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CORRELATION BETWEEN FLOWER YIELD AND DIFFERENT CHARACTERS IN *ROSA DAMASCENA* MILL

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(rezatabaei@gmail.com)

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Canopy

Accession

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(h²_b)

$$\sigma_G^2 = \frac{MSt - MSe}{r}$$

$$h^2_b = \frac{\sigma_G^2}{\sigma_G^2 + \frac{\sigma_e^2}{r}}$$

(r_g)

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$$r_g = \frac{\sigma_{G_{xy}}}{\sqrt{\sigma_{G_x}^2 \cdot \sigma_{G_y}^2}}$$

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SAS

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(P<0.01)

SSR ()

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RAPDs

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(P<0.01)

QTL

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(P<0.01)

Rosa rugosa ()

(P<0.05)

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Table1. Estimated genetic variance and broad-sense heritability of some traits in *Rosa damascena* Mill.

$h^2_b = \frac{\sigma^2_G}{\sigma^2_G + \frac{\sigma^2_e}{r}}$ $\sigma^2_P = MSe = \sigma_e^2$ $\sigma^2_G = \frac{MSt - MSe}{r}$					MSt	Traits
Heritability	Phenotypic variance component	Error variance component	Genetic variance component	Mean of squares		
0.93	1.39	0.24	1.15	3.69 [†]		Flower yield
0.93	355181	65811	289370	933922 [†]		Flower number
0.92	0.15	0.03	0.12	0.374 [†]		Flower weight
0.63	2.59	1.66	0.93	4.46 [†]		Dry weight %
0.94	3.56	0.54	3.02	9.62 [†]		Bloom number
0.96	4.10	0.45	3.65	11.39 [†]		Bloom development
0.90	2.36	0.57	1.79	5.93 [†]		Leaf yellowing
0.94	3.98	0.63	3.35	10.68 [†]		Leaf fall
0.77	1.53	0.73	0.80	3.12 [†]		Bud initiation
0.84	985	357	628	2241 [†]		Plant height
0.85	1274	436	838	2949 [†]		Canopy diameter
0.69	88.69	51.29	37.40	163 [†]		Branch angle
0.73	24.80	12.9	11.9	48.7 [†]		Leaflet length
0.76	13.96	6.78	7.18	28.3 [†]		Leaflet width
0.71	297.00	163	134	564 [†]		Thorns density
0.50	2.22	1.67	0.55	3.31 [†]		Length thorn
0.57	4.20	2.90	1.30	6.8 [†]		Stipule length
0.75	4.50	2.24	2.26	9.1 [†]		Stipule width

[†] Mean of squares are significant (P≤ 0.01)

	(P<0.01)			(P<0.01)	
	(P<0.01)				()
	(P<0.01)				
(P<0.01)		(P<0.05)		(P<0.05)	
	(P<0.01)			(P<0.05)	
(P<0.05)				(P<0.01)	(P<0.05)
	(P<0.01)				
(P<0.01)		(P<0.05)		(P<0.01)	
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Humphreys Berdahl Yan and Hunt Tadesse and Bekele

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Table 2. Phenotypic (above diagonal) and genetic (under diagonal) correlation coefficients between different traits in *Rosa damascena* Mill.

