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DIVERSITY OF SOIL BACTERIA AND FUNGI FROM VEDARANYAM TALUK, NAGAPATTINAM DISTRICT, TAMILNADU, INDIA

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ABSTRACT

In the present study, soil samples were collected from agricultural field of Vedaranyam Taluk, Nagapattinam District and Tamil Nadu. The Physico-chemical characteristics such as pH, temperature, moisture content, organic carbon, electrical conductivity, macro and micro nutrients of soil samples were found to affect the distribution and population of bacteria and fungi. The microbial diversity from the soil sample were analyzed and identified by plating and biochemical characteristics which deals with the diversity and distribution of bacterial and fungal population. Totally 18 different species of soil bacteria and 20 species of fungi were observed. Among the identified bacterial species, *Bacillus* spp, *Enterobacter* spp, *Pseudomonas* spp, *Escherichia* spp and fungal species namely Aspergillus spp, *Penicillium* spp, *Rhizopus* spp, *Mucor* spp, were predominantly present in soil. They are dependent on the nature of substrate and temporal regions that favour the colonization, growth and substrate possession of the bacteria and fungi. Population of soil bacteria and fungi might also get affected by climate. Soil can be managed to optimize its fertility and health under natural and agricultural land uses so as to benefit to bacterial and fungal diversity.

INTRODUCTION

Soil is considered as the land surface of the earth which provides the substratum for plant and animals life. The soil represents a favorable habit for microorganisms and is inhabited by a wide range of microorganisms, including bacteria, fungi, algae, viruses and protozoa. The physical structure, aeration, water holding capacity and availability of nutrients are determined by the mineral constituents of soil, which are formed by the weathering of rock and the derivative metabolic activities of the soil microorganisms. Soil contains a variety of microorganisms included bacteria that can be found in any natural ecosystem. Microorganisms play important role on nutritional chains that are an important part of the biological balance in the life in our planet. Where, bacteria are essential for the closing of nutrients and geochemical cycles such as the carbon, nitrogen, sulfur and phosphorous cycle. Soil normally contains low background levels of heavy metals. However, in areas where agricultural, industrial, or municipal wastes are land applied as fertilizer, concentrations may be much higher.

