2024 Enlist Cotton Variety Trial – Lonestar Gin

Dustin Babcock Farm
Groom, TX

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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 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 400 W3FE, and PHY 411 W3FE.

Relatively good moisture conditions prevailed at the site during the early spring, then lower than normal rainfall began in May. The trial was planted May 21 and escaped hail and wind events typically associated with spring thunderstorms. Good early-season growing conditions and outstanding vigor resulted in an average emergence of about 86% of the seed planted (50,000 seed/acre) when stand count observations were performed on June 17. Minimal seedling disease was noted. A total of 66 days from planting to first bloom (July 26) was noted in this trial. This indicates a fairly rapid rate of development based on calendar days. This is attributed to good root health, and warm May and June growing conditions. Once the crop reached the bloom stage, its progression was excellent through the end of August and into the crop maturity phase in September. Due to the long growing season and adequate irrigation, the trial's yield and quality were excellent. Yields were high (over 3 bales/acre) in the test and fiber maturity as measured by micronaire was excellent for the area and averaged 4.0 across all entries. Substantial late season pre-harvest rainfall likely impacted the color and leaf grades in the trial.

Harvest results indicated that statistically significant differences were observed. Lint yields ranged from a high of 1773 lb/acre (PHY 205 W3FE) to a low of 1564 lb/acre (PHY 250 W3FE),

and averaged 1684 lb/acre (Table 1). Average Loan value for varieties from commercially ginned and classed bales varied from a high of $0.5614/lb (PHY 210 W3FE) to a low of $0.5316/lb (PHY 400 W3FE). Overall Loan value for the trial across all entries was $0.5486/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. Three entries were in the top tier (the "a" group) of statistical significance (PHY 332 W3FE, PHY 205 W3FE, and PHY 411 W3FE). Net value/acre ranged from a high of $1069/acre (PHY 332 W3FE) to a low of $947/acre (PHY 250 W3FE and PHY 400 W3FE). 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 1, and a visual estimate of storm resistance at harvest. Final plant heights ranged from a high of 29.5 inches for PHY 332 W3FE to a low of 24.0 inches for PHY 205 W3FE.

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 21 to 31 across all entries. Leaf grades ranged from about 3 to 4. Staple ranged from about 36.0 (PHY 205 W3FE and PHY 411 W3FE) to 37.3 32nds inch (PHY 332 W3FE). Micronaire averages were excellent for all entries and ranged from a low of 3.63 (PHY 400 W3FE) to a high of 4.27 (PHY 205 W3FE). Low bark contamination was noted in commercial bales. PHY 400 W3FE and PHY 411 W3FE bales both had about 30-40% bark contamination . Fiber strength ranged from 30.5 to 32.3 g/tex, and uniformity ranged from 80.5 to 82.4%.

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: 3340 ft

Previous crop: Corn

Tillage system: No-till wheat cover in the fall, strip-till in the spring

Planted: May 21

Replicates: 3 replicates in a randomized complete block design

Plot width: 12-row plots

Plot length: Trial was planted in ~2,500 ft long rows

Seeding rate: 50,000 seed/acre

Days from planting to first bloom: 66 (July 26)

Row spacing: 30-inch rows

Rainfall (inches) by month:

June 2”, July 1”, August 1”, Sept 1.5”, Oct 0”, Nov 6”

Total irrigation by month if applicable:

June 0.75” 1st week; July 0.75” per week for first 2 weeks, 1” per week for last 2 weeks; August 1” per week for first 2 weeks, 1.5” per week for last 2 weeks; Sept 2” of irrigation with last pass finished by the 15th

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

3/29 - 32 oz Prowl H2O, 3 oz Anthem Flex, 20 oz LV6

4/17 - 28 oz Powermax 3 to terminate cover, 5.5 oz Flagstaff 5/23 - 32 oz Diuron

6/12 - 10 oz Volunteer

6/26 - 32 oz Interline, 32 oz Enlist, 12 oz Outlook 7/21 - 12 oz Outlook

Nitrogen fertility rates, dates and application methods:

3/6 - 40 lbs N strip till

Other fertility (phosphate, potash, micronutrients) application rates, dates, and application methods: 3/6 - 32 lbs P2O5, 5 lbs Sulfur strip till

Insecticide products, application rates and dates: 6/12 - 6 oz Acephate, 6/26 - 1.1 oz Assail

Plant growth regulator products, application rates and dates: 6/26 - 8 oz Pentia, 7/21 - 32 oz MepStar

Harvest aid products, application rates and dates: 10/11 - 48 oz Ethephon, 24 oz Tribufos

Harvesting: November 27 using a John Deere CS770, a full 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 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 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.

List of Tables

Acknowledgements

Lonestar Gin would like to thank Dustin Babcock 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. Gratitude is expressed to PhytoGen Cotton Seed for providing trial seed, and to Windstar Inc for support. Detailed ginning was performed by Carey McKinney and the Lonestar Gin 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, Babcock Farm, Groom, TX, 2024.

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 ----------			
PHY 332 W3FE	32.0	44.5	5533	1771	2462	0.5544	982	88	1069	a
PHY 205 W3FE	32.6	43.8	5443	1773	2385	0.5517	978	82	1060	a
PHY 411 W3FE	33.5	43.8	5191	1741	2274	0.5375	936	77	1013	ab
PHY 210 W3FE	32.0	45.0	5037	1610	2266	0.5614	903	82	986	bc
PHY 250 W3FE	31.5	44.8	4960	1564	2219	0.5547	868	80	947	c
PHY 400 W3FE	32.9	43.4	5007	1645	2174	0.5316	874	73	947	c
Test average	32.4	44.2	5195	1684	2297	0.5486	924	80	1004	
CV, %	--	--	4.4	4.4	4.4	--	4.4	4.3	4.4	
OSL	--	--	0.0471	0.0216	0.0460	--	0.0195	0.0067	0.0222	
LSD	--	--	336	109	149	--	60	5	65	

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 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 technology cotton variety trial, Babcock Farm, Groom, TX, 2024.

