



2020 Enlist Technology Cotton Variety Trial – Lonestar Gin

**Lance Williams Farm
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, in cooperation with Ben Benton, nine PhytoGen varieties with Enlist technology were planted in a center-pivot irrigated field in a scientifically valid trial with three replicates. *This trial encountered minor damage associated with the June 9th regional high wind event. It also escaped hail events that occurred in the surrounding area. Overall, the trial was able to stay on track with growth and development. It was not visually adversely affected by the September 9th record low temperature, 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 1856 lb/acre (PHY 400 W3FE) to a low of 1455 lb/acre (PHY 350 W3FE), and averaged 1669 lb/acre (Table 1). Average Loan value for varieties from commercially ginned and classed bales varied from a high of \$0.5496/lb (PHY 210 W3FE) to a low of \$0.4581/lb (PHY 394 W3FE). Overall Loan value for the trial across all entries was \$0.5158/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. PHY 210 W3FE had the highest net value at \$1039/acre, and PX2C14 W3FE had the lowest at \$733/acre, a difference of \$306/acre.

Table 2 presents in-season data including stand establishment percentage, vigor, nodes above white flower and plant height on three sampling dates, nodes above cracked boll on October 1, and a visual estimate of storm resistance at harvest.

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 fair to good and were typically 11 or 21 across entries. Leaf grades ranged from 2.0 (PHY 332 W3FE) to 3.4 (PHY 394 W3FE). Staple ranged from an average high of 38.1 (PHY 332 W3FE) to an average low of 36.3 32nds inch (PX2C14). Micronaire was affected following the September 9 cold spell. Average micronaire values ranged from a high of 3.5 (PHY 443 W3FE) to a low of 2.8 (PHY 394 W3FE). No bark contamination was noted in commercial bales. Fiber strength was 29.9 to 33.5 g/tex, and uniformity ranged from a high of 82.2% to a low of about 79.4%.

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: 3440 ft

Previous crop: corn harvested in 2019

Tillage system: strip-till

Planted: April 30

Replicates: 3 replicates in a randomized complete block design

Plot width: 8-row plots

Plot length: trial was planted in a circle with ~2,000 ft long rows

Seeding rate: 50,000 seed/acre

Days from planting to first bloom: 78 (July 13)

30-inch rows under center pivot irrigation

Total irrigation April through August: ~9.25 inches

April 1.0, May 0.75, June 1.5, July 3.0, August 3.0

Total rainfall May through August: 6.25 inches

May 0.5, June 2.25, July 0.75, August 2.5

Fertility management:

125 lb N/acre using 82-0-0 during strip-till operation on Dec 20, 2019; 20 gal/acre 10-27-0-4(S) -1 (Zn) during strip till operation

Chemical Applications:

Preplant burndown on March 6 - 2,4-D + Valor + Roundup PowerMax + Zidua

Preemergence on May 1 – 2,4-D + diuron

Post emergence (May 14) – Enlist (2,4-D), Outlook, Roundup PowerMax

Plant growth regulators: 8 oz/acre mepiquat chloride on June 6, 3 oz/acre on August 2, 24 oz/acre on Aug 12

Insecticides: May 27 (early squaring) – 4 oz/acre acephate

Harvest aid application: 1 qt/acre ethephon on August 13

Harvesting: November 10 using a John Deere CS690, with harvested area calculated by the GPS on the stripper monitor. An average of 1500 ft of plot length was harvested. 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.

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Acknowledgements

Lonestar Gin would like to thank Lance Williams with Williams Farms, LLC, for committing equipment, land, and time to conduct and manage the trial. Jimmy Osborn harvested the trial and we are very appreciative of his excellent skills and cooperation. Gratitude is expressed to PhytoGen Cottonseed, Corteva, and 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 Enlist Technology Variety Trial – Edcot Gin

**Lance Williams Farm
Panhandle, TX**

**Dr. Randy Boman
Cotton Agronomics Manager**

Variety Descriptions from Company Literature and Websites

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 250 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. ~37.1 staple, ~31.1 g/tex strength.

PHY 320 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. Medium plant height. Semi-smooth leaf, storm tolerance – very good. Bacterial blight - resistant. Verticillium wilt - good. Root knot nematode – highly resistant. ~36.2 staple, ~30.9 g/tex strength.

PHY 350 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 - excellent. Root knot nematode – highly resistant. ~36.8 staple, ~30.0 g/tex strength.

PHY 394 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. Short plant height. Semi-smooth leaf, storm tolerance – excellent. Bacterial blight - resistant. Verticillium wilt - good. Root knot nematode – resistant. ~37.8 staple, ~29.3 g/tex strength.

PHY 400 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 plant height. Semi-smooth leaf, storm tolerance – excellent. Bacterial blight - resistant. Verticillium wilt - susceptible. Root knot nematode – moderately resistant. ~36.2 staple, ~31.0 g/tex strength.

PX2C14 W3FE Enlist Technology Experimental Entry. 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. Storm tolerance – excellent. Bacterial blight - resistant. Verticillium wilt - good. Root knot nematode – resistant.

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.

PHY 443 W3FE (tested as PX3D43 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. Mid maturity. Tall plant height, Semi-smooth leaf, storm tolerance – good. Bacterial blight - resistant. Verticillium wilt - fair. Root knot nematode –resistant. Reniform nematode – resistant. ~36.2 staple, ~31.0 g/tex strength.



