



2022 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 2022, eight PhytoGen entries (including four experimental 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. The trial escaped various localized hail events that occurred in the surrounding area, but hot, dry environmental conditions in the last half of the growing season were problematic and challenged the irrigation capacity. Overall, the trial 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 1542 lb/acre (PX22A214 W3FE) to a low of 1354 lb/acre (PHY 250 W3FE), and averaged 1459 lb/acre (Table 1). Average Loan value for varieties from commercially ginned and classed bales varied from a high of \$0.5577/lb (PHY 205 W3FE) to a low of \$0.4852/lb (PHY 400 W3FE). Overall Loan value for the trial across all entries was \$0.5173/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 for net value/acre. PHY 205 W3FE had the highest net value at \$1144/acre, and PHY 250 W3FE had the lowest at \$994/acre.

Table 2 presents in-season data including stand establishment percentage, vigor, nodes above white flower (NAWF) on two sampling dates, plant height on three sampling dates, nodes above cracked boll (NACB) on September 28th, 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 good and typically ranged from about 21 to 31 across all entries. Leaf grades ranged from about 3 to 4. Staple ranged from 36.7 (PHY 205 W3FE) to 38.7 32^{nds} inch (PX40A383 W3FE). Micronaire averages were marginally low for some entries and ranged from 3.1 (PHY 400 W3FE) to 3.7 (PHY 205 W3FE). Minimal bark contamination was noted in commercial bales. Fiber strength ranged from 30.3 to 34.1 g/tex, and uniformity ranged from 79.3 to 82.6%.

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: 3840 ft

Previous crop: wheat

Tillage system: no-tilled into wheat residue

Planted: May 9

Replicates: 3 replicates in a randomized complete block design

Plot width: 12-row plots

Plot length: length of field (~3,200 ft, variable plot lengths due to pivot arc)

Seeding rate: 50,000 seed/acre

Days from planting to first bloom: 67 (July 15)

30-inch rows under center pivot irrigation

Total irrigation April through September: 16.9 inches

Apr 2.0, May 3.3, Jun 2.5, Jul 3.0, Aug 4.9, Sep 1.2

Total rainfall April through September: 7.4 inches

Apr 0.0, May 0.6, Jun 0.8, Jul 4.9, Aug 1.0, Sep 0.1

Fertility management:

~70 lb N/acre (20 gallons 32-0-0 streamed with sprayer on April 26, 3 tons composted manure was applied before the previous wheat crop was planted. Soil samples indicated adequate phosphate, potash, and micronutrient levels for 2022 cotton.

Herbicide applications:

April 8 – Red Eagle Flumi – 2oz/acre, LV6 2,4-D – 22 oz/acre, Cornerstone Plus – 22 oz/acre

April 26 – Caparol – 16 oz/acre, Diuron – 16 oz/acre, Paraquat – 32 oz/acre

April 30 – Cornerstone Plus – 22 oz/acre, LV6 – 22 oz/acre

May 23 – Cornerstone Plus – 40 oz/acre, Enlist – 32 oz/acre, Warrant – 48 oz/acre

June 4 – Cornerstone Plus – 32 oz/acre, Enlist – 32 oz/acre, Inflame – 40 oz/acre, Warrant – 48 oz/acre

July 19 - Cornerstone Plus – 32 oz/acre, Enlist – 32 oz/acre, Warrant – 48 oz/acre

August 5 – Abundit Edge – 24 oz/acre

Plant growth regulator applications: 6 oz/acre mepiquat chloride (June 25), 8 oz/acre mepiquat chloride (July 5), 16 oz/acre mepiquat chloride (July 19), 20 oz/acre mepiquat chloride (August 5), 16 oz/acre mepiquat chloride (August 12)

Insecticide applications:

May 23 – Acephate 90 – 3oz/acre

June 4 – Acephate 90 – 3oz/acre

June 25 – Intruder - 0.6 oz/acre

Harvest aid application: 3 pt/acre ethephon + 1 pt/acre Folex (October 10)

Harvesting: November 3 using a 12-row John Deere CS770, 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 CS770 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 replicates = 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.



Table 1. Harvest results for the center pivot-irrigated Enlist technology cotton variety trial, Gruhlkey Farm, Wildorado, TX, 2022.

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 205 W3FE	32.6	47.1	4596	1497	2163	0.5577	835	309	1144 a
PX22A214 W3FE	34.0	48.6	4537	1542	2206	0.5212	804	320	1124 a
PX40A383 W3FE	32.1	48.9	4506	1447	2204	0.5307	768	321	1089 b
PX22A215 W3FE	33.0	49.5	4457	1472	2207	0.5182	763	323	1086 b
PHY 400 W3FE	33.4	47.4	4587	1532	2173	0.4852	743	311	1055 c
PX22A213 W3FE	32.5	50.0	4408	1431	2203	0.5015	717	324	1041 c
PHY 332 W3FE	30.8	48.2	4518	1393	2178	0.5109	711	315	1026 c
PHY 250 W3FE	31.9	48.6	4251	1354	2065	0.5127	694	299	994 d
Test average	32.5	48.5	4483	1459	2175	0.5173	754	315	1070
CV, %	--	--	2.0	2.1	2.0	--	1.9	2.0	2.0
OSL	--	--	0.0070	0.0001	0.0178	--	0.0001	0.0033	0.0001
LSD	--	--	130	43	62	--	21	9	30

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:

\$3.40/cwt commercial ginning cost.

\$430/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, 2022.

Entry	Final population	Stand establishment	Vigor	Nodes above white flower		Plant height			Nodes above cracked boll	Storm resistance
				Early bloom	+3 weeks	Early bloom	+3 weeks	Final		
	plants/acre 6-Jun	% 6-Jun	1-5 visual scale, 5 best 6-Jun		count 18-Jul 10-Aug		inches 18-Jul 10-Aug 28-Sep		count 28-Sep	1-9 visual scale, 9 tight 3-Nov
PHY 205 W3FE	36,009	72.0	3.5	5.9	2.1	13.6	16.3	17.4	1.1	8.5
PHY 250 W3FE	31,363	62.7	2.8	6.1	2.5	15.4	18.9	20.7	1.3	7.7
PHY 332 W3FE	38,913	77.8	3.3	6.1	3.1	16.5	21.5	23.8	3.1	6.2
PHY 400 W3FE	38,333	76.7	3.5	6.3	3.1	14.9	20.7	21.0	2.0	6.8
PX 22A213 W3FE	41,237	82.5	3.5	5.1	1.9	14.5	16.5	18.0	1.1	8.0
PX 22A214 W3FE	39,785	79.6	3.3	5.1	1.9	14.1	15.7	18.2	1.3	8.2
PX 22A215 W3FE	39,204	78.4	3.3	5.1	2.0	14.1	17.3	18.5	0.9	7.8
PX 40A383 W3FE	38,042	76.1	3.5	6.1	3.0	17.7	22.5	23.7	2.5	6.2
Test average	37,861	75.7	3.3	5.7	2.5	15.1	18.7	20.2	1.7	7.4
CV, %	9.2	9.2	6.4	8.0	14.0	4.1	5.6	4.4	22.6	3.45
OSL	0.0945	0.0949	0.0266	0.0102	0.0006	0.0001	0.0001	0.0001	0.0001	0.0001
LSD	5,031	10.1	0.3	0.7	0.5	0.9	1.5	1.3	0.5	0.4

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, 2022.

