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A STUDY OF DIVERSITY OF BUTTERFLIES OF AMBAH, DIST. MORENA, MADHYA PRADESH, INDIA

Jitendra Singh Kirar and Dushyant Kumar Sharma

Department of Zoology, Ambah P. G. College Ambah Morena (M.P.), India
Department of Zoology, SMS Govt. Model Science College Gwalior (M.P.), India

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ABSTRACT

The present study was conducted to document and analyze the common structures, diversity, and abundance of butterflies in Ambah Tehsil, Morena District, Madhya Pradesh, India, from June 2024 to May 2025. Butterfly observations were carried out using the direct visual encounter method, and photographs were taken to assist in species identification. A total of 41 butterfly species belonging to 5 families were recorded. The family Nymphalidae had the highest number of species (14), followed by Pieridae (11), Lycaenidae (9), Papilionidae (4), and Hesperiidae (3), respectively. Among the recorded families, Nymphalidae was the most diverse, comprising 14 species (34% of the total). This was followed by Pieridae with 11 species (27%), Lycaenidae with 9 species (22%), and Papilionidae with 4 species (10%). Hesperiidae and Papilionidae were the least represented each with 3 species (7%).

No. of Pages: 7 **No. of Table: 1** **No. of Figs.: 3** **References: 31**

Keywords: Butterfly, Diversity, Ambah, Conservation, Abundance.

INTRODUCTION

Butterflies belong to a large group of insects known as the order *Lepidoptera*, within the phylum Arthropoda. The name *Lepidoptera*, the second-largest group within the class Insecta (largest class of animals), which includes butterflies (Arya, 2019; Verma, 2017; Verma and Prakash, 2020), comes from the Greek words *lepido*, meaning "scale," and *ptera*, meaning "wings," referring to the tiny scales that cover the wings of adult butterflies. These insects are incredibly diverse in shape, size, and colour (Wadatkar and Kasambe, 2009; Bhoye and Makode, 2025). Butterflies can be found all around the world, except in regions near the poles.

Butterflies are excellent indicators of climatic conditions, seasonal changes, and ecological shifts. They can also play a crucial role in shaping conservation strategies. However, despite their importance, butterflies have often been overlooked by conservation biologists and policymakers. Nevertheless, they are vital to ecosystems and have a co-evolutionary relationship with plants; with their lives being closely intertwined (Ghazanfar et al., 2016). Butterflies play a crucial role in the food chain and are valuable pollinators in their local environments. Habitat enrichment has been shown to be essential in conserving butterfly species and promoting their abundance. Since butterflies depend on specific host plants during their developmental stages, their diversity indirectly reflects the floral diversity of a given area (Kumari et al., 2023).

Kunte et al. (2012) reported that India is home to a total of 1,504 butterfly species, which accounts for 8.74% of

*Corresponding author: *jeetsinghkirar99@gmail.com* | *dushyant3268@gmail.com*

the world's butterfly species, with 285 species found in southern India. Peninsular India and the Western Ghats host 351 and 334 species, respectively. The order *Lepidoptera* represents a highly diverse group of predominantly phytophagous insects, likely linked to the extensive diversification of flowering plants since the Cretaceous period (Menken et al., 2012). Butterflies provide numerous vital, economically significant services within terrestrial ecosystems, including nutrient recycling, soil formation, food resources, and pollination.Insects are among the most fascinating creatures in nature, and butterflies are arguably the most remarkable and colourful among them. Considered one of the most important elements of biodiversity, butterflies make up the second-largest group within the order *Lepidoptera* (Alarape, 2015). The butterflies and many other insects are highly sensitive organisms, influenced by human activities, pollution, pesticides etc. (Prakash and Verma, 2020; Goel et al., 2022; Prakash and Verma, 2022; Singh *et al.,* 2023).

Butterflies are recognized as valuable biological indicators for evaluating habitat quality and overall environmental health (Anjali and Dhivya, 2021). Many butterfly species are highly seasonal and are restricted to specific habitats (Padhye, 2012). Butterflies are among the most extensively studied insect groups. India, often considered a butterfly haven by lepidopterists and entomologists, is home to approximately 1,504 species (Tiple, 2011), including several that are endemic and globally threatened. Studying butterfly communities involves examining various biotic and abiotic factors—such as humidity, temperature, wind, and host plant availability-which significantly influence their distribution patterns.In their 2024 study on the diversity and status of butterfly fauna at Kurukshetra University campus, Haryana, Gupta and Kumar reported that 14 species were abundant, eight were common, 14 were occasional, and two species were classified as rare in the study area.

