Journal of Entomology and Zoology Studies

Available online at www.entomoljournal.com

E-ISSN: 2320-7078
P-ISSN: 2349-6800
www.entomoljournal.com
JEZS 2025; 13(4): 41-45

Received: 26-04-2025
Accepted: 30-05-2025

Shraddha Khapre
Research Scholar, Department of Zoology, Government Science College, Jabalpur, Madhya Pradesh, India

Dr. Rita Bhandari
Retd, Professor, Department of Zoology, Government OFK College, Jabalpur, Madhya Pradesh, India

Dr. Preeti Khare
Assistant Professor, Department of Zoology, Government Science College, Jabalpur, Madhya Pradesh, India

Corresponding Author:
Shraddha Khapre
Research Scholar, Department of Zoology, Government Science College, Jabalpur, Madhya Pradesh, India

A preliminary study on the abundance, habitat preferences and seasonal patterns of butterfly fauna (Lepidoptera: Rhopalocera) of Bargi dam catchment area at Jabalpur division (MP.)

Shraddha Khapre, Rita Bhandari and Preeti Khare

DOI: https://www.doi.org/10.22271/j.ento.2025.v13.i4a.9539

Abstract
From December 2023 to November 2024, a butterfly species survey was done in the Bargi Dam Catchment Area, Jabalpur Division. In and around Jabalpur, 51 butterfly species from five families were recorded: Nymphalidae, Pieridae, Lycaenidae, Papilionidae, and Riodinidae. This unique habitat offers one of the first complete views of the region's butterfly species variety and abundance. Nymphalidae has the most recorded species (21), followed by Lycaenidae (17), Pieridae (7), Papilionidae (5), and Riodinidae (1). Species abundance was divided into four categories: Very Common, Common, Rare, and Very Rare. Butterflies provide critical ecological services and respond distinctively to urbanization, making them valuable bioindicators for measuring habitat quality and environmental health. The butterfly species were found in a variety of settings, including grasslands, open woodlands, scrub forests, and mud puddles, with scrub forests being the most popular. Seasonal differences in species richness were also noticed, with the most species observed during the winter season and the fewest during the monsoon. This study intends to help build biodiversity restoration plans and habitat management techniques for the Bargi Dam Catchment Area.

Keywords: Abundance, butterfly species, Bargi dam catchment area, habitat, seasonal variation, status

Introduction
Butterfly species have a wide dispersal and distribution within the order Lepidoptera due to their evolutionary ability to adapt morphologically and physiologically to a variety of natural environments (Ramesh *et al*., 2010; Pollard, 1991; Kunte, 1997) [21, 20, 10]. Many butterfly species have precise seasonal requirements and prefer specialized habitats (Kunte, 2008) [12]. As a result, they are useful markers of population dispersion and habitat quality (Kocher and Williams, 2000) [8]. Additionally, changes in butterfly species composition have been observed in response to selective logging, an environmental disturbance that may not significantly affect larger fauna such as ungulates or carnivores to the same extent (Hamer *et al*., 2003; Arya *et al*., 2014) [4, 1]. Pollinators play a pivotal role in maintaining ecosystem health and productivity. Approximately 90% of all flowering plants rely on pollination vectors and other pollinating agents for their reproductive success (Kearns & Inouye, 1997) [6]. Among these, butterflies (order: Lepidoptera) are significant contributors due to their ecological adaptability, beauty, and wide distribution. The order Lepidoptera, comprising butterflies (Rhopalocera) and moths (Heterocera), represents about 10% of known animal diversity, with over 155,000 species described to date (Kristensen *et al*., 2007; Nieukerken *et al*., 2011; Mallik *et al*., 2022) [9, 16, 14]. It is the second-largest insect order, including approximately 149,969 species across 126 families worldwide (Life Catalog, 2021) [13]. Notably, Lepidoptera species have been recorded on every continent except Antarctica, underlining their extensive global distribution. Butterflies are widely admired for their aesthetic appeal and are considered among the most beautiful and colorful insect groups. Beyond their visual significance, they serve critical ecological roles-acting as pollinators, components of the food chain, and bioindicators of environmental quality and habitat health. Their life cycle includes complete metamorphosis (holometabolism), with four stages: egg, larvae (caterpillars), pupae, and adults. Butterflies provide important ecosystem services, including pollination, which aids reproduction in a wide

range of plant species. According to Borges *et al*. (2003), they help pollinate more than 50 commercially significant plant crops. Their availability and abundance are strongly correlated with floral diversity, vegetation structure, and microclimatic conditions (Brehm *et al*., 2003; Molleman *et al*., 2006) [3, 15]. Furthermore, butterflies are extremely sensitive to environmental disturbances such habitat fragmentation, selective logging, and climate change, making them ideal markers of biodiversity and ecological change (Kunte, 2000; Pearson, 1994; Hill *et al*., 2001) [11, 19, 5]. In particular, climate change has a disproportionately greater impact on ecologically fragile areas (Niyogi *et al*., 2010) [17], which can be effectively monitored through shifts in butterfly population structure and species composition. Given these attributes, butterflies are not only ecologically essential but also serve as effective tools for environmental monitoring and biodiversity conservation.

