Characteristics of Male-Sterile and Restorer Lines

Sorghum Breeding
Cereals Program
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F O R E W O R D

In this document, we have made an effort to put together all the data we have collected on ICRISAT sorghum hybrid parental (male-sterile and restorer) lines. The data for various traits (32 in all) were collected at ICRISAT Center (17° N), unless otherwise specified, with the generous cooperation of various scientists in other disciplines.

We realize that these data sets may have limitations for extrapolation to other locations, but we believe that they give basic information for selecting an initial set of parental lines which can be further studied and selected in the concerned locations. Thus, we believe that this document will be useful to our cooperators in selecting parent lines to produce hybrids appropriate to their conditions.

Earlier we brought out an another document detailing the pedigrees of all ICRISAT male-sterile lines (ICSA#s), restorer lines (ICSR#s), and hybrids (ICSH#s) in sorghum. We hope that this current document will complement the earlier one to provide full details of ICRISAT male-sterile lines, restorer lines and, consequently the hybrids.

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Abbreviations used and definitions followed:

DFK	= Days to 50% flowering in rainy season.
DFR	= Days to 50% flowering in post-rainy season.
HTK	= Plant height (m) in rainy season.
HTR	= Plant height (m) in post-rainy season.
YIELD (t)	= Grain yield in t/ha during rainy season.
BRL	= Number of R lines tried on a particular A line to produce Hybrids.
DD	= Number of days delay in flower when exposed to 14 hours light.
GLO	= GN = Non glossy; G = Glossy.
MNCU	= Mean of three reps of number of seedlings emerged C/U (Crust/Control).
VIG	= Vigour score : Scored on a scale of 1-5, where 1 = most vigourous and 5 = least vigourous.
PLCO	= Plant colour where T = Tan, P = Purple.
AGSC	= Agronomic score : Scored on a scale of 1-5, where 1 = excellent and 5 = poor.
ANTH (LAB)	= Anthracnose screening in the greenhouse.
RT	= Reaction type where R = resistant, no apparent symptom, HR = Hypersensitively resistant, S = susceptible.
DS	= Disease score on a scale of 1 = no lesions, 2 = 1-5% leaf area covered by lesions, 3 = 6-20%, 4 = 21-40% and 5 = above 40% leaf area covered by lesions.
AN	= Anthracnose : Scored on scale of 1-5, where 1 = resistant, 5 = susceptible.
RU	= Rust : Scored on a scale of 1-5 where, 1 = resistant, 5 = susceptible.
ZL	= Zonate leaf spot : Scored on a scale of 1-5, where 1 = resistant, 5 = susceptible.
GL	= Grey leaf spot : Scored on a scale of 1-5, where 1 = resistant, 5 = susceptible.
DM	= Downey mildew : % infected plants.
LB	= Leaf blight : scored on a scale of 1-5, where 1 = resistant, 5 = susceptible.
EH	= % of healthy plants under ergot inoculation.
ER	= Ergot rating on a scale of 1-5, where 1 = no ergot, 5 = >50 % ergot infected spikelets.
SF	= Shootfly : % Shootfly dead hearts.
SB	= Stem borer : % Stem borer dead hearts.
MID	= Midge : Scored on a scale of 1-9, where 1 = most resistant, 9 = most susceptible.
Color	= Grain colour : C = Cream; W = White and Y = Yellow.
Pericarp	= Pericarp thickness : TN = Thin and TK = Thick.
Shape	= Grain shape : R = Round, O = Oval, B = Bold
Corneous	= Corneousness : On a scale of 1-5, where 1 = corneous and 5 = floury.
100 seed wt(g)	= 100 grain mass in grams.
Grain hardness	= Expressed in kgs pressure required to break the grain (by Kiya's hardness tester).

Table 1. Morpho-physiological characterstics of A/B lines.

S.No.	ICSA/B	DFK	DFR	HTK (m)	HTR (m)	YIELD (t/ha)	ERL	DD	GLO	MNCU	VIG	PLCO	AGSC
1	1	74	74	1.2	1.1	3.9	63	7	NG	0.19	3	T	2
2	2	68	75	1.4	1.2	3.8	75	14	NG	0.10	2	T	2
3	3	67	70	1.2	1.0	5.2	60	4	NG	0.14	2	T	2
4	4	68	71	1.4	1.4	4.5	15	8	NG	0.26	2	T	1
5	5	71	73	1.4	1.4	4.7	14	11	NG	0.15	2	T	1
6	6	66	74	1.2	1.0	4.4	21	11	NG	0.46	1	T	1
7	7	64	75	1.1	0.9	3.9	8	0	G	0.54	2	T	2
8	8	68	80	1.0	0.9	3.8	15	15	NG	0.09	3	T	2
9	9	68	76	1.2	1.0	4.0	26	13	NG	0.31	3	T	2
10	10	60	65	1.1	0.9	3.9	15	10	NG	0.25	2	T	3
11	11	68	67	1.4	1.1	4.9	54	10	NG	0.34	2	T	1
12	12	69	67	1.3	1.3	4.3	25	15	NG	0.16	3	T	2
13	13	62	72	1.4	1.3	5.1	12	14	NG	0.43	2	T	1
14	14	65	80	1.3	1.3	4.8	12	5	NG	0.56	2	T	1
15	15	70	69	1.3	1.1	4.1	11	5	NG	0.21	3	T	2
16	16	64	70	1.1	1.1	4.2	16	15	NG	0.76	3	T	2
17	17	70	69	1.2	1.1	4.0	26	30	NG	0.15	3	T	2
18	18	69	72	1.3	1.2	4.6	31	35	NG	0.27	3	T	1
19	19	70	67	1.3	1.0	4.8	11	9	NG	0.33	3	T	3
20	20	71	73	1.4	1.3	4.4	31	20	NG	0.39	2	T	2
21	21	69	73	1.3	1.1	4.7	12	11	NG	0.10	3	T	2
22	22	65	68	1.2	1.1	4.4	8	11	NG	0.21	3	T	1
23	23	68	69	1.3	1.1	4.8	18	1	NG	0.12	3	T	2
24	24	67	72	1.1	1.0	4.3	20	8	NG	0.28	3	T	2
25	25	64	67	1.5	1.1	3.8	18	10	NG	0.34	2	T	1
26	26	69	72	1.3	1.3	4.1	5	31	NG	0.15	3	T	1
27	27	66	69	1.2	1.0	4.1	5	0	NG	0.57	3	T	1
28	28	68	72	1.2	1.3	4.2	52	-	NG	0.16	4	T	1
29	29	71	73	1.3	1.1	4.3	5	36	NG	0.23	3	T	1
30	30	64	70	1.2	1.1	4.8	15	5	NG	0.59	3	T	1
31	31	61	73	1.4	1.3	4.8	20	5	NG	0.41	2	T	2
32	32	72	75	1.4	1.3	4.2	23	36	NG	0.40	2	T	1
33	33	64	68	1.2	0.9	4.6	4	27	NG	0.63	2	T	1
34	34	69	69	1.2	1.0	4.8	38	12	NG	0.10	3	T	2
35	35	64	68	1.3	1.3	4.8	8	21	NG	0.10	3	T	2
36	36	65	73	1.1	1.0	5.0	8	22	NG	0.15	3	T	2
37	37	73	74	1.3	1.1	3.7	37	19	NG	0.07	3	T	2
38	38	72	75	1.3	1.3	3.5	29	5	NG	0.06	3	T	2
39	39	72	74	1.3	1.1	3.8	13	3	NG	0.20	3	T	2
40	40	68	72	1.3	1.1	4.5	13	4	NG	0.43	2	T	2

Table 1 Contd.,

S.No.	ICSA/8	DFK	DFR	HTK (m)	HTR (m)	YIELD (t/ha)	BRL	DO	GLO	MNCU	VIG	PLCO	AGSC
41	41	71	73	1.4	1.3	3.9	18	3	NG	0.34	3	T	3
42	42	70	74	1.3	1.2	3.5	19	4	NG	0.33	3	T	2
43	43	76	75	1.4	1.3	3.1	9	9	NG	0.07	3	T	1
44	44	70	69	1.2	1.2	4.2	20	9	NG	0.30	3	T	2
45	45	66	73	1.3	1.3	3.6	7	6	NG	0.15	3	T	1
46	46	71	74	1.2	1.0	5.0	3	16	NG	0.10	3	T	1
47	47	68	73	1.4	1.2	4.4	1	0	NG	0.11	3	T	2
48	48	70	75	1.3	1.2	4.2	10	13	G	0.37	2	T	1
49	49	68	80	1.5	1.3	4.5	14	10	NG	0.33	3	T	1
50	50	69	74	1.2	1.1	4.3	8	6	NG	0.04	2	T	2
51	51	69	73	1.6	1.3	5.0	14	8	NG	0.29	3	T	1
52	52	71	68	1.6	1.3	4.0	8	16	G	0.15	3	T	2
53	53	71	80	1.5	1.4	4.2	8	20	NG	0.41	3	T	1
54	54	67	75	1.3	1.1	4.0	8	8	NG	0.32	3	T	1
55	55	67	80	1.4	1.2	5.4	6	8	NG	0.36	3	T	1
56	56	67	71	1.3	0.9	4.7	8	6	NG	0.24	2	T	2
57	57	64	72	1.1	1.0	3.8	2	11	NG	0.27	2	P	3
58	58	68	72	1.6	1.2	4.3	1	3	G	0.24	2	T	1
59	59	66	75	1.2	1.2	4.1	1	5	NG	0.56	3	T	3
60	67	66	72	1.5	1.3	3.2	51	21	NG	0.20	3	T	3
61	70	71	85	1.9	1.1	3.2	9	15	NG	0.29	3	T	3
62	73	71	88	2.1	1.1	3.7	9	17	NG	0.19	1	T	1
63	74	74	92	2.6	1.1	2.9	9	12	NG	0.29	1	T	2
64	75	72	86	2.0	1.2	2.0	9	7	NG	0.39	1	T	1
65	77	73	85	2.3	1.3	2.0	9	6	NG	0.44	2	T	1
66	79	64	85	2.1	1.3	0.5	9	12	NG	0.24	2	T	2
67	81	73	85	2.1	1.3	2.1	9	4	NG	0.16	2	T	1
68	82	66	78	1.2	1.4	1.9	8	16	NG	0.25	3	T	1
69	84	72	81	1.7	1.2	1.6	8	20	NG	0.31	3	T	1
70	85	67	79	1.8	1.3	2.4	8	20	G	0.01	3	T	1
71	89	70	77	2.0	1.3	2.1	8	29	NG	0.33	2	T	1
72	90	72	83	1.9	1.3	1.3	8	29	NG	0.17	2	T	1
73	93	72	81	2.0	1.2	2.2	8	18	G	0.24	3	T	1
74	94	70	81	2.1	1.3	1.7	8	30	NG	0.22	3	T	2
75	95	67	78	1.8	1.4	2.2	8	30	NG	0.07	2	T	1
76	101	67	80	1.7	1.2	2.1	8	15	NG	0.20	1	T	1
77	102	67	80	1.8	1.3	2.3	8	9	NG	0.25	2	T	1
78	88001	66	67	1.9	1.5	4.0	8	4	NG	0.35	3	T	2
79	88003	65	60	1.5	1.0	3.4	0	14	NG	0.18	2	T	2
80	88004	71	77	1.5	1.3	2.7	5	2	NG	0.43	3	T	2

Table 1 Contd.

