SCS-2020-01

TEXAS ROLLING PLAINS REPLICATED AGRONOMIC COTTON EVALUATION (RACE) TRIALS | 2019

TEXAS A&M AGRILIFE EXTENSION

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

cotton

TEXAS ROLLING PLAINS RACE TRIALS | 2019

CONTRIBUTING AUTHORS

Dr. Emi Kimura	Extension Agronomist	AgriLife Extension, Vernon, TX
Jonathan Ramirez	Extension Associate	AgriLife Extension, Vernon, TX
Tamara Royer	Technician	AgriLife Extension, Vernon, TX
Ira Yates	Technician	AgriLife Extension, Lubbock, TX
Ryan Martin	County Extension Agent	AgriLife Extension, Childress Co., TX
Kenny Patterson	County Extension Agent	AgriLife Extension, Collingsworth Co., TX
Kaitlyn Deaton	County Extension Agent	AgriLife Extension, Cottle Co., TX
Brandon Cave	County Extension Agent	AgriLife Extension, Kent Co., TX
Justin Gilliam	County Extension Agent	AgriLife Extension, Hardeman Co., TX
Taylo Chapa	County Extension Agent	AgriLife Extension, Motley Co., TX
Cody Myers	County Extension Agent	AgriLife Extension, Stonewall Co., TX
David Graf	County Extension Agent	AgriLife Extension, Wichita Co., TX
Langdon Reagan	County Extension Agent	AgriLife Extension, Wilbarger Co., TX

ACKNOWLEDGEMENTS

Appreciation is expressed to **the producer cooperators** who provided their land, equipment, and time to assist in preparation, planting, field management, and harvesting of the plots throughout the year. All cooperators are listed in Table 3. We would like to extend our appreciation to **Cotton Incorporated** through the **Texas State Support Committee**, **Americot/NexGen**, **Bayer CropScience**, **Delta Pine, and Phytogen Cottonseed** for their partial funding of these trials.

2019 HIGHLIGHT

Variety selection is the most important decision made during the year. Unlike herbicide or insecticide decisions that can be changed during the season to address specific conditions and pests, variety selection is made only once, and variety selection dictates the management of a field for the entire season. Variety decisions should be based on genetics first and transgenic technology second. Attention should be focused on agronomic characteristics such as yield, maturity, and fiber quality when selecting varieties.

Planted acres declined to 1.16 million acres in 2019 from 1.31 million acres in 2018 in the Rolling Plains; however, harvested acres increased to 1.1 million acres from 639,000 acres in 2018. Planting was delayed in 2019 due to the prolonged wet field conditions in May. Soil temperature stayed lower than average, which decreased seedling vigor early in the season. In-season soil moisture was lower than average, and several weeks of high temperatures increased heat and water stressed cotton in dryland cotton acres. Freeze was observed a week to 10 days earlier than normal years, which also decreased yield potential of both irrigated and dryland cotton in the region.

To assist Texas cotton producers in remaining competitive in the Rolling Plains, the Texas A&M AgriLife Extension Service Agronomy program has conducted, large plot, on-farm, replicated variety trials since 2012. This approach provides a reliable source of information to assist farmers with the variety selection process. Nine replicated agronomic cotton evaluation (RACE) trials and two Monster Trials were planted in 2019; however, we were able to harvest five RACE trial locations and two monster trial locations. Mean irrigated location yields for the 2019 RACE trials ranged from 1891 lb/ac for the Collingsworth trial location to 922 lb/ac for the Wilbarger trial site, while mean dryland location yields ranged from 525 lb/ac at the Kent County trial site to 344 lb/ac at the Hardeman County trial site.

