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Study on sedges and grasses at the point calimere wildlife and bird sanctuary, Tamil Nadu

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Abstract

A survey of the vegetation of an area is chiefly important. It gives the diverse and poorly documented nature of the state's vascular flora. Surveys can be categorized into regional, sub-regional, local and single-species surveys. At all scales, floristic surveys have provided details on individual taxon distribution, identified previously unknown or unrecognized taxa, have located presumably extinct taxa and substantially contributed to information on the distribution of threatened flora. The present study documented the diversity of sedges and grasses in the Point Calimere Wildlife Sanctuary, Tamil Nadu. A total of 34 species was recorded. Out of the 34 species identified in the study sites, 15 species were belonging to Cyperaceae and 19 were belonging to Poaceae. *Cyperus* is the most dominant genera in Cyperaceae with 9 species. Thirteen species of geophytes also recorded in the study area. Presence of sedges and grasses prevent the soil erosion in the coastal region. Conservation of this vegetation is an urgent need to preserve the forest ecosystem.

Keywords: Deepan, pachan, jatharagni, cephalic phase, gastric phase, GI Tract

Introduction

Poaceae is the first and Cyperaceae is the second largest family among the Monocotyledons. Cyperaceae is one of the most intricate families represented by 70-80 genera and 4000 species distributed throughout the world with about 28 genera and 500 species in India. Due to minute to the smaller size of flower, least economic importance and intricacy due to narrow generic and specific delimitation, extreme variation in vegetative and floral parts^[1, 4]. The Family Poaceae contains approximately 11 000 species^[5] distributed among about 750-770 genera^[6-7] worldwide and is the fifth largest flowering plant family^[8, 10]. It covers about 40% of the Earth's surface^[11]. Both family poaceae and cyperaceae consist of annual or perennial herbs with fibrous roots. The habitat of the cyperaceae is moist and wet, but poaceae distributed across most habitats. In cyperaceae stems are solid and trigonous in cross section, but in poaceae stems are hollow, jointed and terete or ellipsoid. In cyperaceae sheath closed leaves are v or w shaped and three ranked, but in poaceae sheath open leaves are flat and two ranked. Achene fruit in cyperaceae but caryopsis fruit in poaceae. In grasses a floret subtended two bracts (glumes), in sedges a floret is contained by a single scale. Floristic surveys of vegetation provide a detailed account on the plant species diversity and management plans for their conservation^[12, 13]. These floristic analyses are much useful in the context of the global climate change and its biological impacts^[14, 16]. In this study an attempt has been made to highlight the distribution of Poaceae (grasses) and Cyperaceae (sedges) in Point Calimere wildlife and bird sanctuary, Tamil Nadu.

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 called as Kallimedu or Kdikarai in Tamil. The Point Calimere sanctuary was created in 1967, for conservation of endemic and endanger species Black Buck. The sanctuary is also famous for flamingos. The sanctuary is known for tidal swamps, dry evergreen forests and mangrove forests. It is located at apex of the Cauvery river delta. The Bay of Bengal meets the Palk Strait and marks a nearly a right-angle turn in the coastline (Fig: 1). The total area of the sanctuary is 377 km². Point Calimere, at a sea level above MSL in the eastern side ending with the sea gradually rises in the west up to 25 mts in Ramarpadam located in the high sand dunes.

Materials and methods

Field visits were made in the area of study during Oct. 2005 to Sep. 2008 to survey the flora and to collect specimens for further study.

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The details like name (family, plant name, and local name), locality, and date of collection, habit and habitat, uses, distribution and salient features like association were recorded in an elaborate field book. The morphological differences were noted and the plants and their families were arranged according to the Bentham and Hooker's system (1862 – 1883). The plant specimens collected were processed at the laboratory of Medicinal Plants Unit, Central Council for Research in Siddha, Department of AYUSH, Ministry of Health and Family welfare, Govt. of India, Tirunelveli, and identified with the help of available literature. Voucher specimens were prepared and compared with those at the herbarium specimens at the Siddha Medicinal Plants unit, Palayamkottai, Tirunelveli. The identification and information on nomenclature was taken from standard references [17, 20].

Results and discussion

For the evaluation of ecosystems at different scales, analysis of the species diversity is one of the most important indices [21]. Biodiversity measurement typically focuses on the species level. Table 1 shows the different plant species, their voucher numbers, habitats and families found in the study sites. A total of 34 species was recorded as belonging to two families. Out of the 34 species identified in the study sites, 15 species were belonging to Cyperaceae and 19 were belonging to Poaceae. Among the selected two families poaceae is the most dominant family with 18 genera and 19 species. Cyperaceae recorded with 5 genera and 15 species. *Cyperus* is the most dominant genera in Cyperaceae with 9 species.

