2021 PhytoGen 210 W3FE Nitrogen Rate Trial – Adobe Walls Gin

Tommy Cartrite Farm – Section 22
Sunray, 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. 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 two growing seasons. In 2021, an N management trial was planned and executed in cooperation with Tommy Cartrite (grower) and Ben Benton (Cotton Development Specialist) with PhytoGen Cottonseed.

On April 5, the trial area was sampled to a depth of 48 inches by Chuck Ford, with Growers 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 for nitrate-N analyses. The 0-to-24-inch profile contained a total of 46 lb residual nitrate-N, and the total 0-to-48-inch profile contained a total of 111 lb residual nitrate-N. Using current Extension recommendations of 50 lb N/bale of yield

goal, a total of 150 lb N 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 111 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 land preparation included vertical tillage prior to N fertilizer rate application. On April 22, N rates were surface band-applied and 32-0-0 (urea-ammonium nitrate or UAN) was used as the N source. Treatments were applied with the grower's Case-IH ground sprayer, and one inch of irrigation was applied to incorporate N fertilizer and herbicides immediately following application. PhytoGen 210 W3FE variety was planted May 13 at 65,000 seed/acre rate using the grower's Case-IH planter. This field was center-pivot irrigated.

Minimal crop damaging weather events during the growing season were noted, and growing conditions were such that good yields and excellent quality were obtained. This project escaped hail events that occurred in the surrounding area. The experiment was able to stay on track with growth and development, and excellent observational, yield, and quality data were obtained.

Harvest results indicated that statistically significant differences were observed among N rates. Lint yields ranged from a low of 1165 lb/acre with the 0 lb/acre N rate to a high of 1290 lb/acre in the 150 lb/acre N rate treatment (Table 1). In this field in 2021, a lint yield response to N fertilization occurred up to the 150 lb/acre N rate. When averaged across all commercially ginned and classed bales for each N rate, Loan value for lint varied from a low of $0.5079/lb for the 100 lb N rate to a high of $0.5469/lb for the 0 N treatment. Overall average Loan value for the trial across all treatments was $0.5223/lb. Net value/acre includes the sum of lint Loan value on a per acre basis and net gin credit/acre and then subtracts N fertilizer cost/acre. **N cost was determined based on $375/ton for 32-0-0 (UAN).** Differences in net value/acre were not statistically significant among N treatments. This indicates that for the range in net value/acre of $691 to $633, differences were not significant at P>F of 0.10. The unfertilized control statistically had the same value as the 50, 100, and 150 lb N/acre rates (actual P>F was 0.1099, which just missed significance at the 0.10 level). Therefore, N fertilization had no significant effect on net value/acre in this trial. High N fertilizer cost, and lower quality numerically reduced the net value/acre of the 50, 100, and 150 lb N/acre rates compared to the unfertilized control treatment.

December 2021 fertilizer prices would change the net value/acre relationship when compared to the UAN prices noted for the spring of 2021. **Table 2 provides the same data as Table 1, except with December 2021 $650/ton UAN price and a recalculated net value/acre.** As UAN price increases from $0.59/lb N seen in the spring of 2021 to $1.01/lb N noted in December 2021, N costs become $51, $101, and $152/acre for 50, 100, and 150 lb applied N/acre, respectively. This December 2021 cost differential, when applied to data captured in this project, indicates that for this field trial, the unfertilized control statistically had the highest ($691) net value/acre (P>F 0.0021), followed by 50 ($633) and 100 lb N/acre ($598) treatments. The lowest net value/acre was $569/acre for the 150 lb N/acre rate treatment. **Therefore, the higher fertilizer prices estimated for 2022 would indicate that from the profit potential perspective, the 0 N fertilizer rate would not necessarily be a bad choice in this trial. The**

0 N/acre rate would essentially maximize potential profitability ($691/acre), whereas the highest yield (1290 lb/acre) would be obtained at the 150 lb N/acre rate.

Table 3 presents in-season data including stand establishment percentage, vigor, nodes above white flower (NAWF) and plant height on three sampling dates, leaf tissue N concentration at both early bloom and cutout, and nodes above cracked boll (NACB) on October 13. Many of the plant vigor parameters were statistically different among N rates for mid- to late-season measurements. Plant heights for higher N rates were significantly greater than the control beginning as early as mid-July and this difference remained for the rest of the season. Late-bloom period NAWF were higher compared to the 0 N check as a result of higher N rates. By early September, the 0 N rate had almost bloomed through the terminal (cutout), and N fertilization resulted in delayed cutout as represented by higher NAWF at that time. This response was greater with highest N rate. A total of 35 leaf blade tissue samples were taken from each plot in 3 of the 4 replicates and submitted to the Servi-Tech Laboratory in Amarillo for tissue nutrient concentration analyses. Leaf blade N concentration was significantly increased by N fertilization at least by the early bloom growth stage, with the unfertilized check having the lowest (4.3%) versus N fertilized treatments having 4.6% or greater. By the cutout sampling date of September 1, the unfertilized check had 3.3% leaf N concentration compared to 3.8% or above for N fertilized treatments. On September 28, significant differences among N rates were noted in NACB (a quantitative measure of crop maturity). The unfertilized check and 50-lb N rate had fewer NACB (denoting earlier maturity) with 2.3 and 3.7, respectively. The 100 lb-N/acre rate exhibited 5.2 NACB, and the 150-lb N rate had 5.7. Overall, the higher N rates had statistically significant later maturity than the unfertilized control and 50-lb N rate treatment. Later maturity typically results in lower micronaire due to fiber immaturity.

Table 4 provides the USDA-AMS classing results from each bale for each N rate treatment and the averages of 9 to 10 commercially ginned bales per treatment. Averages indicate that color grades were mostly 11 (higher quality) and 21 (slightly lower quality). No apparent differences in color grades were noted across N rates. The unfertilized check had the best leaf grades with an average of 1.8. Leaf grades of 2.1, 1.9, and 2.1 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 typically 35 to 37 32nds inch, with minimal impact of N fertilization observed. Average micronaire values were highest in the unfertilized check (3.51) and decreased with higher N rates. Micronaire averages were 3.37, 3.33, and 3.27 for the 50, 100, and 150-lb N rates, respectively. Loan chart micronaire discounts are triggered at values of 3.4 and lower. Therefore, the higher N rates resulted in lower micronaire values and thus Loan rate discounts. No bark contamination was noted in commercial bales in any of the treatments. Average fiber strength ranged from 30.6 to 31.4 g/tex, and appeared unaffected by N fertilization. Uniformity ranged from 79.7 to 80.2% and also appeared to be unaffected by N fertilization. Overall negative impacts on various fiber quality parameters are integrated into the CCC Loan value. Average Loan values were 54.69, 52.11, 50.79, and 51.31 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 were 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: 3470 ft

Previous crop: 285 bu/acre corn harvested in 2020

Tillage system: vertical-till

N application method and date: surface band applied using grower's Case-IH sprayer on April 22

Planted: May 13

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

Plot width: 12 rows with N rate application, center 8 rows harvested

Plot length: fertilized plot length ~2500 ft, harvested plot length ~2,100 ft

Variety planted: PhytoGen 210 W3FE

Seeding rate: 65,000 seed/acre

30-inch rows under center pivot irrigation

Total rainfall: ~6.8 inches

May – 2.3, June – 1.2, July – 2.2, August – 0.4, September 0.7

Total irrigation: ~21.3 inches

April – 4.8, May – 0.7, June – 2.7, July – 3.7, August – 7.6, September – 1.8

Herbicide management:

Preplant burndown (~April 1) - 16 oz/acre (2,4-D + dicamba) + 2 oz/acre flumioxazin

Preemergence (~May 13) - 1 qt/acre Roundup Powermax + 1.25 qt/acre Warrant + 17 lb/100 gal ammonium sulfate

Post emergence (June 12) – 43 oz/acre glufosinate + 1 pt/acre Outlook + 2.9 lb/acre ammonium sulfate

Post emergence (June 24) – 8 oz/acre quizalofop (Targa) + 3.6 lb/acre ammonium sulfate)

Post emergence (July 19) – 3 pt/acre Warrant + 44 oz/acre Roundup Powermax + 43 oz/acre glufosinate + 1 pt/100 gal crop oil concentrate + 3.6 lb/acre ammonium sulfate

Insecticides: 4.5 oz/acre acephate (June 12), 4.5 oz/acre acephate (June 24), 1.1 oz/acre Assail 70WP (July 6)

Plant growth regulators: 5 oz/acre mepiquat chloride (June 29), 12 oz/acre (July 16), 16 oz/acre mepiquat chloride (July 31), 32 oz/acre mepiquat chloride (August 23)

Harvest aids: 42 oz/acre ethephon + 11 oz/acre Folex (October 14), 1 qt/acre Parazone (October 24)

Harvesting: November 8 using a John Deere CS690, with harvested area calculated by the GPS on a tractor monitor. Approximately 2,100 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 Adobe Walls Gin.

Commercial ginning: Round modules for all 4 replicates of each nitrogen rate treatment were staged together and commercially ginned separately by Adobe Walls 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 variety module was ginned and then repeated for each nitrogen rate treatment 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

Adobe Walls Gin would like to thank Tommy Cartrite for committing equipment, land, and time to conduct and manage the trial. Ramon Gonzalez provided excellent support and we appreciate his assistance. Gratitude is expressed to PhytoGen Cottonseed, Corteva, and Windstar Inc. Detailed ginning 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.

ADOBE WALLS GIN

Table 1. Harvest results for the center pivot irrigated PhytoGen 210 W3FE nitrogen rate trial, Cartrite Farm, Sunray, TX, 2021.

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	32.6	41.8	3575	1165	1494	0.5469	637	54	0	691
50	32.2	41.1	3757	1209	1546	0.5211	630	54	29	655
100	31.4	40.8	4037	1266	1649	0.5079	643	57	59	641
150	31.2	41.1	4135	1290	1698	0.5131	662	59	88	633
Test average	31.8	41.2	3876	1233	1597	0.5223	643	56	44	655
CV, %	--	--	4.5	4.5	4.5	--	4.5	4.9	--	4.8
OSL	--	--	0.0051	0.0408	0.0112	--	0.4784	0.0797	--	0.1099
LSD	--	--	226	71	93	--	NS	4	--	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.
N cost was determined based on $375/ton of 32-0-0.
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.