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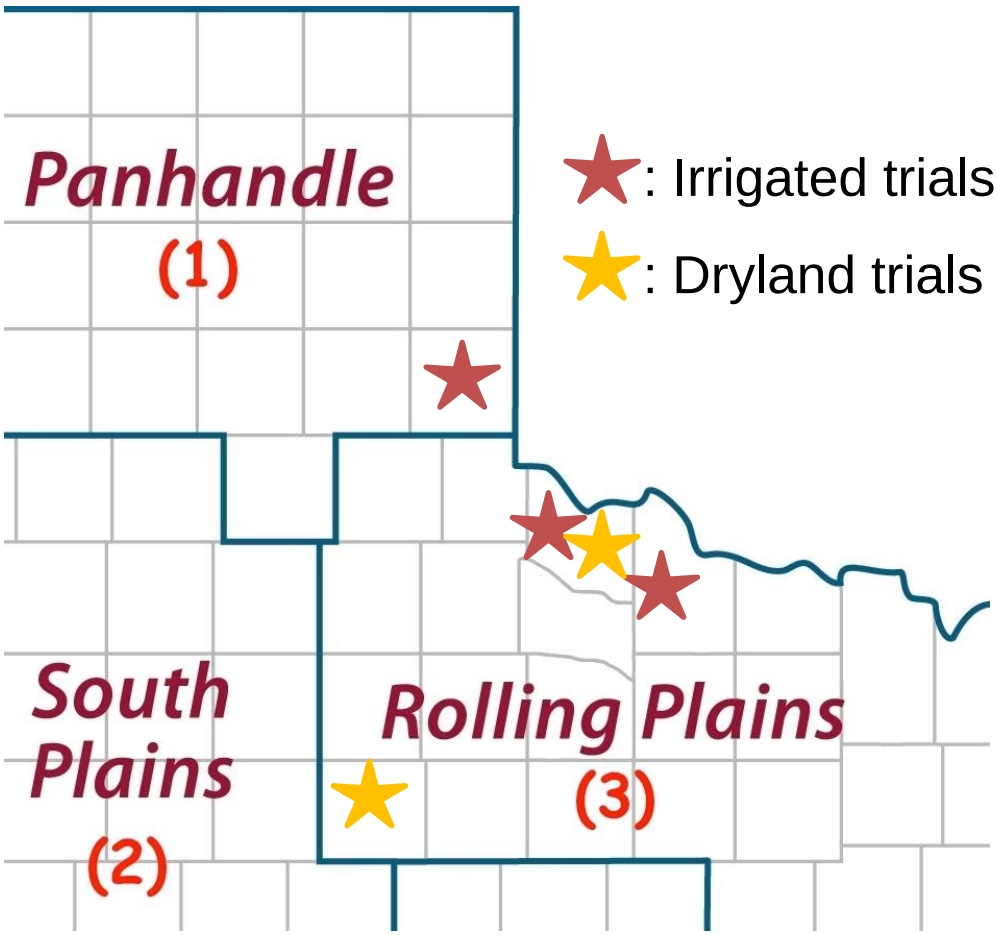

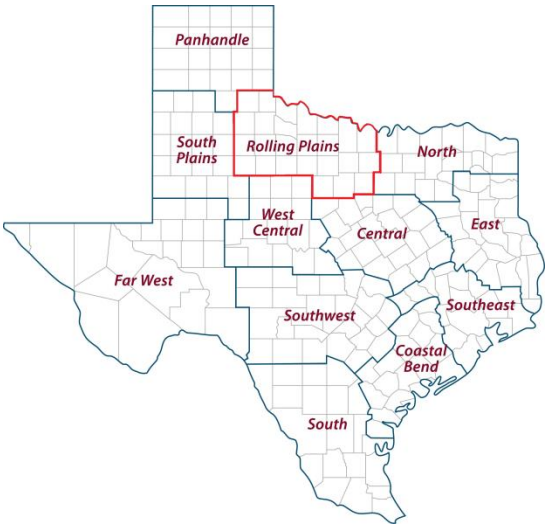

FIGURE 1. 2019 ROLLING PLAINS RACE TRIAL LOCATIONS

In addition to the RACE trials, a Monster cotton variety trial was conducted in 2019 at the Texas A&M Research Station at Lockett, TX. These trials are conducted as small plot variety evaluations and include a larger number of both commercially-available and experimental cotton varieties. Lint samples from all locations were ginned with a 10-saw table-top gin with no lint cleaner. This table-top gin method consistently produces higher lint turnout percentages than in a commercial gin due to having no lint cleaner. Consequently, higher turnouts equate to lint yields which are generally higher than area-wide commercial yields. Additionally, all data were standardized to color and leaf grades of 41-4, because an accurate estimate of leaf and color grades are not possible without a lint cleaner on the gin.

The statistical analysis quantifies the variability of the test site conditions, such as soil type, harvesting, insect damage, etc. A CV (coefficient of variation) of 15% or less is generally considered acceptable and means the data are dependable. Non-statistical significance is represented as "NS" and indicates no differences among the varieties within the data column at a 90% confidence level.

