1F + VIP 3A) targeted to control various lepidopterous pests. Although still sourced from Bt, Widestrike III is a different system than what is currently marketed by Monsanto (Bollgard II, Cry1A + Cry2AB), Dow AgroSciences' Widestrike (Cry1A + Cry1F), and Bayer CropSciences' TwinLink. TwinLink consists of two genes which express Cry1Ab and Cry2Ae proteins. Some trials included TwinLink Plus (Cry1Ab + Cry2Ae + VIP 3A), as well as Bollgard 3 (Cry1A + Cry2AB + VIP 3A) germplasm.

COTTON INSECT LOSSES 2017

Pest	Acres Infested	% Acres Infested	Acres Treated	% Acres Treated	# of apps /acres treated	Cost of 1 insecticide app (including application cost)	% loss /acre infested	# of apps/ total acres	cost/acre	overall % reduction	Bales lost / pest	Loss + cost	Loss + cost/acre	% Total Loss+Cost
Bollworm/Budworm	55,500	10%	27,750	5%	1.0	$15.00	0.5%	0.05	$0.75	0.05%	578	$230,284	$0.41	1.8%
Beet Armyworm	0	0%	0	0%	0.0	$0.00	0.0%	0	$0.00	0.00%	0	$0	$0.00	0.0%
Fall Armyworm	5,550	1%	0	0%	0.0	$0.00	0.0%	0	$0.00	0.00%	0	$0	$0.00	0.0%
Loopers	0	0%	0	0%	0.0	$0.00	0.0%	0	$0.00	0.00%	0	$0	$0.00	0.0%
Cutworms	0	0%	0	0%	0.0	$0.00	0.0%	0	$0.00	0.00%	0	$0	$0.00	0.0%
Cotton Leaf Perforator	0	0%	0	0%	0.0	$0.00	0.0%	0	$0.00	0.00%	0	$0	$0.00	0.0%
Saltmarsh Caterpillar	0	0%	0	0%	0.0	$0.00	0.0%	0	$0.00	0.00%	0	$0	$0.00	0.0%
Lygus	0	0%	0	0%	0.0	$0.00	0.0%	0	$0.00	0.00%	0	$0	$0.00	0.0%
Cotton Fleahopper	416,250	75%	360,750	65%	2.0	$12.00	1.5%	1.3	$15.60	1.13%	13,066	$10,758,242	$19.38	84.9%
Stink Bugs (other than brown stink bug)	83,250	15%	27,750	5%	2.0	$8.50	1.0%	0.10	$0.85	0.15%	1,734	$636,740	$1.15	5.0%
Brown Stink Bug	0	0%	0	0%	0.0	$0.00	0.0%	0	$0.00	0.00%	0	$0	$0.00	0.0%
Clouded Plant Bug	0	0%	0	0%	0.0	$0.00	0.0%	0	$0.00	0.00%	0	$0	$0.00	0.0%
Leaf Footed Bugs	0	0%	0	0%	0.0	$0.00	0.0%	0	$0.00	0.00%	0	$0	$0.00	0.0%
Spider Mites	5,550	1%	5,550	1%	1.0	$12.50	0.0%	0.01	$0.13	0.00%	0	$694	$0.00	0.0%
Thrips	138,750	25%	138,750	25%	1.0	$8.50	0.5%	0.25	$2.13	0.13%	1,503	$785,423	$1.42	6.2%
Aphids	55,500	10%	55,500	10%	1.0	$14.00	0.5%	0.1	$1.40	0.05%	578	$266,359	$0.48	2.1%
Grasshoppers	27,750	5%	0	0%	0.0	$0.00	0.0%	0	$0.00	0.00%	0	$0	$0.00	0.0%
Banded Winged Whitefly	0	0%	0	0%	0.0	$0.00	0.0%	0	$0.00	0.00%	0	$0	$0.00	0.0%
Silverleaf Whitefly	0	0%	0	0%	0.0	$0.00	0.0%	0	$0.00	0.00%	0	$0	$0.00	0.0%
Other-fill in as needed	0		0					0	$0.00	0.00%	0	$0	$0.00	0.0%
Other-fill in as needed	0		0					0	$0.00	0.00%	0	$0	$0.00	0.0%
Other-fill in as needed	0		0					0	$0.00	0.00%	0	$0	$0.00	0.0%
Other-fill in as needed	0		0					0	$0.00	0.00%	0	$0	$0.00	0.0%
Boll Weevil	0		0					0	$0.00	0.00%	0	$0	$0.00	0.0%
TOTAL								1.81	$20.85	1.51%	17,459	$12,677,742	$22.84	

SUMMARY DATA

Data Input

State	Oklahoma
Region	Central
Year	2017
Total Acres (Upland)	555,000
Yield / Acre (Upland)	951
Price / lb	$0.68
yield potential (lb/acre)	1,000
Acres (Pima)	0
Yield / Acre (Pima)	.
% Acres Scouted	50%
Fee / Scouted Acre	$7.50
No. times scouted/week	1
% acres Transgenic (Bt) Cotton	100%
Cost/treated acre Transgenic (Bt) Cotton	$8.00
% acres with seed treatment	10%
Seed trt. cost/ treated acre	$10.00
% acres with in-furrow	0%
In-furrow cost/treated acre	$6.00
% acres in Boll Weevil Eradication	100%
Cost/acre Boll Weevil Eradication	$2.50
% acres in Pink Bollworm Eradication	0%
Cost/acre Pink Bollworm Eradication	$0.00
% Insect apps by air	20%
No. apps by air	1
Cost/app by air	$8.50
% insect apps by ground	80%
No. apps by ground	2.5
Cost/app by ground	$6.00
% Loss to weather	10.0%
% loss to non-arthropods	1.0%
% loss to other (chemical injury, weeds, diseases, etc.)	0.5%

Yield and Management Results

Total Acres	555,000
Total Bales Harvested	1,099,594
Total Bales Lost to Insects	17,459
Percent Yield Loss	1.5%
Yield w/o Insects (lb/acre)	966
Av. # Applications	1.81
Total Bales lost (all factors)	150,428
Total % yield Loss	13.0%
Transgenic Cotton (arthropods) (# acres)	555,000
Boll Weevil Eradication (# acres)	555,000
Pink Bollworm Eradication (# acres)	0
# Scouted Acres	277,500
Seed Treatments (arthropods) (# acres)	55,500
In-Furrow Applications (# acres)	0
Applications by Air (acres)	111,000
Applications by Ground (acres)	444,000

Economic Results

	Total	Per Acre
Foliar Insecticide Costs	$11,571,750	$20.85
Seed Treatment Costs	$555,000	$1.00
In-Furrow Costs	$0	$0.00
Scouting Costs	$2,081,250	$3.75
Eradication Costs	$1,387,500	$2.50
Bt Cotton	$4,440,000	$8.00
Total Costs	$20,035,500	$36.10
Yield Loss to Insects	$5,698,618	$10.27
Total Losses + Costs	$25,734,118	$46.37

Upland Cotton	% Acres	# Acres	Total cost/acre	Bt cost/acre	% acres treated for BW/TBW	# acres treated for BW/TBW	# apps for BW/TBW	% of Population Bollworm
Bollgard II	91.0%	505,050	$68.00	$6.50	5%	25,253	1.0	100%
Bollgard III	0.0%	0	$0.00	$0.00	0%	0	0.0	
WideStrike	1.0%	5,550	$68.00	$6.50	0%	0	0.0	
WideStrike 3	7.0%	38,850	$68.00	$6.50	0%	0	0.0	
TwinLink	1.0%	5,550	$68.00	$6.50	0%	0	0.0	
TwinLink Plus	0.0%	0				0		
Total Bt	100%	555,000	$68.00	$6.50	4.6%	25,253	0.9	91%
Herbicide Traits Only	0%	0				0		
Conventional	0%	0				0		
Organic	0%	0				0		
Total Upland Cotton	100.0%	555,000	$68.00	$6.50	4.6%	25,253	0.9	91.0%
Non Upland Cotton								
Pima	0%	0				0		
Other	0%	0				0		
Organic	0%	0				0		
Total (all Cotton)		555,000	$68.00		4.6%	25,253	0.9	
	% Acres	# Acres						
No. Acres with No foliar applications	15.0%	83,250						

COTTON DISEASE LOSS ESTIMATE COMMITTEE REPORT, 2017.

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Abstract

The National Cotton Council Disease Loss committee submitted estimates of the losses due to each disease during the 2017 growing season. Disease incidence estimates are determined by cotton specialists in each state discussing disease incidence observed across each state during the year. Yield losses are calculated by using the USDA "Crop Production" published at http://usda.mannlib.cornell.edu/usda/current/CropProd/CropProd-12-12-2017.pdf which documents cotton acreage planted, harvested, and average yields for each state. Cotton acreage is expected to total 11.5 million harvested acres, which is an increase from 2015 and 2016. Record high cotton yields are expected to average 902 pounds per acre, which is an increase of 35 pounds from 2016. Increases in cotton acres harvested are expected in Alabama, California, Oklahoma and Tennessee. Total average percent cotton disease losses were estimated at 11.79 % which is very similar to 12.5% loss estimate of 2016.

Plant parasitic nematodes were the group of pathogens responsible for the largest average percent loss estimated at 4.65% follow by seedling disease at 1.87% disease losses. Alabama suffered the greatest total disease losses of over 24% with Florida, Georgia, and Louisiana, estimating losses over 17%. This region of the cotton belt received greater than average rainfall with cool temperatures in April and May. Arizona, California, New Mexico, and Oklahoma, appeared to have the best growing conditions with the least amount of disease losses.

