

On linking mechanism to invasive species impact

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Abstract

Species invasion represents one of the major drivers of biodiversity change globally, yet there is widespread confusion about the nature of non-indigenous species (NIS) impact. This stems from differing notions of what constitutes invasive species ‘impact’ and the scales at which it should be assessed. At local scales, the mechanisms of impact on competitors can be classified into four scenarios: 1) minimal impact from NIS inhabiting unique niche space; 2) neutral impact spread across the community and proportional to NIS abundance; 3) targeted impact on a small number of competitors with overlapping niches; and 4) pervasive impact that is disproportionate to NIS abundance and caused by modifications that filter out other species. I developed a statistical test to distinguish these four mechanisms based on community rank-abundance curves and then created a scale-independent standardized impact score. Using an example long-term dataset, that has high native plant diversity and an abundance gradient of the invasive vine, *Vincetoxicum rossicum*, I show that impact resulted in either targeted extirpations or widespread biodiversity loss. Regardless of whether NIS impact is neutral, targeted or pervasive, the net outcome will be the homogenization of ecosystems and reduced biodiversity at larger scales, perhaps reducing ecosystem resilience.

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