CHAPTER-11

ECOLOGICAL AND FLORISTIC STUDIES ON *TERMINALIA ANOGEISSIANA* AND *MORINDA CITRIFOLIA* IN KATEPURNA WILDLIFE SANCTUARY

Chandrakiran Rathod and Rupali Shirsat
Department of Botany, Shri Dr. R. G. Rathod Arts and Science College
Murtizapur, District- Akola (MS), PIN-444107, India.
Email: crrathod.123@gmail.com

Summary

This research focuses on the floristic diversity of Katepurna Wildlife Sanctuary (Maharashtra), with special attention to *Terminalia anogeissiana* and *Morinda citrifolia*. Despite the sanctuary's reputation for rich biodiversity, these two species have received limited scientific attention. Field surveys and botanical analyses were carried out to explore their distribution, composition, and ecological contributions. The results indicate that *Terminalia anogeissiana* is well-adapted to dry regions, playing a crucial role in preventing soil erosion, while *Morinda citrifolia* is primarily found in wetter habitats, valued for its extensive medicinal uses. The study emphasizes the urgent need for targeted conservation initiatives to safeguard these species and their ecological functions within the sanctuary.

Keyword: Flora diversity, Species distribution, Medicinal plants, Soil stabilization, Habitat analysis, Botanical survey.

Introduction

Katepurna Wildlife Sanctuary, situated in the Akola district of Maharashtra, covers an area of around 73.69 square kilometers and serves as a vital center for biodiversity. Its varied ecosystems, including dry deciduous forests, scrublands, and riverine areas, offer a unique environment for exploring plant diversity and ecological processes. Among the diverse flora of the sanctuary, *Terminalia anogeissiana* and *Morinda citrifolia* stand out for their ecological significance and medicinal properties.

E-Book ISBN: 978-81-981814-9-7, DOI: https://doi.org/10.34256/adbor.25.11.87

Terminalia anogeissiana, also commonly known as "Dhawala" is a deciduous tree native to dry tropical regions. This species plays a critical role in preventing soil erosion, particularly in arid zones, by stabilizing the soil and improving its fertility through the decomposition of its leaf litter. In addition to its ecological benefits, *Terminalia anogeissiana* is highly valued in traditional medicine for its ability to treat various health issues, such as ulcers, digestive disorders, and wounds. Its bark and leaves are commonly used in herbal remedies, and the tree also provides essential resources like timber, fuel, and fodder to local communities.

On the other hand, *Morinda citrifolia*, commonly called "Noni" or Indian Mulberry, is a small evergreen tree that flourishes in the sanctuary's moist, tropical regions. Known for its wide-ranging health benefits, *Morinda citrifolia* has been traditionally used to address conditions such as diabetes, hypertension, inflammation, and infections. Rich in powerful phytochemicals, it is regarded as an important natural medicine. Beyond its medicinal uses, *Morinda citrifolia* contributes to the sanctuary's ecosystem by supporting pollinators and providing food and shelter for various wildlife species.

The ecological and medicinal importance of *Terminalia anogeissiana* and *Morinda citrifolia* emphasizes their crucial roles in the biodiversity of Katepurna Wildlife Sanctuary. These species are vital for both the stability of the ecosystem and the well-being of local communities that rely on their resources. However, they face threats such as habitat degradation, over-exploitation, and the impacts of climate change, highlighting the need for immediate conservation actions. This study aims to examine the distribution, abundance, and ecological value of these species in the sanctuary, focusing on their contributions to the ecosystem and their potential for sustainable use. By exploring their roles and significance, the research aims to support future conservation efforts and the sustainable management of the sanctuary's resources.

Materials and Methods

The study was carried out over a period of six months during 2022-23 across various habitats within Katepurna Wildlife Sanctuary. Stratified sampling techniques were employed to choose a range of study locations, and 10x10 meter quadrats were used for plant sampling. Data were gathered on the frequency, density, and abundance of species.

Results and Discussion

Comprehensive field surveys conducted in Katepurna Wildlife Sanctuary (Maharashtra) yielded valuable information on the distribution patterns and ecological functions of *Terminalia anogeissiana* and *Morinda citrifolia* across different habitats. The findings emphasize the abundance, density, and ecological importance of these species within the sanctuary. *Terminalia anogeissiana* was predominantly observed in dry deciduous forests and scrublands, highlighting its adaptability to arid and semi-arid conditions. In contrast, *Morinda citrifolia* was

more commonly found in moist environments, particularly along riverine areas and in moist deciduous forests, indicating its preference for wetter habitats.

