

300 different intercrosses were made annually between selected male-fertile and male-sterile plants within each population. The origin or background of the four additional populations is as follows: (i) A population similar to the 1964 population was established in 1965. This population was planted in February each year for 11 cycles of selection so that aphid infestations would coincide with the seedling stage to obtain a uniform and severe infection of BYDV. (ii) In 1969 a population was developed by crossing 100 pollen sources onto 200 selected male-sterile plants from the sixth male-sterile-facilitated recurrent cycles of the 1964 population. One-half of the pollen sources were from the USDA world barley collection grown at Mesa and one-half were from coast-type cultivars and advanced selections originating from the original 1962-63 breeding program. (iii) In 1970 a population was established using pollen from 73 'Manchuria' - 'Jotun' selections obtained from the University of Wisconsin. Crosses were made onto 146 male-sterile plants selected from the seventh recurrent selection cycle of the 1964 population. (iv) A population was constituted in 1973 utilizing 50 F_2 short-straw plants and 25 short-straw selections of the original population constituting CCXXXII¹. These were crossed onto 150 male-sterile plants randomly selected in the four previously established composites. There was some unidentified segregation for *msg2* from the 1973 population because CCXXXII contains both of the male-sterile alleles, *msg1* and *msg2*.

In the spring of 1975, 250 intercrosses between male-sterile and male-fertile plants were made at Mesa in each of the five populations. The F_3 generations were increased at Bozeman, Mont. The F_2 generations were grown at Mesa in 1976 from both December and February plantings and subjected to BYDV infection. A uniform expression of BYDV symptoms was obtained. Male-fertile (*Ms/Ms* and *Ms/ms*) plants were randomly selected and threshed in bulk to form Composite Cross Populations XXXIII-A and XXXIII-B.

Composite Cross XXXIII-A (1976) consists of plants selected for BYDV resistance from early December plantings. The composite includes plants with the desirable characteristics of short, stiff straw and rapid early growth habit.

Composite Cross XXXIII-B (1976) consists entirely of plants selected from February plantings. A high percentage of the plants have good BYDV resistance and rapid, early growth habit. Short plants are infrequent. These plants tend to lodge when planted early under irrigation and optimum growing conditions. Composite Crosses XXXIII-A and -B (1977) are bulk increases of Composite Cross XXXIII-A and -B (1976) which were subjected to BYDV, with susceptible types being rogued from the populations. They include seeds from both male-fertile and male-sterile plants. Male-sterile-facilitated recurrent selection for BYDV is to be continued and future seed sources will include bulked seed of resistant plants from advanced generations of CCXXXIII-A and -B.

Seed will be maintained by the Arizona Agricultural Experiment Station and USDA, and can be obtained in limited quantities from Plant Genetics and Germplasm Institute, Grain Collection Building 046, Beltsville, Agricultural Research Center-West, Beltsville, MD 20705.

REGISTRATION OF JPM-781-78-3 COTTON GERMPLASM¹

(Reg. No. GP 52)

Johnie N. Jenkins, W. L. Parrott, A. J. Kappelman, Jr., and Raymond Shepherd²

ONE germplasm line of cotton JPM-781-78-3³ (GP 52) with resistance to Fusarium wilt (incited by *Fusarium oxysporum* Schlecht. f. *vasinfectum* (Atk.) Syd. and Hans.) and *Lygus lineolaris* has been released. This line was derived from a cross of *Gossypium hirsutum*, race *latifolium*, Accession Number T-78 with 'Deltapine 16'. The original cross was made in Iguala, Mexico. The F_1 was backcrossed to Deltapine 16 twice and the F_2 generation following the second backcross was grown at Mississippi State, Miss. Flowering plants were selected in this BC_2F_2 and were bulked for testing. Other F_1 plants from this cross were self-pollinated at Iguala and the F_2 seed planted

