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Association mapping for photosynthesis and yield traits under two moisture conditions and their drought indices in winter bread wheat (*Triticum aestivum* L.) using SSR markers

Iqbal Saeed, Xiaojie Chen, Daoura Goudia Bachir, Liang Chen, Yin-Gang Hu*

Table S1. Details of the genotypes used in the present study.

No.	Genotype	Origin	Production region
1	Luohan 2	Henan	HWWR
2	Shijiazhuang 8	Hebei	NWWR
3	Jinmai 47	Shanxi	NWWR
4	Linhan51329	Shanxi	NWWR
5	Shaan 229	Shaanxi	HWWR
6	Xiaoyan 6	Shaanxi	HWWR
7	Pubing 143	Shaanxi	HWWR
8	Zhonghan 110	Beijing	NWWR
9	Liken 2	Shaanxi	HWWR
10	Changwu135	Shaanxi	HWWR
11	Linfen 10	Shanxi	NWWR
12	Luohan 3	Henan	HWWR
13	Linhan536	Shanxi	NWWR
14	Jing 411	Beijing	NWWR
15	Tongmai 3	Shaanxi	HWWR
16	Mianyang 11	Sichuan	SWWR
17	Xinyuan 958	Henan	HWWR
18	Linfen 10	Shanxi	NWWR
19	Taishan 5	Shandong	NWWR
20	Jining 18	Shandong	NWWR
21	Xinmai 13	Henan	HWWR
22	Youmai 2	Shandong	NWWR
23	Xinmai 18	Henan	HWWR
24	Xinong 2000-7	Shaanxi	HWWR
25	Shaanmai 150	Shaanxi	HWWR
26	Zhoumai 16	Henan	HWWR
27	Yuanfeng 139	Shaanxi	HWWR
28	Fengchan 3	Shaanxi	HWWR
29	Xinong 979	Shaanxi	HWWR
30	Zhongyu 8	Henan	HWWR
31	Aifeng 3	Shaanxi	HWWR
32	Bainong 160	Henan	HWWR
33	Shaanhan 187	Shaanxi	HWWR
34	Shijiazhuang 54	Hebei	NWWR
35	Luomai 21	Henan	HWWR
36	Lunxuan 061	Beijing	NWWR
37	Luo 9908	Henan	HWWR
38	Heng95Guan26	Hebei	NWWR
39	Jinmai 33	Shanxi	NWWR
40	Kedong 81	Beijing	NWWR
41	Shaanken 81	Shaanxi	HWWR
42	Han 6172	Hebi	NWWR
43	Huaimai 21	Jiangsu	HWWR
44	Yunong 982	Henan	HWWR
45	Xifeng 20	Gansu	HWWR
46	Lunxuan 715	Beijing	NWWR
47	Nongda 198	Beijing	NWWR

48	Fengkang 5	Beijing	NWWR
49	Luohan 6	Henan	HWWR
50	Jingwang 9	Beijing	NWWR
51	Jingdong 1	Beijing	NWWR
52	Jinmai 21	Shanxi	NWWR
53	Jimai 23	Hebei	NWWR
54	Jinan 18	Shandong	NWWR
55	Hanxuan 1	Shanxi	NWWR
56	Lumai 1	Shandong	NWWR
57	Wenmai 6	Henan	HWWR
58	Yunhan 618	Shanxi	NWWR
59	Hanxuan 10	Shanxi	NWWR

HWWR: Huang-huai Winter Wheat Region; NWWR: Northern Winter Wheat Region; SWWR: Southwestern Winter Wheat Region

Table S2. Marker-trait associations for phenotypic traits under water-stressed conditions in 2012-13 before Bonferroni correction.

