

## **Mangrove tree growth, diversity, and distribution in tropical coastline ecosystems**

Sabrina Dookie <sup>a\*</sup>, Sirpaul Jaikishun <sup>b</sup> & Abdullah Adil Ansari <sup>c</sup>

<sup>a, b, c</sup> Department of Biology, Faculty of Natural Sciences, University of Guyana, SA.

Corresponding author email: [sabrinadookie1@gmail.com](mailto:sabrinadookie1@gmail.com)

Mangrove trees are subject to several environmental stresses that are often associated with the prevailing conditions of their ecosystems. These stresses are often known to challenge their survivability through their ecological resistance and resilience. We analysed the density, diversity, distribution, and biophysical measurements (height, diameter at breast height, and basal area) of more than 900 trees throughout nine natural, degraded, and restored tropical coastline ecosystems in Guyana. One year of systematic sampling was carried out using the point-centred quarter method (PCQM) throughout two clearly defined wet and dry seasons. Significant variations in the distribution, diversity, and spatial arrangement of trees were observed within both the restored and degraded mangrove habitats. Notable discrepancies in the biophysical measurements of trees were also observed [ $df = 8$ ,  $p < 2.2e-16$ ], which were further found to have positive correlations [ $p < 0.05$ ,  $r_s < 0.5$ ] with their respective ecosystem types. Trees situated within restored and natural habitats, which experience few disturbances, display greater biophysical measures compared to trees in degraded ecosystems that are consistently subjected to multiple disturbances. These observations suggest that both natural and restored ecosystems showcase a heightened capacity for ecological resistance and resilience in the face of environmental stresses, in contrast to the degraded ecosystems that now exhibit states of vulnerability due to low ecological resistance and resilience mainly attributed to prevailing anthropogenic disturbances. Our findings provide additional evidence to support the idea that periodically assessing mangrove vegetation, particularly trees, in different ecosystem types can serve as one indicator of their ecological state as well as their ability to withstand and recover from environmental stresses.

**Keywords:** *ecosystems; Guyana; mangroves; trees; tropical coastline*