

Assessment of Diversity and Current Status of Lepidoptera (Butterflies) in Catchment of Bansagar Reservoir, Shahdol (M.P.)

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Abstract: *Biodiversity protection and conservation is a national and international agenda and responsible for sustainable development of a region or a country. Butterflies are one of the most important assemblages of insects that act as biodiversity indicators as well as nature's gardeners. There are about 28,000 known butterfly species in the world. Lepidoptera (Butterfly) were studied in catchment of Bansagar reservoir, Shahdol, Madhya Pradesh as part of an extensive study of biodiversity. This paper presents a current status of Lepidoptera from reservoir region having aggregation of up to 21 species belonging to 5 families and categories on the basis of their abundance. The Bansagar Reservoir is surrounded by agricultural fields with rural habitation. Not enough research work on Butterfly has been reported from this neglected biodiversity spot of Bansagar area, may be, this is the pioneer work done on the subject matter. This study is aimed towards contributing to the plane of biodiversity restoration in studied region and development of management strategies so as to ensure sustenance of butterflies and ecosystem services derived from them.*

Keywords: Diversity, Bansagar reservoir, Pollination, Butterflies, Indicator

1. Introduction

Biodiversity loss is one of the world's most pressing crisis and there is global concern about the biological resource on which so much human life depends. Biodiversity conservation and management are worldwide concern [1], where determining the diversity levels of indicator groups of ecosystem should permit the prediction of other taxa to be present i.e., the importance and appropriateness of using invertebrate groups as indicator [2-3]. To focus on the conservation of biodiversity has recently received attention.

Butterflies are the most beautiful and colorful creatures on the earth and have a great aesthetic value. Generally observed, butterflies play an important role in maintaining the balance of nature and health of the living world. Butterflies are generally regarded as one of the best taxonomically studied group of insects. Worldwide there are more than 28,000 species of butterflies; with about 80 percent found in tropical regions [4]. It may be noted that Antarctica is the only continent on which no Lepidoptera (butterflies) have been found. The number of Indian butterflies amount to one fifth of the world of butterfly species. Butterflies enable sustenance of ecosystem services through their role in pollination and serving as important food chain components. Being potential pollinating agents of their nectar plants as well as indicators of the health and quality of their host plants and the ecosystem as a whole, exploration of butterfly fauna thus becomes important in identifying and preserving potential habitats under threat.

Lepidoptera is one among the highly specialized insect orders, included scaly winged insect of the holometabolous endopterygote series. Butterfly shows total metamorphosis and pass through various stages such as egg, larva, pupa and adult stage. Bansagar Reservoir created an excellent habit and source of alteration for many faunal species like insects,

reptiles, birds and mammals. The area is surrounded with a very large variety of trees, mini forest, vast grassland & small hills; these are the elements for architecting a preferred habitat or such species.

The Indian subcontinent bearing a diverse terrain, climate and vegetation to hosts about 1,501 species of butterflies [5]. About 1500 species of butterflies are found in India [6]. Some butterflies are migratory. They fly thousands of miles in the winter to places having a warmer climate, and return back in the spring. Butterflies serve as important plant pollinators in the local environment, and help to pollinate more than 50 economically important plant crops [7]. Butterflies are also good indicators of environmental changes as they are sensitive to habitat degradation and climate changes [8]. Butterflies play an important role in ecosystem where they interact with plants as it is one of the major source of pollination and also a herbivorous insect [9]. Tiple [10] revealed that the Indian subcontinent hosts about 1,504 species of butterflies out of which peninsular India and the Western Ghats host 351 and 334 species respectively. In Madhya Pradesh and Vidarbha of central India 177 species of butterfly species have been documented [11].

In the recent past, several researchers have studied butterflies from some districts and conservation areas of Madhya Pradesh and Chhattisgarh [12-20]. Chandra *et al.*, [21] recorded 174 species of butterflies belonging to eight families from Madhya Pradesh and Chhattisgarh.

2. Material and Method

In central India, Bansagar reservoir is a multipurpose river valley project on Sone River situated on Ganga basin in Madhya Pradesh. The study area is coordinated at 24°11'30"N 81°17'15"E, i.e., 51.4 km away from Rewa.

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The random survey on butterflies was carried out on sunny days every month continuously for 11 month from January 2016 to November 2016. The abundance and seasonality was observed from 5 to 9 in the morning and from 5 to 7 in the evening by transect counting.

