

Genetic inheritance of Photoperiod sensitivity in runner bean

Supplementary Table 1. Scaling test for days to flowering, number of racemes and pods in seven runner bean crosses grown at two locations.

Scaling test							
Cross	Traits	A		B		C	
		Kabete	Ol Joro-Orok	Kabete	Ol Joro-Orok	Kabete	Ol Joro-Orok
White Emergo x Kin1	1	0.62ns	0.41ns	0.11ns	-0.33ns	0.08ns	0.12ns
	2	-0.11ns	0.27ns	6.64ns	0.60ns	0.39ns	0.30ns
	3	-0.58ns	-0.11ns	-0.51ns	0.06ns	0.51ns	0.36ns
	4	-1.15ns	-0.61ns	-2.76ns	0.42ns	0.01ns	0.59ns
White Emergo x Kin 2	1	1.00ns	0.5ns	0.57ns	-0.55ns	0.02ns	0.15ns
	2	0.13ns	0.33ns	0.25ns	0.19ns	0.08ns	0.35ns
	3	0.38ns	0.66ns	-0.01ns	1.07ns	0.33ns	0.22ns
	4	-0.14ns	-1.14ns	-0.06ns	-0.21ns	-0.12ns	0.39ns
White Emergo x Kin 3	1	0.95ns	0.22ns	0.39ns	0.06ns	0.06ns	-0.19ns
	2						
	3	-0.29ns	0.29ns	-0.45ns	0.65ns	-0.08ns	0.62ns
	4	-1.32ns	-1.33ns	-1.68ns	-2.19ns	0.27ns	0.29ns
White Emergo x Nyeri	1	0.49ns	0.43ns	0.48ns	0.28ns	-0.06ns	0.16ns
	2	0.17ns	0.69ns	-0.27ns	0.22ns	-0.19ns	0.14ns
	3	-0.45ns	0.50ns	0.70ns	1.57ns	0.34ns	0.28ns
	4	1.29ns	-1.81ns	0.36ns	-1.15ns	0.32ns	0.06ns
White Emergo x Dwarf 1	1	0.69ns	0.36ns	1.16ns	0.28ns	0.02ns	0.05ns
	2	0.18ns	0.8ns	0.16ns	0.55ns	0.43ns	0.39ns

	3	0.74ns	1.49ns	0.56ns	0.32ns	1.55ns	0.47ns
	4	0.19ns	0.78ns	-0.70ns	0.19ns	0.12ns	0.17ns
White Emergo x Dwarf 2	1	3.14ns	0.77ns	0.51ns	-1.36ns	0.21ns	0.36ns
	2	0.29ns	0.50ns	-0.16ns	0.18ns	0.23ns	0.43ns
	3	-0.29ns	1.24ns	-0.42ns	1.21ns	0.15ns	0.25ns
	4	0.53ns	-0.66ns	-2.26ns	-0.03ns	0.49ns	0.08ns
White Emergo x Dwarf 3	1	0.55ns	0.24ns	0.98ns	0.49ns	0.21ns	0.34ns
	2	0.39ns	0.24ns	0.27ns	0.1ns	0.18ns	0.39ns
	3	0.25ns	0.46ns	0.91ns	1.13ns	0.49ns	0.68ns
	4	-0.55ns	0.15ns	-0.78ns	0.09ns	0.16ns	0.68ns

Supplementary Table 2. Estimates of gene effects based on 3(m+a+d) and 6 (m+a+d+aa+ad+dd) parameter models for four traits in seven crosses of runner bean evaluated at two locations.

