

Research Article



An Investigation of Bacterial, Fungal Diversity of Orathanadu Taluk Thanjavur District, Tamil Nadu, India.

N. Uma Maheswari*, G. Sivakami, V. Dhivaharan

PG and Research Department of Microbiology, S.T.E.T Women's College, Mannargudi, Thiruvarur (DT), Tamil Nadu, India.

*Corresponding author's E-mail: umasamyamf@gmail.com

Accepted on: 05-07-2016; Finalized on: 31-08-2016.

ABSTRACT

Soil microorganisms play an important role in soil quality and plant productivity. The development of effective methods for studying the diversity, distribution and behavior of microorganisms in soil habitats is essential for broader understanding of soil health. The present study was aimed to, deals with the diversity at the sites in of Orathanadu Taluk, Thanjavur District, TamilNadu. The study period was covering all the four seasons viz, Monsoon (October-December), postmonsoon (January-March) Summer (April-June) Premonsoon (July-September 2014-2015) and distribution of bacterial and fungal population in around the district. The physico-chemical parameters of such soil were identified includes pH and moisture content of the soil. Macronutrient (Nitrogen, Phosphorus, Magnesium, Calcium) and micronutrient (Iron, Copper, Zinc, Manganese) were analyzed. Totally 13 species of soil bacteria and 21 species of fungi were recorded from the soil samples, sites are namely Orathanadu, Ambalapattu and Thirumangalakottai. Majority of fungi were belonged to Ascomycetes, Phycomycetes and Deuteromycetes and identified with standard manuals. The dominant bacterial species are *Pseudomonas sp*, *Enterobacter sp*, *Bacillus sp*, *Streptococcus sp* and *Escherichia sp* and fungal species *Aspergillus sp*, *Rhizopus sp*, *Pencillium sp*, and *Trichoderma sp* were recorded. Isolation of microorganisms were correlated to percentage frequency and heavy metal content were recorded. The physico-chemical parameters are rich in Orathanadu as Sandy Loam to Sandy Clay soil type.

Keywords: Soil, *Aspergillus sp*, *Rhizopus sp*, *Enterobacter sp*, *Pseudomonas sp* and *Bacillus*.

INTRODUCTION

Soil is a complex ecosystem, delimited by physiochemical parameters that hold enormous number of living organism. Nevertheless, microbes are the least unstated mechanism of soil by both agronomists and soil practitioner. On the farm several soil organism offer benefits to crop growing in an ecosystem, but are not well understood. The soil microbes decompose the plant and animal residues entering the soil and convert them into soil organic matter, which influence on soil physical, chemical and biological properties and on creating a complementary medium for biological reaction and life support in the soil environment. Nonetheless, enhanced site-specific diversity typically results in higher levels of below ground microbial diversity and production¹.

Soil is by far the most biologically diverse part of Earth. The soil food web includes beetles, springtails, mites, worms, spiders, ants, nematodes, fungi, bacteria, and other organisms. These organisms improve the entry and storage of water, resistance to erosion, plant nutrition, and break down of organic matter. A wide variety of organisms provides checks and balances to the soil food web through population control, mobility, and survival from season to season.

Biodiversity refers to the variability of life on Earth, all the living species of animals, plants and microorganisms. According to Hawksworth (2002), fungi are a major component of biodiversity, essential for the survival of other organisms and are crucial in global ecological

processes. Fungi being ubiquitous organisms occur in all types of habitats and are the most adaptable organisms. The soil is one of the most important habitats for microorganisms like bacteria, fungi, yeasts, nematodes, etc. The filamentous fungi are the major contributors to the soil biomass.²

This study deals with the seasonal variation in soil bacterial, fungal population of Orathanadu Taluk, Thanjavur District.

MATERIALS AND METHODS

Soil Sample Collection

The soil samples were collected from Orathanadu taluk, Thanjavur District Tamil Nadu India during Monsoon (October-December), Post monsoon (January- March) Summer (April-June) Premonsoon (July-September (2014-2015) season. In the present case, each sample was collected agricultural field, and from Taluk namely Orathanadu (S1), Ambalapattu (S2) and Thirumangalakottai (S3).

