

A Stochastic Lattice Model Versus a Deterministic Approach to Modeling the Spatial Dynamics of an Invading Species

by

Alex Heitman and Ben Wells

Abstract. The objective of this project was to study the dynamics of the interaction between an invasive predator and a native two-species ecosystem in equilibrium. An invading predator was introduced to both the Lotka-Volterra predator-prey system and the two species competition system. We studied deterministic models of these two systems to gain a base understanding of three species dynamics. We then created a lattice-based stochastic model, based on the deterministic models, in order to study the spatial effects of such an invasion and add the realism of randomness and local interaction to our model. Finally, the deterministic model was extended to study the effects of an invasive predator in a connected two patch system.