



ISSN 0974-7907 (Online)
ISSN 0974-7893 (Print)

Journal of Threatened Taxa | www.threatenedtaxa.org | 26 January 2015 | 7(1): 6774–6787

THE SEASONALITY OF BUTTERFLIES IN A SEMI-EVERGREEN FOREST: GIBBON WILDLIFE SANCTUARY, ASSAM, NORTHEASTERN INDIA

Arun P. Singh¹, Lina Gogoi² & Jis Sebastain³

^{1,2}Ecology & Biodiversity Conservation Division, Rain Forest Research Institute, P.O. Box # 136, Jorhat, Assam 785001, India

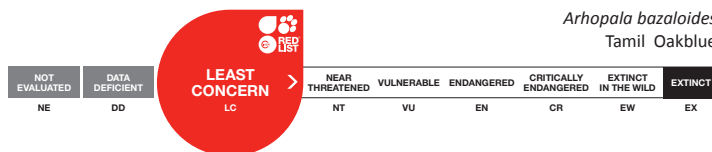
³Research Centre in Botany, Sacred Heart College, Thevara, Kochi, Kerala 682013, India

¹singhap@icfre.org; ranoteaps@gmail.com (corresponding author), ²lina.dbr@gmail.com, ³alkaeliza@gmail.com

OPEN ACCESS

Abstract: A study spanning 3.7 years on the butterflies of Gibbon Wildlife Sanctuary GWS (21km²), a semi-evergreen forest, in Jorhat District of Assam, northeastern India revealed 211 species of butterflies belonging to 115 genera including 19 papilionids and seven 'rare' and 'very rare' species as per Evans list of the Indian sub-continent (Great Blue Mime *Papilio paradoxa telearchus*; Brown Forest Bob *Scobura woolletti*; Snowy Angle *Darpa pteris dealbatata*; Constable *Dichorragia nesimachus*; Grey Baron *Euthalia anosia anosia*; Sylhet Oakblue *Arhopala silhetensis*; Branded Yamfly *Yasoda tripunctata*). The butterflies showed a strong seasonality pattern in this forest with only one significant peak during the post monsoon (September-October) when 118 species were in flight inside the forest which slowly declined to 92 species in November-December. Another peak (102 species) was visible after winter from March to April. Species composition showed least similarity between pre-monsoon (March-May) and post-monsoon (October-November) seasons. The number of papilionid species were greater from July to December as compared from January to June. The findings of this study suggest that the pattern of seasonality in a semi-evergreen forest in northeastern India is distinct from that of the sub-tropical lowland forest in the Himalaya. Favourable logistics and rich diversity in GWS points to its rich potential in promoting 'butterfly inclusive ecotourism' in this remnant forest.

Keywords: Conservation, eco-tourism, endemic, Papilionidae, rainfall, rare, semi-evergreen forest.



Arhopala bazaloides
Tamil Oakblue



DOI: <http://dx.doi.org/10.11609/JoTT.o3742.6774-87> | **ZooBank:** urn:lsid:zoobank.org:pub:4A80B592-41FB-460F-A7E8-7244E20CAB9C

Editor: Anonymity requested.

Date of publication: 26 January 2015 (online & print)

Manuscript details: Ms # o3742 | Received 28 July 2014 | Final received 16 November 2014 | Finally accepted 29 December 2014

Citation: Singh, A.P., L. Gogoi & J. Sebastain (2015). The seasonality of butterflies in a semi-evergreen forest: Gibbon Wildlife Sanctuary, Assam, northeastern India. *Journal of Threatened Taxa* 7(1): 6774–6787; <http://dx.doi.org/10.11609/JoTT.o3742.6774-87>

Copyright: © Singh et al. 2015. Creative Commons Attribution 4.0 International License. JoTT allows unrestricted use of this article in any medium, reproduction and distribution by providing adequate credit to the authors and the source of publication.

Funding: None.

Competing Interest: The authors declare no competing interests.

Author Contribution: APS carried out most of the sampling surveys, photography, identification, compilation and analysis of data and paper writing. LG assisted in sampling surveys, data recording, compilation and analysis for some trips. JS assisted in sampling surveys, data recording, compilation, data analysis for some trips and compilation of appendix

Author Details: ARUN P. SINGH is working on the ecology and conservation of biodiversity of the Himalaya and northeastern India with special reference to butterflies and birds. Presently, he heads the Ecology and Biodiversity Conservation Division, Rain Forest Research Institute (ICFRE), Jorhat. LINA GOGOI is an environmental science post graduate from Tezpur University, Assam had worked on weathering geochemistry of Lohit River, Dibang River and Dibru Saikhowa National Park. Also worked on ecological studies of butterflies in Arunachal Pradesh at the Rain Forest Research Institute for a short period. Currently working in Tezpur University as a project fellow in biochar related project. JIS SEBASTIAN did her MSc in forestry from FRI University in Dehradun, Uttarakhand. She has working experience in Wildlife Trust of India and as JRF in the Rain Forest Research Institute on ecological studies of butterflies in Arunachal Pradesh. Currently perusing PhD research in botany at Sacred Heart College, Cochin, Kerala.

Acknowledgements: The authors are thankful to the officers and staff of the Assam Forest Department at the Gibbon Wildlife Sanctuary, Jorhat for their help from time to time and to the Director, Rain Forest Research Institute, Jorhat for providing necessary facilities. Thanks are due to Monsoon Jyoti Gogoi for sharing his records that have been added to the Appendix and to Riyaz A. Ahmed for assisting in a few of the field trips.

INTRODUCTION

The northeastern region of India, that lies south of the Brahmaputra River, is part of the Indo-Burma biodiversity hotspot on the globe. It is located at the tri-junction of Indo-Chinese, Indo-Malayan and Palaeartic biogeographic realms exhibiting a profusion of habitats characterized by diverse biota with a high level of endemism (http://www.biodiversityhotspots.org/xp/hotspots/indo_burma/Pages/default.aspx).

More than 50% of the butterfly species found in India occur in the northeast, also called the "Papilionidae-rich zone" in the 'Indo-Burma hotspot' as per IUCN (New & Collins 1991). The high species richness and endemism make this an important region for conservation of biodiversity in India.

Study Area

The Gibbon Wildlife Sanctuary (GWS) 26°40'–26°45'N & 94°20'–94°25'E, lies in Jorhat District in upper Assam in northeastern India. It is today an isolated forest patch covering approximately 21km² of mainly lush green 'tropical semi-evergreen forest' sparsely interspersed with 'wet evergreen forest' patches, classified as 'Assam plains alluvial semi-evergreen forests (2B/C1a)' (Champion & Seth 1968). *Dipterocarpus retusus* (Hollong) is the predominant element in the forest. The associated species are *Ailanthus integrifolia*, *Altingia excelsa*, *Artocarpus chama*, *Castanopsis purpurella*,

Cinnamomum bejolgheta, *Dysoxylum gobara*, *Mesua ferrea*, *Michelia champaca* and *Vatica lanceafolia* (Baruah & Khatri 2010) with most of the tree species being utilized by the Western Hoolock Gibbon *Hoolock hoolock* here (Barua & Gogoi 2012). The altitudinal range of GWS varies between 100–120 m above sea level, while the average temperature ranges from 18.95–27.9 °C, the average humidity varies between 64.5% and 94.5% and the annual rainfall of the study area being ~250cm. The sanctuary was carved out of Hollongapar Reserve Forest set aside in 1881 named after the dominant tree species - Hollong (*Dipterocarpus retusus*). Subsequently, more forest areas were added to this RF and by 1997 the total area of the Hollongapar RF increased to 2098.62ha. The Government of Assam declared this entire RF area as the Gibbon Wildlife Sanctuary in 1997. GWS is surrounded by mostly tea gardens and small villages. The Bhogdoi River flows from Nagaland (south) to Assam (north-west) and distinctly demarcates the eastern boundary of this sanctuary as a permanent physical barrier (Image 1). GWS was once contiguous with a large forest tract that extended to Dissoi Valley Reserve Forests of Nagaland in the south and are now separated by a vast stretch of tea gardens presenting a barrier in the effective migration of wildlife such as elephants (Bhattacharjee 2012). GWS today is still a home to many species of animals of global concern namely, Hoolock Gibbon *Hoolock hoolock* (Endangered; Brockelman et al. 2008); Capped Langur *Trachypithecus*

