# DP 432 RR AND DP 434 RR: NEW HIGH QUALITY FIBER, EARLY MATURING RR'S FROM D&PL

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### **Abstract**

Delta and Pine Land Company will introduce two new early maturing, picker RR's, DP 432 RR and DP 434 RR for the 2005 growing season. Both DP 432 RR and DP 434 RR have shown improved yield and fiber quality potential over other currently available RR's, in this maturity range. Average yield increases over currently available RR's (DP 436 RR, FM 989 RR and ST 4793 RR) for DP 432 RR have ranged from 3.7% to 12.4%. Average yield increases for DP 434 RR over currently available RR's (DP 436 RR, FM 989 RR and ST 4793 RR) for DP 432 RR have ranged from 3.7% to 12.4%. Average yield increases for DP 434 RR over currently available RR's (DP 436 RR, FM 989 RR and ST 4793 RR) have ranged from 2.9% to 11.1%. Staple length, Micronaire, Strength (g/tex), and Uniformity ratios have averaged 35.9, 4.38, 30.7 and 83.4 respectively for DP 432 RR (n=368). Staple length, Micronaire, Strength (g/tex), and Uniformity ratios for DP 434 RR have averaged 36.9, 4.09, 29.3 and 82.8 (n=334) respectively. Beltwide yield performance between DP 432 RR and DP 434 RR has shown a non-statistical difference. Regionally, yield has shown to be the strongest for DP 432 RR in the North Delta, Northern Southeast, and Southern Southeast when these two new varieties were compared. While Regional yield performance has been the strongest for DP 434 RR in the South Delta and South Texas, typically non-irrigated conditions. Seed supply is expected to be good for commercial introduction in 2004

### **Introduction**

DP 432 RR and DP 434 RR will be released as new, early maturing Roundup Ready varieties for the 2005 growing season. DP 432 RR and DP 434 RR were tested as DPLX 01X99R and DPLX 01W99R, respectively prior to being given their commercial names. DP 432 RR was developed by Don Keim at the Delta and Pine Land Scott, MS breeding station. Internal testing of DP 432 RR began in 1999 and has been continually tested in internal and external yield trials (including University Official Variety Trials) since 2003. DP 434 RR was developed by Bob Bridge and Bob McGowen at the Delta and Pine Land Company Scott, MS breeding station. Internal testing of DP 434 RR began in 1001 and has been continually tested in internal and external yield trials (including University Official Variety Trials) since 2003. DP 434 RR was developed by Bob Bridge and Bob McGowen at the Delta and Pine Land Company Scott, MS breeding station. Internal testing of DP 434 RR began in 2001 and has been continually tested in internal and external yield trials (including University Official Variety Trials) since 2003.

### **Materials and Methods**

The data describing both DP 432 RR and DP 434 RR were extracted from the Delta and Pine Land Company Agronomic Information System database December 22, 2004. This database contains both the public data from university OVTs and Delta and Pine Land Company (D&PL) tests from the Research and Technical Services departments. The data extracted from the database included yield and HVI fiber quality data to calculate "loan value" based on the 2004 USDA loan chart, using a base value of \$0.52 / lb. Comparisons for yield and fiber quality were made with DP 436 RR, FM 989 RR and ST 4793R 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 selected 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 436 RR.

### **Results and Discussion**

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

DP 432 RR is an early maturing variety with a hairy leaf type and a med-tall plant type (Table 1). Seed size has ranged from 4800 to 5600 seed per pound and seedling vigor has been rated as good. The preliminary disease tolerance ratings of DP 432 RR to Fusarium wilt is very good and Verticillium wilt is good. Storm resistance on DP 432 RR has been rated as good.

The plant height of DP 432 RR has averaged about 3 inches taller than DP 436 RR and has shown to be a vigorous growing plant that has produced more total nodes and has shown a higher height to node ratio (HNR) than DP 436 RR (Table 2). The total number of fruiting nodes and the maturity rating (based on differences in DD60's to reach 100% open bolls) has shown to be very similar to DP 436 RR. The node number of the first fruiting branch (NFFB), the node of the upper most cracked boll (NUCB) and the node of the upper most harvestable boll (NUHB) have all averaged higher than DP 436 RR.

DP 434 RR is an early maturing variety with a smooth leaf type and a med-tall plant type (Table 3). Seed size has ranged from 4500 to 5100 seed per pound and seedling vigor has been rated as good. The preliminary disease tolerance ratings of DP 434 RR to Fusarium wilt is very good and Verticillium wilt is good. Storm resistance on DP 432 RR has been rated as very good.

