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Assessment of Short-Term Dynamics in Tree Diversity in Wet Zone Rainforest, Sri Lanka

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Abstract

Forest cover in Sri Lanka has changed rapidly during the last century. Tree diversity assessment is a crucial requirement at present due to pressure on forests from human activities. This study addresses changes in tree diversity and endemism in wet zone rainforests in Sri Lanka from 2017 to 2022. This study employed a multi-step approach to assess diversity using forest inventory data obtained from the Forest Department of Sri Lanka for the year 2017 and 2022 at same locations. Further, the sample locations were selected randomly throughout the wet zone forest, covering all the conserved, reserved and to be forests. Initially, the Shannon-Weiner index was used to assess diversity, followed by applied Pielou's index and Margalef index to determine evenness and species richness, respectively. Subsequently, Non-metric Multi-Dimensional Scaling (NMDS) analysis was used to analyze species occurrence variation from 2017 to 2022. Finally, an analysis of similarities (ANOSIM) was employed to further investigate species variation over the same period. The findings revealed an increase in both diversity and species richness, as indicated by the Shannon-Weiner index and Margalef index, respectively. However, species evenness showed a decline according to Pielou's index. On average, the Shannon-Weiner index (H′) varied from 2.27 to 2.33 while the evenness index changed from 0.86 to 0.85, and the species richness Margalef index shifted from 15.39 to 16.17 from 2017 to 2022, respectively. The study also observed that the numbers of species, genera, and families tended to decrease with rising altitudes in wet zone forests. The finding that invasive plant species considerably increased by 28.71% while endemic plant species decreased by 18.74% was particularly concerning. Among these, *Alstonia macrophylla* was the most widespread invasive species across the wet zone, while *Acacia mangium* and *Annona glabra* were newly recorded invasive plants as of 2022. These findings offer essential insights for land managers, policymakers, and conservationists, highlighting the urgency of promoting conservation measures to protect endemic and threatened species to maintain ecosystem resilience and long-term stability. This study's results will signify the proper control of invasive species within the wet zone forests and management practices aimed at protecting Sri Lanka's rich biodiversity and mitigating further ecosystem degradation.

Keywords: *Vegetation dynamics, Short term diversity, ANOSIM, Evenness, NMDS, Species richness, Tree diversity*