

Germplasm Release of 81 F₅ Flowering Lines of Cotton Involving 54 *Gossypium hirsutum* L. Race Accessions



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Germplasm Release of 81 F₅ Flowering Lines of Cotton Involving 54 *Gossypium hirsutum* L. Race Accessions

We have released 81 non-commercial lines of cotton, *Gossypium hirsutum* L., containing germplasm from 54 of the primitive accessions in the race collection maintained at Texas A&M University under Regional Project S-77. Each of the 81 releases contains flowering germplasm of the primitive races (Table 1), but the 81 releases also represent a pool of genetic diversity because of the breeding procedure employed. The 54 accessions were crossed as males with either 'Deltapine 16' (DPL-16) or Lubbock Dwarf--27 with Lubbock Dwarf and DPL-16, two with Lubbock Dwarf only, and 25 with DPL-16 only.

The procedure for developing the flowering lines was to cross males of each race accession to the upland parent at the winter nursery at Iguala, Mexico. The F₁ generation was self-pollinated at the winter nursery in Iguala, and the F₂ generation was grown in the field at Mississippi State University. Only those plants with the first fruiting branch at node 10 or below were kept in the crosses with

Lubbock Dwarf as the female, and only those plants with the first fruiting branch at node 13 or below were kept in the crosses with DPL-16 as the female. Open-pollinated seed were harvested from each F₃ progeny row that produced bolls, and most rows produced significant amounts of mature seed. Equal numbers of seed from each F₃ row were pooled and planted for the F₄ generation. Open-pollinated seed from the F₄ generation were harvested, and the F₅ seed are available for release. We have purposely maintained genetic diversity by selecting only for node of first fruiting branch.

The primitive race parents were evaluated in the field for resistance to natural infestations of *Cercospora gossypina* and *Verticillium dahlia*. Reaction to *Cercospora* was rated on a scale of 1 (most resistant) to 5 (most susceptible). *Verticillium* wilt reaction ratings were made from visual observations of leaf symptoms, and lines were rated as having no symptoms, moderate symptoms or severe symptoms (Table 1). We are

releasing F₅ flowering segregates from 20 lines that rated 3 or less for *Cercospora* and 21 lines that were scored as R for *Verticillium* wilt. Nine were common to both groups.

Crosses involving 18 of the 54 race accessions had significantly lower boll weevil oviposition than did the 'Stoneville 213' check in no-choice oviposition tests with the F₄ generation in 1977 (Table 2). Two of the 18 were crossed with Lubbock Dwarf and DPL-16, 10 with Lubbock Dwarf only, and six with DPL-16 only.

None of the 81 strains demonstrated resistance to bollworm as measured by growth rate of bollworm larvae from emergence to five days on abscised terminal leaves from F₄ lines.

Small amounts (200) of seed of these stocks are available for distribution to cotton breeders and other researchers as long as supplies last. Requests should be addressed as follows:

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Table 1. Breeding, Fruiting Habits, and Disease Resistance of the F₄ Generation of 81 Non-Commercial Lines of Cotton, *Gossypium hirsutum* L., Containing Germplasm from 54 Primitive Races of Cotton.

Line ¹	S-77 Accession No. ²	Race ³	Female Parent ⁴	F ₂ Population		Reaction of Parental Race to:	
				With squares	Selected ⁵	<i>Cercospora</i> <i>gossypina</i> ⁶	<i>Verticil- lium</i> wilt ⁷
				-----%-----			
JPM-781-185-1	185	1	1	2.7	1.3	5	R
JPM-781-185-2	185		2	25.6	1.6		
JPM-782-26-1	26	2	1	16.5	10.4	3	S
JPM-782-26-2	26		2	49.1	12.7		
JPM-782-94-1	94	2	1	26.3	18.1	2	R
JPM-782-94-2	94		2	47.4	12.3		

(Continued)

Table 1. (Continued)

