

LARGE BLOCK VARIETY TRIALS AT SOUTHWEST GEORGIA RESEARCH AND EDUCATION CENTER

Steve M. Brown¹, Stan Jones², and Skeet Ragan²

¹Crop & Soil Sciences, The University of Georgia, Tifton

²Southwest Georgia Research and Education Center, Plains

Variety testing is a valuable tool for the entire cotton industry. Field trials permit direct comparisons of the yield potential of varieties and technology in a given environment, but small plot experiments often provide unrealistic fiber quality data because of boll sampling techniques and the use of small, table top gins. Seed cotton processed in gins designed for small samples often lack seed cotton pre-cleaning and lint cleaning, and therefore overestimate fiber quality data such as lint turnout as well as fiber length, strength, and length uniformity.

The development of the UGA Micro Gin facility in Tifton affords the opportunity for research-size samples to be processed in a manner approximating commercial ginning. The facility came on-line in the summer of 2004 and work continues in determining proper protocol for sample size, handling, etc.

Two large plot trials were established at the SW Georgia Research and Education Center at Plains to compare yield and quality of varieties. One of the trials was planted at a normal date (May 7); the other involved double cropping behind small grains and an abnormally late planting date (June 17). Experimental design for the two tests was a randomized complete block with 5 and 6 replications, respectively. Plot size of the early test was 16 rows by 1425 ft; plots in the late planted study were 16 rows by 1230 ft. Plot length and number of replications were matched with the expectation of providing module-size quantities of each variety. Each of the varieties was a Bollgard/Roundup Ready cultivar and was grown with appropriate management practices. Multiple-acre plots allowed the harvest of large amounts of cotton suitable for processing through a commercial gin and standard quality assessment in the USDA cotton classing system. Harvest date of the early test was October 14-15. The later test involved two harvest dates, November 29-30 and December 14, because of varying maturity of the varieties. Harvested seed cotton from each variety in the early test was placed in a separate module; separate wagons were used for the later test. Modules and wagons were processed at McClesky Cotton Company (Gin) near Bronwood, GA, with fiber quality evaluations being made at the USDA Cotton Classing Office in Macon, GA. Additional samples were collected for ginning at the UGA Micro Gin (sample size about 50 lbs) and with a small, table top gin (sample size about 0.75 lb). Lint samples from these small gins were forwarded to the LSU Fiber Quality Lab to provide quality data and to allow comparison with cotton processed through commercial ginning.

Lint yields and turnout data of the early test are reported in Table 1. There is no replication of module and therefore no direct statistical analysis of yield and fiber data. Yields were lower than expected for the site due to the effects of multiple tropical storms and escaped weeds, primarily wild poinsettia. Yields are based on module and bale

weights from the commercial gin. Yields of DP 555 BR were about 70 lb/A greater than yields with the other two varieties. Turnout from table top ginning was higher than that from commercial ginning, and there was no correlation of variety across gin. Lint turnout for DP 555 BR from the commercial gin was typical but slightly lower for the Micro Gin and slightly higher for the table top gin. For ST 5599 BR, commercial gin turnout was somewhat lower than expected.

Table 1. Yield and gin turnout of three varieties planted in large plots in 2004 at the SW Georgia Research and Education Center at Plains.

Variety	Lint yield, lb/A	Lint turnout, %		
		Commercial gin	UGA Micro Gin	Table top gin
DP 555 BG/RR	931	44.2	38.3	45.8
ST 5599 BR	856	34.8	34.9	43.2
FM 960 BR	866	35.8	35.3	41.6

Varieties replicated five times in plots 16 rows by 1,425 ft. Each variety was harvested and put in a single module. Test was planted May 7 and harvested October 14-15, 2004.

Commercial ginning occurred several weeks prior to the time samples were processed on the small gins. Likewise, fiber analysis was conducted in separate labs. Staple, micronaire, and strength of all three varieties were quite good (Table 2), and the rank in length uniformity (least to greatest) was DP 555 BR, ST 5599 BR, and FM 960 BR for the three gins. Uniformity data for samples process on the table top gin were higher than for the commercial gin, while uniformity from the Micro Gin was intermediate. Other investigations suggest that DP 555 BR has a relatively low length uniformity index and high short fiber content. Micronaire data from the smaller gins (and LSU lab) trended lower than for the commercial gin (and the USDA Classing Office).

