

Institutional Green Spaces as Butterfly Refugia: A Preliminary Checklist from Tinsukia College, Assam, India

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ABSTRACT

This study provides a preliminary checklist of butterfly diversity recorded from the Tinsukia College Campus, Tinsukia, Northeast, Assam. A continuous survey was carried out over three months, from February, 2025 to April, 2025, during college hours using the Checklist Survey Method (Royer et al., 1998). A total of 40 butterfly species belonging to six different families were recorded in the study. Among these, family Nymphalidae was found to be the most dominant (20 species), followed by Pieridae (8 species), Papilionidae (7 species), Lycaenidae (6 species), while Riodinidae and Hesperidae were each represented by a single species. The results indicate a significant species richness within the college campus and reflect the presence of a relatively healthy habitat capable of supporting diverse lepidopteran fauna.

Keywords: *Lepidoptera, Academic Institutions, Checklist, Tinsukia*

Introduction

The North East region of India, being part of the Himalayas and the Indo-Burma biodiversity hotspots, is well recognized for its remarkable species diversity and high endemism. This region provides an optimal habitat for flourishing diverse flora and fauna, supported by a suitable climate and annual rainfall exceeding 2000 mm (Bora and Meitei, 2014). Owing to

these environmental conditions, the region sustains a rich butterfly fauna, and more than 50% of the butterfly species recorded from India are known to occur within these Eastern Himalayas and the North-Eastern regions alone (Singh et al., 2015). In Assam, specifically, 962 species of butterflies belonging to five different families have been documented to date (Mudai et al., 2015). In India as whole, rich butterfly

diversity with 1,379 recorded species, spanning six families, namely, Papilionidae, Lycaenidae, Riodinidae, Nymphalidae, and Hesperidae, with 74 species being endemic, has been documented. Biogeographically, 1,143 species (82.95) are identified as oriental elements, 206 species (14.9%) belong to the Palaearctic region, and 23 (1.7%) species are of Afrotropical origin (Das et al., 2023).

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(1.7%) species are of Afrotropical origin (Das et al., 2023).

Butterflies are considered essential eco-indicator species because of their high sensitivity to minor environmental alterations and habitat disturbances (Nally and Fleishman, 2004). Their presence in a particular area often reflects a reliable sign for ecological fitness and environmental quality of that area (Saikia et al., 2021 and Chowdhury et al., 2023). Within the field of conservation ecology, butterflies are recognised as umbrella species (Bertus et al., 2021). These delicate and alluring living jewels are considered effective indicators for assessing the impacts of anthropogenic disturbances on ecosystems (Kocher and Williams, 2000).

Studies on butterfly diversity in human-dominated landscapes are therefore of considerable importance, as such environments often influence species distribution, abundance, and population dynamics (Gascon et al., 2001). Rapid developmental activities and the resulting habitat fragmentation create substantial threats to butterfly survival (Asher et al., 2020). Consequently, the exploration and documentation of butterfly fauna within these human-modified ecological pockets have become necessary.

In view of this, the present study aims to assess butterfly diversity in the human-dominated landscape of Tinsukia College campus, Assam. This research is the first scientific documentation of butterfly fauna from

this academic institution in Tinsukia. This study provides a preliminary checklist of butterfly species recorded from the Tinsukia College campus and determines the dominant Taxa based on observed diversity.

Methods and Methodology

Study area

Geographically, Tinsukia District is situated in the North-Eastern part of Assam, spanning latitudes 27.25° N to 27.30° N and longitudes 94.50° to 95° E (Singh, 2017), with an average elevation of approximately 374 meters above sea level (Gogoi and Rao, 2022). The district is bordered by Dibrugarh and Dhemaji in the West and North-West. It shares its Northern boundary with Arunachal Pradesh and adjoins Myanmar to the Southeast (Singh, 2017). Covering an area of approximately 3,790 sq. km (Das, 2018), the region experiences a subtropical climate with temperatures fluctuating between a minimum of 5°C and a maximum of 37°C. The area is further characterized by high annual precipitation typically exceeding 2,000 mm and humidity levels frequently surpassing 80% (Handique et al., 2016). The study site, Tinsukia College, a government institution affiliated with Dibrugarh University, Dibrugarh, Assam, was established in 1956, located in Kachujan, Tinsukia, with latitudes 95°21'51.40"E and longitude 95°21'51.40"E (Gogoi and Rao, 2022). Recognised as one of the oldest and most prestigious colleges in the Tinsukia district, the institution is noted for its spacious campus and verdant surroundings. In addition to the

academic infrastructures, the college grounds also support significant floral and faunal diversity, sustained by green cover and natural vegetation.

