

Supplementary

Characterization of wheat germplasm for stripe rust (*Puccinia striiformis* f. sp. *tritici*) resistance

Supplementary 1. Seedling and adult-plant response of wheat germplasm against stripe rust

S. No.	Genotype	Seedling IT	Quaid-i-Azam University, Islamabad				Pirsabak			
			RAUDPC		Means	Ranking over years [‡]	RAUDPC		Means	Ranking over years
			2007-08	2008-09			2007-08	2008-09		
1	Mingxian 169	9	60(3)*	48.4(3)	54.2	3	88.9(3)	68.4(3)	78.7	3
2	Shan 229	9	22.9(2)	27.4(2)	25.1	2	63.9(3)	65.8(3)	64.8	3
3	Longyuan 935	9	1.4(1)	17.7(2)	9.6	1	8.3(1)	7.9(1)	8.1	1
4	Mianyang 28	9	5.7(1)	14.5(2)	10.1	2	8.3(1)	7.9(1)	8.1	1
5	Yangmai 5	9	5.7(1)	12.9(2)	9.3	1	8.3(1)	27.6(2)	18	2
6	Yangmai 158	9	71.4(3)	64.5(3)	68	3	58.3(3)	25.0(2)	41.7	3
7	Yumai 18	9	8.6(1)	9.7(1)	9.1	1	52.8(3)	60.5(3)	56.7	3
8	Chuanmai 107	9	1.4(1)	6.5(1)	3.9	1	0.0(1)	7.9(1)	3.9	1
9	Zhengmai 9023	9	10.0(1)	51.6(3)	30.8	3	5.6(1)	9.2(1)	7.4	1
10	Guinong 22	2	5.7(1)	9.7(1)	7.7	1	2.8(1)	5.3(1)	4	1
11	Jinmai 54	9	8.6(1)	17.7(2)	13.2	2	29.2(2)	28.9(2)	29.1	2
12	Emai 14	9	0.0(1)	0.0(1)	0	1	11.1(2)	7.9(1)	9.5	1

13	Yumai 49	9	7.1(1)	9.7(1)	8.4	1	55.6(3)	55.3(3)	55.4	3
14	Shi 4185	0	0.0(1)	3.2(1)	1.6	1	1.4(1)	7.9(1)	4.6	1
15	Jinmai 47	9	40.0(3)	27.4(2)	33.7	3	1.4(1)	7.9(1)	4.6	1
16	Yannong 15	2	5.7(1)	9.7(1)	7.7	2	8.3(1)	6.6(1)	7.5	1
17	Wanmai 19	9	5.7(1)	8.1(1)	6.9	1	29.2(2)	25.0(2)	27.1	2
18	Xifeng 20	9	0.0(1)	3.2(1)	1.6	1	1.4(1)	9.2(1)	5.3	1
19	Jimai 38	2	1.4(1)	6.5(1)	3.9	1	4.2(1)	8.2(1)	6.2	1
20	Jingdong 8	9	0.0(1)	1.6(1)	0.8	1	5.6(1)	6.6(1)	6.1	1
21	AL-1	8	8.5(1)	9.68(1)	9.1	1	29.17(2)	28.95(2)	29.1	2
22	AL-2	9	8.8(1)	9.68(1)	9.3	1	61.11(3)	60.53(3)	60.8	3
23	AL-3	1	8.8(1)	9.68(1)	9.3	1	8.33(1)	7.89(1)	8.1	1
24	AL-4	2	0.00(1)	1.61(1)	0.8	1	8.61(1)	7.89(1)	8.3	1
25	AL-5	3	8.5(1)	6.45(1)	7.5	1	8.33(1)	9.47(1)	8.9	1
26	AL-6	8	0.0(1)	3.23(1)	1.6	1	25.00(2)	28.95(2)	27	2
27	AL-7	9	30.0(2)	24.19(2)	27.1	2	29.17(2)	26.32(2)	27.7	2
28	AL-8	4	10.0(1)	12.90(2)	11.5	2	8.33(1)	7.89(1)	8.1	1
29	AL-9	8	5.7(1)	14.52(2)	10.1	2	6.94(1)	26.32(2)	16.6	2
30	AL-10	5	10.0(1)	10.00(1)	10	1	16.67(2)	18.42(2)	17.5	2
31	AL-11	8	8.5(1)	6.45(1)	7.5	1	23.61(2)	19.74(2)	21.7	2
32	AL-12	8	14.2(2)	12.90(2)	13.6	2	22.22(2)	26.32(2)	24.3	2
33	AL-13	3	4.2(1)	6.45(1)	5.4	1	8.61(1)	8.16(1)	8.4	1
34	AL-14	8	8.5(1)	6.45(1)	7.5	1	23.61(2)	28.95(2)	26.3	2

