

2023 TEXAS HIGH PLAINS REPLICATED AGRONOMIC COTTON EVALUATION (RACE) TRIAL REPORT

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2023 Southern High Plains Replicated Agronomic Cotton Evaluation (RACE) Trial Results



Replicated Agronomic Cotton Evaluation (RACE) Trial in Hale County. Cooperator: Chaney Light

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Season Highlights

To better assist Texas cotton producers in the Southern High Plains, the Texas A&M AgriLife Extension Service-Cotton Agronomy program based out of Lubbock conducted five Replicated Agronomic Cotton Evaluations (RACE). These large, on-farm trials are managed by the collaborating producers and are placed across the Southern High Plains. High temperatures and lack of precipitation during the summer led to the failure of two dryland RACE trials. The persistent high temperatures and below average precipitation contributed to many fields being abandoned across the Southern High Plains. Crop conditions declined as the severe weather conditions persisted, severely affecting cotton production on the Southern High Plains. These conditions were reported across Texas. The USDA-NASS final Crop Progress and Condition report of 2023, released November 27, 2023, classified the Texas cotton crop as 38% very poor, 28% poor, 24% fair, 9% good, and 1% excellent.

List of Tables

<i>Table 1. Agronomic characteristics of varieties included in the 2023 Replicated Agronomic Cotton Evaluation (RACE) trials in the Southern High.....</i>	<i>5</i>
<i>Table 2. Weather summary and precipitation for 2023 RACE trial locations.....</i>	<i>6</i>
<i>Table 3. Crosby County RACE trial. Ranked by highest to lowest lint yield values.</i>	<i>7</i>
<i>Table 4. Hale County RACE trial. Ranked by highest to lowest lint yield values.</i>	<i>8</i>
<i>Table 5. Lubbock County RACE trial. Ranked by highest to lowest lint yield values.</i>	<i>9</i>

Table 1. Agronomic characteristics of varieties included in the 2023 Replicated Agronomic Cotton Evaluation (RACE) trials in the Southern High

Variety	Trial**	Maturity	Herbicide Package	Leaf Type	Plant Height	MIC	Verticillium	Bacterial Blight	Storm tolerance***
FM 1621 GL	I + D	Early	Glufos, Glyphos	Semi-Hairy	Medium	4.3	Fair	Resistant	7
NG 3930 B3XF	I	Early - Medium	Glufos, Glyphos, and Dicamba	Semi-Smooth	Medium-Tall	4.1 - 4.5	Good	Resistant	6.8
NG 3500 XF	D	Early - Medium	Glufos, Glyphos, and Dicamba	Smooth	Medium - Tall	3.7 - 4.6	Excellent	Resistant	5.8
DP 1820 B3XF	I	Early-Mid	Glufos, Glyphos, and Dicamba	Semi-Smooth	Med-Tall	4.08	Mod.	Resistant	3.5
DP 2123 B3XF	D	Early-Mid	Glufos, Glyphos, and Dicamba	Semi-Smooth	Medium	4.67	Mod. Tolerant	Mod. Susceptibility	4
ST 4993 B3XF	I + D	Early-Mid	Glufos, Glyphos, and Dicamba	Semi-Smooth	Medium	4.5	Fair	Resistant	7
NG 4098 B3XF	I	Medium	Glufos, Glyphos, and Dicamba	Semi-Smooth	Medium-Tall	4.3 - 4.5	Good	Resistant	7.8
NG 4792 XF	D	Medium	Glufos, Glyphos, and Dicamba	Smooth	Medium - Tall	3.7 - 4.6	Excellent	Resistant	5.8
DP 2239 B3XF	I + D	Mid	Glufos, Glyphos, and Dicamba	Smooth	Medium	4.4	Susceptible	Susceptible	4.5
DP 2335 B3XF	I + D	Mid	Glufos, Glyphos, and Dicamba	Smooth	Medium	3.8	Tolerant	Resistant	5.1
FM 2498 GLT	I + D	Mid	Glufos, Glyphos	Semi-Smooth	Medium - Tall	4.6	Very Good	Resistant	6

Glufosinate (Glufos), Glyphosate (Glyphos).

Information available on official company websites. Please refer to each individually for additional variety information.

