2023 XtendFlex Technology Cotton Variety Trial – Adobe Walls Gin

McBryde Farm
Stratford, TX
Brad McBryde and Gared McBryde

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

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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 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 2023, five entries with XtendFlex technology were planted in a center pivot irrigated field in a scientifically valid trial with three replicates. One entry had ThryvOn technology, a new Bt transgenic trait (NG 4335 B3TXF).

Dry conditions prevailed at the site during the late winter and early spring, then considerable rainfall began in May. The trial was planted May 10 and escaped numerous hail events which occurred in the area. Cool, wet conditions prevailed during May and June, and a substantial amount of seedling disease and poor early-season vigor was noted. Poor early-season growing conditions and low vigor resulted in an average emergence of about 64% of the seed planted (65,000 seed/acre) when stand count observations were performed on June 28. Some light phenoxy (2,4-D type) herbicide drift injury was found in June and by July good to excellent growing conditions and crop recovery were noted. Four-bract squares (a poorly understood floral anomaly) were observed across all entries during early fruiting. This was observed on

multiple lower fruiting branch nodes, and sometimes across the first two fruiting position sites on each fruiting branch. These squares usually abort, sometimes as late as pollination, and shed from the plants. A substantial number of early fruiting sites were lost due to this phenomenon which is NOT insect related. A total of 79 days from planting to first bloom (July 28) was noted in this trial. This indicates an excessive delay in development based on calendar days. This delay is attributed to poor root health, unusually cool May and June growing conditions, some level of four-bract squares and slight phenoxy herbicide injury. Once the crop reached the bloom stage, its progression was excellent through the end of August and into the crop maturity phase in September. Yields were moderate in the test and fiber maturity as measured by micronaire was not impacted by early season fruit shed.

Harvest results indicated that statistically significant differences were observed. Lint yields ranged from a high of 1316 lb/acre (NG 3406 B2XF) to a low of 1143 lb/acre (NG 4335 B3TXF), and averaged 1221 lb/acre (Table 1). Average Loan value for varieties from commercially ginned and classed bales varied from a high of $0.5766/lb (DP 1822 XF) to a low of $0.5468/lb (NG 3195 B3XF). Overall Loan value for the trial across all entries was $0.5652/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 were found among varieties for net value/acre. NG 3406 B2XF had the highest net value at $822/acre, and NG 3195 B3XF had the lowest at $700/acre. This results in a statistically significant difference of $122/acre.

Table 2 presents in-season data including stand establishment percentage, vigor, nodes above white flower (NAWF) on two observation dates, plant height on three observation dates, nodes above cracked boll (NACB) on October 10, and a visual estimate of storm resistance at harvest. Final plant heights ranged from a high of 23.9 inches for NG 3930 B3XF to a low of 21.6 inches for NG 3406 B2XF.

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 11, 21 to a few 31 values across all entries. Leaf grades ranged from about 1 to 3. Staple ranged from about 34.8 (NG 3195 B3XF) to 37.0 32nds inch (DP 1822 XF). Micronaire averages were good for all entries and ranged from a low of 3.7 (NG 3930 B3XF) to 4.0 (DP 1822 XF). No bark contamination was noted in commercial bales. Fiber strength ranged from 30.0 to 33.4 g/tex, and uniformity ranged from 79.0 to 80.9%.

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: 3585 ft

Previous crop: Wheat

Tillage system: Strip-till

Planted: May 10

Replicates: 3 replicates in a randomized complete block design

Plot width: 8-row plots

Plot length: Trial was planted in ~1,200 ft long rows

Seeding rate: 65,000 seed/acre

Days from planting to first bloom: 79 (July 28)

Row spacing: 30-inch rows

Total rainfall May through June: ~15.4 inches

May: 8.3, June 7.1

Total irrigation April through July: ~6.2 inches

April: 3.0, July 3.2

Fertility management: No N fertilizer applied, 50 lb/acre P_2O_5 in strip-till operation

Herbicide applications:

March 10: 16 oz/acre 2,4D LV6, 4 oz/acre flumioxazin, 17 lb/100 gal ammonium sulfate, 0.25% NIS

May 8: 32 oz/acre diuron, 12 oz/acre dicamba, 1 qt/acre paraquat, 1% COC

June 21: 32 oz/acre Roundup, 12.8 oz/acre Engenia, 16 oz/acre Outlook, 5 oz/acre acephate, 17 lb/100 gal ammonium sulfate,

July 17: 32 oz/acre Roundup, 12.8 oz/acre Engenia, 16 oz/acre Outlook, 17 lb/100 gal ammonium sulfate, 0.25% NIS

Plant growth regulators: July 2 – 8 oz/acre mepiquat chloride, July 10 – 16 oz/acre mepiquat chloride, July 17 – 24 oz/acre mepiquat chloride, July 31 – 40 oz/acre mepiquat chloride

Insecticides: June 21 – 5 oz/acre acephate, July 2 – 1.1 oz/acre Assail, July 17 – 1.1 oz/acre Assail

Harvest aid application: October 20 – 54 oz/acre ethephon plus 0/25% NIS

Harvesting: November 17 using a John Deere CS690, full length of each plot was harvested for each 8-row plot. Round modules were weighed using the integral CS690 handler scale, and all round modules were weighed at the Adobe Walls 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 Adobe Walls 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

Adobe Walls Gin would like to thank Gared McBryde and Brad McBryde, for committing equipment, land, and time to conduct and manage the trial. The Ag Ingenuity crew (Dylan Hatley, Branton Hatley, and Kramer King) planted and assisted with harvest of the trial and we thank them for their great support. Jason Fehr harvested the trial and we are very appreciative of his excellent skills and cooperation. Gratitude is expressed to Deltapine and NexGen for providing cotton seed, and Windstar Inc. Detailed ginning was performed by Malcom Jones, Aaron Moore, and the Adobe Walls Gin crew and a big thank you is extended to this hard-working group.

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Table 1. Harvest results for the center pivot irrigated XtendFlex cotton variety trial, McBryde Farm, Stratford, TX, 2023.

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 ----------			
NG 3406 B2XF	31.0	39.5	4250	1316	1679	0.5653	744	78	822	a
DP 1822 XF	29.3	38.7	4370	1279	1692	0.5766	738	76	813	a
NG 3930 B3XF	29.0	38.5	4149	1204	1596	0.5675	684	70	754	ab
NG 4335 B3TXF	30.7	36.9	3725	1143	1374	0.5700	651	55	706	b
NG 3195 B3XF	30.6	38.5	3792	1162	1459	0.5468	635	64	700	b
Test average	30.1	38.4	4057	1221	1560	0.5652	690	69	759	
CV, %	--	--	6.0	5.9	6.1	--	6.0	6.4	6.0	
OSL	--	--	0.0431	0.0743	0.0125	--	0.0370	0.0014	0.0281	
LSD	--	--	371	109	144	--	62	7	69	

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.
$265/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.

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Table 2. Plant observation results from the center pivot irrigated XtendFlex technology cotton variety trial, McBryde Farm, Stratford, TX, 2023.