Materials and Methods

Jabalpur, also known as Sanskardhani, is one of Madhya Pradesh's main cities, situated in central India at 23.17°N latitude and 79.94°E longitude (Map 01). The Bargi Dam Catchment Area, which extends from Bargi to Chutka on both sides, covers three Madhya Pradesh districts: Jabalpur, Mandla, and Seoni. All research sampling sites were in and around the Bargi Dam Catchment, which is within a 30-kilometer radius of Jabalpur Division. This study is based on one year of random field surveys conducted between December 2023 and November 2024. Butterfly abundance and seasonal patterns were observed using line transect counting, with observations carried out during two specific time windows: 5:00 AM to 11:00 AM in the morning and 4:00 PM to 7:00 PM in the evening, when butterflies are most active. Species identification was primarily conducted in the field by direct observation. In cases of uncertainty, butterflies were photographed or gently captured using handheld aerial sweep nets. In critical identification scenarios, specimens were collected in plastic bottles and taken to the laboratory for examination using standard field guides (Wynter-Blyth, 1957; Kunte, 2000) [24, 11]. Scientific nomenclature and classification followed the guidelines by Varshney and Smetacek (2015) [23] and Kehimkar (2016) [7].

The recorded butterfly species were categorized into four abundance classes: Very Common (VC), Common (C), Rare (R), and Very Rare (VR) based on their frequency of occurrence across the sampling sites (Tiple *et al*., 2006) [22]. Observations also included data on seasonality and habitat preferences, with butterflies recorded from various habitat types such as grasslands, open forests, shrublands, and herbaceous zones (Bobo *et al*., 2006) [2].

Map 1: Jabalpur Region of Madhya Pradesh

Results and Discussion

A total of 51 butterfly species belonging to the order Lepidoptera, suborder Rhopalocera, and superfamily Papilionoidea were recorded (Table 01) from the Bargi Dam Catchment Area, Jabalpur, during the study period (Dec 2023-Nov 2024). These species were classified under five families: Nymphalidae (21 species), Pieridae (7 species), Lycaenidae (17 species), Papilionidae (5 species), and Riodinidae (1 species). The dominant family was Nymphalidae comprising 41% of the total species, indicating their high adaptability and ecological range in the region.

Table 1: Butterfly species of Bargi Dam Catchment Area together with common name, flight period, habitat preference and status.

