



## **2021 Enlist Technology Cotton Variety Trial – Top of Texas Gin**

**Gruhlkey Brothers Farm  
Wildorado, TX**

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

**Billy Sam Borchardt - Steven Birkenfeld – Co-Managers - Top of Texas Gin**

**Zach Haydon – Assistant Manager – Top of Texas Gin**

### **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 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, eight PhytoGen varieties with Enlist technology were planted in a center-pivot irrigated field in a scientifically valid trial with three replicates. *This trial experienced minimal adverse weather events. Some entries had slightly better stand establishment percentages than others. These data are presented in Table 2. The trial escaped various localized hail events that occurred in the surrounding area. Overall, it was able to stay on track with growth and development and excellent in-season, yield and quality data were obtained.*

Harvest results indicated that statistically significant differences were observed. Lint yields ranged from a high of 1336 lb/acre (PHY 205 W3FE) to a low of 1143 lb/acre (PHY 210 W3FE), and averaged 1225 lb/acre (Table 1). Average Loan value for varieties from commercially ginned and classed bales varied from a high of \$0.5731/lb (PHY 210 W3FE) to a low of \$0.5156/lb (PHY 394 W3FE). Overall Loan value for the trial across all entries was \$0.5581/lb. When including lint Loan value on a per acre basis and net gin credit (defined as seed credit minus ginning expense), statistically significant differences in net value were found among varieties. PHY 332 W3FE had the highest net value at \$794/acre, and PHY 394 W3FE had the lowest at \$651/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 28<sup>th</sup>, 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 excellent and were typically 11 or 21 across all entries. Leaf grades were typically 1 and 2. Staple ranged from about 34 (PHY 205 W3FE) to 36.5 32<sup>nds</sup> inch (PHY 332 W3FE). Micronaire averages were good to excellent and ranged from 3.4 (PHY 394 W3FE) to 4.4 (PHY 205 W3FE). No bark contamination was noted in any commercial bales. Fiber strength ranged from 30.4 to 32.7 g/tex, and uniformity ranged from 79.1 to 82.1%.

***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: 3825 ft

Previous crop: wheat for silage harvested in 2021

Tillage system: no-tilled into wheat silage residue

Planted: May 15

Replicates: 3 replicates in a randomized complete block design

Plot width: 8-row plots

Plot length: length of field (~2,900 ft)

Seeding rate: 45,000 seed/acre

Days from planting to first bloom: 75 (July 28)

30-inch rows under center pivot irrigation

Total irrigation April through September: ~10 inches

Apr 1.1, May 0.5, Jun 1.5, Jul 1.2, Aug 4.3, Sep 1.5

Total rainfall April through September: 7.3 inches

Apr 0.10, May 1.7, Jun 1.3, Jul 3.3, Aug 0.3, Sep 0.6

Fertility management:

~105 lb N/acre (15 gallons 32-0-0 streamed with sprayer on April 10, 15 gallons 32-0-0 fertigated through pivot beginning June 15), 3 tons composted manure was applied before the wheat crop was planted (August 25, 2020). Soil samples showed adequate phosphate, potash, and micronutrient levels for 2021 cotton.

## Chemical Applications:

March 5 preplant burndown – 22 oz/acre glyphosate with 17 lb/100 gal AMS + 3 oz/acre flumioxazin + 1 pt/acre 2,4-D + 1 pt/acre dicamba;

May 15 behind planter – 1 qt/acre paraquat + 1 pt/acre diuron + 1 pt/acre Caparol

First post emergence – 22 oz/acre glyphosate + 1 qt/acre Enlist One + 3 pt/acre Warrant

Second post emergence - 22 oz/acre glyphosate + 1 qt/acre Enlist One + 3 pt/acre Warrant

Third post emergence – Edges sprayed with 43 oz/acre Liberty for escaped weeds

Plant growth regulators: 8 oz/acre mepiquat chloride (June 26), 16 oz/acre mepiquat chloride (July 22), 24 oz/acre mepiquat chloride (August 1)

Insecticides: 4 oz/acre acephate (June 12), 0.6 oz/acre Intruder (June 26), 4 oz/acre acephate (July 12)

Harvest aid application: 3 pt/acre ethephon + 1 pt/acre Folex (October 7)

Harvesting: November 10 using a John Deere CS690, with harvested area calculated by the GPS on the stripper monitor. Entire individual plot length was harvested in two round modules. Round modules were weighed using the CS690 scale, and all round modules from each variety were weighed at the Top of Texas Gin.

Commercial ginning: Round modules for all 3 reps of each variety were staged together (2 per plot, with 3 reps = 6 total per variety) and commercially ginned separately by Top of Texas 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**

Top of Texas Gin would like to thank the Gruhlkey brothers (Braden, Brittan, and Cameron) for committing equipment, land, and time to conduct and manage the trial. Gratitude is expressed to PhytoGen Cotton Seed, Corteva, and Windstar Inc. Detailed ginning was performed by Malcom Jones and the Top of Texas ginning crew and a big thank you is extended to this hard-working group.



## 2021 Enlist Variety Trial – Top of Texas Gin

Gruhlkey Brothers Farm  
Wildorado, TX

Dr. Randy Boman  
Cotton Agronomics Manager

### Variety Descriptions from Company Literature and Websites

**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 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 332 W3FE** Enlist Technology: Widestrike 3 Bt technology stacked with triple herbicide technologies including Roundup Ready Flex (glyphosate), 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 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), Liberty Link (glufosinate), and Enlist herbicide (2,4-D choline) tolerance. Early-mid maturity. Short growth habit. Semi-smooth leaf, storm tolerance - excellent. Bacterial blight - resistant. Verticillium wilt - excellent. ~37.8 staple, ~30.1 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.

**PX3E33 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. Early-mid maturity. Storm tolerance – excellent. Bacterial blight - resistant. Verticillium wilt - good. Root knot nematode – resistant.

For the latest Texas A&M AgriLife Research and Extension information from Dr. Terry Wheeler, and Dr. Cecilia Monclova-Santana ([lubbock.tamu.edu](http://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, Root Knot nematode, and reniform nematode disease variety reaction information:

<https://lubbock.tamu.edu/files/2021/12/Cotton-Disease-Report-2021.pdf>



Table 1. Harvest results for the center pivot irrigated Enlist technology cotton variety trial, Gruhlkey Farm, Wildorado, TX, 2021.

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 332 W3FE	33.7	41.6	3814	1287	1586	0.5699	733	61	794	a
PHY 205 W3FE	35.0	40.4	3817	1336	1542	0.5400	721	55	777	b
PHY 400 W3FE	36.5	41.7	3515	1283	1467	0.5619	721	56	777	b
PX3E33W3FE	33.4	39.9	3699	1236	1475	0.5660	700	51	751	c
PHY 350 W3FE	32.7	42.6	3665	1198	1560	0.5678	680	62	743	c
PHY 250 W3FE	34.0	41.4	3418	1161	1416	0.5705	663	54	716	d
PHY 210 W3FE	35.4	42.4	3228	1143	1369	0.5731	655	54	709	d
PHY 394 W3FE	31.0	40.6	3731	1155	1516	0.5156	596	55	651	e
Test average	34.0	41.3	3611	1225	1491	0.5581	684	56	740	
CV, %	--	--	1.4	1.4	1.4	--	1.4	1.4	1.4	
OSL	--	--	0.0001	0.0001	0.0001	--	0.0001	0.0001	0.0001	
LSD	--	--	71	24	29	--	13	1	15	

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.

\$235/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 technology cotton variety trial, Gruhlkey Farm, Wildorado, TX, 2021.