Entry	Final population	Stand establishment	Vigor	Nodes above white flower		Plant height			Nodes above cracked boll	Storm resistance
				Early bloom	Late bloom	Prebloom	Early bloom	Final		
	plants/acre	%	1-5 visual scale, 5 best	count		inches			count	1-9 visual scale, 9 tight
	28-Jun	28-Jun	28-Jun	1-Aug	15-Aug	11-Jul	1-Aug	10-Oct	10-Oct	17-Nov
DP 1822 XF	47,916	73.7	3.2	7.2	4.7	12.4	18.5	22.9	4.2	6.5
NG 3195 B3XF	40,365	62.1	2.2	7.6	5.8	10.9	19.9	23.5	4.7	6.5
NG 3930 B3XF	40,075	61.7	2.0	7.7	5.5	9.7	18.5	23.9	5.1	7.0
NG 4335 B3TXF	36,881	56.8	2.0	7.5	5.4	9.0	17.3	22.2	5.4	7.0
NG 3406 B2XF	41,237	63.4	2.5	6.7	4.7	10.9	17.3	21.6	5.0	6.8
Test average	41,295	63.5	2.4	7.3	5.2	10.6	18.3	22.8	4.9	6.8
CV, %	5.2	5.2	6.7	5.2	8.3	5.2	3.1	3.1	11.9	1.9
OSL	0.0028	0.0028	0.0001	0.0623	0.0590	0.0006	0.0023	0.0227	0.2117	0.0021
LSD	3,280	5.0	0.2	0.6	0.7	0.8	0.9	1.1	NS	0.2

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.

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Table 3. Commercial classing data for the center pivot irrigated XtendFlex technology cotton variety trial, McBryde Farm, Stratford, TX, 2023.

Variety and Bale Number	Color Grade-Quadrant grade-quadrant	Color digit 1	Color digit 2	Leaf grade	Staple 32nds inch	Micronaire units	Extraneous matter	Remarks --	Strength g/tex	Rd %	+b %	Trash % area	Uniformity %	Length 100ths inch	Loan rate cents/lb
DP 1822 XF															
9164508	31-1	3	1	2	38	4.3	.	.	33.4	79.0	8.3	2	79.3	118	57.25
9164509	21-1	2	1	2	36	3.8	.	.	33.4	81.4	8.2	2	78.8	113	57.10
9164510	21-1	2	1	2	37	3.8	.	.	33.5	81.2	8.2	1	81.1	115	58.40
9164511	21-1	2	1	2	37	4.1	.	.	33.3	81.4	8.3	1	79.2	114	57.90
Average	--	2.3	1.0	2.0	37.0	4.00	none	none	33.4	80.8	8.3	1.5	79.6	115.0	57.66
NG 3195 B3XF															
9164512	21-1	2	1	3	34	3.5	.	.	31.0	81.1	8.6	3	78.0	107	53.15
9164513	11-2	1	1	2	36	3.7	.	.	30.5	81.0	8.8	1	80.3	112	57.40
9164514	11-2	1	1	2	34	3.9	.	.	29.0	80.8	8.8	1	78.6	106	53.15
9164515	11-2	1	1	2	35	4.1	.	.	29.5	80.8	8.8	1	79.0	109	55.00
Average	--	1.3	1.0	2.3	34.8	3.80	none	none	30.0	80.9	8.8	1.5	79.0	108.5	54.68
NG 3930 B3XF															
9164516	21-1	2	1	3	35	3.7	.	.	30.6	80.8	8.2	3	79.2	108	54.60
9164517	21-1	2	1	2	36	3.7	.	.	30.3	81.2	8.7	2	81.8	112	57.40
9164518	21-1	2	1	2	36	3.7	.	.	30.4	81.1	8.7	1	80.0	111	57.40
9164519	11-2	1	1	2	37	3.8	.	.	30.4	81.9	8.4	2	79.6	115	57.60
Average	--	1.8	1.0	2.3	36.0	3.73	none	none	30.4	81.3	8.5	2.0	80.2	111.5	56.75

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Table 3 (continued). Commercial classing data for the center pivot irrigated XtendFlex technology cotton variety trial, McBryde Farm, Stratford, TX, 2023.

Variety and Bale Number	Color Grade-Quadrant grade-quadrant	Color digit 1	Color digit 2	Leaf grade	Staple 32nds inch	Micronaire units	Extraneous matter	Remarks --	Strength g/tex	Rd %	+b %	Trash % area	Uniformity %	Length 100ths inch	Loan rate cents/lb
NG 4335 B3TXF															
9164520	21-1	2	1	1	37	4.0	.	.	30.9	82.2	8.2	1	80.9	115	58.10
9164521	11-2	1	1	2	36	3.8	.	.	31.2	80.9	8.8	2	81.9	113	57.55
9164522	11-1	1	1	1	36	3.9	.	.	30.5	81.7	8.8	1	81.4	113	57.40
9164523	11-2	1	1	2	35	4.2	.	.	27.4	81.1	8.8	1	79.4	110	54.95
Average	--	1.3	1.0	1.5	36.0	3.98	none	none	30.0	81.5	8.7	1.3	80.9	112.8	57.00
NG 3406 B2XF															
9164524	21-1	2	1	2	36	3.5	.	.	32.2	81.6	8.2	2	80.8	113	57.45
9164525	11-2	1	1	2	35	3.8	.	.	30.2	81.5	8.4	1	80.3	110	55.65
9164526	11-2	1	1	2	36	3.9	.	.	32.5	81.3	8.9	2	81.8	111	57.55
9164527	11-1	1	1	2	35	3.9	.	.	28.3	81.5	8.9	1	80.0	108	55.45
Average	--	1.3	1.0	2.0	35.5	3.78	none	none	30.8	81.5	8.6	1.5	80.7	110.5	56.53

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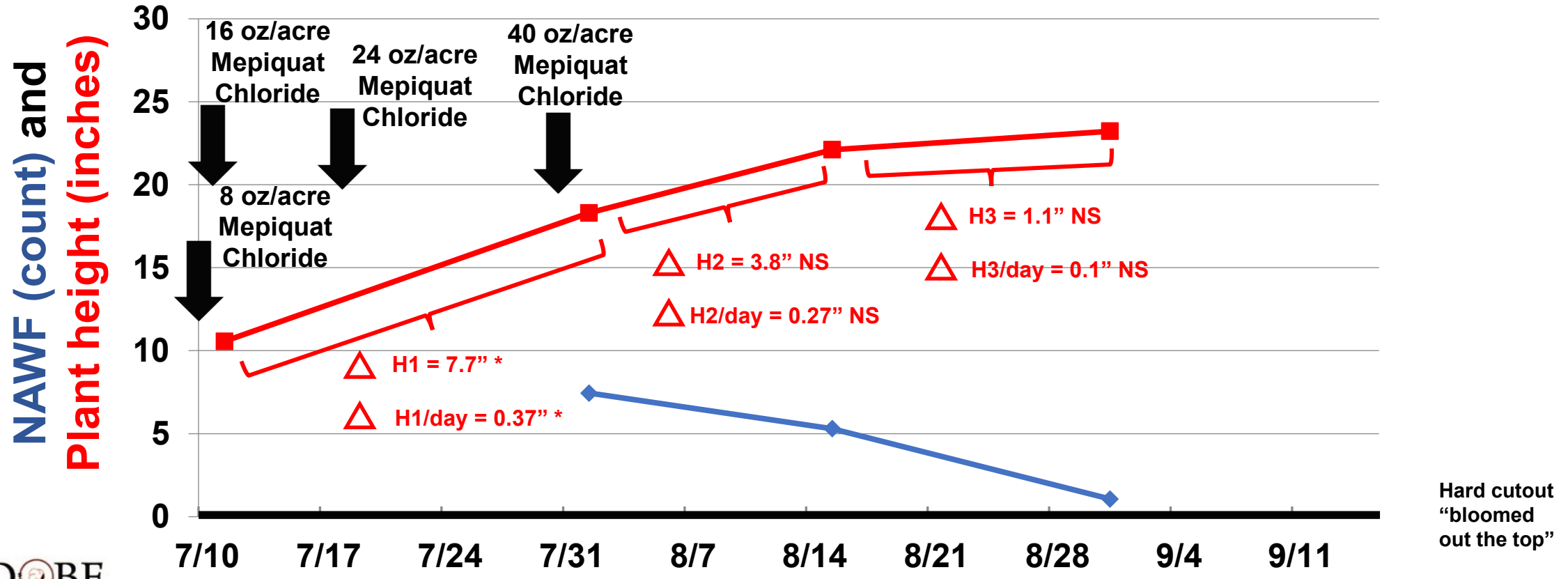
Appendix