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 205 W3FE															
7077792	31-1	3	1	3	36	3.5	.	.	32.8	80.7	7.3	4	82.0	113	56.05
7077793	31-1	3	1	4	37	3.7	11	level 1 bark	35.1	80.2	7.6	6	82.9	116	51.80
7077794	31-1	3	1	4	35	3.5	.	.	33.2	79.6	7.9	7	82.5	110	53.75
7077795	31-1	3	1	4	37	3.5	.	.	32.9	80.0	7.6	7	82.3	116	55.15
7077796	31-1	3	1	4	38	3.6	.	.	33.2	79.9	7.9	6	84.3	118	55.40
7077797	31-1	3	1	3	37	3.8	.	.	33.3	80.2	8.0	4	82.5	116	56.60
7077798	21-1	2	1	4	37	3.7	.	.	33.9	80.5	8.0	5	82.6	116	55.80
7077799	21-2	2	1	4	36	3.7	.	.	34.7	80.0	8.1	4	82.2	112	55.45
7077800	21-2	2	1	4	36	3.7	.	.	33.6	79.6	8.3	5	82.6	112	55.45
7077801	21-2	2	1	3	37	3.7	.	.	33.6	81.2	7.9	4	83.4	115	57.00
7077802	21-1	2	1	3	37	3.8	.	.	35.8	80.9	8.0	3	83.5	115	57.00
7077803	31-1	3	1	4	36	3.8	.	.	33.0	80.4	7.9	4	84.5	113	55.00
7077804	21-2	2	1	4	37	3.7	.	.	33.4	80.6	7.8	4	82.1	115	55.80
7077805	21-1	2	1	3	36	3.7	.	.	32.5	80.6	8.1	3	81.3	111	56.35
7077806	21-2	2	1	3	36	3.7	.	.	33.4	80.9	7.9	4	82.5	112	56.50
7077807	21-2	2	1	3	37	3.6	.	.	34.1	80.5	7.9	4	83.4	114	56.95
7077808	21-2	2	1	3	37	3.8	.	.	33.6	80.3	8.1	3	81.3	114	56.90
7077809	21-2	2	1	4	38	3.7	.	.	34.8	80.5	7.7	5	83.0	118	55.85
7077810	21-2	2	1	3	37	4.6	.	.	33.4	79.9	8.3	3	81.4	115	56.85
Average	--	2.4	1.0	3.5	36.7	3.73	1/19 bales	level 1 bark	33.7	80.3	7.9	4.5	82.6	114.3	55.77
PHY 250 W3FE															
7077872	21-1	2	1	3	37	2.9	.	.	31.9	81.8	7.7	4	81.5	117	47.25
7077873	21-2	2	1	4	37	3.1	.	.	30.1	81.0	7.8	5	80.6	116	48.95
7077874	21-2	2	1	4	37	3.1	.	.	31.5	81.0	7.6	6	80.8	117	49.10
7077875	21-2	2	1	3	37	3.1	.	.	30.6	81.2	7.8	4	81.0	117	50.10
7077876	21-2	2	1	4	37	3.2	.	.	30.5	80.7	7.8	5	81.7	117	48.95
7077877	21-2	2	1	4	37	3.2	.	.	31.2	81.3	7.7	5	80.9	116	49.10
7077878	21-2	2	1	3	39	3.4	.	.	30.6	81.0	7.6	4	81.2	121	51.95
7077879	21-1	2	1	3	38	3.6	.	.	30.4	81.8	8.0	4	81.3	119	56.70
7077880	21-2	2	1	4	38	3.5	.	.	29.9	81.0	7.7	5	80.5	120	55.35
7077881	21-2	2	1	3	39	3.4	.	.	31.5	81.3	7.9	3	80.9	121	52.10
7077882	21-1	2	1	3	37	3.0	.	.	32.1	81.6	7.9	3	79.9	115	49.75
7077883	21-1	2	1	3	38	3.2	.	.	32.6	81.8	8.0	3	81.2	118	50.35
7077884	21-1	2	1	3	37	3.4	.	.	31.2	81.6	7.9	3	80.9	117	52.00
7077885	21-1	2	1	3	38	3.3	.	.	32.1	81.6	8.1	3	81.1	119	52.10
7077886	21-1	2	1	2	38	3.3	.	.	33.3	81.8	7.9	3	81.1	120	52.70
7077887	21-1	2	1	2	37	3.5	.	.	30.7	82.2	7.8	2	80.9	117	57.10
7077888	21-1	2	1	4	37	3.2	.	.	31.1	80.9	8.0	4	80.6	117	49.10
7077889	21-1	2	1	3	37	3.2	.	.	31.6	81.0	8.1	4	81.3	116	50.25
Average	--	2.0	1.0	3.2	37.5	3.26	0/18 bales	level 1 bark	31.3	81.4	7.9	3.9	81.0	117.8	51.27



Table 3 (continued). Commercial classing data for the center pivot irrigated Enlist technology cotton variety trial, Gruhlkey Farm, Wildorado, TX, 2022.

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 332 W3FE															
7077890	21-1	2	1	2	39	3.3	.	.	32.0	80.1	8.9	3	80.2	122	52.60
7077891	11-2	1	1	3	38	3.5	.	.	29.8	79.8	9.3	3	80.0	120	56.60
7077892	21-1	2	1	3	38	3.3	.	.	29.5	79.6	9.2	4	79.8	118	51.35
7077893	21-1	2	1	3	38	3.2	.	.	29.9	79.5	9.0	4	79.3	118	49.60
7077894	21-1	2	1	3	38	3.3	.	.	30.7	79.2	9.2	3	79.5	120	51.45
7077895	21-1	2	1	3	37	3.2	.	.	30.2	79.7	9.1	3	79.0	117	49.60
7077896	21-1	2	1	3	37	3.2	.	.	30.6	80.0	9.1	4	80.8	115	50.10
7077897	21-1	2	1	3	38	3.2	.	.	30.2	79.5	9.2	4	80.1	118	50.20
7077898	21-1	2	1	3	37	3.2	.	.	29.5	79.2	9.2	4	79.8	116	49.50
7077899	21-1	2	1	3	38	3.1	.	.	31.4	79.0	9.2	4	78.6	119	49.75
7077900	21-1	2	1	3	39	3.2	.	.	31.8	79.1	9.2	4	79.8	123	49.85
7077901	21-4	2	1	4	39	3.2	.	.	32.0	78.2	9.3	6	79.3	121	48.60
7077902	21-3	2	1	3	39	3.5	.	.	30.8	79.0	9.4	4	79.8	123	56.20
7077903	21-3	2	1	3	38	3.4	.	.	30.7	79.4	9.4	4	82.0	120	52.00
7077904	21-1	2	1	3	38	3.4	.	.	30.8	79.2	9.2	3	81.2	120	51.95
7077905	21-1	2	1	3	38	3.1	.	.	32.0	78.9	9.2	5	79.3	120	49.85
7077906	21-1	2	1	3	38	3.2	.	.	32.9	79.2	9.3	4	78.2	118	49.75
7077907	11-2	1	1	3	39	3.4	.	.	32.5	79.5	9.3	4	81.3	122	52.10
7077908	21-1	2	1	3	38	3.2	.	.	30.9	79.2	9.3	2	79.2	118	49.70
Average	--	1.9	1.0	3.0	38.1	3.27	0/19 bales	level 1 bark	31.0	79.3	9.2	3.8	79.9	119.4	51.09
PHY 400 W3FE															
7077929	21-1	2	1	3	37	3.3	.	.	30.4	80.7	8.0	4	79.7	115	51.35
7077930	31-1	3	1	4	38	3.4	.	.	28.0	79.4	8.2	5	81.2	118	50.10
7077931	31-1	3	1	4	36	3.2	.	.	29.6	80.4	8.0	5	77.6	113	47.05
7077932	21-2	2	1	4	36	3.1	.	.	30.4	80.2	8.4	5	78.5	112	48.00
7077933	21-1	2	1	3	37	3.1	.	.	31.0	80.5	8.2	4	78.0	114	49.65
7077934	31-1	3	1	4	38	3.1	.	.	29.8	79.1	8.1	5	80.6	118	48.40
7077935	21-2	2	1	4	36	3.2	.	.	28.4	79.8	8.4	6	78.2	113	47.85
7077936	21-1	2	1	4	38	3.3	.	.	30.0	79.8	8.6	6	82.4	119	50.75
7077937	21-2	2	1	4	38	3.5	.	.	31.2	79.9	8.4	4	79.7	120	55.10
7077938	31-1	3	1	4	38	3.2	.	.	30.6	79.4	8.4	6	80.1	119	48.50
7077939	21-2	2	1	4	38	3.0	.	.	29.9	79.4	8.8	6	81.3	118	48.85
7077940	21-2	2	1	4	37	3.0	11	level 1 bark	29.2	79.8	8.3	6	78.4	115	44.75
7077941	21-2	2	1	5	35	3.2	.	.	28.6	79.9	8.2	7	77.4	110	44.80
7077942	31-1	3	1	4	37	2.8	.	.	31.1	78.9	8.2	7	78.9	115	45.00
7077943	21-2	2	1	4	37	3.2	.	.	30.9	80.2	8.2	5	79.5	116	48.45
7077944	21-1	2	1	4	38	3.3	.	.	31.4	80.7	8.1	6	80.1	118	50.85
7077945	21-1	2	1	3	38	3.4	.	.	31.5	80.5	8.1	4	80.6	120	52.10
7077946	21-1	2	1	4	37	2.9	.	.	31.8	80.6	8.2	4	78.9	117	45.50
7077947	21-2	2	1	3	37	2.8	.	.	31.0	81.0	7.9	4	79.3	115	46.75
7077948	21-2	2	1	4	37	2.8	.	.	31.5	80.6	7.7	5	77.4	114	45.20
7077949	21-1	2	1	2	37	3.1	.	.	30.7	81.7	8.1	2	78.5	117	50.00
Average	--	2.2	1.0	3.8	37.1	3.14	1/21 bales	level 1 bark	30.3	80.1	8.2	5.0	79.3	116.0	48.52



Table 3 (continued). Commercial classing data for the center pivot irrigated Enlist technology cotton variety trial, Gruhlkey Farm, Wildorado, TX, 2022.

