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Seasonal Variations of Mycoflora Associated with Decomposing Litter and Fungal Stratification in Soil at Mala Forest, Pilibhit, U.P., India

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INTRODUCTION- Mala Forest range of tropical moist mixed deciduous type, situated in Pilibhit district, Uttar Pradesh, is enriched with luxuriant flora and fauna. The soil covered with litter-bed harbored a distinct mycoflora colonizing litter and soil. The seasonal variations, stratification, and percentage occurrence of the fungal population inhabiting the soil beneath the litter-bed at three research sites viz., Sal-Poplar stand, Mixed Trees stand, and Teak stand at Mala Forest were investigated. Qualitative dynamics as well as quantitative estimations of soil mycoflora were analyzed.

MATERIAL AND METHODS

SAMPLE COLLECTION:

Samples of soil were collected from three depths of soil pits at the forest floor of the research site. The samples were taken in each of the five seasons of the year i.e., spring, summer, rain, autumn, and winter. Three samples of 10 g soil each were taken out from three depths i.e., surface layer (SL) 1-4 cm, middle layer (ML) 4-8 cm, and inner layer (IL) 8-12 cm.

ISOLATION OF MYCOFLORA: The Serial plate dilution technique and pour plate method of the viable count were employed. Czapek's Dox culture medium was used for the isolation of soil mycoflora. Three dilutions i.e., 10^{-2},10^{-3}, and 10^{-4} were prepared for each soil sample. The seasonal fungal population was analyzed quantitatively as well as qualitatively. The % occurrence and the total number of colonies/g dry weight of soil were calculated.

RESULTS AND DISCUSSION- The total number of fungal colonies/g dry weight of soil varies from 19-80x 10^3 in different seasons. The order of relative abundance of the fungal counts in different seasons was rain> winter> spring> autumn> summer.

The surface layer (SL) of soil contributed the highest fungal counts in summer, rain, and autumn. The Middle layer (ML) of soil showed maximum counts in winter and spring.

The inner layer (IL) of soil harbored a minimum number of colonies in all seasons. A total of maximum 80x10^3 colonies/g dry weight of soil was quantified from the surface layer during rain, followed by 72x103 colonies/g dry weight of soil in the middle layer. The lowest fungal population was found in the inner layer of the soil as 19x10^3 colonies/g dry weight of soil during summer.

QUALITATIVE DYNAMICS- TOTAL NUMBER OF SPECIES:- The highest number of species was recorded in autumn and the lowest in winter. The order of relative abundance of qualitative flora during different seasons was autumn> spring> rains> summer> winter. Maximum species were isolated from the surface layer, as 20 in autumn and a minimum of 11 in the middle layer as well as in the inner layer of soil in winter. The surface layer harbored the greatest number of species in the order autumn> spring> rains>winter> summer. The middle layer and the inner layer closely paralleled each other following the order autumn> rains> spring>summer>winter. (Bahera and Mukerji, 1985).

