The impacts of exotic species can be better understood by accounting for demographic variation, positive interaction outcomes, and community composition

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Abstract

Biological invasions have long fascinated ecologists as they fundamentally alter ecological communities, often in surprising ways. The demography of interacting native and exotic populations are core drivers of invasion impact. Demographic models estimate the strength of species interactions but have several shortcomings, often ignoring positive interactions and focusing only on competition, disregarding individual-level variance in demographic parameters, and focusing on one exotic species at a time. In this study, we investigate the fitness outcomes of eleven native and exotic species from a diverse annual plant community in Western Australia. We use a Bayesian demographic modelling approach that integrates demographic variation. Positive effects of exotic species played an integral role in the invaded community, but demographic variation caused many species interaction outcomes to vary from positive to negative, regardless of abiotic conditions. Our approach reveals variation that could be responsible for the diverse and unexpected impacts of exotic species on recipient communities.

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