

## Supplementary File

**Supplementary Table S1**

S.N o	Variety Name	Origin	Ecotype	Group	S.N o	Variety Name	Origin	Ecotype	Group
1	Lmont	USDA, USA	<i>Indic a</i>	Landra ce	51	ROXERO REGUE	USDA, USA	<i>Indic a</i>	Landrace
2	Bond	USDA, USA	<i>Indic a</i>	Landra ce	52	H-256-76- 1-1-1	USDA , USA	<i>Indi ca</i>	Landrace
3	IR-36	USDA, USA	<i>Indica</i>	Landra ce	53	PALMAN	USDA , USA	<i>Indi ca</i>	Landrace
4	Delvex	USDA, USA	<i>Indica</i>	Landra ce	54	JASMINE -85	Thaila nd	<i>Indi ca</i>	Landrace
5	Teqing	USDA, USA	<i>Indica</i>	Landra ce	55	A-301	USDA, USA	<i>Indi ca</i>	Landrace
6	Nira	USDA, USA	<i>Indica</i>	Landra ce	56	L-202	USDA, US A	<i>Indi ca</i>	Landrace
7	Cica	USDA, USA	<i>Indica</i>	Landra ce	57	VE GOLD	USDA, USA	<i>Indi ca</i>	Landrace
8	Koshibika ri	USDA, USA	<i>Indica</i>	Landra ce	58	L-203	USDA , USA	<i>Indic a</i>	Landrace
9	IR-64	USDA, USA	<i>Indica</i>	Landra ce	59	IR-6	Pakistan	<i>Indi ca</i>	Land Race
10	Bellmont	USDA, USA	<i>Indica</i>	Landra ce	60	SATHI BASMAT I	Pakistan	<i>Indi ca</i>	Landrace
11	Yangzi- 95	USDA, USA	<i>Indica</i>	Landra ce	61	SHAHEE N BASMAT I	Pakistan	<i>Indi ca</i>	Landrace
12	Gui-99	USDA, USA	<i>Indica</i>	Landra ce	62	BASMAT I-198	Pakistan	<i>Indic a</i>	Landrace
13	L-203	USDA, USA	<i>Indica</i>	Landra ce	63	BASMAT I-370	Pakistan	<i>Indi ca</i>	Landrace
14	CE-65	USD A, USA	<i>Indica</i>	Landra ce	64	BASMAT I-Pak	Pakistan	<i>Indi ca</i>	Landrace
15	Zao-40	USDA , USA	<i>Indica</i>	Landra ce	65	BASMAT I-385	Pakistan	<i>Indi ca</i>	Landrace
16	LA-110	USDA , USA	<i>Indica</i>	Landra ce	66	BASMAT I-515	Pakistan	<i>Indi ca</i>	Landrace
17	Rando	USDA, USA	<i>Indica</i>	Landra ce	67	R-456	Pakistan	<i>Indi ca</i>	IV
18	Jakson	USD A, USA	<i>Indica</i>	Landra ce	68	CB-5	Pakistan	<i>Indi ca</i>	A B L
19	WC-4644	USD A, USA	<i>Indica</i>	Landra ce	69	CB-10	Pakistan	<i>Indi ca</i>	A B L
20	Tsai Yuan Chung	USD A, USA	<i>Indica</i>	Landra ce	70	CB-11	Pakistan	<i>Indi ca</i>	A B L
21	Cica-6	USDA, USA	<i>Indica</i>	Landra ce	71	CB-12	Pakistan	<i>Indi ca</i>	A B L
22	IR-456-3- 2-1	USDA, USA	<i>Indica</i>	Landra ce	72	CB-13	Pakistan	<i>Indic a</i>	A B L
23	Newbonn et	USDA, USA	<i>Indica</i>	Landra ce	73	CB-14	Pakistan	<i>Indica</i>	A B L
24	Newrex	USDA, USA	<i>Indic a</i>	Landra ce	74	CB-15	Pakistan	<i>Indic a</i>	A B L
25	Taichung Native-1	USDA, USA	<i>Indic a</i>	Landra ce	75	CB-16	Pakistan	<i>Indic a</i>	A B L
26	SinumPag a Selection	USDA, USA	<i>Indica</i>	Landra ce	76	CB-17	Pakistan	<i>Indica</i>	A B L

27	Taducan	USDA, USA	<i>Indica</i>	Landra ce	77	CB-19	Pakistan	<i>Indica</i>	A B L
28	Dee Geo Woo Gen	USDA, USA	<i>Indica</i>	Landra ce	78	CB-20	Pakistan	<i>Indica</i>	A B L
29	Stg- 663228	USDA, USA	<i>Indica</i>	Landra ce	79	CB-209	Pakistan	<i>Indica</i>	A B L
30	Lebonnet	USDA, USA	<i>Indic a</i>	Landra ce	80	CB-21	Pakistan	<i>Indica</i>	A B L
31	Starbonne t	USDA, USA	<i>Indic a</i>	Landra ce	81	CB-22	Pakistan	<i>Indic a</i>	A B L
32	Della	USDA, USA	<i>Indic a</i>	Landra ce	82	CB-26	Pakistan	<i>Indic a</i>	A B L
33	Toro-2	USDA, USA	<i>Indic a</i>	Landra ce	83	CB-27	Pakistan	<i>Indica</i>	A B L
34	Delitus	USDA, USA	<i>Indi ca</i>	Landra ce	84	CB-28	Pakistan	<i>Indica</i>	A B L
35	Dellrose	USDA, USA	<i>Indica</i>	Landra ce	85	CB-29	Pakistan	<i>Indica</i>	A B L
36	CDR-448	USDA, USA	<i>Indic a</i>	Landra ce	86	CB-30	Pakistan	<i>Indica</i>	A B L
37	CDR-201	USDA, USA	<i>Indi ca</i>	Landra ce	87	CB-31	Pakistan	<i>Indica</i>	A B L
38	B5- Xiequizao	USDA, USA	<i>Indi ca</i>	Landra ce	88	CB-32	Pakistan	<i>Indic a</i>	A B L
39	L-203	USDA, USA	<i>Indi ca</i>	Landra ce	89	CB-33	Pakistan	<i>Indic a</i>	A B L
40	VeGold	USDA, USA	<i>Indi ca</i>	Landra ce	90	CB-34	Pakistan	<i>Indica</i>	A B L
41	TP-49	USDA, USA	<i>Indi ca</i>	Landra ce	91	CB-36	Pakistan	<i>Indica</i>	A B L
42	Hill Long Grain	USDA, USA	<i>Indi ca</i>	Landra ce	92	CB-38	Pakistan	<i>Indica</i>	A B L
43	L-202	USDA, USA	<i>Indi ca</i>	Landra ce	93	CB-39	Pakistan	<i>Indica</i>	A B L
44	A-301	USDA, USA	<i>Indic a</i>	Landra ce	94	CB-40	Pakistan	<i>Indica</i>	A B L
45	L-202	USDA, USA	<i>Indi ca</i>	Landrace	95	CB-41	Pakistan	<i>Indic a</i>	A B L
46	V-203	USDA, USA	<i>Indi ca</i>	Landrace	96	CB-43	Pakistan	<i>Indica</i>	A B L
47	PALMA N	USDA, USA	<i>Indi ca</i>	Landrace	97	CB-44	Pakistan	<i>Indica</i>	A B L
48	87-1-550	USDA, USA	<i>Indi ca</i>	Landrace	98	KSK-282	Pakistan	<i>Indica</i>	A B L
49	79	USDA, USA	<i>Indi ca</i>	Landrace	99	KSK-133	Pakistan	<i>Indica</i>	A B L
50	923	USDA, USA	<i>Indi ca</i>	Landrace	100	ROXERO REGUE	USDA, USA	<i>Indic a</i>	Landrace

