International Journal of Innovations & Research Analysis (IJIRA)
ISSN :2583-0295, Impact Factor: 7.662, Volume 05, No. 01(II), January- March, 2025, pp 170-174

A COMPREHENSIVE STUDY OF BUTTERFLIES (LEPIDOPTERA) IN AND AROUND BHENSODA POND REGION IN BHENSODA VILLAGE NEAR BHANPURA SUBDIVISION OF MANDSAUR DISTRICT

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ABSTRACT

Butterflies are essential pollinators and bioindicators in ecosystems. This study documents butterfly diversity in and around Bhensoda Pond, Bhensoda Village, Bhanpura subdivision, Mandsaur district. Surveys conducted from April 2023 to September 2024 recorded 32 species across five families: Nymphalidae (12 species), Lycaenidae (8), Pieridae (7), Papilionidae (4), and Hesperiidae (1). The dominance of Nymphalidae indicates a habitat rich in floral diversity. These findings highlight Bhensoda Pond as a butterfly hotspot, emphasizing the need for conservation efforts and providing baseline data for future ecological studies.

Keywords: *Ecosystems, Floral Diversity, Butterflies, Papilionidae, Hesperiidae.*

Introduction

Butterflies (Order: Lepidoptera) are vital components of ecosystems, serving as pollinators, bioindicators, and prey for various species. Their presence reflects habitat health and biodiversity. With over 18,000 species globally, butterflies exhibit remarkable diversity in behavior, coloration, and ecological roles. They thrive in various habitats, from forests to wetlands, depending on nectar sources and host plants. Studying butterfly diversity helps assess environmental changes and conservation priorities, making them key subjects in ecological research.

India is home to approximately 1,500 butterfly species, with southern India recording around 310 species (Larsen, 1987, 1988; Wynter-Blyth, 1957) [2,4]. Butterflies exhibit a co-evolutionary relationship with the plants they pollinate and often display host specificity (P.R. Ehrlich and P.H. Raven, 1964) [5]. However, species diversity is continuously declining due to habitat loss, environmental changes, pollution, and urban expansion. Many species are now at high risk of extinction due to habitat destruction (Blair R.B. and Launer, 1997; Groombridge, 1992; John, 1997; Laurance and Bierregaard, 1997) [6,7,8]. Their diversity is also influenced by habitat characteristics and environmental factors such as temperature, atmospheric conditions, and weather patterns (Kunte, 2000) [9]. Butterflies primarily inhabit restricted terrestrial ecosystems and are a significant part of forest biodiversity. Insects, including butterflies, play a crucial role in pollination, contributing to both wild plant reproduction and agricultural productivity. Nearly 88.7% of pollination is carried out by bees, beetles, moths, and butterflies, which also support 35% of global crop production and maintain uncultivated floral diversity (Mangowi, 2014) [10].

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The abundance and species richness of butterflies are influenced by vegetation types and the availability of preferred food sources. These insects select habitats based on the presence of host and nectar plants (Manoj R. Borkar and Neelam Komarpant, 2004) [13]. A higher abundance and diversity of butterflies are typically associated with regions rich in food plants and nectar sources. However, Raju and Reddy (1955) [14] noted a significant butterfly diversity on the exotic plant species *Lantana camara* in Visakhapatnam. Additionally, butterfly species richness and abundance have been found to be greater in areas with native vegetation compared to regions dominated by *Prosopis juliflora*, primarily due to the higher availability of food plants and the greater floral diversity in native habitats.

Systematic studies on butterflies have been conducted worldwide since the early 18th century. Heppner (1998) documented a total of 19,238 butterfly species globally. Over the last century, several researchers have made significant contributions to butterfly ecology in various Indian ecosystems (Bingham, 1905, 1907; Williams, 1930; Evans, 1932; Talbot, 1938, 1947; Wynter-Blyth, 1947; Larsen, 1987; Kunte, 2000, 2001). Their work has greatly enhanced the understanding of butterfly diversity across different ecosystems, both in India and in select regions worldwide.