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	Late bloom		
	plants/acre	%	1-5 visual scale, 5 best	count		inches			count	1-9 visual scale, 9 tight
	25-Jun	25-Jun	25-Jun	29-Jul	12-Aug	15-Jul	29-Jul	12-Aug	1-Oct	27-Nov
PHY 205 W3FE	42,108	84.2	4.4	7.2	3.3	16.4	21.8	24.0	2.1	8.2
PHY 210 W3FE	42,399	84.8	4.1	7.5	3.6	17.3	22.5	24.9	1.4	7.0
PHY 250 W3FE	42,398	84.8	4.6	6.8	3.4	17.9	23.7	25.3	2.2	6.2
PHY 332 W3FE	47,045	91.2	4.3	7.3	4.1	20.1	26.7	29.5	6.3	5.0
PHY 400 W3FE	43,560	87.1	4.3	7.3	3.9	19.3	24.7	26.1	4.3	6.2
PHY 411 W3FE	40,656	81.3	4.3	8.3	4.5	20.1	27.5	29.5	6.9	5.5
Test average	43,028	85.6	4.3	7.4	3.8	18.5	24.5	26.6	3.9	6.4
CV, %	5.4	4.2	2.9	4.6	7.4	3.6	3.8	4.6	13.1	4.1
OSL	0.0868	0.1014	0.0113	0.0073	0.0033	0.0002	0.0001	0.0007	0.0001	0.0001
LSD	3,409	5.4	0.2	0.5	0.4	1.0	1.4	1.8	0.8	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, Babcock Farm, Groom, 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															
2147114	31-1	3	1	4	36	4.2	.	.	31.8	78.5	7.6	7	81.8	112	54.90
2147115	31-2	3	1	3	36	4.2	11	.	31.8	78.1	7.6	5	81.8	112	51.85
2147116	31-2	3	1	4	36	4.2	.	.	31.8	78.0	7.8	7	81.8	112	54.90
2147117	31-2	3	1	4	36	4.2	.	.	33.9	77.3	7.9	5	82.8	113	55.05
2147118	31-1	3	1	3	36	4.2	.	.	33.9	79.0	7.9	4	82.8	113	56.35
2147119	31-1	3	1	3	36	4.2	.	.	33.9	78.8	7.9	5	82.8	113	56.35
2147120	31-1	3	1	3	36	4.4	.	.	31.3	78.2	8.0	2	82.7	111	56.15
2147121	31-1	3	1	4	36	4.4	.	.	31.3	78.1	8.2	4	82.7	111	54.85
2147122	31-1	3	1	3	36	4.4	.	.	31.3	78.4	8.1	4	82.7	111	56.15
Average	--	3.0	1.0	3.4	36.0	4.27	1/9 bales	level 1 bark	32.3	78.3	7.9	4.8	82.4	112.0	55.17
PHY 210 W3FE															
2147123	31-2	3	1	3	37	3.8	.	.	32.1	78.7	7.3	4	81.9	116	56.70
2147124	31-1	3	1	3	37	3.8	11	.	32.1	78.5	7.6	4	81.9	116	52.35
2147125	31-1	3	1	3	37	3.8	.	.	32.1	78.2	7.9	3	81.9	116	56.70
2147126	31-1	3	1	3	37	4.1	.	.	31.0	78.5	8.0	5	81.8	116	56.70
2147127	31-1	3	1	3	37	4.1	.	.	31.0	78.5	8.0	4	81.8	116	56.70
2147128	31-2	3	1	3	37	4.1	.	.	31.0	76.8	8.0	4	81.8	116	56.70
2147129	31-1	3	1	3	37	4.4	.	.	31.9	79.3	8.0	4	82.7	115	56.65
2147130	31-1	3	1	3	37	4.4	.	.	31.9	78.3	8.1	2	82.7	115	56.65
Average	--	3.0	1.0	3.0	37.0	4.06	1/8 bales	level 1 bark	31.6	78.4	7.9	3.8	82.1	115.8	56.14
PHY 250 W3FE															
2147131	41-1	4	1	3	37	3.8	.	.	31.4	77.5	7.2	4	81.0	116	54.50
2147132	31-2	3	1	4	37	3.8	.	.	31.4	78.0	7.6	5	81.0	116	55.45
2147133	31-2	3	1	3	37	3.8	11	.	31.4	78.3	7.5	3	81.0	116	52.35
2147134	31-1	3	1	3	37	4.0	.	.	30.2	79.0	7.8	4	81.5	114	56.55
2147135	31-2	3	1	4	37	4.0	.	.	30.2	77.4	8.0	5	81.5	114	55.30
2147136	31-2	3	1	4	37	4.0	.	.	30.2	77.3	7.7	5	81.5	114	55.30
2147137	31-2	3	1	3	37	4.3	.	.	31.0	77.4	8.3	4	81.2	114	56.60
2147138	31-1	3	1	3	37	4.3	.	.	31.0	78.4	8.0	3	81.2	114	56.60
2147139	31-1	3	1	3	37	4.3	.	.	31.0	78.8	8.4	3	81.2	114	56.60
Average	--	3.1	1.0	3.3	37.0	4.03	1/9 bales	level 1 bark	30.9	78.0	7.8	4.0	81.2	114.7	55.47

Table 3 (continued). Commercial classing data for the center pivot irrigated Enlist technology cotton variety trial, Babcock Farm, Groom, 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															
2147140	31-1	3	1	4	38	3.6	.	.	31.7	77.8	8.0	6	80.9	118	55.35
2147141	31-1	3	1	4	38	3.6	.	.	31.7	77.6	8.1	5	80.9	118	55.35
2147142	31-1	3	1	3	38	3.6	.	.	31.7	77.1	8.5	4	80.9	118	56.70
2147143	31-1	3	1	4	37	4.1	.	.	29.8	76.7	8.8	4	81.1	117	55.15
2147144	31-3	3	1	4	37	4.1	.	.	29.8	76.0	8.8	5	81.1	117	55.15
2147145	31-3	3	1	3	37	4.1	.	.	29.8	76.2	8.9	4	81.1	117	56.40
2147146	31-3	3	1	3	37	4.0	11	.	30.0	77.0	9.1	3	79.5	115	51.75
2147147	31-3	3	1	3	37	4.0	.	.	30.0	76.3	8.9	4	79.5	115	56.10
2147148	21-2	2	1	2	37	4.0	.	.	30.0	77.7	9.0	2	79.5	115	57.00
Average	--	2.9	1.0	3.3	37.3	3.90	1/9 bales	level 1 bark	30.5	76.9	8.7	4.1	80.5	116.7	55.44
PHY 400 W3FE															
2147149	31-2	3	1	4	37	3.5	11	.	31.0	77.6	7.8	6	81.2	115	51.00
2147150	31-1	3	1	4	37	3.5	.	.	31.0	78.2	8.0	6	81.2	115	55.35
2147151	31-1	3	1	4	37	3.5	11	.	31.0	77.7	8.1	6	81.2	115	51.00
2147152	31-1	3	1	4	36	3.6	11	.	30.0	77.7	7.9	5	79.6	113	49.85
2147153	31-2	3	1	4	36	3.6	11	.	30.0	78.1	7.7	5	79.6	113	49.85
2147154	31-2	3	1	3	36	3.6	.	.	30.0	77.7	7.7	4	79.6	113	55.50
2147155	31-1	3	1	4	37	3.8	.	.	30.8	78.0	7.9	4	81.3	114	55.30
2147156	31-1	3	1	4	37	3.8	.	.	30.8	77.5	8.2	5	81.3	114	55.30
2147157	31-2	3	1	4	37	3.8	.	.	30.8	76.3	8.3	5	81.3	114	55.30
Average	--	3.0	1.0	3.9	36.7	3.63	4/9 bales	level 1 bark	30.6	77.6	8.0	5.1	80.7	114.0	53.16
PHY 411 W3FE															
2147158	31-2	3	1	4	36	4.0	11	.	29.9	78.7	7.4	7	81.8	112	50.25
2147159	31-2	3	1	4	36	4.0	.	.	29.9	78.7	7.4	6	81.8	112	54.60
2147160	31-1	3	1	4	36	4.0	.	.	29.9	79.7	7.9	6	81.8	112	54.60
2147161	31-1	3	1	4	36	3.9	11	.	30.6	78.5	7.8	5	81.4	113	50.40
2147162	31-1	3	1	3	36	3.9	.	.	30.6	79.5	7.9	3	81.4	113	56.05
2147163	31-1	3	1	3	36	3.9	11	.	30.6	78.7	7.9	4	81.4	113	51.70
2147164	31-2	3	1	4	36	4.2	.	.	31.3	78.0	7.8	5	82.3	112	54.95
2147165	31-1	3	1	4	36	4.2	.	.	31.3	78.6	7.8	5	82.3	112	54.95
2147166	31-1	3	1	3	36	4.2			31.3	79.6	7.8	3	82.3	112	56.25
Average	--	3.0	1.0	3.7	36.0	4.03	3/9 bales	level 1 bark	30.6	78.9	7.7	4.9	81.8	112.3	53.75

