2013 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 14-1

Texas A&M AgriLife and Research and Extension Center of Lubbock
1102 E. FM 1294
Lubbock, TX 79403-6603

Most of our South Plains producers saw some improvement in crop production in 2013 as compared to the two previous years. Most reported better than expected yields of cotton and there were sorghum yields that were exceptional in some areas. At the close of 2013, some areas especially south of Lubbock received significant moisture but, to date, 2014 has not provided the moisture we always hope will occur.

Our continued partnership with Lamesa Cotton Growers jointly operating AG-CARES will celebrate the 24th year in 2014. Our goal has been and will continue to be to provide growers timely information on varieties, cropping systems, disease, insects, and economics that will help them remain competitive in the global market.

One of the major issues emerging in 2011 and now definitely verified was glyphosate resistance in Palmer amaranth (pigweeds). This has not been a problem at AG-CARES but exists on many farms in the region and is being addressed across the region by Drs. Wayne Keeling and Peter Dotray. More information on managing resistance can be found on pages vi-ix.

Other noteworthy issues at AG-CARES in 2013 were:

- Managing declining water tables by efficient use of irrigation and variety selection
- Evaluation and performance of recently released cotton varieties
- Management strategies for root-knot nematodes

We wish to thank Lamesa Cotton Growers for their continued support and especially the current officers:

Shawn Holladay, President
Johnny Ray Todd, Vice-President
Quinton Kearney, Secretary
Kevin Pepper, Past President

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

Danny Nusser
Regional Program Director
Texas A&M AgriLife Extension Service
Agriculture and Natural Resources

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2013

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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/FiberMax
Cotton, Inc. – State Support Program
Dawson County Commissioners Court
DuPont Crop Protection
PhytoGen Cotton Seed
National Cotton Council
Syngenta Crop Protection
Sam Stevens, Inc.
United Sorghum Checkoff Program
Monsanto/Delta & Pine Land Seed Co.
Nichino America

4-step Program for Managing Glyphosate Resistant Pigweeds in Texas Cotton

Gaylon Morgan, *Professor and State Cotton Specialist*
Paul Baumann, *Professor and State Weed Specialist*
Pete Dotray, *Professor and Weed Specialist*

"Assume the Worst":

- Glyphosate resistant pigweeds (Palmer amaranth and common waterhemp) are currently present on a significant portion of Texas cotton farms and are expected to infest the majority of farms in the near future if the management strategies below are not implemented.

- Although some crops have additional herbicide options, glyphosate resistant weeds will negatively impact the economics of all crops in Texas. In most cases, by the time resistant weeds are identified in a field, the weeds will be too large to be effectively controlled by other selective cotton herbicides.

- Uncontrolled resistant weeds following corn, sorghum, and wheat crop harvest, will lead to increased resistant weed levels in the following cotton crop.

- For the foreseeable future, no new herbicides are being developed to control glyphosate resistant pigweeds. New herbicide-tolerant cotton varieties will likely be available in the next two to four years and will provide some new herbicide options. However, these technologies will not be a "silver bullet" for controlling glyphosate resistant pigweeds and rotating herbicide classes or mechanisms of action will remain essential for managing herbicide resistant pigweeds.

Remember:

If glyphosate resistant pigweeds are not managed with the recommendations below, hand removal of glyphosate resistant pigweeds will be necessary. Hand removal is very labor intensive, but leaving even a few plants will result in substantially more glyphosate resistant plants the following seasons. After all, one female pigweed plant can produce over 500,000 seeds. Additionally, pollen from glyphosate resistant plants can spread several hundred yards and create glyphosate resistant off-spring in nearby fields.

Best Management Strategies for preventing and managing herbicide resistant pigweeds in Texas.

A minimum of 3 of the 4 recommendations below should be followed to minimize the impact of glyphosate resistant pigweeds in cotton. The key is to rotate herbicides with differing mechanisms-of-action for management and prevention of herbicide resistant weeds. Where appropriate, tillage is another weed management strategy that will reduce the risk of developing herbicide resistant weeds.

1. Start clean before planting:

- Use burndown herbicide(s) containing non-glyphosate products or tank mixtures with glyphosate to control the glyphosate resistant pigweeds. See Weed Management in Texas Cotton (cotton.tamu.edu) for labeled products and planting restrictions for preplant burndown herbicides in cotton.

- If possible use burndown herbicides with residual soil activity to minimize additional flushes of pigweeds prior to planting.

- Use tillage, if appropriate, in your operation to destroy emerged pigweeds.

2. Preparation for Planting:

- Apply a preplant incorporated (PPI) herbicide before planting and/or preemergence (PRE) herbicide at planting. Remember, rainfall or irrigation is necessary to activate PRE herbicides. See Weed Management in Texas Cotton (cotton.tamu.edu) for labeled products.

- For PPI herbicides, thoroughly incorporate to maximize herbicide performance. See product labels for specific incorporation recommendations. Weed control failures are often the result of insufficient rate and incorporation, and could leave a small percentage of weeds uncontrolled causing big problems.

- Identify the cotton variety with the best herbicide tolerant traits for your operation, whether it is Roundup Ready Flex, Glytol, Glytol/Liberty Link, or Phytogen Widestrike varieties.

3. Postemergence Weed Management: Assume you have or will have glyphosate resistant pigweeds.

- Roundup ReadyFlex or GlyTol Cotton varieties

- only apply glyphosate with a tankmix partner if pigweeds are emerged, such as Staple, Envoke, Dual Magnum, Warrant, or Prowl H20. If ALS resistant pigweeds exist, avoid Staple or Envoke as a tankmix partner with glyphosate. Envoke is not currently labeled in West Texas.

- if no pigweeds have emerged but other weeds have, apply glyphosate with a tank mix partner that has soil residual activity on pigweed, such as Warrant, Prowl H20, or Sequence.

- use tillage, if appropriate for your operation, to destroy weeds between the rows.

- use hooded or layby applications of herbicides to control escapes. See Weed Management in Texas Cotton (cotton.tamu.edu).

- **Glyphosate + Liberty Tolerant varieties**

- Apply Liberty at 22 or 29 oz/a to weeds less than <4" tall. Remember that thorough plant coverage with the spray solution is a key factor in the success of Liberty. The Liberty label recommends a minimum carrier volume of 15 gallons/acre. Under arid conditions, the efficacy of Liberty is typically lower and the use of ammonium sulfate is generally recommended.

- Include a tank mix partner with soil residual activity on pigweed to minimize additional weed flushes.

- Do not apply a tank mixture of Liberty and Roundup (glyphosate) because antagonism will likely result when these herbicide are applied together. It is better to apply these herbicides in a sequential application with 7-14 days between applications.

- Apply glyphosate at the label rate to control any weed escapes. Do not make the glyphosate application less than 10 days after the Liberty application because some regrowth will be necessary for glyphosate to work on previously injured weeds.

- use tillage if appropriate for your operation

- use hooded or layby applications of herbicides to control weed escapes

- **Liberty Link cotton varieties**

- Apply sequential applications of Liberty at 22 or 29 oz/a to weeds less than <4" tall. Remember that good coverage is a key factor in the success of Liberty.

- Include a tankmix partner with soil residual activity on pigweed to minimize additional weeds from emerging.

- use tillage, if appropriate for your operation.

- use hooded or layby applications of herbicides to control escapes.

4. Remedial control options: Most expensive and least practical.

- Destroy the plants prior to seed development using hand hoeing or pulling, although this is a cumbersome and expensive method, keep in mind that the one weed you leave standing in the field can shed a 500,000 seed and remain dormant but viable for up to 40 months.

The suggestions contained herein are based primarily on herbicide labels and research conducted by Texas A&M AgriLife Extension Service and Texas A&M AgriLife Research. The use of product names is not intended as an endorsement of the product or of a specific manufacturer, nor is there any implication that other formulations containing the same active chemical are not equally effective. Product names are included solely to aid readers in locating and identifying the herbicides suggested.

cotton.tamu.edu
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Information given herein is for educational purposes only. Reference to commercial products or trade names is made with the understanding that no discrimination is intended and no endorsement by Texas AgriLife Extension Service is implied.

This publication is no substitute for the herbicide product labels. It is intended to serve only as a guide for controlling weeds in cotton. Labeled rates and restrictions change constantly; therefore, consult the product label before use.

Texas A&M AgriLife Extension Service
AgriLifeExtension.tamu.edu

TITLE:

Cotton variety performance (continuous cotton) as affected by low-energy precision application (LEPA) irrigation levels at AG-CARES, Lamesa, TX, 2013.

AUTHORS:

Wayne Keeling, Justin Cave, Justin Spradley, Joel Webb, and Macy Sutherland; Professor, and Research Assistants.

MATERIALS AND METHODS:

Plot Size:	4 rows by 300-700 feet, 3 replications
Planting Date:	June 3
Varieties:	Phytogen 367WRF Deltapine 1219B2RF FiberMax 2989GLB2 Stoneville 4946GLB2
Herbicides:	Prowl – 3 pt/A – April 17 Roundup PowerMax – 28 oz – July 2 Roundup PowerMax – 28 oz – July 24
Fertilizer:	100-35-0

Irrigation in-season:

	Low	Base	High
Preplant	5.05”	5.05”	5.05”
In Season	4.1”	6.1”	8.1”
Total	9.15”	11.15”	13.15”

Harvest Date:	November 8

RESULTS AND DISCUSSION:

Four cultivars were planted under three irrigation levels in continuous cotton with a terminated rye cover crop. The trial was planted May 9 but due to dry conditions, uneven emergence resulted and the trial was replanted June 3. Lint yields ranged from an average of 519 lbs/A at the low irrigation to 764 lbs/A with the high irrigation (Table 1). When averaged across irrigation levels, highest yields were produced with ST 4946GLB2. Lint value was not affected by irrigation level but did vary between cultivar (Table 2). Similar net revenues ($/A) were produced with base and high irrigation levels but varied between cultivars (Table 3). Irrigation level did not affect fiber properties including micronaire, staple length, or leaf grade (Tables 4, 5, & 6). Differences in micronaire and leaf grade were observed between cultivars, but staple length was not affected.

Table 1. Effects of cultivar and LEPA irrigation levels on cotton lint yields at AG-CARES, Lamesa, TX, 2013.

	In Season Irrigation Levels			
Cultivar	Low (4.0")	Base (6.0")	High (8.0")	Avg.
	lbs/A			
PH 367WRF	520 bc	718 ab	769 a	670 AB
DP 1219B2RF	474 c	731 ab	688 abc	624 B
FM 2989GLB2	478 c	680 abc	719 ab	626 B
ST 4946GLB2	606 abc	794 a	826 a	724 A
Avg.	519 B	731 A	764 A	
% change	(-29%)	(——)	(+5%)	

(5.05 inches applied pre-plant/emergence)

Table 2. Effects of cultivar and LEPA irrigation levels on lint value at AG-CARES, Lamesa, TX, 2013.

	Low	Base	High	Avg.
Variety	¢/lb			
PH 367WRF	52.61 a	50.40 a	53.75 a	52.25 AB
DP 1219B2RF	54.11 a	54.35 a	53.20 a	53.88 A
FM 2989GLB2	51.05 a	51.78 a	52.58 a	51.80 B
ST 4946GLB2	52.25 a	51.83 a	54.11 a	52.73 AB
Avg.	52.50 A	52.09 A	53.41 A	

Table 3. Effects of cultivar and LEPA irrigation levels on gross revenues at AG-CARES, Lamesa, TX, 2013.

	Low	Base	High	Avg.
Variety	$/A			
PH 367WRF	274 bc	362 abc	413 ab	349 AB
DP 1219B2RF	257 c	398 ab	365 abc	337 B
FM 2989GLB2	244 c	352 abc	377 abc	325 B
ST 4946GLB2	315 abc	412 ab	447 a	391 A
Avg.	272 B	381 A	398 A	
% change	(-%)	(——)	(+%)	

Table 4. Effects of cultivar and LEPA irrigation levels on micronaire at AG-CARES, Lamesa, TX, 2013.

	Low	Base	High	Avg.
Variety				
PH 367WRF	3.53 ab	3.35 b	3.45 b	3.44 B
DP 1219B2RF	3.86 a	3.76 ab	3.58 ab	3.70 A
FM 2989GLB2	3.54 b	3.52 ab	3.35 b	3.47 B
ST 4946GLB2	3.38 b	3.39 b	3.39 b	3.39 B
Avg.	3.58 A	3.49 A	3.44 A	

Table 5. Effects of cultivar and LEPA irrigation levels on staple length at AG-CARES, Lamesa, TX, 2013.

	Low	Base	High	Avg.
Variety		Inches		
PH 367WRF	1.073 a	1.077 a	1.087 a	1.078 A
DP 1219B2RF	1.063 a	1.077 a	1.070 a	1.070 A
FM 2989GLB2	1.057 a	1.070 a	1.090 a	1.072 A
ST 4946GLB2	1.077 a	1.083 a	1.100 a	1.086 A
Avg.	1.067 A	1.076 A	1.086 A	

Table 6. Effects of cultivar and LEPA irrigation levels on leaf grade at AG-CARES, Lamesa, TX, 2013.

	Low	Base	High	Avg.
Variety				
PH 367WRF	2.3 ab	2.3 ab	2.7 ab	2.4 AB
DP 1219B2RF	1.0 b	2.0 ab	1.0 b	1.3 C
FM 2989GLB2	1.3 b	2.0 ab	2.0 ab	1.7 BC
ST 4946GLB2	2.7 ab	3.7 a	3.0 ab	3.1 A
Avg.	1.8 A	2.5 A	2.1 A	

TITLE:

Cotton variety performance (wheat-cotton) as affected by low-energy precision application (LEPA) irrigation levels at AG-CARES, Lamesa, TX, 2013.