S.No.	ICSA/B	DFK	DFR	HTK (m)	HTR (m)	YIELD (t/ha)	#RL	DD	GLO	MNCU	VIG	PLCO	AGSC
81	88005	66	70	1.4	1.2	2.5	15	11	NG	0.28	2	T	2
82	88006	71	69	1.3	1.1	3.0	5	4	NG	0.10	4	T	2
83	88007	72	80	1.3	1.0	3.5	9	6	NG	0.18	3	T	2
84	88008	71	80	1.3	1.1	3.2	8	5	NG	0.33	3	T	2
85	88009	71	75	1.4	1.1	2.8	4	5	NG	0.41	2	T	2
86	88010	69	68	1.6	1.3	3.2	5	4	NG	0.07	2	T	1
87	88012	67	71	1.5	1.1	2.9	0	9	NG	0.21	2	T	2
88	88013	66	71	1.5	1.1	2.7	8	-	NG	-	2	T	1
89	88014	68	65	1.6	1.3	2.8	6	3	NG	0.49	3	T	2
90	88015	67	74	1.7	1.3	2.7	1	3	NG	0.59	3	T	2
91	88019	60	82	1.3	1.4	2.1	8	-	NG	-	2	T	2
92	88020	63	80	1.4	1.3	2.5	4	-	NG	-	3	T	2
93	89001	70	76	1.5	1.1	3.2	8	-	NG	-	2	T	2
94	89002	72	80	1.3	1.0	3.2	4	-	NG	-	3	T	2
95	89003	66	76	1.4	1.1	3.3	5	-	NG	-	3	T	2
96	89004	70	80	1.4	1.2	3.6	1	-	NG	-	2	T	1
97	90001	68	74	1.4	1.3	3.4	5	-	NG	-	3	T	2
98	90002	68	68	1.4	1.2	2.0	3	-	NG	-	3	T	3
99	90003	69	69	1.3	1.3	3.2	8	-	G	-	2	T	1
100	90004	70	75	1.5	1.4	2.5	3	-	NG	-	3	T	1

Table 2. Diseases and Pest resistance/susceptibility of A/B lines

S.No.	ICSA/B	ANTH (LAB)		DISEASES								PEST		
		RT	DS	AN	RU	ZL	GL	DM	LB	EH	ER	SF	SB	MID
1	1	S	5	5	3	3	3	98	4	-	5	93	97	9
2	2	S	5	5	4	3	3	86	2	-	5	83	100	9
3	3	S	5	5	2	3	3	100	5	-	5	94	79	5
4	4	S	5	5	2	3	3	100	5	73	3	72	94	4
5	5	S	5	5	2	3	3	100	5	75	-	90	93	6
6	6	S	5	5	5	3	3	94	5	27	-	90	96	9
7	7	R/S	5	5	4	3	3	100	4	-	5	100	98	9
8	8	HR/R	3-5	5	3	3	3	100	4	-	5	97	90	8
9	9	HR/S	3-5	5	3	3	3	100	5	-	5	87	100	8
10	10	S	3-5	5	3	3	3	100	4	-	5	74	87	9
11	11	S	5	2	3	3	3	70	3	81	3	90	84	8
12	12	S	4-5	2	2	1	1	98	4	78	2	95	80	8
13	13	S	5	3	4	3	3	100	5	72	3	83	84	6
14	14	S	5	4	3	4	4	98	5	-	5	76	78	7
15	15	HR/S	4-5	3	3	3	3	100	4	82	3	86	79	7
16	16	HR/S	5	2	3	2	2	88	4	74	3	69	93	7
17	17	S	5	2	5	3	3	87	3	-	5	85	77	7
18	18	S	5	3	5	3	3	76	3	84	2	64	74	8
19	19	S	5	3	5	3	3	100	3	-	5	67	82	6
20	20	S	5	4	2	3	3	96	5	82	2	100	100	9
21	21	HR/S	3-5	4	3	3	3	86	4	73	3	70	95	6
22	22	S	4-5	4	5	3	3	60	3	57	-	86	98	9
23	23	S	5	2	3	2	1	71	4	74	3	94	84	6
24	24	S	5	4	3	3	3	98	3	71	3	86	100	5
25	25	HR/S	5	4	2	3	3	98	3	83	3	85	49	5
26	26	HR/S	5	2	3	2	2	100	2	-	5	90	94	6
27	27	S	5	2	5	2	2	100	4	-	5	99	83	7
28	28	S	3-5	4	3	4	4	100	2	-	5	95	100	6
29	29	S	5	4	3	4	4	76	3	-	5	88	95	7
30	30	S	5	2	5	2	2	96	3	74	3	95	95	8
31	31	S	5	2	5	2	2	100	5	-	5	86	77	9
32	32	S	3-5	3	4	3	3	96	3	-	5	76	81	9
33	33	S	5	2	5	2	2	77	3	-	5	90	71	6
34	34	S	3-5	3	3	2	2	94	3	-	5	55	65	8
35	35	S	4-5	3	3	2	2	90	3	54	3	72	65	6
36	36	S	5	3	3	2	2	100	4	-	5	66	95	6
37	37	S	5	3	3	3	3	97	4	-	5	85	92	6
38	38	S	5	3	2	3	3	100	3	-	5	90	91	7
39	39	HR/S	5	2	2	2	2	100	3	-	5	94	95	7
40	40	HR/S	5	3	2	3	3	100	4	-	5	93	81	6

Table 4 Contd.

S.No.	ICSA/B	ANTH (LAB)		DISEASES								PEST		
		RT	DS	AN	RU	ZL	GL	DM	LB	EH	ER	SF	SB	MID
41	41	S	5	3	4	3	3	100	3	-	5	86	85	9
42	42	MR/S	5	4	4	4	4	88	4	-	5	90	91	6
43	43	MS	5	3	3	3	3	100	3	-	5	95	95	7
44	44	MS	5	3	3	3	3	100	4	89	2	96	94	6
45	45	S	5	3	3	3	3	82	5	68	3	79	90	7
46	46	S	5	3	4	3	3	100	3	79	2	83	91	8
47	47	MR/S	5	3	5	3	3	100	4	-	5	99.	62	6
48	48	S	5	3	3	3	3	81	4	-	5	93	97	8
49	49	MS	5	3	2	3	3	100	2	-	5	96	94	9
50	50	MS	5	4	3	4	4	100	4	-	5	82	87	6
51	51	S	3-5	4	3	3	3	96	5	-	5	60	85	8
52	52	S	5	3	3	3	3	100	2	68	3	75	91	9
53	53	S	4-5	4	2	4	4	74	2	-	5	86	78	9
54	54	S	4-5	4	5	3	3	100	2	71	3	98	70	4
55	55	R/HR	1-3	2	4	3	3	100	2	73	3	100	97	6
56	56	R/S	1-5	2	5	3	3	92	4	-	5	85	80	3
57	57	S	5	5	5	5	5	100	3	-	5	84	79	8
58	58	S	3	2	4	2	2	94	3	-	5	75	86	6
59	59	S	5	3	4	2	2	94	3	-	5	89	66	6
60	67	S	5	2	4	4	2	89	3	-	5	81	54	8
61	70	S	4-5	3	3	1	1	87	2	71	-	91	65	9
62	73	S	5	2	2	1	1	100	4	-	5	94	97	9
63	74	S	5	2	3	1	1	100	3	-	5	94	97	9
64	75	S	5	2	5	1	1	100	5	-	5	91	90	9
65	77	S	5	2	5	1	1	80	3	-	5	76	98	8
66	79	S	5	2	2	2	1	98	5	-	5	95	87	6
67	81	S	5	2	4	1	1	96	3	-	5	84	81	9
68	82	S	5	2	3	2	1	98	3	-	5	85	80	5
69	84	S	5	2	2	2	1	100	4	46	-	82	80	8
70	85	S	5	1	3	2	1	96	5	-	5	91	83	9
71	89	S	5	2	3	2	1	100	5	-	5	89	80	8
72	90	S	3-5	2	2	2	1	100	3	20	-	92	88	7
73	93	S	5	2	3	2	1	100	5	-	5	91	100	9
74	94	S	5	2	2	2	1	100	4	-	5	69	96	9
75	95	S	5	2	3	1	1	100	5	-	5	84	82	9
76	101	S	5	2	3	1	1	100	4	55	-	92	72	9
77	102	MR/S	3-5	2	3	1	1	90	4	78	3	80	96	8
78	88001	MR/S	3-5	2	3	2	1	98	3	80	3	71	72	9
79	88003	S	5	2	3	1	1	100	5	-	5	86	85	9
80	88004	S	5	2	2	1	1	100	2	-	5	65	89	9

Table 2 contd.

.No.	ICSA/B	ANTH (LAB)		DISEASES								PEST		
		RT	DS	AN	RU	ZL	GL	DM	LB	EH	ER	SF	SB	MID
81	88005	S	5	2	3	1	1	98	5	-	5	77	83	8
82	88006	S	4-5	2	2	2	1	100	5	-	5	84	84	9
83	88007	S	2-5	1	2	2	1	100	5	-	5	62	93	8
84	88008	S	2-5	1	2	2	1	100	4	-	5	57	73	7
85	88009	S	4-5	2	3	2	1	100	3	80	3	98	95	8
86	88010	S	5	2	3	2	1	100	5	-	5	87	82	6
87	88012	HR/S	3-5	2	3	3	1	98	3	-	5	79	78	8
88	88013	HR/S	5	2	3	2	1	100	4	-	5	85	98	5
89	88014	S	5	2	3	1	1	84	4	-	5	77	96	9
90	88015	HR/S	3-5	2	2	2	2	100	3	88	2	84	92	7
91	88019	HR/S	3-5	2	2	2	1	48	2	-	5	82	84	3
92	88020	S	5	2	2	2	1	61	2	-	5	92	95	1
93	89001	S	4-5	2	3	2	1	98	5	-	5	100	100	9
94	89002	S	4-5	2	3	2	1	84	3	78	3	79	77	3
95	89003	HR/S	3-5	2	3	2	1	100	5	-	5	94	79	9
96	89004	HR/S	3	2	3	2	1	100	3	-	5	99	82	9
97	90001	-	-	2	-	3	2	96	-	-	-	98	74	8
98	90002	-	-	2	-	4	2	100	-	-	-	97	71	9
99	90003	-	-	2	-	3	1	100	-	-	-	93	77	7
100	90004	-	-	2	-	4	1	12	-	-	-	92	79	5

Table 3. Grain evident characterstics of A/B lines

S.No.	ICSA/B	Grain characters					
		Color	Peri-carp	Sha-pe	Corne-ous	100 seed wt(g)	Grain hard-ness
1	1	C	TN	R	3.0	2.4	6.9
2	2	C	TN	O	2.5	2.5	7.4
3	3	C	TN	O	1.5	2.5	9.8
4	4	W	TK	O	1.5	3.0	10.6
5	5	W	TK	O	1.0	2.9	11.5
6	6	C	TN	R	3.0	3.2	7.3
7	7	C	TN	R	2.0	2.8	8.6
8	8	C	TN	R	4.5	2.5	6.3
9	9	C	TN	R	3.5	2.6	5.7
10	10	C	TN	R	3.0	3.2	9.1
11	11	C	TN	O	3.0	3.4	8.4
12	12	W	TK	O	1.0	3.0	9.8
13	13	C	TN	O	2.5	3.4	10.6
14	14	C	TN	R	3.0	3.4	9.0
15	15	W	TK	O	1.0	2.7	7.3
16	16	W	TK	O	3.0	2.9	7.9
17	17	C	TN	R	2.5	2.8	7.2
18	18	W	TK	R	3.5	3.0	8.3
19	19	W	TK	R	3.0	2.8	7.8
20	20	W	TK	O	1.0	2.7	13.0
21	21	W	TK	O	1.5	2.5	8.3
22	22	W	TK	R	2.0	2.8	7.0
23	23	W	TK	O	1.0	2.5	9.9
24	24	W	TK	R	2.5	2.5	7.0
25	25	W	TK	R	2.0	2.6	7.4
26	26	C	TN	R	3.5	3.1	7.0
27	27	W	TK	R	3.0	3.0	9.8
28	28	Y	TN	R	2.5	1.9	6.2
29	29	C	TN	O	2.5	2.1	6.2
30	30	C	TN	R	3.0	3.0	7.8
31	31	C	TN	R	3.5	3.2	8.2
32	32	C	TN	R	4.0	3.3	8.6
33	33	C	TN	R	4.0	2.9	7.9
34	34	W	TK	O	1.5	2.6	7.1
35	35	C	TN	R	2.5	2.9	7.5
36	36	C	TN	R	3.0	2.4	7.2
37	37	C	TN	R	2.5	3.6	6.6
38	38	C	TN	R	2.5	3.2	7.8
39	39	C	TN	O	3.0	2.9	7.9
40	40	C	TN	R	3.0	2.9	8.1

Table 3 Contd.