35	AL-15	9	8.5(1)	9.68(1)	9.1	1	18.06(2)	11.84(2)	14.9	2
36	AL-16	9	18.5(2)	14.52(2)	16.5	2	15.28(2)	10.53(2)	12.9	2
37	AL-17	9	7.14(1)	6.45(1)	6.8	1	16.67(2)	7.89(1)	12.3	2
38	AL-18	8	18.5(2)	14.52(2)	16.5	2	8.33(1)	13.16(2)	10.7	2
39	AL-19	8	37.1(3)	35.48(3)	36.3	3	44.44(3)	34.21(3)	39.3	3
40	AL-20	8	8.5(1)	9.68(1)	9.1	1	19.44(2)	21.05(2)	20.2	2
41	AL-21	9	8.5(1)	12.90(2)	10.7	2	8.33(1)	18.42(2)	13.4	2
42	AL-22	9	8.5(1)	9.68(1)	9.1	1	11.11(2)	13.16(2)	12.1	2
43	AL-23	4	7.1(1)	6.45(1)	6.8	1	13.89(2)	14.47(2)	14.2	2
44	AL-24	8	0.0(1)	0.00(1)	0	1	18.06(2)	19.74(2)	18.9	2
45	AL-25	9	4.2(1)	0.00(1)	2.1	1	18.06(2)	21.05(2)	19.6	2
46	AL-26	9	8.5(1)	6.45(1)	7.5	1	8.61(1)	19.74(2)	14.2	2
47	AL-27	9	8.8(1)	13.55(2)	11.2	2	8.33(1)	7.89(1)	8.1	1
48	AL-28	9	8.5(1)	4.19(1)	6.4	1	4.17(1)	7.89(1)	6	1
49	AL-29	8	18.5(2)	14.52(2)	16.5	2	16.67(2)	11.84(2)	14.3	2
50	AL-30	9	0.00(1)	0.00(1)	0	1	6.94(1)	5.26(1)	6.1	1
51	AL-31	9	0.00(1)	0.00(1)	0	1	9.72(1)	7.89(1)	8.8	1
52	AL-32	9	4.2(1)	0.00(1)	2.1	1	9.72(1)	6.58(1)	8.2	1
53	AL-33	9	8.5(1)	12.90(2)	10.7	2	20.83(2)	21.05(2)	20.9	2
54	AL-34	9	5.7(1)	9.68(1)	7.7	1	8.33(1)	7.89(1)	8.1	1
55	AL-35	9	18.5(2)	14.52(2)	16.5	2	4.17(1)	6.58(1)	5.4	1
56	AL-36	9	11.4(2)	6.45(1)	8.9	1	8.33(1)	3.95(1)	6.1	1

