2020 XtendFlex Technology Cotton Variety Trial – Lonestar Gin

Williams LLC Farm
Wes Williams and Lance Williams
Panhandle, TX

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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 2020, six varieties with Bollgard 3 XtendFlex technology were planted in a center-pivot irrigated field in a scientifically valid trial with three replicates. *The southwestern side of this trial experienced some damage associated with the June 9th regional high wind event which introduced some variability. Otherwise, the trial was able to stay on track with growth and development until the September 9th record low temperature. Visually, it appeared to escape any damage associated with the cold spell, but the overall impact of these factors apparently negatively affected maturity for some entries. Some minor preharvest seed cotton losses were noted due to the late October ice storm and hard freeze event.*

Harvest results indicated that statistically significant differences were observed. Lint yields ranged from a high of 1120 lb/acre (ST 4480 B3XF) to a low of 794 lb/acre (DP 2012 B3XF), and averaged 1000 lb/acre (Table 1). Average Loan value for varieties from commercially ginned and classed bales varied from a high of $0.5651/lb (DP 1820 B3XF) to a low of $0.4714/lb (NG 2982 B3XF). Overall Loan value for the trial across all entries was 0.5452/lb. When including lint Loan value on a per acre basis and net gin credit, statistically significant differences were found in net value/acre among varieties. ST 4480 B3XF had the highest net value at $671/acre, and DP 2012 B3XF had the lowest at $466/acre. Although NG 2982 B3XF had the second highest yield on a per acre basis (1103 lb/acre) among varieties evaluated, its low quality drastically reduced its gross loan value on a per acre basis.

Table 2 presents in-season data including stand establishment percentage, vigor, nodes above white flower (NAWF) and plant height on three sampling dates, and nodes above cracked boll (NACB) on September 28. NACB values for most varieties were generally low on September 28, and averaged 2.0. Even though NexGen 2982 B3XF had the lowest value of 0.8 NACB on that date, it still exhibited a low micronaire value of 3.1. It is unclear why this may have occurred; however, the September cold spell may have adversely affected the sugar to cellulose conversion that occurs in the fiber.

Table 3 provides the USDA-AMS classing results from each commercial bale for each variety and the variety averages. Averages indicate that color grades were typically 11 and 21. The eight commercial bales of NexGen 2982 B3XF had the lowest color grade quality, and all exhibited a 31 color. Leaf grades ranged from about 2.1 to 4.6. NexGen 2982 B3XF had the lowest leaf grade quality, with commercial bales classed as leaf grade average of 4.6. Staple ranged from an average high of 37.0 (ST 4480 B3XF) to an average low of 36.0 32nds inch (DP 2012 B3XF). Micronaire was apparently significantly affected by the September 9 cold spell. Average micronaire values ranged from a high of 4.0 (DP 1820 B3XF) to a low of 3.1 (NG 2982 B3XF). No bark contamination was noted in any commercial bales. Fiber strength ranged from a high of 34.1 g/tex to a low of 29.4 g/tex. Uniformity ranged from a high of 81.2% to a low of 79.3%.

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: 3485 ft

Previous crop: corn harvested in 2019

Tillage system: strip-till

Planted: May 1

Replicates: 3 replicates in a randomized complete block design

Plot width: 12-row plots

Plot length: trial was planted in circular rows; ~2,500 long

Seeding rate: 50,000 seed/acre

Days from planting to first bloom: 76 (July 15)

30-inch rows under center pivot irrigation

Total rainfall May through August: ~5.6 inches

May 0.0, June 1.5, July 1.9, and August 2.2

Total irrigation May through August: ~6.5 inches

April 1.0, May 1.0, June 0.0, July 2.5, and August 2.0

Fertility management:

85 lb N/acre using 82-0-0 during strip-till operation on Jan 23, 2020; 20 gal/acre 10-27-0-4 (S) -1 (Zn) during strip till operation

Chemical Applications:

Preplant burndown – 2,4-D + Valor + Roundup PowerMax

Preemergence – 12 oz/acre dicamba + 24 oz/acre Direx (diuron)

Post emergence – 22 oz/acre Roundup PowerMax + 22 oz/acre XtendiMax + 12 oz/acre Outlook

Plant growth regulators: 8 oz/acre mepiquat chloride at match head square (Jul 1)

Insecticides: 4 oz/acre acephate Jun 4

Harvest aid applications: Mid-October – 1 qt/acre ethephon + 1 pt/acre tribufos (Folex) followed by 1 qt/acre paraquat

Harvesting: November 4 using a John Deere CS690, with harvested area calculated by the GPS on the stripper monitor. Entire plot length was harvested with 1 round module harvested/plot. Round modules were weighed using the CS690 scale, and all round modules were weighed at the Lonestar 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 Lonestar 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

Lonestar Gin would like to thank Lance and Wes Williams for committing equipment, land, and time to conduct and manage the trial. Jimmy Osborn performed harvesting operations and we appreciate his excellent assistance. Gratitude is expressed to participating seed companies for providing testing seed. These include Deltapine, NexGen, and Stoneville. Gratitude is also expressed to Windstar Inc. Detailed ginning was performed by Malcom Jones, Dalton Skinner and the Lonestar ginning crew and a big thank you is extended to this hard-working group.

2020 XtendFlex Trial Variety Descriptions – Lonestar Gin

Wes Williams Farm
Panhandle, TX

Dr. Randy Boman
Cotton Agronomics Manager

Variety Descriptions from Company Literature and Websites

DP 1820 B3XF Roundup Ready Flex (glyphosate), Liberty Link (glufosinate), and dicamba stacked herbicide tolerance technologies stacked with Bollgard 3 Bt technology. Early-medium maturity. Semi-smooth leaves, medium-tall plant height, storm resistance 3.5 (on scale of 1 = tight, 9 = loose). ~ 39 staple, strength ~30.6 g/tex. Disease ratings: Fusarium wilt – moderately susceptible, Verticillium wilt – moderately susceptible, Bacterial blight – resistant.

DP 2012 B3XF Roundup Ready Flex (glyphosate), Liberty Link (glufosinate), and dicamba stacked herbicide tolerance technologies. Early maturity. Smooth leaves, medium to medium-tall plant height, storm resistance 3.5 (on scale of 1 = tight, 9 = loose). ~ 38 staple, strength ~31.3 g/tex. Disease ratings: Fusarium wilt – no data, Verticillium wilt – moderately tolerant, Bacterial blight – resistant.

