



2022 Enlist Technology Cotton Variety Trial – Lonestar Gin

**Brett Friemel Farm
Panhandle, TX**

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

Ben Benton, formerly Cotton Development Specialist, PhytoGen Cotton Seed

Carey McKinney, Lonestar Gin Manager

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, and timely rainfall provided badly needed moisture during July and August. Overall, the trial was able to stay on track with growth and development and excellent in-season, yield and quality data were obtained. Crop maturity was impacted and entries exhibited low micronaire.*

Harvest results indicated that statistically significant differences were observed. Lint yields ranged from a high of 1690 lb/acre (PX22A214 W3FE) to a low of 1450 lb/acre (PX40A383 W3FE), and averaged 1553 lb/acre (Table 1). Average Loan value for varieties from commercially ginned and classed bales varied from a high of \$0.5029/lb (PHY 210 W3FE) to a low of \$0.4552/lb (PX22A213 W3FE). Overall Loan value for the trial across all entries was \$0.4878/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. PX22A214 W3FE had the highest net value at \$1136/acre, and PX40A383 W3FE had the lowest at \$959/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 observation dates, nodes above cracked boll (NACB) on October 11th 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 typically ranged from about 11 to 31 across all entries. Leaf grades ranged from about 2.9 to 3.6. Staple ranged from about 36.6 (PHY 205 W3FE) to 38.6 32^{nds} inch (PX22A213 W3FE). Micronaire averages were low for all entries and ranged from about 3.0 (PX22A213 W3FE) to 3.4 (PHY 205 W3FE). A varying amount of bark contamination was noted in commercial bales for some entries, and ranged from 0% up to about 88%. Fiber strength ranged from 28.2 to 31.4 g/tex, and uniformity ranged from 79.5 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: 3470 ft

Previous crop: corn harvested in 2021

Tillage system: ripped, disked, fertilizer coulter rig, sweeps, planted flat

Planted: May 17

Replicates: 3 replicates in a randomized complete block design

Plot width: 12-row plots

Plot length: trial was planted in a circle with ~2,500 ft long rows

Seeding rate: 55,000 seed/acre

Days from planting to first bloom: 67 (July 23)

30-inch rows under center pivot irrigation

Total rainfall May through September: ~12.8 inches

May: 2.4, June 2.4, July: 3.4, August: 4.4, September: 0.2

Total irrigation March through September: ~11.0 inches

Pre-water - March: 1.0, April 1.0, May 1.0, June: 1.0, July 2.0, August 4.0,

September 1.0

Fertility management:

Feb 12 - 2 tons/acre compost; no other fertilizers applied

Chemical Applications:

Preplant - 1 qt/acre trifluralin

Post – 1 qt/acre Paco (prometryn)

June 28 – 43 oz/acre Liberty

July 28 – 24 oz/acre Roundup RT3

Plant growth regulators: 16 oz/acre mepiquat chloride on July 28

Insecticides: June 17 (early squaring) – 4 oz/acre acephate

Harvest aid application: 1 qt/acre ethephon October 14

Harvesting: November 21 using a John Deere CS770, with harvested area calculated by the GPS on the stripper monitor. An average of ~1350 ft of plot length was harvested. Round modules were weighed using the CS770 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

Table 1. Harvest results for the center pivot irrigated Enlist technology cotton variety trial, Friemel Farm, Panhandle, TX, 2022.

Table 2. Plant observations for the center pivot irrigated Enlist technology cotton variety trial, Friemel Farm, Panhandle, TX, 2022.

Table 3. Commercial classing data for the center pivot irrigated Enlist technology cotton variety trial, Friemel Farm, Panhandle, TX, 2022.

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

Acknowledgements

Lonestar Gin would like to thank Brett Friemel, for committing equipment, land, and time to conduct and manage the trial. Trevor Friemel planted and 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.



Table 1. Harvest results for the center pivot irrigated Enlist cotton variety trial, Friemel Farm, Panhandle, TX, 2022.

Entry	Lint turnout	Seed turnout	Bur cotton yield	Lint yield	Seed yield	Lint loan value	Lint value	Net gin credit	Net value
----- % -----			----- lb/acre -----			\$/lb	----- \$/acre -----		
PX22A214 W3FE	31.6	41.9	5346	1690	2239	0.4915	831	305	1136 a
PHY 205 W3FE	30.6	41.0	5327	1628	2182	0.4998	814	293	1107 ab
PHY 210 W3FE	30.9	41.8	5123	1581	2143	0.5029	795	292	1087 abc
PHY 400 W3FE	32.5	40.8	4919	1596	2005	0.4719	753	269	1022 bcd
PHY 350 W3FE	29.9	42.4	4872	1459	2065	0.4956	723	283	1006 cd
PHY 332 W3FE	29.5	39.5	5062	1495	2001	0.4944	739	263	1003 cd
PX22A213 W3FE	30.3	42.2	5034	1525	2124	0.4552	694	291	984 d
PX40A383 W3FE	31.8	40.6	4558	1450	1852	0.4908	712	248	959 d
Test average	30.9	41.3	5030	1553	2076	0.4878	758	281	1038
CV, %	--	--	5.7	5.6	5.6	--	5.8	5.6	5.7
OSL	--	--	0.0746	0.0418	0.0257	--	0.0135	0.0090	0.0229
LSD	--	--	409	124	167	--	63	23	85

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.

\$430/ton for seed.

Net gin credit is defined as seed value 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, Friemel Farm, Panhandle, TX, 2022.

