Replicated Irrigated Bollgard II/Roundup Ready Flex Cotton Variety Demonstration, Halfway, TX - 2006

Cooperator: Texas Agricultural Experiment Station, Helms Farm

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Summary: Significant differences were observed for most parameters measured (Tables 1 and 2). Lint turnout ranged from a low of 29.0% to a high of 33.5% for Beltwide Cotton Genetics (BCG) 4630B2F and Stoneville 4554B2RF, respectively. Lint yields varied with a low of 1422 lb/acre (BCG 4630B2F) and a high of 1682 lb/acre (Paymaster 2140B2RF and Stoneville 4554B2RF). Lint loan values ranged from a low of $0.4813/lb (BCG 4630B2F) to a high of $0.5345/lb (AFD 5065B2F). After adding lint and seed value, total value/acre ranged from a low of $859.59 for BCG 4630B2F to a high of $1077.31 for AFD 5065B2F. When subtracting ginning, seed and technology fee costs, the net value/acre among varieties ranged from a high of $891.29 (AFD 5065B2F) to a low of $680.80 (BCG 4630B2F), a difference of $210.49. Significant differences were observed among varieties for micronaire, uniformity, strength, leaf, reflectance (Rd), and 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 transgenic varieties under irrigated production systems.

Materials and Methods:

Varieties:	Deltapine 117B2RF, Americot 1521B2RF, Paymaster 2140B2RF, AFD 5065B2RF, Beltwide Cotton Genetics 3255B2F, Stoneville 4554B2RF, Phytogen 485WRF, FiberMax 9063B2F, All-Tex Apex B2RF, and Beltwide Cotton Genetics 4630B2F
Experimental design:	Randomized complete block with 3 replications
Seeding rate:	4.3 seed per row-ft in 30-inch row spacing (John Deere Max Emerge vacuum planter)

Plot size:	4 rows by variable length(380 to 710 ft) due to circular pivot
Planting date:	17-May
Weed management:	An application of 22 oz/acre Roundup Original Max and 48 oz/acre of Prowl was made pre-plant on 25-April. Glystar was applied on 5-June at a rate of 32 oz/acre.
Rainfall and Irrigation:	From 10-May through September, 10.93 inches of rainfall accumulated in addition to 14.67 inches of preplant and seasonal irrigation, for a total of 25.6 inches.
Insecticides:	Temik was applied in-furrow at planting at 3.0 lbs/acre. No other insecticides were applied at this site.
Fertilizer management:	64 lbs/acre of P_2O_5 (10-34-0) and 19 lbs/acre N (32-0-0) were applied on 10-April using a coulter rig. Another 60 lbs/acre N (32-0-0) was applied on 23-May with a coulter rig. An additional 67 lbs/a N (32-0-0) was applied via fertigation during the growing season.
Plant growth regulators:	Plant growth regulators were not used at this location.
Harvest aids:	Harvest aids consisting of 32 oz/a Prep and 1.5 oz/a ET with 1% v/v (1 gal/100 gal spray solution) crop oil concentrate were applied on 24-Oct.
Harvest:	Plots were harvested on 10-November using a commercial John Deere 7455 stripper harvester 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 University Agricultural 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 Commodity Credit Corporation (CCC) loan values were determined for each variety by plot.
Ginning cost and seed values:	Ginning costs were based on $2.45 per cwt. of bur cotton and seed value/acre was based on $125/ton of seed. Ginning costs did not include checkoff.
Seed and technology cost:	Seed and technology costs were calculated using the appropriate seeding rate (seed/row-ft) for the row spacing and entries using the online Plains Cotton Growers Seed Cost Comparison Worksheet with Monsanto Cap Cost Thresholds. available at: http://www.plainscotton.org/Seed/seedindex.html

Results and Discussion:

Significant differences were observed for most parameters measured (Tables 1 and 2). Lint turnout ranged from a low of 29.0% to a high of 33.5% for Beltwide Cotton Genetics (BCG) 4630B2F and Stoneville 4554B2RF, respectively. Lint yields varied with a low of 1422 lb/acre (BCG 4630B2F) and a high of 1682 lb/acre (Paymaster 2140B2RF and Stoneville 4554B2RF). Lint loan values ranged from a low of $0.4813/lb (BCG 4630B2F) to a high of $0.5345/lb (AFD 5065B2F). After adding lint and seed value, total value/acre ranged from a low of $859.59 for BCG 4630B2F to a high of $1077.31 for AFD 5065B2F. When subtracting ginning, seed and technology fee costs, the net value/acre among varieties ranged from a high of $891.29 (AFD 5065B2F) to a low of $680.80 (BCG 4630B2F), a difference of $210.49. Micronaire values ranged from a low of 2.7 for BCG 4630B2F to a high of 3.3 for Paymaster 2140B2RF. A test average staple length of 37.6 was observed with no significant differences among varieties. The test average for percent uniformity was 81.9 and ranged from a low of 80.7 to a high of 83.3 for BCG 4630B2F and PhytoGen 485WRF, respectively. Strength values ranged from a high of 30.1 g/tex for Deltapine 117B2RF to a low of 23.1 for BCG 4630B2RF. A test average leaf grade of 3.3 was observed with a high of 4.0 for Deltapine 117B2RF and PhytoGen 485WRF. Reflectance (Rd) values ranged from a high of 82.6 (All-Tex Apex B2RF) to a low of 79.6 (PhytoGen 485WRF) and yellowness (+b) values ranged from a high of 7.9 (Stoneville 4554B2RF) to a low of 6.4 (AFD 5065B2F). Color grades for all varieties were 21's and 31's. 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 no inclement weather was encountered at this location prior to harvest. Additional multi-site and multi-year applied research is needed to evaluate varieties and technology across a series of environments.

