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Rhopalocera (Lepidoptera) diversity in Ranga reserve forest, Lakhimpur, Assam: A seasonal perspective

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Abstract

A detailed study on butterfly diversity was conducted in the Ranga Reserve Forest, Assam, India, between March 2021 and June 2022. Throughout the research, 225 species of butterflies, belonging to 131 genera and six families, are recorded. The family Nymphalidae is the most abundant, with 92 species identified. To assess the influence of seasonal changes on butterfly populations, the study period is categorized into four seasons: summer, monsoon, post-monsoon, and winter. Butterfly diversity showed notable seasonal fluctuations, with the most species observed during the monsoon season and the lowest during winter. A sharp contrast in species count is particularly evident during the monsoon, with Nymphalidae contributing 88 species, while Riodinidae accounted for only 2 species. The conservation assessment revealed that two species are listed as Critically Endangered (CR) such as *Discophora sondaica* and *Lethe europa*; two as Endangered (EN) such as *Papilio clytia* and *Doleschallia bisaltide*; one as Vulnerable (VU) such as *Castalius rosimon*; and six as Least Concern (LC) such as *Eurema andersoni*, *Chersonesia intermedia*, *Junonia almana*, *Junonia hierta*, *Caleta decidia* and *Hypolycaena othona* on the IUCN Red List. The conservation status of 214 species remains unassessed. Additionally, 42 species are protected under the Indian Wildlife (Protection) Act, 1972 (Amendment, 2022). The study emphasizes that the forest's rich diversity of butterflies can be attributed to the abundance of host and nectar plants throughout the year, making it a vital habitat for butterfly breeding.

Keywords: Conservation, diversity, Lakhimpur, Rhopalocera, seasonal diversity

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Rhopalocera (Lepidoptera) çeşitliliği Ranga rezerv ormanı, Lakhimpur, Assam: Mevsimsel bir bakış

Özet

Hindistan'ın Assam kentindeki Ranga Rezerv Ormanı'nda Mart 2021 ile Haziran 2022 tarihleri arasında kelebek çeşitliliğine ilişkin detaylı bir çalışma gerçekleştirildi. Araştırma boyunca 131 cins ve altı familyaya ait 225 kelebek türü kaydedildi. Nymphalidae familyası, tanımlanmış 92 türle en bol bulunan familyadır. Mevsimsel değişikliklerin kelebek popülasyonları üzerindeki etkisini değerlendirmek için çalışma dönemi dört mevsime ayrılmıştır: yaz, muson, muson sonrası ve kış. Kelebek çeşitliliği kayda değer mevsimsel dalgalanmalar gösterdi; türlerin çoğu muson mevsiminde, en düşük türler ise kış mevsiminde gözlemlendi. Tür sayısında keskin bir fark özellikle muson sırasında belirgindir; Nymphalidae 88 türe katkıda bulunurken, Riodinidae yalnızca 2 türe katkıda bulunmuştur. Koruma değerlendirmesi, Discophora sondaica ve Lethe europa gibi iki türün Kritik Tehlike Altında (CR) olarak listelendiğini ortaya çıkardı; Papilio clytia ve Doleschallia bisaltide gibi ikisi Tehlike Altında (EN); Castalius rosimon gibi Savunmasız (VU) bir tanesi; ve IUCN Kırmızı Listesinde yer alan Eurema andersoni, Chersonesia intermedia, Junonia almana, Junonia hierta, Caleta decidia ve Hypolycaena othona gibi altısı En Az Endişe (LC) olarak sıralanıyor. 214 türün koruma durumu henüz değerlendirilmemiştir. Ayrıca 42 tür, 1972 tarihli Hindistan Yaban Hayatı

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(Koruma) Yasası (Değişiklik, 2022) kapsamında korunmaktadır. Çalışma, ormandaki zengin kelebek çeşitliliğinin, yıl boyunca konakçı ve nektar bitkilerinin bolluğuna bağlanabileceğini ve bu durumun burayı kelebek yetiştiriciliği için hayati bir yaşam alanı haline getirdiğini vurguluyor.

Anahtar kelimeler: Koruma, çeşitlilik, Lakhimpur, Rhopalocera, mevsimsel çeşitlilik

1. Introduction

The Ranga Reserve Forest (RF) is a significant protected area situated within the Lakhimpur district of Assam, positioned between the Dikrong and Ranganadi rivers. The reserve's northern boundary is contiguous with that of the Papum Pare district in Arunachal Pradesh. Two additional reserve forests, Kakoi and Dulung, are situated within this district and collectively constitute a contiguous landscape. Ranga RF extends as the southwestern arm of Arunachal Pradesh, running eastward along the interstate border [1]. Despite its ecological significance, there has been no prior research on the butterfly diversity of this reserve. The absence of scientific data on the area's fauna has resulted in the conservation value of the reserve remaining unexplored.