Entry	Final population	Stand establishment	Vigor	Nodes above white flower		Plant height			Nodes above cracked boll	Storm resistance
				Early bloom	Late bloom	Early bloom	Late bloom	Final		
	plants/acre	%	1-5 visual scale, 5 best		count		inches		count	1-9 visual scale, 9 tight
	15-Jun	15-Jun	15-Jun	26-Jul	17-Aug	26-Jul	17-Aug	11-Oct	11-Oct	21-Nov
PHY 205 W3FE	45,012	81.9	3.7	6.7	4.5	15.1	21.7	22.6	3.5	8.0
PHY 210 W3FE	46,755	85.0	3.3	7.0	4.9	16.4	23.0	24.3	4.1	7.3
PHY 332 W3FE	42,689	77.6	3.3	7.6	5.0	19.1	27.5	29.1	5.9	6.3
PHY 350 W3FE	42,108	76.6	3.3	7.9	5.1	19.1	26.8	30.1	6.4	5.8
PHY 400 W3FE	41,527	75.5	3.3	7.4	4.5	17.9	23.2	24.5	5.7	7.2
PX22A213 W3FE	41,237	75.0	3.5	6.9	4.3	17.3	24.2	23.9	3.9	8.0
PX22A214 W3FE	40,946	74.5	3.8	6.3	3.5	17.2	23.1	23.5	4.1	7.8
PX40A383 W3FE	45,012	81.9	3.5	7.5	4.7	18.9	27.4	30.2	7.8	6.8
Test average	43,161	78.5	3.5	7.2	4.6	17.6	24.6	26.0	5.2	7.2
CV, %	4.9	4.9	5.3	4.4	7.1	4.9	3.4	2.8	12.4	4.4
OSL	0.0324	0.0319	0.0345	0.0004	0.0010	0.0006	0.0001	0.0001	0.0001	0.0001
LSD	3,022	5.5	0.3	0.5	0.5	1.3	1.2	1.0	0.9	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, Friemel Farm, Panhandle, 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															
912290	31-1	3	1	4	37	3.2	11	level 1 bark	32.3	79.3	7.9	6	82.3	115	45.15
912291	21-2	2	1	4	37	3.3	.	.	30.7	81.1	7.6	4	82.3	114	50.75
912292	21-2	2	1	4	36	3.3	.	.	31.6	80.7	7.8	5	81.4	112	50.50
912293	21-2	2	1	4	36	3.3	11	level 1 bark	32.7	80.9	7.8	5	83.0	113	47.10
912294	21-1	2	1	3	36	3.6	11	level 1 bark	29.4	80.7	8.1	3	82.0	113	52.60
912295	21-2	2	1	3	37	3.6	.	.	29.6	80.8	7.9	3	81.3	115	56.50
912296	21-2	2	1	3	36	3.4	11	level 1 bark	31.4	80.7	7.9	3	81.4	113	48.05
912297	21-2	2	1	4	36	3.3	11	level 1 bark	30.5	80.6	7.9	5	82.6	113	46.90
912298	21-1	2	1	3	38	3.3	.	.	33.1	82.0	7.8	3	82.5	118	52.25
Average	--	2.1	1.0	3.6	36.6	3.37	5/9 bales	level 1 bark	31.3	80.8	7.9	4.1	82.1	114.0	49.98
PHY 210 W3FE															
912299	21-2	2	1	3	38	3.0	.	.	32.7	82.2	7.3	4	82.2	118	50.40
912300	21-1	2	1	3	37	3.2	.	.	30.5	82.3	7.9	4	79.8	117	49.60
912301	21-1	2	1	3	37	3.5	11	level 1 bark	31.0	82.5	7.7	3	80.9	115	53.25
912302	21-1	2	1	3	38	3.3	11	level 1 bark	29.7	82.4	7.7	3	81.1	118	48.35
912303	21-1	2	1	3	38	3.4	11	level 1 bark	30.5	82.6	7.7	2	80.7	118	48.45
912304	21-1	2	1	3	36	3.3	11	level 1 bark	30.0	83.1	7.5	3	80.7	113	47.90
912305	21-1	2	1	3	37	3.2	.	.	30.1	82.4	7.7	3	81.2	117	50.10
912306	21-1	2	1	3	38	3.4	.	.	31.4	82.8	7.7	3	80.9	119	52.10
912307	21-1	2	1	2	38	3.3	.	.	30.1	83.4	7.6	2	80.1	119	52.45
Average	--	2.0	1.0	2.9	37.4	3.29	4/9 bales	level 1 bark	30.7	82.6	7.6	3.0	80.8	117.1	50.29
PHY 332 W3FE															
912308	11-2	1	1	3	38	3.1	.	.	30.5	81.8	8.4	3	81.2	118	50.20
912309	11-2	1	1	3	37	3.2	.	.	26.6	80.7	8.9	2	80.0	116	49.95
912310	11-1	1	1	3	37	3.2	.	.	28.0	81.5	8.8	3	79.8	116	49.45
912311	11-1	1	1	3	37	3.1	.	.	30.0	81.7	8.9	4	80.1	115	50.10
912312	11-1	1	1	3	37	3.1	.	.	30.5	81.5	8.9	3	80.1	115	50.10
912313	11-1	1	1	3	37	3.0	.	.	30.6	81.6	8.9	3	79.4	116	49.60
912314	21-1	2	1	3	37	2.8	.	.	28.6	81.0	8.7	3	79.1	116	46.45
912315	11-1	1	1	3	38	3.0	.	.	30.2	81.6	8.8	3	79.6	118	49.70
Average	--	1.1	1.0	3.0	37.3	3.06	0/8 bales	level 1 bark	29.4	81.4	8.8	3.0	79.9	116.3	49.44



Table 3 (continued). Commercial classing data for the center pivot irrigated Enlist technology cotton variety trial, Friemel Farm, Panhandle, 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 350 W3FE															
912334	11-2	1	1	3	37	3.0	.	.	30.4	82.5	8.0	3	79.2	116	49.60
912335	21-1	2	1	4	38	3.1	.	.	29.5	81.3	8.1	4	79.7	118	48.35
912336	21-1	2	1	3	37	3.5	11	level 1 bark	25.7	81.7	8.3	4	80.8	114	48.85
912337	21-1	2	1	3	36	3.1	.	.	28.6	82.0	8.3	4	79.2	113	49.00
912338	11-2	1	1	3	38	3.1	.	.	29.0	81.9	8.4	3	80.7	120	50.10
912339	21-1	2	1	3	37	3.0	.	.	26.8	81.7	8.1	4	81.1	115	49.95
912340	21-1	2	1	3	37	3.3	.	.	28.1	81.1	8.2	3	79.6	115	51.20
912341	21-1	2	1	3	37	3.1	.	.	27.8	81.9	8.3	3	79.7	117	49.45
Average	--	1.8	1.0	3.1	37.1	3.15	1/8 bales	level 1 bark	28.2	81.8	8.2	3.5	80.0	116.0	49.56
PHY 400 W3FE															
912316	21-1	2	1	3	38	2.9	.	.	30.8	82.6	7.4	4	78.9	118	46.60
912317	21-1	2	1	3	37	2.9	.	.	30.2	81.7	8.2	3	78.6	117	46.50
912318	21-1	2	1	3	38	2.9	11	level 1 bark	30.7	81.5	8.3	4	80.4	119	43.70
912319	21-1	2	1	3	37	3.0	11	level 1 bark	28.6	81.3	8.2	3	79.1	114	45.95
912320	21-1	2	1	3	37	3.0	11	level 1 bark	31.3	81.3	8.2	4	80.8	116	46.75
912321	21-1	2	1	3	37	3.1	11	level 1 bark	30.3	82.1	8.2	3	78.8	115	46.00
912322	21-1	2	1	3	37	3.3	11	level 1 bark	27.6	80.6	8.4	4	78.9	114	47.60
912323	21-1	2	1	3	37	3.3	.	.	30.5	82.2	8.0	3	79.1	114	51.35
912324	11-1	1	1	3	37	3.2	.	.	32.5	82.5	8.2	3	80.7	116	50.25
Average	--	1.9	1.0	3.0	37.2	3.07	5/9 bales	level 1 bark	30.3	81.8	8.1	3.4	79.5	115.9	47.19
PX22A213 W3FE															
912351	21-1	2	1	4	39	2.9	11	level 1 bark	30.7	81.6	7.8	5	81.8	121	42.45
912352	21-2	2	1	4	39	3.0	11	level 1 bark	30.7	80.8	7.9	5	81.1	121	45.45
912353	21-2	2	1	3	38	2.9	11	level 1 bark	32.6	80.8	7.8	5	80.9	120	43.85
912354	31-1	3	1	4	38	3.0	11	level 1 bark	29.7	79.8	7.9	4	81.3	119	44.90
912355	21-2	2	1	3	39	3.0	.	.	32.1	81.4	7.7	4	80.2	121	50.35
912356	21-2	2	1	4	38	3.1	11	level 1 bark	31.7	81.7	7.5	4	79.1	118	45.10
912357	21-1	2	1	3	38	3.1	11	level 1 bark	32.1	82.1	7.8	4	82.8	118	46.90
912358	31-1	3	1	4	40	3.0	11	level 1 bark	31.3	80.2	7.8	6	81.0	124	45.15
Average	--	2.3	1.0	3.6	38.6	3.00	7/8 bales	level 1 bark	31.4	81.1	7.8	4.6	81.0	120.3	45.52