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Table 2. Harvest results for the center pivot irrigated PhytoGen 210 W3FE nitrogen rate trial, Cartrite Farm, Sunray, TX, 2021.

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	32.6	41.8	3575	1165	1494	0.5469	637	54	0	691	a
50	32.2	41.1	3757	1209	1546	0.5211	630	54	51	633	b
100	31.4	40.8	4037	1266	1649	0.5079	643	57	101	598	bc
150	31.2	41.1	4135	1290	1698	0.5131	662	59	152	569	c
Test average	31.8	41.2	3876	1233	1597	0.5223	643	56	76	623	
CV, %	--	--	4.5	4.5	4.5	--	4.5	4.9	--	5.0	
OSL	--	--	0.0051	0.0408	0.0112	--	0.4784	0.0797	--	0.0021	
LSD	--	--	226	71	93	--	NS	4	--	41	

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.
N cost was determined based on $650/ton of 32-0-0.
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.

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Table 3. Plant observation results from the center pivot irrigated PhytoGen 210 W3FE nitrogen rate trial, Cartrite Farm, Sunray, TX, 2021.

N rate	Final population	Stand establishment	Vigor	Nodes above white flower			Plant height			Leaf tissue N concentration		Nodes above cracked boll
				Early bloom	Mid bloom	Late bloom	Prebloom	Early bloom	Final	Early bloom	Cutout	
lb/acre	plants/acre	%	1-5 visual scale, 5 best	count			inches			% N		count
	15-Jun	15-Jun	15-Jun	5-Aug	23-Aug	1-Sep	13-Jul	5-Aug	13-Oct	5-Aug	1-Sep	13-Oct
0	38,333	59.0	2.5	6.9	4.4	0.9	9.8	17.0	20.5	4.3	3.3	2.3
50	38,551	59.3	2.5	7.2	5.1	2.1	10.5	18.5	21.5	4.6	3.8	3.7
100	36,155	55.6	2.5	7.1	4.9	1.8	11.3	20.2	23.8	4.7	3.8	5.2
150	37,244	57.3	2.5	7.1	5.4	2.8	11.3	20.7	26.0	4.9	4.2	5.7
Test average	37,571	57.8	2.5	7.1	5.0	1.9	10.7	19.1	23.0	4.6	3.8	4.2
CV, %	12.6	12.6	--	2.1	9.6	30.6	6.0	4.6	3.1	1.7	2.9	16.5
OSL	0.8809	0.8802	--	0.2853	0.1772	0.0407	0.0709	0.0071	0.0003	0.0004	0.0004	0.0036
LSD	NS	9.4	--	NS	NS	0.9	1.0	1.4	1.1	0.1	0.2	1.1

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 4. Commercial classing data for the center pivot irrigated PhytoGen 210 W3FE nitrogen rate trial, Cartrite Farm, Sunray, TX, 2021.

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															
9107179	21-1	2	1	2	36	3.2	.	.	32.1	82.2	8.0	2	79.4	112	49.95
9107180	21-1	2	1	2	36	3.5	.	.	29.8	81.9	8.1	2	80.0	111	57.25
9107181	11-2	1	1	2	37	3.5	.	.	31.8	81.6	8.5	1	81.5	114	57.70
9107182	21-1	2	1	1	36	3.8	.	.	30.9	81.1	8.3	1	80.5	113	57.05
9107183	21-1	2	1	2	35	3.7	.	.	29.6	81.1	8.5	2	79.6	110	55.40
9107184	11-2	1	1	2	35	3.7	.	.	31.2	81.5	8.4	2	81.2	110	55.85
9107185	21-1	2	1	2	36	3.3	.	.	30.8	81.4	8.6	1	81.5	112	52.00
9107186	21-1	2	1	2	35	3.3	.	.	29.6	81.1	8.3	2	79.4	108	50.35
9107187	21-1	2	1	1	36	3.6	.	.	29.6	81.1	8.5	1	79.1	111	56.70
Average	--	1.8	1.0	1.8	35.8	3.5	none	none	30.6	81.4	8.4	1.6	80.2	111.2	54.69
50 lb N/acre															
9107188	21-1	2	1	2	37	3.4	.	.	32.2	82.6	7.7	2	80.1	114	52.75
9107189	21-1	2	1	2	36	3.7	.	.	32.1	81.8	8.2	1	80.0	112	57.25
9107190	21-1	2	1	2	37	3.4	.	.	31.1	81.4	8.3	2	81.4	114	52.75
9107191	21-1	2	1	3	36	3.3	.	.	30.9	81.1	8.3	3	79.7	111	51.05
9107192	21-1	2	1	2	36	3.3	.	.	32.2	81.0	8.5	2	80.2	113	52.20
9107193	21-1	2	1	2	36	3.4	.	.	31.3	80.8	8.7	2	79.6	113	51.65
9107194	21-1	2	1	2	36	3.2	.	.	31.3	81.4	8.5	2	80.0	112	50.50
9107195	11-2	1	1	2	37	3.2	.	.	30.6	81.7	8.5	1	80.2	114	50.85
9107196	21-1	2	1	2	35	3.4	.	.	30.8	81.7	8.3	2	78.9	110	49.95
Average	--	1.9	1.0	2.1	36.2	3.4	none	none	31.4	81.5	8.3	1.9	80.0	112.6	52.11

ADOBE WALLS GIN

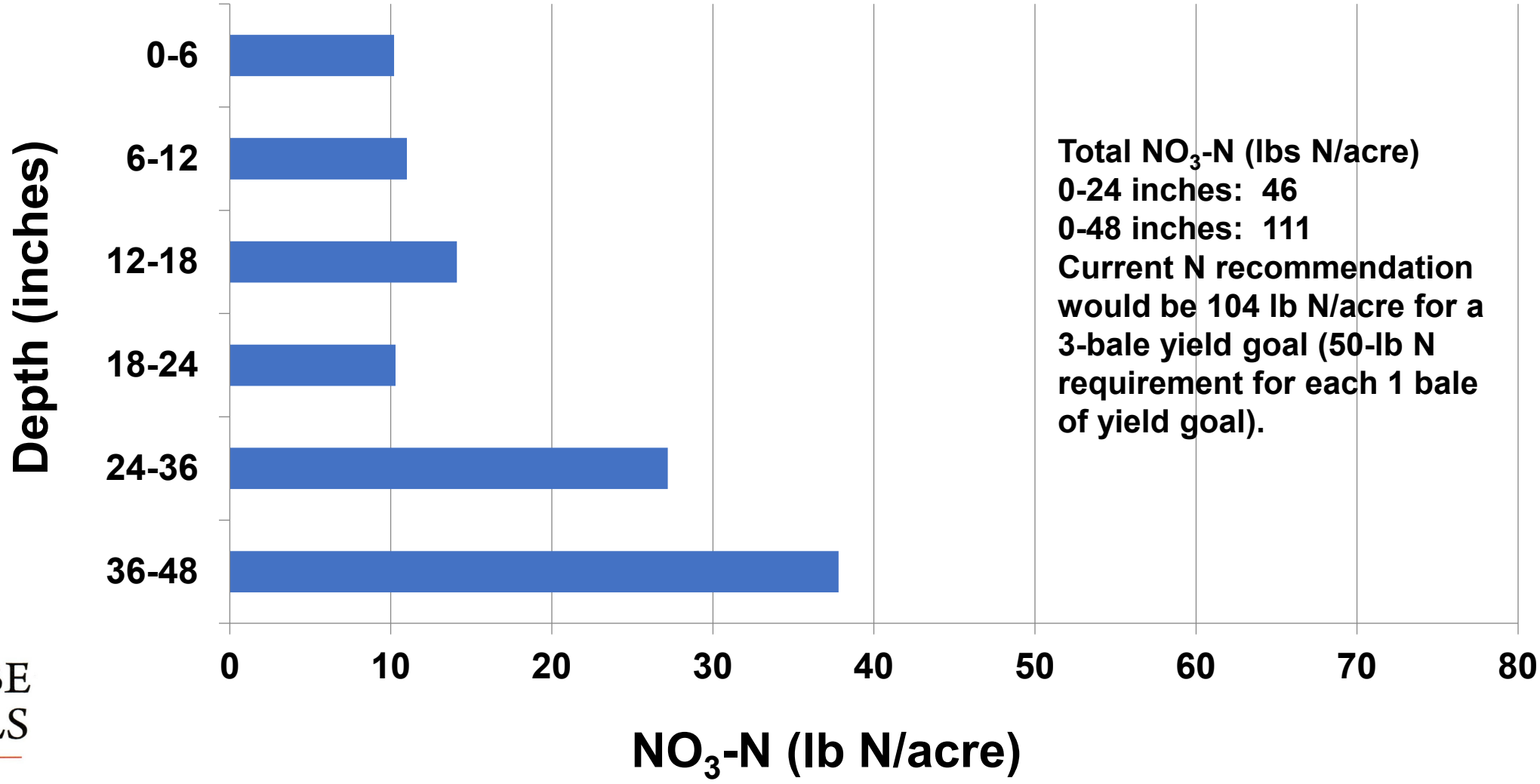
Table 4 (continued). Commercial classing data for the center pivot irrigated PhytoGen 210 W3FE nitrogen rate trial, Cartrite Farm, Sunray, TX, 2021.

