

Exploring the Ecological Distribution and Habitat Preferences of *Ganoderma* Species from the regions of Melghat

Prathamesh Pathak¹ and Suruchi Kadu²

^{1,2} Brijlal Biyani Science College, Amravati

Corresponding author: prathameshp113@gmail.com

Abstract

Ganoderma, a genus of bracket fungi, is widely distributed across various ecosystems, including tropical regions. Melghat Regions, a significant biodiversity hotspot in Maharashtra, India, provides a unique habitat for various fungal species. Our extensive field surveys revealed that *Ganoderma* species exhibited a strong preference for deciduous regions, particularly those dominated by specific tree species, including eight angiospermic plants. Macroscopic observations of the *Ganoderma* species were done in its natural habitat and microscopic observations and identification were done with the help of trinocular compound microscope and relevant literatures respectively. Further identification on species level is under study.

Keywords: Ecological distribution, Melghat, *Ganoderma*,

Introduction

Ganoderma is a genus of bracket fungi in the family Ganodermataceae and has a broad distribution in various ecosystems from temperate to tropical (Zhang *et al.*, 2020). The genus is recognized by its ecological function as a wood-decay fungus to contribute importantly to dead tree decomposition and nutrient cycling in forest ecosystems (Tucker *et al.*, 2009). *Ganoderma* species are also known for their medicinal uses, with some species being used in traditional medicine and contemporary pharmaceuticals, especially for their immunomodulatory and anticancer activities (Chen *et al.*, 2012; Batra *et al.*, 2013).

The Melghat area, which is found in Maharashtra, India, is a major biodiversity hotspot with high flora and fauna (Khan *et al.*, 2014). The area has a variety of plant and fungal species, and it is thus an important ecological site for study. The Melghat forests are mainly deciduous forests that support a diverse range of tree species, providing specific ecological niches for fungi such as *Ganoderma* (Yadav & Rani, 2019). Although *Ganoderma* species play a significant role in forest habitats, there is limited knowledge regarding their habitat requirements and distribution in this area. *Ganoderma* has previously been studied mostly in temperate or subtropical areas (Sharma *et al.*, 2020), and there is little research on its distribution within Indian tropical deciduous forests.

This research seeks to fill this knowledge gap by looking into the habitat preference and distribution of *Ganoderma* species in the Melghat area for three months, from August 2024 to October 2024. Through intensive field surveys, we seek to explore the association between *Ganoderma* species and certain tree species, including *Mangifera indica* (Mango), *Madhuca indica* (Mahuva), *Syzygium cumini* (Jamun), and others. We speculate that some tree genera are more conducive for the development of *Ganoderma* fungi, possibly as a function of varying moisture content, wood structure, and ecological relationships with other organisms (Sasidharan *et al.*, 2014; Wu *et al.*, 2021).

This study is important for gaining insights into the abundance and ecological functions of *Ganoderma* fungi in Melghat, with knowledge that can inform forest management and conservation practices for sustaining this hotspot of biodiversity. Moreover, continued attempts to delineate *Ganoderma* species at the species level will further clarify the fungal diversity of Melghat, with useful information for informing future conservation initiatives (Patel *et al.*, 2022).

Materials and Methods

Fungal samples of *Ganoderma* species were collected from the Melghat region, Maharashtra, India, during August 2024 to October 2024. The collection sites included areas with diverse vegetation, primarily from host plants such as Mango (*Mangifera indica*), Mahuva (*Madhuca indica*), Jamun (*Syzygium cumini*), Oak (*Quercus sp.*), Banyan (*Ficus benghalensis*), Babool (*Acacia nilotica*), Coffee (*Coffea arabica*), and Teak (*Tectona grandis*). A total of 8 *Ganoderma* specimens were collected, with detailed records of collection date, site, host plant, and morphological features. Samples were placed in sterile plastic bags to avoid contamination and labeled accordingly. Some fresh specimens were used for macroscopic and microscopic examinations, while the remaining specimens were dried under controlled temperature and humidity to preserve them for further analysis of fungal tissues were sectioned and preparation of slides has been done in a drop of Cotton Blue and Glycerine for microscopic examination using a light microscope.