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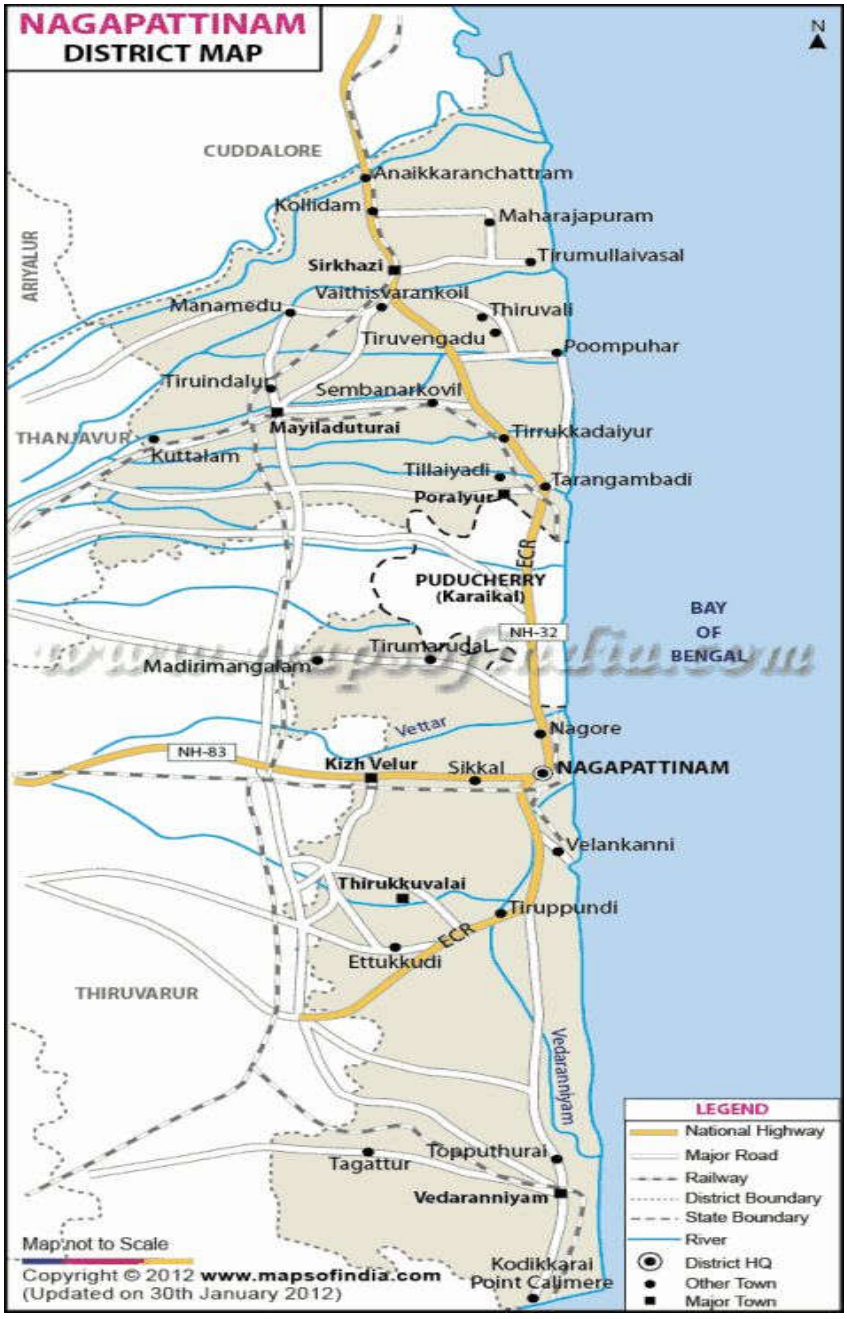
Excessive levels of heavy metals can be hazardous to man, animals and plants. Soil varies due to its structure and composition. Soil can be defined as the organic and inorganic materials on the surface of the earth that provides the medium for plant growth .Soil develops slowly over time and is composed of many different materials. Inorganic materials, or those materials that are not living, include weathered rocks and minerals .Weathering is the mechanical or chemical process by which rocks are broken down into smaller pieces. Which are those materials that originate from living organisms .For example, plants and animals die and decompose, releasing nutrients back into the soil. The soil profile is somewhat like the soil's fingerprint, and it will differ from other soil samples based on factors like color, texture, structure and thickness, as well as its chemical composition. Each layer of a soil profile is referred to as a soil horizon. Cultivated soil has relativities of the soil microorganisms than the follow land, and the soil rich in organic matter contain much more population than sandy and eroded soils. Microbes in the soil are important to us in maintain soil fertility, cycling of nutrient elements in the biosphere and sources of industrial products such as enzymes, antibiotics, vitamins, hormones, organic acids etc. But certain microbes in the soil are the causal agents of various human and plants disease.

Soil microorganism's breakdown variety of organic materials and use a portion of these breakdown products to generates or synthesize a series of compounds that products to generate of synthesize a series of compounds that makeup humus, a dark coloured amorphous substance composed of residual organic matter not readily decomposed by microorganisms. Three major functions of humus are humic substances, polysaccharides and other non- humic substances and humin. These materials impact on the physical, chemical and bio-chemical properties of soil in many ways. Essential elements used by plants in relatively large amounts for the plant growth is called macronutrients. The major macronutrients are Nitrogen (N), Phosphorous (P), Potassium (P), Calcium (C), Magnesium (M), and Sulfur(S) are also macronutrients. All the six nutrients are important constituents in soil that promote plant growth .Concentrations of these macronutrients in the soil are generally determined before the site is disturbed in order to complete a site reclamation plan. In addition to macronutrients, there are various trace elements that are necessary for the plant growth.