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

PX22A214 W3FE

912342	21-1	2	1	3	38	3.4	11	level 1 bark	30.3	82.5	7.2	4	80.2	119	48.45
912343	21-2	2	1	3	38	3.1	11	level 1 bark	30.9	81.4	7.6	4	80.4	119	46.70
912344	21-1	2	1	3	37	3.0	.	.	34.1	81.6	7.8	4	80.5	117	50.35
912345	21-2	2	1	3	37	3.3	.	.	31.1	81.3	7.8	4	80.9	117	52.00
912346	21-1	2	1	3	37	3.2	.	.	31.0	81.9	7.7	3	81.0	116	50.25
912347	21-1	2	1	4	38	3.0	11	level 1 bark	31.9	81.7	7.6	6	81.9	120	45.60
912348	21-1	2	1	3	38	3.0	.	.	32.5	82.0	7.7	4	82.1	120	50.40
912349	31-1	3	1	4	37	3.0	.	.	30.7	80.9	7.5	5	80.7	116	48.45
912350	21-2	2	1	3	38	3.2	.	.	29.5	81.2	7.8	4	82.1	118	50.15
Average	--	2.1	1.0	3.2	37.6	3.13	3/9 bales	level 1 bark	31.3	81.6	7.6	4.2	81.1	118.0	49.15

PX40A383 W3FE

912325	21-1	2	1	3	38	3.0	.	.	30.9	81.2	8.1	4	81.0	119	50.20
912326	21-1	2	1	3	37	3.3	.	.	29.1	81.1	8.4	4	79.3	116	51.25
912327	21-1	2	1	3	35	4.0	11	level 1 bark	26.5	80.0	8.5	4	78.4	108	50.45
912328	21-1	2	1	4	37	3.2	.	.	30.8	80.3	8.6	5	80.1	116	48.95
912329	21-1	2	1	4	37	3.1	11	level 1 bark	30.2	80.1	8.7	5	79.5	115	44.95
912330	21-1	2	1	3	37	3.1	11	level 1 bark	29.5	80.8	8.5	3	78.7	117	45.90
912331	21-1	2	1	3	37	3.1	.	.	29.4	80.8	8.6	4	80.5	117	50.00
912332	21-1	2	1	3	38	3.0	.	.	31.9	80.7	8.6	4	79.3	120	49.85
912333	21-1	2	1	3	39	3.2	.	.	30.6	81.0	8.5	4	81.2	122	50.20
Average	--	2.0	1.0	3.2	37.2	3.22	3/9 bales	level 1 bark	29.9	80.7	8.5	4.1	79.8	116.7	49.08



