



RESEARCH PAPER

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**Diversity of butterflies (Order: *Lepidoptera*) in assam university campus and its vicinity, cachar district, assam, India**

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**Key words:** Assam University Campus, Cachar, Assam, transects lining, eco-forest.

**Abstract**

A preliminary study on the diversity of butterflies was carried out in Assam University campus and its vicinity, Cachar district, Assam, India from June 2013 to May 2014 using transects lining method (Barhaum *et al.*, 1980). The University Campus is surrounded by lush green hillocks, natural lakes and the picturesque tea gardens of South Assam. The inner landscape is featured by sprawling lawns, well nurtured gardens and eco-forests which serves as the store house of a wide variety of butterflies showing an excellent diversity. A total of 96 species of butterflies belonging to 68 genera and five families were recorded during the study period, of which 13 species were under the rare category (included 9 rare\* and 4 very rare\*\*). During the course of the present studies it was observed that the family Nymphalidae represented by 23 genera and 34 species was the most dominant followed by Lycaenidae (19 genera, 20 species), Hesperidae (13 genera, 15 species), Pieridae (9 genera, 14 species) and Papilionidae (4 genera, 13 species). As the area houses 96 species of butterflies distributed throughout the campus, it can be presumed to have a good diversity of butterflies, which may be attributed to the sprawling lawns and well nurtured gardens that provide a suitable nectar source throughout the varying seasons, and especially the eco-forests that serves a breeding habitat to the butterflies.

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## Introduction

North East India is one of the richest in biological values, high in endemism and holds a large number of rare species that are now under serious threat. The region is among the 34 Hot Spots of the world, identified in India, the other being the Western Ghats. The region supports a rich butterfly fauna because of its average annual rainfall that often exceeds 2,000 mm, which is ideal for most flora and fauna. The International Union for Conservation of Nature and Natural Resources (IUCN) has nominated northeastern India as one of the 'swallowtail-rich zones' under the Swallowtail Conservation Action Plan (1984).

Scientific study and documentation of Indian butterflies can be traced to the arrival of a Danish medical doctor Johann Gerhard Koenig in southern India, as early as in 1767. W.H. Evans (1932) provides an excellent scientific documentation of about 962 species/subspecies of butterflies belonging to five taxonomic families from the Assam region alone. Doubleday (1845) seems to be the first person to work on butterflies in the state when he worked in northern Assam covering the areas of Sadia, Jorhat and Cachar followed by Moore (1857) who worked in Abor Hills and Mishmi Hills, including Sadia. The celebrated work of Bingham (1905-1907) is also remarkable. There is renewed interest in butterflies of the Indian Region due to increased awareness among Indian citizens about butterflies, their biology and conservation issues. During a preliminary study on the butterflies of Regional Research Laboratory Campus, Jorhat, Assam (M. Bhuyan *et al.*, 2002), a total of 70 species of butterflies belonging to 45 genera were recorded. Out of the five families, the family Nymphalidae was found to be dominant contributing 40 different species. A similar study carried out in Zoo-Cum-Botanical garden, Guwahati (Ali *et al.*, 2000) recorded 72 species belonging to 43 genera with family Nymphalidae 9 being dominant out of the five families. A total of 1005 individuals representing 59 species in 48 genera belonging to five families were recorded in Trishna Wildlife Sanctuary,

Tripura, Assam (Mozumdar *et al.*, 2010). Of these, 23 species belonged to the family Nymphalidae and accounted for 38.98% of the total species and 45.20% of the total number of individuals. A preliminary checklist was prepared in Jeypore-Dehing forest, eastern Assam (MJ Gogoi, 2011) describing 292 species including the sighting of two species - Snowy Angle (*Darpa pteris*) and Wavy Maplet Chersonesia (*rahira rahrioides*).

Butterflies are suitable for biodiversity studies, as the taxonomy, geographic distribution and status of many species are relatively well known. Further, butterflies are good biological indicators of habitat quality as well as general environmental health (Larsen, 1988; Kocher and Williams, 2000; Sawchik *et al.*, 2005), as many species are strictly seasonal and prefer only particular set of habitats (Kunte, 1997). Butterflies may react to disturbance and change in habitat and act as an ecological indicator (Mac Nally and Fleishman, 2004). They may get severely affected by the environmental variations and changes in the forest structure, as they are closely dependent on plants (Pollard, 1991; Blair, 1999). Thus minor changes in their habitat may lead to either migration or local extinction (Blair, 1999; Kunte, 1997; Mennechez, Schtickzelle and Baguette, 2003). Because of their dependence on the plants, butterfly diversity may reflect overall plant diversity in the given area (Padhye *et al.*, 2006). Thus, change in land use pattern may lead to landscape changes that can reflect into change in butterfly diversity and distribution. As a result, butterflies can also be used as umbrella species (the species whose protection serves to protect many co-occurring species) for conservation planning and management (Fleishman 2004; Betrus *et al.*, 2005).

