

**NOTICE TO PLANT BREEDERS AND
GENETICISTS OF THE RELEASE OF 58
RECOMBINANT INBRED COTTON
GENETIC LINES**

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Abstract

The Agricultural Research Service, United States Department of Agriculture announces the release of 58 F9 inbred genetic lines of Upland cotton. These lines should be valuable sources of genes to enhance traits economically important to the cottonseed and textile industries. The 58 cotton genetic lines were developed at the ARS Coastal Plains Soil, Water, and Plant Research Center, Florence, South Carolina.

The inbred genetic lines originated as 58 randomly selected F2 plants from the cross of PD-3-14/Simian 2'. The germplasm line PD-3-14 was released by ARS in 1993, while Simian 2 was developed by the Cotton Research Institute, Chinese Academy of Agricultural Sciences, Anyang, Henan Province, Peoples Republic of China. PD-3-14 is a selection from the cultivar PD-3. The pedigree of Simian 2 is not available. The 58 F9 genetic lines have been maintained under forced self-pollination to minimize within line genetic variance, while maximizing among line genetic variance. The 58 lines were derived from 58 F2 plants, resulting in a genetic structure that is amenable for gene tagging by molecular marker analysis and by functional genomic analysis of the population phenotypic extremes.

The F8 and F9 generations of the 58 inbred genetic lines have been evaluated for an array of agronomic and fiber traits. Compared with the parents, PD-3-14 and Simian 2, wide variation exists among the 58 lines for lint yield, lint fraction, boll size, seed index, weight of lint per seed, and the fiber properties strength, length distributions, fineness, short fiber content by weight and number, immature fiber content, and maturity ratio (Tables 1-4). The magnitude of segregation among the 58 lines is such that genes encoding for a trait can be bracketed with molecular markers for purposes of marker assisted breeding. Similarly, functional genomic analysis can be applied to the population phenotypic extremes for purposes of gene discovery.

A limited quantity of seed of the 58 lines is available for distribution to bona fide cotton breeders and geneticists upon written request to O.L. May, USDA-ARS, Pee Dee Research and Education Center, 2200 Pocket Road, Florence, SC 29506-9706 (After Feb. 1 2000, address seed requests to:

University of Georgia, Coastal Plain Expt. Station, P.O. Box 748, Tifton, GA 31793). International requests for seed must be accompanied by the appropriate permits that allow the seed to enter into the requestor's country through customs. Without the necessary permits, the seed request cannot be filled. Genetic material of this release will be deposited in the U.S. National Plant Germplasm System where it will be available for research purposes, including development and commercialization of new cultivars. When this germplasm contributes to the development of a new cultivar, hybrid, or germplasm it is requested that appropriate recognition be given to its source.

Table 1. Yield means ranked highest to lowest and yield component means for 58 recombinant inbred lines and two parents, PD-3-14 and 'Simian 2' evaluated in 1998 and 1999 at Florence, SC (3-replicate RCBD both years).

