

A Report on Butterfly Diversity of Biodiversity Park, Ranchi, Jharkhand, India

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Abstract: *The present study on the diversity of butterfly species was carried out in the Biodiversity Park, Ranchi Jharkhand, from September 2021 to July 2023. A total of 88 species of butterflies belonging to 62 genera and 5 families, namely Hesperidae (11 genera, 12 species), Papilionidae (4 genera, 12 species), Nymphalidae (17 genera, 26 species), Pieridae (7 genera, 9 species), and Lycaenidae (23 genera, 29 species) have been recorded. Lycaenidae (33%) was found to be the most dominant family, followed by Nymphalidae (29%), Hesperidae (14%), Papilionidae (14%), and Pieridae (10%) has been recorded.*

Keywords: Butterfly; Biodiversity Park; Jharkhand; Lepidoptera; Ranchi

1. Introduction

Insects comprise more than half of the world's known animal species (Wilson, 1992). Butterflies belonging to the order Lepidoptera that also includes moths are one of the beautiful insects that have attracted the attention of insect lovers worldwide since time immemorial. These are among the best-known insects that are mainly recognized due to their body and wings that are covered with scales (Hutchins, 1972; Gunathilagaraj *et al.*, 1998; Nair, 2002 and 2011). Butterflies are economically significant endopterygotes (Mani, 1973; Campbell & O'Toole, 1987; Zahradnik & Chvala, 1989; Ahsan, 1991). They are valuable pollinators, important food chain components of birds, reptiles, spiders, and predatory insects, and indicators of environmental quality as they are sensitive to environmental changes (Hamback *et al.*, 2007; Dobson, 2012). The caterpillars of many butterflies are phytophagous / pest and cause damage to agricultural as well as horticultural products. (Metcalf and Flint, 1939; Mathur, 1961 and 1962).

Gaonkar (1996) has reported species of butterflies between 15, 000 and 20, 000 worldwide; with about 1501 species from India. Larson *et al.* (2001) have reported more than 28, 000 species of butterflies worldwide, with about 80 percent in tropical regions. However, recently The Zoological Survey of India has reported only 1, 318 species of butterflies in India, of which 35 species are critically endangered as per the IUCN Red List (Cotton *et al.*, 2015).

There are good number of literature available on butterflies from different parts of India (Moore, 1881; Marshall & de Niceville, 1882; 1883; Moore and Swinhoe, 1890- 1913; de Niceville, 1886; 1890; Bingham, 1905; Bell, 1909-1927; Evans, 1932; Wynter-Blyth, 1957; Laithwaite *et al.*, 1975; Larson, 1987; Kunte, 1997; 2000; Chandra *et al.*, 2007; Anu, 2006; Anu *et al.*, 2009; Shanthi *et al.*, 2009; Tiple & Kuhrad, 2009; Ramesh *et al.*, 2010; Singh, 2010; Hussain *et al.*, 2011; Rajgopal *et al.*, 2011), and most of the studies

have been carried out in the southern part of the country. Only a limited number of studies on the biodiversity of butterflies have been carried out in Jharkhand (Morrison-Godfrey, 1950; Verma, 2009; Singh, 2010; Hembrom & Sinha, 2012; Singh & Ahmad, 2017).

Since in the past, no such studies on the diversity of butterflies have been carried out in the Biodiversity Park, Ranchi, Jharkhand, the present study was undertaken.

2. Materials and Methods

The present study was carried out in the Biodiversity Park, Ranchi District in the State of Jharkhand (Fig.1). It is situated between 23°14'35" N to 23°15'20" N latitude and 85°20'05" E to 85°21'10" E longitudes, above 680 meter above sea level. Temperature ranges from a maximum of 42° to 20°C during summer and from 25° to 2°C during winter. December and January are the coolest months, with temperatures getting to freezing point in some places of Ranchi city. The annual rainfall is about 1430 mm (56.34 inches). From June to September, the rainfall is about 1, 100 mm.

All 25 sites were randomly visited with different seasons (from September 2021 to July 2023). The data collection methods were observation, sighting, photography, ground net sweeping, and aerial net sweeping of the butterflies from all four sites. Mostly photography and videography were used for identifying the Butterfly, and capturing butterflies was mostly avoided. Butterflies were sampled by recording them from randomized quadrates of 10 m X 10 m on either side of the laid transect (Manakadan & Rahmani, 1977; Anon, 2000). In the present paper, the authors have followed Mani (1973), Kehimkar (2016), and Zahradnik and Chvala (1989) for field identification and classification.