After going through the literature of the past works, the present study was conducted to study the diversity of butterfly fauna in Assam University campus and its vicinity areas with an objective to prepare a preliminary checklist and to determine the dominant taxa based on their diversity status. The study also

deals with the preferred larval host plant identification of individual butterflies observed within the study area.

#### *Study Area*

Cachar district is located in the southernmost part of Assam. It is bounded on the north by Barail and Jayantia hill ranges, on the south by the State of Mizoram and on the east by the districts of Hailakandi and Karimganj. The district lies between 92° 24' E and 93° 15' E longitude and 24° 22' N and 25° 8' N latitude. The total geographical area of the district is 3,786 Sq. Km. The topography of the district varies from small hillocks to plain areas and low lying areas as beels, etc. The district falls under Barak river basin. It is mostly made up of plains but there are a number of hills spread across the district. Cachar receives an average annual rainfall of more than 3,000 mm. The climate is mostly tropical wet with hot and wet summers and cool winters. The soil of the district is clay loam, alluvial and red alluvial. The soil is highly porous and therefore, lacks moisture retention capacity and is susceptible to erosion. The water level in the district is very low. The district has a total forest cover of 2, 225 sq.km area which is 58.77 percent of its total geographical area as per the estimates of Forest Survey of India. The dense forest cover in the district is 45 percent while 55 percent of the forest cover is under open forest. The vegetation is mostly tropical evergreen and there are large tracts of rainforests in the northern and southern parts of the district.

Assam University campus is situated in Dargakona, a place located 23 km. away from the Silchar city. Silchar city being the gateway to the entire southern part of North East India is the hub of commercial activities and is known for its history as the Tea Capital of South Assam. With the Bhuban and the Barail ranges of hills at the backdrop, the University Campus is surrounded by lush green hillocks, natural lakes and the picturesque tea gardens of South Assam. The inner landscape is featured by sprawling lawns, well nurtured gardens and eco-forests. The

serene setting makes the University Campus a unique one with exquisite natural beauty which captures viewers' imagination. The sprawling University Campus at Silchar is spread over an area of about 600 acres. The eco-forest is the house of a variety of plants that supports a wide variety of flora and fauna including birds, amphibians, reptiles, small mammals and butterflies.

The dominant plant species recorded within the campus include *Citrus* spp., *Toddalia asiatica*, *Murraya* spp., *Aegle marmelos*, *Mangifera indica*, *Polyalthia longifolia*, *Michelia* spp., *Cinnamomum* spp., *Annona* spp., *Magnolia grandiflora*, *Litsea* spp., *Aristolochia* spp., *Ricinus communis*, *Derris scandens*, *Bambusa* spp., *Cocos* spp., *Calamus* spp., *Cassia* spp., *Andropogon* spp., *Cymbopogon* sp., *Setaria glauca*, *Terminalia* spp., *Melastoma malabathricum*, *Dioscorea* spp., *Ageratum conyzoides*, *Vallisneria* spp., *Frerea* spp., *Calotropis* sp., *Ficus* sp., *Nerium* sp., *Dendrocalamus* spp., *Panicum* spp., *Sorghum* spp. This wide variety of plants supports a huge diversity of butterflies providing them an ideal breeding habitat.

The present study deals with diversity of butterflies found within the study area concentrating the following objectives under consideration: -

1. To prepare a preliminary checklist of the butterflies
2. To find out the dominant and rare taxa of the study area
3. To add a preliminary note on their conservation strategies.

#### **Materials and methodology**

##### *Survey Method*

Diversity studies are an important aspect of the butterfly ecology with major conservation implications. The diversity of butterfly community is controlled by various ecological determinants and is known for their value as an important ecological indicator group. Surveys were carried out at different

spots of the campus and its vicinity by point and line transect method (Barhaum *et al.*, 1980) from June 2013 to May 2014. Field notes, photographs (camera: Nikon d5100) and observations of butterflies were taken for the entire growing season during the day light hours. Species were noted along with the date, location of capture and any plant association. Other

factors noted include the time of day using a twenty-four hour clock and the weather conditions. At each location the same route of inspection was followed each time to reduce the number of variables presents (Pyle, 1984). The host specific plants were recorded in each transect and identified by preparing herbarium.



