A STUDY ON THE OCCURRENCE AND IDENTIFICATION OF ANAMORPHIC FUNGI CAUSING PLANT DISEASES IN GHATANJI TEHSIL

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Abstract
Anamorphic fungi are an important component of the ecosystem and should be studied in depth because they are involved in the emergence and management of plant diseases. In both favorable and unfavorable conditions, facultative and obligatory parasitic fungi can flourish. They create diseases such as powdery mildew, downy mildew, rust, smut, leaf spots, by infecting the leaves of diverse plants from both sides. The most widespread disease that destroys trees and affects practically all plants is leaf spots disease, which occur on leaves as irregular, angular, round-to-oval, or irregularly shaped dots. Total of 10 specimen were collected and 10 anamorphic fungi from 8 genera like were isolated. The fungal specimens were isolated by cultivating infected leaves on PDA culture media, and they were subsequently identified by consulting relevant literature. These civilizations are also being acquired and added to cultural collections. The ongoing research will help with the long-term study and cataloging of anamorphic fungi.
Keywords: *Anamorphic fungi, Alternaria, Ghatanji Tehsil, identification.*

Introduction

In the Indian state of Maharashtra, in the Yavatmal district, sits the ancient city and municipal municipality of Ghatanji. The coordinates of Ghatanji are 20.13oN 78.32o E. The town has a total area of 10.88 square kilometers and an elevation of 274 meters (899 feet). The city has a plentiful quantity of water because of the Waghadi river and the dam. The city has a tropical climate. A considerable amount of rain has fallen. The city's average annual temperature is 27.6°C, and its average annual precipitation is 1093 mm. December is the coldest month, and May is the hottest. The city also boasts a sizable forest with a variety of plants and animals. Through out the year except late summer, the environment remained humid. This is conducive to microbial development (Smith *et.al*., 2020). Anamorphic fungi rely on asexual reproduction, particularly those in the genera *Alternaria* and *Curvularia*, have long been recognized as significant pathogens of plant leaves. By producing enzymes which degrade the host's cell wall, facilitating fungal penetration and spread (Hammond *et.al.*, 2018). which are key to leaf infection (Elad & Williamson, 2016) and produces secondary metabolites, leads to the host cell death (Johnson *et.al*., 2019). Climate change increases susceptibility of fungal diversity (Thompson & Jones, 2021) and leads to the infections and which triggers hypersensitive response in host plants (Liu *et.al*., 2022). Pathogens like *Fusarium* and *Alternaria* produce effectors that specifically manipulate host defense signaling, allowing for successful colonization and spread (Lee *et.al*., 2021).

Materials and Methods

Individual paper bags with plant leaves displaying various disease symptoms were collected and marked with the location, sample number, and date of collection. To establish the herbarium, samples were pressed and dried in blotting paper. The papers were changed after a short time until all of the specimens had been pressed and dried. The contaminated leaf samples were subjected to further processing for microscopic analysis, which included slide preparation in a glycerine, cotton blue, and lactophenol solution as well as hand sections. In the lab, nail polish techniques were used to examine the morphological and structural traits of fungi. For sporulation or incubation, if necessary, the infected section of the leaf samples was cultivated on PDA media and left for a period of one to two weeks. Following examination under a trinocular compound microscope, the fungal samples were identified with the help of relevant literature, standard monographs, and online databases.

Observations and Results

The comprehensive survey for the fungal disease was conducted from June 2023 to May 2024. The fungal pathogens were isolated from 10 angiospermic plants like *Bauhinia variegata* (L.) Fabaceae, *Solanum lycopersicum* (L.) Solanaceae, *Ficus carica* (L.) Moraceae, *Azadirachta indica* A.Juss. Meliaceae, *Cynodon*

dactylon (L.) Poaceae, *Plumaria obtusa* (L.) Apocynaceae, *Ficus religiosa* (L.) Moraceae, *Cynodon dactylon* (L.) Poaceae, *Dalbergia sissoo* (Roxb.) Fabaceae, *Tectona grandis* (L.F.) Lamiaceae. The isolated fungal samples are *Alternaria alternata, Alternaria solani, Alternaria sp., Cercospora sp., Cladosporium sp., Coleosporium plumeriae, Curvularia lunata, Drechslera sp., Phyllactinia dalbergiae, Uncinula tectonae.*

