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ENGINEERING AND GINNING

Gross Monetary Returns for Conventionally Processed Cotton Cultivars from Mississippi

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ABSTRACT

The Mississippi Regional Cotton Variety Trials (RCVT) from one location in 2002 and two locations in 2003 were machine harvested and ginned in the microgin in Stoneville, MS, using a standard machine sequence. This allowed the cultivars to be evaluated in a manner similar to commercial ginning practices. Lint yields and HVI measurements were determined and used to calculate the monetary value of the lint and gross monetary return for each cultivar. Gross monetary return was associated with lint yield, and there were large differences in these factors among cultivars and test environments. The variation in lint value was larger among cultivars than among environments. Gross monetary return was calculated from lint yield and lint value, but increases in gross return with lint value were not statistically significant. Increased lint yield was associated with decreased fiber length and strength. Fiber quality determined for these cultivars was compared with the typical needs of both domestic and foreign markets. For fiber length, color, leaf, and uniformity, 93% of the cultivars met the fiber quality demanded by the domestic market, but only 31% met the base requirements of foreign mills.

Seed cotton and fiber properties influence processing parameters as cotton is ginned and transformed into finished products. These properties are different between cotton cultivars and determine the value of the fiber; therefore, the selection of appropriate cotton cultivars is one of the first important production decisions. The USDA Agricultural Marketing Service uses High Volume Instrument (HVI) classification to determine fiber properties for nearly all cotton bales produced in the United States. The USDA Commodity Credit Corporation (CCC) uses some of these properties, such as fiber length (staple), color grade, leaf grade, strength, uniformity, and micronaire, to determine the value of the lint and establish loan rates.

Regional cotton variety trials (RCVT) are conducted yearly to monitor the fiber quality of newly developed cotton cultivars. These tests include cultivars submitted by seed companies and are typically conducted by state agricultural experiment stations. These trials provide information essential to producers in cultivar selection. Since results may vary between test environments, it is important to consider results from several years or locations.

Meredith and Bridge (1973) grew four cultivars in four environments and found that cultivar differences in yield and the fiber quality of hand-harvested bolls changed with environment and harvest interval. These changes were minimal when compared with the overall difference in cultivars. A similar study on conventionally processed cotton that included five cultivars found that cultivar differences in lint yield and HVI fiber quality measurements changed with crop year and harvest interval (Williford et al., 1987). These interactions appeared to be much stronger in comparison with overall cultivar differences, especially for length, strength, micronaire, reflectance, yellowness, and uniformity, unlike the study by Meredith and Bridge (1973). In a more comprehensive study involving 19 cultivars from 2 years and 2 locations, Meredith et al. (1991) used conventional processing to show that interactions between cultivar and either year or field location for numerous measurements (including lint yield and HVI measurements) were minimal or insignificant when compared with cultivar differences.

There have been several other reports evaluating cotton cultivars after machine harvesting and conventional ginning. Anthony (1994) evaluated 30 cultivars from 2 field locations in 1992; Anthony and Calhoun (1997a) evaluated 32 cultivars from 3 field locations in 1993; and Anthony and Calhoun (1997b) evaluated 49 cultivars from 2 field locations in 1995. Interactions between fields and cultivars for lint yield and gin turnout in 1992 and 1993 were

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significant, indicating cultivars were not consistent among fields. These factors were not analyzed in 1995. In each of these tests, there were differences among cultivars for all HVI measurements (color, reflectance, yellowness, strength, trash, length, uniformity, and micronaire), as well as leaf and color grades. Interactions between cultivar and field were significant for yellowness (1992 and 1993), strength (1992 and 1993), percentage area (1993 and 1995), and leaf grade (1993 and 1995).

The quality of a crop is influenced by environmental factors, including growing area, season, weather, etc. Harvest timing also impacts crop quality. These factors play a crucial role in permitting cultivars to reach their maximum potential, but these factors may affect some cultivars differently. After a crop has been grown and harvested, the quality of the lint must be maintained through ginning and fiber processing. These steps may also affect lint from various cultivars differently; therefore, it is important when evaluating cotton cultivars to include numerous cultivars grown in multiple environments. It is also important to subject the cotton to conventional processing steps, including harvesting and ginning. Since many of the cultivars in previous reports have become obsolete, new research is needed that focuses on current cultivars. This study included cotton from three different environments separated by either crop year or soil type, and it included two maturity groups in each of those environments. Overall, this study included 195 sources for cultivar. This large source of variation, both genetic and environmental, strengthens the confidence in the results and their implications on the state of modern cultivars. The focus of the study was gross monetary return associated with each cultivar, since this factor along with production costs are of most interest to the farmer.

The objective of this study was to analyze the variation in gross monetary return, lint yield, lint value, and HVI properties for various cotton cultivars machine harvested and ginned through a typical sequence of gin machinery.

MATERIALS AND METHODS

This study included portions of the Mississippi RCVT conducted during the 2002 crop season in Stoneville, the 2003 crop season in Stoneville, and the 2003 crop season in Tribbett. Each test included an early maturity group containing 38 cotton cultivars and a medium maturity group containing 27 cotton cultivars. The same cultivars were included in both locations in 2003, but only 19 early and 10 medium maturing cultivars grown in 2002 were included in 2003. The early and medium maturing cultivars grown in 2002 are listed in Tables 1 and 2, respectively, and the early and medium maturing cultivars grown in 2003 are listed in Tables 3 and 4, respectively. Cultivars common to all 3 tests are noted. Each cultivar was replicated in six plots, blocked by replication. Plots consisted of 2 rows each 100 cm (40 in) wide and 12.2 m (40 ft) long.

The cotton was harvested with a spindle picker and stored at the Cotton Ginning Lab in Stoneville, MS, until processed through the microgin (Anthony and McCaskill, 1972). Samples were stored for at least 3 d to equilibrate the moisture content of the samples. The amount of cotton available from each plot was insufficient for processing in the microgin, so plots replicated in adjacent blocks were combined. This provided a total of three lots for each cultivar within each test that were ginned. The microgin contained all the machines of a typical gin including a shelf type dryer, Lummus 6 cylinder cleaner (Savannah, GA), Continental Little David stick machine (Continental Eagle; Prattville, AL), Lummus Trashmaster cylinder cleaner, Continental Commander extractor-feeder, Continental 93 (reduced to 20 saws) gin stand, and one Continental 16-D lint cleaner. The 2002 test used two lint cleaners. Feed control settings for cotton entering the dryer and the gin stand were adjusted before ginning and maintained within each test. Deviations in ambient conditions within each test were minimized by cooling the air within the gin to 75 ± 5 °F (24 ± 3 °C). This minimized heat build-up in the gin as the machinery warmed up. The relative humidity was not controlled, but controlling temperature helped to minimize fluctuations in relative humidity. The seed cotton was weighed before ginning, and the lint was weighed after ginning. For each lot, three samples were taken to determine fiber quality by HVI classification, which was performed by the USDA Agricultural Marketing Service in Dumas, AR. The 2005 USDA CCC loan rates were used to determine the value of the lint.

Using the general linear model procedure (PROC GLM), statistical analysis of variance was performed to differentiate cultivars grown in each test based on fiber properties (version 8.2; SAS Institute; Cary, NC). Means for the different parameters were compared using Fisher's LSD (P = 0.05). Regression analysis was performed to characterize trends between fiber properties.

Table 1. Early maturing cultivars grown in 2002

Cultivar	Abbreviation[z]
Bayer FM958	FM958*
Bayer FM958BG	FM958BG*
Bayer FM966	FM966*
Beltwide Cotton Genetics BCG28R	BCG28R*
Delta and Pine Land Company DP436RR	DP436RR*
Delta and Pine Land Company DP451BR	DP451BR*
Delta and Pine Land Company PM1199RR	PM1199RR*
Delta and Pine Land Company PM1218BR	PM1218BR*
Delta and Pine Land Company SG105	SG105*
Delta and Pine Land Company SG215BR	SG215BR*
Delta and Pine Land Company SG521R	SG521R*
Delta and Pine Land Company SG747	SG747*
Delta Research and Extension Center DES810	DES810*
Delta Research and Extension Center DES816	DES816*
Phytogen Seed Company PSC355	PSC355*
Stoneville Pedigreed Seed Company BXN49B	BXN49B*
Stoneville Pedigreed Seed Company ST4793R	ST4793R*
Stoneville Pedigreed Seed Company ST4892BR	ST4892BR*
Syngenta NX2429	NX2429*
ACALA1517-99	AC1517-99
Agri ProAP7115	AP7115
Alltex Atlas	ATAtlas
Delta and Pine Land Company DP20B	DP20B
Delta and Pine Land Company DP458BR	DP458BR
Delta and Pine Land Company DP555BR	DP555BR
Delta and Pine Land Company DPLX99X35	DPLX99X35
Delta and Pine Land Company SG2501BR	SG2501BR
Delta Research and Extension Center DES607	DES607
Mississippi State University MISCOT8806	MIS8806
Mississippi State University MISCOT8839	MIS8839
Olvey and Associates OA87	OA87
Olvey and Associates OA89	OA89
Olvey and Associates OA90	OA90
Phytogen Seed Company PH98M-2983	PH98M2983
RGC2001	RGC2001
RGC2002	RGC2002
Stoneville Pedigreed Seed Company BXN47	BXN47
Stoneville Pedigreed Seed Company ST457	ST457

[z] Cultivars designated with * are common to both crop years.

