Replicated Roundup Ready Flex Cotton Variety Demonstration Under LEPA Irrigation, AG-CARES, Lamesa, TX - 2005

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Summary: Significant differences were noted for most parameters measured (Tables 1 and 2). Lint turnout ranged from 28.8% for Beltwide Cotton Genetics 9775B2RF, to 34.8% for Stoneville 4554B2RF. Lint yields varied from a low of 1428 lb/acre (Deltapine 117B2RF) to a high of 1708 lb/acre (Beltwide Cotton Genetics 9124B2RF). Lint loan values ranged from a low of $0.5651/lb to a high of $0.5813/lb for FiberMax 989B2R. Gross loan value ranged from a high of $983.19 (Beltwide Cotton Genetics 9124B2RF) to a low of $817.34 (Deltapine 143B2RF), a difference of $165.85. Micronaire ranged from a low of 3.5 for Deltapine 143B2RF to a high of 4.0 for Beltwide Cotton Genetics 9124B2RF and Stoneville 4554B2RF. Staple length averaged 36.8 across all varieties with a low of 35.2 (All-Tex Summit B2RF) and a high of 38.4 (Beltwide Cotton Genetics 9975B2RF). Percent uniformity ranged from a low of 80.7 (Dynagro 2242B2RF and Deltapine 143B2RF) to a high of 83.9 (Beltwide Cotton Genetics 9775B2RF). 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).

Objective: The objective of this project was to compare yields, gin turnout, and fiber quality of transgenic Bollgard II/Roundup Ready Flex “stacked” gene varieties under LEPA irrigation.

Materials and Methods:

Varieties: All varieties were BollgardII/Roundup Ready or Bollgard II/Roundup Ready Flex “Stacked.” Those included All-Tex Summit B2RF, All-Tex Apex B2RF, Beltwide Cotton Genetics 9124RF, Beltwide Cotton Genetics 9775 RF, Croplan Genetics 3020 B2RF, Croplan Genetics 3520 B2RF, Dyna-Gro 2242 B2RF, Dyna-Gro 2520 B2RF, Deltapine 117 DF B2RF, Deltapine 143 B2RF, Stoneville 4554 B2RF, Stoneville 6611 B2RF, and FiberMax 989 B2R

Experimental design:	Randomized complete block with 3 replications
Seeding rate:	4.0 seeds/row-ft in 40-inch row spacing (John Deere Max Emerge vacuum planter)
Plot size:	4 rows by variable length due to circular pivot rows (340-810 ft long).
Planting date:	10-May
Weed management:	Trifluralin was applied preplant incorporated at 1.25 pt/acre across all varieties on 7-April. Two over-the-top applications of Mon 3539 at 22 oz/acre with ammonium sulfate (17lbs/100 gallons of spray mix) were applied to Roundup Ready Flex varieties and with one over-the-top application made to FiberMax 989B2R on 7-June, at 4th true leaf stage and 13-July, at early bloom stage. A post-direct application was also applied to the Roundup Ready variety FiberMax 989B2R at a rate of 22 oz/acre with ammonium sulfate (17lbs/100 gallons of spray mix) on 13-July, using MON 3539. Hoeing on 10-August, and 25-August, was done AG-CARES personnel. One blanket cultivation was made across all the varieties on 16-June.
Irrigation:	LEPA irrigation

April:	1.50"	May:	1.20"
June:	1.76"	July:	3.08"
August:	2.64"	September:	0.88"

Total irrigation: 11.06"

Rainfall:

April:	0.20"	July:	0.00"
May:	2.00"	August:	3.10"
June:	1.20"	September:	0.00"

Total rainfall: 6.50"

Total moisture: 17.56"

Insecticides:	Temik was applied at in-furrow at planting at 3.5 lbs/acre. No other insecticides were applied at this site. This location is in an active boll weevil eradication zone, but no 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 110 lb/acre on 7-April. An additional 210 lbs N/acre using 32-0-0 was fertigated in seven 30 lb N/acre increments during the growing season.

Harvest aids: Harvest aids included Prep (6-lb ethephon/gal) at 1.5 pt/acre with Def at 1.0 pt/acre applied at 70 percent open bolls on 27-September, with a follow-up application of Gramoxone Max at 16 oz/acre on 12-October. Both harvest aid treatments were aerially applied.

Harvest: Plots were harvested on 22-October 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.