Butterflies were primarily identified directly in the field by observation and the difficult cases followed capture or photography of the organism. In critical conditions,

specimens were collected only with handheld aerial sweep nets. Each specimen was placed in a plastic bottle and carried to the laboratory for further identification with the help of a field guide [22; 8; 6; 23-24]. In the present study, all scientific names followed [25] guidelines. The observed butterflies were categorized in five categories on the basis of their abundance in Bansagar reservoir i.e., Very common, Common, Very rare, Rare, Not Rare (Tiple *et al.*, 2006).

Table 1: Systematic list of Lepidoptera (Butterflies) reported from Catchment of Bansagar Reservoir, Shahdol (M.P.)

S.No.	Common Name	Scientific Name	Status	Flight period
Order: Lepidoptera				
Suborder: Rhopalocera				
Family: Papilionidae (3 Species)				
1.	Common Mormon	<i>Papilio polytes</i> (Linnaeus)	VC	S, M, PM, W
2.	Common Jay	<i>Graphium doson</i> (Felder)	C	S, M
3.	Lime Butterfly	<i>Papilio demoleus</i> (Linnaeus)	VC	S, M, PM, W
Nymphalidae (9 Species)				
4.	Blue Pansy	<i>Junonia orithiya</i> (Linnaeus)	NR	S, PM
5.	Striped Tiger	<i>Danaus genutia</i> (Cramer)	VC	S, M, PM, W
6.	Lemon Pansy	<i>Junonia lemonias</i> (Linnaeus)	NR	W
7.	Common Crow	<i>Euploea core</i> (Cramer)	VC	S, PM, W
8.	Plain Tiger	<i>Danaus chrysippus</i> (Linnaeus)	VC	PM, W
9.	Peacock Pansy	<i>Junonia almana</i> (Linnaeus)	NR	PM, W
10.	Common Castor	<i>Ariadne merione</i> (Cramer)	C	S, PM, W
11.	Common Evening Brown	<i>Melanitis leda</i> (Linnaeus)	VC	S, M, PM, W
12.	Glassy Tiger	<i>Parantica aglea</i> (Stoll)	NR	S, M, PM, W
Pieridae (5 Species)				
13.	Common Grass Yellow	<i>Eurema hecabe</i> (Linnaeus)	VC	S, M, PM
14.	Psyche	<i>Leptosia nina</i> (Fabricius)	VC	S, PM
15.	Yellow Orange Tip	<i>Ixias pyrene</i> (Linnaeus)	VR	PM, W
16.	Common Emigrant	<i>Catopsilia pomona</i> (Fabricius)	C	S, M, PM, W
17.	Indian Cabbage White	<i>Pieris canidia</i> (Sparrman)	NR	S, PM, W
Lycaenidae (3 Species)				
18.	Common Pierrt	<i>Castalius rosimon</i> (Fabricius)	VC	S, M
19.	Pale Grass Blue	<i>Pseudozizeeria maha</i> (Kollar)	VC	S, M
20.	Plains Cupid	<i>Chilades pandava</i> (Horsfield)	C	PM, W
Hesperiidae (1 Species)				
21.	Small Branded Swift	<i>Pelopidas mathias</i> (Fabricius)	NR	PM

VC-Very Common (> 100 sightings), C-Common (50-100 sightings), NR-Not Rare (15-50 sightings), VR-Very Rare (1-2 sightings) S-Summer, M-Monsoon, PM-Post Monsoon, W-Winter.

3. Result and Discussion

A total of 21 species of Lepidoptera belonging to five family's viz., *Nymphalidae*, *Papilionidae*, *Pieridae*, *Hesperiidae* and *Lycaenidae*. Among the species recorded from the reservoir area, 34% are belonging to the family *Nymphalidae* showed the maximum species richness, comprising of 9 species, while the others are shown less representatives (Figure 1.) i.e., followed by 5 species of *Pieridae*, 3 species of *Lycaenidae*, 3 species *Papilionidae* and 1 species of *Hesperiidae*.

