



Assessment of Macro Debris in Selected Mangrove Ecosystems in Batticaloa Lagoon, Sri Lanka

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Mangrove ecosystems serve as a vital coastal buffer and biodiversity conservation, yet they are vulnerable to anthropogenic debris accumulation. The present study identified the composition, abundance and spatial distribution of macro debris within the mangrove ecosystem of Batticaloa Lagoon. The belt transect method (25m × 2m) was used perpendicular to the shoreline to collect macroplastics in five selected locations within the Batticaloa lagoon during June 2026, with each transect subdivided into 0-5m, 5-15m, and 15-25m segments from the shoreline to capture the cross-shore distribution of debris. Macro debris was classified into Polyethylene Terephthalate (PET), High-density polyethylene (HDPE), Low-density polyethylene (LDPE), Polypropylene (PP), Polystyrene (PS), Other plastics, and Synthetic rubber. Debris count (items/m²) and Plastic Abundance Index (PAI) were calculated, while item color, original purpose, and manufacturing/expiration dates were recorded. A total of 582 debris items (20.09 kg) were recorded across all locations, with an overall average debris density of (0.78±0.21 items/m²). Debris density showed a marked decline with increasing distance from the shoreline; the 0-5 m zone recorded the highest average density (3.51±1.05 items/m²), followed by the 5-15m zone (0.10±0.04 items/m²), while the 15-25 m zone recorded the lowest density (0.01±0.02 items/m²). PET was the most dominant polymer by mass, accounting for 24.35 % of the total weight. Plastic abundance was highest at location 1 (PAI=0.12) and lowest at location 5 (PAI=0.10). PET bottles were the most common items; mainly transparent and green colors bottles were recorded compared to other colors. Study results revealed macro debris accumulation in mangrove ecosystems, and they emphasize the need of targeted waste management strategies to protect mangrove ecosystems in Batticaloa Lagoon.

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