DP 434 RR has shown to have a significantly taller plant type and a significantly higher HNR than DP 436 RR (Table 4). While the number of total nodes produced, the number of total fruiting branches, NUCB, NUHB and maturity ratings have not shown significant differences to DP 436 RR.

# Yield, Fiber Quality, and Crop Value

The yield and HVI fiber quality of DP 432 RR compared to 3 other Roundup Ready varieties (DP 436 RR, FM 989 RR and ST 4793RR) are summarized in Table 5. DP 432 RR yielded significantly greater than all the comparison varieties. Percent yield advantage, over the comparison varieties, ranged from 3.7% to 12.4% for DP 432 RR. The crop value of DP 432 RR (\$/acre) was significantly greater than all the comparison varieties. The improvement in crop value ranged from 5.0% greater compared to ST 4793 R to 11.4% greater than DP 436 RR. The average uniformity ratio of DP 432 RR was significantly greater than each of the comparison RR varieties, ranging from 83.2% to 84.5% uniformity ratios.

The staple length of DP 432 RR was significantly shorter than DP 436 RR and FM 989 RR, while it showed to have a significantly longer staple than ST 4793 RR. Even though DP 432 RR showed to have significantly shorter staple lengths in some of these comparisons, DP 432 RR's staple length average ranged from a respectable 35.7 to 36.0. The micronaire of DP 432 RR showed to be significantly higher than DP 436 RR and FM 989 RR while it showed to have a significantly lower micronaire than ST 4793 RR. Micronaire averages for these comparisons ranged from 4.37 to 4.42 for DP 432 RR. The fiber strength of DP 432 RR was significantly greater than DP 436 RR and ST 4793 RR while FM 989 RR had a significantly stronger fiber strength (g/tex) than DP 432 RR.

The yield and HVI fiber quality of DP 434 RR compared to 3 other Roundup Ready varieties (DP 436 RR, FM 989 RR and ST 4793RR) are summarized in Table 6. DP 434 RR yielded significantly greater than all the comparison varieties. Percent yield advantage, over the comparison varieties, ranged from 2.9% to 11.1% for DP 434 RR. The crop value of DP 434 RR (\$/acre) was significantly greater than all the comparison varieties. The improvement in crop value ranged from 5.8% greater compared to ST 4793 R to 12.1% greater than DP 436 RR. The average uniformity ratio of DP 434 RR was not significantly different than each of the comparison RR varieties, ranging from 82.6% to 83.0% uniformity ratios.

The staple length of DP 434 RR was significantly longer than DP 436 RR, FM 989 RR and ST 4793 RR. Staple length averages for DP 434 RR ranged from 36.7 to 37.0 when compared to the three other commercial Roundup Ready varieties. The average difference in staple length, when compared to DP 436 RR, FM 989 RR and ST 4793 RR, were 0.7, 1.0 and 2.0 staple lengths, respectively. The micronaire of DP 43 RR showed to be significantly lower than DP 436 RR and ST 4793 RR while it showed to have the same micronaire value as FM 989 RR. Micronaire averages for these comparisons ranged from 4.02 to 4.10 for DP 434 RR. The fiber strength of DP 434 RR was significantly greater than DP 436 RR while FM 989 RR and ST 4893 RR had significantly stronger fiber strength (g/tex) than DP 434 RR.

When DP 432 RR was compared to DP 434 RR in yield and fiber quality, the following differences were noted: yields were statistically the same, gin turnout was significantly higher for DP 434 RR, staple length and loan value were significantly higher for DP 434 RR and micronaire, fiber strength, and uniformity ratios were significantly higher for DP 432 RR (Table 9).

### **Regional Performance**

DP 432 RR showed its strongest performance in the Southern Southeast and the North Delta (Table 7) compared to DP 436 RR, where it averaged 16.9% and 14.6% greater yield, in those respective regions than DP 436 RR. When compared to FM 989 RR, DP 432 RR's strongest regional yield performance was in the North Delta, South Delta and the Southern Southeast, where it averaged 21.4%, 12.7% and 12.4% greater yield than FM 989 RR, respectively. The regional yield comparisons to ST 4793 RR showed DP 432 RR's strongest performance in South Texas, Central Texas Blacklands and North Delta, where it had average higher yields of 8.9%, 6.2% and 5.8%, respectively.