X18	X17	X16	X15	X14	X13	X12	X11	X10	X9	X8	X7	X6	X5	X4	X3	X2	X1	Traits
0.39	0.33	0.41	-0.07	-0.05	0.06	0.21	0.34	0.48	0	0.49	0.5	0.42	0.43	0.1	-0.2	0.92	† ₁	Flower yield (X ₁)
0.31	0.18	0.4	0.14	-0.1	-0.02	0.34	0.41	0.51	0.14	0.46	0.54	0.57	0.54	0.09	-0.51	1	0.94	Flower number (X ₂)
0.13	0.24	-0.2	-0.57	0.05	0.12	-0.61	-0.53	-0.41	-0.45	-0.11	-0.4	-0.55	-0.57	-0.03	1	-0.53	-0.23	Flower weight (X ₃)
0.33	-0.01	-0.09	-0.05	-0.4	-0.29	-0.05	0.12	0.03	0.07	0.49	0.38	-0.06	-0.21	1	-0.06	0.12	0.12	Dry weight % (X ₄)
-0.34	0.03	0.28	0.47	0.39	0.32	0.64	0.61	0.66	0.42	-0.2	0.14	0.86	1	-0.26	-0.62	0.56	0.44	Bloom number (X ₅)
-0.34	-0.14	0.13	0.44	0.29	0.14	0.61	0.62	0.71	0.58	-0.11	0.19	1	0.89	-0.08	-0.58	0.59	0.44	Bloom development (X ₆)
0.38	-0.12	0.13	-0.03	-0.38	-0.34	0.26	0.57	0.38	0.17	0.83	1	0.21	0.15	0.49	-0.46	0.59	0.53	Leaf yellowing (X ₇)
0.74	0.12	0.05	-0.25	-0.57	-0.41	-0.07	0.21	0.06	-0.19	1	0.87	-0.12	-0.22	0.63	-0.12	0.49	0.52	Leaf fall (X ₈)
-0.54	-0.31	0.23	0.32	0.38	0.05	0.69	0.7	0.71	1	-0.23	0.17	0.68	0.49	0.11	-0.53	0.18	0.02	Bud initiation (X ₉)
-0.29	-0.02	0.41	0.31	0.47	0.22	0.68	0.8	1	0.87	0.04	0.41	0.76	0.72	0.08	-0.48	0.55	0.52	Plant height (X ₁₀)
-0.25	-0.13	0.24	0.23	0.31	0.1	0.77	1	0.88	0.85	0.22	0.62	0.66	0.65	0.18	-0.59	0.43	0.35	Canopy diameter (X ₁₁)
-0.39	-0.16	0.29	0.4	0.38	0.22	1	1.02	0.92	0.95	-0.09	0.29	0.75	0.8	-0.01	-0.74	0.39	0.25	Branch angle (X ₁₂)
-0.32	0.41	0.24	0.21	0.78	1	0.32	0.07	0.27	0.07	-0.5	-0.44	0.16	0.38	-0.5	0.14	-0.04	0.05	Leaflet length (X ₁₃)
-0.61	0.1	0.19	0.29	1	0.8	0.54	0.3	0.57	0.47	-0.68	-0.5	0.36	0.44	-0.61	0.02	-0.13	-0.08	Leaflet width (X ₁₄)
-0.37	-0.21	0.19	1	0.38	0.31	0.63	0.27	0.37	0.42	-0.33	-0.02	0.52	0.55	-0.12	-0.72	0.17	-0.09	Thorn density (X ₁₅)
-0.02	0.12	1	0.27	0.26	0.37	0.46	0.36	0.6	0.39	0.08	0.17	0.16	0.38	-0.23	-0.33	0.57	0.58	Thorn length (X ₁₆)
0.49	1	0.26	-0.34	-0.03	0.43	-0.3	-0.29	-0.02	-0.49	0.12	-0.22	-0.19	0.02	-0.04	0.27	0.26	0.44	Stipule length (X ₁₇)
1	0.54	-0.02	-0.53	-0.79	-0.39	-0.59	-0.33	-0.37	-0.78	0.84	0.44	-0.42	-0.4	0.53	0.15	0.41	0.49	Stipule width (X ₁₈)

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† Correlation coefficients <0.29, 0.20-0.28 and > 0.29 show non-significant, significant at 5% and significant at 1%, respectively.

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Table 3. Path analysis of total effects into direct and indirect effects of various traits on flower yield in *Rosa damascena* Mill.