**Supplementary Table S2.** Phenotypic trait measurement procedure.

S. no	Phenotypic trait	Procedure for measurement
1	Plant height (cm) (PH)	Plant height was measured for five plants per variety per replication. The height of these five selected plants measured from the end of the shoot to the tip of the central stem when the plant was fully matured. The average height was calculated and expressed in centimeters (cm).
2	Number of tillers per plant (TP)	The total number of tillers per plant in five randomly selected plants from each variety and each replication was taken at harvest. Their mean was estimated and expressed in the number of tillers per plant.
3	Days to maturity (DM)	The sum of days taken from transplanting to the harvesting of the plants in a plot was recorded for each variety as days to maturity.
4	Days to 50 percent flowering (DF)	A sum of days, from transplanting to the flowering of 50 percent of the plants in a plot was recorded for each variety as days to 50 percent flowering (DF).
5	Panicle length (cm) (PL)	Three mature panicles from the selected plants were taken. Panicle length was estimated as the distance from the panicle neck to the tip of the panicle in centimeters (cm).
6	Number of grains per panicle (G/P)	The number of grains in panicles of selected plant (3 plants) were calculated and documented.
7	Number of unfilled grains per panicle (UG/P)	Number of unfilled grain from selected panicle from all three plants were counted and mentioned as unfilled grain per panicle
8	Seed setting %age (SS)	Total filled and empty grains have been calculated. Seed setting %age was estimated as $\text{Seed Setting \%age} = \frac{\text{Number of filled grains}}{(\text{Number of filled grains} + \text{number of unfilled grains})} \times 100$
9	Thousand grain weight (g) (TGW)	Seeds were taken from the sample and weighed as 1000 seed weight
10	Yield per plot (kg/plot) (Y/P)	0.5 m <sup>2</sup> was harvested for measurement of yield components. Harvested plants were threshed and sun-dried. Total grain weight for each plot was measured. All the grains from the replication were collected, sun-dried (at 14% moisture) and cleaned. The weight of the grains of these plants was calculated with an electric balance. Plants were collected from the middle of all rows, leaving 0.5 m of the row at the ends. Therefore, the total harvest area was 1.5 m <sup>2</sup> .
11	Yield per hectare (kg/ha) (Y/H)	Yield per plot was calculated in kilograms per hectare (kg/ha) at 14% moisture content. After measuring the yield component, the grain yield from that 0.5 m <sup>2</sup> area was added with the total grain yield. Grain yield Kg/ha was calculated by the formula $\text{Grain yield (kg/ha)} = \frac{(\text{GYP}/0.8) \times 1000}{10000}$

**Supplementary Table S3.** Mean squares values of studied traits during season 1.

S.O.V	D.F	DF	DM	PH	TP	PL	G/P	UG/P	SS	TGW	Y/P	Y/H
Replications	2	1.97	4.61	417.46	5.77	4.17	150.28	343.26	108.39	1.26	2.33	243012
Genotypes	99	9.93*	7.03*	566.81**	34.19**	11.46**	1917.32**	417.93**	102.43**	40.34**	1.07**	3591471**
Error	198	6.28	3.88	31.06	4.22	2.24	648.94	120.83	23.43	5.3	0.41	156805

Level of significance p<0.05= \* and p<0.01= \*\* \* = Significant, \*\* Highly Significant

DF= Days to 50% Flowering, DM = Days to Maturity, PH= Plant Height (cm), TP= Tiller per Plant, PL= Panicle Length (cm), G/P= Grains per Panicle, UG/P= Unfilled grains/Panicle, SS= Seed Setting percentage, TGW= 1000 Grains weight (g), Y/P=Yield/plot (kg), Y/H= Yield/hectare (Kg)

**Supplementary Table S4.** Principal components (PCs) for 11 agronomic traits of hundred genotypes of rice.

	PC 1	PC 2	PC 3	PC 4	PC 5	PC 6	PC 7	PC 8	PC 9	PC 10
<b>TP</b>	0.044	0.110	-0.038	0.405	<b>0.879</b>	0.147	0.096	-0.053	-0.121	-0.014
<b>DF</b>	-0.007	0.012	0.015	-0.052	-0.190	<b>0.818</b>	0.320	0.200	-0.385	-0.029
<b>PH</b>	0.144	<b>0.780</b>	<b>0.604</b>	-0.035	-0.057	-0.029	-0.018	-0.005	-0.002	0.001
<b>PL</b>	0.015	-0.021	0.024	-0.265	0.103	-0.434	<b>0.809</b>	0.232	-0.146	0.015
<b>GP</b>	<b>0.984</b>	-0.116	-0.091	-0.042	-0.028	0.000	-0.020	-0.062	-0.054	-0.011
<b>UG/P</b>	0.043	-0.545	0.715	0.138	0.076	0.073	0.001	0.298	0.265	0.015
<b>SS</b>	0.075	0.254	-0.327	-0.015	0.060	0.127	-0.025	<b>0.689</b>	<b>0.569</b>	0.064
<b>TGW</b>	0.032	0.062	-0.075	<b>0.856</b>	-0.409	-0.142	0.256	0.023	0.011	-0.056
<b>Yield</b>	0.007	-0.003	0.004	0.052	-0.023	0.026	0.031	-0.070	-0.025	0.995
<b>kg/Plot</b>										
<b>MD</b>	0.005	0.015	-0.002	-0.075	-0.005	0.277	0.408	-0.575	0.647	-0.040

