1053-92-319   **Robert Stephen Cantrell** and **Chris Cosner*** (`gcc@math.miami.edu`), Department of Mathematics, University of Miami, Coral Gables, FL 33124, and **Yuan Lou**. *Evolution of dispersal and the ideal free distribution.*

A general question in the study of the evolution of dispersal is what kind of dispersal strategies can convey competitive advantages and thus will evolve. We consider a two species competition model in which the species are assumed to have the same population dynamics but different dispersal strategies. Both species disperse by random diffusion and advection along certain gradients, with the same random dispersal rates but different advection coefficients. We find a conditional dispersal strategy which results in the ideal free distribution of species, and show that it is a local evolutionarily stable strategy. (A population has an ideal free distribution if all individuals have the same fitness and no individual can increase its fitness by moving.) We further show that this strategy is also a convergent stable strategy under suitable assumptions, and our results illustrate how the evolution of conditional dispersal can lead to an ideal free distribution. The underlying biological reason is that the species with this particular dispersal strategy can perfectly match the environmental resources, which leads to its ﬁtness being equilibrated across the habitats. (Received September 08, 2009)