Before collection of the soil sample, remove the surface litter at the sampling spot. Collect at least 4 to 6 samples from each sampling unit and place.

If make a 'V' shaped cut to a depth of 15 cm in the sampling spot using spade.

Mix the sample thoroughly and remove foreign material like roots, stones and gravels. Sandy loam to Sandy clay soil. The method used for taking soil sample was a slight modification as that used by (Goddard 1913). Collect the



in sample clean sterile polythene bags. All four random samples of each zone were put together to make a single sample from each place. A total of three samples was prepared to investigate the diversity of the bacteria and fungi.

Isolation of Bacteria and Fungi

Isolation was done by serial dilution and dilution plating (Gram's Staining, Motility) using and standard manuals (Bergey's manual of determinative bacteriology) and Identification in terms of biochemical test such as Indole, Methyl-Red and Voges-Proskauert, Citrate Utilization, Catalase, and Oxidase Test.³⁻⁷ The bacterial and fungal colonies were counted as cfu/ml.

Physico Chemical Properties of the Soil Moisture Content⁸⁻¹⁰

The pH, moisture, organic carbon Macronutrients (Nitrogen, phosphorus, Magnesium, Calcium) and micronutrients (Iron, Zinc, Manganese) were analysed and compared with seasonal variations of per standard method (Table 1).

Estimation of Trace Elements (AAS Elico 196)¹¹

Copper, Iron, Manganese and Zinc heavy were analyzed by using Atomic Adsorption Spectrophotometer.

Statistical Analysis

The results obtained in the present investigation were submerged to statistical analysis like mean(X) and Standard Deviation (SD).¹²

RESULTS AND DISCUSSION

The present study was aimed to investigated for the bacterial and fungal diversity from Orathanadu taluk of Thanjavur district, sites such as, Orathanadu, (S₁) Ambalapattu (S₂) and Thirumangalakkottai (S₃). Tamilnadu in monsoon, postmonsoon, summer, and premonsoon seasons.

The bacterial and fungal organisms are isolated and identified as morphological and cultural characteristics. Nearly 25 species (bacteria 10 and fungi 15) were recorded in Monsoon, 23 species (bacteria 12 and fungi 11) were recorded in Postmonsoon, 24 species (bacteria 13 and fungi 11) were recorded in Summer and 30 species (bacteria 12 and fungi 18) were recorded in Premonsoon season (Table 2). Bacterial and fungal colonies were counted and recorded as cfu/ml (Table 6, 7).

In monsoon season, in the area of Orathanadu (S₁) site fungal organisms are *Aspergillus niger*, *A. Flavus*, *A.nidulans* *A. sulphureus*, *Pencillium sp*, *p. chrysogenum*, *P.bovis*, *R.oryzae* *C. Herbarum*, *Mucor sp*, *Alternaria sp*, *Fusarium solani*, *R.nigricans* and bacteria such as *Bacillus sp*, *Enterobacter sp*, *p.vulgaris* *Streptococcus sp*, *E. Aerogenes*, *S.lactis*, *Azospirillum sp*. In Ambalapattu (S₂) *Rhizopus oryzae*, *Candida albicans*, *A. luchuensis*, *Aspergillus flavus*, *C. Herbarum*, *P. bovis*, *Fusarium solani* *F. semitectum* and *Bacillus cerus*, *B. Subtilis*, *Enterobacter*

sp, *E. aerogenes*, *Pseudomonas sp*, *P.aeruginosa*. and Thirumangalakkottai (S₃) *R.oryzae* *Aspergillus flavus*, *A.sulphureus*, *Candida albicans*, *Pencillium chrysogenum*, *Mucor*, *Alternaria sp* and *Micrococcus sp*, *P.vulgaris*, *Pseudomonas sp* *P.aeruginosa* *staphylococcus sp* are dominants.

