2017 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 18-2

Texas A&M AgriLife and Research and Extension Center of Lubbock
1102 E. FM 1294
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Producers in the Southern High Plains continue to face serious challenges as we move into the 2018 growing season. The major challenge is continued low commodity prices combined with increasing production costs. Reliance on Roundup as the sole source for weed control allowed Palmer amaranth (pigweed) to develop glyphosate resistance. Now it is necessary to return to use of yellow herbicides in preplanting operations and then using various other herbicides during the growing season. Our research shows that these controls are effective and necessary and need to be included with new varieties which contain the herbicide technologies Bollgard II XtendFlex and Enlist systems. Texas has been fortunate that we did not experience the serious problems with the dicamba technology that occurred in other states. This may be partially due to the fact that we are not producing soybeans which are very sensitive to auxins. The training provided by our weed scientists and extension educations programs provided assistance to our growers to properly utilize and apply these technologies.

Numerous training sessions are offered across the Southern High Plains on auxin specific herbicides for applicators to meet TDA requirements for those using the new formulations in the 2018 growing season.

Drs. Wheeler and Dever continue to make progress on root-knot nematode management and variety testing and development.

Our scientists working at AG-CARES continue to follow the overall objective to develop cotton-based cropping systems utilizing new technologies to optimize cotton profitability in the Southern High Plains. We wish to acknowledge Dr. Wayne Keeling for his leadership and Dr. Danny Carmichael for day to day management of operations at AG-CARES.

Special thanks go to Lamesa Cotton Growers for their continued support. Current officers are:

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Kirk Tidwell, Vice-President
Glen Phipps, Secretary

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Dawson County Commissioners Court
DuPont Crop Protection
PhytoGen Cotton Seed
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Monsanto/Deltapine

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TITLE:

Cotton variety performance (conventional tillage) as affected by low-energy precision application (LEPA) irrigation levels at AG-CARES, Lamesa, TX, 2017.

AUTHORS:

Wayne Keeling – Professor
Justin Spradley and Ray White – Research Assistant and Graduate Research Assistant

MATERIALS AND METHODS:

Plot Size:	4 rows by 300-700 feet, 3 replications
Planting Date:	May 10
Varieties:	Deltapine 1646 B2XF FiberMax 1911 GLT NexGen 4545 B2XF PhytoGen 490 W3FE Stoneville 4946 GLB2
Herbicides:	Trifluralin 1.3 pt/A – April 10 Roundup PowerMax 1 qt/A – June 16 Roundup PowerMax 1qt/A – August 3
Fertilizer preplant:	42-40-0
Fertilizer in-season:	Low – 64-0-0 Base – 96-0-0 High – 128-0-0

Irrigation in-season:

	Low	Base	High
Preplant	2.0”	2.0”	2.0”
In Season	3.9”	5.7”	7.5”
Total	5.9”	7.7”	9.5”

Harvest Date: October 31

RESULTS AND DISCUSSION:

Five cotton varieties, including two Bollgard II XtendFlex and one Enlist, were compared to FiberMax 1911 GLT and Stoneville 4946 GLB2 under three irrigation levels. The large plot trial was in conventional tillage, continuous cotton and this area has been planted continuously in cotton and conventional tillage since 1990. In-season irrigation levels were 3.9, 5.7, and 7.5 acre inches applied across the five varieties, yields increased with increased irrigation levels (Table 1). Highest yields were produced with Stoneville 4946 GLB2, Deltapine 1646 B2XF, and PhytoGen 490 W3FE. Loan value was highest at the high irrigation level and with Deltapine 1646 B2XF and FiberMax 1911 GLT. Gross revenue was most closely related to yield and increased as irrigation level increased. Effects of cultivar and irrigation levels on cotton lint yield, fiber quality, and gross revenues are summarized in Table 1.

Table 1. Effect of cultivar and irrigation level on cotton lint yield (lbs/A), loan value (cents/lb), and gross revenue ($/A) under continuous cotton.

		Irrigation Levels		
Cultivar	**Low (3.9)**	**Base (5.7)**	**High (7.5)**	**Average**
		------------------ lbs/A------------------		
DP 1646 B2XF	1173	1499	1490	**1387 AB**
FM 1911 GLT	900	1254	1533	**1229 BC**
NG 4545 B2XF	887	1155	1357	**1133 C**
PHY 490 W3FE	1006	1412	1485	**1301 AB**
ST 4946 GLB2	1119	1387	1835	**1447 A**
Average	**1017 B**	**1341 B**	**1540 A**	**--**
		------------------cents/lb-----------------		
DP 1646 B2XF	54.42	54.62	56.83	**55.29 A**
FM 1911 GLT	53.00	53.97	55.33	**54.10 AB**
NG 4545 B2XF	47.90	49.90	51.85	**49.88 C**
PHY 490 W3FE	53.35	51.42	56.10	**53.62 B**
ST 4946 GLB2	46.40	49.90	52.93	**49.74 C**
Average	**51.01 B**	**51.96 B**	**54.61 A**	**--**
		--------------------$/A--------------------		
DP 1646 B2XF	638	818	847	**768 A**
FM 1911 GLT	476	677	847	**667 B**
NG 4545 B2XF	424	576	703	**568 C**
PHY 490 W3FE	537	724	834	**698 AB**
ST 4946 GLB2	520	694	971	**728 AB**
Average	**519 C**	**698 B**	**840 A**	**--**

TITLE:

Cotton variety performance (continuous cotton, terminated cover crop) as affected by low-energy precision application (LEPA) irrigation levels at AG-CARES, Lamesa, TX, 2017.

AUTHORS:

Wayne Keeling – Professor
Justin Spradley and Ray White – Research Assistant and Graduate Research Assistant

MATERIALS AND METHODS:

Plot Size:	4 rows by 300-700 feet, 3 replications
Planting Date:	May 10
Varieties:	Deltapine 1646 B2XF FiberMax 1911 GLT NexGen 4545 B2XF PhytoGen 490 W3FE Stoneville 4946 GLB2
Herbicides:	2,4-D 1 qt/A – March 2 Roundup PowerMax 1 qt/A – April 10, cover termination Prowl 3 pt/A – April 27 Roundup PowerMax 1 qt/A – June 15 Roundup PowerMax 1qt/A –August 3
Fertilizer preplant:	42-40-0
Fertilizer in-season:	Low – 64-0-0 Base – 96-0-0 High – 128-0-0

Irrigation:

	Low	Base	High
Preplant	3.4”	3.4”	3.4”
In Season	3.9”	5.7”	7.5”
Total	7.3”	9.1”	10.9”

Harvest Date: October 31

RESULTS AND DISCUSSION:

Five varieties were compared under three irrigation levels in a large plot trial in which cotton was planted into a terminated rye cover crop. The area has been planted to cotton in this system for almost ten years. When averaged across varieties, yields increased with higher irrigation levels (Table 1). When averaged across irrigation levels, highest yields were produced with Stoneville 4946 GLB2, Deltapine 1646 B2XF, and FiberMax 1911 GLT. Loan value was not affected by irrigation level and was highest with Deltapine 1646 B2XF and FiberMax 1911 GLT. Gross revenues were related to yield and increased as irrigation level increased. Effects of cultivar and irrigation level on cotton lint yield, fiber quality, and gross revenues are summarized in Table 1.

Table 1. Effect of cultivar and irrigation level on cotton lint yield (lbs/A), loan value (cents/lb), and gross revenue ($/A) under continuous cotton with a terminated cover crop.

	Irrigation Levels			
Cultivar	**Low (3.9)**	**Base (5.7)**	**High (7.5)**	**Average**
		------------------ lbs/A------------------		
DP 1646 B2XF	782	852	1247	**960 AB**
FM 1911 GLT	724	957	1168	**950 AB**
NG 4545 B2XF	593	972	1049	**871 B**
PHY 490 W3FE	682	946	1163	**931 B**
ST 4946 GLB2	746	1022	1476	**1081 A**
Average	**705 C**	**950 B**	**1221 A**	**--**
		------------------cents/lb-----------------		
DP 1646 B2XF	56.33	56.75	56.60	**56.56 A**
FM 1911 GLT	55.72	56.67	56.77	**56.38 A**
NG 4545 B2XF	51.12	51.55	51.23	**51.30 C**
PHY 490 W3FE	52.98	54.48	55.22	**54.23 B**
ST 4946 GLB2	49.73	52.30	52.95	**51.66 C**
Average	**53.18 A**	**54.35 A**	**54.55 A**	**--**
		--------------------$/A--------------------		
DP 1646 B2XF	440	484	706	**543 A**
FM 1911 GLT	405	524	663	**537 A**
NG 4545 B2XF	302	501	536	**446 B**
PHY 490 W3FE	361	515	644	**507 AB**
ST 4946 GLB2	370	535	782	**562 A**
Average	**376 C**	**516 B**	**666 A**	**--**

TITLE:

Cotton variety performance (wheat-cotton rotation) as affected by low-energy precision application (LEPA) irrigation levels at AG-CARES, Lamesa, TX, 2017.

AUTHORS:

Wayne Keeling – Professor
Justin Spradley and Ray White – Research Assistant and Graduate Research Assistant

MATERIALS AND METHODS:

Plot Size:	4 rows by 300-700 feet, 3 replications
Planting Date:	May 10
Varieties:	Deltapine 1646 B2XF FiberMax 1911 GLT NexGen 4545 B2XF PhytoGen 490 W3FE Stoneville 4946 GLB2
Herbicides:	2,4-D 1 qt/A – March 2 Roundup PowerMax 1 qt/A – March 2 Prowl 3 pt/A – April 27 Gramoxone 32 oz/A – May 10 Roundup PowerMax 1 qt/A – June 15 Roundup PowerMax 1qt/A – August 3
Fertilizer preplant:	42-40-0
Fertilizer in-season:	Low – 64-0-0 Base – 96-0-0 High – 128-0-0

Irrigation in-season:

	Low	Base	High
Preplant	3.0”	3.0”	3.0”
In Season	3.9”	5.7”	7.5”
Total	6.9”	8.7”	10.5”

Harvest Date: November 6

RESULTS AND DISCUSSION:

Five cotton varieties were planted under three irrigation levels in a large plot area that rotates between cotton and wheat. Wheat is planted after cotton harvest and is harvested the following year. The wheat stubble is maintained without tillage and cotton is planted the following year. When averaged across varieties, cotton lint yields increased from 1151 lbs/A to 1688 lbs/A with increasing irrigation levels. When averaged across irrigation levels, highest yields were produced with Deltapine 1646 B2XF, PhytoGen 490 W3FE, and Stoneville 4946 GLB2. Loan values trended higher with increased irrigation when averaged across irrigation levels, Deltapine 1646 B2XF, FiberMax 1911 GLT, and Stoneville 4966 GLB2 resulted in highest loan values. Highest gross revenues were produced with Deltapine 1646 B2XF, PhytoGen 490 W3FE, and Stoneville 4946 GLB2. Effects of cultivar and irrigation on cotton lint yields, loan values, and gross revenues are summarized in Table 1.

Table 1. Effect of cultivar and irrigation level on cotton lint yield (lbs/A), loan value (cents/lb), and gross revenue ($/A) under wheat-cotton rotation.

Cultivar	Irrigation Levels Low (3.9)	Base (5.7)	High (7.5)	Average
		------------------ lbs/A------------------		
DP 1646 B2XF	1201	1448	1876	**1508 A**
FM 1911 GLT	1125	1218	1546	**1296 C**
NG 4545 B2XF	1060	1389	1557	**1335 BC**
PHY 490 W3FE	1162	1531	1686	**1460 AB**
ST 4946 GLB2	1210	1364	1774	**1449 AB**
Average	**1151 C**	**1390 B**	**1688 A**	**--**
		------------------cents/lb-----------------		
DP 1646 B2XF	54.43	53.97	55.30	**54.57 A**
FM 1911 GLT	54.60	51.68	53.88	**53.39 A**
NG 4545 B2XF	47.47	47.57	49.25	**48.09 B**
PHY 490 W3FE	53.03	51.70	55.65	**53.46 A**
ST 4946 GLB2	47.80	47.40	48.30	**47.83 B**
Average	**51.47 AB**	**50.46 B**	**52.48 A**	**--**
		--------------------$/A--------------------		
DP 1646 B2XF	655	782	1038	**825 A**
FM 1911 GLT	613	628	834	**692 B**
NG 4545 B2XF	502	662	767	**644 B**
PHY 490 W3FE	619	792	939	**783 A**
ST 4946 GLB2	578	647	861	**696 A**
Average	**593 C**	**702 B**	**888 A**	**--**

TITLE:

Effect of cropping system, irrigation rate, and variety on root knot nematode at AG-CARES, Lamesa, TX, 2017.

AUTHORS:

Terry Wheeler – Professor
Jimmy Grant, Zachary Hilliard, Cecil Haralson – Research Assistants

MATERIALS AND METHODS:

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

Planting Date: May 10

Varieties:
Deltapine 1646 B2XF
FiberMax 1911 GLT
NexGen 4545 B2XF
PhytoGen 490 W3FE
Stoneville 4946 GLB2

Cropping Systems:
Wedge 1 - Continuous cotton without cover, history of susceptible cotton varieties
Wedge 7 - Wheat/fallow/cotton rotation with cover, history was a mixture of resistant and susceptible cotton varieties
Wedge 9 - Continuous cotton with cover, history of a mixture of resistant and susceptible cotton varieties

Data Collected:
Galls/root system on 20 roots/plot, dug from 10 locations along the entire plot, taken on 27-28 June
Root-knot nematode eggs and second-stage juveniles in 500 cm^3 soil, dug from 20 locations throughout the entire plot length on 11-13 September

Irrigation in-season:

	Low	Base	High
Preplant	3.0”	3.0”	3.0”
In Season	3.9”	5.7”	7.5”
Total	6.9”	8.7”	10.5”

Harvest Date: November 6

RESULTS AND DISCUSSION:

Cropping systems: The root galls caused by root-knot nematode were highest on wedge 1 (17.6 galls) which had a history of continuous cotton and root-knot nematode susceptible cotton varieties; followed by wedge 9 (12.8 galls) which had a history of continuous cotton with both nematode resistant and susceptible cotton varieties; and the lowest (0.9 galls) was on the cotton rotated with wheat/fallow. However, by September, root-knot nematode had built up similarly on both continuous cotton wedges (6,500 root-knot/500 cm^3 soil for wedge 1 and 8,702 root-knot/500 cm^3 soil for wedge 9) and was higher than the cotton rotated with wheat/fallow (919 root-knot/500 cm^3 soil).

Variety: The galls formed by root-knot nematode differed by irrigation rate and variety in wedge 1 (Table 1) but, were similar across varieties and irrigation rates in wedge 9 and 1, differing only by cropping system. There was no single variety that consistently had the lowest number of galls across the different irrigation rates and wedges. Root-knot nematode density was slightly lower for the partially resistant ST 4946GLB2, at least numerically than for root-knot nematode susceptible varieties in each wedge (Table 1). NG 4545B2XF, consistently had the highest root-knot nematode density (numerically), across the three wedges.

Irrigation: Root-knot nematode density was generally higher for the medium and high irrigation rates in wedges 1 and 9, compared to the low irrigation rate, though differences were not always significant (Table 2). In wedge 7, the medium irrigation rate had a lower root-knot nematode density than the high and low irrigation rates.

Table 1. Effect of variety on galls and density of root-knot nematodes.

Variety	Galls/roots system					Root-knot/500 cm^3 soil		
	Wedge[3] (W) = 1			W=7	W=9	W=1	W=7	W=9
	High[1]	Med	Low	All	All	All	All	All
DP 1646B2XF	20.0 a[2]	11.6 b	22.6 ab	0.8	10.5	3,780 bc	296 bc	10,000
FM 1911GLT	8.8 b	10.8 b	24.6 ab	1.1	12.7	3,947 bc	173 bc	6,473
NG 4545B2XF	18.5 ab	9.8 b	28.1 a	0.6	12.4	13,267 a	2,391 a	12,640
PHY 490W3FE	28.4 a	7.3 b	27.4 a	1.0	12.7	8,880 abc	1,587 ab	8,853
ST 4946GLB2	10.4 b	19.9 a	15.8 b	0.9	16.0	3,027 c	147 c	5,320

[1]High, medium and low refer to the irrigation rate that the varieties were averaged over, while All indicates that there were no irrigation differences, so variety were averaged over all irrigation rates.
[2]Means followed by the same letter are not significantly different within the same column.
[3]Wedge 1 was in continuous cotton without a cover, and with a history of susceptible cotton varieties; 7 was in a wheat/fallow/cotton rotation; and 9 was in continuous cotton with a cover crop and a history of both nematode resistant and susceptible cotton varieties.

