

Effects of water temperature on growth and developmental plasticity in larval stages of *Agalychnis callidryas*

Christopher Attewell-Hughes¹ and Matthew O'Donnell¹

¹The University of Manchester Manchester Museum

April 04, 2024

Abstract

Several climatic models predict Central America will experience increased temperature over the coming century. Highly sensitive to changes in their environment, amphibian responses to changes in temperature may impact their response to climate change. Water temperature can affect tadpole development in rate and size and may impact survivability with many tropical species operating within their optimal range. This study investigated effects of four water temperatures on growth and development of *Agalychnis callidryas* tadpoles in a controlled lab setting. Weekly measurements were taken for head width; body, tail and total length; developmental stage reached; time till emergence from the water; and exit weight. Those kept at 24 °C grew significantly larger ($p < 0.5$) than those at 22, 26 and 28 °C by week 4. Those kept at 22 °C exited the water significantly later ($p < 0.5$) than other groups. Developmental stages were significantly different between 22 °C and all other treatments for weeks 4 and 7, but not to 28 °C during weeks 5 and 6. There was no significant difference in exit weight. Our results build on prior works, which indicated significant differences between *A. callidryas* kept at extremes of temperatures (21 and 29 °C). These results suggest a possible limit to phenotypic plasticity in a species which operates close to its optimal temperature in the wild. This may have impacts on future ecosystem management for anurans in response to climate change.

Hosted file

EFFECT~1.DOC available at <https://authorea.com/users/763612/articles/741000-effects-of-water-temperature-on-growth-and-developmental-plasticity-in-larval-stages-of-agalychnis-callidryas>