# 2016 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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# 2016 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 2016 growing season.

According to USDA-NASS, in 2016, 305,000 acres were planted with 290,000 acres expected to be harvested. USDA projects Oklahoma Cotton production to total 620,000 bales. Yield is expected to average 1,026 pounds per acre, compared with 876 pounds last year. This would

be the largest crop in terms of bale volume since 1944, but that crop was produced on 1.5 million harvested acres. This massive crop by local standards is taxing the ginning infrastructure in the state, and many gins will likely be running well into March and April. 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 another outstanding fall with above normal temperatures and thus cotton heat unit accumulation in September and October – the third in a row. Many dryland as well as irrigated producers generated record yields in 2016.

The one serious caveat to this was the impact of Bacterial blight in many fields in Jackson, Harmon, Tillman and other counties. There is no doubt that this disease, which was first noted in mid-July, produced significant levels of defoliation in many fields. When inspecting severely impacted fields, it was apparent that a large number of plants were defoliated in the bottom one-third to one-half of the canopy. In some fields, the disease was observed on bolls by late July. Boll lesions triggered considerable boll rot in many fields. Based on visual observations, the leaf loss likely impacted boll size in the lower portion of the plant, while boll rot has directly reduced yield. The good rainfall and September and October temperatures allowed many fields to compensate in terms of yield.

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 470,000 bales of Oklahoma ginned cotton classed through February 10. A total of 69% have been color grades 11, 21 or 31, with 29% with color grade 11 or 21 – the best possible. Leaf grades have averaged 2.9 with 35% exhibiting leaf grade 1 or 2 – the best quality possible. Bark contamination is present in about 7% of the bales classed thus far. Staple (fiber length expressed in $32^{nds}$ inch) has averaged 36.4. A total of 49% of the crop has a 37 or longer staple, with an additional 29% classed as a 36. Micronaire (a measure of maturity) averaged 4.4 units, with 87% in the 3.5-4.9 range. The strength average is 30.4 g/tex, with nearly 73% classed as 30 g/tex or higher. Oklahoma-ginned bales classed at Abilene have the highest average staple, uniformity and strength averages, and this again is a result of wise variety selection. The Abilene classing office serves east Texas, the Texas Rolling Plains, 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 |
| Chance Taylor, Temporary Worker | Harley Houston, Field Assistant |
| Jaylan Hamersley, Temporary Worker | Brennan Leighton, Agriculturist |
| Sammy Banks, Temporary Worker | |
| Rocky Thacker, Senior Superintendent | |
| Toby Kelley, Assistant Superintendent | |
| Chase Harris, Field Supervisor | |
| Greg Chavez, Field Assistant | |
| Lynn Halford, Field Assistant | |

## 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 | Tony Cox - Wellington, TX |
| Drew Darby - Duke | Danny Davis - Elk City |
| Keeff Felty – Altus | Kelly Horton – Hollis |
| Robert Luttmer – Elk City | Mark Nichols - 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

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### 2016 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.

Seven large-plot trials were planted and six were harvested using grower equipment. The testing locations were Custer, Harmon, Tillman, Jackson, and Washita Counties. Most trials were established under no-till or strip-till conditions. 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 Southwest Research and Extension Center. Fiber samples were submitted to the Cotton Phenomics Laboratory at the Texas Tech University Fiber and Biopolymer Research Institute (FBRI) for high volume instrument (HVI) analysis and these data were used to compute the 2016 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, $175/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 value based on gross CCC Loan (lint yield times Loan value) and gin-run seed (valued at $175/ton) and then removing seed and technology fees and ginning costs. Analysis of variance was performed using SAS version 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. The irrigated projects indicate that variety selection was important in all fields. Statistically significant differences in net value/acre ranged from $1049 to $1280/acre in Custer County; $912 to $1077/acre in Jackson County (drip irrigated); $677 to $1185/acre in Harmon County; and $676 to $838/acre in Jackson County (furrow irrigated). These differences in performance are $231, $165, $508, and $162/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 $267/acre.

Excellent yields were obtained in two no-till dryland trials. Fiber quality was generally good to excellent at the two sites. Statistically significant differences in net value/acre ranged from $650 to $775/acre in Washita County and $593 to $748/acre in Jackson County. These differences in performance are $125 and $155/acre for Washita and

Jackson Counties, respectively. Across the two dryland sites, the average difference between top and bottom performers in net value/acre range was $140 /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, Tony Cox, Mark Nichols, Drew Darby, and Danny Davis (with Robert Luttmer providing harvest using his equipment) . We also thank the personnel at the Cotton Phenomics Laboratory at Texas Tech University-Fiber and Biopolymer Research Institute for timely assistance with HVI analyses.

**Table 1. Cultural information for 2016 OSU Extension large-plot trial sites.**

| | Irrigated Cotton Inc Enhanced Variety | | Irrigated RACE | | Dryland RACE | |
|---|---|---|---|---|---|---|
| Table numbers | 2 and 3 | 4 and 5 | 6 and 7 | 8 and 9 | 10 and 11 | 12 and 13 |
| County and location | Custer - Hydro | Jackson - Altus | Harmon - Hollis | Jackson - Duke | Washita - Elk City | Jackson - Altus |
| Cooperator | Merlin Schantz | Clint Abernathy | Tony Cox | Drew Darby | Danny Davis | Clint Abernathy |
| Tillage system | terminated cover/strip till | no-till | terminated cover/strip till | conventional till | terminated cover/no-till | no-till |
| Herbicide System | RRF and LL | RRF | XtendFlex Entries Only | RRF and LL | XtendFlex Entries Only | RRF |
| Planting date | 26-May | 27-May | 27-May | 31-May | 25-May | 9-Jun |
| Seeding rate (seeds/acre) | 50,000 | 40,000 | 42,000 | 45,000 | 28,000 | 28,500 |
| Row spacing (inches) | 36 | 38 | 40 | 40 | 40 | 38 |
| Replicates planted | 4 | 3 | 3 | 3 | 3 | 3 |
| Replicates harvested | 3 | 3 | 3 | 3 | 3 | 3 |
| Planter width (rows) | 16 | 12 | 16 | 8 | 12 | 12 |
| Plot width (rows) | 8 | 6 | 8 | 4 | 6 | 6 |
| Harvested plot length (ft) | 600 | 2,250 | variable (1,200-1,720) | variable (720-760) | 1,090 | 2,400 |
| Harvest date | 11-Nov | 26-Oct | 28-Oct | 15-Nov | 4-Nov | 21-Nov |
| Final stand count date | 16-Jun | 15-Jun | 15-Jun | 28-Jun | 16-Jun | 28-Jun |
| Final plant height date | 11-Nov | 24-Oct | 24-Oct | 24-Oct | 4-Nov | 24-Oct |
| Storm resistance rating date | 11-Nov | 26-Oct | 28-Oct | 15-Nov | 4-Nov | 21-Nov |
| | | | | | | |
| Comments | pivot irrigation | drip irrigation | drip irrigation | furrow irrigation | harvested by | |
| | | | | | Robert Luttmer | |
| | | | | | | |
| | | | | | | |
| Bacterial blight infection level | light | light | severe | none | none | moderate |
| | | | | | | |
| Harvester type | basket picker | moduling picker | JD 7460 with FC | JD 7460 with FC | JD 7450 with FC | moduling picker |
| | | | | | | |
| Entries | NG 3406 B2XF | NG 3406 B2XF | NG 3406 B2XF | NG 3406 B2XF | NG 3406 B2XF | NG 3406 B2XF |
| | DP 1522 B2XF | DP 1639 B2XF | NG 4545 B2XF | DP 1522 B2XF | NG 4545 B2XF | DP 1549 B2XF |
| | PHY 490 W3FE | PHY 333 WRF | DP 1522 B2XF | PHY 490 W3FE | DP 1522 B2XF | PHY 333 WRF |
| | CG 3475 B2XF | CG 3475 B2XF | DP 1639 B2XF | CG 3885 B2XF | DP 1549 B2XF | CG 3885 B2XF |
| | FM 1911 GLT | FM 1911 GLT | CG 3475 B2XF | FM 1911 GLT | CG 3475 B2XF | FM 2007 GLT |
| | ST 4848 GLT | ST 4848 GLT | CG 3885 B2XF | ST 4848 GLT | CG 3885 B2XF | ST 4946 GLB2 |
| | | | | | | |
| Local Standard 1 | ST 4946 GLB2 | ST 4946 GLB2 | | | | |
| Local Standard 2 | DP 1518 B2XF | DP 1522 B2XF | | | | |
| Local Standard 3 | FM 1830 GLT | FM 1830 GLT | | | | |
| | | | | | | |
| Grower's choice | PHY PXAST34 W3FE | PHY 490 W3FE | DP 1646 B2XF | ST 4946 GLB2 | DP 1646 B2XF | NG 4545 B2XF |

Table 2. Harvest results from the Custer County irrigated Cotton Incorporated Enhanced Variety trial, Merlin Schantz Farm, Hydro, OK, 2016.

| 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 490W3FE | 37.8 | 53.2 | 5753 | 2173 | 3064 | 0.5798 | 1260 | 268 | 1528 | 172 | 75 | 1280 | a |
| Deltapine DP 1518B2XF | 38.4 | 53.7 | 5614 | 2154 | 3016 | 0.5800 | 1249 | 264 | 1513 | 168 | 77 | 1267 | ab |
| Deltapine DP 1522B2XF | 38.3 | 53.4 | 5617 | 2152 | 2998 | 0.5722 | 1231 | 262 | 1494 | 169 | 77 | 1248 | abc |
| Stoneville ST 4946GLB2 | 36.5 | 54.0 | 5762 | 2105 | 3114 | 0.5793 | 1220 | 272 | 1492 | 173 | 80 | 1240 | abc |
| Stoneville ST 4848GLT | 39.2 | 51.4 | 5465 | 2145 | 2810 | 0.5800 | 1244 | 246 | 1490 | 164 | 92 | 1234 | abc |
| Croplan Genetics CG 3475B2XF | 37.2 | 54.6 | 5601 | 2086 | 3057 | 0.5797 | 1209 | 267 | 1477 | 168 | 79 | 1229 | abc |
| PhytoGen PHY 220W3FE | 38.1 | 54.0 | 5546 | 2111 | 2994 | 0.5658 | 1195 | 262 | 1457 | 166 | 75 | 1216 | bc |
| NexGen NG 3406B2XF | 37.6 | 54.7 | 5407 | 2033 | 2957 | 0.5800 | 1179 | 259 | 1438 | 162 | 72 | 1204 | c |
| FiberMax FM 1830GLT | 37.7 | 52.9 | 4972 | 1873 | 2630 | 0.5802 | 1086 | 230 | 1317 | 149 | 80 | 1087 | d |
| FiberMax FM 1911GLT | 37.9 | 53.3 | 4778 | 1813 | 2545 | 0.5790 | 1050 | 223 | 1272 | 143 | 80 | 1049 | d |
| Test average | 37.9 | 53.5 | 5452 | 2064 | 2919 | 0.5776 | 1192 | 255 | 1448 | 163 | 79 | 1205 | |
| CV, % | 1.8 | 1.9 | 2.4 | 2.4 | 2.4 | 1.6 | 2.9 | 2.4 | 2.8 | 2.4 | -- | 3.0 | |
| OSL | 0.0135 | 0.0391 | <0.0001 | <0.0001 | <0.0001 | 0.6068 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | -- | <0.0001 | |
| LSD | 1.2 | 1.7 | 224 | 85 | 120 | NS | 59 | 11 | 68 | 7 | -- | 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.
$175/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, 2016.

| 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 Genetics CG 3475B2XF | 50,820 | 38.2 | 3.7 | 4.7 | 38.2 | 32.6 | 84.3 |
| Deltapine DP 1518B2XF | 46,464 | 45.1 | 5.3 | 4.2 | 40.1 | 30.5 | 84.4 |
| Deltapine DP 1522B2XF | 50,820 | 39.9 | 6.0 | 4.6 | 39.4 | 32.0 | 84.4 |
| FiberMax FM 1830GLT | 51,304 | 37.4 | 4.7 | 4.2 | 41.3 | 33.2 | 83.0 |
| FiberMax FM 1911GLT | 50,820 | 36.0 | 8.3 | 4.3 | 40.4 | 31.5 | 84.5 |
| NexGen NG 3406B2XF | 46,464 | 37.9 | 5.7 | 4.4 | 38.6 | 31.5 | 84.6 |
| PhytoGen PHY 220W3FE | 50,336 | 37.5 | 7.7 | 4.8 | 37.8 | 32.4 | 84.4 |
| PhytoGen PHY 490W3FE | 49,852 | 46.8 | 6.0 | 4.4 | 38.6 | 32.7 | 84.5 |
| Stoneville ST 4848GLT | 52,272 | 39.3 | 4.7 | 4.2 | 39.3 | 31.8 | 83.7 |
| Stoneville ST 4946GLB2 | 48,884 | 36.6 | 6.3 | 4.6 | 39.0 | 32.6 | 84.1 |
| Test average | 49,804 | 39.5 | 5.8 | 4.4 | 39.3 | 32.1 | 84.2 |
| CV, % | 5.4 | 6.1 | 13.3 | 6.4 | 2.1 | 4.6 | 1.0 |
| OSL | 0.1802 | 0.0003 | <0.0001 | 0.1035 | 0.0021 | 0.5917 | 0.3851 |
| LSD | NS | 4.1 | 1.3 | NS | 1.4 | 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 4.  Harvest results from the Jackson County irrigated Cotton Incorporated Enhanced Variety trial, Clint Abernathy Farm, Altus, OK, 2016.

| 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 1639B2XF | 40.6 | 49.9 | 4733 | 1920 | 2360 | 0.5583 | 1072 | 207 | 1278 | 142 | 60 | 1077 | a |
| PhytoGen PHY 490W3FE | 37.6 | 53.3 | 4771 | 1793 | 2541 | 0.5802 | 1040 | 222 | 1262 | 143 | 60 | 1059 | a |
| Stoneville ST 4946GLB2 | 35.8 | 55.6 | 4894 | 1754 | 2723 | 0.5812 | 1019 | 238 | 1258 | 147 | 64 | 1047 | ab |
| FiberMax FM 1830GLT | 38.1 | 53.3 | 4456 | 1697 | 2373 | 0.5815 | 987 | 208 | 1195 | 134 | 64 | 997 | bc |
| PhytoGen PHY 333WRF | 38.5 | 53.5 | 4385 | 1687 | 2346 | 0.5793 | 978 | 205 | 1183 | 132 | 60 | 992 | c |
| NexGen NG 3406B2XF | 36.7 | 54.7 | 4538 | 1665 | 2483 | 0.5787 | 963 | 217 | 1181 | 136 | 57 | 987 | c |
| Stoneville ST 4848GLT | 38.7 | 52.3 | 4422 | 1711 | 2312 | 0.5725 | 979 | 202 | 1182 | 133 | 74 | 976 | cd |
| Deltapine DP 1522B2XF | 37.3 | 53.8 | 4470 | 1666 | 2403 | 0.5645 | 940 | 210 | 1151 | 134 | 62 | 955 | cde |
| Croplan Genetics CG 3475B2XF | 36.0 | 55.0 | 4494 | 1619 | 2473 | 0.5652 | 915 | 217 | 1131 | 135 | 63 | 933 | de |
| FiberMax FM 1911GLT | 37.1 | 54.8 | 4239 | 1572 | 2322 | 0.5728 | 900 | 203 | 1103 | 127 | 64 | 912 | e |
| Test average | 37.6 | 53.6 | 4540 | 1708 | 2434 | 0.5734 | 979 | 213 | 1192 | 136 | 63 | 993 | |
| CV, % | 1.5 | 1.1 | 3.0 | 3.0 | 3.1 | 1.6 | 2.9 | 3.0 | 2.9 | 3.1 | -- | 3.1 | |
| OSL | <0.0001 | <0.0001 | 0.0005 | <0.0001 | <0.0001 | 0.0485 | <0.0001 | <0.0001 | <0.0001 | 0.0006 | -- | <0.0001 | |
| LSD | 1.0 | 1.0 | 236 | 87 | 128 | 0.0155 | 49 | 11 | 59 | 7 | -- | 53 | |

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.
$175/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, 2016.**

| 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 Genetics CG 3475B2XF | 42,644 | 29.6 | 4.0 | 5.0 | 38.5 | 32.8 | 84.7 |
| Deltapine DP 1522B2XF | 38,058 | 36.9 | 4.7 | 5.0 | 38.2 | 32.8 | 84.4 |
| Deltapine DP 1639B2XF | 39,892 | 39.8 | 4.3 | 5.1 | 38.8 | 33.3 | 85.5 |
| FiberMax FM 1830GLT | 34,390 | 30.8 | 5.3 | 4.6 | 41.5 | 34.6 | 85.6 |
| FiberMax FM 1911GLT | 36,224 | 32.3 | 8.0 | 4.9 | 39.8 | 33.9 | 84.4 |
| NexGen NG 3406B2XF | 38,517 | 32.3 | 5.3 | 4.7 | 37.9 | 30.6 | 84.9 |
| PhytoGen PHY 333WRF | 38,975 | 38.6 | 4.3 | 4.5 | 39.8 | 33.4 | 83.8 |
| PhytoGen PHY 490W3FE | 39,434 | 36.1 | 4.3 | 4.8 | 38.4 | 34.5 | 83.9 |
| Stoneville ST 4848GLT | 36,682 | 33.3 | 5.0 | 4.8 | 38.4 | 32.5 | 84.1 |
| Stoneville ST 4946GLB2 | 34,390 | 30.9 | 6.7 | 4.7 | 39.5 | 32.7 | 85.6 |
| Test average | 37,921 | 34.1 | 5.2 | 4.8 | 39.1 | 33.1 | 84.7 |
| CV, % | 9.0 | 5.5 | 7.7 | 2.9 | 2.1 | 3.2 | 1.0 |
| OSL | 0.1624 | <0.0001 | <0.0001 | 0.0009 | 0.0013 | 0.0124 | 0.1317 |
| LSD | NS | 3.2 | 0.7 | 0.2 | 1.4 | 1.8 | 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 Harmon County irrigated RACE trial, Tony Cox Farm, Hollis, OK, 2016.

| 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 1639B2XF | 32.6 | 44.0 | 6485 | 2112 | 2853 | 0.5647 | 1193 | 250 | 1442 | 195 | 62 | 1185 | a |
| NexGen NG 4545B2XF | 29.9 | 50.6 | 5931 | 1776 | 2999 | 0.5805 | 1031 | 262 | 1294 | 178 | 60 | 1056 | b |
| Deltapine DP 1646B2XF | 31.9 | 46.0 | 5768 | 1840 | 2653 | 0.5527 | 1016 | 232 | 1248 | 173 | 65 | 1010 | bc |
| Croplan Genetics CG 3475B2XF | 30.9 | 50.2 | 5329 | 1648 | 2674 | 0.5808 | 958 | 234 | 1191 | 160 | 67 | 965 | c |
| NexGen NG 3406B2XF | 30.3 | 49.0 | 4646 | 1406 | 2276 | 0.5567 | 783 | 199 | 982 | 139 | 60 | 782 | d |
| Deltapine DP 1522B2XF | 29.1 | 48.8 | 4806 | 1400 | 2347 | 0.5585 | 781 | 205 | 987 | 144 | 65 | 778 | d |
| Croplan Genetics CG 3885B2XF | 29.4 | 47.2 | 4385 | 1288 | 2069 | 0.5387 | 694 | 181 | 875 | 132 | 67 | 677 | e |
| Test average | 30.6 | 48.0 | 5336 | 1639 | 2553 | 0.5618 | 922 | 223 | 1146 | 160 | 64 | 922 | |
| CV, % | 2.4 | 1.9 | 4.0 | 3.9 | 4.0 | 2.4 | 4.0 | 4.1 | 3.9 | 4.0 | -- | 4.2 | |
| OSL | 0.0007 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | 0.0211 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | -- | <0.0001 | |
| LSD | 1.3 | 1.6 | 379 | 114 | 183 | 0.0236 | 65 | 16 | 79 | 11 | -- | 69 | |

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

Assumes:
$3.00/cwt ginning cost.
$175/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 Harmon County irrigated RACE trial, Tony Cox Farm, Hollis, OK, 2016.

| 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 Genetics CG 3475B2XF | 45,738 | 28.8 | 4.0 | 3.9 | 38.5 | 33.3 | 83.4 |
| Croplan Genetics CG 3885B2XF | 45,302 | 37.4 | 4.3 | 3.1 | 37.4 | 30.7 | 82.8 |
| Deltapine DP 1522B2XF | 41,818 | 31.1 | 3.7 | 3.3 | 37.7 | 31.1 | 82.5 |
| Deltapine DP 1639B2XF | 44,431 | 32.8 | 3.7 | 3.4 | 38.6 | 31.0 | 83.1 |
| Deltapine DP 1646B2XF | 43,124 | 31.5 | 4.7 | 3.2 | 41.8 | 29.9 | 82.6 |
| NexGen NG 3406B2XF | 44,867 | 30.0 | 5.7 | 3.4 | 37.4 | 29.4 | 82.4 |
| NexGen NG 4545B2XF | 45,738 | 31.8 | 4.7 | 4.0 | 38.5 | 33.5 | 82.4 |
| Test average | 44,431 | 31.9 | 4.4 | 3.5 | 38.6 | 31.3 | 82.7 |
| CV, % | 7.9 | 8.5 | 14.4 | 5.2 | 1.9 | 3.9 | 1.4 |
| OSL | 0.7834 | 0.0455 | 0.0243 | 0.0002 | 0.0001 | 0.0082 | 0.9136 |
| LSD | NS | 4.8 | 1.1 | 0.3 | 1.3 | 2.2 | 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, 2016.

| 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 ----------------------------- | | | | | | |
| Stoneville ST 4946GLB2 | 34.7 | 49.5 | 4266 | 1480 | 2113 | 0.5762 | 852 | 185 | 1038 | 128 | 72 | 838 | a |
| PhytoGen PHY 490W3FE | 34.1 | 46.7 | 4118 | 1404 | 1921 | 0.5792 | 813 | 168 | 981 | 124 | 67 | 790 | ab |
| NexGen NG 3406B2XF | 34.1 | 48.8 | 4095 | 1398 | 1998 | 0.5730 | 801 | 175 | 976 | 123 | 64 | 789 | ab |
| FiberMax FM 1911GLT | 35.2 | 47.9 | 3808 | 1339 | 1823 | 0.5767 | 772 | 160 | 931 | 114 | 72 | 745 | bc |
| Deltapine DP 1522B2XF | 35.0 | 48.3 | 3743 | 1311 | 1808 | 0.5780 | 757 | 158 | 916 | 112 | 69 | 734 | bcd |
| Croplan Genetics CG 3885B2XF | 34.7 | 47.6 | 3744 | 1299 | 1783 | 0.5727 | 744 | 156 | 900 | 112 | 72 | 716 | cd |
| Stoneville ST 4848GLT | 35.1 | 46.7 | 3571 | 1254 | 1666 | 0.5747 | 721 | 146 | 866 | 107 | 83 | 676 | d |
| Test average | 34.7 | 47.9 | 3906 | 1355 | 1873 | 0.5758 | 780 | 164 | 944 | 117 | 71 | 755 | |
| CV, % | 2.2 | 1.7 | 4.3 | 4.4 | 4.3 | 0.6 | 4.5 | 4.3 | 4.5 | 4.3 | -- | 4.9 | |
| OSL | 0.4968 | 0.0065 | 0.0027 | 0.0084 | 0.0004 | 0.1949 | 0.0096 | 0.0003 | 0.0057 | 0.0024 | -- | 0.0035 | |
| LSD | NS | 1.4 | 301 | 105 | 142 | NS | 852 | 12 | 75 | 9 | -- | 66 | |

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.
$175/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, 2016.**

| 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 Genetics CG 3885B2XF | 39,204 | 26.9 | 3.3 | 4.3 | 36.3 | 29.3 | 82.7 |
| Deltapine DP 1522B2XF | 36,155 | 26.6 | 4.0 | 4.4 | 37.4 | 30.9 | 83.1 |
| FiberMax FM 1911GLT | 42,689 | 25.7 | 8.0 | 4.5 | 37.6 | 31.3 | 82.6 |
| NexGen NG 3406B2XF | 45,302 | 25.1 | 4.7 | 4.2 | 36.6 | 28.9 | 82.2 |
| PhytoGen PHY 490W3FE | 40,946 | 26.2 | 4.3 | 4.3 | 36.7 | 32.8 | 83.2 |
| Stoneville ST 4848GLT | 37,026 | 25.5 | 5.3 | 4.2 | 36.9 | 30.1 | 82.6 |
| Stoneville ST 4946GLB2 | 40,946 | 26.1 | 5.7 | 4.3 | 37.2 | 31.7 | 82.6 |
| Test average | 40,324 | 26.0 | 5.0 | 4.3 | 37.0 | 30.7 | 82.7 |
| CV, % | 11.1 | 9.6 | 8.3 | 3.9 | 2.4 | 4.2 | 1.1 |
| OSL | 0.2509 | 0.9698 | <0.0001 | 0.5423 | 0.5540 | 0.0342 | 0.8277 |
| LSD | NS | NS | 0.7 | NS | NS | 2.3 | 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 10. Harvest results from the Washita County dryland RACE trial, Danny Davis Farm, Elk City, OK, 2016.

| 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 1646B2XF | 34.8 | 45.3 | 3924 | 1365 | 1777 | 0.5705 | 780 | 156 | 935 | 118 | 43 | 775 | a |
| Deltapine DP 1549B2XF | 34.3 | 45.4 | 3897 | 1338 | 1771 | 0.5503 | 736 | 155 | 892 | 117 | 39 | 735 | ab |
| Croplan Genetics CG 3885B2XF | 31.8 | 44.7 | 4049 | 1287 | 1811 | 0.5600 | 720 | 158 | 878 | 122 | 44 | 712 | bc |
| Deltapine DP 1522B2XF | 32.9 | 46.0 | 3900 | 1283 | 1795 | 0.5390 | 691 | 157 | 848 | 117 | 43 | 688 | bcd |
| NexGen NG 4545B2XF | 32.3 | 46.9 | 3848 | 1243 | 1805 | 0.5367 | 667 | 158 | 825 | 115 | 40 | 670 | cd |
| Croplan Genetics CG 3475B2XF | 32.7 | 45.0 | 3863 | 1264 | 1739 | 0.5248 | 663 | 152 | 816 | 116 | 44 | 655 | cd |
| NexGen NG 3406B2XF | 32.3 | 45.3 | 3685 | 1192 | 1670 | 0.5490 | 654 | 146 | 800 | 111 | 40 | 650 | d |
| Test average | 33.0 | 45.5 | 3881 | 1282 | 1767 | 0.5472 | 702 | 155 | 856 | 116 | 42 | 698 | |
| CV, % | 1.5 | 2.5 | 4.0 | 4.0 | 4.0 | 1.5 | 4.4 | 3.9 | 4.3 | 3.9 | -- | 4.6 | |
| OSL | <0.0001 | 0.3586 | 0.2618 | 0.0210 | 0.2791 | 0.0004 | 0.0028 | 0.2295 | 0.0077 | 0.2336 | -- | 0.0043 | |
| LSD | 0.9 | NS | 274 | 90 | NS | 0.0147 | 55 | NS | 65 | NS | -- | 58 | |

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.
$175/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 Washita County dryland RACE trial, Danny Davis Farm, Elk City, OK, 2016.**

| 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 Genetics CG 3475B2XF | 28,750 | 30.9 | 5.7 | 5.5 | 34.9 | 32.6 | 82.9 |
| Croplan Genetics CG 3885B2XF | 25,700 | 31.4 | 3.3 | 4.8 | 36.4 | 30.8 | 82.5 |
| Deltapine DP 1522B2XF | 26,136 | 30.8 | 4.7 | 5.4 | 36.8 | 31.7 | 82.7 |
| Deltapine DP 1549B2XF | 24,394 | 35.4 | 5.0 | 5.0 | 35.8 | 33.0 | 81.6 |
| Deltapine DP 1646B2XF | 25,265 | 34.0 | 4.3 | 4.8 | 38.9 | 31.2 | 83.4 |
| NexGen NG 3406B2XF | 24,829 | 30.2 | 6.0 | 5.2 | 35.6 | 30.4 | 83.4 |
| NexGen NG 4545B2XF | 26,136 | 36.3 | 6.0 | 5.4 | 35.5 | 33.7 | 82.5 |
| Test average | 25,887 | 32.7 | 5.0 | 5.2 | 36.3 | 31.9 | 82.7 |
| CV, % | 13.8 | 7.1 | 11.3 | 4.1 | 1.4 | 2.5 | 0.6 |
| OSL | 0.8152 | 0.0311 | 0.0007 | 0.0046 | <0.0001 | 0.0021 | 0.0245 |
| LSD | NS | 4.1 | 1.0 | 0.4 | 0.9 | 1.4 | 1.0 |

CV - coefficient of variation.

