



## **2021 Irrigated Foliar Fertilizer Trial – Adobe Walls Gin**

**Craig McCloy Farm  
Pringle, 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.

In 2021, the program expanded to include an irrigated foliar fertilizer management component. This trial had two treatments which included an unfertilized control and a Nachurs foliar fertilizer blend containing multiple nutrients. FiberMax 1621 GL was planted in a center pivot irrigated field in a scientifically valid trial with three replicates of two treatments assigned at random across  $\frac{1}{2}$  of a  $\frac{1}{2}$  mile long center pivot. Other than the foliar fertilizer blend treatment, the entire trial area was managed in a similar manner.

This foliar fertilizer blend treatment consisted of three applications of two Nachurs premium foliar fertilizer products. These applications were applied in a tank-mix with mepiquat chloride plant growth regulator, therefore, no application costs were considered in the data analysis.

The first foliar fertilizer blend component, Nachurs Finish Line premium foliar fertilizer product, was applied at the rate of about 11 oz/acre per application (32 oz/acre total). The Finish Line product has a fertilizer analysis of 8 – 4 – 6 - 0.1 B – 0.2 Cu – 1 Mn – 1 Zn, a density of 10.2 lb/gal, and is derived from urea, phosphoric acid, potassium hydroxide, potassium acetate, sodium borate, copper EDTA, and zinc EDTA.

The second foliar fertilizer blend component consisted of Nachurs K-Fuel premium foliar fertilizer product. It was applied at about 49 oz/acre per application (148 oz/acre total). K-Fuel

has a fertilizer analysis of 0 – 0 – 24, a density of 10.65 lb/gal, and is derived from potassium acetate.

Individual experimental unit acreage (plot sizes) for the untreated control treatment were 39.91 (rep 1), 35.00 (rep 2), and 43.21 (rep 3) and totaled 118.12 acres. Individual plot acreages for the foliar fertilizer blend treatment were 43.95 (rep 1), 33.75 (rep 2) and 39.63 (rep 3) and totaled 117.33 acres. Extreme care was taken by the grower to place the trial's experimental units in uniform areas of the field. All statistically analyzed yield and economics related data were expressed on a per acre basis.

*No major adverse weather events during the growing season were noted other than substantial drought stress which began in late August and continued through harvest. Growing conditions were such that good to excellent yields and quality were obtained.*

Harvest results indicated that no statistically significant differences were observed between treatments, except for lint turnout percentage (Table 1). Lint turnout was slightly higher for the foliar blend treatment when compared to the untreated check. Lint yields were 1574 lb/acre with the foliar fertilizer blend and 1540 lb/acre for the untreated check. Average Loan value for treatments from commercially ginned and classed bales was \$0.5617/lb for the untreated check, and \$0.5576/lb for the foliar fertilizer blend treatment. When including gross lint Loan value on a per acre basis plus net gin credit (defined as seed value/acre minus ginning costs) and then removing foliar fertilizer cost, no statistically significant differences were found between the unfertilized check and the foliar fertilizer blend treatment. Foliar fertilizer blend cost was \$14/acre, and since applications were made in a tank-mix with mepiquat chloride plant growth regulator, no application cost was considered.

No statistically significant differences were observed in any quantitative fiber property based on USDA-AMS classing of the commercially ginned bales (Table 2). Although not quantitative, extraneous matter (level 1 bark contamination) was statistically analyzed by determining the percentage incidence of bark contaminated bales in each plot. Numerically, there is substantially greater bark incidence in the foliar fertilizer blend treatment, and this is believed to perhaps be due to slight field variability and harvesting conditions for that treatment.

A classing summary for each individual plot (experimental unit) is provided in Table 3. A total of 130, 110 and 132 commercial bales were obtained from the individual untreated check plots for replicates 1, 2, and 3, respectively (total of 372 bales). The foliar blend had 137, 114, and 123 commercial bales in individual plots in replicates 1, 2, and 3, respectively (total of 374 bales). Means (averages) across all commercially classed quantitative fiber properties were generated across all bales for each individual experimental unit (plot). These mean values across all bales for each individual plot were used in the fiber quality statistical analyses.

***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: 3325 ft

Previous crop: corn harvested in 2020

Tillage system: disked twice, then strip tilled with wheat cover crop and 11-52-0

Planted: May 8 to FM 1621 GL variety

Seeding rate: 90,000 seed/acre

20-inch row spacing (harvested with broadcast finger header)

Replicates: 3 replicates of two treatments in a randomized complete block design

Treatments: 2 – with an unfertilized control and a foliar blend treatment

Plot area: approximately 40 acres in each individual plot (varied)

Rainfall (inches) by month recorded at Pivot Trac gauge 2 miles from trial: May 3.4, June 2.1, July 2.0, August 2.8 (10.3 total)

Irrigation (inches) by month: May 0.6, June 1.3, July 4.4, August 2.0 (8.3 total)

Fertilizer management across entire field:

160 lb/acre soil residual nitrogen in top 48 inches, therefore no additional N fertilizer applied; 60 lb/acre 11-52-0 in strip till band applied in March

June 15 - 8 oz/acre NutriPak (8-10-2) by AgXplore

June 24 - 8 oz/acre BorPak 7.5% Boron by AgXplore (foliar blend treated acres also received 10.66 oz/acre Nachurs Finish Line and 50 oz/acre Nachurs K-Fuel)

July 6 - 8 oz/acre BorPak 7.5% Boron by AgXplore (foliar blend treated acres also received 10.66 oz/acre Nachurs Finish Line and 50 oz/acre Nachurs K-Fuel)

July 17 - 8 oz/acre BorPak 7.5% Boron by AgXplore (foliar blend treated acres also received 10.66 oz/acre Nachurs Finish Line and 50 oz/acre Nachurs K-Fuel)

