

CONTRIBUTION TO THE KNOWLEDGE OF BUTTERFLIES IN AND AROUND SUKINDA VALLEY, ODISHA, INDIA

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Abstract

This study presents the first comprehensive list of butterfly species found in and around Sukinda valley. A total of six sites in Sukinda valley were surveyed between October, 2016 and January, 2017, where we observed a total 92 species of butterflies under six families, including one new record (*Gerosis bhagava*) for the state Odisha. Ashokjhar waterfall was the richest site in terms of species, with 74 species recorded from there.

Key Words: Butterfly, Checklist, New record, *Gerosis bhagava*, Odisha

Introduction

Odisha is well known for its rich biodiversity (Rodgers & Panwar, 1988) with three Biogeographic Zones (Deccan Peninsula, Lower Gangetic Plain and East Coast). In this state, studies on butterfly fauna started late in the nineteenth century when the first record from Odisha was published by Taylor & de Niceville (1888), comprising a list of butterflies from the Khurda district. In the twentieth century, Crawford (1921) reported some butterflies from Meghasani hills of Mayurbhanj district and at the same time Annandale & Dover (1921) also published a list of butterflies from Barkuda Island. Since then, many works on butterflies have been published (Mandal & Nandi, 1984; Mandal & Maulik, 1991; Sahu *et al.* 2006; Sethy *et al.* 2006; Sethy & Jana, 2009; Nair, 2007, 2011; Das & Sahu, 2011; Mohapatra *et al.* 2012;

Palei & Rath, 2014; Payra *et al.* 2016; Paria *et al.* 2018; Boruah *et al.* 2019, etc.) covering different parts of the state. Mohapatra *et al.* (2012) published a book in which more than 200 species of butterflies were reported from the state. However, no data on butterflies is available from the Sukinda region of Odisha. Hence, we documented the butterfly species found in and around Sukinda valley area of Jajpur district, Odisha.

Materials and Methods

Study area

Sukinda valley with an area of over 200 km² is under Cuttack Forest Division, located in the Jajpur District, Odisha. The valley lies between Mahagiri and Daitari hills with undulating terrain where the elevation varies from 100 to 800 m. This area receives 1700 mm of rainfall on an average and temperature varies from 14° C to 46° C through the year. The forest types are Northern Tropical Dry Deciduous Forest and Dry Peninsular Sal Forests (Champion & Seth, 1968), where plants like *Shorea robusta*, *Terminalia tomentosa*, *Anogeissus latifolia*, *Pterocarpus marsupium*, *Terminalia belerica*, *Adina cordifolia* are dominant.

This study was conducted in the following six sites i.e. S1- Ashokjhar waterfall (21.040854° N 85.897324° E, 160 m a.s.l.), S2- Duarseni Nala (21.035209° N 85.850109° E, 145 m a.s.l.), S3- Ragada Dam (21.063992° N

85.731310° E, 116 m a.s.l.), S4- Patna Nala (21.078207° N 85.759016° E, 175 m a.s.l.), S5- Sasubhuasuni Nala (21.118014° N 85.737238° E, 224 m a.s.l.) and S6- Sukinda forest Range Office (20.961694° N 85.914453° E, 69 m a.s.l.) of Sukinda valley from October, 2016 to January, 2017.

Data collection and Identification

To document butterflies we carried out opportunistic surveys in between 7 am to 12 pm. Species were photographed using a Canon digital camera and identified with the help of field guide books and taxonomic literature (Evans, 1932; Kehimkar, 2008, 2016). In difficult cases, we used standard entomological nets to capture specimens and release them immediately at the spot of capture. Specimens were not collected during the study.

Results and Discussion

During these four months, we recorded a total 92 species of butterflies belong to 65 genera of six families from Sukinda valley area (Table 1). From the above six sites, we observed that the greatest variety of butterflies occurred at the Ashokjhar site, followed by Range Office, Sasubhuasuni Nala, Ragada Dam, Duarseni Nala and Rankia Nala.