**Fig. 1.** Map of Cachar District showing the location of Study Area (Assam University Campus).

#### *Taxonomic Study*

An effort has been made to use the latest nomenclature and common names as far as possible as per Evan (1932), D' Abrera (1982-1986), Varshney (1990) and Kehimkar (2008). The relative abundance or say status of individual species in locality is categorized within the forest reserve as "Very Rare" (VR) when recorded rarely; "Rare" (C) when recorded occasionally; "Uncommon" (UC) when recorded frequently; "Common" (C) when recorded regularly; "Very Common" (VC) when recorded regularly in large numbers.

#### **Results**

During the systematic survey, a total of 96 species of butterfly belonging to 67 genera and five families were recorded from the different habitat types at Assam University campus and its vicinity areas during the study period, June 2013 to May 2014 (Table I). Among the five families, family Nymphalidae represented by 22 genera and 34 species was the most dominant followed by Lycaenidae (19 genera, 20 species), Hesperidae (13

genera, 15 species), Pieridae (9 genera, 14 species) and Papilionidae (4 genera, 13 species) (Table II).

#### **Discussion**

The present study provides an array of butterfly diversity of Assam University campus and its vicinity areas. The geographical location of any area, its climatic conditions and vegetative composition are essential requisites for supporting a rich diversity of butterflies. Exploration of species diversity, understanding the habitat ecology and behaviour culminate into a database for the study area is an imperative. Results suggested that the structural complexity and vegetation diversity in different habitat type might facilitate a definite set of microhabitats that might be suitable for a particular species. Klopfer and MacArthur (1961) suggested that in tropical forests species may reside not in the number of niches available, but in an increase in the similarity of coexisting species. The extent to which all these informal explanations apply is a matter of further study at micro-habitat level. As the area houses 96 species of butterflies distributed

throughout the campus, it can be presumed to have a good diversity of butterflies, which may be attributed to the sprawling lawns and well nurtured gardens that provide a suitable nectar source throughout the varying seasons, and especially the eco-forests that serves a breeding habitat to the butterflies.

