2021 Mixed Technology Cotton Variety Trial – Adobe Walls Gin

Tommy Cartrite Farm
Sunray, TX

Dr. Randy Boman, Cotton Agronomics Manager – Windstar Inc.

Jerrell Key, Adobe Walls Gin Manager

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Summary

In 2019, a cotton variety testing program was established as a new service created by Windstar Inc. affiliated gins. These gins are working together to support a Cotton Agronomics Manager position. One of the components of this program is to work with local producers to scientifically evaluate varieties in a commercial on-farm setting from planting through ginning. These unique replicated trials are planted and harvested with the grower's commercial equipment. Each variety's round modules are combined across all replicates and then ginned and classed separately in an extremely detailed manner. Purging and weighing any remnant bale of from the press is also performed for each variety. All lint samples from each variety's commercial bales are then classed by the USDA-AMS classing office. This detailed ginning and classing management of all round modules for each variety is key to the success of this program and to the best of our knowledge is without peer in the U.S. ginning industry.

At this site in 2021, four varieties with XtendFlex technology, three varieties with Enlist technology, and three entries with Glytol-Liberty Link technology were planted in a center-pivot irrigated field in a scientifically valid trial with three replicates.

Minimal crop damaging weather events during the growing season were noted, and growing conditions were such that good yields and excellent quality were obtained. This project escaped hail events that occurred in the surrounding area. The experiment was able to stay on track with growth and development, and excellent observational, yield, and quality data were obtained. It should be noted that by late July, Verticillium wilt disease symptomology appeared in the trial. This disease symptomology increased through the end of the season. By late September, considerable defoliation of susceptible entries occurred as a result of this disease pressure. End of season visual Verticillium wilt ratings were taken in each individual plot on September 30 and are reported in Table 2. Verticillium wilt disease potentially had an impact on these results.

Harvest results indicated that statistically significant differences were observed. Lint yields ranged from a high of 1649 lb/acre (FM 2398 GLTP) to a low of 1316 lb/acre (DP 2115 B3XF), and averaged 1463 lb/acre (Table 1). Average Loan rate for varieties from commercially ginned was good to excellent and classed bales varied from a high of $0.5783/lb (FM 1730 GLTP) to a low of $0.5557/lb (PHY 332 W3FE). Overall mean Loan rate for the trial across all entries was $0.5694/lb. When including lint Loan value on a per acre basis, net gin credit (defined as seed value minus ginning costs) and planting seed cost/acre, statistically significant differences were found among varieties for net value/acre. Numerically, FM 2398 GLTP had the highest net value at $901/acre, and DP 2115 B3XF had the lowest at $667/acre.

Table 2 presents in-season data including stand establishment percentage, vigor, nodes above white flower (NAWF) and plant height on three sampling dates, nodes above cracked boll (NACB) on September 30, and a visual estimate of storm resistance. Plant stands averaged over 44,000/acre. Stand establishment percentage (number of plants/acre counted on June 21 divided by the 65,000 seed/acre seeding rate times 100) ranged from a high of 84.9% (PHY 205 W3FE) to a low of 55.0% (NG 3195 B3XF), with a mean of 68%. NAWF at early bloom averaged 7.8 across entries, mid-bloom averaged 4.0, and late bloom averaged 2.4. This trial reached hard cutout (terminal blooms) around the end of August. Plant heights were extremely well controlled with mepiquat chloride applications which are noted below. Statistically significant differences were noted in plant height at pre-bloom. Final plant heights were taken on September 30, and the mean height across all entries was 24.5 inches. The range in plant height was 21.3 inches (PHY 210 W3FE) to 26.7 inches (DP 2123 B3XF, NG 3195 B3XF, and PHY 332 W3FE). NACB (a quantitative measure of crop maturity) values for all varieties were recorded on September 30, and averaged 3.8. These values ranged from a low (most apparent maturity) of 2.5 (FM 1730 GLTP and PHY 205 W3FE) to a high (least apparent maturity) of 5.3 (PHY 332 W3FE). One node of difference can equate to approximately 3 days difference in crop maturity. This indicates that some unopened bolls in some varieties were being pushed into October to gain additional maturity. Verticillium wilt disease impact on the plants was very obvious when the NACB count was determined on September 30. Therefore, a visual estimate of Verticillium wilt diseased plants was also performed. This quick visual estimate included leaf canopy observations only. The high amount of variability in the disease symptomology made this visual estimate difficult to evaluate. A scale of 1 to 5, with 1 being the best and 5 being the worst assigned ratings, was used to evaluate each individual plot. All varieties were exhibiting some level of Verticillium wilt diseased leaf symptomology. The trial mean for this rating was 3.1, with the range of 2.3 (DP 2123 B3XF) to 4.0 (DP 2115 B3XF and NG 3195 B3XF). It should be noted that although some varieties express a high degree of disease symptomology in the leaf canopy, they may still perform relatively well.

Table 3 provides the USDA-AMS classing results from each commercial bale for each variety and the variety averages. Averages of commercial bales for each variety indicate that color grades were typically 11 (highest quality possible) or 21 (slightly lower quality) across entries. Leaf grades were excellent and ranged from about 1.5 (NG 3930 B3XF and PHY 332 W3FE) to 2.0 (DP 2115 B3XF). Staple averaged 36.6 and ranged from an average high of 36.9 (multiple entries) to an average low of 35.7 32^{nds} inch (PHY 205 W3FE). Micronaire averaged 3.8 across all varieties, and was generally good to excellent. Average micronaire values ranged from a high of 4.2 (PHY 205 W3FE) to a low of 3.6 (DP 2115 B3XF and PHY 332 W3FE). No bark contamination was noted in commercially classed bales. Fiber strength ranged from a high of

31.8 g/tex (FM 1730 GLTP) to a low of 28.7 g/tex (DP 2115 B3XF). Uniformity ranged from a high of 81.4% (PHY 205 W3FE) to a low of 79.8% (DP 2123 B3XF).

Disclaimer: Readers should realize that results from one trial do not represent conclusive evidence that the same response would occur where conditions vary. Multi-site and multi-year data are always best. For this trial, good scientific techniques were used and the results are presented to indicate what actually occurred in the trial. Context of the environment, overall growing season impact, management techniques, and trial methodology used are important and must be considered.

Site Information and Methods

Elevation: 3455 ft

Previous crop: 285 bu/acre corn in 2020

Tillage system: vertical-till

Planted: May 7

Replicates: 3 replicates in a randomized complete block design

Plot width: 8-row plots

Plot length: trial was planted in circular rows; ~3,000 ft for long rows and ~1900 ft for short rows

Seeding rate: 65,000 seed/acre

Days from planting to first bloom: 75 (July 20)

30-inch rows under center pivot irrigation

Total rainfall May through September: ~6.8 inches

May – 2.3, June – 1.2, July – 2.2, August – 0.4, September 0.7

Total irrigation April through September: ~15.1 inches

April 3.8, May 0.7, June 2.6, July 2.4, August 4.2, September 1.4

Fertility management: No nitrogen fertilizer applied

Herbicide management:

Preplant burndown (~March 31) - 16 oz/acre (2,4-D + dicamba) + 2 oz/acre flumioxazin

Preemergence (~May 13) - 1 qt/acre Roundup Powermax + 1.25 qt/acre Warrant + 17 lb/100 gal ammonium sulfate

Post emergence (June 12) – 43 oz/acre glufosinate + 1 pt/acre Outlook + 2.9 lb/acre ammonium sulfate

Post emergence (June 24) – 8 oz/acre quizalofop (Targa) + 3.6 lb/acre ammonium sulfate)

Post emergence (July 16) – 3 pt/acre Warrant + 44 oz/acre Roundup Powermax + 43 oz/acre glufosinate + 1 pt/100 gal crop oil concentrate + 3.6 lb/acre ammonium sulfate

Post emergence (July 30) – 16 oz/acre Volunteer + 1 qt/acre crop oil concentrate

Insecticides: 4.5 oz/acre acephate (June 12), 4.5 oz/acre acephate (June 24), 1.1 oz/acre Assail 70WP (July 6)

Plant growth regulators: 4 oz/acre mepiquat chloride (July 6), 8 oz/acre Pentia (July 16), 16 oz/acre mepiquat chloride (July 30), 24 oz/acre mepiquat chloride (August 25)

Harvest aids: 42 oz/acre ethephon + 11 oz/acre Folex (October 14), 1 qt/acre Parazone (October 24)

Harvesting: November 7 using a John Deere CS690, with harvested area calculated by the GPS on the stripper monitor. Variable plot length (~2,100 ft) was harvested with 1 round module harvested/plot. Round modules were weighed using the CS690 scale, and all round modules from individual plots were weighed at the Adobe Walls Gin.

Commercial ginning: Round modules for all 3 reps of each variety were staged together (1 per plot, with 3 reps = 3 total per variety) and commercially ginned separately by Adobe Walls Gin. Commercial ginning included: cleaning module feeder, clearing gin stream, dumping seed rolls, and purging remnant bale in press. This process was initiated before the first variety module was ginned and then repeated for each variety module in trial.

Remnants were ejected from the bale press and weighed, but not sampled for USDA-AMS classing. Only data from commercial bales are included in classing data for each variety.

Lint value: Table 1 is based on CCC Loan value from commercial ginning and USDA-AMS classing results.

List of Tables

Acknowledgements

Adobe Walls Gin would like to thank Tommy Cartrite for committing equipment, land, and time to conduct and manage the trial. Ramon Gonzalez provided excellent support and we appreciate his assistance. Gratitude is expressed to participating seed companies for providing testing seed. These include Deltapine, FiberMax, NexGen, and PhytoGen. Detailed ginning was performed by Malcom Jones, Aaron Moore, and the Adobe Walls Gin ginning crew and a big thank you is extended to this hard-working group.

ADOBE WALLS GIN

2021 Mixed Technology Trial Variety Descriptions – Adobe Walls Gin

Tommy Cartrite Farm
Sunray, TX

Dr. Randy Boman
Cotton Agronomics Manager

Variety Descriptions from Company Literature and Websites

DP 2115 B3XF Roundup Ready Flex (glyphosate), Liberty Link (glufosinate), and dicamba stacked herbicide tolerance technologies stacked with Bollgard 3 Bt technology. Early maturity. Semi-smooth leaves, medium plant height, storm resistance 4 (on scale of 1 = tight, 9 = loose). ~ 37.2 staple, strength ~30.4 g/tex. Disease ratings: Fusarium wilt – n/a, Verticillium wilt – moderately susceptible, Bacterial blight – susceptible.