Herbicide management:

Preplant burndown – (March 10) 2.5 oz/acre flumioxazin

Preplant incorporated – (April 5) 1 qt/acre trifluralin

Preemergence – (May 7) 1 pt/acre diuron + 1 pt/acre S-metolachlor

Post emergence - (May 22) 40 oz/acre glyphosate

Post emergence - (June 8) 48 oz/acre Warrant

Post emergence – (June 15) 28 oz/acre glyphosate

Post emergence – (July 6) 12 oz/acre clethodim

Post emergence – (July 29) 28 oz/acre glyphosate

Insecticides:

May 22 - 4.5 oz/acre acephate

June 8 - 4.5 oz/acre acephate

June 15 - 4.5 oz/acre acephate

Plant growth regulators:

June 24 - 2 oz/acre Stance

July 6 - 2 oz/acre Stance

July 17 - 14 oz/acre Pentia

July 29 - 28 oz/acre mepiquat chloride

August 6 - 40 oz/acre mepiquat chloride

Harvest aids:

October 5 - 1 qt/acre ethephon + 1 pt/acre Folex

October 12 – 1 oz/acre Sharpen + MSO

October 16 – 1 qt/acre paraquat

Harvesting: October 20 using a John Deere CS690, with a finger stripper header. All round modules for each individual plot were marked and staged together in the field. Modules for each plot were weighed at Adobe Walls Gin.

Commercial ginning: Round modules for each individual plot (for six total groups) were staged together 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 individual plot's modules were ginned and then repeated for each individual plot in the trial.

Remnants were ejected from the bale press and weighed at the completion of the individual plot's ginning, but not sampled for USDA-AMS classing. Only data from commercial bales are included in classing data for each individual plot.

Lint value: Table 1 is based on CCC Loan value from commercial ginning and USDA-AMS classing results.

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Appendix - McCloy Irrigated Foliar Fertilizer Trial – Amarillo 2021 cotton heat units and weather data.

### **Acknowledgements**

Adobe Walls Gin would like to thank Craig McCloy for committing equipment, land, and time to conduct and manage the trial. This trial required a high level of planning, management, and skill for execution. Detailed ginning of trial modules was performed by Malcom Jones, Aaron Moore, and the Adobe Walls Gin ginning crew and a big thank you is extended to this hard-working group.



Table 1. Harvest results for the center pivot irrigated foliar fertilizer trial, McCloy Farm, Pringle, TX, 2021.

N rate	Lint turnout	Seed turnout	Bur cotton yield	Lint yield	Seed yield	Lint loan value	Lint loan value	Net gin credit	Fertilizer cost	Net value
lb/acre	----- % -----		----- lb/acre -----			\$/lb		----- \$/acre -----		
Untreated check	35.7	41.2	4312	1540	1778	0.5617	866	62	0	928 a
Foliar blend	36.6	41.7	4305	1574	1794	0.5576	878	64	14	928 a
Test average	36.1	41.5	4309	1557	1786	0.5597	872	63	7	928
CV, %	0.3	0.6	1.9	2.2	1.6	0.3	2.4	2.2	--	2.3
OSL	0.0143	0.1696	0.9261	0.3486	0.5793	0.1165	0.5471	0.2254	--	0.9866
LSD	0.3	NS	NS	NS	NS	NS	NS	NS	--	NS

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.

\$230/ton for seed.

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

**Foliar fertilizer blend cost was \$14.00/acre.**

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

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



Table 2. Commercial classing treatment means for the center pivot irrigated foliar fertilizer trial, McCloy Farm, Pringle, TX, 2021.

Treatment	Color digit 1	Color digit 2	Leaf grade	Staple 32nds inch	Micronaire units	Extraneous matter % incidence level 1 bark	Strength g/tex	Rd %	+b %	Trash % area	Uniformity %	Length 100ths inch	Loan rate cents/lb
Untreated check	1.9	1.0	3.4	36.8	4.1	11.9	31.7	79.1	9.2	3.9	81.5	114.6	56.17
Foliar blend	2.0	1.0	3.5	36.8	4.1	20.0	31.6	79.2	9.0	4.1	81.5	114.5	55.76
CV, %	2.8	--	0.8	0.2	2.9	41.2	0.3	0.1	1.6	0.3	0.1	0.2	0.3
OSL	0.2814	--	0.0352	0.8269	0.9031	0.2674	0.2431	0.2094	0.2994	0.0023	1.0000	0.6744	0.1165
LSD	NS	--	0.1	NS	NS	NS	NS	NS	NS	0.1	NS	NS	NS

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 treatment summaries by individual plot for the center pivot irrigated foliar fertilizer trial, McCloy Farm, Pringle, TX, 2021.

Replicate number	Bale count in replicate mean	Treatment	Color digit 1	Color digit 2	Leaf grade	Staple 32nds inch	Micronaire units	Extraneous matter % incidence level 1 bark	Strength g/tex	Rd %	+b %	Trash % area	Uniformity %	Length 100ths inch	Loan rate cents/lb
1	130	Untreated check	1.9	1.0	3.3	36.7	4.2	7.6	31.6	78.9	9.3	3.8	81.4	114.1	56.24
2	110	Untreated check	1.7	1.0	3.1	36.9	4.1	9.1	31.8	79.4	9.3	3.4	81.6	114.9	56.69
3	132	Untreated check	2.1	1.0	3.7	36.8	4.0	18.9	31.7	79.0	9.0	4.6	81.5	114.8	55.58
Mean across															
	372 total bales	all replicates ==>	1.9	1.0	3.4	36.8	4.1	11.87	31.7	79.1	9.2	3.9	81.5	114.6	56.17
1	137	Foliar blend	1.8	1.0	3.4	36.6	4.0	18.2	31.4	78.9	9.4	4.0	81.4	114.1	55.86
2	114	Foliar blend	1.9	1.0	3.2	36.8	4.2	7.0	31.7	79.7	9.0	3.6	81.6	114.6	56.53
3	123	Foliar blend	2.1	1.0	3.8	36.9	4.0	34.9	31.7	79.1	8.7	4.8	81.6	114.9	54.89
Mean across															
	374 total bales	all replicates ==>	2.0	1.0	3.5	36.8	4.1	20.03	31.6	79.2	9.0	4.1	81.5	114.5	55.76