Table 2. Effect of irrigation rate on root-knot nematode density.

Irrigation rate	Cropping system wedge[2]		
	1	7	9
High	6,520 ab[1]	988 a	11,128 a
Medium	8,064 a	144 b	11,176 a
Low	4,976 b	1,824 a	3,668 b

[1]Means followed by the same letter are not significantly different within the same column.
[2]Wedge 1 was in continuous cotton without a cover, and with a history of susceptible cotton varieties; 7 was in a wheat/fallow/cotton rotation; and 9 was in continuous cotton with a cover crop and a history of both nematode resistant and susceptible cotton varieties.

TITLE:

Cotton yield response to cotton fleahopper infestations as influenced by irrigation level and cultivar treatments, Lamesa, TX, 2017.

AUTHORS:

Megha Parajulee – Professor, Faculty Fellow, and Regents Fellow
Abdul Hakeem – Postdoctoral Research Associate
Stanley Carroll – Research Scientist
Wayne Keeling - Professor

MATERIALS AND METHODS:

Plot Size:	4 rows by 300 feet, 3 replications
Planting date:	May 10
Fertilizer pre-plant:	42-40-0
Fertilizer in-season:	Low water – 64-0-0; High water – 128-0-0
Cultivars:	FiberMax 1911 GLT and Deltapine 1646 B2XF

Irrigation:

	Low	High
Preplant	3.4"	3.4"
In Season	3.9"	7.5"
Total	7.3"	10.9"

Cotton fleahopper:	Three treatments [*Control* (zero cotton fleahoppers), *Cotton fleahopper augmented* (5 bugs per plant), and *Manual removal* (100% squares removed manually three weeks into squaring]
Herbicides:	2,4-D 1 qt/A – March 2 Roundup PowerMax 1 qt/A – April 10, cover termination Prowl 3 pt/A – April 27 Roundup PowerMax 1 qt/A – June 15 Roundup PowerMax 1qt/A –August 3
Insect release date:	July 1, 2017 at fleahopper susceptible stage
Plant mapping date:	July 15, 2017 (in-season); October 23, 2017 (pre-harvest)
Harvest date:	October 23 (hand-harvested)

Comparative effect of cotton fleahopper feeding injury versus manually removed early stage fruits on resulting cotton lint yield was evaluated on two cotton cultivars, FM 1911 GLT and DP 1646 B2XF, as influenced by irrigation water level. Two seasonal irrigation levels, *High* (10.9 inches) and *Low* (7.3 inches) were evaluated under a center pivot irrigation system. Laboratory-reared cotton fleahopper nymphs were released onto cotton terminals (n=7 plants per experimental unit. Experimental design consisted of three square abscission treatments (*cotton fleahopper augmentation*, *manual removal of squares*, and *control*), two water levels (*high* vs. *low*), and two cultivars (*FM 1911 GLT* and *DP 1646 B2XF*), replicated three times and deployed in a randomized complete block design (total 36 plots). Square abscission treatments, 1) *control* (zero fleahopper augmentation), 2) *manual removal* (removal of 100% squares from the plant, and 3) *cotton fleahopper augmentation* (five fleahoppers augmented per plant), were deployed on July 1, 2017, in order to mimic a natural early-season acute infestation of cotton fleahoppers. A single release of cotton fleahoppers and manual removal of fruits were timed to simulate an acute infestation of cotton fleahoppers while cotton was highly vulnerable to fleahopper injury (2-3 weeks into cotton squaring). Augmented cotton fleahoppers were allowed to feed for 10 days and insecticides were sprayed in all experimental plots. Damage inflicted by fleahopper augmentation was assessed on July 15, 2017 and test plots were harvested on October 23, 2017.

RESULTS AND DISCUSSION:

Cotton cultivar DP 1646 B2XF appeared to be more sensitive to cotton fleahopper injury compared to FM 1911 GLT (Fig. 1). However, the injury effect of cotton fleahopper was more pronounced under low irrigation compared with that in high irrigation condition. Control plots had no square loss because the experimental field did not have naturally occurring cotton fleahoppers. Averaged across cultivars, cotton fleahopper induced crop damage, as measured by cotton square loss, did not vary between the two water levels (32.6% average square loss). Cotton fleahopper augmentation inflicted 27.2% and 40.4% square loss in DP 1646 B2XF and FM 1911 GLT under low water regime, whereas 29.2% and 36.1% squares were lost under high water regime, respectively (Fig. 1), and such pre-flower cotton square loss is considered a moderate level of insect-induced early fruit loss for Texas High Plains cotton.

Lint yield was not significantly affected by square abscission treatments under low water regime (Fig. 2), whereas control plots had significantly higher lint yield followed by manual removal plots, and the lowest lint yield was recorded on the fleahopper-augmented plots under high water regime (Fig. 2). While the overall lint yield was significantly lower in low water plots compared to that in high water plots, as expected, the lack of fleahopper impact on deficit-irrigated cotton is noted. It is suggested that the fruit carrying capacity of the plants under low water regime was maximized at around 800 lb per acre for the amount of water applied and the fleahopper-induced square abscission maintained the fruit load via pruning of extraneous fruits.

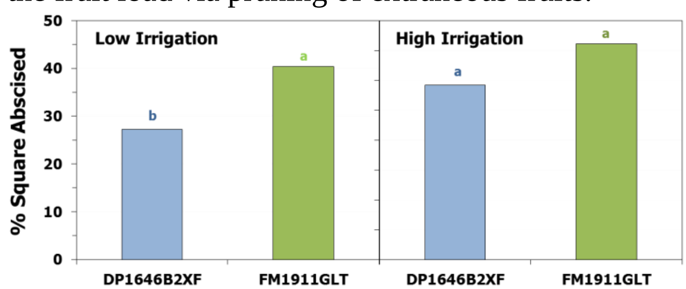


Figure 2. Average square loss following an acute infestation of cotton fleahoppers, achieved by augmenting 5 bugs per plant during the second week of squaring, under low and high irrigation regimes on cotton, Lamesa, Texas, 2017.

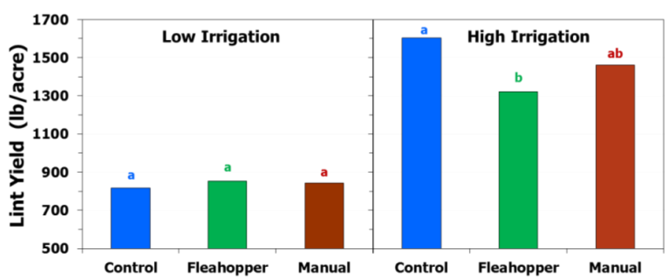


Figure 3. Average lint yield following an acute infestation of fleahoppers and manual removal of 100% squares prior to first flower under high and low irrigation regimes, Lamesa, Texas, 2017.

TITLE:

Performance of Deltapine varieties as affected by low-energy precision application (LEPA) irrigation levels at AG-CARES, Lamesa, TX, 2017.

AUTHORS:

Wayne Keeling – Professor
Justin Spradley and Ray White – Research Assistant and Graduate Research Assistant

MATERIALS AND METHODS:

Plot Size: 4 rows by 30 feet, 4 replications

Planting Date: May 12

Varieties:

16R232B2XF	16R245NRB2XF
16R246NRB2XF	16R346B3XF
17R933NRB3XF	17R945NRB3XF
DP 1522 B2XF	DP 1612 B2XF
DP 1646 B2XF	DP 1820 B3XF
DP 1822 XF	DP 1845 B3XF

Herbicides:
Trifluralin 1.3 pt/A – April 26
Roundup PowerMax 1 qt/A – June 16
Roundup PowerMax 1 qt/A – August 3

Fertilizer preplant: 42-40-0
Fertilizer in-season:
Low – 64-0-0
Base – 96-0-0
High – 128-0-0

Irrigation in-season: LEPA

	Dry	Low	Base	High
Preplant	2.0”	2.3”	2.3”	2.3”
In Season	0.9”	3.9”	5.7”	7.5”
Total	2.9”	6.2”	8.0”	9.8”

Harvest Date: October 20

RESULTS AND DISCUSSION:

Twelve Deltapine commercial and experimental varieties were evaluated under dryland and three levels of center-pivot irrigation. The plot area was rotated with wheat and was fallow during the 2016 growing season. Yields increased significantly with each additional irrigation input (Table 1). When averaged across varieties, yield ranged from 752 lbs/A for dryland, up to 2412 lbs/A with the high irrigation treatment. When averaged across irrigation level, DP 1845 B3XF, DP 1822 XF, DP 1820 B3XF, DP 1646 B2XF, DP 1612 B2XF, and two experimentals were in the highest yield group. Loan values ranged form 53.67 to 56.40 cents/lb, and were highest with the base and high irrigation levels. When averaged across irrigation levels, highest loan values were associated with the DP 1845 B3XF, DP 1822 XF, DP 1820 B3XF, DP 1646 B2XF, and three experimentals. Gross revenues were similar for all varieties when averaged across irrigation levels. DP 1845 B3XF, DP 1822 XF, and DP 1820 B3XF are new varieties for 2018.

Table 1. Effect of cultivar and irrigation level on cotton lint yield (lbs/A), loan value (cents/lb), and revenue ($/A).

	Irrigation Levels				
Variety	**Dry (0.0)**	**Low (3.9)**	**Base (5.7)**	**High (7.5)**	**Average**
		------------------ lbs/A------------------			
16R232B2XF	705	1810	2044	2183	**1685 E**
16R245NRB2XF	799	2080	2151	2333	**1840 AB**
16R246NRB2XF	828	1884	2033	2288	**1758 B-E**
16R346B3XF	774	2140	2265	2528	**1926 A**
17R933NRB3XF	752	1752	1930	2407	**1710 CDE**
17R945NRB3XF	742	1732	1926	2322	**1680 E**
DP 1522 B2XF	733	1910	1762	2349	**1688 DE**
DP 1612 B2XF	806	2064	2128	2553	**1888 A**
DP 1646 B2XF	789	1844	2123	2490	**1811 A-D**
DP 1820 B3XF	685	1971	2078	2501	**1808 A-D**
DP 1822 XF	664	2071	2080	2468	**1820 ABC**
DP 1845 B3XF	757	2026	2156	2528	**1866 AB**
Average	**752 D**	**1940 C**	**2056 B**	**2412 A**	**--**
		------------------cents/lb-----------------			
16R232B2XF	51.78	53.20	56.70	56.90	**54.64 CD**
16R245NRB2XF	55.23	56.80	56.35	56.65	**56.25 A**
16R246NRB2XF	51.83	54.35	56.25	56.68	**54.77 BCD**
16R346B3XF	56.55	56.28	56.50	56.43	**56.43 A**
17R933NRB3XF	55.00	56.18	56.30	55.45	**55.73 ABC**
17R945NRB3XF	52.48	55.28	56.58	56.65	**55.24 A-D**
DP 1522 B2XF	49.28	54.85	56.18	56.40	**54.17 D**
DP 1612 B2XF	51.33	54.40	55.98	56.10	**54.45 D**
DP 1646 B2XF	54.83	55.98	56.28	56.40	**55.86 ABC**
DP 1820 B3XF	54.90	56.60	56.48	56.65	**56.15 A**
DP 1822 XF	54.38	56.60	56.65	56.38	**56 AB**
DP 1845 B3XF	56.60	56.50	56.50	56.23	**56.45 A**
Average	**53.67 C**	**55.58 B**	**56.39 A**	**56.40 A**	**--**
		--------------------$/A--------------------			
16R232B2XF	356	1174	1208	1350	**1022**
16R245NRB2XF	411	1183	1141	1568	**1076**
16R246NRB2XF	318	970	1069	1371	**932**
16R346B3XF	366	1055	1178	1383	**995**
17R933NRB3XF	407	1092	1199	1401	**1025**
17R945NRB3XF	432	1099	1174	1344	**1012**
DP 1522 B2XF	470	985	1141	1437	**1008**
DP 1612 B2XF	438	1035	1070	1469	**1003**
DP 1646 B2XF	432	1077	1247	1322	**1020**
DP 1820 B3XF	396	1215	1244	1469	**1081**
DP 1822 XF	389	1034	937	1309	**917**
DP 1845 B3XF	515	1062	1155	1317	**1012**
Average	**411 D**	**1082 C**	**1147 B**	**1395 A**	**ns**

TITLE:

Performance of PhytoGen varieties as affected by irrigation levels at AG-CARES, Lamesa, TX, 2017.

AUTHORS:

Wayne Keeling – Professor
Justin Spradley and Ray White – Research Assistant and Graduate Research Assistant

MATERIALS AND METHODS:

Plot Size: 4 rows by 30 feet, 4 replications

Planting Date: May 12

Varieties:

PHY 250 W3FE	PHY 300 W3FE
PHY 312 WRF	PHY 330 W3FE
PHY 340 W3FE	PHY 440 W3FE
PHY 444 WRF	PHY 450 W3FE
PHY 480 W3FE	PHY 490 W3FE
PX2A23W3FE	PX2A27W3FE
PX2A28W3FE	PX2A31W3FE
PX2A36W3FE	PX2AX2W3FE
PX2AX3W3FE	PX2AX4W3FE
PX3A82W3FE	PX3A96W3FE
PX3A99W3FE	PX4A54W3FE
PX4A57W3FE	DP 1646 B2XF
FM 1911 GLT	NG 3406 B2XF

Herbicides: Trifluralin 1.3 pt/A – April 26
Roundup PowerMax 1 qt/A – June 16
Roundup PowerMax 1 qt/A – August 3

Fertilizer preplant: 42-40-0
Fertilizer in-season: Low – 64-0-0
Base – 96-0-0
High – 128-0-0

Irrigation in-season: LEPA

	Dry	Low	Base	High
Preplant	2.0"	2.3"	2.3"	2.3"
In Season	0.9"	3.9"	5.7"	7.5"
Total	2.9"	6.2"	8.0"	9.8"

Harvest Date: October 25

RESULTS AND DISCUSSION:

PhytoGen commercial and experimental varieties were planted in three irrigation levels (center-pivot) in a field that was rotated with wheat and compared to an adjacent dryland trial. Excellent yields were produced over the range of irrigation levels (Table 1). Average yields for all varieties ranged from 845 lbs/A for dryland up to 2205 lbs/A under the highest irrigation level. When averaged across irrigation levels, yields for individual varieties ranged from 1423 to

1835 lbs/A. Lint quality improved with increasing irrigation and ranged from 48.77 to 54.23 cents/lb among varieties (Table 2). Gross returns per acre increased with irrigation level and varied between varieties (Table 3). PHY 250 W3FE, PHY 440 W3FE, and PHY 480 W3FE are new Enlist varieties released for 2018.

