2022 Annual Report

AGRICULTURAL COMPLEX FOR ADVANCED RESEARCH AND EXTENSION SYSTEMS (AG-CARES)

IN COOPERATION WITH

Texas A&M Agrilife Research Lamesa Cotton Growers Texas A&M Agrilife Extension Service

Technical Report 23-1

Texas A&M AgriLife and Research and Extension Center of Lubbock
1102 E Drew St
Lubbock, TX 79403-6603

Friends and members of Lamesa Cotton Growers:

This will be my last letter going into the AG-CARES Annual Report. After 50+ years with Texas A&M AgriLife Research, I will be retiring in the near future.

It has been both a privilege and pleasure to have worked with the officers, and board members of Lamesa Cotton Growers as well as producers in Dawson and surrounding counties. Without your vision and cooperation, Texas A&M AgriLife would not have been able to provide adequate support to agricultural producers in the area south of Lubbock.

Some of the impacts our scientists made at AG-CARES are:

- New cotton varieties are evaluated under varying levels of irrigation levels for yield and fiber quality performance in your region.
- Strategies for root-knot nematode management including variety selection, nematicides, and crop rotations are identified.
- Long-term studies continue to evaluate effects of cropping systems (cover crops and rotations) on cotton yields and profitability.
- Carbon dynamics studies are underway and base carbon levels are being determined.
- Soil sampling for N fertilization should be greater than 6 inches depth. 24" is now considered a minimum and 36" is preferred.
- Nitrogen fertilizer timings and requirements for new cotton varieties are being determined.

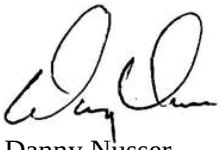
We have welcomed the opportunity to demonstrate research and extension studies to our state and federal representatives over the years and acquainting them with the issues that you as producers face to produce crops in the region. Congressman, Mike Conaway often referred to his visit to AG-CARES as a great benefit to understand cotton production in west Texas.

Dr. Jane Dever, now Associate Director at the Lubbock Center, will be replacing me as Director. Dr. Dever brings a wealth of experience having grown up on a farm just north of the center. She worked at the Lubbock center first in Extension and later in the Cotton Breeding research program. From there she worked for several companies and was the Global Cotton Breeding Manager at Bayer CropScience when she returned to join us at AgriLife Research in 2008 as our Cotton Breeder. You will be in good hands with Dr. Dever taking the leadership role at AgriLife Research at Lubbock.

In closing, let me express my thanks to you for your support, cooperation, and willingness to assist our scientists in carrying out the “Land Grant Mission” in the Southern High Plains.

God bless you and your families as you continue to feed and clothe the world.

Jaroy Moore
Resident Director of Research
Texas A&M AgriLife Research and Extension Center
Lubbock



Danny Nusser
Regional Program Director
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Table of Contents

Table of Contents (cont'd)

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The Lamesa Cotton Growers would like to thank the following for their contributions to the AG-CARES Project:

Americot Cotton Seed
Bayer CropScience
Cotton, Inc. – State Support Program
Sam Stevens, Inc.
Syngenta Crop Protection
BASF
Corteva
Dawson County Commissioners Court
PhytoGen Cotton Seed

TITLE:

Cotton variety performance (continuous cotton, conventional tillage) as affected by low-energy precision application (LEPA) irrigation levels at AG-CARES, Lamesa, TX, 2022.

AUTHORS:

Wayne Keeling – Professor
Ray White – Research Scientist
Justin Spradley – Research Assistant

MATERIALS AND METHODS:

Plot Size:	4 rows by 300-700 feet, 3 replications	
Planting Date:	May 16	
Varieties:	DP 2143NR B3XF FM 2498 GLT	
Herbicides:	Treflan 32 oz/A	4/6/2022
	Caparol 32 oz/A	5/19/22
	Roundup 32 oz/A + Warrant 32 oz/A	6/19/22
	Roundup 32 oz/A + Liberty 32 oz/A	7/18/22
Fertilizer:	80-0-0	

Irrigation:

	Low	Base	Base Plus
Preplant/Emergence	5.75”	5.75”	5.75”
In-season	0.0”	6.95”	9.25”
Total	5.75”	12.7”	15.0”

Harvest Date: November 16

RESULTS AND DISCUSSION:

Two varieties, DP 2143NR B3XF (nematode-resistant) FM 2498 GLT (nematode susceptible) were compared under three irrigation levels (center-pivot) in a continuous cotton/conventional tillage system. Due to extremely dry conditions from September 2021 through late August 2022, yields were below average even with significant irrigation inputs (Table 1). With no in-season irrigation, lint yields averaged 118 lbs/A and increased to 754 lbs/A with the base plus irrigation treatment. No difference in yield was observed between the two varieties. Irrigation level or variety did not affect loan value, while gross revenues were higher with increased irrigation but similar for the two varieties. Reduced root-knot nematode populations resulted from the extremely dry conditions.

Table 1. Effect of varieties and irrigation level on cotton lint yield (lbs/A), loan value (¢/lb), and gross revenue ($/A) in a conventional tillage system.

	In-season Irrigation Levels (inches)			
Variety	**Low (0.0)**	**Base (6.95)**	**Base Plus (9.25)**	**Average**
	---------- lbs/A----------			
DP 2143NR B3XF	105	519	747	**457 A**
FM 2498 GLT	132	582	760	**491 A**
Average	**118 C**	**551 B**	**754 A**	**--**
	---------- ¢/lb----------			
DP 2143NR B3XF	54.00	52.77	52.55	**53.11 A**
FM 2498 GLT	52.92	53.20	51.88	**52.67 A**
Average	**53.46 A**	**52.98 A**	**52.22 A**	**--**
	---------- $/A----------			
DP 2143NR B3XF	56	274	392	**241 A**
FM 2498 GLT	70	309	395	**258 A**
Average	**63 C**	**292 B**	**394 A**	**--**

TITLE:

Cotton variety performance (continuous cotton, terminated rye cover) as affected by low-energy precision application (LEPA) irrigation levels at AG-CARES, Lamesa, TX, 2022.

AUTHORS:

Wayne Keeling – Professor
Ray White – Research Scientist
Justin Spradley – Research Assistant

MATERIALS AND METHODS:

Plot Size: 4 rows by 300-700 feet, 3 replications

Planting Date: May 16, Rye cover planted November 20, 2021, terminated April 27, 2022

Varieties: DP 2143NR B3XF
FM 2498 GLT

Herbicides:

Roundup 32 oz/A + Valor 2 oz/A	4/27/22
Caparol 32 oz/A + Gramoxone 32 oz/A	5/19/22
Roundup 32 oz/A + Warrant 32 oz/A	6/9/22
Roundup 32 oz/A + Liberty 32 oz/A	7/18/22

Fertilizer: 80-0-0

Irrigation:

	Low	Base	Base Plus
Preplant/Emergence	7.25”	7.25”	7.25”
In-season	0.0”	6.95”	9.25”
Total	7.25”	14.2”	16.5”

Harvest Date: November 16

RESULTS AND DISCUSSION:

Two varieties, DP 2143NR B3XF (nematode resistant) and FM 2498 GLT (nematode susceptible) were compared under three irrigation levels (center-pivot) in a continuous cotton/terminated rye cover crop system. Due to extremely dry conditions from September 2021 through late August 2022, yields were below average even with significant irrigation inputs (Table 1). Cotton lint yields ranged from 101 lbs/A to 781 lbs/A as in-season irrigation level increased. When averaged across irrigation levels, both varieties produced similar yields. Loan values were not affected by irrigation levels or variety. Gross revenues were similar for both varieties but increased significantly as irrigation level increased.

Table 1. Effects of varieties and irrigation level on cotton lint yield (lbs/A), loan value (¢/lb), and gross revenue ($/A) under continuous cotton terminated rye cover.

	In-season Irrigation Levels (inches)			
Variety	**Low (0.0)**	**Base (6.95)**	**Base Plus (9.25)**	**Average**
	---------- lbs/A----------			
DP 2143NR B3XF	91	565	756	**470 A**
FM 2498 GLT	112	605	806	**507 A**
Average	**101 C**	**585 B**	**781 A**	**--**
	---------- ¢/lb----------			
DP 2143NR B3XF	50.67	52.78	49.55	**51.00 A**
FM 2498 GLT	51.25	52.20	51.92	**51.79 A**
Average	**50.96 A**	**52.49 A**	**50.73 A**	**--**
	---------- $/A----------			
DP 2143NR B3XF	46	298	377	**240 A**
FM 2498 GLT	58	316	420	**264 A**
Average	**52 C**	**307 B**	**398 A**	**--**

TITLE:

Cotton variety performance (wheat-cotton rotation) as affected by low-energy precision application (LEPA) irrigation levels at AG-CARES, Lamesa, TX, 2022.

AUTHORS:

Wayne Keeling – Professor
Ray White – Research Scientist
Justin Spradley – Research Assistant

MATERIALS AND METHODS:

Plot Size: 4 rows by 300-700 feet, 3 replications

Planting Date: May 16, Wheat planted November 2020, not harvested in 2021 due to severe hail

Varieties: DP 2143NR B3XF
FM 2498 GLT

Herbicides:

Roundup 32 oz/A + Valor 2 oz/A	4/27/22
Caparol 32 oz/A + Gramoxone 32 oz/A	5/19/22
Roundup 32 oz/A + Warrant 32 oz/A	6/9/22
Roundup 32 oz/A + Liberty 32 oz/A	7/18/22

Fertilizer: 80-0-0

Irrigation:

	Low	Base	High
Preplant/Emergence	4.25”	4.25”	4.25”
In-season	0.0”	6.95”	9.25”
Total	4.25”	11.2”	13.5”

Harvest Date: November 16

RESULTS AND DISCUSSION:

Two varieties including DP 2143NR B3XF (nematode resistant) and FM 2498 GLT (nematode susceptible) were planted under three in-season irrigation levels in a wheat-cotton rotation. Wheat was planted following cotton harvest in November 2020 but was not harvested in 2021 due to a severe hail. The stubble was maintained without tillage and cotton was planted into standing stubble in 2022. Cotton lint yields increased to 955 lbs/A as irrigation level increased. When averaged across irrigation levels, similar yields were produced with both varieties (Table 1). Loan values were not affected by irrigation level or variety. Irrigated levels increased gross revenues but were similar for the two varieties.

When comparing across continuous cotton (conventional tillage, continuous cotton (terminated rye cover), and the wheat-cotton rotation, similar yields were produced with or without a cover crop. Yields were 37% greater with the wheat-cotton rotation compared to the other two systems (Table 2). These results are consistent with previous year’s results that the terminated cover crop system produced similar or slightly lower yields compared to the conventional tillage system. Consistent yield increases of 20-30% have been achieved with the wheat-cotton rotation, but economics of this system must consider the lower returns from wheat production.

Table 1. Effects of varieties and irrigation level on cotton lint yield (lbs/A), loan value (¢/lb), and gross revenue ($/A) in a wheat-cotton rotation in 2022.

	In-season Irrigation Levels (inches)			
Variety	**Low (0.0)**	**Base (6.95)**	**Base Plus (9.25)**	**Average**
	---------- lbs/A----------			
DP 2143NR B3XF	159	800	955	**703 A**
FM 2498 GLT	291	864	954	**638 A**
Average	**225 B**	**832 A**	**955 A**	**--**
	---------- ¢/lbs----------			
DP 2143NR B3XF	50.50	51.80	49.00	**50.43 A**
FM 2498 GLT	52.02	52.93	49.35	**51.43 A**
Average	**51.26 A**	**52.37 A**	**49.18 A**	**--**
	---------- $/A----------			
DP 2143NR B3XF	82	415	464	**320 A**
FM 2498 GLT	151	457	479	**363 A**
Average	**117 B**	**437 A**	**471 A**	**--**

Table 2. Effects of cropping systems and irrigation level on cotton lint yield averaged across two varieties in 2022.

		In-season Irrigation Levels		Base/Base Plus
Variety	**Low (0.0)**	**Base (6.95)**	**Base Plus (9.25)**	**Average**
	---------- lbs/A----------			
Continuous Cotton-Conv Tillage (>30 yr)	118	551	754	**653**
Continuous Cotton-Rye Cover	101	585	781	**683 (+5%)**
Wheat-Cotton rotation	225	832	955	**894 (+37%)**
Average	**148**	**656**	**830**	**--**

TITLE:

Effect of planting date on yield and fiber quality of Deltapine varieties at AG-CARES, Lamesa, TX, 2022.

