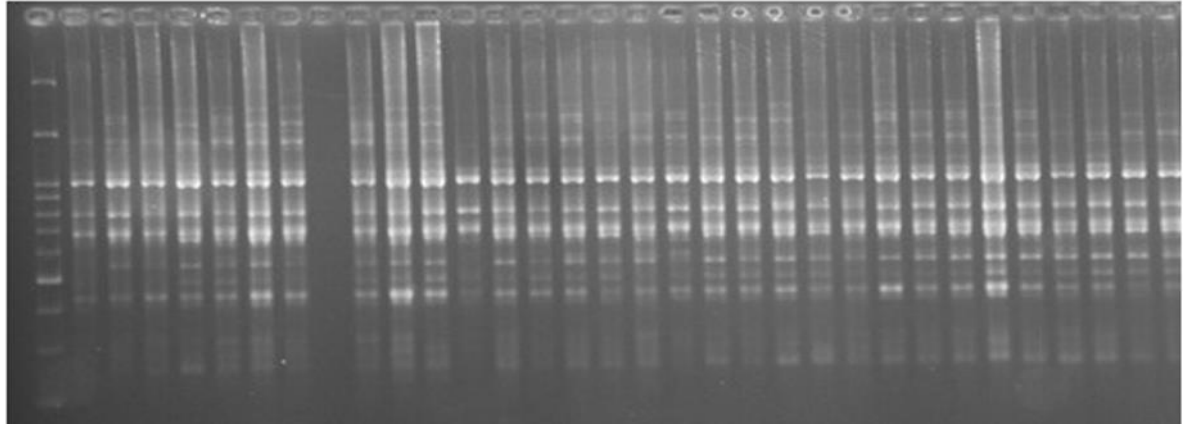


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## Supplementary Materials

**Supplementary Figure 1.** ISSR banding pattern resulting from the multiplication of thornless blackberry genotypes using primers.

Ladder 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32



**Supplementary Table 1.** Correlation coefficient for studied traits.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26											
Plant growth habit	1																																				
number of thorns		.54**																																			
thorn size			.49**																																		
Thorn direction				.88**	.90**																																
cane crosssectional area					.53**	.51**																															
cane diameter in winter						.74**	.67**	.38*																													
The main cane in the bush							.150	.107	1																												
The width of the terminal leaf								.152	.275	1																											
number of leaflets									.064	.327	.088	1																									
flower length										.426*	.79**	.79**	.80**	.47*	.63**	.157	.286	.143	1																		
flower diameter											.433*	.89**	.89**	.79**	.52**	.66**	.026	.194	.277	.698*	1																
flower size												.187	.281	.281	.372	.181	.252	.264	.276	.086	.722**	.022	1														
Leaf bud opening												.071	.114	.103	.118	.001	.019	.005	.016	.030	.195	.162	.122	1													
Flowering time												.048	.029	.036	.083	.117	.360	.333	.245	.278	.058	.057	.132	.103	1												
berry color												.181	.43*	.436*	.434*	.337	.49**	.143	.027	.47*	.57**	.317	.53**	.115	.212	1											
berry ripening time												.396*	.82**	.83**	.74**	.47*	.40*	.307	.401*	.403*	.61**	.75**	.149	.023	.364	.160	1										
berry diameter												.060	.282	.270	.206	.131	.181	.082	.43*	.329	.098	.201	.037	.212	.014	.258	.300	1									
berry length												.081	.212	.214	.185	.112	.047	.261	.46*	.49**	.037	.098	.127	.116	.027	.43*	.289	.83**	1								
berry size												.060	.032	.047	.075	.046	.154	.335	.227	.383*	.178	.067	.171	.003	.002	.39*	.116	.227	.71**	1							
berry fresh weight												.458*	.97**	.98**	.88**	.53**	.72**	.175	.48**	.342	.75**	.86**	.251	.118	.053	.325	.84**	.419*	.386*	.158	1						
TSS												.141	.169	.208	.287	.119	.065	.39*	.310	.329	.275	.065	.331	.108	.008	.021	.165	.533*	.54**	.295	.298	1					
TA												.236	.55**	.56**	.49**	.248	.325	.142	.205	.352	.382*	.45*	.138	.229	.030	.114	.55**	.321	.279	.081	.57**	.250	1				
TSS/TA												.51**	.99**	.99**	.89**	.51**	.74**	.120	.40*	.263	.79**	.89**	.282	.103	.035	.43*	.83**	.284	.221	.043	.98**	.199	.57**	1			
Number of seeds												.306	.348	.351	.347	.169	.353	.219	.019	.353	.52**	.332	.42*	.111	.004	.75**	.168	.505*	.73**	.64**	.186	.306	.060	.343	1		
seeds floating												.113	.53**	.57**	.50**	.69**	.266	.187	.284	.211	.39**	.61**	.028	.168	.208	.199	.54**	.138	.167	.137	.56**	.023	.091	.54**	.086	1	
Anthocyanin												.050	.171	.176	.212	.288	.172	.164	.164	.035	.139	.39*	.222	.318	.007	.121	.38*	.103	.061	.187	.212	.152	.054	.117	.225	.092	1

