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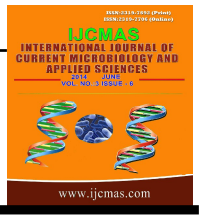

Original Research Article

Diversity of Mycoflora from Sirumalai Hills of Eastern Ghats at Dindigul District, Tamil Nadu, India

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A B S T R A C T

The present investigation is an attempt to concentrate on the diversity of fungi present in Sirumalai hills of Eastern Ghats, at Dindigul district of Tamil Nadu, India. The indigenous information of the village dwellers, tribal people, village herbalists, herbal practitioners, traditional healers and the indigenous plants used for medicinal worthiness were collected through personal interview and questionnaire during field trips. Fungi are one of the most diverse life forms on this planet and predicting the number of fungal species is considered important among Mycologists. The soil samples were collected from three different parts of the Sirumalai hills which includes the top of the hill, middle and bottom of the hill during the month of January. Fungal species were isolated from these soil samples by using Potato Dextrose Agar medium following serial dilution technique.

Keywords

Mycoflora, PDA medium, Sirumalai Hills

Introduction

Biodiversity refers to the variability of life on Earth, all the living species of animals, plants andmicroorganisms. According toHawksworth (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.Fungi play a major role in soil ecosystems and are the principal decomposers of forest litter or dung, fruits or other organic materials (Carlile*et al*., 2001). It has been found that more number ofgenera and species of fungi exist in soil than in any other environment (Nagmani*et al*., 2005). Contributing to the nutrient cycle and maintenance of ecosystem, fungi play an important role insoil formation, soil fertility, soil structure and soil improvement (Hao-quin*et al*., 2008). The present study was undertaken to throw a light on the diversity and abundance of fungal species to reveal the characteristic distribution and diversity with special reference. The study involves isolation and identification of fungal species from three

different ecological soil types in the top, middle and bottom from Sirumalai hills, Dindigul district, Tamilnadu. Physical and chemical analysis of the soil was also studied.

Materials and Methods

Sample collection

The soil samples were collected in the late October to early November, 2012 and stored in sterile bags at 4^{o}C until used for culturing fungi. The present study site represent the top, middle and bottom of the hill. Samples were collected from 2 – 3 cm deep pits dug in the area to be sampled. The samples were collected with a surface sterilized trowel. Soil was scraped along the walls of the pits and collected in polythene bags. Soil from 3-5 pits was pooled together and mixed in the same polythene bag.

Soil Analysis

Physical analysis of the soil such as pH, Color, Texture, Temperature etc. were studied. Chemical analysis of the soil such as available Nitrogen, Carbonetc. were also studied. The Physico-chemical characters were statistically correlated with soil fungal flora.

Isolation of Fungi

The fungi were isolated by the serial dilution and plate count method (Johnson and Curl, 1972). For isolation of total fungi, 10^{-3} to 10^{-5} dilutions were used with Potato Dextrose agar media. After incubation at $28^{o} \pm 2^{o}$ C, the fungal population was counted after 5 to 7 days. The fungi were identified with the help of literature (Barnett., 1998, Ellis., 1993., Gilman., 2001., Raper and Fennel., 1965, Thom andRaper., 1941, Subramanian., 1971).

Presentation of data

Data analysis

I. **Species diversity :** The diversity of species was studied in terms of species richness and relative abundance of the species.

   a.) **Species richness (S) :** It represents the total number of different species in a particular area (Harrison, 2004).

   b.) **Relative dominance (d) :** It was measured by calculating the Berger-Parker dominance (Harrison, 2004).
   d = n/N
   Where n = no of individuals in a species
   N = S = total no of individual.

   c.) **Presentation of data:** In order to assess the dominance of individual species in each site percentage contribution was worked out as follows,

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

Results and Discussion

It is clear from the results that, the fungal species from all the three soil samples includes 19 species belonging to 7 genera and one sterile mycelium were reported. The genus *Aspergillus* were dominant in all the three soil samples.These fungal genera were identified according to their vegetative and reproductive characters following standard manuals and references. The data analysis of all the fungal genera in the different sites were shown in the Table.1.