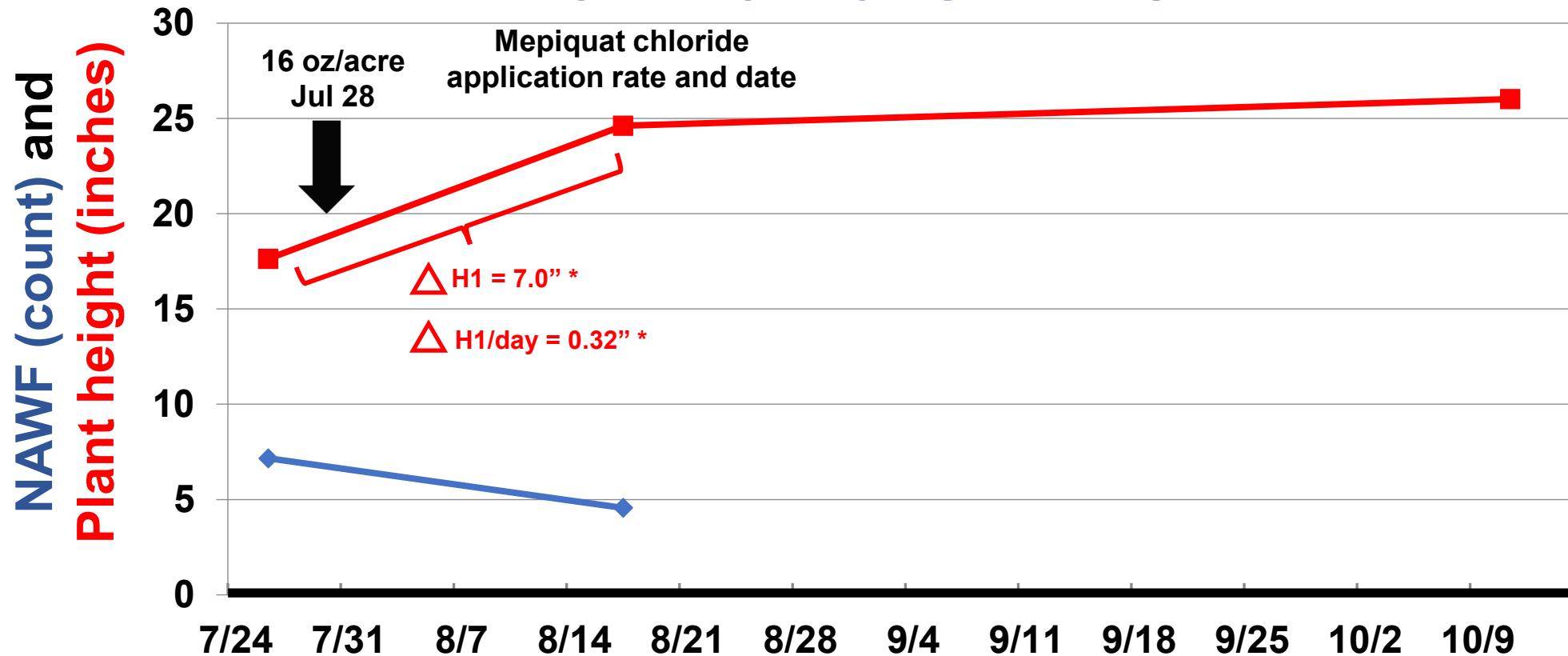
Appendix

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





Friemel PhytoGen Variety Trial (Across All Entries) Panhandle – 2022

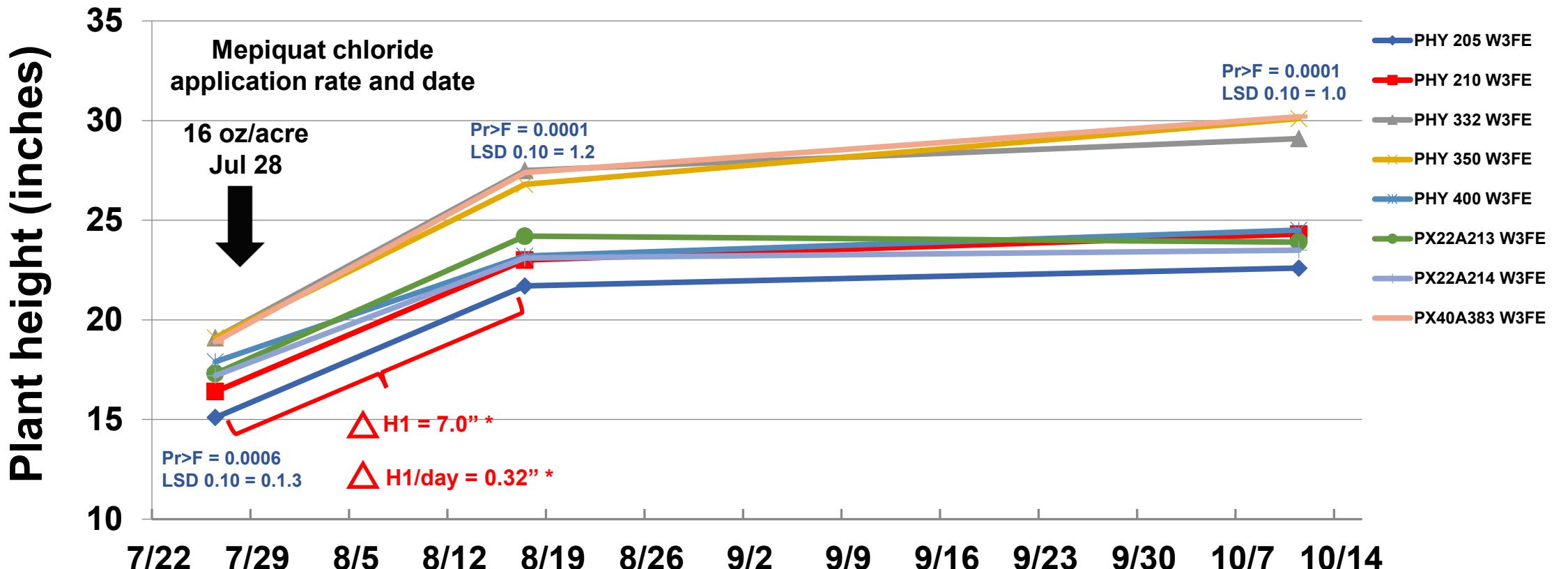


Planted: May 17
Seeding rate: 55K
Days to bloom: 67
First bloom date: Jul 23



Friemel PhytoGen Variety Trial

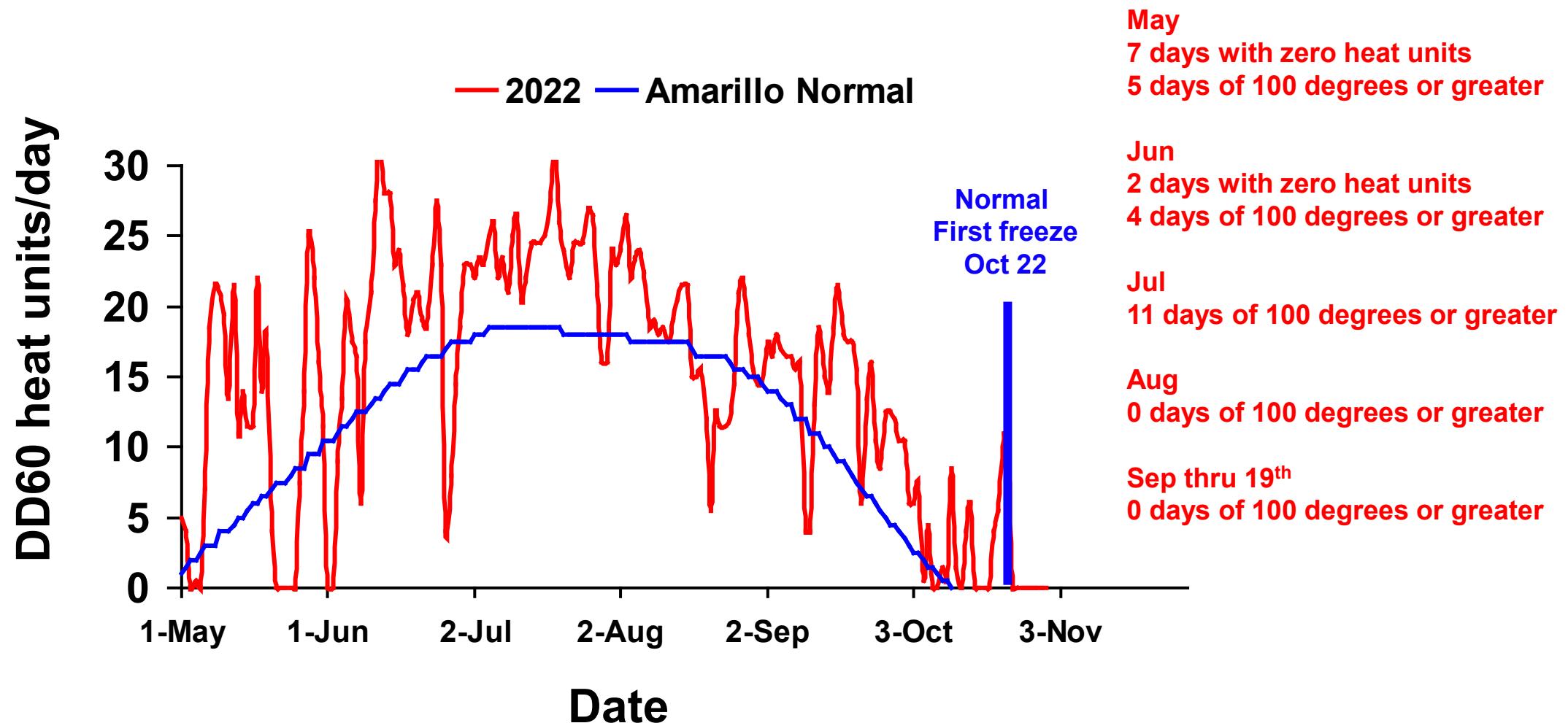
Panhandle – 2022



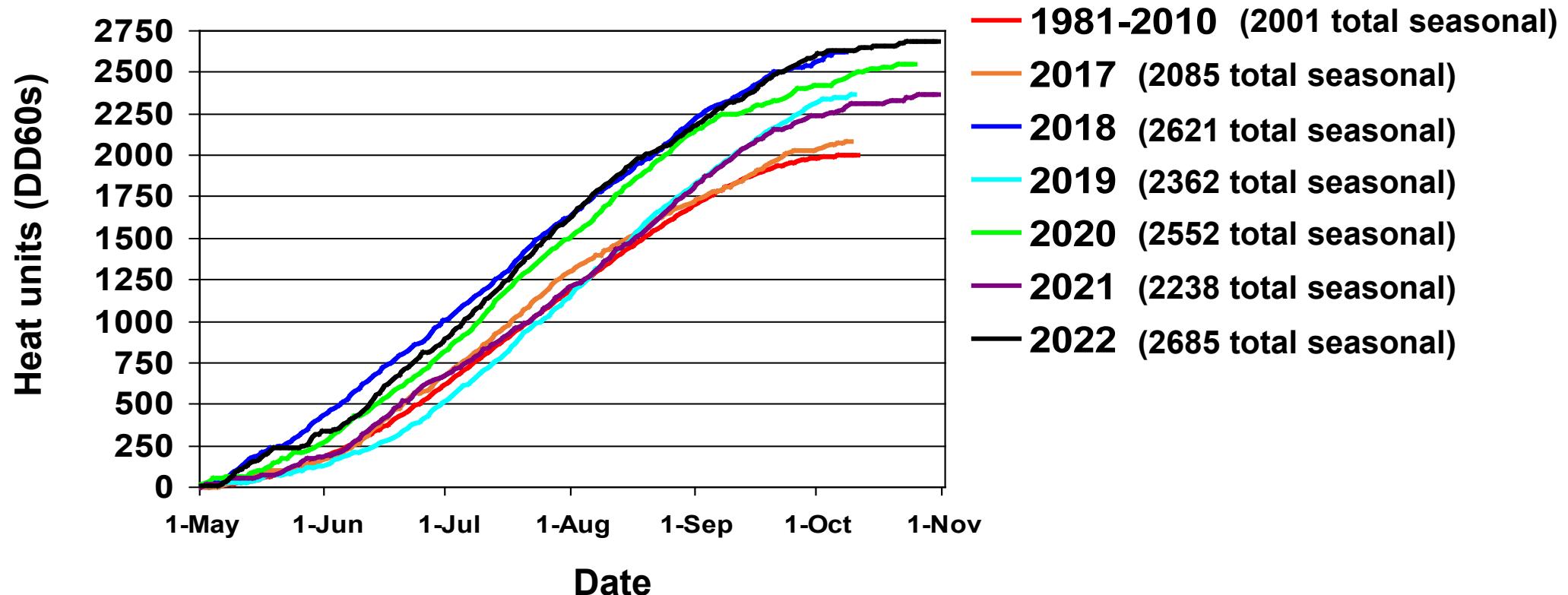
Planted: May 17
Seeding rate: 55K
Days to bloom: 67
First bloom date: Jul 23

