International Journal of Ecology and Environmental Sciences
www.ecologyjournal.in
Online ISSN: 2664-7133; Print ISSN: 2664-7125; Impact Factor: RJIF 5.28
Received: 09-03-2020; Accepted: 10-04-2020; Published: 20-06-2020
Volume 2; Issue 2; 2020; Page No. 28-30

Analysis of vegetation dynamics of point calimere wildlife and bird sanctuary, Tamil Nadu

M Padma Sorna Subramanian[1], A Saravana Ganthi[2], K Subramonian[3]
[1] Survey of Medicinal Plants Unit (S), CCRS, Salem, Tamil Nadu, India
[2] Department of Botany, Rani Anna Govt. College for Women, Tirunelveli, Tamil Nadu, India
[3] Department of Botany, The MDT Hindu College, Tirunelveli, Tamil Nadu, India

Abstract
Coastal ecosystems are areas of rich biological diversity as they support various forms of fauna and flora. India's coastal and marine environment is vast with about 8000 km long coast line and surrounding coastal waters which encompasses a variety of ecosystems and diversity of species. The marine and coastal biodiversity is not systematically studied and documented. The Point Calimere sanctuary, located adjacent to and east of Kodikkarai and Kodikkadu villages, is basically an island surrounded by the Bay of Bengal to the east, the Palk Straight to the south and swampy backwaters and salt pans to the west and north. The entire vegetation has remained with very little enumerative studies and hence the present study was on the vegetation of the Point Calimere Wildlife and Bird Sanctuary, Tamil Nadu, India. The result of the present study revealed that species diversity in Point Calimere forest was significantly influenced by forest stand type.

Keywords: point calimere wildlife and bird sanctuary, sea-shore vegetation, aquatic vegetation, dry evergreen vegetation and mangrove vegetation

Introduction
Maintenance, management and sustainable utilization of plant coverage have required scientific recognition. The information resulted from vegetation can be useful to solve the ecological problems such as biological conservation and natural resources management and the future of an ecosystem trends can be forecasted using that information. In other words, vegetation can be useful to exhibit some ecological factors, which might be hard to measure directly (Daubenmire, 1976) [1]. The indigenous vegetation of an area is the direct expression of the physical environment that has been influenced by geological history. The vegetation is adapted to the long-term rainfall patterns, to the soils, to the temperature regime. The constituent species represent the families and genera that have had access to the area over the geological epochs. Heydari and Mahdavi (2009) [2] studied biodiversity of plant species in related to physiographic factors (aspect, elevation above sea level and slope percentage) in Melah Gavan area in Ilam province of Iran and inferred that seasons have great influence on soil characteristics and species diversity. An increase in species diversity was observed during. India has 7,500 km of coastline under 53 coastal districts of 10 maritime states and six union territories. Point Calimere (10 18" N, 79 51" E) the Calligicum of Ptolemy is a low promontory on the Coromandal coast of Tamil Nadu jutting out into the Bay of Bengal (Map: 1). Perusal of literature revealed that no intensive and systematic floristic investigation with all its climatic characteristics has been carried out in Point Calimere, which has the unique vegetation of coastal, halophyte and tropical dry evergreen forest. Thus, the entire vegetation has remained with very little enumerative studies and hence in this study an attempt has been made to highlight the distribution of vegetation types in Point Calimere.

***Source*:** District Forest Office, Nagapattinam

Map 1: Land cover map showing various sites in Point Calimere

Area of Study
The area of study Point Calimere falls under the Nagapattinam district and it was under the erstwhile district of Tanjore of Tamil Nadu before bifurcation. Point Calimere (Kalli-medu in Tamil) is also called as Cape Calimere and Kodikkarai. It is the apex of the Cauvery river delta, and marks a nearly a right-angle turn in the coastline. In 1988, the sanctuary was enlarged to include the Great Vedaranyam Swamp and the Talaignayar Reserve Forest, and renamed the Point Calimere Wildlife and Bird Sanctuary, with a total area of 377 km². Point Calimere, at a sea level above MSL in the eastern side ending with the sea gradually raises in

the west up to 25 mts in Ramarpadam located in the high sand dunes.

Methodology

The data were gathered from October 2005 – September 2008 with follow up visits to all sites to record seasonal changes in the communities. The vegetation of different parts of the area of study was thoroughly explored by repeated visits during different seasons of the year, covering all ecological habitats represented in the area. During the visits, different forest types and microhabitats were identified.

Results and discussion

Vegetation in contrast to flora identifies the distinct assemblage of plant species in a given area. Vegetation of the area of study can be classified into sea-shore vegetation, aquatic vegetation, dry evergreen vegetation and mangrove vegetation (Plate: 1).

