



**Replicated LESA Irrigated Cotton Variety Research Trial
Under Full and Limited (15% reduction) Irrigation**

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Gaines County

Summary: There was no significant interaction between varieties and irrigation levels for the yield and economic parameters measured, which indicates that the response was consistent with all varieties and irrigations levels. Focusing solely on varieties, seed turnout and lint loan value were the only yield & economic parameters that were significantly different. When looking solely at irrigation level, all of the yield and economic parameters measured, except for lint turnout and lint loan value, were significantly different. Full irrigation had a seed turnout of 51.4%, whereas limited irrigation seed turnout was 53.2%. Full irrigated had a bur cotton yield of 1280 lb/acre & limited irrigation was 978 lb/acre. Full irrigation lint yield was 419 lb/acre, and the lint yield for the limited irrigation was 315 lb/acre. After adding lint and seed value, total value/acre was \$302.63 for the full irrigation and \$227.97 for the limited irrigation. When subtracting ginning, seed and technology fee costs, the net value/acre was \$201.97 (full irrigation) and \$136.37 (limited irrigation), a difference of \$65.60.

Focusing solely on variety, all of the HVI fiber quality parameters, except for staple and uniformity, were significantly different. Micronaire values ranged from a low of 3.6 for NexGen 4012B2RF to a high of 4.2 for Deltapine 1044B2RF. Focusing solely on irrigation level, micronaire, elongation, and (+b), were the only HVI fiber quality parameters that were significantly different.

During the 2011 growing season Gaines County experienced above normal temperatures and very little rainfall. The environmental conditions prior to and during the growing season were a limiting factor in the varieties performance overall.

Objective: The objective of this project was to compare agronomic characteristics, yields, gin turnout, fiber quality, and economic returns of transgenic cotton variety under full and limited (15% reduction) irrigated production in Gaines County.

Materials and Methods:

Varieties: All-Tex DineroB2RF, Deltapine 1044B2RF, FiberMax 2484B2F, NexGen 4012B2RF, PhytoGen 367WRF, Stoneville 5458B2F

Irrigation: This location was under a LESA center pivot.
There were two irrigations levels evaluated in the trial.

- Full irrigation
- Limited irrigation (approximately a 15% reduction).

Experimental design: Randomized complete block with 3 replications

Seeding rate: 3.5 seeds/row-ft in 40-inch row spacing

Plot size: 4 rows by variable length (402ft to 834ft long)

Planting date: 12-May

Harvest: Plots were harvested on 23-September using a commercial stripper harvester. Harvest 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 AgriLife Research and Extension Center at Lubbock to determine gin turnouts.

Fiber Analysis: Lint samples were submitted to the Fiber and Biopolymer Research Institute at Texas Tech University 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 bur cotton and seed value/acre was based on \$300/ton. Ginning costs did not include checkoff.

Seed and technology fees: Seed and technology costs were calculated using the appropriate seeding rate (3.5 seed/row-ft) for the 40 row spacing and entries using the online Plains Cotton Growers Seed Cost Comparison Worksheet available at: <http://www.plainscotton.org/Seed/PCGseed10.xls>

Results and Discussion:

There was no significant interaction between varieties and irrigation levels for the yield and economic parameters measured, which indicates that the response was consistent with all varieties and irrigations levels (Table 1 & 2).

Focusing solely on varieties, seed turnout and lint loan value were the only yield & economic parameters that were significantly different (Table 1). Seed turnout ranged from a high of 53.6 for All-Tex DineroB2RF to a low of 50.2 for Phytogen 367WRF. Lint loan value ranged from a low of \$0.4738/lb (NexGen 4012B2RF) to a high of \$0.5017/lb for FiberMax 2484B2F.

Focusing solely on irrigation level, all of the yield and economic parameters measured, except for lint turnout and lint loan value, were significantly different (Tables 2). Full irrigation had a seed turnout of 51.4%, whereas limited irrigation seed turnout was 53.2%. Full irrigated had a bur cotton yield of 1280 lb/acre & limited irrigation was 978 lb/acre. Full irrigation lint yield was 419 lb/acre, and the lint yield for the limited irrigation was 315 lb/acre. Seed yield was 651 lb/acre for full irrigation and 513 lb/acre for limited irrigation. After adding lint and seed value, total value/acre was \$302.63 for the full irrigation and \$227.97 for the limited irrigation. When subtracting ginning, seed and technology fee costs, the net value/acre was \$201.97 (full irrigation) and \$136.37 (limited irrigation), a difference of \$65.60.

Focusing solely on variety, all of the HVI fiber quality parameters, except for staple and uniformity, were significantly different (Table 3). Micronaire values ranged from a low of 3.6 for NexGen 4012B2RF to a high of 4.2 for Deltapine 1044B2F. Strength values averaged 25.9 g/tex with a high of 28.0 g/tex for Deltapine 1044B2F and a low of 24.4 g/tex for All-Tex DineroB2RF. Elongation ranged from a high of 9.1% for Deltapine 1044B2RF to a low of 6.5% for NexGen 4012B2RF. Values for reflectance (Rd) and yellowness (+b) averaged 77.6 and 10.5, respectively.

Focusing solely on irrigation level, micronaire, elongation, and (+b), were the only HVI fiber quality parameters that were significantly different (Table 4). The full irrigation micronaire was 4.1, whereas the limited irrigation micronaire was 3.8. Full irrigation had an elongation of 8.0% and limited irrigation had an elongation of 7.5%.