DP 2123 B3XF Roundup Ready Flex (glyphosate), Liberty Link (glufosinate), and dicamba stacked herbicide tolerance technologies stacked with Bollgard 3 Bt technology. Early to early-medium maturity. Semi-smooth leaves, medium plant height, storm resistance 4 (on scale of 1 = tight, 9 = loose). ~ 36.5 staple, strength ~30.7 g/tex. Disease ratings: Fusarium wilt – n/a, Verticillium wilt – moderately tolerant, Bacterial blight – moderately susceptible.

FM 1730 GLTP GlyTol (glyphosate) and Liberty Link (glufosinate) stacked herbicide tolerance technologies stacked with TwinLink Plus Bt technology. Early-medium maturity. Semi-smooth leaves, short/compact plant height, storm resistance 5 (on scale of 9 = tight, 0 = loose). ~ 37.4 staple, strength ~32 g/tex. Disease ratings: Fusarium wilt – very good, Verticillium wilt – good, Bacterial blight - resistant.

FM 2202 GL GlyTol (glyphosate) and Liberty Link (glufosinate) stacked herbicide tolerance technologies. Mid maturity. Semi-smooth leaves, moderate plant height, storm resistance 5 (on scale of 9 = tight, 0 = loose). ~35.5 staple, strength ~32 g/tex. Disease ratings: RKN/Fusarium wilt – fair, Verticillium wilt – outstanding, Bacterial blight - resistant.

FM 2398 GLTP GlyTol (glyphosate) and Liberty Link (glufosinate) stacked herbicide tolerance technologies stacked with TwinLink Plus Bt technology. Medium maturity. Semi-smooth leaves, medium-tall/vigorous plant height, storm resistance 5 (on scale of 9 = tight, 0 = loose). ~ 36.5 staple, strength ~30 g/tex. Disease ratings: Fusarium wilt – fair, Verticillium wilt – very good, Bacterial blight - resistant.

NG 3195 B3XF Roundup Ready Flex (glyphosate), Liberty Link (glufosinate), and dicamba stacked herbicide tolerance technologies stacked with Bollgard 3 Bt technology. Early-Medium maturity. Storm tolerance 7 (scale of 0 = very loose, 9 = very storm tolerant), leaf hair smooth, plant height medium, node of first fruiting branch (avg) 6.0, staple 36-37, strength 30-31.

Diseases (on scale of 0 very susceptible, 9 superior resistance): Fusarium wilt - no data, Verticillium wilt 5, Bacterial blight 2.

NG 3930 B3XF Roundup Ready Flex (glyphosate), Liberty Link (glufosinate), and dicamba stacked herbicide tolerance technologies stacked with Bollgard 3 Bt technology. Early-Medium maturity. Storm tolerance 7 (scale of 0 = very loose, 9 = very storm tolerant), leaf hair semi-smooth, plant height medium-tall, node of first fruiting branch (avg) 6.7, staple 37-38, strength 29-30. Diseases (on scale of 0 very susceptible, 9 superior resistance): Fusarium wilt - no data, Verticillium wilt 7, Bacterial blight 8.

PHY 205 W3FE Enlist Technology: Widestrike 3 Bt technology stacked with triple herbicide technologies including Roundup Ready Flex (glyphosate) tolerance, Liberty Link (glufosinate), and Enlist herbicide (2,4-D choline) tolerance. Very early maturity. Short growth habit. Semi-smooth leaf, storm tolerance - excellent. Bacterial blight - resistant. Verticillium wilt - excellent. Root knot nematode –resistant. Reniform nematode – resistant.~35 staple, ~30 g/tex strength.

PHY 210 W3FE Enlist Technology: Widestrike 3 Bt technology stacked with triple herbicide technologies including Roundup Ready Flex (glyphosate) tolerance, Liberty Link (glufosinate), and Enlist herbicide (2,4-D choline) tolerance. Early maturity. Short growth habit. Smooth leaf, storm tolerance - excellent. Bacterial blight - resistant. Verticillium wilt - excellent. ~36.8 staple, ~31.3 g/tex strength.

PHY 332 W3FE (tested as PX3D32 W3FE) Enlist Technology: Widestrike 3 Bt technology stacked with triple herbicide technologies including Roundup Ready Flex (glyphosate) tolerance, Liberty Link (glufosinate), and Enlist herbicide (2,4-D choline) tolerance. Early-mid maturity. Medium-tall plant height, Semi-smooth leaf, storm tolerance – very good. Bacterial blight - resistant. Verticillium wilt - good. Root knot nematode –resistant. Reniform nematode – resistant. ~37 staple, ~30.5 g/tex strength

For the latest Texas A&M AgriLife Research and Extension information from Dr. Terry Wheeler, and Dr. Cecilia Monclova-Santana (lubbock.tamu.edu):

Bacterial blight disease variety reaction information:
https://lubbock.tamu.edu/files/2021/01/Variety-guide-for-bacterial-blight-ratings-Jan-2021.pdf

Verticillium wilt disease variety reaction information:
https://lubbock.tamu.edu/files/2021/11/Verticillium-wilt-variety-trials-2021.pdf

Fusarium wilt disease variety reaction information:
https://lubbock.tamu.edu/files/2021/12/Cotton-Disease-Report-2021.pdf

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Table 1. Harvest results for the center pivot irrigated mixed technology cotton variety trial, Cartrite Farm, Sunray, TX, 2021.

Entry	Lint turnout	Seed turnout	Bur cotton yield	Lint yield	Seed yield	Lint loan value	Lint loan value	Net gin credit	Seed/tech cost	Net value	
	---------- % ----------		---------- lb/acre ----------			$/lb	---------- $/acre ----------				
FM 2398 GLTP	35.1	40.6	4699	1649	1906	0.5721	944	64	106	901	a
FM 2202 GL	36.4	43.0	4296	1564	1847	0.5740	898	71	74	895	a
PHY 205 W3FE	32.8	41.5	4668	1533	1937	0.5676	870	69	113	826	b
DP 2123 B3XF	30.6	43.1	4729	1448	2038	0.5732	830	78	90	818	b
NG 3195 B3XF	35.0	42.2	4254	1489	1793	0.5714	851	66	115	802	bc
NG 3930 B3XF	32.8	43.9	4409	1445	1936	0.5734	828	77	105	801	bc
PHY 332 W3FE	32.2	43.1	4482	1442	1930	0.5557	801	74	116	759	cd
PHY 210 W3FE	32.7	42.5	4284	1401	1820	0.5723	802	68	113	757	cd
FM 1730 GLTP	32.6	42.0	4117	1343	1730	0.5783	777	63	109	731	d
DP 2115 B3XF	36.1	41.0	3643	1316	1493	0.5563	732	52	116	667	e
Test average	33.6	42.3	4358	1463	1843	0.5694	833	68	106	796	
CV, %	--	--	4.3	4.3	4.3	--	4.3	4.2	--	4.9	
OSL	--	--	0.0001	0.0002	0.0001	--	0.0001	0.0001	--	0.0001	
LSD	--	--	262	90	112	--	51	4	--	55	

For net value/acre, means within a column with the same letter are not significantly different.
CV - coefficient of variation.
OSL - observed significance level, or probability of a greater F value.
LSD - least significant difference at the 0.10 level, NS - not significant.
Note: some columns may not add up due to rounding error.

Assumes:
$3.30/cwt commercial ginning cost.
$230/ton for seed.
Net gin credit is defined as seed credit minus ginning expense.
Value for lint based on CCC loan value from commercial ginning and USDA-AMS classing results.

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Table 2. Plant observation results from the center pivot irrigated mixed technology cotton variety trial, Cartrite Farm, Sunray, TX, 2021.

Entry	Final population	Stand establishment	Vigor	Nodes above white flower			Plant height			Nodes above cracked boll	Verticillium wilt visual rating	Storm resistance
				Early bloom	Mid bloom	Late bloom	Prebloom	Early bloom	Final			
	plants/acre	%	1-5 visual scale, 5 best	count			inches			count	1-5 visual scale, 5 worst	1-9 visual scale, 9 best
	21-Jun	21-Jun	21-Jun	27-Jul	12-Aug	23-Aug	13-Jul	27-Jul	30-Sep	30-Sep	30-Sep	7-Nov
DP 2115 B3XF	42,108	64.8	3.3	8.0	4.2	2.6	18.1	20.3	25.8	3.7	4.0	5.2
DP 2123 B3XF	50,530	77.7	4.0	8.3	4.1	2.4	19.5	22.4	26.7	4.1	2.3	5.7
FM 1730 GLTP	41,818	64.4	3.3	7.9	3.8	2.3	16.7	19.6	21.7	2.5	2.7	5.3
FM 2202 GL	42,108	64.8	3.7	7.8	3.9	2.3	16.5	20.5	24.9	3.6	2.7	6.7
FM 2398 GLTP	40,366	62.1	3.0	7.6	3.7	3.0	16.5	21.4	24.2	4.1	3.3	7.0
NG 3195 B3XF	35,719	55.0	3.3	8.5	4.2	2.6	18.1	24.0	26.7	4.8	4.0	5.7
NG 3930 B3XF	46,464	71.5	4.2	8.3	4.2	1.9	16.9	20.8	24.0	4.7	2.7	6.3
PHY 205 W3FE	55,176	84.9	4.0	7.3	3.8	2.0	16.5	20.1	22.9	2.5	2.7	7.8
PHY 210 W3FE	37,171	57.2	3.3	7.3	3.6	2.3	16.1	18.4	21.3	2.8	3.7	8.0
PHY 332 W3FE	50,239	77.3	4.0	7.1	4.6	2.8	18.9	24.5	26.7	5.3	2.7	6.3
Test average	44,170	68.0	3.6	7.8	4.0	2.4	17.4	21.2	24.5	3.8	3.1	6.4
CV, %	9.7	9.7	6.6	4.6	7.6	21.5	6.3	5.1	4.4	17.3	19.2	4.9
OSL	0.0004	0.0004	0.0001	0.0009	0.0189	0.3433	0.0114	0.0001	0.0001	0.0003	0.0137	0.0001
LSD	6,043	9.3	0.3	0.5	0.4	NS	1.6	1.5	1.5	0.9	0.8	0.5

CV - coefficient of variation.