DP 434 RR showed its strongest performance in the South Delta, Southern Southeast and the Central Texas Blacklands (Table 8) when compared to DP 436 RR, where it averaged 17.1%, 12.1% and 10.9% greater yield than DP 436 RR. When compared to FM 989 RR, DP 434 RR's strongest regional yield performance was in the North Delta, Central Texas Blacklands, and South Delta, where it averaged 27.4%, 19.9% and 19.6% greater yield than FM 989 RR, respectively. The regional yield comparisons to ST 4793 RR showed DP 434 RR's strongest performance in South Texas, Central Texas Blacklands and South Delta, where it had average higher yields of 16.7%, 10.5% and 6.6%, respectively.

When DP 432 RR was compared head to head with DP 434 RR, DP 432 RR had a slightly higher average yield than DP 434 RR in the following regions: North Delta, Northern Southeast and the Southern Southeast (Table 10). While DP 434 RR had slightly higher average yields in Central Texas Blacklands, South Delta and South Texas regions.

## **Summary**

DP 432 RR is a new early maturing Roundup Ready variety with improved yield potential over several comparison RR varieties (DP 436 RR, FM 989 RR and ST 4793RR). The yield of DP 432 RR was 3.7% to 12.4% greater than the comparison varieties and the crop value (\$/acre) was 5.0% to 11.4% greater than the comparison varieties. The HVI fiber properties of DP 432 RR showed the following differences: staple was similar to but significantly shorter than DP 436 RR and FM 989 RR while averaging significantly longer staple than ST 4793 RR. Fiber strength was stronger for DP 432 RR when compared to DP 436 RR and ST 4793 RR. Micronaire was higher for DP 432 RR when compared to DP 436 RR and FM 989 RR but lower than ST 4793 RR. DP 432 RR is a med-tall plant with maturity similar to DP 436 RR. Seed supply is expected to be good for commercial introduction in 2005.

DP 434 RR is a new early maturing Roundup Ready variety with improved yield potential over several comparison RR varieties (DP 436 RR, FM 989 RR and ST 4793RR). The yield of DP 434 RR was 2.9% to 11.1% greater than the comparison varieties and the crop value (\$/acre) was 5.8% to 12.1% greater than the comparison varieties. The HVI fiber properties of DP 434 RR showed the following differences: staple was significantly longer than all the comparison varieties and micronaire was significantly lower than DP 436 RR and ST 4793 RR. Fiber strength was lower for DP 434 RR when compared to FM 989 RR and ST 4793 RR, but stronger than DP 436 RR. DP 434 RR is a med-tall plant with maturity similar to DP 436 RR that has performed well in non irrigated trials across the Southern areas of the cotton Belt . Seed supply is expected to be good for commercial introduction in 2005.

Former Design.	DPLX01X99R
Breeders	Don L. Keim
Maturity	Early
Plant Height	Med-Tall
Leaf Hair	Hairy
Seedling Vigor	Good
Seed Size (#/lb)	4,800-5,600
Storm Resist.	Good

Table 1. Characteristics of DP 432 RR.

Fusarium tolerance	Very Good
Verticillium tolerance	Good

Table 2. Plant Mapping parameters for DP 432 RR and DP 436 RR averaged over 28 locations of Delta and Pine Land Company trials across the Cotton Belt in 2003 and 2004.

	DP 432 RR	DP 436 RR	t-Test <sup>†</sup>
Plant Height (in.)	39.7	36.8	***
Total Nodes	20.0	19.2	***
Fruiting Nodes	10.3	10.2	NS
HNR *	2.00	1.92	*
NFFB	6.2	5.8	**
NUCB	10.9	10.5	**
NUHB	15.5	15.2	NS
DD60's to 100% open	231	235	NS
Ν	28	28	

\*HNR - Height to node ratio (inches per node)

NFFB – Node of First Fruiting Branch

NUCB – Node Uppermost Cracked Boll

NUHB – Node Uppermost Harvestable Boll

<sup>†</sup> Prob >|t| that values for each variety are not different; \*, \*\*, \*\*\* indicate significance at alpha = 0.05, 0.01, 0.001, respectively; NS=not significant

Table 3. Characteristics of DP 434 RR.

Former Design.	DPLX01W99R
Breeders	Bob McGowen, Bob Bridge
Maturity	Early
Plant Height	Med-Tall
Leaf Hair	Smooth
Seedling Vigor	Good
Seed Size (#/lb)	4,500-5,100
Storm Resist.	Very Good
Fusarium tolerance	Very Good
Verticillium tolerance	Good

Table 4. Plant Mapping parameters for DP 434 RR and DP 436 RR averaged over 41 locations of Delta and Pine Land Company trials across the Cotton Belt in 2003 and 2004.