Table 1. Harvest results for the center pivot irrigated Enlist 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 -----		
PHY 210 W3FE	27.2	34.0	6766	1839	2299	0.5496	1011	28	1039	a
PHY 332 W3FE (PX3D32)	27.5	41.8	6261	1720	2617	0.5305	912	78	990	ab
PHY 400 W3FE	27.2	36.4	6833	1856	2488	0.5087	944	46	990	ab
PHY 320 W3FE	25.8	37.5	6310	1630	2368	0.5438	886	50	936	bc
PHY 250 W3FE	25.9	38.2	6485	1682	2474	0.5190	873	56	929	bc
PHY 443 W3FE (PX3D43)	26.6	35.9	6175	1643	2214	0.5272	866	38	904	cd
PHY 394 W3FE	25.2	38.7	6692	1688	2591	0.4581	773	62	835	de
PHY 350 W3FE	24.6	33.3	5922	1455	1970	0.5218	759	20	779	ef
PX 2C14 W3FE	23.7	30.6	6371	1509	1947	0.4834	729	4	733	f
Test average	26.0	36.3	6424	1669	2330	0.5158	861	42	904	
CV, %	--	--	5.5	5.6	5.5	--	5.7	5.7	5.7	
OSL	--	--	0.0911	0.0012	0.0001	--	0.0001	0.0001	0.0001	
LSD	--	--	504	134	182	--	70	3	73	

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 Enlist cotton variety trial, Williams Farm, Panhandle, TX, 2020.

Entry	Final population	Stand establishment	Vigor	Nodes above white flower			Plant height			Nodes above cracked boll	Storm resistance
				Early bloom	+3 weeks	+5 weeks	Early bloom	+3 weeks	+5 weeks		
	plants/acre 11-Jun	% 11-Jun	1-5 visual scale, 5 best 11-Jun	count			inches			count 1-Oct	1-9 visual scale, 9 tight 10-Nov
				15-Jul	4-Aug	20-Aug	15-Jul	4-Aug	20-Aug		
PHY 210 W3FE	34,993	70.0	3.5	7.7	6.9	2.9	14.9	23.9	25.3	4.3	6.7
PHY 250 W3FE	36,155	72.3	3.3	7.9	6.8	3.4	15.7	25.9	28.4	6.2	6.3
PX 2C14 W3FE	46,319	92.6	3.8	7.8	8.0	3.1	16.0	28.9	31.5	7.4	6.0
PHY 320 W3FE	44,286	88.6	3.8	7.6	6.7	2.9	16.1	27.6	28.7	5.7	5.7
PHY 332 W3FE (PX3D32)	46,319	92.7	3.8	7.1	6.3	3.0	17.0	28.4	31.3	6.8	6.0
PHY 350 W3FE	38,768	77.5	3.5	7.6	6.7	3.2	17.3	30.7	32.8	6.1	5.0
PHY 394 W3FE	42,834	85.7	3.8	7.9	7.8	3.4	14.6	24.9	26.0	8.2	7.3
PHY 400 W3FE	39,349	78.7	3.8	7.3	6.4	3.1	16.1	27.0	27.7	7.3	7.0
PHY 443 W3FE (PX3D43)	45,157	90.3	4.0	7.0	6.2	3.4	18.3	31.7	34.3	7.2	4.7
Test average	41,576	83.2	3.7	7.5	6.9	3.2	16.2	27.7	29.6	6.6	6.1
CV, %	10.4	10.4	11.3	6.4	12.4	18.6	4.6	4.7	6.4	21.1	7.2
OSL	0.0269	0.0267	0.5940	0.2153	0.1753	0.9006	0.0005	0.0001	0.0002	0.1041	0.0001
LSD	6,151	12.3	NS	NS	NS	NS	1.1	1.9	2.7	2.0	0.62

CV - coefficient of variation.

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

LSD - least significant difference at the 0.10 level.



Table 3. Commercial classing data for the center pivot irrigated Enlist 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
PHY 210 W3FE															
651034	21-1	2	1	2	38	3.0	.	.	35.3	82.3	7.8	2	81.9	118	50.95
651035	21-2	2	1	3	37	3.2	.	.	33.6	81.3	7.9	4	81.3	116	50.35
651036	21-1	2	1	2	38	3.3	.	.	33.2	82.2	8.1	2	82.6	118	52.80
651037	21-1	2	1	3	38	3.5	.	.	33.3	82.2	7.8	3	81.6	118	56.95
651038	21-1	2	1	2	37	3.5	.	.	33.4	82.8	7.7	2	81.3	116	57.25
651039	21-1	2	1	3	37	3.5	.	.	33.3	81.9	8.0	3	82.6	116	56.85
651040	11-2	1	1	2	37	3.7	.	.	32.6	82.6	7.9	2	81.5	116	57.25
651041	21-1	2	1	2	37	3.7	.	.	33.1	82.9	7.8	2	81.7	116	57.30
Average	--	1.9	1.0	2.4	37.4	3.4	none	none	33.5	82.3	7.9	2.5	81.8	116.8	54.96
PHY 250 W3FE															
651013	21-1	2	1	2	39	3.1	.	.	32.6	82.2	7.9	2	82.2	121	50.95
651014	21-1	2	1	2	37	3.5	.	.	31.7	82.3	8.3	2	81.0	116	57.20
651015	21-1	2	1	3	38	3.2	.	.	32.8	81.9	7.8	2	80.6	119	50.45
651016	21-1	2	1	2	37	3.2	.	.	31.9	81.5	8.2	2	80.5	114	50.75
651017	21-1	2	1	2	37	3.3	.	.	31.5	81.2	8.1	2	80.5	115	52.55
651018	21-1	2	1	3	38	3.0	.	.	35.2	81.6	7.9	2	80.7	119	50.50
651019	21-2	2	1	2	38	3.0	.	.	31.9	81.4	7.8	2	80.8	119	50.90
Average	--	2.0	1.0	2.3	37.7	3.2	none	none	32.5	81.7	8.0	2.0	80.9	117.6	51.90
PX2C14 W3FE															
651000	21-1	2	1	3	37	3.1	.	.	30.9	81.4	8.3	3	80.8	116	50.10
651001	21-1	2	1	3	36	3.2	.	.	29.7	81.0	8.5	3	81.1	113	49.50
651002	21-1	2	1	3	37	2.7	.	.	31.0	79.7	8.7	2	81.5	116	47.70
651003	21-1	2	1	3	37	2.7	.	.	30.6	79.7	8.5	3	81.7	117	47.50
651004	21-1	2	1	3	35	2.9	.	.	30.2	79.7	8.9	2	80.5	110	45.75
651005	21-1	2	1	3	36	3.0	.	.	29.4	80.3	8.8	3	81.2	113	49.50
Average	--	2.0	1.0	3.0	36.3	2.9	none	none	30.3	80.3	8.6	2.7	81.1	114.2	48.34