Unlike most other insect groups, butterflies are popular, well-documented, and easy to identify. They are highly adapted to their landscapes and respond quickly to changes in their habitat, especially those caused by human activities such as intensified farming and heavy logging (Mora et al., 2011). Climate change impacts species diversity and is expected to worsen ecosystem conditions (Scott and Lemieux, 2005). Factors such as changes in temperature, rainfall patterns, and extreme weather events like heatwaves, prolonged droughts, or excessive rainfall must be considered. The depletion of nectar sources and desiccation of host plants can lead to direct mortality and trigger migratory behaviors. As ectothermic organisms, butterflies are particularly sensitive to climatic variations, and their short generation times make them ideal subjects for studying these effects.

2. MATERIALS AND METHODS

Ambah is a city in Ambah Tehsil, located in the Morena District of Madhya Pradesh, India. It is a part of the Chambal Division and is situated at coordinates 26.710°N, 78.230°E (Fig. 1). Ambah lies 36 km north of the district headquarters, Morena. The study area is rich in biodiversity and is primarily dominated by

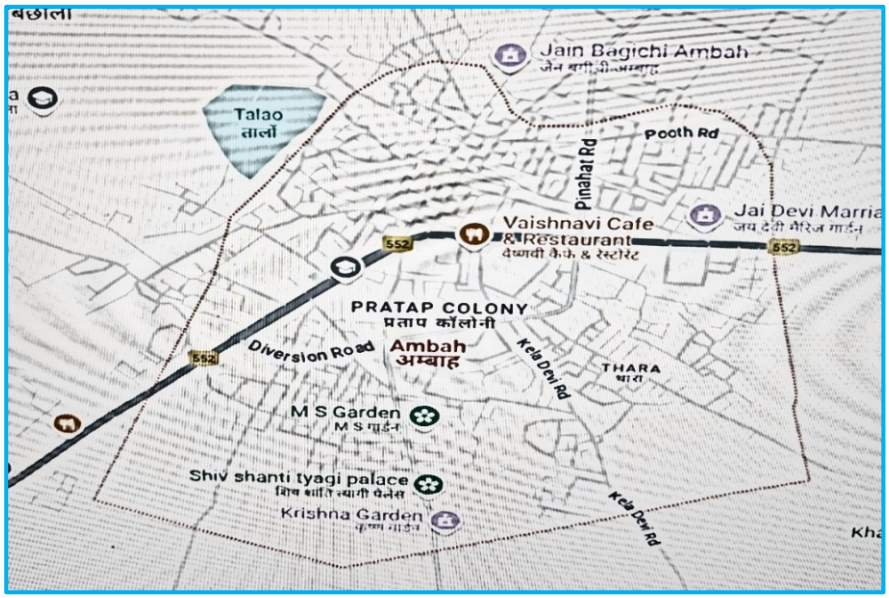


Fig. 1 : Satellite Map showing study area of Ambah Tehsil.

various tree species such as Mango (*Mangifera indica*), Babul (*Acacia arabica*), Guava (*Psidium guajava*), Indian Jujube (*Ziziphus mauritiana*), Indian Banyan (*Ficus bengalensis*), Peepal (*Ficus religiosa*), Tamarind (*Tamarindus indica*), Neem (*Azadirachta indica*), Jamun (*Eugenia jambolana*), Rose (*Rosa rubiginosa*), Pink poeriwinkle (*Catharanthus roseus*), Marigold (*Tagetes patula*) (*Chrysanthemum indicum*) among others. These species are widely distributed in the area and serve as excellent host plants for both caterpillars and butterflies.

A random survey was conducted once every month from June 2024 to May 2025, using the round walk method during two time slots: morning (9:00 am to 11:00 am) and afternoon (3:00 pm to 5:00 pm). The survey was conducted in Ambah Tehsil, Morena District. The visual encounter method and opportunistic sightings were used to assess butterfly populations. Butterfly species identification in the field was verified using identification keys (Kunte, 2008), field guides such as *The Book of Indian Butterflies* by Kehimkar (2008), *A Guide to the Butterflies of Western Ghats, India* by Bhakare and Ogale (2018), and photographs taken during the survey.

3.IDENTIFICATION OF THE BUTTERFLY SPECIES

Butterfly species were identified using photographs, taking into account their color patterns, sizes, shapes, and distinctive markings. Identification was carried out with the assistance of an entomology expert and by referencing relevant literature and photographic guides, including those by Sunil et al. (2016) and Kumar et al. (2016).

