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ragansett'); B14V1Fu2AC3 traces to an intercross between 112 plants each of Arc and Beltsville 2-An4 selected for vigor in nutrient culture followed by 3 cycles of recurrent phenotypic selection for Fusarium wilt resistance (B14V1Fu2 had 65% Fusarium wilt resistant plants in the 1979 St. Paul, Minn. evaluations.); B16AC3 traces to an intercross of 450 plants each from PI 247789 and PI 247790 (nondormant introductions from Peru); B19AC2 traces to an intercross of 829 plants selected from 43 U.S. cultivars carrying varying degrees of resistance to race 1 and race 2 anthracnose (5); W10(Syn 3)AC3 traces to W10 (4); Saranac AR-AC3 traces to the cultivar 'Saranac AR' (8); and BMP8(Syn 4)AC3 traces to a hand cross among 100 randomly selected plants each from Arc and Beltsville 2-An4.

In standard growth chamber anthracnose evaluations at Beltsville the percentage of resistant plants in the 11 germplasm lines ranged from 72 to 91 for race 1 and 67 to 84 for race 2. Corresponding percentages for Arc, Saranac AR, and 'Saranac' were 72, 68, and 8 for race 1 and 3, 54, and 2 for race 2.

Seed stocks are maintained by the Field Crops Lab., Room 335, Bldg. 001, Beltsville Agric. Res. Ctr., USDA-ARS, Beltsville, MD 20705. While supplies last 10 g of B27 seed, 1 g each of B16AC3 and Saranac AR-AC3 seed, and 2 g of seed of the remaining germplasm lines will be supplied upon written request and agreement to acknowledge the source of the germplasm if it contributes to the development of a new cultivar, hybrid, or breeding line.

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REGISTRATION OF FIFTEEN DOUBLED HAPLOID LINES OF COTTON, *GOSSYPIUM* SPP. GERMPLASM

FIFTEEN doubled haploid germplasm lines (Reg. no. GP227-GP241) (Table 1) were released by the USDA-ARS and the Mississippi Agricultural and Forestry Experiment Station in 1983. These lines are homozygous and have nuclear genes from six *G. hirsutum* L. parents in the cytoplasm of *G. barbadense*. They were produced via semigamy as paternal haploids which were subsequently doubled by treating small axillary buds with 0.5% colchicine. This germplasm represents a group of diverse lines each of which is genetically homozygous. They should provide excellent experimental material for cytological, genetic, physiological, biochemical, and breeding studies.

Table 1. Fifteen doubled haploid lines of cotton, *Gossypium* spp. germplasm.

Doubled haploid no.	Registration no. GP	Doubled haploid no.	Registration no. GP
M-DH-1	227	M-DH-66	235
M-DH-2	228	M-DH-21	236
M-DH-71	229	M-DH-16	237
M-DH-84	230	M-DH-94	238
M-DH-89	231	M-DH-128I	239
M-DH-90	232	M-DH-132I	240
M-DH-36	233	M-DH-133	241
M-DH-40	234		

Agronomic properties of the doubled haploids were generally equal to or better than that of their respective paternal parent. Fiber properties varied from inferior to superior to that of their paternal parent. Agronomic and fiber properties of 11 lines are given by Mahill et al. (4).

M-DH-1 and M-DH-2 were produced from an F_1 of 'Carolina Queen' × okra leaf nectariless supplied by W.R. Meredith, Jr. (5). M-DH-2 is normal leaf, completely nectaried and has normal pubescence on the leaf and stem. M-DH-1 is okra leaf, with glabrous stem and leaf, has a full size leaf nectary, often has fewer than three outer involucral nectaries which are often reduced in size, but is void of inner involucral nectaries. This is nectary phenotype *D* as described by Holder et al. (3).

M-DH-71, 84, 89, and 90 have the phenotype okra leaf, frego bract, and pubescent like the parental line ORH-55. M-DH-36, 40, and 66 are glandless like the parental line TX-Ly-18-72 glandless. Both of these parent lines were supplied by L.S. Bird (1). M-DH-21 is glabrous like parent Coker 420 Smooth supplied by H.W. Webb (7). M-DH-16 and 94 have the phenotype of the parent 'Paymaster 303' supplied by D.C. Hess (2).

M-DH-128I, 132I, and 133 were derived from the heterozygous parent MO-HG supplied by W.P. Sappenfield (6). M-DH-128I was derived by doubling with colchicine a haploid branch that exhibited both *G. hirsutum* (paternal) and *G. barbadense* (maternal) traits, and it appears similar to an interspecific hybrid. It has the leaf type and color of the *G. hirsutum* parent, a faint yellow petal color presumably from *G. barbadense*, and its agronomic and fiber properties tend to support that it is an interspecific hybrid, Mahill (4). Data from M-DH-128I strongly indicate that it is not a normal nuclear F_1 hybrid; i.e., it did not segregate when self pollinated. We do not know how this homozygous, interspecific hybrid developed. M-DH-132I appears to be a similar line. Morphological traits from both parents have been observed in haploid branches from several parents utilized in our semigamy research. M-DH-128I and M-DH-132I are the only ones we have succeeded in doubling. M-DH-128I and M-DH-132I have traits which are unexpected. Cytological studies may reveal the nature of these traits.

