WEST CENTRAL TEXAS

REPLICATED AGRONOMIC COTTON EVALUATION (RACE) TRIAL REPORT

2022

Texas A&M AgriLife Extension

Department of
Soil and Crop Sciences
Texas A&M AgriLife
Extension Service

WEST CENTRAL TEXAS RACE TRIALS | 2022

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ADDITIONAL RESOURCES

- General cotton production information for new cotton growers: http://cotton.tamu.edu/index.html
- Cotton variety trial results: http://varietytesting.tamu.edu/cotton/
- Other agronomy information from the Texas A&M AgriLife Extension Center at San Angelo, TX: https://sanangelo.tamu.edu/extension/agronomy/

TABLE OF CONTENTS

2022 OVERVIEW

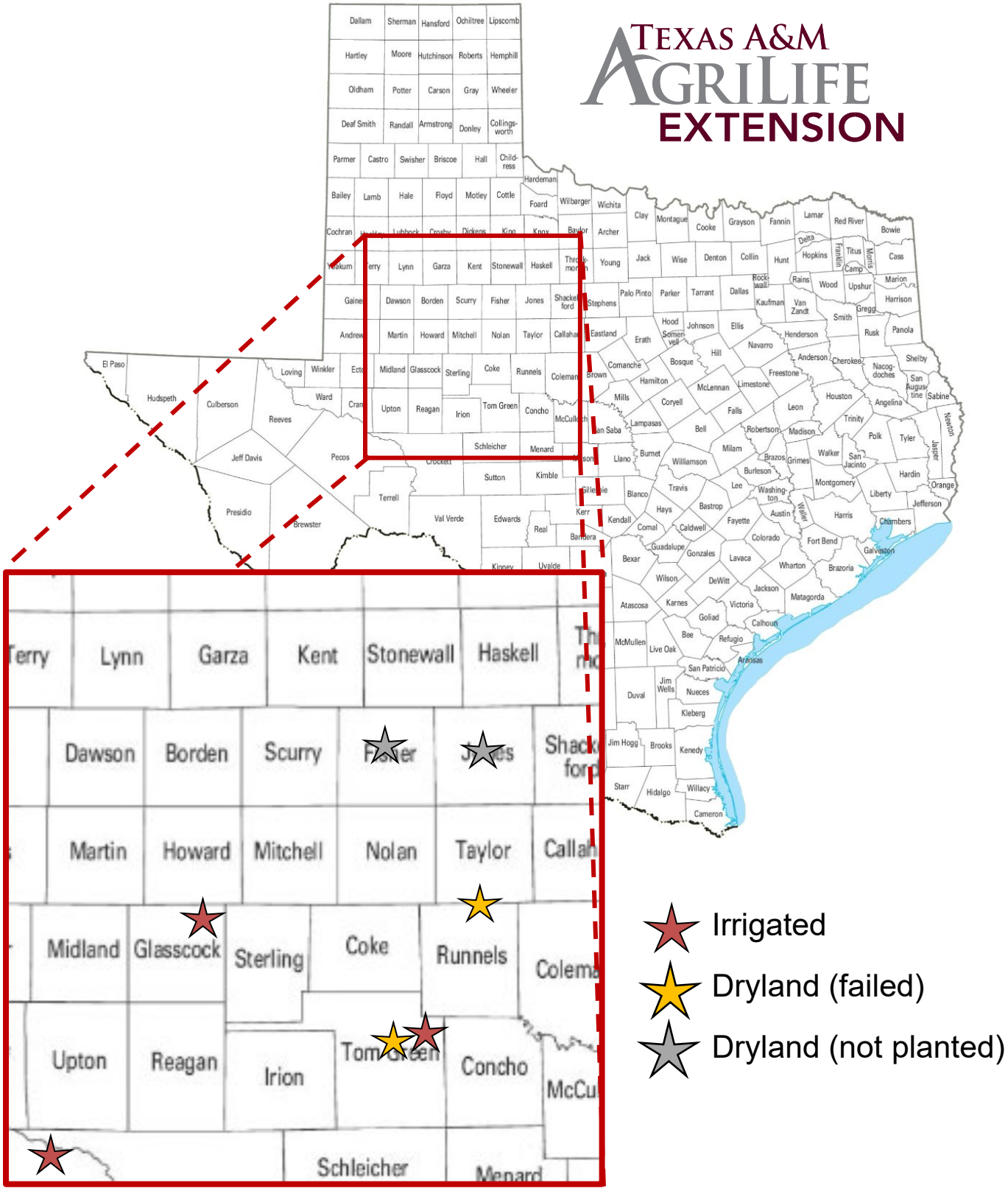
The Texas A&M AgriLife Extension Service agronomy program in San Angelo, TX coordinated the planting of 5 large-plot, on-farm, replicated variety trials across West Central Texas in 2022 (Fig. 1, Table 1). The 2022 cotton growing season was characterized by extreme heat and drought. Average daily temperatures were 4 to 6°F above normal through April, May, June, and July, with the hottest July on record (116 years) in San Angelo (average daily high temperature of 103.5°F). Drought conditions throughout the 2022 cotton growing season were also among the worst on record. Fall of 2021 was extremely dry (much fall-planted wheat in the region did not germinate until February), then the San Angelo area received 3.37 inches of rain from January through July 2022 (71% below average). Most dryland cotton in the region failed, as well as considerable acreage of irrigated cotton. The area received considerable rainfall at the end of August, followed by a drier-than-normal September and near- or above-average rainfall through October and November.

