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# A Study on Butterfly Diversity of Lower-Doigrung (Bijuli) Reserve Forest of Golaghat, Assam, India

Chandopal Saikia[1], Susmita Sonowal[2] and Moirangthem Kameshwor Singh*[3]

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## ABSTRACT

Butterflies are very subtle and charming creature in the world which is considered as pollution indicator and natural pollinator. The present study aims to elucidate the richness and diversity of butterflies from Lower-Doigrung (Bijuli) reserve forest of Golaghat, Assam. A total of 60 species of butterflies belonging to five families were recorded during the study, of which, 5 species were found to be included in the rare category. The family Nymphalidae was found to be most dominant with 26 number of species followed by Lycaenidae (13 species), Papilionidae (9 species), Pieridae and Hesperiidae with 6 species each. The results of the current study will help in implementing proper conservation strategies of butterfly diversity in the protected area.

***Key words*:** Butterfly, Charming, Conservation, Diversity, Pollinator

Butterflies are considered as the most delicate and charismatic among the insects group of the order Lepidoptera. They occupy a vital position in the ecosystem as their occurrence and diversity indicates the fitness of that area [1]. Being sensitive to any changes in the environment like habitat destruction, temperature and humidity, they also act as good bio-indicators [2]. Thus, any disturbance in their habitat may have a negative impact on butterfly assemblages over time [3]. Further, they are beneficial to the environment as an effective pollinator, silk producers and pollution indicator [4]. The unique and aesthetically appealing wing patterns of butterfly have a lucrative trade market in the world [5]. Northeast India is considered as one of the major hub of butterfly diversity which falls into both Himalayan and Indo-Burma biodiversity hot spot [6]. More than 50% of the species of butterflies recorded in India occur in the eastern Himalaya and north-eastern region [7]. According to Mudoi *et al.* [8], a total of 962 species of butterfly belonging to five families have been reported from Assam. The richness of butterflies in this region makes it an important region for conservation of biodiversity in the world [7]. In the present study, an attempt has been made to access the diversity and status of the butterfly species of Lower-Doigrung (Bijuli) reserve forest, Golaghat, Assam.

## MATERIALS AND METHODS

* Moirangthem Kameshwor Singh
✉ kameshworm@dibru.ac.in
[1-3] Department of Life Sciences, Dibrugarh University - 786 004, Assam, India

Continuous survey was undertaken during three successive months i.e., June, July and August of 2020 in early morning (7.00-10.00 am). For data collection, "Line Transact Method" of Pollard [9] was followed. Three permanent transact lines were setup at approximately 750 m in length in different location of the study site. The transact routes were selected in such a way that it represented maximum available habitat. The transact walks were conducted during the peak Lepidopteran activity avoiding the rainy and heavily overcast conditions with a slow but constant pace covering the each transacts within one hour. DSLRs were used for capturing and identifying those butterflies which were unable to identify in the field. The identification of the butterflies was done by using the identification keys of Morre [10-15], Evans [16], Talboot [17-18] and a photographic guide of Kehimker [19]. The species were then further categorized under Wildlife Protection Act, 1972 and IUCN Red List Category. Geographic coordinates were extracted from Google Earth. The status of butterflies was given as per Kehimker [19].

*Study area account*

Lower-Doigrung (Bijuli) reserve forest, a part of Nambor-Doigrung wildlife


Fig 1 Location of Lower-Doigrung (Bijuli)

sanctuary, located in Golaghat district of Assam (26°27′34.01″ N and 93°48′21.39″ S) (Fig 1). It is located in the foothills of Karbi-Anglong district and altitude varies from 100 m to 200 m [6]. The mean annual temperature of the reserve varies from 6°C to 36°C [20]. Annual rainfall of the study area was 249 cm.