Resources for Texas cotton production

- General cotton production information for new cotton growers: http://cotton.tamu.edu/index.html
- Cotton variety trial results: http://varietytesting.tamu.edu/cotton/
- Cotton trial update in the Rolling Plains of Texas: Rolng Plains Agronomy Program Blog (https://agrilife.org/txrollingplainsagronomy/)

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Table 1. Variety characteristics/Highlights

Below are the cotton variety characteristics and highlights that were included in the 2019 RACE trials and other common varieties planted in these regions. These cotton variety descriptions were provided by individual seed company representatives or publicly available information.

Variety	Characteristics
Deltapine 1820 B3XF	Early to mid maturity variety, complement to DP 1612 B2XF
Deltapine 1845 B3XF	Bacterial blight resistance. Good companion variety to DP 1646 B2XF
Deltapine 1948 B3XF	Mid-full maturity. Similar to DP 1646 B2XF
FiberMax 2398 GLTP	Medium maturity, semi-smooth leaf hair, bacterial blight resistance. Good tolerance to Verticillium wilt.
NexGen 3930 B3XF	Early to metium maturity. Very good bacterial blight tolerance.
NexGen 5711 B3XF	Medium- full-maturity. Bacterial blight resistance.
NexGen 4792 XF	Medium maturity, verticillium wilt tolerance.
NexGen 4545 B2XF	Medium maturity, verticillium wilt tolerance.
Phytogen 350 W3FE	Early-mid maturing variety. Root knot nematode and bacterial blight resistance.
Phytogen 400 W3FE	Mid maturity, smooth leaf
Phytogen 480 W3FE	Mid maturity, root-knot nematode resistance
Phytogen 490 W3FE	Mid-maturity, tall plant height, semi-smooth leaf
Stoneville 5600 B2XF	Root knot nematode resistance
Stoneville 5707 B2XF	Mid- to ful-season maturity. Bacterial blight resistance.

Table 2. FIBER EVALUATION

Parameters	Definition	Range
Micronaire (Mic)	Micronaire is a measurement of both fiber fineness and maturity.	Premium range: 3.7-4.2 Base range: 3.5-3.6 or 4.3-4.9 Discount range: 0-3.4 or >5.0
Fiber length	The average length of the longer half of the fibers.	Extra-long: >1.26 Long: 1.11-1.26 Medium: 0.99-1.10 Short: <0.99
Fiber strength	Fiber strength as measured on the High Volume Instrument is the force (in grams) required to break a bundle of fibers one - tex unit in mass.	Very strong: > 31 Strong: 29-30 Average: 26-28 Intermediate: 24-25 Weak: < 23
Length uniformity (unif)	Length uniformity index is the ratio between the "mean length" of the fibers and the "upper half mean length".	Very high: >85 High: 83-85 Intermediate: 80-82 Low: 77-79 Very low: <77

Source: "Classification of Upland Cotton" Adapted from Cotton Incorporated website (http://www.cottoninc.com/fiber/quality/Classification-Of-Cotton/Classification-Upland-Cotton/)

BACKGROUND INFORMATION

Table 3. Trial location, cooperator, planting date, harvesting date, and plot size information of 2019 Texas A&M AgriLife Extension Service RACE trial

County	Producer cooperators	County Extension Agents	Irri/ dry	Planting date	Harvest date	Rows × spacing	Seeding Rate (seeds ac^{-1})	Seeds ft^{-1}	Plot size (ac)
Collingsworth	Rex Henard	Kenny Patterson	I	5/15	11/9	6 rows × 40”	40000	3.1	1.1
Hardeman	TAMU	Justin Gilliam	D	5/30	11/15	4 rows × 40”	52272	4.0	0.1
Hardeman	TAMU	Justin Gilliam	I	5/10	11/19	4 rows × 40”	52272	4.0	0.2
Wilbarger	TAMU	Langdon Reagan	I	5/24	12/5	4 rows × 40”	45000	2.6	0.1
Kent	Dean Boyd	Brandon Cave	D	6/15	12/17	6 rows x 40”	26200	2.0	0.4
Motley			I	6/7			NA		
Cottle			D	6/20			NA		
Wilbarger			D	6/19			NA		
Stonewall			D	6/20			NA		
Monster	TAMU	TAMU	I	5/30	11/30	4 rows × 40”	45000	3.4	0.0046
Monster	TAMU	TAMU	D	5/30	11/26	4 rows × 40”	45000	3.4	0.0046

