

1107-34-147

Donald L. DeAngelis* (ddeangelis@bio.miami.edu), Biology Department, University of Miami, 1301 Memorial Drive, Coral Gables, FL 33124, **Bo Zhang** (bo@bio.miami.edu), Biology Department, University of Miami, 1301 Memorial Drive, Coral Gables, FL 33124, and **Wei-Ming Ni** (wmni@umn.edu), School of Mathematics, University of Minnesota, Minneapolis, MN 55455.
Modeling Allee Effect on Population Invasion of a Patchy, Heterogeneous Environment. Preliminary report.

A recent result for a reaction-diffusion partial differential equation is that a population diffusing at an intermediate rate in an environment in which resources vary spatially will reach a higher total equilibrium biomass than the population in an environment in which the same total resources are distributed homogeneously. This result, originally proven for the case in which the reaction term has only one parameter, $m(x)$ (x is spatial distance), that is both the growth rate coefficient and carrying capacity of the population, has been extended to the logistic reaction term, with independent parameters, $r(x)$ for intrinsic growth rate, and $K(x)$ for carrying capacity. When $r(x)$ and $K(x)$ are proportional, the earlier results still hold. Here we add an Allee effect to the logistic model, in which the Allee threshold, A , for a population to invade is the same at each point in space, but the growth rate of the population varies spatially. When there is diffusion in space, invasion can occur even though the initial population averaged across space is less than the population level needed to exceed the Allee threshold. Criteria for invasion of a patchy environment are presented and studied with simulations. (Received January 11, 2015)