



2022 NexGen 3195 B3XF Nitrogen Rate Trial – Lonestar Gin

**Dave Davis and Ryan Davis – Davis Brothers Farm
Pampa, TX**

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

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. Seed weights are captured for each variety and thus seed value is determined. Net gin credit includes seed value and is calculated by subtracting the ginning cost from the seed value. 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.

Excess nitrogen (N) can have a very significant negative impact on crop maturity and quality but has been poorly researched in this region. Since many growers in our service area are rotating to cotton following corn, N rate trials have been established for the past three growing seasons. In 2022, an N management trial was planned and executed in cooperation with Davis Brothers Farms (Dave Davis and Ryan Davis) near Pampa, TX.

The trial area was deep sampled to a depth of 48 inches by Ryan Livingston with Livingston Ag. Approximately 20 soil cores were taken, and each partitioned into increments of 0-6, 6-12, 12-18, 18-24, 24-36, and 36-48 inches. Soil for each increment was combined across cores. Therefore, six total samples were submitted to Servi-Tech Laboratory in Amarillo for nitrate-N analyses. The 0-to-24-inch profile contained a total of 28 lb/acre residual nitrate-N, and the 0-to-48-inch profile contained a total of 70 lb/acre residual nitrate-N. Using current Extension recommendations of 50 lb N/bale of yield goal, a total of 150 lb N/acre would be required for 3-bale/acre production. Once the 0-to-24-inch profile nitrate-N is subtracted from that amount, a typical N fertilizer recommendation would be 122 lb N/acre.

This trial included an unfertilized control (0 N) and rates of 50, 100, and 150 lbs N/acre. Four replicates of N rates were applied in a scientifically valid randomized complete block experimental design. The previous crop was corn, and no-till was used. A coulter-knife application was used to inject N fertilizer on April 11. Anhydrous ammonia, 82-0-0, was used as the N source. NexGen 3195 B3XF variety was planted May 18 at 60,000 seed/acre rate using the grower's planter. This field was center-pivot irrigated.

Stand establishment was challenged due to various storm events that occurred shortly after planting. A damaging hail/wind event was encountered which substantially impacted plants, resulting in a thin stand. Due to the high plant stand variability, no in-season data were collected. It was estimated that the final plant stand was approximately 18,000 plants/acre, with a significant number of yield-reducing long skips down the row. A decision was made to follow through with harvest to gain additional information with respect to N fertilization impact on low density, non-uniform plant stand. A significant replicate effect was noted in the analysis of variance model, and this was likely due to the western two replicates having lower seed cotton yield than the others. Overall, the data acquisition from this site provides a valuable observation of the effect of N fertilization on commercial lint yield and quality in marginal cotton stands.

Harvest results indicated that statistically significant differences were observed among N rates. Lint yields ranged from a low of 1173 lb/acre with the 0 lb/acre N rate to a high of 1276 lb/acre for the 150 lb/acre N rate treatment (Table 1). In this field in 2022, a statistically significant lint yield response to N fertilization did not occur. When averaged across all commercially ginned and classed bales for each N rate, Loan value for lint did not vary substantially and averaged \$0.5675/lb. Net value/acre includes the sum of lint Loan value on a per acre basis and net gin credit/acre and then subtracting N fertilizer cost/acre. **N cost was determined based on \$1250/ton for 82-0-0 (anhydrous ammonia) on the date of application.** Differences in net value/acre were not statistically significant among N treatments. Due to the extremely expensive 82-0-0 price, net value/acre value was numerically highest for the 0 N/acre rate, and was reduced by marginal yield response and high N cost by increasing N rates. The values in \$/acre were 852, 847, 833, and 828, for the 0, 50, 100, and 150 lb/acre N rates, respectively. Therefore, N fertilization resulted in no statistically significant improvement in net returns in this trial. **The 0 N/acre rate statistically performed similarly to applied N in this trial.**

Therefore, the higher fertilizer prices encountered in the spring of 2022 would indicate that from the profit potential perspective, the 0 N fertilizer rate would not necessarily be a bad management decision in this trial.

Table 2 provides the USDA-AMS classing results from each bale for each N rate treatment and the averages of 11 or 12 commercially ginned bales per treatment. Averages indicate that color grades were predominantly 21, with only two bales with 31 color noted in the classing results. No apparent substantial differences in color grades were noted across N rates. The unfertilized check had the best leaf grades with an average of 1.7. Leaf grades of 1.8, 2.1, and 2.0 were noted for the 50, 100, and 150 lb-N rates, respectively. No apparent major differences were noted with respect to leaf grades across N rates. Average staple was over 36 32nds inch, with minimal impact of N fertilization observed. Average micronaire values were highest in the unfertilized check (4.15) and generally slightly decreased with higher N rates. Micronaire averages were 3.98, 4.04, and 4.02 for the 50, 100, and 150-lb N rates, respectively. Loan chart micronaire discounts are triggered at values of 3.4 and lower. **There was a trend to produce lower micronaire lint with higher N rates, but the values were all still high**

enough to not encounter a low micronaire discount in the CCC Loan chart. That discount triggers at micronaire values of 3.4 and below. So, even though there were minor micronaire reductions due to N fertilization, they were not substantial enough to trigger any micronaire discounts. No bark contamination was noted in commercial bales in any of the N treatments. Average fiber strength ranged from 30.1 to 31.1 g/tex, and appeared essentially unaffected by N fertilization. Uniformity ranged from 81.1 to 81.4% and also appeared to be unaffected by N fertilization. Fiber quality parameters are integrated into the CCC Loan value. Average Loan values were 56.47, 56.69, 56.82, and 57.02 cents/lint-lb for the unfertilized check, 50, 100, and 150-lb N rates, respectively. **Therefore, in this commercial field trial, negative CCC Loan value impacts due to N fertilization in a low density, low uniformity field were not documented.**

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: 3225 ft

Previous crop: corn harvested in 2021

Tillage system: no-till

N application method and date: coulter rig/knifed in using grower's rig on April 13

Planted: May 18

Replicates: 4 replicates of 0, 50, 100, and 150 lb N/acre in a randomized complete block design

Plot width: 16 rows with N rate application, 8 center plot rows harvested

Plot length: fertilized plot length ~3200 ft (varied due to pivot arc), harvested plot length ~2,600 ft (varied by plot)

Variety planted: NexGen 3195 B3XF

Seeding rate: 60,000 seed/acre

30-inch rows under center pivot irrigation

Total rainfall: not recorded

Total irrigation: ~9.8 inches

Pre-water - April – 2.0, May – 0.8, June – 0.0, July – 4.0, August – 3.0

Herbicide management:

Preplant burndown (Mar 19) – 7.5 oz/acre Panther (flumioxazin) + 20 oz/acre 2,4-D LV6 + 30 oz/acre Roundup Powermax

Preemergence (May 20) – 8 oz/acre dicamba + 1 pt/acre diuron + 30 oz/acre paraquat

Post emergence (July 2) – 10 oz/acre Outlook + 12 oz/acre Engenia

Post emergence (July 5) – 12 oz/acre Volunteer (clethodim) + 1 qt/acre Liberty

Post emergence (Aug 18) – 1 qt/acre Roundup Powermax + 1 qt/acre Liberty

Insecticides: 5 oz/acre acephate (July 2)

Plant growth regulators: 16 oz/acre mepiquat chloride (July 18), 32 oz/acre mepiquat chloride (August 18)

Fertilizer: 0 - 42 - 8 - 11S - 0.5 Zn applied to entire trial, various N rates applied to experimental units

Harvest aids: 32 oz/acre ethephon (Oct)

Harvesting: Dec 5 using a 8-row John Deere CS690, with harvested area determined by utilizing the stripper GPS monitor. Approximately 2600 ft of plot length was harvested in one round module per individual plot. Round modules were weighed using the CS690 scale, and all round modules (from each of 4 replicates = 4 total) for each fertilizer treatment were weighed at the Lonestar Gin.