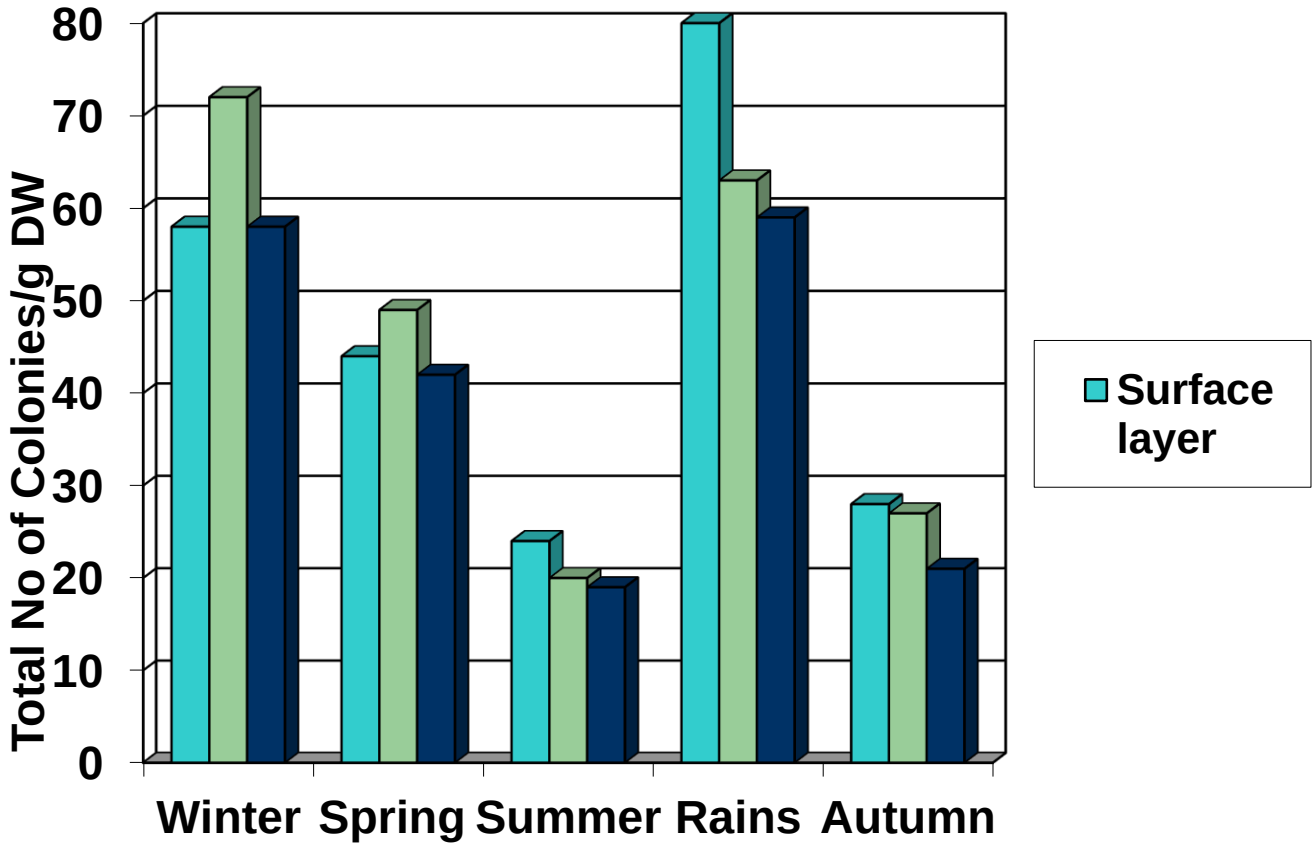


Figure 1. Seasonal variations of quantitative fungal population inhabiting the soil at the three depths