Trait	Marker	*P*value	R^2(%)	Trait	Marker	*P*value	R^2(%)
Pn	Xwmc580	0.0024	13.16	BMPP	**Xpsp3123**	0.00012	18.1
Pn	Xbarc56	0.0027	14.39	BMPP	Xgwm335	0.0261	17.45
Pn	Xbarc134	0.0037	9.19	BMPP	Xwmc486	0.0276	13.84
Pn	Xwmc553	0.0043	10.71	BMPP	Xbarc346	0.0318	13.37
Pn	Xwmc285	0.0047	10.58	BMPP	**Xwmc539**	0.00011	26.57
Pn	Xgwm674	0.0067	8.32	BMPP	Xwmc24	0.0398	18.98
Pn	Xgpw2275	0.007	14.19	BMPP	Xcfd10	0.0398	12.62
Pn	Xcfa2049	0.0106	10.8	BMPP	Xpsp3071	0.0399	21.72
Pn	Xgwm164	0.0141	11.69	BMPP	Xwmc177	0.04	21.71
Pn	Xwmc633	0.0146	14.16	BMPP	Xgwm512	0.0113	12.33
Pn	**Xpsp3123**	1.11E-04	15.22	BMPP	Xwmc756	0.0193	18.45
Pn	Xgwm333	0.0149	8.74	BMPP	Xgwm445	0.0211	14.73
Pn	Xcfa2153	0.015	8.74	BMPP	Xbarc164	0.0229	20.89
Pn	Xgwm429	0.0166	10.04	TKW	Xbarc196	0.0079	10.95
Pn	Xwmc110	0.0174	8.49	TKW	Xwmc428	0.0091	12.39
Pn	Xcfa2234	0.019	8.34	TKW	Xwmc657	0.0105	16.54
Pn	Xwmc361	0.0197	8.28	TKW	Xbarc346	0.0154	9.74
Pn	Xwmc577	0.0202	6.62	TKW	**Xgwm182**	0.000113	11.88
Pn	Xwmc727	0.0202	8.24	TKW	Xcfd88	0.0187	11.02
Pn	Xgwm155	0.0216	8.13	TKW	Xgwm146	0.0218	9.1
Pn	Xgwm610	0.0233	9.44	TKW	Xgwm610	0.0225	10.66
Pn	Xwmc756	0.0261	9.25	TKW	Xgwm126	0.0236	8.94
Pn	Xwmc680	0.0262	11.85	TKW	Xwmc727	0.0309	8.43
Pn	Xcfa2123	0.0266	9.21	TKW	**Xpsp3123**	0.000112	15.06
Pn	Xgwm126	0.027	7.75	TKW	Xwmc272	0.0312	11.49
Pn	Xwmc201	0.0289	10.4	TKW	Xwmc553	0.0315	8.39
Pn	Xwmc311	1.16E-04	12.23	TKW	Xbarc175	0.0315	8.39
Pn	Xwmc335	0.0291	15.17	TKW	Xwmc110	0.0345	8.22
Pn	Xwmc516	0.0296	6.01	TKW	Xwmc759	0.0346	12.68
Pn	Xwmc783	0.0311	11.52	TKW	Xbarc147	0.0351	11.25
Pn	Xbarc168	0.0313	7.5	TKW	Xgwm429	0.0385	9.58
Pn	Xbarc346	0.0322	7.45	TKW	Xwmc361	0.0386	8
Pn	Xwmc693	1.18E-04	18.84	TKW	Xwmc549	0.0392	6.23
Pn	Xcfa2190	0.0328	10.16	TKW	Xwmc652	0.0395	9.53
Pn	Xwmc152	0.0329	7.41	TKW	Xwmc758	0.0404	13.68
Pn	Xwmc777	0.0359	12.45	GYPP	Xpsp3123	**0.000011**	14.26
Pn	Xbarc175	0.0368	7.22	GYPP	Xwmc407	**0.00012**	12.46
Pn	Xwmc274	0.0395	5.54	GYPP	Xwmc31	0.0225	7.17
Pn	Xwmc125	0.0401	7.07	GYPP	Xwmc50	0.0295	8.46
Pn	Xwmc537	0.0403	11.01	GYPP	Xwmc413	0.0355	4.26
Pn	Xbarc260	0.0405	7.05				

Pn: net photosynthesis rate (µmol m^{-2} s^{-1}); BMPP: biomass $plant^{-1}$ (g), TKW: thousand grain weight (g); GYPP: grain yield $plant^{-1}$ (g). Markers in bold represent those which qualified FPDR test.

Table S3. Marker-trait associations for phenotypic traits under water-stressed conditions in 2013-14 before Bonferroni correction.

