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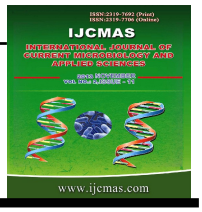

Original Research Article

Diversity of Mycoflora in Mangrove soil at Karankadu, Ramanathapuram (dt), East Coast of Tamil Nadu, India.

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A B S T R A C T

The present investigation were carried out to know the fungi present in different months on the Mangrove soil from Karangadu, Ramanathapuram District, Tamil Nadu, India. Fungal isolation was done by the soil dilution method incubated at 28°C for 72 hours. Totally 56 fungal species belonging to 24 genera were isolated from Karankadu mangrove soil. Besides the above, maximum number of species diversity was encounted with the fungal species belonging to the class Deuteromycetes. The predominant fungal genus namely *Acremonium*, *Acrocylindrium*, *Acrophialophora*, *Alternaria*, *Aspergillus*, *Botryotricum*, *Cephalosporium*, *Circinella*, *Cladosporium*, *Curvularia*, *Fusarium*, *Geotrichum*, *Gliocladiopsis*, *Helminthosporium*, *Hyalopus*, *Hypocrea*, *Neurospora*, *Penicillium*, *Rhizopus*, *Scopulariopsis*, *Spicaria*, *Sporotrichum* and *Trichoderma* were reported. The physic-chemical characteristics of soil samples were found to influence the distribution and population of fungi.

Keywords

Fungi;
soil;
mangrove;
ecosystem;
physico-chemical parameters.

Introduction

Marine fungi have the ability to grow at certain seawater concentrations (Johnson and Sparrow, 1961; Tubaki, 1969). It has been shown that marine fungi cannot be defined strictly on a physiological basis whereas, a broad ecological definition names that the marine fungi of obligate types are those that grow and sporulate exclusively in a marine and estuarine habitat. Facultative forms are those from fresh water or terrestrial milieus able to grow in the marine environment (Kohlmeyer, 1974).

Marine fungi have been classified into three geographical groups by Kohlmeyer and Kohlmeyer (1979): i) cosmopolitan species; ii) temperate water species and iii) species from tropical and subtropical waters. Mangrove fungi have been incorporated in biogeographical maps by Jones (1993), Kohlmeyer (1981, 1984).

Soil contains a vast array of microorganisms such as bacteria, viruses, fungi, actinomycetes, protozoa and algae (Alexander, 1977; Olowonihi, 2003). Soil

organism participates in the genesis of the habitat, which they live. They, together with the total biota and especially the higher vegetation, constitute one of the five interactive factors in soil formation; the other four are climate, topography, parent material, and time (Beare, 1997). The physical and chemical breakdown of rocks to fine particles with large surface areas and the accompanying release of plant materials initiate the soil forming process (Paul and Clerk, 1996). The present study was carried out to understand the ecology and diversity, seasonal variations, frequency of occurrence and distribution fungi in relation to physico - chemical status of marine ecosystem in east coast of Tamil nadu).

Materials and Methods

Study Area

This study was carried out in the permanent site of the Mangrove region at Karankadu, Ramanathapuram (DT), Tamil nadu. Between the months of March 2011 to February 2012. Karankadu is a small village in Ramanathapuram District, Tamil Nadu, India. This village is situated in the Palk Bay, 300 Km south of Chennai. It is located between latitude 9°38'58"N and longitude 78°57'38"E. The population of the village is 5000 and almost all of them depend on fishing (Fig-1).

Sampling schedule

Soil samples were collected in sampling station monthly for a period of two years from March 2011 to February 2012.

Collection of soil sample

Soil samples were collected from mangrove region of Karankadu, Ramanathapuram (DT), Tamil Nadu (Fig-2). Soil samples were collected from the study site at random during the study period. The samples were made at a depth within 10-15 cm from the surface of the soil. The collected soil samples were brought to the laboratory in sterilized polythene bags handpicked air, dried and stored in containers for further analysis.

Physico-chemical analysis of soil

The physico-chemical properties of the soil samples were determined in accordance with standard analytical methods (Subramanyam and Sambamurthy, 2002). The characteristics in relation to Temperature Pressure, pH and Salinity of medium (Masuma *et al.*, 2001) were analyzed.

Isolation of Mycoflora

Dilution plating method

Dilution plating technique described by Warcup (1950) was used to isolate the fungi from soils. Soil sample weighting 1gm was diluted in10ml of sterile distilled water and marked as 10-1 from 10^{-9} dilution. 0.1ml of the diluted (10^{-2} and 10^{-3}) sample was poured and spread on PDA plates. The plates were incubated at 24±2°C for 3-5 days and considered as mother culture.