Number of racemes plant-1 at first flowering															
3-model	W x Kin 1		W X Kin 2		W x Kin 3		W x Nyeri		W x Dwarf 1		W x Dwarf 2		W x Dwarf 3		
	KAB	OJ	KAB	OJ	KAB	OJ	KAB	OJ	KAB	OJ	KAB	OJ	KAB	OJ	
m	8.4*	7.0*	5.5*	7.0*	NS	NS	4.4	8.2*	7.3*	8.3*	5.9*	5.9*	5.9*	6.5*	
a	-5.2 ± 0.6*	-1.9 ± 1.7	-4.3 ± 0.9*	-3.5 ± 0.6*	NS	NS	-10.3 ± 15.1	-6.3 ± 0.7*	-2.8 ± 0.8*	-4.2 ± 0.8*	-3.2 ± 0.6*	-3.3 ± 0.8*	-2.6 ± 0.6*	-3.3 ± 0.9*	
d	-0.9 ± 1.2	2.6 ± 3.1	3.2 ± 1.6	1.3 ± 1.2	NS	NS	53.5 ± 28.4	0.7 ± 1.3	-0.6 ± 1.6	2.2 ± 1.5	3.1 ± 1.2*	4.1 ± 1.5*	2.8 ± 1.0*	2.3 ± 1.7	
R²	0.86	0.66	0.89	0.87	NS	NS	0.83	0.9	0.73	0.67	0.71	0.59	0.89	0.87	
6-model	M	17.2 ± 4.8*	11.3 ± 7.5*	14.3 ± 6.4	10.6 ± 4.4*	NS	NS	6.2 ± 5.9	6.5 ± 3.9	12.1 ± 7.2	5.7 ± 4.7	0.8 ± 5.2	9.1 ± 6.3	2.1 ± 3.9	16.2 ± 7.5
	A	5.2 ± 0.7*	3.4 ± 1.2	0.9*	3.6 ± 0.6*	NS	NS	7.7 ± 0.8*	6.6 ± 0.6*	2.7 ± 1.0*	0.7*	3.5 ± 0.7*	0.9*	2.7 ± 0.6*	3.2 ± 1.1*
	D	21.0 ± 11.6	0.6 ± 18.1	22.2 ± 15.4	3.0 ± 10.6	NS	NS	8.8 ± 14.3	0.7 ± 9.5	8.6 ± 17.4	15.0 ± 11.2	13.9 ± 12.4	1.3 ± 15.2	17.4 ± 18.0	15.5 ± 9.3
	Aa	8.8 ± 4.8	6.1 ± 7.5	8.2 ± 6.3	4.1 ± 4.4	NS	NS	4.1 ± 5.9	1.1 ± 3.9	5.3 ± 7.2	1.6 ± 4.6	5.3 ± 5.1	3.8 ± 6.2	3.4 ± 3.8	10.0 ± 7.4
	Ad	0.3 ± 3.1	1.4 ± 4.8	0.6 ± 4.1	1.2 ± 2.8	NS	NS	6.5 ± 3.8	10.7 ± 2.5	0.9 ± 4.6	0.7 ± 2.9	3.3 ± 3.3	2.1 ± 4.0	1.7 ± 2.5	0.8 ± 4.8
	Dd	11.1 ± 7.2	4.3 ± 11.2	9.5	0.3 ± 6.5	NS	NS	2.4 ± 8.8	0.7 ± 5.9	2.3 ± 10.8	11.9 ± 6.9	5.4 ± 7.7	1.5 ± 9.4	9.8 ± 5.7	9.4 ± 11.1
	R²	0.47	0.58	0.66	0.68	NS	NS	0.34	0.7	0.511	0.34	0.53	0.42	0.6	0.58
	Number of racemes plant -1 at second flowering														
3-model	W x Kin 1		W X Kin 2		W x Kin 3		W x Nyeri		W x Dwarf 1		W x Dwarf 2		W x Dwarf 3		
	KAB	OLJ	KAB	OLJ	KAB	OLJ	KAB	OLJ	KAB	OLJ	KAB	OLJ	KAB	OLJ	
M	8.3*	7.3*	7.8*	8.3*	10.7*	9.9*	9.9*	9.2*	4.9*	7.4*	5.3*	5.1*	6.5*	5.2*	
A	-4.7±1.6 *	-3.9±0.9*	-	4.9±1.2*	-4.5±0.7*	-5.6±1.4*	-7.5±0.6*	-5.6±0.9*	-0.5±1.7	-	-1.8±0.8*	-	-2.1±1.2	-1.5±1.0	
D	3.8±3.0	1.3±1.8	1.7±1.2	0.9±2.3	-1.1±1.4	-0.5±2.3	0.9±1.1	1.4±1.7	4.1±3.2	-1.0±1.5	6.5±1.6*	4.4±1.9*	2.6±2.2	1.7±1.9	
R²	0.88	0.68	0.81	0.57	0.77	0.58	0.63	0.46	0.65	0.47	0.48	0.51	0.94	0.77	
6-model	M	36.0 ± 10.1*	10.7 ± 9.1	13.6 ± 4.7*	1.2 ± 8.3	16.2 ± 5.2*	27.1 ± 9.7*	10.2 ± 3.3*	5.6 ± 6.4	28.6 ± 6.8*	8.9 ± 6.9	14.6 ± 6.9	5.9 ± 4.7	6.3 ± 7.3	7.5 ± 6.4
	A	4.6 ± 1.5*	3.7 ± 1.3*	0.7*	4.4 ± 1.2*	4.8 ± 0.7*	6.4 ± 1.4*	7.4 ± 0.5*	5.5 ± 0.9*	0.7 ± 0.9	2.5 ± 0.9	1.9 ± 0.9	2.0 ± 0.7*	1.4 ± 1.1	1.1 ± 0.9
	D	62.7 ± 24.4*	6.6 ± 21.8	8.8 ± 11.2	25.9 ± 20.0	18.4 ± 12.5	38.7 ± 23.2	16.5 ± 4.8*	15.4	39.1 ± 16.3*	0.5 ± 16.6	15.9 ± 16.6	11.3 ± 11.2	11.7 ± 17.6	4.1 ± 15.5

