Replicated Dryland Cotton Systems Variety Demonstration

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

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Summary: Weed pressure at this site would generally be considered light and consisted mainly of silverleaf nightshade, and pigweed "escapes". Significant differences were noted for most parameters measured (Tables 1 and 2). Lint turnout ranged from 22.9% for Deltapine 5415RR to 30.4% for AFD 2485. Lint yields varied from a low of 405 lb/acre (Deltapine 5415RR) to a high of 724 lb/acre (AFD 2485). Lint loan values ranged from a low of $0.4787/lb to a high of $0.5642/lb for All-Tex AtlasRR and FiberMax 958, respectively. After adding lint and seed value, total value/acre ranged from a low of $260.47 for Deltapine 5415RR, to a high of $462.09 for AFD 2485. When subtracting ginning costs and seed and technology fees, the net value/acre among varieties ranged from a high of $393.04 (AFD 2485) to a low of $168.99 (Deltapine 5415RR), a difference of $224.05. Micronaire values ranged from a low of 3.1 for Deltapine 5415RR to a high of 4.5 for All-Tex AtlasRR and Paymaster HS26. Staple length averaged 33.4 across all varieties with a low of 30.7 and a high of 36.0. Percent uniformity ranged from a low of 79.9 (All-Tex AtlasRR and Douglas King CT210) to a high of 82.7 (FiberMax 958 and Paymaster 2326RR). Significant differences were observed among varieties for elongation (%) and leaf grade, however, no differences existed for strength, reflectance (Rd) or yellowness (+b). 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 conventional and transgenic varieties under dryland production systems.

Materials and Methods:

Varieties: AFD 2485, All-Tex AtlasRR, Beltwide Cotton Genetics 24R, Deltapine 5415RR, Douglas King CT210, FiberMax 958, Paymaster 2379RR, Paymaster 2326RR, Paymaster HS26, and Stoneville 5303R

Experimental design:	Randomized complete block with 3 replications
Seeding rate:	3.6 seed/row-ft in solid planted 40-inch row spacing (John Deere MaxEmerge vacuum planter)
Plot size:	4 rows by length of field (~800 ft)
Planting date:	8-June (dry planted, did not emerge until after 18-June rainfall event)
Weed management:	Treflan was applied preplant incorporated at 1.25 pt/acre across all varieties on 14-April. Roundup WeatherMax was applied over-the-top to Roundup Ready varieties on 12-July at 22 oz/acre with 17 lbs per 100 gallons of ammonium sulfate followed by a post-directed application on 4-August at 22 oz/acre with 17 lbs per 100 gallons of ammonium sulfate. All conventional varieties were cultivated one time on 20-July. Hand hoeing of conventional varieties was conducted on 20-July by project personnel. On 18-August, a blanket hand hoeing was conducted by AG-CARES personnel.

Rainfall:

April:	1.53	July:	2.52"
May:	0.07"	August:	2.14"
June:	1.84"	September:	5.86"

Total rainfall: 13.96"

Insecticides:	No insecticides were applied at this site. This location is in a active boll weevil eradication zone, and one application was made by the Texas Boll Weevil Eradication Program.
Fertilizer management:	No fertilizers were applied at this site.
Harvest aids:	Harvest aids included GramoxoneMax applied at 10 oz/acre on 9-November.
Harvest:	Plots were harvested on 1-December 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 (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 Roundup Ready based on 3.6 seed/row-ft.

