



Assorted variety of genuine mangrove and their partners in east drift locale of Pichavaram Tamil Nadu India and improve to change of mangrove plants, and its remedial properties with a mangrove knowledgebase

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Abstract

Mangroves are embraced with exceptional adjustment to outrageous conditions in tropical and subtropical areas of the world. It has a rich wellspring of auxiliary metabolites. The present investigation centres the assorted variety status examination of genuine mangroves and their partners in pichavaram and its environment. By guide field perception and examining to adjacent occupants. From the perception the decent variety level fluctuates starting with one place then onto the next, because of some natural factors, for example, atmospheres, tidal variables, shortage of learning about mangroves to the informed and town people groups and anthropogenic weights and so on it can instigate mangrove assorted variety harm and misfortune, decrease the human important items which is gotten from mangrove timberland. Must know the exact information from past examines, researchers, logical fields like morphology, life structures, physiology, Scientific classification, Biology, development stages, proliferation levels, and so on. Comprehend between the living space factors and propensity nature can help to dispersing by species required situations, it can normally incite self-insurance level high in plants itself. It can firmly giving aides for effortlessly keeps up mangrove woods monitor, security, forestalling misfortunes, and create new mangrove species in pichavaram and its environment.

Keywords: morphology, mangrove, anthropogenic, pichavaram, atmospheres

Introduction

Mangrove backwoods environment are the most beneficial beach front biological communities on the planet (Kathiresan *et al.*, 2001) ^[3]. Tropics and subtropics, which rule roughly 75% of the world's coastline between 25° N and 25° S and are assessed to cover a region of 1.7 to 2.0× 10⁵ km² (Borges *et al.*, 2003) ^[1]. 1 Mangrove trees and bushes are develop in saline waterfront living spaces, systematically assorted gathering of salt-tolerant, for the most part arboreal, blossoming plants (Ellison and Stoddart, 1991) ^[2] They fall into two gatherings as indicated by their environments in nature: genuine mangroves and mangrove partners. Genuine mangroves allude to species that particularly develop in intertidal zones, while mangrove partners are equipped for happening in either littoral or earthly living spaces. Mangrove arrangements rely upon earthly and tidal waters for their sustenance and sediment stores from upland disintegration as substrate for help (Kathiresan, 2003) ^[13]. Substances in mangroves have for quite some time been utilized as a part of people solution to treat ailments (Bandaranayake, 1998) ^[5, 18]. Mangrove living spaces of India have been confronting gigantic dangers because of unpredictable abuse of mangrove assets for various utilizations like grain, fuel wood, timber for building material, liquor, paper, charcoal and pharmaceutical (Upadhyay *et al.*, 2002) ^[6]. They are additionally utilized locally to mild angle traps and for pontoon development. They additionally bolster the development of microbial vegetation.

Some anti-microbial creating actinomycetes are available in this condition, which is fundamental for hindrance of pathogenic microorganisms. Some novel synthetic atoms and metabolites have been recognized from mangroves and their partners (Bandaranayake, 1998) ^[5, 18].

The Pichavaram mangrove timberland covers a zone of around 1100 ha, of which half is secured by woodland, 40% by conduits and the staying filled by sand-pads and mud-pads (Krishnamurthy and Sovereign Jayaseelan, 1983) ^[14]. The Pichavaram mangrove is impacted by blending of three sorts of waters: 1. Neritic or costal water from the adjoining Cove of Bengal through a mouth called 'Chinnavaikkal', 2. bitter water from the Vellar and Coleroon estuaries and, 3. crisp water from a water system channel (Khan Sahib waterway)', and in addition. From the principle channel of the Coleroon waterway. The year for accommodation is masterminded into four seasons: 1. post storm: January– March; 2. summer: April– June; 3. pre-storm: July– September; and, 4. Rainstorm (upper east storm): October– December. The tides are semi-diurnal and fluctuate in sufficiency from around 15 to 100 cm in various districts amid various seasons, achieving a greatest amid rainstorm and post-storm and a base amid summer (Muniyandi, 1986) ^[15]. The ascent and fall of the tidal waters is through a direct Association with the ocean at the Chinnavaikkal mouth and furthermore through the two adjoining estuaries. The profundity of the water – routes ranges from around 0.3 – 3 m (Muniyandi, 1986) ^[15]. The

