

Genetic dissection of 2-heptenal content in soybean (*Glycine max*) seed through genome-wide association study

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Supplementary material

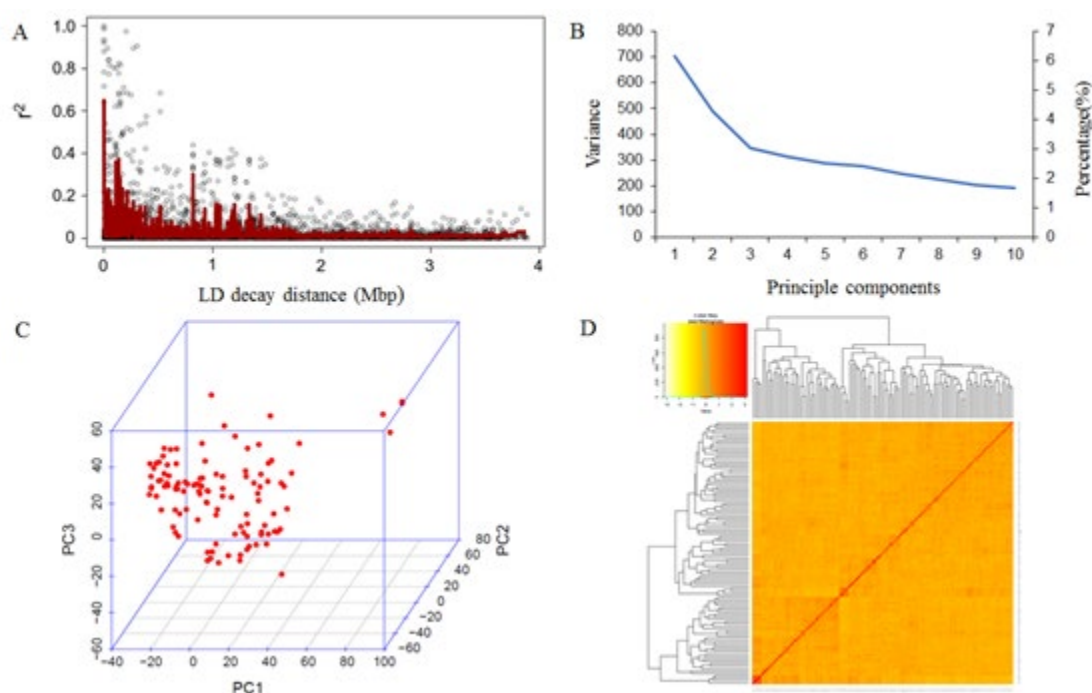


Figure S1. The linkage disequilibrium (LD), principal component, and kinship analysis of soybean genetic data. (A) LD decay of genome-wide association study (GWAS) population; (B) Population structure of soybean germplasm collection as reflected by principal components, the first three PCs could account for 13.99% of the total genetic variation; (C) The first three principal components of 24,651 SNPs used in the GWAS; (D) A heat map of the kinship matrix of the 110 soybean accessions calculated from the same 24,651 SNPs used in the GWAS.

Table S1 Source and phenotype data of 110 soybean accessions

Name	Country	Latitude (°N)	Longitude (°W)	Phenotypic data		
				Harbin (ng·mL ⁻¹)	Shengyang (ng·mL ⁻¹)	Gongzhuling (ng·mL ⁻¹)
HN51	China	48.29	128.08	40.36	44.45	43.51
HF47	China	48.29	128.08	34.78	85.39	66.39
HF50	China	48.29	128.08	54.19	46.27	68.81
KF18	China	48.29	128.08	41.37	68.74	55.89
KF14	China	48.29	128.08	32.68	32.68	45.4
HuJiao4403 (Hujiao03-286)	China	48.29	128.08	43.66	26.64	64.6
HN48	China	48.29	128.08	144.59	144.56	115.84
DN46	China	48.29	128.08	28.92	23.69	54.36
DN49	China	48.29	128.08	66.49	92.11	82.71
Hangbaodou	China	40.845	121.995	42.7	39.57	51.09
HF25	China	48.29	128.08	21.22	89.73	83.64
Small yellow	China	37.385	112.235	30.13	44.84	58.28
BF9	China	48.29	128.08	35.2	25.78	45.29
Fenshou6	China	48.29	128.08	36.06	50.06	46.04
NF11	China	48.29	128.08	26.13	24.03	21.81
NH44	China	48.29	128.08	17.28	24.49	55.04
DN42	China	48.29	128.08	42.94	21.45	68.01
Heimodou	China	43.35	126.285	11.62	32.06	43.26
Douludou	China	43.35	126.285	23.43	17.09	12.66
KJ23	China	48.29	128.08	7.99	15.62	9.84
HH48	China	48.29	128.08	145.74	116.03	106.47
DN48	China	48.29	128.08	58.14	59.17	47.91
SN10	China	48.29	128.08	38.46	9.49	51.34
DN594	China	48.29	128.08	86.25	76.87	73.51
DN1068	China	48.29	128.08	22.65	26.23	20.8
DN43	China	48.29	128.08	71.84	65.28	40.1

Xian3	China	48.29	128.08	92.72	78.11	47.23
JL30	China	43.35	126.285	57.05	42.37	42.19
Jshanmoshi	China	43.35	126.285	49.3	78.61	71.81
JY94	China	43.35	126.285	129.67	187.7	155.59
JY89	China	37.385	112.235	20.03	22.66	32.83
JN20	China	43.35	126.285	39.67	47.01	40.54
HYoutai	China	43.35	126.285	13.63	19.26	18.16
L-28	Canada	43.4	79.25	11.87	47.77	54.05
JD33	China	40.845	121.995	59.99	75.8	95.99
TF8	China	40.845	121.995	69.5	37.14	41.16
Tejia	China	43.35	126.285	52.77	49.33	57.75
LD23	China	40.845	121.995	23.74	27.8	24.44
TD58	China	40.845	121.995	48.01	49.52	57.42
Bmoshi	China	43.35	126.285	161.84	141.52	136.79
L-9	America	41.83	92.905	41.58	46.15	45.25
L-10	America	41.83	92.905	47.43	46.76	57.7
MD14	China	44.49	111.695	108.47	107.49	100.17
Big black	China	36.225	118.31	69	41.98	52.39
Heersong2	Ukraine	50.28	30.29	35	49.01	70.66
Nova	Italy	41.54	12.3	29.66	37.65	45.63
Domaka Tolisa-A	Yugoslavia	46.3	14.3	110.92	136.74	111.58
Aika166	Rumania	44.23	26.1	136.55	146.38	129.54
Yapiche	China	48.29	128.08	24.49	37.28	27.56
Cse	China	43.35	126.285	31.61	25.52	31.8
ZD35	China	40.145	116.275	156.75	38.33	39.55
Stone	China	39.19	116.285	436.25	452.38	490.99
JD17	China	39.19	116.285	50.86	32.46	51.03
4five-star	China	39.19	116.285	1.76	0	0
Datenhei	China	39.19	116.285	20.53	25.67	26.14
Z03-5334	China	40.145	116.275	45.05	72.22	72.36

Z03-5179	China	40.145	116.275	53.19	72.9	44.92
ZD27	China	40.145	116.275	56.7	44.16	61.29
ZZ00-683	China	40.145	116.275	23.66	65.91	74.62
SN1	China	48.29	128.08	13.21	6.88	10.66
HH18	China	48.29	128.08	29.86	34.95	36.41
MF1	China	48.29	128.08	50.94	76.62	53.63
KB1	China	48.29	128.08	17.94	17.95	19.61
HF35	China	48.29	128.08	21.98	78.19	59.93
HF11	China	48.29	128.08	44.39	53.77	38.74
LP03-11	China	48.29	128.08	111.39	146.13	137.21
LongX1	China	48.29	128.08	24.65	26.39	24.12
HF29	China	48.29	128.08	158.98	46.79	67.75
HF37	China	48.29	128.08	19.92	14.83	25.73
DN07-9909	China	48.29	128.08	9.82	66.68	70.9
HF45	China	48.29	128.08	27.36	23.98	21.83
HF55	China	48.29	128.08	106.99	111.22	108.64
BD16	China	48.29	128.08	58.88	24.73	44.06
HuaJiang4403	China	48.29	128.08	87.5	85.39	55.37
B1484	China	48.29	128.08	41.83	39.05	35.77
B1361	China	48.29	128.08	28.45	24.11	33.22
B1873	China	48.29	128.08	125.84	104.11	111.08
B4834	China	48.29	128.08	32.68	56.09	52.65
SN30	China	48.29	128.08	62.32	50.03	92.44
K04-8579	China	48.29	128.08	13.2	19.93	19.61
S03-3046	China	48.29	128.08	32.47	57.93	83.4
S03-3952	China	48.29	128.08	69.92	116.96	44.64
S05-7304	China	48.29	128.08	33.14	36.92	40.32
KN30	China	48.29	128.08	19.97	52.04	40.53
KN29	China	48.29	128.08	101.95	100.11	115.47
KN22	China	48.29	128.08	29.5	27.69	52.82

