

Supplementary Tables

Table S1 Distribution of material subgroups and maturity group of World Soybean Germplasm Population (WSGP)

Sub-population n	MG-set			Total
	E	P	L	
A	24	51		75
B	2	49		51
C		24	22	46
D	5	107	5	117
O		62	3	65
WSGP	31	293	30	354

Note: “O” represents the center of origin; “A” represents Northeast China (NCHN), Far-East of Russia (RUF) and southern Sweden (SSWE); “B” represents the Korea Peninsular (KORP) and Japan Islands (JPAN); “C” represents Southeast Asia (SEAS), South Asia (SASI) and Africa (AFRI); “D” represents northern North America (NNAM), southern North America (SNAM) and Central and South America (CSAM); “E” represents the early MG-set (MG 000~0); “P” represents the primary MG-set (MG I~VII), “L” represents the late MG-set (MG VIII~X).

Table S2 Source information of the tested varieties in the World Soybean Germplasm Population (WSGP)

Variety code	Country source	Geo-pop.	MG-set	Variety code	Country source	Geo-pop.	MG-set
N24136.000	China	A	P	N25306	China	A	P
N24571.000	Russia	A	P	N27107	Sweden	A	E
N24782.000	South Korea	B	P	N23816.000	Japan	B	P
N27113	America	D	P	N24813.000	South Korea	B	P
N27114	America	D	P	N27108	Brazil	D	P
N23729.000	China	A	P	N24788.000	Indonesia	C	L
N27282	America	D	P	N27109	America	D	P
N27116	America	D	P	N23823.000	Japan	B	P
N24586.000	Russia	A	P	N27110	Sweden	A	E
N27258	America	D	P	N27111	America	D	P
N27118	America	D	P	N24767.000	Russia	A	P
N27294	Sweden	A	E	N23825.000	Japan	B	P
N25318	China	A	P	N24764.000	Nepal	C	L
N27279	America	D	P	N23824.000	Japan	B	P
N27274	America	D	P	N24793.000	Nepal	C	P
N27273	America	D	P	N24807.000	Indonesia	C	P
N24775.000	Thailand	C	L	N23822.000	Japan	B	P
N24759.000	Russia	A	P	N23819.000	Japan	B	P
N27265	America	D	P	N01225.000	America	D	P
N27275	America	D	P	N24584.000	Russia	A	P
N27263	America	D	P	N27115	America	D	P
N27262	America	D	P	N24791.000	Thailand	C	L
N27296	Sweden	A	E	N27117	Sweden	A	E
N27266	America	D	P	N27119	America	D	P
N27152	Sweden	A	E	N24787.000	Myanmar	C	P
N01228.000	China	O	P	N24698.000	South Korea	B	P
N24878.000	Japan	B	P	N24686.000	Russia	A	P
N27280	America	D	L	N24768.000	Russia	A	P
N24808.000	Pakistan	C	L	N06653.000	Mexico	D	P
N23820.000	Japan	B	P	N24876.000	America	D	P
N25109	America	D	P	N27121	America	D	P
N27281	America	D	E	N24728.000	Russia	A	P
N27277	America	D	P	N27090	Brazil	D	P
N27284	America	D	P	N24785.000	South Korea	B	P
N24797.000	Myanmar	C	P	N27122	Brazil	D	P
N01261.000	South Korea	B	P	N27123	America	D	P
N27285	America	D	P	N27091	America	D	P
N24817.000	Vietnam	C	P	N24771.000	Thailand	C	L
N27264	America	D	P	N24862.000	America	D	P
N27176	America	D	P	N23813.000	Japan	B	P
N27298	China	A	E	N27125	America	D	P
N27299	China	A	E	N27126	Brazil	D	P
N27300	China	A	E	N27127	Brazil	D	P
N27301	China	A	E	N27128	Japan	B	P
N27303	China	A	E	N24585.000	Russia	A	P
N27304	China	A	E	N24802.000	Thailand	C	L
N27305	China	A	E	N27129	Brazil	D	P
N27270	America	D	P	N27092	America	D	P
N27101	Japan	B	P	N24865.000	Japan	B	P
N27276	America	D	P	N27130	America	D	P
N27286	America	D	P	N27132	Brazil	D	P
N27373	China	O	P	N27133	America	D	P
N27374	China	O	P	N27134	Japan	B	P
N07682.100	China	A	E	N24776.000	Philippine	C	L
N24695.000	Russia	A	P	N07357.000	Sri Lanka	C	P
N27259	America	D	P	N24710.000	Russia	A	P
N27278	America	D	P	N07360.000	Sri Lanka	C	P
N27260	America	D	E	N27135	Sweden	A	E
N25168	China	O	P	N24786.000	South Korea	B	P