The potato tubers were peeled and weighed for about 200g. The tubers were chopped into small pieces with the help of sterile knife. The chopped potatoes were transferred into a conical flask containing about 1000ml of distilled water. The content was boiled for 20 minutes. The supernatant were decanted and filtered by muslin cloth and the filtrate was collected. Dextrose (20g) and agar (15g) were

transferred into the extract and shacked to dissolve the ingredients.

The medium was made up to 1 litre by addition of distilled water. The pH of the medium was observed and adjusted to 5.6 by using 1N hydrochloric acid or sodium hydroxide drop wise. Finally, the medium was cotton plugged and autoclaved at 121°C for 15 lbs. To avoid the bacterial contamination streptomycin antibiotic (50µg/ml) was added to the sterile medium. The medium was poured into the sterile petridish (25ml/ dish). From the dilution of 10^{-2} to 10^{-3} 0.1ml of sample was inoculated into each plate and have spreaded over with L-rod. The plates were incubated at 24±2°C for 3-5 days and considered as mother culture.

Isolation of Pure Culture

The colonies growing on PDA plates with different morphology were counted separately. The different fungal colonies from the mother culture were picked up by sterile inoculation loop and aseptically inoculated into the PDA plates. These plates were incubated at 24±2°C for 3-5 days and each plate contain single kind of fungi.

Identification of fungi

Lactophenol Cotton blue mounting

A drop of lactophenol cotton blue stain was placed on the clean glass slide, a small tuft of the fungus, preferable with spores and spore bearing structures were transferred into the drop, using a flamed, cooled needle and gently tested using mounted needle. A cover glass were placed over the preparation and care was taken to avoid trapping air bubbles in the stain. A thin layer of DPX mount was placed around the edge of the coverslip. The slide was observed under the microscope (400x). Microphotography of the individual fungal species was also taken using Nikon phase contrast microscope (Nikan,Japan).

Identification

Colony colour and morphology were observed besides hyphal structure, spore size, shapes and spore bearing structure. Identification has been done by referring the standard manual Ainsworth *et al.*, (1973). Spore identification was done by Spore atlases of Gregory (1973) and Anna (1990).

Presentation of data

Number of species is referred as species diversity. Population Density is expressed in terms of Colony Forming Unit (CFU) per gram of soil with dilution factor. In order to assess the dominance of individual species in each site percentage contribution was worked out as follows.

$$\% \text{ contribution} = \frac{\text{No. of colonies of fungus in a sample}}{\text{Total number of all colonies of all the species in a sample}} \times 100$$

Results and Discussion

The results based on the physico-chemical characteristics of the soil samples organic matter contents, macronutrients, micronutrients and pH values is shown in Table 1. Physico-chemical characteristics of the soil samples were collected from different month's environmental factors, including climate, geomorphology, hydrodynamics and soil characteristics control the structure and function of any ecosystems. Among the biotic factors, in a particular soil nutrient status, are believed to be the most significant factors.