Commercial ginning: Round modules for all 4 replicates of each nitrogen rate treatment were staged together and commercially ginned separately by Lonestar Gin. Commercial ginning included: cleaning module feeder, clearing gin stream, dumping seed rolls, capturing seed weight, and purging remnant bale in press. This process was initiated before the first module was ginned and then repeated for each nitrogen rate treatment 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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Table 1. Harvest results for the center pivot irrigated NG 3195 B3XF nitrogen rate trial, Davis Farm, Pampa, TX, 2022

Table 2. Commercial classing data for the center pivot irrigated NG 3195 B3XF nitrogen rate trial, Davis Farm, Pampa, TX, 2022

Appendix – Davis Brothers 2022 NG 3195 B3XF nitrogen rate trial – Preplant residual NO₃-N, lint yield quadratic regression function, net value/acre quadratic regression function, and Amarillo 2022 cotton heat units and weather data.

Acknowledgements

Lonestar Gin would like to thank Dave Davis and Ryan Davis for committing equipment, land, and time to conduct and manage the trial. Ethan Greer harvested the trial and we are very appreciative of his excellent skills and cooperation. Gratitude is expressed to Ryan Livingston for deep soil sampling the project and to 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 NexGen 3195 B3XF nitrogen rate trial, Davis Farm, Pampa, TX, 2022.

N rate	Lint turnout	Seed turnout	Bur cotton yield	Lint yield	Seed yield	Lint loan value	Lint loan value	Net gin credit	N cost	Net value
lb/acre ----- % ----- ----- lb/acre ----- \$/lb ----- ----- \$/acre -----										
0	35.0	41.5	3352	1173	1393	0.5647	663	189	0	852 a
50	34.3	41.5	3530	1210	1466	0.5669	686	199	38	847 a
100	34.4	42.0	3597	1238	1509	0.5682	703	206	76	833 a
150	34.6	42.5	3686	1276	1566	0.5702	728	215	114	828 a
Test average	34.6	41.9	3541	1224	1484	0.5675	695	202	57	840
CV, %	--	--	2.9	2.9	2.9	--	2.9	2.9	--	3.1
OSL	--	--	0.0078	0.0165	0.0019	--	0.0087	0.0008	--	0.5694
LSD	--	--	133	46	56	--	26	8	--	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.

\$430/ton for seed.

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

N cost was determined based on \$1250/ton of 82-0-0.

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

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



Table 2. Commercial classing data for the center pivot irrigated NexGen 3195 B3XF nitrogen rate trial, Davis Farm, Pampa, TX, 2022.

N rate 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
0 lb N/acre															
912442	21-1	2	1	2	37	4.2	.	.	30.4	82.0	7.8	2	81.6	115	57.15
912443	21-1	2	1	3	37	4.2	.	.	31.3	81.7	7.9	3	82.8	117	56.85
912444	21-1	2	1	3	36	4.2	.	.	30.2	81.5	7.7	3	82.2	113	56.25
912445	31-1	3	1	2	37	4.2	.	.	31.8	79.3	8.1	1	83.0	114	56.90
912446	21-1	2	1	2	37	4.1	.	.	30.0	81.7	7.9	3	81.0	117	57.15
912447	21-1	2	1	3	38	4.2	.	.	31.8	81.3	8.3	2	82.1	119	56.95
912448	21-1	2	1	2	35	4.3	.	.	28.8	81.4	8.0	2	81.7	110	55.00
912449	21-2	2	1	2	37	4.1	.	.	28.9	80.0	8.1	2	82.4	116	57.05
912450	31-1	3	1	3	36	4.1	.	.	29.5	80.2	7.9	3	79.7	111	55.30
912451	21-1	2	1	2	36	4.1	.	.	28.9	81.2	8.0	2	80.9	111	56.45
912452	21-1	2	1	3	36	4.0	.	.	29.6	81.0	8.2	3	80.2	113	56.10
Average	--	2.2	1.0	2.5	36.5	4.15	0/11 bales	level 1 bark	30.1	81.0	8.0	2.4	81.6	114.2	56.47
50 lb N/acre															
912430	21-1	2	1	2	37	3.7	.	.	33.7	82.1	7.8	2	81.8	117	57.40
912431	21-1	2	1	2	36	4.0	.	.	30.3	81.7	7.6	3	81.8	113	56.60
912432	21-1	2	1	3	37	4.0	.	.	31.9	81.8	7.9	3	81.4	114	56.80
912433	21-1	2	1	3	37	4.1	.	.	32.2	81.8	8.0	3	81.7	114	56.80
912434	21-1	2	1	2	37	4.0	.	.	30.2	81.1	8.1	2	80.6	116	57.15
912435	21-1	2	1	2	36	3.9	.	.	28.8	80.9	8.1	2	81.3	113	56.45
912436	21-2	2	1	3	37	4.1	.	.	31.4	80.4	8.2	3	81.0	114	56.80
912437	21-1	2	1	2	37	4.0	.	.	32.8	81.1	8.0	2	83.1	116	57.40
912438	21-2	2	1	3	35	4.0	.	.	28.7	80.4	8.1	2	80.0	108	54.55
912439	21-1	2	1	2	36	4.1	.	.	31.0	80.7	8.0	2	80.4	112	56.75
912440	21-2	2	1	2	37	4.0	.	.	28.5	80.8	7.9	2	81.3	114	57.00
912441	21-2	2	1	2	36	3.9	.	.	30.3	80.4	8.1	2	81.3	112	56.60
Average	--	2.0	1.0	2.3	36.5	3.98	0/12 bales	level 1 bark	30.8	81.1	8.0	2.3	81.3	113.6	56.69



Table 2 (continued). Commercial classing data for the center pivot irrigated NexGen 3195 B3XF nitrogen rate trial, Davis Farm, Pampa, TX, 2022.

N rate 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
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100 lb N/acre

912418	21-1	2	1	2	37	3.9	.	.	32.7	82.2	7.6	2	82.4	116	57.35
912419	21-1	2	1	3	37	4.0	.	.	30.3	82.0	7.8	3	81.3	114	56.65
912420	21-2	2	1	2	37	4.0	.	.	30.8	81.4	7.9	2	82.2	114	57.20
912421	21-2	2	1	3	37	4.0	.	.	32.7	81.2	7.9	3	82.0	117	56.85
912422	21-1	2	1	3	37	4.2	.	.	31.1	81.5	8.1	3	82.0	114	56.85
912423	21-1	2	1	2	38	4.0	.	.	31.8	81.8	8.1	2	81.7	118	57.40
912424	21-1	2	1	3	37	4.1	.	.	30.9	81.3	8.2	3	81.8	117	56.65
912425	21-1	2	1	3	37	4.1	.	.	30.7	81.6	8.1	3	82.3	116	56.70
912426	21-1	2	1	2	37	4.0	.	.	31.6	80.8	8.3	2	81.7	114	57.30
912427	21-1	2	1	2	37	4.0	.	.	30.6	81.1	8.4	2	81.6	116	57.15
912428	21-2	2	1	2	37	4.0	.	.	30.5	80.4	8.2	2	82.4	115	57.20
912429	21-1	2	1	2	35	4.2	.	.	28.9	81.7	8.3	2	79.9	110	54.55
Average	--	2.0	1.0	2.4	36.9	4.04	0/12 bales	level 1 bark	31.1	81.4	8.1	2.4	81.8	115.1	56.82