Table 4. Background information of 2019 Texas A&M AgriLife Extension RACE Trials in the Rolling Plains

County		Soil map unit name*/soil texture
Collingsworth	Irrigated	Springer-heatly-blown-out land complex, Sandy
Kent	Dryland	Miles fine sandy loam
Hardeman	Irrigated/Dryland	Abilene clay loam/ loam, silt loam, clay loam, silty clay loam
Wilbarger	Irrigated	Miles fine sandy loam

*Soil map unit name was obtained from web soil survey. Soil texture is a representative soil texture of the soil map unit in A horizon.

2019 Rolling Plains RACE Trial

Lint yield of irrigated trials

Variety	Collingsworth	Hardeman	Wilbarger	Average
PHY480W3FE	1888	1457	1290	1545
FM2398GLTP	2117	1337	990	1481
DP1845B3XF	1961	1429	922	1438
PHY350W3FE	1879	1336	902	1372
NG3930B3XF	1746	1199	1156	1367
ST5600B2XF	1987	1165	931	1361
DP1820B3XF	1997	1176	757	1310
NG5711B3XF	1556	1133	431	1040
Mean	**1891**	**1279**	**922**	**1364**
CV %	**6.7**	**14.2**	**38.0**	**-**
P>F	**0.1901**	**0.2562**	**0.2104**	**-**
STD DEV	**173**	**127**	**257**	**151**

2,4-D symptomology was observed at Hardemand and Wilbarger trial locations

Lint yield of dryland trials

Variety	Hardeman	Kent	Average
DP1948B3XF	383	577	480
PHY400W3FE	418	-	418
ST5707B2XF	336	504	420
NG4792XF	263	617	440
PHY350W3FE	416	-	416
NG3930B3XF	323	426	375
NG4545B2XF	240	502	371
PHY480W3FE	467	-	467
FM2398GLTP	254	-	254
Mean	**344**	**525**	**405**
CV %	**16.6**	**22.5**	**-**
P>F	**0.0011**	**0.3908**	**-**
STD DEV	**82**	**54**	**67**

2,4-D symptomology was observed at Hardemand and Wilbarger trial locations

Errors were corrected on Hardeman yield on February 10, 2020

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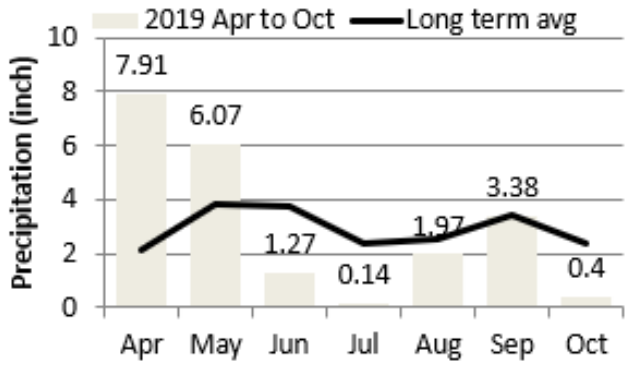
2019 Rolling Plains RACE Trial

Agronomic information

County	Hardeman			
Cooperator	TAMU			
Technologies	Mixed technologies			
Irrigation	Dryland			
Plant	6/11/2019			
Harvest	11/12/2019			
GDD	154	days		
Population	45000			
Rows	4	rows	40"	width
Plot size	0.2	ac		



Variety	Lint (Lbs/ac)	Gin TO (%)	Mic	Fiber Length (inch)	Strength (g/tex)	Unif	Loan Value (¢/lb)	Lint Value* ($/acre)
PHY480W3FE	467	0.45	5.2	1.00	27.8	80.6	44.4	207
PHY350W3FE	416	0.43	5.0	1.02	27.1	80.3	48.1	200
DP1948B3XF	383	0.45	4.9	1.07	30.5	80.4	51.8	199
PHY400W3FE	418	0.45	5.0	0.98	26.4	79.1	45.2	188
ST5707B2XF	336	0.41	4.9	1.05	29.7	80.1	50.4	170
NG3930B3XF	323	0.43	4.8	1.02	26.3	79.9	47.8	158
NG4792XF	263	0.42	4.4	1.07	28.6	79.6	52.2	137
FM2398GLTP	254	0.43	5.3	1.01	25.9	79.9	44.2	114
NG4545B2XF	240	0.39	4.6	0.99	25.4	78.5	45.5	109
Mean	**344**	**0.43**	**5**	**1**	**28**	**80**	**48**	**165**
CV %	**16.6**	**2.9**	**5.0**	**2.9**	**4.9**	**1.2**	**4.7**	**17.7**
P>F	**0.0011**	**<.0001**	**0.0109**	**0.0067**	**0.0025**	**0.2483**	**0.0015**	**0.0032**
STD DEV	**82**	**0.02**	**0.28**	**0.03**	**1.78**	**0.66**	**3.1**	**37**