Fig 1 Map showing the sampling station

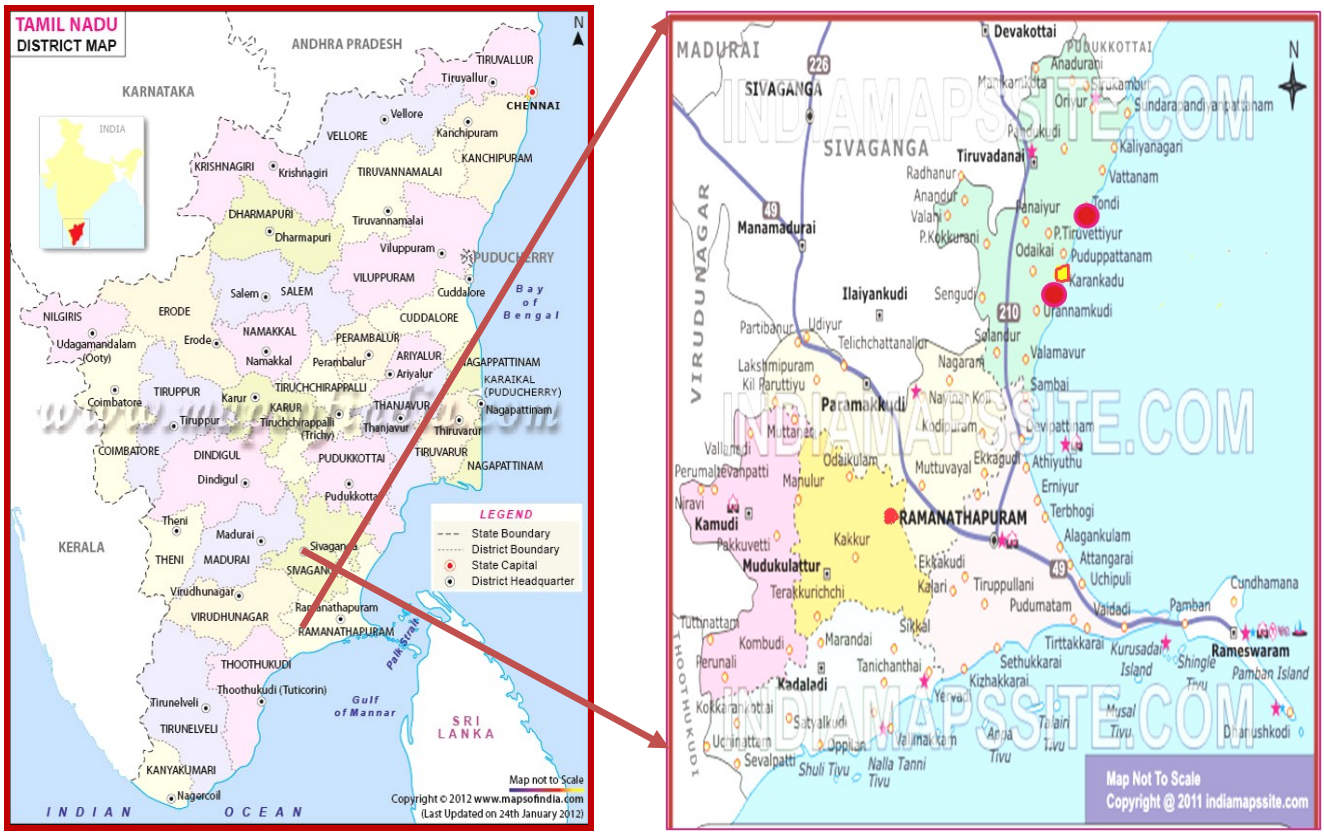

Fig.2 Soil sample collection from Karankadu mangrove forest

Table.1 Physico- chemical analysis of Karankadu soil sample

S. No	Name of the parameter	2011 to 2012											
		March	**April**	**May**	**June**	**July**	**Aug.**	**Sep.**	**Oct.**	**Nov.**	**Dec.**	**Jan.**	**Feb.**
1.	pH	7.56	7.52	7.02	7.12	7.52	7.69	7.56	7.26	7.58	7.52	7.56	7.26
2.	Electrical conductivity (dsm^{-1})	0.23	0.21	0.16	0.21	0.21	0.21	0.15	0.24	0.18	0.21	0.20	0.22
3.	Organic Carbon (%)	0.23	0.36	0.29	0.31	0.36	0.31	0.28	0.33	0.31	0.28	0.28	0.20
4.	Organic Matter (%)	0.46	0.72	0.58	0.62	0.72	0.32	0.38	0.61	0.70	0.71	0.69	0.72
5.	Available Nitrogen (Kg)	110.5	106.3	102.4	106.3	106.3	111.0	102.0	98.5	100.0	110.0	108.3	105.1
6.	Available Phosphorus (Kg)	4.50	4.75	3.75	3.25	4.75	4.81	4.25	3.21	4.13	3.90	3.98	4.00
7.	Available Potassium (Kg)	65	69	76	90	93	89	88	74	75	92	85	83
8.	Available Zinc (ppm)	1.23	1.20	1.21	1.25	1.20	1.22	1.21	1.23	1.22	1.25	1.24	1.22
9.	Available Copper (ppm)	0.93	1.09	0.83	0.36	1.00	0.48	0.67	0.69	0.73	0.58	0.86	0.91
10.	Available Iron (ppm)	4.64	3.79	3.65	3.62	4.79	4.80	4.69	3.20	5.12	3.50	4.11	5.01
11.	Available Manganese (ppm)	3.21	3.56	3.15	3.63	3.56	3.12	2.19	2.10	3.28	3.40	3.18	3.00
12.	Cation Exchange Capacity (C. Mole $Proton^{+}$ / kg)	21.6	20.5	21.8	19.3	18.5	21.8	16.05	19.70	18.81	19.17	18.90	17.60
13.	Calcium (C. Mole $Proton^{+}$ / kg)	5.6	6.2	6.6	7.2	5.1	6.8	5.4	5.5	7.2	6.4	5.2	6.5
14.	Magnesium (C. Mole $Proton^{+}$ / kg)	3.3	4.8	3.2	5.3	4.0	3.8	4.1	5.5	3.9	6.5	3.11	5.8
15.	Sodium (C. Mole $Proton^{+}$ / kg)	2.36	2.54	2.19	2.57	2.30	1.81	2.00	2.18	2.10	3.0	3.18	2.98
16.	Potassium (C. Mole $Proton^{+}$ / kg)	0.23	0.25	0.26	0.24	0.22	0.23	0.28	0.26	0.29	0.24	0.22	0.20

