

**Table S2. QTL positions, replications, effect sizes and proportion along z**

QTL	mrk	Chr	Left	Pos	Right	2D	3D	Semi	% SST <sup>1</sup>	% SS proj Scores <sup>1</sup>	% z <sup>1</sup>
SH1_2D	gnf01.075.385	1	41.33	43.62	45.33		SH1_3D	SH1_Semi	0.83	6.53	
SH2_2D	rs3667007	2	49.54	51.54	60.54		SH3_3D	SH2_Semi	1.14	11.59	
SH3_2D	rs13477217	3	12.01	35.86	60.89		SH4_3D		0.88	9.16	
SH4_2D	rs6226080	4	56.01	66.01	76.01		SH5_3D		1.09	7.56	
SH5_2D	rs3680434	5	10.5	16.5	19.5		SH6_3D	SH7_Semi	0.54	5.72	
SH6_2D	rs13478337	5	47.5	51.5	80.5		SH7_3D	SH8_Semi	0.70	6.74	
SH7_2D	CEL-6_86289708	6	30.00	42.00	44.00		SH8_3D	SH9_Semi	0.88	8.42	
SH8_2D	rs6386110	8	17.21	23.52	25.52		SH9_3D	SH12_Semi	1.45	9.5	
SH9_2D	rs3655717	9	17.1	39.1	72.1		SH10_3D	SH13_Semi	0.61	7.21	
SH10_2D	rs13480773	10	59.03	66.03	77.03		SH11_3D	SH15_Semi	0.59	7.87	
SH11_2D	rs13481109	11	45.08	47.08	49.08		SH12_3D	SH17_Semi	0.94	5.81	
SH12_2D	rs3672597	11	81.08	83.13	86.08		SH13_3D	SH18_Semi	0.69	8.17	
SH13_2D	rs6311081	12	11.9	16.9	19.98		SH14_3D		0.77	5.18	
SH14_2D	rs3720782	13	19.00	26.52	26.52		SH15_3D	SH20_Semi	0.78	7.5	
SH15_2D	CEL-15_36490596	15	12.99	13.68	17.99		SH17_3D	SH21_Semi	0.72	8.19	
SH16_2D	rs4204106	16	44.01	48.03	50.03		SH18_3D	SH22_Semi	0.79	6.96	
SH17_2D	rs6229946	17	37.14	47.14	57.14		SH19_3D		0.84	7.33	
SH1_3D	rs13475866	1	25.06	27.33	44.33	SH1_2D		SH1_Semi	0.56	4.17	0.11
SH2_3D	rs6157620	1	84.33	101.84	105.33				0.62	5.85	0.32
SH3_3D	rs6316774	2	47.54	57.08	62.85	SH2_2D		SH2_Semi	0.93	8.76	0.13
SH4_3D	rs13477217	3	31.01	35.86	40.01	SH3_2D			0.85	6.47	0.07
SH5_3D	rs13477838	4	52.01	54.01	64.01	SH4_2D		SH5_Semi	1.05	6.67	0.15
SH6_3D	rs3680434	5	10.5	16.5	21.5	SH5_2D		SH7_Semi	0.58	5.00	0.08
SH7_3D	rs13478337	5	47.5	51.5	55.5	SH6_2D		SH8_Semi	0.71	5.88	0.09
SH8_3D	CEL-6_83434907	6	34.00	40.4	43.00	SH7_2D		SH9_Semi	0.91	7.46	0.18
SH9_3D	rs6386110	8	17.21	24.52	46.52	SH8_2D		SH12_Semi	1.25	7.15	0.04
SH10_3D	rs3655717	9	36.1	39.1	82.1	SH9_2D		SH13_Semi	0.59	6.33	0.11
SH11_3D	rs13480740	10	59.03	61.03	67.03	SH10_2D		SH15_Semi	0.63	5.16	0.27
SH12_3D	rs13481109	11	45.08	47.08	49.08	SH11_2D		SH17_Semi	0.92	5.52	0.07

