



2024 Enlist Technology Cotton Variety Trial – Top of Texas Gin

**Gruhlkey Brothers Farm
Wildorado, TX**

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Billy Sam Borchardt - Steven Birkenfeld – Co-Managers - 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 2024, six entries with Enlist technology were planted in a center pivot irrigated field in a scientifically valid trial with three replicates. These entries included PHY 205 W3FE, PHY 210 W3FE, PHY 250 W3FE, PHY 332 W3FE, PHY 411 W3FE, and PHY 415 W3FE.

Relatively fair moisture conditions prevailed at the site during the early spring, then low rainfall was encountered in July and August. The trial was planted May 6 and escaped hail and wind events typically associated with spring thunderstorms. Good early-season growing conditions and moderate vigor resulted in an average emergence of about 80% of the seed planted (45,000 seed/acre) when stand count observations were performed on June 17. Some seedling disease was noted. A total of 75 days from planting to first bloom (July 20) was noted in this trial. This indicates a relatively low rate of development based on calendar days. This is attributed to reduced root health. Once the crop reached the bloom stage, its progression was excellent through the early August when excessively high temperatures occurred and rainfall became sparse. Due to the long growing season and limited irrigation, the trial's yield and quality were low. Yields were just over 1 bale/acre in the test and fiber maturity as measured by micronaire was good. Micronaire averaged 4.4 across all entries. Staple was short and averaged 33.3 due to high moisture stress in August and September.

Harvest results indicated that statistically significant differences were observed. Lint yields ranged from a high of 633 lb/acre (PHY 415 W3FE) to a low of 589 lb/acre (PHY 210 W3FE), and averaged 616 lb/acre (Table 1). Average Loan value for varieties from commercially ginned and classed bales varied from a high of \$0.5422/lb (PHY 415 W3FE) to a low of \$0.4903/lb

(PHY 411 W3FE). Overall Loan value for the trial across all entries was 0.5171/lb. Net gin credit is defined as seed credit minus ginning expense. Net value/acre (defined as gross Loan value plus net gin credit) ranged from a high of \$366/acre (PHY 415 W3FE) to a low of \$323/acre (PHY 210 W3FE), a difference of \$43/acre. These differences were statistically significant, and had a very low coefficient of variation of about 2%, indicating very low variability among entries across replicates. Two entries were in the top tier (the “a” group) of statistical significance (PHY 415 W3FE and PHY 332 W3FE). Other entries were statistically lower in net value/acre based on lint loan value than the PHY 415 W3FE and PHY 332 W3FE.

Table 2 provides similar information for the trial, but net value/acre is based on cash bid value. Cash bids were obtained for commercially ginned and classed bale quality for each variety. This was performed on October 29 at 71.00 cent December 2024 futures using the USDA-AMS classing results. These cash bid values ranged from a high of \$0.6714/lb (PHY 415 W3FE) to a low of \$0.5905/lb (PHY 205 W3FE) and averaged almost \$0.63/lb. Net value/acre (defined as gross lint cash value plus net gin credit) ranged from a high of \$448/acre (PHY 415 W3FE) to a low of \$380/acre (PHY 210 W3FE), a difference of \$68/acre. These differences were statistically significant, and had a very low coefficient of variation at 2%. Based on cash bid value, two of the entries were in the top “t-group” (denoted by the letter “a”) indicating there were no significant differences among those entries. These entries were PHY 415 W3FE and PHY 332 W3FE. Other entries were statistically lower in net value/acre based on lint cash bids than the PHY 415 W3FE and PHY 332 W3FE.

Table 3 presents in-season data including stand establishment percentage, vigor, nodes above white flower (NAWF) on one observation date, and plant height on two observation dates. Final plant heights ranged from a high of 20.1 inches for PHY 415 W3FE to a low of 15.8 inches for PHY 205 W3FE.

Table 4 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 were predominantly 11 across all entries. Leaf grades ranged from about 1 to 2. Staple ranged from a low of 32.0 (PHY 411 W3FE) to a high of 34.6 32nds inch (PHY 332 W3FE). Micronaire averages were excellent for most entries and ranged from a low of 4.28 (PHY 415 W3FE) to a high of 4.64 (PHY 411 W3FE). No bark contamination was noted in commercial bales. Fiber strength ranged from 27.2 to 30.1 g/tex, and uniformity ranged from 79.3 to 80.3%. Table 5 presents the mean values across all bales for each variety.

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: 3820 ft

Previous crop: Wheat

Tillage system: No-till

Planted: May 6

Replicates: 3 replicates in a randomized complete block design

Plot width: 12-row plots

Plot length: Trial was planted in straight rows and were ~2,000 ft long

Seeding rate: 45,000 seed/acre

Days from planting to first bloom: 75 (July 20)

Row spacing: 30-inch rows

Total irrigation by month: (Pre water – January 1 – May 1 – 4.5 Inches) (May 1- June 1 – 2.5 inches) (June 1 – July 1 – 0 inches) (July 1 - August 1 – 1.5 inches) (0 for the remainder)

Herbicide management – products, rates, and dates of application:

March – 3 oz/acre flumioxazin, 32 oz/acre Roundup, 32 oz/acre 2,4-D LV6

May – 32 oz/acre paraquat, 32 oz/acre Diuron

June - 32 oz/acre Enlist, 32 oz/acre Roundup, 20 oz/acre Metolachlor

August – 48 oz/acre Liberty, 32 oz/acre Enlist, 6 oz/acre Metolachlor

Nitrogen fertility rates, dates, and application methods:

3 tons compost before previous wheat crop

No additional nitrogen was applied because of crop condition

Soil samples showed 25 ppm NO₃-N

Other fertility (phosphate, potash, micronutrients) application rates, dates, and application methods: None

Insecticide products, application rates and dates:

May – 4 oz/acre Acephate

June - 0.6 oz/acre Intruder

Plant growth regulator products, application rates, and dates:

5 oz/acre mepiquat chloride at pinhead square.

No additional growth regulator was added because of conditions.

Harvest aid products, application rates and dates:

Oct 2 - 48 oz/acre ethephon

Harvesting: October 18 using a John Deere CS770, a round module was harvested for each 12-row plot. Round modules were weighed using the integral CS770 handler scale, and round modules were weighed by variety at the Top of Texas 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 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 the 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 to Windstar Inc. Detailed ginning was performed by Steven Birkenfeld 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 (lint loan value), Gruhlkey Farm, Wildorado, TX, 2024.