The site 1 i.e. Ashokjhar site is well known for its beautiful waterfall called Ashokjhar. It is also a well-known tourist place of Jajpur district located on the eastern side of the Mahagiri hills. Below the perennial waterfall, the stream supports a patch of moist deciduous forest. The Duarseni nala (Site 2) is a seasonal stream located opposite the core mining belt on the southern side of Mahagiri hill. There is dense canopy Sal forest on rocky terrain. The 3 and 4 sites (Ragada dam and Patna nala) located adjacent to the core mining belt of Sukinda is one of the 10 most polluted places on Earth (Blacksmith Institute, 2007). At these sites, fewer species of butterflies i.e. only 21 and 14 respectively, were sighted during the study period. Similarly, the site 5 (Sasubhuasuni nala) is also a perennial stream

located on the western side of the Daitari hills. This site is characterized by rocky terrain along with fairly dense forest where *Shorea robusta* and *Terminalia* species are dominant. The Range Office site (Site 6) is located in the middle of Sukinda town, far from the core mining belt of Sukinda. A total of 50 species of butterflies were observed at this site during the survey period, which is approx 55 percent of the total observed species. Hence, along with the Ashokjhar site, site 6 is also favourable for butterflies in the Sukinda valley region. This site is characterized by shrub patches and a small flower garden inside the Range Office campus, which attracts a number of butterflies. Haidar *et al.* (2017) observed that, in Banagladesh, shrub patches with an abundance of flowering plants are preferable for butterflies.

Significant record

On 11 November, 2016 at about 12:30 pm a single individual of *Gerosis bhagava* (Moore, [1866]) was observed while it was mud-puddling near the Ashokjhar waterfall. This record of *G. bhagava* (Moore, [1866]) Common Yellow-breast Flat (Fig. 1) is very significant for the Sukinda valley, as well as for Odisha. *G. bhagava* is represented by two subspecies, i.e. *G. b. andamanica* (Wood Mason and de Niceville, 1881) and *G. b. bhagava* (Moore, [1866]). *G. b. andamanica* is confined to the Andaman and Nicobar Islands, whereas *G. b. bhagava* ranges from “Goa to Jharkhand and south to Kerala; Sikkim to N.E. India” (Varshney & Smetacek, 2015). From the above mentioned hitherto published information, it is evident that there was no reliable record of *G. bhagava* from Odisha. Hence this species can be considered as a new record for Odisha.

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Table 1: List of the recorded butterflies from Sukinda valley, Odisha, India

Sl. No	Scientific Name	Common Name	IWPA 1972 Status	Sites						
				1	2	3	4	5	6	
Family Hesperidae										
1.	<i>Borbo cinnara</i> (Wallace, 1866)	Rice Swift							+	+
2.	<i>Celaenorrhinus leucocera</i> (Kollar, [1844])	Common Spotted Flat		+					+	
3.	<i>Coladenia indrani</i> (Moore, [1866])	Tricolour Pied Flat		+						
4.	<i>Gerosis bhagava</i> (Moore, [1866])	Common Yellow Breast Flat		+						
5.	<i>Matapa aria</i> (Moore, [1866])	Common Redeye		+	+					+
6.	<i>Pelopidas mathias</i> (Fabricius, 1798)	Small Branded Swift		+						+
7.	<i>Suastus gremius</i> (Fabricius, 1798)	Indian Palm Bob		+	+	+	+	+	+	+
8.	<i>Tagiades japetus</i> (Stoll, [1781])	Common Snow Flat		+						
9.	<i>Tagiades gana</i> (Moore, [1866])	Suffused Snow Flat		+						
10.	<i>Tagiades litigiosa</i> Möschler, 1878	Water Snow Flat		+						
11.	<i>Udaspes folus</i> (Cramer, [1775])	Grass Demon		+					+	+