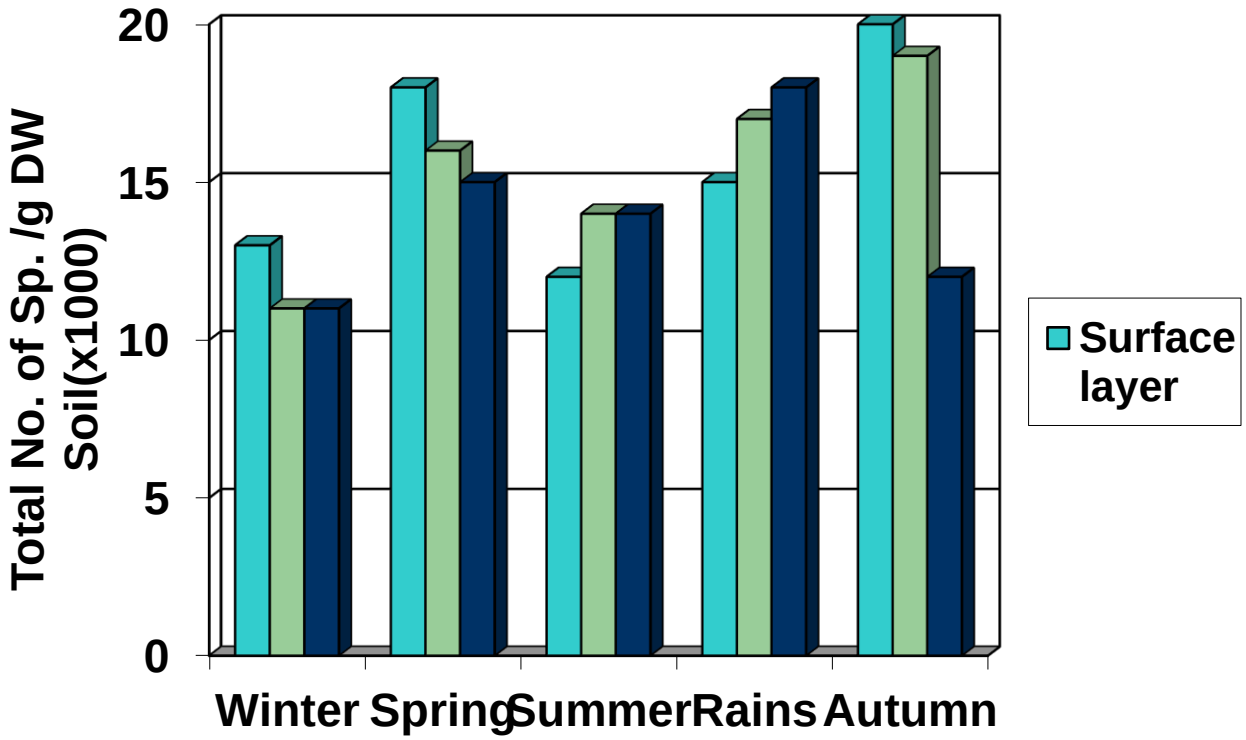


Figure 2. Seasonal variations of qualitative Mycoflora inhabiting the soil at the three depths