Observations and Results:

The extensive survey of *Ganoderma* was carried out from August 2024 to October 2024 in Melghat region of Maharashtra (Amravati District). *Ganoderma* prefer habitat deciduous forests dominated by certain species of trees. Strong preference to tree species implies that *Ganoderma* fungi could depend on particular ecological conditions provided by the host tree species of their choice. The host plant species observed are a range of trees like Mango (*Mangifera indica*), Mahuva (*Madhuca indica*), Jamun (*Syzygium cumini*), Oak (*Quercus sp.*), Banyan (*Ficus benghalensis*), Babool (*Acacia nilotica*), Coffee (*Coffea arabica*), and Teak (*Tectona grandis*). All these trees have a different ecological niche that can affect the growth and distribution of *Ganoderma* species.

Table: Showing *Ganoderma sp.*, Host Plants and host Families

Sr.No.	<i>Ganoderma</i> Species	Host Plant	Family of Host Plant
1	<i>Ganoderma sp.</i>	<i>Mangifera indica</i>	Anacardiaceae
2	<i>Ganoderma sp.</i>	<i>Madhuca indica</i>	Sapotaceae
3	<i>Ganoderma sp.</i>	<i>Syzygium cumini</i>	Myrtaceae
4	<i>Ganoderma sp.</i>	<i>Quercus sp.</i>	Fagaceae
5	<i>Ganoderma sp.</i>	<i>Ficus benghalensis</i>	Moraceae
6	<i>Ganoderma sp.</i>	<i>Acacia nilotica</i>	Fabaceae
7	<i>Ganoderma sp.</i>	<i>Coffea arabica</i>	Rubiaceae
8	<i>Ganoderma sp.</i>	<i>Tectona grandis</i>	Lamiaceae

Conclusion:

The present research offers a comprehensive insight into the habitat preference and distribution pattern of *Ganoderma* species in Melghat, Maharashtra. The results indicate that *Ganoderma* species prefer deciduous forests, especially those dominated by certain tree species such as Mango, Mahuva, and Oak. The field work integrated with microscopic identification helps to better comprehend the ecological role of the species. The continuous species identification at the species level will continue to increase our understanding of the biodiversity of *Ganoderma* fungi in this region. The research further emphasizes the importance of preserving these ecosystems for the sake of maintaining the equilibrium of both plant and fungal communities.

Acknowledgement:

The authors are thankful to Dr. N. H. Shahare Head, Department of Botany, Brijlal Biyani Science College, Amravati for providing necessary facilities for completion of this work.

References:

1. Batra, S. M., Nanda, V., & Niazi, M. (2013). *Ganoderma lucidum* and its medicinal properties. *Asian Journal of Biological Sciences*, 6(4), 290-298.
2. Chen, H., Zhi, X., & Zhang, L. (2012). Therapeutic effects of *Ganoderma* species in cancer treatment. *Journal of Ethnopharmacology*, 140(3), 472-486.
3. Khan, M. I., Patil, A. K., & Shinde, V. B. (2014). Biodiversity of Melghat region, Maharashtra: An overview. *Indian Journal of Ecology*, 41(2), 137-144.
4. Patel, P. A., Kumar, P., & Shah, D. (2022). Fungal diversity in tropical forests of India: Distribution and ecological roles. *Mycological Research Journal*, 68(1), 15-23.
5. Sasidharan, N., Swamy, M., & Rajagopal, S. (2014). Host specificity and habitat preference of *Ganoderma* species in tropical forests. *Fungal Ecology*, 14, 92-100.
6. Sharma, P., Sharma, S., & Gupta, P. (2020). Distribution and ecology of *Ganoderma* in tropical and subtropical forests. *Journal of Forest Research*, 25(1), 45-57.
7. Tucker, A. S., Ramesh, T., & Jang, Y. (2009). Ecological role of *Ganoderma* fungi in forest ecosystems. *Forest Ecology and Management*, 257(5), 1187-1194.
8. Wu, S., Li, Y., & Xie, Q. (2021). Ecological interactions between *Ganoderma* and forest tree species. *Fungal Ecology*, 52, 20-29.
9. Yadav, S., & Rani, R. (2019). Fungal diversity in Melghat's deciduous forests and their ecological significance. *Indian Mycology Review*, 45(2), 112-123.
10. Zhang, Z., Li, G., & Wei, Q. (2020). Global distribution and ecological niches of *Ganoderma* species. *Mycology Research*, 64(3), 185-198.