The two planted dryland sites failed, but all three irrigated sites were successful. Each was machine harvested with grower equipment (Table 1) and seed cotton weights from each entire strip were recorded in the field with a platform scale. Lint yields at Tom Green, Glasscock, and Pecos Counties averaged 446, 776, and 1411 lbs lint ac^{-1}, respectively.

Seed cotton subsamples from harvested locations were ginned at the Texas A&M AgriLife Research Gin at the Texas A&M AgriLife Research and Extension Center in Lubbock, TX. This is a small-scale Lummus gin with lint cleaners that affect turnout and lint quality similar to a commercial gin. HVI quality parameters were measured and reported by the Texas Tech University Fiber and Biopolymer Research Institute. The color, leaf grade, micronaire, length, strength, and uniformity of each sample were used to calculate loan values using the 2021 Cotton Incorporated Loan Value Calculator with a base lint value of \$0.52 lb^{-1}.

Replication and statistical analyses were used to account for variability within test sites and identify effects that can be confidently attributed to the genetic differences between varieties rather than inconsistent conditions or other sources of error. Differences were declared at $\alpha = 0.10$ (or $P < 0.10$), meaning we accept a 10% chance of declaring a false positive, and maintain a 90% chance that declared differences are true and due to the treatments. When *P* is greater than 0.10, no significant differences exist for that response. Significant *P* values are indicated by bold font in the results tables. The CV (coefficient of variation) presented in the results table for each site indicates the range of variability in the raw data. A lower CV is better and indicates a more uniform trial. The LSD (least significant difference) is the margin of variation within groups that are statistically similar, so if $P < 0.10$ and the difference between two values is greater than the LSD, then those values are statistically different. In the results for each site, LSD values are only shown if significant differences exist. Otherwise, non-significance is indicated as “n.s.”

Figure 1. 2022 West Central Texas RACE Trial Locations



SITE INFORMATION

Table 1. Trial locations and details for harvested 2022 West Central Texas RACE trials.

County	Water Regime	Cooperator	Extension Agents	Planting date	Harvest date	Rows × width	Seeding Rate (seeds ac^{-1})	Harvester Type	Soil Series §
Glasscock	Irrigated	Vance Smith	Brad Easterling	5/25	11/24	6 × 40	40,000	Picker baler	Rioconcho Silty Clay
Pecos	Irrigated	Randy Braden	Payton Keifer	5/24	10/26	8 x 40	42,000	Basket stripper	Reagan-Hodgins Silty Clay Loam
Tom Green	Irrigated	Curtis Wilde	Josh Blanek	5/31	11/29	8 × 40	38,000	Stripper baler	Angelo Clay Loam
Tom Green	Dryland	Eli Droll	Josh Blanek	6/7	-	8 × 40‡	29,500	-	Tobosa Clay
Runnels	Dryland	Aaron Colburn	Marty Vahlenkamp	6/8	-	8 × 40	23,000	-	Rowena Clay Loam and Tobosa Clay

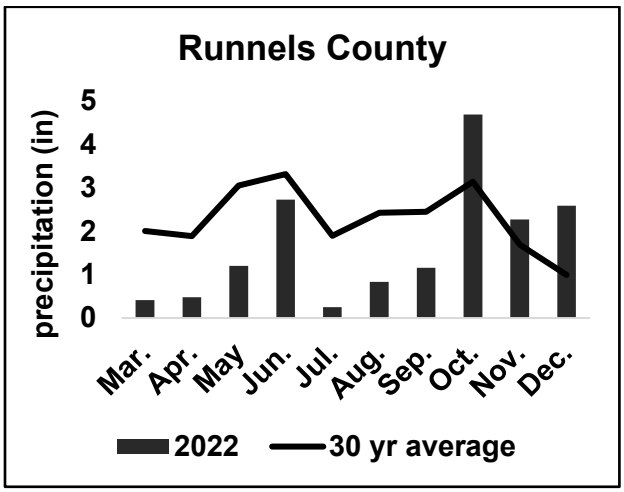
§ Soil series and texture obtained from web soil survey.

