

YIELD, FIBER QUALITY, AND VALUE: 2008 VARIETY TRIALS IN BEN HILL AND IRWIN COUNTIES

Phillip Edwards¹, Scott Carlson², Don Shurley³,
Phillip Roberts⁴, Bob Kemera⁵, and Ken Lewis⁶

¹The University of Georgia Cooperative Extension, Irwin County

²The University of Georgia Cooperative Extension, Ben Hill County

³Agriculture and Applied Economics, University of Georgia, Tifton Campus

⁴Department of Entomology, University of Georgia, Tifton Campus

⁵Department of Crop & Soil Science, University of Georgia, Tifton Campus

⁶The University of Georgia Cooperative Extension- SW District

Introduction

Choice of variety is an important decision for cotton producers. Seed, and the associated technology fee, is the single most expensive production input in cotton production. When selecting seed, the producer is selecting a “package” that includes yield potential, fiber quality potential, and weed and insect management regimes.

In addition to research OVT's (official variety trials), it is often beneficial for producers to know how varieties and technologies compare under local on-farm situations. A large-plot on-farm variety trial was conducted in Ben Hill and Irwin Counties in 2008. This was the fourth year of such a study and, as a result, a large body of information has been accumulated on many of the varieties tested.

Materials and Methods

A total of 3 trials were conducted. Fifteen varieties were tested at 3 locations - the Phillips Farm in Ben Hill County and the Ross Farm and CASE farm in Irwin County. Each location was non-irrigated. For purposes of the study, each trial was considered a separate replication. The average of all 3 locations represents the average over different locations and management practices.

The Phillips Farm trial was strip-tilled and planted on May 30, 2008. Each variety plot was 8 rows wide with 36-inch rows. All 8 rows of each variety were harvested on October 28, 2008.

The Ross Farm trial was planted after wheat on June 6, 2008. Each variety plot was 12 rows in width and planted in 38-inch rows. Six rows of each plot were harvested on November 28, 2008.

The CASE Farm trial was planted in conventional tillage on May 21, 2008. Each variety plot was 8 rows wide with 36-inch rows. All 8 rows of each variety were harvested on December 20, 2008.

Stand counts were taken after emergence. Stand counts were consistent across each plot at each location. Harvest was done in a timely manner at each location with the exception of the CASE farm. Harvest of the CASE trial was delayed by weather and the availability of a picker.

At harvest, the seedcotton of each plot at each location was weighed. A large random sample of the seedcotton for each plot was then taken. The samples were ginned at the UGA Microgin in Tifton, GA. The seedcotton sample and ginned lint were both weighed to determine gin turn-out (lint weight as a percent of seedcotton weight). The gin turn-out was applied to the total seedcotton weight of the plot and lint yield per acre was determined based on the size of the plot.

Cotton seed from ginning was not weighed. The difference between seedcotton weight and lint weight consists of seed, trash, and moisture. Based on previous research, trash and moisture was estimated as a function of gin turnout. For each plot, cotton seed was then estimated as seedcotton weight minus lint weight minus estimated trash and moisture weight.

In addition to lint yield and cotton seed yield, fiber quality was also determined for each variety at each location. Ginned cotton from the Microgin was HVI classed at the USDA Cotton Classing Office in Macon. Fiber quality, Staple and Uniformity especially, of cotton ginned at the UGA Microgin may be higher than that of a commercial gin but still useful for relative comparisons.

Value Per Acre was calculated for each variety. Value Per Acre was calculated for the average lint yield, cottonseed yield, and fiber quality of all 3 trials. Lint was valued at the 2008 Loan Rate based on the fiber quality of each plot. Cotton seed was valued at the November-December 2008 Georgia average price received. The “base” Loan Rate is 52 cents per pound. If the Loan Rate for a variety is above this, the difference represents a net premium for quality. If the Loan Rate for a variety is below this, the difference represents a net discount for quality. The November-December 2008 average price for cotton seed was \$191 per ton.