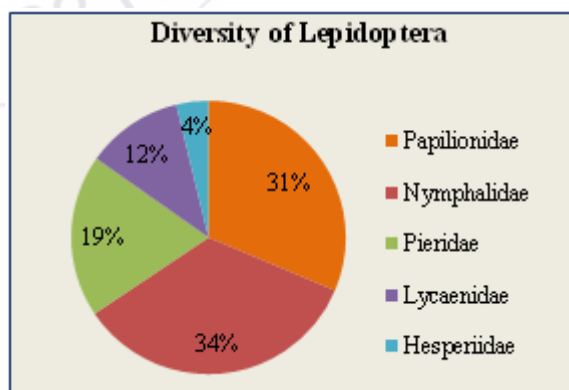


Figure 1: Distribution of families of Butterflies in Bansagar reservoir

The preference of butterflies for particular habitats is associated with the availability of larval host plants and adult nectar plants. The rich diversity of butterflies, especially the *Nymphalids* in Bansagar reservoir indicates a varied assemblage of floral species. The flora in studied site is of mixed type with herbs and shrubs dominating the

vegetation in the tropical climate. Even though family *Lycaenidae*, *Pieridae* and *Nymphalidae* exhibited maximum species diversity, the reason for the abundance of *Nymphalidae* in the study area may be due to the dominance of larval food plants in the region [26].

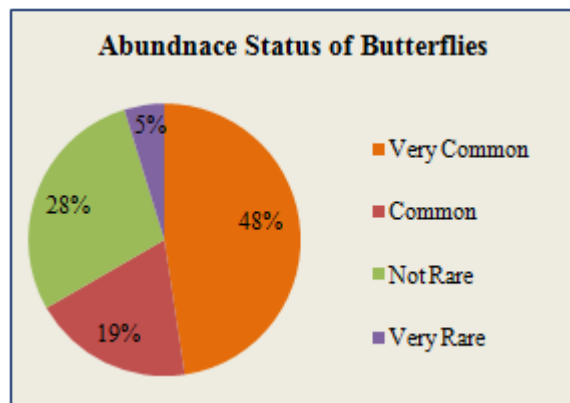


Figure 2: Abundance Status of Butterflies in Bansagar reservoir

Among these species, 1(5%) was very rare, 6 (28%) were not rare, 4(19%) were commonly occurring and 10 (48%) were very common (Figure 2). It was also noted that 6 species were present in all seasons. Highest number (17) of species was seen during post monsoon. A total of 15 species were observed during summer and 14 during winter. Least number of species (9) was observed during monsoon (Figure 2).

Butterfly diversity varies with season. They are abundant for only a few months and rare or absent during other months of the year [8]. Wynter- Blyth [22] had identified two seasons as peaks, March-April and October for butterfly abundance in India. The abundances of diverse species were positively affected by approaching summer, high relative humidity and more rainfall. During the present study, the numbers of the butterflies were peaked during post-monsoon season (late August to October) which was similar to the findings of [27-29]. The species abundance was less during monsoon.

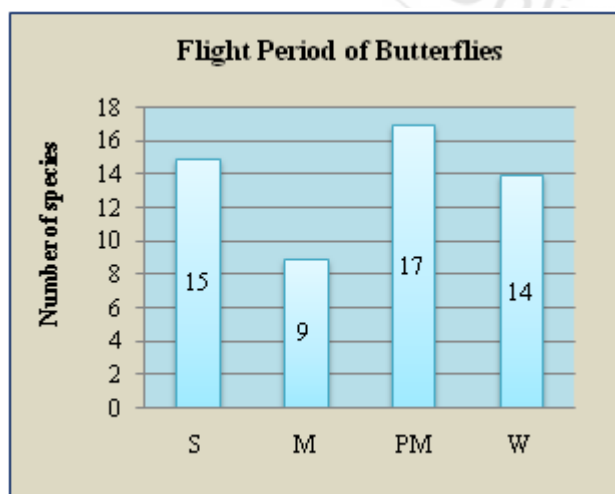


Figure 3: Flight Period of Butterflies in Bansagar reservoir

Apart from being one of the most prominent biodiversity indicators [8], butterflies also act as our native gardener for their dependence on indigenous plants for completion of the life cycle. Therefore, an abundance of butterflies usually indicates a healthier ecosystem.

Butterfly diversity studies carried out at various places showed a varied pattern the Lakeville range of Bhadra Wildlife Sanctuary, Karnataka with 54 species, west Singhbhum in Jharkhand revealed 71 species [30]. Nymphalid butterflies in Rani-Garbhanga reserve forest, Assam had 109 species [31]. The diversity in tropical forest research institute, Jabalpur, had 66 species [28].

4. Conclusion

The findings of the present study underline the importance of dam catchment as a preferred habitat for butterflies. This is the first effort in exploring the butterfly wealth of Bansagar reservoir in Sone River. The present list of butterfly species is not conclusive and exhaustive and future exploration will be continued to update this checklist.

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