Table 3 (continued). Commercial classing data for the center pivot irrigated Enlist 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
PHY 320 W3FE															
650987	21-1	2	1	3	38	3.1	.	.	30.8	80.8	8.1	3	82.1	119	50.30
650988	21-1	2	1	3	37	3.3	.	.	30.0	80.9	8.5	2	82.2	116	51.95
650989	21-1	2	1	2	37	3.5	.	.	29.0	80.2	8.6	2	81.8	115	56.80
650990	21-1	2	1	3	36	3.5	.	.	31.3	80.6	8.4	2	80.7	113	56.35
650991	21-1	2	1	3	37	3.5	.	.	28.7	80.5	8.6	3	82.6	114	56.35
650992	21-1	2	1	3	37	3.5	.	.	30.3	81.1	8.5	2	83.1	117	56.65
650993	21-1	2	1	2	37	3.4	.	.	29.4	81.4	8.6	1	83.0	115	52.25
Average	--	2.0	1.0	2.7	37.0	3.4	none	none	29.9	80.8	8.5	2.1	82.2	115.6	54.38
PHY 332 W3FE (PX3D32)															
651006	21-1	2	1	2	38	3.3	.	.	34.4	79.9	9.1	2	81.2	120	52.75
651007	11-3	1	1	2	38	3.8	.	.	32.6	79.7	9.6	2	80.1	118	57.40
651008	21-3	2	1	2	38	2.6	.	.	34.9	79.3	9.5	2	80.5	119	43.45
651009	11-2	1	1	2	38	3.8	.	.	32.1	79.6	9.4	2	79.5	119	56.90
651010	21-1	2	1	2	39	3.9	.	.	30.9	79.2	9.3	1	80.6	122	57.20
651011	21-3	2	1	2	38	3.2	.	.	33.3	79.3	9.6	2	81.1	119	50.95
651012	11-2	1	1	2	38	3.3	.	.	31.9	79.5	9.4	2	81.0	120	52.70
Average	--	1.6	1.0	2.0	38.1	3.4	none	none	32.9	79.5	9.4	1.9	80.6	119.6	53.05
PHY 350 W3FE															
650994	21-1	2	1	2	38	3.6	.	.	30.2	81.4	8.3	1	82.2	118	57.20
650995	21-1	2	1	2	38	3.4	.	.	31.4	81.3	8.6	2	81.4	118	52.70
650996	21-1	2	1	2	37	3.4	.	.	29.2	81.3	8.7	2	81.2	115	52.15
650997	21-1	2	1	2	38	3.4	.	.	31.1	81.4	8.4	2	80.5	119	52.70
650998	21-1	2	1	2	38	3.1	.	.	31.2	81.5	8.3	2	81.3	119	50.90
650999	21-1	2	1	3	38	2.8	.	.	29.6	80.9	8.4	3	81.2	118	47.45
Average	--	2.0	1.0	2.2	37.8	3.3	none	none	30.5	81.3	8.5	2.0	81.3	117.8	52.18