AUTHORS:

Wayne Keeling, Justin Cave, Justin Spradley, Joel Webb, and Macy Sutherland; Professor, and Research Assistants.

MATERIALS AND METHODS:

Plot Size:	4 rows by 300-700 feet, 3 replications
Planting Date:	May 9
Varieties:	Phytogen 367WRF Deltapine 1219B2RF FiberMax 2989GLB2 Stoneville 4946GLB2
Herbicides:	Prowl – 3 pt/A – April 17 Roundup PowerMax – 28 oz – July 2 Roundup PowerMax – 28 oz – July 24
Fertilizer:	100-35-0

Irrigation in-season:

	Low	Base	High
Preplant	5.05”	5.05”	5.05”
In Season	4.1”	6.1”	8.1”
Total	9.15”	11.15”	13.15”

Harvest Date: November 8

RESULTS AND DISCUSSION:

Four cultivars were planted under three irrigation levels in wheat residue that was maintained with no-tillage following harvest in June 2012. Yields averaged 897 lbs. lint/A when averaged across the four cultivars at the low irrigation level, 1112 lbs/A with the base irrigation and 1356 lbs./A with the high irrigation level. When averaged across irrigation levels, average yields ranged from 1019-1222 lbs/A (Table 1). Lint values trended higher with increased irrigation but were not different across cultivars (Table 2). Gross revenues increased with increasing irrigation levels but were similar across cultivar (Table 3). Fiber properties, including micronaire, staple length, and leaf grade were not affected by irrigation level (Tables 4, 5, and 6). ST 4946GLB2 produced a higher micronaire value than the other cultivars, and there was a trend to lower micronaire with increased irrigation.

Table 1. Effects of cultivar and LEPA irrigation levels on cotton lint yields at AG-CARES, Lamesa, TX, 2013.

	In Season Irrigation Levels			
Variety	Low (4.0")	Base (6.0")	High (8.0")	Avg.
	lbs/A			
PH 367WRF	823 d	1173 abc	1353 ab	1111 AB
DP 1219B2RF	951 cd	1103 abcd	1365 ab	1140 AB
FM 2989GLB2	788 d	976 cd	1292 abc	1019 B
ST 4946GLB2	1027 bcd	1224 abc	1415 a	1222 A
Avg.	897 B	1112 AB	1356 A	
% change	(-19%)	(——)	(+22%)	

5.05 Inches applied preplant/germination

Table 2. Effects of cultivar and LEPA irrigation levels on lint value at AG-CARES, Lamesa, TX, 2013.

	Low	Base	High	Avg.
Variety	¢/lb			
PH 367WRF	51.20 a	52.11 a	53.70 a	52.11 A
DP 1219B2RF	52.65 a	51.05 a	52.90 a	52.20 A
FM 2989GLB2	51.36 a	52.48 a	54.33 a	52.72 A
ST 4946GLB2	50.11 a	51.81 a	50.16 a	50.66 A
Avg.	51.33 A	51.72 A	52.75 A	

Table 3. Effects of cultivar and LEPA irrigation levels on gross revenues at AG-CARES, Lamesa, TX, 2013.

	Low	Base	High	Avg.
Variety	$/A			
PH 367WRF	419 c	610 abc	727 a	580 A
DP 1219B2RF	501 bc	562 abc	727 a	597 A
FM 2989GLB2	405 c	511 abc	702 ab	539 A
ST 4946GLB2	514 abc	633 ab	710 ab	619 A
Avg.	459 C	575 AB	716 A	
% change	(-20%)	(——)	(+24%)	

Table 4. Effects of cultivar and LEPA irrigation levels on micronaire at AG-CARES, Lamesa, TX, 2013.

	Low	Base	High	Avg.
Variety				
PH 367WRF	4.73 a	4.32 a	4.37 a	4.49 A
DP 1219B2RF	4.73 a	4.47 a	4.73 a	4.69 A
FM 2989GLB2	4.57 a	4.40 a	4.47 a	4.46 A
ST 4946GLB2	4.90 a	4.77 a	4.87 a	4.82 A
Avg.	4.72 A	4.49 A	4.57 A	

Table 5. Effects of cultivar and LEPA irrigation levels on staple length at AG-CARES, Lamesa, TX, 2013.

	Low	Base	High	Avg.
Variety		Inches		
PH 367WRF	1.060 a	1.060 a	1.087 a	1.065 A
DP 1219B2RF	1.053 a	1.070 a	1.077 a	1.066 A
FM 2989GLB2	1.053 a	1.087 a	1.087 a	1.075 A
ST 4946GLB2	1.057 a	1.070 a	1.037 a	1.054 A
Avg.	1.055 A	1.069 A	1.071 A	

Table 6. Effects of cultivar and LEPA irrigation levels on leaf grade at AG-CARES, Lamesa, TX, 2013.

	Low	Base	High	Avg.
Variety				
PH 367WRF	2.7 a	2.6 a	3.3 a	2.8 A
DP 1219B2RF	2.3 a	3.7 a	2.7 a	2.8 A
FM 2989GLB2	2.7 a	3.0 a	3.0 a	2.8 A
ST 4946GLB2	3.0 a	2.7 a	3.7 a	3.1 A
Avg.	2.6 A	2.9 A	3.1 A	

TITLE:

Americot variety performance as affected by low-energy precision application (LEPA) irrigation levels at AG-CARES, Lamesa, TX, 2013.

AUTHORS:

Wayne Keeling, Justin Cave, Justin Spradley, Joel Webb, and Macy Sutherland; Professor, and Research Assistants.

MATERIALS AND METHODS:

Planting Date: May 13

Varieties:
NG 1511 B2RF
NG 3348 B2RF
NG 4012 B2RF
NGX 2306 B2RF
NGX 3305 B2RF
NGX 3306 B2RF

Herbicides:
Prowl – 3 pt/A – March 28
Roundup PowerMax – 28 oz – June 12
Roundup PowerMax – 28 oz – July 25

Fertilizer: 100-40-0

Irrigation in-season:

	Low	Base	High
Preplant	5.05”	5.05”	5.05”
In Season	4.1”	6.1”	8.1”
Total	9.15”	11.15”	13.15”

Harvest Date: October 21

RESULTS AND DISCUSSION:

Three commercial and three experimental Americot cultivars were evaluated under three irrigation levels. When averaged across cultivars, yields ranged from 639 lbs. lint/A at the low irrigation level to 1087 lbs./A at the high level (Table 1). When averaged across irrigation levels, yields ranged from 787 lbs./A to 972 lbs./A for the six cultivars. Lint values (cents/lb.) increased with increasing irrigation level and varied between varieties (Table 2). Gross revenues ($/A) also increased with increasing irrigation, but were similar for all cultivars (Table 3). Increasing irrigation levels reduced micronaire but increased staple length (Tables 4 & 5). Differences were observed between cultivars for both micronaire and staple length. Irrigation level did not affect leaf grade, but difference were observed between cultivars (Table 6).

Table 1. Effects of Americot cultivar and LEPA irrigation levels on cotton lint yields at AG-CARES, Lamesa, TX, 2013.

	In Season Irrigation Levels			
Variety	Low (")	Base (")	High (")	Avg.
	lbs/A			
NG 1511 B2RF	677 ef	1045 abc	1195 a	972 A
NG 3348 B2RF	615 ef	860 bcde	1136 ab	870 AB
NG 4012 B2RF	656 ef	990 abcd	1050 abc	899 AB
NGX 2306 B2RF	754 de	980 abcd	974 abcd	903 AB
NGX 3305 B2RF	503 f	811 cde	1046 abc	787 B
NGX 3306 B2RF	630 ef	1019 abc	1122 ab	924 AB
Avg.	639 C	951 B	1087 A	
% change	(-33%)	(——)	(+14%)	

5.05 Inches applied preplant/germination

Table 2. Effects of Americot cultivar and LEPA irrigation levels on lint value at AG-CARES, Lamesa, TX, 2013.

	Low	Base	High	Avg.
Variety	¢/lb			
NG 1511 B2RF	47.12 h	51.03 defg	53.51 abcde	50.55 C
NG 3348 B2RF	47.90 gh	49.95 efgh	53.67 abcde	50.50 C
NG 4012 B2RF	49.28 fgh	54.46 abcd	53.31 bcde	52.35 BC
NGX 2306 B2RF	50.58 efgh	51.81 cdef	50.10 efgh	50.83 C
NGX 3305 B2RF	50.63 efgh	54.97 abc	56.46 ab	54.02 AB
NGX 3306 B2RF	52.13 cdef	54.57 abcd	57.11 a	54.60 A
Avg.	49.61 B	52.80 A	54.02 A	

Table 3. Effects of Americot cultivar and LEPA irrigation levels on gross revenues at AG-CARES, Lamesa, TX, 2013.

	Low	Base	High	Avg.
Variety	$/A			
NG 1511 B2RF	320 efg	535 abc	641 a	499 A
NG 3348 B2RF	294 fg	428 cdef	610 a	444 A
NG 4012 B2RF	324 efg	539 abc	559 abc	474 A
NGX 2306 B2RF	381 defg	508 abcd	489 abcd	459 A
NGX 3305 B2RF	255 g	446 bcde	591 ab	431 A
NGX 3306 B2RF	328 efg	557 abc	640 a	508 A
Avg.	317 C	502 B	588 A	
% change	(-37%)	(——)	(+17%)	

Table 4. Effects of Americot cultivar and LEPA irrigation levels on micronaire at AG-CARES, Lamesa, TX, 2013.

	Low	Base	High	Avg.
Variety				
NG 1511 B2RF	4.60 a	4.00 cde	4.00 cde	4.21 A
NG 3348 B2RF	4.05 cde	3.70 def	3.65 ef	3.77 C
NG 4012 B2RF	4.38 abc	3.85 de	3.63 ef	3.94 BC
NGX 2306 B2RF	3.88 de	3.38 f	3.05 g	3.43 C
NGX 3305 B2RF	4.53 ab	3.98 cde	3.63 ef	4.02 ABC
NGX 3306 B2RF	4.35 abc	4.15 bcd	3.73 def	4.05 AB
Avg.	4.29 A	3.83 B	3.59 C	

Table 5. Effects of Americot cultivar and LEPA irrigation levels on staple length at AG-CARES, Lamesa, TX, 2013.

	Low	Base	High	Avg.
Variety		Inches		
NG 1511 B2RF	0.985 h	1.040 efg	1.068 cdef	1.030 C
NG 3348 B2RF	1.008 gh	1.053 def	1.090 bcd	1.050 BC
NG 4012 B2RF	1.015 gh	1.080 cde	1.078 cde	1.057 B
NGX 2306 B2RF	1.055 def	1.095 bcd	1.120 ab	1.090 A
NGX 3305 B2RF	1.030 fg	1.083 bcd	1.135 a	1.082 A
NGX 3306 B2RF	1.060 def	1.103 abc	1.138 a	1.100 A
Avg.	1.025 C	1.075 B	1.104 A	

Table 6. Effects of Americot cultivar and LEPA irrigation levels on leaf grade at AG-CARES, Lamesa, TX, 2013.

	Low	Base	High	Avg.
Variety				
NG 1511 B2RF	2.0 ab	2.5 ab	2.8 ab	2.4 AB
NG 3348 B2RF	3.0 ab	3.0 ab	2.5 ab	2.8 A
NG 4012 B2RF	1.5 ab	1.5 ab	2.0 ab	1.6 B
NGX 2306 B2RF	3.0 ab	3.3 ab	3.5 a	3.2 A
NGX 3305 B2RF	1.5 ab	1.8 ab	1.8 ab	1.6 B
NGX 3306 B2RF	1.5 ab	1.5 ab	1.3 b	1.4 B
Avg.	2.2 A	2.2 A	2. 0 A	

TITLE:

Performance of Bayer CropScience varieties as affected by irrigation level at AG-CARES, Lamesa, TX, 2013.

AUTHORS:

Wayne Keeling, Justin Cave, Justin Spradley, Joel Webb, and Macy Sutherland; Professor and Research Assistants.

MATERIALS AND METHODS:

Plot Size:	4 rows by 50 feet, 3 replications May
Planting Date:	21
Varieties:	BX 1320GL
	FM 2484B2F
	BX 1422GL
	FM 2989GLB2
	FM 9250GL
	BX 1347GLB2
	FM 1944GLB2
	FM 2011GT
	ST 4946GLB2
Herbicides:	Prowl 3pt/A -March 28
	Roundup PowerMax 28 oz./A - July 2
	Roundup PowerMax 28 oz./A - July 25
Fertilizer:	12-40-0 applied April 7

Additional Nitrogen (in-season):		Low	Base	High
		60 lbs.	90 lbs.	120 lbs
Sub-surface Drip Irrigation:		Low	Base	High
	Pre-plant	5.05”	5.05”	5.05”
	In-season	4.1”	6.1”	8.1”
	Total	9.15”	11.15”	13.15”

Harvest Date: November 7

RESULTS AND DISCUSSION:

Five FiberMax, one Stoneville commercial and three experimental cultivars were planted under three irrigation levels. When averaged across cultivars, yields under base irrigation were 818 lbs/A, 609 lab/A with the low irrigation and 1109 lbs/A with the high irrigation level. When averaged across irrigation levels, ST 4946 GLB2, FM 2011 GT, BX 1347 GLB2, and BX 1320 GL produced similar yields, which were higher than several other entries (Table 1). Irrigation level did not affect overall loan value when averaged across cultivars, although staple length increased and micronaire decreased with increased irrigation (Tables 2,4 and 5). Gross revenues per acre increased with increased irrigation levels and varied between cultivares (Table 3).