Table.2 Total number of colonies, mean density (CFU/g) and percentage contribution of fungi during every month from Karankadu

S. No	Name of the organisms	March 2011 to February 2012																						Total no. of colonies	% contribution
		March		April		May		June		July		August		Sep.		October		Nov.		Dec.		Jan.		Feb.			
		TNC	MD	TNC	MD	TNC	MD	TNC	MD	TNC	MD	TNC	MD	TNC	MD	TNC	MD	TNC	MD	TNC	MD	TNC	MD	TNC	MD		
1	*Acremonium* sp.	5	1.67	1	0.33	-	-	4	1.33	-	-	-	-	-	-	2	0.67	-	-	3	1.00	-	-	3	1.00	18	1.63
2	*Acrocylindrium oryzae*	-	-	-	-	-	-	4	1.33	4	1.33	-	-	-	-	3	1.00	-	-	-	-	3	1.00	-	-	14	1.27
3	*Acrophialophora fusispora*	-	-	-	-	2	0.67	-	-	-	-	4	1.33	4	1.33	-	-	-	-	-	-		-	4	1.33	14	1.27
4	*Alternaria alternata*	2	0.67	3	1.00	-	-	-	-	-	-	-	-	-	-	-	-	2	0.67	-	-	3	1.00	3	1.00	13	1.18
5	*Aspergillus awamori*	-	-	1	0.33	-	-	-	-	2	0.67	6	2.00	-	-	2	0.67	3	1.00	4	1.33		-	5	1.67	23	2.09
6	*A. chevalieri*	-	-	-	-	2	0.67	-	-	5	1.67	-	-	5	1.67	5	1.67	-	-	-	-	-	-	-	-	17	1.54
7	*A. flavipes*	2	0.67	-	-	-	-	3	1.00	-	-	3	1.00	-	-	2	0.67	2	0.67	-	-	-	-	-	-	12	1.09
8	*A. flavus*	4	1.33	-	-	5	1.67	2	0.67	-	-	5	1.67	3	1.00	-	-	2	0.67	2	0.67	4	1.33	4	1.33	31	2.81
9	*A. fumigatus*	-	-	2	0.67	3	1.00	-	-	3	1.00	-	-	-	-	-	-	4	1.33	-	-	4	1.33	3	1.00	19	1.72
10	*A. granulosis*	-	-	-	-	-	-	-	-	4	1.33	3	1.00	-	-	-	-	5	1.67	-	-	-	-	-	-	12	1.09
11	*A. koeningii*	4	1.33	3	1.00	6	2.00	-	-	-	-	-	-	-	-	-	-	2	0.67	-	-	-	-	3	1.00	18	1.63
12	*A. lentulus*	-	-	-	-	-	-	5	1.67	6	2.00	-	-	6	2.00	-	-	-	-	4	1.33	5	1.67	-	-	26	2.36