Table 1. Cotton disease loss estimates for the 2017 season.																		
Percent disease loss estimates	AL	AZ	AR	CA	FL	GA	LA	MS	MO	NM	NC	OK	SC	TN	TX	VA	Bales lost	% Bales lost
Fusarium Wilt (*F.o. vasinfectum*)	1.0		0.1	2.0	0.5	0.3	0.0	0.1	0.1	0.0	0.0	0.0	1.0	0.0	0.4	0.0		
Bales lost to Fusarium (x 1,000)	8.3	0.0	1.1	6.0	0.9	5.8	0.0	1.4	0.7	0.0	0.1	0.0	7.3	0.0	38.0	0.0	**69.5**	**0.33**
Verticillium Wilt (*V. dahliae*)	0.5		0.4	0.2	0.0	0.0	0.0	0.0	0.5	1.0	0.0	2.0	0.0	0.8	2.1	0.0		
Bales lost to Verticillium (x 1,000)	4.2	0.0	4.2	0.6	0.0	0.0	0.0	0.0	3.6	1.0	0.0	22.0	0.0	5.5	199.5	0.0	**240.6**	**1.16**
Bacterial Blight (*X. malvacearum*)	3.0		0.1	0.0	0.0	0.1	0.5	0.1	0.1	0.0	0.0	0.0	0.2	0.0	0.2	0.0		
Bales lost to Xanthomonas (x 1,000)	24.9	0.0	1.1	0.0	0.0	2.3	2.1	0.7	0.7	0.0	0.1	0.0	1.5	0.0	19.0	0.0	**52.4**	**0.25**
Root Rot (*P. omnivora*)	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	2.8	0.0		
Bales lost to Phymatotrichopsis (x 1,000)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	0.0	0.0	266.0	0.0	**268.2**	**1.29**
Seedling Diseases (*Rhizoctonia* & Etc.)	8.0		2.5	1.5	0.3	0.5	2.0	1.1	2.5	0.5	2.0	0.1	1.0	4.0	1.8	2.0		
Bales lost to Seedling disease (x 1,000)	66.4	0.0	26.5	4.5	0.5	11.5	8.4	15.5	18.1	0.5	14.2	1.1	7.3	29.2	171.0	4.2	**378.9**	**1.82**
Ascochyta Blight (*A. gossypii*)	0.1		0.0	0.0	2.0	0.0	0.1	0.0	0.0	0.0	0.5	0.0	0.1	0.5	0.0	0.1		
Bales lost to Ascochyta (x 1,000)	0.8	0.0	0.0	0.0	3.6	0.0	0.4	0.0	0.0	0.0	3.6	0.0	0.7	3.7	0.0	0.2	**13.0**	**0.06**
Boll Rots (*Rhizopus*, etc.)	1.0		1.2	0.0	4.0	5.0	5.0	0.7	1.0	0.0	3.0	0.2	0.2	1.0	1.0	3.0		
Bales lost to Rhizopus (x 1,000)	8.3	0.0	12.7	0.0	7.2	115.0	21.0	9.9	7.3	0.0	21.3	2.2	1.1	7.3	95.0	6.2	**314.5**	**1.51**
Nematodes (All)	10.2		4.1	0.1	9.5	10.0	7.0	7.5	4.3	0.5	4.0	0.1	10.0	2.6	3.1	4.0		
Bales lost to Nematodes (x 1,000)	84.7	0.0	43.5	0.3	17.1	230.0	29.4	105.8	31.2	0.5	28.4	1.1	73.0	19.0	294.5	8.3	**966.6**	**4.65**
Nematodes (*Meloidogyne* spp.)	6.0		2.0	0.1	7.0	8.0	3.5	2.0	2.0	0.5	3.0	0.1	4.0	0.0	2.6	2.0		
Bales lost to Meloidogyne (x 1,000)	49.8	0.0	21.2	0.3	12.6	184.0	14.7	28.2	14.5	0.5	21.3	1.1	29.2	0.1	247.0	4.2	**628.6**	**3.02**
Nematodes (*Rotylenchulus reniformis*)	4.0		2.0	0.0	2.0	1.0	3.5	5.0	2.0	0.0	0.5	0.0	2.0	2.5	0.5	0.0		
Bales lost to Reniform (x 1,000)	33.2	0.0	21.2	0.0	3.6	23.0	14.7	70.5	14.5	0.0	3.6	0.0	14.6	18.3	47.5	0.0	**264.6**	**1.27**
Nematodes (Other spp.)	0.2		0.1	0.0	0.5	1.0	0.0	0.5	0.1	0.0	0.2	0.0	4.0	0.0	0.0	2.0		
Bales lost to other Nematodes (x 1,000)	1.7	0.0	1.1	0.0	0.9	23.0	0.0	7.1	0.7	0.0	1.4	0.0	29.2	0.0	0.0	4.2	**69.2**	**0.33**
Leaf Spots & Others	0.5		0.3	0.0	3.0	2.0	3.0	2.3	0.2	0.0	1.0	0.5	0.1	0.7	0.3	0.5		
Bales lost to Leaf spots & Others (x 1,000)	4.2	0.0	3.2	0.0	5.4	46.0	12.6	32.4	1.5	0.0	7.1	5.5	0.7	5.1	28.5	1.0	**153.2**	**0.74**
Total Percent Lost	24.3	0.0	8.7	3.8	19.3	17.9	17.6	11.8	8.5	2.0	10.2	3.1	12.6	9.5	11.7	9.6		
Total Bales Lost (x 1,000)	**201.7**	**0.0**	**92.2**	**11.4**	**34.7**	**410.6**	**73.9**	**165.7**	**61.6**	**2.0**	**72.6**	**34.1**	**91.6**	**69.1**	**1111.5**	**20.0**	**2452.7**	**11.79**
Total Yield in Bales (x 1,000) (USDA Dec'17)	**830**	**505**	**1060**	**300**	**180**	**2300**	**420**	**1410**	**725**	**100**	**710**	**1100**	**730**	**730**	**9500**	**208**	**20808**	

2018 Beltwide Cotton Conference Presentations-San Antonio, Texas

Project personnel were involved in several Beltwide Cotton Conference presentations in San Antonio, Texas in January 2018.

The Extension Specialist Working Group (ESWG) initiated a project to evaluate the impact of soil applied potassium on cotton yield in eight states. Those included Louisiana, Texas, Oklahoma, Virginia, Mississippi, North Carolina, Arkansas, and Alabama. Locations were established to evaluate various soils and determine if there was any yield increase or economic benefit associated with these applications.

Crop irrigation water use is a major concern, and producers continue to seek ways to reduce water usage. This project was furrow irrigated and was located in the Lugert-Altus Irrigation District, near Altus. Typically about 3 acre-inches are applied per irrigation using gravity flow through concrete ditch/siphon tubes. Producers historically terminate irrigation in this area around September 1 each year. Questions have been asked concerning the long-term impact of earlier irrigation termination, and is there a potential water savings without sacrificing yield and quality? Dr. Saleh Taghvaeian initiated a project to monitor soil moisture, and project personnel were involved in managing crop response.

IMPACT OF SOIL APPLIED POTASSIUM ON COTTON YIELD ACROSS THE COTTON BELT

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INTRODUCTION

The frequency and severity of potassium (K) deficiency symptoms in cotton (*Gossypium hirsutum* L.) have increased in some areas of the U.S. Cotton Belt over the past decade. Insufficient levels of plant available K in the soils of these regions may be reducing lint yield and fiber quality and leading to decreased profits for cotton producers. Deficiency symptoms may be observed beginning at first flower but increase in severity as the boll load and boll fill periods progress (Reddy et al., 2005). Potassium plays a major role in several critical processes, including photosynthesis, activation of protein enzymes, disease and drought stress mitigation, and fiber development. Previous research has reported 44 lb K/acre/bale will be removed annually with lint and seed harvest (Oosterhuis, 1995). Increased yield potential in new varieties and better insect management have pushed cotton yields to three to four bales per acre and can exceed five bales on irrigated land. Greater yield potentials put a substantial demand on the roots' ability to take up sufficient quantities of K and other nutrients to meet the physiological demand of the plant, seed, and lint. As K demand continues to increase, deep profile soil samples indicate a reduced level of plant available K in some production areas. According to the Nutrient Use Geographic Information System (NuGIS) webpage, K_2O balance is negative (-11 to -50 lb/a) for the majority of the cotton production regions (IPNI, 2012). It is well documented that cotton is more sensitive to low K availability than most other major field crops, and often shows symptoms of K deficiency in soil not considered deficient (Cassman et al., 1989).

The objectives of this research were to: 1) quantify soil K levels, at depth, from several major cotton production regions in the Cotton Belt experiencing K deficiencies; and 2) evaluate the impact of application method and K rate on cotton lint yield, quality, and return on investment (ROI). Based on these results, soil K recommendations will be re-evaluated and modified as appropriate to optimize yields.

MATERIALS AND METHODS

The 2015 trials were initiated at 12 locations across the U.S. Cotton Belt, including Virginia (VA), North Carolina (NC), South Carolina (SC), Alabama (AL), Mississippi (MS), Louisiana (LA), Tennessee (TN), Arkansas (AR), Oklahoma (OK), Texas (TX) and Arizona (AZ). There were three research locations in TX in 2015: Lubbock, Williamson, and Wharton Counties. In 2016, trials were divided into sites that were conducted at a new location (8) and sites superimposed over the 2015 sites with an identical plot plan, called multi-year sites (8). States using new locations for research sites, included: AL, AR, LA, MS, NC, OK, TX (Lubbock and Williamson County), and VA.

Soil samples were collected four to six weeks prior to planting from all locations in 2015, 2016, and 2017 and were analyzed using the Mehlich III extraction method at depth increments of 0-6", 6-12", 12-24" by the Texas A&M AgriLife Extension Soil, Water and Forage Testing Laboratory (College Station, TX). Soil K concentrations at depth are presented in Fig. 1 a,b,c. Potassium treatments, injected and broadcast application methods, were applied two to four weeks prior to planting cotton (Table 1). The granular treatments (muriate of potash, KCl, 0-0-60) were broadcast applied and incorporated to an approximate depth of two inches with tillage. Liquid K fertilizer treatments (solution of KCl, 0-0-15) were injected approximately six inches deep and four inches to the side of the seed row.

Table 1. Potassium application method and rates for 2015, 2016, and 2017 trials across the Cotton Belt.

Application method	**Rate (lb K_2O/A)**
Broadcast (0-0-60, KCl)	0, 40, 80, 120, and 160
Knife-injected (0-0-15, KCl)	0, 40, 80, 120, and 160

Nitrogen, P, and other nutrients (as needed) were applied at the recommended rate based on soil test results to ensure nutrients were not limiting and maximum yield potential for each location were possible of being obtained. The cotton variety planted at all locations was DP 1321 B2RF in 2015 and DP 1522 B2XF in 2016 and 2017. The plots were arranged in a randomized complete block design with four replications. Plot dimensions varied by location but were generally four rows wide and greater than 40 feet in length. In-season plant measurements included stand counts, plant height, total nodes, and leaf samples collected at four weeks after first flower. Leaf samples were sent to the Texas A&M AgriLife Extension Soil, Forage, and Water Testing Laboratory for mineral analysis including P, K, Ca, Mg, Na, Zn, Fe, Cu, Mn, S, and B. After mechanical harvest, seed cotton was ginned to calculate lint turnout and yield, and fiber samples were sent to Cotton Incorporated for high volume instrument (HVI) testing. These data were analyzed using a PROC GLIMMIX procedure in SAS 9.4 and after analysis of variance was performed, Fisher's LSD means separation was used to determine treatment differences ($P < 0.05$).

RESULTS

Soil Potassium

Soil tests indicate a range of K levels across the Cotton Belt, with the lowest levels occurring in VA, LA, MS and Williamson-TX new-site locations in 2015 (Fig. 1a). At these locations, K levels were less than 150 mg/kg at the 0-6" depth based on the Mehlich III K critical level or threshold, and as such K fertilizer would have been recommended for a two-bale (approximately 1000 lb/A lint) yield goal. The Lubbock, TX location had K levels much greater than the threshold in 2015 at the 0-6" depth and decreased at deeper depths. In 2016 and 2017, the Lubbock, TX and OK locations had K levels much less than 2016 but still greater than the threshold. The site chosen for the Williamson, TX location in 2016 had K levels less than 100 mg/kg, but the new-site used in 2017 had levels greater than 200 mg/kg K. Potassium levels in 2016 and 2017 at the MS, AL, VA, AR, NC, and LA locations were mostly less than the threshold. Across most locations, soil K levels decrease with depth and indicate some level of K stratification and K mining with depth. The plant growth measurements, leaf tissue K concentrations, and fiber quality data were collected for each location, but this information will not be presented.

