

Supplementary data

Screening of soybean [*Glycine max* (L.) Merr.] genotypes for yellow mosaic virus (YMV) disease and their molecular characterization using RGA and SSRs markers

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Supplementary Table 1. List of 121 SSR markers used for molecular characterization of soybean genotypes with their information about bin location (cM), linkage group, chromosome number, no. of repeats, annealing temperature, number of alleles and PIC values found during study.

S.No.	Marker	Bin Location (cM)	LG	Chr. No.	No. of repeats	Aneal. Temp.	Rare alleles	Normal alleles	PIC value
1	Satt211	95.96	A1	5	(ATT)10	49 ⁰ C	-	2	0.44
2	Satt717	51.95	A1	5	(ATT)11	49 ⁰ C	1	2	0.12
3	Satt593	25.56	A1	5	(ATT)15(TTG)10(TT)4	49 ⁰ C	-	2	0.50
4	Satt648	59.18	A1	5	(ATT)12	49 ⁰ C	2	4	0.60
5	Satt619	69.21	A1	5	(ATT)11	49 ⁰ C	-	2	0.34
6	Satt538	159.63	A2	8	(ATT)12	49 ⁰ C	1	3	0.61
7	Satt409	145.57	A2	8	(ATT)27	49 ⁰ C	2	4	0.67
8	Satt119	92.43	A2	8	(ATT)13	49 ⁰ C	2	4	0.34
9	Satt177	36.77	A2	8	(ATT)16	49 ⁰ C	-	2	0.47
10	Satt187	54.92	A2	8	(ATT)19	49 ⁰ C	1	2	0.22
11	Satt228	154.11	A2	8	(ATT)19	49 ⁰ C	-	2	0.48
12	Satt429	162.03	A2	8	(ATT)25	49 ⁰ C	2	3	0.36
13	Sat_199	84.09	A2	8	(AT)22	49 ⁰ C	1	3	0.57
14	Sat_377	116.64	A2	8	(AT)20	49 ⁰ C	-	1	0
15	Satt378	165.73	A2	8	(ATT)11	49 ⁰ C	-	1	0
16	Satt707	116.62	A2	8	(ATT)9	49 ⁰ C	-	1	0
17	Satt197	46.39	B1	11	(ATT)20	49 ⁰ C	1	3	0.59
18	Satt665	96.36	B1	11	(ATT)18	49 ⁰ C	-	2	0.44
19	Satt453	123.96	B1	11	(ATT)13	49 ⁰ C	2	3	0.37
20	Sat_156	35.00	B1	11	(AT)17	49 ⁰ C	3	6	0.53
21	Satt251	36.48	B1	11	(ATT)15	49 ⁰ C	-	3	0.40
22	Sat_411	30.87	B1	11	(AT)24	49 ⁰ C	-	1	0
23	Satt687	113.61	B2	14	(ATT)9	49 ⁰ C	-	2	0.45
24	Satt534	87.59	B2	14	(ATT)25	49 ⁰ C	3	4	0.35

25	Sat_287	31.88	B2	14	(AT)28	49 ⁰ C	-	2	0.35
26	Satt168	55.20	B2	14	(ATT)16	49 ⁰ C	1	2	0.10
27	Satt272	71.68	B2	14	(ATT)14	49 ⁰ C	-	3	0.65
28	Satt467	17.77	B2	14	(ATT)16	49 ⁰ C	2	3	0.34
29	Satt560	97.92	B2	14	(ATT)12	49 ⁰ C	1	3	0.40
30	Satt601	67.73	B2	14	(ATT)13	49 ⁰ C	-	1	0
31	Satt180	127.77	C1	4	(ATT)16	49 ⁰ C	1	3	0.44
32	Satt396	24.11	C1	4	(ATT)9	49 ⁰ C	1	2	0.28
33	Satt524	120.12	C1	4	(ATT)14	49 ⁰ C	1	2	0.08
34	Satt565	0.00	C1	4	(ATT)19	49 ⁰ C	-	2	0.41
35	Satt646	70.52	C1	4	(ATT)11	49 ⁰ C	1	4	0.42
36	Sct_186	9.02	C1	4	(CT)15	49 ⁰ C	-	1	0
37	Satt361	75.52	C1	4	(ATT)17	49 ⁰ C	-	1	0
38	Satt170	70.56	C2	6	(ATT)10	49 ⁰ C	-	2	0.33
39	Satt460	117.77	C2	6	(ATT)26	49 ⁰ C	1	4	0.74
40	Satt432	38.05	C2	6	(ATT)15	49 ⁰ C	1	2	0.29
41	AW734043	4.22	C2	6	(AT)18	49 ⁰ C	3	5	0.75
42	Satt643	94.65	C2	6	(ATT)12	49 ⁰ C	-	1	0
43	Sat_336	51.84	C2	6	(AT)19	49 ⁰ C	-	1	0
44	Satt202	126.24	C2	6	(ATT)15	49 ⁰ C	1	2	0.31
45	Satt532	49.07	D1a	1	(ATT)15	49 ⁰ C	1	3	0.62
46	Satt408	106.69	D1a	1	(ATT)19	49 ⁰ C	2	4	0.49
47	Satt407	99.59	D1a	1	(ATT)13	49 ⁰ C	1	2	0.17
48	Satt531	40.87	D1a	1	(ATT)14	49 ⁰ C	1	2	0.17
49	Satt342	48.14	D1a	1	(ATT)21	49 ⁰ C	-	2	0.40
50	Satt370	60.99	D1a	1	(ATT)13	49 ⁰ C	-	1	0
51	Satt266	59.61	D1b	2	(ATT)22	49 ⁰ C	1	3	0.39
52	Satt459	118.62	D1b	2	(ATT)13	49 ⁰ C	1	2	0.06
53	Satt698	38.04	D1b	2	(ATT)17	49 ⁰ C	-	3	0.46
54	Satt558	43.91	D1b	2	(ATT)16	49 ⁰ C		2	0.38
55	Satt600	75.41	D1b	2	(CAA)18(T AA)15	49 ⁰ C	1	2	0.10
56	Satt290	73.35	D1b	2	(ATT)16	49 ⁰ C	1	3	0.36
57	Sat_289	131.92	D1b	2	(AT)24	49 ⁰ C	-	1	0