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

	In-season Irrigation Levels				
Variety	**Dry (0.0)**	**Low (3.9)**	**Base (5.7)**	**High (7.5)**	**Average**
	------------------ lbs/A------------------				
PHY 250 W3FE	767	1478	1677	2172	**1524 DEF**
PHY 300 W3FE	883	1785	1898	2381	**1737 AB**
PHY 312 WRF	947	1898	1894	2603	**1835 A**
PHY 330 W3FE	913	1779	1727	2222	**1660 BC**
PHY 340 W3FE	910	1644	1747	2331	**1658 BC**
PHY 440 W3FE	838	1772	1735	2045	**1598 CDE**
PHY 444 WRF	829	1622	1786	2194	**1608 CD**
PHY 450 W3FE	877	1637	1876	2225	**1654 BC**
PHY 480 W3FE	922	1872	1968	2481	**1811 A**
PHY 490 W3FE	885	1875	1802	2477	**1760 AB**
PX2A23W3FE	776	1503	1669	2015	**1491 EF**
PX2A27W3FE	749	1433	1557	2100	**1460 F**
PX2A28W3FE	833	1565	1776	1973	**1537 DEF**
PX2A31W3FE	728	1506	1739	1939	**1478 F**
PX2A36W3FE	767	1466	1611	1894	**1434 F**
PX2AX2W3FE	696	1589	1707	2076	**1517 DEF**
PX2AX3W3FE	788	1534	1769	1828	**1480 F**
PX2AX4W3FE	746	1422	1496	2029	**1423 F**
PX3A82W3FE	864	1620	1594	2053	**1533 DEF**
PX3A96W3FE	928	1800	1914	2397	**1760 AB**
PX3A99W3FE	960	1759	1978	2558	**1814 A**
PX4A54W3FE	863	1727	2109	2289	**1747 AB**
PX4A57W3FE	993	1763	1916	2356	**1757 AB**
DP 1646 B2XF	863	1619	1871	2123	**1619 CD**
FM 1911 GLT	710	1591	1711	2087	**1524 DEF**
NG 3406 B2XF	924	1812	2057	2470	**1816 A**
Average	**845 D**	**1657 C**	**1792 B**	**2205 A**	**--**

Table 2. Effect of variety and irrigation level on loan value (cents/lb).

Variety	In-season Irrigation Levels				
	Dry (0.0)	**Low (3.9)**	**Base (5.7)**	**High (7.5)**	**Average**
	----------------cents/lb----------------				
PHY 250 W3FE	48.70	54.26	53.48	55.21	**52.91 EDF**
PHY 300 W3FE	46.83	50.23	51.53	52.50	**50.26 JK**
PHY 312 WRF	49.20	53.66	52.93	54.18	**52.49 EFG**
PHY 330 W3FE	49.78	50.30	51.35	51.81	**50.80 IJK**
PHY 340 W3FE	48.58	48.56	50.63	51.73	**49.87 K**
PHY 440 W3FE	51.10	52.08	52.90	52.49	**52.14 FGH**
PHY 444 WRF	52.84	52.55	54.75	55.79	**53.98 A-D**
PHY 450 W3FE	48.76	49.93	51.24	52.06	**50.49 IJK**
PHY 480 W3FE	50.04	53.99	52.71	52.74	**52.36 EFG**
PHY 490 W3FE	50.56	54.44	54.04	54.59	**53.40 B-E**
PX2A23W3FE	51.76	54.83	55.80	54.53	**54.22 AB**
PX2A27W3FE	50.71	54.90	54.43	55.06	**53.77 BCD**
PX2A28W3FE	48.38	54.68	54.93	54.66	**53.15 B-F**
PX2A31W3FE	48.65	51.20	52.00	52.13	**50.99 IJ**
PX2A36W3FE	50.33	54.96	54.24	55.66	**53.79 BCD**
PX2AX2W3FE	51.34	54.93	54.89	55.03	**54.04 ABC**
PX2AX3W3FE	50.25	54.86	54.46	56.15	**53.93 A-D**
PX2AX4W3FE	49.18	53.21	54.75	55.34	**53.11 C-F**
PX3A82W3FE	46.98	53.20	51.85	53.78	**51.45 GHI**
PX3A96W3FE	48.73	54.50	55.61	55.65	**53.62 BCD**
PX3A99W3FE	47.08	50.34	53.88	53.26	**51.13 HIJ**
PX4A54W3FE	46.03	50.53	51.21	52.43	**50.04 JK**
PX4A57W3FE	45.00	49.36	48.98	51.73	**48.76 L**
DP 1646 B2XF	52.03	55.14	56.45	56.34	**54.98 A**
FM 1911 GLT	49.18	55.53	55.00	56.34	**54.00 A-D**
NG 3406 B2XF	46.78	51.55	53.26	53.98	**51.39 GHI**
Average	**49.18 C**	**52.83 B**	**53.35 AB**	**54.04 A**	**--**

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

Variety	In-season Irrigation Levels Dry (0.0)	Low (3.9)	Base (5.7)	High (7.5)	Average
	--------------------$/A--------------------				
PHY 250 W3FE	374	801	900	1199	**818 F-K**
PHY 300 W3FE	414	897	980	1251	**885 CDE**
PHY 312 WRF	466	1018	1003	1410	**974 A**
PHY 330 W3FE	452	896	888	1151	**846 D-H**
PHY 340 W3FE	443	799	885	1206	**833 D-I**
PHY 440 W3FE	428	923	918	1073	**835 D-I**
PHY 444 WRF	438	851	981	1227	**874 EDF**
PHY 450 W3FE	428	817	961	1159	**841 D-H**
PHY 480 W3FE	462	1010	1037	1307	**954 AB**
PHY 490 W3FE	448	1019	973	1353	**948 ABC**
PX2A23W3FE	403	824	931	1100	**814 F-K**
PX2A27W3FE	381	787	847	1156	**792 H-K**
PX2A28W3FE	404	856	976	1079	**828 E-J**
PX2A31W3FE	355	773	908	1011	**761 K**
PX2A36W3FE	386	806	872	1055	**779 IJK**
PX2AX2W3FE	358	873	936	1142	**827 E-J**
PX2AX3W3FE	398	842	965	1028	**807 G-K**
PX2AX4W3FE	367	757	818	1123	**766 JK**
PX3A82W3FE	406	861	827	1105	**799 H-K**
PX3A96W3FE	452	980	1064	1333	**957 AB**
PX3A99W3FE	450	885	1066	1364	**941 ABC**
PX4A54W3FE	398	873	1080	1200	**887 CDE**
PX4A57W3FE	447	870	937	1218	**868 D-G**
DP 1646 B2XF	449	891	1057	1196	**898 BCD**
FM 1911 GLT	349	883	942	1175	**837 D-I**
NG 3406 B2XF	433	934	1097	1333	**949 ABC**
Average	**414 D**	**874 C**	**955 B**	**1190 A**	**--**

TITLE:

Performance of FiberMax and Stoneville varieties as affected by subsurface drip irrigation levels at AG-CARES, Lamesa, TX, 2017.

AUTHORS:

Wayne Keeling – Professor
Justin Spradley and Ray White – Research Assistant and Graduate Research Assistant

MATERIALS AND METHODS:

Plot Size: 4 rows by 40 feet, 3 replications

Planting Date: May 23

Varieties:

BX 1833GLT	BX 1834GLT
BX 1835GLT	FM 1320GL
FM 1830GLT	FM 1888GL
FM 1911GLT	FM 2322GL
FM 2498GLT	FM 2574GLT
ST 4946GLB2	ST 5517GLTP

Herbicides:
Trifluralin 1.3 pt/A – April 10
Caparol 1.5 pt/A – June 9
Roundup PowerMax 1 qt/A – June 24
Roundup PowerMax 1qt/A – July 26

Fertilizer: 145-40-0

Irrigation in-season:

	Low	Base	High
Preplant	4.0”	4.0”	4.0”
In Season	10.9”	13.0”	15.0”
Total	14.9”	17.0”	19.0”

Harvest Date: November 21

RESULTS AND DISCUSSION:

Three experimental FiberMax cotton varieties from Bayer were compared to six commercial FiberMax and two Stoneville varieties under three levels of subsurface drip irrigation. Included were two new varieties introduced for 2018 - FM 2498GLT and FM 2573GLT. Excellent yields and fiber qualities were produced in this trial (Table 1). When averaged across varieties yield ranged from 1499 to 2282 lbs lint/A as irrigation level increased. When averaged across irrigation levels, yields ranged from 1799 to 2133 lbs/A. Loan values were not affected by irrigation level but did vary among varieties, with a range of 52.86 to 54.56 cents/lb. Gross revenues increased with higher irrigation levels and varied among varieties. FM 1888GLT, FM 1833GLT, FM 2498GLT, FM 2574GLT, and FM 1320GL were in the highest yield group.

Table 1. Effect of cultivar and irrigation level on cotton lint yield (lbs/A), loan value (cents/lb), and revenue ($/A).

Cultivar	Irrigation Levels Low (3.9)	Base (5.7)	High (7.5)	Average
	------------------ lbs/A------------------			
BX 1833GLT	1658	2353	2286	**2099 AB**
BX 1834GLT	1499	2151	2221	**1957 BCD**
BX 1835GLT	1449	1991	2246	**1895 CDE**
FM 1320GL	1512	2164	2447	**2041 ABC**
FM 1830GLT	1438	2027	2413	**1959 BCD**
FM 1888GL	1791	2185	2423	**2133 A**
FM 1911GLT	1184	2018	2184	**1795 E**
FM 2322GL	1311	2049	2037	**1799 E**
FM 2498GLT	1689	2182	2428	**2100 AB**
FM 2574GLT	1602	2134	2476	**2071 AB**
ST 4946GLB2	1460	2018	2119	**1866 DE**
ST 5517GLTP	1394	2094	2102	**1863 DE**
Average	**1499 C**	**2114 B**	**2282 A**	**--**
	------------------cents/lb-----------------			
BX 1833GLT	54.62	54.36	54.69	**54.56 A**
BX 1834GLT	54.67	54.17	54.54	**54.46 A**
BX 1835GLT	53.52	54.32	53.76	**53.87 ABC**
FM 1320GL	53.14	53.29	53.77	**53.40 CD**
FM 1830GLT	54.12	54.42	54.42	**54.32 AB**
FM 1888GL	54.16	54.02	54.22	**54.13 ABC**
FM 1911GLT	51.94	54.09	54.37	**53.47 BCD**
FM 2322GL	52.81	53.16	54.42	**53.46 BCD**
FM 2498GLT	54.24	52.99	54.07	**53.77 ABC**
FM 2574GLT	54.47	54.37	54.64	**54.50 A**
ST 4946GLB2	53.22	53.41	51.94	**52.86 D**
ST 5517GLTP	52.61	53.67	54.16	**53.48 BCD**
Average	**53.63 A**	**53.86 A**	**54.08 A**	**--**
	--------------------$/A--------------------			
BX 1833GLT	905	1279	1249	**1145 A**
BX 1834GLT	820	1165	1211	**1066 ABC**
BX 1835GLT	776	1082	1207	**1022 BCD**
FM 1320GL	804	1153	1317	**1091 AB**
FM 1830GLT	778	1103	1313	**1065 ABC**
FM 1888GL	970	1180	1315	**1155 A**
FM 1911GLT	614	1091	1188	**965 D**
FM 2322GL	693	1090	1109	**964 D**
FM 2498GLT	916	1156	1313	**1128 A**
FM 2574GLT	873	1160	1353	**1129 A**
ST 4946GLB2	776	1079	1109	**988 CD**
ST 5517GLTP	734	1124	1139	**999 CD**
Average	**805 C**	**1139 B**	**1235 A**	**--**

TITLE:

Performance of Americot varieties as affected by low-energy precision application (LEPA) irrigation levels at AG-CARES, Lamesa, TX, 2017.

AUTHORS:

Wayne Keeling – Professor
Justin Spradley and Ray White – Research Assistant and Graduate Research Assistant

MATERIALS AND METHODS:

Plot Size:	4 rows by 30 feet, 4 replications
Planting Date:	May 24
Varieties:	AMX 1711 B3XF AMX 5140 XF AMX 6180 B2XF NG 3406 B2XF NG 3517 B2XF NG 3699 B2XF NG 4545 B2XF NG 4545 B2XF W/INDIGO NG 4601 B2XF NG 4689 B2XF NG 5007 B2XF NG 5007 B2XF W/INDIGO
Herbicides:	Trifluralin 1.3 pt/A – April 26 Roundup PowerMax 1 qt/A – June 16 Roundup PowerMax 1 qt/A – August 3
Fertilizer:	138-40-0
Irrigation in-season:	LEPA

	Base
Preplant	2.0”
In Season	5.7”
Total	7.7”

Harvest Date:	October 23

RESULTS AND DISCUSSION:

Commercial and experimental cotton varieties from Americot were evaluated under base irrigation level in 2017. Lint yields averaged 1332 lbs/A with similar yields produced with all varieties (Table 1). Loan values averaged 54.03 cents/lb and ranged from 52.50 to 55.58 cents/lb. All these varieties are dicamba tolerant.

Table 1. Effect of cultivar under base irrigation level on cotton lint yield (lbs/A), loan value (cents/lb), and revenue ($/A).

Variety	Lint Yield (lbs/Acre)	Loan (cents/lb)	Revenue ($/A)
AMX1711B3XF	1353	56.15	759
AMX5140XF	1433	52.50	752
AMX6180B2XF	1361	52.63	716
NG3406B2XF	1348	52.39	705
NG3517B2XF	1276	53.94	688
NG3699B2XF	1313	53.23	698
NG4545B2XF	1474	54.86	806
NG4545B2XFW/INDIGO	1343	52.08	699
NG4601B2XF	1193	55.58	665
NG4689B2XF	1388	53.60	743
NG5007B2XF	1220	56.28	686
NG5007B2XFW/INDIGO	1283	55.10	706
Average	**1332**	**54.03**	**719**
LSD (0.05)	**188 ns**	**2.49**	**96 ns**

TITLE:

Results of the drip irrigated cotton variety performance test at AG-CARES, Lamesa, TX, 2017.

AUTHORS:

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

MATERIALS AND METHODS:

Plot Size:	2 rows by 35 feet
Design:	Randomized Complete Block, 4 replications
Planting Date:	June 1
Planting Pattern:	Solid
Herbicides:	Trifluralin 1.4 pt/A – Preplant incorporated
Fertilizer:	34 lbs N applied through fertigation
Irrigation in-season:	8.61 acre-inches applied May-September
Harvest Aid:	Bollbuster 2 pt/A + ETX 1.25 oz/A – October 19
Harvest Date:	December 5

RESULTS AND DISCUSSION:

Texas A&M AgriLife Research, in conjunction with the AG-CARES location in Lamesa, provide an important service to seed companies and producers through a fee-based testing system that can evaluate a relatively large number of commercial and pre-commercial cotton varieties in small-plot replicated performance trials. This service allows varieties from different companies and seed developers to be tested together by an independent source. The small-plot replicated trials 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 5 locations across the Southern High Plains, including the irrigated site at AG-CARES.

Lint yield is determined by the stripper-harvested plot weight and a lint percentage (gin turnout) determined from a ~600g grab sample collected randomly from the harvested plot material. Boll size, and pulled and picked lint percent are determined from a 50 boll sample obtained from 2 replications of each entry. Maturity and storm resistance ratings are a visual assessment of percent open bolls and a 1(very loose, considerable storm loss) to 9(very tight boll, no storm loss) storm resistance rating.

Forty-eight cotton varieties from 6 different seed companies were submitted for variety testing at 5 locations, including the irrigated location at AG-CARES in Lamesa. International Seed Technology (IST), is a company testing conventional cotton varieties developed in Brazil. Average yield was 1415 pounds of lint per acre with a test coefficient of variation of 16.0 and 265 pound least significant difference. The highest yielding variety was NG 4689 B2XF with a yield of 1774 pounds of lint per acre. The next 13 varieties in the test were not significantly different than the highest yielding variety (Table 1). NexGen was joined in the top tier by; FiberMax, Deltapine, PhytoGen, IST, and Seed Source Genetics brands. Yields for the test ranged from 1774 pounds of lint per acre to 945 pounds of lint per acre in 2017. Plant height ranged from 28-46 inches with a test average of 38 inches. Relative maturity of the varieties as indicated by percent open bolls on a given date averaged 73%, with a range from 36-88%. Storm resistance ratings ranged from 3-7 with the test average of 5.

