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Factors Influencing the Abundance and Coverage of *Ramalina* sp. Lichens on Selected Three Mangrove Species

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Abstract

Mangrove ecosystems are vital and highly threatened coastal habitats, and lichens of the genus *Ramalina* serve as important bioindicators. However, their distribution in Sri Lankan mangroves remains critically understudied. This study investigated the abundance and coverage of *Ramalina* lichens on three key mangrove species: *Excoecaria agallocha*, *Rhizophora mucronata*, and *Lumnitzera racemosa* in Rekawa Lagoon to determine the influence of host tree characteristics and microenvironmental conditions. Data were systematically collected over one month (3rd of November to 3rd of December 2024) from a total of 90 randomly selected trees (30 per species), recording lichen abundance, coverage, tree height. Regression analysis revealed that canopy cover was the dominant factor, showing a strong positive correlation (p<0.0001) with lichen abundance across all three species. The regression equations between lichen abundance and canopy cover were: *E. agallocha*-Number of lichens=6.442+34.15 canopy cover (R^2 = 64.0%, p=0.000); *R. mucronata*-Number of lichens =-2.689+44.98 canopy cover (R^2=74.7%, p=0.000); and *L. racemosa*-Number of Lichens=-23.98+65.12 canopy cover (R^2=94.8%, p=0.000). These results suggest that a dense canopy is crucial for creating a stable microclimate, particularly consistent moisture, necessary for the fruticose *Ramalina* growth form. Tree height, however, exhibited species-specific influences, with the following regression equations: *E. agallocha* - Number of lichens = 11.65+0.0726 Tree height (R^2=63.7%, p=0.000); *R. mucronata*-Number of lichens=78.87-0.1017 Tree height (R^2=66.4%, p=0.000); and *L. racemosa*-Number of lichens=91.42-0.2129 Tree height (R^2=62.6%, p=0.000). Multiple regression analysis further confirmed that canopy cover had a consistent positive effect, while tree height varied by species: *E. agallocha*-Number of lichens=5.94+0.0425 Tree height +20.32 canopy cover; *R. mucronata* - Number of lichens=41.9-0.0567 Tree height+24.17 canopy cover; and *L. racemosa*-Number of lichens=-6.85-0.0368 Tree height +57.99 canopy cover. A one-way ANOVA indicated no statistically significant difference in overall lichen coverage among the three-mangrove species (p=0.270). These findings highlight that the distribution of *Ramalina* sp. lichens is driven by a combination of overarching environmental factors (canopy cover) and host-species-specific traits (tree height), offering valuable insight for ecological monitoring and conservation of mangrove canopy integrity.

Keywords: *Ramalina sp., Lichens, Mangrove species, Abundance and coverage, Bioindicators*