AUTHORS:

Wayne Keeling – Professor
Ray White – Research Scientist
Justin Spradley – Research Assistant

MATERIALS AND METHODS:

Plot Size:	4 rows by 200 feet		
Planting Date:	May 6, May 16, May 31, June 15 Wheat planted November 2020, not harvested in 2021 due to severe hail		
Varieties:	DP 1909 XF	DP 2012 B3XF	
	DP 1820 B3XF	DP 2123 B3XF	
	DP 2239 B3XF	DP 2044 B3XF	
Herbicides:	Roundup 32 oz/A + Valor 2 oz/A		4/27/22
	Caparol 32 oz/A + Gramoxone 32 oz/A		5/19/22
	Roundup 32 oz/A + Warrant 32 oz/A		6/9/22
	Roundup 32 oz/A + Liberty 32 oz/A		7/18/22
Fertilizer:	80-0-0		

Irrigation:

	Base
Preplant/Emergence	4.25”
In-season	6.95”
Total	11.2”

Harvest Date:	Planting dates 1-3 harvested October 13 Fourth planting date harvested November 2

RESULTS AND DISCUSSION:

Six Deltapine varieties were planted at four dates (May 6, May 16, May 31, and June 15). Irrigation was applied similarly across all four dates during the growing season. Results are probably not typical due to the extremely hot, dry summer and good fall that enhanced maturity of the June 15 planting. When averaged across varieties, yields increased with later planting dates ranging from 812 to 1320 lbs lint/A (Table 1). When averaged across planting date, yields ranged from 866 to 1235 lbs lint/A for the six varieties. Loan values were lowest for the June 15 planting date (low micronaire) but were similar for the other three dates. Gross returns ($/A) were highest for the later planting dates. In a more typical year, the June 15 planting date would have reduced yield potential but delaying planting until mid-May appears optimum.

Table 1. Effects of Deltapine varieties and planting date on cotton lint yield (lbs/A), loan value (¢/lb), and gross revenue ($/A) in a wheat-cotton rotation in 2022.

	Planting Date				
Variety	**May 6**	**May 16**	**May 31**	**June 15**	**Average**
		---------- lbs/A----------			
DP 1909 XF	573	626	981	1285	**866**
DP 2012 B3XF	809	916	1198	1329	**1063**
DP 1820 B3XF	809	1075	1226	941	**1013**
DP 2123 B3XF	694	774	1036	1568	**1018**
DP 2239 B3XF	954	977	1336	1460	**1182**
DP 2044 B3XF	1035	1150	1421	1334	**1235**
Average	**812**	**920**	**1200**	**1320**	**--**
		---------- ¢/lb----------			
DP 1909 XF	52.85	50.50	54.50	51.20	**52.26**
DP 2012 B3XF	54.45	55.90	57.00	56.80	**56.04**
DP 1820 B3XF	54.50	57.10	55.20	49.40	**54.05**
DP 2123 B3XF	52.85	52.15	53.85	56.80	**53.91**
DP 2239 B3XF	57.10	57.15	57.50	50.35	**55.53**
DP 2044 B3XF	56.60	56.60	56.80	46.75	**54.19**
Average	**54.73**	**54.90**	**55.81**	**51.88**	**--**
		---------- $/A----------			
DP 1909 XF	303	331	519	658	**453**
DP 2012 B3XF	440	499	653	755	**587**
DP 1820 B3XF	441	586	668	465	**540**
DP 2123 B3XF	367	409	548	891	**554**
DP 2239 B3XF	545	558	763	735	**650**
DP 2044 B3XF	586	651	805	624	**666**
Average	**447**	**506**	**659**	**688**	**--**

TITLE: Impact of Long-term Cover Cropping on Cotton Yield, AG-CARES, Lamesa, TX 2022

AUTHORS:
Katie Lewis – Associate Professor
Joseph Burke – Postdoctoral Research Associate
Christopher Cobos – Senior Research Associate
Wayne Keeling – Professor

MATERIALS AND METHODS:

Location:	AG-CARES, Lamesa, TX
Plot Size:	8 rows by 45 ft, 3 replications
Design:	Randomized complete block
Row Spacing:	40”
Cover Crop	
Seeding Dates:	2 December 2014; 4 November 2015; 12 December 2016; 17 November 2017; 4 December 2018; 21 November 2019; 4 December 2020; 19 November 2021; and 21 November 2022
Termination:	10 April 2015; 11 March 2016; 3 April 2017; 27 March 2018; 9 April 2019; 27 March 2020; 9 April 2021; and 27 April 2022
Cotton	
Planting Dates:	13 May 2015; 24 May 2016; 5 May 2017; 15 May 2018; 19 May 2019; 18 May 2020; 12 May 2021 and replanted 7 July 2021; 16 May 2022
Cotton Harvest:	28 October 2015; 22 November 2016; 7 November 2017; 19 November 2018; 28 October 2019; 31 October 2020; 22 November 2021; and 15 November 2022
Variety:	2015 DP 1321 B2RF planted at 53,000 seed/acre; 2016-2018 DP 1646 B2XF planted at 53,000 seed/acre; 2019-2020 DP 1747 NR B2XF and DP 1646 B2XF planted at 53,000 seed/acre; 2021, DP 1646 B2XF planted at 53,000 seeds/acre, replanted to DP 1820 B2XF at 53,000 seeds/acre; 2022, DP 1646 B2XF planted at 53,000 seeds/acre.
Fertility:	120 lb N/A as 32-0-0 applied through the pivot in 4 applications of 30 lb N/A (2020); 65 lb N/A applied as 32-0-0 through pivot (2021); 90 lb N/A applies as 32-0-0 through pivot in 3 applications of 30 lb N/A (2022)
Rainfall:	12.4” (2015); 13” (2016); 10.5” (2017); 6” (2018); and 10.9” (2019); 6.7” (2020); 15.11” (2021); and 9.4” (2022)
Irrigation:	7.1” (2015); 5.1” (2016); 8.0” (2017); 11.6” (2018); and 10.8” (2019); 11.4” (2020); 0.75” (2021), no additional irrigation following cotton replanting on 7 July 2021; and 14.2” (2022)

Management practices being demonstrated include: 1) conventional, winter fallow; 2) reduced tillage (no-till) - rye (*Secale cereal* L.) cover crop; and, 3) reduced tillage (no-till) – mixed species cover crop. Mixed cover crop species included hairy vetch (*Vicia villosa* Roth), radish (*Raphanus sativus* L.), winter pea (*Pisum sativum* L.), and rye. Conventional tillage and reduced

tillage with rye cover crop treatments were established in 1998 and the mixed species cover was seed in 2014 in 8 of 16 rows of the rye cover crop plots. In 2019, each plot was split into 8-row plots to include a nematode resistant cotton variety (DP 1747 NR B2XF). Cover crops were planted using a no-till drill on 2 December 2014, 4 November 2015, 12 December 2016, 17 November 2017, 4 December 2018, 21 November 2019, 4 December 2020, 19 November 2021, and 21 November 2022, and were chemically terminated 10 April 2015, 11 March 2016, 3 April 2017, 27 March 2018, 9 April 2019, 27 March 2020, and 9 April 2021 using Roundup PowerMax (32 oz/acre). Prior to termination, above ground biomass of cover crops were harvested from a 1 m^2 area to calculate herbage mass (dry weight basis), nitrogen (N) uptake, and C:N ratios. Soil core samples were collected following cover crop termination each year to a depth of 24 inches from each plot and analyzed for total C and N, organic C, nitrate-N, Mehlich III extractable macronutrients, and sodium (Na), and pH and electrical conductivity (EC). Additional samples were collected at this time to a 6-inch depth and analyzed using the Soil Health Test. After soil sampling, cotton (DP 1321 B2RF) was planted 13 May 2015, 24 May 2016, 5 May 2017, (DP 1646 B2XF) 15 May 2018, 19 May 2019, 18 May 2020 (DP 1747 NR B2XF and DP 1646 B2XF), 12 May 2021 (DP 1747 NR B2XF and DP 1646 B2XF) at a seeding rate 53,000 seed/acre. Cotton was hailed out at a total loss on 26 June 2021 and replanted 7 July 2021 to DP 1822 B2XF. Cotton was harvested on 28 October 2015, 22 November 2016, 7 November 2017, 19 November 2018, 28 October 2019, 31 October 2020, and 17 November 2021. After cotton harvest the no-till plots were drilled with cover.

Prior to termination, above ground biomass of cover crops were harvested from a 1 m^2 area to calculate herbage mass (dry weight basis). Biomass from an additional 1 m^2 sampling area was collected and transferred to 15- x 20-cm nylon litterbags at field scale to simulate decomposition *in-situ*. Litterbags were installed in triplicate into the single or mixed species cover crop plots on 9 April 2021 and collected at 4, 8, 16, 32, 64, and 128 days after termination (DAT).

RESULTS AN DISCUSSION:

Cover Crop Herbage Mass Production and Decomposition

Herbage mass was not significantly different between no-till with rye cover and no-till with mixed cover crop treatments in 2016, 2018, 2020, 2021, or 2022 but differences were determined in 2015, 2017, and 2019 with the rye cover crop treatment producing greater above ground biomass compared to the mixed cover crop treatment in 2015 and 2017, while in 2019 the mixed species cover produced significantly greater biomass compared to the rye (Fig. 1). In 2015, 2016, and 2018 the rye cover crop tended to produce more herbage mass than the mixed cover crop treatment. Cover crops harvested in 2016 were seeded about a month earlier than cover crops harvested in 2015 and 2017, which provided adequate time for crop establishment prior to colder temperatures. Cover crops harvested in 2018 had the longest growing season of the years evaluated but due to limited rainfall during the growing season it produced reduced biomass. In 2019, the mixed species cover produced greater herbage mass compared to rye for the first time in the study. This is most likely due to poor rye germination in winter 2018. Herbage production in 2020 was similar to production rates in 2016 and 2017. This was likely a combination of increased heat units in Spring 2020. Herbage production in 2021 was severely limited by reduced winter precipitation and fewer heat units in the 2020-2021 growing seasons. In 2022, herbage mass production was again significantly reduced compared to the 2015-2020 historical averages due to significant drought during the 2021-2022 growing season.

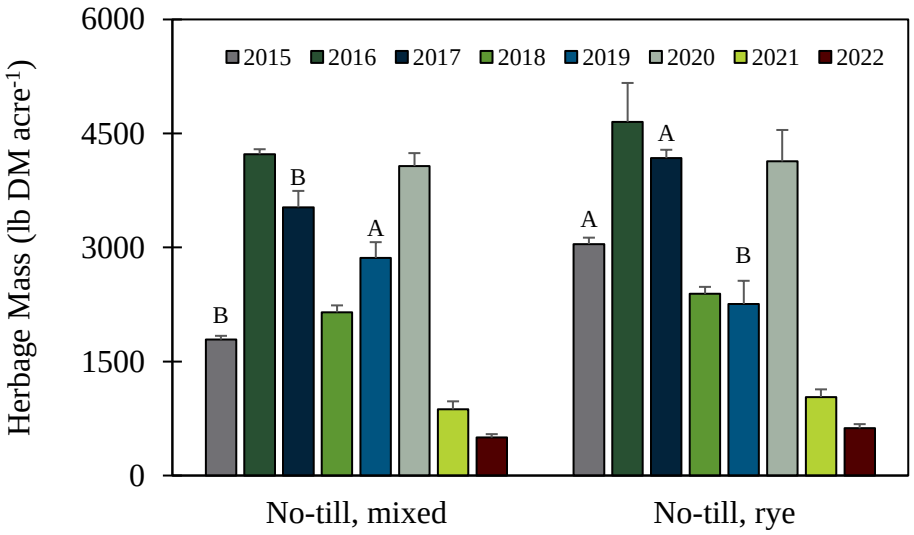

Figure 1. Herbage mass (dry matter, DM) of rye and mixed cover crops harvested in 2015, 2016, 2017, 2018, 2019, 2020, 2021, and 2022 with the no-till treatments at Lamesa, TX. Bars represent standard error of the sample mean. Mean values with the same letter within year are not significantly different at $P < 0.05$.

Cotton Lint Yield

Lint yields were greater in the conventional tillage treatment followed by no-till, mixed cover and no-till, rye cover treatments in 2016 and 2017 (Fig. 2). Lint yields were not different between the conventional tillage and no-till with mixed cover crop treatments in any year but were significantly reduced when cotton was planted in terminated rye cover compared to the conventional tillage treatment in 2016 and 2017. In 2019, plots were split from 16 to 8 rows to

determine the impact of nematode pressure of cotton lint yield under conservation management practices. The two years of results suggest there is no yield benefit to nematode resistant varieties in conservation management systems (Fig. 2). Despite the late planting date, there was no difference in cotton lint yield in 2021 with the no-till cover crop treatments generally producing greater lint than the CT system. In 2022, cotton lint yield was greatest in the CT compared to both no-till cotton systems. While the cotton lint yields in the no-tillage rye and mixed species cover followed a decreasing trend we have observed since 2020, yields in the CT system remained consistent to the yields observed in 2015-2016 and 2018-2020 which is likely caused by weed pressure in the no-tillage plots.