57	AL-37	9	11.4(2)	9.68(1)	10.6	2	8.33(1)	9.21(1)	8.8	1
58	AL-38	9	17.1(2)	9.68(1)	13.4	2	5.56(1)	8.42(1)	7	1
59	AL-39	8	21.4(2)	29.03(2)	25.2	2	5.56(1)	9.21(1)	7.4	1
60	AL-40	9	0.00(1)	0.00(1)	0	1	8.33(1)	9.21(1)	8.8	1
61	AL-41	9	8.5(1)	0.00(1)	4.3	2	6.94(1)	5.26(1)	6.1	1
62	AL-42	9	0.0(1)	0.00(1)	0	1	8.33(1)	5.26(1)	6.8	1
63	AL-43	9	45.7(3)	46.77(3)	46.2	3	18.06(2)	7.89(1)	13	2
64	AL-44	9	18.5(2)	25.81(2)	22.2	2	22.22(2)	19.74(2)	21	2
65	AL-45	9	0.00(1)	0.00(1)	0	1	8.33(1)	14.47(2)	11.4	2
66	AL-46	9	5.7(1)	9.68(1)	7.7	1	27.78(2)	26.32(2)	27	2
67	AL-47	9	27.1(2)	24.19(2)	25.7	2	16.67(2)	11.84(2)	14.3	2
68	AL-48	9	5.7(1)	6.45(1)	6.1	1	16.67(2)	21.05(2)	18.9	2
69	AL-49	9	18.5(2)	25.81(2)	22.2	2	5.56(1)	27.63(2)	16.6	2
70	AL-50	9	7.1(1)	6.45(1)	6.8	1	6.94(1)	7.89(1)	7.4	1
71	AL-51	9	0.00(1)	0.00(1)	0	1	5.56(1)	9.21(1)	7.4	1
72	AL-52	9	0.00(1)	0.00(1)	0	1	4.17(1)	5.26(1)	4.7	1
73	AL-53	9	11.4(2)	6.45(1)	8.9	1	8.33(1)	9.74(1)	9	1
74	AL-54	9	0.00(1)	0.00(1)	0	1	6.94(1)	5.26(1)	6.1	1
75	AL-55	9	0.00(1)	0.00(1)	0	1	15.28(2)	11.84(2)	13.6	2
76	AL-56	9	0.00(1)	0.00(1)	0	1	8.33(1)	7.89(1)	8.1	1
77	AL-57	9	4.29(1)	0.00(1)	2.1	1	8.33(1)	8.42(1)	8.4	1
78	AL-58	9	0.00(1)	0.00(1)	0	1	15.28(2)	10.53(2)	12.9	2

79	AL-59	N/A	0.00(1)	0.00(1)	0	1	6.94(1)	5.26(1)	6.1	1
80	AL-60	9	8.57(1)	0.00(1)	4.3	1	50.00(3)	63.16(3)	56.6	3
81	AL-61	9	0.00(1)	0.00(1)	0	1	6.94(1)	5.26(1)	6.1	1
82	AL-62	8	0.00(1)	0.00(1)	0	1	16.67(2)	10.53(2)	13.6	2
83	AL-63	8	0.00(1)	0.00(1)	0	1	1.39(1)	0.00(1)	0.7	1
84	AL-64	9	0.00(1)	0.00(1)	0	1	6.94(1)	5.26(1)	6.1	1
85	AL-65	9	11.43(2)	12.90(2)	12.2	2	8.33(1)	6.58(1)	7.5	1
86	AL-66	9	0.00(1)	0.00(1)	0	1	58.33(3)	50.00(3)	54.2	3
87	AL-67	5	7.14(1)	6.45(1)	6.8	1	38.89(3)	42.11(3)	40.5	3
88	AL-68	N/A	0.00(1)	0.00(1)	0	1	0.00(1)	5.26(1)	2.6	1
89	AL-69	9	0.00(1)	0.00(1)	0	1	9.72(1)	19.74(2)	14.7	2
90	AL-70	9	5.71(1)	0.00(1)	2.9	1	8.33(1)	5.26(1)	6.8	1
91	AL-71	9	0.00(1)	0.00(1)	0	1	13.89(2)	10.53(2)	12.2	2
92	AL-72	9	17.14(2)	12.90(2)	15	2	18.06(2)	19.74(2)	18.9	2
93	AL-73	9	0.00(1)	0.00(1)	0	1	8.33(1)	9.21(1)	8.8	1
94	AL-74	9	14.29(2)	14.52(2)	14.4	2	9.72(1)	7.89(1)	8.8	1
95	AL-75	9	0.00(1)	0.00(1)	0	1	6.94(1)	5.26(1)	6.1	1
96	AL-76	9	11.43(2)	14.52(2)	13	2	13.89(2)	13.16(2)	13.5	2
97	AL-77	4	0.00(1)	0.00(1)	0	1	6.94(1)	5.26(1)	6.1	1
98	AL-78	9	0.00(1)	0.00(1)	0	1	0.00(1)	0.00(1)	0	1
99	AL-79	9	17.14(2)	12.90(2)	15	2	26.39(2)	27.63(2)	27	2
100	AL-80	9	20.00(2)	19.35(2)	19.7	2	18.06(2)	10.53(2)	14.3	1