150 lb N/acre

912406	21-2	2	1	3	37	4.0	.	.	29.9	80.8	7.7	3	82.2	117	56.60
912407	21-2	2	1	2	37	4.1	.	.	33.5	81.2	7.6	2	81.4	114	57.40
912408	21-1	2	1	2	38	4.1	.	.	30.6	82.0	7.9	2	82.4	118	57.30
912409	21-2	2	1	2	37	4.0	.	.	31.5	81.0	7.9	2	82.0	115	57.35
912410	21-1	2	1	2	37	4.0	.	.	30.2	81.5	8.0	2	81.6	114	57.15
912411	21-1	2	1	2	37	4.1	.	.	30.7	81.7	8.0	2	82.7	115	57.20
912412	21-1	2	1	3	37	4.0	.	.	30.2	81.3	8.1	3	82.2	115	56.70
912413	21-2	2	1	2	37	4.0	.	.	29.9	80.4	8.1	2	80.8	117	57.05
912414	21-1	2	1	3	37	4.0	.	.	31.7	81.7	8.0	3	81.5	115	56.80
912415	21-1	2	1	3	37	4.0	.	.	31.6	81.0	8.2	3	81.8	117	56.80
912416	21-1	2	1	2	37	4.0	.	.	30.7	81.1	8.1	3	82.1	116	57.20
912417	21-1	2	1	3	37	3.9	.	.	30.9	81.3	8.0	3	81.3	114	56.65
Average	--	2.0	1.0	2.4	37.1	4.02	0/12 bales	level 1 bark	31.0	81.3	8.0	2.5	81.8	115.6	57.02



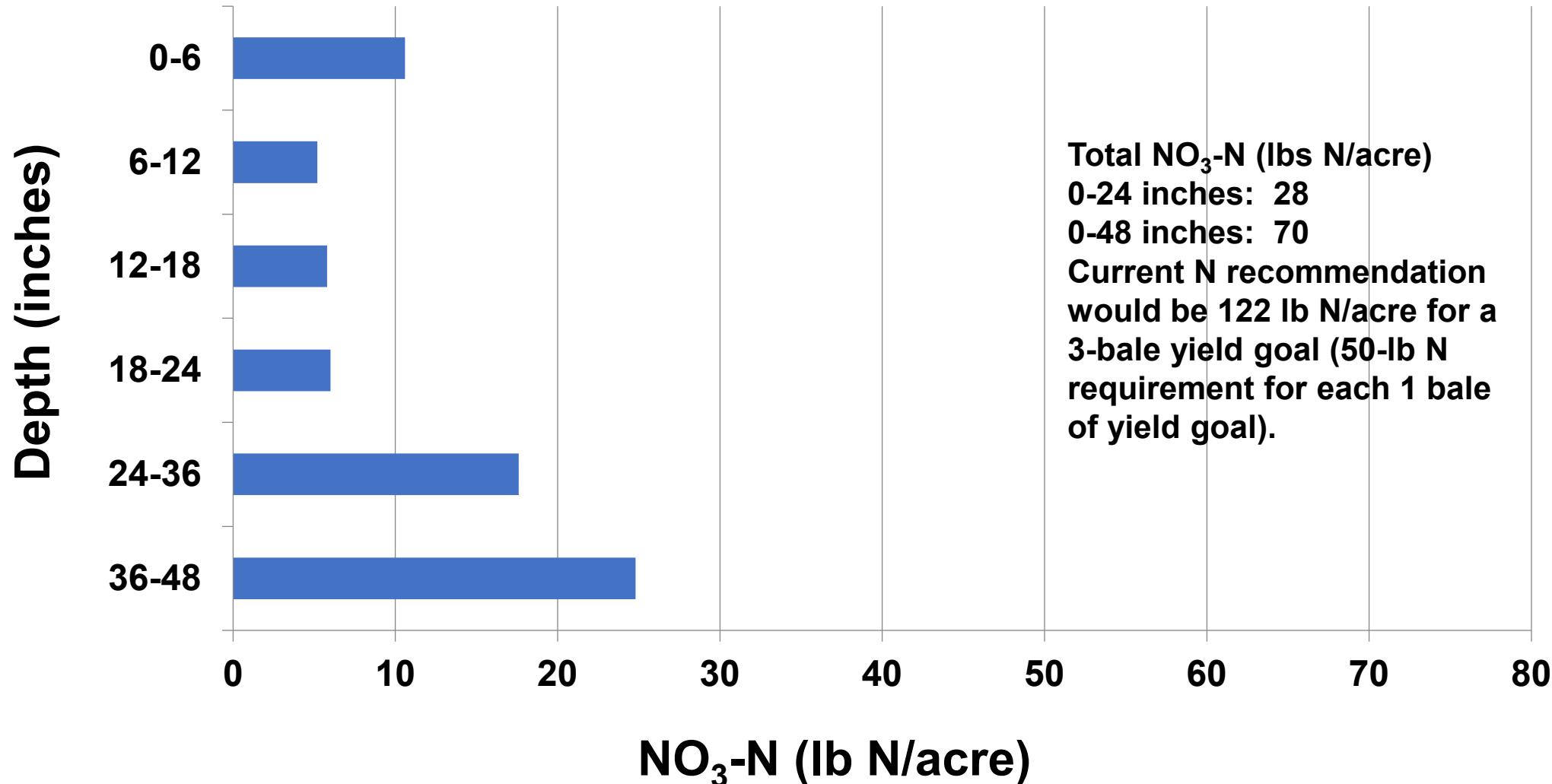
Appendix

**Davis Brothers 2022 NexGen 3195 B3XF - N Rate Trial –
Preplant residual NO₃-N, lint yield linear regression function,
net value/acre linear regression function, and Amarillo 2022
cotton heat units and weather data.**



$\text{NO}_3\text{-N}$ (Pounds N/Acre) vs. Depth (inches)

