



April 2010

## SOIL MYCOFLORA OF INDO-CHINA BORDER NATHULA, INDIA



\*Dr. Kavita Sharma \*\*Shaista Parveen

\*\* H.O.D. Botany, Arts and Commerce Girls college, Raipur (C.G)

Referred By—1. Dr. M.N. Khatal 2. Dr. T.I. Kahan

### ABSTRACT

Isolation of soil mycoflora from Indo-China border Nathula Sikkim was observed by serial dilution method during summer, 2009. In investigation period colonies of 15 fungal species were observed the maximum percentage contribution of *Aspergillus niger* (21.73%), was followed by *A. japonicus* and *Phoma* sp. (10.86%) and minimum percentage contribution of *A. chartarum*, *A. luchensis*, *Nigrospora* sp. and *Trichoderma* sp. (2.17%). The maximum fungal species belongs to the Ascomycotina 54 colonies, followed by Deuteromycotina 30 colonies, and Mycelia sterilia (white) 8 colonies were observed.

**Key words** – Nathula, *Aspergillus niger*, soil mycoflora.

### INTRODUCTION

Several micro fungi are present in the soil and they play significant role for the improvement of soil nutrients in neutral and alkaline soils. Hundreds of species of moulds inhabit the soil. The quality and quantity of organic materials present in the soil have a direct effect on the fungal population of the soil. The development of microfungi is especially favoured by soils having an acidic reaction and where the aerobic condition is likely to be present near the surface. Fungi play a focal role in nutrient cycling by regulating soil biological activity. However the role at which organic matter is decomposed by the microbes is interrelated

to the chemical composition of the substrate as well as environmental conditions (Arunachalam *et al.*, 1997). Fungi come in many different species, sizes, and shapes in soil. Many fungi aid plants by breaking down organic matter or by releasing nutrients from soil minerals. Fungi are generally quick to colonize larger pieces of organic matter and begin the decomposition process. Psychrophiles thrive at very low temperatures. These include organisms living in deep sea (–1 to 4°C), Arctic and Antarctic 35°C during wintertime), and glacial ice habitats (–5°C). Fungi secrete several enzymes and secondary metabolites that adapt the fungi in cold region (Feller and Gerday, 1997 and Russell 2003). The

numbers and kinds of micro-organisms present in soil depend on many environmental factors: amount and type of nutrients available, available moisture, degree of aeration, pH, temperature etc.

Lal Nehru Road at 54 kms from Gangtok lies Nathula whereby Indian troops and the Red Army stand face to face. At an altitude of 14790 ft, Nathula means the whistling pass. Nathula gives a clear picture of the Dry Alpine Forest, The Vegetation in this zone is practically of scattered shrubs, often barren and snow covered at higher elevations. The aim of the present investigation is to isolate mycoflora from Nathula soil and to observe the percentage contribution of different fungal species.

### MATERIALS AND METHODS

Soil sample were collected from the indo-china border, in a small sterilized plastic bottle. Potato Dextrose Agar (Potato 20%, Dextrose 2% and Agar 1.5%) was used to isolate fungi from soil. Isolation of fungi – The fungal species were isolated by serial dilution method, 1g of soil sample was suspended in 10ml double distilled water to make microbial suspension, this suspension was used to make microbial concentration ( $10^{-1}$  -  $10^{-5}$ ). 1ml of microbial suspension of each concentration were added to sterile Petri dishes (triplicate of each dilution) containing 15ml of sterile Potato dextrose agar media.

The Petri dishes were then incubated for 4-6 days for 26±1°C. After incubation the fungi were identified and frequency distribution of fungal species was investigated

**RESULT AND DISCUSSIONS**

During the investigation period 92 fungal colonies of 15 fungal species were observed. The maximum fungal species belongs to the Ascomycotina class - 8 fungal species and 54 colonies. 6 fungal species and 30 colonies