101	AL-81	8	0.00(1)	0.00(1)	0	1	13.89(2)	18.42(2)	16.2	1
102	AL-82	8	0.00(1)	0.00(1)	0	1	8.33(1)	7.89(1)	8.1	1
103	AL-83	9	7.14(1)	6.45(1)	6.8	1	15.28(2)	14.47(2)	14.9	1
104	AL-84	9	21.43(2)	24.19(2)	22.8	2	63.89(3)	60.53(3)	62.2	3
105	AL-85	9	50.00(3)	64.52(3)	57.3	3	33.33(3)	35.53(3)	34.4	3
106	SH-1	N/A	8.57(1)	9.68(1)	9.1	1	15.28(2)	11.05(2)	13.2	2
107	SH-2	1	9.14(1)	6.45(1)	7.8	1	8.33(1)	3.95(1)	6.1	1
108	SH-3	N/A	5.71(1)	0.00(1)	2.9	1	8.33(1)	6.32(1)	7.3	1
109	SH-4	8	4.00(1)	0.00(1)	2	1	5.56(1)	3.68(1)	4.6	1
110	SH-5	8	4.29(1)	0.00(1)	2.1	1	4.17(1)	7.89(1)	6	1
111	SH-6	1	5.43(1)	9.68(1)	7.6	1	2.50(1)	5.79(1)	4.1	1
112	SH-7	0	8.57(1)	9.68(1)	9.1	1	8.33(1)	9.21(1)	8.8	1
113	SH-8	0	2.57(1)	9.68(1)	6.1	1	2.78(1)	2.37(1)	2.6	1
114	SH-9	N/A	0.00(1)	0.00(1)	0	1	2.50(1)	1.32(1)	1.9	1
115	SH-10	2	4.00(1)	0.00(1)	2	1	1.39(1)	2.63(1)	2	1
116	SH-11	2	0.57(1)	1.61(1)	1.1	1	4.17(1)	5.79(1)	5	1
117	SH-12	6	12.86(2)	0.00(1)	6.4	1	18.06(2)	11.84(2)	14.9	2
118	SH-13	7	5.71(1)	0.00(1)	2.9	1	4.17(1)	7.89(1)	6	1
119	SH-14	0	6.29(1)	1.61(1)	3.9	1	0.00(1)	7.89(1)	3.9	1
120	SH-15	7	6.86(1)	4.84(1)	5.8	1	18.06(2)	21.05(2)	19.6	2
121	SH-16	N/A	6.29(1)	0.00(1)	3.1	1	15.28(2)	11.84(2)	13.6	2
122	SH-17	8	6.86(1)	12.90(2)	9.9	1	4.17(1)	5.26(1)	4.7	1

123	SH-18	7	1.43(1)	0.00(1)	0.7	1	6.67(1)	5.26(1)	6	1
124	SH-19	1	6.29(1)	0.00(1)	3.1	1	6.94(1)	8.42(1)	7.7	1
125	SH-20	2	4.00(1)	0.00(1)	2	1	8.89(1)	7.89(1)	8.4	1
126	SH-21	2	6.29(1)	10.32(2)	8.3	1	5.56(1)	7.89(1)	6.7	1
127	SH-22	2	4.00(1)	9.68(1)	6.8	1	8.33(1)	6.32(1)	7.3	1
128	SH-23	7	4.00(1)	13.55(2)	8.8	1	8.89(1)	11.84(2)	10.4	2
129	SH-24	2	8.57(1)	0.00(1)	4.3	1	0.00(1)	0.00(1)	0	1
130	SH-25	0	4.00(1)	3.23(1)	3.6	1	1.39(1)	1.32(1)	1.4	1
131	SH-26	7	31.43(3)	45.16(3)	38.3	3	33.33(3)	39.47(3)	36.4	3
132	SH-27	1	6.29(1)	1.61(1)	3.9	1	5.56(1)	5.26(1)	5.4	1
133	SH-28	4	1.43(1)	3.23(1)	2.3	1	9.72(1)	3.68(1)	6.7	1
134	SH-29	4	47.14(3)	38.71(3)	42.9	3	51.39(3)	39.47(3)	45.4	3
135	SH-30	2	5.71(1)	7.10(1)	6.4	1	5.56(1)	5.26(1)	5.4	1
136	SH-31	5	4.00(1)	0.00(1)	2	1	16.67(2)	14.47(2)	15.6	2
137	SH-32	N/A	2.57(1)	1.61(1)	2.1	1	5.56(1)	7.89(1)	6.7	1
138	SH-33	9	8.57(1)	6.45(1)	7.5	1	8.89(1)	5.79(1)	7.3	1
139	SH-34	0	6.86(1)	0.00(1)	3.4	1	1.39(1)	2.63(1)	2	1
140	SH-35	0	6.86(1)	1.61(1)	4.2	1	4.17(1)	7.89(1)	6	1
141	SH-36	0	2.57(1)	7.10(1)	4.8	1	1.39(1)	2.63(1)	2	1
142	SH-37	2	7.14(1)	7.10(1)	7.1	1	4.17(1)	7.89(1)	6	1
143	SH-38	6	6.86(1)	0.00(1)	3.4	1	25.00(2)	28.95(2)	27	2
144	SH-39	2	6.29(1)	1.61(1)	3.9	1	5.56(1)	7.89(1)	6.7	1

