

## Butterflies of gadeshwar reservoir, Panvel, Maharashtra

Anant Lokhande<sup>1</sup>, Ashish Thoke<sup>1</sup>, Vedanti Mahimkar<sup>1</sup>, Rahul Misal<sup>1</sup>, Shashank More<sup>2\*</sup>

<sup>1</sup> Department of Zoology, D G Ruparel College of Arts, Science and Commerce, Matunga West, Mumbai, Maharashtra, India

<sup>2</sup> Assistant Professor, Department of Zoology, D G Ruparel College of Arts, Science and Commerce, Matunga West, Mumbai, Maharashtra, India

### Abstract

Raigad district, one of the largest forest areas in India, grasps huge biodiversity in few green fragmented natural habitats. One such habitat is the backwaters of Gadeshwar reservoir, Panvel. This habitat located in dense forest area of Panvel. The current research was surveyed from January 2018 to December 2019 to assess the diversity of butterflies and has recorded 58 species belonging to five families in which Nymphalidae (22 species) was highly dominant family followed by Pieridae (15 species), Lycaenidae (10 species), Papilionidae (8 species) and Hesperidae (3 species). The research showed that forest along the backwaters of Gadeshwar reservoir have distinctive biodiversity of butterfly.

**Keywords:** biodiversity, natural habitats, butterfly fauna

### Introduction

Butterflies are the second most existing species of insects in the world, after the beetles<sup>[1]</sup>. Butterflies are the major component of a food chain, as predators and prey, make the world a little more vibrant. They play an important role in pollinating flowers, eat plenty of weedy plants and provide a food source for other animals<sup>[2]</sup>. They are often polymorphic, and many species make use of camouflage, mimicry and Aposematism to evade their predators<sup>[3]</sup>. Butterfly like monarch and the painted lady, migrate over long distances, as well as being an indicator of climate change, butterflies are also sensitive to other threats such as habitat destruction<sup>[4]</sup>.

Western Ghats is considered to be one of the biodiversity rich areas not only in India but also on the planet. It possesses great diversity of flora and fauna and also endemism<sup>[5]</sup> to get counted in biodiversity hotspots of the world<sup>[6]</sup>. Panvel city along with Karnala Bird Sanctuary (KBS) also lies within these stretches of Western Ghats. In the year of 2016 work has been done in the panvel region i.e. Butterflies of the Karnala Bird Sanctuary, Raigad, Maharashtra by Raju kasambe.

Panvel is located in Raigad district of Maharashtra in Konkan Division, and is a node of Navi Mumbai city, situated on the banks of Panvel Creek. Panvel is surrounded by some major industries in the regions, but still panvel has rich diversity. In and around Raigad district region there are many protected forests like Phansad Wildlife Sanctuary and Matheran hills station thus this area has home for more than 100 species of butterflies<sup>[2]</sup>. Our study area Maldunge is located approx 15 km from panvel city of Raigad district, Maharashtra, almost centrally in northern Western Ghats, about 45km west of Mumbai district.

The aim for choosing this area is because it forms the crest line of Western Ghats, with hill ranges. The flora is moist deciduous as well as with some endless forest spots with many sacred groves. This area provides a good habitat to diverse insects like butterflies. Prominent feature of this area is a centrally located

Gadeshwar reservoir. Dodhani and Maldunge are small villages situated at foothills of Matheran hill station, close to the backwaters of Gadeshwar reservoir. This study can help us in understanding the diversity of various butterfly species and help us to understand how to conserve the diversity in the area.

### Materials and Methods

#### Study Area



Fig 1: Map of study area (source: Google Maps)

The Gadeshwar reservoir spans over 6km (10.5miles) area. The average annual precipitation is 4500mm. Weather is Sunny across the year. There is heavy rain during monsoon. May is the warmest month of the year. The temperature in May averages 30.3 °C. The minimum temperatures in the year occur in January and February and it's around 23.4 °C. Average annual temperature of Panvel is 27.0 ° provides a preliminary checklist of butterflies' gadeshwar reservoir with note on their diversity<sup>[7]</sup>.