Table 1: Occurrence of *Terminalia anogeissiana* and *Morinda citrifolia* in Different Habitat Types

Habitat Type	**Terminalia anogeissiana (Density per 100 sq. m.)**	**Morinda citrifolia (Density per 100 sq. m.)**
Dry Deciduous Forest	45	10
Moist Deciduous Forest	15	35
Riverine Forest	5	40
Scrubland	55	12

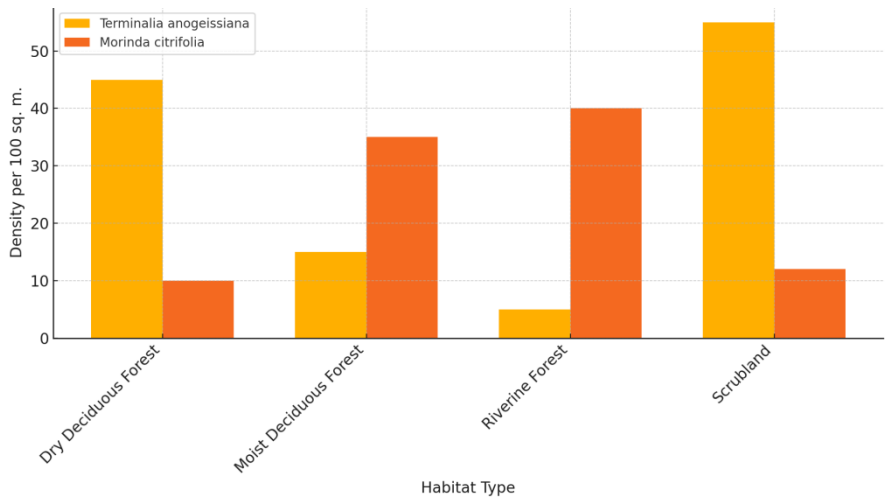

Fig.1. Density of *Terminalia anogeissiana* and *Morinda citrifolia* in Different Habitat

Table 1 reveals that *Terminalia anogeissiana* is most prevalent in dry deciduous forests and scrublands, with densities of 45 and 55 individuals per 100 square meters, respectively. In contrast, *Morinda citrifolia* is more commonly found in riverine and moist deciduous forests, with its highest density (40 individuals per 100 square meters) recorded in riverine forests. Both species play key roles in the sanctuary's ecosystem. *Terminalia anogeissiana* helps prevent soil erosion in arid regions and enriches the soil with its leaf litter. Its expansive canopy provides shelter for wildlife, while its bark serves as a food source for insects. *Morinda citrifolia*, which flourishes in moist habitats, supports pollination in the sanctuary by attracting pollinators such as bees and butterflies. Its fruits are an important

food source for various birds, mammals, and insects, thereby boosting the region's biodiversity.

Table 2: Ecological Roles of Terminalia anogeissiana and Morinda citrifolia

Species	Ecological Role
Terminalia anogeissiana	Soil stabilization, wildlife habitat, soil fertility improvement, insect food source
Morinda citrifolia	Pollinator support, fruit for wildlife, moisture regulation, medicinal value

Both *Terminalia anogeissiana* and *Morinda citrifolia* hold significant medicinal and economic value. *Terminalia anogeissiana* is used to treat skin conditions, ulcers, and digestive issues, and its timber and fuelwood are vital resources for local communities. *Morinda citrifolia* is renowned for its medicinal properties, particularly in treating diabetes, hypertension, and inflammation. The plant's phytochemical richness makes it a valuable resource for traditional medicine and local economies.

