Data from: Consistent temperature dependence of functional response parameters and their use in predicting population abundance

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Abstract

1. Global warming is one of the greatest threats to the persistence of populations: increased metabolic demands should strengthen pairwise species interactions, which could destabilise food webs at the higher organisational levels. Quantifying the temperature dependence of consumer-resource interactions is thus essential for predicting ecological responses to warming. 2. We explored feeding interactions between different predator-prey pairs in

temperature-controlled chambers and in a system of naturally-heated streams. We found consistent temperature dependence of attack rates across experimental settings, though the magnitude and activation energy of attack rate was specific to each predator, which varied in mobility and foraging mode. 3. We used these parameters along with metabolic rate measurements to estimate energetic efficiency and population abundance with warming. Energetic efficiency accurately estimated field abundance of a mobile predator that struggled to meet its metabolic demands, but was a poor predictor for a sedentary predator that operated well below its energetic limits. Temperature effects on population abundance may thus be strongly dependent on whether organisms are regulated by their own energy intake or interspecific interactions. 4. Given the widespread use of functional response parameters in ecological modelling, reconciling outcomes from laboratory and field studies increases the confidence and precision with which we can predict warming impacts on natural systems.

Usage Notes

Abundance, respiration, and feeding rates of freshwater invertebrates in the laboratory and field at increasing temperatures

Contains: data on the abundance of Limnophora riparia, Potamophylax cingulatus, and Simuliidae in the Hengill geothermal stream system, Iceland, along with data on respiration rates of L. riparia and P. cingulatus, and feeding rate data of both species (on Simuliidae prey) in the laboratory and field across a gradient of temperatures. These datasets also contain information on the natal stream (IS = stream identifier), natal stream temperature, experimental temperature, mass, species, initial prey number, and experimental setting (laboratory or field) where appropriate.
Archer et al data.zip

References

This dataset is supplement to https://doi.org/10.1111/1365-2656.13060

Location

Hengill

Iceland

Keywords

Predictive Modelling, Potamophylax cingulatus, trophic interactions, Limnophora riparia,

consumer-resource, predator-prey, Freshwater, Aquatic, population dynamics, climate change

Files

2 files for this dataset

Archer et al data.zip	5.24 kB	application/zip
README_for_Archer et al data.txt	2.23 kB	text/plain

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