Followed by postmonsoon season S₁ site, recorded fungal organisms are *R.oryzae* *Aspergillus flavus*, *A.sulphureus*, *Candida albicans*, *Pencillium chrysogenum*, *Mucor*, *Alternaria sp* and *Micrococcus sp*, *P.vulgaris*, *Azotobacter*, *Pseudomonas sp* *P.aeruginosa* *staphylococcus sp*. In S₂ site *A.flavus*, *A.fumigatus*, *Rhizopus sp* *R.oryzae*, *C. herbarum*, *Fusarium sp*, *F.solani*, *Mucor sp* and bacteria such as *Enterobacter sp*, *E. aerogenes*, *P.vulgaris*, *Pseudomonas sp*, *P.aeruginosa*. In S₃ site *A.terrus* *A.fumigatus*, *A. Luchuensis*, *Pencillium sp* *P.chrysogenum* *Mucor sp*, *Candida albicans*, *R.oryzae*, *Fusarium sp* (*F.oxysporum*) and *E.coli*, *Micrococcus sp*, *staphylococcus sp* *B. subtilis* *P.aeruginosa*, *Micrococcus*, *Pseudomonas* are dominants.

Next Summer season S₁ site *A.niger*, *A.fumigatus*, *Rhizopus sp* *Candida albicans* *R.stolonifer*, *R.nigricans*, *Fusarium oxysporium*, *F. Semitectum*, *T.viridae*, and bacterial species *E.coli*, *S.lactis*, *E. aerogenes*, *Micrococcus sp*, *Lactobacillus sp* *Azotobacter P.aeruginosa*. In S₂ site *A.niger*, *A.flavus*, *A. Sulphurous*, *A. Luchuensis*, *Rhizopus sp*, *R.oryzae*, *R.nigricans* *Fusarium sp*, *F.oxysporum*, *F.solani*, *T.viridae* and *Enterobacter sp*, *Pseudomonas sp*, *P.vulgaris*, *B. subtilis*. *P.aeruginosa* and S₃ site *A.niger*, *A.flavus*, *C. herbarum*, *A.itaconicus*, *Candida albicans*, *pencillium bovis* *p.chrysogenum*, *Mucor sp*, *Fusarium solani*, *F.oxysporum*, *E. aerogenes*, *E.coli*, *Micrococcus sp*, *staphylococcus sp* are dominants.

Similarity by Premonsoon season S₁ site *Aspergillus A.flavus* *A. sulphureus*, *A. Luchuensis*, *Candida albicans*, *F.solani*, *Rhizopus sp* *R.oryzae* and *S.lactis*, *Enterobacter sp*, and *Pseudomonas sp*, *P.vulgaris*, *B. subtilis* and *staphylococcus sp*. In S₂ site *Aspergillus niger*, *A.oryzae*, *Mucor sp*, *Fusarium oxysporium*, *Helmithosporium irregular* and *Micrococcus sp*, *Bacillus sp*, and In S₃ site *A.itaconicus*, *pencillium chrysogenum*, *R.nigricans*, *Candida albicans*, *Fusarium oxysporium* *Trichoderma viridae*, *Rhizopus sp* *R.oryzae* and *Azotobacter Bacillus sp*, *B. subtilis* *Enterobacter sp*, *E. aerogenes*, *E.coli* *P.aeruginosa* are dominants (Table 3, 4).

Maximum number of fungi and bacteria were isolated from monsoon season, minimum number of fungi and bacteria isolated in postmonsoon season.

Diversity was found to be higher in monsoon season than summer. The season variation and (%) frequency of the bacterial and fungal flora were statistically analyzed (Table 5, 6).

Physico-chemical Parameters

The pH, moisture, organic carbon Macronutrients (Nitrogen, phosphorus, Manganese, Calcium) and micronutrients (Iron, Zinc, Manganese) were analysed



and compared with seasonal variation of Orathanadu taluk of Thanjavur District (Table 1).

