2020 COTTON VARIETY AND 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 eight (28) 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, nine conventional varieties, two acala types (PHY 764 & Acala 1517-18) 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 300 W3FE at 618 pounds (lbs) of lint per acre with 9 of the 28 varieties not statistically significantly different from the top variety for lint yield. The trial mean was 451 lbs of lint per acre and slightly lower than average for the area. Bollworm pressure was low not giving an advantage to the varieties with insect resistance traits. The conventional variety UA222 was in the top yield grouping. The Acala and hybrid pima varieties did not yield in the top grouping but with the lower trial yield the increased fiber quality may compensate for yield with higher value per acre. Fiber quality, as determined by HVI were PHY 764, DP 1948, PHY 332, ST 5707, and UA222. HA 1432 had superior fiber qualities but would require roller ginning to capitalize on the length. Length and mic were reduced for all varieties compared to previous growing seasons. Variety selection should be based on multiple year information with similar location and production practices. Four varieties were in the top 10 for lint yield in 2019 and 2020; PHY 300, PHY 480, DP 1948, and PHY 350.

Materials and Methods

Plots were seeded on June 1, 2020 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 5 replications. Plots received a preemergent application of Trifluralin and an early season cultivation. Glyphosate tolerant varieties received a post emergent application of glyphosate and conventional varieties were hand weeded as needed. 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 ammonium nitrate (34-0-0). Rows were harvested by removing bolls by hand beginning in October. 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 300 W3FE at 618 pounds (lbs) of lint per acre with 9 of the 28 varieties not statistically significantly different from the top variety for lint yield. The trial mean was 451 lbs of lint per acre and slightly lower than average for the area. The lower yield is attributed to a wet spring, some early weed pressure, and a dry fruiting season. Bollworm pressure was low giving not giving an advantage to the varieties with insect resistance traits. Plots were not sprayed in season for insects.

The conventional variety UA222 was in the top yield grouping. The Acala and hybrid pima varieties did not yield in the top grouping but with the lower trial yield the increased fiber quality may compensate for yield with higher value per acre. All varieties were saw ginned and samples sent for HVI. Results were not available at the time of publication but the top fiber quality varieties as determined by HVI in 2019 were HA 1432, DP 1948, and PHY 764. The hybrid pima's lower yield has similar gross returns to the higher yielding uplands based on higher lint value if it could be

roller ginned. Samples have been sent for roller ginning and classing to confirm the improved quality. Despite the lack of traits in the hybrid there is still a higher seed cost because of the increased seed production. Currently transportation to a roller gin would be a large cost. Variety selection should be based on multiple year information with similar location and production practices. Four varieties were in the top 10 for lint yield in 2019 and 2020; PHY 300, PHY 480, DP 1948, and PHY 350. Unfortunately, not all varieties were tested in both years.

Table 1. Dryland cotton variety evaluation at Commerce, TX in 2020. Twenty-seven varieties are ranked by lint yield and also evaluated by population, and lint turnout. Values in a column followed by the same letter are not statistically different.

Variety/Hybrid	Lint Yield lbs/acre		Plant Population plants/acre		Lint Turnout		2019 Lint Yield Rank
PHY 300 W3FE	618	a	66,200	a	0.4912	a	1
PHY PX3D32	566	a	76,000	a	0.4707		
DP 1948 B3XF	541	a	52,600		0.4648		10
PHY 480 W3FE	538	a	69,200	a	0.4712		3
UA 222	531	a	67,400	a	0.4405		
PHY 350 W3FE	522	a	57,800		0.4582		6
NG 4098 B3XF	502	a	67,800	a	0.4295		
ST 4550 GLTP	501	a	54,200		0.4808	a	
PHY 400 W3FE	501	a	69,000	a	0.4854	a	12
ST 5707 B2XF	476		71,600	a	0.4315		13
BRS 335	466		68,600	a	0.4258		
PHY 764 WRF	465		54,800		0.4342		16
HQ 210CT	451		67,200	a	0.4208		
PHY 500 W3FE	431		68,400	a	0.4785		
TAM G11	426		43,000		0.4182		
DP 2020 B3XF	415		62,200	a	0.4560		
Ton Buster	408		59,400		0.4162		
ST 4990 B3XF	406		50,800		0.4569		
DP 1646 B2XF	404		44,600		0.4743		11
HA 1432	400		60,600		0.3622		14
Acala 1517-18	399		46,600		0.4267		
UA 107	398		55,000		0.4309		
NG 4936 B3XF	391		56,800		0.4598		5
TAM 211	381		50,600		0.4134		
FM 2398 GLTP	371		53,000		0.4684		17
UA 114	343		53,800		0.4141		
DG 3421 B3XF	334		46,800		0.4568		18
Average	451.3		58,690		0.4455		
P > F	0.001		.0001		.001		
LSD $_{(0.05)}$	129.8		14,970		0.0108		
CV	23.0		20.3		1.45		

Table 2. Dryland cotton variety evaluation at Commerce, TX in 2020. Ranked by lint value per acre using the loan value per cwt. Lint quality was assessed by Texas Tech Fiber Lab for quality evaluation by HVI using 2 replicates.