## RESULTS AND DISCUSSION

A total number of 60 species representing five families have been recorded in the study area. The species and their families with their ecological status have been presented in (Table 1). Among them, family Nymphalidae (26 species) was found to be most dominant followed by Lycaenidae (13 species), Papilionidae (9 species), Hasperiidae (6 species) and Pieridae (6 species) respectively (Fig 2).

Most of the butterfly species recorded from Hesperiidae family was found to be common [19]. *Graphium antiphates* (Cramer) from Papilionidae family observed from the current study was described as common in north India where as it is considered as rare in south India. Others species from Papilionidae family were found to be common and very common in NE region.

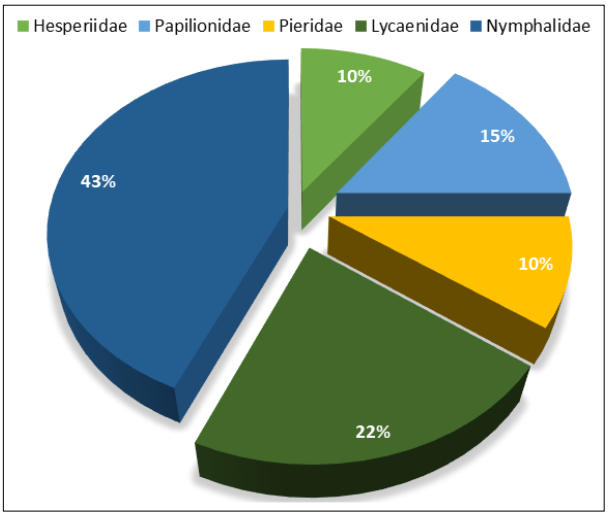


Fig 2 Family-wise distribution of butterfly species recorded in the Lower-Doigrung (Bijuli) Reserve Forest

Table 1 List of Butterfly species recorded in Lower-Doigrung (Bijuli) Reserve Forest, Assam and its IUCN status

| Family | Common Name | Scientific Name | Status as per Kehimkar (2008) | IUCN status |
|---|---|---|---|---|
| Hesperiidae | Restricted Demon | *Notocrypta curvifascia* (C. & R. Felder) | Common | NE |
| | Chocolate Demon | *Ancistroides nigrita* (Moore) | Common | NE |
| | Tiger Hopper | *Ampittia subvittatus* (Moore) | Not rare | NE |
| | Fulvous Pied Flat | *Pseudocoladenia dan* (Febricius) | Common | NE |
| | Common Small Flat | *Sarangesa dasahara* (Moore) | Common | NE |
| | Indian Ace | *Halpe homolea* (Hewitson) | Common | NE |
| Papilionidae | Common Jay | *Graphium doson* (C. & R. Felder) | Locally Common | NE |
| | Great Mormon | *Papilio memnon* (Linnaeus) | Locally Common | NE |
| | Common Mormon | *Papilio polytes* (Linnaeus) | Very Common | NE |
| | Common Bluebottle | *Graphium sarpedon* (Linnaeus) | Common | NE |
| | Tailed Jay | *Graphium agamemnon* (Linnaeus) | Common | NE |
| | Yellow Helen | *Pepilio nephelus* (Boiduval) | Not Rare | NE |
| | Red Helen | *Papilio helenus* (Linnaeus) | Common | NE |
| | Five Bar Sword Tail | *Graphium antiphates* (Cramer) | Common in North India, rare in South India | NE |
| | Common Birdwing | *Troides Helena* (Linnaeus) | Not Rare | LC |
| Pieridae | Large Cabbage White | *Pieris brassicae* (Linnaeus) | Common | LC |
| | Red Base Jezebel | *Delias pasithoe* (Linnaeus) | Not Rare | NE |
| | Three Spotted Grass yellow | *Eurema blanda* (Boisduval) | Common | NE |
| | Great Orange Tip | *Hebomoia glaucippe* (Linnaeus) | Common | NE |
| | Chocolate Albatross | *Appias lyncida* (Cramer) | Locally common in south India, Common in north of India | NE |
| | Common grass yellow | *Eurema hecabe* (Linnaeus) | Common | NE |
| Lycaenidae | Common Line Blue | *Prosotas nora* (C. Felder) | Common | NE |
| | Elbowed Pierrot | *Pycnophallium elna* (Hewitson) | Locally Common | NE |
| | Fluffy Tit | *Zeltus amasa* (Hewitson) | Not Common | NE |
| | Metallic Cerulean | *Jamides alecto* (C. & R. Felder) | Locally Common | NE |
| | Transparent Six Line Blue | *Nacaduba kurava* (Moore) | Not Rare | NE |
| | Western Centaur Oakblue | *Arhopala pseudocentaurus* (Doubleday) | Not Common | NE |
| | Common Pierrot | *Castalius rosimon* (Febricius) | Common | NE |
| | Common Imperial | *Cheritra freja* (Febricius) | Locally Common | LC |
| | Common Hedge Blue | *Acytolepis puspa* (Horsfield) | Common | NE |
| | Common Cerulean | *Jamides celeno* (Cramer) | Common | NE |
| | Punchinello | *Zemeros flegyas* (Cramer) | Common | NE |
| | Forget-Me-Not | *Catochrysops strabo* (Fabricius) | Common | NE |