2022 Davis – Lonestar Gin Half Circle, Pampa

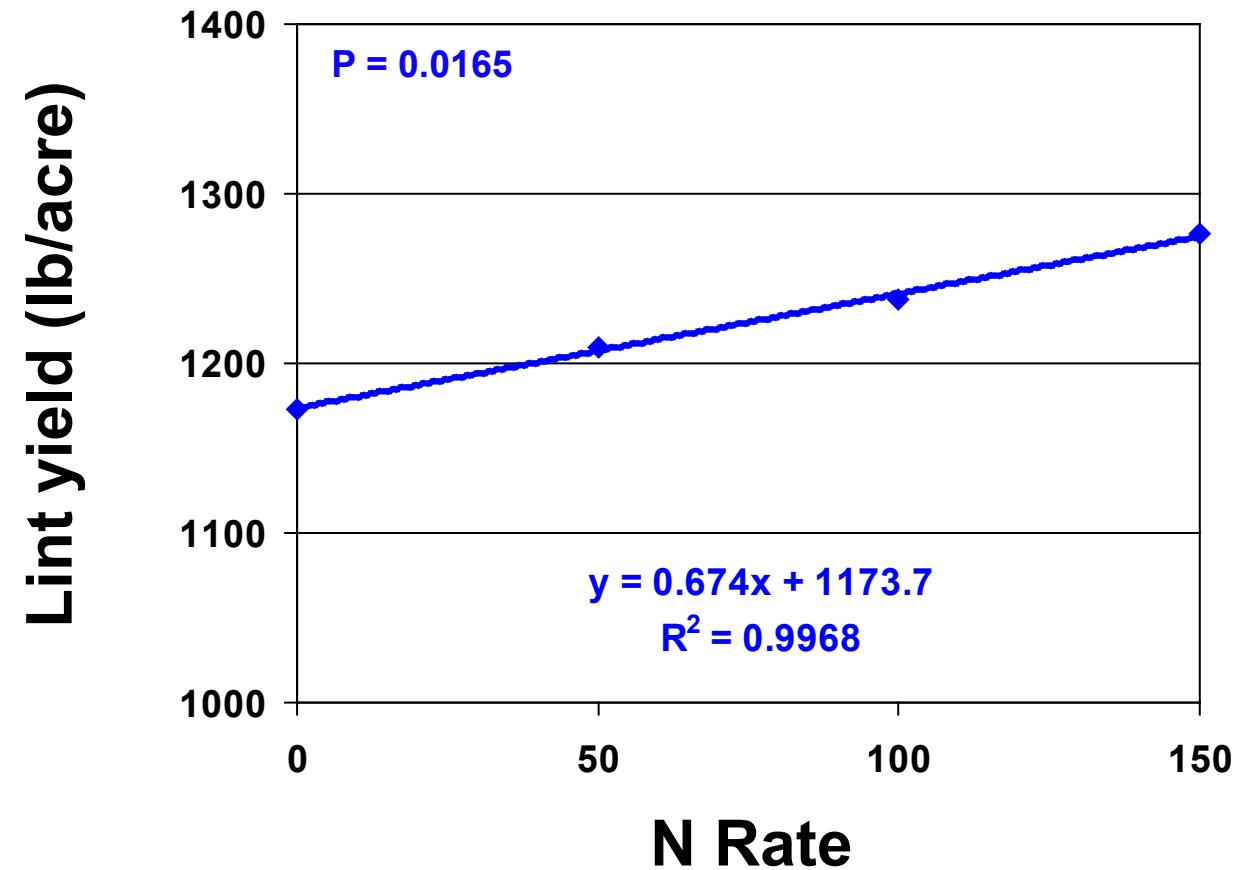




NexGen 3195 B3XF - N Rate Trial

Pampa, TX – 2022

4 Replicates



Planted: May 18
Harvested: Oct 31

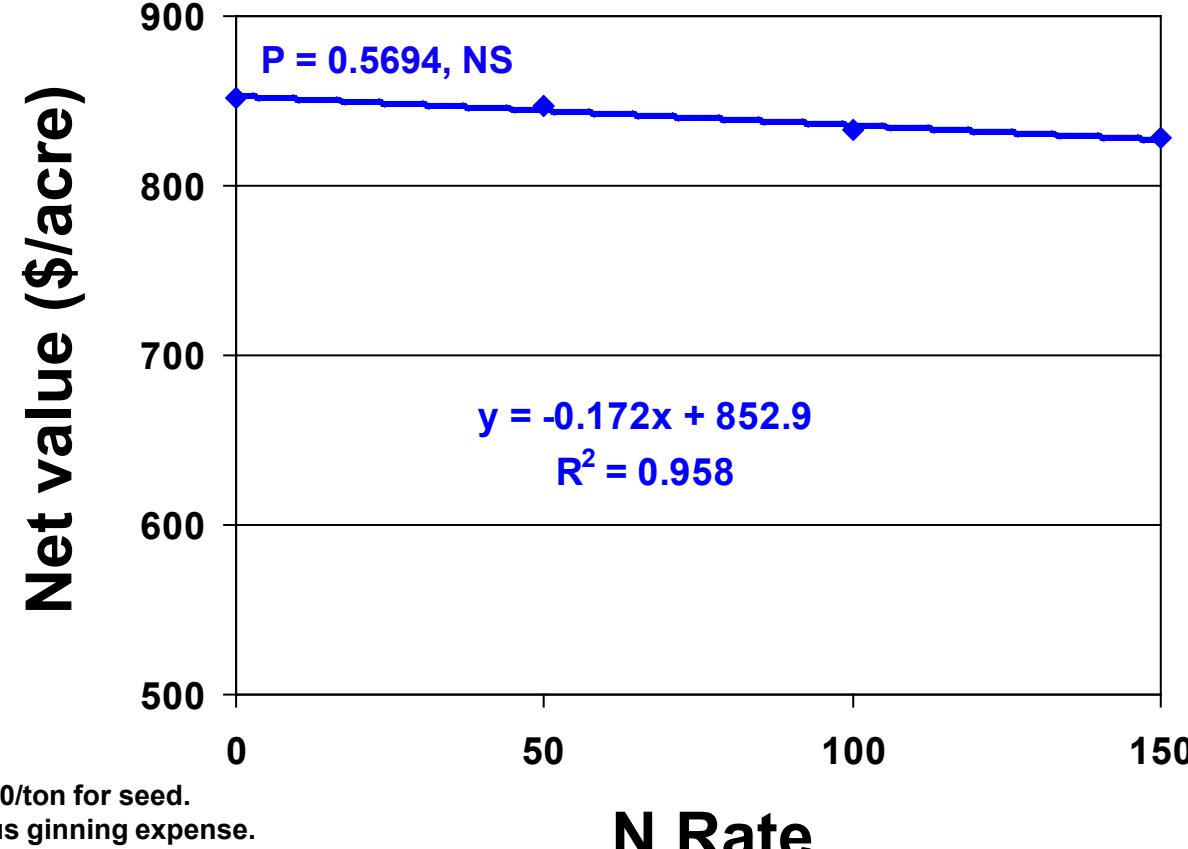


NexGen 3195 B3XF - N Rate Trial

Pampa, TX – 2022

4 Replicates

Assumes \$1250/Ton for 82-0-0



Assumes:

\$3.30/cwt commercial ginning cost, and \$430/ton for seed.

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

N cost was determined based on \$1250/ton of 82-0-0.

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

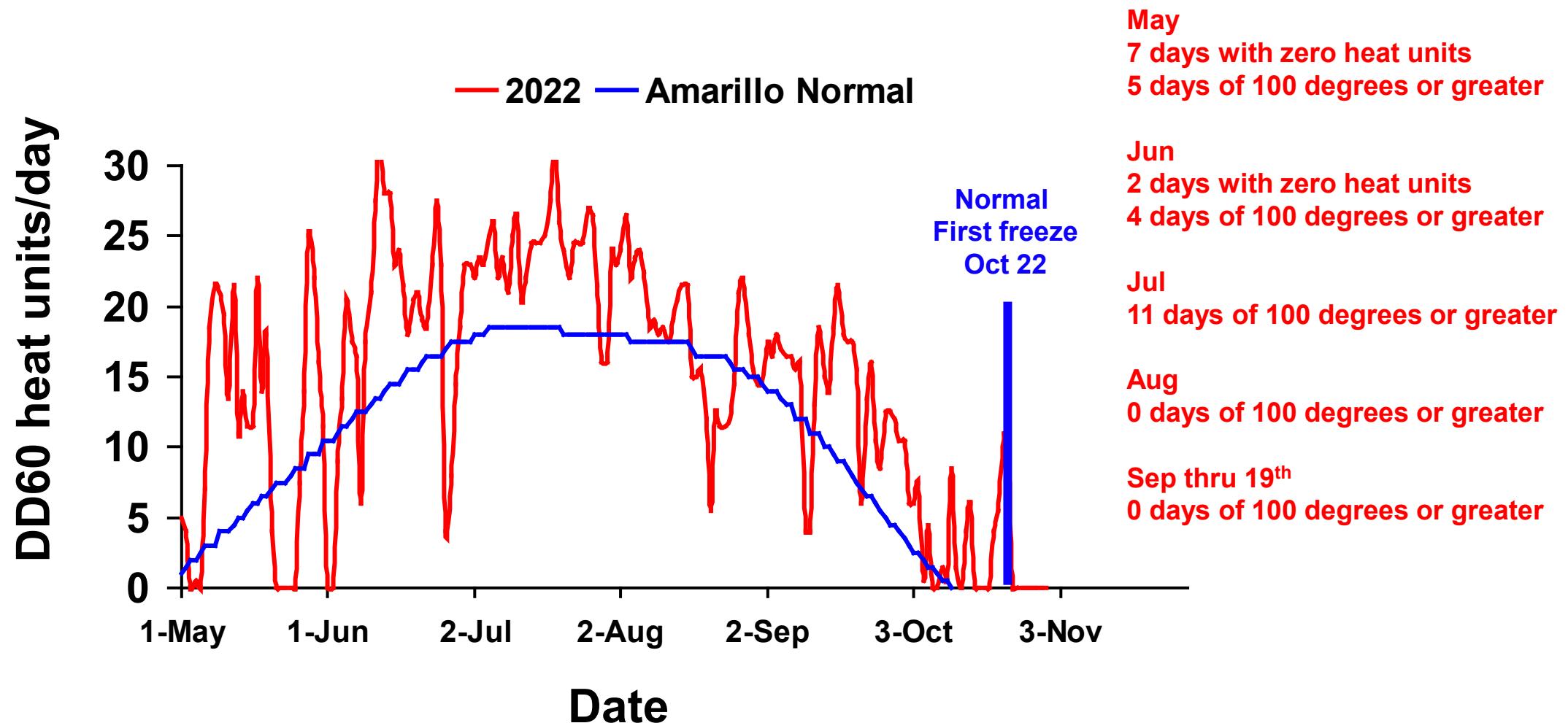
Value for lint based on CCC loan value from commercial ginning and USDA-AMS classing results.

