

## DELTA AND PINE LAND COMPANY'S NEW CONVENTIONAL MID-FULL COTTON VARIETIES: DELTAPEARL AND DP565

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### Abstract

Delta and Pine Land Company is introducing two mid-full season, conventional cotton varieties that exhibit excellent yield potential across a wide geographic area and produce high-quality fiber. DeltaPEARL was developed at Delta and Pine Land's Australian cotton breeding program under the direction of Richard Leske, and is adapted primarily to the southern tier of the cotton belt, although our data show that it has outstanding performance in the upper southeast (northern SC and NC). DP565 was developed by Delta and Pine Land's Western Research staff under the direction of Larry P. Burdett in Casa Grande and Maricopa, AZ. DP565 has wide adaptability including all of the southeast, the lower mid-south, southwest, and western regions of the cotton belt.

### Introduction

Delta and Pine Land Company has continually developed and successfully marketed transgenic and conventional cotton varieties in a wide maturity range. Because most of our transgenic products are derived from backcrosses from our best conventional germplasm, and because the cotton growers across the belt continue to demand conventional varieties, we remain committed to the development of conventional varieties. In the 2001 season, we will introduce two new conventional, mid-full season picker varieties, DeltaPEARL and DP565. These two new varieties will provide growers with a tool to potentially achieve high yield and excellent fiber quality. Planting varieties of different maturity can potentially minimize the risks associated with weather and other environmental factors beyond the growers' control. DeltaPEARL and DP565 provide effective tools for growers to take advantage of full-season weather.

### Methods

DeltaPEARL was developed from a cross between DP5816 and Sicala 34 made in 1989 at Casa Grande, AZ. F<sub>1</sub> seed were introduced into Australia in 1990/1991, and all subsequent breeding and selections were conducted in Australia by Richard Leske at Delta and Pine Land's research facility. F<sub>2</sub> seed were planted in winter nursery in 1991 and harvested as a bulk. F<sub>3</sub> bulks were planted in 1991/1992 and selected as F<sub>4</sub> single plants. The F<sub>4</sub> plants were grown at winter nursery as individual progeny rows and harvested as bulk selections. F<sub>3</sub> bulk selections were yield and fiber tested, and seed increased at a single location in 1992/1993. F<sub>6</sub> selections were evaluated in multi-location yield and fiber tests from 1993/1994 to 1995/1996. Selection criteria included disease tolerance, yield, plant maturity, and fiber quality. Small-scale seed increases were made in 1994/1995, and larger seed increases were made in 1995/1996. Delta and Pine Land began testing DeltaPEARL domestically in 1997 as DPX8C80. Beltwide field testing of DeltaPEARL has continued by Delta and Pine Land's Research and Technical Services departments. Seed supply for the 2001 growing season is expected to be limited.

DP565 originated from a cross between Deltapine 6100 Acala and Georgia King that was made in 1991 at Casa Grande, AZ, by the staff of Delta and Pine Land's research facility under the direction of Larry P. Burdett. F<sub>1</sub> seed was increased at winter nursery in 1991/1992. In the summer of 1992, the F<sub>2</sub> bulk population from which DP565 was derived was grown at Casa Grande, AZ. Selections were made visually for yield potential. Superior

F<sub>2</sub> populations were bulk-harvested. Fiber traits, lint percent, and seed index were identified and inferior populations discarded. In the summer of 1993, the F<sub>3</sub> bulk population was grown at Casa Grande, AZ, and again, visual selection for yield potential was imposed. Superior plants were maintained to progress to F<sub>4</sub> progeny rows. The selected individual plants' seed were planted in 1994 in replicated trials and selected for yield, homogeneity, and plant structure. Three replicates of desirable F<sub>4</sub> progeny rows were bulk-harvested. From 1995 to present, DP565, first tested as DPX8C09, has been tested by Delta and Pine Land's Research and Technical Services departments across the cotton belt. Seed supply for the 2001 growing season is expected to be adequate.

### Results and Discussion

#### Variety Characteristics

DeltaPEARL is a mid-full maturity variety that has a tall, aggressive plant type with smooth leaves and good seedling vigor. Seed size ranges from 5,400 to 5,800 seed per pound, and storm resistance is fair. DeltaPEARL has an impressive disease resistance package, with good *Fusarium* and *Verticillium* tolerance and resistance to bacterial blight, race 18. Average node of the first fruiting branch for DeltaPEARL is 6.8, and total fruiting branches average 15.5. DeltaPEARL has an excellent fiber quality package, with high turnout, long staple, good strength, micronaire, leaf grade, and uniformity values (Table 1).

