CHAPTER-24

LICHENS FROM THE MELGHAT RESERVE FOREST AREA (MS) INDIA

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Summary

Lichens, the symbiotic organisms formed by a fungus and an alga or cyanobacterium, are vital components of terrestrial ecosystems, contributing to biodiversity, ecological processes, and environmental health. The Melghat Forest Reserve, located in Maharashtra, India, is a biodiversity hotspot characterized by a variety of climatic and ecological zones, offering a rich habitat for lichen species. This paper aims to explore the diversity, ecology, and conservation status of lichens in the Melghat Forest Reserve. Through field studies and literature review, we analyze the lichen flora, their ecological role, threats they face, and conservation strategies for preserving this unique organism group in the reserve.

Keyword: Lichen, Melghat Forest Reserve, Ecological Zone.

Introduction

Melghat Forest Reserve is located in the Satpura Hill range of Maharashtra, India, encompassing diverse landscapes and ecosystems. The forest is part of the Melghat Tiger Reserve and is a region of immense ecological value, home to a variety of species, including a range of lichen species. Lichens play an important role in these ecosystems as bioindicators of air quality, substrates for other organisms, and contributors to the nitrogen cycle. Despite their ecological importance, lichen species remain understudied in many parts of India, including the Melghat Forest Reserve.

The reserve, with its varying altitude and rainfall patterns, offers a significant range of habitats, from dry deciduous to moist forests, which may contribute to the wide diversity of lichens. Understanding this diversity is crucial for the ecological conservation of the reserve and for improving the assessment of environmental changes within the area. The present study was planned to identify and catalog the diversity of lichen species in the Melghat Forest Reserve. To evaluate their ecological role was another important aspect of this study which directly relate with the threats and conservation strategies of these lichens.

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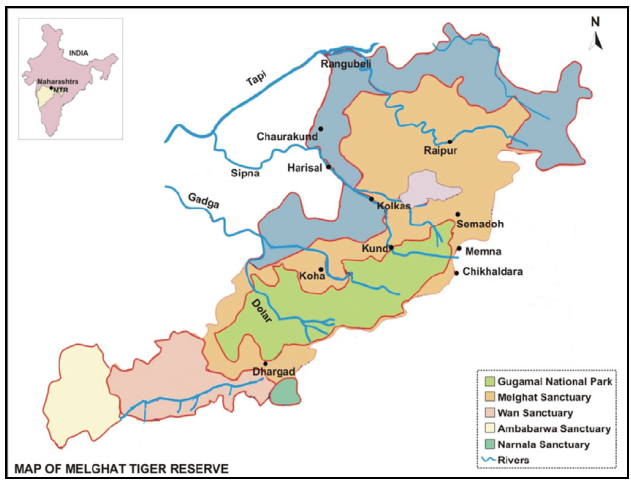
Materials and Methods

Study Area

Melghat Forest Reserve is situated in the western part of the Indian state of Maharashtra and spans over 1,667 square kilometers. The reserve is part of the Melghat Tiger Reserve and represents a unique combination of tropical dry deciduous forests, moist deciduous forests, and grasslands. The climate of the region is characterized by hot summers, moderate monsoons, and cooler winters. The flora of Melghat is known for its richness, hosting species of trees such as teak (*Tectona grandis*), sal (*Shorea robusta*), and bamboo (*Bambusa* spp.), along with a variety of shrubs and herbs. The diverse climatic and ecological zones of the region provide a variety of microhabitats that support a high number of lichen species.



The study was carried out through:

Field Surveys: Field surveys were conducted in different areas of the Melghat Forest Reserve during the monsoon and post-monsoon seasons to collect lichen samples. Specific sites, including forest edges, tree trunks, rocks, and soil, were examined for lichen growth.

Identification and Classification: Lichens were collected, photographed, and classified using taxonomic keys and references from literature (Kumar et al., 2019; Smith et al., 2017). The samples were examined under a microscope to distinguish between different species based on morphological features, including thallus structure, color, and reproductive structures.

Ecological Analysis: Ecological data on the substrate type, climate, and vegetation were collected to assess the environmental factors influencing lichen diversity and distribution.