OSL - observed significance level, or probability of a greater F value.

LSD - least significant difference at the 0.10 level, NS - not significant.

ADOBE WALLS GIN

Table 3. Commercial classing data for the center pivot irrigated mixed technology cotton variety trial, Cartrite Farm, Sunray, TX, 2021.

Variety and Bale Number	Color Grade-Quadrant grade-quadrant	Color digit 1	Color digit 2	Leaf grade	Staple 32nds inch	Micronaire units	Extraneous matter	Remarks --	Strength g/tex	Rd %	+b %	Trash % area	Uniformity %	Length 100ths inch	Loan rate cents/lb
DP 2115 B3XF															
9107105	11-2	1	1	2	36	3.6	.	.	29.7	80.3	9.5	1	81.4	113	57.25
9107106	11-2	1	1	2	35	3.5	.	.	28.0	79.6	9.5	2	80.5	110	55.35
9107107	11-3	1	1	2	36	3.4	.	.	29.1	79.6	10.0	1	80.9	112	52.30
9107108	11-3	1	1	2	35	3.6	.	.	27.8	80.4	9.7	2	79.8	110	54.80
9107109	11-2	1	1	2	35	3.7	.	.	29.4	80.3	9.5	1	79.6	110	55.40
9107110	11-3	1	1	2	36	3.8	.	.	27.7	80.1	9.7	1	79.4	111	56.30
9107111	11-1	1	1	2	36	3.7	.	.	29.5	80.9	9.8	1	80.8	111	57.35
9107112	11-3	1	1	2	36	3.7	.	.	28.6	80.4	9.8	2	79.8	111	56.30
Average	--	1.0	1.0	2.0	35.6	3.6	none	none	28.7	80.2	9.7	1.4	80.3	111.0	55.63
DP 2123 B3XF															
9107096	11-2	1	1	2	37	3.9	.	.	30.5	80.5	9.0	2	79.2	117	57.05
9107097	11-1	1	1	2	37	4.1	.	.	31.5	80.6	9.2	2	80.1	115	57.80
9107098	21-1	2	1	2	37	4.0	.	.	31.0	79.3	9.0	2	81.1	114	57.80
9107099	11-1	1	1	1	36	3.9	.	.	29.8	80.6	9.5	1	79.1	113	56.80
9107100	11-2	1	1	2	36	3.9	.	.	29.3	80.0	9.4	1	78.9	111	56.70
9107101	11-2	1	1	2	37	4.1	.	.	30.4	79.9	9.4	2	80.3	114	57.60
9107102	11-1	1	1	1	37	3.9	.	.	30.0	80.9	9.4	1	80.6	115	57.60
9107103	11-1	1	1	1	37	4.1	.	.	31.1	80.6	9.3	1	79.5	114	57.25
9107104	11-2	1	1	1	37	4.1	.	.	32.6	81.2	9.1	1	79.2	114	57.25
Average	--	1.1	1.0	1.6	36.8	4.0	none	none	30.7	80.4	9.3	1.4	79.8	114.1	57.32
FM 1730 GLTP															
9107087	21-1	2	1	2	38	3.7	.	.	31.9	81.6	8.0	1	81.4	118	57.95
9107088	11-2	1	1	2	38	3.8	.	.	31.6	82.3	8.5	1	81.5	120	57.95
9107089	11-2	1	1	2	38	3.8	.	.	32.8	81.6	8.4	2	82.2	118	58.00
9107090	11-2	1	1	1	37	3.7	.	.	31.2	82.1	8.4	1	80.1	117	57.80
9107091	11-1	1	1	2	38	3.8	.	.	31.6	82.8	8.4	1	82.7	118	58.00
9107092	11-2	1	1	2	38	4.0	.	.	31.5	81.9	8.4	2	81.3	118	57.95
9107093	11-1	1	1	2	37	3.8	.	.	32.6	82.5	8.3	2	81.5	117	57.80
9107094	11-1	1	1	2	38	3.9	.	.	32.3	82.5	8.5	2	81.2	118	57.95
9107095	11-1	1	1	1	37	3.9	.	.	30.3	82.6	8.8	1	79.1	114	57.05
Average	--	1.1	1.0	1.8	37.7	3.8	none	none	31.8	82.2	8.4	1.4	81.2	117.6	57.83

ADOBE WALLS GIN

Table 3 (continued). Commercial classing data for the center pivot irrigated mixed technology cotton variety trial, Cartrite Farm, Sunray, TX, 2021.

Variety and Bale Number	Color Grade-Quadrant grade-quadrant	Color digit 1	Color digit 2	Leaf grade	Staple 32nds inch	Micronaire units	Extraneous matter	Remarks --	Strength g/tex	Rd %	+b %	Trash % area	Uniformity %	Length 100ths inch	Loan rate cents/lb
FM 2202 GL															
9107113	21-1	2	1	2	36	3.5	.	.	31.0	79.8	8.8	2	78.5	111	56.50
9107114	21-1	2	1	2	36	3.9	.	.	31.7	79.5	8.9	2	81.2	111	57.25
9107115	21-1	2	1	2	37	4.1	.	.	31.4	79.9	9.0	2	79.2	114	57.25
9107116	21-1	2	1	2	36	4.0	.	.	31.2	79.1	9.2	1	82.0	113	57.30
9107117	21-1	2	1	2	37	3.9	.	.	31.4	79.9	9.1	1	82.3	115	57.85
9107118	21-1	2	1	2	36	3.9	.	.	32.0	79.0	9.2	1	81.6	113	57.25
9107119	21-1	2	1	2	37	4.0	.	.	32.2	79.5	9.0	2	82.5	116	57.85
9107120	21-1	2	1	2	36	3.9	.	.	29.0	80.1	9.0	2	81.1	112	57.35
9107121	11-2	1	1	2	37	4.1	.	.	30.4	81.2	8.9	2	81.2	116	57.60
9107122	11-2	1	1	1	37	3.9	.	.	33.7	80.9	8.9	1	81.9	114	57.85
9107123	11-2	1	1	1	36	3.9	.	.	32.7	81.1	8.9	1	82.6	112	57.30
Average	--	1.7	1.0	1.8	36.5	3.9	none	none	31.5	80.0	9.0	1.5	81.3	113.4	57.40
FM 2398 GLTP															
9107124	11-1	1	1	2	37	3.3	.	.	31.0	80.6	9.5	1	81.3	114	52.75
9107125	11-2	1	1	1	37	4.0	.	.	29.9	80.1	9.4	1	80.7	114	57.90
9107126	11-1	1	1	2	37	3.8	.	.	31.2	80.5	9.8	2	82.5	115	57.85
9107127	11-1	1	1	2	37	3.8	.	.	29.7	80.5	9.6	1	81.4	114	57.90
9107128	11-3	1	1	1	36	3.8	.	.	29.9	80.3	9.7	1	78.0	113	56.70
9107129	11-3	1	1	2	37	3.9	.	.	29.6	80.4	9.8	2	81.5	116	57.90
9107130	11-3	1	1	1	37	4.0	.	.	29.6	80.9	9.9	1	80.6	115	57.90
9107131	11-3	1	1	2	37	3.9	.	.	30.2	79.9	9.9	3	79.7	114	57.05
9107132	11-2	1	1	1	37	4.0	.	.	29.9	80.4	9.5	1	80.7	114	57.90
9107133	11-3	1	1	2	37	3.9	.	.	30.8	79.6	9.7	2	80.7	115	57.60
9107134	11-1	1	1	2	37	4.2	.	.	29.5	80.7	9.7	2	80.5	115	57.90
Average	--	1.0	1.0	1.6	36.9	3.9	none	none	30.1	80.4	9.7	1.5	80.7	114.5	57.21
NG 3195 B3XF															
9107135	11-3	1	1	2	37	3.6	.	.	30.9	80.1	9.6	2	81.5	114	57.50
9107136	11-3	1	1	1	36	3.9	.	.	28.1	79.7	9.7	1	80.1	113	56.85
9107137	11-2	1	1	2	36	3.7	.	.	30.0	79.9	9.4	2	79.0	112	56.50
9107138	11-2	1	1	3	36	3.9	.	.	30.0	80.2	9.5	2	80.4	112	56.65
9107139	11-3	1	1	2	37	3.9	.	.	29.4	81.2	9.9	2	81.1	114	57.90
9107140	11-1	1	1	2	37	3.8	.	.	30.3	80.7	9.5	2	80.2	115	57.60
9107141	11-3	1	1	2	37	3.8	.	.	29.5	80.4	9.7	2	80.3	114	57.90
9107142	11-3	1	1	2	36	3.5	.	.	27.2	80.3	10.0	1	78.8	111	56.10
9107143	11-3	1	1	1	36	3.5	.	.	29.7	80.5	9.9	1	80.1	113	57.25
Average	--	1.0	1.0	1.9	36.4	3.7	none	none	29.5	80.3	9.7	1.7	80.2	113.1	57.14

ADOBE WALLS GIN

Table 3 (continued). Commercial classing data for the center pivot irrigated mixed technology cotton variety trial, Cartrite Farm, Sunray, TX, 2021.