HN55	China	48.29	128.08	79.43	69.1	40.15
SN29	China	48.29	128.08	37.69	33.83	43.41
JN21	China	43.35	126.285	91.96	109.73	40.79
LD3	China	40.845	121.995	118.63	117.83	118.51
L98072	China	40.845	121.995	51.15	34.11	71.14
TD50	China	40.845	121.995	25.25	33.32	48.34
HuJiao4403 (Hujiao03-286)	China	48.29	128.08	51.96	25.6	77.54
DY2004-5	China	43.35	126.285	20.26	21.6	22.63
JL47	China	43.35	126.285	26.54	49.6	54.83
H04-1824	China	48.29	128.08	44.06	35	32.62
DNL-13	Canada	43.4	79.25	40.54	43.81	41.9
L-57	America	41.83	92.905	5.97	21.75	55.69
L-21	America	41.83	92.905	80.59	37.65	57.55
Z30	China	40.145	116.275	24.05	33.81	48.52
TD52	China	40.845	121.995	58.54	45.19	44.79
TD54	China	40.845	121.995	17.29	21.04	23.97
Harvest10	China	48.29	128.08	60.21	67.58	56.24
Jin13	China	39.19	116.285	54.39	65.91	50.55
YF31	China	40.845	121.995	27.97	31.3	51.22
Z95-5388	China	40.145	116.275	18.58	16.44	17.57
Z20	China	40.145	116.275	43.15	30.54	60.15
SN4	China	48.29	128.08	33.39	50.16	73.43
SN8	China	48.29	128.08	37.36	89.7	70.2
HN33	China	48.29	128.08	8.08	34.16	34.86

Table S2 Distribution of SNP markers among 20 chromosomes

Chromosome	SNP Number	Length of Chromosome (bp)	Average distance (bp)
Gm01	1329	56817171	42751.82
Gm02	1180	48520291	41118.89
Gm03	1121	45729644	40793.62
Gm04	1461	52284546	35786.82
Gm05	912	42144173	46210.72
Gm06	1336	51332558	38422.57
Gm07	1115	44600425	40000.38
Gm08	1132	47793019	42219.98
Gm09	1346	50183288	37283.27
Gm10	1265	51538321	40741.76
Gm11	684	34558108	50523.55
Gm12	843	40016302	47468.92
Gm13	1301	45746672	35162.70
Gm14	1113	48910801	43945.01
Gm15	1728	51720128	29930.63
Gm16	1176	37787936	32132.60
Gm17	1222	41615226	34055.01

Gm18	1795	57994294	32308.80
Gm19	1506	50665020	33642.11
Gm20	1086	47897597	44104.60

Table S3 Peak SNP and beneficial allele associated 2-heptenal content in soybean seed identified by GWAS

Peak SNP	Chromosome	Position	Location	$-\log_{10} (P)$	MAF	R ²	Allele 1	Allele 2
rs4492754	1	4492754	Harbin	5.41	0.04	0.23	C	A
			Shenyang	5.74	0.04	0.26		
			Gongzhuling	6.34	0.04	0.28		
rs35313221	1	35313221	Shenyang	3.86	0.06	0.17	G	T
			Gongzhuling	3.20	0.06	0.13		
rs40738106	1	40738106	Harbin	4.01	0.06	0.16	T	A
			Shenyang	4.15	0.06	0.18		
			Gongzhuling	4.61	0.06	0.19		
rs46263468	4	46263468	Harbin	3.31	0.11	0.13	C	A
			Shenyang	3.36	0.11	0.14		
			Gongzhuling	3.79	0.11	0.16		
rs49595299	4	49595299	Shenyang	3.41	0.05	0.15	G	T
			Gongzhuling	4.81	0.05	0.20		
rs25694987	5	25694987	Harbin	3.51	0.06	0.14	G	T
			Shenyang	3.67	0.06	0.16		
			Gongzhuling	4.41	0.06	0.18		
rs5441402	6	5441402	Harbin	3.17	0.08	0.13	G	T
			Shenyang	3.98	0.08	0.17		
			Gongzhuling	4.75	0.08	0.20		
rs11332761	6	11332761	Harbin	4.61	0.05	0.19	C	A
			Shenyang	4.08	0.05	0.18		
			Gongzhuling	5.61	0.05	0.25		
rs16811442	6	16811442	Harbin	3.72	0.06	0.15	C	A
			Shenyang	3.75	0.06	0.16		
			Gongzhuling	3.73	0.06	0.15		
rs7892362	7	7892362	Harbin	4.47	0.05	0.19	G	A
			Shenyang	5.59	0.05	0.25		
			Gongzhuling	4.95	0.05	0.21		
rs12163245	7	12163245	Harbin	3.09	0.06	0.12	T	G
			Shenyang	4.09	0.06	0.18		
			Gongzhuling	4.95	0.05	0.21		
rs19941548	7	19941548	Harbin	3.57	0.08	0.14	G	T
			Shenyang	4.49	0.08	0.20		
			Gongzhuling	4.74	0.08	0.20		
rs8363510	8	8363510	Harbin	4.22	0.06	0.17	C	A
			Shenyang	3.57	0.06	0.15		
			Gongzhuling	4.24	0.06	0.18		
rs12785378	8	12785378	Harbin	3.39	0.06	0.14	C	A
			Gongzhuling	3.39	0.06	0.14		
rs12785753	8	12785753	Harbin	3.38	0.06	0.13	T	A
			Gongzhuling	3.39	0.06	0.14		
rs12962552	8	12962552	Harbin	3.62	0.06	0.15	C	T
			Gongzhuling	3.55	0.06	0.14		

rs14695972	8	14695972	Harbin	4.10	0.06	0.17	G	T
			Shenyang	4.74	0.06	0.21		
			Gongzhuling	5.03	0.06	0.22		
rs16260829	8	16260829	Harbin	3.11	0.08	0.12	C	T
			Shenyang	5.23	0.08	0.23		
			Gongzhuling	4.63	0.08	0.20		
rs40443448	8	40443448	Shenyang	3.29	0.06	0.14	G	A
			Gongzhuling	3.53	0.06	0.14		
rs45442302	8	45442302	Harbin	6.43	0.04	0.29	A	C
			Shenyang	6.60	0.04	0.31		
			Gongzhuling	7.82	0.04	0.37		
rs47351598	8	47351598	Harbin	3.32	0.11	0.13	T	A
			Shenyang	3.28	0.11	0.14		
			Gongzhuling	3.30	0.11	0.13		
rs32098065	9	32098065	Harbin	3.24	0.06	0.13	C	T
			Shenyang	3.39	0.06	0.15		
			Gongzhuling	4.81	0.06	0.20		
rs1267771	10	1267771	Harbin	3.69	0.06	0.15	C	A
			Shenyang	3.69	0.06	0.16		
			Gongzhuling	4.52	0.06	0.19		
rs23273692	10	23273692	Harbin	3.02	0.04	0.12	C	A
			Shenyang	3.15	0.04	0.14		
			Gongzhuling	3.64	0.04	0.15		
rs40416504	10	40416504	Harbin	3.36	0.07	0.13	C	A
			Shenyang	3.35	0.07	0.14		
			Gongzhuling	4.07	0.07	0.17		
rs41544708	10	41544708	Harbin	3.05	0.05	0.12	G	A
			Shenyang	3.36	0.05	0.14		
			Gongzhuling	4.23	0.05	0.18		
rs42890926	10	42890926	Harbin	3.14	0.06	0.12	G	T
			Shenyang	3.19	0.06	0.14		
			Gongzhuling	3.25	0.06	0.13		
rs46095445	10	46095445	Harbin	4.67	0.06	0.20	A	T
			Shenyang	5.14	0.06	0.23		
			Gongzhuling	5.95	0.06	0.26		
rs47397746	10	47397746	Harbin	4.96	0.04	0.21	C	T
			Shenyang	4.23	0.04	0.19		
			Gongzhuling	5.16	0.04	0.22		
rs48669169	10	48669169	Harbin	3.15	0.05	0.12	A	C
			Gongzhuling	4.71	0.05	0.20		
rs182585	11	182585	Harbin	3.05	0.09	0.12	A	G
			Shenyang	3.17	0.09	0.14		
			Gongzhuling	3.49	0.09	0.14		
rs34604822	11	34604822	Harbin	4.02	0.05	0.16	C	A
			Shenyang	3.68	0.05	0.16		
			Gongzhuling	4.61	0.05	0.19		