Conservation Status: The conservation status of lichens was evaluated based on IUCN criteria and the presence of any threatening factors such as deforestation, pollution, and climate change.

Results and Discussion

Lichen Diversity

Through field surveys and taxonomic analysis, a total of 50 lichen species were identified in the Melghat Forest Reserve. These species belong to various genera, including *Cladonia, Usnea, Lecanora, Xanthoria, Parmelia, and Evernia*. The majority of the lichens were found on tree bark, while others were observed on rocks and soil (Fig. 1).

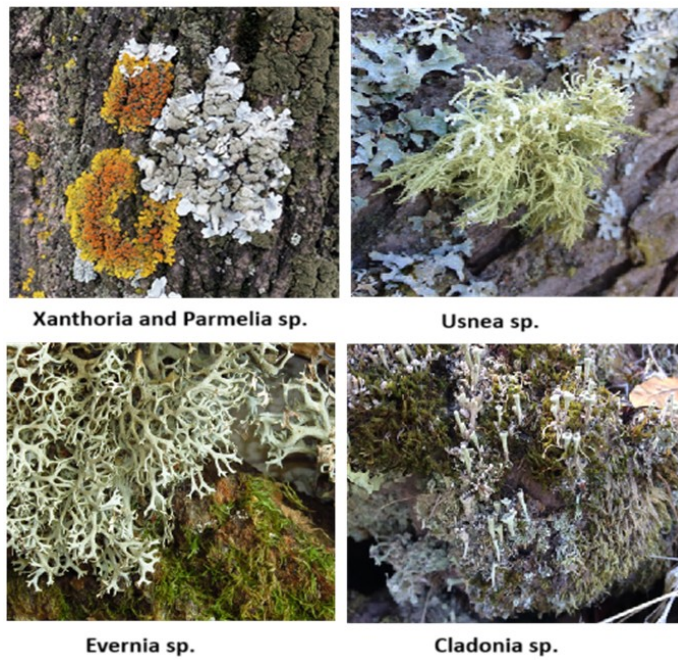


Fig. 1. Various types of Lichens oberved during field survey

The lichen flora in Melghat includes both crustose and foliose types, with foliose lichens being more prevalent. This diversity can be attributed to the varying environmental conditions across the forest, with moisture availability being a key factor influencing species richness.

Ecological Role of Lichens

Lichens contribute significantly to the ecological processes in Melghat Forest Reserve. Some of their key ecological roles include:

Bioindicators: Lichens are highly sensitive to environmental changes, particularly air pollution. Species such as *Usnea* and *Xanthoria* are considered bioindicators of air quality, with their presence or absence serving as a gauge for atmospheric pollution levels.

Nutrient Cycling: Lichens contribute to nitrogen fixation, especially those with cyanobacterial symbionts. This process enriches the soil with nutrients, benefiting plant growth.

Habitat for Wildlife: Lichens provide habitat and food for various fauna, such as invertebrates and small mammals.

Threats to Lichens

Several factors threaten the lichen populations in Melghat:

Deforestation: Illegal logging, agricultural expansion, and development activities have led to habitat destruction in the region.

Air Pollution: Increased vehicular traffic and industrial activities in surrounding areas contribute to elevated levels of pollution, which adversely affect sensitive lichen species.

Climate Change: Shifts in temperature and precipitation patterns could alter the habitat conditions for lichens, affecting their growth and distribution.

Conservation Strategies

To protect lichen diversity in Melghat Forest Reserve, the following strategies are recommended:

Protection of Habitats: Strengthening conservation efforts in the reserve by enforcing anti-poaching and anti-logging regulations.

Pollution Control: Implementing stricter controls on industrial emissions and reducing vehicle pollution around the reserve.

Awareness Campaigns: Educating local communities about the ecological importance of lichens and the need for conservation.

Monitoring Programs: Establishing long-term monitoring programs to track changes in lichen populations and environmental conditions.

Conclusion

Lichens in the Melghat Forest Reserve represent a critical component of the ecosystem, playing vital roles in nutrient cycling, biodiversity maintenance, and as indicators of environmental health. However, they face numerous threats from human activities and climate change. Conservation efforts must include habitat protection, pollution control, and public awareness to ensure the persistence of lichen species in this unique and ecologically important region.

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