N27414	China	O	L	N27136	Sweden	A	E
N27415	China	O	P	N23827.000	Japan	B	P
N27418	China	O	L	N27137	Brazil	D	P
N27245	Canada	D	E	N27093	Sweden	A	E
N27256	Canada	D	E	N27138	Brazil	D	P
N24818.000	North Korea	B	P	N24805.000	Indonesia	C	P
N27272	America	D	P	N06589.000	Vietnam	C	P
N27247	Canada	D	P	N27139	America	D	P
N27288	America	D	P	N27140	America	D	P
N27253	America	D	P	N27141	America	D	P
N27255	Canada	D	E	N24859.000	America	D	P
N27242	America	D	P	N24815.000	Vietnam	C	P
N27267	America	D	P	N24563.000	North Korea	B	P
N27246	America	D	P	N24784.000	South Korea	B	P
N27243	America	D	P	N01343.000	Japan	B	P
N27254	America	D	P	N27143	Sweden	A	E
N27257	America	D	P	N23821.000	Japan	B	P
N27292	America	D	P	N07359.000	Sri Lanka	C	L
N27252	America	D	P	N24779.000	Nepal	C	L
N27293	America	D	P	N27144	America	D	L
N27261	America	D	P	N24871.000	Mozambique	C	L
N27290	America	D	P	N24781.000	Zaire	C	L
N27241	America	D	P	N23992.000	Japan	B	P
N27289	America	D	P	N24798.000	Philippine	C	L
N27251	America	D	P	N27145	America	D	P
N27240	South Korea	B	P	N08661.100	Myanmar	C	P
N27271	America	D	P	N23826.000	Japan	B	P
N25220	China	A	P	N27094	Brazil	D	P
N27283	America	D	P	N27147	Brazil	D	P
N08855.000	China	O	P	N22996.000	South Africa	C	P
N000611.110	China	O	P	N27148	Japan	B	P
N23682.000	China	O	P	N27149	America	D	P
N03343.000	China	O	P	N24872.000	Japan	B	E
N25430	China	O	P	N24774.000	Thailand	C	L
N25363	China	O	P	N24795.000	Malaysia	C	L
N25130	China	O	P	N24772.000	Nepal	C	L
N25147	China	O	P	N27150	America	D	P
N25299	China	O	P	N27151	Brazil	D	P
N05126.000	China	O	P	N24573.000	Russia	A	P
N22492.000	China	O	P	N27088	America	D	P
N02229.000	China	O	P	N24819.000	India	C	P
N21295.000	China	O	P	N24866.000	Tanzania	C	L
N25499	China	O	P	N01244.000	America	D	L
N25267	China	O	P	N27153	America	D	P
N25287	China	O	P	N27154	Brazil	D	P
N23748.000	China	O	P	N06620.000	Vietnam	C	P
N23563	China	O	P	N27156	Brazil	D	P
N05458.000	China	O	P	N27157	Brazil	D	P
N23569.000	China	O	P	N23814.000	Japan	B	P
N23617	China	O	P	N24696.000	Russia	A	P
N25134	China	O	P	N23912.000	Japan	B	P
N25293	China	O	P	N24572.000	Russia	A	E
N04930.100	China	O	P	N27158	Brazil	D	P
N25158	China	O	P	N24706.000	South Korea	B	E
N00013.100	China	O	P	N27159	America	D	P
N25225	China	O	P	N27097	America	D	P
N25169	China	O	P	N24810.000	Malaysia	C	L
N25135	China	O	P	N24792.000	Thailand	C	L
N04978.000	China	O	P	N27098	America	D	P
N25274	China	O	P	N27160	Japan	B	P
N09955.000	China	O	P	N27163	Japan	B	P
N25461	China	O	P	N24726.000	Russia	A	P
N23970.000	China	O	P	N24875.000	America	D	P
N09120.000	China	O	P	N27164	Sweden	A	E