**Table 1.** List of Butterflies recorded in Assam University Campus, Silchar.

Sl. No.	Common Name	Scientific Name	Preferred larval food plants	Relative Abundance
Family: Papilionidae				
1	Common Mormon	<i>Papilio polytes</i> L.	<i>Citrus</i> spp., <i>Aegle marmelos</i> , curry leaf plant	VC
2	Great Mormon	<i>Papilio memnon</i> L.	Cultivated lime and oranges, <i>Murraya</i> spp.	C
3	Red Helen	<i>Papilio helenus</i> L.	<i>Toddalia asiatica</i> , all types of wild and cultivated <i>Citrus</i> plants	UC
4	Yellow Helen	<i>Papilio nephelus</i> Westwood.	<i>Toddalia asiatica</i> , all types of wild and cultivated <i>Citrus</i> plants	UC
5	Spangle	<i>Papilio protenor</i> Cramer.	<i>Murraya</i> spp., <i>Citrus</i> spp.	R
6	Common Lime	<i>Papilio demoleus</i> L.	<i>Aegle marmelos</i> , <i>Murraya</i> spp., <i>Citrus</i> spp., limes and lemons	VC
7	Common Bluebottle	<i>Graphium sarpedon</i> L.	<i>Cinnamomum</i> spp., <i>Milium tomentosum</i> , <i>Polyalthia longifolia</i> , <i>Michelia doltoarpa</i>	C
8	Glassy Bluebottle	<i>Graphium cloanthus</i> Westwood.	<i>Michelia</i> spp., <i>Milium</i> spp.,	VR
9	Great Jay	<i>Graphium eurypylus</i> L.	<i>Cinnamomum</i> spp., <i>Annona</i> spp., <i>Polyalthia longifolia</i>	R
10	Common Jay	<i>Graphium doson</i> C. & R. Felder	<i>Cinnamomum</i> spp., <i>Milium</i> spp., <i>Polyalthia longifolia</i> , <i>Magnolia grandiflora</i>	UC
11	Tailed Jay	<i>Graphium Agamemnon</i> L.	<i>Annona</i> spp., <i>Polyalthia longifolia</i> , <i>Milium tomentosum</i> , <i>Michelia</i> spp., <i>Cinnamomum</i> spp.	UC
Sl. No.	Common Name	Scientific Name	Preferred larval food plants	Relative Abundance
12	Common Mime	<i>Chilasa clytia</i> L.	<i>Cinnamomum</i> spp., <i>Litsea</i> spp.	UC
13	Common Rose	<i>Atrophaneura aristolochiae</i> Fabricius.	<i>Aristolochia</i> spp.	R
Family: Hesperidae				
14	Branded Awlet	<i>Bibasis oedipodea</i> Swainson.	<i>Hiptage benghalensis</i>	UC
15	Common Awl	<i>Hasora chromus</i> Cramer.	<i>Ricinus communis</i> , <i>Derris scandens</i>	C
16	Common Awl	<i>Hasora badra</i> Moore.	<i>Derris</i> spp.	R
17	Common Flat	<i>Calaenorrhinus leucocera</i> Kollar.	<i>Ecbolium ligustrinum</i> , <i>Eranthemum</i> spp.	UC
18	Fulvous Pied Flat	<i>Pseudocoladenia dan</i> Fabricius.	<i>Achyranthes aspera</i>	C
19	Common Snow Flat	<i>Tagiades japetus</i> Stoll.	<i>Dioscorea oppositifolia</i>	VR
20	Common Grass Dart	<i>Taractrocera maevius</i> Fabricius.	Grasses	C
21	Dark Palm Dart	<i>Telicota ancilla</i> Herrich-S.	<i>Calamus</i> spp., <i>Cocos nucifera</i>	C
22	Small Branded Swift	<i>Pelopidas mathias</i> Fabricius.	<i>Cymbopogon nardus</i> , <i>Imperata cylindrical</i>	C
23	Great Swift	<i>Pelopidas assamensis</i> de-Niceville.	Data Deficient	UC
24	Chestnut Bob	<i>Iambrix salsala</i> Moore.	Grasses, <i>Bambusa</i> spp.	C
25	Indian Palm Bob	<i>Suastus gremius</i> Fabricius.	<i>Calamus</i> spp., <i>Cocos nucifera</i>	C
26	Common Redeye	<i>Matapa aria</i> Moore.	<i>Bambusa</i> spp.	C
27	Grass Demon	<i>Udaspes folus</i> Cramer.	<i>Zingiber</i> spp., <i>Curcuma</i> spp.	UC
Sl. No.	Common Name	Scientific Name	Preferred larval food plants	Relative Abundance
28	Chocolate Demon	<i>Ancistroides nigrita</i> Latreille.	<i>Zingiber</i> spp.	C
Family: Pieridae				
29	Common Yellow	<i>Eurema hecabe</i> Boisduval.	<i>Acacia</i> spp., <i>Cassia</i> spp.	VC
30	Three Spot Yellow	<i>Eurema blanda</i> Boisduval.	<i>Cassia</i> spp., <i>Delonix regia</i>	C
31	Common Emigrant	<i>Catopsilia Pomona</i> Fabricius.	<i>Cassia</i> spp., <i>Bauhinia racemosa</i>	VC
32	Mottled Emigrant	<i>Catopsilia pyranthe</i> L.	<i>Cassia</i> spp.	VC
33	Small Orange Tip	<i>Colotis etrida</i> Boisduval.	<i>Maerua oblongifolia</i>	UC