	DP 434 RR	DP 436 RR	t-Test <sup>†</sup>
Plant Height (in.)	40.5	36.4	***
Total Nodes	19.1	19.0	NS
Fruiting Nodes	9.9	10.2	NS
HNR *	2.12	1.91	***
NFFB	6.0	5.8	**
NUCB	10.9	10.9	NS
NUHB	15.0	15.1	NS
DD60's to 100% open	208	211	NS
N	28	28	

\*HNR - Height to node ratio (inches per node)

NFFB - Node of First Fruiting Branch

NUCB - Node Uppermost Cracked Boll

NUHB – Node Uppermost Harvestable Boll

<sup>†</sup> Prob >|t| that values for each variety are not different; \*, \*\*, \*\*\* indicate significance at alpha = 0.05, 0.01, 0.001, respectively; NS=not significant

database as of	12.22.04.							
				Staple			Uniformity	
	Crop Value	Yield	% Gin	$(32^{nd})$	Micro-	Strength	Index	Loan Value
Variety	(\$/Acre)	(lb/acre)	Turn Out	inch)	naire	(g/tex)	(%)	(cents/lb)
DP 432 RR	645	1213	37.9	35.8	4.42	30.6	83.2	53.21
DP 436 RR	579	1079	36.3	36.3	4.37	28.9	82.9	53.70
n	170	184	184	170	170	170	168	170
t-Test <sup>†</sup>	***	***	***	***	**	***	**	**
% Difference	11.4	12.4	8.5	-1.3	1.1	5.9	0.4	09
DP 432 RR	633	1200	37.8	35.7	4.37	30.8	84.5	52.75
FM 989 RR	583	1091	37.8	36.0	4.06	32.1	83.4	53.40
n	55	55	55	55	55	55	55	55
t-Test <sup>†</sup>	**	***	NS	*	***	***	***	***
% Difference	8.6	10.0	-0.1	-0.6	7.6	-4.3	1.3	-1.2
DP 432 RR	669	1255	38.1	36.0	4.39	31.1	83.6	53.29
ST 4793 RR	637	1210	38.9	35.2	4.62	30.4	83.3	52.62
n	211	235	235	226	226	226	226	211
t-Test <sup>†</sup>	***	***	***	***	***	***	***	***
% Difference	5.0	3.7	-2.0	2.2	-5.1	2.1	0.4	1.3

Table 5. Head to Head Yield and HVI Performance of DP 432 RR compared to Delta and Pine Land Company and competitor Roundup Ready varieties. Data includes both DPL AST data and University OVT data from DPL AIS database as of 12.22.04.

<sup>†</sup> Prob |t| that values for each variety are not different; \*, \*\*, \*\*\* indicate significance at alpha = 0.05, 0.01, 0.001, respectively; NS=not significant

Table 6. Head to Head Yield and HVI Performance of DP 432 RR compared to Delta and Pine Land Company and competitor Roundup Ready varieties. Data includes both DPL AST data and University OVT data from DPL AIS database as of 12.22.04.

				Staple			Uniformity	
	Crop Value	Yield	% Gin	$(32^{nd})$	Micro-	Strength	Index	Loan Value
Variety	(\$/Acre)	(lb/acre)	Turn Out	inch)	naire	(g/tex)	(%)	(cents/lb)
DP 434 RR	632	1164	39.0	36.9	4.10	29.4	83.0	54.29
DP 436 RR	564	1047	34.8	36.2	4.34	29.0	83.0	53.84
n	181	194	194	181	181	181	177	181
t-Test <sup>†</sup>	***	***	***	***	**	**	**	**
% Difference	12.1	11.1	12.0	2.0	-5.6	1.1	0.0	0.8
DP 434 RR	597	1103	37.9	36.7	4.02	29.5	82.6	54.14
FM 989 RR	541	1008	37.0	35.7	4.03	31.8	82.7	53.72
n	72	73	73	72	72	72	72	72
t-Test <sup>†</sup>	***	***	**	***	NS	***	NS	*
% Difference	10.4	9.4	2.5	2.8	0.0	-7.3	-0.1	0.8
DP 434 RR	659	1215	39.0	37.0	4.05	29.7	83.0	54.26
ST 4793 RR	623	1181	38.6	35.0	4.58	30.4	83.1	52.76
n	179	202	202	194	194	194	194	179
t-Test <sup>†</sup>	***	***	***	***	***	***	NS	***
% Difference	5.8	2.9	1.1	5.7	-11.5	-2.4	-0.1	2.9

<sup>†</sup> Prob >|t| that values for each variety are not different; \*, \*\*, \*\*\* indicate significance at alpha = 0.05, 0.01, 0.001, respectively; NS=not significant

