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Coastal Sand Dune Floral Diversity in Cuddalore Coastal Areas, Southeast Coast of India

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ABSTRACT

The first layer of protection to the coastal areas from the natural hazards is sand dunes. The stability of the sand dunes are depends upon the rate of vegetation cover. Hence, the present study investigated the coastal sand dune floral diversity in Parangipettai coastal areas, Cuddalore. The coastal sand dune floral survey was done in Cuddalore coastal areas. 32 species belonging to 20 families were identified along the Cuddalore coastal area (from Mudasalodai to Thazhanguda). The coastal sand dunes are unique ecosystem provide habitat for all level of living organisms and nesting beds for marine turtle. So, the coastal sand dunes should be protected from destruction and anthropogenic impact. We will leave it for our future generation protection.

Keywords: Sand dune, Vegetation, Conservation, Management, Diversity

INTRODUCTION

Coastal Sand dunes are a natural wonder with beauty and majesty. They are in fact extensions of the beach into the land. While a beach is closely linked to the sea and controlled by waves and tides, the dunes are linked to land and are controlled by winds. Sand dunes are important features of sand coastal environments. Sand Dunes act as a home for some important specialized plants and animals (rare and endangered species). CSDs are dynamic, but fragile buffer zones of sand and vegetation are formed, where the following three characteristics can be found: large quantities of sand, persistent wind capable of moving the sand and suitable locations for sand to accumulate [1]. Dunes protect the beaches from erosion and control the potential sea level rise; filter for rainwater and groundwater [2]. Directly and indirectly, coastal sand dunes were threatened by human activities without knowing the importance. Countries like the United Kingdom, Australia, Canada, United States, New Zealand and Netherlands, continuously doing significant dune protection projects and programs.

The plants that are present in sand dunes are called Psammophytes. These psammophytic plants play an essential role in protecting the coast areas from erosion and floods [3]. Dune plants strengthening and supporting the dunes with their roots, anchoring them temporarily in place, while their leaves trap sand, expanding the dune formation. The sand dune is always depending upon the sand dune vegetation followed by wind traps, sand binders and dune stabilizers [4]. Beach ecosystems in India have been studied for their physical, geological and restoration aspects [5,6], CSD ecosystems are categorized as ecologically sensitive (MoEF).

India has a coastline of about 7516.6 km long with 2.02 million km² exclusive economic zone and 0.13 million km² continental shelf [7] and it covers nine states and two union territories. Tamil nadu coastal line has a length of about 1076 km, it constitutes about 15% of the total coastal length of India. The coastal zone is an important biogeographically habitats of the Indian subcontinent [8].

The coastal organisms are directly depending on coastal sand dune vegetation for food, fodder, health, reproduction, protection, manure and recreation. Actually, a few numbers of publications are presents on the floral diversity of Indian sand dunes [2]. This paper aims to generate a baseline data on coastal sand dune vegetation in the Parangipettai coastal areas, Cuddalore.

MATERIALS AND METHODS

Study area

Cuddalore (11.75°N and 79.75°E) is a one among the largest industrial area in south India in the State of Tamil Nadu, which has increasing rates of coastal development. The coastal area of Cuddalore starts from the Gadilam estuary in the north to Pichavaram mangroves in the south; it covers totally a length of 42 km (Figure 1) along the Bay of Bengal. The geomorphology of the Cuddalore coastal areas comprises coastal plain, trandlines, raised beaches, sand dunes, mangrove swamps and tidal flats with dominantly sandy beaches on the northern side and mangrove swamps to the south. In North side the coastal towns of Cuddalore and South side Porto Novo (Parangipettai) are the highly populated area along the region.

Data collection

Data collections were made from Mudasalodai (Parangipettai) to Thazhanguda (Cuddalore) coastal villages. A line transects of about 10000m were laid randomly (wherever the vegetation cover was predominantly found) in different locations at different distance from the shoreline in each area. The plant species which are found in the transects was recorded and observed. The plant species are identified in the field and lab. Species were identified by using published flora [9,10]. All recorded plant species were divided into annual versus perennial groups.