Amarillo

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

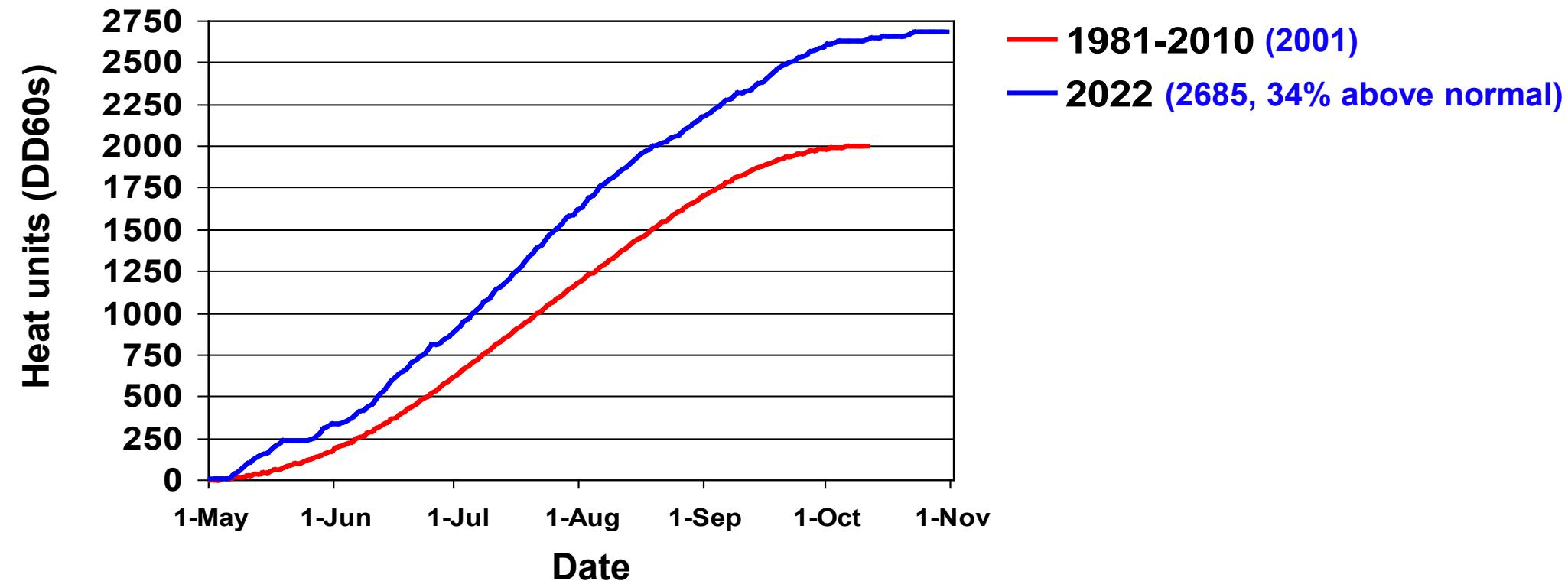


**Amarillo 30-Yr Normal (1981-2010)
vs. 2017, 2018, 2019, 2020, 2021, and 2022
Cotton Heat Unit Accumulation
From May 1 Through First Hard Freeze**



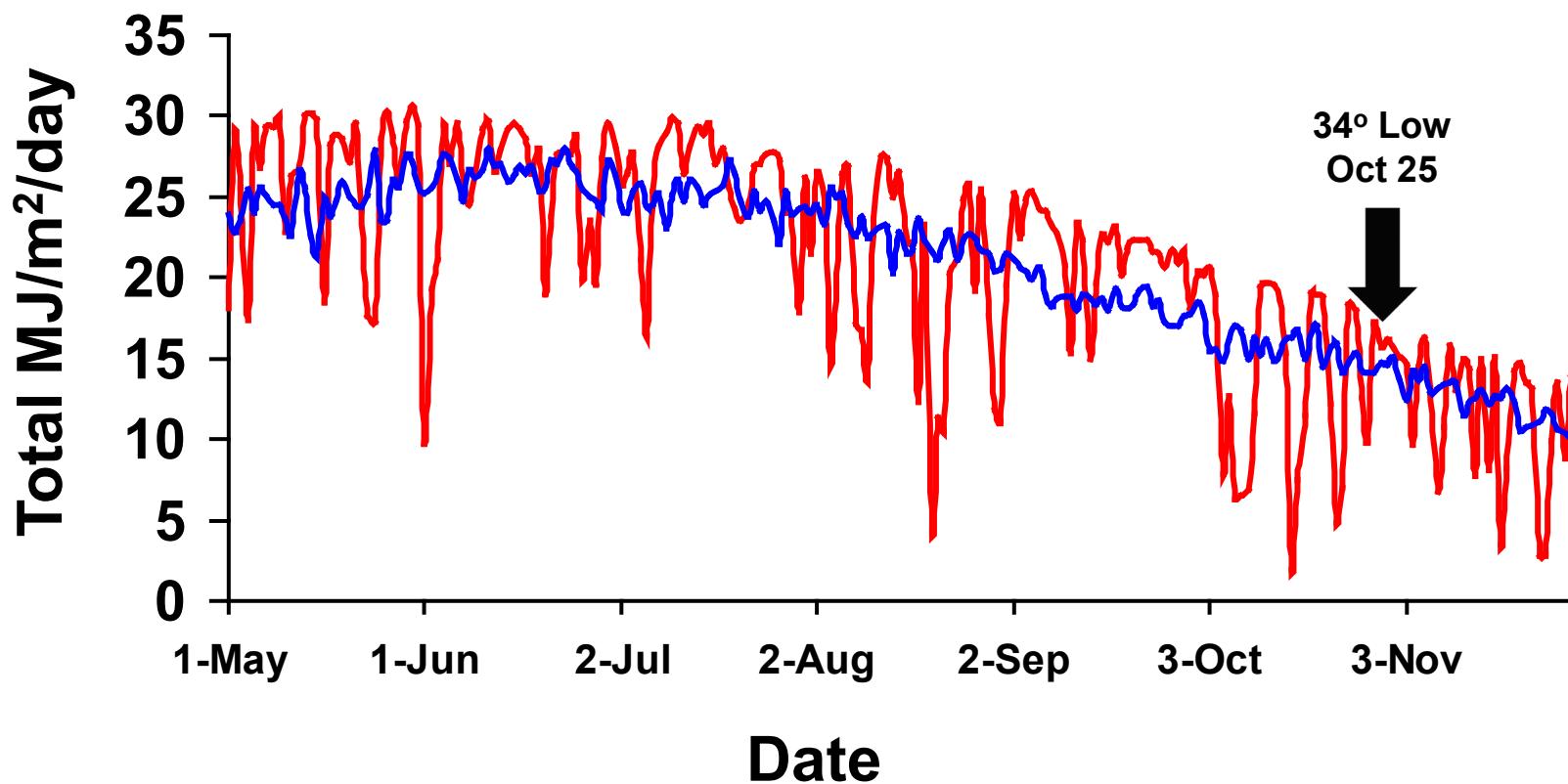
Amarillo 30-Yr Normal (1981-2010) vs. 2022 Cotton Heat Unit Accumulation From May 1

