
How diversity, density and maturity of restored plant communities influence invasion success

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Abstract

Active restoration of native plant cover is increasingly being advocated as a method to reduce invasive alien plant species (IAPS) establishment and spread. Of all the processes underlying invasion resistance, competition for resources is a major process that could be manipulated by restorationists to combat invasion. Tipping the competitive balance in favor of natives could be achieved by giving a time advance to the restored community, generating "priority effects". Through priority effects, the restored native community benefit of a fitness advantage by which they better resist invasions. How priority effects are influenced by community characteristics is still unknown, but could be very useful to practitioners to improve invasion resistance of restored communities. We designed a pot experiment to simulate a situation in which seeds of three IAPS in France (*Ambrosia artemisiifolia*, *Bothriochloa barbinodis*, *Cortaderia selloana*) reach soil covered with restored native communities composed of commercial plant varieties. We assessed how species diversity (1, 3 or 9 sp.), density (4 or 15 g.m⁻²), and age of the community (1 or 5 months) influence germination, survival, growth and phenology of the three IAPS. In addition to global community characteristics, we also analyzed how soil nutrient content, community cover, and the features of the immediate neighborhood at the time of introduction (i.e. canopy density and the distance to-/the identity of the closest neighbor) affect the performance of each IAPS individual. This study provides new useful insights to elaborate revegetation strategies effective against IAPS.

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