Aa	27.5 ± 10.0*	3.5 ± 8.9	6.1 ± 4.6	6.1 ± 4.6	4.8 ± 5.1	17.5 ± 9.6	0.3 ± 3.2	2.7 ± 6.3	25.3 ± 6.7*	1.9 ± 6.8	9.2 ± 6.8	2.1 ± 4.6	0.9 ± 7.3	3.3 ± 6.4
Ad	1.3 ± 6.5	2.0 ± 5.8	3.7 ± 2.9	5.5 ± 5.3	2.4 ± 3.3	7.9 ± 6.2	0.5 ± 2.1	1.1 ± 4.1	2.2 ± 4.3	1.1 ± 4.4	1.1 ± 4.4	4.2 ± 2.9	6.7 ± 4.7	4.2 ± 4.1
Dd	39.2 ± 15.1	4.4 ± 13.5	3.9 ± 6.9	19.8 ± 12.3	13.1 ± 7.7	20.5 ± 14.3	6.8 ± 4.8	13.2 ± 9.5	16.4 ± 10.0	2.8 ± 10.2	13.3 ± 10.2	10.2 ± 6.9	11.1 ± 10.9	6.6 ± 9.6
R²	0.63	0.39	0.34	0.46	0.16	0.48	0.49	0.34	0.15	0.09	0.26	0.3	0.32	0.04

Number of pods plant-1

3-model	W x Kin 1		W X Kin 2		W x Kin 3		W x Nyeri		W x Dwarf 1		W x Dwarf 2		W x Dwarf 3	
	KAB	OLJ	KAB	OLJ	KAB	OLJ	KAB	OLJ	KAB	OLJ	KAB	OLJ	KAB	OLJ
M	13.33*	17.99*	14.45*	17.72*	13.56*	21.98*	22.19*	20.30*	18.42*	20.45*	15.18*	16.17*	18.75*	17.23*
A	-9.2±2.4*	-9.1±1.6*	-	-11.6±2.6*	-5.6±3.3	-14.6±3.2*	-	-11±2.2*	-6.8±1.2*	-	-9.0±1.3*[	-	-	-
D	13.86±4.5*	5.13±3.1	9.5±2.2*	12.5±4.9*	12.9±6.2*	5.9±6.1	3.9±3.9	5.9±3.9	10.9±2.2*	4.4±4.6	11.4±2.5*	10.7±2.0*	5.6±2.96	4.9±2.9
R²	0.66	0.74	0.74	0.69	0.63	0.64	0.84	0.56	0.86	0.93	0.85	0.72	0.83	0.71
6-model														
	m	30.1 ± 16.8	42.6 ± 11.7*	18.4 ± 11.1	67.8 ± 9.2*	74.2 ± 11.7*	78.3 ± 14.1*	57.2 ± 11.6*	57.8 ± 5.8*	30.8 ± 6.3*	23.1 ± 22.2	40.9 ± 7.0*	28.7 ± 6.2*	47.9 ± 5.2*
	a	7.2 ± 2.4*	8.9 ± 1.7*	1.6*	9.9 ± 1.3*	6.3 ± 1.7*	15.5 ± 2.0*	1.7*	0.8*	7.9 ± 0.9*	3.2*	9.0 ± 1.0*	0.9*	0.7*
	d	34 ± 40.5	28.0	26.7	22.1*	28.2*	33.8*	27.8*	13.9*	15.1	53.4	16.9*	15.0	12.5*
	aa	15.7 ± 16.7	24.0 ± 11.5	4.0 ± 11.0	49.5 ± 9.1	58.3 ± 11.6	54.0 ± 13.9	34.3 ± 11.5	35.6 ± 5.7	12.1 ± 6.2	22.0	25.5 ± 6.9	12.1 ± 6.2	28.2 ± 5.2
	ad	19.6 ± 10.8	2.2 ± 7.5	1.2 ± 7.1	16.9 ± 5.9	5.7 ± 7.5	7.9 ± 9.0	8.9 ± 7.4	0.6 ± 3.7	11.9 ± 4.0	14.2	0.1 ± 4.5	8.7 ± 3.9	4.9 ± 3.3
	dd	33.3 ± 25.0	36.8 ± 17.3	4.4 ± 16.5	72.3 ± 13.6	104.4 ± 17.4 *	98.0 ± 10.9	53.9 ± 17.2	68.8 ± 8.6	19.6 ± 9.3	2.0 ± 33.0	36.4 ± 10.4	21.8 ± 9.2	20.0 ± 13.7
	R²	0.53	0.45	0.62	0.28	0.39	0.4	0.31	0.34	0.23	0.34	0.25	0.42	0.43

W=White Emergo, R²= coefficient of determination, KAB=Kabete, OJ=Ol Joro-orok, m = mean effect a = additive effect and d = dominance effect and NS = Means the populations did not show significant differences for this cross at (P ≤ 0.05) hence excluded from this analysis