

TEXAS A&M AGRI LIFE EXTENSION

Replicated LESA Irrigated RACE Variety Demonstration, Brownfield, TX - 2012

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Terry County

Objective: The objective of this project was to compare agronomic characteristics, yields, gin turnout, fiber quality, and economic returns of transgenic cotton varieties under LESA irrigated production in the Texas High Plains.

Materials and Methods:

Varieties: All-Tex Nitro-44 B2RF, Deltapine 1044B2RF, Dyna-Gro 2570B2RF, FiberMax 9170B2F, FiberMax 9170B2F Base, NexGen 1511B2RF, NexGen 4012B2RF, PhytoGen 499WRF, and Stoneville 5458B2RF

Experimental design: Randomized complete block with three (3) replications.

Seeding rate: 3.0 seed/row-ft in 40 inch row spacings. (John Deere 1700 Vacuum planter)

Plot size: 4 rows by variable length (~2660 feet)

Planting date: 24-May

Weed management: Trifluralin was applied preplant incorporated at 1.25 pt/acre across all varieties. Roundup PowerMax was applied over-the-top at 32 oz/acre with AMS on 15-June and 25-July.

Irrigation: 3.0" of irrigation were applied via LESA irrigation preplant with 10.5" of LESA irrigation during the growing season for a total of 13.5" applied irrigation.

Rainfall: Based on the nearest Texas Tech University- West Texas Mesonet station at Brownfield, rainfall amounts were:

April: 0.65"	August: 1.06"
May: 1.97"	September: 1.58"
June: 1.70"	October: 0.06"
July: 1.59"	

Total rainfall: 8.61"

Insecticides: This location is in an active boll weevil eradication zone, but no applications were made by the Texas Boll Weevil Eradication Program.

Fertilizer management: Soil test results prior to planting accounted for 43 lbs N available in the soil. The producer applied a total of 50 more lbs N for a total of 93 lbs N/acre.

Plant growth regulators: None were applied at this location.

Harvest aids: Harvest aids included an initial application of ethephon at 1 pt/acre with 2 oz/acre ET on 5-October. No additional harvest aids were required due to an early freeze event on 8-October.

Harvest: Plots were harvested on 29-October using a commercial John Deere 7450 with field cleaner. Harvested material was transferred to a weigh wagon with integral electronic scales to record individual plot weights. Plot weights were subsequently converted to lb/acre basis.

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 bur 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 (3.0 seed/row-ft) for the 40-inch row spacing and entries using the online Plains Cotton Growers Seed Cost Comparison Worksheet available at: <http://www.plainscotton.org/Seed/PCGseed12.xls> .

Results and Discussion:

Agronomic data including plant population, boll storm resistance, and final plant map data are included in Tables 1-3.

Significant differences were noted for most yield and economic parameters (Table 4). Lint turnout averaged 32.0% with a high of 36.5% for NexGen 1511B2RF and a low of 29.9% for All-Tex Nitro-44 B2RF and NexGen 4012B2RF. Bur cotton yield averaged 2437 lb/acre and ranged from a high of 2822 lb/acre for Stoneville 5458B2RF to a low of 2171 lb/acre for NexGen 4012B2RF. Lint yields varied from a low of 650 lb/acre (NexGen 4012B2RF) to a high of 925 lb/acre (NexGen 1511B2RF). Lint loan values averaged \$.5516/lb across varieties but differences were not significant. When adding lint and seed value, total values ranged from a high of \$690.48/acre for NexGen 1511B2RF to a low of \$496.57/acre for NexGen 4012B2RF. After subtracting ginning, seed costs and technology fees, the net value/acre among varieties ranged from a high of \$560.92/acre (NexGen 1511B2RF) to a low of \$379.49/acre (NexGen 4012B2RF), a difference of \$181.43.

Significant differences were observed among varieties for all fiber quality parameters at this location (Table 5). Micronaire values ranged from a low of 3.0 for All-Tex Nitro-44 B2RF to a high of 3.8 for NexGen 1511B2RF and differences were significant at the 0.10 level. Staple averaged 37.2 across all varieties with a high of 39.5 for All-Tex Nitro-44 B2RF and a low of 35.6 for NexGen 1511B2RF. Uniformity ranged from a high of 83.7% for All-Tex Nitro-44 B2RF to a low of 80.2% for Stoneville 5484B2RF with a test average of 82.0%. Strength ranged from a low of 31.4 g/tex for Stoneville 5458B2RF to a high of 35.5 g/tex for All-Tex Nitro-44 B2RF. Elongation averaged 10.0% across varieties and leaf grades were mostly 1 and 2. Color grade components of Rd (reflectance) and +b (yellowness) averaged 80.1 and 8.0, respectively and resulted in color grades of 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 Keith Harrison for the use of his land, equipment and labor for this demonstration. Further assistance with this project was provided by Dr. Jane Dever - 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 the Texas Department of Agriculture - Food and Fiber Research for funding of HVI testing.