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
100 lb N/acre															
9107197	21-1	2	1	2	36	3.4	.	.	30.8	80.7	8.0	1	80.0	112	52.00
9107198	21-1	2	1	1	35	3.3	.	.	31.0	82.4	8.1	1	79.8	110	50.25
9107199	21-1	2	1	2	35	3.2	.	.	28.5	82.2	8.3	1	78.5	108	48.05
9107200	21-1	2	1	2	36	3.3	.	.	30.8	81.2	8.1	2	79.5	113	51.45
9107201	21-1	2	1	2	35	3.4	.	.	29.6	81.0	8.2	2	80.1	110	50.90
9107202	21-1	2	1	2	36	3.4	.	.	32.5	80.0	8.7	2	78.9	113	51.55
9107203	21-1	2	1	2	36	3.3	.	.	30.3	81.1	8.5	1	80.5	111	52.00
9107204	11-2	1	1	2	36	3.2	.	.	31.5	81.8	8.6	1	79.9	113	49.95
9107205	11-2	1	1	2	35	3.4	.	.	30.0	81.5	8.5	1	79.9	110	50.05
9107206	21-1	2	1	2	36	3.4	.	.	31.7	81.3	8.6	2	79.6	111	51.65
Average	--	1.8	1.0	1.9	35.6	3.3	none	none	30.7	81.3	8.4	1.4	79.7	111.1	50.79
150 lb N/acre															
9107207	21-1	2	1	2	36	3.3	.	.	31.6	81.7	8.0	2	80.0	112	52.20
9107208	21-1	2	1	2	35	3.4	.	.	29.8	82.4	8.2	2	79.4	110	50.35
9107209	11-2	1	1	3	37	3.4	.	.	33.3	81.5	8.4	2	80.5	114	52.25
9107210	11-2	1	1	2	36	3.4	.	.	30.0	81.6	8.6	2	79.5	112	51.45
9107211	21-1	2	1	2	37	3.1	.	.	33.5	81.2	8.5	1	80.8	114	51.10
9107212	21-1	2	1	2	37	3.1	.	.	31.8	81.2	8.7	2	80.6	115	51.05
9107213	21-1	2	1	2	37	3.3	.	.	31.5	80.7	8.7	2	80.0	115	52.75
9107214	21-1	2	1	2	37	3.3	.	.	31.7	81.9	8.3	1	81.2	117	52.75
9107215	21-1	2	1	2	36	3.2	.	.	29.5	81.1	8.7	2	80.6	112	50.60
9107216	21-1	2	1	2	35	3.2	.	.	31.2	81.1	8.7	2	79.6	110	48.55
Average	--	1.8	1.0	2.1	36.3	3.3	none	none	31.4	81.4	8.5	1.8	80.2	113.1	51.31

Appendix

Cartrite 2021 PhytoGen 210 W3FE N Rate Trial – Preplant residual NO_3-N in Section 22 field, lint yield quadratic regression function, net value/acre quadratic regression functions, plant height, NAWF, and NACB graphs, Amarillo 2021 cotton heat units and weather data.

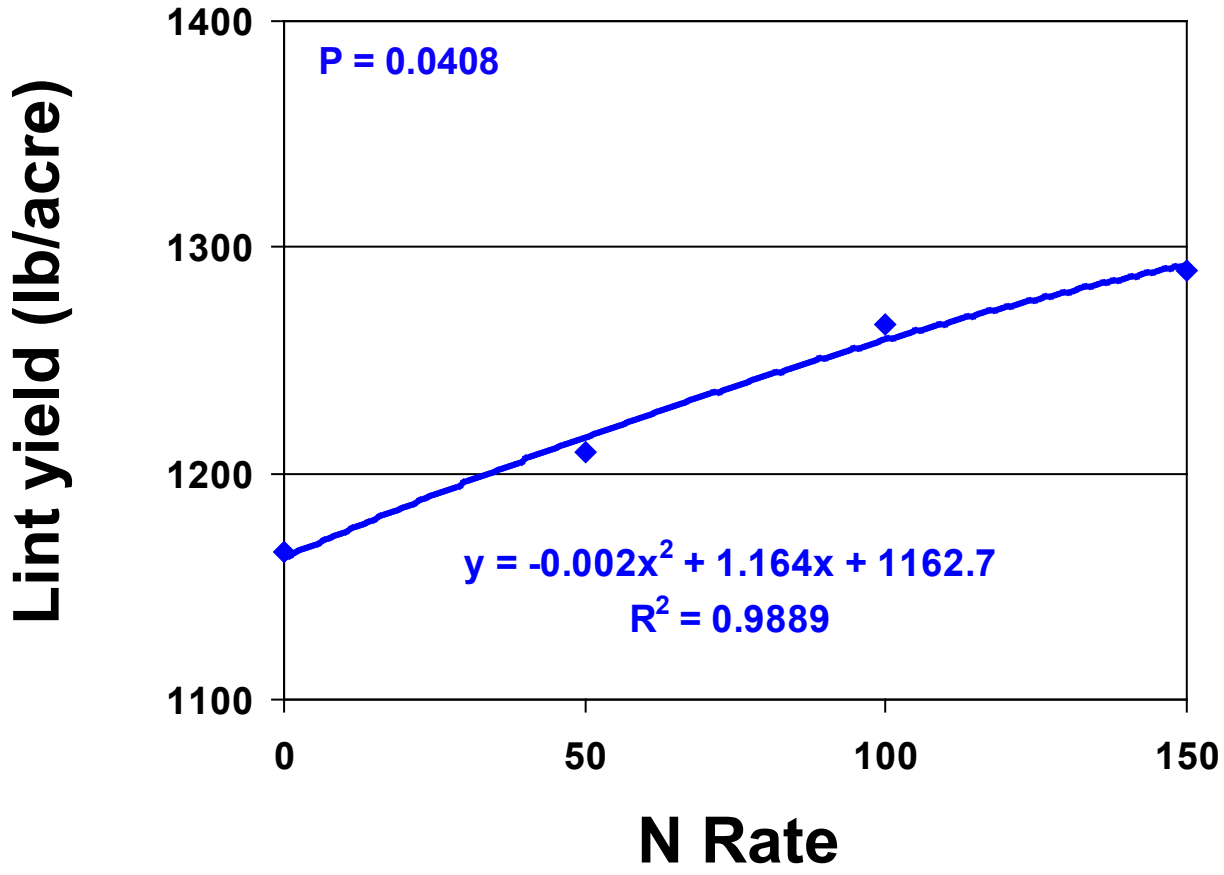
NO_3-N (Pounds N/Acre) vs. Depth (inches)
Cartrite – Section 22, April 5 Deep Sampling Date



Total NO_3-N (lbs N/acre)
0-24 inches: 46
0-48 inches: 111
Current N recommendation would be 104 lb N/acre for a 3-bale yield goal (50-lb N requirement for each 1 bale of yield goal).

ADOBE WALLS GIN

PhytoGen 210 W3FE - N Rate Trial
Sunray, TX – 2021
4 Replicates



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Planted: May 13
Days to bloom: 76
First bloom date: Jul 27
Harvested: Nov 8

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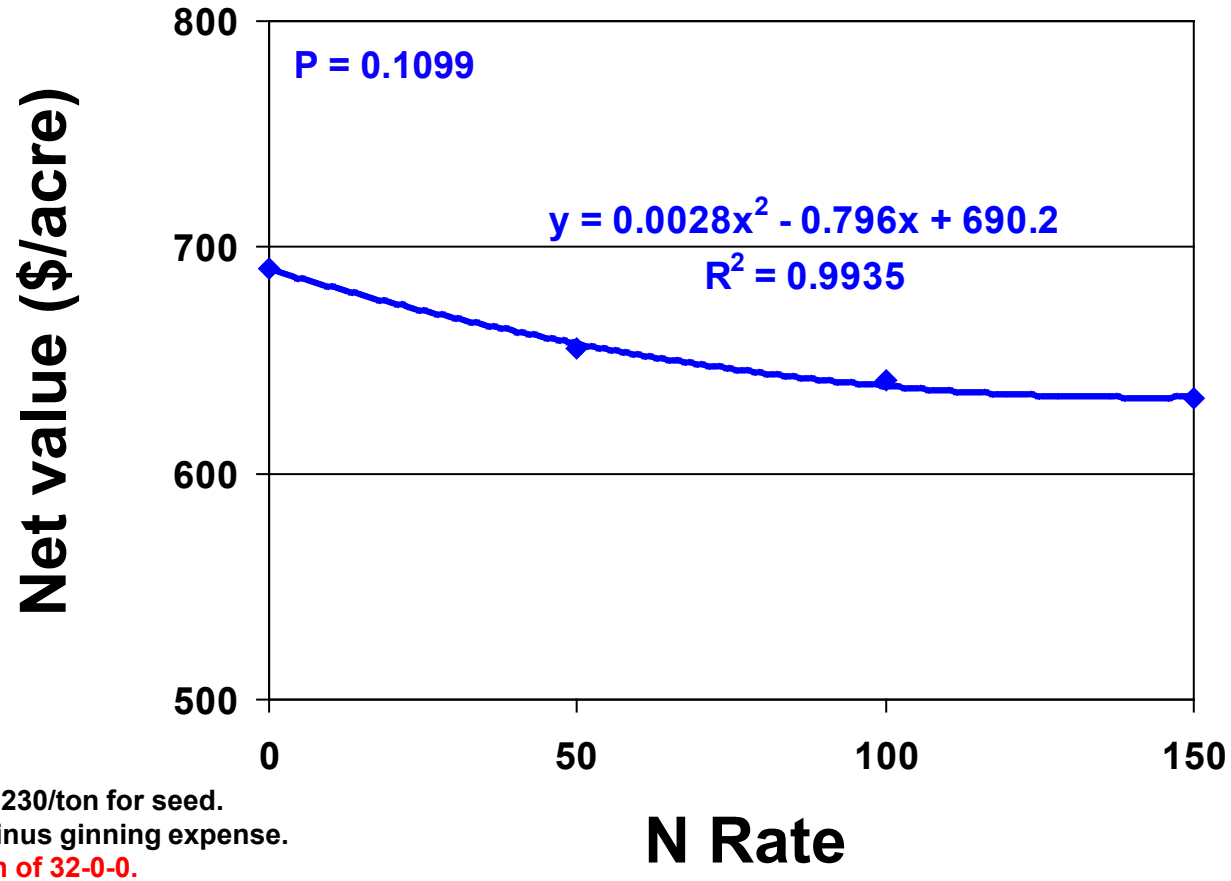
PhytoGen 210 W3FE - N Rate Trial
Sunray, TX – 2021
4 Replicates
Assumes $375/Ton for 32-0-0

