

**Supporting information for**

Pollinator-mediated selection on flower color, flower scent and flower morphology of *Hemerocallis*:  
evidence from genotyping individual pollen grains on the stigma

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**Table S1** Floral traits of *H. fulva*, *H. citrina* and F2 hybrids.

Trait	<i>H. fulva</i>					<i>H. citrina</i>					F2 hybrids				
	mean	se	min.	max.	N	mean	se	min.	max.	N	mean	se	min.	max.	N
Tepal color (color chart)	22.8	0.10	21	23	50	3.2	0.87	3	4	8	11.9	0.31	3	23	269
Scent intensity	2.3	0.28	0.1	7.3	49	21.2	2.39	11.3	33.3	3	12.4	0.57	0.2	49.0	119
Corolla direction (°)	56.1	1.28	28.9	79.3	48	41.4	3.49	3.0	57.7	13	54.9	1.10	8.7	139.3	106
Stem height (cm)	93.8	1.93	73.5	134.6	41	92.2	4.01	68.0	112.7	8	105.3	1.10	64.5	142.8	259
ASD (mm)	22.5	0.92	12.6	39.4	41	13.2	1.12	6.0	20.0	14	14.1	0.51	0.5	32.2	143

**Table S2** Floral traits of flowers used in observations of swallowtail butterflies or hawkmoths

Floral traits	Observation of swallowtail butterflies			Observation of hawkmoths		
	Mean (SE)	Min.	Max.	Mean (SE)	Min.	Max.
Tepal color	18.6 (0.40)	3	23	18.7 (0.35)	3	23
Floral scent	5.61 (0.47)	0.1	33.3	5.29 (0.42)	0.1	33.3
Corolla Direction (°)	64.7 (0.95)	4	90	67.8 (0.76)	4	90
Stem height (cm)	98.9 (0.89)	53	139	99.2 (0.80)	60	132
ASD (mm)	21.4 (0.66)	0	70.5	20.3 (0.55)	0	56.4

**Table S3** Characteristics of the microsatellite loci

Locus	Repeat Motif	Primer sequences (5'-3')	Reference
HemC4	(CA) <sub>24</sub>	F: TGGGTCGCATAAAATGTGAA R: AAGTGCACAACGGAAGGTTT	Miyake & Yahara (2006)
HemC10	(AC) <sub>20</sub>	F: GCAGCCATAAAATCCCACAAC R: CGTACTCAGCAATGACGTTGA	Miyake & Yahara (2006)
HemC22	(CA) <sub>26</sub>	F: TTTGGGTCCGTCTCATTCTC R: CCCTGGATATAATGCTTTTGTCT	Miyake & Yahara (2006)
HemC25	(AC) <sub>15</sub>	F: TCTATGAGCGTGAGCGTGAG R: CGAGAGGGACACTTTTGGAA	Miyake & Yahara (2006)
Yha2L04E15	(AG) <sub>17</sub>	F: CTATTGTTCCCACTAGCTGA R: CCGAAGATGAAGACGAAGA	This study
Yha2L05M11	(TC) <sub>10</sub>	F: CCCATCTCTCCTTTCGAAGTC R: GGCCATGTTTGTATTGAGTT	This study
Yha3M14G09	(GA) <sub>14</sub>	F: TTCCGCAACAATAACAACCAT R: CAGACCCGAGAACGAGCATC	This study
Yha3M07F01	(CT) <sub>14</sub>	F: TTCAACTCCTCATAACCAACC R: CCCAAGCCAGTGATAACA	This study
Yha3M10C05	(TC) <sub>7..17..(TC)<sub>9</sub></sub>	F: AGGCATTTCACTCTATCGT R: CATTTCGCATCTCCGTC	This study
Yha3M15E09	(CT) <sub>15</sub>	F: GTCGGAATATCAAACCCTAAT R: CGAAGATGTTGCGATCCTC	This study

**Reference**

Miyake T, Yahara T (2006) Isolation of polymorphic microsatellite loci in *Hemerocallis fulva* and *Hemerocallis citrina* (Hemerocallidaceae). *Molecular Ecology Notes* **6**, 909-911.

