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ISSN:3107-9997
CUREVITA RESEARCH INTERNATIONAL NEXUS
Peered Reviewed Multidicplinary Journal

Diversity and Distribution of Beetles (Coleoptera) of Mukundpur White Tiger Safari, Satna, Madhya Pradesh, India

Shashi kala Patel and Meenakshi Samartha

Abstract

Beetles (Order: Coleoptera) represent the most diverse group of insects and play a crucial role in maintaining ecosystem stability through their involvement in decomposition, nutrient cycling, pollination, and biological control. Protected forest ecosystems serve as important refuges for beetle diversity, yet many such areas in central India remain poorly explored. The present study investigates the diversity and distribution of beetles in the Mukundpur White Tiger Safari, Satna district, Madhya Pradesh. Systematic field surveys were conducted across different habitat types using standard entomological sampling methods. Beetles collected were identified up to family and, where possible, genus and species levels using standard taxonomic keys. A total of 65 species were recorded during the study period. Carabidae, Scarabaeidae, Chrysomelidae, and Tenebrionidae were the dominant families. The distribution of beetle assemblages showed a strong association with vegetation type, soil moisture, and anthropogenic disturbance. The findings highlight the ecological significance of Mukundpur White Tiger Safari as an important habitat for beetle conservation and emphasize the need for long-term monitoring and insect-focused management strategies within protected areas.

Keywords: Beetle diversity, Coleoptera, distribution, White Tiger Safari, Mukundpur, Satna, biodiversity.

ARTICLEINFO

Article history: Received 02 March- 2026, Revised 18 Apr 2026, Accepted 26 Apr 2026, Published: May-2026.

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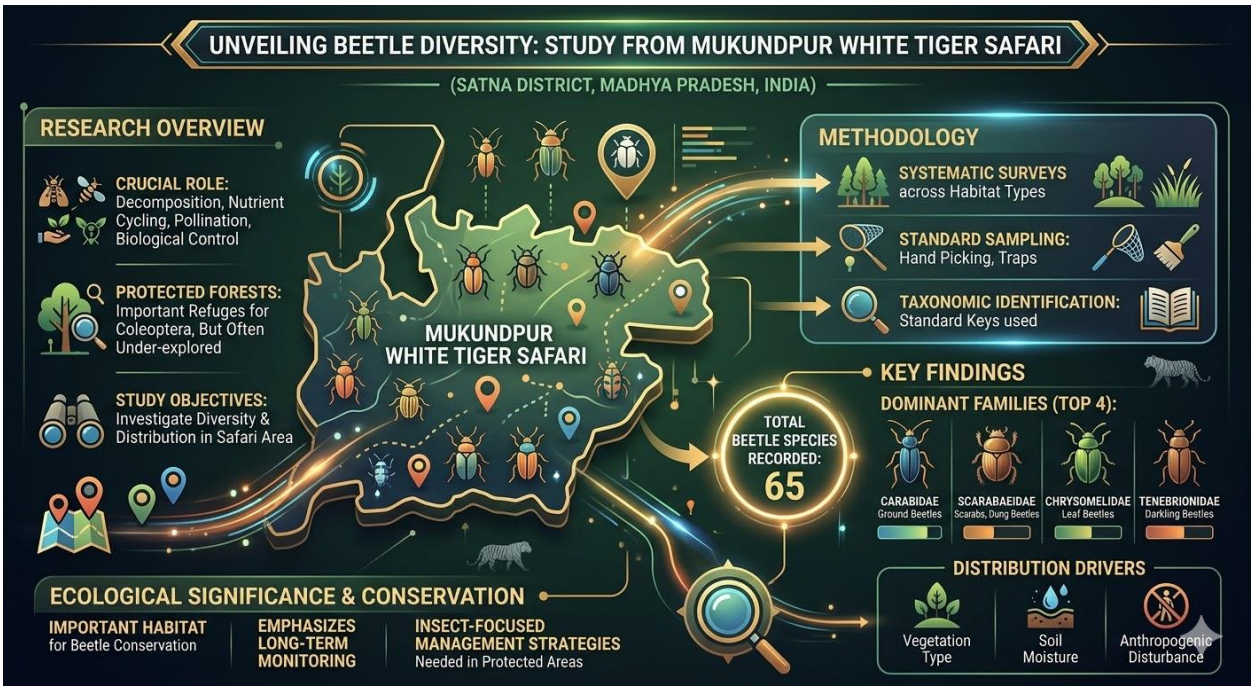
Publisher: Curevita Research Pvt Ltd

Citation: Patel Shashikala and Samartha Meenakshi,2026.Diversity and Distribution of Beetles (Coleoptera) of Mukundpur White Tiger Safari, Satna, Madhya Pradesh, India.Curevita Research International Nexus. 2,2.1-8.

Infographic Abstract



Research Highlights

Study Objective: Investigated the diversity and distribution of the order Coleoptera (beetles) within the under-explored protected ecosystem of Mukundpur, Madhya Pradesh.

Species Richness: A total of 65 beetle species were recorded using systematic field surveys and standard taxonomic identification.