McBryde 2023 XtendFlex Variety Trial – Plant height and NAWF graphs, Amarillo 2023 cotton heat units and weather data.

Kight/McBryde XtendFlex Variety Trial (Across All Entries) Stratford – 2023



Hard cutout "bloomed out the top"

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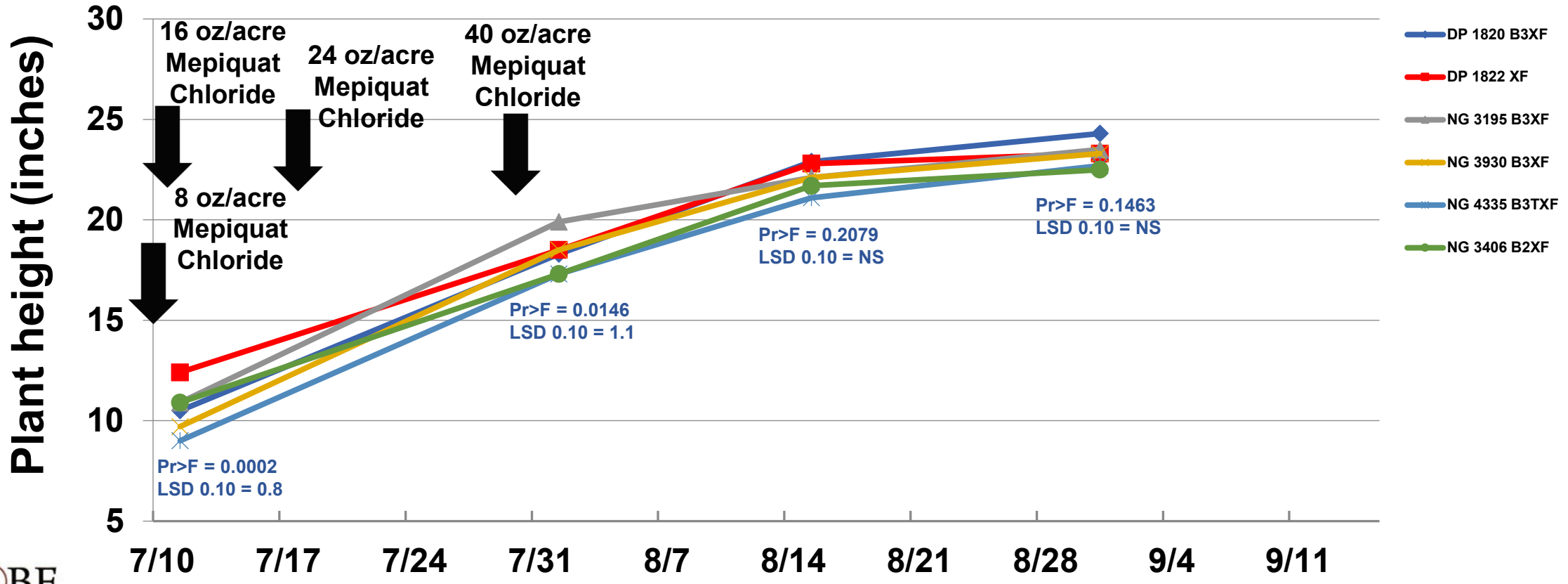
Rainfall (inches): May 8.3, June 7.1 = 15.4
Irrigation (inches): April 3.0, July 3.2 = 6.2