N01599.100	China	O	P	N27165	Brazil	D	P
N23568.000	China	O	P	N27166	America	D	P
N02951.100	China	O	L	N24868.000	Indonesia	C	P
N21478.000	China	O	P	N27167	Sweden	A	P
N07384.000	China	O	P	N27168	Brazil	D	P
N21266.000	China	O	P	N01316.000	Japan	B	P
N05461.000	China	O	P	N06603.000	Nigeria	C	P
N00667.000	China	O	P	N27169	America	D	P
N22503.000	China	O	P	N24770.000	Zaire	C	L
N09117.000	China	O	P	N27170	America	D	P
N22308.000	China	O	P	N27171	America	D	P
N25339	China	O	P	N24732.000	Russia	A	P
N25404	China	O	P	N24867.000	Venezuela	D	L
N23688.000	China	O	P	N24803.000	Pakistan	C	P
N25226	China	O	P	N27172	America	D	P
N06144.000	China	O	P	N24719.000	Russia	A	P
N25511	China	O	P	N24814.000	Vietnam	C	P
N07917.000	China	O	P	N24763.000	South Korea	B	P
N070381.100	China	O	P	N23812.000	Japan	B	P
N25489	China	O	P	N27099	America	D	P
N25353	China	O	P	N27173	Japan	B	P
N23774.000	China	O	P	N27174	America	D	P
N25281	China	O	P	N27175	Sweden	A	E
N24391	China	A	E	N27177	America	D	P
N24392.000	China	A	P	N27178	Brazil	D	P
N24385.000	China	A	P	N27100	Japan	B	P
N24406.000	China	A	P	N23818.000	Japan	B	P
N25178	China	A	E	N24812.000	Myanmar	C	P
N25186	China	A	E	N24816.000	South Korea	B	P
N25206	China	A	P	N24883.000	America	D	P
N25200	China	A	P	N27102	Brazil	D	P
N25223	China	A	P	N06575.000	Nigeria	C	P
N25251	China	A	P	N24864.000	Brazil	D	L
N25262	China	A	P	N27103	Brazil	D	P
N25417	China	A	P	N27104	Brazil	D	P
N25421	China	A	P	N24780.000	South Korea	B	P
N25255	China	A	P	N23955.000	Japan	B	P
N25369	China	A	P	N24806.000	Philippine	C	L
N08814.000	China	A	P	N24801.000	India	C	P
N01133.000	China	A	P	N24576.000	Russia	A	P
N01102.000	China	A	P	N01216.000	Japan	B	P
N24418.000	China	A	P	N24773.000	Thailand	C	P
N24419.000	China	A	P	N23817.000	Japan	B	P
N25309	China	A	P	N24799.000	India	C	P
N25312	China	A	P	N24769.000	Philippine	C	L
N25314	China	A	P	N27105	America	D	P
N25315	China	A	P	N01242.000	America	D	P
N25319	China	A	P	N24565.000	North Korea	B	P
N25320	China	A	P	N24748.000	South Korea	B	P
N25321	China	A	P	N24863.000	America	D	P
N25302	China	A	P	N01207.000	Japan	B	P
N25303	China	A	P	N24796.000	Nepal	C	P
N25304	China	A	P	N24874.000	South Korea	B	P
N25305	China	A	P	N24783.000	South Korea	B	P

Note: Geo-pop.: Geographic groups; MG-set: maturity group set. “O” represents the center of origin; “A” represents Northeast China (NCHN), Far-East of Russia (RUFE) and southern Sweden (SSWE); “B” represents the Korea Peninsular (KORP) and Japan Islands (JPAN); “C” represents Southeast Asia (SEAS), South Asia (SASI) and Africa (AFRI); “D” represents northern North America (NNAM), southern North America (SNAM) and Central and South America (CSAM). “E” represents the early MG-set (MG 000~0); “P” represents the primary MG-set (MG I ~ VII), “L” represents the late MG-set (MG VIII~X).