Trait	Marker	*P*value	R^2 (%)	Trait	Marker	*P* value	R^2 (%)
Pn	**Xpsp3123**	0.000109	14.48	BMPP	Xwmc494	0.0168	11.28
Pn	**Xwmc732**	0.000113	17.16	BMPP	Xgwm368	0.0193	13.97
Pn	Xbarc85	0.001	11.78	BMPP	Xwmc577	0.0194	7.52
Pn	Xwmc24	0.0017	17.48	BMPP	Xwmc63	0.0264	4.79
Pn	Xgwm257	0.0032	13.54	BMPP	Xgwm499	0.028	11.77
Pn	Xwmc272	0.0034	14.92	BMPP	Xcfa2193	0.0291	11.68
Pn	Xgpw2132	0.0052	14.21	BMPP	Xwmc741	0.0299	10.14
Pn	Xgpw2275	0.0065	15.24	BMPP	Xbarc37	0.0349	4.33
Pn	Xgwm333	0.0066	10.69	BMPP	Xgwm340	0.0387	11.08
Pn	Xbarc200	0.0078	12.03	BMPP	Xcfd3	0.039	6.26
Pn	Xbarc160	0.0102	9.95	BMPP	Xwmc168	0.043	9.39
Pn	Xbarc56	0.0114	12.82	TKW	**Xgwm182**	0.000114	11.87
Pn	Xwmc727	0.0132	9.5	TKW	**Xpsp3123**	0.00013	15.07
Pn	Xgwm181	0.0141	10.96	TKW	Xwmc741	0.008	10.94
Pn	Xwmc274	0.0143	7.61	TKW	Xwmc428	0.009	12.4
Pn	Xwmc112	0.0146	9.32	TKW	Xwmc657	0.0104	16.56
Pn	Xwmc718	0.0163	14.84	TKW	Xbarc346	0.0153	9.75
Pn	Xgwm135	0.0174	13.4	TKW	Xcfd88	0.0188	11.02
Pn	Xbarc1022	0.0212	8.67	TKW	Xgwm146	0.0217	9.1
Pn	Xcfa2049	0.0219	10.16	TKW	Xgwm610	0.0223	10.67
Pn	Xwmc402	0.0228	10.09	TKW	Xgwm126	0.0235	8.95
Pn	Xwmc361	0.0237	8.47	TKW	Xwmc727	0.0308	8.43
Pn	Xwmc830	0.0275	9.73	TKW	Xwmc272	0.031	11.51
Pn	Xbarc196	0.0285	6.45	TKW	Xwmc553	0.0313	8.4
Pn	Xwmc723	0.0293	8.09	TKW	Xbarc175	0.0313	8.4
Pn	Xgwm340	0.0298	10.99	TKW	Xwmc110	0.0344	8.22
Pn	Xbarc108	0.0305	9.53	TKW	Xwmc759	0.0347	12.68
Pn	Xwmc752	0.0333	13.39	TKW	Xbarc147	0.035	11.25
Pn	Xwmc335	0.0334	15.82	TKW	Xgwm429	0.0384	9.58
Pn	Xbarc24	0.0344	9.3	TKW	Xwmc361	0.0384	8.01
Pn	Xwmc787	0.035	14.52	TKW	Xwmc549	0.039	6.24
Pn	Xbarc79	0.0362	9.2	TKW	Xwmc652	0.0393	9.54
Pn	Xgwm610	0.0364	9.19	TKW	Xwmc516	0.0403	6.18
Pn	Xwmc559	0.0372	9.15	TKW	Xwmc758	0.0405	13.68
Pn	Xwmc633	0.0372	13.15	TKW	Xwmc125	0.0406	7.9
Pn	Xwmc313	0.0376	10.53	TKW	Xwmc201	0.0417	10.88
Pn	Xgwm320	0.0378	5.97	TKW	Xcfa2049	0.0417	9.42
Pn	Xwmc516	0.0382	5.95	TKW	Xwmc522	0.043	12.2
Pn	Xbarc213	0.0384	13.08	TKW	Xcfd152	0.0449	7.7
Pn	Xgwm186	0.0399	13	TKW	Xgwm368	0.0449	12.11
Pn	Xcfd141	0.043	3.78	GYPP	**Xpsp3123**	0.000112	14.28
BMPP	**Xpsp3123**	0.00011	17.87	GYPP	Xwmc407	0.019	12.43
BMPP	Xgwm135	0.0047	16.71	GYPP	Xwmc31	0.0225	7.17
BMPP	Xbarc196	0.0149	7.98	GYPP	Xwmc664	0.0292	8.48
				GYPP	Xwmc413	0.0351	4.28

Pn: net photosynthesis rate (µmol m^{-2} s^{-1}); BMPP: biomass $plant^{-1}$ (g), TKW: thousand grain weight (g); GYPP: grain yield $plant^{-1}$ (g). Markers in bold represent those which qualified FPDR test.

Table S4. Marker-trait associations for phenotypic traits under well-watered conditions in 2012-13 before Bonferroni correction.