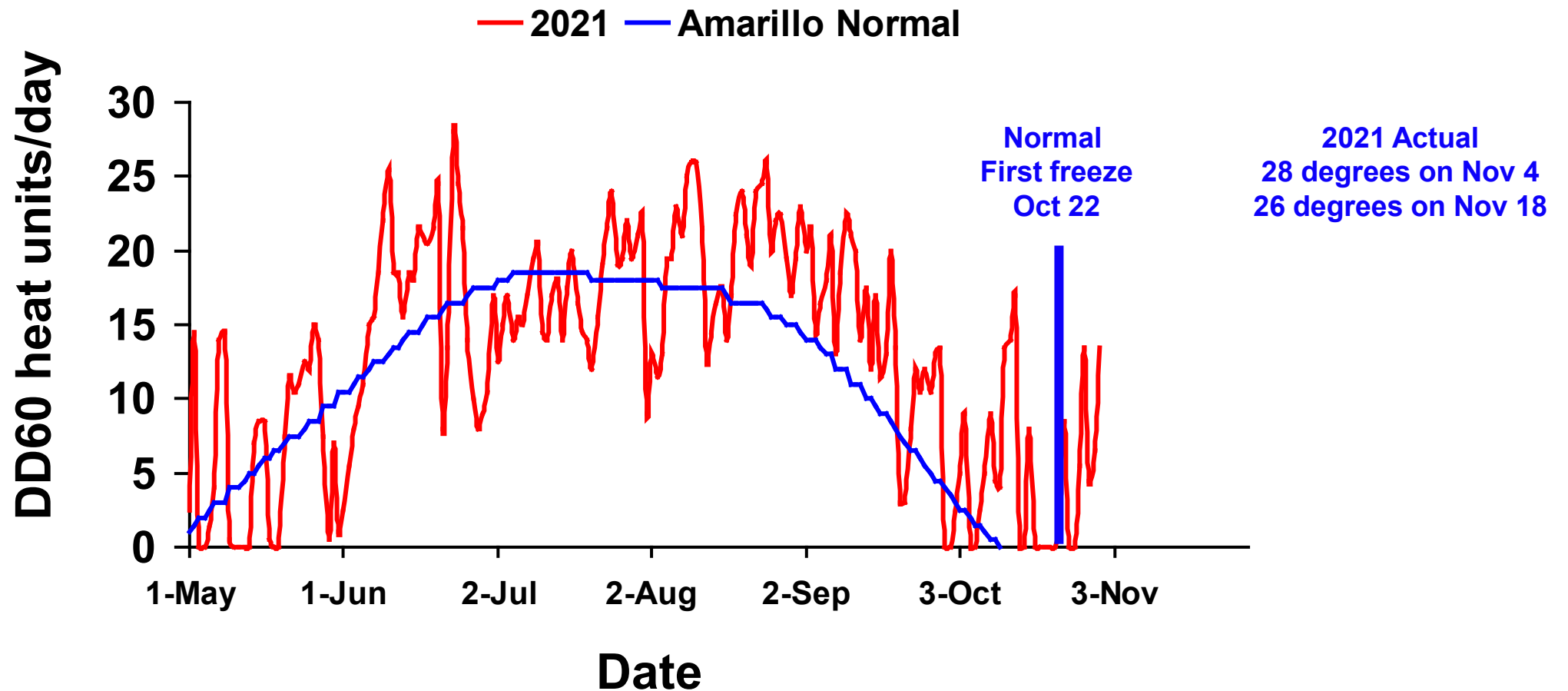


# Appendix

**McCloy Irrigated Foliar Fertilizer Trial – Amarillo 2021 cotton  
heat units and weather data.**

# Amarillo

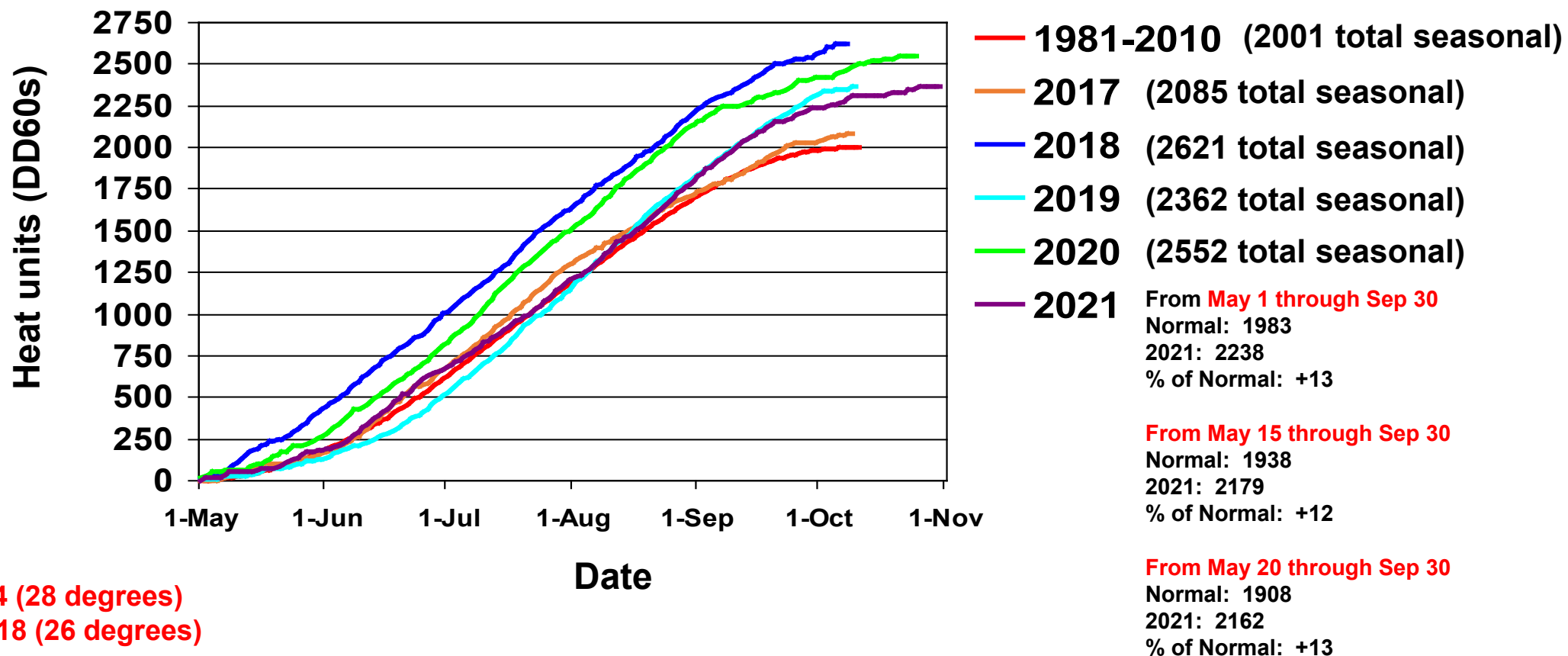