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Table 1. Harvest results from the irrigated replicated transgenic cotton variety demonstration, Texas Agricultural Experiment Station, Helms Farm, Halfway, TX, 2006.

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	
AFD 5065B2F	30.1	56.5	5496	1652	3104	0.5345	883.28	194.03	1077.31	134.64	51.38	891.29	a
Paymaster 2140B2RF	33.1	54.6	5089	1682	2778	0.5223	878.47	173.61	1052.08	124.67	55.15	872.26	ab
Stoneville 4554B2RF	33.5	56.7	5027	1682	2852	0.5157	867.70	178.24	1045.95	123.17	59.64	863.14	ab
FiberMax 9063B2F	32.3	53.8	4948	1597	2661	0.5282	846.33	166.30	1012.63	121.24	55.48	835.91	abc
Deltapine 117B2RF	32.3	52.4	4892	1582	2563	0.5120	809.61	160.20	969.80	119.86	61.20	788.75	abcd
Americot 1521B2RF	30.0	55.2	5306	1592	2931	0.4963	790.13	183.14	973.27	130.01	56.15	787.11	abcd
All-Tex Apex B2RF	29.7	56.2	5222	1553	2936	0.5048	783.64	183.52	967.17	127.95	59.89	779.33	bcd
Beltwide Cotton Genetics 3255B2F	31.1	55.8	5091	1585	2838	0.4938	782.52	177.40	959.91	124.74	58.80	776.38	bcd
PhytoGen 485WRF	30.0	53.9	4816	1445	2597	0.5158	745.66	162.30	907.96	117.99	56.52	733.45	cd
Beltwide Cotton Genetics 4630B2F	29.0	56.3	4898	1422	2759	0.4813	687.16	172.44	859.59	119.99	58.80	680.80	d
Test average	31.1	55.1	5079	1579	2802	0.5105	807.45	175.12	982.57	124.43	57.30	800.84	
CV, %	3.7	1.8	5.5	5.5	5.5	4.2	7.7	5.5	7.2	5.5	--	8.1	
OSL	0.0010	0.0006	0.1538	0.0188	0.0107	0.1441	0.0213	0.0108	0.0356	0.1538	--	0.0207	
LSD	2.0	1.7	NS	148	264	NS	107.34	16.50	121.51	NS	--	111.39	

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

Assumes:
$2.45/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 irrigated replicated transgenic cotton variety demonstration, Texas Agricultural Experiment Station, Helms Farm, Halfway, TX, 2006.

Entry	Micronaire	Staple	Uniformity	Strength	Elongation	Leaf	Rd	+b	Color grade	
	units	32^{nds} inches	%	g/tex	%	grade	reflectance	yellowness	color 1	color 2
AFD 5065B2F	3.2	37.2	81.8	27.8	7.3	3.3	82.4	6.4	3	1
Paymaster 2140B2RF	3.3	36.6	82.5	27.1	6.9	3.7	81.0	6.5	3	1
Stoneville 4554B2RF	3.0	38.1	81.9	26.4	6.9	3.3	81.5	7.9	2	1
FiberMax 9063B2F	3.0	38.3	81.5	27.2	6.6	3.0	82.1	7.4	2	1
Deltapine 117B2RF	3.1	37.5	81.8	30.1	6.1	4.0	79.7	7.0	3	1
Americot 1521B2RF	2.9	37.7	81.1	23.9	6.9	3.0	82.5	7.1	2	1
All-Tex Apex B2RF	2.8	38.1	82.3	27.4	7.2	3.0	82.6	7.1	2	1
Beltwide Cotton Genetics 3255B2F	2.8	37.0	81.6	23.6	7.2	3.0	82.3	7.1	3	1
PhytoGen 485WRF	3.1	37.4	83.3	27.0	7.3	4.0	79.6	7.6	3	1
Beltwide Cotton Genetics 4630B2F	2.7	38.0	80.7	23.1	6.9	3.0	82.4	7.3	2	1
Test average	3.0	37.6	81.9	26.4	6.9	3.3	81.6	7.1	2.6	1.0
CV, %	6.8	2.3	0.9	7.7	8.7	8.8	1.2	7.0	--	--
OSL	0.0375	0.3896	0.0175	0.0127	0.3479	0.0006	0.0072	0.0323	--	--
LSD	0.3	NS	1.2	3.5	NS	0.5	1.7	0.9	--	--

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 - nonsignificant.