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 -----			\$/lb		----- \$/acre -----	
PHY 415 W3FE	34.6	41.8	1830	633	764	0.5422	343	23	366 a
PHY 332 W3FE	33.7	41.6	1874	631	780	0.5375	339	23	362 a
PHY 250 W3FE	33.7	43.7	1777	599	776	0.5297	317	26	343 b
PHY 205 W3FE	33.5	43.9	1856	622	816	0.4974	310	28	338 b
PHY 411 W3FE	35.6	42.1	1743	621	734	0.4903	305	23	327 c
PHY 210 W3FE	34.3	43.6	1715	589	748	0.5055	298	25	323 c
Test average	34.2	42.8	1799	616	770	0.5171	319	25	343
CV, %	--	--	2.0	2.0	2.1	--	2.0	2.9	1.9
OSL	--	--	0.0017	0.0059	0.0014	--	0.0001	0.0001	0.0001
LSD	--	--	54	18	24	--	9	1	10

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:

\$3.65/cwt commercial ginning cost.

\$235/ton for seed.

Net gin credit is defined as seed credit minus ginning expense.

Net value is defined as gross loan value/acre plus net gin credit.

Value for lint based on CCC loan value from commercial ginning and USDA-AMS classing results.



Table 2. Harvest results for the center pivot irrigated Enlist technology cotton variety trial (lint cash value), Gruhlkey Farm, Wildorado, TX, 2024.

Entry	Lint turnout	Seed turnout	Bur cotton yield	Lint yield	Seed yield	Lint cash value	Lint cash value	Net gin credit	Net value	
lb/acre	----- % -----		----- lb/acre -----			\$/lb		----- \$/acre -----		
PHY 415 W3FE	34.6	41.8	1830	633	764	0.6714	425	23	448	a
PHY 332 W3FE	33.7	41.6	1874	631	780	0.6710	424	23	447	a
PHY 250 W3FE	33.7	43.7	1777	599	776	0.6495	389	26	415	b
PHY 205 W3FE	33.5	43.9	1856	622	816	0.5905	368	28	396	c
PHY 411 W3FE	35.6	42.1	1743	621	734	0.5885	365	23	388	cd
PHY 210 W3FE	34.3	43.6	1715	589	748	0.6035	355	25	380	d
Test average	34.2	42.8	1799	616	770	0.6291	388	25	412	
CV, %	--	--	2.0	2.0	2.1	--	1.9	2.9	2.0	
OSL	--	--	0.0017	0.0059	0.0014	--	0.0001	0.0001	0.0001	
LSD	--	--	54	18	24	--	11	1	12	

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:

\$3.65/cwt commercial ginning cost.

\$235/ton for seed.

Net gin credit is defined as seed credit minus ginning expense.

Net value is defined as gross loan value/acre plus net gin credit.

*Value based on cash bids for each variety on October 29 at 71.00 cent December 2024 futures using commercial ginning and USDA-AMS classing results.



Table 3. Plant observation results from the center pivot irrigated Enlist technology cotton variety trial, Gruhlkey Farm, Wildorado, TX, 2024.

Treatment	Final population	Stand establishment	Vigor	Nodes above white flower	Plant height	
				Mid-bloom	Pre-bloom	+3 weeks
	plants/acre	%	1-5 visual scale, 5 best	count	inches	
	17-Jun	17-Jun	17-Jun	29-Jul	10-Jul	29-Jul
PHY 205 W3FE	37,171	82.6	3.4	3.3	13.4	15.8
PHY 210 W3FE	40,366	89.7	3.2	3.7	13.5	16.1
PHY 250 W3FE	37,171	82.6	3.1	4.1	14.4	17.2
PHY 332 W3FE	39,204	87.1	3.0	4.3	15.1	17.9
PHY 411 W3FE	29,040	64.5	2.8	5.0	15.6	19.3
PHY 415 W3FE	34,267	76.2	3.1	4.3	15.9	20.1
Test average	36,203	80.5	3.1	4.1	14.7	17.7
CV, %	8.6	8.6	3.5	7.1	4.2	3.3
OSL	0.0132	0.0132	0.0015	0.0006	0.0018	0.0001
LSD	4,593	10.2	0.2	0.4	0.9	0.9

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 4. Commercial classing data for the center pivot irrigated Enlist technology cotton variety trial, Gruhlkey Farm, Wildorado, TX, 2024.

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															
7130992	11-1	1	1	2	33	4.4	.	.	30.3	81.8	9.1	1	81.3	104	51.40
7130993	11-2	1	1	2	32	4.1	.	.	26.2	81.4	8.9	3	79.3	99	49.15
7130994	11-1	1	1	1	32	4.3	.	.	26.4	81.5	9.0	1	80.2	100	49.50
7130995	11-1	1	1	1	32	4.4	.	.	27.5	81.4	9.3	1	81.9	101	49.50
7130996	11-1	1	1	2	32	4.4	.	.	30.4	81.3	9.4	1	78.7	101	49.15
Average	--	1.0	1.0	1.6	32.2	4.32	0/5 bales	level 1 bark	28.2	81.5	9.1	1.4	80.3	101.0	49.74
PHY 210 W3FE															
7130997	11-1	1	1	1	33	4.3	.	.	28.3	82.1	8.9	1	80.2	103	51.20
7130998	11-1	1	1	1	33	4.4	.	.	27.6	82.2	8.9	1	78.7	102	50.65
7130999	11-1	1	1	2	33	4.4	.	.	27.5	82.3	8.9	2	80.3	102	51.20
7131000	11-1	1	1	1	33	4.5	.	.	26.7	81.9	8.8	1	79.1	102	50.75
7131001	11-1	1	1	2	32	4.5	.	.	26.0	81.9	9.0	2	78.3	99	48.95
Average	--	1.0	1.0	1.4	32.8	4.42	0/5 bales	level 1 bark	27.2	82.1	8.9	1.4	79.3	101.6	50.55
PHY 250 W3FE															
7131002	11-1	1	1	2	34	4.0	.	.	27.9	81.6	8.7	1	80.0	106	53.60
7131003	11-1	1	1	2	34	4.4	.	.	27.1	80.7	9.5	2	80.0	106	53.50
7131004	11-1	1	1	2	34	4.5	.	.	27.5	82.0	9.2	2	80.7	105	53.50
7131005	11-1	1	1	1	34	4.4	.	.	28.4	81.7	9.1	1	80.4	105	53.50
7131006	11-1	1	1	1	33	4.3	.	.	26.4	81.5	9.2	1	79.1	102	50.75
Average	--	1.0	1.0	1.6	33.8	4.32	0/5 bales	level 1 bark	27.5	81.5	9.1	1.4	80.0	104.8	52.97



Table 4 (continued). Commercial classing data for the center pivot irrigated Enlist technology cotton variety trial, Gruhlkey Farm, Wildorado, TX, 2024.