rs4246516	12	4246516	Harbin	3.01	0.05	0.12	T	A
			Shenyang	3.35	0.05	0.14		
			Gongzhuling	4.49	0.05	0.19		
rs24880696	12	24880696	Harbin	3.16	0.10	0.12	G	T
			Shenyang	3.20	0.10	0.14		
			Gongzhuling	4.25	0.04	0.18		
rs37710139	12	37710139	Harbin	3.02	0.04	0.12	G	A
			Shenyang	2.71	0.04	0.12		
			Gongzhuling	4.25	0.04	0.18		
rs38586856	12	38586856	Harbin	3.66	0.06	0.15	C	T
			Shenyang	4.79	0.06	0.21		
			Gongzhuling	5.19	0.06	0.22		
rs15487982	13	15487982	Harbin	3.46	0.07	0.14	G	T
			Shenyang	3.71	0.07	0.16		
			Gongzhuling	3.31	0.07	0.13		
rs35400999	13	35400999	Harbin	4.25	0.06	0.19	G	A
			Shenyang	3.22	0.06	0.13		
			Gongzhuling	3.28	0.06	0.13		
rs41084947	13	41084947	Shenyang	3.53	0.06	0.15	G	T
			Gongzhuling	4.55	0.06	0.19		
			Harbin	3.99	0.08	0.16		
rs43590608	13	43590608	Harbin	3.99	0.08	0.16	C	T
			Shenyang	3.62	0.08	0.16		
			Gongzhuling	4.14	0.08	0.17		
rs5491627	14	5491627	Shenyang	3.04	0.06	0.13	C	A
			Gongzhuling	4.59	0.06	0.19		
			Harbin	4.65	0.06	0.20		
rs11937326	14	11937326	Harbin	4.65	0.06	0.20	G	A
			Shenyang	5.87	0.06	0.27		
			Gongzhuling	6.61	0.06	0.30		
rs22586695	14	22586695	Harbin	3.78	0.12	0.15	G	T
			Shenyang	4.40	0.12	0.19		
			Gongzhuling	4.17	0.12	0.17		
rs13369197	15	13369197	Harbin	3.40	0.09	0.14	T	C
			Shenyang	3.97	0.09	0.17		
			Gongzhuling	4.32	0.09	0.18		
rs5524645	16	5524645	Harbin	3.61	0.04	0.15	G	A
			Shenyang	3.63	0.04	0.16		
			Gongzhuling	4.76	0.04	0.20		
rs8911940	16	8911940	Harbin	3.61	0.04	0.15	A	T
			Shenyang	3.63	0.04	0.16		
			Gongzhuling	4.76	0.04	0.20		
rs36039084	16	36039084	Harbin	5.09	0.14	0.22	A	G
			Shenyang	3.08	0.14	0.13		
			Gongzhuling	3.29	0.14	0.13		
rs36081826	16	36081826	Harbin	3.23	0.12	0.13	G	T
			Gongzhuling	3.12	0.12	0.12		
			Harbin	3.37	0.06	0.13		
rs10490744	17	10490744	Harbin	3.37	0.06	0.13	G	T
			Shenyang	4.63	0.06	0.20		

			Gongzhuling	5.29	0.06	0.23		
rs1234449	18	1234449	Harbin	4.70	0.05	0.20	C	T
			Shenyang	5.23	0.05	0.23		
			Gongzhuling	5.45	0.05	0.24		
rs17080077	18	17080077	Harbin	4.59	0.08	0.19	G	A
			Shenyang	3.31	0.08	0.14		
			Gongzhuling	3.27	0.08	0.13		
rs17153020	18	17153020	Harbin	4.56	0.08	0.19	G	A
			Shenyang	3.46	0.08	0.15		
			Gongzhuling	3.67	0.08	0.15		
rs18485898	18	18485898	Shenyang	3.13	0.07	0.13	C	T
			Gongzhuling	3.96	0.07	0.16		
rs56402600	18	56402600	Shenyang	3.00	0.05	0.13	C	T
			Gongzhuling	3.28	0.05	0.13		
rs1019215	19	1019215	Harbin	3.68	0.05	0.15	C	A
			Shenyang	3.49	0.05	0.15		
			Gongzhuling	3.46	0.05	0.14		
rs2987507	19	2987507	Harbin	4.24	0.09	0.18	A	T
			Shenyang	6.13	0.09	0.28		
			Gongzhuling	4.90	0.09	0.21		
rs6380031	19	6380031	Harbin	5.38	0.06	0.23	G	T
			Shenyang	3.71	0.06	0.16		
			Gongzhuling	3.13	0.06	0.12		
rs35067191	19	35067191	Harbin	5.27	0.05	0.23	G	T
			Shenyang	3.70	0.05	0.16		
			Gongzhuling	4.13	0.05	0.17		
rs48769908	19	48769908	Harbin	3.07	0.06	0.12	G	T
			Shenyang	3.72	0.06	0.16		
			Gongzhuling	3.36	0.06	0.14		
rs9922668	20	9922668	Harbin	3.79	0.06	0.15	G	T
			Shenyang	3.18	0.06	0.14		
			Gongzhuling	3.74	0.06	0.15		
rs32170037	20	32170037	Harbin	3.10	0.11	0.12	A	T
			Shenyang	3.58	0.11	0.15		
			Gongzhuling	3.86	0.11	0.16		
rs38986884	20	38986884	Shenyang	3.06	0.06	0.13	A	G
			Gongzhuling	3.78	0.06	0.15		

Table S4 Gene models in the flanking regions of peak SNP

Chromosome	Peak SNP	Physical position (bp)	Gene model	Start(bp)	End(bp)	Functional annotation			
1	rs4492754	4492754	Glyma.01G040700	4392159	4393458	thioredoxin 2			
			Glyma.01G040900	4396965	4402461	RNA helicase family protein			
			Glyma.01G041100	4403613	4404643	thioredoxin 2			
			Glyma.01G041200	4420529	4421978	thioredoxin 2			
			Glyma.01G041400	4457128	4461721	nitrate transporter 1.7			
			Glyma.01G041700	4530106	4532731	homeobox 1			
1	rs35313221	35313221	Glyma.01G104900	35327725	35328290	Nucleic acid-binding, OB-fold-like protein			
1	rs40738106	40738106	Glyma.01G117800	40630042	40635116	APRATAXIN-like			
			Glyma.01G117900	40636080	40646114	ARK3,RK3			
			Glyma.01G118000	40666204	40669741	Thiamine pyrophosphate dependent pyruvate decarboxylase family protein			
			Glyma.01G118100	40699940	40700495	Aha1 domain-containing protein			
			Glyma.01G118200	40731727	40739098	Plant nuclear matrix protein 1 (NMP1)			
			Glyma.01G118300	40757868	40778212	Leucine-rich repeat transmembrane protein kinase			
			Glyma.01G118400	40773818	40793638	Leucine-rich repeat transmembrane protein kinase			
			Glyma.01G118800	40805498	40839057	Leucine-rich repeat transmembrane protein kinase			
			4	rs46263468	46263468	Glyma.04G191900	46271697	46281894	relative of early flowering 6
						Glyma.04G192000	46279239	46297477	relative of early flowering 6
Glyma.04G192200	46324061	46333019				retinoblastoma-related 1			
4	rs49595299	49595299	Glyma.04G224800	49506661	49513681	cytochrome P450, family 714, subfamily A, polypeptide 1			
			Glyma.04G225500	49557678	49558448	response to low sulfur 2			
5	rs25694987	25694987	Glyma.05G097300	25690760	25692626	CYCLIN D3;2			
			Glyma.05G097500	25774602	25775899	homolog of mammalian P58IPK			
6	rs5441402	5441402	Glyma.06G069700	5345917	5349422	overexpressor of cationic peroxidase 3			
			Glyma.06G069900	5362065	5364532	Ran BP2/NZF zinc finger-like superfamily protein			
			Glyma.06G070100	5370822	5376415	alpha/beta-Hydrolases superfamily protein			
			Glyma.06G070300	5381397	5387924	Cyclophilin-like peptidyl-prolyl cis-trans isomerase family protein			
			Glyma.06G070400	5393488	5398575	Plant Tudor-like RNA-binding protein			
			Glyma.06G070500	5400379	5402683	RAN GTPase 3			
			Glyma.06G070600	5405972	5408460	RAN GTPase 3			
			Glyma.06G070700	5409185	5412525	RAN GTPase 3			