Note:

2,4-D symptomology was observed at the trial.

Turnout is higher with the table-top gin than using a conventional gin.

Highlighted values are significantly same as the highest value at $P<0.1$

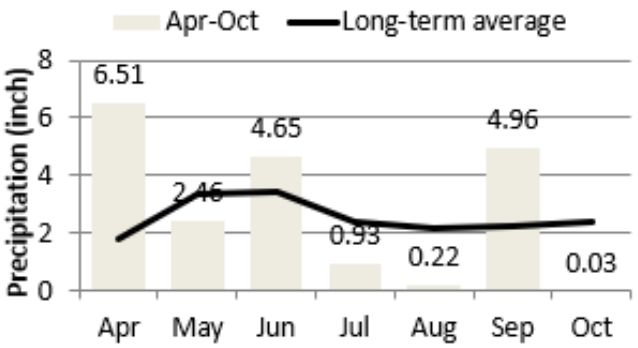
Errors were corrected on Hardeman yield and turnout on February 10, 2020

TEXAS A&M AGRILIFE EXTENSION

2019 Rolling Plains RACE Trial

Agronomic information

County	Kent			
Cooperator	Dean Boyd			
Technologies	Xtendflex only			
Irrigation	Dryland			
Plant	6/12/2019			
Harvest	12/17/2019			
GDD	188	days		
Population	26200			
Rows	6	rows	40"	width
Plot size	0.1	ac		



Variety	Lint (Lbs/ac)	Gin TO (%)	Mic	Fiber Length (inch)	Strength (g/tex)	Unif	Loan Value (¢/lb)	Lint Value* ($/acre)
DP1948B3XF	577	0.43	4.3	1.11	29.5	81.4	53.6	309
NG4792XF	617	0.45	4.8	0.99	27.7	79.5	45.9	286
ST5707B2XF	504	0.42	5.0	1.05	28.7	81.5	50.8	257
NG4545B2XF	502	0.43	4.8	0.99	25.4	79.6	45.7	230
NG3930B3XF	426	0.40	4.4	1.04	26.2	81.4	50.0	213
Mean	**525**	**0.43**	**5**	**1.04**	**27**	**81**	**49**	**259**
CV %	**22.5**	**3.8**	**8.0**	**2.7**	**4.0**	**0.5**	**3.8**	**24.0**
P>F	**0.3908**	**0.083**	**0.2841**	**0.0042**	**0.0101**	**0.0002**	**0.0036**	**0.3729**
STD DEV	**74**	**0.02**	**0.27**	**0.05**	**1.70**	**1.03**	**3.38**	**39.72**

Notes:

Turnout is higher with the table-top gin than using a conventional gin.

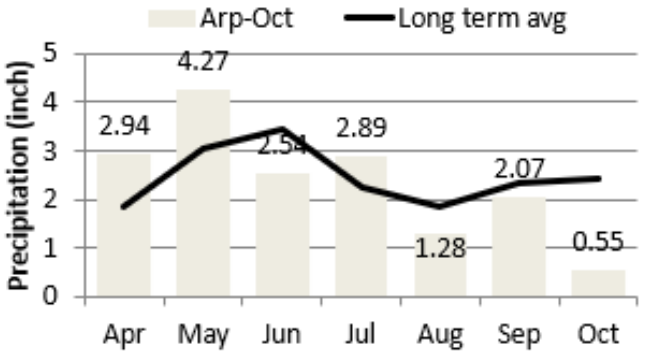
Highlighted values are significantly same as the highest value at $P<0.1$