Trait	Marker	*P* value	R^2(%)	Trait	Marker	*P* value	R^2 (%)
Pn	**Xwmc652**	1.13E-04	12.58	BMPP	**Xcfd33**	0.000142	7.76
Pn	**Xpsp3123**	1.10E-04	13.16	BMPP	**Xwmc486**	0.000133	8.31
Pn	**Xbarc260**	1.40E-04	9.74	BMPP	**Xpsp3123**	0.000123	8.93
Pn	**Xgwm186**	1.40E-04	15.21	BMPP	Xcfd75	0.0256	8.16
Pn	Xwmc257	0.0102	7.85	BMPP	Xgwm194	0.026	4.44
Pn	Xwmc752	0.0122	14.83	BMPP	Xgwm459	0.0268	8.07
Pn	Xbarc263	0.0137	10.61	BMPP	Xwmc476	0.0276	10.9
Pn	Xcfd8	0.0176	6.99	BMPP	Xgwm320	0.0315	6.14
Pn	Xwmc276	0.0176	14.13	TKW	**Xcfd33**	0.00011	7.76
Pn	Xwmc219	0.0202	8.43	TKW	**Xpsp3123**	0.000112	8.31
Pn	Xwmc707	0.0213	12.52	TKW	Xgwm186	0.007	20.43
Pn	Xgwm164	0.0233	11.04	TKW	Xwmc168	0.0112	18.51
Pn	Xwmc654	0.025	10.91	TKW	Xwmc633	0.0135	22.04
Pn	Xwmc810	0.0252	10.9	TKW	Xcfd61	0.0162	22.63
Pn	Xwmc687	0.0257	10.86	TKW	Xbarc200	0.0238	18.29
Pn	Xgwm499	0.0261	10.83	TKW	Xwmc237	0.0326	7.39
Pn	Xwmc110	0.0266	7.95	GYPP	**Xpsp3123**	0.000113	11.95
Pn	Xcfa2193	0.0294	10.6	GYPP	**Xgwm182**	0.00013	9.02
Pn	Xwmc402	0.0316	9.11	GYPP	Xcfd189	0.0191	6.9
Pn	Xwmc335	0.0323	15.29	GYPP	Xwmc525	0.0256	10.93
Pn	Xgwm445	0.0337	10.34	GYPP	Xbarc271	0.0272	4.33
Pn	Xgwm291	0.034	7.53	GYPP	Xgwm135	0.0272	7.96
Pn	Xwmc274	0.0342	5.91	GYPP	Xbarc164	0.0352	10.32
Pn	Xwmc658	0.0365	11.47	GYPP	Xwmc486	0.0391	5.72
Pn	Xwmc111	0.0365	5.8				
Pn	Xwmc432	0.0388	10.07				
Pn	Xwmc356	0.0393	5.68				
Pn	Xcfa2049	0.0406	8.64				
Pn	Xwmc749	0.0421	9.91				
Pn	Xwmc598	0.0438	13.49				

Pn: net photosynthesis rate (µmol m^{-2} s^{-1}); BMPP: biomass $plant^{-1}$ (g), TKW: thousand grain weight (g); GYPP: grain yield $plant^{-1}$ (g). Markers in bold represent those which qualified FPDR test.

Table S5. Marker-trait associations for phenotypic traits under well-watered conditions in 2013-14 before Bonferroni correction.

Trait	Marker	*P* value	R^2 (%)	Trait	Marker	*P* value	R^2 (%)
Pn	**Xbarc134**	0.000118	8.47	TKW	Xwmc285	0.0119	9.74
Pn	**Xpsp3123**	0.00012	15.91	TKW	Xbarc37	0.0122	5.72
Pn	Xwmc754	0.0184	11.77	TKW	Xgwm182	0.0192	8.91
Pn	Xcfd8	0.0264	6.49	TKW	Xwmc525	0.0237	11.52
Pn	Xbarc79	0.0345	9.17	TKW	Xbarc62	0.0239	10.06
Pn	Xcfd10	0.0391	5.83	TKW	Xwmc168	0.032	9.5
BMPP	**Xcfd33**	0.00014	7.76	TKW	Xbarc71	0.0426	8.94
BMPP	**Xpsp3123**	0.000121	8.32	GYPP	**Xpsp3123**	0.000113	12
BMPP	Xwmc157	0.0166	8.91	GYPP	**Xgwm182**	0.000141	9.05
BMPP	Xcfd75	0.0255	8.16	GYPP	**Xcfd189**	1.21E-05	6.88
BMPP	Xgwm194	0.0261	4.44	GYPP	Xwmc525	0.0257	10.93
BMPP	Xgwm459	0.0264	8.1	GYPP	Xbarc271	0.0274	4.32
BMPP	Xwmc476	0.0277	10.9	GYPP	Xgpw2275	0.0276	7.94
BMPP	Xgwm320	0.0316	6.14	GYPP	Xbarc164	0.0358	10.29
TKW	**Xpsp3123**	0.000011	8.92	GYPP	Xwmc486	0.0392	5.72
TKW	**Xwmc376**	0.000114	8.29				

Pn: net photosynthesis rate (µmol m^{-2} s^{-1}); BMPP: biomass $plant^{-1}$ (g), TKW: thousand grain weight (g); GYPP: grain yield $plant^{-1}$ (g). Markers in bold represent those which qualified FPDR test.

Table S6. Marker-trait associations for stress tolerance index (STI) of phenotypic traits before bonferroni correction in 2012-13.