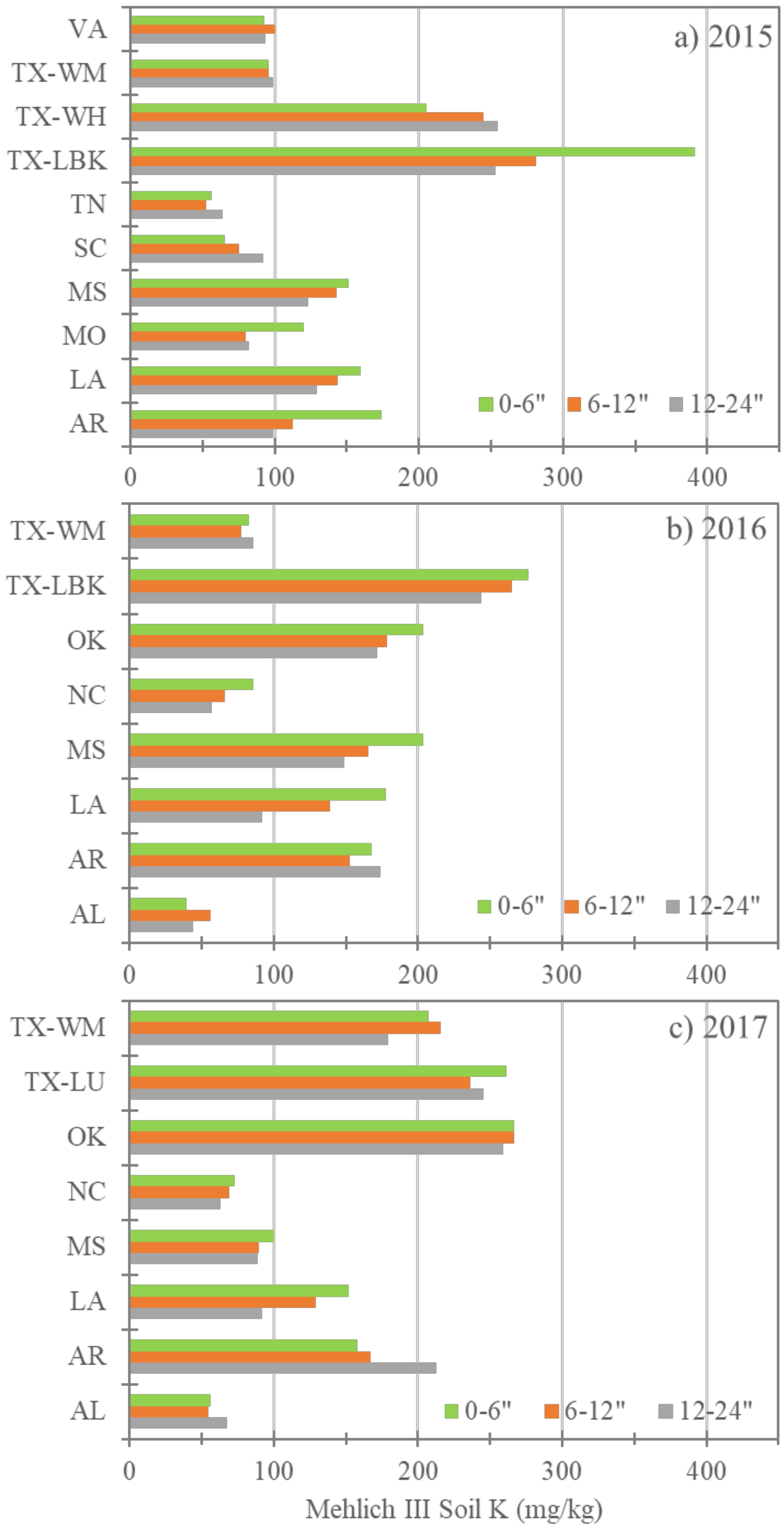

Figure 1. Soil K determined at research locations using the Mehlich III extraction method at soil depths of 0-6”, 6-12”, and 12-24” in 2015 (a), 2016 (b), and 2017 (c).

Cotton Lint Yield

In 2015 at the Southwestern locations (TX and OK), a significant yield response was observed at the Williamson County, TX location, despite very low yields (Fig. 2). Lint yields at the Wharton County, TX location were on average greater than the Williamson County location and was non-responsive, but soil K levels were well above the current soil K threshold level of 125 mg/kg. At the Lubbock location with over 350 mg/kg K, a significant yield response was determined with the two highest K application rates for the injected application method resulting in the greatest lint yield (Fig. 3). Due to herbicide injury, the trial was not harvested at the OK location in 2015.

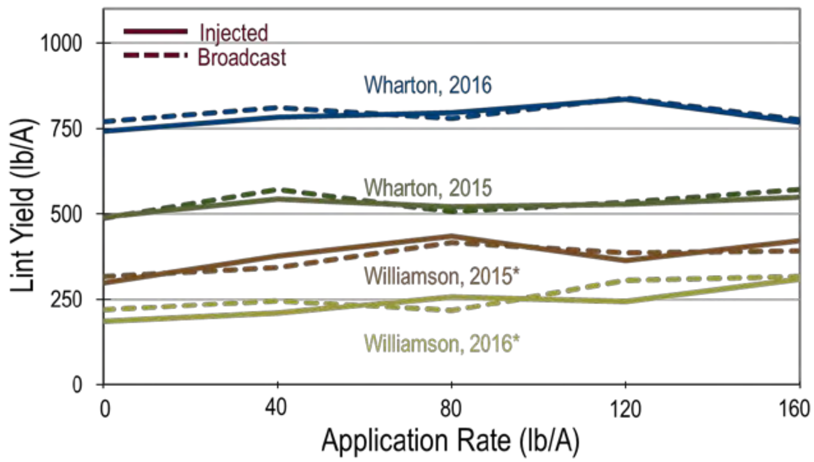

Figure 2. Cotton lint yield in response to K fertilizer application rate (lb/A K_2O) and method at the Williamson and Wharton County, TX, locations in 2015 and 2016.

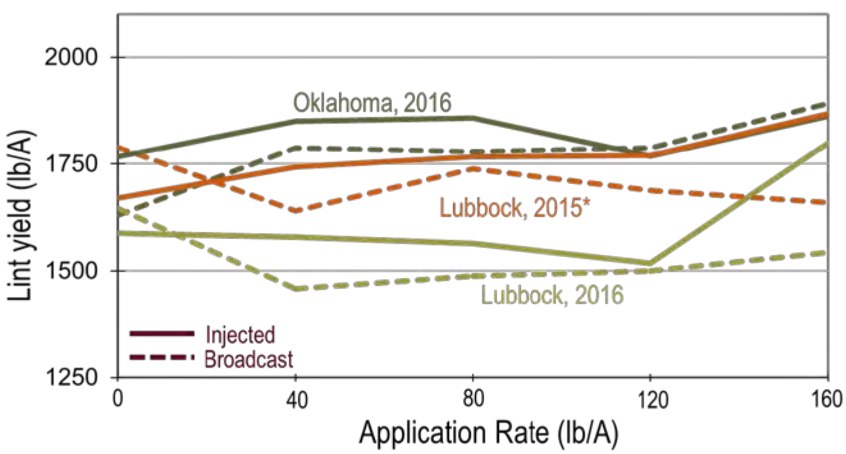

Figure 3. Cotton lint yield in response to K fertilizer application rate (lb/A K_2O) and method at the Lubbock County, TX, location in 2015 and 2016 and Oklahoma location in 2016.

There was not significant ($P < 0.05$) yield response at AL, VA, MS, LA, and AR to K rate and application method in 2015, despite all sites being close to the current soil K threshold level of 150 mg/kg (Figs. 4 and 5). Only a numerical increase in lint yields at AL and LA for the injected application method was observed (except at 80 lb/A at LA). At these locations, a good range of yield potential were identified with yields as high as 2300 lb/a in lint yield. However, despite the high yielding locations and soil K levels being near the threshold, no significant increase in lint yield was determined.

In 2016 at the new site locations, the Williamson County, TX, VA, NC, and AL locations were below the threshold of 150 mg/kg K, and as such a yield response was expected (Fig 1b). A yield response ($P < 0.05$) was observed to increasing K rates at the Williamson county, TX (Fig. 2) and VA (Fig 5b) locations but not any other locations (Figs. 2-5). The average soil K levels of the other sites exceeded 150 mg/kg K at all depths except at the 6-12” and 12-24” depths at LA and no yield response was observed. The exception was the Lubbock location, where the highest rates of injected K did provide a significant yield response and was similar to the treatment response in 2015, however, yields were much less in 2016 than 2015 (Fig. 3). Differences were not determined at the OK location, but a general increasing trend from 0 lb/A to 80 lb/A for both application methods was observed.

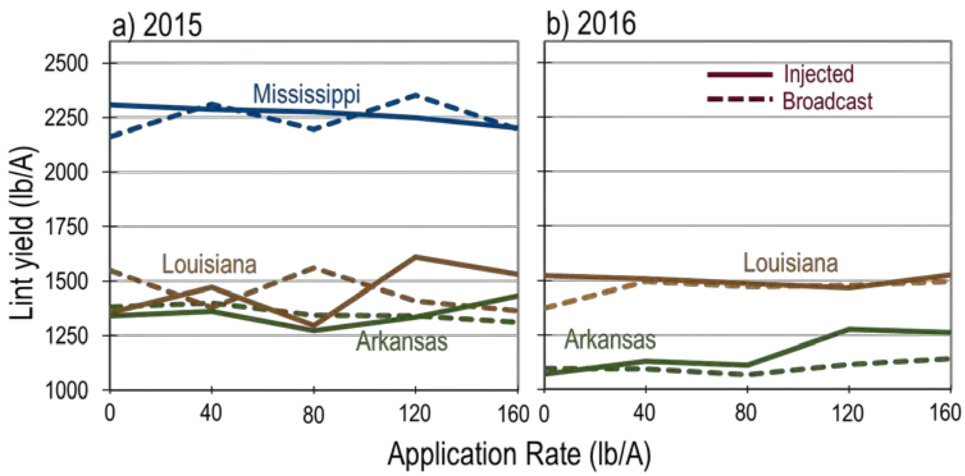

Figure 4. Cotton lint yield in response to K fertilizer application rate (lb/A K_2O) and method at the Mississippi, Louisiana, and Arkansas locations in 2015 (a) and Louisiana and Arkansas locations in 2016 (b).

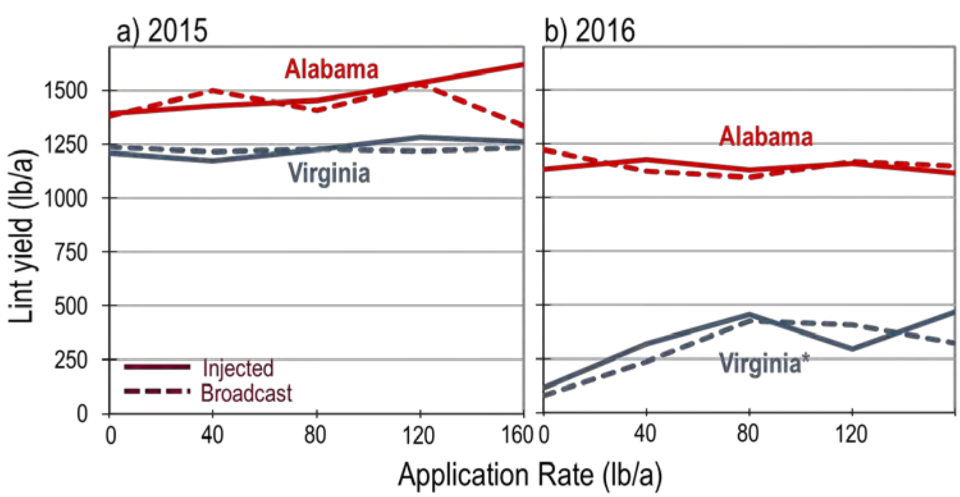

Figure 5. Cotton lint yield in response to K fertilizer application rate (lb/A K_2O) and method at the Alabama and Virginia locations in 2015 (a) and 2016 (b).

In 2017, the MS and AL locations were at least 50 mg/kg less than the threshold K level at all measured depths (Fig. 1c). The LA location K level was close to the threshold at 0-6” and decreased with depth to levels less than the threshold. All other locations had soil K levels greater than the threshold at each depth. Differences between treatments did not exist at any location in 2017; however, general trends were observed (Figs. 6-8). At the Lubbock, TX location, lint yield was on average closer to the 2015 yields and a small yield increase (approximately 100 lb/A lint) from 0 lb/A to 80 lb/A K was observed for injected K but not broadcast applied (Fig. 6). At MS, LA, and AR, lint yields ranged from 500 lb/A (MS) to 1250 lb/A (AR), but differences were not determined (Fig. 7). Lint yield at MS on average was much less than in 2015.