** Variety present in dryland (D) or irrigated (I) trial(s).

*** Please refer to individual company website for scale.

Table 2. Weather summary and precipitation for 2023 RACE trial locations.

Crosby (June 7th - December 1st)					
	Precip.	Temp.	Temp.	DD60	# of
	(in.)	(°F)	(°F)		100
		Min.	Max.		°F
					days
June	0.72	57	107	474	6
July	1.37	63	106	686	7
Aug.	0.76	57	108	742	19
Sep.	1.62	57	104	510	7
Oct.	2.98	26	88	105	-
Nov.	0.05	23	86	-	-
Dec.	0	27	61	-	-
Total	7.5			2515	39

Weather summary provided by the National Weather Service. Precipitation data provided by PivoTrac

Hale (June 9th - December 1st)					
	Precip.	Temp.	Temp.	DD60	# of
	(in.)	(°F)	(°F)		100
		Min.	Max.		°F
					days
June	2.88	57	107	440	6
July	1.64	62	107	662	8
Aug.	1.28	61	106	721	14
Sep.	2.88	58	103	493	5
Oct.	2.76	25	89	105	-
Nov.	0.04	20	88	-	-
Dec.	0	26	57	-	-
Total	11.48			2420	33

Weather summary provided by the National Weather Service. Precipitation data provided by PivoTrac

Lubbock (June 16th - November 21st)					
	Precip.	Temp.	Temp.	DD60	# of
	(in.)	(°F)	(°F)		100
		Min.	Max.		°F
					days
June	0.51	58	109	378	9
July	1.16	64	110	772	13
Aug.	0.09	59	107	790	18
Sep.	3.71	60	107	558	6
Oct.	3.38	26	90	115	-
Nov.	0.09	31	87	-	-
Dec.	-	-	-	-	-
Total	8.94			2612	46

Weather summary and precipitation provided by the National Weather Service.

Table 3. Crosby County RACE trial. Ranked by highest to lowest lint yield values.

Cooperator: Ciera Huffstutler Soil Type: Pullman Silty Clay Loam Row spacing: 40 in.
 Planted: 6/7/2023 Irrigation: Drip (40 in.) Plot size: 8 rows x 1108 ft.
 Harvested: 12/1/2023 Seed/Acre: 38,600
 Prior Crop: Cotton Remainder of field: ARMOR 9371 B3XF

Variety	Yield lb/A	Turnout %	MIC	Length in.	Staple 1/32 in.	Uniformity %	Strength g/tex	Color Grade	Leaf Grade	Loan Value Cents/lb	Lint Value \$/A	Plant Population Plants/A
ST 4993 B3XF	951	37.0	5.33	1.08	34.6	82.2	32.5	31-1,31-1,31-2	3.3	50.23	477	23,631
DP 2335 B3XF	931	35.6	4.83	1.12	35.7	79.6	31.0	31-1,31-1,31-1	3.0	54.20	505	23,632
FM 2498 GLT	905	33.6	5.63	1.09	34.9	80.5	29.9	31-2,31-2,31-3	3.6	50.03	452	27,552
DP 2239 B3XF	874	36.9	5.03	1.14	36.4	81.8	30.3	31-1,31-1,31-1	3.3	53.93	471	23,849
FM 1621 GL	861	31.8	5.40	1.08	34.4	81.6	30.8	31-2,41-1,41-1	4.3	48.27	416	21,998
ARMOR 9371 B3XF*	833	35.3	5.13	1.09	34.7	81.0	28.5	31-1,31-1,31-2	3.3	50.77	423	22,978
DP 1820 B3XF	810	33.0	5.10	1.13	36.1	81.8	32.4	31-1,31-1,31-1	3.0	53.97	437	25,701
NG 4098 B3XF	801	31.8	4.90	1.12	35.8	80.5	32.2	31-1,31-1,41-1	4.0	53.43	428	26,136
NG 3930 B3XF	781	32.4	5.00	1.10	35.1	81.5	29.5	31-1,31-1,31-2	4.0	52.00	406	27,334
FM 1730 GLTP*	760	30.3	5.13	1.11	35.6	82.5	33.3	41-1,41-1,41-1	4.3	49.70	379	24,612
Mean	851	33.8	5.15	1.11	35.33	81.3	31.0		3.6	51.65	439	24,742
R ²	0.57	0.84	0.84	0.57	0.56	0.67	0.81		0.57	0.56	0.51	0.32
c.v.%	8.3	3.7	2.8	2.1	2.2	0.9	3.1		15.3	5.0	10.4	13.8
p-value	0.0468	0.0000	0.0001	0.0454	0.0579	0.0051	0.0001		0.0456	0.0573	0.1014	0.5475
LSD 0.05	100	1.8	0.20	0.03	NS	1.1	1.3		1.0	NS	NS	NS

Loan value calculated using the Cotton Incorporated (2023) Upland Loan Calculator Program (52.0 cents/lb).