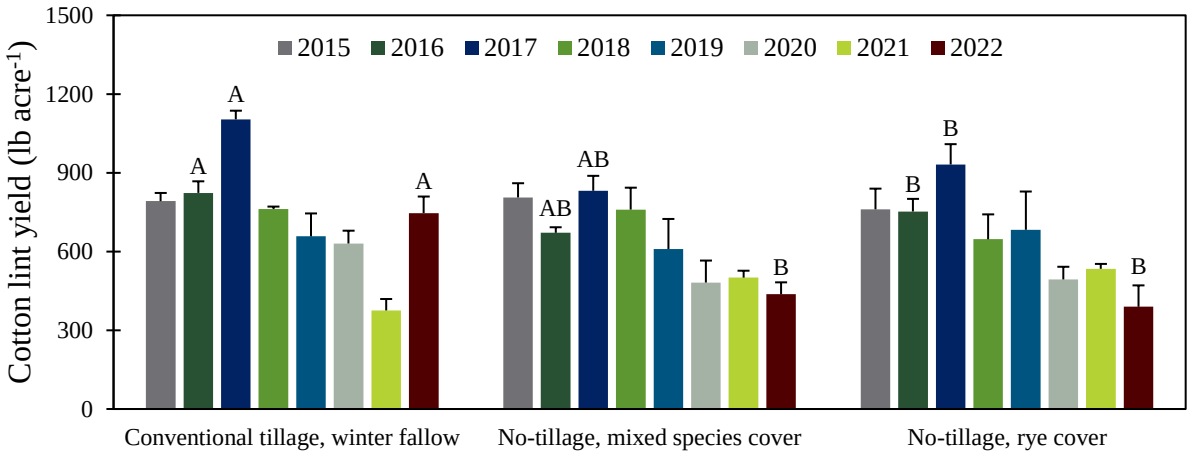

Figure 2. Lint yield with conventional tillage (CT), no-till with rye cover, and no-till with mixed cover treatments in Lamesa, TX for 2015, 2016, 2017, 2018, 2019, 2020, 2021, and 2022. Bars represent the standard deviation of the sample mean. Mean values within year with the same letter are not significantly different at $P < 0.1$.

TITLE: Impact of Nitrogen Management across Cotton Cropping Systems in the Texas Southern High Plains, AG-CARES, Lamesa, TX 2022

AUTHORS:
Katie Lewis – Associate Professor
Joseph Burke – Postdoctoral Research Associate
Wayne Keeling – Professor

MATERIALS AND METHODS:

Location:	AG-CARES, Lamesa, TX
Plot Size:	4 rows by 40 ft, 40” row spacing
Design:	Randomized complete block with 4 replications
Planting Date:	16 May 2022
Cotton Harvest:	5 November 2022
Variety:	DP 2141NR B3XF and FM 2498GLT planted at 53,000 seeds/acre in 2022.
Fertility:	90 lb N/A as 32-0-0 applied through the pivot in 3 applications of 30 lb N/A

Irrigation:

	CT	NT-Cover	W/C Rotation
Preplant/Emergence	5.75”	7.25”	4.25”
In-season	9.25”	9.25”	9.25”
Total	15.0”	16.5”	13.5”

In 2022, the study was modified to allow for larger plots throughout the pivot wedges. Two varieties were planted, DP 2141NR B3XF and FM 2498GLT, and three fertility treatments were implemented: 1) 30 lb/A (preplant), 30 lb/A (mid-June), 30 lb/A (mid to late July) (Common Practice); 2) 30 lb/A (preplant), 50 lb/A (mid-June), 10 lb/A (mid to late July); 3) 30 lb/A (preplant), 10 lb/A (mid-June), 50 lb/A (mid to late July).

RESULTS AND DISCUSSION:
Cotton following a wheat-fallow rotation resulted in the greatest lint yield compared to conventionally tilled, winter fallow, and no-tillage, rye cover cotton at Lamesa (Table 1). Soil water was significantly greater in the Cotton-Wheat-Fallow Rotation throughout the growing season which was likely the reason for the increased lint yield (data not shown). The effects of variety and nitrogen fertilizer timing and their interactions were not significant. Unlike previous years (2018-2020), we did not observe a fertility effect. This was likely caused by limited precipitation which caused a reliance on groundwater for irrigation. That groundwater has been reported to have elevated levels of nitrate-N that reduced the need for inorganic fertilizers.

Table 2. Cotton lint yield of two cotton varieties grown in three cropping systems and under three fertility timings.

	Fertility Treatment			
Cropping System	30 lb N/A Preplant 30 lb N/A Post Emergence 30 lb N/A Pinhead Square	30 lb N/A Preplant 50 lb N/A Post Emergence 10 lb N/A Pinhead Square	30 lb N/A Preplant 10 lb N/A Post Emergence 50 lb N/A Pinhead Square	*Cropping Systems Average*
Conventional tillage, winter fallow				
DP 2141	747	804	718	
FM 2498	760	782	812	*771*
Variety Average	*754*	*793*	*765*	
No-tillage, rye cover				
DP 2141	756	806	797	
FM 2498	806	784	782	*788*
Variety Average	*781*	*795*	*789*	
Cotton-Wheat-Fallow Rotation				
DP 2141	955	977	921	
FM 2498	954	943	946	*949*
Variety Average	*955*	*960*	*934*	
Fertility Average	*830*	*849*	*829*	

TITLE: Soil Water Dynamics in Semi-Arid Cotton Conservation Agroecosystems, AG-CARES, Lamesa, TX 2022

AUTHORS:

Katie Lewis- Associate Professor
Christopher Cobos- Senior Research Associate
Joseph Burke- Postdoctoral Research Associate
Wayne Keeling- Professor

MATERIALS AND METHODS:

Location:	AG-CARES, Lamesa, TX
Plot Size:	24 rows by the center pivot span length
Design:	Split plot design with cropping system as the main plot and irrigation level as the sub-plot
Row Spacing:	40”
Irrigation	
Base:	60% estimated ET replacement; W1: 12.7”, W7: 5”, W8: 11.2”, W9: 14.2”
Low:	to achieve adequate stands with ≤ 3” of early season irrigation (23 June 2022), then dryland until harvest; W1: 5.75”, W7: 5”, W8: 4.25”, W9: 7.25”
Cover Crop	
Seeding Date:	28 November 2021
Termination:	27 April 2022
Cotton	
Planting Date:	16 May 2022
Cotton Harvest:	1 November 2022
Variety:	DP 2141
Fertility:	90 lb N/A applied as 32-0-0 through the pivot in four equal applications

Experimental plots established in 2014 at the Lamesa site are located on a 0.8 km diameter center pivot separated into nine equivalent wedges, each consisting of a different cropping system. The center pivot encompasses eight spans of 48 rows (1.02 m centers) span^{-1}. All treatments were replicated within wedges and arranged as a split-plot design with the cropping system as the main plot and irrigation levels as the subplot. The following cropping systems were evaluated: (1) continuous cotton with conventional tillage at base irrigation level (60% estimated ET replacement); (2) continuous cotton with conventional tillage at low irrigation level (irrigation to achieve adequate stands with ≤ 3 in. of early season irrigation, otherwise dryland cropping system); (3) continuous cotton with no-tillage and winter rye (*Secale cereal*) cover crop at base irrigation level (60% estimated ET replacement); (4) continuous cotton with no-tillage and winter rye (*Secale cereal*) cover crop at low irrigation level (irrigation to achieve adequate stands with ≤ 3 in. of early season irrigation, otherwise dryland cropping system); (5) cotton – wheat – summer cover (60% sudangrass [*Sorghum drummondii*] and 40% cowpea [*Vigna unguiculata* L.] seeded at 45 kg ha^{-1}) rotation with no-tillage at base irrigation level only (60% estimated ET replacement); (6) cotton – wheat – fallow with no-tillage at base irrigation level (60% estimated ET replacement) and (7)

cotton – wheat – fallow with no-tillage at low irrigation level (irrigation to achieve adequate stands with ≤ 3 in. of early season irrigation, otherwise dryland cropping system). Wheat will be planted following cotton harvest with a summer cover mix planted into wheat stubble following wheat harvest in system (5) only. Systems (5), (6), and (7) will be replicated on two wedges with alternating wheat/cotton planting years to allow a cotton crop to be grown at all times during the duration of the study. Cover crops were planted using a no-till drill on 27 April 2022 using Roundup PowerMAX (32 oz/acre). Prior to termination, above ground biomass of cover crops were harvested from a 1 m^2 area to calculate herbage mass (dry weight basis), nitrogen (N) uptake, and C:N ratios. Soil core samples were collected following cover crop termination each year to a depth of 41 inches from each plot and analyzed for soil texture, total C and N, organic C, nitrate-N, Mehlich III extractable macronutrients, and sodium (Na), and pH and electrical conductivity (EC). After soil sampling, cotton was planted 16 May 2022 at a seeding rate 53,000 seed/acre. Cotton was harvested on 1 November 2022. After cotton harvest the no-till plots were drilled with cover.

Soil moisture measurements were collected via field-calibrated neutron attenuation with access tubes installed within each plot to a depth of approximately 41 inches. Readings were taken at 5.9-inch increments every two weeks throughout the year unless rainfall inhibited our ability to get into the field.

RESULTS AND DISCUSSION

Soil Moisture

Profile soil moisture was greatest in the cotton – wheat – fallow with no-tillage systems in both the base and low irrigation levels followed by continuous cotton with no-tillage and winter rye (*Secale cereal*) cover crop and the continuous cotton with conventional tillage systems during cover crop growth and termination and through cotton planting (*figure 1*). Across seven sampling dates throughout the growing season (4/25, 5/13, 5/31, 6/28, 7/15, 8/9, 10/15), there was an increase of 2.9 and 2.6 acre-inches of water in the cotton – wheat – fallow with no-tillage system at the base and low irrigation levels respectively compared to the conventional tillage system. An increase of 3.3 and 0.8 acre-inches of water was measured in the continuous cotton with no-tillage and winter rye cover crop at the base and low irrigation when compared to the conventional tillage system. Any increase in stored soil moisture can be significant in semi-arid agricultural production systems, as the 2022 growing season only received 8 in. of precipitation from April through October. Greater soil moisture in the conservation systems can most likely be attributed to increased soil physical properties such as infiltration and percolation via reduced disturbance from no-tillage and decreased evapotranspiration from greater plant biomass ground cover. Plant emergence and subsequent cotton lint yields are reflective of the increased early season soil moisture (*figure 2*). Gravimetric water content of the total soil profile and the top 0-6 in. after cover crop termination and prior to cotton planting validate the early season neutron probe measurements (data not shown).

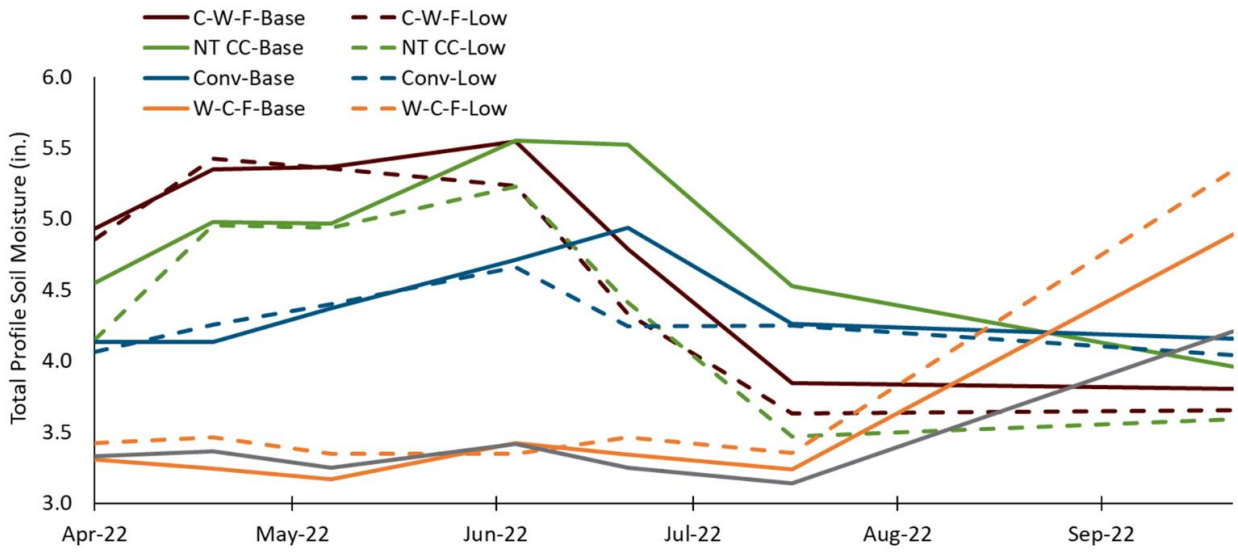

Figure 1. Total profile (0-41 in.) soil moisture in inches of all cropping systems at the Lamesa, TX AG-CARES site in 2022 for continuous cotton with conventional tillage and winter fallow (Conv), continuous cotton with no-tillage and winter rye cover crop (NT CC), cotton – wheat – fallow with no-tillage (C-W-F). Orange lines indicate the 2022 wheat crop for the alternating cotton – wheat – fallow with no-tillage system (W-C-F). The gray solid line indicates the cotton – wheat – summer cover (60% sudangrass [*Sorghum drummondii*] and 40% cowpea [*Vigna unguiculata* L.] seeded at 45 kg ha^{-1}) rotation with no-tillage at base irrigation level only system. Solid lines indicate base irrigation at 60% estimated ET replacement (Base) and dotted lines represent low irrigation treatments with irrigation to achieve adequate stands with ≤ 3 in. of early season irrigation, otherwise dryland cropping system (Low). Moisture readings were taken every other week from April - October 22'.