S. No.	Scientific Name	Common Name	Status	Habitat Preference	Flight Period
Order: Lepidoptera **Suborder:** Rhopalocera **Superfamily:** Papilionoidea **Family:** Nymphalidae (21)					
1.	Ariadne merione (Cramer, [1777])	Common Castor	C	OF	PM, W, S
2.	*Hypolimnas bolina* (Linnaeus, 1758)	Great Eggfly	C	GL	PM, W
3.	*Elymnias hypermnestra* (Linnaeus, 1763)	Common Palmfly	R	OF	W
4.	*Symphaedra nais* (Forster, 1771)	Baronet	C	GL	PM, S
5.	*Euploea core* (Cramer, [1780])	Common Crow	VC	OF, MP	S, M, PM,W
6.	*Melanitis leda* (Linnaeus, 1758)	Common Evening Brown	VC	GL	S, M, PM,W
7.	*Melanitis phedima* (Cramer, [1780])	Dark Evening Brown	VC	GL	S, M, PM,W
8.	*Junonia lemonias* (Linnaeus, 1758)	Lemon Pansy	VC	OF	S, M, PM,W
9.	*Junonia almana* (Linnaeus, 1758)	Peacock Pansy	C	OF	W,S
10.	*Junonia atlites* (Linnaeus, 1763)	Grey Pansy	VC	OF	S, M, PM,W
11.	*Junonia iphita* (Cramer, [1779])	Chocolate Pansy	C	OF	W,S
12.	*Junonia orithya* (Linnaeus, 1758)	Blue Pansy	C	OF	W,S
13.	*Mycalesis mineus* (Linnaeus, 1758)	Dark brand Bushbrown	R	OF	PM
14.	*Neptis hylas* (Linnaeus, 1758)	Common Sailer	C	OF	W
15.	*Polyura agraria** (Swinhoe, 1887)	Anomalous Nawab	VR	SF	PM
16.	*Danaus chrysippus* (Linnaeus, 1758)	Plain Tiger	VC	GL	S, M, PM,W
17.	*Acraea violae* (Fabricius, 1793)	Tawny Coster	R	OF	W
18.	*Phalanta phalantha* (Drury, [1773])	Common Leopard	R	OF	S
19.	*Moduza procris* (Cramer, [1777])	Commander	VR	OF, SF	W, PM
20.	*Tirumala limniace* (Cramer, [1775])	Blue Tiger	R	GL	M, PM
21.	*Hypolimnas misippus* (Linnaeus, 1764)	Danaid Eggfly	C	SF	PM
Family - Pieridae (7)					
22.	*Eurema brigitta* (Stoll, [1780])	Small Grass Yellow	C	GL, OF, SF	W, S
23.	*Delias eucharis* (Drury, 1773)	Common Jezabel	C	OF, SF	PM, W
24.	*Pareronia valeria* (Cramer, [1776])	Common Wanderer	C	SF	W, S
25.	*Catopsilia pomona* (Fabricius, 1775)	Common Emigrant	VC	OP, MP	S, M, PM,W
26.	*Leptosia nina* (Fabricius, 1793)	Psyche	VC	OF, SF	S, M, PM,W
27.	*Cepora nerissa* (Fabricius, 1775)	Common Gull	C	GL, OF, SF	W, PM
28.	*Eurema blanda** (Boisduval, 1836)	Three-spot Grass Yellow	R	GL, OF, SF	PM
Family - Lycaenidae (17)					
29.	*Talicada nyseus* (Guerin-Meneville, 1843)	Red Pierrot	R	GL, SF	PM
30.	*Tarucus extricatus** Butler 1886	Rounded Pierrot	VR	GL, SF	W
31.	*Tarucus nara* (Kollar, 1848)	Striped Pierrot	R	GL, SF	W
32.	*Cyclargus thomasi** W.P. Comstock & Huntington, 1943	Miami Blue	VR	GL, SF	W
33.	*Luthrodes pandava* (Horsfield, [1829])	Plain Cupid	C	GL, SF	W, PM
34.	*Freyeria putli* (Kollar, [1844])	Small Grass Jewel	R	GL	W
35.	*Leptotes plinius* (Fabricius, 1793)	Zebra Blue	R	SF	W, M
36.	*Euchrysops cnejus* (Fabricius, 1798)	Gram blue	R	SF	W, M
37.	Prosotas dubiosa* (Semper, [1879])	Tailless Line blue	VR	GL, SF	PM
38.	Castalius rosimon (Fabricius, 1775)	Common Pierrot	C	GL, SF	W
39.	*Catochrysops* panormus* (C. Felder, 1860)	Forget-me-not	R	GL, MP	W
40.	*Prosotas nora** (C. Felder, 1860)	Common Line blue	C	GL, SF	W, PM
41.	*Tarucus balkanicus* (Freyer, 1844)	Black-spotted Pierrot	R	GL, SF	PM
42.	*Zizeeria karsandra* (Moore, 1865)	Dark grass blue	VR	GL, SF	M
43.	*Rapala iarbus* (Fabricius, 1787)	Common Red Flash	VR	SF	W, PM
44.	*Zizina hylax* (Fabricius, 1775)	Tiny Grass Blue	R	GL, SF	W
45.	*Chilades parrhasius* (Fabricius, 1793)	Small Cupid	C	GL, SF	PM
Family - Papillionidae (5)					
46.	*Papilio polytes* Linnaeus, 1758	Common Mormon	VC	OF	S, M, PM,W
47.	*Papilio demoleus* Linnaeus, 1758	Lime Butterfly	VC	SF	S, M, PM,W
48.	*Pachliopta aristolochiae* (Fabricius, 1775)	Common Rose	C	OF	S, PM,W
49.	*Graphium doson** (C. & R. Felder, 1864)	Common Jay	R	OF, SF	PM,W
50.	*Graphium agamemnon* (Linnaeus, 1758)	Tailed Jay	R	OF	PM,W
Family - Riodinidae (1)					
51.	*Dodona dipoea** (Hewitson, 1865)	Lesser Punch	VR	OF	PM,W

*New to Central India, R-Rare (05-20 sightings), C-Common (20-50 sightings), and VC-Very Common (>50 sightings) VR: Very Rare Seen (1-2 sightings) S for summer, W for winter, M for monsoon, PM: Post-Monsoon SF stands for scrub forest, MP for mud puddles, OF for open forest, along with GL for grass land.

