



Biodiversity Of Pathogenic Fungi From North Tarai Region Of Uttar Pradesh India

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ABSTRACT

The pathogenic fungi were collected from Kuwana Forest which is a part of North Tarai Region of Uttar Pradesh during January to February, 2024. The authors collected two fungal genera with eight fungal species has been found on nine different angiospermic plant species which belong to nine genera of nine families.

Keywords: - Pathogenic fungi, Kuwana Forest, North Tarai Forest, Uttar Pradesh.

INTRODUCTION

The plant and its part provide a very suitable habitat for the growth & development of fungal pathogen by providing ample surface area and nutrient supply. Such plant inhabiting fungi are known as pathogenic or disease fungi and the invaded area of the plant appear as spot or lesion. The weed and forest plants serve as reservoir of leaf spot pathogen which on getting opportunity may spread to agriculture & horticulture plants. India is one of the twelve mega diversity countries of the world has two of the worlds eighteen biodiversity hot spots located in the Western Ghat and in the Eastern Himalayas. In north of North Tarai region, the Himalayas rise as a virtual wall beyond the snow line. Above the alluvial plain lie the Tarai strips, a seasonally marshy zone of sand & clay soils. The Tarai has higher rainfall than the plains and the downward-rushing rivers of the Himalayas show down and spread out in the flatter tarai zone depositing fertile silt and reproductive means during the monsoon season and receding in the dry season. The Tarai, as a result has high water level and is characterized by moist sub tropical conditions and a luxuriant turn-over of green vegetation all the year around. The climatological and topographical conditions favour the luxuriant growth & development of pathogenic fungi. This North-Tarai region of U.P. is next only to Eastern and Western Ghat as one of the hottest spots for biodiversity in general and the diversity of fungal organism inhabiting plant leaves in particular offers an ideal opportunity for the morphotaxonomic exploration of fungal organism in general and foliar fungi in particular (T.P. Mall,

2012). The pathogenic fungi cause huge losses every year in different parts of world. The fungal pathogens producing leaf spots infect a large variety of hosts including most of the crops, forests and other plants. The destruction caused by these enemies of plant is a serious problem before us. The focus of this research is identification & documentation of disease causing fungi which will assist in the discovery of new fungicides and ideas to overcome from the severity of these enemies of nature as well as in the protection of floral diversity from the infection of these pathogens and also in the conservation of valuable flora of the area. Keeping this in view the authors surveyed the Kuwana Forest which is a part of North Tarai region of U.P during January- February 2024.

MATERIALS AND METHODS

The climatic condition favors the growth of various types of phanerogamic vegetation along with seasonal and annual crops and other plants. With a view to study the pathogenic fungi in their natural habitat, frequent collection trips will be arranged. The following articles would be required for collecting pathogenic fungi-collection containers, hand lens, pruning scissor or secateurs, light plant pressures, blotting paper, paper envelope, field note book etc.

Laboratory processing and preliminary examination:

Preparations:

- (a) Photograph of both host and pathogen will be taken.
- (b) Scrap mount: - If the organisms are superficially attached with the host tissue scrap mounts are made by a sharp razor or scalpel.
- (c) Collodion Preparation :- A drop of collodion solution is applied to a colony on the leaf. The fungus gets embedded entirely and the dried film is peeled off readily from the host surface. Removal of collodion by acetone on a glass slide gives undisturbed preparation.
- (d) Squash preparation: - The fruiting body is mounted, cleared and examined. Then the preparation is tapped vigorously and reheated. In this way the fruiting body is broken and content is released.
- (e) Hand cut Section preparation: A hand cut section of infected tissue is made with sharp razor to study immersed or semi-immersed fungi. Section cutting for host parasite interaction / relation.

Staining and Mounting:

For routine microscopic study in the lab temporary slides are made in different type of stains and mountants according to nature of fungal forms involved.