N Rate

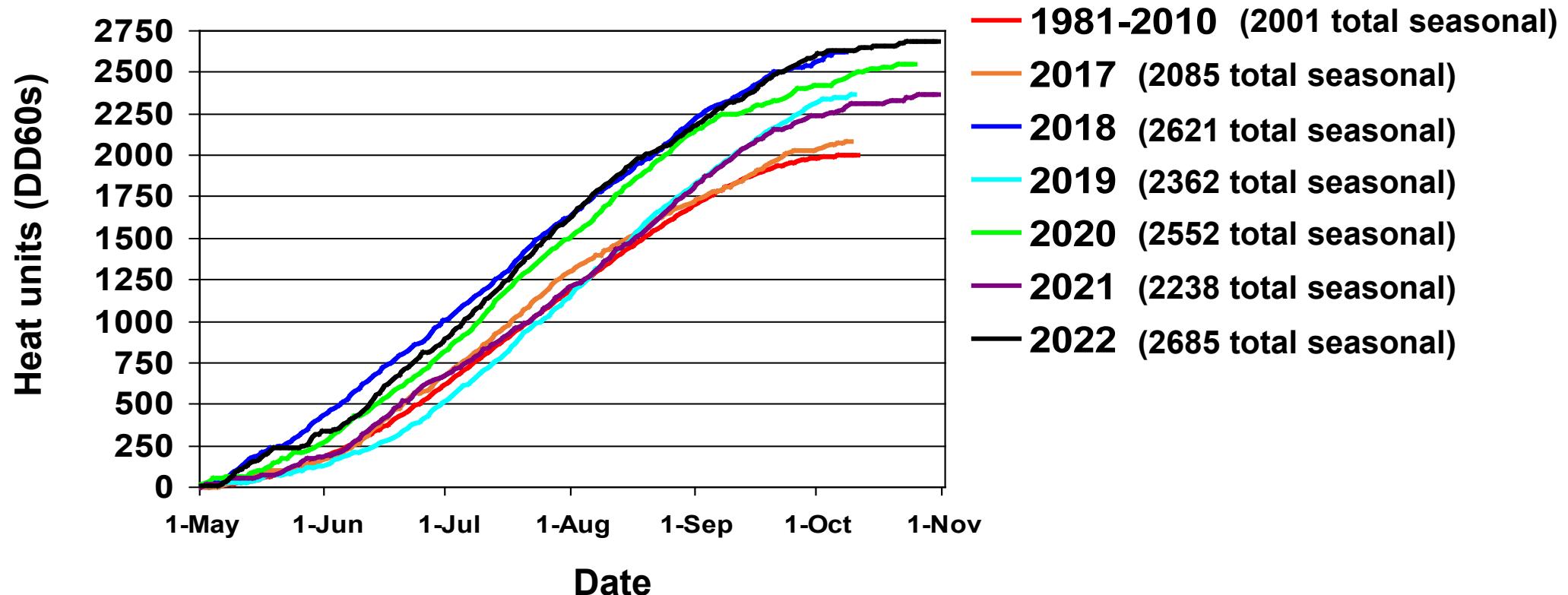
Planted: May 18
Harvested: Oct 31

Amarillo

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

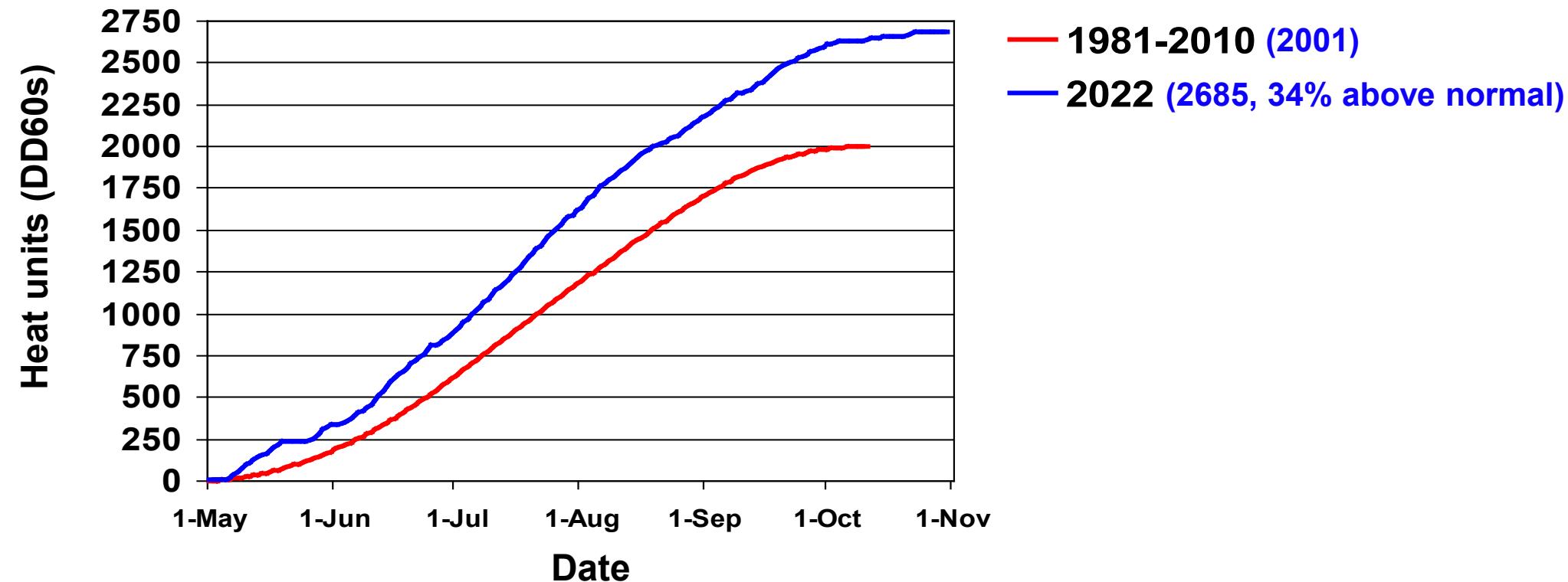


**Amarillo 30-Yr Normal (1981-2010)
vs. 2017, 2018, 2019, 2020, 2021, and 2022
Cotton Heat Unit Accumulation
From May 1 Through First Hard Freeze**