**Supplementary Table S5.** Mean squares values of studied traits during season 2.

S.O.V	D.F	DF	DM	PH	TP	PL	G/P	UG/P	SS	TGW	Y/P	Y/H
Replications	2	92.92	102.79	55.07	34.74	39.60	256.86	14.32	67.46	123.91	2.44	432927
Genotypes	99	11.00**	5.34*	342.00**	35.58**	9.55**	1596.58**	260.53**	100.18**	39.73**	0.90**	3519407**
Error	198	4.49	3.81	85.54	3.07	1.95	696.77	124.43	20.01	4.18	0.41	123622

Level of significance p&lt;0.05= \* and p&lt;0.01= \*\* \* = Significant, \*\* Highly Significant

DF= Days to 50% Flowering, DM = Days to Maturity, PH= Plant Height (cm), TP= Tiller per Plant, PL= Panicle Length (cm), G/P= Grains per Panicle, UG/P= Unfilled grains/Panicle, SS= Seed Setting percentage, TGW= 1000 Grains weight (g), Y/P=Yield/plot (kg), Y/H= Yield/hectare (Kg)

**Supplementary Table S6**

Traits	SNP	Chromosome	Position	P.value	R%
flowering (DF) Days to 50%	OsGRb30080	2	18212087	0.000103702	19.84
	OsGRb14914	7	20814664	0.000112756	19.66
	OsGRb15039	7	22304042	0.000112756	19.66
	OsGRb05211	2	29829169	0.000115539	19.61
	OsGRb24510	2	9826527	0.000127307	19.39
	OsGRb24572	2	12405692	0.000148829	19.05
	OsGRb24900	2	30132327	0.000192517	18.49
	OsGRb04151	2	17990840	0.000207459	18.33
	OsGRb04250	2	19120460	0.000240121	18.01
	OsGRg02806	2	17273659	0.000248846	17.93
	OsGRb04064	2	16775829	0.000254602	17.88

	OsGRb04108	2	17345198	0.000282383	17.66
	OsGRb04456	2	21810979	0.000314737	17.43
	OsGRb04559	2	22869364	0.000314737	17.43
	OsGRb04569	2	23120515	0.000314737	17.43
	OsGRb30142	2	24285137	0.00034923	17.20
	OsGRb04511	2	22354743	0.000358582	17.15
	OsGRb16114	8	8615206	0.000426811	16.78
	OsGRb16145	8	8929911	0.000449302	16.67
	OsGRb04104	2	17309380	0.000512281	16.39
	OsGRb04421	2	20975538	0.000519788	16.36
	OsGRb04893	2	26259806	0.000555053	16.22
	OsGRb21146	11	15034296	0.000563352	16.19
	OsGRg02884	2	19568531	0.000566321	16.18
	OsGRg03095	2	23712290	0.000566321	16.18
	OsGRb25451	3	24409509	0.000582683	16.12
	OsGRb21461	11	19084575	0.000582683	16.12
	OsGRg14009	11	18935157	0.000582683	16.12
	OsGRb05101	2	28940961	0.000596317	16.07
	OsGRg02717	2	11885546	0.000596317	16.07
	OsGRb04072	2	16904305	0.000600264	16.06
	OsGRb04943	2	26640578	0.000631732	15.95
	OsGRg03565	2	30862290	0.000725216	15.66
	OsGRb21548	11	19994753	0.000735707	15.63
	OsGRg02708	2	11594325	0.000752687	15.58
	OsGRb25462	3	25181277	0.000767637	15.54
	OsGRb25459	3	25131417	0.000772959	15.53
	OsGRg05363	3	24961621	0.000772959	15.53
	OsGRb21468	11	19129697	0.000772959	15.53
	OsGRb21471	11	19170789	0.000772959	15.53
	OsGRb32442	11	19026652	0.000772959	15.53
	OsGRg03058	2	23529294	0.000791106	15.48
	OsGRg03325	2	26931234	0.000831996	15.37
	OsGRb30127	2	22416322	0.000839333	15.35
	OsGRb04643	2	23850363	0.000880233	15.25
	OsGRg02730	2	12762219	0.000883595	15.25
	OsGRb24567	2	12345631	0.000900866	15.21

	Maturity days (DM)	OsGRg13980	11	18173691	0.000941609	15.11
		OsGRb25578	3	33753141	0.000971774	15.05
	No. of grain/panicle (G/P)	OsGRb09564	4	27939281	0.000827828	12.97
		OsGRg04275	3	4267961	0.000110491	12.35
		OsGRb17703	9	11125119	0.000159335	11.57
		OsGRb28603	9	12952275	0.000252418	20.79
		OsGRb31905	9	17074373	0.000256058	20.76
		OsGRb17510	9	7800022	0.00035416	20.08
		OsGRb28600	9	12915373	0.000413351	19.76
		OsGRg12308	9	14048196	0.000532384	19.24
	Plant height (PH)	OsGRg12310	9	14048809	0.00055683	19.14
		OsGRb18178	9	19105152	0.000694254	18.69
		OsGRb27733	7	20438541	0.000870925	18.23
		OsGRb14446	7	14594194	2.02E-06	25.55
		OsGRb30717	4	29956594	5.59E-05	17.27
		OsGRb09705	4	29950172	0.000117035	15.52
		OsGRb31240	7	9363018	0.000119296	15.47
		OsGRb12976	6	16465767	0.000121861	15.42
		OsGRb13852	7	485365	0.000134253	15.20
		OsGRb13891	7	754356	0.000134253	15.20
		OsGRg01923	1	39950738	0.000256562	13.70
		OsGRb13812	7	219361	0.000418686	12.58
		OsGRb14044	7	1929142	0.000492237	12.21
		OsGRb28184	8	14792948	0.000524592	12.07
		OsGRb27102	6	24322609	0.0005983	11.77
	Panicle Length (PL)	OsGRb27139	6	25535681	0.0005983	11.77
		OsGRg05238	3	21673888	0.000648167	11.60
		OsGRb14503	7	15365358	0.000664937	11.54
		OsGRb13785	7	20400	0.000686431	11.47
	%age (SS)	OsGRb23906	1	10116371	0.000191598	18.77
		OsGRg09425	6	21482221	0.000860313	15.54
		OsGRb24377	1	40794243	0.000190652	13.89
		OsGRb10830	5	10350550	0.000257357	13.27
	Seed Setting	OsGRb30591	4	12914840	3.70464E-05	22.69
		OsGRb08881	4	13725269	0.000195545	18.97
		OsGRb08538	4	4440931	0.000246253	18.46