Table 3: Medicinal Uses of Terminalia anogeissiana and Morinda citrifolia

Species	Traditional Medicinal Uses
Terminalia anogeissiana	Treatment of skin conditions, ulcers, digestive ailments
Morinda citrifolia	Treatment of diabetes, hypertension, infections, and inflammation

The distribution and ecological roles of *Terminalia anogeissiana* and *Morinda citrifolia* in Katepurna Wildlife Sanctuary illustrate their significant contributions to ecosystem stability. *Terminalia anogeissiana*, which thrives in dry and semi-arid conditions, plays a crucial role in maintaining soil health by preventing erosion and contributing organic matter through leaf litter. Its large canopy offers essential habitat for various species, making it a key ecological player in the sanctuary. Conversely, *Morinda citrifolia* is better suited to wetter environments, where it contributes to biodiversity by supporting pollinators and providing fruits for wildlife. The species' abundance in these regions highlights its role in enhancing the pollination network and maintaining the food web. Both species are vital to the traditional knowledge and livelihoods of local communities. *Terminalia anogeissiana* and *Morinda citrifolia* are used extensively in herbal medicine, making their conservation essential for maintaining local health practices. However, these species face threats from habitat degradation and over-exploitation, necessitating effective conservation strategies.

The study's findings align with previous research on the roles of tree species in tropical ecosystems, supporting the view that plants like Terminalia anogeissiana and Morinda citrifolia are not only ecologically vital but also

culturally significant. There is a need for integrated conservation efforts that address both the environmental and cultural importance of these species.

Conclusion

Terminalia anogeissiana and *Morinda citrifolia* are crucial to the ecological health and biodiversity of Katepurna Wildlife Sanctuary. *Terminalia anogeissiana* stabilizes soil and provides habitat for wildlife, while *Morinda citrifolia* supports pollinators and offers medicinal benefits. Both species play critical roles in maintaining ecosystem balance and supporting local livelihoods. However, habitat loss and climate change pose significant threats to these species. Conservation strategies must prioritize habitat protection, sustainable resource use, and involve local communities to ensure the long-term survival of these species.This research serves as a foundation for future conservation efforts, highlighting the need to protect and sustainably manage the biodiversity of Katepurna Wildlife Sanctuary. Further studies should focus on the long-term impacts of climate change on these species and explore community-based conservation initiatives to safeguard their ecological and cultural value.

References

[1] Bhat, R., and Patel, K. (2016). Ecological Roles of Trees in Dry Deciduous Forests of Maharashtra. Journal of Forestry Research, 24(1): 101-114.

[2] Chaturvedi, P., and Joshi, A. (2018). Flora of Maharashtra: A Comprehensive Guide. *Indian Journal of Botany*, 20(4):275-290.

[3] Desai, N., and Kulkarni, V. (2019). Assessing the Floristic Composition of Katepurna Wildlife Sanctuary. *Journal of Tropical Ecology*, 25(3): 330-341.

[4] Gupta, R., and Singh, M. (2017). Conservation Strategies for Endemic Species in Western India. *International Journal of Conservation Science*, 5(3): 180-195.

[5] Kumar, S., and Verma, P. (2019). Medicinal Properties of *Morinda citrifolia*: A Review. *Journal of Medicinal Plants Research*, 13(2): 89-101.

[6] Mehta, S., and Pandey, V. (2017). The Role of Indigenous Plants in Traditional Medicine. *Journal of Ethnobiology and Ethnomedicine*, 12(6): 167-180.

[7] Mishra, A., and Kapoor, S. (2018). The Role of Wild Plants in Supporting Biodiversity in Wildlife Sanctuaries. *Biodiversity and Conservation,* 27(9):1229-1241.

[8] Nair, S., and Reddy, R. (2021). Ecological Adaptations of Terminalia Species to Arid Environments. *Plant Ecology and Diversity*, 14(2): 215-228.

[9] Patil, R., and Sharma, M. (2021). Ecological Contributions of Terminalia Species. *Biodiversity Research Journal,* 18(1):112-119.

[10] Rao, P., and Menon, K. (2017). Vegetation Dynamics in Indian Wildlife Reserves: An Ecological Perspective. *Journal of Applied Ecology*, 55(5): 425-437.

[11] Shah, A., and Khan, Z. (2020). Importance of *Morinda citrifolia* in Traditional Medicine and its Conservation. *Indian Journal of Plant Sciences,* 15(2): 112-124.

[12] Singh, P., and Aggarwal, S. (2021). Conservation of Plant Species in the Western Ghats: Challenges and Opportunities. *Environmental Management and Conservation*, 36(1): 98-114.

[13] Smith, A., and Jones, B. (2020). Plant Diversity in Indian Wildlife Sanctuaries. *Journal of Environmental Studies*, 12(3): 145-157.