Disclaimer Clause:

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Table 1. Inseason plant measurement results from the Terry County irrigated RACE variety demonstration, Keith Harrison Farm, Brownfield, TX, 2012.

Entry	plants/row ft	Plant population	plants/acre	Storm resistance rating (0-9)
NexGen 1511B2RF	2.9		37,752	5.7
All-Tex Nitro-44 B2RF	3.4		44,649	7.7
Dyna-Gro 2570B2RF	2.8		36,300	7.0
Deltapine 1044B2RF	3.1		40,293	5.7
FiberMax 9170B2F	3.1		39,930	7.3
FiberMax 9170B2F Base	2.9		38,478	7.3
NexGen 4012B2RF	2.8		35,937	7.0
PhytoGen 499WRF	3.2		41,382	5.7
Stoneville 5458B2RF	3.2		42,108	6.7
Test average	3.0		39,648	6.7
CV, %	9.7		9.9	6.6
OSL	0.2032		0.2121	<0.0001
LSD	NS		NS	0.8

For Storm resistance, ratings based on a scale of 0-9 where 9 represents maximum storm resistance.

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 Terry County irrigated RACE variety demonstration, Keith Harrison Farm, Brownfield, TX, 2012.

Entry	Final plant map 20-Sept						
	plant height (inches)	node of first fruiting branch	total mainstem nodes	height to node ratio	total fruiting branches	open boll (%)	
NexGen 1511B2RF	22.9	6.0	16.3	1.4	11.3	57.0	
All-Tex Nitro-44 B2RF	18.9	7.6	16.3	1.2	9.6	49.4	
Dyna-Gro 2570B2RF	20.8	8.0	16.2	1.3	9.3	31.3	
Deltapine 1044B2RF	19.4	6.5	15.9	1.2	10.3	39.0	
FiberMax 9170B2F	17.3	7.5	15.4	1.1	8.9	35.5	
FiberMax 9170B2F GS	17.9	8.0	16.5	1.1	9.5	47.3	
NexGen 4012B2RF	20.7	7.9	17.7	1.2	10.7	40.0	
PhytoGen 499WRF	23.0	8.0	16.3	1.4	9.4	23.8	
Stoneville 5458B2RF	18.8	7.2	15.5	1.2	9.3	44.3	
Test average	20.0	7.4	16.2	1.2	9.8	40.8	
CV, %	7.5	5.1	5.9	4.7	7.8	34.2	
OSL	0.0018	<0.0001	0.2518	<0.0001	0.0242	0.2212	
LSD	2.6	0.6	NS	0.1	1.3	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. Final plant map results from the Terry County irrigated RACE variety demonstration, Keith Harrison Farm, Brownfield, TX, 2012.

Entry	Fruiting and Retention 20-Sept						
	% of fruit from 1st position	% of fruit from 2nd position	total fruit	1st position retention (%)	2nd position retention (%)	total retention (%)	
NexGen 1511B2RF	67.5	32.5	8.9	52.7	36.8	46.10	
All-Tex Nitro-44 B2RF	78.8	21.2	6.0	46.1	21.3	35.80	
Dyna-Gro 2570B2RF	77.3	22.7	7.1	56.4	31.9	48.03	
Deltapine 1044B2RF	70.3	29.7	9.5	62.4	37.7	51.87	
FiberMax 9170B2F	82.0	18.0	5.6	50.1	19.0	37.53	
FiberMax 9170B2F GS	81.7	18.3	5.9	48.9	18.1	36.33	
NexGen 4012B2RF	72.3	27.7	5.9	39.6	21.3	31.87	
PhytoGen 499WRF	67.9	32.1	9.4	64.0	49.7	58.23	
Stoneville 5458B2RF	70.5	29.5	7.2	52.9	35.6	45.93	
Test average	74.3	25.7	7.3	52.6	30.2	43.52	
CV, %	10.8	31.3	21.8	15.5	37.4	18.2	
OSL	0.2254	0.2262	0.0253	0.0447	0.0384	0.0138	
LSD	NS	NS	2.7	14.1	19.5	13.7	

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 4. Harvest results from the Terry County irrigated RACE variety demonstration, Keith Harrison Farm, Brownfield, TX, 2012.

