REPLICATED AGRONOMIC COTTON EVALUATION (RACE) TRIAL IN THE ROLLING PLAINS OF TEXAS-2021

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Abstract

Cultivar selection is one of the most important decisions producers need to make before planting; however, it has become more difficult to make the decisions as new cultivars are available on market each year with advanced herbicide technologies. To help support cotton producers make decisions on cultivar selection, we conduct replicated on-farm large plot cultivar trials. Our objective of this project is to provide agronomic information of advanced cotton cultivars to producers in the Rolling Plains of Texas. Cotton trials were planted on-farm with plot size varying from 0.7 to 1.3 ac. The study was replicated three times and designed as randomized complete block design. Lint yield and fiber quality will be reported.

Introduction and objectives

Cultivar selection is the most important decision made by the cotton (*Gossypium hirsutum* L.) producers especially in the Rollins Plains of Texas, where dryland cotton production is dominant. With the expansion of transgenic technology, new seed treatments for both early season insects and disease management, and new genetics, cultivar selection has become even more critical, and one of the biggest expenses of growing cotton. Therefore, the objective of this project was to compare yield and lint quality of Stacked-Gene insect and herbicide tolerant cultivars grown in large plot replicated trials on producer-cooperator fields in the Rolling Plains region of Texas.

Materials and methods

Twelve cultivars were planted in 5 dryland and 1 irrigated fields across the Rolling Plains of Texas. Cultivar selection were determined with input from grower cooperators/committees, Extension faculty, and seed industry representatives. Plot size ranged from 0.7 to 1.3 acres in size, depending on the location (Table 1). Study was designed as a CRBD with 3 replications. All trials were machine harvested with grower harvesters. Plot weights were determined using a boll buggy equipped with integral electronic scales. Sub-samples from each plot were ginned with a conventional gin. Lint quality was quantified by a high-volume instrument (HVI) at the Fiber and Biopolymer Research Institute at Texas Tech University in Lubbock, TX. Analysis of variance was conducted using proc GLM of SAS. Highlighted values are significantly same as the highest value at $p < 0.1$ (Table 2-5).

Results and Discussion

In 2021, average yields across locations somewhat varied. Average variety yield of the irrigated location ranged from DP 2020B3XF 1665 lbs/ac to DP 1948B3XF 1343 lbs/ac (Table 2). Overall average yield of all varieties in the irrigated location was 1523 lbs/ac. Average variety yields across the dryland locations ranged from ST 5707B2XF 814 lbs/ac to NG 4936B3XF 347 lbs (Table 3,4,5). Overall average yield of all varieties across the dryland locations was 564 lbs/ac.

Table 1. Trial location, cooperator, planting date, harvesting date, information on plot size for 2021 Rolling Plains Replicated Agronomic Cotton Evaluation

County	Producer cooperators	County Extension Agents	Irri/ dry	Planting date	Harvest date	Rows x width	Seeding Rate (seeds ac^{-1})	DAP	Plot size (ac)
Collingsworth	Rex Henard	Kenny Patterson	I	5/22	11/24	6 rows x 40”	40000	186	0.7
Wilbarger	Donald Shoppa	Langdon Reagan	D	6/19	11/30	8 rows x 40”	24100	164	0.9
Childress	Cade Wyatt	Veronica Urbanczyk	D	6/3	11/20	4 rows x 40”	45000	170	1.3
Haskell	Gary Thomas	N/A	D	6/13	11/20	10 rows x 32”	45000	162	0.7
Stonewall	Billy Kirk Meador	Cody Myers	D	6/16		abandoned			
Kent	Dean Boyd	Brandon Cave/ Cody Myers	D	6/15		abandoned			

Table 2. Collingsworth County Mixed trait irrigated trial

Variety	Lint (Lbs/ac)	Gin TO (%)	Micronaire	Fiber Length (inch)	Strength (g/tex)	Unif.	Loan Value	Lint Value ($/acre)
DP2020B3XF	1665	26.2	3.1	1.19	29.9	81.2	50.5	842
FM2398GLTP	1574	26.1	3.3	1.15	30.3	80.8	52.9	835
PHY400W3FE	1630	26.9	3.2	1.18	31.9	80.9	50.8	828
NG4936B3X	1545	26.1	3.3	1.18	29.5	81.5	52.9	820
ST4993B3XF	1583	25.0	3.1	1.14	31.9	82.6	50.4	803
FM2498GLT	1545	24.8	3.4	1.18	29.9	80.5	51.5	795
DP2038B3XF	1527	27.2	3.1	1.10	28.6	79.3	51.2	784
NG4190B3XF	1465	25.1	2.9	1.17	29.8	81.3	48.0	703
PHY332W3FE	1536	25.1	2.9	1.14	30.3	79.0	44.7	688
NG5150B3XF	1412	24.1	2.8	1.14	28.1	78.7	47.3	667
PHY480W3FE	1454	23.2	2.8	1.14	29.8	81.9	44.5	656
DP1948B3XF	1343	23.7	2.8	1.21	29.7	79.6	44.2	593
Mean	1523	25	3.0	1.16	30.0	80.6	49.1	751
CV %	6.7	4.9	9.9	1.1	2.7	0.9	7.5	11.7
P>F	NS	NS	NS	0.0002	0.02	0.003	NS	NS
STD DEV	91	1	0.2	0.03	1.1	1.2	3.2	85