Line ¹	S-77 Accession No. ²	Race ³	Female Parent ⁴	F ₂ Population		Reaction of Parental Race to:	
				With squares	Selected ⁵	Cercospora gossypina ⁶	Verticil- lium wilt ⁷
				-----%-----			
JPM-786-11-1	11	6	1	14.0	8.6	3	S
JPM-786-11-2	11		2	2.1	0.3		
JPM-786-194-1	194	6	1	36.5	9.9	3	S
JPM-786-194-2	194		2	9.8	1.1		
JPM-786-292-1	292	6	1	22.0	3.0	2	S
JPM-786-292-2	292		2	6.5	0.6		
JPM-786-295-1	295	6	1	6.8	2.9	3	R
JPM-786-295-2	295		2	40.7	6.4		
JPM-786-297-1	297	6	1	8.6	8.0	--	--
JPM-786-297-2	297		2	21.2	3.3		
JPM-784-336-1	336	4	1	10.7	1.6	5	R
JPM-784-336-2	336		2	9.5	0.4		
JPM-788-339-1	339	8	1	8.8	1.1	5	R
JPM-788-339-2	339		2	13.6	0.1		
JPM-788-404-1	404	8	1	82.3	56.1	--	--
JPM-788-404-2	404		2	95.3	74.9		
JPM-788-459-1	459	8	1	26.0	16.1	2	R
JPM-788-459-2	459		2	4.7	0.4		
JPM-788-679-1	679	8	1	48.6	28.8	2	R
JPM-788-679-2	679		2	29.5	14.6		
JPM-788-730-1	730	8	1	13.6	3.6	--	--
JPM-788-730-2	730		2	8.4	1.1		
JPM-788-732-1	732	8	1	6.9	1.0	4	S
JPM-788-732-2	732		2	19.5	4.0		
JPM-788-759-1	759	8	1	26.5	19.0	2	S
JPM-788-759-2	759		2	86.1	22.9		
JPM-788-763-1	763	8	1	78.4	43.9	3	S
JPM-788-763-2	763		2	80.4	26.2		
JPM-788-766-1	766	8	1	18.9	9.6	1	R
JPM-788-766-2	766		2	11.0	1.7		
JPM-788-786-1	786	8	1	21.9	7.7	4	R
JPM-788-786-2	786		2	15.5	3.9		
JPM-788-790-1	790	8	1	7.0	2.4	2	R
JPM-788-790-2	790		2	17.7	3.8		
JPM-788-805-1	805	8	1	17.3	9.2	4	S
JPM-788-805-2	805		2	22.1	5.9		
JPM-788-1134-1	1134	8	1	17.0	4.0	5	S
JPM-788-1134-2	1134		2	7.4	0.5		
JPM-788-1149-1	1149	8	1	52.7	34.3	--	--
JPM-788-1149-2	1149		2	62.1	15.5		
JPM-788-1159-1	1159	8	1	27.9	9.9	4	R
JPM-788-1159-2	1159		2	20.7	2.0		
JPM-788-1167-1	1167	8	1	42.7	18.9	--	--
JPM-788-1167-2	1167		2	22.6	4.0		
JPM-788-1177-1	1177	8	1	7.5	2.1	4	R
JPM-788-1177-2	1177		2	19.2	2.1		

(Continued)

Table 1. (Continued)

Line ¹	S-77		Female Parent ⁴	F ₂ Population		Reaction of Parental Race to:	
	Accession No. ²	Race ³		With squares	Selected ⁵	<i>Cercospora gossypina</i> ⁶	<i>Verticillium wilt</i> ⁷
				-----%-----			
JPM-788-1180-1	1180	8	1	47.5	17.3	--	--
JPM-788-1180-2	1180		2	54.5	9.0		
JPM-784-347-2	347	4	2	25.2	1.7	--	--
JPM-782-1045-2	1045	2	2	20.8	1.2	--	--
JPM-788-267-1	267	8	1	9.6	2.9	--	--
JPM-784-326-1	326	4	1	10.7	1.2	5	R
JPM-788-725-1	725	8	1	15.3	5.6	2	R
JPM-788-764-1	764	8	1	49.5	20.6	3	VS
JPM-781-3-1	3	1	1	88.2	50.9	3	S
JPM-781-59-1	59	1	1	76.7	39.3	4	S
JPM-781-66-1	66	1	1	65.7	40.0	3	VS
JPM-781-69-1	69	1	1	78.4	30.3	5	S
JPM-781-75-1	75	1	1	54.3	18.4	5	S
JPM-781-78-1	78	1	1	25.7	9.8	5	S
JPM-781-84-1	84	1	1	55.1	30.2	5	R
JPM-781-88-1	88	1	1	53.6	29.5	4	S
JPM-781-103-1	103	1	1	55.5	36.5	--	--
JPM-781-106-1	106	1	1	54.6	37.0	1	R
JPM-781-109-1	109	1	1	78.1	45.7	--	--
JPM-781-113-1	113	1	1	77.3	58.2	5	R
JPM-781-118-1	118	1	1	17.1	8.4	--	--
JPM-781-159-1	159	1	1	18.2	4.1	--	--
JPM-781-201-1	201	1	1	31.9	18.0	5	R
JPM-781-209-1	209	1	1	27.0	14.2	5	R
JPM-781-223-1	223	1	1	28.2	10.6	5	R
JPM-782-25-1	25	2	1	21.4	8.8	3	VS
JPM-782-488-1	488	2	1	63.7	27.4	--	--
JPM-782-495-1	495	2	1	16.3	5.5	2	R
JPM-785-461-1	461	5	1	62.8	16.9	3	S