S.No.	ICSA/B	Grain characters					
		Color	Peri-carp	Sha-pe	Corne-ous	100 seed wt(g)	Grain hard-ness
41	41	C	TN	R	2.5	3.4	8.9
42	42	C	TN	R	2.0	2.9	6.3
43	43	C	TN	O	2.5	3.0	7.9
44	44	W	TK	O	1.0	2.6	10.4
45	45	C	TN	O	3.5	2.5	7.1
46	46	C	TN	R	3.5	3.2	6.5
47	47	C	TN	R	3.5	2.1	5.3
48	48	C	TN	R	2.5	2.9	7.3
49	49	C	TN	O	3.5	2.4	6.7
50	50	C	TN	O	3.5	3.1	6.6
51	51	C	TN	O	2.5	2.9	9.3
52	52	Y	TN	R	3.0	4.3	8.0
53	53	Y	TN	R	4.5	2.5	5.9
54	54	Y	TN	R	3.0	2.8	5.5
55	55	C	TN	O	2.0	2.8	7.0
56	56	C	TN	O	1.5	2.7	7.9
57	57	C	TN	O	1.5	2.5	8.7
58	58	C	TN	O	3.5	3.6	6.4
59	59	C	TN	O	3.5	2.8	6.9
60	67	C	TN	O	3.5	3.6	8.2
61	70	Y	TN	O	3.0	4.5	8.8
62	73	Y	TN	R	2.0	3.8	5.4
63	74	Y	TN	R	1.5	2.9	6.0
64	75	Y	TN	R	4.0	4.3	4.9
65	77	C	TN	R	3.0	2.9	5.8
66	79	C	TN	R	3.5	4.0	5.2
67	81	C	TN	R	2.0	2.6	5.8
68	82	C	TN	R	2.0	2.8	7.9
69	84	C	TN	R	1.5	2.6	7.5
70	85	C	TN	R	3.0	3.4	7.0
71	89	C	TN	R	3.0	3.4	6.0
72	90	Y	TN	R	3.0	3.0	5.1
73	93	C	TN	R	3.5	2.9	7.5
74	94	Y	TN	R	2.0	2.5	8.4
75	95	C	TN	R	4.0	3.6	7.8
76	101	C	TN	R	1.5	2.9	8.3
77	102	C	TN	O	2.0	2.8	7.9
78	88001	C	TN	R	3.0	2.6	7.0
79	88003	C	TN	R	2.5	2.5	7.0
80	88004	C	TN	O	1.5	2.5	7.7

Table 3 Contd.

S.No.	ICSA/B	Grain characters					
		Color	Peri-carp	Sha-pe	Corne-ous	100 seed wt(g)	Grain hard-ness
81	88005	W	TK	O	3.0	2.9	8.5
82	88006	W	TK	O	2.5	2.6	8.0
83	88007	W	TK	O	2.5	2.3	7.0
84	88008	W	TK	O	2.0	2.5	6.9
85	88009	W	TK	O	2.0	2.5	8.2
86	88010	W	TK	R	3.5	3.2	5.2
87	88012	C	TN	O	3.0	2.9	6.0
88	88013	C	TN	R	2.0	3.0	6.4
89	88014	C	TN	O	1.5	3.0	8.4
90	88015	W	TK	O	1.0	3.1	10.2
91	88019	C	TN	O	2.5	2.7	6.8
92	88020	C	TN	R	2.0	2.6	7.1
93	89001	C	TN	B	2.5	2.6	8.5
94	89002	C	TN	R	3.0	2.8	7.4
95	89003	C	TN	B	3.0	3.2	8.5
96	89004	C	TN	O	3.5	2.8	8.4
97	90001	C	TN	O	2.5	2.8	7.1
98	90002	W	TK	B	2.5	2.6	8.3
99	90003	C	TN	B	2.0	3.1	8.9
100	90004	C	TN	O	3.0	2.4	7.6

Range and means of various traits in male-sterile lines

Characteristic	Number	Mean	Range
Days to 50% flower-rainy	100	68	60 - 76
Days to 50% flower-postrainy	100	74	65 - 88
Plant height (m)-rainy	100	1.4	1.0 - 2.6
Plant height (m)-postrainy	100	1.2	0.9 - 1.5
Grain yield (t ha^{-1})	100	3.6	0.5 - 5.2
Vigour score	100	3	1 - 4
Agronomic score	100	2	1 - 3
Anthracnose score	100	3	1 - 5
Rust score	96	3	2 - 5
Zonate leaf spot score	100	2	1 - 5
Grey leaf spot score	100	2	1 - 5
Downy mildew (% infection)	100	94	12 - 100
Leaf blight score	96	4	2 - 5
Ergot (% healthy plants)	92	71	20 - 89
Ergot score	89	4	2 - 5
Shoot fly (% dead hearts)	100	85	55 - 100
Stem borer (% dead hearts)	100	86	49 - 100
Midge score	100	7	1 - 9
Corneousness score	100	2.9	1.0 - 4.5
100 grain mass (g)	100	2.9	1.9 - 4.5
Grain hardness (kg)	100	7.6	5.1 -13.0

Abbreviations used and definitions followed:

DFK	Days to 50% flowering in rainy season.
DFR	Days to 50% flowering in post-rainy season.
HTK	Plant height (m) in rainy season.
HTR	Plant height (m) in post-rainy season.
YIELD (t)	Grain yield in t/ha during rainy season.
#AL	Number of A lines tried with a particular R line to produce Hybrids.
DD	Number of days delay in flower when exposed to 14 hours light.
GLO	GN = Non glossy; G = Glossy.
MNCU	Mean of three reps of number of seedlings emerged C/U (Crust/Control).
VIG	Vigour score : Scored on a scale of 1-5, where 1 = most vigourous and 5 = least vigourous.
PLCO	Plant colour where T = Tan, P = Purple.
AGSC	Agronomic score : Scored on a scale of 1-5, where 1 = excellent and 5 = poor.
ANTH (LAB)	Anthracnose screening in the greenhouse.
RT	Reaction type where R = resistant, no apparent symptom, HR = Hypersensitively resistant, S = susceptible.
DS	Disease score on a scale of 1 = no lesions, 2 = 1-5% leaf area covered by lesions, 3 = 6-20%, 4 = 21-40% and 5 = above 40% leaf area covered by lesions.
AN	Anthracnose : Scored on scale of 1-5, where 1 = resistant, 5 = susceptible.
RU	Rust : Scored on a scale of 1-5 where, 1 = resistant, 5 = susceptible.
ZL	Zonate leaf spot : Scored on a scale of 1-5, where 1 = resistant, 5 = susceptible.
GL	Grey leaf spot : Scored on a scale of 1-5, where 1 = resistant, 5 = susceptible.
DM	Downey mildew : % infected plants.
LB	Leaf blight : scored on a scale of 1-5, where 1 = resistant, 5 = susceptible.
EH	% of healthy plants under ergot inoculation.
ER	Ergot rating on a scale of 1-5, where 1 = no ergot, 5 = >50 % ergot infected spikelets.
SF	Shootfly : % Shootfly dead hearts.
SB	Stem borer : % Stem borer dead hearts.
MID	Midge : Scored on a scale of 1-9, where 1 = most resistant, 9 = most susceptible.
Color	Grain colour : C = Cream; W = White and Y = Yellow.
Pericarp	Pericarp thickness : TN = Thin and TK = Thick.
Shape	Grain shape : R = Round, O = Oval, B = Bold
Corneous	Corneousness : On a scale of 1-5, where 1 = corneous and 5 = floury.
100 seed wt(g)	100 grain mass in grams.
Grain hardness	Expressed in kgs pressure required to break the grain (by Kiya's hardness tester).

Table 4. Morpho-physiological characterstics of restorer lines.

S.No.	ICSR#	DFK	DFR	HTK (m)	HTR (m)	YIELD (t/ha)	BAL	DD	GLO	MNCU	VIG	PLCO	AGSC
1	1	65	65	1.6	1.2	4.1	9	10	NG	0.40	3	T	2
2	2	81	62	1.5	1.5	1.9	12	32	NG	0.67	2	T	2
3	3	66	67	1.6	1.3	3.4	7	-	NG	0.26	2	T	1
4	4	58	63	1.6	1.2	4.9	5	1	NG	0.12	2	T	1
5	5	76	66	1.5	1.2	4.1	3	9	NG	0.22	2	T	2
6	6	65	68	1.5	1.0	3.7	8	9	G	0.33	3	T	1
7	7	65	69	1.5	1.3	5.1	6	14	NG	0.06	3	T	1
8	8	70	74	1.4	1.1	2.9	2	21	NG	0.30	2	T	3
9	9	65	81	1.9	1.4	5.8	7	7	NG	0.16	2	T	2
10	10	54	67	1.6	1.3	3.6	8	39	NG	-	4	T	2
11	11	67	72	1.5	1.1	4.1	4	34	NG	0.42	3	T	2
12	12	66	73	1.8	1.3	3.7	6	26	NG	0.04	2	T	1
13	13	60	72	1.6	1.3	4.2	5	-2	NG	0.16	1	T	2
14	14	88	70	1.7	1.4	1.4	3	16	NG	0.36	3	T	4
15	15	66	72	1.6	1.2	3.3	3	2	NG	0.32	3	T	2
16	16	67	73	1.7	1.0	3.6	1	24	NG	0.25	2	T	2
17	17	62	71	1.8	1.1	4.3	5	15	NG	0.34	3	T	1
18	18	76	71	1.8	1.3	4.1	5	10	NG	0.10	3	T	2
19	19	61	67	1.7	1.4	3.4	9	9	NG	0.28	2	T	2
20	20	78	71	1.4	1.2	4.7	3	9	NG	0.22	2	T	1
21	21	70	74	1.3	1.2	2.5	5	0	NG	0.13	2	T	2
22	22	66	73	1.8	1.3	2.9	6	7	NG	0.38	2	T	2
23	23	66	67	1.5	1.3	3.3	4	3	NG	0.28	3	T	2
24	24	72	76	1.5	1.2	2.2	2	7	NG	0.24	2	T	3
25	25	70	69	2.0	1.4	2.7	3	6	NG	0.24	2	T	3
26	26	56	68	2.0	1.5	5.3	9	7	NG	0.59	2	T	1
27	27	67	75	1.5	1.1	4.4	7	2	NG	0.19	2	T	2
28	28	66	69	1.8	1.3	3.6	6	14	NG	0.52	2	T	2
29	29	57	74	2.2	1.2	5.1	5	2	NG	0.43	2	T	1
30	30	56	67	2.0	1.6	4.3	9	6	NG	0.29	1	T	2
31	31	58	67	2.3	1.6	4.7	8	9	NG	0.32	1	T	2
32	32	65	69	1.6	1.1	3.9	2	10	NG	0.25	3	T	2
33	33	66	68	1.6	1.1	3.6	16	20	NG	0.15	3	T	1
34	34	66	73	1.5	1.3	4.2	4	19	NG	0.32	2	T	2
35	35	68	77	2.1	1.5	4.8	3	25	NG	0.44	1	T	1
36	36	60	68	2.0	1.3	3.6	10	3	NG	0.20	1	T	1
37	37	66	69	1.3	1.1	3.9	11	1	NG	0.27	3	T	1
38	38	66	66	1.8	1.3	3.7	45	14	NG	0.55	2	T	1
39	39	61	69	1.8	1.4	5.0	3	2	NG	0.13	3	T	1
40	40	69	60	1.4	1.2	3.3	2	14	NG	0.25	3	T	2

Table 4 Contd.