## 30-Year Normal (1981-2010) and 2021 Daily Heat Units



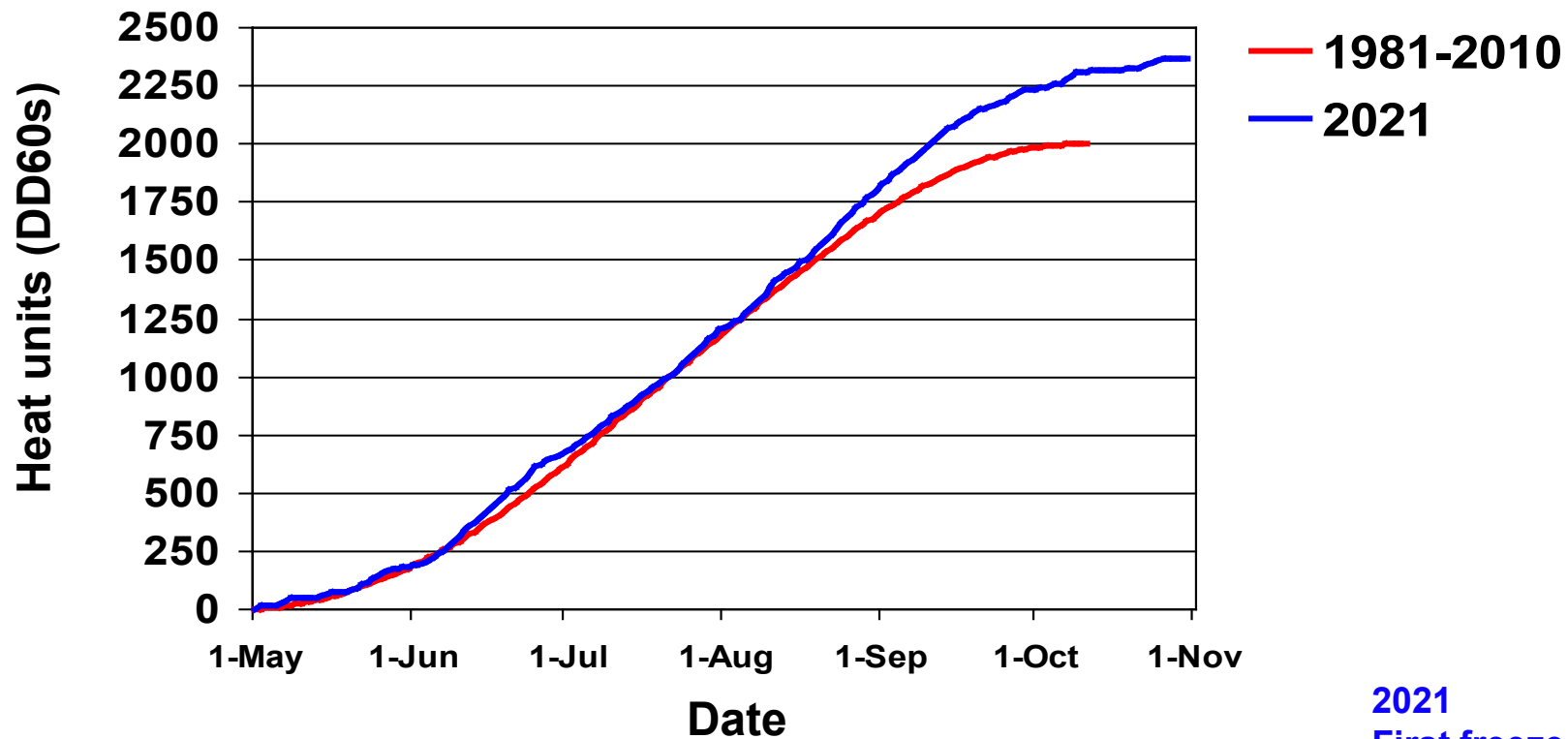
# Amarillo 30-Yr Normal (1981-2010) vs. 2017, 2018, 2019, 2020, and 2021