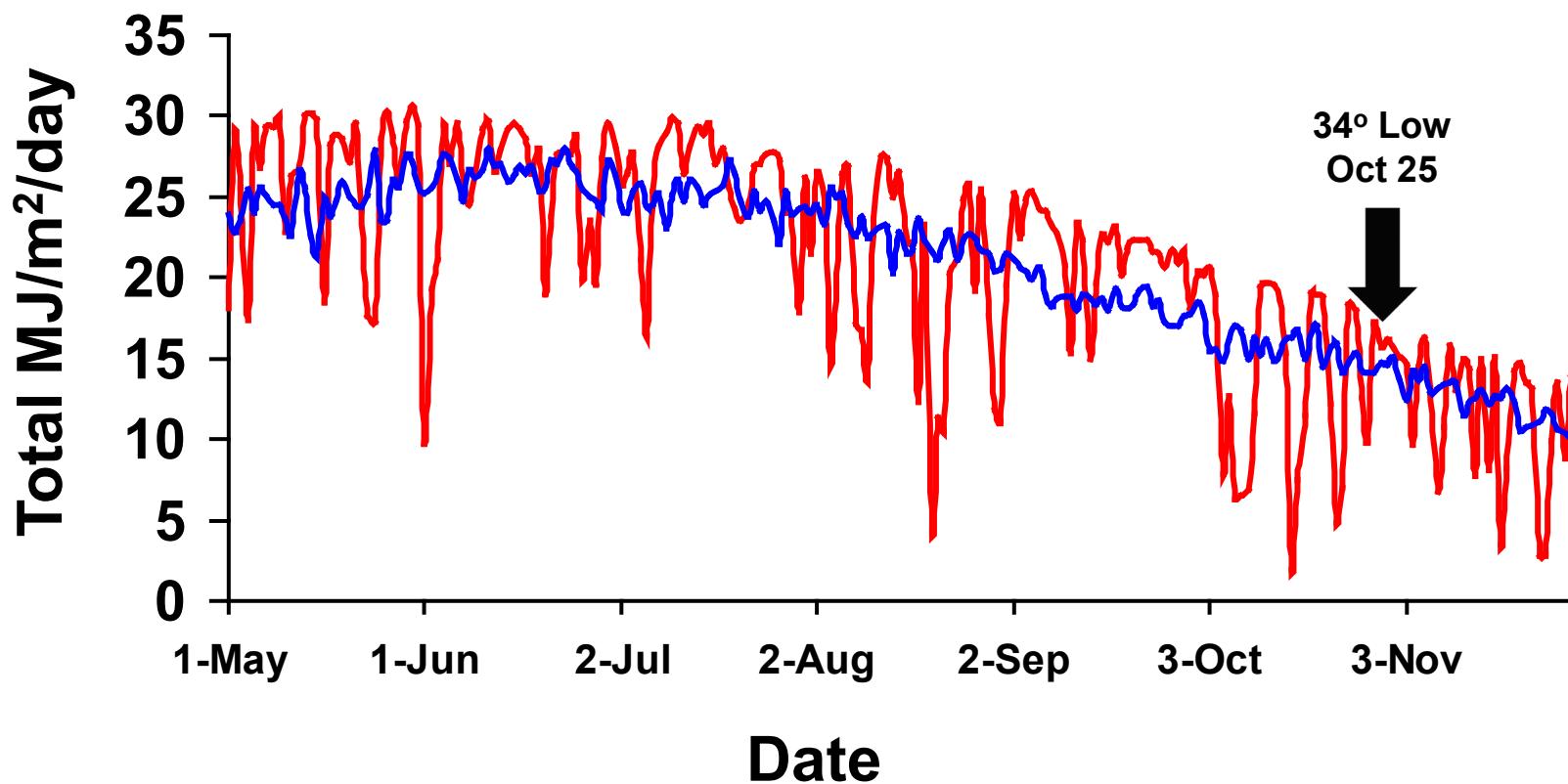
Amarillo 30-Yr Normal (1981-2010) vs. 2022 Cotton Heat Unit Accumulation From May 1

% 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)