| | | | | |
|---|---|---|---|---|
| Nymphalidae | Angled Sunbeam | *Curetis acuta* (Moore) | Not Rare | NE |
| | Long Branded Blue Crow | *Euploea algea* (Godart) | Not common | VU |
| | Common Four Ring | *Ypthima huebneri* (Kirby) | Common | NE |
| | Common Five Ring | *Ypthima baldus* (Fabricius) | Common | NE |
| | Dark Banded Bush Brown | *Mycalesis mineus* (Linnaeus) | Common | NE |
| | Orange Okleaf | *Kallima inachus* (Boisduval) | Not Rare | NE |
| | Common Leopard | *Phalanta phalantha* (Drury) | Common | NE |
| | Common Lascar | *Pantoporia hordonia* (Stoll) | Common | NE |
| | Constable | *Dichorragia nesimachus* (Doyere) | Not Rare | NE |
| | Nigger | *Orsotriaena medus* (Fabricius) | Locally common | NE |
| | Yellow Pansy | *Junonia hierta* (Fabricius) | Common | LC |
| | Chocolate Pansy | *Junonia iphita* (Cramer) | Common | NE |
| | Common Bush Brown | *Mycalesis perseus* (Fabricius) | Common | NE |
| | Chinese Bush Brown | *Mycalesis gotama charaka* (Moore) | Rare | NE |
| | Blue Tiger | *Tirumala limniace* (Cramer) | Common | NE |
| | Striped Tiger | *Danaus genutia* (Cramer) | Common | NE |
| | Courtesan | *Euripus consimilis* (Doubleday) | Not Rare | NE |
| | Great Eggfly Female | *Hypolimnas bolina* (Linnaeus) | Common | NE |
| | Variegated Rajah | *Charaxes kahruba* (Moore) | Not Common | NE |
| | Plain Earl | *Tanaecia jahnu* (Moore) | Not Rare | NE |
| | Leopard Lacewing | *Cesthosia cyane* (Drury) | Not Rare | NE |
| | Large Yeoman | *Cirrochroa aoris* (Doubleday) | Common | NE |
| | Grey Count | *Tanaecia lepidea* (Butler) | Rarer in south India than north India | NE |
| | Dark Archduke Male | *Lexias dirtea khasiana* (Swinhoe) | Rare | NE |
| | Blue Pansy | *Junonia orithya* (Fabricius) | Common | NE |
| | Archduke | *Lexias pardelis* (Moore) | Rare | NE |
| | Common Maplet | *Chersonesia risa* (Doubleday) | Not common | NE |

**IUCN: International Union for Conservation of Nature and Natural Resources,
LC: Least Concern, VU: Vulnerable, NE: Not Evaluated