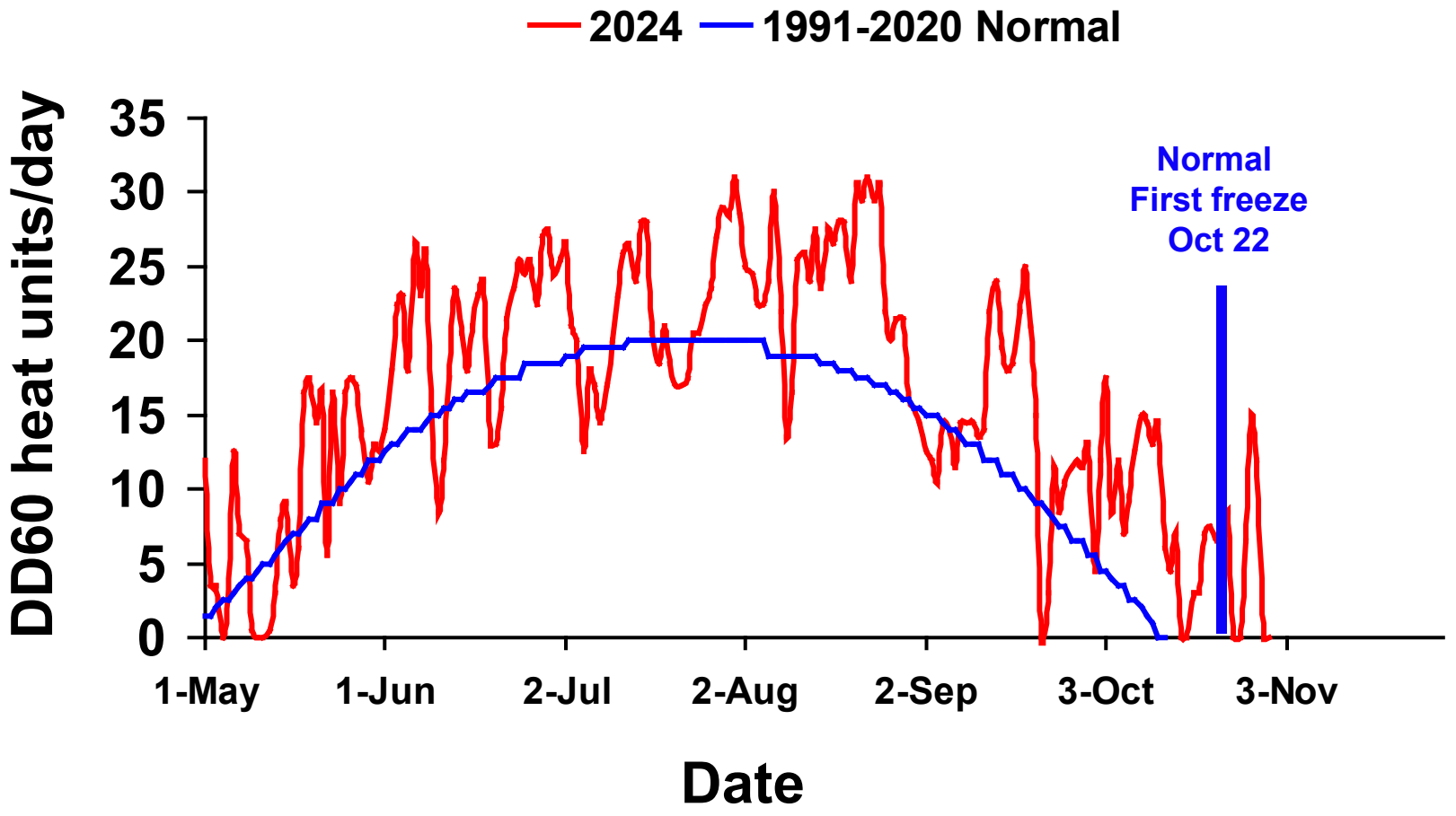
Table 4. Mean commercial classing data across all bales by variety for the center pivot irrigated Enlist technology cotton variety trial, Babcock Farm, Groom, TX, 2024.

Variety	Color	Color	Leaf	Staple	Micronaire	Extraneous	Remarks	Strength	Rd	+b	Trash	Uniformity	Length	Loan rate
	digit 1	digit 2	grade	32nds inch	units	matter	--	g/tex	%	%	% area	%	100ths inch	cents/lb
PHY 205 W3FE	3.0	1.0	3.4	36.0	4.27	1/9 bales	level 1 bark	32.3	78.3	7.9	4.8	82.4	112.0	55.17
PHY 210 W3FE	3.0	1.0	3.0	37.0	4.06	1/8 bales	level 1 bark	31.6	78.4	7.9	3.8	82.1	115.8	56.14
PHY 250 W3FE	3.1	1.0	3.3	37.0	4.03	1/9 bales	level 1 bark	30.9	78.0	7.8	4.0	81.2	114.7	55.47
PHY 332 W3FE	2.9	1.0	3.3	37.3	3.90	1/9 bales	level 1 bark	30.5	76.9	8.7	4.1	80.5	116.7	55.44
PHY 400 W3FE	3.0	1.0	3.9	36.7	3.63	4/9 bales	level 1 bark	30.6	77.6	8.0	5.1	80.7	114.0	53.16
PHY 411 W3FE	3.0	1.0	3.7	36.0	4.03	3/9 bales	level 1 bark	30.6	78.9	7.7	4.9	81.8	112.3	53.75
Mean	3.0	1.0	3.4	36.7	3.99	.	.	31.1	78.0	8.0	4.4	81.5	114.2	54.86