These trace elements are needed in smaller quantities than macronutrients. If the trace elements is required for plant growth it is called a micronutrient These include aluminum, arsenic, boron, cadmium, chlorine, copper, iron (sometimes thought of as a macronutrient), lead, manganese, sodium, zinc and others. Micronutrient concentration is generally higher in the surface soil and decrease with soil depth. In spite of the high concentration of most micronutrients in soils, only a small fraction is available to plants. Micronutrients also known as trace elements are required in microquantities but their lack can cause serious crop production and animal health problems. Micronutrient deficiencies are more common in humid temperate regions, as well as humid tropical regions , because important factors affecting the availability of micronutrients to plants .With increasing p^H ,the availability of these nutrients is reduced with the exception of whose availability increases as soil pH increases. The concept of soil as an environment for microbial life is based on the number of truisms and on a number of traditional but unsupported assumptions.



Among the truisms is that, soil is a complex habitat and that it has a high solid liquid ratio, which distinguishes it from most other nature habitats (Alexander, 1977).

MATERIALS AND METHODS

Study area

The study was conducted in Vedaranyam taluk of Nagapattinam district. Vedaranyam has an average elevation of 1 m (3.3 ft) and is located on the Coramandel coast of Bay of Bengal. The Vedaranyam swamp is located parallel to the Palk strait for 48 km (30 mi).which situation in the east coast line of Tamilnadu state, India. Its location at 79^0 37' 30" – 79^0 51' 30" E and 10^0 16' 00" – 10^0 39'00" N. The geographical area of Vedaranyam taluk is 533.03sq km. The average annual rainfall was 1000 to 1500mm and monthly average temperature above 27^0C. The average humidity of the area is 75 %. Geographically, the study area consists of flood plains, delta plain and natural levels. The formation is a sedimentary terrain (alluvium, sandy and beach sand) the important crops are paddy and groundnut. The study area were designated as Vedaranyam ($S1_)$, Chettipulam ($S_{2)}$ and Ahasthiyapalli (S_3).

Sample collection

oil sample was collected from different area of Vedaranyam taluk of Nagapattinam district, Tamil Nadu during seasons namely Monsoon (October to December), Post monsoon (January to March), Summer (April to June) and Pre monsoon (July to September). Soil samples were collected by aseptic manner at a depth of 5-10 cm according to the V – shaped method, at three different locations in and around the Vedaranyam taluk. From each sites, five samples were collected and pooled together and considered as one sample. The p^H and temperature were determined at the sampling sites. The pH was determined by using p^H meter and temperature with laboratory thermometer .The sample was transported to laboratory at 4^0 C as in accordance with the standard methods.

Analysis of physico chemical properties of the soil

The physical parameter includes pH, moisture content ,temperature ,organic carbon and electrical conductivity and the chemical parameters include Nitrogen, Phosphours, Potassium, Calcium, Magnesium, zinc, Copper and Iron in different sites of Vedaranyam taluk from four seasons (Monsoon, Postmonsoon, Summer and Premonsoon). The physical parameters were analysed by standard methods. Soil moisture (Motsara, 2002), p^H (Ghosh *et al* ., 1983), temperature (Willis and Amemiya, 1973), electrical conductivity (Nadler and Frenkel, 1979), organic carbon (Walkely and Black, 1934). The chemical parameters were analysed i.e Nitrogen (Subbaiah and Asija, 1956), phosphours (Jackson and Bray, 1973), potassium (Toth and Prince, 1949), calcium (El mahi *et al*., 1987), magnesium (Williams, 2006), zinc (Axel Meyer, 1987), copper (Gunter Henze, 1987) and iron (Bubicz and Zofia, 1996).

Isolation of bacteria and fungi from soil

In this study soil sample was collected from different areas of Vedaranyam taluk of Nagapattinam district, Tamil Nadu. The sample was collected from Monsoon to Premonsoon (2014-2015). These sample were used for the isolation of bacterial and fungal species using serial dilution plating methods. Serially diluted sample was poured into Nutrient agar medium and the Rose bengal agar medium were used to isolate bacteria and fungi respectively. Serial dilution was performed by using the collected soil sample to isolate the bacterial and fungal population. The soil samples were diluted with conical flask containing 90 ml of sterile distilled water and mixed thoroughly to make 1:10 dilution (10^{-1}). Then 10 ml of diluted samples was transferred to the next flasks and serially diluted into the series of conical flask having 90 ml of sterile distilled water with sterile pipettes, up to 10^{-7}. Here, 10^{-7} to 10^{-7} dilutions were taken for the bacterial isolation and 10^{-2} to 10^{-5} dilution were taken for the fungal isolation. Soil samples were taken from each container and subjected to serial dilution followed by pour plate method.