58	Satt301	93.71	D2	17	(ATT)24	49 ⁰ C, 53.5 ⁰ C	2	4	0.75
59	GMHSP17 9	99.04	D2	17	(AT)15	49 ⁰ C	-	2	0.45
60	Satt386	125.00	D2	17	(ATT)15	55 ⁰ C	1	3	0.51
61	Satt543	88.02	D2	17	(ATT)19	45 ⁰ C	2	3	0.48
62	Satt186	105.45	D2	17	(ATT)19	45 ⁰ C	1	2	0.30
63	Satt311	84.62	D2	17	(ATT)13	45 ⁰ C	-	1	0
64	Satt230	71.31	E	15	(ATT)15	49 ⁰ C	-	2	0.40
65	Satt720	20.80	E	15	(ATT)19	45 ⁰ C	1	2	0.25
66	Satt685	56.70	E	15	(ATT)14	49 ⁰ C	2	4	0.40
67	Satt114	63.69	F	13	(ATT)17	49 ⁰ C	1	4	0.68
68	Satt335	77.70	F	13	(ATT)12	55 ⁰ C	-	2	0.43
69	Satt554	111.89	F	13	(ATT)33	49 ⁰ C	1	2	0.12
70	Satt522	119.19	F	13	(ATT)16	49 ⁰ C	1	2	0.15
71	Satt288	76.77	G	18	(ATT)17	49 ⁰ C	1	3	0.53
72	Satt612	80.38	G	18	(ATT)10	49 ⁰ C	-	2	0.43
73	Sct_187	107.11	G	18	(CT)10	49 ⁰ C	1	2	0.19
74	Satt566	49.91	G	18	(ATT)16	49 ⁰ C	-	2	0.38
75	Satt302	81.04	H	12	(ATT)12	49 ⁰ C	-	2	0.50
76	Satt434	105.74	H	12	(ATT)32	49 ⁰ C		2	0.50
77	Satt635	4.88	H	12	(ATT)7CAA (TAA)3	49 ⁰ C	2	3	0.42
78	Satt666	0.59	H	12	(ATT)14	49 ⁰ C	-	1	0
79	Satt142	86.49	H	12	(ATT)21	49 ⁰ C	-	1	0
80	Satt671	72.09	I	20	(ATT)9	49 ⁰ C	1	2	0.08
81	Satt239	36.94	I	20	(ATT)22	49 ⁰ C	2	3	0.32
82	Satt451	20.34	I	20	(ATT)10	49 ⁰ C	-	1	0
83	Satt367	27.98	I	20	(ATT)21	55 ⁰ C	1	2	0.25
84	Sat_324	84.48	I	20	(AT)27	45 ⁰ C	1	3	0.50
85	Satt674	15.95	J	16	(ATT)17	49 ⁰ C	2	3	0.21
86	Satt405	12.41	J	16	(ATT)9	53 ⁰ C	1	2	0.12
87	Satt529	41.90	J	16	(ATT)13	49 ⁰ C	1	3	0.53
88	Satt183	42.51	J	16	(ATT)13	49 ⁰ C	-	2	0.48
89	Sat_224	75.13	J	16	(AT)19	49 ⁰ C	1	4	0.72
90	Sat_366	52.84	J	16	(AT)8	49 ⁰ C	-	1	0