34	Great Orange Tip	<i>Hebomoia glaucippe</i> L.	<i>Capparis</i> spp.	C
35	Striped Albatross	<i>Appias libythea</i> Fabricius.	<i>Capparis</i> spp.	UC
36	Common Albatross	<i>Appias albino</i> Boisduval.	<i>Drypetes</i> spp.	C
37	Chocolate Albatross	<i>Appias lyncida</i> Cramer.	<i>Capparis</i> spp.	C
38	Indian Cabbage White	<i>Pieris canidia</i> Sparrman.	Cabbage, Mustard and other related plants	VC
39	Lesser Gull	<i>Cepora nadina</i> Lucas.	<i>Capparis</i> spp.	C
40	Red-Base Jezebel	<i>Delias pasithoe</i> L.	<i>Dendrophthoe</i> spp.	UC
41	Red-Spot Jazebel	<i>Delias descombesi</i> Boisduval.	Data Deficient	R
42	Psyche	<i>Leptosia nina</i> Fabricius.	<i>Capparis</i> spp.	VC
Family: Lycaenidae				
43	Western Centaur Oakblue	<i>Arhopala pseudocentaurus</i> <i>Doubleday.</i>	<i>Terminalia paniculata</i>	UC
Sl. No.	Common Name	Scientific Name	Preferred larval food plants	Relative Abundance
44	Yamfly	<i>Loxura atymnus</i> Stoll.	<i>Dioscorea</i> sp.	UC
45	Common Imperial	<i>Cheritra freja</i> Fabricius.	<i>Cinnamomum</i> spp.	C
46	Common Tit	<i>Hypolycaena erylus</i> Godart.	<i>Cinnamomum</i> spp.	C
47	Copper Flash	<i>Rapala pheretima</i> Hewitson.	Data Deficient	UC
48	Indian Red Flash	<i>Rapala airbus</i> Fabricius.	<i>Melastoma malabathricum</i>	C
49	Long-Banded Silverline	<i>Spindasis lohita</i> Horsfield.	<i>Dioscorea</i> spp., <i>Psidium guajava</i>	UC
50	Common Ciliate Blue	<i>Anthene emolus</i> Godart.	<i>Terminalia paniculata</i>	R
51	Common Pierrot	<i>Castalius rosimon</i> Fabricius.	<i>Zizyphus</i> spp.	C
52	Zebra Blue	<i>Leptotes plinius</i> Fabricius.	<i>Mimosa</i> spp.	UC
53	Common Lineblue	<i>Prosotas nora</i> C. Felder.	<i>Acacia</i> sp., <i>Mimosa</i> spp.	C
54	Common Cerulean	<i>Jamides celeno</i> Cramer.	<i>Xylia xylocarpa</i>	C
55	Pea Blue	<i>Lampides boeticus</i> L.	<i>Pisum sativum</i>	UC
56	Dark Grass Blue	<i>Zizeeria karsandra</i> Moore.	<i>Amaranthus spinosus</i> , <i>Polygonum</i> spp.	VC
57	Pale Grass Blue	<i>Pseudozizeeria maha</i> Kollar.	<i>Oxalis corniculata</i>	VC
58	Lesser Grass Blue	<i>Zizina otis</i> Fabricius.	<i>Vicia</i> spp.	VC
59	Quaker	<i>Neopithecops zalmora</i> Butler.	Data Deficient	C
60	Gram Blue	<i>Euchrysops cnejus</i> Fabricius.	<i>Acacia</i> spp., <i>Pisum sativum</i>	C
61	Lime Blue	<i>Chilades lajus</i> Stoll.	<i>Citrus</i> spp.	VC
62	Punchinello	<i>Zemerus flegyas</i> Cramer.	<i>Maesa</i> spp.	C
Sl. No.	Common Name	Scientific Name	Preferred larval food plants	Relative Abundance
Family: Nymphalidae				
63	Dark Blue Tiger	<i>Tirumala septentrionis</i> Butler.	<i>Ageratum conyzoides</i> , <i>Vallisneria</i> spp.	UC
64	Plain Tiger	<i>Danaus chrysippus</i> L.	<i>Frerea</i> spp., <i>Calotropis</i> sp.	VC
65	Striped Tiger	<i>Danaus genutia</i> Cramer.	Data Deficient	UC
66	Glassy Tiger	<i>Parantica aglea</i> Stoll.	<i>Calotropis</i> sp.	C
67	Chocolate Tiger	<i>Parantica melaneus</i> Cramer.	Data Deficient	R
68	Striped Blue Crow	<i>Euploea mulciber</i> Cramer.	<i>Ficus</i> sp.	UC
69	Common Crow	<i>Euploea core</i> Cramer.	<i>Ficus</i> sp., <i>Nerium</i> sp.	C
70	Common Duffer	<i>Discophora sondaica</i> Boisduval.	<i>Dendrocalamus</i> sp.	C
71	Common Evening Brown	<i>Melanitis leda</i> L.	<i>Panicum</i> spp., <i>Sorghum</i> spp.	VC
72	Dark Evening Brown	<i>Melanitis phedima</i> Cramer.	Data Deficient	R
73	Common Palmfly	<i>Elymnias hypermnestra</i> L.	<i>Calamus</i> spp., <i>Areca</i> spp.	VC
74	Common Bushbrown	<i>Mycalesis perseus</i> Fabricius.	Grasses	VC
75	Dark-Brand Bushbrown	<i>Mycalesis mineus</i> L.	Grasses	C
76	Common Fourring	<i>Ypthima huebneri</i> Kirby.	Grasses	C
77	Common Fivering	<i>Ypthima baldus</i> Fabricius.	Data Deficient	C
78	Vagrant	<i>Vagrans egista</i> Cramer.	Data Deficient	UC
Sl. No.	Common Name	Scientific Name	Preferred larval food plants	Relative Abundance
79	Common Leopard	<i>Phalanta phalantha</i> Drury.	<i>Flacourtia</i> spp.	VC
80	Commander	<i>Moduza procris</i> Cramer.	<i>Mussaenda frondosa</i>	UC