¹Explanation of Code; e.g., 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 = richmondi, 6 = morrilli, 7 = yucatanense, and 8 = unclassified); 185 = accession number in ARS catalogue ARS-H-2, October 1974, the regional collection of *Gossypium* germplasm, and 1 = serial release number from crosses involving this particular accession.

²Accession numbers are Texas numbers from the regional collection of *Gossypium* germplasm, ARS-H-2, October 1974.

³Race Code 1 = latifolium; 2 = punctatum; 3 = marie-galante; 4 = palmeri; 5 = richmondi; 6 = morrilli; 7 = yucatanense; 8 = unknown.

⁴Female parent 1 was DPL-16; Female parent 2 was Lubbock Dwarf.

⁵In the F₂ with DPL-16 all plants with first fruiting branch at node 13 or below were kept. In the Lubbock Dwarf cross all plants with first fruiting branch at node 10 or below were kept.

⁶*Cercospora* ratings 1 - 3 = Resistant, 4 - 5 = Susceptible.

⁷R = no leaf symptoms, S = moderate leaf symptoms, VS = severe leaf symptoms.

Table 2. Boll Size, Fiber Properties, and Insect Resistance of the F₄ Generation of 81 Non-Commercial Lines of Cotton, *Gossypium hirsutum* L., Containing Germplasm from 54 Primitive Races of Cotton.

