The evolution of conditional dispersal strategies in spatially heterogeneous habitats. (English summary)


Summary: “To understand the evolution of dispersal, we study a Lotka-Volterra reaction-diffusion-advection model for two competing species in a heterogeneous environment. The two species are assumed to be identical except for their dispersal strategies: both species disperse by random diffusion and advection along environmental gradients, but with slightly different random dispersal or advection rates. Two new phenomena are found for one-dimensional habitats and monotone intrinsic growth rates: (i) If both species disperse only by random diffusion, i.e., no advection, it was well known that the slower diffuser always wins. We show that if both species have the same advection rate which is suitably large, then the faster dispersal will evolve. (ii) If both species have the same random dispersal rate, it was known that the species with a little advection along the resource gradient always wins, provided that the other species is a pure random disperser and the habitat is convex. We show that if both species have the same random dispersal rate and both also have suitably large advection rates, the species with a slightly smaller advection rate always wins. Implications of these results for the habitat choices of species are discussed. Some future directions and open problems are addressed.”

References

30. Grindrod, P., 1988. Models of individual aggregation or clustering in single and

Note: This list reflects references listed in the original paper as accurately as possible with no attempt to correct errors.

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