DP 2020 B3XF Roundup Ready Flex (glyphosate), Liberty Link (glufosinate), and dicamba stacked herbicide tolerance technologies. Early-medium maturity. Semi-smooth leaves, medium to medium-tall plant height, storm resistance 3.5 (on scale of 1 = tight, 9 = loose). ~ 37.7 staple, strength ~30.3 g/tex. Disease ratings: Fusarium wilt – no data, Verticillium wilt – moderately tolerant, Bacterial blight – resistant.

NG 2982 B3XF Roundup Ready Flex (glyphosate), Liberty Link (glufosinate), and dicamba stacked herbicide tolerance technologies stacked with Bollgard 3 Bt technology. Early maturity. Storm tolerance 9 (scale of 0 = very loose, 9 = very storm tolerant), leaf hair semi-smooth, plant height medium, node of first fruiting branch (avg) 7, staple 36-37, strength 31-33. Diseases (on scale of 0 very susceptible, 9 superior resistance): Fusarium wilt - no data, Verticillium wilt 7, Bacterial blight 9.

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.

ST 4480 B3XF Roundup Ready Flex (glyphosate), Liberty Link (glufosinate), and dicamba stacked herbicide tolerance technologies. Early-medium maturity. Semi-smooth leaves, medium plant height, storm resistance 6 (on scale of 0 = very loose, 9 = very storm tolerant). ~ 37.7 staple, strength ~31.1 g/tex. Disease ratings: Root knot nematode/Fusarium wilt – fair, Verticillium wilt – fair, Bacterial blight – resistant.

Table 1. Harvest results for the center pivot irrigated XtendFlex cotton variety trial, Williams Farm, Panhandle, TX, 2020.

Entry	Lint turnout	Seed turnout	Bur cotton yield	Lint yield	Seed yield	Lint loan value	Lint loan value	Net gin credit	Net value	
	---------- % ----------		---------- lb/acre ----------			$/lb	---------- $/acre ----------			
ST 4480 B3XF	28.2	40.0	3977	1120	1593	0.5619	629	42	671	a
DP 1820 B3XF	29.8	34.2	3506	1044	1200	0.5651	590	16	605	ab
NG 3930 B3XF	28.0	36.9	3695	1034	1364	0.5561	575	27	602	ab
DP 2020 B3XF	27.5	40.9	3284	905	1344	0.5616	508	38	546	bc
NG 2982 B3XF	26.4	32.3	4171	1103	1348	0.4714	520	10	530	bc
DP 2012 B3XF	27.6	38.5	2872	794	1105	0.5552	441	25	466	c
Test average	27.9	37.2	3584	1000	1326	0.5452	544	26	570	
CV, %	--	--	9.3	9.7	8.8	--	9.8	11.6	9.7	
OSL	--	--	0.0080	0.0138	0.0077	--	0.0168	0.0001	0.0151	
LSD	--	--	493	143	173	--	79	5	82	

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:
$3.15/cwt commercial ginning cost.
$210/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.

Table 2. Plant observation results from the center pivot irrigated XtendFlex cotton variety trial, Williams Farm, Panhandle, TX, 2020.

Entry	Final population	Stand establishment	Vigor	Nodes above white flower			Plant height			Nodes above cracked boll
				Early bloom	+3 weeks	+6 weeks	Early bloom	+3 weeks	+5 weeks	
	plants/acre	%	1-5 visual scale, 5 best	count			inches			count
	3-Jun	3-Jun	3-Jun	15-Jul	4-Aug	20-Aug	15-Jul	4-Aug	20-Aug	28-Sep
DP 1820 B3XF	29,621	59.3	2.8	8.3	6.1	2.1	18.9	27.6	27.7	2.0
DP 2012 B3XF	35,138	70.3	3.2	8.1	5.0	2.1	18.1	25.7	26.1	2.0
DP 2020 B3XF	36,300	72.6	3.3	7.9	4.4	2.1	19.4	24.1	24.4	1.6
NG 2982 B3XF	37,752	75.5	3.2	7.4	4.2	1.5	17.8	22.1	23.1	0.8
NG 3930 B3XF	42,689	85.4	3.2	7.9	3.7	2.0	16.5	22.9	24.5	2.0
ST 4480 B3XF	29,621	59.2	3.2	8.6	6.3	3.7	17.4	27.4	27.3	3.3
Test average	35,187	70.4	3.2	8.0	5.0	2.3	18.0	25.0	25.5	2.0
CV, %	13.9	13.9	9.0	5.0	16.7	28.4	6.2	5.8	3.7	30.2
OSL	0.0569	0.0569	0.4651	0.0570	0.0169	0.0315	0.0907	0.0033	0.0008	0.0101
LSD	7,231	14.5	NS	0.6	1.2	0.9	1.7	2.1	1.4	0.9

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.

Table 3. Commercial classing data for the center pivot irrigated XtendFlex cotton variety trial, Williams Farm, Panhandle, TX, 2020.

