

# **DP 444 BG/RR, A NEW EARLY-MATURING TRANSGENIC VARIETY WITH HIGH YIELD POTENTIAL AND FIBER QUALITY POTENTIAL**

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## **Abstract**

A new, early-maturing picker variety, DP 444 BG/RR, will be available in significant commercial quantities by Delta and Pine Land Company in the 2004 season. DP 444 BG/RR was developed from diverse germplasm by Dr. Curtis Williams in Stuttgart, AR. Growth habit for DP 444 BG/RR was very similar to that of PM 1218 BG/RR, but maturity was slightly earlier for DP 444 BG/RR compared to PM 1218 BG/RR. DP 444 BG/RR has produced similar or better yields than the leading early-maturing BG/RR varieties available commercially, while also producing fiber with excellent quality potential. Micronaire for DP 444 BG/RR has been significantly lower than most of the leading early-maturing BG/RR varieties across a wide geographic area. Similarly, staple length, fiber strength, and uniformity values for DP 444 BG/RR have been as good as or better than most of the early-maturing BG/RR varieties currently commercially available. DP 444 BG/RR has the potential to produce the high yields and high crop value per acre demanded by the growers and the excellent fiber quality demanded by the textile industry.

## **Introduction**

Delta and Pine Land Company (D&PL) is making available in significant commercial quantities a new early-maturing picker variety with high yield potential, and excellent fiber quality potential. DP 444 BG/RR, a variety that has the Bollgard<sup>®</sup> and Roundup Ready<sup>®</sup> transgenic traits, has shown impressive yield potential in trials in many areas of the U.S. cotton belt.

For at least a decade, cotton breeders have been attempting to develop materials with high yield potential that also exhibit improved micronaire and staple values. Since micronaire values in the high discount range of the loan chart often inadvertently accompany genetic improvement for higher yields, germplasm released in the last decade that had high yield potential frequently also had high micronaire potential (Keim, 2002).

The yield and fiber quality performance of DP 444 BG/RR provides evidence that breeders have been able to overcome the cross-linkage between high yield potential and improved fiber quality, particularly micronaire and staple (Lege' et al., 2003).

## **Materials and Methods**

DP 444 BG/RR is the result of the breeding of very diverse Delta and Pine Land germplasm, and was developed at breeding facilities at Stuttgart, AR, by Dr. Curtis Williams. Prior designations of DP 444 BG/RR included DPLX00S13BR and 96-7PS0724BGRR. DP 444 BG/RR was first tested broadly by university researchers and by D&PL technical service agronomists in 2001. In 2002 and 2003, DP 444 BG/RR has been tested in state university official variety trials and in large-scale, on-farm D&PL agronomic service trials across the U.S. cotton belt. All data reported within are as of 19 December, 2003, from D&PL research and agronomic service trials (ASTs), as well as state university official variety trials (OVTs), Extension county agent trials (CATs), and consultant trials (CSTs).

## **Results and Discussion**

### **General Characteristics and Plant Growth**

DP 444 BG/RR is an early-maturing variety that has medium-tall plant stature, with semi-smooth leaves and large seed (Table 1). The boll type of DP 444 BG/RR is open, often allowing a once-over harvest, but has fair storm resistance. Tolerances to *Fusarium* spp. and *Verticillium* spp. were rated as fair-good.

Compared to PM 1218 BG/RR at 51 locations throughout the cotton belt during 2001-2003, DP 444 BG/RR matured an average of 22 degree days (DD<sub>60</sub>s) before PM 1218BG/RR, was approximately the same final height, but had about 1 fewer total nodes (Table 2). DP 444 BG/RR had slightly fewer fruiting nodes than PM 1218 BG/RR, but had a slightly larger height-to-node ratio. Both varieties began producing fruiting branches at or near mainstem node 6.

DP 444 BG/RR has exhibited excellent seedling vigor compared to other varieties. Table 3 shows a direct comparison of seedling vigor ratings for DP 444 BG/RR, PM 1218 BG/RR, and ST4892BR at 106 locations across the cotton belt during

2002-2003. Although no statistical difference could be detected among the seedling vigor ratings for all three varieties, DP 444 BG/RR numerically had the best rating.

### **Yield and Fiber Quality Performance**

DP 444 BG/RR has yielded numerically more than PM 1218 BG/RR in 295 head-to-head comparisons across the U.S. cotton belt over a four-year period by over 4%, while having superior quality for all fiber properties except uniformity (Table 4). Loan value for DP 444 BG/RR was significantly better than PM 1218 BG/RR in these comparisons, and crop value was significantly better. When these data are examined geographically, this trend for DP 444 BG/RR versus PM 1218 BG/RR is very consistent for lint yield and for all the fiber properties (Tables 5-13). In general, DP 444 BG/RR numerically outyielded PM 1218 BG/RR, had higher turnout, longer staple, stronger fiber, with significantly lower micronaire, regardless of geography.