12.	<i>Spialia galba</i> (Fabricius, 1793)	Indian Grizzled Skipper								+
13.	<i>Telicota colon</i> (Fabricius, 1775)	Indian Pale Palm-Dart								+
14.	<i>Baoris farri</i> (Moore, 1878)	Paint-brush Swift	I V	+						
Family Papilionidae										
15.	<i>Pachliopta aristolochiae</i> (Fabricius, 1775)	Common Rose		+	+	+			+	+
16.	<i>Pachliopta hector</i> (Linnaeus, 1758)	Crimson Rose	I	+		+			+	+
17.	<i>Graphium agamemnon</i> (Linnaeus, 1758)	Tailed Jay		+						+
18.	<i>Graphium doson</i> (C. and R. Felder, 1864)	Common Jay		+					+	+
19.	<i>Graphium nomius</i> (Esper, 1799)	Spot Swordtail		+					+	
20.	<i>Papilio clytia</i> Linnaeus, 1758	Common Mime	I	+					+	+
21.	<i>Papilio crino</i> Fabricius, 1793	Common Banded Peacock		+				+	+	+
22.	<i>Papilio demoleus</i> Linnaeus, 1758	Lime Butterfly		+	+	+	+	+	+	+
23.	<i>Papilio polymnestor</i> Cramer, 1775	Blue Mormon		+	+				+	+
24.	<i>Papilio polytes</i> Linnaeus, 1758	Common Mormon		+	+	+	+	+	+	+
Family Pieridae										
25.	<i>Appias libythea</i> (Fabricius, 1775)	Striped Albatross	I V	+						+
26.	<i>Catopsilia pomona</i> (Fabricius, 1775)	Common Emigrant		+	+	+	+	+	+	+
27.	<i>Catopsilia pyranthe</i> (Linnaeus, 1758)	Mottled Emigrant		+						+
28.	<i>Delias eucharis</i> (Drury, 1773)	Common Jezabel		+	+					+
29.	<i>Eurema andersonii</i> (Moore, 1886)	One-spot Grass Yellow							+	
30.	<i>Eurema blanda</i> (Boisduval, 1836)	Three-spot Grass Yellow		+		+				

31.	<i>Eurema laeta</i> (Boisduval, 1836)	Spotless Grass Yellow				+			+
32.	<i>Eurema hecabe</i> (Linnaeus, 1758)	Common Grass Yellow		+	+	+	+	+	+
33.	<i>Cepora nerissa</i> (Fabricius, 1775)	Common Gull		+					+
34.	<i>Leptosia nina</i> (Fabricius, 1793)	Psyche		+	+	+	+	+	+
35.	<i>Pareronia hippia</i> (Fabricius, 1787)	Common Wanderer		+					
Family Riodinidae									
36.	<i>Abisara bifasciata</i> Moore, 1877	Double-Banded Judy		+					
Family Lycaenidae									
37.	<i>Arhopala amantes</i> (Hewitson, 1862)	Large Oakblue		+			+	+	
38.	<i>Arhopala atrax</i> (Hewitson, 1862)	Indian Oakblue		+					+
39.	<i>Amblypodia anita</i> Hewitson, 1862	Purple Leaf Blue		+					
40.	<i>Caleta decidia</i> (Hewitson, 1876)	Angled Pierrot		+					+
41.	<i>Castalius rosimon</i> (Fabricius, 1775)	Common Pierrot				+	+		+
42.	<i>Catochrysops strabo</i> (Fabricius, 1793)	Forget-Me-Not		+	+				+
43.	<i>Curetis thetis</i> (Drury, [1773])	Indian Sunbeam		+					
44.	<i>Euchrysops cnejus</i> (Fabricius, 1798)	Gram Blue		+					
45.	<i>Everes lacturnus</i> (Godart, [1824])	Indian Cupid		+					
46.	<i>Jamides celeno</i> (Cramer, [1775])	Common Cerulean		+	+	+	+		+
47.	<i>Jamides bochus</i> (Stoll, [1782])	Dark Cerulean		+					
48.	<i>Lampides boeticus</i> (Linnaeus, 1767)	Pea Blue	II	+		+			
49.	<i>Leptotes plinius</i> (Fabricius, 1793)	Zebra Blue		+					
50.	<i>Loxura atymnus</i> (Stoll, 1780)	Yamfly		+					
51.	<i>Megisba malaya</i> (Horsfield, [1828])	Malayan		+					

