

Supplementary Information

Genetic Diversity and Population Structure of a Longan Germplasm in Thailand revealed by Genotyping-By-Sequencing (GBS)

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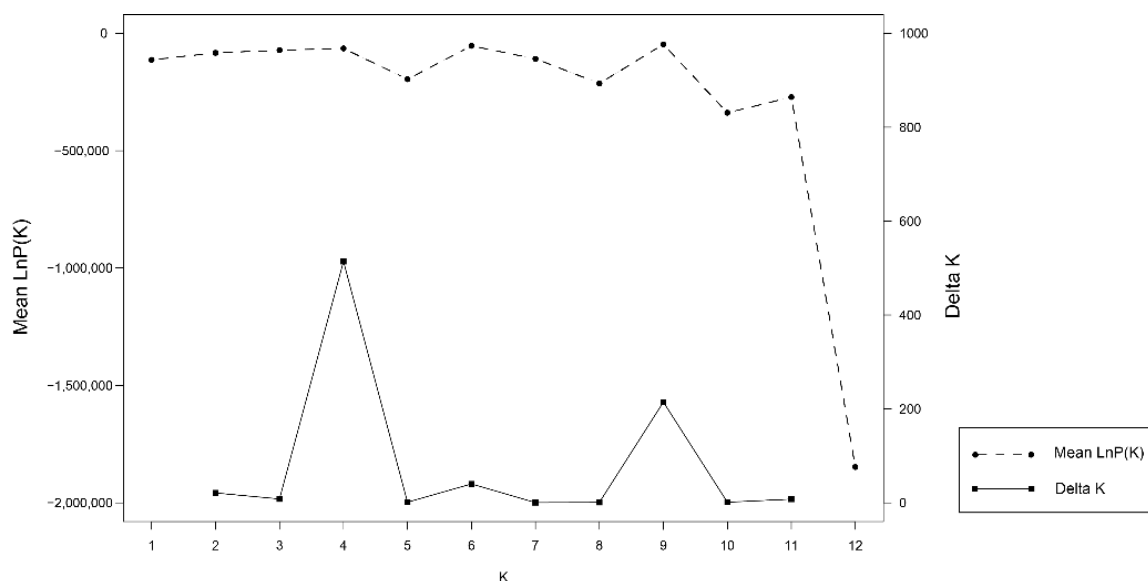


Figure S1. The average log-likelihood of the K-value against the number of K and delta K for different numbers of subpopulations (K)

Table S1 List of longan accessions used for GWAS analysis

List	Accession	Name	Source	Fruit shape	Fruit symmetry	Cross-section of fruit	Color of skin
1	ACC01	Daw Kathi	Longan Community BioBank	Oblate	Symmetry	Broadly elliptic	Brownish green
2	ACC02	E-daw #1	Longan Community BioBank	Oblate	Symmetry	Broadly elliptic	Brownish green
3	ACC03	E-daw #2	Longan Community BioBank	Oblate	Symmetry	Broadly elliptic	Brownish green
4	ACC04	Biew Khiew #1	Longan Community BioBank	Oblate	Oblique	Broadly elliptic	Yellowish brown
5	ACC05	Puang Thong #1	Longan Community BioBank	Oblate	Moderate	Broadly elliptic	Yellowish brown
6	ACC06	E-daw #3	Longan Community BioBank	Oblate	Symmetry	Broadly elliptic	Brownish green
7	ACC07	E-daw #4	Longan Community BioBank	Oblate	Symmetry	Broadly elliptic	Brownish green
8	ACC08	E-daw #5	Longan Community BioBank	Oblate	Symmetry	Broadly elliptic	Brownish green
9	ACC09	Biew Khiew #2	Longan Community BioBank	Oblate	Oblique	Broadly elliptic	Yellowish brown
10	ACC10	Kaew Yee	Longan Community BioBank	Oblate	Moderate	Round	Yellowish brown
11	ACC11	E-daw #6	Longan Community BioBank	Oblate	Symmetry	Broadly elliptic	Brownish green
12	ACC12	E-daw #7	Longan Community BioBank	Oblate	Symmetry	Broadly elliptic	Brownish green
13	ACC13	E-daw #8	Longan Community BioBank	Oblate	Symmetry	Broadly elliptic	Brownish green
14	ACC14	Kohala	Longan Community BioBank	-	-	-	-
15	ACC15	E-daw #9	Longan Community BioBank	Oblate	Symmetry	Broadly elliptic	Brownish green
16	ACC16	E-daw #10	Longan Community BioBank	Oblate	Symmetry	Broadly elliptic	Brownish green
17	ACC17	E-daw #11	Longan Community BioBank	Oblate	Symmetry	Broadly elliptic	Brownish green