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															
7131007	11-3	1	1	2	35	4.3	.	.	28.9	79.6	9.8	1	78.6	108	54.40
7131008	12-1	1	2	2	34	4.4	.	.	28.8	79.0	10.3	3	80.0	106	52.55
7131009	11-3	1	1	1	34	4.3	.	.	28.7	79.3	10.1	1	78.8	105	52.95
7131010	12-1	1	2	1	35	4.4	.	.	30.8	79.4	10.5	1	80.1	108	53.90
7131011	11-4	1	1	1	35	4.4	.	.	28.6	78.6	10.0	1	80.6	108	54.95
Average	--	1.0	1.4	1.4	34.6	4.36	0/5 bales	level 1 bark	29.2	79.2	10.1	1.4	79.6	107.0	53.75
PHY 411 W3FE															
7131012	11-1	1	1	2	32	4.5	.	.	27.8	81.4	9.6	1	79.8	99	49.05
7131013	11-1	1	1	3	32	4.7	.	.	28.7	81.7	9.6	3	79.8	100	48.80
7131014	11-1	1	1	1	31	4.7	.	.	27.5	81.7	9.5	1	78.9	98	47.55
7131015	11-1	1	1	1	33	4.6	.	.	29.4	82.5	9.4	1	78.9	102	50.70
7131016	11-1	1	1	1	32	4.7	.	.	28.4	82.1	9.3	1	79.5	99	49.05
Average	--	1.0	1.0	1.6	32.0	4.64	0/5 bales	level 1 bark	28.4	81.9	9.5	1.4	79.4	99.6	49.03
PHY 415 W3FE															
7131017	11-3	1	1	2	34	4.4	.	.	30.3	79.8	9.8	2	79.4	107	53.25
7131018	11-4	1	1	2	34	4.2	.	.	30.4	79.2	9.7	1	80.2	107	53.80
7131019	11-4	1	1	2	35	4.4	.	.	30.1	79.2	10.0	1	81.0	108	55.15
7131020	11-4	1	1	1	34	4.2	.	.	29.4	79.4	9.7	1	80.1	105	53.65
7131021	11-4	1	1	2	35	4.2	.	.	30.3	78.5	10.0	1	80.8	108	55.25
Average	--	1.0	1.0	1.8	34.4	4.28	0/5 bales	level 1 bark	30.1	79.2	9.8	1.2	80.3	107.0	54.22



Table 5. Mean commercial classing data across all bales by variety for the center pivot irrigated Enlist technology cotton variety trial, Gruhlkey Farm, Wildorado, TX, 2024.

Entry	Color	Color	Leaf	Staple	Micronaire	Extraneous	Remarks	Strength	Rd	+b	Trash	Uniformity	Length	Loan rate	Cash bid*
	digit 1	digit 2	grade	32nds inch	units	matter	--	g/tex	%	%	% area	%	100ths inch	cents/lb	cents/lb
PHY 205 W3FE	1.0	1.0	1.6	32.2	4.32	0/5 bales	level 1 bark	28.2	81.5	9.1	1.4	80.3	101.0	49.74	59.05
PHY 210 W3FE	1.0	1.0	1.4	32.8	4.42	0/5 bales	level 1 bark	27.2	82.1	8.9	1.4	79.3	101.6	50.55	60.35
PHY 250 W3FE	1.0	1.0	1.6	33.8	4.32	0/5 bales	level 1 bark	27.5	81.5	9.1	1.4	80.0	104.8	52.97	64.95
PHY 332 W3FE	1.0	1.4	1.4	34.6	4.36	0/5 bales	level 1 bark	29.2	79.2	10.1	1.4	79.6	107.0	53.75	67.10
PHY 411 W3FE	1.0	1.0	1.6	32.0	4.64	0/5 bales	level 1 bark	28.4	81.9	9.5	1.4	79.4	99.6	49.03	58.85
PHY 415 W3FE	1.0	1.0	1.8	34.4	4.28	0/5 bales	level 1 bark	30.1	79.2	9.8	1.2	80.3	107.0	54.22	67.14
Mean	1.0	1.1	1.6	33.3	4.39	.	.	28.4	80.9	9.4	1.4	79.8	103.5	51.71	62.91

*Value based on cash bids for each variety on October 29 at 71.00 cent December 2024 futures using commercial ginning and USDA-AMS classing results.