In Pieridae family, *Delias pasithoe* (Linnaeus) belonged to not rare category. *Zeltus amasa* (Hewitson), *Arhopala pseudocentaurus* (Doubleday) (Fig 3O) from Lycaenidae family were found to be in not common category. Among the species recorded from Nymphalidae, three species *Euploea algea* (Godart) and *Charaxes kahruba* (Moore), *Chersonesia risa* (Doubleday) were considered under not common category. The Nymphalids viz. *Mycalesis gotama charaka* (Moore), *Lexias dirtea khasiana* (Swinhoe), *Lexias pardelis* (Moore) and *Tanaecia lepidea* (Butler) (Fig 3C) falls in rare category according to Kehimker [19].

Of the 60 species encountered, 10 species were protected under the Wildlife Protection Act, India, 1972. However, most of them were listed as Scheduled II (Part II) species and one species listed as Scheduled I (Part IV). Amongst them, *Castalius rosimon* (Febricius) is listed under Scheduled I (Part IV) whereas *Halpe homolea* (Hewitson), *Appais lyncida* (Cramer), *Jamides alecto* (C. & R. Felder), *Mycalesis gotama charaka* (Moore), *Charaxes kahruba* (Moore), *Tanaecia lepidea* (Butler), *Lexias dirtea khasiana* (Swinhoe), *Lexias pardelis* (Moore), *Euripus consimilis* (Doubleday) falls under Scheduled II (Part II) species. Four species viz. *Troides Helena* (Linnaeus), *Pieris brassicae* (Linnaeus), *Cheritra freja* (Febricius), *Junonia hierta* (Fabricius) are listed in the IUCN Red List category of Least Concern (LC) whereas *Euploea algea* (Godart) have been given the IUCN status of Vulnerable (Vu) category.

From the present survey, the abundance and richness of Nymphalidae family was found to be most dominant with the highest number of species observed during the study period [21-23]. Such dominance of Nymphalidae family indicates high availability of the host plants [2]. Additionally, the Nymphalids are active flier which helps them to cover large areas in searching their resources [24]. Among the other species recorded, three species viz., *Mycalesis gotama charaka*, *Lexias dirtea khasiana* and *Lexias pardelis* are listed under rare category. The rare species are more prone to extinct in the ecosystem due to aggressive habitat destruction, pollution, changes in the physical and chemical environment and overexploitation [25]. The rare species are often purchased by the collectors at high prices because of their unique and interesting patterns which are not found in normal butterflies [5]. The family Hesperiidae and Pieridae was recorded with the least number of species which may be due to decline of their suitable host plants or the timing of observations [26]. Moreover, the distribution of butterfly species in the studied area is similar with the findings obtained from Nambor-Garampani wildlife sanctuary [6], [27].

## CONCLUSION

The present study depicts the butterfly species community structure of Lower-Doigrung (Bijuli) reserve forest, Golaghat. The current investigation will assist in proper documenting of butterfly community and also help in ensuring long term conservation efforts of butterfly by identifying what are criticals for the survival of the species especially for the rare and endemic ones which have a very narrow geographic range or habitat.

Fig 3(A) Chinese Bush Brown

Fig 3(B) Common Five Ring

Fig 3(C) Common Gray Count

Fig 3(D) Common Imperial

Fig 3(E) Red Helen

Fig 3(F) Punchinello

Fig 3(G) Fulvous Pied Flat

Fig 3(H) Red Base Jezebel

Fig 3(I) Yellow Helen

Fig 3(J) Great Egg fly Female

Fig 3(K) Chocolate Albatross

Fig 3(L) Common Bush Brown

Fig 3(M) Nigger

Fig 3(N) Dark Banded Bush Brown

Fig 3(O) Western Centaur Oakblue

Fig 3 Some of the butterflies cited in the study site (Lower-Doigrung (Bijuli) Reserve Forest, Assam)

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***Conflict of interest***

*Authors declared no conflict of interest.*

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