S.No.	ICSR#	DFK	DFR	HTK (m)	HTR (m)	YIELD (t/ha)	#AL	DD	GLO	MNCU	VIG	PLCO	AGSC
41	41	66	72	1.8	1.4	6.0	42	21	NG	0.15	2	T	1
42	42	65	71	1.7	1.4	4.4	6	9	NG	0.17	2	T	1
43	43	65	71	1.9	1.5	4.1	12	16	NG	0.09	2	T	1
44	44	76	74	1.9	1.6	5.0	4	8	NG	0.12	2	T	3
45	45	59	70	1.4	0.9	2.9	3	0	NG	0.37	3	T	3
46	46	52	74	2.0	1.4	1.8	9	16	NG	0.16	2	T	2
47	47	72	72	1.7	1.3	2.3	4	35	NG	0.14	2	T	2
48	48	72	72	1.6	1.3	0.9	4	16	NG	0.46	2	T	3
49	49	72	72	1.8	1.2	3.2	6	22	NG	0.35	3	T	2
50	50	72	73	1.7	1.1	2.5	4	2	NG	0.39	3	T	3
51	51	72	73	1.8	1.3	2.3	4	16	NG	0.25	3	T	3
52	52	64	82	1.9	1.2	5.4	7	-4	NG	0.20	3	T	1
53	53	58	74	2.0	1.6	3.9	9	12	NG	0.28	2	T	1
54	54	65	73	1.6	1.2	2.5	6	10	NG	0.41	4	T	2
55	55	65	68	1.6	1.3	3.3	5	6	NG	0.09	3	T	3
56	56	62	66	2.0	1.5	3.0	38	29	NG	0.57	2	T	2
57	57	67	69	1.5	1.3	3.0	7	21	NG	0.18	2	T	2
58	58	66	71	1.7	1.3	4.2	40	24	NG	0.17	3	T	2
59	59	57	64	1.4	1.3	2.9	13	-	NG	0.12	3	T	3
60	60	65	68	1.8	1.3	3.0	5	16	NG	0.16	4	T	2
61	61	59	67	1.5	1.2	4.3	3	29	NG	0.24	3	T	2
62	62	67	74	2.2	1.4	4.1	5	5	NG	0.08	2	T	2
63	63	67	65	2.0	1.3	4.0	4	4	NG	0.40	2	T	2
64	64	59	73	1.9	1.4	5.3	4	14	NG	0.29	3	T	1
65	65	57	60	1.7	1.3	3.7	2	7	NG	0.08	4	T	1
66	66	59	72	2.2	1.5	5.7	4	31	NG	0.61	2	T	2
67	67	65	82	1.7	1.3	4.7	8	10	NG	0.08	3	T	1
68	68	67	58	1.9	1.4	3.7	3	16	NG	0.20	3	T	1
69	69	65	59	1.5	1.2	2.7	2	10	NG	0.23	3	T	2
70	70	62	72	1.7	1.3	4.2	6	16	NG	0.21	2	T	1
71	71	62	75	1.4	1.1	3.4	6	16	NG	0.49	3	T	1
72	72	67	60	2.0	1.4	3.9	4	7	NG	0.18	3	T	1
73	73	67	74	1.6	1.3	1.8	4	3	NG	0.34	3	T	3
74	74	67	70	1.6	1.2	1.6	5	-1	NG	0.14	4	T	2
75	75	66	80	1.4	1.0	4.0	4	14	NG	0.41	4	T	2
76	76	67	81	1.5	1.1	3.4	8	9	NG	0.32	3	T	2
77	77	65	67	2.1	1.5	4.1	8	17	NG	0.50	2	T	1
78	78	67	80	1.5	1.2	1.9	4	22	NG	0.16	3	T	3
79	79	65	82	1.3	1.1	2.6	3	11	NG	0.32	3	T	3
80	80	61	67	2.3	1.6	3.6	5	11	NG	0.11	2	T	3

Table 4 Contd.

S.No.	ICSR#	DFK	DFR	HTK (m)	HTR (m)	YIELD (t/ha)	BAL	DD	GLO	MNCU	VIG	PLCO	ABSC
81	81	63	81	1.8	1.3	3.9	4	10	G	0.27	3	T	3
82	82	76	77	2.3	1.8	2.6	4	11	G	0.28	2	T	2
83	83	68	76	1.8	1.3	3.6	7	18	NG	0.30	3	T	3
84	84	72	81	1.9	1.5	2.3	3	17	NG	0.27	3	T	2
85	85	66	74	1.5	1.5	4.0	4	8	NG	0.31	2	T	1
86	86	65	74	1.5	1.2	4.1	5	7	NG	0.37	3	T	2
87	87	66	72	1.4	1.1	4.1	5	0	NG	0.40	3	T	2
88	88	65	80	1.0	1.1	2.7	4	23	NG	0.22	4	T	2
89	89	63	75	2.0	1.6	3.6	5	32	NG	0.20	2	T	2
90	90	62	72	1.3	1.0	3.4	5	30	NG	0.36	3	T	2
91	91	72	80	1.4	1.3	0.9	3	21	NG	0.17	3	T	3
92	92	67	75	1.3	1.0	2.9	2	32	NG	0.49	3	T	2
93	93	67	74	1.5	1.4	5.0	3	14	NG	0.78	2	T	1
94	94	65	71	1.4	1.1	1.9	5	0	NG	0.12	3	T	3
95	95	67	76	1.9	1.5	3.9	3	13	NG	0.16	2	T	2
96	96	66	73	1.6	1.2	3.5	3	10	NG	0.75	3	T	1
97	97	60	73	1.9	1.3	3.9	4	-2	NG	0.25	4	T	1
98	98	71	72	1.0	1.1	2.5	5	9	NG	0.29	3	T	3
99	99	83	82	1.3	1.6	2.5	3	6	NG	0.24	2	T	3
100	100	73	74	1.5	1.5	3.7	3	7	NG	0.54	2	T	3
101	101	68	69	1.2	1.4	4.9	4	3	NG	0.15	2	T	1
102	102	73	67	1.3	1.3	3.6	3	1	NG	0.31	2	T	2
103	103	67	70	1.8	1.4	1.0	14	9	NG	0.07	2	T	1
104	104	63	69	1.6	1.4	1.5	16	7	NG	0.22	3	T	1
105	105	63	72	1.8	1.4	2.2	16	14	NG	0.38	2	T	2
106	106	70	76	1.8	1.6	1.6	1	28	NG	0.22	2	T	1
107	107	67	72	1.7	1.4	1.8	13	8	NG	0.11	2	T	1
108	108	65	68	1.6	1.3	1.7	13	4	NG	0.23	3	T	1
109	109	69	75	1.5	1.3	1.5	7	11	NG	0.13	3	T	2
110	110	66	68	1.5	1.3	1.8	12	4	NG	0.08	2	T	1
111	111	65	69	1.5	1.4	1.5	12	9	NG	0.42	2	T	2
112	112	69	75	1.5	1.3	0.9	10	11	NG	0.19	2	T	1
113	113	65	73	1.7	1.5	1.6	11	3	NG	0.33	2	T	2
114	114	67	66	1.6	1.4	1.8	16	8	NG	0.19	2	T	1
115	115	68	72	1.5	1.5	1.8	12	4	NG	0.47	2	T	2
116	116	67	65	1.5	1.4	0.8	16	-1	NG	0.10	4	T	1
117	117	69	75	1.4	1.3	0.6	10	6	NG	0.40	3	T	1
118	118	74	76	1.5	1.6	1.2	7	8	NG	0.22	2	T	2
119	119	67	72	1.9	1.5	1.0	9	5	NG	0.24	2	T	2
120	120	61	67	2.0	1.5	1.1	13	5	NG	0.26	2	T	2

Table 4 Contd.

S.No.	ICSR#	OFK	OFR	HTK (a)	HTR (a)	YIELD (t/ha)	BAL	OD	GLO	MNCU	VIG	PLCO	AGSC
121	121	63	74	1.8	1.4	0.9	14	11	NG	0.34	3	T	2
122	122	64	67	1.6	1.4	1.1	14	18	NG	0.20	2	T	1
123	123	67	74	1.4	1.3	1.1	7	14	NG	0.05	3	T	2
124	124	60	67	1.5	1.3	2.1	11	13	NG	0.09	3	T	3
125	125	66	75	1.5	1.5	0.8	8	9	NG	0.23	2	T	3
126	126	66	75	1.6	1.5	1.3	5	11	NG	0.18	2	T	1
127	127	67	76	1.6	1.4	1.7	4	16	G	0.22	2	T	3
128	128	66	74	1.8	1.6	1.8	14	4	NG	0.24	2	T	1
129	129	67	69	1.5	1.1	1.3	16	9	NG	0.19	3	T	3
130	130	74	78	1.7	1.6	3.6	7	9	NG	0.34	2	T	1
131	131	73	82	1.2	1.2	0.6	7	25	NG	0.57	3	T	3
132	132	77	76	1.5	1.4	0.3	7	13	NG	0.20	2	T	1
133	133	73	76	1.5	1.3	0.1	9	0	NG	-	3	T	1
134	134	68	75	1.8	1.5	1.7	7	6	NG	0.30	2	T	1
135	135	79	77	1.2	1.3	0.7	6	6	G	0.48	3	T	1
136	136	73	77	1.7	1.4	1.1	3	12	NG	0.19	3	T	1
137	137	62	68	1.8	1.5	1.7	16	4	NG	0.18	2	T	2
138	138	65	69	1.6	1.3	2.1	11	7	NG	0.27	2	T	1
139	139	68	75	1.5	1.3	1.9	11	2	NG	0.22	2	T	1
140	140	67	72	1.6	1.4	1.5	15	10	NG	0.05	2	T	1
141	141	68	75	1.5	1.3	0.8	13	8	NG	0.09	3	T	1
142	142	64	67	1.7	1.4	1.8	18	7	NG	0.17	2	T	2
143	143	72	76	1.7	1.5	0.5	5	2	NG	0.14	2	T	1
144	144	67	74	1.8	1.5	0.9	12	0	NG	0.11	2	T	1
145	145	68	65	1.9	1.6	1.0	20	3	G	0.19	1	T	1
146	146	74	76	1.5	1.4	0.6	5	3	NG	0.18	2	T	3
147	147	68	82	1.4	1.5	0.7	9	1	NG	0.18	3	T	2
148	148	65	75	1.5	1.4	0.3	8	1	NG	0.00	2	T	3
149	149	75	75	1.8	1.7	1.4	7	9	NG	0.33	2	T	2
150	150	69	74	1.4	1.3	1.0	7	0	NG	0.13	3	T	1
151	151	63	66	2.2	1.6	2.1	19	19	NG	0.15	1	T	3
152	152	69	78	1.6	1.4	4.2	2	10	NG	-	3	T	3
153	153	74	82	1.5	1.2	5.1	25	2	NG	-	3	T	2
154	154	73	71	2.5	1.5	4.9	-	9	NG	-	1	T	3
155	155	69	68	2.0	1.6	4.3	2	5	NG	-	1	T	3
156	156	83	73	2.0	1.6	4.9	2	10	G	-	2	T	3
157	160	69	76	1.7	1.3	4.1	16	-	NG	0.44	2	T	1
158	161	65	74	1.9	1.2	4.6	15	-	NG	0.49	2	T	1
159	162	65	78	2.3	1.7	4.6	15	-	NG	0.45	2	T	2
160	165	86	78	2.7	1.8	3.3	14	-	NG	0.38	3	T	4

Table 4 Contd.

S.No.	ICSR#	DFK	DFR	HTK (m)	HTR (m)	YIELD (t/ha)	BAL	DD	GLO	MNCU	VIG	PLCO	AGSC
161	166	75	86	1.6	1.4	4.1	15	-	NG	0.11	3	T	3
162	170	72	86	1.8	1.2	4.4	11	-	NG	0.38	2	T	2
163	171	73	84	1.6	1.3	4.3	9	-	NG	0.24	2	T	3
164	172	66	77	1.8	1.3	4.3	20	-	NG	0.15	4	T	1
165	174	69	79	2.0	1.8	5.1	2	2	NG	0.33	3	P	2
166	176	76	84	2.0	1.1	[illegible]	2	-	-	0.17	2	-	2
167	179	69	75	2.1	2.0	5.6	2	-2	G	0.13	2	T	3
168	181	75	78	2.0	1.7	7.5	3	-1	G	0.21	2	T	3
169	185	83	86	1.8	1.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
170	186	73	75	2.1	1.9	1.8	-	1	G	0.27	2	T	3
171	194	69	74	2.0	2.2	3.4	4	1	NG	0.22	2	T	2
172	196	70	76	1.9	1.5	4.6	4	0	G	0.63	3	T	2
173	89001	74	78	1.5	1.2	3.6	8	14	NG	0.28	4	T	2
174	89002	80	78	1.9	1.5	4.7	4	18	NG	0.28	2	T	3
175	89003	69	76	1.7	1.3	6.2	7	11	NG	0.17	3	T	2
176	89004	69	76	1.8	1.4	3.3	10	10	NG	0.18	2	T	2
177	89005	73	80	1.6	1.4	6.0	7	11	NG	0.23	2	T	1
178	89006	69	71	1.8	1.5	4.9	1	4	NG	0.19	3	T	2
179	89007	64	76	1.8	1.3	4.3	5	8	NG	0.36	2	T	3
180	89008	66	70	1.7	1.4	6.1	4	7	NG	0.08	2	T	2
181	89009	63	75	1.8	1.5	3.0	4	14	NG	0.53	3	T	2
182	89010	69	68	1.9	1.4	5.5	3	17	NG	0.09	2	T	3
183	89011	69	68	1.5	1.2	3.6	2	16	NG	0.12	2	T	3
184	89012	63	64	1.8	1.3	4.8	1	17	NG	0.30	2	T	1
185	89013	60	67	1.5	0.9	4.4	5	8	NG	0.19	3	T	1
186	89014	64	80	1.8	1.6	3.6	6	10	NG	0.43	2	T	2
187	89015	66	72	1.8	1.5	3.4	6	16	G	0.13	3	T	2
188	89016	80	85	1.9	1.6	3.9	3	10	NG	0.11	2	T	2
189	89017	74	76	1.5	1.3	5.0	3	4	NG	0.20	3	T	2
190	89018	56	72	1.5	1.1	3.4	3	4	NG	-	3	T	1
191	89019	69	78	1.5	1.2	3.9	1	10	NG	0.07	2	T	2
192	89020	69	80	1.7	1.6	3.1	6	6	NG	0.17	2	T	2
193	89021	69	80	1.8	1.6	2.9	6	4	NG	0.10	2	T	3
194	89022	73	81	1.6	1.6	3.3	3	11	NG	0.13	2	T	2
195	89023	69	77	1.8	1.6	5.1	3	4	NG	0.13	2	T	3
196	89024	68	79	1.6	1.2	4.8	4	9	NG	0.36	3	T	1
197	89025	74	82	1.8	1.2	6.0	5	12	NG	0.29	3	T	2
198	89026	79	80	1.5	1.2	4.3	7	7	NG	0.27	4	T	3
199	89027	76	82	1.6	1.5	4.4	5	8	NG	0.47	2	T	3
200	89028	60	83	1.5	1.5	3.5	7	10	NG	0.26	3	T	2

Table 4 Contd.

