# DP 449 BG/RR, A NEW MID-SEASON COTTON VARIETY David Albers Delta and Pine Land Company Lubbock, TX Larry Burdett Delta and Pine Land Company Maricopa, AZ

#### Abstract

DP 449 BG/RR is a new mid-season cotton variety being released by Delta and Pine Land Company for the 2003-growing season. DP 449 BG/RR is a smooth-leaf, medium height variety developed at D&PL's Maricopa, AZ research location and has been tested widely in the 2001 and 2002 growing seasons. The highlights of DP 449 BG/RR's performance are improved fiber quality, excellent yield stability, and improved yield potential and crop value per acre over standard DP&L and competitor varieties. Fiber micronaire is reduced and fiber strength is improved when compared to DP 451 B/RR, DP 458 B/RR, DP 555 BG/RR, and ST4892BR. Supplies of DP 449 BG/RR for the 2003 growing season are projected to be good introductory quantities.

## **Introduction**

Delta and Pine Land Company is releasing DP 449 BG/RR as a commercial variety for the 2003 growing season. This variety was tested previously as DPLX 01T25BR, beginning in the 2000, and has been widely tested in 2001 and 2002 growing seasons. DP 449 BG/RR was developed from a cross of DP 5415 and DP 5690 that was backcrossed to introgress both Bollgard and Roundup Ready genes. After being entered in some university strains tests and D&PL tests with contract researchers and universities in 2001, DP 449 BG/RR was tested in university Official Variety Tests (OVTs) beginning in 2002.

## **Materials and Methods**

The data describing DP 449 BG/RR here were extracted from the Delta and Pine Land Company Agronomic Information System database December 23, 2002. This database contains the both public data from university OVTs and Delta and Pine Land Company (D&PL) tests of both the Research and Technical Services departments. The data extracted from the database was limited to those tests that had both yield and HVI fiber quality data to calculate "loan value" based on the 2002 USDA loan chart, using a base value of \$0.52 / lb. Comparisons for yield and fiber quality were made with DP 451 B/RR, DP 458 B/RR, DP 555 BG/RR, ST 4892 BR, and FM 989 BR, and were all balanced head to head comparisons for all locations included. Crop value per acre was calculated by multiplying the lint yield for each plot by the USDA loan value calculated for that plot. Plant mapping data for maturity comparisons was collected at D&PL Technical Service plot sites. The data was collected near maturity when the plants had from 30 percent to 70 percent open bolls. Balanced, head to head comparisons of the plant mapping data were made against DP 451 B/RR and DP 458 B/RR.

#### **Results and Discussion**

The yield performance of DP 449 BG/RR was greater than 4 of the 5 comparison varieties (Table 1). DP 555 BG/RR was the only variety to out-yield DP 449 BG/RR in these comparisons. The yield improvements ranged from 2.0 percent higher than ST 4892BR to 8.6 percent higher than FM 989 BR, including an 8.2 percent improvement over DP 451 B/RR. The loan value of DP 449 BG/RR was higher than 4 of the 5 comparison varieties, except FM 989BR, which DP 449 BG/RR was within 0.2 cent per lb. The improvements in loan value of DP 449 BG/RR ranged from 0.4 cents per pound over DP 458 B/RR to 2.3 cent per pound over ST 4892BR. The combination of improved yields and improved loan value resulted in the crop value (\$/acre) of DP 449 BG/RR to be greater than all the comparison varieties except DP 555 BG/RR. Crop value improvements ranged up to \$47/acre better than DP 451B/RR and \$37/acre better than FM 989 BR, while DP 449 BG/RR was within \$27 / acre of DP 555 BG/RR.

The HVI fiber properties that resulted in improved loan value of DP 449 BG/RR for these comparisons were lower micronaire than 4 of the 5 varieties and improved fiber strength over all 5 of the comparison varieties. Micronaire was 7.0 percent lower than ST 4892BR to just 0.6 percent lower than DP 555 BG/RR. Improvements in fiber strength ranged from 7.6 percent greater HVI strength than DP 451 B/RR to 0.9 percent greater strength than DP 458 B/RR. Staple length of DP 449 BG/RR was very similar to the comparison varieties, ranging from 0.5 percent shorter than DP 451 B/RR to 1.0 percent longer than ST 4892 BR. The yield performance of DP 449 BG/RR across cotton growing regions of the U.S. Cotton Belt was strong compared to DP 451 B/RR and DP 458 B/RR over the past 3 years of testing (Table 2). DP 449 BG/RR out-yielded DP 451 B/RR in 10 of 11 growing regions tested and out-yielded DP 458 B/RR in 8 of 11 regions tested. The strongest performance of DP 449 BG/RR was in AZ, but excellent performance was also noted in central and south Texas, the north Delta and portions of the South-east U.S. The regions that DP 449 BG/RR was out-yielded by DP 458 B/RR (Trans-Pecos, Southern High Plains, and South-ern Southeast) have been historically strong performance areas for DP 458 B/RR.

The overall yield stability of DP 449 BG/RR is very strong, based on the data available through December 10, 2002 (Figure 1). The stability analysis by linear regression of DP 449 BG/RR's yield versus the trial mean yield, indicated a very low scatter of DP 449 BG/RR yield with a  $R^2$  of 0.97. This is among the highest  $R^2$  for varieties that have been compared using this method by Delta and Pine Land Company. An  $R^2$  of 0.97 indicates that 97 percent of the variation in DP 449 BG/RR's yield performance in the tests to date can be explained by the differences in the trial mean (environment).