Fig 2: Survey site

**Survey Method**

The gadeshwar reservoir area was surveyed from January 2018 to December 2019 to assess the diversity of butterflies. The entire year was divided into three seasons, i.e. pre monsoon from February to May, monsoon from June to September and post monsoon from October to January. During the year, the study area were visited twice or thrice in each month. Butterflies were categorized into five groups based on their occurrence during the study period on the basis of frequency sightings.

Pollard and Yates (1976) [8] “Pollard Walk” Butterfly Survey Methods was followed for observing butterflies, walking along the fixed paths while recording the species [9].

**Identification of Butterfly**

Photograph of the butterfly were used to identify the species. Identification of butterfly carried out using field guides authored by Isaac Kehimkar, ArunPratap and literature available from research articles [10-12].

No specimens were collected during this study.

**Results and Discussion**

Butterfly families with respect to total percentage of species found at Gadeshwar Reservoir, panvel shown in Figure 3. Fifty eight species of butterflies belonging to five families were recorded during the survey. *Nymphalidae* was the richest family comprising 22 registered species followed by *Pieridae* 15 species, *Lycaenidae* 10 species, *Papilionidae* 8 and *Hesperiidae* 03 respectively as shown in Table 1. Occurrence of maximum number of the species in the family *nymphalidae* could be the result of high availability of food plants in the study area. Fourteen different larval food plants belonging to seven

angiosperm families were available which fed by *nymphalidae* butterflies, whereas *hesperidia* feed on 2 plants belonging to *Orobanchaceae* and *Nelumbonaceae* families. Tailed Jay (*Graphium Agamemnon*) feeds on Anon squamosal, citrus Limon, *M. koenighii*, cassia fistula these are some larval food plants found in the study area.

Complete butterfly checklist is shown in table 2.

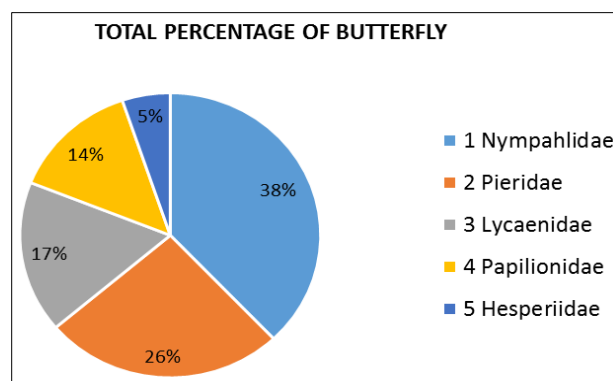
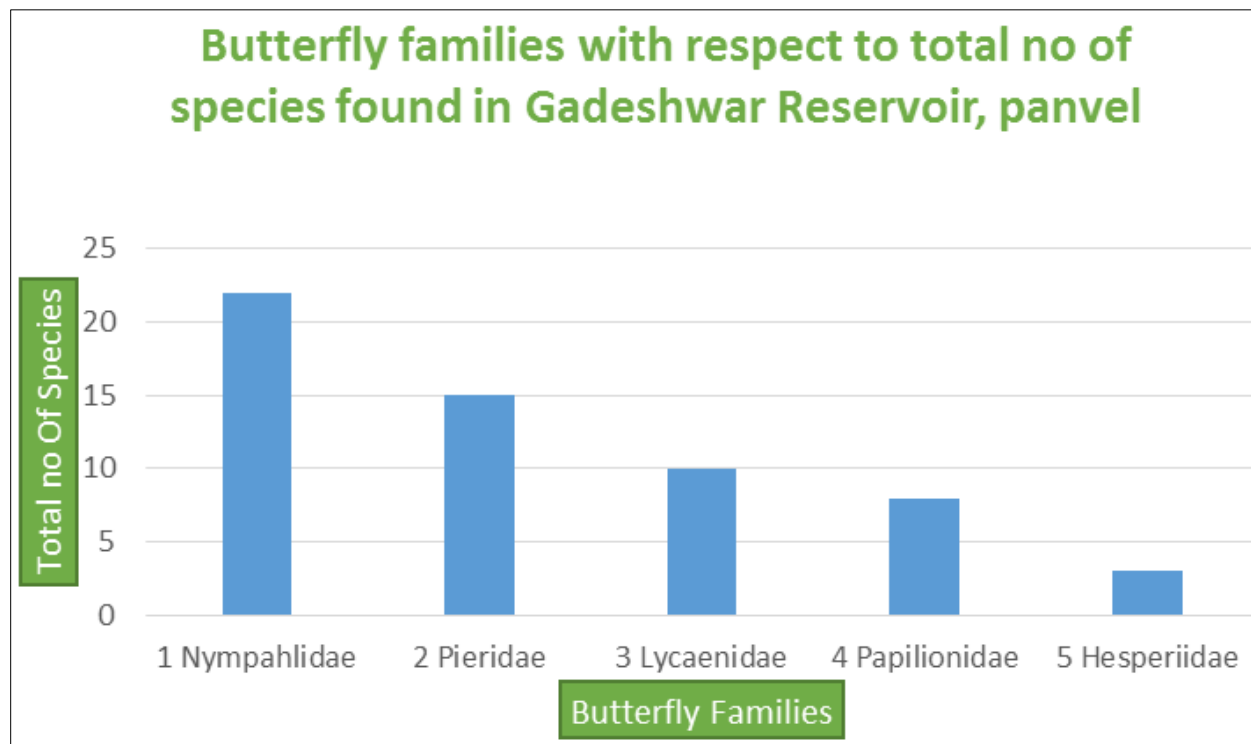