TEXAS A&M AGRILIFE EXTENSION

2019 Rolling Plains RACE Trial

Agronomic information

County	Collingsworth			
Cooperator	Rex Henard			
Technologies	Mixed technologies			
Irrigation	Irrigated			
Plant	5/15/2019			
Harvest	11/9/2019			
GDD	178	days		
Population	40000			
Rows	6	rows	40"	width
Plot size	1.1	ac		



Variety	Lint (Lbs/ac)	Gin turnout (%)	Micronair	Fiber Length (inch)	Strength (g/tex)	Uniformity	Loan Value (¢/lb)	Lint Value* ($/acre)
FM2398GLTP	2117	0.43	4.3	1.16	30.7	82.7	54.6	1155
DP1820B3XF	1997	0.41	4.1	1.22	31.7	81.9	54.7	1093
ST5600B2XF	1987	0.41	4.4	1.19	30.5	82.3	54.5	1082
DP1845B3XF	1961	0.40	3.7	1.24	30.0	82.0	53.3	1050
PHY350W3FE	1879	0.38	3.9	1.16	30.5	82.7	53.2	1023
PHY480W3FE	1888	0.38	3.5	1.16	30.2	83.0	52.7	995
NG3930B3XF	1746	0.38	3.5	1.17	29.5	82.0	51.9	904
NG5711B3XF	1556	0.38	3.4	1.22	30.1	81.3	52.7	806
Mean	1891	0.40	4.0	1.19	30.6	82	54	1067
CV %	6.7	4.9	7.3	2.0	3.3	0.8	3.9	9.5
P>F	0.1901	0.1266	0.0023	0.0035	0.3353	0.1038	0.6325	0.0327
STD DEV	173	0.019	0.40	0.03	0.65	0.55	1.04	112

Note:

Weak seedling vigor was observed early in the sesason due to low soil temperature

Turnout is higher with the table-top gin than using a conventional gin.

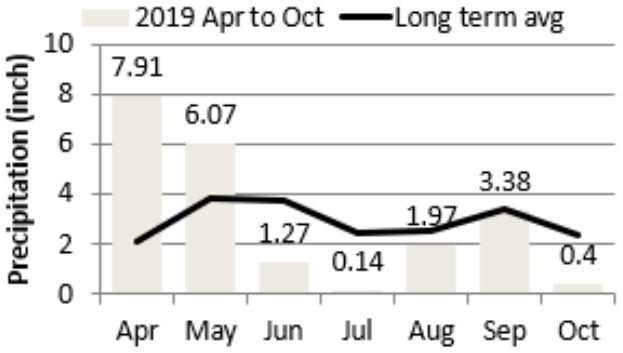
Highlighted values are significantly same as the highest value at $P<0.1$

TEXAS A&M AGRILIFE EXTENSION

2019 Rolling Plains RACE Trial

Agronomic information

County	Hardeman			
Cooperator	TAMU			
Technologies	Mixed technologies			
Irrigation	Irrigated			
Plant	6/14/2019			
Harvest	11/13/2019			
GDD	152	days		
Population	45000			
Rows	4	rows	40"	width
Plot size	0.1	ac		



Variety	Lint (Lbs/ac)	Gin TO (%)	Micronair	Fiber Length (inch)	Strength (g/tex)	Unif	Loan Value (¢/lb)	Lint Value* ($/acre)
PHY480W3FE	1457.3	0.44	4.4	1.10	31.0	82.7	53.6	781.7
DP1845B3XF	1429.4	0.45	4.1	1.16	32.4	80.8	52.0	740.4
PHY350W3FE	1335.6	0.43	4.6	1.11	28.9	81.3	53.3	712.6
FM2398GLTP	1336.6	0.44	5.3	1.10	28.7	81.0	50.8	680.1
NG3930B3XF	1198.7	0.44	4.8	1.09	28.1	81.3	52.9	634.4
DP1820B3XF	1175.6	0.44	4.9	1.17	32.8	81.7	53.4	625.8
NG5711B3XF	1133.4	0.42	4.6	1.14	31.0	81.0	54.0	612.6
ST5600B2XF	1164.8	0.45	5.2	1.12	30.8	81.6	51.7	601.0
Mean	1279	0.44	4.73	1.12	30.46	81.43	52.71	673.57
CV %	14.2	3.7	9.1	2.7	3.6	0.9	3.3	15.2
P>F	0.2562	0.6265	0.0781	0.0586	0.0006	0.1083	0.3611	0.3409
STD DEV	127	0.0085	0.39	0.03	1.75	0.60	1.09	66.04

Note:

2,4-D symptomology was observed at the trial.

