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REGISTRATION OF GERMPLASMS

REGISTRATION OF CHI-1 CRIMSON CLOVER GERMPLASM

THE CHI-1 (Reg. no. GP-62) crimson clover (*Trifolium incarnatum* L.) germplasm pool was developed and released cooperatively by the Texas Agricultural Experiment Station, the Mississippi Agricultural and Forestry Experiment Station, and USDA-ARS in December 1985.

A single plant of crimson clover with ineffective nodulation was selected under nil-N conditions from a 1000-plant population of the cultivar Chief. The ineffective plant (designated CH-I) was 2-cm tall with a normal root system and many white nodules, 1 to 1.5 mm in diameter. With the addition of N (0.05 *M* KNO_3) this plant was grown to maturity and self-pollinated. The S_1 plants were inoculated with 11 different *Rhizobium trifolii* strains, each resulting in an ineffective symbiosis. No segregation for effectiveness occurred in the S_1 or S_2 generation of the CH-I line. The F_1 populations from crosses between CH-I and normal crimson clover were effectively nodulated with *R. trifolii* strain 162K13. The F_2 generation segregated for symbiotic effectiveness when nodulated with strain 162K13. The F_2 populations from two crosses showed a good fit to a 3:1 ratio of normal to ineffective nodulation. The nonstrain-specific ineffective nodulation of crimson clover is controlled by a single recessive gene pair (rt_1 rt_1) with possible modifiers (1).

CHI-1 has the potential to be useful in further enhancement and measurement investigations of N_2 fixation in clover. Twenty live seed per request are available to each applicant upon written request. It is requested that this germplasm source be recognized if it contributes to research findings on N_2 fixation. Request seed from G.R. Smith, Clover Breeding Program, Texas Agricultural Experiment Station, Texas A&M University Agricultural Research and Extension Center, Overton, TX 75684.

G. R. SMITH AND W. E. KNIGHT (2)

References and Notes

1. Smith, G.R., and W.E. Knight. 1984. Inheritance of ineffective nodulation on crimson clover. Crop Sci. 24:601–604.
2. Assistant professor, Texas Agric. Exp. Stn., Texas A&M Univ. Agric. Res. and Ext. Ctr., Overton, TX 75684; and research agronomist, Crop Sci. and Engineering Res. Lab., USDA-ARS, Mississippi State, MS 39762. Registration by the Crop Sci. Soc. of Am. Accepted 30 May 1986.

REGISTRATION OF EIGHT OKRA LEAF-FREGO BRACT COTTON GERMPLASM LINES

EIGHT okra leaf-frego bract germplasm lines (Reg. no. GP-270 to GP-277; Table 1) of cotton (*Gossypium hirsutum* L.) were released by USDA-ARS and the Mississippi Agricultural and Forestry Experiment Station in 1985.

The okra-leaf trait reduces boll rot by opening up the plant canopy and also confers resistance to banded-winged whitefly [*Trialeurodes abutilonea* (Haldeman)] and to pink bollworm [*Pectinophora gossypiella* (Saunders)] (3). Okra-leaf plants also mature earlier than normal-leaf plants (1). The frego-bract trait confers resistance to boll weevil (*Anthonomus grandis* Boheman) (2). These germplasm lines offer breeders the advantages of the host-plant resistance traits in a broad germplasm base, which should be useful in cotton enhancement programs to reduce diseases and to control insects. Also, they should provide excellent experimental material for genetical, physiological, and entomological studies.

These germplasm lines were derived from crosses of each of eight okra-leaf with a frego-bract counterpart with corresponding germplasm (Table 1). Fifty to 60 okra-frego segregants in each cross were selected in the F_2, self-pollinated, and equal numbers of seed from each line were bulked. Selection for okra-frego was continued through F_4. Each line in F_5, along with four commercial checks, was field tested for agronomic performance in 1984 at Mississippi State University.

Table 1. Eight okra leaf-frego bract germplasm lines of cotton.

