13. Investigation of Phylloplane Mycoflora of Medicinal Plant - *Catharanthus Roseus*

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Abstract

The phylloplane is the surface of plant leaves which present a complex terrestrial habitat which includes various microorganisms including bacteria and Fungi Phylloplane. Fungi are the mycota growing on leaves surface. This study investigates the phylloplane mycoflora of *Catharanthus roseus*, a medicinal plant known for its pharmacological properties. Over the course of a year, leaf samples were collected and subjected to mycological analysis to identify the fungal species present on the leaf surface. A vast diversity of fungal species was found throughout the examination, with *Aspergillus, Alternaria,* and *Fusarium* being the most common species. The phylloplane of *Catharanthus roseus* may have an impact on the health and therapeutic properties of the plant in addition to serving as a repository for fungal variety, according to these studies. The work highlights the significance of mycoflora in the context of medicinal plant research and advances our knowledge of plant-microbe interactions on the phylloplane.

Keywords- Phyloplane, mycoflora, fungi, *Catharanthus roseus, Aspergillus*

Introduction

The phylloplane refers to the surface of plant leaves, which is colonized by a diverse community of microorganisms, including fungi (Comandini et al., 2006). These phylloplane microorganisms play essential roles in plant health, nutrient cycling, and defence against pathogens. They are known to interact with the plant host through various mechanisms, such as biofilm formation, production of antimicrobial compounds, and modulation of plant immune responses. Understanding the composition and function of the phylloplane mycoflora is crucial for exploring the potential benefits they offer to medicinal plants (Hastuti et al., 2018).

Catharanthus Roseus (L) G. Don is a well know important medicinal as well as ornamental plant synonyms include *Vinca rosea* (the basonym) in the Louisiana State Act 159.

This plant belongs to family Apocynaceae. It is perennial plant commonly found in tropical countries and are native to Madagascar and Southern Asia. (Shamsi and Sultana, 2014)

Phylloplane mycoflora of medicinal plants, such as *Catharanthus roseus*, has been the subject of investigation to uncover the diversity and dynamics of fungal communities inhabiting the leaf surfaces. By studying the phylloplane mycoflora of *Catharanthus roseus*, researchers aim to identify specific fungal species that contribute to the plant's overall health and ecological interactions. Furthermore, understanding the interactions between these fungi and the medicinal plant could potentially lead to the discovery of novel bioactive compounds with pharmaceutical applications.

Material and Methods

1. Selection of site

For the present investigation two different location was selected. First is Patur taluka which comes under Akola district. Patur is located at 20.45 N 76.94E. Second is Akola city. Akola is a major city in Vidarabha region. Located at 20.7 N 77.00E on the banks of Morna River.

2. Collection of Sample

For sample collection polythene zip-lock bags were used. The leaves of *Catharanthus roseus* were collected in those polythene bags and brought to the laboratory from the two different location one from Patur –residential area of Patur region and another from Akola –old bus stand region.

3. Media Preparation

From commercial ready-mix Potato-Dextrose Agar powder. 39 gm Potato- dextrose agar powder was weight and 1000 ml distilled water. This mixture was boiled for 20-25 min. Cotton plug where prepared. Finally, the medium was cotton plugged and autoclaved at 121^0C for 15 minutes. Pinch of streptomycin were added.

4. Isolation of fungus

Serial dilution method was used for isolation of fungi. For this fresh leaves of *Catharanthus roseous* were collected and washed with sterilized distilled water in conical flask. The flask containing leaves were thoroughly shaken for 15 minutes to get homogeneous suspension. Ten test-tube where filled with 10 ml distilled water. Number given to test- tube from 1-10. For transformation of the suspension micro-pipette where use. 1 ml suspension where

transferred to the test-tube no. one and mix thoroughly. From the test-tube no. one 1 ml solution was transferred to the test-tube no. two and mix it. This procedure was repeated up to test-tube number ten i.e. serially diluted.

Then 1 ml solution from each test-tube was poured aseptically into sterilized petri-plates containing medium. The inoculums was spread uniformly through gentle rotation. These petri-plates kept undisturbed in dust free chamber at room temperature for 6-7 days. Fungal colonies where developed on agar plates.