Total Effect	Indirect effects via other traits																	Direct Effect	Traits
	X18	X17	X16	X15	X14	X13	X12	X11	X10	X9	X8	X7	X6	X5	X4	X3	X2		
0.94	-0.02	-0.09	0.06	-0.06	-0.06	0	-0.04	-0.17	0.12	-0.03	0.1	0.01	-0.33	0.42	0.04	-0.02		1.04	Flower number (X ₂)
-0.23	-0.01	-0.09	-0.04	0.24	0.01	0	0.07	0.23	-0.11	0.07	-0.03	0.01	0.32	-0.46	-0.02		-0.55	0.04	Flower weight (X ₃)
0.12	-0.03	0.01	-0.02	0.04	-0.3	0.01	0	-0.07	0.02	-0.02	0.13	0.01	0.04	-0.19		0.00	0.12	0.35	Dry weight % (X ₄)
0.44	0.02	-0.01	0.04	-0.18	0.21	-0.01	-0.08	-0.25	0.16	-0.07	-0.05	0.02	-0.5		-0.09	-0.02	0.58	0.74	Bloom number (X ₅)
0.44	0.02	0.07	0.02	-0.17	0.18	0	-0.08	-0.26	0.17	-0.09	-0.02	-0.01		0.66	-0.03	-0.02	0.61	-0.56	Bloom development (X ₆)
0.53	-0.02	0.08	0.02	0.01	-0.24	0.01	-0.03	-0.24	0.09	-0.02	0.18		-0.12	0.11	0.17	-0.02	0.62	0	Leaf yellowing (X ₇)
0.52	-0.04	-0.04	0.01	0.11	-0.33	0.01	0.01	-0.09	0.01	0.03		0.00	0.06	-0.17	0.22	0.00	0.51	0.21	Leaf fall (X ₈)
0.02	0.04	0.17	0.04	-0.14	0.23	0	-0.09	-0.33	0.19		-0.05	0.01	-0.38	0.36	0.04	-0.02	0.19	-0.14	Bud initiation (X ₉)
0.52	0.02	0.01	0.07	-0.12	0.28	-0.01	-0.09	-0.34		-0.12	0.01	0.00	-0.43	0.53	0.03	-0.02	0.57	0.22	Plant height (X ₁₀)
0.35	0.02	0.1	0.04	-0.09	0.15	0	-0.1		0.19	-0.12	0.05	0.00	-0.37	0.48	0.06	-0.02	0.45	-0.39	Canopy diameter (X ₁₁)
0.25	0.03	0.11	0.05	-0.21	0.27	-0.01		-0.4	0.2	-0.13	-0.02	0.01	-0.42	0.59	0.00	-0.03	0.4	-0.1	Branch angle (X ₁₂)
0.05	0.02	-0.15	0.04	-0.1	0.39		-0.03	-0.03	0.06	-0.01	-0.1	-0.02	-0.09	0.28	-0.17	0.01	-0.04	-0.02	Leaflet length (X ₁₃)
-0.08	0.04	0.01	0.03	-0.12		-0.02	-0.05	-0.12	0.13	-0.07	-0.14	-0.02	-0.2	0.32	-0.21	0.00	-0.13	0.49	Leaflet width (X ₁₄)
-0.09	0.03	0.12	0.03		0.18	-0.01	-0.06	-0.11	0.08	-0.06	-0.07	0.02	-0.29	0.4	-0.04	-0.03	0.18	-0.33	Thorns density (X ₁₅)
0.58	0.00	-0.09		-0.09	0.13	-0.01	-0.05	-0.14	0.13	-0.05	0.02	-0.01	-0.09	0.28	-0.08	-0.01	0.6	0.11	Thorn length (X ₁₆)
0.44	-0.03		0.03	0.11	-0.01	-0.01	0.03	0.11	-0.01	0.07	0.02	0	0.1	0.02	-0.01	0.01	0.27	-0.35	Stipule length (X ₁₇)
0.49		-0.19	0.00	0.18	-0.39	0.01	0.06	0.13	-0.08	0.11	0.18	0.01	0.23	-0.3	0.18	0.01	0.42	-0.05	Stipule width (X ₁₈)

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