% 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)

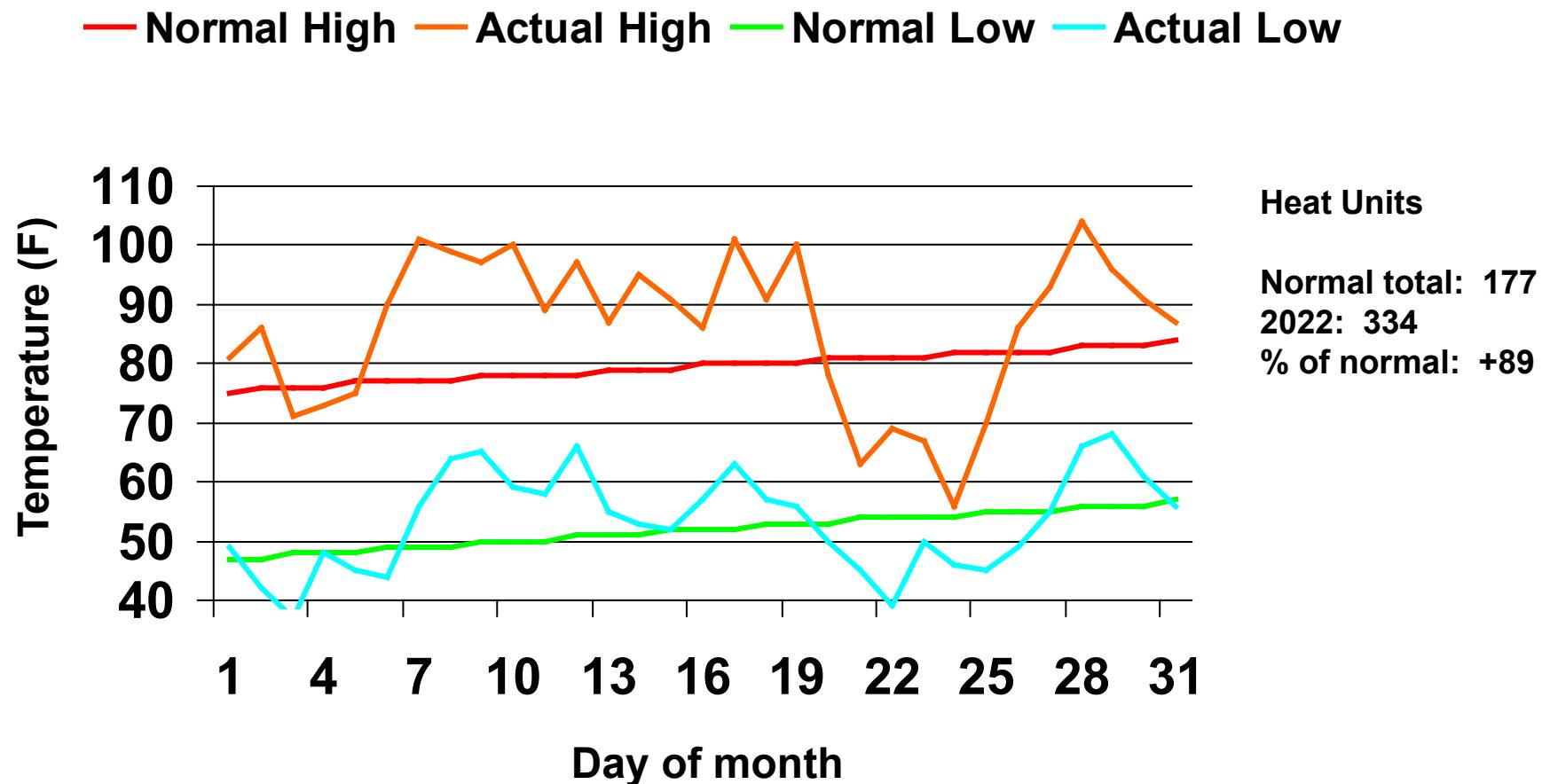
— 2022 — Muleshoe 18-Yr Mean



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

Amarillo

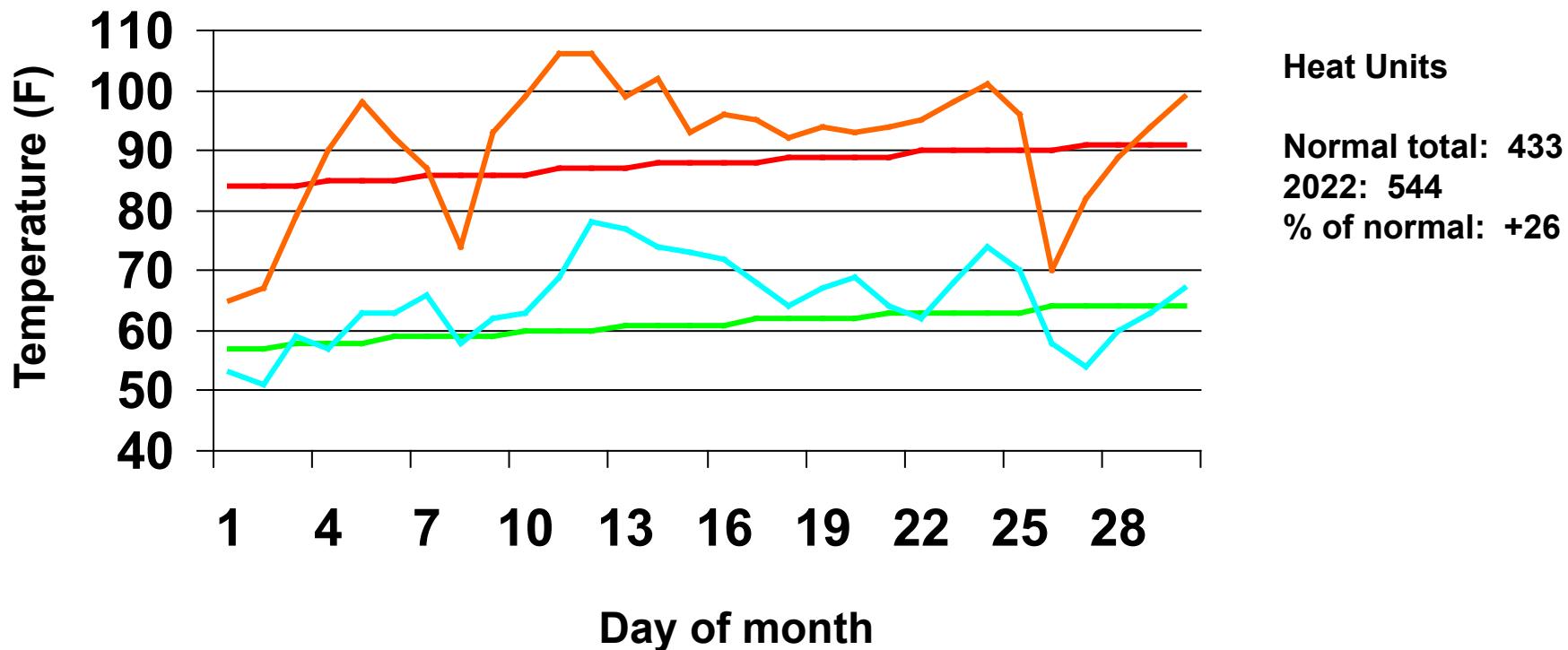
30-Yr Normal (1981-2010) and May 2022 Air Temperatures