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
PX 22A213 W3FE															
7077811	31-1	3	1	4	40	3.3	.	.	34.4	80.9	7.4	5	83.0	126	50.60
7077812	31-1	3	1	4	38	3.4	.	.	34.8	80.2	7.8	5	81.7	120	50.50
7077813	31-1	3	1	5	39	3.3	.	.	34.4	79.5	7.7	7	80.6	123	48.20
7077814	31-1	3	1	4	39	3.3	.	.	34.5	80.2	7.4	7	82.2	122	50.55
7077815	31-1	3	1	4	38	3.2	.	.	34.2	80.3	7.7	5	81.1	120	48.75
7077816	31-1	3	1	4	38	3.2	.	.	33.1	79.5	7.7	5	81.8	118	48.75
7077817	31-1	3	1	3	38	3.2	.	.	34.8	80.2	7.4	4	81.9	119	50.10
7077818	31-1	3	1	4	38	3.4	.	.	33.7	79.9	7.4	4	81.8	118	50.50
7077819	31-1	3	1	4	39	3.4	.	.	33.7	80.0	7.7	5	82.9	123	50.55
7077820	31-1	3	1	4	37	3.2	.	.	33.3	79.7	7.5	5	82.1	117	48.75
7077821	31-1	3	1	4	39	3.3	.	.	32.6	79.5	7.5	5	81.9	122	50.40
7077822	31-1	3	1	4	38	3.7	.	.	33.1	79.7	7.8	5	81.3	120	55.30
7077823	31-2	3	1	4	39	3.4	.	.	34.5	79.3	7.3	6	82.2	123	50.55
7077824	31-1	3	1	4	37	3.2	.	.	35.3	80.0	7.6	6	80.1	115	48.70
7077825	31-1	3	1	4	38	3.4	.	.	36.1	80.5	7.4	6	81.3	120	50.50
7077826	31-1	3	1	4	40	3.2	.	.	34.1	79.7	7.5	6	83.3	124	48.85
7077827	31-1	3	1	4	40	3.5	.	.	33.0	79.4	7.7	6	81.4	124	55.25
7077828	31-1	3	1	4	40	3.1	.	.	35.3	80.2	7.7	6	83.0	126	48.85
7077829	31-1	3	1	4	37	3.2	.	.	34.1	79.7	7.7	5	80.9	117	48.70
7077830	31-1	3	1	4	37	3.2	.	.	33.3	81.1	7.5	5	81.1	117	48.70
Average	--	3.0	1.0	4.0	38.5	3.31	0/19 bales	level 1 bark	34.1	80.0	7.6	5.4	81.8	120.7	50.15
PX 22A214 W3FE															
7077831	31-1	3	1	4	37	3.2	.	.	33.3	81.1	7.5	5	81.8	117	48.70
7077832	21-2	2	1	3	37	3.2	.	.	31.7	80.9	7.8	4	79.8	114	49.75
7077833	31-1	3	1	4	36	3.3	.	.	30.3	81.1	7.5	4	80.6	111	49.80
7077834	21-2	2	1	4	37	3.2	.	.	33.4	80.5	7.6	5	80.6	116	49.20
7077835	21-2	2	1	4	36	3.3	.	.	31.5	81.0	7.6	6	79.9	112	50.00
7077836	31-1	3	1	4	38	3.2	.	.	33.4	80.2	7.5	6	80.6	118	48.75
7077837	31-1	3	1	4	38	3.5	.	.	32.4	80.4	7.4	4	81.1	118	55.15
7077838	21-2	2	1	4	39	3.4	.	.	34.0	80.5	7.7	5	81.5	121	50.95
7077839	31-1	3	1	4	37	3.3	.	.	32.9	80.8	7.4	4	82.2	117	50.40
7077840	31-1	3	1	4	37	3.3	.	.	33.5	80.0	7.4	5	82.2	116	50.50
7077841	31-1	3	1	4	37	3.3	.	.	33.5	80.8	7.3	5	82.0	116	50.50
7077842	21-2	2	1	3	37	3.2	.	.	32.0	81.1	7.6	4	81.3	117	50.25
7077843	21-2	2	1	4	37	3.5	.	.	30.0	80.6	7.7	5	81.3	115	55.45
7077844	31-1	3	1	4	38	3.3	.	.	33.6	80.6	7.5	5	81.4	118	50.50
7077845	21-2	2	1	3	37	3.4	.	.	31.3	81.0	7.7	5	81.7	117	52.00
7077846	21-2	2	1	3	38	3.6	.	.	31.5	80.8	7.7	3	81.9	120	56.85
7077847	21-2	2	1	4	39	3.6	.	.	31.6	80.5	7.7	5	83.0	121	55.70
7077848	21-1	2	1	3	38	3.4	.	.	34.5	81.6	7.7	3	82.2	119	52.25
7077849	21-2	2	1	3	38	3.5	.	.	33.3	80.9	7.8	3	81.1	120	56.95
7077850	31-1	3	1	4	38	3.6	.	.	32.5	80.4	7.5	5	82.6	118	55.20
7077851	21-2	2	1	4	39	3.5	.	.	33.6	80.9	7.8	5	80.5	121	55.70
Average	--	2.4	1.0	3.7	37.5	3.37	0/21 bales	level 1 bark	32.6	80.7	7.6	4.6	81.4	117.2	52.12



Table 3 (continued). Commercial classing data for the center pivot irrigated Enlist technology cotton variety trial, Gruhlkey Farm, Wildorado, TX, 2022.

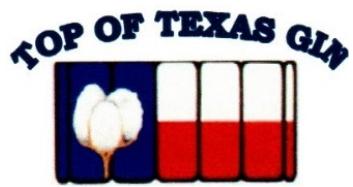
Variety and Bale Number	Color Grade-Quadrant grade-quadrant	Color digit 1	Color digit 2	Leaf grade	Staple 32nds inch	Micronaire units	Extraneous matter	Remarks --	Strength g/tex	Rd %	+b %	Trash % area	Uniformity %	Length 100ths inch	Loan rate cents/lb
PX 22A215 W3FE															
7077852	31-1	3	1	3	38	3.3	.	.	32.4	81.1	7.4	4	80.1	118	51.75
7077853	31-1	3	1	4	37	3.1	.	.	32.9	80.0	7.5	5	80.7	116	48.60
7077854	31-1	3	1	3	38	3.2	.	.	31.7	81.1	7.5	4	83.0	120	50.10
7077855	21-2	2	1	3	38	3.3	.	.	33.3	81.0	7.6	4	81.6	120	52.20
7077856	31-1	3	1	4	39	3.5	.	.	32.6	80.3	7.7	5	83.3	121	55.25
7077857	21-2	2	1	3	38	3.5	.	.	32.0	80.8	7.8	3	82.4	120	56.90
7077858	31-1	3	1	3	39	3.5	.	.	34.0	80.2	7.6	3	81.3	121	56.60
7077859	31-1	3	1	4	38	3.2	.	.	33.2	80.2	7.6	5	81.9	119	48.75
7077860	31-1	3	1	4	37	3.2	.	.	33.1	80.3	7.5	5	81.0	117	48.70
7077861	31-1	3	1	4	37	3.5	.	.	32.9	80.4	7.5	5	81.4	117	55.10
7077862	31-1	3	1	4	38	3.2	.	.	33.4	80.0	7.6	6	82.1	120	48.80
7077863	21-2	2	1	4	38	3.3	.	.	32.0	80.6	7.6	5	81.4	119	50.85
7077864	31-1	3	1	4	39	3.6	.	.	35.1	80.3	7.8	6	82.4	123	55.30
7077865	31-1	3	1	5	39	3.5	.	.	31.9	79.8	7.5	7	82.1	122	52.90
7077866	31-1	3	1	3	38	3.3	.	.	33.5	80.3	7.6	4	81.2	120	51.85
7077867	31-1	3	1	4	38	3.3	.	.	34.6	79.5	7.7	5	82.5	120	50.55
7077868	31-1	3	1	4	38	3.4	.	.	33.7	80.5	7.5	5	81.5	119	50.50
7077869	21-2	2	1	4	37	3.2	.	.	32.1	80.7	7.6	4	81.1	116	49.10
7077870	21-1	2	1	3	37	3.3	.	.	32.8	81.6	7.6	4	82.1	114	52.05
7077871	31-1	3	1	4	37	3.3	.	.	33.1	80.8	7.4	5	81.0	116	50.45
Average	--	2.8	1.0	3.7	37.9	3.34	0/20 bales	level 1 bark	33.0	80.5	7.6	4.7	81.7	118.9	51.82
PX 40A383 W3FE															
7077909	21-2	2	1	4	39	3.4	.	.	33.8	77.7	8.9	5	80.5	123	50.95
7077910	31-1	3	1	5	39	3.5	.	.	32.6	77.8	8.8	6	80.9	122	52.85
7077911	31-1	3	1	5	37	3.4	.	.	31.3	78.1	8.6	6	78.4	117	47.50
7077912	31-1	3	1	4	39	3.2	.	.	34.7	78.4	8.8	6	80.6	121	48.75
7077913	21-2	2	1	3	38	3.5	.	.	32.1	78.3	9.0	4	81.2	120	56.85
7077914	21-2	2	1	4	39	3.5	.	.	33.6	78.1	9.0	6	79.8	123	55.20
7077915	31-1	3	1	5	38	3.5	.	.	34.1	78.0	8.8	7	79.5	120	52.45
7077916	31-1	3	1	4	40	3.5	.	.	34.5	78.0	8.7	5	81.0	124	55.25
7077917	31-1	3	1	4	39	3.4	.	.	32.6	78.3	8.8	5	79.3	123	49.90
7077918	31-1	3	1	4	39	3.2	.	.	33.3	78.1	8.6	5	79.7	123	48.25
7077919	21-2	2	1	4	38	3.3	.	.	31.6	78.0	9.0	5	81.3	119	50.85
7077920	21-2	2	1	4	39	3.4	.	.	32.7	78.1	8.9	5	79.4	123	50.35
7077921	21-1	2	1	3	39	3.5	.	.	33.4	79.1	8.9	4	80.8	123	56.95
7077922	21-2	2	1	4	38	3.6	.	.	31.1	77.6	9.0	4	79.4	120	55.10
7077923	21-1	2	1	3	39	3.3	.	.	33.5	79.5	8.9	3	80.0	122	52.20
7077924	21-1	2	1	3	39	3.5	.	.	31.7	79.7	8.7	3	80.0	121	56.85
7077925	31-1	3	1	5	37	3.7	.	.	32.3	78.1	8.7	6	80.0	117	52.90
7077926	21-2	2	1	4	39	3.5	.	.	33.2	78.2	9.0	6	78.8	123	55.10
7077927	21-2	2	1	4	40	3.6	.	.	33.0	77.7	9.0	6	80.9	124	55.70
7077928	21-1	2	1	2	39	3.6	.	.	33.2	79.3	9.3	2	80.7	123	57.45
Average	--	2.4	1.0	3.9	38.7	3.46	0/20 bales	level 1 bark	32.9	78.3	8.9	5.0	80.1	121.6	53.07