	OsGRg06306	4	11320635	0.000258291	18.36
	OsGRb25787	4	12725098	0.00026478	18.31
	OsGRb09155	4	19209543	0.000283155	18.16
	OsGRb08910	4	14035735	0.000287425	18.13
	OsGRb25664	4	8124043	0.000302411	18.02
	OsGRb09180	4	19850601	0.00030797	17.98
	OsGRg06407	4	19601384	0.000626121	17.90
	OsGRg06430	4	19893385	0.000626121	17.88
	OsGRg06261	4	6968387	0.000653867	17.82
	OsGRb25862	4	19570740	0.000655505	17.77
	OsGRb09200	4	20060586	0.000665116	17.77
	OsGRb09238	4	20485782	0.000665116	17.70
	OsGRb09240	4	20505437	0.000665116	17.67
	OsGRg06458	4	20426851	0.00067696	17.66
	OsGRb08754	4	11300762	0.000678377	17.56
	OsGRg06304	4	11316471	0.000678377	17.49
	OsGRb25740	4	10304323	0.000683696	17.45
	OsGRb08742	4	10624962	0.000688745	17.39
	OsGRb25839	4	17182231	0.000690069	17.36
	OsGRg06490	4	21414906	0.000703709	17.36
	OsGRg06518	4	22025935	0.000718576	17.34
	OsGRb17738	9	11674055	0.0007187	17.33
	OsGRg11329	8	3389509	0.00072166	17.32
	OsGRb25742	4	10354477	0.000732621	17.32
	OsGRb09195	4	20025177	0.000732792	17.31
	OsGRb09323	4	21564212	0.000733361	17.29
	OsGRg06481	4	21313607	0.000733361	17.20
	OsGRb08806	4	12650451	0.000733361	17.17
	OsGRb08813	4	12874705	0.000733361	17.16
	OsGRg06515	4	21663324	0.000741247	17.13
	OsGRb15879	8	5219860	0.000742324	17.13
	OsGRb08847	4	13340370	0.000756465	17.12
	OsGRb25737	4	10077235	0.000763724	17.10
	OsGRb08680	4	6440881	0.000764093	17.03
	OsGRb16283	8	10764889	0.000771753	17.00
	OsGRb08606	4	5500642	0.000784231	16.98

	OsGRb08627	4	5670305	0.000784231	16.96
	OsGRb08694	4	6660438	0.000784231	16.93
	OsGRb25632	4	4940344	0.000784231	16.92
	OsGRb09194	4	20010914	0.000784231	16.88
	OsGRb09207	4	20199885	0.000784231	16.87
	OsGRb09214	4	20274610	0.000784231	16.73
	OsGRg06440	4	20086815	0.000784231	16.71
	OsGRb15664	8	3149787	0.000792674	16.70
	OsGRb08808	4	12675840	0.000828223	16.70
	OsGRb09328	4	21610688	0.000833843	16.70
	OsGRb25901	4	21362199	0.000833843	16.70
	OsGRg06507	4	21623763	0.000833843	16.70
	OsGRb25899	4	20863673	0.000835161	16.70
	OsGRg06415	4	19655752	0.000840551	16.62
	OsGRb25775	4	11747654	0.000846295	16.62
	OsGRg06551	4	22587609	0.000867816	16.60
	OsGRb25803	4	14321111	0.0008711	16.58
	OsGRb08799	4	12535482	0.000885343	16.55
	OsGRg06453	4	20414472	0.000892554	16.53
	OsGRg06299	4	9673467	0.000895015	16.53
	OsGRb08990	4	17475598	0.00091055	16.53
	OsGRb08759	4	11454103	0.00091055	16.53
	OsGRb08766	4	11794996	0.00091055	16.53
	OsGRg06245	4	6939489	0.000910949	16.50
	OsGRb15974	8	6205816	0.000922788	16.47
	OsGRg06447	4	20096863	0.000922968	16.47
	OsGRb30636	4	20645999	0.000930739	16.46
	OsGRg06525	4	22150395	0.000933322	16.46
	OsGRg03752	2	34032581	0.000936312	16.46
	OsGRb09282	4	21089615	0.000939103	16.46
	OsGRb25626	4	4148271	0.000940647	16.46
	OsGRg06529	4	22194439	0.000945565	16.44
	OsGRb08633	4	5735183	0.000957862	16.43
	OsGRb09289	4	21225501	0.000957862	16.41
	OsGRb09307	4	21340929	0.000957862	16.37
	OsGRb31669	8	27620157	0.000959899	16.37

