

Table S1. The awn phenotype of transgenic lines and parental lines.

	Number of seeds		awn length(mm)	Frequency of awned seeds(%)
	Awned	Awnless		
WCSL26	237	14	26.6±0.84*	96.1±6.52*
Nipponbare	0	261	0	0
pGW501(V.C.) (line1)	0	223	0	0
pGW501(V.C.) (line2)	0	129	0	0
pGW501(V.C.) (line3)	0	217	0	0
pRAE2::RAE2 (line 1)	230	11	25.2±0.73*	95.4±3.43*
pRAE2::RAE2 (line 2)	259	36	28.3±0.62*	87.8±4.25*
pRAE2::RAE2 (line 3)	213	12	15.1±0.68*	94.7±8.15*
GIL116	143	143	20.2±2.82	100±0.0
T65	0	242	0.0±0.0	0.0±0.0
pANDA(V.C) (line1)	49	1	16.8±3.09	98.3±1.08
pANDA(V.C) (line2)	55	0	17.5±5.38	100±0.0
pANDA(V.C) (line3)	12	0	23.2±3.56	100±0.0
OgAWN2-RNAi (line 1)	25	5	10.1±2.06*	83.3±8.15
OgAWN2-RNAi (line 2)	23	3	7.4±3.04*	84.5±6.53
OgAWN2-RNAi (line 3)	26	6	8.5±2.13*	81.3±4.78
pCAMBIA(V.C.) (line1)	0	41	0	0
pCAMBIA(V.C.) (line2)	0	35	0	0
pCAMBIA(V.C.) (line3)	0	33	0	0
rae2(4C)ox (line1)	0	38	0	0
rae2(4C)ox (line2)	0	42	0	0
rae2(4C)ox (line3)	0	45	0	0
rae2(5C)ox (line1)	0	50	0	0
rae2(5C)ox (line2)	0	32	0	0
rae2(5C)ox (line3)	0	34	0	0
RAE2(6C)ox (line1)	25	15	23.8±5.24*	38.3±1.15*
RAE2(6C)ox (line2)	29	18	19.8±2.56*	40.2±3.43*
RAE2(6C)ox (line3)	24	13	24.5±3.17*	37.5±2.89*
rae2(7C)ox (line1)	0	48	0	0
rae2(7C)ox (line2)	0	51	0	0
rae2(7C)ox (line3)	0	39	0	0

* P < 0.05 based on two-tailed Student's t test.

Table S2. Germplasm information used for *RAE2* diversity study.

