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Yuan Lou* (lou@math.ohio-state.edu), Department of Mathematics, Ohio State University, Columbus, OH 43210, and **Robert Stephen Cantrell** and **Chris Cosner**. *Approximating the Ideal Free Distribution via Reaction-Diffusion-Advection Equations.*

We consider reaction-diffusion-advection models for spatially distributed populations that have a tendency to disperse up the gradient of fitness, where fitness is defined as a logistic local population growth rate. We show that in temporally constant but spatially varying environments such populations have equilibrium distributions that can approximate those that would be predicted by a version of the the ideal free distribution incorporating population dynamics. The modeling approach shows that a dispersal mechanism based on local information about the environment and population density can approximate the ideal free distribution. The analysis suggests that such a dispersal mechanism may sometimes be advantageous because it allows populations to approximately track resource availability. The models are quasilinear parabolic equations with nonlinear boundary conditions. (Received September 15, 2007)