

2019

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Elsevier B.V.

<https://doi.org/10.1016/j.gecco.2019.e00807>

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Abstract

Studies on germination behavior are important tools for understanding how environmental factors affect geographic distribution and colonization of invasive plants. Particularly seedlings of invasive plant species benefit from high light intensity, as often found in disturbed areas of low canopy cover. We investigated the effect of various shade levels on seed germination and early growth of the invasive tree *Maesopsis eminii* at the nursery of a biodiversity hotspot, the Amani Nature Forest Reserve, Tanzania. Shade houses provided forest-like sun flecks of four categories (0%, 50%, 65% and 85% shade), representing light regimes found in tropical natural forests throughout the entire growing season. The average germination rate across the four different shade levels differed significantly during the dry season ($F_{3,12} = 48.74$, $P < 0.001$) but not in the wet season ($F_{3,12} = 3.49$, $P = 0.051$). Final germination percentage at 0% shade was 1.5 times higher compared to that under 85% shade during the wet season. In both dry and wet seasons, stem diameter, shoot height, total fresh and dry biomass significantly decreased with an increase in shade levels. During the dry season, leaf chlorophyll contents were three times higher at 85% and 65% shade than at 0% shade. Both seasonality and shade levels as well as their interactions influenced most germination parameters but not growth parameters except stem diameter. We conclude that *M. eminii* seed germination is fostered by light as it prefers colonizing in forest gaps, and lower light levels might act as a barrier to its invasive capacity, particularly during the dry season. Hence, management strategies of *M. eminii* should include the provision of unfavorable light regimes and take seasonality into account.

Keywords

Shade; Biodiversity; hotspot Tree seedling; Forest gaps; Disturbance