- (a) **Lacto- phenol cotton blue:** - The lacto-phenol mounting fluid is used for mounting-colored fungi. For locating cytoplasm, septa, guttules other structures and hyaline forms 0.05-0.01% cotton blue is added.
- (b) **Poly- vinyl Alcohol:** - Benson, 1969 is used in routine staining and mounting.
- (c) **Lacto-fuchsin:** - By this cell walls are stained more clearly, rapidly and with more suitable color specially for photography [Carmichael., 1955]. Slides prepared in mountants are sealed with wax or commercial good quality nail polish and are stored for further study.

Camera Lucida: - Drawings will be made of the distinctly different taxa of generic or species rank so as to show the morpho taxonomic features of vital importance.

Morpho taxonomic treatment. - Hitherto undescribed forms of foliar fungi will be executed with the help of present literature and expertise available at hand.

- New taxon will be described in English or Latin or both as and when required.
- Material (holotypes) will be deposited in recognized Herbaria for accession no.
- The Mycobank number of each new Taxa will be procured.

RESULTS AND DISCUSSION

The authors surveyed during January- February 2024 in diversified habitats of North Tarai Forest for the collection, study and documentation of the leaf spot microfungi infecting variety of the angiosperms has resulted in abundant gathering of the fungal specimens. The holotype of collections for allotment of accession number from HCIO is in process. Two fungal genera with eight fungal species have been found on nine different angiospermic plant species which belong to nine genera of nine families. The fungal species and their respective hosts are given below:-

The list of hosts infected with pathogenic fungi are given below-

S.N.	Name of the fungus	Name of the Host and family
1.	<i>Alternaria alternata</i>	<i>Shorea robusta</i> Roth. (Dipterocarpaceae)
2.	<i>Alternaria sp.</i>	<i>Glycosmis pentaphylla</i> (Retz.) DC (Rutaceae)
3.	<i>Alternaria sp.</i>	<i>Merremia umbellata</i> (L.)Hallier f. (Convolvulaceae)
4.	<i>Alternaria sp.</i>	<i>Bauhinia vahlii</i> Wight & Arn (Fabaceae)
5.	<i>Drechslera sp.</i>	<i>Fagus sylvatica</i> Carl Linn. (Fagaceae)
6.	<i>Drechslera sp.</i>	<i>Euginea jambolana</i> Haeckel (Myrtaceae)
7.	<i>Alternaria alternata</i>	<i>Capparis zeal</i> (Capparaceae)
8.	<i>Alternaria sp.</i>	<i>Calamus tenuis</i> Roxb. (Arecaceae)
9.	<i>Alternaria sp.</i>	<i>Euginea jambolana</i> Haeckel (Myrtaceae)
10.	<i>Alternaria alternata</i>	<i>Mangifera indica</i> Linn. (Anacardiaceae)

