

Global dynamics of a competition model with nonlocal dispersal I: The shadow system

Fang Li*

Center for Partial Differential Equations, East China Normal University, 500 Dong Chuan Road, Minhang 200241, Shanghai, P.R. China

Yuan Lou

Department of Mathematics, The Ohio State University, Columbus, OH 43210, USA

Yang Wang

The School of Science, Hangzhou Dianzi University, Hangzhou, Zhejiang, 310018, P. R. China

Abstract

Equations with non-local dispersal have been widely used as models in biology. In this paper we focus on logistic models with non-local dispersal, for both single and two competing species. We show the global convergence of the unique positive steady state for the single equation and derive various properties of the positive steady state associated with the dispersal rate. We investigate the effects of dispersal rates and interspecific competition coefficients in a shadow system for a two-species competition model and completely determine the global dynamics of the system. Our results illustrate that the effect of dispersal in spatially heterogeneous environments can be quite different from that in homogeneous environments.

Keywords: Non-local dispersal, Competition, Shadow system, Global dynamics

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*Corresponding author

Email addresses: fangli0214@gmail.com, 86-21-54343067 (Fang Li), lou@math.ohio-state.edu (Yuan Lou), yangwang79@126.com (Yang Wang)

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