Table 2. Medium maturing cultivars grown in 2002

Cultivar	Abbreviation[z]
Bayer FM989BR	FM989BR*
Beltwide Crop Genetics BCG24R	BCG24R*
Delta and Pine Land Company DP448B	DP448B*
Delta and Pine Land Company DP458BR	DP458BR*
Delta and Pine Land Company DP491	DP491*
Delta and Pine Land Company DP5415RR	DP5415RR*
Delta and Pine Land Company DP555BR	DP555BR*
Delta and Pine Land Company SG747	SG747*
Stoneville Pedigreed Seed Company ST 5303 R	ST5303R*
Stoneville Pedigreed Seed Company ST 5599 BR	ST5599BR*
Bayer FM966	FM966
Bayer FM989R	FM989R
Beltwide Crop Genetics BCG245	BCG245
Delta and Pine Land Company DELTAPEARL	DPPearl
Delta and Pine Land Company DP565	DP565
Delta and Pine Land Company DP5690R	DP5690R
Delta and Pine Land Company DP655BR	DP655BR
Delta and Pine Land Company NUCOTN35B	DPNu35B
Germain's GC271	GC271
Olvey and Associates OA85	OA85
Olvey and Associates OA87	OA87
Olvey and Associates OA88	OA88
PhytogenPSC355	PSC355
Stoneville Pedigreed Seed Company ST580	ST580
USGEXP555	USG555
USGEXP650	USG650
USGEXP710	USG710

[z] Cultivars designated by * are common to both crop years.

RESULTS

Gross monetary returns. Gross monetary returns were calculated from the 2005 CCC loan rates and lint yield. It is important to note that harvest costs, ginning costs, turnout, and other expenses were not figured into these values and could influence these rankings. For the early maturity group, cultivars with the highest return were DPLX99X35, DP555BR, OA90, BXN49B, OA87, ST4892BR, and DP458BR at Stoneville in 2002 (Table 5); OAX303, DP444BR, DP434RR, and OAX300BR at Stoneville in 2003 (Table 6); and DP493, FM958BG, FM966, FM958, FM966LL, BXN49B, NX2429, OAX300BR, and OAX303 at Tribbett in 2003 (Table 7). Of the cultivars common to all three test groups, only BXN49B was among those with the highest gross return in more than one test. For the cultivars grown only in 2003, OAX303 and OAX300BR were among those with the highest return in both tests.

For the medium maturity group, cultivars with the highest return were DP555BR, ST5599BR, DP491, OA88, DP448B, ST5303R, DP5415RR, OA85, and DP565 at Stoneville in 2002 (Table 8); ST5599BR, STX0203BR, DP493, and DP555BR at Stoneville in 2003 (Table 9); and ST5599BR, STX0203BR, and DP555BR at Tribbett in 2003 (Table 10). The cultivars DP555BR and ST5599BR were among those with the highest return in all three tests, and STX0203BR had highest return in both 2003 tests.

Table 3. Early maturing cultivars grown in 2003

Cultivar	Abbreviation[z]
Bayer FM958	FM958*
Bayer FM958BG	FM958BG*
Bayer FM966	FM966*
Beltwide Cotton Genetics BCG28R	BCG28R*
Delta and Pine Land Company DP436RR	DP436RR*
Delta and Pine Land Company DP451BR	DP451BR*
Delta and Pine Land Company PM1199RR	PM1199RR*
Delta and Pine Land Company PM1218BR	PM1218BR*
Delta and Pine Land Company SG105	SG105*
Delta and Pine Land Company SG215BR	SG215BR*
Delta and Pine Land Company SG521R	SG521R*
Delta and Pine Land Company SG747	SG747*
Delta Research and Extension Center DES810	DES810*
Delta Research and Extension Center DES816	DES816*
Phytogen Seed Company PSC355	PSC355*
Stoneville Pedigreed Seed Company BXN49B	BXN49B*
Stoneville Pedigreed Seed Company ST4793R	ST4793R*
Stoneville Pedigreed Seed Company ST4892BR	ST4892BR*
Syngenta NX2429	NX2429*
BayerFM 958LL(FM989R)	FM958LL
BayerFM 960BR	FM960BR
BayerFM 966LL(FM819RR)	FM966LL
Beltwide Cotton Genetics BCG 28RBCG295	BCG295
Delta and Pine Land Company DP449BR	DP449BR
Delta and Pine Land Company DP493	DP493
Delta and Pine Land Company DP434RR	DP434RR
Delta and Pine Land Company DP432RR	DP432RR
Delta and Pine Land Company DPLX02X71R	DPX02X71R
Delta and Pine Land Company DP444BR	DP444BR
Olvey and Associates OAX300BR	OAX300BR
Olvey and Associates OAX302BR	OAX302BR
Olvey and Associates OAX303	OAX303
Olvey and Associates OAX304BR	OAX304BR
Phytogen Seed Company PHY410RR	PHY410RR
Stoneville Pedigreed Seed Company ST4563B2	ST4563B2
Stoneville Pedigreed Seed Company ST474	ST474
Stoneville Pedigreed Seed Company STX0202B2R	STX202B2R
Stoneville Pedigreed Seed Company STX0204BR	STX0204BR

[z] Cultivars designated by * are common to both crop years.

Table 4. Medium maturing cultivars grown in 2003

Cultivar	Abbreviation[z]
Bayer FM989BR	FM989BR*
Beltwide Crop Genetics BCG24R	BCG24R*
Delta and Pine Land Company DP448B	DP448B*
Delta and Pine Land Company DP458BR	DP458BR*
Delta and Pine Land Company DP491	DP491*
Delta and Pine Land Company DP5415RR	DP5415RR*
Delta and Pine Land Company DP555BR	DP555BR*
Delta and Pine Land Company SG747	SG747*
Stoneville Pedigreed Seed Company ST 5303 R	ST5303R*
Stoneville Pedigreed Seed Company ST 5599 BR	ST5599BR*
Bayer FM800BR	FM800BR
Bayer FM991BR	FM991BR
Beltwide Crop Genetics BCG28R	BCG28R
California Planting Cotton Seed Distributors CS31	CS31
California Planting Cotton Seed Distributors CS32	CS32
California Planting Cotton Seed Distributors CS33	CS33
California Planting Cotton Seed Distributors CS34	CS34
California Planting Cotton Seed Distributors CS35	CS35
California Planting Cotton Seed Distributors CS36	CS36
Delta and Pine Land Company DP449BR	DP449BR
Delta and Pine Land Company DP493	DP493
Delta and Pine Land Company DPLX02X25R	DPX25R
Delta and Pine Land Company DP488BR	DP488BR
Delta and Pine Land Company DP494RR	DP494RR
Olvey and Associates OAX301R	OAX301R
Stoneville Pedigreed Seed Company ST5222B2	ST5222B2
Stoneville Pedigreed Seed Company STX0203BR	STX0203BR

[z] Cultivars designated by * are common to both crop years.

The greatest difference in gross monetary return was among environments, but there was little difference between maturity groups (Table 11). Averaged across cultivars in both maturity groups, the gross return was highest at Stoneville in 2003 (1761 dollars/ha) followed by Stoneville in 2002 (1209 dollars/ha) and Tribbett in 2003 (1034 dollars/ha). This range was about the same as the range across cultivars within each test group (about 600 dollars/ha), though the range across cultivars was over 900 dollars/ha in the early maturity test at Stoneville in 2002 and medium maturity at Stoneville in 2003.

Lint yield. Differences in gross monetary return between environments were related to lint yield. Lint yield was highest at Stoneville in 2003 (1405 kg/ha) followed by Stoneville in 2002 (1007 kg/ha) and Tribbett in 2003 (858 kg/ha) (Table 11). Cultivars with the highest lint yield typically had the highest gross return (dollars/ha). Regression analysis indicated a significant positive relationship ($P < 0.0001$) between lint yield and gross return with no variation in slope between test groups.