		Agronomic Properties										
		% Turnout		% Lint		Boll	Seed	Lint	Seed per	% Open Bolls	Storm	
Designation	Yield	Lint	Seed	Picked	Pulled	Size	Index	Index	Boll	1-Nov	Resistance	Height
NexGen NG 4689 B2XF	1774	29.9	46.0	40.3	31.6	5.9	9.7	7.2	33.0	63	4	41
FiberMax FM 1911GLT	1692	29.2	44.9	40.1	31.6	5.9	11.6	8.4	28.3	81	6	33
Monsanto 16R346 B2XF	1673	29.0	42.1	39.7	30.4	5.1	8.0	6.1	33.1	63	5	42
International Seed Technology BRS-335	1627	27.0	47.3	38.3	31.3	5.4	9.3	6.1	34.0	75	4	45
Stoneville ST 4946GLB2	1616	29.7	47.1	36.2	28.4	5.4	9.7	6.2	32.0	74	5	38
FiberMax FM 2334GLT	1605	30.4	43.5	41.0	32.2	5.6	8.2	6.7	34.1	74	4	38
FiberMax FM 958	1588	28.1	46.6	36.5	28.6	5.4	9.8	6.4	30.5	80	6	37
PhytoGen PHY 330 W3FE	1584	28.8	43.9	40.4	30.7	5.1	8.7	6.8	30.4	75	5	38
PhytoGen PHY 340 W3FE	1579	28.6	43.9	40.5	31.4	5.3	10.1	7.5	28.9	78	5	37
PhytoGen PHY 499 WRF	1574	28.2	43.8	38.9	30.0	4.8	8.7	6.3	29.9	76	4	39
Seed Source Genetics UA 222 Saberex	1569	28.0	45.8	41.0	32.8	5.4	9.9	7.4	30.0	74	4	36
PhytoGen PX2A27W3FE	1550	26.8	45.2	38.6	28.9	5.5	9.9	6.9	31.0	85	6	35
PhytoGen PHY 243 WRF	1526	27.3	45.6	40.9	31.6	5.5	9.8	7.2	31.6	80	4	36
Deltapine DP 1522 B2XF	1523	28.7	44.2	41.9	32.7	5.3	8.2	6.6	34.0	70	5	42
NexGen NG 3640 XF	1500	29.5	45.0	40.7	31.9	4.8	8.7	6.7	28.7	70	5	36
PhytoGen PHY 450 W3FE	1498	27.5	44.2	38.1	29.5	5.0	8.7	5.9	32.9	69	5	40
FiberMax FM 1888GL	1485	28.8	46.3	39.5	31.1	6.4	10.5	7.7	33.3	75	5	38
PhytoGen PHY 250 W3FE	1481	28.4	44.2	36.9	28.1	5.5	9.7	6.3	32.5	84	5	33
PhytoGen PX2A28W3FE	1473	27.9	44.8	39.0	30.4	5.6	10.2	7.2	30.3	70	5	37
PhytoGen PX2A31W3FE	1469	28.5	45.4	39.4	30.4	5.4	9.8	6.8	30.9	88	7	28
PhytoGen PX2A23W3FE	1465	26.6	44.9	39.2	29.6	5.8	10.0	6.7	33.7	81	6	33
PhytoGen PHY 300 W3FE	1449	27.3	42.4	41.9	32.0	5.3	8.1	6.5	34.0	83	5	39
International Seed Technology BRS-293	1430	28.2	46.3	37.3	29.8	5.7	9.6	6.3	34.0	69	5	41
PhytoGen PX2AX4W3FE	1420	27.7	44.2	37.0	28.2	5.9	10.3	6.8	32.3	83	6	31
PhytoGen PX2AX2W3FE	1419	27.9	45.4	38.6	29.2	5.4	10.3	6.8	30.7	83	6	33
Seed Source Genetics HQ 210 CT	1419	28.7	49.9	36.0	29.0	5.5	8.6	5.5	35.6	73	4	37
Deltapine DP 1646 B2XF	1411	33.3	44.5	44.1	35.0	5.4	8.5	7.5	32.1	66	5	44
NexGen NG 3406 B2XF	1410	29.4	44.1	41.0	31.9	5.4	8.6	6.5	34.3	70	5	39
PhytoGen PHY 444 WRF	1391	29.0	43.2	41.9	32.3	6.1	10.3	8.2	31.4	70	5	45
Monsanto 16R245NR B2XF	1390	29.5	45.2	40.5	32.6	4.7	9.7	7.3	26.2	65	4	42

FiberMax FM 1830GLT	1359	30.1	43.4	41.1	32.1	4.9	8.2	6.5	31.3	79	4	42
PhytoGen PHY 490 W3FE	1358	27.6	44.0	38.1	29.0	4.9	9.5	6.7	27.8	76	5	39
PhytoGen PX2AX3W3FE	1351	27.9	46.7	38.0	29.4	5.3	10.1	6.7	30.2	88	6	31
Deltapine DP 1845 B3XF	1350	30.2	44.7	43.6	32.6	4.5	7.8	6.7	28.8	61	6	39
Monsanto 16R246NR B2XF	1348	30.2	42.2	44.0	34.5	6.8	9.6	8.1	37.3	36	5	41
International Seed Technology BRS-286	1325	27.4	44.8	39.9	31.7	5.6	10.1	7.2	30.9	71	4	46
Deltapine DP 1549 B2XF	1309	28.4	43.4	40.6	33.0	4.7	9.3	7.4	26.3	68	4	45
Deltapine DP 1612 B2XF	1280	27.4	44.9	38.7	29.5	5.3	8.8	6.2	32.7	85	3	37
PhytoGen PHY 312 WRF	1252	28.4	45.0	39.8	31.2	5.3	9.5	6.9	30.4	83	4	41
PhytoGen PX2A36W3FE	1235	26.1	46.9	35.2	27.1	5.9	10.8	6.4	32.4	80	5	31
Seed Source Genetics UA 222	1225	27.0	46.2	38.9	31.3	5.5	10.3	7.3	29.6	71	3	32
Deltapine DP 1747NR B2XF	1219	31.3	42.8	43.3	35.1	5.2	8.5	7.5	29.8	66	3	37
NexGen NG 3699 B2XF	1207	28.3	45.4	38.3	30.3	5.7	8.2	6.3	34.4	71	5	36
NexGen NG 4545 B2XF	1174	28.7	45.4	40.2	32.0	5.5	9.1	6.7	32.9	76	4	40
NexGen NG 3500 XF	1163	29.2	45.2	41.8	32.3	5.4	9.0	6.9	32.7	79	5	40
FiberMax FM 2322GL	1161	29.7	42.4	38.8	30.5	5.8	10.1	7.5	29.8	73	5	32
13-9-1001S	1054	25.0	43.8	39.2	29.8	4.8	8.1	5.9	32.2	74	4	41
PhytoGen PHY 764 WRF	945	25.0	43.5	38.1	27.9	4.8	9.3	6.4	28.6	71	3	39
Mean	1415	28.4	44.8	39.6	30.9	5.4	9.3	6.8	31.5	74	5	38
c.v.%	16.0	3.3	3.5	2.2	2.2	5.7	7.1	6.9	7.7	12.3	14.7	11.7
LSD 0.05	265	1.1	1.8	1.4	1.1	0.5	1.1	0.8	4.1	11	1	5

TITLE:

Results of the dryland cotton variety performance test, and the dryland advanced strains test at AG-CARES, Lamesa, TX, 2017.

AUTHORS:

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

MATERIALS AND METHODS:

Plot Size:	2 rows by 30 feet
Design:	Randomized Complete Block, 4 replications
Planting Date:	May 11
Planting Pattern:	Solid
Herbicides:	Trifluralin 1.3 pt/A – Preplant incorporated
Fertilizer:	32 lbs N applied through fertigation
Rainfall:	12.75 acre-inches in-season
Harvest Aid:	Bollbuster 2 pt/A + ETX 1 oz/A – October 6
Harvest Date:	October 22

RESULTS AND DISCUSSION:

The AG-CARES facility provides an excellent opportunity to evaluate varieties in small-plot replicated trials under both irrigated and dryland conditions in the Southern High Plains. Testing varieties in dryland conditions presents some of the same challenges of dryland cotton production, such as waiting for a planting rain which may favor early maturing varieties if the rain comes late, and trying to plant after rain before the soil dries. The dryland location at Lamesa AG-CARES is one of the official locations included in the National Cotton Variety Testing Program (NCVT), so data are reported even under difficult conditions. Since the location is important to the NCVT, the trial is planted under the pivot so minimum planting moisture can be applied if necessary. Some un-adapted varieties are included in these tests because they are national standards for the NCVT program. There has been a NCVT location in the Southern High Plains region since the inception of the program in 1950.

The dryland location also allows growers to evaluate variety relative yields in unpredictable situations, but other parameters, such as maturity, storm resistance, and plant height are also important in assessing overall performance when yield may be influenced as much by field conditions as variety genetic response. Data presented here are intended to provide all pertinent information for variety selection decisions.

Lint yield is determined by the stripper-harvested plot weight and a lint percentage (gin turnout) determined from a ~600g grab sample collected randomly from the harvested plot material. Boll size, and pulled and picked lint percent are determined from a 50 boll sample obtained from 2 replications of each entry. Maturity and storm resistance ratings are a visual assessment of percent open bolls and a 1(very loose, considerable storm loss) to 9 (very tight boll, no storm loss) storm resistance rating.

Forty-eight cotton varieties from 6 different seed companies were submitted for variety testing at 5 locations, including the dryland location at AG-CARES in Lamesa. Average yield was 722 pounds of lint per acre with a test coefficient of variation of 11.5 and 97 pound least significant difference. The highest yielding variety was DP 1646 B2XF with a yield of 905. The next 9 varieties in the test were not significantly different than the highest yielding variety (Table 2). Deltapine, PhytoGen, Seed Source Genetics, and NexGen brands were all represented in this top tier. Yields for the test ranged from 905 pounds of lint per acre to 404 pounds of lint per acre in 2017. Relative maturity of the varieties as indicated by percent open bolls on a given date averaged 55%, with a range from 11-81%. All of the varieties tested had storm resistance ratings from 3-7 with the test average of 5. Plant height averaged 25 inches and ranged from 21-29 inches across all varieties.

						Agronomic Properties				% Open		
		% Turnout		% Lint		Boll	Seed	Lint	Seed per	Bolls	Storm	
Designation	Yield	Lint	Seed	Picked	Pulled	Size	Index	Index	Boll	7-Sep	Resistance	Height
Deltapine DP 1646 B2XF	905	32.2	42.3	44.2	36.3	5.6	7.5	6.4	32.2	49	4	27
Deltapine DP 1549 B2XF	903	30.4	44.9	41.1	33.0	6.0	8.5	6.1	32.5	34	5	27
PhytoGen PHY 450 W3FE	890	29.3	43.6	37.0	29.3	6.3	9.2	5.9	31.4	44	5	26
PhytoGen PHY 499 WRF	887	32.0	43.3	41.4	33.7	6.2	9.0	6.8	30.8	55	3	28
Deltapine DP 1747NR B2XF	870	32.0	42.8	44.2	35.8	6.6	8.4	7.0	33.8	11	4	28
Seed Source Genetics UA 222	864	29.2	45.1	38.6	31.9	7.0	10.7	7.0	31.6	34	4	25
PhytoGen PHY 444 WRF	846	30.9	44.9	42.6	34.5	6.5	9.2	7.2	31.2	38	5	26
NexGen NG 3406 B2XF	825	30.7	44.6	41.2	33.7	6.1	8.5	6.4	32.1	56	5	24
PhytoGen PHY 312 WRF	810	30.5	42.4	40.5	32.7	6.6	9.5	6.9	31.4	68	4	27
Seed Source Genetics HQ 210 CT	809	31.0	48.7	36.4	29.5	5.9	8.8	5.3	32.9	45	3	26
Monsanto 16R245NR B2XF	805	29.2	43.3	43.0	34.8	7.5	9.7	7.5	34.5	29	5	27
Deltapine DP 1612 B2XF	802	29.6	43.4	40.2	32.7	6.1	9.1	6.7	29.7	73	3	25
Stoneville ST 4946GLB2	784	28.9	44.4	38.3	31.7	7.5	10.7	7.1	33.9	40	5	27
Monsanto 16R246NR B2XF	779	31.1	43.6	41.8	34.3	7.1	9.2	7.0	35.1	34	4	25
PhytoGen PHY 330 W3FE	777	29.7	40.1	40.4	31.6	6.2	8.6	6.4	30.2	70	5	25
International Seed Technology BRS-335	772	29.3	46.4	38.2	31.3	7.0	9.3	6.0	36.8	49	3	25
Monsanto 16R346 B2XF	769	29.8	43.8	41.2	33.0	6.6	8.5	6.3	34.3	36	5	25
Deltapine DP 1522 B2XF	764	30.0	42.7	38.3	30.8	6.1	8.6	5.8	31.9	65	4	27
PhytoGen PHY 300 W3FE	759	28.6	40.8	42.3	32.6	6.3	7.9	6.3	32.9	73	6	25
NexGen NG 3500 XF	757	30.0	44.1	40.3	32.4	6.6	9.0	6.4	33.4	70	5	26
Deltapine DP 1845 B3XF	755	31.0	43.4	40.8	33.0	6.1	8.2	6.1	33.2	44	5	24
NexGen NG 4545 B2XF	749	29.6	43.2	42.2	34.6	5.7	8.7	6.5	30.5	65	5	29
PhytoGen PHY 490 W3FE	742	26.9	43.8	39.7	31.4	5.7	8.5	5.9	30.4	51	5	26
International Seed Technology BRS-293	730	27.7	46.0	36.9	30.0	7.2	10.8	6.7	32.2	34	4	27
PhytoGen PHY 340 W3FE	727	30.2	42.1	38.4	29.9	6.3	8.0	5.8	32.9	54	6	24
NexGen NG 3640 XF	725	29.4	43.8	40.1	31.7	6.7	9.6	6.7	31.2	49	5	28
PhytoGen PX2AX3W3FE	715	29.1	42.2	41.2	32.3	6.4	9.4	7.2	29.0	75	6	23
PhytoGen PHY 243 WRF	707	26.7	41.2	41.1	31.5	6.0	9.9	7.2	26.5	70	4	25
PhytoGen PX2A28W3FE	691	29.9	42.5	40.7	31.3	6.6	9.8	7.0	29.5	76	6	24
Seed Source Genetics UA 222 Saberex	691	27.4	44.8	38.1	30.9	6.3	10.2	6.6	29.4	30	4	23

NexGen NG 4689 B2XF	688	30.4	42.2	40.3	32.6	6.4	8.7	6.2	33.5	46	5	28
PhytoGen PX2AX4W3FE	684	27.7	42.3	38.7	29.2	6.7	9.9	6.6	29.9	73	7	23
FiberMax FM 2322GL	674	30.5	42.0	42.5	33.9	6.8	9.3	7.5	30.9	55	5	27
PhytoGen PX2AX1W3FE	653	28.5	41.2	37.0	28.4	6.3	9.0	6.0	29.9	73	7	22
FiberMax FM 1888GL	649	30.0	43.8	41.7	33.5	7.1	9.5	7.1	33.8	48	5	26
PhytoGen PX2A23W3FE	642	26.9	42.4	37.2	27.3	6.2	9.5	6.1	28.1	69	7	22
FiberMax FM 1830GLT	640	31.0	40.8	43.3	35.2	6.9	8.9	7.1	34.3	71	4	26
FiberMax FM 1911GLT	636	29.2	41.5	42.1	33.5	7.9	11.0	8.4	31.3	70	6	23
NexGen NG 3699 B2XF	631	28.0	45.4	38.5	30.8	6.8	9.4	6.2	33.8	60	6	26
PhytoGen PX2A36W3FE	630	28.8	47.1	38.4	29.4	6.7	9.7	6.3	31.4	68	7	20
PhytoGen PX2A27W3FE	627	25.9	42.4	39.3	29.5	6.7	10.1	6.7	29.5	65	6	23
PhytoGen PX2AX2W3FE	624	29.3	42.0	38.4	28.3	6.5	9.4	6.2	29.3	76	7	22
FiberMax FM 958	616	29.2	46.9	37.0	28.7	6.7	10.5	6.5	29.3	74	5	21
PhytoGen PX2A31W3FE	597	28.2	41.9	38.0	28.4	6.7	9.4	5.9	32.2	79	7	21
FiberMax FM 2334GLT	578	28.9	40.8	41.1	33.5	6.1	8.5	6.2	32.8	81	4	25
13-9-1001S	577	27.9	42.0	39.0	30.3	6.5	8.4	5.8	33.8	43	4	24
International Seed Technology BRS-286	509	25.6	43.7	43.3	34.4	6.4	9.2	6.7	32.6	49	3	25
PhytoGen PHY 764 WRF	404	25.7	42.4	38.3	29.3	5.8	9.8	6.6	25.8	18	3	23
Mean	722	29.2	43.3	40.1	31.8	6.5	9.2	6.5	31.6	55	5	25
c.v.%	11.5	4.6	5.2	2.7	3.0	4.4	2.9	4.4	4.3	16.2	17.8	6.5
LSD 0.05	97	1.6	2.6	1.8	1.6	0.5	0.5	0.5	2.3	10	1	2

TITLE:

Results of the Root-Knot Nematode (RKN) cotton variety performance test at AG-CARES, Lamesa, TX, 2017.