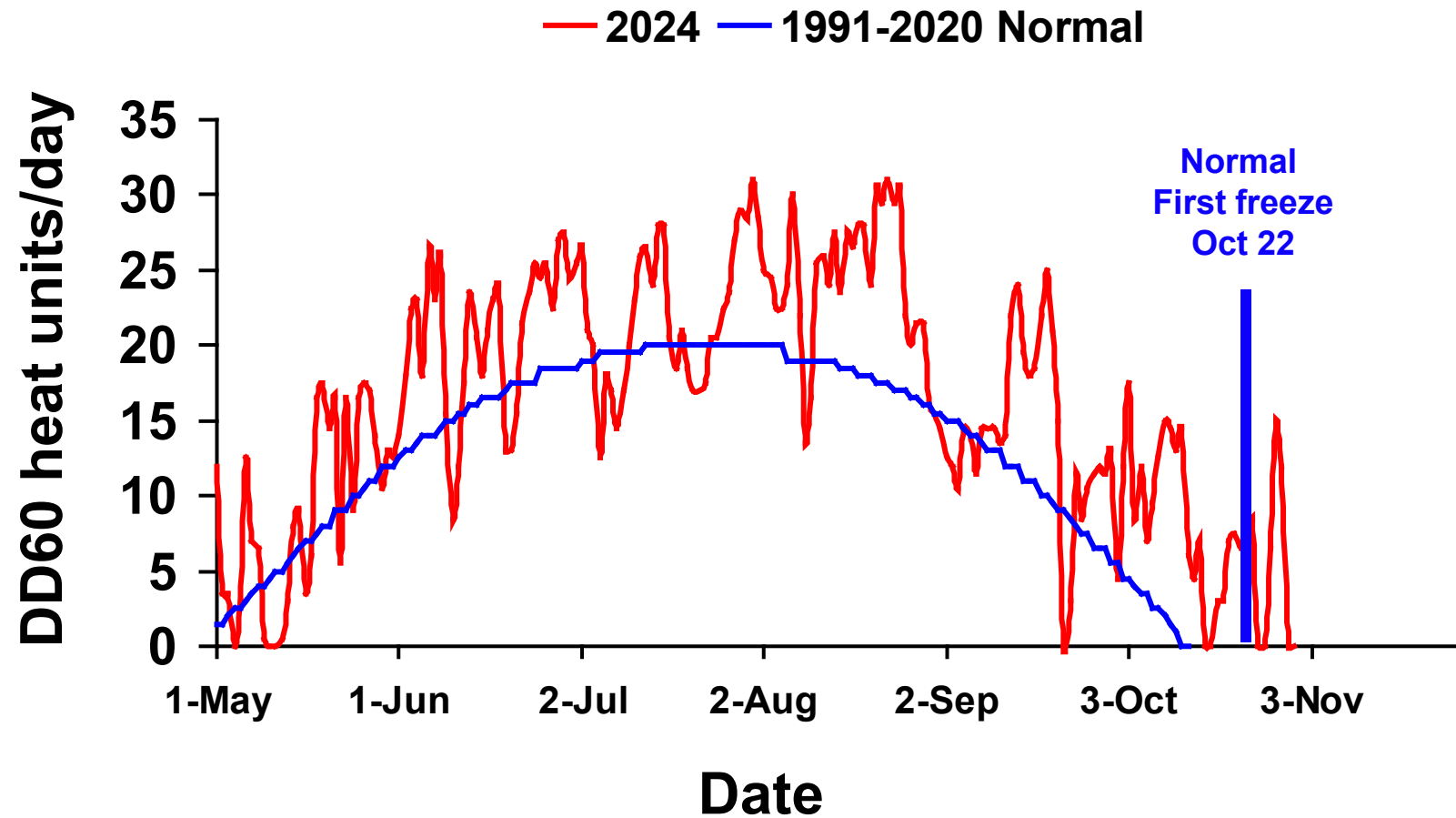
Appendix

Amarillo 2024 cotton heat units and weather data.



Amarillo

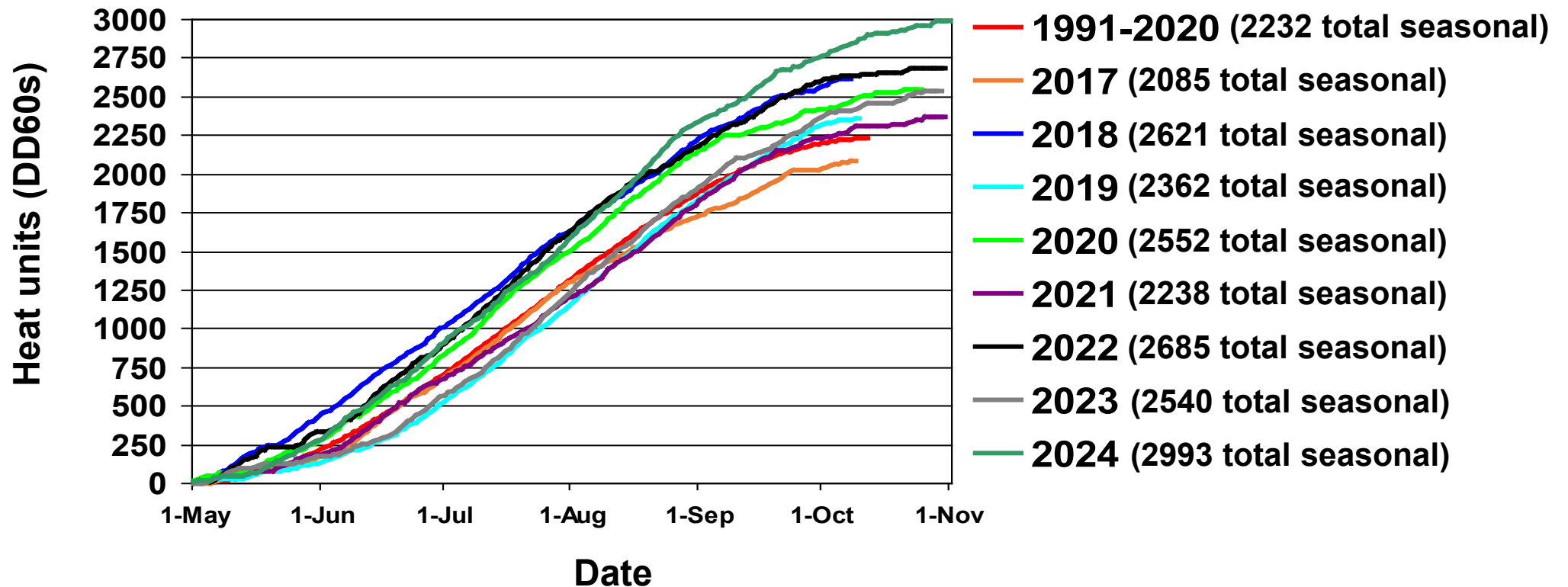
30-Year Normal (1991-2020) and 2024 Daily Heat Units



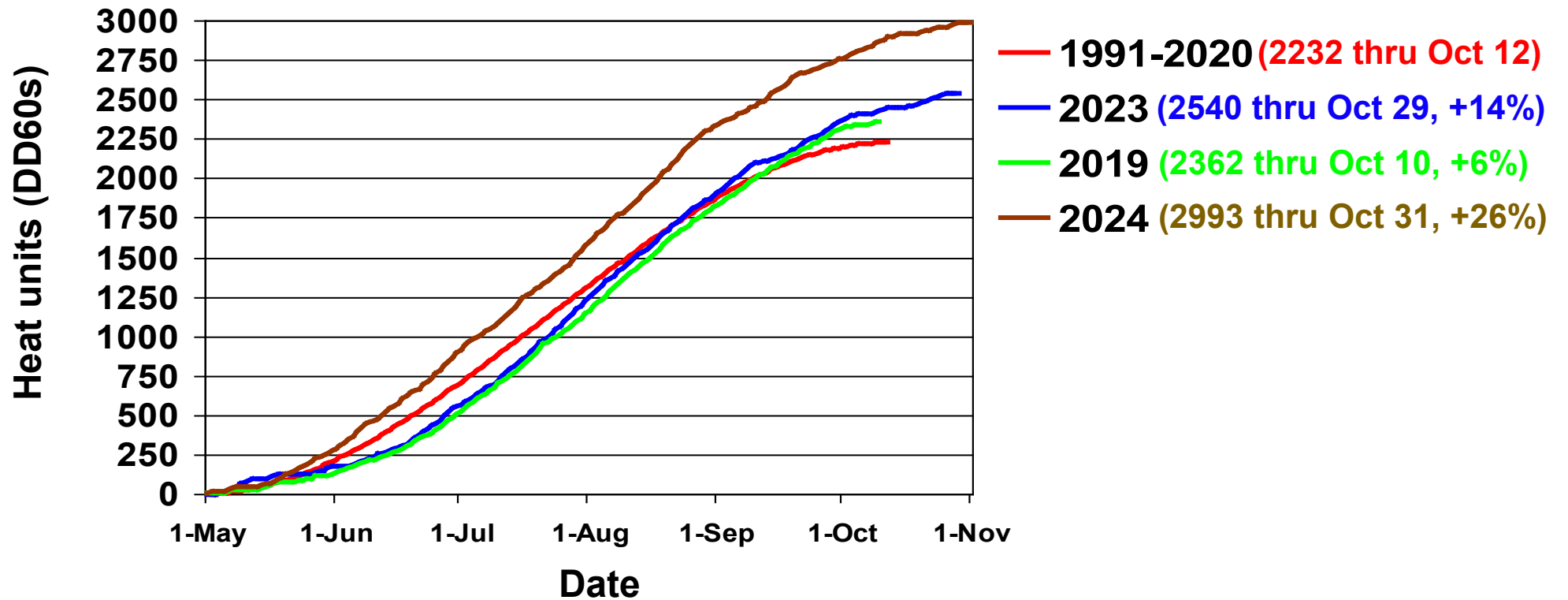
Amarillo 30-Yr Normal (1991-2020) vs. 2017 through 2024

