Seed limitation interacts with biotic and abiotic causes to constrain novel species' impact on community biomass and richness

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Abstract

Seed limitation can narrow down the number of coexisting plant species and limit plant community productivity. It is also likely to constrain community responses to changing environmental and biotic conditions. In a 10-year full-factorial experiment of seed addition, fertilisation, warming and herbivore exclusion, we tested how seed addition alters community richness and biomass, and how its effects depend on seed origin and environmental and biotic context. We found that seed addition increased richness in all treatments, and increased community biomass depending on nutrient addition and warming. Novel seeded species, originally absent from the communities, increased biomass the most, especially in fertilised plots and in the absence of herbivores, while adding seeds of local species did not affect biomass. Our results show that dispersal limitation can constrain the invasion of novel species and their effects on community biomass, and demonstrate that these relationships are contingent on trophic interactions and environmental conditions.

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