

A study on floristic structure and its
relationships with edaphic factors in the
Waturana swamp forest, Sri Lanka

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Abstract

The last remaining fresh water swamp forest in Sri Lanka, Waturana, ($6^{\circ} 37' - 6^{\circ} 38' N$, $80^{\circ} 11' - 80^{\circ} 12' E$), is a peculiar ecosystem. The extent of the forest is 12 ha due to severe anthropogenic activities. This is the first study that analyzes the floristic data in relation to edaphic conditions. This study was performed in two phases. First, floristic inventory was prepared for the total forest area. Secondly, a quantitative study of vegetation and soil characters were performed. Quadrats of $10\text{ m} \times 10\text{ m}$ were laid on a stratified random manner in 12 localities representing different habitats. Vegetation and soil parameters were determined using standard methods. Soil parameters and species abundance data were subjected to principal component analysis in order to identify the plant communities.

Total flora enumerated 172 species which belonged to 138 genera and 74 families. Out of the total species, 44 % were endemics. Three distinct strata of the forest could be identified namely canopy layer ($<10\text{ m}$), shrub layer ($<5\text{ m}$) and ground layer ($<1\text{ m}$). Most dominant tree species was *Macaranga digyna*. Based on family important value index of trees, the highest abundance was recorded for the family Euphorbiaceae. Shannon Wiener diversity index for trees was 2.62. Most dominant sapling species was *Stemonoporus moonii* (Dipterocarpaceae). Shannon Wiener index was recorded as 2.61 for saplings and as 2.80 for seedlings. Most dominant seedling species was *Calamus radiates* (Arecaceae).

Pearson correlation analysis of soil characters and species abundance revealed that species abundance was positively and significantly related to the percentage of total Nitrogen ($r = .576$, $p = 0.05$), negatively and significantly related to pH ($r = -0.714$, $p = 0.009$) whereas no significant relationships observed between plant abundance and other soil parameters.

Principal component analysis indicated three distinct community types with relation to plant abundance and edaphic factors. Forty eight plant species presented in community one that was highly diverse and restricted to elevated areas. Community two was found from gully areas with boggy soil and recorded 41 plant species. Both communities one and two were having broad range of soil parameters where community three had very narrow ranges of edaphic factors. Community three was restricted in elevated hillocks that were least diverse recording 31 species.

Waturana should be identified as a priority area of biodiversity conservation for its extremely high biodiversity richness and site tenacity shown by the point endemics, though indiscriminate human interference has led it to degradation. Fate of the species in this habitat could be symptomatic of a large number of rare plant species distributed in a small fragmented patch. The results of the present study could be useful in taking measures pertaining to the conservation of naturally established flora in swamp forest to recognize conservation actions and preparation of a management plan.