***Note***

**Temperature-dependence of growth allometry**

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Abstract

Introduction

Materials and Methods

*Allometric growth model*

The allometric growth can be rewritten as:

Find derivative with respect to *T*. Apply product rule:

Factor out :

Go back to normal form:

cannot be 0, so parenthesis needs to be. If is a constant, the expression for the maximum does not have in it. If declines with temp, optimum is lower for larger masses. (Show this in a figure, two allometric growth curves, with or without temperature effect on )

In this study, we utilize a newly collated dataset on the intraspecific scaling of body growth in relation to temperature. Given that we use strictly below-optimum data, we do not find an overall clear interaction. However, including data near or beyond will lead to an interaction (maybe show this also? Fit the same model to all data?), likely a negative one since large fish have a lower optimum growth temperature (Lindmark et al. 2021).

*Data*

We use data from a recently published meta-analysis.

*Statistical Analysis*

\*Explain brms models here

Results

|  |  |  |
| --- | --- | --- |
|  | **log y** | |
| *Predictors* | *Estimates* | *CI (95%)* |
| Intercept | 0.63 | 0.29 – 0.96 |
| log mass ct | -0.37 | -0.40 – -0.33 |
| temp arr ct | -0.61 | -0.71 – -0.51 |
| log\_mass\_ct:temp\_arr\_ct | 0.02 | -0.01 – 0.05 |
| N species\_ab | 13 | |
| Observations | 156 | |
| Marginal R2 / Conditional R2 | 0.748 / 0.884 | |

Fig. 1. PLACEHOLDER: illustrate unimodal growth~temperature curves for two sizes for growth calculated with and without temperature-dependent allometric exponent.

Chart

Description automatically generated with medium confidence

Fig. 2

Discussion

Discussion

Code and Data Availability

All data and R code (lists of studies in literature search, data preparation, analyses and figures) can be downloaded from a GitHub repository (<https://github.com/maxlindmark/warm_life_history> ) and will be archived on Zenodo upon publication.

References

Lindmark, M., J. Ohlberger, and A. Gårdmark. 2021. Optimum growth temperature declines with body size within fish species. bioRxiv 2021.01.21.427580.

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Author Contributions

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Supporting Information

A picture containing chart

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A picture containing graphical user interface

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