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Butterflies of Guma Reserve Forest of Western Assam, India

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Abstract

A survey was carried out to document the alpha diversity of butterfly fauna from January 2018 to December 2019 in Guma Reserve Forest of western Assam, India. Total 239 species of butterflies belonging to six families were recorded in the study area. The relative abundance and the butterflies listed in the schedules of the Wildlife (Protection) Act, 1972 have also been discussed. Mud-puddling activity was observed among the butterflies. Habitat destruction, fragmentation, illegal tree felling and forest fire were recorded as the potential threat to their survival in the study area.

Keywords: Papilionidae, Pieridae, Lycaenidae, Nymphalidae and Hesperiidae, diversity and population status.

Introduction

The species-level taxonomy of butterflies is well established and relatively stable (David et al. 2003), which have received a reasonable amount of attention throughout the world (Ghazoul 2002). Therefore, among the insects butterflies occupy a vital position in ecosystem and their occurrence and diversity are considered as good indicators of the state of the environment (Aluri & Rao 2002, Kunte 2000, Thomas 2005). Due to their high mobility, butterflies can also respond quickly to changes in landscape and local vegetation. Studies have shown that many butterfly species are strictly seasonal and prefer only a particular set of habitats (Kunte 1997) and they are good indicators in terms of anthropogenic disturbance and habitat quality (Kocher & Williams 2000, Thomas et al. 2004). Nature of vegetation and climatic factors like temperature, wind, moisture and humidity also play important roles on the distribution, feeding and reproductive behavior of butterflies. Besides, they form an important part of the food chain of birds, reptiles, amphibians, spiders and predatory insects.

butterflies within North Eastern region. Wood-Mason and De Nice'ville (1887), Evans (1932), Cantlie (1952), Varshney & Chanda (1971) and Haribal (1992) published a list of butterflies including all families from different parts of this region. Of late some works on documentation of Nymphalid butterflies at Rani-Garbhanga Reserve Forest (Saikiya et al. 2010) and reported 109 species, Choudhury and Ghosh (2008) reported 154 species from Chakrashila Wildlife Sanctuarty, Gogoi (2015) reported 116 Lycaenidae butterflies from Panbari Reserve Forest and adjoining areas in Kaziranga National park, Mudai (2015) recorded 224 species of butterflies in Nambor-Doigrung Wildlife Sanctuary and Singh (2017) reported 237 species in eight reserve forest areas and Dehing-Patkai Wildlife Sanctuary, covering three districts (Tinsukhia, Dibrugarh & Sibasagar) in the eastern part of upper Assam. However, the Guma Reserve Forest under Parbatihora Division of Lower Assam was totally untouched in earlier studies of butterflies. This paper presents a comprehensive list of butterflies with special reference to their conservation status in Guma Raserve Forest of Western Assam. India.

Very few works have been done so far on the

Study Area

The study was carried out from January 2018 to December 2019 in Guma Reserve Forest (89°54'51.97"E and 26°22'14.94"N, elevation 55 meter). Guma Reserve Forest falls under Parbatjhora Forest Divisions of Kokrajhar district that consists of four blocks in western Assam in India (Figure 1). The average rain fall was recorded as 3330 mm. The total area of the RF is 6793.06 Hector. The forest type available in this forest ranges from semi-deciduous with Sal (*Shorea robusta*) as the dominant tree species to broad leaved wet evergreen forest and riparian forest (Champion & Seth 1968). Khoranala beel is the only major source of water in the study area.



Figure 1: Guma Reserve Forest of western Assam, India

Materials and Methods

During the survey, butterflies were recorded by walking on fixed transects that traversed through different habitat types following Pollard and Yates (1993). Each transect was covered twice a month, between 8 am to 12 noon and the butterflies were recorded while doing various activities viz., mudpuddling, basking, nectaring and flying. The motorable road, forest trails, river side and streams located inside the forest were used as permanent transects. The butterflies were encountered in different transects of 1 km and were recorded in an interval of 15 days. On the basis of visual observation during the entire study period the conservation status of various butterflies of the area was prepared. The abundance of the butterflies were calculated following Aneesh et

al. (2013) where species observed 80–100 % of the survey days were categorized as very common (VC), 60–80 % as common (C), 40–60 % as occasional (O), 20–40% as rare (R) and below 20% as very rare (VR).