Table.1 Total number of colonies(CFU/g), mean density and percentage contribution were recorded during monsoon season from Sirumalai hill-Dindigul

S.No	Name of the organisms	Station I Top		Station II Middle		Station III Bottom		Total No.of colonies	Percentage contribution (%)
		TNC	MD	TNC	MD	TNC	MD		
1.	*Aspergillusniger*	5	1.66	4	1.33	4	1.33	13	8.72
2.	*A. glaucus*	4	1.33	2	0.66	3	1.0	9	6.04
3.	*A.fumigatus*	3	1.0	3	1.0	2	0.66	8	5.36
4.	*A.phoenicis*	2	0.66	1	0.33	2	0.66	5	3.35
5.	*A.citricus*	3	1.0	1	0.33	1	0.33	5	3.35
6.	*A.niveo-glaucus*	2	0.66	2	0.66	2	0.66	6	4.02
7.	*A.variecolor*	3	1.0	2	0.66	2	0.66	7	4.69
8.	*A.elegans*	4	1.33	1	0.33	2	0.66	7	4.69
9.	*A.petrakii*	2	0.66	2	0.66	3	1.0	7	4.69
10.	*A. tamari*	2	0.66	1	0.33	1	0.33	4	2.68
11.	*A.carbonarius*	2	0.66	2	0.66	1	0.33	5	3.35
12.	*A.granulosis*	5	1.66	3	1.0	2	0.66	10	6.71
13.	*A.ochraceus*	4	1.33	3	1.0	2	0.66	9	6.04
14.	*Verticilliumterrestre*	3	1.0	1	0.33	2	0.66	6	4.02
15.	*Chaetomiumglobosum*	2	0.66	1	0.33	1	0.33	4	2.68
16.	*Alternariaalternata*	4	1.33	2	0.66	2	0.66	8	5.36
17.	*Helminthosporium*sp.,	5	1.66	3	1.0	3	1.0	11	7.38
18.	*Curvularialunata*	3	1.0	2	0.66	2	0.66	7	4.69
19.	*Dendryphionnanum*	2	0.66	2	0.66	1	0.33	5	3.35
20.	Sterile mycelium	4	1.33	5	1.66	4	1.33	13	8.72
	TOTAL	64	21.2	43	14.2	42	13.9	149	

Table.2 Correlation between the number of colonies and the physico-chemical parameters in monsoon season were recorded

	TNC	pH	EC	OC	OM	AN	AP	APO	AZ	AC	AI	AM	C	M	S	P
TNC	1															
pH	0.943	1														
EC	0.198	-0.140	1													
OC	-0.943	-0.778	-0.514	1												
OM	-0.943	-0.778	-0.514	10.000*	1											
AN	0.019	-0.315	0.984	-0.351	-0.351	1										
AP	0.856	0.979	-0.338	-0.634	-0.634	-0.501	1									
APO	0.824	0.588	0.719	-0.966	-0.966	0.583	0.411	1								
AZ	-0.717	-0.444	-0.825	0.908	0.908	-0.711	-0.253	-0.986	1							
AC	-0.989	-0.883	-0.342	0.982	0.982	-0.168	-0.769	-0.899	0.813	1						
AI	-0.901	-0.705	-0.604	0.994	0.994	-0.451	-0.546	-0.988	0.949	0.955	1					
AM	-0.186	-0.502	0.926	-0.153	-0.153	0.979	-0.667	0.404	-0.552	0.037	-0.260	1				
C	-0.685	-0.403	-0.850	0.888	0.888	-0.742	-0.208	-0.977	0.999*	0.786	0.933	-0.589	1			
M	0.748	0.484	0.799	-0.926	-0.926	0.678	0.296	0.992	-0.999*	-0.839	-0.962	0.513	-0.996	1		
S	0.249	0.557	-0.900	0.088	0.088	-0.964	0.714	-0.344	0.497	-0.101	0.197	-0.998*	0.536	-0.457	1	
P	0.860	0.641	0.671	-0.981	-0.981	0.527	0.472	0.998*	-0.972	-0.926	-0.996	0.342	-0.961	0.982	-0.281	1

**. Correlation is significant at the 0.01 level0; *. Correlation is significant at the 0.05 level0.

Among the various genera of soil fungi the*Aspergillus*was the most common genera that was distributed in all the types, indicating that it adapts easily to different environment as well (Wahegaonkar*et al.*, 2011**)**.Several isolated species viz. *Dendryphion, Curvularia, Chaetomium etc*. were involved in strong fungal associations and have dominant adaptative features as primary colonizers probably due to their capacity for the rapid invasion of the available substrate (Frankland, 1981).

The mean population mean density of fungi varied from 13.9 to 21.2 $\times 10^{-2}$ CFU/g with the minimum in the samples were collected from bottom of the hill and maximum in the samples collected from top of the hill. Percentage contribution of the individual species to the total fungal population at all the three stations showed variation.

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