



Vegetation Structure and Natural Regeneration of Native and Replanted Mangrove Species in Mandaitivu Lagoon, Northern Sri Lanka

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Mangrove restoration is widely executed to rehabilitate degraded coastal ecosystems; however, evaluations of the structural development and regeneration of restored species remain limited. Mandaitivu in Jaffna Lagoon is an important restored mangrove ecosystem in Northern Sri Lanka. This study assessed vegetation structure, species composition, and regeneration status of native and replanted mangrove species in Mandaitivu, Jaffna Lagoon. Field surveys were conducted using 27 quadrats (10 × 10 m) established along nine line transects positioned perpendicular to the shoreline. Within each quadrant, the prominent species, tree height, diameter at breast height (DBH), abundance of trees, saplings, and seedlings were recorded. Community diversity was assessed using the Shannon–Wiener Diversity Index (H'), while regeneration was evaluated using demographic cohort structure. Five mangrove species were recorded, with *Avicennia marina* (76.2%) and replanted *Rhizophora mucronata* (23.8%) dominating the study area. Species diversity was relatively low ($H'=0.55$), reflecting monospecific distribution. *Avicennia marina* exhibited greater structural development, with a higher mean height (1.71m) and mean DBH (17.9cm) than *R. mucronata* (1.61 m and 9.1 cm, respectively). Larger height (up to 5.18 m) and DBH (~ 83cm) classes were predominant in *A. marina*, whereas *R. mucronata* had a lower DBH ranged (<20cm) and reached a maximum height of 3.05m. *A. marina* showed substantially greater seedling and sapling abundance, indicating effective natural regeneration (Succession Index (SI)>1) and *R. mucronata* shows a SI=0; which reveals the environmental bottleneck while replanted trees survived. The native *A. marina* demonstrates greater structural maturity and regeneration potential rather than re-planted *R. mucronata*. The findings suggest that conservation of natural mangroves should be prioritized. Restoration should be applied selectively in degraded areas where natural regeneration is inadequate, with long-term monitoring to evaluate ecosystem recovery.

Keywords: *Jaffna lagoon, Mandaitivu, Mangrove restoration, Natural regeneration, Vegetation structure*