Beltwide comparisons at 359 locations across three years show that DP 444 BG/RR yielded numerically more, had higher turnout, significantly longer staple, lower micronaire, and stronger fiber than SG 215 BG/RR (Table 4). Across most of the various geographies of the U.S. cotton belt, this trend between these two varieties was very consistent (Tables 5-13). While SG 215 BG/RR produced numerically more yield in some geographies, when the loan value (\$/lb, based on fiber quality) for DP 444 BG/RR was considered, crop value per acre was numerically higher for DP 444 BG/RR than for SG 215 BG/RR in every geography except for Arizona, where SG 215 BG/RR's crop value was significantly higher (Table 5), and for the northern mid-south region, where DP 444 BG/RR's crop value was significantly higher than that of SG 215 BG/RR (Table 10).

Averaged across 357 beltwide locations during three years, DP 444 BG/RR produced numerically more lint yield per acre and significantly higher turnout than ST4892BR (Table 4). At 336 of these locations where HVI data were available to date, DP 444 BG/RR had significantly longer staple and significantly lower micronaire than ST4892BR. Additionally, DP 444 BG/RR had a significantly higher loan value than ST4892BR beltwide. Crop value per acre for DP 444 BG/RR was 4.2% higher than for ST4892BR across the U.S. cotton belt. The trend for improved staple length and micronaire for DP 444 BG/RR was very consistent in each geography for which comparisons were made against ST4892BR (Tables 5-13).

DP 444 BG/RR numerically yielded more, and had significantly higher turnout than FM960BR, when averaged over 176 beltwide locations during 2002 and 2003 (Table 4). In the 157 locations for this comparison in which HVI data were reported to date, DP 444 BG/RR had significantly longer staple, significantly lower micronaire, but significantly lower strength values compared to FM960BR. However, strength for DP 444 BG/RR still averaged 30.4 g/tex across these 157 locations.

A new variety from Stoneville, ST3990BR, was tested against DP 444 BG/RR at 40 locations (primarily state university OVTs) across the cotton belt for the first time in 2003. Our field observations indicated the maturities of these two varieties were very similar. DP 444 BG/RR numerically yielded more than ST3990BR across these 40 locations by 8.8% (Table 4). Turnout and crop value per acre were significantly higher for DP 444 BG/RR in these comparisons. In the 36 locations that had HVI data reported to date, DP 444 BG/RR had significantly longer staple (1.8 staple units longer), stronger fiber (29.4 vs. 28.0), and higher length uniformity than ST3990BR; micronaire for these two varieties were very similar (Table 4).

### **Summary**

The growth habit of DP 444 BG/RR was very similar to that of PM 1218 BG/RR, although DP 444 BG/RR matured slightly earlier than PM 1218 BG/RR. DP 444 BG/RR exhibited high yield potential across the U.S. cotton belt by producing similar or higher yields than the leading early-maturing BG/RR varieties. Due to the high yield potential and excellent fiber quality potential for DP 444 BG/RR, crop value per acre was significantly higher than ST3990BR and PM 1218 BG/RR, and numerically higher than FM960BR, ST4892BR, and SG 215 BG/RR, when averaged across the U.S. cotton belt. Micronaire for DP 444 BG/RR often averaged in the premium range, and had very few datapoints in the high micronaire discount range of the loan chart. DP 444 BG/RR exhibited significantly improved micronaire over PM 1218 BG/RR, SG 215 BG/RR, ST4892BR, and FM960BR across the U.S. cotton belt. DP 444 BG/RR produced significantly longer fiber than the leading early-maturing BG/RR varieties, and had significantly stronger fiber than ST3990BR, PM 1218 BG/RR, and SG 215, BG/RR, when averaged across the U.S. cotton belt. The performance of DP 444 BG/RR indicated that it has the potential to produce the high yields and crop value per acre demanded by the grower, and the excellent fiber quality demanded by the textile industry. A good supply of seed of DP 444 BG/RR for the 2004 season is expected.

### **Acknowledgements**

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## References

Keim, Don L. 2002. Breaking the yield-fiber quality barrier. Proceedings of the Beltwide Cotton Conferences.

