1035-35-776   **Yuan Lou*** (`lou@math.ohio-state.edu`), Department of Mathematics, Ohio State University, Columbus, OH 43210, and **Xinfu Chen** and **Richard Hambrock**. *Evolution of conditional dispersal: a reaction-diffusion-advection model.* Preliminary report.

To study evolution of conditional dispersal, a Lotka-Volterra reaction-diffusion-advection model for two competing species in a heterogeneous environment is proposed and investigated. The two species are assumed to be identical except their dispersal strategies: both species disperse by random diffusion and advection along environmental gradients, but one species has stronger biased movement (i.e., advection along the environmental gradients) than the other one. It is shown that at least two scenarios can occur: if only one species has strong tendency to move upward the environmental gradients, the two species can coexist since one species mainly pursues resources at places of locally most favorable environments while the other relies on resources from other parts of the habitat; if both species have such strong biased movements, it can lead to overcrowding of the whole population at places of locally most favorable environments, which causes the extinction of the species which has stronger biased movement. These results provide a new mechanism for the coexistence of competing species, and they also imply that selection is against excessive advection along environmental gradients due to overcrowding, and an intermediate biased movement rate may evolve. (Received September 15, 2007)

1