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Poster Session 35: Evolutionary Ecology

Thursday, August 11, 5:00 PM - 6:30 PM, Exhibit Hall 220 A-E, Level 2, Palais des congrès de Montréal

Dispersal and the relative importance of local recruits versus immigrants in affecting animal distributions: a simulation study.

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ABSTRACT- The population dynamics, and therefore the population size and distribution, of a species depend on birth, death, immigration and emigration of individuals. While the birth and death components have received much attention, immigration and emigration and their influence on the spatial distribution of population sizes have been underappreciated as central processes. The unanswered question is: under which conditions does the influence of immigration and emigration on population sizes increase relative to the importance of local recruits and how does this shape dispersal patterns over a landscape? I approached this question with a simple, deterministic simulation model set on a landscape lattice with varying habitat quality. Each cell contained a population with the basic dynamics of density-regulated birth and death, and was connected to other populations by immigration and emigration that decayed in intensity with distance. As expected, the degree to which dispersal influenced the distribution of abundances depended on the absolute amount of dispersal, but the most influential parameter besides dispersal rate was the difference between potential reproductive rate and death rate. In a species with a difference between potential reproductive rate and average death rate considerably larger than one, the population dynamics were dominated by local recruitment, while a difference between the two rates close to one led to a strong influence of dispersal. The influence of dispersal on spatial distribution is an equalization of population sizes, which decays with distance, leading to an increase in spatial autocorrelation. Consequences of the presented results to distribution modeling and conservation management are discussed.

Key words: dispersal, distribution modeling, autocorrelation, population dynamics