Accession ID	Name	Species: subpopulation	Germplasm Repository	Origin	Awn Class (SES)	GC length	RAE2 protein length class
NSFTV7	Arias	<i>O. sativa: tropical japonica</i>	GSOR 301007	Indonesia	1	22	long/7C
NSFTV30	Chiem Chanh	<i>O. sativa: indica</i>	GSOR 301028	Vietnam	1	22	long/7C
NSFTV46	Dourado Agulha	<i>O. sativa: tropical japonica</i>	GSOR 301043	Brazil	5	20	short/4C
NSFTV50	DZ78	<i>O. sativa: aus</i>	GSOR 301046	Bangladesh	0	20	short/4C
NSFTV53	Firooz	<i>O. sativa: aromatic</i>	GSOR 301049	Iran	0	20	short/4C
NSFTV59	Gogo Lempuk	<i>O. sativa: tropical japonica</i>	GSOR 301055	Indonesia	9	24	med/6C
NSFTV75	Jambu	<i>O. sativa: tropical japonica</i>	GSOR 301068	Indonesia	5	20	short/4C
NSFTV93	Kitrana 508	<i>O. sativa: aromatic</i>	GSOR 301085	Madagascar	9	20	short/4C
NSFTV105	Mehr	<i>O. sativa: aus</i>	GSOR 301097	Iran	0	20	short/4C
NSFTV112	N12	<i>O. sativa: aromatic</i>	GSOR 301104	India	5	20	short/4C
NSFTV142	Shai-Kuh	<i>O. sativa: indica</i>	GSOR 301133	China	7	22	long/7C
NSFTV153	T26	<i>O. sativa: aus</i>	GSOR 301144	India	7	20	short/4C
NSFTV154	Ta Hung Ku	<i>O. sativa: temperate japonica</i>	GSOR 301145	China	9	24	med/6C
NSFTV160	NSF-TV 160	<i>O. sativa: aromatic</i>	GSOR 301151	Iran	1	20	short/4C
NSFTV173	Nipponbare	<i>O. sativa: temperate japonica</i>	GSOR 301164	Japan	1	20	short/4C
NSFTV200	P 737	<i>O. sativa: aus</i>	GSOR 301191	Pakistan	3	20	short/4C
NSFTV221	Sadri Belyi	<i>O. sativa: aromatic</i>	GSOR 301212	Azerbaijan	0	20	short/4C
NSFTV222	Paraiba Chines Nova	<i>O. sativa: indica</i>	GSOR 301213	Brazil	0	22	long/7C
NSFTV223	Priano Guaira	<i>O. sativa: tropical japonica</i>	GSOR 301214	Brazil	1	24	med/5C
NSFTV243	Tropical Rice	<i>O. sativa: temperate japonica</i>	GSOR 301233	Ecuador	0	22	long/7C
NSFTV250	Bulgare	<i>O. sativa: temperate japonica</i>	GSOR 301240	France	9	24	med/6C
NSFTV261	Shim Balte	<i>O. sativa: aus</i>	GSOR 301251	Iraq	9	20	short/4C
NSFTV265	Vialone	<i>O. sativa: temperate japonica</i>	GSOR 301255	Italy	3	22	long/7C
NSFTV269	Sundensis	<i>O. sativa: indica</i>	GSOR 301259	Kazakhstan	1	22	long/7C
NSFTV284	IR-44595	<i>O. sativa: indica</i>	GSOR 301274	Nepal	1	22	long/7C
NSFTV298	LD 24	<i>O. sativa: indica</i>	GSOR 301288	Sri Lanka	0	22	long/7C
NSFTV309	Manzano	<i>O. sativa: tropical japonica</i>	GSOR 301299	Zaire	0	20	short/4C
NSFTV310	R 101	<i>O. sativa: tropical japonica</i>	GSOR 301300	Zaire	0	22	long/7C
NSFTV337	Sabharaj	<i>O. sativa: indica</i>	GSOR 301327	Bangladesh	0	22	long/7C
NSFTV339	Yodanya	<i>O. sativa: indica</i>	GSOR 301329	Myanmar	0	22	long/7C
NSFTV349	Chang Ch'Sang Hsu Tao	<i>O. sativa: indica</i>	GSOR 301339	China	0	22	long/7C