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 1820 B3XF															
651066	11-1	1	1	2	37	3.9	.	.	32.1	81.9	8.8	2	78.6	117	56.65
651067	11-2	1	1	2	37	4.0	.	.	32.4	81.3	9.1	2	79.0	114	56.75
651068	11-2	1	1	2	37	3.9	.	.	33.3	81.2	9.0	1	79.1	116	56.80
651069	11-1	1	1	2	38	3.9	.	.	34.4	81.6	9.1	1	80.8	119	57.45
651070	11-1	1	1	2	37	4.0	.	.	32.5	82.0	8.9	2	80.9	117	57.25
651071	11-2	1	1	3	37	4.0	.	.	31.0	81.0	8.9	3	80.1	115	56.80
651072	11-1	1	1	2	35	4.1	.	.	29.1	80.5	9.2	2	77.9	110	54.10
651073	11-2	1	1	2	36	4.1	.	.	31.0	81.4	8.8	1	79.9	112	56.30
Average	--	1.0	1.0	2.1	36.8	4.0	none	none	32.0	81.4	9.0	1.8	79.5	115.0	56.51
DP 2012 B3XF															
651074	11-4	1	1	2	37	3.5	.	.	30.4	78.9	9.7	3	78.9	114	56.40
651075	12-1	1	2	3	35	3.8	.	.	28.0	78.6	10.2	3	78.4	110	52.55
651076	11-3	1	1	2	35	3.6	.	.	29.0	79.6	9.8	2	78.9	110	54.55
651077	11-3	1	1	2	36	3.7	.	.	29.2	79.8	9.8	2	79.9	112	55.90
651078	11-1	1	1	2	36	3.5	.	.	30.2	80.7	9.8	2	79.0	111	56.05
651079	11-1	1	1	2	36	3.7	.	.	28.6	81.5	9.4	2	80.1	112	56.35
651080	11-1	1	1	2	36	3.5	.	.	30.1	81.4	9.4	2	79.4	112	56.05
651081	11-1	1	1	2	37	3.5	.	.	29.6	81.3	9.6	2	79.4	114	56.30
Average	--	1.0	1.1	2.1	36.0	3.6	none	none	29.4	80.2	9.7	2.3	79.3	111.9	55.52
DP 2020 B3XF															
651058	11-4	1	1	2	36	3.5	.	.	28.9	78.6	9.8	2	79.0	113	55.80
651059	22-1	2	2	3	36	3.6	.	.	28.7	77.9	10.0	2	79.0	111	53.80
651060	11-3	1	1	3	37	3.5	.	.	31.1	79.7	9.8	3	80.5	114	56.75
651061	11-1	1	1	2	37	3.6	.	.	29.3	80.8	9.5	1	79.5	114	56.30
651062	11-1	1	1	2	37	3.6	.	.	28.7	81.0	9.3	2	80.4	115	56.75
651063	11-1	1	1	2	37	3.6	.	.	30.4	81.7	9.4	2	80.6	115	57.00
651064	11-1	1	1	2	36	3.6	.	.	29.2	81.7	9.5	2	79.5	112	55.85
651065	11-1	1	1	2	37	3.7	.	.	30.4	82.2	9.4	2	80.0	114	57.05
Average	--	1.1	1.1	2.3	36.6	3.6	none	none	29.6	80.5	9.6	2.0	79.8	113.5	56.16

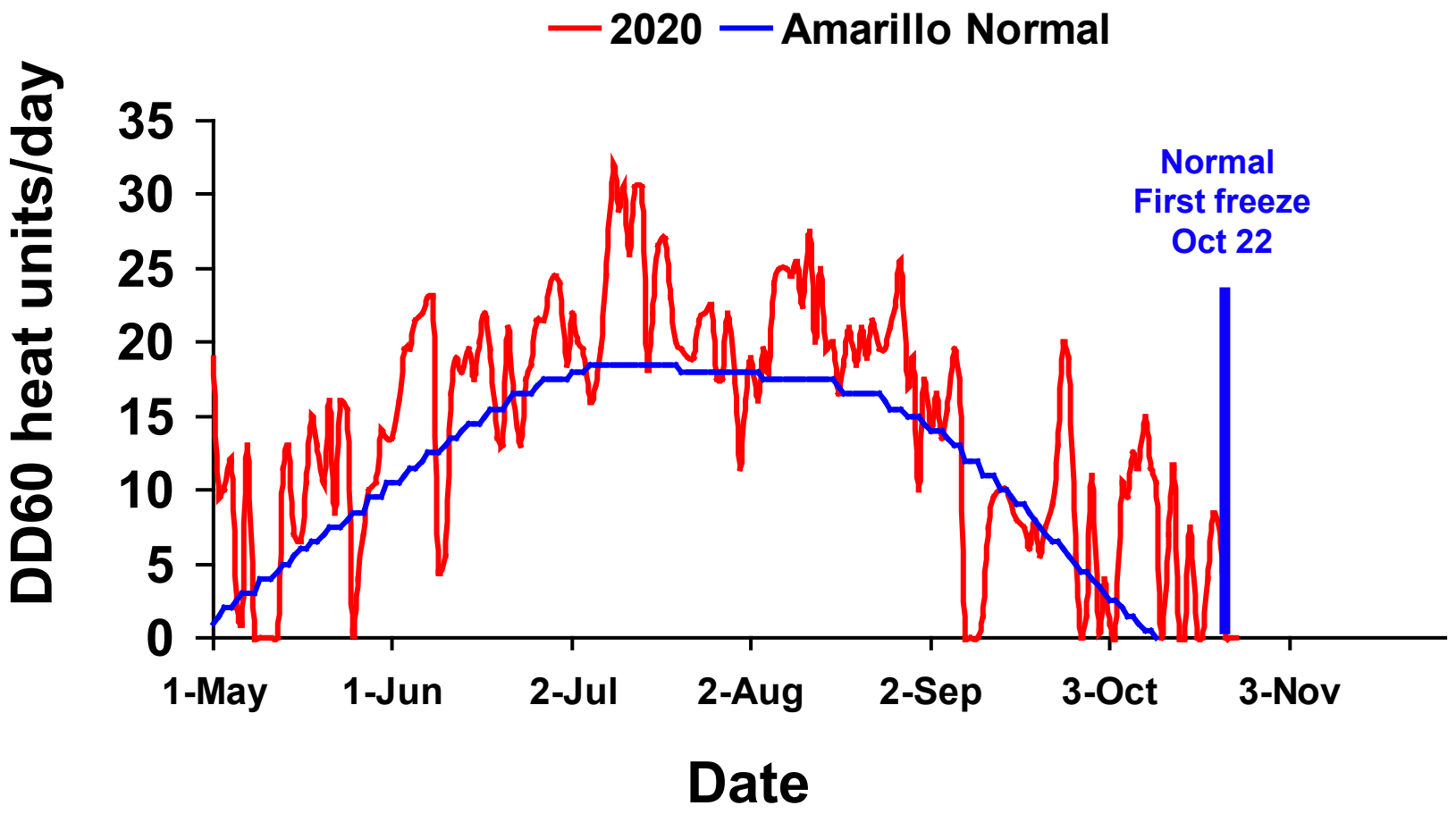
Table 3 (continued). Commercial classing data for the center pivot irrigated XtendFlex cotton variety trial, Williams Farm, Panhandle, TX, 2020.

