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Density Dependence in Demography and Dispersal Generates Fluctuating Invasion Speeds.

It is well-known that density dependence generates temporal fluctuations in population density. However, the ways in which density dependence affects spatial population processes, such as species invasions, is less understood. In this talk, we explore endogenous density dependence as a mechanism for inducing variability in biological invasions with a set of integro-difference population models that incorporate density dependence in demographic or dispersal parameters. We show that density dependence in demography at low population densities—i.e., an Allee effect—combined with spatiotemporal variability in density behind the invasion front can produce fluctuations in spreading speed. The necessary density fluctuations behind the front can arise from either overcompensatory population growth or from density-dependent dispersal, both of which are common in nature. Our results demonstrate that simple rules can generate complex spread dynamics, and highlight a novel source of variability in biological invasions that may aid in ecological forecasting (Received August 01, 2017)