Cultivar differences in fiber properties and lint value. Fiber properties were analyzed by HVI and reported along with the value of the lint and gross return for each cultivar (Tables 5, 6, 7, 8, 9, and 10). Based on the overall analysis of variance, cultivars were different ($P < 0.01$) within each maturity group in each environment for lint value and all HVI measurements, including length, uniformity, micronaire,

Table 5. Results for HVI, lint yield, lint value, and gross monetary return for early maturing cultivars tested at Stoneville in 2002

Cultivar [z]	Cotton property [y]											
	Length (mm)	Uniformity (%)	Micronaire	Strength (cN/tex)	Rd	PlusB	Color	Leaf grade	Trash (%)	Yield (kg/ha)	Value ($/kg lint) [x]	Return ($/ha)
DPLX99X35	27.4	82.3	4.72	27.53	76.2	7.98	41	2.89	0.233 L	1215 H	1.21	1469 H
DP555BR	27.3	80.7 L	4.30	28.92	78.0 H	7.58 L	31	3.00	0.244	1198 H	1.22	1458 H
OA90	27.6	82.6	4.70	27.84	76.7	8.00	41	2.78	0.189 L	1178 H	1.23 H	1450 H
BXN49B*	28.4 H	82.2	4.43	28.34	74.8	8.46	41	3.00	0.289	1191 H	1.23 H	1444 H
OA87	26.2 L	82.4	4.72	26.07 L	75.0	8.36	41	3.00	0.211 L	1237 H	1.14 L	1415 H
ST4892BR*	27.7	83.0 H	4.78	27.74	73.8	8.49	41	3.00	0.222 L	1159 H	1.19	1383 H
DP458BR	27.5	82.1	4.69	28.63	77.7 H	8.10	31	2.89	0.200 L	1078	1.24 H	1341 H
BCG28R*	28.1	82.2	4.67	28.18	75.8	8.10	41	2.89	0.233 L	1079	1.23	1321
OA89	27.1	82.4	4.66	28.31	75.3	8.76 H	31	2.78	0.244	1073	1.21	1298
SG215BR*	26.7	82.4	4.78	26.59 L	74.7	8.57	41	2.33 L	0.178 L	1099	1.16 L	1280
FM966*	28.2	82.4	4.26	32.22 H	76.4	7.90	41	3.22 H	0.378 H	1019	1.25 H	1273
NX2429*	28.1	83.0 H	4.62	30.45	72.2 L	8.24	41	3.33 H	0.378 H	1045	1.22	1272
PSC355*	27.5	82.9 H	4.79	28.95	72.9	8.24	41	3.33 H	0.378 H	1066	1.18	1260
FM958*	28.7 H	81.8	4.48	30.77	76.7	8.17	31	3.00	0.289	996	1.26 H	1257
DP451BR*	28.0	82.2	4.58	28.07	76.4	7.94	41	3.00	0.278	1009	1.24 H	1254
ST4793R*	27.4	82.6	4.91	28.53	73.9	8.82 H	41	2.33 L	0.211 L	1055	1.17 L	1235
MIS8839	28.6 H	82.8 H	4.60	28.05	74.9	8.19	41	2.89	0.233 L	993	1.23 H	1229
MIS8806	28.1	83.1 H	4.62	30.22	73.1	8.07	41	3.11	0.300	1004	1.22	1226
FM958BG*	28.1	82.2	3.98 L	31.71 H	75.8	7.97	41	3.56 H	0.389 H	1002	1.22	1224
PM1218BR*	27.1	82.7	4.87	28.00	75.1	8.26	41	2.33 L	0.189 L	1051	1.17 L	1209
SG747*	28.2	83.2 H	5.08 H	27.21 L	74.1	8.54	41	2.67 L	0.200 L	1028	1.17 L	1201
AP7115	27.3	81.7	4.40	27.05 L	76.8	7.93	41	2.89	0.278	980	1.21	1189
SG105*	28.2	82.8 H	4.84	29.39	75.2	8.21	41	2.56 L	0.189 L	959	1.22	1174
PH98M2983	27.8	82.1	4.72	27.73	73.3	7.79 L	41	3.00	0.211 L	976	1.19	1158
RGC2001	28.0	82.4	4.69	28.64	73.9	8.24	41	3.11	0.256	953	1.21	1152
RGC2002	27.5	82.4	4.49	27.51	73.3	8.39	41	3.00	0.267	960	1.20	1149
BXN47	27.6	82.7	4.77	27.40	73.2	8.58 H	41	2.67 L	0.178 L	972	1.18 L	1146
DES607	28.2	82.4	4.38	28.45	75.1	8.69 H	31	2.78	0.233 L	923	1.24 H	1145
SG2501BR	27.3	83.0 H	4.77	28.87	74.7	8.44	41	2.78	0.333 H	958	1.19	1144
DP20B	27.9	82.6	4.62	27.58	75.9	7.89	41	3.00	0.233 L	924	1.23	1136
DES816*	27.7	82.2	4.61	30.15	74.0	7.96	41	3.00	0.289	931	1.21	1129
ST457	27.5	82.4	4.56	28.50	72.9	8.79 H	41	2.89	0.256	945	1.19	1127
SG521R*	27.1	82.9 H	4.68	27.19 L	74.8	8.41	41	3.00	0.278	939	1.19	1118
PM1199RR*	28.0	83.3 H	4.81	29.08	74.0	8.30	41	3.00	0.267	915	1.21	1112
DES810*	27.6	82.9 H	4.34	29.84	73.0	7.74 L	41	3.56 H	0.367 H	917	1.19	1095
DP436RR*	28.2	82.6	4.71	27.42	75.9	7.94	41	2.89	0.233 L	883	1.22	1080
ATAtlas	27.8	82.2	4.53	30.05	75.2	8.39	41	3.00	0.322	810	1.23	1009
AC1517-99	28.4 H	82.3	3.94 L	31.28 H	75.4	8.48	41	3.33 H	0.311	443 L	1.25 H	554 L
Rep *F*	21.38**	4.24 *	42.42**	0.65	45.45**	16.84**		11.98**	28.31**	70.27**	11.35	78.33
Cultivar *F*	12.34**	4.35**	19.47**	11.99**	35.48**	12.01**		4.25**	7**	12.87**	4.92**	11.24**
Mean	27.7	82.5	4.61	28.64	74.9	8.23		2.94	0.262	1,004	1.21	1,214
LSD	0.4	0.6	0.15	1.15	0.7	0.25		0.38	0.064	107	0.03	134

[z] Cultivars followed by * are common to both crop years.

[y] Values followed by H are statistically equal to the maximum and values are followed by L are statistically equal to the minimum. Values significant at $P \leq 0.05$ and $P \leq 0.01$ are followed by * and **, respectively.

[x] Values calculated from the 2005 USDA CCC loan rates which were different in 2002.

strength, reflectance (Rd), trash (percentage area), and yellowness (plus B), with one exception. For yellowness, cultivar was not significant ($F = 1.6$, $P = 0.07$) in the medium maturity group at Stoneville in 2002 (Table 8), but mean comparisons indicated differences in some cultivars near maximum and minimum values (LSD = 0.72; range = 1.46).

Interactions between cultivar and environment for the early maturing cultivars (Table 12) and for the medium maturing cultivars (Table 13) were significant for some HVI results. This analysis included cultivars from all three tests. In the early maturity test, the interaction between cultivar and environment was significant for all HVI measurements except fiber strength (Table 12). In the medium maturity test, the interaction was significant for micronaire, leaf, and trash (percentage area). In each case, the interaction was less important than the overall difference among cultivars, as reflected in the lower value of F for the interaction than for cultivars (Table 13).

Lint monetary value. Averaged across all cultivars in both maturity groups, values were highest at Stoneville in 2003 (1.25 dollars/kg) followed by Tribbett in 2003 (1.21 dollars/kg) and Stoneville in 2002 (1.20 dollars/kg). These differences were similar to those seen in gross return and lint yield, which were also highest at Stoneville in 2003 (Table 11).

Unlike gross return, cultivar differences in lint value were larger than differences among environments. The range across cultivars was lowest (0.08 dollar/kg) in the medium maturity group planted at Stoneville in 2003 (Table 9), and the range across cultivars was highest (0.15 dollar/kg) in the early maturity group at Tribbett in 2003 (Table 7). The highest lint value was 1.29 dollar/kg for CS35 at Stoneville in 2003 medium maturity group (Table 9). At Stoneville in 2003, there were 9 of 38 early maturing cultivars and 5 of 27 medium maturing cultivars valued at 1.28 dollars/kg (Tables 6 and 9). The highest lint values at Tribbett in 2003 were 1.26 and 1.27 dollars/kg in the early and medium maturity groups, respectively. At Tribbett in 2003, there were 2 of 38 cultivars valued at 1.26 dollars/kg in the early maturity group, and there were 4 of 27 cultivars valued at 1.27 dollars/kg in the medium maturity group. These values were less than the highest value at Stoneville in 2003, but there were fewer cultivars with these higher lint values. It appears that conditions at Stoneville in 2003 were more favorable for the production of more valuable lint by more cultivars.