Table 1. Effects of cotton variety and LEPA irrigation levels on cotton lint yields at AG-CARES, Lamesa, TX, 2013.

	In Season Irrigation Levels			
Variety	Low (4.1")	Base (6.1")	High (8.1")	Avg.
	——————————lbs/A——————————			
BX 1320GL	656 ab	902 ab	1157 a	905 AB
FM 2484B2F	584 ab	683 c	1128 a	798 BC
BX 1422GL	564 ab	702 bc	1033 a	766 C
FM 2989GLB2	534 b	754 abc	1111 a	800 BC
FM 9250GL	572 ab	810 abc	1067 a	816 BC
BX 1347GLB2	701 a	835 abc	1024 a	853 ABC
FM 1944GLB2	553 b	803 abc	1088 a	815 BC
FM 2011GT	647 ab	928 a	1122 a	889 ABC
ST 4946GLB2	673 ab	943 a	1246 a	954 A
Avg.	609 B	818 AB	1109 A	
% change	(-26%)	(——)	(+36%)	

Table 2. Effects of cotton variety and LEPA irrigation levels on lint value at AG-CARES, Lamesa, TX, 2013.

Variety	Low	Base	High	Avg.
	——————————¢/lb——————————			
BX 1320GL	54.08 ab	54.85 a	57.20 a	55.37 AB
FM 2484B2F	57.10 a	56.86 a	56.91 a	56.96 AB
BX 1422GL	57.31 a	56.95 a	56.91 a	57.06 A
FM 2989GLB2	53.86 ab	54.73 a	55.95 a	54.85 AB
FM 9250GL	54.35 ab	56.40 a	56.43 a	55.72 AB
BX 1347GLB2	56.56 ab	56.75 a	55.92 a	56.41 AB
FM 1944GLB2	56.23 ab	57.10 a	56.71 a	56.68 AB
FM 2011GT	53.83 ab	55.20 a	55.25 a	54.76 B
ST 4946GLB2	53.35 b	56.86 a	57.38 a	55.86 AB
Avg.	55.18 A	56.19 A	56.52 A	

Table 3. Effects of cotton variety and LEPA irrigation levels on gross revenues at AG-CARES, Lamesa, TX, 2013.

Variety	Low	Base	High	Avg.
		——————$/A——————		
BX 1320GL	355 ab	494 ab	662 a	536 A
FM 2484B2F	333 ab	389 b	643 a	455 AB
BX 1422GL	323 ab	399 ab	590 a	437 B
FM 2989GLB2	288 b	413 ab	620 a	440 B
FM 9250GL	311 ab	457 ab	601 a	456 AB
BX 1347GLB2	396 a	473 ab	573 a	481 AB
FM 1944GLB2	311 ab	458 ab	617 a	462 AB
FM 2011GT	348 ab	515 ab	620 a	494 AB
ST 4946GLB2	358 ab	536 a	715 a	536 A
Avg.	336 B	459 AB	627 A	
% change	(-26%)	(——)	(+36%)	

Table 4. Effects of cotton variety and LEPA irrigation levels on micronaire at AG-CARES, Lamesa, TX, 2013.

Variety	Low	Base	High	Avg.
BX 1320GL	4.56 a	4.30 a	.10 a	4.32 A
FM 2484B2F	4.16 a	3.83 bc	3.66 c	3.88 C
BX 1422GL	4.23 a	4.33 a	4.06 ab	4.21 AB
FM 2989GLB2	4.50 a	4.06 abc	3.76 abc	4.11 ABC
FM 9250GL	4.53 a	3.70 c	3.73 bc	3.98 BC
BX 1347GLB2	4.53 a	4.06 abc	3.86 abc	4.15 ABC
FM 1944GLB2	4.26 a	3.93 abc	3.83 abc	4.01 BC
FM 2011GT	4.63 a	3.90 abc	3.96 abc	4.16 AB
ST 4946GLB2	4.30 a	4.00 abc	3.66 c	3.98 BC
Avg.	4.41 A	4.01 B	3.85 B	

Table 5. Effects of cotton variety and LEPA irrigation levels on staple at AG-CARES, Lamesa, TX, 2013.

Variety	Low	Base	High	Avg.
		——————Inches——————		
BX 1320GL	1.06 cd	1.08 a	1.14 a	1.09 BC
FM 2484B2F	1.14 ab	1.14 a	1.15 a	1.14 AB
BX 1422GL	1.16 a	1.15 a	1.14 a	1.15 A
FM 2989GLB2	1.06 cd	1.08 a	1.11 a	1.09 C
FM 9250GL	1.07 bcd	1.11 a	1.11 a	1.10 ABC
BX 1347GLB2	1.13 abc	1.14 a	1.11 a	1.13 ABC
FM 1944GLB2	1.11 abcd	1.14 a	1.14 a	1.13 ABC
FM 2011GT	1.06 cd	1.11 a	1.09 a	1.09 BC
ST 4946GLB2	1.05 d	1.11 a	1.16 a	1.11 ABC
Avg.	1.09 A	1.12 A	1.13 A	

TITLE:

Results of the Pivot Irrigated Regional Cotton Variety Performance Test at AG-CARES, Lamesa, TX, 2013

AUTHORS:

Jane K. Dever, Carol Mason Kelly and Valerie Morgan; Associate Professor, Assistant Research Scientist and Research Associate

MATERIALS AND METHODS:

Test:	Cotton Variety, pivot-irrigated
Planting Date:	May 8th
Design:	Randomized Complete Block, 4 replications
Plot Size:	2-row plots, 24 ft
Row Spacing:	40-in
Planting Pattern:	Solid
Herbicide:	Trifluralin @ 1.5 pt/A applied pre-plant
	Caparol @ 1.5 pt/A applied May 8
	Staple @ 2 oz/A applied June 21
Fertilizer:	11-40-0 lbs/A applied pre-plant
	30 lbs/A nitrogen applied June 26 (fertigation)
	30 lbs/A nitrogen applied July 8 (fertigation)
	30 lbs/A nitrogen applied July 25 (fertigation)
Irrigations:	3.7 acre-in applied pre-plant
	8.40 acre-in applied May-September
Harvest Aid:	Bollbuster @ 1 qt/A + ET @ 2 oz/A applied October 24
Harvest Date:	November 7th

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 at 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 ~600 g 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.

Thirty-five cotton varieties from 6 different seed companies were submitted for variety testing at 5 locations, including the irrigated location at AG-CARES in Lamesa. Average yield was 850 pounds of lint per acre with a test coefficient of variation of 21.9% and 261 pounds least significant difference. The highest yielding variety was DP 1219 B2RF with a yield of 1,262 pounds of lint per acre; also a top performer in the dryland trial. The next 7 varieties in the test were not significantly different than the highest yielding variety (Table 1). Deltapine, Nex-Gen, Stoneville, and FiberMax brands were all represented in this top yield tier. Yields for the test ranged from 1,262 pounds of lint per acre to as little 407 pounds of lint per acre in 2013. Plant height ranged from 16-26 inches with a test average of 22 inches. Relative maturity of the varieties as indicated by percent open bolls on a given date averaged 81%, with a range from 70-91%. Storm-proof ratings ranged from 3-6 with the test average of 4.

Fiber quality evaluations are not available at the time of the 2013 Annual Report publication, and will be added to the website when available.

Table 1. Yield and agronomic results of the pivot-irrigated regional cotton variety test conducted at AG-CARES, Lamesa, TX, 2013

		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
Deltapine DP 1219 B2RF	1262	28.9	42.0	39.3	31.3	4.4	8.7	5.8	29.4	70	4	24
Deltapine DP 1044 B2F	1163	29.1	43.7	35.7	29.0	4.3	9.1	5.4	28.2	83	4	23
NexGen NGX 3306B2RF	1131	28.3	42.8	38.8	30.5	4.6	9.0	6.0	29.5	80	4	23
Stoneville ST 5458B2F	1130	28.2	42.7	37.5	30.2	4.7	9.5	6.0	29.4	81	5	23
Stoneville ST 4946GLB2	1127	27.8	42.8	39.8	31.6	5.8	10.4	7.3	31.7	81	6	23
Stoneville ST 5288 B2F	1060	28.1	42.1	39.1	31.7	4.9	9.8	6.6	28.7	83	5	24
FiberMax FM 2011GT	1040	29.8	40.6	40.0	31.5	5.6	10.9	7.8	28.9	76	6	21
NexGen NG 4111 RF	1036	27.5	39.6	39.9	31.8	5.5	9.5	6.7	32.7	71	5	23
NexGen NGX 3305B2RF	999	27.8	41.2	39.1	30.5	4.3	8.9	6.0	27.5	75	4	24
Deltapine DP 0912 B2RF	980	26.7	38.6	38.7	30.7	4.6	9.1	6.1	28.7	80	4	24
PhytoGen PHY 367 WRF	978	27.3	38.9	38.6	29.9	4.4	8.8	5.8	29.1	83	3	22
FiberMax FM 9250GL	973	27.6	42.9	37.5	29.5	5.6	11.0	6.9	30.6	78	6	22
FiberMax FM 2484B2F	917	27.1	40.2	37.9	30.5	4.5	9.8	6.3	27.1	80	5	22
FiberMax FM 9180B2RF	896	25.8	41.5	36.1	28.4	5.0	10.4	6.2	29.2	85	6	20
PhytoGen PHY 339 WRF	885	28.5	40.4	36.7	28.6	4.5	8.6	5.4	30.6	79	4	21
PhytoGen PHY 499 WRF	882	27.4	40.0	39.7	31.5	4.8	8.9	6.2	30.4	81	5	26
All-Tex AT Epic RF	871	29.3	41.4	39.8	31.7	4.7	9.5	6.6	28.8	85	4	22
NexGen NG 1511 B2RF	867	26.5	38.5	39.1	30.5	4.4	9.4	6.3	27.4	78	5	16
NexGen NG 4010 B2RF	863	25.4	41.2	39.5	31.5	4.9	9.4	6.5	29.7	73	6	22
All-Tex AT Nitro 44 B2RF	833	26.2	42.4	35.6	28.5	4.9	10.5	6.2	28.6	86	5	21
Deltapine DP 1321 B2RF	830	28.4	40.3	40.1	30.6	4.7	9.5	6.7	28.1	79	4	23
FiberMax FM 2989GLB2	787	26.2	40.0	37.3	29.0	5.0	10.5	6.6	28.4	84	5	23
Seed Source Genetics UA 222	763	24.7	37.5	39.0	31.2	5.0	10.1	6.8	28.8	78	4	22
NexGen NG 3348 B2F	748	25.4	40.5	37.0	28.8	5.1	10.3	6.4	29.4	81	6	19
NexGen NG 4012 B2RF	727	25.9	38.9	37.5	29.3	5.2	9.0	5.8	33.9	74	5	21
NexGen NG 2051 B2RF	721	23.0	40.7	35.4	27.2	4.7	9.7	5.6	30.1	81	6	19
FiberMax FM 9058F	698	24.7	39.6	38.5	30.1	4.7	9.7	6.4	28.2	81	6	21
NexGen NGX 2306B2RF	694	25.9	43.1	36.3	28.9	5.0	9.3	5.5	33.2	86	3	23

DynaGrow DG 13125 B2RF	693	27.3	40.0	39.2	30.1	4.8	9.6	6.5	28.7	91	5	21
FiberMax FM 1944GLB2	677	26.5	41.6	37.5	29.8	5.4	10.1	6.4	31.2	80	5	22
PhytoGen PHY 725 RF	601	23.2	38.0	35.6	27.0	3.9	9.9	5.9	23.4	74	3	22
DynaGrow DG 12353 B2RF	532	30.0	41.7	39.5	29.6	4.9	9.3	6.4	30.1	85	6	23
PhytoGen PHY 375 WRF	505	24.9	37.2	37.0	26.1	4.1	8.5	5.4	27.6	90	3	16
Seed Source Genetics HQ 210 CT	477	25.4	41.3	36.4	27.8	4.7	8.5	5.2	32.7	88	3	20
UA 48	407	26.8	41.2	37.1	28.3	4.8	10.2	6.4	27.8	79	4	20
Mean	850	26.9	40.7	38.0	29.8	4.8	9.7	6.2	29.3	81	4	22
c.v.%	21.9	6.2	4.5	3.1	3.5	7.8	2.8	4.5	7.7	7.4	19.7	13.4
LSD 0.05	261	2.3	2.6	2.4	2.1	0.8	0.5	0.6	4.6	8	1	4

TITLE:

Results of the Dryland Regional Cotton Variety Performance Test at AG-CARES, Lamesa, TX, 2013

AUTHORS:

Jane K. Dever, Carol Mason Kelly and Valerie Morgan; Associate Professor, Assistant Research Scientist and Research Associate

MATERIALS AND METHODS:

Test:	Dryland Cotton Variety
Planting Date:	May 8th
Design:	Randomized Complete Block, 4 replications
Plot Size:	2-row plots, 24 ft
Row Spacing:	40-in
Planting Pattern:	Solid
Herbicide:	Trifluralin @ 1.5 pt/A applied pre-plant Caparol @ 1.5 pt/A applied May 15 Staple @ 2 oz/A applied June 21
Fertilizer:	11-40-0 lbs/A applied pre-plant
Harvest Aid:	Bollbuster @ 1qt/A + Sharpen @1 oz/A + Crop Oil @ 1% applied October 1 ET @ 3 oz/A applied on October 11
Harvest Date:	November 1st

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 it comes late, and trying to plant after a 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 NCVT, the trial is planted under the pivot so planting 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 yield 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 ~600 g 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) visual storm resistance rating.

