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Supplementary Materials

Application of 50K chip-based genetic map to QTL mapping of stem-related traits in wheat

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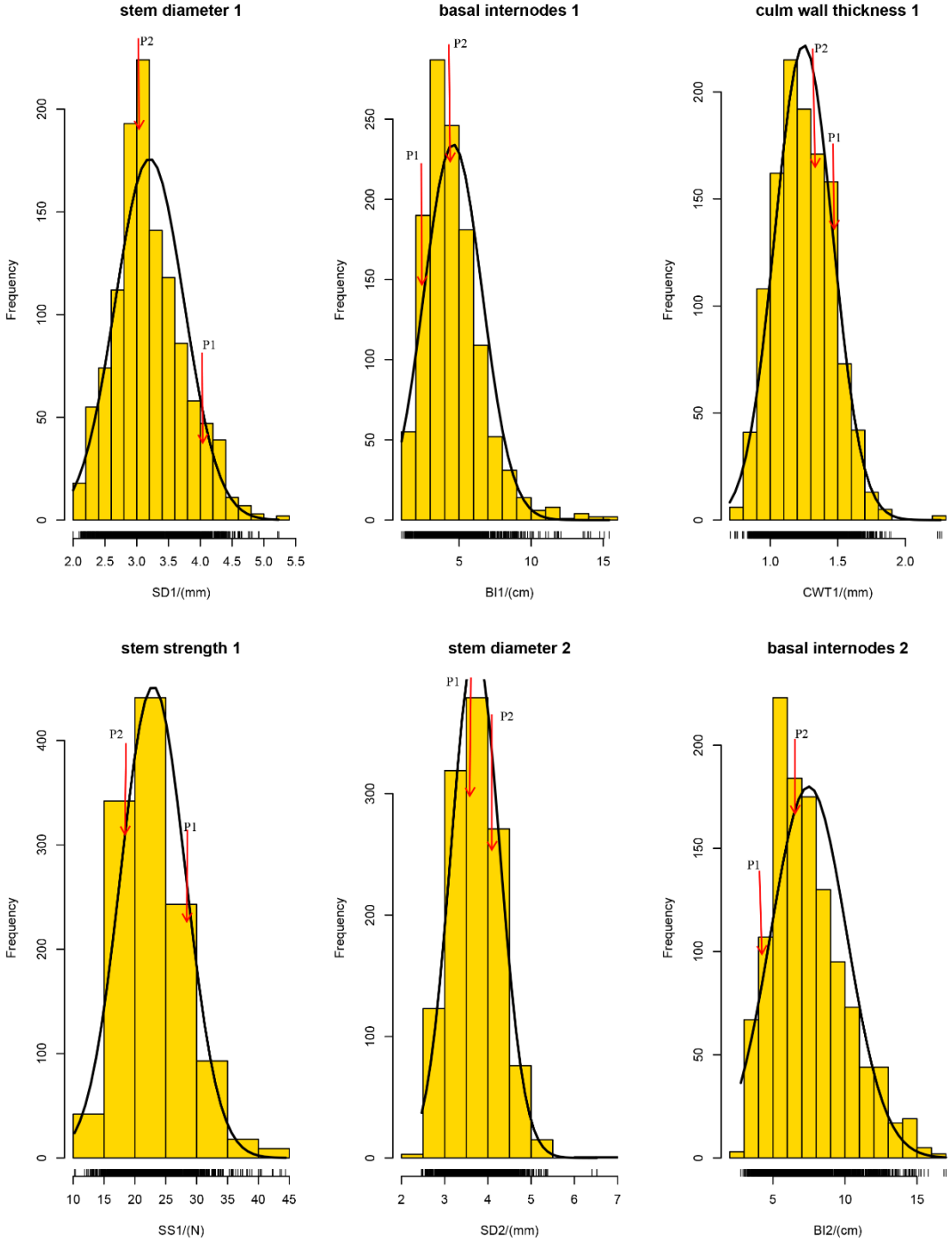
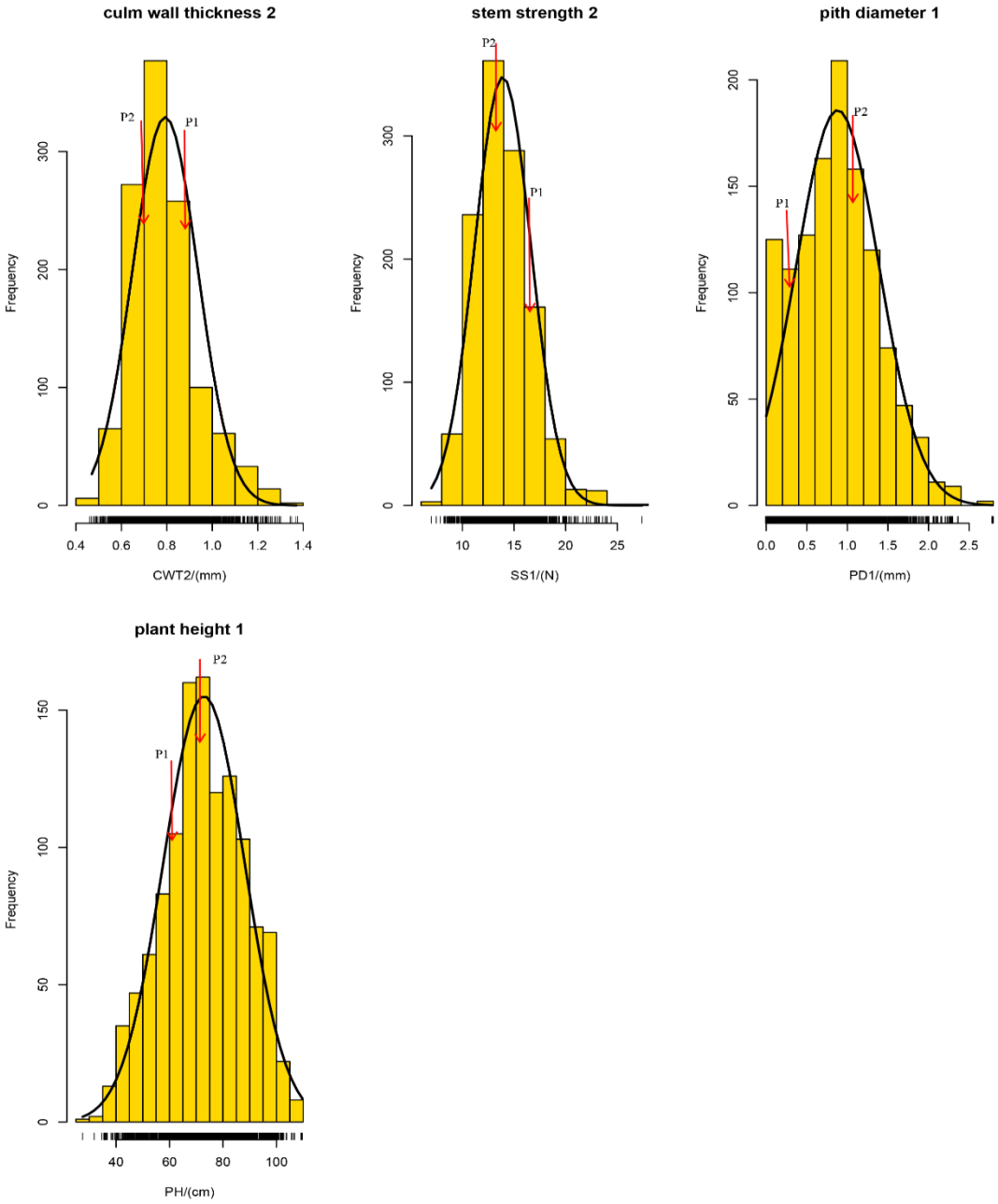
Fig. S1. Phenotype distribution

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P2
P1
Frequency
0
100
200
300
0.4
0.6
0.8
1.0
1.2
1.4
CWT2/(mm)
stem strength 2
P2
P1
Frequency
0
100
200
300
10
15
20
25
SS1/(N)
pith diameter 1
P1
P2
Frequency
0
50
100
150
200
0.0
0.5
1.0
1.5
2.0
2.5
PD1/(mm)
plant height 1
P2
P1
Frequency
0
50
100
150
40
60
80
100
PH/(cm)

Fig. S2. Compare the position of the genetic map marker and the chromosome of the reference genome.