Planted: May 10
Days to bloom: 79
First bloom date: Jul 28

Kight/McBryde XtendFlex Variety Trial
Stratford – 2023

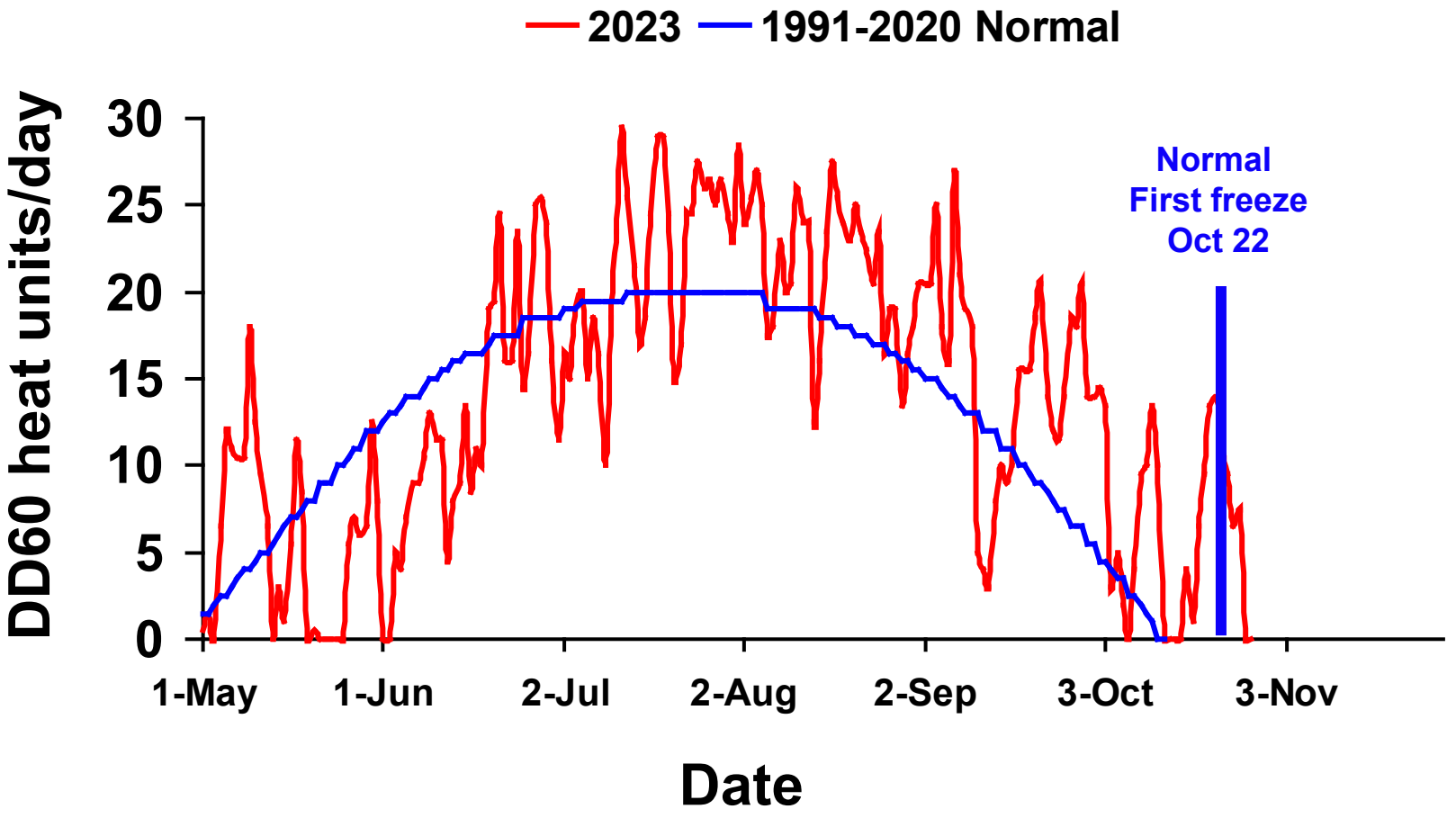


ADOBE WALLS GIN

Rainfall (inches): May 8.3, June 7.1 = 15.4
Irrigation (inches): April 3.0, July 3.2 = 6.2

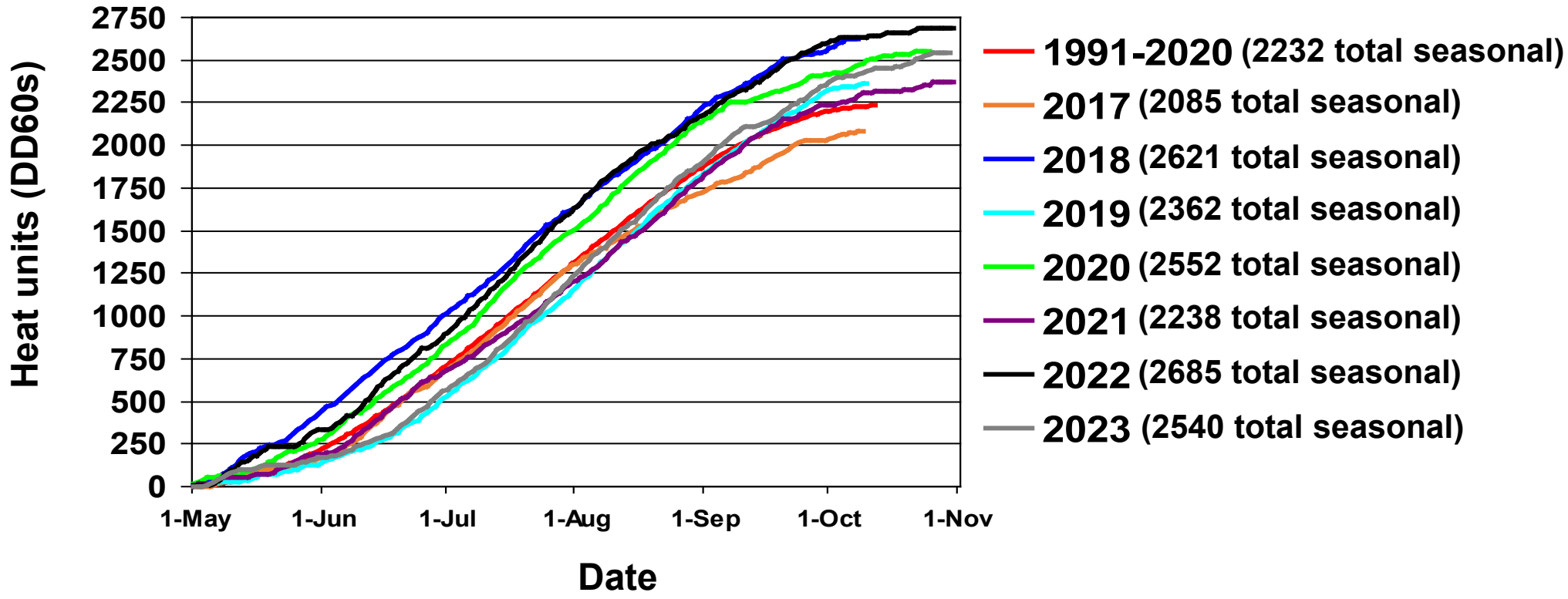
Planted: May 10
Days to bloom: 79
First bloom date: Jul 28

Amarillo
30-Year Normal (1991-2020) and 2023
Daily Heat Units

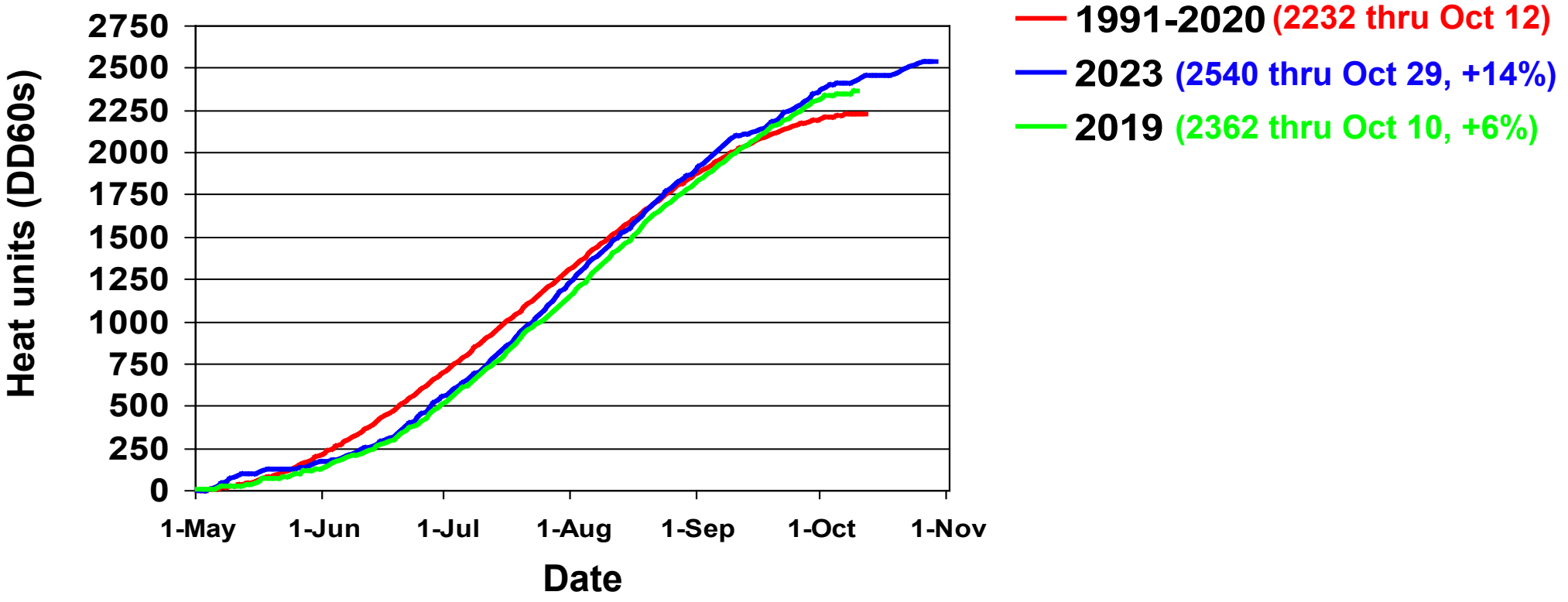


Amarillo 30-Yr Normal (1991-2020) vs. 2017, 2018, 2019, 2020, 2021, 2022, and 2023 Cotton Heat Unit Accumulation