Thirty- five cotton varieties from 6 different seed companies were submitted in 2013 for variety testing at 5 locations, including a dryland location at AG-CARES in Lamesa. The average yield for the test was 281 pounds of lint per acre with a coefficient of variation of 22.7%, least significant difference of 90; yields ranging from 142 to 378 pounds of lint per acre. The top seventeen varieties were not significantly different from the highest yielding variety, DP 1044 B2RF (Table 1). Relative maturity of the varieties as indicated by percent open bolls on a given date, ranged from 69% to 86%, with a test average of 79%. All of the varieties tested had storm resistance ratings from 2 to 7. Plant height averaged 16 inches and ranged from 14 to 18 inches across all varieties.

Fiber quality evaluations are not available at the time of the 2013 Annual Report publication, and will be added to the website when available.

Table 1. Yield and agronomic results of the dryland regional cotton variety performance test conducted at AG-CARES, Lamesa, TX, 2013

		Agronomic Properties										
		% Turnout		% Lint		Boll	Seed	Lint	Seed per	% Open Bolls	Storm	
Designation	Yield	Lint	Seed	Picked	Pulled	Size	Index	Index	Boll	1-Oct	Resistance	Height
Deltapine DP 1044 B2F	378	27.0	36.6	37.4	28.1	4.1	9.3	5.9	25.7	84	5	16
FiberMax FM 2011GT	376	29.1	37.6	41.0	30.6	5.0	9.7	7.0	29.4	81	6	15
Stoneville ST 4946GLB2	376	29.2	38.4	38.0	29.9	4.9	9.2	6.0	30.1	80	5	15
NexGen NGX 3305B2RF	331	25.2	37.3	38.5	28.7	3.7	8.2	5.6	25.2	79	5	17
FiberMax FM 9058F	316	26.0	38.0	38.6	29.0	4.3	9.1	6.0	27.2	85	7	14
NexGen NG 4111 RF	315	26.1	36.7	38.9	28.1	4.4	9.0	6.2	27.3	79	4	16
PhytoGen PHY 499 WRF	315	28.3	37.2	39.9	30.0	3.6	8.0	5.7	25.3	71	4	18
Deltapine DP 1219 B2RF	313	26.8	35.5	38.3	26.9	3.7	7.7	5.2	27.2	73	4	17
FiberMax FM 9250GL	313	28.3	38.5	37.9	28.0	4.1	9.6	6.3	24.3	79	6	17
Stoneville ST 5458B2F	312	25.4	36.4	38.1	28.6	4.5	9.4	6.3	27.4	69	6	17
NexGen NG 2051 B2RF	310	23.8	37.5	35.7	26.4	4.1	9.3	5.5	26.6	80	5	15
FiberMax FM 9180B2RF	309	25.4	37.8	35.3	26.4	4.2	10.0	5.9	25.5	79	6	15
All-Tex AT Epic RF	306	25.4	34.9	39.3	28.3	3.9	8.1	5.7	27.0	78	4	17
NexGen NGX 3306B2RF	300	25.9	35.9	36.5	28.1	3.7	8.4	5.3	25.5	81	4	18
NexGen NG 4012 B2RF	297	27.2	37.9	37.4	27.8	4.0	8.4	5.5	27.8	76	5	17
FiberMax FM 2484B2F	294	25.6	35.9	35.6	31.7	4.0	8.3	5.1	28.2	80	5	17
NexGen NG 1511 B2RF	292	29.0	36.0	40.4	30.4	4.0	8.5	6.3	25.9	76	4	17
Seed Source Genetics HQ 210 CT	291	24.8	38.2	35.1	26.0	4.0	8.5	4.9	28.3	84	3	15
NexGen NG 4010 B2RF	286	25.4	37.6	36.9	27.8	4.0	8.8	5.5	26.5	83	5	17
All-Tex AT Nitro 44 B2RF	285	23.4	35.6	37.6	27.5	3.9	9.7	6.2	23.3	75	5	16
Stoneville ST 5288 B2F	281	24.1	35.2	37.9	27.2	3.3	7.5	5.0	25.0	83	4	17

PhytoGen PHY 375 WRF	270	25.5	35.4	39.3	28.1	3.8	8.4	5.8	26.0	84	3	18
Deltapine DP 1321 B2RF	264	25.7	32.4	40.5	29.8	3.9	8.5	6.2	25.3	78	2	17
Deltapine DP 0912 B2RF	257	26.7	34.4	39.0	28.8	3.6	7.9	5.7	24.7	75	4	18
FiberMax FM 2989GLB2	256	24.9	36.5	39.3	28.9	3.8	8.9	6.1	24.9	75	4	16
PhytoGen PHY 339 WRF	244	26.1	36.2	36.8	27.6	4.4	8.4	5.3	30.1	86	3	18
NexGen NGX 2306B2RF	241	26.5	36.4	37.5	27.5	3.8	8.4	5.3	26.5	80	3	17
DynaGrow DG 13125 B2RF	240	26.9	36.3	39.2	28.2	4.2	9.1	6.3	25.6	78	5	17
PhytoGen PHY 367 WRF	233	25.2	34.2	37.9	28.0	4.0	8.5	5.7	26.4	79	4	16
PhytoGen PHY 725 RF	221	21.0	31.6	34.1	25.4	3.4	9.2	5.2	22.4	79	4	16
FiberMax FM 1944GLB2	221	25.2	34.8	37.7	27.5	4.0	9.1	5.9	25.4	74	6	16
NexGen NG 3348 B2F	217	24.3	36.9	36.6	26.1	3.9	9.3	5.9	24.1	75	5	15
DynaGrow DG 12353 B2RF	211	25.7	35.4	39.4	29.2	4.5	9.1	6.2	28.4	79	7	17
Seed Source Genetics UA 222	205	22.5	34.0	37.5	26.7	4.8	9.4	6.2	28.6	80	2	17
UA 48	142	21.8	33.7	38.8	27.5	4.1	10.3	6.7	23.4	79	4	15
Mean	281	25.7	36.1	37.9	28.1	4.0	8.8	5.8	26.3	79	4	16
c.v.%	22.7	6.9	5.7	3.3	3.9	10.2	6.1	6.7	8.7	7.1	31.5	6.9
LSD 0.05	90	2.5	2.9	2.5	2.2	0.8	1.1	0.8	4.7	8	2	2

TITLE:

Replicated LEPA Irrigated RACE Variety Demonstration, Lamesa, TX - 2013

AUTHORS:

Mark Kelley, Kristie Keys, Hayden Alexander, Tommy Doederlein and Gary Roschetzky; Extension Agronomist – Cotton, Extension Assistants – Cotton, EA-IPM Dawson/Lynn Counties and CEA-ANR Dawson County

MATERIALS AND METHODS:

Varieties:	Deltapine 1044B2RF, FiberMax 2989GLB2, FiberMax 2011GT, NexGen 1511B2RF, NexGen 3348B2RF, PhytoGen 499WRF, PhytoGen 367WRF and Stoneville 4946GLB2
Experimental design:	Randomized complete block with three (3) replications.
Seeding rate:	4.0 seed/row-ft in 40 inch row spacing with John Deere MaxEmerge XP Vacuum planter, into terminated rye cover.
Plot size:	4 rows by variable length (253-872 ft)
Planting date:	15-May
Weed management:	32 oz/acre of Roundup PowerMax and 3 pt/acre of Prowl H20 were applied preplant on 28-March and 24-April, respectively. In-season Roundup PowerMax applications were on 12-June and 25-July at 28oz/acre. Cultivation with sweeps and furrow diking was performed on 14-June.
Irrigation:	4.75" inches of irrigation were applied preplant, with 8.1” applied during the growing season for a total of 12.85” of irrigation applied.
Fertilizer management:	116 lbs of 10-34-0 was applied on 28-March. An additional 90 lbs N/acre was applied via fertigation of 32-0-0.
Plant growth regulators:	None were applied at this location.
Harvest aids:	Harvest aids included 1 qt/acre Bollbuster + 1oz/acre Sharpen with 1% v/v crop oil on 1-October followed by 3 oz/acre ET on 11-October.
Harvest:	Plots were harvested on 24-October using a commercial John Deere 7445 with field cleaner. Harvested material was transferred into a

weigh wagon with integral electronic scales to determine individual plot weights. Plot yields were adjusted to lb/acre.

Gin turnout: Grab samples were taken by plot and ginned at the Texas A&M AgriLife Research and Extension Center at Lubbock to determine gin turnouts.

Fiber analysis: Lint samples were submitted to the Texas Tech University – Fiber and Biopolymer Research Institute for HVI analysis, and USDA Commodity Credit Corporation (CCC) loan values were determined for each variety by plot.

Ginning cost and seed values: Ginning cost were based on $3.00 per cwt. of burr cotton and seed value/acre was based on $250/ton. Ginning cost did not include check-off.

Seed and Technology fees: Seed and technology costs were calculated using the appropriate seeding rate (4.0 seed/row-ft) for the 40-inch row spacing and entries using the online Plains Cotton Growers Seed Cost Comparison Worksheet available at: http://plainscotton.org/Seed/PCGseed13.xls.

RESULTS AND DISCUSSION:

Agronomic data including plant population, nodes above white flower (NAWF) and final plant map data are included in Tables 1 and 2.

Significant differences were noted for most yield and economic parameters (Table 3). Stripper harvested lint turnout ranged from a low of 32.0% for Deltapine 1044B2RF to a high of 39.5% for NexGen 1511B2RF. Seed turnouts averaged 51.1% and not significant differences were observed among varieties. Lint yields ranged from a low of 530 lb/acre (NexGen 3348B2RF) to a high of 820 lb/acre (Stoneville 4946GLB2). Lint loan values average $0.5009/lb across varieties. Lint value averaged $330.99/acre and ranged from a high of $413.50/acre for Stoneville 4946GLB2 to a low of $258.61/acre for NexGen 3348B2RF. When subtracting ginning and seed and technology costs, the net value/acre averaged $324.98. Differences among varieties were observed at the 0.10 significance level and values ranged from a high of $413.93/acre to a low of $254.55/acre for Stoneville 4946GLB2 and NexGen 3348B2RF, respectively.

No significant differences were observed for fiber quality parameters at this location (Table 4). Micronaire values averaged 4.1 and staple averaged 33.0 across all varieties. Uniformity values averaged 79.1%. Strength and elongation values averaged 29.8 g/tex and 8.7%, respectively. Leaf grades were mostly 2 and 3 at this location. Finally, Rd or reflectance (73.5 avg), and +b or yellowness (9.1 avg) values resulted in color grades of mostly 31.

These data indicate that substantial differences can be obtained in terms of netvalue/acre due to variety selection. Additional multi-site and multi-year applied research is needed to evaluate varieties across a series of environments.

ACKNOWLEDGMENTS:

Appreciation is expressed to Drs. Wayne Keeling and Danny Carmichael, Texas A&M AgriLife Research Systems Agronomist - Lubbock and Research Associate - AGCARES, Lamesa. Further assistance with this project was provided by Dr. Jane Dever and Ms. Valerie Morgan - Texas A&M AgriLife Research and Extension Center, Lubbock, and Dr. Eric Hequet - Associate Director, Fiber and Biopolymer Research Institute, Texas Tech University. Furthermore, we greatly appreciate funding for HVI testing from the Cotton Fibers Initiative Fund.

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Table 1. Inseason plant measurement results from the Dawson County Irrigated RACE, AGCARES - Texas A&M AgriLife Research Farm, Lamesa, TX, 2013.

Entry	Plant population		Nodes Above White Flower (NAWF) for week of		
			30-Jul	8-Aug	19-Aug
	plants/row ft	plants/acre			
Deltapine 1044B2RF	3.1	40,075	7.0	5.5	2.7
FiberMax 2011GT	2.9	38,333	6.6	3.8	2.1
FiberMax 2989GLB2	2.9	38,478	6.7	5.5	2.4
NexGen 1511B2RF	2.9	38,188	6.1	4.4	2.1
NexGen 3348B2RF	3.0	38,623	6.2	4.0	2.6
PhytoGen 367WRF	3.0	38,623	7.0	4.9	2.2
PhytoGen 499WRF	3.1	41,092	6.9	4.5	2.4
Stoneville 4946GLB2	3.0	39,640	6.3	4.0	2.2
Test average	3.0	39,131	6.6	4.6	2.3
CV, %	12.3	12.3	17.1	18.7	23.9
OSL	0.9874	0.9933	0.9427	0.1488	0.7985
LSD	NS	NS	NS	NS	NS

For NAWF, numbers represent an average of 5 plants per variety per rep (15 plants per variety)
CV - coefficient of variation.
OSL - observed significance level, or probability of a greater F value.
LSD - least significant difference at the 0.05 level, NS - not significant

Table 2. Final plant map results from the Dawson County Irrigated RACE, AGCARES - Texas A&M AgriLife Research Farm, Lamesa, TX, 2013.