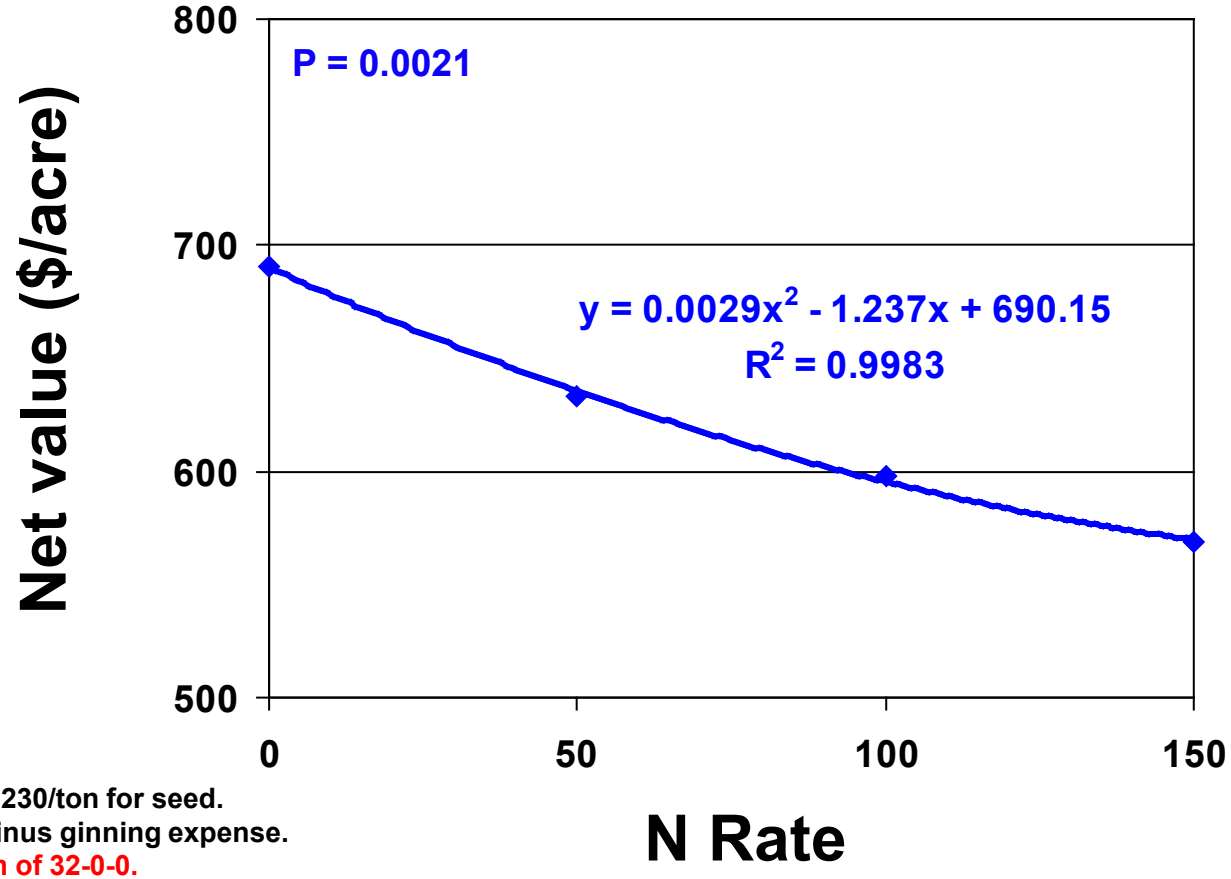


Assumes:
$3.30/cwt commercial ginning cost, and $230/ton for seed.
Net gin credit is defined as seed credit minus ginning expense.
N cost was determined based on $375/ton of 32-0-0.
Net value is defined as gross loan value/acre plus net gin credit minus N fertilizer cost.
Value for lint based on CCC loan value from commercial ginning and USDA-AMS classing results.

Planted: May 13
Days to bloom: 76
First bloom date: Jul 27
Harvested: Nov 8

ADOBE WALLS GIN

PhytoGen 210 W3FE - N Rate Trial
Sunray, TX – 2021
4 Replicates
Assumes $650/Ton for 32-0-0



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N cost was determined based on $650/ton of 32-0-0.
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Planted: May 13
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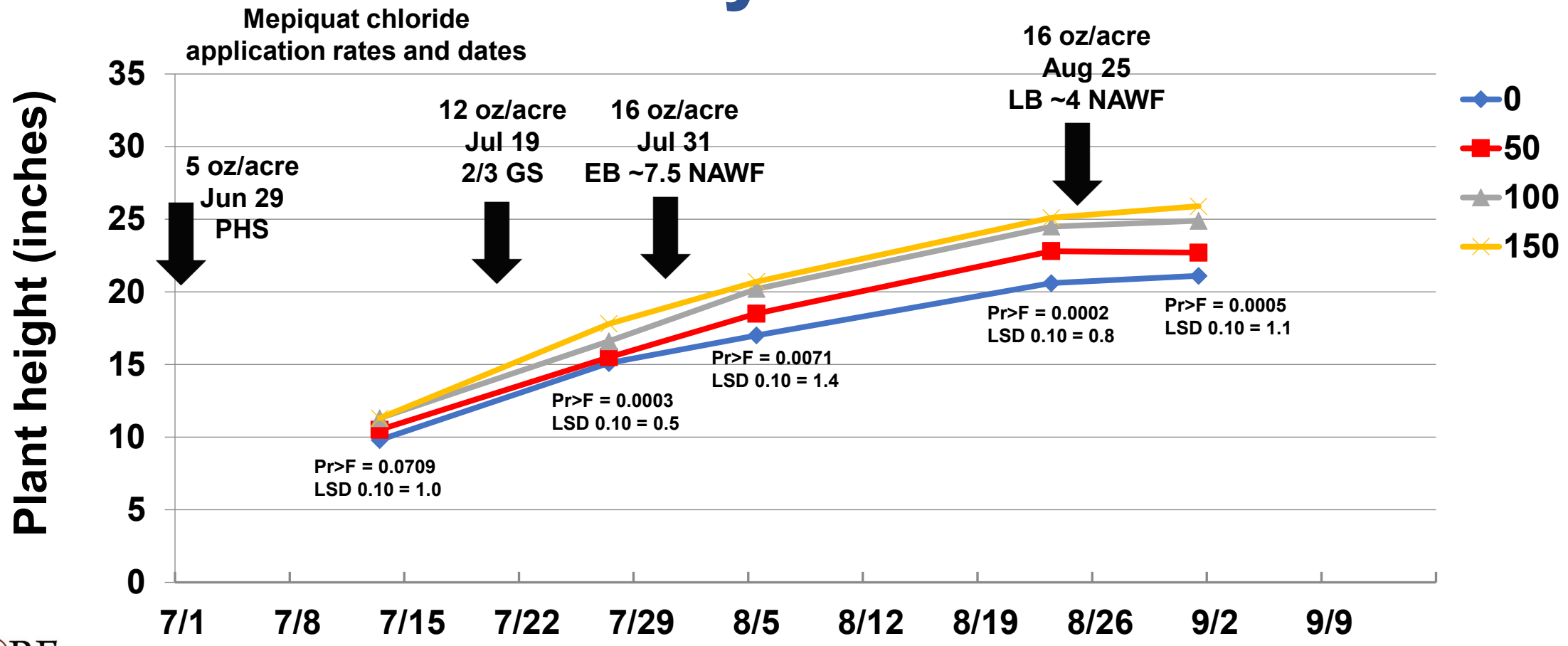
First bloom date: Jul 27
Harvested: Nov 8

Cartrite PhytoGen 210 N Rate Trial
Sunray – 2021

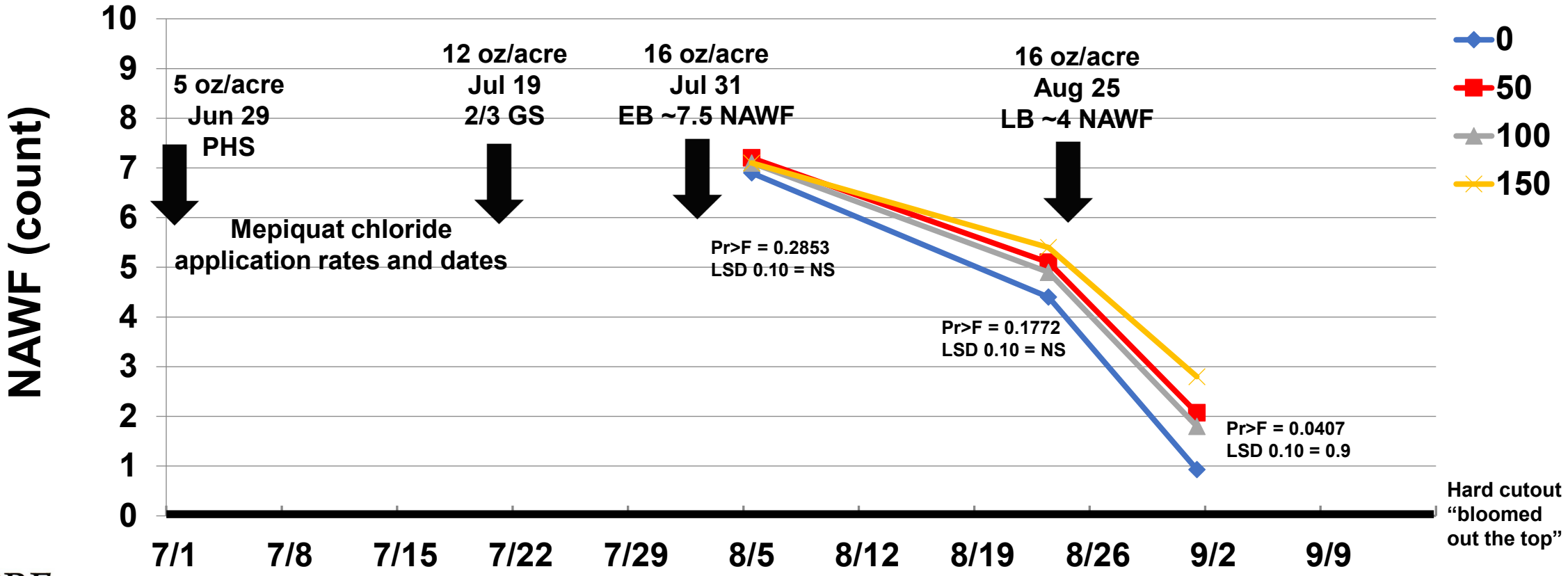


ADOBE WALLS GIN

Rainfall (inches): May 2.3, Jun 1.2, Jul 2.2, Aug 0.4, Sep 0.7 = ~6.8
Irrigation (inches): May 0.7, Jun 2.7, Jul 3.7, Aug 7.6, Sep 1.8 = ~16.5