Table S3 Analysis of variance of growth period traits, accumulative day length and accumulative active temperature in the World Soybean Germplasm Population (WSGP)

SV	DSF				ADL _{DSF}				AAT _{DSF}			
	DF	MS	F-value	h ² (%)	DF	MS	F-value	h ² (%)	DF	MS	F-value	h ² (%)
Env	3	50025.6331	552.91**		3	10211424	509.91**		3	5896359	118.41**	
Blk(env)	7	10.3732	3.7**		7	1694.47	3.32**		7	7736.84	3.60**	
Geno	352	2784.744	34.25**	95.7	352	575815	31.18**	95.8	352	2193250	50.66**	99.2
Geno×Env	1049	83.1646	29.63**	4.2	1049	18897	37.06**	4.1	1053	44218	20.57**	0.7
Error	2445	2.806			2445	509.8			2458	2149.8		
Total	3856				3856				3873			
SV	DFM				ADL _{DFM}				AAT _{DFM}			
	DF	MS	F-value	h ² (%)	DF	MS	F-value	h ² (%)	DF	MS	F-value	h ² (%)
Env	3	124848.0241	308.38**		3	31839234	428.52**		3	95422994	278.75**	
Blk(env)	7	46.5576	2.95**		7	10153	3.83**		7	28778	3.15**	
Geno	352	2673.5605	7.27**	80.7	352	383060	5.84**	78.5	352	1332370	4.21**	70.9
Geno×Env	1044	376.6775	23.9**	18.8	1048	67289	25.37**	20.9	1048	324005	35.42**	29.0
Error	2411	15.759			2413	2652.5			2426	9147		
Total	3817				3823				3836			

Note: SV: Source of variation; DSF: days from sowing to flowering; ADL_{DSF}: DSF required accumulative day length; AAT_{DSF}: DSF required accumulative active temperature; DFM: days from flowering to maturity; ADL_{DFM}: DFM required accumulative day length; AAT_{DFM}: DFM required accumulative active temperature; DF: degree of freedom; MS: mean square; h²: heritability value calculated from the ANOVA; **indicate significance level at $\alpha=0.01$ in *F*-test.

Table S4 Regression analysis of variance of growth period traits, accumulative day length and accumulative active temperature

