
Consequences of multi-species introductions on island ecosystems

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Abstract

Multiple interacting introduced species are now the norm on islands across the planet, but the consequences of this for native species and ecological communities can only be properly understood if the mode of ecosystem regulation is taken in to account. In contrast to continents where predation-controlled top-down trophic regulation is the norm, islands are predominantly resource-limited bottom-up trophic regulated ecosystems, reliant on temporally-varying, externally-driven nutrient inputs. The outcome of interactions among introduced species on their population dynamics will depend on their relative trophic position, ultimately determining whether their combined impacts on native species are additive, multiplicative or suppressive of one another. Changes at different scales in community structure that occur following multiple introductions, and their effect on function, can be investigated from analysis of ecological networks. Understanding how both species population dynamics and community structure change following multiple species introductions to bottom-up regulated ecosystems will better inform appropriate conservation management strategies on islands. This will be particularly important when predicting the consequences of invasive species eradications, where an ordered ecological disassembly that minimises adverse effects in the wider community is to be preferred. Restoration targets can then be set that focus on removing or minimising the impact of keystone introduced species and re-establishing bottom-up trophic regulation dominance on islands. Although a robust understanding of the consequences of multiple species introductions to ecosystems requires extensive data, islands provide an opportunity where resolvable networks and consistent patterns in species introductions and interactions can facilitate predictability.

Keywords: conservation, eradication, interaction, invasive, restoration, trophic

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