

An insight into the butterfly diversity of Nilachal Hill, Assam

Butterflies are brilliantly coloured and one of the most diverse groups of insects (Basfore & Buragohain 2024) belonging to the order Lepidoptera. In addition to their visual appeal, butterflies serve as reliable indicators of habitat health and demonstrate sensitivity to shifts in climate conditions (Ramana 2010).

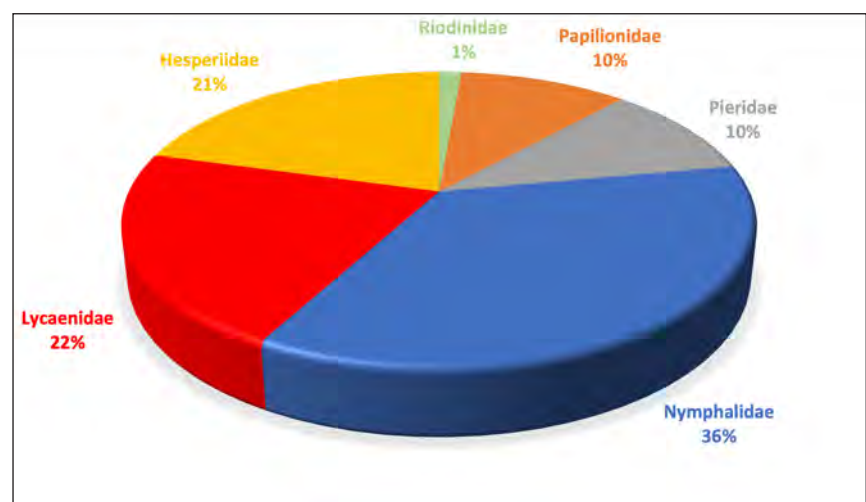
The global butterfly population boasts an impressive diversity, encompassing an extensive array of about 20,000–25,000 distinct species (Wynter-Blyth 1957), out of which 1500 species are found in India (Venkataramani 1986). Furthermore, about 962 species and sub-species belonging to five different families have been reported from Assam (Evans 1957).

The current study reports an assessment of the butterfly diversity in the Nilachal Hill, located in the Kamrup

metropolitan district of Assam, India. The globally renowned Kamakhya Temple situated on the hill holds significant historical, archaeological, and spiritual value. The hill spans an area of 2.6 km² (Bohra et al. 2024) and is situated geographically at 26.1677 N, 91.7110 E. The Nilachal Hill encompasses diverse habitats and is mostly dominated by human settlements, with a few thickly forested places interspersed.

A total of 47 field surveys were conducted between August 2022 and February 2024, each

involving an investment of at least four man-hours. The sampling strategy adopted the Pollard Walk methodology (Pollard 1982), entailing traversing approximately 500 m on designated trails across various habitats, including residential areas, forests, religious sites, and streams. Opportunistic surveys were also carried out, focusing on trails rich in flowering and fruiting plants, as well as areas with trees, bushes, rocks, and damp soil, known to attract butterflies for feeding, basking, and mud-puddling activities. Species identification was



Family-wise abundance of butterflies in Nilachal Hill.

Checklist of butterflies recorded from Nilachal Hill, Assam, India.