4. RESULT AND DISCUSSION

The checklist of butterfly species observed in the study area is presented in Table 1. A total of 457 individuals, representing 41 species from five different families, were recorded. Among these, the family *Nymphalidae* was the most diverse, comprising 14 species (34% of the total). This was followed by *Pieridae* with 11 species (27%), *Lycaenidae* with 9 species (22%), and *Papilionidae* with 4 species (10%). The families *Papilionidae* and *Hesperiidae* were the least represented each with 3 species (7%). These results are illustrated in Fig. 2.The checklist of the recorded butterfly fauna, including their common names, scientific names, and local abundance status, is presented in Table1. In a related study, Abdullahi et al. (2019) reported that *Nymphalidae* was the most dominant butterfly family in the Prayagraj district, comprising 9 species (43% of the total). This was followed by *Pieridae* with 6 species (29%). *Papilionidae* and *Lycaenidae* were the least represented each with 3 species (14%). Panda et al. (2016) reported a total of 53 butterfly species belonging to five families on the Fakir Mohan University campus, Balasore, Odisha. Similarly, Shouche and Ratnakar (2018) recorded 150 individual butterflies representing 21 species across five families on the Vikram University campus, Ujjain. Dabhadkar and Prajapati (2020) documented 40 butterfly species from 29 genera and five families during their study on butterfly diversity and abundance at M.N. College, Visnagar, Gujarat, India. Pandey and Tamboli (2022) stated that rich plant diversity attracts butterflies by providing nectar sources and suitable breeding grounds. The feeding habits and food requirements differ between the adult and larval stages. Therefore, a habitat that offers adequate food resources for both life stages is essential for sustaining a successful butterfly population.

The present study revealed that, of the total recorded species from Ambah Tehsil in Morena District, Madhya Pradesh, 19 (46%) species were classified as Least Concern (LC) according to the IUCN, while 22 (54%) species were categorized as Not Protected (NP), meaning they are not legally protected under any schedule of the Wildlife (Protection) Act, 1972 (Fig. 3). Gupta and Kumar (2024), in their study on the diversity and status of butterfly fauna at Kurukshetra University campus, Haryana, assessed the local abundance and reported that 14 species were abundant, eight were common, 14 were occasional, and two species were classified as rare in the study area.

This study aims to address the knowledge gap concerning butterfly diversity and abundance in Ambah Tehsil, Morena District, Madhya Pradesh. Specifically, it focuses on documenting the species checklist and analyzing the seasonal occurrence of butterflies in the region. The insights gained from this research are essential for the effective and sustainable conservation of butterflies and their habitats. While this represents a preliminary investigation, it lays a valuable foundation for future studies.

Table 1: Compilation of Butterfly Species Identified in the Study Area.

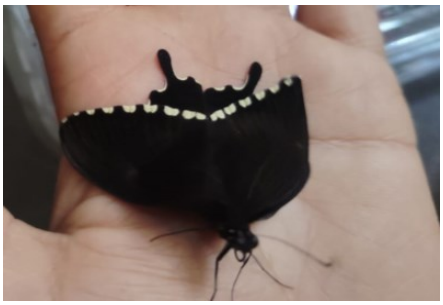
S. No.	Family	Scientific Name	Common Name	Number of Butterflies	IUCN Status
1.	Nymphalidae	*Junoniaorithiya*	Blue Pansy	10	LC
2.		*Junonialemonias*	Lemon Pansy	8	NP
3.		*Junoniahierta*	Yellow Pansy	5	LC
4.		*Junoniaatlites*	Grey Pansy	5	NP
5.		*Junonia almanac*	Peacock Pansy	7	LC
6.		*Ariadne merione*	Common Castor	3	NP
7.		*Euploea core*	Common Crow	2	LC
8.		*Danaus chrysippus*	Plain Tiger	25	LC
9.		*Tirumala limniace*	Blue Tiger	8	LC
10.		*Danaus genutia*	Common Tiger	60	LC
11.		*Phalanthaphalantha*	Common Leopard	4	NP
12.		*Melanitisleda*	Common Evening Brown	1	LC
13.		*Neptissappho*	Common glider	4	NP
14.		*Hypolimnasbolina*	Blue moon butterfly	28	NP
15.	Pieridae	*Euremabrigitta*	Small Grass Yellow	2	LC
16.		*Euremalaeta*	Spotless Grass Yellow	6	NP
17.		*Euremahecabe*	Common Grass Yellow	8	LC
18.		*Catopsiliapomona*	Common Emigrant	9	NP
19.		*Catopsiliapyranthe*	Mottled Emigrant	2	NP
20.		*Ixias Marianne*	White Orange Tip	2	NP
21.		*Ixias pyrene*	Yellow Orange Tip	6	NP
22.		*Colotisetrida*	Small Orange Tip	2	NP
23.		*Colotisamata*	Small Salmon Arab	3	LC
24.		*Belenoiseaurota*	Pioneer	4	NP
25.		*Leptosianina*	Psyche	5	NP
26.	Papilionidae	*Papilio domoleus*	Lime Butterfly	20	NP
27.		*Pachlioptaaristolochiae*	Common Rose	7	LC
28.		*Graphiumdoson*	Common Jay	7	NP
29.		*Papilio polytes*	Common Mormon	45	LC
30.	Lycaenidae	*Zizinaotis*	Lesser Grass Blue	70	LC
31.		*Castaliusrosimon*	Common Pierrot	5	NP
32.		*Spindasiselima*	Scarce Shot Silverline	1	NP
33.		*Acytolepispuspa*	Common Hedge Blue	8	NP
34.		*Zizulahylax*	Tiny Grass Blue	5	LC
35.		*Zizeeriakarsandra*	Dark Grass Blue	4	LC
36.		*Lampidesboeticus*	Pea Blue	6	LC