Index	Marker	*P* value	R^2 (%)	Index	Marker	*P* value	R^2 (%)
STI-Pn	**Xpsp3123**	0.000121	15.78	STI-BMPP	Xcfd3	0.0099	8.49
STI-Pn	**Xwmc693**	0.00011	18.77	STI-BMPP	Xcfa2193	0.0112	13.28
STI-Pn	**Xwmc311**	0.00013	11.88	STI-BMPP	Xgwm499	0.0126	13.06
STI-Pn	Xwmc580	0.0034	12.04	STI-BMPP	Xwmc770	0.0182	12.35
STI-Pn	Xbarc56	0.0038	13.23	STI-BMPP	Xcfd88	0.0255	10.2
STI-Pn	Xwmc577	0.0044	8.51	STI-BMPP	Xgwm368	0.0287	12.82
STI-Pn	Xbarc134	0.0049	8.38	STI-BMPP	Xwmc741	0.0293	9.93
STI-Pn	Xgwm164	0.0054	12.68	STI-BMPP	Xbarc168	0.0306	8.27
STI-Pn	Xbarc260	0.0062	9.67	STI-BMPP	Xgwm340	0.0318	11.22
STI-Pn	Xgwm674	0.0066	7.94	STI-BMPP	Xwmc110	0.0351	8.02
STI-Pn	Xcfa2153	0.0072	9.44	STI-BMPP	Xgpw2006	0.036	9.52
STI-Pn	Xbarc318	0.0078	9.32	STI-BMPP	Xcfa2049	0.038	9.41
STI-Pn	Xbarc168	0.0088	9.15	STI-BMPP	Xcfd141	0.0426	3.92
STI-Pn	Xwmc705	0.0088	11.9	STI-BMPP	Xwmc63	0.0438	3.88
STI-Pn	Xcfa2049	0.0094	10.48	STI-TKW	**Xgwm182**	0.000113	12.59
STI-Pn	Xgwm155	0.0095	9.02	STI-TKW	**Xpsp3123**	0.00012	11.72
STI-Pn	Xwmc335	0.0103	16.32	STI-TKW	Xwmc407	0.0067	14.47
STI-Pn	Xbarc263	0.0104	10.32	STI-TKW	Xcfd88	0.0188	10.97
STI-Pn	Xwmc110	0.0105	8.87	STI-TKW	Xwmc428	0.0219	10.67
STI-Pn	Xwmc537	0.013	12.5	STI-TKW	Xwmc657	0.0233	14.84
STI-Pn	Xcfa2123	0.0148	9.75	STI-TKW	Xwmc759	0.0245	13.38
STI-Pn	Xcfa2190	0.0155	10.97	STI-TKW	Xgwm499	0.0254	11.88
STI-Pn	Xgwm428	0.0166	9.56	STI-TKW	Xgpw2275	0.0298	12.96
STI-Pn	Xwmc777	0.0171	13.21	STI-TKW	Xbarc346	0.0315	8.36
STI-Pn	Xwmc741	0.0175	9.47	STI-TKW	Xgwm368	0.0317	12.83
STI-Pn	Xwmc476	0.0182	10.7	STI-TKW	Xgwm610	0.0338	9.81
STI-Pn	Xwmc553	0.0221	7.7	STI-TKW	Xgwm126	0.0426	7.77
STI-Pn	Xwmc788	0.0243	8.92	STI-TKW	Xgwm146	0.0429	7.76
STI-Pn	Xgpw2275	0.0254	11.34	STI-GYPP	**Xpsp3123**	0.000012	12.2
STI-Pn	Xbarc71	0.0273	8.73	STI-GYPP	Xwmc31	0.0106	8.31
STI-Pn	Xcfa2234	0.0286	7.28	STI-GYPP	Xwmc407	0.0143	12.72
STI-Pn	Xwmc783	0.0312	10.96	STI-GYPP	Xwmc759	0.0224	13.24
STI-Pn	Xwmc680	0.0366	10.67	STI-GYPP	Xwmc525	0.0248	11.64
STI-Pn	Xwmc50	0.0372	10.64	STI-GYPP	Xcfd189	0.0255	6.8
STI-Pn	Xgwm368	0.0382	10.59	STI-GYPP	Xwmc413	0.0313	4.37
STI-Pn	Xwmc749	0.0384	9.39	STI-GYPP	Xgwm499	0.0383	10.76
STI-Pn	Xbarc78	0.0405	10.48	STI-GYPP	Xwmc633	0.0404	13.31
STI-Pn	Xwmc633	0.043	11.5	STI-GYPP	Xwmc654	0.0446	10.44
STI-BMPP	**Xwmc707**	7.25E-05	22.87				
STI-BMPP	**Xwmc577**	0.00011	9.45				
STI-BMPP	**Xpsp3123**	0.00012	15.01				
STI-BMPP	Xgwm135	0.0076	15.44				
STI-BMPP	Xwmc494	0.0078	12.42				

Pn: net photosynthesis rate (µmol m^{-2} s^{-1}); BMPP biomass $plant^{-1}$ (g); TKW: thousand kernel weight (g); GYPP: grain yield $plant^{-1}$ (g). STI: stress tolerance index. Markers in bold represent those which qualified FPDR test.

Table S7. Marker-trait associations for stress tolerance index (STI) of phenotypic traits before Bonferroni correction in 2013-14.

