### Appendix S2 to"Ecological specialisation is significantly associated with genetic structure"

**Table S3.** Results from generalized linear mixed models. Response variables were re-sampled to account for a potential bias introduced by uneven sample sizes. Values were calculated after randomly selecting five specimens per species 1000 times and averaged thereafter. All calculations were carried out using the “MCMCglmm” package in R with 1.3×106 iterations, and a burn-in period of 3×105 iterations. Phylogeny (Fig. S1) was included as a random effect in all models. Significant P-values are printed in bold.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Response variable** | **Fixed effects** | **Posterior mean** | **Lower 95% Confidence Limit** | **Upper 95% Confidence Limit** | **Effective sample size (ESS)** | **MCMC *P*-value** |
| **MICROEVOLUTION** |
| Maximum divergence, N = 5, each species’ mean of 103 iterations | Ant specialisation | 0.02794 | 0.00320 | 0.05331 | 2000 | **0.034** |
| Plant specialisation | 0.01683 | 0.00273 | 0.03137 | 2128 | **0.017** |
| Ant specialisation & Plant specialisation | -0.02881 | -0.06849 | 0.01100 | 2000 | 0.175 |
| Carnivory | 0.02431 | -0.01352 | 0.06202 | 2000 | 0.221 |
| Average geographic distance between samples | 0.00002 | 0.00001 | 0.00002 | 2000 | **<0.001** |
| Body size (wingspan mm) | 0.00149 | 0.00066 | 0.00234 | 2481 | **0.001** |
|  |  |  |  |  |  |
| Obligate ant parasites vs. obligate ant mutualists  | 0.00789 | -0.05571 | 0.0647 | 2000 | 0.784 |
| Average geographic distance between samples | 0.00002 | -0.00001 | 0.00005 | 2000 | 0.225 |
| Body Size (wingspan mm) | 0.00195 | -0.00104 | 0.00481 | 2000 | 0.199 |
|  |  |  |  |  |  |  |
| Haplotype diversity(*h*), N = 5, each species’ mean of 103 iterations | Ant specialisation | 0.15650 | -0.00406 | 0.30340 | 2000 | 0.053 |
| Plant specialisation | 0.13550 | 0.05008 | 0.22840 | 2000 | **0.003** |
| Ant specialisation & Plant specialisation | -0.01858 | -0.28220 | 0.25640 | 2000 | 0.888 |
| Carnivory | 0.13130 | -0.07781 | 0.35850 | 2000 | 0.225 |
| Average geographic distance between samples | 0.00004 | 0.00001 | 0.00008 | 2000 | **0.021** |
| Sample size | -0.00022 | -0.00077 | 0.00029 | 2000 | 0.442 |
| Body size (wingspan mm) | 0.00644 | 0.00104 | 0.01181 | 2000 | **0.016** |
|  |  |  |  |  |  |
| Obligate ant parasites vs. obligate ant mutualists  | 0.02651 | -0.15880 | 0.22230 | 2000 | 0.779 |
| Average geographic distance between samples | 0.00001 | -0.00008 | 0.00012 | 2621 | 0.790 |
| Body size (wingspan mm) | 0.00201 | -0.00599 | 0.01048 | 1843 | 0.638 |
|  |  |  |  |  |  |  |
| Isolation by distance (IBD) coefficient *r*, N = 5, each species’ mean of 103 iterations | Ant specialisation | 0.05234 | -0.12650 | 0.24130 | 1606 | 0.606 |
| Plant specialisation | 0.05383 | -0.05716 | 0.16740 | 2000 | 0.370 |
| Ant specialisation & Plant specialisation | -0.06775 | -0.38410 | 0.25170 | 2000 | 0.682 |
| Carnivory | 0.42650 | 0.15700 | 0.69300 | 2000 | **0.001** |
| Average geographic distance between samples | -0.00030 | -0.00008 | 0.00002 | 1585 | 0.295 |
| Body size (wingspan mm) | 0.00256 | -0.00447 | 0.00976 | 2000 | 0.464 |
|  |  |  |  |  |  |
| Obligate ant parasites vs. obligate ant mutualists  | 0.24320 | -0.07447 | 0.56250 | 2000 | 0.119 |
| Average geographic distance between samples | 0.00009 | -0.00008 | 0.00026 | 2000 | 0.292 |
| Body size (wingspan mm) | -0.00012 | -0.01530 | 0.01615 | 2000 | 0.987 |

## Acknowledgements

This study could not have been achieved without the specimens and data contributed by many scientists and available through BOLD and GenBank. We thank C. Adams, J. Adams, T. Alario, T.D. Als, G. Ardeleanu, A. Atkins, A.J. Berry, M.F. Braby, E. Brockmann, S.S. Brown, E. Buck, D. Campbell, M. Canfield, F. Carasa, J. Ciampini, K. Cockburn, V. Colomer, S. Cuvelier, A.V. Danchenko, J. Dantart, L. Dapporto, V. Dincă, M. Djuric, K.L. Dunn, D. Edge, M. Engra, M. Erazo, S. Ercić, J. Estela, S. Fisher, R. Gadeberg, V. Gagić, Ó. García, J.A. García-Alamá, E. García-Barros, A. Gardiner, F. Gil-T., M. Goia, F. González, O. Gorbunov, E. Hasanagić, A. Heath, J. Hernández-Roldán, J.J. Herrero-Borgoñón, M. Huertas, M.A. Ibáñez-Orrico, A.A. Illum, J. Jubany, N.P. Kandul, A.I. Knight, Z. Kolev., R. Laffitte, T.B. Larsen, A. Leavesley, S. Lelo, J. Lluc, D.J. Lohman, V. Lukhtanov, P. Maina, E. Maravalhas, F. Mars, E. Martínez, D.J. Martins, J. Mathew, L. Matthews, T. McAvoy, D.N. Merrill, A. Mignault, D.L. Miller, J. Mills, M.S. Molgaard, S. Montagud, H. Mortera, M.L. Munguira, M. Mutiso, P.S. Nielsen, B. Obanda, J. Pérez-López, A. Petrović, M.J. Picó, M. Piera, J. Pino, E. Planas, G. Pratt, D. Rand, J. Requejo, L. Rieppel, I. Rodrigo, H. Romo, N. Ruzafa, M. Sanchís, J. Saruni, H. Selb, A. Sendra, A. Shapiro, N. Shapoval, N.J. Shtinkov, P.A. Sousa, C. Stefanescu, D.L. Stern, L. Szekely, D. Tan, S. Teruel, W. Tiren, Ž. Tomanović, M.A. Travassos, S. Viader, J.C. Vicente, R. Vodă, D. Wagner, M. Wah Tan, A.A.E.W. Williams, D.M. Wright, G.E. Wurtz, M. Zapater and V. Žikić for contributing DNA material. We are grateful to R. Hawkins for logistic support and S. Salzman and S.D. Kocher for help and advice in the laboratory. A. Heath, D.J. Lohman, R.K. Robbins and V. Lukhtanov contributed to the data on lycaenid specialisation, A.J. Berry, J. Seger and N.K. Whiteman provided helpful discussions about possible interpretations of population genetic parameters, and N. Wahlberg, L. Sundström, J. Eilenberg, S. Johnson and two anonymous reviewers gave useful comments on earlier versions of this manuscript.