Appendix

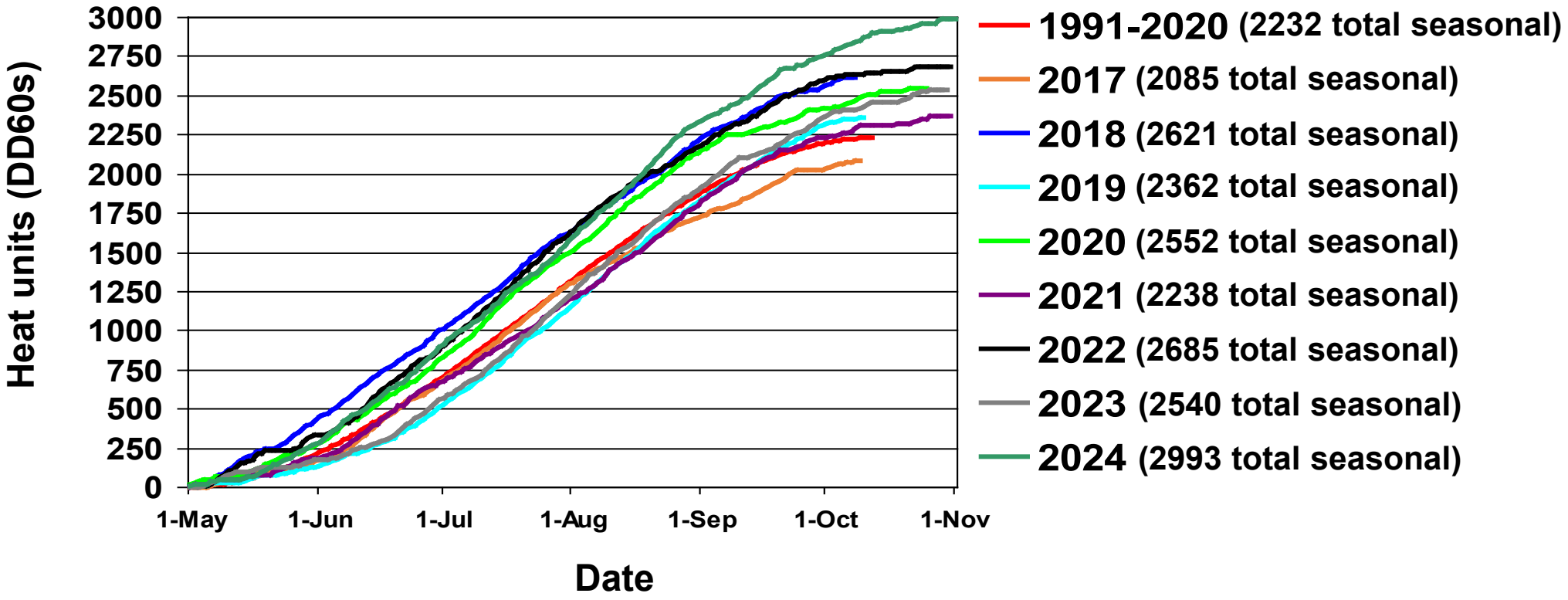
Amarillo 2024 cotton heat units and weather data.

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

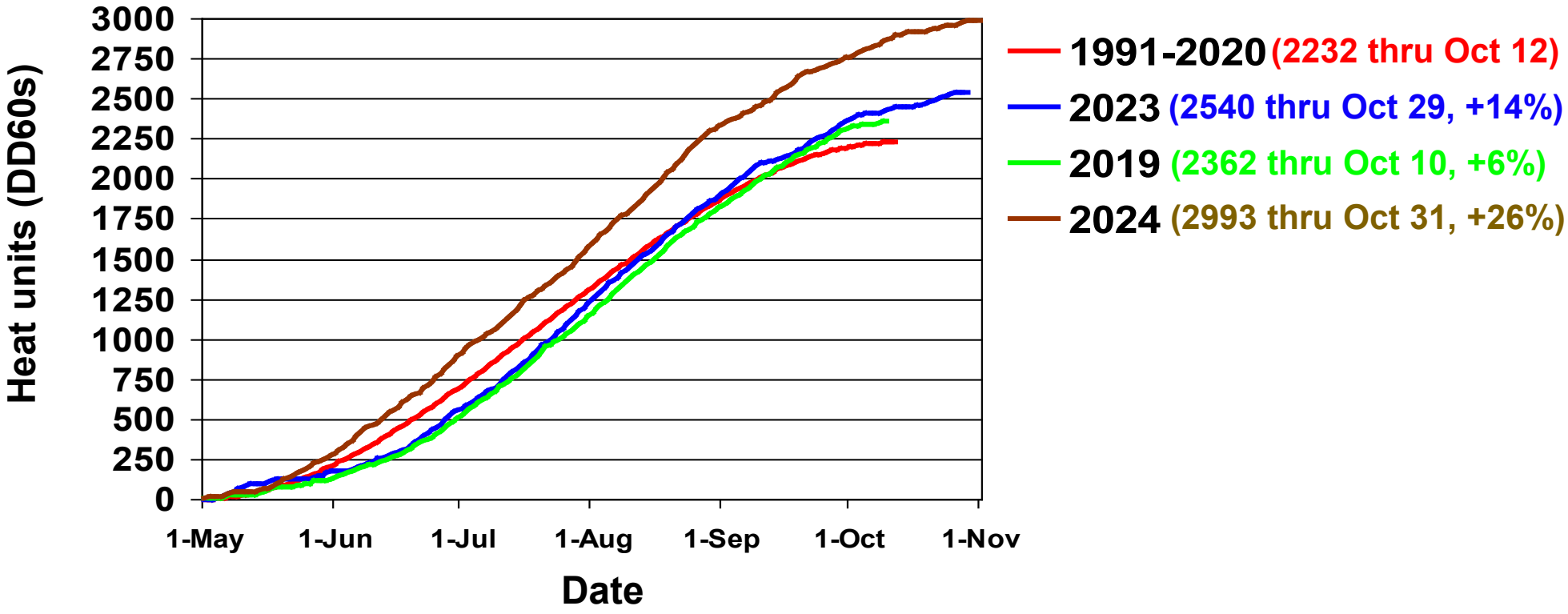


Amarillo 30-Yr Normal (1991-2020) vs. 2017 through 2024 Cotton Heat Unit Accumulation