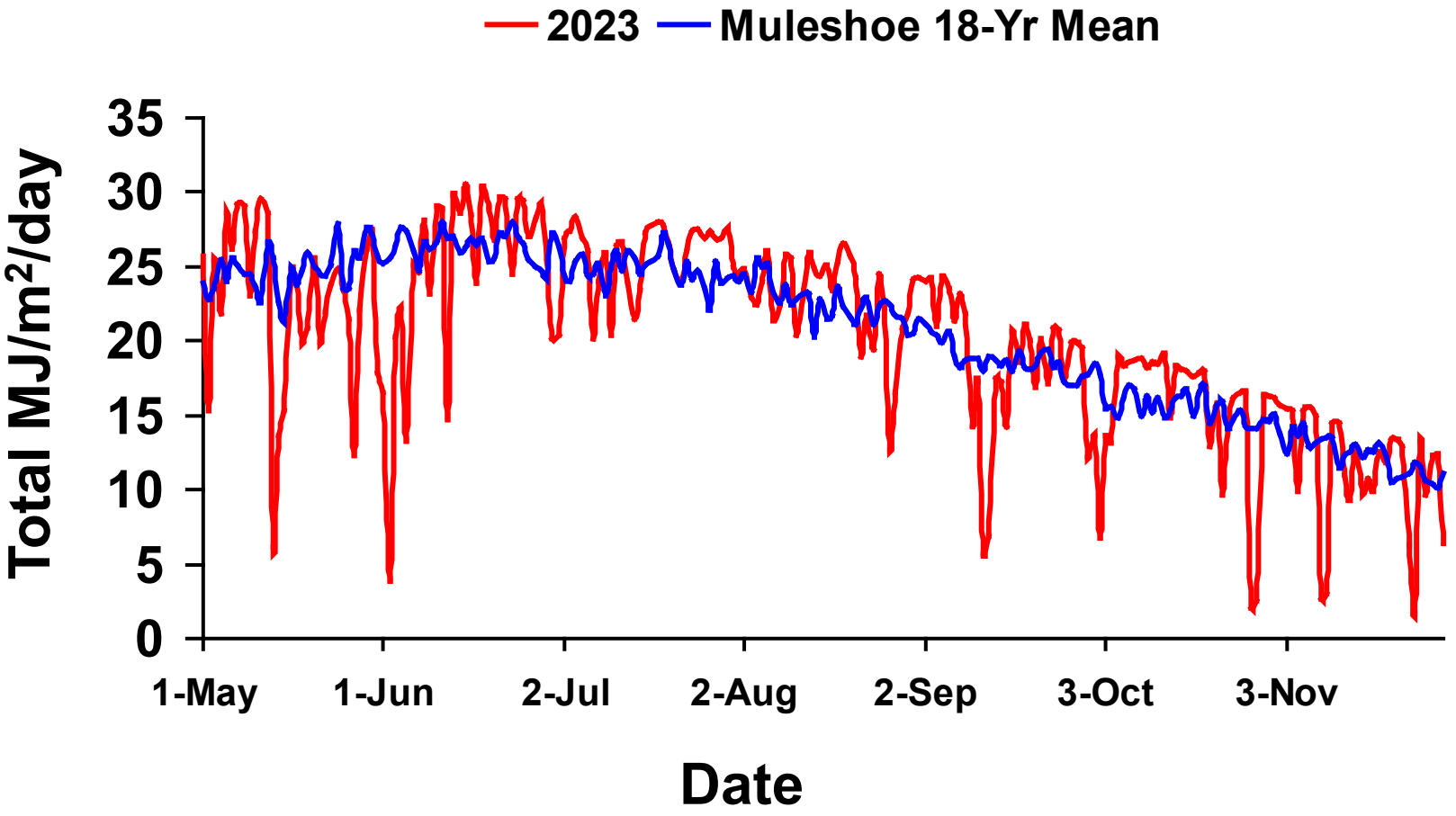
From May 1 Through First Hard Freeze



Amarillo 30-Yr Normal (1991-2020) vs. 2019 and 2023 Cotton Heat Unit Accumulation From May 1



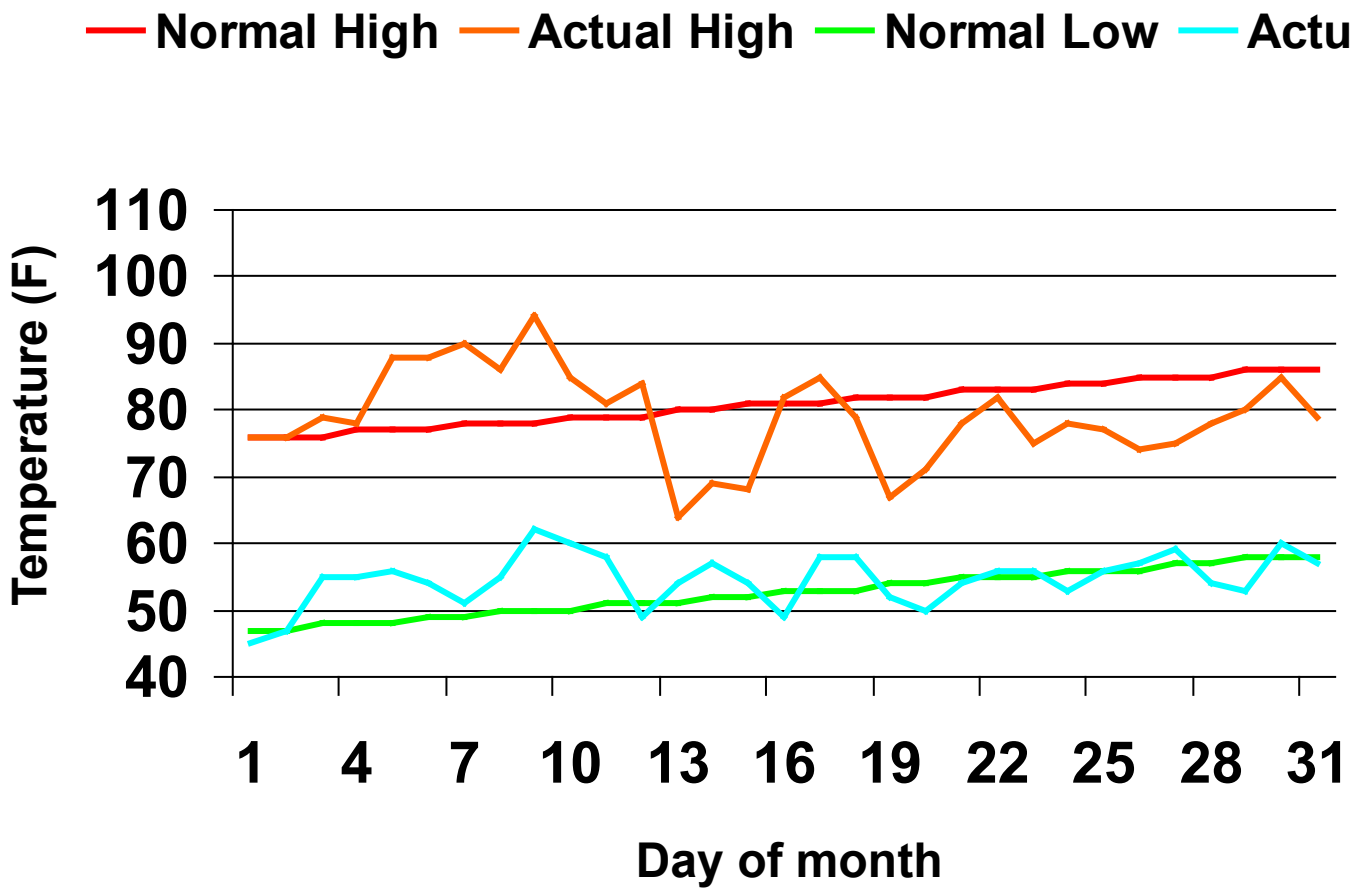
Muleshoe
18-Year Mean (2004-2021) and 2023
Daily Total Solar Radiation (MJ/meter^2)



Total solar energy, in MJ/meter^2, calculated from the hourly average global solar radiation rates and converted to energy by integrating over time.