Entry	Final population	Stand establishment	Vigor	Nodes above white flower			Plant height			Nodes above cracked boll	Storm resistance
				Early bloom	Mid bloom	Late bloom	Prebloom	Mid bloom	Final		
	plants/acre 14-Jun	% 14-Jun	1-5 visual scale, 5 best 14-Jun	count			inches			count 28-Sep	1-9 visual scale, 9 tight 10-Nov
				28-Jul	11-Aug	23-Aug	14-Jul	11-Aug	28-Sep		
PHY 205 W3FE	29,040	64.6	3.0	8.4	3.7	1.1	13.5	21.3	21.7	2.7	8.2
PHY 210 W3FE	24,684	54.9	2.0	8.7	4.4	1.4	13.7	21.4	22.4	2.9	8.2
PHY 250 W3FE	22,070	49.1	2.0	8.5	4.9	1.8	13.6	22.7	24.2	3.6	7.2
PHY 332 W3FE	24,394	54.2	2.3	8.6	4.9	1.8	16.2	25.6	26.9	5.2	6.2
PHY 350 W3FE	23,813	52.9	2.7	8.7	5.2	2.1	16.3	25.2	26.4	5.2	5.3
PHY 394 W3FE	30,202	67.1	3.0	8.4	4.7	1.2	14.7	21.4	21.8	3.6	7.7
PHY 400 W3FE	22,070	49.0	2.0	9.0	4.9	1.5	15.6	24.2	23.3	4.5	6.5
PX3E33W3FE	24,974	55.5	2.0	8.8	4.9	1.9	16.9	25.7	26.1	5.7	6.7
Test average	25,156	55.9	2.4	8.6	4.7	1.6	15.1	23.4	24.1	4.2	7.0
CV, %	12.7	12.7	13.0	2.8	6.6	26.0	3.2	2.6	3.8	11.6	4.52
OSL	0.0590	0.0587	0.0016	0.0830	0.0011	0.1069	0.0001	0.0001	0.0001	0.0001	0.0001
LSD	4,584	10.2	0.4	0.3	0.5	0.6	0.7	0.9	1.3	0.7	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.





Table 3. Commercial classing data for the center pivot irrigated Enlist technology cotton variety trial, Gruhlkey Farm, Wildorado, 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
<b>PHY 205 W3FE</b>															
7073584	21-1	2	1	1	35	3.9	.	.	31.3	81.6	7.9	1	80.7	109	55.85
7073585	21-1	2	1	2	34	4.4	.	.	29.9	82.3	8.3	1	81.7	105	53.65
7073586	11-2	1	1	2	34	4.5	.	.	29.2	82.0	8.4	1	81.7	106	53.65
7073587	11-2	1	1	1	34	4.6	.	.	30.9	82.1	8.4	1	80.8	105	53.80
7073588	11-2	1	1	1	34	4.4	.	.	30.1	82.4	8.5	1	81.9	106	53.80
7073589	11-1	1	1	1	35	4.4	.	.	31.0	82.6	8.5	1	82.4	108	55.80
7073590	11-1	1	1	1	34	4.4	.	.	31.2	83.1	8.4	1	82.4	106	54.05
7073591	11-1	1	1	1	34	4.3	.	.	31.3	82.9	8.5	1	82.3	105	54.05
7073592	21-1	2	1	1	34	4.5	.	.	31.9	82.1	8.3	1	82.6	107	54.05
7073593	11-2	1	1	2	34	4.4	.	.	30.9	82.3	8.4	2	83.7	107	53.90
7073594	21-1	2	1	2	33	4.5	.	.	30.4	81.7	8.3	2	83.0	104	51.55
7073595	21-1	2	1	2	34	4.5	.	.	30.7	81.1	8.4	1	82.4	107	53.85
Average	--	1.4	1.0	1.4	34.1	4.4	none	none	30.7	82.2	8.4	1.2	82.1	106.3	54.00
<b>PHY 210 W3FE</b>															
7073628	11-1	1	1	1	36	3.9	.	.	33.4	84.4	7.8	1	82.4	113	57.35
7073629	11-1	1	1	1	36	4.0	.	.	32.7	83.6	7.9	1	82.0	112	57.30
7073630	11-1	1	1	1	36	4.1	.	.	32.1	84.4	8.2	1	81.5	113	57.25
7073631	11-1	1	1	1	36	4.1	.	.	33.2	84.1	8.1	1	82.3	112	57.35
7073632	11-1	1	1	1	36	4.1	.	.	33.5	83.6	8.1	1	82.0	111	57.35
7073633	11-1	1	1	1	36	4.2	.	.	31.5	83.8	8.1	1	82.3	111	57.30
7073634	11-1	1	1	1	36	4.0	.	.	31.3	83.6	8.3	1	81.2	111	57.25
7073635	11-1	1	1	2	36	4.1	.	.	32.9	83.8	8.0	1	82.7	113	57.30
7073636	11-1	1	1	1	36	4.2	.	.	32.7	83.6	8.0	1	81.4	111	57.25
7073637	11-2	1	1	1	36	4.1	.	.	33.3	83.4	8.1	1	82.6	113	57.35
Average	--	1.0	1.0	1.1	36.0	4.1	none	none	32.7	83.8	8.1	1.0	82.0	112.0	57.31



Table 3 (continued). Commercial classing data for the center pivot irrigated Enlist technology cotton variety trial, Gruhlkey Farm, Wildorado, 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
<b>PHY 250 W3FE</b>															
7073596	21-1	2	1	2	37	3.8	.	.	31.1	82.7	7.8	1	82.1	114	57.85
7073597	11-1	1	1	1	35	3.9	.	.	29.2	83.6	7.9	1	80.4	110	55.50
7073598	11-1	1	1	2	36	3.9	.	.	30.6	83.5	8.0	1	80.7	111	57.05
7073599	11-1	1	1	1	36	3.9	.	.	32.5	83.6	8.3	1	80.6	111	57.25
7073600	11-1	1	1	1	37	3.9	.	.	31.8	83.8	8.2	1	81.1	115	57.80
7073601	11-1	1	1	1	37	3.8	.	.	31.1	83.3	8.2	1	82.1	115	57.85
7073602	11-1	1	1	1	36	3.8	.	.	30.7	83.6	7.9	1	81.0	111	57.05
7073603	11-1	1	1	1	36	3.8	.	.	31.0	83.8	7.9	1	80.4	111	57.25
7073604	11-1	1	1	1	35	3.9	.	.	30.1	83.8	8.1	1	81.1	110	55.65
7073605	11-2	1	1	2	36	4.1	.	.	31.0	83.3	8.0	1	80.4	111	57.25
Average	--	1.1	1.0	1.3	36.1	3.9	none	none	30.9	83.5	8.0	1.0	81.0	111.9	57.05
<b>PHY 332 W3FE</b>															
7073638	11-1	1	1	1	38	3.6	.	.	32.4	81.6	8.7	1	82.0	118	57.90
7073639	11-1	1	1	1	37	3.7	.	.	31.9	82.1	9.0	1	81.7	114	57.80
7073640	11-1	1	1	1	37	3.7	.	.	31.4	82.5	9.5	1	80.7	115	57.80
7073641	11-1	1	1	1	37	3.9	.	.	31.0	82.4	9.4	1	81.7	116	57.80
7073642	11-1	1	1	1	36	3.8	.	.	30.5	83.1	9.3	1	80.1	111	57.05
7073643	11-1	1	1	1	36	3.7	.	.	31.2	82.2	9.5	1	78.3	111	56.60
7073644	11-1	1	1	1	36	3.7	.	.	32.4	82.1	9.3	1	80.5	112	57.25
7073645	11-1	1	1	1	35	3.7	.	.	30.1	81.9	9.4	1	77.6	110	54.60
7073646	11-1	1	1	1	36	3.7	.	.	30.7	82.0	9.3	1	78.9	111	56.40
7073647	11-1	1	1	1	37	3.6	.	.	31.1	82.0	9.7	1	79.6	114	57.15
7073648	11-1	1	1	1	36	3.7	.	.	30.1	81.8	9.3	1	79.8	111	56.50
Average	--	1.0	1.0	1.0	36.5	3.7	none	none	31.2	82.2	9.3	1.0	80.1	113.0	56.99