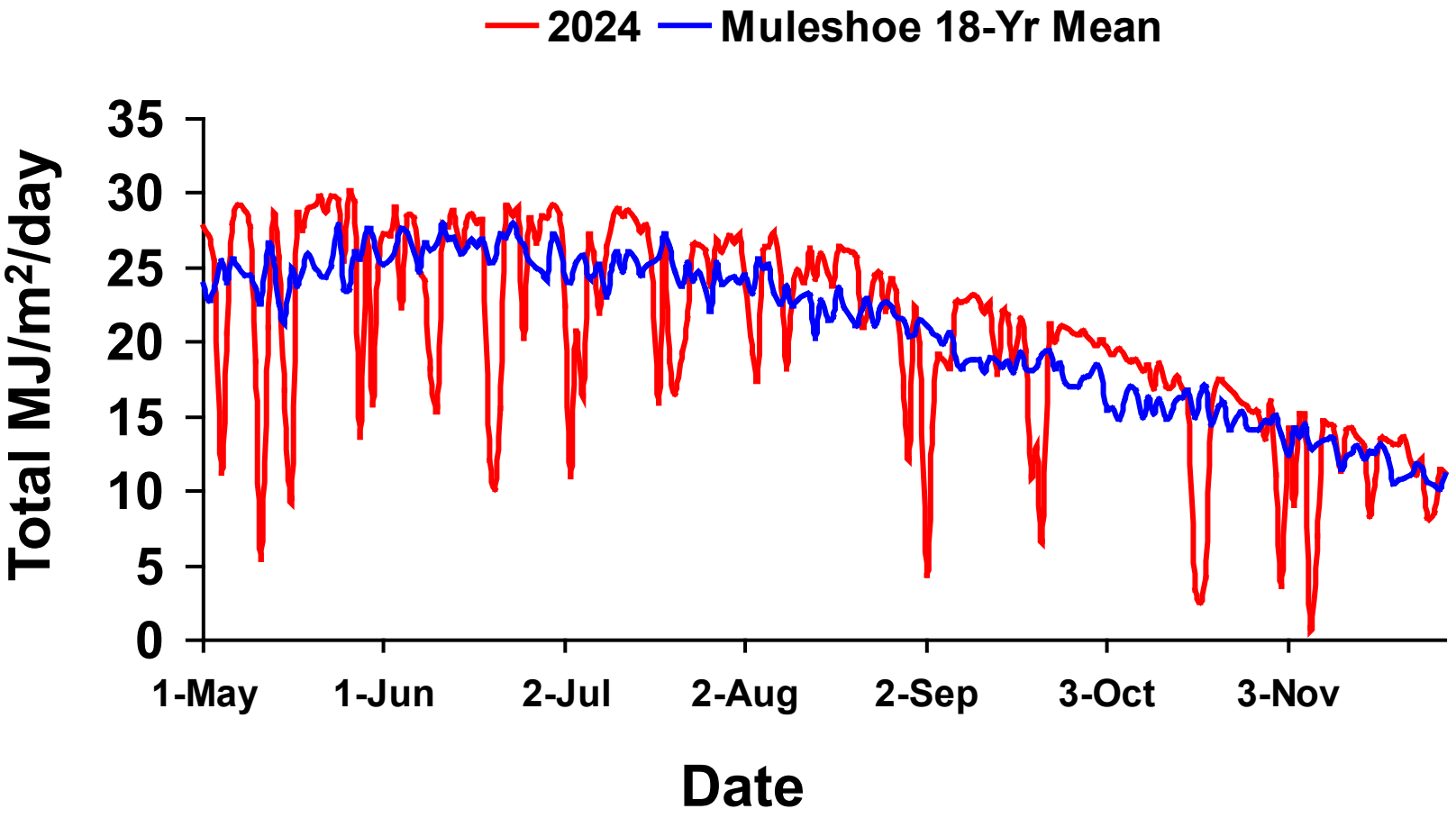
From May 1 Through First Hard Freeze



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



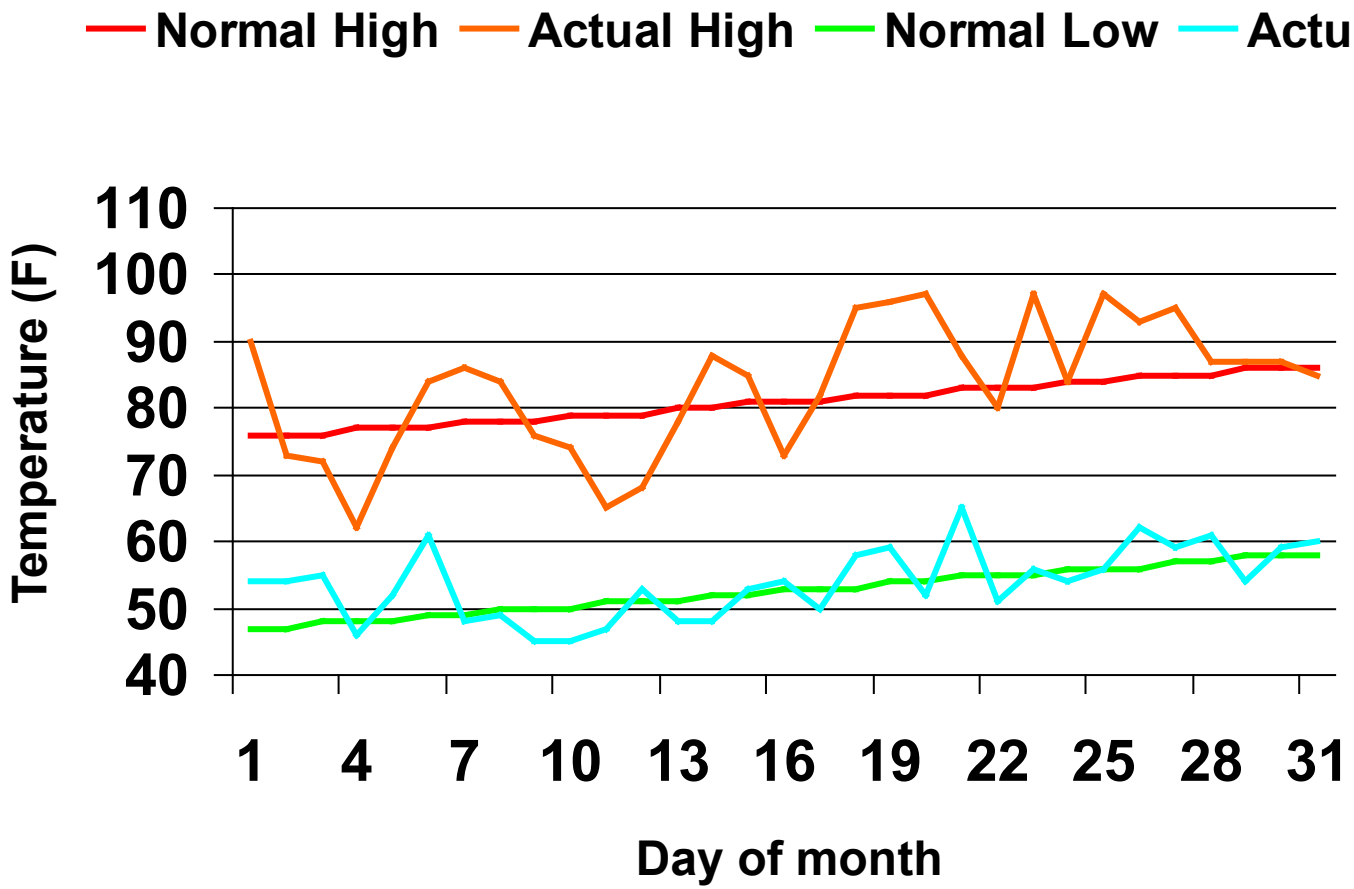
Muleshoe
18-Year Mean (2004-2021) and 2024
Daily Total Solar Radiation (MJ/meter^2)