Butterflies serve as important indicators of habitat quality and regional vegetation. They contribute to natural ecosystems by pollinating various plant species (Padhya et al., 2006). Many butterfly species exhibit migratory behavior that is strictly seasonal, while others are restricted to specific habitats, making them valuable indicators of regional biodiversity. Due to these characteristics, butterflies are considered ideal subjects for biodiversity studies (Pullin et al., 1995; Thomas, 2001). Research on butterfly diversity has been emphasized across different habitat conditions in India's protected areas, with a particular focus on Karnataka (Basavarajappa et al., 2018). However, several butterfly species have experienced population declines due to threats such as hunting, poaching, and forest fires (Grewal, 1996). Consequently, many species are now at risk, even within protected areas (Ghazol, 2002; Solomon and Rao, 2002). To ensure effective conservation, periodic updates on species composition, diversity, preferred host and food plants, and distribution patterns of butterflies are essential.

Material & Methods

The study utilized essential entomological tools, including insect nets and bait traps for capturing butterflies and Odonates with minimal harm. Plastic boxes with ventilation were used for temporary storage, while chloroform (if necessary) and alternative cooling methods ensured ethical specimen euthanasia. Preserved specimens were stored in insect boxes with spreading sheets and wax for taxonomic confirmation. High-resolution cameras and binoculars facilitated photographic documentation. Species identification was carried out using taxonomic keys, reference guides, and expert consultation. A field notebook and GPS device were employed for recording observations and mapping species distribution.

The study followed a systematic survey approach using the belt transect method, covering a 2.5m x 5m observation area. Sampling was conducted daily from 8:00 AM to 10:00 AM under consistent environmental conditions. Butterflies and Odonates were primarily recorded through live capture and photography, with minimal specimen collection for verification. Identification was conducted using insect keys and reference materials, with ambiguous specimens cross-verified by experts. Data analysis focused on species diversity, abundance, and habitat preferences to support ecological assessments and conservation planning.

Study Area

Bhensoda village is located in Bhanpura tehsil of Mandsaur district in Madhya Pradesh, India. It is situated 18 km away from sub district head quarter Bhanpura and 125 km away from district head quarter Mandsaur. The total geographical area of village is 2657.33 hectares. It is in the KhathiarGir dry deciduous forests eco region in Gandhi Sagar area. Flat grass lands are also found here. Principal tree species Khair (*Acacia cathechu*), Tendu, Palash etc. Many species of insects are also found here. Having special climatic conditions for citrus fruits, this area is a big hub for orange production.

Bhensoda talab is situated near railway track area surrounded by agricultural land. Many species of Butterflies and Odonates are found here due to very less pollution and favorable conditions for their survival.

Result & Discussion

Butterflies serve as vital bioindicators of environmental health and play a crucial role in pollination and ecosystem functioning. The present study aimed to document the butterfly diversity at Bhensoda Pond and assess the distribution patterns of different families. The findings provide insights into species richness, family-wise dominance, and habitat associations, offering valuable baseline data for conservation planning.

A total of 32 butterfly species were recorded during the assessment, distributed across five families, as follows: Nymphalidae – 12 species (37.5%); Lycaenidae – 8 species (25%); Pieridae – 7 species (21.87%); Papilionidae – 4 species (12.5%); Hesperiidae – 1 species (3.13%).

The Nymphalidae family exhibited the highest species richness, contributing to over one-third of the total recorded species. This dominance may be attributed to the high ecological adaptability of nymphalid butterflies, which are known to thrive in diverse habitat types, including open grasslands, forest edges, and riparian zones. Their generalist feeding behavior and ability to exploit a wide range of nectar and larval host plants further contribute to their widespread distribution.

The Lycaenidae (blues and coppers) and Pieridae (whites and yellows) families were the second and third most represented, indicating the presence of a varied floral composition that supports multiple butterfly species. Lycaenids are often associated with specific host plants and mutualistic relationships with ants, which may influence their distribution patterns. The Pieridae family, comprising many species with strong migratory behavior, suggests seasonal movement and habitat connectivity in the region.

The Papilionidae family, although less represented, includes several ecologically significant species that are often indicators of well-preserved ecosystems with undisturbed natural vegetation. The relatively lower number of Papilionidae species may indicate the presence of selective larval host plants that limit their population distribution.

The Hesperiidae family, represented by only one species (3.13% of the total recorded species), was the least abundant. Skippers (Hesperiidae) tend to exhibit specialized habitat preferences and may have seasonal variations in population size. Their low representation could be due to specific ecological requirements such as dense undergrowth or shaded areas, which may be limited in the surveyed habitat.