			Glyma.06G070800	5414803	5415947	FRS (FAR1 Related Sequences) transcription factor family
			Glyma.06G070900	5418211	5420653	Protein of unknown function, DUF642
			Glyma.06G071000	5424118	5427196	Protein of unknown function, DUF642
			Glyma.06G071100	5435526	5441542	K ⁺ transporter 1
			Glyma.06G071200	5443006	5448211	HCO ₃ ⁻ - transporter family
			Glyma.06G071300	5451032	5457998	1-deoxy-D-xylulose 5-phosphate synthase 3
			Glyma.06G071400	5460879	5463068	plant natriuretic peptide A
			Glyma.06G071500	5464145	5466093	histone H2A protein 9
			Glyma.06G071800	5480586	5488550	pleiotropic drug resistance 12
			Glyma.06G071900	5490395	5493730	DNA-binding protein phosphatase 1
			Glyma.06G072100	5509065	5512168	Flavin-binding monooxygenase family protein
6	rs11332761	1332761	Glyma.06G137200	11232269	11234491	O-methyltransferase 1
			Glyma.06G137300	11237072	11239469	O-methyltransferase 1
			Glyma.06G137700	11252976	11255680	nascent polypeptide-associated complex subunit alpha-like protein 2
			Glyma.06G137800	11256521	11258533	nascent polypeptide-associated complex subunit alpha-like protein 2
			Glyma.06G138100	11272268	11275624	NAC transcription factor-like 9
			Glyma.06G138400	11302499	11303644	Ribosomal protein L6 family
6	rs16811442	16811442	Glyma.06G190800	16760534	16765691	WRKY DNA-binding protein 72
			Glyma.06G190900	16769976	16773415	ubiquitinating-conjugating enzyme 2
			Glyma.06G191100	16779880	16780410	glutathione S-transferase THETA 2
			Glyma.06G191200	16797513	16804509	IQ-domain 31
			Glyma.06G191300	16805742	16812503	ATP-binding cassette A2
			Glyma.06G191400	16821833	16831587	ABC2 homolog 6
			Glyma.06G191600	16852060	16859338	SIGNAL PEPTIDE PEPTIDASE-LIKE 2
			Glyma.06G191800	16867632	16870439	activation-tagged BRI1(brassinosteroid-insensitive 1)-suppressor 1
7	rs7892362	7892362	Glyma.07G084400	7774576	7781174	Major facilitator superfamily protein
			Glyma.07G084500	7788320	7793377	RNA-binding protein-related
			Glyma.07G084600	7793897	7796474	Late embryogenesis abundant protein
			Glyma.07G084700	7801384	7806205	Protein of unknown function (DUF502)
			Glyma.07G085000	7828234	7833116	RHO guanyl-nucleotide exchange factor 8
			Glyma.07G085100	7831540	7840058	ABI-1-like 1
			Glyma.07G085200	7845887	7852685	3-hydroxyacyl-CoA dehydrogenase
			Glyma.07G085300	7855189	7864377	Tesmin/TSO1-like CXC domain-containing protein
			Glyma.07G085400	7870356	7876333	Adenine nucleotide alpha hydrolases-like superfamily protein
			Glyma.07G085500	7877189	7883386	SITE-1 protease

			Glyma.07G085600	7891876	7896291	proline extensin-like receptor kinase 1
			Glyma.07G085700	7910707	7915213	NAD(P)-binding Rossmann-fold superfamily protein
			Glyma.07G085800	7918483	7922268	AAA-type ATPase family protein / ankyrin repeat family protein
			Glyma.07G086000	7942077	7944540	polyol/monosaccharide transporter 5
			Glyma.07G086200	7964042	7967721	Flavin-binding monooxygenase family protein
			Glyma.07G086300	7997334	7998516	heat shock factor 1
7	rs12163245	12163245	Glyma.07G114800	12183198	12187105	RAS 5
			Glyma.07G114900	12214607	12218109	ribosomal protein L4
7	rs19941548	19941548	Glyma.07G158800	19882111	19885620	CHASE domain containing histidine kinase protein
8	rs8363510	8363510	Glyma.08G107500	8266733	8268742	indole-3-acetate beta-D-glucosyltransferase
			Glyma.08G107600	8276759	8278195	indole-3-acetate beta-D-glucosyltransferase
			Glyma.08G107800	8296196	8307328	aspartate kinase-homoserine dehydrogenase ii
			Glyma.08G108000	8311539	831495	selenium-binding protein 1
			Glyma.08G108200	8317340	8318268	ralf-like 32
			Glyma.08G108600	8338000	8342875	winged-helix DNA-binding transcription factor
			Glyma.08G108700	8344071	8344459	ralf-like 33
			Glyma.08G108800	8350933	8353638	S-adenosyl-L-homocysteine hydrolase
			Glyma.08G108900	8358422	8363343	serine hydroxymethyltransferase 4
			Glyma.08G109000	8364770	8373803	Subtilisin-like serine endopeptidase family protein
			Glyma.08G109100	8380662	8383004	UDP-D-glucuronate 4-epimerase 6
			Glyma.08G109200	8384742	8386542	Chalcone and stilbene synthase family protein
			Glyma.08G109300	8387509	8391327	Chalcone and stilbene synthase family protein
			Glyma.08G109400	8391364	8394840	Chalcone and stilbene synthase family protein
			Glyma.08G109500	8397944	8399751	Chalcone and stilbene synthase family protein
			Glyma.08G109700	8419650	8422508	DNAJ-like 20
			Glyma.08G109800	8423696	8424408	low-molecular-weight cysteine-rich 82
			Glyma.08G109900	8431287	8436291	cytochrome P450, family 71, subfamily B, polypeptide 34
8	rs12785378	12785378	Glyma.08G162900	12756525	12757349	metacaspase 5
			Glyma.08G163100	12786187	12790560	NAC domain containing protein 20
			Glyma.08G163200	12800182	12802293	myb domain protein 67
			Glyma.08G163500	12850739	12853451	Homeodomain-like superfamily protein
8	rs12785753	12785753	Glyma.08g162400	12692978	12695479	Eukaryotic aspartyl protease family protein
			Glyma.08g162500	12702931	12706079	DNA glycosylase superfamily protein
			Glyma.08g162600	12731124	12735195	Ribosomal protein L18e/L15 superfamily protein
			Glyma.08g162700	12736920	12739132	Peroxidase superfamily protein