NSFTV356	JC 117	<i>O. sativa: indica</i>	GSOR 301344	India	0	22	long/7C
NSFTV369	Sathi	<i>O. sativa: aus</i>	GSOR 301356	Pakistan	1	20	short/4C
NSFTV373	Lambayeque 1	<i>O. sativa: aromatic</i>	GSOR 301360	Peru	0	20	short/4C
NSFTV377	PR 304	<i>O. sativa: tropical japonica</i>	GSOR 301362	Puerto Rico	0	22	long/7C
NSFTV379	Wanica	<i>O. sativa: tropical japonica</i>	GSOR 301364	Suriname	0	22	long/7C
NSFTV380	Tainan-lku No. 512	<i>O. sativa: temperate japonica</i>	GSOR 301365	Taiwan	0	20	short/4C
NSFTV381	325	<i>O. sativa: tropical japonica</i>	GSOR 301366	Taiwan	9	22	long/7C
NSFTV395	OS 6 (WC 10296)	<i>O. sativa: tropical japonica</i>	GSOR 301378	Zaire	1	22	long/7C
NSFTV398	93-11	<i>O. sativa: indica</i>	GSOR 301399	China	3	22	long/7C
NSFTV399	Spring	<i>O. sativa: tropical japonica</i>	GSOR 301381	United States	1	20	short/4C
NSFTV400	Yang Dao 6	<i>O. sativa: indica</i>	GSOR 301400	China	7	22	long/7C
NSFTV402		<i>O. spontanea</i>	IRGC80539	India	9	20	short/4C
NSFTV410		<i>O. nivara</i>	IRGC80759	Myanmar	9	21	med/6C
NSFTV413		<i>O. nivara</i>	IRGC81850	India	9	15	med/6C
NSFTV415		<i>O. spontanea</i>	IRGC81909	India	9	15	med/6C
NSFTV416		<i>O. spontanea</i>	IRGC81970	Thailand	0	22	long/7C
NSFTV422		<i>O. rufipogon</i>		Vietnam		15	med/6C
NSFTV427		<i>O. rufipogon</i>		China	9	21	med/6C
NSFTV431		<i>O. rufipogon</i>	IRGC82992	China	9	15	med/6C
NSFTV432		<i>O. rufipogon</i>		Thailand		21	long/7C
NSFTV433		<i>O. rufipogon</i>	IRGC83795	India	9	23	short/4C
NSFTV435		<i>O. rufipogon</i>	IRGC86448	Thailand		24	med/6C
NSFTV438 (438_B2_1_S2)		<i>O. rufipogon</i>		India	9	22	long/7C
NSFTV443		<i>O. nivara</i>	IRGC93183	Nepal	9	15	med/6C
NSFTV444		<i>O. nivara</i>	IRGC93188	Nepal	9	15	med/6C
NSFTV446		<i>O. spontanea</i>	IRGC93224	Nepal	9	15	med/6C
NSFTV450		<i>O. nivara</i>	IRGC100916	China	9	15	med/6C
NSFTV453		<i>O. rufipogon</i>	IRGC103404	Bangladesh	9	22	long/7C
NSFTV457 (457_B3_1_S2)		<i>O. nivara</i>		Bangladesh	9	27	med/6C
NSFTV461 (461_A1_1_S2)		<i>O. rufipogon</i>		China	9	20	short/4C
NSFTV467		<i>O. RUFIFOGON</i>	IRGC104624	China	5	22	med/6C
NSFTV472		<i>O. SPONTANEA</i>	IRGC104636	China		22	long/7C
NSFTV477		<i>O. SPONTANEA</i>	IRGC104967	China	9	22	long/7C
NSFTV481		<i>O. NIVARA</i>	IRGC105343	India	9	15	med/6C
NSFTV482		<i>O. RUFIFOGON</i>	IRGC105349	India	9	15	med/6C
NSFTV483 (483_C2_1_S2)		<i>O. RUFIFOGON</i>		Thailand	9	15	med/6C
NSFTV487 (487_C2_S2)		<i>O. NIVARA</i>		Sri Lanka	9	15	med/6C
NSFTV490		<i>O. RUFIFOGON</i>		Japan		24	med/6C
NSFTV492		<i>O. RUFIFOGON</i>		Japan	9	15	med/6C
NSFTV493		<i>O. NIVARA</i>	IRGC105706	Nepal	9	15	med/6C