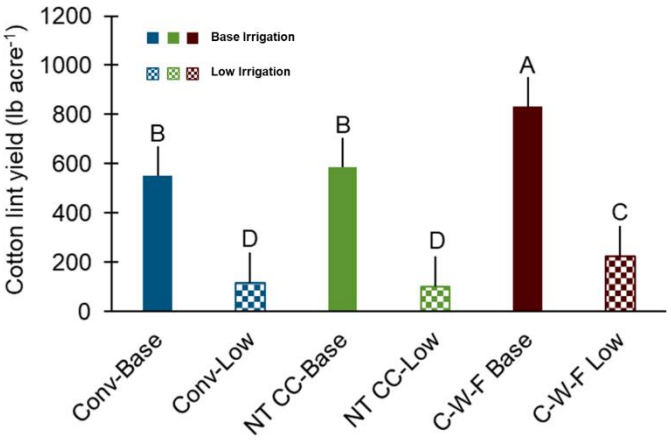

Figure 2. Cotton lint yields in pounds/acre for continuous cotton with conventional tillage and winter fallow (Conv), continuous cotton with no-tillage and winter rye cover crop (NT CC), cotton – wheat – fallow with no-tillage (C-W-F) in 2022. Solid bars represent base irrigation at 60% estimated ET replacement (Base) and patterned bars represent low irrigation treatments with irrigation to achieve adequate stands with ≤ 3 in. of early season irrigation, otherwise dryland cropping system (Low). Error bars represent standard deviation of the sample mean. Mean values with the same letter are not significantly different at $P < 001$.

TITLE:

Performance of Deltapine varieties as affected by irrigation levels at AG-CARES, Lamesa, TX, 2022.

AUTHORS:

Wayne Keeling – Professor
Ray White – Research Scientist
Justin Spradley – Research Assistant

MATERIALS AND METHODS:

Plot Size: 4 rows by 32 feet, 4 replications

Planting Date: May 23

Varieties:

DP 2239 B3XF	21R 635 B3XF (DP 2335 B3XF)
DP 2123 B3XF	21R 634 B3XF
DP 2044 B3XF	21R 536 XF
DP 1845 B3XF	21R 521 XF
DP 1820 B3XF	20R 745NR B3XF
21R 649NR B3XF	20R 733 B3XF

Herbicides:

Caparol 32 oz/A + Gramoxone 32oz/A	5/23/22
XtendiMax 22 oz/A + Roundup 32 oz/A	6/23/22
Roundup 32 oz/A + Dual 20 oz/A	7/6/22

Fertilizer: 80-0-0

Irrigation:

	Low	Base	High
Preplant/Emergence	10.1”	10.1”	10.1”
In-season	4.0”	6.7”	8.3”
Total	14.1”	16.8”	18.3”

Harvest Date: October 28

RESULTS AND DISCUSSION:

Five commercial and seven experimental Deltapine varieties were evaluated under three levels of subsurface drip irrigation. When averaged across irrigation levels, cotton lint yields ranged from 1126 lbs/A to 1307 lbs/a as irrigation amount applied increased (Table 1). When averaged across varieties, average lint yields ranged from 783 lbs/A to 1429 lbs/A. The highest yielding group include four commercial varieties (DP 2239 B3XF, DP 2123 B3XF, DP 2044 B3XF, and DP 1820 B3XF) and four experimentals (21R 635 B3XF, 21R 649NR B2XF, 21R 536 XF, and 21R 521 XF).

Loan values were higher for the base and high irrigation levels compared to the in-season low level. When averaged across irrigation levels, varieties in the highest group of loan value included DP 2044 B3XF, DP 1845 B3XF and three experimentals including 21R 635 B3XF, 21R 634 B3XF, and 20R 745NR B3XF. 21R 635 B3XF will be marketed as DP 2335 B3XF in 2023 for West Texas. Gross revenues, when averaged across irrigation levels, ranged from $444 to

$809/A. The highest gross values were achieved with DP 2239 B3XF, DP 2123 B3XF, DP 2044 B3XF, DP 1820 B3XF, 21R 635 B3XF (DP 2335 B3XF), and two other experimentals.

Table 1. Effects of variety and irrigation level on cotton lint yield (lbs/A), loan value (¢/lb), and gross revenue ($/A).

	In-season Irrigation Levels (inches)			
Variety	**Low (4.0)**	**Base (6.7)**	**High (8.3)**	**Average**
	---------- lbs/A----------			
DP 2239 B3XF	1170	1265	1523	**1320 AB**
DP 2123 B3XF	1067	1450	1429	**1315 AB**
DP 2044 B3XF	1179	1291	1347	**1272 AB**
DP 1845 B3XF	773	834	743	**783 D**
DP 1820 B3XF	1088	1393	1248	**1243 ABC**
21R 649NR B3XF	1208	1423	1425	**1352 AB**
21R 635 B3XF	1274	1417	1597	**1429 A**
21R 634 B3XF	1285	1218	1109	**1204 BC**
21R 536 XF	1246	1505	1508	**1420 A**
21R 521 XF	1072	1342	1344	**1253 AB**
20R 745NR B3XF	1118	906	1113	**1046 C**
20R 733 B3XF	1026	1192	1293	**1170 BC**
Average	**1126 A**	**1270 A**	**1307 A**	**--**
	----------¢/lb----------			
DP 2239 B3XF	55.01	56.65	56.71	**56.13 AB**
DP 2123 B3XF	52.96	55.40	55.59	**54.65 D**
DP 2044 B3XF	56.90	56.71	56.83	**56.81 A**
DP 1845 B3XF	55.71	56.76	56.83	**56.43 A**
DP 1820 B3XF	54.49	55.53	56.38	**55.46 BC**
21R 649NR B3XF	53.84	55.00	56.59	**55.14 CD**
21R 635 B3XF	56.48	56.56	56.64	**56.56 A**
21R 634 B3XF	56.73	56.66	56.68	**56.69 A**
21R 536 XF	52.64	55.80	56.33	**54.92 CD**
21R 521 XF	52.40	56.40	56.50	**55.10 CD**
20R 745NR B3XF	56.54	56.43	56.63	**56.53 A**
20R 733 B3XF	53.16	55.83	55.96	**54.98 CD**
Average	**54.74 B**	**56.14 A**	**56.47 A**	**--**
	----------$/A----------			
DP 2239 B3XF	644	717	864	**742 ABC**
DP 2123 B3XF	565	805	795	**722 ABC**
DP 2044 B3XF	671	732	765	**723 ABC**
DP 1845 B3XF	437	474	422	**444 E**
DP 1820 B3XF	593	776	702	**690 ABCD**
21R 649NR B3XF	650	783	806	**746 ABC**
21R 635 B3XF	720	802	905	**809 A**
21R 634 B3XF	729	690	629	**683 BCD**
21R 536 XF	656	838	850	**781 AB**
21R 521 XF	562	757	759	**693 ABCD**
20R 745NR B3XF	632	510	630	**591 D**
20R 733 B3XF	543	665	723	**644 CD**
Average	**617 B**	**712 AB**	**737 A**	**--**

TITLE:

Performance of XtendFlex varieties as affected by irrigation levels at AG-CARES, Lamesa, TX, 2022.

AUTHORS:

Wayne Keeling – Professor
Ray White – Research Scientist
Justin Spradley – Research Assistant

MATERIALS AND METHODS:

Plot Size: 4 rows by 32 feet, 4 replications

Planting Date: May 23

Varieties:
DP 1820 B3XF
DP 2143NR B3XF
NG 3930 B3XF
NG 4098 B3XF
ST 4993 B3XF
ST 5600 B2XF

Herbicides:		
	Caparol 32 oz/A + Gramoxone 32oz/A	5/23/22
	XtendiMax 22 oz/A + Roundup 32 oz/A	6/23/22
	Roundup 32 oz/A + Dual 20 oz/A	7/6/22

Fertilizer: 80-0-0

Irrigation:

	Base	High
Preplant/Emergence	10.1”	10.1”
In-season	6.7”	8.3”
Total	16.8”	18.3”

Harvest Date: October 28

RESULTS AND DISCUSSION:

Six B3XF varieties from three seed companies were compared under two levels of subsurface drip irrigation. Cotton lint averages increased from 1521 to 1747 lbs lint/A as irrigation level increased (Table 1). When averaged across irrigation levels, the highest yielding varieties included DP 2143NR B3XF, NG 4098 B3XF, and ST 5600 B2XF. Loan values were slightly higher at the high irrigation level. When averaged across irrigation levels, highest loan values were achieved with DP 1820 B3XF, NG 3930 B3XF, NG 4098 B3XF, and ST 4993 B3XF. Gross revenues ($/A) increased with increasing irrigation and were highest with the three highest yielding varieties.

Table 1. Effects of variety and irrigation level on cotton lint yield (lbs/A), loan value (¢/lb), and gross revenue ($/A).

Variety	In-season Irrigation Levels (inches) Base (6.7)	High (8.3)	Average
	---------- lbs/A----------		
DP 1820 B3XF	1252	1545	**1399 B**
DP 2143NR B3XF	1634	1951	**1793 A**
NG 3930 B3XF	1402	1533	**1468 B**
NG 4098 B3XF	1782	1774	**1778 A**
ST 4993 B3XF	1367	1724	**1546 B**
ST 5600 B2XF	1686	1951	**1819 A**
Average	**1521 B**	**1747 A**	**--**
	----------¢/lb----------		
DP 1820 B3XF	55.83	57.03	**56.43 A**
DP 2143NR B3XF	53.75	54.50	**54.13 B**
NG 3930 B3XF	56.68	56.55	**56.61 A**
NG 4098 B3XF	57.00	57.03	**57.01 A**
ST 4993 B3XF	55.70	56.85	**56.28 A**
ST 5600 B2XF	51.75	54.48	**53.11 C**
Average	**55.12 B**	**56.07 A**	**--**
	---------- $/A----------		
DP 1820 B3XF	699	881	**790 C**
DP 2143NR B3XF	879	1063	**971 AB**
NG 3930 B3XF	794	867	**831 C**
NG 4098 B3XF	1016	1012	**1014 A**
ST 4993 B3XF	759	980	**870 BC**
ST 5600 B2XF	873	1063	**968 AB**
Average	**837 B**	**978 A**	**--**

TITLE:

Performance of FiberMax and Stoneville varieties as affected by subsurface drip irrigation levels at AG-CARES, Lamesa, TX, 2022.

AUTHORS:

Wayne Keeling – Professor
Ray White – Research Scientist
Justin Spradley – Research Assistant

MATERIALS AND METHODS:

Plot Size: 4 rows by 35 feet, 3 replications

Planting Date: May 24

Varieties:

BX 2392 B3XF	FM 2398 GLTP
BX 2394 B3XF	FM 2498 GLT
BX 2396 B3XF	ST 4595 B3XF
BX 2398 B3XF	ST 4993 B3XF
FM 1621 GL	ST 5600B2XF
FM 2022 GLT	ST 5707 B2XF

Herbicides:

Caparol 32 oz/A + Gramoxone 32oz/A	5/23/22
Liberty 32 oz/A + Roundup 32 oz/A	6/22/22
Roundup 32 oz/A + Dual 20 oz/A	7/6/22

Fertilizer: 80-0-0

Irrigation:

	Low	Base	High
Preplant/Emergence	8.3”	8.0”	8.2”
In-season	6.1”	6.7”	8.2”
Total	14.4”	14.7”	16.4”

Harvest Date: October 28

RESULTS AND DISCUSSION:

Eight commercial FiberMax and Stoneville varieties and four experimental varieties were compared under three levels of subsurface drip irrigation. Above average irrigation amounts were applied to sufficiently wet the soil for planting and to ensure good emergence. Late-season rainfall allow for early (mid-August) irrigation termination, resulting in reduced irrigation amounts in-season.

When averaged across varieties, average lint yields increased from 916 to 1028 lbs/A as irrigation level increased (Table 1). When averaged across irrigation levels, yields ranged from 749 to 975 lbs/A, with the highest yielding group including BX 2369 B3XF and several commercial FiberMax and Stoneville varieties. Loan values trended higher with the base and high irrigation level compared to the low irrigation treatment. Gross revenues increased as irrigation level increased but there were no differences in gross revenues among varieties. Yields were lower than expected in the base irrigation due to unexplained poor emergence.

Table 1. Effects of FiberMax and Stoneville varieties and subsurface drip irrigation level on cotton lint yield (lbs/A), loan value (¢/lb), and gross revenue ($/A).