			Glyma.08g162800	12740092	12750238	Zinc finger C-x8-C-x5-C-x3-H type family protein
			Glyma.08g163600	12868508	12870770	Plant protein of unknown function (DUF946)
8	rs12962552	12962552	Glyma.08g163500	12850739	12853451	Myb-like DNA-binding domain
			Glyma.08g163600	12868508	12870770	VACUOLAR PROTEIN SORTING-ASSOCIATED PROTEIN 62-RELATED
			Glyma.08g163700	12875239	12891819	(Succinate-semialdehyde dehydrogenase (NAD(P)(+))
			Glyma.08g163800	12895207	12899792	LEM3 (ligand-effect modulator 3) family / CDC50 family
			Glyma.08g163900	12901876	12908991	Terpenoid cyclases/Protein prenyltransferases superfamily protein
			Glyma.08g164100	12918209	12921985	INOSINE-5'-MONOPHOSPHATE DEHYDROGENASE
			Glyma.08g164200	12933155	12934611	Carbohydrate-binding X8 domain superfamily protein
			Glyma.08g164400	12943200	12945729	zinc transporter 1 precursor
			Glyma.08g164600	12963520	12965813	SER/THR DEHYDRATASE, TRP SYNTHASE
			Glyma.08g164700	12972477	12975940	(Mitochondrial Fe ²⁺ transporter MMT1 and related transporters (cation diffusion facilitator superfamily)
			Glyma.08g164800	12978532	12982936	Mitochondrial Fe ²⁺ transporter MMT1 and related transporters (cation diffusion facilitator superfamily)
			Glyma.08g164900	12991540	12999834	RP42 RELATED
			Glyma.08g165000	13003749	13004222	low-molecular-weight cysteine-rich 68
			Glyma.08g165100	13008580	13018140	Transglycosylase SLT domain
			Glyma.08g165400	13037061	13040277	phosphoglycerate kinase
8	rs14695972	14695972	Glyma.08G182000	14601875	14604750	26S proteasome regulatory subunit, putative (RPN5)
			Glyma.08G182100	14605001	14606709	cytochrome P450, family 71, subfamily B, polypeptide 37
			Glyma.08G182200	14613725	14616889	actin-11
			Glyma.08G183100	14693692	14697939	tubby like protein 10
			Glyma.08G183500	14724384	14726579	senescence-associated gene 29
			Glyma.08G183900	14745705	14748018	COP9 signalosome, subunit CSN8
			Glyma.08G184200	14764831	14781649	homolog of separase
8	rs16260829	16260829	Glyma.08G200400	16204825	16207943	IQ-domain 26
			Glyma.08G200500	16217120	16222339	poly(A) polymerase 2
			Glyma.08G200600	16223426	16229564	hexokinase 2
			Glyma.08G200700	16232246	16235957	phytochrome-associated protein 1
			Glyma.08G201000	16258261	16262687	hydroxyproline-rich glycoprotein family protein
			Glyma.08G201100	16266131	16268320	HPT phosphotransmitter 4
			Glyma.08G201200	16282204	16287957	NADP-malic enzyme 4
			Glyma.08G201300	16293501	16303097	ABC-2 and Plant PDR ABC-type transporter family protein
			Glyma.08G201400	16320946	16322946	downstream target of AGL15-4

8	rs40443448	40443448	Glyma.08G290300	40353614	40356078	TRICHOME BIREFRINGENCE-LIKE 27
			Glyma.08G290700	40436892	40439186	eukaryotic translation initiation factor 3G1
			Glyma.08G291000	40478791	40483454	CYCLIN D1;1
			Glyma.08G290300	40353614	40356078	TRICHOME BIREFRINGENCE-LIKE 27
8	rs45442302	45442302	Glyma.08G290700	40436892	40439186	eukaryotic translation initiation factor 3G1
			Glyma.08G336500	45351234	45352403	myb domain protein 103
			Glyma.08G336600	45353582	45357689	amino acid permease 7
			Glyma.08G336700	45360421	45362711	amino acid permease 5
			Glyma.08G336800	45365956	45370818	amino acid permease 7
			Glyma.08G336900	45376142	45387404	cation exchanger 5
			Glyma.08G337000	45389334	45394894	cation exchanger 5
			Glyma.08G337200	45409629	45418811	Transducin/WD40 repeat-like superfamily protein
			Glyma.08G337400	45423999	45433706	Transducin/WD40 repeat-like superfamily protein
			Glyma.08G338100	45505725	45507731	UDP-Glycosyltransferase superfamily protein
			Glyma.08G338200	45509289	45511145	UDP-Glycosyltransferase superfamily protein
			Glyma.08G338300	45511931	45513337	UDP-Glycosyltransferase superfamily protein
Glyma.08G338500	45518235	45519632	UDP-Glycosyltransferase superfamily protein			
Glyma.08G338600	45522321	45523727	UDP-Glycosyltransferase superfamily protein			
Glyma.08G338700	45527941	45529335	UDP-Glycosyltransferase superfamily protein			
Glyma.08G338800	45531295	45532911	UDP-Glycosyltransferase superfamily protein			
8	rs47351598	47351598	Glyma.08G360800	47257667	47259828	Pollen Ole e 1 allergen and extensin family protein
			Glyma.08G360900	47259972	47267218	SIGNAL PEPTIDE PEPTIDASE-LIKE 3
			Glyma.08G361000	47268171	47269978	RAB GTPase homolog A5D
			Glyma.08G361100	47272965	47274937	RmlC-like cupins superfamily protein
			Glyma.08G361200	47283029	47285674	inositol transporter 1
			Glyma.08G361300	47288505	47290361	Major facilitator superfamily protein
			Glyma.08G361400	47290726	47298021	Transducin/WD40 repeat-like superfamily protein
			Glyma.08G361500	47300299	47324252	glucan synthase-like 12
			Glyma.08G361700	47332057	47339934	Protein kinase family protein
			Glyma.08G361900	47343753	47357001	RNA helicase, ATP-dependent, SK12/DOB1 protein
			Glyma.08G362000	47357492	47362396	S-adenosyl-L-methionine-dependent methyltransferases superfamily protein
			Glyma.08G362100	47365168	47370638	Eukaryotic protein of unknown function (DUF914)
			Glyma.08G362200	47371991	47377438	Phosphoenolpyruvate carboxylase family protein
			Glyma.08G362400	47378446	47386476	ENTH/VHS family protein

			Glyma.08G362600	47407193	47408926	Got1/Sft2-like vesicle transport protein family
			Glyma.08G362700	47420809	47422278	alpha/beta-Hydrolases superfamily protein
			Glyma.08G362800	47439097	47440152	Major facilitator superfamily protein
			Glyma.08G362900	47442261	47446716	Aldolase-type TIM barrel family protein
9	rs32098065	32098065	Glyma.09G128400	32032434	32034258	UDP-glucosyl transferase 88A1
			Glyma.09G128600	32163608	32167676	cation/H ⁺ exchanger 4
			Glyma.09G128800	32182557	32186778	phosphatase-related
10	rs1267771	1267771	Glyma.10G012900	1168915	1170362	CP12 domain-containing protein 2
			Glyma.10G013300	1181771	1183043	basic region/leucine zipper motif 53
			Glyma.10G013900	1235166	1241282	beta-xylosidase 2
			Glyma.10G014300	1278620	1283265	20S proteasome alpha subunit E2
			Glyma.10G014500	1291637	1294861	TBP-associated factor 13
			Glyma.10G014600	1304361	1309215	myb domain protein 12
			Glyma.10G014700	1313154	1318059	thioredoxin family protein
10	rs23273692	23273692	Glyma.10G105200	23336995	23342523	Patatin-like phospholipase family protein
10	rs40416504	40416504	Glyma.10G169300	40354773	40356358	phloem protein 2-B10
			Glyma.10G169600	40364489	40369741	phloem protein 2-B10
			Glyma.10G169700	40370938	40372608	phloem protein 2-B2
			Glyma.10G170200	40398001	40403174	Eukaryotic release factor 1 (eRF1) family protein
			Glyma.10G170500	40415898	40419947	Peptidase C12, ubiquitin carboxyl-terminal hydrolase 1
			Glyma.10G170800	40431432	40436540	zinc finger protein 1
			Glyma.10G171000	40467214	40469822	zinc-dependent activator protein-1
			Glyma.10G171100	40472655	40474482	WRKY DNA-binding protein 4
			Glyma.10G171200	40476883	40479141	WRKY DNA-binding protein 4
			Glyma.10G171400	40494363	40498737	Integrase-type DNA-binding superfamily protein
			Glyma.10G171500	40502502	40517656	RNA binding (RRM/RBD/RNP motifs) family protein
10	rs41544708	41544708	Glyma.10G181100	41462028	41467447	XB3 ortholog 5 in Arabidopsis thaliana
			Glyma.10G181200	41475653	41477462	Protein of unknown function (DUF640)
			Glyma.10G181700	41505696	41512460	casein kinase I
			Glyma.10G181900	41531674	41535236	trigalactosyldiacylglycerol 1
			Glyma.10G182600	41580457	41584383	glycolipid transfer protein 1
			Glyma.10G182700	41587622	41590420	ROP-interactive CRIB motif-containing protein 1
			Glyma.10G182900	41602272	41604035	Plastid-lipid associated protein PAP / fibrillin family protein
			Glyma.10G183000	41605748	41617854	fatty alcohol oxidase 3
			Glyma.10G183100	41618663	41620145	Alkaline phytoceramidase (aPHC)

