



DIVERSITY OF SOIL BORNE PHYTOPATHOGENIC MYCOFLORA IN AGRICULTURAL FIELDS OF GAYA DISTRICT

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Abstract:

The Present investigation was conducted to find out various types of soil borne fungal phytopathogen. Soil samples were collected from three farms of Gaya District, Bihar. About 10 species of fungi were isolated from these farms. The Present study showed that the agricultural fields have a good diversity of fungal species and some of the species are pathogenic as per the available scientific literature. The fungal types were isolated by using soil dilution method and soil plate technique of Potato Dextrose Agar Medium. In this study the common fungal species belonging to Ascomycetes, Phycomycetes and Deuteromycetes were reported.

Keyword :- Soil born fungi, Soil dilution.

Introduction:

Soils are highly complex system with many mycoflora. It has capacity of holding moisture and it maintains proper aeration. Fungi are more dominating among all microflora [1]. The organic and inorganic compounds present in the soil affect the fungal growth. The important attributes of fungi are that, they are eukaryotic, nonphotosynthetic and contains chitin or other polysaccharides in their cell wall and they breed through the spores sexually or asexually [2]. As compared to other plant parasites, fungi cause the greatest impact with regard to disease and crop production losses. Soil borne fungal plant pathogens have proven difficult to manage, in many cases pesticides have not been effective. Soil borne fungal species of the genera *Alternaria*, *Aspergillus*, *Fusarium* and other species have been considered to be major plant pathogens worldwide. The fungi persist for several years in soil by fabricating sclerotial and other forms of spores [3].

The fungal populations present in soil affect crop plants positively as well as negatively [4]. Soil born fungi cause disease to agricultural plant but on the other hand also take part in nutrient recycling and act as decomposers and assist in breakdown of dead organic matter and supply nutrients to plants [5]. The present study has been done to isolate the soil fungi from farms. It involved isolation, morphological characterization and screening of fungi from three agricultural field of Gaya District, Bihar.

Materials and Methods:

(1). **Collection of soil samples :-** soil samples were collected in the month of April-May 2022 from different sites of Gaya District, Bihar. Sample was collected at 25 cm below the soil in sterilized bags for analysis using methods adopted by Brown (1958) [6].

(2). **Isolation of fungi :-** There were two methods used for the fungi isolation. (i). Soil dilution method. (ii). Soil plate method. (i). Soil dilution method :- 1 gm of soil sample was dissolved in 10 ml of distilled water to make four fold dilution (10^{-1} , 10^{-2} , 10^{-3} and 10^{-4}). Then Potato Dextrose Agar medium was prepared and after autoclaving antibiotic solution of streptomycin was added to the medium as an antibacterial agent. 20 ml PDA and 1 ml of 10^{-3} dilution was used to isolate fungi. The petri dishes were incubated at 28-30°C for 3-5 days [7]. (ii). Soil plate method :- 0.05 mg of soil sample was spread on sterile petriplate and cooled PDA medium was poured in petriplate. Petriplate was then gently rotated and incubated at 28-30°C for 3-5 days [8].

(3). **Identification of fungi :-** First of all isolated fungal colonies were differentiated depending upon their morphological characters. Colour of colonies, texture, and shape provided clues for identification. These fungal types were also confirmed by slide preparation using the fungal stain cotton blue, lactophenol and examined visually under microscope. Literature was consulted to identify fungal colonies [9].

Result:

S.No	Sampling location (Agriculture Farm)	Isolated Fungi
1	Farm of Agriculture Department, Paraiya	<i>Aspergillus niger</i> <i>Aspergillus flavus</i> <i>Rhizopus</i> spp. <i>Mucor</i> spp. <i>Alternaria</i> spp.
2	Farm of Agriculture Department, Singhapur, Tekari	<i>Mucor</i> spp. <i>Aspergillus Fumigatus</i> <i>Alternaria</i> spp. <i>Cladosporium</i> spp. <i>Curvularia</i> spp. <i>Aspergillus</i> <i>flavus</i> .
3	Farm near S.V.M High school, Guraru	<i>Penicillium</i> spp. <i>Fusarium</i> spp. <i>Mucor</i> spp. <i>Alternaria</i> spp. <i>Curvularia</i> spp. <i>Aspergillus</i> <i>niger</i> . <i>Aspergillus</i> <i>flavus</i> .

Result :

The present investigation revealed that ten fungal species were isolated from different soil samples of Gaya District. The common fungal species belonging to Ascomycetes were found. Among these fungi, three species of *Aspergillus*, *Rhizopus*, *Mucor*, *Alternaria*, *Cladosporium*, *Fusarium* and *Curvularia* were found. The highest number of fungal species were found in soil sample collected from farm near S.V.M. Highschool Guraru followed by soil sample of farm of Agricultural Department, Singhapur, Tekari. In present investigation *Aspergillus*, *Alternaria* and *Fusarium* species were dominant. This study clearly provided information that the soil have good diversity of fungal species which may affect the crop production.

Discussion:

The fungal multiplication in soil be dependent on numerous agent like soil texture, moisture, organic material and P^H [10]. In this study the *Aspergillus* species were found to be dominant. Similar result were also documented by Jadhav et al in 2017 [11]. They isolated 18 species belongs to 4 genera from Kadegaon Tehsil, Sangli District, Maharashtra, India. Ratan Kumar et al., in 2019 isolated soil mycoflora from crop fields of Chintalapudi Mandal in West Godavari District, Andhra Pradesh, India [12]. In present study *Aspergillus* and *Fusarium* species were frequently isolated: Comparable work was done by Gnanasekaran et al., in 2015. They isolated soil mycoflora from Banana field at Manachanallur, Tiruchirappalli District., TamilNadu. The dominant fungal species isolated by them has been *Aspergillus*, *Penicillium* and *Trichoderma* [13]. From Nanjangud taluka of Mysore District, Karnatka, Chandrashekar et al, in 2014 identified different fungal types in rhizosheric soils from paddy, pulses, ragi, sugarcane, vegetable and banana fields. They isolated *Mucor*, *Aspergillus*, *Alternaria*, *Curvularia*, *Fusarium* and *Rhizopus* as major fungal Types. In current study *Aspergillus*, *Fusarium* and *Alternaria* were more Frequent [14]. In the present investigation Potato Dextrose Agar Medium was used for the isolation of fungi. PDA is most widely used media because of its simple formulation and its ability to support mycelial growth of wide range of fungi. Several workers demonstrated that PDA as the best medium for fungal isolation and growth, having a complete nutritional basis. On PDA colony development was faster with respect to other fungal culture media [15,16].

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