3. Study Area

The study was conducted at Biodiversity Park ($23^{\circ}15'15''$ N; $85^{\circ}20'48''$ E). The Park is a part of the natural sal (*Shorea robusta*) forest native to the area on the outskirts (about 18 km) of Ranchi city, Murangtoli, Lalkhatanga, Ranchi district, in Jharkhand state. It was established in 2012. Biodiversity Park was developed to conserve rare and imperative plants, trees, and medicinal herbs. The Park is developed in a vast area of 542 acres of land. A total of 25 areas have been demarcated in the Biodiversity Park (Fig.1). It has several sections, like Cactus House, Water plant, Rose Garden, Medical Garden, Palm Garden, Aquatic Garden, etc. There is a place called Valley of Butterflies

which allows visitors to observe butterflies in their natural habitat.

Ranchi district is one of the twenty-four districts of Jharkhand state in eastern India and is located in the southern part of the Chota Nagpur plateau, the eastern section of the Deccan plateau. Ranchi city, the capital of Jharkhand state, is the district headquarters. Ranchi has a hilly topography and dense tropical forests, a combination that produces a relatively moderate climate compared to the rest of the state. *Shorea robusta* (Sal) is the predominant tree species in the Ranchi Forest Divisions. According to the classification of the Forest Types of India (Champion & Seth, 1968), the area's forests fall under a broad category of Northern Tropical Dry Deciduous forest.

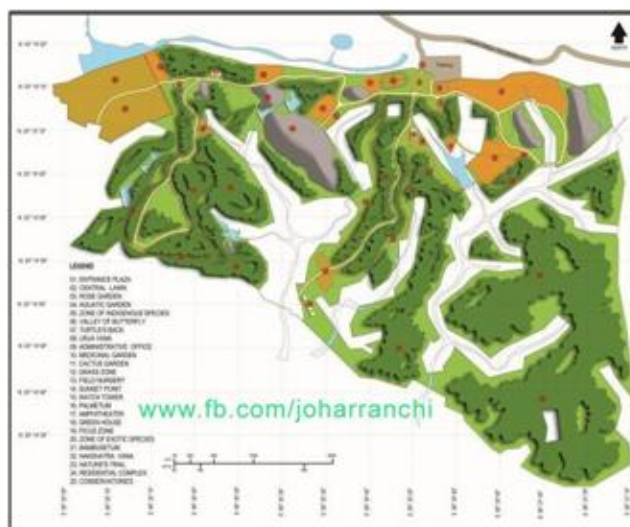


Figure 1: Biodiversity Park, Ranchi, Jharkhand

4. Results and Discussion

In the present study, 88 species of butterflies distributed in 62 genera and five families were recorded (Table 1). The families include Hesperidae (Eleven genera, 12 species), Papilionidae (four genera, 12 species), Nymphalidae (17 genera, 26 species), Pieridae (7 genera, 9 species), Lycaenidae (23 genera, 29 species). Lycaenidae (33%) was found to be the most dominant, followed by Nymphalidae (29%), Hesperidae (14%), Papilionidae (14%), and Pieridae (10%). The percent occurrence of Butterfly families is shown in Fig. 2. It was found that the butterflies of all the

families except Hesperidae were mainly observed from April to August. However, the family Hesperidae was mainly observed from June to October.

According to Blair (1999) and Swengel and Swengel (1999), the diversity of butterflies within a particular habitat can be used to predict the diversity of Birds. Therefore, the study's results can be used for making conservation strategies for important biological resources. Our study and present publication will act as baseline data for further studies in this area.

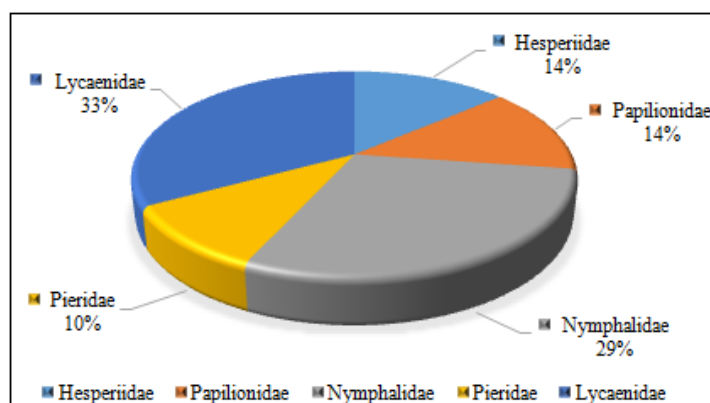


Figure 2: Percent occurrence of Butterfly families



Figure 1: Peacock Pansy (*Junonia almana*)



Figure 4: Great Eggfly (*Hypolimnasthetina*)



Figure 2: Striped Tiger (*Danaus genutia*)



Figure 5: Blue pansy (*Junonia orithyia*)



Figure 3: Baronet (*Euthaliopsis*)