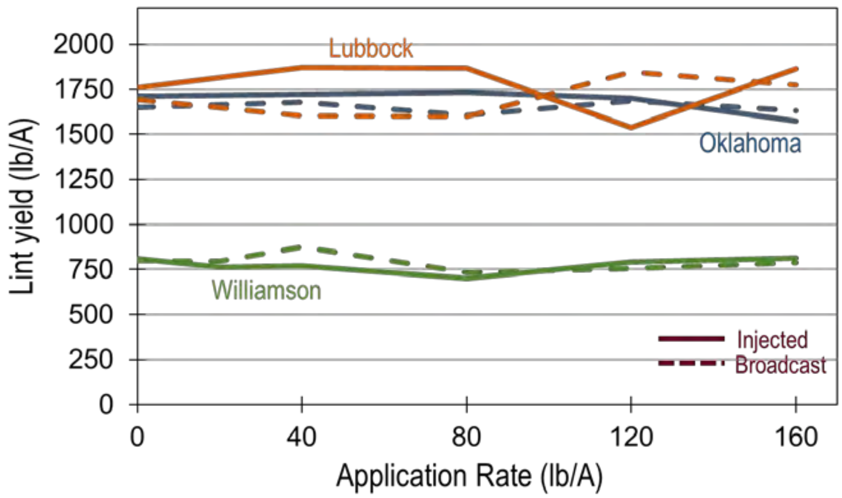

Figure 6. Cotton lint yield in response to K fertilizer application rate (lb/A K_2O) and method at the Lubbock and Williamson County, TX, and OK locations in 2017.

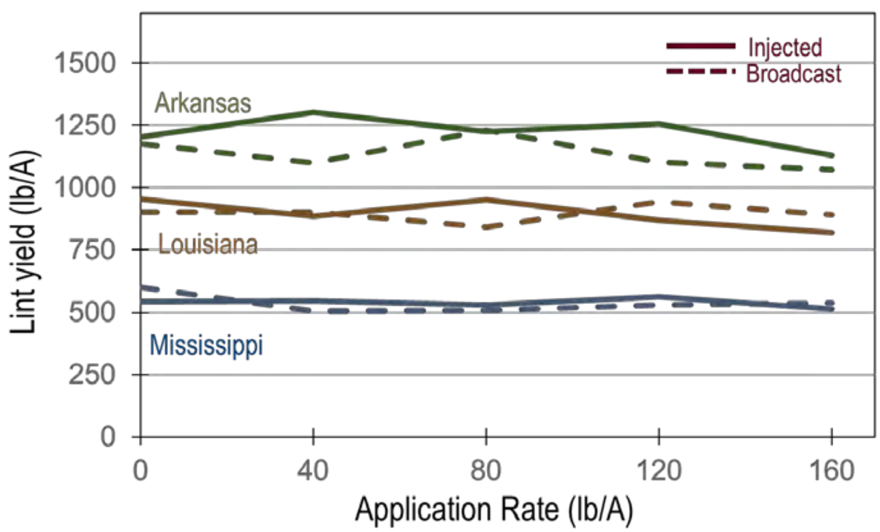

Figure 7. Cotton lint yield in response to K fertilizer application rate (lb/A K_2O) and method at the Arkansas, Louisiana, and Mississippi locations in 2017.

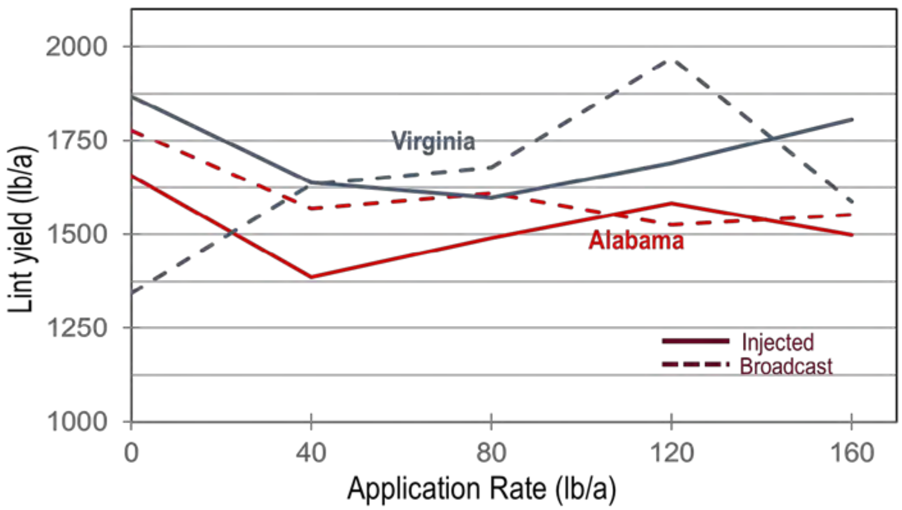

Figure 8. Cotton lint yield in response to K fertilizer application rate (lb/A K_2O) and method at the Virginia and Alabama locations in 2017.

SUMMARY

There appears to be much that remains unclear about potassium-cotton dynamics. A response was observed more often at locations with lower yield potentials, but also at locations with soil K levels greater than the Mehlich III K threshold of 150 mg/kg. At locations where K fertilizer would have been recommended because soil K levels were well below the threshold, a response to added K was rarely determined. Further evaluation of data will include calculating nutrient use efficiency and using principal component analysis to identify patterns in data, including lint yield, leaf tissue mineral concentrations, and soil macronutrient levels.

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ACKNOWLEDGEMENTS

The authors would like to extend their appreciation to Cotton Incorporated, Fluid Fertilizer Foundation, and International Plant Nutrition Institute for providing financial support for this Cotton Specialist Working Group project.

FURROW IRRIGATION TERMINATION TIMING EFFECTS ON SOUTHWEST OKLAHOMA COTTON

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Altus, OK
Saleh Taghvaeian
Oklahoma State University
Stillwater, OK

Abstract

Crop irrigation water use is a major concern, and producers continue to seek ways to reduce water usage. This project was furrow irrigated and was located in the Lugert-Altus Irrigation District, near Altus. The objectives of this project were to evaluate the effects of 3 weekly irrigation termination timings in furrow irrigated cotton in the Lugert-Altus Irrigation District. The site is classified as a Hollister silty clay loam, with 0-1 percent slopes. Typically about 3 acre-inches are applied per irrigation using gravity flow through concrete ditch/siphon tubes. Producers historically terminate irrigation in this area around September 1 each year, so targeted termination dates of August 16, August 23 and August 30 were used for a 3-year period. Results indicate that yield and fiber quality responses are seasonally dependent. In years with hot, dry September conditions, irrigation termination at the end of August is critical for maintaining yield and quality. There is no indication that final irrigation dates near the end of August have any detrimental effect on fiber quality in the 3 years evaluated, even when followed by high rainfall. No termination date effects were observed for any reported AFIS fiber quality characteristics in any year.

Introduction

Crop irrigation water use is a major concern, and producers continue to seek ways to reduce water usage. This project was furrow irrigated and was located in the Lugert-Altus Irrigation District, near Altus. Typically about 3 acre-inches are applied per irrigation using gravity flow through concrete ditch/siphon tubes. Producers historically terminate irrigation in this area around September 1 each year. Questions have been asked concerning the long-term impact of earlier irrigation termination, and is there a potential water savings without sacrificing yield and quality? The objectives of this project were to evaluate the effects of 3 weekly irrigation termination timings in furrow irrigated cotton in the Lugert-Altus Irrigation District.

Materials and Methods

This project was furrow irrigated and was located in the Lugert-Altus Irrigation District, near Altus. The site is classified as a Hollister silty clay loam, with 0-1 percent slopes. Target termination dates of August 16, August 23 and August 30 were used for a 3-year period (2015, 2016, and 2017). Crop maturity was tracked using nodes above white flower and nodes above cracked boll (data not presented). In order to determine soil profile moisture, WaterMark sensors were installed at 10, 20 and 30 inch depths in each plot and were monitored weekly (data not presented). Three replicates of 8-row plots x field length resulted in 24 rows/replicated or a total of 72 rows for the test. Normal fertilizer, insect, herbicide, plant growth regulator, and harvest aid management as well as irrigation practices were used at the site. Table 1 presents various cultural practices used for the project. About 3 acre-inches were applied per irrigation using a siphon tube/concrete ditch system. Harvested plot size included the center 4 rows x 50 ft of each plot with a John Deere 482 modified plot stripper (without field cleaner). Grab samples were taken from each plot and were ginned on a plot gin. Lint turnout for each plot was used to convert plot bur cotton weights to lint per acre. Lint yield and high volume instrument (HVI) and advanced fiber information system (AFIS) fiber quality data were obtained. Ginned lint samples from each plot were submitted for the HVI/AFIS analyses. These lint samples were analyzed at the Cotton Phenomics Laboratory at the Fiber and Biopolymer Research Institute at Texas Tech University. Lint Commodity Credit Corporation Loan values were determined for each year using HVI data and the respective Upland Cotton Loan Valuation Model (Falconer, 2015). The GLM procedure in SAS version 9.4 for Windows was used for data analysis, and the Fisher's Protected LSD was used for mean separation.

Table 1. Cultural practices used for furrow irrigation termination project.

Cultural practice	2015	2016	2017
Planting date	4-Jun	28-May	25-May
Cultivar	Deltapine DP 1044 B2RF	Deltapine DP 1044 B2RF	Deltapine DP 1044 B2RF
Final plant stand (plants/acre)	67,000	41,000	38,000
Irrigations across entire project	16-Jul, 22-Jul, 30-Jul, 11-Aug, 17-Aug	27-Jul, 2-Aug, 9-Aug, 16-Aug	22-Jul, 29-Jul, 10-Aug
Final irrigation dates	17-Aug, 24-Aug, 31-Aug	16-Aug, 23-Aug, 30-Aug	10-Aug, 10, Aug, 29-Aug
Harvest date	12-Nov	21-Nov	1-Nov
Comments	near normal Aug temperature, very hot, dry Sep	Bacterial blight infection cool, wet Aug wet Sep	excessive Aug rainfall prevented second termination cool, wet Aug Sep dry for first 2 weeks

Results and Discussion

Results are presented in Table 2. In 2015, late planted (June 4) cotton with hot, dry conditions in September benefitted significantly from furrow irrigation through the end of August. Both yield and some HVI fiber quality attributes were significantly improved by the latest irrigation termination.

In 2016, average rainfall in August and above average rainfall in September resulted in no differences in yield or quality among irrigation termination dates. No negative yield and fiber quality differences were observed with irrigation through the end of August, even with above average September rainfall.

In 2017, above average August rainfall affected the treatment structure, and effectively only 2 termination dates were possible (August 10 and 29). In spite of above average August rainfall, August 29 irrigation resulted in a significant increase in yield (350+ lb/acre) compared to earlier termination dates. No fiber qualities reported were economically impacted.

Summary and Conclusions

Results from the 3-year project indicate that yield and fiber quality responses are seasonally dependent. In years with hot, dry September conditions, irrigation termination at the end of August is critical for maintaining yield and quality. There is no indication that final irrigation dates near the end of August have any detrimental effect on fiber quality in the 3 years evaluated, even when followed by high rainfall. No termination date effects were observed on any AFIS fiber quality characteristics in any year.

Acknowledgements

This project was supported by the Oklahoma State Support Committee – Cotton Incorporated, and the OSU Integrated Pest Management Program. The authors also thank Larry Bull, Rocky Thacker, Toby Kelley and the staff at the Southwest Research and Extension Center at Altus for their excellent cooperation.

Reference

Falconer, L. 2015. 2015 Upland Cotton Loan Valuation Model. Available online at: http://www.cottoninc.com.

Table 2. Lint yield, loan value and HVI and AFIS fiber properties for furrow irrigation termination project.