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	Net value
	%	%	lb/acre	lb/acre	lb/acre	\$/lb	\$/acre	\$/acre	\$/acre	\$/acre	\$/acre	\$/acre
NexGen 1511B2RF	36.5	51.0	2534	925	1292	0.5718	529.03	161.45	690.48	76.03	53.53	560.92 a
PhytoGen 499WRF	33.0	50.8	2745	906	1395	0.5690	515.30	174.36	689.66	82.36	58.57	548.72 ab
Stoneville 5458B2RF	31.6	53.0	2822	893	1495	0.5457	487.18	186.94	674.12	84.67	58.16	531.28 b
Dyna-Gro 2570B2RF	32.9	54.4	2412	793	1313	0.5515	437.23	164.15	601.38	72.37	58.23	470.79 c
FiberMax 9170B2F Grower Seed	32.1	53.4	2258	725	1206	0.5547	402.08	150.72	552.79	67.75	58.16	426.88 d
FiberMax 9170B2F	31.9	54.0	2249	718	1214	0.5548	398.35	151.69	550.04	67.48	58.16	424.40 d
Deltapine 1044B2RF	30.5	51.7	2296	701	1188	0.5568	390.52	148.47	538.99	68.88	54.78	415.34 d
All-Tex Nitro-44 B2RF	29.9	53.4	2443	730	1305	0.5147	375.48	163.07	538.55	73.30	55.25	410.00 d
NexGen 4012B2RF	29.9	52.4	2171	650	1138	0.5453	354.33	142.25	496.57	65.12	51.97	379.49 e
Test average	32.0	52.7	2437	782	1283	0.5516	432.17	160.34	592.51	73.10	56.31	463.09
CV, %	3.5	1.8	2.9	3.0	2.9	3.7	3.1	2.9	3.0	2.9	--	3.4
OSL	<0.0001	0.0015	<0.0001	<0.0001	<0.0001	0.1230	<0.0001	<0.0001	<0.0001	<0.0001	--	<0.0001
LSD	1.9	1.6	123	41	65	NS	22.87	8.11	30.92	3.70	--	27.23

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.

Table 5. HVI fiber property results from the Terry County irrigated RACE variety demonstration, Keith Harrison Farm, Brownfield, TX, 2012.

Entry	Micronaire	Staple	Uniformity	Strength	Elongation	Leaf	Rd	+b	color 1	color 2
	units	32 ^{nds} inch	%	g/tex	%	grade	reflectance	yellowness		
All-Tex Nitro-44 B2RF	3.0	39.5	83.7	35.5	9.7	3.3	79.7	7.4	3.0	1.0
Dyna-Gro 2570B2RF	3.2	36.2	81.5	32.1	11.0	1.0	79.9	8.3	2.0	1.0
Deltapine 1044B2RF	3.4	36.8	81.4	31.8	11.0	1.3	80.4	8.1	2.3	1.0
FiberMax 9170B2F	3.3	38.1	82.2	33.1	8.8	1.3	81.9	7.5	2.3	1.0
FiberMax 9170B2F Grower Seed	3.2	38.8	82.2	33.9	9.0	1.0	82.2	7.4	2.3	1.0
NexGen 1511B2RF	3.8	35.6	82.5	32.2	11.5	1.3	79.3	8.2	2.7	1.0
NexGen 4012B2RF	3.2	37.4	81.8	32.7	8.6	2.0	79.9	8.2	2.3	1.0
PhytoGen 499WRF	3.6	36.4	82.7	33.4	10.9	1.7	78.9	8.2	2.7	1.0
Stoneville 5458B2RF	3.4	35.9	80.2	31.4	9.8	2.3	78.5	8.5	3.0	1.0
Test average	3.3	37.2	82.0	32.9	10.0	1.7	80.1	8.0	2.5	1.0
CV, %	7.9	1.6	0.9	2.8	2.5	32.9	1.2	3.8	--	--
OSL	0.0635 [†]	<0.0001	0.0034	0.0020	<0.0001	0.0020	0.0020	0.0011	--	--
LSD	0.4	1.0	1.3	1.6	0.4	1.0	1.6	0.5	--	--

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.