present investigation expected to review the mangroves and their partners display in three distinct regions to understand the plant decent variety of mangroves and their partners, which is useful in inferring taxonomical data in light of species assorted variety, morphological changes and efficient significance from the pichavaram locale of Tamil Nadu India . The primary target of the present examination is to understand the plant assorted variety of mangroves and their partners, which is useful in determining taxonomical data in view of species decent variety, morphological changes and prudent significance from the four distinct districts in the Pichavaram and their surroundings territory.

Materials and techniques

Pichavaram mangrove backwoods (Lat. 11.20' N; Long. 79, 47' E) is situated between the Vellar and Coleroon estuaries close Chidambaram, Tamil Nadu. The woodland happens on 51 islets, running in estimate from 1100 Ha isolated by perplexing conduits, which associate the Vellar and Coleroon estuaries. The southern part close to the Coleroon estuary is prevalently mangrove vegetation, while the northern part close to the Vellar estuary is ruled by mud-pads. The Vellar estuary opens into the Sound of Bengal at Parangipettai and connections

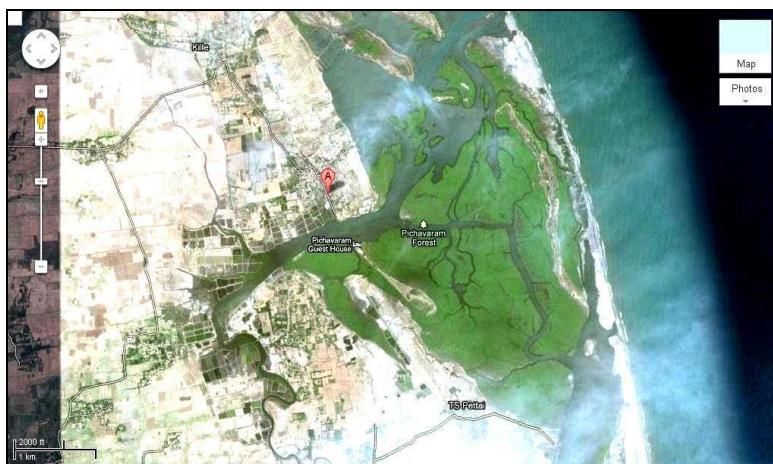


Fig 1: Study area-Pichavaram Mangrove forest

Information gathering and term

The zones where mangroves and mangrove related vegetation exists in Killai, T.S. Pettai and Pichavaram were first distinguished and reported. For the evaluation of present biodiversity status, the mangroves, mangrove related vegetation's current around the investigation region were considered for distinguishing proof. Customary overviews were made all through the woodland to investigate the victories of the genuine mangroves and their partners. The mangroves and mangrove related vegetation were culled amid their blossoming and fruiting seasons for recognizable proof

and took photos with the assistance of camera. The terminology of the examples took after Bet (1957) and Matthew (1983) [8]. Plant examples were gathered at whatever point distinguishing proof was impractical in the field. The gathered examples were related to the assistance of the distributions (Rajendran and Baskar Sanjeevi, 2004; Ramanathan, 1997). Classifications of the recognized species were checked with the Worldwide Plant Naming File (IPNI) with the Coleroon Stream, which are distributaries to the Waterway Cauvery.