Butterflies are recognized as valuable biological indicators due to their seasonal patterns and habitat specificity [2], as well as their high sensitivity to climate variations [3]. Given their well-documented taxonomy, geographical distribution, and conservation status for many species, butterflies are an ideal subject for biodiversity research [4]. Even minor alterations to the habitat can result in migration or local extinction [5], [6]. In northeastern India, research on butterflies is still in its infancy, lagging behind studies on birds, mammals, and other fauna. Nevertheless, there is a growing interest in the biology and conservation of butterflies across India, particularly in the north-eastern region, as awareness of these issues increases.

This study aims to record the butterfly species found in the Ranga Reserve Forest and the Lakhimpur district of Assam. The paper also aims to document the butterfly species present in the study area, providing valuable insights for future conservation efforts and ecological assessments.It is anticipated that the findings will facilitate a deeper comprehension of the diversity of butterflies in this region that has hitherto been relatively underexplored and will contribute to the conservation of the species.

2. Materials and methods

2.1. Study area

The research was conducted in the Ranga Reserve Forest, located in Assam's Lakhimpur district, India, spanning an area of approximately 85.29 km². The forest is situated between longitudes 93°47'37.48" E and 94°01'12.75" E, and latitudes 27°07'04.50" N and 27°19'21.02" N. The northernmost point of the reserve is at 27°19'21.02" N. (Figure 1). 88.14% of the forest is composed of dense and open woodland [7]. For this study, the following locations were selected as the primary sampling sites: Golajuli, Bogoli, Kachajuli, Dhekiajuli, Rampur, and Kimin.

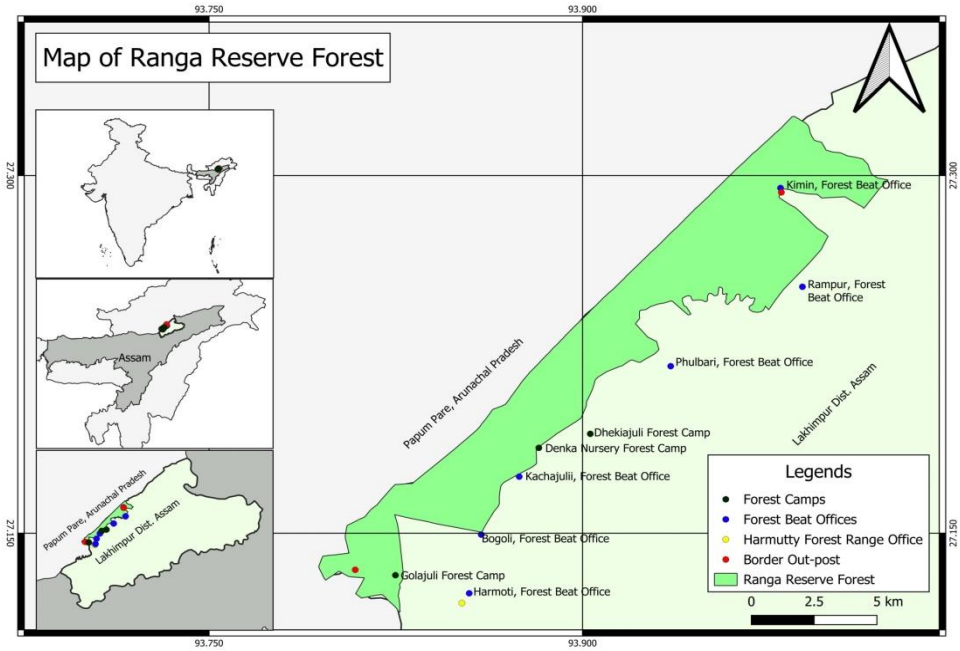

Figure 1. A map illustrating the study area within the Ranga Reserve Forest, located in

Assam, India

This reserve forest is characterized by a predominantly riverine and hilly landscape, with vegetation ranging from riverine grasslands to tropical lowland rainforest [8]. The lowlands extend northward through the Ranga Reserve, gradually giving way to low hills that continue seamlessly into Arunachal Pradesh. The forest is largely composed of semi-deciduous trees typical of the region, including species such as cottonwood (*Bombax ceiba*), beech (*Gmelina arborea*), Indian rosewood (*Dalbergia sissoo*), Chebulic myrobalan (*Terminalia chebula*), Ceylon ironwood (*Mesua ferrea*), and neem tree (*Azadirachta indica*) [9].