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

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

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

Assumes:

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, 2016.

| 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 ----------------------------- | | | | | | |
| NexGen NG 4545B2XF | 36.9 | 52.8 | 3474 | 1283 | 1835 | 0.5705 | 732 | 161 | 893 | 104 | 41 | 748 | a |
| Deltapine DP 1549B2XF | 38.9 | 50.8 | 3235 | 1259 | 1642 | 0.5777 | 727 | 144 | 871 | 97 | 40 | 734 | a |
| FiberMax FM 2007GLT | 35.1 | 55.9 | 3420 | 1200 | 1912 | 0.5795 | 695 | 167 | 862 | 103 | 43 | 717 | a |
| Stoneville ST 4946GLB2 | 36.4 | 54.4 | 3308 | 1206 | 1799 | 0.5785 | 698 | 157 | 855 | 99 | 45 | 710 | a |
| NexGen NG 3406B2XF | 38.3 | 52.1 | 3111 | 1191 | 1622 | 0.5693 | 678 | 142 | 820 | 93 | 41 | 686 | a |
| PhytoGen PHY 333WRF | 38.3 | 52.2 | 2997 | 1148 | 1563 | 0.5785 | 664 | 137 | 801 | 90 | 43 | 668 | ab |
| Croplan Genetics CG 3885B2XF | 37.3 | 53.0 | 2761 | 1030 | 1464 | 0.5755 | 593 | 128 | 721 | 83 | 45 | 593 | b |
| Test average | 37.3 | 53.0 | 3187 | 1188 | 1691 | 0.5756 | 684 | 148 | 832 | 96 | 43 | 694 | |
| CV, % | 1.6 | 1.1 | 6.5 | 6.4 | 6.7 | 1.0 | 6.5 | 6.7 | 6.5 | 6.5 | -- | 6.9 | |
| OSL | <0.0001 | <0.0001 | 0.0143 | 0.0280 | 0.0039 | 0.2857 | 0.0346 | 0.0041 | 0.0320 | 0.0138 | -- | 0.0293 | |
| LSD | 1.0 | 1.1 | 369 | 134 | 201 | NS | 79 | 18 | 96 | 11 | -- | 85 | |

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.
$175/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, 2016.

| 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 Genetics CG 3885B2XF | 27,970 | 37.3 | 5.7 | 4.5 | 37.4 | 30.4 | 82.9 |
| Deltapine DP 1549B2XF | 28,429 | 34.7 | 4.7 | 4.5 | 37.1 | 33.3 | 81.9 |
| FiberMax FM 2007GLT | 27,512 | 32.6 | 7.3 | 4.2 | 40.5 | 32.8 | 82.5 |
| NexGen NG 3406B2XF | 27,054 | 31.7 | 4.3 | 4.6 | 35.9 | 30.6 | 83.2 |
| NexGen NG 4545B2XF | 28,887 | 35.4 | 4.3 | 4.9 | 36.9 | 35.0 | 83.2 |
| PhytoGen PHY 333WRF | 27,512 | 36.6 | 3.7 | 4.4 | 37.7 | 30.8 | 83.8 |
| Stoneville ST 4946GLB2 | 24,302 | 31.7 | 6.0 | 4.6 | 36.8 | 33.6 | 83.7 |
| Test average | 27,381 | 34.3 | 5.1 | 4.5 | 37.5 | 32.4 | 83.0 |
| CV, % | 10.0 | 6.8 | 11.2 | 2.9 | 1.9 | 3.1 | 0.7 |
| OSL | 0.5307 | 0.0494 | <0.0001 | 0.0007 | <0.0001 | 0.0005 | 0.0285 |
| LSD | NS | 4.1 | 1.0 | 0.2 | 1.1 | 1.8 | 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.

**OSU Cotton Official Variety Tests - 2016**

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The Oklahoma Agricultural Experiment Station official variety tests (OVTs) were planted at the Southwest Research and Extension Center at Altus (Lugert-Altus Irrigation District - furrow irrigated), Tipton Valley Research Center (dryland), and Caddo Research Station at Fort Cobb (center pivot irrigated) in 2016.

Site information:

1) Altus conventional tillage furrow irrigated OVT – planted May 27 at 4 seeds/row-ft, harvested November 21. This trial experienced severe Bacterial blight infection beginning in late July.

2) Tipton no-till dryland OVT – planted June 8 at 3 seeds/row-ft, harvested November 22.

3) Fort Cobb no-till in terminated wheat cover – low elevation spray center pivot irrigated OVT – planted May 26 at 4 seeds/row-ft, harvested November 30.

Four replicates were planted and harvested at all sites. Plots were four rows wide at all sites. Row spacing at Altus and Tipton was 40 inches, and row spacing was 36 inches at the Fort Cobb site. Plot lengths in all trials were 30 ft. Harvested area was the center two rows by the length of the plot. Trials were harvested with a brush-roll plot stripper. Grab samples were taken by plot in three replicates for lint and seed turnouts and High Volume Instrument (HVI) fiber quality analyses.

These grab samples were ginned on small plot ginning equipment at the OSU SWREC and lint samples were submitted to the Cotton Phenomics Laboratory at the Fiber and Biopolymer Research Institute at Texas Tech University for HVI analyses.

Additionally, 50-boll samples were taken from each plot in three replicates and other data (including boll sample lint fractions, boll size, seed index, lint index, and seed per boll) were derived from those. Additional collected data included plant height from the soil surface to terminal and a visual estimate of storm resistance (1-9 with 9 tightest).

Important cultural practices are noted in Table 1, and results for Altus (Tables 2 and 3), Tipton (Tables 4 and 5), and Fort Cobb (Tables 6 and 7) are presented below.

Table 1. Cultural practices used for the cotton official variety tests at Altus, Tipton, and Fort Cobb, 2016.

| **Location** | **Fertilizer application** | **Irrigations** | **Herbicide applications** | **Plant growth regulator application** | **Insecticide applications** | **Harvest aid applications** |
|---|---|---|---|---|---|---|
| Altus | March 3, Broadcast air boom truck application of 40-10-0 @ 300 lbs/A – Treated with N-Fix Nitrogen Stabilizer | 6 total<br><br>July 28<br>August 3<br>August 10<br>August 17<br>August 24<br>August 31 | (1) April 7, PPI ground rig broadcast application of Trifluralin HF @ 2.0 pts prod/A<br><br>(2) May 28, Pre-emerge ground rig broadcast application of Caparol 4L Mad Dog Plus + Choice Weather Master + Activator 90 nonionic surfactant @ 3.2 pts prod/A + 48.0 oz prod/A + ½ % v/v+ ½ % v/v<br><br>(3) June 20, Post emerge ground rig broadcast application of Mad Dog Plus + Choice Weather Master + Activator 90 nonionic surfactant @ 48.0 oz prod/A + ½ % v/v + ½ % v/v<br><br>(4) July 8, Post emerge ground rig broadcast application of Roundup PowerMax + Staple LX + Choice Trio + Activator 90 nonionic surfactant @ 32.0 oz prod/A + 3.2 oz prod/A + ½ % v/v + ½ % v/v<br><br>(5) July 15, 2016 Post emerge ground rig broadcast application of Roundup PowerMax + Staple LX + Choice Trio + Activator 90 nonionic surfactant @ 32.0 oz prod/A + 1.9 oz prod/A + ½ % v/v + ½ % v/v | July 29, Aerial application of Mepiquat + Activator 90 Nonionic Surfactant @ 8.0 oz prod/A + ¼ % v/v | (1) May 27, At planting, Temik 15G applied infurrow @ ½ lb ai/A<br><br>(2) July 2, Aerial application of Acephate 90 WDG + Activator 90 Nonionic surfactant @ 8.0 oz prod/A + ¼ % v/v<br><br>(3) July 9, Aerial application of Acephate 90 WDG + Activator 90 Nonionic surfactant @ 8.0 oz prod/A + ¼ % v/v | (1) October 19, Ground rig broadcast application of Ethephon + Folex + Ginstar + Induce nonionic surfactant @ 42.0 oz prod/A + 16.0 oz prod/A + 12.0 oz prod/A + ½ % v/v<br><br>(2) November 16, Aerial application of Aim + Induce nonionic surfactant 1.6 oz prod/A + ¼ % v/v |

Table 1 (continued).  Cultural practices used for the cotton official variety tests at Altus, Tipton, and Fort Cobb, 2016.

| Location | Fertilizer application | Irrigations | Herbicide applications | Plant growth regulator application | Insecticide applications | Harvest aid applications |
|---|---|---|---|---|---|---|
| Tipton | (1) September 11, Apply pre-plant fertilizer with 40' ground drive broadcast spreader with 34-20-0 @ 74 lbs/A (2x E to W then N to S) = 50-30-0 treated w/N-Fix<br><br>(2) March 16, Broadcast air boom truck application of 40-10-0 @ 200 lbs/A – Treated with N-Fix Nitrogen Stabilizer | n/a | (1) May 5, Pre-plant ground rig broadcast application of Roundup Power Max (glyphosate) + Choice Weather Master + Activator 90 nonionic surfactant @ 32.0 oz prod/A + ½ % v/v + ½ % v/v<br><br>(2) June 8, Pre-emergence ground rig broadcast application of Prowl H2O + Parazone + Induce non-ionic surfactant @ 32 oz prod/A + 32 oz prod/A + ¼% v/v<br><br>(3) June 23, Post emerge ground rig broadcast application of Mad Dog Plus + Choice Weather Master + Activator 90 nonionic Surfactant @ 48.0 oz prod/A + ½ % v/v + ½ % v/v<br><br>(4) July 14, Post emerge ground rig broadcast application of Roundup Power Max + Staple LX + Mepiquat + Choice Trio + Activator 90 nonionic surfactant @ 32.0 oz prod/A + 3.2 oz prod/A + 4.0 oz prod/A +½ % v/v + ½ % v/v | July 14, In Post emerge ground rig broadcast of Roundup Power Max + Staple LX + Mepiquat + Choice Trio + Activator 90 nonionic surfactant @ 32.0 oz prod/A + 3.2 oz prod/A + 4.0 oz prod/A +½ % v/v + ½ % v/v | (1) July 9, Aerial application of Acephate 90 WDG + Induce Nonionic surfactant @ 8.0 oz prod/A + ¼ % v/v | (1) October 25, Ground rig broadcast application of Ethephon + Folex + Ginstar + Induce nonionic surfactant @ 42.0 oz prod/A + 16.0 oz prod/A + 12.0 oz prod/A + ½ % v/v<br><br>(2) November 15, 2016 Aerial application of Aim + Induce nonionic surfactant @ 1.6 oz prod/A + ¼ % v/v |

Table 1 (continued). Cultural practices used for the cotton official variety tests at Altus, Tipton, and Fort Cobb, 2016.

| **Location** | **Fertilizer application** | **Irrigations** | **Herbicide applications** | **Plant growth regulator application** | **Insecticide applications** | **Harvest aid applications** |
|---|---|---|---|---|---|---|
| Fort Cobb | May 10, 100 lb/acre of 18-46-0 broadcast applied to test area after wheat cover baled and removed from test area<br><br>May 24, 420 lb/acre of 38-0-7 | 15 total via center pivot, 13.75" total<br><br>May 31, ¾"<br>June 11, ¾"<br>June 21, ¾"<br>July 7, 1"<br>July 10, 1"<br>July 23, 1"<br>August 3, 1"<br>August 8, 1"<br>August 11, ¾ "<br>August 14, ¾ "<br>August 17, 1 "<br>August 19, 1"<br>August 26, 1"<br>August 30, 1"<br>September 4, 1" | (1) May 10, Gramoxone SL 2.0 @ 1 qt/acre<br><br>(2) May 26, Prowl H2O @ 1 qt. + Glyphosate @ 2 qt. + Induce @ 3 oz.<br><br>(3) June 17, Glyphosate @ 40 oz. + Dual Magnum @ 1.33 pt.<br><br>(4) June 29, Glyphosate @ 40 oz. + Bracket @ 8 oz.<br><br>(5) July 14, Mepachlor 4.2 @ 8 oz. + Glyphosate @ 40 oz. + Warrant @ 3 pt. | July 14, Mepachlor 4.2 @ 8 oz. + Glyphosate @ 40 oz. + Warrant @ 3 pt. | (1) June 29, Glyphosate @ 40 oz. + Bracket @ 8 oz.<br><br>(2) July 6, Bracket @ 12 oz. | (1) October 19, Finish @ 42 oz. + Ginstar @ 10 oz.<br><br>(2) November 15, ETX @ 1.7 oz. + Crop Oil @ 1% /v in 12 GPA |

Table 2. Yield and agronomic results from the OSU cotton official variety test, Southwest Research and Extension Center, Altus, OK 2016.

| Entry | Lint yield | Grab sample turnout | | Boll sample lint fraction | | Boll size | Seed index | Lint index | Seed per boll | Storm resistance | Final plant height |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Lint | Seed | Picked | Pulled | | | | | | |
| | lb/acre | ------------------------% | ------------------------ | | | g seed cotton/boll | g wt 100 fuzzy seed | g wt lint from 100 fuzzy seed | count/boll | visual scale (1=loose, 9=tight) | inches |
| Deltapine DP 1639B2XF | 2310 | 29.7 | 41.7 | 39.8 | 30.4 | 6.4 | 9.3 | 7.0 | 28.2 | 4 | 31 |
| PhytoGen PHY 444WRF | 2261 | 29.3 | 44.1 | 38.9 | 31.0 | 7.3 | 11.5 | 8.3 | 27.3 | 5 | 32 |
| PhytoGen PHY 300W3FE | 2246 | 28.1 | 42.6 | 39.3 | 30.2 | 6.9 | 9.5 | 6.9 | 30.3 | 6 | 29 |
| FiberMax FM 2011GT | 2216 | 29.0 | 44.8 | 39.7 | 31.5 | 8.7 | 12.2 | 8.8 | 31.1 | 8 | 31 |
| NexGen NG 1511B2XF | 2173 | 30.8 | 43.2 | 40.6 | 31.8 | 7.0 | 10.1 | 7.7 | 29.0 | 4 | 30 |
| FiberMax FM 2484B2F | 2162 | 27.4 | 45.2 | 37.4 | 29.9 | 6.5 | 10.2 | 6.8 | 28.2 | 5 | 34 |
| PhytoGen PHY 312WRF | 2161 | 28.2 | 44.4 | 39.2 | 31.0 | 7.3 | 10.4 | 7.5 | 30.1 | 4 | 30 |
| Deltapine DP 1518B2XF | 2149 | 28.8 | 45.9 | 37.2 | 30.1 | 6.1 | 9.6 | 6.4 | 28.5 | 4 | 30 |
| PhytoGen PHY 490W3FE | 2127 | 27.1 | 45.0 | 39.9 | 30.8 | 6.6 | 9.0 | 6.6 | 30.7 | 6 | 32 |
| FiberMax FM 1900GLT | 2121 | 29.2 | 44.9 | 40.1 | 32.0 | 7.9 | 11.1 | 8.2 | 31.2 | 7 | 30 |
| Deltapine DP 1612B2XF | 2111 | 29.0 | 46.5 | 37.5 | 29.5 | 6.9 | 10.5 | 7.0 | 29.3 | 4 | 28 |
| Deltapine DP 1614B2XF | 2103 | 29.7 | 42.8 | 40.2 | 31.0 | 6.5 | 8.8 | 6.7 | 29.8 | 5 | 28 |
| Croplan CG 3527B2XF | 2078 | 29.4 | 42.3 | 39.8 | 31.2 | 6.7 | 9.3 | 7.1 | 29.6 | 5 | 28 |
| All-Tex Nitro-44B2RF | 2054 | 26.8 | 46.5 | 36.5 | 29.6 | 7.1 | 10.9 | 6.9 | 30.6 | 7 | 32 |
| FiberMax FM 2322GL | 2042 | 30.7 | 42.0 | 41.6 | 32.2 | 7.6 | 10.5 | 8.4 | 29.1 | 7 | 35 |
| Stoneville ST 4946GLB2 | 2036 | 28.0 | 45.0 | 37.4 | 29.9 | 7.6 | 11.0 | 7.2 | 31.4 | 6 | 28 |
| PhytoGen PHY 243WRF | 2027 | 26.9 | 45.2 | 35.8 | 28.0 | 7.2 | 11.7 | 7.3 | 27.6 | 7 | 29 |
| FiberMax FM 1911GLT | 2016 | 28.7 | 44.9 | 39.7 | 31.2 | 8.6 | 12.4 | 9.2 | 29.2 | 7 | 28 |
| FiberMax FM 2007GLT | 2015 | 27.6 | 48.3 | 36.6 | 29.2 | 6.9 | 10.9 | 7.0 | 28.6 | 7 | 27 |
| Stoneville ST 4747GLB2 | 2009 | 27.6 | 45.6 | 37.6 | 28.4 | 7.1 | 10.5 | 7.0 | 28.8 | 5 | 30 |
| NexGen NG 4545B2XF | 2001 | 27.3 | 45.4 | 37.1 | 29.5 | 7.5 | 10.7 | 6.9 | 32.1 | 5 | 31 |
| Deltapine DP 1044B2RF | 1985 | 26.5 | 46.9 | 35.8 | 28.7 | 6.3 | 10.2 | 6.4 | 28.6 | 5 | 29 |
| PhytoGen PHY 223WRF | 1966 | 26.1 | 47.7 | 35.2 | 27.7 | 7.6 | 11.3 | 6.8 | 31.3 | 6 | 31 |
| FiberMax FM 2334GLT | 1958 | 29.2 | 44.0 | 39.4 | 31.2 | 6.8 | 9.2 | 6.6 | 31.9 | 4 | 27 |
| Stoneville ST 4848GLT | 1957 | 28.9 | 43.1 | 40.1 | 31.1 | 7.1 | 9.7 | 7.3 | 30.3 | 5 | 29 |
| PhytoGen PHY 333WRF | 1937 | 27.9 | 43.8 | 39.1 | 30.1 | 7.3 | 9.8 | 7.0 | 30.9 | 5 | 30 |
| PhytoGen PHY 499WRF | 1933 | 27.9 | 44.7 | 39.0 | 30.6 | 7.0 | 9.8 | 7.0 | 30.6 | 5 | 32 |
| NexGen NG 3406B2XF | 1931 | 28.4 | 44.9 | 37.9 | 29.6 | 6.9 | 9.7 | 6.7 | 30.4 | 5 | 27 |
| PhytoGen PHY 220W3FE | 1925 | 26.9 | 44.0 | 37.9 | 28.8 | 6.6 | 10.9 | 7.4 | 25.6 | 7 | 28 |
| NexGen NG 3517B2XF | 1898 | 27.0 | 44.8 | 35.7 | 28.0 | 6.9 | 10.5 | 6.5 | 30.0 | 5 | 32 |
| Deltapine DP 1522B2XF | 1890 | 27.2 | 44.8 | 37.9 | 30.7 | 6.7 | 9.6 | 6.6 | 30.8 | 5 | 33 |
| Deltapine DP 0912B2RF | 1876 | 27.8 | 46.5 | 37.4 | 29.8 | 6.8 | 10.2 | 6.7 | 30.2 | 4 | 29 |
| FiberMax FM 1830GLT | 1851 | 28.1 | 43.9 | 39.5 | 31.5 | 7.0 | 10.2 | 7.4 | 29.9 | 5 | 29 |
| PhytoGen PHY 308WRF | 1822 | 24.4 | 43.5 | 36.7 | 27.8 | 7.5 | 10.5 | 6.7 | 31.1 | 6 | 32 |
| PhytoGen PHY 222WRF | 1752 | 26.7 | 45.3 | 37.3 | 28.5 | 7.0 | 11.2 | 7.4 | 27.0 | 6 | 26 |
| PhytoGen PHY 725RF | 1519 | 24.6 | 46.2 | 34.8 | 27.2 | 7.2 | 11.6 | 6.8 | 28.9 | 3 | 34 |
| Test average | 2017 | 28.0 | 44.7 | 38.2 | 30.0 | 7.1 | 10.4 | 7.2 | 29.7 | 5 | 30 |
| CV, % | 5.0 | 3.6 | 2.1 | 2.4 | 2.9 | 3.8 | 4.2 | 4.7 | 4.7 | 13.9 | 6.9 |
| OSL | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 |
| LSD | 141 | 1.6 | 1.5 | 1.5 | 1.4 | 0.4 | 0.7 | 0.6 | 2.3 | 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 3. Fiber property results and Texas A&M AgriLife Research Bacterial blight ratings for entries in the OSU cotton official variety test, Southwest Research and Extension Center, Altus, OK 2016.

| Entry | Micronaire | Length | Staple | Strength | Uniformity | Elongation | Reflectance | Yellowness | Texas A&M AgriLife Research Bacterial blight rating* |
|---|---|---|---|---|---|---|---|---|---|
| | units | inches | 32nds inch | g/tex | % | % | rd % | +b % | |
| All-Tex Nitro-44B2RF | 3.9 | 1.29 | 41.3 | 32.8 | 84.0 | 6.8 | 65.6 | 6.8 | R |
| Croplan CG 3527B2XF | 4.8 | 1.21 | 38.8 | 30.3 | 83.5 | 7.6 | 67.9 | 7.2 | Not reported |
| Deltapine DP 0912B2RF | 4.9 | 1.09 | 34.8 | 28.6 | 81.9 | 7.8 | 68.4 | 7.1 | S |
| Deltapine DP 1044B2RF | 4.2 | 1.19 | 38.2 | 31.0 | 82.9 | 8.4 | 69.2 | 7.4 | MS |
| Deltapine DP 1518B2XF | 4.5 | 1.22 | 38.9 | 30.4 | 83.3 | 6.7 | 68.2 | 6.4 | R |
| Deltapine DP 1522B2XF | 4.7 | 1.17 | 37.5 | 31.3 | 82.9 | 8.5 | 69.9 | 7.1 | S |
| Deltapine DP 1612B2XF | 4.9 | 1.21 | 38.8 | 31.7 | 85.2 | 8.3 | 66.6 | 6.5 | PS |
| Deltapine DP 1614B2XF | 4.9 | 1.21 | 38.7 | 30.7 | 84.4 | 8.4 | 66.4 | 7.2 | MS |
| Deltapine DP 1639B2XF | 4.8 | 1.21 | 38.7 | 34.1 | 84.8 | 7.8 | 68.4 | 6.9 | R |
| FiberMax FM 1830GLT | 5.0 | 1.33 | 42.5 | 34.0 | 83.9 | 5.1 | 70.7 | 6.2 | R |
| FiberMax FM 1900GLT | 4.6 | 1.24 | 39.7 | 35.2 | 84.7 | 4.5 | 67.2 | 7.2 | R |
| FiberMax FM 1911GLT | 4.8 | 1.23 | 39.3 | 33.2 | 83.1 | 6.0 | 70.2 | 6.4 | R |
| FiberMax FM 2007GLT | 4.4 | 1.28 | 41.1 | 32.9 | 84.3 | 6.2 | 69.5 | 6.2 | R |
| FiberMax FM 2011GT | 4.9 | 1.21 | 38.7 | 33.4 | 83.6 | 5.7 | 67.7 | 6.5 | R |
| FiberMax FM 2322GL | 4.5 | 1.26 | 40.2 | 34.4 | 83.7 | 4.9 | 67.7 | 6.9 | S |
| FiberMax FM 2334GLT | 4.6 | 1.25 | 40.0 | 34.5 | 84.9 | 5.6 | 71.7 | 6.4 | R |
| FiberMax FM 2484B2F | 4.1 | 1.27 | 40.6 | 32.8 | 84.0 | 5.5 | 70.9 | 6.5 | R |
| NexGen NG 1511B2XF | 4.9 | 1.18 | 37.7 | 32.7 | 83.0 | 8.8 | 68.8 | 6.9 | MS |
| NexGen NG 3406B2XF | 4.6 | 1.15 | 36.7 | 29.3 | 83.2 | 8.5 | 70.6 | 7.0 | S |
| NexGen NG 3517B2XF | 4.4 | 1.23 | 39.4 | 34.2 | 83.4 | 7.7 | 69.3 | 7.3 | MS |
| NexGen NG 4545B2XF | 4.7 | 1.20 | 38.3 | 35.0 | 84.3 | 5.3 | 69.2 | 7.3 | R |
| PhytoGen PHY 220W3FE | 5.1 | 1.15 | 36.7 | 31.3 | 83.9 | 8.6 | 69.8 | 7.2 | Not reported |
| PhytoGen PHY 222WRF | 5.1 | 1.19 | 38.2 | 32.7 | 84.3 | 7.6 | 68.0 | 6.8 | S |
| PhytoGen PHY 223WRF | 4.5 | 1.29 | 41.4 | 31.5 | 85.2 | 6.6 | 65.7 | 6.1 | MR |
| PhytoGen PHY 243WRF | 4.2 | 1.24 | 39.8 | 30.2 | 82.6 | 7.6 | 65.3 | 6.0 | PR |
| PhytoGen PHY 300W3FE | 4.5 | 1.18 | 37.8 | 31.7 | 83.3 | 6.5 | 69.3 | 7.2 | Not reported |
| PhytoGen PHY 308WRF | 4.0 | 1.20 | 38.3 | 33.8 | 83.8 | 7.8 | 66.8 | 7.7 | S |
| PhytoGen PHY 312WRF | 4.5 | 1.23 | 39.4 | 31.4 | 84.6 | 7.0 | 68.6 | 6.9 | MS |
| PhytoGen PHY 333WRF | 4.4 | 1.20 | 38.5 | 30.8 | 82.5 | 6.5 | 67.6 | 7.5 | S |
| PhytoGen PHY 444WRF | 3.9 | 1.30 | 41.7 | 31.9 | 84.8 | 6.7 | 71.0 | 7.5 | MS |
| PhytoGen PHY 490W3FE | 4.4 | 1.22 | 38.9 | 33.8 | 83.5 | 7.6 | 67.3 | 6.8 | Not reported |
| PhytoGen PHY 499WRF | 4.4 | 1.15 | 36.7 | 32.6 | 84.0 | 8.0 | 68.0 | 7.7 | S |
| PhytoGen PHY 725RF | 4.5 | 1.26 | 40.2 | 36.6 | 84.5 | 7.3 | 66.3 | 7.5 | Not reported |
| Stoneville ST 4747GLB2 | 4.7 | 1.25 | 40.0 | 30.2 | 82.9 | 5.0 | 65.4 | 5.8 | S |
| Stoneville ST 4848GLT | 4.6 | 1.18 | 37.8 | 32.0 | 83.2 | 6.8 | 67.8 | 7.3 | S |
| Stoneville ST 4946GLB2 | 4.8 | 1.20 | 38.3 | 33.0 | 83.5 | 6.6 | 68.1 | 7.1 | S |
| Test average | 4.6 | 1.22 | 39.0 | 32.4 | 83.8 | 7.0 | 68.3 | 6.9 | -- |
| CV, % | 3.4 | 2.0 | 2.0 | 4.5 | 1.4 | 7.5 | 1.7 | 4.4 | -- |
| OSL | <0.0001 | <0.0001 | <0.0001 | <0.0001 | 0.0814 | <0.0001 | <0.0001 | <0.0001 | -- |
| LSD | 0.3 | 0.04 | 1.3 | 2.4 | 1.5 † | 0.8 | 1.9 | 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.
* Texas A&M AgriLife Research bacterial blight ratings are courtesy of Dr. Terry Wheeler's "Response of cotton varieties to Bacterial blight Race 18 in 2016."
Ratings are classified as: S = highly susceptible; MS = mostly susceptible; PS = partially susceptible; PR = partially resistant; MR = mostly resistant; R = highly resistant