Lege', Ken E., Kevin D. Howard, Thomas A. Kerby, Don L. Keim, David W. Albers, and Tom R. Speed. 2003. Simultaneous improvement of yield and fiber quality. Proceedings of the Beltwide Cotton Conferences pp. 2557-2560.

Table 1. Characteristics of DP 444 BG/RR.

<b>Characteristic</b>	<b>Description or Rating</b>
Maturity	Early
Plant Height	Medium-Tall
Leaf Pubescence	Semi-smooth
Range of Seed Size (#/lb.)	4,100-5,050
Storm Resistance	Fair
<i>Fusarium</i> Tolerance	Fair-Good
<i>Verticillium</i> Tolerance	Fair-Good
Bronze Wilt	Not observed
Node of 1 <sup>st</sup> Fruiting Branch <sup>†</sup>	5.5
Total No. Fruiting Branches <sup>†</sup>	10.5

<sup>†</sup> Node of 1<sup>st</sup> fruiting branch and total number of fruiting branch values are least square means of all locations across the Cotton Belt for DP 444 BG/RR in 2002-2003.

Table 2. Plant mapping parameters for DP 444 BG/RR and PM 1218 BG/RR averaged over 51 locations of Delta and Pine Land Company agronomic service trials across the U.S. cotton belt in 2001-2003.

<b>Parameter</b>	<b>DP 444 BG/RR</b>	<b>PM 1218 BG/RR</b>
Plant Height (in)	38.6	38.3
Total Mainstem Nodes	19.5	20.6
Total Fruiting Nodes	9.6	10.2
Height-to-Node Ratio (in/internode)	1.97	1.87
Node of 1 <sup>st</sup> Fruiting Branch	6.0	5.9
Node of Uppermost Cracked Boll	12.0	12.1
Node of Uppermost Harvestable Boll	14.9	15.5
DD60s to 100% Open Boll <sup>†</sup>	145	167

<sup>†</sup> Calculated as the number of fruiting nodes between the uppermost cracked boll and the uppermost harvestable boll multiplied by 50 DD60s/node.

Table 3. Seedling vigor ratings for DP 444 BG/RR, PM 1218 BG/RR, and ST4892BR averaged over 106 locations of Delta and Pine Land Company agronomic service trials across the U.S. cotton belt in 2002-2003.

<b>Variety</b>	<b>Seedling Vigor Rating (1=excellent; 5=poor)<sup>†</sup></b>
DP 444 BG/RR	1.7
PM 1218 BG/RR	1.9
ST4892BR	2.4

<sup>†</sup> Visual ratings made between 2<sup>nd</sup> and 4<sup>th</sup> true leaf stages; means shown were not significantly different (LSD<sub>0.05</sub>=1.0)

Table 4. Head-to-head comparisons of DP 444 BG/RR and early-mid maturity BG/RR alternatives across the cotton belt in D&PL agronomic service trials, research trials, state university official variety trials, county agent trials, and consultant trials, as of 19 December, 2003.

<b>Variety Comparison</b>	<b>Crop Value<sup>†</sup> (\$/acre)</b>	<b>Lbs. lint/acre</b>	<b>% Turnout</b>	<b>Staple (1/32 in)</b>	<b>Strength (g/tex)</b>	<b>Micro-naire</b>	<b>% Uniformity</b>	<b>Loan Value (\$/lb)</b>
DP 444 BG/RR	631	1180	38.9	36.0	30.0	3.95	83.1	0.5327
PM 1218 BG/RR	586	1130	38.4	34.5	28.3	4.70	83.2	0.5156
t test <sup>¶</sup> (2000-2003 data)	0.0066	0.0992	0.0641	<0.0001	<0.0001	<0.0001	0.7955	<0.0001
No. of tests:	295	295	295	281	281	281	280	295
DP 444 BG/RR	617	1154	38.5	35.8	29.8	3.96	83.0	0.5326
SG 215 BG/RR	588	1128	36.8	34.4	28.1	4.47	82.7	0.5188
t test (2001-2003 data)	0.0603	0.3668	<0.0001	<0.0001	<0.0001	<0.0001	0.1238	<0.0001
No. of tests:	359	359	359	335	335	335	332	359
DP 444 BG/RR	619	1159	38.8	35.9	29.9	3.97	83.0	0.5326
ST4892BR	594	1133	38.3	35.2	29.9	4.59	83.1	0.5208
t test (2001-2003 data)	0.1032	0.3684	0.0483	<0.0001	0.6031	<0.0001	0.5103	<0.0001
No. of tests:	357	357	357	336	336	336	329	357
DP 444 BG/RR	638	1191	39.2	36.0	30.4	3.92	83.2	0.5344
FM960BR	616	1149	37.6	35.6	32.6	4.23	83.0	0.5350
t test (2002-2003 data)	0.2690	0.2296	<0.0001	0.0030	<0.0001	<0.0001	0.1250	0.7762
No. of tests:	176	176	176	157	157	157	154	176
DP 444 BG/RR	693	1294	40.7	35.9	29.4	3.86	83.6	0.5354
ST3990BR	621	1189	37.6	34.1	28.0	3.91	82.9	0.5218
t test (2003 data)	0.0254	0.0750	<0.0001	<0.0001	<0.0001	0.5962	0.0044	0.0001
No. of tests:	40	40	40	36	36	36	35	40