2.2. Methods of the study

The purpose of the survey was to develop a comprehensive checklist of butterfly species within the designated study area. The following methods were used during the study: Line Transect Method [10], Randomized Walk [11], and Visual Encounter Survey [12]. These techniques were conducted along stream banks, forest trails, forest edges, and at the boundaries of human-altered environments such as roads and agricultural fields to document butterfly presence in these habitats.

2.3. Study design

Butterfly diversity in the Ranga Reserve Forest was assessed through field surveys conducted from March 2021 to June 2022, covering four distinct seasons: summer (March to May), monsoon (June to August), post-monsoon (September to November), and winter (December to February). Surveys were carried out during favorable weather conditions, avoiding rain and strong winds to ensure reliable data collection. Six different locations within the forest were surveyed, with a total transect length of 30.5 km. Observations were made within a 150 m wide area on both sides of the transect. Total of 11 search paths were selected: three at the Bogoli site, two each at Gulajuli, Kachajuli, and Kimin, and one each at Dhekiajuli and Rampur. Random walks were also conducted to visually record butterfly species. Each trail was surveyed three times per week, depending on weather conditions, with data collected for 9 hours per day (06:00-11:00 and 14:00-18:00). In total, the study covered 180 days and 1,620 hours of observation.

2.4. Data collection and identification

For this study, data were recorded on a field data sheet, which included details such as location, date, time, and habitat for each butterfly observation, along with any reproductive or behavioral information noted. Sampling was conducted randomly along trails, streams, riverbanks, adjacent grasslands, and other locations known to host butterfly species. Photographs were taken using a DSLR camera (Nikon D5600) and a cell phone (Asus Zenfone) to document individuals. By following the ethical guidelines, no samples of butterflies were captured during the study period. Species identification was performed through visual examination and analysis of photographs, relying on reference guides [13] as well as personal observations and expertise. Identification keys from Evans [14], Talbot [15], and resources from the Butterflies of India website (https://www.ifoundbutterflies.org/) were used for classification. Geographical coordinates of survey sites were recorded using the Note Cam app on an Android device. Following conservation ethics, no specimens were collected during the survey. The map of the study area (Figure 1) was created using QGIS software version 3.18, and data analysis was conducted with Microsoft Office Excel 2007.

3. Results

A total of 225 butterfly species from six families within the order Lepidoptera were identified in the Ranga Reserve Forest. Among these, the Nymphalidae family (Plate III) showed the greatest diversity, encompassing 92 species across 46 genera. This was followed by the Lycaenidae family (Plate IV) with 47 species from 32 genera, and the Hesperiidae family (Plate VI), which included 43 species across 34 genera. The Papilionidae family (Plate I) featured 22 species from seven genera, while the Pieridae family (Plate II) contained 19 species across 10 genera. Finally, the Riodinidae family (Plate V) included two species from two genera. This research provided significant insights into the butterfly diversity of the region, highlighting several rare and noteworthy species such as *Hidari bhawani* (de Niceville, 1889), *Burara harisa* (Moore, 1866), *Arhopala perimuta* (Moore, 1858), *Telinga malsarida* (Butler, 1868), and *Mycalesis anaxias* (Hewitson, 1862). Notably, *Hidari bhawani* is regarded as extremely rare in India. Among the recorded species, three are classified under Schedule I and 39 under Schedule II of the Indian Wildlife (Protection) Act, 1972 (Amendment, 2022). According to the IUCN conservation status, two species are categorized as Critically Endangered (CR), two as Endangered (EN), one as Vulnerable (VU), and six as Least Concern (LC), while the conservation status of the remaining 200 species has yet to be assessed.

The butterfly species documented in the Ranga Reserve Forest, Assam, during the study period (March 2021 to June 2022), are as follows:

Family: *Papilionidae*
Lamproptera curius, *Graphium doson*, *Graphium eurypylus* (SC II), *Graphium agamemnon*, *Graphium sarpedon* (SC II), *Graphium antiphates*, *Byasa polyeuctes*, *Atrophaneura varuna*, *Pachliopta aristolochiae*, *Troides helena*, *Troides aecus* (SC II), *Papilio clytia* (SC II, EN), *Papilio paradoxa* (SC II), *Papilio polytes*, *Papilio memnon*, *Papilio castor*, *Papilio helenus*, *Papilio chaon*, *Papilio protenor*, *Papilio demoleus*, *Papilio paris* and *Papilio bianor*.
Family: *Pieridae*