Fig 3: Total percentage of Butterfly species found in each family.

Table 1: Total numbers of Butterfly from study area

Families	No. of. Species
1. <i>Nymphalidae</i>	22
2. <i>Pieridae</i>	15
3. <i>Lycaenidae</i>	10
4. <i>Papilionidae</i>	8
5. <i>Hesperiidae</i>	3
	Total = 58



**Fig 4:** Numbers of Butterfly species found in Gadeshwar Reservoir with respect to their families.

**Conclusion**

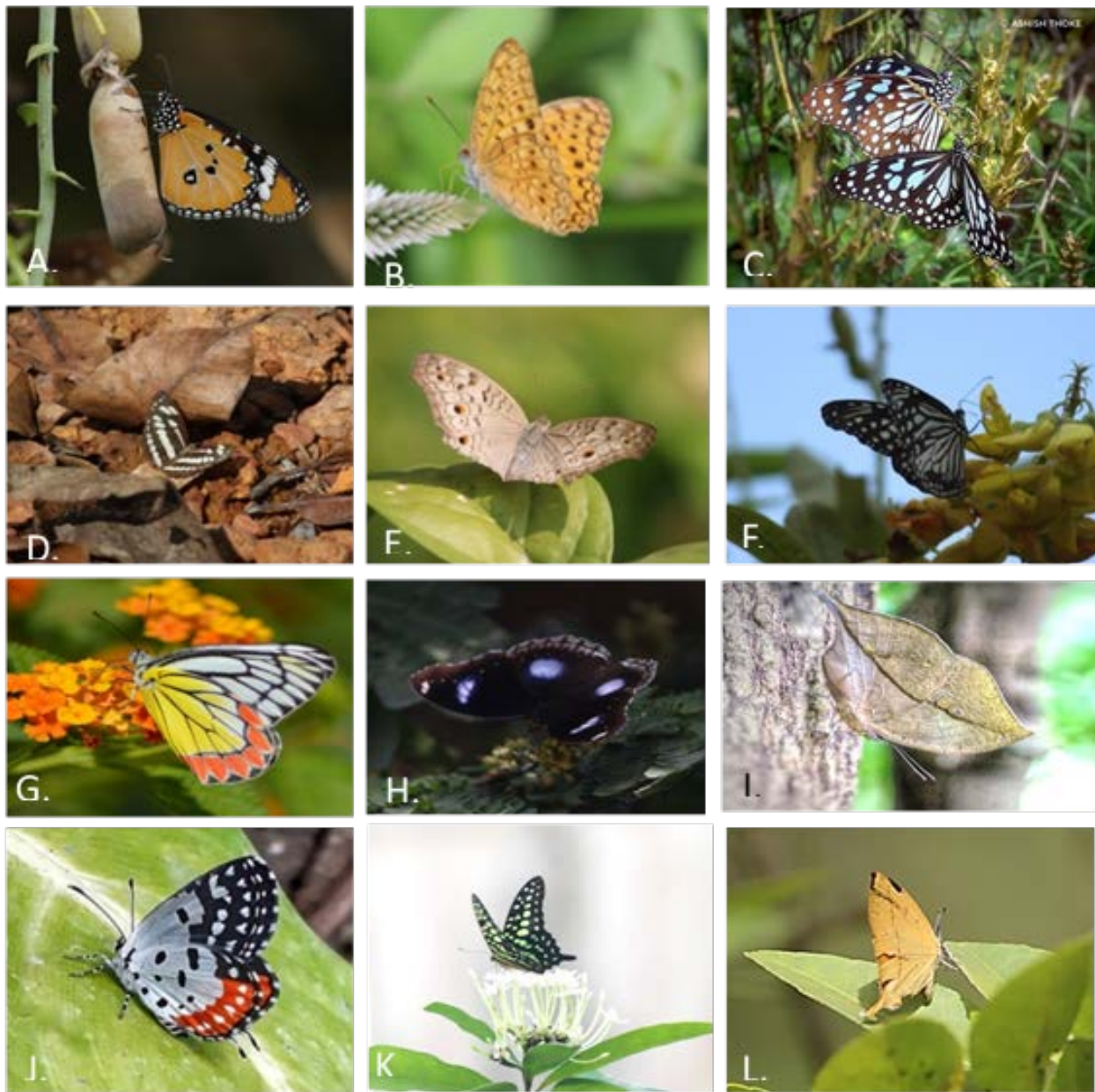
As described by Kunte (2000), diversity list will be very helpful in providing relevant and suitable legal protection to Indian butterflies. The backwaters of Gadeshwar reservoir region have become a great example of greenwood within city. The given data will definitely useful for monitoring butterfly diversity as well as to upgrade the ecological benefit of butterflies and interpret