**Table 4. Yield and agronomic results from the OSU cotton official variety test, Tipton Valley Research Center, Tipton, OK 2016.**

| Entry | Lint yield | Grab sample turnout Lint | Grab sample turnout Seed | Boll sample lint fraction Picked | Boll sample lint fraction Pulled | Boll size | Seed index | Lint index | Seed per boll | Storm resistance | Final plant height |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | lb/acre | -------------------------% | | ------------------------- | | g seed cotton/boll | g wt 100 fuzzy seed | g wt lint from 100 fuzzy seed | count/boll | visual scale (1=loose, 9=tight) | inches |
| FiberMax FM1830GLT | 1022 | 27.6 | 43.2 | 44.3 | 34.7 | 6.4 | 10.0 | 8.2 | 27.3 | 5 | 30 |
| NexGen NG 3406B2XF | 1006 | 26.8 | 44.5 | 41.7 | 33.2 | 6.4 | 9.7 | 7.2 | 29.5 | 5 | 33 |
| Deltapine DP1612B2XF | 968 | 27.2 | 44.2 | 42.0 | 33.4 | 6.4 | 9.6 | 7.3 | 29.1 | 5 | 32 |
| Deltapine DP1646B2XF | 958 | 28.2 | 43.3 | 44.9 | 36.1 | 6.1 | 8.7 | 7.3 | 30.4 | 5 | 35 |
| Stoneville ST 4946GLB2 | 948 | 26.1 | 45.1 | 41.6 | 33.4 | 7.2 | 11.2 | 8.2 | 29.6 | 7 | 31 |
| Dyna-Gro DG 3109B2XF | 941 | 27.1 | 44.8 | 42.2 | 34.2 | 5.7 | 8.5 | 6.4 | 30.2 | 4 | 34 |
| Deltapine DP 1549B2XF | 937 | 27.5 | 44.3 | 43.1 | 34.6 | 5.7 | 8.9 | 7.0 | 28.6 | 5 | 33 |
| PhytoGen PHY 333WRF | 914 | 26.3 | 41.4 | 42.6 | 33.2 | 6.4 | 10.0 | 7.7 | 27.3 | 5 | 33 |
| PhytoGen PHY 300W3FE | 906 | 25.4 | 40.1 | 43.1 | 33.1 | 6.3 | 8.9 | 7.1 | 29.4 | 7 | 32 |
| PhytoGen PHY 220W3FE | 896 | 25.6 | 42.0 | 44.3 | 33.3 | 5.9 | 9.9 | 8.0 | 24.3 | 8 | 31 |
| PhytoGen PHY 490W3FE | 895 | 26.2 | 43.1 | 42.1 | 32.6 | 6.0 | 9.3 | 7.1 | 27.6 | 6 | 33 |
| Stoneville ST 4747GLB2 | 881 | 25.1 | 44.7 | 40.8 | 31.8 | 6.7 | 10.4 | 7.4 | 28.6 | 5 | 32 |
| Dyna-Gro DG 3385B2XF | 880 | 27.3 | 45.1 | 43.4 | 34.9 | 6.1 | 9.5 | 7.4 | 28.9 | 5 | 30 |
| FiberMax FM2322GL | 877 | 28.2 | 42.3 | 45.2 | 34.6 | 6.6 | 10.3 | 8.7 | 26.1 | 6 | 34 |
| FiberMax FM1900GLT | 876 | 26.6 | 45.4 | 40.8 | 32.7 | 6.7 | 10.7 | 7.7 | 28.5 | 6 | 30 |
| Croplan CG 3527B2XF | 871 | 27.8 | 42.3 | 44.6 | 34.6 | 6.3 | 8.4 | 7.0 | 31.0 | 5 | 30 |
| FiberMax FM1911GLT | 866 | 26.3 | 43.5 | 43.8 | 33.9 | 7.8 | 12.5 | 10.0 | 26.7 | 8 | 31 |
| PhytoGen PHY 444WRF | 862 | 27.1 | 44.8 | 43.5 | 34.9 | 6.4 | 10.5 | 8.4 | 26.5 | 6 | 33 |
| Dyna-Gro DG 3635B2XF | 855 | 26.9 | 45.1 | 43.4 | 35.7 | 5.8 | 8.5 | 6.6 | 31.2 | 6 | 34 |
| PhytoGen PHY 243WRF | 850 | 25.8 | 44.6 | 41.0 | 32.0 | 6.5 | 10.3 | 6.9 | 30.1 | 7 | 31 |
| NexGen NG 4545B2XF | 839 | 25.0 | 44.9 | 41.5 | 32.4 | 6.9 | 10.1 | 7.4 | 30.5 | 6 | 34 |
| FiberMax FM2334GLT | 839 | 27.2 | 43.3 | 43.7 | 33.9 | 6.4 | 9.8 | 7.8 | 28.0 | 5 | 31 |
| Stoneville ST 4848GLT | 823 | 25.3 | 41.8 | 44.0 | 34.1 | 6.4 | 10.0 | 8.1 | 27.1 | 5 | 31 |
| Deltapine DP 1522B2XF | 822 | 26.4 | 43.9 | 42.0 | 32.9 | 5.8 | 9.3 | 6.9 | 27.6 | 5 | 33 |
| PhytoGen PHY 222WRF | 818 | 24.8 | 42.5 | 41.7 | 31.7 | 6.3 | 10.5 | 7.7 | 26.0 | 6 | 29 |
| FiberMax FM2007GLT | 812 | 25.8 | 46.4 | 40.0 | 32.2 | 6.5 | 11.1 | 7.6 | 27.7 | 7 | 29 |
| PhytoGen PHY 223WRF | 787 | 24.1 | 45.5 | 38.4 | 30.1 | 6.5 | 10.6 | 6.8 | 28.7 | 6 | 30 |
| NexGen NG 3517B2XF | 785 | 24.5 | 45.2 | 42.0 | 32.8 | 6.5 | 10.0 | 7.3 | 29.0 | 7 | 36 |
| PhytoGen PHY 308WRF | 720 | 25.0 | 43.2 | 41.2 | 31.5 | 6.2 | 11.0 | 7.9 | 24.8 | 6 | 34 |
| Dyna-Gro DG 3445B2XF | 679 | 22.4 | 42.9 | 40.4 | 30.3 | 7.5 | 11.5 | 7.9 | 28.8 | 7 | 31 |
| Test average | 871 | 26.2 | 43.8 | 42.5 | 33.3 | 6.4 | 10.0 | 7.6 | 28.3 | 6 | 32 |
| CV, % | 12.8 | 2.3 | 2.0 | 2.6 | 2.9 | 5.5 | 3.4 | 4.7 | 6.4 | 13.8 | 5.7 |
| OSL | 0.0163 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | 0.0006 | <0.0001 | <0.0001 |
| LSD | 157 | 1.0 | 1.4 | 1.8 | 1.6 | 0.6 | 0.6 | 0.6 | 3.0 | 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.**

Table 5.  Fiber property results from the OSU cotton official variety test, Tipton Valley Research Center, Tipton, OK 2016.

| Entry | Micronaire | Length | Staple | Strength | Uniformity | Elongation | Reflectance | Yellowness |
|---|---|---|---|---|---|---|---|---|
| | units | inches | 32nds inch | g/tex | % | % | rd % | +b % |
| Croplan CG 3527B2XF | 4.8 | 1.15 | 36.8 | 30.3 | 82.4 | 7.8 | 67.7 | 7.2 |
| Deltapine DP 1522B2XF | 4.8 | 1.13 | 36.2 | 32.4 | 82.8 | 8.6 | 69.4 | 7.2 |
| Deltapine DP 1549B2XF | 4.4 | 1.13 | 36.3 | 32.8 | 81.7 | 6.5 | 70.3 | 7.6 |
| Deltapine DP1612B2XF | 4.9 | 1.13 | 36.2 | 31.6 | 83.0 | 8.7 | 67.4 | 6.9 |
| Deltapine DP1646B2XF | 4.5 | 1.24 | 39.7 | 31.6 | 82.6 | 7.8 | 71.7 | 6.4 |
| Dyna-Gro DG 3109B2XF | 4.7 | 1.13 | 36.1 | 33.7 | 82.5 | 7.2 | 66.3 | 6.5 |
| Dyna-Gro DG 3385B2XF | 4.7 | 1.12 | 35.9 | 30.3 | 82.9 | 8.9 | 70.9 | 7.4 |
| Dyna-Gro DG 3445B2XF | 4.5 | 1.21 | 38.7 | 34.5 | 84.1 | 5.5 | 71.0 | 6.5 |
| Dyna-Gro DG 3635B2XF | 4.6 | 1.15 | 36.9 | 33.7 | 82.0 | 6.5 | 71.0 | 8.1 |
| FiberMax FM1830GLT | 4.7 | 1.25 | 40.0 | 34.3 | 83.3 | 5.3 | 73.7 | 6.5 |
| FiberMax FM1900GLT | 4.6 | 1.16 | 37.0 | 32.6 | 82.8 | 4.6 | 68.2 | 6.6 |
| FiberMax FM1911GLT | 4.7 | 1.17 | 37.3 | 32.7 | 82.0 | 5.8 | 72.6 | 6.7 |
| FiberMax FM2007GLT | 4.6 | 1.22 | 38.9 | 32.9 | 82.0 | 6.3 | 71.0 | 6.4 |
| FiberMax FM2322GL | 4.8 | 1.22 | 39.1 | 36.6 | 84.3 | 4.8 | 69.5 | 6.8 |
| FiberMax FM2334GLT | 4.9 | 1.23 | 39.5 | 33.8 | 84.9 | 5.4 | 72.2 | 6.6 |
| NexGen NG 3406B2XF | 4.6 | 1.13 | 36.2 | 30.8 | 84.0 | 8.2 | 69.2 | 6.9 |
| NexGen NG 3517B2XF | 4.6 | 1.18 | 37.8 | 33.7 | 82.7 | 7.1 | 68.6 | 7.3 |
| NexGen NG 4545B2XF | 4.6 | 1.16 | 37.1 | 33.8 | 82.9 | 6.6 | 67.2 | 7.1 |
| PhytoGen PHY 220W3FE | 5.0 | 1.13 | 36.3 | 33.0 | 84.0 | 7.6 | 68.9 | 7.3 |
| PhytoGen PHY 222WRF | 5.0 | 1.14 | 36.5 | 32.7 | 84.4 | 8.1 | 68.9 | 7.2 |
| PhytoGen PHY 223WRF | 4.6 | 1.23 | 39.3 | 33.3 | 84.2 | 7.3 | 67.1 | 6.3 |
| PhytoGen PHY 243WRF | 4.2 | 1.17 | 37.3 | 29.5 | 81.2 | 7.6 | 67.6 | 6.3 |
| PhytoGen PHY 300W3FE | 4.5 | 1.14 | 36.6 | 33.2 | 83.0 | 6.6 | 68.4 | 7.3 |
| PhytoGen PHY 308WRF | 5.0 | 1.13 | 36.3 | 34.1 | 83.5 | 7.7 | 64.5 | 6.9 |
| PhytoGen PHY 333WRF | 4.4 | 1.16 | 37.0 | 30.8 | 82.2 | 6.5 | 67.1 | 7.3 |
| PhytoGen PHY 444WRF | 4.0 | 1.25 | 40.1 | 32.5 | 83.2 | 6.4 | 71.9 | 7.3 |
| PhytoGen PHY 490W3FE | 4.6 | 1.14 | 36.6 | 35.0 | 84.1 | 8.1 | 69.0 | 7.0 |
| Stoneville ST 4747GLB2 | 4.5 | 1.17 | 37.4 | 29.3 | 81.2 | 5.1 | 65.4 | 5.8 |
| Stoneville ST 4848GLT | 4.8 | 1.17 | 37.3 | 32.1 | 83.2 | 6.4 | 68.0 | 7.0 |
| Stoneville ST 4946GLB2 | 4.8 | 1.14 | 36.6 | 33.1 | 81.9 | 7.6 | 69.2 | 7.1 |
| Test average | 4.7 | 1.17 | 37.4 | 32.7 | 83.0 | 6.9 | 69.1 | 6.9 |
| CV, % | 3.3 | 2.6 | 2.6 | 4.0 | 1.2 | 7.8 | 2.0 | 4.6 |
| OSL | <0.0001 | <0.0001 | <0.0001 | <0.0001 | 0.0004 | <0.0001 | <0.0001 | <0.0001 |
| LSD | 0.3 | 0.05 | 1.6 | 2.1 | 1.7 | 0.9 | 2.2 | 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.

Table 6. Yield and agronomic results from the OSU cotton official variety test, Caddo Research Station, Fort Cobb, OK 2016.

| Entry | Lint yield | Grab sample turnout | | Boll sample lint fraction | | Boll size | Seed index | Lint index | Seed per boll | Storm resistance | Final plant height |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Lint | Seed | Picked | Pulled | | | | | | |
| | lb/acre | ------------------------% | ------------------------ | | | g seed cotton/boll | g wt 100 fuzzy seed | g wt lint from 100 fuzzy seed | count/boll | visual scale (1=loose, 9=tight) | inches |
| Deltapine DP 1044B2RF | 1527 | 27.4 | 45.3 | 40.6 | 30.8 | 6.7 | 8.8 | 6.3 | 32.4 | 4.8 | 26 |
| Croplan CG 3527B2XF | 1488 | 29.0 | 43.3 | 44.2 | 33.1 | 7.2 | 8.5 | 7.1 | 33.9 | 5.0 | 29 |
| NexGen NG 3406B2XF | 1460 | 29.5 | 43.6 | 43.2 | 32.5 | 7.3 | 9.9 | 7.9 | 30.0 | 5.5 | 27 |
| Deltapine DP 1518B2XF | 1448 | 28.0 | 43.7 | 40.3 | 29.7 | 6.3 | 9.4 | 6.6 | 28.7 | 5.0 | 28 |
| Deltapine DP1639B2XF | 1446 | 28.3 | 40.3 | 45.9 | 33.5 | 6.5 | 8.7 | 7.9 | 27.8 | 3.8 | 27 |
| Stoneville ST 4747GLB2 | 1440 | 27.0 | 44.5 | 42.1 | 31.9 | 7.1 | 9.6 | 7.2 | 31.4 | 6.3 | 27 |
| PhytoGen PHY 312WRF | 1425 | 27.5 | 43.9 | 43.1 | 32.6 | 7.3 | 10.4 | 8.2 | 29.3 | 4.3 | 29 |
| PhytoGen PHY 300W3FE | 1424 | 26.4 | 41.0 | 43.7 | 31.7 | 7.0 | 9.4 | 7.6 | 29.3 | 6.8 | 29 |
| Deltapine DP 0912B2RF | 1421 | 27.0 | 44.3 | 40.7 | 31.2 | 7.4 | 9.9 | 7.0 | 32.9 | 3.8 | 26 |
| Deltapine DP 1612B2XF | 1421 | 27.5 | 43.7 | 41.4 | 31.2 | 7.2 | 9.6 | 7.1 | 32.0 | 4.5 | 26 |
| Deltapine DP 1614B2XF | 1420 | 27.7 | 41.9 | 44.4 | 32.8 | 6.8 | 8.3 | 6.9 | 32.1 | 4.5 | 26 |
| Stoneville ST 4848GLT | 1410 | 26.8 | 40.5 | 42.3 | 31.3 | 7.2 | 9.7 | 7.5 | 29.7 | 4.0 | 28 |
| PhytoGen PHY 223WRF | 1409 | 25.7 | 46.1 | 40.5 | 30.5 | 8.0 | 11.3 | 7.9 | 30.8 | 6.3 | 29 |
| Dyna-Gro DG 3385B2XF | 1406 | 29.2 | 43.5 | 43.2 | 32.3 | 7.1 | 9.6 | 7.5 | 30.8 | 6.3 | 28 |
| PhytoGen PHY 490W3FE | 1399 | 27.2 | 42.5 | 43.6 | 31.8 | 7.2 | 9.4 | 7.5 | 30.6 | 4.5 | 29 |
| Stoneville ST 4946GLB2 | 1391 | 27.1 | 44.6 | 40.1 | 30.8 | 7.8 | 11.0 | 7.7 | 31.6 | 6.5 | 29 |
| FiberMax FM 2334GLT | 1390 | 29.6 | 43.5 | 43.1 | 32.4 | 6.9 | 9.3 | 7.2 | 31.1 | 4.8 | 27 |
| Dyna-Gro DG 3635B2XF | 1386 | 27.9 | 44.7 | 42.7 | 32.4 | 6.4 | 8.5 | 6.6 | 31.4 | 5.0 | 30 |
| FiberMax FM 1900GLT | 1379 | 27.6 | 45.3 | 41.5 | 31.7 | 7.9 | 11.1 | 8.2 | 31.0 | 6.5 | 28 |
| FiberMax FM 2007GLT | 1370 | 25.7 | 46.9 | 39.0 | 29.9 | 7.2 | 10.3 | 6.8 | 31.9 | 6.8 | 26 |
| FiberMax FM 1830GLT | 1361 | 29.2 | 43.8 | 42.9 | 32.9 | 7.3 | 10.1 | 7.8 | 30.4 | 5.3 | 27 |
| PhytoGen PHY 333WRF | 1352 | 27.0 | 42.5 | 42.5 | 31.4 | 7.5 | 9.4 | 7.3 | 32.6 | 5.5 | 31 |
| PhytoGen PHY 222WRF | 1340 | 26.5 | 43.0 | 41.9 | 31.5 | 7.2 | 10.9 | 8.1 | 28.1 | 5.0 | 29 |
| Dyna-Gro DG 3109B2XF | 1322 | 27.6 | 44.5 | 41.6 | 31.6 | 6.6 | 8.5 | 6.3 | 33.0 | 4.0 | 30 |
| Deltapine DP 1522B2XF | 1322 | 27.2 | 42.9 | 40.7 | 30.1 | 6.5 | 9.3 | 6.8 | 29.2 | 5.0 | 28 |
| PhytoGen PHY 243WRF | 1312 | 25.6 | 44.1 | 41.6 | 31.1 | 7.1 | 10.8 | 7.9 | 27.9 | 7.5 | 28 |
| FiberMax FM 2322GL | 1297 | 30.5 | 41.2 | 45.5 | 34.0 | 7.9 | 10.1 | 8.8 | 30.6 | 7.5 | 29 |
| Dyna-Gro DG 3445B2XF | 1261 | 25.0 | 43.8 | 40.2 | 29.2 | 8.6 | 10.8 | 7.4 | 33.8 | 7.0 | 28 |
| PhytoGen PHY 308WRF | 1186 | 25.1 | 42.0 | 40.5 | 30.1 | 7.2 | 11.0 | 7.8 | 28.0 | 5.0 | 27 |
| PhytoGen PHY 220W3FE | 1184 | 25.9 | 41.0 | 42.7 | 30.9 | 6.6 | 10.2 | 7.9 | 25.8 | 6.8 | 26 |
| NexGen NG 4545B2XF | 1155 | 26.2 | 44.4 | 40.3 | 30.4 | 7.2 | 9.9 | 7.0 | 31.1 | 5.8 | 29 |
| NexGen NG 3517B2XF | 1131 | 25.1 | 45.7 | 40.6 | 30.9 | 6.2 | 9.5 | 6.7 | 28.7 | 6.3 | 28 |
| FiberMax FM 1911GLT | 966 | 26.3 | 43.2 | 41.2 | 30.9 | 8.7 | 12.4 | 9.0 | 30.7 | 7.8 | 25 |
| Test average | 1353 | 27.3 | 43.5 | 42.1 | 31.5 | 7.2 | 9.9 | 7.4 | 30.6 | 5.5 | 28 |
| CV, % | 11.8 | 4.4 | 2.2 | 3.1 | 3.4 | 5.3 | 5.5 | 6.9 | 6.7 | 15.9 | 7.1 |
| OSL | 0.0023 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | 0.0009 | <0.0001 | 0.0082 |
| LSD | 233 | 1.9 | 1.5 | 2.1 | 1.8 | 0.6 | 0.9 | 0.8 | 3.3 | 1.2 | 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 7. Fiber property results from the OSU cotton official variety test, Caddo Research Station, Fort Cobb, OK 2016.

| Entry | Micronaire | Length | Staple | Strength | Uniformity | Elongation | Reflectance | Yellowness |
|---|---|---|---|---|---|---|---|---|
| | units | inches | 32nds inch | g/tex | % | % | rd % | +b % |
| Croplan CG 3527B2XF | 4.6 | 1.20 | 38.5 | 30.8 | 83.6 | 7.4 | 70.9 | 6.4 |
| Deltapine DP 0912B2RF | 5.2 | 1.10 | 35.3 | 31.9 | 82.5 | 7.2 | 70.1 | 6.0 |
| Deltapine DP 1044B2RF | 4.4 | 1.16 | 37.0 | 31.8 | 83.0 | 7.9 | 71.0 | 5.7 |
| Deltapine DP 1518B2XF | 4.1 | 1.20 | 38.5 | 31.0 | 83.0 | 6.4 | 71.4 | 5.5 |
| Deltapine DP 1522B2XF | 4.1 | 1.19 | 38.0 | 31.6 | 82.9 | 7.9 | 71.3 | 6.3 |
| Deltapine DP 1612B2XF | 4.5 | 1.17 | 37.3 | 33.6 | 82.8 | 8.4 | 69.2 | 5.9 |
| Deltapine DP 1614B2XF | 4.8 | 1.19 | 38.2 | 31.4 | 82.0 | 8.6 | 69.8 | 6.2 |
| Deltapine DP1639B2XF | 4.4 | 1.15 | 36.9 | 33.2 | 83.0 | 7.4 | 70.7 | 5.9 |
| Dyna-Gro DG 3109B2XF | 4.2 | 1.18 | 37.8 | 32.1 | 83.8 | 7.2 | 68.0 | 5.6 |
| Dyna-Gro DG 3385B2XF | 4.4 | 1.17 | 37.3 | 32.0 | 83.0 | 8.2 | 73.3 | 6.3 |
| Dyna-Gro DG 3445B2XF | 4.6 | 1.20 | 38.4 | 34.8 | 84.4 | 5.4 | 73.0 | 5.6 |
| Dyna-Gro DG 3635B2XF | 4.4 | 1.17 | 37.3 | 32.2 | 81.0 | 7.1 | 71.1 | 6.5 |
| FiberMax FM 1830GLT | 4.7 | 1.26 | 40.4 | 35.8 | 84.5 | 5.3 | 74.7 | 5.5 |
| FiberMax FM 1900GLT | 4.5 | 1.24 | 39.7 | 35.9 | 83.4 | 4.7 | 69.7 | 5.9 |
| FiberMax FM 1911GLT | 4.0 | 1.19 | 38.2 | 34.0 | 84.1 | 5.8 | 73.5 | 6.0 |
| FiberMax FM 2007GLT | 3.7 | 1.25 | 40.0 | 34.3 | 83.1 | 5.9 | 74.0 | 5.2 |
| FiberMax FM 2322GL | 4.6 | 1.26 | 40.4 | 37.6 | 83.7 | 4.8 | 70.9 | 6.6 |
| FiberMax FM 2334GLT | 4.7 | 1.25 | 39.9 | 33.0 | 83.4 | 5.7 | 74.1 | 5.6 |
| NexGen NG 3406B2XF | 4.7 | 1.15 | 36.7 | 31.4 | 82.5 | 8.4 | 72.6 | 6.1 |
| NexGen NG 3517B2XF | 4.2 | 1.17 | 37.5 | 33.5 | 82.2 | 6.7 | 72.2 | 5.9 |
| NexGen NG 4545B2XF | 4.3 | 1.15 | 36.8 | 33.0 | 82.2 | 5.2 | 71.7 | 6.5 |
| PhytoGen PHY 220W3FE | 5.1 | 1.14 | 36.5 | 34.1 | 83.9 | 7.7 | 73.0 | 6.8 |
| PhytoGen PHY 222WRF | 4.8 | 1.17 | 37.5 | 32.7 | 84.1 | 7.9 | 71.0 | 6.3 |
| PhytoGen PHY 223WRF | 4.3 | 1.25 | 40.1 | 32.1 | 84.3 | 6.7 | 70.4 | 5.9 |
| PhytoGen PHY 243WRF | 4.0 | 1.22 | 38.9 | 31.6 | 80.9 | 7.0 | 71.0 | 5.8 |
| PhytoGen PHY 300W3FE | 4.2 | 1.15 | 36.8 | 32.7 | 83.4 | 7.0 | 71.5 | 6.8 |
| PhytoGen PHY 308WRF | 4.5 | 1.17 | 37.3 | 35.0 | 83.4 | 7.7 | 69.7 | 6.5 |
| PhytoGen PHY 312WRF | 4.2 | 1.18 | 37.7 | 31.8 | 83.7 | 6.9 | 71.0 | 6.0 |
| PhytoGen PHY 333WRF | 4.0 | 1.22 | 38.9 | 32.4 | 83.5 | 6.1 | 70.2 | 6.6 |
| PhytoGen PHY 490W3FE | 4.6 | 1.15 | 36.9 | 37.2 | 83.9 | 8.1 | 71.1 | 6.0 |
| Stoneville ST 4747GLB2 | 4.3 | 1.22 | 38.9 | 31.3 | 82.9 | 5.1 | 70.0 | 5.5 |
| Stoneville ST 4848GLT | 4.5 | 1.19 | 38.0 | 32.1 | 83.7 | 6.4 | 69.7 | 6.1 |
| Stoneville ST 4946GLB2 | 4.6 | 1.20 | 38.3 | 35.8 | 83.6 | 7.0 | 70.7 | 6.6 |
| Test average | 4.4 | 1.19 | 38.1 | 33.1 | 83.2 | 6.8 | 71.3 | 6.1 |
| CV, % | 7.9 | 1.8 | 1.8 | 4.3 | 1.2 | 6.7 | 1.5 | 6.5 |
| OSL | 0.0010 | <0.0001 | <0.0001 | <0.0001 | 0.0020 | <0.0001 | <0.0001 | <0.0001 |
| LSD | 0.6 | 0.04 | 1.1 | 2.3 | 1.6 | 0.7 | 1.7 | 0.6 |

CV - coefficient of variation.
OSL - observed significance level, or probability of a greater F value.
LSD - least significant difference at the 0.05 level, † 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 6 sites. Data were provided to these industry sponsors and all of these trials will assist companies in investigating performance of their cotton genetics in Oklahoma.

| Trial type | Bayer CAP Trial | PhytoGen Innovation Trial | | | PhytoGen AST Nursery | Monsanto FACT Trial |
|---|---|---|---|---|---|---|
| County - location | Harmon - Hollis | Custer - Hydro | Jackson - Duke | Jackson - Altus | Caddo - Fort Cobb | Jackson-Altus |
| Cooperator | Kelly Horton | Merlin Schantz | Drew Darby | OSU SWREC | OSU CRS | OSU SWREC |
| Tillage system | terminated cover | terminated cover/strip till | conventional | conventional | terminated wheat/no-till | clean tillage |
| Herbicide System | RRF | RRF and LL | RRF and LL | RRF | RRF | RRF |
| Planter width/plot width (rows) | 12/6 | 16/8 | 8/4 | 4/4 | 4/2 | 4/4 |
| Planting date | 28-Apr | 26-May | 31-May | 31-May | 26-May | 27-May |
| Seeding rate (seeds/acre) | 40,000 | 50,000 | 45,000 | 45,000 | 58,080 | 52,000 |
| Row spacing (inches) | 40 | 36 | 40 | 40 | 36 | 40 |
| Replicates | 1 | 3 | 3 | 3 | 4 | 3 |
| Harvested plot width (rows) | 6 | 8 | 4 | 4 | 2 | 2 |
| Comments | drip irrigation | pivot irrigation | furrow irrigation | furrow irrigation | pivot irrigation | furrow irrigation |
| Harvester type | picker | picker | stripper | stripper | stripper | stripper |
| Entries | BX 1733GLT | PHY 490 W3FE | PHY 490 W3FE | PHY 490 W3FE | 29 total entries | 14 total entries |
| | BX 1773GLTP | PHY 220 W3FE | PHY 220 W3FE | PHY 220 W3FE | | |
| | BX 1774GLTP | PHY 300 W3FE | PHY 300 W3FE | PHY 300 W3FE | | |
| | FM 1830GLT | PHY 222 WRF | PHY 222 WRF | PHY 222 WRF | | |
| | FM 1900GLT | PHY 243 WRF | PHY 243 WRF | PHY 243 WRF | | |
| | FM 1911GLT | PHY 312 WRF | PHY 312 WRF | PHY 312 WRF | | |
| | FM 2007GLT | PHY 333 WRF | PHY 333 WRF | PHY 333 WRF | | |
| | FM 2334GLT | ST 4946GLB2 | ST 4946GLB2 | ST 4946GLB2 | | |
| | ST 4747GLB2 | | | | | |
| | ST 4946GLB2 | | | | | |
| | ST 5115GLT | | | | | |
| | ST 4848GLT | | | | | |
| | ST 4949GLT | | | | | |
| | DP 1522 B2XF | | | | | |

*Bayer CropScience CAP Trial – Elite Germplasm Evaluation*

One Bayer CropScience Cotton Agronomic Performance (CAP) trial was planted (Harmon County) and this was harvested on November 1.

*Dow AgroSciences – PhytoGen Enlist Germplasm Evaluations*

Three irrigated Dow AgroSciences Innovation Trials in Custer and Jackson Counties (2 sites) were planted and harvested. Results for these projects are provided below beginning with Table 1. This provides a summary of yield across all sites where the same 8 PhytoGen variety entries were located. This table includes data from the Altus irrigated and Fort Cobb irrigated OVT projects, as well as the three large-plot PhytoGen Innovation Trials. Tables 2, 3, and 4 provide the individual site results for the Custer, Jackson (Duke) and Jackson (SWREC) Innovation Trials. In addition, a small-plot Dow AgroSciences AST (Enlist) nursery project with 29 entries replicated four times was planted under center pivot irrigation at the OSU Caddo Research Station in Caddo County. Table 5 includes performance data from 13 named entries in the AST Nursery.

*Monsanto FACT – Elite XtendFlex Germplasm Evaluation*

A replicated small-plot Monsanto FACT trial was conducted at the OSU SWREC. This trial had 14 entries and was replicated three times.