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/daily01/2024/

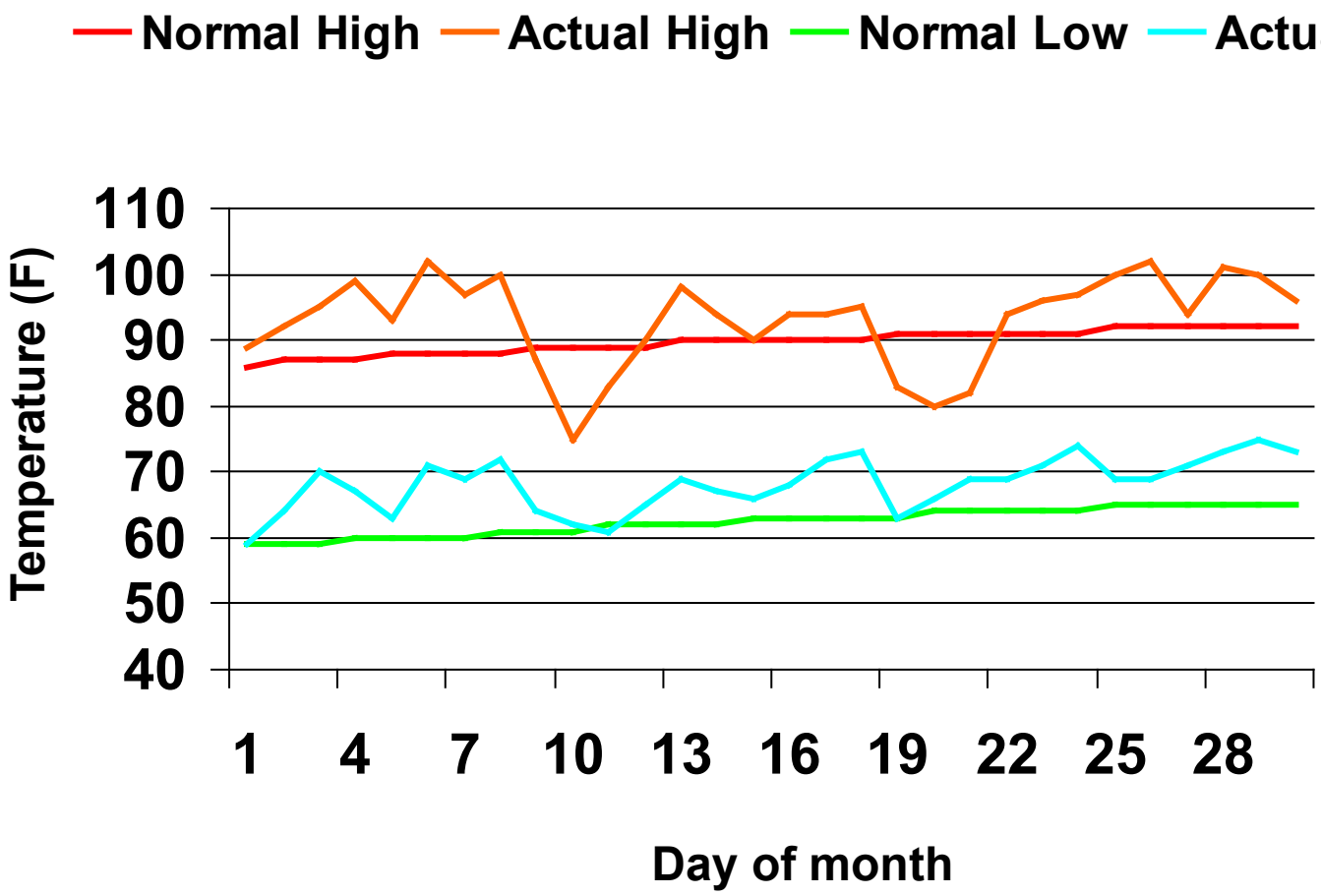
Amarillo
30-Yr Normal (1991-2020) and May 2024 Air Temperatures



Heat Units

Normal total: 210
2024: 276
% of normal: +32

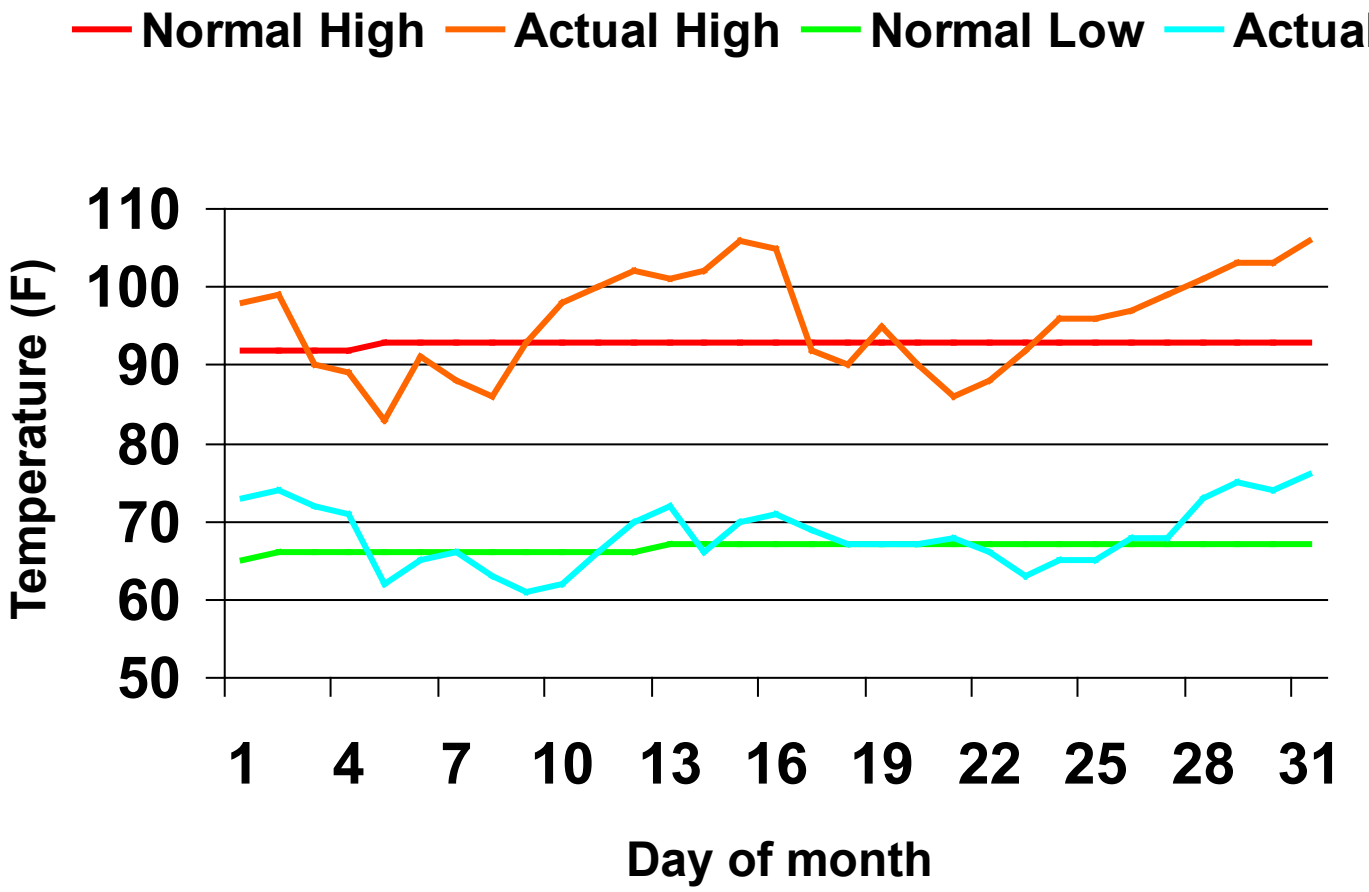
Amarillo
30-Yr Normal (1991-2020) and June 2024 Air Temperatures