weight (TGW)	OsGRg06450	4	20099643	0.000965278	16.37
	OsGRb14503	7	15365358	0.000975387	16.36
	OsGRb28608	9	13162604	0.000978713	16.33
	OsGRb09256	4	20715720	0.000990246	16.33
	OsGRb09232	4	20440235	0.000994596	16.33
	OsGRb08676	4	6365651	0.000995588	16.33
1000 grain plant (TP)	OsGRb23906	1	10116371	0.000902976	15.63
	OsGRb05492	2	34355959	0.000148332	14.60
	OsGRg01164	1	28331892	0.000216037	13.83
	OsGRb21690	11	21789361	0.000222423	13.77
Tiller/ plant (TP)	OsGRb13190	6	20245648	0.00021125	17.57
	OsGRg04446	3	6518355	0.000107335	14.09
	OsGRg03402	2	28582430	0.000239771	12.44
	OsGRb29047	11	858733	0.000269943	12.19
Unfilled Grains (UG/P)	OsGRg07442	5	258353	0.000292806	15.74
	OsGRb14503	7	15365358	0.000324535	15.51
	OsGRg11329	8	3389509	0.00039926	15.05
	OsGRb15879	8	5219860	0.000399863	15.05
	OsGRb15974	8	6205816	0.000412558	14.98
	OsGRb15664	8	3149787	0.000440233	14.83
	OsGRb18405	9	21000940	0.00047682	14.66
	OsGRb16283	8	10764889	0.000508358	14.52
	OsGRb08910	4	14035735	0.000531266	14.42
	OsGRg12794	9	22384257	0.000534432	14.41
	OsGRb15653	8	3005090	0.000542166	14.38
	OsGRb15702	8	3385132	0.000567692	14.28
	OsGRb30591	4	12914840	0.00057091	14.26
	OsGRb15730	8	3554391	0.000586197	14.21
	OsGRb25803	4	14321111	0.000629133	14.05
	OsGRb14687	7	17400358	0.000642796	14.00
	OsGRb14703	7	17504411	0.000642796	14.00
	OsGRg10445	7	17412788	0.000642796	14.00
Yield (Y/H)	OsGRb17690	9	10920756	0.000772503	13.61
	OsGRg11693	8	21450206	0.00094483	13.17
kg/Ha	OsGRb20658	11	7220561	0.000495796	18.71
	OsGRb30591	4	12914840	0.00065155	18.15

	OsGRb08205	3	35394566	0.000651771	18.15
	OsGRb09180	4	19850601	0.000932963	17.42
	OsGRb23685	12	27209750	0.000953745	17.37
Yield kg/Plot (Y/P)	OsGRb01011	1	13770374	0.000594655	16.03
	OsGRb09543	4	27450829	0.000644405	15.86
	OsGRb31605	8	18321045	0.000823727	15.34
	OsGRg10392	7	15377693	0.000823727	15.34
	OsGRb14555	7	15910856	0.000953954	15.03
	OsGRg12112	9	5025651	0.000953954	15.03
	OsGRg07137	4	31075040	0.000981469	14.97

**Supplementary Table S7: Identification of Candidate Genes corresponding to the significantt associated SNPs.**

SNP_name	chrnum	Strand	snp_position	region	Gene_ID
OsGRb30080	2	-	18212087	intergenic	Os02g0508500 45221;Os02g0510100 19402;Os02g0510300 27182
OsGRb14914	7	+	20814664	intron	Os07g0531700
OsGRb15039	7	-	22304042	3UTR	Os07g0558200
OsGRb05211	2	+	29829169	intron	Os02g0719000
OsGRb24510	2	-	9826527	CDS	Os02g0271600
OsGRb24572	2	-	12405692	intergenic	Os02g0313450 23371;Os02g0313700 537;Os02g0313900 8692
OsGRb24900	2	-	30132327	intergenic	Os02g0724100 32147;Os02g0724850 2226;Os02g0725100 7584;Os02g0725500 25276;Os02g0725700 31973
OsGRb04151	2	-	17990840	3UTR	Os02g0505700
OsGRb04250	2	-	19120460	intergenic	Os02g0523300 23066;Os02g0523500 14999;Os02g0523650 8186
OsGRg02806	2	+	17273659	intergenic	Os02g0492500 46331;Os02g0492800 28927;Os02g0493087 486
OsGRb04064	2	-	16775829	intergenic	Os02g0484975 24267
OsGRb04108	2	+	17345198	intergenic	Os02g0494600 2684;Os02g0494700 13518
OsGRb04456	2	-	21810979	CDS	Os02g0570700

OsGRb045 59	2	+	22869364	CDS	Os02g0591500
OsGRb045 69	2	+	23120515	intergenic	Os02g0595200 21927;Os02g0595700 6685;Os02g059580 0 72;Os02g0596200 21596
OsGRb301 42	2	-	24285137	CDS	Os02g0614800
OsGRb045 11	2	+	22354743	intergenic	Os02g0580300 17067; Os02g0580600 2737;Os02g0580700 452;Os02g0580966  15583;Os02g0581000 26456;Os02g0581100 35630;Os02 g0581200 46591
OsGRb161 14	8	-	8615206	CDS	Os08g0241800
OsGRb161 45	8	+	8929911	intergenic	Os08g0246300 9589;Os08g0246400 25383;Os08g024650 0 33882;Os08g0246700 36393;Os08g0246800 39103
OsGRb041 04	2	-	17309380	intron	Os02g0494000
OsGRb044 21	2	-	20975538	intron	Os02g0555200
OsGRb048 93	2	+	26259806	intergenic	Os02g0650800 21516; Os02g0650900 16826;Os02g0651200 12684;Os02g06515 00 2841;Os02g0651900 11875
OsGRb211 46	11	+	15034296	intergenic	Os11g0448700 36114; Os11g0449600 40946;Os11g0450050 44351
OsGRg028 84	2	-	19568531	intron	Os02g0531600
OsGRg030 95	2	+	23712290	CDS	Os02g0605000
OsGRb254 51	3	+	24409509	intergenic	Os03g0637800 6375;Os03g0638200 39626
OsGRb214 61	11	-	19084575	intergenic	Os11g0525500 27707;Os11g0525800 5273;Os11g052590 0 716;Os11g0526800 28084;Os11g0527100 43579;Os11g 0527300 49512
OsGRg140 09	11	+	18935157	intergenic	Os11g0523700 9903;Os11g0524300 46738
OsGRb051 01	2	-	28940961	CDS	Os02g0702500
OsGRg027 17	2	-	11885546	intron	Os02g0304900
OsGRb040 72	2	+	16904305	intergenic	Os02g0487300 11224
OsGRb049 43	2	+	26640578	intergenic	Os02g0658150 31579;Os02g0658300 18687;Os02g06586 00 590;Os02g0658800 8259;Os02g0659100 28218;Os02g 0659500 48848
OsGRg035 65	2	+	30862290	intron	Os02g0738950
OsGRb215	11	-	19994753	5UTR CDS	Os11g0544200;Os11g0544200