Table S2. Germplasm information used for *RAE2* diversity study.

Individuals used for *RAE2* diversity study

Accession ID	Name	Species: subpopulation	Germplasm Repository	Origin	Awn Class (SES)	GC length	<i>RAE2</i> protein length class
NSFTV494		<i>O. RUFIFOGON</i>	IRGC105711	India		15	med/6C
NSFTV495		<i>O. NIVARA</i>	IRGC105717	Cambodia	9	15	med/6C
NSFTV496		<i>O. RUFIFOGON</i>	IRGC105720	Cambodia		15	med/6C
NSFTV503		<i>O. RUFIFOGON</i>		Thailand	9	15	med/6C
NSFTV505 (505_A1_2_S2)		<i>O. RUFIFOGON</i>		Thailand		21	med/6C
NSFTV508		<i>O. RUFIFOGON</i>	IRGC105890	Bangladesh	0	21	med/6C
NSFTV509		<i>O. RUFIFOGON</i>	IRGC105897	Bangladesh	3	22	long/7C
NSFTV514		<i>O. RUFIFOGON</i>	IRGC105956	Indonesia	9	24	med/6C
NSFTV549		<i>O. RUFIFOGON</i>	IRGC81881	Indonesia	9	24	med/6C
NSFTV553		<i>O. RUFIFOGON</i>	IRGC100926	Japan	9	22	long/7C
NSFTV555 (555_B1_1_S2)					9	15	med/6C
NSFTV592						24	med/6C
NSFTV600			IRGC100187		9	22	long/7C
NSFTV602			IRGC100900		9	15	med/6C
NSFTV605			IRGC100911		9	22	long/7C
NSFTV665		<i>O. RUFIFOGON/O. SATIVA</i>	IRGC100203	Taiwan	0	22	long/7C
NSFTV666		<i>O. RUFIFOGON</i>	IRGC100211	Taiwan	9	15	med/6C
NSFTV669 (669_C2_3_S2)		<i>O. NIVARA</i>		Taiwan	9	21	med/6C
NSFTV673		<i>O. RUFIFOGON</i>	IRGC100647	Taiwan	9	22	med/5C
NSFTV676 (676_A1_1_S2)		<i>O. RUFIFOGON</i>		Taiwan	0	20	short/4C
NSFTV682		<i>O. RUFIFOGON</i>	IRGC100904	Japan	9	24	med/6C
NSFTV701		<i>O. NIVARA/O. RUFIFOGON</i>	IRGC103813	China	9	20	short/4C
NSFTV704		<i>O. RUFIFOGON/O. NIVARA</i>	IRGC103818	China	9	20	short/4C
NSFTV708 (708_A1_2_S2)		<i>O. NIVARA</i>		Bangladesh	9	21	med/6C
NSFTV711		<i>O. NIVARA</i>	IRGC103841	Bangladesh	9	15	med/6C
NSFTV719 (719_A1)		<i>O. NIVARA</i>		France	9	15	med/6C
NSFTV720		<i>O. NIVARA</i>	IRGC104703	France	9	15	med/6C
NSFTV721					9	15	med/6C
NSFTV736 (736_B2_1_S2)					9	24	med/6C
NSFTV743 (743_C1_2_S2T)		<i>O. NIVARA</i>		Nepal	9	15	short/4C
NSFTV751		<i>O. NIVARA</i>	IRGC105895	Bangladesh	9	24	med/6C
NSFTV759 (759_A1_3_S2)		<i>O. RUFIFOGON</i>		Cambodia	9	22	long/7C
NSFTV760		<i>O. NIVARA</i>	IRGC106345	Myanmar	9	21	med/6C
NSFTV762		<i>O. NIVARA</i>		Myanmar	9	15	med/5C
NSFTV765			W1943			24	med/6C
NSFTV767			W1945			24	med/6C
RLS10173		<i>O. barthii</i>	IRGC103912	Tanzania	9	18	med/6C
RLS5584		<i>O. barthii</i>	IRGC104119		9	18	med/6C
RLS10188		<i>O. barthii</i>	IRGC100933		9	18	med/6C
RLS10194		<i>O. barthii</i>	IRGC106303		9	18	med/6C
RLS10128		<i>O. barthii</i>	IRGC101196	Cameroon	9	18	med/6C
RLS10123	WAB 010850	<i>O. barthii</i>	IRGC86524	Chad	9	18	med/6C
RLS10179		<i>O. barthii</i>	IRGC104983	Niger	9	18	med/6C
RLS10183	W0864	<i>O. barthii</i>	IRGC106207	Mali		18	med/6C
RLS10177		<i>O. barthii</i>	IRGC104140	Cameroon	9	18	med/6C
RLS10157		<i>O. barthii</i>	IRGC106291	Mauritania	9	18	med/6C
RLS10190		<i>O. barthii</i>	IRGC100941		9	18	med/6C
RLS10242	DAN MANU (1)	<i>O. glaberrima</i>	TOG5474	Burkina Faso	0	18	med/6C
RLS10239	YAR KARENGESHE	<i>O. glaberrima</i>	TOG5440	Nigeria	0	18	med/6C
RLS10236	TOG5286	<i>O. glaberrima</i>	TOG5286		1	18	med/6C
RLS6183	YANDEV(1)	<i>O. glaberrima</i>	TOG5949	Liberia	1	18	med/6C
RLS10233	ZAKI BIAM-YANDE(WILD)1	<i>O. glaberrima</i>	TOG6193	Nigeria	0	18	med/6C
RLS10245	SHENDAM (WEEDY)1	<i>O. glaberrima</i>	TOG5984	Nigeria	1	18	med/6C
RLS10257	YAR BUTUKA	<i>O. glaberrima</i>	TOG5467	Nigeria	1	18	med/6C
RLS10253	DAN MAIWUYA (6)	<i>O. glaberrima</i>	TOG5390	Nigeria	0	18	med/6C
RLS10262	NEW AYOMA LOCAL (2)	<i>O. glaberrima</i>	TOG7402	Ghana	5	18	med/6C
RLS10247	SHAWHON (2)	<i>O. glaberrima</i>	TOG5747	Liberia	1	18	med/6C
RLS10264	ACC 100982	<i>O. glaberrima</i>	TOG6211	Guinea Bissau	0	18	med/6C
RLS10265	QUE (2)	<i>O. glaberrima</i>	TOG5815	Liberia	0	18	med/6C