Entry	Final plant map (19-August)									
	plant height (inches)	node of first fruiting branch	total mainstem nodes	height to node ratio	total fruiting branches	1st position retention (%)	2nd position retention (%)	total retention (%)	1st five retention (%)	open boll (%)
Deltapine 1044B2RF	20.7	6.8	17.3	1.2	11.5	55.1	33.7	46.40	77.3	27.1
FiberMax 2011GT	19.2	6.6	16.2	1.2	10.6	48.7	35.1	42.77	72.0	34.8
FiberMax 2989GLB2	19.4	7.4	17.8	1.1	11.4	43.7	41.4	42.57	64.0	21.6
NexGen 1511B2RF	18.8	6.6	16.0	1.2	10.4	42.2	31.7	37.50	64.0	35.9
NexGen 3348B2RF	21.0	6.6	16.7	1.3	11.1	46.6	39.2	43.33	68.0	28.6
PhytoGen 367WRF	21.5	6.5	16.9	1.3	11.4	49.5	32.9	42.27	70.7	41.5
PhytoGen 499WRF	21.2	7.2	17.1	1.2	10.9	44.1	45.3	44.53	68.0	27.9
Stoneville 4946GLB2	19.0	6.3	16.3	1.2	11.0	49.0	56.3	52.17	80.0	16.0
Test average	20.1	6.8	16.8	1.2	11.0	47.4	39.4	43.94	70.5	29.2
CV, %	9.5	6.5	7.2	5.7	10.7	14.2	29.3	17.6	13.0	64.4
OSL	0.4761	0.1248	0.6330	0.0484	0.9271	0.3933	0.2347	0.5529	0.3583	0.7714
LSD	NS	NS	NS	0.1	NS	NS	NS	NS	NS	NS

For Final plant map, numbers represent and average of 6 plants per variety per rep (18 plants per variety)
CV - coefficient of variation.
OSL - observed significance level, or probability of a greater F value.
LSD - least significant difference at the 0.05 level, NS - not significant

Table 3. Harvest results from the Dawson County Irrigated RACE Variety Trial, AGCARES - Texas A&M AgriLife Research Farm, Lamesa, TX, 2013.

Entry	Lint turnout	Seed turnout	Bur cotton yield	Lint yield	Seed yield	Lint loan value	Lint value	Seed value	Total value	Ginning cost	Seed/technology cost[1]	Net value	
	-------- % --------		---------- lb/acre ----------			$/lb	---------- $/acre ----------						
Stoneville 4946GLB2	35.7	50.2	2297	820	1154	0.5040	413.50	144.22	557.72	68.91	74.88	413.93	a
NexGen 1511B2RF	39.5	51.6	1919	759	991	0.4973	377.27	123.91	501.18	57.58	65.57	378.02	ab
PhytoGen 367WRF	36.4	51.6	1884	685	971	0.4952	339.13	121.43	460.56	56.51	69.20	334.86	bc
FiberMax 2011GT	38.4	50.9	1673	642	852	0.5157	331.28	106.45	437.72	50.19	62.92	324.61	bcd
Deltapine 1044B2RF	32.0	49.4	1956	626	966	0.5062	317.08	120.77	437.85	58.69	67.98	311.18	bcd
PhytoGen 499WRF	37.2	50.8	1741	648	885	0.4930	319.30	110.59	429.90	52.24	69.20	308.46	bcd
FiberMax 2989GLB2	34.8	51.7	1654	575	856	0.5077	291.74	106.96	398.70	49.61	74.88	274.21	cd
NexGen 3348B2RF	35.4	52.4	1497	530	785	0.4880	258.61	98.10	356.71	44.90	57.27	254.55	d
Test average	36.2	51.1	1828	661	932	0.5009	330.99	116.55	447.54	54.83	67.74	324.98	
CV, %	3.7	4.8	13.6	13.9	13.6	3.6	14.0	13.6	13.9	13.6	--	16.8	
OSL	0.0004	0.8477	0.0430	0.0321	0.0748†	0.6243	0.0292	0.0747†	0.0413	0.0431	--	0.0535†	
LSD	2.4	NS	437	161	183	NS	80.89	22.85	108.69	13.10	--	78.51	

For net value/acre, means within a column with the same letter are not significantly different at the 0.05 probability level.
CV - coefficient of variation.
OSL - observed significance level, or probability of a greater F value.
LSD - least significant difference at the 0.05 level, †indicates significance at the 0.10 level, NS - not significant.
Note: some columns may not add up due to rounding error.

Assumes:
$3.00/cwt ginning cost.
$250/ton for seed.
Value for lint based on CCC loan value from grab samples and FBRI HVI results.

[1] - Seed/technology cost does not include any rebates that may be available from seed companies based on quantities purchased.

Table 4. HVI fiber property results from the Dawson County Irrigated RACE Variety Trial, AGCARES - Texas A&M AgriLife Research Farm, Lamesa, TX, 2013.

Entry	Micronaire	Staple	Uniformity	Strength	Elongation	Leaf	Rd	+b	Color grade	
	units	32^{nds} inch	%	g/tex	%	grade	reflectance	yellowness	color 1	color 2
Stoneville 4946GLB2	4.3	32.6	78.6	29.9	8.6	2.7	73.5	9.4	3.7	1.3
NexGen 1511B2RF	4.3	33.4	79.0	30.3	9.6	2.3	72.4	9.2	3.7	2.0
PhytoGen 367WRF	4.2	32.7	78.7	29.5	9.5	2.0	73.5	9.3	3.3	2.0
FiberMax 2011GT	4.3	33.4	79.0	29.3	7.3	2.0	74.9	8.7	3.3	1.0
Deltapine 1044B2RF	4.1	33.2	79.1	29.7	9.5	2.3	73.7	9.0	3.7	1.3
PhytoGen 499WRF	4.0	32.9	79.8	30.8	8.8	2.3	72.7	9.2	3.7	1.7
FiberMax 2989GLB2	4.1	33.3	79.3	29.7	8.0	3.3	74.3	9.1	3.3	1.3
NexGen 3348B2RF	4.0	32.7	78.8	29.3	8.3	2.7	72.8	9.1	4.0	1.7
Test average	4.1	33.0	79.1	29.8	8.7	2.5	73.5	9.1	3.6	1.5
CV, %	6.9	2.7	1.5	3.4	12.1	23.5	1.6	3.2	--	--
OSL	0.8034	0.9065	0.9386	0.6082	0.1665	0.1894	0.2190	0.2193	--	--
LSD	NS	NS	NS	NS	NS	NS	NS	NS	--	--

CV - coefficient of variation.
OSL - observed significance level, or probability of a greater F value.
LSD - least significant difference at the 0.05 level, NS - not significant

TITLE:

Replicated Dryland RACE Variety Demonstration, Lamesa, TX - 2013

AUTHORS:

Mark Kelley, Kristie Keys, Hayden Alexander, Tommy Doederlein and Gary Roschetzky; Extension Agronomist – Cotton, Extension Assistants – Cotton, EA-IPM Dawson/Lynn Counties and CEA-ANR Dawson County

MATERIALS AND METHODS:

Varieties:	Deltapine 1044B2RF, FiberMax 1944GLB2, FiberMax 2989B2F, NexGen 1511B2RF, NexGen 5315B2RF, PhytoGen 499WRF, PhytoGen 367WRF and Stoneville 4946GLB2
Experimental design:	Randomized complete block with three (3) replications.
Seeding rate:	4.0 seed/row-ft in 40 inch row spacings with a John Deere MaxEmerge XP Vacuum planter on prepared, listed rows
Plot size:	4 rows by variable length (253-872 ft)
Planting date:	15-May
Weed management:	Preplant application of trifluralin was applied at a rate of 1.5 pt/acre on 11-April and a rolling cultivator and rodweeder were used on 12-April and 24-April, respectively. Roundup PowerMax was applied over-the-top at 28 oz/acre on 19-June and at 28 oz/acre on 24-June.
Irrigation:	To insure germination, 1.00” inch of irrigation was applied preplant.
Harvest aids:	Harvest aids included 1 qt/acre Bollbuster + 1 oz/acre Sharpen with 1% v/v crop oil on 25-September followed by 3 oz/acre ET with 1% v/v crop oil on 1-October.
Harvest:	Plots were harvested on 24-October using a commercial John Deere 7445 with field cleaner. Harvested material was transferred into a weigh wagon with integral electronic scales to determine individual plot weights. Plot yields were adjusted to lb/acre.
Gin turnout:	Grab samples were taken by plot and ginned at the Texas A&M AgriLife Research and Extension Center at Lubbock to determine gin turnouts.
Fiber analysis:	Lint samples were submitted to the Texas Tech University – Fiber and Biopolymer Research Institute for HVI analysis, and USDA Commodity Credit Corporation (CCC) loan values were determined

for each variety by plot.

Ginning cost and seed values: Ginning costs were based on $3.00 per cwt. of burr cotton and seed value/acre was based on $250/ton. Ginning cost did not include check-off.

Seed and Technology fees: Seed and technology costs were calculated using the appropriate seeding rate (4.0 seed/row-ft) for the 40-inch row spacing and entries using the online Plains Cotton Growers Seed Cost Comparison Worksheet available at: http://plainscotton.org/Seed/PCGseed13.xls.

RESULTS AND DISCUSSION:

Agronomic data including plant population, nodes above white flower (NAWF) and final plant map data are included in Tables 1 and 2.

Significant differences were noted for most yield and economic parameters (Table 3). Stripper harvested lint turnout averaged 37.5% across all varieites. Seed turnouts averaged 48.8% with a high of 50.5% for NexGen 5315B2RF and low of 45.5% for NexGen 1511B2RF. Lint yields ranged from a low of 214 lb/acre (FiberMax 2989GLB2) to a high of 349 lb/acre (Stoneville 4946GLB2). Lint loan values ranged from a low of $0.4618/lb to a high of $0.4715/lb for NexGen 1511B2RF and FiberMax 2989GLB2, respectively. Lint value was not significant with a test average of $137.51/acre. When subtracting ginning and seed and technology costs, the net value/acre averaged $91.60, and ranged from a high of $117.13 for Stoneville 4946GLB2 to a low of $45.38 for FiberMax 2989GLB2, a difference of $72.05/acre.

Significant differences were observed for most fiber quality parameters at this location (Table 4). Micronaire values ranged from a low of 4.4 for NexGen 1511B2RF and PhytoGen 367WRF to a high of 4.8 for Deltapine 1044B2RF. Staple averaged 31.1 across all varieties with a low of 29.8 (NexGen 1511B2RF) and a high of 31.8 (FiberMax 2989GLB2). Uniformity was significant at the 0.10 level and averaged 77.9%. Strength ranged from a low of 26.4 g/tex for FiberMax 1944GLB2 to a high of 28.9 g/tex for PhytoGen 499WRF. No significant differences were observed among varieties for percent elongation (8.6% avg), Rd or reflectance (72.5 avg), and +b or yellowness (9.9 avg). Leaf grades were mostly 1 and 2, and color grades were mostly 21 and 31.

These data indicate that substantial differences can be obtained in terms of net value/acre due to variety selection. Additional multi-site and multi-year applied research is needed to evaluate varieties across a series of environments.

ACKNOWLEDGMENTS:

Appreciation is expressed to Drs. Wayne Keeling and Danny Carmichael, Texas A&M AgriLife Research Systems Agronomist - Lubbock and Research Associate - AGCARES, Lamesa. Further assistance with this project was provided by Dr. Jane Dever and Ms. Valerie Morgan - Texas A&M AgriLife Research and Extension Center, Lubbock, and Dr. Eric Hequet - Associate Director, Fiber and Biopolymer Research Institute, Texas Tech University. Furthermore, we greatly appreciate funding for HVI testing from the Cotton Fibers Initiative Fund.

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Table 1. Inseason plant measurement results from the Dawson County Dryland RACE, AGCARES Farm, Lamesa, TX, 2013.

Entry	Plant population		Nodes above white flower (NAWF)	
			30-Jul	8-Aug
	plants/row ft	plants/acre		
Deltapine 1044B2RF	3.3	43,270	6.4	3.5
FiberMax 1944GLB2	3.3	43,705	5.7	3.5
FiberMax 2989GLB2	3.3	43,415	5.7	4.0
NexGen 1511B2RF	3.4	45,012	5.5	4.1
NexGen 5315B2RF	2.7	35,719	6.7	3.5
PhytoGen 367WRF	3.3	42,834	6.2	3.7
PhytoGen 499WRF	3.4	44,431	5.5	4.1
Stoneville 4946GLB2	3.7	48,352	6.1	3.9
Test average	3.3	43,342	6.0	3.8
CV, %	11.7	12.0	11.5	20.9
OSL	0.2370	0.2817	0.3210	0.9126
LSD	NS	NS	NS	NS

For NAWF, numbers represent an average of 5 plants per variety per rep (15 plants per variety)
CV - coefficient of variation.
OSL - observed significance level, or probability of a greater F value.
LSD - least significant difference at the 0.05 level, NS - not significant

Table 2. Final plant map results from the Dawson County Dryland RACE, AGCARES Farm, Lamesa, TX, 2013.