Variety and Bale Number	Color Grade-Quadrant grade-quadrant	Color digit 1	Color digit 2	Leaf grade	Staple 32nds inch	Micronaire units	Extraneous matter	Remarks --	Strength g/tex	Rd %	+b %	Trash %	Uniformity %	Length 100ths inch	Loan rate cents/lb
NG 3930 B3XF															
9107153	11-2	1	1	1	37	3.7	.	.	28.9	80.2	9.4	1	81.2	117	57.40
9107154	11-3	1	1	2	37	3.5	.	.	30.1	79.7	9.6	1	81.5	115	57.50
9107155	11-4	1	1	1	37	3.7	.	.	27.1	79.4	9.7	1	79.8	116	56.85
9107156	21-1	2	1	2	37	3.7	.	.	28.8	79.3	9.3	1	79.8	115	56.85
9107157	11-3	1	1	2	36	3.7	.	.	28.5	79.5	9.6	1	79.4	112	56.30
9107158	11-2	1	1	1	37	3.9	.	.	29.0	80.0	9.5	1	82.2	116	57.95
9107159	21-1	2	1	1	37	3.9	.	.	29.4	80.4	9.1	1	82.1	116	57.95
9107160	11-2	1	1	2	37	3.9	.	.	29.0	80.6	9.1	1	80.6	114	57.90
Average	--	1.3	1.0	1.5	36.9	3.8	none	none	28.9	79.9	9.4	1.0	80.8	115.1	57.34
PHY 205 W3FE															
9107161	11-2	1	1	2	36	3.9	.	.	33.0	80.8	8.8	1	81.6	112	57.30
9107162	11-2	1	1	2	36	4.1	.	.	31.1	80.9	9.0	1	81.1	111	57.25
9107163	11-2	1	1	2	35	4.2	.	.	33.1	80.7	8.9	1	82.2	110	55.95
9107164	21-1	2	1	2	36	4.3	.	.	32.8	80.4	8.8	2	81.5	112	57.15
9107165	11-2	1	1	2	36	4.3	.	.	32.5	80.9	8.8	1	82.6	112	57.20
9107166	11-1	1	1	1	35	4.4	.	.	29.4	81.6	8.7	1	80.1	110	55.85
9107167	11-2	1	1	1	36	4.1	.	.	31.0	81.2	8.9	1	81.0	111	57.25
9107168	21-1	2	1	2	36	4.0	.	.	30.3	80.3	9.0	2	81.2	111	57.05
9107169	11-1	1	1	2	36	4.3	.	.	31.6	80.5	9.2	2	82.1	112	57.20
9107170	21-1	2	1	3	35	4.2	.	.	31.0	80.2	8.9	4	80.2	110	55.35
Average	--	1.3	1.0	1.9	35.7	4.2	none	none	31.6	80.8	8.9	1.6	81.4	111.1	56.76

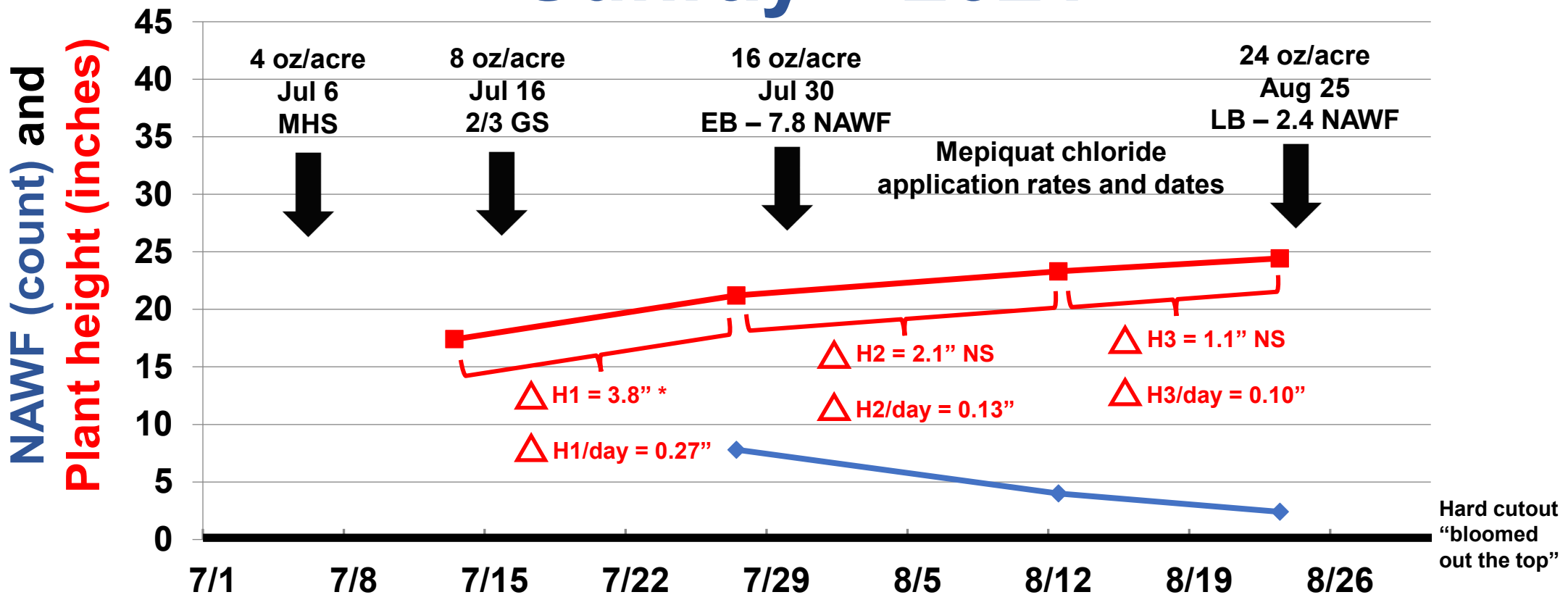
Table 3 (continued). Commercial classing data for the center pivot irrigated mixed technology cotton variety trial, Cartrite Farm, Sunray, TX, 2021.

Variety and Bale Number	Color Grade-Quadrant grade-quadrant	Color digit 1	Color digit 2	Leaf grade	Staple 32nds inch	Micronaire units	Extraneous matter	Remarks --	Strength g/tex	Rd %	+b %	Trash %	Uniformity %	Length 100ths inch	Loan rate cents/lb
PHY 210 W3FE															
9107144	21-1	2	1	2	37	3.5	.	.	31.3	80.0	9.0	1	80.5	114	57.70
9107145	11-1	1	1	2	36	3.7	.	.	30.7	81.7	9.1	1	81.4	112	57.05
9107146	11-1	1	1	2	36	4.0	.	.	31.4	81.9	8.8	1	80.8	113	57.25
9107147	11-2	1	1	2	36	3.8	.	.	30.0	81.1	8.8	1	79.3	113	56.50
9107148	11-2	1	1	2	36	3.7	.	.	29.8	80.7	9.1	1	78.9	112	56.70
9107149	21-1	2	1	1	37	3.7	.	.	32.2	81.4	8.7	1	80.5	114	57.80
9107150	11-1	1	1	1	37	3.8	.	.	31.3	82.1	8.7	1	81.5	114	57.80
9107151	11-2	1	1	2	37	4.0	.	.	30.2	81.6	8.5	1	79.3	114	57.05
9107152	21-1	2	1	2	37	3.8	.	.	31.5	82.1	8.3	1	79.9	114	57.25
Average	--	1.3	1.0	1.8	36.6	3.8	none	none	30.9	81.4	8.8	1.0	80.2	113.3	57.23
PHY 332 W3FE															
9107171	11-3	1	1	1	37	3.6	.	.	32.5	79.5	10.0	1	81.4	117	57.70
9107172	12-1	1	2	2	37	3.7	.	.	32.0	78.8	10.2	2	81.5	116	55.70
9107173	12-1	1	2	1	36	3.7	.	.	30.5	79.0	10.5	1	79.6	113	54.55
9107174	12-1	1	2	1	37	3.5	.	.	31.2	78.1	10.7	1	79.4	114	55.05
9107175	12-1	1	2	2	37	3.8	.	.	32.7	78.1	10.6	1	82.4	115	55.75
9107176	12-1	1	2	2	37	3.7	.	.	32.1	78.7	10.6	1	79.5	116	55.15
9107177	12-1	1	2	1	37	3.5	.	.	31.3	78.2	10.7	1	80.1	115	55.60
9107178	12-1	1	2	2	37	3.5	.	.	31.6	79.1	10.4	1	79.8	115	55.05
Average	--	1.0	1.9	1.5	36.9	3.6	none	none	31.7	78.7	10.5	1.1	80.5	115.1	55.57

Appendix

Cartrite 2021 Mixed Technology Variety Trial – Plant height and NAWF graphs, Amarillo 2021 cotton heat units and weather data.

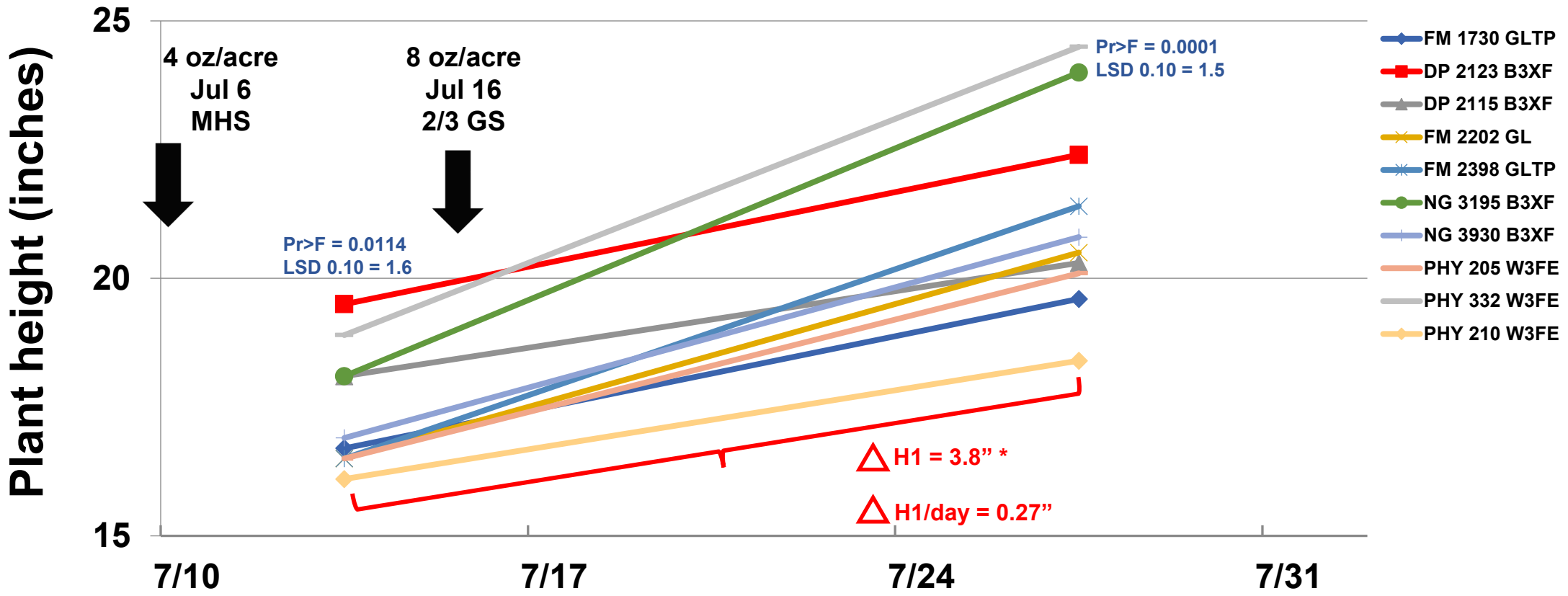
Cartrite Mixed Technology Variety Trial (Across All Entries) Sunray – 2021