Table S3. Seven different length polymorphisms in the GC-repeat region of *RAE2*.

	nt length	***protein length class	Cys no.	wild Asian	cult. Asian	wild African	cult. African
African	18	medium				10	11
	15	medium	5C/ 6C	25*			
	21	medium		9			
Asian	24	medium		9	4		
	20	short	4C	5	17		
	23	short		1			
	22	long	7C	12**	20		

*one accession showed short RAE2 protein length (4C) because of the 1 bp insertion in apart from GC-rich region

**one accession showed medium RAE2 protein length (5C) because of the 1 bp insertion in apart from GC-rich region

***the classification of protein length class is described in Fig. S7B legend

Table S4. Germplasm information used for *RAE2* selective sweep analysis.

Accession ID	Name	Species: subpopulation	Germplasm Repository	Origin	RAE2 protein length class
NSFTV1	Agostano	<i>O. sativa: temperate japonica</i>	IRGC126380		4C/short
NSFTV104	Mansaku	<i>O. sativa: temperate japonica</i>	IRGC117811		6C/med
NSFTV108	Moroberekan	<i>O. sativa: tropical japonica</i>	IRGC117621		4C/short
NSFTV110	Mudgo	<i>O. sativa: indica</i>	IRGC117818		7C/long
NSFTV154	Ta_Hung_Ku	<i>O. sativa: temperate japonica</i>	IRGC117904		6C/med
NSFTV16	Bico_Branco	<i>O. sativa: aromatic</i>	IRGC117658		4C/short
NSFTV163	Taducan	<i>O. sativa: indica</i>	IRGC117906		7C/long
NSFTV165	Trembese	<i>O. sativa: tropical japonica</i>	IRGC117921		7C/long
NSFTV173	Nipponbare	<i>O. sativa: temperate japonica</i>			4C/short
NSFTV174	Azucena	<i>O. sativa: tropical japonica</i>			7C/long
NSFTV18	BJ1	<i>O. sativa: aus</i>	IRGC117661		4C/short
NSFTV19	Black_Gora	<i>O. sativa: aus</i>	IRGC117662		4C/short
NSFTV207	Sigadis	<i>O. sativa: indica</i>	IRGC117889		7C/long
NSFTV226	IRAT_44	<i>O. sativa: tropical japonica</i>	IRGC117762		7C/long
NSFTV23	Canella_De_Ferro	<i>O. sativa: tropical japonica</i>	IRGC117675		7C/long
NSFTV248	Caucasica	<i>O. sativa: temperate japonica</i>	IRGC117677		4C/short
NSFTV268	Vavilovi	<i>O. sativa: temperate japonica</i>	IRGC117928		4C/short
NSFTV28	Champa_Tong_54	<i>O. sativa: aus</i>	IRGC117680		4C/short
NSFTV29	Chau	<i>O. sativa: indica</i>	IRGC117682		7C/long
NSFTV317	DJ123	<i>O. sativa: aus</i>	IRGC117711		4C/short
NSFTV336	Paung_Malaung	<i>O. sativa: aus</i>	IRGC117847		4C/short
NSFTV338	Sitpwa	<i>O. sativa: temperate japonica</i>	IRGC117892		4C/short
NSFTV341	Shirkati	<i>O. sativa: aus</i>	IRGC117885		4C/short
NSFTV369	Sathi	<i>O. sativa: aus</i>	IRGC117878		4C/short
NSFTV378	Kalubala_Vee	<i>O. sativa: aus</i>	IRGC117774		4C/short
NSFTV397	Cybonnet	<i>O. sativa: tropical japonica</i>	IRGC117699		4C/short
NSFTV402		<i>O. spontanea</i>	IRGC80539	India	4C/short
NSFTV410		<i>O. nivara</i>	IRGC80759	Myanmar	6C/med
NSFTV413		<i>O. nivara</i>	IRGC81850	India	6C/med
NSFTV415		<i>O. spontanea</i>	IRGC81909	India	6C/med
NSFTV416		<i>O. spontanea</i>	IRGC81970	Thailand	7C/long
NSFTV422		<i>O. rufipogon</i>		Vietnam	6C/med
NSFTV427		<i>O. rufipogon</i>		China	6C/med
NSFTV43	Dee_Geo_Woo_Gen	<i>O. sativa: indica</i>	IRGC117705		7C/long
NSFTV431		<i>O. rufipogon</i>	IRGC82992	China	6C/med
NSFTV432		<i>O. rufipogon</i>		Thailand	7C/long
NSFTV433		<i>O. rufipogon</i>	IRGC83795	India	4C/short
NSFTV435		<i>O. rufipogon</i>	IRGC86448	Thailand	6C/med
NSFTV438 (438_B2_1_S2)		<i>O. rufipogon</i>		India	7C/long
NSFTV443		<i>O. nivara</i>	IRGC93183	Nepal	6C/med
NSFTV444		<i>O. nivara</i>	IRGC93188	Nepal	6C/med
NSFTV446		<i>O. spontanea</i>	IRGC93224	Nepal	6C/med
NSFTV450		<i>O. nivara</i>	IRGC100916	China	6C/med
NSFTV453		<i>O. rufipogon</i>	IRGC103404	Bangladesh	7C/long
NSFTV457 (457_B3_1_S2)		<i>O. nivara</i>		Bangladesh	6C/med
NSFTV461 (461_A1_1_S2)		<i>O. rufipogon</i>		China	4C/short
NSFTV467		<i>O. RUFIPOGON</i>	IRGC104624	China	6C/med
NSFTV472		<i>O. SPONTANEA</i>	IRGC104636	China	7C/long
NSFTV477		<i>O. SPONTANEA</i>	IRGC104967	China	7C/long
NSFTV481		<i>O. NIVARA</i>	IRGC105343	India	6C/med
NSFTV482		<i>O. RUFIPOGON</i>	IRGC105349	India	6C/med
NSFTV483 (483_C2_1_S2)		<i>O. RUFIPOGON</i>		Thailand	6C/med
NSFTV487 (487_C2_S2)		<i>O. NIVARA</i>		Sri Lanka	6C/med
NSFTV490		<i>O. RUFIPOGON</i>		Japan	6C/med
NSFTV492		<i>O. RUFIPOGON</i>		Japan	6C/med
NSFTV493		<i>O. NIVARA</i>	IRGC105706	Nepal	6C/med
NSFTV494		<i>O. RUFIPOGON</i>	IRGC105711	India	6C/med
NSFTV495		<i>O. NIVARA</i>	IRGC105717	Cambodia	6C/med
NSFTV496		<i>O. RUFIPOGON</i>	IRGC105720	Cambodia	6C/med
NSFTV503		<i>O. RUFIPOGON</i>		Thailand	6C/med

Table S4. Germplasm information used for *RAE2* selective sweep analysis.