S.No.	ICSR#	DFK	DFR	HTK (a)	HTR (a)	YIELD (t/ha)	BAL	DD	GLD	MNCU	VIG	PLCO	AGSC
201	89029	62	76	1.4	1.2	3.3	3	13	NG	0.26	2	T	3
202	89030	69	78	1.5	1.4	4.3	7	10	NG	0.11	4	T	2
203	89031	66	77	1.4	1.2	3.4	7	9	NG	0.05	3	T	2
204	89032	68	77	1.5	1.3	4.5	8	9	NG	0.19	2	T	3
205	89033	64	73	1.3	1.2	2.5	2	10	NG	0.31	2	T	2
206	89034	54	65	1.5	1.1	3.7	2	10	G	0.20	4	T	2
207	89035	53	65	1.3	1.2	3.7	1	9	G	0.24	3	T	3
208	89036	56	66	1.4	1.3	2.9	1	11	G	0.45	3	T	2
209	89037	54	63	1.5	1.2	5.1	4	14	NG	0.35	3	T	2
210	89038	54	69	1.3	1.3	2.3	2	14	NG	0.21	4	T	2
211	89039	61	71	1.4	1.3	4.7	3	9	NG	0.30	3	T	3
212	89040	64	76	1.3	1.2	4.0	3	11	NG	0.13	3	T	3
213	89041	60	72	1.6	1.3	4.4	2	19	NG	0.58	3	T	2
214	89042	62	76	1.2	1.0	3.9	3	20	NG	0.34	4	T	1
215	89043	56	76	1.8	1.2	4.6	4	10	NG	0.33	2	T	1
216	89044	57	70	1.5	1.3	4.3	1	19	NG	0.65	2	T	1
217	89045	69	69	1.5	1.4	4.6	1	9	NG	0.35	3	T	2
218	89046	66	71	1.6	1.1	4.8	1	9	NG	0.23	3	T	1
219	89047	70	79	1.9	1.4	3.7	1	13	NG	0.57	3	T	3
220	89048	68	78	1.5	1.4	5.8	1	1	NG	0.48	2	T	3
221	89049	69	74	2.5	1.6	4.0	1	12	NG	0.35	1	T	2
222	89050	65	82	1.7	1.5	4.4	1	16	NG	0.12	2	T	2
223	89051	69	74	1.7	1.4	5.3	1	15	NG	0.21	4	T	2
224	89052	78	75	1.4	1.0	3.3	2	10	NG	0.03	4	T	2
225	89053	71	80	1.9	1.3	5.6	2	10	NG	0.22	2	T	1
226	89054	70	78	2.0	1.4	1.4	2	5	NG	-	2	T	3
227	89055	85	78	2.5	1.4	3.6	1	10	NG	0.15	2	T	3
228	89056	82	77	1.9	1.4	5.3	1	5	NG	0.22	2	T	3
229	89057	72	80	1.8	1.3	4.1	1	8	NG	0.33	2	T	3
230	89058	64	76	1.6	1.4	4.0	1	9	NG	0.14	2	T	2
231	89059	76	80	1.5	1.3	4.0	1	9	G	-	4	T	2
232	89060	83	88	1.6	1.1	3.0	1	23	G	0.16	3	T	3
233	89061	75	80	1.5	1.5	3.6	1	8	G	0.13	3	T	3
234	89062	78	80	1.5	1.4	3.4	1	7	G	-	3	T	3
235	89064	69	76	1.6	1.5	5.0	8	6	NG	0.09	3	T	2
236	89065	63	75	1.3	1.0	4.2	1	10	NG	0.29	3	T	2
237	89066	64	69	1.2	1.0	2.2	-	6	G	0.07	3	T	2
238	89067	64	66	1.5	1.1	4.2	-	8	G	0.54	3	T	1
239	89068	61	67	1.4	1.0	4.1	-	14	G	0.30	3	T	1
240	89069	69	82	1.5	1.2	4.4	-	9	G	0.17	3	T	2

Table 4 Contd.

S.No.	ICSR#	DFK	DFR	HTK (m)	HTR (m)	YIELD (t/ha)	BAL	DD	GLO	MNCU	VIG	PLCO	AGSC
241	89070	76	76	1.5	1.2	3.4	-	6	G	0.22	3	T	3
242	89071	78	84	1.5	1.2	5.4	-	9	G	0.65	3	T	3
243	89073	69	69	1.2	1.2	2.9	-	9	G	0.06	2	T	3
244	89074	63	73	1.7	1.5	2.9	-	7	G	-	2	T	1
245	89075	74	70	1.5	1.4	4.9	1	-	G	-	2	T	2
246	89076	71	70	1.6	1.4	5.3	1	-	G	-	2	T	1
247	90001	72	70	1.4	1.4	3.9	4	0	G	-	2	T	2
248	90002	78	71	1.5	1.4	4.4	2	9	G	-	2	T	2
249	90003	63	66	1.8	1.5	4.1	2	0	G	-	3	T	1
250	90004	60	62	1.8	1.7	5.0	1	6	NG	-	2	T	1
251	90005	69	69	1.9	1.4	4.9	4	27	NG	-	2	T	1
252	90006	53	58	1.3	1.1	3.5	2	26	NG	-	3	T	1
253	90007	54	59	1.5	1.3	4.6	1	8	NG	-	3	T	1
254	90008	73	75	2.4	1.6	3.4	1	-	G	-	2	T	3
255	90009	68	65	1.5	1.4	3.5	1	-	G	-	2	T	3
256	90010	73	74	1.8	1.4	4.8	-	-	NG	-	2	T	2
257	90011	74	73	1.9	1.5	5.0	1	-	NG	-	2	T	2
258	90012	73	73	1.8	1.5	4.1	1	-	NG	-	2	T	3
259	90013	85	68	2.3	1.7	3.6	1	-	NG	-	2	T	4
260	90014	65	72	1.7	1.4	3.2	1	-	NG	-	3	T	3
261	90015	63	69	1.8	1.5	4.4	1	-	G	-	2	T	3
262	90016	73	63	2.1	1.6	3.2	1	-	NG	-	2	T	4
263	90017	75	76	3.1	2.5	2.2	1	-	G	-	2	T	4
264	90018	76	77	1.5	1.3	2.0	1	-	G	-	3	T	3
265	90019	76	73	1.8	1.6	4.1	1	-	G	-	3	T	3
266	90020	72	70	2.6	2.3	3.6	1	-	NG	-	2	T	4
267	90021	68	69	2.1	1.9	3.5	1	-	G	-	2	T	3
268	90022	75	73	2.7	2.3	2.7	1	-	G	-	2	T	4
269	90023	69	69	1.5	1.5	2.5	1	-	G	-	3	T	3
270	90024	69	70	1.3	1.3	2.6	1	-	G	-	3	T	3
271	90025	64	68	2.5	1.9	3.6	1	-	G	-	2	T	4
272	90026	69	73	1.5	1.3	2.1	1	-	G	-	3	T	3
273	90027	82	75	1.5	1.4	3.7	1	-	G	-	3	T	3
274	90028	73	76	1.6	1.4	2.9	1	-	G	-	3	T	3

Table 5. Diseases and Pest resistance/susceptibility of restorer lines

No.	ICSR#	ANTH (LAB)		DISEASES								PEST		
		RT	DS	AN	RU	ZL	GL	DM	LB	EM	ER	SF	SB	MID
1	1	S	3	3	3	2	2	54	4	72	3	66	75	8
2	2	S	4	3	3	2	2	93	2	-	5	98	90	9
3	3	S	5	2	3	2	2	84	5	70	3	79	72	6
4	4	S	4	2	2	2	1	75	5	-	5	93	88	7
5	5	S	4	2	4	2	2	93	5	-	5	91	84	9
6	6	S	4	2	3	2	2	90	2	66	3	78	91	6
7	7	MR	3	3	2	3	3	81	3	67	3	59	53	9
8	8	S	3	2	3	2	2	59	2	-	5	77	98	9
9	9	S	3	3	3	3	3	81	3	-	5	91	78	9
10	10	S	4	2	3	2	2	88	3	-	5	82	85	8
11	11	S	3	3	3	3	3	77	3	-	5	72	91	8
12	12	S	3	2	3	3	3	72	3	66	3	58	89	9
13	13	MR	3	3	3	3	3	83	3	-	5	75	92	8
14	14	S	5	2	2	2	2	70	2	-	5	66	84	6
15	15	S	5	2	2	2	2	77	2	56	-	92	90	6
16	16	S	4	3	2	3	3	76	2	-	5	70	94	8
17	17	S	4	2	2	2	2	67	2	-	5	75	94	6
18	18	S	5	5	3	3	3	48	3	70	2	89	77	9
19	19	S	5	2	3	3	3	48	3	-	2	89	81	5
20	20	S	5	3	2	3	3	72	2	71	3	83	86	7
21	21	S	2	3	3	3	3	63	3	41	-	91	84	9
22	22	S	5	3	2	3	3	55	3	69	3	80	73	6
23	23	S	3	2	2	2	2	77	3	-	5	85	84	7
24	24	S	4	3	4	3	3	53	2	-	5	89	100	8
25	25	S	5	3	3	3	3	80	3	78	2	98	87	6
26	26	R/S	1-2	3	2	3	3	69	2	73	2	83	100	6
27	27	S	3	3	3	3	3	97	2	73	3	92	88	3
28	28	S	4	2	2	2	2	96	3	59	-	81	94	8
29	29	MR	1	3	3	3	3	84	3	60	-	52	80	9
30	30	S	4	3	3	3	3	81	3	65	-	75	92	7
31	31	MR	2	3	2	3	3	100	2	82	2	88	97	9
32	32	S	4	3	3	3	3	50	3	-	5	93	100	7
33	33	S	3	3	3	3	3	84	3	86	2	80	82	8
34	34	MR	4	3	3	3	3	90	2	-	5	79	63	9
35	35	S	4	2	4	2	2	52	3	-	5	85	96	8
36	36	S	4	3	3	3	3	72	3	79	3	73	94	7
37	37	S	5	3	3	3	3	93	2	-	5	68	69	4
38	38	S	4	3	3	3	3	52	4	76	3	80	56	7
39	39	S	5	3	3	3	3	93	3	-	5	96	90	8
40	40	S	5	2	3	2	2	54	5	75	3	83	86	8

Table 5 Contd.

