

## DIVERSITY AND SEASONAL VARIATION OF SOIL MYCOFLORA OF BILASPUR DISTRICT OF CHHATTISGARH STATE

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### ABSTRACT

During present investigation soil samples of different categories viz; rice field soil, Crop field soil and horticultural field soil located in and around Bilaspur district was collected, from five different zones demarcating three sampling sites. Isolation, identification and characterization of fungi from various samples were done to analyze diversity and seasonal variation of soil Mycoflora. Fungi have been divided in to summer; Rainy and winter types based on their occurrence. Using various nutrient media for concerned fungi through serial dilution, spread plate technique and microscopic observation, diverse form of fungal strains were isolated. Nine fungal strains were isolated from samples collected during different seasons of year. Seasonal variation affects the diversity of soil inhabiting fungi underpins many crucial ecosystem services which support the plants and animals typically targeted by conservation efforts.

**KEYWORDS:** Fungal Diversity, Seasonal Variation, Soil Samples, Ecosystem Services, Conservation Efforts

The diversity and distribution of soil microorganisms has been a interesting subject for scientists over the years. Many fruitful effects of microbes in soil have been investigated (Alexander, 1971; Subba Rao and Gaur, 2000). Diversity of fugal species varies greatly within regions to regions. Distribution of fungi of particular area was affected by seasonal variations, the Number and types of fungal species changes. The climate of Bilaspur district characterized by three seasons i.e. summer, rainy and winter. Several Mycologists in India studied the Soil fungal diversity and their distribution.

The importance of mycological studies of different habitat has been recorded by Manoharachary and Murthy, 1981; Saravankumar and Kaviyaran 2010; Rane and Gandhe 2006 etc. According to Ainsworth & Bisby 1995, Fungi are an important component of soil microbiota, contributing more soil biomass than bacteria.

### MATERIALS AND METHODS

The proposed study area i.e. District of Bilaspur was divided into five zones graphically. For survey and collection of samples three within each zone three category of field soil have been demarcated from all three seasons. A study was conducted in and around Bilaspur district. Soil sample was collected bimonthly for mycological analysis. Extreme care was taken at all times during the whole sampling process to ensure minimal contamination. Soil samples were collected in first week

bimonthly of the year. The soil samples are taken from a depth of 0-10 cm then soil were pooled and shaken directly into fresh polythene bags Sterilized high density polythene bags were used as sample scoop. Various media i.e. Potato dextrose agar media, Sabouraud's agar media were used for isolation using the serial dilution plate technique (Johnson & Curl 1972). Fungi were grown at 25±1°C for 5 days. Three replicates were maintained in each case. The sub cultures were carried out to purify the fungal isolates. Isolated fungal Slides were prepared by taking fungal material on slide from Petri dish with the help of forceps or needle. Fungal material was stained with lacto phenol, cotton blue. Fungi so observed were characterized and identified using appropriate taxonomic guides (Alexopoulos, C. J., Mims, C. W. Blackwell, M., 1996).

### RESULTS AND DISCUSSION

During present investigation variety of fungal sp. were collected and identified. On the basis of morphological characteristics nine fungal species were observed via direct microscopic examination. Seasonal variation in fungal diversity present in different soil sources have been tabulated (Table-1) and Seasonal variation of fungal isolates were also mentioned in Table-2. The % Frequency of occurrence have been also observed and was measured in triplicate set, which mean value with ± SD have been tabulated (Table-3, Figure-1).

**Table 1: Seasonal variation in diversity of fungal sp. in different soil sources**

Stuy zone/ Area		Seasons					
Zone	Area	Summer		Rainy		Winter	
		March	May	July	September	November	January
Zone-I	Rice	-	+	+	+	+	+
	Crop	+	-	+	+	-	-
	Horticulture	-	+	+	-	-	-
Zone-II	Rice	+	+	-	-	-	-
	Crop	+	-	+	+	-	+
	Horticulture	-	-	-	+	+	+
Zone-III	Rice	+	-	+	-	-	-
	Crop	+	-	+	-	+	+
	Horticulture	-	+	+	+	-	+
Zone-IV	Rice	-	-	+	-	-	-
	Crop	+	-	+	-	+	+
	Horticulture	+	+	+	-	+	-
Zone-V	Rice	-	-	+	-	-	+
	Crop	+	-	-	+	+	-
	Horticulture	-	+	+	+	-	+

**Table 2: Seasonal variation of fungal isolates in various seasons:**

NAME OF FUNGI	RICE FIELD			CROP FIELD			HORTICULTURE FIELD		
	Rainy	Winter	Summer	Rainy	Winter	Summer	Rainy	Winter	Summer
<i>Aspergillus niger</i>	26.6 ±0.28	13.3 ±0.42	16.6 ±0.34	16.7 ±0.52	26.6 ±0.89	20.0 ±0.48	26.6 ±0.35	-	-
<i>Penicillium Crysogenum</i>	13.3 ±0.34	10.0 ±0.75	6.6 ±0.21	16.6 ±0.54	13.3 ±0.36	18.6 ±0.53	20.0 ±0.31	13.3 ±0.35	23.3 ±0.54
<i>Helminthosporium maydis</i>	-	-	-	-	-	-	6.6±0.43	10.0 ±0.27	2.5 ±0.68
<i>Trichoderma viridae.</i>	-	-	-	10.4 ±0.54	2.4 ±0.70	-	6.6 ±0.36	-	3.3 ±0.55
<i>Alternaria alternate</i>	6.6 ±0.21	-	3.3 ±0.82	-	-	-	13.3 ±0.28	6.6 ±0.26	2.8 ±0.54
<i>Chaetomium globosum.</i>	-	-	-	6.6 ±0.58	8.0 ±0.23	-	-	-	-
<i>Cladosporium sp.</i>	6.6 ±0.45	6.6 ±0.50	-	23.3 ±0.28	3.3 ±0.88	-	-	-	-
<i>Cunninghamella Elegans</i>	3.3 ±0.27	-	6.6 ±0.76	-	-	-	6.6 ±0.48	3.2 ±0.26	-
<i>Curvularia lunata</i>	-	-	-	6.6 ±0.37	-	16.6 ±0.46	-	-	10.0 ±0.63

Table 3: % Frequency of occurrence of fungal strains.