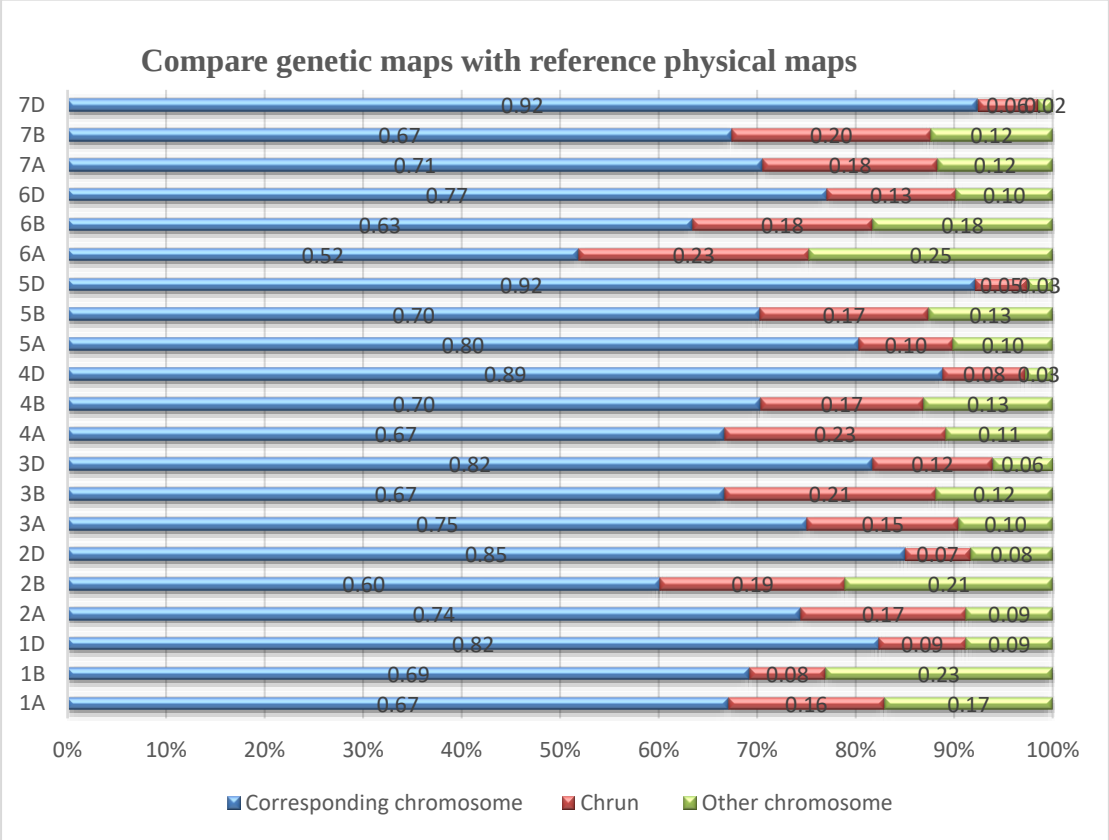


Fig. S3. Pairwise recombination fractions and LOD scores.