Dominant Taxa: The most prevalent families identified were Carabidae (ground beetles), Scarabaeidae (scarabs/dung beetles), Chrysomelidae (leaf beetles), and Tenebrionidae (darkling beetles).

Ecological Drivers: Beetle distribution was significantly influenced by vegetation type, soil moisture levels, and the degree of anthropogenic (human) disturbance.

Conservation Impact: The study establishes the Safari as a critical habitat for insect biodiversity and advocates for insect-focused

management strategies and long-term ecological monitoring.

Introduction

Beetles (Coleoptera) constitute the largest order of insects, accounting for nearly 40% of all described insect species and approximately 25% of known animal species worldwide (Gaston & Spicer, 2023). Their remarkable diversity, ecological adaptability, and evolutionary success have enabled them to colonize almost all terrestrial and freshwater habitats except the open ocean and polar ice regions. Beetles play indispensable roles in ecosystem functioning, including organic matter decomposition, nutrient recycling, soil aeration, pollination, seed dispersal, and regulation of pest populations.

In recent decades, biodiversity loss driven by habitat destruction, climate change, pollution, and land-use modification has emerged as a major global concern. Insects, including beetles, are experiencing alarming population declines, raising serious questions about ecosystem resilience and sustainability (Wagner et al., 2021). Protected areas such as wildlife sanctuaries, national parks, and safari parks serve as critical reservoirs of biodiversity and offer opportunities for understanding species diversity and distribution patterns under relatively undisturbed conditions.

The Mukundpur White Tiger Safari, located in Satna district of Madhya Pradesh, represents an important protected forest ecosystem of central India. While the area has gained prominence for wildlife conservation, particularly for white tigers, its insect fauna, especially beetles, remains largely undocumented. The present study aims to assess the diversity and distribution of beetles in the Mukundpur White Tiger Safari and to provide baseline data for future ecological and conservation studies.

Materials and Methods

Study Area

Mukundpur White Tiger Safari is situated in the Satna district of Madhya Pradesh, India, within the Vindhyan hill range. The safari encompasses a mosaic of dry deciduous forest, scrub vegetation, grasslands, and seasonal water bodies. The climate of the region is tropical, characterized by hot summers, a monsoon season from June to September, and cool winters. The vegetation of the area is dominated by tree species such as Tectona grandis, Anogeissus latifolia, Terminalia tomentosa, and Boswellia serrata. Leaf litter accumulation, varied soil types, and heterogeneous vegetation structure create favorable microhabitats for diverse beetle communities. Minimal anthropogenic disturbance within the core safari zone further enhances its potential as a refuge for insect biodiversity.

Sampling Methods

Field surveys were conducted during different seasons to capture maximum beetle diversity. Beetles were collected using a combination of standard entomological techniques, including pitfall traps for ground-dwelling beetles, light traps for nocturnal species, sweep netting for foliage-dwelling beetles, and hand collection from leaf litter, logs, and soil surfaces.

Preservation and Identification

Collected specimens were preserved in 70% ethanol or dry-mounted as per standard entomological procedures. Identification was carried out using external morphological characters with the help of standard taxonomic keys and reference literature such as Andrewes (1924–1930), Slipinski et al. (2020), and relevant regional faunal

monographs. Specimens were identified up to family and genus level, and species identification was attempted wherever possible.

Data Analysis Table and Graph

Species richness, relative abundance, and distribution patterns were analyzed across different habitat types. Beetle families were categorized based on their ecological roles, such as predators, decomposers, herbivores, and scavengers.

The dominance of Carabidae and Scarabaeidae in the study area is consistent with findings from other tropical and subtropical forest ecosystems (Rainio & Niemelä, 2020). Ground beetles are known for their sensitivity to microhabitat changes, making them reliable indicators of habitat quality. The high diversity observed in Mukundpur White Tiger Safari reflects the relatively undisturbed nature of the habitat and the availability of diverse ecological niches.

Comparative studies from central Indian forests indicate similar patterns of beetle diversity, suggesting that the Vindhyan region supports a rich coleopteran fauna. The observed seasonal variation aligns with previous reports highlighting the influence of rainfall and vegetation growth on insect population dynamics.

Conservation Significance

Beetles contribute significantly to ecosystem services such as nutrient recycling, soil formation, and biological control. Their diversity and distribution patterns provide valuable insights into ecosystem health and stability. Conservation of beetle diversity within the Mukundpur White Tiger Safari is therefore essential not

only for insect conservation but also for maintaining overall ecological balance.

Incorporating insect diversity studies into wildlife management and conservation planning can strengthen the effectiveness of protected areas. Long-term monitoring of beetle communities can serve as an early warning system for environmental change.

Table-1: Family-wise diversity of beetles recorded from Mukunpur white tiger safari, Satna.

