



Replicated Transgenic Cotton Variety Demonstration Under LEPA Irrigation

Cooperator: AG-CARES - Lamesa Cotton Growers/Texas Agricultural Experiment Station/Texas Cooperative Extension, Lamesa, TX - 2004

**Casey Barrett, Tommy Doederlein, Randy Boman,
Mark Stelter, and Mark Kelley;
CEA-Agriculture Dawson County, EA-IPM Dawson/Lynn Counties,
Extension Agronomist-Cotton,
Extension Assistant-Cotton, and
Extension Program Specialist-Cotton**

Dawson County

Summary: Significant differences were noted for most parameters measured (Tables 1 and 2). Lint turnout ranged from 27.8% for All-Tex 40802RR, to 34.8% for Stoneville 5599BR. Lint yields varied from a low of 834 lb/acre (All-Tex 40802RR) to a high of 1176 lb/acre (Stoneville 5599BR). Lint loan values ranged from a low of \$0.4627/lb to a high of \$0.5378/lb for Stoneville 4646B2R and Stoneville 2448R, respectively. After adding lint and seed value, total value/acre ranged from a low of \$519.70 for Stoneville 4646B2R, to a high of \$706.60 for Stoneville 2448R. When subtracting ginning costs and seed and technology fees, the net value/acre among varieties ranged from a high of \$599.05 (Stoneville 2448R) to a low of \$406.44 (Stoneville 4646B2R), a difference of \$192.61. Micronaire ranged from a low of 2.9 for Deltapine 488BG/RR to a high of 3.8 for Paymaster 2326RR and Stoneville 2448R. Staple length averaged 35.3 across all varieties with a low of 33.7 and a high of 37.0. Percent uniformity ranged from a low of 79.5 (Stoneville 5599BR) to a high of 82.8 (Stoneville 2448R). A test average strength of 28.9 g/tex was observed with Deltapine 434RR producing the lowest value (26.2), and FiberMax 960RR producing the highest (31.8). Significant differences were observed among varieties for elongation (%), reflectance (Rd) and yellowness (+b), however, no differences existed for leaf values. These data indicate that substantial differences can be obtained in terms of net value/acre due to variety and technology selection.

Objective: The objective of this project was to compare yields, gin turnout, fiber quality and economics of variety and technology selection.

Materials and Methods:

Varieties: All-Tex 40801RR, All-Tex 40802RR, AFD 3602R, Beltwide Cotton Genetics 28R, Deltapine 434RR, Deltapine 488BG/RR, Deltapine 494RR, FiberMax 958LL, FiberMax 960RR, Paymaster 2326RR, Stoneville 2448R, Stoneville 4646B2R, and Stoneville 5599BR

Experimental design: Randomized complete block with 3 replications

Seeding rate: 4 seed/row-ft in 40-inch row spacing (John Deere MaxEmerge vacuum planter)

Plot size: 4 rows by variable length due to circular pivot rows (340-810 ft long).

Planting date: 7-May

Weed management: Treflan was applied preplant incorporated at 1.25 pt/acre across all varieties on 20-April. No system specific herbicides were applied on the Roundup Ready or Liberty Link varieties due to minimal weed pressure. A blanket cultivation was performed on 3-June.

Irrigation: LEPA irrigation

April:	0.00"	May:	2.75"
June:	2.90"	July:	3.70"
August:	1.00"	September:	1.00"
Total irrigation:	11.35"		

Rainfall:

April:	1.53	July:	2.52"
May:	0.07"	August:	2.14"
June:	1.84"	September:	5.86"
Total rainfall:	13.96"		
Total moisture:	25.31"		

Insecticides: No insecticides were applied at this site. This location is in an active boll weevil eradication zone, and two applications were made by the Texas Boll Weevil Eradication Program.

Fertilizer management: Preplant fertilizer consisting of 10-34-0 was applied at a rate of 150 lb/acre on 12-April. An additional 100 lbs N/acre using 32-0-0 was fertigated in two 25 lb and one 50 lb N/acre events during the growing season.

Harvest aids: Harvest aids included Boll'd (6-lb ethephon/gal) at 1.3 pt/acre + Ginstar at 4 oz/acre applied at 70 percent open bolls on 8-October, with follow-up application of GramoxoneMax at 20 oz/acre + ET defoliant at 1.5 oz/acre with COC on 1-November.

Harvest: Plots were harvested on 10-November 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 Research and Extension Center at Lubbock to determine gin turnouts.

Fiber analysis: Lint samples were submitted to the International Textile Center at Texas Tech University for HVI analysis, and USDA loan values were determined for each variety by plot.

Ginning cost

and seed values: Ginning costs were based on \$2.25 per cwt. of bur cotton and seed value/acre was based on \$125/ton. Ginning costs did not include checkoff.