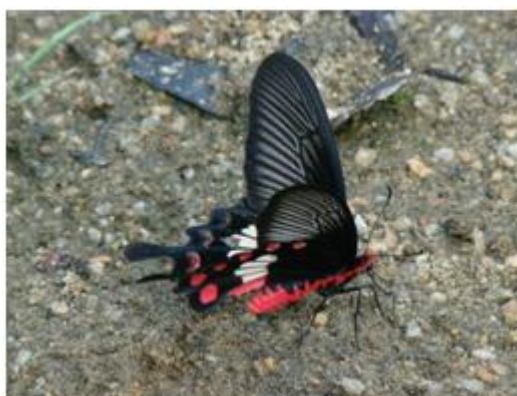


Figure 6: Common Rose (*Atrophaneura aristolochiae*)

Table 1: Inventory of Butterfly diversity of Biodiversity Park, Ranchi, Jharkhand

Sl. No.	Family	Common name	Scientific Name	Status
1	Hesperiidae	Bevan's Swift	<i>Pseudoborbo bevani</i>	Common
2	Hesperiidae	Grass Demon	<i>Udaspes folus</i>	Common
3	Hesperiidae	Common Small Flat	<i>Sarangesa desahara</i>	Common
4	Hesperiidae	Straight Swift	<i>Parnara guttatus</i>	Common
5	Hesperiidae	Oriental Straight Swift	<i>Parnara bada</i>	Common
6	Hesperiidae	Indian Palm Bob	<i>Suastus gremius</i>	Common
7	Hesperiidae	Common Banded Awl	<i>Hasora chromus</i>	Common
8	Hesperiidae	Indian Skipper	<i>Spialia galba</i>	Common
9	Hesperiidae	Common Spotted Flat	<i>Celaenorrhinus leucocera</i>	Common
10	Hesperiidae	Tricoloured Pied Flat	<i>Coladenia indrani</i>	Common
11	Hesperiidae	Tamil Grass Dart	<i>Taractrocera ceramas</i>	Very Common
12	Hesperiidae	Rice Swift	<i>Borbo cinnara</i>	Common
13	Papilionidae	Common Rose	<i>Atrophaneura aristolochiae</i>	Common
14	Papilionidae	Crimson Rose	<i>Atrophaneura hector</i>	Common
15	Papilionidae	Spot Swordtail	<i>Graphium nomius</i>	Locally Common

