UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
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AND

CLEMSON UNIVERSITY EXPERIMENT STATION
CLEMSON, SOUTH CAROLINA

AND

COTTON INCORPORATED
CARY, NORTH CAROLINA

NOTICE OF RELEASE OF TWO UPLAND COTTON GERMPLASM LINES POSSESSING SUPERIOR FIBER QUALITY

The Agricultural Research Service, United States Department of Agriculture and the Clemson University Experiment Station announce the release of two Upland cotton germplasm lines, PD 98066 and PD 99035, that possess superior fiber quality and acceptable yield performance under a range of growing environments. The lines provide public and private breeders with resources for concurrent improvement of fiber quality and yield performance in Upland cottons targeted for the southeastern United States. The lines also serve as genetic resources for improving fiber quality in environments across the Upland cotton belt of the United States.

PD 98066 was derived from a cross made by O.L. May between PD 5363 and the experimental germplasm line GA 88-186. PD 5363 was derived from a cross between 'Delcot 311' and the experimental germplasm line PD 6311. PD 5363 combined high fiber quality with improved yield potential. GA 88-186 is an experimental germplasm line developed by the University of Georgia. Approximately fifteen F1 plants of PD 5363/GA 88-186 were self-pollinated at the ARS winter nursery in Mexico and the F2 seed bulked. Based on its yield performance, the F2 bulk was advanced to the F3 for single plant selection. The F3 plants were selected for plant type, fiber properties, and lint percent, and advanced to F4 progeny rows. PD 98066 was derived from a single F3:4 progeny row visually selected for yield potential.

PD 99035 was derived from a cross made by O.L. May between PD 93043 and 'Deltapine 5409'. PD 93043 was derived from a cross between the experimental germplasm line PD 5265 and PD 5576. PD 93043 combined high yield potential and acceptable fiber quality. Deltapine 5409 is a cultivar developed by Delta and Pineland Company (Scott, MS) and derived from a cross between 'Deltapine 50' and 'Deltapine Acala 90'. Approximately fifteen F1 plants of PD 93043/Deltapine 5409 were self-pollinated at the ARS winter nursery in Mexico and the F2 seed bulked. Based on its yield performance, the F2 bulk was advanced to the F3 for single plant selection.The F3 plants were selected for plant type, fiber properties, and lint percent, and advanced to F4 progeny rows. PD 99035 was derived from a single F3:4 progeny row visually selected for yield potential.

PD 98066 displays a mid- to full-season maturity, while combining superior fiber quality potential and acceptable yield potential. Averaged over four on-station trials conducted in 2005 and 2006, PD 98066 produced fiber length values 4% higher than widely grown commercial cultivars 'Deltapine 555BR' and 'FiberMax 960BR', while producing 3% higher fiber length values than 'Deltapine 444BR'. PD 98066 also produced 3% higher fiber strength values than Deltapine 444BR and fiber strength values equivalent to Deltapine 555BR and 'Stoneville 5599BR'. PD 98066 produced lint yields equivalent to Deltapine 555BR and 8% higher than Deltapine 444BR. PD 98066 produced an average lint percent of 40% as compared to 41% for Deltapine 555BR, 42% for Stoneville 5599BR, 41% for Deltapine 444BR, and 40% for FiberMax 960BR.

PD 99035 displays a mid- to full-season maturity, while combining excellent fiber quality potential and acceptable yield potential. Averaged over four on-station trials conducted over 2005 and 2006, PD 99035 produced fiber length values 6% higher than widely grown commercial cultivars Deltapine 555BR, Deltapine 444BR and FM960BR, while producing 5% higher fiber length values than Stoneville 5599BR. PD 99035 also produced fiber strength values 9% higher than Deltapine 555BR and Deltapine 444BR, while producing 5% higher fiber strength values than Stoneville 5599BR. PD 99035 produced fiber strength values equivalent to FiberMax 960BR. PD 99035 produced lint yields equivalent to Deltapine 444BR and FiberMax 960BR, but produced 15% lower yields compared to Deltapine 555BR and Stoneville 5599BR. PD 99035 produced an average lint percent of 40% as compared to 43% for Deltapine 555BR, 42% for Stoneville 5599BR, 41% for Deltapine 444BR, and 40% for FiberMax 960BR.

PD 98066 and PD 99035 were both tested in nine locations across the Upland cotton growing area as part of the 2006 Regional Breeders Testing Network (RBTN). Table 1 provides a summary of data for PD 98066 and PD 99035 combined over all nine locations. PD 98066 and PD 99035 produced fiber length values significantly greater than the commercial check cultivars 'Deltapine 393', 'FiberMax 958', and 'SureGrow 105'. PD 98066 and PD 99035 both produced greater fiber strength values than SureGrow 105, but also were lower than the high fiber strength check FiberMax 958. PD 98066 produced fiber strength values greater than Deltapine 393. PD 98066 produced lower micronaire values than all commercial checks, whereas PD 99035 produced micronaire equivalent to FiberMax 958 and lower than Deltapine 393 and SureGrow 105. Uniformity index and short fiber content values for PD 98066 and PD 99035 did not differ from any of the commercial checks. PD 98066 and PD 99035 produced lower fiber elongation than each of the commercial checks. Lint yields for PD 98066 and PD 99035 were equivalent to FiberMax 958, but lower than Deltapine 393 and SureGrow 105. Lint percents for PD 98066 and PD 99035 were both similar to SureGrow 105, but lower than Deltapine 393 and FiberMax 958.