Table 2. Fiber quality of three varieties from large plot field trials processed on a commercial gin, the UGA Micro Gin, and a table top gin, 2004.

Variety	<u>Commercial gin</u>				<u>UGA Micro Gin</u>				<u>Table top gin</u>			
	stap	mic	stre	unif	stap	mic	stre	unif	stap	mic	stre	unif
DP 555 BR	36.3	33.5	30.0	79.6	38.1	28	29.8	80.6	38.1	29	29.3	81.1
ST 5599 BR	36.1	36.9	30.7	80.5	37.1	29	31.5	82.0	37.4	28	33.4	82.8
FM 960 BR	35.9	40.9	32.2	81.6	37.1	34	36.6	82.9	39.0	38	35.7	83.6

Plots replicated five times in the field but harvested and put in a single module. Quality data averaged across bales in the respective modules and from samples ginned at the two small scale gins. Color-leaf grade data from the commercial gin included from DP 555 BR - 9 bales 31-3 or 31-4, 2 bales 41-3; from ST 5599 BR - 5 bales 31-4, 5 bales 41-4; from FM 960 BR - 2 bales 31-4, 8 bales 41-3 or 41-4.

In the double cropped study, yields were well below average production for the site because of delayed planting and late maturity, wet weather during the growing season and in September, and possibly late season damage from stink bugs (Table 3). On November 2, the three varieties DP 444 BR, FM 960 BR, and DP 555 BR were approximately 30 to 40, 15 to 20, and 0 to 5 percent open, respectively, and stink bug numbers were extremely high in DP 555 BR. Yields of DP 555 BR were 140 lb/A less than with the other two varieties. Turnout at the commercial gin was unexpectedly low with DP 555 BR and high with FM 960 BR. Turnout data demonstrate the difficulty of correlating small gin turnout with that from commercial gins.

Table 3. Yield and gin turnout of three double-cropped varieties planted in large plots in 2004 at the SW Georgia Research and Education Center at Plains.

Variety	Lint yield, lb/A	Lint turnout, %		
		Commercial gin	UGA Micro Gin	Table top gin
DP 555 BR	546	35.8	36.3	43.0
DP 444 BR	685	38.4	34.9	45.9
FM 960 BR	687	40.2	36.2	42.4

Varieties replicated six times in plots 16 rows by 1,230 ft. Each variety was harvested and put in a separate wagon. Test was planted June 17; harvest dates were DP 444 BR-November 29, FM 960 BR-November 30, and DP 555 BR-December 14, 2004.

Staple of commercially ginned DP 555 BR and DP 444 BR was in the discount range (below 34 32nds). Micronaire for all three varieties was well below the state average of 44. Fiber strength of DP 444 BR was less than the other varieties regardless of gin.

Table 4. Fiber quality of three varieties from double-cropped, large plot field trials processed on a commercial gin, the UGA Micro Gin, and a table top gin, 2004.

Variety	Commercial gin				UGA Micro Gin				Table top gin			
	stap	mic	stre	unif	stap	mic	stre	unif	stap	mic	stre	unif
DP 555 BR	33.7	30.4	27.4	79.3	36.2	30	29.7	81.4	35.8	30	28.4	81.9
DP 444 BR	33.8	36.6	26.3	81.5	34.2	28	25.2	81.7	34.9	30	25.5	81.3
FM 960 BR	34.9	38.6	29.5	82.1	36.2	36	30.8	81.6	35.2	35	32.3	82.9

Plots replicated six times in the field but harvested and put in a separate wagon. Quality data averaged across bales in the respective wagons and from samples ginned at the two small scale gins. Color-leaf grade data from the commercial gin included from DP 555 BR - 6 bales 21-1 or 21-3, 1 bale 41-1; from DP 444 BR - 2 bales 31-3 or 31-4, 3 bales 32-2, 3 bales 42-1; from FM 960 BR - 3 bales 31-3 or 31-4, 3 bales 32-2, 2 bales 41-2.