



Studies on Floristic Diversity and its Importance of Pichavaram Mangrove Reserve Forest, Tamil Nadu

D. C. Saini, Kamla Kulshrestha*, Shambhu Kumar, Deepak K. Gond and G.K.Mishra

Birbal Sahni Institute of Palaeobotany, 53 University Road, Lucknow, India

*National Botanical Research Institute, Rana Pratap Marg, Lucknow, India

Email: dcsaini1955@yahoo.com

Introduction

The word "Mangrove" is considered to be a combination of the Portuguese word "Mangue" and the English word "grove". Mangroves are woody, specialized types of trees of the tropics that can live on the edge, where rainforests meet oceans occurring along the sheltered inter-tidal coastlines, mudflats, riverbanks in association with the brackish water margin between land and sea in tropical and subtropical areas. Mangroves have a very specialised adaptations that enable them to live in salty waters. Breathing roots allow them to survive in anaerobic sediments. Buttresses and above-ground roots enable them to grow in unstable mud flats. Their foliage removes excess salt from the sap, and they conserve water to cope with periods of high salinity. Their seeds are buoyant to allow them to disperse and establish themselves in new areas. Mangroves are salt-tolerant plants and the specific regions where these plants occur are termed as 'mangrove ecosystem'. These are highly productive but extremely sensitive and fragile. The area has already lost



75% of its green cover within this century and about 90% of the forest area is degrading (Krishnamurthy *et al.*, 1995). Bearing this in mind, research was undertaken during 2003-2004.

Pichavaram Mangrove Forest

The Study Area

Pichavaram is located 51 km north east of



Chidambaram, in Cuddalore district, Tamil Nadu, between latitude 11°20' to 11°30' north and longitudes 79°45' to 79°55' east. It is an estuarine type of mangrove situated at the confluence of Uppanar, a tributary of the Coleroon River. Fishing villages, croplands, and Aquaculture ponds surrounds the area. This mangrove environment is attracting large number of tourists.

The Pichavaram mangrove wetland has 51 islets and the total area of the Vellar-Pichavaram-Coleroon estuarine complex is 2335.5 ha of which only 241 ha. is occupied by dense mangrove vegetation. Nearly 593 ha, of this wetland is occupied by helophytic vegetation like *Suaeda*, 262.5 ha. barren mud flats and 1238.5 ha. Barren high saline soil (Krishnamurthy *et al.*, 1984) out of the 2335.5 ha of this mangrove wetland only 1100 ha comprising the entire mangrove vegetation located in the middle portion of the Vellar-Pichavaram-Coleroon wetland has been declared as a reserved forest. Department of Forest, Government of Tamil Nadu, declared the Pichavaram mangrove as a Reserved Forest.

Two major rivers namely Vellar River and Coleroon River in this area drained into Bay of Bengal. The area between the two rivers is identified as brackish water with mangrove vegetation.

Threat to Mangrove Ecosystem

The threats to the mangrove ecosystem could be broadly grouped into two: Natural and Anthropogenic. These factors may affect the system as a whole or any one entity within the system, etc. The natural threats include: Climatic changes, Cyclones and Physical processes. Diseases, deterioration, pollution, grazing, agriculture, aquaculture and human encroachment (including reclamation), etc., are considered as the anthropogenic threats to the ecosystem.

Floristic Study

Many surveys were conducted during 2003 - 2004 to collect plant sample for study of floristic diversity of Pichavaram mangrove reserve forest with the identification of different floristic components, it has been found that the area comprises 13 true mangrove tree species, beside 73 spp. of other vegetation, which include 24 tree, 21 shrub, 28 herb, seven climber, three parasite and three creeper species. By degree of

abundance, Vegetative Cover at Pichavaram have been demarcated in Six zones; *Avicennia marina* is dominant in Zone-1; *Arthrocnemum indicum*, *Exoecaria agallocha*, *Salicornia brachiata*, *Sesuvium portulacastrum* and *Suaeda maritima* are sporadically distributed in the sandy region Zone II which includes the bank of three creeks lying parallel to the shore, the fringe of shoreward belt is occupied by *Salicornia brachiata* and the inward belt has *Avicennia apiculata*, *Rhizophora apiculata* and *Rhizophora stylosa*. The inner region is found to have mixed community of *Exocaria agallocha* and *Salicornia brachiata* and *Arthrocnemum indicum*. Luxuriant mangrove vegetation exists in zone III with maximum number of species. The channels fringes areas are bordered by *Rhizophora apiculata* and *Rhizophora mucronata*, *Acanthus ilicifolins* and *Derris heterophylla* found in the zone IV and *Acanthus continuous* stretch of *Suaeda maritima* observed in zone V. *Salicornia-brachiata* dominant exists in zone VI near Coleroon estuary (Anonymous, 2005).