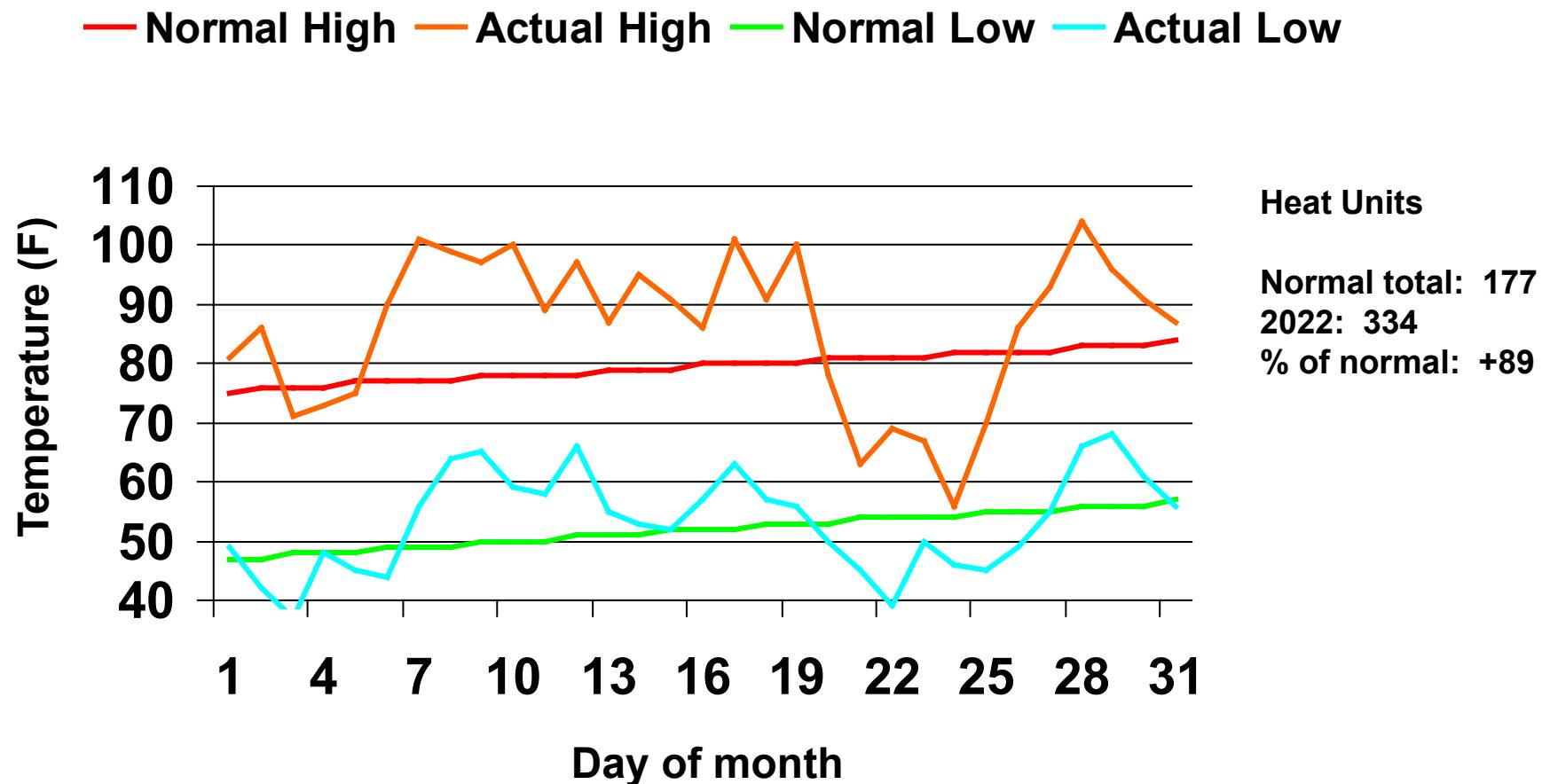
— 2022 — Muleshoe 18-Yr Mean



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

Amarillo

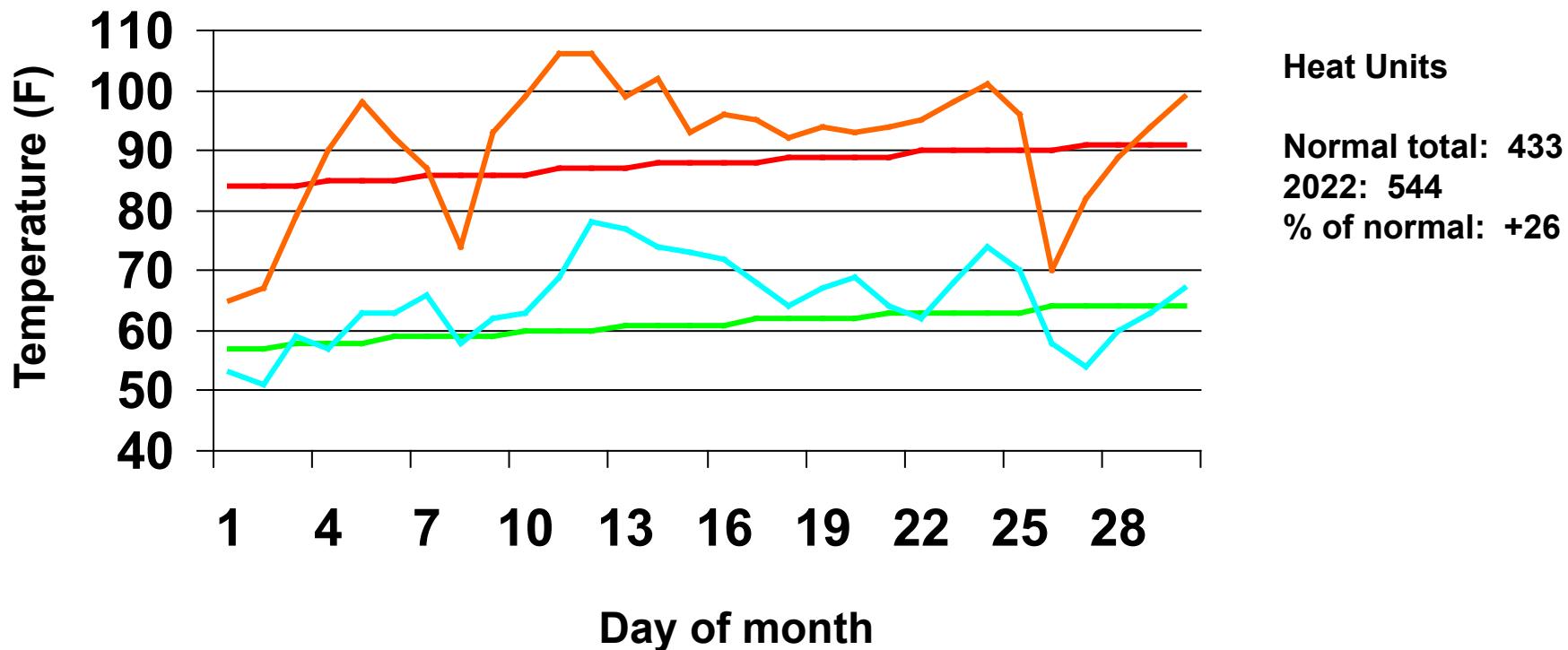
30-Yr Normal (1981-2010) and May 2022 Air Temperatures



Amarillo

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

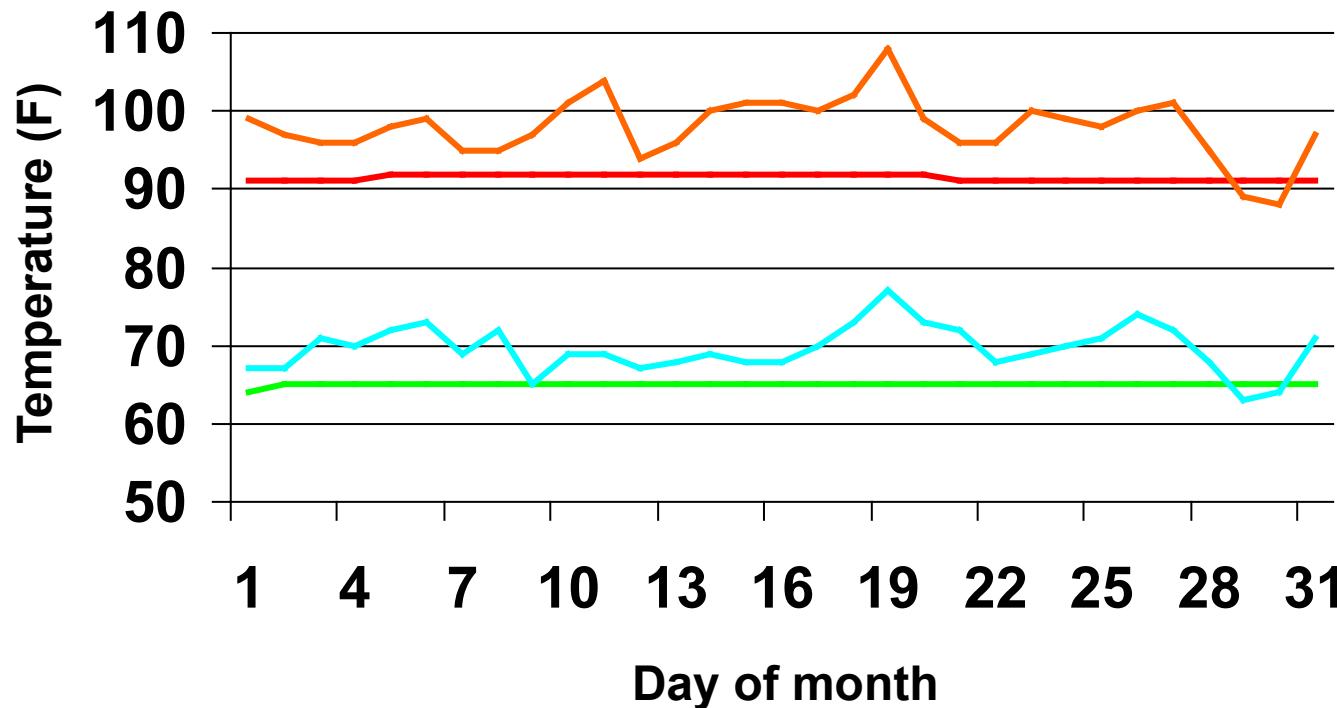
— Normal High — Actual High — Normal Low — Actual Low