Amarillo

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

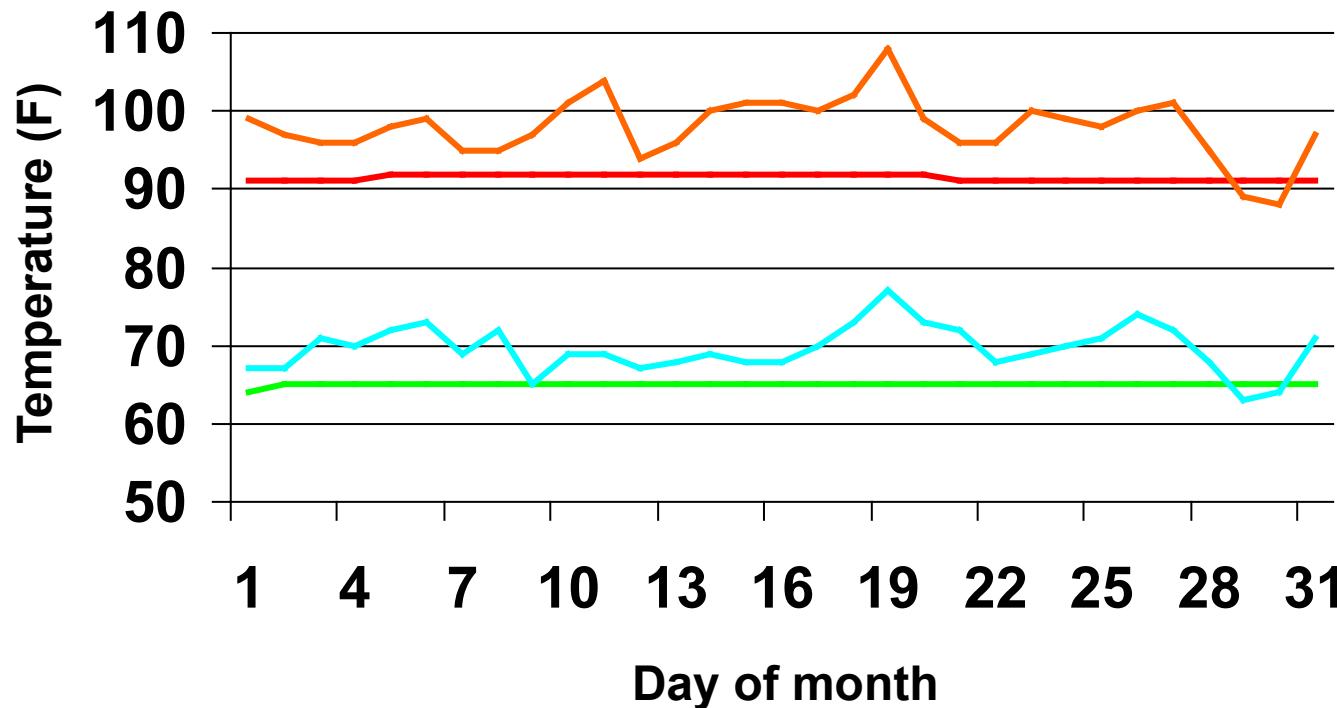
— Normal High — Actual High — Normal Low — Actual Low