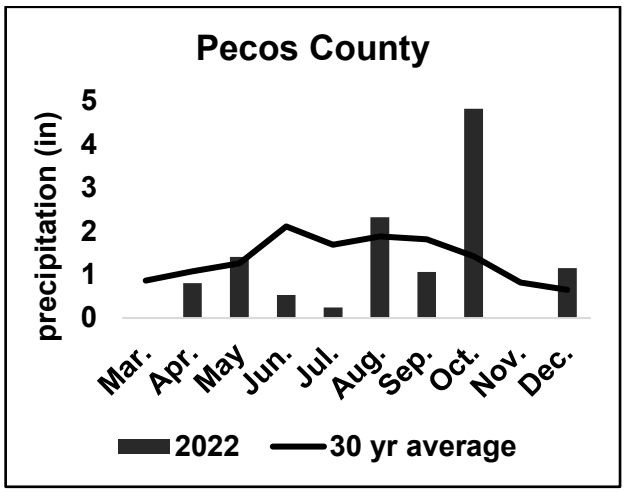
VARIETY CHARACTERISTICS

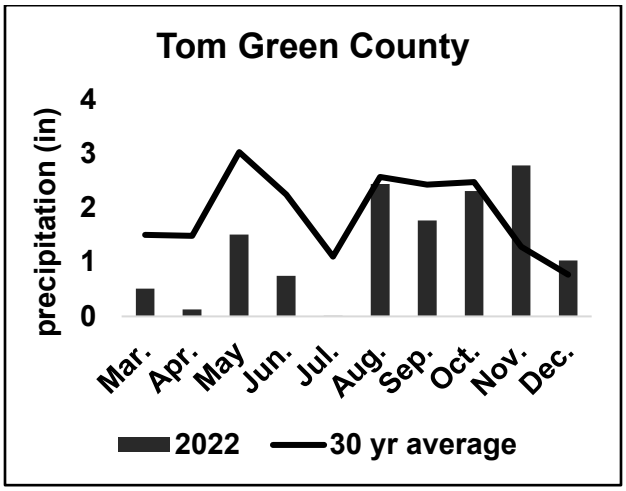
Table 2. Characteristics of cotton varieties included in the 2021 RACE trials in West Central Texas. Information was obtained from seed company websites.

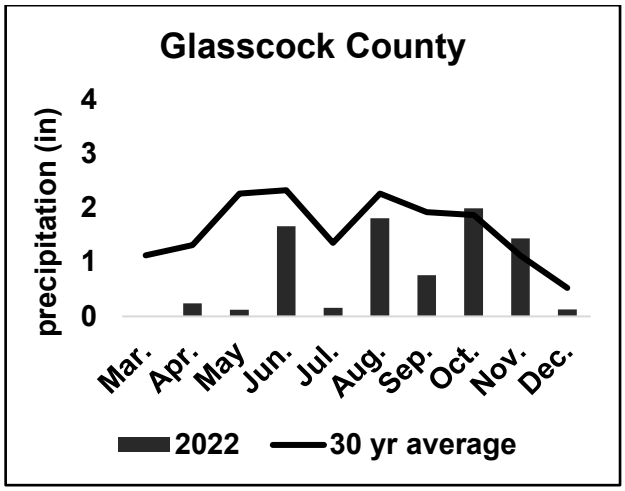
Variety	Maturity	Leaf Type	Plant Height	Verticilium	Bacterial Blight	Root-knot	Reniform
DeltaPine 2239 B3XF	med.	smooth	med.	mod-sus	susceptible	susceptible	susceptible
DeltaPine 2012 B3XF	early-mid	semi-smooth	med-tall	mod-tol	resistant	susceptible	susceptible
FiberMax 2398 GLTP	med.	semi-smooth	med-tall	tolerant	resistant	fair	susceptible
Stoneville 4993 B3XF	early-mid	semi-smooth	med.	fair	resistant	fair	susceptible
NexGen 4098 B3XF	med.	semi-smooth	med-tall	mod-tol	mod-res	susceptible	susceptible
NexGen 4190 B3XF	med.	smooth	med-tall	fair	susceptible	susceptible	susceptible
Phytogen 332 W3FE	early-mid	semi-smooth	med-tall	tolerant	resistant	resistant	resistant
Phytogen 411 W3FE	med.	semi-smooth	med-tall	susceptible	resistant	resistant	resistant

2022 PRECIPTIATION BY LOCATION









VARIETY PERFORMANCE ACROSS LOCATIONS - RACE TRIAL - 2022

Table 1. Variety rankings based on lint yield.