Data Collection

The college campus was surveyed for a period of three months from February 2025 to April 2025 to assess butterfly diversity during college hours (9:00 AM to 4:00 PM). Butterfly fauna was systematically recorded using the Checklist Survey Method (Royer et al., 1998). Photographs of the observed species of butterflies were taken. Taxonomic identification was carried out through photographic documentation and cross-referenced with standard taxonomic literature (Evans, 1932; Haribal, 1992; Kehimkar, 2016; Kunte, 2000). Information on global distribution and conservation status was prepared using standard resources such as the IUCN Red List and I Found Butterflies.

Result

The present study recorded a total of 40 butterfly species comprising 111 individuals belonging to six different families. Taxonomic analysis revealed that the family Nymphalidae (50%) was the most dominant in terms of species richness, represented by 20 species and 59 individuals, followed by Pieridae (20%) with 8 species and 29 individuals, Papilionidae (17%) with 7 species and 13 individuals, Lycaenidae (7%) with 3 species and 6 individuals, and both Riodinidae (3%) and Hesperidae (3%) with the

least number of species, i.e. one species with 2 individuals each has shown in Figure 2 and

Figure 3.A. detailed account of recorded species, including their conservation status under the IUCN Red List and the Indian Wildlife (Protection) Act 1972, is provided in Table 1.

Discussion

The present study reveals that the family Nymphalidae is the most dominant family, with the highest species richness and abundance within the study area. The dominance of the family Nymphalidae aligns with similar patterns of findings with previous lepidopteran surveys (Chakraborty et al., Bawri et al., 2014; Mukharjee et al., 2022; Saikia et al., 2021; Pradhan and Khaling, 2020; Saha et al., 2023) conducted globally. The dominance of the family Nymphalidae aligns with similar patterns of findings with previous lepidopteran surveys (Chakraborty et al., Bawri et al., 2014; Mukharjee et al., 2022; Saikia et al., 2021; Pradhan and Khaling, 2020; Saha et al., 2023) conducted globally and regionally. The species belonging to the family Nymphalidae showing this trend is often and regionally associated with the family's polyphagous nature and high adaptability to diverse habitats (GRACIA et al., 2021; Koneri et al., 2020). Moreover, similar trends have also been

documented from institutional campuses such as Cotton University, Assam (Gogoi et al., 2023). The ecological success of Nymphalid butterflies in the Tinsukia college campus can be attributed to the high availability of diverse host and nectar plants, combined with the strong vagility of many species belonging to this family. (GRACIA et al., 2021). Their status as active fliers further allows them to survive in human-modified or disturbed landscapes, where they effectively exploit fragmented floral resources (GRACIA et al., 2021; Koneri et al., 2020).

In contrast, the families Lycaenidae, Hesperidae, and Riodinidae were represented by significantly fewer species. This lower richness of these families may stem from a decline in species larval host plants, as well as the temporal constraints of the current study. Many species that belong to these families are crepuscular in nature or show peak activity during early morning hours, which may not have coincided with the sampling period conducted during college hours. Furthermore, Lycaenids often show a lower presence in rapid assessments despite their global diversity, possibly because of their specialised niche requirements and sensitivity to habitat structure. (GRACIA et al., 2021).

The findings from this study indicate that Tinsukia College maintains a relatively healthy and low-pollution environment capable of supporting diverse butterfly fauna. In India,

higher educational institutions possess significant landholdings and scientific resources that position them as vital hubs for regional biodiversity conservation. Such campuses can serve as “living laboratories” and semi-protected microhabitats that can effectively maintain rare or endangered flora and fauna within urbanised matrices (Tiago et al., 2024). Collaboration with forest departments, along with the green campus initiatives, can further strengthen biodiversity conservation efforts within the institutional spaces.

Globally, the concept of “Green Campuses” has emerged as an effective strategy for promoting environmental sustainability in academic institutions (Yerokhin et al., 2023). For instance, the University of Ilorin in Nigeria has adopted measures such as regulated land use, controlled wildfires, and the construction of botanical and zoological gardens and parks. These initiatives have contributed not only to the conservation of biodiversity but also to erosion control and enhanced carbon sequestration (Oloyede, 2010). In the context of Northeast India, a region that is already characterized by substantial green cover, institutional campuses can serve as important habitats that mitigate the ecological impacts of pollution and urbanization. The adoption of similar conservation-oriented measures can promote long-term sustainability, strengthen plant conservation efforts, and provide suitable habitats for butterfly diversity.