Accession ID	Name	Species: subpopulation	Germplasm Repository	Origin	RAE2 protein length class
NSFTV505 (505_A1_2_S2)		<i>O. RUFIOGON</i>		Thailand	6C/med
NSFTV508		<i>O. RUFIOGON</i>	IRGC105890	Bangladesh	6C/med
NSFTV509		<i>O. RUFIOGON</i>	IRGC105897	Bangladesh	7C/long
NSFTV51	Early_Wataribune	<i>O. sativa: temperate japonica</i>	IRGC117727		4C/short
NSFTV514		<i>O. RUFIOGON</i>	IRGC105956	Indonesia	6C/med
NSFTV549		<i>O. RUFIOGON</i>	IRGC81881	Indonesia	6C/med
NSFTV553		<i>O. RUFIOGON</i>	IRGC100926	Japan	7C/long
NSFTV555 (555_B1_1_S2)					6C/med
NSFTV56	Geumobyeyo	<i>O. sativa: temperate japonica</i>	IRGC117612		4C/short
NSFTV57	Gharib	<i>O. sativa: indica</i>	IRGC117739		7C/long
NSFTV592					6C/med
NSFTV600			IRGC100187		7C/long
NSFTV602			IRGC100900		6C/med
NSFTV605			IRGC100911		7C/long
NSFTV612	IR64	<i>O. sativa: indica</i>			7C/long
NSFTV620	Jasmine85	<i>O. sativa: indica</i>	IRGC125597		7C/long
NSFTV628	Jefferson	<i>O. sativa: tropical japonica</i>	IRGC126385		4C/short
NSFTV630	Saber	<i>O. sativa: tropical japonica</i>	IRGC126393		4C/short
RLS672	Minghui_63	<i>O. sativa: indica</i>	IRGC117271		7C/long
NSFTV665		<i>O. RUFIOGON/O. SATIVA</i>	IRGC100203	Taiwan	7C/long
NSFTV666		<i>O. RUFIOGON</i>	IRGC100211	Taiwan	6C/med
NSFTV669 (669_C2_3_S2)		<i>O. NIVARA</i>		Taiwan	6C/med
NSFTV673		<i>O. RUFIOGON</i>	IRGC100647	Taiwan	5C/med
NSFTV676 (676_A1_1_S2)		<i>O. RUFIOGON</i>		Taiwan	4C/short
NSFTV682		<i>O. RUFIOGON</i>	IRGC100904	Japan	6C/med
NSFTV7	Arias	<i>O. sativa: tropical japonica</i>	IRGC126381		7C/long
NSFTV701		<i>O. NIVARA/O. RUFIOGON</i>	IRGC103813	China	4C/short
NSFTV704		<i>O. RUFIOGON/O. NIVARA</i>	IRGC103818	China	4C/short
NSFTV708 (708_A1_2_S2)		<i>O. NIVARA</i>		Bangladesh	6C/med
NSFTV711		<i>O. NIVARA</i>	IRGC103841	Bangladesh	6C/med
NSFTV719 (719_A1)		<i>O. NIVARA</i>		France	6C/med
NSFTV720		<i>O. NIVARA</i>	IRGC104703	France	6C/med
NSFTV721					6C/med
NSFTV736 (736_B2_1_S2)					6C/med
NSFTV743 (743_C1_2_S2T)		<i>O. NIVARA</i>		Nepal	4C/short
NSFTV751		<i>O. NIVARA</i>	IRGC105895	Bangladesh	6C/med
NSFTV759 (759_A1_3_S2)		<i>O. RUFIOGON</i>		Cambodia	7C/long
NSFTV760		<i>O. NIVARA</i>	IRGC106345	Myanmar	6C/med
NSFTV762		<i>O. NIVARA</i>		Myanmar	5C/med
NSFTV765			W1943		6C/med
NSFTV767			W1945		6C/med
NSFTV81	Kalamkati	<i>O. sativa: aus</i>	IRGC117773		4C/short
NSFTV84	Kaniranga	<i>O. sativa: tropical japonica</i>	IRGC117776		7C/long
NSFTV85	Kasalath	<i>O. sativa: aus</i>	IRGC117617		4C/short
RLS29440	KUI_SALI	<i>O. sativa: aromatic</i>			4C/short
RLS49428	JC111	<i>O. sativa: aromatic</i>			4C/short
RLS29427	JC101	<i>O. sativa: aromatic</i>			4C/short
RLS5667	ARC_13523	<i>O. sativa: aromatic</i>			4C/short
RLS5669	Sathi_Basmati	<i>O. sativa: aromatic</i>			4C/short
RLS5665	Ambemohar	<i>O. sativa: aromatic</i>			4C/short
RLS29412	Basmati	<i>O. sativa: aromatic</i>			4C/short
RLS5670	Taraori_Basmati	<i>O. sativa: aromatic</i>			4C/short
RLS6303	Basmati_370	<i>O. sativa: aromatic</i>			4C/short
RLS29421	Sadri_Belyi	<i>O. sativa: aromatic</i>			4C/short
RLS29461	X9524	<i>O. sativa: aus</i>			4C/short
RLS29443	Khao_Gaew	<i>O. sativa: aus</i>			4C/short
RLS29426	Gie_57	<i>O. sativa: aus</i>			4C/short
RLS29437	BADAL89	<i>O. sativa: aus</i>			4C/short
RLS29464	Jhona349	<i>O. sativa: aus</i>			4C/short
RLS367	Chati_Kamma_Nangarhar	<i>O. sativa: aus</i>			4C/short

Table S4. Germplasm information used for *RAE2* selective sweep analysis.