Table 3 (continued). Commercial classing data for the center pivot irrigated Enlist 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 %	Uniformity %	Length 100ths inch	Loan rate cents/lb
PHY 394 W3FE															
651042	21-1	2	1	3	38	2.9	.	.	31.9	79.6	8.8	3	79.1	118	47.35
651043	21-1	2	1	4	37	3.0	.	.	31.3	78.9	9.2	4	78.6	117	48.70
651044	21-1	2	1	3	37	3.0	.	.	29.1	78.6	8.9	3	78.9	114	49.30
651045	21-1	2	1	3	37	2.9	.	.	31.0	78.7	9.1	3	81.5	115	47.70
651046	21-2	2	1	3	37	2.8	.	.	30.0	77.9	9.0	3	79.7	117	47.00
651047	31-1	3	1	4	38	2.5	.	.	30.4	77.2	8.7	4	78.6	119	40.25
651048	31-1	3	1	4	38	2.6	.	.	30.4	78.4	8.5	4	79.1	120	40.35
Average	--	2.3	1.0	3.4	37.4	2.8	none	none	30.6	78.5	8.9	3.4	79.4	117.1	45.81
PHY 400 W3FE															
651026	21-1	2	1	2	36	3.3	.	.	32.4	80.0	8.7	2	79.3	113	51.60
651027	11-2	1	1	2	37	3.3	.	.	32.3	80.5	9.0	2	80.9	115	52.55
651028	21-1	2	1	2	37	3.4	.	.	32.1	79.9	8.9	2	79.3	115	52.05
651029	21-2	2	1	1	33	4.9	.	.	29.4	79.8	8.2	1	79.7	104	51.05
651030	21-1	2	1	2	38	3.5	.	.	32.5	80.3	8.8	2	80.7	118	57.35
651031	21-1	2	1	3	38	2.9	.	.	31.8	79.2	8.9	2	79.1	118	47.35
651032	21-1	2	1	3	37	2.8	.	.	31.9	79.4	8.9	3	80.2	117	47.70
651033	21-1	2	1	3	38	2.7	.	.	34.2	79.8	8.9	2	78.8	118	47.30
Average	--	1.9	1.0	2.3	36.8	3.4	none	none	32.1	79.9	8.8	2.0	79.8	114.8	50.87
PHY 443 W3FE (PX3D43)															
651020	21-1	2	1	3	38	2.4	.	.	30.0	79.0	9.0	2	80.6	119	38.30
651021	21-1	2	1	2	37	3.9	.	.	29.7	79.6	9.1	2	81.5	115	56.85
651022	21-1	2	1	3	36	3.9	.	.	32.2	80.2	8.9	2	81.5	113	56.40
651023	21-1	2	1	2	37	3.8	.	.	31.4	80.6	8.7	1	82.3	115	57.30
651024	21-1	2	1	2	37	3.4	.	.	31.3	79.4	9.3	2	82.3	116	52.60
651025	21-1	2	1	3	35	3.8	.	.	30.3	79.7	9.1	3	80.3	110	54.85
Average	--	2.0	1.0	2.5	36.7	3.5	none	none	30.8	79.8	9.0	2.0	81.4	114.7	52.72