	In-season Irrigation Levels (inches)			
Variety	**Low (6.1)**	**Base (6.7)**	**High (8.2)**	**Average**
		---------- lbs/A----------		
BX 2392 B3XF	758	656	834	**749 D**
BX 2394 B3XF	899	680	845	**808 BCD**
BX 2396 B3XF	864	927	1021	**937 AB**
BX 2398 B3XF	945	620	816	**794 D**
FM 1621 GL	853	600	1214	**889 ABCD**
FM 2202 GL	1011	689	1049	**916 ABC**
FM 2398 GLTP	1027	665	1233	**975 A**
FM 2498 GLT	908	876	1112	**965 A**
ST 4595 B3XF	1010	763	1014	**929 ABC**
ST 4993 B3XF	997	888	1079	**988 A**
ST 5600 B2XF	842	842	1084	**923 ABC**
ST 5707 B2XF	880	659	1031	**856 ABCD**
Average	**916 B**	**739 C**	**1028 A**	**--**
		----------¢/lb----------		
BX 2392 B3XF	57.1	57.2	57.2	**57.2 A**
BX 2394 B3XF	55.6	57.3	56.3	**56.4 AB**
BX 2396 B3XF	55.4	56.2	56.6	**56.0 ABC**
BX 2398 B3XF	55.3	57.0	57.1	**56.5 AB**
FM 1621 GL	53.4	57.2	56.4	**55.7 ABC**
FM 2202 GL	54.9	56.5	55.9	**55.8 BCD**
FM 2398 GLTP	53.9	55.6	56.5	**55.3 AB**
FM 2498 GLT	52.4	52.9	53.4	**52.9 E**
ST 4595 B3XF	55.7	57.0	57.4	**56.7 AB**
ST 4993 B3XF	53.7	54.4	55.4	**54.5 D**
ST 5600 B2XF	54.4	55.8	54.4	**54.9 CD**
ST 5707 B2XF	55.1	55.5	56.8	**55.8 BCD**
Average	**54.7 B**	**56.1 A**	**56.1 A**	**--**
		----------$/A----------		
BX 2392 B3XF	433	375	477	**428 A**
BX 2394 B3XF	499	389	476	**455 A**
BX 2396 B3XF	478	519	577	**525 A**
BX 2398 B3XF	520	354	466	**447 A**
FM 1621 GL	455	342	683	**493 A**
FM 2202 GL	554	389	587	**510 A**
FM 2398 GLTP	554	369	696	**540 A**
FM 2498 GLT	475	462	595	**511 A**
ST 4595 B3XF	562	435	581	**526 A**
ST 4993 B3XF	535	487	598	**540 A**
ST 5600 B2XF	460	467	590	**505 A**
ST 5707 B2XF	484	369	586	**480 A**
Average	**501 B**	**413 C**	**576 A**	**--**

TITLE:

Performance of PhytoGen varieties as affected by irrigation levels at AG-CARES, Lamesa, TX, 2022.

AUTHORS:

Wayne Keeling – Professor
Ray White – Research Scientist
Justin Spradley – Research Assistant

MATERIALS AND METHODS:

Plot Size: 4 rows by 32 feet, 4 replications

Planting Date: May 24

Varieties:

DP 2044 B3XF	PX1122A214-04W3FE
FM 2498 GLT	PX1124B236-04W3FE
NG 3930 B3XF	PX1125B234-04W3FE
PHY205W3FE	PX1130B333-04W3FE
PHY332W3FE	PX1140A385-04W3FE
PHY390W3FE	PX1140B373-04W3FE
PHY400W3FE	PX1150B437-04W3FE
PHY411W3FE	
PHY 415W3FE	
PHY480W3FE	
PHY545W3FE	

Herbicides:

Caparol 32 oz/A + Gramoxone 32oz/A	5/18/22
Roundup 32 oz/A + Dual 20 oz/A	6/23/22
Roundup 32 oz/A	7/6/22

Fertilizer: 80-0-0

Irrigation:

	Low	Base	High
Preplant/Emergence	8.1”	8.1”	8.1”
In-season	6.1”	6.7”	8.2”
Total	14.2”	14.8”	16.3”

Harvest Date: October 30

RESULTS AND DISCUSSION:

Phytogen commercial and experimental varieties and three competitive varieties were compared across three subsurface drip irrigation levels. Due to almost no rainfall from September 2021 through May 2022, greater amounts of preplant irrigation were applied to ensure good seedling emergence. A good rain (1.5”) at the first of June helped stand establishment. Hot, dry conditions continued throughout the growing season until mid-August through September when several good rains were received, and irrigation was terminated earlier than usual. When averaged across varieties, lint yields from 1110 to 1296 lbs/A as in-season irrigation level increased. When averaged across irrigation levels, yields ranged from 1040

to1468 lbs/A across varieties. Many of the experimental varieties were in the highest yielding group (Table 1).

Loan values were highest in the base irrigation treatments and loan values ranged from 52.51 to 56.48 c/lb across varieties. (Table 2). Gross revenues (yield x loan value) increased with increasing irrigation values and ranged from $537 to $794/A for varieties averaged across irrigation levels (Table 3).

Table 1. Effects of variety and irrigation level on cotton lint yield (lbs/A).

	In-season Irrigation Levels (inches)			
Variety	**Low (6.1)**	**Base (6.7)**	**High (8.2)**	**Average**
	---------- lbs/A----------			
DP2044B3XF	1070	1169	1180	**1139 DEF**
FM2498GLT	1100	1235	1187	**1174 C-F**
NG3930B3XF	996	977	1188	**1053 F**
PHY205W3FE	1011	1050	1133	**1064 EF**
PHY332W3FE	1133	1296	1277	**1235 CDE**
PHY390W3FE	1215	1353	1265	**1277 BCD**
PHY400W3FE	1137	1196	1313	**1215 C-F**
PHY411W3FE	1058	1205	1266	**1176 C-F**
PHY415W3FE	1215	1237	1483	**1311 A-D**
PHY480W3FE	823	1195	1118	**1045 F**
PHY545W3FE	985	1287	1158	**1143 DEF**
PX1122A214-04W3FE	1318	1471	1615	**1468 A**
PX1124B236-04W3FE	1233	1090	1273	**1198 C-F**
PX1125B234-04W3FE	1222	1254	1350	**1275 BCD**
PX1130B333-04W3FE	1160	1279	1541	**1326 ABC**
PX1140A385-04W3FE	1205	1441	1635	**1426 AB**
PX1140B373-04W3FE	1181	1276	1313	**1256 BCD**
PX1150B437-04W3FE	927	1157	1038	**1040 F**
Grand Total	**1110 B**	**1231 A**	**1296 A**	**--**

Table 2. Effects of variety and irrigation level on loan value (¢/lb).

Variety	In-season Irrigation Levels (inches) Low (6.1)	Base (6.7)	High (8.2)	Average
	----------¢/lb----------			
DP2044B3XF	56.48	56.33	56.60	**56.46 A**
FM2498GLT	53.40	55.43	53.15	**53.99 E**
NG3930B3XF	55.93	56.38	56.23	**56.17 A**
PHY205W3FE	50.93	54.80	51.95	**52.55 F**
PHY332W3FE	53.78	56.70	55.53	**55.33 B**
PHY390W3FE	52.73	55.85	55.33	**54.63 CD**
PHY400W3FE	53.48	56.50	55.45	**55.14 BC**
PHY411W3FE	49.05	53.05	51.83	**51.30 H**
PHY415W3FE	56.25	56.73	56.48	**56.48 A**
PHY480W3FE	53.68	55.53	55.28	**54.82 BCD**
PHY545W3FE	49.55	54.28	53.73	**52.51 F**
PX1122A214-04W3FE	52.85	55.53	53.93	**54.10 E**
PX1124B236-04W3FE	55.33	56.78	56.83	**56.30 A**
PX1125B234-04W3FE	49.88	55.03	50.60	**51.83 G**
PX1130B333-04W3FE	53.00	56.83	54.50	**54.77 CD**
PX1140A385-04W3FE	50.70	54.75	52.18	**52.54 F**
PX1140B373-04W3FE	53.48	56.53	53.45	**54.48 DE**
PX1150B437-04W3FE	49.55	53.48	51.60	**51.54 GH**
Average	**52.78 C**	**55.58 A**	**54.15 B**	**--**

Table 3. Effects of variety and irrigation level on gross revenue ($/A).

Variety	In-season Irrigation Levels (inches) Low (6.1)	Base (6.7)	High (8.2)	Average
	----------$/A----------			
DP2044B3XF	605	658	668	**643 C-G**
FM2498GLT	587	684	632	**634 C-G**
NG3930B3XF	557	552	668	**592 E-H**
PHY205W3FE	514	575	589	**559 GH**
PHY332W3FE	610	735	708	**684 B-E**
PHY390W3FE	641	755	700	**698 A-D**
PHY400W3FE	607	675	728	**670 B-E**
PHY411W3FE	519	639	656	**604 D-H**
PHY415W3FE	684	702	838	**741 AB**
PHY480W3FE	442	664	618	**574 FGH**
PHY545W3FE	488	698	622	**602 E-H**
PX1122A214-04W3FE	696	815	871	**794 A**
PX1124B236-04W3FE	682	619	723	**674 B-E**
PX1125B234-04W3FE	610	690	681	**660 B-F**
PX1130B333-04W3FE	615	727	835	**725 ABC**
PX1140A385-04W3FE	612	789	853	**751 AB**
PX1140B373-04W3FE	632	721	702	**684 B-E**
PX1150B437-04W3FE	459	617	535	**537 H**
Average	**587 B**	**684 A**	**701 A**	**--**

TITLE:

Results of the irrigated cotton variety performance test at AG-CARES, Lamesa, TX, 2022.

AUTHORS:

Jane K. Dever – Professor & Associate Director
Carol M. Kelly – Research Scientist
Valerie M. Morgan – Research Specialist

MATERIALS AND METHODS:

Test:	Cotton variety, pivot irrigated		
Planting Date:	May 19		
Design:	Randomized complete block, 4 replications		
Plot Size:	2-row plots, 24ft		
Planting Pattern:	Solid		
Herbicide:	Treflan 32 oz/A		4/6/2022
	Caparol 32 oz/A		5/19/22
	Roundup 32 oz/A + Warrant 32 oz/A		6/19/22
	Roundup 32 oz/A + Liberty 32 oz/A		7/18/22
Fertilizer:	Preplant	30-0-0	
	In-season	50-0-0	
Irrigation:			
		Base	
	Preplant	5.75”	
	In-season	6.95”	
	Total	12.7”	
Harvest Aid:	Ethephon 32 oz/A + ETX 1.2 oz/A fb Gramoxone 32 oz/A		
Harvest Date:	November 14		

RESULTS AND DISCUSSION:

Texas A&M AgriLife Research in Lubbock, in conjunction with the AG-CARES location in Lamesa, provides an important service to seed companies and producers through a fee-based system that can evaluate a relatively large number of commercial and pre-commercial cotton varieties in small-plot replicated performance tests. This service allows varieties from different companies and seed developers to be tested together by an independent source. The small plot replicated tests are intended to evaluate the genetic performance of lines independent of biotechnology traits, so the tests are managed as conventional varieties as opposed to herbicide or insecticide systems. Every effort is made to minimize the effects of insect and weed pressure. The same varieties are tested in four locations across the Southern High Plains, including the irrigated site at AG-CARES.

Lint yield is determined by the stripper-harvested plot weight and pulled lint percent. Boll size and pulled and picked lint percent are determined from a random 50-boll sample obtained from two replications of each entry. Relative maturity and storm resistance ratings are a visual assessment of percent open bolls on a given date and a 1 (very loose, considerable storm loss) to 9 (very tight boll, no storm loss) storm resistance rating.

Fifty-five cotton varieties from eight different seed companies and one university were submitted for variety testing at four locations, including the base level irrigated location at AG-CARES in Lamesa. Planting conditions were harsh this year. Soil moisture was limited from a dry winter and early spring, while pre-plant irrigation efforts were hindered by hot, dry, and windy conditions through most of April and May. Stands were not ideal but consistent throughout the test, and the varieties were able to overcome and compensate during the growing season. Weed and insect management was excellent, and the test recovered well by boll opening stage.

Brownfield Seed and Delinting entered five conventional varieties. SSG UA 114, SSG UA248 and SSG UA222 are conventional varieties from University of Arkansas licensed to Seed Source Genetics, and UA 48 is a conventional line from the University of Arkansas licensed to Americot. There were also five conventional ExCeed brand varieties in the test. There were 12 B3XF, four B2XF, and one XF varieties; three GLTP, two GLT, and one GL varieties; and 14 W3FE and one WRF (included as a Western region standard in the National Cotton Variety Testing Program) varieties in the test.

Average yield was 991 pounds of lint per acre with a 16.6% test coefficient of variation and 193 pound least significant difference. The highest yielding variety was PhytoGen PHY 545 W3FE with a yield of 1392 pounds of lint per acre. This top yielder also had an 9.6 seed index, a micronaire of 5.4, upper half mean length (UHML) of 1.11 in., and a strength of 30.9 g/tex. The next seven varieties in the test were not significantly different than the highest yielding variety (Table 1). The seed index for these varieties ranged from 9.0 to 11.1, and they had an average mic of 5.0, an average UHML of 1.17 in., and average strength of 31.5 g/tex. PhytoGen was joined in the top tier by FiberMax, Deltapine, Stoneville, and NexGen brand varieties. Yields for the test ranged from 1392 pounds of lint per acre to 701 pounds of lint per acre. Plant height ranged from 23-32 inches with a test average of 27 inches. Relative maturity of the varieties as indicated by percent open bolls on October 5 averaged 83%, with a range from 59-93%. Storm resistance ratings ranged from 3-8 with a test average of 5. There was quite a range of fiber quality throughout the test with mic ranging from 4.3 to 5.7, UHML from 1.08 to 1.24 in., and strengths from 28.7 to 35.7 g/tex (Table 1).

Table 1. Yield and fiber quality data from the irrigated, base level, regional cotton variety performance test at AG-CARES farm, Lamesa, 2022.