Variety	Glasscock	Pecos	Tom Green	Mean Rank
Mean Lint Yield (lb/ac)	766	1411	446	
Location				
ST 4993 B3XF	4	1	1	**2.0**
DP 2239 B3XF	1	6	2	**3.0**
NG 4190 B3XF	2	3	7	**4.0**
FM 2398 GLTP	5	5	3	**4.3**
PHY 411 W3FE	6	2	6	**4.7**
NG 4098 B3XF	7	4	4	**5.0**
PHY 332 W3FE	3	7	5	**5.0**
DP 2012 B3XF	8	8	8	**8.0**

Table 1. Variety rankings based on loan value.

Variety	Glasscock	Pecos	Tom Green	Mean Rank
Mean Loan (¢/lb)	52.2	53.0	51.7	
Location				
DP 2239 B3XF	1	5	1	**2.3**
DP 2012 B3XF	3	1	4	**2.7**
PHY 332 W3FE	4	2	2	**2.7**
NG 4190 B3XF	2	3	5	**3.3**
FM 2398 GLTP	5	4	3	**4.0**
NG 4098 B3XF	7	6	6	**6.3**
ST 4993 B3XF	6	8	7	**7.0**
PHY 411 W3FE	8	7	8	**7.7**

Tom Green County Irrigated RACE Trial - 2022

Variety	Stand Est. (%)	Lint (lbs/ac)	Seed Yield (lbs/ac) [(lbs/bale)] §	Turnout (%)	Mic	Length (in)*	Strength (g/tex)	Unif.	Color	Leaf	Loan Value (¢/lb)
ST 4993 B3XF	71.6	**540**†	**631** [564]	35.2	**4.59**	1.03	29.3	**80.5**	31-1,31-1,31-1	2,3,1	**51.0**
DP 2239 B3XF	78.5	**480**	583 [583]	33.7	4.12	**1.11**	28.9	**79.8**	31-2,31-1,41-1	4,2,3	**53.9**
FM 2398 GLTP	69.9	478	**695 [699]**	32.7	**4.48**	**1.09**	28.7	**80.9**	41-1,31-2,31-1	5,4,3	**52.7**
NG 4098 B3XF	79.1	442	**670 [727]**	29.3	3.80	1.08	**31.0**	78.1	41-1,41-1,41-1	6,5,5	49.4
PHY 332 W3FE	83.1	426	621 **[696]**	30.8	4.18	**1.09**	28.3	**79.9**	31-2,31-2,31-1	4,3,3	**53.8**
PHY 411 W3FE	71.1	424	498 [567]	31.1	**4.31**	1.00	28.9	**79.9**	41-1,31-2,41-1	5,2,4	48.4
NG 4190 B3XF	71.6	399	470 [570]	31.3	3.75	**1.09**	27.6	**79.9**	41-1,31-2,31-2	3,2,3	**52.4**
DP 2012 B3XF	73.4	382	542 **[681]**	29.6	3.90	1.06	27.9	79.3	31-1,31-2,31-1	3,4,2	**52.2**
P > F	0.72	**0.011**	**0.02 [0.0001]**	**<.0001**	**0.0023**	**<.0001**	**0.057**	**0.034**	-	-	**0.0003**
CV	13.9	9.1	12.5 [5.9]	3.3	5.3	1.3	3.9	1.1	-	-	2.2
LSD	n.s.	59.2	106 [54.3]	0.01	0.3	0.02	1.6	1.2	-	-	1.7
mean	74.8	446	589 [636]	31.7	4.14	1.07	28.8	79.8	-	-	51.7

† Within columns, bold values represent the uppermost grouping, and are not statistically different from each other.

§ Seed yield per bale is based on a 480 lb bale.