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OsGRg027 08	2	-	11594325	CDS	Os02g0301100
OsGRb254 62	3	+	25181277	intergenic	Os03g0648600 45196;Os03g0648900 34885;Os03g06490 50 30134;Os03g0650000 15780;Os03g0650350 46300
OsGRb254 59	3	-	25131417	intron	Os03g0648500
OsGRg053 63	3	+	24961621	intergenic	Os03g0645900 361;Os03g0646100 35026;Os03g0646300  42043
OsGRb214 68	11	-	19129697	CDS	Os11g0527100
OsGRb214 71	11	+	19170789	intergenic	Os11g0527000 42651; Os11g0527150 40433;Os11g0527500 22150;Os11g05277 00 13663;Os11g0528200 2;Os11g0528300 2107;Os11g05 28812 13584;Os11g0529150 36925
OsGRb324 42	11	+	19026652	intergenic	Os11g0524300 38738; Os11g0525200 21914;Os11g0525600 31768;Os11g05257 00 42569
OsGRg030 58	2	+	23529294	intron	Os02g0601300
OsGRg033 25	2	+	26931234	intron	Os02g0664000
OsGRb301 27	2	+	22416322	CDS	Os02g0581400
OsGRb046 43	2	+	23850363	5UTR 5UTR	Os02g0608100; Os02g0608100
OsGRg027 30	2	+	12762219	intergenic	Os02g0319100 33346; Os02g0320000 6415;Os02g0320300 3063;Os02g0320600  15600;Os02g0320800 26449
OsGRb245 67	2	-	12345631	intron	Os02g0312800
OsGRg139 80	11	-	18173691	intron	Os11g0508600
OsGRb255 78	3	+	33753141	intron	Os03g0807500
OsGRb095 64	4	-	27939281	CDS	Os04g0557500
OsGRg042 75	3	-	4267961	intron	Os03g0181550
OsGRb177 03	9	-	11125119	CDS	Os09g0350900
OsGRb286 03	9	+	12952275	intergenic	Os09g0381600 37451
OsGRb319 05	9	-	17074373	intergenic	Os09g0453900 38940; Os09g0454200 6846;Os09g0454500 3292;Os09g0454900  17831;Os09g0455200 34916

OsGRb175 10	9	+	7800022	3UTR	Os09g0305300
OsGRb286 00	9	+	12915373	intergenic	Os09g0381100 26849; Os09g0381300 17367;Os09g0381600 549
OsGRg123 08	9	+	14048196	CDS	Os09g0401100
OsGRg123 10	9	+	14048809	CDS	Os09g0401100
OsGRb181 78	9	-	19105152	intron	Os09g0493200
OsGRb277 33	7	+	20438541	intergenic	Os07g0525400 19952; Os07g0525450 17375;Os07g0526150 17001
OsGRb144 46	7	-	14594194	intergenic	Os07g0436100 13882; Os07g0436350 3483;Os07g0437000 24064
OsGRb307 17	4	+	29956594	intergenic	Os04g0591232 34925; Os04g0591300 16643;Os04g0592400 8558;Os04g059340 0 44940;Os04g0593500 47700
OsGRb097 05	4	+	29950172	intergenic	Os04g0591232 28503; Os04g0591300 10221; Os04g0592400 14980
OsGRb312 40	7	+	9363018	intergenic	Os07g0264000 13557; Os07g0264100 5314;Os07g0264800 32347;Os07g026490 0 36333;Os07g0265100 42821
OsGRb129 76	6	+	16465767	intergenic	Os06g0484400 35800; Os06g0484500 38747;Os06g0484600 43561
OsGRb138 52	7	-	485365	intergenic	Os07g0108200 40529; Os07g0108300 34116;Os07g0108400 31655;Os07g01085 00 25147;Os07g0108900 7710;Os07g0109100 11217;Os0 7g0109500 38401;Os07g0109600 43341
OsGRb138 91	7	-	754356	CDS	Os07g0113700
OsGRg019 23	1	+	39950738	intron	Os01g0916400
OsGRb138 12	7	+	219361	3UTR	Os07g0103500
OsGRb140 44	7	-	1929142	intron	Os07g0136500
OsGRb281 84	8	-	14792948	intergenic	Os08g0333100 26682
OsGRb271 02	6	-	24322609	intergenic	Os06g0609600 46656; Os06g0609700 40123;Os06g0609850 30126;Os06g06101 00 22855;Os06g0610500 9406;Os06g0611100 41392;Os0 6g0611150 42642;Os06g0611200 47962
OsGRb271 39	6	-	25535681	intergenic	Os06g0630850 10422
OsGRg052 38	3	+	21673888	intron	Os03g0586900

OsGRb145 03	7	-	15365358	intergenic	Os07g0447200 49709; Os07g0448300 3824;Os07g0448600 11682
OsGRb137 85	7	+	20400	CDS CDS	Os07g0100300; Os07g0100300
OsGRb239 06	1	-	10116371	intron intron	Os01g0283000; Os01g0283000
OsGRg094 25	6	+	21482221	3UTR	Os06g0561000
OsGRb243 77	1	-	40794243	3UTR	Os01g0929500
OsGRb108 30	5	+	10350550	intergenic	Os05g0264200 6058
OsGRb305 91	4	-	12914840	intergenic	Os04g0294401 3101; Os04g0294812 20440;Os04g0295100 40925
OsGRb088 81	4	+	13725269	intergenic	Os04g0304400 49385; Os04g0304750 34299;Os04g0305700 46203
OsGRb085 38	4	+	4440931	intron intron	Os04g0165300; Os04g0165300
OsGRg063 06	4	-	11320635	intron intron	Os04g0271000; Os04g0271000
OsGRb257 87	4	-	12725098	CDS	Os04g0291900
OsGRb091 55	4	-	19209543	intergenic	Os04g0389901 28627; Os04g0391000 31202
OsGRb089 10	4	-	14035735	intergenic	Os04g0309100 38178; Os04g0309400 29740;Os04g0309751 23242;Os04g03101 00 3162;Os04g0310500 26921;Os04g0310800 36906
OsGRb256 64	4	-	8124043	intron	Os04g0221600
OsGRb091 80	4	+	19850601	intergenic	Os04g0401200 23; Os04g0401700 36073
OsGRg064 07	4	-	19601384	intergenic	Os04g0396550 34615; Os04g0397100 82;Os04g0397500 11460;Os04g0397901  39416
OsGRg064 30	4	+	19893385	intergenic	Os04g0401200 42807; Os04g0401700 1030;Os04g0402250 31023;Os04g040230 0 39856
OsGRg062 61	4	-	6968387	CDS	Os04g0202500
OsGRb258 62	4	+	19570740	intron	Os04g0396500
OsGRb092 00	4	-	20060586	intergenic	Os04g0403600 40187; Os04g0403701 35445;Os04g0403900 13669;Os04g04041 00 2676;Os04g0404400 4612;Os04g0404900 23339;Os04 g0405100 39579;Os04g0405300 48991