91	Satt620	53.71	J	16	(ATT)15	49 ⁰ C	-	1	0
92	Satt196	104.79	K	9	(ATT)12	49 ⁰ C	-	2	0.38
93	Satt260	80.12	K	9	(ATT)22	49 ⁰ C	1	2	0.12
94	Satt337	47.38	K	9	(ATT)19	49 ⁰ C	1	3	0.47
95	Satt240	52.88	K	9	(ATT)11	49 ⁰ C	1	2	0.06
96	Sat_087	4.85	K	9	(AT)19(GT) 7	49 ⁰ C	1	3	0.41
97	Satt499	71.01	K	9	(ATT)25	49 ⁰ C	-	1	0
98	Sat_286	87.42	L	19	(AT)32	49 ⁰ C	1	3	0.55
99	Satt481	54.57	L	19	(ATT)14	49 ⁰ C	1	3	0.51
100	Satt006	92.00	L	19	(ATT)12	49 ⁰ C	1	2	0.19
101	Satt373	107.24	L	19	(ATT)21	49 ⁰ C	1	2	0.14
102	Sat_408	1.31	L	19	(AT)32	49 ⁰ C	-	1	0
103	Satt664	92.66	L	19	(ATT)12	49 ⁰ C	-	1	0
104	Sat_405	29.62	L	19	(AT)33	49 ⁰ C	-	1	0
105	Satt418	30.93	L	19	(ATT)2	49 ⁰ C	-	1	0
106	Satt618	111.06	M	7	(ATT)13	49 ⁰ C	-	2	0.39
107	Satt435	38.94	M	7	(ATT)15	49 ⁰ C		2	0.46
108	Satt463	50.10	M	7	(ATT)19(CA A)17(ATT)1 3	49 ⁰ C	2	4	0.62
109	Sat_389	0.00	M	7	(AT)29	49 ⁰ C	-	2	0.50
110	Satt308	130.76	M	7	(ATT)21	49 ⁰ C	-	4	0.54
111	Satt336	133.83	M	7	(ATT)14	49 ⁰ C	-	1	0
112	Satt255	76.49	N	3	(ATT)11	49 ⁰ C	1	4	0.72
113	Satt549	70.60	N	3	(ATT)29	49 ⁰ C	1	4	0.62
114	Satt022	102.06	N	3	(ATT)17	49 ⁰ C	-	3	0.58
115	Satt530	32.85	N	3	(ATT)12	49 ⁰ C	2	3	0.35
116	Satt653	38.09	O	10	(ATT)11	49 ⁰ C	-	3	0.30
117	Satt331	93.37	O	10	(ATT)14	49 ⁰ C	2	2	0.50
118	Satt347	42.29	O	10	(ATT)11	49 ⁰ C	1	2	0.06
119	Sat_282	63.81	O	10	(AT)21	49 ⁰ C	2	4	0.54
120	Satt581	106.03	O	10	(ATT)11	49 ⁰ C	1	2	0.12
121	Satt592	100.38	O	10	(ATT)12	49 ⁰ C	-	1	0

Total							90	286	
Mean							0.74	2.36	0.32

Supplementary Table 2. Details of soybean genotypes used for yellow mosaic virus disease screening and molecular characterization using SSR and RGA based markers.