## Cotton Heat Unit Accumulation

### From May 1 Through First Hard Freeze



# Amarillo 30-Yr Normal (1981-2010) vs. 2021 Cotton Heat Unit Accumulation From May 1

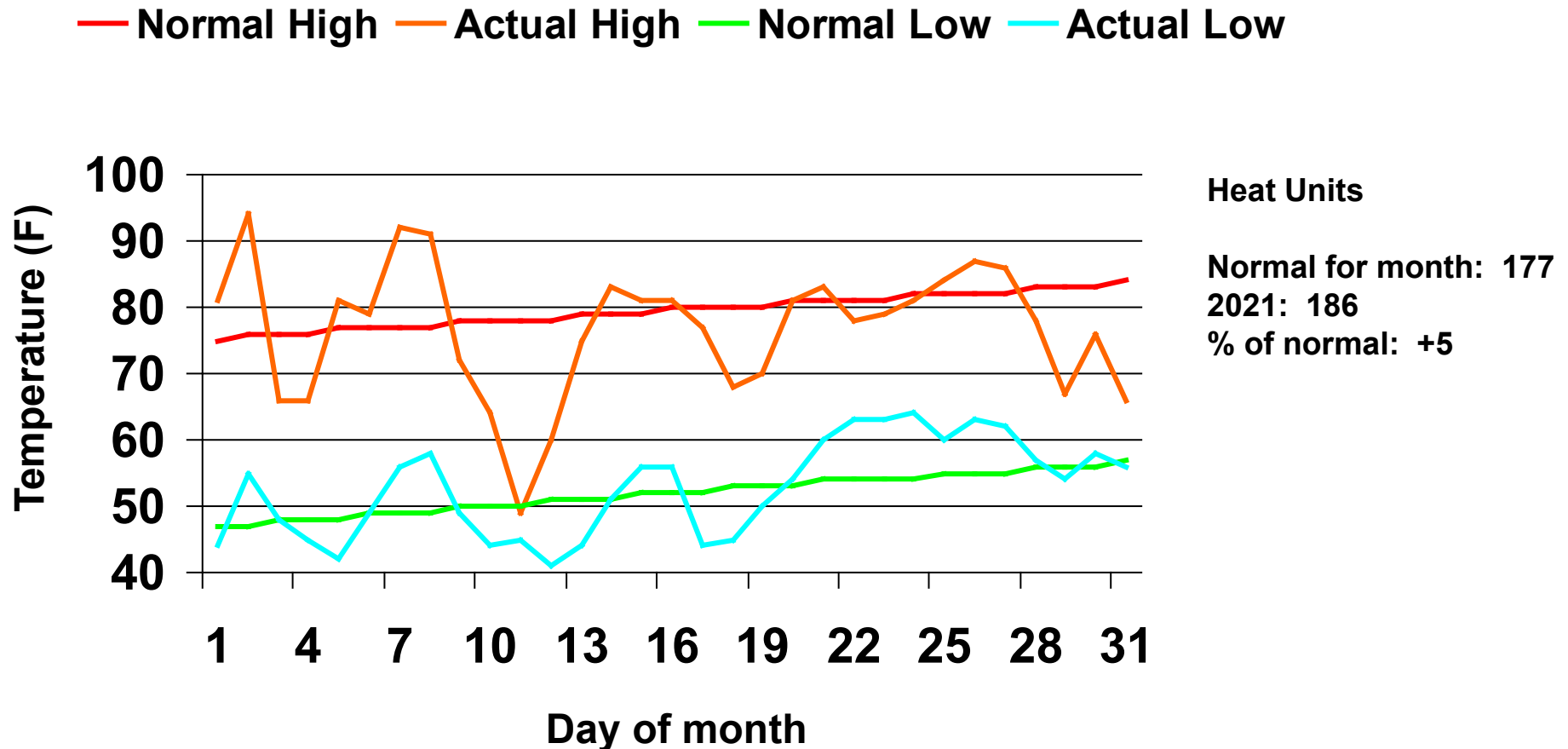


2021

First freeze on Nov 4 (28 degrees)  
Hard freeze on Nov 18 (26 degrees)