Designation	Yield	Lint % Picked	Lint % Pulled	Boll Size	Seed Index	Seed per Boll	% Open Boll 5-Oct	Height	Storm Rating	Mic	Length	Uni-formity	Strength	Elon-gation	Color Grade	Leaf
PhytoGen PHY 545 W3FE	1392	36.5	29.0	5.1	9.6	29.3	80	27	5	5.4	1.11	81.6	30.9	7.1	21-1	1
FiberMax FM 2498GLT	1319	36.3	29.0	6.1	10.7	32.3	79	29	6	5.7	1.14	82.3	29.9	6.3	21-1	1
Deltapine DP 2044 B3XF	1252	37.8	30.6	5.8	10.4	33.1	80	24	4	4.3	1.23	80.2	32.8	6.3	21-1	2
Stoneville ST 5600B2XF	1247	37.9	30.8	6.1	9.8	35.6	60	29	4	5.4	1.15	82.9	31.7	7.4	21-1	1
PhytoGen PHY 400 W3FE	1227	37.4	29.5	4.9	9.0	30.6	81	26	6	4.9	1.15	81.0	31.2	6.9	21-1	2
Stoneville ST 5707B2XF	1227	32.2	26.0	6.5	11.1	34.8	73	30	5	5.2	1.16	82.6	32.5	7.1	11-2,21-3	2
NexGen NG 4098 B3XF	1212	35.1	29.0	4.6	10.3	29.1	72	26	3	4.6	1.22	80.8	32.3	6.3	21-1,41-3	5
PhytoGen PHY 332 W3FE	1212	35.3	28.3	5.6	9.3	34.5	80	27	6	5.1	1.16	81.3	30.0	7.0	11-2,21-3	2
PhytoGen PHY 350 W3FE	1194	36.9	29.4	5.4	10.2	30.3	88	29	5	5.4	1.14	81.7	30.2	6.9	21-1,21-2	1
ExCeed 4498	1145	38.0	30.1	5.3	9.0	33.3	80	28	5	5.2	1.19	82.4	31.8	7.6	21-1	1
Deltapine DP 2123 B3XF	1081	32.7	27.1	4.6	9.6	31.2	83	30	6	5.0	1.14	82.0	29.5	5.9	11-2,21-1	2
FiberMax FM 1621GL	1076	36.2	28.6	5.9	10.1	31.9	82	27	7	5.4	1.13	82.3	31.8	5.9	21-1,21-1	2
PhytoGen PX 1140A383-04W3FE	1074	28.7	22.9	5.1	9.4	30.8	80	29	5	5.2	1.14	81.2	32.2	6.9	21-1,21-3	2
Brownfield Seed and Delinting 4X	1058	36.1	28.8	6.4	11.4	33.6	89	26	6	4.9	1.10	81.0	29.1	6.2	21-1	1
Deltapine DP 2020 B3XF	1057	35.1	27.6	4.9	8.7	32.9	81	28	6	4.8	1.20	82.7	30.0	6.1	11-2,21-1	1
Brownfield Seed and Delinting 9X	1038	36.2	29.1	4.6	10.6	29.0	86	27	5	5.1	1.15	80.9	31.4	6.1	21-1	2
FiberMax FM 1830GLT	1032	40.0	31.2	5.5	9.1	33.8	79	26	5	4.7	1.16	81.7	30.6	6.3	11-1,11-2	1
PhytoGen PHY 205 W3FE	1027	35.7	27.5	5.3	10.7	28.6	91	25	8	5.4	1.10	81.1	30.1	6.6	11-2,21-1	2
ExCeed 4344	1021	34.8	27.8	6.0	10.6	33.2	93	28	3	5.3	1.13	82.6	31.0	7.0	21-1,21-3	1
ExCeed 6546	1017	34.4	26.5	5.4	9.0	34.3	86	28	5	5.1	1.19	81.4	32.0	6.7	11-1,21-1	1
Stoneville ST 4993B3XF	1017	35.8	29.2	5.4	9.3	31.5	80	27	6	5.5	1.12	82.8	32.3	7.0	21-1	1
Brownfield Seed and Delinting Ton Buster Magnum	1012	34.5	27.8	5.5	10.6	31.0	88	28	5	5.3	1.09	81.4	29.9	6.5	11-2,21-1	1
PhytoGen PHY 480 W3FE	1008	31.0	24.4	5.1	9.5	31.3	83	26	6	5.0	1.13	82.2	30.6	7.6	21-1,21-3	2
ExCeed 6494	1000	34.8	27.8	4.6	9.2	32.9	91	29	4	5.5	1.11	81.7	29.1	6.2	11-2,21-1	1
Stoneville ST 4550GLTP	999	35.9	28.6	5.7	9.2	33.7	85	28	5	5.3	1.13	81.9	31.1	7.2	21-1	3
PhytoGen PHY 411 W3FE	993	35.0	28.2	4.8	8.4	32.2	86	26	5	5.4	1.11	81.5	31.2	7.2	11-2,21-1	1
PhytoGen PHY 443 W3FE	992	36.8	28.2	5.4	10.1	30.4	89	29	5	5.5	1.13	81.6	32.5	6.8	21-1,21-3	1
Deltapine DP 2012 B3XF	977	32.6	24.8	4.8	8.5	32.6	80	30	6	4.9	1.19	82.0	30.3	6.3	11-2	2
NexGen NG 3930 B3XF	962	32.8	26.3	5.2	9.4	32.4	84	29	7	5.1	1.16	82.3	30.1	6.7	21-1,21-3	1
Deltapine DP 2143NR B3XF	953	36.7	28.4	5.2	9.3	33.2	85	25	5	5.4	1.20	83.3	32.0	7.0	21-1	2

Table 1 (continued). Yield and fiber quality data from the irrigated, base level, regional cotton variety performance test at AG-CARES farm, Lamesa, 2022.

Designation	Yield	Lint % Picked	Lint % Pulled	Boll Size	Seed Index	Seed per Boll	% Open Boll 5-Oct	Height	Storm Rating	Micro-naire	Length	Uni-formity	Strength	Elon-gation	Color Grade	Leaf
FiberMax FM 1730GLTP	951	34.8	28.2	5.9	9.2	36.5	87	28	6	5.2	1.16	82.8	31.9	6.2	11-1,11-2	2
Seed Source Genetics SSG UA 114	951	31.7	25.7	5.9	10.6	33.9	91	24	4	5.3	1.16	83.4	31.6	7.4	21-1,21-3	2
Seed Source Genetics SSG UA 248	938	33.7	27.9	5.7	10.3	32.3	86	24	4	5.1	1.16	81.0	29.8	7.3	11-2,21-1	2
Seed Source Genetics SSG UA 222	936	34.8	28.1	5.8	10.6	32.4	59	25	4	4.6	1.20	82.2	30.6	7.7	11-2,21-1	3
FiberMax FM 2398GLTP	926	34.7	27.6	5.9	9.8	34.0	85	26	6	5.6	1.15	82.9	30.3	6.2	11-1,21-1	1
DynaGro DG 3520 B3XF	917	37.5	25.2	4.4	11.2	20.9	75	28	5	4.4	1.19	82.4	31.5	6.9	11-2,21-1	1
Brownfield Seed and Delinting 224	908	33.3	26.3	5.6	10.9	31.6	83	26	6	5.0	1.15	81.7	31.5	5.7	21-1	1
PhytoGen PX 1122A213-04W3FE	907	35.4	27.0	5.0	10.4	27.4	91	25	7	5.3	1.11	81.8	31.9	6.5	21-1	2
PhytoGen PHY 250 W3FE	906	34.3	27.0	5.3	10.1	30.5	86	25	6	5.3	1.11	81.2	30.1	6.1	21-1	2
NexGen NG 4936 B3XF	902	36.5	28.2	3.7	8.9	24.2	87	25	4	5.0	1.18	82.6	28.7	7.2	11-1,21-2	1
FiberMax FM 958	892	32.9	25.8	4.9	11.4	28.3	90	26	7	5.2	1.14	81.1	31.0	5.5	21-1	1
PhytoGen PHY 764 WRF	891	37.9	28.5	4.8	10.7	25.9	80	29	3	4.9	1.14	81.6	32.4	6.9	21-1,21-3	1
PhytoGen PHY 210 W3FE	877	34.7	27.2	6.5	9.8	31.5	86	26	7	5.4	1.11	81.6	31.2	6.2	21-1	2
NexGen NG 3500 XF	865	33.4	26.8	5.1	10.1	29.4	85	28	5	5.5	1.14	81.8	33.6	7.2	21-3,22-1	1
ExCeed 4447	859	33.0	26.4	5.4	9.7	32.5	90	28	4	5.4	1.16	81.7	30.4	6.7	21-1	1
Seed Source Genetics SSG UA 222 Saberex	854	28.8	22.9	5.6	10.5	31.1	89	26	4	5.0	1.18	81.9	30.9	7.1	21-1	1
Deltapine DP 1820 B3XF	845	31.8	24.7	4.6	9.2	27.6	80	23	4	5.2	1.15	81.3	31.8	6.3	21-1	2
Brownfield Seed and Delinting Ton Buster Elite	830	32.2	25.0	6.0	10.7	33.8	87	27	4	5.2	1.13	81.1	29.5	7.5	21-1	1
UA 48	816	30.4	24.3	5.8	11.5	31.8	90	29	4	5.4	1.24	83.3	35.7	5.6	21-1	2
Deltapine DP 1646 B2XF	785	36.6	29.0	4.8	8.2	32.7	80	32	5	5.1	1.20	80.4	29.3	7.4	11-1	1
PhytoGen PX 1122A214-04W3FE	767	34.2	27.4	5.2	9.8	29.3	85	24	7	5.2	1.08	79.7	30.9	6.7	11-2,21-1	1
Deltapine DP 2141NR B3XF	751	35.6	27.7	5.1	9.7	30.0	79	25	5	5.4	1.17	81.6	32.1	6.9	21-3,22-1	1
FiberMax FM 2484B2XF	709	32.8	26.0	5.2	10.6	28.9	78	27	6	4.7	1.16	81.6	30.8	6.3	11-2,21-1	1
PhytoGen PX 1122A215-04W3FE	701	31.8	24.6	4.9	9.9	28.1	92	26	7	5.3	1.08	79.7	32.5	6.4	21-1	1
Mean	991	34.6	27.4	5.3	9.9	31.3	83	27	5	5.1	1.15	81.7	31.1	6.7		1
c.v.%	16.6	3.2	3.2	10.3	3.8	8.4	10.3	6.7	14.3	3.5	2.3	0.9	2.9	4.1		51.2
LSD 0.05	193	1.8	1.5	0.9	0.6	4.4	10	2	1	0.3	0.04	1.2	1.2	0.5		1

* FiberMax FM 2011GT was dropped due to seed quality.

TITLE:

The Effect of Varieties on Root-knot Nematode Density and Cotton Yield at AG-CARES, Lamesa, TX, 2022.

AUTHORS:

Terry Wheeler – Professor
Jay Hodge, Robert Ballesteros, Marcus Labay

RESULTS AND DISCUSSION:

There were 32 entries that were planted in an area of AGCARES with low to moderate pressure from root-knot nematode. Plots were 2-rows wide and 35 feet long, and entries were arranged in a randomized complete block design with four replications per entry. They were irrigated at the base rate. The plots were planted on May 12-13 and harvested on November 1 and 2. Soil samples were taken on 11-12th of August and assayed for root-knot nematode.

The highest yields were associated with PHY 411 W3FE (1,077 lbs lint/a) which has 2-gene nematode resistance, PHY 415 W3FE, and PHY 350 W3FE (942 lbs/a), both of which have partial nematode resistance (Table 1). The next highest yielding varieties, which were susceptible to root-knot nematode were NG 4190 B3XF (933 lbs/a), Armor 9371 B3XF (919 lbs/a), and FM 2498GLT (909 lbs/a)). There were three entries tested that had resistance to root-knot nematode and tolerance to dicamba (ST 5600B2XF, DP 2141NR B3XF, and DP 2143NR B3XF). None of these three entries performed very well in this test, however, in all three cases, the plant stands were quite low, making it difficult in a dry year to fill in the gaps between plants. DP 2141NR B3XF and DP 2143NR B3XF did perform well in trials in other locations with root-knot nematode, when plant stand was adequate. The lowest nematode counts were all associated with varieties that are resistant to root-knot nematode. Loan value was negatively affected by high micronaire. Of the 32 entries, 29 had micronaire values in the discount range (5.0 and greater). The entry with the longest fiber (1.26 inches) was DP 1646 B2XF, and the entry with the highest fiber strength ratings was DP 2143NR B3XF (Table 2).

Table 1. Variety trial in Dawson County with root-knot nematode (RK).