Conclusions:

These data indicate that substantial differences can be obtained in terms of net value/acre due to irrigation level, but not due to variety selection. During the 2011 growing season Gaines County experienced above normal temperatures and very little rainfall. The environmental conditions prior to and during the growing season were a limiting factor in the varieties performance overall.

Additional multi-site and multi-year applied research is needed to evaluate varieties and irrigation levels across a series of environments.

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Disclaimer Clause:

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Table 1. Harvest results by variety, Shelby Elam Farms, Seminole, TX, 2011.

Variety	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		
FiberMax 2484B2F	33.0	50.6	1086	360	549	0.5017	180.45	82.30	262.75	32.57	65.05	165.12
Stoneville 5458B2RF	32.1	52.7	1139	358	588	0.4788	171.71	88.16	259.87	34.17	65.05	160.65
Deltapine 1044B2RF	33.3	53.2	1173	391	622	0.4922	192.50	93.34	285.84	35.19	61.17	189.48
PhytoGen 367WRF	33.2	50.2	1183	393	594	0.4793	189.08	89.04	278.11	35.50	64.39	178.23
NexGen 4012B2RF	32.0	53.4	1045	336	558	0.4738	159.91	83.62	243.53	31.34	57.23	154.95
All-Tex Dinero B2RF	33.2	53.6	1146	363	582	0.4809	174.34	87.34	261.68	34.38	60.69	166.61
Test average	32.8	52.3	1129	367	582	0.4845	178.00	87.30	265.30	33.86	62.26	169.17
OSL	0.2606	0.0233	0.9640	0.9201	0.9746	0.0506	0.8634	0.9747	0.9339	0.9638	--	0.9429
LSD	NS	2.4	NS	NS	NS	0.0187	NS	NS	NS	NS	--	NS

OSL - observed significance level, or probability of a greater F value.

LSD - least significant difference at the 0.05 level.

Note: some columns may not add up due to rounding error.

Assumes:

\$3.00/cwt ginning cost.

\$300/ton for seed.

Value for lint based on CCC loan value from grab samples and FBRI HVI results.

Table 2. Harvest results by irrigation level, Shelby Elam Farms, Seminole, TX, 2011.

Irrigation Level	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		
Full	33.0	51.4	1280	419	651	0.4895	204.94	97.69	302.63	38.39	62.26	201.97 a
Limited (15% reduction)	32.6	53.2	978	315	513	0.4794	151.06	76.91	227.97	29.33	62.26	136.37 b
Test average	32.8	52.3	1129	367	582	0.4845	178.00	87.30	265.30	33.86	62.26	169.17
OSL	0.3943	0.0130	0.0065	0.0053	0.0177	0.0666	0.0029	0.0178	0.0054	0.0064	--	0.0053
LSD	NS	1.4	208	69	112	NS	33.37	16.83	50.17	6.24	--	43.96

For net value/acre, means within a column with the same letter are not significantly different at the 0.05 probability level.

OSL - observed significance level, or probability of a greater F value.

LSD - least significant difference at the 0.05 level.

Note: some columns may not add up due to rounding error.

Assumes:

\$3.00/cwt ginning cost.

\$300/ton for seed.

Value for lint based on CCC loan value from grab samples and FBRI HVI results.

Table 3. HVI fiber property results by variety, Shelby Elam Farms, Seminole, TX, 2011.

Variety	Micronaire	Staple	Uniformity	Strength	Elongation	Rd	+b
	units	32 ^{nds} inch	%	g/tex	%	reflectance	yellowness
FiberMax 2484B2F	3.9	32.0	78.5	26.4	7.0	80.3	9.9
Stoneville 5458B2RF	4.1	30.9	78.0	25.5	7.7	74.8	11.0
Deltapine 1044B2RF	4.2	31.1	78.4	28.0	9.1	77.8	10.6
PhytoGen 367WRF	3.8	31.3	78.5	26.2	8.5	76.0	11.1
NexGen 4012B2RF	3.6	30.9	78.0	24.8	6.5	77.9	10.3
All-Tex Dinero B2RF	4.0	31.4	77.8	24.4	7.6	78.7	10.3
Test average	3.9	31.3	78.2	25.9	7.7	77.6	10.5
OSL	<0.0001	0.1010	0.3981	0.0003	<0.0001	<0.0001	<0.0001
LSD	0.1	NS	NS	1.4	0.5	0.6	0.2

OSL - observed significance level, or probability of a greater F value.

LSD - least significant difference at the 0.05 level.

Table 4. HVI fiber property results by irrigation level, Shelby Elam Farms, Seminole, TX, 2011.

Irrigation Level	Micronaire	Staple	Uniformity	Strength	Elongation	Rd	+b
	units	32 ^{nds} inch	%	g/tex	%	reflectance	yellowness
Full	4.1	31.5	78.4	26.2	8.0	77.5	10.4
Limited (15% reduction)	3.8	31.1	78.0	25.6	7.5	77.6	10.6
Test average	3.9	31.3	78.2	25.9	7.7	77.6	10.5
OSL	<0.0001	0.0824	0.0763	0.1501	0.0013	0.5829	0.0187
LSD	0.1	NS	NS	NS	0.3	NS	0.1

OSL - observed significance level, or probability of a greater F value.

LSD - least significant difference at the 0.05 level.