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Spatial vs. individual variability with inheritance in a stochastic Lotka-Volterra system ULRICH DOBRAMYSL, UWE C. TAUBER, Department of Physics, Virginia Tech — We investigate a stochastic spatial Lotka-Volterra predator-prey model with randomized interaction rates that are either affixed to the lattice sites and quenched, and / or specific to individuals in either population. In the latter situation, we include rate inheritance with mutations from the particles' progenitors. Thus we arrive at a simple model for competitive evolution with environmental variability and selection pressure. We employ Monte Carlo simulations in zero and two dimensions to study the time evolution of both species' densities and their interaction rate distributions. The predator and prey concentrations in the ensuing steady states depend crucially on the environmental variability, whereas the temporal evolution of the individualized rate distributions leads to largely neutral optimization. Contrary to, e.g., linear gene expression models, this system does not experience fixation at extreme values. An approximate description of the resulting data is achieved by means of an effective master equation approach for the interaction rate distribution.

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