145	SH-40	0	4.00(1)	3.23(1)	3.6	1	9.72(1)	9.21(1)	9.5	1
146	SH-41	0	6.86(1)	1.61(1)	4.2	1	2.78(1)	5.79(1)	4.3	1
147	SH-42	2	7.14(1)	1.61(1)	4.4	1	8.33(1)	7.89(1)	8.1	1
148	SH-43	2	6.29(1)	9.68(1)	8	1	12.50(2)	8.42(1)	10.5	2
149	SH-44	2	4.86(1)	1.61(1)	3.2	1	5.56(1)	7.89(1)	6.7	1
150	SH-45	3	7.14(1)	1.61(1)	4.4	1	6.11(1)	8.42(1)	7.3	1
151	SH-46	5	40.00(3)	37.10(3)	38.5	3	11.11(2)	10.53(2)	10.8	2
152	SH-47	5	42.86(3)	54.84(3)	48.8	3	47.22(3)	39.47(3)	43.3	3
153	SH-48	1	6.29(1)	1.61(1)	3.9	1	5.56(1)	5.26(1)	5.4	1
154	SH-49	1	10.00(1)	1.61(1)	5.8	1	8.33(1)	5.26(1)	6.8	1
155	SH-50	N/A	38.57(3)	32.26(3)	35.4	3	38.89(3)	31.58(3)	35.2	3
156	SH-51	1	8.57(1)	1.61(1)	5.1	1	8.33(1)	6.32(1)	7.3	1
157	SH-52	0	5.43(1)	7.10(1)	6.3	1	2.78(1)	6.58(1)	4.7	1
158	SH-53	4	42.86(3)	35.48(3)	39.2	3	34.72(3)	34.21(3)	34.5	3
159	SH-54	4	31.43(3)	46.77(3)	39.1	3	8.33(1)	7.89(1)	8.1	1
160	SH-55	8	48.57(3)	33.87(3)	41.2	3	55.56(3)	42.11(3)	48.8	3
161	SH-56	1	9.14(1)	7.10(1)	8.1	1	8.33(1)	9.21(1)	8.8	1
162	SH-57	5	1.43(1)	9.68(1)	5.6	1	8.89(1)	5.79(1)	7.3	1
163	SH-58	N/A	4.29(1)	9.68(1)	7	1	9.72(1)	5.26(1)	7.5	1
164	SH-59	5	9.14(1)	9.68(1)	9.4	1	8.89(1)	8.42(1)	8.7	1
165	SH-60	1	6.29(1)	2.90(1)	4.6	1	6.11(1)	8.42(1)	7.3	1
166	SH-61	1	2.57(1)	7.10(1)	4.8	1	6.94(1)	5.26(1)	6.1	1