			Glyma.10G183200	41621187	41628008	cytidinediphosphate diacylglycerol synthase 2
			Glyma.10G183300	41633437	41645279	phosphate 1
10	rs42890926	42890926	Glyma.10G197000	42826875	42843526	limit dextrinase
			Glyma.10G197300	42857995	42860990	SKU5 similar 3
			Glyma.10G197400	42863093	42868252	RAB GTPase homolog C2A
			Glyma.10G197500	42882331	42888608	NAC domain containing protein 52
			Glyma.10G197600	42899234	42904478	NAC domain containing protein 2
			Glyma.10G197800	42914376	42918603	OPC-8:0 CoA ligase1
			Glyma.10G197900	42920530	42922671	OPC-8:0 CoA ligase1
			Glyma.10G198300	42942649	42951239	binding to TOMV RNA 1L (long form)
10	rs46095445	46095445	Glyma.10G229800	45996215	45998100	ABC-2 type transporter family protein
			Glyma.10G229900	46001071	46006711	Major Facilitator Superfamily with SPX (SYG1/Pho81/XPR1) domain-containing protein
			Glyma.10G230000	46013366	46017442	phosphatase-related
			Glyma.10G230100	46018669	46021536	Pentatricopeptide repeat (PPR) superfamily protein
			Glyma.10G230200	46024155	46026091	WRKY DNA-binding protein 27
			Glyma.10G230300	46036884	46037891	NAD(P)-binding Rossmann-fold superfamily protein
			Glyma.10G230500	46044438	46045534	Heavy metal transport/detoxification superfamily protein
			Glyma.10G230600	46047209	46048615	Heavy metal transport/detoxification superfamily protein
			Glyma.10G230700	46060022	46065739	Homeodomain-like superfamily protein
			Glyma.10G230900	46072235	46075548	Pectin lyase-like superfamily protein
			Glyma.10G231000	46077416	46080227	Pectin lyase-like superfamily protein
			Glyma.10G231100	46085150	46088062	Pectin lyase-like superfamily protein
			Glyma.10G231200	46093079	46095496	beta-hydroxylase 1
			Glyma.10G231400	46106023	46108113	PPPDE putative thiol peptidase family protein
			Glyma.10G231500	46111104	46113584	Protein kinase superfamily protein
			Glyma.10G231600	46121774	46127235	ferric reduction oxidase 4
			Glyma.10G231700	46133598	46138435	ferric reduction oxidase 2
			Glyma.10G231800	46138896	46139641	MATE efflux family protein
			Glyma.10G232000	46154299	46156888	SCARECROW-like 8
			Glyma.10G232200	46170280	46174862	detoxifying efflux carrier 35
			Glyma.10G232300	46180120	46186843	Methyltransferase MT-A70 family protein
			Glyma.10G232400	46187567	46191636	Bacterial sec-independent translocation protein mttA/Hcf106
10	rs47397746	47397746	Glyma.10G245000	47360650	47364366	IQ-domain 19
			Glyma.10G245500	47393249	47399064	TESMIN/TSO1-like CXC 2

			Glyma.10G245800	47420769	47422144	FASCICLIN-like arabinogalactan-protein 12
			Glyma.10G245900	47426255	47430752	beta-galactosidase 12
			Glyma.10G246000	47437535	47443608	CVP2 like 1
			Glyma.10G246200	47469659	47471353	TCP family transcription factor
			Glyma.10G246300	47483367	47486096	cupin family protein
			Glyma.10G246400	47487929	47495178	cupin family protein
11	rs182585	182585	Glyma.11G002200	115811	118160	magnesium transporter 4
			Glyma.11G002600	135007	170100	target of rapamycin
			Glyma.11G002800	181252	184062	cysteine-rich RLK (RECEPTOR-like protein kinase) 10
			Glyma.11G003000	188906	189478	Late embryogenesis abundant (LEA) hydroxyproline-rich glycoprotein family
			Glyma.11G003200	197383	205041	gibberellin 2-oxidase 8
			Glyma.11G003300	219372	222023	COBRA-like protein 10 precursor
			Glyma.11G003400	226274	233670	protodermal factor 2
			Glyma.11G003600	268784	270800	ribosomal protein S15A
			Glyma.11G003700	274132	276266	ribosomal protein S15A
11	rs34604822	34604822	Glyma.11G254800	34507187	34510099	Werner syndrome-like exonuclease
			Glyma.11G254900	34519145	34521614	UDP-D-glucuronate 4-epimerase 6
			Glyma.11G255000	34525509	34528331	glycine-rich RNA-binding protein 2
			Glyma.11G255700	34577320	34579792	purple acid phosphatase 15
			Glyma.11G256400	34614957	34616879	PHYTOENE SYNTHASE
			Glyma.11G256600	34626692	34632912	ubiquitin-specific protease 2
			Glyma.11G256700	34639433	34641547	SKU5 similar 12
			Glyma.11G256800	34643142	34698831	RNA polymerase II transcription mediators
11	rs34604822	34604822	Glyma.11G254800	34507187	34510099	Werner syndrome-like exonuclease
			Glyma.11G254900	34519145	34521614	UDP-D-glucuronate 4-epimerase 6
			Glyma.11G255000	34525509	34528331	glycine-rich RNA-binding protein 2
			Glyma.11G255700	34577320	34579792	purple acid phosphatase 15
			Glyma.11G256400	34614957	34616879	PHYTOENE SYNTHASE
			Glyma.11G256600	34626692	34632912	ubiquitin-specific protease 2
			Glyma.11G256700	34639433	34641547	SKU5 similar 12
			Glyma.11G256800	34643142	34698831	RNA polymerase II transcription mediators
12	rs4246516	4246516	Glyma.12G057300	4173101	4176586	RNA-binding (RRM/RBD/RNP motifs) family protein
			Glyma.12G057400	4178669	4181863	aldehyde dehydrogenase 3F1
			Glyma.12G057600	4185724	4191751	GTP-binding family protein