Thirteen (13) species of mangroves representing 6 families and 4 species of salt marshes belonging to a single family have been reported from Pichavaram. Unfortunately, mangroves are under serious threat of degradation; India has lost about 40% of its mangrove cover within this century (Henry *et al.*, 1987; Krishnamurthy *et al.*, 1987; Kathiresan, 2002; Nair *et al.*, 1986). Pichavaram has among one of the best studied mangrove ecosystems in India.

IUCN Species Status

The area has already lost 75% of its green cover within this century and about 90% of the forest area is degrading (Krishnamurthy *et al.*, 1995). According to IUCN categorisation, out of 14 species, 10 are endangered, 3 are vulnerable (*E. agallocha*, *R. mucronata*, *A. indicum*) and 1 species (*S. brachiata*) is at lower risk of nearly threatened. The list of species in the order of relative dominance and the IUCN status is given below.

IUCN Species Status	IUCN Status (Nationally)
<i>Avicennia marina</i>	Endangered
<i>Suaeda maritima</i>	Endangered
<i>Avicennia officinalis</i>	Endangered



<i>Suaeda monoica</i>	Endangered
<i>Rhizophora mucronata</i>	Vulnerable
<i>Rhizophora apiculata</i>	Endangered
<i>Excoecaria agallocha</i>	Vulnerable
<i>Bruguiera cylindrica</i>	Endangered
<i>Ceriops decandra</i>	Endangered
<i>Aegiceras corniculatum</i>	Endangered
<i>Acanthus ilicifolius</i>	Endangered
<i>Arthrocnemum indicum</i>	Vulnerable
<i>Lumnitzera racemosa</i>	Endangered
<i>Salicornia brachiata</i>	Lower risk- Near threatened

Benefits of Mangrove Forests

Mangrove biodiversity and conservation has received significant importance in the recent past as research has increased the understanding of values, functions and attributes of mangrove ecosystems and the role they play in providing important ecological services and livelihoods for the mangrove associated communities. Mangrove forests are among one of the world's most productive tropical ecosystems. They are endowed with rich and diverse living resources that

References

- Anonymous 2005. State of Forest Report, Forest Survey of India.
- Anonymous 2006. Conservation Benefits of Mangroves. The World Conservation Union (IUCN), Sri Lanka.
- Henry, A.N., Kumari G. R & Chitra, V. 1987. Flora of Tamil Nadu, India Analysis. Vols.2-3 Botanical Survey of India, Coimbatore
- Kathiresan, K 2000. A review of studies on Pichavaram mangrove, southeast India, *Hydrobiologia* 430: 185-205.
- Krishnamurthy, K., A. Choudhury & A. G. Untawale, 1987. Status report. Mangroves in India, Ministry of Environment and Forests, Govt. of India, New Delhi: 150 pp.

provide forestry and fishery products to a large human population. They sustain diverse flora and fauna species in large portion and provide many ecosystem services such as coastal protection from storm, reduction of shoreline and riverbank erosion, stabilizing sediments and absorption of pollutants. Presences of mangrove ecosystems on coastline save lives and property during natural hazards such as cyclones, storm surges and erosion. These ecosystems are also well known for their economic importance. They protect coastal zones from erosion, and provide food and shelter for a large number of commercially valuable fin- and shell-fishes. They are breeding, feeding and nursery grounds for many estuarine and marine organisms (Anonymous, 2006). However, the ecosystem has a very large unexplored potential for natural products useful for medicinal purposes and also for salt production, apiculture, fuel and fodder etc.

Acknowledgement

Authors are thankful to Director, Birbal Sahni Institute of Palaeobotany, Lucknow for encouragement and Uttar Pradesh State Biodiversity Board for providing assistance to the authors (S. Kumar, D. K. Gond & G. K. Mishra).

- Nair N. C., Henry A. N., Kumari G. R., Chithra V. & Balakrishnan N. P. 1989. Flora of Tamil Nadu, India, Botanical Survey of India, Howrah.
- Krishnamurthy, K. & Jayaseelan, M. J. P. 1984. Human's Impacts on the Pichavaram Mangrove Ecosystems: A Case Study from Southern India. In Proc. Asia Symp. Mangr. Environ. Res. & Manag: 432 pp.
- Krishnamoorthy, R; Sundaramoorthy, S., Mohan, D., Gowri, D. S. & Ramchandran, S. 1995. Status of Mangroves along Tamil Nadu coast and their spectral properties - A remote sensing approach. In Mukalikrishna, I.V. (ed.), Remote Sensing and Geographical Information System for Environmental Planning. Tata McGraw Hill Publ. Ltd. New Delhi: 763pp.