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REGISTRATION OF EIGHT NECTARILESS-FREGO BRACT COTTON GERMPLASM LINES

EIGHT cotton (*Gossypium hirsutum* L.) germplasm lines (Reg. no. GP-278 to GP-285; Table 1) with nectariless and frego-bract traits were released by USDA-ARS and the Mississippi Agricultural and Forestry Experiment Station in August 1985. These lines offer breeders the advantages of the host-plant resistance traits nectariless and frego bract in a broad germplasm base. The frego-bract trait imparts resistance to the boll weevil (1) and the nectariless trait reduces populations of several insect pests, including tarnished plant bug [*Lygus lineolaris* (Palisot de Beauvois)], bollworm [*Heliothis zea* (Boddie)], tobacco budworm [*Heliothis virescens* (F.)], pink bollworm [*Pectinophora gossypiella* (Saunders)], cabbage looper [*Trichoplusia ni* (Hübner)], and cotton leaf perforator [*Bucculatrix thurberiella* Busck] (2).

These germplasm lines were developed from crosses of each of eight nectariless with its frego bract counterpart having corresponding germplasm (Table 1). Forty to 60 nectariless, frego-bract segregants in each cross were selected in the F_2, self-pollinated, and equal numbers of selfed seed of the F_2 plants of each line were bulked. Selection for nectariless and frego-bract traits was continued in each of the eight lines in the F_3 and F_4 generation. Each line in F_5, along with four commercial checks, were tested in a field experiment at Mississippi State University in 1984. Experimental design was a randomized complete block with six replications. Cultural practices, including insect control, were standard for the area.

These germplasm lines produced comparable yields with those of the check cultivars. Except for Aub NeFg-277, which had 37.6% lint [(lint/seed cotton) × 100], the check cultivars 'Stoneville 213', 'Deltapine 61', and 'Missouri 311' had higher lint percentages than the germplasm lines. However, all lines had equal or higher lint percentages than the 'Auburn 56' check, which had 36.0% lint. Boll weight and seed index (100-seed weight) of most of the germplasm lines ranged from 6.0 to 7.2 g, and 10.2 to 12.0 g, respectively, which was in the range of the checks, but Aub NeFg-149 had a heavier boll (7.7 g) and a greater seed index (12.4 g) than any of the checks. The germplasm lines did not differ from the checks in 2.5 and 50% fiber span length, micronaire or fiber elongation (E_1). The check cultivar Missouri 311 had the highest fiber strength (T_1) and Auburn 56 had the lowest fiber strength in the experiment. Fiber strength of the germplasm lines were in the range of these checks.

Small amounts of seed of these eight lines are available for distribution to cotton geneticists and other research workers. Written requests should be addressed to R.L. Shepherd, USDA-ARS, Crop Science Research Laboratory, P.O. Box 5367, Mississippi State, MS 39762-5367.

Table 1. Eight nectariless-frego bract lines of cotton.

Germplasm identification	Registration no.	Parentages
Aub NeFg-16	GP-278	Aub Ne-16 (GP175) × Aub Fg-16 (GP167)
Aub NeFg-56	GP-279	Aub Ne-56 (GP176) × Aub Fg-56 (GP168)
Aub NeFg-149	GP-280	Aub Ne-149 (GP177) × Aub Fg-149 (GP169)
Aub NeFg-165	GP-281	Aub Ne-165 (GP178) × Aub Fg-165 (GP170)
Aub NeFg-201	GP-282	Aub Ne-201 (GP179) × Aub Fg-201 (GP171)
Aub NeFg-213	GP-283	Aub Ne-213 (GP180) × Aub Fg-213 (GP172)
Aub NeFg-277	GP-284	Aub Ne-277 (GP181) × Aub Fg-277 (GP173)
Aub NeFg-310	GP-285	Aub Ne-310 (GP182) × Aub Fg-310 (GP174)

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REGISTRATION OF NC-D_3 COMPATIBLE 1 AND NC-D_3 INCOMPATIBLE 1 GERMPLASM LINES OF COTTON

NC-D_3 Compatible 1 (Reg. no. GP-286) and NC-D_3 Incompatible 1 (Reg. no. GP-287) cotton germplasm lines (*Gossypium hirsutum* L.) were released by the North Carolina Agricultural Research Service and the USDA-ARS in May 1986. These cotton lines provide a means for the genetic isolation of cultivars grown for special purposes, for example, those bearing glandless (gossypol-free) seeds.