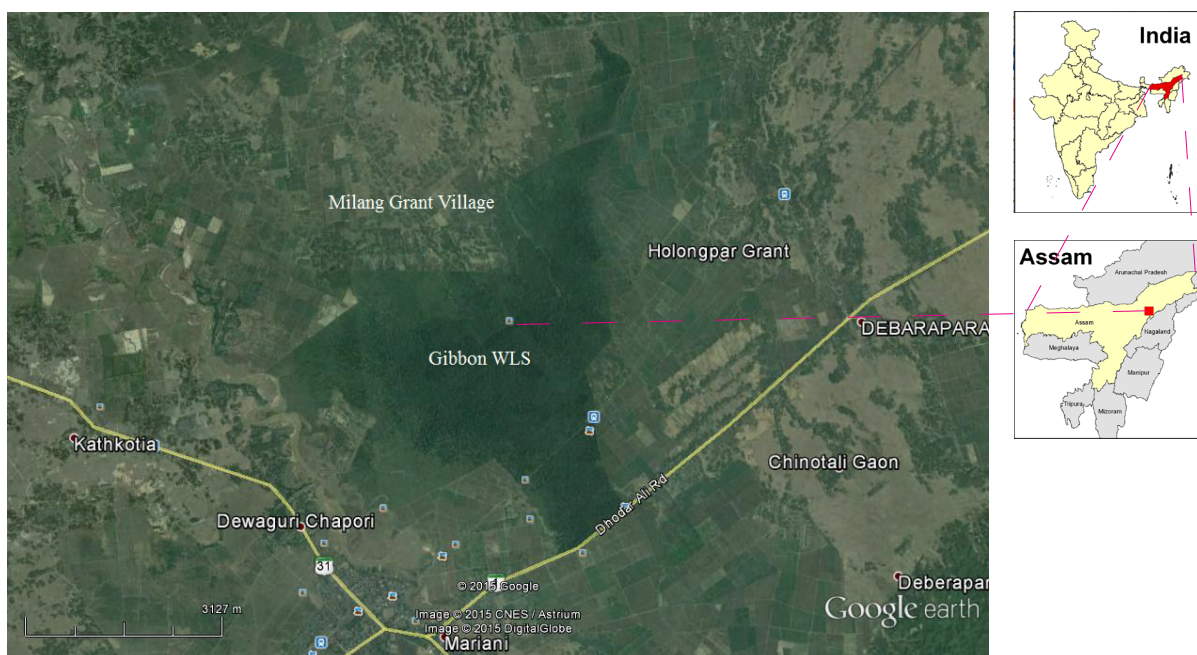


Image 1. Gibbon Wildlife Sanctuary and its surrounding areas.

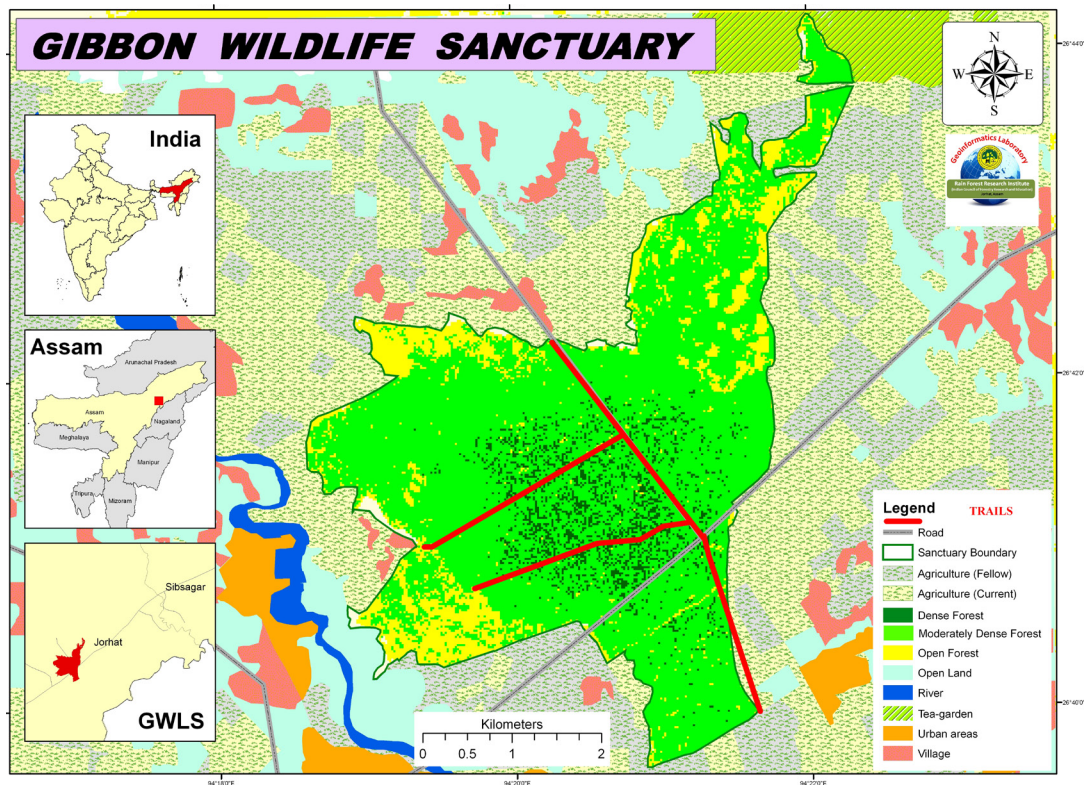


Figure 1. The Gibbon Wildlife Sanctuary with the butterfly sampling trails, marked in red (Source: D.J. Das, Geo Informatics Laboratory, Ecology & Biodiversity Conservation Division, RFRI, Jorhat).

pileatus (Vulnerable; Das et al. 2008), Slow Loris *Nycticebus bengalensis* (Vulnerable; Streicher et al. 2008), Pig-tailed Macaque *Macaca leonina* (Vulnerable; Boonratana et al. 2008), Stump-tailed Macaque *Macaca arctoides* (Vulnerable; Htun et al. 2008), Assamese Macaque *Macaca assamensis* (Near Threatened; Boonratana et al. 2008), Malayan Giant Squirrel *Ratufa bicolour* (Near Threatened; Walston et al. 2008), Asian Elephant *Elephas maximus* (Endangered; Choudhury et al. 2008), Leopard *Panthera pardus* (Near Threatened; Henschel et al. 2008), Large Indian Civet *Viverra zibetha* (Near Threatened; Duckworth, et al. 2008), Chinese Pangolin *Manis pentadactyla* (Endangered; Challender et al. 2014), as recorded by the author. Besides, many other species have also been listed in the sanctuary's catalogue (Bordoloi 2010).

The published literature on the butterflies of the GWS is scanty. Senthilkumar et al. (2006) recorded 37 species from GWS. A blog by Abhijit Narvekar (<http://butterflyinggibbonwls.blogspot.in/>) lists 31 species from GWS, recorded in May 2013. Besides these, there are no other published records of butterflies from GWS. The authors hereby report the results of a three and a half year study carried out by them in the GWS.

METHODS

Sampling

Twenty-eight sampling surveys covering all the months were carried out in Gibbon WS from 4 August 2010 to 26 April 2014. Sampling was carried out along forest trails up to 5m on both sides along a stretch of 3.5km from the village Melang Grant to the Gibbon Forest Rest House (FRH) and along the two parallel trails that goes from the FRH towards river Bhogdoi in the east (Fig. 1). The 'Pollard walk' (Pollard & Yates 1993) method was used for sampling butterflies. Sampling was carried out between 08.00hr to 15.00hr mostly on sunny days, but the sampling hours varied in different samplings from 1.5–3 hours. The taxa encountered were recorded in each sampling. The data on abundance, however, could not be recorded for each survey, but species occurring in exceptionally high numbers (peak abundance) were noted. A total of ~65 hours of sampling was carried out. Butterflies were identified from photographs and using field guides (Evans 1932; Wynter-Blyth 1957; Haribal 1992; Smith 1989 & 2006; Kehimkar 2008; Sondhi et al. 2013 and websites: www.flutters.org/ and www.ifoundbutterflies.org/).

