2021 COTTON VARIETY AGRONOMY EVALUATION IN NORTHEAST TEXAS

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Introduction and Abstract

Cotton variety selection is an important decision in growing a cotton crop and affects many other management decisions throughout the production and marketing of a crop. Twenty six (26) cotton varieties were evaluated for yield in a replicated small plot trial near Commerce, Texas at the Cereal Crops Research Inc. (CCRI), Research and Teaching Farm. Entries included commercially available upland varieties from major companies, two conventional varieties (BRS 335 & UA222) and a hybrid pima X upland type (HA 1432). Varieties were evaluated for agronomic traits, yield, and fiber quality. The highest yielding variety was PHY 350 W3FE at 741.8 pounds (lbs) of lint per acre with 24 of the 26 varieties not statistically significantly different from the top variety for lint yield. The trial mean was 566.1 lbs of lint per acre and an average yield for the area. Bollworm pressure was low, not giving an advantage to the varieties with insect resistance traits. The entire trial was treated conventionally for weed control. The trial was planted late due to early season wet conditions and the season was cooler than normal but finished with a warm fall. Fiber quality as determined by HVI showed low micronaire on many of the varieties. The hybrid pima variety was not ginned on a roller gin to preserve fiber length but would be expected to have superior fiber value. Other varieties with better fiber quality included DP 1646, PHY 350, ST 4550 and ST 4993. This trial demonstrates the need for timely planting and selection of proper maturity for the Northeast Texas environment. Variety selection should be based on multiple year information with similar location and production practices.

Materials and Methods

Plots were seeded on June 18, 2021 as 2 row plots, 40 ft in length, 38 inch spacing, at 103,448 seeds per acre with a two-row cone planter in a randomized complete block design with 4 replications. Plots received a pre-emergent application of Prowl H2O and an early season cultivation. After emergence, seedlings were rated for vigor/size on a 1-10 scale with 10 being the largest. Plots were fertilized at planting with 100lbs of 18-46-0 placed in a band beside the row, then side-dressed in July with 99 units of N as Urea (46-0-0). In season weed control consisted of separate applications of Select and Envoke and a mid-season cultivation. Rows were harvested by removing bolls by hand beginning in November. 13’ 9” of a representative row was harvested per plot to equal a thousandth of an acre. Final populations were determined by counting the number of plants harvested and multiplying by 1000. Lint was deburred by hand. Samples were ginned to determine lint turnout and yield. Yield and trait analysis was done with ANOVA. Fiber samples from replications 1 and 2 were sent to Texas Tech Fiber Lab for quality determination by HVI.

Results and Discussion

The highest yielding variety was PHY 350 W3FE at 741.8 pounds (lbs) of lint per acre with 24 of the 26 varieties not statistically significantly different from the top variety for lint yield. The trial mean was 566.1 lbs of lint per acre and an average yield for the area. The trial was planted late due to wet conditions in the spring. The growing season was cooler than normal but finished with a warm fall. Bollworm pressure was low, not giving an advantage to the varieties with insect resistance traits. Plots were not sprayed in season for insects. Conventional varieties and the hybrid pima were in the same yield grouping.

Table 1. Dryland cotton variety evaluation near Commerce, TX in 2021. Twenty six varieties are ranked by lint yield and also evaluated by lint turnout and lint value per acre. Values in a column followed by the same letter are not statistically different.

Variety/Hybrid	Lint Yield lbs/acre		Lint Turnout		Lint Value $/acre	Yield Ranking 2020	Yield Ranking 2019
PHY 350 W3FE	741.8	a	0.436	a-d	$367.56	6	6
ST 4993 B3XF	693.3	ab	0.448	ab	$345.61		
NG 4098 B3XF	663.1	ab	0.402	efg	$299.39	7	
PX4B08 W3FE	650.5	ab	0.458	a	$300.21		
PHY 332 W3FE	635.0	ab	0.418	c-f	$278.00	2	
NG 4936 B3XF	612.8	ab	0.429	a-e	$271.78	24	5
PHY 443 W3FE	611.1	ab	0.446	abc	$266.32		
BRS 335	590.6	ab	0.387	g	$252.78	11	
PHY 390 W3FE	583.9	ab	0.455	a	$245.41		
DP 1646 B2XF	579.0	ab	0.442	abc	$272.71	19	11
UA 222	578.8	ab	0.411	d-g	$266.54	5	
PHY 480 W3FE	575.8	ab	0.447	ab	$242.87	4	3
ST 4550 GLTP	574.1	ab	0.450	ab	$274.42	8	
NG 5150 B3XF	572.0	ab	0.431	a-e	$248.53		
PHY 400 W3FE	566.4	ab	0.450	ab	$242.87	9	12
DG 3421 B3XF	555.6	ab	0.442	abc	$241.13	28	18
ST 5707 B2XF	552.9	ab	0.403	efg	$245.10	10	13
DG H959 B3XF	546.2	ab	0.400	fg	$237.32		
DG 3402 B3XF	540.5	ab	0.405	efg	$240.79		
PHY 300 W3FE	529.1	ab	0.443	abc	$213.23	1	1
DP 2020 B3XF	500.6	ab	0.429	a-e	$243.29	16	
FM 2398 GLTP	500.5	ab	0.451	ab	$230.48	26	17
HA 1432	483.8	ab	0.350	h	$231.50	20	14
PHY 500 W3FE	478.5	ab	0.453	ab	$194.89	14	
DP 1948 B3XF	403.6	b	0.423	b-f	$141.66	3	10
ST 4990 B3XF	398.9	b	0.414	def	$182.42	18	
Average	566.1		0.428				
P > F	0.0486		0.0001				
LSD (0.05)	171.6		0.0169				
CV	21.5		1.92				