Source: https://www.ncei.noaa.gov/pub/data/uscrn/products/daily01/2023/

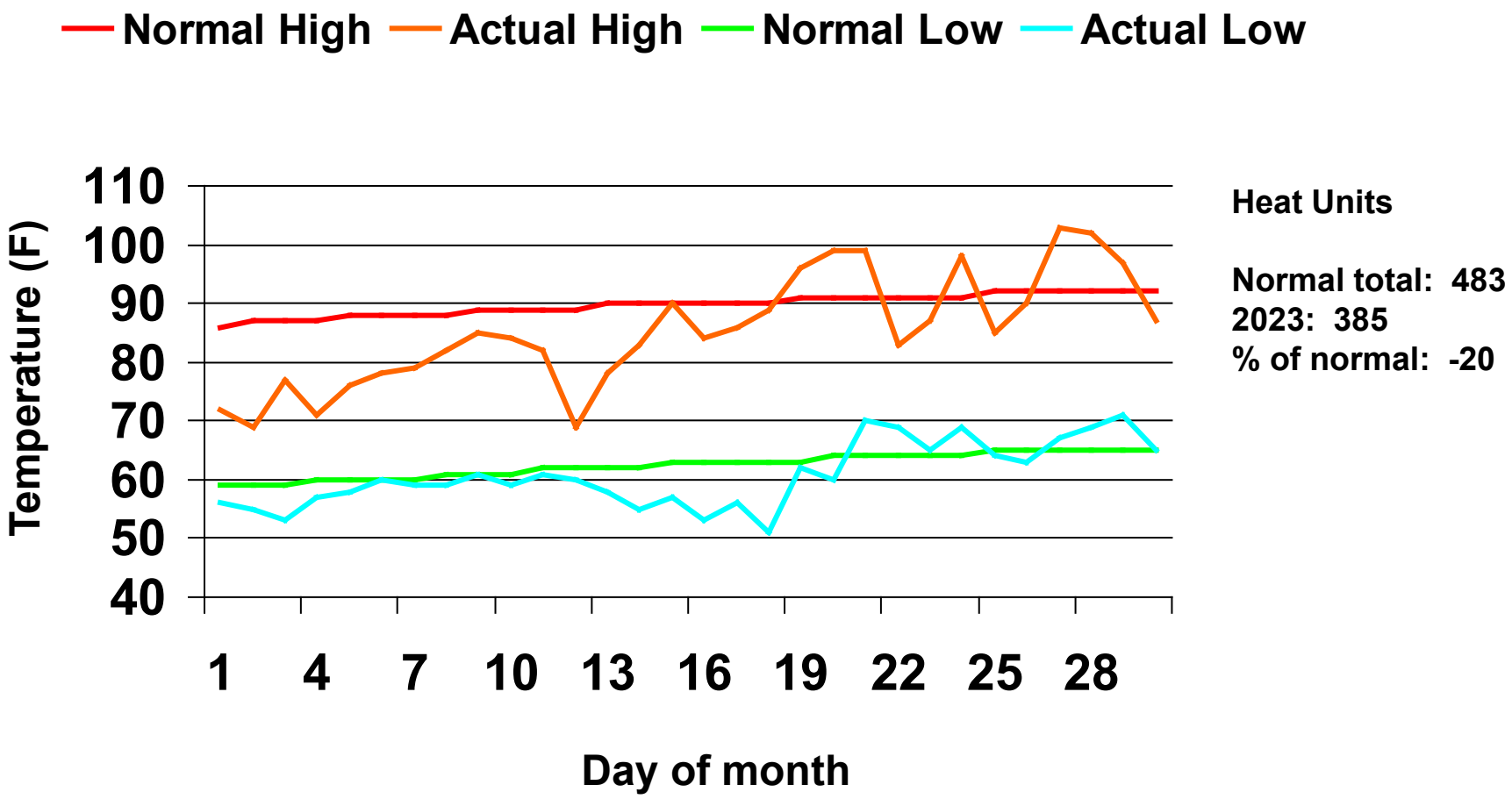
Amarillo
30-Yr Normal (1991-2020) and May 2023 Air Temperatures



Heat Units

Normal total: 210
2023: 175
% of normal: -17

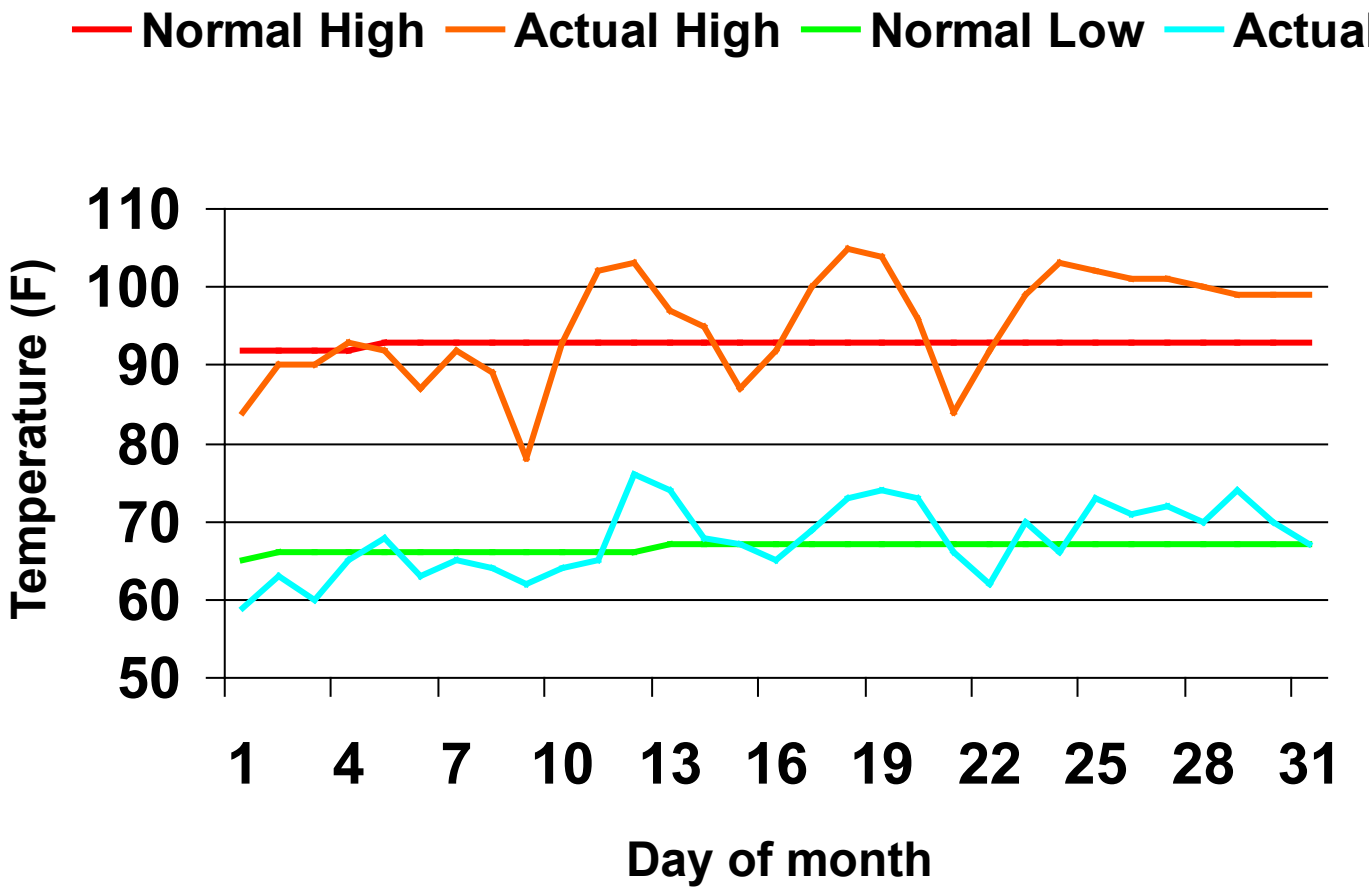
Amarillo
30-Yr Normal (1991-2020) and June 2023 Air Temperatures



