



Diversity and Abundance of Mangrove Crabs and their Contribution to Mangrove Soil Carbon in Chilaw Lagoon Mangrove in Pambala

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Mangroves play a critical role in the coastal ecosystems; long-term carbon sinks and nurseries for crustaceans, fish, and others, and breeding, nesting sites for several species, including crabs. Mangrove-associated crab species influence on ecosystem balance by facilitating mechanical decay and air exchange through the build-up pores between soil, enhancing nutrient recycling and carbon sequestration through bioturbation, the shoveling mechanism, and as deep burial of faecal pellets. The distribution and abundance of crabs influence the mangrove productivity, leaf and other litter decomposition, nutrient cycling, and sediment turnover. The present study was conducted to investigate the influence on the mangrove carbon sequestration rate by crabs. The study area was the Chilaw lagoon in the Pambala area (07° 30' N, 079° 49' E). Data were gathered from fifteen selected 10 × 10 m plots. Samples were equally distributed to reflect the true total population in a random manner. Soil temperature, soil texture, water salinity, light intensity, and soil pH were measured as the environmental parameters in each plot from August 2025 to April 2026. Crab abundance and distribution were calculated using the equation of the Shannon–Wiener Diversity Index (H') and Shannon Evenness (E). Crab density was calculated following standard methods. The loss on ignition method (LOI) was used to calculate the soil organic matter (SOM) content of the crab-nested area and normal locations, and soil organic carbon content (SOC) was estimated using the standard conventional factor of 1.724. A notable SOC percentage, 10.05% was estimated at the crab-nested area (10.05%) compared to the normal locations (7.57%). The dominant species are *Parasesarma plicatum* (34.4%) and *Neosarmatium asiaticum* (20.4%). Each plot showed moderate diversity (H=1.0 –1.6) and various evenness (E=0.75 – 1.00). This study demonstrates that mangrove associated crabs significantly enhance blue carbon sequestration in the Chilaw lagoon, increasing soil organic carbon from 7.57% to 10.05% through bioturbation and leaf litter processing.

Keywords: *Chilaw-Pambala Lagoon, Carbon sequestration, Soil organic carbon content, Mangrove-associated crabs*