Accession ID	Name	Species: subpopulation	Germplasm Repository	Origin	RAE2 protein length class
RLS29433	TD2	<i>O. sativa: indica</i>			7C/long
RLS29419	Leung_Prataew	<i>O. sativa: indica</i>			7C/long
RLS29431	Popot_165	<i>O. sativa: indica</i>			7C/long
RLS29418	Guan.Yin.Tsan	<i>O. sativa: indica</i>			7C/long
RLS29429	JC91	<i>O. sativa: indica</i>			7C/long
RLS5364	CO39	<i>O. sativa: indica</i>			7C/long
RLS930	Short_Grain	<i>O. sativa: indica</i>			7C/long
RLS29463	X9311	<i>O. sativa: indica</i>			7C/long
RLS460	IR8	<i>O. sativa: indica</i>			7C/long
RLS5316	Taichungsien17	<i>O. sativa: indica</i>			7C/long
RLS5317	Tainungsien20	<i>O. sativa: indica</i>			7C/long

Table S5. RAE2 variants across the five subpopulations of *O. sativa*.

Protein type	<i>tej</i>	<i>trj</i>	<i>aro</i>	<i>aus</i>	<i>ind</i>
Short (dysfunc.)	0.33	0.33	1.00	1.00	
Medium (func.)	0.33	0.18			
Long (dysfunc.)	0.33	0.55			1.00
n	6	11	6	6	12

Table S6. The list of SP-8 type protease expressed in the spikelet.

No.	Locus IDs	Chromosome location	Accession	FeatureNum (Link to graph)
1	LOC_Os01g17160	chr01	AK119444	36860
2	LOC_Os01g50680	chr01	-	5682
3	LOC_Os01g52750	chr01	AK108195	17131
4	LOC_Os01g56320	chr01	AK070376	37342
5	LOC_Os01g58240	chr01	AK109067	14086
6	LOC_Os01g58260	chr01	AF200467	30347
7	LOC_Os01g58270	chr01	-	1768
8	LOC_Os01g58280	chr01	AK066488	6645
9	LOC_Os01g58290	chr01	AK100351	18445
10	LOC_Os01g6485	chr01	-	-
11	LOC_Os01g64860	chr01	AK062271	19280
12	LOC_Os02g10520	chr02	AK120287	30014
			AK106394	40115
13	LOC_Os02g16940	chr02	-	8596
14	LOC_Os02g17000	chr02	AK110825	25369
15	LOC_Os02g17060	chr02	-	-
16	LOC_Os02g17080	chr02	-	-
17	LOC_Os02g17090	chr02	AK072092	42776
18	LOC_Os02g17150	chr02	-	35042
19	LOC_Os02g44520	chr02	AK103515	33598
			AK067099	34821
			AK066478	41274
20	LOC_Os02g44590	chr02	AB037371	19329
			AK072929	20201
			AK100551	21433
21	LOC_Os02g53850	chr02	-	16087
22	LOC_Os02g53860	chr02	AK106527	5667
			AK121728	42860
23	LOC_Os02g53910	chr02	-	-
24	LOC_Os02g53970	chr02	AK070669	30949
25	LOC_Os03g02750	chr03	AK069220	12951
26	LOC_Os03g04950	chr03	-	-
27	LOC_Os03g06290	chr03	AK071242	43120
28	LOC_Os03g13930	chr03	-	39736
29	LOC_Os03g31630	chr03	-	37303
30	LOC_Os03g40830	chr03	AK105749	29457
31	LOC_Os03g55350	chr03	AK101646	22817
			AK103255	31812
32	LOC_Os04g02960	chr04	CI260116	1713
33	LOC_Os04g02980	chr04	-	4178
34	LOC_Os04g03060	chr04	-	16547
35	LOC_Os04g03100	chr04	-	26338
36	LOC_Os04g03710	chr04	-	-
37	LOC_Os04g03800	chr04	-	-
38	LOC_Os04g03810	chr04	AK062269	23506
39	LOC_Os04g03850	chr04	-	-
40	LOC_Os04g10360	chr04	CB653384	32192
41	LOC_Os04g35140	chr04	AK105112	5780
42	LOC_Os04g45960	chr04	AK106823	12015
			AY644644	15417
			AY683198	21133
43	LOC_Os04g47150	chr04	AK100861	1851
44	LOC_Os04g47160	chr04	-	23449
45	LOC_Os04g48420	chr04	-	-
46	LOC_Os05g30580	chr05	AK064686	5180
47	LOC_Os05g36010	chr05	AK067138	31360
48	LOC_Os06g06800	chr06	-	-
49	LOC_Os06g06810	chr06	AK071415	24262
50	LOC_Os06g40700	chr06	AK109185	4261
51	LOC_Os06g41880	chr06	-	39167
52	LOC_Os06g48650	chr06	AK102835	3665
53	LOC_Os07g39020	chr07	AK107610	24754
54	LOC_Os07g48650	chr07	AK119348	41308
55	LOC_Os08g23740	chr08	-	-
56	LOC_Os08g35090	chr08	CI043104	38603
57	LOC_Os09g26920	chr09	CI383807	8743
58	LOC_Os09g30250	chr09	CI269495	4777
59	LOC_Os09g36110	chr09	-	16075
60	LOC_Os10g25450	chr10	CI191448	30831
61	LOC_Os10g38080	chr10	AK069238	21727
62	LOC_Os11g15520	chr11	AK110921	33825
63	LOC_Os12g23980	chr12	-	23981

Table S7. Primers used in this study.