<sup>†</sup> Based on 2003 USDA CCC loan value of \$0.52/lb +/- premiums and discounts, expressed as \$/acre gross revenue. Data are means of crop value of individual plots. Base leaf grade, color grade, and uniformity values were used in the crop value calculation for data points for which those data were not reported by the cooperator.

<sup>¶</sup> Prob >| t| that values for each variety are not different.

Table 5. Head-to-head comparisons of DP 444 BG/RR and early-mid maturity BG/RR alternatives in Arizona in D&PL agronomic service trials, research trials, and state university official variety trials, as of 19 December, 2003.

Variety Comparison	Crop Value <sup>†</sup> (\$/acre)	Lbs. lint/acre	% Turnout	Staple (1/32 in)	Strength (g/tex)	Micro-naire	% Uniformity	Loan Value (\$/lb)
DP 444 BG/RR	856	1611	40.2	36.9	29.4	4.63	85.8	0.5307
PM 1218 BG/RR	740	1468	38.9	35.6	28.3	5.26	85.3	0.5049
t test <sup>‡</sup>	0.0267	0.1256	0.0593	0.0312	0.1067	<0.0001	0.6563	0.0004
(2000-2003 data)								
No. of tests:	11	11	11	11	11	11	11	11
DP 444 BG/RR	841	1584	40.2	37.0	29.6	4.64	86.0	0.5299
SG 215 BG/RR	875	1706	39.3	35.4	28.3	5.22	85.2	0.5127
t test	0.5215	0.1821	0.1779	0.0077	0.0327	0.0003	0.3319	0.0447
(2001-2003 data)								
No. of tests:	10	10	10	10	10	10	10	10
DP 444 BG/RR	859	1604	39.6	36.4	29.2	4.58	86.0	0.5340
ST4892BR	897	1746	39.8	36.2	29.8	5.23	85.9	0.5124
t test	0.4799	0.1125	0.7596	0.6869	0.2875	<0.0001	0.8829	0.0112
(2001-2003 data)								
No. of tests:	15	15	15	15	15	15	10	15
DP 444 BG/RR	806	1538	39.1	37.3	30.1	4.70	84.7	0.5239
FM960BR	683	1300	37.4	37.0	32.6	4.94	84.9	0.5242
t test	0.1703	0.1372	0.1043	0.8528	0.0032	0.1156	0.6474	0.9468
(2003 data)								
No. of tests:	5	5	5	5	5	5	4	5

† Based on 2003 USDA CCC loan value of \$0.52/lb +/- premiums and discounts, expressed as \$/acre gross revenue. Data are means of crop value of individual plots. Base leaf grade, color grade, and uniformity values were used in the crop value calculation for data points for which those data were not reported by the cooperator.

‡ Prob >|t| that values for each variety are not different.

Table 6. Head-to-head comparisons of DP 444 BG/RR and early-mid maturity BG/RR alternatives in the southern High Plains (portions of NM and TX) in D&PL agronomic service trials, research trials, and state university official variety trials, as of 19 December, 2003.

Variety Comparison	Crop Value <sup>†</sup> (\$/acre)	Lbs. lint/acre	% Turnout	Staple (1/32 in)	Strength (g/tex)	Micro-naire	% Uniformity	Loan Value (\$/lb)
DP 444 BG/RR	741	1411	38.8	34.6	29.2	4.41	82.8	0.5204
PM 1218 BG/RR	686	1350	38.5	33.6	27.6	5.09	82.8	0.5029
t test <sup>‡</sup>	0.7094	0.8078	0.9304	0.1227	0.0368	0.1071	0.9977	0.3390
(2001-2003 data)								
No. of tests:	6	6	6	6	6	6	6	6
DP 444 BG/RR	829	1537	35.4	35.4	29.3	4.13	82.6	0.5368
SG 215 BG/RR	796	1526	34.2	34.2	27.3	4.47	82.3	0.5182
t test	0.7298	0.9385	0.6939	0.0781	0.0080	0.2798	0.7175	0.2922
(2001-2003 data)								
No. of tests:	10	10	10	10	10	10	10	10
DP 444 BG/RR	821	1553	37.2	35.0	29.0	4.30	82.8	0.5254
ST4892BR	882	1680	36.9	35.0	29.3	4.83	84.2	0.5206
t test	0.5602	0.4186	0.9291	0.9657	0.7458	0.2106	0.1073	0.8105
(2001-2002 data)								
No. of tests:	7	7	7	7	7	7	7	7