DP565 is a full-maturity variety that is tall-growing, has smooth leaves, good seedling vigor, and good storm resistance. Seed size ranges from 5,000 to 5,500 seed per pound. DP565 has good *Verticillium* tolerance, begins fruiting on average on node 6, and averages 16.0 fruiting branches. Turnout averages 35.89%, and averages for staple length are excellent. DP565 has good strength, micronaire, leaf grade, and uniformity values (Table 1).

#### DeltaPEARL Performance

DeltaPEARL has outperformed all other major conventional mid-full varieties beltwide in terms of lint yield (Table 2). Additionally, because DeltaPEARL exhibits excellent fiber properties, crop values are superior to other conventional mid-full competitor varieties across the belt (Table 2). Beltwide averages for staple length are superior to most of the competitor varieties; strength values for DeltaPEARL are slightly lower than the comparison varieties, although micronaire for DeltaPEARL tends to be equal to or less than those of the comparison varieties across the belt (Table 2).

Data from the southern tier of the cotton belt, which includes south AL, south AR, FL, GA, LA, south MS, and south SC, indicate that DeltaPEARL is well-adapted, based on yield and fiber quality performance. DeltaPEARL yield, staple length, and crop value were superior to all the comparison varieties in this region (Table 3).

Data from the upper southeast region of the cotton belt (i.e., north SC and NC) suggest that, despite its mid-full maturity, DeltaPEARL has produced higher yields, longer staple, and higher crop values than other major conventional mid-full varieties in that region (Table 4).

#### DP565 Performance

Beltwide data for DP565 suggest a wide adaptability for the variety. When compared to other major conventional mid-full maturity varieties across the belt, DP565 exhibits excellent yield and fiber quality performance. DP565 outyielded all the comparison varieties except for DeltaPEARL, and because of the excellent fiber properties of DP565, crop values were superior to all other varieties with the exception of DeltaPEARL (Table 5).

DP565, similar to DeltaPEARL, is well-adapted to the southern tier of the cotton belt, based on its yield and fiber quality performance. The only comparison variety that outperformed DP565 was DeltaPEARL.

In the upper southeast, DP565 exhibited excellent performance compared to other major conventional mid-full varieties. Although the overall performance of DP565 in this region was similar to that of DeltaPEARL, DeltaPEARL tends to slightly outyield and have slightly higher crop values than DP565 (Table 7).

Although DeltaPEARL outperformed DP565 in the southern tier and in the upper southeast regions, DP565 is better adapted to the southwestern (i.e., NM, OK, TX) and western regions (i.e., AZ, CA), based on data in Tables 8 and 9. Additionally, in both regions DP565 outperformed all other comparison varieties in terms of lint yield and crop value.

### Summary

Delta and Pine Land Company will be introducing two new conventional, mid-full maturity cotton varieties to the belt in the 2001 growing season. DeltaPEARL was developed at our research facility in Australia, and originates from diverse germplasm. DeltaPEARL has exhibited excellent yield and fiber quality performance across the southern tier of the cotton belt, as well as the upper southeast region. Additionally, DeltaPEARL has an impressive disease tolerance package that includes tolerance to *Fusarium* and *Verticillium*, and resistance to bacterial blight, race 18. DeltaPEARL has fair storm resistance. DP565 was developed at our research facility in AZ, and also originates from diverse background including germplasm developed in the southeastern U.S., as well as an Acala background, giving this variety superior fiber quality. DP565 has performed well across a wide geographic area, including the southern tier of the cotton belt, as well as the upper southeast, southwest and western regions. Both varieties will provide growers with effective tools to take advantage of full-season environments, as well as means of minimizing potential risks associated with weather and other environmental conditions by planting these varieties in combination with earlier-maturing varieties. Supplies of DeltaPEARL will be limited for 2001; DP565 supplies will be adequate for the 2001 growing season.

Table 1. Characteristics of DeltaPEARL and DP565.