Data Analysis

Data for the number of species recorded in each survey was pooled. Species accumulation curve was then plotted from the first to the last sampling to see the rate of species accumulation during the study period. The Sorensen’s similarity index or β was calculated to see the species similarity in butterflies between four different seasons meeting different seasons [pre-monsoon (March–May), monsoon (June–Sept), post-monsoon (October–November) and winter (December–February)] in this semi-evergreen forest.

$$\beta = 2c / (S1+S2)$$

here, S1 = the total number of species recorded in one season/site

S2 = the total number of species recorded in different season/site

C = number of species common to both seasons/sites

The Sorensen’s similarity index (Sorensen 1948) is a very simple measure of beta diversity, ranging from a value of zero, where there is no species overlap between the communities to a value of one, when exactly the same species are found in both communities.

The seasonality of butterflies in GWS was then compared with trends available in other studies in other forest habitats in the Himalaya and the northeast to see the variation in this forest type.

RESULTS AND DISCUSSIONS

Species richness

Amongst the 211 species belonging to 115 genera recorded during 28 sampling surveys (Appendix 1), 19

species were of the family Papilionidae. This suggests that species richness of the area could be as high as 257 species based on the family proportion model (Singh & Pandey 2004), by taking Papilionidae’s proportion as 7.4% of the total for northeastern India (Wynter-Blyth 1957). The present sampling thus represents about 82% of the species found in the study area. Families Lycaenidae and Hesperidae proportions are less than those of the northeastern region, these two families are thus under-represented (Table 1) in the present surveys and there is a need to look for more species among these two families in GWS.

Species accumulation

An increasing trend in the species accumulation curve shows that new species were added during every sampling up to the last sampling at a prominently higher rate just after the monsoon rains (Aug–Sep) until pre-monsoon (March), every year (Fig. 2). The trend obtained during the last six samplings suggests that new species were still being discovered until the end (mainly Lycaenidae and Hesperidae).

Seasonality

Maximum number of species were recorded during the ‘post monsoon’ season in the region (Fig. 3). The first peak in species richness (102 species) during March and April was smaller than the second peak in September to October (118) when most of the species are in flight in GWS. The two peak seasonal trends in butterflies is very typical of the Himalaya and northeastern India. In GWS, which is a semi-evergreen forest, the second peak is higher than the first peak, however. This pattern differs considerably from the sub-tropical lowland forests in Bhutan (Fig. 4; Singh 2012) lying between 100–220 m,

Table 1. Comparison of the proportion of butterfly families recorded from Gibbon WS with northeastern India

Site	Total no. of species recorded	Family				
		Papilionidae	Pieridae	Lycaenidae	Nymphalidae	Hesperidae
Wynter-Blyth 1957 Northeastern India	853	7.3 (62)	6.1	30.2	34.2	22.2
Present study Semi-evergreen Forest Gibbon Wildlife Sanctuary, Assam (21km ²)	211	9.0 (19)	9.0 (19)	24.6 (52)	40.8 (86)	16.6 (35)

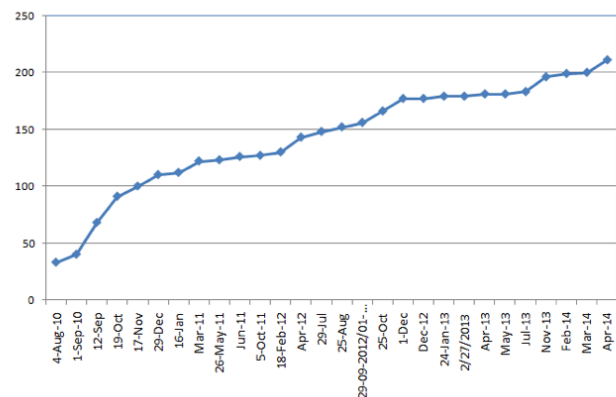


Figure 2. Species accumulation curve for 28 samplings of butterflies through different seasons in Gibbon WS (August 2010–April 2014)

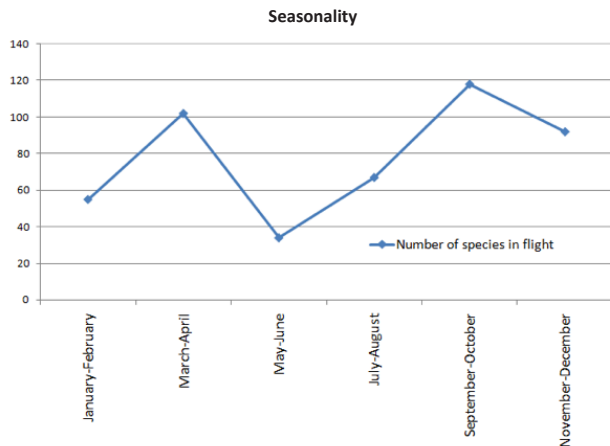


Figure 3. Seasonal variation in number of species recorded in Gibbon WS (August 2010–April 2014).

where both the peaks are high but the first peak in April is slightly greater than the second peak in December (Fig. 4). The reason for the first peak being smaller than the second peak in GWS may be related to the pattern of rainfall here. The reason for the first peak being smaller than second peak higher in GWS may be related to the pattern of rainfall here. In GWS the onset of early rains is early in spring (from April), monsoons are less severe, there is short dry (moderate) winter in comparison to rains arriving relatively late in May–June, severe monsoon and a longer winter season in Bhutan.

Species similarity among seasons

Sorensen’s similarity index between seasons varied from 0.25–0.55. This suggests that, the species composition varied in GWS all over the seasons of the year. However, the highest similarity was noticed between post-monsoon and autumn, post-monsoon and spring, winter and spring, spring and autumn, respectively. In other words from post-monsoon to spring the species composition in GWS showed much similarity. The similarity index was least between spring and pre-monsoon followed by monsoon and winter, respectively (Fig. 5). This suggests that major changes in species composition in the semi-evergreen forests occurs between these seasons, which may be related to the life history patterns of these butterflies. The number of species in flight during rainy season were few in comparison to the dry season.

Papilionidae species similarity of GWS with other semi evergreen forest areas in the region

GWS, a small forest, recorded 19 species of

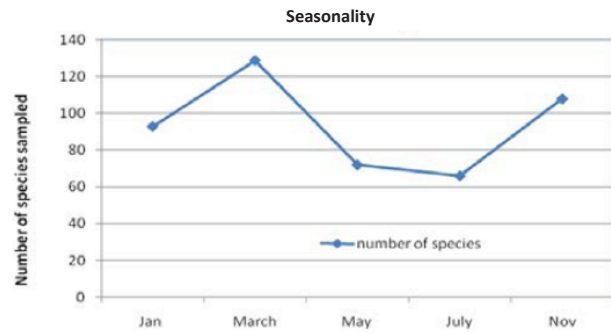


Figure 4. Seasonal variation in number of butterfly species (pooled) in subtropical lowland forests of Bhutan (January 2009–March 2010) (Singh 2012).

Table 2. Similarity index of papilionids in different areas having ‘semi-evergreens forest’ in northeastern India

Between Sites	Jaccard’s coefficient of similarity
Gibbon WS and Jeypore RF	0.667
Gibbon WS and Garo Hills	0.531
Jeypore RF and Garo Hills	0.634
(Jeypore RF+Gibbon WS) and Garo Hills	0.606

Papilionidae as compared to the other large forest tracts like in Jeypore-Dehing RF where 21 species of Papilionidae have been reported (Gogoi 2013). Four species (Great Zebra *Graphium xenocles*; Common Peacock *Papilio polyctor*; Common Windmill *Atrophaneura polyeuctes* and Lesser Batwing *Atrophaneura aidoneus*) found in Jeypore-Dehing RF (Gogoi 2013) were absent in GWS. This could be due to proximity and continuity of Jeypore RF with Himalayan foothills of Arunachal Pradesh from where these species come down and non-connectivity of GWS forest with the nearest hills in Nagaland and no freshwater mountain streams inside the GWS. Besides, 30 papilionids have been recorded in Garo Hills (Sondhi et al. 2013) of which 10 have not been recorded at GWS, but Garo Hills have diverse habitats under at least three forest types and a large altitudinal gradient when compared to GWS.