Planted: May 13
Days to bloom: 76
First bloom date: Jul 27

Cartrite PhytoGen 210 N Rate Trial
Sunray – 2021

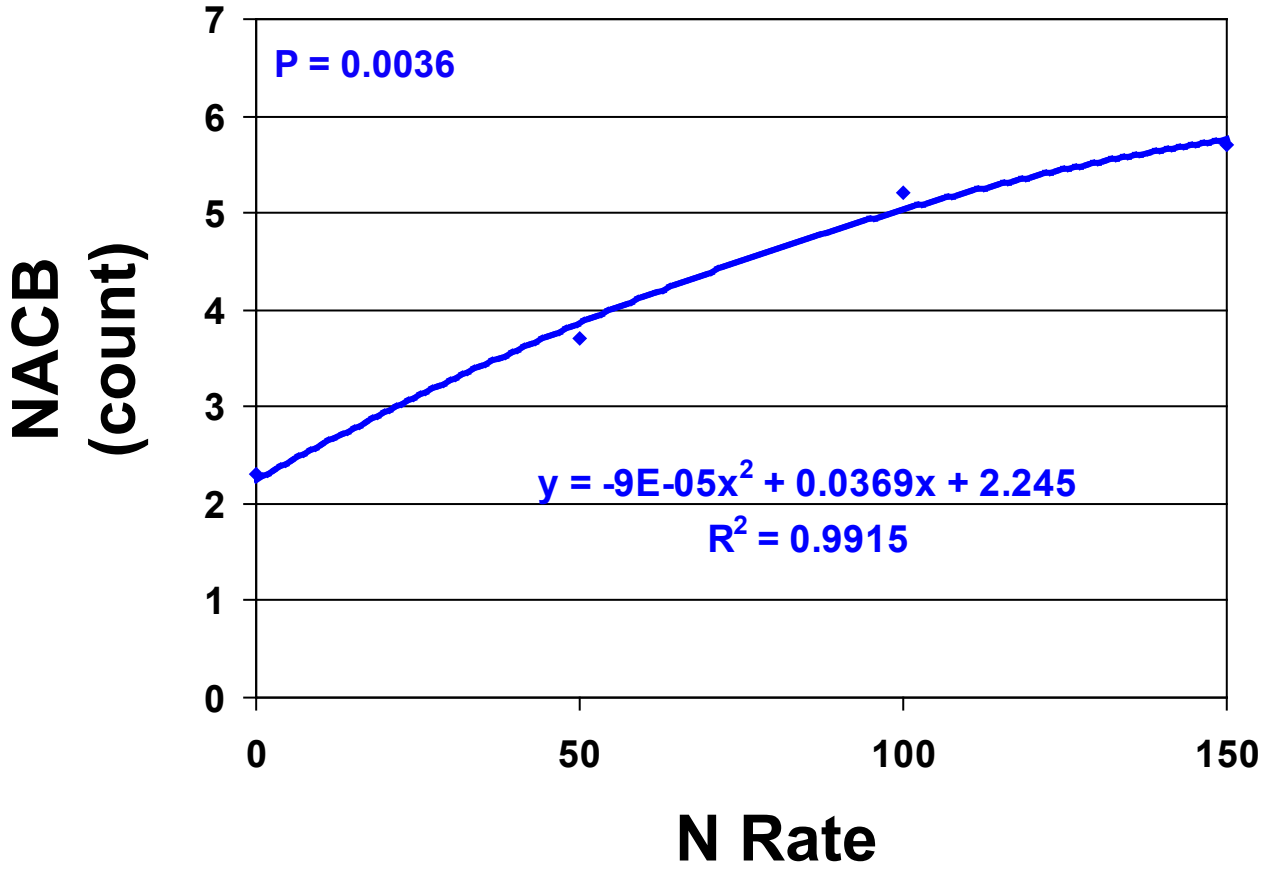


ADOBE WALLS GIN

Rainfall (inches): May 2.3, Jun 1.2, Jul 2.2, Aug 0.4, Sep 0.7 = ~6.8
Irrigation (inches): May 0.7, Jun 2.7, Jul 3.7, Aug 7.6, Sep 1.8 = ~16.5

Planted: May 13
Days to bloom: 76
First bloom date: Jul 27

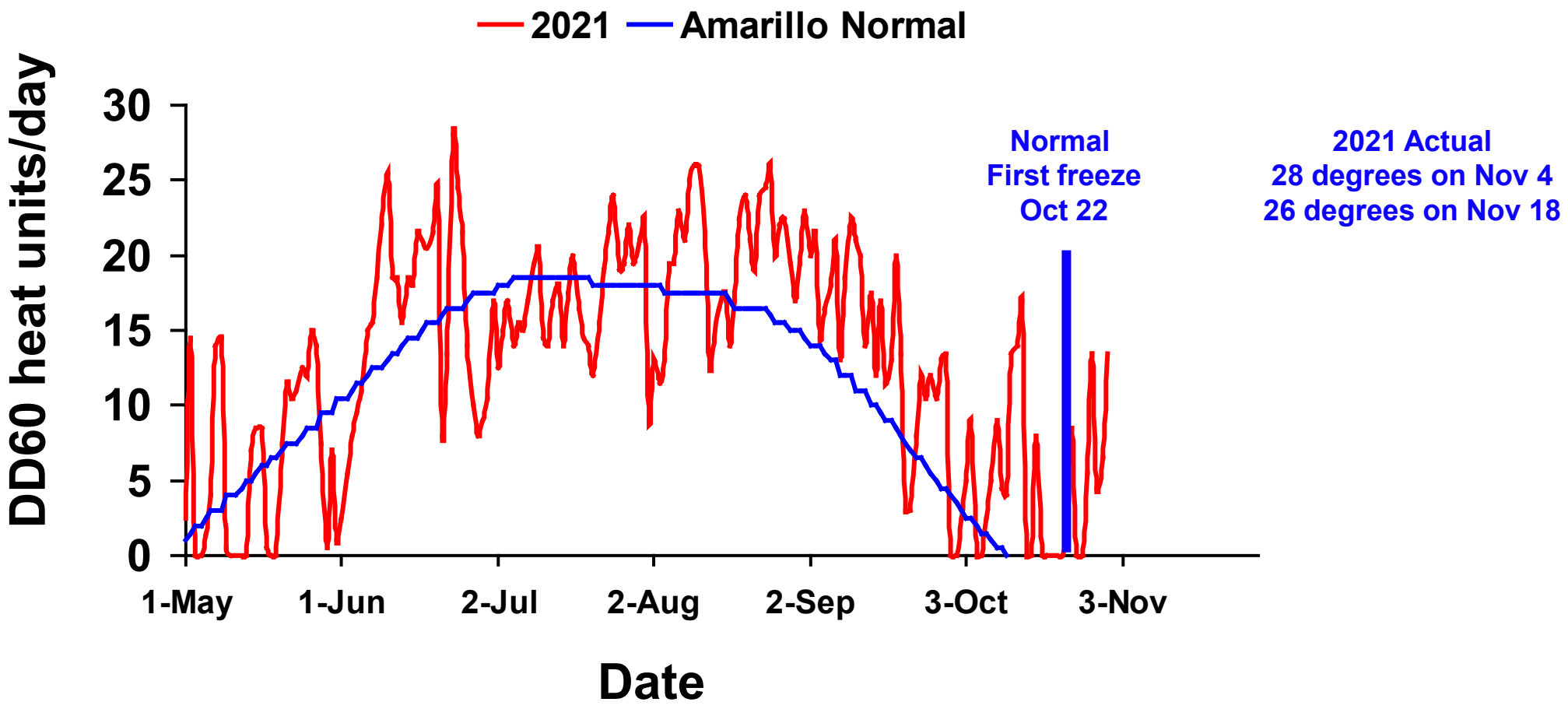
PhytoGen 210 W3FE - N Rate Trial
Sunray, TX – 2021
3 Replicates



Surface band – N application
Planted: May 13
Seeding rate: 65K
NACB sampling date: Oct 13