	Family	Scientific name	Common name	IUCN Red List
1.	Papilionidae	<i>Atrophaneura varuna</i> (White 1842)	Common Batwing	LC
2.		<i>Graphium agamemnon</i> (Linnaeus 1758)	Tailed Jay	NA
3.		<i>Graphium doson</i> (C. & R. Felder 1864)	Common Jay	LC
4.		<i>Graphium megarus</i> (Westwood 1844)	Assam Spotted Zebra	NA
5.		<i>Graphium sarpedon</i> (Linnaeus 1758)	Common Bluebottle	LC
6.		<i>Pachliopta aristolochiae</i> (Fabricius 1775)	Common Rose	LC
7.		<i>Papilio agenor</i> Linnaeus 1758	Great Mormon	LC
8.		<i>Papilio chaon</i> Westwood 1845	Yellow Helen	NA
9.		<i>Papilio clytia</i> Linnaeus 1758	Common Mime	NA
10.		<i>Papilio demoleus</i> Linnaeus 1758	Lime Butterfly	NA
11.		<i>Papilio helenus</i> Linnaeus 1758	Red Helen	NA
12.		<i>Papilio paris</i> Linnaeus 1758	Paris Peacock	NA
13.		<i>Papilio polytes</i> Linnaeus 1758	Common Mormon	NA
14.		<i>Troides aeacus</i> (C. & R. Felder 1860)	Golden Birdwing	LC
15.		<i>Troides helena</i> (Linnaeus 1758)	Common Birdwing	LC
16.	Pieridae	<i>Appias albina</i> (Boisduval 1836)	Common Albatross	NA
17.		<i>Appias lycinda</i> (Cramer [1777])	Chocolate Albatross	NA
18.		<i>Appias olferna</i> Swinhoe 1890	Eastern Striped Albatross	NA
19.		<i>Catopsilia pomona</i> (Fabricius 1775)	Lemon Emigrant	NA
20.		<i>Delias descombesi</i> (Boisduval 1836)	Red spot Jezebel	NA
21.		<i>Delias hyparete</i> (Linnaeus 1758)	Painted Jezebel	NA
22.		<i>Delias pasithoe</i> (Linnaeus 1767)	Red-base Jezebel	NA
23.		<i>Eurema andersonii</i> (Moore 1886)	One-spot Grass Yellow	LC
24.		<i>Eurema blanda</i> (Boisduval 1836)	Three-spot Grass Yellow	NA
25.		<i>Eurema hecabe</i> (Linnaeus 1758)	Common Grass Yellow	NA
26.		<i>Gandaca harina</i> (Horsfield [1829])	Tree Yellow	NA
27.		<i>Ixias pyrene</i> (Linnaeus 1758)	Yellow Orange Tip	NA
28.		<i>Leptosia nina</i> (Fabricius 1793)	Psyche	NA
29.		<i>Pieris brassicae</i> (Linnaeus 1758)	Large Cabbage White	NA
30.	<i>Pieris canidia</i> (Linnaeus 1768)	Indian Cabbage White	NA	
31.	Lycaenidae	<i>Anthene emolus</i> (Godart [1824])	Common Ciliate Blue	NA
32.		<i>Anthene lycaenina</i> (Felder 1868)	Pointed Ciliate Blue	NA
33.		<i>Arhopala centaurus</i> (Fabricius 1775)	Centaur Oakblue	NA
34.		<i>Caleta decidia</i> (Hewitson 1876)	Angled Pierrot	LC
35.		<i>Caleta elna</i> (Hewitson 1876)	Elbowed Pierrot	LC
36.		<i>Castalius rosimon</i> (Fabricius 1775)	Common Pierrot	NA
37.		<i>Catochrysops strabo</i> (Fabricius 1793)	Forget-me-not	NA

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38.	Lycaenidae	<i>Cheritra freja</i> (Fabricius 1793)	Common Imperial	LC	
39.		<i>Chilades lajus</i> (Stoll [1780])	Lime Blue	NA	
40.		<i>Chilades pandava</i> (Horsfield [1829])	Plains Cupid	LC	
41.		<i>Curetis acuta</i> Moore 1877	Acute Sunbeam	NA	
42.		<i>Heliophorus epicles</i> (Godart [1824])	Purple Sapphire	NA	
43.		<i>Hypolycaena erylus</i> (Godart [1824])	Common Tit	NA	
44.		<i>Jamides alecto</i> (C. Felder 1860)	Metallic Cerulean	LC	
45.		<i>Jamides bochus</i> (Stoll [1782])	Dark Cerulean	NA	
46.		<i>Jamides celeno</i> (Cramer [1775])	Common Cerulean	NA	
47.		<i>Lampides boeticus</i> (Linnaeus 1767)	Peablu	NA	
48.		<i>Loxura atymnus</i> (Stoll 1780)	Yamfly	NA	
49.		<i>Megisba malaya</i> (Horsfield [1828])	Malayan	NA	
50.		<i>Neopithecops zalmora</i> (Butler [1870])	Common Quaker	NA	
51.		<i>Prosotas dubiosa</i> (Semper [1879])	Tailless Lineblue	NA	
52.		<i>Prosotas nora</i> (C. Felder 1860)	Common Lineblue	NA	
53.		<i>Pseudozizeeria maha</i> (Kollar [1844])	Pale Grass Blue	NA	
54.		<i>Rapala iarbas</i> (Fabricius 1787)	Common Red Flash	NA	
55.		<i>Rapala manea</i> (Hewitson 1863)	Slate Flash	NA	
56.		<i>Spalgis epius</i> (Westwood [1851])	Apefly	NA	
57.		<i>Surendra quercetorum</i> (Moore [1858])	Common Acacia Blue	NA	
58.		<i>Leptotes plinius</i> (Fabricius 1793)	Zebra Blue	NA	
59.		<i>Taraka hamada</i> (Druce 1875)	Forest Pierrot	NA	
60.		<i>Zeltus amasa</i> (Hewitson [1865])	Fluffy Tit	NA	
61.		<i>Zizeeria karsandra</i> (Moore 1865)	Dark Grass Blue	NA	
62.		Riodinidae	<i>Abisara echerius</i> (Stoll [1790])	Plum Judy	NA
63.			<i>Zemeros flegyas</i> (Cramer [1780])	Punchinello	NA
64.		Nymphalidae	<i>Acraea terpiscore</i> (Linnaeus 1758)	Tawny Coster	NA
65.			<i>Ariadne merione</i> (Cramer [1777])	Common Castor	NA
66.			<i>Athyma inara</i> Westwood 1850	Colour Sergeant	NA
67.			<i>Athyma perius</i> (Linnaeus 1758)	Common Sergeant	NA
68.			<i>Cethosia biblis</i> (Drury [1773])	Red Lacewing	NA
69.	<i>Cethosia cyane</i> (Drury [1773])		Leopard Lacewing	NA	
70.	<i>Charaxes bernardus</i> (Fabricius 1793)		Tawny Rajah	NA	
71.	<i>Charaxes bharata</i> C. & R. Felder [1867]		Common Nawab	NA	
72.	<i>Charaxes marmax</i> Westwood 1847		Yellow Rajah	NA	
73.	<i>Chersonesia intermedia</i> Martin 1895		Wavy Maplet	LC	
74.	<i>Chersonesia risa</i> (Doubleday [1848])		Common Maplet	NA	
75.	<i>Cirrochroa aoris</i> Doubleday [1847]		Large Yeoman	NA	
76.	<i>Cirrochroa tyche</i> C. & R. Felder 1861		Common Yeoman	NA	