Conclusion

Understanding the influence of habitat and other biogeographic factors on butterfly diversity is essential for the conservation of these ecologically important pollinators. The findings of this preliminary checklist highlight the ecological value of the Tinsukia College Campus as a significant habitat for supporting a diverse assemblage of butterfly fauna. As a preliminary assessment, the present study provides the first taxonomic baseline for butterfly species within the Tinsukia College campus, establishing a foundational record that underscores the ecological potential of institutional green spaces. This is a first step towards long-term sustainability and habitat restoration initiatives. Future studies should focus on the rigorous documentation of host plant species and promote the integration of biodiversity management practices into institutional policies to ensure the continued protection of this important lepidopteran fauna. In addition to documenting the diverse fauna of butterflies on the campus, the study also contributes valuable information that may aid in the development of appropriate conservation habitat management strategies, ultimately aiding regional biodiversity preservation and protection of these butterflies in their natural environments.

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Declarations

Conflict of Interest: The author declares that there are no financial, personal, professional, or institutional relationships that could be perceived as a conflict of interest or as having influenced the researcher's interpretation in this manuscript.

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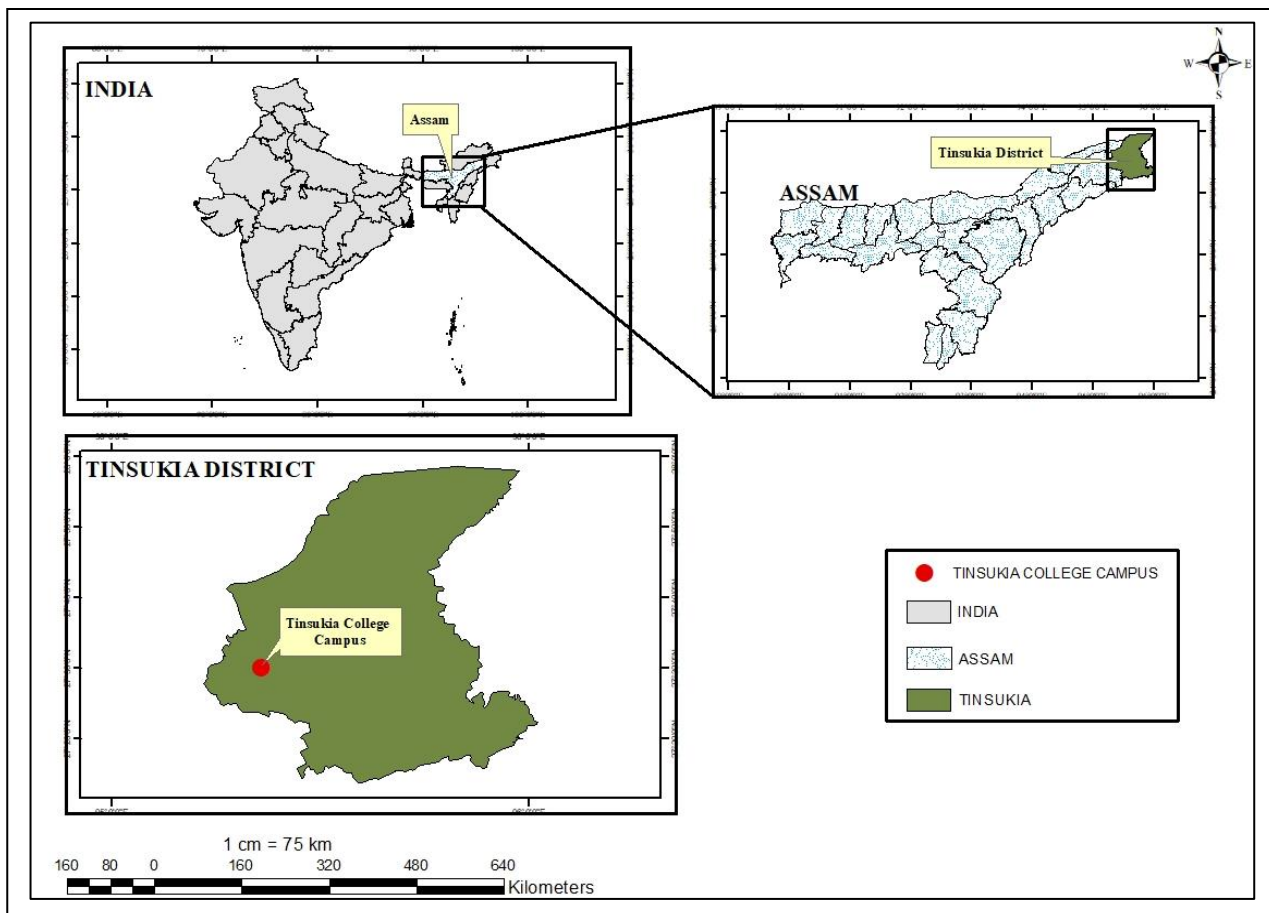


