

COLQUITT COUNTY SYSTEMS TRIAL

Scott N. Brown¹, W. Don Shurley², and Glen L. Ritchie³

¹Cooperative Extension, University of Georgia, Moultrie, GA

²Department of Agricultural and Applied Economics

³Crop and Soil Sciences Department

The University of Georgia - Tifton

Introduction

In 2009, over 83% of Georgia's cotton acreage was planted to BR (Bollgard® plus Roundup-Ready®) technology with over 82% of the states acreage planted to a single variety - Deltapine 555 BR (USDA-AMS, 2009a). Registration for this and all single-gene Bollgard technology and related variety types (B and BR) expired September 30, 2009. Single-gene plantings in 2010 will be limited to remaining seed in stock purchased prior to the expiration. It is estimated that less than 35% of Georgia's cotton acreage will be planted to BR technology in 2010.

Because this technology has dominated the Georgia cotton landscape and because one variety, DP555BR, accounted for the vast majority of these acres, Georgia producers are concerned about the loss of single-gene technology, and more specifically, DP555BR. Grower surveys conducted in Colquitt County during the winter and spring of 2009 indicated that, while producers planned to plant significantly more acres of available two-gene technologies (B2 & W) in 2009, they would not embrace these technologies at a level adequate to provide them with the significant experience or confidence going into the 2010 season.

Objective

Growers lack experience with non-BR technology and varieties other than 555, specifically. Two-gene technologies (B2 or W) often come packaged with Roundup Ready Flex® (RF) rather than R. Furthermore, due to the rapid increase/spread of glyphosate resistance in Palmer amaranth, producers require good local data on the production, performance and economics of Liberty-Link (LL) technology. This LL technology allows them to use an Ignite (glufosinate) herbicide-based program for control of this weed.

The objective of this study was to compare lint yield, lint turn-out, cottonseed yield, fiber quality, cost of production, and net return for B2RF, WR, WRF and LLB2 technologies.

Materials and Methods

This research was conducted at Windy Pond Farm, Doerun, GA in Colquitt County. Producer cooperators were Tony Lassiter and Kelly Walker. Production was conventional tillage, irrigated. The test was planted on May 11, 2009. All varieties were planted on 36-inch row spacing at a rate of 2.5 seed per foot of row (36,300 seed/acre).

The test consisted of 7 varieties, in 4 technology packages: LLB2- FiberMax 1735 and 1845, WR- Phytogen 370, WRF- Phytogen 375, and B2RF- DeltaPine 0935, FiberMax 1740, and Stoneville 5458. Variety selection for inclusion in the test was made by the participating seed company from a list compiled by researchers based on technology and germplasm diversity to fit the Colquitt County area. The test consisted of field length plots. Each plot was approximately the same length and was measured with GPS equipment to determine exact harvested area. The 7 varieties were randomized once as shown in Figure 1. This pattern was then repeated 2 more times in the same field for a total of three replications.

18	12	18	Rows 12	Wide 18	12	18	12
1845 (LL)	1735 (LL)	370 (WR)	0935 (RF)	1740 (RF)	5458 (RF)	375 (WRF)	Buffer (370)
7-12	1-6	7-12	Rows Harvested		1-6	7-12	

Figure 1. Example of variety plot design, replicated 3 times.

The sprayer was 30 rows (90 feet) wide. LL varieties (FM 1735 and 1845) were grown side-by-side so both could be sprayed in the same pass over the field. Every other plot was 18 rows wide. Rows 13-18 of the 18-row plots were the spray middle and not harvested to avoid any effects of the sprayer pass or formation of a traffic pan. A Widestrike variety (PHY 370 or 375) was planted on either side of the LL plots to intercept any Ignite or glyphosate drift which may cause injury and impact results of the competing technology. Six rows of each plot were harvested (Figure 1).