Value Per Acre was calculated as:

Lint Value + (Seed Value – GWSM)

GWSM is the cost of ginning, warehousing, storage, and marketing (classing and state and national check-off). Because this cost varies due to yield, it should be considered when comparing varieties. This cost per acre was estimated at 8.5 cents per pound for ginning plus \$15.30 per bale (\$8.00 for warehouse receiving and load-out, \$2.00 for one month of storage, \$1.85 for classing, and \$3.45 for state and national boards). Cost per acre assumed a 500-lb bale.

In this analysis, production practices and cost of production were not considered. Varieties are compared for lint and cottonseed yield, fiber quality, and net Value Per Acre as defined.

Results and Discussion

Phillips Farm

Yield per acre varied from a high of 1,275 lbs per acre for DP174RF to 920 lbs per acre for DP167RF (Table 1). The top 1/3 (highest 5) yielding varieties were DP174RF, DP515BR, PHY370WR, DP141B2RF, and PHY485WRF.

Color Grades were mostly 31 and 41 with Leaf Grades mostly 4. Staple averaged 37.2, ranging from 35 to 40. Fiber Strength averaged 30.2 and fiber length Uniformity averaged 82.7 ranging from a low of 80.3 to a high of 85.2.

Ross Farm

Yield per acre varied from a high of 1,275 lbs per acre for DP555BR to 899 lbs per acre for DP167RF (Table 2). The top 1/3 (highest 5) yielding varieties were DP555BR, DP174RF, DP515BR, DP141B2RF, PHY485WRF, and PHY480WR.

Color Grade was mostly 31 with Leaf Grades 3 and 4. Staple averaged 36.9, ranging from 35 to 39. Fiber Strength averaged 29.6 and fiber length Uniformity averaged 82.0, ranging from a low of 80.2 to a high of 83.5.

The Ross Farm trial was June-planted behind wheat and harvested a month later than the Phillip Farm trial. Yield in this trial was similar to the Phillips Farm trial. Fiber quality was better.

CASE Farm

Yield per acre varied from a high of 1,361 lbs per acre for DP555BR to 785 lbs per acre for ST4554B2RF (Table 3). The top 1/3 (highest 5) yielding varieties were DP555BR, DP174RF, DP164B2RF, DP515BR, DP141B2RF, and PHY370WR.

Color Grades were 41 and 51 with Leaf Grade mostly 3. Staple averaged 36.2, ranging from 35 to 38. Fiber Strength averaged 29.4 and fiber length Uniformity averaged 81.8, ranging from a low of 80.4 to a high of 83.5.

The CASE Farm trial was planted in May but not harvested until late December. Staple, Strength, and Uniformity were lower compared to the other 2 trials and micronaire was higher. Color Grade was lower—mostly 51 compared to 31 and 41 for the other 2 locations. Color and Leaf are generally a function of weather, harvest timing, and other management factors, not variety genetics.

Average of All Three Tests

The highest yielding variety over all three test locations (reps) was DP555BR, which averaged 1,264 pounds per acre (Table 4). DP555BR was the highest yielding variety

at 2 of the 3 locations. The yields of the top five varieties- DP555BR, DP174RF, DP515BR, PHY370WR, and DP141B2RF, were not statistically different. With the registration on single-gene Bollgard® technology expiring after the 2009 crop season, it is worth noting that two-gene varieties PHY370WR and DP141B2RF and non-Bt Variety DP174RF were not statistically different than DP555BR.

In addition to yield, Table 4 also shows the average fiber quality of the 15 varieties. Color grade is shown as the average of each of its 2 digits. A color grade of 31, for example, would be designated as a C1 of 3 and C2 of 1. DP555BR was highest in yield but among the lowest in fiber length Staple and Uniformity and lowest in Strength.

