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Factors Affecting Growth, Survival and Leaf Functional Traits of Tree Saplings Planted Along a Successional Chrono-Sequence in Endane Biodiversity Corridor in Southwestern, Sri Lanka

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Abstract

The growth of a sapling is influenced by species, succession, and habitat characteristics such as shade and elevation. Forest restoration efforts often fail due to insufficient consideration of habitat characteristics and site-species suitability. In this study, we examined how habitat characteristics, successional age and elevation affect growth, survival, and functional traits of 13 threatened tree species planted in Endane Biodiversity Corridor in Southwestern Sri Lanka. The growth parameters and selected leaf functional traits in 13 threatened tree species interplanted within four successional ages (marginal tea, scrub, woodland 1, and woodland 2) with contrasting elevation and canopy closure were measured after one year of planting and analyzed using a linear mixed-effect model. We found that mean annual height growth in different habitats increased significantly with successional age, from the highest being in shaded woodland, the lowest growth ($p<0.001$) in open marginal tea habitats. Mean annual diameter growth also varied by successional age but did not follow the same trend as height growth due to differences in canopy closure. A strong positive correlation was observed between height and diameter growth one year after planting (r=0.71, $p<0.001$). Chlorophyll content increased with succession, the highest in a shaded woodland ($p<0.001$). In contrast, leaf dry matter content (LDMC) and leaf mass per area (LMA) decreased with successional age, with marginal tea showing the highest values ($p<0.001$). The LMA variability was explained by LDMC (r=0.41, $p<0.001$) and leaf thickness (LT) (r=0.42, $p<0.001$). These results provide valuable insights into long-term monitoring of restoration success in *Endane* Biodiversity Corridor in Southwestern Sri Lanka.

Keywords: *Mean annual height growth, Species selection, Specific leaf area, Specific dry matter content*