Identification of bacteria and fungi from soil

The isolated bacteria were identified by Gram's staining (Hans Christian ,1884) , motility test (Crookshank, 1886) , and biochemical test (Kennedy , 1990),catalase test, oxidase test, indole test , methyl red / voges proskauer test and citrate utilization test. The isolation fungi were identified by Lactophenol cotton blue mounting (Gilliman, 1957). A loopful culture was picked up with the help of a sterile inoculation loop and semi permanent slides were prepared using lactophenol cotton blue. The slides were gently heated in a spirit lamp so as to release the air bubbles, if any present inside the cover glass. The excess stain was removed by using tissue paper and the cover glass was sealed with white nail polish.

RESULT AND DISCUSSION

Sample collection

The present study was carried out to investigate the soil characters and isolate the bacterial and fungal species of different crop field soils from Vedaranyam (S_1), Chettipulam (S_2) and Ahasthiyapalli (S_3) in Vedaranyam Taluk, Nagapattinam district in Monsoon to Premonsoon (2014-2015). The physicochemical parameter of soils were identified.

Physico-chemical parameters

The physical parameter includes analysis of pH, moisture content ,temperature, organic carbon and electrical conductivity of the soils. The chemical parameters include Nitrogen, Phosphours, Potassium, Calcium, Magnesium, zinc, Copper and Iron present in twelve samples from four seasons (Monsoon, Postmonsoon, Summer and Premonsoon).

Physical parameters

Our finding similarto (Yu *et al.,* 2001) reported that the soil pH, organic content and water are the main factors affecting the fungal population and diversity. The present study indicated that the moisture content of the collected soil samples was measured, it was known that the soils had high moisture content. An indicator of the high content was the isolation of *Gongronella butleri* (Zygomycetes) at very high abundance from all land use type soil. This fungus and other fungi in the Zygomycetes, such as Mucor spp, prefer high moisture content habitats (Grishkan *et al.,* 1989).

pH

Among the pH ranges observed from the twelve different soil samples of three villages ,there was no observable changes. The p^H values was no great difference found in seasonal analysis. The alkaline nature of p^H were recorded. The pH values are 8.9, 8.4, and 8.0 (Monsoon), 8.0, 8.5 and 8.6 (Postmonsoon), 8.2,8.1 and 8.9 (Summer) and 9.0,9.2, and 8.2 (Premonsoon). The high level of p^H content present in premonsoon season (9.0,9.2 and 8.2) [Table -1].

Temperature

The present investigation oftemperature were recorded in different seasons at different localities S_1 ,S_2 and S_3. The temperature were 28^0C , 29^0C and 30.8^0C (Monsoon), 39^0C,37^0C and 34^0C (Postmonsoon) ,48^0C ,45^0C and 40^0C (Summer) and 35^0C,30^0C and 39^0C (Premonsoon). The high level of temperature were observed in summer season (48^0 C, 45^0 C and 40^0 C) (Table -1).

Moisture

The present investigation reveals that there was high values are reported during Monsoon and Post monsoon seasons .The moisture content were 40.8 , 29.8 and 30 (Monsoon) , 38.9 ,34.9 and 32.7 (Postmonsoon) ,34.3 ,26.8 and 21.9 (Summer) and 32.9,34.8 and 38.9 (Premonsoon). The high level of moisture content present in monsoon season (40.8, 29.8 and 30) (Table -1).

Organic carbon

The total organic carbon of different study sites Vedaranyam (S_1) ,Chettipulam (S_2) and Ahasthiyapalli (S_3). The values were 0.42% ,0.47 % and 0. 36 % (Monsoon) ,0.64 % ,0.30 % and 0.18 % (Postmonsoon), 0.18 %, 0.14 % and 0.26 % (Summer) and 0.55 % ,0.26 % and 0.45 % (Premonsoon) .The high level of organic carbon content was present in postmonsoon season (0.64%,0.30 %and 0.18%) (Table -1).