Seed and technology fees: Seed and technology fee costs (Table 3) were determined by variety on a per acre basis using the manufacturer's suggested retail price for seed and appropriate technology fees for Bollgard, Bollgard II, and/or Roundup Ready and Liberty Link based on 4 seed/row-ft.

Results and Discussion:

Significant differences were noted for most parameters measured (Tables 1 and 2). Lint turnout ranged from 27.8% for All-Tex 40802RR, to 34.8% for Stoneville 5599BR. Lint yields varied from a low of 834 lb/acre (All-Tex 40802RR) to a high of 1176 lb/acre (Stoneville 5599BR). Lint loan values ranged from a low of \$0.4627/lb to a high of \$0.5378/lb for Stoneville 4646B2R and Stoneville 2448R, respectively. After adding lint and seed value, total value/acre ranged from a low of \$519.70 for Stoneville 4646B2R, to a high of \$706.60 for Stoneville 2448R. When subtracting ginning costs and seed and technology fees, the net value/acre among varieties ranged from a high of \$599.05 (Stoneville 2448R) to a low of \$406.44 (Stoneville 4646B2R), a difference of \$192.61. Micronaire ranged from a low of 2.9 for Deltapine 488BG/RR to a high of 3.8 for Paymaster 2326RR and Stoneville 2448R. Staple length averaged 35.3 across all varieties with a low of 33.7 and a high of 37.0. Percent uniformity ranged from a low of 79.5 (Stoneville 5599BR) to a high of 82.8 (Stoneville 2448R). A test average strength of 28.9 g/tex was observed with Deltapine 434RR producing the lowest value (26.2), and FiberMax 960RR producing the highest (31.8). Significant differences were observed among varieties for elongation (%), reflectance (Rd) and yellowness (+b), however, no differences existed for leaf values. These data indicate that substantial differences can be obtained in terms of net value/acre due to variety and technology selection. It should be noted that some inclement weather was encountered with low intensity rainfall and low wind events at this location prior to harvest. Picker type varieties experienced some preharvest losses due to these weather conditions. Additional multi-site and multi-year applied research is needed to evaluate varieties across a series of environments.

Acknowledgments: Appreciation is expressed to Danny Carmichael, Research Associate - AG-CARES, Lamesa; and John Everitt, Research Associate - Texas Agricultural Experiment Station (TAES), Lubbock, for their assistance with this project and to Dr. John Gannaway - TAES, Lubbock, for his cooperation.

Disclaimer Clause: Trade names of commercial products used in this report are included only for better understanding and clarity. Reference to commercial products or trade names is made with the understanding that no discrimination is intended and no endorsement by the Texas A&M University System is implied. Readers should realize that results from one experiment do not represent conclusive evidence that the same response would occur where conditions vary.

Table 1. Harvest results from the LEPA irrigated replicated transgenic cotton variety demonstration, AG-CARES, Lamesa, TX 2004.

Variety	Lint turnout	Seed turnout	Bur cotton yield	Lint yield	Seed yield	Lint loan value	Lint value	Seed value	Total value	Ginning cost	Seed-tech fee	Net value
	%	%	lb/acre	lb/acre	lb/acre	\$/lb	\$/acre	\$/acre	\$/acre	\$/acre	\$/acre	\$/acre
ST 2448R	29.9	54.1	3631	1085	1964	0.5378	583.83	122.77	706.60	81.71	25.84	599.05 a
BCG 28R	29.5	50.9	3614	1067	1839	0.5225	558.45	114.94	673.39	81.32	23.87	568.20 ab
DP 434RR	32.1	51.6	3466	1113	1789	0.4988	555.44	111.80	667.24	77.98	32.35	556.91 abc
PM 2326RR	29.2	53.8	3589	1047	1930	0.5049	528.65	120.64	649.30	80.76	20.09	548.44 abc
ST 5599BR	34.8	52.7	3375	1176	1779	0.4712	554.69	111.20	665.89	75.94	46.29	543.66 abc
FM 960RR	30.7	52.8	3664	1124	1935	0.4752	533.84	120.95	654.80	82.44	29.28	543.08 abc
AFD 3602R	29.5	55.5	3414	1007	1895	0.5007	504.29	118.42	622.71	76.81	24.01	521.89 bc
All Tex 40801RR	30.4	52.2	3292	1003	1719	0.5105	511.81	107.44	619.25	74.08	25.55	519.62 bc
DP 494RR	30.4	51.3	3419	1039	1755	0.4957	514.33	109.67	623.99	76.92	32.35	514.73 bc
DP 488BG/RR	29.9	52.3	3591	1073	1879	0.4673	502.01	117.42	619.42	80.79	45.77	492.86 cd
FM 958LL	29.0	51.0	3328	966	1697	0.5068	489.65	106.06	595.71	74.89	29.30	491.52 cd
All Tex 40802RR	27.8	56.0	3004	834	1682	0.5057	421.29	105.13	526.41	67.58	25.55	433.28 de
ST 4646B2R	30.5	53.7	2976	908	1599	0.4627	419.78	99.92	519.70	66.97	46.29	406.44 e
Test average	30.3	52.9	3413	1034	1805	0.4969	513.70	112.80	626.49	76.78	31.27	518.44
CV, %	6.9	2.2	6.3	6.3	6.3	2.5	7.3	6.3	7.1	6.3	--	7.6
OSL	0.0682	0.0001	0.0074	<0.0001	0.0120	<0.0001	0.0003	0.0119	0.0008	0.0074	--	0.0002
LSD 0.05	NS	2.0	364	110	192	0.0206	63.17	12.02	74.51	8.20	--	66.73