CV (coefficient of variation), LSD (least significant difference, p <0.05), NS (no statistical significance).

*Grower entry.

Table 4. Hale County RACE trial. Ranked by highest to lowest lint yield values.

Cooperator: Chaney Light Soil Type: Estacado Loam/Pullman Clay Loam Row spacing: 40 in.
 Planted: 6/9/2023 Irrigation: Drip (80 in.) Plot size: 8 rows x 1531 ft.
 Harvested: 12/1/2023 Seed/Acre: 35,000
 Prior Crop: Grain Sorghum Remainder of field: FM 1830 GLT

Variety	Yield lb/A	Turnout %	MIC	Length in.	Staple 1/32 in.	Uniformity %	Strength g/tex	Color Grade	Leaf Grade	Loan Value Cents/lb	Lint Value \$/A	Plant Population Plants/A
DP 2335 B3XF	1,013	33.8	4.66	1.15	36.9	80.7	31.1	21-1,21-2,31-1	2.6	57.20	578	31,799
FM 2498 GLT	1,095	31.7	5.53	1.10	35.2	81.2	29.7	31-1,31-1,31-1	2.6	51.37	561	26,789
DP 1820 B3XF	1,005	32.8	5.26	1.16	37.1	82.5	32.2	31-1,31-1,31-1	3.0	53.83	541	28,096
DP 2239 B3XF	961	34.6	5.03	1.16	37.1	81.9	29.7	21-1,21-2,21-2	2.0	56.17	540	32,670
NG 4098 B3XF	948	28.1	4.50	1.18	37.8	80.8	32.7	31-1,31-1,31-1	3.3	56.60	537	26,789
DP 1822 XF*	958	29.9	5.26	1.12	36.0	81.4	31.2	21-2,31-1,31-1	2.6	54.10	518	32,126
ST 4993 B3XF	990	34.9	5.36	1.08	34.7	81.3	31.0	21-2,31-1,31-1	3.3	50.40	500	27,261
FM 1621 GL	972	30.8	5.43	1.11	35.4	81.1	31.5	41-1,41-1,41-1	4.6	47.73	464	27,225
NG 3930 B3XF	895	30.8	5.26	1.09	34.7	81.4	28.8	31-1,31-1,31-1	4.0	50.17	449	30,819
Mean	982	31.9	5.14	1.13	36.1	81.4	30.9		3.1	53.06	521	29,286
R ²	0.55	0.88	0.95	0.61	0.63	0.38	0.64		0.80	0.87	0.67	0.71
c.v.%	8.5	3.3	2.0	3.2	3.1	1.1	3.8		15.7	3.0	8.7	7.3
P-value	0.3064	0.0000	0.0000	0.0309	0.0223	0.4001	0.0149		0.0003	0.0000	0.0448	0.0072
LSD 0.05	NS	1.5	0.14	0.05	1.6	NS	1.6		0.7	2.27	65	3,030

Loan value calculated using the Cotton Incorporated (2023) Upland Loan Calculator Program (52.0 cents/lb).

CV (coefficient of variation), LSD (least significant difference, $p < 0.05$), NS (no statistical significance).

*Grower entry.

Table 5. Lubbock County RACE trial. Ranked by highest to lowest lint yield values.