Cultivars of the tetraploid cultivated cotton, *G. hirsutum* L., $2(AD)_1$, and *G. barbadense* L., $2(AD)_2$, in the genomic nomenclatural system of cotton, are of the genotype $Le_1Le_1Le_2Le_2$, and the wild diploid species, *G. davidsonii* Kell., $2(D)_3$, $Le_2^{dav}Le_2^{dav}$. When the diploid species is crossed with the cultivated cotton lines, the hybrid embryos abort because of a lethal interaction between Le_2^{dav} and the *Le* alleles. A rare genotype, $le_1le_1le_2le_2$, stems from a wild form of *G. barbadense*. Cotton of that genotype hybridizes with *G. davidsonii* and produce vigorous, although sterile, triploid plants of the genotype $le_1le_2Le_2^{dav}$. The chromosome number of these triploids can be doubled to produce fertile hexaploid plants (1).

The compatibility genotype, $le_1le_1le_2le_2$, was transferred to several stocks of *G. hirsutum*, and one such stock was crossed with a hexaploid, $2[(AD)_1D_3]$, and the Le_2^{dav} allele bridged into the tetraploid background of upland cotton. The new stock, of the genotype $le_1le_1Le_2^{dav}Le_2^{dav}$, did not cross successfully with cultivars of the genotype $Le_1Le_1Le_2Le_2$. Therefore, stocks of the genotypes $le_1le_1le_2le_2$ and $le_1le_1Le_2^{dav}Le_2^{dav}$ are needed for transferring the isolating allele, Le_2^{dav}, to new cultivars (2). NC-D_3 Compatible 1, genotype $le_1le_1le_2le_2$, and NC-D_3 Incompatible 1, $le_1le_1Le_2^{dav}Le_2^{dav}$, are stocks based upon

the glandless cultivar 'Paymaster 464', a cotton adapted for production in Texas and Oklahoma. Lint percentage and fiber properties of the germplasm lines and Paymaster 464, estimated from field-grown material, were comparable. Seed stocks of NC-D_3 Compatible 1 and NC-D_3 Incompatible 1 are maintained by the North Carolina Agricultural Research Service, and small lots can be obtained from the Department of Crop Science, North Carolina State University, Raleigh, NC 27695-7620.

J. A. LEE (3)

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REGISTRATION OF CAL-6 AND CAL-7 GUAYULE GERMPLASM

CAL-6 and Cal-7 (Reg. no. GP-6 and GP-7) germplasm are two high-yielding guayule (*Parthenium argentatum* A. Gray) selections that were developed and released by the University of California, Davis, in 1985 (1).

The program to develop high rubber-yielding lines began in 1981 when more than 800 vigorous polyploid guayule plants from thousands of plants growing in 11 demonstration plots across California were analyzed for their rubber content. Among the plants sampled in a 4-ha field located 30 km east of Bakersfield, CA, two appeared promising with respect to both biomass and rubber content. Open-pollinated seed was collected from those plants, designated C250 and C254, and used to develop Cal-6 and Cal-7 germplasm.