Figure 1: Map showing Tinsukia College campus considered for the butterfly faunal study in Tinsukia District, Assam, India.

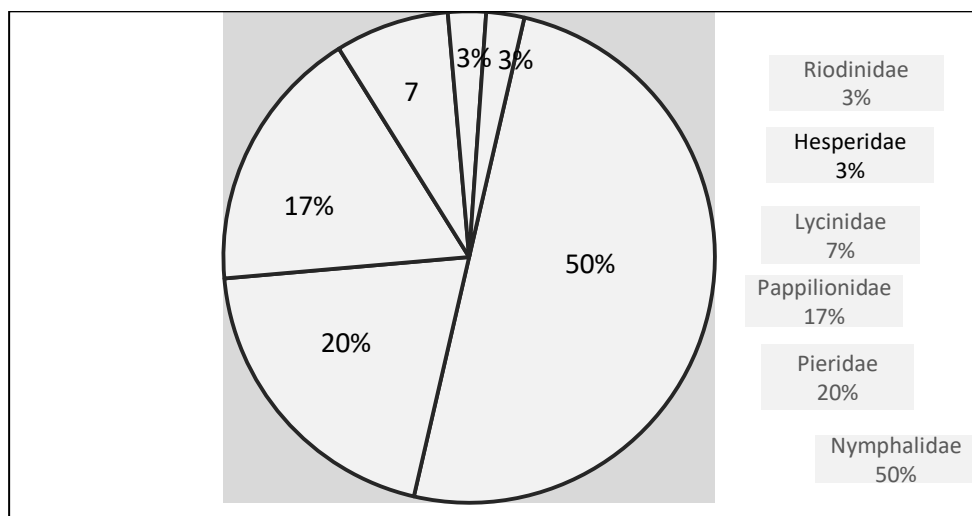


Figure 2: Family wise percentage distribution of recorded species in the study area

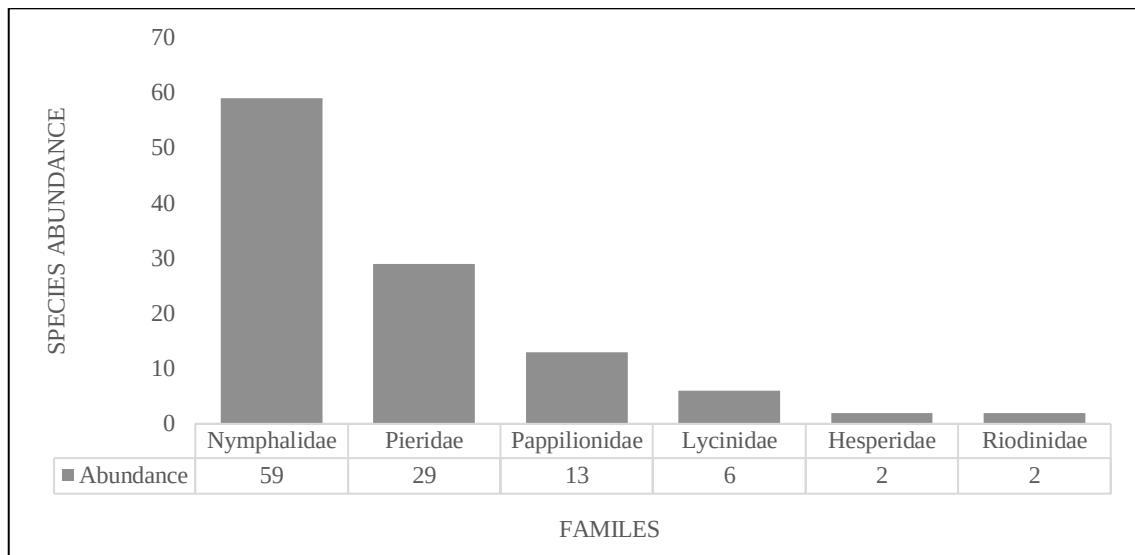


Figure 3: Family-wise abundance data of the recorded species in the study area.