† Based on 2003 USDA CCC loan value of \$0.52/lb +/- premiums and discounts, expressed as \$/acre gross revenue. Data are means of crop value of individual plots. Base leaf grade, color grade, and uniformity values were used in the crop value calculation for data points for which those data were not reported by the cooperator.

‡ Prob >|t| that values for each variety are not different.

Table 7. Head-to-head comparisons of DP 444 BG/RR and early-mid maturity BG/RR alternatives in the rolling plains (portions of TX and OK) in D&PL agronomic service trials, research trials, and state university official variety trials, as of 19 December, 2003.

Variety Comparison	Crop Value <sup>†</sup> (\$/acre)	Lbs. lint/acre	% Turnout	Staple (1/32 in)	Strength (g/tex)	Micro-naire	% Uniformity	Loan Value (\$/lb)
DP 444 BG/RR	706	1330	38.5	36.3	29.6	3.90	82.5	0.5290
PM 1218 BG/RR	614	1190	37.4	34.7	27.6	4.62	83.7	0.5140
t test <sup>‡</sup> (2001-2003 data)	0.1635	0.2389	0.5250	0.0031	0.0036	0.0020	0.0948	0.1132
No. of tests:	20	20	20	20	20	20	20	20
DP 444 BG/RR	675	1262	37.4	36.0	29.3	3.97	82.2	0.5313
SG 215 BG/RR	641	1245	35.9	34.2	27.7	4.40	82.4	0.5105
t test (2001-2003 data)	0.5684	0.8707	0.3511	0.0003	0.0022	0.0237	0.7479	0.0102
No. of tests:	28	28	28	28	28	28	28	28
DP 444 BG/RR	666	1258	39.5	36.0	29.4	4.01	82.5	0.5274
ST4892BR	641	1257	39.8	35.1	29.1	4.64	83.0	0.5054
t test (2001-2003 data)	0.7463	0.9947	0.8771	0.0770	0.6991	0.0146	0.5487	0.0093
No. of tests:	19	19	19	19	19	19	19	19

<sup>†</sup> Based on 2003 USDA CCC loan value of \$0.52/lb +/- premiums and discounts, expressed as \$/acre gross revenue. Data are means of crop value of individual plots. Base leaf grade, color grade, and uniformity values were used in the crop value calculation for data points for which those data were not reported by the cooperator. <sup>‡</sup> Prob >| t| that values for each variety are not different.

Table 8. Head-to-head comparisons of DP 444 BG/RR and early-mid maturity BG/RR alternatives in the central TX blacklands in D&PL agronomic service trials, state university official variety trials, and county agent trials, as of 19 December, 2003.

Variety Comparison	Crop Value <sup>†</sup> (\$/acre)	Lbs. lint/acre	% Turnout	Staple (1/32 in)	Strength (g/tex)	Micro-naire	% Uniformity	Loan Value (\$/lb)
DP 444 BG/RR	554	1030	35.0	35.0	27.7	3.98	81.8	0.5368
PM 1218 BG/RR	510	1011	34.7	33.4	26.5	4.65	82.6	0.5042
t test <sup>‡</sup> (2002-2003 data)	0.5582	0.8914	0.7810	0.0016	0.2292	0.0012	0.3600	0.0010
No. of tests:	11	11	11	11	11	11	11	11
DP 444 BG/RR	504	949	34.8	34.7	28.4	3.81	81.7	0.5295
SG 215 BG/RR	501	962	34.1	33.7	27.6	4.31	81.5	0.5179
t test (2002-2003 data)	0.9373	0.8539	0.5058	0.0011	0.1352	<0.0001	0.6944	0.0668
No. of tests:	27	27	27	27	27	27	27	27
DP 444 BG/RR	517	970	35.1	34.9	28.5	3.85	81.9	0.5310
ST4892BR	506	971	34.7	34.0	28.1	4.45	81.9	0.5168
t test (2002-2003 data)	0.8110	0.9970	0.7291	0.0234	0.5026	<0.0001	0.9156	0.0434
No. of tests:	24	24	24	24	24	24	24	24
DP 444 BG/RR	461	872	36.2	34.6	29.0	3.80	81.9	0.5279
FM960BR	449	839	35.0	34.6	30.4	4.09	81.9	0.5316
t test (2003 data)	0.8931	0.8291	0.7087	0.9422	0.1787	0.1205	0.9745	0.8114
No. of tests:	8	8	8	8	8	8	8	8