SV	Geographic subpopulation / MG-set subpopulation											
	Total				O				A			
	DF	MS	F-value	P-value	DF	MS	F-value	P-value	DF	MS	F-value	P-value
ADL _{DSF} (x ₁)	1	13.37	87.90	<0.0001	1	1.43	40.18	<0.0001	1	3.55	60.88	<0.0001
AAT _{DSF} (x ₂)	1	15.74	103.49	<0.0001	1	0.75	21.07	<0.0001	1	1.24	21.32	<0.0001
(x ₁ ×x ₂) _{DSF}	1	6.01	39.51	<0.0001	1	2.69	75.68	<0.0001	1	0.45	7.71	0.0070
Error	349	0.15			61	0.04			71	0.06		
Total	352				64				74			
B				C				D				
ADL _{DSF} (x ₁)	1	1.99	30.79	<0.0001	1	0.05	0.08	0.7739	1	2.45	33.9	<0.0001
AAT _{DSF} (x ₂)	1	0.01	0.08	0.7745	1	9.03	15.06	0.0004	1	1.09	15.12	0.0002
(x ₁ ×x ₂) _{DSF}	1	0.35	5.41	0.0244	1	0.15	0.26	0.6153	1	1.94	26.85	<0.0001
Error	47	0.06			41	0.60			113	0.07		
Total	50				44				116			
E				P				L				
ADL _{DSF} (x ₁)	1	0.30	6.75	0.015	1	7.04	56.62	<0.0001	1	0.07	0.12	0.7309
AAT _{DSF} (x ₂)	1	0.12	2.59	0.1194	1	10.27	82.56	<0.0001	1	3.90	7.18	0.0126
(x ₁ ×x ₂) _{DSF}	1	3.9E-05	0.00	0.9768	1	1.58	12.72	0.0004	1	0.62	1.14	0.2951
Error	27	0.05			288	0.12			26	0.54		
Total	30				291				29			
Total				O				A				
ADL _{DFM} (x ₃)	1	1855.94	909.77	<0.0001	1	136.15	78.62	<0.0001	1	0.21	0.12	0.7263
AAT _{DFM} (x ₄)	1	243.63	119.42	<0.0001	1	14.69	8.48	0.005	1	4.66	2.72	0.1038
(x ₃ ×x ₄) _{DFM}	1	11.59	5.68	0.0177	1	0.80	0.46	0.5002	1	8.44	4.91	0.0298
Error	349	2.04			61	1.73			71	1.72		
Total	352				64				74			
B				C				D				
ADL _{DFM} (x ₃)	1	81.59	53.34	<0.0001	1	100.85	92.09	<0.0001	1	272.27	350.34	<0.0001
AAT _{DFM} (x ₄)	1	31.14	20.36	<0.0001	1	4.60	4.2	0.0468	1	53.78	69.2	<0.0001
(x ₃ ×x ₄) _{DFM}	1	0.08	0.05	0.8223	1	1.16	1.06	0.3092	1	3.20	4.12	0.0448
Error	47	1.53			41	1.10			113	0.78		
Total	50				44				116			
E				P				L				
ADL _{DFM} (x ₃)	1	0.11	0.06	0.8143	1	780.92	397.31	<0.0001	1	37.42	43.69	<0.0001
AAT _{DFM} (x ₄)	1	1.68	0.87	0.3593	1	197.08	100.27	<0.0001	1	1.90	2.21	0.1488
(x ₃ ×x ₄) _{DFM}	1	2.03	1.05	0.3143	1	2.91	1.48	0.2251	1	0.18	0.21	0.6468
Error	27	1.93			288	1.97			26	0.86		
Total	30				291				29			

Note: SV: Source of variation; ADL_{DSF}: DSF required accumulative day length; AAT_{DSF}: DSF required accumulative active temperature; DFM: days from flowering to maturity; ADL_{DFM}: DFM required accumulative day length; AAT_{DFM}: DFM required accumulative active temperature; (x₁×x₂)_{DSF} represents the interaction between ADL and AAT for DSF; (x₃×x₄)_{DFM} represents the interaction between ADL and AAT for DFM. DF: degree of freedom; MS: mean square.

“O” represents the center of origin; “A” represents Northeast China (NCHN), Far-East of Russia (RUFE) and southern Sweden (SSWE); “B” represents the Korea Peninsular (KORP) and Japan Islands (JPAN); “C” represents Southeast Asia (SEAS), South Asia (SASI) and Africa (AFRI); “D” represents northern North America (NNAM), southern North America (SNAM) and Central and South America (CSAM); “E” represents the early MG-set (MG 000~0); “P” represents the primary MG-set (MG I~VII), “L” represents the late MG-set (MG VIII~X).

