

An Academic Exploration: Investigating Phytodiversity Research in Sanjay- Dubri Tiger Reserve, Sidhi, Madhya Pradesh

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Abstract - The Sanjay –Dubri Tiger reserve, located in the Sidhi district of the Madhya Pradesh, India, is a well-preserved ecological area known for its diverse range of species. This review article undertakes an academic exploration to examine and consolidate the substantial body of research on Phytodiversity conducted within the ecologically important reserve. The main aim of this review is to present a thorough examination of the research endeavours focused on the gaining a comprehensive understanding of the varied plant life present within the Sanjay–Dubri Tiger Reserve Sidhi . Search was conducted on databases by using related keywords. Further, Analysis of the results is done to find research done specifically to Sanjay-Dubri Tiger Reserve, Sidhi district of Madhya Pradesh. The analysis and findings reveal that Limited research is conducted on phytodiversity of Sidhi district and most of them are old studies. In particularly Sanjay-Dubri Tiger Reserve, only 4 researches were found which indicate that this region is not hot region for researchers. We suggest researchers to conduct phytodiversity studies, regeneration and research related to distribution pattern of the flora in this region because of its diverse range of species. In conclusion, this article provides valuable resources for academics, researchers and policymakers who have interest in the dynamic filed of biodiversity research within the distinctive context of the Sanjay-Dubri Tiger Reserve in Sidhi, Madhya Pradesh.

Keywords - Phytodiversity, Research, Plant, Sanjay-Dubri Tiger Reserve, National Park.

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INTRODUCTION

All life forms depend on forests, which are essential to maintaining the natural nutrient and gas cycles in balance. Nearly 4 billion hectares, or 31%, of the world's total land area is covered by forests; nearly half of this area is not distributed evenly, and 34% of it is primary forest (FAO and UNEP, 2020). The majority of the world's forests (45%) are in the tropics, followed by boreal, temperate, and subtropical forests (FAO, 2020).

Deforestation has been identified as a significant cause of various ecological, social, and economic consequences, including but not limited to the decline in biodiversity, the extinction of biotic communities, and a decrease in income for forest inhabitants (Panigrahy et al., 2010). Agricultural expansion activities have had a substantial impact on the loss of biodiversity (FAO and UNEP, 2020). The practice of shifting cultivation in tropical regions has resulted in significant deforestation and degradation of forest ecosystems, as documented by Thong et al. (2020). According to the Food and Agriculture Organization

(FAO, 2020), it is estimated that approximately 420 million hectares of forest have been lost globally due to deforestation since 1990. During this period, there has been a significant reduction in the extent of the primary forest, amounting to over 80 million hectares. According to the Food and Agriculture Organization (FAO) and the United Nations Environment Programme (UNEP) in 2020, a total area exceeding 100 million hectares of forest has experienced adverse effects due to various factors such as forest fires, invasive species, pests, diseases, drought, and unfavourable weather events.

The future configuration and makeup of forest ecosystems are modified as a result of population structure changes specific to certain species, which are caused by the illegal cutting down of trees and excessive utilization of forest resources (Dutta and Devi, 2013). The preservation of habitat trees in managed forests is crucial for supporting biodiversity conservation, as multiple taxa depend on these trees for nesting, foraging, and rooting (Asbeck et al., 2020). Enhancing our comprehension of the inherent

processes of tree species' natural regeneration in conjunction with spatial patterns is crucial for enhancing the efficacy of forest management and community restoration endeavors (Zhang et al., 2020). The spatial patterns of seedlings and saplings play a critical role in the process of community regeneration.

Throughout history, human beings have depended on forests as a crucial resource for fulfilling their fundamental requirements. The pressure exerted on forests has escalated as a consequence of population expansion and the implementation of developmental endeavors, leading to the occurrence of deforestation and other forms of forest land degradation. Therefore, it is imperative to conduct a thorough investigation of plant diversity in order to gain a comprehensive understanding of ecosystem functioning (Turnbull et al., 2016). A more comprehensive comprehension of the mechanistic aspects is necessary to fully grasp the correlation between ecosystem functioning and biological processes (Turnbull et al., 2013).

Madhya Pradesh is widely acknowledged as a significant region characterized by extensive forested terrain, covering a vast expanse of approximately 4,63,452 square kilometers. It is worth mentioning that approximately 33% of the land area is distinguished by the existence of tropical forests, primarily consisting of Teak and Sal species. Madhya Pradesh comprises a comprehensive count of 52 districts, among which the district of Balaghat stands out due to its remarkable phytodiversity. The Vindhya and Satpura mountain ranges are adjacent geographical formations that span the central region of the state, extending in a south-west to north-east orientation. The Eastern Ghats range stretches in a southern direction, reaching the southern region of Bastar. Madhya Pradesh, a state located in India, harbors a diverse range of distinctive vegetation that is distributed across various regions including the Narmada valley, Satpura, Vindhyas, and Malwa plateau. Madhya Pradesh is home to tropical and mountain subtropical forests, as evidenced by the research conducted by Champion and Seth in 1968. The forests have been classified into specific categories, including Northern semi-evergreen forests, moist deciduous forests, dry deciduous forests, and thorn forest..