S.No.	ICSR#	ANTH (LAB)		DISEASES								PEST		
		RT	DS	AN	RU	ZL	GL	DM	LB	EH	ER	SF	SB	MID
41	41	S	5	2	2	2	2	75	3	74	3	82	73	9
42	42	S	5	2	2	2	2	89	4	75	2	87	98	8
43	43	S	5	3	3	3	3	61	4	-	5	93	82	9
44	44	S	5	4	3	4	4	85	2	-	5	69	88	7
45	45	S	4	3	3	3	3	72	3	-	5	55	81	3
46	46	S	5	3	2	3	3	63	2	74	3	100	95	6
47	47	S	5	2	3	2	2	83	3	81	2	85	98	5
48	48	HR/S	1-4	2	3	2	2	59	2	-	5	98	96	6
49	49	S	2	2	3	2	2	81	2	73	-	71	87	6
50	50	HR/S	1-2	2	2	2	2	43	2	79	-	89	89	7
51	51	S	3	2	3	2	2	97	2	76	3	60	83	6
52	52	S	4	2	4	2	2	26	3	-	5	81	90	7
53	53	S	5	3	3	3	3	90	4	47	-	86	93	9
54	54	S	3	4	3	4	4	48	3	61	-	90	98	5
55	55	S	5	5	3	5	5	71	5	-	5	79	92	6
56	56	S	5	4	3	4	4	93	4	-	5	67	96	7
57	57	S	5	3	4	3	1	77	2	-	5	85	71	6
58	58	S	4	4	4	4	4	47	2	77	3	86	78	5
59	59	S	5	4	2	4	4	88	5	-	5	77	85	6
60	60	HR	2	4	2	4	4	74	2	82	2	94	89	7
61	61	S	5	3	3	3	3	29	4	-	5	85	74	6
62	62	S	5	3	2	3	3	54	2	-	5	83	95	3
63	63	HR	4	3	3	3	3	76	3	-	5	87	57	6
64	64	S	5	4	3	4	4	73	3	75	2	88	100	5
65	65	HS	4	4	2	4	4	36	4	-	5	98	84	7
66	66	R	1	4	3	4	4	60	3	-	5	75	88	7
67	67	S	4	4	3	4	4	82	3	-	5	87	90	7
68	68	S	4	3	3	3	3	85	3	-	5	82	87	9
69	69	S	4	2	3	2	2	18	3	-	5	54	92	6
70	70	HR	2	2	3	2	2	100	3	-	5	93	100	3
71	71	S	3	2	3	4	2	31	4	-	5	89	92	9
72	72	HR	4	3	3	3	3	96	3	-	5	83	95	9
73	73	S	2-4	3	3	3	3	77	2	-	5	79	88	7
74	74	S	3	1	3	2	1	91	3	-	5	63	97	6
75	75	S	3	2	4	2	2	82	5	-	5	54	92	9
76	76	HR	3	3	3	3	3	31	3	-	5	72	100	8
77	77	S	3	3	2	3	3	62	4	-	5	81	80	8
78	78	S	3	2	2	2	2	36	3	-	5	96	77	8
79	79	HR/S	3-4	3	3	3	3	73	4	-	5	96	74	8
80	80	S	5	2	2	2	2	90	4	-	5	59	77	7

Table 5 Contd.

S.No.	ICSR8	ANTH (LAB)		DISEASES								PEST		
		RT	DS	AM	RU	ZL	GL	DM	LB	EH	ER	SF	SB	MID
81	81	S	5	2	3	2	2	100	2	24	-	88	79	9
82	82	S	5	2	2	3	1	100	2	-	5	81	85	9
83	83	S	5	3	2	3	3	48	2	-	5	98	43	7
84	84	HR	3	2	2	2	1	69	3	-	5	95	72	9
85	85	S	2	2	3	2	2	72	5	-	5	89	68	9
86	86	S	3	4	3	4	4	89	3	-	5	72	78	7
87	87	HR	3	4	3	4	4	97	3	-	5	59	87	7
88	88	S	3	4	4	4	4	60	2	-	5	98	100	8
89	89	S	5	4	2	4	4	100	2	-	5	91	95	6
90	90	S	4	3	3	3	3	66	3	-	5	85	81	2
91	91	HR	3	3	4	3	3	27	4	-	5	90	86	7
92	92	S	5	3	3	3	3	96	4	-	5	79	91	7
93	93	S	5	3	3	3	3	73	3	62	2	69	85	6
94	94	S	5	3	3	3	3	96	3	-	5	84	89	6
95	95	HR/S	2-3	2	3	2	2	56	5	-	5	97	80	9
96	96	S	3	3	3	3	3	68	2	-	5	64	98	6
97	97	HR/S	2-3	2	2	2	2	82	2	-	5	58	91	7
98	98	HR	2	2	3	2	2	90	4	20	-	86	89	7
99	99	HR/S	2-3	3	3	3	3	94	3	-	5	85	94	9
100	100	S	4	4	4	3	3	19	2	-	5	98	63	7
101	101	S	3	4	2	3	3	72	2	-	5	69	70	6
102	102	S	5	4	2	3	3	52	2	-	5	85	90	3
103	103	S	3	4	3	3	3	90	3	-	5	84	83	6
104	104	HR/S	2-3	2	4	2	2	76	5	-	5	80	93	8
105	105	S	3	2	4	2	2	58	5	-	5	87	85	8
106	106	S	5	2	3	2	2	89	3	-	5	95	64	9
107	107	S	4	3	2	3	3	87	2	-	5	86	81	6
108	108	S	4	3	2	3	3	63	2	80	2	72	94	6
109	109	HR/S	2-3	3	4	3	3	38	4	43	-	84	98	6
110	110	S	3	3	3	3	3	52	3	76	3	95	75	6
111	111	S	4	4	4	4	4	43	3	-	5	82	97	6
112	112	S	4	3	3	3	3	33	3	-	5	75	100	6
113	113	HR	3	3	3	3	3	15	3	-	5	85	82	7
114	114	S	4	3	3	3	3	62	4	-	5	70	78	5
115	115	HR/S	2-4	2	3	4	2	39	4	-	5	94	90	7
116	116	S	5	4	2	4	4	50	4	-	5	85	85	7
117	117	S	5	4	2	4	4	59	4	55	-	96	88	6
118	118	S	3	3	3	3	3	58	4	-	5	89	89	7
119	119	S	5	3	2	3	3	92	2	62	3	55	92	7
120	120	S	4	3	3	3	3	69	3	-	5	91	89	6

Table 5 Contd.

S.No.	ICSR8	ANTH (LAB)		DISEASES								PEST		
		RT	DS	AN	RU	ZL	GL	DM	LB	EM	ER	SF	SB	MID
121	121	S	5	4	3	3	3	35	3	71	3	100	71	6
122	122	S	5	4	2	4	4	90	4	71	3	84	98	6
123	123	S	3	4	2	4	4	87	5	-	5	96	81	6
124	124	S	4	4	2	4	4	87	4	-	5	59	74	7
125	125	-	-	2	3	3	3	100	5	-	5	95	58	7
126	126	S	4	2	3	3	3	75	5	-	5	100	76	8
127	127	S	5	2	3	2	2	75	5	-	5	76	67	7
128	128	HR	3	3	3	3	3	76	5	-	5	88	82	9
129	129	HR	4	3	3	4	4	87	3	54	3	97	91	6
130	130	S	4	3	2	4	4	75	3	-	5	75	100	9
131	131	HR/S	3	3	2	4	4	81	3	-	5	100	100	6
132	132	HR/S	3-4	3	3	3	3	90	4	68	3	80	87	7
133	133	HR/S	2-3	1	3	3	2	42	3	-	5	82	85	7
134	134	S	3	3	3	3	3	70	3	73	2	71	97	6
135	135	HR/S	2-2	3	3	3	3	93	2	80	3	64	97	7
136	136	S	3	3	3	3	3	79	2	-	5	75	89	6
137	137	S	4	4	3	3	3	50	3	75	2	82	100	6
138	138	S	5	4	3	3	3	62	4	74	3	88	95	8
139	139	HR	2	4	2	3	3	96	4	-	5	82	90	8
140	140	S	5	4	3	3	3	60	3	-	5	89	81	7
141	141	S	4	3	3	4	4	100	5	-	5	90	72	7
142	142	S	3	3	3	4	4	97	5	-	5	100	75	6
143	143	S	3	1	2	4	2	93	2	-	5	84	77	6
144	144	S	3	2	3	3	3	83	3	-	5	92	93	6
145	145	S	5	3	3	3	3	72	5	85	3	89	85	7
146	146	S	5	3	2	3	3	89	3	79	3	76	92	4
147	147	S	5	3	3	3	2	62	4	-	5	98	88	7
148	148	S	5	4	3	4	4	87	5	-	5	79	91	8
149	149	HR	1	4	3	3	3	90	4	83	3	70	97	8
150	150	S	3	4	4	3	3	70	5	69	3	90	96	7
151	151	HR/S	2-2	3	2	3	3	93	5	74	2	87	94	6
152	152	HR	2	3	2	4	2	79	2	-	5	86	82	9
153	153	S	2	2	2	2	1	81	3	-	5	83	93	9
154	154	R	1	2	2	3	1	97	5	-	5	94	85	1
155	155	S	2	2	2	4	1	93	4	-	5	93	79	2
156	156	HR	2	2	3	3	1	93	4	-	5	87	90	9
157	160	HR/S	2-2	3	3	4	1	97	3	84	2	81	90	7
158	161	HR/S	2-4	2	3	3	1	79	4	-	5	88	90	8
159	162	S	5	2	3	3	1	93	4	-	5	71	95	8
160	165	S	4	2	5	2	1	96	3	84	2	72	97	9

Table 5 Contd.

S.No.	ICSR#	ANTH (LAB)		DISEASES								PEST		
		RT	DS	AN	RU	ZL	GL	DM	LB	EM	ER	SF	SB	MID
161	166	S	3	2	3	3	1	96	4	-	5	100	100	9
162	170	HR	3	2	4	2	1	93	4	-	5	81	100	9
163	171	HR	4	2	4	3	1	93	4	-	5	69	95	9
164	172	HS	5	2	3	3	1	96	3	-	5	88	98	7
165	174	HR/S	2-5	*	3	*	*	87	3	-	5	82	95	7
166	176	HS	3	3	3	2	1	96	3	55	-	93	95	9
167	179	HS	3	2	3	3	1	94	4	65	3	87	74	8
168	181	HR/S	2-5	2	3	2	1	86	4	-	5	85	93	9
169	185	S	4	2	3	2	1	97	4	-	5	100	82	9
170	186	HR/S	3-3	2	3	3	1	96	4	78	3	100	90	9
171	194	S	4	3	-	4	1	96	-	-	5	93	77	7
172	196	HR/S	2-2	2	-	3	1	90	-	-	5	70	96	7
173	89001	HR/S	3-3	2	3	3	2	100	2	-	5	81	92	6
174	89002	HR/S	2-4	3	3	3	1	100	3	-	5	87	95	7
175	89003	S	5	2	3	3	1	100	3	-	5	97	88	6
176	89004	HR	2	2	4	3	1	87	4	-	5	89	93	7
177	89005	HR/S	2-3	2	3	4	1	100	4	-	5	87	85	9
178	89006	S	3	2	4	3	1	97	4	-	5	57	87	7
179	89007	S	3	2	3	4	1	83	4	-	5	73	100	7
180	89008	HR	2	2	2	2	1	13	2	-	5	88	87	8
181	89009	HR	2	2	3	2	1	93	3	-	5	95	89	7
182	89010	-	-	2	3	2	1	66	4	-	5	80	83	7
183	89011	-	-	2	3	2	1	87	4	-	5	84	84	7
184	89012	-	-	2	3	4	2	93	4	-	5	98	67	7
185	89013	HR	2	2	3	2	1	20	4	-	5	60	60	7
186	89014	S	3	-	4	-	-	84	4	-	5	100	81	6
187	89015	HR	2	-	2	-	-	79	2	-	5	97	86	6
188	89016	-	-	-	3	-	-	100	5	66	3	100	69	7
189	89017	-	-	2	3	3	1	90	4	-	5	65	65	9
190	89018	-	-	2	4	2	1	44	4	-	5	95	86	8
191	89019	-	-	2	4	2	2	97	3	-	5	91	97	3
192	89020	S	3	-	4	-	-	93	5	-	5	100	100	6
193	89021	S	3	-	4	-	-	86	4	-	5	99	87	6
194	89022	HR	2	-	4	-	-	100	5	-	5	100	74	9
195	89023	-	-	-	3	-	-	96	4	-	5	100	91	7
196	89024	-	-	2	4	3	2	86	3	-	5	93	78	6
197	89025	-	-	2	4	2	1	84	3	-	5	55	84	7
198	89026	-	-	2	4	3	2	97	3	-	5	80	87	8
199	89027	-	-	-	4	-	-	97	4	-	5	100	66	7
200	89028	-	-	-	3	-	-	100	2	-	5	100	84	6

Table 5 Contd.