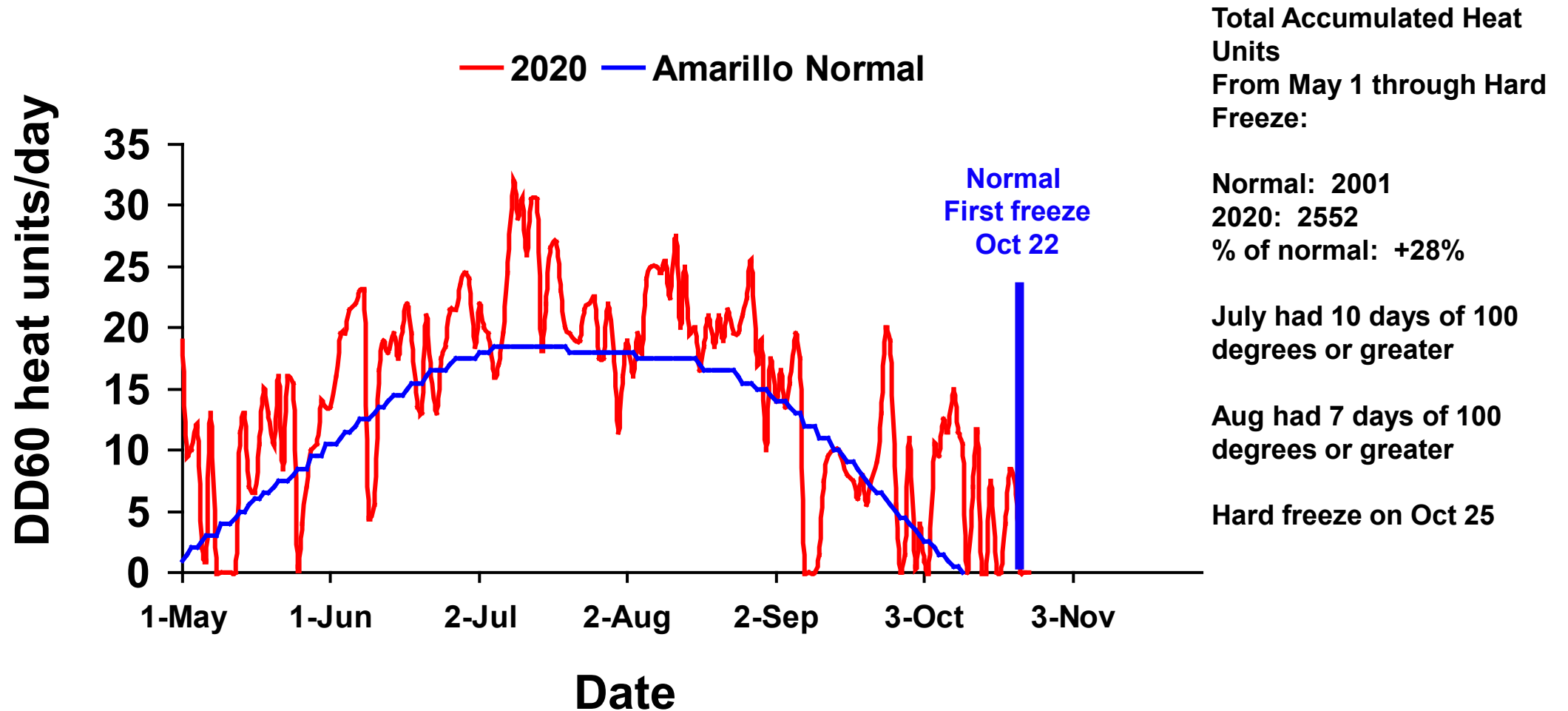
Appendix

Amarillo 2020 Cotton Heat Units and Weather Data



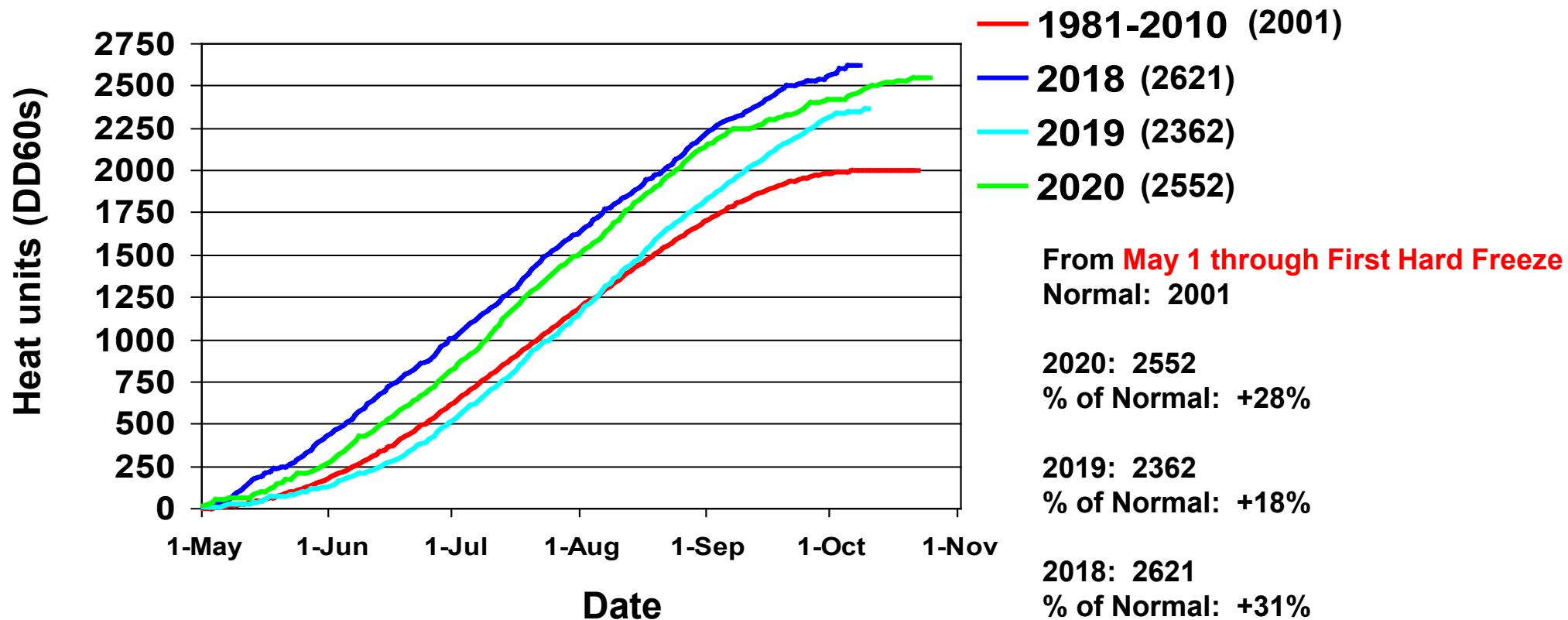
Amarillo