13	*A. luchensis*	**-**	**-**	**-**	**-**	**2**	**0.67**	**-**	**-**	**-**	**-**	**4**	**1.33**	**5**	**1.67**	**3**	**1.00**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**14**	**1.27**
14	*A. nidulans*	**2**	**0.67**	**3**	**1.00**	**2**	**0.67**	**-**	**-**	**3**	**1.00**	**-**	**-**	**6**	**2.00**	**-**	**-**	**-**	**-**	**3**	**1.00**	**3**	**1.00**	**3**	**1.00**	**25**	**2.27**
15	*A. niger*	**3**	**1.00**	**5**	**1.67**	**3**	**1.00**	**2**	**0.67**	**3**	**1.00**	**4**	**1.33**	**-**	**-**	**2**	**0.67**	**6**	**2.00**	**3**	**1.00**	**1**	**0.33**	**2**	**0.67**	**34**	**3.08**
16	*A. ochraceus*	**7**	**2.33**	**4**	**1.33**	**-**	**-**	**2**	**0.67**	**3**	**1.00**	**5**	**1.67**	**3**	**1.00**	**-**	**-**	**3**	**1.00**	**3**	**1.00**	**-**	**-**	**4**	**1.33**	**34**	**3.08**
17	*A. oryzae*	**-**	**-**	**-**	**-**	**3**	**1.00**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**4**	**1.33**	**-**	**-**	**-**	**-**	**6**	**2.00**	**-**	**-**	**13**	**1.18**
18	*A. quercinus*	**5**	**1.67**	**6**	**2.00**	**-**	**-**	**4**	**1.33**	**-**	**-**	**3**	**1.00**	**-**	**-**	**-**	**-**	**2**	**0.67**	**-**	**-**	**5**	**1.67**	**6**	**2.00**	**31**	**2.81**
19	*A. ruber*	**6**	**2.00**	**-**	**-**	**-**	**-**	**-**	**-**	**4**	**1.33**	**-**	**-**	**4**	**1.33**	**-**	**-**	**-**	**-**	**4**	**1.33**	**6**	**2.00**	**-**	**-**	**24**	**2.18**
25	*A. sydowi*	**-**	**-**	**-**	**-**	**2**	**0.67**	**6**	**2.00**	**-**	**-**	**-**	**-**	**-**	**-**	**5**	**1.67**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**13**	**1.18**
26	*A. tamarii*	**-**	**-**	**2**	**0.67**	**-**	**-**	**-**	**-**	**6**	**2.00**	**-**	**-**	**6**	**2.00**	**5**	**1.67**	**-**	**-**	**4**	**1.33**	**-**	**-**	**2**	**0.67**	**25**	**2.27**
19	*A. terreus*	**-**	**-**	**6**	**2.00**	**2**	**0.67**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**4**	**1.33**	**-**	**-**	**-**	**-**	**6**	**2.00**	**18**	**1.63**
20	*A. terricola*	**5**	**1.67**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**6**	**2.00**	**-**	**-**	**4**	**1.33**	**-**	**-**	**-**	**-**	**3**	**1.00**	**-**	**-**	**18**	**1.63**
21	*A. ustus*	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**5**	**1.67**	**5**	**1.67**	**-**	**-**	**-**	**-**	**-**	**-**	**4**	**1.33**	**-**	**-**	**-**	**-**	**14**	**1.27**
24	*A. variecolor*	**3**	**1.00**	**-**	**-**	**-**	**-**	**5**	**1.67**	**-**	**-**	**3**	**1.00**	**4**	**1.33**	**6**	**2.00**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**21**	**1.90**
22	*A. versicolor*	**3**	**1.00**	**6**	**2.00**	**-**	**-**	**7**	**2.33**	**-**	**-**	**6**	**2.00**	**-**	**-**	**-**	**-**	**-**	**-**	**5**	**1.67**	**-**	**-**	**6**	**2.00**	**33**	**2.99**
27	*A. wentii*	**-**	**-**	**7**	**2.33**	**4**	**1.33**	**5**	**1.67**	**5**	**1.67**	**4**	**1.33**	**-**	**-**	**3**	**1.00**	**6**	**2.00**	**-**	**-**	**-**	**-**	**7**	**2.33**	**41**	**3.72**
28	*Botryotricum* sp.	**2**	**0.67**	**-**	**-**	**-**	**-**	**-**	**-**	**6**	**2.00**	**-**	**-**	**3**	**1.00**	**-**	**-**	**5**	**1.67**	**3**	**1.00**	**-**	**-**	**-**	**-**	**19**	**1.72**
29	*Cephalosporium lignicolum*	**-**	**-**	**-**	**-**	**5**	**1.67**	**3**	**1.00**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**5**	**1.67**	**-**	**-**	**4**	**1.33**	**-**	**-**	**17**	**1.54**