Table 3 (continued). Commercial classing data for the center pivot irrigated Enlist technology cotton variety trial, Gruhlkey Farm, Wildorado, 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
<b>PHY 350 W3FE</b>															
7073606	11-1	1	1	1	37	3.7	.	.	30.7	82.6	8.2	1	81.5	115	57.60
7073607	11-1	1	1	1	36	3.8	.	.	28.9	82.9	8.7	1	81.8	112	56.85
7073608	11-1	1	1	1	36	3.7	.	.	30.1	83.3	8.7	1	81.0	112	57.05
7073609	11-1	1	1	1	35	3.7	.	.	30.4	82.6	8.9	1	80.8	110	55.65
7073610	11-1	1	1	2	35	3.8	.	.	32.0	82.8	9.0	2	80.3	108	55.85
7073611	11-1	1	1	2	36	3.7	.	.	31.0	82.9	8.9	1	81.1	111	57.25
7073612	11-1	1	1	1	37	3.7	.	.	30.4	83.1	8.6	1	82.9	116	57.65
7073613	11-1	1	1	1	36	3.9	.	.	30.1	82.6	8.7	1	81.3	112	57.05
7073614	11-1	1	1	1	36	3.7	.	.	30.4	82.8	8.6	1	81.5	113	57.05
7073615	11-1	1	1	1	35	3.8	.	.	30.4	83.2	8.7	1	81.0	110	55.65
7073616	11-1	1	1	1	36	3.8	.	.	29.7	82.5	8.6	1	81.1	111	56.90
Average	--	1.0	1.0	1.2	35.9	3.8	none	none	30.4	82.8	8.7	1.1	81.3	111.8	56.78
<b>PHY 394 W3FE</b>															
7073649	21-1	2	1	2	37	3.3	.	.	32.5	82.0	8.3	1	80.0	115	52.75
7073650	11-1	1	1	2	37	3.3	.	.	33.5	82.8	8.4	1	79.6	114	52.25
7073651	11-1	1	1	2	37	3.4	.	.	30.7	82.6	8.5	2	78.4	114	51.90
7073652	11-1	1	1	2	37	3.4	.	.	32.1	82.6	8.5	1	78.8	114	52.10
7073653	11-1	1	1	2	36	3.4	.	.	31.0	82.3	8.4	2	79.0	111	51.65
7073654	11-1	1	1	1	36	3.4	.	.	31.3	82.4	8.5	1	79.3	113	51.65
7073655	11-1	1	1	2	36	3.3	.	.	30.5	82.1	8.5	1	77.8	111	50.95
7073656	11-1	1	1	1	35	3.3	.	.	31.1	82.0	8.5	1	79.1	110	50.25
7073657	21-1	2	1	1	35	3.4	.	.	29.6	82.0	8.3	1	79.7	110	49.90
7073658	11-2	1	1	2	37	3.4	.	.	31.3	82.2	8.4	2	79.1	115	52.20
Average	--	1.2	1.0	1.7	36.3	3.4	none	none	31.4	82.3	8.4	1.3	79.1	112.7	51.56



Table 3 (continued). Commercial classing data for the center pivot irrigated Enlist technology cotton variety trial, Gruhlkey Farm, Wildorado, 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
<b>PHY 400 W3FE</b>															
7073617	11-1	1	1	1	36	3.5	.	.	31.4	82.8	8.4	1	79.1	112	56.60
7073618	11-1	1	1	1	35	3.7	.	.	31.9	83.0	8.6	1	80.9	109	55.85
7073619	11-1	1	1	1	36	3.7	.	.	32.5	82.5	8.8	1	81.2	112	57.25
7073620	11-1	1	1	1	36	3.8	.	.	32.7	83.0	8.9	1	80.1	111	57.25
7073621	11-1	1	1	1	35	3.6	.	.	30.9	83.0	8.7	1	79.3	110	55.00
7073622	11-1	1	1	1	35	3.6	.	.	31.2	83.1	8.7	1	79.2	110	55.20
7073623	11-1	1	1	1	36	3.7	.	.	33.8	82.6	8.8	1	79.9	111	56.75
7073624	11-1	1	1	1	36	3.5	.	.	32.0	82.4	8.8	1	79.3	111	56.60
7073625	11-1	1	1	1	36	3.5	.	.	33.9	83.2	8.7	1	80.9	111	57.20
7073626	11-1	1	1	1	35	3.7	.	.	30.4	82.7	8.6	1	79.7	108	55.10
7073627	11-1	1	1	1	35	3.7	.	.	31.1	82.7	8.8	1	79.9	110	55.30
Average	--	1.0	1.0	1.0	35.5	3.6	none	none	32.0	82.8	8.7	1.0	80.0	110.5	56.19
<b>PX 3E33W3FE</b>															
7073659	11-1	1	1	1	36	3.8	.	.	30.7	82.5	9.2	1	81.0	112	57.05
7073660	11-1	1	1	2	36	3.7	.	.	31.6	82.2	9.4	1	81.0	113	57.25
7073661	11-1	1	1	1	35	3.7	.	.	30.3	81.7	9.4	1	80.4	110	55.65
7073662	11-1	1	1	1	35	3.7	.	.	32.2	82.1	9.5	1	79.9	110	55.30
7073663	11-1	1	1	1	36	3.8	.	.	33.5	82.3	9.5	1	80.5	112	57.30
7073664	11-1	1	1	1	36	3.8	.	.	33.5	82.1	9.5	1	80.0	111	57.30
7073665	11-1	1	1	1	35	3.7	.	.	30.9	81.6	9.6	1	80.5	110	55.65
7073666	11-1	1	1	1	35	3.7	.	.	33.1	81.6	9.5	1	79.7	110	55.35
7073667	11-1	1	1	2	36	3.7	.	.	31.5	81.8	9.5	2	80.5	112	57.25
7073668	11-1	1	1	1	36	3.7	.	.	31.6	81.7	9.4	1	80.2	111	57.25
7073669	11-1	1	1	2	36	3.8	.	.	33.5	80.7	9.4	1	80.4	112	57.30
Average	--	1.0	1.0	1.3	35.6	3.7	none	none	32.0	81.8	9.4	1.1	80.4	111.2	56.60

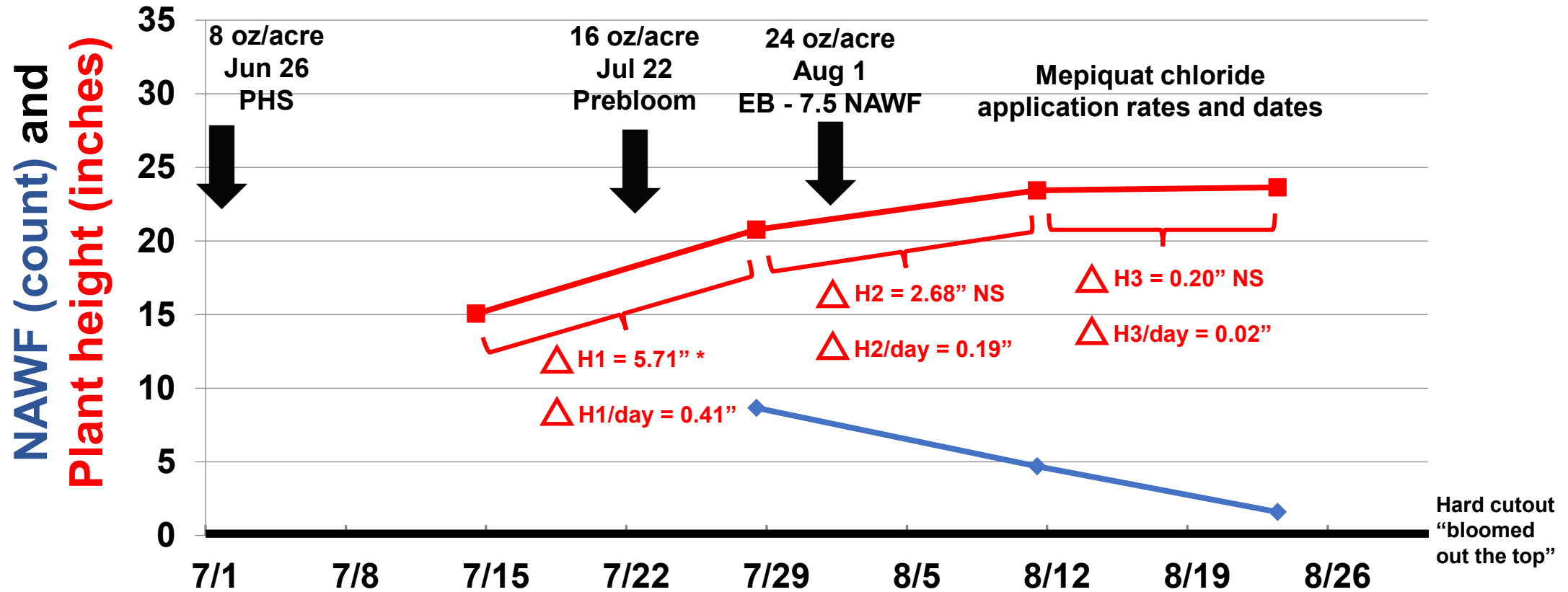


# Appendix

**Gruhlkey 2021 PhytoGen Enlist Variety Trial – Plant height and NAWF graphs, Amarillo 2021 cotton heat units and weather data.**



