

# Allee effects and species coexistence

- Understanding how species co-exist is central in ecology and evolution.
- When rates of reproduction decline at low population density, species are said to exhibit an “Allee effect”.
- We study the evolution of Allee effects and the consequences for species co-existence.
- Allee effects have historically been thought to make species persistence and co-existence more difficult.
- We have shown, however, that when resource abundance varies in space, Allee effects can promote co-existence (Figure 1).
- We are now investigating how variation in resource abundance can select for different types of density-dependence.
- We have shown that evolution of density-responses can enable species to co-exist along a resource gradient (Figure 2).

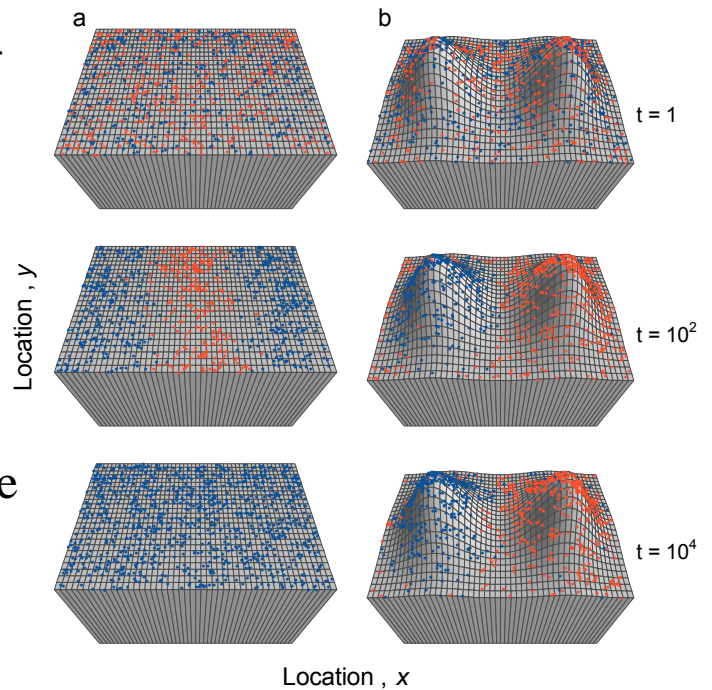


Figure 1. Sample model runs in a landscape where resources are (a) uniformly distributed and (b) distributed according to two symmetric Gaussian peaks. Colored points correspond to individuals of two species. Both species exhibit reduced fitness at low density.

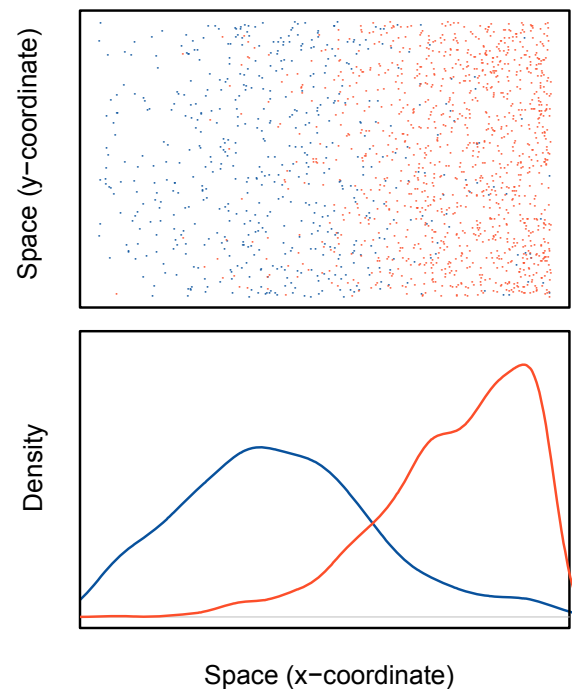


Figure 2. Species can evolve density-responses that enable them to inhabit regions with different resource abundances. Top panel shows individuals distributed across space when there is a resource gradient (resource availability increases from left to right). Bottom panel shows the resultant density of each species. The blue species is thus a “low density” specialist.

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