With 21 species (41%) of the total, the Nymphalidae family has the greatest number of butterfly species. Next in line were the Lycaenidae (17 species, or 33%), Pieridae (7 species, or 14%), and Papilionidae (5 species, or 10%). The Riodinidae family had the fewest species, with just 1 species (2%) (Fig. 1). Out of all the species that were recorded, 17 (33%) were classified as Common, 10 (20%) as Very Common, 16 (31%) as Rare, and 8 (16%) as Very Rare based on abundance status (Fig. 2).

A total of four distinct habitat types were identified within the study area, which supported varying numbers of butterfly species. Scrub forests (SF) emerged as the most preferred habitat, recording the highest number of species (27), likely due to the availability of diverse host plants, dense vegetation, and microclimatic conditions favorable for butterfly activities such as feeding and breeding. Both grasslands (GL) and open forests (OF) supported an equal number of species (23 each). Grasslands provide abundant nectar resources and open flight space, while open forests offer a mosaic of sunlight and shade, promoting ecological diversity. Mud puddles (MP) recorded the lowest number of species (7), yet these areas are ecologically significant as butterflies visit them for essential minerals and nutrients through a behavior known as mud-puddling. This habitat-based distribution highlights the importance of maintaining a variety of landscapes to support butterfly diversity in the Bargi Dam catchment area.

Seasonal variation played a significant role in the distribution and abundance of butterfly species within the Bargi Dam catchment area. The highest number of species was recorded during the winter season (W), with 39 species, indicating favorable climatic conditions, floral availability, and suitable microhabitats during this period. The post-monsoon (PM) season supported 30 species, likely due to increased vegetation growth and blooming after the rains. In summer (S), a moderate diversity was observed with 16 species, despite higher temperatures, which may have limited butterfly activity during peak heat. The monsoon season (M) recorded the lowest number of species (10), possibly due to continuous rainfall, habitat disturbance, and reduced nectar sources. These observations suggest that butterflies are highly sensitive to seasonal changes, with winter being the most favorable and monsoon the least favorable for their activity and visibility.

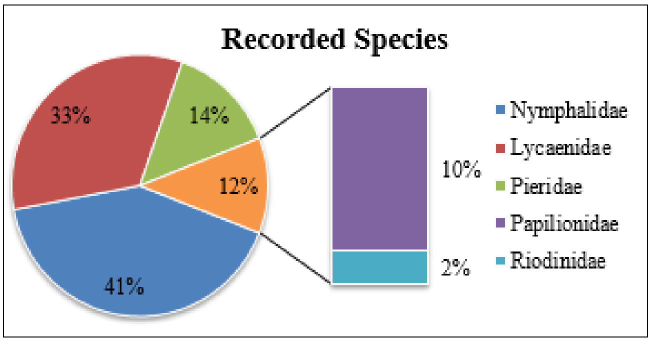

Fig 1: Family-wise of Butterfly Species

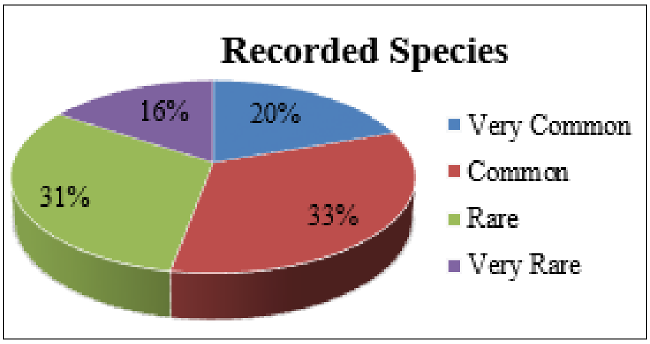

Fig2: Status Abundance of Butterfly species

Conclusion

This study provides a comprehensive baseline on butterfly diversity and seasonal dynamics in the Bargi Dam Catchment Area. The dominance of family Nymphalidae, preference for scrub forest habitats, and sensitivity to seasonal variation demonstrate the importance of landscape heterogeneity in sustaining butterfly populations. These findings can significantly contribute to:

- Biodiversity monitoring programs
- Habitat conservation and restoration planning
- Eco-sensitive tourism development
- Public awareness on pollinator conservation

The study also highlights the potential of butterflies as Bioindicators of habitat quality and climate responsiveness, reinforcing their ecological importance in biodiversity and ecosystem health assessment.