AUTHORS:

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

MATERIALS AND METHODS:

Plot Size:	2 rows by 30 feet
Design:	Randomized Complete Block, 4 replications
Planting Date:	May 11
Planting Pattern:	Solid
Herbicides:	Trifluralin 1.3 pt/A – Preplant incorporated
Fertilizer:	32 lbs N applied through fertigation
Irrigation in-season:	6.9 acre-inches applied May-September
Harvest Aid:	Bollbuster 2 pt/A + ETX 1 oz/A – October 6
Harvest Date:	October 22

RESULTS AND DISCUSSION:

Some locations at the AG-CARES facility provide an excellent opportunity to evaluate a number of commercial, pre-commercial; and breeding strains in small-plot replicated trials under root-knot nematode (RKN) pressure. Texas A&M AgriLife Research provides a fee-based testing service for seed companies to evaluate their products in the same test with other varieties, and allows producers access to independently generated performance data in production situations that may resemble their own.

Lint yield is determined by the stripper-harvested plot weight and a lint percentage (gin turnout) determined from a ~600g grab sample collected randomly from the harvested plot material. Boll size, and pulled and picked lint percent are determined from a 50 boll sample obtained from 2 replications of each entry. Maturity and storm resistance ratings are a visual assessment of percent open bolls and a 1(very loose, considerable storm loss) to 9 (very tight boll, no storm loss) storm resistance rating.

Forty-four cotton varieties and experimental strains, from 7 different seed companies were submitted for variety testing in a field where root-knot nematodes were known to have been present. Average yield was 1320 pounds of lint per acre with a test coefficient of variation of 9.8 and 152 pound least significant difference. Yields for the test ranged from 1655 pounds of lint per acre to 1048 pounds of lint per acre. PHY 480 W3FE allowed the lowest level of nematode reproduction in 2017 while obtaining a yield of 1655 pounds of lint per acre (Table 3). Five other varieties were not significantly different in terms of yield, these include CPS, Stoneville, and PhytoGen.

		Agronomic Properties												Nematode counts	
		% Turnout		% Lint		Boll	Seed	Lint	Seeds per	% Open Bolls	Storm			RK/500cc	Waller
Designation	Yield	Lint	Seed	Picked	Pulled	Size	Index	Index	Boll	8-Sep	Resistance	Height		Soil	Grouping
PhytoGen PHY 480 W3FE	1655	32.5	46.0	41.6	32.6	5.2	9.4	7.2	30.0	35	5	25		505	F
CPS 72510 B2XF	1622	32.6	44.6	39.5	31.8	5.4	9.0	6.7	31.8	16	5	27		3120	A-E
Stoneville ST 4946 GLB2 check	1615	30.7	47.9	38.1	31.6	6.4	10.2	6.9	35.9	35	5	28		4590	A-E
PhytoGen PX4A57W3FE	1591	33.6	43.2	43.4	34.6	5.2	8.9	7.8	28.7	39	5	26		8820	A-E
PhytoGen PX3A99 W3FE	1551	32.2	44.7	38.1	30.0	5.3	10.2	7.0	28.6	43	5	26		4500	A-E
PhytoGen PX3A82 W3FE	1539	32.6	44.9	38.1	31.2	5.3	9.2	6.4	31.4	63	5	27		1200	EF
PhytoGen PX4A54W3FE	1458	31.7	44.8	40.2	32.4	5.1	9.5	7.2	28.1	46	5	25		3090	CDEF
PhytoGen PHY 417 WRF	1453	33.0	46.1	42.9	35.3	5.0	8.4	6.9	30.9	45	4	28		1110	CDEF
Monsanto 16R246NR B2XF	1444	33.3	45.0	40.9	32.3	5.4	9.3	7.0	30.9	45	5	26		2210	DEF
Deltapine DP 1747NR B2XF	1434	32.0	42.9	43.0	33.2	5.0	9.3	7.8	27.6	16	5	29		4170	A-E
PhytoGen PHY 440 W3FE	1411	30.6	45.5	39.3	31.1	4.7	8.8	6.1	30.1	35	5	25		990	CDEF
PhytoGen PHY 340 W3FE	1405	31.1	43.7	39.4	30.4	5.0	8.5	6.1	31.9	64	5	25		4440	CDEF
PhytoGen PHY 450 W3FE	1388	30.8	45.9	39.4	31.0	4.7	9.2	6.7	27.6	48	6	25		2130	A-F
Americot AMX 1711 B3XF	1377	33.9	45.9	39.8	32.4	4.6	8.3	6.2	29.5	40	6	31		6300	A-E
Monsanto 16R245NR B2XF	1371	30.9	45.7	38.7	32.3	5.3	9.7	6.9	30.1	28	5	28		10290	A-E
PhytoGen PX3A96 W3FE	1362	30.7	45.2	38.5	30.6	5.0	9.8	6.9	27.7	61	5	26		3510	A-E
FiberMax FM 1911GLT check	1335	32.0	45.5	40.2	32.5	5.3	10.5	8.0	26.8	58	6	25		3390	A-E
PhytoGen PHY 490 W3FE	1332	30.5	45.3	38.9	31.4	4.5	9.0	6.6	26.6	38	5	24		7320	ABCD
Deltapine DP 1558NR B2RF check	1321	31.6	44.0	39.1	30.9	5.7	9.4	6.7	32.9	26	5	27		2670	DEF
CPS 72280 B2XF	1307	32.2	43.1	40.4	32.2	5.0	8.5	6.7	30.0	38	5	30		2340	A-F
PhytoGen PHY 300 W3FE	1301	30.6	44.0	40.1	32.2	5.2	10.3	7.9	26.7	58	6	26		7110	A-E
PhytoGen PX2AX4 W3FE	1296	30.4	44.8	38.0	29.5	5.8	11.2	7.7	28.8	63	5	24		3210	CDEF
NexGen NG 3640 XF	1291	30.5	47.6	37.7	30.8	5.5	9.8	6.5	31.8	50	5	27		29160	A
NexGen NG 3406 B2XF	1290	32.3	45.7	39.0	31.3	5.5	9.5	6.8	31.5	65	4	26		6750	ABCD
NexGen NG 5007 B2XF	1276	32.9	44.5	40.6	31.2	4.6	8.0	6.1	30.6	63	4	27		9210	A-E
NexGen NG 3500 XF	1272	30.2	46.8	36.4	29.3	5.2	9.1	5.8	33.0	59	6	28		21690	A
PhytoGen PHY 330 W3FE	1270	30.0	43.4	38.3	29.2	4.2	8.5	6.3	25.8	71	6	24		10980	ABC
FiberMax FM 2011GL check	1259	30.7	44.8	38.2	30.8	6.1	11.2	7.7	30.3	49	6	24		13200	A-E
NexGen NG 4689 B2XF	1256	31.4	46.7	38.7	31.6	5.4	9.1	6.4	32.4	43	5	27		28410	A
CPS 70123 B2XF	1251	30.6	45.0	38.9	31.1	5.1	7.8	5.5	35.8	31	6	30		6330	ABCD

PhytoGen PX2A28 W3FE	1235	29.6	43.9	37.9	29.7	5.2	9.8	6.7	29.4	60	6	25	1170	B-F
13-9-1001S	1233	31.2	45.6	37.8	30.4	5.0	9.0	6.0	31.6	45	4	27	25440	A
FiberMax FM 1888GL	1233	31.3	47.0	40.0	32.2	6.2	10.8	7.8	31.6	65	6	26	21150	AB
PhytoGen PX2A36 W3FE	1229	28.0	46.6	36.5	26.6	5.1	11.5	7.2	26.0	53	5	21	8040	A-E
NexGen NG 4545 B2XF	1226	31.2	46.6	38.4	31.1	5.4	9.1	6.3	33.1	48	5	30	25380	A
PhytoGen PHY 250 W3FE	1212	30.1	44.0	39.4	31.6	5.6	9.9	7.1	31.2	69	6	22	5480	A-E
13-9-1107S	1205	28.4	47.3	36.1	29.6	5.7	11.9	7.3	28.3	40	5	26	7590	ABC
13-9-218S	1153	28.0	51.2	34.3	28.1	5.2	11.2	6.4	28.2	45	5	29	11730	ABC
PhytoGen PX2A27 W3FE	1145	28.3	45.1	36.6	27.5	5.6	9.6	6.0	34.4	54	6	25	2520	B-F
PhytoGen PX2A23 W3FE	1133	27.7	44.5	35.7	27.0	5.3	10.3	6.3	29.8	58	6	24	4830	A-E
PhytoGen PX2A31 W3FE	1114	30.3	45.3	38.9	29.8	4.9	9.8	6.9	27.6	73	7	21	4770	A-E
PhytoGen PX2AX3 W3FE	1110	29.6	43.8	37.9	29.6	5.5	10.0	6.8	31.1	64	6	22	6450	A-E
PhytoGen PX2AX2 W3FE	1095	28.7	45.2	37.9	30.0	5.3	9.7	6.7	30.2	73	6	22	5490	A-E
CA 4001	1048	27.4	49.5	33.7	26.9	5.5	10.8	6.1	30.7	39	5	24	10050	ABC
Mean	1320	30.8	45.4	38.8	30.8	5.2	9.6	6.7	30.1	49	5	26		
c.v.%	9.8	2.9	2.6	1.9	2.6	4.8	7.5	6.6	6.7	27.3	13.9	7.4		
LSD 0.05	152	1.1	1.4	1.3	1.4	0.4	1.2	0.8	3.4	16	1	2	11023	

TITLE:

Small plot evaluation of cotton varieties and breeding lines with varying levels of resistance to root-knot nematodes under three different irrigation levels at AG-CARES, Lamesa, TX, 2017.

AUTHORS:

Jason Woodward – Extension Plant Pathologist
Richard Roper – Former Graduate Research Assistant
Madison Cartwright and Ira Yates – Technicians

MATERIALS AND METHODS:

Plot size: 2-rows by 35 feet, four replications

Soil type: Amarillo fine sandy loam

Planting date: May 11

Varieties: Multiple varieties

Herbicides: Trifluralin 1.3 pt/A – April 26
Roundup PowerMax 1 qt/A – June 16
Roundup PowerMax 1 qt/A – August 3

Fertilizer preplant: 42-40-0
Fertilizer in-season: Low – 64-0-0
Base – 96-0-0
High – 128-0-0

Irrigation in-season: LEPA

	Low	Base	High
Preplant	2.3”	2.3”	2.3”
In Season	3.9”	5.7”	7.5”
Total	6.2”	8.0”	9.8”

Harvest Date: October 23

RESULTS AND DISCUSSION:

Overall, the use of resistant varieties reduced root-knot reproduction compared to the susceptible varieties. Reductions were lowest for varieties that contain two resistance genes, such as PHY 417WRF, DP 1747B2XF, DP 1558B2RF, and a few experimental varieties from Deltapine (data not shown). In addition, nematode galling differed among varieties with higher levels of galling occurring on the susceptible varieties PHY 499WRF, NG 3406B2XF, FM 1830GLT, FM 1888GL and NG 1511B2RF (data not shown). Irrigation level had little effect on nematode reproduction, whereas, nematode damage was more severe under drought conditions. Differences in lint yield were observed between varieties and performance differed across irrigation levels. All varieties except DP 1747NRB2XF and NG 1511B2RF responded to the addition of irrigation. When averaged across irrigation levels, yields for partially resistant varieties, such as ST 4946GLB2 and FM 2011GT increased by 11 and 15% over susceptible and resistant cultivars, respectfully. Yield of resistant varieties may have been limited due to reduced heat units late in the season that impacted maturity, as the majority of varieties possessing dual gene resistance are later maturing. Additional studies evaluating these and other cotton varieties under varying irrigation levels are needed.

Table 1. Effect of variety and irrigation level on lint yield under moderate nematode pressure at AG-CARES, 2017

Variety	Low (6.2")		Base (8.0")		High (9.8")		Variety mean
	- (lb ac^{-1}) -						
ST 4946	1,331	a	1,689	a	1,434	b-e	**1,485**
FM 2011	1,027	c-g	1,481	ab	1,870	a	**1,459**
DP 17R246	1,271	ab	1,337	bcd	1,546	a-e	**1,385**
PHY 499	1,053	b-f	1,412	abc	1,565	a-e	**1,343**
PHY 487	1,075	b-f	1,282	b-e	1,667	abc	**1,341**
FM 1832	1,101	d-h	1,334	bcd	1,586	a-e	**1,340**
NG 1511	1,226	abc	1,125	def	1,638	a-d	**1,330**
FM 1888	857	fgh	1,385	bcd	1,663	abc	**1,302**
DP 17R945	1,119	a-e	1,415	abc	1,358	cde	**1,297**
DP 17R946	803	h	1,284	bcd	1,719	bcd	**1,269**
FM 1830	956	d-h	1,279	b-e	1,536	a-e	**1,257**
DP 17R931	1,168	a-d	1,221	b-e	1,343	cde	**1,244**
DP 17R245	1,048	c-f	1,291	bcd	1,376	b-e	**1,238**
DP 17R924	1,012	c-h	1,252	b-e	1,413	b-e	**1,226**
DP 1558	1,017	c-h	1,115	def	1,454	b-e	**1,195**
DP 17R933	1,031	c-g	1,132	c-f	1,352	cde	**1,172**
NG 3406	943	e-h	1,168	c-f	1,384	b-e	**1,165**
FM 1911	938	e-h	1,202	b-e	1,301	de	**1,147**
PHY 417	812	gh	997	ef	1,547	a-e	**1,119**
DP 1747	1,143	a-e	908	f	1,266	e	**1,106**
Trial mean	**1,042**		**1,265**		**1,501**		**--**
$LSD_{(0.05)}$	**220**		**286**		**356**		**--**

TITLE:

Effect of nematicide treatments on root-knot nematode in cotton at AG-CARES, Lamesa, TX, 2017.

AUTHORS:

Terry Wheeler – Professor
Jimmy Grant, Zachary Hilliard, Cecil Haralson – Research Assistants

MATERIALS AND METHODS:

Plot Size:	4 rows by 36 feet
Planting Date:	May 11
Variety:	Stoneville 4946 GLB2
Treatments:	None Copeo Velum Total (14 oz/a) Velum Total (18 oz/a) Aeris + Velum Total (14 oz/a) Aeris + Velum Total (18 oz/a) Copeo + Velum Total (10 oz/a) Copeo + Velum Total (14 oz/a) Aeris + Copeo Propulse (7.5 oz/a) Propulse (10 oz/a)
Location:	Wedge 4, Span 8, Base Irrigation

RESULTS AND DISCUSSION:

Plant stands were good overall, but the in-furrow application of Propulse at 10 oz/acre did reduce stands, and even the lower rate (7.5 oz/a) tended to have lower stands (Table 1). There were a high number of root-knot nematode galls across all treatments indicating that nematicide control was not that strong. Root-knot nematode densities were in the moderate to high range. Lint yield was improved by the in-furrow application of Velum Total at 14 and 18 oz/acre compared to the no nematicide treatment (Table 1). The 14 oz/acre treatment (applied with seed that had no nematicide treatment), which costs approximately $27/acre, increased yield over the no nematicide treatment by 263 lbs of lint/acre. Propulse is a fungicide which has shown activity on nematodes. However, when applied as an in-furrow treatment at planting, appears to be somewhat phytotoxic to the seed/emerging seedlings.