Table 1. Lint yield results from PhytoGen entries and competitor entry across multiple OSU testing sites in 2016.

| County ==> | Custer | Jackson | Jackson | Jackson | Caddo | Multi-Site |
|---|---|---|---|---|---|---|
| Irrigation Type ==> | Pivot | Furrow | Furrow | Furrow | Pivot | Mean |
| Trial Type ==> | Innovation | Innovation | Innovation | OVT | OVT | |
| Location ==> | Hydro | Duke | SWREC | SWREC | CRS | |
| Cooperator ==> | Schantz | Darby | OSU | OSU | OSU | |
| Planting Date ==> | 26-May | 31-May | 31-May | 27-May | 26-May | |
| Harvest Date ==> | 12-Nov | 16-Nov | 21-Nov | 21-Nov | 30-Nov | |
| Bacterial Blight Infection Level ==> | Light | Light | Severe | Severe | Light | |
| Entry | ---------------------------------------- Lint yield (lb/acre) ---------------------------------------- | | | | | |
| PhytoGen PHY 300W3FE (BB-R**) | 1808 | 1594 | 2070 | 2246 | 1424 | 1829 |
| PhytoGen PHY 490W3FE (BB-R**) | 1814 | 1496 | 1959 | 2127 | 1399 | 1759 |
| PhytoGen PHY 312WRF (BB-MS*) | 1747 | 1484 | 1941 | 2161 | 1425 | 1752 |
| Stoneville ST 4946GLB2 (BB-S*) | 1830 | 1450 | 1777 | 2036 | 1391 | 1697 |
| PhytoGen PHY 220 W3FE (BB-R**) | 1750 | 1494 | 1838 | 1925 | 1184 | 1638 |
| PhytoGen PHY 243WRF (BB-PR*) | 1547 | 1428 | 1773 | 2027 | 1312 | 1617 |
| PhytoGen PHY 333WRF (BB-S*) | 1420 | 1218 | 1819 | 1937 | 1352 | 1549 |
| PhytoGen PHY 222WRF (BB-S*) | 1597 | 1299 | 1753 | 1752 | 1340 | 1548 |
| Test average | 1689 | 1433 | 1866 | 2026 | 1353 | 1674 |
| CV, % | 4.4 | 5.4 | 5.5 | 4.3 | 11.9 | |
| OSL | <0.0001 | 0.0009 | 0.0210 | <0.0001 | 0.4704 | |
| LSD | 130 | 135 | 181 | 128 | NS | |

* Texas A&M AgriLife Research Bacterial blight ratings are courtesy of Dr. Terry Wheeler's "Response of cotton varieties to Bacterial blight Race 18 in 2016."
Ratings are classified as: S = highly susceptible; MS = mostly susceptible; PS = partially susceptible; PR = partially resistant; MR = mostly resistant; R = highly resistant.
**PhytoGen personnel indicate that all Enlist varieties (W3FE) are considered resistant to Bacterial blight Race 18.
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 Custer County irrigated PhytoGen Innovation trial, Merlin Schantz Farm, Hydro, OK, 2016.

| Entry | Lint yield | | Lint loan value* | Lint value | Final plant stand | Visual storm resistance rating | Micronaire | Staple | Strength | Uniformity |
|---|---|---|---|---|---|---|---|---|---|---|
| | lb/acre | | $/lb | $/acre | plants/acre | 1-9, 9 best | units | 32nds inch | g/tex | % |
| Stoneville ST 4946GLB2 | 1830 | a | 0.5798 | 1061 | 46,948 | 5.3 | 4.3 | 38.9 | 31.9 | 83.9 |
| PhytoGen PHY 490W3FE | 1814 | a | 0.5803 | 1053 | 45,496 | 3.3 | 4.3 | 38.7 | 31.9 | 84.1 |
| PhytoGen PHY 300W3FE | 1808 | a | 0.5777 | 1044 | 50,336 | 5.0 | 4.4 | 38.1 | 30.6 | 83.4 |
| PhytoGen PHY 220W3FE | 1750 | a | 0.5755 | 1007 | 50,820 | 5.7 | 4.5 | 38.0 | 29.4 | 83.5 |
| PhytoGen PHY 312WRF | 1747 | a | 0.5715 | 998 | 44,528 | 3.7 | 3.8 | 39.1 | 30.4 | 82.6 |
| PhytoGen PHY 222WRF | 1597 | b | 0.5765 | 921 | 47,432 | 4.3 | 4.2 | 38.6 | 29.2 | 83.3 |
| PhytoGen PHY 243WRF | 1547 | bc | 0.5742 | 889 | 49,852 | 5.3 | 3.6 | 40.2 | 28.8 | 81.6 |
| PhytoGen PHY 333WRF | 1420 | c | 0.5765 | 819 | 51,304 | 4.0 | 3.9 | 39.5 | 29.2 | 82.9 |
| Test average | 1689 | | 0.5765 | 974 | 48,340 | 4.6 | 4.1 | 38.9 | 30.2 | 83.2 |
| CV, % | 4.4 | | 0.7 | 4.6 | 8.5 | 12.9 | 4.7 | 1.1 | 1.5 | 0.5 |
| OSL | <0.0001 | | 0.2059 | <0.0001 | 0.3670 | 0.0016 | 0.0004 | 0.0003 | <0.0001 | 0.0002 |
| LSD | 130 | | NS | 78 | NS | 1.0 | 0.3 | 0.8 | 0.8 | 0.8 |

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, Drew Darby Farm, Duke, OK, 2016.**

| Entry | Lint yield | | Lint loan value* | Lint value | Final plant stand | Visual storm resistance rating | Micronaire | Staple | Strength | Uniformity |
|---|---|---|---|---|---|---|---|---|---|---|
| | lb/acre | | $/lb | $/acre | plants/acre | 1-9, 9 best | units | 32nds inch | g/tex | % |
| PhytoGen PHY 300W3FE | 1594 | a | 0.5730 | 913 | 43,560 | 4.0 | 4.5 | 36.6 | 29.9 | 82.0 |
| PhytoGen PHY 490W3FE | 1496 | ab | 0.5768 | 863 | 43,560 | 3.7 | 4.4 | 37.2 | 31.7 | 82.8 |
| PhytoGen PHY 220W3FE | 1494 | ab | 0.5737 | 857 | 40,946 | 5.7 | 4.7 | 36.9 | 29.6 | 82.9 |
| PhytoGen PHY 312WRF | 1484 | ab | 0.5768 | 856 | 43,560 | 3.7 | 4.2 | 37.3 | 30.5 | 82.6 |
| Stoneville ST 4946GLB2 | 1450 | b | 0.5757 | 835 | 40,946 | 5.7 | 4.4 | 37.0 | 30.7 | 82.7 |
| PhytoGen PHY 243WRF | 1428 | bc | 0.5728 | 818 | 41,818 | 4.7 | 3.9 | 38.5 | 28.9 | 80.4 |
| PhytoGen PHY 222WRF | 1299 | cd | 0.5747 | 747 | 40,946 | 4.3 | 4.5 | 37.0 | 30.3 | 82.3 |
| PhytoGen PHY 333WRF | 1218 | d | 0.5750 | 701 | 47,045 | 4.3 | 4.0 | 37.2 | 29.2 | 82.3 |
| Test average | 1433 | | 0.5748 | 824 | 42,798 | 4.5 | 4.3 | 37.2 | 30.1 | 82.3 |
| CV, % | 5.4 | | 0.4 | 5.2 | 11.8 | 16.2 | 1.8 | 1.0 | 3.6 | 0.6 |
| OSL | 0.0009 | | 0.4021 | 0.0009 | 0.8027 | 0.0199 | <0.0001 | 0.0016 | 0.1155 | 0.0006 |
| LSD | 135 | | NS | 77 | NS | 1.3 | 0.1 | 0.7 | NS | 0.9 |

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, 2016.

| Entry | Lint yield | | Lint loan value* | Lint value | Final plant stand | Visual storm resistance rating | Micronaire | Staple | Strength | Uniformity |
|---|---|---|---|---|---|---|---|---|---|---|
| | lb/acre | | $/lb | $/acre | plants/acre | 1-9, 9 best | units | 32nds inch | g/tex | % |
| PhytoGen PHY 300W3FE | 2070 | a | 0.5765 | 1194 | 46,609 | 6.0 | 4.4 | 38.1 | 30.5 | 82.3 |
| PhytoGen PHY 490W3FE | 1959 | ab | 0.5792 | 1135 | 48,787 | 5.0 | 4.3 | 38.4 | 32.8 | 83.1 |
| PhytoGen PHY 312WRF | 1941 | abc | 0.5787 | 1123 | 33,977 | 3.3 | 4.4 | 39.3 | 31.4 | 83.0 |
| PhytoGen PHY 220W3FE | 1838 | bcd | 0.5682 | 1043 | 36,591 | 7.0 | 4.8 | 37.5 | 30.0 | 83.0 |
| PhytoGen PHY 333WRF | 1819 | bcd | 0.5768 | 1049 | 40,511 | 4.3 | 3.9 | 38.4 | 29.7 | 82.5 |
| Stoneville ST 4946GLB2 | 1777 | cd | 0.5795 | 1030 | 34,412 | 6.0 | 4.3 | 38.7 | 32.2 | 83.4 |
| PhytoGen PHY 243WRF | 1773 | cd | 0.5750 | 1019 | 43,125 | 6.7 | 3.7 | 39.7 | 29.4 | 81.3 |
| PhytoGen PHY 222WRF | 1753 | d | 0.5785 | 1014 | 33,977 | 4.7 | 4.7 | 38.0 | 31.2 | 83.4 |
| Test average | 1866 | | 0.5765 | 1076 | 39,749 | 5.4 | 4.3 | 38.5 | 30.9 | 82.7 |
| CV, % | 5.5 | | 0.9 | 5.3 | 10.7 | 6.9 | 4.0 | 0.8 | 1.8 | 0.7 |
| OSL | 0.0210 | | 0.2204 | 0.0137 | 0.0026 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | 0.0118 |
| LSD | 181 | | NS | 101 | 7464 | 0.6 | 0.3 | 0.5 | 1.0 | 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 5. Results from the PhytoGen AST Nursery, Caddo Research Station, Fort Cobb, OK, 2016.

| Entry | Lint yield | | Lint loan value* | Lint value | Micronaire | Length | Staple | Strength | Uniformity | Elongation | Reflectance | Yellowness |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | lb/acre | | $/lb | $/acre | units | 100ths inch | 32nds inch | g/tex | % | % | rd % | +b % |
| PhytoGen PHY 450W3FE | 1611 | a | 0.5649 | 910 | 4.9 | 1.13 | 36.3 | 34.5 | 83.2 | 8.8 | 78.4 | 7.4 |
| PhytoGen PHY 444WRF | 1601 | a | 0.5788 | 926 | 3.9 | 1.25 | 40.1 | 31.9 | 82.5 | 6.8 | 79.3 | 7.4 |
| PhytoGen PHY 470W3FE | 1565 | ab | 0.5711 | 895 | 4.8 | 1.13 | 36.3 | 33.9 | 84.0 | 8.8 | 78.7 | 7.0 |
| PhytoGen PHY 490W3FE | 1545 | ab | 0.5763 | 890 | 4.6 | 1.14 | 36.6 | 32.5 | 82.2 | 8.2 | 78.5 | 7.4 |
| PhytoGen PHY 300W3FE | 1510 | ab | 0.5768 | 871 | 4.4 | 1.16 | 37.0 | 30.9 | 82.0 | 7.2 | 78.3 | 7.5 |
| PhytoGen PHY 499WRF | 1484 | abc | 0.5741 | 852 | 4.6 | 1.14 | 36.3 | 31.8 | 82.5 | 8.5 | 77.6 | 7.5 |
| PhytoGen PHY 340W3FE | 1479 | abc | 0.5771 | 853 | 4.6 | 1.15 | 36.9 | 31.7 | 82.9 | 7.3 | 77.4 | 7.8 |
| PhytoGen PHY 333WRF | 1467 | abc | 0.5770 | 846 | 4.3 | 1.17 | 37.5 | 30.8 | 82.1 | 7.0 | 77.3 | 7.8 |
| PhytoGen PHY 460W3FE | 1412 | bc | 0.5760 | 813 | 4.5 | 1.17 | 37.3 | 31.8 | 82.0 | 7.8 | 78.1 | 7.1 |
| Stoneville ST 4946GLB2 | 1402 | bc | 0.5801 | 814 | 4.4 | 1.19 | 38.1 | 32.8 | 83.1 | 7.5 | 78.9 | 7.3 |
| PhytoGen PHY 243WRF | 1331 | cd | 0.5756 | 767 | 4.2 | 1.18 | 37.7 | 30.2 | 80.9 | 7.7 | 78.1 | 7.2 |
| PhytoGen PHY 330W3FE | 1329 | cd | 0.5716 | 760 | 4.6 | 1.17 | 37.4 | 31.5 | 82.8 | 7.4 | 78.2 | 7.6 |
| PhytoGen PHY 220W3FE | 1176 | d | 0.5591 | 659 | 5.0 | 1.14 | 36.6 | 31.2 | 82.7 | 7.9 | 78.1 | 8.0 |
| Test average | 1455 | | 0.5737 | 835 | 4.5 | 1.16 | 37.2 | 32.0 | 82.5 | 7.8 | 78.2 | 7.4 |
| CV, % | 9.4 | | 1.3 | 9.4 | 5.4 | 1.9 | 1.9 | 3.5 | 1.0 | 7.3 | 1.1 | 6.1 |
| OSL | 0.0030 | | 0.0149 | 0.0018 | <0.0001 | <0.0001 | <0.0001 | 0.0001 | 0.0016 | <0.0001 | 0.0707 | 0.0923 |
| LSD | 197 | | 0.0106 | 113 | 0.3 | 0.03 | 1.0 | 1.6 | 1.1 | 0.8 | 1.0† | 0.5† |

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.

# Choosing Which Cotton Varieties to Grow

Randy Boman
Research Director and Cotton Extension Program Leader
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Oklahoma Cooperative Extension Fact Sheets are also available on our website at:
**http://osufacts.okstate.edu**

## 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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# Weed Control

**2016 Highlights**

The 2016 season was one of continued challenges for weed control in Oklahoma cotton. Abundant early season and in-season rainfall resulted in numerous weed flushes of various species in producer fields, with subsequent control issues becoming expensive. Monsanto's XtendFlex traited cotton varieties were planted across a large number of acres. However, the long-awaited dicamba label from EPA failed to appear during the growing season. This left producers reaching for proven residual herbicides such as yellows applied preplant incorporated (trifluralin, Prowl H2O) and many pre-emergence herbicides such as Caparol, Cotoran, Karmex and others. Post-emergence applications generally focused on Staple LX, Liberty (on Liberty Link and XtendFlex varieties), and to lesser degree hooded sprayers for precision applications of various lay-by products.

*Research Trials*

In 2016, two important herbicide systems trials were established as collaborative projects with our Extension cotton group and Dr. Todd Baughman at the OSU Institute for Agricultural Biosciences in Ardmore. An XtendFlex project was planted to evaluate various herbicide regimes in dicamba tolerant cotton. Monsanto's XtendiMax (dicamba DGA salt) with Vapor Grip technology as well as BASF's Engenia (dicamba BAPMA salt) product were evaluated. Both of these dicamba formulations are considered ultra-low with respect to volatility. The XtendiMax product received a label from EPA on November 8, 2016 for use in XtendFlex cotton. The Engenia label for XtendFlex cotton was granted by EPA on December 20, 2016.

In addition, a Dow AgroSciences Enlist cotton project was also initiated. Enlist Duo (premix of the choline formulation of 2,4-D and glyphosate), and various herbicide treatments and systems were evaluated. The the Colex-D 2,4-D formulation in Enlist Duo is considered an ultra-low volatile formulation, and currently is the only 2,4-D product labeled for use in Enlist cotton. The EPA granted a full label for Enlist Duo for use in Enlist cotton on January 13, 2017.

Cotton injury was 6% or less with all treatments and was transient in nature in the XtendFlex trial. Palmer amaranth control at Altus was less than 85% and red sprangletop control was less than 40% with Caparol prior to any postemergence herbicide application. Treflan provided 99% red sprangletop control 2 weeks after planting. Late season Palmer amaranth control was less than 60% with Liberty + Warrant followed by Liberty. Palmer amaranth control was at least 99% regardless of PRE program when XtendiMax + Warrant followed by XtendiMax + Roundup was applied POST. Late season Red sprangletop control was at least 99% when Treflan was applied PPI regardless of the POST program. Control was only 51% when Caparol was applied PRE and followed by the Liberty POST program and 80% when followed by the XtendiMax program.

Early season tumble pigweed control was greater than 90% with all Engenia POST treatments. Tumble pigweed control was 100% late season when Engenia was applied with either Roundup or Liberty.

Enlist Duo applied alone or in combination POST1 with Dual Magnum controlled both Palmer amaranth and red sprangletop at least 98% season long. This research indicates that when used in a program approach, each of these new technologies can provide excellent season long control of Palmer amaranth, red sprangletop, and tumble pigweed. These projects were reported at the Beltwide Cotton Conferences in Dallas in January, 2017. For more information on this project refer to the Beltwide Cotton Conference poster presentation.

*Enlist Duo Demonstration and Field Day*

A demonstration was planted August 2nd specifically for observations of the effects of Enlist Duo in Enlist cotton and non-Enlist cotton. A field day was held on September 21st, in conjunction with Dow AgroSciences and PhytoGen Cottonseed personnel. Enlist cotton varieties and elite lines were observed as well as the Enlist small plot herbicide system research trial. Effects of various auxin herbicide products were observed on non-Enlist cotton including a tank cleanout demonstration, and a tank contamination demonstration. A total of 55 clientele attended the field day.

# Entomology & Plant Pathology

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

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, 2016, the number of unique visitors was 18,552 with 54,991 documents delivered.

The OSU Extension Cotton Team published eight newsletters which were directly sent to 436 email recipients. A yearly survey was sent to all recipients, and a total of 26 responded. It was evident based on this survey and respondents, that an additional 313 people were forwarded the newsletter. Therefore, the best estimate we have for direct distribution of the newsletters would total about 749. The best estimate we have for direct distribution of the newsletter is a total of 5,992 (8 editions x 749 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 4.57. With respect to the question of "topics being timely and discussed" the result was 4.53. 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 2016. 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 2016. Field surveys were conducted in 5 counties in a total of 14 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.

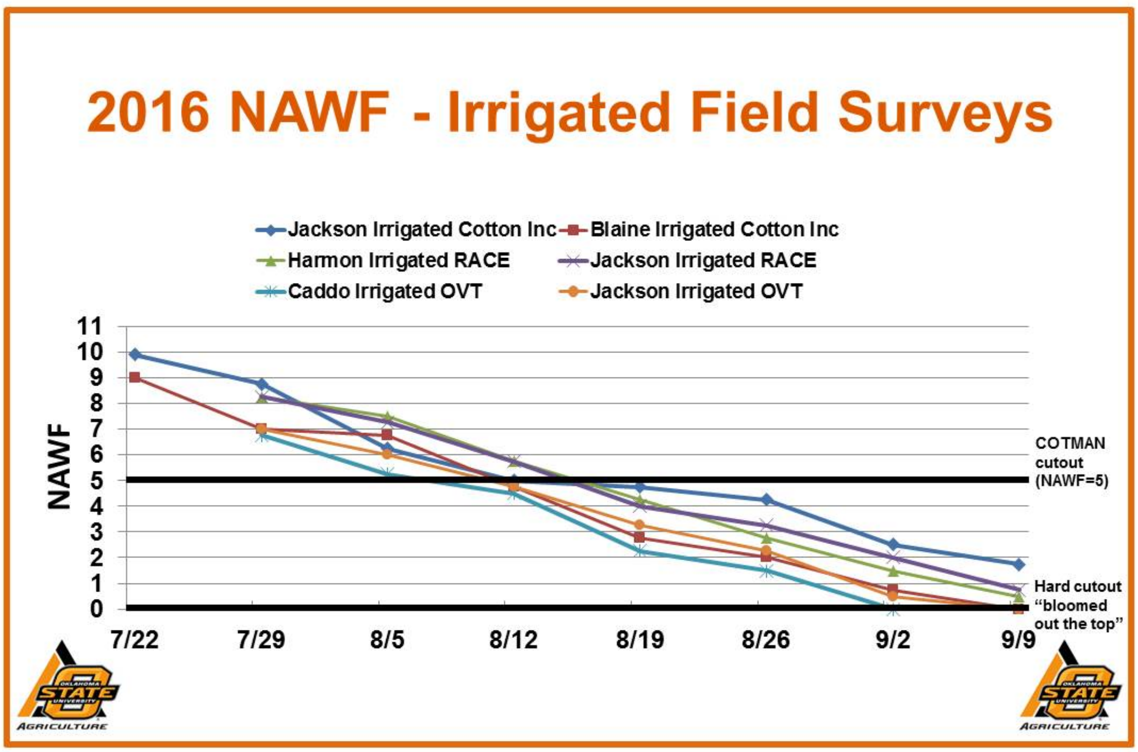


**Figure 1. Weekly nodes above white flower (NAWF) in surveyed irrigated fields in 2016.**

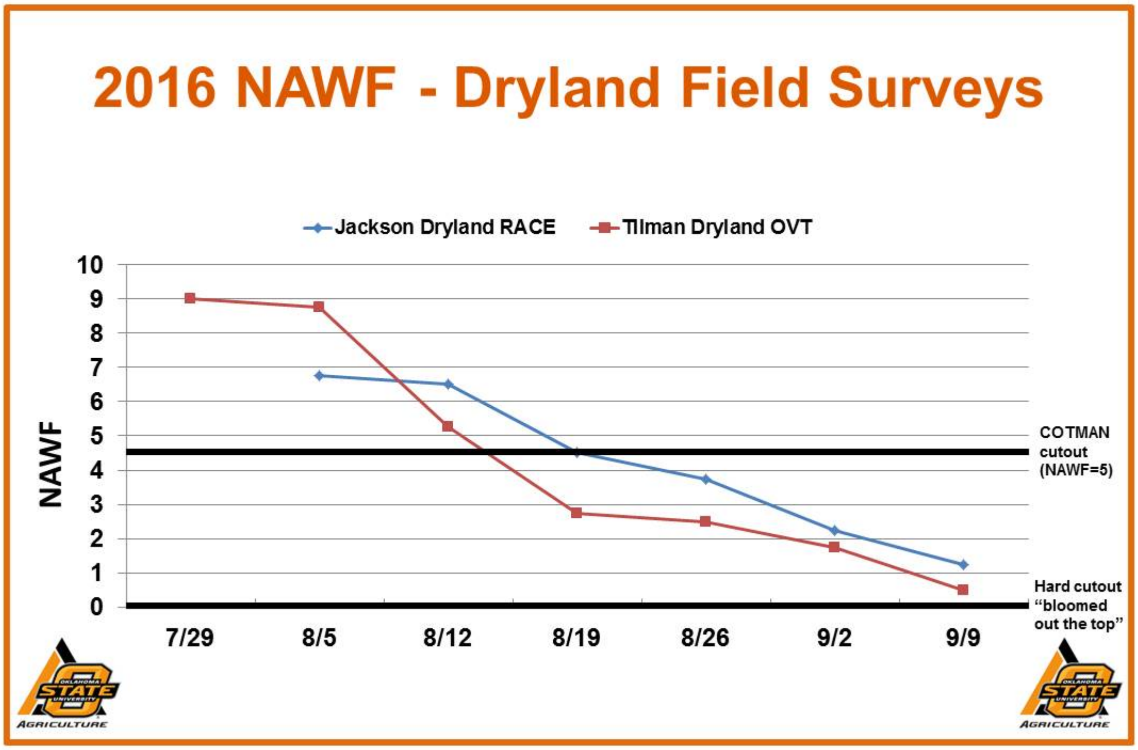


**Figure 2. Weekly nodes above white flower (NAWF) in surveyed dryland fields in 2016.**

## 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, and sites were reduced due to budget constraints. In addition to Heliothine activity, beet armyworm catches were also monitored at each location. Traps were maintained between June 1 and October 1, 2016. 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 1,227 moths were captured between the weeks of June 1 and October 1 in 2016. This is a decrease of 28.1% percent of 2015 trap totals. Bollworms comprised 89.6% of the total catch in 2016.

**Table 1. Moth Pheromone Trap Catch Totals for Selected Regions of Oklahoma, Summer 2016.**

| | | | |
|---|---|---|---|
| **Bollworm** | | | |
| Altus | Tipton | Hollis | Ft. Cobb |
| 385 | 294 | 253 | 168 |
| **Tobacco Budworm** | | | |
| Altus | Tipton | Hollis | Ft.Cobb |
| 39 | 46 | 35 | 7 |
| **Beet Armyworm** | | | |
| Altus | Tipton | Hollis | Ft.Cobb |
| 25 | 45 | 7 | 85 |