Eurema andersoni (SC II, LC), *Eurema hecabe*, *Eurema blanda*, *Gandaca harina*, *Catopsilia pomona*, *Catopsilia pyranthe*, *Ixias pyrene*, *Hebomoia glaucippe*, *Appias olferna*, *Appias lyncida* (SC II), *Appias indra* (SC II), *Appias lalage*, *Pieris canidia*, *Cepora nerissa*, *Cepora nadina* (SC II), *Delias hyparete*, *Delias descombesi*, *Delias pasithoe*, *Leptosia nina*.
Family: *Nymphalidae*
Parantica aglea, *Parantica melaneus*, *Tirumala limniace*, *Tirumala septentrionis*, *Danaus genutia*, *Danaus chrysippus*, *Euploea core*, *Euploea sylvester*, *Euploea mulciber*, *Euploea klugii*, *Euploea algea* (SC II), *Euploea radamanthus*, *Charaxes bharata* (SC II), *Charaxes eudamippus*, *Charaxes bernardus* (SC II), *Charaxes kahruba* (SC II), *Charaxes marmax* (SC II), *Charaxes solon* (SC II), *Discophora sondaica* (SC I, CR), *Amathuxidia amythaon*, *Thaumantis diores*, *Elymnias hypermnestra*, *Elymnias malelas* (SC II), *Elymnias nesaea*, *Ethope himachala*, *Melanitis leda*, *Melanitis phedima*, *Lethe confusa*, *Lethe europa* (SC I, CR), *Lethe mekara*, *Lethe chandica*, *Lethe sinorix* (SC II), *Telinga malsara*, *Telinga malsarida* (SC II), *Mycalesis perseus*, *Mycalesis visala*, *Mycalesis mineus*, *Mycalesis anaxias* (SC II), *Mycalesis gotama* (SC II), *Orsotriaena medus*, *Ypthima huebneri*, *Ypthima baldus*, *Acraea terpsicore*, *Acraea issoria*, *Cethosia cyane*, *Cethosia biblis* (SC II), *Argynnis hyperbius*, *Phalanta phalantha*, *Vindula erota*, *Cirrochroa aoris*, *Cirrochroa tyche*, *Vagrans egista*, *Moduza procris*, *Athyma perius*, *Athyma inara*, *Athyma asura* (SC II), *Athyma ranga* (SC II), *Athyma selenophora*, *Athyma cama*, *Lebadea martha*, *Pantoporia hordonia*, *Neptis hylas*, *Neptis clinia* (SC II), *Neptis nata*, *Neptis pseudovikasi*, *Euthalia aconthea* (SC II), *Euthalia monina*, *Lexias dirtea* (SC II), *Lexias cyanipardus* (SC II), *Tanaecia julii*, *Tanaecia jahnu*, *Tanaecia lepidea* (SC II), *Cyrestis thyodamas*, *Chersonesia risa*, *Chersonesia intermedia* (SC II, LC), *Stibochiona nicea*, *Ariadne merione*, *Rohana parisatis*, *Euripus nyctelius* (SC II), *Hestinalis nama*, *Symbrenthia lilaea*, *Kaniska canace*, *Vanessa indica*, *Vanessa cardui*, *Junonia atlites*, *Junonia iphita*, *Junonia lemonias*, *Junonia almana* (LC), *Junonia hierta* (LC), *Hypolimnas bolina*, *Kallima inachus*, and *Doleschallia bisaltide* (SC II, EN).
Family: *Lycaenidae*
Curetis acuta dentata, *Curetis bulis*, *Poritia hewitsoni* (SC II), *Taraka hamada*, *Spalgis epius*, *Cigaritis lohita* (SC II), *Cigaritis syama*, *Anthene emolus*, *Anthene lycaenina*, *Prosotas nora*, *Prosotas dubiosa*, *Caleta decidia* (LC), *Caleta roxus* (SC II), *Caleta elna*, *Jamides celeno*, *Jamides bochus*, *Jamides alecto* (SC II), *Jamides elpis*, *Catochrysops strabo*, *Lampides boeticus*, *Chilades lajus*, *Chilades pandava*, *Leptotes plinius*, *Castalius rosimon* (VU), *Taracus spp.*, *Pseudozizeeria maha*, *Zizeeria karsandra*, *Zizina otis*, *Neopithecops zalmora*, *Megisba malaya* (SC II), *Acytolepis puspa*, *Heliophorus epicles*, *Arhopala centaurus*, *Arhopala perimuta*, *Surendra quercetorum*, *Hypolycaena erylus*, *Zeltus amasa*, *Hypolycaena othona* (SC I, LC), *Loxura atymnus*, *Horaga onyx* (SC II), *Cheritra freja*, *Remelana jangala* (SC II), *Rapala manea*, *Rapala nissa*, *Rapala iarbus*, *Rapala pheretima* and *Rapala suffusa*.
Family: *Riodinidae*
Abisara bifasciata and *Zemeros flegyas*.
Family: *Hesperiidae*
Burara harisa, *Burara oedipodea*, *Bibasis sena* (SC II), *Hasora badra*, *Hasora chromus*, *Choaspes benjaminii*, *Seseria sambara*, *Gerosis phisara*, *Tagiades japetus*, *Tagiades gana*, *Tagiades litigiosa*, *Odontoptilum angulata*, *Celaenorrhinus leucocera*, *Celaenorrhinus putra*, *Sarangesa dasahara*, *Pseudocoladenia dan*, *Ampittia dioscorides*, *Astictopterus jama*, *Halpe porus*, *Pithauria stramineipennis*, *Thoressa cerata*, *Iambrix salsala*, *Suastus gremius*, *Psolos fuligo*, *Hyarotis adrastus*, *Ancistroides nigrita*, *Udaspes folus*, *Notocrypta paralysos*, *Hidari bhawani*, *Matapa aria*, *Matapa druna*, *Erionota torus*, *Gangara thyrsis*, *Baoris farri*, *Caltoris kumara*, *Parnara guttata*, *Pelopidas sinensis*, *Pelopidas agna*, *Polytremis eltola*, *Oriens gola*, *Oriens goloides*, *Telicota colon* and *Telicota bambusae*.