Staple ranged from 38.7 to 35.3. Strength ranged from 31.97 to 28.13. Uniformity ranged from 83.77 to 80.63. Color grade (C1) was mostly 3 and 4 and still averaged 4 or less for most varieties; although the late-harvested CASE location had C1 of 5 for most varieties.

Comparison of Value Per Acre

The highest Value Per Acre was DP555BR with a value of \$699.33 per acre (Table 5). DP555BR was followed closely by DP174RF at \$694.90 per acre. There was no statistical difference in Value Per Acre among the top eight varieties.

As measured by the Loan Rate, DP174RF had the highest fiber quality - receiving a loan premium of 3.5 cents per pound. This was followed by DP161B2RF with a loan premium of 3.41 cents per pound.

The top five yielding varieties were also, in that same order, the top five in Value.

Summary and Conclusions

Choice of variety is an important decision for cotton producers. Seed, and the associated technology fee, is the single most expensive production input in cotton production. A large plot on-farm variety trial was conducted in Ben Hill and Irwin Counties in 2008; the fourth year of such a study. Fifteen varieties were tested at 3 locations, the Phillips Farm in Ben Hill County and the Ross Farm and CASE farm in Irwin County.

The highest yielding variety over all three test locations was DP555BR which averaged 1,264 pounds per acre. The top five varieties, DP555BR, DP174RF, DP515BR, PHY370WR, and DP141B2RF were not statistically different in yield. Two-gene varieties PHY370WR and DP141B2RF and non-Bt Variety DP174RF were not statistically different in yield than DP555BR.

DP555BR was highest in yield but among the lowest in fiber length Staple and Uniformity and lowest in Strength. DP555BR was still the highest in Value Per Acre followed closely by DP174RF. There was no statistical difference in Value Per Acre among the top eight varieties.

As measured by the Loan Rate, DP174RF had the highest fiber quality—receiving a loan premium of 3.5 cents per pound. This was followed by DP161B2RF with a loan premium of 3.41 cents per pound. The top five yielding varieties were also the top five in Value, in that same order.

Acknowledgements

The authors would like to acknowledge the representatives who donated cotton seed for this trial: Chris Hopkins with Bayer Crop Science, Harold Roberts with Delta and Pine Land, and Steve Brown with Phytogen. We would especially like to thank the farmer cooperators: Wesley Paulk, Kyle Phillips, Kent Phillips, Darrell Ross and Jeffery Ross

Table 1. 2008 Variety trial, Phillips Farm location, non-irrigated, planted May 30, 2008, harvested Oct. 28, 2008, 36-inch rows.

Variety	Seedcotton Lbs/Acre	Lint Yield Lbs/Acre	% Gin Turn-out	Color Grade	Leaf Grade	Staple	Strength	Micronaire	Uniformity
DP174RF	3,321	1,275	38.39	31	4	38	29.4	4.2	84.6
DP515BR	3,150	1,209	38.38	41	4	35	29.0	4.1	82.1
PHY370WR	3,190	1,183	37.08	31	3	36	29.3	4.4	83.1
DP141B2RF	3,264	1,178	36.09	41	5	39	32.6	4.2	82.5
PHY485WRF	3,208	1,164	36.28	41	5	37	30.9	4.5	85.2
DP555BR	2,949	1,156	39.20	31	4	35	29.3	4.2	80.9
PHY480WR	3,158	1,127	35.69	41	4	37	30.3	4.5	84.7
PHY375WRF	3,021	1,114	36.88	41	3	36	31.2	3.9	82.1
DP147RF	3,050	1,110	36.39	41	4	38	29.9	3.9	82.8
ST5327B2RF	2,883	1,056	36.63	41	4	37	29.9	3.8	82.8
DP143B2RF	2,907	1,024	35.23	31	4	40	31.2	3.6	80.3
ST4554B2RF	2,826	1,009	35.70	31	4	36	27.3	4.0	81.6
DP161B2RF	2,788	971	34.83	31	4	39	32.5	4.0	83.6
DP164B2RF	2,658	931	35.03	41	3	38	29.2	3.8	81.4
DP167RF	2,614	920	35.20	41	3	37	30.4	4.0	82.8

Table 2. 2008 Variety trial, Ross Farm location, non-irrigated, planted Jun. 6, 2008, harvested Nov. 28, 2008, 38-inch rows.