30	*Cephalosporium* sp.	-	-	-	-	-	-	-	-	3	1.00	-	-	3	1.00	7	2.33	2	0.67	-	-	2	0.67	-	-	17	1.54
31	*Circinella minor*	5	1.67	-	-		-	3	1.00	-	-	-	-	-	-	-	-	-	-	-	-	6	2.00	-	-	14	1.27
32	*Circinella* sp.	-	-	4	1.33	5	1.67	-	-	-	-	-	-	-	-	-	-	-	-	3	1.00	-	-	4	1.33	16	1.45
33	*Cladosporium herbarum*	-	-	-	-	-	-	4	1.33	4	1.33	4	1.33	4	1.33	-	-	7	2.33	4	1.33	3	1.00	-	-	30	2.72
34	*Curvularia lunata*	2	0.67	2	0.67	4	1.33	-	-	-	-	-	-	-	-	3	1.00	-	-	-	-	-	-	2	0.67	13	1.18
35	*Fusarium lactis*	-	-	-	-	-	-	4	1.33	4	1.33	6	2.00	-	-	-	-	-	-	-	-	3	1.00	-	-	17	1.54
36	*F. moniliforme*	-	-	-	-	3	1.00	-	-	-	-	-	-	5	1.67	-	-	-	-	2	0.67	-	-	-	-	10	0.91
37	*F. oxysporum*	4	1.33	3	1.00	-	-	-	-	-	-	3	1.00	-	-	-	-	3	1.00	-	-	-	-	-	-	13	1.18
38	*F. semitectum*	-	-	-	-	-	-	3	1.00	2	0.67	-	-	3	1.00	3	1.00	-	-	-	-	4	1.33	-	-	15	1.36
39	*Geotrichum candidum*	-	-	1	0.33	-	-	2	0.67	5	1.67	3	1.00	-	-	-	-	-	-	4	1.33	-	-	-	-	15	1.36
40	*Geotrichum* sp.	-	-	3	1.00	2	0.67	-	-	-	-	-	-	-	-	2	0.67	-	-	-	-	-	-	2	0.67	9	0.82
41	*Gliocladiopsis sumatrensis*	-	-	2	0.67	-	-	-	-	-	-	-	-	-	-	2	0.67	2	0.67	3	1.00	5	1.67	3	1.00	17	1.54
42	*Helminthosporium oryzae*	7	2.33	-	-	-	-	5	1.67	4	1.33	4	1.33	-	-	5	1.67	-	-	-	-	-	-	-	-	25	2.27
43	*Hyalopus* sp.	-	-	-	-	-	-	-	-	-	-	-	-	4	1.33	2	0.67	-	-	3	1.00	3	1.00	4	1.33	16	1.45
44	*Hypocrea virens*	5	1.67	-	-	5	1.67	-	-	6	2.00	-	-	-	-	-	-	-	-	-	-	-	-	3	1.00	19	1.72
45	*Neurospora crassa*	6	2.00	-	-	-	-	2	0.67	-	-	5	1.67	-	-	-	-	3	1.00	-	-	-	-	5	1.67	21	1.90

46	*Penicillium chermesinum*	**-**	**-**	**3**	**1.00**	**7**	**2.33**	**-**	**-**	**3**	**1.00**	**-**	**-**	**5**	**1.67**	**-**	**-**	**-**	**-**	**4**	**1.33**	**-**	**-**	**-**	**-**	**22**	**1.99**
47	*P. expansum*	**5**	**1.67**	**-**	**-**	**6**	**2.00**	**-**	**-**	**-**	**-**	**3**	**1.00**	**-**	**-**	**-**	**-**	**2**	**0.67**	**-**	**-**	**-**	**-**	**-**	**-**	**16**	**1.45**
48	*P. granulatum*	**-**	**-**	**-**	**-**	**2**	**0.67**	**4**	**1.33**	**3**	**1.00**	**-**	**-**	**3**	**1.00**	**3**	**1.00**	**2**	**0.67**	**-**	**-**	**4**	**1.33**	**-**	**-**	**21**	**1.90**
49	*P. lanosum*	**3**	**1.00**	**3**	**1.00**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**5**	**1.67**	**4**	**1.33**	**-**	**-**	**-**	**-**	**15**	**1.36**
50	*Rhizopus oryzae*	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**6**	**2.00**	**-**	**-**	**2**	**0.67**	**2**	**0.67**	**5**	**1.67**	**-**	**-**	**3**	**1.00**	**18**	**1.63**
51	*R. stolonifer*	**3**	**1.00**	**1**	**0.33**	**-**	**-**	**-**	**-**	**4**	**1.33**	**5**	**1.67**	**6**	**2.00**	**-**	**-**	**-**	**-**	**-**	**-**	**5**	**1.67**	**-**	**-**	**24**	**2.18**
52	*Scopulariopsis* sp.	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**6**	**2.00**	**5**	**1.67**	**4**	**1.33**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**15**	**1.36**
53	*Spicaria elegans*	**-**	**-**	**3**	**1.00**	**3**	**1.00**	**7**	**2.33**	**-**	**-**	**-**	**-**	**6**	**2.00**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**1.00**	**3**	**1.00**	**25**	**2.27**
54	*Sporotrichum* sp.	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**5**	**1.67**	**3**	**1.00**	**-**	**-**	**-**	**-**	**-**	**-**	**4**	**1.33**	**-**	**-**	**-**	**-**	**12**	**1.09**
55	*Trichoderma harzianum*	**2**	**0.67**	**2**	**0.67**	**-**	**-**	**5**	**1.67**	**-**	**-**	**-**	**-**	**3**	**1.00**	**6**	**2.00**	**3**	**1.00**	**6**	**2.00**	**-**	**-**	**4**	**1.33**	**31**	**2.81**
56	*T .polysporum*	**-**	**-**	**-**	**-**	**2**	**0.67**	**6**	**2.00**	**3**	**1.00**	**-**	**-**	**-**	**-**	**4**	**1.33**	**2**	**0.67**	**3**	**1.00**	**6**	**2.00**	**-**	**-**	**26**	**2.36**
	Total	**95**	**31.67**	**76**	**25.33**	**80**	**26.67**	**97**	**32.33**	**105**	**35**	**109**	**36.33**	**96**	**32**	**89**	**29.67**	**84**	**28**	**87**	**29**	**91**	**30.33**	**94**	**31.33**	**1103**	**100**