OsGRb092 38	4	+	20485782	intergenic	Os04g0413900 41174; Os04g0414000 34166;Os04g0414100 22842;Os04g0414300 591;Os04g0414700 10272;Os04g0414800 13639;Os04g0415000 22843;Os04g0415100 33354;Os04g0415200 40328;Os04g0415600 48108
OsGRb092 40	4	-	20505437	intergenic	Os04g0414250 34605; Os04g0414500 18351;Os04g0414850 4413;Os04g0415401 23348;Os04g0416100 44551
OsGRg064 58	4	+	20426851	3UTR	Os04g0413500
OsGRb087 54	4	-	11300762	intergenic	Os04g0269900 29232;Os04g0270200 6652;Os04g0270900 8718;Os04g0271000 15474
OsGRg063 04	4	-	11316471	3UTR 3UTR	Os04g0271000; Os04g0271000
OsGRb257 40	4	-	10304323	intergenic	Os04g0257500 12414
OsGRb087 42	4	+	10624962	5UTR	Os04g0261400
OsGRb258 39	4	+	17182231	intron	Os04g0359100
OsGRg064 90	4	+	21414906	intron intron	Os04g0432000; Os04g0432000
OsGRg065 18	4	-	22025935	intron intron	Os04g0442300; Os04g0442300
OsGRb177 38	9	+	11674055	CDS	Os09g0359500
OsGRg113 29	8	-	3389509	3UTR	Os08g0157900
OsGRb257 42	4	-	10354477	intergenic	Os04g0257500 36863
OsGRb091 95	4	+	20025177	intergenic	Os04g0403200 29019; Os04g0403300 15652;Os04g0403400 9648;Os04g0403500 5584;Os04g0404000 22399;Os04g0404601 40244
OsGRb093 23	4	-	21564212	CDS	Os04g0433900
OsGRg064 81	4	+	21313607	intron	Os04g0429800
OsGRb088 06	4	+	12650451	CDS	Os04g0290800
OsGRb088 13	4	-	12874705	intergenic	Os04g0294401 43236
OsGRg065 15	4	-	21663324	CDS CDS	Os04g0435500; Os04g0435500
OsGRb158 79	8	-	5219860	intergenic	Os08g0190200 49057

OsGRb088 47	4	+	13340370	intergenic	Os04g0300100 28399
OsGRb257 37	4	+	10077235	intergenic	Os04g0254000 12026; Os04g0254300 1671
OsGRb086 80	4	-	6440881	intergenic	Os04g0194000 13817; Os04g0194433 29727;Os04g0194500 34476
OsGRb162 83	8	-	10764889	intergenic	Os08g0277300 38100; Os08g0278600 31180;Os08g0278900 45506
OsGRb086 06	4	+	5500642	intergenic	Os04g0180400 13939; Os04g0180900 21271
OsGRb086 27	4	-	5670305	5UTR	Os04g0183201
OsGRb086 94	4	-	6660438	intergenic	Os04g0197275 22387; Os04g0197500 4642
OsGRb256 32	4	+	4940344	3UTR	Os04g0172560
OsGRb091 94	4	+	20010914	CDS	Os04g0403400
OsGRb092 07	4	+	20199885	intergenic	Os04g0406600 28639; Os04g0407500 3615;Os04g0407800 747;Os04g0407900  11687
OsGRb092 14	4	+	20274610	intergenic	Os04g0409600 18889; Os04g0409900 15337;Os04g0410300 1553;Os04g041040 0 5750;Os04g0410700 8104;Os04g0411200 30895;Os04g 0411300 35545
OsGRg064 40	4	-	20086815	intron	Os04g0404900
OsGRb156 64	8	+	3149787	3UTR	Os08g0154700
OsGRb088 08	4	-	12675840	intergenic	Os04g0290450 45186; Os04g0290750 26641;Os04g0292150 42210;Os04g02919 00 43210
OsGRb093 28	4	-	21610688	intron	Os04g0434600
OsGRb259 01	4	-	21362199	3UTR	Os04g0430800
OsGRg065 07	4	-	21623763	intron intron	Os04g0434800;Os04g0434800
OsGRb258 99	4	+	20863673	intron	Os04g0421900
OsGRg064 15	4	+	19655752	3UTR	Os04g0398000
OsGRb257 75	4	+	11747654	5UTR	Os04g0278100
OsGRg065 51	4	+	22587609	CDS	Os04g0452500

OsGRb258 03	4	+	14321111	intergenic	Os04g0313600 35592;Os04g0314201 7716
OsGRb087 99	4	-	12535482	intron	Os04g0288500
OsGRg064 53	4	+	20414472	intron	Os04g0413200
OsGRg062 99	4	-	9673467	intron intron	Os04g0249600;Os04g0249600
OsGRb089 90	4	-	17475598	intergenic	Os04g0363700 16019
OsGRb087 59	4	+	11454103	5UTR	Os04g0272700
OsGRb087 66	4	+	11794996	intron intron	Os04g0278200;Os04g0278200
OsGRg062 45	4	+	6939489	Intergenic	Os04g0202200 15025;Os04g0202700 35812
OsGRb159 74	8	+	6205816	Intergenic	Os08g0205300 48039;Os08g0205400 44433;Os08g0205650 42758;Os08g0205800 36528;Os08g0206400 223;Os08g0206600 12872;Os08g0206700 20540;Os08g0206800 27691;Os08g0206900 31633;Os08g0207300 45537
OsGRg064 47	4	+	20096863	Intergenic	Os04g0404000 48772;Os04g0404601 30394;Os04g0404800 13939;Os04g0405000 2732;Os04g0405150 3751;Os04g0405700 34420;Os04g0405800 42312
OsGRb306 36	4	+	20645999	Intergenic	Os04g0417600 19928;Os04g0418000 7717;Os04g0418500 44868
OsGRg065 25	4	+	22150395	Intron	Os04g0444200
OsGRg037 52	2	-	34032581	intron intron	Os02g0799100;Os02g0799100
OsGRb092 82	4	+	21089615	Intergenic	NA
OsGRb256 26	4	+	4148271	Intergenic	Os04g0160801 21579
OsGRg065 29	4	-	22194439	5UTR	Os04g0445000
OsGRb086 33	4	-	5735183	Intergenic	Os04g0183401 45983;Os04g0184250 3414;Os04g0184450 4253;Os04g0184900 43672
OsGRb092 89	4	-	21225501	Intergenic	Os04g0428900 1907;Os04g0428950 7121;Os04g0429050 23364
OsGRb093 07	4	+	21340929	CDS	Os04g0430400
OsGRb316 69	8	+	27620157	CDS	Os08g0550600