81	Common Sergeant	<i>Athyma perius</i> L.	<i>Glochidion</i> sp.	C
82	Colour Sergeant	<i>Athyma nefte</i> Cramer.	<i>Glochidion</i> sp.	UC
83	Common Lascar	<i>Pantoporia hordonia</i> Stoll.	<i>Acacia</i> spp.	UC
84	Common Sailer	<i>Neptis hylas</i> L.	<i>Bombax</i> sp.	VC
85	Short-Banded Sailer	<i>Phaedyma columella</i> Cramer.	<i>Dalbergia</i> sp.	UC
86	Clipper	<i>Parthenos sylvia</i> Cramer.	Data Deficient	VR
87	Common Baron	<i>Euthalia aconthea</i> Cramer.	<i>Mangifera indica</i>	UC
88	Plain Earl	<i>Tanaecia jahnu</i> Moore.	Data Deficient	R
89	Archduke	<i>Lexias pardalis</i> Moore.	<i>Garcinia</i> sp.	VR
90	Common Castor	<i>Ariadne merione</i> Cramer.	<i>Ricinus communis</i>	C
91	Grey Pansy	<i>Junonia atlites</i> L.	<i>Barleria</i> sp.	VC
92	Peacock Pansy	<i>Junonia almanac</i> L.	<i>Barleria</i> sp.	VC
93	Yellow Pansy	<i>Junonia hierta</i> Fabricius.	<i>Barleria</i> sp.	VC
94	Lemon Pansy	<i>Junonia lemonias</i> L.	<i>Barleria</i> sp.	C
95	Chocolate Pansy	<i>Junonia iphita</i> Cramer.	Data Deficient	UC
96	Great Eggfly	<i>Hypolimnas bolina</i> L.	<i>Hibiscus</i> sp.	C

**Table 2.** Composition of the five Families along with their number of Genera and Species.

Family	No. of Genera	Percentage %	No. of Species	Percentage %
Nymphalidae	23	33.82%	34	35.41%
Lycaenidae	19	27.94%	20	20.83%
Hesperiidae	13	19.40%	15	15.62%
Pieridae	9	13.23%	14	14.58%
Papilionidae	4	5.88%	13	13.4%
Total	68		96	

**Table 3.** List of 20 Dominant Taxa recorded along with their respective taxonomic families.

Family	Scientific Name
Papilionidae	<i>Papilio polytes</i> L.
	<i>Papilio demoleus</i> L.
Pieridae	<i>Eurema hecabe</i> L.
	<i>Catopsilia Pomona</i> Fabricius.
	<i>Catopsilia pyranthe</i> L.
	<i>Pieris canidia</i> Sparmann.
	<i>Leptosia nina</i> Fabricius.
Lycaenidae	<i>Zizeeria karsandra</i> Moore.
	<i>Pseudozizeeria maha</i> Kollar.
	<i>Zizina otis</i> Fabricius.
Nymphalidae	<i>Chilades lajus</i> Stoll.
	<i>Danaus chrysippus</i> L.
	<i>Melanitis leda</i> L.
	<i>Elymnias hypermnestra</i> L.
	<i>Mycalesis perseus</i> Fabricius.
	<i>Phalanta phalantha</i> Drury.
	<i>Neptis hylas</i> L.
	<i>Junonia atlites</i> L.
	<i>Junonia almanac</i> L.
	<i>Junonia lemonias</i> L.
<i>Junonia hierta</i> Fabricius.	

**Table 4.** List of 13 Rare Taxa (included 9 Rare\* and 4 Very Rare\*\*) along with their respective taxonomic families.