Table 1: Distribution of Mangroves and their family

S. No.	Species	Genus	Family	Order	Common name	Local name	Available status			
							PM	PI	KI	T.I
1.	<i>Acanthus ilicifolius</i> (L.)	Acanthus	Acanthaceae	Personales	Sea holly	Kazhi mulli	+	-	+	+
2.	<i>Aegiceras corniculatum</i> (L.) Blanco	Aegiceras	Myrsinaceae	Primulales	Black mangrove or kalsi	Narikandan	+	-	-	+
3.	<i>Avicennia marina</i> (L.)	Avicennia	Avicenniaceae	Lamiales	Grey or white mangrove	Vencandal	+	+	+	+
4.	<i>Avicennia officinalis</i> (L.)	Avicennia	Avicenniaceae	Lamiales	Indian or white mangrove	Venkandal	+	-	+	+
5.	<i>Bruguiera cylindrica</i> (L.) Bl.	Bruguiera	Rhizophoraceae	Myrtales	Bakau Putih	kakandal	+	+	-	+
6.	<i>Ceriops decandra</i> (Griff.) Ding How.	Ceriops	Rhizophoraceae	Myrtales	flat-leaf spurred mangrove	Chiru kandal	+	-	-	+
7.	<i>Excoecaria agallocha</i> (L.)	Excoecaria	Euphorbiaceae	Euphorbiales	Milky or blinding mangrove	Thillai	+	-	+	+
8.	<i>Lumnitzera racemosa</i> Willd.	Lumnitzera	Combretaceae	Myrtales	Teruntum Bunga Puteh	thiparathai	+	-	-	+
9.	<i>Rhizophora apiculata</i> Blume.	Rhizophora	Rhizophoraceae	Myrtales	Tall-stilt Mangrove	Surapinnai	+	+	+	+
10.	<i>Rhizophora mucronata</i> Lam.	Rhizophora	Rhizophoraceae	Myrtales	loop-root mangrove	Malattu surapinnai	+	+	-	+
11.	<i>Rhizophora annamalayana</i> Kathir.	Rhizophora	Rhizophoraceae	Myrtales	Red mangrove`	Alaiyathi	+	-	-	-
12.	<i>Xylocarpus mekongensis</i> Pierre	Xylocarpus	Meliaceae	Sapindales	Mangrove Cannonball, Nyireh Bunga	Comuntiri	+	-	-	-
Total	9	7	6				12	4	5	10

PM: Pichavaram PI: Parangipettai KI: Killai TI: Thaandarayan Sozhanpettai + available – not available

Table 2: Distribution of Mangrove Associates and their families

S. No.	Species	Genus	Family	Order	Common name	Local name	Available status			
							PM	PI	KI	T.I
1.	<i>Arthrocnemum indicum</i>	Arthrocnemum	Chenopodiaceae	Ficoidales	<i>Pogadala chettu,</i>	kiramar	+	+	+	+
2.	<i>Calotropis gigantea</i>	Calotropis	Asclepiadaceae	Gentianales	Crown flower	erukku	+	+	+	+
3.	<i>Citrullus colocynthis</i>	Citrullus	Cucurbitaceae	Cucurbitales	bitter apple,	Komtii kai	+	+	+	+
4.	<i>Clerodendrum inerme</i>	Clerodendrum	Verbenaceae	Lamiales	Glory Bower, Indian privet	Sangam	+	-	+	+
5.	<i>Derris trifoliata</i>	Derris	Fabacea	Fabales	Sea Derris	Derris	+	+	+	+
6.	<i>Ipomoea pes-caprae</i>	Ipomoea	Convolvulaceae	Solanales	beach morning glory	Adappankodi	+	+	+	+
7.	<i>Pongamia pinnata</i>	Pongamia	Fabaceae	Fabales	Pongam Tree	Pungai	+	+	+	+
8.	<i>Salicornia brachiata</i>	Salicornia	Chenopodiaceae	Ficoidales	glasswort	Kattumari	+	-	-	+
9.	<i>Sesuvium portulacastrum</i>	Sesuvium	Aizoaceae	Ficoidales	Shore Purslane	Orputu, vankaravacc	+	+	+	+
10.	<i>Spinifex littoreus</i>	Spinifex	Poaceae	Poales	Triodia.	Almarittanpul, Ravanan meese	+	+	-	+
11.	<i>Suaeda maritima</i>	Suaeda	Amaranthaceae	Caryophyllales	annual seablite	nir-umari	+	+	-	+
12.	<i>Suaeda monoica</i>	Suaeda	Amaranthaceae	Caryophyllales	South-Indian Seepweed	Umarinandi,	+	+	+	+
13.	<i>Heliotropium curassavicum</i>	Heliotropium	Boraginaceae	Boraginales	Seaside Heliotrope	Siru thel kodukku	+	+	-	+
14.	<i>Hibiscus tiliacioides</i>	Hibiscus	Malvaceae	Malvales	Hill Portia tree	Malai Poovarasu	+	+	+	+
15.	<i>Thespesia populnea</i>	Thespesia	Malvaceae	Malvales	Portia tree	Poovarasu	+	+	+	+
Total	14	12	10				15	13	11	15