Index	Marker	*P* value	R^2 (%)	Index	Marker	*P* value	R^2 (%)
STI-Pn	**Xpsp3123**	0.00026	13.92	STI-BMPP	Xgwm499	0.0083	13.79
STI-Pn	**Xwmc272**	0.000937	17.21	STI-BMPP	Xcfa2193	0.0094	13.56
STI-Pn	Xwmc732	0.0016	16.32	STI-BMPP	Xcfd88	0.0109	11.77
STI-Pn	Xgwm257	0.0016	14.83	STI-BMPP	Xwmc741	0.0146	11.22
STI-Pn	Xwmc36	0.0016	13.12	STI-BMPP	Xwmc770	0.0168	12.45
STI-Pn	Xgwm333	0.002	12.79	STI-BMPP	Xbarc168	0.0209	8.95
STI-Pn	Xwmc24	0.0046	16.01	STI-BMPP	Xgpw2006	0.0213	10.51
STI-Pn	Xbarc200	0.0064	12.49	STI-BMPP	Xgwm368	0.0215	13.37
STI-Pn	Xbarc79	0.0088	11.94	STI-BMPP	Xwmc110	0.0235	8.73
STI-Pn	Xwmc718	0.01	15.96	STI-BMPP	Xwmc112	0.0244	8.66
STI-Pn	Xwmc727	0.0117	9.83	STI-BMPP	Xcfa2049	0.0298	9.86
STI-Pn	Xgpw2132	0.0166	12.26	STI-BMPP	Xgwm340	0.0316	11.19
STI-Pn	Xbarc160	0.0194	8.93	STI-BMPP	Xbarc260	0.033	8.1
STI-Pn	Xwmc633	0.0201	14.59	STI-BMPP	Xcfd141	0.0348	4.22
STI-Pn	Xbarc196	0.0219	6.97	STI-BMPP	Xwmc654	0.0367	10.88
STI-Pn	Xgpw2275	0.022	13.09	STI-BMPP	Xcfd92	0.0372	6.17
STI-Pn	Xgwm181	0.0225	10.22	STI-TKW	**Xgwm182**	0.000104	12.02
STI-Pn	Xbarc56	0.025	11.47	STI-TKW	**Xpsp3123**	0.00013	15.24
STI-Pn	Xgwm291	0.0281	8.26	STI-TKW	Xwmc407	0.0068	11.19
STI-Pn	Xgwm135	0.0295	12.49	STI-TKW	Xcfd88	0.0125	11.75
STI-Pn	Xgwm32	0.0306	6.4	STI-TKW	Xwmc657	0.0217	15
STI-Pn	Xwmc112	0.032	8.02	STI-TKW	Xgpw2275	0.0244	13.39
STI-Pn	Xcfa2049	0.0335	9.46	STI-TKW	Xwmc428	0.0262	10.33
STI-Pn	Xwmc361	0.0337	7.92	STI-TKW	Xbarc346	0.0275	8.62
STI-Pn	Xwmc402	0.0353	9.35	STI-TKW	Xcfd152	0.0317	8.35
STI-Pn	Xcfd32	0.0355	6.14	STI-TKW	Xwmc759	0.0343	12.66
STI-Pn	Xwmc830	0.0369	9.27	STI-TKW	Xgwm499	0.0355	11.18
STI-Pn	Xwmc787	0.0385	14.47	STI-TKW	Xgwm610	0.0375	9.6
STI-Pn	Xwmc274	0.0394	5.97	STI-TKW	Xgwm126	0.039	7.95
STI-Pn	Xpsp3071	0.0431	10.36	STI-GYPP	**Xpsp3123**	0.00012	12.45
STI-Pn	Xgwm674	0.0436	5.79	STI-GYPP	Xwmc31	0.0086	8.64
STI-Pn	Xbarc108	0.0452	8.87	STI-GYPP	Xwmc407	0.0152	12.59
STI-BMPP	**Xwmc707**	1.14E-05	25.2	STI-GYPP	Xwmc759	0.0202	13.43
STI-BMPP	**Xpsp3123**	1.01E-05	14.16	STI-GYPP	Xcfd189	0.0226	7.01
STI-BMPP	Xwmc577	0.0033	10.24	STI-GYPP	Xwmc525	0.0278	11.4
STI-BMPP	Xgwm135	0.0049	16.19	STI-GYPP	Xwmc413	0.0365	4.13
STI-BMPP	Xcfd3	0.006	9.27	STI-GYPP	Xgwm499	0.0376	10.78
STI-BMPP	Xwmc494	0.0079	12.34	STI-GYPP	Xwmc633	0.0396	13.34

Pn: net photosynthesis rate (µmol m^{-2} s^{-1}); BMPP biomass $plant^{-1}$ (g); TKW: thousand kernel weight (g); GYPP: grain yield $plant^{-1}$ (g).STI: stress tolerance index. Markers in bold represent those which qualified FPDR test.

Table S8. Marker-trait associations for stress susceptibility index (SSI) of phenotypic traits before Bonferroni correction in 2012-13.