Turnout is higher with the table-top gin than using a conventional gin.

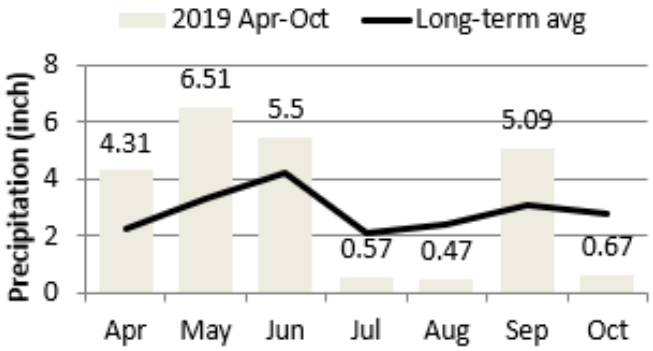
Highlighted values are significantly same as the highest value at $P<0.1$

TEXAS A&M AGRILIFE EXTENSION

2019 Rolling Plains RACE Trial

Agronomic information

County	Wilbarger			
Cooperator	TAMU			
Technologies	Mixed technologies			
Irrigation	Limited Irrigated			
Plant	5/31/2019			
Harvest	12/4/2019			
GDD	187	days		
Population	45000			
Rows	4	rows	40"	width
Plot size	0.1	ac		



Variety	Lint (Lbs/ac)	Gin TO (%)	Mic	Fiber Length (inch)	Strength (g/tex)	Unif	Loan Value (¢/lb)	Lint Value* ($/acre)
PHY480W3FE	1290.5	0.45	4.3	1.08	30.0	81.2	52.9	683
NG3930B3XF	1155.9	0.45	4.7	1.13	28.7	81.3	53.3	616
DP1845B3XF	922.0	0.47	4.9	1.16	30.7	80.7	52.8	487
PHY350W3FE	902.1	0.42	4.5	1.14	29.1	81.0	53.9	483
FM2398GLTP	990.2	0.45	5.3	1.07	28.5	80.6	48.4	480
ST5600B2XF	930.5	0.47	5.5	1.09	28.7	81.1	49.4	460
DP1820B3XF	757.3	0.46	4.9	1.18	32.3	82.2	53.5	402
NG5711B3XF	431.3	0.40	4.4	1.15	29.7	81.3	54.2	234
Mean	**922**	**0.45**	**4.81**	**1.13**	**29.73**	**81.19**	**52.28**	**480.55**
CV %	**38.0**	**4.8**	**7.2**	**3.5**	**4.6**	**1.2**	**3.0**	**38.7**
P>F	**0.2104**	**0.0118**	**0.0099**	**0.0361**	**0.059**	**0.6164**	**0.0027**	**0.2236**
STD DEV	**257**	**0.02**	**0.42**	**0.04**	**1.29**	**0.49**	**2.2**	**135**

Note:

2,4-D symptomology was observed at the trial.

Turnout is higher with the table-top gin than using a conventional gin.

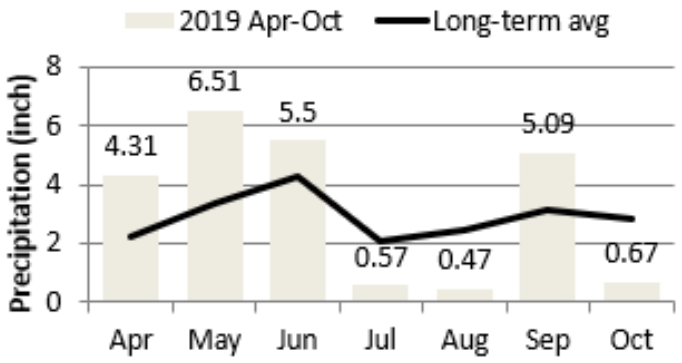
Highlighted values are significantly same as the highest value at $P<0.1$

TEXAS A&M AGRILIFE EXTENSION

2019 Rolling Plains MONSTER trial

Agronomic information

County	Wilbarger			
Cooperator	TAMU			
Technologies	Mixed technologies			
Irrigation	Irrigated			
Plant	5/30/2019			
Harvest	12/12/2019			
GDD	196	days		
Population	45000			
Rows	4	rows	40"	width
Plot size	0.000459137	ac		