Cotton Heat Unit Accumulation

From May 1 Through First Hard Freeze



Amarillo 30-Yr Normal (1991-2020) vs. 2019, 2023 and 2024 Cotton Heat Unit Accumulation From May 1

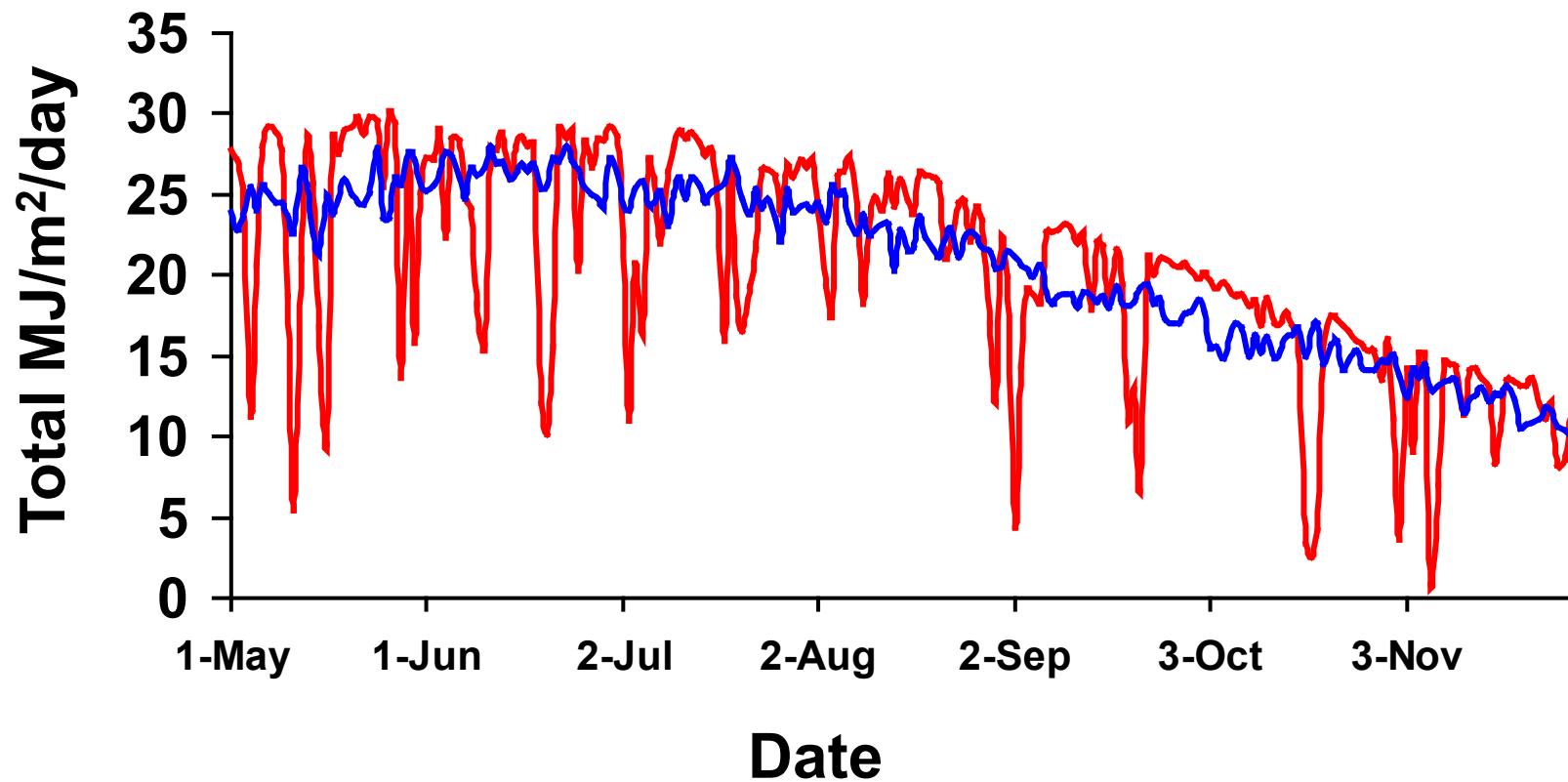


Muleshoe

18-Year Mean (2004-2021) and **2024**

Daily Total Solar Radiation (MJ/meter²)