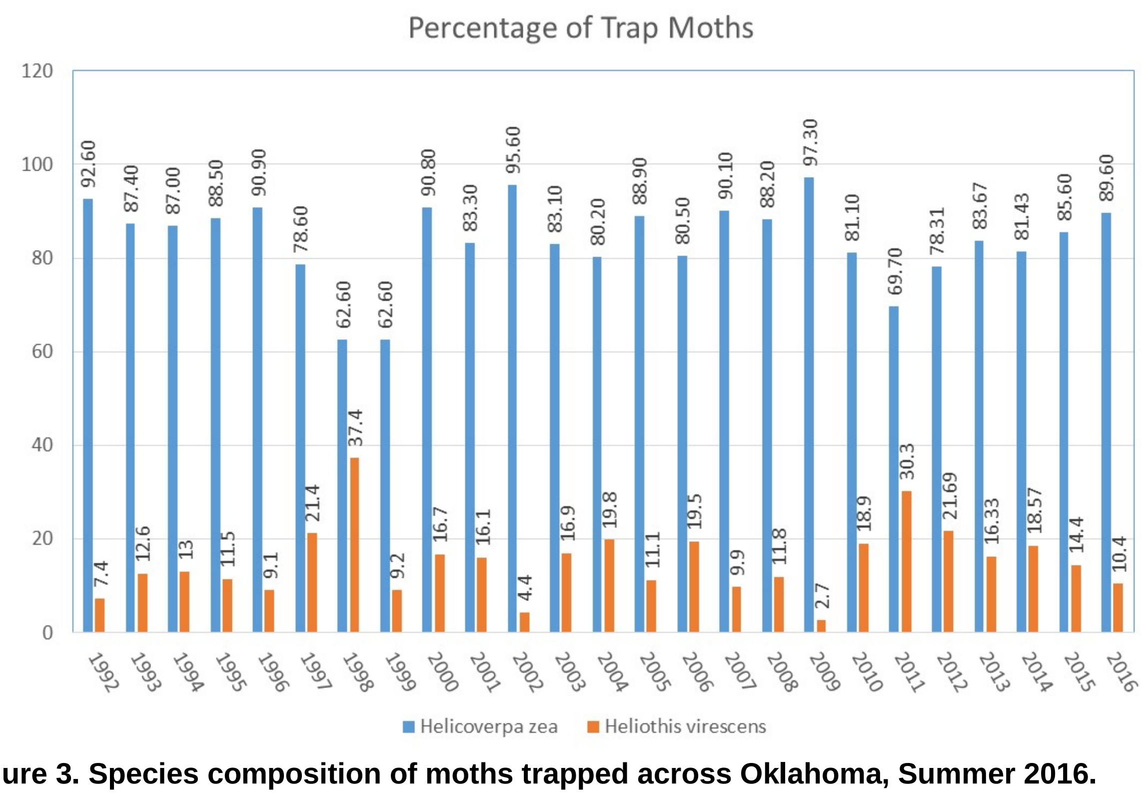


**Figure 3. Species composition of moths trapped across Oklahoma, Summer 2016.**

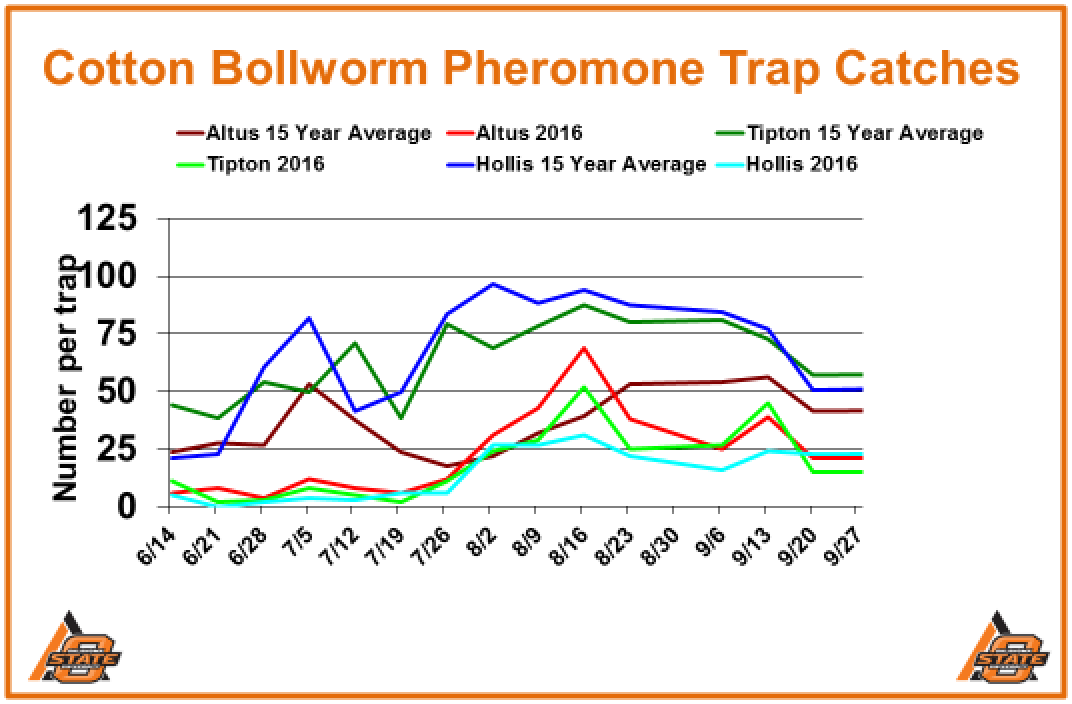


**Figure 4. Cotton bollworm moths trapped by week across Oklahoma, Summer 2016.**

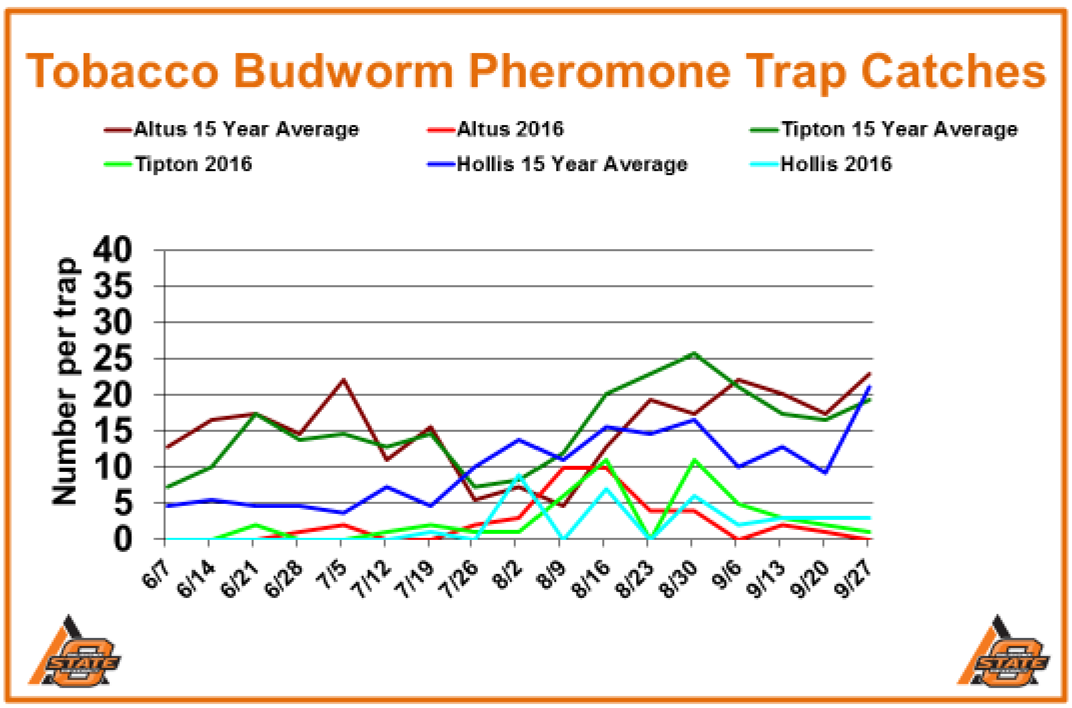


**Figure 5. Tobacco budworm moths trapped by week across Oklahoma, Summer 2016.**

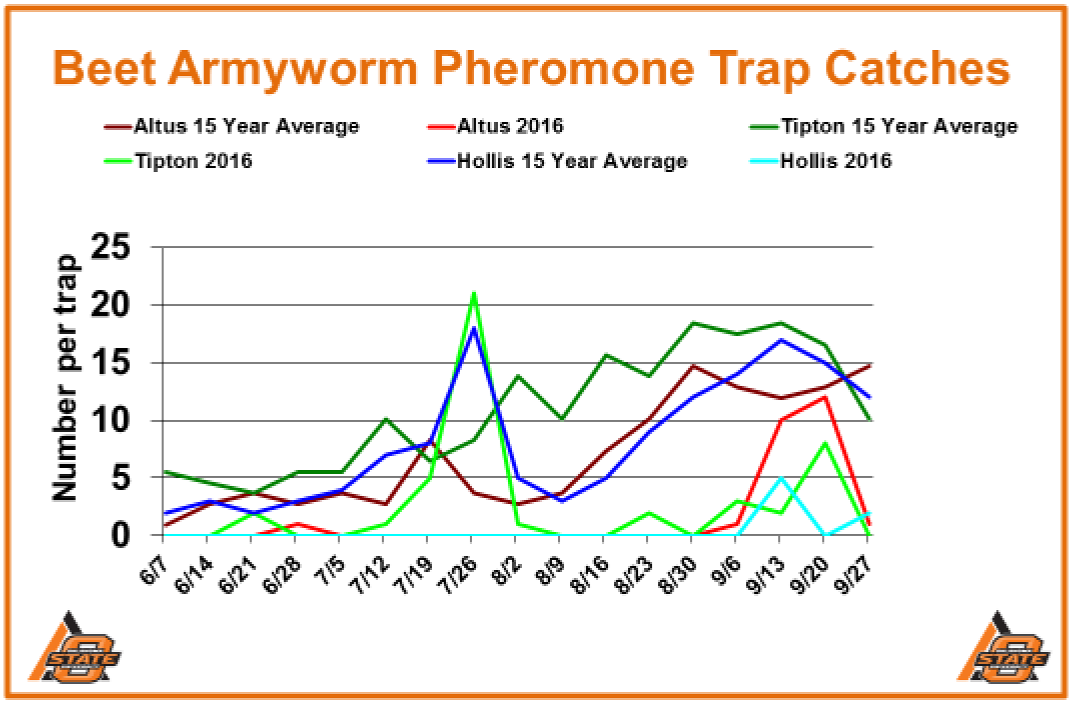


**Figure 6. Beet armyworm moths trapped by week across Oklahoma, Summer 2016.**

*Insecticide Evaluation Trials*

Three 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 6 treatments, 5 treatments and 4 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 Bt Observation Trial – Important Tool in Cotton Insect Resistance Management*

Working with industry, three Dow AgroSciences Innovation Trials in Custer and Jackson Counties (2 sites) were planted and harvested. Both of the Jackson County trials were planted under furrow irrigation, while the Custer County site was center-pivot irrigated. In addition, a small-plot Dow AgroSciences AST (Enlist) nursery project with 29 entries replicated four times was planted under center pivot irrigation at the OSU Caddo Research Station in Caddo County. Some of the entries contained Widestrike III triple-stacked Bt technology (Cry1A + Cry1F + VIP 3A) targeted to control various lepidopterous pests. Other entries included Dow Agrosciences' Widestrike technology. 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 and was approved by EPA and USDA in 2013, and was commercialized in 2014. The objectives of these trials were to evaluate germplasm and to observe Widestrike III performance compared to Widestrike technology.

Although worm pressure was low, these observations of triple-Bt stacked traits provided important information concerning the efficacy of the products and variety performance. Additional traits will be important to reduce the potential for insect resistance to currently planted Bt traits. In the near future, Bollgard II and TwinLink will also be stacked with the VIP 3A trait. These will be called Bollgard III and TwinLink Plus.

# COTTON INSECT LOSSES - 2016

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

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## Highlights

Cotton losses to arthropod pests reduced overall yields by 2.60%. *Lygus* were the top ranked pests in 2016 reducing yields by 0.734%. Stink bugs were ranked second at 0.640%. Thrips were ranked third at 0.423%. The bollworm/budworm complex were fourth at 0.413%. Spider mites reduced yields by 0.120% and cotton fleahoppers caused 0.091% loss. No other pest exceeded 0.1% loss. Total costs and losses for insects in 2016 were $569.5 million. Direct management costs for arthropods were $34.05 per acre.

**Table 1. Oklahoma summary, cotton insect losses, 2016.**

| Pest | acres infested | acres treated | #apps/ acre trtd | #apps/ tot acres | cost/ acre | %red | Bales lost |
|---|---|---|---|---|---|---|---|
| Bollworm/Budworm | 5,986 | 500 | 1.00 | 0.00 | $0.02 | 0.027% | 152 |
| Beet Armyworm | 0 | 0 | 1.00 | 0.00 | $0.00 | 0.000% | 0 |
| Fall Armyworm | 0 | 0 | 1.00 | 0.00 | $0.00 | 0.000% | 0 |
| Loopers | 0 | 0 | 1.00 | 0.00 | $0.00 | 0.000% | 0 |
| Cutworms | 0 | 0 | 1.00 | 0.00 | $0.00 | 0.000% | 0 |
| Cotton Leafperforator | 0 | 0 | 0.00 | 0.00 | $0.00 | 0.000% | 0 |
| Saltmarsh Caterpillar | 0 | 0 | 0.00 | 0.00 | $0.00 | 0.000% | 0 |
| Verde Plant Bugs | 0 | 0 | 1.00 | 0.00 | $0.00 | 0.000% | 0 |
| Cotton Fleahopper | 239,442 | 194,546 | 1.50 | 0.98 | $6.83 | 1.440% | 8,189 |
| Lygus | 0 | 0 | 2.00 | 0.00 | $0.00 | 0.000% | 0 |
| Stink Bugs | 29,930 | 14,965 | 1.00 | 0.05 | $0.45 | 0.100% | 569 |
| Clouded Plant bugs | 0 | 0 | 1.00 | 0.00 | $0.00 | 0.000% | 0 |
| Brown Stink bug | 0 | 0 | 0.00 | 0.00 | $0.00 | 0.000% | 0 |
| Bagrada Bugs | 0 | 0 | 0.00 | 0.00 | $0.00 | 0.000% | 0 |
| Leaf footed bugs | 0 | 0 | 0.00 | 0.00 | $0.00 | 0.000% | 0 |
| Spider Mites | 2,993 | 1,497 | 1.00 | 0.01 | $0.06 | 0.000% | 0 |
| Thrips | 44,895 | 74,826 | 1.00 | 0.25 | $0.60 | 0.150% | 853 |
| Aphids | 14,965 | 1,497 | 1.00 | 0.01 | $0.05 | 0.000% | 0 |
| Grasshoppers | 44,895 | 0 | 0.00 | 0.00 | $0.00 | 0.000% | 0 |
| Banded Winged Whitefly | 0 | 0 | 1.00 | 0.00 | $0.00 | 0.000% | 0 |
| Silverleaf Whitefly | 0 | 0 | 0.00 | 0.00 | $0.00 | 0.000% | 0 |
| Darkling Beetle | 0 | 0 | 0.00 | 0.00 | $0.00 | 0.000% | 0 |
| Pale-striped Flea Beetles | 0 | 0 | 0.00 | 0.00 | $0.00 | 0.000% | 0 |
| Mealybugs | 0 | 0 | 0.00 | 0.00 | $0.00 | 0.000% | 0 |
| Crickets | 0 | 0 | 0.00 | 0.00 | $0.00 | 0.000% | 0 |
| Boll Weevils | 0 | 0 | 0.00 | 0.00 | $0.00 | 0.000% | 0 |
| | | | | 1.29 | $8.01 | 1.717% | 9,762 |

| Yield & Management Results | |
|---|---|
| Total Acres | 299,302 |
| Total bales Harvested | 568,674 |
| yield (lbs/acre) | 912 |
| Total bales Lost to Insects | 9,762 |
| Percent Yield Loss | 1.72% |
| Yield w/o Insects (lbs/ac) | 928 |
| Ave. # Spray Applications | 1.29 |
| Bales lost all factors | 58,099 |
| % yield loss all factors | 10.22% |

| Economic Results | Total | Per Acre |
|---|---|---|
| Foliar Insecticides Costs | $2,396,926 | $8.01 |
| At Planting Costs | $946,393 | $3.16 |
| In-furrow costs | $0 | $0.00 |
| Scouting costs | $419,023 | $1.40 |
| Eradication costs | $1,346,859 | $4.50 |
| Transgenic cotton | $1,888,583 | $6.31 |
| Total Costs | $6,997,784 | $23.38 |
| Yield Lost to insects | $2,858,371 | $9.55 |
| Total Losses + Costs | $9,856,155 | $32.93 |

**COTTON DISEASE LOSS ESTIMATE COMMITTEE REPORT, 2016**

**Kathy Lawrence & Austin Hagan**
**Auburn University**
**Randy Norton**
**University of Arizona**
**Travis Faske**
**University of Arkansas**
**Robert Hutmacher**
**University of California**
**John Muller**
**Clemson University**
**David Wright & Ian Small**
**University of Florida**
**Bob Kemerait**
**University of Georgia**
**Charlie Overstreet & Paul Price**
**Louisiana State University**
**Gary Lawrence & Tom Allen**
**Mississippi State University**
**Sam Atwell & Andrea Jones**
**University of Missouri**
**Steve Thomas & Natalie Goldberg**
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**Randy Boman & Jerry Goodson**
**Oklahoma Slate University**
**Heather Young**
**University of Tennessee**
**Jason Woodward**
**Texas A & M University**
**Hillary L. Mehl**
**Virginia Tech**

## Abstract

The National Cotton Council Disease Loss committee submitted estimates of the losses due to each disease during the 2016 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-12-09-2016.pdf which documents cotton acreage planted, harvested, and average yields for each state. Cotton acreage harvested is expected to total 9.46 million acres, which is an increase of 19 % from 2015. Record high upland cotton yields were expected in Alabama, California, Oklahoma and Tennessee. Total average percent loss was estimated at 12.5%, which is up 3.3 % from 2015.

Plant parasitic nematodes were the group of pathogens responsible for the largest average percent loss estimated at 4.30% follow by boll rots at 3.07% disease losses. Missouri suffered the greatest total disease losses of over 20%. Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, South Carolina, Tennessee, Texas and Virginia all estimated losses over 10%. Arizona, California, New Mexico, and Oklahoma, appeared to have the best growing conditions with the least amount of disease losses. In Oklahoma the largest disease loss, this year was due to Bacterial blight. This disease was reported present in most of the 90,000 irrigated acreage in the state. Based on the USDA Planted Varieties Survey for 2016, about 67,500 irrigated acres were planted to susceptible varieties dominated mostly by DP 1522 B2XF and NG 3406 B2XF. In severely infected fields, producers lost up to a bale/acre based on their estimates when comparing yields from resistant varieties (mostly DP 1518 B2XF) planted in nearby fields.

| Table 1. Cotton disease loss estimate percentages by state for the 2016 season. | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent disease loss estimates, 2016.** | **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 | 0.0 | 0.3 | 1.8 | 0.0 | 0.1 | 0.0 | 0.1 | 0.1 | 0 | | 0.0 | 1.5 | **0.5** | 0.3 | 0.0 | | **0.35** |
| ***Bales lost to Fusarium (x 1,000)*** | 7.1 | 0.0 | 2.5 | 4.6 | 0.0 | 2.3 | 0.0 | 1.1 | 0.6 | 0.0 | | 0.0 | 4.4 | 2.8 | 22.2 | 0.0 | **47.4** | |
| **Verticillium Wilt (V. dahliae)** | 1.0 | 1.5 | 0.1 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 1 | | 0.8 | 0.0 | **0.5** | 2.2 | 0.0 | | **0.47** |
| ***Bales lost to Verticillium (x 1,000)*** | 7.1 | 5.4 | 0.8 | 0.8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.6 | 0.9 | | 4.2 | 0.0 | 2.8 | 162.8 | 0.0 | **185.4** | |
| **Bacterial Blight (X. malvacearum)** | 0.2 | 0.0 | 0.1 | 0.0 | 0.0 | 0.5 | 0.8 | 0.1 | 2.0 | 0.5 | | 2.5 | 0.1 | **0.0** | 0.2 | 0.0 | | **0.44** |
| ***Bales lost to Xanthomonas (x 1,000)*** | 1.4 | 0.0 | 0.8 | 0.0 | 0.0 | 11.3 | 2.2 | 1.1 | 11.3 | 0.4 | | 14.1 | 0.3 | 0.1 | 14.8 | 0.0 | **57.8** | |
| **Root Rot (P. omnivora )** | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0 | | 0.2 | 0.0 | **0.0** | 3.0 | 0.0 | | **0.33** |
| ***Bales lost to Phymatotrichopsis (x 1,000)*** | 0.0 | 7.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 1.1 | 0.0 | 0.0 | 222.0 | 0.0 | **230.3** | |
| **Seedling Diseases (Rhizoctonia & Etc.)** | 2.0 | 0.5 | 2.5 | 1.3 | 0.2 | 1.0 | 1.0 | 1.5 | 0.1 | 0.5 | | 0.1 | 2.0 | **4.0** | 1.8 | 3.0 | | **1.40** |
| ***Bales lost to Seedling disease (x 1,000)*** | 14.2 | 1.8 | 20.8 | 3.3 | 0.4 | 22.5 | 2.7 | 16.5 | 0.6 | 0.4 | | 0.6 | 5.8 | 22.6 | 133.2 | 3.0 | **248.2** | |
| **Ascochyta Blight (A. gossypii)** | 0.5 | 0.0 | 0.1 | 0.0 | 1.0 | trace | 0.1 | 0.0 | 0.0 | 0 | | 0.0 | 0.1 | **1.0** | 0.0 | 0.1 | | **0.21** |
| ***Bales lost to Ascochyta (x 1,000)*** | 3.6 | 0.0 | 0.4 | 0.0 | 1.8 | 0.0 | 0.3 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.3 | 5.7 | 0.0 | 0.1 | **12.1** | |
| **Boll Rots (Rhizopus, etc.)** | 4.0 | 0.1 | 2.5 | 0.0 | 5.0 | 2.5 | 6.0 | 1.5 | 6.0 | 0.5 | | 0.1 | 0.3 | **2.0** | 0.7 | 3.0 | | **3.07** |
| ***Bales lost to Rhizopus (x 1,000)*** | 28.4 | 0.4 | 20.8 | 0.0 | 9.0 | 56.3 | 16.2 | 16.5 | 33.9 | 0.4 | | 0.6 | 0.7 | 11.3 | 51.8 | 3.0 | **249.2** | |
| **Nematodes (All)** | 6.0 | 3.0 | 4.2 | 0.1 | 7.1 | 8.5 | 6.0 | 7.5 | 4.0 | 0.5 | | 0.2 | 8.0 | **2.6** | 2.9 | 5.0 | | **4.30** |
| ***Bales lost to Nematodes (x 1,000)*** | 42.6 | 10.8 | 34.9 | 0.3 | 12.8 | 191.3 | 16.2 | 82.5 | 22.6 | 0.4 | | 1.1 | 23.2 | 14.7 | 214.6 | 5.1 | **672.9** | |
| **Nematodes (Meloidogyne spp.)** | 2.0 | 3.0 | 2.0 | 0.1 | 5.5 | 6.0 | 3.0 | 2.0 | 0.0 | 0.5 | | 0.2 | 3.0 | **0.1** | 2.5 | 2.0 | | **2.15** |
| ***Bales lost to Meloidogyne (x 1,000)*** | 14.2 | 10.8 | 16.6 | 0.3 | 9.9 | 135.0 | 8.1 | 22.0 | 0.0 | 0.4 | | 1.1 | 8.7 | 0.6 | 185.0 | 2.0 | **414.7** | |
| **Nematodes (Reniform reniformis)** | 4.0 | 0.0 | 2.0 | 0.0 | 1.5 | 2.0 | 3.0 | 5.0 | 0.0 | 0 | | 0.0 | 2.0 | **2.5** | 0.4 | 0.0 | | **1.43** |
| ***Bales lost to Reniform (x 1,000)*** | 28.4 | 0.0 | 16.6 | 0.0 | 2.7 | 45.0 | 8.1 | 55.0 | 0.0 | 0.0 | | 0.0 | 5.8 | 14.1 | 29.6 | 0.0 | **205.3** | |
| **Nematodes (Other spp.)** | 0.5 | 0.0 | 0.2 | 0.0 | 0.1 | 0.5 | 0.0 | 0.5 | 0.0 | 0 | | 0.0 | 3.0 | **0.0** | 0.0 | 3.0 | | **0.50** |
| ***Bales lost to other Nematodes (x 1,000)*** | 3.6 | 0.0 | 1.7 | 0.0 | 0.2 | 11.3 | 0.0 | 5.5 | 0.0 | 0.0 | | 0.0 | 8.7 | 0.0 | 0.0 | 3.0 | **33.9** | |
| **Leaf Spots & Others** | 3.0 | 0.5 | 1.5 | 0.0 | 2.5 | 0.3 | 4.0 | 3.2 | 8.0 | 0 | | 0.5 | 0.1 | **2.0** | 0.2 | 0.5 | | **1.68** |
| ***Bales lost to Leaf spots & Others (x 1,000)*** | 21.3 | 1.8 | 12.5 | 0.0 | 4.5 | 6.8 | 10.8 | 35.2 | 45.2 | 0.0 | | 2.8 | 0.3 | 11.3 | 14.8 | 0.5 | **167.7** | |
| **Total Percent Lost** | **17.7** | **7.6** | **11.3** | **3.4** | **15.8** | **12.9** | **17.9** | **13.9** | **20.3** | **3.0** | | **4.4** | **12.1** | **12.6** | **11.3** | **11.6** | | 12.24 |
| **Total Bales Lost (x 1,000)** | **125.7** | **27.4** | **93.4** | **8.8** | **28.4** | **290.3** | **48.3** | **152.9** | **114.7** | **2.6** | | **24.6** | **34.9** | **71.2** | **836.2** | **11.7** | **1871.1** | |
| **Total Yield in Bales (x 1,000) (USDA Nov'16)** | **710** | **360** | **830** | 260 | 180 | **2250** | **270** | 1100 | **565** | **85** | | 565 | 290 | 565 | **7400** | **101** | **15531** | |

# Harvest Aids

Three harvest aid demonstrations were established on October 5, 2016. These were located at the Southwest Research and Extension Center at Altus, the Tipton Valley Research Center, western Jackson County furrow irrigated RACE trial at the Drew Darby farm. Since these plots were not replicated, no data were collected, and they were strictly for demonstration purposes only. These demonstrations focused on tank-mixing various defoliants with ethephon, and consisted of 8 treatments. All treatments were applied in a finished spray volume of 12 gallons per acre at 60 PSI with a medium spray droplet. Signs were installed on each treatment at all sites so producers could observe performance and determine the most effective treatment. Numerous references to these demonstrations were made during visits with growers seeking guidance with harvest aid applications and each of these locations were instrumental in helping growers determine the harvest aid treatment that may be appropriate for their own fields.

**Table 1. Treatments applied in 2016 harvest aid demonstrations.**

| Treatment | Rates and products |
|---|---|
| 1. | 21 oz/a Finish 6 Pro + 16 oz/a Folex |
| 2. | 21 oz/a Finish 6 Pro + 6.4 oz/a Ginstar |
| 3. | 32 oz/a Ethephon + 16 oz/a Folex+ 0.75 oz/a ETX + 1% COC |
| 4. | 32 oz/a Ethephon + 16 oz/a Folex |
| 5. | 32 oz/a Ethephon + 6.4 oz/a Ginstar |
| 6. | 32 oz/a Ethephon + 8.0 oz/a Ginstar |
| 7. | 32 oz/a Ethephon + 1.25 oz/a ETX + 1% Crop oil |
| 8. | 32 oz/a Ethephon + 1 oz/a Sharpen + 1% MSO + Ammonium Sulfate |


**Figure 1. Harvest aid demonstration at the OSU SWREC, photo taken October 11, 2016.**


**Figure 2. Harvest aid demonstration near Duke, photo taken October 12, 2016.**

# COTTON HARVEST AID SUGGESTIONS FOR OKLAHOMA – 2016

**TREATMENTS LISTED ARE NOT NECESSARILY EQUALLY EFFECTIVE**
**RATES LISTED ARE UNITS OF PRODUCT PER ACRE**

**Dr. Randy Boman**
**Research Director and Cotton Extension Program Leader, Altus**

| CROP CONDITION | DRY TEMPERATURES GREATER THAN 80° (0-3 DAYS AFTER TREATMENT) | DRY TEMPERATURES LESS THAN 80° (0-3 DAYS AFTER TREATMENT) | WET TEMPERATURES LESS THAN 75° (0-3 DAYS AFTER TREATMENT) |
|---|---|---|---|
| **HEIGHT:** Short 14 inches or less<br>**YIELD:** up to 500 lb/acre | Gramoxone (SL 2.0) 8-16 oz[1] | Gramoxone (SL 2.0) 8-16 oz[1] | Gramoxone (SL 2.0) 8-16 oz[1] |
| | Firestorm or Parazone 5.3-10.7 oz[1] | Firestorm or Parazone 5.3-10.7 oz[1] | Firestorm or Parazone 5.3-10.7 oz[1] |
| | Gramoxone (SL 2.0) 4-8 oz followed by (FB) Gramoxone (SL 2.0) up to 32 oz total[2] | Gramoxone (SL 2.0) 8-12 oz FB Gramoxone (SL 2.0) up to 32 oz total[2] | Gramoxone (SL 2.0) 8-12 oz FB Gramoxone (SL 2.0) up to 32 oz total[2] |
| | Firestorm or Parazone 2.6-5.3 oz FB Firestorm or Parazone up to 21 oz total[2] | Firestorm or Parazone 2.6-5.3 oz FB Firestorm or Parazone up to 21 oz total[2] | Firestorm or Parazone 2.6-5.3 oz FB Firestorm or Parazone up to 21 oz total[2] |
| | Gramoxone (SL 2.0) 6-10 oz + defoliant/desiccant[3] | Gramoxone (SL 2.0) 8-12 oz + defoliant/desiccant[3] | Gramoxone (SL 2.0) 10-24 oz + defoliant/desiccant[3] |
| | Firestorm or Parazone 4-6.7 oz + defoliant/desiccant[3] | Firestorm or Parazone 5.3-8 oz + defoliant/desiccant[3] | Firestorm or Parazone 6.7-16 oz + defoliant/desiccant[3] |
| | Ginstar 6-8 oz banded | Ginstar 8 oz banded | Ginstar 8-10 oz banded |
| | Aim EC 1-1.6 oz + COC with or without defoliant/desiccant | Aim EC 1-1.6 oz + COC with or without defoliant/desiccant | Aim EC 1-1.6 oz + COC with or without defoliant/desiccant |
| | Aim EC 1-1.6 oz + COC FB Aim EC 1-1.6 oz + COC[4] | Aim EC 1-1.6 oz + COC FB Aim EC 1-1.6 oz + COC[4] | Aim EC 1-1.6 oz + COC FB Aim EC 1-1.6 oz + COC[4] |
| | ETX 0.9-1.7 oz + COC with or without defoliant/desiccant | ETX 0.9-1.7 oz + COC with or without defoliant/desiccant | ETX 0.9-1.7 oz + COC with or without defoliant/desiccant |
| | ETX 0.9-1.7 oz + COC FB ETX 0.9-1.7 oz + COC[4] | ETX 0.9-1.7 oz + COC FB ETX 0.9-1.7 oz + COC[4] | ETX 0.9-1.7 oz + COC FB ETX 0.9-1.7 oz + COC[4] |
| | Display 1.0 oz + COC with or without defoliant/desiccant | Display 1.0 oz + COC with or without defoliant/desiccant | Display 1.0 oz + COC with or without defoliant/desiccant |
| | Display 1.0 oz + COC FB Display 1.0 oz + COC[4] | Display 1.0 oz + COC FB Display 1.0 oz + COC[4] | Display 1.0 oz + COC FB Display 1.0 oz + COC[4] |
| | Sharpen 1 oz + MSO + AMS with or without defoliant/desiccant | Sharpen 1 oz + MSO + AMS with or without defoliant/desiccant | Sharpen 1 oz + MSO + AMS with or without defoliant/desiccant |
| | Sharpen 1 oz + MSO + AMS FB Sharpen 1 oz + MSO + AMS[4] | Sharpen 1 oz + MSO + AMS FB Sharpen 1 oz + MSO + AMS4 | Sharpen 1 oz + MSO + AMS FB Sharpen 1 oz + MSO + AMS[4] |