PM: Pichavaram PI: Paramkipettai KI: Killai TI: Thaandavarayan Sozhanpettai + available – not available



1: *Acanthus ilicifolius*



2: *Aegiceras corniculatum*



3: *Avicennia marina*



4: *Avicennia officinalis* L.



5: *Ceriops decandra*



6: *Excoecaria agallocha* male and Female



7: *Lummitzera racemosa*



8: *Rhiuzophora apiculata*



9: *Rhizophora mucronata*



10: *Salvadora Persica*



11: *Xylocarpus mekongensis*

Fig 2(1-11): True mangrove species distribution in Pichavaram areas



Fig 3(a-o): Mangrove Associate species distribution in pichavaram areas

Result

Mangrove plants partitioned into two gatherings, for example, genuine mangroves and mangrove partners. Among them, 25 species were recorded in the investigation time frame including 12 mangroves (Fig.) And 13 mangrove related plants. Absolutely 12 types of mangroves having a place with 9 genera and 7 families were recorded (Table 1). *Avicennia marina*, *Avicennia officinalis* has a

place with *Avicenniaceae* and *Rhizophora apiculata*, *Rhizophora mucronata* has a place with *Rhizophoraceae* was most prevailing mangrove plant species in Pichavaram mangrove timberland. In Pichavaram and T.S. Pettai *Avicennia marina*, *Avicennia officinalis* and *Rhizophora mucronata* was most overwhelming contrasted with Killai. In T.S. Pettai and Parankipettai *Aegiceras corniculatum*, *Bruguiera cylindrica* and *Lumnitzera racemosa* was most prevailing

species contrasted with Pichavaram, parangipettai and Killai. *Xylocarpus mekongensis* is a jeopardized species and it was recorded in few numbers in Pichavaram. Absolutely 13 types of mangroves partners having a place with 12 genera and 12 families were recorded in Pichavaram Mangrove woods. Six partners *Suaeda maritima*, *Suaeda monoica*, *Ipomoea pes-caprae* and *Sesuvium portulacastrum* were seen as prevailing species (Table 2). Fig. 2(1-11). True mangrove species distribution in the researched areas Pichavaram, parangipettai, killai, and T.S. pettai Fig. 3(a-o). Indicates the mangrove associate species morphological views

Discussion

Aggregate 39 mangroves, animal groups were distinguished from India (Kathiresan, 1999) [11]. Tomlinson (1986) [17] revealed 60 species mangrove partners having a place with 46 genera and 27 families that exist on the planet mangroves. Along the east drift, minimal number of mangrove species is available in Tamil Nadu (Deshmukh and Mahalingam, 1991). [12] Our present examination showed that 12 Mangrove species and 15 related species were available. Investigation of the dissemination of genuine mangrove species in various territories of Pichavaram Mangroves wetlands demonstrates that *Acanthus ilicifolius*, *Aegiceras corniculatum*, *Avicennia marina*, *Avicennia officinalis*, *Bruguiera cylindrica*, *Ceriops decandra*, *Excoecaria agallocha*, *Lumnitzera racemosa*, *Rhizophora apicuata*, *Rhizophora mucronata*, *Salvadora persica* are basic to every one of the mangroves of Tamil Nadu. The Pichavaram is likewise described by the nearness of a characteristic half breed of *Rhizophora* species *Rhizophora annamalayana*. *Xylocarpus mekongensis* was additionally announced in Pichavaram by Kathiresan (2003) [13].