Note: Species with conservation statuses are noted: **SC I** indicates inclusion under Schedule I, **SC II** indicates inclusion under Schedule II of the Indian Wildlife (Protection) Act, 1972 (Amendment,2022). **CR** denotes Critically Endangered, **EN** denotes Endangered and **VU** denotes Vulnerable status as per the IUCN Red List.

3.1. Diversity of butterflies in the study area

Throughout the study, the Nymphalidae family exhibited the greatest species richness, representing 41% of the total with 92 species. This was followed by the Lycaenidae family, contributing 21% (47 species), Hesperiidae at 19% (43 species), Papilionidae at 10% (22 species), and Pieridae at 8% (19 species). The family Riodinidae contributed a small fraction of 1% of the total with 2 species. Notably, the Ranga Reserve Forest exhibit a remarkable diversity of butterfly species (Figure 2).

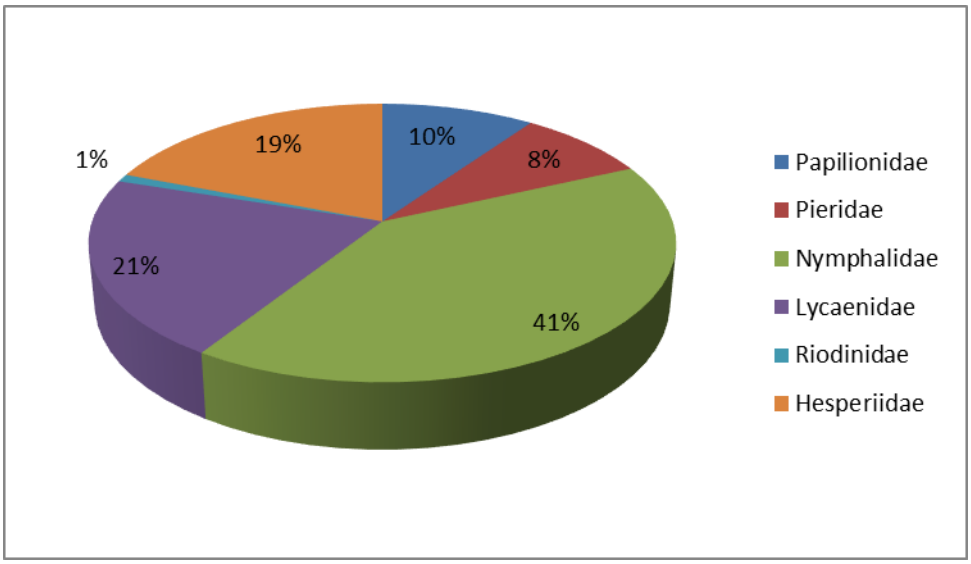

Figure 2. Distribution of butterfly species by family in Ranga Reserve Forest, Assam, India

3.2. Seasonal diversity of butterflies in the study area

The study, conducted from March 2021 to June 2022, was divided into four distinct seasons: summer, monsoon, post-monsoon, and winter. A seasonal analysis revealed considerable variation in the distribution of butterfly species. The highest diversity of 194 species was observed during the monsoon season, followed by 182 species in the summer. The post-monsoon season showed a slight decline in diversity with 130 species recorded, and the winter recorded the lowest number of species with 95. Notably, the family Nymphalidae consistently showed the highest diversity across all seasons. In the monsoon, Nymphalidae dominated with 88 species, while the Riodinidae family had the lowest representation with only two species (Figure 3).