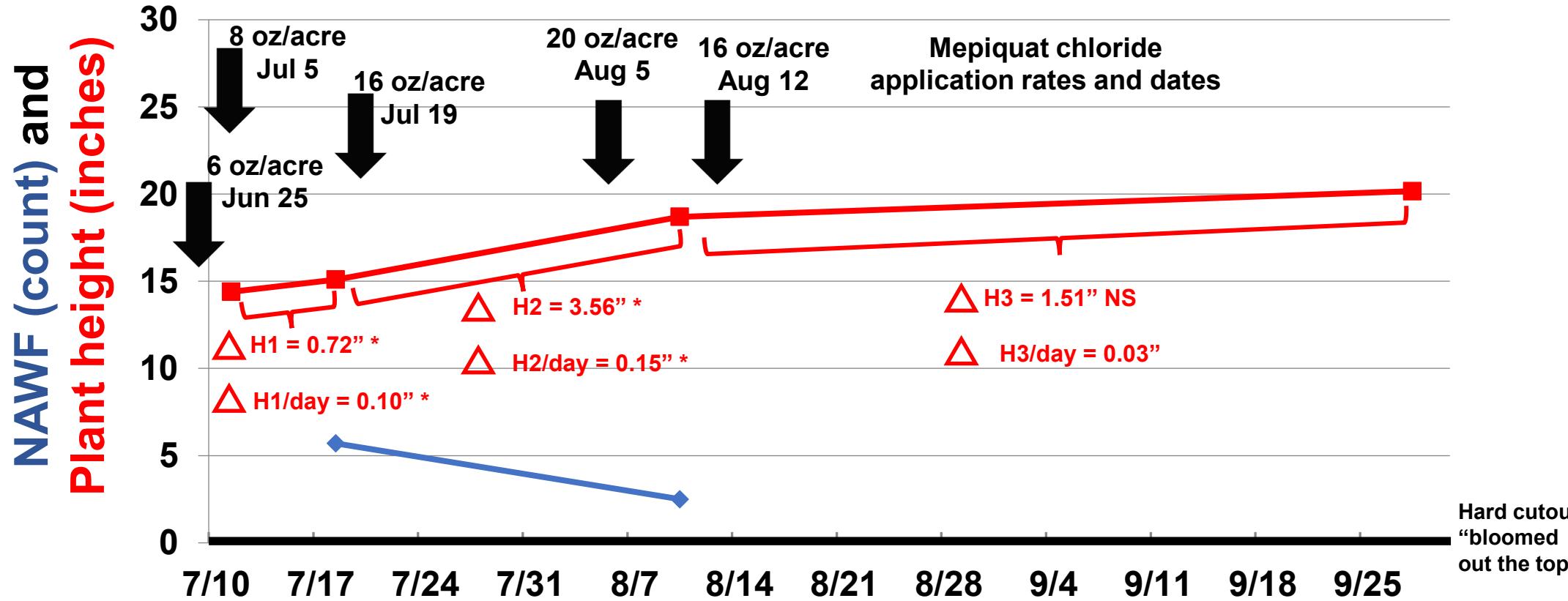
Appendix

Gruhlkey 2022 PhytoGen Enlist Variety Trial – Plant height and NAWF graphs, Amarillo 2022 cotton heat units and weather data.





Gruhlkey Enlist Variety Trial (Across All Entries) Wildorado – 2022



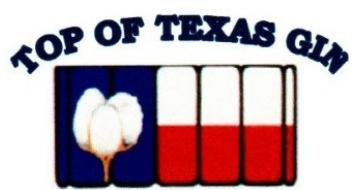
Rainfall (inches): Apr 0.0, May 0.6, Jun 0.8, Jul 4.9, Aug 1.0, Sep 0.1 = 7.4