The Papilionidae species similarity between these three forests (Table 2) all having semi-evergreen forest component in common also have at least 53 percent papilionid species common among them.

Significant records

A dead female of the Great Blue Mime *Papilio paradoxa telearchus*, a rare species (Evan 1932), crushed by a vehicle on the forest road was recorded on 25

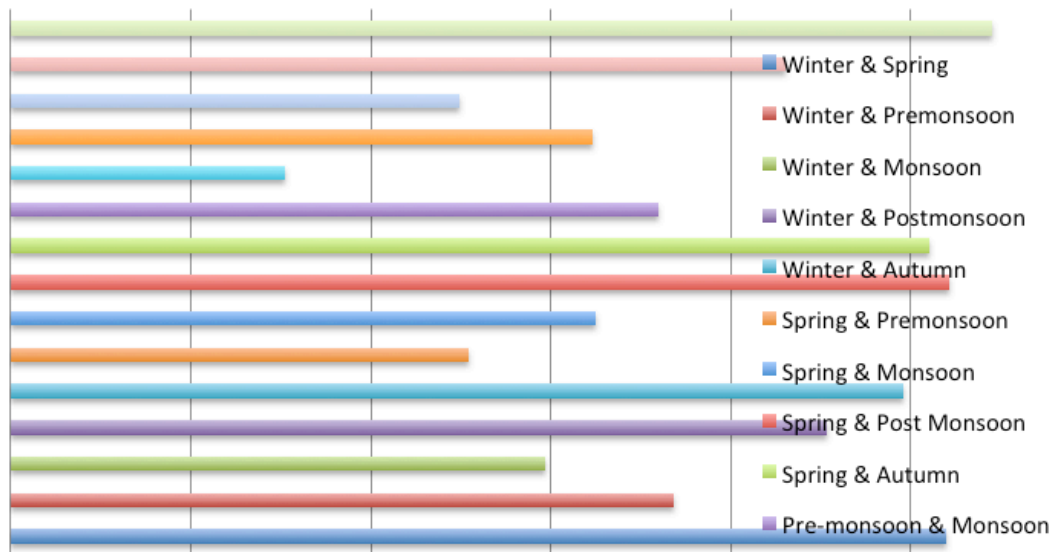


Figure 5. Butterfly species similarity between different seasons in Gibbon WS (August 2010–March 2014).

August 2012 on the road and later identified (Image 2). The female of this species are very rarely photographed as they mimic the female of the Magpie Crow *Euploea radamanthus* and thus overlooked. A male *P.p. telearchus* was photographed (Image 3) on 10 July 2013 feeding on the wet ground on the trail. This species also feeds on the nectar of *Syzygium* sp. flowers in September–October 2011 along with Great Archduke *Lexias dirtea* (Image 4), Blue-spotted Crow *Euploea midamus*; Stripe Blue Crow *Euploea mulciber*; Yellow-spot Jezebel *Delias agostina*; Red-spot Jezebel *D. descombesi* and Red-base Jezebel *D. pasithoe*. Brown Forest Bob *Scobura woolletti woolletti* Riley (Image 5), a rare species, was recorded on 20 February 2011 and 27 March 2011 was also a species with a distribution in the Naga Hills, Siam and Borneo (Evans 1932). Norman (1956), however, had recorded *S.w. woolletti* Riley from Sibsagar District of Assam that was previously also known from Manipur. The record of Snowy Angle, *Darpa pteris dealbata* on 4 August 2012 (Image 6), is the second photographic record of this species from India. Earlier, it had been recorded from the forests of Jeypore-Dehing in Assam between April 24 and 29, 2011, the distribution of the species being further south through Burma, Thailand, Laos, Malay Peninsula, Tioman, Borneo, Sumatra, Java, and Palawan, Phillipines in South-east Asia (Karthikeyan & Venkatesh 2011). The Constable, *Dichorhagia nesimachus* (Image 7) a very rare species (Evans 1932) was recorded on three occasions, 15 April 2012, 7 December 2013 and 4 March 2014 and a male of Grey Baron, *Euthalia anosia anosia* (Image 8) another rare species (Evans 1932), on 15 April 2012 and 4 March 2014, both basking in



Image 2. Great Blue Mime *Papilio paradoxa telearchus* (female)

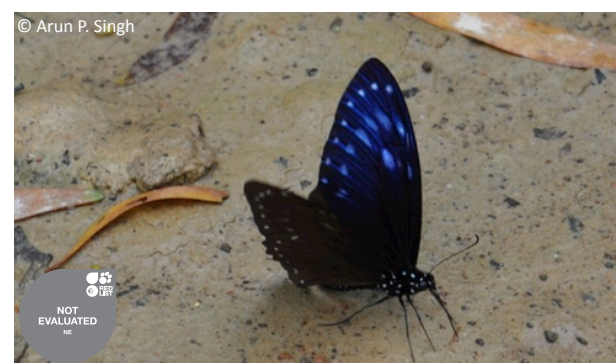


Image 3. Great Blue Mime *Papilio paradoxa telearchus* (male)

the sunshine and on wet mud inside the forest. Sylhet Oakblue *Arhopala silhetensis* (Images 9,10) is another rare species (Evans 1932) that was recorded on several occasions (6 February 2011, 24 January 2013; 13 May



Image 4. Dark Archduke *Lexia dirtea khasiana* (male) (locally common)



Image 5. Brown Forest Bob *Scobura woolletti*



Image 6. Snowy Angle *Darpa pteris dealbata*

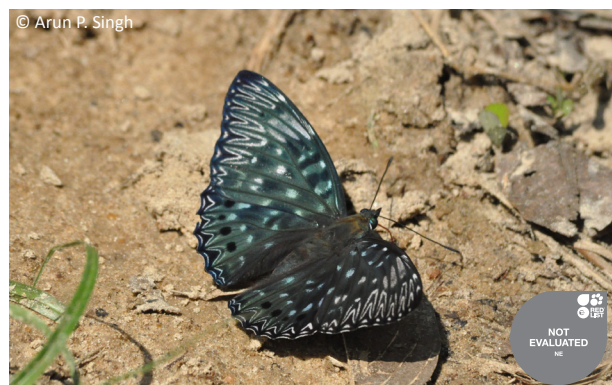


Image 7. Constable *Dichorragia nesimachus*



Image 8. Grey Baron *Euthalia anosia* (male)



Image 9. Sylhet Oakblue *Arhopala silhetensis* (underside)

2013; April 2014), the species being found from Sikkim to North Myanmar. Tamil Oakblue *Narathura bazaloides* also a rare species was photographed on 9 October 2010 (Image 11) and April 2014 while Spotless Oakblue *Arhopala fulla ignara* Riley, a rare (Evans 1932) on April

2014. Branded Yamfly *Yasoda tripunctata tripunctata* (Image 12) is yet another rare species, which is also distributed from Sikkim to Myanmar, was recorded once on 25 October 2011.

