



Original Research Article

Status of Susceptible Hosts for Foliicolous Fungi in North Central Tarai Forests of (U.P.) India

Ajay Kumar and T.P. Mall*

Postgraduate Department of Botany, Kisan P.G. College, Bahraich- 271 801, Uttar Pradesh, India

**Corresponding author.*

Abstract	Keywords
During the survey in the North Central Tarai forests of Uttar Pradesh for Foliicolous fungi during April 2013 in locality of Gulra Rest House, Bhinga Forest Range, Shrawasti Forest Division, Shrawasti, twenty eight angiospermic plant species belonging to twenty eight genera of eighteen families being infected with thirty nine fungal species representing fifteen fungal genera were enumerated. It is surprising to note and record that out of thirty nine fungal species thirty one species belonging to thirteen genera are sp. nov. and five fungal species are found on new hosts.	Foliicolous fungi Shrawasti Susceptible hosts

Introduction

The leaves provide a very suitable habitat for the growth & development of fungal pathogen by providing ample surface area and nutrient supply. Such leaf inhabiting fungi are known as Foliicolous Fungi and the invaded area of the leaf appears as leaf spot or leaf lesion. Taxonomic studies of such fungal forms have been generally considered as only of academic interest but the taxonomic treatment of a fungal organism in the first requirement for any studies concerning its biology. Correct identification of a fungus absolutely free from ambiguities is vital for its employment in applied disciplines. In fact without being equipped for ascertaining the correct identity of a fungal pathogen all studies concerning its phyto pathological aspects would be misleading. The weed and forest plants serve as reservoirs of leaf spot pathogens which on getting opportunity may spread to agriculture and horticulture plants.

India is located to the north of an equator, lies between 8° 4' and 37° 6' north latitude and 68° 7' and 97° 25' east latitude, measures 3214 kilometers from south to north and 2933 km from east to west, the total land area being 32,87,263 square kilometers. India is the one of the twelve mega biodiversity countries of the world lying between tropic of Capricorn and tropic of Cancer, has two of the worlds eighteen biodiversity hot spots located in the Western Ghats and in the Eastern Himalayas. The Himalayas rise as a virtual wall beyond the snow line, above the alluvial plain lies the Tarai strip, a seasonally marshy zone of sand and clay soil. The Tarai region has higher rain fall than the plains, and downward rushing rivers originating from the Himalayas slow 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 subtropical conditions and a luxuriant turnover of green vegetation all the year around. The climatological and

topographical conditions favor the luxuriant growth and development of foliicolous fungi. This North Tarai Region of U. P. is next only to Eastern and Western Ghats, as one of the hottest spots for biodiversity in general and the diversity of fungal organism inhabiting plant in particular offers an ideal opportunity for the morphotaxonomic exploration of the fungal organism in general and foliicolous fungi in particular. Keeping in view the authors surveyed the North Tarai forests of Uttar Pradesh for Follicolous Fungi on April 01, 2013 in locality of Gulra Rest House, Bhinga Forest Range representing Shrawasti Forest Division, Shrawasti.

Materials and methods

During survey and collection, infected plant parts where noticed were collected carefully in the field and notes were made regarding their pathogenicity, nature of colonies, nature of infection, locality, attitude. For each collection a separate field number was given. Each infected plant parts was collected separately in polythene bags along with host twig (preferably with the reproductive parts) to facilitate the identity of corresponding hosts. These collections were pressed neatly and dried in between blotting papers. The host plants were identified by matching them with authentic herbarium material and also consulting the experts.

In the laboratory, Hosagouder and Kapoor, 1984 nail polish technique was used to study the structural and morphological characters of fungi. Since the desired quality and quantity of nail polish is difficult to procure from the market, this problem is eased by preparing a xylene thermocol solution. 5 ml or desired quantity of xylene poured in a container, very bright and clean thermocol cut into minute pieces, added to xylene, mixed thoroughly till getting it to a particular consistency and poured it into air tight bottle for the use. A drop of xylene – thermocol solution applied on the selected colonies, carefully thinned with the help of a fine brush without disrupting the colonies.