16	Papilionidae	Tailed Jay	<i>Graphium agamemnon</i>	Common
17	Papilionidae	Common Bluebottle	<i>Graphium sarpedon</i>	Common
18	Papilionidae	Tailed Jay	<i>Graphium agamemnon</i>	Common
19	Papilionidae	Common Jay	<i>Graphium doson</i>	Locally Common
20	Papilionidae	Common Banded Peacock	<i>Papilio crino</i>	Common
21	Papilionidae	Common Mormon	<i>Papilio polytes</i>	Very Common
22	Papilionidae	Blue Mormon	<i>Papilio polymnestor</i>	Not rare
23	Papilionidae	Lime Butterfly	<i>Papilio demoleus</i>	Very Common
24	Papilionidae	Common Mime	<i>Chilasa clytia</i>	Not rare
25	Nymphalidae	Striped Tiger	<i>Danaus genutia</i>	Common
26	Nymphalidae	Plain Tiger	<i>Danaus chrysippus</i>	Common
27	Nymphalidae	Glassy Tiger	<i>Parantica aglea</i>	Common
28	Nymphalidae	Common Leopard	<i>Phalanta phalantha</i>	Common
29	Nymphalidae	Baronet	<i>Euthalia nals</i>	Locally Common
30	Nymphalidae	Common Crow	<i>Euploea core</i>	Common
31	Nymphalidae	Brown King Crow	<i>Euploea klugii</i>	Locally Common
32	Nymphalidae	Great Eggfly	<i>Hypolimnas bolina</i>	Common
33	Nymphalidae	Danaid Eggfly	<i>Hypolimnas misippus</i>	Common
34	Nymphalidae	Tawny Coster	<i>Acraea violae</i>	Common
35	Nymphalidae	Peacock Pansy	<i>Junonia almana</i>	Common
36	Nymphalidae	Blue pansy	<i>Junonia orithy</i>	Common
37	Nymphalidae	Chocolate Pansy	<i>Junonia iphita</i>	Common
38	Nymphalidae	Grey Pansy	<i>Junonia atlites</i>	Locally Common
39	Nymphalidae	Lemon Pansy	<i>Junonia lemonias</i>	Common
40	Nymphalidae	Yellow Pansy	<i>Junonia hierta</i>	Common
41	Nymphalidae	Angled castor	<i>Ariadne ariadne</i>	Common
42	Nymphalidae	Common Castor	<i>Ariadne merione</i>	Common
43	Nymphalidae	Common Sailer	<i>Neptis hylas</i>	Common
44	Nymphalidae	Blue Tiger	<i>Tirumala limniace</i>	Common
45	Nymphalidae	Common Lascar	<i>Pantoporia hordonia</i>	Common
46	Nymphalidae	Common Palmfly	<i>Elymnias hypermnestra</i>	Common
47	Nymphalidae	Common Sergeant	<i>Athyma perius</i>	Locally Common
48	Nymphalidae	Common Evening Brown	<i>Melanitis leda</i>	Common
49	Nymphalidae	Dark-branded Bush Brown	<i>Mycalasis mineus</i>	Common
50	Nymphalidae	Common Four Ring	<i>Ypthima hubneri</i>	Common
51	Pieridae	Common Emigrant	<i>Catopsilia pomona</i>	Common
52	Pieridae	Mottled Emigrant	<i>Catopsilia pyranthe</i>	Common
53	Pieridae	Common Grass Yellow	<i>Esenahae cabe</i>	Common
54	Pieridae	Small Grass Yellow	<i>Eurema brigitta</i>	Common
55	Pieridae	One Spot Grass Yellow	<i>Eurema andersoni</i>	Not rare
56	Pieridae	Common Jezebel	<i>Delias eucharis</i>	Common
57	Pieridae	Common Gull	<i>Cepora nerissa</i>	Common
58	Pieridae	Psyche	<i>Leptosia nina</i>	Common
59	Pieridae	Common Wanderer	<i>Pareronia valeria</i>	Common
60	Lycaenidae	Plains Cupid	<i>Chilades pandava</i>	Locally Common
61	Lycaenidae	Lime Blue	<i>Chilades laius</i>	Common
62	Lycaenidae	Indian Cupid	<i>Everes lacturnus</i>	Common
63	Lycaenidae	Tailless Lineblue	<i>Prosotas dubiosa</i>	Common
64	Lycaenidae	Common Lineblue	<i>Prosotas nora</i>	Common
65	Lycaenidae	Large Oakblue	<i>Arhopala amantes</i>	Locally Common
66	Lycaenidae	Indian Oakblue	<i>Arhopala atrax</i>	Common
67	Lycaenidae	Forget-me-not	<i>Catochrysops strabo</i>	Common
68	Lycaenidae	Common Cerulean	<i>Jamides celeno</i>	Common
69	Lycaenidae	Dark Cerulean	<i>Jamides bochus</i>	Common
70	Lycaenidae	Metallic cerulean	<i>Jamides alecto</i>	Locally Common
71	Lycaenidae	Pale Grass Blue	<i>Pseudozizeeria maha</i>	Common
72	Lycaenidae	Common Hedge Blue	<i>Acytolepis puspa</i>	Common
73	Lycaenidae	Common Acacia Blue	<i>Surendra quercetorum</i>	Common
74	Lycaenidae	Zebra Blue	<i>Syntarucus plinius</i>	Common
75	Lycaenidae	Common Pierrot	<i>Castalius rosimon</i>	Common
76	Lycaenidae	Rounded Pierrot	<i>Tarucus nara</i>	Common
77	Lycaenidae	Plum Judy	<i>Abisara echerius</i>	Common
78	Lycaenidae	Purple Leaf Blue	<i>Amblypodia anita</i>	Common
79	Lycaenidae	Purple Leaf blue	<i>Amblypodia anita</i>	Not rare
80	Lycaenidae	Peacock Royal	<i>Tajuria cippus</i>	Common
81	Lycaenidae	Banded Royal	<i>Rachana jalindra</i>	Rare
82	Lycaenidae	Dark Grass blue	<i>Zizeeria karsandra</i>	Common

83	Lycaenidae	Lesser Grass Blue	<i>Zizina otis</i>	Common
84	Lycaenidae	Tiny Grass Blue	<i>Zizula hylax</i>	Common
85	Lycaenidae	Grass Jewel	<i>Freyeria trochylus</i>	Locally Common
86	Lycaenidae	Red Pierrot	<i>Talicauda nyseus</i>	Locally Common
87	Lycaenidae	Quaker	<i>Neopithecops zalmora</i>	Common
88	Lycaenidae	Gram blue	<i>Euchrysops cnejus</i>	Common

5. Conclusion

Eighty-eight species of butterflies were recorded from the Biodiversity Park. The butterflies recorded are typical of the Sal and Dry Deciduous forest in the study area. Biodiversity Park is unique in geography, so vast opportunities exist to explore many more species of Lepidoptera from the Park. Repeated surveys with long-term monitoring programmes will help enrich the information. Our study revealed that the butterfly wealth of the Biodiversity Park is wealthy. If further explored, it will give an accurate picture of the study area and help conserve the Butterfly.

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