

**Supplemental Table S1.** Statistical values of microsatellite markers on 29 genotypes of *A. trifoliata*

Locus	Na*	Ne*	I*	He*	Ho	Nei**	PIC
AK1	10	8.087	2.185	0.892	0.035	0.876	0.864
AK2	10	4.380	1.743	0.785	0.000	0.772	0.740
AK3	8	3.630	1.601	0.738	0.000	0.725	0.696
AK4	7	4.847	1.708	0.808	0.000	0.794	0.764
AK6	11	4.621	1.786	0.797	0.000	0.784	0.752
AK7	14	7.063	2.213	0.874	0.071	0.858	0.844
AK8	8	4.522	1.652	0.793	0.000	0.779	0.744
AK9	9	5.515	1.847	0.833	0.069	0.819	0.794
AK11	11	8.167	2.208	0.899	0.000	0.878	0.865
AK12	8	3.921	1.687	0.758	0.069	0.745	0.721
AK14	15	8.327	2.365	0.895	0.000	0.880	0.869
AK15	6	3.867	1.495	0.754	0.000	0.741	0.700
AK16	6	3.431	1.436	0.721	0.143	0.709	0.667
AK17	11	4.195	1.749	0.775	0.035	0.762	0.730
AK18	6	4.667	1.605	0.800	0.000	0.786	0.751
AK19	12	5.780	2.047	0.842	0.035	0.827	0.808
AK20	4	3.166	1.257	0.698	0.115	0.684	0.630
AK21	6	3.508	1.444	0.728	0.000	0.715	0.676
AK22	5	2.576	1.094	0.623	0.000	0.612	0.536
AK23	8	3.155	1.396	0.696	0.000	0.683	0.630
AK24	10	5.608	1.917	0.837	0.000	0.822	0.798
AK25	6	2.641	1.165	0.632	0.000	0.621	0.548
AK26	9	4.885	1.801	0.810	0.000	0.795	0.769
AK27	6	3.124	1.276	0.692	0.071	0.680	0.621

AK28	2	2.000	0.693	1.000	0.000	0.500	0.375
AK29	7	4.810	1.724	0.807	0.000	0.792	0.763
AK30	1	1.000	0.000	0.000	1.000	0.000	0.000
AK31	3	2.147	0.825	0.544	0.000	0.534	0.426
AK10	6	2.731	1.195	0.645	0.000	0.634	0.564
AK32	2	1.998	0.693	0.508	0.035	0.499	0.375
AK33	7	4.335	1.587	0.783	0.000	0.769	0.732
AK34	5	3.156	1.281	0.695	0.035	0.683	0.626
AK35	6	2.532	1.124	0.617	0.000	0.605	0.526
AK36	2	1.071	0.150	0.068	1.000	0.067	0.064
AK37	6	5.452	1.736	0.849	0.231	0.817	0.790
AK38	7	2.908	1.282	0.669	0.000	0.656	0.594
AK39	9	4.991	1.832	0.814	0.035	0.800	0.776
AK40	12	6.230	2.044	0.856	0.000	0.840	0.820
AK41	4	2.420	1.038	0.612	0.750	0.587	0.515
AK42	4	1.810	0.760	0.456	0.962	0.448	0.377
AK43	8	2.694	1.252	0.640	0.000	0.629	0.559
AK44	7	3.641	1.504	0.738	0.035	0.725	0.681
AK45	9	2.730	1.292	0.646	0.037	0.634	0.565
AK46	6	3.299	1.389	0.710	0.037	0.697	0.650
AK47	4	2.402	1.000	0.595	0.000	0.584	0.495
AK48	5	2.522	1.088	0.615	0.000	0.604	0.523
AK49	4	3.200	1.256	0.786	0.000	0.688	0.630
AK50	4	2.148	0.847	0.544	0.000	0.534	0.426
AK51	1	1.000	0.000	0.000	1.000	0.000	0.000
AK52	3	2.074	0.772	0.528	0.037	0.518	0.402

AK54	12	6.451	2.067	0.861	0.000	0.845	0.827
AK55	3	2.616	1.025	0.629	0.000	0.618	0.545
AK56	7	3.226	1.344	0.703	0.185	0.690	0.633
AK57	10	4.528	1.755	0.794	0.000	0.779	0.747
AK58	9	5.152	1.839	0.821	0.000	0.806	0.782
AK59	2	1.998	0.693	0.508	0.036	0.499	0.375
AK60	6	3.204	1.334	0.701	0.000	0.688	0.634
AK61	3	2.620	1.026	0.631	0.039	0.618	0.546
AK62	7	2.921	1.347	0.671	0.280	0.658	0.609
AK63	10	3.806	1.641	0.751	0.000	0.737	0.701
AK64	10	4.273	1.744	0.780	0.000	0.766	0.734
AK65	6	2.577	1.149	0.625	0.000	0.612	0.536
AK66	8	5.930	1.905	0.865	0.385	0.831	0.810
AK67	9	3.482	1.533	0.725	0.069	0.713	0.669
AK68	8	2.618	1.215	0.630	0.000	0.618	0.544
AK69	7	3.618	1.462	0.737	0.000	0.724	0.678
AK70	6	2.991	1.261	0.679	0.000	0.666	0.608
AK71	8	3.811	1.674	0.753	0.440	0.738	0.714
AK72	5	2.831	1.205	0.659	0.037	0.647	0.590
AK73	2	1.461	0.495	0.321	0.607	0.316	0.266
AK74	4	2.233	0.904	0.563	0.037	0.552	0.451
AK75	6	3.198	1.354	0.699	0.241	0.687	0.633
AK76	5	2.269	1.085	0.582	0.385	0.559	0.511
AK77	2	1.932	0.676	0.498	0.188	0.482	0.366
AK78	4	2.129	0.849	0.541	0.077	0.530	0.426
AK79	9	3.089	1.443	0.689	0.037	0.676	0.622