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77.	Nymphalidae	<i>Cyrestis thyodamas</i> Doyère [1840]	Oriental Map Butterfly	NA
78.		<i>Danaus chrysippus</i> (Linnaeus 1758)	Plain Tiger	LC
79.		<i>Danaus genutia</i> (Cramer [1779])	Striped Tiger	NA
80.		<i>Discophora sondaica</i> Boisduval 1836	Common Duffer	NA
81.		<i>Elymnias hypermnestra</i> (Linnaeus 1763)	Common Palmfly	NA
82.		<i>Elymnias malelas</i> (Hewitson 1863)	Spotted Palmfly	NA
83.		<i>Euploea core</i> (Cramer [1780])	Common Crow	LC
84.		<i>Euploea midamus</i> (Linnaeus 1758)	Blue-spotted Crow	NA
85.		<i>Euploea mulciber</i> (Cramer [1777])	Striped Blue Crow	NA
86.		<i>Euthalia aconthea</i> (Cramer [1777])	Common Baron	NA
87.		<i>Euthalia lubentina</i> (Cramer [1777])	Gaudy Baron	NA
88.		<i>Hypolimnas bolina</i> (Linnaeus 1758)	Great Eggfly	NA
89.		<i>Junonia almana</i> (Linnaeus 1758)	Peacock Pansy	LC
90.		<i>Junonia atlites</i> (Linnaeus 1763)	Grey Pansy	NA
91.		<i>Junonia hierta</i> (Fabricius 1798)	Yellow Pansy	LC
92.		<i>Junonia iphita</i> (Cramer [1779])	Chocolate Pansy	NA
93.		<i>Junonia lemonias</i> (Linnaeus 1758)	Lemon Pansy	NA
94.		<i>Lebadea martha</i> (Fabricius 1787)	Knight	NA
95.		<i>Lethe chandica</i> (Moore [1858])	Angled Red Forester	NA
96.		<i>Lethe europa</i> (Fabricius 1775)	Bamboo Treebrown	DD
97.		<i>Lethe rhorja</i> (Fabricius 1787)	Common Treebrown	NA
98.		<i>Melanitis leda</i> (Linnaeus 1758)	Common Evening Brown	LC
99.		<i>Melanitis phedima</i> (Cramer [1780])	Dark Evening Brown	NA
100.		<i>Moduza procris</i> (Cramer [1777])	Commander	NA
101.		<i>Mycalesis mineus</i> (Linnaeus 1758)	Dark-branded Bushbrown	NA
102.		<i>Mycalesis perseus</i> (Fabricius 1775)	Common Bushbrown	NA
103.		<i>Mycalesis visala</i> Moore [1858]	Long-branded Bushbrown	NA
104.		<i>Neptis hylas</i> (Linnaeus 1758)	Common Sailer	NA
105.		<i>Orsotriaena medus</i> (Fabricius 1775)	Medus Brown	NA
106.		<i>Pantoporia hordonia</i> (Stoll [1790])	Common Lascar	NA
107.		<i>Parantica aglea</i> (Stoll [1782])	Glassy Tiger	NA
108.	<i>Parthenos sylvia</i> (Cramer [1775])	Clipper	NA	
109.	<i>Symbrenthia lilaea</i> (Hewitson 1864)	Common Jester	DD	
110.	<i>Tanaecia lepidea</i> (Butler 1868)	Grey Count	NA	
111.	<i>Vagrans egista</i> (Cramer [1780])	Vagrant	NA	
112.	<i>Ypthima baldus</i> (Fabricius 1775)	Common Five-ring	NA	
113.	<i>Ypthima huebneri</i> Kirby 1871	Common Four-ring	NA	
114.	<i>Vindula erota</i> (Fabricius 1793)	Cruiser	NA	
115.	<i>Tirumala limniace</i> (Cramer [1775])	Blue Tiger	NA	