conservation plan of action in the study area. This new study will surely fascinate to different butterflies and nature lovers to the Gadeshwar reservoir and it could become possible to explore new data and more conservation and development strategies will be used to conserve and magnify the floral and faunal diversity of Gadeshwar reservoir.

**Table 2:** Butterfly checklist of Gadeshwar Reservoir, Panvel

S / N	Families	Common Name	Scientific Name
1	Nymphalidae	Blue pansy	<i>Junonia orithya</i>
2		Blue tiger	<i>Tirumala limniace</i>
3		Blue oakleaf	<i>Kallima horsfieldii</i>
4		Common leopard	<i>Phalanta phalantha</i>
5		Oriental Common evening brown	<i>Melanitis leda</i>
6		Common caster	<i>Ariadne merione</i>
7		Indian Common crow	<i>Euploa core</i>
8		Chocolate pansy	<i>Junonia iphita</i>
9		Common four ring	<i>Ypthima huebneri</i>
10		Common bushbrown	<i>Mycalesis perseus</i>
11		Common sailer	<i>Neptis hylas</i>
12		Dark blue tiger	<i>Tirumala septentrionis</i>
13		Danaideggfly	<i>Hypolimnas misippus</i>
14		Grey pansy	<i>Junonia allites</i>
15		Lemon pansy	<i>Junonia lemanias</i>
16		Peacock pansy	<i>Junonia almanac</i>
17		Plain tiger	<i>Danaus chrysipus</i>
18		Short banded sailor	<i>Neptis columella</i>
19		Striped tiger	<i>Danaus genutia</i>
20		Yellow pansy	<i>Junoni ahierta</i>
21		Tawny coster	<i>Acraea terpsicore</i>
22		Glassy tiger	<i>Parantica aglea</i>
23	Pieridae	Common grass yellow	<i>Eurema hecabe</i>
24		Common gull	<i>Cepora nerissa</i>