Heat Units

Normal total: 483
2024: 618
% of normal: +28

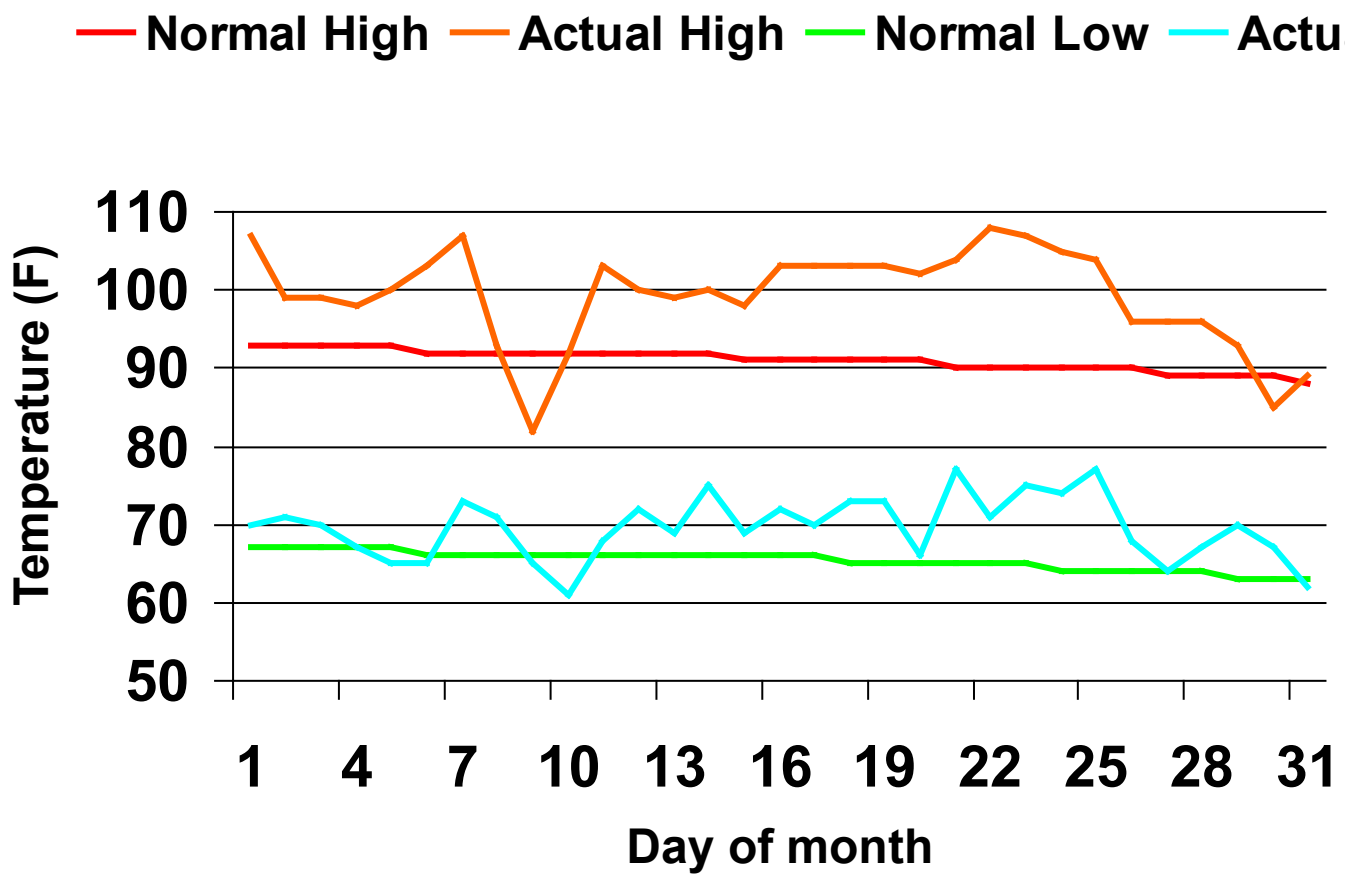
Amarillo
30-Yr Normal (1991-2020) and July 2024 Air Temperatures