S.No.	ICSR#	ANTH (LAB)		DISEASES								PEST		
		RT	DS	AN	RU	ZL	GL	DM	LB	EH	ER	SF	SB	MID
201	89029	-	-	-	4	-	-	94	5	-	5	100	97	8
202	89030	HR	2	-	4	-	-	96	3	-	5	99	90	7
203	89031	S	4	-	5	-	-	100	5	-	5	100	84	7
204	89032	HR/S	4	-	4	-	-	88	4	-	5	100	69	6
205	89033	S	3	-	5	-	-	100	4	-	5	100	85	8
206	89034	S	2	1	3	3	1	92	5	-	5	92	74	7
207	89035	HR	2	1	3	3	1	97	4	-	5	90	88	7
208	89036	HR	2	2	3	3	2	100	4	-	5	72	77	8
209	89037	S	2	2	3	1	1	80	5	-	5	78	81	8
210	89038	HR/S	2-2	2	4	2	1	90	3	84	3	99	79	6
211	89039	HR/S	2-2	2	4	3	1	100	4	80	3	88	69	6
212	89040	S	3	2	4	4	1	90	5	77	3	96	91	8
213	89041	S	2	1	4	2	1	93	4	87	2	86	85	7
214	89042	S	3	1	4	3	1	82	4	65	3	72	100	7
215	89043	S	3	1	3	3	2	90	4	-	5	91	78	7
216	89044	S	3	2	2	4	2	93	5	-	5	96	77	6
217	89045	S	3	2	3	3	1	63	4	61	3	80	100	2
218	89046	HR/S	1-3	2	4	2	1	75	5	67	3	95	84	3
219	89047	HR/S	2-3	2	4	2	1	79	3	-	5	77	87	8
220	89048	S	3	3	3	2	1	70	3	-	5	86	100	6
221	89049	HR	3	3	4	1	1	100	3	88	2	69	100	6
222	89050	S	5	2	4	1	1	97	5	69	3	98	96	5
223	89051	HR	3	3	4	1	1	93	4	-	5	89	86	2
224	89052	S	4	2	4	2	1	96	4	-	5	73	80	5
225	89053	-	-	2	3	2	1	94	3	67	3	93	85	3
226	89054	S	3	2	3	1	1	91	4	-	5	98	67	4
227	89055	S	3	2	2	2	1	94	2	-	5	82	81	3
228	89056	HR/S	2-2	2	3	2	1	100	5	60	3	65	90	7
229	89057	HR/S	2-2	2	2	3	1	90	4	75	3	99	100	3
230	89058	S	3	2	4	1	1	100	4	-	5	88	86	3
231	89059	S	4	2	4	3	2	79	5	-	5	79	91	7
232	89060	HR/S	2-2	2	4	3	2	90	5	-	5	67	85	6
233	89061	HR	2	2	3	3	1	84	5	79	2	90	88	6
234	89062	S	4	2	4	2	1	93	4	-	5	91	81	6
235	89064	S	3	2	4	3	2	68	3	-	5	91	94	7
236	89065	HR/S	2-2	2	3	2	1	48	4	-	5	94	91	8
237	89066	-	-	2	4	2	1	97	4	70	3	53	54	5
238	89067	S	4	1	2	3	2	65	2	85	2	97	72	2
239	89068	S	3	1	3	3	2	57	3	75	3	99	97	2
240	89069	HR	4	2	3	3	1	93	3	-	5	80	100	3

Table 5 contd.

S.No.	ICSR#	ANTH (LAB)		DISEASES							PEST		
		RT	DS	AN	RU	ZL	GL	DM	LB	EH	ER	SF	SB	MID
241	89070	MR/S	2-3	2	4	2	1	89	4	-	5	73	97	6
242	89071	S	3	2	4	3	1	87	3	-	5	71	79	6
243	89073	S	4	2	3	2	1	65	4	75	2	61	65	9
244	89074	MR/S	3-5	2	4	1	1	76	4	-	5	64	79	6
245	89075	-	-	-	4	-	-	100	4	-	-	97	91	7
246	89076	-	-	-	4	-	-	72	4	-	-	100	98	8
247	90001	-	-	2	4	4	1	100	3	-	-	98	86	6
248	90002	-	-	2	3	2	1	78	3	-	-	100	98	9
249	90003	-	-	2	2	3	2	8	2	-	-	100	89	8
250	90004	-	-	-	3	-	-	96	4	-	-	97	74	8
251	90005	-	-	2	3	4	2	100	4	-	-	100	90	9
252	90006	-	-	1	2	5	3	92	5	-	-	99	83	6
253	90007	-	-	2	3	5	4	91	5	-	-	97	85	7
254	90008	-	-	1	3	3	1	62	5	-	-	91	86	6
255	90009	-	-	2	3	4	2	96	5	-	-	95	100	6
256	90010	-	-	3	4	3	2	88	3	-	-	97	100	4
257	90011	-	-	2	4	3	1	88	2	-	-	100	94	4
258	90012	-	-	2	2	3	1	11	4	-	-	97	100	2
259	90013	-	-	-	2	-	-	92	2	-	-	95	96	3
260	90014	-	-	2	2	4	2	75	3	-	-	100	98	2
261	90015	-	-	2	2	3	1	64	5	-	-	96	93	5
262	90016	-	-	-	3	-	-	0	4	-	-	96	94	4
263	90017	-	-	3	4	4	2	100	4	-	-	78	77	9
264	90018	-	-	2	4	4	1	77	4	-	-	60	93	7
265	90019	-	-	4	3	4	1	50	5	-	-	68	87	6
266	90020	-	-	-	3	-	-	100	4	-	-	91	59	8
267	90021	-	-	1	3	4	1	83	4	-	-	56	81	7
268	90022	-	-	2	4	2	1	100	4	-	-	82	48	9
269	90023	-	-	-	3	-	-	79	4	-	-	82	65	9
270	90024	-	-	2	3	4	1	64	4	-	-	40	67	9
271	90025	-	-	1	3	3	2	88	4	-	-	89	83	9
272	90026	-	-	-	4	-	-	91	5	-	-	84	92	7
273	90027	-	-	1	4	3	1	96	5	-	-	86	87	9
274	90028	-	-	3	3	4	2	62	4	-	-	58	74	7

Table 6. Grain evident characterstics of restorer lines

S.No.	ICSR#	Grain characters				100 seed wt(g)	Grain hard-ness
		Color	Peri-carp	Sha-pe	Corne-ous		
1	1	C	TN	R	2.5	2.9	6.6
2	2	C	TN	B	2.5	3.9	9.2
3	3	C	TN	R	3.5	3.8	9.0
4	4	C	TN	R	3.0	3.0	8.7
5	5	C	TN	B	4.0	2.7	10.6
6	6	C	TN	B	3.0	4.0	11.2
7	7	C	TN	O	2.0	2.8	9.6
8	8	C	TN	R	3.0	3.4	7.5
9	9	C	TN	O	3.0	3.4	8.3
10	10	C	TK	B	3.0	4.8	9.7
11	11	C	TK	O	2.0	3.0	8.8
12	12	C	TN	O	3.0	3.6	8.9
13	13	C	TN	O	2.0	3.2	7.8
14	14	W	TK	B	3.0	4.7	9.8
15	15	C	TN	O	1.5	3.4	9.2
16	16	C	TK	O	4.0	3.5	8.1
17	17	C	TK	B	2.5	3.0	10.5
18	18	C	TN	B	3.5	3.3	7.0
19	19	W	TK	O	2.5	3.4	8.0
20	20	W	TK	O	2.0	3.7	9.1
21	21	W	TK	O	2.0	3.2	7.8
22	22	C	TN	R	3.0	2.8	7.5
23	23	C	TK	O	2.5	3.3	8.7
24	24	C	TK	R	3.0	3.5	6.8
25	25	C	TK	O	2.0	3.7	8.1
26	26	C	TK	O	2.5	3.2	8.7
27	27	C	TK	O	3.5	2.8	6.9
28	28	C	TK	O	3.0	3.4	8.5
29	29	C	TK	O	1.0	3.1	11.8
30	30	C	TN	R	3.0	3.4	9.6
31	31	C	TK	O	2.0	3.2	9.2
32	32	C	TK	O	3.0	2.7	9.0
33	33	C	TK	O	3.0	3.3	8.2
34	34	C	TK	B	1.0	3.2	11.8
35	35	C	TK	O	4.0	3.0	8.2
36	36	C	TK	O	2.0	3.3	11.0
37	37	W	TK	O	3.0	3.2	10.2
38	38	W	TK	O	2.0	2.9	8.8
39	39	C	W	R	2.5	3.3	10.0
40	40	W	TK	B	3.0	4.0	8.1

Table 6 Contd.

S.No.	ICSR8	Grain characters					
		Color	Peri-carp	Sha-pe	Corne-ous	100 seed wt(g)	Grain hard-ness
41	41	W	TK	B	2.5	3.1	8.5
42	42	W	TN	O	2.5	3.1	8.8
43	43	W	TK	O	1.0	2.7	11.0
44	44	C	TN	R	2.5	3.7	9.8
45	45	C	TN	R	2.0	3.7	10.3
46	46	W	TK	O	3.5	3.2	8.0
47	47	W	TK	O	3.0	3.2	9.3
48	48	W	TK	B	3.0	3.8	7.6
49	49	W	TN	O	4.0	3.8	5.7
50	50	C	TN	B	3.0	4.0	6.9
51	51	C	TN	O	2.0	3.9	8.6
52	52	C	TN	R	3.0	3.2	8.2
53	53	C	TN	R	2.0	3.6	7.5
54	54	W	TK	O	3.5	2.9	10.9
55	55	C	TN	R	3.0	2.5	8.3
56	56	C	TK	B	3.0	3.9	9.0
57	57	C	TN	R	3.0	4.2	8.2
58	58	C	TN	R	3.5	2.7	7.6
59	59	C	TN	O	2.5	2.8	8.8
60	60	C	TN	O	1.5	2.2	6.4
61	61	C	TN	O	3.5	2.7	7.4
62	62	C	TN	O	3.0	2.7	8.1
63	63	C	TN	B	2.0	3.4	13.6
64	64	C	TN	O	2.0	2.5	10.1
65	65	C	TN	O	3.0	3.1	7.2
66	66	C	TN	R	3.5	4.0	10.6
67	67	C	TN	R	2.5	2.4	7.4
68	68	C	TN	B	2.5	4.3	11.4
69	69	C	TN	B	3.0	3.7	8.4
70	70	C	TN	O	2.0	2.8	7.7
71	71	C	TN	R	2.5	3.1	7.2
72	72	C	TK	B	3.5	4.4	12.6
73	73	C	TK	R	4.0	3.0	7.5
74	74	C	TN	R	5.0	3.1	4.7
75	75	C	TN	O	3.0	2.8	9.5
76	76	C	TN	O	2.5	3.2	10.1
77	77	C	TN	O	3.0	3.5	6.1
78	78	C	TN	O	3.5	3.9	10.7
79	79	C	TN	O	2.0	3.0	10.4
80	80	W	TK	B	1.5	3.3	12.0

Table 6 Contd.