Variety	Lint (Lbs/ac)	Gin turnout (%)	Micronair	Fiber Length (inch)	Strength (g/tex)	Uniformity	Loan Value (¢/lb)	Lint Value* ($/acre)
BX2037GLTP	1047	0.33	4.5	1.21	34	83	51.7	553
FM2398GLTP	1695	0.30	4.9	1.13	30	82	48.7	817
FM2498GLT	1399	0.30	5.2	1.16	29	83	45.5	639
ST4880B3XF	1462	0.31	4.3	1.19	31	81	45.8	672
ST4990B3XF	1452	0.29	4.3	1.22	31	83	47.4	694
ST5471GLTP	1620	0.31	4.7	1.12	30	81	47.9	762
ST5600B2XF	1598	0.35	4.8	1.17	32	83	44.3	723
Mean	1467	0.31	4.7	1.2	30.5	82	48	690
CV %	29.7	6.0	5.9	2.6	3.8	1.2	9.8	29.7
P>F	0.8914	0.0197	0.0115	0.0086	0.006	0.2211	0.5677	0.8914
STD DEV	214	0.022	0.3	0.04	1.6	1	2.4	85

Note:

Turnout is higher with the table-top gin than using a conventional gin.

Highlighted values are significantly same as the highest value at $P<0.1$

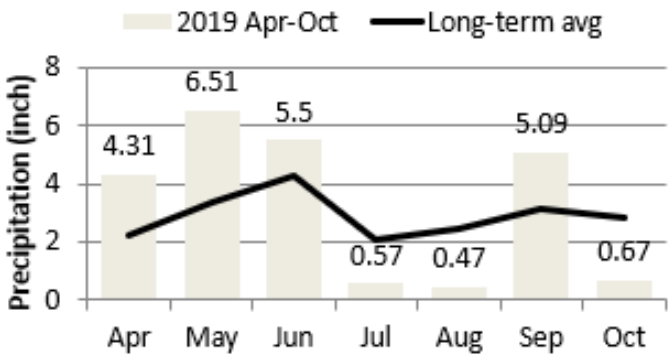
2,4-D symptomology was observed at the trial.

TEXAS A&M AGRILIFE EXTENSION

2019 Rolling Plains MONSTER trial

Agronomic information

County	Wilbarger			
Cooperator	TAMU			
Technologies	Mixed technologies			
Irrigation	Dryland			
Plant	5/30/2019			
Harvest	12/12/2019			
GDD	196	days		
Population	45000			
Rows	4	rows	40"	width
Plot size	0.000459137	ac		



Variety	Lint (Lbs/ac)	Gin turnout (%)	Micronair	Fiber Length (inch)	Strength (g/tex)	Uniformity	Loan Value (¢/lb)	Lint Value* ($/acre)
BX2037GLT	635	0.31	5.5	1.08	29	81	48.9	256
FM2398GLTP	686	0.34	5.8	1.07	27	81	51.6	355
FM2574GLT	554	0.33	5.6	1.05	27	81	54.6	303
ST4880B3XF	341	0.26	4.6	1.02	22	78	48.2	165
ST4990B3XF	475	0.29	4.8	1.06	25	80	54.6	260
ST5471GLTP	573	0.31	5.6	0.96	23	77	52.9	303
ST5517GLTP	481	0.31	4.9	0.97	24	78	50.9	246
ST5707B2XF	515	0.35	5.9	1.02	25	80	49.8	256
Mean	533	0.31	5.3	1.0	25.4	80	52	274
CV %	32.1	8.6	9.5	4.4	10.5	1.3	8.1	34.5
P>F	0.4281	0.016	0.0496	0.0535	0.0962	0.0009	0.4407	0.4409
STD DEV	106	0.029	0.5	0.04	2	2	2.5	55

Note:

Turnout is higher with the table-top gin than using a conventional gin.

Highlighted values are significantly same as the highest value at $P<0.1$

2,4-D symptomology was observed at the trial.

TEXAS A&M AGRILIFE EXTENSION

http://cotton.tamu.edu/

Issued in furtherance of Cooperative Extension Work in Agriculture and Home Economics, Acts of Congree of May 8, 1914, as amended, and June 30, 1914, in cooperation with the United States Department of Agriculture. Edward G. Smith, Director, Texas A&M AgriLife Extension Service, The Texas A&M University System.

Department of Soil and Crop Sciences

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