in a field test at Mississippi State. Flowering plants were selected in this F_2 and open-pollinated seeds were planted in F_3 progeny rows. An equal number of open-pollinated seed from each F_3 row was bulked for the F_4 . The BC_2F_3 and F_6 generations were tested for resistance to Fusarium wilt in three greenhouse tests and the BC_2F_3 was grown in a field at Tallahassee, Ala., which contained a heavy infestation of Fusarium wilt and root-knot nematodes (*Meloidogyne incognita acrita* Chitwood & Oteifa). When averaged over the three greenhouse tests, there were 44% fewer wilted plants in JPM-781-78-3 than in the resistant check line used in these tests. The BC_2F_3 exhibited significantly more field resistance to Fusarium wilt and root-knot nematodes than the susceptible check when grown at Tallahassee. The original T-78 accession line was tested for resistance to the root-knot nematode by inoculating with nematode eggs in a greenhouse test. It contained a high degree of resistance to root-knot nematode. The seed that is being released (BC_2F_6) has not been tested for reaction to root-knot nematode.

The BC_2F_6 generation was grown in a yield test at Mississippi State in 1976. Its yield and fiber properties were not significantly different from Deltapine 16. It was also grown in a field test with a low level and a high level of *Lygus lineolaris* in 1975 and 1976 at Mississippi State and in 1976 at Stoneville, Miss. Yields of JPM-781-78-3 were less variable than 'Stoneville 213' when grown under the two levels of lygus. In 1975 at Mississippi State and in 1976 at Stoneville lygus caused less yield loss in JPM-781-78-3 than in Stoneville 213. This indicates that it is as resistant as, and perhaps more resistant to lygus than the commercial cultivar Stoneville 213, which is one of the most resistant cultivars with nectararies grown in Mississippi.

Small amounts (200) of seed of this stock are available for distribution to cotton breeders and other research workers as long as present seed is available. Requests should be addressed to: Johnie N. Jenkins, Department of Agronomy, Crop Science and Engineering Research Laboratory, P. O. Box 5367, Mississippi State, MS 39762.

Tabular data on yield, insect resistance and wilt readings are available in Research Report Vol. 5 No. 2 from the Mississippi Agricultural and Forestry Experiment Station, Mississippi State, MS 39762.

¹ Registered by the Crop Sci. Soc. Am. Cooperative investigations of AR, SEA, USDA; Mississippi Agric. and For. Exp. Stn., Mississippi State, MS 39762; and AR, SEA, USDA; Alabama Agric. Exp. Stn., Auburn, AL 36830. Accepted 7 Sept. 1979.

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³ Explanation of Code c.x. JPM-781-78-3: JPM = originators; 78 = year of germplasm release; 1 through 8 = race designation (1 = latifolium, 2 = punctatum, 3 = marie-galante, 4 = palmeri, 5 = richmondii, 6 = morrilli, 7 = yucatanense, and 8 = unclassified); 78 - accession number in ARS catalogue ARS-H-2 October 1974 the regional collection of *Gossypium* germplasm; 3 = serial release number from crosses involving this particular accession.

REGISTRATION OF 11 COTTON GERMPLASM¹

(Reg. No. GP 53 to GP 63)

Johnie N. Jenkins, J. C. McCarty, W. L. Parrott, and A. J. Kappelman, Jr.²

ELEVEN non-commercial germplasm lines with resistance to Fusarium wilt [incited by *Fusarium oxysporum* Schlecht. f. *vasinfectum* (Atk.) Syd. and Hans.] have been released. These were derived from 11 crosses of primitive accessions of *Gossypium hirsutum* L., race *latifolium* with 'Deltapine 16'. The original crosses were made in Iguala, Mexico. The F_1 plants were self-pollinated in Iguala and the F_2 generation was grown at Mississippi State, Miss. Flowering plants were selected in this F_2 and bulked until the F_6 generation. Other F_1 plants from crosses were backcrossed to Deltapine 16 twice and the F_2 generation following the second backcross was grown at Mississippi

Table 1. Eleven *Fusarium* wilt resistant cotton germplasms.