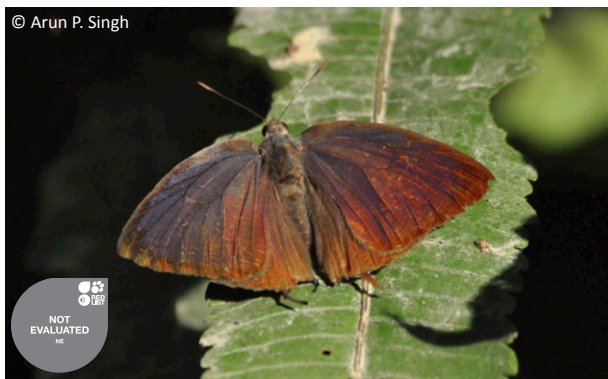


Image 10. Sylhet Oakblue *Arhopala silhetensis* (upperside)

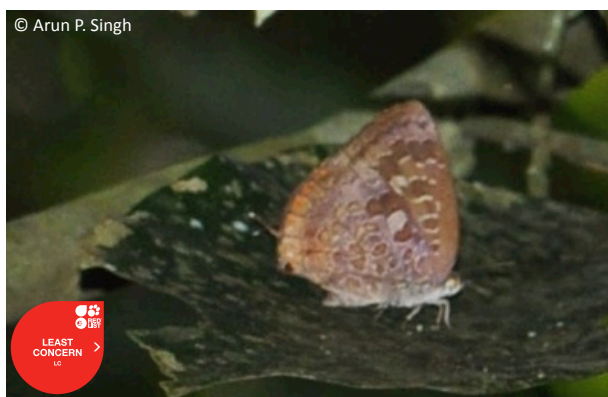


Image 11. Tamil Oakblue *Arhopala bazaloides*



Image 12. Branded Yamfly *Yasoda tripunctata*

CONCLUSION

Being a remnant forest of 21km², GWS supports a rich diversity of butterflies found in northeastern India. The seasonality and diversity of butterflies of a 'semi evergreen forest' is unique from that of lowland subtropical forests of the lower Himalaya. Barua et al. (2010) have also found that rainfall has a strong correlation with the abundance of some papilionids

in northeastern India besides a strong seasonality in continental South-east Asian butterfly assemblages. GWS, besides supporting butterfly diversity, also needs to be preserved as a gene bank biodiversity of flora and fauna (birds, mammals, herpetofauna, orchids, canes, bamboos, etc.) unique to northeastern India and functions as an island habitat for movement of large mammals and birds between larger protected areas in the landscape. Also, better accessibility and location of GWS with the national highway in the region, proximity to Jorhat town, lying in the plains and having a rest house, increases its potential for attracting tourists for - butterflyinclusive eco-tourism in a natural semi-evergreen forest habitat. Using local villagers as guides to generate livelihood for communities involved thereby reducing biotic pressure on one hand and conserving this magnificent forest on the other along, with the researchers and students, GWS can easily be taken up as a role model in conservation biology.

REFERENCES

- Barua, K.K., J.K.S. Slowik & M. Muehlenberg (2010). Correlations of rainfall and forest type with papilionid assemblages in Assam in northeast India. *Psyche: A Journal of Entomology* 2010, Article ID 560396, 10pp; <http://dx.doi.org/10.1155/2010/560396>
- Barua, K.N. & P.K. Khatri (2010). Floristic wealth, life form and biological spectrum of Gibbon Wildlife Sanctuary, Assam. *Journal of Economic and Taxonomic Botany* 34(1): 72–86.
- Barua, K.N. & G. Gogoi (2012). Observations on feeding and lodging behaviour of *Hoolock hoolock* (Western Hoolock Gibbon) in Gibbon Wildlife Sanctuary, Assam. *Journal of Nature and Environment* 4&5: 29–35.
- Bhattacharjee, S. (2012). The scenario of man-elephant conflict in Hoollongapar Gibbon Wildlife Sanctuary of Assam, India. *International Journal of Scientific and Research Publications* 2(8): 1–3.
- Boonratana, R., M. Chalise, J. Das, S. Htun & R.J. Timmins (2008). *Macaca assamensis*. The IUCN Red List of Threatened Species. Version 2014.3. <www.iucnredlist.org>. Downloaded on 20 January 2015.
- Boonratana, R., J. Das, L. Yongcheng, S. Htun & R.J. Timmins (2008). *Macaca leonina*. The IUCN Red List of Threatened Species. Version 2014.3. <www.iucnredlist.org>. Downloaded on 20 January 2015.
- Bordoloi, P.K. (2010). Gibbon Wildlife Sanctuary. Catalogue published by Jorhat Division, Assam. Genesis Printers, 6pp.
- Brockelman, W., S. Molur & T. Geissmann (2008). *Hoolock hoolock*. The IUCN Red List of Threatened Species. Version 2014.3. <www.iucnredlist.org>. Downloaded on 20 January 2015.
- Challender, D., J. Baillie, G. Ades, P. Kaspal, B. Chan, A. Khatiwada, L. Xu, S. Chin, R. KC, H. Nash & H. Hsieh (2014). *Manis pentadactyla*. The IUCN Red List of Threatened Species. Version 2014.3. <www.iucnredlist.org>. Downloaded on 20 January 2015.
- Champion, S.H.G. & S.K. Seth (1968). *A Revised Survey of The Forest Types of India*. Manager of Pb.Govt. of India, New Delhi, 404pp.
- Choudhury, A., D.K.L. Choudhury, A. Desai, J.W. Duckworth, P.S. Easa, A.J.T. Johnsingh, P. Fernando, S. Hedges, M. Gunawardena, F. Kurt, U. Karanth, A. Lister, V. Menon, H. Riddle, A. Rübél & E. Wikramanayake (IUCN SSC Asian Elephant Specialist Group)

Appendix 1. Checklist of butterflies recorded in Gibbon Wildlife Sanctuary, Assam, India (110–120 m; August 2010–April 2014).

	Common name	Scientific name	Season					
			Jan-Feb	Mar-Apr	May-Jun	Jul-Aug	Sep-Oct	Nov-Dec
	Papilionidae							
1	White Dragontail	<i>Lamproptera curius curius</i> Fabricius				*		
2	Common Blue Bottle	<i>Graphium sarpedon sarpedon</i> Linnaeus		*			*	
3	Common Jay	<i>Graphium dosonaxion</i> Felder			*	*	*	
4	Great Jay	<i>Graphium eurypylus cheronus</i> Fruhstorfer			*			
5	Tailed Jay	<i>Graphium agamemnon agamemnon</i> Linnaeus		*		*	*	*
6	Five Bar Swordtail	<i>Graphium antiphates pompilius</i> Fabricius				*	*	*
7	Lesser Zebra	<i>Graphium macareus indicus</i> Rothschild		*				
8	Common Mormon	<i>Papilio polytesromulus</i> Cramer				*	*	*
9	Common Raven	<i>Papilio castorcastor</i> Westwood					*	
10	Red Helen	<i>Papilio helenushelenus</i> Linnaeus	*	*	*		*	*
11	Yellow Helen	<i>Papilio nepheluschaon</i> Westwood				*	*	*
12	Great Mormon	<i>Papilio memnonagenor</i> Linnaeus		*		*	*	
13	Spangle	<i>Papilio protenoreuprotenor</i> Fruhstorfer				*	*	
14	Redbreast	<i>Papilio alcmenor alcmenor</i> C.&R.Felder						*
15	Blue Peacock	<i>Papilio arcturus arcturus</i> Westwood				*		
16	Great Blue Mime	<i>Papilio paradoxa telearchus</i> Hewitson				*		
17	Common Batwing	<i>Atrophaneura varunaastorion</i> Westwood			*		*	*
18	Common Rose	<i>Atrophaneura aristolochiae aristolochiae</i> Fabricius				*	*	
19	Common Birdwing	<i>Troides helenacerberus</i> Felder & Felder		*		*	*	*
	Pieridae							
20	One-spot Grass Yellow	<i>Eurema andersonijordani</i> Corbet & Pendlebury				*	*	
21	Three-spot Grass Yellow	<i>Eurema blandasilhetana</i> Wallace	*^	*		*	*	*
22	Common Grass Yellow	<i>Eurema hecabehecabe</i> Linnaeus					*	*
23	Tree Yellow	<i>Gandaca harinaassamica</i> Moore		*		*	*	
24	Common Emigrant	<i>Catopsilia pomona pomona</i> Fabricius	*	*	*			
25	Great Orange Tip	<i>Hebomoia glaucippeglaucippe</i> Linnaeus		*			*	*
26	Pale Wanderer	<i>Pareronia avatar</i> Moore	*				*	
27	Chocolate Albatross	<i>Appias lyncida</i> Cramer	*	*	*	*	*	*
28	Indo-Chinese Chocolate Albatross	<i>Appias lyncida elenora</i> Boisduval						
29	Common Albatross	<i>Appias albinadarada</i> Felder & Felder			*		*	*
30	Eastern Striped Albatross	<i>Appias olferna olferna</i> Swinhoe			*			
31	Indian Cabbage White	<i>Pieris canidiaindica</i> Evans	*	*			*	
32	Lesser Gull	<i>Cepora nadinanadina</i> Lucas					*	
33	Common Gull	<i>Cepora nerissa phryne</i> Fabricius	*					
34	Red Base Jezebel	<i>Delias pasitheopasithoe</i> Linnaeus	*	*	*		*	*
35	Red Spot Jezebel	<i>Delias descombesidescombesi</i> Boisduval					*^	*
36	Red Breast Jezebel	<i>Delias thysbe pyramus</i> Wallace		*				
37	Yellow Jezebel	<i>Delias agostinaagostina</i> Hewitson		*				*
38	Psyche	<i>Leptosia ninanina</i> Fabricius		*	*	*	*	*
	Lycaenidae							
39	Bright Sunbeam	<i>Curetis bulis</i> Westwood		*				