Table 1: Physico Chemical Parameter of the Soil

S. No.	Name of the Parameters	Monsoon			Post Monsoon			Summer			Pre Monsoon		
		S ₁	S ₂	S ₃	S ₁	S ₂	S ₃	S ₁	S ₂	S ₃	S ₁	S ₂	S ₃
1	PH	7.24	7.35	7.66	7.06	7.56	7.08	7.25	7.13	7.25	7.34	7.29	7.64
2	Moisture (%)	40.02	41.56	43.2	39.57	40.06	40.02	43.56	42.0	40.6	41.5	40.6	42.36
3	Temperature (°C)	29	30	28	37	38	37	46	48	47	38	38	37
4	Carbon (%)	0.42	0.95	0.87	0.43	1.78	0.25	90.12	87.5	85.4	0.24	0.41	0.47
5	Nitrogen (Kg/ac)	88.6	82.6	82.6	90.28	85.5	93.2	88.5	87.5	90.6	95.6	85.6	90.2
6	Potassium (kg/ac)	76	74.6	72.5	68	69.1	63.7	70.7	72.2	71	72.3	70.8	70.1
7	Phosphorus (kg/ac)	4.12	4.15	3.16	2.15	2.36	4.2	2.19	2.57	1.24	2.54	2.35	3.24
8	Magnesium (ppm)	10.5	10.1	9.7	8	8.2	8.5	9.5	9.8	10	9.5	9.7	9.3
9	Calcium (ppm)	8.4	7.9	9	7	7.1	7.3	8.8	8.6	9.5	9.4	9.5	9.6
10	Copper (ppm)	0.78	0.79	0.84	1.9	1.4	1.8	0.96	0.88	0.92	1.8	1.6	1.9
11	Iron (ppm)	2.34	2.55	2.65	3.3	3	2.25	4.7	4.6	4.9	2.5	2.8	2.6
12	Zinc (ppm)	0.87	0.78	0.76	0.67	0.81	0.74	1.8	2.7	2.5	0.7	1.5	2.3
13	Manganese (ppm)	2	2.5	2.8	2.1	1.7	2.4	3.5	3.8	3	2.2	1.7	2.8

S₁ – Orathanadu, S₂ - Ambalapattu, S₃ - Thirumangalakkottai

Table 2: Isolation of Bacteria and Fungi from Soil during four Seasons

S. No.	Species	Seasons			
		Monsoon	Post Monsoon	Summer	Pre Monsoon
1	Bacteria	10	12	13	12
2	Fungi	15	11	11	18

Table 3: Details of Bacteria Isolated from Soil

S. No.	Bacterial Species	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
1	<i>Bacillus subtilis</i>	+	+	+	-	+	+	+	-	+	+	-	+
2	<i>B. megaterium</i>	+	-	+	+	-	+	+	-	+	+	+	-
3	<i>B. cereus</i>	-	+	-	+	-	-	+	-	+	+	-	+
4	<i>B. coagulase</i>	+	+	-	+	+	-	+	-	-	-	+	-
5	<i>Escherichia coli</i>	+	+	+	-	-	+	-	+	+	+	-	+
6	<i>Enterobacter aerogenosa</i>	-	+	-	+	-	+	+	+	-	-	-	+
7	<i>Proteus vulgaris</i>	+	+	-	+	-	+	+	+	+	-	+	-
8	<i>Pseudomonas aeruginosa</i>	+	-	-	+	-	+	-	+	-	+	-	+
9	<i>Staphylococcus aureus</i>	+	+	+	-	+	+	-	+	-	+	+	-
10	<i>S. phyogenes</i>	+	-	-	+	-	+	-	-	-	-	+	+
11	<i>Micrococcus varians</i>	+	+	-	+	-	+	+	-	+	-	+	-
12	<i>Lactobacillus sp</i>	+	+	-	+	-	+	+	+	-	+	-	+
13	<i>Micrococcus sp</i>	-	+	+	-	-	+	-	+	-	-	+	-

(+ Present, - Absent)