TNC – Total Number of Colonies; MD – Mean Density

matter contents, macronutrients, micronutrients and pH values is shown in Table 1. Physico-chemical characteristics of the soil samples were collected from different month's environmental factors, including climate, geomorphology, hydrodynamics and soil characteristics control the structure and function of any ecosystems. Among the biotic factors, in a particular soil nutrient status, are believed to be the most significant factors.

pH values below 4 generally produce sour taste and values above 8.5 show alkaline taste (Karunakaran, 2008). A pH range of 6.5 and 8.5 is normally acceptable as per BIS (1983) and WHO (1984). It was observed from pH values that the water samples of Karankadu were alkaline varying from 7.02 to 7.69.

Hardness is caused by multivalent metallic cations which are the divalent ions like Ca, Mg, Strontium, Ferrous and Mn. A number of authors have studied the physico - chemical characteristics of some Indian estuaries and mangroves (Satpathy, 1996; Das *et al*., 1997; Padma and Periakali, 1999; Govindasamy *et al*., 2000; Rajesh *et al*., 2002; Rajasegar, 2003).

Fungi are one of the important microbial components of the soil. Since 1860's, research had been carried out on the fungi of different soil types, such as soils of forest (Domsch *et al.*, 1980; Joshi and Chauhan, 1981) driftwood (Figueira and Barata, 2007), grasslands (Ray and Dwivedi, 1962; Ghose and Dutta, 1962; Jabbar Miah *et al.*, 1980), polar region (Cooke and Fournelle, 1960), desert (Durrell and Shield, 1960), marine and mangrove habitats (Sparrow,1937; Matondkar *et al.*,1980; Gibert and Sousa, 2002) and coastal sand (Upadhyay, 1978) from various parts of the world. All these studies revealed that the fungi might reside permanently or temporarily in the soil. Their number and species composition in the soil habitat differs from place to place depending upon the physical, chemical and biological factors of the particular habitat.

Totally 56 fungal species belonging to 24 genera were isolated from Karankadu mangrove soil. Besides the above, maximum number of species diversity was encounted with the fungal species belonging to the class Deuteromycetes. The fungal isolates were presented in Table-1.

The genus *Aspergillus* (23 species) was dominant followed by *Fusarium* and *Penicillium* (4 species), *Cladosporium, Circinella, Geotrichum, Rhizopus* and *Trichoderma* (2 species each). All other genera were represented by one species each.

Percentage contribution of the individual species to the total fungal population. The maximum percentage contribution of 3.72% *Aspergillus wentii,* (3.08%) was found with *Aspergillus niger* and *A. ochraceus.* This was followed by *Aspergillus versicolor* (2.99%), *Aspergillus flavus, A.quercinus, Rhizopus stolonifer,* and *Trichoderma harzianum* (2,81%) (Table 2).

References

Alexander, M., 1977. Introduction to Soil Microbiology (2nd Ed.) John Wiley & Sons, New York. pp. 423-437.

Beare, M H., 1997. Fungal & Bacteria pathway of organic matter decomposition and Nitrogen and feneracana to soil ecology in sustainable agricultural system (Boca Raton Flamis cemis publishers) pp.67.

BIS 1983. Indian Standard Specification for drinking water IS: 10500. Bureau of Indian Standards.

Cooke, W.N., and Fournelle, H.T. 1960. Some soil fungi from an Alaskan tundra area. *Arctic*, 13: 266-270.

Das, J., Das, S.N. and Sahoo, R.K., 1997. Semidiurnal variation of some physicochemical parameters in the Mahanadi estuary, East coast of India. Indian J. Mar. Sci., 26: 323-326.

Domsch, K. H., W. Gams and Anderson, T.H. 1980. Compendium of soil fungi**.** Academic Press, New York.

Durrell, L.W., and Shield, L. M., 1960. Fungi isolated from soils of the Nevada test site. Mycologia. 52: 636-641.

Figueira, D., and Barata, M. 2007. Marine fungi from two sandy beaches in Portugal. Mycological Society of America. 20-23.