Table 3. Wilbarger County Mixed trait dryland trial

Variety	Lint (Lbs/ac)	Gin TO (%)	Micronaire	Fiber Length (inch)	Strength (g/tex)	Unif.	Loan Value	Lint Value ($/acre)
ST5707B2XF	483	32.5	4.5	1.06	30.3	80.8	53.3	257
PHY332W3FE	479	31.1	4.1	1.06	28.3	79.0	53.2	255
DP1948B3XF	441	30.6	4.0	1.11	31.1	80.8	56.5	249
PHY400W3FE	487	31.9	3.9	1.04	27.7	78.6	51.2	249
PHY480W3FE	476	31.0	3.9	1.05	29.6	81.1	51.9	247
NG4098B3XF	421	31.0	3.8	1.09	31.7	78.6	54.4	229
ST5600B2XF	449	33.0	4.5	1.04	28.4	79.4	51.0	229
ST4993B3XF	454	33.3	4.2	1.01	30.2	80.0	50.1	228
DP2020B3XF	434	30.3	3.8	1.06	27.0	79.6	50.8	220
NG4190B3XF	421	31.8	3.9	1.05	26.6	79.6	52.0	219
NG4936B3XF	365	28.5	3.9	1.07	28.2	80.1	53.5	195
DP2012B3XF	366	30.0	4.0	1.04	26.9	79.4	51.3	188
Mean	440	31	4.0	1.06	28.8	79.8	52.4	231
CV %	10.9	8.2	3.5	1.2	3.3	0.8	3.2	11.5
P>F	0.0489	NS	<.0001	<.0001	<.0001	0.0004	0.006	0.1
STD DEV	42	1	0.2	0.03	1.7	0.8	1.8	23

Table 4. Childress County XtendFlex trait dryland trial

Variety	Lint (Lbs/ac)	Gin TO (%)	Micronaire	Fiber Length (inch)	Strength (g/tex)	Unif	Loan Value	Lint Value ($/acre)
ST5707B2XF	814	30.8	4.4	1.11	30.9	81.1	55.7	454
NG4098B3XF	774	29.0	4.0	1.15	33.5	80.3	57.1	442
ST4993B3XF	807	36.5	4.8	1.06	31.1	81.0	53.9	435
DP1948B3XF	756	31.6	4.1	1.17	31.3	81.8	57.4	434
ST5600B2XF	756	33.4	4.9	1.09	30.5	81.0	55.7	421
DP2012B3XF	746	31.9	4.2	1.08	28.4	80.8	54.9	409
DP2020B3XF	684	32.0	4.0	1.10	27.7	80.4	56.2	385
NG4936B3XF	629	31.0	4.2	1.12	28.5	81.0	56.9	358
NG4190B3XF	638	32.5	3.9	1.10	28.1	81.1	56.0	357
Mean	734	32	4	1	30	81	56	411
CV %	7.5	3.0	2.7	1.0	3.1	0.8	1.1	7.9
P>F	0.0	<.0001	<.0001	<.0001	<.0001	NS	0.0	0.0
STD DEV	68	2.0	0.4	0.03	1.9	0.4	1.1	36

Table 5. Haskell County XtendFlex trait dryland trial

Variety	Lint (Lbs/ac)	Gin TO (%)	Micronaire	Fiber Length (inch)	Strength (g/tex)	Unif	Loan Value	Lint Value ($/acre)
ST5600B2XF	652	36.3	4.9	1.11	30.2	81.8	55.3	361
ST5707B2XF	611	31.7	4.6	1.14	32.4	82.9	57.4	350
NG4098B3XF	603	30.2	3.9	1.17	33.7	80.9	57.3	346
DP2012B3XF	583	36.2	4.4	1.11	28.9	81.3	56.4	328
DP2020B3XF	528	36.4	4.5	1.16	29.5	82.1	57.3	302
ST4993B3XF	533	36.5	4.7	1.11	31.8	82.5	56.6	301
NG4190B3XF	447	34.9	4.0	1.13	28.9	82.2	57.0	255
DP1948B3XF	363	32.5	3.8	1.18	31.2	81.4	57.5	209
NG4936B3XF	347	32.1	4.3	1.15	29.4	82.7	57.4	199
Mean	519	34	4.3	1.14	30.7	82.0	56.9	295
CV %	11.4	6.9	3.6	1.2	2.4	0.9	1.2	11.8
P>F	<.0001	0.010	<.0001	<.0001	<.0001	0.024	0.015	<.0001
STD DEV	110	2	0.4	0.03	1.7	0.7	0.7	61

Conclusion

We harvested four out of the six Replicated Agronomic Cotton Evaluations (RACE) trials that were conducted in Rolling Plains of Texas in 2021 by Texas A&M AgriLife Extension Service. The 2021 season started off with delayed planting due to wet planting conditions. Then turned off hot and dry causing the Rolling Plains to finish up with average yields or even some locations to have to be abandoned. The data generated from these RACE trials and other similar trials throughout the state, provide growers with updated information on the most marketed varieties and technology commercially available to them for 2021 and future years to come. The cotton data from the Rolling Plains region can be viewed at the website listed below. https://agrilife.org/txrollingplainsagronomy/sample-page-fertility/

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