Irrigation (inches): Apr 2.0, May 3.3, Jun 2.5, Jul 3.0, Aug 4.9, Sep 1.2 = 16.9

Planted: May 9

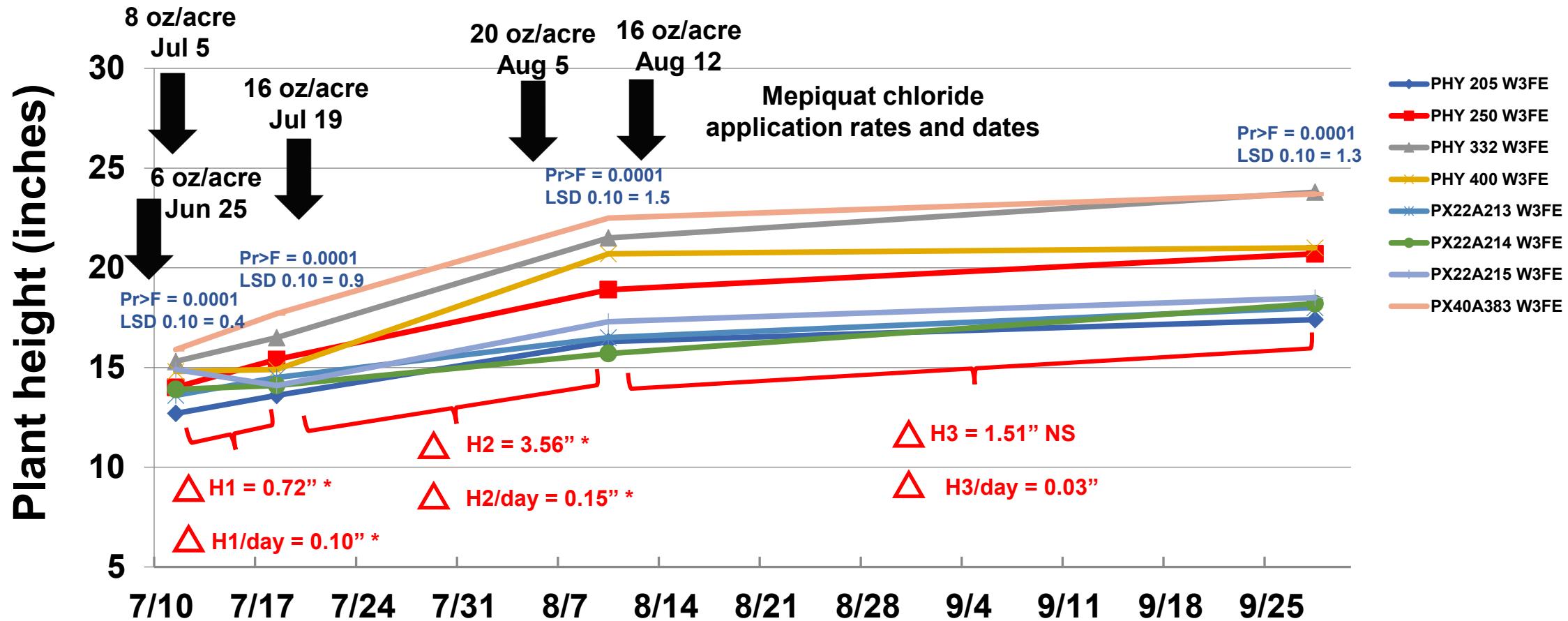
Days to bloom: 67

First bloom date: Jul 15



Gruhlkey Enlist Variety Trial

Wildorado – 2022



Rainfall (inches): Apr 0.0, May 0.6, Jun 0.8, Jul 4.9, Aug 1.0, Sep 0.1 = 7.4

Irrigation (inches): Apr 2.0, May 3.3, Jun 2.5, Jul 3.0, Aug 4.9, Sep 1.2 = 16.9

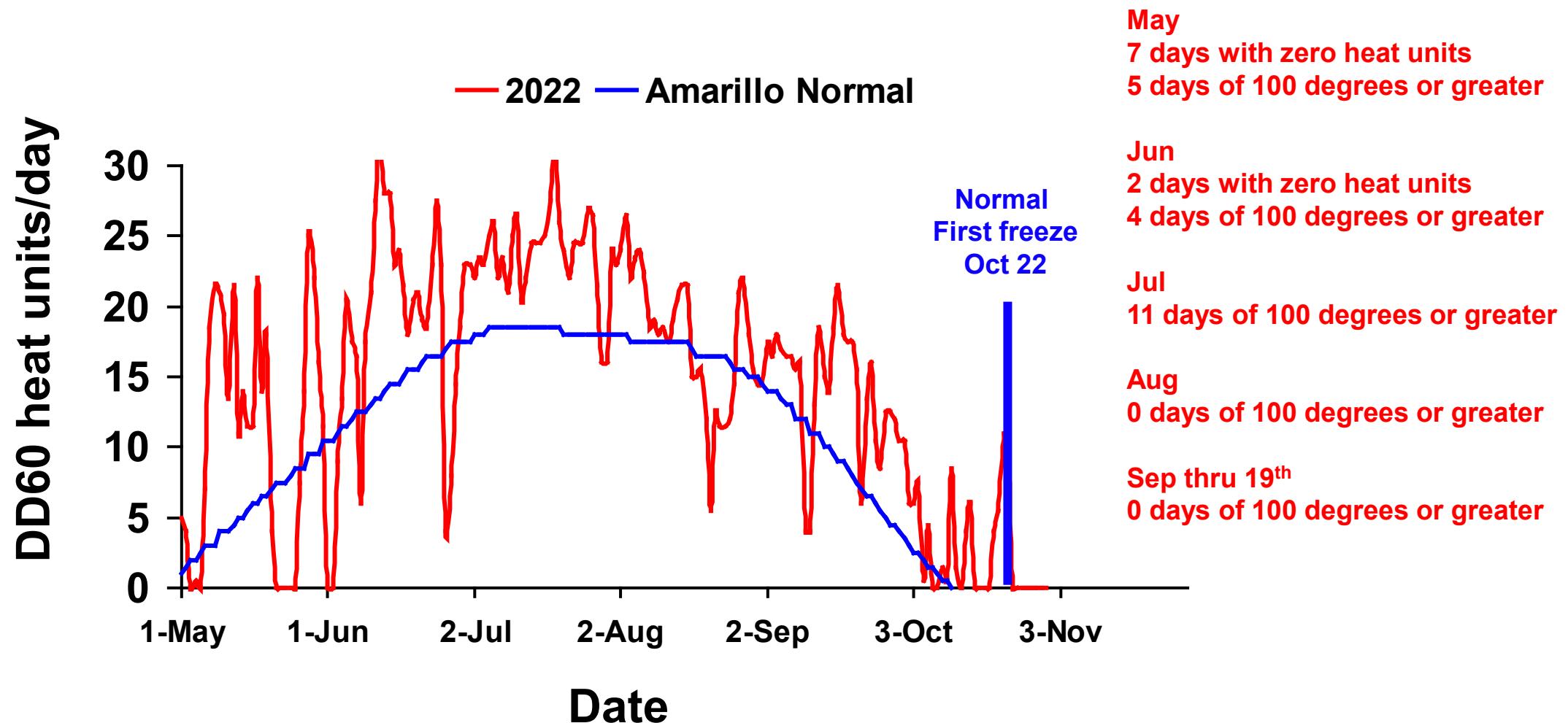
Planted: May 9

Days to bloom: 67

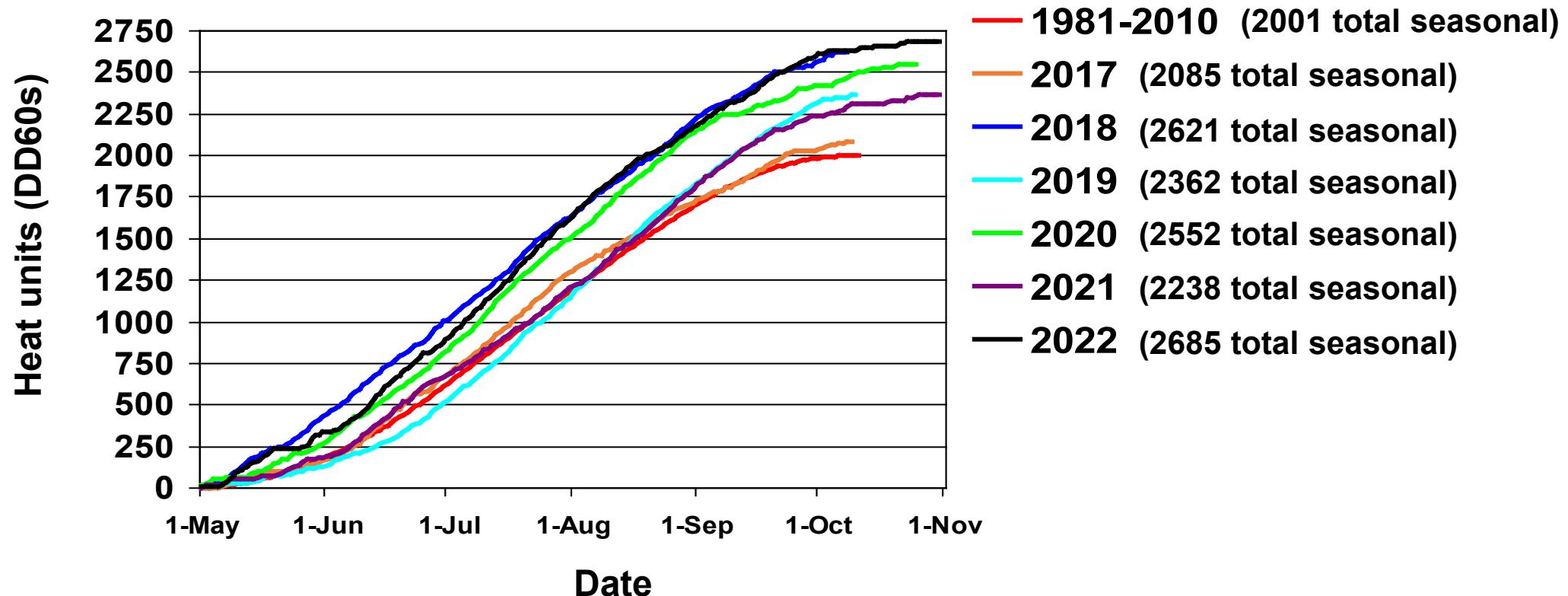
First bloom date: Jul 15

Amarillo

30-Year Normal (1981-2010) and 2022 Daily Heat Units

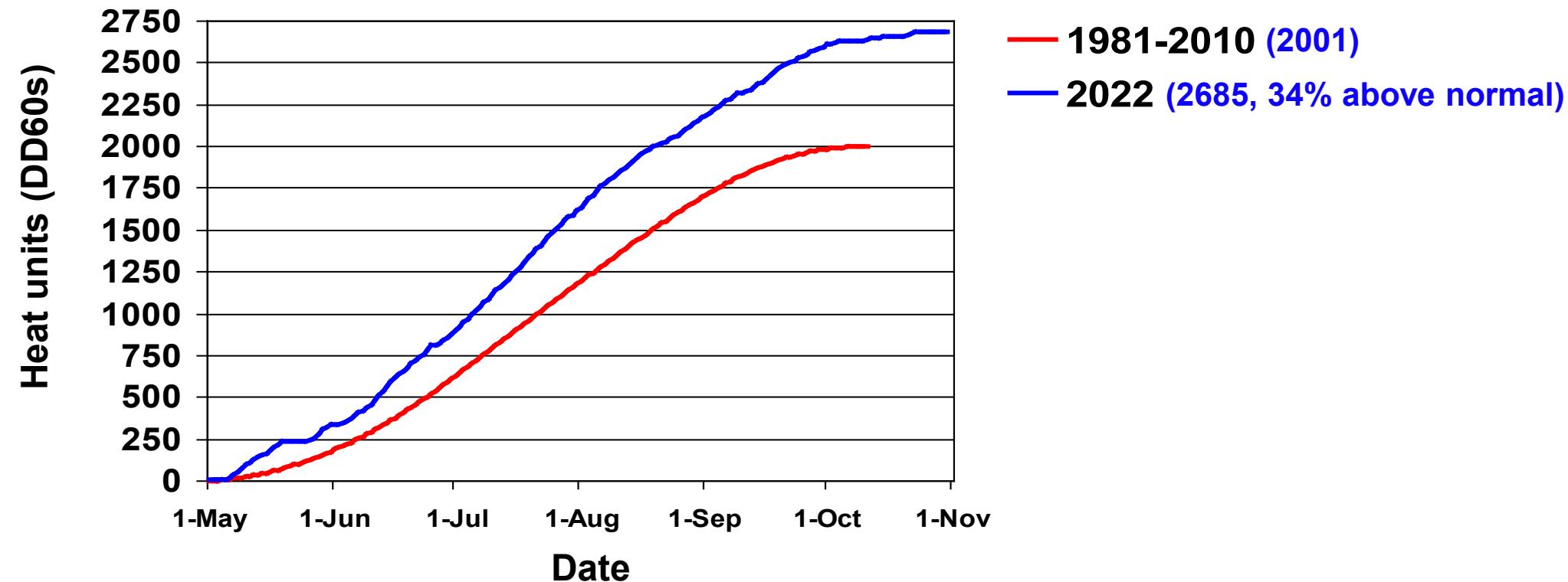


**Amarillo 30-Yr Normal (1981-2010)
vs. 2017, 2018, 2019, 2020, 2021, and 2022
Cotton Heat Unit Accumulation
From May 1 Through First Hard Freeze**