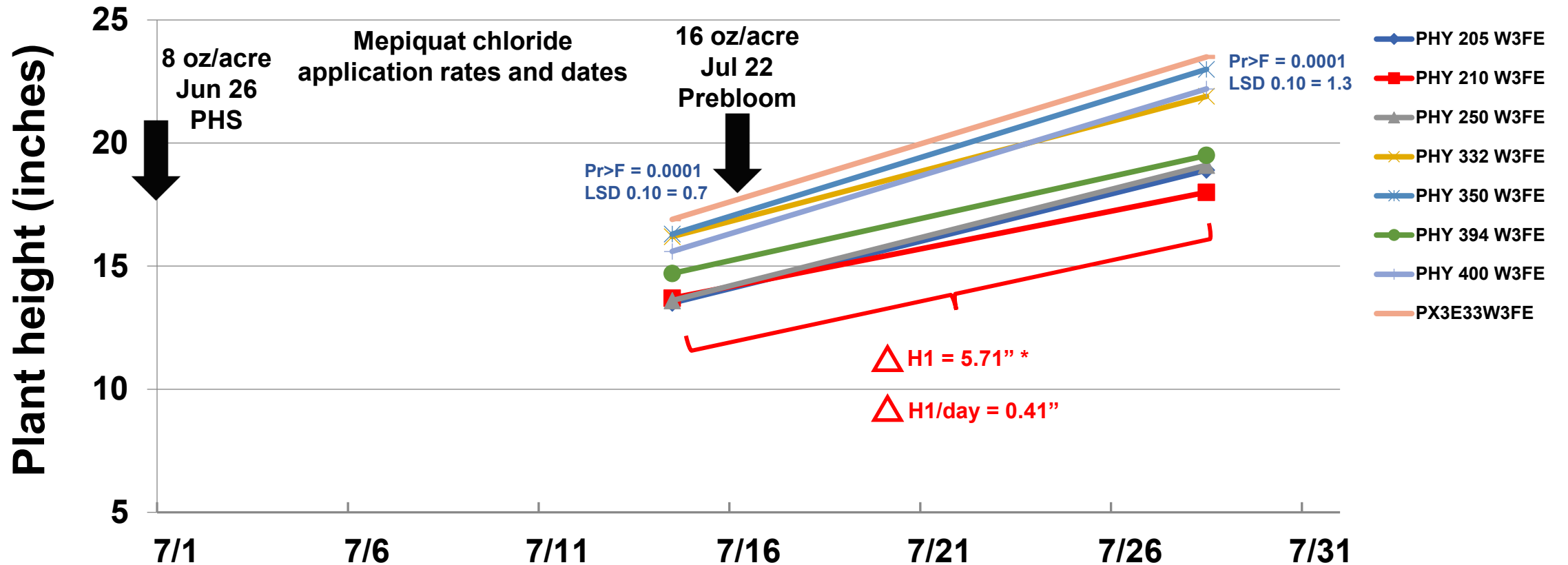
# Gruhlkey Enlist Variety Trial (Across All Entries) Wildorado – 2021



Rainfall (inches): Apr 0.10, May 1.7, Jun 1.3, Jul 3.3, Aug 0.3, Sep 0.6 = 7.3  
Irrigation (inches): Apr 1.1, May 0.5, Jun 1.5, Jul 1.2, Aug 4.3, Sep 1.5 = 10.1

Planted: May 15  
Days to bloom: 75  
First bloom date: Jul 28

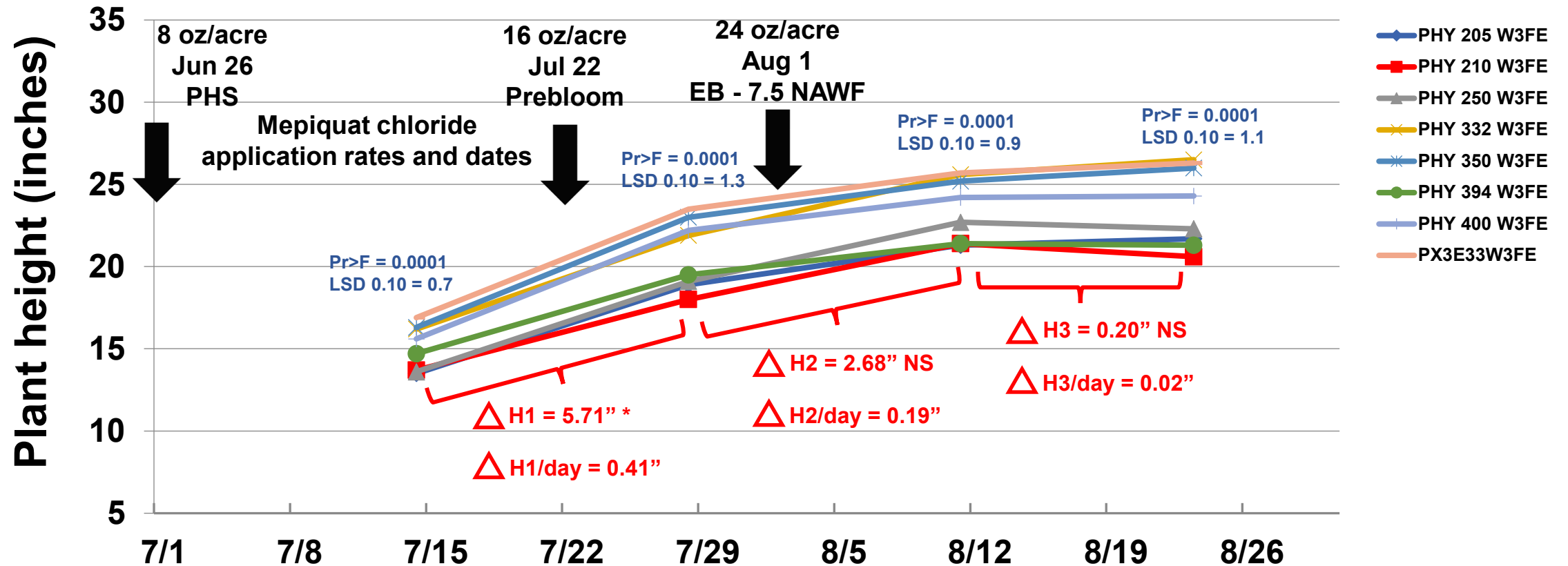
# Gruhlkey Enlist Variety Trial Wildorado – 2021



Rainfall (inches): Apr 0.10, May 1.7, Jun 1.3, Jul 3.3, Aug 0.3, Sep 0.6 = 7.3  
Irrigation (inches): Apr 1.1, May 0.5, Jun 1.5, Jul 1.2, Aug 4.3, Sep 1.5 = 10.1