OsGRg064 50	4	+	20099643	CDS	Os04g0405000
OsGRb145 03	7	-	15365358	Intergenic	Os07g0447200 49709;Os07g0448300 3824;Os07g044860 0 11682
OsGRb286 08	9	+	13162604	Intergenic	Os09g0384601 43740;Os09g0386450 14656;Os09g03865 00 18726
OsGRb092 56	4	-	20715720	Intergenic	Os04g0418300 24665;Os04g0419400 12414;Os04g04197 50 26461;Os04g0419800 42038
OsGRb092 32	4	+	20440235	Intergenic	Os04g0412700 47152;Os04g0412800 44955;Os04g04129 00 34489;Os04g0413200 24995;Os04g0413500 13314;Os 04g0413900 3055;Os04g0414000 6632;Os04g0414100 17 727;Os04g0414300 43913
OsGRb086 76	4	-	6365651	Intergenic	Os04g0193300 18986
OsGRb239 06	1	-	10116371	intron intron	Os01g0283000;Os01g0283000
OsGRb054 92	2	-	34355959	CDS	Os02g0805250
OsGRg011 64	1	+	28331892	intron intron	Os01g0686800;Os01g0686800
OsGRb216 90	11	-	21789361	Intergenic	Os11g0577300 26425;Os11g0577350 26083;Os11g05776 75 8740;Os11g0577866 572;Os11g0578066 15406
OsGRb131 90	6	-	20245648	Intergenic	Os06g0538900 20956;Os06g0539100 13974;Os06g05395 00 11602;Os06g0540050 35029;Os06g0540200 36824
OsGRg044 46	3	+	6518355	3UTR 3UTR 3 UTR	Os03g0224200;Os03g0224200;Os03g0224200
OsGRg034 02	2	-	28582430	CDS	Os02g0695800
OsGRb290 47	11	+	858733	3UTR	Os11g0119200
OsGRg074 42	5	+	258353	3UTR	Os05g0104700
OsGRb145 03	7	-	15365358	intergenic	Os07g0447200 49709;Os07g0448300 3824;Os07g044860 0 11682
OsGRg113 29	8	-	3389509	3UTR	Os08g0157900
OsGRb158 79	8	-	5219860	intergenic	Os08g0190200 49057
OsGRb159 74	8	+	6205816	intergenic	Os08g0205300 48039;Os08g0205400 44433;Os08g02056 50 42758;Os08g0205800 36528;Os08g0206400 223;Os08 g0206600 12872;Os08g0206700 20540;Os08g0206800 27 691;Os08g0206900 31633;Os08g0207300 45537
OsGRb156 64	8	+	3149787	3UTR	Os08g0154700

OsGRb184 05	9	-	21000940	intergenic	Os09g0533600 33488;Os09g0533800 25750;Os09g05339 00 20289;Os09g0534000 14561;Os09g0535000 32163
OsGRb162 83	8	-	10764889	intergenic	Os08g0277300 38100;Os08g0278600 31180;Os08g02789 00 45506
OsGRb089 10	4	+	14035735	intergenic	Os04g0309500 29465;Os04g0309600 22292;Os04g03099 00 6548;Os04g0310200 4772;Os04g0310400 20800;Os04 g0310900 37133
OsGRg127 94	9	+	22384257	intron 3UTR	Os09g0563300;Os09g0563300
OsGRb156 53	8	-	3005090	intergenic	Os08g0152300 3257;Os08g0152366 2181;Os08g0152500  4603;Os08g0152600 8717;Os08g0152800 17578;Os08g0 152900 26192
OsGRb157 02	8	-	3385132	CDS	Os08g0157800
OsGRb305 91	4	-	12914840	intergenic	Os04g0294401 3101;Os04g0294812 20440;Os04g029510 0 40925
OsGRb157 30	8	+	3554391	intergenic	Os08g0160300 19490;Os08g0160600 7463;Os08g016090 1 3791;Os08g0161100 21435
OsGRb258 03	4	+	14321111	intergenic	Os04g0313600 35592;Os04g0314201 7716
OsGRb146 87	7	+	17400358	intron	Os07g0479100
OsGRb147 03	7	+	17504411	CDS CDS	Os07g0481000;Os07g0481000
OsGRg104 45	7	-	17412788	intron	Os07g0479300
OsGRb176 90	9	-	10920756	intergenic	Os09g0346900 42803;Os09g0347500 12773;Os09g03477 00 1365;Os09g0347900 7640;Os09g0348766 44108
OsGRg116 93	8	+	21450206	intron	Os08g0440800
OsGRb206 58	11	+	7220561	intergenic	Os11g0235250 23265;Os11g0235700 1114
OsGRb305 91	4	-	12914840	intergenic	Os04g0294401 3101;Os04g0294812 20440;Os04g029510 0 40925
OsGRb082 05	3	-	35394566	CDS	Os03g0841900
OsGRb091 80	4	+	19850601	intergenic	Os04g0401200 23;Os04g0401700 36073
OsGRb236 85	12	+	27209750	3UTR	Os12g0634700
OsGRb010 11	1	-	13770374	intergenic	Os01g0346700 8390;Os01g0347100 29581;Os01g034720 0 37151
OsGRb095 43	4	+	27450829	intergenic	Os04g0547600 40445;Os04g0547900 24660;Os04g05480 00 21006;Os04g0548300 6323;Os04g0549350 43896;Os0 4g0549400 47281

OsGRb316 05	8	-	18321045	CDS CDS	Os08g0387700;Os08g0387700
OsGRg103 92	7	+	15377693	intron	Os07g0448400
OsGRb145 55	7	-	15910856	3UTR	Os07g0457200
OsGRg121 12	9	-	5025651	intergenic	Os09g0265800 45677;Os09g0266100 28257;Os09g02666 00 1433
OsGRg071 37	4	-	31075040	CDS	Os04g0612800