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Germplasm Release of 81 F_5 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 F_1 generation was self-pollinated at the winter nursery in Iguala, and the F_2 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 F_3 progeny row that produced bolls, and most rows produced significant amounts of mature seed. Equal numbers of seed from each F_3 row were pooled and planted for the F_4 generation. Open-pollinated seed from the F_4 generation were harvested, and the F_5 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 dalhia*. 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 F_5 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 F_4 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 F_4 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 F_4 Generation of 81 Non-Commercial Lines of Cotton, *Gossypium hirsutum* L., Containing Germplasm from 54 Primitive Races of Cotton.

	S-77			F_2 Population		Reaction of Parental Race to:	
Line[1]	Accession No.[2]	Race[3]	Female Parent[4]	With squares	Selected[5]	Cercospora gossypina[6]	Verticillium 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 With squares	F_2 Population Selected[5]	Reaction of Parental Race to: Cercospora gossypina[6]	Reaction of Parental Race to: Verticillium 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 Accession No.[2]	Race[3]	Female Parent[4]	F_2 Population With squares	F_2 Population Selected[5]	Reaction of Parental Race to: Cercospora gossypina[6]	Reaction of Parental Race to: Verticillium wilt[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

[1]Explanation 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.

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

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

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

[5]In the F_2 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.

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

Table 2. Boll Size, Fiber Properties, and Insect Resistance of the F_4 Generation of 81 Non-Commercial Lines of Cotton, *Gossypium hirsutum* L., Containing Germplasm from 54 Primitive Races of Cotton.

	F_4 Bulk Progeny Boll and Fiber Properties							Boll weevil	Weight of 5-day-old Heliothis
Line[1]	Boll Size	Lint	50% SL	2.5% SL	El	Tl	Micronaire	eggs/female/day[2,3]	virescens larvae[3]
	g	%			%	g/Tex		no	mg
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

[1]See Footnote 1, Table 1.

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

[3]All 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 F_4 bulk progeny.

z = larvae significantly larger than on DPL-16 at 0.05 level. All data collected on F_4 bulk progeny.

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