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Individual-based modeling and the consequences of Allee effects

One of the advantages of using an individual-based modeling approach in ecology is to better understand the link between intra-specific interactions and population-level dynamics. In this case, certain assumptions about spatially localized behavior can influence how individual processes scale to higher levels of organization. Specifically, when individual fitness depends on the presence of conspecifics (i.e., density dependence), properties of local interaction neighborhoods and propensity for dispersal can have ecological and evolutionary consequences. Here I will focus on the scenario of a founder population at low density, and consider how positive density dependence (i.e., Allee effects) and spatial structure interact to impact population persistence. The overall aim is to highlight the spectrum of behaviors that emerge from our individual-based model in order to further consider approaches to approximate the results with aggregate models.