— 2024 — Muleshoe 18-Yr Mean

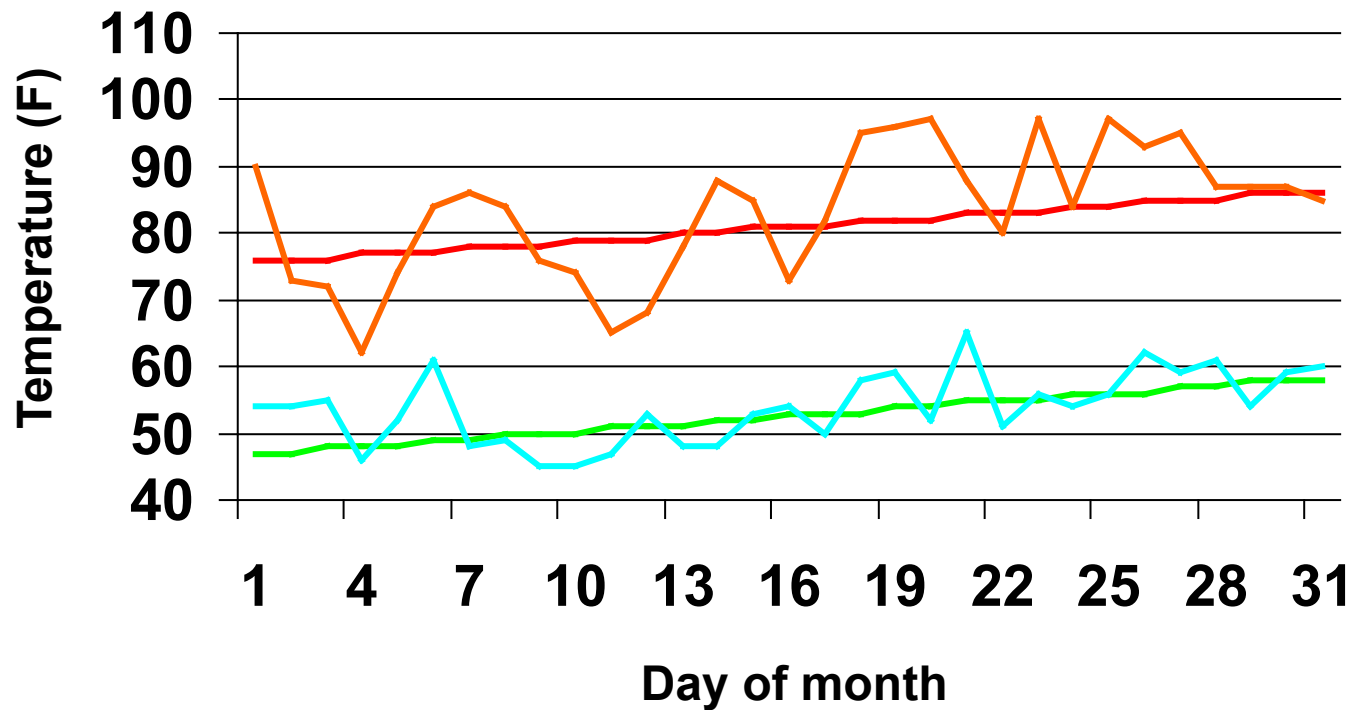


Total solar energy, in MJ/meter², calculated from the hourly average global solar radiation rates and converted to energy by integrating over time.

