Title:	Transient dynamics in metapopulations depend on the nature of density-dependence of growth
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Abstract:	Single species discrete population growth is modelled using one-dimensional uni-modal maps having different types of density dependent functions specific to the species life history. These models exhibit similar sequence of bifurcation dynamics – from a fixed point to chaotic – with increasing growth rates. A metapopulation of single species subpopulations, coupled through inter-patch migration, can be modelled using the coupled map lattice (CML) formalism. Even though dynamical behavior of such metapopulation models has been done under many conditions, a systematic analysis of the transient behaviors exhibited in these CMLs is lacking. In this study, first a detailed characterization of the spatiotemporal transient states is developed for one-dimensional CMLs. Then the role of three specific single species growth models, having different density dependent functions (viz, logistic, Ricker, and Hassell), is studied to evaluate their influence in developing and maintaining transient states for local and non-local couplings. Our results show that, even when the growth functions (maps) belong to the same universality class and show similar period doubling route to chaos, the three different metapopulations exhibit significant differences in their transient states. The CML with logistic growth function shows opposite trends when compared to the CMLs with Ricker and Hassell growth functions. Our results demonstrate that transient dynamics in metapopulations depends specifically on the nature of density-dependence of the species growth functions. This can have important implications in biodiversity and conservation practices in ecology, where understanding the growth dynamics of different species in the metapopulation scenario are crucial.
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