As discussed earlier, there was a strong relationship between gross return and lint yield. Regression analysis did not show a significant relationship between gross return and lint value ($P = 0.23$). This indicated that cultivar differences in lint yield either overshadowed the effect of lint value on gross return or negatively impacted lint value. There was a negative association between lint yield and lint value, but the relationship was not significant ($P = 0.18$). When groups were analyzed individually, the negative association was significant in the early maturity group at Stoneville in 2003 ($P = 0.013$) and nearly significant in the early maturity group at Stoneville in 2002 ($P = 0.058$). When regression analysis was used to relate lint yield to HVI properties, a negative association was found between lint yield and fiber length ($P = 0.033$) and between lint yield and strength ($P = 0.006$). Regardless of the meaning of these relationships, highest lint values were sometimes observed for cultivars with the greatest gross return. In the early maturity group, these included OA90, BXN49B, and DP458BR at Stoneville in 2002 (Table 5); OAX303 and DP434R at Stoneville in 2003 (Table 6); and DP493, FM958BG, FM966, FM958, FM966LL, and BXN49B at Tribbett in 2003 (Table 7). Cultivars producing the highest lint values and the greatest gross return in the medium maturity test were DP555BR, DP491, DP448B, ST5303R, DP5415RR, OA85, and DP565 at Stoneville in 2002 (Table 8); and STX0203BR and DP493 at Stoneville in 2003 (Table 9). No cultivars in the medium maturity test at Tribbett in 2003 were included in this group (Table 10). There were also several cultivars with highest lint values producing the lowest gross returns, and there were several with lowest lint values producing the highest gross returns.

Fiber length. Typically, HVI fiber length did not fall below 26 mm or exceed 30 mm. The exceptions were the early maturing cultivar OAX300BR with short fibers (25.4 mm) at Tribbett in 2003 (Table 7) and the medium maturing cultivar DP491 with long fibers (30.3 mm) at Stoneville in 2003 (Table 9). The medium maturing cultivars had the longest fibers averaging 28.2 mm, and the early maturing cultivars averaged 27.8 mm (Table 11).

Domestic mills typically require fiber length of 26.6 mm (staple = 34), but foreign mills require a fiber length of 27.4 mm (staple = 35) (Watson, 2006). For the 195 cultivars tested, 95% met domestic needs, and 75% met foreign needs. Overall, 68% of the early maturing and 86% of the medium maturing cultivars met foreign mill requirements, and most of these were observed at Stoneville in 2003.

Table 6. Results for HVI, lint yield, lint value, and gross monetary return for early maturing cultivars tested at Stoneville in 2003

Cultivar [z]	Cotton property [y]											
	Length (mm)	Uniformity (%)	Micronaire	Strength (cN/tex)	Rd	PlusB	Color	Leaf grade	Trash (%)	Yield (kg/ha)	Value ($/kg lint) [x]	Return ($/ha)
OAX303	28.1	82.9	4.73	28.89	79.9	7.53 L	31	3.0 L	0.333 L	1663 H	1.26 H	2104 H
DP444BR	28.4	83.2	4.08 L	28.50	79.0	7.71 L	31	3.7	0.556	1584 H	1.25	1973 H
DP434RR	29.6 H	83.1	4.31	28.76	80.0 H	7.70 L	31	3.1 L	0.389 L	1548 H	1.27 H	1966 H
OAX300BR	26.7 L	83.0	4.70	26.63 L	79.9	7.92	31	3.0 L	0.278 L	1638 H	1.19 L	1955 H
PM1218BR*	27.5	82.9	4.67	28.56	78.7	8.20	31	3.0 L	0.367 L	1534	1.24	1901
ST4892BR*	28.3	83.6 H	4.82 H	29.76	78.1	8.36 H	31	3.6	0.533	1550 H	1.22	1890
DP493	29.3	83.7 H	4.63	29.98	77.9	8.48 H	31	3.0 L	0.344 L	1454	1.28 H	1863
DP432RR	28.5	83.3 H	4.57	29.01	78.0	8.27	31	3.8 H	0.589	1499	1.24	1856
SG215BR*	27.5	83.3 H	4.84 H	26.91 L	79.4	8.33 H	31	3.0 L	0.300 L	1493	1.23	1842
FM966*	29.2	83.3 H	4.44	33.55 H	80.0 H	7.68 L	31	3.1 L	0.444	1437	1.28 H	1841
ST474	28.2	83.3 H	4.88 H	28.41	77.2	8.32 H	31	3.8 H	0.589	1513	1.22 L	1838
BXN49B*	29.0	82.4 L	4.51	29.25	78.2	8.23	31	3.8 H	0.611	1484	1.24	1832
ST4563B2	29.1	82.1 L	4.31	29.38	79.6	7.97	31	3.7	0.500	1450	1.25	1811
DPX02X71R	28.6	83.4 H	4.50	29.24	78.4	8.46 H	31	3.0 L	0.289 L	1416	1.28 H	1808
PSC355*	28.4	83.6 H	4.70	29.64	76.2 L	7.87	41	4.1 H	0.722	1496	1.21 L	1804
FM960BR	28.4	83.3 H	4.40	33.91 H	79.0	7.54 L	31	3.6	0.500	1437	1.25	1802
NX2429*	28.6	83.7 H	4.53	29.81	76.6 L	7.70 L	41	4.1 H	0.844 H	1491	1.20 L	1791
FM958*	29.2	82.8	4.60	32.19	79.3	7.69 L	31	3.0 L	0.456	1394	1.28 H	1790
ST4793R*	27.9	83.3 H	4.84 H	28.72	77.6	8.42 H	31	3.9 H	0.500	1478	1.19 L	1764
BCG28R*	28.7	82.3 L	4.66	28.87	78.7	8.19	31	3.0 L	0.378 L	1380	1.27 H	1758
FM958BG*	28.6	82.9	4.16 L	33.25 H	79.2	7.54 L	31	3.3 L	0.589	1390	1.26	1748
SG747*	28.5	83.6 H	4.97 H	27.16 L	77.9	8.62 H	31	3.0 L	0.311 L	1391	1.23	1709
DES810*	28.1	83.0	4.26	30.67	76.9 L	7.78	41	3.9 H	0.644	1379	1.23	1692
DES816*	28.5	82.9	4.44	29.97	77.4	7.74	31	4.0 H	0.633	1377	1.22	1686 L
BCG295	29.8 H	82.4 L	4.31	31.24	79.3	7.84	31	3.0 L	0.444	1313 L	1.28 H	1685 L
PHY410RR	28.3	83.1	4.41	29.73	76.7 L	7.91	41	4.0 H	0.678	1385	1.22 L	1684 L
SG521R*	27.7	83.4 H	4.64	26.90 L	78.0	8.16	31	3.3 L	0.511	1348 L	1.24	1673 L
DP451BR*	28.8	83.2	4.59	28.93	80.0 H	7.49 L	31	3.0 L	0.344 L	1307 L	1.28 H	1670 L
OAX304BR	27.8	82.9	4.58	30.14	79.1	7.89	31	3.2 L	0.367 L	1344 L	1.24	1666 L
STX202B2R	28.4	82.6 L	4.38	29.43	77.8	8.17	31	3.7	0.556	1345 L	1.24	1666 L
DP436RR*	28.8	83.3 H	4.58	28.68	79.6	8.00	31	3.0 L	0.411	1303 L	1.28 H	1665 L
FM966LL	28.5	83.6 H	4.54	32.44 H	79.0	7.83	31	3.1 L	0.422	1306 L	1.27 H	1661 L
FM958LL	29.7 H	82.3 L	4.38	33.06 H	79.4	7.37 L	31	3.1 L	0.478	1292 L	1.28 H	1650 L
PM1199RR*	28.3	83.9 H	4.60	29.93	77.7	7.90	31	3.3 L	0.478	1290 L	1.25	1619 L
DP449BR	28.5	83.0	4.60	31.47	80.0 H	7.68 L	31	3.0 L	0.311 L	1259 L	1.28 H	1611 L
OAX302BR	28.2	82.9	4.73	27.29 L	80.8 H	7.69 L	31	3.0 L	0.300 L	1267 L	1.26	1593 L
SG105*	28.6	83.4 H	4.83 H	30.00	78.7	7.99	31	3.0 L	0.333 L	1242 L	1.26 H	1568 L
STX0204BR	27.4	82.9	4.06 L	27.30 L	79.3	7.73	31	3.7	0.522	1255 L	1.22	1535 L
Rep *F*	2.08	2.05	7.79**	1.61	26.03**	4.57 *		0.12	2.72	12.79**	2.82	12.41**
Cultivar *F*	20.31**	3.98**	12.44**	10.07**	14.91**	6.47**		8.27**	11.06**	6.38**	9.39**	5.35**
Mean	28.5	83.1	4.55	29.67	78.6	7.94		3.4	0.470	1414	1.25	1762
LSD	0.4	0.6	0.18	1.67	0.8	0.35		0.4	0.115	121	0.02	153

[z] Cultivars followed by * are common to both crop years.

