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Joint evolution of dispersal propensity and site selection in structured metapopulation models

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HIGHLIGHTS

Joint evolution of dispersal propensity and site selection in structured metapopulation models

- We develop a novel approach for modeling metapopulations with two levels of dispersal: local dispersal from site to site within a patch and global dispersal from patch to patch.
- We derive a proxy for invasion fitness in this model and study the joint evolution of site selection and propensity for global (long-distance) dispersal.
- Metapopulation structure allows extremely complicated evolutionary scenarios for site selection.
- The evolutionary dynamics of propensity for long-distance dispersal are mainly determined by the global-level ecological factors but are also strongly affected by winter-survival probabilities of the site-holders.
- As our main result, we show that the evolutionary dynamics are often dominated by indirect factors that take place via density-dependence. This means that predictions concerning the evolutionary effects of ecological changes cannot be based on intuition, which underlines the need for mechanistic models suitable for evolutionary analysis.

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