Herbicide and insecticide applications were made in accordance with UGA Extension recommendations (Roberts, et al, 2009) and the technology requirements for each variety. Each variety also received insecticide, fungicide, and nematicide seed treatment. The FiberMax and Stoneville varieties were treated with Aeris plus Trilex seed treatment. The Phytogen varieties were treated with Avicta. The DeltaPine

varieties were treated with Acceleron (Acceleron by Monsanto will not be commercially available until 2011. For this study, Acceleron was priced the same as Avicta).

All other inputs and production practices were the same regardless of variety and technology. All varieties were treated the same in fertilizer application and defoliation. Each variety was evaluated individually to determine plant growth regulator (PGR) needs. There were no differences noted, thus each variety received the same amount of PGR at similar timing of application.

All plots were harvested on October 21, 2009. Each plot was individually harvested with a 6-row cotton picker and weighed using a scaled boll buggy to determine the seed cotton yield per acre based on the weight and exact harvested area of each plot.

A 25-30 lb seedcotton sample was randomly collected from each plot and ginned at the UGA Microgin in Tifton. Both lint and seed weight were determined from the sample. Lint turnout (lint weight as a percent of seedcotton weight) was determined and applied to the seedcotton yield from each plot to determine lint yield per acre.

The ginned cotton from each plot was HVI classed at the USDA Cotton Classing Office in Macon. Lint was valued based on fiber quality. Lint price was the Georgia average price received during November and December 2009 for base quality Color 41-Leaf 4/ Staple 34 cotton (USDA, 2009b) then adjusted for the fiber quality of each plot. Cotton seed was valued as the Georgia average price received during November and December 2009 (USDA, 2010).

For each variety plot, "system cost" was calculated. This cost was seed, technology fees, seed treatments, herbicides, insecticides, and the cost of application. All other inputs and production practices were the same regardless of technology and variety. For each variety plot, the net cost of ginning, warehousing, storage, and promotions and marketing (GSWM) was also calculated. This must be considered to account for differences in lint yield, lint turn-out, and cottonseed yield. This was 11.19 cents per pound (Shurley and Smith, 2008) minus the value of cottonseed. Net return was calculated for each variety plot as follows:

$$\text{Net Return} = (\text{Lint Yield/Acre} \times \text{Price}) - \text{SC} - \text{GSWM}$$

where Price = the quality adjusted price/lb of lint;

SC = systems costs; and

GSWM = net cost after cottonseed value.

Results and Discussion

All varieties received 1.75 pt/acre of Treflan impregnated on fertilizer which was preplant incorporated prior to bedding and planting (Table 1). There was no charge for impregnation. No separate cost of application was charged since the Treflan was applied with the fertilizer. All varieties also received 14 oz of Reflex at planting.

Each system received 3 post-emergence herbicide applications. There was no difference in herbicide applications between Roundup Ready® varieties (WR) and Roundup Ready Flex® varieties (FM1740B2RF, DP0935B2RF, PHY375WRF). Table 1 summarizes the applications made for R/RF and Liberty-Link (LL) varieties.

There was no difference in insect control (sprays) required for B2 and W varieties (Table 2). B2 and W varieties required the same spray materials and applications. PHY370 and 375, however, did require additional treatment for thrips. Over 7 inches of rain fell within the first 15 days after planting. This resulted in soil saturation and caused leaching of the insecticide from the Avicta seed treatment, but not from the Aeris and Acceleron treatments. The differences in thrips control requirements between varieties were due to the solubility of the insecticidal components of the seed treatments used. Orthene was applied to PHY370 and 375 to control thrips.

Table 1. Herbicides applied by technology.

Application	Roundup and Roundup Ready Flex		Liberty Link	
	Materials	Rate Per Acre	Materials	Rate Per Acre
Preplant	Treflan	1.75 pt	Treflan	1.75 pt
PRE- At Planting	Reflex	14 oz	Reflex	14 oz
POST OTT	Touchdown +Staple	23 oz 2.6 oz	Ignite	29 oz
POST Directed	Glyphosate +Envoke	32 oz .125 oz	Ignite	29 oz
POST Layby	Diuron +MSMA	2 pt 2 pt	Diuron +Ignite	2 pt 23 oz

Table 2. Insecticide spray applications.