Results and Discussion: Weed pressure at this site would generally be considered light and consisted mainly of silverleaf nightshade, and pigweed "escapes". Significant differences were noted for most parameters measured (Tables 1 and 2). Lint turnout ranged from 22.9% for Deltapine 5415RR to 30.4% for AFD 2485. Lint yields varied from a low of 405 lb/acre (Deltapine 5415RR) to a high of 724 lb/acre (AFD 2485). Lint loan values ranged from a low of $0.4787/lb to a high of $0.5642/lb for All-Tex AtlasRR and FiberMax 958, respectively. After adding lint and seed value, total value/acre ranged from a low of $260.47 for Deltapine 5415RR, to a high of $462.09 for AFD 2485. When subtracting ginning costs and seed and technology fees, the net value/acre among varieties ranged from a high of $393.04 (AFD 2485) to a low of $168.99 (Deltapine 5415RR), a difference of $224.05. Micronaire values ranged from a low of 3.1 for Deltapine 5415RR to a high of 4.5 for All-Tex AtlasRR and Paymaster HS26. Staple length averaged 33.4 across all varieties with a low of 30.7 and a high of 36.0. Percent uniformity ranged from a low of 79.9 (All-Tex AtlasRR and Douglas King CT210) to a high of 82.7 (FiberMax 958 and Paymaster 2326RR). Significant differences were observed among varieties for elongation (%) and leaf grade, however, no differences existed for strength, reflectance (Rd) or yellowness (+b). 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, the picker-type varieties experienced some preharvest 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 systems 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	Systems cost	Net value	
	%	%	lb/acre	lb/acre	lb/acre	$/lb	$/acre	$/acre	$/acre	$/acre	$/acre	$/acre	
AFD 2485	30.4	45.1	2379	724	1072	0.5437	395.09	66.99	462.09	53.52	15.53	393.04	a
FM 958	28.4	45.4	2165	616	983	0.5642	347.22	61.45	408.67	48.72	22.22	337.73	ab
PM 2326RR	28.6	49.3	2075	594	1022	0.5442	323.18	63.88	387.07	46.69	45.30	295.08	bc
PM HS26	28.1	48.8	2079	584	1014	0.5027	293.29	63.36	356.65	46.78	18.29	291.58	bcd
PM 2379RR	27.9	47.8	2227	622	1063	0.4982	310.13	66.47	376.60	50.10	45.30	281.21	bcde
BCG 24R	29.1	48.4	1993	581	965	0.5092	296.09	60.34	356.43	44.85	51.55	260.03	cde
All-Tex AtlasRR	29.5	49.8	1915	565	954	0.4787	270.65	59.66	330.31	43.09	44.79	242.43	cde
DK CT210	27.2	49.0	1805	492	886	0.4842	239.31	55.35	294.66	40.62	19.05	235.00	de
ST 5303R	29.5	47.8	1898	560	908	0.4867	273.03	56.75	329.78	42.71	53.50	233.58	e
DP 5415RR	22.9	47.5	1771	405	842	0.5142	207.87	52.60	260.47	39.85	51.63	168.99	f
Test average	28.2	47.9	2031	574	971	0.5126	295.59	60.69	356.27	45.69	36.72	273.87	
CV, %	5.9	4.3	8.6	8.6	8.5	4.5	11.0	8.6	10.5	8.6	--	12.3	
OSL	0.0025	0.1399	0.0095	<0.0001	0.0470	0.0024	<0.0001	0.0471	0.0002	0.0095	--	<0.0001	
LSD 0.05	2.8	NS	299	85	142	0.0395	55.68	8.90	63.94	6.74	--	57.64	

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 systems 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
AFD 2485	4.3	34.6	81.8	28.1	4.8	1.7	79.4	9.0	1.7	1.0
FM 958	4.0	36.0	82.7	29.2	4.0	1.7	78.3	9.3	1.7	1.0
PM 2326RR	4.3	34.1	82.7	28.4	6.9	2.3	75.4	9.4	3.0	1.0
PM HS26	4.5	32.7	82.0	29.3	7.1	2.7	75.6	8.8	3.0	1.0
PM 2379RR	4.4	32.6	81.6	28.5	7.9	1.3	77.4	9.8	2.0	1.3
BCG 24R	3.6	33.5	81.2	27.4	8.4	1.0	77.7	10.3	1.3	1.7
All-Tex AtlasRR	4.5	30.7	79.9	27.5	8.2	1.7	74.8	10.0	2.3	1.7
DK CT210	3.4	32.4	79.9	27.1	8.7	1.0	78.2	10.0	1.3	1.3
ST 5303R	4.1	32.0	80.8	28.0	7.8	1.0	76.7	10.4	1.7	2.0
DP 5415RR	3.1	35.1	80.8	27.9	8.1	1.0	79.8	9.7	1.3	1.0
Test average	4.0	33.4	81.3	28.1	7.2	1.5	77.3	9.7	1.9	1.3
CV, %	5.0	2.8	1.1	3.6	9.1	28.9	3.3	6.4	--	--
OSL	<0.0001	<0.0001	0.0105	0.2094	<0.0001	0.0012	0.2910	0.0633	--	--
LSD 0.05	0.3	1.6	1.6	NS	1.1	0.8	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.