<sup>†</sup> Based on 2003 USDA CCC loan value of \$0.52/lb +/- premiums and discounts, expressed as \$/acre gross revenue. Data are means of crop value of individual plots. Base leaf grade, color grade, and uniformity values were used in the crop value calculation for data points for which those data were not reported by the cooperator.

<sup>‡</sup> Prob >| t| that values for each variety are not different.

Table 9. Head-to-head comparisons of DP 444 BG/RR and early-mid maturity BG/RR alternatives in south TX in D&PL agronomic service trials, research trials, state university official variety trials, and county agent trials, as of 19 December, 2003.

<b>Variety Comparison</b>	<b>Crop Value<sup>†</sup> (\$/acre)</b>	<b>Lbs. lint/acre</b>	<b>% Turnout</b>	<b>Staple (1/32 in)</b>	<b>Strength (g/tex)</b>	<b>Micro-naire</b>	<b>% Uniformity</b>	<b>Loan Value (\$/lb)</b>
DP 444 BG/RR	440	818	36.6	34.8	29.0	4.51	83.0	0.5334
PM 1218 BG/RR	384	780	35.6	33.5	27.9	5.14	83.0	0.4831
t test <sup>‡</sup> (2002-2003 data)	0.5194	0.8116	0.5858	0.0164	0.0798	<0.0001	0.9660	0.0005
No. of tests:	12	12	12	12	12	12	12	12
DP 444 BG/RR	505	928	36.7	35.4	29.6	4.27	82.7	0.5385
SG 215 BG/RR	492	953	35.7	34.0	28.0	4.78	82.6	0.5087
t test (2002-2003 data)	0.8560	0.8333	0.3501	0.0164	0.0039	0.0003	0.8751	0.0015
No. of tests:	22	22	22	21	21	21	20	22
DP 444 BG/RR	529	971	36.7	35.6	29.9	4.31	83.0	0.5398
ST4892BR	533	1039	36.7	35.0	30.0	5.04	83.5	0.5047
t test (2002-2003 data)	0.9583	0.6206	0.9772	0.2574	0.8683	<0.0001	0.3530	0.0005
No. of tests:	21	21	21	21	21	21	21	21
DP 444 BG/RR	624	1149	39.7	35.8	30.6	4.17	83.4	0.5413
FM960BR	658	1214	38.5	35.5	33.1	4.40	83.3	0.5392
t test (2003 data)	0.5966	0.5523	0.3152	0.6275	0.0122	0.1131	0.9407	0.7172
No. of tests:	18	18	18	17	17	17	15	18

<sup>†</sup> Based on 2003 USDA CCC loan value of \$0.52/lb +/- premiums and discounts, expressed as \$/acre gross revenue. Data are means of crop value of individual plots. Base leaf grade, color grade, and uniformity values were used in the crop value calculation for data points for which those data were not reported by the cooperator.  
<sup>‡</sup> Prob >| t| that values for each variety are not different.

Table 10. Head-to-head comparisons of DP 444 BG/RR and early-mid maturity BG/RR alternatives in the northern mid-south (north AL, north AR, MO, north MS, TN) in D&PL agronomic service trials, research trials, state university official variety trials, and county agent trials, as of 19 December, 2003.