Cooperator: Casey Jones Soil Type: Estacado Clay Loam Row spacing: 40 in.
 Planted: 6/16/2023 Irrigation: Pivot Plot size: 8 rows x 211-581 ft.
 Harvested: 11/21/2023 Seed/Acre: 38,000
 Prior Crop: Cotton Remainder of field: DP 1820 B3XF

Variety	Yield lb/A	Turnout %	MIC	Length in.	Staple 1/32 in.	Uniformity %	Strength g/tex	Color Grade	Leaf Grade	Loan Value Cents/lb	Lint Value \$/A	Plant Population Plants/A
ST 4993 B3XF	321	37.5	5.00	1.05	33.5	80.3	30.4	31-1,31-1,31-1	3.33	50.03	160	26,354
DP 2335 B3XF	318	36.4	4.70	1.05	33.6	79.7	29.4	31-1,31-3,32-1	3.00	50.33	160	28,205
DP 2239 B3XF	287	36.8	4.96	1.09	34.8	79.8	29.8	21-2,31-1,31-1	3.33	52.50	150	26,572
NG 3930 B3XF	280	33.0	4.96	1.06	33.9	80.4	28.7	31-1,31-2,31-3	3.33	50.77	142	30,056
NG 4098 B3XF	277	30.1	4.53	1.06	33.8	77.7	30.1	31-2,31-2,41-1	4.33	50.33	139	27,225
DP 1820 B3XF	260	33.2	5.13	1.06	33.9	79.4	30.2	31-1,31-1,31-2	3.66	50.30	131	27,334
Mean	291	34.5	4.88	1.06	33.9	79.5	29.8		3.50	51.71	147	27,624
R ²	0.50	0.84	0.84	0.57	0.42	0.67	0.81		0.57	0.46	0.65	0.24
c.v.%	12.8	2.1	3.6	2.2	2.1	0.9	2.0		12.8	4.5	9.8	12.7
p-value	0.3614	0.0000	0.0186	0.3627	0.3405	0.0103	0.0493		0.057	0.7913	0.1671	0.8045
LSD 0.05	NS	1.0	0.30	NS	NS	1.1	0.9		NS	NS	NS	NS

Loan value calculated using the Cotton Incorporated (2023) Upland Loan Calculator Program (52.0 cents/lb).

CV (coefficient of variation), LSD (least significant difference, $p < 0.05$), NS (no statistical significance).



<http://cotton.tamu.edu/>

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2023 Texas Panhandle Replicated Agronomic Cotton Evaluation (RACE)

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2023 Texas Panhandle Highlights

The objective of the Texas Panhandle replicated agronomic cotton evaluations (RACE Trials) is to provide producers regional, on-farm, and unbiased comparisons of top cotton varieties marketed for Panhandle cotton production systems. The 2023 Texas Panhandle RACE trials were planted at 5 locations under varying crop rotations, row spacings, and populations (Table 1). Four locations failed because of weather related damage (hail and flooding). The Hutchinson County trial was the only location harvested. Early to medium maturing varieties were planted at each location as a seed company entry or a cooperating producer entry (Table 2). Cumulative GDDs at the Hansford County location was 2,331 (Fig. 1), which was in-line with the regional 8-year average of 2,234 (GDDs). The trial was defoliated on October 11 and harvested on November 10, 2023. The highest yielding variety was FiberMax 2202 GL (Table 3). Varieties were significantly different ($p < 0.0001$), but there was no difference between the top 4 varieties. Fiber quality was significantly different between varieties ($p < 0.0001$). Plant stands were not significantly different between varieties (Table 4). There was no correlation between maturity at the time of defoliation and micronaire using nodes above cracked boll (Table 5) as a maturity guideline ($R^2 = 0.01$).