Amarillo

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

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

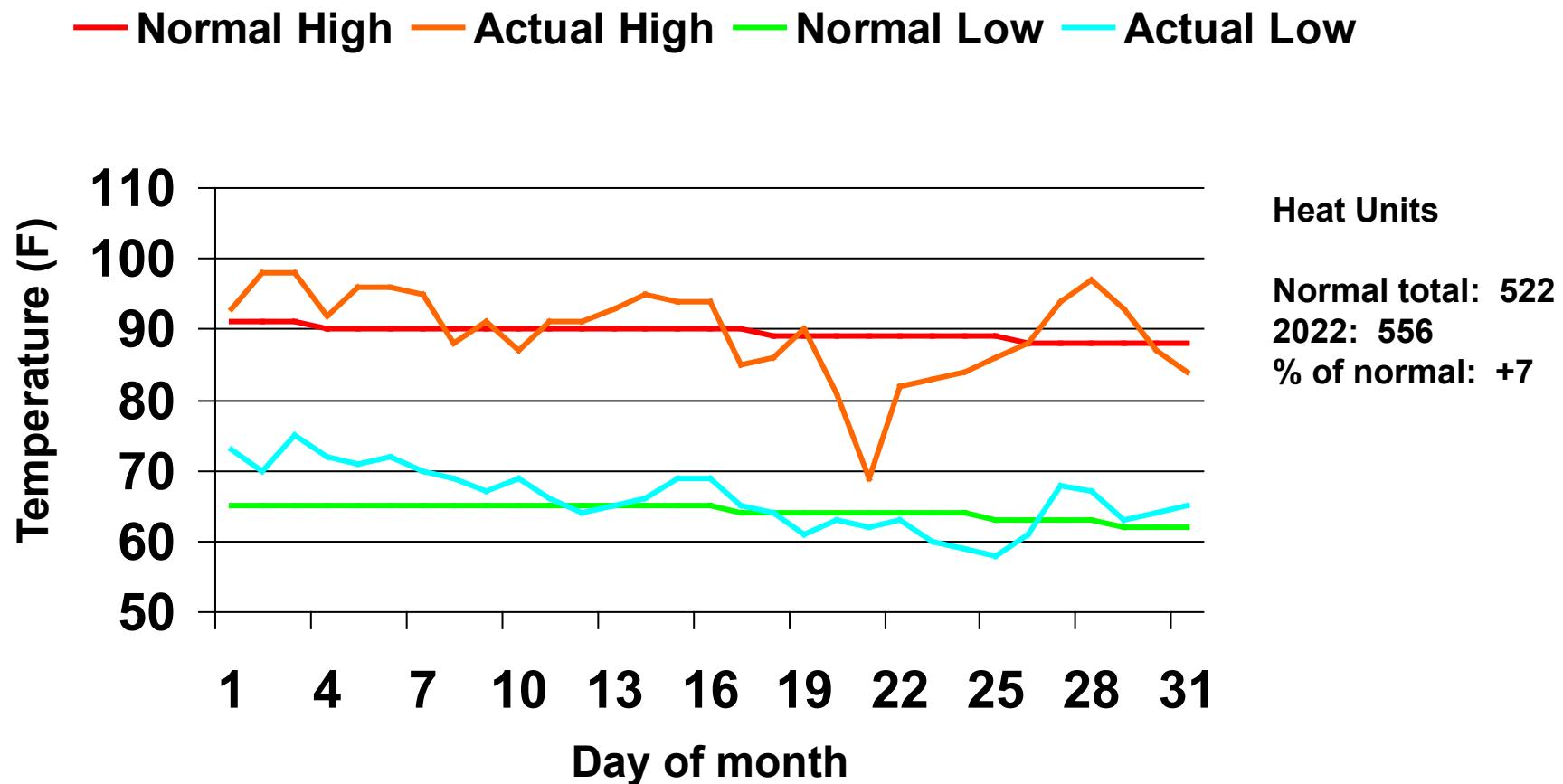


Heat Units

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

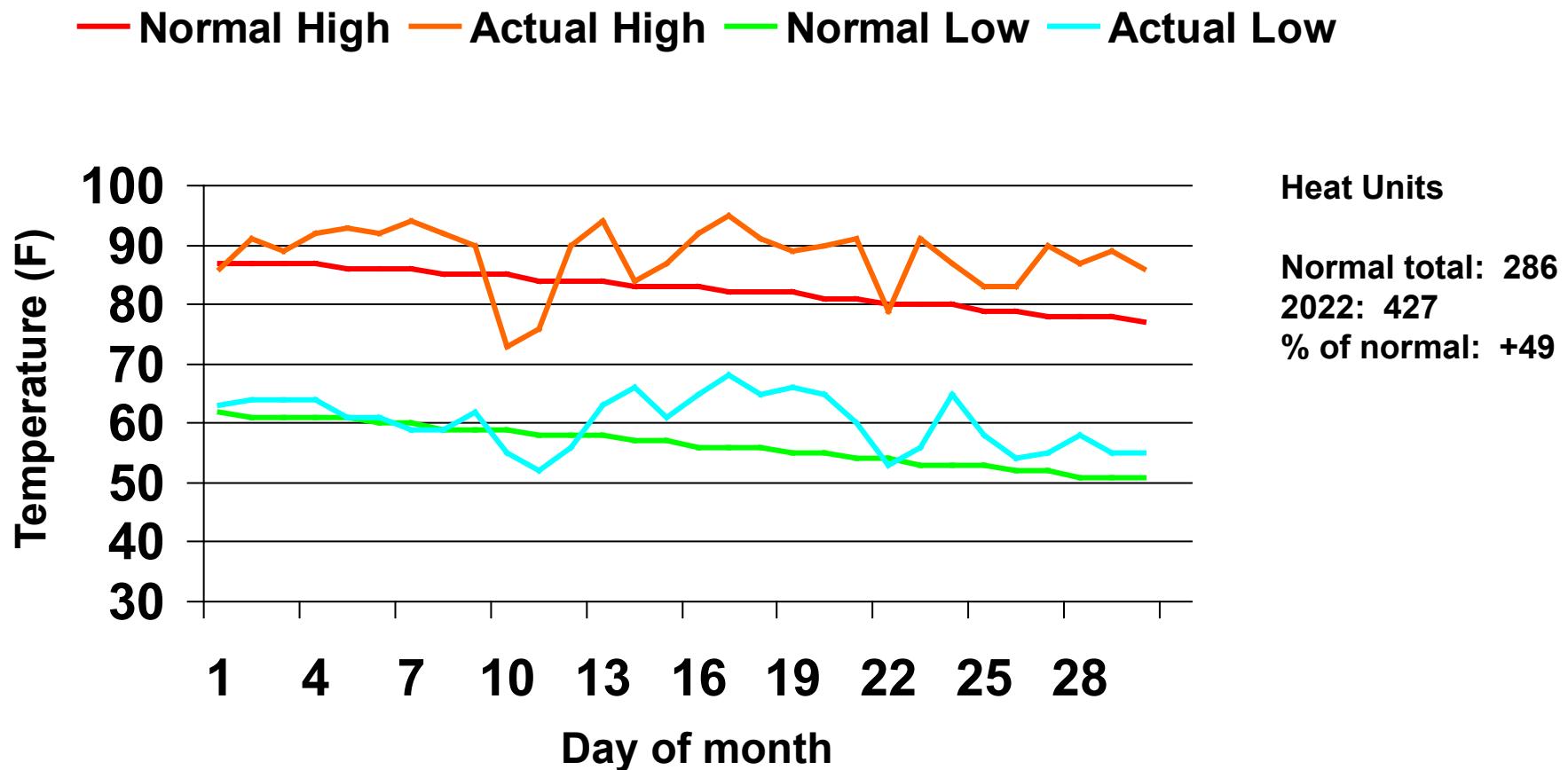
Amarillo

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



Amarillo

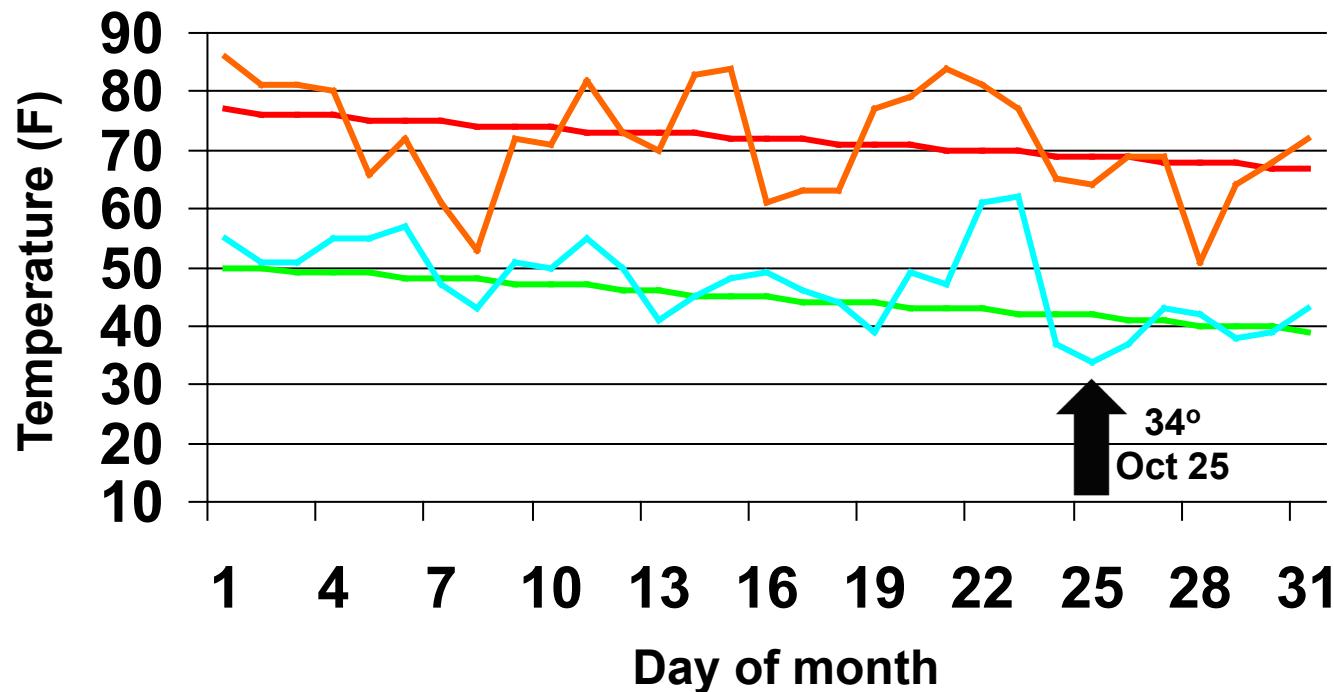
30-Yr Normal (1981-2010) and September 2022 Air Temperatures



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)