Electrical conductivity

The electrical conductivity of different study site soil were recorded in different seasons .The values were 1.250 dsm^{-1},1.201 dsm^{-1} and 1.320 dsm^{-1}(Monsoon) , 1.230 dsm^{-1},1.253 dsm^{-1} and 1.120 dsm^{-1}(Postmonsoon) ,1.211 dsm^{-1},1.231dsm^{-1} and 1.321dsm^{-1} (Summer) and 1.210 dsm^{-1},1.219 $dsm^{-1}$and 1.310 dsm^{-1}(Premonsoon) .). The high level of electrical conductivity was present in summer season (1.211 dsm-^{1}, 1.231 dsm^{-1} and 1.321 dsm^{-1}) (Table – 1).

Chemical parameters

Estimation of macronutrients

The availability of Nitrogen, Phosphorous, Magnesium and calcium were analyzed for the soil samples collected from three different places namely Vedaranyam(S_1), Chettipulam (S_2) and Ahasthiyapalli (S_3) in Monsoon, Postmonsoon, Summer and Premonsoon (Table -1).

Isolation and identification of bacteria from soil

In this study soil sample was collected from different areas of Vedaranyam taluk of Nagapattinam district,Tamil Nadu. The sample was collected from Monsoon to Premonsoon (2014-2015). The soil sample was collected during four seasons namely premonsoon monsoon, postmonsoon and summer. 18 species recorded in monsoon, 17 species were recorded in postmonsoon, 16 species recorded in summer and 17 species recorded in premonsoon season. (Table -1), *Bacillus cereus, Micrococcus spp, E. aerogens, B.subtilis , Rhizobium meliloti , Streptococcus spp, P.aerogens, P.striata, E.citermedia, Xanthomonas spp, E.coli , B .licheniformis , Azotobacter spp and Azospirillum spp* were most frequently isolated.

Identification of fungi

Vijaylakshmi *et al.,* 2014 reported that the soil sample was collected during four seasons namely premonsoon monsoon , postmonsoon and summer. 40 species were recorded in premonsoon, 20 species recorded in monsoon, 35 species recorded in post monsoon and 45 species recorded in summer season. (Table 1), *Aspergillus spp, Phoma spp and Penicillium spp* were most frequently isolated (Table :2), *Cladosporium herbarum, Botrytis cinera*,*Oidiodendro spp* present only in rhizosphere soil . Maximum number of fungi isolated from summer season, minimum number of fungi isolated from monsoon season. Majority of the fungi belongs to Ascomycota and Deuteromycota. In the present study , 20 different species of soil fungi were observed from the soil samples collected from three different localities. The colonies showed a characteristic colour of black, green, white and brown and they were confirmed by identifying their morphological characters by Lactophenol cotton blue method. The isolated organisms were identified by using manual of Hypomycetes (Table- 4). The soil sample collected during four seasons namely monsoon ,postmonsoon ,summer and premonsoon. 18 species were recorded in monsoon , 19 species were recorded in postmonsoon,15 species were recorded in summer and 18 species were recorded in premonsoon. (Table -4), *Aspergillus niger, Aspergillus flavus,*