	Common name	Scientific name	Season					
			Jan-Feb	Mar-Apr	May-Jun	Jul-Aug	Sep-Oct	Nov-Dec
40	Centaur Oak blue	<i>Arhopala centauruspirithous</i> Moore		*			*	*
41	Aberrent Oakblue	<i>Arhopala abseus indicus</i> Riley	*				*	
42	Sylhet Oakblue	<i>Arhopala silhetensisilhetensis</i> Hewitson [IWPA-Schedule-II]	*	*	*			
43	Tamil Oakblue	<i>Narathura bazaloides</i> (Hewitson) [IWPA-Schedule-II]		*			*	
44	Hooked Oakblue	<i>Arhopala paramutaparamuta</i> de Nicéville # [IWPA-Schedule-II]		*				
45	Spotless Oakblue	<i>Arhopala fulla ignara</i> Riley #		*				
46	Green Oakblue	<i>Arhopala eumolphus eumolphus</i> Cramer		*				
47	Yellow Disc Tailless Oakblue	<i>Arhopala perimuta perimuta</i> , Moore #		*				
48	Common Acacia Blue	<i>Surendra quercetorumquercetorum</i> Moore		*				*
49	Branded Yamfly	<i>Yasoda tripunctatatripunctata</i> Hewitson [IWPA-Schedule-II]		*				
50	Yamfly	<i>Loxura atymnuscontinentalis</i> Fruhstorfer		*			*	
51	Blue Imperial	<i>Ticherra acteacte</i> Moore	*	*				*
52	Common Imperial	<i>Cheritra freja evansi</i> Cowan	*					
53	Banded Royal	<i>Rachana jalindra indra</i> Moore		*				
54	Chocolate Royal	<i>Remelana jangala ravata</i> (Horsfield) #		*				
55	Broad Spark	<i>Sinthusa chandrana grotei</i> Moore #						
56	Common Tit	<i>Hypolycaena erylushimavantus</i> Fruhstorfer			*		*	*
57	Fluffy Tit	<i>Zetus amasa amasa</i> Hewitson	*	*	*	*	* ^	*
58	Copper Flash	<i>Rapala pheretimapetosiris</i> Hewitson #						*
59	Indian Red Flash	<i>Rapala iarbusiarbus</i> Fabricius						*
60	Long banded Silverline	<i>Spindasis lohitalhimalayanus</i> Moore [IWPA-Schedule-II]					*	
61	Common Tinsel	<i>Catapaecilma major anais</i> Fruhstorfer #		*				
62	Golden Sapphire	<i>Heliophorus brahmamajor</i> Moore						*
63	Purple Sapphire	<i>Heliophorus epicles latilimbata</i> Fruhstorfer	*	*	*	*	*	*
64	Common Ciliate Blue	<i>Anthene emolusemolus</i> Godart				*		
65	Pointed Ciliate Blue	<i>Anthene lyceninalycaenia</i> Felder & Felder			*			
66	Elbowed Pierrot	<i>Caleta elnanoliteia</i> Fruhstorfer		*		*	*	*
67	Common Pierrot	<i>Castalius rosimonrosimon</i> Fabricius	*				*	*
68	Banded Lineblue	<i>Prosotas aluta coelestis</i> Wood-Mason & de-Niceville					*	
69	Pale 4-Lineblue	<i>Nacaduba hermusnabo</i> Fruhstorfer [IWPA-Schedule-II]				*		
70	Opaque 6-Lineblue	<i>Nacaduba beroegythion</i> Fruhstorfer				*		
71	Transparent 6-Lineblue	<i>Nacadubakurava euplea</i> Fruhstorfer				*		
72	Common Lineblue	<i>Prosotas noraardates</i> Moore				*	*	
73	Tailless Lineblue	<i>Prosotas dubiosa indica</i> Evans	*				*	*
74	Bhutia Lineblue	<i>Prosotas bhutea</i> de Niceville					*	
75	Pointed Lineblue	<i>Ionolyce helicon merguiana</i> Moore				*		
76	Common Cerulean	<i>Jamides celeno celeno</i> Cramer	*	*			*	*
77	Metallic Cerulean	<i>Jamides alectoalocina</i> Swinhoe	*					*
78	Dark Cerulean	<i>Jamides bochus bochus</i> (Stoll)		*				
79	Silver Forget-me-not	<i>Catochrysops panormusexiguus</i> Distant				*		
80	Forget-me-not	<i>Catochrysops strabo</i> Strabo Fabricius		*				
81	Pale Grass Blue	<i>Pseudozizeeria mahamaha</i> Kollar		*		*		