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
NG 2982 B3XF															
651082	31-2	3	1	5	36	2.8	.	.	34.6	78.0	7.5	7	80.8	113	44.10
651083	31-2	3	1	5	36	3.1	.	.	33.1	76.7	7.8	8	80.4	112	46.70
651084	31-2	3	1	6	36	3.2	.	.	33.1	76.9	7.9	7	80.7	112	43.55
651085	31-1	3	1	4	36	3.1	.	.	34.7	78.3	7.9	5	82.2	113	48.40
651086	31-1	3	1	4	37	3.1	.	.	35.7	78.8	8.0	5	81.7	114	48.60
651087	31-1	3	1	4	37	3.2	.	.	34.5	78.8	7.8	5	81.3	114	48.60
651088	31-1	3	1	4	37	3.2	.	.	33.1	78.8	7.7	5	82.2	114	48.65
651089	31-1	3	1	5	36	3.3	.	.	33.6	78.3	8.0	5	80.6	112	48.50
Average	--	3.0	1.0	4.6	36.4	3.1	none	none	34.1	78.1	7.8	5.9	81.2	113.0	47.14
NG 3930 B3XF															
651090	21-1	2	1	3	37	2.8	.	.	33.2	80.4	8.6	3	81.9	117	47.75
651091	21-1	2	1	2	37	3.6	.	.	30.5	80.3	9.1	2	79.1	114	56.50
651092	21-1	2	1	3	36	3.6	.	.	28.5	80.1	9.1	2	78.9	111	55.30
651093	11-1	1	1	2	36	3.7	.	.	31.2	81.1	9.2	2	80.3	113	56.80
651094	11-1	1	1	2	37	3.8	.	.	30.2	81.6	9.2	2	81.7	116	57.05
651095	11-1	1	1	2	37	3.8	.	.	31.0	81.5	9.2	2	81.7	115	57.25
651096	11-2	1	1	2	37	3.8	.	.	30.6	80.6	9.1	2	81.7	117	57.05
651097	11-1	1	1	2	37	3.6	.	.	30.3	82.1	8.9	2	79.6	114	56.50
651098	11-1	1	1	2	37	4.1	.	.	28.6	81.9	9.2	1	79.9	114	56.30
Average	--	1.3	1.0	2.2	36.8	3.6	none	none	30.5	81.1	9.1	2.0	80.5	114.6	55.61
ST 4480 B3XF															
651049	21-1	2	1	3	37	3.3	.	.	32.8	83.3	7.7	2	80.5	116	52.10
651050	11-2	1	1	3	37	3.7	.	.	32.2	82.9	8.1	2	80.0	114	56.80
651051	11-2	1	1	2	38	3.7	.	.	31.3	83.2	7.9	2	79.1	118	56.90
651052	11-2	1	1	2	37	3.5	.	.	31.8	83.3	7.9	2	79.1	114	56.70
651053	11-1	1	1	2	36	3.7	.	.	30.4	83.7	8.2	1	79.1	113	56.10
651054	11-1	1	1	1	37	3.7	.	.	32.5	84.5	8.0	1	79.4	116	56.75
651055	11-1	1	1	2	37	3.9	.	.	30.8	84.4	8.0	2	80.1	114	57.05
651056	11-2	1	1	2	37	3.9	.	.	32.4	84.4	7.7	1	79.7	114	56.75
651057	11-1	1	1	2	37	3.9	.	.	30.1	84.5	7.9	1	79.0	114	56.55
Average	--	1.1	1.0	2.1	37.0	3.7	none	none	31.6	83.8	7.9	1.6	79.6	114.8	56.19

Appendix

Amarillo 2020 Cotton Heat Units and Weather Data

Amarillo
30-Year Normal (1981-2010) and 2020
Daily Heat Units



Total Accumulated Heat Units
From May 1 through Hard Freeze:

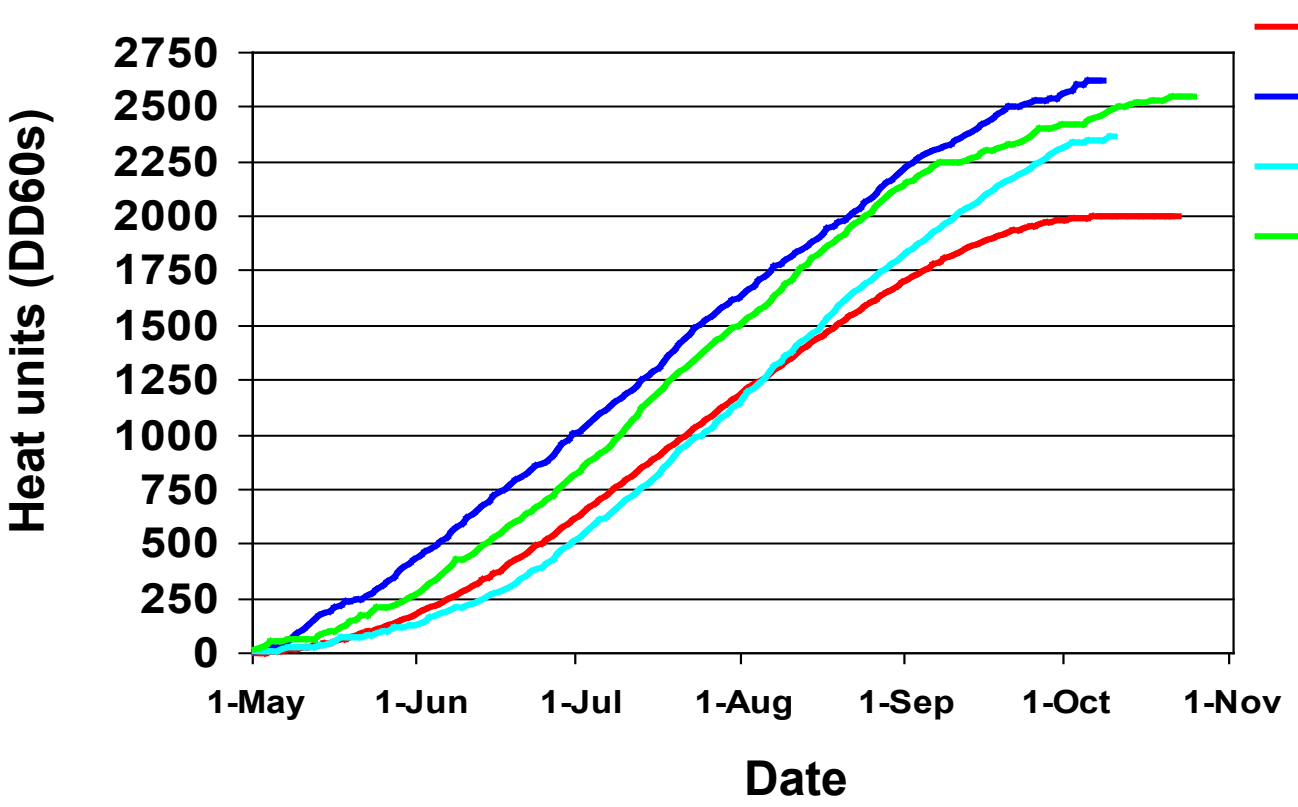
Normal: 2001
2020: 2552
% of normal: +28%