Registration no.	Line†
GP 53	JPM-781-66-3
GP 54	JPM-781-69-3
GP 55	JPM-781-75-3
GP 56	JPM-781-84-3
GP 57	JPM-781-87-1
GP 58	JPM-781-88-3
GP 59	JPM-781-100-1
GP 60	JPM-781-496-3
GP 61	JPM-781-113-3
GP 62	JPM-781-158-1
GP 63	JPM-781-195-1

† Explanation of code: Example—JPM-781-66-3, JPM = originators; 78 = year of germplasm release; 1 through 8 = race designation (1 = latifolium, 2 = punctatum, 3 = marie-galante, 4 = palmeri, 5 = richmondii, 6 = morrilli, 7 = yucatanense, and 8 = unclassified); 66 = accession number in ARS catalogues ARS-H-2, October 1974, the Regional Collection of *Gossypium* germplasm; 3 = the serial release number from crosses involving this particular accession.

State. The flowering plants were selected in this BC₂F₂ and bulked for testing.

The F₂ and/or BC₂F₃ generations of the lines were tested for resistance to *Fusarium* wilt in three greenhouse tests and nine selections were grown in a field test at Tallahassee, Ala., in an area which contained a heavy infestation of *Fusarium* wilt and root knot nematodes.

The BC₂F₄ generation was grown in a yield test at Mississippi State in 1976. Each of the lines compared very favorably with the commercial check, Deltapine 16, in yield and in all fiber properties. Some lines were considerably earlier than Deltapine 16. A comparison of the *Fusarium* wilt score of each of these lines with the resistant check showed resistance ranging from equal to the resistant check to 53% greater than the resistant check. Seed of the released lines are from the BC₂F₅ generation (Table 1).

Small amounts (200) of seed of these stocks are available for distribution to cotton breeders and other research workers upon written request. Requests for seed should be made to Dr. Johnnie N. Jenkins, AR, SEA, USDA, Department of Agronomy, Crop Science and Engineering Research Laboratory, P.O. Box 5367, Mississippi State, MS 39762.

Tabular data on yield and wilt readings are available in Research Report Vol. 4 No. 20 from the Mississippi Agricultural and Forestry Experiment Station, Mississippi State, MS 39762.

¹ Registered by the Crop Sci. Soc. Am. Cooperative investigations of AR, SEA, USDA; Mississippi Agric. and For. Exp. Stn., Mississippi State, MS 39762; and Alabama Agric. Exp. Stn., Auburn, L 36830. Accepted 7 Sept. 1979.

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REGISTRATION OF 77 COTTON GERMPLASM¹

(Reg. No. GP 64 to GP 140)

Johnnie N. Jenkins, J. C. McCarty, R. G. Creech,
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WE have released 77 flowering germplasm lines involving 53 accessions from the *Gossypium hirsutum* L. race collection. These lines represent a diverse pool of germplasm. Each line also contains genetic diversity due to the breeding procedure employed. The 53 accessions were crossed as males with either 'Deltapine 16' or Lubbock Dwarf. Lubbock Dwarf is a noncommercial breeding line with reduced plant height, earliness of crop maturity, short, fine, weak fibers, and a low yield of lint per plant^a. We used it as a parent because of its earliness and reduced plant height. Twenty-four accessions were crossed

Table 1. Seventy-seven F₂ non-commercial flowering lines of cotton germplasm involving *Gossypium hirsutum* L. race accessions.