Some of the regional yield performance noted can be explained by the growth and maturity of DP 449 BG/RR (Table 3). DP 449 BG/RR is described medium height variety, and was shorter than both DP 451 B/RR and DP 458 B/RR over the past 2 seasons. A shorter plant type, like expressed by DP 449 BG/RR, should be easier to control height with growth regulators, than more vigorous growing varieties. The plant mapping analysis showed that the maturity of DP 449 BG/RR is slightly later than DP 451 BG/RR (25 DD60's later to 100 percent open) and earlier than DP 458 B/RR (35 heat units quicker to 100 percent open). The strong performance of DP 449 BG/RR in both the North Delta and the northern Southeast, could be due in part to its maturity being nearly as early as DP 451 B/RR, which is well adapted to both of these short season environments.

## **Summary**

DP 449 BG/RR is a medium maturity variety that is being released by Delta and Pine Land Company for the 2003-growing season. DP 449 BG/RR has shown improved yield performance over 4 of the 5 comparison varieties reported in this study, both D&PL and competitor varieties. HVI fiber strength and micronaire is also improved, resulting in improved loan value for DP 449 BG/RR, versus four of the five comparison varieties. The staple of DP 449 BG/RR is very similar to the comparison varieties. DP 449 BG/RR exhibited strong yield performance in a majority of growing regions, and has shown excellent yield stability by linear regression analysis of the variety yield versus the trial mean yield.

,		Crop							Loan
		Value	Yield	Turnout	Staple		Strength	Uniformity	Value
Variety	Ν	(\$/acre)	(lb/acre)	(%)	$(32^{nd} in.)$	Micronaire	(g/tex)	Index	( <b>\$/lb</b> )
DP449BR	101	534.91	1068	35.8	35.0	4.57	29.1	80.9	0.514
DP451BR	101	487.80	987	34.2	35.1	4.65	27.1	79.9	0.507
% Difference		9.7	8.2	4.8	-0.5	-1.6	7.6	1.2	1.2
DP449BR	125	554.54	1099	35.3	35.1	4.49	29.4	81.1	0.519
DP458BR	125	531.26	1058	35.3	35.2	4.62	29.1	80.5	0.515
% Difference		4.4	3.9	-0.3	-0.2	-2.8	0.9	0.8	0.7
DP449BR	139	538.26	1065	35.1	34.9	4.47	29.1	80.8	0.519
DP555BR	139	564.96	1130	38.8	34.8	4.50	27.8	78.4	0.512
% Difference		-4.7	-5.8	-9.4	0.5	-0.6	5.0	3.1	1.2
DP449BR	106	526.93	1047	35.3	34.9	4.49	29.2	80.7	0.517
ST4892BR	106	494.68	1026	36.3	34.6	4.83	28.1	82.0	0.494
% Difference		6.5	2.0	-2.8	1.0	-7.0	4.0	-1.6	4.7
DP449BR	96	483.82	964	35.4	34.8	4.48	28.9	80.6	0.514
FM989BR	96	446.93	888	34.9	34.8	4.33	28.6	80.0	0.516
% Difference		8.3	8.6	1.5	-0.2	3.4	1.0	0.8	-0.3

Table 1. Head to head comparisons of DP 449 BG/RR vs. DP 451 B/RR, DP 458 B/RR, DP 555 BG/RR, ST 4892 BR, and FM989BR; 2000 to 2002.

Data	% Difference vs. DP	% Difference vs. DP		
Region	451 BG/RR	458 BG/RR		
California	13.70	10.00		
Arizona	15.05	10.51		
Trans-Pecos	5.28	-0.32		
S. High Plains	7.19	-1.74		
Rolling Plains	3.27	2.75		
South Texas	9.19	1.22		
Central TX Blacklands	8.87	3.63		
South Delta	-1.97	3.33		
North Delta	10.08	7.46		
Southern Southeast	8.22	-1.55		
Northern Southeast	5.73	2.93		

Table 2. DP 449 BG/RR yield performance by data region vs. DP 451 B/RR and DP 458 B/RR.

Table 3. Final Plant Mapping comparisons of DP 449 BG/RR vs. DP 451 B/RR and DP 458 B/RR.

			Total	Fruiting					DD60 to
Variety	n	Ht	Nodes	Nodes	HNR	NFFB	NUCB	NUHB	100% open
DP449BR	46	33.2	21.1	10.6	1.6	6.5	12.0	16.1	203
DP451BR	46	33.9	21.2	10.6	1.6	6.3	12.3	15.9	178
DP449BR	92	32.7	21.1	9.9	1.5	6.7	12.2	15.4	160
DP458BR	92	34.1	21.7	10.3	1.6	6.9	12.2	16.1	195

Ht – Plant Height in inches

HNR - Height to node ratio (inches per node)

NFFB – Node of First Fruiting Branch

NUCB - Node Uppermost Cracked Boll

NUHB – Node Uppermost Harvestable Boll



Figure 1. Yield Stability of DP 449 BG/RR vs. Yield of Trial Mean, All data sources from Delta and Pine Land Company AIS database through December 10, 2002.