Heat Units

Normal total for month: 612
2024: 680
% of normal: +11

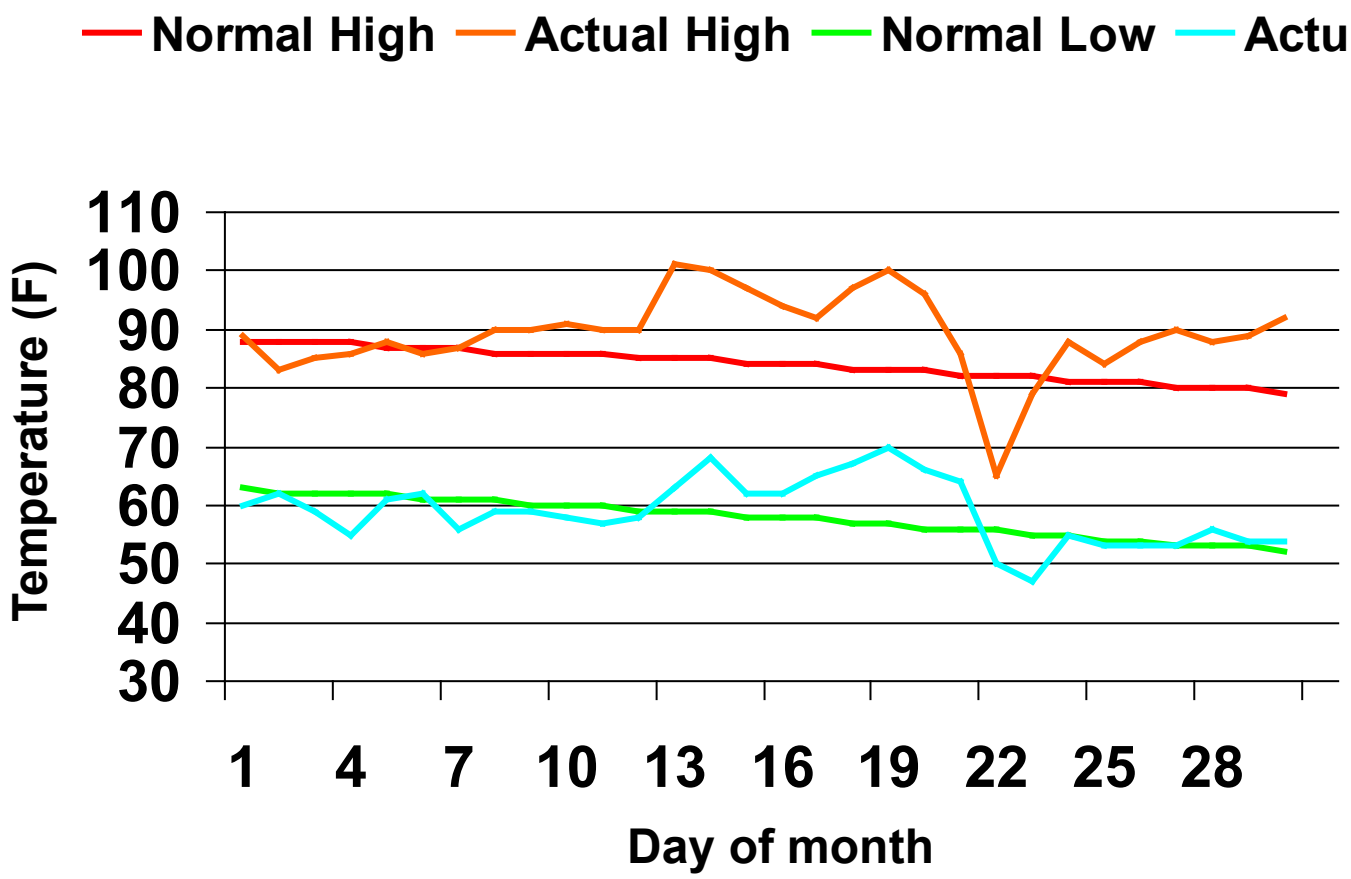
Amarillo
30-Yr Normal (1991-2020) and August 2024 Air Temperatures



Heat Units

Normal total for month: 565
2024: 757
% of normal: +34

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

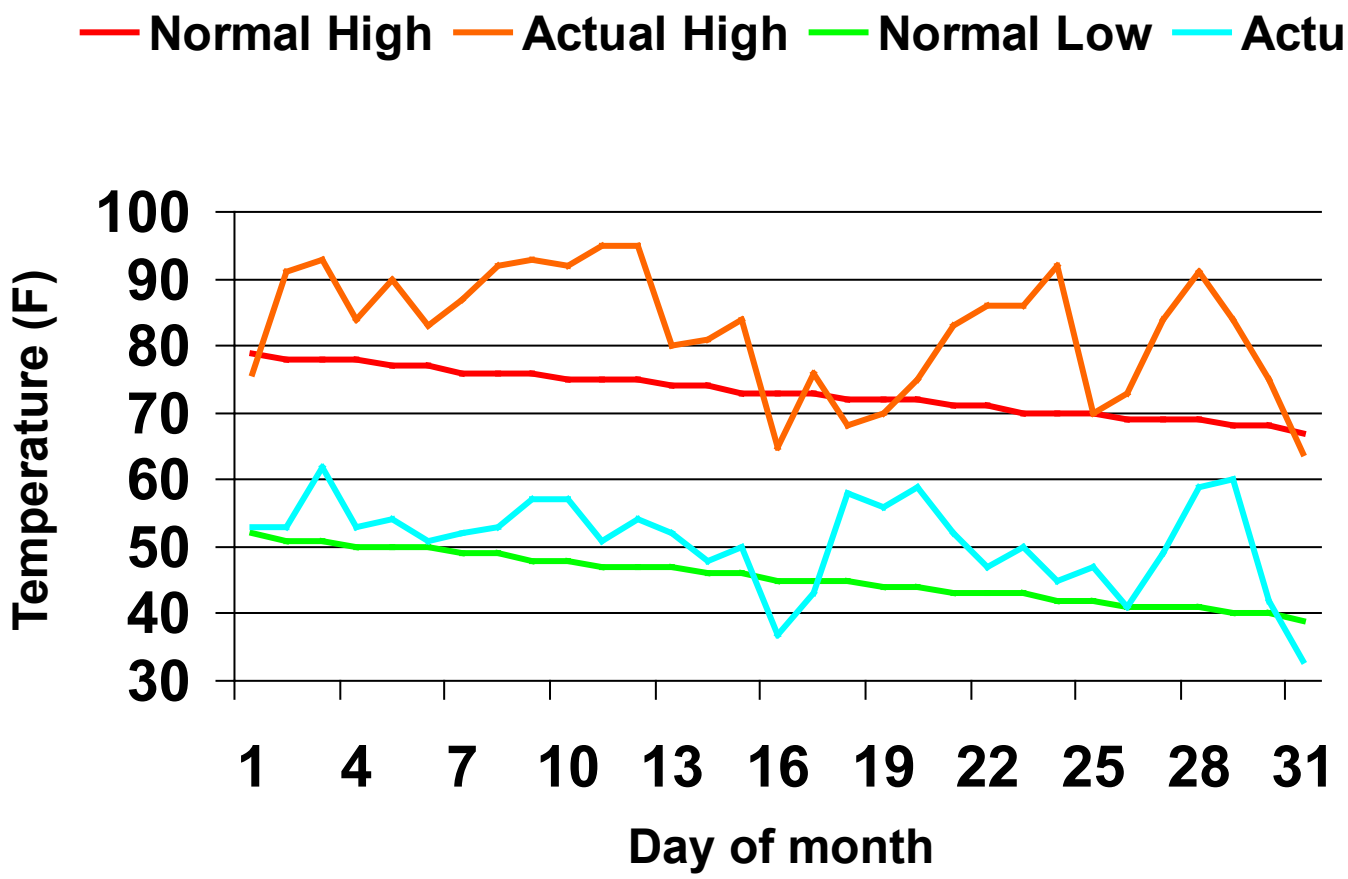


Heat Units

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



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