Registration no.	Line†	Registration no.	Line†
GP 64	JPM-781-185-1	GP 85	JPM-788-459-2
GP 65	JPM-781-185-2	GP 86	JPM-788-679-1
GP 66	JPM-782-26-1	GP 87	JPM-788-679-2
GP 67	JPM-782-26-2	GP 88	JPM-788-730-1
GP 68	JPM-782-94-1	GP 89	JPM-788-730-2
GP 69	JPM-782-94-2	GP 90	JPM-788-732-1
GP 70	JPM-786-11-1	GP 91	JPM-788-759-1
GP 71	JPM-786-11-2	GP 92	JPM-788-759-2
GP 72	JPM-786-194-1	GP 93	JPM-788-763-1
GP 73	JPM-786-292-1	GP 94	JPM-788-763-2
GP 74	JPM-786-292-2	GP 95	JPM-788-766-1
GP 75	JPM-786-295-1	GP 96	JPM-788-766-2
GP 76	JPM-786-295-2	GP 97	JPM-788-786-1
GP 77	JPM-786-297-2	GP 98	JPM-788-786-2
GP 78	JPM-784-336-1	GP 99	JPM-788-790-1
GP 79	JPM-784-336-2	GP 100	JPM-788-790-2
GP 80	JPM-788-339-1	GP 101	JPM-788-805-1
GP 81	JPM-788-339-2	GP 102	JPM-788-805-2
GP 82	JPM-788-404-1	GP 103	JPM-788-1134-1
GP 83	JPM-788-404-2	GP 104	JPM-788-1134-2
GP 84	JPM-788-459-1		
GP 105	JPM-788-1149-1	GP 123	JPM-781-69-1
GP 106	JPM-788-1149-2	GP 124	JPM-781-75-1
GP 107	JPM-788-1159-1	GP 125	JPM-781-78-1
GP 108	JPM-788-1159-2	GP 126	JPM-781-84-1
GP 109	JPM-788-1167-1	GP 127	JPM-781-88-1
GP 110	JPM-788-1167-2	GP 128	JPM-781-103-1
GP 111	JPM-788-1177-1	GP 129	JPM-781-106-1
GP 112	JPM-788-1177-2	GP 130	JPM-781-109-1
GP 113	JPM-788-1180-1	GP 131	JPM-781-113-1
GP 114	JPM-788-1180-2	GP 132	JPM-781-118-1
GP 115	JPM-784-347-2	GP 133	JPM-781-159-1
GP 116	JPM-782-1045-2	GP 134	JPM-781-201-1
GP 117	JPM-788-267-1	GP 135	JPM-781-209-1
GP 118	JPM-788-725-1	GP 136	JPM-781-223-1
GP 119	JPM-788-764-1	GP 137	JPM-782-25-1
GP 120	JPM-781-3-1	GP 138	JPM-782-488-1
GP 121	JPM-781-59-1	GP 139	JPM-782-495-1
GP 122	JPM-781-66-1	GP 140	JPM-785-461-1

† Explanation of code: Example—JPM-781-185-1, JPM = originators; 78 = year of germplasm release; 1 through 8 = race designation (1 = latifolium, 2 = punctatum, 3 = marie-galante, 4 = palmeri, 5 = richmondii, 6 = morrilli, 7 = yucatanense, and 8 = unclassified); 185 = accession number in ARS catalogues ARS-H-2, October 1974, the Regional Collection of *Gossypium* germplasm; 1 = the serial release number from crosses involving this particular accession.

with both Lubbock Dwarf and Deltapine 16. Three accessions were crossed only with Lubbock Dwarf; 26 accessions were crossed only with Deltapine 16.

Based on no choice oviposition tests in the F₄ generation, crosses involving 18 of the 53 race accessions had significantly lower boll weevil oviposition than the 'Stoneville 213' check. One of the 18 accessions was crossed with both Lubbock Dwarf and Deltapine 16; 10 were crossed with Lubbock Dwarf only and six were crossed with Deltapine 16 only. As measured by growth rate of bollworm larvae from emergence to 5 days on abscised terminal leaves from F₄ lines, none of the 77 strains are resistant to bollworm. The original race stocks themselves, not the flowering segregates, were evaluated in the field for resistance to natural infestations of *Cercospora gossypina* Cooke and *Verticillium albo-atrum* Reinke and Berth. Reaction to *Cercospora* was rated on a scale of 1 (most resistant) to 5 (most susceptible). *Verticillium* wilt reaction was rated from visual observations of leaf symptoms. Lines were rated as R (no leaf symptoms), S (moderate symptoms), and VS (severe symptoms). We are releasing F₂ flowering segregates from 20 lines which rated 3 or less for *Cercospora* and 20 lines scored as R for *Verticillium*. Nine of these lines are common to both groups.

The procedure for developing the flowering lines was to cross each of the race accessions as males to the upland parent at the winter nursery at Iguala, Mexico. The F₄ generation was also self-pollinated at the winter nursery in Iguala. The