Table 1. Physical properties of the soil at different season

PHYSICAL PROPERTIES	PHYSICAL PROPERTIES OF THE SOIL											
	MONSOON			POSTMONSOON			SUMMER			PREMONSOON		
	S_1	S_2	S_3	S_1	S_2	S_3	S_1	S_2	S_3	S_1	S_2	S_3
pH	8.9	8.4	8.0	8.0	8.5	8.6	8.2	8.1	8.9	9.0	9.2	8.2
Temperature (^{0}C)	28	29	30.8	39	37	34	48	45	40	35	30	39
Moisture (%)	40.8	29.8	30	38.9	34.9	32.7	34.3	26.8	21.9	32.9	34.8	38.9
Organic carbon	0.42	0.47	0.36	0.46	0.30	0.18	0.18	0.14	0.26	0.55	0.26	0.45
Electrolytic conductivity	1.250	1.201	1.320	1.230	1.253	1.120	1.211	1.231	1.321	1.210	1.219	1.310
CHEMICAL PROPERTIES OF THE SOIL												
CHEMICAL PROPERTIES	MONSOON			POSTMONSOON			SUMMER			PREMONSOON		
	S_1	S_2	S_3	S_1	S_2	S_3	S_1	S_2	S_3	S_1	S_2	S_3
Nitrogen (kg/ac)	70.5	72.3	75.0	70.3	71.2	70.3	72.1	70.5	74.5	75.0	71.5	75.2
Phosphorous (kg/ac)	4.13	4.15	3.17	2.15	3.13	4.2	2.16	2.57	1.24	2.35	2.54	3.45
Potassium (kg/ac)	50.7	59	43.3	60.3	54.2	45 .6	53.2	48.2	45.6	50.2	65.6	40
Calcium (kg/ac)	9.8	10.2	9.2	8.4	9.6	7.8	9.4	9.0	9.3	8.0	8.3	8.2
Magnesium(kg/ac)	10.2	9.2	10.3	9.3	8.1	8.3	9.3	8.8	9.5	9.3	10.2	8.7
Copper (ppm)	0.34	0.78	0.89	0.95	0.87	0.78	1.9	1.7	1.9	1.5	1.5	0.67
Zinc (ppm)	0.86	0.79	0.78	0.82	0.75	1.9	2.5	0.8	1.6	2.3	0.81	2.3
Iron (ppm)	2.35	2.56	3.3	5.1	3.89	4.1	4.8	5.0	3.2	4.1	3.4	4.5

S_1- Vedaranyam, S_2-Chettipulam, S_3-Ahasthiyapalli

Table 2. Isolation of soil bacteria from Vedaranyam taluk at different season

ORGANISMS	MONSOON			POSTMONSOON			SUMMER			PREMONSOON		
	S_1	S_2	S_3	S_1	S_2	S_3	S_1	S_2	S_3	S_1	S_2	S_3
Azotobacter spp	_	+	+	_	+	_	+	_	_	+	_	_
Azospirillum spp	_	+	+	_	+	_	+	+	_	_	_	+
Bacillus cereus	_	+	+	_	+	_	+	+	_	+	_	_
Bacillus licheniformis	+	_	_	_	_	_	+	_	+	_	_	+
Bacillus subtilis	+	+	_	_	_	+	_	+	_	+	_	+
E.aerogens	_	+	_	_	_	_	+	_	+	_	_	_+
E.citermedia	+	-	+	+	+	-	+	_	+	_	+	+
E.coli	_	+	+	_	_	+	_	+	_	_	+	+
Flavibacterium sp	_	+	+	_	_	+	_	_	_	+	_	_
Micrococcus spp	+	_	_	_	+	_	+	_	+	_	+	_
Nitrobacter spp	_	+	+	+	+	_	_	+	_	+	+	_
Pseudomonas aeroginosa	_	_	+	_	_	+	_	+	+	+	+	_
P.striata	+	+	+	+	_	_	+	+	_	+	+	_
Serratia marcescens	_	_	+	+	+	_	_	_	_	_	_	+
Staphylococcus spp	+	+	_	_	_	+	+	_	+	_	_	+
Streptococcus spp	+	+	+	_	_	+	_	+	_	+	+	_
Rhizobium meliloti	_	_	+	+	+	_	_	_	_	_	_	+
Xanthomonas spp	+	_	_	+	_	+	_	_	+	_	+	+

+- Indicates presence S_1- Vedaranyam, _ Indicates Absence S_2-Chettipulam, S_3-Ahasthiyapalli