Characteristic	DeltaPEARL	DP565
Maturity	Mid-Full	Full
Plant Height	Tall	Tall
Leaf Hair	Smooth	Smooth
Seedling Vigor	Good	Good
Seed Size (#/lb)	5,400 - 5,800	5,000 - 5,500
Storm Resistance	Fair	Good
<i>Fusarium</i> tolerance	Good	n/a
<i>Verticillium</i> tolerance	Good	Good
Bacterial Blight	Resistant - race 18	n/a
Node of 1 <sup>st</sup> Fruiting Branch	6.8	6.0
Total Fruiting Branches	15.5	16.0
% Turnout <sup>†</sup>	37.6 (176)	35.9 (142)
Staple (1/32 in) <sup>†</sup>	35.9 (160)	35.8 (123)
Strength (g/tex) <sup>†</sup>	28.3 (160)	28.6 (123)
Micronaire <sup>†</sup>	4.50 (160)	4.54 (123)
Leaf Grade <sup>†</sup>	2.2 (160)	1.5 (123)
Uniformity (%) <sup>†</sup>	81.2 (160)	82.3 (123)

<sup>†</sup> Beltwide averages over years; values in parentheses indicates the number of observations for each parameter for each variety.

Table 2. Head-to-head lint yield, fiber quality, and crop value comparisons of DeltaPEARL vs. comparison varieties across the cotton belt. (as of December, 2000)

Varieties Compared	lbs. Lint/Acre	% Wins	Staple (1/32 in)	Strength (g/tex)	Micro-naire	Value (\$/acre) <sup>†</sup>
DeltaPEARL	1049	78	36.2	28.2	4.6	611
DP90	958	22	35.0	29.6	4.5	532
no. of tests	18					
year(s)	98-00					
DeltaPEARL	1068	81	36.2	28.9	4.4	660
DP5415	1019	19	35.2	28.9	4.5	601
no. of tests	26					
year(s)	98-00					
DeltaPEARL	1045	67	35.8	28.2	4.8	622
DP5690	966	33	34.4	29.3	4.8	544
no. of tests	12					
year(s)	98-00					
DeltaPEARL	1025	79	36.0	28.3	4.4	643
DP675	945	21	35.3	30.5	4.4	580
no. of tests	56					
year(s)	98-00					
DeltaPEARL	800	100	35.7	27.4	4.6	513
FM819	539	0	35.7	28.3	4.4	348
no. of tests	3					
year(s)	99-00					
DeltaPEARL	911	85	35.3	27.0	4.5	581
FM832	778	15	36.6	30.5	4.0	497
no. of tests	13					
year(s)	98-00					
DeltaPEARL	939	74	36.0	28.2	4.3	587
FM989	823	26	35.6	30.1	4.0	518
no. of tests	31					
year(s)	98-00					
DeltaPEARL	1009	63	36.0	28.3	4.5	627
ST474	993	37	34.5	27.7	4.7	590
no. of tests	65					
year(s)	98-00					

<sup>†</sup> Value per acre is based on \$0.65/lb +/- premiums and discounts according to 2000 USDA loan chart.

Table 3. Head-to-head lint yield, fiber quality, and crop value comparisons of DeltaPEARL vs. comparison varieties across the southern tier of the cotton belt (S AL, S AR, FL, GA, LA, S MS, S SC). (as of December, 2000)

Varieties Compared	lbs. Lint/Acre	% Wins	Staple (1/32 in)	Strength (g/tex)	Micro-naire	Value (\$/acre) <sup>†</sup>
DeltaPEARL	925	62	36.0	27.6	4.8	556
DP90	839	38	34.5	28.6	4.8	499
no. of tests	8					
year(s)	99-00					
DeltaPEARL	953	83	35.7	27.9	4.7	643
DP5415	845	17	34.7	28.0	4.9	560
no. of tests	12					
year(s)	99-00					
DeltaPEARL	928	70	35.8	28.0	4.8	559
DP5690	823	30	34.0	29.2	4.9	473
no. of tests	10					
year(s)	99-00					
DeltaPEARL	1007	82	35.8	27.7	4.6	645
DP675	913	18	35.0	30.1	4.7	576
no. of tests	33					
year(s)	98-00					
DeltaPEARL	983	59	36.4	28.0	4.6	611
FM989	857	41	36.1	30.3	4.3	536
no. of tests	17					
year(s)	99-00					
DeltaPEARL	1017	64	36.0	28.0	4.7	632
ST474	1015	36	34.7	27.5	4.9	601
no. of tests	33					
year(s)	98-00					

<sup>†</sup> Value per acre is based on \$0.65/lb +/- premiums and discounts according to 2000 USDA loan chart.