Sl. No.	Common Name	Scientific Name	Abundance	IWPA	IUCN
Family: Hesperidae					
1	Bright Red Velvet Bob	<i>Koruthaialos Sindu</i> (Felder & Felder)	2	-	NA
Family: Lycaenidae					
1	Blue Imperial	<i>Ticherraacte</i> (Moore)	1	-	NA
2	Purple Sapphire	<i>Heliophorusepicles</i> (Godart)	3	-	NA
3	Yalmfly	<i>Loxuraatymnus</i> (Stoll)	2	-	NA
Family: Nymphalidae					
1	Bengal Striped Blue crow	<i>Euploea mulciber</i> (Cramer)	4	Schedule IV	NA
2	Commander	<i>Moduza procris</i> (Cramer)	1	-	NA
3	Chocolate Pansy	<i>Junonia iphita</i> (Cramer)	1	-	NA
4	Common bushbrown	<i>Mycalesis perseus</i> (Fabricius)	4	-	NA
5	Common-five ring	<i>Ypthima baldus</i> (Fabricius)	2	-	NA
6	Common four-ring	<i>Ypthima huebneri</i> (Kriby)	1	-	NA
7	Common Sailer	<i>Neptis hylas</i> (Linnaeus)	2	-	NA
8	Common sergeant	<i>Athyma perius</i> (Linnaeus)	3	-	NA
9	Common palmfly	<i>Elymnia shyerpmnestra</i> (Drury)	1	-	NA
10	Common evening brown	<i>Melanitis leda</i> (Linnaeus)	9	-	LC

11	Glassy Tiger	<i>Parantica aglea</i> (Stoll)	1	-	NA
12	Great Eggfly	<i>Hypolimnas bolina</i> (Linnaeus)	4	-	NA
13	Grey Count	<i>Tanaecia lepidea</i> (Butler)	2	Schedule II	NA
14	Grey Pansy	<i>Junonia atlites</i> (Linnaeus)	12	-	NA
15	Common Jester	<i>Symbrenthia lila</i> (Hewitson)	1	-	NA
16	Lemon Pansy	<i>Junonia monias</i> (Linnaeus)	4	-	NA
17	Paris peacock	<i>Papilio paris</i> (Linnaeus)	1	-	NA
18	Plain tiger	<i>Danaus chrysippus</i> (Linnaeus)	2	-	LC
19	Peacock Pansy	<i>Junonia almana</i> (Linnaeus)	2	-	LC
20	Tiger Palmfly	<i>Elymnias nesaea</i> (Linnaeus)	2	-	NA
Family: Papilionidae					
1	Common Bluebottle	<i>Graphium sarpedon</i> (Linnaeus)	1	-	LC
2	Common Mormon	<i>Papilio polytes</i> (Linnaeus)	2	-	NA
3	Common Lime	<i>Papilio demoleus</i> (Linnaeus)	3	-	NA
4	Common rose	<i>Pachliopta aristolochiae</i> (Fabricius)	1	-	LC
5	Great Mormon	<i>Papilio memnon</i> (Linnaeus)	2	-	NA
6	Yellow Helen	<i>Papilio chaon</i> (Westwood)	3	-	NA
7	Tailed Jay	<i>Graphium agamemnon</i> (Linnaeus)	1	-	NA
Family: Pieridae					
1	Cabbage White	<i>Pieris canidia</i> (Linnaeus)	7	-	NA
2	Common Grass Yellow	<i>Eurema hecabe</i> (Linnaeus)	3	-	LC
3	Great Orange tip	<i>Hebomoia glaucippe</i> (Linnaeus)	1	-	NA
4	Lemon Emigrant	<i>Catopsilia pomona</i> (Fabricius)	4	-	NA
5	Oriental Psyche	<i>Leptosia nina</i> (Fabricius)	2	-	NA
6	Plain Puffin	<i>Appia sindra</i> (Moore)	2	-	NA
7	Red Pierrot	<i>Talica danyseus</i> (Guérin-Ménéville)	9	-	NA
8	Three-spot Grass Yellow	<i>Eurema blanda</i> (Boisduval)	1	-	NA
Family: Riodinidae					
1	Punchinello	<i>Zemeros flegyas</i> (Cramer)	2	-	NA
Total Abundance			111		

Table 1: Checklist of Butterfly species recorded in the Tinsukia College Campus with their IWPA and IUCN status

