

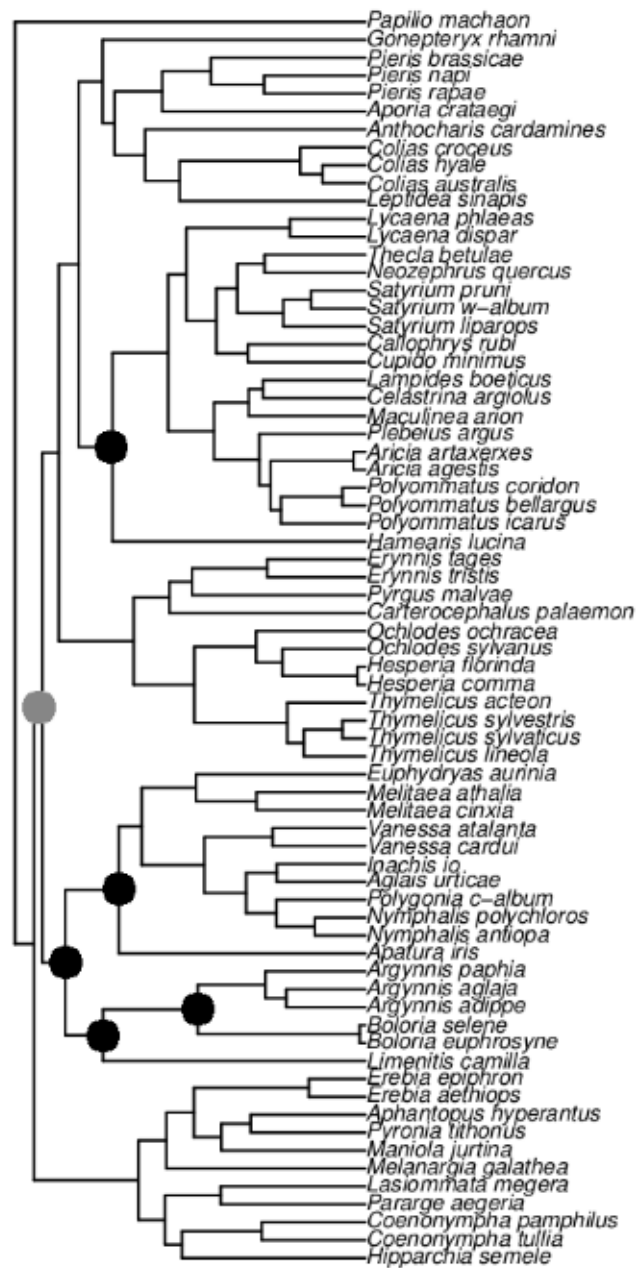
Ecography

ECOG-02658

Brooks, S. J., Self, A., Powney, G., Pearse, W. D., Penn, M. and Paterson, G. L. J. 2016. The influence of life history traits on the phenological response of British butterflies to climate variability since the late-19th century. – Ecography doi: 10.1111/ecog.02658

Supplementary material

Appendix 1. Figure A1. Butterfly phylogeny. Created as described in main text. Coloured circles at nodes indicate clades that were constrained to be monophyletic based on recent multi-locus higher-level Lepidoptera phylogenies; circles in black come from Wahlberg et al. (2009), while the grey circle is based on Mutanen et al. (2010). *Papilio machaon* was defined as the out-group for all BEAST analyses.



Appendix 1, Table A2. Correlation matrix of 20 life history traits of British butterflies. Figures in bold indicate significant correlation between traits. These co-varying traits were omitted from subsequent analyses.

	Mean fore wing length	Overwintering stage	Typical flight season length	Max number generations	First week in flight	Timing of flight season	Host breadth	Habitat	Range size	Mobility score	Niche breadth	Latitudinal extent of range	In % 10km grid squares occupied	In all host plants (AHP)	In principle host plants (PHP)	In core host plant (CHP)	Mean collection day	Median collection day	Northern range boundary 1995	Northern range boundary 1970
Overwintering stage	0.06																			
Typical flight season length	0.02	0.36																		
Max number generations	-0.17	0.23	0.77																	
First week in flight	0.04	-0.67	-0.75	-0.71																
Timing of flight season	0.02	-0.55	-0.56	-0.59	0.88															
Host breadth	-0.06	0.25	0.10	0.01	-0.13	-0.04														
Habitat	0.34	0.07	-0.11	-0.18	0.01	0.03	-0.04													
Range size	0.25	0.39	0.40	0.28	-0.32	-0.18	0.36	-0.04												
Mobility score	0.65	0.33	0.53	0.25	-0.39	-0.30	0.12	0.13	0.61											
Niche breadth	0.43	0.21	0.00	-0.05	0.01	0.07	0.45	0.32	0.36	0.31										
Latitudinal extent of range	0.16	0.30	0.43	0.30	-0.48	-0.33	-0.07	-0.08	0.36	0.45	0.04									
In % 10km grid squares occupied	0.23	0.35	0.53	0.41	-0.50	-0.32	0.12	-0.12	0.76	0.66	0.26	0.77								
In all host plants (AHP)	0.14	0.44	0.40	0.18	-0.49	-0.41	0.50	-0.02	0.48	0.46	0.37	0.48	0.62							
In principle host plants (PHP)	0.14	0.43	0.32	0.13	-0.44	-0.37	0.48	-0.06	0.45	0.43	0.37	0.47	0.61	0.99						
In core host plant (CHP)	0.06	0.30	0.16	0.07	-0.25	-0.24	0.47	-0.06	0.25	0.16	0.42	0.29	0.38	0.65	0.67					
Mean collection day	0.09	-0.70	-0.63	-0.64	0.94	0.85	-0.08	0.00	-0.19	-0.29	0.05	-0.42	-0.39	-0.39	-0.36	-0.21				
Median collection day	0.12	-0.70	-0.64	-0.65	0.95	0.84	-0.09	-0.01	-0.18	-0.27	0.05	-0.41	-0.37	-0.38	-0.35	-0.20	1.00			
Northern range boundary 1995	0.22	0.32	0.38	0.28	-0.44	-0.38	-0.07	-0.21	0.31	0.34	0.04	0.86	0.66	0.40	0.40	0.21	-0.34	-0.33		
Northern range boundary 1970	0.22	0.28	0.37	0.28	-0.44	-0.41	-0.05	-0.24	0.28	0.34	0.04	0.81	0.64	0.44	0.44	0.28	-0.35	-0.33	0.96	
10th percentile collection day	0.07	-0.70	-0.71	-0.66	0.96	0.84	-0.12	0.01	-0.26	-0.36	0.02	-0.47	-0.45	-0.45	-0.40	-0.22	0.98	0.99	-0.38	-0.38

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