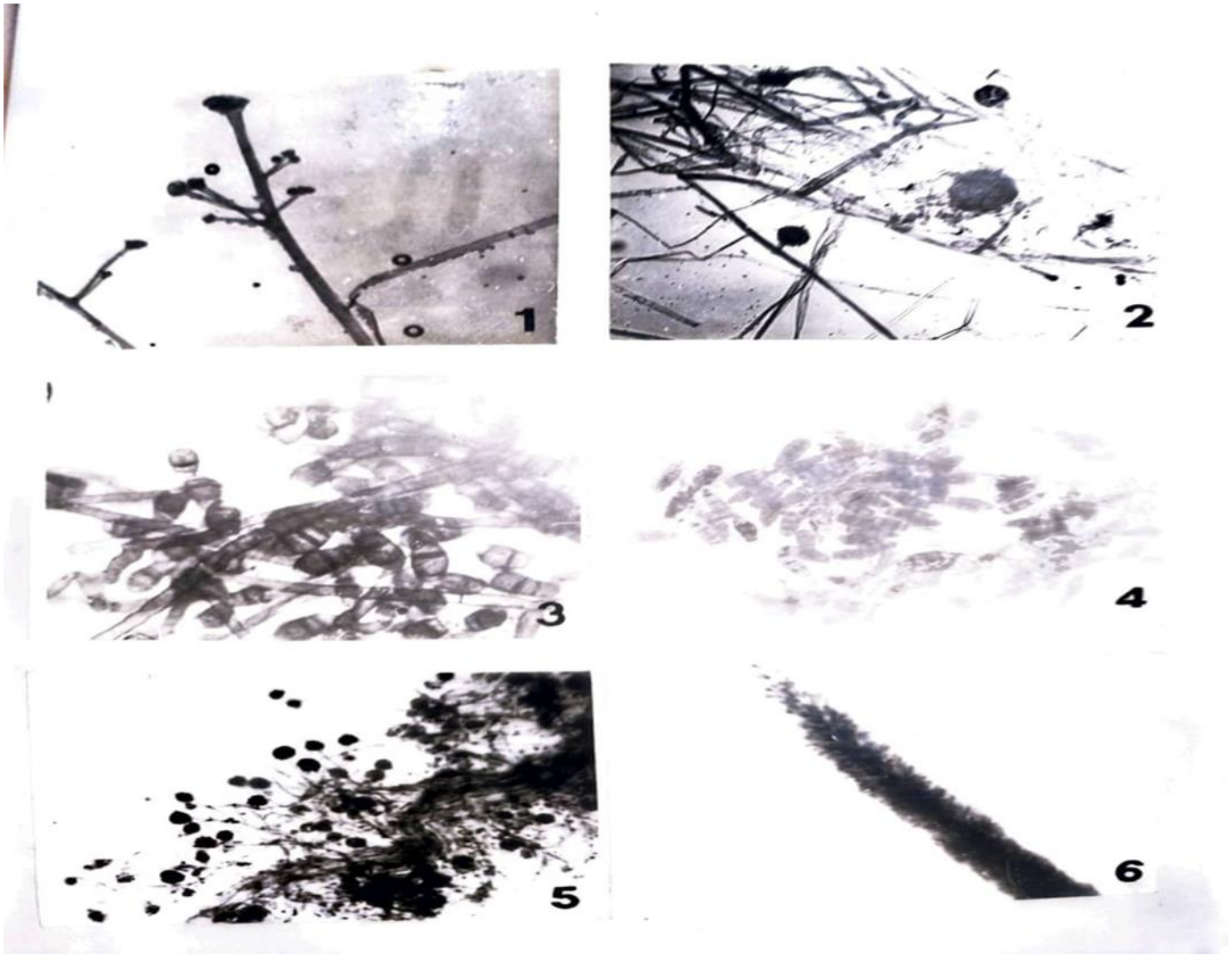
FUNGAL SPECIES: 29 Genera represented by 58 fungal species were recorded from the soil in five seasons: Phycomycetes- 2 species, Ascomycetes- 3 species, Deuteromycetes- 49, Mycelia sterilia-4 (Barnett and Hunter, 1987).

Phycomycetes:- Cunninghamella elegans, in spring; Mucor hiemalis and Actinomucor sp Syncephalustrum racemosum in rains.

Ascomycetes:- Arachiniotis terrestris in summer; Chaetomium globosum in rains; Trichophyton mentagrophytes in autumn.

Deuteromycetes: - Phoma glomerata in summer only; Aspergillus and members of Moniliaceae family were dominated by 13 species throughout the year. Other Aspergilli were A. fonsacaeous ; A. candidus; A. luchuensis; A. sydowi; A. versicolor. 11 species of Penicillium were recorded specially P. rubrum; P. sublateritium. Other occurring species was Scopulariopsis constantini and Curvullaria Pallescens in all layers of soil from winter to spring. Trichoderma glaucum was present from rains to winter. T. lignorum, and occurred rarely.

Deuteromycetes:- Cephalosporium acremonium, Acremonium vitis, Nigrospora sphaerica, Memnoniella echinata, Curvularia lunata, Helminthosporium velutinum, Drechslera papendorfii, Zygosporium oescheoides, Humicola grisea, H. brevis, Cladosporium cladosporides, C. sphaerospermum, Tilachlidium humicola, Fusarium lini, F. neoceras, and Monilia moniliformi. Monochaetium mali, Gibellula suffulta and Stysanus stenonites were of rare occurence.
Mycelia sterilia:- Rhizoctonia solani, and Sclerotium rolfsi.



1. Actinomucor repens
2. Syncephalastrum racemosum
3. Curvularia pallescens
4. Monochaetium mali
5. Gibellula suffulta
6. Stysanus stemonites

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