	Common name	Scientific name	Season					
			Jan-Feb	Mar-Apr	May-Jun	Jul-Aug	Sep-Oct	Nov-Dec
82	Dark Grass Blue	<i>Zizeera karsandra</i> Moore				*		
83	Quaker	<i>Neopithecops zalmorazalmora</i> Butler			*	*	*	*
84	Malayan	<i>Megisba malayasikkima</i> Moore			*	*	*	
85	Common Hedge Blue	<i>Acytulepis puspagisca</i> Fruhstorfer			*	*	*	
86	Pale Hedge Blue	<i>Udara dilectadilecta</i> Moore				*		*
87	Lime Blue	<i>Chilades lajuslajus</i> Stoll				*	*	
88	Punchinello	<i>Zemeros flegyasindicus</i> Fruhstorfer	*	*	*	*	*	*
89	Tailed Judy	<i>Abisara neophron neophron</i> Hewitson		*				
90	Plum Judy	<i>Abisara echerius paionea</i> Fruhstorfer		*				*
	Nymphalidae							
91	Striped Tiger	<i>Danaus genutiagenutia</i> Cramer	*	*				*
92	Plain Tiger	<i>Danaus chrysippus chrysippus</i> Linnaeus		*				
93	Glassy Tiger	<i>Parantica aglea melanoides</i> Moore	*	*		*	*	*
94	Chestnut Tiger	<i>Parantica sitasita</i> Kollar		*				
95	Striped Blue Crow	<i>Euploea mulciber mulciber</i> Cramer		*			* ^	
96	Blue-spotted Crow	<i>Euploea midamus rogenhoferi</i> Felder & Felder [IWPA-Schedule-II]				*	*	
97	Magpie Crow	<i>Euploea radamanthus radamanthus</i> Fabricius	*	*	*	*	*	*
98	Common Indian Crow	<i>Euploea core core</i> Cramer					*	
99	Common Nawab	<i>Polyura athamas athamas</i> Drury				*	*	*
100	Pallid Nawab	<i>Charaxes arja arja</i> Felder & Felder #				*		
101	Tawny Rajah	<i>Charaxes bernardushierax</i> Felder & Felder		*	*	*	*	*
102	Yellow Rajah	<i>Charaxes marmax marmax</i> Westwood IWPA-Schedule-II		*			*	
103	Variegated Rajah	<i>Charaxes kahruba kahruba</i> Moore IWPA-Schedule-II		*				
104	Common Faun	<i>Faunis canensarcesilas</i> Stichel				*		*
105	Common Duffer	<i>Discophora sondaica</i> Westwood	*				*	
106	Great Duffer	<i>Discophora timora timora</i> Westwood					*	
107	Longbrand Bushbrown	<i>Mycalesis visala visala</i> Moore					*	
108	Common Evening Brown	<i>Melanitis ledaleda</i> Linnaeus	*	*			*	*
109	Dark Evening Brown	<i>Melanitis phedimabela</i> Moore	*				*	*
110	Great Evening Brown	<i>Melanitis zitenius zitenius</i> Herbst					*	
111	Bamboo Treebrown	<i>Lethe europa niladana</i> Fruhstorfer					*	
112	Banded Treebrown	<i>Lethe confusa confusa</i> Aurivillius						*
113	Straightbanded Treebrown	<i>Lethe verma sintica</i> Fruhstorfer	*	*			*	
114	Common Palmfly	<i>Elymnias hypermnestra undularis</i> Drury				*		*
115	Tiger Palmfly	<i>Elymnias nesaeatimandra</i> Wallace			*			
116	White-bar Bushbrown	<i>Mycalesis anaxiasaemate</i> Fruhstorfer						*
117	Lilacine Bushbrown	<i>Mycalesis franciscasatanata</i> Moore	*	*	*			*
118	Chinese Bushbrown	<i>Mycalesis gotamacharaka</i> Moore	*	*				*
119	Common Bush Brown	<i>Mycalesis perseus blasius</i> Fabricius	*		*	*	*	*
120	Dark-brand Bushbrown	<i>Mycalesis mineus mineus</i> Linnaeus	*	*				
121	Long brand Bushbrown	<i>Mycalesis visala visala</i> Moore					*	
122	Nigger	<i>Orsotrioena medus medus</i> Fabricius						*
123	Common Fiver-ring	<i>Ypthima baldus baldus</i> Fabricius	*	*	*		*	*

	Common name	Scientific name	Season					
			Jan-Feb	Mar-Apr	May-Jun	Jul-Aug	Sep-Oct	Nov-Dec
124	Large Three-ring	<i>Ypthima nareda nareda</i> Kollar					*	*
125	Common Four-ring	<i>Ypthima huebnerihuebneri</i> Kirby				*		
126	Himalayan Five-ring	<i>Ypthima sakraausteni</i> Moore						*
127	Red Lacewing	<i>Cethosia biblis tisamena</i> Fruhstorfer				*	*	*
128	Leopard Lacewing	<i>Cethosia cyane cyane</i> Drury	*	*		*	*	*
129	Cruiser	<i>Vindula erotaerota</i> Fabricius		*				*
130	Large Yeoman	<i>Cirrochroa aorisais</i> Doubleday	*				*	*
131	Green Commodore	<i>Sumalia daraxadaraxa</i> Doubleday		*				*
132	Commander	<i>Moduza procrisprocris</i> Cramer		*			*	*
133	Unbroken Sergeant	<i>Athyma pravara acutipennis</i> Fruhstorfer		*			*	*
134	Common Sergeant	<i>Athyma periusperius</i> Linnaeus		*				*
135	Dot-Dash Sergeant	<i>Athyma kanwaphorkys</i> Fruhstorfer	*	*		*	*	*
136	Black-vein Sergeant	<i>Athyma rangaranga</i> Moore	*	*			*	
137	Small staff Sergeant	<i>Athyma zeroa zeroa</i> Moore						*
138	Staff Sergeant	<i>Athyma selenopharaselenophora</i> Kollar	*	*			*	*
139	Colour Sergeant	<i>Athyma nefte inara</i> Westwood		*			*	*
140	Common Lascar	<i>Pantoporia hordoniahordonia</i> Stoll	*	*		*	*	*
141	Perak Lascar	<i>Pantoporia paraka paraka</i> Butler						*
142	Yellow Jack Sailer	<i>Neptis viraja viraja</i> (Moore)					*	
143	Common Sailer	<i>Neptis hylaskamarupa</i> Moore	*	*	*	*	*	*
144	Clear Sailer	<i>Neptis clinia susruta</i> Moore		*				
145	Creamy Sailer	<i>Neptis soma soma</i> Linnaeus					*	
146	Sullied Sailer	<i>Neptis nata adipala</i> Moore [IWPA-Schedule-II]	*	*			*	*
147	Great Yellow Sailer	<i>Neptis radha</i> Moore					*	
148	Plain Sailer	<i>Neptis cartica</i> Moore		*				
149	Dingy Sailer	<i>Neptis pseudovikasi</i> Moore		*			*	
150	Dingiest Sailer	<i>Neptis harita</i> Moore					*	
151	Broad-banded Sailer	<i>Neptis sankara amba</i> Moore		*				
152	Knight	<i>Lebadea marthamartha</i> Fabricius	*	*				*
153	Powdered Baron	<i>Euthalia monina kesava</i> Moore		*				*
154	White-edged Blue Baron	<i>Euthalia phemius phemius</i> Doubleday					*	
155	Baron	<i>Euthalia aconthea garuda</i> Moore		*	*	*	*	*
156	Grey Baron	<i>Euthalia anosiaanosa</i> Moore [IWPA-Schedule-II]		*				
157	Gaudy Baron	<i>Euthalia lubentina indica</i> Fruhstorfer					*	
158	Grey Count	<i>Tanaecia lepidealepidia</i> Butler	*	*		*	*	*
159	Common Earl	<i>Tanaecia julii appiadus</i> Ménétriés					*	*
160	Plain Earl	<i>Tanaecia jahnujahnu</i> Moore		*			*	
161	Great Archduke	<i>Lexias cyanipardus cyanipardus</i> Butler	*	*	*	* ^	*	*
162	Common Map	<i>Cyrestis thyodamasthyodamas</i> Boisduval			*		*	
163	Common Maplet	<i>Chersonesia risarisa</i> Doubleday	*	*	*	*	*	
164	Constable	<i>Dichorhagia nesimachusnesimachus</i> Doyere		*				*
165	Indian Purple Emperor	<i>Mimathyma ambica</i> Kollar		*				
166	Common Castor	<i>Ariadne merionetapestrina</i> Moore						*