Table 1. Effect of nematicide treatments on cotton infected with root-knot nematodes.

Treatment	Plants/ foot	Galls	RK[2]/ 500 cc soil	Lint Yield (lbs/acre)
None	2.57 ab[1]	16.6	4,500	1,098 b
Copeo	2.69 ab	15.9	3,090	1,206 ab
Velum Total (14 oz/a)	2.85 a	20.0	6,300	1,361 a
Velum Total (18 oz/a)	2.67 ab	11.7	2,220	1,342 a
Aeris + Velum Total (14 oz/a)	2.87 a	20.8	4,200	1,309 a
Aeris + Velum Total (18 oz/a)	2.63 ab	17.0	3,270	1,229 ab
Copeo + Velum Total (10 oz/a)	2.61 ab	14.5	4,980	1,239 ab
Copeo + Velum Total (14 oz/a)	2.83 a	15.9	2,835	1,095 b
Aeris + Copeo	2.79 a	22.0	6,060	1,243 ab
Propulse (7.5 oz/a)	2.43 ab	15.8	5,220	1,244 ab
Propulse (10 oz/a)	2.28 b	12.5	5,520	1,220 ab

[1]Means followed by the same letter are not significantly different at P=0.05, based on T-test comparisons.
[2]Root-knot nematodes

TITLE:

Demonstrating Soil Health Promoting Practices to Increase Water Holding Capacity and Lint Yield in Deficit-Irrigation Agriculture, AG-CARES, Lamesa, TX 2017.

AUTHORS:

Katie Lewis – Assistant Professor
Paul DeLaune – Associate Professor
Wayne Keeling – Professor
Dustin Kelley – Research Assistant
Joseph Burke – Graduate Research Assistant

MATERIALS AND METHODS:

Location:	AG-CARES, Lamesa, TX
Plot Size:	16 rows by 250 ft, 3 replications
Design:	Randomized complete block
Row Spacing:	40”
Cover Crop Seeding Dates:	2 December 2014; 4 November 2015; 12 December 2016; and, 17 November 2017
Termination:	10 April 2015; 11 March 2016; and, 3 April 2017
Cotton Planting Dates:	13 May 2015; 24 May 2016; and, 5 May 2017
Cotton Harvest:	28 October 2015; 22 November 2016; and, 7 November 2017
Variety:	DP 1321 planted at 53,000 seed/acre
Fertility:	120 lb N/A as 32-0-0 and 34 lb P_2O_5/A as 10-34-0
Rainfall:	12.4” (2015); 13” (2016); and, 10.5” (2017)
Irrigation:	7.1” (2015); 5.1” (2016); and, 8.0” (2017)

This research aims to evaluate the effects of incorporating single and mixed species cover crops into long-term, reduced tillage cotton systems. We are evaluating how soil health promoting practices can improve water use efficiencies under deficit irrigation without compromising crop yields and/or economic returns. 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. Cover crops were planted using a no-till drill on 12 December 2016 and were chemically terminated 3 April 2017 using Roundup PowerMAX (32 oz/acre). Prior to termination, cover crops were harvested on 27 March 2017 from a 1 m^2 area to calculate biomass, nitrogen uptake, and C to N ratios. Soil core samples were collected 7 April 2017 to a depth of 24 inches from each demonstration plot and analyzed for total C and N, organic C, nitrate-N, Mehlich III extractable macronutrients, and sodium, and pH and electrical conductivity. 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 in all plots on 5 May 2017 at a seeding rate 53,000 seed/acre. Cotton was harvested on 6 November 2017. After cotton harvest the no-till plots were drilled with cover on 17 November 2017. Soil moisture measurements were collected via neutron attenuation with access tubes installed within each plot to a depth of approximately 60 inches. Readings were taken at 8-inch increments and every two weeks throughout the year unless rainfall inhibited our ability to get into the field.

RESULTS AND DISCUSSION:

Soil Characteristics

Soil organic C (SOC) was greater with the no-tillage, mixed cover crop treatment at the 0-6” depth followed by the no-till, rye cover crop and conventional tillage treatments prior to planting cotton in May 2016 and 2017 (Fig. 1). From 2015 to 2017, a greater increase in SOC has been determined for the no-till, mixed cover treatment compared to the no-till, rye cover treatment. This may be the result of greater microbial biomass and activity with a mixed cover crop compared to a single species cover crop. Differences of SOC were not determined between treatments at the 6-24” depth. In 2017 and at this deeper depth, SOC averaged 0.28%, 0.34%, and 0.32% with the conventional tillage, no-till with rye cover, and no-till with mixed cover treatments, respectively.

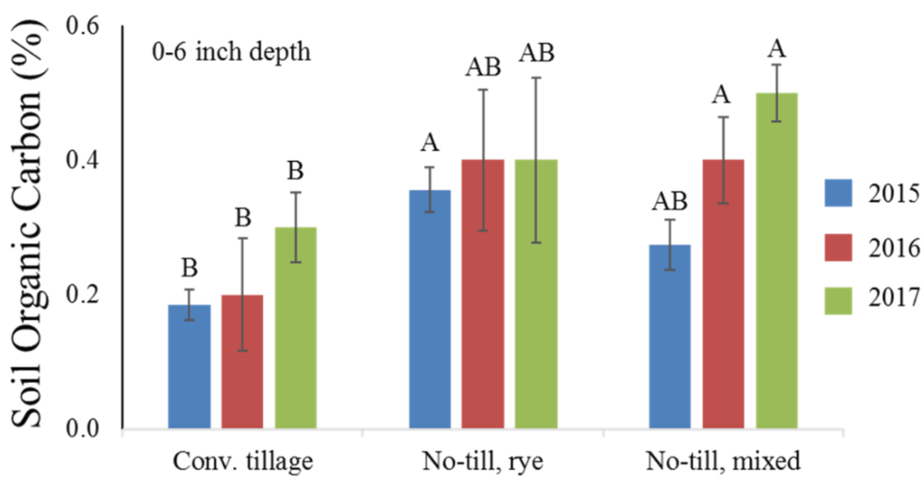


Figure 1. Soil organic C levels under conventional tillage, no-till with rye cover, and no-till with mixed cover management practices at Lamesa, TX. Bars represent standard deviation of the sample mean. Mean values with the same letter within year are not significantly different at $P < 0.05$.

Nitrate-N, potassium (K), and calcium (Ca) concentrations were greater under no-till compared to conventional tillage at the 0-6" depth (Table 1). Phosphorus was greater with the no-till, mixed cover crop treatment compared to the conventional tillage treatment at the 6-24" depth. Calcium and Na were greater at the deeper depth with the conventional tillage treatment compared to the no-till treatments. The no-till with mixed cover crop treatment decreased soil pH to 7.0 compared to the conventional tillage treatment (pH of 7.6) but not the no-till with rye cover crop treatment at the 0-6" depth. Soil pH differences were not determined in the 6-24" depth. Electrical conductivity was greater in the no-till treatments compared to the control.

Table 1. Soil pH and electrical conductivity (EC) and extractable macronutrient and sodium concentrations under conventional tillage (winter fallow), no-tillage with rye cover, and no-tillage with mixed cover at depths of 0-6 inch and 6-24 inch. Samples were collected prior to planting cotton in 2017. Means within soil parameter and depth followed by the same letter are not significantly different at $P < 0.05$.

Management Practice	Depth	pH	EC	TN	Nitrate-N	P	K	Ca	Mg	S	Na
	inch	----	µmhos/cm	mg/kg							
Winter Fallow	0-6	7.6 A	154 B	338 B	2.5 B	35	257 B	591 B	636	10 B	47 AB
(conv. tillage)	6-24	7.9	203	493	1.1	10 b	232	1149 a	848	14	96 a
Rye Cover	0-6	7.2 AB	192 A	638 A	4.5 A	39	334 A	688 A	688	13 AB	47 A
(no-tillage)	6-24	7.6	188	478	0.4	13 ab	276	765 b	859	17	68 b
Mixed Cover	0-6	7.0 B	204 A	634 A	6.3 A	49	353 A	713 A	671	20 A	40 B
(no-tillage)	6-24	7.7	160	428	0.3	18 a	289	728 b	814	10	45 c

Cover Crop Aboveground Biomass

Aboveground cover crop biomass (or herbage mass) was not significantly different between no-till with rye cover and no-till with mixed cover crop treatments in 2015 and 2016, but differences were determined in 2017 with the rye cover crop treatment producing greater aboveground biomass (4,172 lb/acre, dry weight basis) compared to the mixed cover crop treatment (3,529 lb/acre; Fig. 2). In 2015 and 2016, the rye cover crop tended to produce more biomass 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.

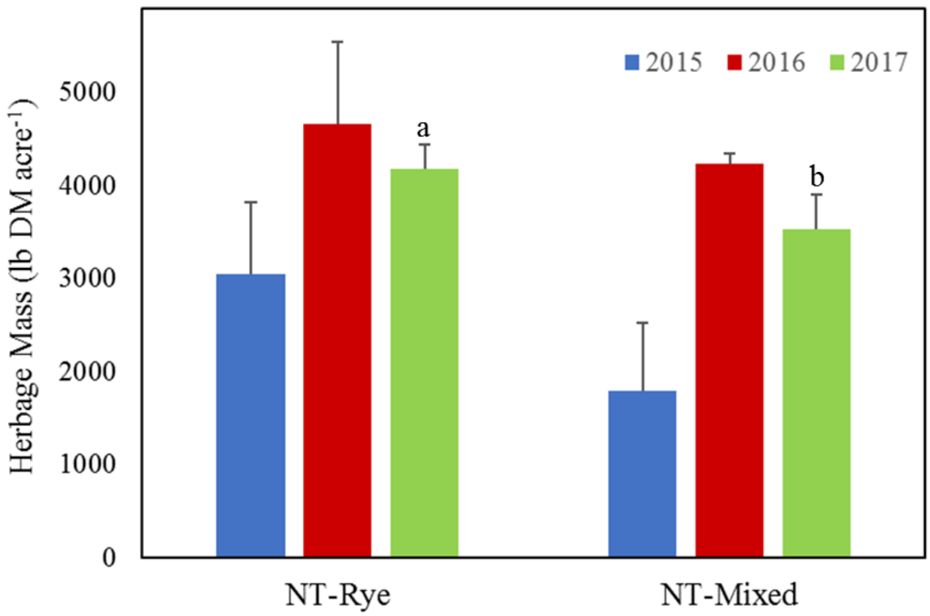


Figure 2. Herbage mass of rye and mixed cover crops harvested in 2015, 2016, and 2017 with the no-till treatments at Lamesa, TX. Bars represent standard deviation of the sample mean. Treatment means in 2017 with the same letter are not significantly different at $P < 0.05$.

Soil Moisture

Stored soil moisture was greatest in the conventional tillage treatment (CT) prior to cover crop termination in 2015, 2016, and 2017 compared to the no-till treatments (Fig. 3). During the cropping season, soil moisture was greatest in the no-till treatments (NT-Mixed and NT-Rye) where greater soil cover provided by cover crop residue likely increased water capture and reduced evaporation losses. Organic matter and reduced tillage can improve soil structure increasing infiltration and percolation while decreasing evaporation from the soil surface. The no-till treatments were better able to respond to precipitation events through increased infiltration and moisture storage.

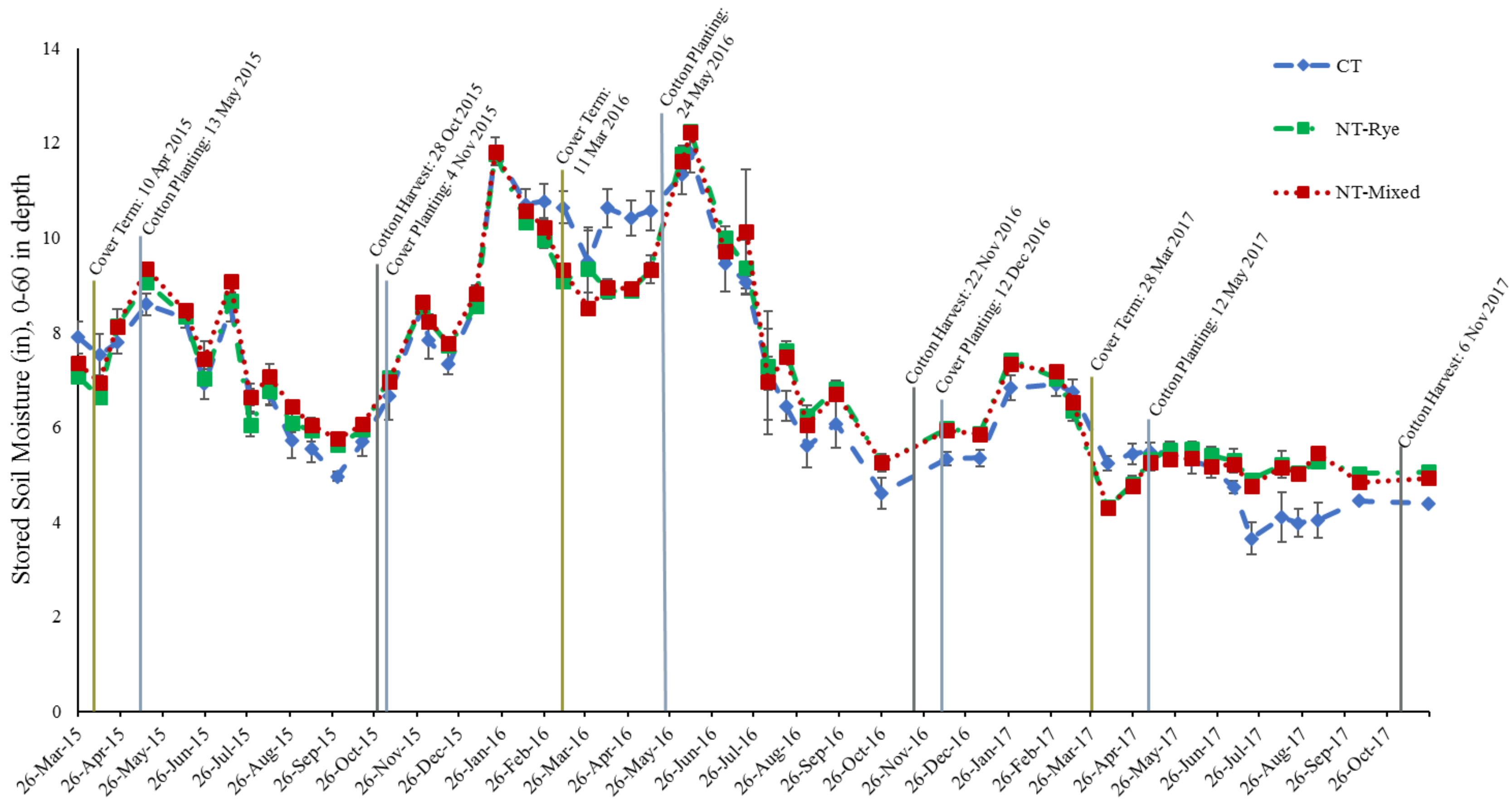


Figure 3. Stored soil moisture measured from March 2015 to October 2017 to a depth of 60 inches under conventional tillage (CT), no-till with mixed cover (NT-Mixed), and no-till with rye cover (NT-Rye) in Lamesa, TX. Bars represent standard deviation of the sample mean.

Lint Yield

Lint yield was greater in the conventional tillage treatment followed by no-till, mixed cover and no-till, rye cover treatments in 2016 and 2017 (Fig. 4). 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.