Table 3. Frequency of bacterial species at Vedaranyam taluk

Genus	Species	Average	S_1	S_2	S_3	Total	Frequency
Azotobacter	*Azotobacterspp*	57	5	7	6	18	31.56
Azospirillum	*Azospirillumspp*	68	10	12	11	33	48.52
Bacillus	*B.cereus*	34	9	12	13	34	11.50
	B.subtilis	46	8	10	9	27	9.18
	B.licheniformis	34	8	8	9	25	8.50
Clostridium	*Clostridium spp*	64	9	15	8	32	36.01
Enterobacter	*E.aerogens*	50	11	5	6	22	14.98
	E.citermedia	72	9	8	11	28	38.88
Escherichia	*E.coli*	78	10	12	7	29	37.17
Flavibacterium	*Flavibacteriumspp*	56	8	6	7	21	37.51
Micrococcus	*Micrococcus spp*	59	8	10	9	27	45.76
Nitrobacter	*Nitrobacter*	65	8	11	15	33	32.31
Pseudomonas	*P.aeruginosa*	49	8	11	6	25	30.06
	P.striata	68	11	9	13	33	48 .52
Serratia	*S.marcesscens*	48	10	7	6	23	38.35
Staphylococcus	*Staphylococcus spp*	48	7	8	6	21	13.12
Streptococcus	*Streptococcus spp*	65	8	11	8	27	41.53
Rhizobium	*Rhizobium spp*	60	7	13	6	26	30.20
Xanthomonas	*Xanthomonasspp*	50	8	11	15	24	25.56

S1- Vedaranyam, S2-Chettipulam, S3-Ahasthiyapalli

Table 4. Isolation of soil fungi from Vedaranyam talukat different season

ORGANISMS	MONSOON			POSTMONSOONNO			SUMMER			PREMONSOON		
	S_1	S_2	S_3	S_1	S_2	S_3	S_1	S_2	S_3	S_1	S_2	S_3
Aspergillus fumigatus	+	_	+	_	_	_	_	+	_	_	+	_
Aspergillus granulates						+			+			+
Aspergillus niger	+	+	+	_	_	+	_	_	+	_	+	+
Aspergillus nidulans	+	_	_	_	+	_	+	_	_	+	_	+
Aspergillus terreus	+	_	_	_	+	+	_	_	_	+	+	+
Aspergillus flavus	_	+	_	_	_	_	_	_	_	_	_	_
Cladosporium spp	_	_	_	+	_	+	_	_	_	_	_	+
Fusarium spp	_	_	_	_	_	+	-	+	_	+	_	-
Fusarium oxysporum	+	_	_	_	+	+	_	+	+	+	_	_
Mucor spp	_	+	_	+	+	_	+	_	_	+	_	+
Penicillium citrinum	_	+	_	+	+	_	+	_	_	+	+	+
Penicillium conidia	_	+	+	_	_	+	+	+	+	+	_	+
Pencillium janthinellum	_	_	_	+	+	_	_	+	_	_	+	+
Penicillium spp	_	_	_	+	_	+	_	+	_	+	_	+
Rhizopus stolinifer	_	+	_	+	+	_	+	_	_	+	_	+
Rhizopus oryzae	_	_	_	+	+	_	_	+	_	_	+	+
Saccharomyces spp	_	_	_	+	_	+	_	_	+	+	_	+
Trichoderma spp	_	+	_	_	+	_	_	_	+	_	+	+
Trichoderma viridae	_	_	+	+	+	_	_	_	_	_	_	_
Trichoderma harzianum	_	_	_	_	+	_	+	_	_	+	_	_