18	ACC18	E-daw #12	Longan Community BioBank	Oblate	Symmetry	Broadly elliptic	Brownish green
19	ACC19	E-daw #13	Longan Community BioBank	Oblate	Symmetry	Broadly elliptic	Brownish green
20	ACC20	E-daw #14	Longan Community BioBank	Oblate	Symmetry	Broadly elliptic	Brownish green
21	ACC21	Biew Khiew #3	Longan Community BioBank	Oblate	Oblique	Broadly elliptic	Yellowish brown
22	ACC22	E-daw #15	Longan Community BioBank	Oblate	Symmetry	Broadly elliptic	Brownish green
23	ACC23	E-daw #16	Longan Community BioBank	Oblate	Symmetry	Broadly elliptic	Brownish green
24	ACC24	Chompoo #1	Longan Community BioBank	Rounded	Symmetry	globular	Yellowish brown
25	ACC25	Chuliang	Longan Community BioBank	-	-	-	-
26	ACC26	E-daw #17	Longan Community BioBank	Oblate	Symmetry	Broadly elliptic	Brownish green
27	ACC27	Krob Kathi #1	Longan Community BioBank	Oblate	Moderate	Broadly elliptic	Yellowish brown
28	ACC28	E-daw #18	Longan Community BioBank	Oblate	Symmetry	Broadly elliptic	Brownish green
29	ACC29	Biew Khiew #4	Longan Community BioBank	Oblate	Oblique	Broadly elliptic	Yellowish brown
30	ACC30	E-daw #19	Longan Community BioBank	Oblate	Symmetry	Broadly elliptic	Brownish green
31	ACC31	Puang Thong #2	Longan Community BioBank	Oblate	Moderate	Broadly elliptic	Yellowish brown
32	ACC32	Krob Kathi #2	Longan Community BioBank	Oblate	Moderate	Broadly elliptic	Yellowish brown
33	ACC33	Chompoo #2	Longan Community BioBank	Rounded	Symmetry	globular	Yellowish brown
34	ACC34	Biew Khiew #5	Longan Community BioBank	Oblate	Oblique	Broadly elliptic	Yellowish brown
35	ACC35	Haew Yod Daeng	Longan Community BioBank	Oblate	Moderate	Broadly elliptic	Yellowish brown
36	ACC36	E-daw #20	Longan Community BioBank	Oblate	Symmetry	Broadly elliptic	Brownish green
37	ACC37	Biew Khiew #6	Longan Community BioBank	Oblate	Oblique	Broadly elliptic	Yellowish brown
38	ACC38	Puang Thong #3	Longan Community BioBank	Oblate	Moderate	Broadly elliptic	Yellowish brown
39	ACC39	Puang Thong #4	Longan Community BioBank	Oblate	Moderate	Broadly elliptic	Yellowish brown
40	ACC40	Chompoo #3	Longan Community BioBank	Rounded	Symmetry	globular	Yellowish brown
41	ACC41	E-daw #21	Longan Community BioBank	Oblate	Symmetry	Broadly elliptic	Brownish green
42	ACC42	Krob Kathi #3	Longan Community BioBank	Oblate	Moderate	Broadly elliptic	Yellowish brown
43	ACC43	Chompoo #4	Longan Community BioBank	Rounded	Symmetry	globular	Yellowish brown
44	ACC44	E-daw #22	Longan Community BioBank	Oblate	Symmetry	Broadly elliptic	Brownish green
45	ACC45	E-daw #23	Longan Community BioBank	Oblate	Symmetry	Broadly elliptic	Brownish green
46	ACC46	E-daw #24	Longan Community BioBank	Oblate	Symmetry	Broadly elliptic	Brownish green
47	ACC47	Chompoo #5	Longan Community BioBank	Rounded	Symmetry	globular	Yellowish brown
48	ACC48	E-daw #25	Longan Community BioBank	Oblate	Symmetry	Broadly elliptic	Brownish green
49	ACC49	Biew Khiew #7	Longan Community BioBank	Oblate	Moderate	Broadly elliptic	Yellowish brown
50	ACC50	E-daw #26	Longan Community BioBank	Oblate	Symmetry	Broadly elliptic	Brownish green