			HVI data				AFIS data			
	Lint yield	Lint loan value	Mic	Length	Uniformity	Strength	Neps	Short fiber content	Fineness	Maturity ratio
	lb/acre	$/lb	units	inches	%	g/tex	count/g	%	mtex	units
2015										
Termination dates										
17-Aug	718	0.5250	2.9	1.14	80.7	28.8	464	10.5	143	0.83
24-Aug	862	0.5265	2.9	1.16	82.5	30.8	415	9.7	144	0.84
31-Aug	1139	0.5525	3.3	1.15	82.4	30.6	414	10.4	153	0.83
CV, %	2.0	2.9	4	0.7	0.7	1.4	20	19.4	2.5	1.9
Pr>F	<0.0001	0.1454	0.0178	0.0400	0.0351	0.0081	0.7344	0.8642	0.0758	0.7575
LSD 0.05	40	NS	0.3	0.02	1.3	1	NS	NS	NS	NS
2016										
Termination dates										
16-Aug	1778	0.5772	4.4	1.16	82.4	31.8	181	8.5	165	0.87
23-Aug	1762	0.5772	4.4	1.15	82.7	31.3	219	9.8	163	0.85
30-Aug	1862	0.5783	4.5	1.17	83.4	31.3	185	8.8	164	0.86
CV, %	3.4	0.12	4.8	1.3	0.7	2.4	13.6	10.5	3.3	1.2
Pr>F	0.2201	0.1736	0.9070	0.5848	0.2325	0.6701	0.26	0.3149	0.8711	0.1736
LSD 0.05	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
2017										
Termination dates										
10-Aug	1009	0.5482	3.7	1.13	82.1	29.8	261	10.6	164	0.84
10-Aug B	920	0.5364	3.6	1.11	81.5	29.4	303	12.9	157	0.82
29-Aug	1321	0.5466	3.9	1.12	82.5	30.9	249	11.1	166	0.85
CV, %	4.4	1.4	2.4	1.3	0.8	3.5	12.2	12.1	1.8	1.5
Pr>F	0.0011	0.2451	0.0348	0.3265	0.2792	0.3011	0.2192	0.2054	0.0511	0.0913
LSD 0.05	108	NS	0.2	NS	NS	NS	NS	NS	NS	NS

CV - coefficient of variation, percent

Pr>F - Probability of a greater F value.

LSD - least significant difference at the 0.05 level, NS - not significant.

2017 Red River Crops Conference

The Red River Crops Conference brings together two land-grant institutions - Texas A&M AgriLife Extension Service and OSU - Oklahoma Cooperative Extension Service. In 2014, this was a new concept for Extension crop production programming in our region. The two-day inaugural conference was held in January, 2014 in Altus, and was a great success with nearly 300 people in attendance. The “cotton” and “other crops” days were fairly equally divided in terms of participation. In 2017, the conference rotated to Childress, TX and was held on January 24th and 25th at the Event Center. The conference was once again planned and executed as a joint effort of Extension personnel with both institutions. I am a founding member of the planning committee for this conference.

The first day was considered the cotton day while the second day covered in-season and summer crops. Total conference participants noted by meal counts on Day One of the program totaled 160. Day Two meals served were to 110 participants. Thus, total participation over the two days was counted at 270 attendees indicating strong support and outstanding attendance of the conference. A total of 24 various industry groups supported the conference through sponsorships.

Evaluating the Program

To finalize each day of the program, participants were asked to provide their candid responses to an evaluation. These results were compiled following the conference and are provided below.

<u>Day 1 (Cotton Day) Results</u>

1. How would you rate the quality of speakers? 4.62 (Frequency: 1=0 observations; 2=0; 3=5, 4=25; 5=63)
2. How would you rate the facilities? 4.57 (Frequency: 1=0 observations; 2=0; 3=8, 4=24; 5=61)
3. How would you rate the overall conference? 4.45 (Frequency: 1=0 observations; 2=0; 3=3, 4=24; 5=58)

Of particular note regarding the first three questions, only three respondents rated either the speakers, the facilities, or the overall conference less than 3. Obviously, the first day of the conference was well received.

The fourth question captured whether the participants felt as if they would make changes to pending production and/or marketing plans based on the information they received at the conference. The question was scaled such that 1 represented “definitely will not”, 3 equaled “undecided” and 5 was “definitely will”. Frequency of responses included: 1=1; 2=1; 3=39; 4=27; and 5=12. Based on these results, 49 percent expected to, at least minimally, change their production and/or marketing plan based on the information they received at the conference.

<u>Day 2 (In-Season and Other Summer Crops) Results</u>

1. How would you rate the quality of speakers? 4.61 (Frequency: 1=0 observations; 2=0; 3=1, 4=20; 5=35)
2. How would you rate the facilities? 4.55 (Frequency: 1=0 observations; 2=1; 3=2, 4=18; 5=35)
3. How would you rate the overall conference? 4.54 (Frequency: 1=0 observations; 2=0; 3=1, 4=17; 5=37)

The fourth question was as before. The question was again scaled such that 1 represented “definitely will not”, 3 equaled “undecided” and 5 was “definitely will”. Frequency of responses included: 1=3; 2=0; 3=17; 4=11; and 5=9. Based on these results, 50 percent expected to, at least minimally, change their production and/or marketing plan based on the information they received at the conference.

Based on the specific respondents who said they would at least minimally change their plans and the average number of acres of cotton or other crops planted annually, a financial impact figure was determined. It was assumed that those that indicated a 5 on question 4 for cotton (definitely would change their plans) would increase their net income $10 per acre for the acres of cotton planted and $7.50 per acre for the other crops. Likewise, for those respondents indicating a 4, it was assumed that an improvement of $7.50 per acre of cotton planted and $5.00 per acre of other crops planted. These changes would be in the form of better marketing, risk management, varietal selection, etc. Given these hypotheses, the financial impact of attending the 2017 Red River Crops Conference was estimated to be $3,308 per respondent.

Extending the Red River Crops Conference Information Via Agricultural Media

At least 10 Southwest Farm Press email articles discussing various speaker topics were generated by Ron Smith. He has previously indicated the distribution of the SWFP Daily email was 11,435. This would indicate that direct distribution of the SWFP Daily email edition would be 114,350. This is a very conservative number as the articles were also distributed by Cotton eNews which is produced by the National Cotton Council of America and disseminated to recipients across the Cotton Belt. Other media outlets also ran or quoted the articles. All SWFP Daily email articles were also printed in the SWFP magazine. Ron Smith recently noted the circulation of that magazine at about 30,000. Since 10 articles were generated, it would appear that an additional 300,000 contacts were made. Combining the SWFP magazine and SWFP Daily email distribution, this would indicate a total of 414,350.

A Honda Air Compressor & a YETI Cooler will be given away each day!

To register for the 2017 Red River Crops Conference complete the form on the reverse side. For more conference information contact your local county extension office.

January 24 & 25, 2017

A hardy group of people chose to settle the upper Red River region in Oklahoma and Texas. In spite of many obstacles, pioneers and their descendants have turned the area into a viable agricultural production region. These obstacles can include water and land resources, and weather extremes such as hot and dry summers and bitterly cold winters. These challenges must be overcome in order to succeed as an agricultural producer.

This region offers high agricultural potential when all of the conditions align. Pastures of both introduced grass and native species have the potential to support traditional cattle operations. Crop mixes include but are not limited to cotton, wheat, and grain and forage sorghum. More recently, producers have discovered that canola, guar, and sesame can also be successfully cultivated within this environment.

The area spans across the state lines of Oklahoma and Texas. Given this, Texas A&M AgriLife Extension and Oklahoma Cooperative Extension have joined together to help address these special agricultural production circumstances.

The goal of the Red River Crops Conference is to provide agricultural producers with relevant management information applicable to this production area that will create and enhance the profitability of farm and ranch enterprises.

CEU's offered: 12 Certified Crop Advisors
6 Texas Department of Agriculture
4 Oklahoma Department of Agriculture, Food, and Forestry

Pre-registration is encouraged for meal count.

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Planning for Success - Crop production information designed for Southwest Oklahoma and the Texas Rolling Plains.

Red River CROPS CONFERENCE

January 24 & 25, 2017

Childress Event Center
1100 7th Street, NW
Childress, TX

TEXAS A&M AGRILIFE EXTENSION

OKLAHOMA STATE UNIVERSITY EXTENSION

COTTON DAY AGENDA
January 24

7:45 - 8:15 am	*Registration*
8:15 - 8:30 am	*Welcome* Mr. Zeb Petty Childress County Agricultural Extension Agent - Agriculture and Natural Resources Texas A&M AgriLife Extension Service
8:30 - 9:15 am	*National Cotton Council Update* Dr. Jody Campiche Director, Economics and Policy Analysis National Cotton Council, Memphis, TN
9:15 - 10:05 am	*Cotton Market Update and Outlook* Dr. John Robinson Professor and Extension Economist - Cotton Marketing Texas A&M AgriLife Extension Service, College Station, TX
10:05 - 10:20 am	*Break*
10:20 - 11:10 am	*Cotton Weed Control and Herbicide Update* Dr. Todd Baughman Professor and Program Support Leader Institute for Agricultural Biosciences Oklahoma State University, Ardmore, OK
11:10 am - 12:00 pm	*Bacterial Blight Management* Dr. Jason Woodard Associate Dept. Head, Dept. of Plant Pathology & Microbiology Texas A&M AgriLife Extension Service, Lubbock, TX
12:00 - 1:00 pm	*Lunch*
1:00 - 2:00 pm	*Texas and Oklahoma Cotton Genetic Performance and Variety Update* Dr. Gaylon Morgan Professor and Extension Agronomist - Cotton Texas A&M AgriLife Extension Service, College Station, TX Dr. Randy Boman Research Director & Cotton Extension Program Leader OSU Southwest Research and Extension Center, Altus, OK
2:00 - 2:50 pm	*Cotton Insect Management* Dr. David Kerns Associate Professor & Jack Hamilton Regents Chair in Cotton Production, Department of Entomology Louisiana State University, Winnsboro, LA
2:50 - 3:15 pm	*Break*
3:15 - 4:00 pm	*Crop Profitability Evaluation and Spreadsheet Analyzer* Dr. Jackie Smith Professor and Extension Economist - Management Texas A&M AgriLife Extension Service, Lubbock, TX
4:00 - 4:15 pm	*Wrap-Up and Evaluation*

IN SEASON & SUMMER CROPS DAY AGENDA
January 25

7:45 - 8:15 am	*Registration*
8:15 - 8:25 am	*Welcome* Mr. Heath Sanders Southwest Area Agronomist Oklahoma Cooperative Extension Service, Duncan, OK
8:25 - 9:10 am	*Grain and Livestock Market Update* Dr. Mark Welch Associate Professor and Extension Economist - Grain Marketing Texas A&M AgriLife Extension Service, College Station, TX
9:10 - 10:00 am	*Permanent Pasture Production & Management* Dr. Larry Redmon Regents Professor and Extension Forage Agronomist Associate Department Head for Extension Texas A&M AgriLife Extension Service, College Station, TX
10:00 - 10:20 am	*Break*
10:20 - 11:10 am	*Canola Production & Management* Dr. Josh Lofton Assistant Professor & Cropping Systems Extension Specialist Oklahoma Cooperative Extension Service, Stillwater, OK
11:10 am - 12:00 pm	*Mid-term Review of the 2014 Farm Bill* Dr. Joe Outlaw Professor and Extension Economist Texas A&M AgriLife Extension Service, College Station, TX
12:00 - 1:00 pm	*Lunch*
1:00 - 2:00 pm	*Annual Forage Production and Management* Dr. Emi Kimura Assistant Professor and Extension Agronomist Texas A&M AgriLife Extension Service, Vernon, TX Mr. Gary Strickland Jackson and Greer County Agriculture Extension Educator SWREC-Dryland Cropping Systems Specialist Oklahoma Cooperative Extension Service, Altus, OK
2:00 - 2:50 pm	*Grain Sorghum Production and Management* Dr. Jourdan Bell Assistant Professor and Extension Agronomist Texas A&M AgriLife Extension Service, Amarillo, TX
2:50 - 3:10 pm	*Break*
3:10 - 4:00 pm	*Agronomic & Economic Evaluation of Cover Crops* Dr. Paul DeLaune Associate Professor of Environmental Soil Science Texas A&M AgriLife Research, Vernon, TX
4:00 - 4:15 pm	*Wrap-Up and Evaluation*

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REGISTRATION

Red River CROPS CONFERENCE

My check for $ _______ is enclosed

$25 per person conference fee
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Contact your local county Extension office for more information!