Seashore and saline vegetation

As the Point Calimere forest is surrounded on the East and South by the sea and on the north and west by the extensive salt swamps the littoral vegetation is marked. *Spinifix* along with *Ipomoea, Launaea, Pandanus* etc., serve as sand binders or soil binders at several places. *Pandanus* serves as sand binder and wind breaker. *Spinifix littoreus* is predominant on sandy seashores. Sand dunes observed adjoining the sea and inhabited by *Pandanus fasicularis, Prosopis chilensis, Tribulus terrestris, Solanum surattense, Spinifix littoreus* and *Ipomoea pes-caprae.*

The next zone consists of *Phyla nudiflora, Enicostema axillare* and *Gisekia pharnaceoides* etc. Interior to this zone, where sand mat expands, is covered by a thin layer of brine during high tide. The vegetation comprises *Aleuropus lagopoides, Suaeda, Salicornia, Arthrocneum* etc. During the maximum rainfall season of October – December *Peplidium* occurs over extensive areas indicating the lowering of salt content in the water. *Astercantha* occurs alongside as a common plant during this period. Untawale and Nair reported that the sand dune flora of India comprised of 63 species and *Ipomea pescaprae, Spinifix squarrosus, S. littoreus, Vitex negundo, Launea pinnatifida, Anacardium occidentale, Pandanus* and *Opuntia* spp. dominate the vegetation.

Nearer to the two villages, *Prosopis* an introduced plant is progressively encircling patches of natural vegetation and strangles them extending inwards. This acts very well as soil binder. Further inside the vegetation comprises of *Manilkara hexandra, Canthium diccocum, Carissa carandus, Canavalia virosa, Cyphostema setosum, Cassis sps, lablab purpureus, Ixora parviflora, Memecylon umbellatum, Sapindus emarginata* etc. *Ochna obtusata, Capparis oppositifolia, Salacia chinensis, Mucuna pruriens* and *Walsura piscidia* are the typical flora of this area. The following herbaceous plants are found very common in this area; *Tinospora cordifolia, Asystasia gangetic*a, *Rivea hypocrateriformis, Asparagus racemosus, Crotalaria striata, Indigofera aspalathoides* and others. *Viscum* is a parasite on *Excoecaria agallocha* and *Loranthus falcatus* on tree species like *Azhadirachta, Sapindus* etc.

On alluvial halomorphic soil, the forest is not continuous but intersected by numerous tidal inlets and creeks. *Salvadora persica* is the predominant tree. *Manilkara hexandra* is the principal tree on the dune is slowly disappearing on poorly drained, salty terrain. The thicket then presents a more regular appearance, less high, but the natural openings are many wherever there is saline efflorescence.

Aquatic vegetation

In the fresh water pools of the rainy season, aquatic ephemerals such as *Ludwigia Lindernia, Bacopa, Limnophila, Marsilea* etc., come up. The ridges are predominant with *Salacia chinensis* and *Mucuna pruriens* which are unique to this area. The usually low-lying salt marshy habitat is generally inhabited by *Salicornia, Sporobolus, Suaeda* and *Arthrocnemon*. Emergent species include *Limnophilla* and *Typha*. Floating-leaved hydrophytes are *Aponogeton natans, Ipomoea aquatica, Nymphaea pubescens* and *Nelumbo nucifera*. Submerged species are *Vallisneria natans* and *Ottleia alismoides*.

The Tropical Dry Evergreen Vegetation

The area consists of stunted, almost exclusively formed of bushed much branched plant species measuring 2 to 4 m in height. Here and there emerge some evergreen arborescent shrubs under 10 m in height with dark green voluminous crowns. High thorny evergreen thickets are found on the sand dunes. The continuous and principal stratum is thorny with a slight numerical dominance of *Zizyphus, Catuneragam, Maytenus.* Other non-thorny ligneous species are also common but their density varies from place to place. This is in the case with *Memecylon, Sapindus, Premna, Ixora, Canthium.* Therefore, in the thicket, the majority of the species are non-thorny though the number of the individual thorny plants appears to be higher than the others. They make the entry into the thicket particularly difficult especially in the presence of the invading spinescent climbing shrubs like *Toddalia asiatica.* Generally, the lianas grow well even in the interior of the thickets but relatively few species. The herbaceous and ground cover is exclusively poor.

Being accessible, this vegetation is often traversed by man and openings are made in places. Also, some anthropic stages appear here and there with anthropochore trees like *Syzygium cumini, Borassus flabellifer, Lannea coromandelica* and *Manilkara hexandra*.

This is the most productive vegetation of the forest in terms of biomass as well as utility. Dendroid forms of *Manilkara, Calophyllum, Walsura, Syzygium, Dryptes* and climbers or stragglers like *Mucuna, Canavalia, Lablab, Salacia, Cissus, Toddalia, Tinospora* occur here are valuable as food and medicine.