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**Supplementary Table 2.** Decomposition into factors.

Component	1	2	3	4	5	6	7
Eigen values	9.757	4.438	2.009	1.719	1.474	1.169	1.047
% of variance **	37.526	17.068	7.727	6.612	5.669	4.495	4.026
Cumulative %	37.526	54.594	62.321	68.934	74.603	79.098	83.124
1 Spin number	.975**	-0.027	0.068	0.043	-0.1	-0.048	0.037
1 Spin size	.984**	-0.019	0.068	0.035	-0.066	-0.034	0.01
1 Spind irection	.923 **	-0.037	-0.019	0.012	-0.019	-0.049	0.048
1 Shoot crosssec	.603**	-.095	0.284	-0.08	0.484	0.336	-0.07
1 Shoot Dia	-.724**	0.241	-0.014	-0.409	0.169	-0.026	0.102
1 Flower length	-.849**	0.275	0.324	-0.002	-0.064	0.159	-0.027
1 Flower dia	-.877**	.073	-0.303	-0.024	0.024	0.211	0.14
1 Ripening	-.839**	-0.192	-0.137	0.314	0.065	0.066	0
1 Frfresh wei	.975**	0.151	0.039	0.059	-0.031	-0.004	-0.009
1 TA	-.570**	-0.189	0.063	0.067	0.421	-0.22	0.381
1 TSS/TA	.982**	-0.014	0.061	0.036	-0.091	-0.038	0.015
2 Leaflet no	-0.291	-.620**	-0.091	0.213	0.262	0.323	0.116
2 unripen ripe fruit color	-0.444	.713**	0.254	-0.095	-0.096	-0.23	0.035
2 Fruit diameter	0.321	.666**	-0.11	0.33	0.138	0.111	-0.137
2 Fruit length	0.25	.902**	-0.054	0.227	0.07	0.166	0.005
2 Fruit size	0.044	.722**	0.031	0.029	0	0.142	0.166
2 Seed num	-0.335	.853**	0.051	0.164	0.113	0.008	-0.167
2 Growth habit	-0.507	.093**	-0.152	0.01	0.411	-0.025	-0.48
3 Shoot no	-0.132	-0.393	.547**	0.504	0.112	0.153	-0.028
3 Flower size	-0.371	0.303	.754**	0.022	-0.124	-0.024	-0.2
3 TSS	0.254	0.512	-.602**	0.148	0.042	-0.027	-0.09
4 Flower anthesis	-.072	-0.212	-0.145	.850**	-0.146	0.058	-0.07
5 Empty seed	.085	0.056	0.456	-0.071	.510**	-0.007	-0.002
6 Leaf anthesis	0.103	0.105	-0.078	0.308	0.471	-.705**	0.185
7 Anthocyanin	-0.241	0.319	0.28	0.27	-0.304	0.012	.550**
7 Leaflet Width	0.459	0.335	-0.191	-0.135	0.302	0.426	0.389

**Supplementary Table 3.** Cophenetic coefficient resulting from algorithms with similarity coefficients.

Similarity coefficients	UPGMA algorithm	Full connection algorithm	Simple connection algorithm
Jaccard similarity coefficient	0.84	0.76	0.72
Dice similarity coefficient	0.79	0.73	0.71
Simple similarity coefficient	0.74	0.54	0.62

**Supplementary Table 4.** Decomposition into PCA principal components.

	Relative variance %	Cumulative variance %
First component	21	21
Second component	6.3	27.3
Third component	3.5	30.8