

## **SUPPLEMENTARY INFORMATION**

### **Manuscript title**

Genome-wide Association Analysis of Powdery Mildew Resistance in U.S.  
Winter Wheat

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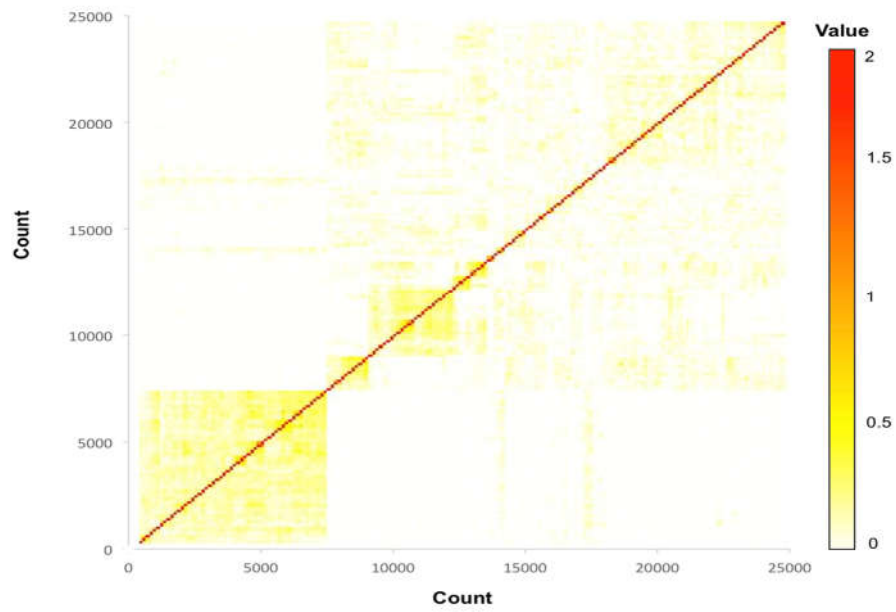
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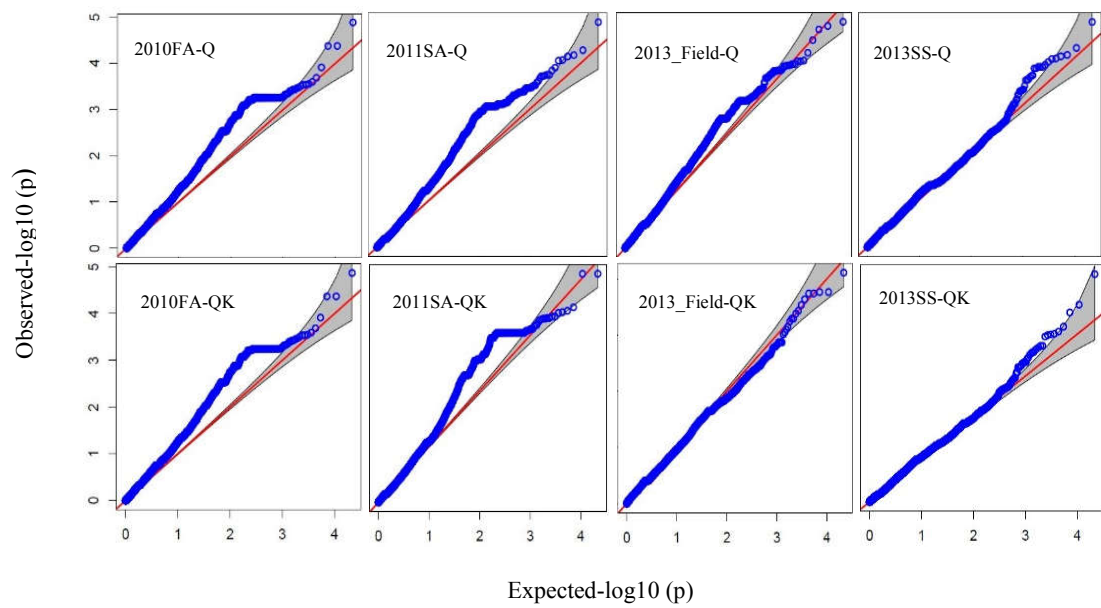
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**Supplementary Figure S1** Heatmap of Gowers similarity coefficient to show three distinct clusters among the 185 U.S. wheat accessions.



**Supplementary Figure S2** Comparison of QQ plots to select model that fits wheat powdery mildew data from three greenhouse experiments (2010FA, 2011SA, and 2013SS) and one field experiment (2013\_Field).



**Supplementary Table S2.** Detailed information for the significant markers linked to QTL for powdery mildew resistance detected from association mapping.

No.	Marker name	Chromosome	Marker Type	Position* (cM)	No.	Marker name	Chromosome	Marker Type	Position* (cM)
1	Kukri_c46010_146	1A	90K-SNP	35.41	21	RAC875_c16962_288	6A	90K-SNP	25.15
2	wsnp_Ex_c31983_40709607	1A	90K-SNP	35.41	22	Excalibur_c23748_1050	6A	90K-SNP	--
3	Ra_c5696_1556	1A	90K-SNP	44.51	23	BobWhite_c19725_1329	3B	90K-SNP	56.89
4	wsnp_Ex_c12101_19360213	1A	90K-SNP	44.51	24	wsnp_JD_c19725_17732526	3B	90K-SNP	56.89
5	BobWhite_c34661_208	1A	90K-SNP	44.51	25	Excalibur_c5298_171	3B	90K-SNP	56.89
6	wsnp_Ex_c31525_40302747	1A	90K-SNP	44.51	26	Excalibur_c5416_846	22	90K-SNP	--
7	Kukri_c4099_321	1A	90K-SNP	--	27	Ku_c71049_1180	22	90K-SNP	--
8	Jagger_c2047_362	2A	90K-SNP	59.23	28	wsnp_Ex_c13496_21243167	5B	90K-SNP	38.77
9	Ku_c57425_413	2A	90K-SNP	59.23	29	Kukri_c18702_132	5B	90K-SNP	38.77
10	CAP8_c4813_252	2A	90K-SNP	--	30	wsnp_Ex_c20988_30107609	5B	90K-SNP	38.77
11	Kukri_rep_c73477_888	2A	90K-SNP	59.23	31	BobWhite_c14258_434	1B	90K-SNP	--
12	wsnp_Ex_c2887_5330426	2A	90K-SNP	59.23	32	BS00093945_51	1B	90K-SNP	44.44
13	wsnp_Ex_c2887_5330787	2A	90K-SNP	59.23	33	JD_c12243_360	1B	90K-SNP	--
14	BS00068178_51	5A	90K-SNP	14.78	34	BobWhite_c26130_475	1B	90K-SNP	--
15	Kukri_c14889_116	5A	90K-SNP	14.78	35	BS00077837_51	1D	90K-SNP	44.44
16	GENE-3189_377	5A	90K-SNP	14.78	36	IACX6586	1D	90K-SNP	44.44
17	BS00098207_51	5A	90K-SNP	14.78	37	Kukri_c3181_2340	1D	90K-SNP	--
18	wsnp_Ex_c11621_18716254	6A	90K-SNP	25.15	38	Xscm0009	1A	SSR	--
19	Tdurum_contig9612_80	6A	90K-SNP	--	39	Xcfd95	6D	SSR	52.35
20	RFL_Contig5693_646	6A	90K-SNP	--	40	Xcfd9-2	3D	SSR	--

\*The chromosome locations were assigned based on W7984 reference sequence map.