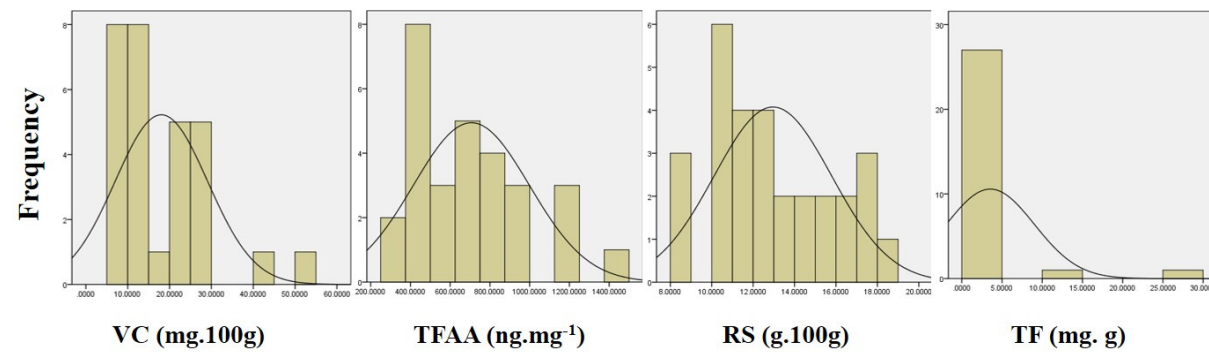
AK80	2	2.000	0.693	0.510	0.000	0.500	0.375
AK81	6	3.853	1.501	0.754	0.000	0.740	0.699
AK82	4	2.314	0.957	0.579	0.037	0.568	0.474
AK83	3	2.541	1.009	0.621	0.046	0.606	0.535
AK84	7	3.424	1.477	0.721	0.000	0.708	0.671
AK85	2	1.125	0.224	0.114	1.000	0.111	0.105
Mean	6.488	3.527	1.328	0.672	0.121	0.652	0.600

**Supplemental Table S2.** The characterized of 29 genotypes in 19 phenotypic traits and nutritional components of *A. trifoliata*.

Strain	Ripe ning date	Fruit color	Fruit shape	Fruit weight (g)	Peel weight (g)	Peric arp thick ness (cm)	Longit udinal diamet er (cm)	Transv erse diamet er (cm)	Seed weight (g)	Propor tion of seeds (%)	Seed/p ulp (%)	Edible proporti on (%)	Vita min C (mg/1 00g)	Reducin g sugar (g/100g)	Prot ein (g/10 0g)	Total flavo noids (mg/ g)	Titra table acid (g/10 0g)	HAAta tal (ng/mg )	TotalFA A (ng/mg)
78	9.07	Fuchsia	Pyriform	222.76	188.52	1.22	12.49	6.19	7.95	3.71	34.95	12.47	8.84	12.5	0.49	1.54	0.043	3163.33	963.28
209	9.20	Lavenderblush	Bnana like	227.04	174.52	1.16	13.52	5.68	9.79	4.32	24.13	18.83	25.04	15.46	0.44	1.26	0.039	2430.00	312.39
388	9.15	Fuchsia	Spindle	245.00	176.33	0.96	12.17	6.27	8.21	3.37	13.77	24.70	8.87	13.4	0.47	3.69	0.045	2940.00	863
422	9.20	Lavenderblush	Spindle	232.87	161.88	1.12	13.29	6.20	8.57	3.73	13.98	27.11	24.84	14.4	0.46	4.18	0.066	3940.00	495.34
516	9.07	PalevioletRed	Bnana like	190.44	161.07	1.11	11.21	5.75	7.92	4.27	73.46	10.75	8.64	8.71	0.53	2.6	0.06	3806.67	1234.33
548	9.25	Fuchsia	Spindle	228.75	168.93	1.16	12.81	6.10	8.76	3.85	17.46	23.05	25.48	16.28	0.47	1.08	0.076	2990.00	684.15
665	9.21	Fuchsia	Spindle	188.79	135.34	1.17	12.04	5.83	8.21	3.80	19.54	23.96	22.13	16.07	0.43	3.54	0.063	2943.33	481.91
679	9.11	Fuchsia	Spindle	233.85	179.55	1.20	12.80	6.00	10.44	4.45	24.05	18.75	11.23	11.32	0.52	2.75	0.057	3580.00	493.84