(+) Indicates S1- Vedaranyam, (-)-Indicates S2 – Chettipulam, S3 –Ahasthiyapalli

Table 5. Frequency of fungal species at Vedaranyam taluk

GENUS	SPECIES	AVERAGE	S_1	S_2	S_3	TOTAL	FREQUENCY
	A.niger	54	10	7	6	23	17.36
Aspergillusspp	*A.terreus*	45	15	9	8	32	15.58
	A.flavus	60	7	12	11	29	14.68
	A.granulatus	54	13	14	15	42	16.69
	A.nidulnus	47	11	9	9	29	16.02
	A.fumigatus	58	8	10	12	30	16.91
Cladosporiumspp	*Cladosporiumspp*	58	14	9	15	38	17.55
Fusariumspp	*Fusariumspp*	56	7	13	14	34	12.42
	F.oxysporum	65	8	10	11	29	14 43
Mucorspp	*Mucorspp*	49	11	7	10	28	20.72
	Penicilliumspp	43	15	15	10	40	14.68
Penicilliumspp	*P. conidia*	48	9	5	14	28	14.46
	P. citrinum	65	6	8	11	25	14.91
	P .janthinellum	50	13	10	7	30	10.21
	R .stolinifer	60	11	13	5	29	2.95
Rhizopusspp	*R.oryzae*	52	7	11	9	27	1.89
Saccharomyces spp	*Saccharomyces spp*	52	5	11	10	26	16.40
Trichodermaspp	*Trichodermaspp*	58	15	12	7	34	10.82
	T .viridae	53	11	15	10	36	13.60
	T. harzianum	63	14	10	9	33	11.83

S1-Vedaranyam, S2-Chettipulam, S3-Ahasthiyapalli

Aspergillus terreus, Aspergillus nidulans, Aspergillus granulates, penicillium spp , Aspergillus fumigate, P.citrinum , Mucor spp, R.oryzae, P.conidia, Fusarium spp, Trichoderma spp and *Cladosporium spp* were most frequently isolated. Thus, from this study we reveal that the bacterial and fungal diversity showed some difference due to seasonal variation. In all study sites climatic changes favor some of the species and the same can be unfavorable for the other. Thus, the seasonal changes influence the biodiversity of the particular soil.

Conclusion

The present study, deals with the soil characters, diversity and distribution of bacterial and fungal (Monsoon, Postmonsoon, Summer and Premonsoon) from three different place, namely Vedaranyam (S_1), Chettipulam (S_2) and Ahasthiyapalli (S_3) of Vedaranyam Taluk. The physicochemical parameters of soils were analyzed. The physical parameters includes the analysis of P^H, temperature,

moisture, organic carbon and electrical conductivity in the soil. The chemical properties such as macronutrients (Nitrogen, Phosphorus, Magnesium,Calcium) and micronutrients (Iron, Zinc, Copper) were present in Vedaranyam taluk of Nagapattinam district. Totally 18 different species of soil bacteria were observed from the soil samples in the three villages namely Vedaranyam ,Chettipulam and Ahasthiyapalli of Vedaranyam taluk in Nagapattinam district. The bacterial species were *Staphylococcus spp, Flavibacterium spp, Nitrobacter spp, Micrococcus spp, P.striata, B.licheniformis,Streptococcus spp, P.aeroginosa, E.citermedia, E.aerogens, B.subtilis, E.coli, Xanthomonas spp, B.cereus,R.meliloti, Azotobacter spp, Serratia marcescens* and *Azospirillium spp.*

Totally 20 different species of soil fungi were observed from the soil sample in the three villages namely Vedaranyan, Chettipulam and Ahasthiyapalli of Vedaranyamtaluk in Nagapattinam district. The fungal species were *Aspergillus niger, Aspergillus flavus, Aspergillus terreus, Aspergillu snidulans, Aspergillus granulates, Pencillium spp, Saccharomyce spp, Rhizopus stolinifer, , Fusarium oxysporum Aspergillus fumigate, P.citrinum, Mucor spp, R.oryzae, P.conidia, Fusarium spp, P. janthinellum, Trichoderma spp, Trichoderma viridiae, Cladosporium spp and Trichoderma horizanum.* The fungal predominant species are *Aspergillus spp, Rhizopus spp ,Trichoderma spp* and *Penicillium spp* in soil. Micro nutrients such as, Zinc, Copper, Iron that used to enriched the soil fertility and also used the plant growth promoting factors. The bacterial and fungal population in the soil were used to increase the soil quality and fertility. The organisms were produced by the laboratory condition and apply the agricultural field to use the increasing the crop management. They are dependent on the nature of substrate and temporal regions that favour colonization, growth and substrate possession of the fungi Population of soil bacteria and fungi might also get affected by climate. Soil can be managed to optimize its fertility and health under natural and agricultural land uses so as to benefit to fungal diversity. Due to the dispersed nature the soil asset, a broad but consistent and economically appealing to its protection is needed.

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