[y] Values followed by H are statistically equal to the maximum and values are followed by L are statistically equal to the minimum. Values significant at $P \le 0.05$ and $P \le 0.01$ are followed by * and **, respectively.

[x] Values calculated from the 2005 USDA CCC loan rates which were different in 2003.

Fiber length uniformity. The cultivar with the highest uniformity (84.0%) was the medium maturing cultivar ST5303R tested at Stoneville in 2003 (Table 9). This cultivar was also among the highest at Stoneville in 2002 (83.4%) (Table 8) and Tribbett in 2003 (83.1%) (Table 10). The cultivar with the lowest uniformity (80.1%) was the medium maturing cultivar DP555BR tested at Tribbett in 2003 (Table 10). This cultivar was also the lowest at Stoneville in 2002 (80.6%) (Table 8) and at Stoneville in 2003 (81.3%) (Table 9). When DP555BR was included in the early maturity test at Stoneville in 2002, it also had the lowest uniformity (80.7%) (Table 5).

The highest uniformity was seen for both maturity groups at Stoneville in 2003 (average = 82.9%), and the lowest uniformity was seen at Tribbett in 2003 (average = 82.1%) (Table 11). The average uniformity was higher in the early maturity groups (0.3%) than the medium maturing groups.

Domestic markets require a uniformity of 80%, and all cultivars met this requirement (Watson, 2006). Foreign markets require a uniformity of 82%, and 92% of cultivars met this requirement. Most cultivars not meeting foreign market requirements were in the medium maturity groups at Stoneville in 2002 and Tribbett in 2003.

Micronaire. The average micronaire value (4.58) was similar among environments and between maturity groups (Table 11). The lowest micronaire (3.63) was observed for FM800BR in the medium maturity test at Stoneville in 2003 (Table 9). This cultivar was also lowest at Tribbett in 2003 (Table 10). The highest micronaire (5.14) was observed for SG747 in the medium maturity test at Tribbett in 2003. This cultivar was also among the highest in the other medium maturity tests (Tables 8 and 9), and it was among the highest in the early maturity tests (Tables 5, 6, and 7).

The value of cotton is discounted when micronaire is below 3.5 or exceeds 4.9. The only cultivar discounted for micronaire was SG747, which was discounted for high micronaire in 4 of the 6 tests. Premiums were designated for cultivars with micronaire above 3.4 and below 4.3, depending on color and leaf grade. Only 9% of cultivars met these criteria.

Strength. The average fiber strength was higher for the medium maturity group (28.96 cN/tex overall) than for the early maturity group (28.15 cN/tex), and cultivars at Stoneville in 2003 had the highest fiber strength (29.20 cN/tex) (Table 11). The highest fiber strength was 33.91 cN/tex for FM960BR in the early maturity test at Stoneville in 2003 (Table 6). The lowest fiber strength was observed for SG215BR in the early maturity test at Tribbett in 2003 (25.18 cN/tex) (Table 7).

Cultivars with strength below 24.99 cN/tex (25.5 g/tex) are discounted, but no cultivars had strength this low. For strength over 28.81 cN/tex (29.4 g/tex), 50% of the cultivars received premiums, and these were more frequently found in the medium maturity groups (59%).

Reflectance and yellowness. Reflectance (Rd) was higher in the medium maturity group than in the early maturity group (Table 11). The largest differences were between environments with Rd highest at Stoneville in 2003 (79.2) followed by Tribbett in 2003 (77.4) and Stoneville in 2002 (74.1). The cultivar with the highest Rd was CS35 in the medium maturity group at Stoneville in 2003 (82.0) (Table 9) and at Tribbett in 2003) (80.2) (Table 10). The cultivar with the lowest Rd (70.8) was PSC355 in the medium maturity group at Stoneville in 2002 (Table 8).

Similar trends were observed for yellowness (plus B), which was lower in the medium maturity group (Table 11). The largest differences were among environments with yellowness lowest at Tribbett in 2003 (7.72) followed by Stoneville in 2003 (7.82) and Stoneville in 2002 (8.36). The cultivars with the lowest plus B were FM800BR (6.82) in the medium maturity test at Stoneville in 2003 (Table 9) and DP493 (6.83) in the medium maturity test at Tribbett in 2003 (Table 10). The cultivar with the highest plus B was OA87 (9.08) in the medium maturity test at Stoneville in 2002 (Table 8).

Domestic mills require a color grade of 41, and foreign mills require a 31 (Watson, 2006). Only 3% of the cultivars did not meet domestic mill requirements, and these were in the medium maturity test at Stoneville in 2002. About 50% of the cultivars did not meet foreign mill requirements, and most of these were at Stoneville in 2002 (medium and early maturity) and at Tribbett in 2003 (early maturity).

Percentage area and leaf. Both percentage area and leaf grade were highest at Stoneville in 2003 and lowest at Tribbett in 2003, but there were no differences between maturity groups (Table 11). Variation among these groups was smaller than the variation among cultivars. The early maturing cultivar with the lowest percentage area was SG215BR at Stoneville in 2002 (0.178%) (Table 5) and at Tribbett in 2003 (0.189%) (Table 7), but this cultivar had moderate trash levels at Stoneville in 2003 (Table 6). Cultivar BXN47 also had 0.178% area at Stoneville in 2002

Table 7. Results for HVI, lint yield, lint value, and gross monetary return for early maturing cultivars tested at Tribbett in 2003

Cultivar [z]	Cotton property [y]											
	Length (mm)	Uniformity (%)	Micronaire	Strength (cN/tex)	Rd	PlusB	Color	Leaf grade	Trash (%)	Yield (kg/ha)	Value ($/kg lint) [x]	Return ($/ha)
DP493	27.7	82.4	4.64	28.72	75.6	8.20	41	3.0 L	0.278 L	1144 H	1.22 H	1392 H
FM958BG*	27.7	82.8 H	4.21 L	30.63	77.1 H	7.48 L	41	2.9 L	0.433	1089 H	1.24 H	1389 H
FM966*	28.2	82.9 H	4.64	32.30 H	78.1 H	7.46 L	31	3.0 L	0.433	1097 H	1.26 H	1377 H
FM958*	28.1	82.0	4.71 H	30.29	78.2 H	7.64	31	3.0 L	0.367	1058 H	1.26 H	1333 H
FM966LL	27.9	82.9 H	4.61	32.41 H	77.9 H	7.28 L	41	3.1	0.522	1068 H	1.24 H	1322 H
BXN49B*	27.9	81.8	4.29 L	27.39	76.6	7.99	41	3.6	0.378	1061 H	1.22 H	1290 H
NX2429*	27.7	83.6 H	4.79 H	29.44	72.4 L	7.86	41	3.7 H	0.633 H	1057 H	1.18	1248 H
OAX300BR	25.4 L	82.1	4.72 H	25.48 L	75.6	8.49 H	41	2.8 L	0.244 L	1126 H	1.11 L	1247 H
OAX303	26.4	82.3	4.67	25.84 L	76.9 H	7.52 L	41	2.7 L	0.233 L	1158 H	1.14 L	1234 H
OAX302BR	27.2	82.1	4.77 H	26.29 L	77.9 H	7.40 L	41	2.9 L	0.333	993	1.20	1188
ST4563B2	27.1	80.2 L	4.29 L	25.84 L	77.3 H	7.93	31	3.1	0.322	975	1.21	1179
FM958LL	28.9 H	82.2	4.54	31.41 H	77.4 H	7.48 L	41	3.3	0.456	942	1.24 H	1175
ST4892BR*	26.7	82.0	4.67	27.35	76.3	8.46 H	31	3.1	0.311	984	1.18	1166
PM1218BR*	26.6	81.9	4.62	27.12	76.8	7.96	41	2.8 L	0.233 L	989	1.18	1163
DP434RR	27.8	81.2	4.14 L	25.77 L	77.9 H	7.78	31	3.0 L	0.300	921	1.25 H	1153
ST4793R*	26.6	82.4	4.76 H	27.53	76.1	8.17	31	3.2	0.311	984	1.17	1150
PSC355*	27.3	83.0 H	4.88 H	28.99	72.4 L	7.99	41	3.6	0.489	997	1.15 L	1150
SG747*	27.1	82.3	4.83 H	26.38 L	75.3	8.57 H	41	3.0 L	0.222 L	949	1.19	1131
ST474	26.9	81.9	4.90 H	27.39	74.3	8.24 H	41	3.4	0.344	982	1.14 L	1123
DP444BR	27.0	82.0	4.11 L	27.29	75.4	8.00	41	3.0 L	0.289	951	1.18	1122
BCG28R*	27.2	81.6	4.79 H	27.29	77.4 H	7.83	31	2.8 L	0.244 L	942	1.19	1121
OAX304BR	26.6	82.1	4.56	26.87	77.6 H	8.29 H	31	2.8 L	0.267 L	933	1.19	1110
FM960BR	27.3	82.0	4.22 L	31.94 H	77.4 H	7.66	41	3.0 L	0.389	902	1.23 H	1110
DES810*	27.1	82.8 H	4.61	29.28	72.3 L	7.73	41	3.9 H	0.544 H	957	1.15	1102
BCG295	27.8	81.6	4.24 L	27.97	76.7	8.11	31	2.7 L	0.300	875 L	1.25 H	1092
DES816*	27.1	82.2	4.61	28.40	74.8	7.83	41	3.3	0.367	897 L	1.17	1054 L
DP436RR*	27.2	82.1	4.80 H	26.36 L	76.6	7.47L	41	2.7 L	0.267 L	885 L	1.18	1049 L
SG215BR*	26.2	81.6	4.71 H	25.18 L	75.7	8.52 H	41	3.0 L	0.189 L	924	1.12 L	1032 L
SG521R*	26.4	82.7	4.74 H	26.39 L	75.7	8.22	41	3.0 L	0.356	853 L	1.16	989 L
DP451BR*	27.3	81.9	4.59	26.38 L	76.4	7.72	41	3.0 L	0.267 L	825 L	1.20	964 L
SG105*	27.1	83.3 H	4.89 H	26.99	76.2	7.90	41	3.0 L	0.256 L	816 L	1.18	957 L
PHY410RR	27.6	82.7	4.35	28.27	74.7	7.70	41	4.0 H	0.606 H	796 L	1.18	943 L
STX0204BR	26.2	82.1	4.12 L	26.00 L	77.4 H	7.73	31	3.0 L	0.317	852 L	1.15 L	941 L
STX202B2R	26.6	81.1	4.23 L	26.92	75.4	8.38 H	41	3.2	0.356	799 L	1.17	936 L
DPX99R	26.6	82.0	4.59	27.22	74.6	8.47 H	41	3.4	0.367	806 L	1.15	931 L
DPX02X71R	26.6	82.1	4.64	26.24 L	75.9	8.48 H	41	3.0 L	0.233 L	779 L	1.18	920 L
DP449BR	27.0	81.9	4.42	29.21	77.1 H	7.46 L	41	3.0 L	0.300	769 L	1.19	915 L
PM1199RR*	26.9	82.9 H	4.92 H	28.23	75.1	8.40 H	41	3.0 L	0.267 L	760 L	1.15	876 L
Rep *F*	18.84**	3.5 *	9.61**	8.82**	3.64 *	6.23**		3.35 *	10.27**	6.41**	7.35**	6.39**
Cultivar *F*	11.26**	5.05**	8.08**	16.44**	11.09**	9.63**		4.27**	11.55**	4.78**	5.72**	4.62**
Mean	27.1	82.2	4.58	27.87	76.1	7.94		3.1	0.343	945	1.19	1120
LSD	0.6	0.8	0.24	1.36	1.3	0.34		0.4	0.090	141	0.05	186