The planting date and season somewhat favored the earlier maturing varieties and also affected fiber quality. Fiber quality as determined by HVI showed low micronaire on many of the varieties. The hybrid pima variety was not ginned on a roller gin which would have preserved fiber length. It would be expected to have superior fiber value. Other varieties with better fiber quality included DP 1646, PHY 350, ST 4550 and ST 4993. . Variety selection should be based on multiple year information with similar location and production practices. This trial demonstrates the need for timely planting and selection of proper maturity for the Northeast Texas environment.

This trial demonstrates the ability to grow hybrid pima and conventional varieties with similar yields and perhaps capture value in the market. The hybrid pima would need to be roller ginned and extra costs for transportation or roller

gin infrastructure would need to be covered by the higher fiber value. Despite the lack of traits in the hybrid there is also a higher seed cost because of the increased hybrid seed production cost.

Table 2. Dryland cotton variety evaluation at Commerce, TX in 2021. Lint was assessed by Texas Tech Fiber Lab for quality evaluation by HVI using 2 replicates. Loan value was determined with color and leaf standardized to 41-4.

Variety/Hybrid	Mic	Length		Uniformity	Strength		Loan Value
BRS 335	3.04	1.04	h	79.5	26.55	g	$42.25
DG 3402 B3XF	2.74	1.14	bcd	81.35	30.30	c-g	$44.65
DG 3421 B3XF	3.37	1.05	fgh	80.50	28.25	efg	$45.25
DP 1646 B2XF	3.35	1.17	bc	80.95	29.30	d-g	$48.03
DP 1948 B3XF	2.44	1.16	bc	82.60	31.45	c-f	$35.15
DP 2020 B3XF	2.82	1.13	b-f	81.50	28.75	d-g	$41.70
FM 2398 GLTP	3.14	1.11	c-h	81.40	29.70	c-g	$46.50
DG H959 B3XF	2.65	1.07	d-h	80.95	27.55	fg	$38.20
HA1432	2.94	1.28	a	84.70	41.05	a	$46.55
NG 4098 B3XF	2.87	1.19	b	81.90	35.80	b	$45.13
NG 4936 B3XF	3.11	1.12	c-g	80.95	29.05	d-g	$46.50
NG 5150 B3XF	2.96	1.12	c-h	81.60	29.50	d-g	$45.38
PHY 300 W3FE	2.67	1.10	c-h	81.95	29.75	c-g	$40.30
PHY 332 W3FE	2.87	1.16	bc	82.10	31.80	c-f	$43.78
PHY 350 W3FE	3.31	1.10	c-h	81.70	30.35	c-g	$49.55
PHY 390 W3FE	2.92	1.05	gh	80.10	28.05	efg	$42.03
PHY 400 W3FE	2.94	1.08	d-h	79.90	28.70	d-g	$42.88
PHY 443 W3FE	2.80	1.08	d-h	81.55	33.20	bcd	$43.58
PHY 480 W3FE	2.89	1.07	d-h	81.95	30.20	c-g	$42.18
PHY 500 W3FE	2.61	1.06	d-h	80.55	31.55	c-f	$40.73
PX4B08 W3FE	3.27	1.06	e-h	80.95	30.50	c-g	$46.15
ST 4550 GLTP	3.22	1.11	c-h	82.45	34.20	bc	$47.80
ST 4990 B3XF	3.01	1.13	b-e	81.10	27.25	fg	$45.73
ST 4993 B3XF	3.54	1.09	c-h	82.50	32.70	b-e	$49.85
ST 5707 B2XF	2.96	1.11	c-h	81.60	31.95	c-f	$44.33
UA 222	2.96	1.13	b-e	81.95	31.75	c-f	$46.05
Average	2.97	1.11		81.47	30.74		$44.25
P > F	0.1146	0.0001		0.2744	0.0001		0.18
$LSD_{(0.05)}$	NS	0.046		NS	2.83		NS
CV	9.7	2.01		1.58	4.46		8.95

Conclusions

- Several excellent yielding varieties are available for producer selection that include choices in herbicide and insect tolerant traits.
- Early season excess soil moisture delayed planting and a cool season affected maturity and fiber quality, especially mironaire.
- The trial was conducted conventionally for pests and insect pressure was low and did not favor varieties with insect protection traits.
- This trial demonstrates the need for timely planting and selection of proper maturity for the Northeast Texas environment.
- Varieties with higher fiber values included HA 1432, DP 1646, PHY 350, ST 4550, and ST 4993.
- The hybrid pima would need to be roller ginned to maximize fiber value.

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