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has excellent resistance to biotypes A and B of Hessian fly (*Mayetiola* destructor (Say)) conferred by the H6 gene.

Caldwell is moderately tolerant to aluminum in acid soils.

Caldwell averages about 160/hl lower in test weight and kernels are smaller than Arthur-type cultivars. Caldwell has excellent soft wheat milling quality and very good baking quality compared to Arthur.

Variety Protection will be applied for under the Plant Variety Protection Act, Pulbic Law 91-577, under the seed certification required. If granted, the owners further specify that Caldwell may be sold for seed *only* by cultivar name. Breeder seed is maintained by the Purdue Univ. Agric. Exp. Stn., West Lafayette, IN 47907.

Registration of Germplasms

REGISTRATION OF THREE GERMPLASM LINES OF COTTON[1]
(Reg. Nos. GP 164 to GP 166)

Raymond L. Shepherd

THREE breeding lines of cotton (*Gossypium hirsutum* L.), Auburn 566 RNR (GP164), Auburn 612 RNR (GP 165), and Auburn 634 RNR (GP 166), were developed and released cooperatively by ARS-USDA and the Alabama Agric. Exp. Stn. These breeding lines represent significant progress in developing cultivars with exceptionally high resistance to root-knot nematodes (*Meloidogyne incognita acrita*) and Fusarium wilt (*Fusarium oxysporum* f. *vasinfectum*).

Auburn 566 RNR was developed by transferring root-knot and Fusarium wilt resistance to 'Coker 201' through backcrossing. The other two lines were developed by transferring both of the above traits to 'Auburn 56.' Auburn 623 RNR was the source of root-knot nematode and Fusarium wilt resistance.[3] Until the current release, Auburn 623 RNR had the highest resistance to root-knot nematodes and Fusarium wilt known in cotton. In numerous tests, when seedlings were each inoculated with 8,000 root-knot nematode eggs, less than 1,200 eggs were produced per seedling in 40 days on the above three lines and Auburn 623 RNR, compared with 50,000 to 150,000 eggs produced on currently grown cotton cultivars.

Each of the above lines was developed by selecting for root-knot nematode resistance in the F_2 in greenhouse tests, growing selected F_2 plants to maturity for F_3 seed, and using the F_3 seed for progeny testing each selected F_2 for root-knot resistance in greenhouse tests. Resistant selections were evaluated in replicated field experiments for Fusarium resistance and agronomic performance in the F_3 and F_4. The most resistant and best performing resistant selections were used to initiate each backcross cycle.

Auburn 566 RNR, Auburn 612 RNR, and Auburn 634 RNR each is bulked selfed seed from ten BC_3 F_4 resistant plants. Performance of the three lines was compared with that of nonrecurrent and recurrent parents at three environments in Alabama. Where soils were relatively free of root-knot nematodes and Fusarium wilt, Auburn 566 RNR, Auburn 634 RNR, and Auburn 612 RNR yielded 100, 97, and 88% as much as their recurrent parent, respectively, and 202, 191, and 174% as much as the nonrecurrent parent, respectively. Each line matured as early as their recurrent parent and much earlier than the nonrecurrent parent. Percent lint of Auburn 612 RNR equalled that of the recurrent parent, but the other lines had lower lint percentages than their respective recurrent parent. Boll size of each of the three lines was larger than that of the nonrecurrent parent but slightly smaller than that of their recurrent parent. The lines were similar to their recurrent parent in fiber length and micronaire, except for Auburn 566 RNR, which had slightly shorter fiber and higher micronaire. All three lines had slightly higher fiber strength than that of their recurrent parent.

Seed (10 g) of each line is available upon written request as long as present seed is available. Requests should be addressed to R. L. Shepherd, Crop Science Research Unit, ARS-USDA, Dep. of Agronomy and Soils, Auburn Univ., AL 36849.

[1]Registered by the Crop Sci. Soc. of Am. Joint contribution of the ARS-USDA and the Ala. Agric. Exp. Stn., Auburn Univ., AL 36849. Accepted 26 Jan. 1982.