July had 10 days of 100 degrees or greater

Aug had 7 days of 100 degrees or greater

Hard freeze on Oct 25

Amarillo 30-Yr Normal (1981-2010) vs. 2018, 2019, and 2020 Cotton Heat Unit Accumulation for May 1 Through First Hard Freeze



1981-2010 (2001)
2018 (2621)
2019 (2362)
2020 (2552)

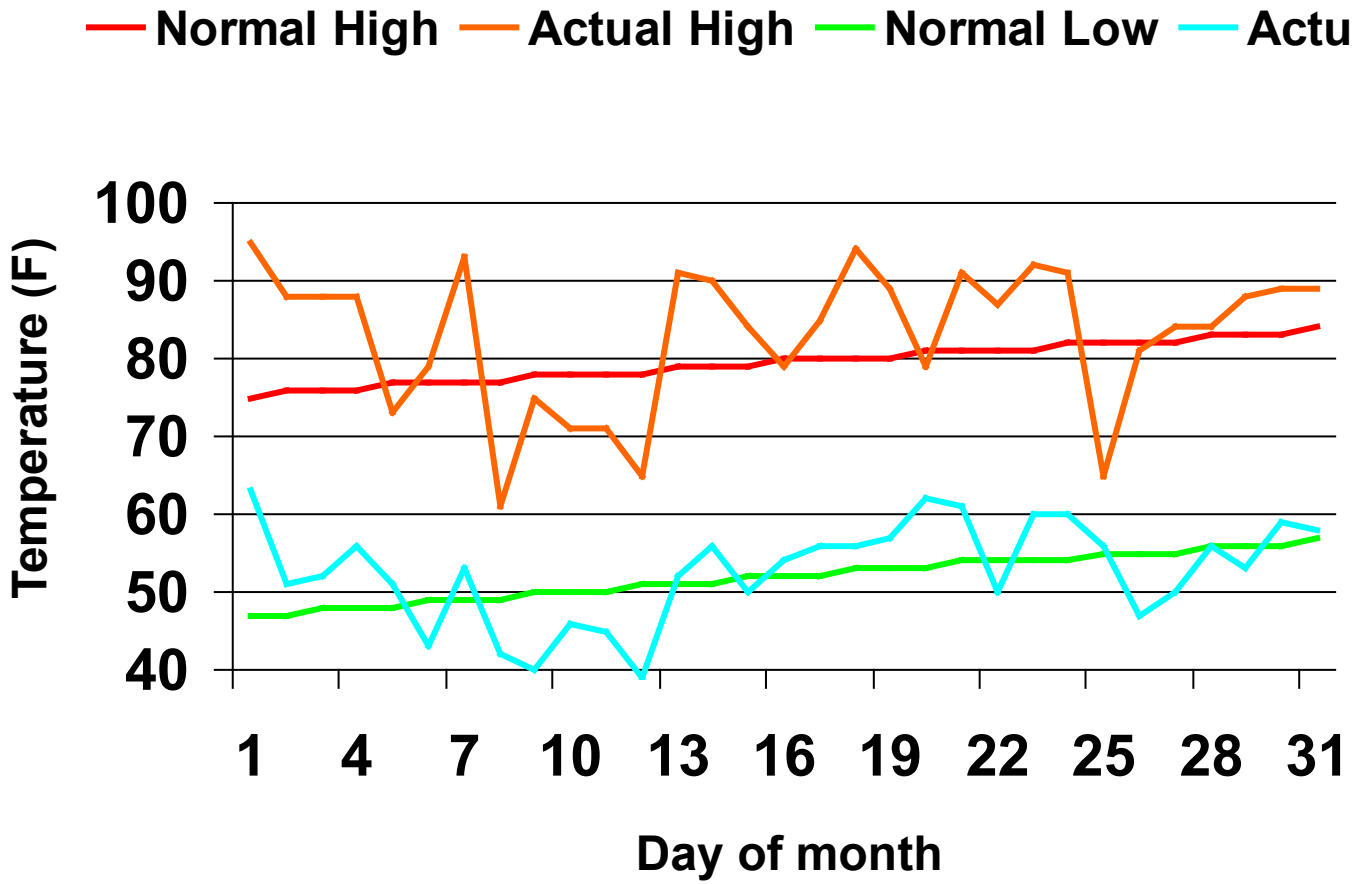
From May 1 through First Hard Freeze
Normal: 2001