Amarillo

30-Yr Normal (1991-2020) and May 2024 Air Temperatures

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



Heat Units

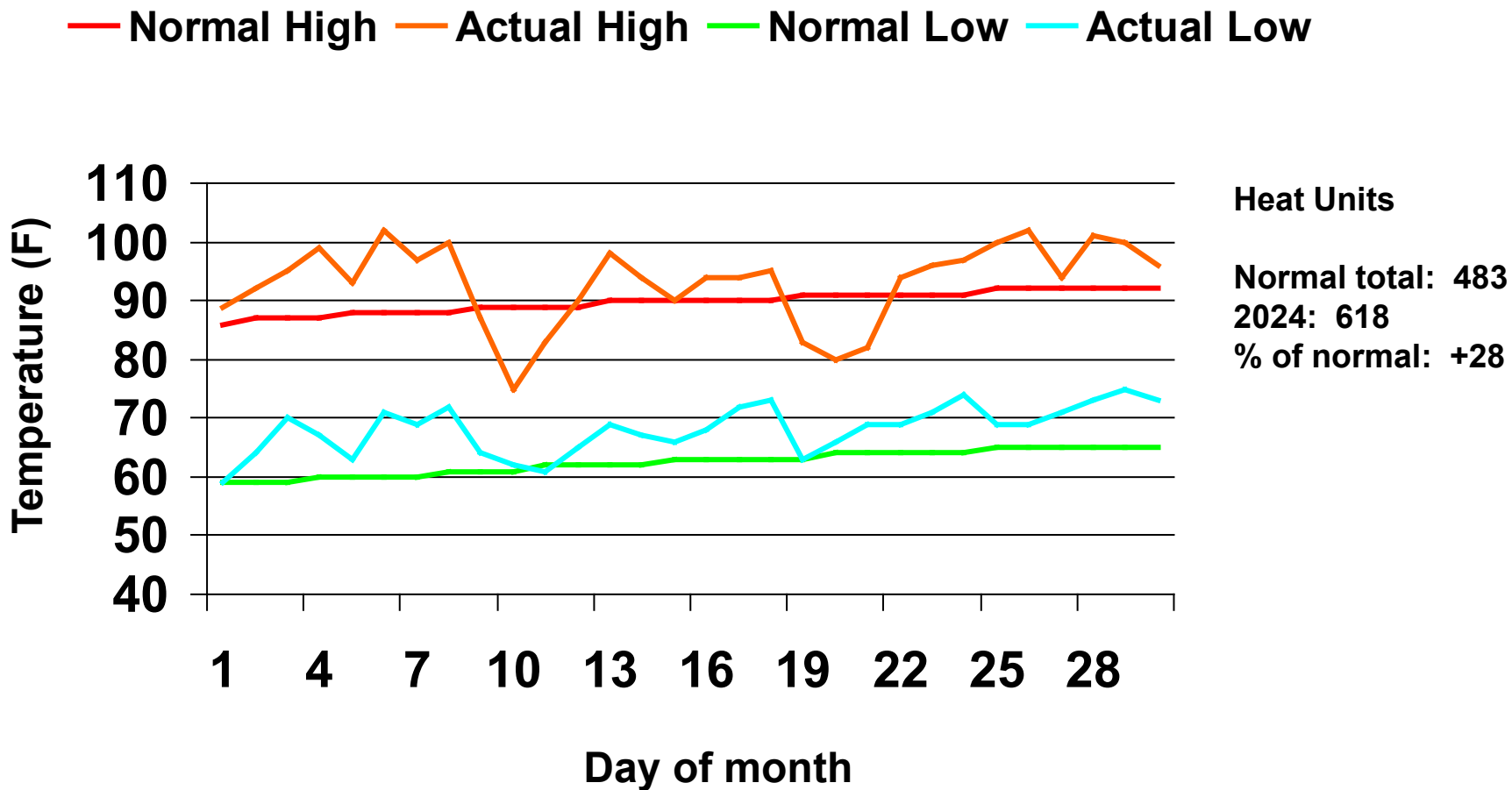
Normal total: 210

2024: 276

% of normal: +32

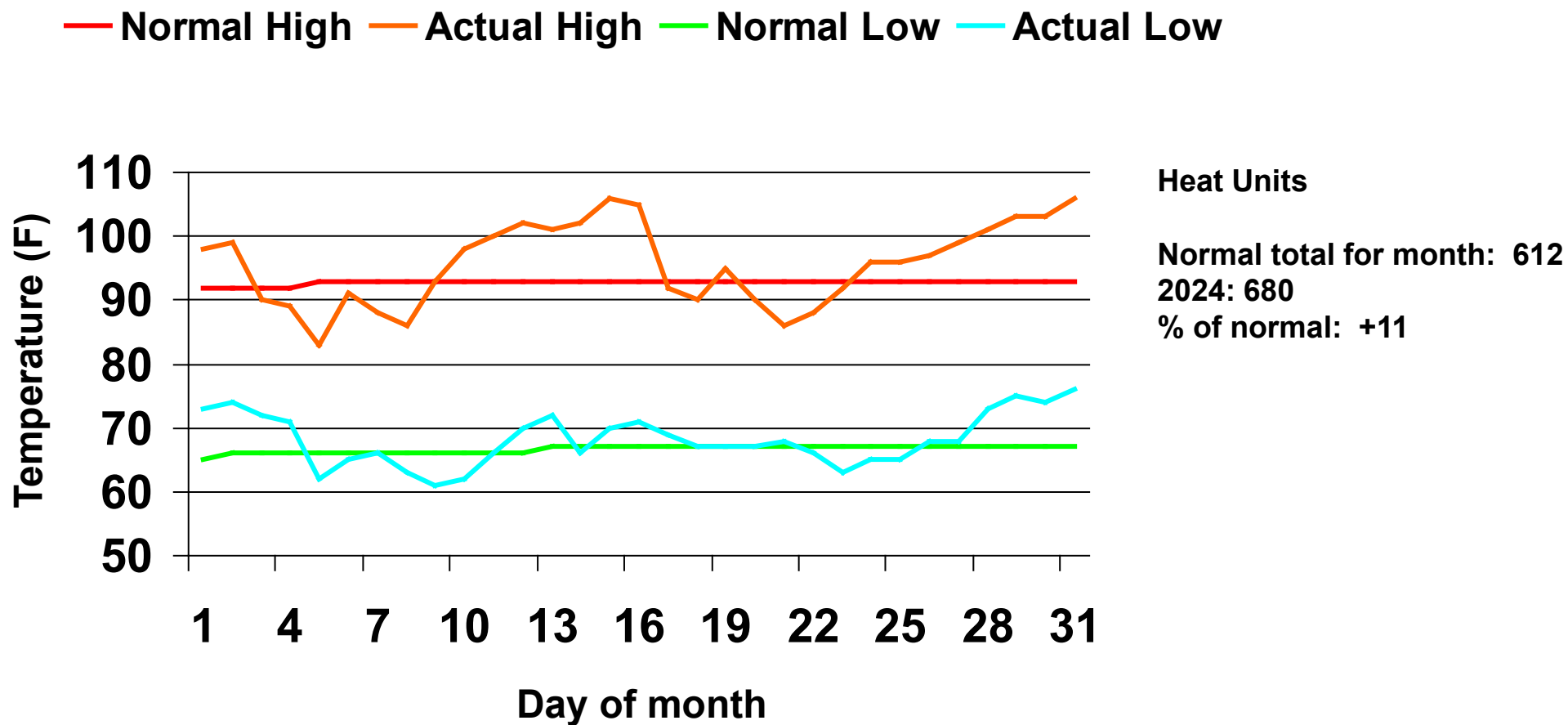
Amarillo

30-Yr Normal (1991-2020) and June 2024 Air Temperatures



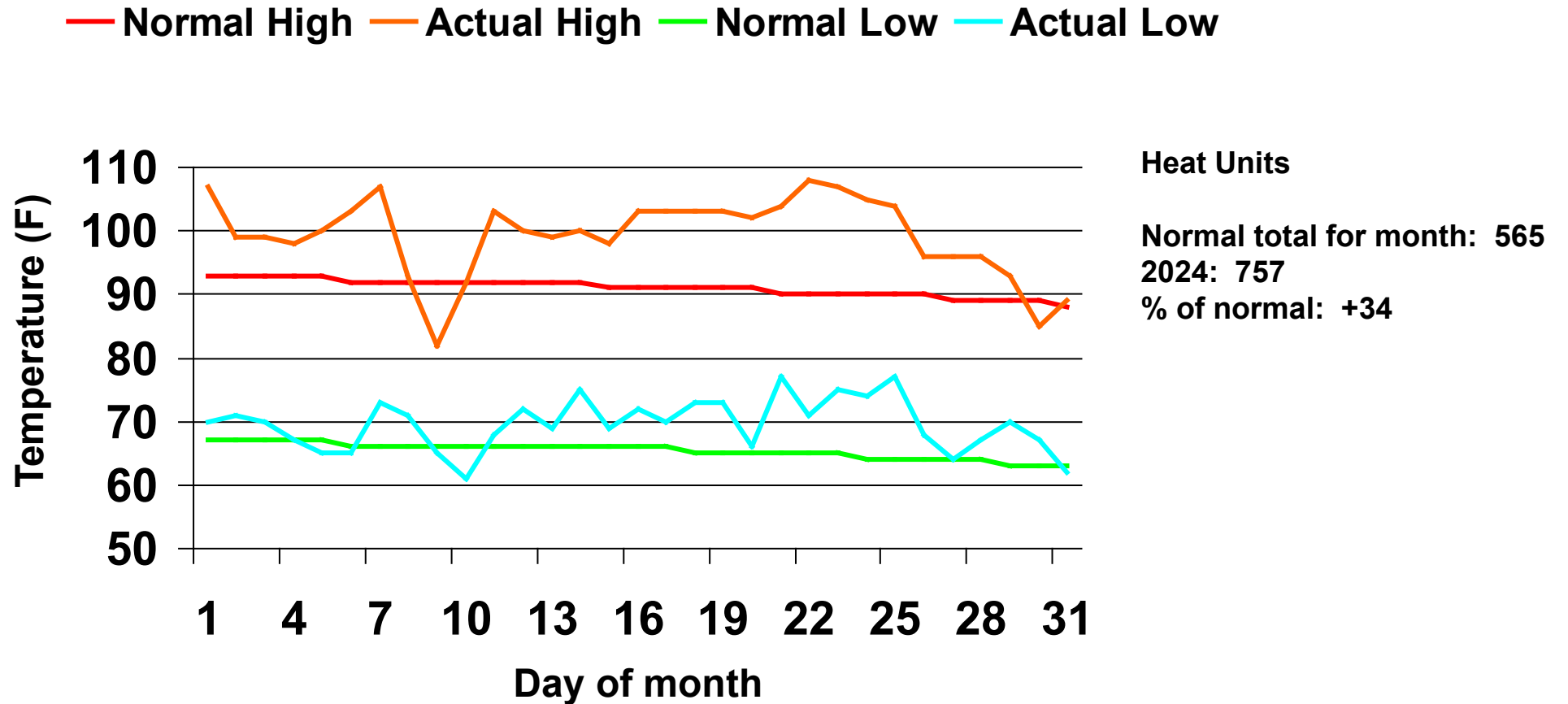
Amarillo

30-Yr Normal (1991-2020) and July 2024 Air Temperatures



Amarillo

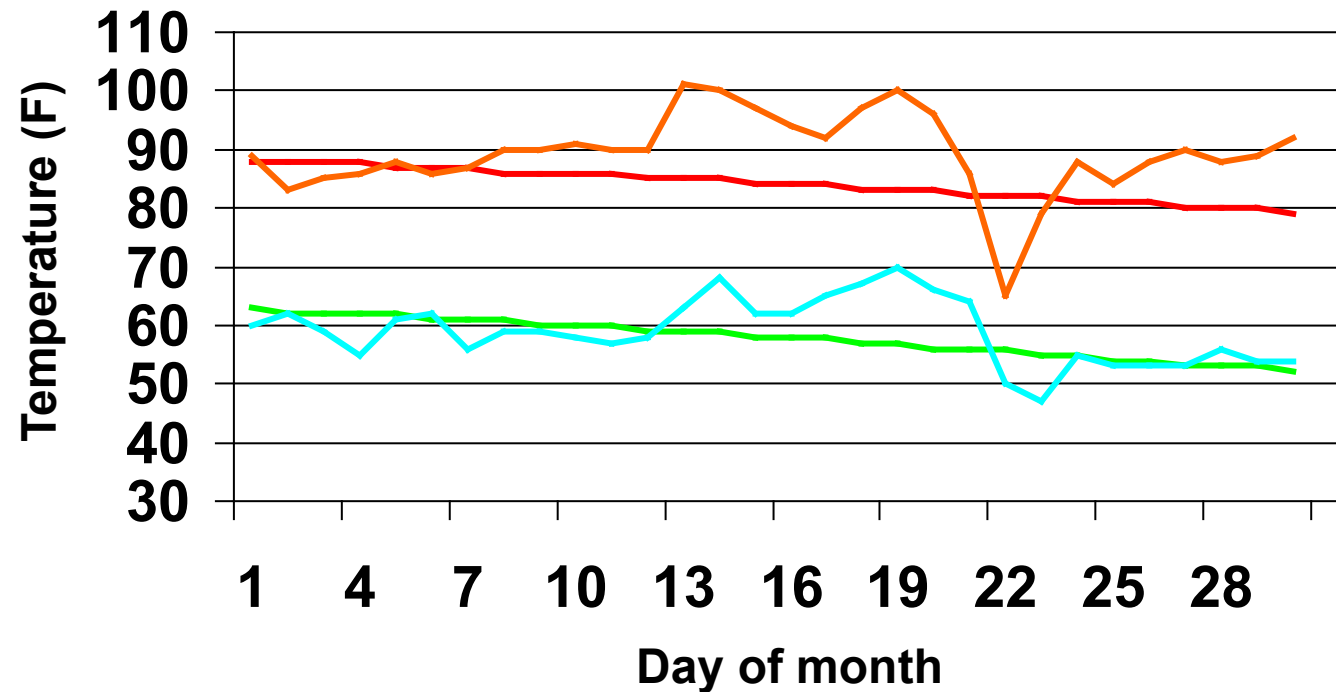
30-Yr Normal (1991-2020) and August 2024 Air Temperatures



Amarillo

30-Yr Normal (1991-2020) and September 2024 Air Temperatures

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



Heat Units

Normal total for month: 329