[z] Cultivars followed by * are common to both crop years.

[y] Values followed by H are statistically equal to the maximum and values are followed by L are statistically equal to the minimum. Values significant at $P \leq 0.05$ and $P \leq 0.01$ are followed by * and **, respectively.

[x] Values calculated from the 2005 USDA CCC loan rates which were different in 2003.

(Table 5). Cultivar SG747 had the lowest percentage area in the medium maturity group at Tribbett in 2003 (0.122%) (Table 10) and at Stoneville in 2002 (0.267%) (Table 8). The cultivar SG747 was also among the lowest in the early maturity tests (Table 5, 6, and 7). The cultivars with the highest percentage area were NX2429 (0.844%) in the early maturity group (Table 6) and CS33 (0.833%) in the medium maturity group (Table 9) both at Stoneville in 2003.

Domestically, mills require a leaf grade 4 or lower, and all cultivars met this requirement. Foreign mills require a leaf grade 3 or better (Watson, 2006). Over all cultivars tested, 80% met foreign market needs, but only 61% met these needs in the early maturity test at Stoneville in 2003, and only 52% met these needs in the medium maturity test at Stoneville in 2002.

DISCUSSION

The Mississippi RCVT conducted in Stoneville (2002 and 2003) and Tribbett (2003), including both early (38 cultivars) and medium (27 cultivars) maturity groups, were machine harvested and processed through a standard sequence of gin machinery. Differences in gross monetary return, lint yield, and lint value were very similar between environments, and the largest values were seen at Stoneville in 2003. Among cultivars, differences in gross monetary return were closely related to lint yield but not lint value. The variation in gross monetary return and lint yield across environments was typically equal to the variation across cultivars, but variation in lint value was larger across cultivars. The highest lint value was 1.29 dollars/kg, and 23% of the cultivars tested at Stoneville in 2003 were valued at 1.28 dollars/kg or higher. In other tests, fewer cultivars were grouped at the top in lint value. Several cultivars with the highest gross return had very low lint value, but several cultivars offered both high monetary returns and high lint value. This provides evidence to producers that growing cotton for high lint value does not always reduce profits; however, there was a slight negative trend between lint yield and lint value. Specifically, increased lint yield appeared to come at a cost in fiber length and fiber strength. This shows the need to improve fiber length and fiber strength in some of the high yielding cultivars.

The domestic cotton industry requirements for fiber quality include 26.6 mm fiber length (staple = 34), color grade 41, leaf grade 4, and 80% length uniformity (Watson, 2006). Of the 195 cultivars entered in these tests, 93% met all requirements for domestic mills. There were 12 cultivars that met all but 1 requirement (4 were color and 8 were fiber length), and 1 cultivar (OA87 in the medium maturity test at Stoneville in 2002) met all but 2 requirements (color and length).

Foreign mills require 27.4 mm fiber length (staple = 35), color grade 31, leaf grade 3, and 82% fiber length uniformity (Watson, 2006). Overall, 31% of the cultivars met all these requirements; 5% at Stoneville in 2002, 68% at Stoneville in 2003, and 22% at Tribbett in 2003. Twenty-five percent of the early maturing cultivars and 41% of the medium maturing cultivars met all these requirements. There were 38% meeting all but 1 requirement: color (42 cultivars), leaf (15 cultivars), length (13 cultivars), or uniformity (5 cultivars). There were 28% meeting only 2 of the requirements. The rest of the cultivars (3%) met only 1 of the 4 foreign mill requirements, and these were found in the medium maturity test at Stoneville in 2002 (3 cultivars) and the early maturity test at Tribbett in 2003 (3 cultivars).

CONCLUSION

Several cultivars included in the 2002 and 2003 Mississippi RCVT stood out above the rest for high gross monetary returns. Gross return was closely tied to lint yield, not lint value, but some cultivars with high gross return also produced some of the most valuable lint. Some cultivars with high gross return also produced some of the least valuable lint, and overall trends indicated that high yield was associated with decreased length and strength. Most cultivars met the typical requirements of domestic mills, but foreign mills require higher quality fibers. Only 31% of cultivars met base foreign mill requirements for color, leaf, staple length, and length uniformity. Since most of the U.S. cotton is sold in foreign markets, it is becoming more important that cultivars meet the base requirements of those markets. Improvements are particularly needed in some of the higher yielding cotton cultivars.

DISCLAIMER

Mention of a trade names or commercial products in the publication is solely for the purpose of providing specific information and does not imply recommendation or endorsement by the U. S. Department of Agriculture.

