

Table S1. Comparison of QTL mapped in this study with reported genes/QTL in other studies

QTL	Environment	Chromosome	Physical position (Mb)	LOD	PVE (%)	Add	Positions of reported genes/QTL (Mb) in other studies	References
<i>QPh-1A</i>	2020TA	1A	516.58-535.77	4	4.31	1.5	509-511	36
<i>QPh-2D.1</i>	2020TA	2D	21.61-32.34	21.33	28.88	3.89	24	35
	2021TA	2D	19.62-23.03	29.4	37.81	3.18	24	35
	2021ZK	2D	21.61-32.34	11.34	21.32	2.94	24	35
	2021TA	3B	31.64-39.75	2.54	2.24	-0.77	43.4-43.9	36
<i>QPh-3B.2</i>	2021TA	3B	31.64-39.75	2.54	2.24	-0.77	43.4-43.9	36
<i>QPh-4A</i>	2021TA	4A	616.67-617.58	6.2	5.54	-1.21	605、626	37、40
<i>QPh-7D.1</i>	2021TA	7D	8.56-588.62	2.99	3.1	-0.9	7.5-7.6	36
<i>QSl-2D</i>	2020TA	2D	21.61-32.34	25.44	38.24	0.67	24	18、35
	2021TA	2D	21.61-32.34	24.01	33.25	0.48	24	18、35
<i>QSl-6D</i>	2021TA	6D	404.23-448.87	3.33	3.95	0.17	405	18
<i>QSns-2B</i>	2020TA	2B	749.22-756	3.32	5.96	-0.23	710.11-717.87	41
<i>QSns-2D.2</i>	2020TA	2D	31.81-50.23	3.41	6.1	-0.23	28.09-34.43	7
<i>QGns-3B</i>	2021TA	3B	814.29-803.52	5.05	8.83	-1.93	805-237	37
<i>QGns-4A</i>	2020TA	4A	672.73-666.06	3.16	4.65	1.76	699.5-703	36
	2021TA	4A	680.4-673.49	10.31	18.24	2.71	699.5-703	36
<i>QSn-1B</i>	2021ZK	1B	637.82-640.06	2.64	6.68	0.69	537-543	37
<i>QSn-6A</i>	2020TA	6A	600.19-604.44	3.06	7.78	0.45	598.6-598.7	36
<i>QTgw-2A</i>	2021TA	2A	603.5-621.19	4.44	6.5	1.26	558.8	39
<i>QTgw-4A</i>	2021TA	4A	635.29-639.18	10.44	16.21	-1.98	632-662	37
<i>QTgw-4B</i>	2021TA	4B	429.3-496.28	5.93	8.43	-1.45	513.97-516.66	38
	2020TA	4B	482.13-562.87	4.05	8.78	-1.99	513.97-516.66	38
<i>QTgw-7B</i>	2021TA	7B	708.55-716.7	3.27	5.91	1.2	683-694	37
<i>QGl-6D</i>	2021TA	6D	404.23-448.87	3.15	4.22	-0.07	405	18

Note: LOD, logarithm of odds; PVE, phenotypic variance explained; Add, additive effect; Positive additive effects indicate that the allele increasing its phenotypic value is from YN999, and negative additive effects indicate that the allele increasing its phenotypic value is from XN822. PH, plant height (cm); SNS, spikelet number per spike; SL, spike length (cm); GNS, grain number per spike; SN, spike number per plant; TGW, thousand grain weight (g); GL, grain length (mm); GW, grain width (mm); GL/GW, length/width of grain; Peri, perimeter of grain (mm); Sur, surface area of grains per plant (mm<sup>2</sup>); 2020TA, in Taian during the 2020-2021 growing season; 2021TA, in Taian during the 2021-2022 growing season; 2021ZK, in Zhoukou during the 2021-2022 growing season.