Amarillo

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

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

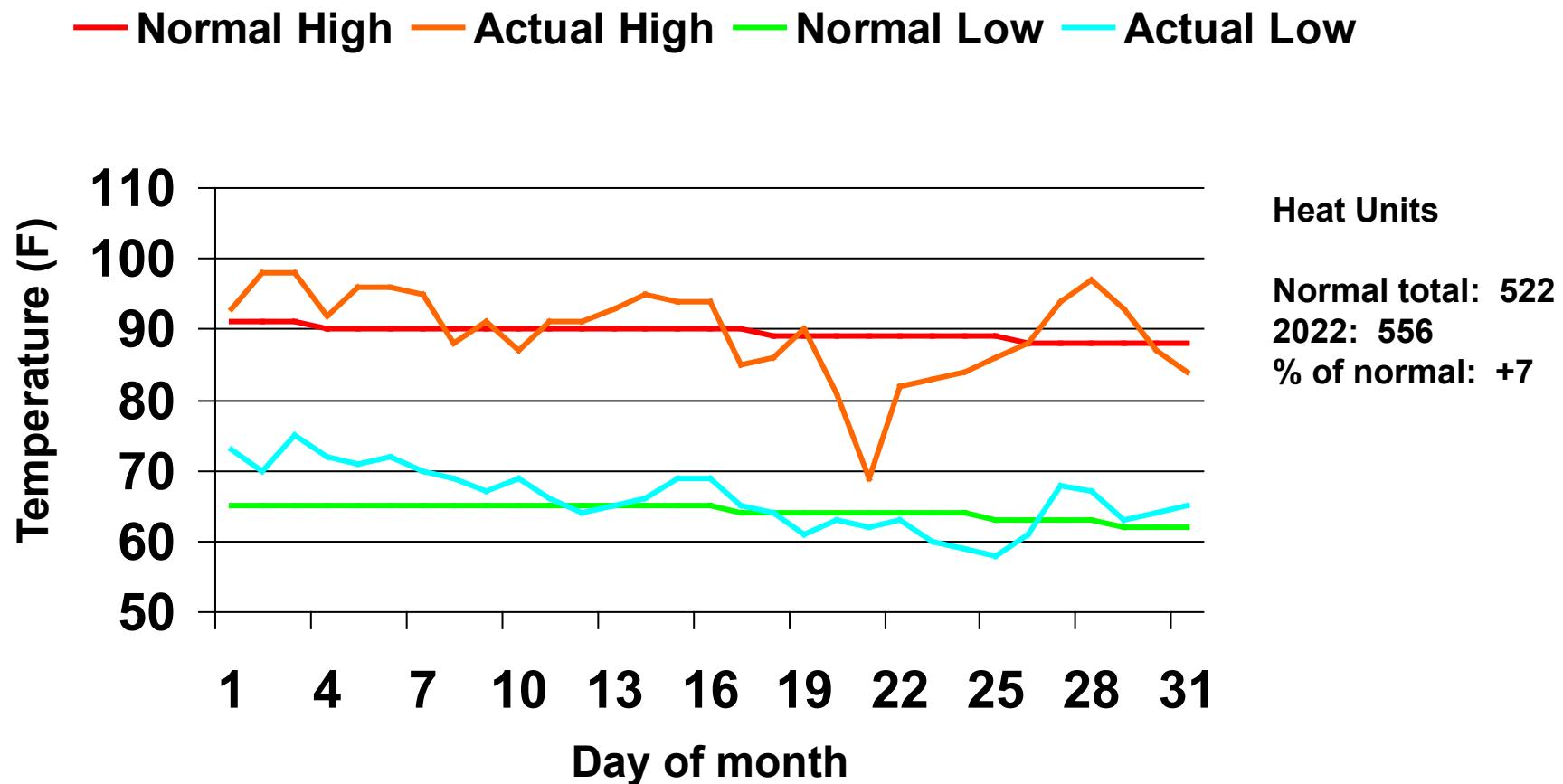


Heat Units

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

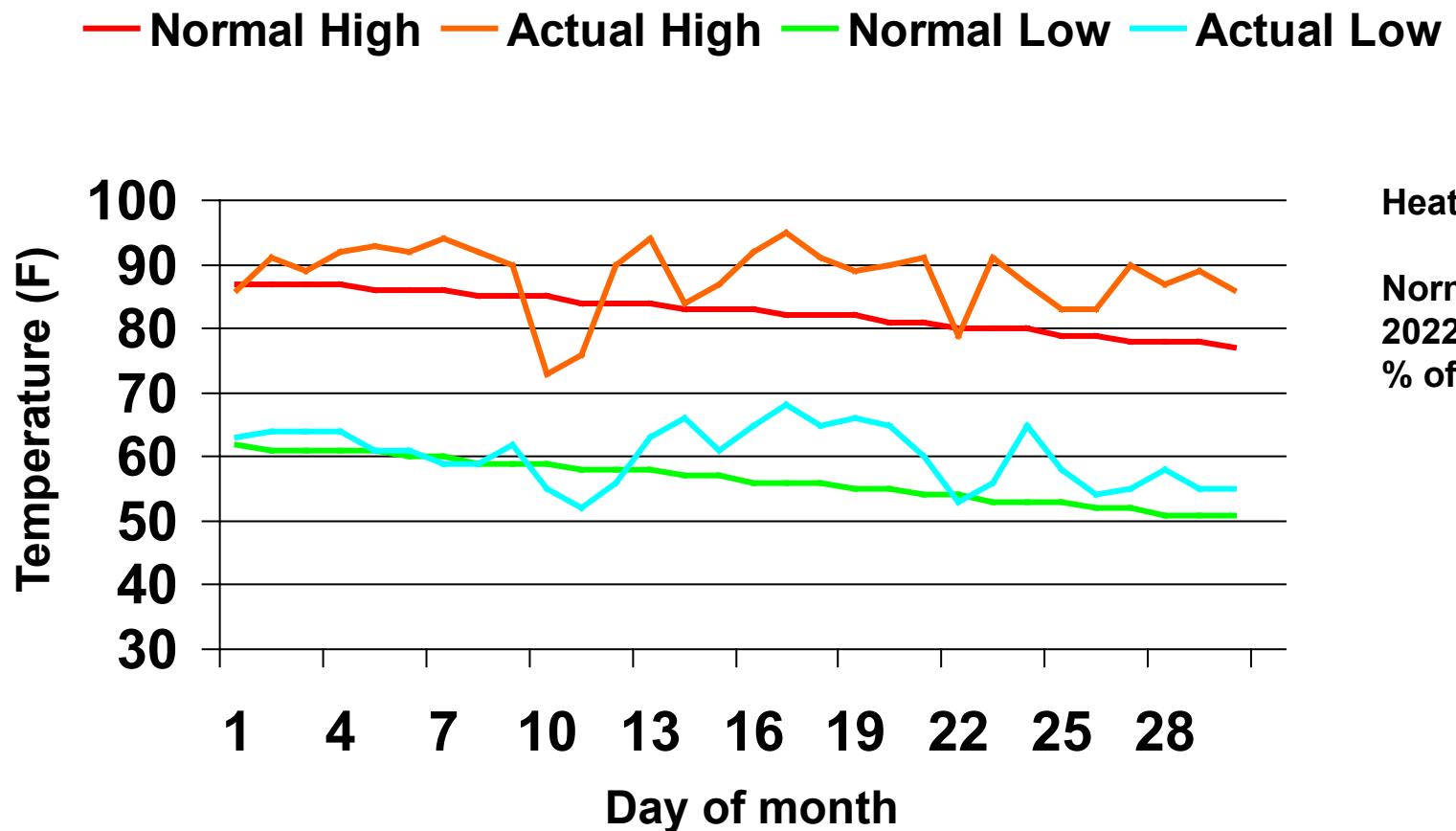
Amarillo

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



Amarillo

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



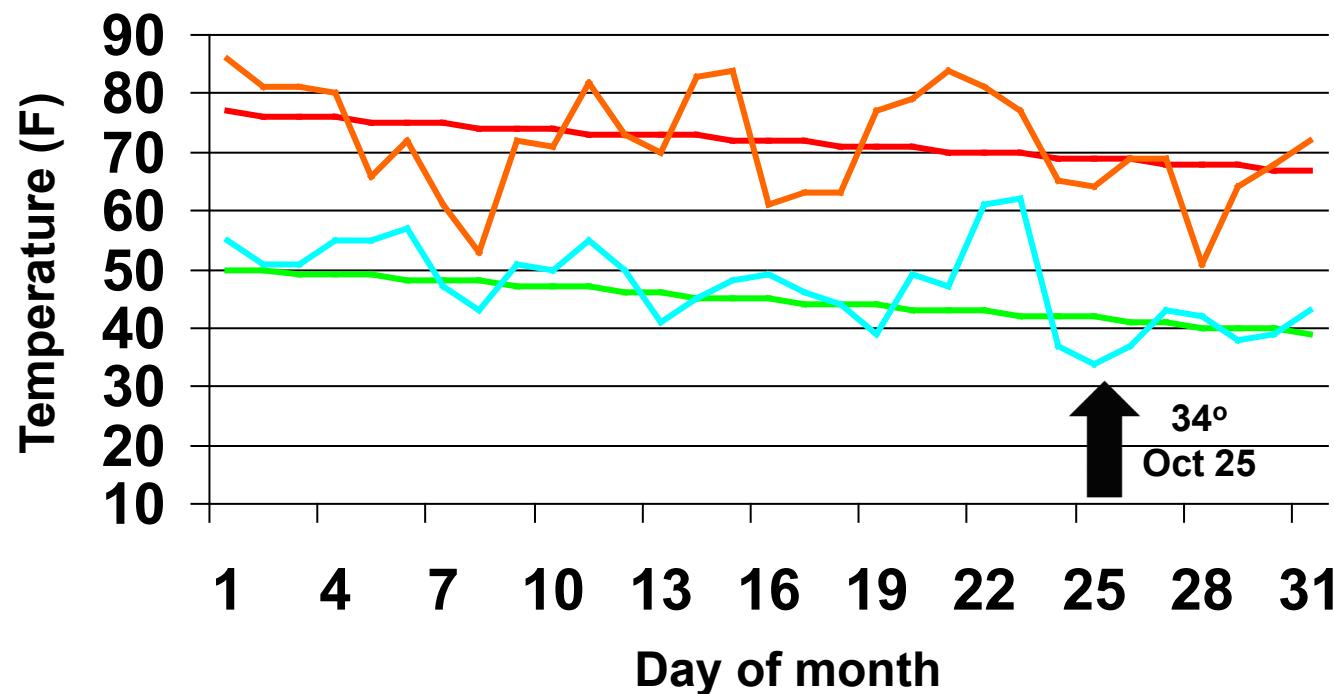
Heat Units

Normal total: 286
2022: 427
% of normal: +49

Amarillo

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

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



34°
Oct 25

Heat Units

Normal total: 19

2022: 87

% of normal: +358

First freeze on Nov 4 (29 degrees)
Hard freeze on Nov 11 (22 degrees)