Spatial populations with seed-bank

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In this lecture we consider a spatial population with seed-bank. Individuals carry one of two types, live in colonies labelled by a countable Abelian group playing the role of geographic space, and are subject to resampling and migration as long as they are *active*. Each colony has a seed-bank into which individuals can retreat to become *dormant*, suspending their resampling and migration until they become active again. Our goal is to understand in what way the seed-bank *enhances genetic diversity*.

When individuals become dormant they adopt a *random colour* that determines their wake-up time. The system of continuum stochastic differential equations describing the population in the large-colony-size limit has a unique strong solution that converges to an equilibrium parametrised by the initial type densities. This equilibrium exhibits a dichotomy between two phases: *coexistence* (= locally multi-type equilibrium) versus *clustering* (= locally mono-type equilibrium). We identify the parameter regimes for which these two phases occur. We also establish the *finite-systems scheme*, i.e., identify how a finite truncation of the system (both in the geographic space and in the seed-bank) behaves as both the time and the truncation level tend to infinity, properly tuned together.