Entry	Final plant map									
	plant height (inches)	node of first fruiting branch	total mainstem nodes	height to node ratio	total fruiting branches	1st position retention (%)	2nd position retention (%)	total retention (%)	1st five retention (%)	open boll (%)
Deltapine 1044B2RF	15.0	6.9	14.9	1.0	9.0	38.3	16.5	29.15	56.0	64.3
FiberMax 1944GLB2	15.9	7.3	15.5	1.0	9.2	35.5	23.8	30.59	53.3	56.2
FiberMax 2989GLB2	14.6	6.6	14.9	1.0	9.3	35.9	22.7	30.14	58.7	62.8
NexGen 1511B2RF	17.4	6.8	15.5	1.1	9.7	37.3	25.3	32.95	61.7	67.2
NextGen 5315B2RF	14.5	6.5	14.3	1.0	8.7	26.0	17.6	22.27	41.3	66.4
PhytoGen 367WRF	15.6	7.7	15.9	1.0	9.3	32.9	20.6	27.44	50.7	38.7
PhytoGen 499WRF	14.5	6.5	13.9	1.0	8.5	27.6	17.1	23.00	40.0	70.3
Stoneville 4946GLB2	16.5	6.7	14.9	1.1	9.2	43.8	27.6	36.71	66.7	36.6
Test average	15.5	6.9	15.0	1.0	9.1	34.7	21.4	29.03	53.5	57.8
CV, %	6.7	7.2	5.1	6.2	6.5	26.3	48.8	24.2	25.6	25.2
OSL	0.0326	0.1172	0.1015	0.0723†	0.3846	0.3635	0.8415	0.2744	0.2804	0.0765†
LSD	1.8	NS	NS	0.1	NS	NS	NS	NS	NS	21.0

For Final plant map, numbers represent and average of 6 plants per variety per rep (18 plants per variety)
CV - coefficient of variation.
OSL - observed significance level, or probability of a greater F value.
LSD - least significant difference at the 0.05 level, †indicates significance at the 0.10 level, NS - not significant

Table 3. Harvest results from the Dawson County Dryland RACE Variety Trial, Texas A&M AgriLife Research - AGCARES Farm, Lamesa, TX, 2013.

Entry	Lint turnout	Seed turnout	Bur cotton yield	Lint yield	Seed yield	Lint loan value	Lint value	Seed value	Total value	Ginning cost	Seed/technology cost[1]	Net value	
	-------- % --------		---------- lb/acre ----------			$/lb	---------- $/acre ----------						
Stoneville 4946GLB2	37.7	49.1	925	349	454	0.4675	163.27	56.81	220.07	27.76	74.88	117.43	a
PhytoGen 367WRF	36.2	49.7	899	325	447	0.4713	153.31	55.83	209.13	26.97	69.20	112.97	a
Deltapine 1044B2RF	38.4	49.9	851	327	425	0.4648	151.92	53.09	205.01	25.53	67.98	111.50	a
PhytoGen 499WRF	38.5	47.5	859	331	408	0.4653	154.01	51.04	205.05	25.77	69.20	110.08	a
NexGen 5315B2RF	39.0	50.5	777	303	392	0.4708	142.60	49.06	191.66	23.32	65.57	102.76	a
FiberMax 1944GLB2	36.7	48.2	744	273	358	0.4708	128.57	44.78	173.35	22.31	74.88	76.16	b
NexGen 1511B2RF	36.6	45.5	622	228	283	0.4618	105.34	35.39	140.74	18.67	65.57	56.49	bc
FiberMax 2989GLB2	36.8	50.4	583	214	293	0.4715	101.06	36.69	137.75	17.48	74.88	45.38	c
Test average	37.5	48.8	783	294	383	0.4680	137.51	47.84	185.35	23.48	70.27	91.60	
CV, %	3.4	1.5	9.1	9.2	9.0	2.4	9.2	9.0	9.2	9.1	--	16.2	
OSL	0.1244	<0.0001	0.0002	0.0001	0.0001	0.9334	0.0001	0.0001	0.0001	0.0002	--	0.0001	
LSD	NS	1.3	124	47	60	NS	22.16	7.56	29.71	3.73	--	25.99	

For net value/acre, means within a column with the same letter are not significantly different at the 0.05 probability level.
CV - coefficient of variation.
OSL - observed significance level, or probability of a greater F value.
LSD - least significant difference at the 0.05 level, NS - not significant.
Note: some columns may not add up due to rounding error.

Assumes:
$3.00/cwt ginning cost.
$250/ton for seed.
Value for lint based on CCC loan value from grab samples and FBRI HVI results.

[1] - Seed/technology cost does not include any rebates that may be available from seed companies based on quantities purchased.

Table 4. HVI fiber property results from the Dawson County Dryland RACE Variety Trial, Texas A&M AgriLife Research - AGCARES Farm, Lamesa, TX, 2013.

Entry	Micronaire	Staple	Uniformity	Strength	Elongation	Leaf	Rd	+b	Color grade	
	units	32^{nds} inch	%	g/tex	%	grade	reflectance	yellowness	color 1	color 2
Deltapine 1044B2RF	4.8	30.3	77.7	27.4	9.2	2.0	73.2	9.9	3.0	2.0
FiberMax 1944GLB2	4.5	31.7	77.3	26.4	6.7	2.0	74.2	9.3	3.3	1.7
FiberMax 2989GLB2	4.7	31.8	77.7	26.9	6.8	1.3	72.1	9.7	3.7	2.0
NexGen 1511B2RF	4.4	29.8	76.1	27.9	9.4	2.7	72.6	10.0	3.0	2.0
NexGen 5315B2RF	4.5	31.7	78.5	27.0	8.9	1.0	71.8	10.1	3.3	2.0
PhytoGen 367WRF	4.4	31.4	78.8	27.6	8.8	1.7	72.5	10.0	3.0	2.0
PhytoGen 499WRF	4.5	30.8	78.0	28.9	10.1	2.3	71.4	10.1	3.7	2.0
Stoneville 4946GLB2	4.6	31.5	79.0	28.8	8.8	2.3	72.1	10.1	3.3	2.0
Test average	4.5	31.1	77.9	27.6	8.6	1.9	72.5	9.9	3.3	2.0
CV, %	3.1	1.7	1.3	2.9	4.9	20.9	1.7	1.6	--	--
OSL	0.0279	0.0021	0.0575†	0.0171	<0.0001	0.0027	0.2630	0.0002	--	--
LSD	0.2	0.9	1.4	1.4	0.7	0.7	NS	0.3	--	--

CV - coefficient of variation.
OSL - observed significance level, or probability of a greater F value.
LSD - least significant difference at the 0.05 level, †indicates significance at the 0.10 level, NS - not significant

TITLE:

Results of the Root-Knot Nematode (RKN) Cotton Variety Performance Test and Nursery at AG-CARES, Lamesa, TX, 2013

AUTHORS:

Jane K. Dever, Terry A. Wheeler, Carol Mason Kelly and Valerie Morgan; Associate Professor, Professor, Assistant Research Scientist and Research Associate

MATERIALS AND METHODS:

Test:	R-K Nematode Variety
Planting Date:	May 30th
Design:	Randomized Complete Block, 4 replications
Plot Size:	2-row plots, 20 ft
Row Spacing:	40-in
Planting Pattern:	Solid
Herbicide:	Trifluralin @ 1.5 pt/A applied pre-plant
	Caparol @ 1.5pt/A applied May 31st
	Staple @ 2.0 oz/A applied June 21
Fertilizer:	11-40-0 lbs/A applied pre-plant
Irrigations:	2.75 acre-in applied pre-plant
	8.8 acre-in applied May-September
Growth Regulators:	Pix 12 oz/A applied July 30
Harvest Aid:	Prep @ 3pt/A + ET @ 2 oz/A November 8
Harvest Date:	December 4th

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. Texas A&M AgriLife Research cotton breeding program at Lubbock utilizes the same location to select progeny from RKN resistant breeding populations and advance promising lines for yield testing.

Variety Test

Twenty-five cotton varieties and experimental strains were submitted for small-plot, replicated testing in a field where root-knot nematodes were known to have been present. The highest-yielding variety was PHY 499 WRF at 2,215 pounds of lint per acre (Table 1). The next 18 varieties, in descending yield order, were not significantly different in yield from PHY 499

WRF. FM 2011GT allowed the lowest level of nematode reproduction in 2013 while obtaining yield of 1,964 pounds of lint per acre (Table 1). A new variety from Deltapine, DP 1454*NR* B2RF equaled the low nematode reproduction in FM 2011GT, and produced 1,965 pounds of lint per acre. Experimental lines that performed well in terms of yield for 2013 include Phytogen PHX 4433-25 WRF, also having second lowest level of nematode reproduction, and Monsanto MON 13R341B2R2. Test yield average was 1,870 pounds per acre with a coefficient of variation of 17.7 %.

Fiber quality evaluations are not available at the time of the 2013 Annual Report publication, and will be added to the website when available.

Root-knot Nematode Nursery

Two hundred and nine individual plant selections harvested in 2012 were screened in the greenhouse during 2013; 127 are equivalent in root galling to resistant check M240. Because of fairly low field pressure in 2012, all of the 2012 progenies were planted in a nursery under drip irrigation at Lamesa where RKN numbers were higher. The nursery was planted in 1-row, 20 ft. un-replicated plots on May 30. Fourteen new F_2 populations were evaluated and 127 individual plant selections were harvested in 2013. An additional nursery was planted this year for 144 F_3 and advanced generation populations and 121 individual plants were selected from this nursery. Selections were based on greenhouse screening from the previous generation plant selection, boll type, maturity, yield potential and fiber quality. All individual plant selections were screened in the greenhouse for gall production since RKN pressure was variable in the nursery. Three rows were selected for 2014 yield testing and these lines were screened in the greenhouse for both gall production and egg reproduction. Plant selections with good RKN response results with data that indicate improved fiber quality, boll type, and yield potential will be considered for advancement to the 2014 nursery.

Table 1. Yield and agronomic results of the drip-irrigated root-knot nematode cotton variety test conducted at AG-CARES, Lamesa, TX, 2013

		Agronomic Properties												
		% Turnout		% Lint		Boll	Seed	Lint	Seed per	% Open Bolls	Storm		Root-knot	Log10
Designation	Yield	Lint	Seed	Picked	Pulled	Size	Index	Index	Boll	1-Nov	Resistance	Height	/500 cc soil	P=0.05
PhytoGen PHY 499 WRF	2215	28.0	42.9	38.9	31.5	5.6	10.5	7.1	30.7	70	4	33	2,420	ab
NexGen NGX 3305B2RF	2200	27.7	45.3	35.6	28.7	5.1	10.8	6.3	28.7	81	5	32	4,035	a
PhytoGen PHX 4433-25 WRF	2191	28.3	44.6	39.1	32.2	5.5	9.7	6.4	33.3	74	5	31	630	bc
NexGen NG 1511 B2RF	2113	31.0	42.2	40.1	31.6	5.4	11.0	7.9	27.3	78	4	31	5,490	ab
Stoneville ST 5458B2F	2089	27.6	45.2	37.1	30.5	6.1	11.9	7.4	30.8	70	4	31	13,590	a
Monsanto MON 13R341B2R2	2055	27.0	43.4	38.0	29.9	6.1	10.9	7.1	32.7	69	3	32	2,820	ab
Stoneville ST 4946GLB2	2035	28.7	44.9	38.2	31.1	6.9	12.6	8.1	32.3	75	6	29	3,325	a
NexGen NG 4111 RF	2031	27.8	44.6	37.7	30.3	5.7	11.1	7.0	30.8	82	5	28	3,645	ab
Deltapine DP 1454*NR* B2RF	1965	28.2	43.2	40.6	31.9	6.2	10.4	7.4	33.6	59	5	36	1,640	abc
FiberMax FM 2011GT	1964	28.7	43.0	40.1	32.1	6.8	12.1	8.5	32.6	80	7	29	50	c
NexGen NG 4010 B2RF	1940	27.2	45.3	36.6	29.3	5.5	11.3	6.9	29.7	88	4	29	4,200	ab
Deltapine DP 1044 B2F	1914	27.7	46.7	36.1	29.4	5.0	10.2	6.1	29.6	66	4	29	10,230	a
FiberMax FM 1944GLB2	1895	26.9	44.1	36.4	29.6	5.8	11.3	6.8	31.1	76	5	29	2,210	ab
FiberMax FM 9160B2F	1891	27.9	45.2	37.3	30.5	5.8	11.1	7.0	30.9	85	6	30	3,450	a
NexGen NG 3348 B2RF	1838	27.2	46.1	36.6	29.6	5.9	12.0	7.3	29.8	83	5	27	4,695	ab
Deltapine DP 1219 B2RF	1829	27.0	44.2	39.5	31.0	5.2	8.7	6.0	35.2	64	4	36	3,930	a
NexGen NGX 3306B2RF	1805	28.2	46.1	37.9	30.6	5.5	10.5	6.7	31.2	70	5	32	5,610	a
Deltapine DP 174 RF	1778	28.7	44.9	38.7	30.6	6.0	10.7	7.1	32.9	71	4	29	4,470	ab
PhytoGen PHY 367 WRF	1765	27.1	43.0	37.8	29.7	5.7	10.1	6.5	33.3	79	4	28	1,320	ab
PhytoGen PHX 4433-27 WRF	1715	27.7	47.0	37.3	29.9	5.4	10.2	6.4	31.7	78	4	32	1,930	ab
NexGen NG 2051 B2RF	1686	24.2	46.0	32.7	25.2	5.5	11.1	5.8	31.3	86	6	26	7,325	a
NexGen NG 4012 B2RF	1683	27.7	44.9	38.0	30.2	5.7	10.8	7.0	30.9	80	5	30	17,970	a
PhytoGen PHY 339 WRF	1596	29.3	44.5	37.2	29.9	5.3	9.9	6.2	32.0	80	4	32	5,310	a
NexGen NGX 2306B2RF	1368	24.4	44.4	34.6	27.7	5.6	10.7	5.9	33.0	80	5	33	9,450	a
LA001	1178	25.4	41.6	37.8	29.7	6.6	12.9	8.1	30.7	58	5	30	7,890	a
Mean	1870	27.6	44.5	37.6	30.1	5.7	10.9	6.9	31.4	75	5	30		
c.v.%	17.7	4.4	3.7	2.1	2.4	5.3	5.4	5.4	7.3	11.5	18.7	8.9		
LSD 0.05	469	1.7	2.3	1.6	1.5	0.6	1.2	0.8	4.8	12	1	4		

TITLE:

The effect of Irrigation and Crop Rotation on Root-knot Nematode Population Density

AUTHORS:

Terry Wheeler and Aaron Osborn, Texas A&M AgriLife Research, Lubbock.