<b>Variety Comparison</b>	<b>Crop Value<sup>†</sup> (\$/acre)</b>	<b>Lbs. lint/acre</b>	<b>% Turnout</b>	<b>Staple (1/32 in)</b>	<b>Strength (g/tex)</b>	<b>Micro-naire</b>	<b>% Uniformity</b>	<b>Loan Value (\$/lb)</b>
DP 444 BG/RR	642	1192	38.7	36.2	30.5	3.75	83.0	0.5426
PM 1218 BG/RR	604	1133	38.3	34.8	28.8	4.54	82.8	0.5361
t test <sup>‡</sup> (2000-2003 data)	0.0614	0.1162	0.3335	<0.0001	<0.0001	<0.0001	0.5990	0.0229
No. of tests:	97	97	97	88	88	88	88	97
DP 444 BG/RR	617	1147	38.4	36.1	30.3	3.77	82.8	0.5376
SG 215 BG/RR	557	1042	36.1	34.9	28.5	4.22	82.5	0.5338
t test (2001-2003 data)	0.0059	0.0082	<0.0001	<0.0001	<0.0001	<0.0001	0.2675	0.2147
No. of tests:	89	89	89	79	79	79	79	89
DP 444 BG/RR	632	1176	38.6	36.2	30.4	3.76	82.9	0.5371
ST4892BR	573	1072	37.8	35.5	30.4	4.29	82.8	0.5343
t test (2001-2003 data)	0.0086	0.0099	0.0514	<0.0001	0.8323	<0.0001	0.8270	0.3869
No. of tests:	93	93	93	84	84	84	84	93
DP 444 BG/RR	642	1196	39.2	36.2	30.5	3.72	83.1	0.5367
FM960BR	591	1093	37.2	35.8	33.4	4.08	83.0	0.5407
t test (2002-2003 data)	0.1203	0.0861	0.0003	0.0859	<0.0001	<0.0001	0.7328	0.2496
No. of tests:	54	54	54	44	44	44	44	54

<sup>†</sup> Based on 2003 USDA CCC loan value of \$0.52/lb +/- premiums and discounts, expressed as \$/acre gross revenue. Data are means of crop value of individual plots. Base leaf grade, color grade, and uniformity values were used in the crop value calculation for data points for which those data were not reported by the cooperator.  
<sup>‡</sup> Prob >| t| that values for each variety are not different.



Table 11. Head-to-head comparisons of DP 444 BG/RR and early-mid maturity BG/RR alternatives in the southern mid-south (south AR, LA, south MS) in D&PL agronomic service trials, research trials, and state university official variety trials, as of 19 December, 2003.

Variety Comparison	Crop Value <sup>†</sup> (\$/acre)	Lbs. lint/acre	% Turnout	Staple (1/32 in)	Strength (g/tex)	Micro-naire	% Uniformity	Loan Value (\$/lb)
DP 444 BG/RR	621	1155	38.6	36.1	30.4	4.08	83.5	0.5356
PM 1218 BG/RR	602	1176	38.5	34.6	28.4	4.88	83.2	0.5090
t test <sup>‡</sup> (2000-2003 data)	0.5191	0.6950	0.8884	<0.0001	<0.0001	<0.0001	0.4629	<0.0001
No. of tests:	70	70	70	68	68	68	68	70
DP 444 BG/RR	624	1156	38.2	36.1	30.6	4.07	83.4	0.5379
SG 215 BG/RR	612	1180	37.1	34.6	28.7	4.70	82.9	0.5172
t test (2001-2003 data)	0.6645	0.6568	0.0365	<0.0001	<0.0001	<0.0001	0.2016	<0.0001
No. of tests:	71	71	71	69	69	69	69	71
DP 444 BG/RR	623	1154	38.2	36.1	30.6	4.08	83.4	0.5379
ST4892BR	600	1143	38.1	35.6	30.7	4.80	83.4	0.5227
t test (2001-2003 data)	0.4385	0.8217	0.8314	0.0621	0.6476	<0.0001	0.9845	0.0005
No. of tests:	73	73	73	71	71	71	71	73
DP 444 BG/RR	661	1231	38.3	36.0	30.6	4.05	83.3	0.5366
FM960BR	659	1232	37.4	35.5	32.7	4.44	83.0	0.5339
t test (2002-2003 data)	0.9537	0.9840	0.1476	0.0965	0.0005	<0.0001	0.2239	0.4859
No. of tests:	40	40	40	38	38	38	38	40

<sup>†</sup> Based on 2003 USDA CCC loan value of \$0.52/lb +/- premiums and discounts, expressed as \$/acre gross revenue. Data are means of crop value of individual plots. Base leaf grade, color grade, and uniformity values were used in the crop value calculation for data points for which those data were not reported by the cooperator.

<sup>‡</sup> Prob >|t| that values for each variety are not different.

Table 12. Head-to-head comparisons of DP 444 BG/RR and early-mid maturity BG/RR alternatives in the northern southeast (NC, north SC, VA) in D&PL agronomic service trials, research trials, state university official variety trials, and county agent trials, as of 19 December, 2003.