Variety	Seedcotton Lbs/Acre	Lint Yield Lbs/Acre	% Gin Turn-out	Color Grade	Leaf Grade	Staple	Strength	Micronaire	Uniformity
DP555BR	3,230	1,275	39.47	31	3	36	27.3	3.7	80.9
DP174RF	3,065	1,243	40.51	31	3	37	28.6	4.1	83.3
DP515BR	3,228	1,197	37.08	31	3	36	29.9	3.9	82.3
DP141B2RF	3,226	1,188	36.83	31	4	38	30.6	4.1	81.2
PHY485WRF	3,170	1,179	37.19	41	4	36	30.8	4.1	83.5
PHY480WR	3,293	1,177	35.74	31	5	37	30.6	4.1	83.1
PHY370WR	3,067	1,150	37.50	31	4	35	29.0	3.9	82.6
DP143B2RF	2,944	1,056	35.87	31	4	37	28.6	3.5	80.4
DP164B2RF	2,879	1,005	34.91	31	3	37	29.6	3.5	80.2
PHY375WRF	2,620	1,004	38.32	31	3	37	27.5	3.8	81.9
DP161B2RF	2,822	999	35.40	31	4	39	32.5	4.1	83.6
ST5327B2RF	2,550	945	37.06	31	4	36	30.4	3.5	81.9
ST4554B2RF	2,610	933	35.75	31	4	37	29.9	4.1	82.2
DP147RF	2,618	927	35.41	31	3	38	30.2	3.8	81.7
DP167RF	2,523	899	35.28	31	3	37	29.0	3.7	80.9

Table 3. 2008 Variety trial, CASE Farm location, non-irrigated, planted May 21, 2008, harvested Dec. 20, 2008, 36-inch rows.

Variety	Seedcotton Lbs/Acre	Lint Yield Lbs/Acre	% Gin Turn-out	Color Grade	Leaf Grade	Staple	Strength	Micronaire	Uniformity
DP555BR	3,442	1,361	39.54	41	3	35	27.8	4.4	80.4
DP174RF	2,996	1,209	40.35	41	3	36	27.8	4.7	82.7
DP164B2RF	3,318	1,204	36.29	51	3	38	30.7	4.5	81.4
DP515BR	3,098	1,190	38.41	41	3	35	27.7	4.9	81.6
PHY370WR	3,093	1,185	38.31	51	3	35	28.2	4.7	81.6
DP161B2RF	3,253	1,175	36.12	41	3	38	30.9	4.4	82.5
DP143B2RF	3,184	1,168	36.68	41	4	37	27.2	4.3	81.2
DP141B2RF	3,142	1,141	36.31	51	4	37	29.8	4.5	81.9
DP167RF	3,072	1,124	36.59	41	3	37	30.6	4.5	82.9
PHY375WRF	2,833	1,086	38.33	51	3	36	29.5	4.3	82.6
DP147RF	2,866	1,054	36.78	51	3	37	31.2	4.2	81.1
PHY480WR	2,785	994	35.69	51	3	36	29.6	4.9	83.5
PHY485WRF	2,723	984	36.14	51	3	35	29.4	4.8	81.0
ST5327B2RF	2,730	980	35.90	51	3	36	30.1	4.4	81.7
ST4554B2RF	2,108	785	37.24	51	3	35	29.8	4.5	81.1

Table 4. 2008 Variety trial, yield and fiber quality, average of three locations.

