



Replicated Dryland Transgenic Cotton Variety Demonstration

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

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Summary: Significant differences were observed for a majority of the parameters measured (Tables 1 and 2). Lint turnout ranged from 31.4% to 39.6% for Stoneville 2448R and Deltapine 555BG/RR, respectively. Lint yields ranged from a low of 559 lb/acre (Stoneville 2448R), to a high of 805 lb/acre (FiberMax 960B2R). Lint loan values varied from a low of \$0.4813/lb for Stoneville 2448R, to a high of \$0.5462/lb for Deltapine 494RR. After adding lint and seed value, total value/acre ranged from a low of \$329.73 to a high of \$489.87 (Stoneville 2448R and Deltapine 488BG/RR, respectively). When subtracting ginning costs and seed and technology fees, the net value/acre ranged from a high of \$413.73 (Deltapine 494RR) to a low of \$270.30 (Stoneville 2448R), a difference of \$143.43. Micronaire values ranged from a low of 3.2 for Stoneville 2448R, to a high of 4.1 for Deltapine 555BG/RR. Staple length averaged 33.5 across all varieties with a low of 32.6 and a high of 34.7. Percent uniformity ranged from a low of 78.1 (Deltapine 434RR) to a high of 81.1 (Deltapine 494RR). A test average strength of 26.8 g/tex was observed with Deltapine 434RR producing the lowest value (24.0), and Deltapine 494RR and Stoneville 2448R producing the highest (28.6). 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 under dryland production systems.

Materials and Methods:

Varieties:	All-Tex 40801RR, All-Tex 40802RR, AFD 3602R, Beltwide Cotton Genetics 28R, Deltapine 434RR, Deltapine 488BG/RR, Deltapine 494RR, Deltapine 555BG/RR, FiberMax 960RR, FiberMax 960B2R, Paymaster 2326RR, Stoneville 2448R, and Stoneville 5599BR
Experimental design:	Randomized complete block with 3 replications
Seeding rate:	3 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 (360-920 ft long).
Planting date:	May 21
Weed management:	Treflan was applied preplant incorporated at 1.25 pt/acre on April 20. A generic glyphosate herbicide was applied at 32 oz/acre on June 14 with a follow up post-direct application of 32 oz/acre on August 3. A single cultivation was conducted on June 25.
Irrigation:	Watered up on 21, 24-May (LEPA irrigation - 0.80" total)
Rainfall:	April: 1.53 July: 2.52" May: 0.07" August: 2.14" June: 1.84" September: 5.86" Total moisture: 14.76"
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 150 lbs/acre 10-34-0 was applied on 12-April.
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 October 8 with a follow-up application of GramoxoneMax at 20 oz/acre + ET defoliant at 1.5 oz/acre + crop oil concentrate on November 1.
Harvest:	Plots were harvested on November 10 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 fees 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 based on 3 seed/row-ft.

Results and Discussion:

Significant differences were observed for a majority of the parameters measured (Tables 1 and 2). Lint turnout ranged from 31.4% to 39.6% for Stoneville 2448R and Deltapine 555BG/RR, respectively. Lint yields ranged from a low of 559 lb/acre (Stoneville 2448R), to a high of 805 lb/acre (FiberMax 960B2R). Lint loan values varied from a low of \$0.4813/lb for Stoneville 2448R, to a high of \$0.5462/lb for Deltapine 494RR. After adding lint and seed value, total value/acre ranged from a low of \$329.73 to a high of \$489.87 (Stoneville 2448R and Deltapine 488BG/RR, respectively). When subtracting ginning costs and seed and technology fees, the net value/acre ranged from a high of \$413.73 (Deltapine 494RR) to a low of \$270.30 (Stoneville 2448R), a difference of \$143.43. Micronaire values ranged from a low of 3.2 for Stoneville 2448R, to a high of 4.1 for Deltapine 555BG/RR. Staple length averaged 33.5 across all varieties with a low of 32.6 and a high of 34.7. Percent uniformity ranged from a low of 78.1 (Deltapine 434RR) to a high of 81.1 (Deltapine 494RR). A test average strength of 26.8 g/tex was observed with Deltapine 434RR producing the lowest value (24.0), and Deltapine 494RR and Stoneville 2448R producing the highest (28.6). 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 at this location with low intensity rainfall and low wind events prior to harvest. As a result, some picker type varieties experienced slight pre-harvest losses. Additional multi-site and multi-year applied research is needed to evaluate varieties across a series of environments.