25		Common wanderer	<i>Pareronia valeria</i>
26		Common albatross	<i>Appias albina</i>
27		Emigrant	<i>Catopsilia pomona</i>
28		Common jezebel	<i>Delias eucharis</i>
29		Molted emigrant	<i>Catopsilia pyranthe</i>
30		Psyche	<i>Leptosia nina</i>
31		Plain orange tip	<i>Colotis aurora</i>
32		Salmon Arab	<i>Colotis amata</i>
33		Small grass yellow	<i>Eurema brigitta</i>
34		Spotless grass yellow	<i>Eurema laeta</i>
35		Pioneer	<i>Belenois aurota</i>
36		White orange tip	<i>Lxias Marianne</i>
37		Yellow orange tip	<i>Lxias pyrene</i>
38	<i>Lycaenidae</i>	Common pierrot	<i>Castalius rosimon</i>
39		Common lime blue	<i>Chilades lajus</i>
40		Grass jewel	<i>Chilades trochylus</i>
41		Indian cupid	<i>Chilades trochylus</i>
42		Lesser grass blue	<i>Zizina otis</i>
43		Gram blue	<i>Euchrysops cnejus</i>
44		Monkey puzzle	<i>Rathinda amor</i>
45		Yamfly	<i>Loxura atymnus</i>
46		Zebra blue	<i>Leptotes plinius</i>
47		Red pierrot	<i>Talicauda nyseus</i>
48	<i>Papilionidae</i>	Bluebottle	<i>Graphium sarpedon</i>
49		Common jay	<i>Graphium doson</i>
50		Common mime	<i>Papilio clytia</i>
51		Crimson rose	<i>Pachliopta hector</i>
52		Common rose	<i>Pachliopta aristolochiae</i>
53		Common Mormon	<i>Papilio polytes</i>
54		Common lime butterfly	<i>Papilio demoleus</i>
55		Tailed jay	<i>Graphium agamenmnnon</i>
56	<i>Hesperiidae</i>	Brown awl	<i>Badamia exclamationis</i>
57		Common redevye	<i>Matapa aria</i>
58		Indian palm bob	<i>Suastus gremius</i>



**Fig 2:** Photographs of some butterfly from the sturdy area

A. Plain tiger (*Danaus chrysippus*), B. Common leopard (*Phalanta phalantha*), C. Blue tiger (*Tirumala limniace*), D. Common sailor (*Neptishylas*), E. Grey pancake (*Junonia atlites*), F. Glassy tiger (*Parantica aglea*), G. Common jezebel (*Delias eucharis*), H. Danaid eggfly (*Hypolimnas misippus*), I. Blue oak leaf (*Kallima horsfieldii*), J. Red Pierot (*Talicada nyseus*), K. Tailed jay (*Graphium agamemnon*), L. Yamfly (*Loxura atymnus*).

## References

1. Aitkin EH, E Comber *et al.* A list of Butterflies of Konkan. Journal of Bombay Natural History Society, 1903a:15:42-55.
2. Gaonkar *et al.* Et Butterflies of the Western Ghats, India (including Sri Lanka) – A Biodiversity Assessment of a threatened submitted to the Centre for Ecological Sciences. 86 p. mountain system. Bangalore: Report, 1996.
3. Aitkin EH, E Comber *et al.* Further notes on Konkan butterflies. Journal of Bombay Natural History Society, 1903b:15:356-357.
4. Gokarnkar P, SV Chorgha. A Rajbhor *et al.* Butterfly Diversity of Maharashtra Nature Park, 2008, 63-64.
5. Daniels RJR, Hegde M, Joshi NV, Gadgil M. Assigning conservation value: A case study from India. Conservation biology, 1991:5:464-45.
6. Critical Ecosystem Partnership fund. Western Ghats and Sri Lanka Biodiversity hotspot–Western Ghats region, 2007.
7. J Gupta, M Majumdar. Diversity in some of the Indian Butterflies. Zoological Survey of India, 2012.
8. Pollard E, Yates TJ. Monitoring Butterflies for Ecology and Conservation. Chapman & Hall, London, 1993.
9. Kunte K. Butterflies of Peninsular India. Universities Press (Hyderabad) and Indian Academy of Sciences (Bengaluru), 2000.

10. Best AEG *et al.* The Butterflies of Bombay and Salsette. Journal of Bombay Natural History Society, 1951:50:331-339.
11. Gunathilagaraj K, TNA Perumal, K Jayaram, M Ganesh kumar *et al.* Some Indian Butterflies. Udhagamandalam: Nilgiri Wild Life and Environment Association, 1998, 274.
12. Rout, pendharkar *et al.* Butterfly (Rhopalocera) fauna of Maharashtra Nature Park, Mumbai, and Maharashtra, India. Checklist journal of species lists and distribution, 2005.