Table 4: Details of Fungi from Soil

S. No.	Species	Monsoon			Post Monsoon			Summer			Pre Monsoon		
		S1	S2	S3	S1	S2	S3	S1	S2	S3	SI	S2	S3
1	<i>Aspergillus flavus</i>	+	-	+	+	-	+	-	+	+	+	-	+
2	<i>A. oryzae</i>	-	+	+	-	+	-	-	+	-	+	+	+
3	<i>A. niger</i>	+	+	+	+	+	+	+	+	+	+	+	+
4	<i>A. fumigatus</i>	-	+	-	-	+	-	+	-	+	-	+	+
5	<i>A. terreus</i>	+	+	-	+	-	-	-	+	+	-	-	+
6	<i>A. luchuensis</i>	-	+	-	+	-	-	+	-	+	+	-	-
7	<i>A. sulphureus</i>	+	+	-	-	+	-	+	-	-	-	+	+
8	<i>Cladosporium sp</i>	-	-	+	-	-	+	-	-	-	+	-	-
9	<i>Cunninghamella sp</i>	+	+	-	+	+	-	-	+	-	+	+	-
10	<i>Candida albicans</i>	+	+	-	+	-	+	+	+	+	-	+	-
11	<i>Fusarium oxysporium</i>	+	-	-	+	-	+	-	+	+	+	-	+
12	<i>F. solani</i>	+	-	+	-	+	+	-	-	-	+	+	-
13	<i>F. semitectum</i>	-	-	+	-	-	+	+	-	+	-	+	-
14	<i>Helmithosporium</i>	+	-	+	+	-	+	-	+	-	-	+	+
15	<i>Mucor sp</i>	+	+	-	+	+	-	+	-	+	-	+	-
16	<i>Rhizopus stolonifer</i>	+	+	+	-	-	+	+	-	+	-	+	-
17	<i>R. oryzae</i>	+	+	-	+	-	+	+	+	-	+	-	+
18	<i>R. nigricans</i>	-	+	+	-	+	+	+	+	-	-	+	-
19	<i>Trichoderma viridae</i>	+	+	-	+	+	+	+	-	+	+	-	-
20	<i>Penicillium chrysogenum</i>	+	+	-	+	-	+	-	+	-	+	+	+
21	<i>P. bovis</i>	+	+	-	+	-	+	-	+	+	+	-	-

Table 5: Frequency of Mycoflora in the Isolated Sites

S. No.	Genus	Species	Average	S1	S2	S3	Total	Frequency
1	<i>Aspergillus sp</i>	<i>A. niger</i>	50	7	10	10	27	9.85
		<i>A. flavus</i>	53	5	7	8	20	7.29
		<i>A. terreus</i>	39	8	8	9	25	9.12
		<i>A. Fumigatus</i>	38	7	5	6	18	6.56
		<i>A. oryzae</i>	35	9	10	10	29	10.58
		<i>A. sulphureus</i>	30	7	5	6	18	6.56
		<i>A. lughuensis</i>	29	4	6	5	15	5.47
2	<i>Cladosporium sp</i>	<i>Cladosporium sp</i>	23	6	4	3	13	56.52
3	<i>Fusarium sp</i>	<i>F. solani</i>	56	15	13	10	38	25.85
		<i>F. oxysporium</i>	43	8	5	4	17	11.56
		<i>F. semiectum</i>	48	7	8	5	19	12.92
4	<i>Rhizopus sp</i>	<i>R. stolonifer</i>	58	10	20	10	37	20.55



		<i>R. oryzae</i>	62	13	7	8	28	15.55
		<i>R. nigricans</i>	60	18	10	9	37	20.55
			180					
5	<i>Penicillium sp</i>	<i>P. crysogenum</i>	56	7	9	20	36	33.9
		<i>P. bovis</i>	60	13	10	11	34	32.07
106								
6	<i>Candida sp</i>	<i>C. albicans</i>	47	10	10	23	43	91.48
7	<i>Trichoderma sp</i>	<i>T. viridae</i>	41	5	7	6	18	22.2
		<i>T. harzinum</i>	40	9	5	8	22	27.16
81								
8	<i>Mucor sp</i>	<i>Mucor sp</i>	44	6	6	4	16	36.36
9	<i>Helmithosporium sp</i>	<i>Helmithosporium sp</i>	26	5	9	3	17	65.3

Table 6: Bacterial Colony Forming Units (CFU)