# COTTON HARVEST AID SUGGESTIONS FOR OKLAHOMA – 2016 (CONTINUED)

**NOT ALL TREATMENTS ARE EQUALLY EFFECTIVE**
**RATES LISTED ARE UNITS OF PRODUCT PER ACRE**

| CROP CONDITION | DRY TEMPERATURES GREATER THAN 80º (0-3 DAYS AFTER TREATMENT) | DRY TEMPERATURES LESS THAN 80º (0-3 DAYS AFTER TREATMENT) | WET TEMPERATURES LESS THAN 75º (0-3 DAYS AFTER TREATMENT) |
|---|---|---|---|
| **HEIGHT:** Medium 15-24 inches<br>**YIELD:** 500+ lb/acre | **FOR TREATMENTS LISTED BELOW, A SEQUENTIAL APPLICATION OF PARAQUAT (OR OTHER DESICCANT ACTIVITY PRODUCT) 7-14 DAYS AFTER INITIAL TREATMENT WILL LIKELY BE NECESSARY TO SUFFICIENTLY CONDITION CROP FOR STRIPPER HARVESTING** | | |
| | Gramoxone (SL 2.0) 6-10 oz[1] + defoliant/desiccant[3] | Gramoxone (SL 2.0) 8-12 oz[1] + defoliant/desiccant[3] | Gramoxone (SL 2.0) 10-24 oz[1] + defoliant/desiccant[3] |
| | Firestorm or Parazone 4-6.7 oz[1] + defoliant/desiccant[3] | Firestorm or Parazone 5.3-8 oz[1] + defoliant/desiccant[3] | Firestorm or Parazone 6.7-16 oz[1] + defoliant/desiccant[3] |
| | Gramoxone (SL 2.0) 4-8 oz followed by (FB) Gramoxone (SL 2.0) up to 32 oz total[2] | Gramoxone (SL 2.0) 6-8 oz FB Gramoxone (SL 2.0) up to 32 oz total[2] | Gramoxone (SL 2.0) 6-8 oz FB Gramoxone (SL 2.0) up to 32 oz total[2] |
| | Firestorm or Parazone 2.6-5.3 oz FB Firestorm or Parazone up to 21 oz total[2] | Firestorm or Parazone 4-5.3 oz FB Firestorm or Parazone up to 32 oz total[2] | Firestorm or Parazone 4-5.3 oz FB Firestorm or Parazone up to 32 oz total[2] |
| | Ginstar 6-8 oz | Ginstar 8 oz | Ginstar 8-10 oz |
| | Aim EC 1-1.6 oz + COC + defoliant/desiccant | Aim EC 1-1.6 oz + COC + defoliant/desiccant | Aim EC 1-1.6 oz + COC + defoliant/desiccant |
| | Aim EC 1-1.6 oz + COC FB Aim EC 1-1.6 oz + COC[4] | Aim EC 1-1.6 oz + COC FB Aim EC 1-1.6 oz + COC[4] | Aim EC 1-1.6 oz + COC FB Aim EC 1-1.6 oz + COC[4] |
| | ETX 0.9-1.7 oz + COC with or without defoliant/desiccant | ETX 0.9-1.7 oz + COC with or without defoliant/desiccant | ETX 0.9-1.7 oz + COC with or without defoliant/desiccant |
| | ETX 0.9-1.7 oz + COC FB ETX 0.9-1.7 oz + COC[4] | ETX 0.9-1.7 oz + COC FB ETX 0.9-1.7 oz + COC[4] | ETX 0.9-1.7 oz + COC FB ETX 0.9-1.7 oz + COC[4] |
| | Display 1.0 oz + COC with or without defoliant/desiccant | Display 1.0 oz + COC with or without defoliant/desiccant | Display 1.0 oz + COC with or without defoliant/desiccant |
| | Display 1.0 oz + COC FB Display 1.0 oz + COC[4] | Display 1.0 oz + COC FB Display 1.0 oz + COC[4] | Display 1.0 oz + COC FB Display 1.0 oz + COC[4] |
| | Sharpen 1 oz + MSO + AMS with or without defoliant/desiccant | Sharpen 1 oz + MSO + AMS with or without defoliant/desiccant | Sharpen 1 oz + MSO + AMS with or without defoliant/desiccant |
| | Sharpen 1 oz + MSO + AMS FB Sharpen 1 oz + MSO + AMS[4] | Sharpen 1 oz + MSO + AMS FB Sharpen 1 oz + MSO + AMS[4] | Sharpen 1 oz + MSO + AMS FB Sharpen 1 oz + MSO + AMS[4] |
| | Ethephon 16-32 oz + Ginstar 3-5 oz | Ethephon 16-32 oz[5] + Ginstar 3-5 oz | Ethephon 21-32 oz[5] + Ginstar 3-5 oz |
| | Ethephon 16-32 oz + Folex 8-16 oz | Ethephon 16-32 oz[5] + Folex 16 oz | Ethephon 21-32 oz[5] + Folex 16 oz |
| | Ethephon 16-32 oz + Aim EC 1-1.6 oz + COC or + Display 1.0 oz + COC or + ETX 0.9-1.7 oz + COC or + Sharpen 1 oz + MSO + AMS[4] | Ethephon 16-32 oz[5] + Aim EC 1-1.6 oz + COC or + Display 1.0 oz + COC or + ETX 0.9-1.7 oz + COC or + Sharpen 1 oz + MSO + AMS[4] | Ethephon 21-32 oz[5] + Aim EC 1-1.6 oz + COC or + Display 1.0 oz + COC or + ETX 0.9-1.7 oz + COC or + Sharpen 1 oz + MSO + AMS[4] |
| | Finish 6 Pro 21 oz + defoliant (Folex 8 oz or Ginstar 3-5 oz) | Finish 6 Pro 21-32 oz[5] (defoliant may be required) | Finish 6 Pro 21-42 oz[5] (defoliant may be required) |
| | FirstPick 3 pts + Ginstar 3 oz | FirstPick 3-4 pts[5] + Ginstar 5 oz | FirstPick 4 pts[5] + Ginstar 6-8 oz |

# COTTON HARVEST AID SUGGESTIONS FOR OKLAHOMA – 2016 (CONTINUED)

**NOT ALL TREATMENTS ARE EQUALLY EFFECTIVE**
**RATES LISTED ARE UNITS OF PRODUCT PER ACRE**

| CROP CONDITION | DRY<br>TEMPERATURES<br>GREATER THAN 80º<br>(0-3 DAYS AFTER TREATMENT) | DRY<br>TEMPERATURES<br>LESS THAN 80º<br>(0-3 DAYS AFTER TREATMENT) | WET<br>TEMPERATURES<br>LESS THAN 75º<br>(0-3 DAYS AFTER TREATMENT) |
|---|---|---|---|
| | **FOR TREATMENTS LISTED BELOW, A SEQUENTIAL APPLICATION OF PARAQUAT (OR OTHER DESICCANT ACTIVITY PRODUCT) 7-14 DAYS AFTER INITIAL TREATMENT WILL LIKELY BE NECESSARY TO SUFFICIENTLY CONDITION CROP FOR STRIPPER HARVESTING** | | |
| **HEIGHT:**<br>Greater than 24 inches<br><br>**YIELD:**<br>1000+ lb/acre | Ethephon 21-32 oz + Folex 8-16 oz | Ethephon 21-32 oz + Folex 16 oz | Ethephon 32-42 oz[5] + Folex 16 oz |
| | Finish 6 Pro 21 oz<br>+ defoliant (Folex 8 oz or<br>Ginstar 3-5 oz) | Finish 6 Pro 21-32 oz[5]<br>+ defoliant (Folex 8-10 oz or<br>Ginstar 4-6 oz) | Finish 6 Pro 32-42 oz[5]<br>+ defoliant (Folex 8-10 oz or<br>Ginstar 6-8 oz) |
| | Finish 6 Pro 21-32 oz<br>+ Aim EC 1-1.6 oz + COC<br>or + Display 1.0 oz + COC<br>or + ETX 0.9-1.7 oz + COC<br>or + Sharpen 1 oz + MSO + AMS[4] | Finish 6 Pro 21-32 oz[5]<br>+ Aim EC 1-1.6 oz + COC<br>or + Display 1.0 oz + COC<br>or + ETX 0.9-1.7 oz + COC<br>or + Sharpen 1 oz + MSO + AMS[4] | Finish 6 Pro 32-42 oz[5]<br>+ Aim EC 1-1.6 oz + COC<br>or + Display 1.0 oz + COC<br>or + ETX 0.9-1.7 oz + COC<br>or + Sharpen 1 oz + MSO + AMS[4] |
| | Ethephon 21-32 oz +<br>Ginstar 3-5 oz | Ethephon 21-32 oz[5] +<br>Ginstar 4-6 oz | Ethephon 32-42[5] oz +<br>Ginstar 6-8 oz |
| | Ethephon 21-32 oz[5]<br>+ Aim EC 1-1.6 oz + COC<br>or + Display 1.0 oz + COC<br>or + ETX 0.9-1.7 oz + COC<br>or + Sharpen 1 oz + MSO + AMS[4] | Ethephon 21-32 oz[5]<br>+ Aim EC 1-1.6 oz + COC<br>or + Display 1.0 oz + COC<br>or + ETX 0.9-1.7 oz + COC<br>or + Sharpen 1 oz + MSO + AMS[4] | Ethephon 32-42 oz[5]<br>+ Aim EC 1-1.6 oz + COC<br>or + Display 1.0 oz + COC<br>or + ETX 0.9-1.7 oz + COC<br>or + Sharpen 1 oz + MSO + AMS[4] |
| | FirstPick 3-4 pts +<br>Ginstar 3-5 oz | FirstPick 4-5 pts[5] +<br>Ginstar 6-8 oz | FirstPick 6-7 pts[5] +<br>Ginstar 6-8 oz |
| | FirstPick 3-4 pts<br>+ Aim EC 1-1.6 oz + COC<br>or + Display 1.0 oz + COC<br>or + ETX 0.9-1.7 oz + COC<br>or + Sharpen 1 oz + MSO + AMS[4] | FirstPick 4-5 pts[5]<br>+ Aim EC 1-1.6 oz + COC<br>or + Display 1.0 oz + COC<br>or + ETX 0.9-1.7 oz + COC<br>or + Sharpen 1 oz + MSO + AMS[4] | FirstPick 6-7 pts[5]<br>+ Aim EC 1-1.6 oz + COC<br>or + Display 1.0 oz + COC<br>or + ETX 0.9-1.7 oz + COC<br>or + Sharpen 1 oz + MSO + AMS[4] |
| | Ginstar 6-8 oz | Ginstar 8 oz | Ginstar 8-10 oz |
| | **CONDITIONING TREATMENT ONLY**<br>(Apply after daily heat units drop below 5, but at least 7 days before average first killing freeze date) | | |
| **LATE MATURING** | Gramoxone (SL 2.0) 4-8 oz | Gramoxone (SL 2.0) 6-12 oz | Gramoxone (SL 2.0) 10-16 oz |
| | Firestorm or Parazone 2.6-5.3 oz | Firestorm or Parazone 4-8 oz | Firestorm or Parazone 6.7-10.7 oz |
| | Ethephon 32 oz | Ethephon 32-42 oz[5] | Ethephon 32-42 oz[5] |
| | Ethephon 32 oz<br>+ Folex 8 oz<br>or + Ginstar 8 oz<br>or + Aim EC 1-1.6 oz + COC<br>or + Display 1.0 oz + COC<br>or + ETX 0.9-1.7 oz + COC<br>or + Sharpen 1 oz + MSO + AMS[4] | Ethephon 32-42 oz[5]<br>+ Folex 8 oz<br>or + Ginstar 8 oz<br>or + Aim EC 1-1.6 oz + COC<br>or + Display 1.0 oz + COC<br>or + ETX 0.9-1.7 oz + COC<br>or + Sharpen 1 oz + MSO + AMS[4] | Ethephon 32-42 oz[5]<br>+ Folex 16 oz<br>or + Ginstar 8-16 oz<br>or + Aim EC 1-1.6 oz + COC<br>or + Display 1.0 oz + COC<br>or + ETX 0.9-1.7 oz + COC<br>or + Sharpen 1 oz + MSO + AMS[4] |

## FOOTNOTES

FB = Followed by

[1] - Use on cotton with natural leaf shed. High rates can cause green, healthy leaves to stick. There is some concern for the single high dose rate, especially on hairy-leaf cotton varieties. Reduced fiber quality with respect to leaf grades may be obtained. Always use a non-ionic surfactant at 0.25% v/v to 0.5% v/v when applying paraquat-based products (Gramoxone (SL 2.0), Firestorm, Parazone). For maximum paraquat desiccation activity, apply late in the day prior to a forecast for a bright, sunny morning. Make sure the cotton has at least 80% open bolls at application, use a sufficient paraquat rate and application to completely kill all foliage, then stripper harvest only when leaves are dry enough to "crunch" when crushed by hand. Proper ginning techniques must be followed in order to reduce trash in the stripped cotton and to minimize potential for lint quality loss. This typically includes adequate drying, pre-cleaning and two stages of lint cleaning. **Avoid stripper harvesting moist, dead leaves or poor leaf grades may be encountered. Adjacent small grains or other desirable vegetation may be severely damaged by paraquat drift so use appropriate caution.**

[2] - No more than 32 oz/acre total of Gramoxone (SL 2.0) (2 lb paraquat/gallon) or no more than 21 oz/acre total of Firestorm or Parazone (3 lb paraquat/gallon) may be applied as a cotton harvest aid. The need for and rate of Gramoxone (SL 2.0), Firestorm, or Parazone in a second application will depend upon green leaves and unopened bolls remaining. Use higher rates if regrowth is excessive.

[3] - Tankmix partners with Gramoxone (SL 2.0), Firestorm, or Parazone can include Folex, Aim, Display, and ETX.

[4] - No more than: 3.2 oz/acre total of Aim 2EC as a cotton harvest aid (in two applications) or 7.9 oz/acre for all uses in one season may be applied. No more than 2 oz/acre total of Display as a cotton harvest aid may be applied per season. Do not exceed 3.4 oz/acre total (in no more than 2 applications) of ETX as a cotton harvest aid (or 5.25 oz/acre for all uses) in one season. Do not apply more than 2 oz/acre of Sharpen in a single application, and no more than 2 oz/acre total as a harvest aid per season.

[5] - 6 lb/gallon ethephon-based product (such as Finish 6 Pro, FirstPick, Prep, Super Boll, Boll'd, Boll Buster, Setup, etc.) activity is determined by rate and temperature. At lower temperatures, boll opening response can be enhanced by increasing rate. Do not exceed a maximum of 2.0 lb ethephon active ingredient per acre per year through combined or repeated uses of any ethephon products.

# 2017 Beltwide Cotton Conference Presentations – Dallas, TX

Project personnel were involved in several Beltwide Cotton Conference presentations in Dallas, TX in January 2017.

1) Weed control continues to challenge cotton producers, and is a major concern. A poster presentation using the data from weed control projects conducted at the SWREC was generated.

2) The frequency and severity of potassium (K) deficiency symptoms in cotton have increased in some soils in the U.S. Cotton Belt over the past decade. Deficiency symptoms may be observed beginning at first flower but many times increase in severity as the boll load and boll fill period progress. A Beltwide project was recently funded by the Cotton Incorporated Core Program to address these issues, and preliminary results were presented at the Beltwide Cotton Conference. A location at the SWREC was included in this project.

# WEED MANAGEMENT IN OKLAHOMA COTTON

**T.A. Baughman**
**R. W. Peterson**
**Oklahoma State University - Institute for Agricultural Biosciences**
**Ardmore, OK**
**R. K. Boman**
**J. R. Goodson**
**Oklahoma State University – Southwest Research and Extension Center**
**Altus, OK**
**D.L. Teeter**
**Oklahoma State University - Institute for Agricultural Biosciences**
**Ardmore, OK**

## Abstract

Research was conducted during the 2016 growing season at the Oklahoma State University Southwest Research and Extension Center near Altus, OK and the Tipton Valley Research Center near Tipton, OK to evaluate new cotton weed management technologies. The technologies include the Bollgard II XtendFlex cotton system in which both XtendiMax herbicide with VaporGrip technology and Engenia were evaluated, and the Enlist cotton system in which Enlist Duo was evaluated. Palmer amaranth and tumble pigweed late season control was at least 99% with XtendiMax, Engenia, and Enlist Duo postemergence programs. Red sprangletop control was 100% late season with Enlist Duo and when XtendiMax followed Treflan. This research indicated that successful control of problematic weeds in Oklahoma cotton could be achieved with each of these technologies.

## Introduction

Weed management in cotton is often difficult due to the typically slow growth rate and wide row spacing. This combined with the increasing spread of weed resistance has made new weed management technology development even more valuable. Two new weed management systems were evaluated in Oklahoma cotton. The first technology evaluated was the Bollgard II XtendFlex Cotton system. This technology is tolerant to dicamba, glyphosate, and glufosinate herbicides. Both the XtendiMax (diglycolamine salt of dicamba) with VaporGrip technology, Roundup Xtend (diglycolamine salt of dicamba + glyphosate) with VaporGrip technology, and Engenia (BAPMA salt of dicamba) formulations were evaluated within this system. The other technology evaluated was the Enlist Cotton system. This technology is tolerant to 2,4-D, glyphosate, and glufosinate herbicides. Enlist Duo (premix of the choline salt of 2,4-D and glyphosate) with the Colex-D technology was evaluated in this system. The objectives of these studies were to evaluate the performance of these technologies for weed management in Oklahoma cotton.

## Materials and Methods

Cotton was planted June 9, 2016, at the Oklahoma State University Research Stations near Altus and Tipton. "Deltapine 1522B2XF" was planted in the XtendFlex trial and "Phytogen PX5005W3FE" was planted in the Enlist trial at Altus. "NexGen 3406B2XF" was planted in the Engenia trial at Tipton. Typical small plot research methods and normal farming techniques were used to conduct all trials. Treflan was applied at 1 qt/A to individual plots in late March and incorporated with a prepmaster bed condition followed by a rolling cultivator at Altus and Tipton (entire trial area). Gramoxone at 1 pt/A + Caparol at 1 qt/A was applied PRE to individual plots in the Xtend Cotton trial at Altus. Cotoran at 1 qt/A was applied PRE to all plots in the Enlist Cotton trial at Altus. Postemergence combination in the XtendiMax trial at Altus include Liberty (29 fl oz/A) + Warrant (1.5 qt/A) followed by Liberty (43 fl oz/A) and XtendiMax (2 qt/A) + Warrant (1.5 qt/A) followed by Roundup Xtend (2 qt/A). At Tipton, each of the Engenia early POST treatments were applied with Outlook at 12 fl oz/A and all POST treatments were applied with Agridex Crop Oil Concentrate at 1% v/v. Treatments in all trials were visually evaluated for stand reduction, cotton injury, and weed control during the growing season.

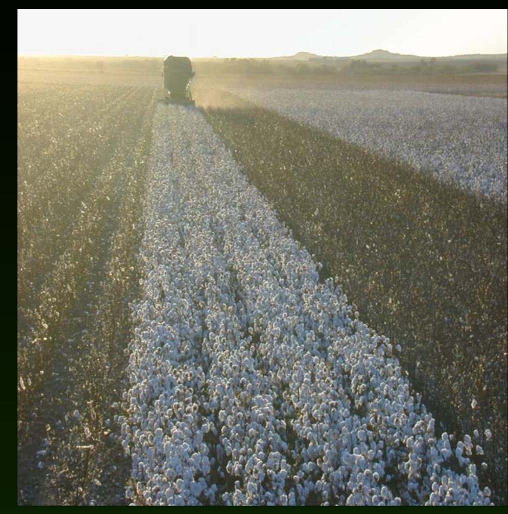
## Results and Discussion

Cotton injury was 6% or less with all treatments and was transient in nature in the XtendFlex trial. Palmer amaranth control at Altus was less than 85% and red sprangletop control was less than 40% with Caparol prior to any postemergence herbicide application. Treflan provided 99% red sprangletop control 2 weeks after planting. Late season Palmer amaranth control was less than 60% with Liberty + Warrant followed by Liberty. Palmer amaranth control was at least 99% regardless of PRE program when XtendiMax + Warrant followed by XtendiMax + Roundup was applied POST. Late season Red sprangletop control was at least 99% when Treflan was applied PPI regardless of the POST program. Control was only 51% when Caparol was applied PRE and followed by the Liberty POST program and 80% when followed by the XtendiMax program. Early season tumble pigweed control was greater than 90% with all Engenia POST treatments. Tumble pigweed control was 100% late season when Engenia was applied with either Roundup or Liberty. Enlist Duo applied alone or in combination POST1 with Dual Magnum controlled both Palmer amaranth and red sprangletop at least 98% season long. This research indicates that when used in a program approach, each of these new technologies can provide excellent season long control of Palmer amaranth, red sprangletop, and tumble pigweed.

## Acknowledgements

The authors extend a special thank you to Rocky Thacker and the station personnel at the Southwest Research and Extension Center for their help in the establishment, maintenance, and harvest of these trials.

# Weed Management in Oklahoma Cotton



**T.A. Baughman, R.W. Peterson, R. K. Boman, D.L. Teeter, J.R. Goodson**

**Oklahoma State University**

## Introduction

Weed management in cotton is often difficult due to typically slow growth rate and wide row spacing. This combined with the rapid spread of weed resistance has made new weed management technology development even more valuable. Two new weed management systems were evaluated in Oklahoma cotton. The first technology evaluated was the Bollgard II XtendFlex Cotton system. This technology is tolerant to dicamba, glyphosate, and glufosinate herbicides. Both the XtendiMax (diglycolamine salt of dicamba) with Vapor Grip technology and Engenia (BAPMA salt of dicamba) formulations were evaluated with this system. The other technology evaluated was the Enlist Cotton system. This technology is tolerant to 2,4-D, glyphosate, and glufosinate. Enlist Duo (premix of glyphosate and choline salt of 2,4-D) with the Colex-D technology was evaluated in this system. The objectives of these studies were to evaluate the performance of these technologies for weed management in Oklahoma cotton.

## Materials and Methods

Cotton was planted June 9, 2016, at the Oklahoma Agricultural Experiment Stations near Altus and Tipton. At Altus, “Deltapine 1522B2XF” was planted in the XtendFlex trial and “PhytoGen PX5005W3FE” was planted in the Enlist trial. “NexGen 3406B2XF” cotton was planted at Tipton. Typical small plot research methods were used to conduct all trials. Treflan was applied at 1 qt/A to individual plots in late March and incorporated with a prepmaster bed conditioner followed by a rolling cultivator at Altus and Tipton (entire trial area). Gramoxone 2SL at 1 pt/A + Caparol at 1 qt/A was applied PRE to individual plots in the XtendFlex trial at Altus. Cotoran at 1 qt/A was applied PRE to all plots in the Enlist trial at Altus. Various other herbicide combinations were applied POST at labeled rates. At Tipton, each of the Engenia early POST treatments was applied with Outlook at 12 fl oz/A and all POST treatments were applied with Agridex crop oil concentrate at 1% v/v. Treatments in all trials were visually evaluated for stand reduction, cotton, injury, and weed control during the growing season.

## Results and Discussion

Cotton injury was 6% or less with all treatments and was transient in nature (data not shown). Palmer amaranth control at Altus was less than 85% and red sprangletop control was less than 40% with Caparol prior to any postemergence herbicide application (data not shown). Treflan provided 99% red sprangletop control 2 weeks after planting. Late season Palmer amaranth control was less than 60% with Liberty + Warrant followed by Liberty (Figure 1). Palmer amaranth control was at least 99% regardless of PRE program when XtendiMax + Warrant followed by XtendiMax + Roundup was applied POST. Red sprangletop control late season was at least 99% when Treflan was applied PPI regardless of the POST program (Figure 2). Control was only 51% when Caparol was applied PRE and followed by the Liberty POST program and 80% when followed by the XtendiMax program. Early season tumble pigweed control was greater than 90% with all Engenia POST treatments (Figure 3). Tumble pigweed control was 100% late season when Engenia was applied with either Roundup or Liberty. Enlist Duo applied alone or in combination POST1 with Dual Magnum controlled both Palmer amaranth and red sprangletop at least 98% season long. This research indicated that when used in a program approach, each of these new technologies can provide excellent season-long control of Palmer amaranth, red sprangletop, and tumble pigweed.

Figure 1. Postemergence Palmer amaranth control late season in XtendFlex cotton. LSD (10%) = 16

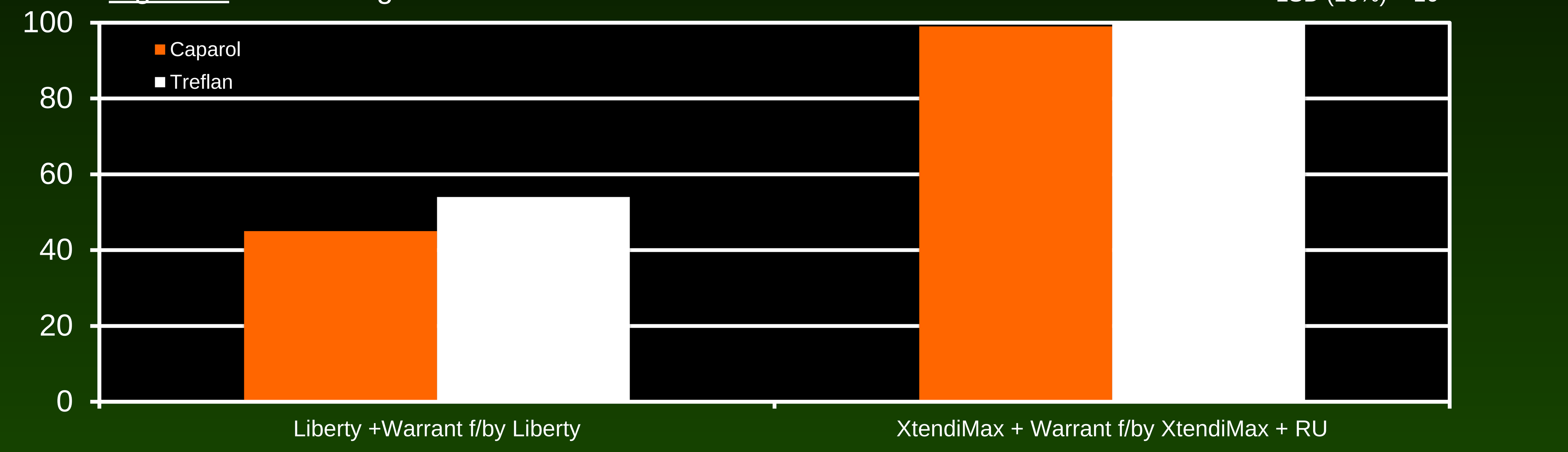



Figure 2. Postemergence red sprangletop control late season in XtendFlex cotton. LSD (10%) = 17

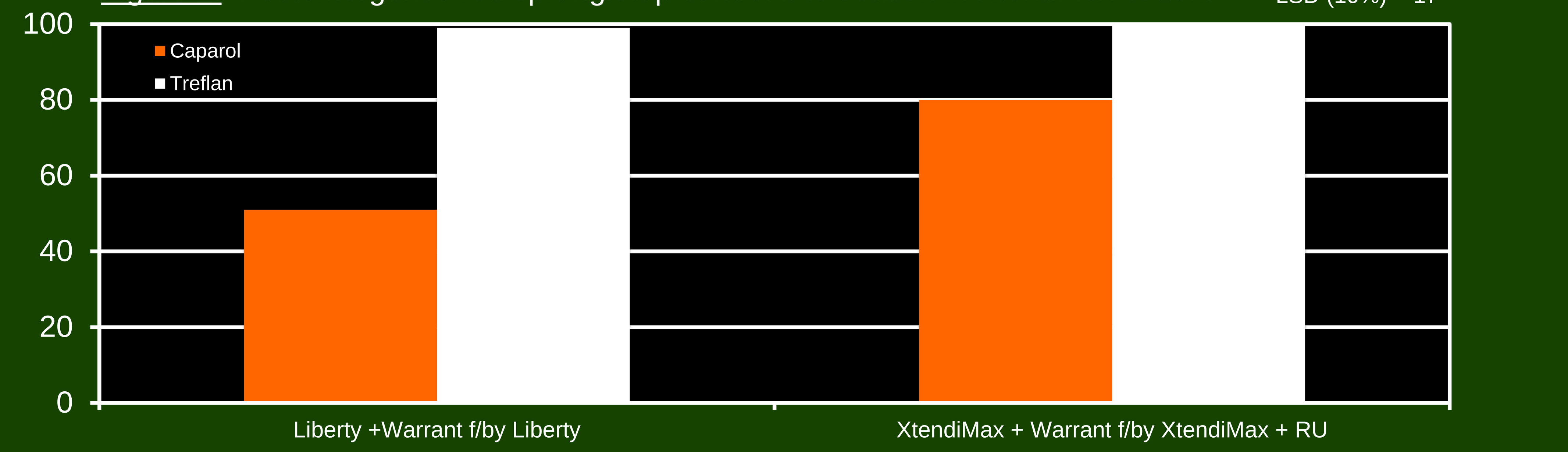
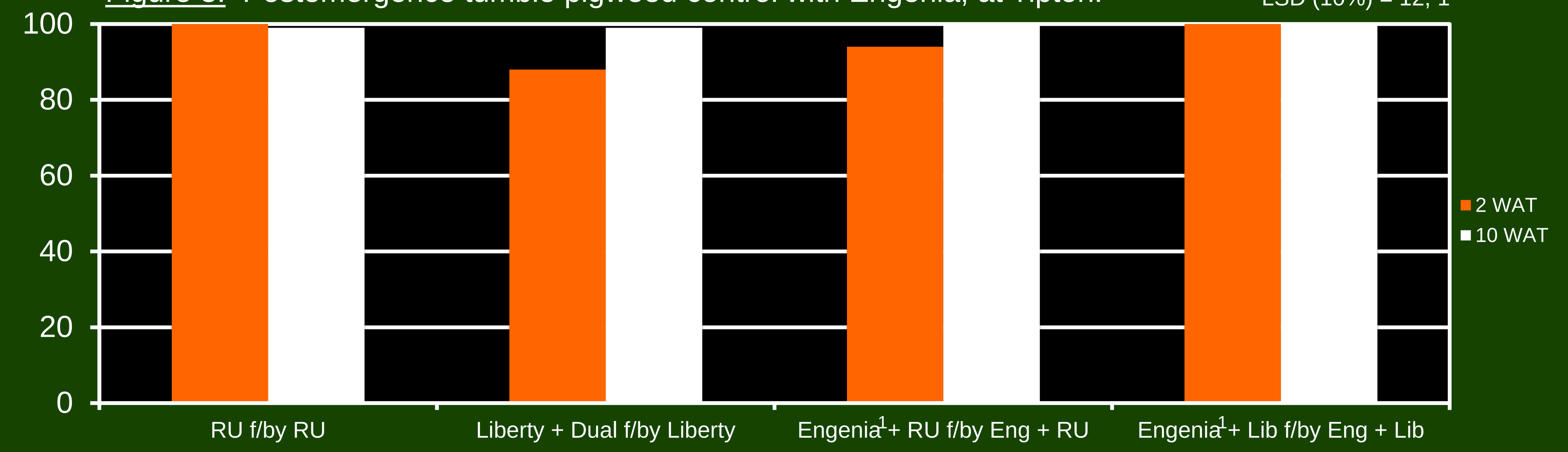



Figure 3. Postemergence tumble pigweed control with Engenia, at Tipton. LSD (10%) = 12, 1




[1]Engenia early POST was applied with Outlook at 12 fl oz/A.