Application	Materials	Rate Per Acre
Spray OTT ¹	Orthene	3.2 oz
Spray OTT	Bidrin	4 oz
	+bifenthrin	4 oz
Spray OTT	Bidrin	4 oz
	+bifenthrin	4 oz
Spray OTT	bifenthrin	6.4 oz
	+Curacon	12 oz

¹Tankmixed with Touchdown. Applied to PHY370 and 375 and DP0935 only.

Yield and Fiber Quality

Yield for the 7 varieties ranged from 1,390 lbs/acre to 1,194 lbs per acre (Table 3). The highest yielding variety was FM1740B2RF, but the 4 highest yielders were not statistically different. These varieties were FM1740B2RF, ST5458B2RF, PHY375WRF, and PHY370WR.

The three B2RF varieties averaged 1,342 lbs/acre. The two Widestrike® (WR and WRF) varieties averaged 1,304 lbs/acre. The two Liberty-Link® (LL) varieties averaged 1,235 lbs/acre.

Fiber quality was not statistically different among varieties. FM1845LLB2 had the highest Staple, Strength, and Uniformity of the 7 varieties in the test. Staple for 1845 was statistically higher than all other varieties but Strength and Uniformity were not. Color, Leaf, and Micronaire were not different among any varieties.

The average price for “base quality” Color 41-Leaf 4 and Staple 34 for the two month period November-December 2009 was 69.205 cents per pound (USDA-AMS, 2009b). This price was adjusted for fiber quality premiums and discounts on the quality of each variety. Price did not vary greatly but ranged from a high of 71.83 cents per pound for PHY375WR to 70.77 cents per pound for ST5458B2RF. All varieties graded well and there were no discounts for any quality parameters.

Table 3. Lint yield, turnout, seed yield, and fiber quality by variety.

	Lint Yield ¹	% Lint Turnout	Seed Yield	C1	C2	Leaf Grade	Staple ²	Strength	Micronaire	Uniformity
FM1740B2RF	1,390	39.31	1,872	3.67	1.00	3.00	36.7	31.0	4.5	82.8
ST5458B2RF	1,340	39.00	1,884	3.33	1.00	4.00	36.5	30.1	4.8	82.1
PHY375WRF	1,310	39.23	1,749	3.00	1.00	2.67	36.2	30.6	4.3	83.1
PHY370WR	1,297	39.86	1,710	3.33	1.00	3.33	35.3	30.6	4.6	82.8
DP0935B2RF	1,296	41.13	1,645	3.00	1.00	3.33	36.4	30.1	4.5	82.9
FM1735LLB2	1,275	36.68	1,931	3.67	1.00	3.00	36.5	31.0	4.5	82.8
FM1845LLB2	1,194	36.43	1,848	4.00	1.00	3.33	38.7	32.6	4.6	83.4

¹Top four varieties (in bold) not statistically different at 95% probability. LSD = 201 lbs/acre.

²Highest Staple (in bold) is statistically different from all other varieties at 95% probability.

Costs and Net Returns

This analysis compares costs and net return associated with yield, fiber quality, and choice of seed variety and technology (Table 4). Costs include seed, technology fees, insecticide and fungicide seed treatments, herbicides, insecticides, cost of application, and ginning, storage, warehousing, and marketing and promotion (GSWM). GSWM is the net cost after deducting the value of cottonseed. Cottonseed was valued at \$127 per ton (USDA, 2010). All other inputs and costs were the same for all varieties and technologies and thus do not need to be considered for comparison.

Seed and technology fees ranged from lows of around \$66 per acre to highs of almost \$80 per acre. Including seed treatments, cost ranged from about \$85 per acre to around \$97 per acre. WR and LLB2 were the least expensive in terms of seed costs and technology fees. B2RF was the most expensive.

Herbicide expenses for LL were cheaper than R and RF. Herbicide costs were \$54.01 per acre for LL varieties and \$60.44 for R and RF varieties. Insecticides were the same for B2 and W. Cost was slightly higher for varieties PHY375 and 370 due to the use of Orthene for thrips control but that was not a function of system choice.