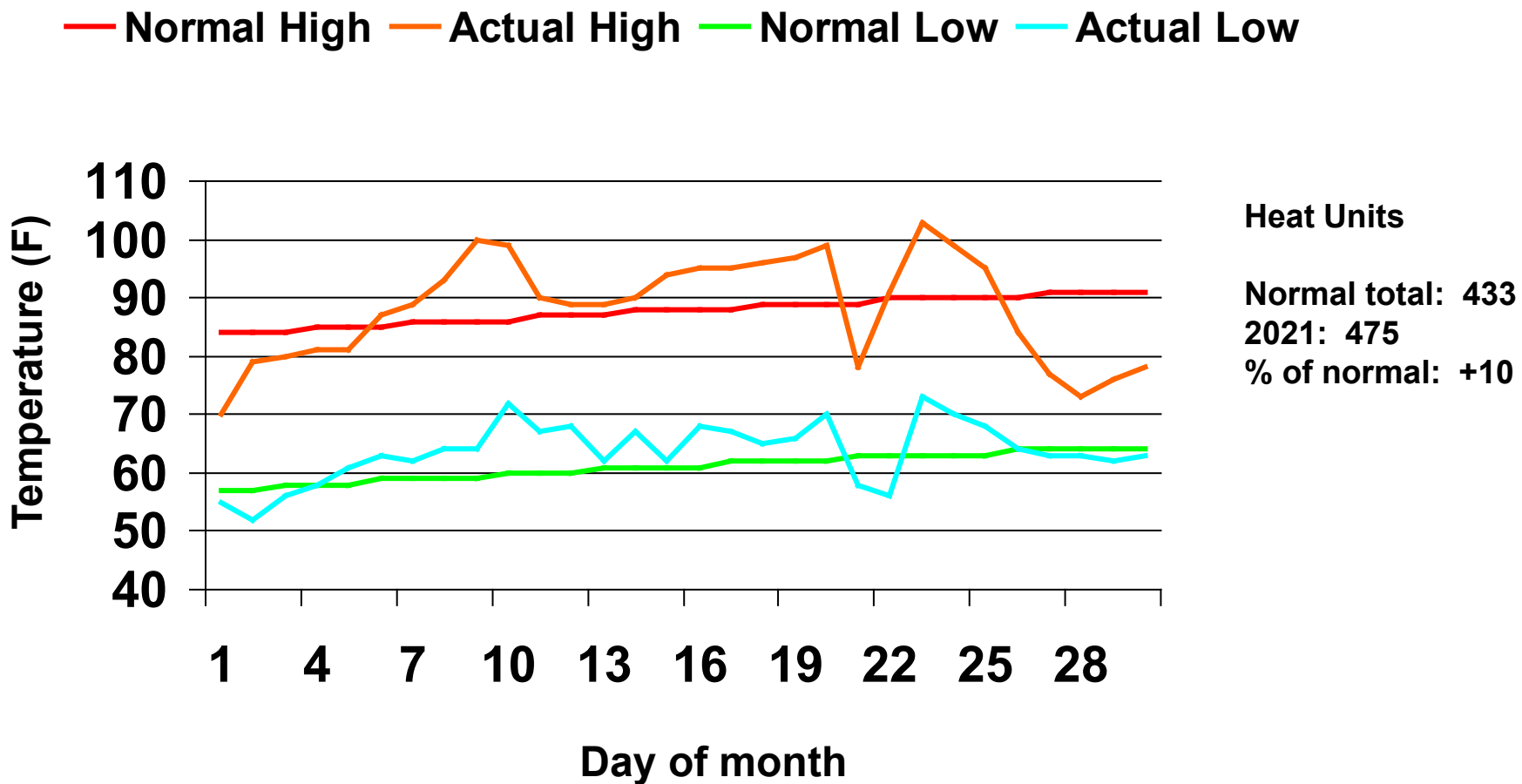
# Amarillo

## 30-Yr Normal (1981-2010) and May 2021 Air Temperatures



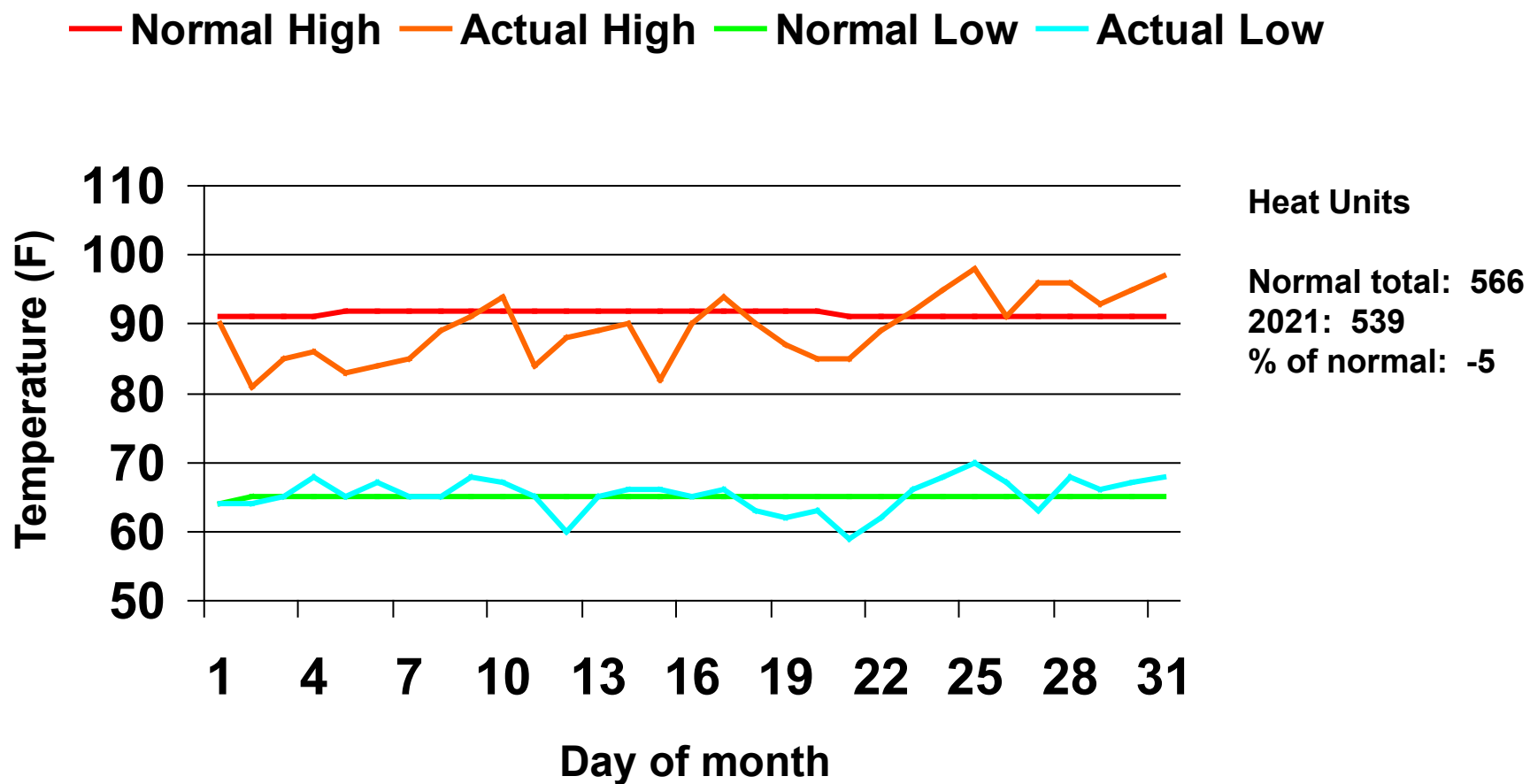
# Amarillo

## 30-Yr Normal (1981-2010) and June 2021 Air Temperatures



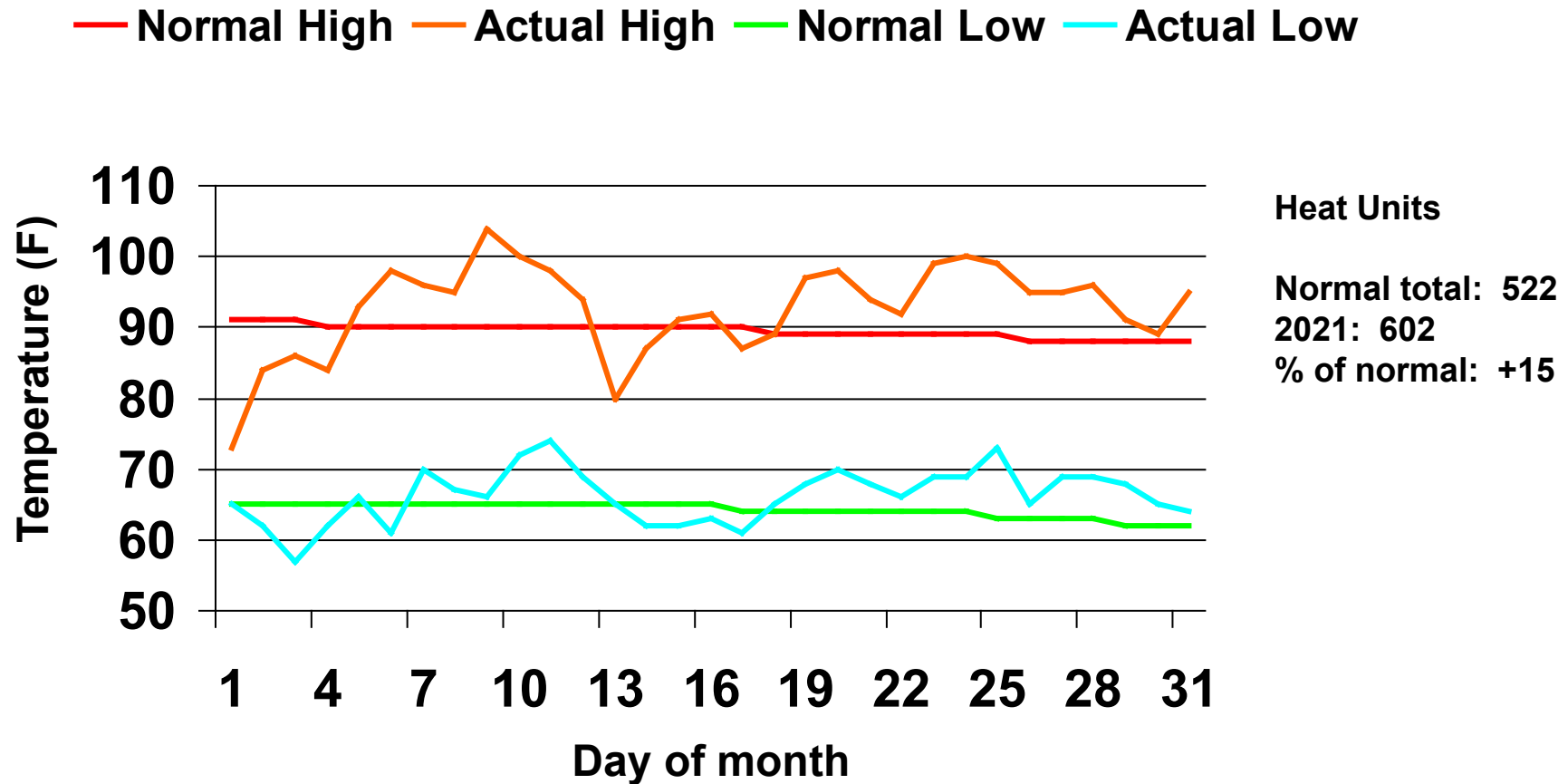