Table 8. Results for HVI, lint yield, lint value, and gross monetary return for medium maturing cultivars tested at Stoneville in 2002

Cultivar [z]	Cotton property [y]											
	Length (mm)	Uniformity (%)	Micronaire	Strength (cN/tex)	Rd	PlusB	Color	Leaf grade	Trash (%)	Yield (kg/ha)	Value ($/kg lint) [x]	Return ($/ha)
DP555BR*	27.8	80.6 L	4.32	29.55	76.1 H	7.62 L	41	3.0 L	0.389	1294 H	1.22 H	1576 H
ST5599BR*	27.6	81.7	4.39	29.94	72.1 L	8.99 H	42	3.7 H	0.467	1233 H	1.16 L	1439 H
DP491*	29.6 H	81.4	4.20	31.96 H	73.8	8.60 H	41	4.0 H	0.556 H	1133 H	1.21 H	1372 H
OA88	27.6	82.7	4.71	27.35 L	72.7 L	8.90 H	42	3.6 H	0.389	1160 H	1.16 L	1348 H
DP448B*	28.1	82.1	4.37	29.65	74.8 H	8.42 H	41	3.2 L	0.367 L	1074 H	1.22 H	1314 H
ST5303R*	27.3	83.4 H	4.73	30.87	73.4	8.49 H	41	3.0 L	0.300 L	1086 H	1.20 H	1304 H
DP5415RR*	27.7	82.3	4.72	28.53	74.9 H	8.40 H	41	3.1 L	0.289 L	1076 H	1.21 H	1300 H
OA85	27.4	82.0	4.68	27.94 L	73.3	8.39 H	41	3.6 H	0.378	1098 H	1.18 H	1295 H
DP565	28.4	82.6	4.57	28.92	75.1 H	7.88 L	41	3.1 L	0.400	1059 H	1.22 H	1291 H
ST580	28.0	82.6	4.63	28.71	72.4 L	8.91 H	42	3.0 L	0.333 L	1079 H	1.1 8	1266
FM966	28.5	83.3 H	4.40	33.29 H	73.7	8.40 H	41	3.8 H	0.478	1040	1.21 H	1264
OA87	26.3 L	81.9	4.72	27.02 L	72.0 L	9.08 H	42	3.2 L	0.344 L	1128 H	1.12 L	1263
DP655BR	28.0	82.3	4.26	31.53	74.3 H	8.53 H	41	3.9 H	0.522 H	1036	1.20 H	1246
PSC355	27.9	83.4 H	4.68	30.21	70.8 L	8.40 H	41	3.7 H	0.411	1044	1.17	1227
USG555	27.8	81.9	4.32	28.14 L	71.9 L	8.47 H	41	3.2 L	0.356 L	1039	1.18 H	1226
DP458BR*	28.1	82.4	4.70	30.51	74.7 H	8.53 H	41	3.0 L	0.311 L	1004	1.22 H	1225
BCG24R*	27.4	82.7	4.49	29.27	74.4 H	8.61 H	41	3.3 L	0.344 L	1014	1.19 H	1206
DPNu35B	28.1	81.4	4.34	30.99	74.6 H	8.30 L	41	3.6 H	0.422	966 L	1.21 H	1167 L
GC271	29.2	83.7 H	4.74	31.12	72.0 L	8.22 L	41	3.7 H	0.400	954 L	1.22 H	1162 L
USG650	28.3	81.7	4.48	28.37 L	72.2 L	8.52 H	41	3.1 L	0.383	910 L	1.19 H	1078 L
DPPearl	28.4	81.4	4.40	29.78	73.9	8.44 H	41	3.2 L	0.422	897 L	1.19 H	1068 L
BCG245	29.8 H	82.7	3.83 L	33.23 H	74.2 H	8.52 H	41	3.9 H	0.600 H	840 L	1.23 H	1030 L
FM989BR*	28.1	82.6	4.46	30.60	74.1	8.36	41	3.8 H	0.444	815 L	1.21 H	987 L
FM989R	28.2	82.5	4.38	31.64	73.1	8.50 H	41	3.2 L	0.444	842 L	1.17 L	986 L
USG710	27.4	82.7	4.68	28.47	71.8 L	8.29 L	41	3.8 H	0.467	834 L	1.17 L	974 L
SG747*	27.8	82.8	4.93 H	27.46 L	71.4 L	9.06 H	42	3.3 L	0.267 L	866 L	1.12 L	973 L
DP5690R	28.2	82.4	4.48	30.87	73.9	8.42 H	41	3.7 H	0.467	750 L	1.21 H	911 L
Rep F	2.44	0.75	1.22	0.91	4.88 *	0.39		0.22	1.77	1.02	3.08	0.78
Cultivar F	17.83**	10.7**	15.52**	11.69**	3.93**	1.6		3.51**	4.32**	2.43**	2.51**	2.48**
Mean	28.0	82.3	4.50	29.85	73.4	8.49		3.4	0.406	1010	1.19	1204
LSD	0.5	0.6	0.17	1.41	1.9	0.72		0.5	0.109	242	0.05	287

[z] Cultivars followed by * are common to both crop years.

[y] Values followed by H are statistically equal to the maximum and values are followed by L are statistically equal to the minimum. Values significant at $P \leq 0.05$ and $P \leq 0.01$ are followed by * and **, respectively.

[x] Values calculated from the 2005 USDA CCC loan rates which were different in 2002.

Table 9. Results for HVI, lint yield, lint value, and gross monetary return for medium maturing cultivars tested at Stoneville in 2003

Cultivar [z]	Cotton property [y]											
	Length (mm)	Uniformity (%)	Micronaire	Strength (cN/tex)	Rd	PlusB	Color	Leaf grade	Trash (%)	Yield (kg/ha)	Value ($/kg lint) [x]	Return ($/ha)
ST5599BR*	28.2	81.9 L	4.48	29.23	78.1 L	7.53	31	3.8	0.656	1909 H	1.23 L	2343 H
STX0203BR	28.2	83.0	4.29	27.90 L	80.1	7.84	31	3.0 L	0.356	1731 H	1.27 H	2195 H
DP493	28.1	81.8 L	4.69	30.33	80.7	7.61	31	3.0 L	0.356	1681	1.27 H	2137 H
DP555BR*	27.9 L	81.3 L	4.46	28.70	81.9 H	7.01 L	31	2.9 L	0.356	1692	1.26	2126 H
DP488BR	29.9 H	82.0	4.57	30.86	79.0	8.02 H	31	3.0 L	0.389	1567	1.28 H	2003
OAX301R	27.9 L	83.8 H	4.62	26.88 L	79.0	7.60	31	3.0 L	0.456	1524	1.26	1924
DP494RR	29.5	82.8	4.63	31.73 H	78.0 L	8.10 H	31	3.4	0.444	1508	1.26	1899
BCG28R	28.3	82.3	4.69	28.09	79.2	7.71	31	3.0 L	0.367	1487	1.26	1874
ST5303R*	27.9 L	84.0 H	4.59	30.67	79.2	7.70	31	3.0 L	0.367	1472	1.27 H	1867
DP448B*	28.2	81.9 L	4.47	28.58	81.1 H	7.54	31	2.9 L	0.233 L	1413	1.27 H	1796
DP5415RR*	28.1	82.7	4.94 H	28.45	81.6 H	7.44	31	3.0 L	0.244 L	1444	1.24	1788
DP491*	30.3 H	82.0	4.51	30.65	78.0 L	8.11 H	31	3.9	0.467	1444	1.23 L	1780
DP449BR	28.4	82.6	4.56	31.02	81.1 H	7.43	31	3.0 L	0.300 L	1357	1.28 H	1739
SG747*	28.4	83.6 H	5.01 H	26.86 L	78.2 L	8.36 H	31	3.0 L	0.267 L	1416	1.21 L	1717
DPX25R	28.9	83.2	4.88 H	31.22	80.2	7.94	31	2.9 L	0.267 L	1349	1.27 H	1715
BCG24R*	27.5 L	82.9	4.48	27.86 L	80.1	7.41	31	3.0 L	0.289 L	1377	1.24	1709
FM800BR	29.9 H	82.7	3.63 L	32.46 H	80.8	6.82 L	31	3.7	0.500	1355	1.25	1691
DP458BR*	28.3	82.1	4.78	29.26	81.7 H	7.63	21	2.9 L	0.256 L	1318	1.27 H	1680
FM989BR*	28.9	82.8	4.50	31.19	80. 3	7.63	31	3.0 L	0.344	1298	1.28 H	1664
FM991BR	28.5	83.0	4.91 H	32.63 H	78.6 L	8.07 H	31	3.0 L	0.378	1294	1.26	1625
CS35	28.4	82.0	4.19	30.26	82.0 H	7.70	21	3.0 L	0.322	1236 L	1.29 H	1595
CS31	27.9 L	82.8	4.62	28.79	79.1	8.23 H	31	3.0 L	0.322	1208 L	1.26	1525 L
ST5222B2	28.9	83.2	4.53	32.20 H	80.7	7.58	31	3.0 L	0.278 L	1167 L	1.28 H	1492 L
CS34	28.6	82.9	4.58	30.66	78.7	8.16 H	31	3.0 L	0.344	1133 L	1.28 H	1447 L
CS32	28.0	82.4	4.62	29.12	79.7	7.46	31	3.0 L	0.389	1128 L	1.26	1425 L
CS33	29.4	82.8	4.00	31.38	77.7 L	7.29	41	4.2 H	0.833 H	1139 L	1.22 L	1386 L
CS36	29.2	82.7	4.60	30.77	78.7	7.88	31	3.3	0.467	1067 L	1.26	1349 L
Rep *F*	5.27**	5.11**	3.73 *	3.35 *	1.57	8.5**		6.63**	6.36**	6.6**	0.34	6.49**
Cultivar *F*	20.4**	7.02**	35.18**	15.52**	15.43**	7.61**		14.7**	22.68**	13.76**	5.28**	13.02**
Mean	28.6	82.6	4.55	29.92	79.8	7.70		3.1	0.379	1397	1.26	1759
LSD	0.4	0.7	0.14	1.17	0.9	0.37		0.3	0.078	179	0.03	230

[z] Cultivars followed by * are common to both crop years.