2020: 2552
% of Normal: +28%

2019: 2362
% of Normal: +18%

2018: 2621
% of Normal: +31%

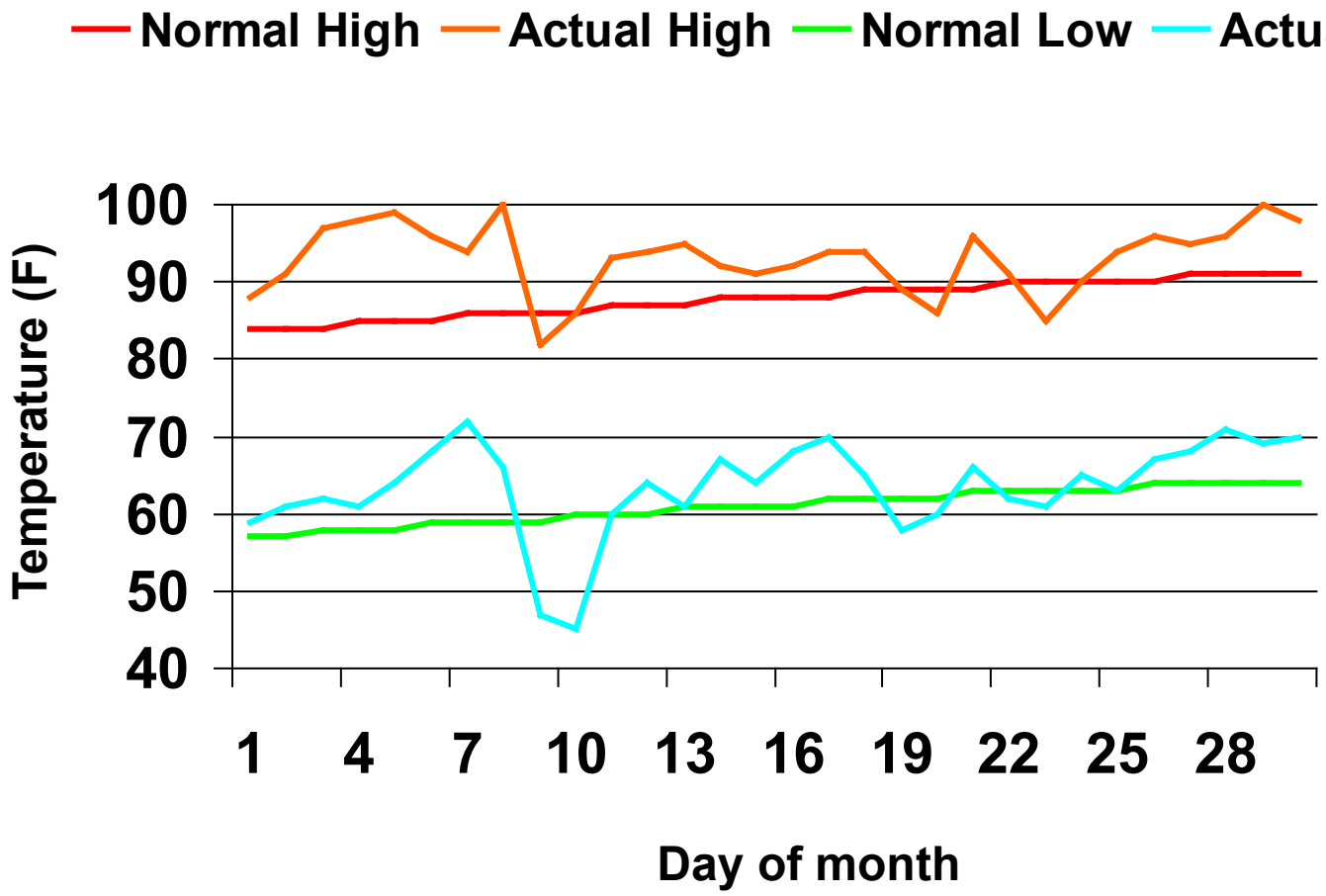
Amarillo
30-Yr Normal (1981-2010) and May 2020 Air Temperatures



Heat Units

Normal: 177
2020: 269
% of normal: +52

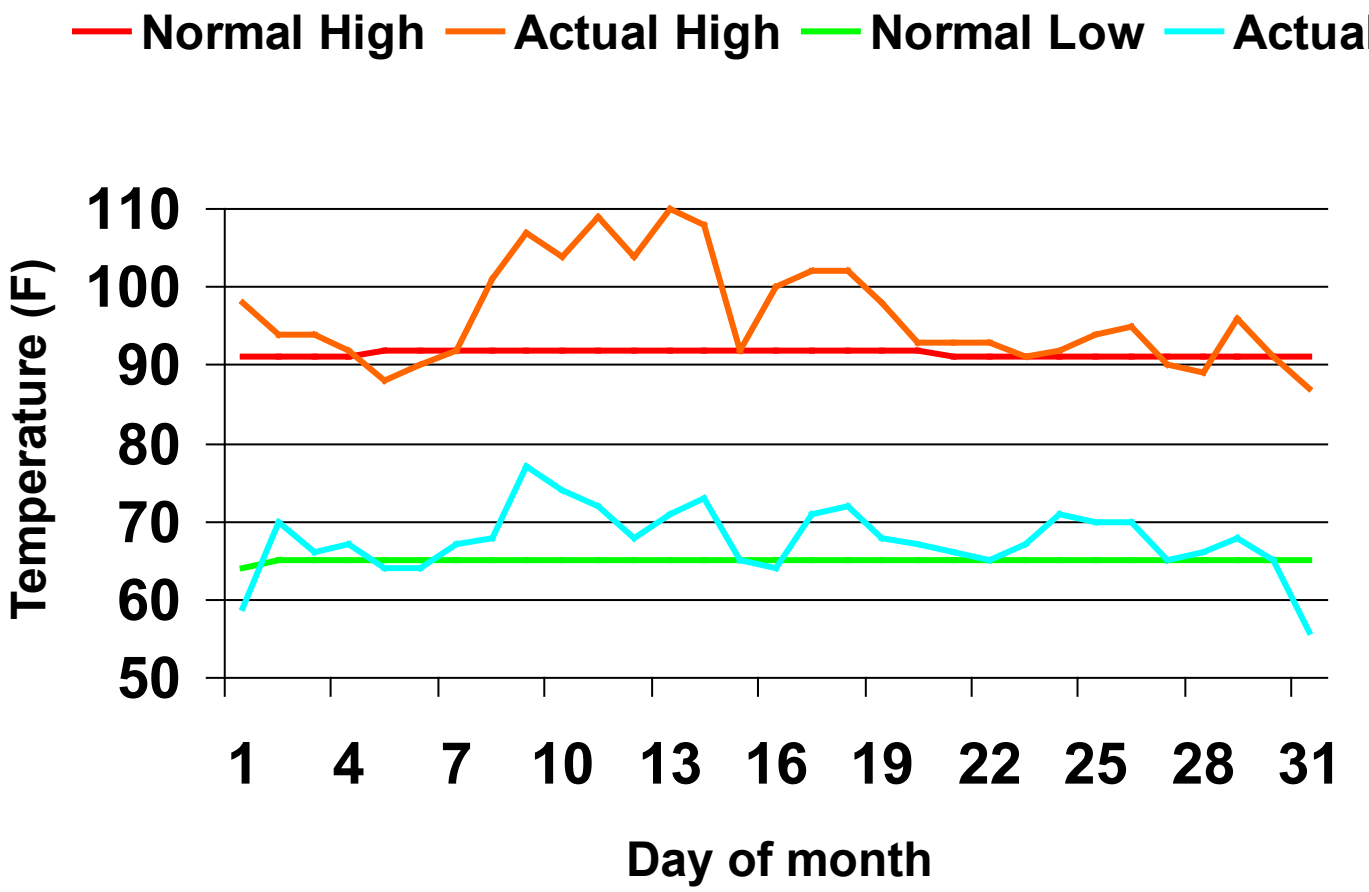
Amarillo
30-Yr Normal (1981-2010) and June 2020 Air Temperatures