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



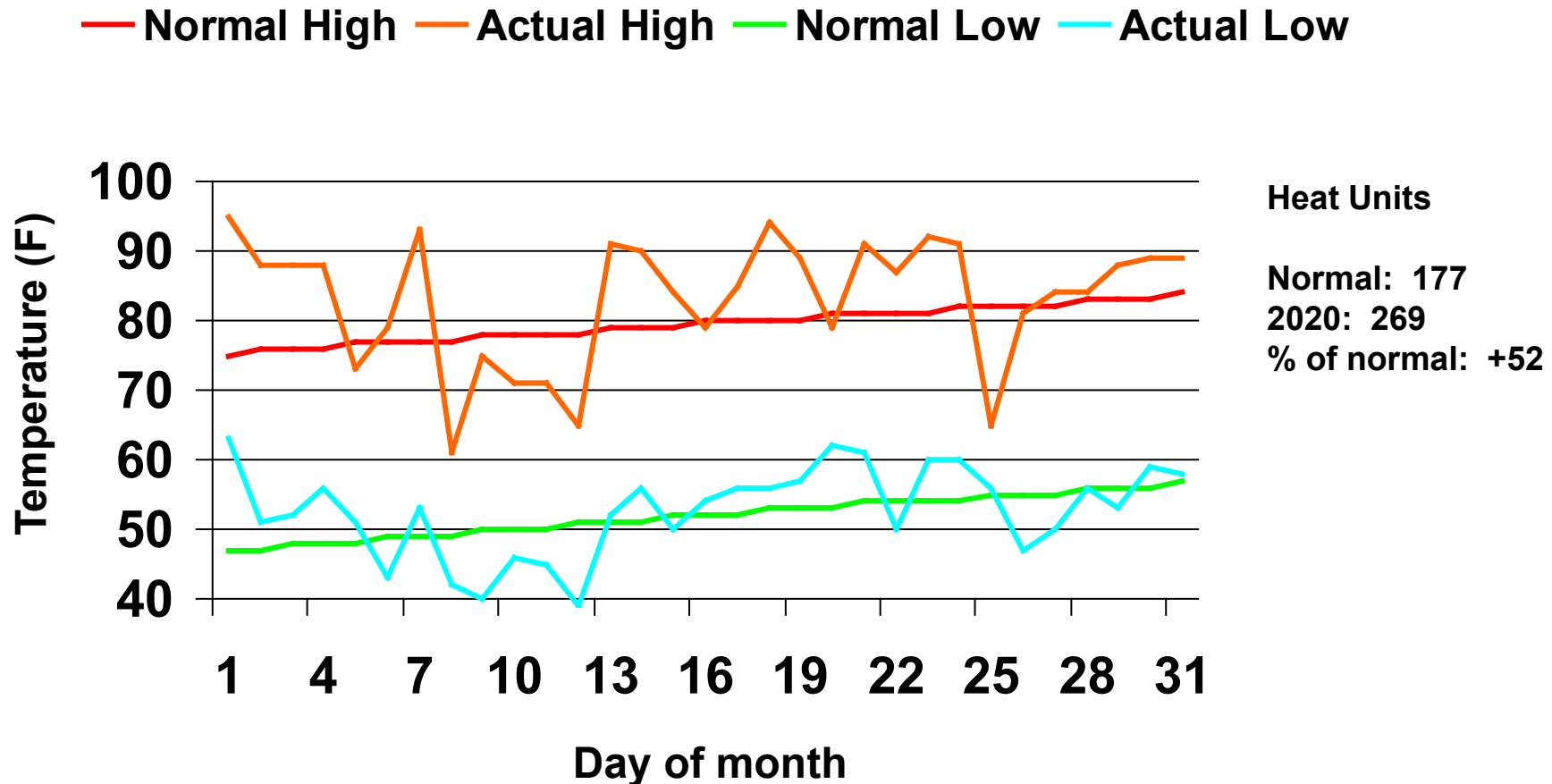
Amarillo 30-Yr Normal (1981-2010) vs. 2018, 2019, and 2020