Seeds from C250 and C254 were planted in a greenhouse in January 1982 following the procedure described previously (2). The seedlings marked as C250-1 and C254-1 were transplanted in a field at Shafter, CA, in May 1982. In a preliminary rubber-yield comparison conducted on 36-week-old plants in February 1983, C250-1 and C254-1 yielded significantly more rubber than cultivar N565 by 36 and 62%, respectively (3). Off-type plants of C250-1 and C254-1 were removed and the mature heads from the remaining plants were discarded. The new crop of seeds were collected by hand and planted in a greenhouse. The seedlings, marked as C250-2 and C254-2, were transplanted in a field at Shafter, CA, in May 1983, along with check cultivars and progenies of 24 other selections in a completely randomized design with three replications. Each plot consisted of four 11-m rows. The rows were 1-m apart and the plant spacing within the row was 0.45 m. In February 1985, when the plants were approximately 84 weeks old, six plants were harvested at ground level from an area of 2.7 m^2 in the two middle rows of each plot. Leaves and peduncles were removed by hand and plants were weighed, ground, and sampled for dry weight, and rubber and resin contents determination. The rubber and resin contents were obtained by the near-infrared reflectance spectroscopy (NIR) method (4).

Table 1 compares C250-2 and C254-2 with two check cultivars for height, spread, percent rubber content, percent resin content, dry matter per year, resin yield per year, rubber yield per year, and combined yield of rubber and resin per year. C250-2 and C254-2 were not significantly different from cultivar N565 with respect to resin and rubber contents. However, because of their increased dry matter production, they yielded significantly more than cultivar N565.

C250-2 produced 2.3 times more resin and 2.3 times more rubber than cultivar N565. This selection is tetraploid with $2n = 72$ chromosomes. It reproduces by facultative apomixis. On the average, 12.5% of the C250-2 plants are off-types, most of which are the product of sexual outcrossing.

After the conclusion of the yield test, the off-types of C250-2 were removed and the mature heads were discarded. From June through October 1985, open-pollinated heads from the C250-2 plants were collected by hand, threshed, and the clean seed was bulked as Cal-6 (250-3), which represents the third generation progeny of the original C250 individual selection. Seeds of cultivar N565 are light brown in color and average 376 mg/1000 seed. Seeds of Cal-6 are darker and larger than N565 seeds, and average 530 mg/1000 seed. Like other guayule cultivars, Cal-6 has white flowers.

C254-2 was not as productive as C250-2. However, it was superior to cultivar N565. C254-2 produced 1.8 times more resin and 1.7 times more rubber than cultivar N565. C254-2 is triploid with $2n = 54$ chromosomes. It also reproduces by facultative apomixis. With an average of 18.5% off-types, C254-2 is less uniform than C250-2. Open-pollinated seeds from C254-2 plants were bulked as Cal-7 (C254-3), which represents the third generation progeny of the original C254 individual selection. Like Cal-6, Cal-7 has brown seed and white flowers. However, seeds of Cal-7 are smaller than Cal-6 seeds and larger than N565 seeds. They average 490 mg/1000 seed.

Limited quantities of seed are available for distribution. Written requests should be addressed to Dr. A. Estilai, Department of Botany and Plant Sciences, University of California, Riverside, CA 92521.

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Table 1. Comparison of selections C250-2 and C254-2 with cultivars N565 and 593 for rubber yield, resin yield, and other characteristics.

Guayule entries	Height†	Spread	Resin	Rubber	Dry matter‡	Resin yield	Rubber yield	Resin and rubber combined
	cm		%		kg/h/yr			
C250-2	88.5a	86.6a	7.47a	7.74a	11 816a	877a	910a	1 787a
C254-2	85.9a	83.0a	7.22a	7.21a	9 496b	687b	684b	1 371b
N565	61.7b	73.4b	6.70a	7.07a	5 743c	378c	397c	775c
593	59.9b	70.2b	5.04b	5.04b	5 623c	290c	322c	612c

† In each column, means followed by the same letter are not significantly different at the 0.05 level as determined by Duncan's new multiple range test.
‡ The last four columns present the yields on an annual basis. These values are derived by multiplying the yields from 84-week-old plants of the February 1985 harvest by a conversion factor of 0.571 (12/21).