2017 Oklahoma Irrigation Conference

Planning for the fourth annual Oklahoma Irrigation Conference began in late 2016. The planning committee consisted of David Nowlin, Caddo County Extension Educator, Oklahoma Cooperative Extension Service, Anadarko; Dr. Saleh Taghvaeian, Assistant Professor & Extension Specialist in Water Resources in the Biosystems & Agricultural Engineering Department; Gary Strickland, Jackson and Greer Counties Extension Educator, and Dr. Randy Boman, Research Director and Cotton Extension Program Leader. As a founding member of the planning committee of the annual Oklahoma Irrigation Conference, I supported the meeting held at the Pioneer Heritage Room at Western Oklahoma State College in Altus, OK in March. The conference was well attended with 110 total participants, and a total of 21 sponsors from various industry groups. Surveys were distributed and a total of 17 respondents returned them. The results are below.

RANKING AS TO HOW EACH TOPIC WAS BENEFICIAL TO YOU

Very Useful……………..Not Useful

TOPIC	**1**	**2**	**3**	**4**	**5**
Lugert-Altus Irrigation District Update	**9**	**1**	**2**	**2**	**3**
Threats to the Lugert-Altus Irrigation District	**6**	**3**	**5**	**3**	**1**
U.S. Bureau of Reclamation Update	**2**	**7**	**5**	**1**	**3**
Crop ET and the Oklahoma Mesonet	**6**	**8**		**2**	**2**
Texas Alliance for Water Conservation	**7**	**5**	**4**	**1**	**1**
Lunch	**6**		**2**		**1**
Salinity and Irrigation Sensor Project	**5**	**7**	**2**	**3**	
Results for the Texas Alliance for Water Conservation: Irrigation Sensors	**6**	**8**	**1**	**4**	
High Plains Cotton Irrigation Research	**11**	**1**	**4**	**2**	**1**
SWREC Furrow Irrigation Termination Project	**9**	**1**	**5**	**2**	**1**
Energy and Water Efficiency of Center Pivot Systems	**6**	**4**	**3**	**1**	**1**

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OKLAHOMA IRRIGATION CONFERENCE

March 1, 2017
Altus, OK
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Please respond by February 24th 2017.

Altus, Ok

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Oklahoma Irrigation Conference Committee
David Nowlin Saleh Taghvaeian Randy Boman Gary Strickland

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Certified Crop Advisor: 5.0 CEUs (Soil & Water Management)

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OKLAHOMA IRRIGATION CONFERENCE

March 1, 2017

ALTUS, OK
WESTERN OKLAHOMA STATE COLLEGE

AGENDA

8:30 am
Registration - coffee and donuts

Morning Moderator - Gary Strickland

9:00 am	Welcome	David Nowlin
9:15 am	Lugert-Altus Irrigation District Update	Tom Buchanan
9:45 am	Threats to the Lugert-Altus Irrigation District	Tyson Ochsner
10:15 am	US Bureau of Reclamation Update on Activities and Programs	Nathan Kuhnert
10:45 am	Break	
11:00 am	Crop Water Use and the Oklahoma Mesonet	Al Sutherland
11:30 am	Texas Alliance for Water Conservation: What Has Been Learned Over the Past 12 Years?	Rick Kellison
12:00 pm	Lunch and Industry Updates	

Afternoon Moderator - David Nowlin

1:00 pm	Soil Salinity and Smart Irrigation Scheduling	Saleh Taghvaeian
1:30 pm	Results from the Texas Alliance for Water Conservation: Irrigation Sensors and Deficit Irrigation in Cotton	Jeff Pate
2:00 pm	High Plains Cotton Irrigation Research	Jim Bordovsky
2:30 pm	Break	
2:45 pm	SWREC Furrow Irrigation Termination Project	Randy Boman
3:15 pm	Energy and Water Efficiency of Center-Pivot Systems	Scott Frazier
3:45 pm	Evaluation and Adjourn	

OKLAHOMA IRRIGATION CONFERENCE

FEATURING

Randy Boman

Research Director and Cotton Extension Program Leader, OSU Southwest Research and Extension Center, OSU

Randy's major responsibilities are to work with the Cotton Team to develop and conduct Extension and applied research programs to inform Oklahoma producers as to best management practices for cotton production. They conduct cotton variety performance and applied research trials as necessary; develop educational materials relating to the information; and disseminate it to growers and Extension personnel by all appropriate means. An important function is serving as an information and materials source for area agronomists and Extension personnel in the state.

Jim Bordovsky

Research Engineer, Texas A&M Helms Research Farm

Jim is a senior research engineer and coordinator of research activities at the Texas A&M Helms Research Farm, Halfway TX. His current research focus is irrigation system design and management for water and energy conservation. He has had a major role in development and evaluation of the LEPA irrigation concept, and he has a well-recognized research program addressing optimizing limited irrigation crop production systems.

Tom Buchanan

General Manager, Lugert-Altus Irrigation District

Tom is a 1974 graduate of Altus High School. He graduated from the University of Oklahoma in 1979 with a bachelor of arts degree. He runs a cow-calf operation and grows wheat and irrigated cotton on his farm near Altus. He also raises cattle in a family partnership with his brother and sister. Mr. Buchanan serves as the general manager of the Lugert-Altus Irrigation District and represents irrigation water use interests as vice chairman of the Oklahoma Water Resources Board. He was elected president of Oklahoma Farm Bureau at the organization's 72nd annual meeting.

Scott Frazier

Associate Professor, Energy Management Extension Engineer, Oklahoma State University

Scott joined the Biosystems and Agricultural Engineering department in June 2008 on a research and Extension appointment. His background is Industrial Engineering specializing in resource and energy management. He worked for the electric utility industry on the East Coast conducting energy studies for the commercial and industrial sectors. His research efforts include energy management of agricultural systems such as irrigation and animal housing, life cycle assessment (LCA) of biofuels and bio-product production, and various energy related education topics.

Rick Kellison

Project Director, Texas Alliance for Water Conservation

Rick received his BS degree in animal business and MS degree in ruminant nutrition from Texas Tech University. He owns Silver Creek Farms, a registered cow/calf operation near Lockney. Mr. Kellison has served as the project director for the Texas Alliance for Water Conservation Program in the College of Agricultural Sciences and Natural Resources at Texas Tech University since 2005. His awards include the 2016 Outstanding Service to Agriculture Award of Merit from Gamma Sigma Delta at Texas Tech, the 2016 Texas Tech CASNR Research Staff Award, and the 2016 Texas Tech Chancellor's Staff Award of Excellence.

Nathan Kuhnert

Hydrologist, US Bureau of Reclamation

Nathan is a hydrologist with over 20 years' experience in water management and environmental compliance. He has evaluated the feasibility of produced water treatment technologies, coordinated the development of water management plans and has served on multiple advisory teams including an EPA Water Acquisition Technical Roundtable. Nathan began his career with Reclamation in 2016. Before that he played the lead role in building a water sustainability culture and enacting related policies for Devon Energy.

Tyson Ochsner

Associate Professor, Oklahoma State University

Tyson is a native of Chattanooga, OK and a professor of applied soil physics at OSU. He has a Ph.D. in Soil Science and Water Resources from Iowa State University. The mission of his research is to help people better understand and appreciate the soil, the soil water balance, and the surface energy balance so that we can more wisely manage and conserve the land and water with which we have been entrusted.

Jeff Pate

Extension Economist, Texas A&M AgriLife Extension Service

Jeff is an Extension Economist - Risk Management Specialist with the Texas A&M AgriLife Extension Service based in Lubbock. He joined the Texas A&M System in August of 2005. His activities focus on strategies for area producers in cooperation with the Texas Alliance for Water Conservation demonstration project. Mr. Pate's awards include the Blue Legacy Award, the Texas Environmental and Water Conservation Award, and the National Energy and Water Conservation Award. He has published numerous papers, journal articles, and posters all dealing with water conservation and the economics surrounding that conservation. Prior to his current position, Mr. Pate worked for several years in the banking industry. He also spent 12 years farming in the Lubbock area, after a 10 year period of teaching Agriculture Science. He holds a B.S. and a M.Ed. degree from Texas Tech University.

Al Sutherland

OSU Mesonet Agricultural Coordinator, National Weather Service

Al conducts agricultural and horticultural product development and extension outreach for the Oklahoma Mesonet. He has a Bachelor's degree in horticulture from Oregon State University, a Masters in horticulture from Ohio State University, and has worked for the No. 1 OSU, Oklahoma State University, since 1989. Al is a Certified Crop Advisor and Certified Professional Horticulturist. He is officed on the OU campus at the National Weather Center.

Saleh Taghvaeian

Assistant Professor and Extension Specialist, Oklahoma State University

Saleh is an assistant professor and extension specialist in water resources at the Department of Biosystems & Agricultural Engineering. Prior to joining OSU in Oct 2013 he was a postdoctoral fellow at Colorado State University, conducting research on deficit irrigation management. He received his PhD in Irrigation Engineering in 2011 from Utah State University. Saleh's research and extension interests include irrigation and drainage efficiency, using sensor technologies, and improving irrigation management.

2017 Peer Reviewed Journal Article in Review and American Phytopathological Society Compendium Chapter in Review

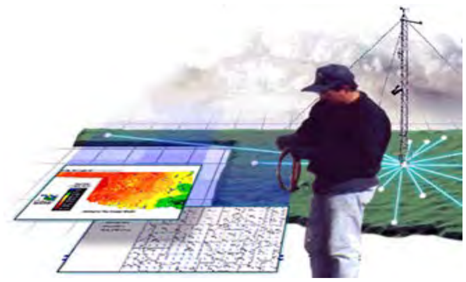
Peer Reviewed Journal Article in Review:

Manandhar, R., E.F. Hequet, R. Boman, J. Wanjura, M. Kelley, N. Abidi, and C. Delhom. 2017. Impact of cotton fiber maturity on cotton fiber properties and yarn quality. Submitted to Industrial Crops and Products. In review.

Book Chapter Component Prepared and Submitted for Compendium of Cotton Diseases (3rd Edition):

Boman, R.K. 2016. Planting considerations. In Kirkpatrick, T., C. Rothrock, and J. Woodward (eds.) Compendium of cotton diseases (3rd ed.). Publisher: APS, St. Paul, MN. This compendium is in review at this time.