At the borders, roads and pathways, some unarmed species like *Vitex negundo, Clerodendron inerme, Cassia auriculata* and others are common. *Cassytha, Loranthus* and *Viscum* are the parasites. *Vanda* is the only orchid, fairly common in these forests as it could thrive in the warm humid atmospheres.

Mangrove vegetation

Mangroves are salt-tolerant species of divergent groups. They play vital role in land-stabilizing and building, preventing soil erosion in coastal zones and are a source of nutrients for the inhabitants therein besides being a supplier of a variety of forest produce for human use. The presence of luxurious mangrove vegetation in the locality called Muniappan Lake on the western side of the road and vertises of such patches in several other places suggests that the once exuberant mangrove formations are

progressively dwindling and disappearing due to human interference in the form of salt pars.

Dynamism of the vegetation

The thickets are often invaded by the human population to get their requirement of fuel wood. On the dunes, the equilibrium of the woody species is precarious. There are hardly any seedlings of these species observed colonizing the clear areas. As their growth is apparently very low, special attention should be paid to the protection of the vegetation.

Practically all the thorny shrubs of the thickets may be considered as the pioneers. Under their light shade and protection and due to the thin superficial humus layer, some seedlings have developed. These shrubs, if not cut, may give rise to the discontinuous dominant stratum of the formation.

On the halomorphic soils of the tidal inlets and creeks, almost a continuous herbaceous cover precedes the woody species. There appears quick growing species like *Prosopis chilensis, Clerodendrum inerme, Salvadora persica, Excoecaria agallocha* are capable of forming a thick bush within 5 – 6 years. Between the clumps of shrubs develop a low dense grassy carpet of *Poaceae*, *Cyperaceae* and *Scrophulariaceae* on the halomorphic soils. It is grazed by the cattle and represents a sort of equilibrium between dynamism of shrubs on the one hand and the biotic factors on the other.

This pasture is likely to be immersed under a thin layer of brackish water during the strong tides of October – November. *Fimbristylis* and *Kyllinga* are the dominant species. Another *Cyperaceae* member *Cyperus arenarius* is also locally very abundant. *Poaceae* species like *Chloris barbata, Chrysopogon fulvus, Eragrostis japonica* and *Oplismenus composites* also observed along with the *Cyperaceae.*

The remaining flora is essentially comprised of *Phyla nodiflora, Portulaca oleracea, Leucas aspera, Oldenlandia umbellata, Evolvulus alsinoides, Hybanthus enneaspermum, Tribulus terrestris, Boerhaavia diffusa, Phyllanthus amarus* and *Spermacoce hispida*.

Although the bushy species are evergreen, some may be partially defoliated for some days per year. The arborescent species are evergreen (*Manilkara)* or deciduous for a very short time (*Diospyros ferrea)* or yet distinctly deciduous (*Albizia, Vitex*). The number of individuals of deciduous species is quite low compared to that of the evergreens. Tobacco is cultivated at several places. Leaves of *Manilkara hexandra* used as manure for tobacco fields.

Across the study site, the highest value of plant diversity and richness. The reason can be the arid environment which results in the lower tree cover diversity and thus increase the light level in the forest floor. The plant diversity is related to the edaphically heterogeneity in the semi-arid environment in USA (Moustafa and Zayed, 1996) [3]. So that, the more rugged area would have more biodiversity that the other areas. The effects of environmental factors on vegetation established on alluvial plains of Sina desret stated that the species richness is different toward humidity difference (Sabestia, 2004) [4]. Also, humidity change is a mixture of changes related to altitude, slope, climatic drought and texture and nature of top soil, so that plant species diversity is higher in drier aspects than another aspect. The soil fertility is the main environmental factor in vegetation establishment (Shmida and Wilson, 1985) [5]. This paper concludes that a proper management from human disturbance and scientific management of medicinal plants of the forest area may lead a rich biodiversity site in India.

References

1. Daubenmire RF. The use of vegetation in assessing the productivity of forest lands. Botanical Review. 1976; 42:115-143.
2. Heydari M, Mahdavi A. Pattern of species diversity in related to physiographic factors in Melah Gavan Protected area. Iran Asian Journal of Biological Sciences. 2009; 2(1):20-27.
3. Moustafa AE, Zayed A. Effect of environmental factors on the flora of alluvial fans Southern Sina. Journal Arid Environment. 1996; 32:431-443.
4. Sabestia MT. Role of topography and soils in grassland structuring at the landscape and community scales. Basic Applied Ecology. 2004; 5:331-346.
5. Shmida A, Wilson MV. Biological determinants of species diversity at different spatial scales. Journal Biogeography. 1985; 12:1-20.
6. Untawale AG, Nair A. Ecology of sand dune vegetation in relation beach stability at Miramar. Goa. Mahasagar. Bulletin National Institute of Oceanography. 1974; 7(1 &2):41-51.