Family	Scientific Name
Papilionidae	<i>Papilio protenor</i> Cramer. *
	<i>Graphium cloanthus</i> Westwood. **
	<i>Graphium eurypylus</i> L. *
	<i>Atrophaneura aristolochiae</i> Fabricius. *
Hesperiidae	<i>Hasora badra</i> Moore. *
	<i>Tagiades japetus</i> Stoll. **
Pieridae	<i>Delias descombesi</i> Boisduval. *
Lycaenidae	<i>Anthene emolus</i> Godart. *
Nymphalidae	<i>Parantica melaneus</i> Cramer. *
	<i>Melanitis phedima</i> Cramer. *
	<i>Parthenos Sylvia</i> Cramer. **
	<i>Tanaecia jahnu</i> Moore. *
	<i>Lexias pardalis</i> Moore. **



**Plate 1.** Papilionidae, Butterflies of Assam University Campus and Its Vicinity Areas.

1. *Papilio polytes* (Common Mormon)
2. *Papilio memnon* (Great Mormon)
3. *Papilio helenus* (Red Helen)
4. *Papilio nephelus* (Yellow Helen)
5. *Papilio protenor* (Spangle)
6. *Papilio demoleus* (Common Lime)
7. *Graphium sarpedon* (Common Bluebottle)
8. *Graphium doson* (Common Jay)
9. *Graphium Agamemnon* (Tailed Jay).



**Plate 2.** Hesperidae, Butterflies of Assam University Campus and Its Vicinity Areas.

10. *Bibasis oedipodea* (Branded Orange Awlet)
11. *Hasora chromus* (Common Banded Awl)
12. *Hasora badra* (Common Awl)
13. *Pseudocoladenia dan* (Fulvous Pied Flat)
14. *Tagiades japetus* (Common Snow Flat)
15. *Taractrocera maevius* (Common Grass Dart)
16. *Telicota ancilla* (Dark Palm Dart)
17. *Pelopidas mathias* (Small Banded Swift)
18. *Pelopidas assamensis* (Large Banded Swift)
19. *Iambrix salsala* (Chestnut Bob)
20. *Suastus gremius* (Indian Palm Bob)
21. *Matapa aria* (Common Red Eye).





**Plate 3.** Pieridae, Butterflies of Assam University Campus and Its Vicinity Areas.

22. *Eurema hecabe* (Common Grass Yellow)
23. *Eurema blanda* (Three spot Grass Yellow)
24. *Catopsilia pomona* (Common Emigrant)
25. *Catopsilia pyranthe* (Mottled Emigrant)
26. *Hebomoia glaucippe* (Great Orange Tip)
27. *Appias libythea* (Striped Albatross)
28. *Appias lycinda* (Chocolate Albatross)
29. *Pieris canidia* (Indian Cabbage White)
30. *Delias pasithoe* (Red-Base Jazebel)
31. *Delias descombesi* (Red-Spot Jazebel)
32. *Leptosia nina* (Psyche).

Results suggested that the family Nymphalidae with 22 genera and 34 species was the most dominant in the study area. Members of the Nymphalidae were always dominant in the tropical region because most of the species are polyphagous in nature, consequently helping them to live in all the habitats. Additionally, many species of this family are strong, active fliers that might help them in searching for resources in large areas (Eswaran and Pramod 2005; Krishna Kumar *et al.* 2007). A high proportion of nymphalid species thus clearly indicates high host plant richness. The family Papilionidae representing the swallowtails was recorded to be the least with 4 genera and 13 species. Loss of suitable habitat may be the reason for their decline in population. Thus further studies should be taken out on this group of

butterflies to get the base line information of the reason of their decline. A milestone of the study is the recording of of the two species *Castalius rosimon* (Common Pierrot) and *Pantoporia hordonia* (Common Lascar) in the study area that are listed in the Indian Wildlife Protection Act, 1972 as under Schedule I and II (Anonymous, 2006). This two species are recorded throughout the growing season with reasonable abundance indicating the superior quality habitat of the study area.



