

Metadata information

for

MSc. Thesis: Climate change and ectotherms - How rising temperatures might elevate rates of evolution

by

Lennart Gries

Multiple R scripts and small data sets were created as part of a MSc. thesis supervised by Prof. Susanne Fritz and Prof. Markus Pfenninger, which was completed in May 2023. Below you can find 1.) where the data is stored, 2.) descriptions of the created R scripts and 3.) a literature list with references to all publications from which data for temperature dependent generation time was extracted.

1. Zenodo data

The following files were uploaded on and distributed with Zenodo under the Creative Commons Attribution 4.0 International license.

Data is available at: <https://doi.org/10.5281/zenodo.7817384>

Data

Temperature-generation time sheet.xlsx	Temperature dependent generation time data for 153 species collected from literature
modelcomp.xlsx	Comparison of AUC and R ² values for different temperature-dependent generation time models
spec_models_gen.xlsx	Temperature coefficients and intercept of selected linear-log models
GBIF_species_list.xlsx	Final list of selected species
var_list_allSpec.xlsx	Selected bioclimatic variables used to construct SDMs

R-Scripts

- | | |
|--------------------------------|-----------------------------|
| 1. Starting Script Data Prep.R | See list of R scripts below |
| 2. Model Selection GT.R | See list of R scripts below |
| 3. GBIF occurrence data.R | See list of R scripts below |

4. CHELSA Bioclim Aggregate Prep.R	See list of R scripts below
5. OccToGrid.R	See list of R scripts below
6. Latitude model.R	See list of R scripts below
7. Extent Select and Pseudosample Generation.R	See list of R scripts below
8. Variable Select.R	See list of R scripts below
9. gam.variable.select.script.R	See list of R scripts below
10. SDM Ensemble.R	See list of R scripts below
11. Temperature transform.R	See list of R scripts below
12. GPY all climates.R	See list of R scripts below

2. List of scripts

Scripts can be used in the same order as given below to apply the developed methodology and reproduce the results with the same data set.

Temperature-dependent generation time models:

- *1. Starting Script Data Prep.R*
 - Read in temperature ~ generation time sheet and prepare basic data frames
- *2. Model Selection GT.R*
 - Build temperature dependent generation time models and check which one has the best fit, create data frame with model coefficients
- *3. GBIF occurrence data.R*
 - Download GBIF data, clean and transform data for the next steps

Species distribution models:

- *4. CHELSA Bioclim Aggregate Prep.R*
 - Read in bioclim data, aggregate to 50x50 km and create raster stacks
- *5. OccToGrid.R*
 - Occurrence data is fitted to a 50x50 km grid
- *6. Latitude model.R*
 - Check for the influence of latitude on G~T models
- *7. Extent Select and Pseudosample Generation.R*

- Find extent based on gridded occurrence data, create buffer zones and sample pseudoabsences
- 8. *Variable Select.R* + 9. *gam.variable.select.script.R*
 - Select variables for SDMs
- 10. *SDM Ensemble.R*
 - Build SDMs and predict occurrences using the ensemble approach

Stage-structured population model:

- 11. *Temperature transform.R*
 - Transform temperature of projected habitat to generation time
- 12. *GPY all climates.R*
 - Count generations per year for all scenarios

3. Reference list for temperature-dependent generation time data

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