167	SH-62	N/A	4.00(1)	5.48(1)	4.7	1	6.11(1)	5.26(1)	5.7	1
168	SH-63	N/A	24.29(2)	17.74(2)	21	2	11.11(2)	26.32(2)	18.7	2
169	SH-64	0	9.14(1)	10.32(2)	9.7	1	4.72(1)	3.95(1)	4.3	1
170	SH-65	N/A	0.00(1)	6.45(1)	3.2	1	22.22(2)	21.05(2)	21.6	2
171	SH-66	4	45.71(3)	61.29(3)	53.5	3	36.11(3)	42.11(3)	39.1	3
172	SH-67	8	25.71(2)	26.45(2)	26.1	2	13.89(2)	21.05(2)	17.5	2
173	SH-68	8	15.71(2)	25.81(2)	20.8	2	27.78(2)	28.95(2)	28.4	2
174	SH-69	N/A	28.57(2)	27.42(2)	28	2	19.44(2)	14.47(2)	17	2
175	SH-70	N/A	41.43(3)	38.71(3)	40.1	3	37.50(3)	39.47(3)	38.5	3
176	SH-71	N/A	9.14(1)	10.32(2)	9.7	1	8.33(1)	3.95(1)	6.1	1
177	SH-72	N/A	28.57(2)	24.19(2)	26.4	2	13.89(2)	19.74(2)	16.8	2
178	SH-73	8	47.14(3)	46.77(3)	47	3	34.72(3)	38.16(3)	36.4	3
179	SH-74	N/A	54.29(3)	35.48(3)	44.9	3	40.28(3)	36.84(3)	38.6	3
180	SH-75	N/A	6.86(1)	6.45(1)	6.7	1	8.89(1)	5.26(1)	7.1	1
181	SH-76	N/A	10.00(1)	6.45(1)	8.2	1	2.78(1)	1.32(1)	2	1
182	SH-77	1	6.29(1)	9.68(1)	8	1	8.33(1)	7.89(1)	8.1	1
183	SH-78	8	31.43(3)	33.87(3)	32.6	3	33.33(3)	32.89(3)	33.1	3
184	SH-79	N/A	1.43(1)	10.32(2)	5.9	1	2.50(1)	0.00(1)	1.3	1
185	SH-80	N/A	9.71(1)	7.10(1)	8.4	1	6.67(1)	5.79(1)	6.2	1
186	SH-81	N/A	2.57(1)	6.45(1)	4.5	1	6.94(1)	9.21(1)	8.1	1
187	SH-82	0	1.43(1)	3.23(1)	2.3	1	2.78(1)	5.26(1)	4	1
188	SH-83	0	0.57(1)	0.65(1)	0.6	1	6.11(1)	1.32(1)	3.7	1

189	SH-84	8	60.00(3)	48.39(3)	54.2	3	41.67(3)	47.37(3)	44.5	3
190	SH-85	1	6.29(1)	10.32(2)	8.3	1	9.72(1)	7.89(1)	8.8	1
191	SH-86	0	5.71(1)	7.10(1)	6.4	1	3.89(1)	5.79(1)	4.8	1
192	SH-87	0	2.57(1)	1.61(1)	2.1	1	2.78(1)	6.32(1)	4.5	1
193	SH-88	0	6.29(1)	3.23(1)	4.8	1	2.50(1)	7.89(1)	5.2	1
194	SH-89	0	6.29(1)	6.45(1)	6.4	1	8.89(1)	5.26(1)	7.1	1
195	SH-90	2	4.00(1)	2.90(1)	3.5	1	2.50(1)	5.26(1)	3.9	1
196	SH-91	0	6.29(1)	8.06(1)	7.2	1	6.11(1)	8.42(1)	7.3	1
197	SH-92	N/A	8.57(1)	1.61(1)	5.1	1	8.33(1)	3.95(1)	6.1	1
198	SH-93	2	5.71(1)	1.61(1)	3.7	1	5.56(1)	7.89(1)	6.7	1
199	SH-94	N/A	5.71(1)	1.61(1)	3.7	1	8.89(1)	0.53(1)	4.7	1
200	SH-95	0	0.00(1)	3.23(1)	1.6	1	1.39(1)	0.53(1)	1	1
201	Morocco	8	100.00(3)	100.00(3)	100	3	100.00(3)	100.00(3)	100	3

‡Ranking is based on the resistance response 1=Resistant, 2= Intermediate and 3=Susceptible; *values in parenthesis show the ranking within year