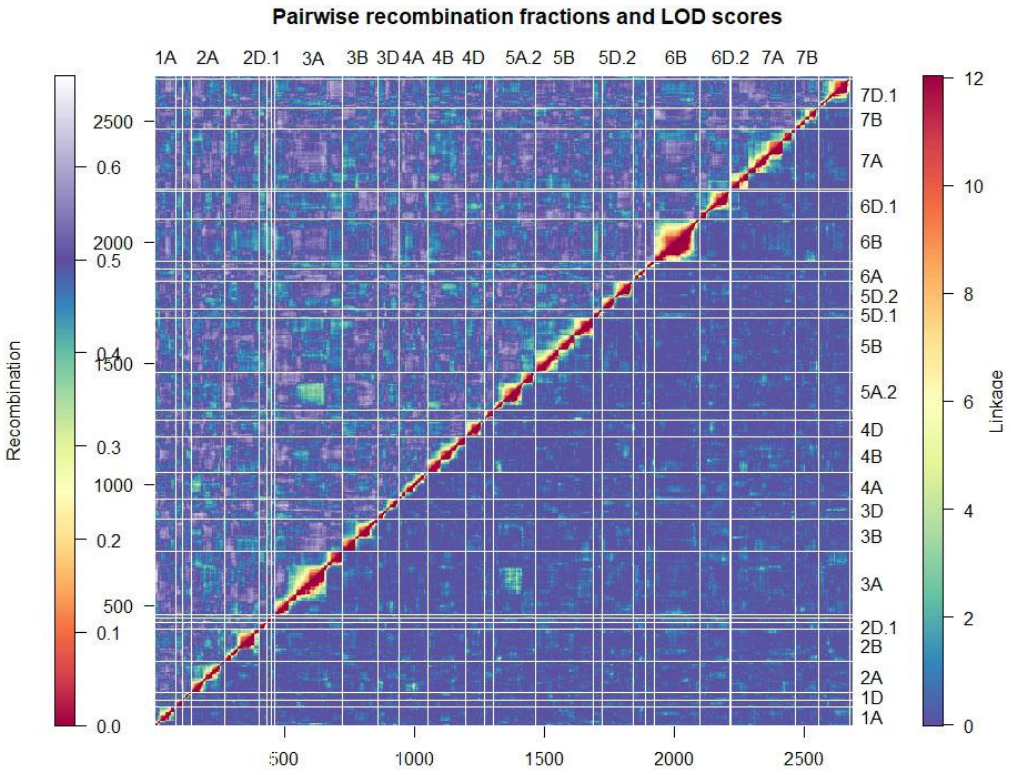
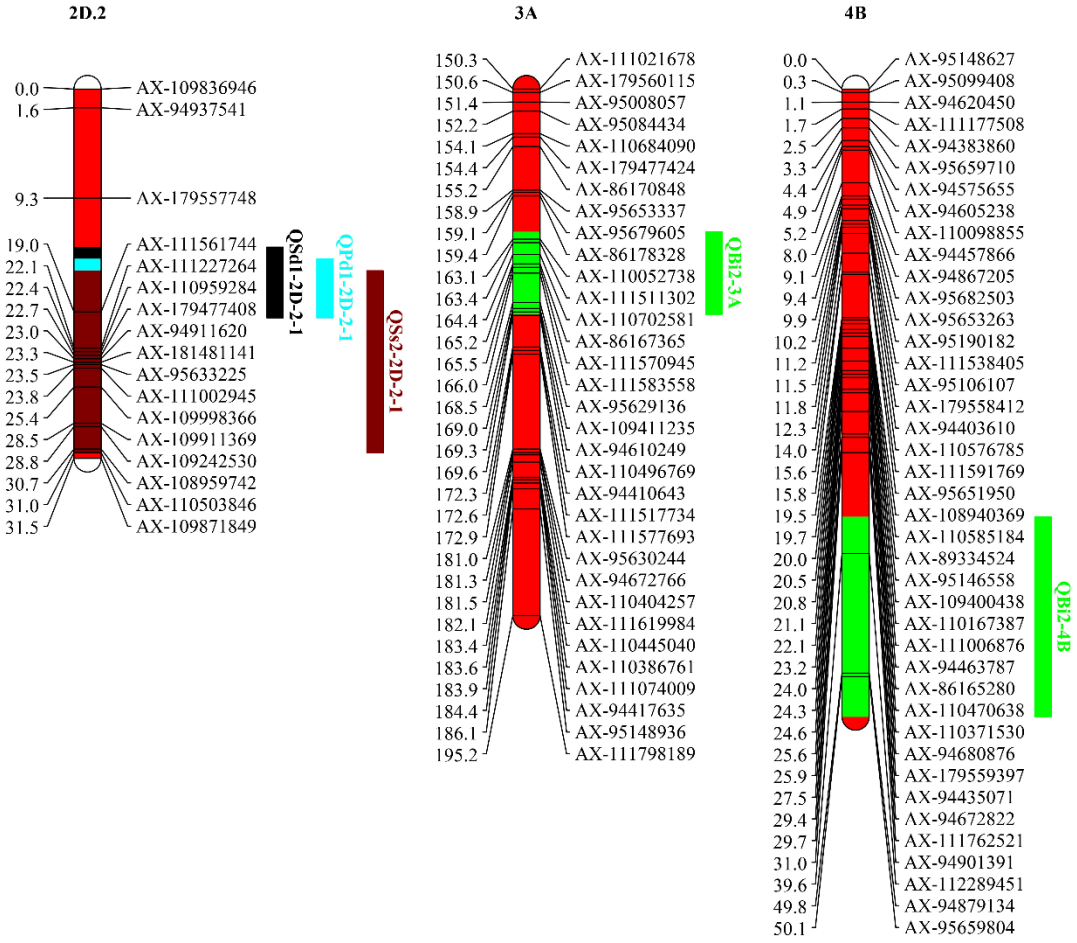