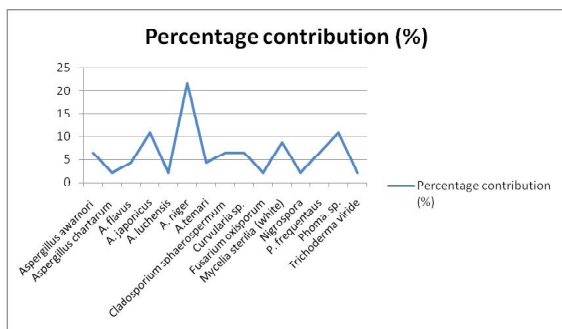


Figure 1 Percentage contribution of fungal species

found belong to the Deuteromycotina. 8 colonies of mycelia sterilia (white) was observed among total 92 colonies (Table 1, figure 1). The results of present investigation reveal with various work done by researchers. Some *Aspergillus* species such as *Aspergillus niger* and *A. temari* were isolated from soil of forest and cave ecosystems of Taiwan by Hsu and Agoramoorthy (2001). Microbial analysis of different soil samples of selected site in Obafemi Awolowo University, Nigeria was investigated by Ogunmwonyi *et al.* (2008) they found *Aspergillus niger* as a dominated fungi among all, in the present investigation *A. fumigatus* found dominated in different fungal species. Baxter and Illston (1980) found some fungal species such as *Alternaria alternate*, *Chrysosporium pannorum*, *Cladosporium cladosporioides*, *Fusarium sp.*, *Mucor hiemalis*, *M. racemosus* etc. from low temperature region of New Zealand,

**REFERENCE**

\*Arunachalam, K., Arunachalam, A., Tripathi, R. S. and Pandey H. N. 1997. Dynamics of microbial population during the aggradation phase of a selectively logged subtropical humid forest in north east India. *Trop. Ecol.* 38, 333-341.\*Baxter, M. & Illston, G. M. 1980. Temperature Relationships of Fungi Isolated at Low Temperatures from Soils and other Substrates. *Mycopathologia* 72, p. 21-25\* Feller, G. and Gerday, C. 1997. Psychrophilic enzymes: molecular basis of cold adaptation. *CMLS*, 53 p. 830-841.\* Hsu, M. J. and Agoramoorthy, G. 2001. Occurrence and diversity of thermophilous soil microfungi in forest and cave ecosystems of Taiwan. *Fungal Diversity*, 7 p.27-33.\* Ogunmwonyi I. N, Igbinsola, O. E, Aiyegoro, O. A. and Odjajare, E. E. 2008. Microbial analysis of different top soil samples of selected site in Obafemi Awolowo University, Nigeria. *Scientific Research and Essay*, 3(3), p.120-124.

in the present work we have also found similar fungal genera such as *Alternaria*, *Cladosporium*, *Mucor* etc. from the low temperature region of Dargeeling. Fungi belonging to genera *Acremonium*, *Aspergillus*, *Cladosporium*, *Fusarium* and *Trichoderma* were isolates from Antarctic soils by Singh *et al.* (2006). Species of *Penicillium* and *Trichoderma* were found from different tea growing locations in India by Pandey *et al.* (2001) The fungi were isolated from mesophilic temperature ranges of 15 °C to 35 °C. About 90 fungal stains were isolates form the soil of Kotri barrage, Pakistan by Suhail *et al.* (2007). Among the 21 *Aspergillus* species isolated, the *A. niger* was found as dominant.

**CONCLUSION**

The fungi are omnipresence in environment, they gets dominated by secreting enzymes in cold region. The fungi obtained from the site of present investigation belong to low temperature region. Now it was concluded that the isolated fungal species were get adopted at the low temperature.

**Table No. 1 Observations of different fungal species from Darjeeling soil.**

S. NO.	Fungal Species obtained	Percentage contribution
1	<i>Aspergillus awamori</i>	6.52
2	<i>Aspergillus chartarum</i>	2.17
3	<i>A. flavus</i>	4.34
4	<i>A. japonicus</i>	10.86
5	<i>A. luchensis</i>	2.17
6	<i>A. niger</i>	21.73
7	<i>A. temari</i>	4.34
8	<i>Cladosporium sphaerospermum</i>	6.52
9	<i>Curvularia sp.</i>	6.52
10	<i>Fusarium oxisporum</i>	2.17
11	<i>Mycelia sterilia (white)</i>	8.69
12	<i>Nigrospora</i>	2.17
13	<i>P. frequentaus</i>	6.52
14	<i>Phoma. sp.</i>	10.86
15	<i>Trichoderma viride</i>	2.17