Table 2 provides a summary of data collected from the 2006 RBTN for the southeastern US environments only. PD 98066 and PD 99035 produced significantly higher fiber length values than Deltapine 393, FiberMax 958, and SureGrow 105, while producing fiber strength values higher than Deltapine 393 and SureGrow 105. PD 99035 produced the lowest short fiber content, while PD 98066 produced a short fiber content lower than SureGrow 105 and equivalent to Deltapine 393 and FiberMax 958. PD 98066 and PD 99035 did not differ from the commercial checks for uniformity index or lint yield, but both produced lower fiber elongation values. PD

98066 and PD 99035 produced lower micronaire values than each of the commercial checks. PD 98066 and PD 99035 produced lint percents equivalent to SureGrow 105, but lower than Deltapine 393 and FiberMax 958.

PD 98066 and PD 99035 were also tested in the 2006 South Carolina Official Variety Trials. Table 3 provides a summary of data combined over all locations of the variety trials. PD 98066 and PD 99035 produced significantly higher fiber length values, higher uniformity index, and lower micronaire than Deltapine 555BR, Stoneville 5599BR, and FiberMax 960BR. PD 98066 and PD 99035 also produced significantly higher fiber strength values than Deltapine 555BR and Stoneville 5599BR, while producing lower fiber strength values than the high fiber strength check FiberMax 960BR. PD 98066 and PD 99035 both produced lower lint yield and lint percent values than Deltapine 555BR, Stoneville 5599BR, and FiberMax 960BR.

These two germplasm lines provide an excellent source of superior fiber quality with broad adaptation across the Upland cotton belt in the United States. Small quantities of seed (20 g) are available to cotton breeders, geneticists, and other research personnel upon written request to: B.T. Campbell, USDA-ARS, Coastal Plains Soil, Water, and Plant Research Center, 2611 West Lucas Street, Florence, SC 29501. It is requested that appropriate recognition of the source be given when these germplasm lines contribute to the development of a new breeding line, hybrid, or cultivar. Genetic material of this release will be deposited in the National Plant Germplasm System where it will be available for research purposes, including development and commercialization of new cultivars.

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Table 1. Lint yield, lint percent, and fiber quality (HVI) performance of lines PD 98066, PD 99035, and check cultivars, averaged across replicated tests conducted at Auburn, AL, Florence, SC, Rocky Mount, NC, Tifton, GA, Alexandria, LA, Stoneville, MS, Maricopa, AZ, Lubbock, TX, and Keiser, AR in 2006.*

Entries	Lint Yield kg ha^{-1}	Lint Percent %	Micronaire † units	Length † mm	Strength † kN m kg^{-1}	Uniformity Index † %	Elongation † %	Short Fiber Content † %
PD 98066	1065	37.4	4.8	29.00	318	83.3	5.3	7.4
PD 99035	1079	37.0	4.9	28.92	316	83.6	5.3	7.3
Deltapine 393	1174	40.0	5.1	28.19	311	83.8	6.4	7.3
FiberMax 958	1051	38.6	5.0	28.45	336	83.7	4.0	7.5
SureGrow 105	1167	37.9	5.1	28.24	304	83.7	5.7	7.5
LSD 0.05	77	0.5	0.1	0.38	6	0.5	0.2	0.3

* Data has been extracted from a larger, 24 entry test called the Regional Breeder's Testing Network. LSD values are from the 24 entry, replicated test.

† Data does not include Keiser, AR trial.

Table 2. Lint yield, lint percent, and fiber quality (HVI) performance of lines PD 98066, PD 99035, and check cultivars, averaged across replicated tests conducted in the southeastern USA at Auburn, AL, Florence, SC, Rocky Mount, NC, and Tifton, GA in 2006.*

Entries	Lint Yield kg ha^{-1}	Lint Percent %	Micronaire units	Length mm	Strength kN m kg^{-1}	Uniformity Index %	Elongation %	Short Fiber Content %
PD 98066	954	38.6	4.9	28.79	324	83.2	4.8	8.0
PD 99035	950	38.4	5.1	28.61	317	83.3	4.9	7.8
Deltapine 393	1007	42.2	5.4	27.69	315	83.7	6.2	7.9
FiberMax 958	942	40.3	5.4	27.94	344	83.4	3.4	8.3
SureGrow 105	885	38.5	5.3	28.07	309	84.0	5.2	8.4
LSD 0.05	86	0.5	0.1	0.37	6	0.6	0.2	0.4

* Data has been extracted from a larger, 24 entry test called the Regional Breeder's Testing Network. LSD values are from the 24 entry, replicated test.

Table 3. Lint yield, lint percent, and fiber quality (HVI) performance of lines PD 98066, PD 99035, and commercial cultivars, averaged across replicated tests conducted in the 2006 South Carolina Official Variety Trials.*

Entries	Lint Yield kg ha^{-1}	Lint Percent %	Micronaire units	Length mm	Strength kN m kg^{-1}	Uniformity Index %
PD 98066	1081	38.6	4.3	29.46	317	83.1
PD 99035	963	37.7	4.3	29.67	321	83.2
Deltapine 555BR	1320	42.8	4.5	28.50	288	82.2
Stoneville 5599BR	1211	39.5	4.8	28.65	301	82.5
FiberMax 960BR	1137	39.6	4.5	28.70	325	82.8
LSD 0.05	50	0.4	0.1	0.15	3	0.2

* Data has been extracted from the larger, 29 entry trials. LSD values are from the 29 entry, replicated test.