**Plate 4.** Lycaenidae, Butterflies of Assam University Campus and Its Vicinity Area.

33. *Arhopala pseudocentaurus* (Western Centaur Blue).
34. *Loxura atymnus* (Yamfly)
35. *Cheritra freja* (Common Imperial)
36. *Hypolycaena erylus* (Common Tit)
37. *Rapala pheretima* (Copper Flash)
38. *Rapala iarbus* (Indian Red Flash)
39. *Spindasis lohita* (Long-Banded Silverline)
40. *Anthene emolus* (Common Ciliate Blue)
41. *Castalius rosimon* (Common Pierrot)
42. *Jamides celeno* (Common Cerulean)
43. *Zizeeria karsandra* (Dark Grass Blue)
44. *Pseudozizeeria maha* (Pale Grass Blue)
45. *Zizina otis* (Lesser Grass Blue)
46. *Neopithecops zalmora* (Quaker)
47. *Zemeros flegyas* (Punchinello).

Systematic study and continuous observation suggests that the month of November and March were the best for the butterflies. During this seasons,

a variety of host plants grow across the vacant areas. This is the time when butterfly activity is at its peak as there are plenty of food source available for their breeding cycles. The plants belonging to the family Rutaceae, Annonaceae, Lauraceae, Magnoliaceae and Aristolochiaceae are found to be the dominant larval food plants of the family Papilionidae; for Nymphalidae (plants belonging to family Apocynaceae, Asclepiadaceae, Moraceae, Poaceae, Arecaceae, Flacourtiaceae, Rubiaceae, Euphorbiaceae, Mimosaceae, Malvaceae, Cucurbitaceae, Acanthaceae and Melastomataceae); for Pieridae (plants belonging to family Caesalpiniaceae, Mimosaceae, Fabaceae, Capparaceae, Euphorbiaceae, Cruciferae and Lorantaceae); for Lycaenidae (plants belonging to family Mimosaceae, Dioscoreaceae, Lauraceae, Rubiaceae, Melastomataceae, Myrtaceae, Caesalpiniaceae, Rhamnaceae, Zingiberaceae, Fabaceae, Oxalidaceae, Rutaceae and Myrsinaceae) and for Hesperidae (plants belonging to family Malpighiaceae, Euphorbiaceae, Fabaceae, Acanthaceae, Amaranthaceae, Poaceae, Arecaceae and Zingiberaceae) are dominant larval food plants.



**Plate 5.** Nymphalidae, Butterflies of Assamuniversity Campus and Its Vicinity Areas.

48. *Tirumala septentrionis* (Dark Blue Tiger)
49. *Danaus chrysippus* (Plain Tiger)
50. *Danaus genutia* (Striped Tiger)
51. *Parantica aglea* (Glassy Tiger)
52. *Euploea mulciber* (Striped Blue Crow)

53. *Euploea core* (Common Crow)
54. *Melanitis leda* (Common Evening Brown)
55. *Elymnias hypermnestra* (Common Palmfly)
56. *Mycalesis perseus* (Common Bushbrown)
57. *Mycalesis mineus* (Dark-Brand Bushbrown)
58. *Ypthima huebneri* (Common Fourring)
59. *Ypthima baldus* (Common Fivering)
60. *Vagrans egista* (Vagrant)
61. *Phalanta phalantha* (Common Leopard)
62. *Moduza procris* (Commander).



**Plate 5.** Nymphalidae, Butterflies of Assamuniversity Campus and Its Vicinity Areas (continued).

63. *Athyma perius* (Common Sergeant)
64. *Athyma nefte* (Colour Sergeant)
65. *Pantoporia hordonia* (Common Lascar)
66. *Neptis hylas* (Common Sailer)
67. *Euthalia aconthea* (Common Baron)
68. *Tanaecia jahnu* (Plain Earl)
69. *Lexias pardalis* (Archduke)
70. *Junonia atlites* (Grey Pansy)
71. *Junonia almana* (Peacock Pansy)
72. *Junonia hierta* (Yellow Pansy)
73. *Junonia lemonias* (Lemon Pansy)
74. *Junonia iphita* (Chocolate Pansy)
75. *Hypolimnas bolina* (Great Eggfly).

*Recommendations and Suggestions*

The association between butterflies and plants is always highly specific. Unlike bees, butterflies collect their nectar from flower. Thus pollination, a crucial link in the survival of ecosystem, is one such factor

that needs to be well understood to develop appropriate strategies for conservation of the biodiversity.

The study area houses a rich butterfly diversity mainly attributed to the micro-habitats available within the eco-forest. Thus an attempt should be made by the administration of other universities and educational institutions to set up an eco-forest or to adopt any other conservation plans to support the wildlife of the area which can also be used to practically train the students regarding conservation issues and plans.

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