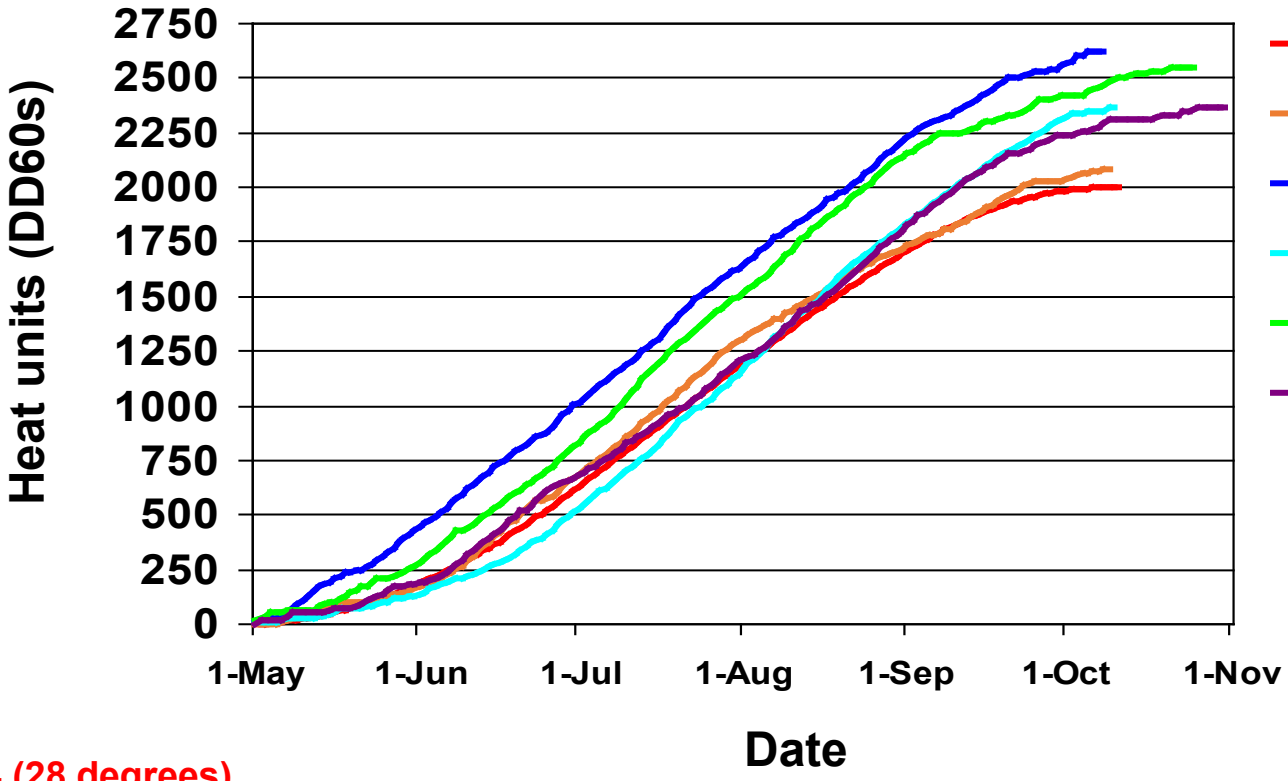
ADOBE WALLS GIN

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



1981-2010 (2001 total seasonal)
2017 (2085 total seasonal)
2018 (2621 total seasonal)
2019 (2362 total seasonal)
2020 (2552 total seasonal)
2021

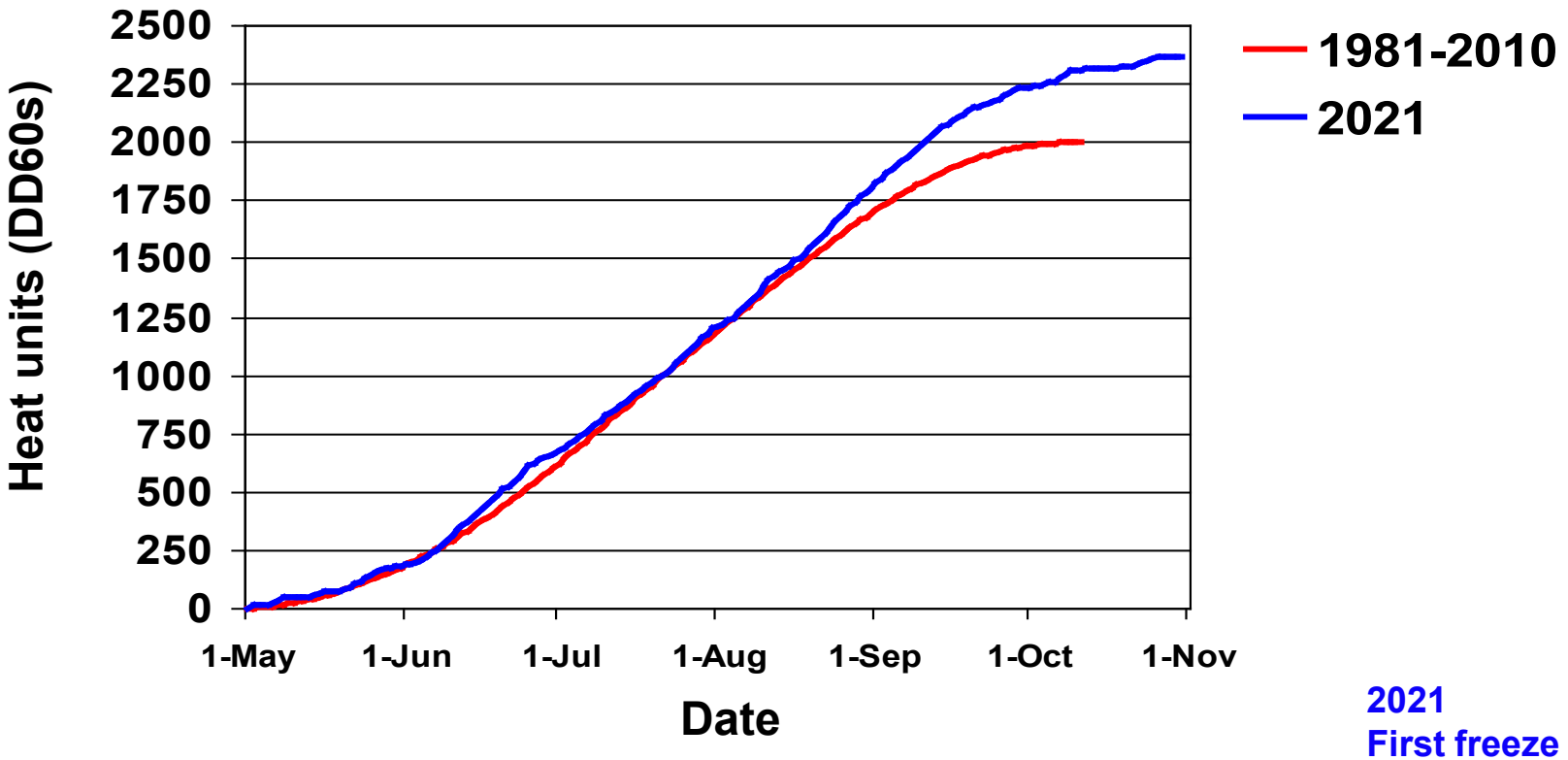
From May 1 through Sep 30
Normal: 1983
2021: 2238
% of Normal: +13

From May 15 through Sep 30
Normal: 1938
2021: 2179
% of Normal: +12

From May 20 through Sep 30
Normal: 1908
2021: 2162
% of Normal: +13

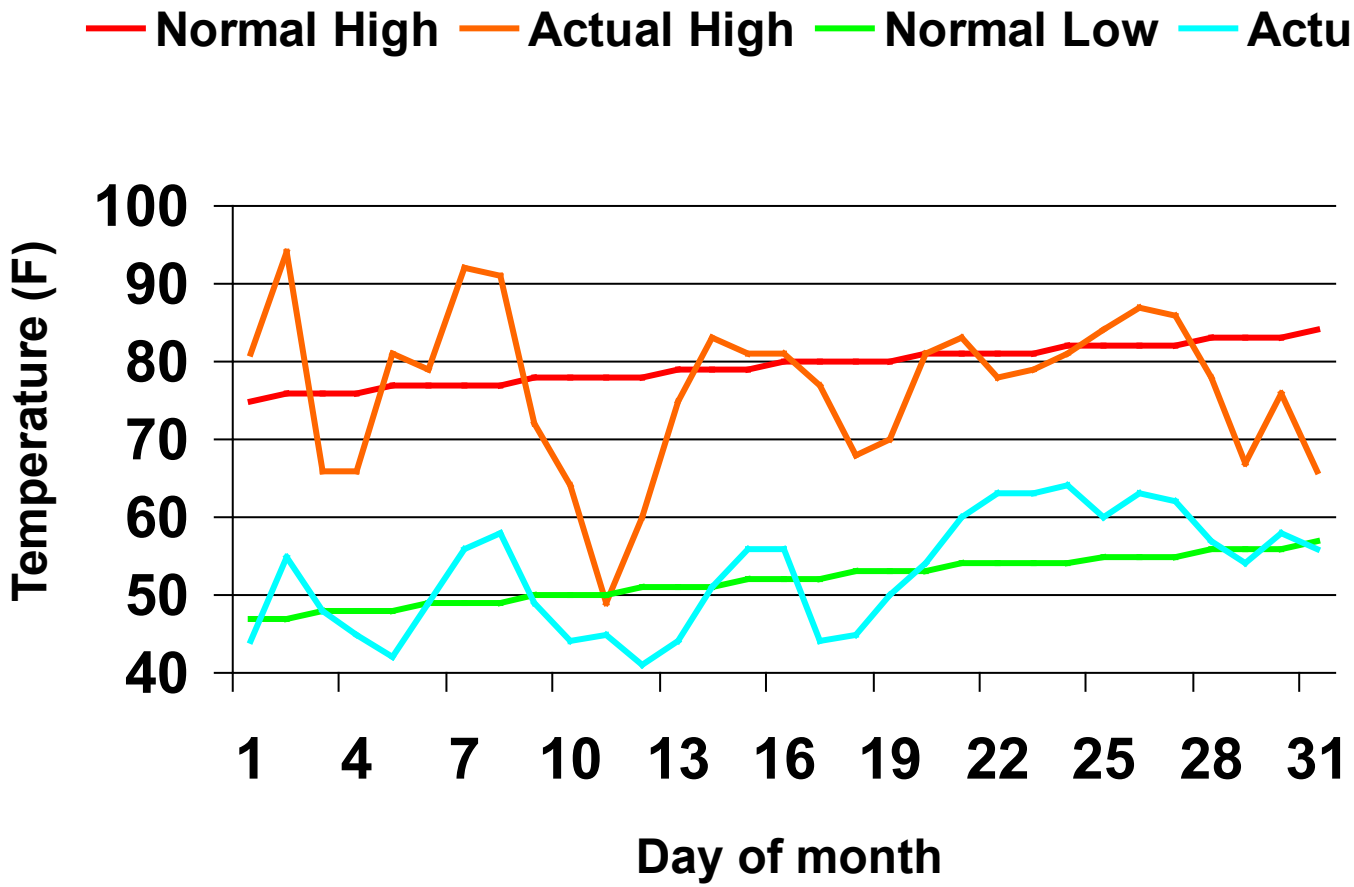
2021
First freeze on Nov 4 (28 degrees)
Hard freeze on Nov 18 (26 degrees)