Table S5 Estimation of parameters in regression of growth period traits on accumulative day length and accumulative active temperature

Variable	Geographic subpopulation / MG-set subpopulation								
	Total			O			A		
	Parameter estimate	Standard error	t-value	Parameter estimate	Standard error	t-value	Parameter estimate	Standard error	t-value
Intercept	-0.7755	0.2016	-3.85	1.9149	0.5032	3.81	2.4344	1.2132	2.01
ADL _{DSF} (X ₁)	0.0298	0.0032	9.38**	0.0309	0.0049	6.34**	0.0318	0.0041	7.8**
AAT _{DSF} (X ₂)	0.0178	0.0018	10.17**	0.013	0.0028	4.59**	0.0096	0.0021	4.62**
(X ₁ ×X ₂) _{DSF}	1.1E-06	1.8E-07	6.29**	4.4E-06	5.1E-07	8.7**	9.3E-06	3.3E-06	2.78**
	B			C			D		
Intercept	0.5861	0.6772	0.87	-0.9358	2.7861	-0.34	-0.6872	0.3497	-1.97
ADL _{DSF} (X ₁)	0.0589	0.0106	5.55**	-0.0042	0.0146	-0.29	0.0372	0.0064	5.82**
AAT _{DSF} (X ₂)	0.0016	0.0055	0.29	0.0353	0.0091	3.88**	0.0138	0.0035	3.89**
(X ₁ ×X ₂) _{DSF}	2.0E-06	8.4E-07	2.33*	8.3E-07	1.6E-06	0.51	1.6E-06	3.1E-07	5.18**
	E			P			L		
Intercept	-1.0249	5.8403	-0.18	-1.0179	0.2546	-4	2.3646	4.6630	0.51
ADL _{DSF} (X ₁)	0.0411	0.0158	2.6*	0.0287	0.00386	7.52**	0.0065	0.0186	0.35
AAT _{DSF} (X ₂)	0.0134	0.0083	1.61	0.01877	0.0021	9.09**	0.0268	0.0101	2.68*
(X ₁ ×X ₂) _{DSF}	-6.3E-07	2.2E-05	-0.03	9.5E-07	2.7E-07	3.57**	2.3E-06	2.1E-06	1.07
	Total			O			A		
Intercept	-18.7483	4.6149	-4.06	-15.0090	14.0627	-1.07	11.4159	12.9932	0.88
ADL _{DFM} (X ₃)	0.1477	0.0049	30.16**	0.1338	0.0151	8.87**	-0.0099	0.0283	-0.35
AAT _{DFM} (X ₄)	-0.0261	0.0024	-10.93**	-0.0209	0.0072	-2.91*	0.0195	0.0118	1.65
(X ₃ ×X ₄) _{DFM}	-4.7E-06	2.0E-06	-2.38*	-4.0E-06	5.9E-06	-0.68	1.5E-05	6.6E-06	2.22*
	B			C			D		
Intercept	-6.5911	8.7876	-0.75	-16.8950	13.3524	-1.27	-23.1280	6.9785	-3.31
ADL _{DFM} (X ₃)	0.1250	0.0171	7.3**	0.1264	0.0132	9.6**	0.1530	0.0082	18.72**
AAT _{DFM} (X ₄)	-0.0240	0.0053	-4.51**	-0.0138	0.0067	-2.05*	-0.0257	0.0031	-8.32**
(X ₃ ×X ₄) _{DFM}	-9.7E-07	4.3E-06	-0.23	-5.6E-06	5.4E-06	-1.03	-5.9E-06	2.9E-06	-2.03*
	E			P			L		
Intercept	56.5449	58.0646	0.97	-13.0944	5.9102	-2.22	-6.3590	12.0665	-0.53
ADL _{DFM} (X ₃)	0.0166	0.0699	0.24	0.1461	0.0073	19.93**	0.1089	0.0165	6.61*
AAT _{DFM} (X ₄)	-0.0379	0.0406	-0.93	-0.0298	0.0030	-10.01**	-0.0130	0.0088	-1.49
(X ₃ ×X ₄) _{DFM}	3.5E-05	3.4E-05	1.03	-3.1E-06	2.5E-06	-1.22	-2.2E-06	4.8E-06	-0.46

Note: DSF: days from sowing to flowering; ADL_{DSF}: DSF required accumulative day length; AAT_{DSF}: DSF required accumulative active temperature; DFM: days from flowering to maturity; ADL_{DFM}: DFM required accumulative day length; AAT_{DFM}: DFM required accumulative active temperature. “O” represents the center of origin; “A” represents Northeast China (NCHN), Far-East of Russia (RUFE) and southern Sweden (SSWE); “B” represents the Korea Peninsular (KORP) and Japan Islands (JPAN); “C” represents Southeast Asia (SEAS), South Asia (SASI) and Africa (AFRI); “D” represents northern North America (NNAM), southern North America (SNAM) and Central and South America (CSAM); “E” represents the early MG-set (MG 000~0); “P” represents the primary MG-set (MG I~VII), “L” represents the late MG-set (MG VIII~X).