			Glyma.12G057700	4192499	4196144	transferases;tRNA (5-methylaminomethyl-2-thiouridylate)-methyltransferases
			Glyma.12G057800	4197012	4200309	Nucleolar GTP-binding protein
			Glyma.12G057900	4209199	4211871	myb domain protein 83
			Glyma.12G058000	4219805	4223573	dicarboxylate transporter 1
			Glyma.12G058100	4224823	4229301	Protein kinase protein with tetratricopeptide repeat domain
			Glyma.12G058200	4235968	4237273	HSP20-like chaperones superfamily protein
			Glyma.12G058300	4239445	4242286	UDP-glucosyl transferase 76E2
			Glyma.12G058500	4254166	4256321	Adenine nucleotide alpha hydrolases-like superfamily protein
			Glyma.12G058600	4258403	4259166	maternal effect embryo arrest 60
			Glyma.12G058700	4260173	4262029	Pentatricopeptide repeat (PPR) superfamily protein
			Glyma.12G058800	4262867	4263283	maternal effect embryo arrest 60
			Glyma.12G058900	4267027	4269543	RAB GTPase homolog A2B
			Glyma.12G059000	4270381	4272387	metal tolerance protein B1
			Glyma.12G059100	4278315	4280533	NAD(P)-binding Rossmann-fold superfamily protein
			Glyma.12G059200	4284905	4287703	senescence-associated gene 13
			Glyma.12G059300	4289989	4292215	senescence-associated gene 13
			Glyma.12G059400	4293922	4295662	NAD(P)-binding Rossmann-fold superfamily protein
			Glyma.12G059500	4303168	4304345	C2H2 and C2HC zinc fingers superfamily protein
			Glyma.12G059600	4307581	4311393	plastid transcriptionally active 16
			Glyma.12G059700	4313016	4319308	splicing factor PWI domain-containing protein
			Glyma.12G059800	4325044	4330012	Transcription factor IIA, alpha/beta subunit
			Glyma.12G059900	4331347	4335487	Major facilitator superfamily protein
			Glyma.12G060100	4342393	4343691	Tetratricopeptide repeat (TPR)-like superfamily protein
12	rs24880696	24880696	Glyma.12G156100	24795858	24798360	FTSH protease 10
12	rs37710139	37710139	Glyma.12G216900	37654433	37659037	flavodoxin-like quinone reductase 1
			Glyma.12G217200	37674484	37675152	nuclear factor Y, subunit C4
			Glyma.12G217300	37694663	37696709	BURP domain-containing protein
			Glyma.12G217400	37700474	37703715	BURP domain-containing protein
			Glyma.12G218000	37776200	37779067	CYCLIN D1;1
			Glyma.12G218100	37784644	37792588	ribonuclease II family protein
12	rs38586856	38586856	Glyma.12G225400	38496696	38504370	embryo defective 2737
			Glyma.12G225500	38511055	38512780	early nodulin-like protein 1
			Glyma.12G225800	38539307	38542484	phytosylfokine-alpha receptor 2
			Glyma.12G226000	38560115	38562153	squamosa promoter-binding protein-like 12

			Glyma.12G226500	38629959	38632784	NAC (No Apical Meristem) domain transcriptional regulator superfamily protein
			Glyma.12G226600	38650006	38651354	ethylene responsive element binding factor 4
13	rs15487982	15487982	Glyma.13G056200	15396194	15400219	receptor-like protein kinase 2
			Glyma.13G056500	15410233	15411505	hydroxyproline-rich glycoprotein family protein
			Glyma.13G056600	15417552	15421953	UDP-Glycosyltransferase superfamily protein
			Glyma.13G056800	15431070	15433820	UDP-Glycosyltransferase superfamily protein
			Glyma.13G056900	15439351	15446633	Transducin/WD40 repeat-like superfamily protein
			Glyma.13G057300	15485529	15505747	PHD finger family protein
			Glyma.13G057400	15508358	15514389	biotin carboxyl carrier protein 2
			Glyma.13G057500	15518837	15520836	Ribosomal protein S19e family protein
			Glyma.13G057600	15526111	15529372	TPX2 (targeting protein for Xklp2) protein family
			Glyma.13G057700	15533358	15536680	UDP-glucose 6-dehydrogenase family protein
			Glyma.13G057800	15537334	15547315	Glycosyl transferase, family 35
			Glyma.13G058000	15564001	15565674	UDP-glucosyl transferase 85A5
			Glyma.13G058100	15568438	15575658	galacturonosyltransferase 13
13	rs35400999	35400999	Glyma.13G243600	35301659	35311187	SNF2 domain-containing protein / helicase domain-containing protein / zinc finger protein-related
			Glyma.13G244200	35346902	35354316	STRUBBELIG-receptor family 3
			Glyma.13G244400	35373589	35379029	bromodomain 4
			Glyma.13G244600	35399703	35405706	secretory carrier 3
			Glyma.13G244900	35416822	35421281	HAL2-like
			Glyma.13G245800	35479651	35480866	syntaxin of plants 124
			Glyma.13G245900	35481859	35492023	HSI2-like 1
13	rs41084947	41084947	Glyma.13G314600	40993081	40996703	NTM1-like 8
			Glyma.13G314900	41018298	41024037	decapping 1
			Glyma.13G315100	41029988	41035004	Protein of unknown function (DUF1022)
			Glyma.13G315200	41035905	41037849	lycopene cyclase
			Glyma.13G315300	41041851	41044605	NAC domain containing protein 90
			Glyma.13G316900	41139769	41147330	bZIP transcription factor family protein
			Glyma.13G317000	41148922	41151182	Basic-leucine zipper (bZIP) transcription factor family protein
			Glyma.13G317100	41160519	41161629	centroradialis
			Glyma.13G317200	41173745	41177372	WIP domain protein 3
13	rs43590608	43590608	Glyma.13G343600	43493279	43496074	farnesyltransferase A
			Glyma.13G343700	43498244	43503045	endonuclease III 2

			Glyma.13G343900	43507479	43517209	ARM repeat superfamily protein
			Glyma.13G344000	43520381	43521137	Ribosomal L18p/L5e family protein
			Glyma.13G344100	43522222	43525502	Far-red impaired responsive (FAR1) family protein
			Glyma.13G344200	43525753	43527011	ARF-GAP domain 11
			Glyma.13G344400	43540507	43544269	crinkly4
			Glyma.13G344500	43554239	43558544	pfkB-like carbohydrate kinase family protein
			Glyma.13G344700	43563135	43565875	B-box zinc finger family protein
			Glyma.13G344900	43570241	43571499	Protein of unknown function (DUF1336)
			Glyma.13G345000	43571752	43573766	Tetratricopeptide repeat (TPR)-like superfamily protein
			Glyma.13G345100	43575141	43577633	Calcium-dependent phosphotriesterase superfamily protein
			Glyma.13G345200	43578042	43582797	Basic-leucine zipper (bZIP) transcription factor family protein
			Glyma.13G345300	43587625	43599347	RNA binding
			Glyma.13G345400	43601121	43604841	glyoxalase 2-4
			Glyma.13G345500	43608864	43615746	Plant protein of unknown function (DUF936)
			Glyma.13G345600	43622980	43624838	Ribosomal L38e protein family
			Glyma.13G345700	43631856	43633187	GRAS family transcription factor
			Glyma.13G345800	43638962	43643893	RNA-binding ASCH domain protein
			Glyma.13G346000	43655654	43661885	Protein of unknown function (DUF3755)
			Glyma.13G346100	43666720	43668935	Peroxidase superfamily protein
			Glyma.13G346200	43667976	43676380	Ypt/Rab-GAP domain of gyp1p superfamily protein
			Glyma.13G346300	43682553	43689937	Plant regulator RWP-RK family protein
14	rs5491627	5491627	Glyma.14G067300	5574711	5576631	RING-H2 finger C2A
14	rs11937326	11937326	Glyma.14G108400	11901726	11906954	homology to ABI1
			Glyma.14G109000	12020173	12024201	ubiquitin-specific protease 22
14	rs22586695	22586695	Glyma.14g131700	22555716	22558927	Protein of unknown function (DUF1218)
			Glyma.14g131800	22561942	22562718	Transcription factor Pcc1
			Glyma.14g131900	22580087	22586928	Splicing coactivator SRm160/300, subunit SRm300
			Glyma.14g132000	22609490	22618264	Protein of unknown function (DUF1997)
			Glyma.14g132100	22626936	22629212	maturase K
			Glyma.14g132200	22632092	22632391	NADH-ubiquinone oxidoreductase B18 subunit, putative
			Glyma.14g132300	22684278	22688050	mraW methylase family protein
15	rs13369197	13369197	Glyma.15G158500	13284838	13309792	SET domain protein 25
			Glyma.15G158800	13371775	13376269	eukaryotic initiation factor 4A-III
			Glyma.15G158900	13379110	13383078	FTSH protease 8
16	rs5524645	5524645	Glyma.16G057100	5588912	5590753	cytochrome P450, family 94, subfamily B, polypeptide 2