	Common name	Scientific name	Season					
			Jan-Feb	Mar-Apr	May-Jun	Jul-Aug	Sep-Oct	Nov-Dec
167	Common Jester	<i>Symbrenthia lilaea khasiana</i> Moore	*	*		*	*	*
168	Blue admiral	<i>Kaniska canaceanace</i> Linnaeus	*	*				
169	Indian Red Admiral	<i>Vanessa indica indica</i> Herbst						*
170	Chocolate Pansy	<i>Junonia iphitaiphita</i> Cramer		*		*	*	
171	Grey Pansy	<i>Junonia atlites atlites</i> Linnaeus	*	*		*	*	*
172	Peacock Pansy	<i>Junonia almana almanac</i> Linnaeus	*			*	*	*
173	Lemon Pansy	<i>Junonia lemonias lemonias</i> Linnaeus		*				*
174	Great Eggfly	<i>Hypolimnas bolinjacintha</i> Drury	*				*	
175	Orange Oakleaf	<i>Kallima inachus inachus</i> Boisduval		*				
176	Autumn Leaf	<i>Doleschallia bisaltideindica</i> Moore	*	*			*	
	Hesperiidae							
177	Indian Awlking	<i>Choaspes benjaminii japonica</i> Murray		*			*	
178	Common Awl	<i>Hasora badra</i> Moore						*
179	Plain Ace	<i>Halpe kumara kumara</i> de Niceville #	*					
180	Common Spotted Flat	<i>Celaenorrhinus leucocera leucocera</i> Kollar	*		*			*
181	Fulvous Pied Flat	<i>Pseudocoladenia danfabia</i> Evans		*			*	*
182	Brown Pied Flat	<i>Coladenia agni</i> de Niceville #		*				
183	Dusky Yellow Breasted Flat	<i>Gerosis phisaraphisara</i> Moore					*	
184	Suffused Snowflat	<i>Tagiades gana athos</i> Plötz				*	*	
185	Common Snowflat	<i>Tagiades japetusravi</i> Moore	*				*	*
186	Snowy Angle	<i>Darpa pteria dealbata</i> Distant				*		
187	Common Dartlet	<i>Oriens goloides</i> Moore		*			*	*
188	Common Dart	<i>Potanthus pseudomaesa</i> Moore		*				
189	Straight Swift	<i>Parnara badabada</i> Moore		*			*	*
190	Blank Swift	<i>Caltoris kumara</i> (Moore)					*	
191	Rice Swift	<i>Borbo cinnara</i> Wallace				*		
192	Small branded Swift	<i>Pelopidas mathias</i> Fabricius				*	*	*
193	Large Branded Swift	<i>Pelopidas sinensis sinensis</i> Mabille				*		
194	Paint-brush Swift	<i>Baoris farri</i> (Moore) [IWPA-Schedule-II]					*	
195	Colon Swift	<i>Caltoris cahira austeni</i> Moore					*	
196	Brown Forest Bob	<i>Scobura woolletti</i> Riley #	*	*				
197	Chestnut Bob	<i>Iambrix salsala salsala</i> Moore	*	*				
198	Small Indian Palm Bob	<i>Suastus gremius</i> Fabricius					*	
199	Grass Bob	<i>Suada swerga swergade</i> Niceville #		*				
200	Dark Velvet Bob	<i>Koruthaialos butleri butleri</i> de Niceville #						*
201	Common Redeye	<i>Matapa aria</i> Moore						*
202	Coon	<i>Psolos fuligo subfasciatus</i> Moore	*	*			*	
203	Chocolate Demon	<i>Ancistroides nigrita diocles</i> Moore			*	*		
204	Common Banded Demon	<i>Notocrypta paralyss asawa</i> Fruhstorfer				*	*	
205	Restricted Demon	<i>Notocrypta curvifascia</i> Felder & Felder		*			*	
206	Tiger Hopper	<i>Ochus subvittatusubradiatus</i> Moore		*		*	*	*
207	Bush Hopper	<i>Ampittia dioscorides</i> Fabricius			*	*		
208	Scarce Bush Hopper	<i>Ampittia maroides</i> de Niceville					*	
209	Veined Scrub Hopper	<i>Aeromachus stigmataobsoletus</i> Takeuchi					*	

	Common name	Scientific name	Season					
			Jan-Feb	Mar-Apr	May-Jun	Jul-Aug	Sep-Oct	Nov-Dec
210	Grey Scrub Hopper	<i>Aeromachus jhoracretade</i> Nicéville #					*	
211	Pygmy Scrub Hopper	<i>Aeromachus pygmaeuspygmaeus</i> Fabricius					*	

IWPA-Indian Wildlife Protection Act,1972; \wedge -peak season for the species; # -Recorded by Monsoon Jyoti Gogoi

- (2008). *Elephas maximus*. The IUCN Red List of Threatened Species. Version 2014.3. <www.iucnredlist.org>. Downloaded on 20 January 2015.
- Das, J., S. Molur & W. Bleisch (2008). *Trachypithecus pileatus*. The IUCN Red List of Threatened Species. Version 2014.3. <www.iucnredlist.org>. Downloaded on 20 January 2015.
- Duckworth, J.W., C. Wozencraft, W. Yin-xiang, B. Kanchanasaka & B. Long (2008). *Viverra zibetha*. The IUCN Red List of Threatened Species. Version 2014.3. <www.iucnredlist.org>. Downloaded on 20 January 2015.
- Evans, W.H. (1932). *The Identification of Indian Butterflies-Second Edition*. Bombay Natural History Society, Bombay, 464pp.
- Gogoi, M.J. (2013). A preliminary checklist of butterflies recorded from Jeypore-Dehing forest, eastern Assam, India. *Journal of Threatened Taxa* 5(2): 3684–3696; <http://dx.doi.org/10.11609/JoTT.o3022.3684-96>
- Haribal, M. (1992). *The Butterflies of Sikkim Himalayas and their Natural History*. Sikkim Nature Conservation Foundation. Sikkim, 217pp.
- Henschel, P., L. Hunter, U. Breitenmoser, N. Purchase, C. Packer, I. Khorozyan, H. Bauer, L. Marker, E. Sogbohossou & C. Breitenmoser-Wursten (2008). *Panthera pardus*. The IUCN Red List of Threatened Species. Version 2014.3. <www.iucnredlist.org>. Downloaded on 20 January 2015.
- Htun, S., R.J. Timmins, R. Boonratana & J. Das (2008). *Macaca arctoides*. The IUCN Red List of Threatened Species. Version 2014.3. <www.iucnredlist.org>. Downloaded on 20 January 2015.
- Karthikeyan, S. & V. Venkatesh (2011). "Snowy Angle *Darpa pterid*". The Wild Wanderer, 07 September 2011 (Retrieved on 09/July 2013 from <http://www.wildwanderer.com/journal/?p=435>).
- Kehimkar I. (2008). *The Book of Indian Butterflies*. BNHS, Oxford University, Delhi Press, 497pp.
- New, T.R. & N.M. Collins (1991). Swallowtail Butterflies - An Action Plan for their Conservation. IUCN, Gland, Switzerland.
- Norman, T. (1956). Notes on the Lepidoptera of Assam-III. Further additions to the Indian list and other notes. *Journal of the Bombay Natural History Society* 53: 738–740.
- Pollard, E. & T.J. Yates (1993). *Monitoring Butterflies for Ecology and Conservation*. Chapman & Hall, London, 274pp.
- Senthilkumar, N., S. Trivedi, P.K. Khatri, N.D. Borthakur & N.J. Borah (2006). Butterflies of Gibbon Wildlife Sanctuary, Assam: a preliminary survey. *Annals of Forestry* 14(1): 86–91.
- Singh, A.P. (2012). Lowland forest butterflies of the Sankosh River catchment, Bhutan. *Journal of Threatened Taxa* 4(12): 3085–3102; <http://dx.doi.org/10.11609/JoTT.o2625.3085-102>
- Singh, A.P. & R. Pandey (2004). A model for estimating butterfly species richness of areas across the Indian subcontinent: species proportion of family Papilionidae as an indicator. *Journal of the Bombay Natural History Society* 101(1): 79–89.
- Smith, C. (1989). *Butterflies of Nepal (Central Himalaya)*. Teccress Service L.P., Bangkok, 352pp.
- Smith, C. (2006). *Illustrated Checklist of Nepal's Butterflies*. Craftman press, Bangkok, 129pp.
- Sondhi, S., K. Kunte, G. Agavekar, R. Lovalekar & K. Tokekar (2013). *Butterflies of the Garo Hills*. Samrakshan Trust (New Delhi), Titli Trust (Dehradun), and Indian Foundation for Butterflies (Bengaluru), xvi+200pp.
- Sorensen, T.A. (1948). A method of establishing groups of equal amplitude in plant sociology based on similarity of species content, and its application to analyses of the vegetation on Danish commons. *Kongelige Danske Videnskabernes Selskabs Biologiske Skrifter* 5: 1–34.
- Streicher, U., M. Singh, R.J. Timmins & W. Brockelman (2008). *Nycticebus bengalensis*. The IUCN Red List of Threatened Species. Version 2014.3. <www.iucnredlist.org>. Downloaded on 20 January 2015.
- Walston, J., J.W. Duckworth & S. Molur (2008). *Ratufa bicolor*. The IUCN Red List of Threatened Species. Version 2014.3. <www.iucnredlist.org>. Downloaded on 20 January 2015.
- Wynter-Blyth, M.A. (1957). *Butterflies of the Indian Region*. Bombay Natural History Society, Bombay, 523pp.