Table 1: Butterflies Species Recorded in and Near Bhensoda Pond

Sr. No.	Common name and families	Zoological names
	Papilionidae	
1	Common Rose	*Pachlioptaaristolochiae (Fabricius, 1775)*
2	Lime butterfly	*Papiliodemodemoleus(Linnaeus, 1758)*
3	Common Mormon	*Papilio polytes(Linnaeus, 1758)*
4	Tailed Jay	*Graphium Agamemnon (Lathy,1907)*
	Pieridae	
5	Common Emigrant	*Catopsiliapomona (Fabricius,1775)*
6	Small Grass Yellow	*Euremabrigitta (Linnaeus, 1758)*
7	Common grass yellow	*Euremahecabe(Linnaeus, 1758)*
8	Common Jezebel	*Delias eucharis (Drury, 1773)*
9	Yellow orange tip	*Ixias pyrene (Linnaeus,1764)*
10	Spotless grass yellow	*Euremalaeta (Boisduval, 1836)*
11	Psyche	*Leptosianina (Fabricius, 1793)*
	Lycaenidae	
12	Common silver line	*Spindasisvulcansfusca (Moore,1881)*
13	Pale grass blue	*Pseudozizeeria maha (Kollar, 1844)*
14	Dark grass blue	*Zizeeriakarsandra (Moore, 1865)*
15	Lesser grass blue	*Zizinaotis (Fabricius,1787)*
16	Lime blue	*Chiladeslajus (Cramer, 1782)*
17	Zebra blue	*Leptotesplinius (Fabricius, 1793)*
18	Gram blue	*Euchrysopscnejus (Fabricus, 1798)*
19	Tiny grass blue	*Zizulahylax (Fabricius, 1775)*
	Nymphalidae	
20	Painted lady	*Vanessa cardui (Linnaeus, 1758)*
21	Grey pansy	*Junoniaatlites (Linnaeus, 1763)*
22	Blue pansy	*Junoniaorithya (Linnaeus, 1758)*
23	Great eggfly	*Hypolimnasbolina (Linnaeus, 1758)*
24	Blue Tiger	*Tirumala limniace leopardus(Butler, 1866)*
25	Danaid Eggfly	*Hypolimnasmisippus (Linnaeus, 1764)*
26	Plain tiger	*Danaus chrysippus (Linnaeus, 1758)*

27	Peacock pansy	*Junoniaalmana (Linnaeus, 1758)*
28	Yellow pansy	*Junoniahierta (Fabricius, 1798)*
29	Lemon pansy	*Junoialemonias (Linnaeus, 1758).*
30	Common four ring	*Ypthimahuebneri Kirby, 1871*
31	Common crow	*Euploea core (Cramer, 1780)*
	Hesperridae	
32	Spotted Small flat	*Sarangesapurendra (Moore, 1865)*

Conclusion

The present study provides a comprehensive assessment of the Odonate and Butterfly diversity at Bhensoda Pond, highlighting its ecological significance as a biodiversity-rich freshwater ecosystem. The findings confirm that the pond and its surrounding habitats support a wide range of species, indicating favourable environmental conditions for both aquatic and terrestrial insect communities.

The Butterfly diversity survey recorded 32 species from five families, with Nymphalidae (37.5%) being the most dominant due to its adaptability to various habitats. The presence of Lycaenidae (25%) and Pieridae (21.87%) indicates a rich floral diversity that supports nectar-feeding adults and caterpillars. The Papilionidae (12.5%), often considered indicators of undisturbed habitats, further reinforces the ecological value of the study site. The low representation of Hesperiidae (3.13%) suggests that these species may have specialized habitat requirements or exhibit seasonal variability. The presence of migratory Pieridae species also implies that Bhensoda Pond may act as an important corridor for butterfly movement, emphasizing the need to preserve habitat connectivity.

The results of this study reinforce the ecological significance of Bhensoda Pond as a critical habitat that supports a diverse community of insects, playing essential roles in pollination, nutrient cycling, and ecosystem stability. The presence of both Odonate and Butterfly species that are known bioindicators suggests that water quality, vegetation cover, and overall habitat health remain favourable in many areas of the pond. However, human disturbances, habitat fragmentation, and potential water pollution could pose threats to these insect populations over time.