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:

\$2.25/cwt ginning cost.

\$125/ton for seed.

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

Table 2. HVI fiber property results from the LEPA irrigated replicated transgenic cotton variety demonstration, AG-CARES, Lamesa, TX 2004.

Variety	Micronaire	Staple	Uniformity	Strength	Elongation	Leaf	Rd	+b	Color grade	
	units	32 ^{nds} inches	%	g/tex	%	grade	reflectance	yellowness	color 1	color 2
ST 2448R	3.8	34.6	82.8	30.3	5.4	2.3	71.4	9.0	4.0	1.0
BCG 28R	3.5	35.4	80.6	27.8	4.8	3.0	70.0	8.9	4.0	1.3
DP 434RR	3.1	36.3	80.5	26.2	5.8	3.0	73.2	8.6	4.0	1.0
PM 2326RR	3.8	33.7	82.5	29.5	6.6	4.3	69.6	8.8	4.0	1.0
ST 5599BR	3.2	33.9	79.5	28.7	4.8	3.3	70.9	9.0	4.0	1.3
FM 960RR	2.9	35.9	81.3	31.8	3.4	3.0	72.8	8.3	4.0	1.0
AFD 3602R	3.2	35.1	81.7	29.2	4.6	2.3	71.0	8.8	4.0	1.0
All Tex 40801RR	3.3	34.6	81.1	27.7	6.4	2.0	71.5	8.6	4.0	1.0
DP 494RR	3.2	35.8	80.7	30.0	4.8	2.7	70.9	8.8	4.0	1.3
DP 488BG/RR	2.9	35.9	80.2	28.9	4.8	2.7	71.7	8.7	4.0	1.0
FM 958LL	3.1	37.0	82.0	31.2	3.4	2.3	71.7	8.2	4.0	1.0
All Tex 40802RR	3.1	36.2	80.2	26.5	5.1	2.7	71.1	8.5	4.0	1.0
ST 4646B2R	3.2	34.1	80.2	27.3	5.9	1.3	70.3	9.3	4.0	2.0
Test average	3.3	35.3	81.0	28.9	5.1	2.7	71.2	8.7	4.0	1.2
CV, %	4.0	1.5	1.1	2.5	7.2	35.2	1.0	3.1	--	--
OSL	<0.0001	<0.0001	0.0040	<0.0001	<0.0001	0.1298	0.0002	0.003	--	--
LSD 0.05	0.2	0.9	1.5	1.2	0.6	NS	1.2	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, NS - not significant.

Table 3. Seed and technology expenses* for the LEPA irrigated replicated transgenic cotton variety demonstration, AG-CARES, Lamesa, TX 2004

Variety	Seed/lb	Seed/bag	Acres planted /bag	Seed fee \$/bag	Tech fee \$/bag	Total seed and tech fee \$/bag	Seed and tech fee \$/acre
ST 2448R	4460	230,000	4.40	75.90	37.80	113.70	25.84
BCG 28R	5605	280,250	5.36	68.50	59.50	128.00	23.87
DP 434RR	4720	250,000	4.78	97.50	57.20	154.70	32.35
PM 2326RR	4700	250,000	4.78	55.00	41.10	96.10	20.09
ST 5599BR	4300	230,000	4.40	92.00	111.70	203.70	46.29
FM 960RR	4400	220,000	4.21	72.95	50.30	123.25	29.28
AFD 3602R	4450	222,500	4.26	64.40	37.80	102.20	24.01
All Tex 40801RR	5000	250,000	4.78	65.00	57.20	122.20	25.55
DP 494RR	5725	250,000	4.78	97.50	57.20	154.70	32.35
DP 488BG/RR	5050	250,000	4.78	97.50	121.40	218.90	45.77
FM 958LL	4460	223,000	4.27	125.00	.	125.00	29.30
All Tex 40802RR	5000	250,000	4.78	65.00	57.20	122.20	25.55
ST 4646B2R	4500	230,000	4.40	92.00	111.70	203.70	46.29

*Trial was planted at 52,272 seed/acre in 40-inch rows.