S. No.	Species	Monsoon	Post Monsoon	Summer	Pre Monsoon
1	<i>Bacillus subtilis</i>	35	56	37	56
	<i>B. megaterium</i>	41	23	33	45
	<i>B. cereus</i>	45	30	29	32
	<i>B. coagulase</i>	36	56	43	45
2	<i>Staphylococcus aureus</i>	53	45	29	50
3	<i>Streptococcus lactis</i>	51	32	19	53
	<i>S. pyogenes</i>	43	45	19	46
4	<i>Enterobacter aerogenosa</i>	60	50	32	72
5	<i>Escherichia coli</i>	72	75	35	46
6	<i>Pseudomonas aerogenosa</i>	50	32	45	51
7	<i>Proteus vulgaris</i>	45	28	45	36
8	<i>Micrococcus varians</i>	32	20	30	42
9	<i>Lactobacillus</i>	45	35	56	35
10	<i>Enterococcus</i>	56	43	25	55

Table 7: Fungal Colony Forming Units (CFU)

S. No.	Species	Monsoon	Post Monsoon	Summer	Pre Monsoon
1	<i>A. niger</i>	50	42	56	39
2	<i>A. flavus</i>	53	39	26	33
3	<i>A. terrus</i>	39	36	43	31
4	<i>A. Fumigatus</i>	38	44	53	41
5	<i>A. oryzae</i>	35	42	42	33

6	<i>A. sulphureus</i>	30	49	66	40
7	<i>A. lughuensis</i>	29	38	44	64
8	<i>Cladosporium sp</i>	23	61	32	59
9	<i>F. solani</i>	56	61	23	34
10	<i>F. oxysporium</i>	43	45	45	27
11	<i>F. semiectum</i>	48	66	56	23
12	<i>R. stolonifer</i>	58	47	41	32
13	<i>R. oryzae</i>	62	48	23	37
14	<i>R. nigricans</i>	60	51	26	35
15	<i>P. crysogenum</i>	56	23	58	34
16	<i>P. bovis</i>	60	33	51	35
17	<i>C. albicans</i>	47	42	44	32
18	<i>T. viridae</i>	41	38	23	68
19	<i>T. harzinum</i>	40	36	33	64
20	<i>Helmithosporiumsp</i>	44	29	33	23
21	<i>Mucor sp</i>	26	32	20	33

Table 8: Cultural Characteristics of Bacteria

Organism	Gram stain	Cultural Characteristics	Motility	Indole	MR	VP	Citrate Utilization	Catalase	Urease
<i>E. aerogenes</i>	–	Abundant thick, white, glistening growth	Motile	–	–	+	+	+	–
<i>E.coli</i>	–	White, moist, glistening growth	Motile	–	–	+	+	+	–
<i>B. cereus</i>	+	Abundant, opaque, white waxy growth	Motile	–	–	+	+	+	–
<i>C.pyogenes</i>	+	Gray- white, convex growth	Motile	–	–	+	+	+	–
<i>M. luteus</i>	+	Circular, entire, convex with regular edges	Non motile	–	+	–	–	+	–
<i>P.aeruginosa</i>	–	White large wringled growth	Motile	–	–	–	–	+	–
<i>S. aureus</i>	+	Smooth raised, glistening with circular growth	Non motile	–	+	–	–	+	–
<i>p.vulgaris</i>	–	Thin blue- gray, spreading growth	Non motile	+	–	–	+	+	–
<i>S.lactis</i>	+	Thin even growth	Non motile	–	+	–	–	–	–
<i>M.luteus</i>	+	Circular, entire, with regular edges	Non motile	–	+	–	–	+	–
<i>B.megaterium</i>	+	Abundant, opaque, white waxy growth	Motile	–	+	–	–	+	–
<i>B. coagulase</i>	+	White large wringled growth	Motile	–	–	+	+	+	–