Heat Units

Normal total: 433
2020: 548
% of normal: +27

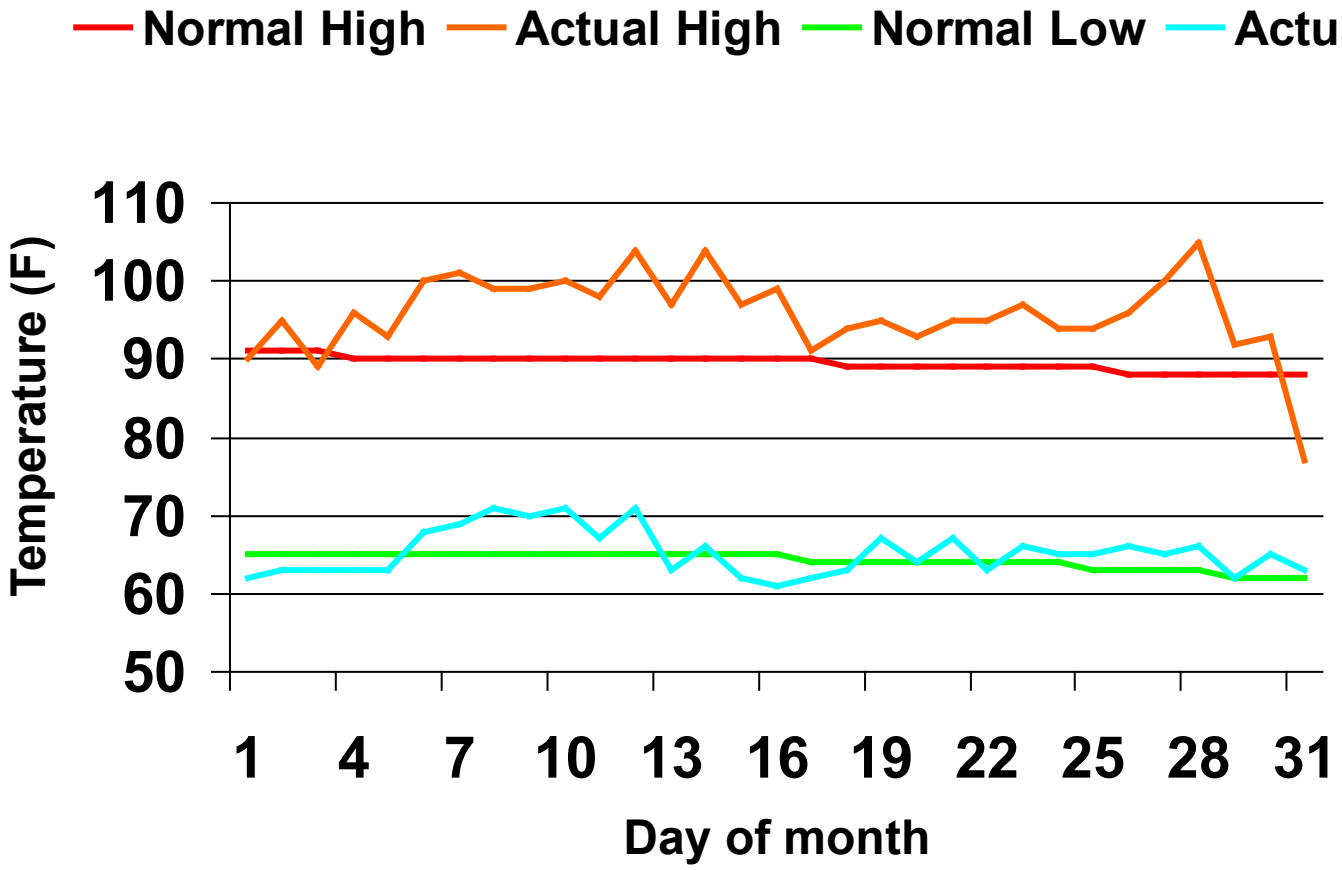
Amarillo
30-Yr Normal (1981-2010) and July 2020 Air Temperatures



