Combined effects of seed and soil quality drive seedling performance of a late-successional canopy tree in a tropical forest

Jun 26, 2017
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Abstract

Habitat loss and fragmentation affect the structure and functioning of forested ecosystems worldwide, yet we lack an understanding of how species respond to environmental changes. Here, we examined reproductive success and seedling performance of Poulsenia armata (Moraceae) in continuous and fragmented forests of Los Tuxtlas, southern Mexico. We further investigated how maternal habitat and soil conditions manifested in the seedling stage. We determined seed quality and seedling performance by combining isotopic analyses in seed quality with field observations of P. armata fruit production and a common-garden experiment. Soil conditions in forest fragments negatively impacted P. armata reproductive success. Trees of P. armata in forest fragments were smaller in size and produced fewer fruits and smaller seeds with lower quality compared with trees from the continuous forest. The combined effects of maternal habitat and soil conditions determined seedling survival and growth of this tropical tree. Notably, seedlings had restricted plasticity for biomass allocation to roots, limiting the capacity of fragmented populations to compensate for the initial low N content in seeds. Trees in forest fragments at Los Tuxtlas produced offspring competitively inferior and potentially less resilient than counterparts in continuous forest, jeopardizing future persistence of this late-successional tree species.

Read the article in Biotropica. [1]

Associated Project:
Spatial Patterns of Demography [2]

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DOI for citing:
DOI: 10.1111/btp.12466

Source URL:

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