S.No.	Genotypes	Centre/Country of origin	Disease Reaction	Source population	S.No.	Genotypes	Centre/Country origin	Disease Reaction	Source population
1	UPSM 534	Pantnagar	Resistant	NA	49	SKAF 106	Mandsaur	Susceptible	NA
2	SL 633	Ludhiana	Resistant	NA	50	SKAF 635	Mandsaur	Susceptible	NA
3	DS 9817	Delhi	Resistant	NA	51	SKAF 750-1	Mandsaur	Susceptible	NA
4	DS 9819	Delhi	Resistant	NA	52	SKAF 2202	Mandsaur	Susceptible	NA
5	DS 9821	Delhi	Resistant	NA	53	SKA 2008	Mandsaur	Susceptible	NA
6	PK 292	Pantnagar	Resistant	NA	54	SKAF 415	Mandsaur	Susceptible	NA
7	DS 9720	Delhi	Resistant	NA	55	M 135	India	Susceptible	NA
8	EC 9467	USA	Resistant	NA	56	EC 113397	N.Guinea	Susceptible	4M-6
9	PK 1041	Pantnagar	Resistant	NA	57	EC 389392	Taiwan	Susceptible	NA
10	SL 528	Ludhiana	Resistant	NA	58	G 2130	Taiwan	Susceptible	NA
11	PS 1392	Pantnagar	Resistant	NA	59	G 2132	Taiwan	Susceptible	NA
12	PS 1394	Pantnagar	Resistant	NA	60	EC 439617	Taiwan	Susceptible	G 10428
13	SL 710	Ludhiana	Resistant	NA	61	EC 472095	Taiwan	Susceptible	G2271
14	EC456549	USA	Resistant	PI587621	62	EC 472101	Taiwan	Susceptible	G2277
15	SL 637	Ludhiana	Resistant	NA	63	EC 472103	Taiwan	Susceptible	G2280
16	EC439618	Taiwan	Resistant	G 2261	64	EC 472118	Taiwan	Susceptible	G2301
17	EC439619	Taiwan	Resistant	G 73	65	EC 472126	Taiwan	Susceptible	G2311
18	EC 44303	Taiwan	Resistant	Taita Kachsiung-6	66	EC 472127	Taiwan	Susceptible	G2312
19	DS 9712	Delhi	Resistant	NA	67	EC 472145	Taiwan	Susceptible	G2335
20	PK 1169	Pantnagar	Resistant	NA	68	EC 472184	Taiwan	Susceptible	G2391
21	PK 1241	Pantnagar	Resistant	NA	69	EC 472217	Taiwan	Susceptible	G2456
22	PK 1135	Pantnagar	Resistant	NA	70	EC 472220	Taiwan	Susceptible	G2460
23	NRC 1180	Indore	Resistant	NA	71	EC 472218	Taiwan	Susceptible	G2457
24	PK 1223	Pantnagar	Resistant	NA	72	EC 472228	Taiwan	Susceptible	G2478
25	PK 1225	Pantnagar	Resistant	PK 515 X PK 327	73	EC 472239	Taiwan	Susceptible	G2517
26	PKV 25	Akola	Resistant	NA	74	DS 2006	Delhi	Susceptible	NA

27	SL 46	Ludhiana	Resistant	NA	75	DS 2009	Delhi	Susceptible	NA
28	SL 427	Ludhiana	Resistant	NA	76	DS 2011	Taiwan	Susceptible	NA
29	PK 1347	Pantnagar	Resistant	PS 1024 X PK 472	77	EC 458354	USA	Susceptible	TGX1895- 19F
30	SL 525	Ludhiana	Resistant	PK 416 X PK 1023	78	PK 7427-B	Pantnagar	Susceptible	NA
31	PS 1042	Pantnagar	Resistant	NA	79	EC 471427	Taiwan	Susceptible	PI 92706
32	SL 432	Ludhiana	Resistant	NA	80	PK 1080	Pantnagar	Susceptible	NA
33	SL 459	Ludhiana	Resistant	NA	81	UPSL 534	Pantnagar	Susceptible	NA
34	MAUS 164	Parbhani	Resistant	NA	82	IC 244409	India	Susceptible	NA
35	SL 444	Ludhiana	Resistant	NA	83	JS(SH) 93- 01	Sehore	Susceptible	NA
36	DS 9801	Delhi	Resistant	NA	84	JS 335	Jabalpur	Susceptible	JS 78-77 X JS 71-5
37	EC 458356	USA	Resistant	TGX1895- 22F	85	G 2144	Taiwan	Susceptible	NA
38	EC 456597	USA	Resistant	PI587814C	86	EC 472171	Taiwan	Susceptible	G2371
39	EC 471276	Taiwan	Resistant	ANOKA	87	EC 472211	Taiwan	Susceptible	G2442
40	EC 471784	Taiwan	Resistant	G1713	88	EC 472229	Taiwan	Susceptible	G2486
41	EC 471809	Taiwan	Resistant	G1750	89	EC 456580	USA	Susceptible	PI587573A
42	DS 9814	Delhi	Resistant	Bragg X DS 93-MM-39	90	EC 456626	USA	Susceptible	PI507059
43	DS 9820	Delhi	Resistant	NA	91	JS 96	Jabalpur	Susceptible	NA
44	EC 456574	USA	Resistant	PI594589	92	MAUS 162	Parbhani	Susceptible	NA
45	L 291	Taiwan	Resistant	NA	93	KG 83-1A	Kasbe Digraj	Susceptible	NA
46	EC 456554	USA	Resistant	PI594805A	94	DS 9816	Delhi	Susceptible	NA
47	VLS 57	Almora	Resistant	NA	95	EC 457254	USA	Susceptible	PI587633A
48	Himso 1598	Palampur	Resistant	NA	96	EC 456535	USA	Susceptible	PI587925
