

Coringa mangroves in relation to local environmental conditions on the East coast of India

B. Satyanarayana^{1,2}, A.V. Raman³, C. Kalavati³, B.R. Subramanian⁴ & F. Dahdouh-Guebas^{1,2}

¹Laboratory of Systems Ecology and Resource Management, Dept. of Organism Biology, Faculty of Sciences, Université Libre de Bruxelles - ULB, B-1050 Brussels, Belgium. Email: satvam2149@gmail.com

²Laboratory of Plant Biology and Nature Management, Mangrove Management Group, Vrije Universiteit Brussel - VUB, Pleinlaan 2, B-1050 Brussels, Belgium.

³Marine Biological Laboratory, Department of Zoology, Andhra University, Waltair, India.

⁴ICMAM Project Directorate, NIOT Campus, Chennai - 600100, India.

Abstract

This study aimed at investigating mangrove species distribution vis-à-vis environmental conditions and was carried out at 12 sampling sites encompassing Coringa (Wildlife Sanctuary), Gaderu/seaward channels and Gautami-Godavari estuary (~235 km²). At each site (located at 4 km intervals), the tree structural measurements included stem density (number/0.1 ha), basal area (m²/0.1ha), relative density (%), relative dominance (%), absolute and relative frequency (%), and Importance Value (I.V.) (sum of relative density, dominance and frequency, using the PCQ-Method); along with physico-chemical observations on water salinity, sediment texture (sand/silt/clay), organic matter and elevation. The mangrove species composition was represented by 9 species amongst which *Avicennia marina*, *A. officinalis* and *Excoecaria agallocha* were abundant and distributed throughout the forest. The (mean) stem density (also diversity) is rich in the sites belonging to Gaderu/seaward channels (8 species, 327 nos./0.1ha), followed by Coringa (4 species, 260 nos./0.1ha) and the estuary (3 species, 240 nos./0.1ha). In contrast, higher basal area in Coringa (4.1 m²/0.1ha) is attributable to the local protection status. Based on the I.V., *A. marina* ranked first with its sheer dominance in 8 out of 12 sites followed by *A. officinalis* (2 sites) and *E. agallocha* (2 sites), respectively. The sediments are of silty-clay in nature, where silt levels increased in the direction of Gautami-Godavari estuary and clay characterized the mangroves proper. The Gaderu/seaward channels with a strong neritic incursion had higher salinity (>20‰) compared to Coringa and/or the estuary. There are four mangrove species associations (Bray-Curtis similarity: 30%) of which Group-1 represents the widespread distribution of *A. marina*, *A. officinalis* and *E. agallocha*, while Group-2 (*Lumnitzera racemosa*, *Ceriops decandra* and *Aegiceras corniculatum*), Group-3 (*Sonneratia apetala*), and Group-4 (*A. alba* and *Rhizophora apiculata*) are seen only at the individual sites. The Principle Component Analysis (PCA) also revealed significant differences in the environmental conditions that are ultimately responsible for the varied mangrove species distribution at Coringa, Gaderu/seaward channels and Gautami-Godavari estuary.

In view of possible vegetation (mangrove) structural changes with changes in the local environmental conditions (due to sustained human intervention), it is necessary to evaluate their distributional patterns on long-term field-based observations. Therefore the present results would also be able to assist for future investigations in terms of better monitoring/management at Coringa.

Keywords

Coringa, estuary, floristic, neritic incursion, ground-truth, India