RIL [†]	Lint %	Lint Yield kg/ha	Linte -mg-	Seed/ Boll --#--	Seed Size -mg-	Lint/ Seed- mg-	Boll Size -g-
51	38.2	835	18.3	29.1	90.5	68.3	5.2
52	39.8	822	12.0	26.1	97.1	73.2	4.8
8	40.1	818	14.0	28.7	90.9	71.4	5.1
9	39.4	800	17.6	26.8	99.3	76.7	5.2
10	39.6	797	15.4	29.2	82.9	64.9	4.8
48	40.9	794	13.0	28.1	86.6	69.5	4.8
49	40.3	790	15.7	29.9	89.0	71.6	5.3
5	40.9	785	16.0	28.8	82.4	68.9	4.8
33	36.7	785	18.1	26.7	92.9	65.1	4.7
3	39.4	741	13.0	27.7	85.0	64.4	4.5
45	40.6	732	13.9	28.2	89.2	71.6	4.9
29	38.3	723	12.7	28.4	88.7	63.7	4.7
46	41.6	719	12.9	28.2	91.3	75.6	5.1
32	35.3	717	16.0	29.8	94.3	60.6	5.1
58	40.6	713	12.2	29.4	76.3	61.3	4.4
43	39.0	693	13.7	29.9	91.8	67.8	5.2
17	39.0	686	16.2	33.1	91.4	69.3	5.9
40	36.2	685	19.7	32.0	90.6	63.7	5.6
Sim2	41.1	675	14.4	30.8	75.5	64.3	4.8
6	37.5	675	14.5	29.5	88.8	62.4	4.9
47	40.3	665	10.0	30.7	79.0	60.5	4.6
31	39.3	660	13.2	27.1	88.2	66.0	4.5
15	41.5	658	13.4	30.0	92.1	75.5	5.5
39	41.8	657	11.6	27.2	86.9	71.2	4.6
16	40.0	656	9.5	30.0	77.9	59.1	4.4
44	37.9	656	13.1	27.4	90.4	59.1	4.4
53	38.8	654	10.4	29.4	74.6	54.4	4.1
1	40.7	651	13.9	27.8	94.9	74.5	5.1
54	39.0	647	9.8	26.0	87.1	62.8	4.2
22	42.5	646	13.5	28.7	78.7	69.1	4.7
11	42.2	643	13.4	27.8	82.3	70.8	4.7
12	37.1	642	13.7	30.3	78.9	55.1	4.5
27	39.4	633	16.7	30.2	86.2	68.2	5.2
13	38.6	626	16.9	29.8	88.3	66.3	5.1
30	39.1	622	16.6	27.7	91.0	69.8	4.9
23	36.4	617	14.6	29.9	74.8	51.9	4.3
55	36.6	617	16.5	31.1	77.1	54.9	4.7
19	40.1	610	13.0	27.4	79.8	63.3	4.3
14	43.8	609	17.0	28.2	86.2	81.7	5.3
4	36.5	603	16.1	30.2	89.6	58.6	4.9
PD-3	36.2	602	15.1	28.6	95.4	62.9	4.9
2	40.0	595	12.5	30.1	79.9	62.0	4.7
34	38.5	576	12.1	28.1	85.2	61.7	4.5
21	37.5	574	15.7	31.9	93.3	65.9	5.6
41	37.6	573	15.3	31.3	81.9	59.4	4.9
20	37.1	571	14.1	27.1	78.6	56.4	4.1
50	39.8	567	13.6	30.3	69.8	55.7	4.2
36	37.7	560	15.7	29.1	89.6	64.5	4.9
18	37.6	557	16.6	29.0	81.3	59.4	4.6
28	35.0	552	12.7	28.9	85.0	53.3	4.4
26	41.0	552	9.9	27.4	80.3	63.6	4.2
42	41.1	551	16.4	26.5	96.7	80.2	5.2
38	37.0	544	13.1	25.9	95.1	64.6	4.5
24	36.6	529	10.8	29.0	81.6	54.2	4.3
7	40.2	523	9.1	27.4	78.0	58.9	4.0
57	39.7	517	12.0	28.7	90.0	68.6	4.9
35	40.6	510	14.5	30.2	82.9	67.7	5.0
25	36.6	508	13.3	27.3	78.3	53.3	3.9
56	40.2	485	11.5	25.0	91.5	70.8	4.4
37	38.8	472	14.2	28.6	88.9	66.3	4.9

[†]RIL=line number (1-58); Sim2=Simian 2 parent; PD-3=PD-3-14 parent.

Table 2. Fiber properties measured with single-instruments for 58 recombinant inbred lines and two parents evaluated in 1998 and 1999 at Florence, SC.

RIL	MIC	2.5%SL	T1	UR
51	4.0	29.6	221	0.50
52	4.4	29.3	236	0.50
8	4.2	28.2	187	0.49
9	4.0	29.3	194	0.49
10	4.2	28.2	220	0.51
48	4.2	28.4	194	0.49
49	4.2	29.1	229	0.50
5	4.5	27.8	199	0.50
33	4.6	28.7	211	0.49
3	4.0	27.8	185	0.51
45	3.9	28.5	209	0.50
29	4.2	27.8	216	0.51
46	4.1	28.6	215	0.49
32	3.9	30.1	187	0.48
58	4.3	27.0	173	0.50
43	4.0	28.5	204	0.50
17	4.4	28.6	202	0.50
40	4.3	27.7	197	0.50
Simian 2	4.4	28.1	202	0.49
6	3.8	29.5	204	0.49
47	4.3	28.4	213	0.52
31	3.9	28.6	221	0.52
15	4.4	27.9	207	0.51
39	4.0	28.0	212	0.49
16	4.4	27.6	201	0.52
44	3.9	27.5	223	0.51
53	3.9	29.1	190	0.47
1	4.2	28.0	226	0.52
54	3.9	28.3	232	0.51
22	3.7	27.5	189	0.50
11	4.1	27.9	185	0.50
12	4.0	28.0	178	0.49
27	4.4	28.7	197	0.49
13	4.3	26.0	204	0.52
30	4.0	26.1	182	0.52
23	4.0	27.0	200	0.51
55	4.5	26.7	191	0.50
19	4.4	28.3	204	0.51
14	4.9	27.1	202	0.52
4	4.0	28.6	221	0.51
PD-3-14	3.8	29.9	244	0.50
2	3.8	27.6	212	0.50
34	3.9	28.6	220	0.51
21	3.9	28.5	211	0.50
41	4.0	28.1	192	0.49
20	3.3	28.8	188	0.48
50	4.1	27.7	188	0.49
36	4.3	26.9	206	0.52
18	4.0	26.5	198	0.51
28	4.1	27.7	251	0.52
26	3.7	27.7	212	0.52
42	4.6	26.8	224	0.52
38	3.7	29.8	217	0.49
24	3.7	27.8	203	0.50
7	3.5	29.3	226	0.50
57	4.6	27.5	202	0.51
35	4.2	27.4	176	0.50
25	4.0	27.8	213	0.51
56	3.9	27.7	229	0.51
37	3.8	27.8	232	0.51

Table 3. Fiber properties by AFIS for 58 recombinant inbred lines and two parents evaluated in 1998 and 1999 at Florence, SC.