The butterflies were identified by observing their morphology, wing colour patterns as well as their particular behaviour. The identification was made with the help of references to Haribal (1992) and cross checked with Bingham (1905 and 1907), Evans (1932), Talbot (1939 and 1947), Winter-Blyth (1957), Mani (1986), Kunte (2000) and Kehimker (2008). The unidentified specimens were collected with the help of sweep netting and released after taking photographs. Later the photographs were referred to the above mentioned literatures for final identification.

Results and Discussion

During the survey total 239 species belonging to 150 genera representing six families were identified in the study area (Table 1). Of which, the maximum number (95) of species belonging to the family Nymphalidae, which almost 40% of the total recorded species, followed by family Lycaenidae with 60 species (25%), family Hesperiidae with 38 species (16%), family Papilionidae with 23 species (10%), family Pieridae with 20 species (8%) and family Riodinidae with only

3 species (1%) (Figure 2). Most butterfly species were observed from the monsoon (hot/wet season) to early winter (cool/wet season) but thereafter declined in the middle of winter (November-December). The reason of this decline might be non-availability of nectar and larval food plants. But certain species were found uniformly all around the year due to their polyphagus nature. Besides, few species are only available in the winter months (October – January).



Figure 2: Family wise representation of butterflies in Guma Reserve Forest of western Assam

Among the butterflies recorded *Chilasa clytia*, *Castalius rosimon*, *Chliaria othona*, *Euthalia telchinia*, *Hypolimnas misippus*, *Actolepis puspa*, *Megisba malaya*, *Doleschallia bisaltida* were enlisted as schedule-I; *Appias lyncaida*, *Euchrysope cnejus*, *Lampodea boeticus*, *Tanaecia lepidea* in schedule-II and *Taraka hamada* listed as schedule –IV in the Indian Wildlife (Protection) Act. 1972.

Sl. No.	COMMON NAME	SCIENTIFIC NAME	RELATIVE ABUNDANCE	IW(P) Act.		
	Family-PAPILIONIDAE					
1.	Common Birdwing	Triodes Helena	Occasional			
2.	Golden Birdwing	Triodes aeacus	Very Rare			
3.	Common Jay	Graphium doson	Common			
4.	Tailed Jay	Graphium agammemnon	Common			
5	Classy Divebattle	Cumhinn de mélan	Occesional			
<i>J</i> .	Glassy Blueboule	Graphium cioaninus	Occasional			
6. 7	Great Zebra	Graphium xenocles	Occasional			
1.	Common Bluebottle	Graphium sarpedon	Very Common			
8.	Lime Butterfly	Princeps demoleous	Very Common			
9.	Great Mormon	Princeps memnon	Common			
10.	Common Mormon	Princeps polytes	Very Common			
11.	Red Helen	Princeps helenus	Common			
12.	Yellow Helen	Princeps nephelus	Common			
13.	Common Raven	Princeps castor	Occasional			
14.	Paris Peacock	Princeps paris	Occasional			
15.	Red Breast	Princeps alcmenor	Occasional			
16.	Spangle	Princeps protenor	Rare			
17.	Fivebar Swordtail	Pathysa antiphates	Very Common			
18.	Spot Swordtail	Pathysa nomius	Rare			
19.	Common Batwing	Atrophaneura varuna	Very Rare			
20.	Lesser Batwing	Atrophaneura aidoneus	Very Rare			
21.	Common Windmill	Atrophaneura polveuctes	Very Rare			
22.	Common Rose	Pachliopta aristolochiae	Occasional			
23.	Common Mime	Chilasa clytia	Common	Schedule-I		
Family-PIERIDAE						
24.	Psyche	Leptosia nina	Very Common			
25.	Large Cabbage White	Pieris brassicae	Common			
26.	Chocolate Albatros	Appias lyncaida	Abundant	Schedule-II		
27.	Striped Albatros	Appias libythea	Common			
28.	Common Albatros	Appias albino	Common			
29.	Great Orange Tip	Hebomoia glaucippe	Very Common			
30.	Yellow Orange Tip	Ixias pyrene	Very Common			
31.	Common Jezebel	Delias eucharis	Common			
32.	Painted Jezebel	Delias hyparete	Common			
33.	Yellow Jezebel	Delias agostina	Common			
34.	Red Spot Jezebel	Delias descombesi	Common			
35.	Redbreast Jezebel	Delias aglaia	Common			
36.	Common Emigrant	Catopsilia pomona	Common			
37.	Mottled Emigrant	Catopsilia pyranthe	Common			
38.	Spotless Grass Yellow	Eurema laeta	Common			