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)

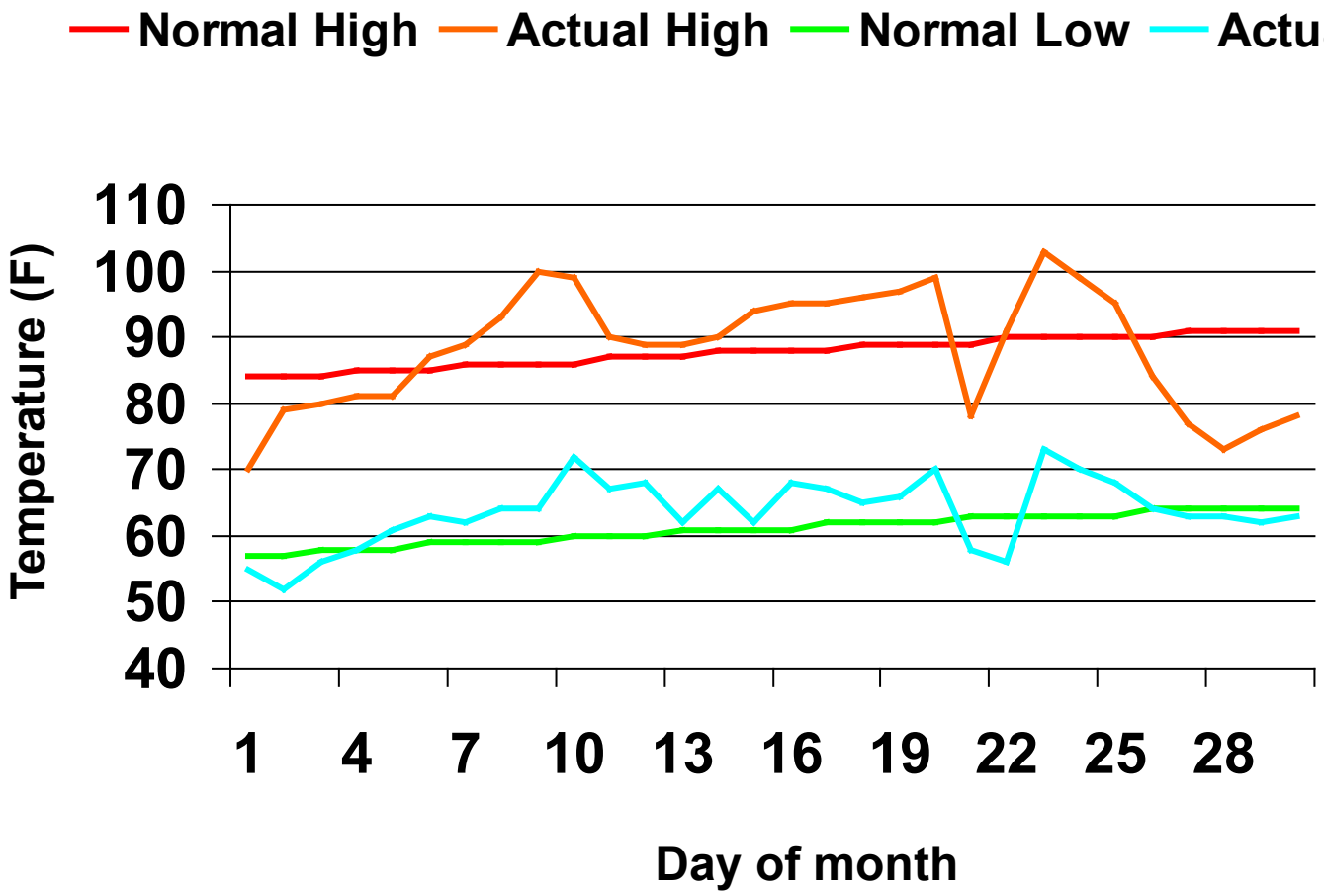
Amarillo
30-Yr Normal (1981-2010) and May 2021 Air Temperatures



Heat Units

Normal for month: 177
2021: 186
% of normal: +5

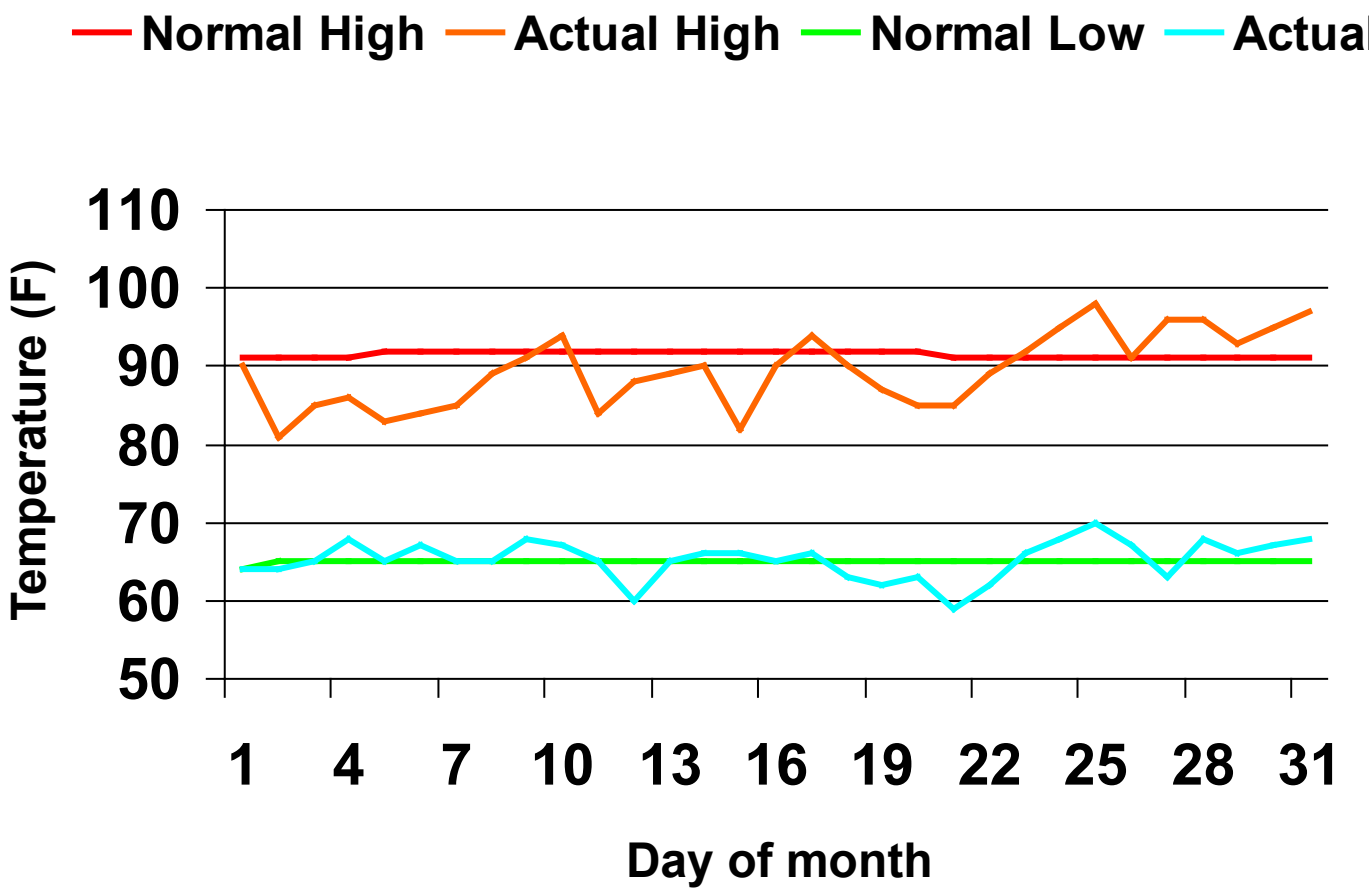
Amarillo
30-Yr Normal (1981-2010) and June 2021 Air Temperatures



