EVOLUTION OF DISPERSAL IN AMERICAN PIKA METAPOPULATIONS

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The motivation for this work is driven by a desire to understand the evolution of dispersal in populations of American pikas (*Ochotona princeps*) and especially how global warming will affect their survival. American pikas are small, diurnal herbivores, whose physiology limits their range to areas with cold climates, primarily on mountains near or above treeline. Precisely these regions are expected to experience the greatest impact of global climate change (GCC). Therefore, intuition suggests that pikas are exposed to great risk from GCC. However, field data are ambiguous at best. How GCC is affecting pika populations, and if this species will be able to adapt to what changes are occurring are still open questions.

We derive a mechanistic dispersal model in semi-discrete time, meaning continuous within-phases dynamics (e.g. emigration, immigration, chasing territory) connected with discrete between-phases dynamics (e.g. winter survival, breeding). Our metapopulation model contains infinitely many patches with different local population sizes. Local catastrophes occur with a rate which can depend on the local population size.

We derive (a proxy for) the invasion fitness with which we are able to investigate the adaptive dynamics of dispersal in this model. We have considered GCC as a change in model parameters, e.g. catastrophes, dispersal cost, mortality and survival rate. In this presentation we will explore how these potential effects of GCC will affect the evolutionarily stable dispersal strategies.

Keywords: dispersal, adaptive dynamics, american pika