Appendix

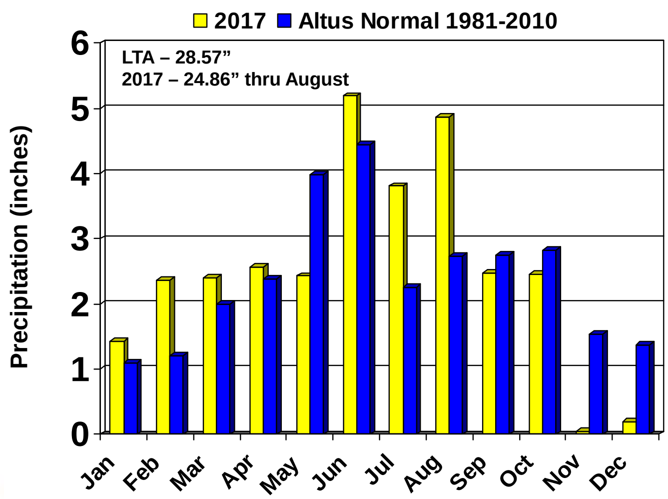


About the Mesonet The Oklahoma Mesonet is a world-class network of environmental monitoring stations. The network was designed and implemented by scientists at the University of Oklahoma (OU) and at Oklahoma State University (OSU). The Oklahoma Mesonet consists of 120 automated stations covering Oklahoma. There is at least one Mesonet station in each of Oklahoma's 77 counties. At each site, the environment is measured by a set of instruments located on or near a 10-meter-tall tower. The measurements are packaged into "observations" every 5 minutes, then the observations are transmitted to a central facility every 5 minutes, 24 hours per day year-round. The Oklahoma Climatological Survey (OCS) at OU receives the observations, verifies the quality of the data and provides the data to Mesonet customers. It only takes 5 to 10 minutes from the time the measurements are acquired until they become available to the public.

History of the Mesonet In 1982, Oklahoma scientists recognized the need for a statewide monitoring network. At OSU, agricultural scientists wanted to upgrade weather instruments at their research sites. Their primary goal was to expand the use of weather data in agricultural applications.Meanwhile, scientists from the OU meteorological community were helping to plan and implement a flood-warning system for Tulsa. The success of Tulsa's rain gauge network pointed to the potential for a more extensive, statewide network. OSU and OU joined forces in 1987 when they realized that one system would help both universities achieve their respective missions. The two universities approached the Governor's Office and, in December of 1990, the Oklahoma Mesonet Project was funded with $2.0 million of oil-overcharge funds available from a court settlement. Both universities contributed almost $350,000 each to bring the grand total to $2.7 million. In addition, the Oklahoma Law Enforcement Telecommunications System (OLETS) donated the use of their communications infrastructure to help move the data from the remote sites to OU. Once funding was available, the Mesonet Project progressed quickly. Committees were formed, potential station sites were located and surveyed and instruments were chosen. In late 1991, the first Mesonet towers were installed and, by the end of 1993, 108 sites were completely operational. Three more sites were added soon thereafter to supplement a U. S. Department of Agriculture network in the Little Washita River Basin. In 1996, three sites were added near Tulsa for an Oklahoma Department of Environmental Quality study of air pollution. Thus, by the fall of 1996, the total number of Oklahoma Mesonet sites was 114. Since 1996, 8 sites have relocated to other areas in the same town, 4 sites have been retired, and 10 sites have been added resulting in our current 120 station network. A 2009 National Research Council report named the Oklahoma Mesonet as the "gold standard" for statewide weather and climate networks. The Mesonet is unique in its capability to measure a large variety of environmental conditions at so many sites across an area as large as Oklahoma. In addition, these conditions are relayed to a wide variety of customers very quickly after the observations are taken.

Agriculture Agricultural applications of the Mesonet include improved insect and disease advisories, spraying recommendations, irrigation scheduling, frost protection, planting and harvesting recommendations and prescribed burn advisories. Agriculture is such a large Oklahoma industry that any increase in efficiency from more accurate environmental information can translate into several million dollars in statewide savings each year. Visit our Agweather site at: agweather.mesonet.org.

Altus Normal (1981-2010) and Mesonet 2017 Rainfall



Altus Normal From January 1 – April 30 6.66”

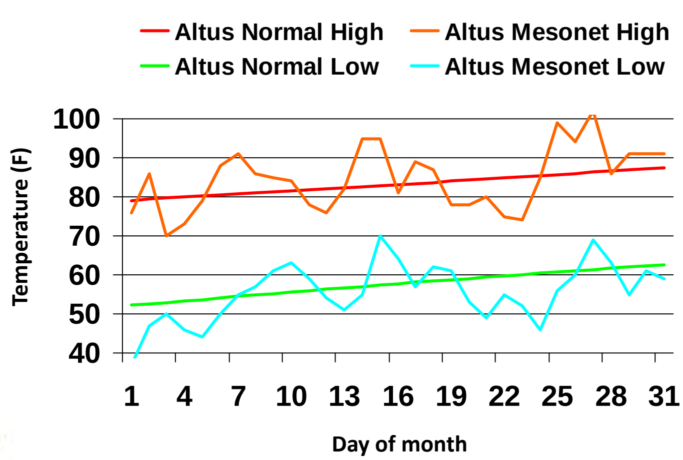
Altus Actual From January 1 – April 30 8.75” 31% above normal

Altus Normal From April 1 – June 30 10.82”

Altus Actual From April 1 – June 30 10.19” 6% below normal

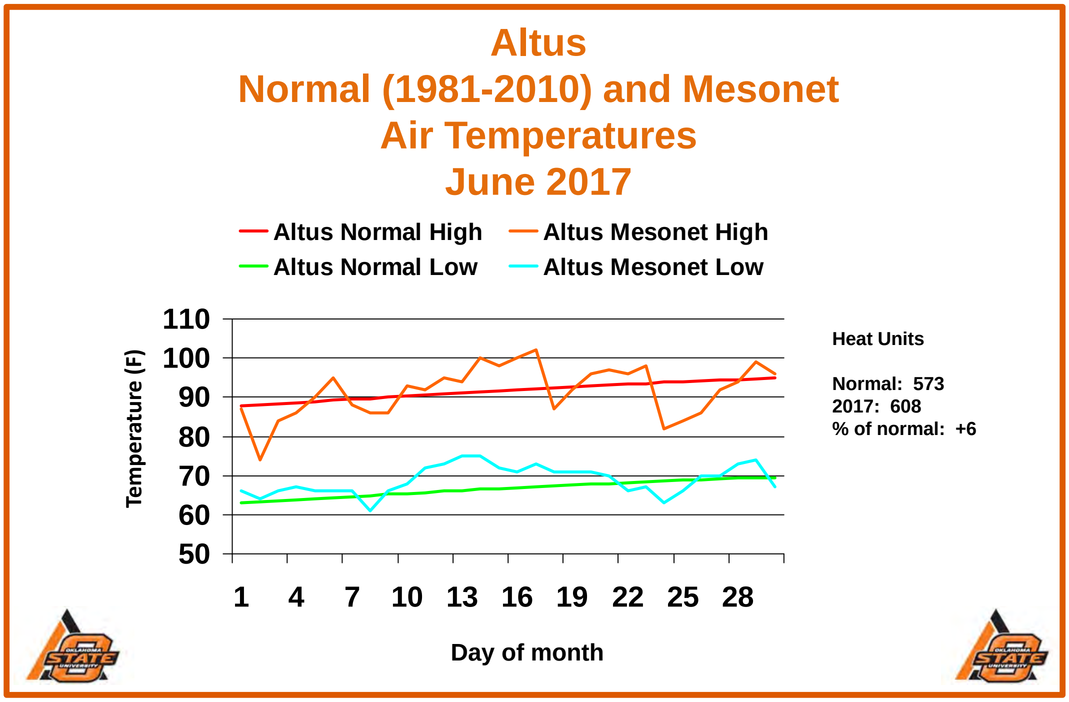
Source: http://climate.ok.gov/index.php/climate/county_climate_by_county/jackson

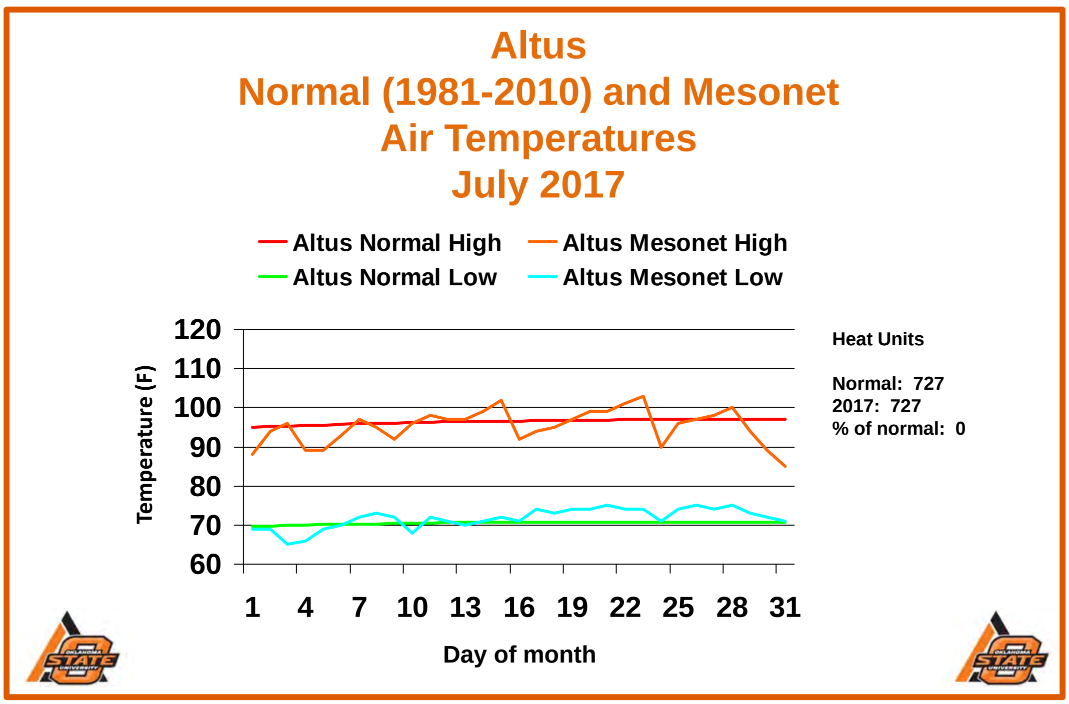
Altus Normal (1981-2010) and Mesonet Air Temperatures May 2017



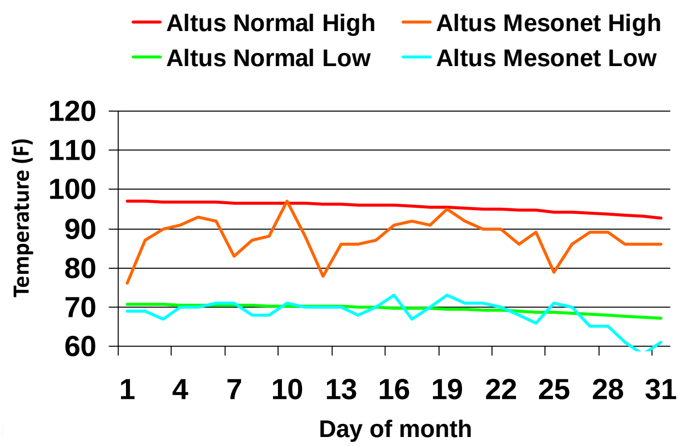
Heat Units

Normal: 323
2017: 313
% of normal: -3


Altus
Normal (1981-2010) and Mesonet
Air Temperatures
June 2017
Altus Normal High
Altus Mesonet High
Altus Normal Low
Altus Mesonet Low
Temperature (F)
110
100
90
80
70
60
50
1
4
7
10
13
16
19
22
25
28
Day of month
Heat Units
Normal: 573
2017: 608
% of normal: +6


Altus
Normal (1981-2010) and Mesonet
Air Temperatures
July 2017
Altus Normal High
Altus Mesonet High
Altus Normal Low
Altus Mesonet Low
Temperature (F)
120
110
100
90
80
70
60
1
4
7
10
13
16
19
22
25
28
31
Day of month
Heat Units
Normal: 727
2017: 727
% of normal: 0