	Cent. TX	N. Delta	N. Southeast	S. Delta	S. Southeast	S. Texas
Yield						
DP 432 RR	755	1257	1147	1282	1250	1118
DP 436 RR	699	1096	1025	1148	1070	1028
t-Test <sup>†</sup>	*	***	***	***	***	***
% difference	8.0	14.6	11.9	11.7	16.9	8.8
n	15	54	32	34	19	23
DP 432 RR	NA	1152	947	1355	1076	1205
FM 989 RR	NA	949	863	1203	957	1144
t-Test <sup>†</sup>	NA	NS	NS	**	NS	*
% difference	NA	21.4	9.8	12.7	12.4	5.4
N	NA	5	12	8	5	11
DP 432 RR	790	1266	1090	1321	1240	925
ST 4793 RR	743	1197	1049	1291	1180	850
t-Test <sup>†</sup>	NS	***	*	*	NS	NS
% difference	6.2	5.8	3.9	2.3	5.1	8.9
Ν	6	81	44	51	12	10

Table 7. Regional Head to Head Yield comparisons of DP 432 RR vs. DP 436 RR, FM 989 RR and ST 4793R. Data includes both DPL AST data and University OVT data from DPL AIS database as of 12.22.04.

 $\dagger$  Prob >|t| that values for each variety are not different; \*, \*\*, \*\*\* indicate significance at alpha = 0.05, 0.01, 0.001, respectively; NS=not significant

	Cent. TX	N. Delta	N. Southeast	S. Delta	S. Southeast	S. Texas
Yield						
DP 434 RR	771	1175	1158	1306	1181	1148
DP 436 RR	696	1080	1080	11115	1054	1045
t-Test <sup>†</sup>	**	***	***	***	***	**
% difference	10.9	8.8	9.3	17.1	12.1	9.8
N	21	65	32	33	23	17
DP 434 RR	766	1146	935	1212	1019	1192
FM 989 RR	639	900	908	1013	970	1135
t-Test <sup>†</sup>	**	**	NS	***	NS	NS
% difference	19.9	27.4	3.0	19.6	5.1	5.0
Ν	5	11	11	12	8	9
DP 434 RR	823	1210	1086	1347	1068	1009
ST 4793 RR	745	1181	1063	1264	1048	864
t-Test <sup>†</sup>	**	*	NS	***	NS	NS
% difference	10.5	2.5	2.2	6.6	1.9	16.7
Ν	8	85	33	41	14	6

Table 8. Regional Head to Head Yield comparisons of DP 434 RR vs. DP 436 RR, FM 989 RR and ST 4793R. Data includes both DPL AST data and University OVT data from DPL AIS database as of 12.22.04.

<sup>†</sup> Prob >|t| that values for each variety are not different; \*, \*\*, \*\*\* indicate significance at alpha = 0.05, 0.01, 0.001, respectively; NS=not significant

							Uniformit	Loan
	Crop Value	Yield	% Gin	Staple	Micro-	Strength	y Index	Value
Variety	(\$/Acre)	(lb/acre)	Turn Out	(32 <sup>nd</sup> inch)	naire	(g/tex)	(%)	(cents/lb)
DP 432 RR	656	1236	38.0	35.9	4.41	30.8	83.5	53.10
DP 434 RR	664	1230	39.5	37.0	4.13	29.3	83.1	53.99
n	228	262	262	243	243	243	238	228
t-Test <sup>†</sup>	*	NS	***	***	***	***	***	***
% Difference	-1.2	0.5	-3.7	-3.0	6.8	5.1	0.5	-1.6

Table 9. Head to Head Yield and HVI Performance of DP 432 RR compared to DP 434 RR. Data includes both DPL AST data and University OVT data from DPL AIS database as of 12.22.04.

 $\dagger$  Prob >|t| that values for each variety are not different; \*, \*\*, \*\*\* indicate significance at alpha = 0.05, 0.01, 0.001, respectively; NS=not significant

Table 10. Regional Head to Head Yield comparisons of DP 432 RR vs. DP 434 RR. Data includes both DPL AST data and University OVT data from DPL AIS database as of 12.22.04.

data and University OVI data nom DFL Als database as of 12.22.04.									
	Cent. TX	N. Delta	N. Southeast	S. Delta	S. Southeast	S. Texas			
Yield									
DP 432 RR	765	1243	1158	1317	1227	1078			
DP 434 RR	807	1213	1131	1368	1195	1113			
t-Test <sup>†</sup>	NS	*	NS	***	NS	*			
% difference	-5.2	2.5	2.3	-3.7	2.7	-3.2			
n	14	77	39	39	30	30			