Table 1: Butterflies recorded in Guma Reserve Forest of Western Assam

39.	Three Spot Grass Yellow	Eurema blanda	Common	
40.	Common Grass Yellow	Eurema hecabe	Common	
41.	Tree Yellow	Gandaka harina	Very Common	
42.	Lesser Gull	Cepora nadina	Very Common	
43.	Bathwhite	Pontia daplidice	Occasional	
		Family _L.YCAENIDAE		
44	Chocolate Royal	Remelana jangala	Common	
45.	Slate Flash	Rapala manea	Occasional	
46	Common Flash	Rapala nissa	Occasional	
47.	Indian Red Flash	Rapala airbus	Occasional	
48.	Copper Flash	Rapala pheretima	Occasional	
49.	Common Onvx	Horaga onvx	Verv Rare	
50.	White banded Royal	Dacalana cotys	Very Rare	
51.	Forest Pierrot	Taraka hamada	Common	
52.	Dark Pierrot	Tarucus ananda	Occasional	Schedule-IV
53.	Zebra Blue	Syntarucus plinius	Occasional	
54.	Pale Hedge Blue	Celastrina cardia	Common	
55.	Apefly	Spalgis epius	Common	
56.	Bright Sunbeam	Curetis bulis	Common	
57.	Angled Sunbeam	Curetis dentate	Common	
58.	Club Silverline	Spindasis syama	Very Common	
59.	Dark Himalayan Oakblue	Narathura rama	Common	
60.	Spotless Oak-Blue	Narathura oakbkue	Common	
61.	Common Tinsel	Catapaecilma elegans	Very Rare	
62.	Yamfly	Loxura atymnus	Occasional	
63.	Fluffy Tit	Zeltus amasa	Very Common	
64.	Lime Blue	Chilades laius	Common	
65.	Purple Sapphire	Heliophorus epicles	Very Common	
66.	Striped Pierrot	Tarucus nara	Occasional	
67.	Pale Fore Line Blue	Nacaduba hermus	Very Common	
68.	Opaque 6-line Blue	Nacaduba kurava	Very Common	
69.	Large 4 line Blue	Nacaduba hermus	Very Common	
70.	Transparent 6-Line Blue	Nacaduba beroe	Very Common	
71.	Forget-Me-Not	Catochrysops strabo	Common	
72.	Western Centaur Oakblue	Arhopala pseudocentaurus	Occasional	
73.	Yellow-disc Tailless Oakblue	Arhopala perimuta	Common	
74.	Common Imperial	Cheritraa freja	Rare	
75.	Blue Imperial	Ticherra acte	Rare	
76.	Metalic Cerulean	Jamides alecto	Very Common	
77.	Dark Cerulean	Jamides bochus	Very Common	
78.	Plane	Bindahara phocides	Occasional	
79.	Gram Blue	Euchrysops cnejus	Occasional	Schedule-II
80.	Silverstreaked Acacia Blue	Surendra todara	Common	
81	Common Acacia Blue	Surendra avercetorum	Very Common	