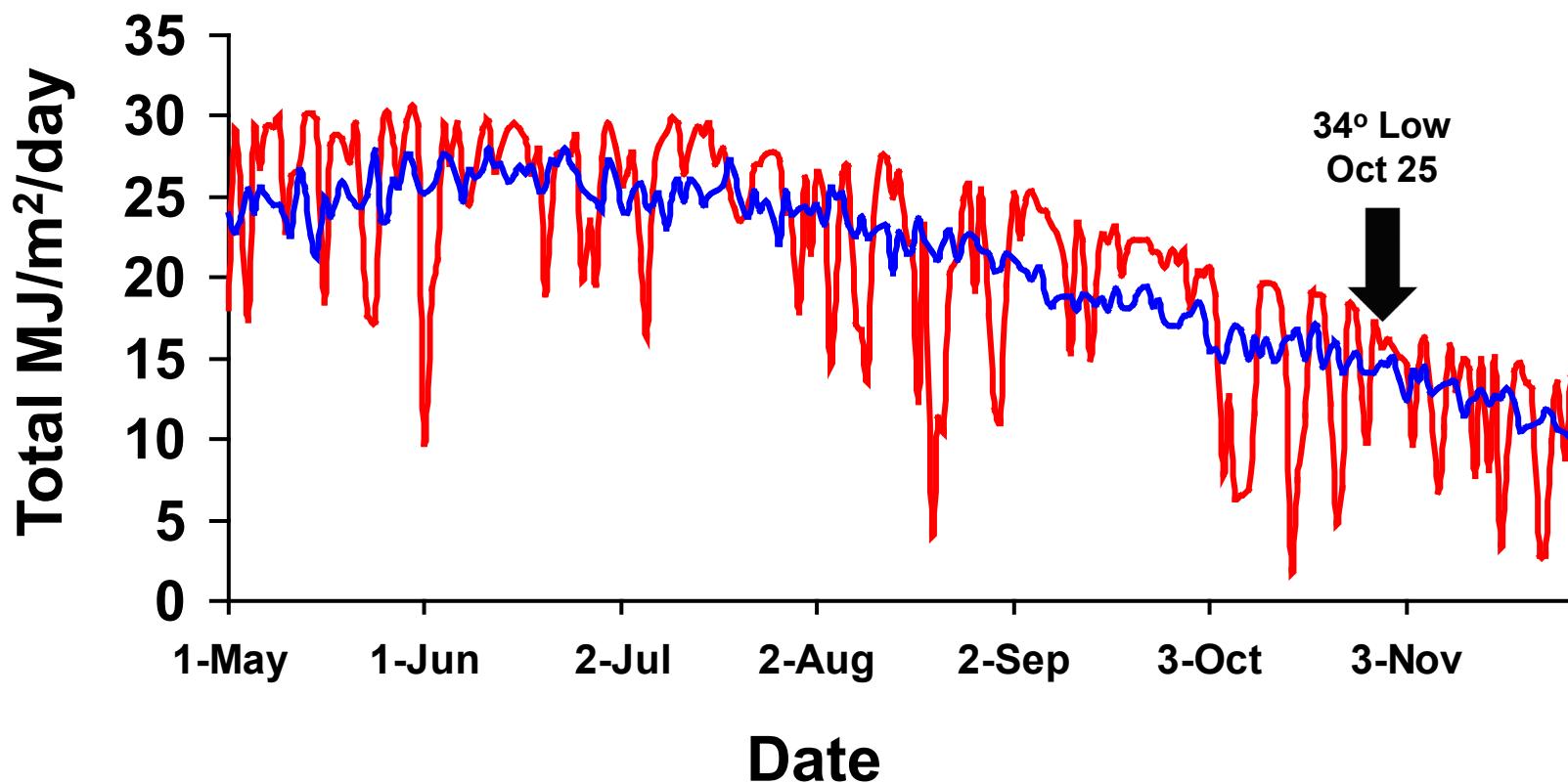
Amarillo 30-Yr Normal (1981-2010) vs. 2022 Cotton Heat Unit Accumulation From May 1

% normal Sep 1-30	HU from May 1 thru Sep 30	% LTA from May 1 thru Sep 30	HU from May 15 thru Sep 30	% LTA from May 15 thru Sep 30	HU from May 20 thru Sep 30	% LTA from May 20 thru Sep 30
plus 49	2599	plus 31	2442	plus 26	2365	plus 24



Muleshoe 18-Year Mean (2004-2021) and 2022 Daily Total Solar Radiation (MJ/meter²)

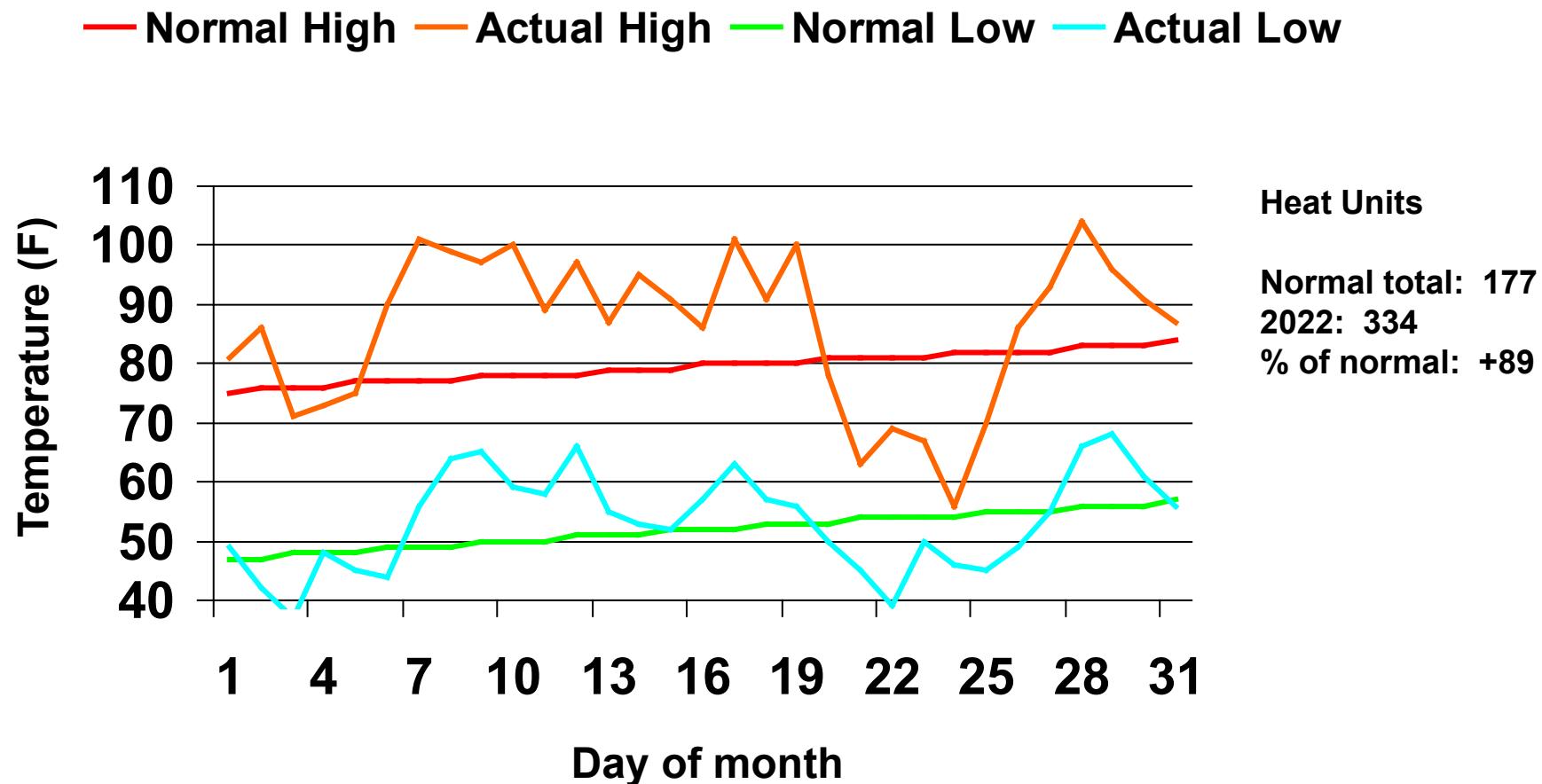
— 2022 — Muleshoe 18-Yr Mean



Total solar energy, in MJ/meter², calculated from the hourly average global solar radiation rates and converted to energy by integrating over time.