Line ¹	F ₄ Bulk Progeny Boll and Fiber Properties							Boll weevil eggs/female/day ^{2,3}	Weight of 5-day-old <i>Heliothis virescens</i> larvae ³
	Boll Size	Lint	50% SL	2.5% SL	El	TI	Micronaire		
	g	%			%	g/Tex			
JPM-781-185-1	5.3	33.0	.59	1.21	6.7	20.6	4.9	13.0	12.8
JPM-781-185-2	4.3	28.9	.58	1.21	7.5	23.2	4.7	15.6	15.4
JPM-782-26-1	5.4	32.9	.58	1.23	6.5	23.0	4.7	17.8	18.5
JPM-782-26-2	4.5	28.7	.59	1.24	6.0	21.9	4.5	16.7	20.6
JPM-782-94-1	4.8	30.8	.55	1.17	7.3	22.5	4.6	11.0**	15.6
JPM-782-94-2	4.7	31.8	.54	1.13	6.5	21.7	4.7	17.2	20.7
JPM-786-11-1	5.0	30.4	.57	1.17	6.5	22.3	4.9	13.1	13.7
JPM-786-11-2	4.8	34.4	.56	1.16	7.0	21.6	4.6	13.6	22.2 z
JPM-786-194-1	5.4	32.5	.56	1.21	6.8	22.1	4.4	14.1	12.9
JPM-786-194-2	4.7	29.1	.57	1.18	7.0	23.0	4.4	15.4	18.9
JPM-786-292-1	4.8	31.0	.54	1.19	6.8	19.9	4.3	13.4	10.9
JPM-786-292-2	4.6	30.3	.56	1.17	7.0	23.0	4.3	14.3	19.5
JPM-786-295-1	5.2	32.8	.57	1.18	6.5	21.0	4.8	14.7	12.4
JPM-786-295-2	4.7	33.4	.56	1.15	6.3	20.3	4.7	13.2	22.0 z
JPM-786-297-1	5.6	35.4	.60	1.26	6.5	21.9	4.5	14.0	16.6
JPM-786-297-2	4.2	32.7	.52	1.11	6.5	19.2	4.4	12.6**	26.1 z
JPM-784-336-1	5.1	32.7	.60	1.23	7.0	21.6	4.6	12.2*	16.1
JPM-784-336-2	4.4	34.8	.55	1.14	7.0	21.4	5.1	12.0**	15.8
JPM-788-339-1	4.9	32.1	.55	1.20	6.8	22.0	4.3	11.9**	13.6
JPM-788-339-2	4.5	32.2	.55	1.13	6.5	21.9	4.9	11.0*	17.3
JPM-788-404-1	5.4	33.0	.49	1.09	6.8	18.7	4.3	12.1	30.3 z
JPM-788-404-2	4.2	32.6	.51	1.07	5.3	22.8	4.1	14.6	38.9 z
JPM-788-459-1	5.5	37.3	.57	1.21	7.5	21.5	5.1	13.7	13.7
JPM-788-459-2	3.6	28.0	.54	1.03	7.0	23.2	4.1	13.2**	30.9 z
JPM-788-679-1	5.3	30.6	.59	1.15	6.8	24.0	5.1	13.3	14.1
JPM-788-679-2	3.8	27.9	.50	1.08	6.0	20.9	4.2	15.2	18.7
JPM-788-730-1	4.9	31.4	.57	1.23	7.5	21.2	5.0	14.2	15.0
JPM-788-730-2	5.1	30.2	.59	1.19	6.0	22.7	4.9	11.4*	14.4
JPM-788-732-1	4.8	29.8	.56	1.22	7.3	23.0	4.7	14.9	14.2
JPM-788-732-2	5.3	31.5	.57	1.18	5.8	24.5	4.8	14.1	19.6
JPM-788-759-1	5.0	33.7	.54	1.12	5.8	22.0	4.7	14.5	17.6
JPM-788-759-2	4.0	31.1	.49	1.03	5.8	22.2	4.4	14.6	23.4 z
JPM-788-763-1	5.0	34.6	.56	1.15	7.8	21.3	4.9	13.6	20.5
JPM-788-763-2	4.6	29.1	.58	1.17	6.5	24.5	4.5	14.5	18.5
JPM-788-766-1	5.5	33.4	.58	1.23	7.5	21.7	4.9	13.7	15.0
JPM-788-766-2	4.4	28.7	.54	1.13	6.8	21.4	4.5	13.2**	14.6
JPM-788-786-1	4.8	31.6	.57	1.18	6.8	23.2	4.8	14.0	16.1
JPM-788-786-2	4.6	28.5	.54	1.10	7.5	20.6	4.2	13.7	17.9
JPM-788-790-1	4.6	31.1	.56	1.13	6.8	21.6	4.5	13.9	15.8
JPM-788-790-2	4.6	29.0	.55	1.10	6.5	22.7	4.8	11.8*	17.8
JPM-788-805-1	4.9	35.2	.55	1.14	6.8	21.2	4.8	12.2	16.3
JPM-788-805-2	4.3	30.9	.55	1.11	7.5	22.2	4.5	9.8*	20.6

(Continued)

Table 2. (Continued)