Heat Units

Normal total: 483
2023: 385
% of normal: -20

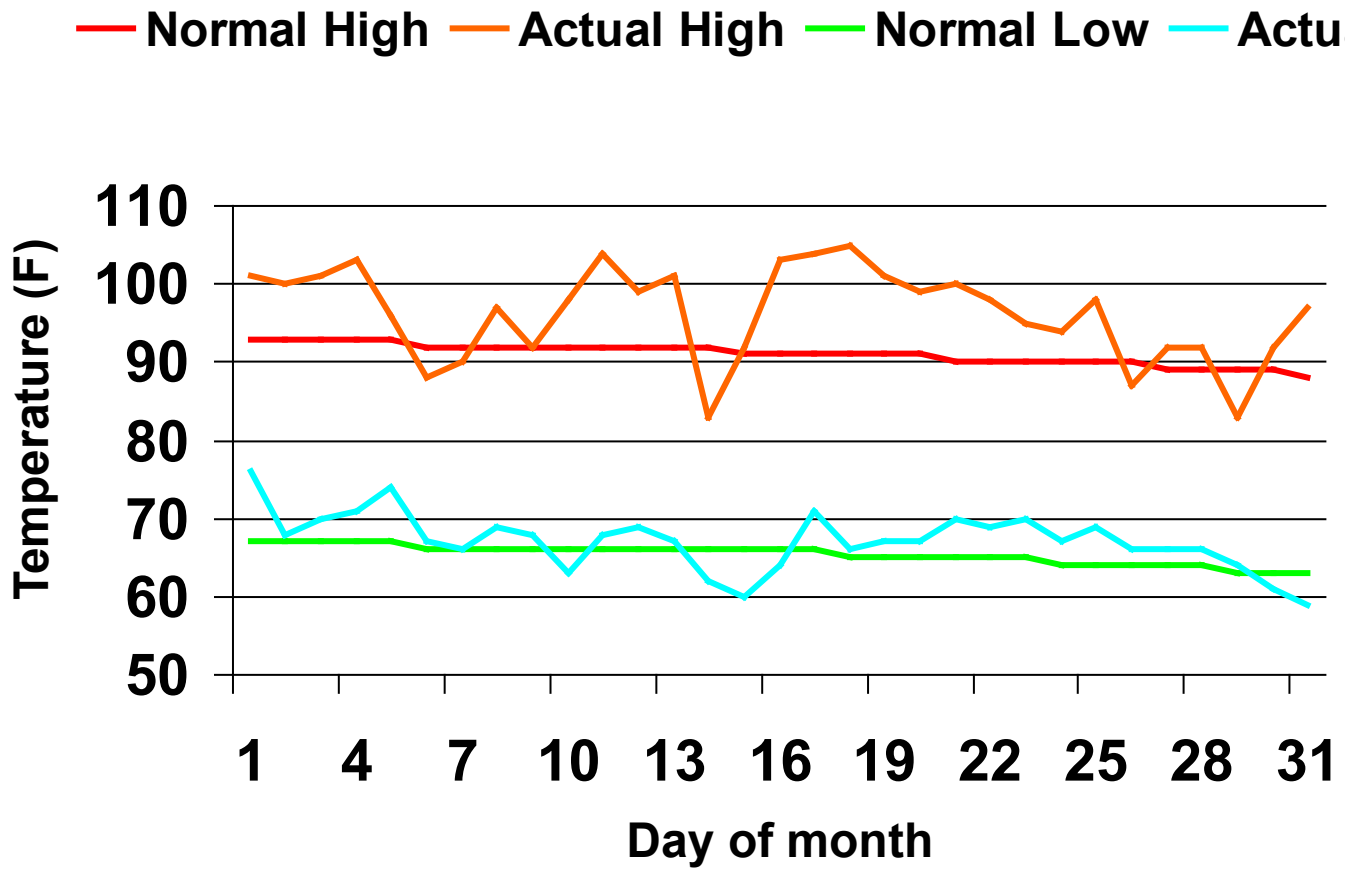
Amarillo
30-Yr Normal (1991-2020) and July 2023 Air Temperatures