82.	White banded Hedge Blue	Lestranicus transpectus	Common	
83.	Common Hedge Blue	Acytolepis puspa	Occasional	Schedule-I
84.	Quaker	Neopithecops zalmora	Occasional	
85.	Malayan	Megisba malaya	Common	
86.	Pale Grass Blue	Pseudozizeeria maha	Very Common	
87.	Lesser Grass Blue	Zizina otis	Very Common	
88.	Dark Grass Blue	Zizeeria karsandra	Common	
89.	Common Peirrot	Castalius rosimon	Occasional	Schedule-I
90.	Plains Cupid	Chilades pandava	Occasional	
91.	Orchid Tit	Chliaria othona	Occasional	Schedule-I
92.	Elbowed Pierrot	Caleta elna	Very Common	
93.	Long Banded Silverline	Aphnaeus lohita	Very Common	
94.	Common Silverline	Aphnaeus vulcans	Occasional	
95.	Scarce Shot Silverline	Aphnaeus elima	Occasional	
96.	Common Tit	Hypolycaena erylus	Common	
97.	Pea Blue	Lampides boeticus	Rare	Schedule-II
98.	Pointed Ciliated Blue	Anthene lycaenina	Common	
99.	Common Ciliated Blue	Anthene emolus	Very Common	
100.	Tailless Lineblue	Prosotas dubiosa	Common	
101.	Common Lineblue	Prosotas nora	Common	
102.	Dingy Lineblue	Petrelaea dana	Occasional	
103.	Common Gem	Poritia hewitsoni	Rare	
		Family-NYMPHALIDAE	1	
104.	Streaked Baron	Euthalia alpheda	Common	
105.	Common Baron	Euthalia aconthea	Occasional	
106.	Blue Baron	Euthalia telchinia	Rare	Schedule-I
107.	Common Evening Brown	Melanitis leda	Common	
108.	Great Evening Brown	Melanitis zitenius	Common	
109.	Dark Evening Brown	Melanitis phedima	Common	
110.	Common Lascar	Pantoporia hordonia	Very Common	
111.	Vagrant	Vagrans egista	Common	
112.	Dark Archduke	Lexias dirtea	Occasional	
113.	Jezebel Palm Fly	Elymnias basudeva	Occasional	
114.	Common Palmfly	Elymnias hypermnestra	Very Common	
115.	Whitebar Bushbrown	Mycalesis anaxias	Very Common	
116.	Lilacine Bushbrown	Mycalesis franscica	Common	
117.	Common Bushbrown	Mycalesis perseus	Very Common	
118.	Darkbrand Bushbrown	Mycalesis mineus	Very Common	
119.	White line Bushbrown	Mycalesis malsara	Common	
120.	Brighteye Bushbrown	Mycalesis nicota	Occasional	
121.	Common Fivering	Ypthima baldus	Common	
122.	Common Fourring	Ypthima hubenri	Common	
123.	Common Threering	Ypthima asterope	Common	
124.	Common Jester	Symbrenthia lilea	Very Common	
125.	Himalayan Jester	Symbrenthia hypselis	Occasional	
126.	Nigger	Orsotrioena medus	Very Common	
127.	Tawny Rajah	Charaxes polyxena	Very Common	