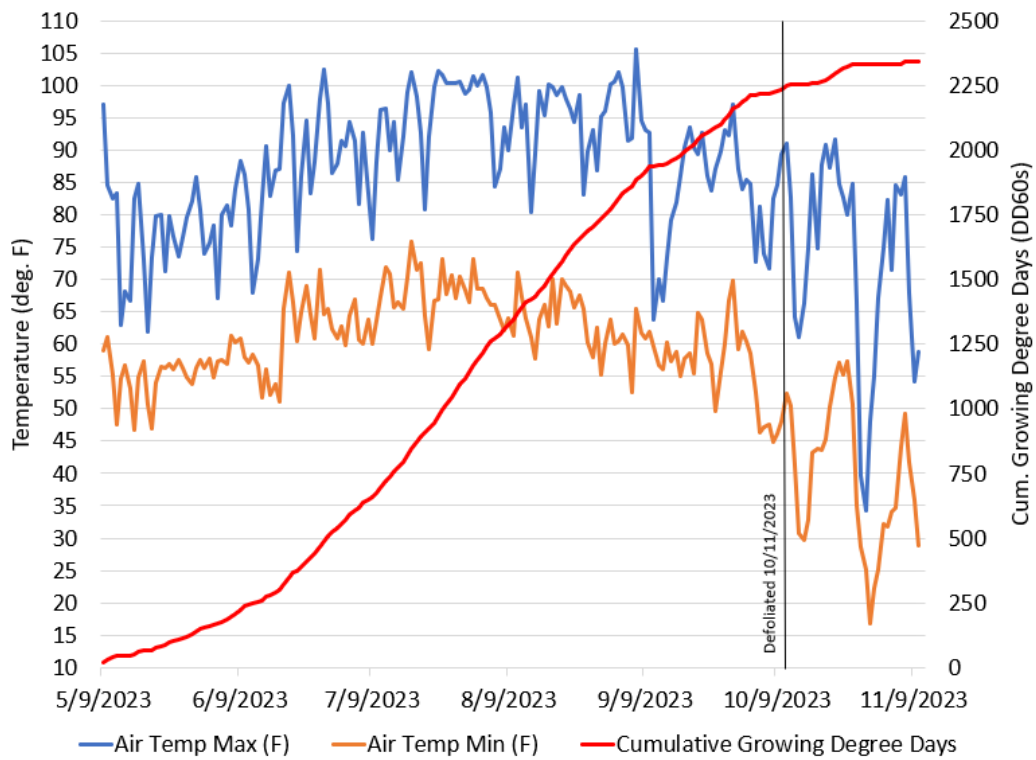


Figure 1. Daily temperature and cumulative growing degree days at the Hutchinson County trial.

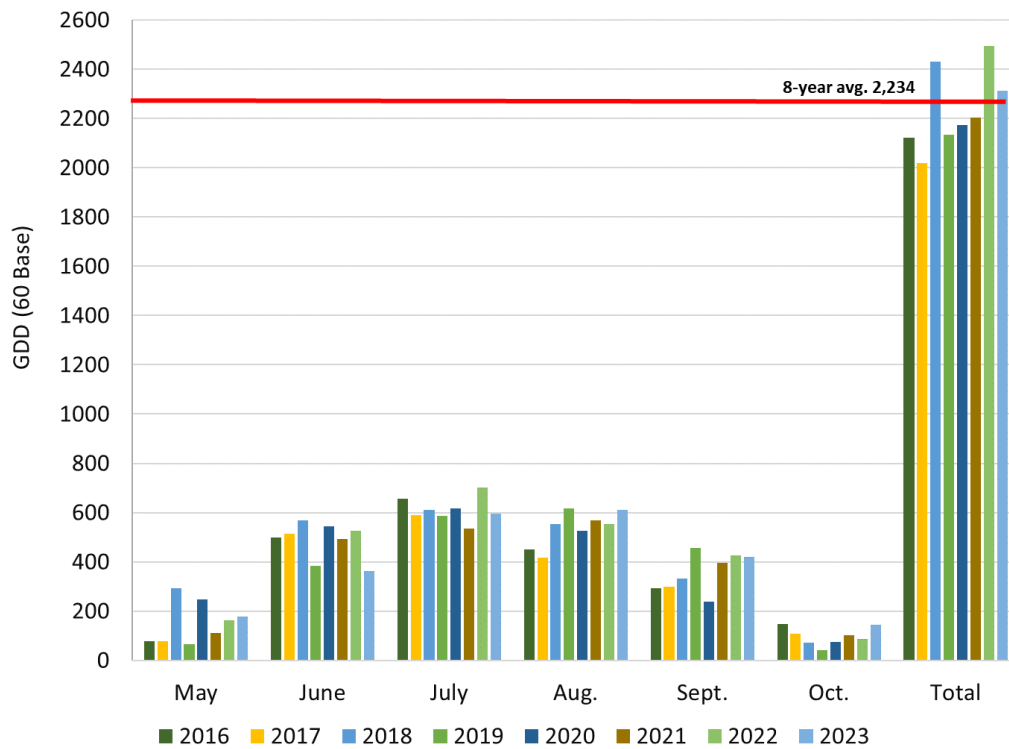


Figure 2. Monthly and cumulative growing degree days at Texas Panhandle trial locations from 2016-2024.