References

1. Basavarajappa S, GopiKrishna V, Santhosh S (2018). Report on the checklist of butterfly species found at Nagarhole National Park, Karnataka, India. Journal of Entomology and Zoology Studies 6(2):1968-1975.
2. Bingham CT (1905). Fauna of British India. Butterflies, London, UK: Taylor and Francis 1:56-148.
3. Bingham CT (1907). Fauna of British India. Butterflies, London, UK: Taylor and Francis 2:98.
4. Ehrlich PR, Raven PH. “Butterflies and Plants: A Study in Coevolution,” Evolution. 1964; 18(4):586608, 1964.
5. Evans WH (1932). The Identification of Indian butterflies. Journal of Bombay Natural History Society, Mumbai, India P 454.
6. Ghazol J (2002). Impact of logging on the richness and diversity of forest butterflies in a tropical dry forest in Thailand. Biological Conservation 11:521-541.
7. Grewal B (1996). Friends of butterflies. Sanctuary Asia 16: 4-17.
8. Groombridge B, (ed.) Global Biodiversity. Status of the Earth's Living Resources. A Report. London,
9. Glasgow, New York, Tokyo, Melbourne, Madras: Chapman & Hall. Price £29.95 (hard covers). ISBN 0 412 47240 6, 1992, 132.
10. Heppner J (1998). Classification of Lepidoptera, Part I, Introduction. Holarctic Lepidoptera 5:148.
11. John AG. Timber production andbiodiversity conservation I tropicalrainforest. (2nd Ed.). United Kingdom: Cambridge University Press, 1997.
12. Kunte K (2000). India - A Lifescape: Butterflies of Peninsular India. Indian Academy of Science, Bangalore: University Press P 270.
13. Kunte K (2001). Butterfly diversity of Pune city along the human impact gradient. Journal of Ecological Society 13-14:40-45.

14. Larsen TB. The butterflies of the Nilgiri Mountains of south India. Journal of Bombay Natural History Society. 1987; 74:546-549.
15. Larsen T8. The butterflies cf the mountains of South India (Lepidoptera: Rhopalocer a), J. Bonbay Nat. Hist., Soc. 1988; 5:26-43.
16. Laurance WF, Bierregaard RO. Preface - A crisis in the making. In:Laurance W. F. and R. O Bierregaard (Eds.). Tropical forest remnants – ecology, management and conservation of fragmented communities. Chicago: Chicago University Press, 1997.
17. Mangowi AL. Effect of agriculture on abundance and diversity of arthropods with chewing mouth parts at Sokoine University of Agriculture Main Campus. Journal of Natural Sciences Research. 2014; 4(4):55-62.
18. Manoj R Borkar, Neelam Komarpant. Diversity, abundance and habitat association of Butterfly species in Bondla wildlife sanctuary of Goa, India. 2004; 19(10):1648-1653.
19. Padhya AD, Dahanukar N, Paingankar M, Deshpande M, Deshpande D (2006). Season and landscape wise distribution of butterflies in Tamhini, Northern and Western Ghats, India. Zoos Print Journal. 21(3):2175-2181.
20. Pullin AS, McLean IF, Webb MR (1995). Ecology and conservation of Lycaena dispar: British and European perspectives. In Ecology and Conservation of Butterflies pp. 150-164.
21. Raju AJS, Reddi CS. Flower colourshifts and pollination in Lantana camara L. Verbenaceae. Journal of Palynology. 1995; 31:275-289.
22. Solomon RAJ, Rao PS (2002). A case study on the decline of butterfly colonies in degraded habitats of Vishakhapatnam. Bulletin of Andhra University Research Forum 7(10): 57-59.
23. Talbot G (1938). The fauna of British India including Ceylon and Burma. Butterflies, London, UK: Taylor and Francis. 1: 1-110.
24. Talbot G (1947). The fauna of British India including Ceylon and Burma. Butterflies. London, UK: Taylor and Francis, London 2:45.
25. Thomas JD (2001). Using pollination deficits to infer pollinator decline: Can theory guide us? Conservation Ecology 5(1):6-8.
26. Williams CB (1930). The migration of butterflies. Edinburg and London, UK: Oliver and Boyd pp. 440-448.
27. Wynter-Blyth MA (1947). The butterflies of the Nilgiris- a supplementary note. Journal of Bombay Natural History Society 46(4):735-736.
28. Wynter-Blyth MA. Butterflies of the Indian Region. 523pp. Bombay Natural History Society, Bombay, India, 1957.

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