# Community structures, above ground biomass and blue carbon stocks assessment of mangrove species in tropical mangrove forest, Panama Lagoon, Sri Lanka

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Mangrove ecosystems can be considered as pools of carbon stocks as a result of sequestering, carbon stored in biomass and underlying sediments. This study assessed species diversity, community structures, and blue carbon potential and carbon dioxide equivalent in a tropical mangrove forest, Panama lagoon, Sri Lanka. The line transect method was systematically used perpendicular to the shoreline from the water margin to landwards. The survey was conducted in 24 field plots (10 m ×10 m) of 8 transects that were placed in the forest strata randomly. A total of 2100 trees representing 9 true mangrove species under 6 families from a total transect area of 0.24 ha, *Rhizophora mucronata, R. apiculata, Avicennia marina, Bruguiera gymnorrhiza, B. sexangula, Acanthus illicifolius, Exoecaria agallocha, Pemphis acidula, Lumnitzera racemosa* were recorded. The *Avicennia marina* was the dominant species followed by the *R. mucronata*. The highest plant density of 4096 trees $ha^{-1}$ was recorded by *R. mucronata* followed by *A. marina* of 2646 trees $ha^{-1}$ and the lowest density was recorded by *B. gymnorrhiza* (145.83 trees $ha^{-1}$). The highest basal area of 240.61 $m^2ha^{-1}$ was recorded by *A. marina* followed by *R. mucronata* (90.36 $m^2ha^{-1}$). The highest IVI was recorded by *A. marina* (109.87) followed by *R. mucronata* (89.73). The lowest value of Shannon diversity index was obtained in plot 5 (H'=0.81) whereas the highest value was obtained in plot 1(H'=1.49). The statistical analyses ANOVA performed revealed there were no significant differences among other plots ($p>0.05$). The biomass estimation was carried out using a common allometric equation ($AGB=0.251\rho DBH2.46$). The highest above-ground biomass (720.89 Mg $ha^{-1}$) was recorded by *Avicennia marina* contributing to the highest blue carbon amount of 346.02 Mg C $ha^{-1}$ followed by *Rhizophora mucronata* (225.02 Mg C $ha^{-1}$) with living above-ground blue carbon of 108 Mg C $ha^{-1}$, *Lumnitzera racemosa* (44.89 Mg C $ha^{-1}$), *Exoecaria agallocha* (65.51 Mg C $ha^{-1}$), *Bruguiera sexangula* (49.92 Mg C ha-1) and *Bruguiera gymnorrhiza* (6.10 Mg C $ha^{-1}$). The total mangrove surveyed area of 0.24 ha with a total living above-ground biomass of 1292.63 Mg $ha^{-1}$ contributed to the living above-ground blue carbon of 620.46 Mg C $ha^{-1}$ with stored carbon dioxide equivalents of 2277.09 Mg $CO_2eha^{-1}$. Understanding of blue carbon potential from mangrove forests could be used to preserve sustainably; those ecosystems may have a positive impact on sinking anthropogenic $CO_2$ in the environment.

**Keywords**: blue carbon, carbon equivalents, community structures, mangroves

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