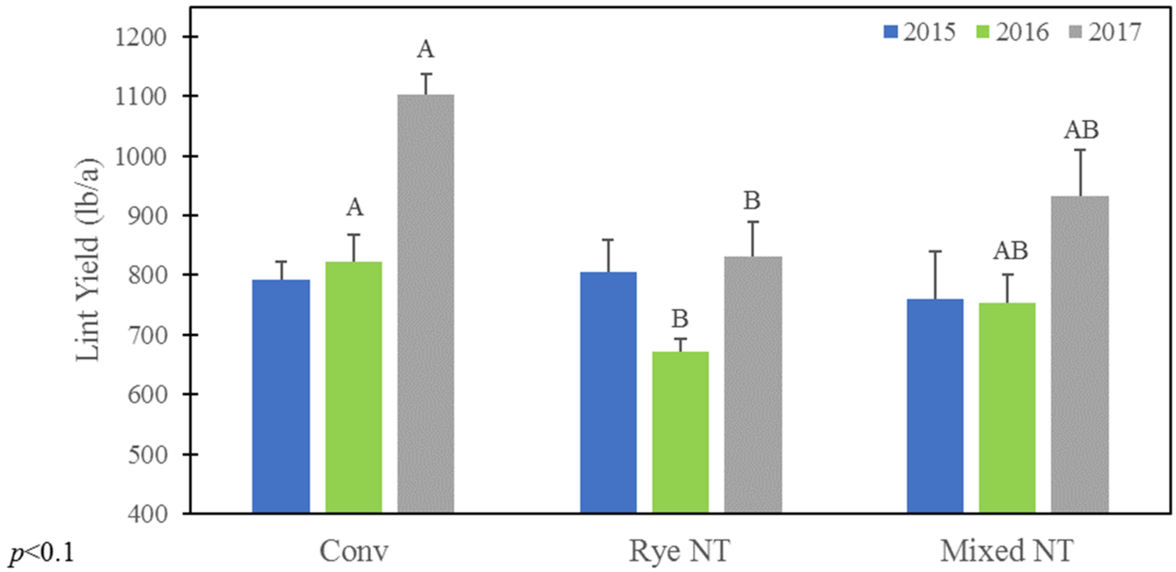


Figure 4. Lint yield with conventional tillage (Conv), no-till with rye cover (Rye NT), and no-till with mixed cover (Mixed NT) treatments in Lamesa, TX for 2015, 2016 and 2017. Bars represent standard deviation of the sample mean. Mean values within year with the same letter are not significantly different at $P < 0.1$.

By implementing reduced tillage and cover crops, SOC has increased from 0.2% to 0.4%. This increase has been a slow process taking nearly 19 years. While the benefits of conservation practices to soil have been observed, cotton lint yield has not been consistent from one year to the next. While cover crops do reduce stored soil water, timely rainfall and irrigation reduces water deficits at cotton planting. Nitrogen and P immobilization may be reason for reduced lint yield for cotton planted into rye but not the mixed cover. Not only is timely termination important for soil water dynamics but also nutrient cycling and availability. Increasing the length of time between cover crop termination and planting cotton may have a positive effect on cotton growth and development.

TITLE:

Cover crop management with wheat and rye at AG-CARES, Lamesa, TX, 2017.

AUTHORS:

Ray White – Graduate Research Assistant
Wayne Keeling – Professor
Katie Lewis – Professor
Justin Spradley – Research Assistant

MATERIALS AND METHODS:

Plot Size:	4 rows by 40-50 feet, 4 replications
Cover Crop Planting Date:	December 12, 2016
Cover Crop Terminations:	March 27, 2017 April 10
Cotton Planting Date:	May 24
Variety	NexGen 4545 B2XF
Herbicides:	2,4-D 1 qt/A – March 2 Prowl 3 pt/A – April 27 Roundup PowerMax 1 qt/A – June 15 Roundup PowerMax 1qt/A – August 3
Fertilizer:	138-40-0
Irrigation:	Preplant 3.4” In Season 5.7” Total 6.9”
Harvest Date:	October 20

RESULTS AND DISCUSSION:

Cover crops can reduce wind and sand damage to emerging cotton plants and improve soil health and quality. On the Texas High Plains, questions remain regarding cover crop water use and its subsequent effect on cotton lint yield. Studies were initiated in December 2016 at the AG-CARES location to evaluate management factors that could affect cover crop biomass production and effects on cotton yield compared to conventional tillage with no cover crop. The objective of the study was to determine effects of winter cover crop species (wheat and rye) at two seeding rates (30 lbs/A and 60 lbs/A) and two termination dates on biomass production, cotton stand establishment, soil water content, and cotton lint yield.

Soil water content was similar at each depth for any of the cover crop treatments. At the 12-24” depth, soil water content was greater in the conventional tillage than in any cover crop treatment (Figure 1). At the early termination timing, rye tended to produce greater biomass compared to wheat. At the late termination timing, biomass production was not affected by cover crop species or seeding rate (Figure 2). Cotton populations were in an acceptable range with all treatments for optimum cotton production (Figure 3). Species or seeding rate did not affect yield. However, lower yields resulted with the later termination date. Cotton yields were not greater with cover crops compared to conventional tillage (Figure 4).

Figure 1. Effect of cover crop species, planting rate, and termination date on gravimetric water content at cotton planting at three depths.

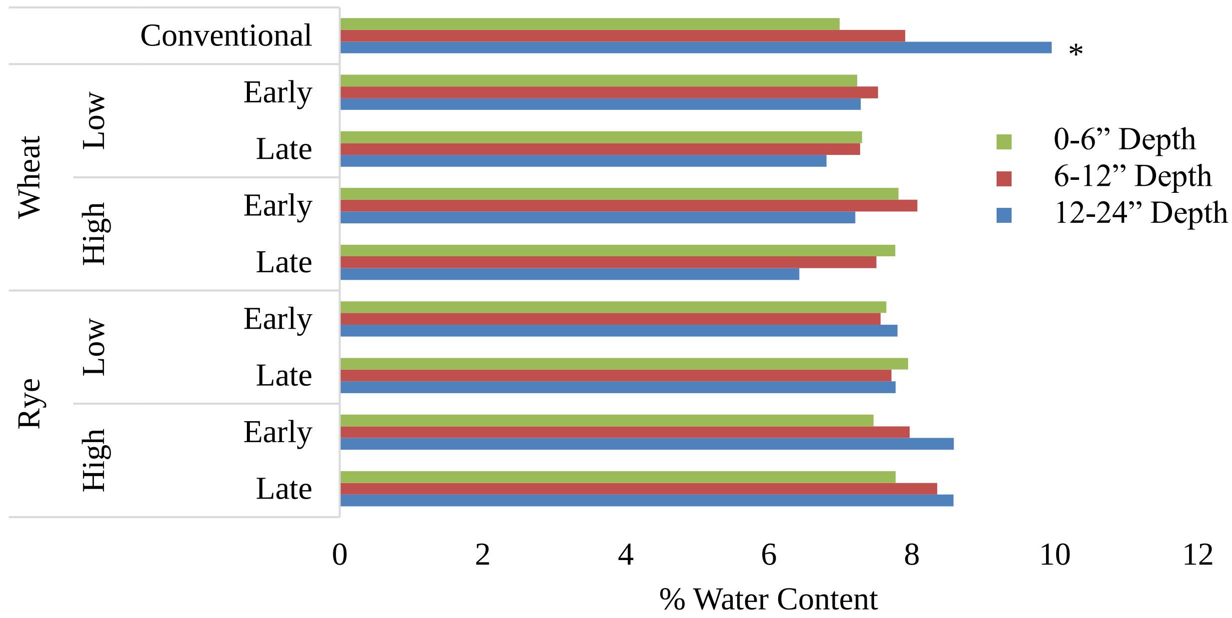


Figure 2. Effect of cover crop species, planting rate, and termination date on aboveground biomass production at three collection dates.

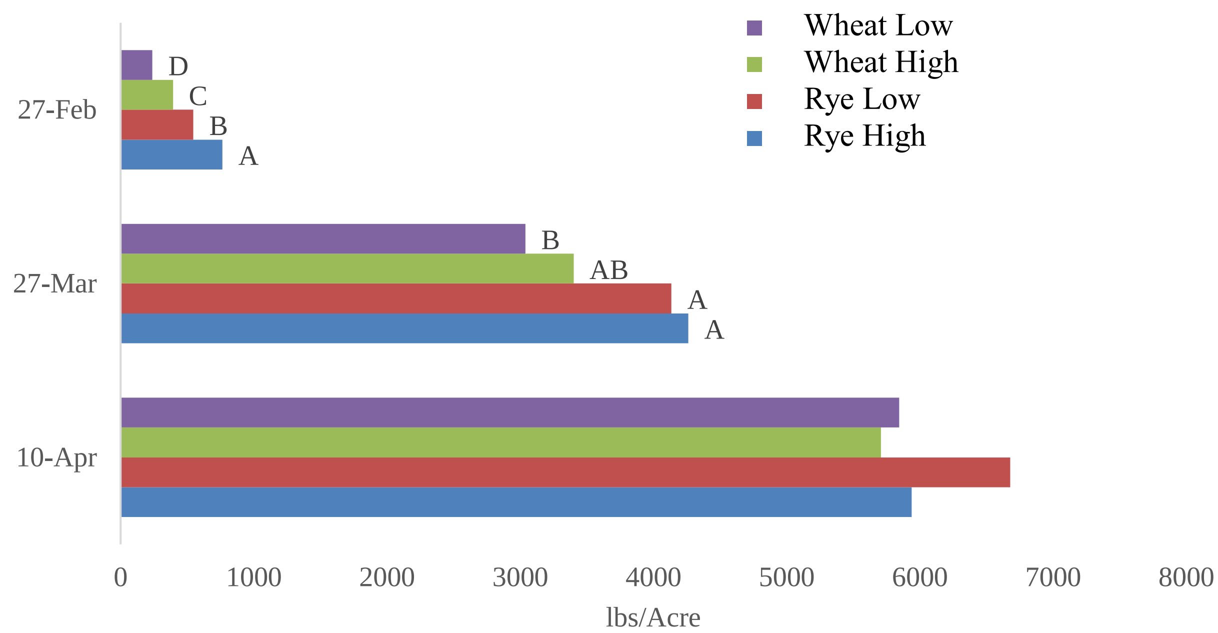


Figure 3. Effect of cover crop species, planting rate, and termination date on cotton plant populations.

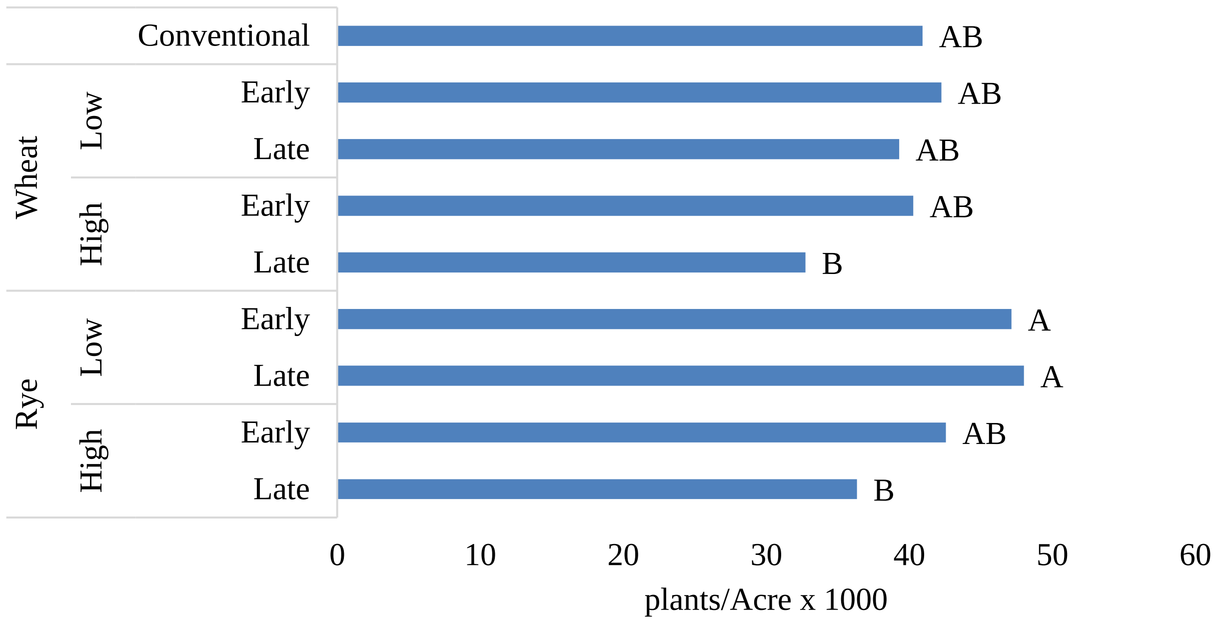
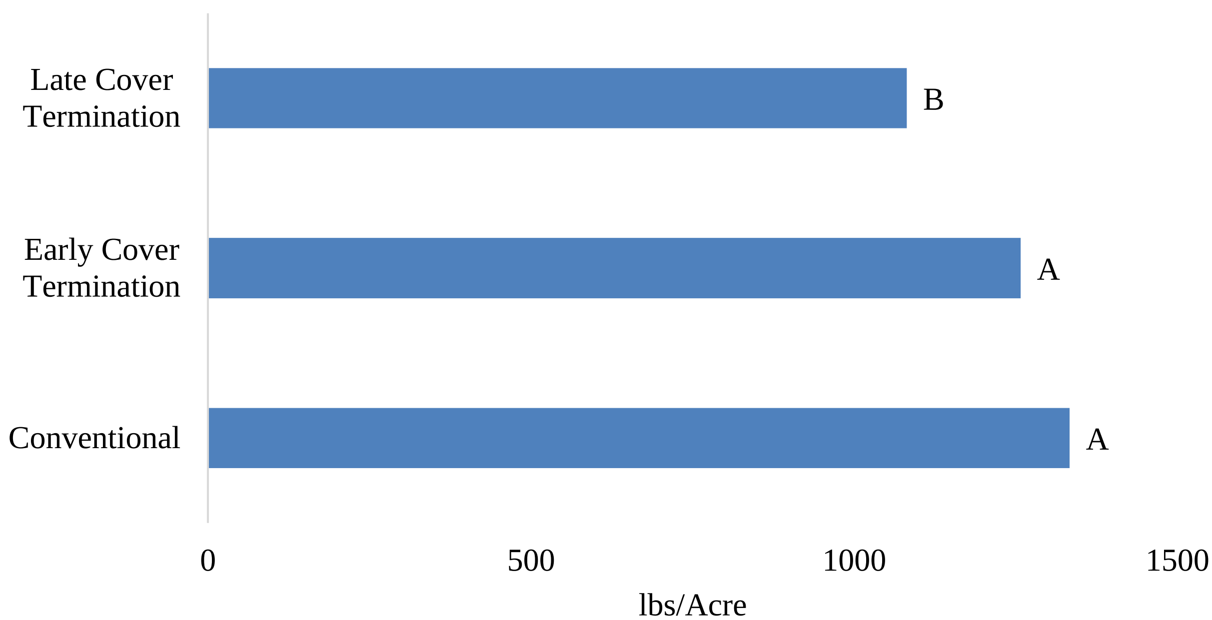


Figure 4. Effect of cover crop termination timing on cotton lint yield.



TITLE:

Cotton tolerance to Outlook applied preemergence to cotton at AG-CARES, Lamesa, TX, 2017.

AUTHORS:

Wayne Keeling – Professor
Justin Spradley and Ray White – Research Assistant and Graduate Research Assistant

MATERIALS AND METHODS:

Plot Size:	4 rows by 30 feet, 4 replications
Planting Date:	May 11
Varieties:	Stoneville 4946 GLB2
PRE Application Date:	May 11
Treatments:	Warrant 48 OZ/A Warrant 96 OZ/A Outlook 10 OZ/A Outlook 20 OZ/A Outlook 30 OZ/A Outlook 10 OZ/A + Prowl H2O 32 OZ/A
Irrigation in-season:	LEPA Preplant 1.0” In Season 6.8” Total 7.8”
Harvest Date:	October 20

RESULTS AND DISCUSSION:

The increasing problems with glyphosate-resistant Palmer amaranth have renewed interest in preemergence (PRE) herbicides as part of an overall weed management system. Concerns about crop response to PRE applications exist, especially on coarse-textured soils. Outlook (dimethenamid-P) herbicide is now registered postemergence (POST) in cotton. Field studies were conducted at AG-CARES in 2017 to evaluate PRE use of Outlook in cotton under weed-free conditions. The purpose of this trial was to evaluate cotton response to Outlook herbicide applied PRE at varying rates, alone or in combination with Prowl H_2O at the Lamesa location with an Amarillo fine sandy loam soil. Effects of PRE herbicide treatments on cotton populations, crop response, and yield are summarized in Figures 1, 2, and 3. Outlook at rates above 10 oz/A injured cotton 20-30% (stand loss, stunting) at 21 DAP. The injury declined as the season progressed, but was still evident at 42 DAP. Cotton lint yield was not reduced by any treatment. Although injury was not seen, other trials would suggest that because of crop response concerns, Outlook can effectively and safely be used POST in combination with glyphosate, glufosinate, or approved dicamba or 2,4-D formulations and not as a PRE herbicide treatment.