Planted: May 15  
Days to bloom: 75  
First bloom date: Jul 28

# Gruhlkey Enlist Variety Trial Wildorado – 2021



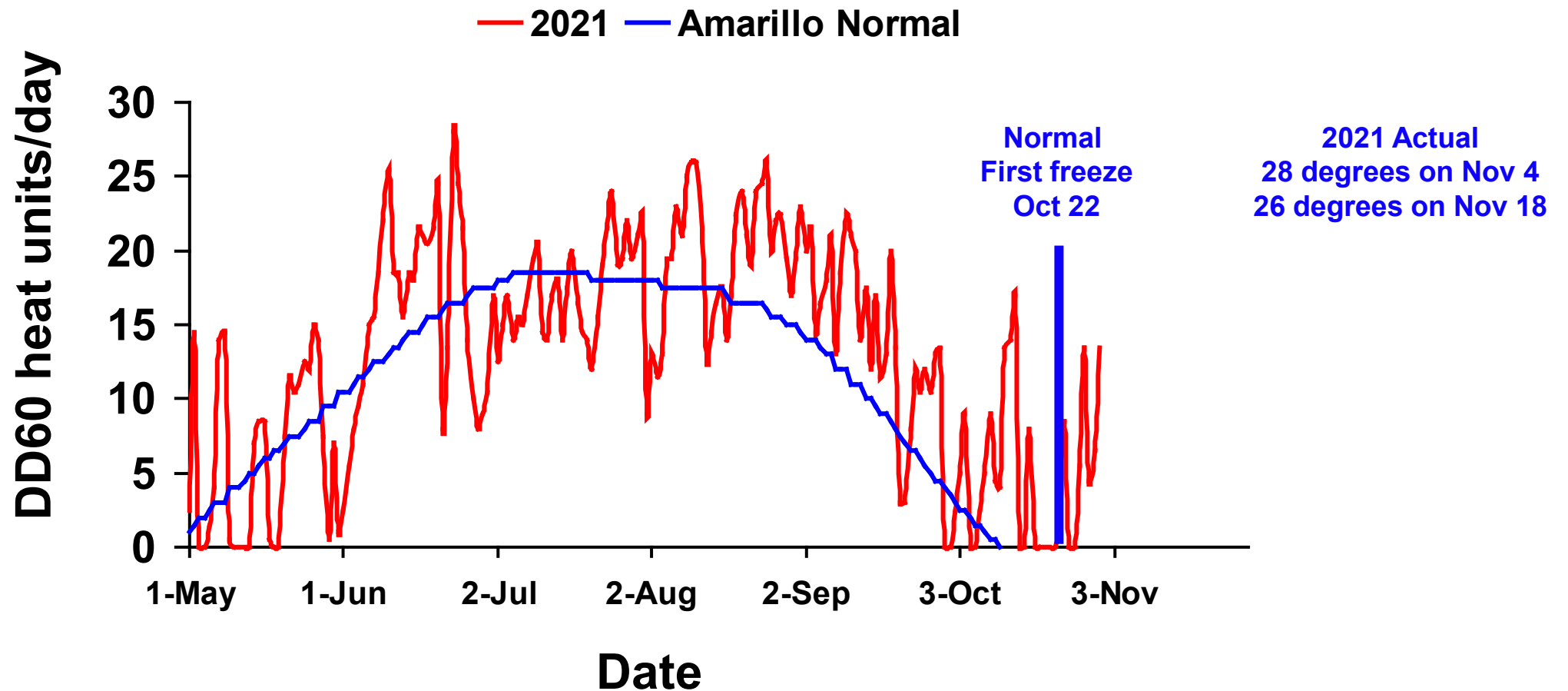
Rainfall (inches): Apr 0.10, May 1.7, Jun 1.3, Jul 3.3, Aug 0.3, Sep 0.6 = 7.3  
Irrigation (inches): Apr 1.1, May 0.5, Jun 1.5, Jul 1.2, Aug 4.3, Sep 1.5 = 10.1

Planted: May 15  
Days to bloom: 75  
First bloom date: Jul 28



# Amarillo

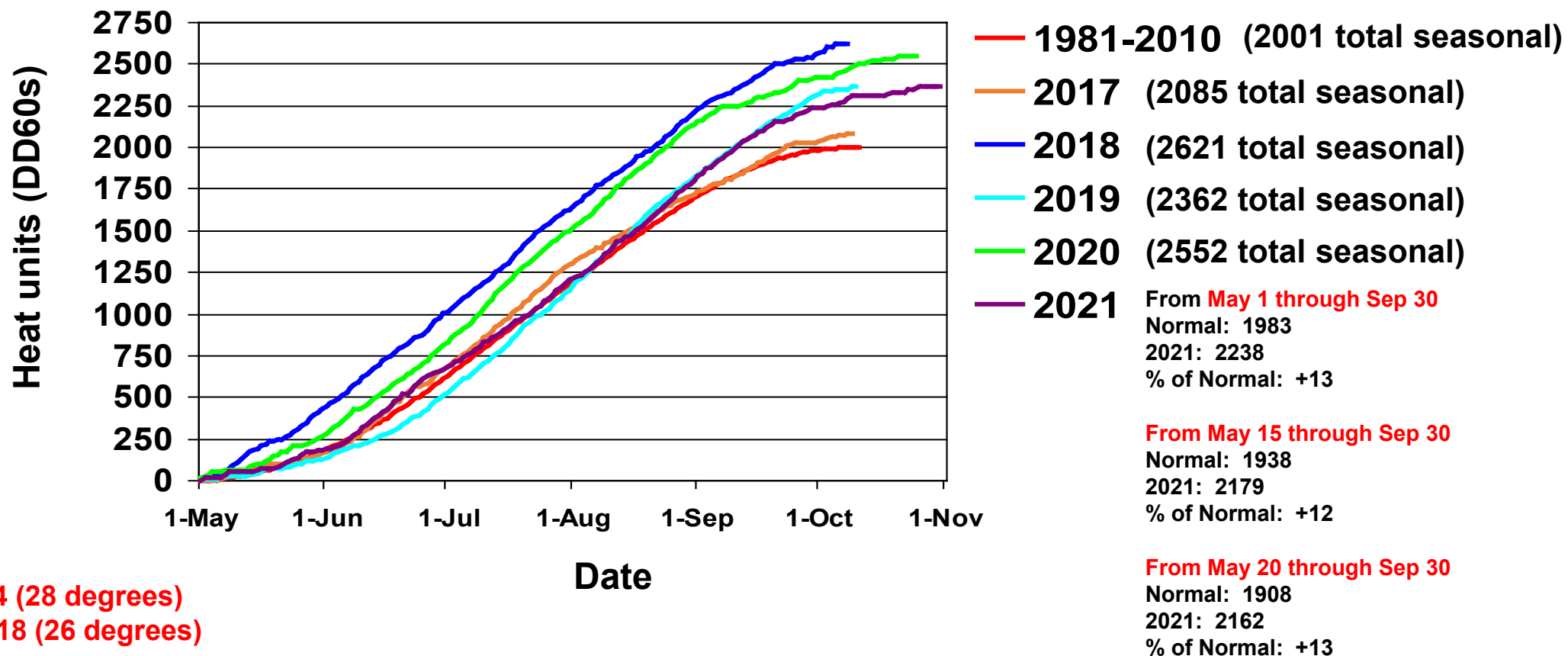
## 30-Year Normal (1981-2010) and 2021 Daily Heat Units



