Evolutionary change in metabolic rate of Daphnia pulicaria following invasion by the predator Bythotrephes longimanus

varsha rani¹, Matthew Walsh², Tim Burton³, and Sigurd Einum³

¹Centre for Ecological Research
²University of Texas at Arlington
³Norwegian University of Science and Technology

April 13, 2022

Abstract

Metabolic rate is a trait that may evolve in response to the direct and indirect effects of predator-induced mortality. Predators may indirectly alter selection by lowering prey densities and increasing resource availability or by intensifying resource limitation through changes in prey behaviour (e.g. use of less productive areas). In the current study we quantify evolution of metabolic rate in the zooplankton Daphnia pulicaria following an invasive event by the predator Bythotrephes longimanus in Lake Mendota, Wisconsin, US. This invasion has been shown to dramatically impact D. pulicaria, causing a 60% decline in their biomass. Using a resurrection ecology approach, we compared the metabolic rate of D. pulicaria clones originating from prior to the Bythotrephes invasion with that of clones having evolved in the presence of Bythotrephes. We observed a 7.4% reduction in metabolic rate among post-invasive clones compared to pre-invasive clones, and discuss the potential roles of direct and indirect selection in driving this change.

Hosted file

Ecology and Evolution MS_resubm_wo_tracks.docx available at https://authorea.com/users/450377/articles/565158-evolutionary-change-in-metabolic-rate-of-daphnia-pulicaria-following-invasion-by-the-predator-bythotrephes-longimanus
