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The vegetation structure and floristic composition of tropical rainforest landscape, at Udakiruwa, Sri Lanka

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The Udakiruwa rainforest fragments in the Uva province, Sri Lanka, represent the last remaining refugia in the Eastern part of the country. Within these forest fragments, populations of endemic plant species thrive, however, many of them are now threatened due to overexploitation of forest products and agricultural expansions. To address the conservation of these endangered species and the maintaining of ecosystem services in Udakiruwa forest fragments, baseline information is crucial. Therefore, this study aimed to examine the species composition and structure of the forests in both old-growth and secondary forest landscapes in Udakiruwa. In this study, we recorded the diameter and species composition of trees in 44 randomly located circular plots, where the tree diameter at breast height (DBH) was greater than 5 cm. The individuals were categorized into five DBH classes (5-9.9 cm, 10-29.9 cm, 30-49.9 cm, 50-69.9 cm, and >70 cm). A total of 1408 individuals, representing 79 species, 38 families, and 62 genera, were recorded from this comprehensive study. Out of the total number of species identified, 25 were endemic. *Mallotus fuscescens* and *Dipterocarpus zeylanicus* emerged as the most abundant species as 70% of the established experimental plots. However, the endemic species such as *Shorea dyeri* (5%), *Euonymus walkeri* (0.1%), *Strombosia ceylanica* (2%), *Palaquium hinmolpedda* (1%), *Diospyros ebenoides* (0.1%), *Mangifera zeylanica* (3%), *Calophyllum tomentosum* (0.1%), and *Garcinia quaesita* (1%) were found to be present in very low numbers. The total basal area of individuals in the site was measured to be 912.615 m^2, and further investigation revealed that 28 out of 44 plots had experienced selective logging. Notably, 87.5% of recorded *Shorea dyeri* in the experimental plots fell under the DBH classes of 5-9.9 cm and 10-29.9 cm, while *Dipterocarpus zeylanicus* was most abundant in the DBH size class >70 cm. The calculated Shannon diversity index and evenness of species were 1.823 and 0.780, respectively, indicating a diverse and relatively balanced ecosystem. However, sites closer to rubber cultivations and those located at the forest edge reported a high disturbance index (7.879), suggesting the impact of human activities on these fragmented lowland forests. The lowland fragmented forest landscapes of Udakiruwa are rich with many endemic species, emphasizing the urgent need for immediate conservation actions to conserve this unique rainforest ecosystem.

Keywords: Diversity indices, Endemic species, Rainforest, Species composition, Udakiruwa

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