Cotton Heat Unit Accumulation for May 1 Through First Hard Freeze



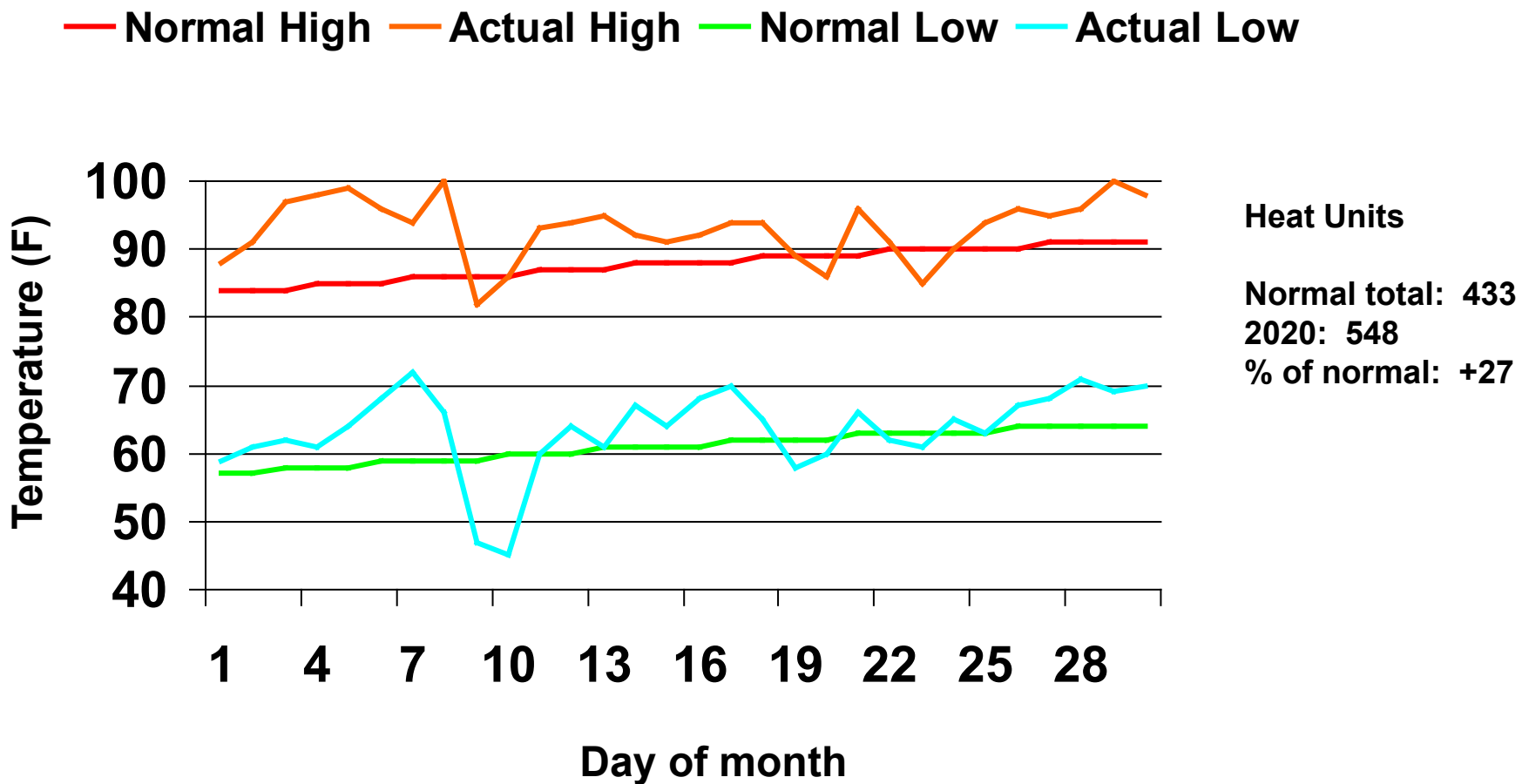
Amarillo

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



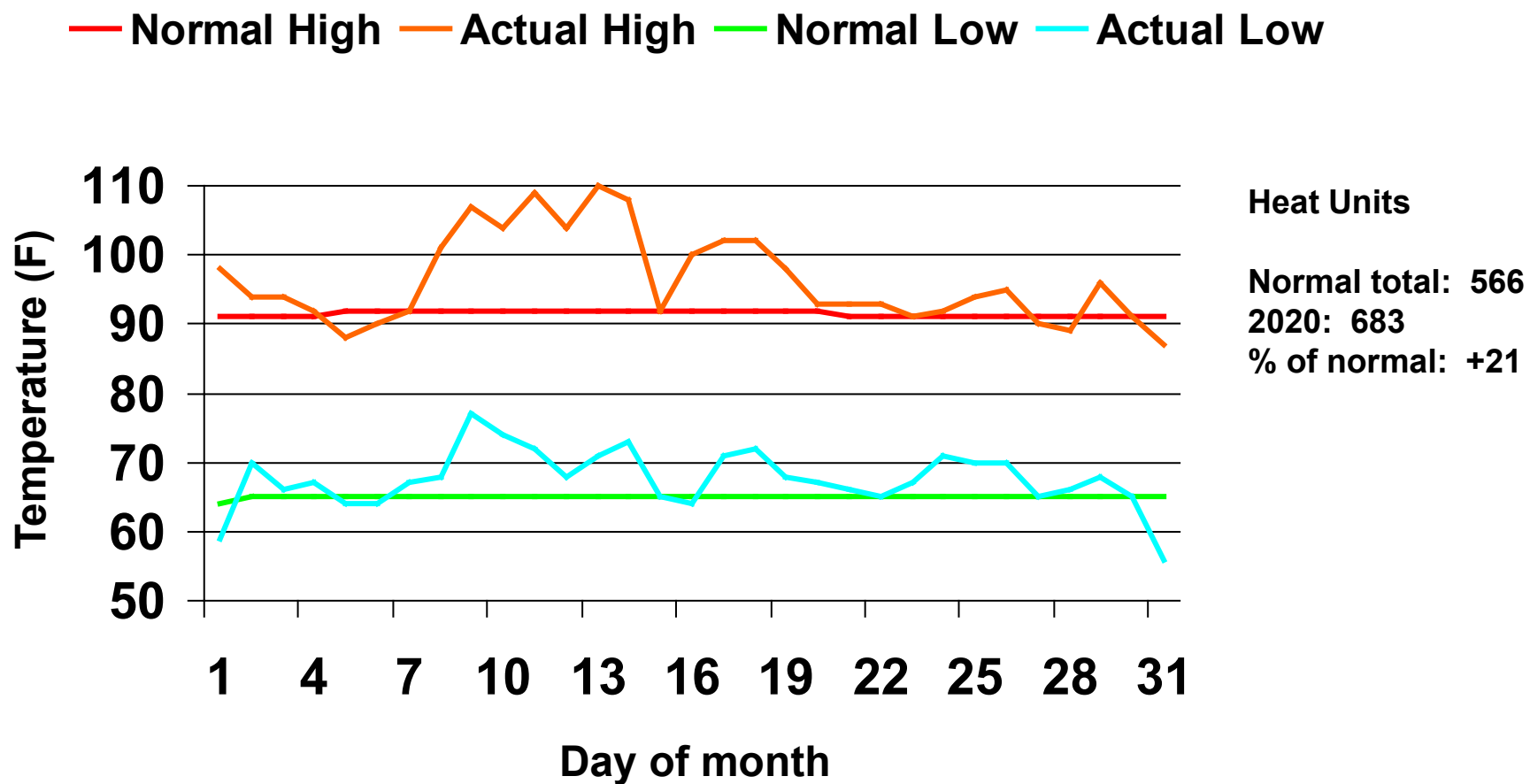
Amarillo

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



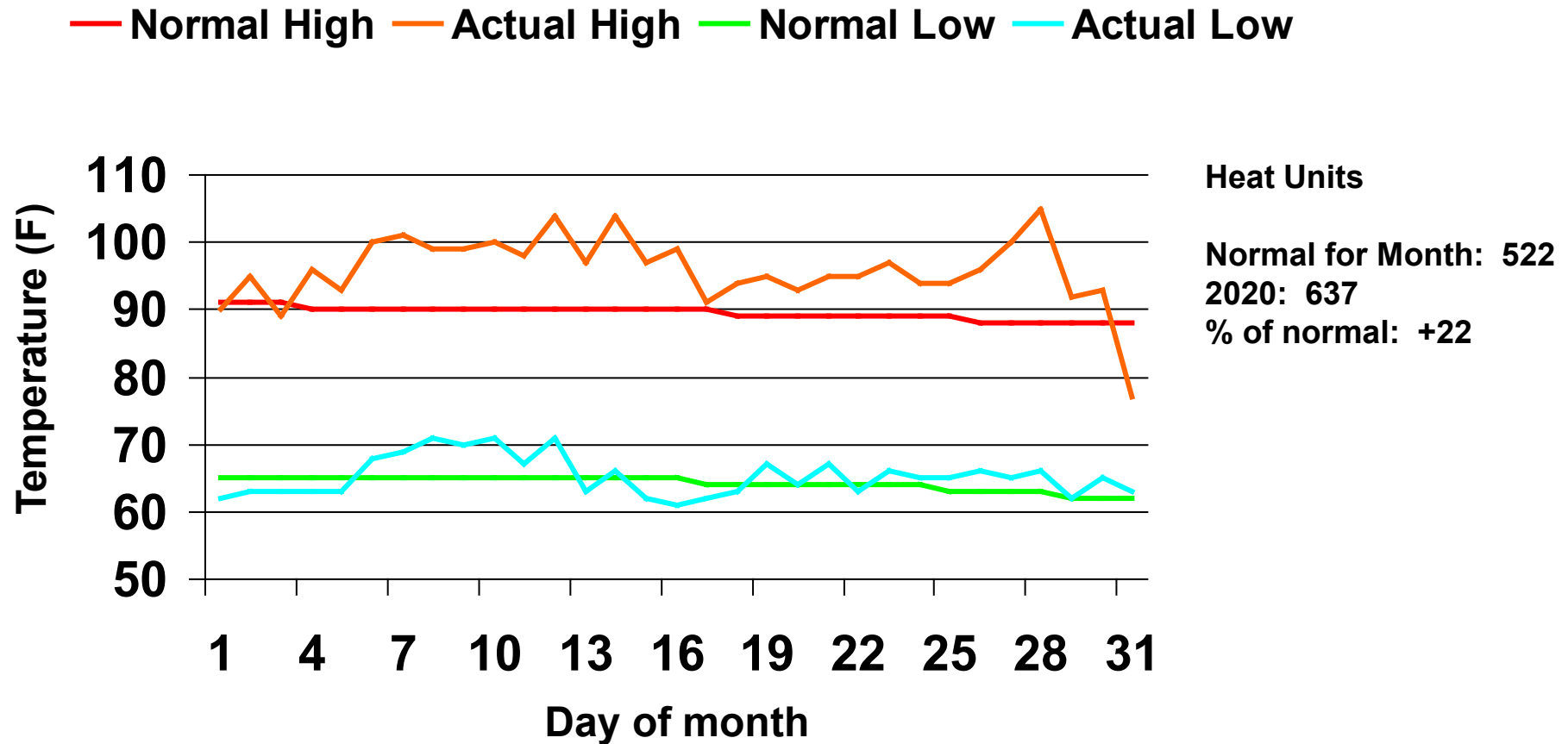
Amarillo