Heat Units

Normal total: 566
2020: 683
% of normal: +21

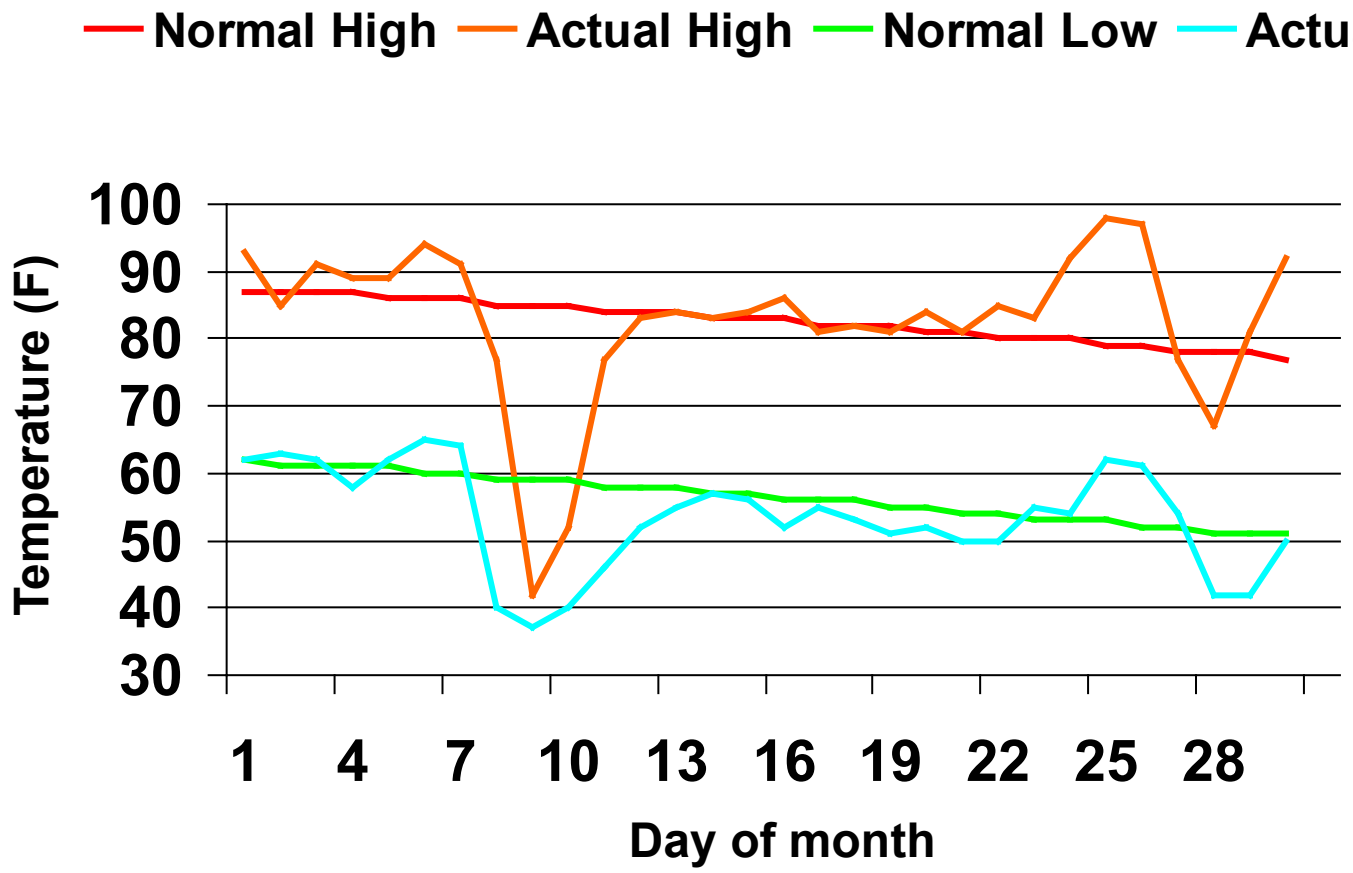
Amarillo
30-Yr Normal (1981-2010) and August 2020 Air Temperatures



Heat Units

Normal for Month: 522
2020: 637
% of normal: +22

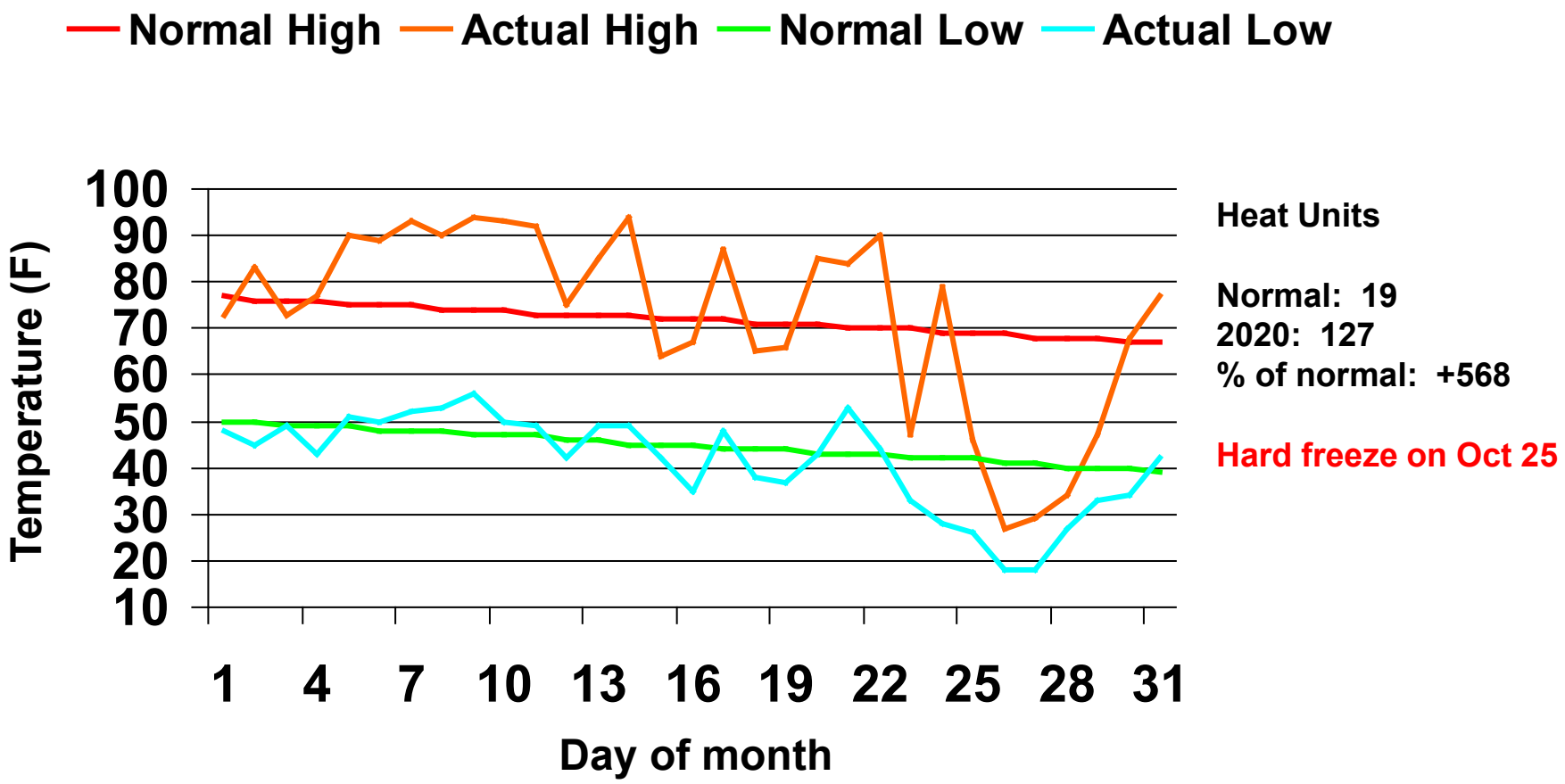
Amarillo
30-Yr Normal (1981-2010) and September 2020 Air Temperatures



Heat Units

Normal for Month: 286
2020: 283
% of normal: -1

Amarillo
30-Yr Normal (1981-2010) and October 2020 Air Temperatures



Heat Units

Normal: 19
2020: 127
% of normal: +568

Hard freeze on Oct 25