

Regular Article

Status of Mangroves in Thekkumbad, Kannur, Kerala

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ABSTRACT: The status of mangroves in Thekkumbad island of Kerala state was documented and assessed using the following parameters; total area covered, diversity, population structure and threats to mangroves. The study was conducted in Dec. 2008 using the plot quadrat method. Ten plots were non-randomly distributed in the study area. Eleven true mangrove species and six associates were found in the study area ($H' = 1.76$). The dominant species were *Rhizophora mucronata*, *Bruguiera cylindrica*, *Sonneratia alba* and *Excoecaria agallocha* with important values 35.83, 32.43, 13.31, 25.02 respectively. Considering the small area of the island, the diversity was relatively high compared to nearby mangrove rich areas. However the continuous anthropogenic activities poses threat to the survival of mangroves. Thus the management of the present mangrove is urgent for a sustainable living.

Key words: Mangrove, Sacred grove, Thekkumbad, Thazhekkavu

Introduction

Mangroves represent a highly dynamic and fragile ecosystem. It occupies a large fraction of the tropical coastline, dominating the inter-tidal zone of diverse environmental settings. The potential role of mangrove ecosystem as sinks for anthropogenic contaminants in tropical and sub tropical areas has been widely recognized. India has a total area of 4461 sq. km of mangroves. It is 0.14% of country's total geographical area. The higher population density in the Kerala coast has resulted tremendous pressure on the natural ecosystem, partially on the mangroves. In Kannur, mangroves are scattered and distributed in the area of Pappinisseri, Kunhimangalam, Thalasseri, Edakkad etc (Naskar and Mandal, 1999). These mangroves have drawn the attention for its floristic and faunal diversity. This paper reports the status of mangroves in the wetlands of Thekkumbad island in terms of total area covered, species composition and community structure. Thekkumbad island in Matttool Panchayath is characterized by the presence of a biodiversity rich coastal sacred grove namely Thazhekkave. The Valapatanam estuary provides tidal water for this mangrove rich wetland.

Materials and Methods

This study was conducted in the Northern part of Kerala. The geographical position of the study area was N- 11° 58 '2.5" and E - 75° 17'46.6". In order to assess the size of the area covered by mangroves and to identify the location of structures that might influence the occurrence of mangroves, the area was assessed and mapped using the Global Positioning System.

All mangrove species encountered were recorded at species level using the method of Tomlinson (1986). To assess the community structure in terms of density, frequency and dominance, a total of 10 plots (10x10 m²) were non randomly established at each site. In

each plot the species were identified, stems per species were counted and the girth of each tree was measured at breast height approximately 1.3 m above the ground using a measuring tape. The number of individuals per species was determined by actual counts. The important value index (IVI) and the Shannon Weaver species index (H') were measured.

Findings and Discussion

The total mangrove area is approximately 2788 m². The area composed eleven true mangrove species and six associates. This includes *Acanthus ilicifolius*, *Acrostichum aureum*, *Aegiceras corniculatum*, *Avicennia officinalis*, *Avicennia marina*, *Excoecaria agallocha*, *Kandelia candel*, *Rhizophora mucronata*, *Rhizophora apiculata*, *Sonneratia alba*, *Bruguiera cylindrica*, *Calamus rotang*, *Mimusops elengi*, *Pandanus tectorius*, *Clerodendron inerme*, *Cinnamomum zeylanicum* etc

The number of major species found in Thekkumbad is lower compared to Kunhimangalam where highest species diversity is found in Kannur District (CED., 2005). The Thekkumbad island is characterized by the strong fences of mangroves, that protect the island from natural disasters. There are mainly two distinct pattern of arrangement noticed in this region. The seaward side is dominated by a long stretch of *Rhizophora mucronata* species while the opposite sides are characterized by a mixed vegetation representing *Bruguiera cylindrica*, *Aegiceras corniculatum*, *Avicennia officinalis*, *Avicennia marina*, *Excoecaria agallocha*, *Kandelia candel*, *Rhizophora apiculata* and some associates. This mangrove association plays an important role in the purification of water present in the nearby wells.