# Amarillo 30-Yr Normal (1981-2010) vs. 2017, 2018, 2019, 2020, and 2021

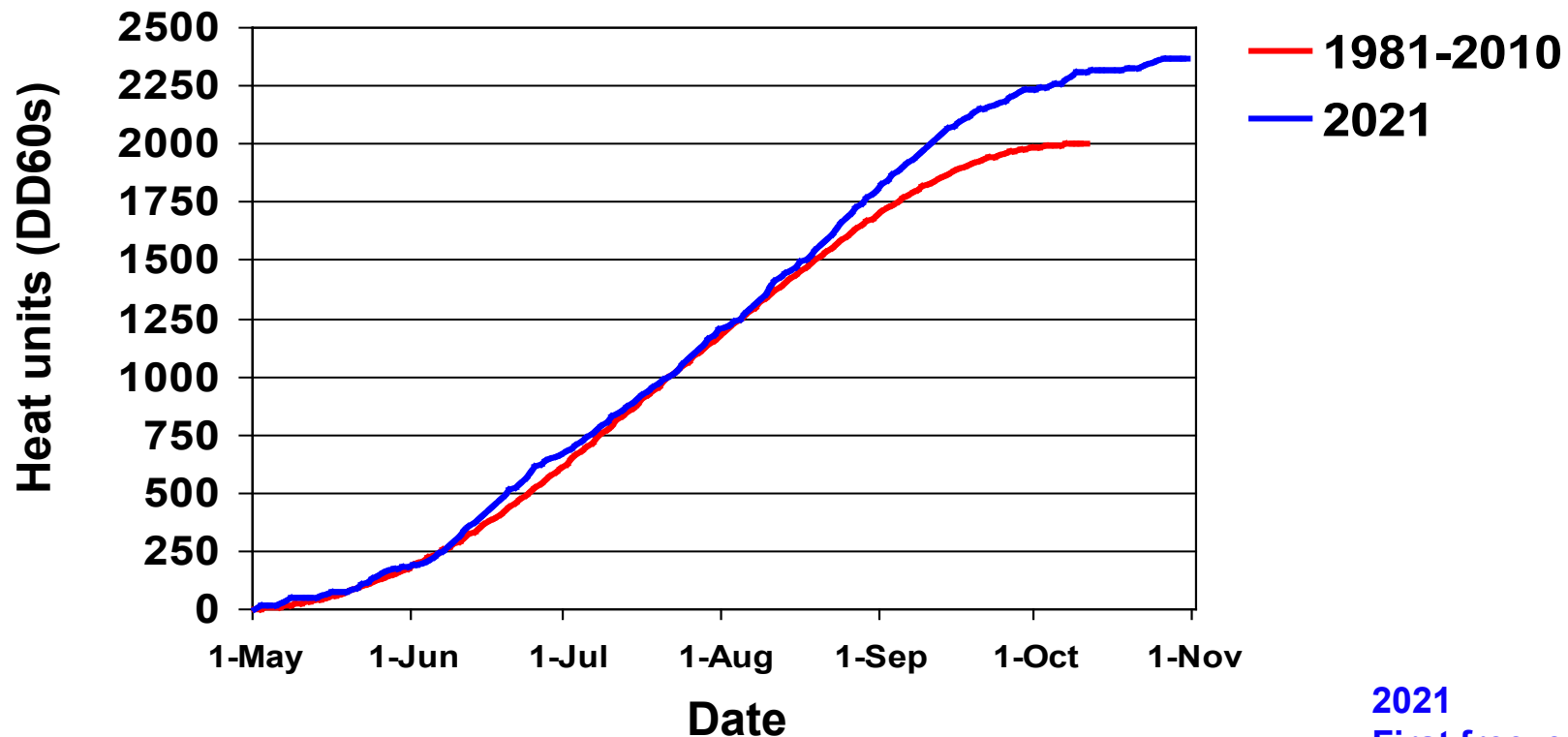
## Cotton Heat Unit Accumulation

### From May 1 Through First Hard Freeze



**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



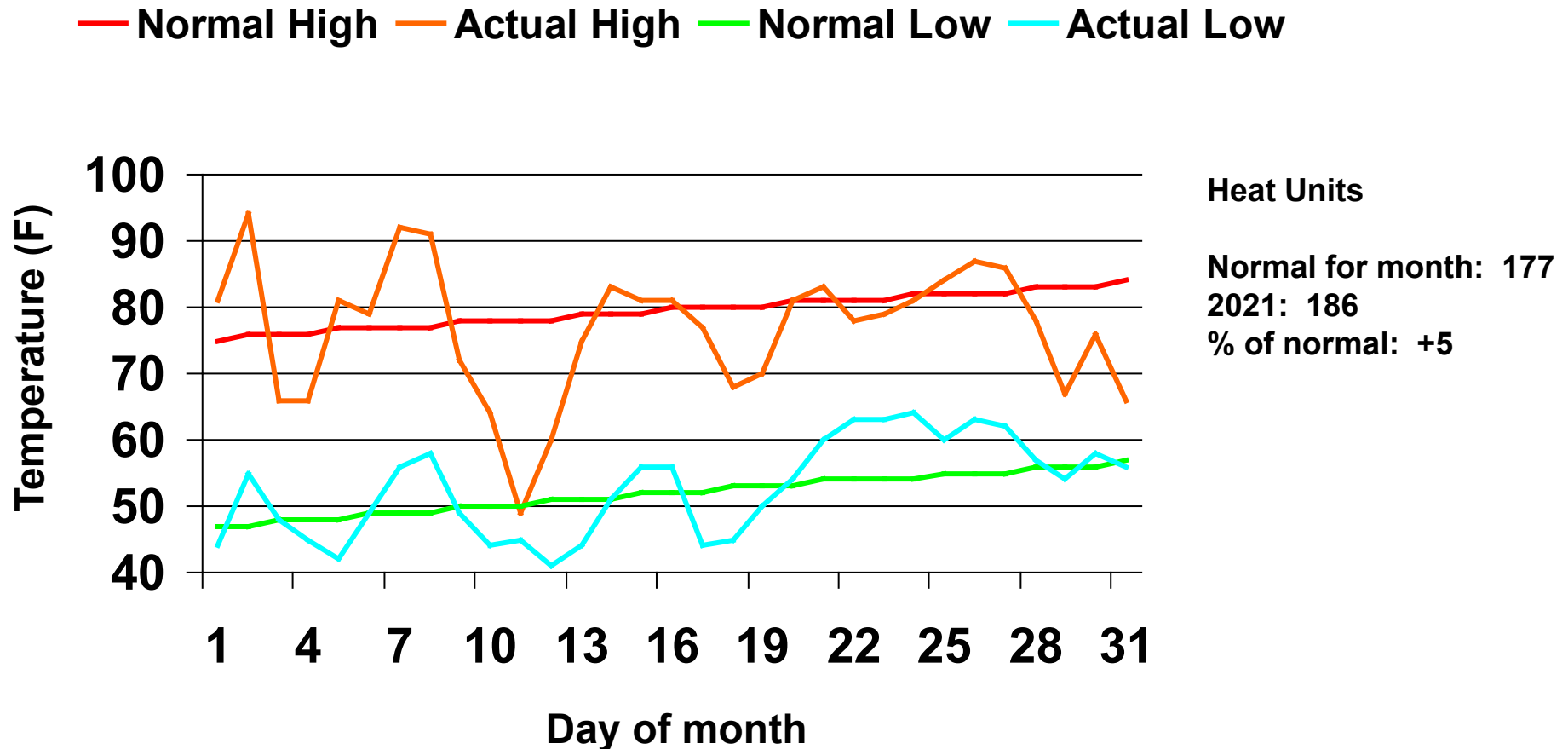
2021

First freeze on Nov 4 (28 degrees)

Hard freeze on Nov 18 (26 degrees)

