

Sheltered or suppressed? Tree regeneration in unmanaged European forests

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Abstract

Tree regeneration is a key demographic process influencing long-term forest dynamics. It is driven by many biotic and abiotic factors. Thus, predictions of tree regeneration are challenging because of complex feedbacks along climatic gradients. The stress gradient hypothesis (SGH) and life-history strategies (LHS) provide a framework for assessing such feedbacks across different species ranges. To address these topics, we analyzed regeneration for 24 tree species in 6,540 plots from 299 unmanaged European forests. Negative interactions predominated, with their intensity decreasing under stressful conditions for most species, as predicted by the SGH. However, positive interactions were only evident for a few species. Our study indicates that SGH and LHS can be combined to partially explain within- and between-species differences in tree recruitment. Moreover, our

findings imply that projections of forest dynamics along wide climatic gradients must accommodate both negative and positive biotic interactions, as they strongly affect rates of community turnover.

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