Rainfall (inches): May 2.3, Jun 1.2, Jul 2.2, Aug 0.4, Sep 0.7 = ~6.8
Irrigation (inches): May 0.7, Jun 2.6, Jul 2.4, Aug 4.2, Sep 1.4 = ~11.3

Planted: May 7
Days to bloom: 75
First bloom date: Jul 20

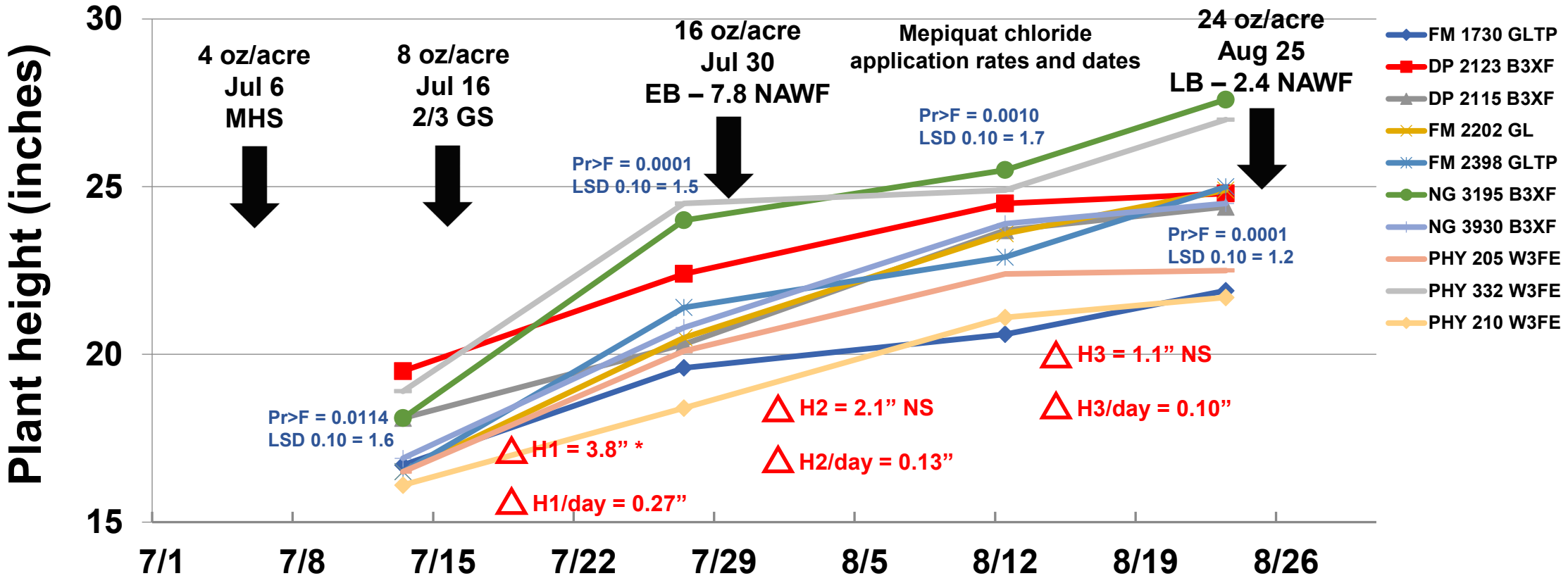
Cartrite Mixed Technology Variety Trial
Sunray – 2021



Rainfall (inches): May 2.3, Jun 1.2, Jul 2.2, Aug 0.4, Sep 0.7 = ~6.8
Irrigation (inches): May 0.7, Jun 2.6, Jul 2.4, Aug 4.2, Sep 1.4 = ~11.3

Planted: May 7
Days to bloom: 75
First bloom date: Jul 20

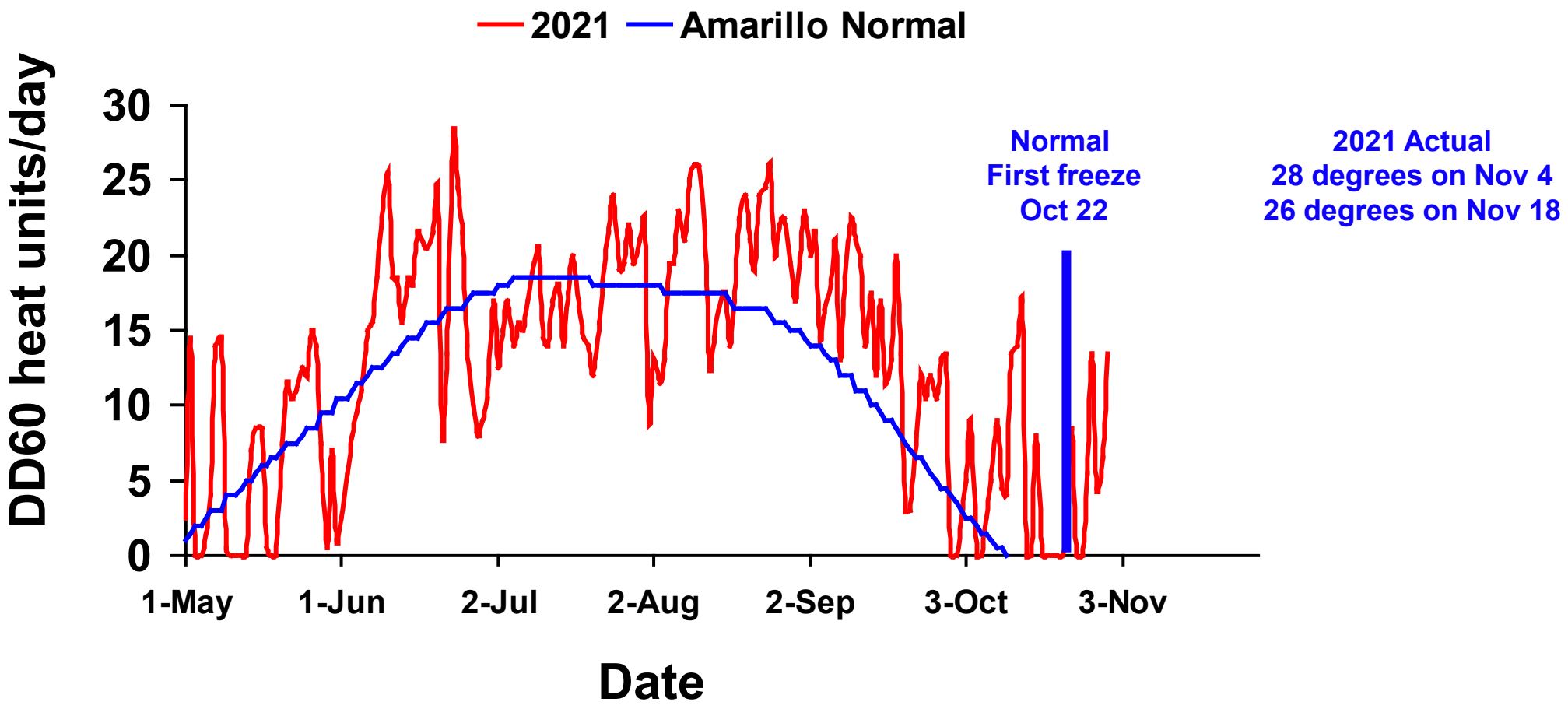
Cartrite Mixed Technology Variety Trial
Sunray – 2021



Rainfall (inches): May 2.3, Jun 1.2, Jul 2.2, Aug 0.4, Sep 0.7 = ~6.8
Irrigation (inches): May 0.7, Jun 2.6, Jul 2.4, Aug 4.2, Sep 1.4 = ~11.3

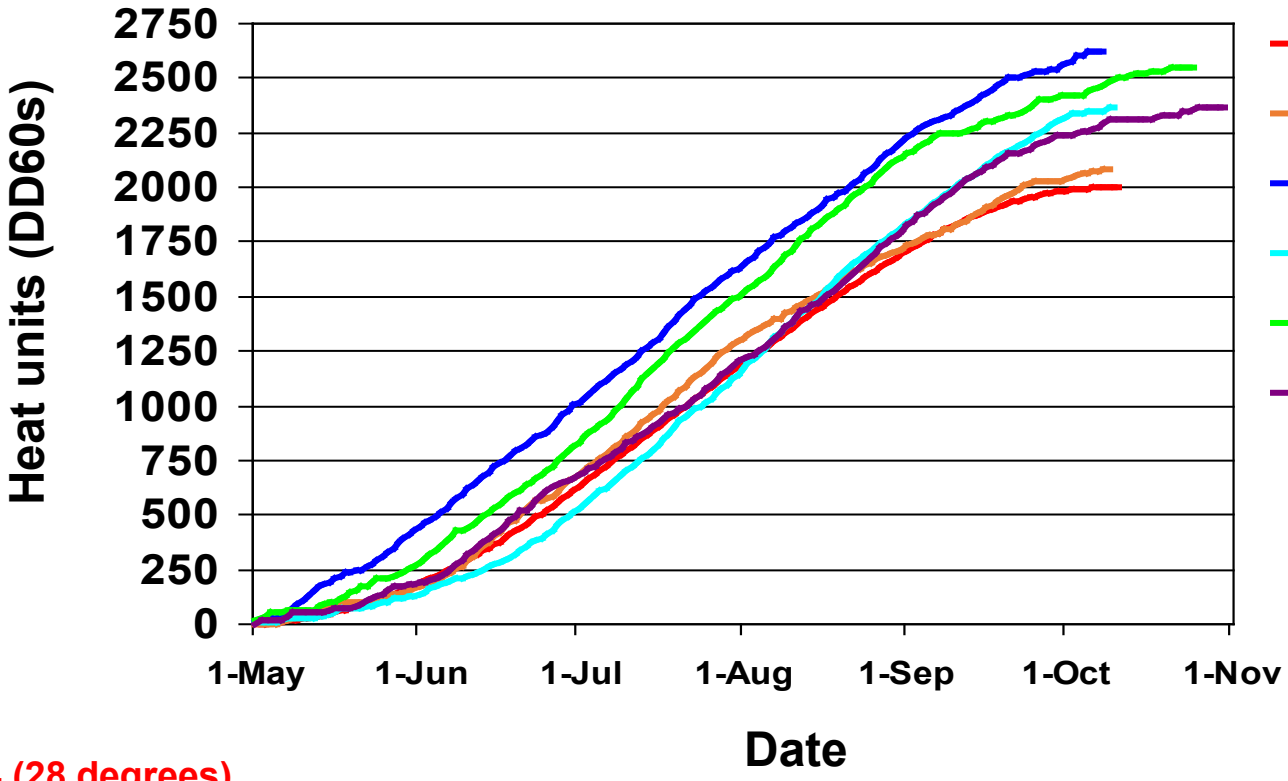
Planted: May 7
Days to bloom: 75
First bloom date: Jul 20