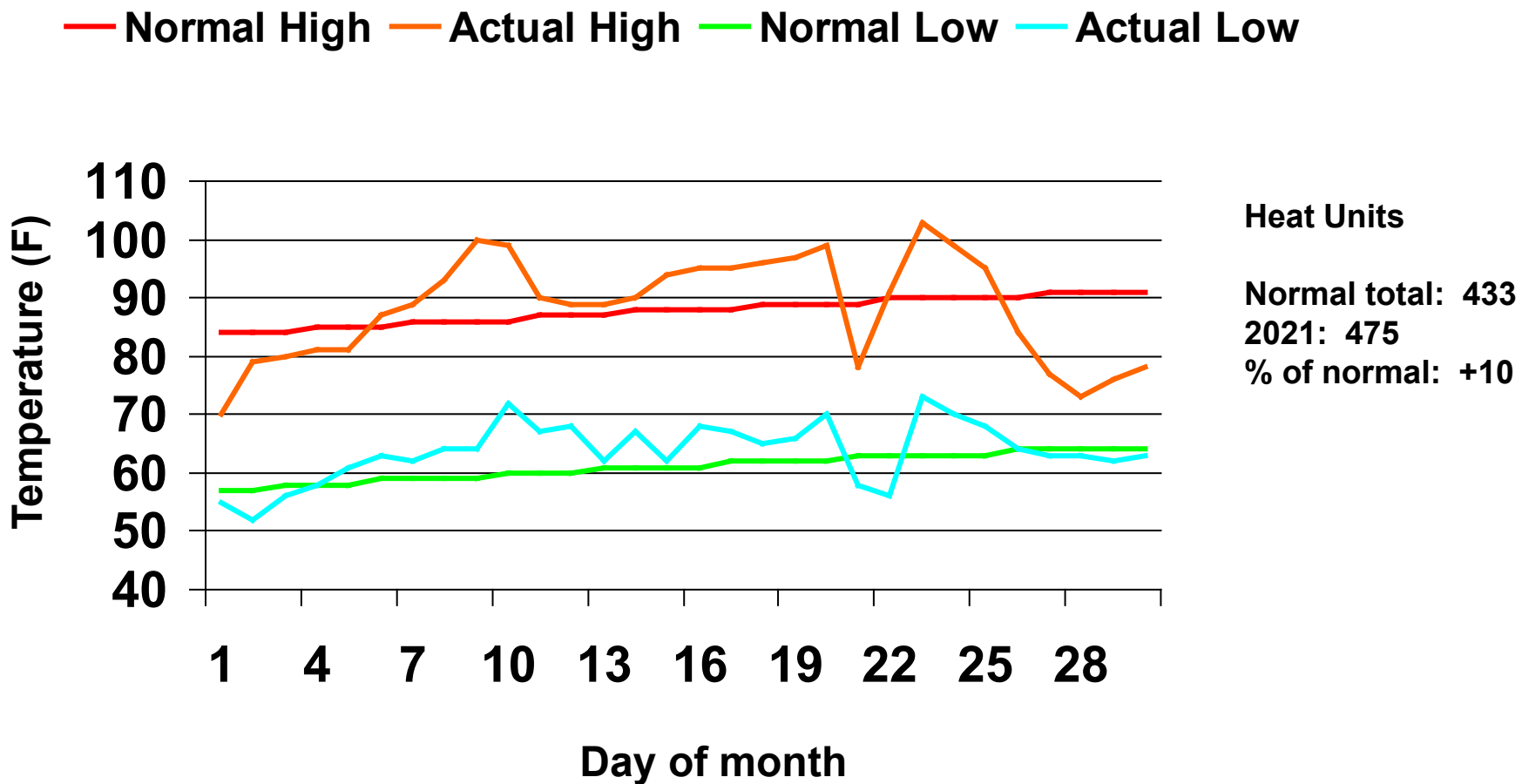
# Amarillo

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



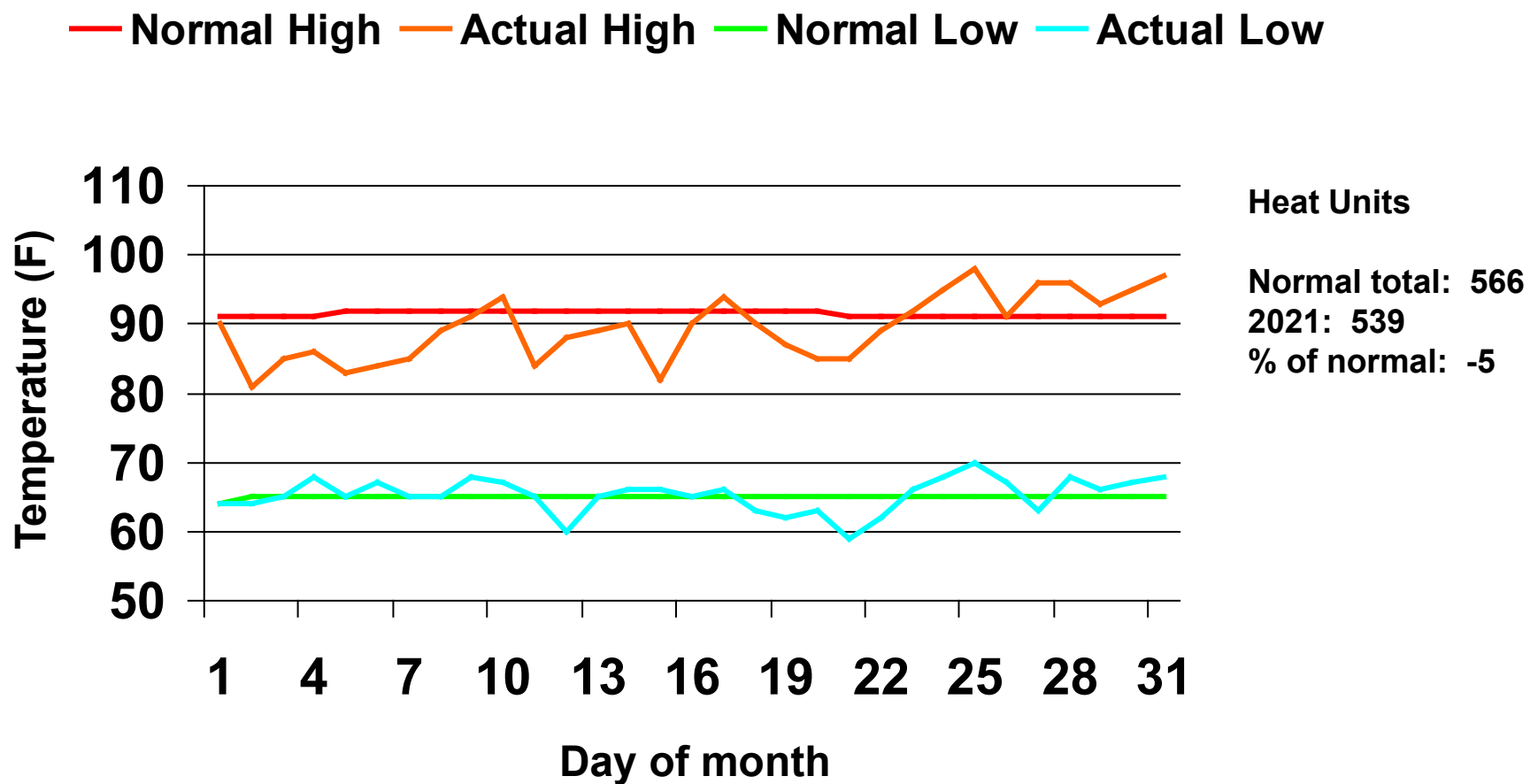
# Amarillo

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



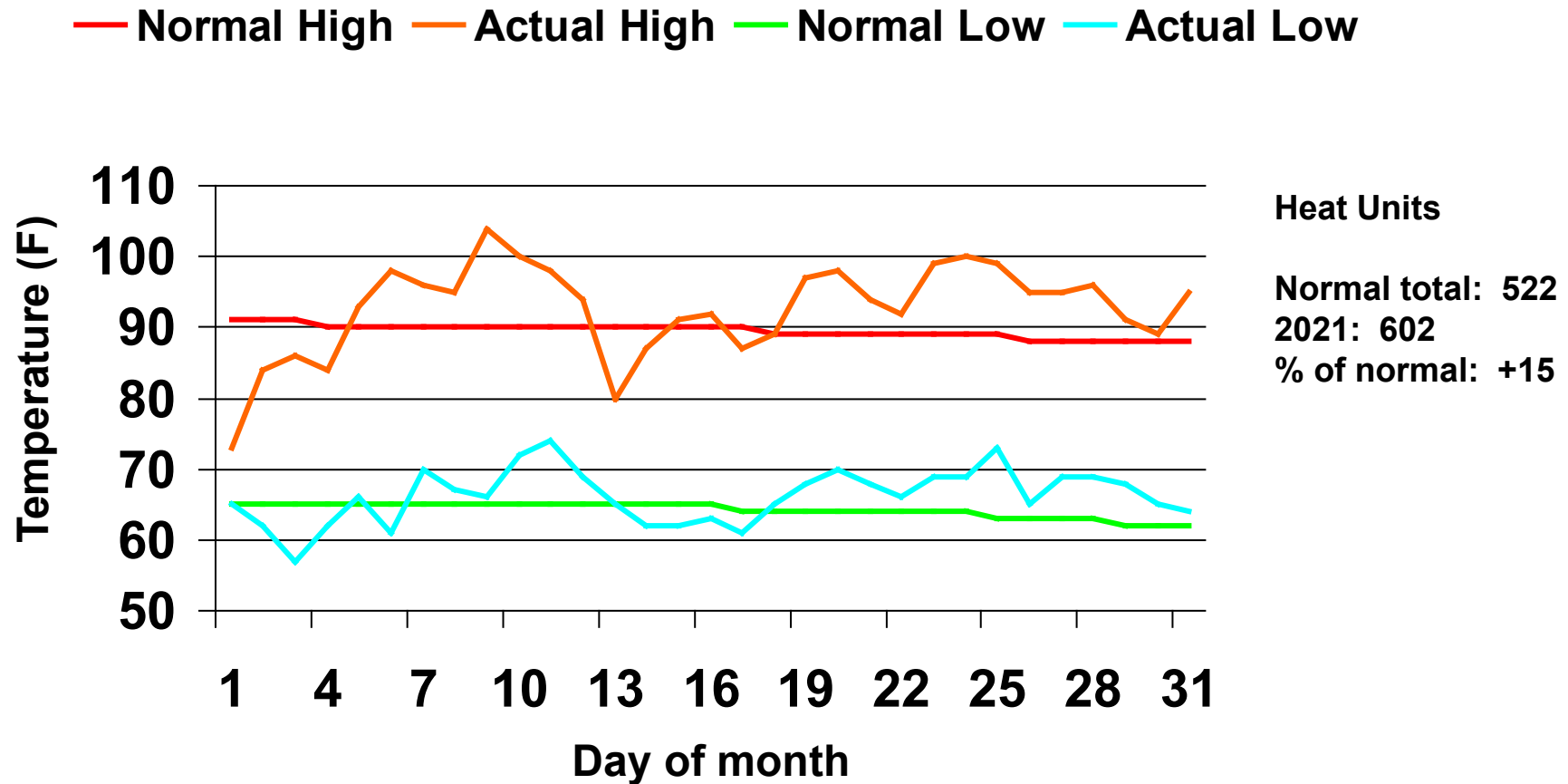
# Amarillo

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



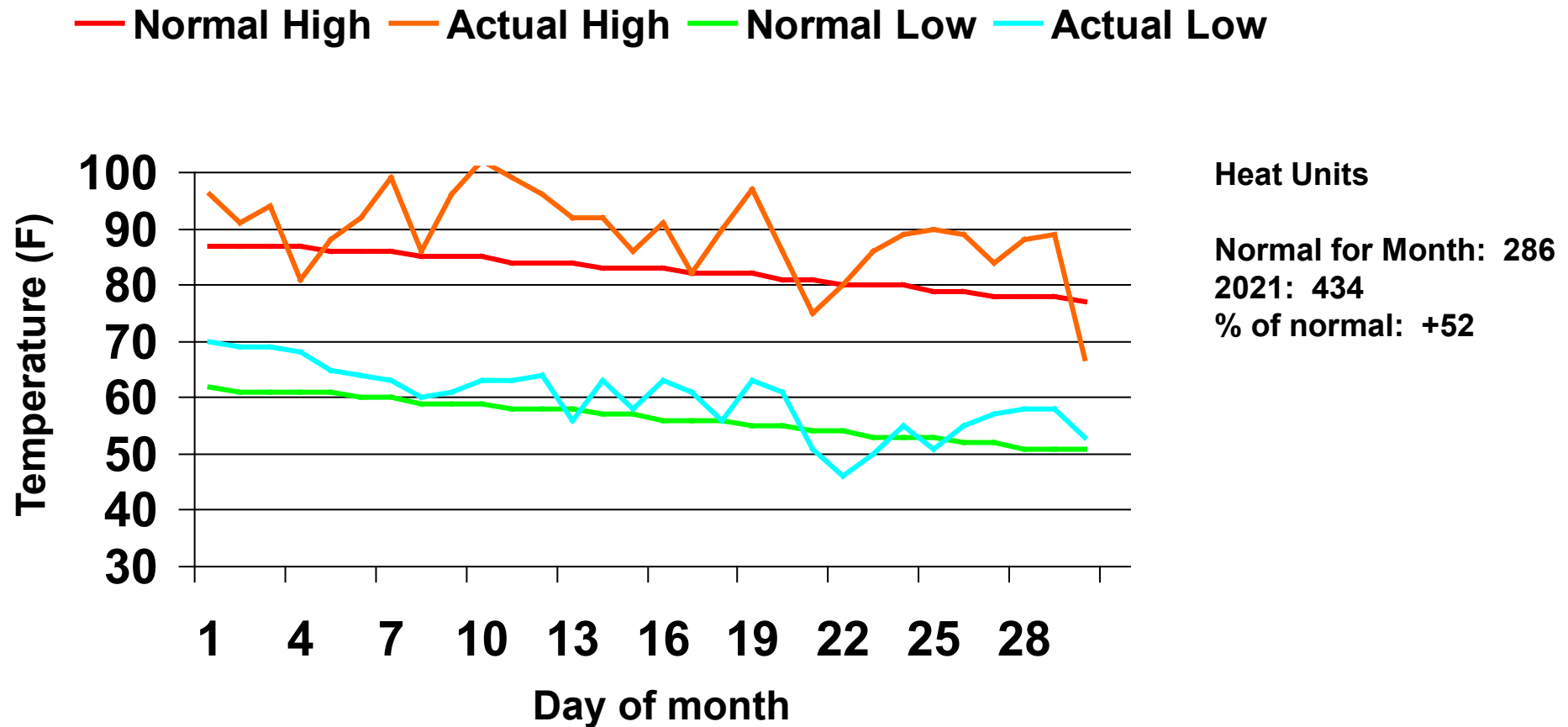