Variety[1]	Lint Yield (lbs/a)	Loan ($/lb)	Value (Yield x Loan)	Turn Out (%)	Plants /foot row	RK	LRK[2]	RK[3] Rating
PHY 411 W3FE	1,077	0.4950	532.87	32.4	1.62	150	1.19	RR
PHY 415 W3FE	949	0.5245	497.88	28.5	1.65	85	0.63	PR
PHY 350 W3FE	942	0.5308	500.01	31.5	1.55	445	1.98	PR
NG 4190 B3XF	933	0.5463	509.43	31.0	2.60	2,990	3.02	S
AR 9371 B3XF	919	0.5213	478.95	33.9	2.13	4,625	3.65	S
FM 2498GLT	909	0.5265	478.33	32.3	2.18	6,650	3.61	S
PHY 400 W3FE	902	0.5010	452.03	31.1	1.91	900	2.55	PR
PHY 545 W3FE	898	0.5018	450.74	33.5	1.55	60	0.60	RR
FM 1621GL	879	0.5050	443.77	31.3	1.47	450	1.98	PR
AR 9512 B3XF	872	0.5165	450.26	30.5	1.80	2,045	2.94	S
DP 2127 B3XF	867	0.5375	465.75	31.7	1.95	1,030	2.30	S
AR22x424B3XF	858	0.5463	468.59	30.7	2.46	860	2.70	S
DP 1646 B2XF	853	0.5498	469.12	33.2	1.76	715	1.49	S
PHY 480 W3FE	850	0.5315	451.51	31.4	1.57	25	0.50	RR
PHY 332 W3FE	844	0.5233	441.54	29.6	1.75	0	0.00	RR
ST 4946GLB2	835	0.5245	438.09	29.8	1.42	2,995	2.58	PR
FM 2398GLTP	824	0.5270	434.38	29.7	1.69	1,290	2.33	S
PX1122A215-04W3FE	824	0.5438	447.82	30.6	1.64	2,670	2.65	PR
AR 9413 XF	789	0.5223	411.83	30.2	1.29	795	2.01	S
NG 4098 B3XF	787	0.5463	429.94	28.9	1.50	535	2.03	S
NG 5150 B3XF	783	0.5245	410.68	32.3	1.16	575	2.00	S
NG 3299 B3XF	770	0.5300	407.84	31.5	1.58	1,590	2.42	S
PHY 394 W3FE	758	0.5450	413.25	26.7	1.71	0	0.00	RR
ST 5600B2XF	754	0.5185	390.82	31.7	1.23	30	0.52	PR
AR 9442 XF	752	0.5338	401.29	30.7	1.07	4,515	2.56	S
PHY 443 W3FE	750	0.5180	388.24	28.8	1.56	1,895	1.73	RR
DP 2143NR B3XF	743	0.5195	385.99	31.3	1.13	120	1.16	RR
DP 2038 B3XF	727	0.5148	374.13	32.2	1.51	485	2.09	S
BX2394B3XF	715	0.5150	367.97	31.2	2.24	5,765	3.59	S
PHY 205 W3FE	714	0.4925	351.52	29.0	1.66	925	1.54	RR
DP 2141NR B3XF	571	0.5305	302.79	29.8	0.90	0	0.00	RR
FM 1730GLTP	481	0.5270	253.49	29.0	0.96	1,805	2.44	PR
Prob>F	0.020	0.001	0.025	10.0	0.019	0.003	0.0001	
MSD (0.05)	332	2.77	177.91		1.18	4,233	2.03	

[1]AR=Armor, BX is experimental line for BASF, DP=Deltapine, FM=Fibermax, NG=NexGen, PHY=Phytogen, PX is experimental line for Phytogen, ST=Stoneville.

[2]LRK is LOG10(Root-knot nematode/500 cm^3 soil).

[3]RK rating is the nematode rating based on company description and experience in testing these varieties. RR is 2-gene resistance, PR is partial resistance, and S is susceptible.

Table 2. Fiber[2] properties from varieties in a Dawson County trial.

Variety[1]	Mic.	Length	Unif.	Strength	Elon.	Rd	+b	Leaf
AR22x424B3XF	5.13	1.20	83.1	32.8	6.3	77.2	7.9	4.0
AR 9371 B3XF	5.68	1.14	82.0	29.8	6.0	77.9	7.6	3.0
AR 9413 XF	5.42	1.14	81.4	31.2	5.5	78.1	7.6	3.0
AR 9442 XF	5.16	1.19	83.3	31.8	6.8	77.2	7.7	3.5
AR 9512 B3XF	5.36	1.14	81.7	34.4	5.5	77.6	7.5	3.5
BX2394B3XF	5.19	1.10	81.7	30.8	6.3	77.4	8.0	3.5
DP 1646 B2XF	5.16	1.26	83.0	31.2	7.1	79.6	7.5	3.0
DP 2038 B3XF	5.37	1.10	81.3	31.0	6.1	78.2	7.9	3.0
DP 2127 B3XF	5.26	1.18	83.0	31.5	5.9	79.1	7.8	3.0
DP 2141NR B3XF	5.68	1.19	82.2	34.1	6.3	77.0	8.4	3.0
DP 2143NR B3XF	5.72	1.21	83.2	36.4	6.0	76.5	8.0	4.0
FM 1621GL	5.41	1.15	82.9	34.9	5.6	74.4	7.4	5.0
FM 1730GLTP	5.56	1.14	82.1	34.4	5.4	78.5	7.4	3.5
FM 2398GLTP	5.55	1.16	82.7	32.4	5.9	78.9	8.0	2.5
FM 2498GLT	5.96	1.14	81.6	33.8	5.7	78.3	7.9	3.0
NG 3299 B3XF	5.58	1.13	82.8	35.4	5.8	79.1	8.1	2.0
NG 4098 B3XF	4.71	1.24	82.9	35.0	6.0	74.2	8.0	5.5
NG 4190 B3XF	5.05	1.22	84.0	32.1	6.0	78.5	8.0	3.5
NG 5150 B3XF	5.55	1.17	81.1	29.5	6.0	78.5	8.1	2.5
PHY 205 W3FE	5.34	1.06	80.4	31.5	5.7	77.1	8.1	3.5
PHY 332 W3FE	5.31	1.19	83.6	34.6	6.5	75.5	8.6	4.0
PHY 350 W3FE	5.30	1.13	82.7	31.4	6.4	77.2	8.1	3.5
PHY 394 W3FE	4.90	1.19	81.4	32.5	5.7	76.3	7.8	4.0
PHY 400 W3FE	5.57	1.10	81.2	31.9	5.9	77.4	7.8	3.5
PHY 411 W3FE	5.44	1.13	82.8	32.4	6.6	72.7	7.8	4.5
PHY 415 W3FE	5.06	1.16	82.1	33.0	6.5	74.1	8.4	4.5
PHY 443 W3FE	5.48	1.15	83.0	32.8	6.4	76.6	8.5	2.5
PHY 480 W3FE	5.24	1.11	83.1	31.5	7.2	76.3	8.6	3.5
PHY 545 W3FE	5.34	1.10	82.2	32.5	6.7	76.6	8.1	3.5

TITLE:

The Effect of Cover Crops on Soil Fertility, Root-knot Nematode density, and Cotton Yield at AG-CARES, Lamesa, TX, 2022.

AUTHORS:

Jonathan Shockey – Plant Pathology Technician

RESULTS AND DISCUSSION:

Cover Crops (crimson clover, hairy vetch, rye) were planted on December 06, 2021 and were terminated on April 27, 2022. On May 17, 2022 the cotton trial was planted over the terminated cover crops and a no-cover treatment in a no-till system including nematode susceptible DP 1820 B3XF and nematode resistant DP 2143NR B3XF. Plots were 100 feet long, and cover crops were four rows wide (two rows for each of the cotton varieties). There were four replications of each cover crop/variety combination. Soil samples were taken to determine if there were any nutrient changes as a result of the cover crops, and then on August 4, 2022 to determine the impact of variety or cover crop on root-knot nematode density. The cotton was harvested on November 02, 2022.

Soil nutrients did not differ between treatments, except for phosphorus where the hairy vetch cover had less phosphorus (28.0 ppm) compared to crimson clover (41.7 pm). There were no other differences between cover crops (or no cover) with regards to nitrogen, potassium, calcium, magnesium, sulfur, or sodium. Organic matter did not differ significantly between cover crop treatments but averaged the lowest for the no cover (0.35%), and increased to 0.40% for crimson clover, and 0.41% for hairy vetch and rye. Plant stand did not differ with regards to cover crop, nor did cotton yield (Table 1). However, cotton lint yield was higher for DP 2143NR B3XF (across all cover crop treatments) than for DP 1820 B3XF (Table 1). Root-knot nematode density was lower for the nematode resistant DP 2143NR B3XF than for the nematode susceptible DP 1820 B3XF (Table 1).

Table 1. Effect of cover crop and cotton variety on plant stand, root-knot nematode density, and cotton lint yield.

	Plants/acre		Root-knot Nematodes /500 cm^3 soil		Cotton lint yield (lbs/a)	
Cover Crop	DP 1820 B3XF	DP 2143NR B3XF	DP 1820 B3XF	DP 2143NR B3XF	DP 1820 B3XF	DP 2143NR B3XF
None	14,875	18,377	5,975 a[1]	400 ab	742 b	1,053 a
Crimson clover	17,934	17,364	560 ab	310 ab	720 b	944 a
Hairy Vetch	16,119	18,567	625 ab	182 c	762 b	989 a
Rye	15,423	16,731	650 ab	155 bc	707 b	946 a

[1]Means within a measured attribute (plant stand, nematode, density, yield) followed by the same letter are not significantly different (P=0.05).

TITLE:

Cotton yield response to simulated cotton fleahopper and western tarnished plant bug infestations as influenced by irrigation level and cultivar treatments, Lamesa, TX, 2022.

AUTHORS:

Megha Parajulee – Professor, Faculty Fellow, and Regents Fellow
Dol Dhakal - Senior Research Associate
Wayne Keeling - Professor

MATERIALS AND METHODS:

Plot Size: 4 rows by 300-700 feet, 3 replications

Planting Date: May 16, Rye cover planted November 20, 2021, terminated April 27, 2022

Varieties: DP 2143NR B3XF
FM 2498 GLT

Herbicides:

Gramoxone 32 oz/A + Caparol 32 oz/A	5/19/22
Roundup 32 oz/A + Warrant 32 oz/A	6/9/22
Aim (hooded) 1 oz/A	7/11/22
Roundup 32 oz/A + Liberty 32 oz/A	7/22/22

Fertilizer: 80-0-0

Irrigation:

	Low	Base	Base Plus
Preplant/Emergence	7.25”	7.25”	7.25”
In-season	0.0”	6.95”	9.25”
Total	7.25”	14.2”	16.5”

Treatments: Three treatments included c*ontrol*, *manual removal of 100% squares three weeks into squaring (July 14) to time cotton fleahopper susceptible stage, and removal of 20% bolls from the top of the plant to simulate Lygus infestation (August 18)*.

Harvest date: November 16 (hand-harvested)

Effect of manual removal of early-stage versus late-stage fruits was evaluated on two cotton cultivars, FM 2498 GLT and DP 2143NR B3XF, as influenced by two irrigation (low and high) water levels. The experiment comprised of two water levels, two cultivars, and three simulated fruit loss events [control, pre-flower 100% square loss mimicking the cotton fleahopper injury-induced loss, and 20% small bolls (<3 cm diameter) loss mimicking the Lygus boll injury-induced small fruit abortion at cut-out], replicated three times, totaling 36 plots. The test plots were monitored for the occurrence of any other insects, but no such occurrences were observed during the growing season.

RESULTS AND DISCUSSION:

Combined over two cultivars and three insect simulation treatments, significantly higher lint yield was recorded from 'high' water regime (891 lb/acre) compared to that in 'low' water regime (128 lb/acre). No significant difference in lint yield was recorded between insect simulated (cotton fleahopper or Lygus) and control plots regardless of the water regime (Fig. 1). Lint yield under low water regime was abnormally low in 2022 due to prolonged drought, resulting in no insect simulation treatment difference. However, the late season fruit removal mimicking Lygus injury reduced lint yield by 375 lb/A compared to an early season fruit removal mimicking cotton fleahopper injuiry under high water regime (Fig. 1), indicating a greater pest risk at cut-out than for pre-flower cotton. While Lygus simulation consistently reduced lint yield across all irrigation water level X cultivar combinations, FM 2498 GLT at high water treatment showed the most impact (Fig. 2).

All 12 treatment combinations (2 Water x 2 Cultivar x 3 Insect Infestation treatments) resulted in micronaire values >5.0 (5.2 in FM 2498 GLT-High Water-Control to 5.8 in FM 2498 GLT-High Water-FH Simulation), rendering the entire test crop to a discount range. Irrigation water treatment significantly impacted the Short Fiber Index (SFI), with SFI values of 8.67 in 'high' water and 12.18 in 'low' water treatments. Similarly, early-season square removal improved SFI (8.97) compared to control (10.88) and late-season boll removal (11.44), suggesting a significant fiber quality impact by late-season Lygus infestation. Similarly, 'high' water plots produced stronger fiber (31.8) than 'low' water plots (29.7). A significant interaction of water x cultivar x insect simulation influenced fiber strength. Six of the 12 treatment combinations resulted in very strong fiber, four produced strong fiber, one intermediate, and one weak fiber (Fig. 3).