Amarillo
30-Year Normal (1981-2010) and 2021
Daily Heat Units



Amarillo 30-Yr Normal (1981-2010) vs. 2017, 2018, 2019, 2020, and 2021 Cotton Heat Unit Accumulation

From May 1 Through First Hard Freeze



1981-2010 (2001 total seasonal)
2017 (2085 total seasonal)
2018 (2621 total seasonal)
2019 (2362 total seasonal)
2020 (2552 total seasonal)
2021

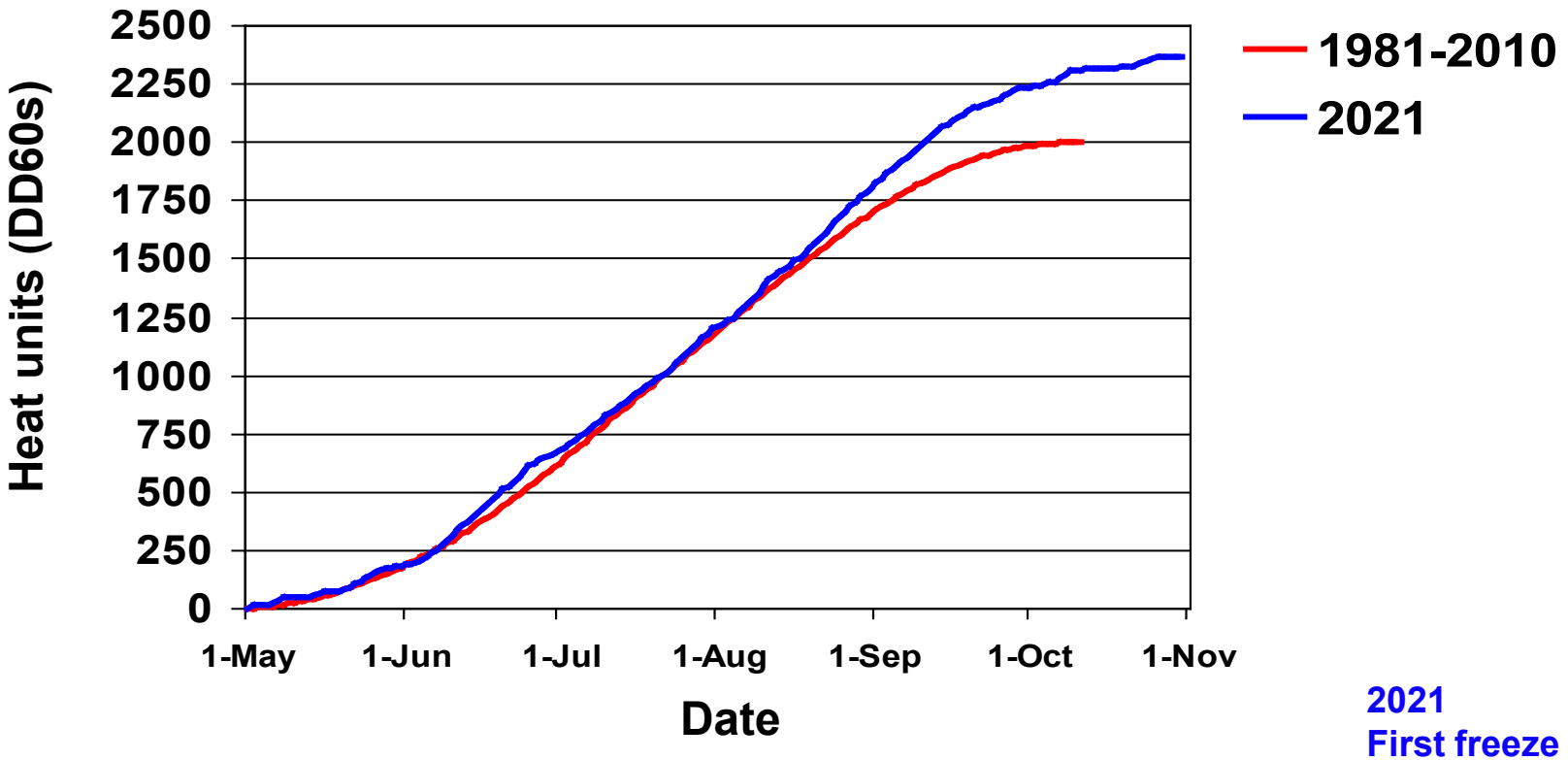
From May 1 through Sep 30
Normal: 1983
2021: 2238
% of Normal: +13

From May 15 through Sep 30
Normal: 1938
2021: 2179
% of Normal: +12

From May 20 through Sep 30
Normal: 1908
2021: 2162
% of Normal: +13

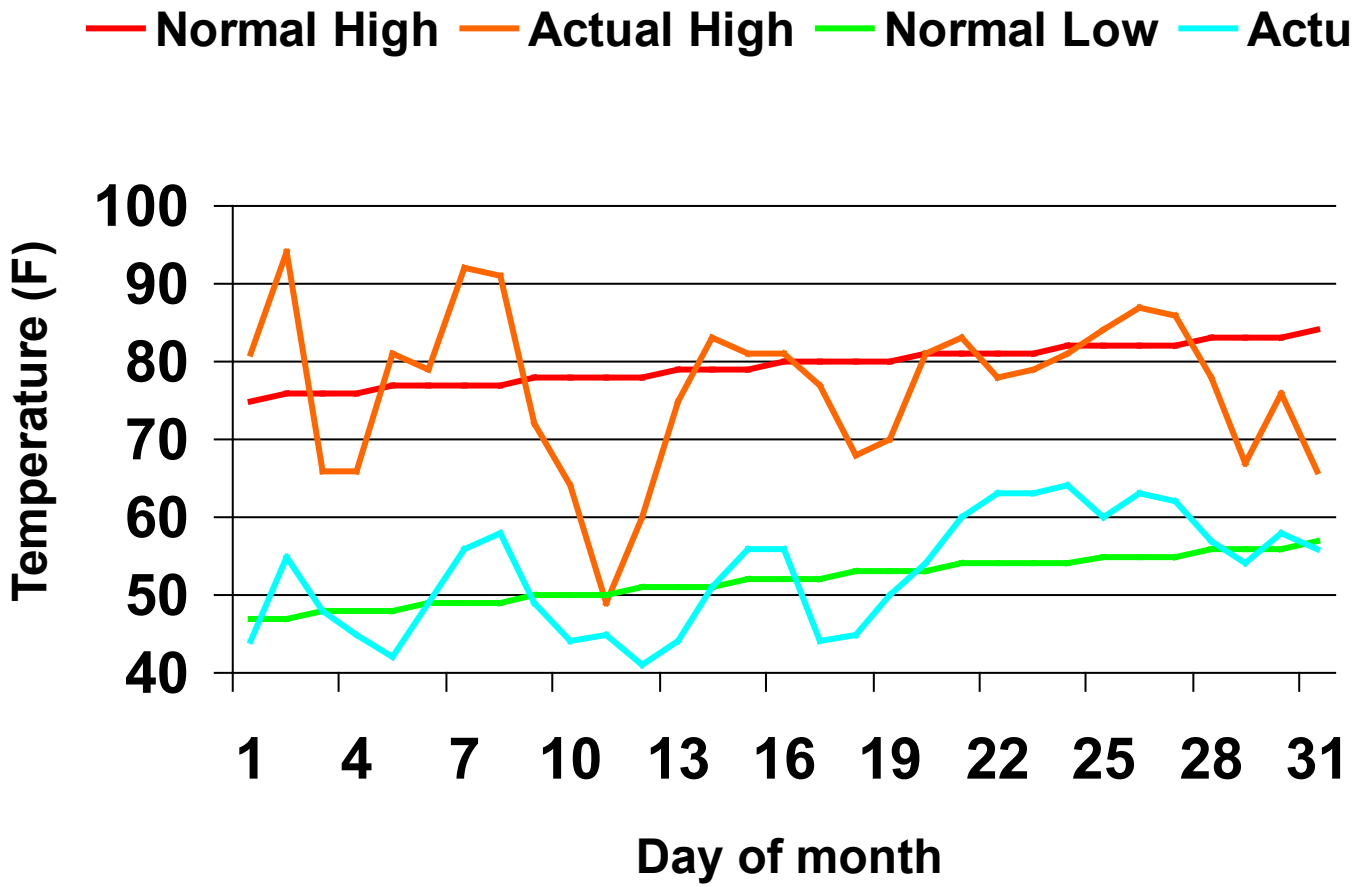
2021
First freeze on Nov 4 (28 degrees)
Hard freeze on Nov 18 (26 degrees)