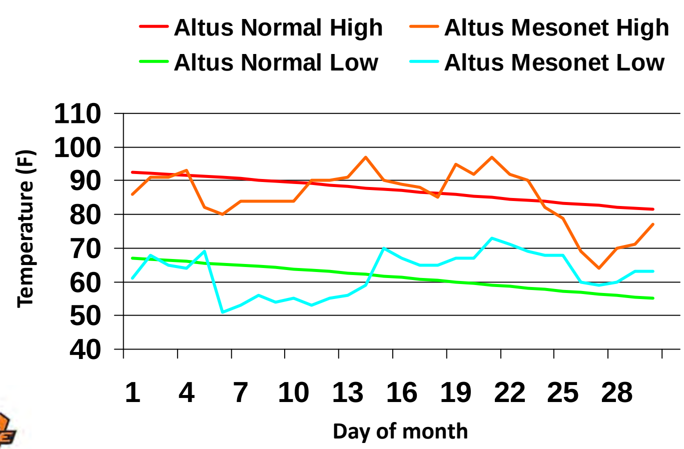
Altus
Normal (1981-2010) and Mesonet
Air Temperatures
August 2017



Heat Units

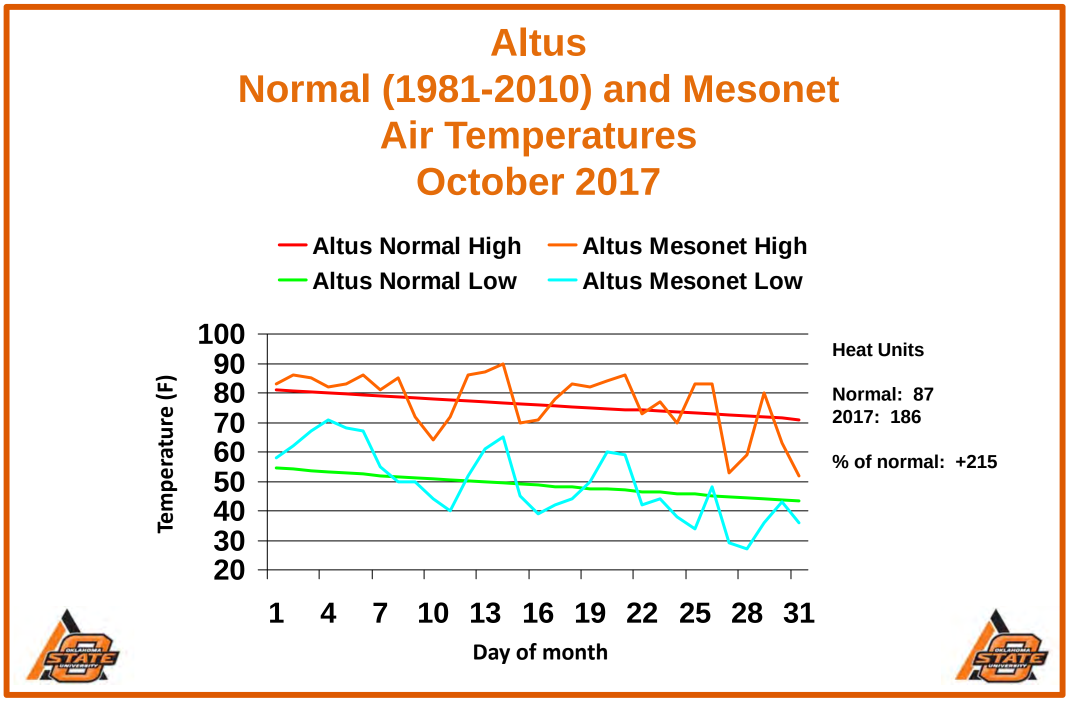
Normal: 698
2017: 564
% of normal: -19

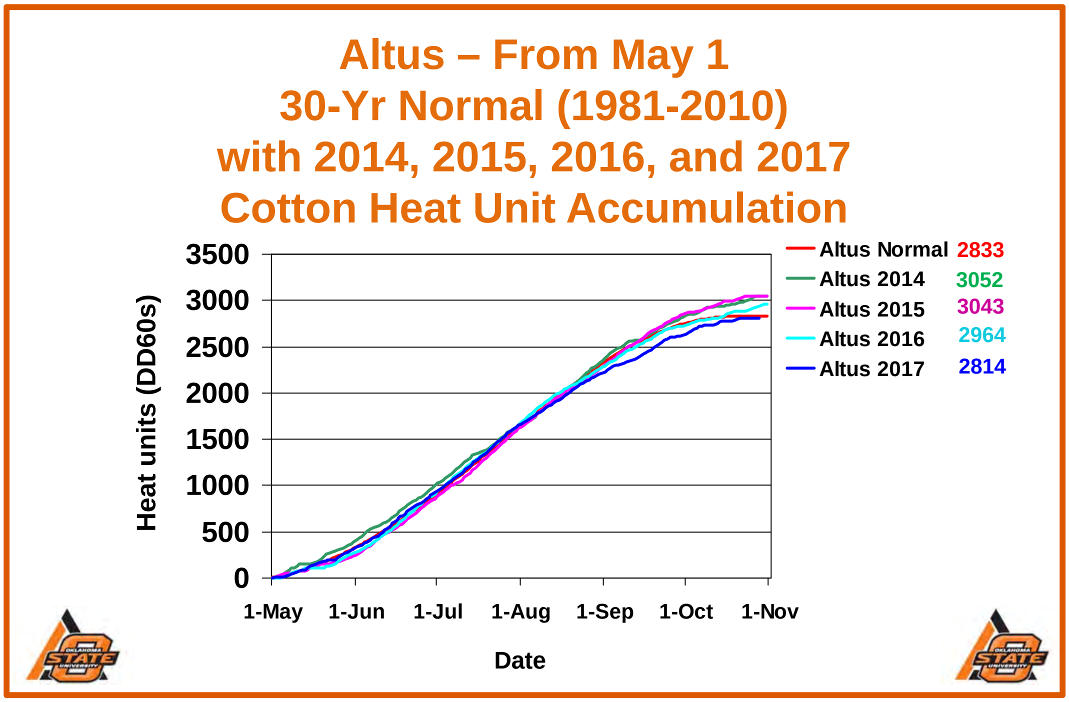
Altus
Normal (1981-2010) and Mesonet
Air Temperatures
September 2017



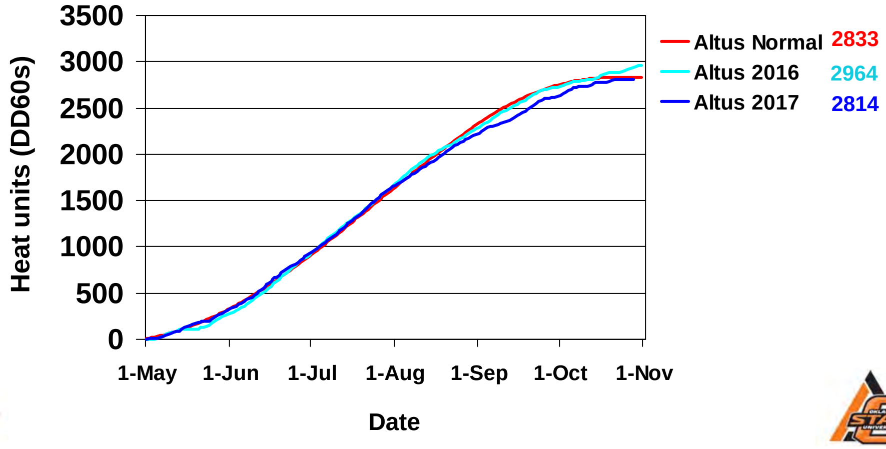
Heat Units

Normal: 427
2017: 413
% of normal: -4

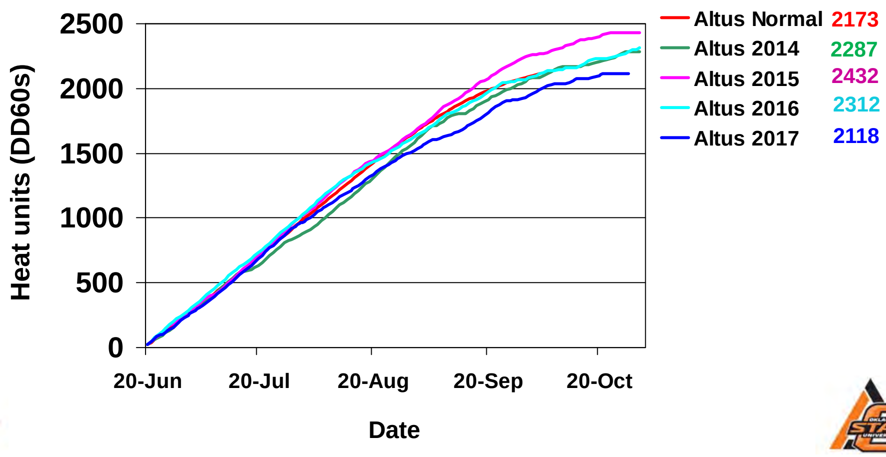

Altus
Normal (1981-2010) and Mesonet
Air Temperatures
October 2017
Altus Normal High
Altus Mesonet High
Altus Normal Low
Altus Mesonet Low
Temperature (F)
100
90
80
70
60
50
40
30
20
1
4
7
10
13
16
19
22
25
28
31
Day of month
Heat Units
Normal: 87
2017: 186
% of normal: +215


Altus – From May 1
30-Yr Normal (1981-2010)
with 2014, 2015, 2016, and 2017
Cotton Heat Unit Accumulation
Heat units (DD60s)
3500
3000
2500
2000
1500
1000
500
0
1-May
1-Jun
1-Jul
1-Aug
1-Sep
1-Oct
1-Nov
Date
Altus Normal 2833
Altus 2014 3052
Altus 2015 3043
Altus 2016 2964
Altus 2017 2814

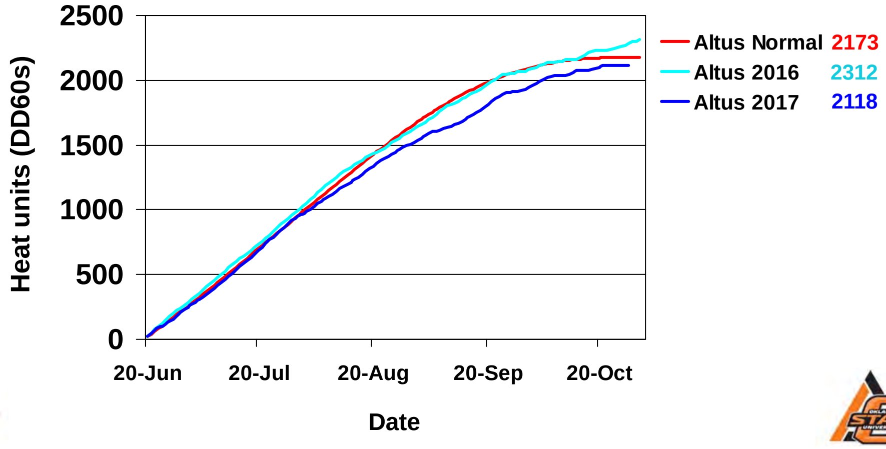
Altus – From May 1 30-Yr Normal (1981-2010) with 2016 and 2017 Cotton Heat Unit Accumulation



Altus – From June 20 30-Yr Normal (1981-2010) with 2014, 2015, 2016, and 2017 Cotton Heat Unit Accumulation



Altus – From June 20
30-Yr Normal (1981-2010)
with 2016 and 2017
Cotton Heat Unit Accumulation



Evaluating Field Trial Data

This article has been reprinted from Southwest Farm Press Vol 25, Number 11, April 9, 1998.

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.