Table 4. Head-to-head lint yield, fiber quality, and crop value comparisons of DeltaPEARL vs. comparison varieties across the upper southeast region of the cotton belt (N SC, NC). (as of December, 2000)

Varieties Compared	lbs. Lint/Acre	% Wins	Staple (1/32 in)	Strength (g/tex)	Micro-naire	Value (\$/acre) <sup>†</sup>
DeltaPEARL	912	100	36.8	29.5	4.1	574
DP90	766	0	35.8	30.6	3.8	475
no. of tests	4					
year(s)	99-00					
DeltaPEARL	901	100	36.6	30.6	3.9	575
DP5415	812	0	35.6	30.3	3.7	492
no. of tests	6					
year(s)	99-00					
DeltaPEARL	1020	89	36.5	30.3	4.0	625
DP675	901	11	35.9	31.4	3.6	539
no. of tests	9					
year(s)	98-00					
DeltaPEARL	954	88	36.4	29.7	4.1	582
FM989	826	12	35.8	30.9	3.8	502
no. of tests	8					
year(s)	99-00					
DeltaPEARL	1006	71	36.1	29.7	4.3	609
ST474	964	29	34.3	28.5	4.4	549
no. of tests	14					
year(s)	98-00					

<sup>†</sup> Value per acre is based on \$0.65/lb +/- premiums and discounts according to 2000 USDA loan chart.

Table 5. Head-to-head lint yield, fiber quality, and crop value comparisons of DP565 vs. comparison varieties across the cotton belt. (as of December, 2000)

Varieties Compared	lbs. Lint/Acre	% Wins	Staple (1/32 in)	Strength (g/tex)	Micro-naire	Value (\$/acre) <sup>†</sup>
DP565	1062	77	35.9	29.1	4.7	600
DP90	949	23	35.2	29.8	4.5	544
no. of tests	13					
year(s)	99-00					
DP565	1104	77	36.3	29.2	4.7	661
DP5415	1035	23	35.7	29.1	4.6	627
no. of tests	13					
year(s)	99-00					
DP565	1053	72	35.9	28.4	4.5	655
DP675	993	28	35.4	30.4	4.4	621
no. of tests	39					
year(s)	99-00					
DP565	1010	39	35.7	28.3	4.5	616
DeltaPEARL	1023	61	36.2	28.1	4.4	630
no. of tests	31					
year(s)	99-00					
DP565	867	67	34.3	25.5	4.2	462
FM832	796	33	36.2	29.1	3.8	441
no. of tests	3					
year(s)	00					
DP565	890	65	35.6	28.0	4.3	549
FM989	827	35	35.8	29.5	3.9	515
no. of tests	17					
year(s)	99-00					
DP565	1045	50	35.9	28.5	4.5	652
ST474	1027	50	34.7	27.6	4.7	625
no. of tests	40					
year(s)	99-00					

<sup>†</sup> Value per acre is based on \$0.65/lb +/- premiums and discounts according to 2000 USDA loan chart.

Table 6. Head-to-head lint yield, fiber quality, and crop value comparisons of DP565 vs. comparison varieties across the southern tier of the cotton belt (S AL, S AR, FL, GA, LA, S MS, S SC). (as of December, 2000)

Varieties Compared	lbs. Lint/Acre	% Wins	Staple (1/32 in)	Strength (g/tex)	Micro-naire	Value (\$/acre) <sup>†</sup>
DP565	972	57	35.6	28.0	5.0	587
DP90	871	43	34.5	28.2	4.8	533
no. of tests	7					
year(s)	99-00					
DP565	785	80	35.4	27.8	5.1	526
DP5415	749	20	34.9	27.6	4.9	515
no. of tests	5					
year(s)	99-00					
DP565	999	72	35.6	28.1	4.7	617
DP675	950	28	35.2	30.0	4.7	590
no. of tests	18					
year(s)	99-00					
DP565	1005	38	35.6	28.0	4.7	616
DeltaPEARL	1021	62	36.1	27.7	4.6	629
no. of tests	16					
year(s)	99-00					
DP565	932	67	35.7	27.9	4.7	586
FM989	832	33	36.0	29.7	4.2	543
no. of tests	9					
year(s)	00					
DP565	999	44	35.6	28.1	4.7	617
ST474	986	56	34.6	27.4	4.9	600
no. of tests	18					
year(s)	99-00					

<sup>†</sup> Value per acre is based on \$0.65/lb +/- premiums and discounts according to 2000 USDA loan chart.