Small amounts of seed of these lines are available for distribution to cotton geneticists and other research workers. Written requests should be addressed to J.N. Jenkins, Crop Science Res. Lab., P.O. Box 5367, Mississippi State, MS 39762.

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REGISTRATION OF FOUR DOUBLED HAPLOID COTTON GERMPLASMS

M-DH-118 (Reg. no. GP242), M-DH-121 (Reg. no. GP243), M-DH-126 (Reg. no. GP244), and M-DH-128 (Reg. no. GP245) were released as germplasm lines resistant to tobacco budworm, *Heliothis virescens* (F.), by the USDA-ARS and the Mississippi Agricultural and Forestry Experiment Station in 1983. They were produced as *Gossypium hirsutum* L. paternal haploids via semigamy in *G. barbadense* cytoplasm. Haploids were doubled with colchicine. The paternal parent was a heterozygous line MOHG obtained from W.P. Sappenfield (2) which has resistance to the tobacco budworm.

Lint yield of each of the four doubled haploids is 30 to 36% less than 'Stoneville 213' (ST 213) when protected from insects with insecticides. Resistance is measured as the ability to yield when artificially infested with 12 first instar tobacco budworm larvae per plant, on a weekly basis, for 6 weeks. Under these infestations, M-DH-118, M-DH-121, M-DH-126, and M-DH-128 yielded 57, 60, 66, and 39% of their respective yield when under insecticidal protection from insects. The MOHG parent yielded 43% and the two checks, ST 213 and ST 7A glandless, yielded 28 and 18% of their respective protected yield.

Each line lodges excessively as does MOHG. When compared with MOHG, the M-DH-118 has higher lint percent, greater fiber elongation, larger bolls, and stronger fiber; M-DH-121 has higher lint percent, larger bolls, and greater fiber elongation; M-DH-126 has smaller bolls with a shorter, coarser, stronger fiber; M-DH-128 has larger bolls with higher lint percent, stronger fiber with greater elongation. Each line is slightly earlier than MOHG, Mahill (1).

These doubled haploid lines, compared with MOHG, have equal or greater resistance to tobacco budworm, and generally have improved yield components and fiber properties. They are also genetically stable, true breeding sources of resistance to tobacco budworm.

Terminal leaf gossypol in each line is equivalent to MOHG and ST 213. Square gossypol of all lines except M-DH-126 is equivalent to ST 213 but lower than MOHG. Gossypol in blooms is higher in each than in ST 213 and equal to MOHG. Seed gossypol in each line, except M-DH-118, is lower than in ST 213 or MOHG. Thus, the resistance to the tobacco budworm in these lines may be due in part to increased gossypol levels from the MOHG parent.

Small amounts of seed of these lines are available for distribution to cotton breeders and other research workers until present supply is exhausted. Written requests should be addressed to J.N. Jenkins, Crop Science Res. Lab., P.O. Box 5367, Mississippi State, MS 39762.

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REGISTRATION OF MHR-1, TOBACCO BUDWORM RESISTANT COTTON GERMPLASM

MHR-1 IS A germplasm line of cotton, *Gossypium hirsutum* L. (Reg. no. GP246), which has resistance to the tobacco budworm, *Heliothis virescens* (F.). It was released by USDA-ARS and the Mississippi Agricultural and Forestry Experiment Station in 1983. MHR-1 as released is a composite of nine lines in the F_7 from (DES-24 × MOHG) × MOHG. 'DES-24' was developed as a high yielding early strain by R.R. Bridge (1) and the MOHG strain was obtained as a *Heliothis* spp. resistant composite from W.P. Sappenfield (2) in 1976.

In 1982, MHR-1 was tested as a F_4 composite at nine locations in seven states. At three locations MHR-1 and 'Stoneville 213' (ST 213) were grown under *Heliothis* spp. infestation with average yields of 950 and 824 kg lint/ha for MHR-1 and ST 213, respectively. When *Heliothis* spp. were controlled, lint yields averaged over locations were 1275 and 1513 kg/ha for MHR-1 and ST 213, respectively. Thus MHR-1 yielded 15% more than ST 213 when *Heliothis* spp. were not controlled and 16% less than ST 213 when they were controlled. Lint percent of MHR-1 is 1.2% less than that of ST 213.

Resistance in MHR-1 was measured as the ability to yield when artificially infested with 12 first instar tobacco budworm larvae per plant for each of 6 weeks. MHR-1 and ST 213 were compared in 1982 at Mississippi State, Miss., when artificially inoculated for 6 weeks with tobacco budworm larvae and when protected with insecticides. MHR-1 under infestation attained 62% of its protected yield; whereas, ST 213 attained only 48% of its protected yield. Although significant yield losses occurred with both cottons the yield loss averaged 630 kg/ha with MHR-1 and 1107 with ST 213. The F_3 generation of the nine lines which became MHR-1 plus the parents and two checks were grown with an artificial infestation of tobacco budworm larvae and under protection with insecticides in 1980 at Mississippi State. In 1981 and 1982 the test was repeated except the F_4 and F_5 generations, respectively, were grown instead of the F_3. The nine lines averaged 23% yield loss; whereas, the parents DES-24 and MOHG averaged 47 and 17% yield loss, respectively. The two checks, ST 213 and Stoneville 7A glandless, averaged 46 and 51% yield loss, respectively. When protected from tobacco budworm the nine lines av-