References

1. Arya MK, Dayakrishnan, Chaudhary R. Species richness and diversity of butterflies in and around Kumaun University, Nainital, Uttarakhand, India. J Entomol Zool Stud. 2014;2(3):153-159.
2. Bobo KS, Waltert M, Fermon H, Njokagbor J, Muhlenberg M. From forest to farmland: butterfly Diversityandhabitat associations along a gradient of Forest conservation in Southwestern Cameroon. J Insect Conserv. 2006;10:29-42.
3. Brehm G, Sussenbach D, Fiedler K. Unique elevation diversity patterns of geometrid moths in an Andean montane rainforest; 2003.
4. Hamer KC, Hill JK, Benedick S, Mustaffa N, Sherratt TN, Maryati M, *et al.* Ecology of butterflies in natural and selectively-loggedforests of northern Borneo: the importance of habitat heterogeneity. J Appl Ecol. 2003;40:150-162.
5. Hill JK, Collingham YC, Thomas CD, Blakeley DS, Fox R, Moss D, *et al.* Impacts of landscape structure on butterfly range expansion. Ecol Lett. 2001;4(4):313-321.
6. Kearns CA, Inouye DW. Pollinators, flowering plants, and conservation biology. Bioscience. 1997;47:297-307.
7. Kehimkar I. The Book of Indian Butterflies. Delhi: BNHS, Oxford University, Delhi Press; 2016. p. 497.
8. Kocher SD, Williams EH. The Diversity and Abundance of North America Butterflies, VaryWithHabitat Disturbance and Geography. J Biogeogr. 2000;27:785-794.
9. Kristensen NP, Scoble MJ, Karsholt O. *Lepidoptera* phylogeny and systematic: the state of inventorying moth and butterfly diversity. Zootaxa. 2007;1668:699-747.
10. Kunte K. Seasonal patterns in butterfly abundance and species diversity in four tropical habitats in the northern Western Ghats. J Biosci. 1997;22:593-603.
11. Kunte K. Butterflies of Peninsular India. Indian Academy of Sciences, Universities Press (India) Limited; 2000. p. 1-254.
12. Kunte K. The Wildlife (protection) Act and conservationprioritization of butterflies of the Western Ghats, Southwestern India. Curr Sci India. 2008;94:729-735.
13. Catalogue of life. 2021. Available from: https://www.catalogueoflife.org/
14. Mallik S, Mondal S, Debnath N. Study on the butterfly diversity inChittaranjan town, Bardhaman district, West

Bengal. Pharma Innov J. 2022;SP-11(6):2892-2899.

15. Molleman F, Kop A, Brakefield PM, DeVries PJ, Zwaan BJ. Vertical and temporal patterns of biodiversityofFruit-feeding butterflies in a tropical forest in Uganda. Biodivers Conserv. 2006;15:107-121.
16. Nieukerken EJ, Kaila L, Kitching I, Kristensen NP. order *Lepidoptera* Linnaeus, 2011, 1758.
17. Niyogi D, Kishtawal C, Tripathi S, Govindaraju RS. Observational evidence that agricultural intensification And land use change may be reducing the Indian summer Monsoon rainfall. Water Resour Res. 2010;46:W03533.
18. Deshpande M, Deshpande D. Season and Landscape wise distribution of butterflies in Tamhini, Northern, Western Ghats, India. Zoos Print J. 2006;21(3):2175-2181.
19. Pearson DL. Selecting indicator taxa for the Quantitative assessment of biodiversity. Philos Trans R Soc Lond B. 1994;345:75-79.
20. Pollard E. Monitoring Butterfly Numbers. In: Goldsmith FB, editor. Monitoring for ConservationandEcology. London: Chapman and Hall; 1991. p. 274.
21. Ramesh T, Hussain KJ, Selvanayagam M, Satpathy KK, Prasad RVM. Patterns of diversity, abundance and habitat associations of butterfly communities in heterogeneous landscapes of the department of atomic energy (DAE)campus at Kalpakkam, South India. Int J Biodivers Conserv. 2010;2(4):75-85.
22. Tiple AD, Deshmukh VP, Dennis RLH. Factors influencing nectar plant resource visits by butterflies on a university campus: implications for conservation. Nota Lepidopterologica. 2006;28:213-224.
23. Varshney RL, Smetacek P. A synoptic catalogue of the butterflies of India. Bhimtal and New Delhi: Butterfly Research Centre and Indinov Publishing; 2015. p. 261.
24. Wynter-Blyth MA. Butterflies of the Indian Region. Bombay: Bombay Natural History Society; 1957. p. 523.