S.No.	Beetle Family	Number of Species
1	Carabidae	18
2	Scarabeeidae	14
3	Chrysomelidae	12
4	Tenebrionidae	9
5	Cerambycidae	7
6	Curculionidae	5
Total		**65**

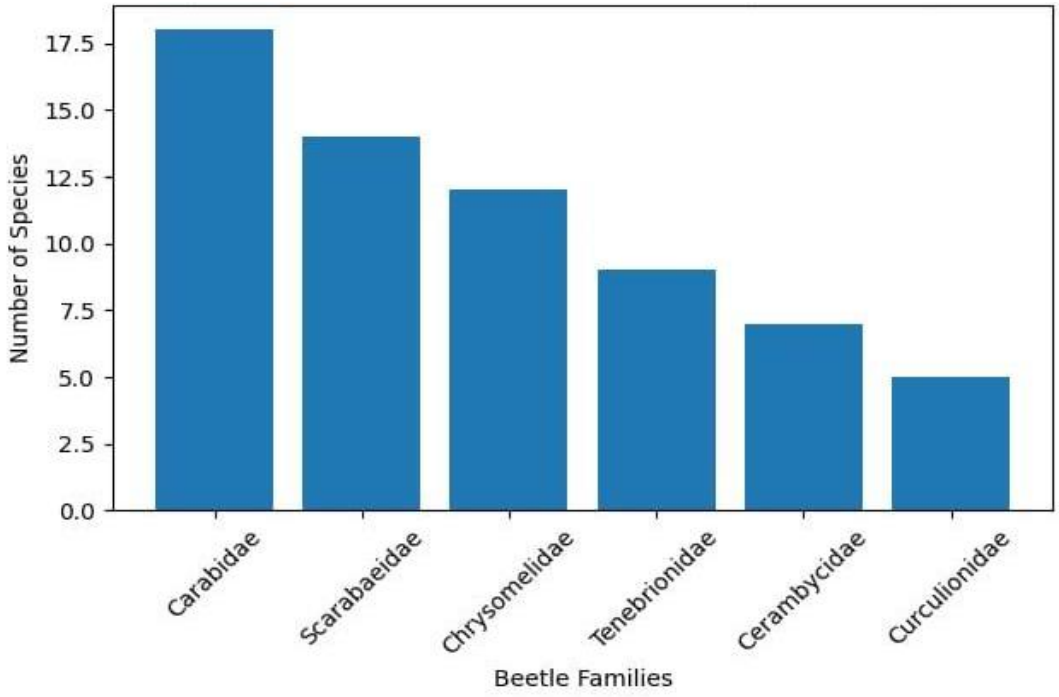


Fig-1: Family-wise distribution of beetles in mukundpur white tiger Safari.

Results and Discussion

The present study recorded a total of 65 beetles from the Mukundpur White Tiger Safari. The family Carabidae was the most dominant, followed by Scarabaeidae, Chrysomelidae, Tenebrionidae, and Cerambycidae.

Ground beetles (Carabidae) were predominantly distributed in forest floor habitats with high leaf litter and moisture content. Scarabaeidae were commonly observed in open grasslands and near dung-rich areas, reflecting their scavenging and decomposer habits. Chrysomelidae showed strong association with vegetation and were more abundant in areas with dense foliage.

Seasonal variation in beetle abundance was evident, with higher species richness recorded during the monsoon and post-monsoon periods. Habitat heterogeneity played a

significant role in shaping beetle community structure and distribution.

Conclusion

The present study provides the first comprehensive account of beetle diversity and distribution in the Mukundpur White Tiger Safari, Satna. The rich coleopteran diversity recorded highlights the ecological importance of the area and underscores the need for continued research and conservation attention. The baseline data generated through this study will be useful for future biodiversity assessments, environmental impact studies, and conservation planning in the region.

References

Andrewes, H.E. (1924–1930). The Fauna of British India: Coleoptera (Carabidae). Taylor and Francis, London.

Gaston, K.J. & Spicer, J.I. (2023). Biodiversity: An Introduction (3rd ed.). Wiley-Blackwell.

Rainio, J. & Niemelä, J. (2020). Ground beetles (Carabidae) as bioindicators. Biodiversity and Conservation, 29, 1–18.

Slipinski, A., Leschen, R., & Lawrence, J. (2020). Australian Beetles. CSIRO Publishing.

Wagner, D.L., Grames, E.M., Forister, M.L., Berenbaum, M.R., & Stopak, D. (2021). Insect decline in the Anthropocene. Proceedings of the National Academy of Sciences, 118(2), e2023989118.

IPBES (2023). Global Assessment Report on Biodiversity and Ecosystem Services. Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services.

Chandra, K., & Ahirwar, S. C. (2005). Scarabaeid beetles of Bandhavgarh National Park, Madhya Pradesh. *Zoos' Print Journal*, *20*(8), 1961–1964.

Shirbhate, M., & Shirbhate, A. (2020). Diversity and checklist of Beetles (Arthropoda: Coleoptera) from Forest areas and Agricultural areas of District Akola, (Maharashtra), India. *Environment Conservation Journal*, *21*(1&2), 89–94.

Chandra, K., & Gupta, D. (2013). Taxonomic studies on dung beetles (Coleoptera: Scarabaeidae, Geotrupidae, Hybosoridae) of Chhattisgarh, India. *Munis Entomology & Zoology*, *8*(1), 331–360.