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A quantitative analysis of biodiversity of foliar fungi from mall road area of Kanpur district U.P. India

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Abstract
The foliar fungi were collected from Kanpur during January 2018- January 2019. The authors collected eleven fungal genera with twenty one species has been found on twenty three different flowering plant species which belong to twenty two genera of seventeen families.

Keywords: Foliar fungi, Kanpur, U.P.

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 foliar fungi and the invaded area of the leaf appears as leaf spot or leaf lesion. The weed and forest plants serve as reservoir of leaf spot pathogen which on getting opportunity may spread to agriculture & horticulture plants. Keeping this in view, the authors surveyed the locality of Kanpur which is a part of north tarai region during January 2021- January 2022. 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 foliar 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 foliicolous fungi in particular. The Foliicolous Fungi causes 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 leaves is a serious problem before us. The focus of this research is identification & documentation of foliicolus 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.

Materials and Methods

During collection, infected leaf samples were taken in separate polythene bags. Suitable mounts of surface scrapping and hand cut sections were prepared from infected portions of the leaf samples. Slides were prepared in cotton-blue lactophenol mixture & were examined. Camera lucida drawing were made and the morpho-taxonomic determination of taxa was done using available literature and with the help of resident's expertise available. All the fungal taxa were identified using microscopic preparation.

Results and Discussion

The authors surveyed during January 2021- January 2022 in very diversified habitats of Kanpur for the collection, study and documentation of the leaf spot microfungi infecting variety of the angiosperems has resulted in abundant gathering of the fungal specimens. The holotype of collections for allotment of accession number from HCIO is in process. Eleven fungal genera with twenty-one species has been found on twenty three different angiospermic plant species which belong to twenty two genera of seventeen families. The fungal species and their respective hosts are given below-

S. N.	Name of the fungus	Name of the Host & family
1.	*Acroconidiellina chlorodis* Ellis	*Lagerstroemia indica* Linn. Sawni (Lythraceae)
2.	*Alternaria alternata* (Fr) Keissler	*Calotropis procera* R.Br. Madar, Aak (Asclepiadaceae) *Codiaeium variegatum* (L) A Juss. Croton (Euphorbiceae) *Litchi chinensis* Sonn. Litchi (Sapindaceae)
3.	*Alternaria dianthi* Stev & Hall	*Hibiscus mutabilis* Linn. Gurhal (Malvaceae)
4.	*Alternaria dianthicola* Neergaard	*Caladium bicolor* (Aiton)Vent. (Araceae) *Calotropis procera* R.Br. Madar, Aak (Asclepiadaceae)
5.	*Alterenaria sp*. Nees.	*Dracaena draco* (L.)L. (Asparagaceae)
6.	*Aspergillus sp*. Mich.ex Fr.	*Crinum latifolium* Linn. Sudarshan (Amaryllidaceae)
7.	*Cercospora abelmoschi* Ell. & Ev.	*Abelmoschus esculentus* (L.) Moench Ladyfinger, Bhindi (Malvaceae)
8.	*Cercospora alstoniae* Mall and Kumar.	*Alstonia scholaris* R.Br. Black board tree, Saptaparni, Milk Wood Pine (Apocynaceae)
9.	*Cercospora cirtullina* (Cooke)	*Cucurbita maxima* Duchesne Kaddu, Pumpkin (Cucurbitaceae)
10.	*Cercospora chevalleri* Sacc.	*Amorphophallus companulatus* Decne Sooran, Jimikand (Araceae)
11.	*Cercospora fici-religiosae* Chiddarwar	*Ficus religiosa* L. Peepal (Moraceae)
12.	*Cercospora scipicola* (Fuckel) Van Zinderen Bakker.	*Cymbopogon jwarancusa* (Jones Schutt) Jwarancus (Poaceae)
13.	*Cercospora sp*. Fres.	*Sida acuta* Burm. F. (Malvaceae)
14.	*Cladosporium colocasiae* Sawada	*Colocasia esculenta* L.(Schott) Arvi (Araceae)
15.	*Curvularia fallax* B. Oedijn	*Livistona chinensis* R.Br. (Arecaceae)
16.	*Meliola mangiferae* Earle	*Mangifera indica* L. Aam (Anacardiaceae)
17.	*Meliola sp*. Fr.	*Jasminum sambac* (L) Aition. Bella (Oleaceae)
18.	*Periconia venezuelang* Ellis	*Dracaena reflexa* Lam. (Asparagaceae)
19.	*Pseudocercospara carissae* Singh & Mall.	*Carissa carandas* L. Karonda (Apocyanaceae)
20.	*Stigmina caffra* (Wakefield) Ellis	*Aloe vera* (L.) Burn.f. Ghritkumari (Xanthorrhoeaceae)
21.	*Synchytrium lepidagathis* Mundkar& Mhatre	*Andrographis peniculata* (Burm.f.) Wall ex Nees. Kalpnath. (Acanthaceae)

Majority of the fungus has parasitized on one or two host species. Foliar diseases may influence the dynamics of carbohydrates and N, which determine grain yield and quality [1, 2]. In addition, management practices such as N fertilization, genotypes, and fungicides may impact these effects in a differential way. Nitrogen fertilization may influence the severity caused by fungal diseases, generally increasing grain yield and modifying N dynamics and end-use quality [3-8]. Furthermore, fungicide applications can increase yield and cause a differential effect on the N remobilization, processing, and end-use quality parameters, depending on the nutritional habit of the pathogen (9-11). Moreover, the effects of fungicides on NREM and end-use quality can be different according to the type of fungicides used, due to their variable effects on leaf senescence and grain yield. Triazoles, which are characterized by a lively inhibitor of ergosterol, are one of the foremost groups of fungicides available to control foliar diseases in wheat. They are usually utilized in combination with *strobilurins*, which are synthetic derivatives produced by the Basidiomycete fungus *Strobilurus tenacellus* (Pers.), with a wide antifungal spectrum. *Strobilurins* could cause substantial yield increases, higher than those produced by conventional fungicides, because they have an ethylene-synthesis-inhibition property, which can cause a delay in leaf senescence. Furthermore, the incorporation of carboxamides (succinate dehydrogenase inhibitors) in *triazole-strobilurin* mixtures has resulted in better control of some foliar wheat diseases, such as tan spot and leaf rust [12-15]. On the other hand, the effects of fungal diseases and consequently of fungicides used to control them on GPC may vary according to the end-use quality of genotypes used.

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