Heat Units

Normal total: 433
2021: 475
% of normal: +10

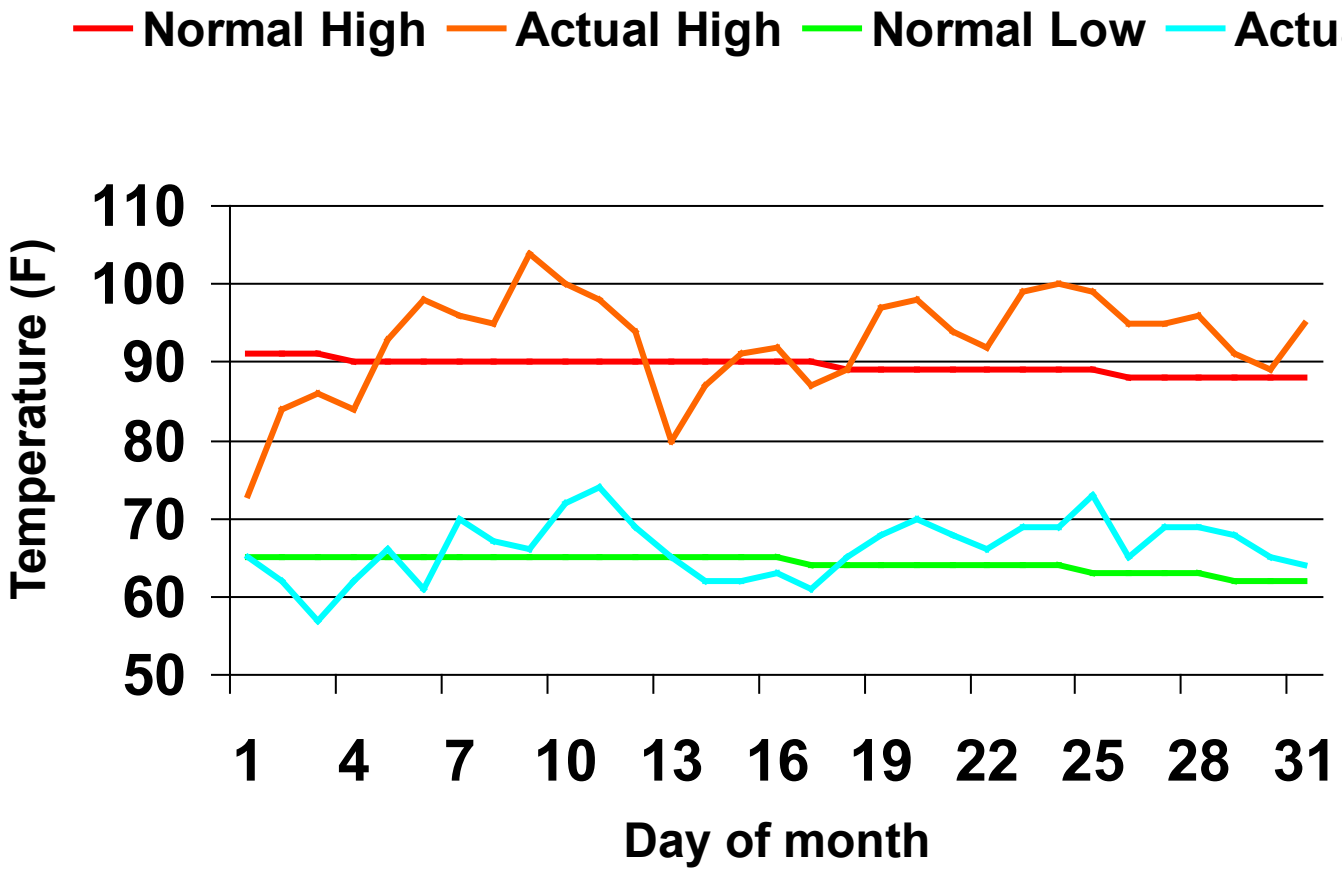
Amarillo
30-Yr Normal (1981-2010) and July 2021 Air Temperatures



Heat Units

Normal total: 566
2021: 539
% of normal: -5

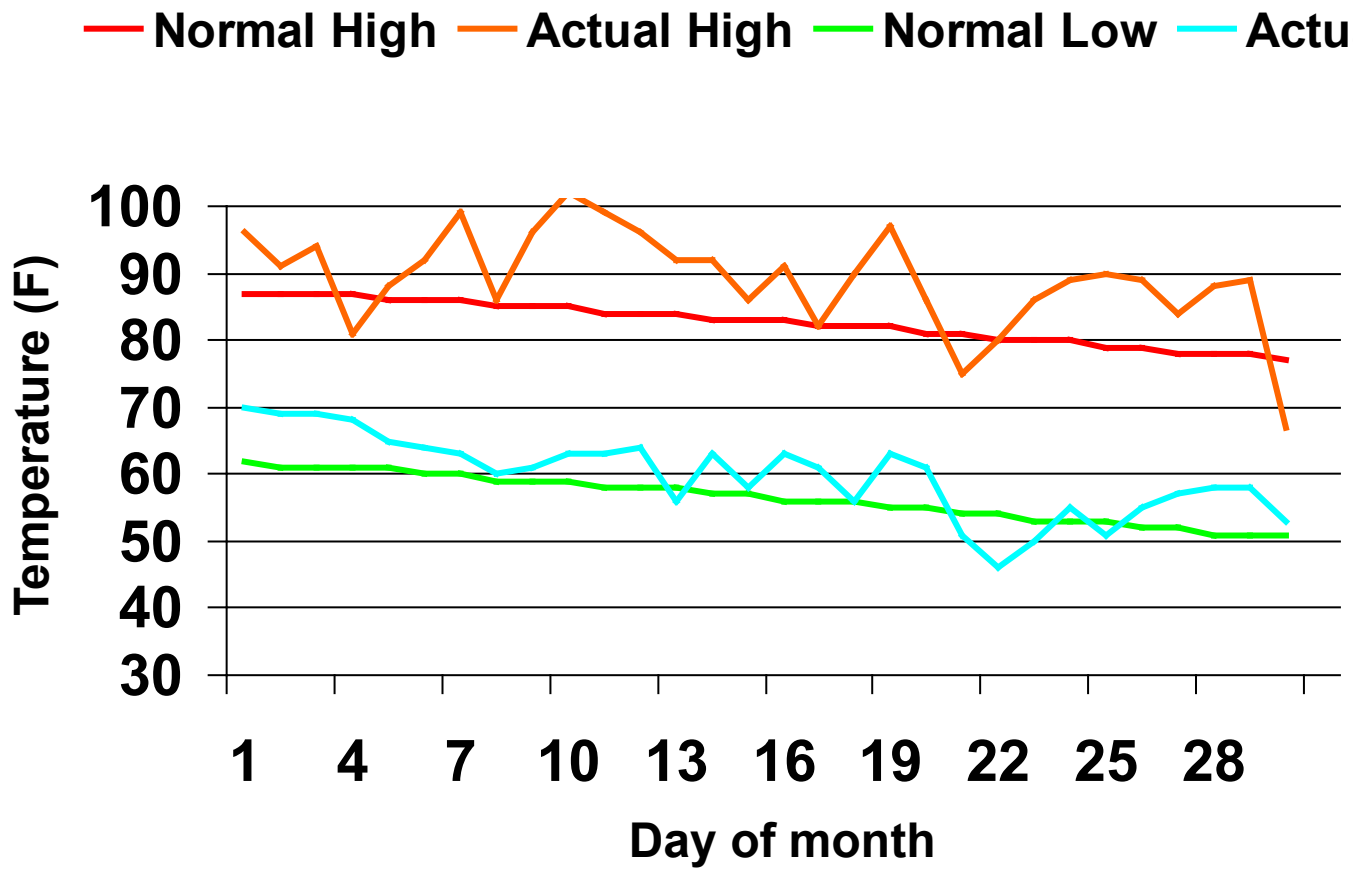
Amarillo
30-Yr Normal (1981-2010) and August 2021 Air Temperatures



Heat Units

Normal total: 522
2021: 602
% of normal: +15

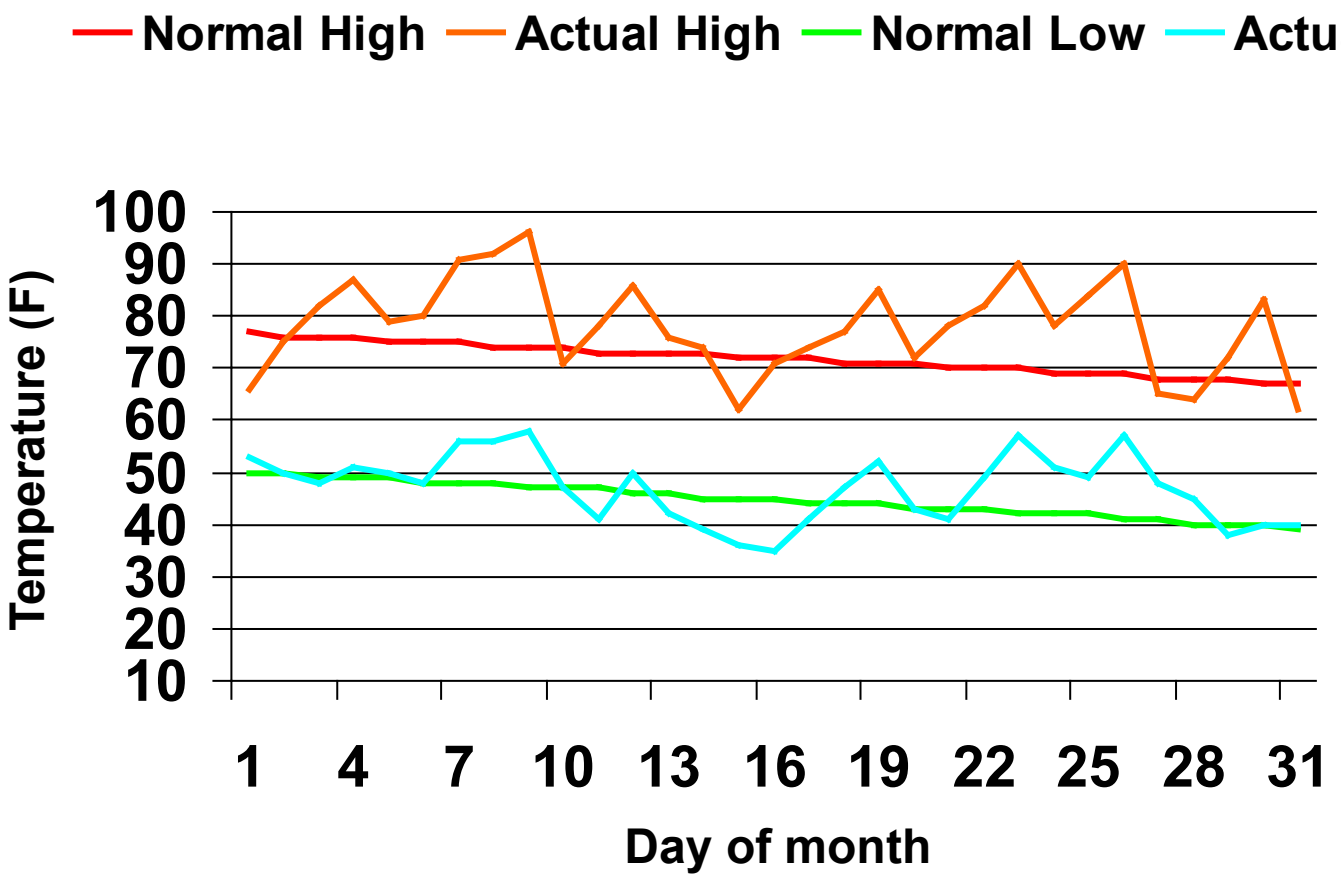
Amarillo
30-Yr Normal (1981-2010) and September 2021 Air Temperatures



Heat Units

Normal for Month: 286
2021: 434
% of normal: +52

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



Heat Units

Normal: 19
2021: 133
% of normal: +600

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