Germplasm identification	Registration no.	Parentage
Aub OkFg-16	GP-270	Aub Okra-16 (GP186) × Aub Fg-16 (GP167)
Aub OkFg-56	GP-271	Aub Okra-56 (GP187) × Aub Fg-56 (GP168)
Aub OkFg-149	GP-272	Aub Okra-149 (GP188) × Aub Fg-149 (GP169)
Aub OkFg-165	GP-273	Aub Okra-165 (GP189) × Aub Fg-165 (GP170)
Aub OkFg-201	GP-274	Aub Okra-201 (GP190) × Aub Fg-201 (GP171)
Aub OkFg-213	GP-275	Aub Okra-213 (GP191) × Aub Fg-213 (GP172)
Aub OkFg-277	GP-276	Aub Okra-277 (GP192) × Aub Fg-277 (GP173)
Aub OkFg-310	GP-277	Aub Okra-310 (GP193) × Aub Fg-310 (GP174)

Aub OkFg-310, Aub OkFg-16, and Aub OkFg-213 produced the highest average lint yields of 1571, 1500, and 1493 kg ha^{-1}, respectively. These yields were significantly higher than that of the 'Missouri 311' check, but were not significantly higher than those of the 'Coker 310', 'Deltapine 61', and 'Stoneville 213'. The three latter cultivars contained the same or similar germplasm as the three germplasm lines, respectively. Yields of Aub OkFg-149 and Aub OkFg-201 also were not significantly different from the yields of the same three checks, and yield of Aub OkFg-277 was not significantly different from that of Coker 310 or Missouri 311. Only Aub OkFg-165 and Aub OkFg-56 had significantly lower yields than any check.

Lint percentages [(lint/seed cotton) × 100] ranged from 36.0 to 39.6% in the germplasm lines and 38.6 to 39.1% in the check cultivars. Boll weight ranged from 5.8 to 6.9 g in the lines compared with 6.6 to 7.1 g in the checks. Except for Aub OkFg-165, Aub OkFg-201, and Aub OkFg-277, the lines had significantly lighter bolls than the check cultivars. Aub OkFg-16 and Aub OkFg-149 had significantly smaller seeds, and Aub OkFg-165 had significantly larger seeds than the check cultivars. Aub OkFg-56 had significantly lower, 2.5 and 50%, fiber span length than the checks. None of the other germplasm lines were significantly different in 2.5% or 50% fiber span length than one or more check cultivars. Each of the lines was similar to one or more of the checks in fiber strength (T_1), fiber elongation (E_1), and micronaire.

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.

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References and Notes

1. Jones, J.E., D.F. Clower, M.R. Milam, W.D. Caldwell, and D.R. Melville, 1975. Resistance in upland cotton to the banded-winged whitefly, *Trialeurodes abutilonea* (Haldeman). p. 98–99. *In* J.M. Brown (ed.) Proc. Beltwide Cotton Prod. Res. Conf., New Orleans, LA. 6–8 Jan. National Cotton Council. Memphis, TN.
2. Jenkins, J.N., and W.L. Parrott. 1971. Effectiveness of frego bract as a boll weevil resistant character. Crop Sci. 11:739–743.
3. Wilson, F.D., and B.W. George. 1982. Effects of okra-leaf, frego-bract, and smooth-leaf mutants on pink bollworm damage and agronomic properties of cotton. Crop Sci. 22:798–801.
4. Research agronomist, research entomologist, research agronomist, and research geneticist, respectively, USDA-ARS, Crop Sci. Res. Lab., P.O. Box 5367, Mississippi State, MS 39762-5367. Joint contribution of USDA-ARS and Mississippi Agric. and Forestry Exp. Stn., Mississippi State, MS 39762. Registration by the Crop Sci. Soc. of Am. Accepted 30 May 1986.

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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References and Notes

1. Jenkins, J.N., and W.L. Parrott. 1971. Effectiveness of frego bract as a boll weevil resistant character in cotton. Crop Sci. 11:739–743.
2. Meredith, W.R., Jr. 1978. Nectar glands: Role in breeding for plant resistance. p. 214–25. *In* W.M. Tingey (ed.) Proc. 3rd Bienn. Plant Resistance Workshop. Cornell University, Ithaca, NY.
3. Research agronomist, research geneticist, research entomologist, and research agronomist, respectively, USDA-ARS, Crop Sci. Res. Lab., P.O. Box 5367, Mississippi State, MS 39762-5367. Joint contribution of USDA-ARS and Mississippi Agric. and Forestry Exp. Stn., Mississippi State, MS 39762. Registration by the Crop Sci. Soc. of Am. Accepted 30 May 1986.

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