[2]Research agronomist, ARS-USDA, Dep. of Agronomy and Soils, Auburn Univ., AL 36849.

[3]Shepherd, R. L. 1974. Transgressive segregation for root-knot nematode resistance in cotton. Crop Sci. 14:872-875.

REGISTRATION OF EIGHT GERMPLASM LINES OF FREGO-BRACT COTTON[1]
(Reg. Nos. GP167 to GP174)

Raymond L. Shepherd[2]

THE following frego-bract cotton (*Gossypium hirsutum* L.) lines were developed and released cooperatively by ARS-USDA and the Alabama Agric. Exp. Stn.

Reg. no.	Identification	Parentages
GP167	Aub Fg-16	'Deltapine 16' × frego bract
GP168	Aub Fg-56	'Auburn 56' × frego bract
GP169	Aub Fg-149	Triple Hybrid 149 × frego bract
GP170	Aub Fg-165	Pee Dee 2165 × frego bract
GP171	Aub Fg-201	'Coker 201' × frego bract
GP172	Aub Fg-213	'Stoneville 213' × frego bract
GP173	Aub Fg-277	'Delcott 277' × frego bract
GP174	Aub Fg-310	'Coker 310' × frego bract

The eight lines were developed through backcrossing by transferring frego bract to eight recurrent parents as indicated above. The source of frego bract was a frego-bract strain of 'Deltapine Smoothleaf' developed by Dr. Jack Jones, Louisiana State Univ., Baton Rouge. Each backcross cycle was initiated at Auburn, Ala., by crossing 30 to 40 frego-bract F_2 to each respec-

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tive recurrent parent. F_2 seed of these crosses were produced in Mexico by self-pollination and grown at Auburn, where selection for frego bract was done before initiation of each backcross cycle. Each line is bulked selfed seed of 40 to 60 BC_5 F_2 frego-bract plants. These lines represent a diverse pool of germplasm, particularly regarding combinations of the frego-bract trait with desirable combinations of yield, fiber quality, and adaptation.

Frego bracts are long and twisted and tend to curl outward, leaving flower buds and bolls exposed. A single recessive gene (*fg*) controls this condition. Frego bract has been reported to be associated with boll weevil (*Anthonomous grandis grandis* Boheman) nonpreference, resistance to boll rot, later maturity, lower yield, and more sensitivity to cotton fleahoppers [*Pseudatomoscelis seriatus* (Reuter)] and tarnished plant bugs [*Lygus lineolaris* (Palisot de Beauvois)] than cottons with normal bracts. Disadvantages of frego bract may be overcome by combining it with traits that provide resistance to fleahoppers and plant bugs and/or combining use of frego bract with selective insecticides.

Performance of the eight frego-bract lines was compared with recurrent parent cultivars in seven environments in Alabama. Normal boll weevil control practices were used, but no special efforts were made to control plant bugs. The eight frego-bract lines, compared with their recurrent parent, had 12% lower mean yields, later maturity, and tended to have slightly smaller bolls. Lint percentages and fiber quality of these lines were similar to that of their recurrent parent.

Small amounts (10 g) of seed of these lines are available upon written request as long as present seed are available. Requests should be addressed to R. L. Shepherd, Crop Science Research Unit, ARS-USDA, Dep. of Agronomy and Soils, Auburn Univ., AL 36849.

REGISTRATION OF EIGHT GERMPLASM LINES OF NECTARILESS COTTON[1]

(Reg. Nos. GP 175 to GP 182)

Raymond L. Shepherd[2]

THE following nectariless cotton (*Gossypium hirsutum* L.) lines were developed and released cooperatively by ARS-USDA and the Alabama Agric. Exp. Stn.

Reg. no.	Identification	Parentages
GP 175	Aub Ne-16	'Deltapine 16' × nectariless
GP 176	Aub Ne-56	'Auburn 56' × nectariless
GP 177	Aub Ne-149	Triple Hybrid 149 × nectariless
GP 178	Aub Ne-165	Pee Dee 2165 × nectariless
GP 179	Aub Ne-201	'Coker 201 × nectariless
GP 180	Aub Ne-213	'Stoneville 213' × nectariless
GP 181	Aub Ne-277	'Delcott 277' × nectariless
GP 182	Aub Ne-310	'Coker 310' × nectariless

The eight lines were developed by backcrossing the nectariless parent to eight recurrent parents as indicated above. These lines represent a diverse pool of germplasm, particularly regarding combination of nectariless trait with desirable combinations of yield, fiber quality, and adaptation.