710	8.29	Lavenderblush	Neohroid	446.90	354.35	1.28	16.30	6.97	16.32	3.66	21.78	20.48	40.45	10.16	0.67	1.84	0.06	3535.83	632.16
713	9.17	Fuchsia	Bnana like	234.67	174.04	1.07	12.82	6.14	8.16	3.48	15.68	22.40	10.43	11.76	0.34	1.2	0.062	3553.33	759.69
725	9.12	Fuchsia	Neohroid	262.08	199.13	0.97	12.89	5.83	8.73	3.38	21.83	20.82	8.13	10.07	0.52	1.09	0.069	3566.67	944.19
743	9.20	Fuchsia	Neohroid	214.57	145.96	1.12	12.39	5.91	7.22	3.38	14.01	28.24	24.68	12.56	0.48	1.61	0.064	3090.00	531.8
750	9.15	PalevioletRed	Neohroid	255.89	185.17	1.11	12.97	5.98	8.19	3.27	13.52	24.42	15.81	10.22	0.44	2.11	0.06	2866.67	482.82
752	9.20	Lavenderblush	Spindle	237.31	175.33	1.19	13.18	6.16	7.76	5.15	15.08	22.53	24.76	11.93	0.45	3.16	0.051	3150.00	380.74
761	9.21	Fuchsia	Neohroid	199.67	144.15	1.06	12.54	6.28	8.91	4.48	19.28	23.60	22.38	18.22	0.48	2.16	0.05	3585.00	1205.73
780	9.05	PalevioletRed	Neohroid	277.32	211.06	1.31	13.68	6.28	13.27	4.79	25.21	19.21	7.67	8.95	0.32	1.65	0.058	1663.33	745.74
857	9.11	PalevioletRed	Neohroid	135.15	100.48	0.84	10.12	5.35	6.15	4.59	21.68	21.25	14.68	11.28	0.51	2.68	0.063	2135.40	626.56
878	9.11	Fuchsia	Spindle	195.28	151.24	1.02	11.95	5.67	10.29	5.73	32.94	17.28	6.72	10.95	0.49	1.47	0.072	3196.67	826.63
882	9.18	PalevioletRed	Bnana like	292.56	206.27	1.18	14.00	6.69	9.65	3.33	12.69	26.35	10.5	17.67	0.58	1.14	0.054	3806.67	926.91
1002	9.11	PalevioletRed	Bnana like	213.68	161.44	1.08	12.10	5.71	10.37	4.87	25.10	19.56	10.71	10.85	0.51	3.19	0.064	3475.00	1144.32
1004	9.07	PalevioletRed	Neohroid	195.59	165.97	1.10	11.51	5.56	8.53	4.36	52.36	10.74	7.57	8.78	0.52	2.63	0.066	3443.33	1443.07
1023	9.28	Darkorchid	Neohroid	280.45	187.79	0.69	14.32	7.57	20.20	7.19	28.14	25.99	27.56	17.41	0.49	14.28	0.053	3486.67	455.47
1054	9.20	PalevioletRed	Neohroid	198.17	134.81	1.02	12.73	5.79	7.98	4.05	15.27	27.80	25.42	15.03	0.42	1.01	0.059	3450.00	518.92
1062	9.21	PalevioletRed	Bnana like	181.92	130.61	0.97	11.64	5.49	9.11	5.12	22.75	23.83	14.7	12.63	0.38	2.07	0.074	2135.00	504.51
1314	9.11	PalevioletRed	Bnana like	252.45	192.96	0.99	13.29	6.63	9.55	3.76	19.83	19.89	9.7	17.72	0.46	1.97	0.073	2693.33	496.25
1316	9.07	PalevioletRed	Pyriform	247.53	188.89	1.30	12.69	6.30	9.26	3.77	19.88	19.79	13.37	10.97	0.46	2.13	0.069	3460.00	846.23
1356	9.20	PalevioletRed	Neohroid	234.40	185.37	1.08	12.98	6.08	8.94	3.87	23.05	17.27	10.64	12.15	0.54	3.54	0.048	3286.67	733.38
1411	9.21	Cyan purpe	Spindle	331.44	215.45	0.88	15.83	7.48	14.93	4.64	18.52	29.47	54.44	13.75	0.52	29.11	0.06	3636.67	344.49
1427	9.25	PalevioletRed	Pyriform	237.33	178.51	1.12	12.92	6.38	10.01	4.28	21.09	20.78	27.88	14.45	0.42	2.21	0.082	3060.00	407.94

**Supplemental Figure S1.** Distributions of VC (vitamin C), TFAA (total free amino acid), RS (reducing sugar), and TF (total flavonoids).



**Supplemental Figure S2.** The scree plot of principal component analysis