Table 1. 2023 Agronomic information by location.

County	Armstrong	Castro	Hartley	Hutchinson	Parmer
Location (Nearest Town)	Claude	Dimmitt	Hartley	Pringle	Farwell
Cooperator	Madison Bagwell	Blake Fennel	Bill Graff	Craig McCloy	Vic Christian
County Agent(s)	Sami Hatley & Jody Bradford	Kristie Keys	Dennis Coker & Laura Taylor	Hanna Conner & Kristy Slough	John Thobe & Janelle Duffy
Irrigation Regime	Dryland	Dryland	Irrigated	Irrigated	Limited Irrigated
In-Season Precipitation (in.)	----	----	----	~14.5 (7.5 inches in May)	---
Growing Degree Days (DD60s)	----	----	----	2,511	---
Herbicide Technologies	Gly, Gluf, XF	Gly, Gluf, XF	Gly, Gluf, XF	Gly, Gluf, XF	Gly, Gluf, XF
Planting Date	5/23/2023	5/23/2023	5/11/2023	5/9/2023	5/10/2023
Planting Pop (Seeds/ac)	28,000	16,000	65,000	60,000	40,000
Soil Temp. at Planting (°F)	74	81	70	67	85
Harvest Date	Failed - Flooding	Failed - Hail	Failed - Hail	11/10/2023	Failed - Hail
Row Spacing (in.)	30	60	30	40	30

Table 2. Characteristics of varieties evaluated in 2023 Panhandle RACE trials. All variety characteristics are obtained from company variety descriptions. Varieties listed are seed company and farmer entries.

Variety	Maturity	Pesticide Trait Package	Leaf Type	Storm Tolerance ¹	Plant Height	Mic	Verticillium Tol. ²	Bacterial Blight ²
Deltapine 1820 B3XF	Early-Med	Bollgard 3*, Glyphos., Glufos., and Dicamba	Semi-Smooth	3.5	Med-Tall	4.1	Moderate	Resistant
Deltapine 2012 B3XF	Early	Bollgard 3, Glyphos., Glufos., and Dicamba	Smooth	4	Med-Tall	4.3	Mod. Tol.	Resistant
Deltapine 2211 B3TXF [§]	Early	Bollgard 3 Thryvon, Glyphos., Glufos., and Dicamba	Smooth	6.7	Med-Tall	4.4	Susc.	Resistant
Deltapine 2317 B3TXF	Early	Bollgard 3 Thryvon, Glyphos., Glufos., and Dicamba	Smooth	5.1	Med-Tall	4.5	Mod. Tol.	Resistant
FiberMax 1621 GL	Early	Glyphosate and Glufosinate	Semi-Hairy	6	Medium	4.2	Fair	Resistant
FiberMax 2202 GL	Med	Glyphosate and Glufosinate	Semi-Smooth	5	Medium	4.6	Outstanding	Resistant
FiberMax 2398 GLTP	Med	Glyphosate and Glufosinate; Twin Link Plus [¥]	Semi-Smooth	5	Med-Tall	4.4	Very Good	Resistant
NexGen 3195 B3XF	Early	Bollgard 3, Glyphos., Glufos., and Dicamba	Semi-Smooth	9	Medium	4.0-4.2	Very Good	Very Tol.
Phytogen 205 W3FE†	Very Early	WideStrike 3, Glyphosate, Glufosinate, and Enlist	Semi-Smooth	Excellent	Short	4.5	Tolerant	Resistant
Phytogen 332 W3FE†	Early-Med	WideStrike 3, Glyphosate, Glufosinate, and Enlist	Semi-Smooth	Excellent	Med-Tall	4.1	Tolerant	Resistant

†Farmer entry

¹Storm Tolerance (1-9): 1=Loose Boll, 9=Tight Boll from company variety descriptions.

² Verticillium and bacterial blight tolerance from company descriptions.

[§] T in the trait code denotes a Thryvon variety.

* Bollgard 3 contains three Bt proteins: Cry1Ac, Cry2AB and Vip3A.

[¥] TwinLink Plus provides three Bt proteins: Cry1Ab, Cry2Ae and Vip3Aa19.