JPM-788-1134-1	4.5	34.2	.53	1.14	7.5	22.9	4.9	13.1	13.1
JPM-788-1134-2	4.7	30.0	.53	1.07	7.5	20.6	4.5	14.6	17.8
JPM-788-1149-1	4.4	33.2	.55	1.11	8.0	20.8	4.8	14.0	15.3
JPM-788-1149-2	4.2	30.0	.55	1.13	6.3	23.2	4.3	14.6	19.0
JPM-788-1159-1	4.7	31.0	.57	1.18	7.3	21.2	4.4	12.9	20.3 z
JPM-788-1159-2	5.6	28.2	.57	1.19	7.0	21.4	4.4	16.6	16.4
JPM-788-1167-1	5.2	30.3	.57	1.19	6.5	22.9	4.7	13.6	27.5 z
JPM-788-1167-2	5.0	29.3	.55	1.12	6.8	20.6	5.4	13.3**	16.4
JPM-788-1177-1	3.9	30.8	.57	1.16	6.5	21.8	4.8	13.7	18.5 z
JPM-788-1177-2	3.2	33.3	.56	1.15	7.0	20.8	4.6	12.1**	11.9
JPM-788-1180-1	4.0	31.9	.54	1.18	7.5	21.9	4.8	13.1	18.1
JPM-788-1180-2	3.9	32.5	.55	1.12	7.5	20.8	4.6	11.6*	17.1
JPM-784-347-2	4.5	31.1	.57	1.18	6.0	22.0	4.7	11.2**	17.0
JPM-782-1045-2	4.7	28.4	.54	1.09	6.3	22.4	5.0	15.4	17.6
JPM-788-267-1	6.2	33.2	.58	1.21	7.3	23.8	4.6	13.1	12.6
JPM-784-326-1	4.8	33.0	.56	1.19	8.0	22.5	4.7	12.2	13.3
JPM-788-725-1	4.7	34.0	.55	1.14	6.8	22.7	4.9	11.2**	15.5
JPM-788-764-1	4.9	31.9	.60	1.22	7.8	21.5	4.9	14.3	15.1
JPM-781-3-1	5.9	33.9	.57	1.16	7.8	21.1	5.4	12.6	14.4
JPM-781-59-1	5.1	30.9	.58	1.21	6.5	20.8	4.8	13.6	16.9
JPM-781-66-1	5.7	31.3	.58	1.18	6.0	24.8	5.1	12.8	14.9
JPM-781-69-1	4.9	31.4	.57	1.14	7.5	22.4	4.7	12.7	19.9
JPM-781-75-1	4.8	31.5	.56	1.14	7.5	23.9	5.1	14.2	16.3
JPM-781-78-1	4.1	32.5	.55	1.13	7.0	23.7	4.7	13.1	19.0
JPM-781-84-1	4.9	32.0	.60	1.22	7.3	22.6	4.6	12.8	17.5
JPM-781-88-1	5.9	30.9	.58	1.22	7.0	22.4	4.9	12.4	13.8
JPM-781-103-1	5.7	32.6	.58	1.20	6.0	22.6	4.7	13.9	17.1
JPM-781-106-1	4.8	29.9	.58	1.17	5.5	20.8	5.1	12.2	15.9
JPM-781-109-1	5.6	32.3	.58	1.16	6.5	22.6	5.1	12.3	13.8
JPM-781-113-1	5.0	33.4	.56	1.14	7.3	20.4	4.9	11.9**	16.0
JPM-781-118-1	6.0	35.6	.57	1.22	7.3	22.4	4.6	11.7**	12.6
JPM-781-159-1	4.9	34.1	.56	1.18	7.5	20.9	4.9	11.5**	12.2
JPM-781-201-1	5.9	30.8	.59	1.22	7.3	22.4	5.0	13.2	13.5
JPM-781-209-1	5.3	31.0	.62	1.26	7.0	22.8	4.5	12.7	15.9
JPM-781-223-1	4.9	31.1	.58	1.17	6.8	21.2	4.9	13.4	15.2
JPM-782-25-1	4.9	28.4	.61	1.22	6.8	23.0	5.1	11.2**	16.3
JPM-782-488-1	4.9	34.0	.59	1.20	7.8	22.7	5.0	15.2	13.1
JPM-782-495-1	5.3	36.2	.61	1.23	8.5	21.5	5.0	13.5	16.6
JPM-785-461-1	5.2	32.6	.57	1.15	7.0	23.1	4.9	13.4	16.3

¹See Footnote 1, Table 1.

²Significantly fewer eggs than on ST-213 at * 0.10 level and ** 0.05 level.

³All crosses with DPL-16 were in Test 1. Boll weevil eggs: DPL-16 = 11.6, ST-213 = 13.9. Bollworm weight: DPL-16 = 13.1; ST-213 = 7.9. All crosses with Lubbock Dwarf were in Test 2. Boll weevil eggs: DPL-16 = 14.4; ST-213 = 15.0. Bollworm weight: DPL-16 = 12.8; ST-213 = 11.1. All data collected on F₄ bulk progeny.

^z = larvae significantly larger than on DPL-16 at 0.05 level. All data collected on F₄ bulk progeny.

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In conformity with Title IX of the Education Amendments of 1972 and Section 504 of the Rehabilitation Act of 1973, Dr. T. K. Martin, Vice President, 610 Allen Hall, P. O. Drawer J, Mississippi State, Mississippi 39762, office telephone number 325-3221, has been designated as the responsible employee to coordinate efforts to carry out responsibilities and make investigation of complaints relating to nondiscrimination.



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