MATERIALS AND METHODS:

A wheat/cotton rotation began in 2011 in wedge 8, and in wedge 7 in 2012. By the fall of 2013, both of those wedges had lower root-knot nematode population densities, particularly in the high irrigation rate, than did the irrigated cotton wedges (Table 1).

Table 1. Root-knot nematode density/500 cm^3 soil in the fall of 2013 associated with different cropping systems and irrigation rates.

Wedge	**Cropping system**[a]	**Irrigation Rate**			
		High	**Medium**	**Low**	**Dry**
1	CCC	826 a	446 ab	0 c	
2	CCC	213 a	183 cd	882 a	
3	PCC	286 a	756 a	655 a	
4	CCC	-----	-----	----	326 a
5	CCC	973 a	1,123 a	502 ab	
6	CCC	-----	-----	----	17 b
7	CWC	73 b	123 cd	0 c	
8	WCW	0 b	46 d	0 c	
9	CCC	606 a	279 bc	35 b	

[a]The first letter represents the crop in 2011, the middle letter in 2012, and the third letter is the crop in 2013. P=peanut, C = cotton and W= wheat.

TITLE:

Management of Root-knot Nematodes with combinations of Nematode Resistant Variety and Available Commercial Chemicals.

AUTHORS:

Terry Wheeler and Aaron Osborn, Texas A&M AgriLife Research, Lubbock.

MATERIALS AND METHODS:

Plot size: 35 ft. long, 4 rows wide, with 6 replications per variety/chemical treatment combination.

Varieties tested: Fibermax (FM) 9160B2F (susceptible to root-knot nematode); Phytogen (PHY) 367WRF (partially resistant to root-knot nematode).

Chemical treatments: None; Cruiser treated seed (C); Avicta Complete Cotton (A); C+Vydate CLV (17 oz/acre); A+Vydate CLV (17 oz/acre); Temik 15G (5 lbs/acre); Telone II (3 Gal/acre) + C.

FM 9160B2F had more galls/root system (13) than did PHY 367WRF (7). There were no chemical treatment differences in root galling (Table 1). Root-knot nematode density was higher for FM 9160B2F (10,886/500 cm^3 soil) than for PHY 367WRF (5,025/500 cm^3 soil). There were no chemical treatment differences with respect to root-knot nematode population density. Lint yield was higher for PHY 367WRF (1,683 lbs of lint/acre) than for FM 9160B2F (1,430 lbs of lint/acre). There were no chemical treatment differences for FM 9160B2F, however, with PHY 367WRF, plots treated with Temik 15G had higher yields than all other treatments except for Cruiser+Vydate (Table 1). PHY 367WRF had a higher net value ($853/acre) than did FM 9160B2F ($707/acre). There were no differences in net value between the different chemical treatments for FM 9160B2F, however with PHY 367WRF, Temik 15G treated plots had higher net value than all other treatments except Cruiser + Vydate (Table 1).

Table 1. Effect of root-knot nematode on various chemicals[a] and varieties[b] at the Lamesa site.

Chem	Galls/root		RK/500 cm^3 soil		Lbs of Lint/acre		Net Return ($/acre)[c]	
	FM	PHY	FM	PHY	FM	PHY	FM	PHY
1	13 a	3 a	9,160 a	9,440 a	1,399 a	1,610 bc	712 a	834 b
2	14 a	12 a	11,320 a	11,720 a	1,430 a	1,598 bc	722 a	820 c
3	15 a	14 a	10,860 a	2,380 a	1,451 a	1,590 c	725 a	807 c
4	17 a	6 a	10,280 a	2,900 a	1,359 a	1,791 ab	676 a	923 ab
5	13 a	5 a	11,540 a	1,913 a	1,377 a	1,630 bc	678 a	824 b
6	5 a	5 a	10,780 a	3,620 a	1,469 a	1,882 a	734 a	970 a
7	13 a	4 a	12,260 a	3,200 a	1,527 a	1,682 bc	701 a	792 c

[a]Chemial (CHEM) treatments 1-7 were:) none; 2) Cruiser (C) treated seed; 3) AVICTA (A) Complete Cotton; 4) C + Vydate CLV applied around the 4th leaf-stage with 17 oz/acre banded; 5) A+ Vydate CLV applied around the 4th leaf-stage with 17 oz/acre banded; 6) Temik 15G at 5 lbs/acre; and7) Telone II applied preplant at 3 gal/acre + C. [b]Varieties were FiberMax 9160B2F (FM) and Phytogen 367WRF (PHY). [c]Net Return was calculated by multiplying the yield x loan value minus the chemical and variety costs.
[d]Different letters within a column indicate that treatments are significantly different at P=0.05.

TITLE:

Cotton yield response to cotton fleahopper acute infestations as influenced by irrigation level treatments, Lamesa, TX, 2013.

AUTHORS:

Megha Parajulee, Abdul Hakeem, Stanley Carroll, and Wayne Keeling; Professor, Research Associate, Research Scientist, and Professor, Texas A&M AgriLife Research

MATERIALS AND METHODS:

Plot Size:	4 rows by 200 feet, 3 replications
Planting Date:	June 5, 2013
Varieties:	PHY 367WRF
Fertilizer:	100-35-0
In-season Irrigation:	Low = 4.1 inches; High = 8.1 inches
Insect Treatments:	Control (zero cotton fleahopper); Cotton fleahopper infested (5 nymphs per plant)
Insect Release Date:	August 6, 2013 (last effective fleahopper susceptible stage)
Harvest Date:	November 2, 2013 (hand-harvested)

Cotton fleahopper feeding injury was evaluated in a high yielding cotton cultivar, Phytogen 367 B2RF, as affected by irrigation level. Two irrigation levels were evaluated, High (8.1") and Low (4.1"), under a center pivot irrigation system. The experiment consisted of 2 irrigation levels (high and low) and two cotton fleahopper augmentation treatments (5 cotton fleahopper nymps per plant versus no fleahopper augmentation as control). Each treatment plot consisted of 10 plants and the entire test was replicated three times, with a total of 12 experimental units.

Conditions conducive to cotton fleahopper emergence were simulated in a laboratory environment in order to induce hatching of overwintered eggs embedded in the woolly croton stems that were collected from the Brazos Valley, and emerged cotton fleahoppers were subsequently reared using fresh green beans as a feeding substrate. A single release of nymphal cotton fleahoppers was timed to simulate the acute late infestation of cotton fleahoppers while cotton is still vulnerable to the fleahopper injury, which is approximately around the first observation of cotton flower in test plots. The release was done on August 6 by aspirating third- to fourth-instar cotton fleahopper nymphs from the laboratory colony, transferring them into 0.75" X 1.5" plastic vials, then cautiously and methodically depositing them onto the terminals of plants in each treatment plot at the rate of 5 nymphs per plant; the control plots received no fleahoppers. There was no natural infestation of cotton fleahopper at the experimental farm, so the control plots did not require any insecticidal intervention. Post-release data collection included a pre-harvest complete plant mapping and lint yield.

RESULTS AND DISCUSSION:

Harvestable boll density (number of harvestable bolls per plant) did not significantly vary between fleahopper augmented and control plots (Fig. 1). Nevertheless, the difference in total number of harvestable bolls under 'Low' water regime (1.4 bolls per plant) was numerically greater than that for 'High' water regime (0.4 bolls per plant), suggesting that 'High' water regime compensated for the fruit loss caused by fleahopper injury. Lint yield varied with fleahopper augmentation treatment under 'Low' water regime, but it did not vary under 'High' water regime. Lint yield values were 781 and 998 lbs per acre for 'Low' water regime and 1,271 and 1,380 lbs/acre for 'High' water regime in control and fleahopper augmented plots, respectively (Fig. 2). Lint yield was significantly lower due to cotton fleahopper infestation under 'Low' water regime, but the effect was not as pronounced and not significant under 'high' water regime, indicating plants' ability to compensate for fleahopper-induced fruit loss under high irrigation production system.

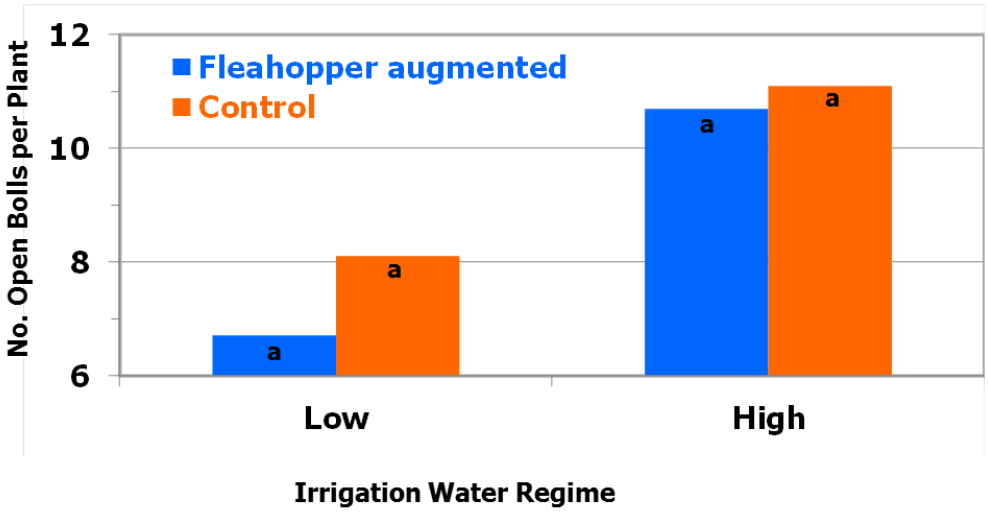

Fig. 1. Average number of total open (harvestable) bolls per plant following a simulated acute infestation of cotton fleahoppers, achieved by augmenting 5 nymphs per plant during the third week of squaring, under low and high irrigation regimes, Lamesa, Texas, 2013.

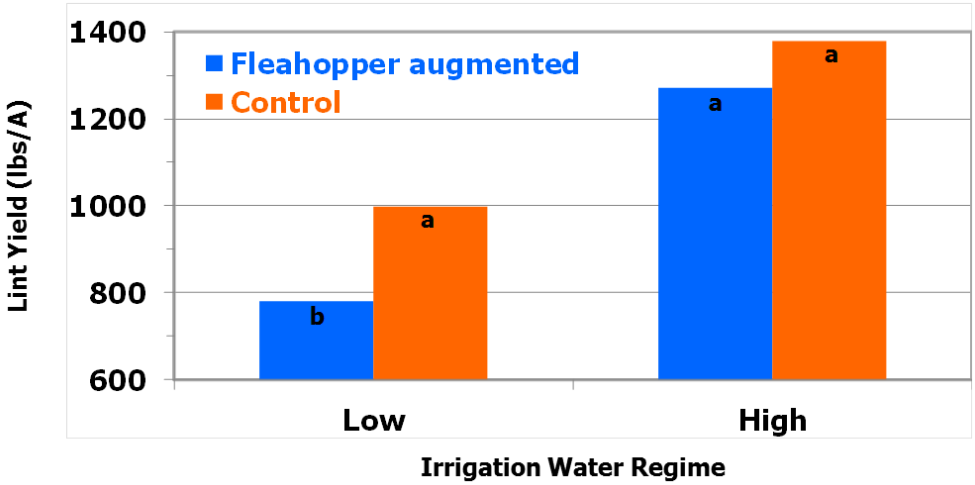

Fig. 2. Average lint yield following a simulated acute infestation of cotton fleahoppers, achieved by augmenting 5 nymphs per plant during the third week of squaring, under low and high irrigation regimes, Lamesa, Texas, 2013.

TITLE:

Evaluation of Experimental Nematicide Seed Treatments in Cotton, 2013.

AUTHORS:

Jason Woodward, Plant Pathologist, Texas A&M AgriLife Extension Service, Lubbock

MATERIALS AND METHODS:

Plot size:	2-rows by 35 feet, five replications
Soil type:	Amarillo fine sandy loam
Planting date:	8-May
Treatments:	Various experimental seed treatments
Harvest date:	n/a

RESULTS AND DISCUSSION:

With the loss of Temik 15G, there has been an emphasis placed on identifying alternative management options. While efforts have been focused mainly on variety performance, additional field trials were initiated in 2013 to evaluate experimental nematicide seed treatments. A total of 10 treatments were compared in this trial. Differences in final stand establishment, as well as mid and late season nematode populations were observed (Table 1). This trial was not taken to yield. Overall, stand establishment was relatively poor; however, three of the 10 treatments (1, 2, and 3) provided adequate stands, whereas, stands for treatments 5 and 10 were intermediate. Levels of galling were similar among treatments. Mid-season nematode densities ranged from 160 to 880 second state juveniles (J2's) per pint of soil. Final population densities were similar for all treatments except treatment 2; where 2600 J2's were recovered. These results suggest that some of the experimental nematicides evaluated may have activity towards root-knot nematodes; however, additional studies are needed.