# Amarillo

## 30-Yr Normal (1981-2010) and July 2021 Air Temperatures



# Amarillo

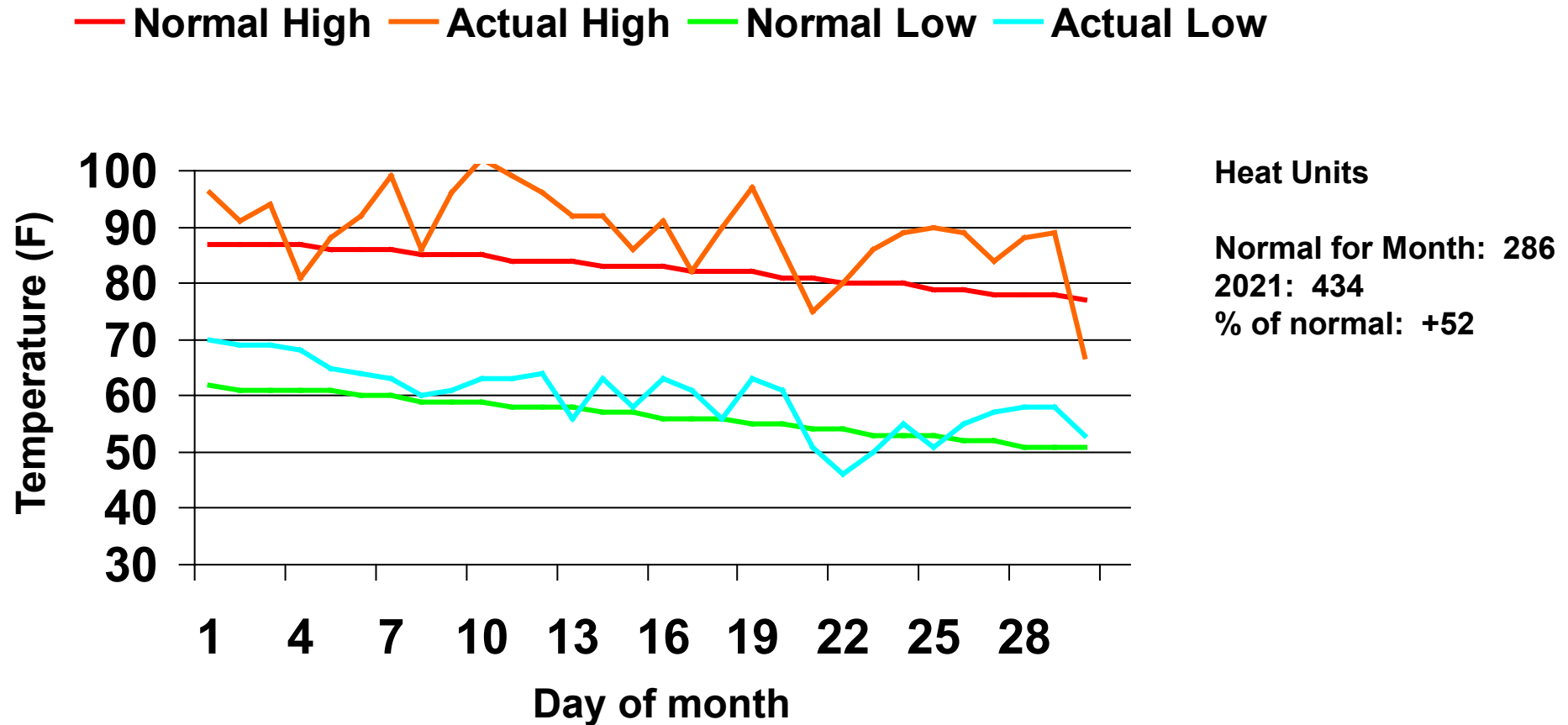
## 30-Yr Normal (1981-2010) and August 2021 Air Temperatures





# Amarillo

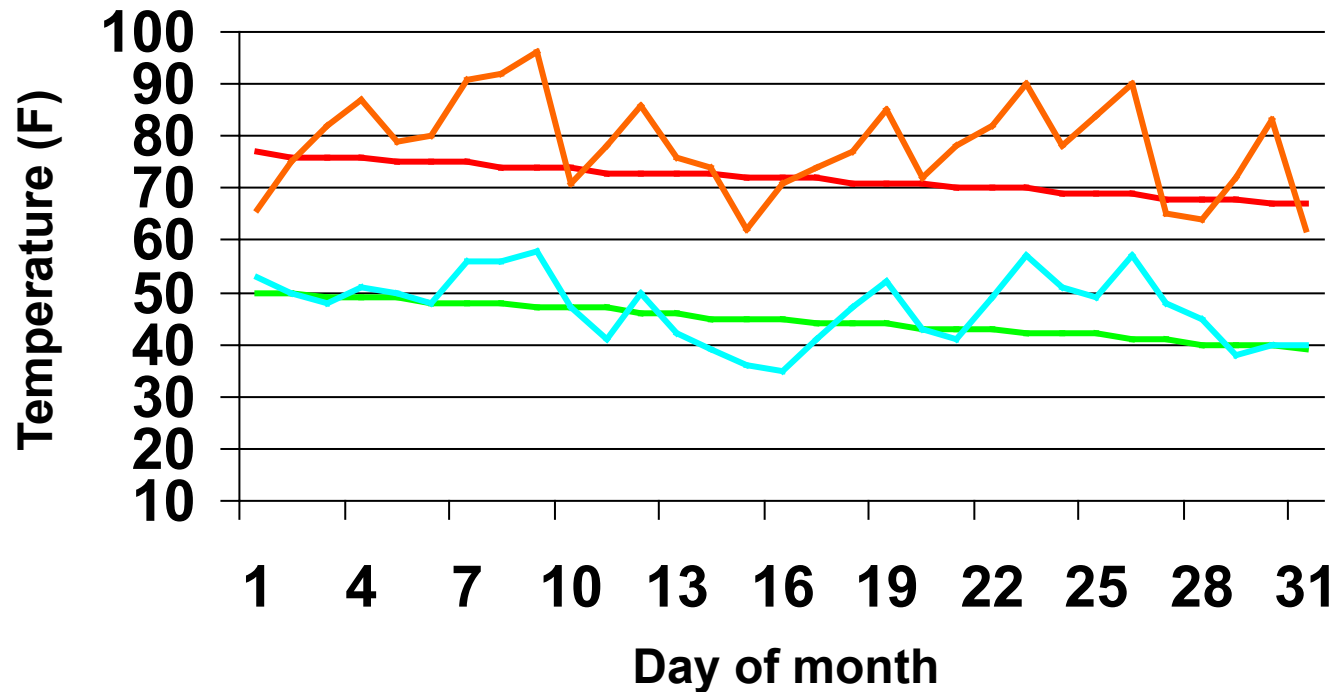
## 30-Yr Normal (1981-2010) and September 2021 Air Temperatures



# Amarillo

## 30-Yr Normal (1981-2010) and October 2021 Air Temperatures

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



Heat Units

Normal: 19

2021: 133

% of normal: +600

First freeze on Nov 4 (28 degrees)

Hard freeze on Nov 18 (26 degrees)