Heat Units

Normal total for month: 612
2023: 663
% of normal: +8

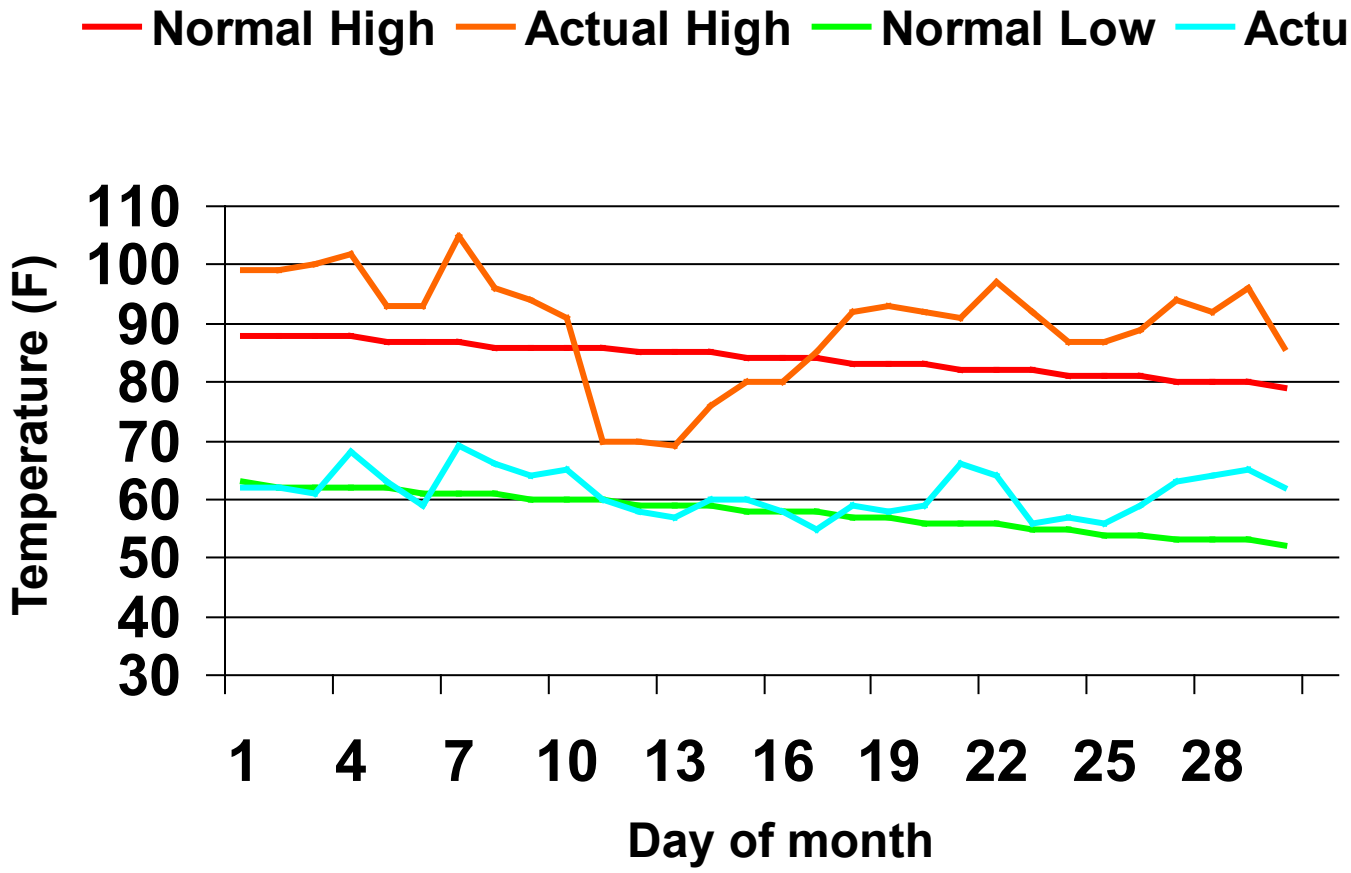
Amarillo
30-Yr Normal (1991-2020) and August 2023 Air Temperatures



Heat Units

Normal total for month: 565
2023: 673
% of normal: +19

Amarillo
30-Yr Normal (1991-2020) and September 2023 Air Temperatures

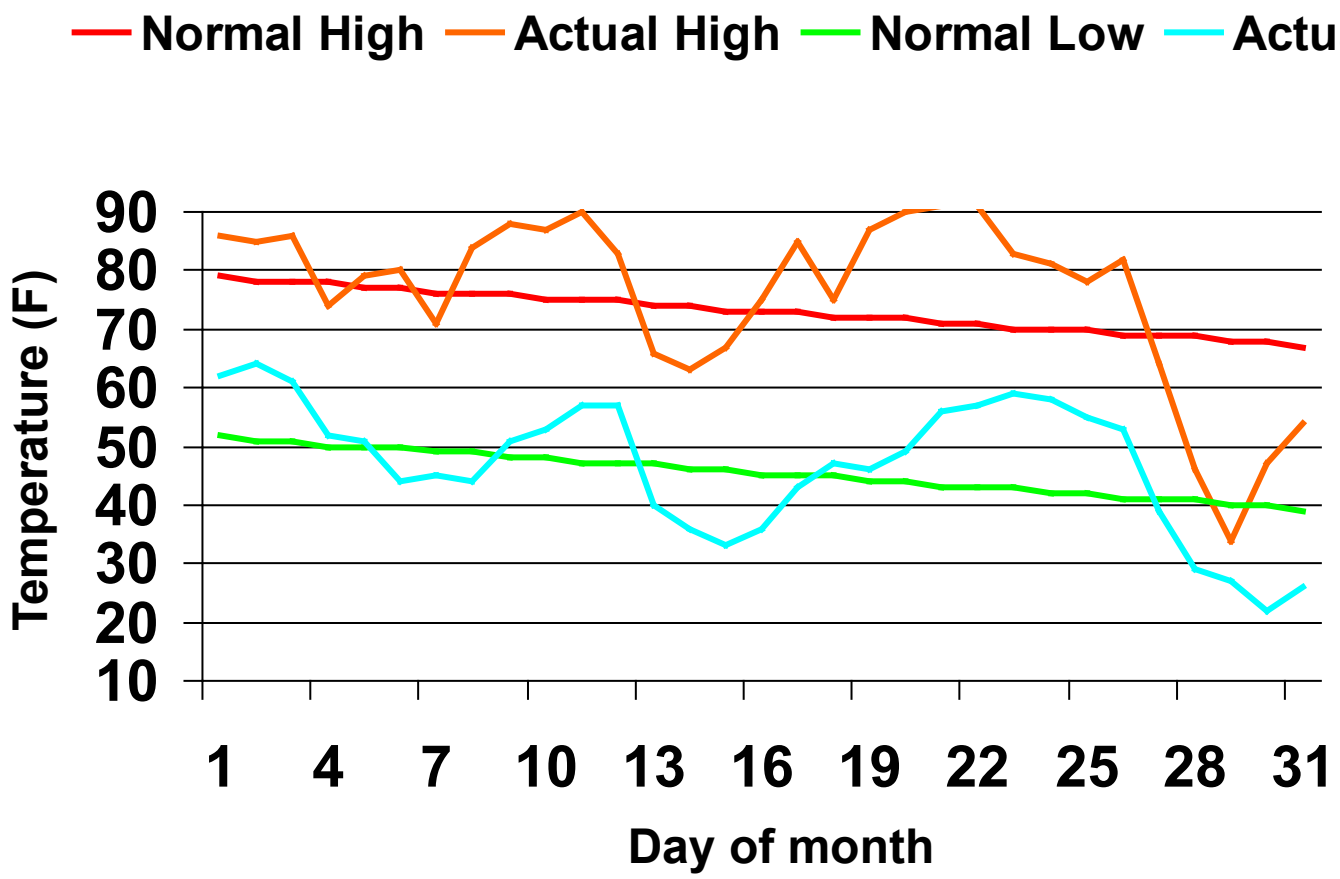


Heat Units

Normal total for month: 329
2023: 463
% of normal: +41

Normal Heat Units/Day
Sep 1: 16
Sep 30: 6
Goes to zero on Oct 12

Amarillo
30-Yr Normal (1991-2020) and October 2023 Air Temperatures



Heat Units

Normal total for month: 35
2023: 182
% of normal: +420

Normal Heat Units/Day
Oct 1: 6
Oct 12: 0
Goes to zero on Oct 12

First freeze on Oct 29 (27 degrees)
Hard freeze on Oct 30 (22 degrees)

Amarillo – 26 Total Days ≥100 Degrees

- 2 in June
- 10 in July
- 11 in August
- 3 in September, last was 105 on Sep 7

- 30-Year normal highest temperatures
  - 93 degrees from July 6 through August 5