Chaos in Ecology?

The Dynamic and Evolutionary Characteristics of a Discrete Time Competition Model

Master of Science Thesis

Jörgen Ripa

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Abstract

A discrete time density-dependent competition model was used to simulate evolution of a haploid (asexual) species with discrete, nonoverlapping generations. The dynamic and evolutionary characteristics of the model were studied, especially on the boundary to and within the parametric region of periodic and chaotic dynamics.

Numerical simulations revealed K-selection, favouring genotypes with high equilibrium densities (K) and low intrinsic growth rates (r). High growth rates give chaotic dynamics, ergo chaos seems to be evolutionary repelling.

Only in the region of periodic and chaotic dynamics stable coexistence of a low r genotype and a high K genotype was possible without an existing fixed point.

Populations containing two different genotypes with few exceptions exhibited dynamics corresponding to an intermediate growth rate, which was analytically motivated.

Supervisors:

Sigfrid Lundberg (Theoretical Ecology)

Gunnar Ohlén (Mathematical Physics)