Table S6 Variation of growth period traits, accumulative day length and accumulative active temperature in genetic clusters of the World Soybean Germplasm Population (WSGP)

Trait	Genetic cluster	Class midpoint value (frequency)												N	Mean	GCV(%)	Range
ADL _{DSF} (d•h)	(PDL _{DSF} %)	<320	370	470	570	670	770	870	970	1070	1170	>1220					
i(29.7 ^B)		0	0	1	0	0	0	0	0	0	0	0	1	448.0 ^B	/		448.0-448.0
ii(33.5 ^{BA})		0	2	2	1	3	1	0	0	0	1	0	10	611.5 ^{BA}	37.3		365.0-1138.0
iii(33.1 ^{BA})		0	0	2	4	1	1	0	0	0	0	0	8	577.4 ^B	19.6		444.0-814.0
iv(28.5 ^B)		0	3	3	0	0	0	0	0	0	0	0	6	423.0 ^B	6.6		381.0-458.0
v(40.0 ^A)		0	1	11	29	17	7	3	8	6	14	8	104	794.9 ^A	35.5		399.0-1382.0
vi(32.5 ^{BA})		0	2	5	6	4	0	0	0	0	0	0	17	535.1 ^{BA}	17.5		359.0-693.0
vii(32.0 ^{BA})		3	17	14	8	3	4	2	0	0	0	0	51	490.7 ^B	30.4		313.0-876.0
viii(31.4 ^{BA})		2	55	37	5	24	27	3	1	2	0	0	156	536.0 ^{BA}	33.3		312.0-1099.0
AAT _{DSF} (d•°C)	(PAT _{DSF} %)	<650	760	980	1200	1420	1640	1860	2080	2300	2520	>2630					
i(30.1 ^B)		0	0	1	0	0	0	0	0	0	0	0	1	888.0 ^B	/		888.0-888.0
ii(33.8 ^{BA})		0	3	1	3	2	0	0	1	0	0	0	10	1176.2 ^{BA}	32.7		737.0-2000.0
iii(33.3 ^{BA})		0	1	2	4	0	1	0	0	0	0	0	8	1125.1 ^{BA}	19.0		869.0-1562.0
iv(28.7 ^B)		0	4	2	0	0	0	0	0	0	0	0	6	832.2 ^B	7.4		725.0-894.0
v(41.1 ^A)		0	4	15	29	17	3	8	6	14	3	5	104	1552.1 ^A	35.5		805.0-2726.0
vi(32.6 ^{BA})		0	3	8	4	2	0	0	0	0	0	0	17	1044.6 ^{BA}	17.0		725.0-1347.0
vii(32.4 ^{BA})		4	19	13	7	6	2	0	0	0	0	0	51	961.4 ^B	29.0		623.0-1683.0
viii(32.0 ^{BA})		2	70	23	12	37	9	1	1	1	0	0	156	1049.8 ^{BA}	32.2		628.0-2203.0
ADL _{DFM} (d•h)	(PDL _{DFM} %)	<720	760	840	920	1000	1080	1160	1240	1320	1400	>1440					
i(70.3 ^{BA})		0	0	0	0	0	1	0	0	0	0	0	1	1062.0 ^A	/		1062.0-1062.0
ii(66.5 ^{BA})		0	0	1	1	1	2	0	0	3	1	1	10	1173.0 ^A	18.6		834.0-1458.0
iii(66.0 ^{BA})		0	0	2	0	0	0	0	3	3	0	0	8	1169.5 ^A	16.6		851.0-1309.0
iv(71.5 ^A)		0	0	0	1	2	0	1	2	0	0	0	6	1070.8 ^A	13.8		880.0-1234.0
v(60.0 ^B)		0	0	7	10	8	17	15	24	12	10	1	104	1152.8 ^A	14.4		834.0-1479.0
vi(67.5 ^{BA})		0	0	1	2	3	5	2	1	2	1	0	17	1107.4 ^A	14.3		808.0-1419.0
vii(68.0 ^{BA})		3	14	2	0	7	5	4	3	3	8	2	51	1036.9 ^A	25.2		652.0-1476.0
viii(68.6 ^{BA})		0	12	12	16	13	11	23	18	26	20	5	156	1138.1 ^A	18.3		731.0-1478.0
AAT _{DFM} (d•°C)	(PAT _{DFM} %)	<1400	1470	1610	1750	1890	2030	2170	2310	2450	2590	>2660					
i(69.9 ^A)		0	0	0	0	0	1	0	0	0	0	0	1	2066.0 ^A	/		2066.0-2066.0
ii(66.2 ^{BA})		0	0	1	1	0	2	1	0	1	3	1	10	2241.1 ^A	16.9		1612.0-2687.0
iii(66.7 ^{BA})		0	0	1	1	0	0	0	1	4	1	0	8	2258.0 ^A	15.7		1667.0-2524.0
iv(71.3 ^A)		0	0	0	1	2	0	1	0	2	0	0	6	2086.0 ^A	13.9		1708.0-2411.0
v(58.9 ^B)		0	4	8	13	8	10	12	13	17	13	6	104	2160.4 ^A	16.4		1437.0-2733.0
vi(67.4 ^{BA})		0	0	1	1	1	4	5	1	2	2	0	17	2150.4 ^A	13.3		1547.0-2650.0
vii(67.6 ^{BA})		5	11	2	1	6	4	3	5	3	7	4	51	1992.5 ^A	24.3		1252.0-2721.0
viii(68.0 ^{BA})		0	12	10	10	21	8	14	19	34	19	9	156	2175.0 ^A	17.3		1419.0-2755.0