Sanjay-Dubri Tiger Reserve

In Madhya Pradesh's Sidhi district, the 831 sq. km. Sanjay-Dubri Tiger Reserve, established in 1975, is notable for its diverse ecosystem, which is primarily an evergreen Sal forest. The forest reserve is known throughout the world for being the birthplace of white tigers known as "Mohan," in addition to housing 34 species of freshwater fish, 152 bird species, 3 amphibian species, and 32 mammals. The forest exhibits a distinctive variety of flora that is significant to socioeconomic development.

Sanjay National Park

Both the "Sidhi" district of Madhya Pradesh and the "Manendragarh-Chirmiri-Bharatpur" district of Chhattisgarh, India, contain the protected area known as Sanjay National Park. The region is a crucial part of the Sanjay-Dubri Tiger Reserve and covers a total area of 2,300 square kilometers (890 square miles) (Singh et al., 2005). It is located in the Narmada Valley's typical dry deciduous forest ecoregion.

Flora

Sal plantations are common throughout a sizeable portion of the forest, and Bamboo trees can be found spread out over large areas. Several significant plant species found within the sanctuary include Palas (*Butea monosperma*), Salai (*Boswellia serrata*), Dhawada (*Anogeissus latifolia*), Guraja (*Dectocarpus turbinatus*), Mahua (*Madhuca longifolia*), Semal (*Bombax ceiba*), Harra (*Terminalia chebula*), Ber (*Ziziphus mauritiana*), Haldu (*Haldiana Cardifolia*), Bel (*Aegle Marmelos*), Anwla (*Phyllanthus Emblica officinalis*) and Tendu (*Diospyros melanoxylon*). These plants work together to create incredibly diverse and plentiful vegetation that is ideal for supporting a range of local wildlife species. Both tropical moist peninsular forests and southern dry mixed deciduous forests, which can be found in both hilly and plain areas, are included in the diverse range of ecosystems that make up Sanjay-dubri National Park.

Fauna

A wide variety of animal species, including leopards, tigers, sambar deer, wild boar, deer, chinkara, neelgai, civets, monitor lizards, porcupines, sloth bears, pythons, and wild dogs, can be found in the Sanjay-dubri National Park. There are about 309 different species of birds in the area, which has a diverse population of birds. Peacocks, golden hooded orioles, wagtails, bulbuls, teetars, blue kingfishers, Indian pitta rufus-treepies, red-breasted barbets, racket-tailed drongos, red-headed vultures, lesser adjutants, Egyptian vultures, nightjars, and Indian white-rumped vultures are notable examples of these. The sloth bear, which is highly visible in close proximity to the park's rivers and streams, is the second most common species in this park after the tiger. Reptiles that are common and simple to spot include the Bengal monitor, skink, and garden lizard, among others. In this area, snakes of the krait, cobra, rat snake, rock python, scaled viper, saw-scaled viper, and russell viper species are frequently seen.

The diversity and species composition of the wild flora have changed as a result of anthropogenic activities, climate change, and natural disasters like drought, pathogen invasion, insect pests, and pestilence. The biodiversity is now in danger as a result. In order to understand how to restore the

original habitat in a way that is beneficial to all life forms, it is crucial to evaluate the factors that lead to the natural regeneration of forest flora. Understanding the functioning of the wild ecosystem and the relationships between various environmental components requires a thorough understanding of the distribution patterns of plant species over a range of spatial scales. Therefore, accurate identification, documentation, and plant diversity conservation are required. For this purpose our review article aimed to explore the existing research on phytodiversity of Sanjay Dubri Tiger Reserve specifically.

For data collection, specific keywords related to phytodiversity such as flora of Sanjay-Dubri Tiger reserve, Flora of Sanjay-dubri National Park, phytodiversity of Sanjay Dubri Tiger Reserve, even keywords related to its formal name "Guru Ghadidas National Park" was utilized so that single article related to our research did not skipped. In this review article, just English language articles were considered.

PHYTODIVERSITY RESEARCH ON SANJAY-DUBRI TIGER RESERVE SIDHI

A total of 84 studies were initially acquired through the search process. Subsequent to the screening process, it was determined that the majority of the research undertaken pertained to Madhya Pradesh or specifically focused on the Sidhi district, rather than encompassing the Sanjay-Dubri Tiger Reserve. Ultimately, the research yielded surprising results. There are only four articles available that document the research conducted in Sanjay-Dubri Tiger Reserve. The research studies were conducted in various years, including 2005, 2007, 2016, and the most recent one in 2018.