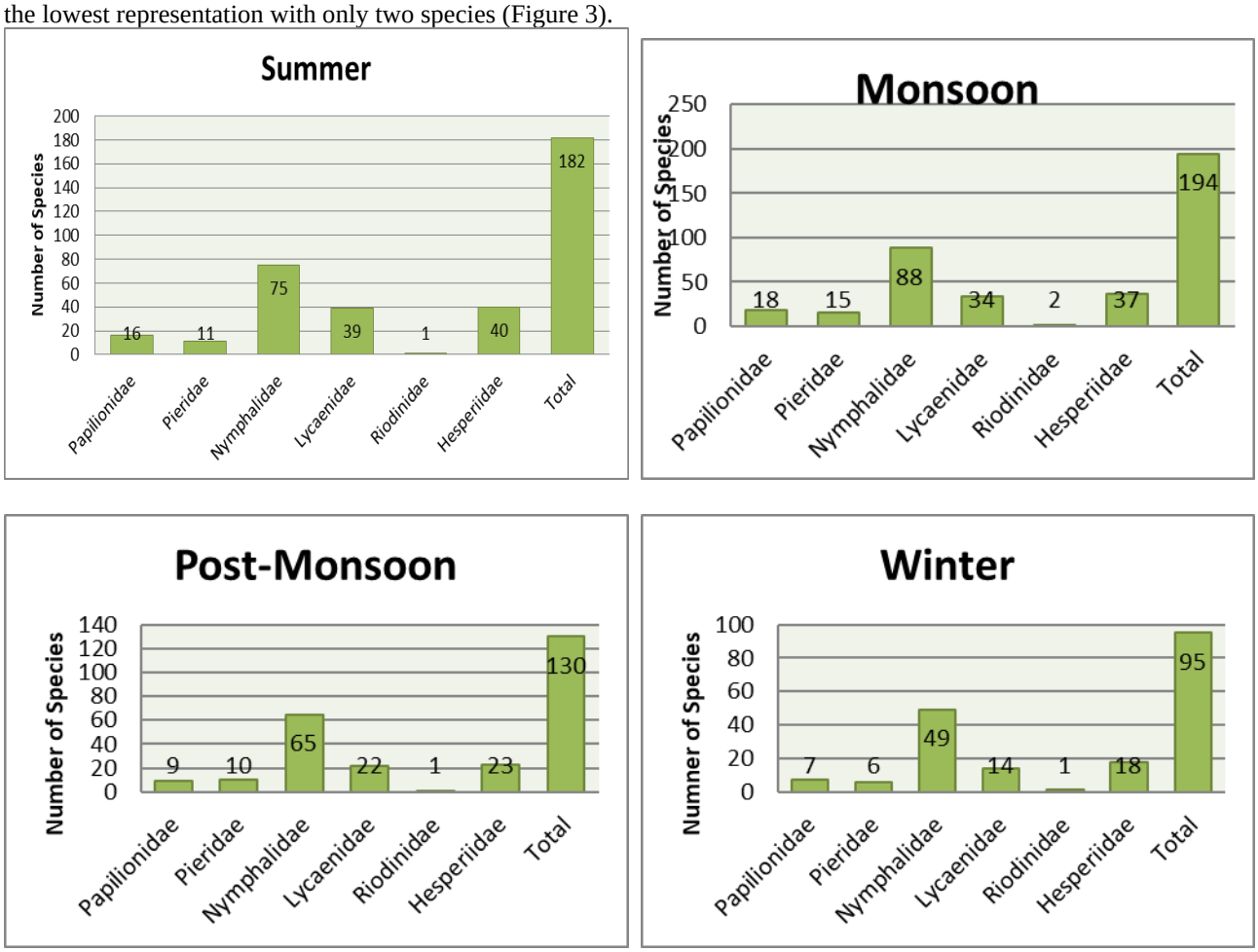

Figure 3. Seasonal distribution of butterflies ofRanga Reserve Forest, Assam, India