Table 1. Effect of experimental seed treatment nematicides on plant stand, galling and root-knot nematode densities†

		Stand	Galls	Root-knot (J's pint soil^{-1})	
Trt	**Description**	**(plants ft^{-1})**	**(# plant^{-1})**	**11-Jul**	**8-Oct**
1	Exp. #1	2.29 a	1.6 a	600 a	1140 b
2	Exp. #2	2.11 a	2.0 a	180 c	2600 a
3	Exp. #3	2.14 a	1.4 a	540 ab	1160 b
4	Exp. #4	1.03 cd	0.9 a	240 bc	240 b
5	Exp. #5	1.12 bc	1.3 a	880 a	280 b
6	Exp. #6	0.81 de	1.0 a	600 a	340 b
7	Exp. #7	0.99 cde	1.3 a	160 c	260 b
8	Exp. #8	0.95 cde	1.8 a	220 bc	120 b
9	Exp. #9	0.72 e	1.2 a	220 bc	340 b
10	Exp. #10	1.34 b	1.4 a	780 a	260 b
LSD ($P \leq 0.05$)		**0.30**	**ns**	**355**	**1265**

†Densities represent the number of second stage juveniles per pint of soil. Means within a column followed by the same letter are not different according to Fisher's Protected LSD.

TITLE:

Effects of cotton harvest aid chemical combinations at AG-CARES, Lamesa, TX, 2013.

AUTHORS:

Wayne Keeling, Justin Spradley, Joel Webb, and Macy Sutherland; Professor, and Research Assistants.

MATERIALS AND METHODS:

Plot Size:	2 rows by 30 feet, 3 replications
Planting Date:	May 31
Varieties:	Phytogen 499WRF
Herbicides:	Trifluralin, Roundup PowerMax
Fertilizer:	100-35-0
Irrigation In-season:	20.1”
Application Date:	October 17, 60% open bolls

RESULTS AND DISCUSSION:

This harvest aid trial was established on subsurface drip irrigated cotton on October 17. Treatments included ET + ethephon, Folex + ethephon, and ET + Folex + ethephon at varying rates. Plots were evaluated 7 and 14 days after treatment (DAT). At 7 DAT, defoliation ranged from 53-63% for all treatment combinations compared to 42% for ethephon alone and 37% for the untreated. Remaining green leaves ranged from 7-10% for all combination treatments compared to 57% for the untreated. At 14 DAT, defoliation ranged from 70-98% and green leaves were less than 10% compared to 37% for the untreated (Table 1).

ET (2 oz.) + ethephon was similar in effectiveness to Folex (12 oz./A) + ethephon. Mixtures of ET and Folex with ethephon provided similar defoliation to either product at recommended rate when combined with ethephon.

Table 1. Effect of cotton harvest aid chemical combinations on defoliation, desiccation, and green leaves at AG-CARES, Lamesa, TX 2013.

Trt No.	Treatment Name	Rate	Rate Unit	10/24/2013 Defoliation %	10/24/2013 Dessication %	10/24/2013 Green Leaves %	10/31/2013 Defoliation %	10/31/2013 Dessication %	10/31/2013 Green Leaves %
1	ET	1	fl oz/a						
	ETHEPHON	32	fl oz/a	57 a	32 a	12 c	70 d	20 a	10 c
	COC	1	% v/v						
2	ET	1.5	fl oz/a						
	ETHEPHON	32	fl oz/a	57 a	33 a	10 c	82 abc	13 bc	5 c
	COC	1	% v/v						
3	ET	2	fl oz/a						
	ETHEPHON	32	fl oz/a	55 ab	35 a	10 c	83 abc	12 bc	4 c
	COC	1	% v/v						
4	FOLEX	4	fl oz/a						
	ETHEPHON	32	fl oz/a	53 ab	23 a	23 c	85 ab	8 cd	7 c
5	FOLEX	8	fl oz/a						
	ETHEPHON	32	fl oz/a	62 a	17 ab	22 c	87 ab	8 cd	6 c
6	FOLEX	12	fl oz/a						
	ETHEPHON	32	fl oz/a	63 a	20 ab	17 c	90 a	5 d	5 c
7	FOLEX	24	fl oz/a						
	ETHEPHON	32	fl oz/a	55 ab	37 a	8 c	85 ab	11 bcd	4 c
8	ET	1	fl oz/a						
	FOLEX	4	fl oz/a						
	ETHEPHON	32	fl oz/a	53 ab	37 a	10 c	85 ab	10 bcd	5 c
	COC	1	% v/v						
9	ET	1	fl oz/a						
	FOLEX	8	fl oz/a						
	ETHEPHON	32	fl oz/a	63 a	27 a	10 c	86 ab	8 cd	6 c
	COC	1	% v/v						
10	ET	1	fl oz/a						
	FOLEX	12	fl oz/a						
	ETHEPHON	32	fl oz/a	62 a	32 a	7 c	83 abc	12 bc	4 c
	COC	1	% v/v						
11	ET	1	fl oz/a						
	FOLEX	24	fl oz/a						
	ETHEPHON	32	fl oz/a	60 a	32 a	8 c	87 ab	12 bc	4 c
	COC	1	% v/v						
12	ET	1.5	fl oz/a						
	FOLEX	4	fl oz/a						
	ETHEPHON	32	fl oz/a	53 ab	35 a	12 c	85 ab	10 bcd	5 c
	COC	1	% v/v						
13	ET	1.5	fl oz/a						
	FOLEX	8	fl oz/a						
	ETHEPHON	32	fl oz/a	58 a	27 a	15 c	85 ab	9 cd	6 c
	COC	1	% v/v						
14	ET	1.5	fl oz/a						
	FOLEX	12	fl oz/a						
	ETHEPHON	32	fl oz/a	53 ab	37 a	10 c	78 bc	17 ab	5 c
	COC	1	% v/v						
15	ET	1.5	fl oz/a						
	FOLEX	24	fl oz/a						
	ETHEPHON	32	fl oz/a	57 a	37 a	10 c	82 abc	13 bc	5 c
	COC	1	% v/v						
16	ETHEPHON	32	fl oz/a						
	COC	1	% v/v	42 bc	18 ab	40 b	75 cd	10 bcd	15 b
17	UNTREATED			37 c	7 b	57 a	53 e	10 bcd	37 a

Appendix

	January			February		
Days	Temp. Max	Temp. Min.	Precipitation	Temp. Max	Temp. Min.	Precipitation
1	42	28	0	65	26	0
2	48	20	0	61	34	0
3	36	28	0	63	31	0
4	33	28	0	66	40	0
5	53	25	0	72	32	0
6	52	24	0	72	34	0
7	51	26	0	64	39	0
8	48	26	0	59	30	0
9	43	39	1.3	71	40	0
10	55	40	0	58	32	0
11	61	39	0	60	32	0
12	49	27	0	48	29	0
13	36	22	0	58	22	0
14	34	20	0	65	24	0
15	36	20	0	45	26	0
16	52	18	0	64	23	0
17	56	31	0	69	23	0
18	60	27	0	58	37	0
19	66	25	0	57	33	0.25
20	64	30	0	51	40	0.25
21	48	30	0	58	39	0
22	63	25	0	49	24	0
23	74	33	0	60	26	0
24	77	36	0	71	30	0
25	57	46	0	40	30	0
26	66	37	0	64	24	0
27	74	47	0	49	31	0
28	74	42	0	55	25	0
29	58	34	0			
30	49	27	0			
31	62	27	0			

	March			April		
Days	Temp. Max	Temp. Min.	Precipitation	Temp. Max	Temp. Min.	Precipitation
1	57	28	0	85	44	0
2	65	28	0	67	38	0
3	80	30	0	56	37	0
4	81	48	0	75	30	0
5	54	33	0	81	36	0
6	63	27	0	83	44	0
7	75	31	0	88	43	0
8	77	48	0	87	51	0
9	66	52	0	86	40	0
10	54	36	0	55	28	0
11	70	23	0	69	29	0
12	61	36	0	80	43	0
13	69	32	0	73	50	0
14	81	38	0	88	48	0
15	86	40	0	88	48	0
16	88	40	0	84	52	0
17	77	40	0	90	55	0
18	72	43	0	58	35	0
19	70	39	0	65	29	0
20	65	35	0	79	38	0
21	83	45	0	82	42	0
22	62	43	0	89	51	0
23	77	36	0	70	36	0
24	51	24	0	62	32	0
25	50	23	0	70	46	0
26	62	24	0	86	50	0
27	77	31	0	81	50	0
28	82	40	0	85	47	0
29	79	47	0	87	47	0
30	86	47	0	94	57	0
31	75	54	0			

	May			June		
Days	Temp. Max	Temp. Min.	Precipitation	Temp. Max	Temp. Min.	Precipitation
1	81	46	0	85	67	0
2	52	37	0	86	58	0
3	67	30	0	94	68	0
4	76	41	0	105	70	0
5	73	41	0	94	63	0
6	72	49	0	77	62	0
7	85	47	0	83	61	0.4
8	88	58	0	90	61	0.2
9	87	64	0	89	63	0
10	67	53	0.2	96	65	0
11	74	49	0	95	64	0
12	79	52	0	93	67	0
13	84	48	0	93	69	0
14	88	55	0	80	68	0
15	93	58	0	87	67	0
16	96	54	0	95	67	0
17	101	60	0	97	63	0
18	99	63	0	93	64	1.2
19	92	64	0	91	68	0
20	93	51	0	95	68	0
21	81	63	0	93	73	0
22	93	53	0	95	69	0
23	97	65	0	97	71	0
24	84	62	0	95	71	0
25	87	64	0	101	71	0
26	93	60	0	104	70	0
27	95	68	0	102	70	0
28	82	68	0	100	72	0
29	94	69	0	100	72	0.1
30	96	67	0	89	69	0
31	101	67	0			

	July			August		
Days	Temp. Max	Temp. Min.	Precipitation	Temp. Max	Temp. Min.	Precipitation
1	82	65	0	97	74	0
2	84	64	0	100	69	0
3	88	59	0	101	69	0
4	89	64	0	98	76	0
5	94	65	0	98	71	0
6	95	70	0	101	70	0
7	94	68	0	100	70	0
8	94	69	0	98	68	0
9	92	68	0	94	68	0
10	96	69	0	91	69	0
11	97	69	0	94	69	0.3
12	96	68	0	95	67	0
13	98	67	0	96	67	0
14	99	63	0	82	64	1
15	73	59	0.8	89	64	0
16	71	60	1.5	90	66	0
17	76	66	0.6	93	65	0
18	81	66	0	94	66	0.3
19	84	63	0	96	60	0
20	88	65	0	93	67	0
21	89	65	0	91	66	0
22	91	68	0	93	65	0
23	95	71	0	93	70	0
24	93	70	0	93	67	0
25	94	73	0	93	68	0
26	91	72	0	89	67	0
27	89	65	0	90	65	0
28	92	62	0.1	89	67	0
29	94	70	0	94	63	0
30	99	71	0	96	66	0
31	97	71	0	97	68	0

	September			October		
Days	Temp. Max	Temp. Min	Precipitation	Temp. Max.	Temp. Min.	Precipitation
1	97	67	0	91	55	0
2	92	74	0	91	57	0
3	94	65	0	90	59	0
4	95	65	0	89	65	0
5	94	63	0	69	49	0
6	93	64	0	78	43	0
7	93	65	0	81	47	0
8	91	66	0	83	44	0
9	89	63	0	85	48	0
10	85	66	0	85	53	0
11	83	68	0	81	54	0
12	88	64	0	81	50	0
13	90	61	0	64	58	2.0
14	89	64	0	77	63	0
15	89	63	0	68	49	0
16	85	65	0	58	45	0
17	82	66	0	68	41	0
18	85	67	0	72	40	0
19	75	65	0	62	35	0
20	73	63	0	79	37	0
21	77	59	0	65	47	0
22	81	54	0	72	40	0
23	88	54	0	77	43	0
24	86	56	0	73	44	0
25	88	57	0	67	43	0
26	92	63	0	74	46	0
27	88	63	0	71	42	0
28	76	53	3.75	78	50	0
29	77	50	0	76	61	0
30	88	50	0	74	59	0.3
31				68	45	0

	November			December		
Days	Temp. Max.	Temp. Min.	Precipitation	Temp. Max.	Temp. Min.	Precipitation
1	69	42	0	64	43	0
2	66	37	0	71	37	0
3	50	42	0	78	40	0
4	74	42	0	73	40	0
5	76	50	0	38	19	0
6	61	35	0	24	16	0
7	59	29	0	17	11	0
8	57	35	0	42	17	0
9	79	33	0	3	19	0.29
10	71	40	0	42	16	0
11	72	43	0	41	25	0
12	53	32	0	40	22	0
13	54	24	0	62	31	0
14	68	32	0	51	26	0
15	75	33	0	58	22	0
16	77	55	0	67	27	0
17	78	46	0	68	28	0
18	60	44	0	66	28	0
19	72	38	0	74	39	0
20	77	54	0	46	33	1.46
21	75	34	0	53	38	0.06
22	33	25	0	44	29	0
23	31	27	0	52	25	0
24	29	27	0.4	58	23	0
25	41	29	0	47	31	0
26	47	28	0	51	25	0
27	49	24	0	53	26	0
28	56	28	0	57	31	0
29	58	27	0	38	23	0
30	68	33	0	55	20	0
31				56	21	0