Table S2 Summary of 210,882 total SNPs identified based on GBS data in each longan accession

Accession	Name	Hom. SNP	Hom. Rate (%)	Het. SNP	Het rate (%)	Missing SNP	Missing rate (%)
ACC01	Daw Kathi	67577	32.04	12171	5.77	131134	62.18
ACC02	E-daw #1	88189	41.82	26427	12.53	96266	45.65
ACC03	E-daw #2	81270	38.54	21833	10.35	107779	51.11
ACC04	Biew Khiew #1	58622	27.80	10026	4.75	142234	67.45
ACC05	Puang Thong #1	80927	38.38	20218	9.59	109737	52.04
ACC06	E-daw #3	67583	32.05	15692	7.44	127607	60.51
ACC07	E-daw #4	59826	28.37	12751	6.05	138305	65.58
ACC08	E-daw #5	71183	33.75	16800	7.97	122899	58.28
ACC09	Biew Khiew #2	68446	32.46	12580	5.97	129856	61.58
ACC10	Kaew Yee	80010	37.94	17830	8.45	113042	53.60
ACC11	E-daw #6	88035	41.75	26031	12.34	96816	45.91
ACC12	E-daw #7	74053	35.12	18365	8.71	118464	56.18
ACC13	E-daw #8	65905	31.25	14216	6.74	130761	62.01
ACC14	Kohala	85182	40.39	12432	5.90	113268	53.71
ACC15	E-daw #9	65329	30.98	14353	6.81	131200	62.21
ACC16	E-daw #10	79603	37.75	21455	10.17	109824	52.08
ACC17	E-daw #11	74863	35.50	18931	8.98	117088	55.52
ACC18	E-daw #12	74670	35.41	19469	9.23	116743	55.36
ACC19	E-daw #13	76792	36.41	19571	9.28	114519	54.30
ACC20	E-daw #14	64722	30.69	11360	5.39	134800	63.92
ACC21	Biew Khiew #3	72088	34.18	14819	7.03	123975	58.79
ACC22	E-daw #15	66106	31.35	14045	6.66	130731	61.99
ACC23	E-daw #16	69948	33.17	16059	7.62	124875	59.22
ACC24	Chompoo #1	80738	38.29	18104	8.58	112040	53.13
ACC25	Chuliang	75473	35.79	11771	5.58	123638	58.63
ACC26	E-daw #17	75866	35.98	19526	9.26	115490	54.77
ACC27	Krob Kathi #1	72099	34.19	12831	6.08	125952	59.73
ACC28	E-daw #18	78660	37.30	20266	9.61	111956	53.09
ACC29	Biew Khiew #4	78482	37.22	16873	8.00	115527	54.78
ACC30	E-daw #19	70475	33.42	16507	7.83	123900	58.75
ACC31	Puang Thong #2	73056	34.64	16797	7.97	121029	57.39
ACC32	Krob Kathi #2	52394	24.85	6783	3.22	151705	71.94
ACC33	Chompoo #2	70052	33.22	13662	6.48	127168	60.30
ACC34	Biew Khiew #5	83939	39.80	17538	8.32	109405	51.88
ACC35	Haew Yod Daeng	69582	33.00	15911	7.54	125389	59.46
ACC36	E-daw #20	61498	29.16	12631	5.99	136753	64.85
ACC37	Biew Khiew #6	87342	41.42	20129	9.55	103411	49.04
ACC38	Puang Thong #3	77409	36.71	18410	8.73	115063	54.56
ACC39	Puang Thong #4	69932	33.16	15077	7.15	125873	59.69
ACC40	Chompoo #3	67072	31.81	12733	6.04	131077	62.16
ACC41	E-daw #21	64127	30.41	13933	6.61	132822	62.98
ACC42	Krob Kathi #3	63710	30.21	9955	4.72	137217	65.07
ACC43	Chompoo #4	76857	36.45	16027	7.60	117998	55.95
ACC44	E-daw #22	71876	34.08	17064	8.09	121942	57.82
ACC45	E-daw #23	54704	25.94	8881	4.21	147297	69.85
ACC46	E-daw #24	72053	34.17	15623	7.41	123206	58.42
ACC47	Chompoo #5	67533	32.02	11151	5.29	132198	62.69
ACC48	E-daw #25	63195	29.97	11711	5.55	135976	64.48
ACC49	Biew Khiew #7	64933	30.79	10843	5.14	135106	64.07
ACC50	E-daw #26	57366	27.20	8099	3.84	145417	68.96