4. Conclusions and discussion

The geographic positioning of the study area is of great consequence in the formation of habitats that foster a rich and diverse butterfly population. Our research indicates that Ranga RF is a habitat with abundant resources, which renders it an optimal environment for butterflies. The study on the diversity of butterflies within Ranga Reserve Forest, Assam, India, a total of 225 species were recorded, including several rare and unique species that are exclusively found in this region. During our 16 months of fieldwork in the Ranga Reserve Forest, we documented a significant diversity of butterfly species, reflecting the rich biodiversity of the area. While Assam as a state has an impressive record of 686 butterfly species, our findings from Ranga Reserve Forest represent a large subset of this total, highlighting the importance of the reserve as a key habitat within the state. Compared to the national record of 1,379 butterfly species in India [16], our results from Ranga Reserve Forest underline the region's contribution to the country's overall butterfly diversity. This comparison highlights the importance of Ranga Reserve Forest as an important area for butterfly conservation in the state and national context. It is noteworthy that this marks the inaugural comprehensive butterfly survey for both the reserve forest and the Lakhimpur district of the state. The distribution of butterfly species exhibited distinct patterns across the four seasons, with the family Nymphalidae consistently demonstrating the highest diversity. The study revealed that the butterfly diversity is high during the monsoon season, the reason maybe, due to the region's favorable climatic conditions, such as moderate temperatures, and abundant rainfall. These conditions lead to lush vegetation growth, providing ample nectar sources for adult butterflies and suitable host plants for caterpillars. Additionally, the monsoon season supports the blooming of a diverse variety of flowers, creating microhabitats that are ideal for butterfly survival and proliferation. This observation aligns with previous studies by Eswaran & Pramod [17] and Krishnakumar et al. [18], which also noted the dominance of the Nymphalidae family in tropical regions. Their dominance can be attributed to their polyphagous nature, which allows them to thrive in a range of habitats.The findings of our study indicate that the diverse vegetative cover across the various habitat types within the area provides optimal conditions for the survival of numerous species of butterflies. This finding is consistent with conclusions of Bora and Meitei [4], who suggested that the structural complexity and diversity of vegetation in different habitats may create specific microhabitats that support the persistence of certain butterfly species.there are similar studies also from other states like Jammu and Kasmir by Riyaz [19]. The expansion of human activities along forest edges has resulted in a reduction in forest cover and habitat loss [20]. Factors such as pesticide use, grazing pressure, and alterations in land use patterns have been identified as principal contributors to the decline in butterfly populations [21]. The increasing application of pesticides in proximity to forested areas represents a significant cause for concern. Furthermore, the rate of deforestation is increasing as a result of the expansion of human settlements and the conversion of land for agricultural purposes. Collectively, these issues present a significant challenge to the long-term sustainability of the forest. The presence of rare or uncommon butterfly species serves to illustrate the rich biodiversity potential of this area, thereby underscoring the necessity for the implementation of more robust protection measures. Further surveys in this biologically significant region have the potential to identify additional butterfly species, thereby enhancing its conservation value.

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PHOTO PLATES

PLATE I: Photographs of butterfly species from the Papilionidae family, documented in the Ranga Reserve Forest, Lakhimpur, Assam, India, during the study period from March 2021 to June 2022.

Lamproptera curius

Graphium doson

Graphium eurypylus

Graphium agamemnon

Graphium sarpedon

Graphium antiphates

Byasa polyeuctes

Pachliopta aristolochiae

Troides helena

Troides aecus

Papilio clytia

Papilio paradoxa

Papilio polytes

Papilio memnon

Papilio castor

Papilio helenus

Papilio chaon

Papilio protenor

Papilio demoleus

Papilio paris

PLATE II: Photographs of butterfly species from the Pieridae family, documented in the Ranga Reserve Forest, Lakhimpur, Assam, India, during the study period from March 2021 to June 2022.

Eurema andersoni

Eurema hecabe

Eurema blanda

Gandaca harina

Catopsilia pomona

Catopsilia pyranthe

Ixias pyrene

Hebomoia glaucippe

Appias olferna

Appias lyncida

Appias indra

Appias lalage

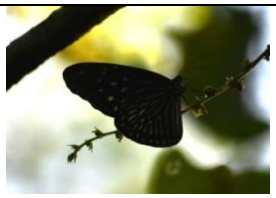
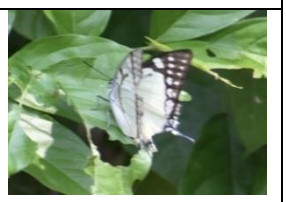
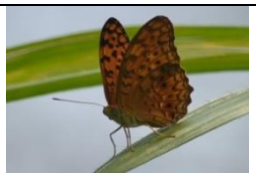
Pieris canidia

Cepora nadina

Delias hyparete

Delias descombesi

PLATE III: Photographs of butterfly species from the Nymphalidae family, documented in the Ranga Reserve Forest, Lakhimpur, Assam, India, during the study period from March 2021 to June 2022.