5. Identification of Fungi

After incubation period the phylloplane fungal colonies were identified. The fungal colonies were observed and slides were prepared from the colonies. The fungal colonies were identified on the basis of colon characteristics such as colony colour, shape and other morphological features of the mycelia and spores. The mycelia were picked from the culture, a drop of lactophenol cotton blue is placed on it. The hyphae were separated using sterile needles and a cover glass is placed on it. The slides were observed under the binocular microscope and trinocular microscope. In addition, identifications were confirmed by referring to the standard manuals “Soil fungi” (Manoharachary. et al. 2014)

Results and Discussion

In the present study 15 fungal species were isolated from phylloplane of Medicinal Plant *Catharanthus roseus*, through serial dilution method (Table-1).

The present investigation revealed the presence of fungus, *Aspergillus sp.1 Aspergillus sp. 2*, *Aspergillus sp.3*, *Aspergillus sp.4*, *Mucor sp*., *Rhizopus. sp*., *Fusarium sp1, Fusarium sp.2*, *Fusarium sp.3*, *Alternaria sp1*, *Alternaria sp2*, *Curvularia sp*, *Helminthosporium sp*., *Cladosporium sp.*, *Tricoderma sp*.

In the first site Patur *Aspergillus sp. 1, Aspergillus sp.2*, *Aspergillus sp.3*, *Aspergillus sp.4*, *Mucor sp.*, *Fusarium sp.1*, *Fusarium sp.2*, *Fusarium sp.3*, *alternaria sp.1*, *Cladosporium sp*., *Helminthosporium sp*., Curvularia sp all these fugus are found and in second site i.e. Akola *Aspergillus sp. 1*, *Aspergillus sp. 2*, *Fusarium sp. 1, Fusarium sp. 2*, *Alternaria sp.1*, *Alternaria sp. 2*, *Mucor sp*., *Rhizopus sp.,* these fugus are found.

These fungi belongs from the three class first is Ascomycetes, second Zygomycetes third is Deuteromycetes. It is observed that the members which comes under the class Deuteromycetes were shows the dominance (Table-1).

Table -1: List of Reported Fungi

Sr. Number	Group	Name of Fungus	Locality	
			Patur	Akola
1	Ascomycotina	*Aspergillus Sp. 1*	+	+
2		*Aspergillus Sp. 2*	+	+
3		*Aspergillus Sp. 3*	+	-
4		*Aspergillus Sp. 4*	-	+
5	Zygomycotina	*Mucor sp.*	+	+
6		*Rhizopus Sp.*	-	+
7	Deuteromycetina	*Fusarium sp. 1*	+	+
8		*Fusarium sp. 2*	+	+
9		*Fusarium sp. 3*	-	-
10		*Alternaria Sp. 1*	+	+
11		*Alternaria Sp. 2*	-	+
12		*Curvularia Sp.*	+	-
13		*Helminthosporium Sp.*	+	-
14		*Cladosporium Sp.*	+	-
15		*Tricoderma sp.*	+	-

The frequency of fungal species differed significantly between the wet and dry season. The number of fungi and frequency of colonization is greater during the wet season then the dry season. Microorganism can establish their niche on plant surface also in internal tissues. Plant surface have been recognized as an important habitat for microorganism. (Ogwa and Osawaru, 2014)

The phylloplane mycoflora of *Ocimum sanctum L.* where studied by Yadav (2015) and isolated *Aspergillus, Mucor* and *Rhizopus* from phylloplane and from phyllosphere isolated *Aspergillus* and *Fusarium*.

In the present study totally 15 species of fungi were isolated from the phylloplane of medicinal plant. For isolation of the fungus serial dilution plating technique were use. Through this technique 15 species are identified such as four species of Aspergillus, two species of *Alternaria*, three species of fusarium and *Helminthosporium sp*., *Cladosporium sp*., *Mucor sp., Rhizopus sp*., *Trichoderma sp*., *Curvularia sp.* one species of each.

Conclusion

Fungi play a significant role in the daily life of human being besides their utilization in industry, agriculture, medicine, food industry, textiles, bio-remediation and many other ways

fungal biodiversity has become as integral part of the human welfare (Jalander and Gachande, 2012).

Phylloplane mycoflora studies on medicinal plants is crucial since fungus may readily infect plants these days. Different medicinal plants' leaf samples revealed varying degrees of mycoflora occurrence. It shows that fungi, regardless of their nature, are capable of forming a relationship with a wide range of leaves.

While the focus of this study is on the diversity of fungal communities related to *Catharanthus roseus*, the true diversity may vary depending on how leaf samples were collected and handled, how big the leaf fragments were, and how they were cultured.

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