128.	Variegated Rajah	Charaxes kahruba	Common	
129.	Yellow Rajah	Charaxes marmax	Very Common	
130.	Courtesan	Euripus halitheres	Occasional	
131.	Commodore	Limenitis danava	Common	
132.	Pallid Nawab	Polyura arja	Very Common	
133.	Common Nawab	Polyura athamas	Very Common	
134.	Indian Purple Emperor	Apatura ambica	Common	
135.	Common Leopard	Phalanta phalantha	Very Common	
136.	Banded Treebrown	Letha confusa	Common	
137.	Eastern Courtier	Sephisa chandra	Common	
138.	Sergeant Emperor	Apatura chevana	Common	
139.	Cruiser	Vindula erota	Common	
140.	Red Lacewing	Cethosia bibles	Very Common	
141.	Leopard Lacewing	Cethosia cyane	Very Common	
142.	Circe	Hestina nama	Occasional	
143.	Angle Castor	Ariadne ariadne	Common	
144.	Common Castor	Ariadne merione	Very Common	
145.	Large Yeomen	Cirrochroa aoris	Common	
146.	Common Yeomen	Cirrochroa tyche	Common	
147.	Yellow Pansy	Precis hierta	Common	
148.	Lemon Pansy	Precis lemonias	Abundant	
149.	Peacock Pansy	Precis almanac	Very Common	
150.	Chocolate Pansy	Precis iphita	Very Common	
151.	Blue Pansy	Precis orithya	Rare	
152.	Grey Pansy	Precis atlites	Very Common	
153.	Yellow Coster	Acraea issoria	Common	
154.	Tawny Coster	Acraea violae	Very Common	
155.	Indian Red Admiral	Vanessa indica	Common	
156.	Painted Lady	Cynthia cardui	Occasional	
157.	Great Eggfly	Hypolimnas bolina	Common	
158.	Danaid Eggfly	Hypolimnas misippus	Occasional	Schedule-I
159.	Autumn Leaf	Doleschallia bisaltide	Occasional	Schedule-I
160.	Orange Oakleaf	Kallima inachus	Common	
161.	Common Map	Cyrestis thyodamas	Very Common	
162.	Common Maplet	Chersonesia risa	Very Common	
163.	Common Sailor	Neptis hylas	Very Common	
164.	Small Yellow Sailor	Neptis miah	Very Common	
165.	Clear Sailor	Neptis clina	Very Common	
166.	Sullied Sailor	Neptis soma	Occasional	
167.	Yellow Sailor	Neptis ananta	Very Common	
168.	Dingy Sailor	Neptis pseudovikasi	Very Common	
169.	Unbroken Sergeant	Athyma pravara	Very Common	
170.	Colour Sergeant	Athyma nefta	Very Common	

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171	Q, (CQ)		V. C	
1/1.	Staff Sergeant	Athyma selenophora Parathyma parius	Very Common	
172.	Small Staff Sargeant	Parathyma zaroog	Very Common	
173.	Dial Star Sergean		Very Common	
174.	Blackvein Sergeant	Parathyma ranga	Very Common	
175.	Commander	Moduza procris	Very Common	<u> </u>
176.	Grey Count	Tanaecia lepidea	Very Common	Schedule-II
177.	Knight	Lebadea martha	Very Common	
178.	Common Earl	Tanaecia julil	Very Common	
179.	Glassy Tiger	Parantica aglea	Very Common	
180.	Chestnut Tiger	Parantica sita	Very Common	
181.	Chocolate Tiger	Parantica melaneus	Very Common	
182.	Plain Tiger	Danaus chrysippus	Very Common	
183.	Common Tiger	Danaus genutia	Very Common	
184.	Double Branded Crow	Euploea Sylvester	Frequent	
185.	Common Crow	Euploea core	Very Common	
186.	Magpie Crow	Euploea radmanthus	Common	
187.	Long Banded Blue Crow	Euploea algea	Occasional	
188.	Blue Spotted Crow	Euploea midamus	Common	
189.	Striped Blue Crow	Euploea mulciber	Occasional	
190.	Blue King Crow	Euploea klugii	Occasional	
191.	Popinjay	Stibochiona nicea	Occasional	
192.	Club Beak	Libythia myrrha	Rare	
193.	Constable	Dichorragia nesimachus	Occasional	
194.	Black Prince	Rohana parisatis	Occasional	
195.	Dark Blue Tiger	Tirumala septentrionis	Very Common	
196.	Blue Tiger	Tirumala limniace	Very common	
197.	Indian Fritillary	Argyreus hyperbius	Rare	
198.	Dark Archduke	Lexias dirtea	Rare	
	1	Family-RIODINIDAE	1	1
199.	Plum Judy	Abisara echerius	Occasional	
200.	Tailed Judy	Abisara neophoran	Occasional	
201.	Punchinello	Zemeros flegyas	Common	
		Family-HESPERIIDA		
202.	The Dart	Potanthus nesta	Rare	
203.	Water Snow Flat	Tagiades litigiosa	Common	
204.	Suffused Snow Flat	Tagiades gana	Common	
205.	Chestnut Bob	Iambrix salsala	Common	
206.	Grass Demon	Udaspes folus	Occasional	
207.	Wax Dart	Cupitha purreea	Occasional	
208.	Angled Red Forester	Lethe chandica	Common	
209.	Common Snow Flat	Tagiades japetus	Common	
210.	Chestnut Angle	Odontoptilum angulata	Very Common	