Index	Marker	*P* value	R^2 (%)	Index	Marker	*P* value	R^2 (%)
SSI-Pn	**Xwmc553**	1.16E-05	13.13	SSI-BMPP	**Xpsp3123**	0.00012	15.1
SSI-Pn	**Xpsp3123**	0.00012	12.71	SSI-BMPP	Xbarc37	0.0127	6.01
SSI-Pn	Xbarc56	0.0031	15.23	SSI-BMPP	Xgwm135	0.0141	14.73
SSI-Pn	Xgpw2275	0.0042	16.16	SSI-BMPP	Xwmc63	0.0165	5.58
SSI-Pn	Xwmc652	0.0044	13.15	SSI-BMPP	Xwmc168	0.0284	10.32
SSI-Pn	Xwmc580	0.0053	12.83	SSI-BMPP	Xwmc741	0.0362	9.82
SSI-Pn	Xwmc274	0.0057	9.2	SSI-BMPP	Xwmc407	0.0375	11.24
SSI-Pn	Xbarc346	0.0083	10.42	SSI-BMPP	Xcfd152	0.0429	7.89
SSI-Pn	Xwmc361	0.009	10.27	SSI-BMPP	Xwmc707	0.0431	12.34
SSI-Pn	Xwmc612	0.0093	10.21	SSI-TKW	**Xpsp3123**	0.000012	17
SSI-Pn	Xbarc134	0.0094	8.38	SSI-TKW	Xwmc428	0.0097	12.02
SSI-Pn	Xgwm610	0.0095	11.81	SSI-TKW	Xwmc429	0.0131	9.83
SSI-Pn	Xcfa2049	0.0095	11.8	SSI-TKW	Xbarc346	0.0153	9.55
SSI-Pn	Xwmc633	0.0095	16.05	SSI-TKW	Xcfa2049	0.0178	10.88
SSI-Pn	Xwmc201	0.0097	13.25	SSI-TKW	Xcfa2123	0.0188	10.79
SSI-Pn	Xgwm429	0.01	11.7	SSI-TKW	Xwmc407	0.0205	12.1
SSI-Pn	Xgwm126	0.0105	10	SSI-TKW	Xbarc271	0.0221	4.94
SSI-Pn	Xwmc516	0.0109	8.14	SSI-TKW	Xgwm146	0.0237	8.75
SSI-Pn	Xgwm445	0.0113	12.98	SSI-TKW	Xwmc272	0.0244	11.76
SSI-Pn	Xgwm333	0.0116	9.83	SSI-TKW	Xgwm126	0.0254	8.62
SSI-Pn	Xbarc175	0.0121	9.76	SSI-TKW	Xgwm182	0.0265	8.54
SSI-Pn	Xcfa2234	0.0123	9.73	SSI-TKW	Xwmc553	0.0267	8.53
SSI-Pn	Xwmc756	0.0134	11.17	SSI-TKW	Xbarc175	0.0269	8.52
SSI-Pn	Xwmc110	0.0153	9.34	SSI-TKW	Xwmc522	0.0308	12.67
SSI-Pn	Xwmc311	0.0155	9.32	SSI-TKW	Xgwm610	0.0357	9.53
SSI-Pn	Xwmc125	0.0156	9.31	SSI-TKW	Xbarc147	0.0368	10.91
SSI-Pn	Xwmc428	0.0159	10.87	SSI-TKW	Xbarc17	0.0374	9.44
SSI-Pn	Xgwm282	0.018	13.48	SSI-TKW	Xwmc652	0.0375	9.43
SSI-Pn	Xwmc549	0.0194	7.17	SSI-TKW	Xwmc110	0.0375	7.89
SSI-Pn	Xwmc272	0.0196	11.93	SSI-TKW	Xwmc727	0.039	7.81
SSI-Pn	Xbarc147	0.0207	11.83	SSI-TKW	Xwmc633	0.0395	13.45
SSI-Pn	Xwmc693	0.0223	15.64	SSI-TKW	Xgwm102	0.0432	7.62
SSI-Pn	Xcfa2114	0.0248	10.04	SSI-TKW	Xgwm429	0.0451	9.06
SSI-Pn	Xwmc522	0.0262	12.73	SSI-TKW	Xwmc361	0.0459	7.5
SSI-Pn	Xcfd72	0.0266	6.64	SSI-TKW	Xgwm32	0.0473	5.77
SSI-Pn	Xwmc402	0.031	9.6	SSI-TKW	Xwmc125	0.048	7.41
SSI-Pn	Xgwm335	0.0326	10.93	SSI-GYPP	**Xgwm508**	0.00013	7.13
SSI-Pn	Xgwm674	0.0331	6.26	SSI-GYPP	**Xpsp3123**	0.00011	13.44
SSI-Pn	Xbarc164	0.0344	10.82	SSI-GYPP	Xcfd32	0.0273	6.85
SSI-Pn	Xwmc152	0.0394	7.63	SSI-GYPP	Xcfd75	0.0408	7.85
SSI-Pn	Xgwm164	0.0396	10.53				
SSI-Pn	Xgwm186	0.0403	13.12				
SSI-Pn	Xcfa2193	0.0418	10.42				

Pn: net photosynthesis rate (μmol m^{-2} s^{-1}); BMPP biomass $plant^{-1}$ (g); TKW: thousand kernel weight (g); GYPP: grain yield $plant^{-1}$ (g).SSI: stress susceptibility index. Markers in bold represent those which qualified FPDR test.