S.No.	ICSR8	Grain characters				100 seed wt(g)	Grain hard-ness
		Color	Peri-carp	Sha-pe	Corne-ous		
81	81	C	TN	R	2.5	3.5	9.4
82	82	C	TN	O	3.0	3.7	8.6
83	83	C	TN	R	3.5	3.3	6.8
84	84	C	TK	O	4.0	3.2	8.7
85	85	C	TN	R	3.0	3.5	7.4
86	86	C	TK	O	1.5	2.9	10.7
87	87	C	TN	B	2.5	3.1	11.7
88	88	C	TN	R	2.5	2.8	9.5
89	89	C	TN	R	2.0	2.9	8.9
90	90	C	TK	O	3.0	3.3	9.7
91	91	C	TN	R	3.5	2.5	7.3
92	92	C	TN	O	3.5	3.0	7.8
93	93	C	TN	O	4.0	2.8	7.9
94	94	C	TN	O	4.0	3.1	9.6
95	95	C	TN	O	4.5	3.3	7.5
96	96	C	TK	O	4.0	3.7	9.0
97	97	C	TN	O	3.5	2.6	7.8
98	98	C	TN	R	4.0	2.0	7.1
99	99	W	TN	R	1.5	2.9	9.1
100	100	W	TK	O	3.0	3.0	7.7
101	101	W	TK	O	4.5	3.2	12.7
102	102	W	TK	B	2.5	2.7	14.1
103	103	C	TN	R	4.5	3.2	13.4
104	104	C	TN	O	3.0	3.2	10.4
105	105	C	TN	R	2.5	2.8	7.8
106	106	C	TN	R	2.0	3.5	11.3
107	107	C	TK	O	4.5	3.2	7.1
108	108	C	TK	B	3.0	2.7	15.4
109	109	C	TN	O	2.0	2.2	9.2
110	110	C	TN	B	2.5	2.7	14.0
111	111	C	TN	O	3.5	4.2	13.4
112	112	C	TN	O	3.0	2.5	7.2
113	113	C	TK	B	2.5	2.8	15.1
114	114	C	TN	O	3.0	3.7	15.0
115	115	C	TN	O	3.5	3.1	8.6
116	116	C	TN	B	3.0	3.3	9.6
117	117	C	TN	O	2.5	3.0	8.2
118	118	C	TK	O	2.0	2.9	8.8
119	119	C	TN	O	3.5	3.4	14.8
120	120	C	TN	O	4.0	3.6	7.1

Table 6 Contd.

S.No.	ICSR#	Grain characters					
		Color	Peri-carp	Sha-pe	Corne-ous	100 seed wt(g)	Grain hard-ness
121	121	C	TN	R	3.0	3.3	7.5
122	122	C	TN	O	3.5	3.6	10.3
123	123	C	TN	O	3.0	3.5	7.9
124	124	C	TN	O	3,5	4.0	9.4
125	125	C	TN	O	2.5	3.1	11.0
126	126	C	TN	O	3.0	2.8	7.6
127	127	C	TN	O	3.5	2.8	8.2
128	128	C	TN	O	4.0	2.6	7.4
129	129	C	TN	O	2.5	2.9	14.4
130	130	C	TN	R	2.0	3.8	10.2
131	131	C	TN	R	3.5	3.3	7.6
132	132	C	TN	O	2.0	3.1	8.8
133	133	C	TN	O	1.5	2.9	16.4
134	134	C	TN	O	2.5	2.8	10.2
135	135	C	TN	B	1.5	4.3	11.4
136	136	C	TN	R	4.5	3.2	11.8
137	137	C	TK	B	1.5	2.6	9.8
138	138	C	TN	O	2.5	3.1	8.3
139	139	C	TK	O	2.0	2.9	12.0
140	140	C	TN	O	3.0	3.2	14.3
141	141	C	TK	O	3.5	3.1	13.1
142	142	C	TN	O	3.0	2.9	10.0
143	143	C	TN	R	4.0	3.1	8.9
144	144	C	TK	O	2.5	2.2	9.8
145	145	C	TK	B	3.0	2.8	8.4
146	146	C	TN	O	1.5	3.3	8.6
147	147	C	TN	R	3.5	2.9	8.0
148	148	C	TN	R	3.5	3.1	8.8
149	149	C	TN	O	3.0	3.5	7.1
150	150	C	TN	O	4.0	3.0	11.1
151	151	C	TN	O	2.5	3.0	8.7
152	152	C	TN	O	3.0	2.8	7.6
153	153	C	TN	O	2.5	2.9	8.3
154	154	C	TN	O	2.0	2.5	9.0
155	155	C	TN	O	1.5	3.0	11.2
156	156	C	TN	O	3.0	2.5	6.9
157	160	C	TN	O	2.0	2.9	18.1
158	161	C	TN	O	1.5	4.0	14.1
159	162	C	TN	R	2.5	3.3	12.7
160	165	C	TN	B	3.0	4.1	15.5

Table 6 Contd.

S.No.	ICSR#	Grain characters					
		Color	Peri-carp	Sha-pe	Corne-ous	100 seed wt(g)	Grain hard-ness
161	166	C	TK	O	4.0	2.9	5.5
162	170	C	TN	R	3.0	4.6	8.1
163	171	C	TN	O	1.5	4.3	9.4
164	172	C	TN	O	3.0	3.4	11.0
165	174	C	TK	O	5.0	3.6	4.9
166	176	C	TN	O	4.0	4.2	6.1
167	179	C	TN	O	3.5	4.8	7.2
168	181	Y	TN	R	3.0	4.6	6.7
169	185	C	TN	R	3.5	3.7	6.3
170	186	C	TN	R	2.5	4.3	10.9
171	194	C	TN	R	3.0	3.5	10.6
172	196	C	TN	O	1.5	4.0	18.4
173	89001	C	TN	O	4.0	3.9	7.9
174	89002	C	TN	O	3.5	2.8	5.2
175	89003	W	TN	O	2.5	2.7	7.0
176	89004	C	TN	O	1.5	3.1	7.0
177	89005	W	TK	O	3.0	2.5	7.6
178	89006	C	TN	O	2.0	3.3	7.0
179	89007	C	TN	O	2.0	3.1	8.0
180	89008	C	TN	O	4.0	4.5	8.9
181	89009	W	TK	B	3.0	4.9	9.0
182	89010	C	TN	B	4.0	5.8	8.2
183	89011	C	TK	B	2.5	5.3	7.6
184	89012	C	TN	B	2.5	4.1	9.8
185	89013	C	TN	O	1.5	4.5	9.2
186	89014	C	TN	O	1.5	3.7	9.0
187	89015	W	TK	O	2.5	4.5	10.0
188	89016	W	TK	O	1.5	2.9	7.9
189	89017	C	TN	O	2.5	3.2	7.8
190	89018	C	TN	B	2.0	4.1	8.5
191	89019	W	TN	O	2.0	2.7	9.0
192	89020	C	TK	B	2.5	3.0	8.1
193	89021	W	TK	O	2.5	3.0	8.4
194	89022	C	TN	O	1.5	2.5	8.0
195	89023	C	TN	O	1.5	3.3	8.2
196	89024	W	TK	O	1.5	2.8	9.1
197	89025	C	TN	O	1.0	3.2	8.2
198	89026	W	TK	O	2.5	2.7	10.8
199	89027	C	TN	O	2.0	3.5	10.8
200	89028	C	TK	B	2.5	4.0	7.9

Table 6 Contd.

S.No.	ICSR8	Grain characters					
		Color	Peri-carp	Sha-pe	Corne-ous	100 seed wt(g)	Grain hard-ness
201	89029	W	TK	O	2.0	2.9	7.0
202	89030	C	TK	O	2.5	2.3	8.7
203	89031	C	TN	O	1.5	3.1	8.0
204	89032	C	TN	O	1.5	3.2	7.6
205	89033	C	TN	O.	2.0	3.3	7.6
206	89034	C	TN	B	1.5	4.7	10.2
207	89035	C	TN	B	1.5	4.5	12.5
208	89036	C	TN	B	1.0	4.9	11.8
209	89037	C	TN	R	4.5	4.1	7.4
210	89038	C	TN	R	2.0	3.2	8.0
211	89039	C	TN	O	1.5	3.2	9.0
212	89040	C	TN	O	3.0	3.1	7.2
213	89041	C	TN	B	2.5	3.2	8.2
214	89042	C	TN	R	2.5	3.6	7.6
215	89043	C	TN	B	3.0	3.7	8.8
216	89044	W	TK	O	1.5	2.6	9.0
217	89045	C	TN	R	1.5	2.9	8.8
218	89046	W	TK	O	2.0	2.5	4.1
219	89047	C	TN	B	1.0	2.5	8.7
220	89048	C	TN	O	1.5	2.1	7.4
221	89049	C	TN	O	2.0	2.8	8.5
222	89050	C	TN	O	2.5	2.3	8.8
223	89051	W	TK	O	1.5	2.2	8.8
224	89052	C	TN	R	2.0	3.1	7.6
225	89053	C	TN	B	3.5	3.1	7.0
226	89054	C	TN	O	5.0	2.7	6.6
227	89055	C	TN	O	2.0	2.4	8.6
228	89056	W	TK	B	2.5	2.6	7.0
229	89057	C	TN	O	1.5	2.6	7.6
230	89058	W	TK	B	2.0	2.7	8.6
231	89059	C	TN	R	5.0	3.2	7.0
232	89060	C	TN	O	1.5	2.7	8.4
233	89061	C	TN	R	4.0	2.6	5.0
234	89062	C	TN	B	3.5	3.5	7.4
235	89064	C	TN	B	2.5	3.5	8.4
236	89065	W	TK	B	1.5	3.7	10.1
237	89066	C	TN	O	1.5	2.5	9.0
238	89067	C	TN	O	2.5	2.8	7.8
239	89068	W	TK	B	4.0	3.2	7.9
240	89069	C	TN	O	3.0	2.2	6.6

Table 6 Contd.

S.No.	ICSR#	Grain characters					
		Color	Peri-carp	Sha-pe	Corne-ous	100 seed wt(g)	Grain hard-ness
241	89070	C	TN	B	2.5	2.7	8.4
242	89071	C	TN	O	4.0	2.8	7.8
243	89073	C	TN	O	2.0	2.2	9.1
244	89074	C	TN	B	2.5	3.2	7.5
245	89075	C	TN	R	3.5	3.2	6.8
246	89076	C	TN	R	3.0	3.3	8.6
247	90001	C	TN	O	3.5	2.3	7.8
248	90002	C	TN	B	3.0	2.6	8.1
249	90003	C	TN	B	2.0	4.2	11.6
250	90004	C	TN	B	1.5	3.8	15.2
251	90005	C	TN	O	1.5	2.1	8.6
252	90006	C	TN	B	2.0	3.9	11.4
253	90007	C	TN	O	3.5	3.0	9.2
254	90008	C	TN	O	2.0	3.1	6.7
255	90009	C	TN	O	2.5	2.5	6.1
256	90010	W	TK	O	2.0	2.0	6.4
257	90011	C	TN	O	2.0	2.3	5.7
258	90012	C	TN	R	1.5	2.5	6.2
259	90013	C	TN	O	1.5	2.0	9.6
260	90014	C	TN	O	1.0	1.9	11.2
261	90015	C	TN	B	1.5	2.9	10.4
262	90016	C	TN	O	2.0	2.7	8.6
263	90017	C	TN	B	1.5	3.2	5.8
264	90018	C	TN	O	2.5	3.0	8.8
265	90019	C	TN	O	4.0	2.5	7.1
266	90020	C	TN	B	2.5	3.1	8.7
267	90021	C	TN	B	2.0	2.9	7.9
268	90022	C	TN	B	1.5	3.6	9.6
269	90023	C	TN	O	3.5	2.9	8.7
270	90024	C	TN	O	3.0	3.2	9.4
271	90025	C	TN	B	2.0	2.3	8.2
272	90026	C	TN	O	2.5	2.6	8.5
273	90027	C	TN	O	3.0	2.7	7.0
274	90028	C	TN	R	3.5	2.1	6.5

Range and means of various traits in restorer lines

Characteristic	Number	Mean	Range
Days to 50% flower-rainy	274	68	52 - 88
Days to 50% flower-postrainy	274	73	58 - 88
Plant height (m)-rainy	274	1.7	1.0 - 3.1
Plant height (m)-postrainy	274	1.4	0.9 - 2.5
Grain yield (t ha^{-1})	274	3.4	0.1 - 6.2
Vigour score	274	3.0	1 - 4
Agronomic score	274	2.0	1 - 4
Anthracnose score	251	3.0	1 - 5
Rust score	272	3.0	2 - 5
Zonate leaf spot score	251	3.0	1 - 5
Grey leaf spot score	251	2.0	1 - 5
Downy mildew (% infection)	273	78	0 - 100
Leaf blight score	272	3.5	2 - 5
Ergot (% healthy plants)	77	70	20 - 88
Ergot score	230	4.3	2 - 5
Shoot fly (% dead hearts)	274	85	40 - 100
Stem borer (% dead hearts)	274	86	43 - 100
Midge score	274	7.2	1 - 9
Corneousness score	274	2.6	1 - 5
100 grain mass (g)	274	3.6	1.9 - 5.8
Grain hardness (kg)	274	9.0	4.7 -18.4