Conclusion

The vegetation and estate of mangroves and its partners were effective and very much safeguarded in the district of Pichavaram mangrove woods territory. Is a reproducing ground for water fauna and avifauna and the area can possibly be created for ecotourism, and to make a breeze breaking zone along the shoreline of India. As far as anyone is concerned, this computational asset is a standout amongst the most profitable assets on mangroves for South India, and we intend to refresh and additionally enhance this knowledgebase. We are additionally intending to fuse the hunt alternatives (quick and current conditions examinations) into this asset. A component that we intend to execute in the following form of "Mangroves in pichavaram" is to incorporate therapeutically imperative mixes, conventional and logical learning about mangrove plants which will be valuable for potential medication revelation mangrove misfortune recuperation and incite the new species contemplates.

Future research directions

Improvement of single herb definitions comprising of a full range institutionalized natural concentrate with built up wellbeing and viability thinks about led as per logical standards for mangrove clutters could incorporate utilization of this mangrove plant into clinical practice.

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References

1. Borges AV, Djenidi S, Lacroix G, The ´ate J, Delille B, Frankignoulle M. Atmospheric CO₂ flux from mangrove surrounding waters, Geophys. Res. Lett. 2003; 30(11):1558.
2. Ellison JC, Stoddart DR. Mangrove ecosystem collapse during predicted sea-level rise: Holocene analogues and implications.

- Journal of Coastal Research. 1991; 7:151-165.
3. Kathiresan K, Bingham, Brain L. Biology of mangroves and mangrove ecosystem. Adv. Mar. Biol. 2001; 40:81-251.
4. Kathiresan K. How do mangrove forests induce sedimentation? Rev. Biol. Trop. 2003; 51:355-360.
5. Bandaranayake WM. Traditional and medicinal uses of mangroves. Mang. & Salt Marsh. 1998; 2:133-48.
6. Upadhyay VP, Ranjan R, Singh JS. Human mangrove conflicts: The way out. Current Science. 2002; 83:1328-1336.
7. Gamble JS. Flora of the Presidency of Madras, Botanical Survey of India, Calcutta, 2002.
8. Matthew KM. The Flora of the Tamilnadu Carnatic. The Rapinat Herbarium, Tiruchirappalli, 1983.
9. Rajendran N, Baskara Sanjeevi S. Flowering Plants and Ferns in Mangrove Ecosystem of India, An Identification Manual. Environmental Information System (ENVIS), Centre for Advanced study in Marine Biology, Annamalai University, India, 2004.
10. Ramanathan AL. Sediment characteristics of the Pichavaram mangrove environment, southeast coast of India. Ind. J Mar. Sci. 1997; 26:319-32
11. Kathiresan K. Impact of mangrove biodiversity on associated fishery resources and fishers' income. A project final report submitted to WWF, Washington DC., 1999, pp142.
12. Deshmukh SV. Mangroves of India: Status report. In: Deshmukh S V, Mahalingam R, eds. A Global Network of Mangrove Genetic Resource Centres Project Formulation Workshop. Madras, India, 1991, 15-25.
13. Kathiresan K. How do mangrove forests induce sedimentation?. Revista de Biologia Tropical. 2003; 51(2):355-360.
14. Krishnamurthy K, and Prince Jeyaseelan MJ. The Pichavaram (India) mangrove ecosystem. Int. J Ecol. Envir. Sci. 1983; 9:79-85.
15. Muniyandi K. Studies on mangroves of Pichavaram (southeast coast of India). Ph.D. Thesis, Annamalai University, Parangipettai, India, 1986, pp215.
16. Gamble JS. Flora of the Presidency of Madras, Botanical Survey of India, Calcutta, 1957.
17. Tomlinson PB. The Botany of Mangroves, Cambridge, UK Cambridge University Press, 1986.
18. Bandaranayake WM. Traditional and medicinal uses of mangroves. Mangroves and Salt Marshes. 1998; 2:133-148.