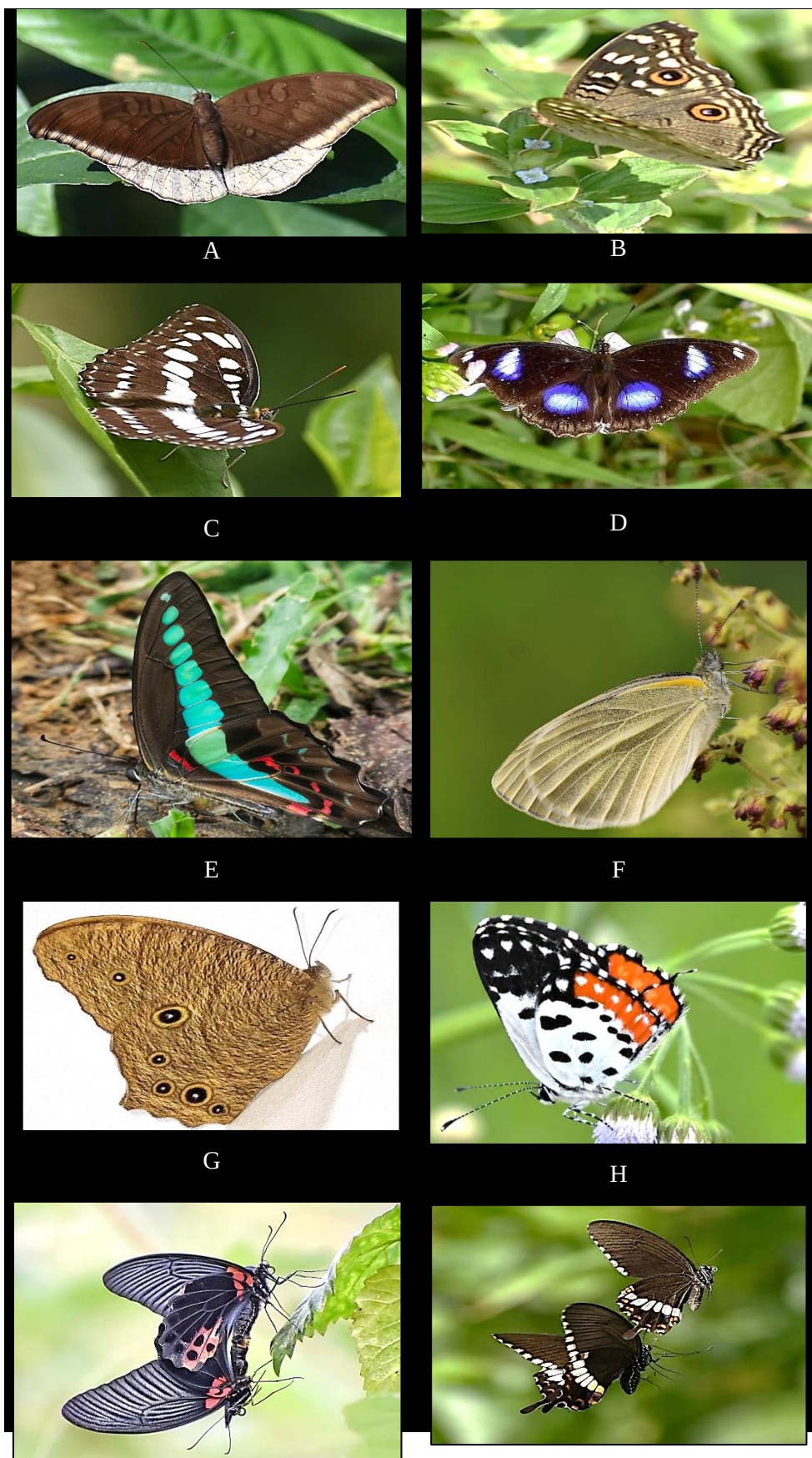


Figure 4: Some butterflies of Tinsukia College Campus

- (A) Grey count (*Tanaecialepidea*)
- (B) Lemon Pansy (*Junonia lemonias*)
- (C) Common Sergeant (*Athyma periu*)
- (D) Great Eggfly (*Hypolimnas bolina*)
- (E) Common Bluebottle (*Graphium sarpedon*)
- (F) Cabbage White (*Pieris canidia*)
- (G) Common Evening Brown (*Melanitis leda*)
- (H) Red Pierrot (*Talica danyseus*)
- (I) Great Mormon (*Papilio memnon*)
- (J) Common Mormon (*Papilio polytes*)