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



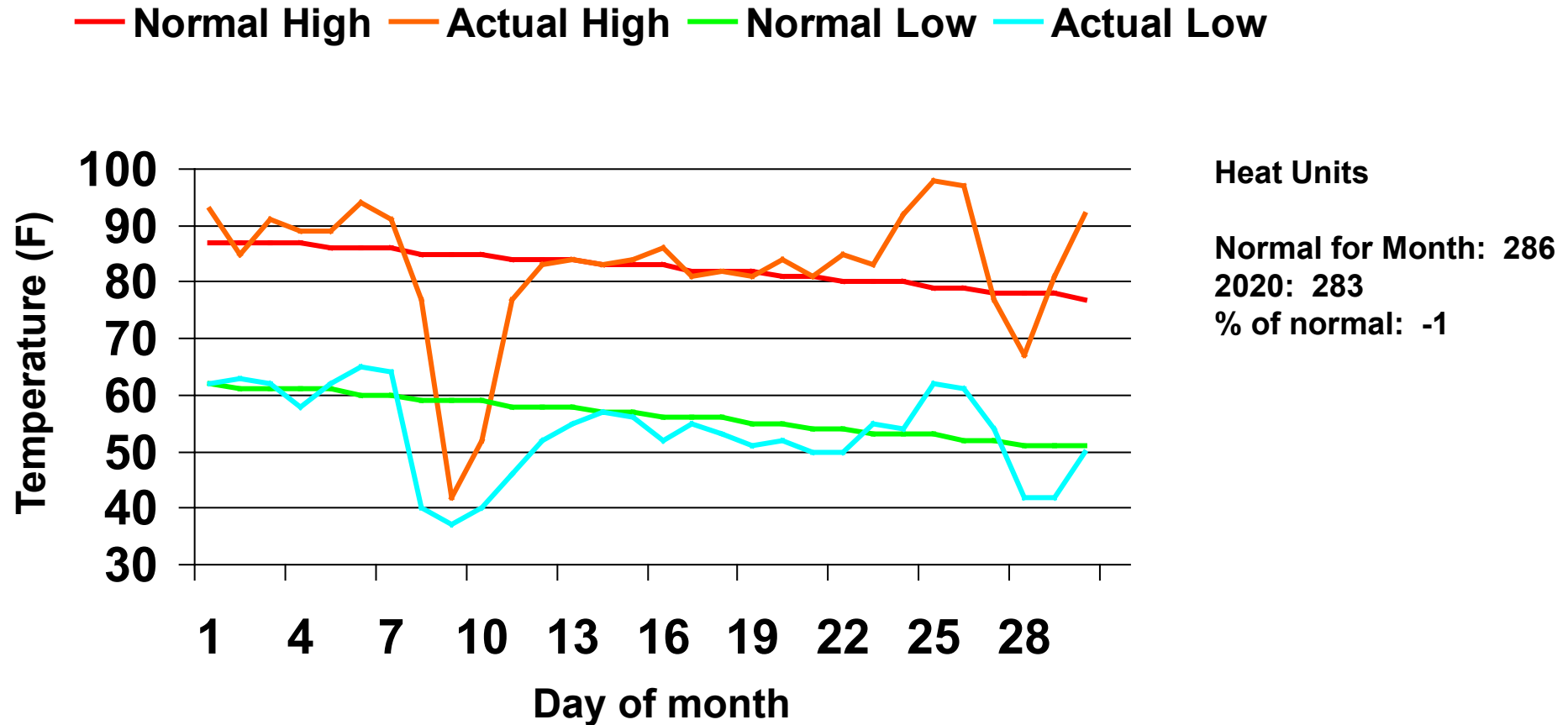
Amarillo

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



Amarillo

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



Amarillo

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

— Normal High — Actual High — Normal Low — Actual Low