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116.	Hesperiidae	<i>Ampittia subvittatus</i> (Moore 1878)	Tiger Hopper	NA
117.		<i>Ancistroides nigrita</i> (Latreille [1824])	Chocolate Demon	NA
118.		<i>Baoris unicolor</i> Moore [1884]	Black Paint-Brush Swift	NA
119.		<i>Borbo cinnara</i> (Wallace 1866)	Rice Swift	NA
120.		<i>Burara harisa</i> (Moore [1866])	Harisa Orange Awlet	NA
121.		<i>Cephrenes acalle</i> (Höpffer 1874)	Plain Palm Dart	NA
122.		<i>Erionota acroleuca</i> (Wood-Mason & de Nicéville 1881)	Small Palm-redeye	NA
123.		<i>Gerosis bhagava</i> (Moore [1866])	Common Yellow-breasted flat	NA
124.		<i>Gerosis phisara</i> (Moore 1884)	Dusky Yellow-breast flat	NA
125.		<i>Gerosis sinica</i> (C. & R. Felder 1862)	White Yellow-breasted flat	NA
126.		<i>Halpe zema</i> (Hewitson 1877)	Banded Ace	NA
127.		<i>Hasora chromus</i> (Cramer [1780])	Common Banded Awl	NA
128.		<i>Lambrix salsala</i> (Moore [1866])	Chestnut Bob	NA
129.		<i>Matapa sasivarna</i> (Moore [1866])	Black-veined Branded Redeye	NA
130.		<i>Notocrypta curvifascia</i> (C. & R. Felder 1862)	Restricted Demon	NA
131.		<i>Notocrypta paralysos</i> (Wood-Mason & de Nicéville 1881)	Common Banded Demon	NA
132.		<i>Odontoptilum angulata</i> (C. Felder 1862)	Chestnut Angle	NA
133.		<i>Oriens gola</i> (Moore 1877)	Common Dartlet	NA
134.		<i>Parnara</i> sp.		NA
135.		<i>Pelopidas assamensis</i> (de Nicéville 1882)	Great Swift	NA
136.		<i>Polytremis lubricans</i> (Herrich-Schäffer 1869)	Contiguous Swift	NA
137.		<i>Pseudocoladenia dan</i> (Fabricius 1787)	Fulvous Pied Flat	NA
138.		<i>Sarangesa dasahara</i> (Moore [1866])	Common Small Flat	NA
139.		<i>Scobura isota</i> (Swinhoe 1893)	Khasi Hills Bob	NA
140.		<i>Suastus gremius</i> (Fabricius 1798)	Oriental Palm Bob	NA
141.		<i>Tagiades gana</i> (Moore [1866])	Suffused Snow Flat	NA
142.	<i>Tagiades japetus</i> (Stoll [1781])	Common Snow Flat	NA	
143.	<i>Telicota colon</i> (Fabricius 1775)	Pale Palm-Dart	NA	
144.	<i>Udaspes folus</i> (Cramer [1775])	Grass Demon	NA	
145.	<i>Unkana ambasa</i> (Moore [1858])	Hoary Palmer	NA	

