## Supplemental Results and Figures

#### PRISMA Flow Diagram

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| A flowchart of a scientific experiment  Description automatically generated  **Fig. S1.** PRISMA flow diagram of the literature search and screening process. |

#### Acute and acclimation for different trait categories across marine, freshwater and terrestrial taxa

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| **Fig. S2- Acute and Acclimation across traits for A) marine, B) freshwater and C) terrestrial systems**. k = total number of effect size estimates while the numbers in brackets indicate the number of species. Thick bars indicate 95% confidence intervals and thin bars indicate 95% prediction intervals. The x-axis is truncated for ease of visualisation. |

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| **Fig. S3- Acute and Acclimation across traits for A) marine, B) freshwater and C) terrestrial systems.** k = total number of effect size estimates while the numbers in brackets indicate the number of species. Thick bars indicate 95% confidence intervals and thin bars indicate 95% prediction intervals. The x-axis is truncated for ease of visualisation. |

#### Comparing raw variance changes using

Analysis of suggested that variance increases with higher temperatures across all habitat types, with terrestrial ectotherms having the smallest increase in variance ([**Fig. S9**](#fig-s1), **Table S1**).

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| A diagram of a graph  Description automatically generated with medium confidence  **Fig.** **S9**. **Estimated mean for marine, freshwater and terrestrial systems.** Note there were no differences between acute and acclimation types so they were averaged. Thick black bars are 95% confidence intervals (CI’s) and thin bars 95% prediction intervals (PI’s). The percentage change in variance is also back calculated. Note that these are raw variances and do not account for changes in mean physiological rates. k = total number of effect size estimates while the numbers in brackets indicate the number of species. |

**Table** **S1:** Model estimates, standard error, and 95% credible intervals comparing changes in acute and acclimation across habitat types. Model estimates are based off 1,253 effect sizes from 139 studies.

| **Parameter** | **Estimate** | **Est.Error** | **l-95% CI** | **u-95% CI** |
| --- | --- | --- | --- | --- |
| **Fixed Effects** | | | | |
| Intercept | 0.4932 | 0.10684 | 0.2984 | 0.7281 |
| Acclimation Time (z scaled) | -0.0001 | 0.00071 | -0.0015 | 0.0013 |
| Acclimation Effect | -0.0247 | 0.04247 | -0.1097 | 0.0593 |
| Habitat (Marine) | -0.0024 | 0.09890 | -0.1957 | 0.1968 |
| Habitat (Terrestrial) | -0.2032 | 0.10196 | -0.3956 | -0.0049 |
| Acclimation\*Marine | -0.0857 | 0.07817 | -0.2389 | 0.0700 |
| **Random Effects** |  |  |  |  |
| Study | 0.3647 | 0.03944 | 0.2910 | 0.4434 |
| Phylogeny | 0.1194 | 0.09729 | 0.0043 | 0.3630 |
| Species | 0.0821 | 0.05471 | 0.0041 | 0.2017 |
| Trait | 0.3134 | 0.04159 | 0.2386 | 0.3975 |

#### Plots of for multi-level models

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| A graph of a number of percents  Description automatically generated with medium confidence  **Fig. S10- estimates. A) B) and C) .** |

#### Publication Bias Analysis

Funnel plots did not show any noticeable deviation from the typical funnel shape for any of the effect size estimates ([**Fig. S11**](#fig-s2)).

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| A graph of a number of dots  Description automatically generated with medium confidence  **Fig. S11. Funnel plot of precision (1/sampling standard error) against effect size for A) log response ratio (), B) log coefficient of variance ratio () and C) log variance ratio ().** Both acute (‘green’) and acclimation (‘orange’) effect sizes are plotted. |