RESULTS AND DISCUSSION

In India, totally 154 species belonging to 108 genera and 41 families were present in coastal sand dunes [11]. In the present study totally 32 species belonging to 20 families were identified during my survey. Fabaceae was the most common and dominant family with 5 species followed by Poaceae (4), Cyperaceae (3), Arecaceae (2), Euphorbiaceae (2) and Scrophulariaceae (2). Fifteen families were represented only by one single species (Table 1 and Figures 2-5). Coastal Sand Dunes which present in temperate areas comprise mainly the members of Poaceae, In tropical areas mainly comprises with Asteraceae, Cyperaceae and Fabaceae and Poaceae [2,9,11,12].



Figure 1: Map showing the study area



Figure 2: *Ipomoea pescaprae*, *Spinifex littoreus*

Table 1: List of coastal dune flora from Cuddalore coastal areas, India

Scientific Name	Family	Habit
<i>Acalypha indica</i> (Linnaeus, 1753)	Euphorbiaceae	H
<i>Acrachne henrardiana</i> (Bor) S.M. Phillips	Poaceae	H
<i>Aeschynomene aspera</i> (Linnaeus, 1753)	Fabaceae	H
<i>Aerva persica</i> (Burm.f.) Merr.	Amaranthaceae	S
<i>Anacardium oxydendrum</i>	Anacardiaceae	T
<i>Azadirachta indica</i> Adr. Juss.	Meliaceae	T
<i>Borassus flabellifer</i>	Arecaceae	T
<i>Bulbostylis barbata</i> (Rottb. and C.B. Clarke 1893)	Cyperaceae	H
<i>Calotropis gigantea</i> (L.) R. Br.	Asclepiadaceae	S
<i>Calophyllum inophyllum</i>	Calophyllaceae	T
<i>Canavalia cathartica</i> (Thouars 1823)	Fabaceae	C
<i>Canavalia rosea</i> (Sw.and Dc. 1825)	Fabaceae	C
<i>Casureneia equisetifoliys</i> (Linnaeus, 1753)	Casureneiaceae	T
<i>Catharanthus roseus</i> (Linnaeus and G.Don, 1956)	Apocynaceae	H
<i>Cocos nucifera</i>	Arecaceae	T
<i>Cyperus compressu</i> (Linnaeus,1753)	Cyperaceae	H
<i>Cyperus rotundus</i> (Linnaeus,1753)	Cyperaceae	H
<i>Desmodium trifolium</i> (Linnaeus and DC, 1825)	Fabaceae	H
<i>Erythrina indica</i>	Fabaceae	T
<i>Euphorbia rosea</i> (Retz,1830)	Euphorbiaceae	H
<i>Gisekia pharnaceoides</i> (Linnaeus,1771)	Aizoaceae	H
<i>Glinus oppositifolius</i> (Linnaeus and A. Dc.,1901)	Molluginaceae	H
<i>Ipomoea pes-caprae</i> (Linnaeus and R. Br.1818)	Convolvulaceae	C
<i>Lindernia crustaceae</i> (Linnaeus, 1883)	Scrophulariaceae	H
<i>Lindernia oppositifolia</i> (Retz.and Mukerjee, 1884)	Scrophulariaceae	H
<i>Launaea sarmentosa</i> (Willd.) Sch.Bip. ex Kuntze	Asteraceae	H
<i>Oldenlandia umbellata</i> (Linnaeus,1771)	Rubiaceae	
<i>Pedaliium murex</i> (Linnaeus,1759)	Pedaliaceae	H
<i>Spinifex littoreus</i> (Burm.f. and Merr. 1855)	Poaceae	H
<i>Trachys muricata</i> (L.) Pers.	Poaceae	H
<i>Tribulus terrestris</i> (Linnaeus, 1771)	Zygophyllaceae	H
<i>Zoysia matrella</i> . (Linnaeus, 1771)	Poaceae	H

**Figure 3:** *Borassus flabellifer*, *Anacardium oxydendrum*



Figure 4: *Casuarina equisetifolia*



Figure 5: *Cocos nucifera*

CONCLUSION

In this manner, the present work also indicates and identifies that the study area having a high level of flora with number of native dune plants. It is very important to conserve and protect the coastal sand dune vegetation for our future coastal generation protection and ecosystem management.

ETHICAL ISSUES

The authors declare no ethical issues.

CONFLICT OF INTEREST STATEMENT

We declare that we have no conflict of interest.

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