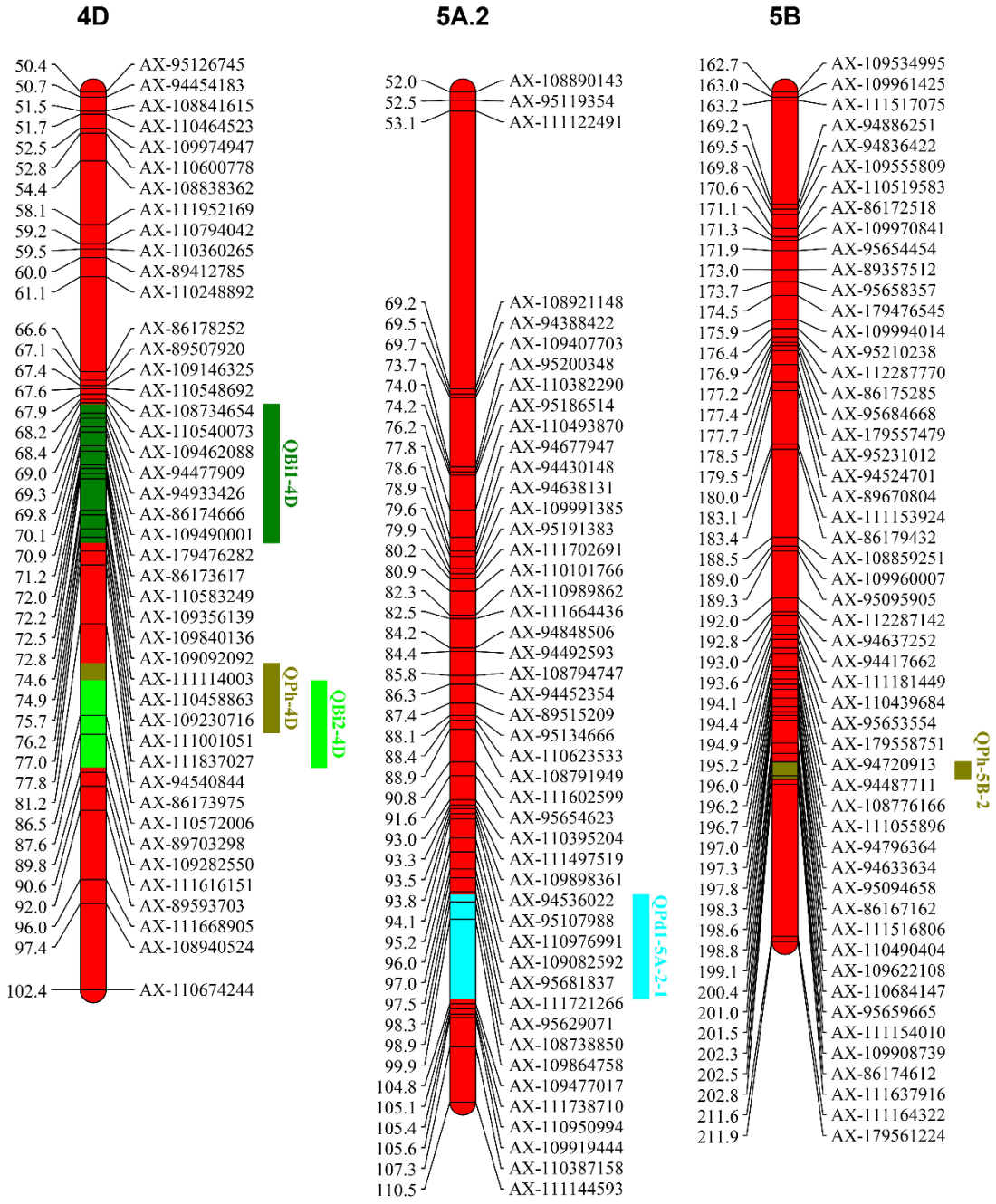


Fig. S4. Distribution of QTL on chromosome.