**Table S4** Definitions of prior distribution of parameters

Parameters		Distribution	Mean	SD
$\beta_1$	Tepal color	Gaussian	0	1.0E+02
$\gamma_1$		Gaussian	0	1.0E+02
$\beta_2$	Scent intensity	Gaussian	0	1.0E+02
$\gamma_2$		Gaussian	0	1.0E+02
$\beta_3$	Corolla direction	Gaussian	0	1.0E+02
$\gamma_3$		Gaussian	0	1.0E+02
$\beta_4$	Stem height	Gaussian	0	1.0E+02
$\gamma_4$		Gaussian	0	1.0E+02
$\beta_5$	ASD	Gaussian	0	1.0E+02
$\gamma_5$		Gaussian	0	1.0E+02
$\beta_6$	number of visits per flower per trip bout	Gaussian	0	1.0E+02
$\alpha$	Intercept	Gaussian	0	1.0E+02
$r[i]$	Trip bout (random effect)	Gaussian	0	$\tau r$
$rp[i]$	Genet ID of experimental flowers (random effect)	Gaussian	0	$\tau rp$

**Table S5** Floral traits of flowers visited by swallowtail butterflies or hawkmoths

Floral traits	Visited by swallowtail butterflies			Visited by hawkmoths		
	Mean (SE)	Min.	Max.	Mean (SE)	Min.	Max.
Tepal color	22.0 (0.35)	7	23	21.4 (0.44)	3	23
Floral scent	2.29 (0.22)	0.1	6.8	3.44 (0.55)	0.1	32.9
Corolla Direction (°)	66.2 (1.63)	30	89	70.6 (1.20)	30	89
Stem height (cm)	100.0 (1.47)	74	130	96.6 (1.61)	60	127
ASD (mm)	25.1 (1.38)	0	52.2	22.2 (0.97)	2.3	44.3

**Table S6** Means and 95% confidence intervals of the posterior distribution of parameters in analyses of combined fitness index calculating with Ave. X/Ave. Y = 1.

Traits	$\beta$				$\gamma$			
	Mean	SD	2.5%	97.5%	Mean	SD	2.5%	97.5%
<b>Swallowtail butterflies</b>								
Tepal color	1.934	1.771	-1.368	5.723	-3.586	3.128	-11.263	0.844
<b>Scent intensity</b>	<b>-17.233</b>	<b>11.490</b>	<b>-41.541</b>	<b>-0.447</b>	<b>-25.116</b>	<b>13.699</b>	<b>-53.683</b>	<b>-4.738</b>
<b>Corolla direction</b>	<b>-0.034</b>	<b>0.333</b>	<b>-0.671</b>	<b>0.631</b>	<b>-1.263</b>	<b>0.361</b>	<b>-2.009</b>	<b>-0.589</b>
Stem height	0.188	0.297	-0.401	0.757	-0.006	0.256	-0.526	0.490
<b>ASD</b>	<b>-0.777</b>	<b>0.215</b>	<b>-1.207</b>	<b>-0.367</b>	<b>0.349</b>	<b>0.141</b>	<b>0.063</b>	<b>0.626</b>
<b>Hawkmoths</b>								
Tepal color	1.314	0.838	-0.206	3.086	0.163	0.560	-1.001	1.246
Scent intensity	-0.140	0.804	-1.748	1.451	-0.182	0.358	-0.977	0.479
Corolla direction	-0.285	0.226	-0.733	0.166	-0.266	0.182	-0.639	0.049
Stem height	0.028	0.271	-0.502	0.561	-0.249	0.198	-0.649	0.119
ASD	-0.229	0.207	-0.624	0.188	0.024	0.153	-0.280	0.309

Bold values are the effects of the parameters classified into groups of [negative] or [positive].