1. **Singh et al. (2005)** carried out a study to look at the diversity of pteridophytes in Sanjay National Park. Pteridophytes make up the majority of the ground vegetation during the rainy season. Data on the taxonomic composition of pteridophytes in the studied area have been obtained through a thorough evaluation of the body of literature, herbarium consultation (BSA), and the author's (Shweta Singh) own collection. The results show that there are 14 families, 19 genera, and 30 species in all. The two families with the most species each are Thelypteridaceae and Polypodiaceae, with 6 and 3 species, respectively. The dense and wet deciduous Sal forest that covers Sanjay National Park is its defining feature. The *Madhuca* and *Diospyros* species are found in great abundance in the park. A common fern species in the park is *Dryopteris cochleata*, also known as Buch.-Ham. ex D. Don and categorized by *C. Chr. Adiantum L., Selaginella P. Beauv., Tectaria Cav., and Dryopteris Adanson* are four plant species that the locals in the area use for medicinal purposes.

2. For the **Lahiri (2007)** study, 154 species of angiospermic and pteridophytic plants were collected from the Sanjay National Park in the Madhya Pradesh district of Sidhi. These botanical specimens are given nomenclature and ethno-pharmacological applications
3. The focus of **Dwivedi and Salim's (2016)** study is the analysis of various plant species using floristic information. Plants that are considered rare or endangered were found in the study area. 37 plant species in total have been identified in this study as being rare or endangered. All 37 plant species were completely listed in the study area, along with their red data categories, botanical names, local names, and current status. For the sake of their conservation, a number of plant species demand immediate attention. It is concerning that endangered species are requiring more and more attention. This study also highlights the abundance of rare or endangered plant species that can be found in the Sidhi district's Dubri Wildlife Sanctuary. Due to its role as a refuge for a sizable population of rare and endangered plant species, the protected forest area is widely regarded as an outstanding conservation model for plant diversity.
4. **Tripathi et al. (2018)** evaluated the Sanjay-dubri Tiger Reserve conservation status in the Sidhi-Sarguja District, which includes parts of MP and Chhattisgarh, and identified some of the park's wild animals, trees, shrubs, herbs, grasses, vegetation, and parasites. The study suggested on-site wild life habitat conservation for the benefit of people and the wilderness.

The examination of the existing scholarly literature pertaining to Phytodiversity research conducted within the Sanjay-Dubri Tiger Reserve unveils a noteworthy trend. Only 4 available articles suggest that there is a limited amount of research directly addressing this distinctive ecological area. The aforementioned studies, although limited in scope, play a crucial role in establishing the fundamental principles for comprehending and protecting the distinct plant diversity found within the Sanjay Dubri Tiger Reserve. These studies emphasize the pressing need for additional research endeavors and conservation efforts in this ecologically essential area.

SUGGESTION FOR THE FUTURE RESEARCH

- This review offers a number of promising directions for upcoming research projects.
- For the purpose of cataloging and documenting every plant species that is thriving within the reserve, through floristic surveys are essential.
- Understanding how climate change is affecting the distribution, phenology and

abundance of these species is another area of possible future research.

- To address potential threats, it is recommended to investigate the potential effects of invasive plant species on native flora of reserve.
- Investigating how local communities use plants ethno-botanically can promote ethical harvesting methods and project indigenous knowledge. Insightful information can be gain by conducting research on the ecological functions of important plant species within the reserve's ecosystems, including their interactions with fauna.
- Programs for long term monitoring will be crucial for observing changes in phytodiversity and ecosystem health. Strategies for conservation can be influenced by evaluating the genetic diversity off rare and endangered plant species.
- The support system for the threatened species can be strengthened by doing research on opportunities for ecosystem restoration and habitat improvement.
- Examining how human activities like resource extraction and tourism affect the plant communities within the reserve can be possible future research topic.
- The unique phytodiversity of the reserve can be safeguarded for doing long term by evaluating the effectiveness of conservation strategies and protected area management research.

CONCLUSION

The Sanjay–Dubri Tiger Reserve, which is situated in Sidhi district of the Madhya Pradesh, India, is the subject of ongoing research into phytodiversity. This thorough review clarifies the current state of that endeavour in Sanjay-Dubri Tiger Reserve Sidhi. The main finding of this analysis is the small number of studies that are solely focused on this critically important ecological region, with only a few articles being found in the vast literature. The reserve's distinctive botanical diversity and its potential significance for biodiversity conservation are both highlighted by the studies that have been mentions in findings. While it is clear that there is a dearth of studies specifically focused on the Sanjay-Dubri Tiger Reserve, the ones that do exist provide important information about the diversity and ecological significance of plant species found there. This review provides suggestions for the future research as well as also emphasizes the necessity of stepping up research efforts and conservation initiatives in this reserve. Understanding and protecting the region's phytodiversity is crucial for the long term sustainability of this important ecosystem. In conclusion, while the current research lays the groundwork for understanding the phytodiversity research of the Sanjay-Dubri Tiger Reserve Sidhi, it also highlights the pressing need for additional research on

phytodiversity, regeneration and distribution patterns in this reserve.

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