

ABSTRACT

Vegetational assessments were carried out on four mangrove forests (Hunt's Bay, Port Royal (Kingston Harbour), Wreck Bay (Hellshire) and Salt Marsh Bay in Falmouth) experiencing different physiographic conditions. These vegetation assessments included the determination of species composition, zonation and productivity. Accompanying physical, chemical and biological conditions were also investigated. The expected eutrophication/disturbance gradient was Hunt's Bay > Port Royal > Wreck Bay > Falmouth. Results indicated that the vegetation type and forest structure of the four forests were different and that zonation in each forest is driven by various environmental/edaphic parameters. While the average soil nutrient content was different for each site, the values did not follow the eutrophication gradient expected. Nitrate concentration at Wreck Bay was maximum (34.4 μM), followed by Hunt's Bay (12.41 μM), Falmouth (12.4 μM) and Port Royal (10.0 μM). Phosphate was maximum at Port Royal (9.69 μM), followed by Hunt's Bay (4.41 μM), then Wreck Bay (1.24 μM) and Falmouth (0.43 μM). The values for average productivity and average tree height at each site suggested a ranking similar the hypothesis (i.e. Hunt's Bay > Port Royal > Wreck Bay > Falmouth) however there was a reversal of the Falmouth and Wreck Bay sites. Zonation and distribution of species was evidently the result of complex interactions of the vegetational, environmental and edaphic factors, which are dissimilar in each forest. The most important

characteristics influencing tree height and productivity are soil NO_3 content, soil PO_4 content, soil salinity and soil temperature with R^2 values of 0.44, 0.66, 0.62 and 0.89 respectively for tree height and R^2 values of 0.50, 0.62, 0.64 and 0.95 respectively for productivity. Other biotic parameters such as diameter at breast height, height of lowest living limb, pneumatophore density and seedling density all showed weak relationships with soil organic content and soil moisture content ($R^2 < 0.18$, $p < 0.001$).

Most traditional indices used in the sampling of terrestrial forests were also useful in sampling mangrove species within a site. Those that were not useful were DBH, pneumatophore density, pH and temperature. Those indices that were not useful in sampling mangrove species between sites were height of lowest living limb, percentage cover and pneumatophore density.