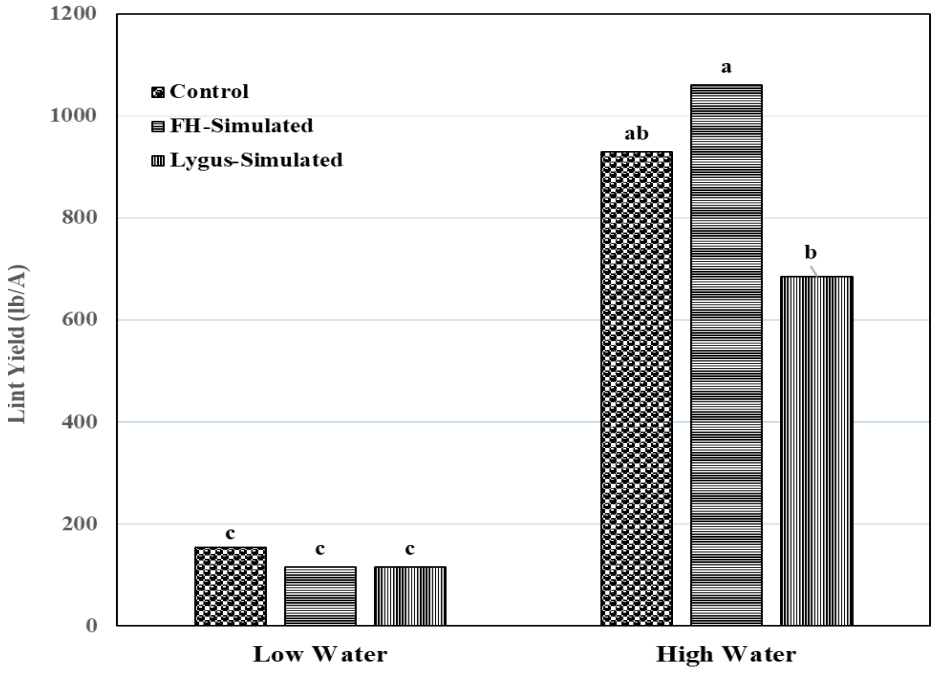

Figure 1. Average lint yield under low and high irrigation regimes following cotton fleahopper and Lygus infestation simulation versus control, Lamesa, Texas, 2020.

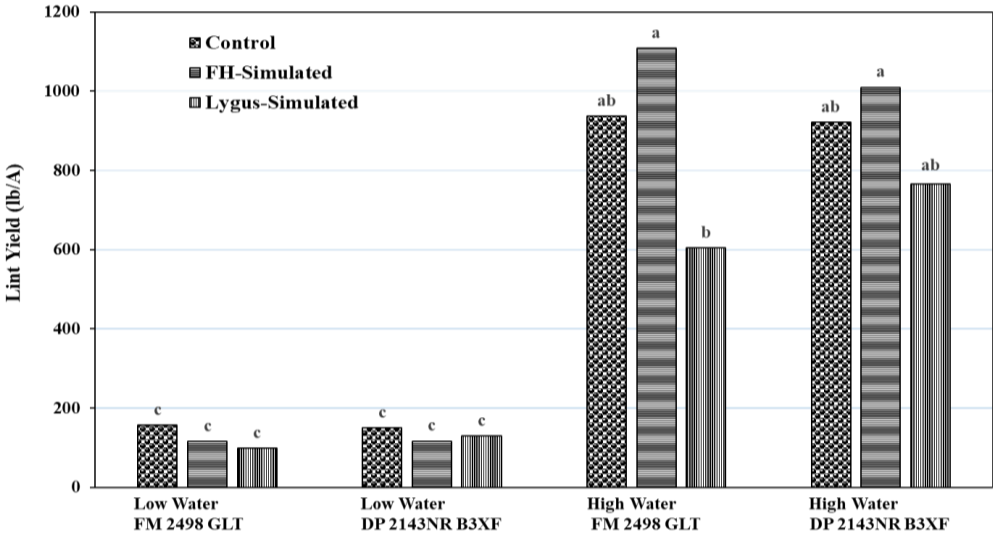

Figure 2. Average lint yield influenced by simulated cotton fleahopper versus *Lygus*-induced fruit removal in two cotton cultivars under low and high irrigation regimes, Lamesa, Texas, 2022.

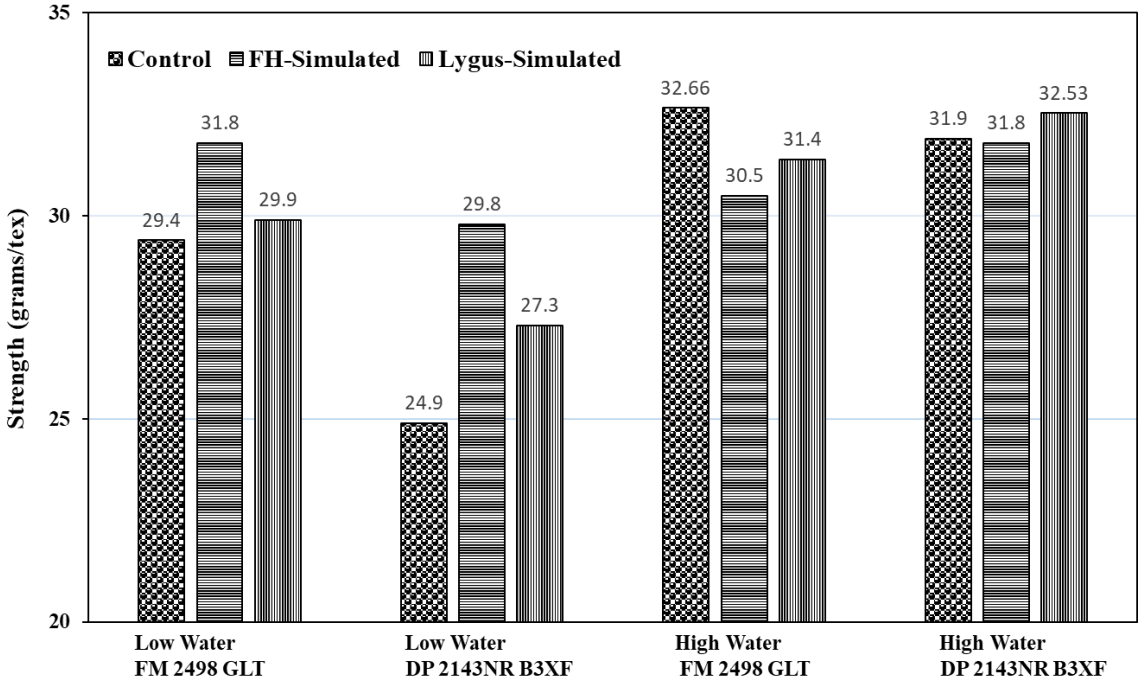

Figure 3. Average fiber strength values (grams/tex) influenced by early-season simulated cotton fleahopper damage and simulated *Lygus*-induced fruit removal in late season in two cotton cultivars under low and high irrigation regimes, Lamesa, Texas, 2022. Interpretation of fiber strength: Very strong ≥31, Strong 29-30, Average 26-28, Intermediate 24-25, and Weak ≤23.

	January			February		
Day	Max Temp	Min Temp	Precipitation	Max Temp	Min Temp	Precipitation
1	67	19	-	68	39	-
2	45	14	-	48	20	-
3	56	20	-	24	14	-
4	69	30	-	41	7	-
5	59	36	-	49	17	-
6	48	24	-	58	17	-
7	59	17	-	54	23	-
8	74	36	-	64	24	-
9	55	34	-	64	26	-
10	49	28	-	65	26	-
11	54	34	-	72	35	-
12	67	25	-	48	29	-
13	70	27	-	61	24	-
14	77	34	-	71	35	-
15	49	23	-	74	41	-
16	67	21	-	77	48	-
17	68	24	-	55	27	-
18	73	44	-	58	22	-
19	64	33	-	63	29	-
20	34	25	-	75	42	-
21	49	17	-	72	42	-
22	41	23	-	69	30	-
23	51	37	-	30	19	-
24	65	33	-	51	19	-
25	63	24	-	44	21	-
26	41	22	-	46	27	-
27	55	27	-	58	19	-
28	52	22	-	63	24	-
29	57	21	-			
30	66	32	-			
31	65	34	-			

	March			April		
Day	Max Temp	Min Temp	Precipitation	Max Temp	Min Temp	Precipitation
1	65	38	-	83	48	-
2	73	32	-	80	43	-
3	74	36	-	89	52	-
4	81	47	-	78	53	-
5	77	44	-	91	51	-
6	83	35	-	74	49	-
7	45	26	-	69	37	-
8	56	30	-	71	36	-
9	64	30	-	87	42	-
10	61	30	-	89	60	-
11	42	24	-	89	63	-
12	59	20	-	90	64	-
13	69	29	-	74	52	-
14	69	42	-	84	45	-
15	74	33	-	93	59	-
16	83	43	-	77	59	-
17	74	40	-	91	49	-
18	63	31	-	80	48	-
19	74	32	-	76	59	-
20	77	43	-	95	60	-
21	69	41	-	94	63	-
22	56	39	-	87	70	-
23	63	35	-	91	65	-
24	77	29	-	81	58	-
25	83	36	-	71	55	-
26	88	37	-	72	45	-
27	91	57	-	82	59	-
28	91	54	-	94	63	-
29	90	63	-	92	65	-
30	67	47	-	83	59	-
31	68	37	-			

	May			June		
Day	Max Temp	Min Temp	Precipitation	Max Temp	Min Temp	Precipitation
1	86	62	-	94	62	-
2	94	68	-	73	60	-
3	82	52	-	85	59	1.14
4	91	70	-	92	62	0.14
5	85	55	-	100	70	-
6	98	57	-	103	72	-
7	103	63	-	103	74	-
8	100	66	-	92	77	-
9	99	71	-	97	70	-
10	91	72	-	100	71	-
11	92	68	-	105	74	-
12	96	70	-	104	79	-
13	97	71	-	101	77	-
14	100	67	-	100	75	-
15	103	68	0.20	98	75	-
16	101	70	-	97	75	-
17	103	77	-	97	69	-
18	101	73	-	96	72	-
19	103	73	-	95	74	-
20	98	71	-	95	72	-
21	82	62	-	95	73	-
22	74	53	-	96	72	-
23	84	62	0.22	98	74	-
24	80	53	0.40	99	73	-
25	76	46	-	98	75	-
26	93	53	-	94	69	-
27	98	64	-	90	66	-
28	105	73	-	92	68	0.34
29	101	74	-	90	68	-
30	98	73	-	95	70	-
31	97	75	-			

	July			August		
Day	Max Temp	Min Temp	Precipitation	Max Temp	Min Temp	Precipitation
1	98	74	-	99	76	-
2	100	74	-	98	74	-
3	95	71	-	103	75	-
4	97	74	-	101	77	-
5	99	75	0.40	100	78	-
6	99	72	-	97	74	-
7	101	76	-	95	73	-
8	102	74	-	97	74	-
9	100	76	-	96	74	-
10	102	76	-	93	77	-
11	105	74	-	96	75	-
12	100	73	-	96	69	-
13	100	75	-	96	74	-
14	99	72	-	97	73	-
15	96	69	-	91	72	-
16	97	74	-	88	70	-
17	98	77	-	94	67	-
18	102	73	-	88	68	-
19	105	79	-	92	70	-
20	104	80	-	92	69	0.56
21	95	78	-	87	69	0.17
22	100	77	-	79	69	0.15
23	98	77	-	83	67	-
24	97	76	-	87	67	-
25	99	77	-	90	71	-
26	100	75	-	92	71	-
27	99	76	-	93	73	-
28	98	74	-	96	69	-
29	98	75	0.38	92	65	0.80
30	98	75	-	78	66	1.42
31	99	77	-	77	67	1.65

	September			October		
Day	Max Temp	Min Temp	Precipitation	Max Temp	Min Temp	Precipitation
1	76	69	-	86	59	-
2	85	70	-	84	61	-
3	86	68	-	81	54	-
4	88	65	-	83	58	-
5	90	68	-	83	61	-
6	92	68	-	78	60	-
7	90	64	-	79	58	0.97
8	88	62	-	71	55	0.30
9	90	64	-	77	54	-
10	92	67	-	75	58	-
11	77	61	0.82	80	56	-
12	87	65	-	82	57	-
13	90	65	-	79	51	-
14	87	65	0.18	83	51	-
15	87	64	0.42	87	63	0.11
16	91	66	-	68	53	0.97
17	91	68	-	61	50	0.31
18	90	66	-	64	48	-
19	89	69	-	70	44	-
20	91	67	-	81	46	-
21	90	65	-	82	49	-
22	90	67	-	86	58	-
23	89	58	-	84	62	-
24	91	62	-	75	43	-
25	89	62	-	68	36	-
26	85	65	-	75	42	-
27	86	59	-	79	50	-
28	86	55	-	60	45	-
29	86	57	-	66	39	-
30	88	56	-	71	40	-
31						

	November			December		
Day	Max Temp	Min Temp	Precipitation	Max Temp	Min Temp	Precipitation
1	72	46	-	58	35	-
2	72	55	-	77	40	-
3	77	60	-	57	40	-
4	69	41	-	63	38	-
5	73	38	-	78	51	-
6	81	49	-	70	56	-
7	78	50	-	73	57	-
8	77	63	-	74	53	-
9	79	62	-	63	51	-
10	78	53	-	64	51	-
11	56	36	-	60	49	-
12	52	26	-	71	51	0.50
13	54	32	-	58	41	-
14	55	31	-	54	37	-
15	49	24	-	54	29	-
16	48	35	-	48	27	-
17	55	31	-	52	20	-
18	42	29	-	55	30	-
19	40	29	-	64	35	-
20	42	26	-	50	26	-
21	57	26	-	58	34	-
22	62	24	-	38	11	-
23	62	45	-	25	10	-
24	58	40	-	36	15	-
25	43	32	0.66	51	18	-
26	53	32	0.43	60	29	-
27	61	36	-	64	29	-
28	69	36	-	75	44	-
29	72	38	-	68	38	-
30	45	26	-	58	37	-
31				72	42	-