The vegetation in Point calimere reserve forest varies with different habitats such as foreshore sandy, inland sandy, salt marsh, mangrove, sand dune and woody scrub jungles.

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 and Cyperaceae on the halomorphic soils. It is grazed by the cattle and represents a sort of equilibrium between the 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 compositus* also observed along with the Cyperaceae. Inland sandy habitat harbours large patches of *Spinifex littoreus* (Ravananmeesai in Tamil). *Spinifex* along with *Ipomoea*, *Launaea*, *Pandanus* etc., serve as sand binders or soil binders at several places. *Oplismenus* is a common in shady places. *Fimbristylis polytrichoides* and *F. argenta* are wetland indicator species. *F. ferruginea* is a common weed of irrigated rice and brackish swamps.

Geophytes are perennial plants due to the presence of underground storage organs. *Cyperus arenarius*, *C. exaltatus*, *C. kyllingia*, *C. procerus*, *Fimbristylis triflora*, *Aeluropus lagopoides*, *Cenchrus ciliaris* are rhizomatous perennial plants of the study area. Stoloniferous grasses such as *Halopyrum mucronatum*, *Spinifex littoreus*, *Echinochola colona* also codominate with other angiospermic plants. *Cyperus rotundus* is the common tuberous plant distributed in

wetlands. *Cynodon dactylon* spreads by scaly rhizomes and flat stolons to form a dense mat. One bulbous geophyte *Cyperus bulbosus* also found along the margin of the water bodies.

Cyperus exaltatus rhizome is grated and eaten, and also applied in dressings to scarifications over the spleen, in the treatment of cases of chronic malaria [22]. Tubers of *Cyperus rotundus* used as aromatic and antipyretic. *C. rotundus* rhizomes widely used in Ayurveda to consider as astringent, diaphoretic, diuretic, analgesic, antispasmodic, aromatic, carminative, antitussive, emmenagogue, litholytic, sedative, stimulant, stomachic, vermifuge, tonic and antibacterial [23]. *Aristida setacea* culms are used extensively for making brooms [24]. *Chloris barbata* leaf paste applied externally for fever and diarrhea [25]. Leaf paste and juice used for treatment of fever, skin diseases, and diabetes by the Malayali tribes in the Kolis hills of Tamilnadu, India [26]. *Dactyloctenium aegyptium* dried grain is eaten by women suffering from bellyache after child birth [27].

Cynodon dactylon (Bermuda grass) possesses enormous medicinal value. It may be applied both externally as well as internally. It has haemostatic, refrigerant and healer properties, so it is beneficial for skin complexion. Externally it is used to treat wounds, hemorrhages, burning and discoloration of skin. Leaf paste is applied in traumatic wounds and piles. The fresh juice of the plant drops into eyes for catarrhal conditions. Paste of the plant is applied on forehead in headache. Internally the plant is used to cure various diseases such as epilepsy, hysteria, bleeding in dysentery, piles, haematuria, epistaxis, menorrhagia, diarrhea, raktapitta, prostatitis, syphilis and urinary tract infection. The plant extract checks uterine bleeding, strengthens the uterus, averts abortion and augments of foetal growth. Decoction of *C. dactylon* can be used to treat kidney stones [28].

Cyperus procerus culms are also used as a source of material for weaving mats [29]. *Echinochola colona* (Kudiravalli pullu in Tamil) is a valuable fodder, common along the railway tracts in the study area. The grains used in biliousness and constipation [30]. Highly nutritious grass *Cenchrus ciliaris* (buffel grass) is considered excellent for pasture in hot and dry areas. *Aristida setacea* culms are used extensively for making brooms [24]. The needle grass, *Aristida adscensionis*, assists in stabilising sand-dunes and used to control soil erosion. *Aeluropus lagopoides* inhabits damp, saline soil on the fringes of salt marshes. It survives at high-salinity habitats. The plant itself has a very low salt content and it is able to expel the salt, it gains from the highly saline soil, through glands on the leaves [31].

Soil erosion is one of the major threats in achieving the potential productivity. Grasses and sedges overcome this major problem. It not only binds the soil, but provides more biomass, fodder for livestock, commercial and medicinal usages. Grasses produce rapidly humus too. They help in converting erodible sandy soil into stabilizing terrace in the study area. Hence, conservation of the grasses and sedges is very important for management of different ecosystems in Point Calimere.