Total system costs ranged from \$178.98 per acre for FM1845LLB2 and FM1735LLB2 to \$198.28 per acre for FM1740B2RF and ST5458B2RF. LLB2 was the least expensive system at an average of approximately \$179 per acre, B2RF averaged approximately \$198 per acre, and WR/WRF averaged \$191 per acre.

When considering both systems cost and the net cost of ginning (Net GSWM) due to lint turn-out and cottonseed yield, FM1740B2RF resulted in the highest net return at \$755.56 per acre. The next highest net return was for ST5458B2RF at \$719.59 per acre.

Net returns followed yield. Regardless of variety and technology, the highest 3 yielders were also the highest in net return. However, FM1735LLB2 ranked 4th in net return although it ranked 6th in yield. This was somewhat due to the low cost for the LL technology, but largely due to high seed yield resulting in low net cost of ginning.

Summary

The objective of this study was to compare lint yield, lint turn-out, cottonseed yield, fiber quality, cost of production, and net return for B2RF, WR, WRF and LLB2 technologies. Analysis compared costs and net return associated with yield, fiber quality, and choice of seed variety and technology. The test consisted of 7 varieties, in 4 technology packages: LLB2- FiberMax 1735 and 1845, WR- Phytogen 370, WRF- Phytogen 375, and B2RF- DeltaPine 0935, FiberMax 1740, and Stoneville 5458. Herbicide and insecticide applications were made in accordance with UGA Extension recommendations and technology requirements for each variety.

Table 4. Value, costs, and net return by variety.

	Lint Yield	Price	Lint Value	Seed			Herbicide	Insecticide	Appl.	Total System Costs	GSWM			Net Return
				Seed	Tech	Treat.					GSWM	CS Value	Net GSWM	
FM1740B2RF	1,390	.713	\$991	21.12	58.33	18.27	60.44	26.34	13.78	\$198.28	155.68	118.87	\$36.81	\$755.56
ST5458B2RF	1,340	.708	\$948	21.12	58.33	18.27	60.44	26.34	13.78	\$198.28	150.08	119.63	\$30.45	\$719.59
PHY375WRF	1,310	.718	\$941	19.89	55.18	18.07	60.44	28.14	13.78	\$195.50	146.72	111.06	\$35.66	\$709.81
FM1735LLB2	1,275	.712	\$908	37.62 ^a	28.96	18.27	54.01	26.34	13.78	\$178.98	142.80	122.62	\$20.18	\$708.77
PHY370WR	1,297	.714	\$927	19.89	45.67	18.07	60.44	28.14	13.78	\$185.99	145.26	108.59	\$36.67	\$704.05
DP0935B2RF	1,296	.715	\$927	20.62	58.24	18.07	60.44	26.34	13.78	\$197.49	145.15	104.46	\$40.69	\$688.46
FM1845LLB2	1,194	.710	\$848	37.62 ^a	28.96	18.27	54.01	26.34	13.78	\$178.98	133.73	117.35	\$16.38	\$652.74

^aIncludes Liberty-Link (LL) fee.

Seed and technology fees ranged from lows of around \$66 per acre to highs of almost \$80 per acre. WR and LLB2 were the least expensive in terms of seed and technology fees. B2RF was the most expensive. Total system costs ranged from \$178.98 per acre for FM1845LLB2 and FM1735LLB2 to \$198.28 per acre for FM1740B2RF and ST5458B2RF. LLB2 was the least expensive system at an average of approximately \$179 per acre, B2RF averaged approximately \$198 per acre, and WR/WRF averaged \$191 per acre.

FM1740B2RF resulted in the highest net return at \$755.56 per acre. The next highest net return was for ST5458B2RF at \$719.59 per acre. Net returns followed yield. Regardless of variety and technology, the highest 3 yielders were also the highest in net return. Costs due to choice of technology (seed, technology fees, herbicides, insecticides, and application) varied about \$20 per acre. Yield, therefore, remains an important consideration in variety and technology choice.

Acknowledgments

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