

## Seasonal distribution pattern of Microorganisms in Sal forest of Achanakmar Bilaspur

Pratiksha Pandey<sup>1</sup> Deepti Chauhan<sup>2\*</sup>

<sup>12</sup> (Department of Botany, Bhilai Mahila Mahavidyalaya, Hospital Sector, Bhilai, C.G., India)

\*Corresponding author e-mail: [deeptibotany@rediffmail.com](mailto:deeptibotany@rediffmail.com)

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**Abstract:** The fertility status of soil depends not only on its chemical and physical composition but also depends of the occurrence of micro-organisms. During the course of study an extensive survey of area of dry peninsular Sal forest of Achanakmar Bilaspur District (Chhattisgarh) was made to investigate the total microbial flora in relation to the seasonal trends in the Sal forest appearance.

**Key words:-** Microorganism Sal forest.

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### I. Introduction

*Shorea robusta* commonly known as Sal representing family *Depterocarpaceae* is famous for their dense forest area in Chhattisgarh. Present study was taken in Sal forest of Achanakmar forest area in Bilaspur District (Chhattisgarh). Recently Sal ecosystem have suffered/ serious depletion and facing die back and regeneration problem. Sal forests are intimately linked with microbial components. Microorganisms are the major decomposers which contributes Organic matter decomposition and transformation of nutrients (Tilak K.V.B.R.2000). Microbes plays significant role in soil structure maintenance. Soil borne disease control and plant growth promoter through secretion of hormones. The diversity and richness of soil microbes is a interesting subject for scientists but very little information regarding the Sal ecosystem and microbial population is not sufficient (Diwadi 1955, Saksena and Sarabhai 1963, Kamal et al.1979) studies in Northern Indian forest soil. Therefore the present study was undertaken to evaluate the effect of climatic factors on the population of soil microorganism.

### II. Material And Methods

The studies were carried out in the natural Sal forest of Achanakmar, Bilaspur district. It lies between 22° 5' N latitude and 82° 12' E at 262 meters above mean sea level. The average annual rainfall 2011-2012 was recorded 1261.90 mm. The average RH value was 52% and 47.1% in the morning and evening respectively. The colour of soil samples were collected from compartment no. 1094. The population status of the microflora viz. Bacteria, Fungi, Actinomycetes and Mycorrhiza recorded to Jan. 2011 to Dec.2011. The soil sample were collected from 0-15 cm depth after scraping the surface soil layer by mean of sterilized agar and individual group of *Aspergillus* in Sal forest ecosystem. The conventional dilution plate method (Diwedi 1965, Mishra 1964) was used for fungal isolation. The culture were used as given by Martin's for Fungal isolation. Where as starch nutrient media was made for bacterial growth and Population. The assessment of mycorrhizal population in soil sample was recorded only by direct microscopic examination.

The inoculated plates were incubated at 25°C and inoculation period was 48 hours for bacteria, 5 days for fungi and 7 days for assessment of actinomycetes only quantitative data's were obtained to the soil microorganisms.

The chemical analysis e.g. digital PH meter, soil- soil moisture box method. Organic carbon by Walkey and Black rapid titration method given by (Jackson 1958). Total nitrogen content (Micro Kjeldahl method) phosphorus (Moybd. blue method) and soil potassium by flame photometry method. Relative humidity and rainfall data was obtained from meteorological department of Bilaspur.

### III. Result And Discussion

Present study the data shows total microbial population in Sal forest area Table 1. Shows the total fungal flora is determined by total colony count per gram of soil at different season viz. rainy season, winter season and summer season. It observed that fungal species varied season to season. It shows the peak population in winter season (Oct. -2011 to Jan.) and summer season (Mar. to Jan. 2011).

Fungal species e.g. *Curvularia* Sp, *Cladosporium* sp. *Alternaria* sp., were found in rainy season a winter season while *Aspergillus* sp. and *Fusarium* sp. Were common in all season. *Penicillium* sp. *Phoma* sp. Were

found in only summer season. It was interested to note that *A. niger* and *A. nidulans* found all over the season. It is believed that due to their wide tolerance capacity to different climate condition ( **Tiwari et. al. 2001**). 25° to 30°c is suitable for growth and survival of fungal population. Our findings shows that high relative humidity and temp. shows better symbiotic association in Sal forest. There is no significant correlation found in mycorrhizal population and climatic factors except it shows minimum value in Oct. and Nov. otherwise all over the months population is in between in 18.33 -23.57 all the VAM spores belongs to genus *Glomus*.

Table showing the climatic factors with distribution pattern of microflora. It shows that high moisture and balanced ratio of nitrogen and phosphorus accelerate the growth and morphology of roots of vegetation (**Kamal et.al.1979**).The PH value of forest soil is good for Microbial population especially for Fungi and Mycorrhizal population.

Data shows that Bactrium and Actinomycetes groups shows similar trend. Both microbial groups shows least appearance in winter season and peak population value was recorded in rainy season(**Yadav et.al. 2011**). Also found similar observation regarding bacterial population perhaps during this period temperature, humidity and soil moisture are fluctuating which directly affects the population status the both group. Actinomycetes was not identified due to some reason but common Bacteria namely *E. coli*, *Bacillus subtilis*, *Streptococcus* sp., *Pseudomonas* sp. *Rhizobium* sp. *Klepshilla* sp., *Shigella* sp., *Acetobactron* sp. Commonly found in study area.

**Table -1 Population status of micro flora in Sal forest of Achanakmar 2011**

	Jan	Feb	Mar.	April	May	June	July	Aug	Sep.	Oct.	Nov.	Dec.
Mean value of Fungal Population	59.12 %	55.97 %	21.24 %	18.66 %	9.62 %	3.20 %	11.27 %	24.00 %	39.81 %	44.00 %	57.82 %	62.00 %
Mean value of Mycorrhizal Population	20.24 %	23.57 %	21.35 %	19.32 %	20.00 %	20.23 %	16.00 %	9.30 %	4.39 %	21.56 %	19.29 %	18.21 %
Mean value of Bacterial Population	5.72 %	4.29 %	3.28 %	9.29 %	4.32 %	30.41 %	14.41 %	16.66 %	9.82 %	8.11 %	8.20 %	7.66 %
Mean value of Actinomycetes Population	4.32 %	4.23 %	3.41 %	11.42 %	9.96 %	19.21 %	13.10 %	14.33 %	13.33 %	9.23 %	4.22 %	1.29 %

**Table -2 Physico – Chemical Properties of Sal forest of Achanakmar**

Moisture %	Organic carbon %	Total Nitrogen %	Phosphorus mg/100gm	Potassium / 100gm	PH
21.56	6.00	0.31	0.82	0.99	6.50

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