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Species Diversity, Community Structure and Functions of Lagoon and Estuarine Mangrove Ecosystems in Pottuvil to Okanda Coastal Stretch in the East Coast of Sri Lanka**Maduwe Guruge M.P.^{1,2*}, Ranawana K.B.³, Jayasuriya G.^{2,4}**

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Abstract

Studies on mangroves in Sri Lanka are mostly confined to the western, north-western and southern parts. Thus, the main objective of this study was to determine the distribution, abundance and diversity of true mangrove species, identify mangrove communities and calculate the carbon stocks of five mangrove ecosystems in the Eastern coast of Sri Lanka namely Pottuvil, Hada Oya, Ragamwela, Panama and Okanda. Mangroves were sampled using 84 randomly allocated 10×10 m² plots. True mangrove species were identified, height and diameter at breast height (dbh) of trees >10 cm dbh were recorded. Species density, frequency, dominance and different diversity indices were calculated. Plant communities were identified using multivariate analysis procedures. Biomass and carbon stocks were estimated using allometric equations. Soil samples were collected from top 0.3 m layer in five randomly selected locations in each plot. Pooled samples were used to determine soil organic carbon (loss on ignition method), salinity, conductivity, pH and total dissolved solutes. Light intensity below and away from the canopy was determined and net photosynthesis rate was estimated. Nine true mangroves were recorded in Panama estuarine lagoon and the least number of species (3) were recorded from Ragamwela creek. Highest Shannon diversity value ($H' = 1.7$) and the lowest Simpson index (0.22) was obtained for the Panama mangrove. Nearly half of the true mangrove species (11) that have been recorded from Sri Lanka occurs in the five study sites. Seven different plant communities were identified in the analysis. Soil salinity showed a significant difference among sites, while pH did not vary very much. Highest total organic carbon was recorded in Pottuvil lagoon (558.4±131.8 t/ha), and the lowest in Ragamwela creek (200.9±38.5 t/ha). The highest above ground carbon was recorded in Hada Oya estuary (336.0±123.0 t/ha), while lowest in Ragamwela creek (76.1±60.2 t/ha). Net photosynthesis rates were similar among study sites, the highest was recorded in Hada Oya estuary (2,445.1±553.3 gcm⁻²/year). It can be concluded that the mangroves in the Eastern province have a moderate diversity with high carbon stock. However, as most mangroves are under different anthropogenic threats, it is immediately required to take measures to conserve them.

Keywords: Mangrove ecosystem, Community structure, Species diversity