Table S3 Summary of 10,619 filtered SNPs in each longan accession

Accession	Name	Homozygous SNP	Homozygous rate (%)	Heterozygous SNP	Heterozygous rate (%)
ACC01	Daw Kathi	6859	64.59	3760	35.41
ACC02	E-daw #1	5909	55.65	4710	44.35
ACC03	E-daw #2	5937	55.91	4682	44.09
ACC04	Biew Khiew #1	6889	64.87	3730	35.13
ACC05	Puang Thong #1	6020	56.69	4599	43.31
ACC06	E-daw #3	6156	57.97	4463	42.03
ACC07	E-daw #4	6364	59.93	4255	40.07
ACC08	E-daw #5	6114	57.58	4505	42.42
ACC09	Biew Khiew #2	7088	66.75	3531	33.25
ACC10	Kaew Yee	6621	62.35	3998	37.65
ACC11	E-daw #6	5928	55.82	4691	44.18
ACC12	E-daw #7	6065	57.11	4554	42.89
ACC13	E-daw #8	6321	59.53	4298	40.47
ACC14	Kohala	8518	80.21	2101	19.79
ACC15	E-daw #9	6289	59.22	4330	40.78
ACC16	E-daw #10	5954	56.07	4665	43.93
ACC17	E-daw #11	6034	56.82	4585	43.18
ACC18	E-daw #12	6042	56.90	4577	43.10
ACC19	E-daw #13	6029	56.78	4590	43.22
ACC20	E-daw #14	6938	65.34	3681	34.66
ACC21	Biew Khiew #3	6570	61.87	4049	38.13
ACC22	E-daw #15	6316	59.48	4303	40.52
ACC23	E-daw #16	6194	58.33	4425	41.67
ACC24	Chompoo #1	6418	60.44	4201	39.56
ACC25	Chuliang	8366	78.78	2253	21.22
ACC26	E-daw #17	6090	57.35	4529	42.65
ACC27	Krob Kathi #1	7107	66.93	3512	33.07
ACC28	E-daw #18	6056	57.03	4563	42.97
ACC29	Biew Khiew #4	6566	61.83	4053	38.17
ACC30	E-daw #19	6147	57.89	4472	42.11
ACC31	Puang Thong #2	6086	57.31	4533	42.69
ACC32	Krob Kathi #2	7833	73.76	2786	26.24
ACC33	Chompoo #2	6524	61.44	4095	38.56
ACC34	Biew Khiew #5	6915	65.12	3704	34.88
ACC35	Haew Yod Daeng	6089	57.34	4530	42.66
ACC36	E-daw #20	6410	60.36	4209	39.64
ACC37	Biew Khiew #6	6395	60.22	4224	39.78
ACC38	Puang Thong #3	6060	57.07	4559	42.93
ACC39	Puang Thong #4	6249	58.85	4370	41.15
ACC40	Chompoo #3	6601	62.16	4018	37.84
ACC41	E-daw #21	6325	59.56	4294	40.44
ACC42	Krob Kathi #3	7292	68.67	3327	31.33
ACC43	Chompoo #4	6448	60.72	4171	39.28
ACC44	E-daw #22	6143	57.85	4476	42.15
ACC45	E-daw #23	7181	67.62	3438	32.38
ACC46	E-daw #24	6213	58.51	4406	41.49
ACC47	Chompoo #5	6993	65.85	3626	34.15
ACC48	E-daw #25	6741	63.48	3878	36.52
ACC49	Biew Khiew #7	6924	65.20	3695	34.80
ACC50	E-daw #26	7516	70.78	3103	29.22