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Source: District Forest Office, Nagapattinam, Tamil Nadu

Table 1: list of sedges and grasses

Botanical Name	Voucher number	Tamil Name	Habitat
Cyperaceae			
<i>Cyperus arenarius</i> Retz.	XCH 6080	-	Sandy beaches
<i>Cyperus bulbosus</i> Vahl,	XCH 6081	Silanthi	Sandy beaches
<i>Cyperus difformis</i> L.	XCH 608	Vattakorai	Marshy areas and paddy fields
<i>Cyperus exaltatus</i> Retz.	XCH 6155	-	Puddles and paddy fields
<i>Cyperus iria</i> L.	XCH 6145	Yanaikkitti, Oosikorai	Marshy areas and paddy fields
<i>Cyperus kyllingia</i> Endlicher	XCH 6197	velutta nirbasi	Degraded forest areas
<i>Cyperus procerus</i> Rottb.	XCH 6086	Mattakorai	Marshy areas
<i>Cyperus pygmaeus</i> Rottb	XCH 6160	-	Edges of ponds, ditches
<i>Cyperus rotundus</i> L.	XCH 6087	Koraikilangu	Cultivated fields
<i>Cyperus squarrosus</i> L.	XCH 6149	-	Edges of tanks, pools, streams, ditches
<i>Fimbristylis argentea</i> (Rottb.) Vahl,	XCH 6156	-	Moist sandy grounds
<i>Fimbristylis ferruginea</i> (L.) Vahl	XCH 6160	-	Mangrove forests
<i>Fimbristylis triflora</i> (L.) K.Schum. ex Engl.	XCH 6159	-	Grasslands near the coast
<i>Kylinga hyalina</i> (Vahl) T. Koyama	XCH 6165	-	Dry grasslands
<i>Lipocarpa squarrosa</i> (L.) Goetgh.	XCH 6161	-	Marshy areas
Poaceae			
<i>Aeluropus lagopoides</i> (L.) Trin. ex Thwaites	XCH 5617, 5706	Kadal Arugampullu	Fringes of salt marshes
<i>Aristida adscensionis</i> L.	XCH 6162	Kodai pullu, Balla pullu	Degraded lands
<i>Aristida setacea</i> Retz.	XCH 6164	Thodappam pullu	Roadsides, sandy localities
<i>Cenchrus ciliaris</i> L.	XCH 6163	Kolukkattai pullu	Roadsides, sandy localities
<i>Chloris barbata</i> Sw.	XCH 5845, 5650	Kodai Pullu, Sevarug pullu	Roadsides, sandy localities. bunds of paddy fields
<i>Chrysopogon fulvus</i> (Spreng.) Chiov.	XCH 6166	-	Moist places
<i>Cynodon dactylon</i> (L.) Pers.	XCH 5831	Arukampullu	Roadsides, sandy localities. bunds of paddy fields
<i>Dactyloctenium aegyptium</i> (L.) Willd.	XCH 6173	-	Wastelands, sandy localities
<i>Echinochola colona</i> (L.) Link	XCH 5851	Kudiravalli pullu, Rail pullu	Moist localities, bunds of paddy fields
<i>Eragrostiella bifaria</i> (Vahl) Bor.	XCH 6169	-	Sandy areas near streams
<i>Eragrostis japonica</i> (Thunb.) Trin.	XCH 6171	Kanjirapul	Wet localities
<i>Eremopogon foveolatus</i> (Delile) Stapf.	XCH 6170	-	Salt marsh
<i>Hackelochloa granularis</i> (L.) Kuntze,	XCH 6172	-	Cultivated lands
<i>Halopyrum mucronatum</i> (L.)Stapf.	XCH 6167	-	Coastal dunes
<i>Heteropogon contortus</i> (L.) P.Beauv. ex Roem, & Schult	XCH 6168	Oosi pullu	Scrub jungles dry localities
<i>Oplismenus composites</i> (L.) P. Beauv	XCH 5809	-	Shady places
<i>Perotis indica</i> (L.) Kuntze,	XCH 5856	Narivalpullu	Sandy places
<i>Spinifex littoreus</i> (Burm.f.) Merr.	XCH 5605, 5662, 5687	Ravananmeesai.	Seashores, sand dunes
<i>Trachys muricata</i> (L.) Pers. ex Trin.	XCH 5712	Vennai thirati pul	Sandy localities

*Aristida setacea**Cynodon dactylon**Dactyloctenium aegyptium**Perotis indica**Spinifex littoreus**Eragrostis japonica**Cyperus rotundus**Cyperus iria**Aeluropus lagopoides*

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