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Genetic effects of introduced species on their native competitors in habitats with different spatial structures

When a new species is introduced to a habitat where it did not occur before, it interacts with the members of the local community and influences them in many ways. Most empirical and theoretical work so far has focused on how introduced species cause changes in population sizes of interacting native species. However, little is known on the genetic effect of introduced species on their native competitors, predators, or prey species. Using analytical arguments and computer simulations, we aim to understand how the amount and spatial structure of genetic variation in a native species changes after the introduction of an ecologically similar competitor. Genetic variation measured in terms of the expected heterozygosity at a neutral locus declines after the introduction event, reaches a minimum, and eventually rises again provided that the native species does not go extinct. The severity of this reduction as well as the time scale on which it occurs depend on the number of introduced individuals, the size, and the spatial structure of the native population. The expected impacts differ between single homogeneous populations, subdivided populations, and metapopulations subject to local extinction and recolonization. These results for neutral loci suggest that also variation at loci for ecologically important traits may be affected by competition with introduced species, thus influencing the species ability to adapt to new environmental conditions.