			Glyma.16G057200	5596182	5597893	SWIB/MDM2 domain superfamily protein
16	rs8911940	8911940	Glyma.16G081900	8844681	8854311	Ankyrin repeat family protein
			Glyma.16G082000	8863644	8879643	Ankyrin repeat family protein
			Glyma.16G082200	9017557	9025383	NAD(P)-binding Rossmann-fold superfamily protein
16	rs36039084	36039084	Glyma.16G198500	35943480	35946032	BCL-2-associated athanogene 1
			Glyma.16G198600	35958085	35960833	BCL-2-associated athanogene 1
			Glyma.16G198700	35991715	35993403	MATE efflux family protein
			Glyma.16G198800	36006373	36020152	response regulator 2
			Glyma.16G198900	36030164	36034070	Disease resistance protein (TIR-NBS-LRR class) family
			Glyma.16G199000	36041529	36042937	C-repeat-binding factor 4
			Glyma.16G199100	36044516	36049524	Per1-like family protein
			Glyma.16G199200	36055701	36061119	GroES-like zinc-binding alcohol dehydrogenase family protein
			Glyma.16G199300	36062040	36068016	zinc finger WD40 repeat protein 1
			Glyma.16G199400	36071524	36075157	phosphoenolpyruvate carboxylase-related kinase 1
			Glyma.16G199600	36085036	36085353	Pentatricopeptide repeat (PPR) superfamily protein
			Glyma.16G199700	36087974	36089644	Tetratricopeptide repeat (TPR)-like superfamily protein
			Glyma.16G199900	36101914	36103082	peptidoglycan-binding LysM domain-containing protein
			Glyma.16G200000	36107537	36107746	peptidoglycan-binding LysM domain-containing protein
						Pyridoxal phosphate (PLP)-dependent transferases superfamily protein
			Glyma.16G200100	36120597	36123004	hydroxymethylglutaryl-CoA synthase / HMG-CoA synthase / 3-hydroxy-3-methylglutaryl coenzyme A synthase
17	rs10490744	10490744	Glyma.16G200200	36127589	36134053	Subtilase family protein
			Glyma.17G130000	36120597	36123004	ATP synthase delta-subunit gene
			Glyma.17G130100	36127589	36134053	replication factor C 2
			Glyma.17G130800	10470141	10473395	IQ-domain 22
			Glyma.17G130900	10477047	10481433	Ubiquitin-like superfamily protein
			Glyma.17G131100	10500089	10505582	phloem protein 2-A12
			Glyma.17G131400	10531699	10534109	BCL-2-associated athanogene 1
18	rs1234449	1234449	Glyma.17G131600	10549941	10552615	UDP-glucosyl transferase 85A3
			Glyma.18G016100	1152808	1154785	DNAJ heat shock family protein
			Glyma.18G016200	1156405	1160766	alpha/beta-Hydrolases superfamily protein
			Glyma.18G016300	1162283	1165276	leucine-rich repeat transmembrane protein kinase family protein
			Glyma.18G016400	1168765	1176737	C2H2 and C2HC zinc fingers superfamily protein
			Glyma.18G016700	1192570	1193911	ubiquitin-specific protease 3
			Glyma.18G016800	1197734	1203267	

			Glyma.18G017000	1213993	1219616	RAB GTPase homolog H1E
			Glyma.18G017100	1219206	1221657	Ribosomal protein L23/L15e family protein
			Glyma.18G017200	1223455	1229857	asparagine synthetase 3
			Glyma.18G017300	1230462	1234426	TLD-domain containing nucleolar protein
			Glyma.18G017600	1248018	1259605	peroxisomal ABC transporter 1
			Glyma.18G017800	1285879	1287658	VQ motif-containing protein
			Glyma.18G017900	1293915	1296633	tetratricopeptide repeat (TPR)-containing protein
			Glyma.18G018100	1312068	1315259	Haloacid dehalogenase-like hydrolase (HAD) superfamily protein
			Glyma.18G018200	1329855	1331629	Integrase-type DNA-binding superfamily protein
18	rs17080077	17080077	Glyma.18G127300	17047868	17060571	AMP deaminase, putative / myoadenylate deaminase, putative
			Glyma.18G127400	17093217	17094911	thioredoxin 2
			Glyma.18g127500	17096119	17098853	DNAJ heat shock family protein
			Glyma.18g127600	17105204	17106750	BED zinc finger ,hAT family dimerisation domain
			Glyma.18g127700	17153042	17171345	alpha/beta-Hydrolases superfamily protein
18	rs17153020	17153020	Glyma.18G127900	17212882	17215294	disease resistance protein (TIR-NBS class), putative
			Glyma.18G128100	17235800	17237647	Tetratricopeptide repeat (TPR)-like superfamily protein
19	rs1019215	1019215	Glyma.19G009900	923053	937826	Nodulin MtN3 family protein
			Glyma.19G010100	957825	961567	homeobox 1
			Glyma.19G010200	961949	976606	methyl-CPG-binding domain 9
			Glyma.19G010800	1020788	1033952	aldehyde dehydrogenase 2B7
			Glyma.19G011400	1099629	1100814	HSP20-like chaperones superfamily protein
			Glyma.19G011700	1123637	1130946	Peroxidase superfamily protein
			Glyma.19G011800	1134716	1143232	Peroxidase superfamily protein
			Glyma.19G012100	1155711	1161298	TRICHOME BIREFRINGENCE-LIKE 22
19	rs2987507	2987507	Glyma.19G024500	2893626	2895846	NAC domain containing protein 100
			Glyma.19G024600	2908529	2909632	HVA22-like protein K
			Glyma.19G024700	2999572	3002606	myb domain protein 16
19	rs6380031	6380031	Glyma.19G043300	6333502	6335782	RNA-DIRECTED DNA METHYLATION 1
			Glyma.19G043400	6370545	6371480	OSBP(oxysterol binding protein)-related protein 3C
			Glyma.19G043500	6400220	6402401	prenylated RAB acceptor 1.B4
			Glyma.19G043600	6402604	6404354	RAB GTPase homolog A1D
			Glyma.19G043800	6431204	6434273	alpha/beta-Hydrolases superfamily protein
19	rs35067191	35067191	Glyma.19G102000	34998146	35001862	basic helix-loop-helix (bHLH) DNA-binding superfamily protein
			Glyma.19G102100	35013345	35023103	aspartate kinase 1
			Glyma.19G102400	35035772	35037104	CCR-like

			Glyma.19G102500	35038411	35056266	MALE GAMETOPHYTE DEFECTIVE 2
			Glyma.19G102800	35089528	35091792	UDP-Glycosyltransferase superfamily protein
			Glyma.19G102900	35098365	35100269	high mobility group A5
19	rs48769908	48169008	Glyma.19G237900	48668526	48674713	glutathione synthetase 2
			Glyma.19G239100	48756071	48759574	histidine-containing phosphotransmitter 1
			Glyma.19G239200	48759711	48760830	gamma histone variant H2AX
			Glyma.19G239500	48772248	48783268	Calcium-dependent phospholipid-binding Copine family protein
			Glyma.19G239800	48799777	48804575	dehydroquinase, putative / shikimate dehydrogenase, putative
			Glyma.19G240100	48810255	48812762	acyl carrier protein 3
			Glyma.19G240400	48827949	48831447	copper/zinc superoxide dismutase 1
			Glyma.19G240500	48831733	48835916	sodium hydrogen exchanger 2
			Glyma.19G240700	48852200	48868987	ARM repeat superfamily protein
20	rs9922668	9922668	Glyma.20G049300	9982923	9984452	RNA recognition motif (RRM)-containing protein
			Glyma.20G049400	9999481	10013551	RNA recognition motif (RRM)-containing protein
20	rs32170037	32170037	Glyma.20G086400	32161588	32167005	Protein of unknown function (DUF810)
20	rs38986884	38986884	Glyma.20G150000	38901600	38907499	TIFY domain/Divergent CCT motif family protein
			Glyma.20G150100	38907926	38909832	RmlC-like cupins superfamily protein
			Glyma.20G150200	38912015	38915770	RmlC-like cupins superfamily protein
			Glyma.20G150300	38922066	38924621	heat shock transcription factor A6B
			Glyma.20G150600	38940669	38942133	Chlorophyll A-B binding family protein
			Glyma.20G151000	38974348	38976077	DNA repair (Rad51) family protein
			Glyma.20G151400	39014555	39023364	Stabilizer of iron transporter SufD / Polynucleotidyl transferase
			Glyma.20G151500	39043661	39047942	ATP sulfurylase 1
			Glyma.20G151600	39049005	39052165	SOH1 family protein