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59.5 AX-110360265
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61.1 AX-110248892
66.6 AX-86178252
67.1 AX-89507920
67.4 AX-109146325
67.6 AX-110548692
67.9 AX-108734654
68.2 AX-110540073
68.4 AX-109462088
69.0 AX-94477909
69.3 AX-94933426
69.8 AX-86174666
70.1 AX-109490001
70.9 AX-179476282
71.2 AX-86173617
72.0 AX-110583249
72.2 AX-109356139
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72.8 AX-109092092
74.6 AX-111114003
74.9 AX-110458863
75.7 AX-109230716
76.2 AX-111001051
77.0 AX-111837027
77.8 AX-94540844
81.2 AX-86173975
86.5 AX-110572006
87.6 AX-89703298
89.8 AX-109282550
90.6 AX-111616151
92.0 AX-89593703
96.0 AX-111668905
97.4 AX-108940524
102.4 AX-110674244
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QPh-4D
QBi2-4D
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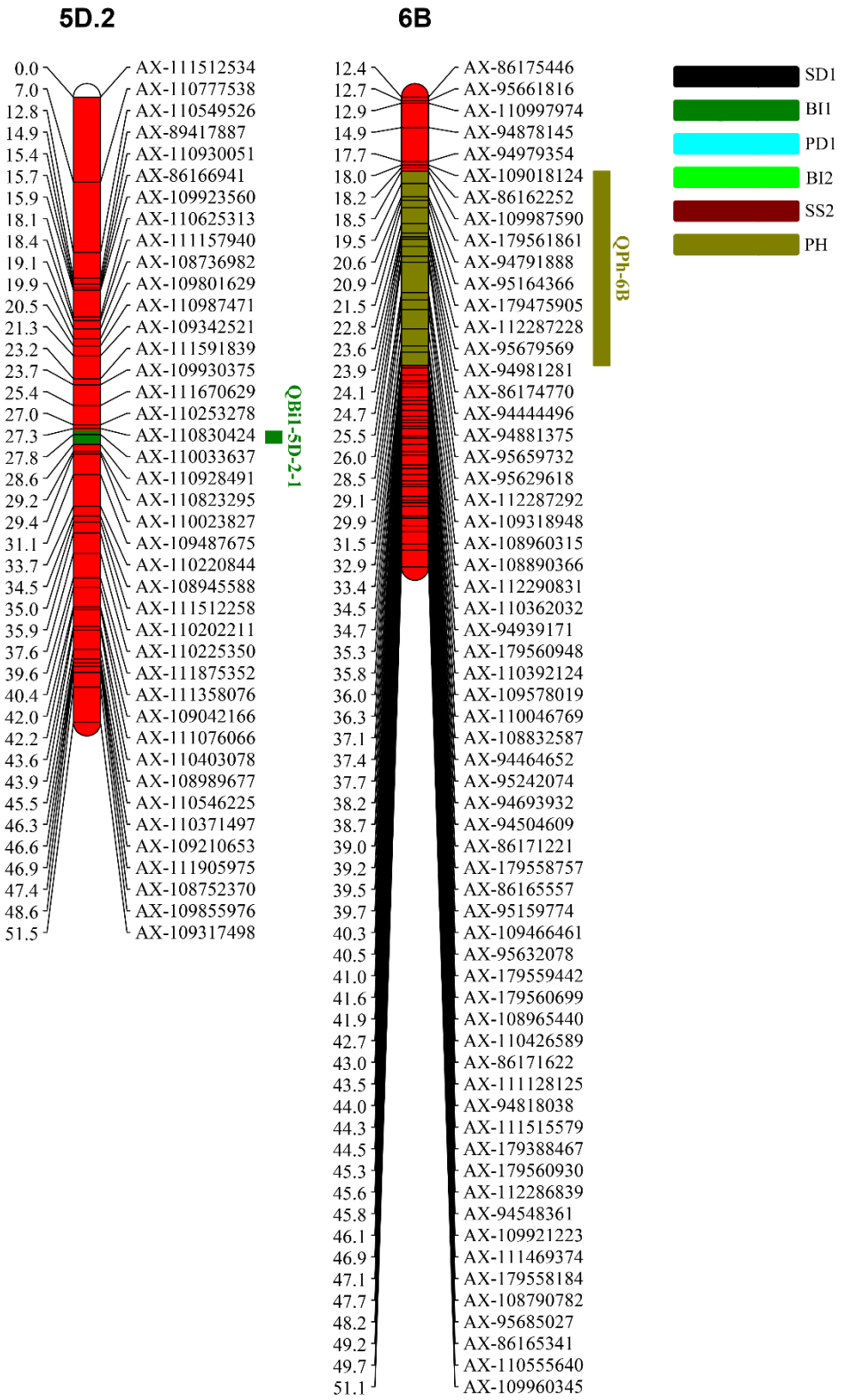
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QPh-6B
SD1
BI1
PD1
BI2
SS2
PH

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Table S1. QTL flanking markers found in previous studies related to QTL found in this study

Trait	Chr	Maker or interval	PVE%	reference
SS2	2D	91.3-131.4cM	2.80%	Nilsen et al. 2017
		Xgwm382-Xgwm311	12%	Guo (2002)
		Kukri_c13329_800	21.85%	Liu et al. 2017
		Xcfd53-Xwmc18	10.79%	Xie (2011)
SD	1A	Xwmc550-Xbarc269	13.47%	Guo (2002)
	1B	Xwmc406-Xbarc156	9.48%	Guo (2002)
		Xbarc119-Xgwm18	4.95%	Guo (2002)
		Xcwem6.1-Xwmc128	11.37%	Guo (2002)
		wsnp_Ex_rep_c78209_74462664-Excalibur_c37496_271	7.03%	Zhang (2017)