Among mangroves the *Excoecaria agallocha* has the highest basal area followed by *Sonneratia alba*. *Rhizophora mucronata* has the highest stem density followed by *Bruguiera cylindrica*. The other species of mangroves were rather inconspicuous in terms of basal area and stem number. *Rhizophora mucronata* and *Bruguiera cylindrica* has the highest frequency (90%) followed by *Excoecaria agallocha* (80%), *Avicennia officinalis* and *Sonneratia alba* (70%). The relative dominance of all the species in the study area ranged between 0.001% to 0.52%. The relative density of the species ranged from 0.52 to 25.36 from the entire study sites. The most important species was *Rhizophora mucronata* followed by *Bruguiera cylindrica* and *Excoecaria agallocha*. The *Kandelia candel* is accounted for the lowest IVI value. The Shannon Diversity Index was 1.7655. The diversity index signifies that the area was diverse representing most of the species (Table 1)

Threats to mangroves

The mangroves in this island are subjected to human disturbances. The non-degradable and domestic wastes are directly discharged to the immediate environment. Within the forest, cut and burnt trees were also observed.

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Table-1

No	Name of the Species	Total Number of Species (N)	Quadrat of Occurrence	Frequency %	Density	Abundance	Basal Area	Relative Density	Relative Frequency	Relative Dominance	IVI	Pi	Pi log Pi
1	<i>Avicennia marina</i>	49	4	40	4.9	12.25	17	5.05	4.65	0.007	9.710	0.0505	-0.1265
2	<i>Avicennia officinalis</i>	94	7	70	9.4	13.43	23	9.69	8.14	0.00941	17.840	0.0969	-0.2877
3	<i>Aegiceras corniculatum</i>	60	5	50	6	12.00	1.99	6.19	5.81	0.00081	12.000	0.0619	-0.1621
4	<i>Acanthus illicifolius</i>	14	13	30	1.4	1.08	10.4	1.44	15.12	0.00426	16.564	0.0144	-0.03087
5	<i>Acrostichum aureum</i>	15	3	30	1.5	5.00	0.72	1.55	3.49	0.00029	5.035	0.0155	-0.0334
6	<i>Bruguiera cylindrica</i>	213	9	90	21.3	23.67	17.12	21.96	10.47	0.00701	32.431	0.2196	-0.2678
7	<i>Excoecaria agallocha</i>	128	8	80	12.8	16.00	1290	13.20	9.30	0.52804	23.026	0.132	-0.1494
8	<i>Kandelia candel</i>	5	2	20	0.5	2.50	4.35	0.52	2.33	0.00178	2.843	0.0052	-0.0183
9	<i>Rhizophora apiculata</i>	18	2	20	1.8	9.00	20	1.86	2.33	0.00819	4.189	0.0186	-0.04067
10	<i>Rhizophora mucronata</i>	246	9	90	24.6	27.33	25.326	25.36	10.47	0.01037	35.836	0.2536	-0.3179
11	<i>Sonneratia alba</i>	50	7	70	5	7.14	49.74	5.15	8.14	0.02036	13.315	0.0515	-0.1295
12	<i>Calamus sp.</i>	13	4	40	1.3	3.25	14	1.34	4.65	0.00573	5.997	0.0134	-0.0286
13	<i>Clerodendron inerme</i>	38	5	50	3.8	7.60	2.3	3.92	5.81	0.00094	9.732	0.0392	-0.0938
14	<i>Mimusops elengi</i>	9	3	30	0.9	3.00	500	0.93	3.49	0.20467	4.621	0.0093	-0.0365
15	<i>Cinnamomum zeylanicum</i>	16	4	40	1.6	4.00	320	1.65	4.65	0.13099	6.432	0.0165	-0.0357
16	<i>Pandanus tectorius</i>	2	1	10	0.2	2.00	147.34	0.21	1.16	0.06031	1.429	0.0021	-0.00674
		970	86	760	97		2443						

$$H' = -\sum Pi \log Pi = -(-1.7655) = 1.7655$$

-1.7655

F – Frequency, RF – Relative Frequency, RD – Relative Density, RDO – Relative Dominance, IVI – Important Value Index, H' – Shannon Wiener's Diversity Index

Conclusion

Based on the study, it is concluded that the area supports a rich diversity of mangroves representing eleven true mangrove species. Improper waste disposal (domestic, slaughter and industrial) and developmental activities may severely affect the stands of most of the mangrove species. There is an urgent need to conserve this biodiversity rich wetland.

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