Table S9. Marker-trait associations for stress susceptibility index (SSI) of phenotypic traits before Bonferroni correction in 2013-14.

Index	Marker	*P* value	R^2	Index	Marker	*P value*	R^2
SSI-Pn	Xpsp3123	**9.01E-05**	13.64	SSI-TKW	**Xpsp3123**	0.000103	16.83
SSI-Pn	Xwmc732	**0.000101**	14.23	SSI-TKW	**Xwmc428**	0.000105	12.22
SSI-Pn	Xwmc24	0.0051	15.4	SSI-TKW	Xwmc429	0.0128	9.85
SSI-Pn	Xgpw2132	0.007	13.47	SSI-TKW	Xcfa2049	0.0145	11.26
SSI-Pn	Xgpw2275	0.008	14.63	SSI-TKW	Xcfa2123	0.0161	11.06
SSI-Pn	Xbarc85	0.0114	7.86	SSI-TKW	Xbarc346	0.0175	9.29
SSI-Pn	Xwmc274	0.0118	7.79	SSI-TKW	Xbarc271	0.0176	5.29
SSI-Pn	Xwmc752	0.0147	14.81	SSI-TKW	Xgwm182	0.02	9.05
SSI-Pn	Xwmc112	0.017	8.92	SSI-TKW	Xgwm146	0.0234	8.76
SSI-Pn	Xbarc1022	0.018	8.82	SSI-TKW	Xbarc175	0.0246	8.66
SSI-Pn	Xgwm257	0.0181	10.35	SSI-TKW	Xwmc407	0.0259	11.61
SSI-Pn	Xbarc160	0.0185	8.78	SSI-TKW	Xgwm126	0.026	8.56
SSI-Pn	Xbarc56	0.0194	11.64	SSI-TKW	Xwmc522	0.0267	12.94
SSI-Pn	Xgwm181	0.0209	10.09	SSI-TKW	Xwmc272	0.0269	11.54
SSI-Pn	Xwmc154	0.0216	12.77	SSI-TKW	Xwmc553	0.0269	8.5
SSI-Pn	Xwmc713	0.0218	11.42	SSI-TKW	Xwmc652	0.0297	9.88
SSI-Pn	Xwmc718	0.0228	13.95	SSI-TKW	Xbarc17	0.0341	9.6
SSI-Pn	Xgwm135	0.0235	12.62	SSI-TKW	Xwmc633	0.0345	13.72
SSI-Pn	Xbarc24	0.0242	9.81	SSI-TKW	Xgwm610	0.0353	9.53
SSI-Pn	Xwmc304	0.0255	8.21	SSI-TKW	Xwmc727	0.0363	7.93
SSI-Pn	Xbarc200	0.0277	9.56	SSI-TKW	Xbarc147	0.0366	10.9
SSI-Pn	Xgwm340	0.0288	10.88	SSI-TKW	Xwmc110	0.0372	7.89
SSI-Pn	Xgwm186	0.0289	13.47	SSI-TKW	Xwmc121	0.0384	4.07
SSI-Pn	Xwmc723	0.032	7.8	SSI-GYPP	Xpsp3123	**0.00012**	12.95
SSI-Pn	Xcfd141	0.0321	4.16	SSI-GYPP	Xwmc759	0.0267	13.19
SSI-Pn	Xwmc335	0.0341	15.53	SSI-GYPP	Xcfd32	0.028	6.81
SSI-Pn	Xgwm320	0.0342	6.04	SSI-GYPP	Xcfd75	0.0403	7.89
SSI-Pn	Xwmc402	0.0351	9.12				
SSI-Pn	Xwmc727	0.0354	7.62				
SSI-Pn	Xbarc108	0.0373	9				
SSI-Pn	Xwmc272	0.038	10.34				
SSI-Pn	Xwmc313	0.0385	10.32				
SSI-Pn	Xwmc361	0.04	7.4				
SSI-Pn	Xpsp3113	0.0401	5.77				
SSI-BMPP	**Xpsp3123**	0.000103	12.03				
SSI-BMPP	Xgwm368	0.011	15.24				
SSI-BMPP	Xwmc63	0.014	5.86				
SSI-BMPP	Xgwm135	0.0163	14.46				
SSI-BMPP	Xwmc168	0.0366	9.81				
SSI-BMPP	Xbarc1022	0.0404	8.01				
SSI-BMPP	Xgwm157	0.042	4.08				

Pn: net photosynthesis rate (μmol m^{-2} s^{-1}); BMPP biomass $plant^{-1}$ (g); TKW: thousand kernel weight (g); GYPP: grain yield $plant^{-1}$ (g).SSI: stress susceptibility index. Markers in bold represent those which qualified FPDR test.