Figure 4. Postemergence Palmer amaranth control in Enlist cotton. LSD (10%) = 10, 6

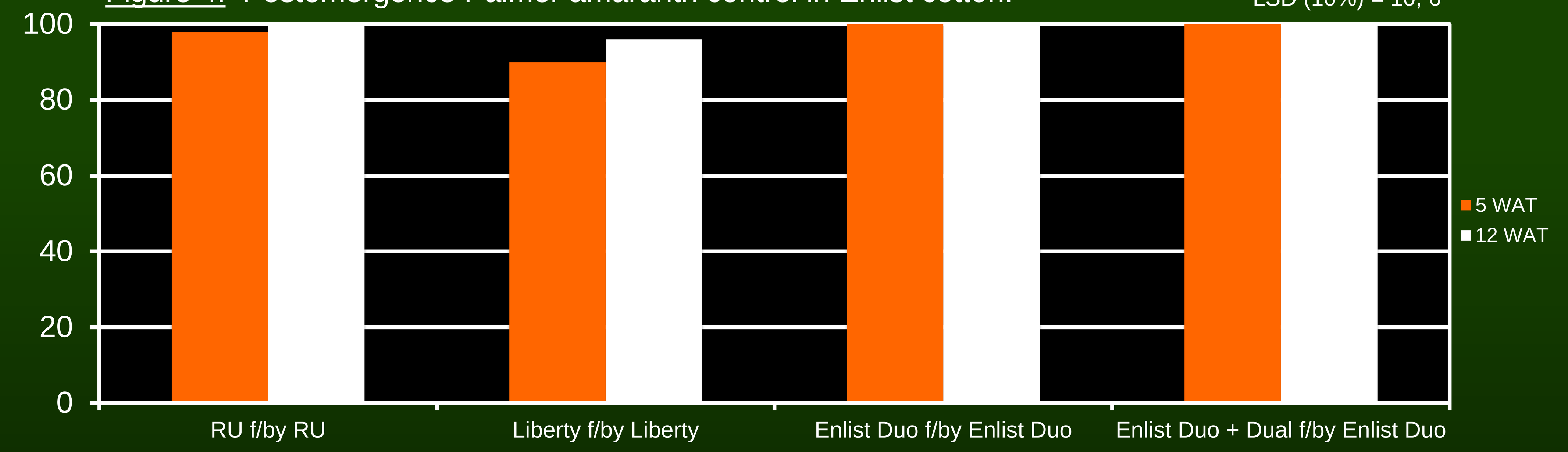
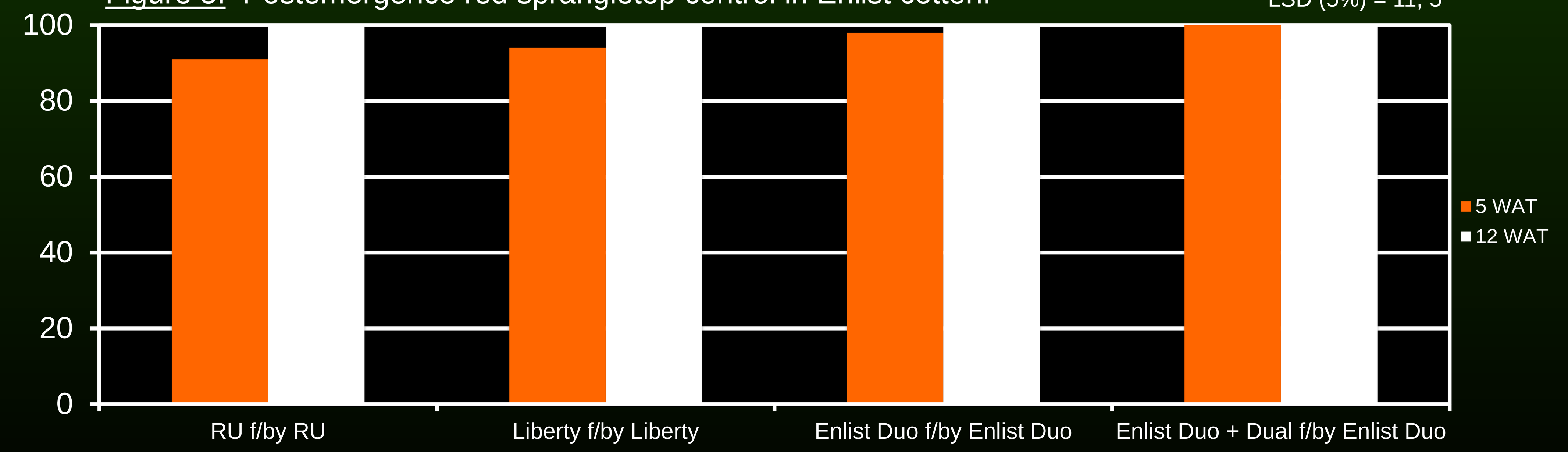



Figure 5. Postemergence red sprangletop control in Enlist cotton. LSD (5%) = 11, 5



# A BELTWIDE EVALUATION OF POTASSIUM RATE AND APPLICATION METHOD ON COTTON YIELD AND QUALITY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**Bill Robertson**
**University of Arkansas**

**Bob Nichols**
**Cotton Incorporated**


## Abstract


Higher yield potential paired with a more condensed fruiting window puts significant demand on potassium uptake throughout the reproductive cycle. This compressed and substantial demand on the cotton root system to take-up sufficient potassium (K) and other nutrients can be problematic, even when soil test K levels indicate sufficient K levels. The objectives of the trials are: 1. Determine the soil potassium levels in the surface horizon and at depth in several cotton production regions experience K deficiency symptoms; 2. Evaluation the application methods and rates of K on cotton yield, quality, and return on investment. Trials were conducted at 8 locations across the Cotton Belt, from the Southwest to the East Coast. Soil samples were collected to a minimum of a two feet depth at each site. Potassium was applied via broadcast incorporated (0-0-60) or injected (0-0-15) at six inches depth at rates of 0, 40, 80, 120, and 160 lb K2O/a. DP 1522 B2XF was planted at each location. Leaf samples were collected at FB+2 weeks and analyzed for K levels. Late-season plant ratings and disease incidence data were collected. Plots were harvested, ginned, and fiber sample analyses conducted at Cotton Incorporated. Despite the majority of the 2016 sites being at or near the current soil K threshold, few sites were responsive to K application rates or method. The locations with the highest moisture stress, (South Texas and Virginia) did show a significant response to the K application rate. In the High Plains location, a significant yield response was obtained at the highest K application rates. Other plant ratings and fiber quality have not be analyzed, but will be presented in future years.



## Acknowledgements

The authors would like to extend our appreciation to Cotton Incorporated, International Plant Nutrition Institute, and Fluid Fertilizer Foundation for supporting this research project.

# 2016 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 2016, the conference rotated to Altus, OK and was held on January 20th and 21st at the Southwest Technology Center. The conference was once again planned and executed as a joint effort of Extension personnel with both institutions.

The first day was considered an in-season and summer crops while the second day covered cotton specifically. Total conference participants noted by meal counts on Day One of the program totaled 154. Day Two meals served were to 145 participants. Thus, total participation over the two days was counted at 299 attendees indicating strong support and outstanding attendance of the conference. A total of 26 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.

Day 1 (In-Season and Other Summer Crops) Results
1. How would you rate the quality of speakers? 4.50 (Frequency: 1=0 observations; 2=0; 3=1, 4=30; 5=33)
2. How would you rate the facilities? 4.72 (Frequency: 1=0 observations; 2=0; 3=1, 4=16; 5=47)
3. How would you rate the overall conference? 4.45 (Frequency: 1=0 observations; 2=0; 3=4, 4=27; 5=33)

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=3; 2=3; 3=28; 4=22; and 5=5. Based on these results, 44 percent expected to, at least minimally, change their production and/or marketing plan based on the information they received at the conference.

Day 2 (Cotton Day) Results
1. How would you rate the quality of speakers? 4.56 (Frequency: 1=0 observations; 2=0; 3=0, 4=26; 5=33)
2. How would you rate the facilities? 4.61 (Frequency: 1=0 observations; 2=0; 3=1, 4=21; 5=37)
3. How would you rate the overall conference? 4.54 (Frequency: 1=0 observations; 2=0; 3=1, 4=25; 5=33)

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=1; 2=1; 3=19; 4=20; and 5=14. Based on these results, 62 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 2016 Red River Crops Conference was estimated to be $5,342 per respondent.

**Extending the Red River Crops Conference Information Via Agricultural Media**

Much of the information provided by the speakers was extended by news articles. While other media reporters were probably present, some prominent agricultural reporters spent the two days listening, recording, and reporting information. These included Ron Smith with the Southwest Farm Press (SWFP) and Jennifer Latzke with the High Plains Journal. Within hours, news articles began showing up on their internet sites.

At least 10 SWFP 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.

**Summary**

The 2016 Red River Crops Conference proved to be an outstanding program. Participants were particularly complementary based on their evaluations. Additionally, the program provided information such that 44 and 62 percent of the evaluation respondents intended to make a change to their current production and/or marketing plans that should equal to an estimated $5,342.

Finally, it isn't rare that one states' Extension Service utilizes another state' Extension Service faculty for speaking engagements. What is rare is faculty from two separate Extension Services' coming together to plan, design, implement and evaluate an entire program. The Red River Crops Conference has now completed its third year. Competition between the two state locations is never mentioned among any one on the planning committee. As one verbal comment said, "Thank you guys for providing a great conference for us, we need this." And, from one of our many sponsors, "It is our pleasure to support a conference of this caliber; this is great for our producers and us." This conference has now created a reputation for being the leading conference in the Texas Rolling Plains and southwest Oklahoma. As one participant put it on his evaluation, "One of the best conferences I attend every year."

## IN SEASON & SUMMER CROPS DAY AGENDA — January 20

| | |
|---|---|
| 8:00 - 8:45 am | *Registration* |
| 8:45 - 9:00 am | *Welcome*<br>Mr. Gary Strickland<br>Jackson and Greer County Agriculture Extension Educator<br>SWREC-Dryland Cropping Systems Specialist<br>Oklahoma Cooperative Extension Service, Altus, OK |
| 9:00 - 9:50 am | *Effective Crop Rotation and Use of Cover Crops*<br>Dr. Paul DeLaune<br>Associate Professor, Environmental Soil Science<br>Texas A&M AgriLife Research, Vernon, TX |
| 9:50 - 10:50 am | *Grain and Forage Sorghum Production*<br>Dr. Jourdan Bell<br>Assistant Professor and Extension Agronomist<br>Texas A&M AgriLife Extension Service, Amarillo, TX<br>Mr. Gary Strickland<br>Jackson and Greer County Agriculture Extension Educator<br>SWREC-Dryland Cropping Systems Specialist<br>Oklahoma Cooperative Extension Service, Altus, OK |
| 10:50 - 11:10 am | *Break* |
| 11:10 - 12:00 am | *Economics of Transitioning from Crop Production Systems to Forage and Livestock Production Systems*<br>Mr. Stan Bevers<br>Professor and Extension Economist - Management<br>Texas A&M AgriLife Extension, Vernon, TX |
| 12:00 - 1:00 pm | *Lunch* |
| 1:00 - 1:50 pm | *Livestock and Crop Commodity Market Discussion*<br>Dr. Derrell Peel<br>Professor and Extension Livestock Economist<br>Oklahoma Cooperative Extension Service, Stillwater, OK<br>Dr. Kim Anderson<br>Professor and Extension Grain Marketing Economist<br>Oklahoma Cooperative Extension Service, Stillwater, OK |
| 1:50 - 2:40 pm | *Best Management Practices for Peanut Production*<br>Dr. Jason Woodward<br>Associate Professor and Extension Plant Pathologist<br>Texas A&M AgriLife Extension Service, Lubbock, TX |
| 2:40 - 3:00 pm | *Break* |
| 3:00 - 3:50 pm | *Southern Great Plains Wheat Breeding Update*<br>Dr. Jackie Rudd<br>Regents Fellow, Professor<br>Texas AgriLife Research, Amarillo, TX |
| 3:50 - 4:00 pm | *Wrap-Up, Evaluation, & Compressor Giveaway* |

## COTTON DAY AGENDA — January 21

| | |
|---|---|
| 8:00 - 8:30 am | *Registration* |
| 8:30 - 8:45 am | *Welcome*<br>Mr. Steven Sparkman<br>Hardeman County Agricultrural Extension Agent - Agriculture and Natural Resources<br>Texas A&M AgriLife Extension Service, Quanah, TX |
| 8:45 - 9:30 am | *Risk Management Issues in the Cotton Industry*<br>Dr. Jody Campiche<br>Director, Economics and Policy Analysis<br>National Cotton Council, Memphis, TN |
| 9:30 - 10:00 am | *Cotton Market Update and Outlook*<br>Dr. John Robinson<br>Professor and Extension Economist - Cotton Marketing<br>Texas A&M AgriLife Extension Service, College Station, TX |
| 10:00 - 10:20 am | *Break* |
| 10:20 - 11:10 am | *Cotton Herbicide Management Update*<br>Mr. Shane Osborne<br>Associate Extension Specialist<br>OSU Southwest Research and Extension Center, Altus, OK |
| 11:10 - 12:00 pm | *XTendFlex and Enlist Cotton Technology Update*<br>Moderator: Dr. Gaylon Morgan<br>Dr. Ty Witten<br>Cotton, Soybean, Specialty Crop and Seed Treatment Systems Lead<br>Monsanto, St. Louis, MO<br>Dr. Jonathan Siebert<br>Enlist Field Specialist Leader<br>Dow AgroSciences LLC, Leland, MS |
| 12:00 - 1:00 pm | *Lunch* |
| 1:00 - 1:50 pm | *Salinity Management in Irrigated Systems*<br>Dr. Randy Norton<br>Regional Extension Specialist / Resident Director<br>The University of Arizona - Safford Ag Center, Safford, AZ |
| 1:50 - 2:40 pm | *Cotton Genetics Performance Update*<br>Dr. Gaylon Morgan<br>Professor and Extension Agronomist - Cotton<br>Texas A&M Extension Service, College Station, TX<br>Dr. Randy Boman<br>Research Director & Cotton Extension Program Leader<br>OSU Southwest Research and Extension Center, Altus, OK |
| 2:40 - 3:00 pm | *Break* |
| 3:00 - 3:50 pm | *Innovative Cotton Production Systems Panel Discussion*<br>Moderator: Dr. Randy Boman<br>Tony Cox, Loco, TX<br>Danny Davis, Elk City, OK<br>Roger Fischer, Frederick, OK |
| 3:50 - 4:00 pm | *Wrap-Up Evaluation, & Compressor Giveaway* |

**EXTENSION CONFERENCE PLANNING COMMITTEE**

Stan Bevers, TX; Randy Boman, OK; Michael Bowman, TX; Aaron Henson, OK; Emi Kimura, TX; Charity Penington, OK; Zeb Petty, TX; Tim Rabalais, OK; Langdon Reagan, TX; Steven Sparkman, TX; Gary Strickland, OK; Katy White, TX

## REGISTRATION

Red River CROPS CONFERENCE

My check for $ ________ is enclosed

$25 per person conference fee

Pre-registration is encouraged

Name ____________________

Address ____________________

City ____________________

State/Zip ____________________

Phone ____________________

Email ____________________

*My guests include:*

Name ____________________

Name ____________________

**Make checks payable to the Red River Crops Conference**
**Mail to 2801 N. Main, Suite A**
**Altus, OK 73521**
**Phone: 580-482-0823**

Host Hotel: Hampton Inn
3601 N. Main (580) 482-1273
Scan this QR code for more info

Texas A&M AgriLife Extension — Oklahoma State Extension

*Contact your local county Extension office for more information!*

**A Honda Air Compressor will be given away each day!**

To register for the 2016 Red River Crops Conference complete the form on the reverse side. For more conference information contact your local county extension office.

January 20&21, 2016

Host Hotel: Hampton Inn
3601 N. Main (580) 482-1273
Scan this QR code for more info

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.

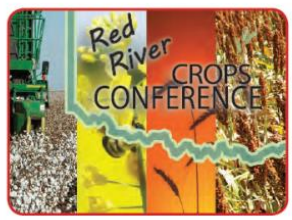
The area spans across the state lines of Oklahoma and Texas. Given this, Texas A&M AgriLife Extension and Oklahoma Cooperative Extension have joined together to help address these special agricultural production circumstances.

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: 11.5 Certified Crop Advisors**
**6 Texas Department of Agriculture**
**4 Oklahoma Department of Agriculture, Food, and Forestry**

Pre-registration is encouraged for meal count.






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

Red River CROPS CONFERENCE

January 20&21, 2016

**Southwest Technology Center**
**711 W. Tamarack**
**ALTUS, OKLAHOMA**

Texas A&M AgriLife Extension — Oklahoma State Extension

# 2016 Oklahoma Irrigation Conference

Planning for the third annual Oklahoma Irrigation Conference began in late 2015. 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; Dana Bay, Woodward County 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 Woodward County Event Center & Fairgrounds in Woodward, OK in March. The conference was well attended with 118 total participants, and a total of 23 sponsors from various industry groups. Surveys were distributed and a total of 31 respondents returned them. The results are below.

# AGENDA

## March 8, 2016

9:45 am
Welcome ........................................ *David Nowlin*
Morning Moderator - David Nowlin

10:00 am
Irrigation Water Quality Assessment ............ *Hailin Zhang*

10:30 am
Northwest Water Action Plan ............. *Brent Kisling*

11:00 am
Break

11:15 am
Row Placement Considerations for Subsurface Drip Irrigation ............. *Jason Warren*

11:45 am
Maximizing Long-Term Value of Groundwater.... *Art Stoecker*

12:15 pm
Lunch

Afternoon Moderator - Dana Bay

1:30 pm
Frequently and Not-SoFrequently Asked Questions about SDI ..................... *Freddie Lamm*

2:00 pm
The Challenges of Increased Irrigation Production in the Future ................... *Tomas Marek*

2:30 pm
Plant Water Use and Evapotranspiration........ *Al Sutherland*

3:00 pm
Break

3:30 pm
Energy and Water Efficiency of Center-Pivot Systems ................... *Scott Frazier*

4:00 pm
Sensors for Irrigation Management: Help or Headache? .................... *Saleh Taghvaeian*

4:30 pm
Adjourn

# Oklahoma IRRIGATION CONFERENCE

# FEATURING

### 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.

### Brent Kisling

**Executive Director of Enid Regional Development Alliance**
**Chairman of Northwest Oklahoma Water Action Team**

Brent has a Bachelor's Degree in Agribusiness from OSU. He has worked as a District Field Representative for U.S. Senator Jim Inhofe and later as the Senator's Field Director for the entire state. In March of 2001, Brent was appointed by the George W. Bush Administration to be the State Director for USDA Rural Development in Oklahoma. In March of 2009, Brent was named as the Executive Director of the Enid Regional Development Alliance. The mission of the Alliance is to ensure quality job growth through the expansion and retention of existing businesses and the recruitment of new industry to Enid and Garfield County.

### Freddie Lamm

**Professor, Research Irrigation Engineer, Kansas State**
**Northwest Research-Extension Center at Colby**

Freddie specializes in water management for grain and oilseed crops and in the design and management of pressurized irrigation systems. As a result of his devotion to development and adaptation of subsurface drip irrigation for use in the U.S. Great Plains, Freddie has received numerous prestigious awards, such as the Irrigation Association Person of the Year in 2012 and the 2014 Netafim Award for Advancements in Microirrigation.

### Thomas Marek

**Senior Irrigation Engineer, Texas A&M AgriLife**
**Texas A&M System Regents Fellow**

Thomas has focused his research efforts on Irrigated Cropping Systems, Regional Water Planning, Variable Rate Irrigation Technology, and evapotranspiration models.

### Art Stoecker

**Associate Professor, Agricultual Economics**
**Oklahoma State University**

Art has over 40 years of national and international experience in Resource and Environmental Economic modeling and policy. Current research involves crop and irrigation system choices that allow producers make the most profitable long-term use of groundwater from the Ogallala. Recent research has compared the economic use of swine effluent with pivot and drip irrigation systems. Other current research involves the least cost choice and location of best management practices in watersheds to reduce sediment loading from watersheds. Art received a Ph.D. from Iowa State University in Agricultural Economics. He currently teaches courses in the Applications of Advanced Mathematical Programming and Benefit-Cost Analysis.

### 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.

### Jason Warren

**Associate Professor, Soil and Water Conservation/**
**Management Extension Specialist, OSU**

Jason is an associate professor, and soil and water conservation/management Extension specialist. He earned a B.S. degree in Environmental Sciences in 1999 and M.S. in Plant and Soil Sciences in 2001 at Oklahoma State University. Jason continued his education at Virginia Tech, where he obtained a Ph.D. in Crop and Soil Environmental Sciences in 2005. His research and Extension efforts will focus on management practices to reduce soil erosion and improve soil quality in both the agricultural and urban landscapes.

### Hailin Zhang

**Regents Professor, Soil Fertility/Chemistry**
**Director of Soil, Water and Forage Analytical Lab, OSU**

Hailin earned his B.S. degree from Nanjing Agricultural University, China, M.S. degree from Iowa State University, and Ph.D. degree from the University of Minnesota. He worked for the Navajo Agricultural Products Industry in Farmington, New Mexico for 6 years before joining OSU in 1996. Hailin's Extension and research programs focus mainly on plant nutrient management and environmental quality protection. He has been actively promoting soil testing as a best management practice for fertilizer and animal waste utilization, and developing decision support tools for farmers and crop consultants.

# REGISTRATION

Name ____________________ Organization ____________________

Mailing Address ____________________ Phone Number ____________________

City/State/Zip ____________________

Print Name(s) for Name Tag(s) ____________________

Amt. Enclosed $________ ☐ **Will Pay at Door**

Please make check / money order payable to:
*Woodward County OSU Extension*
*105 Temple Houston Dr, Woodward, OK 73801 • (580) 254-3391*

Online registration available at:
*oces.okstate.edu/woodward/oklahoma-irrigation-conference*

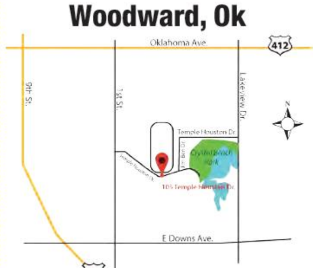
Oklahoma IRRIGATION CONFERENCE

*March 8, 2016*
Woodward, OK

**$15 REGISTRATION PER PERSON**

Please respond by March 1, 2016.

## Woodward, Ok




Woodward County Event Center and Fairgrounds
105A Temple Houston Drive
Woodward, Oklahoma, 73801

For more information contact:
Woodward County Extension
580.254.3391
For online registration visit:
*oces.okstate.edu/woodward/oklahoma-irrigation-conference*

**Oklahoma Irrigation Conference Committee**

*David Nowlin* *Saleh Taghvaeian* *Randy Boman* *Dana Bay*

**Approved CEUs being offered:**

**Irrigation Association - 4.5 Tier 1 CEUs**

**Certified Crop Advisor - 4.5 CEUs in "Soil and Water Management"**

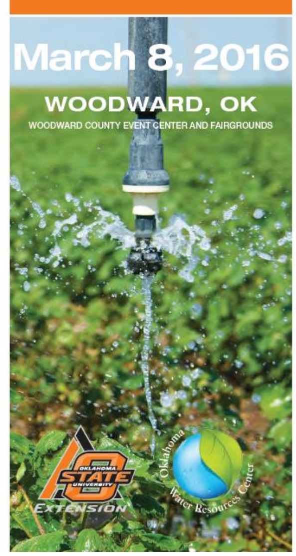
The 2016 Oklahoma Irrigation Conference brought to you by:

*Oklahoma Cooperative Extension Service*
*Oklahoma Water Resources Center*
*Enid Regional Development Alliance*
*Northwest Oklahoma Agriculture and Irrigation Association*
*Oklahoma Panhandle Agriculture and Irrigation Association*



Issued in furtherance of Cooperative Extension work, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, Director of Oklahoma Cooperative Extension Service, Oklahoma State University, Stillwater, Oklahoma. This publication is printed and issued by Oklahoma State University as authorized by the Vice President, Dean, and Director of the Division of Agricultural Sciences and Natural Resources and has been prepared and distributed at a cost of 17.5 cents per copy.

# Oklahoma IRRIGATION CONFERENCE



**SURVEY RESULTS**
**Oklahoma Irrigation Conference**
**March 8, 2016**
**Woodward County Event Center & Fairgrounds**
**Woodward, Oklahoma**

| | |
|---|---|
| **Total participants** | **118** |
| **Total surveys returned** | **31** |
| **Was information helpful and timely** | **21 yes** |

**COMMENTS**

- A great conference (4)
- Interesting topics and issues
- Meal good and good presentations
- Energy and Water Efficiency of Center Pivot Systems helpful
- Very good topics on everything irrigation
- There were no huge time set-backs. I learned a lot of information that will help me do my job better and more efficiently
- Most of it was helpful, but at the same time it could have focused more on how to allow farmers to use irrigation to increase their yield crops
- Irrigation sensors was good
- Only change would be to get into more detail about irrigation systems and new technologies
- Very relevant in light of the drought and political issues
- The information was presented in an understandable manner. The presenters were very knowledgeable and willing to answer all questions
- A nice mix of current practice results with new opportunities in the future
- Meal and facility was great (2)
- Good exhibits and sound system was good
- You have a good system, looking forward to next year
- Facilities are excellent
- Might need more black curtains around screen. Can you make a dark corner?
- Advise speakers to use light colors in powerpoint
- Time and relevant. Display hard to see, due to ambient lighting/small size of screen
- Video Conference and make available on DVD (at small cost) for those who could not attend
- I find it a shame that such a good conference is not attended by more growers

## TOPICS/PRESENTATIONS FOUND MOST USEFUL

| | |
|---|---|
| Plant Water Use and Evapotranspiration – **Al Sutherland** | **8** |
| The Challenges of Increased Irrigation Production in the Future – **Tomas Marek** | **7** |
| Row Placement Considerations for Subsurface Drip Irrigation – **Jason Warren** | **6** |
| Using Sensor-Based Technologies to Improve Irrigation Management **– Saleh Taghvaeian** | **6** |
| Irrigation Water Quality Assessment – **Hailin Zhang** | **5** |
| Frequently and Not So Frequently Asked Questions About SDI **– Freddie Lamm** | **3** |
| Energy and Water Efficiency of Center- Pivot Systems – **Scott Frazier** | **3** |
| Northwest Water Action Plan – **Brent Kisling** | **2** |
| Maximizing Long-Term Value of Groundwater – **Art Stoecker** | **0** |

## OTHER TOPICS THAT SHOULD BE INCLUDED IN THE FUTURE

- More on water quality
- Any ideas or uses for injection water (salt) from oil wells
- Comparison of pivot vs. SDS, as well as energy uses – electricity vs. gas. These topics were discussed, but could go into more detail
- Alfalfa information on water usage
- Nozzle selection
- Water law – surface vs. groundwater
- I know this is geared more for ag., but commercial and residential irrigation would be helpful
- More about types of sensors – pros and cons
- The pros and cons of different systems – flood, pivot, SDI and dryland
- More about the new irrigation technologies that are out there
- Talks more specific to growing crops
- When and how to water in order to increase crop yields
- More agronomic related topics
- Chemigation
- Sports/Turf irrigation management
- Allow the vendors to talk about and describe their new products and technology
- Wastewater utilization for irrigation
- Door Prizes
- El Nino, La Nina – variability of rainfall

## WHAT CAN WE DO TO IMPROVE?

- Could possibly use more lapel mic better
- Projector needs to be brighter
- Breaks too long (2)
- Better lighting on screen displays
- More information on irrigating with a limited supply of water
- Nothing to improve…more people should attend
- Move conference to Guymon/Goodwell area where majority of the state’s irrigation is located (8)
- Table closer to projection screen

- Increase volume on microphone
- All presentations should be a standard color scheme, so they are easier to see
- Bigger projection screen
- Too much information on many slides, based on room size and projection system
- May be useful to send some specifications to presenters
- More about residential irrigation
- Would like more in-depth information on Mesonet site

**RANKING AS TO HOW EACH TOPIC WAS BENEFICIAL TO YOU**

**Very useful……………………………….Not Useful**

| TOPIC | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Irrigation Water Quality Assessment | 9 | 15 | 3 | 3 | |
| Northwest Water Action Plan | 2 | 11 | 8 | 7 | 2 |
| Row Placement Considerations for Subsurface Drip Irrigation | 1 | 16 | 6 | 2 | 1 |
| Maximizing Long-Term Value of Groundwater | | 9 | 11 | 8 | |
| Lunch | 23 | 2 | 1 | 1 | |
| Frequently and Not-So-Frequently Asked Questions about SDI | 4 | 12 | 10 | 3 | |
| The Challenges of Increased Irrigation Production in the Future | 10 | 11 | 3 | 5 | |
| Plant Water Use and Evapotranspiration | 12 | 11 | 2 | 1 | |
| Energy and Water Efficiency of Center Pivot Systems | 5 | 14 | 5 | 2 | 2 |
| Sensors for Irrigation Management: Help or Headache | 11 | 12 | 3 | 1 | |

# Peer Reviewed Journal Articles and American Phytopathological Society Compendium Chapter

Peer Reviewed Journal Article Published:

Woodward, J.E., D.M. Dodds, C.L. Main, L.T. Barber, R.K. Boman, J.R. Whitaker, K.L. Edmisten, J.C. Banks, N.W. Buehring, and T.W. Allen. 2016. Evaluation of strobilurin fungicides in cotton across the Southern United States. J. Cotton Sci. 20:116–124.