** WideStrike 3 contains three Bt proteins: Cry1Ac, Cry1F and Vip3A.

Table 3. 2023 Lint yield, quality, and loan value results for the Texas A&M AgriLife irrigated RACE Trial located in Hutchinson County, Craig McCloy Cooperator.

Variety	Seed Cotton Yield (lb/acre)	Turnout (%)	Lint Yield (lb/acre)	Seed Yield (lb/acre)	Micro-naire	Fiber Length (in.)	Unif. (%)	Strength (g/tex)	Leaf Grade	Lint loan Value (cents/lb)	Lint Value (\$/acre)
FM 2202 GL	5151	33	1710	2192	3.53	1.13	81.9	31.6	2.0	56.15	961
FM 1621 GL	4992	34	1683	2107	3.52	1.17	82.0	32.1	3.7	54.87	923
PHY 205 W3FE [†]	5123	32	1628	2339	4.03	1.09	81.5	32.2	2.0	55.83	908
FM 2398 GLT	4875	33	1624	2133	3.93	1.15	81.3	29.9	2.0	57.73	937
DP 1820 B3XF	4566	32	1483	1904	3.42	1.18	81.1	32.3	2.0	56.22	833
PHY 332 W3FE [†]	4530	30	1381	1982	3.03	1.16	81.5	31.3	2.0	52.17	694
DP 2012 B3XF	4239	32	1347	1881	3.12	1.15	81.2	31.3	2.0	52.73	713
NG 3195 B3XF	4249	31	1335	1871	2.97	1.15	82.3	31.1	2.3	50.65	677
DP 2317 B3TX	4150	30	1226	1801	2.64	1.16	81.3	29.7	2.0	45.62	559
DP 2211 B3T	3837	32	1217	1676	2.78	1.15	81.0	28.8	1.7	48.23	587
Test Average	4573	32	1466	1989	3.30	1.15	81.5	31.0	2.2	53.02	779
CV, %	3.5	3.3	5.0	5.6	7.2	1.8	1.2	3.9	14.9	5.9	7.8
p-value	<0.0001	0.0032	<0.0001	<0.0001	<0.0001	0.0067	0.7921	0.0231	<0.0001	0.0019	<0.0001
LSD	279	1.8	128	194	0.42	0.04	NS	2.1	0.6	5.5	109

Value for lint based on CCC loan value from grab samples at harvest and FBRI HVI results.

Lint loan value calculated from the 2023 Upland Cotton Loan Evaluation Model from Cotton Incorporated using a \$0.52/pound base.

Samples ginned on a Compass gin at TTU-FBRI.

[†]Farmer Entry

Table 4. Four-week post planting stand counts at 2 locations.

	Hutchinson Irrigated	Hartley Irrigated Failed
Planted Seeds/Acre	60,000	65,000
	---- Measured plants/acre----	
NG 3195 B3XF	24,720	12,052
NG 3406 B2XF	-----*	13,504
FM 1621 GL	27,770	14,375
FM 2202 GL	29,621	14,665
FM 2398 GLT	31,908	21,490
DP 1820 B3XF	32,452	3,920
DP 2012 B3XF	31,908	17,714
DP 2211 B3T	27,661	16,117
DP 2317 B3TX	27,661	11,906
PHY 205 W3FE [‡]	34,739	-----*
PHY 332 W3FE [‡]	30,274	-----*
Trial Average	29,871	13,971
CV, %	14.2	58.9
p-value	0.2217	0.4543
LSD	NS	NS

*Varieties not planted at the respective location.

‡Farmer entry

Stand counts were measured approximately 30 days post planting. Data represents stand counts from all 3 replications.

Table 5. Hutchinson County average nodes above uppermost cracked boll on the day of defoliation (October 11, 2023). Each value is an average of 6 plants representing 2 plants per plot.

Variety	Average Nodes Above Uppermost Cracked Boll
NG 3195 B3XF	10
FM 1621 GL	13
FM 2202 GL	10
FM 2398 GLT	12
DP 1820 B3XF	8
DP 2012 B3XF	10
DP 2211 B3T	11
DP 2317 B3TX	9
PHY 205 W3FE [‡]	7
PHY 332 W3FE [‡]	6
Trial Average	10
p-value	0.1802
LSD	NS

‡Farmer entry