52.	<i>Neopithecops zalmora</i> (Butler, [1870])	Quaker		+					+
53.	<i>Rapala manea</i> (Hewitson, 1863)	Slate Flash		+					
54.	<i>Rapala varuna</i> (Horsfield, [1829])	Indigo Flash	II	+					
55.	<i>Rathinda amor</i> (Fabricius, 1775)	Monkey Puzzle		+					+
56.	<i>Spindasis syama</i> (Horsfield, [1829])	Club Silverline		+			+		
57.	<i>Zeltus amasa</i> (Hewitson, 1865)	Fluffy Tit		+					
58.	<i>Zizeeria karsandra</i> (Moore, 1865)	Dark Grass Blue					+		+
59.	<i>Pseudozizeeria maha</i> (Kollar, [1844])	Pale Grass Blue		+			+		+
60.	<i>Zizina otis</i> (Fabricius, 1787)	Lesser Grass Blue					+		+
61.	<i>Zizula hylax</i> (Fabricius, 1775)	Tiny Grass Blue					+		+
Family Nymphalidae									
62.	<i>Acraea terpsicore</i> (Linnaeus, 1758)	Tawny Coster						+	+
63.	<i>Athyma perius</i> (Linnaeus, 1758)	Common Sergeant		+					+
64.	<i>Athyma selenophora</i> (Kollar, [1844])	Staff Sergeant							+
65.	<i>Charaxes psaphon</i> Westwood, 1847	Plain Tawny Rajah		+					
66.	<i>Charaxes solon</i> Fabricius, 1793	Black Rajah		+					
67.	<i>Danaus chrysippus</i> (Linnaeus, 1758)	Plain Tiger		+	+				+
68.	<i>Danaus genutia</i> (Cramer, [1779])	Common Tiger							+
69.	<i>Euploea core</i> (Cramer, [1780])	Common Crow	I V				+	+	+
70.	<i>Euthalia aconthea</i> (Cramer, [1777])	Common Baron					+	+	+
71.	<i>Euthalia lubentina</i> (Cramer, [1777])	Gaudy Baron	I V	+					
72.	<i>Symphaedra nais</i> (Forster, 1771)	Baronet		+	+				
73.	<i>Hypolimnas bolina</i> (Linnaeus, 1758)	Great Eggfly		+	+				

74.	<i>Hypolimnas misippus</i> (Linnaeus, 1764)	Danaid Eggfly	II	+						+
75.	<i>Junonia almana</i> (Linnaeus, 1758)	Peacock Pansy								+
76.	<i>Junonia atlites</i> (Linnaeus, 1763)	Grey Pansy								+
77.	<i>Junonia hierta</i> (Fabricius, 1798)	Yellow Pansy								+
78.	<i>Junonia iphita</i> (Cramer, [1779])	Chocolate Pansy		+	+				+	+
79.	<i>Junonia lemonias</i> (Linnaeus, 1758)	Lemon Pansy				+				+
80.	<i>Junonia orithya</i> (Linnaeus, 1758)	Blue Pansy		+	+	+				+
81.	<i>Kallima inachus</i> (Boisduval, 1846)	Orange Oakleaf		+						
82.	<i>Melanitis leda</i> (Linnaeus, 1758)	Common Evening Brown		+					+	
83.	<i>Moduza procris</i> (Cramer, [1777])	Commander		+						+
84.	<i>Mycalesis perseus</i> (Fabricius, 1775)	Common Bushbrown		+					+	+
85.	<i>Neptis hylas</i> (Linnaeus, 1758)	Common Sailer		+					+	+
86.	<i>Orsotriaena medus</i> (Fabricius, 1775)	Nigger		+						
87.	<i>Pantoporia hordonia</i> (Stoll, [1790])	Common Lascar		+						
88.	<i>Phalanta phalantha</i> (Drury, [1773])	Common Leopard		+					+	+
89.	<i>Polyura athamas</i> (Drury, [1773])	Common Nawab		+						
90.	<i>Cynitia lepidea</i> (Butler, 1868)	Grey Count	II	+					+	
91.	<i>Tirumala limniace</i> (Cramer, [1775])	Blue Tiger		+				+	+	+
92.	<i>Ypthima huebneri</i> Kirby, 1871	Common Fourring		+						

Legends: “+” indicates presence of the species at the site



Fig. 1: *Gerosis bhagava*



Fig. 2: *Kallima inachus*



Fig. 3: *Eurema blanda*



Fig. 4: *Abisara bifasciata*



Fig. 5: *Spindasis syama*



Fig. 6: *Tagiades gana*