

Contribution of plant species to carbon sequestration function of mangrove ecosystems in Sri Lanka

K.A.R.S. Perera^{1,2}, M.D. Amarasinghe¹ & W.A. Sumanadasa³

¹Department of Botany, University of Kelaniya, Kelaniya, Sri Lanka. E-mail: mala@kln.ac.lk

²The Open University of Sri Lanka, Nawala, Nugegoda, Sri Lanka.

³National Aquatic Resources Research & Development Agency, Colombo 15, Sri Lanka.

Abstract

High primary productivity of mangroves facilitates carbon sequestration function of mangrove ecosystems. Present study is the first one in Sri Lanka that aims at determining the amount of carbon sequestered by mangrove plants. Allometric relationships and harvest method were used to determine mangrove plant biomass. Carbon content was determined by $K_2Cr_2O_7$ oxidation. Except for the leaves, approximately 50% of biomass is composed of organic carbon. *Lumnitzera racemosa* was found to occur in five mangrove areas that represented three climatic zones. *Avicennia marina* (36.62 t/ha), *Rhizophora mucronata* (27.09 t/ha) and *L. racemosa* (9.43 t/ha) are the species that contribute most to retain carbon in Negombo estuary. *L. racemosa* (30.1 t/ha at Rekawa and 42.24 t/ha at Pambala/Chilaw lagoon), *Ceriops tagal* (16.91 t/ha at Rekawa) and *Avicennia officinalis* were found to be the most significant species in terms of carbon retention. The greatest carbon retaining species at Kala Oya mangrove ecosystems were *L. racemosa* (59.55 t/ha), *Excoecaria agallocha* (42.73 t/ha) and *R. mucronata* (45.75 t/ha). Malwathu Oya estuarine mangroves were dominated by *Sonneratia alba* (92.81 t/ha) and *A. marina* (41.53 t/ha) while *R. apiculata* (79.66 t/ha) and *E. agallocha* (25.98 t/ha) at Batticaloa lagoon retained the most carbon. Among the eleven species considered in the present study, *L. racemosa* and *R. mucronata* were proven to be superior in their capacity of carbon retention in all three climatic zones while *Bruguiera cylindrica* and *B. gymnorrhiza* contributed the least. In terms of carbon sequestration by the ecosystems, Kala Oya mangroves with 204 t/ha of carbon, ranks the highest, followed by Malwathu Oya (165 t/ha) and Batticaloa lagoon (150 t/ha) mangroves. Remote location in sparsely populated areas with poor accessibility, partly due to war situation prevailed in these three areas for the past three decades would have saved these mangroves from human interference unlike mangrove areas in Negombo estuary, situated in a very populous area on the western coast and mangrove wood is predominantly used for “Brush Park” construction, a traditional fishing device used in this estuary, records the least amount (80 t/ha) of retained carbon in mangrove plant biomass.

Keywords

carbon sequestration, Sri Lanka