The nectariless parent of the eight lines was a nectariless BC_5 F_4 Auburn 56 line derived from backcrossing Auburn 56 to nectariless M11. Nectariless M11 was developed by Jim Meyer, Stoneville, Miss. Each backcross cycle was initiated at Auburn, Ala., by crossing 40 to 50 nectariless F_2 plants to each respective recurrent parent. F_2 seed of these crosses were produced in Mexico by self-pollination and grown at Auburn where selection for nectariless was done before initiation of each backcross cycle. With the exception of Aub Ne-56, which is BC_{10} F_4, each of the eight lines is a bulk of selfed seed from 40 to 60 BC_5 F_2 plants homozygous for the nectariless trait. This seed was increased with selection for nectariless and used for agronomic testing and public release.

The nectariless trait is conditioned by the genotype (ne_1 ne_1 ne_2 ne_2) originating from *Gossypium tomentosum*. These genes suppress leaf to extrafloral nectaries. the nectariless trait has been reported to provide beneficial levels of resistance to tarnished plant bugs [*Lygus lineolaris* (Palisot de Beauvois)], cotton fleahoppers [*Pseudatomoscelis seriatus* (Reuter)], and pink bollworm [*Pectinophora gossypiella* (Saunders)]. Boll rot organisms have been reported to enter through extrafloral flower and boll nectaries; therefore, nectariless cottons should reduce boll rotting.

The eight lines were compared in replicated tests with their respective parents in eight environments in Alabama. Lint yield and fiber properties of each line were at least equal to that of its recurrent parent, except Aub Ne-277 and Aub Ne-310, which had slightly shorter fiber.

Small amounts (10 g) of seed of these lines are available upon written request as long as present seed are available. Requests should be addressed to R. L. Shepherd, Crop Science Research Unit, ARS-USDA, Dep. of Agronomy and Soils, Auburn Univ., AL 36849.

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REGISTRATION OF THREE OKRA-LEAF, FREGO-BRACT DISEASE RESISTANT COTTON GERMPLASMS[1]

(Reg. No. GP 183, GP 184, and GP 185)

A. J. Kappelman, Jr.[2]

THREE noncommercial cotton (*Gossypium hirstutum* L.) germplasm lines with resistance to fusarium wilt incited by *Fusarium oxysporum* Schlect. f. *vasinfectum* (Atk.) Snyd. and Hans and bacterial blight caused by *Xanthomonas malvacearum* (E. F. Sm.) Dows. have been released by the ARS-USDA, and the Alabama Agric. Exp. Stn. Auburn OK fg-1 (GP 183) was derived from a single F_2 plant selection from the cross (Auburn okra-leaf × K_4E) × (W-133 × 79N). Auburn OK fg-2 (GP 184) and Auburn OK fg-3 (GP 185) were selected progeny of the first backcross of the above cross to (W-133 × 79N). Auburn okra-leaf was developed by A. L. Smith prior to 1964 from an okra-leaf line of unknown source crossed with 'Auburn 56'. K_4E is a selection from a cross between Knight's BAR 4/16 × 'Empire' followed by three backcrosses to Empire and contains the B_2 and B_3 genes for resistance to bacterial blight. K_4E and the following two lines were developed by L. S. Bird. W-133 was a selection from a cross between (Lankart 57 with the $B_2B_4B_6$ genes) × ('Deltapine Smoothleaf' × 101-102B). Line 101-102B carried bacterial blight resistance genes B_2 and B_3. W-133 was selected for bacterial blight and Verticillium wilt resistance in Texas followed by 3 years of selection for resistance to the fusarium wilt-root-knot nematode (*Meloidogyne* spp.) complex at Tallassee. In addition to disease resistance, W-133 also carries the frego-bract character-

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