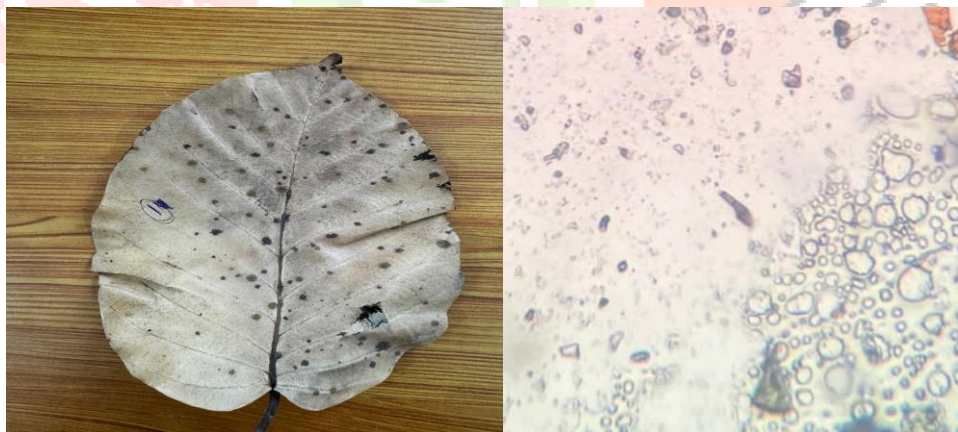


Figure 1:- Leaf of *Shorea robusta* infected with *Alternaria alternata*

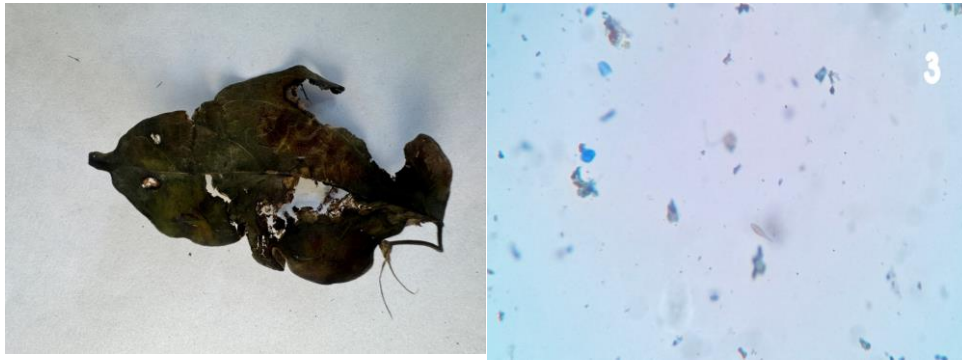


Figure 3:- Leaf of *Merremia umbellata* infected with *Alternaria sp.*



Figure 2:- Leaf of *Glycosmis pentaphylla* infected with *Alternaria sp.*



Figure 4:- Leaf of *Bauhinia vahlii* infected with *Alternaria sp.*

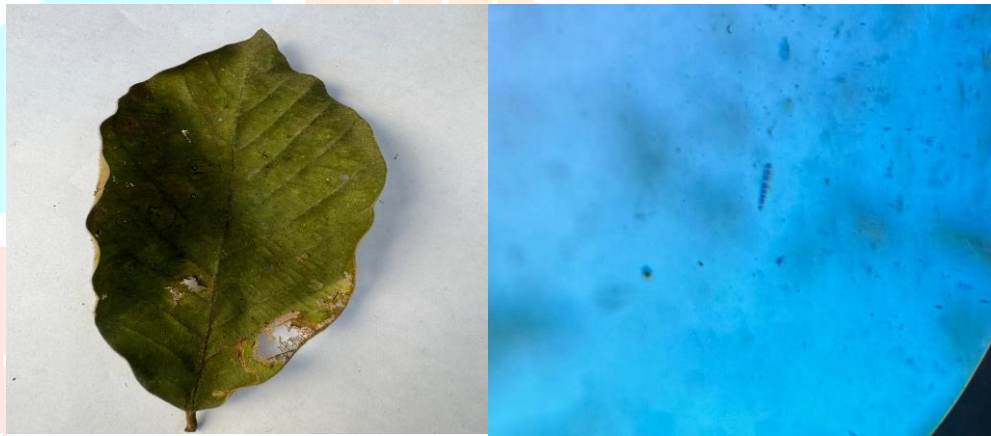


Figure 5:- Leaf of infected *Fagus sylvatica* with *Drechlera sp.*

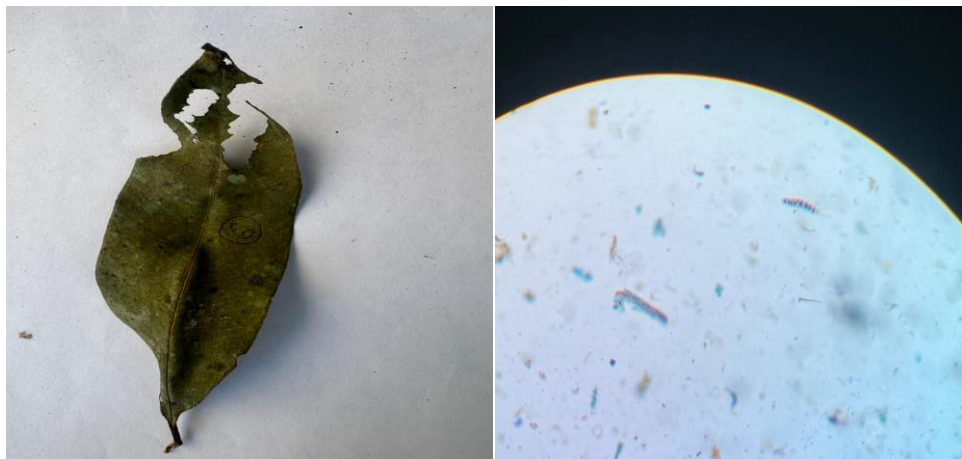


Figure 6:- Leaf of *Eugenia jambolana* infected with *Drechslera sp.*



Figure 7:- Leaf of *Capparis zeylnica* infected with *Alternaria sp.*

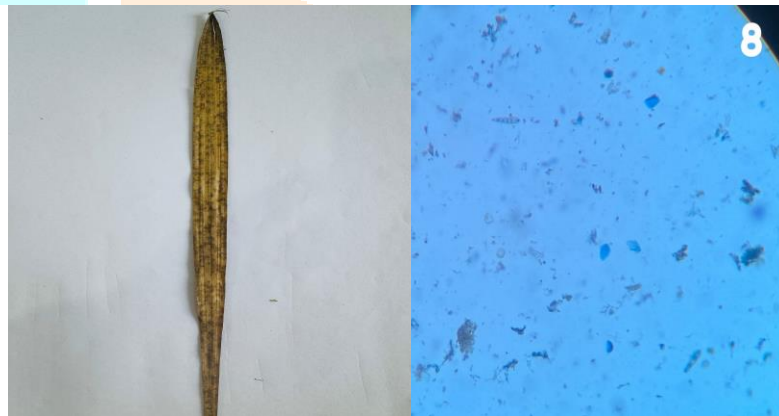


Figure 8:- Leaf of *Calamus tenuis* infected with *Alternaria Sp.*

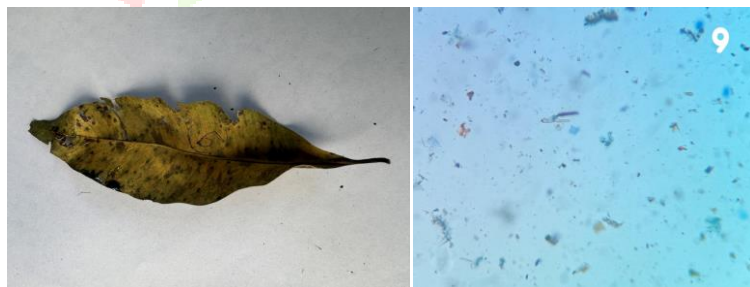


Figure 9:- Leaf of *Eugenia jambolana* infected with *Alternaria sp.*



Figure 10:- Leaf of *Mangifera indica* infected with *Alternaria alternata*

The literature Bilgrami *et al.*, 1979, 1981, 1991; Carmichael *et al.*, 1980; Ellis 1971, 1976; Ellis and Ellis, 1997; Hosagaudar *et al.*, 1996, 2006; Jamaluddin *et al.*, 2004; Mukerji *et al.*, 1974; Sarbhoyet *et al.*, 1986, 1996; Singh and Mall, 2007; Verma *et al.*, 2008; Singh *et al.*, 2009; Mall, 2011a,b, Parmar *et al.*, 2012; Kumar and Mall, 2012, 2013, 2015; Mall, 2015 a, b, Rani *et al.*, 2015; Singh and Mall, 2015; Tripathi *et al.*, 2016; Singh *et al.*, 2020 reveals that the fungal taxa mentioned above are hitherto unexplored from Kuwana Forest, Gonda. Hence are the new records for Indian mycoflora from Kuwana Forest which is a part of North Tarai Region of U.P.

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