Supporting Information

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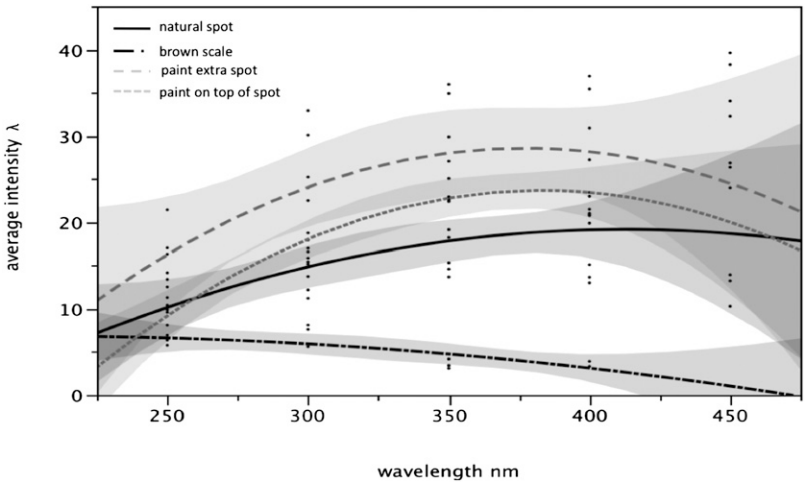

Fig. S1. Average UV reflectance spectra of dorsal spots with 95% confidence interval curves. $n = 5$ butterflies per spot, $n = 3$ for brown scales. Each butterfly was sampled three times. All spots, painted or natural, reflect in the UV (<400 nm), but brown scales do not. In the experiment with manipulated wild-type (Wt) and painted spots, females chose between a male with the two dorsal eyespot centers painted over ("paint on top of spot" spectra; painted Cu1 eyespot center measured above) and a male with two spots exhibiting the "natural spot" spectra plus two spots exhibiting the ectopic spot spectra ("paint extra spot").

Table S1. Impact of training male behavior on female mating outcome using a compound measure of male behavior (principle component analysis)

Principle component	2 UV spot χ^2	2 UV spot *P* value	4 UV spot χ^2	4 UV spot *P* value	1UV spot χ^2	1 UV spot *P* value	0 UV spot χ^2	0 UV spot *P* value
PC1	2.27	0.132	0.58	0.447	0.05	0.831	1.16	0.281
PC2	0.01	0.923	0.18	0.667	1.14	0.280	0.32	0.572

The χ^2 statistics depicted below are the result of a logistic regression of training male behavior on female mating outcome for each training male phenotype. Control two UV spot males from all experiments, $n = 77$; four UV spot $n = 25$, one UV spot, and zero UV spot, $n = 26$.

Table S2. Analysis of power of observed mating patterns

Compared treatments	Difference in proportion mated wild-type	Sample size used in experiments	Sample size required for $\alpha = 0.05$, $\beta = 0.80$
Naïve vs. 4 UV	0.52	51	34
2 UV vs. 4 UV	0.49	51	38
Naïve vs. 1 UV	0.05	50	3,209
2 UV vs. 1 UV	0.08	50	1,655
Naïve vs. 0 UV	0.02	52	8,809
2 UV vs. 0 UV	0.11	50	682

Sample sizes determined using a power analysis for detecting a difference between two proportions, with a continuity correction to the sample size formula based on the normal approximation to the binomial distribution. Analysis performed in JavaStat.

Table S3. Effect of zero-spot training male behavior on female mating patterns

		Effect likelihood ratio test	
Male behavior	Parameter estimate	χ^2	*P* value
Flutters	0.558	12.280	0.0005
Courting	1.561	6.142	0.013
Flights	−0.451	16.098	<0.0001
Circling	−4.202	12.434	0.0004

Stepwise nominal logistic model, best model contains flutters, courting, flights, and circling. Whole-model test: $\chi^2 = 21.867$, $P = 0.002$, generalized $R^2 = 0.778$.

Table S4. Comparison of training male behaviors

Training male behavior	χ^2	*df*	*P* value
Flutter	10.1674	5	0.0706
Flight	8.0806	5	0.1518
Walk	11.0535	5	0.0503
Circle	5.2769	5	0.3830
Court	4.5518	5	0.4730
PC1	1.3649	5	0.9281
PC2	6.8731	5	0.2302

Kruskal–Wallis test of training male behavior across treatments. Each control two UV spot treatment was treated separately, giving us a total of six treatments: signal enhancement, signal enhancement control, ancestral state, ancestral state control, no UV spots, no UV spot control.

Table S5. Principle component analysis of training male activity

	2UV Sp		4 UV Sp		1 UV Sp		0 UV Sp	
Loading	PC1	PC2	PC1	PC2	PC1	PC2	PC1	PC2
Fluttering	0.575	−0.110	0.597	−0.022	0.597	0.059	0.615	0.067
Walking	0.518	−0.143	0.556	0.067	0.558	0.008	0.522	0.136
Flying	0.551	−0.174-	0.564	−0.052	0.567	0.069	0.579	0.015
Circling	0.304	0.600	0.093	0.701	−0.016	0.724	−0.100	0.697
Courting	0.067	0.759	−0.085	0.707	−0.099	0.684	−0.077	0.700
Variation explained (%)	54.14	27.31	53.86	27.56	51.65	23.59	50.99	27.83

Principle component (PC)1 loadings are comprised of roughly equal proportions of flutterings, walking, and flying behaviors, and PC2 loadings comprise male circling and courting behaviors. Sp, spotty.