Table 9: Cultural Characteristics on a PDA of the Isolated Fungi

S. No.	Species	Upper Surface			Lower Surface	Observations
		Cultural Aspect	Density	Colour		
1	<i>Rhizopus stolonifer</i>	Effuse cotton	High	White at first become bluish black maturity	Idem to upper face	Rhizords rare sporangiophore
2	<i>Aspergillus flavus</i>	Effuse floccose	Medium	Conidial heads yellow to green	Idem to upper case	Hyphae, Septate with conidiophore
3	<i>A. oryzae</i>	Effuse globose	High	Orange to vinaceous or purple sclerotia	Idem to upper face	Hyphae, Septae with conidiophore
4	<i>Penicillium bovis</i>	Effuse floccose	Light	Grey green to brownish	Idem to upper face	Conidiophore (vertical of phialides)
5	<i>P. crysogenum</i>	Effuse floccose	Light	Yellow to green	Idem to upper face	Conidiophore, compact vertical of phialides
6	<i>Trichoderma viride</i>	Effuse globose	Medium	Light green	Idem to upper face	Conidio elliptical and septae
7	<i>Basidiomycetes sp</i>	Globose	Light	Grey colour	Idem to upper face	Conidia and septae

The present study was carried out to isolate the bacterial and fungal species of different agricultural field soil from Orathanadu (S_1), Ambalapattu (S_2) and Thirumangalakottai (S_3) during seasons, such as Monsoon, Postmonsoon, Summer, and Premonsoon.

The physicochemical parameters of the soils were also analyzed.

Our work is supported, population density during Monsoon season, maximum, fungal species was recorded in 2009-2010.

In our study report also highlighted that fungal population also high in monsoon season and similar that dominant species are *Aspergillus*, *penicillium* were also the same to that study¹³.

However, the distribution of the soil microbial population is determined by a number environmental factors like, pH, Moisture content and soil organic matter higher fungal and bacterial population during rainy season and autumn supported the findings of other workers which perhaps is due to prevailing favorable moisture and temperature setting during the period litter and other plant residues are decomposed faster during rainy season and sufficient soil organic matter and humus accumulates that have enhanced the colonization of the soil microbes in subsequent period.¹⁴

In our study correlated to that soil dilution plate method used for the isolation of soil fungi in the current study is a suitable method for isolating fungi in these two classes, as

it ports releasing and mixing of numerous spores produced by the fungi into the diluted soil suspension.

A reason that may explain why only five fungi in the class *Ascomycetes* were obtained is that the suitable methods for their isolation were not used, namely, heat treatment and treatment methods.¹⁵

In our work were correlated to that suitable method for isolating fungi in diluted soil suspension similar to that *Ascomycetes* were obtained is that the suitable methods in same like that.¹⁶

Our finding similar to that were, collected 15 soil samples from three different stations namely Koraiyar river head, Saradi, and Xavier munai along the Muthupet Mangroves in Tamilnadu and examined by dilution plating method of PDA medium to access fungal diversity and the population diversity. Out of 22 species screened the *Aspergillus* and *Penicillium* were represented as dominant one of each. In the present study also species like *Aspergillus* and *Penicillium* were common to all sites.¹⁷

Our study was correlated to from that totally 36 different species of fungi were isolated from seven taluks of Thiruvavur Dt. They are dependent on the nature of substrate and temporal regions that form colonization. Here our study revealed that totally 13 different bacterial, and 24 fungi were isolated and identified from Orathanadu Taluks of Thanjavur Districts.¹⁸

CONCLUSION

The present study was planned to, Isolation and Identification of soil bacteria and fungi from Orathanadu taluk of Thanjavur (Dt) Tamilnadu deals with diversity and distribution of bacterial and fungal population in an around soil. The physico – chemical parameters of such soils were recorded. Population of soil bacteria and fungi might also get affected by climate and resistance over extreme environmental condition.

Here it could be concluded that the Orathanadu taluk of fungi and bacteria have a unique habitat where there as diverse niches for bacteria and fungi. There ports of Orathanadu taluk of fungi from different places were mainly from decaying woods, submerged plants, decaying plants.

However a very little information was studied regarding the diversity of soil in agricultural lands, however, the simplest management tool to increased biodiversity in agriculture in terms of the crop and livestock species used with possible implications for enhancing the biodiversity of other group of organisms.

Acknowledgement: Grateful acknowledge to The Management S.T.E.T Women's College Mannargudi. Yoge International Private Limited (Ltd.), Pune for providing the financial support to carry out the research work.

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Source of Support: Nil, Conflict of Interest: None.