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Table 1. Harvest results from the replicated dryland 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
DP 494RR	37.4	49.9	2063	771	1029	0.5462	420.12	64.29	484.41	46.42	24.26	413.73 a
DP 488BG/RR	36.7	49.9	2147	788	1072	0.5362	422.89	66.98	489.87	48.29	34.33	407.25 ab
FM 960B2R	35.5	51.6	2266	805	1169	0.5148	413.74	73.10	486.84	50.99	32.75	403.10 ab
ST 5599BR	36.7	52.1	2167	796	1129	0.4950	394.93	70.52	465.46	48.77	34.72	381.97 abc
BCG 28R	35.2	51.2	2078	732	1064	0.5018	366.25	66.48	432.73	46.75	17.91	368.07 abc
AFD 3602R	32.3	53.5	2132	689	1141	0.5142	355.55	71.31	426.86	47.95	18.01	360.90 abcd
DP 555BG/RR	39.6	50.8	1897	751	964	0.4915	370.17	60.25	430.42	42.68	34.33	353.42 abcd
DP 434RR	36.8	50.3	2010	740	1011	0.4827	357.48	63.21	420.69	45.24	24.26	351.20 abcd
All Tex 40801RR	34.8	52.1	1956	682	1020	0.4937	336.46	63.74	400.20	44.01	19.16	337.02 abcde
FM 960RR	36.6	51.6	1849	677	954	0.4967	335.88	59.65	395.53	41.61	21.96	331.96 bcde
All Tex40802RR	32.5	54.8	2037	662	1115	0.4818	317.49	69.71	387.21	45.83	19.16	322.21 cde
PM 2326RR	31.8	54.1	1804	574	977	0.4877	280.00	61.02	341.02	40.59	15.07	285.36 de
ST 2448R	31.4	54.5	1780	559	969	0.4813	269.15	60.58	329.73	40.05	19.38	270.30 e
Test average	35.2	52.0	2014	710	1047	0.5018	356.93	65.45	422.38	45.32	24.25	352.81
CV, %	2.0	1.9	12.5	12.8	12.5	3.1	12.5	12.5	12.4	12.5	--	13.3
OSL	<0.0001	<0.0001	0.4343	0.0424	0.5142	0.0003	0.0031	0.5150	0.0117	0.4356	--	0.0200
LSD 0.05	1.2	1.7	NS	153	NS	0.0261	75.01	NS	88.19	NS	--	78.93

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 replicated dryland 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
DP 494RR	3.9	34.7	81.1	28.6	5.0	2.7	73.3	8.9	3.3	1.0
DP 488BG/RR	3.9	34.2	80.2	27.8	4.8	1.0	74.1	9.2	3.3	1.0
FM 960B2R	3.4	34.7	78.8	28.3	3.6	3.0	74.5	7.7	4.0	1.0
ST 5599BR	3.9	32.8	78.3	26.0	4.7	2.3	73.3	9.1	3.7	1.0
BCG 28R	4.0	33.4	79.2	25.3	4.7	2.0	72.8	8.9	3.7	1.0
AFD 3602R	3.5	33.9	79.7	28.1	4.5	2.0	73.1	9.0	3.7	1.0
DP 555BG/RR	4.1	32.6	78.6	25.2	4.9	1.7	77.3	8.0	3.0	1.0
DP 434RR	3.6	32.7	78.1	24.0	6.4	1.7	75.7	8.5	3.0	1.0
All Tex 40801RR	3.6	33.1	80.1	26.5	6.6	1.7	74.9	8.6	3.3	1.0
FM 960RR	3.3	34.0	79.4	27.3	4.0	2.0	75.4	8.2	3.3	1.0
All Tex40802RR	3.4	33.1	79.0	25.4	5.2	1.7	74.4	8.6	3.7	1.0
PM 2326RR	3.9	33.0	80.7	27.8	6.1	2.7	71.5	9.4	3.7	1.7
ST 2448R	3.2	33.6	80.8	28.6	5.6	2.3	73.1	9.4	3.3	1.3
Test average	3.7	33.5	79.5	26.8	5.1	2.1	74.1	8.7	3.5	1.1
CV, %	5.6	1.8	0.9	3.5	7.8	37.3	1.0	3.6	--	--
OSL	<0.0001	0.0012	<0.0001	<0.0001	<0.0001	0.1906	<0.0001	<0.0001	--	--
LSD 0.05	0.3	1.0	1.2	1.6	0.7	NS	1.3	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 replicated dryland 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
DP 494RR	5725	250,000	6.38	97.50	57.20	154.70	24.26
DP 488BG/RR	5050	250,000	6.38	97.50	121.40	218.90	34.33
FM 960B2R	4188	209,400	5.34	72.95	102.00	174.95	32.75
ST 5599BR	4300	230,000	5.87	92.00	111.70	203.70	34.72
BCG 28R	5605	280,250	7.15	68.50	59.50	128.00	17.91
AFD 3602R	4450	222,500	5.68	64.40	37.80	102.20	18.01
DP 555BG/RR	6300	250,000	6.38	97.50	121.40	218.90	34.33
DP 434RR	4720	250,000	6.38	97.50	57.20	154.70	24.26
All Tex 40801RR	5000	250,000	6.38	65.00	57.20	122.20	19.16
FM 960RR	4400	220,000	5.61	72.95	50.30	123.25	21.96
All Tex40802RR	5000	250,000	6.38	65.00	57.20	122.20	19.16
PM 2326RR	4700	250,000	6.38	55.00	41.10	96.10	15.07
ST 2448R	4460	230,000	5.87	75.90	37.80	113.70	19.38

*Trial was planted at 39204 seed/acre in 40-inch rows.