Table S4 Clusters of 50 longan accessions identified by STRUCTURE and UPGMA tree

Accession	Name	STRUCTURE	UPGMA tree
ACC34	Biew Khiew #5	G4	C2.1
ACC09	Biew Khiew #2	G4	C2.1
ACC27	Krob Kathi #1	G4	C2.1
ACC42	Krob Kathi #3	G4	C2.1
ACC32	Krob Kathi #2	G4	C2.1
ACC49	Biew Khiew #7	G2	C2.2
ACC24	Chompoo #1	G2	C2.2
ACC21	Biew Khiew #3	G2	C2.2
ACC37	Biew Khiew #6	G2	C2.2
ACC29	Biew Khiew #4	G2	C2.2
ACC04	Biew Khiew #1	G2	C2.2
ACC50	E-daw #26	G1	C1
ACC45	E-daw #23	G1	C1
ACC03	E-daw #2	G1	C1
ACC44	E-daw #22	G1	C1
ACC07	E-daw #4	G1	C1
ACC41	E-daw #21	G1	C1
ACC02	E-daw #1	G1	C1
ACC19	E-daw #13	G1	C1
ACC12	E-daw #7	G1	C1
ACC16	E-daw #10	G1	C1
ACC11	E-daw #6	G1	C1
ACC18	E-daw #12	G1	C1
ACC28	E-daw #18	G1	C1
ACC26	E-daw #17	G1	C1
ACC17	E-daw #11	G1	C1
ACC23	E-daw #16	G1	C1
ACC08	E-daw #5	G1	C1
ACC30	E-daw #19	G1	C1
ACC06	E-daw #3	G1	C1
ACC46	E-daw #24	G1	C1
ACC22	E-daw #15	G1	C1
ACC15	E-daw #9	G1	C1
ACC13	E-daw #8	G1	C1
ACC36	E-daw #20	G1	C1
ACC48	E-daw #25	G1	C1
ACC05	Puang Thong #1	G3	C4

ACC31	Puang Thong #2	G3	C4
ACC38	Puang Thong #3	G3	C4
ACC39	Puang Thong #4	G3	C4
ACC01	Daw Kathi	G3	C3
ACC20	E-daw #14	G3	C3
ACC10	Kaew Yee	G3	C3
ACC33	Chompoo #2	Admixture	ADMX1
ACC43	Chompoo #4	Admixture	ADMX1
ACC40	Chompoo #3	Admixture	ADMX1
ACC47	Chompoo #5	Admixture	ADMX1
ACC35	Haew Yod Daeng	Admixture	ADMX1
ACC25	Chuliang	Admixture	ADMX2
ACC14	Kohala	Admixture	ADMX2
