

TITLE. Evolutionary and ecological processes influencing chemical defense variation in an aposematic and mimetic *Heliconius* butterfly

Supplementary File 1

Table S1A. Cyanogenic glucoside compound concentrations (mean, standard deviation (SD) and *P*-values of Tukey HSD pairwise comparisons) in natural populations of *Heliconius erato* and *Passiflora biflora* sampled along environmental gradients in Panama and Ecuador. Statistically significant pairwise comparisons are marked in bold.

<i>H. erato</i>		<u>Linamarin %</u>					<u>Lotaustralin %</u>					<u>Total cyanogen %</u>										
Country	Population	Mean	SD	Pairwise comparisons (Tukey HSD <i>P</i> -value)					Mean	SD	Pairwise comparisons (Tukey HSD <i>P</i> -value)					Mean	SD	Pairwise comparisons (Tukey HSD <i>P</i> -value)				
				Dry	Int	Wet	Low	High			Dry	Int	Wet	Low	High			Dry	Int	Wet	Low	High
Panama	Dry	0.771	0.557						0.293	0.177						1.064	0.709					
Panama	Intermediate	0.776	0.465	0.997					0.495	0.218	<0.001				1.271	0.631	0.432					
Panama	Wet	0.569	0.356	0.445	0.295				0.337	0.198	0.766	0.007			0.907	0.521	0.905	0.098				
Ecuador	Low	0.011	0.028	<0.001	<0.001	<0.001			0.000	0.000	<0.001	<0.001	<0.001		0.011	0.028	<0.001	<0.001	<0.001			
Ecuador	High	0.026	0.033	<0.001	<0.001	<0.001	0.911		0.000	0.000	<0.001	<0.001	<0.001	1.000	0.026	0.033	<0.001	<0.001	<0.001	0.936		

<i>P. biflora</i>		<u>Passiflorin (µg/mg)</u>			<u>Passiflorin triglycoside (µg/mg)</u>			<u>Tetraphyllin A (µg/mg)</u>			<u>Total cyanogens (µg/mg)</u>										
Country	Population	Mean	SD	Pairwise comparisons (Tukey HSD <i>P</i> -value)			Mean	SD	Pairwise comparisons (Tukey HSD <i>P</i> -value)			Mean	SD	Pairwise comparisons (Tukey HSD <i>P</i> -value)							
				Dry	Int	Wet			Dry	Int	Wet			Dry	Int	Wet	Dry	Int	Wet		
Panama	Dry	11.005	9.459				0.732	0.620				0.113	0.416				11.850	10.073			
Panama	Intermediate	20.291	12.925	0.035			1.166	0.654	0.126			0.087	0.289	0.970			21.544	13.586	0.038		
Panama	Wet	17.095	7.528	0.123	0.653		0.911	0.497	0.598	0.478		0.000	0.000	0.448	0.709		18.005	7.953	0.146	0.627	

Table S1B. Variance components of *Heliconius* biosynthesized cyanogenic toxicity estimated with REML animal models. For each variance component, Variance (V), Standard error ($S.E.$) of variance, Statistical significance (P) of variance, and Proportion of variance of total phenotypic variance (V/V_P) are shown. In addition, broad-sense heritability H^2 (V_G/V_P) and evolvability e_μ (V_G/μ^2 ; %) are calculated based on the genetic variance component (shaded columns). Data consists of 322 observations, including 20 mothers, 13 fathers, and 289 F1 offspring belonging to 20 broods (of which 18 are full-siblings, and 2 are paternal half-siblings).

Model type	Cyanogen trait	Trait mean (μ)	Genetic variance component, heritability and evolvability					Maternal variance				Fixed effects				Residual variance			Total phenotypic variance				
			V_G	$V_G S.E.$	$P V_G$	H^2 (V_G/V_P)	e_μ (V_G/μ^2); %	V_{mat}	$S.E.$ V_{mat}	$P V_{mat}$	V_{mat}/V_P	Feeding treatment		Sex		V_R	$S.E.$ V_R	V_R/V_P	V_P				
												V_{trm}	$S.E.$ V_{trm}	P_{trm}	V_{trm}/V_P					V_{sex}	$S.E.$ V_{sex}	P_{sex}	V_{sex}/V_P
1	Total CNglc %	0.772	0.0093	0.0069	0.0368	0.1152	1.5548				0.001	7.E-05	0.467	0.011	0.001	7.E-05	0.057	0.011	0.070	0.008	0.874	0.0805	
1	Linamarin %	0.577	0.0063	0.0043	0.0202	0.1387	1.8869				5.E-05	4.E-06	0.418	0.001	0.001	5.E-05	0.036	0.013	0.038	0.004	0.848	0.0453	
1	Lotaustralin %	0.195	4.0E-04	3.9E-04	0.1304	0.0668	1.0394				5.E-05	4.E-06	0.621	0.008	3.E-05	2.E-06	0.224	0.004	0.005	0.001	0.929	0.0059	
2	Total CNglc %	0.772	1.0E-07	0.0312	1.0000	1.4E-06	1.7E-05	0.007	0.013	1.000	0.102	0.003	2.E-04	0.134	0.043	2.E-04	1.E-05	0.378	0.002	0.065	0.018	0.895	0.0727