Variety/Hybrid	Mic	Length		Uniformity		Strength	Color -lf	Loan Value	Lint Value Per acre
PHY 332 W3FE	4.14	1.14	bc	82.3	abc	34.15	21-1, 31-3	$55.75	$315
PHY 300 W3FE	3.92	1.03	c	82.2	abc	28.90	31-3, 41-5	$48.63	$300
DP 1948 B3XF	3.84	1.17	b	83.1	abc	33.40	31-4, 21-2	$53.80	$291
UA 222	3.64	1.09	bc	81.4	abc	31.60	41-5	$53.38	$284
PHY 350 W3FE	3.85	1.07	bc	81.7	abc	30.65	21-2, 31-4	$50.88	$265

PHY 764 WRF	3.74	1.13	bc	83.7	ab	36.70	31-4, 41-4	$56.13	$261
ST 5707 B2XF	3.45	1.13	bc	82.7	abc	33.95	31-2, 31-4	$53.43	$254
ST 4550 GLTP	3.47	1.06	bc	82.0	abc	31.45	31-2, 31-3	$48.70	$244
BRS 335	3.68	1.06	bc	80.6	bc	28.00	31-1	$51.88	$242
NG 4098 B3XF	2.78	1.14	bc	80.3	bc	33.40	31-2, 41-6	$42.95	$216
PHY 480 W3FE	2.83	1.06	c	82.2	abc	29.20	31-4, 31-5	$39.88	$215
Ton Buster	3.95	1.05	c	80.1	bc	30.00	31-2, 31-3	$52.00	$212
PHY 400 W3FE	2.99	1.03	c	80.7	bc	28.05	21-3, 31-4	$41.95	$210
HQ 210CT	3.25	1.03	c	80.3	bc	28.05	31-4	$45.33	$204
ST 4990 B3XF	3.15	1.10	bc	82.5	abc	27.50	31-5, 31-7	$49.90	$203
PHY 500 W3FE	3.17	1.04	c	81.1	abc	30.70	31-3, 31-8	$46.90	$202
TAM G11	3.14	1.14	bc	79.5	c	30.50	31-1, 41-6	$47.38	$202
TAM 211	3.48	1.08	bc	82.7	abc	30.25	31-2, 31-6	$51.63	$197
FM 2398 GLTP	3.40	1.11	bc	82.7	abc	29.30	31-3, 32-2	$52.75	$196
DP 2020 B3XF	3.05	1.08	bc	81.0	abc	26.85	31-3, 31-6	$47.10	$196
DP 1646 B2XF	3.07	1.14	bc	81.9	abc	28.85	31-3, 31-5	$46.85	$189
Acala 1517-18	3.27	1.06	bc	80.5	bc	30.4	31-4, 41-4	$47.03	$188
UA 107	3.36	1.07	bc	82.3	abc	29.35	31-2, 31-3	$46.98	$187
HA 1432	2.99	1.26	a	84.6	a	39.70	31-1, 32-4	$45.78	$183
UA 114	3.78	1.05	c	82.1	abc	29.45	41-5	$51.60	$177
NG 4936 B3XF	3.04	1.08	bc	81.1	abc	26.05	31-4, 41-4	$43.85	$172
DG 3421 B3XF	3.80	1.05	c	81.5	abc	30.45	21-1, 31-1	$49.93	$167
Average	3.41	1.08		81.60		30.28	-	$48.97	$221
P > F	0.2997	0.0035		0.0782		0.0012	-	-	-
LSD (0.10)	NS	0.0562		1.89		3.172	-	-	-
CV	14.08	3.04		1.36		6.13	-	-	-

Conclusions

Several excellent yielding varieties are available for producer selection that include choices in herbicide and insect tolerant traits.
Early season excess soil moisture hampered plant growth and encourage weed growth followed by late season drought that further reduced yields.
Boll worm pressure was low and did not favor varieties with insect protection traits.
The conventional variety UA222 was in the top yield grouping.
The Acala and hybrid pima varieties did not yield in the top grouping but with the lower trial yield the increased fiber quality may compensate for yield with higher value per acre.
Hybrid seed has a higher seed cost than other conventional varieties.
Four varieties were in the top 10 for lint yield in 2019 and 2020; PHY 300, PHY 480, DP 1948, and PHY 350.

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