Ghose, G. R., and Dutta, B. G. 1962. Myxomycetes from Orissa (India). Mycopath. Mycol. Appl. 16: 209 - 218.

Gilbert, G. S., and Sousa, W. P., 2002. Host specialization among wood-decay fungi in Caribbean mangrove forests. Biotropica. 34: 396-404.

Govindasamy, C., L. Kannan and Azariah, J. 2000. Seasonal variation in physico-chemical properties and primary production in the coastal water biotopes of Coromandel coast, India. J. Environ. Biol. 21: 1-7.

Jabbar Miah, M.A., Varshney, J. C. and Sarbhoy, A.K., 1980. Soil fungi from South India, Proc. Indian Natn. Sci. Acad. 49: 593-602.

Johnson, T.W., and Sparrow, F.K. 1961. Fungi in oceans and Estuaries. Cramer, Weinheim, Germany.

Jones, E.B.G., 1993. Tropical marine fungi. Aspect . Trop. Mycol. 19: 73- 89.

Joshi and Chauhan, R. K. S., 1981. Distribution of soil microfungi in various soil types of Chambal ravines. Proc. Ind. Natn. Sci. Acad. 48: 513 -521.

Karunakaran, V. 2008. Study of water quality in and Around Vriddhachalam in Cuddalore District,Tamil Nadu. Nature Environment and Pollution Techonology, vol7. No.4, pp.635- 638.

Kohlmeyer, J., 1974. On the definition and taxonomy of higher marine fungi.Veroff. Inst. Meerforsh. Bremerhaven. Suppl. 5 : 263-286.

Kohlmeyer, J., 1981. Marine fungi from Martinique. Can. J. Bot. 59: 1314- 1321.

Kohlmeyer, J., 1984. Tropical marine fungi. P.S.Z.N.I. Marine Ecol. 5: 329- 378.

Kohlmeyer, J., and Kohlmeyes, E. 1979. Marine Mycology The Higher fungi. Academic press, New York.

Masuma, R., Yamaguchi, Y., Noumi, M., Omura, S. and Namikoshi, M.,2001. Effect of sea water concentration on hyphal growth and antimicrobial metabolite production in marine fungi. Mycoscience. 24(5): 455-459.

Matondkar, S.G.P., Mahtani, S. and Mavinkurve, S., 1980. Seasonal variations in the microflora from mangrove swamps of Goa. Mahasagar. 13: 282-283.

Olowonihi, E T., 2003. Studies on the distribution of Bacteria and Fungi in the five soil series of University of Ilorin Teaching and Research Farm. An M.Sc Thesis Dissertation submitted to the Department of Crop production, Faculty of Agriculture. University of Ilorin. pp.6-18 (2).

Padma, S. and Periakali, P., 1999. Physico-chemical and geochemical studies in Pulicate lake, East coast of India. Ind. J. Mar. Sci. 28: 434-437.

Paul, E. A ., Clark, F .E., 1996. Soil Microbiology and Biochemistry. 2nd Edition. (New York; academic press, 225- 229.

Rajasegar, M.: Physico-chemical characteristics of the Vellar estuary in relation to shrimp farming. J. Environ. Biol. 24: 95-101.

Rajesh, K.M., Gowda, G. and Mridula, R.

Mendon, 2002. Primary productivity of the brackishwater impoundments along Nethravathi estuary, Mangalore in relation to some physico-chemical parameters. Fish. Technol. 39: 85-87.

Ray, R.Y. and Dwivedi, R.S., 1962. A comparision of soil fungal flora of three different grass lands. Proc. Nat. Acad. Sci. India. 32: 421-428.

Satpathy, K.K., 1996. Seasonal distribution of nutrients in the coastal waters of Kalpakkam, East coast of India, Ind. J. Mar. Sci. 25: 221-224.

Sparrow, F.K., 1937. The occurrence of saprophytic fungi in marine muds. Biol. Poll. (Woods hole, mass). 73: 242-248.

Subramanyam, N.S. and A.V.S.S. Sambamurths, 2002. *Ecology*. Narosa Publishing House, Delhi. Pp. 616.

Tubaki, K., 1969. Studies on the Japanese marine fungi, lignicolous group (III), alga colous group and a general consideration. Annu. Rep Inst. Frement. Osaka. 4: 12- 41.

Upadhyay, R.S., Sing, D.B. and Rai, B., 1978. Ecology of microfungi in a tropical coastal sand belt. Ind. J. Mar. Sci. **7**: 187-190.

Warcup, J.H., 1950. The soil plate method for isolation of fungi from soil. Nature. Lond, 178:1477.

WHO 1984.Guidelines for Drinking Water Quality, vol.1,Recommendations, World Health Organization.