Amarillo 30-Yr Normal (1981-2010) vs. 2021
Cotton Heat Unit Accumulation
From May 1



2021
First freeze on Nov 4 (28 degrees)
Hard freeze on Nov 18 (26 degrees)

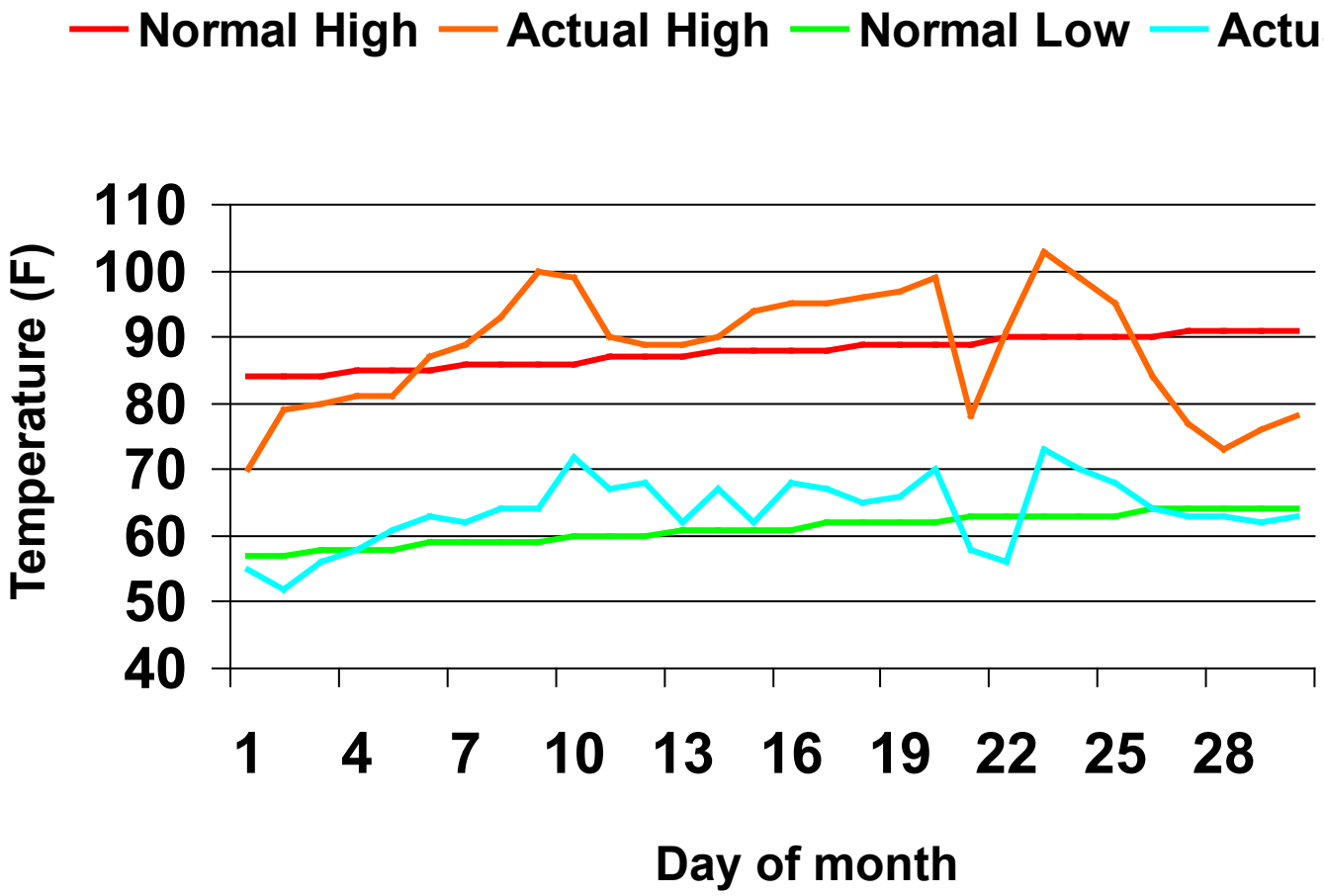
Amarillo
30-Yr Normal (1981-2010) and May 2021 Air Temperatures



Heat Units

Normal for month: 177
2021: 186
% of normal: +5

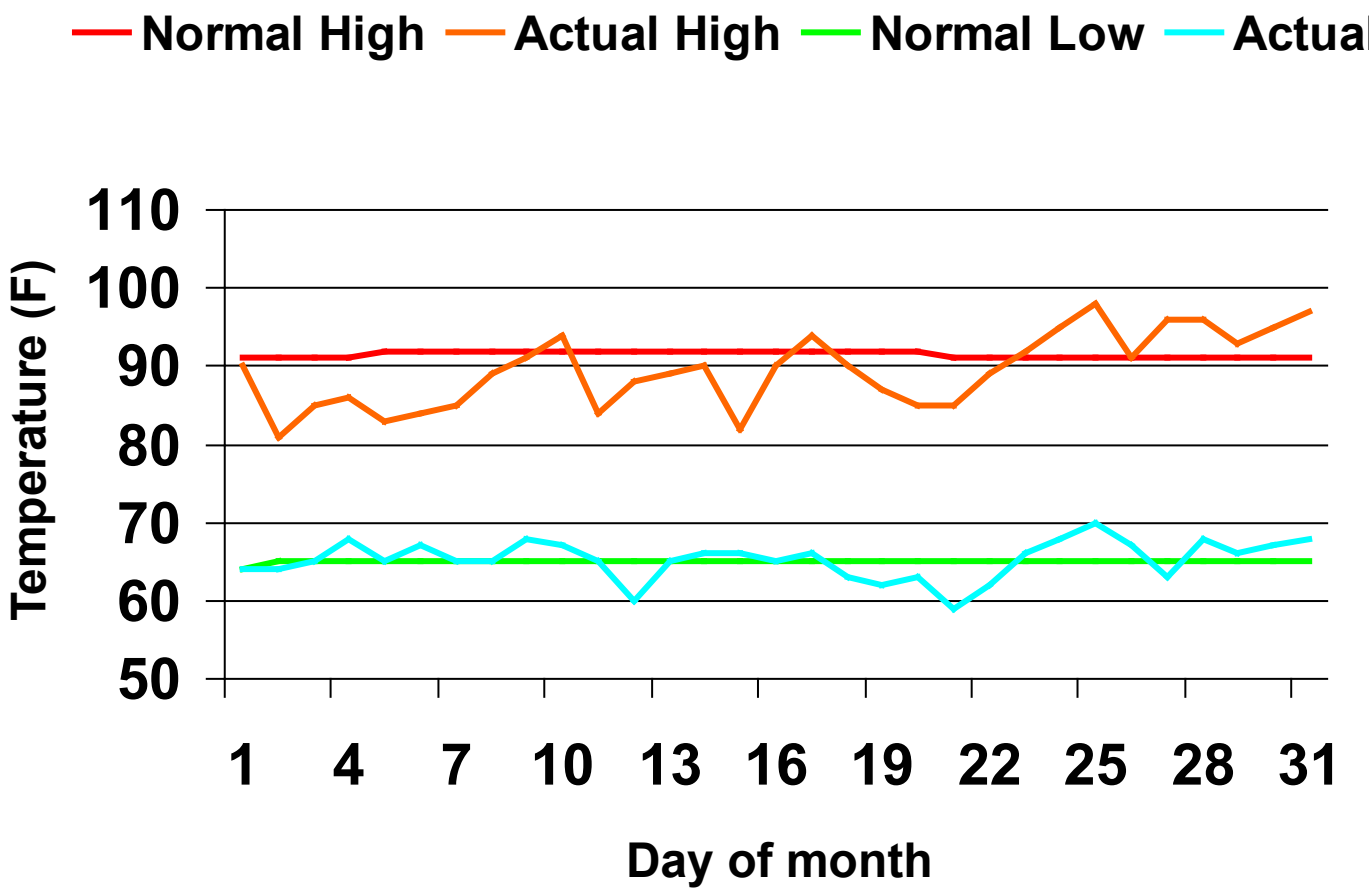
Amarillo
30-Yr Normal (1981-2010) and June 2021 Air Temperatures



Heat Units

Normal total: 433
2021: 475
% of normal: +10

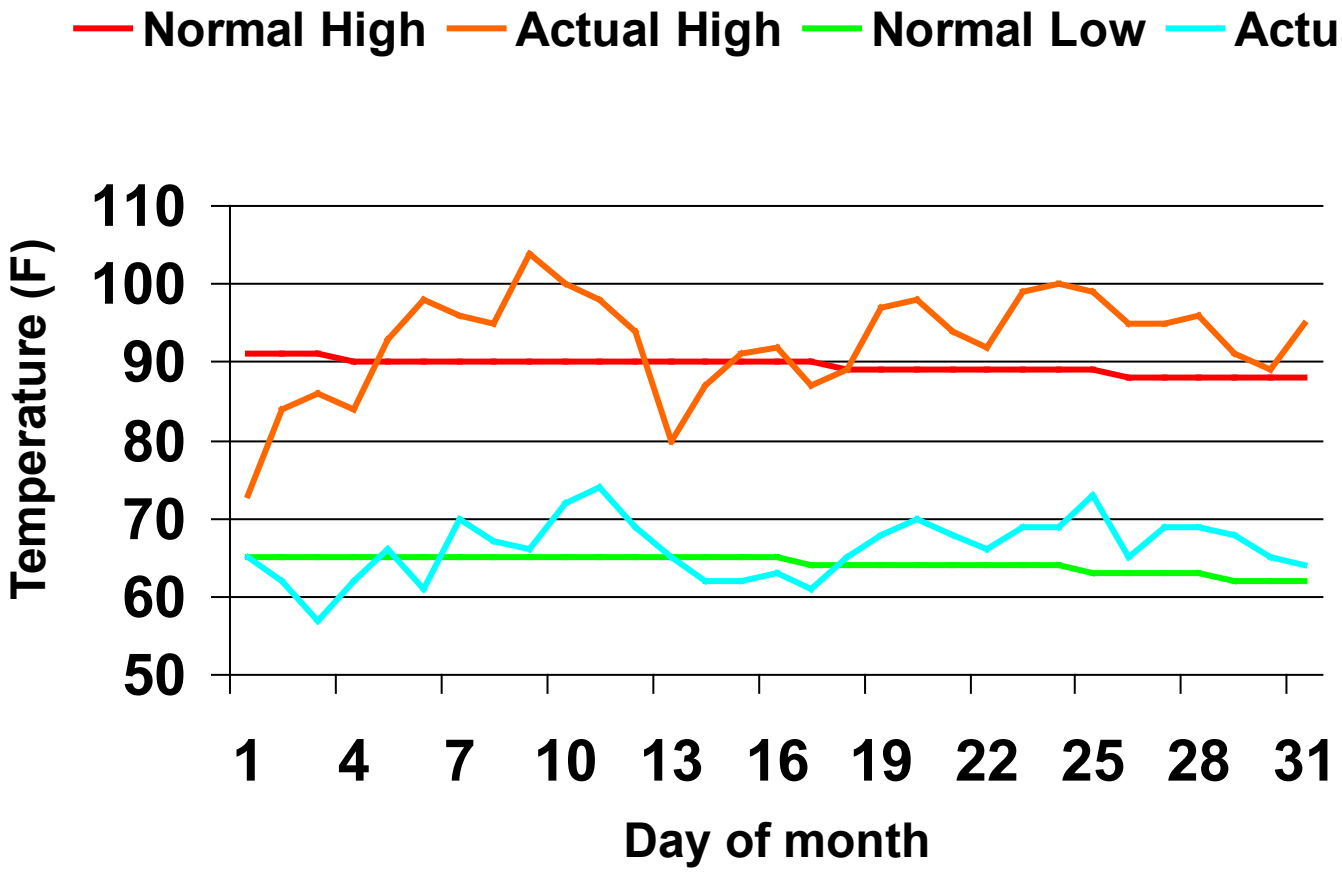
Amarillo
30-Yr Normal (1981-2010) and July 2021 Air Temperatures