Variety	Lint Yield Lbs/Acre ¹	% Gin Turn-out	Color (C1)	Color (C2)	Leaf Grade	Staple	Strength	Micronaire	Uniformity
DP555BR	1,264	39.39	3.33	1.00	3.33	35.3	28.13	4.10	80.73
DP174RF	1,242	39.75	3.33	1.00	3.33	37.0	28.60	4.33	83.53
DP515BR	1,199	37.96	3.67	1.00	3.33	35.3	28.87	4.30	82.00
PHY370WR	1,173	37.63	3.67	1.00	3.33	35.3	28.83	4.33	82.43
DP141B2RF	1,169	36.41	4.00	1.00	4.33	38.0	31.00	4.27	81.87
PHY485WRF	1,109	36.54	4.33	1.00	4.00	36.0	30.37	4.47	83.23
PHY480WR	1,100	35.71	4.00	1.00	4.00	36.7	30.17	4.50	83.77
DP143B2RF	1,083	35.93	3.33	1.00	4.00	38.0	29.00	3.80	80.63
PHY375WRF	1,068	37.85	4.00	1.00	3.00	36.3	29.40	4.00	82.20
DP161B2RF	1,048	35.45	3.33	1.00	3.67	38.7	31.97	4.17	83.23
DP164B2RF	1,046	35.39	4.00	1.00	3.00	37.7	29.83	3.93	81.00
DP147RF	1,031	36.16	4.00	1.00	3.33	37.7	30.43	3.97	81.87
ST5327B2RF	994	36.53	4.00	1.00	3.67	36.3	30.13	3.90	82.13
DP167RF	981	35.81	3.67	1.00	3.00	37.0	30.00	4.07	82.20
ST4554B2RF	909	36.22	3.67	1.00	3.67	36.0	29.00	4.20	81.63

¹/ Yield per acre of the top five varieties was not statistically different, 95% confidence level, LSD=142 lbs per acre.

Table 5. 2008 Variety trial, value per acre, average of three locations.

Variety	Lint Yield Lbs/Acre	Loan Price Cents/Lb	Cotton Value/Ac	Seed Est. Lbs/Ac	Seed Value/Ac	GWSM	TOTAL Value/Ac ¹
DP555BR	1,264	54.73	\$691.79	1,609	\$153.66	\$146.12	\$699.33
DP174RF	1,242	55.50	\$689.31	1,562	\$149.17	\$143.58	\$694.90
DP515BR	1,199	54.43	\$652.62	1,612	\$153.95	\$138.60	\$667.97
PHY370WR	1,173	53.69	\$629.78	1,597	\$152.51	\$135.60	\$646.69
DP141B2RF	1,169	52.78	\$617.00	1,670	\$159.49	\$135.14	\$641.35
DP143B2RF	1,083	54.62	\$591.53	1,576	\$150.51	\$125.19	\$616.85
PHY480WR	1,100	53.23	\$585.53	1,615	\$154.23	\$127.16	\$612.60
DP161B2RF	1,048	55.41	\$580.70	1,555	\$148.50	\$121.15	\$608.05
PHY485WRF	1,109	52.36	\$580.67	1,576	\$150.51	\$128.20	\$602.98
PHY375WRF	1,068	53.85	\$575.12	1,442	\$137.71	\$123.46	\$589.37
DP164B2RF	1,046	53.59	\$560.55	1,556	\$148.60	\$120.92	\$588.23
DP147RF	1,031	53.86	\$555.30	1,487	\$142.01	\$119.18	\$578.13
DP167RF	981	55.18	\$541.32	1,435	\$137.04	\$113.40	\$564.96
ST5327B2RF	994	53.25	\$529.31	1,413	\$134.94	\$114.91	\$549.34
ST4554B2RF	909	53.80	\$489.04	1,308	\$124.91	\$105.08	\$508.87

¹/ Value per acre is lint value plus cottonseed value minus GWSM (ginning, warehousing, storage, and marketing and promotions).

Value per acre of the top eight varieties is not statistically different at the 95% confidence level, LSD=\$95.90 per acre.