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# High number of small populations as a tool to study evolutionary and ecological processes of diversification: insight from Arctic charr in lava caves

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## Abstract

A key question in evolutionary biology is to understand which factors shape biological diversity. This is especially true at the intraspecific level, where evolutionary and ecological processes interact to shape the phenotypic and genetic structure of natural populations. Long-term monitoring studies on highly replicated natural populations are particularly powerful to study processes of diversification in space and time. We have studied phenotypic and genetic diversity of Arctic charr (*Salvelinus alpinus*) from twenty lava caves around Lake Myvatn, NE. Iceland, for four years. Mark-recapture studies, combined with population genetics, show that these caves are inhabited by small local populations of charr with very low connectivity across caves. Tagging of individuals, combined with measurements of growth and morphology, further show phenotypic divergence at small spatial scales. Additionally local ecological factors seem to affect phenotypic traits in these populations. These results strongly indicate that both evolution and ecological factors play a role in shaping genetic and phenotypic structure of wild populations at contemporary time scale.

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