NAME OF FUNGI	RICE FIELD			CROP FIELD			HORTICULTURE FIELD		
	Rainy	Winter	Summer	Rainy	Winter	Summer	Rainy	Winter	Summer
<i>Aspergillus niger</i>	26.6 ±0.28	13.3 ±0.42	16.6 ±0.34	16.7 ±0.52	26.6 ±0.89	20.0 ±0.48	26.6 ±0.35	-	-
<i>Penicillium Crysogenum</i>	13.3 ±0.34	10.0 ±0.75	6.6 ±0.21	16.6 ±0.54	13.3 ±0.36	18.6 ±0.25	20.0 ±0.31	13.3 ±0.35	23.3 ±0.54
<i>Helminthosporium maydis</i>	-	-	-	-	-	-	6.6 ±0.43	10.0 ±0.27	2.5 ±0.68
<i>Trichoderma viridae.</i>	-	-	-	10.4 ±0.54	2.4 ±0.70	-	6.6 ±0.36	-	3.3 ±0.55
<i>Alternaria Alternate</i>	6.6 ±0.21	-	3.3 ±0.82	-	-	-	13.3 ±0.28	6.6 ±0.26	2.8 ±0.54
<i>Chaetomium globosum.</i>	-	-	-	6.6 ±0.58	8.0 ±0.23	-	-	-	-
<i>Cladosporium sp.</i>	6.6 ±0.45	6.6 ±0.50	-	23.3 ±0.28	3.3 ±0.88	-	-	-	-
<i>Cunnighamela Elegans</i>	3.3 ±0.27	-	6.6 ±0.76	-	-	-	6.6 ±0.48	3.2 ±0.26	-
<i>Curvularia lunata</i>	-	-	-	6.6 ±0.37	-	16. 6±0.46	-	-	10.0 ±0.63

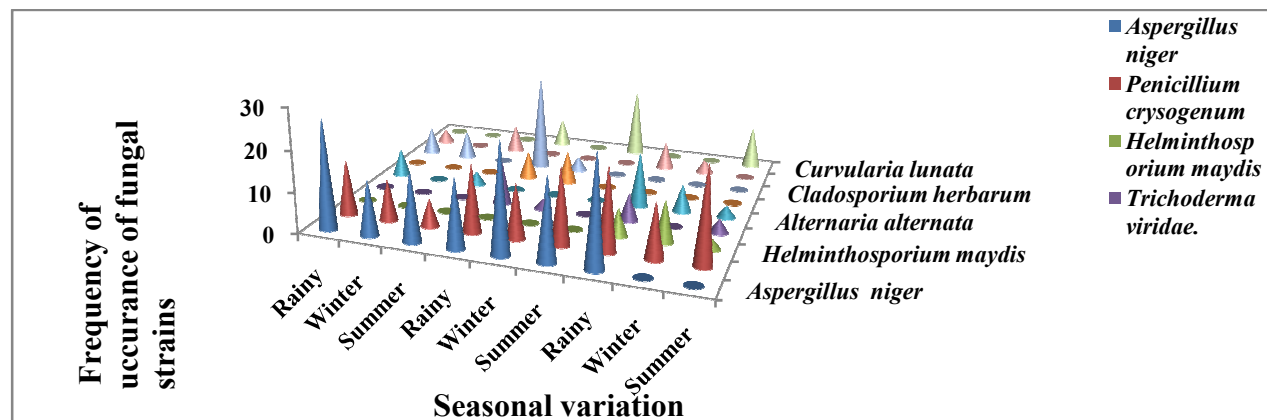


Figure 1: % Frequency of occurrence of fungal strains.

During present course of investigation it was noticed that *Chaetomium globosum*, *Curvularia lunata*, *Trichoderma viride*. Were not frequently found in rice field soil than crop field and horticulture field soil while *Cladosporium herbarum.*, *cunnighamela elegans*, were dominant in rice field *Helminthosporium maydis*, *Alternaria alternata* were also observed in low frequency. Species like *Aspergillus niger* and *penicillium crysogenum* Frequency were quite higher in crop area while in rice field area it did not exceed more. The observations of this study have analyze & discuss

here that consistent with previous reports. The findings revealed that the maximum fungi recorded in rainy season, and was moderate in winter and summer season. During the study it was noticed that manuring and fertilizer applications have a significant impact on species diversity.

## CONCLUSION

Findings of present investigation reveals that significant changes occur in the diversity of important mycoflora, Therefore there is need to understand the

aspects of mycodiversity in order to conserve and sustain the soil productivity on a long term basis. It was noticed that fungal population were not equivalent whole the year they show seasonal variation. These findings concludes diversity of fungal community of soil fungi isolated from Bilaspur District local soil were well adapted for survival on that seasonal variations. Further studies have to be made for My co-diversity because that play crucial role in nutrient transformation, plant disease control and growth promotion in response to various soil managing practices which are part of intensive agriculture.

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