Variety Comparison	Crop Value <sup>†</sup> (\$/acre)	Lbs. lint/acre	% Turnout	Staple (1/32 in)	Strength (g/tex)	Micro-naire	% Uniformity	Loan Value (\$/lb)
DP 444 BG/RR	534	1014	40.9	35.5	29.7	3.85	82.8	0.5203
PM 1218 BG/RR	473	926	40.1	34.0	28.1	4.62	83.2	0.5041
t test <sup>‡</sup> (2000-2003 data)	0.1739	0.2919	0.1276	<0.0001	0.0011	<0.0001	0.5988	0.0131
No. of tests:	51	51	51	49	49	49	48	51
DP 444 BG/RR	528	1003	40.7	35.5	29.7	3.91	82.7	0.5206
SG 215 BG/RR	485	946	38.2	33.8	27.6	4.40	82.6	0.5061
t test (2001-2003 data)	0.2999	0.4517	<0.0001	<0.0001	<0.0001	<0.0001	0.8530	0.0156
No. of tests:	58	58	58	54	54	54	53	58
DP 444 BG/RR	537	1018	40.7	35.5	29.7	3.90	82.8	0.5215
ST4892BR	502	960	39.7	34.8	29.6	4.49	83.0	0.5123
t test (2001-2003 data)	0.4176	0.4576	0.0131	0.0060	0.8744	<0.0001	0.7057	0.1502
No. of tests:	61	61	61	57	57	57	56	61
DP 444 BG/RR	595	1127	40.6	36.0	31.0	3.73	83.6	0.5271
FM960BR	551	1043	38.6	35.3	32.2	3.94	82.9	0.5284
t test (2003 data)	0.4083	0.3940	0.0048	0.0409	0.1452	0.1294	0.1061	0.8274
No. of tests:	20	20	20	19	19	19	19	20

<sup>†</sup> Based on 2003 USDA CCC loan value of \$0.52/lb +/- premiums and discounts, expressed as \$/acre gross revenue. Data are means of crop value of individual plots. Base leaf grade, color grade, and uniformity values were used in the crop value calculation for data points for which those data were not reported by the cooperator.  
<sup>‡</sup> Prob >| t | that values for each variety are not different.

Table 13. Head-to-head comparisons of DP 444 BG/RR and early-mid maturity BG/RR alternatives in the southern southeast (south AL, FL, GA, south SC) in D&PL agronomic service trials, research trials, state university official variety trials, county agent trials, and consultant trials, as of 19 December, 2003.

<b>Variety Comparison</b>	<b>Crop Value<sup>†</sup> (\$/acre)</b>	<b>Lbs. lint/acre</b>	<b>% Turnout</b>	<b>Staple (1/32 in)</b>	<b>Strength (g/tex)</b>	<b>Micro-naire</b>	<b>% Uniformity</b>	<b>Loan Value (\$/lb)</b>
DP 444 BG/RR	808	1512	41.2	36.1	29.4	3.78	84.1	0.5324
PM 1218 BG/RR	776	1477	40.2	34.7	28.0	4.42	83.8	0.5256
t test <sup>‡</sup> (2001-2003 data)	0.6811	0.7972	0.0478	0.0005	0.0065	<0.0001	0.7190	0.0990
No. of tests:	14	14	14	14	14	14	14	14
DP 444 BG/RR	689	1291	41.2	36.1	29.3	3.92	83.9	0.5328
SG 215 BG/RR	673	1284	38.8	34.6	27.8	4.39	83.1	0.5228
t test (2001-2003 data)	0.7143	0.9277	<0.0001	<0.0001	0.0007	<0.0001	0.1167	0.0182
No. of tests:	35	35	35	30	30	30	30	35
DP 444 BG/RR	668	1254	41.0	36.1	29.4	3.90	83.7	0.5315
ST4892BR	660	1256	40.2	35.1	30.0	4.60	83.6	0.5234
t test (2001-2003 data)	0.8612	0.9770	0.1500	0.0029	0.1326	<0.0001	0.8546	0.0806
No. of tests:	39	39	39	33	33	33	33	39
DP 444 BG/RR	663	1248	41.4	36.4	29.4	3.85	83.5	0.5309
FM960BR	673	1263	39.1	35.8	32.4	4.17	83.2	0.5320
t test (2003 data)	0.8432	0.8629	<0.0001	0.0837	<0.0001	0.0002	0.4310	0.7861
No. of tests:	25	25	25	20	20	20	20	25

<sup>†</sup> Based on 2003 USDA CCC loan value of \$0.52/lb +/- premiums and discounts, expressed as \$/acre gross revenue. Data are means of crop value of individual plots. Base leaf grade, color grade, and uniformity values were used in the crop value calculation for data points for which those data were not reported by the cooperator.  
<sup>‡</sup> Prob >| t| that values for each variety are not different.