Table 3. Seed and technology expenses* for the replicated dryland systems 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
AFD 2485	4560	228,000	4.85	36.80	0.00	36.80	7.59
FM 958	4472	223,600	4.75	67.85	0.00	67.85	14.28
PM 2326RR	4700	250,000	5.31	55.00	41.10	96.10	18.08
PM HS26	4200	250,000	5.31	55.00	0.00	55.00	10.35
PM 2379RR	4600	250,000	5.31	55.00	41.10	96.10	18.08
BCG 24R	5128	256,400	5.45	68.50	64.10	132.60	24.33
All-Tex AtlasRR	4600	215,000	4.57	42.50	37.80	80.30	17.57
DK CT210	5250	262,500	5.58	62.00	0.00	62.00	11.11
ST 5303R	4400	230,000	4.89	75.90	52.60	128.50	26.28
DP 5415RR	5600	250,000	5.31	72.50	57.20	129.70	24.41

***Trial was planted at 47,045 seed/acre in 40-inch rows.**

Table 4. Expenses incurred for the replicated dryland systems variety demonstration, AG-CARES, Lamesa, TX 2004.												
								Roundup WeatherMax	Roundup WeatherMax			
		Seed	Tech	Total	Seed &	Herb	Herb app	over-the-top	post-directed	Cultivation	Hoe	Systems
	Variety	cost/bag	fees/bag	cost/bag	tech fee/ac	apps	cost/ac	cost/ac	cost/ac	cost/ac	cost/ac	cost/ac
1	PM 2326RR	55.00	41.10	96.10	18.08	2	7.00	10.11	10.11	0.00	0.00	45.30
2	PM 2379RR	55.00	41.10	96.10	18.08	2	7.00	10.11	10.11	0.00	0.00	45.30
3	DP 5415RR	72.50	57.20	129.70	24.41	2	7.00	10.11	10.11	0.00	0.00	51.63
4	ST 5303R	75.90	52.60	128.50	26.28	2	7.00	10.11	10.11	0.00	0.00	53.50
5	All-Tex AtlasRR	42.50	37.80	80.30	17.57	2	7.00	10.11	10.11	0.00	0.00	44.79
6	BCG 24R	68.50	64.10	132.60	24.33	2	7.00	10.11	10.11	0.00	0.00	51.55
7	PM HS26	55.00	0.00	55.00	10.35	0	0.00	0.00	0.00	5.00	2.94	18.29
8	DK CT210	62.00	0.00	62.00	11.11	0	0.00	0.00	0.00	5.00	2.94	19.05
9	AFD 2485	36.80	0.00	36.80	7.59	0	0.00	0.00	0.00	5.00	2.94	15.53
10	FM 958	67.85	0.00	67.85	14.28	0	0.00	0.00	0.00	5.00	2.94	22.22
					3.6 seed/row-ft		3.50/ac	12-Jul	4-Aug	20-Jul	20-Jul	
					per row-foot			57.00/gal	57.00/gal		0.49 hr/ac	
					47045 seed/ac			includes AMS	includes AMS		total hrs	
								at 0.31/ac	at 0.31/ac		hoeing 1.5	
											6.00/hr	
Base weed control program				chem cost	app cost	total cost		Roundup WeatherMax	Roundup WeatherMax			
								rate at 22 oz/ac	rate at 22 oz/ac		spot hoeing	
	Preplant											
14-Apr	1.25 pt Treflan PPI			4.29	3.50	7.79						
18-Aug	Blanket hoe cost					4.09						
Total blanket weed control program						11.88						
Harvest aid Program												
9-Nov	10 oz/acre Gramoxone Max			3.10	3.50	6.60						
Total blanket input cost ($/acre)						18.48						