RIL	SFWT [†]	SFN	FINE	IFC	MRAT
51	7.3	25.1	157	7.4	0.89
52	5.7	20.8	170	5.6	0.94
8	9.0	28.5	168	5.5	0.93
9	10.1	31.7	166	5.9	0.92
10	6.6	21.0	168	5.9	0.94
48	9.0	27.9	173	5.4	0.93
49	6.9	23.4	164	6.5	0.92
5	9.3	28.6	170	5.3	0.93
33	4.4	19.1	186	4.7	0.97
3	8.2	25.1	163	7.3	0.89
45	8.7	27.3	159	6.6	0.91
29	7.1	23.7	173	5.2	0.94
46	7.7	25.8	163	7.3	0.89
32	10.0	30.1	166	5.7	0.93
58	8.8	25.0	179	5.7	0.93
43	7.1	23.7	168	6.2	0.92
17	7.3	22.8	172	5.7	0.94
40	6.9	22.3	175	5.9	0.94
Sim 2	7.6	25.7	173	6.0	0.91
6	8.6	27.8	160	7.3	0.89
47	7.4	24.4	172	5.8	0.92
31	7.1	23.6	162	6.8	0.90
15	6.5	21.9	175	5.0	0.95
39	10.4	30.2	166	6.2	0.91
16	6.5	21.8	179	5.1	0.94
44	7.3	24.0	165	6.6	0.91
53	10.9	31.4	166	5.9	0.92
1	5.2	18.1	171	5.7	0.95
54	7.1	23.6	161	6.9	0.91
22	9.3	28.8	158	6.9	0.90
11	10.0	29.9	157	6.8	0.89
12	9.0	27.6	169	5.2	0.94
27	7.7	25.7	175	5.4	0.93
13	7.5	21.3	176	6.3	0.92
30	9.2	27.5	168	6.9	0.88
23	7.0	22.4	174	5.7	0.94
55	8.4	25.2	174	5.1	0.94
19	7.5	25.2	173	5.6	0.92
14	6.1	20.8	193	3.8	0.98
4	6.5	21.5	168	6.0	0.93
PD-3-14	6.4	22.0	163	6.1	0.93
2	7.8	24.5	163	6.6	0.91
34	7.1	23.4	155	8.1	0.88
21	9.2	27.2	161	6.8	0.91
41	8.0	26.0	166	6.3	0.91
20	12.2	35.1	152	7.4	0.87
50	7.8	24.1	173	6.3	0.91
36	6.7	20.4	178	5.1	0.95
18	7.7	23.5	168	5.6	0.93
28	5.7	19.0	166	5.8	0.94
26	8.9	27.3	157	7.2	0.89
42	5.3	17.5	183	4.9	0.96
38	8.6	28.3	160	6.6	0.91
24	7.6	24.2	162	6.8	0.91
7	7.7	26.1	156	7.1	0.90
57	5.6	18.6	177	5.3	0.95
35	8.6	24.6	176	5.3	0.94
25	6.9	22.7	164	6.1	0.92
56	6.6	21.2	158	7.1	0.90
37	7.2	23.2	159	7.0	0.91

[†]SFWT=% short fiber by weight; SFC=% short fiber by no.; FINE=fineness in millitex; IFC=immature fiber content; MRAT=maturity ratio.

Table 4. Mean, standard deviation, minimum and maximum values, significance of segregation, and LSD among 58 RIL means.

Trait [†]	Mean	Std Dev	Min	Max	Seg.	LSD
Lint %	39.1	1.9	35.0	43.8	**	2.1
Yield	645	93	472	835	0	218
Linters	14.0	2.4	9.1	19.7	**	1.7
Seed/ Boll	28.8	1.6	25.0	33.1	**	3.0
Seed Size	86.0	6.5	69.7	99.3	**	6.1
Lint/ Seed	65.1	6.9	51.9	81.7	**	6.0
Boll Size	4.8	0.4	3.9	5.9	**	0.6
MIC	4.09	0.29	3.27	4.87	**	0.5
2.5% length	28.1	0.8	25.9	30.1	**	0.8
UR	0.50	0.01	0.47	0.52	**	0.04
T1	206	17	173	251	**	19
SFWT	7.8	1.5	4.4	12.2	**	2.2
SFN	24.7	3.6	17.5	35.1	**	5.3
Fine	168	8	152	193	**	9.6
IFC	6.1	0.8	3.8	8.1	**	1.5
MRAT	0.92	0.02	0.87	0.98	**	0.04

[†]Units as follows: Yield (kg/ha); Linters (mg/seed); Seeds/Boll (No.); Seed Size (mg/seed); Lint/Seed (mg lint/seed); Boll Size (g/boll); MIC (units); 2.5% length (mm); UR (%); T1 (kN m kg⁻¹); SFWT (short fiber by weight expressed as % by AFIS); SFN (short fiber by number expressed as % by AFIS); Fine (fineness in millitex by AFIS); IFC (immature fiber content expressed as % by AFIS); MRAT (maturity ratio by AFIS).

**, * genotypic variation significant at P<0.10 or 0.05, respectively.