The treated colonies along with their host plants kept in dust free chamber for half an hour. When the applied solution dried, a thin colorless “film” or flip was formed with the colonies firmly embedded in it. The flip was lifted up with a slight pressure on the upper side of the leaves and just below the colonies on an edge of the flip eased and subsequently the entire flip peeled-off by using the thumb nail finger of the left hand. In case of hard host plants, the flip was eased off with the help of a razor or scalpel. A drop of DPX was added on a clean

slide and flip was spread properly on it. Care was taken to avoid air bubbles while mounting. One or two more drops of DPX were again added on the flip and clean cover glass brings out the excess DPX and it was removed after drying. These slides were labeled and placed in dust free chamber for one or two days for drying. Slides were prepared in cotton-blue lacto phenol mixture and were examined. Camera Lucida drawings were made and the morphotaxonomic determination of the taxa was done using available literature. The fungal taxa were identified using microscopic preparation. The fungal holotype specimen had been either deposited for allotment of accession number from HCIO or in process. The Mycobank No. from the Fungal Database Nomenclature and Species Banks has also been procured for certain species and rest are under preparatory stage for the same.

Results and discussion

The authors surveyed the diversified habitats of the North Central Tarai Forest of Uttar Pradesh for Follicolous Fungi on April 01, 2013 in locality of Gulra Rest House, Bhinga Forest Range representing Shrawasti Forest Division, Shrawasti. The authors collected twenty eight Angiospermic plant species belonging to twenty eight genera of eighteen families being parasitized by thirty nine fungal species representing fifteen genera. The host plants and their parasites enumerated are given in Table 1.

The perusal of list reveals that eighteen families can be divided in four categories depending upon the number of host infected. The most susceptible family was found to be Rutaceae which is represented by four infected plant species followed by Moraceae with three plants where as Fabaceae, Apocynaceae, Mimosaceae, Bignoniaceae, Poaceae, Verbenaceae with two plants each and Cucurbitaceae, Myrtaceae, Berberidaceae, Liliaceae, Asclepiadaceae, Ebenaceae, Anacardiaceae, Euphorbiaceae, Boraginaceae and Malvaceae is represented by single host each. Among the entire susceptible hosts *Ficus benghalensis* was found to be most susceptible being infected by four sp. nov. fungus whereas *Carissa carandas* and *Indopiptadenia oudhensis* was found to be infected with three fungus, *Artocarpus heterophyllus*, *Glycosmis pentaphylla*, *Bauhinia variegata*, *Thevetia neriifolia*, *Gossypium herbaceum*, *Prosopis juliflora*, *Kigelia africana* and *Clerodendrum viscosum* with two fungus where as the rest seventeen hosts were found to be infected by single host only.

Table 1. Hosts plants for foliicolous fungi enumerated in North Central Tarai Forests of Uttar Pradesh, India