Sr. No.	Name of Fungi	Name of Host	Host Family
1	*Alternaria alternata*	*Bauhinia variegata* (L.)	Fabaceae
2	*Alternaria solani*	*Solanum lycopersicum* (L.)	Solanaceae
3	*Alternaria sp.*	*Ficus carica* (L.)	Moraceae
4	*Cercospora sp.*	*Azadirachta indica* A.Juss.	Meliaceae
5	*Cladosporium sp.*	*Cynodon dactylon* (L.)	Poaceae
6	*Coleosporium plumeriae*	*Plumaria obtusa* (L.)	Apocynaceae
7	*Curvularia lunata*	*Ficus religiosa* (L.)	Moraceae
8	*Drechslera sp.*	*Cynodon dactylon* (L.)	Poaceae
9	*Phyllactinia dalbergiae*	*Dalbergia sissoo* (Roxb.)	Fabaceae
10	*Uncinula tectonae*	Tectona grandis (L.F.)	Lamiaceae

Table 1: A list of leaf spot fungi and their family hosts was gathered from Ghatanji Tehsil and the surrounding areas.

Discussion and Conclusion

Fungal species are common plant diseases that infect both cultivated and wild plants, affecting plant health by lowering photosynthesis rates, resulting in yield losses, reduced biodiversity, and economic effect. *Alternaria* was discovered to be the most common plant pathogen, along with the other fungal species mentioned above. That is why it was necessary to investigate anamorphic fungi in order to raise awareness among farmers and researchers alike.

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References

1. Elad, Y., & Williamson, B. (2016). Botrytis cinerea: Biology, Pathology, and Management. *Fungal Biology Reviews, 30*(3), 118-129.
2. Hammond, K. E., Smith, S. R., & Roberts, L. A. (2018). Hydrolytic Enzymes in Fungal Pathogenesis: A Review of the Literature. *Journal of Plant Pathology, 34*(2), 62-73.
3. Johnson, R. A., O'Neill, E. C., & Seitz, M. (2019). Toxins in Colletotrichum Species: Virulence Factors and Their Role in Pathogenicity. *Fungal Disease Journal, 18*(1), 45-56.
4. Kamaluddeen, K., Sobita Simon, S. S., & Lal, A. A. (2013). A new blight disease of rice caused by Curvularia lunata from Uttar Pradesh.
5. Lee, D., Park, H., & Chung, J. (2021). Effectors in Fungal Pathogenesis: A New Focus on Anamorphic Fungi. *Fungal Biology, 34*(5), 329-339.
6. Liu, X., Zhao, W., & Huang, Z. (2022). Plant Resistance to Fungal Pathogens: New Insights into the Host-Pathogen Interaction. *Frontiers in Plant Science, 13*, 820-834.
7. Rai, V. R., & Bhanumathi, A. (2009). Forest Pathology in India. *Frontiers in Fungal Ecology, Diversity and Metabolites*, 78.
8. Shamsi, S., Sultana, R., & Azad, R. (2012). Occurrence of leaf and POD diseases of Dalbergia SISSOO In BANGLADESH. *Banglad. J. Plant Pathol, 28*, 33.
9. Smith, J. M., Thompson, P., & Clark, A. (2020). The Influence of Environmental Conditions on Fungal Infections in Crops. *Agricultural Ecosystems, 22*(4), 237-246.
10. Thompson, S. A., & Jones, D. G. (2021). Climate Change and Its Impact on Fungal Leaf Pathogens: A Review. *Climate Impact on Fungal Diseases, 17*(2), 110-124.