# Amarillo

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



# Amarillo

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

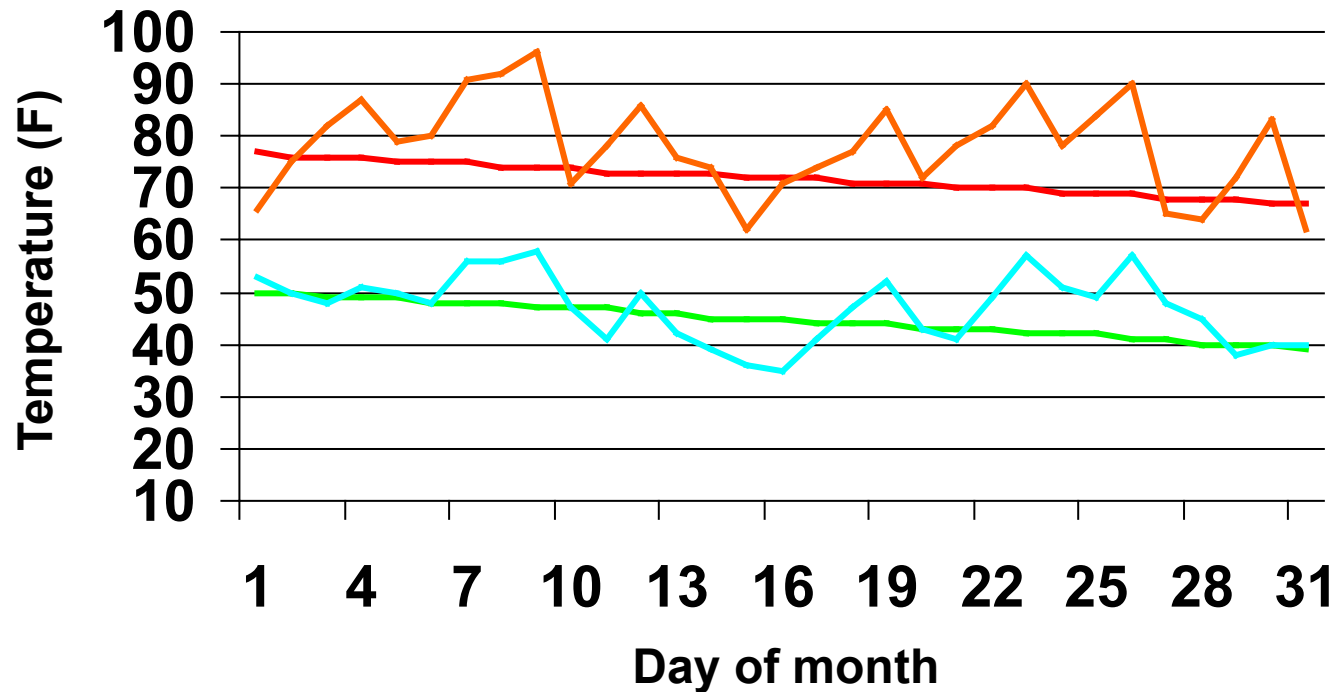




# Amarillo

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

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



Heat Units

Normal: 19

2021: 133

% of normal: +600

First freeze on Nov 4 (28 degrees)

Hard freeze on Nov 18 (26 degrees)