

Gap colonization in the Patagonian semidesert: seed bank and diaspore morphology.

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Abstract

We report work on a cold, windy South American steppe dominated by tussock grasses and shrubs of small stature that, together, cover only half of the soil surface. Our objective was to find out why seedlings and juveniles of these dominant species are generally absent from the bare or poorly-populated spots (gaps) that exist between established individuals. We hypothesized that matrix-forming species fail to colonize gaps because of a lack of properly-placed seeds, contained in diaspores which because of their morphology are blown away from gaps that otherwise would constitute safe sites for recruitment. We evaluated diaspore size and wing loading (weight:area ratio) for all common species in the community, collected seed-bank samples in different occasions and microsites, and performed detailed field observations for one gap-dwelling species during several years. We found that: (1) Seeds of the dominant, matrix forming species are uncommon in the soil bank of the center of the gaps between established vegetation. (2) Seeds of the dominant species are more abundant towards the edges of the gaps than at their center. (3) Diaspores of those species present in the seed bank of the gaps are smaller than diaspores of absent species; contrary to expectations, not all gap-dwelling species had larger diaspore wing loading than non-gap species. (4) Seeds and adult densities of the most common gap species (the annual *Camissonia dentata*), were correlated between them and across subsequent years. We conclude that it is not an overall shortage of seeds what precludes the dominant species from becoming established in the gaps, but rather the seeds' uneven spatial distribution. We further argue that gaps would be suitable sites for recruitment, but large diaspore size makes seeds of the dominant species to be blown away by the strong westerly winds.