Amarillo

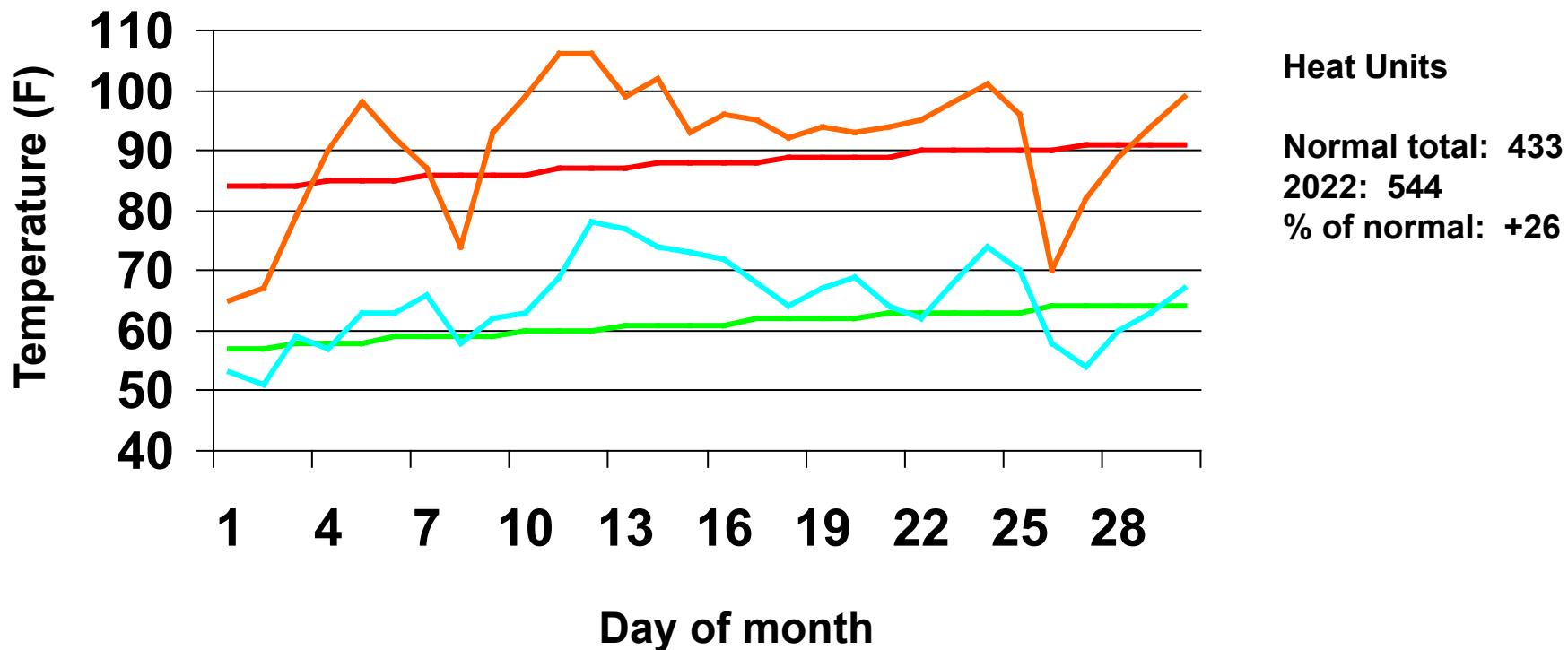
30-Yr Normal (1981-2010) and May 2022 Air Temperatures



Amarillo

30-Yr Normal (1981-2010) and June 2022 Air Temperatures

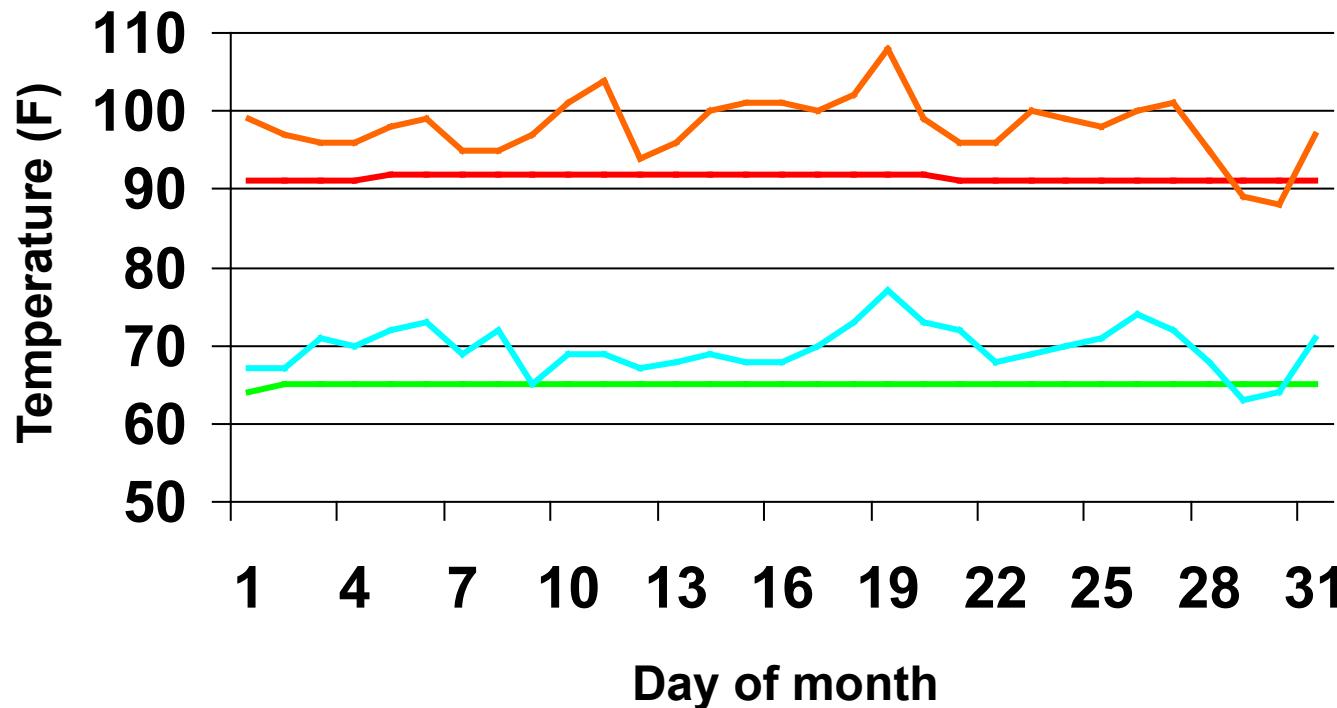
— Normal High — Actual High — Normal Low — Actual Low