Purpose	name	Sequence (5' → 3')
Linkage mapping of RAE2	8KG23941	CACGCTTGTAAAGGCTGAGTT ATTCCGTATCCGAAAACCTC
	8KG23994	TGGAACAACGTGAGATTGTC GTTCTGATCAGATTGTTGC
	8KG23999	CATCCATCAACATGTCGTCCG CGCCATGTATAGTGTGATTCCG
	8KG24021	TATCCTTCTTGGGTTCTTGC TGAATGTGGTGCATTTTCATC
BAC screening	pk31	GCACCTCAGCCTGGTTTCAAG
	pk32	GTAGTAGTTTGGTTGTTCTCTTGC
RAE2 promoter sequencing	KU42	CCAAGATGACAGCATGCTACTG
	KU43	CCAATTCTTTGTAACAAAGGGTAG
RAE2 coding region cloning	KU32	CACCATGAGGACGGCGGCCACGCCCT
	KU35	TCAGGGGTCGAACAGGGC
RAE2 RNAi construct	RNAi-F	CACCGATAGATTCCGTGTAATAT
	RNAi-R	ATATTACCGGAATCTATC
qRT-PCR of RAE2	KU37	ATTTTGACCAGACCACCTCG
	KU38	CGCCCAGCTACTTATACCCA
qRT-PCR of ACT1	ACT1 RT-f	GGATCCATCTTGGCATCTCTCA
	ACT1 RT-r	GGGCCAGACTCGTCTACTC
qRT-PCR of UBQ5	UBQ5 RT-f	AAACCCTAACGGGGAAGACCATAA
	UBQ5 RT-r	CCACAGTAATGGCGATCAAATGA
in situ probe of RAE2	in situ-f	AGCTTCTTGGTAGGCGAGGTGT
	in situ-r	GAAGAAGACGGCGAGGAGGA
3xFLAG primer	KU71	CGACCATGGGATTACAAGGATGACGACGATAAGGACTATAAGGACGATGATGACAAGGATTACAAAGATG
	KU72	CGACCATGGTTTATCGTCATCATCTTTGTAATCCTTGTTCATCATCGTCCTTATAGTCCTTATCGTCGTCA
pACT::RAE2-3xFLAG	KU73	ATGTCTAGAATGAGGACGGCGGCCACGCC
	KU75	CTAAGCTTACGGGGTCGAACAGGCGGTTCGC
recombinant RAE2 pro-peptide	PRO-f	CCGATATCAGGCTCCCTCCTCCTCGC
	PRO-r	GGTGCTCGAGCTACCATGGTTTATCGTCAT
recombinant RAE2 mature peptide	MA-f	GATCGGATCCCGGCTGGGGTCGAGCCCCGC
	MA-r	CCCAAGCTTTCAGGGGTCGAAC
Alanine substituted construct #1	KU132	GAGGAGAAGGTGCGGGCGGGCGGGCGGGGAGCTGCTACAGCAAGTGC
	KU133	CCCGTAGCACTTGTGTAGCAGCTCGCCGCCGCCGCCGCCGCCGCCACCTTCTC
Alanine substituted construct #2	KU111	GGGGAGGAGGAGGCGGCGCGCTGGGGTTCG
	KU112	CAGCCGCGCCGCTCCTCCTCCCCAGCCAC
Alanine substituted construct #3	KU113	GAGGAGGAGAAGGCGGCGCTGGGGTTCGAGC
	KU114	CCCCAGCGCCGCTTCTCCTCCTCCCCAGC
Alanine substituted construct #4	KU121	GCTGTAGCAGCTCGCCGCGCTCGACCCAG
	KU122	CTCGACCCAGCCGACCCGCCGCCGCCCTCCCCAGC
SLP1 cloning	KU127	CACCATGCAGACTTATGTGATCGTCTTTG
	KU139	GGAATTCCCTACCCGAGGTGCTCTTG
	KU144	CGTGTCCTTACAACATAATGTCC
semi qRT-PCR of SLP1	KU146	GATCTTGCCGCTGTGCTTGTGTC
	FLAG-f	CCAGCAGGGAGGTACTATGCAGACTTATGTGATCGT
in vitro translation of SLP1	FLAG-r	CCTTATGGCCGATCCAAGAGCTCTTTTTTTTTTACCCGAGGTGCTCTTG