Results and Discussion:

Significant differences were noted for most parameters measured (Tables 1 and 2). Lint turnout ranged from 28.8% for Beltwide Cotton Genetics 9775B2RF, to 34.8% for Stoneville 4554B2RF. Lint yields varied from a low of 1428 lb/acre (Deltapine 117B2RF) to a high of 1708 lb/acre (Beltwide Cotton Genetics 9124B2RF). Lint loan values ranged from a low of $0.5651/lb to a high of $0.5813/lb for FiberMax 989B2R. Gross loan value ranged from a high of $983.19 (Beltwide Cotton Genetics 9124B2RF) to a low of $817.34 (Deltapine 143B2RF), a difference of $165.85. Micronaire ranged from a low of 3.5 for Deltapine 143B2RF to a high of 4.0 for Beltwide Cotton Genetics 9124B2RF and Stoneville 4554B2RF. Staple length averaged 36.8 across all varieties with a low of 35.2 (All-Tex Summit B2RF) and a high of 38.4 (Beltwide Cotton Genetics 9975B2RF). Percent uniformity ranged from a low of 80.7 (Dynagro 2242B2RF and Deltapine 143B2RF) to a high of 83.9 (Beltwide Cotton Genetics 9775B2RF). 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). Elongation percent ranged from a high of 8.5% to a low of 5.0%. These data indicate that substantial differences can be obtained in terms of gross 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 across a series of environments.

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Table 1. Harvest results from the LEPA irrigated Roundup Ready Flex replicated cotton variety demonstration, AG-CARES, Lamesa, TX, 2005.

Variety	Lint turnout	Bur cotton yield	Lint yield	Lint loan value	Gross loan value	
	%	lb/acre	lb/acre	$/lb	$/acre	
Beltwide Cotton Genetics 9124B2RF	32.6	5240	1708	0.5755	983.19	a
Stoneville 4554B2RF	34.8	4715	1639	0.5748	942.64	ab
All-Tex Summit B2RF	32.1	5145	1652	0.5680	938.46	ab
Dyna-Gro 2520B2RF	33.0	4746	1565	0.5755	900.59	bc
Croplan Genetics 3020B2RF	31.7	4988	1583	0.5651	894.06	bc
All-Tex Apex B2RF	32.7	4720	1545	0.5755	889.09	bc
Croplan Genetics 3520B2RF	32.3	4667	1509	0.5748	867.60	cd
FiberMax 989B2R*	31.6	4646	1469	0.5813	853.99	cd
Dyna-Gro 2242B2RF	32.6	4546	1481	0.5731	848.58	cd
Beltwide Cotton Genetics 9775B2RF	28.8	4984	1436	0.5790	831.46	d
Deltapine 117B2RF	32.4	4405	1428	0.5805	829.05	d
Stoneville 6611B2RF	31.8	4511	1433	0.5780	828.25	d
Deltapine 143B2RF	32.7	4408	1440	0.5675	817.34	d
Test mean	32.2	4748	1530	0.5745	878.79	
CV, %	2.6	3.7	4.0	0.8	3.7	
OSL	<0.0001	<0.0001	<0.0001	0.0034	<0.0001	
LSD 0.05	1.4	293	103	0.0076	54.15	

*** Roundup Ready standard.**
For gross loan value, 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.
Note: some data columns may reflect rounding error.

Value for lint based on CCC loan value from grab samples and ITC HVI results. Color grades set at 21 and leaf grades set at 3.

Table 2. HVI fiber property results from the LEPA irrigated Roundup Ready Flex replicated cotton variety demonstration, AG-CARES, Lamesa, TX, 2005.

Variety	Micronaire	Length	Staple	Uniformity	Strength	Elongation
	units	inches	32^{nds} inches	%	g/tex	%
All-Tex Summit B2RF	3.8	1.10	35.2	82.3	27.0	7.2
All-Tex Apex B2RF	3.8	1.16	37.2	81.7	27.3	6.2
Beltwide Cotton Genetics 9124B2RF	4.0	1.17	37.3	81.7	27.6	6.4
Beltwide Cotton Genetics 9775B2RF	3.9	1.20	38.4	83.9	28.6	6.6
Croplan Genetics 3020B2RF	3.7	1.11	35.5	82.7	26.3	7.3
Croplan Genetics 3520B2RF	3.9	1.13	36.3	82.4	27.2	7.1
Dyna-Gro 2242B2RF	3.8	1.13	36.2	80.7	27.3	7.3
Dyna-Gro 2520B2RF	3.8	1.17	37.3	80.8	27.3	6.5
Deltapine 143B2RF	3.5	1.17	37.5	80.7	29.4	5.7
Deltapine 117B2RF	3.8	1.16	37.1	81.8	32.1	5.0
FiberMax 989B2R*	3.7	1.16	37.0	82.7	32.1	5.0
Stoneville 4554B2RF	4.0	1.13	36.1	82.2	29.0	8.5
Stoneville 6611B2RF	3.8	1.17	37.3	82.4	29.5	5.0
Test mean	3.8	1.15	36.8	82.0	28.5	6.5
CV, %	3.3	1.0	1.0	0.7	2.5	4.1
OSL	0.0173	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
LSD 0.05	0.2	0.02	0.6	1.0	1.2	0.4

*** Roundup Ready standard.**
CV - coefficient of variation.
OSL - observed significance level, or probability of a greater F value.
LSD - least significant difference at the 0.05 level.