Heat Units

Normal total: 566
2021: 539
% of normal: -5

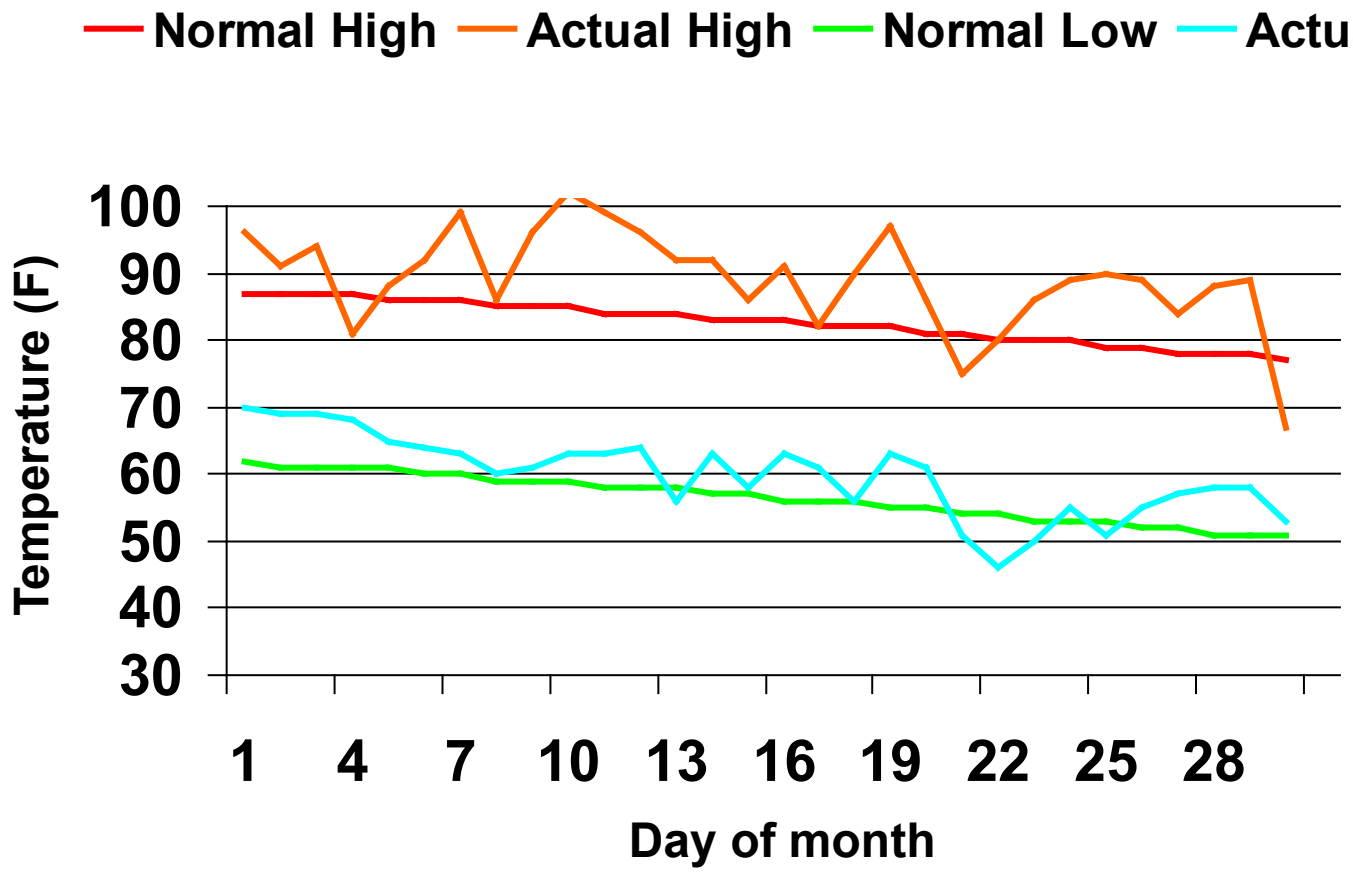
Amarillo
30-Yr Normal (1981-2010) and August 2021 Air Temperatures



Heat Units

Normal total: 522
2021: 602
% of normal: +15

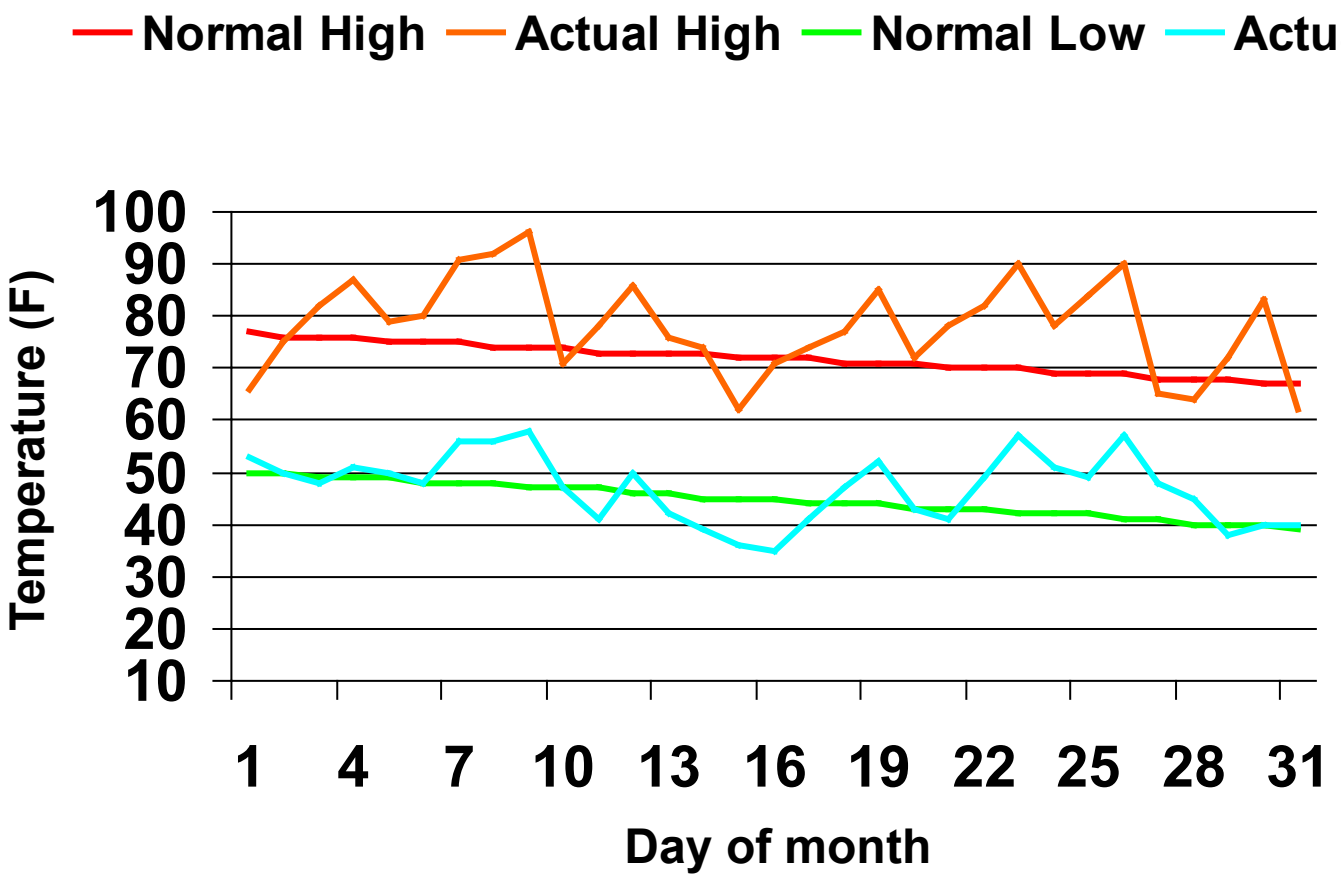
Amarillo
30-Yr Normal (1981-2010) and September 2021 Air Temperatures



Heat Units

Normal for Month: 286
2021: 434
% of normal: +52

Amarillo
30-Yr Normal (1981-2010) and October 2021 Air Temperatures



Heat Units

Normal: 19
2021: 133
% of normal: +600

First freeze on Nov 4 (28 degrees)
Hard freeze on Nov 18 (26 degrees)