*Staple (32^{nds}) = Length (in) × 32

Glasscock County Irrigated RACE Trial – 2022

Variety	Stand Est. (%)	Lint (lbs/ac)	Seed Yield (lbs/ac) [(lbs/bale)] §	Turnout (%)	Mic	Length (in)*	Strength (g/tex)	Unif.	Color	Leaf	Loan Value (¢/lb)
DP 2239 B3XF	74.6	807	762 [452]	42.2	4.89	**1.21**	29.0	82.1	31-2,31-2,31-1	4,3,3	**54.3**
NG 4190 B3XF	87.1	783	845 [519]	40.4	4.91	1.13	28.6	81.9	41-1,31-2,41-1	4,3,3	**52.8**
PHY 332 W3FE	92.6	782	898 [550]	39.2	5.15	1.16	29.7	82.0	31-1,31-1,31-2	3,3,4	**52.6**
ST 4993 B3XF	82.2	762	735 [463]	**42.5**	**5.40**	1.08	**30.1**	82.0	31-2,31-2,31-1	4,1,2	50.7
FM 2398 GLTP	84.4	757	818 [519]	41.8	**5.57**	1.13	29.6	82.6	31-1,31-1,31-1	2,3,3	**52.5**
PHY 411 W3FE	79.0	755	772 [493]	40.5	**5.42**	1.06	29.4	80.6	31-2,31-2,31-2	3,3,4	48.8
NG 4098 B3XF	75.1	746	**1011 [652]** †	35.4	4.53	**1.22**	**31.5**	80.9	41-1,31-2,41-2	5,4,6	**52.0**
DP 2012 B3XF	82.2	736	848 [555]	39.9	4.94	1.13	29.4	82.2	31-2,31-1,31-1	2,3,3	**53.8**
P > F	0.31	0.65	**0.0009 [0.0006]**	**0.0009**	**0.0037**	**<.0001**	**0.071**	0.23	-	-	**0.038**
CV	11.0	6.1	6.8 [7.7]	3.6	5.1	1.7	3.2	1.2	-	-	3.4
LSD	n.s.	n.s.	81.8 [56.5]	0.02	0.4	0.03	1.3	1.4	-	-	2.5
mean	82.2	766	836 [526]	40.3	5.10	1.14	29.7	81.8	-	-	52.2

† Within columns, bold values represent the uppermost grouping, and are not statistically different from each other.

§ Seed yield per bale is based on a 480 lb bale.

*Staple (32^{nds}) = Length (in) × 32

Pecos County Irrigated RACE Trial – 2022

Variety	Stand Est. (%)	Lint (lbs/ac)	Seed Yield (lbs/ac) [(lbs/bale)][§]	Turnout (%)	Mic	Length (in)*	Strength (g/tex)	Unif.	Color	Leaf	Loan Value (¢/lb)
ST 4993 B3XF	78.3	**1494**[†]	1566 [502]	**39.2**	**4.98**	1.12	**30.6**	**82.4**	31-1,21-2,31-1	4,3,1	53.9
PHY 411 W3FE	83.0	**1466**	1390 [456]	37.2	**4.95**	1.10	29.2	81.7	41-1,31-2,31-1	3,6,4	51.2
NG 4190 B3XF	83.0	**1451**	1400 [464]	38.2	4.67	**1.17**	27.8	**83.0**	41-1,21-2,31-1	4,2,3	55.5
NG 4098 B3XF	81.9	**1401**	**1845 [631]**	32.3	4.19	**1.16**	**30.2**	79.1	51-3,41-3,41-3	8,5,5	45.0
FM 2398 GTLP	79.3	1394	1517 [523]	38.0	**5.04**	**1.15**	28.3	82.1	31-1,31-1,31-1	3,3,2	54.3
DP 2239 B3XF	86.1	1385	1325 [459]	38.5	**4.88**	**1.18**	28.4	81.7	31-1,31-1,31-1	4,3,4	54.2
PHY 332 W3FE	76.2	1382	1585 [550]	35.6	4.77	1.14	28.9	81.6	31-3,31-3,31-3	4,2,3	55.3
DP 2012 B3XF	87.6	1314	1362 [498]	37.1	4.67	1.14	28.8	81.4	31-1,21-2,31-1	3,3,5	54.6
P > F	0.39	**0.077**	**0.0005 [0.0001]**	**<.0001**	**<.0001**	**0.0008**	**0.0007**	**0.0001**	-	-	0.15
CV	7.6	4.6	[6.1]	2.6	2.3	1.5	2.1	0.7	-	-	2.9
LSD	n.s.	92.3	[44.6]	0.01	0.2	0.02	0.9	0.9	-	-	n.s.
mean	81.9	1411	[511]	37.0	4.77	1.15	29.0	81.6	-	-	53.0

† Within columns, bold values represent the uppermost grouping, and are not statistically different from each other.

§ Seed yield per bale is based on a 480 lb bale.

*Staple (32^{nds}) = Length (in) × 32

http://cotton.tamu.edu/

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