Amarillo

30-Yr Normal (1981-2010) and July 2022 Air Temperatures

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

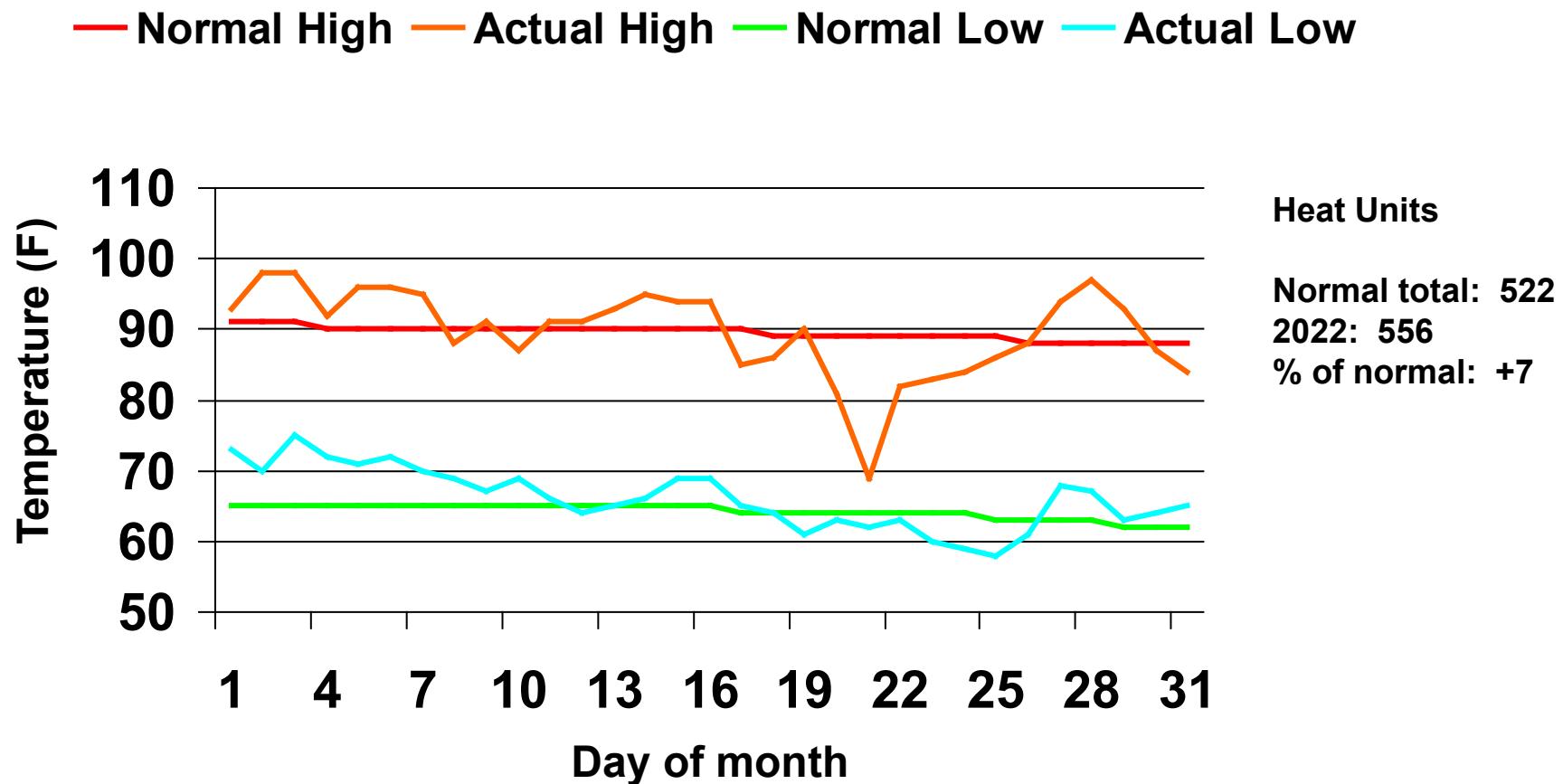


Heat Units

Normal total: 566
2022: 738
% of normal: +31

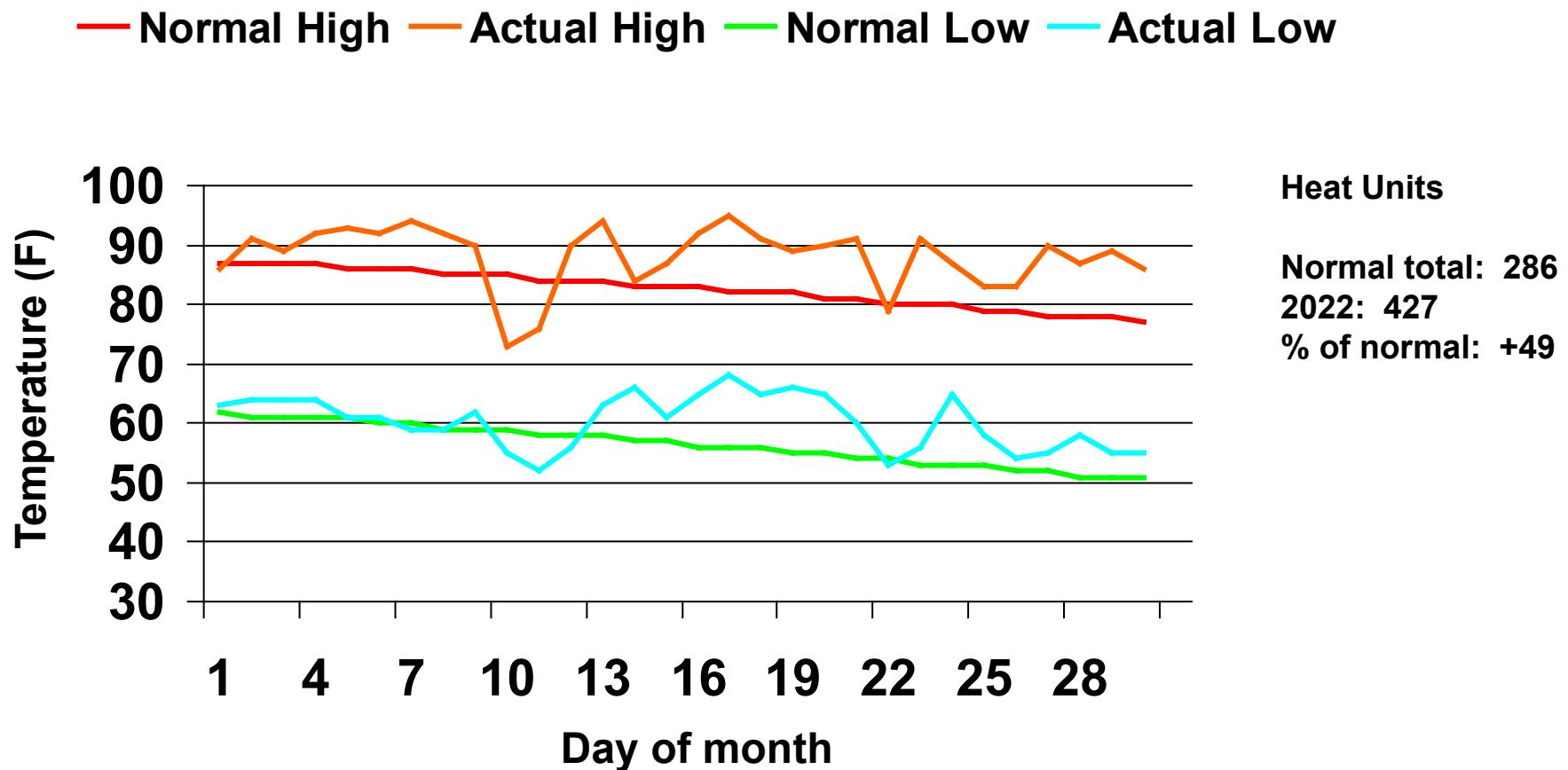
Amarillo

30-Yr Normal (1981-2010) and August 2022 Air Temperatures



Amarillo

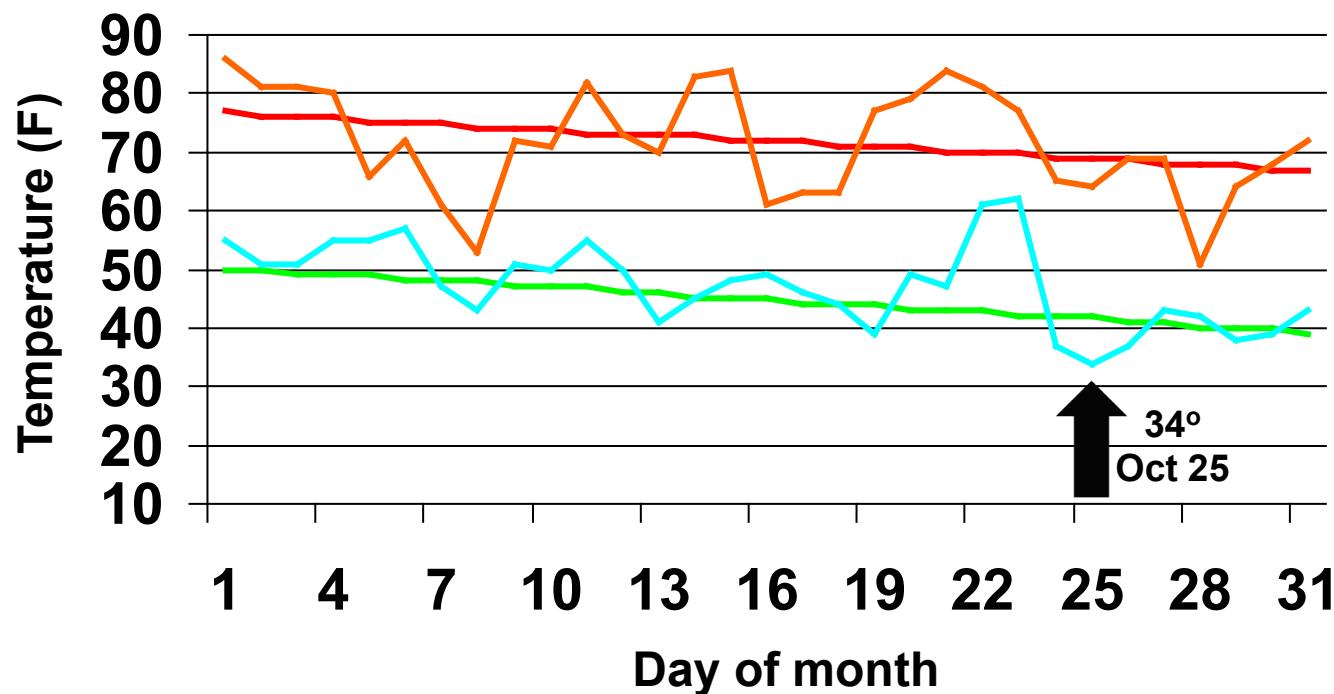
30-Yr Normal (1981-2010) and September 2022 Air Temperatures



Amarillo

30-Yr Normal (1981-2010) and October 2022 Air Temperatures

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



Heat Units

Normal total: 19

2022: 87

% of normal: +358

First freeze on Nov 4 (29 degrees)
Hard freeze on Nov 11 (22 degrees)