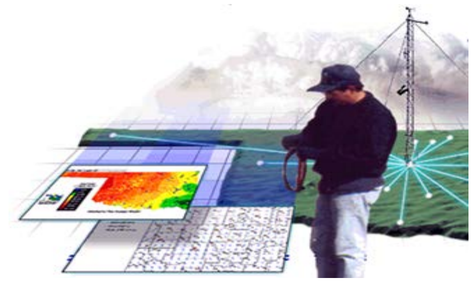
Peer Reviewed Journal Article in Review:

Porter, W.M., J.D. Wanjura, R.K. Taylor, R.K. Boman and M. D. Buser. 2016. Tracking cotton fiber quality and foreign matter throughout a stripper harvester. J. Cotton Sci. 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

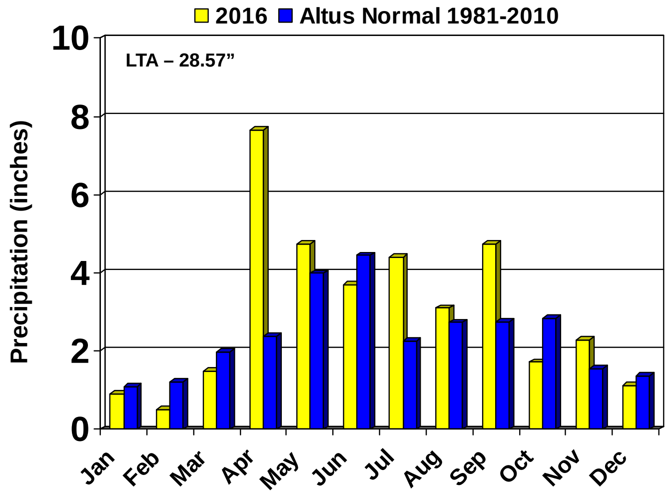


**About the Mesonet** The Oklahoma Mesonet is a world-class network of environmental monitoring stations. The network was designed and implemented by scientists at the University of Oklahoma (OU) and at Oklahoma State University (OSU). The Oklahoma Mesonet consists of 120 automated stations covering 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 2016 Rainfall




Altus Normal From January 1 – April 30 6.66”

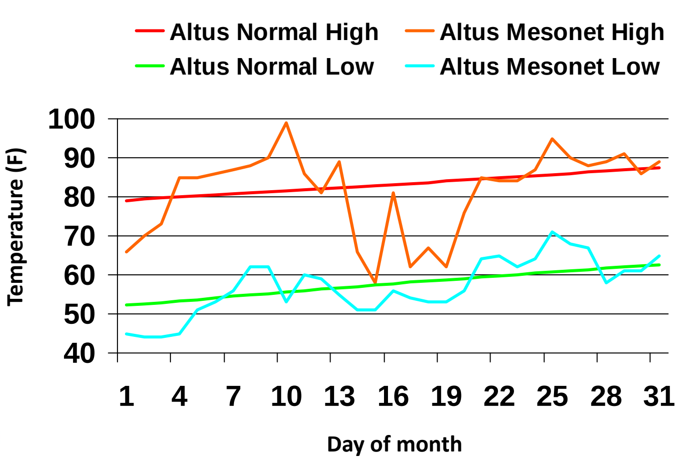
Altus Actual From January 1 – April 30 10.55” 58% above normal

Altus Normal From April 1 – June 30 10.82”

Altus Actual From April 1 – June 30 16.09” 49% above normal

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

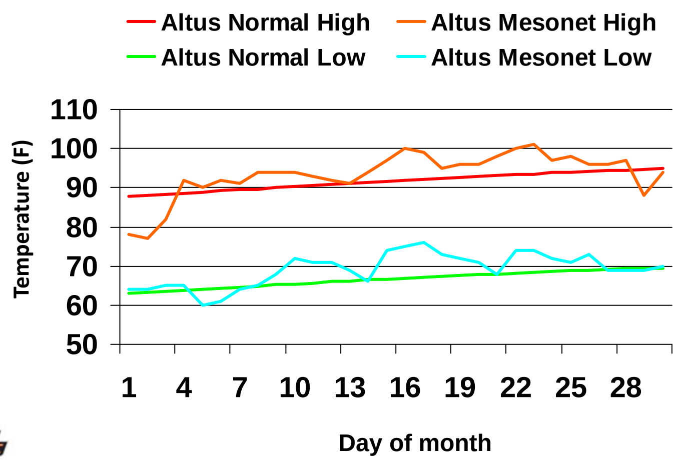
# Altus Normal (1981-2010) and Mesonet Air Temperatures May 2016




Heat Units

Normal: 314
2016: 274
% of normal: -15

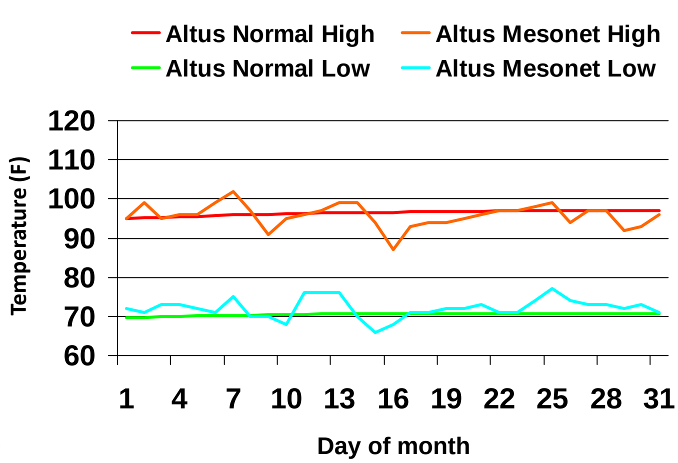
# Altus
# Normal (1981-2010) and Mesonet Air Temperatures June 2016




Heat Units

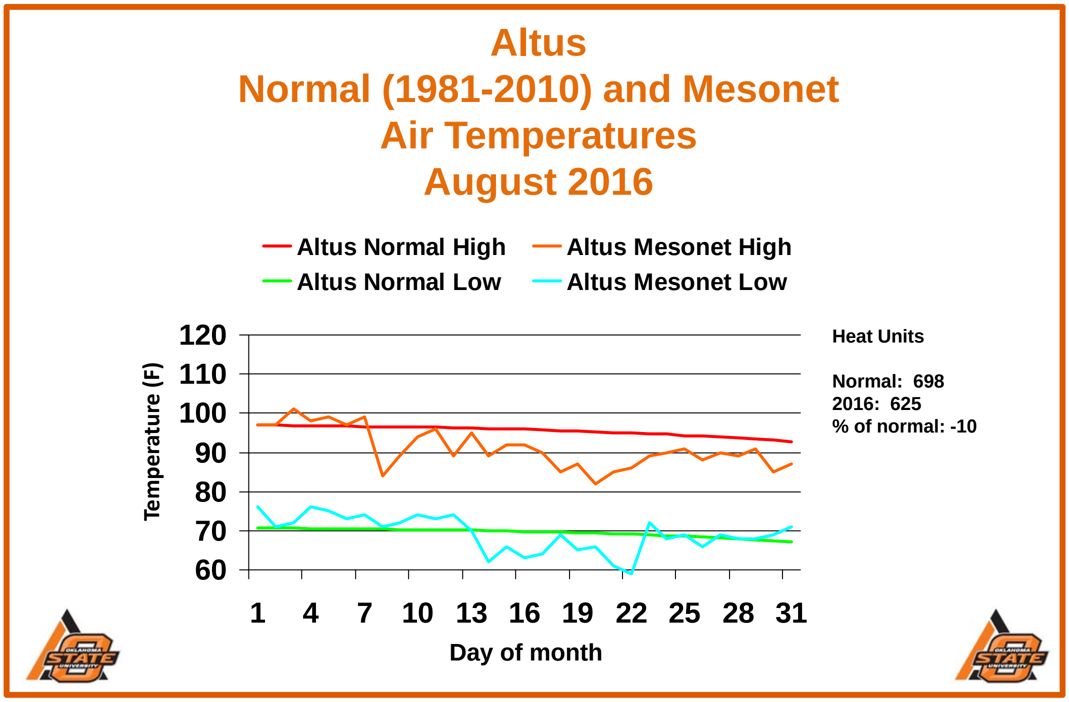
Normal: 573
2016: 639
% of normal: +11

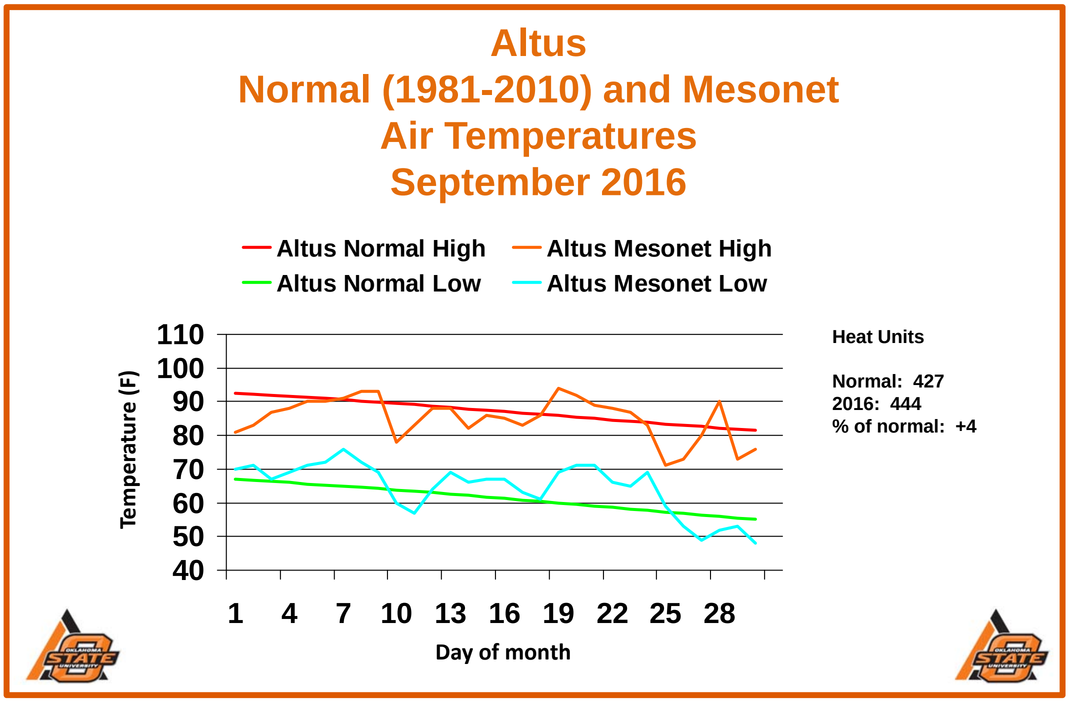
# Altus
# Normal (1981-2010) and Mesonet Air Temperatures July 2016

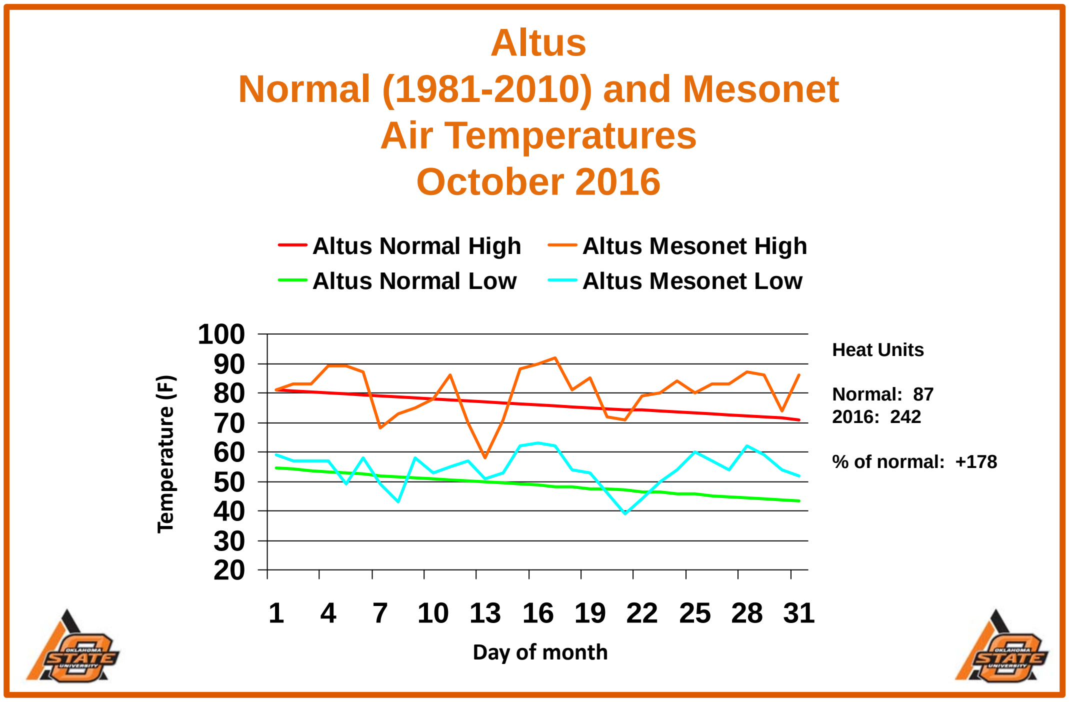


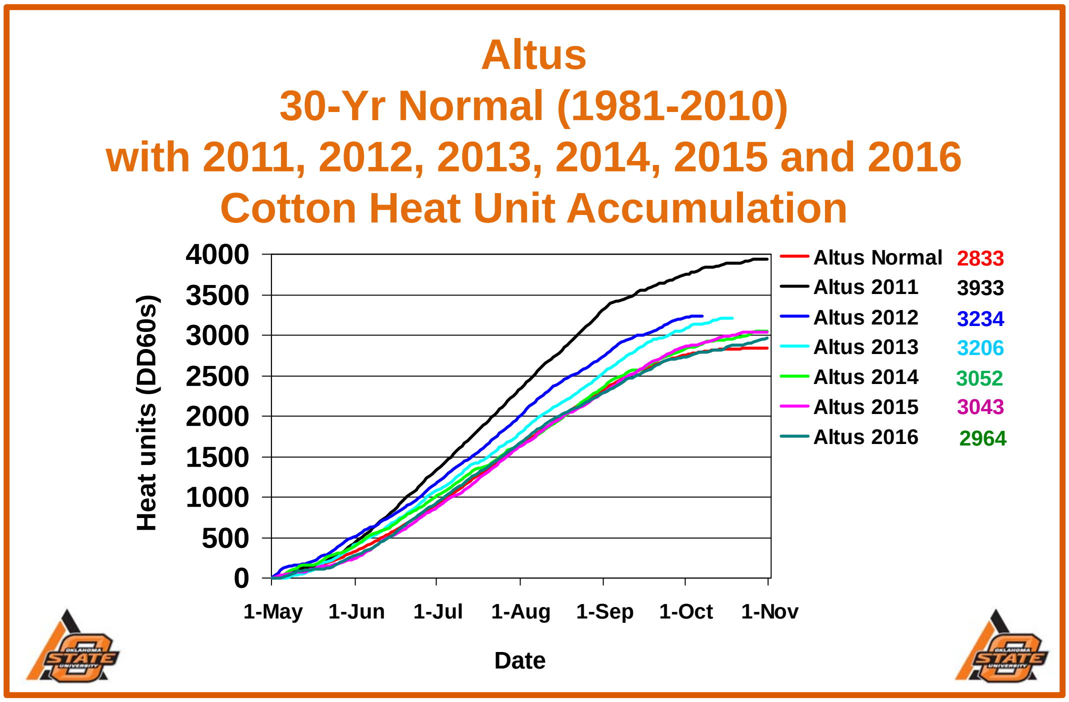

Heat Units

Normal: 727
2016: 742
% of normal: +2


Altus
Normal (1981-2010) and Mesonet
Air Temperatures
August 2016
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: 698
2016: 625
% of normal: -10


Altus
Normal (1981-2010) and Mesonet
Air Temperatures
September 2016
Altus Normal High
Altus Mesonet High
Altus Normal Low
Altus Mesonet Low
Temperature (F)
110
100
90
80
70
60
50
40
1
4
7
10
13
16
19
22
25
28
Day of month
Heat Units
Normal: 427
2016: 444
% of normal: +4


Altus
Normal (1981-2010) and Mesonet
Air Temperatures
October 2016
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
2016: 242
% of normal: +178


Altus
30-Yr Normal (1981-2010)
with 2011, 2012, 2013, 2014, 2015 and 2016
Cotton Heat Unit Accumulation
Heat units (DD60s)
4000
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 2011 3933
Altus 2012 3234
Altus 2013 3206
Altus 2014 3052
Altus 2015 3043
Altus 2016 2964

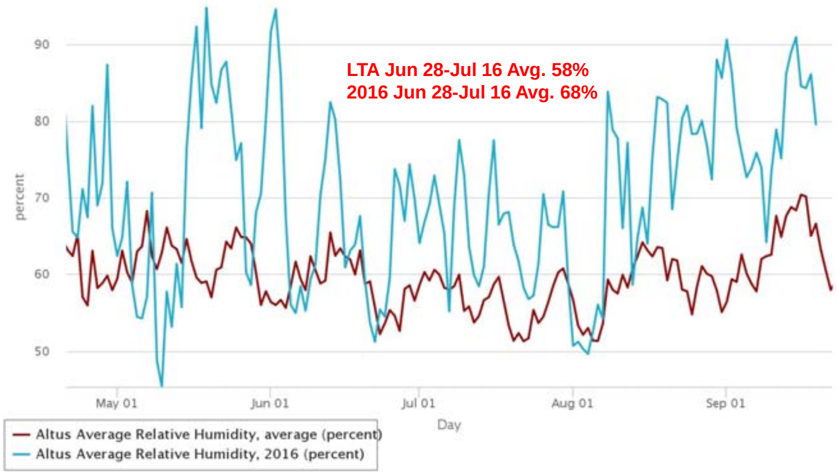
# Bacterial Blight

# 2016 - A Favorable Environment for the Pathogen

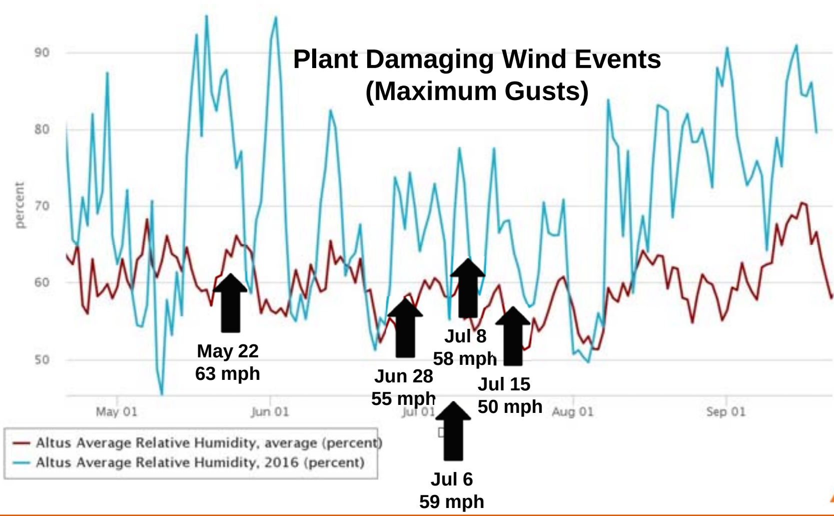
## Compendium of Cotton Diseases 2nd Edition Bacterial Blight (p. 35)

- **Bacterium (*Xanthomonas campestris* pv. *malvacearum* (Smith) Dye) and contaminated debris are disseminated by wind, water, insects or field equipment.**
- **Pathogen enters the host through open stomata or wounds**
- **Disease is potentially very destructive where wind-driven rain and sprinkler irrigation favor dissemination of pathogen**
- **Relative humidity above 85% and temperatures of 86-97$^{o}$F enhance infection and disease development**

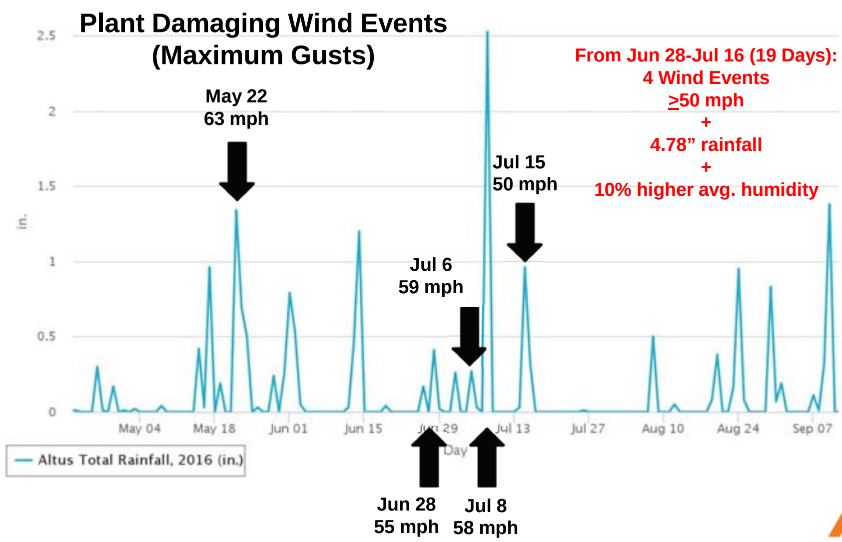
## Altus Mesonet
## Average Relative Humidity
## 2001-2015 LTA vs. 2016



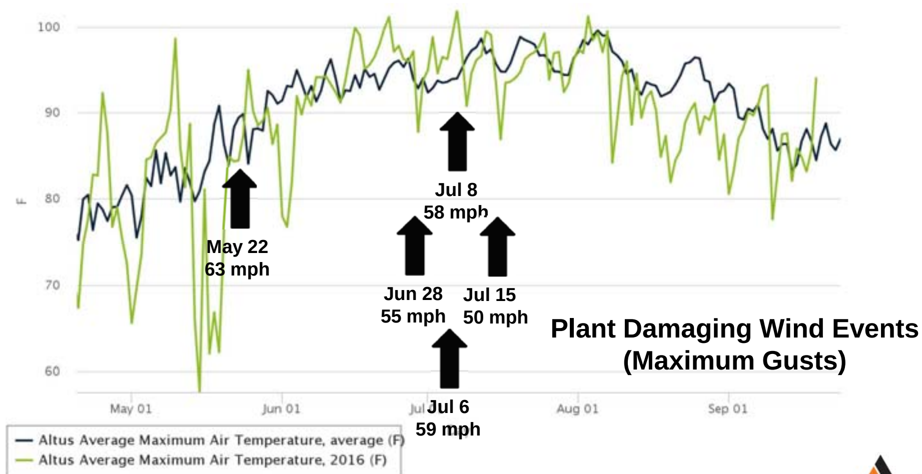

## Altus Mesonet
## Average Relative Humidity
## 2001-2015 LTA vs. 2016



# Altus Mesonet
# 2016 Rainfall




# Altus Mesonet
# High Temperatures 2001-2015 LTA vs. 2016



# Bacterial Blight

Dr. Randy Boman
Oklahoma Cooperative
Extension Service

- Initial symptoms include small dark green 'water-soaked' spots with a circular or irregular shape – "angular leaf spot"
- Lesions are generally first visible on the underside of leaves
  – Become present on the upper leaf surface

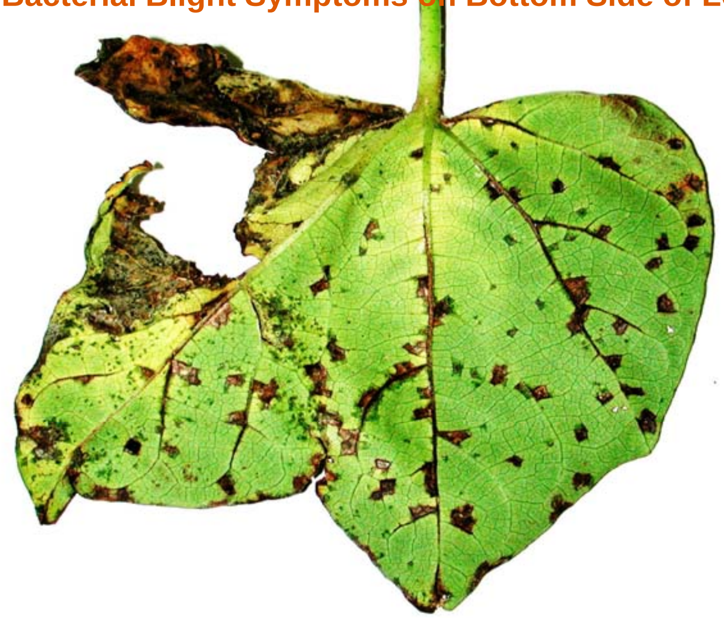
# Bacterial Blight

- A second leaf symptom consists of lesions that extend along the main vein
- Individual lesions coalesce and become necrotic
  – Results in leaf loss
  – Similar lesions may also occur on bolls

## Bacterial Blight Symptoms on Bottom Side of Leaf

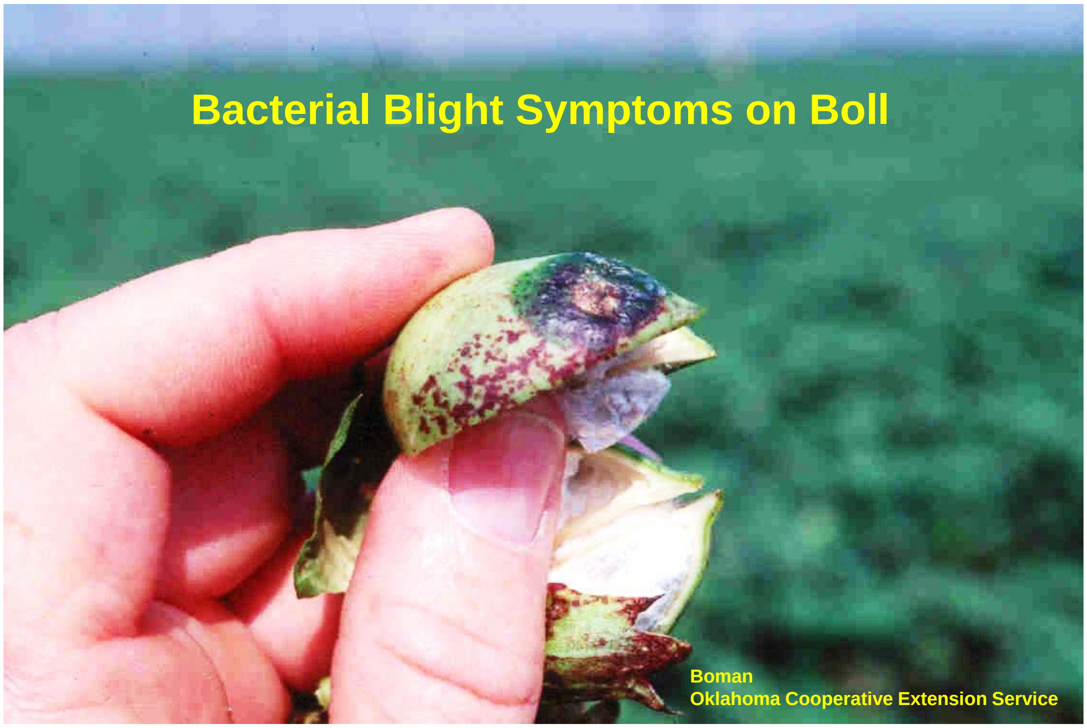
Boman – Oklahoma Cooperative Extension Service

## Bacterial Blight Symptoms on Bottom Side of Leaf



Boman – Oklahoma Cooperative Extension Service


Boman – Oklahoma Cooperative Extension Service


Bacterial Blight Symptoms on Boll
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Bacterial Blight Symptoms on Boll
Boman
Oklahoma Cooperative Extension Service


## Impact of Bacterial Blight on Leaves and Boll Set

## Boll Rot in Bacterial Blight Infected Boll


## Locks Destroyed by Boll Rot

## Small Infected Bolls Prematurely Opened by Boll Rot Arising From Bacterial Blight


# 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.