2024: 427

% of normal: +30

Normal Heat Units/Day

Sep 1: 16

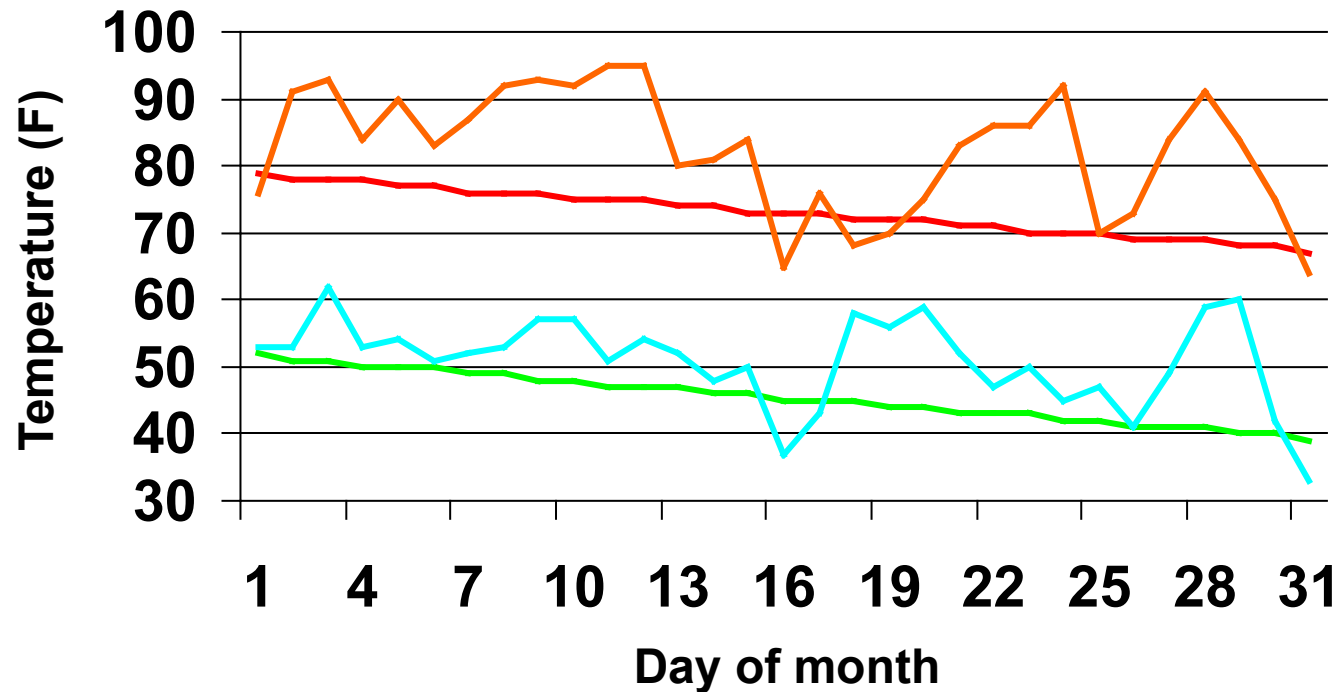
Sep 30: 6

Goes to zero on Oct 12

Amarillo

30-Yr Normal (1991-2020) and October 2024 Air Temperatures

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



Heat Units

Normal total for month: 35

2024: 235

% of normal: +571

Normal Heat Units/Day

Oct 1: 6

Oct 12: 0

Goes to zero on Oct 12

No first freeze in Oct;
first freeze on Nov 9 (32 degrees).
No hard freeze in Oct;
hard freeze on Nov 29 (25 degrees).

Amarillo 2024 DD60s vs Normal (1991-2020)

Month	May	June	July	August	September
Normal	210	483	612	565	329
Actual	276	618	680	757	427
% of Normal	+32	+28	+11	+34	+30
Number of days ≥ 100 degrees	0	6	10	17	3