

Effect of vegetation structure on potential gross primary productivity of mangrove ecosystems in Negombo estuary, Sri Lanka.

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ABSTRACT

Photosynthetically active radiation (PAR) absorbed by the plant canopies/ leaves gives a reliable measure of its gross primary production. The potential gross primary productivity of two mangrove stands, i.e. Kadolkele (7° 11'42.18" - 7°11'50.48" N; 79° 50'32.08" – 79° 50'47.50" E) a relatively undisturbed natural mangrove area and a cultivated and selectively harvested stand at Wedikanda (7° 11'18.29" – 7° 11'29.09" N; 79° 49'56.37" – 79° 50'04.96" E) located at northern part of the Negombo estuary were studied in relation to mangrove vegetation structure which was characterized with species richness, plant density, basal area and stand height. Amount of PAR absorbed by the canopies of two mangrove stands were estimated by calculating leaf area index (LAI) values obtained from the relationship between incident PAR and PAR under the canopy that were measured using LI-191SA line Quantum sensor during wet (raining) and dry seasons.

Natural mangrove stands at Kadolkele were revealed to be structurally more complex/ superior with a complexity index value of 42.36, in comparison to that of Wedikanda which recorded a value of 22.48. LAI in both study areas recorded higher values for the zone near the estuarine shoreline and it decreased towards inland. LAI recorded higher values in wet season (Kadolkele 7.336 and Wedikanda 6.157) than in the dry period (Kadolkele 6.693 and Wedikanda 5.896). Gross primary productivity too showed a similar trend as structural diversity, along the estuary-land gradient and it was manifested in both the mangrove stands. Kadolkele recorded relatively a high average potential gross primary productivity, i.e. 24.541 t/ha/yr than Wedikanda that recorded 21.011 t/ha/yr. Artificial selection of mangrove species for planting and periodic harvesting of mangrove branches to construct a traditional fishing device known as “brush parks” may contribute to the lower gross primary productivity value of the cultivated mangrove stands at Wedikanda.