<b>SH13_3D</b>	rs3672597	11	81.08	83.13	86.08	SH12_2D	SH18_Semi	0.63	6.38	0.08
<b>SH14_3D</b>	UT_12_24.561109	12	8.9	12.9	19.98	SH13_2D	SH19_Semi	0.69	4.44	0.10
<b>SH15_3D</b>	rs3720782	13	23.00	26.52	26.52	SH14_2D	SH20_Semi	0.98	7.28	0.22
<b>SH16_3D</b>	rs6396829	14	8.99	11.99	14.99			0.51	5.52	0.26
<b>SH17_3D</b>	CEL-15_43206205	15	12.99	15.99	17.4	SH15_2D	SH21_Semi	0.8	6.82	0.11
<b>SH18_3D</b>	rs4204106	16	43.03	48.03	51.03	SH16_2D	SH22_Semi	0.78	6.35	0.10
<b>SH19_3D</b>	rs13483135	17	17.14	56.14	58.49	SH17_2D		0.85	7.14	0.06
<b>SH1_Semi</b>	gnf01.075.385	1	42.33	43.62	44.33	SH1_2D	SH1_3D	0.91	5.6	0.11
<b>SH2_Semi</b>	rs3722345	2	51.09	51.09	60.54	SH2_2D	SH3_3D	0.85	8.62	0.17
<b>SH3_Semi</b>	rs6274061	3	12.01	20.01	21.01			0.67	5.82	0.13
<b>SH4_Semi</b>	rs3676039	3	59.01	65.01	77.01			0.31	5.11	0.19
<b>SH5_Semi</b>	rs3711477	4	52.01	52.2	53.01		SH5_3D	0.63	5.10	0.20
<b>SH6_Semi</b>	UT_4_132.137715	4	81.01	83.01	84.01			0.70	6.30	0.13
<b>SH7_Semi</b>	rs13478154	5	13.5	15.71	17.5	SH5_2D	SH6_3D	0.70	7.16	0.16
<b>SH8_Semi</b>	rs13478388	5	43.5	52.5	56.5	SH6_2D	SH7_3D	0.60	5.31	0.13
<b>SH9_Semi</b>	CEL-6_86289708	6	41.55	43.00	43.00	SH7_2D	SH8_3D	1.09	4.92	0.20
<b>SH10_Semi</b>	rs3658783	6	84.00	88.00	89.28			0.40	5.09	0.21
<b>SH11_Semi</b>	rs13479427	7	43.05	55.02	57.2			0.54	5.96	0.08
<b>SH12_Semi</b>	rs6386110	8	22.38	25.52	27.52	SH8_2D	SH9_3D	1.01	6.76	0.11
<b>SH13_Semi</b>	rs3721056	9	43.1	44.47	71.1	SH9_2D	SH10_3D	0.61	4.48	0.20
<b>SH14_Semi</b>	rs3686911	10	3.03	3.18	9.03			0.53	6.42	0.13
<b>SH15_Semi</b>	mCV24217147	10	67.03	70.03	71.12	SH10_2D	SH11_3D	0.58	4.84	0.17
<b>SH16_Semi</b>	rs3700830	11	12.08	16.08	17.08			0.35	4.38	0.29
<b>SH17_Semi</b>	rs13481127	11	48.08	49.08	54.08	SH11_2D	SH12_3D	0.6	4.81	0.21
<b>SH18_Semi</b>	rs3672597	11	82.08	84.08	86.08	SH12_2D	SH13_3D	0.53	4.33	0.13
<b>SH19_Semi</b>	rs13481321	12	6.9	7.99	8.95		SH14_3D	0.84	6.21	0.13
<b>SH20_Semi</b>	rs3693942	13	25.00	26.00	26.52	SH14_2D	SH15_3D	1.01	5.94	0.11
<b>SH21_Semi</b>	CEL-15_36490596	15	13.68	13.68	14.99	SH15_2D	SH17_3D	0.67	6.24	0.10
<b>SH22_Semi</b>	rs4204106	16	33.03	48.03	53.31	SH16_2D	SH18_3D	1.10	8.97	0.07
<b>SH23_Semi</b>	rs6298471	17	16.03	18.14	21.14			0.59	6.64	0.12

<sup>1</sup> See Table S1 and the main text for an explanation of these percentage of variance explained.