Figure 1. Effect of herbicide treatments on cotton plant populations.

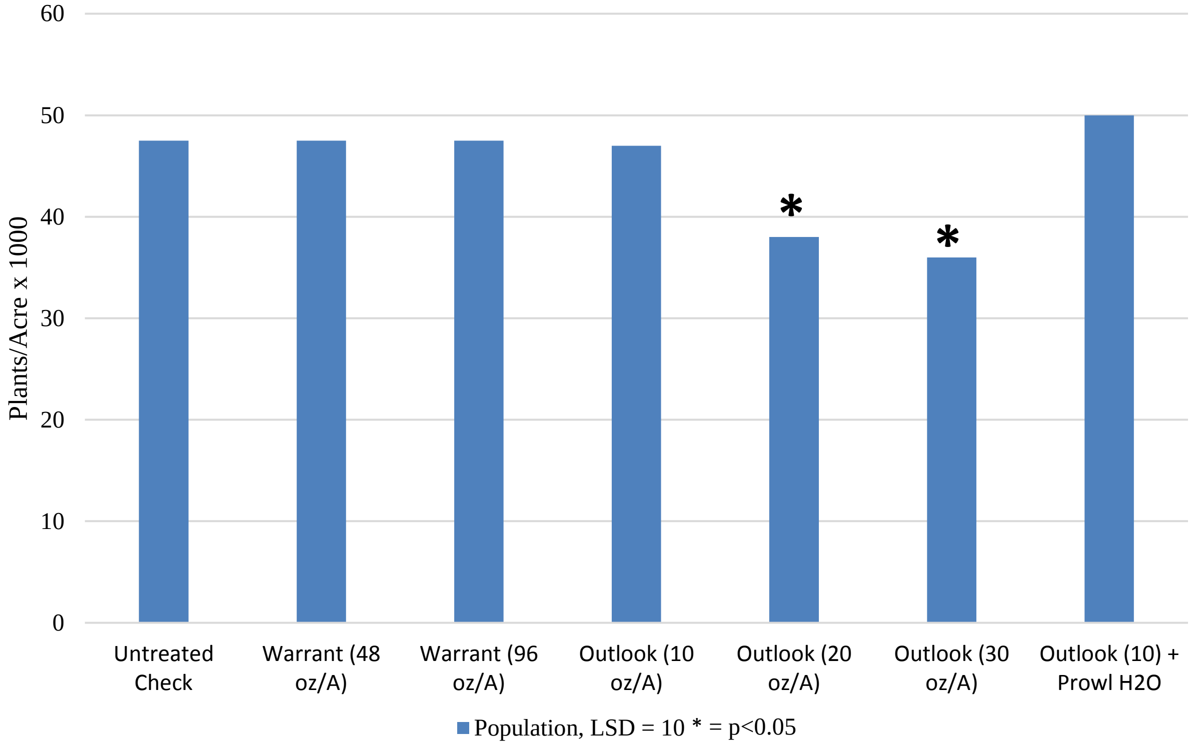


Figure 2. Effect of herbicide on cotton injury.

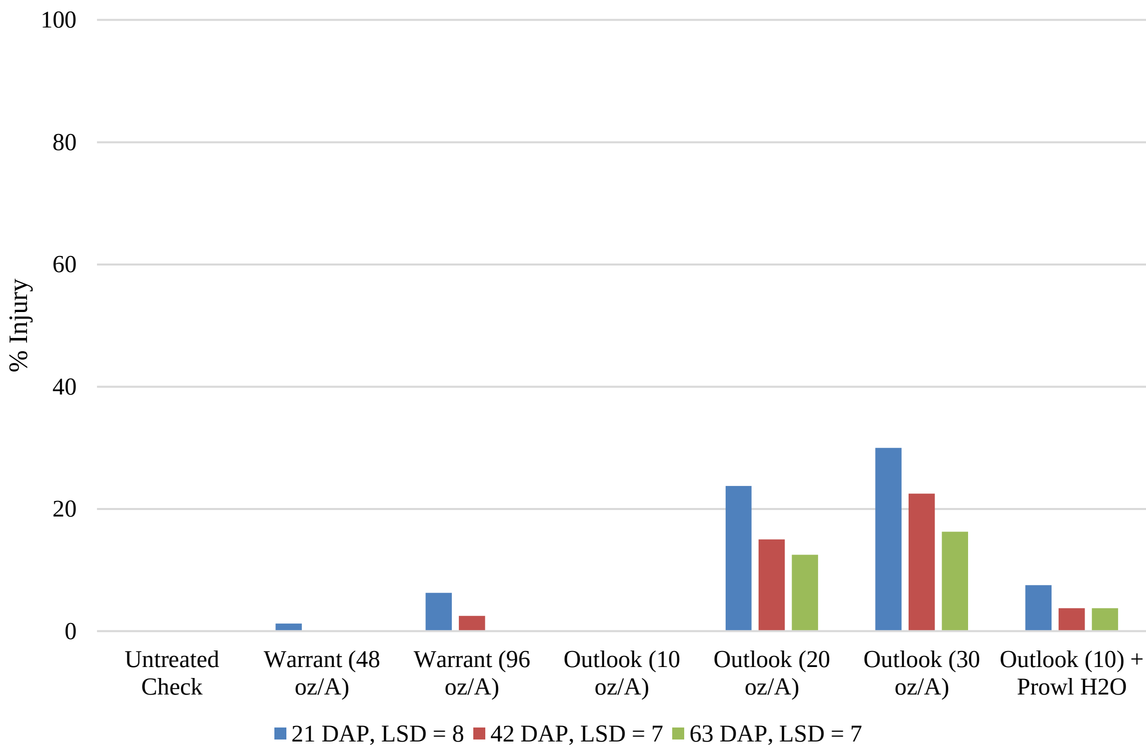
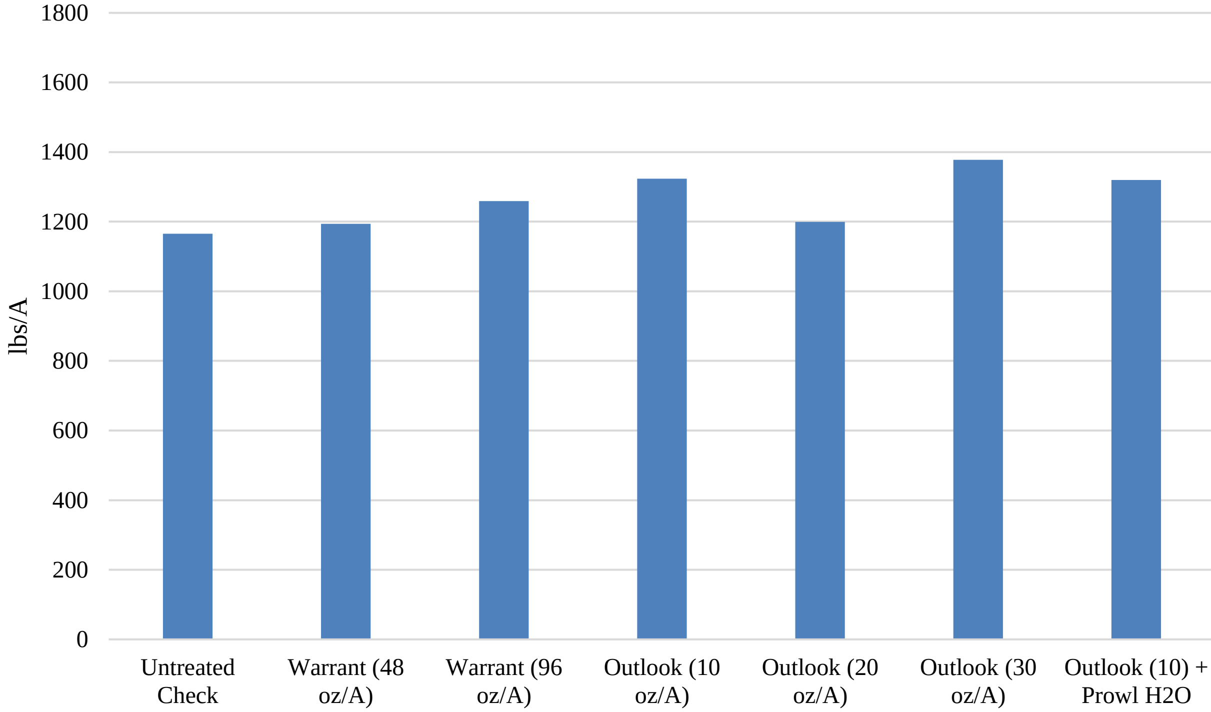


Figure 3. Effect of herbicide on cotton lint yield.



	January			February		
Day	Max Temp	Min Temp	Precipitation	Max Temp	Min Temp	Precipitation
1	72	33	-	74	30	-
2	67	33	0.28	67	27	-
3	61	38	-	50	24	-
4	54	28	-	47	24	-
5	50	24	-	53	25	-
6	33	13	-	78	32	-
7	24	10	-	77	36	-
8	38	10	-	75	43	-
9	58	23	-	79	32	-
10	78	31	-	71	32	-
11	68	40	-	85	38	-
12	78	38	-	91	39	-
13	70	33	-	60	34	0.36
14	38	31	0.11	39	34	0.90
15	34	31	0.25	41	32	-
16	41	31	0.58	56	32	-
17	60	33	-	62	33	-
18	46	34	0.14	71	37	-
19	57	37	-	72	40	-
20	65	37	-	68	38	0.03
21	63	39	-	69	38	-
22	57	39	-	79	40	-
23	61	30	-	85	42	-
24	71	30	-	80	35	-
25	66	33	-	62	26	-
26	53	20	-	56	26	-
27	51	20	-	67	34	-
28	42	23	-	75	34	-
29	52	25	-			
30	63	28	-			
31	70	28	-			

	March			April		
Day	Max Temp	Min Temp	Precipitation	Max Temp	Min Temp	Precipitation
1	76	37	-	87	41	0.75
2	58	28	-	63	42	-
3	62	26	-	54	42	-
4	62	31	-	79	42	-
5	64	40	-	74	39	-
6	79	52	-	66	36	-
7	80	40	-	75	36	-
8	64	35	-	78	46	-
9	78	35	-	92	48	-
10	81	44	-	89	55	-
11	67	44	-	75	50	-
12	72	36	-	76	50	-
13	58	36	-	70	51	1.40
14	69	37	-	77	52	-
15	81	37	-	76	57	-
16	74	39	-	82	57	-
17	86	44	-	83	52	-
18	88	44	-	80	52	-
19	81	48	-	85	52	-
20	87	50	-	89	57	-
21	94	51	-	86	57	-
22	94	50	-	90	46	-
23				66	39	-
24	79	46	-	71	41	-
25	71	42	-	91	4	-
26	75	42	-	89	53	-
27	79	41	-	70	44	-
28	76	41	-	88	44	-
29	83	43	0.03	86	48	-
30	54	36	-	55	35	-
31	80	36	-			

	May			June		
Day	Max Temp	Min Temp	Precipitation	Max Temp	Min Temp	Precipitation
1	66	35	-	85	55	-
2	81	37	-	83	60	0.28
3	93	46	-	81	62	0.16
4	76	43	-	84	60	-
5	77	41	-	84	60	-
6	83	40	-	89	60	-
7	92	52	-	89	60	-
8	89	58	-	92	63	-
9	80	58	-	92	62	0.26
10	81	63	-	95	62	-
11	85	45	-	99	65	-
12	79	45	0.09	100	68	-
13	79	49	-			
14	88	49	-			
15				100	66	-
16	92	70	-	103	66	-
17	93	51	-	106	66	-
18	86	50	-	111	66	-
19	90	54	-	86	67	-
20	87	50	-	88	67	-
21	79	50	-			
22	72	51	-	100	67	0.07
23	78	51	-	101	67	-
24				105	63	1.00
25	85	55	-	86	63	1.25
26	702	55	-			
27	98	61	-	82	59	-
28				89	66	-
29				95	66	-
30				107	67	0.40
31	88	55	-			

	July			August		
Day	Max Temp	Min Temp	Precipitation	Max Temp	Min Temp	Precipitation
1	105	60	0.40	87	66	0.63
2	92	59	0.25	81	65	0.40
3	95	65	-	85	62	-
4	99	70	0.32	88	62	-
5	100	65	0.04	91	66	-
6	89	62	0.05	97	67	-
7	91	62	-	98	68	0.06
8	93	63	-	84	68	0.01
9	96	62	-	83	64	-
10	97	65	-	92	62	-
11	97	65	-			
12	95	67	-	96	67	0.96
13	95	66	-	86	67	1.20
14	93	65	-	94	63	-
15	92	65	-	94	63	-
16	95	66	-	83	66	-
17	96	64	-	96	65	-
18	98	64	-			
19	96	67	-			
20	97	66	-	95	65	0.60
21	98	66	-	96	65	0.58
22	100	66	-	90	66	-
23	100	68	-	93	65	0.28
24	95	67	-	85	65	-
25	99	67	-	85	66	-
26				87	66	-
27	99	70	-	86	61	-
28	100	68	-	87	62	-
29	98	65	-	87	57	-
30	100	74	-	86	54	-
31	96	70	-	86	54	-

	September			October		
Day	Max Temp	Min Temp	Precipitation	Max Temp	Min Temp	Precipitation
1	86	54	-	63	57	0.10
2	88	56	-	76	61	-
3	94	57	-	82	63	-
4	89	60	-	77	66	-
5	92	62	-	78	67	0.04
6	84	53	-	83	65	-
7	84	53	-	87	52	-
8	86	53	-	79	46	-
9	86	55	-	89	46	-
10	85	55	-	72	43	-
11	85	52	-	63	42	-
12	89	52	-	73	42	-
13	95		-	85	52	-
14	97	62	-	88	57	-
15	99	62	-	90	49	0.75
16	98	63	-	68	36	-
17	95	68	-	68	36	-
18	96	63	-	77	40	-
19	95	63	-	83	44	-
20	99	63	-	73	50	0.04
21	100	63	-	77	50	-
22	97	66	-	84	42	-
23	90	66	-	70	39	-
24	86	63	-	80	39	-
25	77	64	1.25	67	38	-
26	78	61	-	77	38	-
27	62	57	-	83	41	-
28	62	57	-	51	31	-
29	61	56	-	60	31	-
30	62	56	-	76	36	-
31				59	38	-

	November			December		
Day	Max Temp	Min Temp	Precipitation	Max Temp	Min Temp	Precipitation
1	57	38	-	61	36	-
2	81	38	-	68	36	-
3	83	39	-	68	38	-
4	79	39	-	73	47	-
5	88	53	-	77	35	-
6	88	45	-	48	35	-
7	77	43	-	36	30	0.25
8	59	32	0.68	35	24	-
9	41	30	0.02	53	24	-
10	57	30	-	62	27	-
11	53	37	-	68	27	-
12	68	45	-	71	26	-
13	56	47	-	58	26	-
14	59	47	-	69	26	-
15	77	46	-	50	27	-
16	65	41	-	53	28	-
17	66	40	-	50	28	-
18	85	45	-	60	31	-
19	60	24	-	66	28	-
20	57	24	-	66	30	-
21	69	25	-	70	30	-
22	70	29	-	71	28	-
23	59	29	-	35	17	-
24	76	33	-	64	30	-
25	80	40	-	40	20	-
26	71	34	-			
27	67	34	-			
28				28	18	-
29	78	33	-	52	26	-
30	61	33	-	65	27	-
31				31	22	-