



Floral Diversity and Ecological Significance of Kowtharimunai Mangrove Ecosystem in Poonakary, Northern Sri Lanka

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Mangrove ecosystems are vital coastal habitats that provide essential ecosystem services, including shoreline protection, biodiversity conservation, and blue carbon sequestration. This study investigated the structure, composition, and anthropogenic pressures on the Kowtharimunai mangrove ecosystem in Poonakary, Northern Sri Lanka. Field observations were conducted from November 2024 to February 2026. A total of five true mangrove species were recorded using a systematic plot sampling based on stratified random sampling: *Avicennia marina*, *Bruguiera cylindrica*, *Excoecaria agallocha*, *Lumnitzera racemosa*, and *Scyphiphora hydrophyllacea*. Among these, *Avicennia marina* was the dominant species within the mangrove community. The floral surveys performed using the systematic plot sampling revealed a Shannon–Wiener diversity index (H') of 1.21, indicating moderate species diversity, and a Simpson's dominance index (D) of 0.62, reflecting strong dominance of *Avicennia marina*. The mean tree density was estimated as $3,250 \pm 420$ individuals ha^{-1} , with *A. marina* contributing over 58% of total stem density. Diameter at breast height (DBH) ranged from 2.1 cm to 72.6 cm, with a mean DBH of 7.8 ± 3.2 cm, indicating relatively young to mid-successional individuals, while the presence of a few large trees reflects scattered mature components within the forest structure. Canopy cover averaged $68 \pm 9\%$, indicating moderately closed stands. Seedling density was recorded at $4,850 \pm 610$ individuals ha^{-1} , dominated by *A. marina*, recorded with a density of 3440 individuals ha^{-1} , indicating active natural regeneration despite localized disturbances. Sea grass patches with the co-occurrence of *Halophila Ovalis* and *Enhalus acoroides* were observed in the proximity of 20-to 50-meter distances from the coastline. Salt marsh communities comprising grass and graminoid patches, along with shrubby vegetation, including *Tecticornia indica*, *Sporobolus virginicus*, and *Sesuvium portulacastrum*, were also recorded. Notably, the study area supports all three blue carbon ecosystems mangroves, seagrasses and salt marshes - in proximity, highlighting its significance as a coastal carbon hotspot. These findings underscore the ecological importance of the Kowtharimunai mangrove ecosystem and emphasize the need for conservation and scientifically guided restoration strategies to maintain its biodiversity, ecosystem structure, and carbon sequestration potential.

Keywords: *Avicennia marina*, Blue carbon, Ecosystem restoration, Mangrove ecology