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211.	Fulvous Pied Flat	Psuedocoladenia dan	Very Common
212.	Common Dartlet	Oriens gola	Common
213.	Restricted Demon	Notocrypta curvifascia	Common
214.	Spotted Demon	Notocrypta feisthameli	Common
215.	Chocolate Demon	Ancistriodes nigrita	Common
216.	Tiger Hopper	Ochus atkinsoni	Very Common
217.	Forest Hopper	Astictopterus jama	Common
218.	Straight Swift	Parnara guttatus	Common
219.	Restricted Demon	Notocrypta curvifascia	Common
220.	Sikkim White Flat	Sesseria sambara	Rare
221.	Coon	Sancus fuligo	Occasional
222.	Bush Hopper	Ampittia dioscorides	Common
223.	Dark Yellow Banded Flat	Celaenorrhinus aurivittata	Rare
224.	Common Spotted Flat	Celaenorrhinus leucocera	Common
225.	Orange Tail Awl	Bibasis sena	Rare
226.	Small Green Awlet	Bibasis amara	Rare
227.	Indian Awl King	Choaspes benjaminii	Occasional
228.	Small Banded Swift	Pelopidas mathias	Occasional
229.	Rice Swift	Borbo cinnara	Very Common
230.	Yellow Spot Swift	Polytremis eltola	Common
231.	Common banded Awl	Hasora chromus	Occasional
232.	Common Awl	Hasora badra	Occasional
233.	Plain Banded Awl	Hasora vita	Occasional
234.	White Banded Awl	Hasora taminatus	Occasional
235.	Brown Awl	Badamia exclamationis	Occasional
236.	Common Redeye	Matapa aria	Common
237.	Dark Velvet Bob	Koruthaialos butleri	Common
238.	Indian Skipper	Spialia galba	Occasional
239.	Common Yellow Breasted Flat	Gerosis bhagava	Occasional

Very Common (VC) = 80-100 %, Common (C) = 60-80 %, Occasional (O) = 40-60 %, Rare (R) = 20-40% and Very Rare (VR) = below 20%

Plate 1: List of Butterflies











Huge mud-puddling (upto 25 individuals) was common during the sunny hours after a rain in post monsoon months (Figure 3). Both mixed and occasionally single species assemblages were found at wet soil patches. Several species such as *Princeps castor*, *Princeps helenus*, *Princeps memnon*, *Graphium sarpedon*, *Graphium agammemnon*, *Appias lyncaida*, *Hebomoia glaucippe*, *Ixias pyrene*, *Eurema blanda*, *Gandaka harina*, *Cepora nerissa*, *Cepora nadina* and *Caleta elna* (13 species) were found to be present in a mixed puddling group. But on most of the occasions, the Pierids or Lycaenids dominated the assemblages. During monsoon most of the earth surface including the forest trails were covered with herbs, shrubs and climbers and the only gravel motorable road that traverse through the reserve forest is the only place for mud-puddling.



Figure 3: Congregations of butterflies during mud-puddling in Guma Reserve Forest of western Assam

Conclusion

Though the habitat conditions of Guma Reserve are suitable for the propagation of butterflies but certain anthropogenic activities like illegal tree felling for fire wood and timber, agricultural practice, cattle farms and illegal forest fires have taken a heavy toll on butterfly population in the region.

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