[y] Values followed by H are statistically equal to the maximum and values are followed by L are statistically equal to the minimum. Values significant at $P \leq 0.05$ and $P \leq 0.01$ are followed by * and **, respectively.

[x] Values calculated from the 2005 USDA CCC loan rates which were different in 2003.

Table 10. Results for HVI, lint yield, lint value, and gross monetary return for medium maturing cultivars tested at Tribbet in 2003

Cultivar [z]	Cotton property [y]											
	Length (mm)	Uniformity (%)	Micronaire	Strength (cN/tex)	Rd	PlusB	Color	Leaf grade	Trash (%)	Yield (kg/ha)	Value ($/kg lint) [x]	Return ($/ha)
ST5599BR*	27.4 L	80.9	4.69	27.96	77.6 L	7.60	41	3.2 H	0.422	1098 H	1.21	1332 H
STX0203BR	27.5	82.6 H	4.53	26.86 L	78.6	7.77	31	2.7 L	0.244	1036 H	1.23	1277 H
DP555BR*	27.2 L	80.1 L	4.64	27.78	80.2 H	7.06 L	31	3.0 H	0.256	941 H	1.21	1140 H
CS35	27.7	80.7 L	4.28	28.21	80.2 H	7.07 L	31	3.0 H	0.211	850	1.25 H	1065
BCG28R	27.9	81.9	4.96	28.08	77.8 L	7.51	41	3.0 H	0.256	864	1.20 L	1037
DP493	27.7	80.6 L	4.88	28.86	79.5 H	6.83 L	31	2.8	0.277	845	1.22	1033
DP488BR	29.3	81.8	4.68	29.32	77.6 L	7.79	31	3.1 H	0.367	796	1.27 H	1006
BCG24R*	27.1 L	82.1	4.60	27.17 L	79.4 H	7.10 L	31	3.0 H	0.200 L	835	1.21	1006
FM800BR	29.9 H	82.2	3.80 L	32.13 H	79.7 H	7.27	31	3.1 H	0.356	777	1.27 H	991
ST5303R*	27.2 L	83.1 H	4.80	29.97	79.0	7.91	31	2.2 L	0.167 L	770	1.22	943
DP448B*	27.6	81.9	4.64	28.30	79.2	7.47	31	2.8	0.211	751	1.25 H	941
DP494RR	28.7	82.2	4.92	30.25	78.0 L	7.80	31	3.0 H	0.267	749	1.25 H	933
DP491*	29.1	80.9	4.72	30.02	77.6 L	7.87	31	3.1 H	0.289	731 L	1.27 H	927
SG747*	27.3 L	82.4	5.14 H	26.21 L	77.1 L	8.24 H	31	2.8	0.122 L	791	1.16 L	922
OAX301R	27.3 L	83.2 H	4.84	26.04 L	78.2	7.39	31	2.9	0.311	749	1.23	916
CS32	27.5	82.0	4.81	27.68	77.6 L	7.30	41	3.0 H	0.333	751	1.21	908
DPX25R	27.9	82.4	4.96	29.12	78.6	7.60	31	2.7 L	0.211	738	1.22	908
FM991BR	28.3	81.9	4.63	31.02 H	78.6	7.47	31	2.8	0.278	718 L	1.26 H	904
FM989BR*	27.7	81.9	4.53	29.36	79.9 H	7.54	31	2.8	0.233	714 L	1.24 H	888 L
CS34	28.1	82.7 H	4.66	31.32 H	77.7 L	7.98 H	31	2.7 L	0.233	696 L	1.27 H	880 L
CS31	27.0 L	82.2	4.68	28.58	78.2	7.56	31	2.8	0.211	729 L	1.19 L	869 L
ST5222B2	27.6	82.7 H	4.92	30.89 H	79.2	7.84	31	3.0 H	0.184 L	703 L	1.23	863 L
DP5415RR*	27.5	82.2	4.92	27.37 L	80.1 H	7.28	31	2.8	0.167 L	709 L	1.21	858 L
CS36	28.6	81.9	4.52	30.37	77.8 L	7.44	41	3.1 H	0.389	643 L	1.25 H	805 L
CS33	28.4	82.4	4.21	30.03	77.9 L	6.96 L	41	3.4 H	0.511 H	653 L	1.23	799 L
DP449BR	27.2 L	81.6	4.78	28.46	79.6 H	7.34	31	2.7 L	0.200 L	613 L	1.20	738 L
DP458BR*	27.3 L	81.4	4.82	28.66	79.8 H	7.39	31	2.6 L	0.200 L	573 L	1.21	696 L
Rep *F*	0.82	1.08	29.78**	1.74	11.75**	3.77 *		2.05	1.85	0.14	0.46	0.1
Cultivar *F*	23.11**	8.07**	18.79**	9.19**	7.93**	9.41**		2.23**	10.5**	4.63**	3.88**	4.3**
Mean	27.9	81.9	4.69	28.89	78.7	7.49		2.9	0.263	771	1.23	948
LSD	0.4	0.7	0.18	1.47	1.0	0.31		0.5	0.078	160	0.04	201

[z] Cultivars followed by * are common to both crop years.

[y] Values followed by H are statistically equal to the maximum and values are followed by L are statistically equal to the minimum. Values significant at $P \leq 0.05$ and $P \leq 0.01$ are followed by * and **, respectively.

[x] Values calculated from the 2005 USDA CCC loan rates which were different in 2003.

Table 11. Summary for HVI, lint yield, lint value, and gross monetary return across all test groups

	Length (mm)	Uniformity (%)	Micronaire	Strength (cN/tex)	Rd	PlusB	Leaf grade	Trash (%)	Yield (kg/ha)	Value ($/kg lint) [z]	Return ($/ha)
Maturity group											
Early	**27.8**	**82.6**	**4.58**	**28.15**	**76.6**	**8.04**	**3.14**	**0.358**	**1121**	**1.21**	**1365**
Medium	**28.2**	**82.3**	**4.58**	**28.96**	**77.3**	**7.89**	**3.15**	**0.349**	**1059**	**1.23**	**1303**
Environment											
Stoneville'02	**27.9**	**82.4**	**4.56**	**28.66**	**74.1**	**8.36**	**3.18**	**0.334**	**1007**	**1.20**	**1209**
Stoneville'03	**28.5**	**82.9**	**4.55**	**29.20**	**79.2**	**7.82**	**3.25**	**0.425**	**1405**	**1.25**	**1761**
Tribbett'03	**27.5**	**82.1**	**4.63**	**27.81**	**77.4**	**7.72**	**3.00**	**0.303**	**858**	**1.21**	**1034**

[z] Values calculated from the 2005 USDA CCC loan rates which differed slightly in 2003.

Table 12. Result of the statistical analysis of HVI results for early maturing cultivars common to the three test locations

	Cotton property [z]							
	Length (mm)	Uniformity (%)	Micronaire	Strength (cN/tex)	Rd	PlusB	Leaf grade	Trash (%)
Locations (L)	**356.4****	**73.24****	**5.83****	**77.38****	**691.85****	**39.2****	**43.67****	**217.11****
Replication	**8.69****	**2.56 ***	**8.01****	**2.46 ***	**10.73****	**4.34****	**2.79 ***	**4.13****
Cultivar (C)	**38.2****	**10.94****	**25.74****	**52.16****	**54.99****	**24.89****	**14.22****	**31.22****
L * C	**1.56 ***	**2.1****	**2.82****	**1.41**	**3.4****	**2.36****	**2.82****	**3.04****

[z] *F* values significant at $P \leq 0.05$ and $P \leq 0.01$ are followed by * and **, respectively.

Table 13. Results of the statistical analysis of HVI results for medium maturing cultivars common to the three test location

	Cotton property [z]							
	Length (mm)	Uniformity (%)	Micronaire	Strength (cN/tex)	Rd	PlusB	Leaf grade	Trash (%)
Location (L)	**86.56****	**31.84****	**33.01****	**24.31****	**595.61****	**121.96****	**38.8****	**81.91****
Replication	**0.67**	**1.49**	**4.57****	**0.74**	**3.12 ***	**1.98**	**0.95**	**1.98**
Cultivar (C)	**63.06****	**37.86****	**30.85****	**18.95****	**29.13****	**15.65****	**15.12****	**35.62****
L * C	**1.66**	**1.11**	**1.87 ***	**0.51**	**1.43**	**1.53**	**2.27 ***	**3.71****

[z] *F* values that are significant at $P \leq 0.05$ and $P \leq 0.01$ are followed * and **, respectively.

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