Table 7. Head-to-head lint yield, fiber quality, and crop value comparisons of DP565 vs. comparison varieties across the upper southeast region of the cotton belt (N SC, NC). (as of December, 2000)

Varieties Compared	lbs. Lint/Acre	% Wins	Staple (1/32 in)	Strength (g/tex)	Micro-naire	Value (\$/acre) <sup>†</sup>
DP565	861	100	36.4	29.5	3.9	526
DP90	766	0	35.8	30.6	3.8	475
no. of tests	4					
year(s)	99-00					
DP565	861	50	36.4	29.5	3.9	526
DP5415	845	50	35.8	29.7	3.8	515
no. of tests	4					
year(s)	99-00					
DP565	991	50	35.9	28.9	3.9	590
DP675	971	50	35.3	29.5	3.7	566
no. of tests	6					
year(s)	99-00					
DP565	884	17	36.1	29.2	3.8	550
DeltaPEARL	1015	83	36.7	29.1	4.0	630
no. of tests	6					
year(s)	99-00					
DP565	855	60	36.2	29.1	3.6	534
FM989	855	40	36.1	30.0	3.5	516
no. of tests	5					
year(s)	99-00					
DP565	962	43	35.9	28.9	3.9	586
ST474	984	57	34.0	27.7	4.3	568
no. of tests	7					
year(s)	99-00					

<sup>†</sup> Value per acre is based on \$0.65/lb +/- premiums and discounts according to 2000 USDA loan chart.

Table 8. Head-to-head lint yield, fiber quality, and crop value comparisons of DP565 vs. comparison varieties across the southwest region of the cotton belt (NM, OK, TS). (as of December, 2000)

Varieties Compared	lbs. Lint/Acre	% Wins	Staple (1/32 in)	Strength (g/tex)	Micro-naire	Value (\$/acre) <sup>†</sup>
DP565	879	75	35.0	27.1	4.3	530
DP675	823	25	34.9	30.1	4.1	502
no. of tests	8					
year(s)	99-00					
DP565	918	50	34.0	25.3	4.1	488
FM832	844	50	35.8	28.1	3.6	462
no. of tests	2					
year(s)	00					
DP565	858	67	34.3	26.2	3.9	463
FM989	767	33	34.6	28.1	3.8	431
no. of tests	3					
year(s)	00					
DP565	888	50	35.0	26.9	4.2	522
DeltaPEARL	865	50	35.4	26.6	4.2	515
no. of tests	6					
year(s)	99-00					
DP565	879	50	35.0	27.1	4.3	530
ST474	859	50	34.3	26.4	4.4	512
no. of tests	8					
year(s)	99-00					
DP565	904	67	35.7	27.6	4.5	581
SG821	890	33	34.9	28.0	4.5	575
no. of tests	3					
year(s)	99					

<sup>†</sup> Value per acre is based on \$0.65/lb +/- premiums and discounts according to 2000 USDA loan chart.

Table 9. Head-to-head lint yield, fiber quality, and crop value comparisons of DP565 vs. comparison varieties across the western region of the cotton belt (AZ, CA). (as of December, 2000)

<b>Varieties Compared</b>	<b>lbs. Lint/Acre</b>	<b>% Wins</b>	<b>Staple (1/32 in)</b>	<b>Strength (g/tex)</b>	<b>Micro-naire</b>	<b>Value (\$/acre)<sup>†</sup></b>
DP565	1906	100	37.9	30.4	4.9	1184
DP5415	1722	0	36.9	30.2	4.9	1076
no. of tests	3					
year(s)	99-00					
DP565	1573	83	38.1	30.2	4.8	1057
DP675	1440	17	37.4	32.8	4.7	987
no. of tests	6					
year(s)	99-00					
DP565	1991	100	37.8	31.2	5.0	1252
DeltaPEARL	1751	0	37.7	30.9	4.5	1131
no. of tests	2					
year(s)	99-00					
DP565	1348	67	37.9	29.4	4.7	943
SG747	1302	33	35.5	26.9	4.9	891
no. of tests	3					
year(s)	00					
DP565	1606	100	37.2	30.8	5.3	1050
SG821	1445	0	36.4	30.5	5.3	942
no. of tests	2					
year(s)	99-00					
DP565	1573	67	38.1	30.2	4.8	1057
ST474	1501	33	36.5	28.9	5.0	983
no. of tests	6					
year(s)	99-00					

<sup>†</sup> Value per acre is based on \$0.65/lb +/- premiums and discounts according to 2000 USDA loan chart.