			
Parantica aglea	*Tirumala septentrionis*	*Danaus chrysippus*	*Euploea sylvester*
			
Euploea mulciber	*Euploea algae*	*Euploea radamanthus*	*Charaxes eudamippus*
			
Charaxes solon	*Discophora sondaica*	*Thaumantis diores*	*Elymnias hypermnestra*
			
Elymnias malelas	*Ethope himachala*	*Lethe confusa*	*Lethe europa*
			
Lethe mekara	*Lethe chandica*	*Telinga malsara*	*Telinga malsarida*
			
Mycalesis anaxias	*Mycalesis gotama*	*Orsotriaena medus*	*Phalanta phalantha*

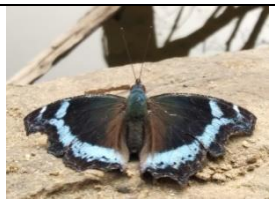
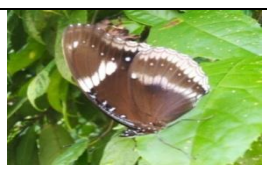
			
Vindula erota	*Cirrochroa aoris*	*Cirrochroa tyche*	*Vagrans egista*
			
Athyma inara	*Athyma asura*	*Athyma ranga*	*Athyma selenophora*
			
Pantoporia hordonia	*Euthalia aconthea*	*Euthalia monina*	*Lexias dirtea*
			
Tanaecia jahnu	*Cyrestis thyodamas*	*Chersonesia intermedia*	*Stibochiona nicea*
			
Rohana parisatis	*Euripus nyctelius*	*Hestinalis nama*	*Symbrenthia lilaea*
			
Kaniska canace	*Vanessa indica*	*Junonia atlites*	*Junonia almana*
			
Junonia hierta	*Hypolimnas bolina*	*Kallima inachus*	*Doleschallia bisaltide*

PLATE IV: Photographs of butterfly species from the Lycaenidae family, documented in the Ranga Reserve Forest, Lakhimpur, Assam, India, during the study period from March 2021 to June 2022.

Curetis acuta

Poritia hewitsoni

Taraka hamada

Spalgis epius

Cigaritis lohita

Anthene emolus

Anthene lycaenina

Prosotas nora

Caleta decidia

Caleta elna

Jamides celeno

Jamides elpis

Catochrysops strabo

Lampides boeticus

Chilades lajus

Chilades pandava

Leptotes plinius

Castalius rosimon

Taracus spp.

Pseudozizeeria maha

Zizeeria karsandra

Zizina otis

Neopithecops zalmora

Acytolepis puspa

Heliophorus epicles

Arhopala centaurus

Arhopala perimuta

Surendra quercetorum

Hypolycaena erylus

Zeltus amasa

Chliaria othona

Loxura atymnus

Cheritra freja

Remelana jangala

Rapala nissa

Rapala pheretima

PLATE V: Photographs of butterfly species from the Riodinidae family, documented in the Ranga Reserve Forest, Lakhimpur, Assam, India, during the study period from March 2021 to June 2022.

Abisara bifasciata

Zemeros flegyas

PLATE VI: Photographs of butterfly species from the Hesperiidae family, documented in the Ranga Reserve Forest, Lakhimpur, Assam, India, during the study period from March 2021 to June 2022.

Burara harisa

Burara oedipodea

Bibasis sena

Hasora badra

Hasora chromus

Choaspes benjaminii

Seseria sambara

Gerosis phisara

Tagiades japetus

Tagiades gana

Tagiades litigiosa

Odontoptilum angulata

Celaenorrhinus putra

Sarangesa dasahara

Pseudocoladenia dan

Ampittia dioscorides

Astictopterus jama

Halpe porus

Pithauria stramineipennis

Thoressa cerata

Iambrix salsala

Suastus gremius

Hyarotis adrastus

Ancistroides nigrita

Udaspes folus

Hidari bhawani

Matapa druna

Gangara thyrsis

Baoris farri

Pelopidas agna

Oriens gola

Telicota colon