37.		*Chiladesparrhassius*	Small Cupid	2	NP
38.		*Celastrinaargiolus*	Holly blue	40	LC
39.	Heperiidae	*Pelopidas mathias*	Small Branded Swift	4	LC
40.		*Suastusgremius*	Indian Palm Bob	5	NP
41.		*Spialiagalba*	Indian Skipper	9	NP

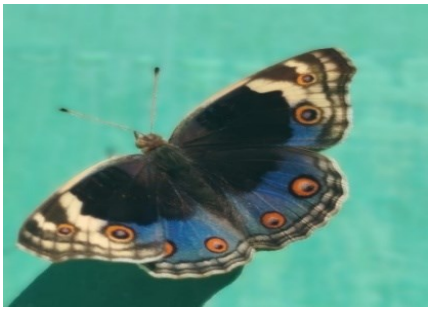
IUCN status- LC- Lest Concern, NP- Not Protected species (This species is not legally protected in India under any schedules of Wild Life (Protection) Act, 1972).

Common Tiger

Holly blue



Common Mormon



Blue Pansy

Common Glider

Small Orange Tip

Lime Butterfly

Lesser Grass Blue

Blue moon butterfly

Common Emigrant

Common Rose

Mottled Emigrant

Photographs showing some of the beautiful Butterfly Species found in study area.

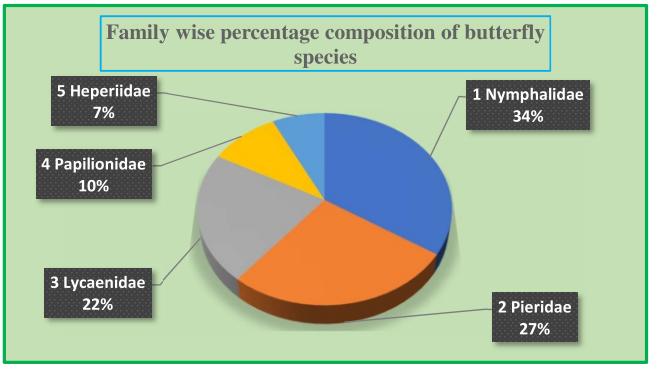


Fig. 2: Family-wise percentage composition of butterfly species recorded in the study area.

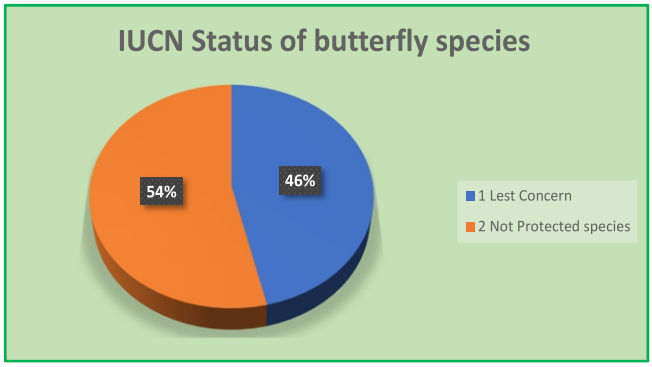


Fig. 3: IUCN Conservation Status of butterfly species in the study area.

5. CONCLUSION

Based on the results of the butterfly diversity study, the Nymphalidae family was found to have the highest number and percentage of species among all butterfly families in the area. Among the surveyed study area, these findings suggest that the study area supports rich butterfly diversity. Further research is recommended to expand the documentation and understanding of local butterfly species, which will aid in their conservation and support the development of butterfly parks.

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