		Xgwm259-Xwmc719	20.70%	Pan (2016)
	2D	Xwmc112-Xcfd53	8.62%	Guo (2002)
		Xcfd53-Xwmc18	8.12%	Guo (2002)
	3A	Xbarc45	8.44%	Berry and Berry 2015
		Xwmc264	13.90%	Berry and Berry 2015
		BS00025191_51-BS00065382_51	5.45%	Zhang (2017)
	3B	Xgwm547-Xgwm247	8.14%	Pan (2016)
		Xgwm108-Xwmc-291	8.75%	Lin et al. 2005
	4B	Xwmc48-Xbarc1096	7.92%	Guo (2002)
		IACX3386-Tdurum_contig31139_143	10.17%	Zhang (2017)
	5A	RAC875_c9617_373-RAC875_c9617_395	8.28%	Zhang (2017)
	5D	Xbarc320-Xwmc215	15.49%	Guo (2002)
	6A	Xgwm1005	9.45%	Berry and Berry 2015

	6B	Xwmc398	16.93%	Berry and Berry 2015
	7D	Xgwm1007	7.38%	Berry and Berry 2015
PD	2D	Xgwm382-Xgwm311	11%	Guo (2002)
		Xgwm311-Xgwm301	18.70%	Lin et al. 2005
	5A	gwm156-gwm443	8.70%	Pan (2016)
Bi1	4D	*wmc720-barc98*	18.80%	Liang et al. 2014
		wmc473-wmc285	6.47%	Liang et al. 2014
		barc334-wmc331	13.9%-14.67%	Xie (2011)
	5D	wmc215-barc345	10%	Xie (2011)
		barc320-wmc215	8.99%	Xie (2011)
Bi2	3A	barc310-barc359	24.75%	Liang et al. 2014
	4B	EX_C101685-RAC857-C27536	12.12%-15.3%	Liu et al. 2017
	4D	wmc473-wmc285	20.20%	Guo (2002)
		wmc473-wmc285	36.81%-45.08%	Liang et al. 2014
PH	4D	wmc473-wmc285	63.42%	Guo (2002)
		wmc285-wmc237	62.61%	Guo (2002)
		RAC875_rep_c70284_235-wsnp_Ex_rep_c107564_91144523	10.17%-10.84%	Zhang (2017)
		Xbarc334-Xwmc331	11.54%	Xie (2011)
		Xwmc473-Xbarc334	12.60%	Xie (2011)
		Xbarc105-Xwmc585	18.18%	Wang et al. 2010
	5B	Xgwm213-Xgwm371	1.44%	Wang et al. 2010
		Xgwm499-Xissr854.2	3.54%	Lu et al. 2014
	6B	wpt5037-AX-108969155	4.70%	Zhang et al. 2017