Note: ADL_{DSF}: DSF required accumulative day length; AAT_{DSF}: DSF required accumulative active temperature; ADL_{DFM}: DFM required accumulated day-length; AAT_{DFM}: DFM required accumulative active temperature.

PDL_{DSF}: Percentage of accumulated day-length during DSF to that in a life cycle; PAT_{DSF}: Percentage of accumulative active temperature during DSF to that in a life cycle; PDL_{DFM}: Percentage of accumulative day length during DFM to that in a life cycle; PAT_{DFM}: Percentage of accumulative active temperature during DFM to that in a life cycle. *N*: the number of accessions; *GCV*: genotypic coefficient of variation. The superscripts of A and B indicate multiple comparisons.

Supplementary Figure

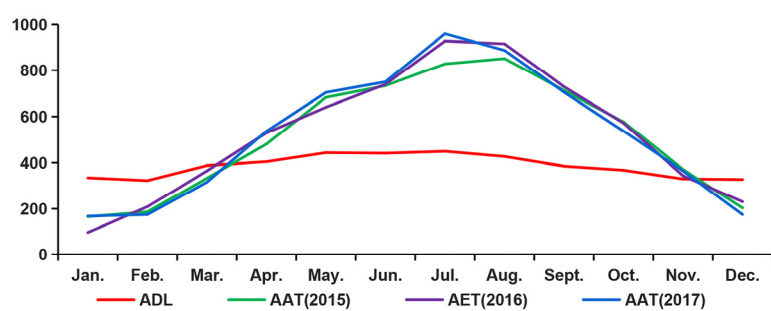


Figure S1 Variation of accumulative day length (ADL) and accumulative active temperature (AAT) among months in experiments site in 2015, 2016 and 2017.

Note: The ADLs were the same among years while the AATs were different among years.