Sl. No.	Name of the Host with Family	Name of the Fungus with Author name
1.	Rutaceae: <i>Agel marmelos</i> Linn. Correa. <i>Citrus lemon</i> linn. <i>Glycosmis pentaphylla</i> (Retz.) Correa. <i>Murraya exotica</i> Linn.	<i>Meliola marmelosis</i> sp. nov. <i>Drechslera citricola</i> sp. nov. <i>Alternaria glycosmidis</i> sp. nov. <i>Sarcinella glycosmidis</i> sp. nov. <i>Alternaria exotica</i> sp. nov.
2.	Moraceae: <i>Artocarpus heterophyllus</i> Lamk. <i>Ficus benghalensis</i> Linn.	<i>Alternaria tenuissima</i> (Kunze. ex. Pers.) Wilt. <i>Stegnosporium artocarpii</i> sp. nov. <i>Alternaria banyan</i> Mall and Kumar MB-805889 <i>Asterina benghalensis</i> Mall and Kumar MB-805890 <i>Drechslera fici</i> Mall and Kumar MB-805891 <i>Tripospermum benghalensis</i> sp. nov.
3.	Fabaceae: <i>Bauhinia variegata</i> Linn. ** <i>Cassia fistulosa</i> Linn.	<i>Pleospora bauhiniae</i> sp. nov. <i>Alternaria tenuis</i> Nees. <i>Petalotiopsis adussta</i> (Ell. & Ev.) Stey.
4.	Apocynaceae: <i>Carissa carandas</i> Linn. ** <i>Thevetia nerifolia</i> Linn.	<i>Pestalotiopsis versicolor</i> (Speg.) Stey. <i>Curvularia carandus</i> sp. nov. <i>Tripospermum carissae</i> sp. nov. <i>Alternaria thevetiae</i> sp. nov. <i>Meliola nerifolae</i> sp. nov.
5.	Mimosaceae: <i>Indopiptadenia oudhensis</i> (Brandis) Brenan. ** <i>Prosopis juliflora</i> (Sw.) Dc.	<i>Pestalotiopsis oudhensis</i> Mall and Kumar MB- 805213 <i>Domingoella indopiptadiana</i> Mall and Kumar MB- 805214 <i>Alternaria tenuis</i> Nees. <i>Alternaria prosopidis</i> sp. nov. <i>Meliola prosopidis</i> sp. nov. <i>Drechslera juliflorae</i> sp. nov.
6.	Bignoniaceae: <i>Kigelia africana</i> (Lam.) Benth.	<i>Ascochyta petrakii</i> Sharma. <i>Drechslera kigela</i> sp. nov.
7.	Poaceae: <i>Saccharum spontaneum</i> Linn. ** <i>Bambusa arundinacea</i> Retz.	<i>Periconia byssoides</i> Pers. Ex. Metat. <i>Taxosporium bambusicola</i> sp. nov.
8.	Verbenaceae: <i>Lantan indica</i> Linn. <i>Clerodendrum viscosum</i> Linn.	<i>Alternaria lantanae</i> sp. nov. <i>Alternaria clerodendii</i> sp. nov.
9.	Cucurbitaceae: <i>Coccinia cordifolia</i> Linn.	<i>Curvularia coccinae</i> sp. nov.
10.	Myrtaceae: <i>Eugenia jambolana</i> Linn.	<i>Alternaria euginiae</i> sp. nov.
11.	Berberidaceae: <i>Berberis vulgaris</i> Linn.	<i>Alternaria vulgaris</i> sp. nov.
12.	Liliaceae: <i>Lilium candidum</i> Linn.	<i>Alternaria tenuissima</i> (Kunze. ex. Pers.) Wilt.
13.	Asclepiadaceae: <i>Calotropis procera</i> R. Br.	<i>Alternaria calotropidis</i> sp. nov.
14.	Ebenaceae: <i>Diospyros montana</i> Roxb.	<i>Dactylosporium diospyricola</i> sp. nov.
15.	Anacardiaceae: <i>Mangifera indica</i> Linn.	<i>Meliola mangiferae</i> Earle.
16.	Euphobiaceae: <i>Mallotus philippensis</i> Muell. Arg.	<i>Alternaria mallotica</i> sp. nov.
17.	Boraginaceae: <i>Heleotropium indicum</i> Linn.	<i>Drechslera heleotropiumae</i> sp. nov.
18.	Malvaceae: <i>Gossypium herbaceum</i> Linn. **	<i>Alternaria gossypae</i> sp. nov. <i>Meliola kamettiae</i> Hosag. & Riju.

The review of literature (Bilgrami et al., 1979, 1981, 1991; Ellis, 1971, 1976; Ellis and Ellis, 1997; Hansford and Thirumalachar, 1948; Hosagaudar et al., 1996, 2006, 2012; Jamaluddin et al., 2004; Kamal et al., 1981; Mukerji et al., 1974; Sarbhoy et al., 1986, 1996; Subramanium and Jain, 1966; Uppal et al., 1935; Verma et al., 2008) reveals that *Alternaria* is most common plurivorous hyphomycetous fungi found on sixteen hosts where twelve are new species record and *Alternaria tenuis* has two new host record where as *Drechslera* and *Meliola* are reported on five plants each where almost are sp. nov. *Pestalotiopsis* is found on three hosts, two hosts are new whereas one species is sp. nov. *Curvularia* has been found on two hosts both sp. nov. whereas ten species are found on single host each. It is very much interesting to note that most of the species are sp. nov. showing an alarming situation of the fungus on new hosts which is a challenging situation so far as the health of the plant and quality of their products is concerned being used by the human being in their various ethnobotanical uses. The detailed study along with their English and Latin diagnosis and receiving the Mycobank number is in process.

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