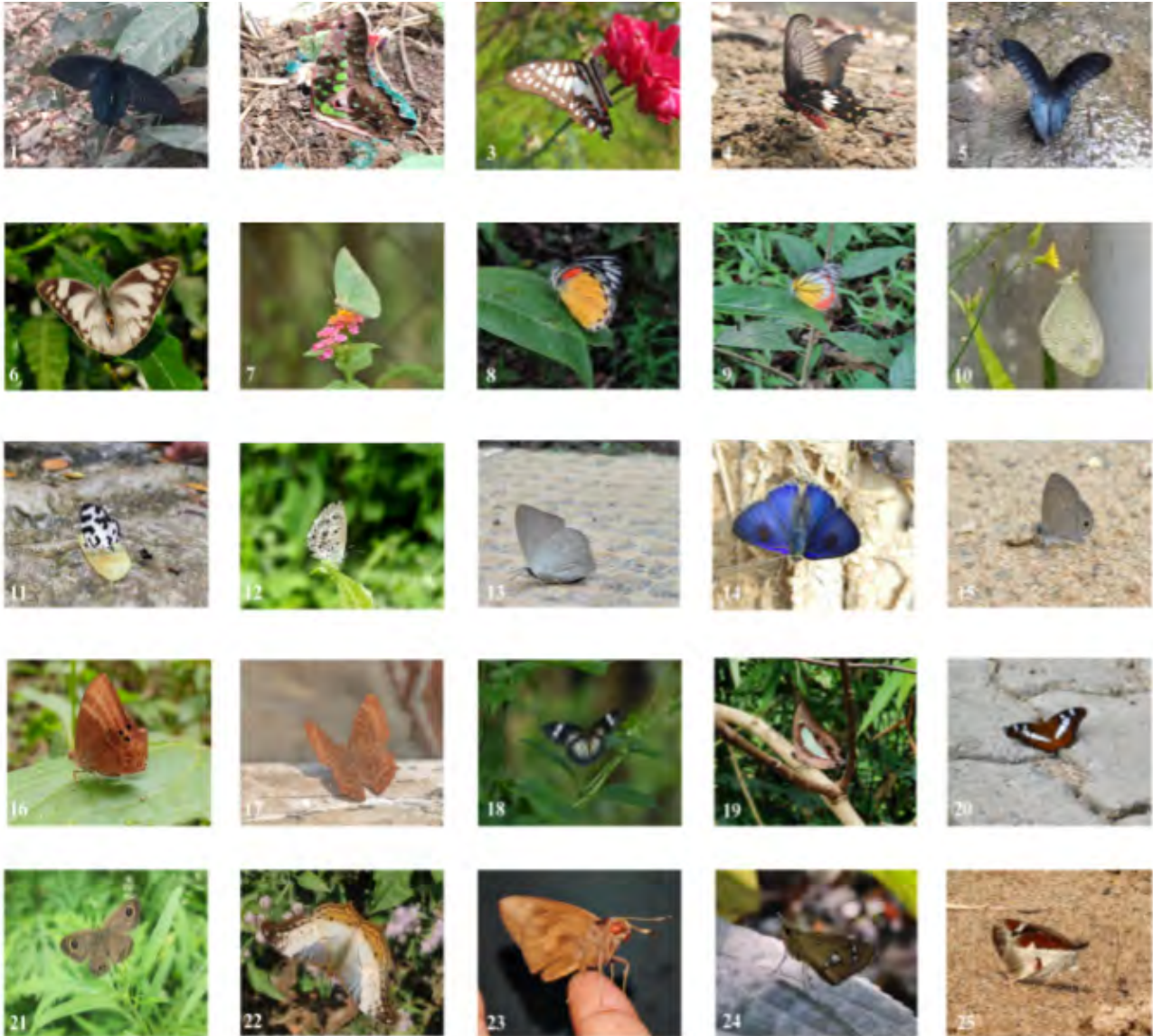
performed in the field or from photos using literature (Evans 1932; Kehimkar 2016) and web sources like ifoundbutterflies (<https://www.ifoundbutterflies.org/>).

A total of 145 species of butterflies belonging

to 95 genera and six families were recorded during the study. Among the recorded species, 19 species are listed as 'Least Concern' (LC), two as 'Data Deficient' (DD), and 124 species remain non-assessed under the IUCN Red

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1. *Atrophaneura varuna*, 2. *Graphium agamemnon*, 3. *Graphium doson*, 4. *Pachliopta aristolochiae*, 5. *Papilio agenor*, 6. *Appias olferna*, 7. *Catopsilia pomona*, 8. *Delias descombesi*, 9. *Delias hyparete*, 10. *Leptosia nina*, 11. *Caleta decidia*, 12. *Chilades lajus*, 13. *Curetis acuta*, 14. *Hypolycaena erylus*, 15. *Prosotas dubiosa*, 16. *Abisara echerius*, 17. *Zemeros flegyas*, 18. *Cethosia cyane*, 19. *Charaxes bharata*, 20. *Moduza procris*, 21. *Ypthima baldus*, 22. *Vindula erota*, 23. *Erionota acroleuca*, 24. *Scobura isota*, 25. *Udaspes folus*.

List. Additionally, Nymphalidae was found to be the most dominant family with 52 (36%) species, followed by Lycaenidae with 31 (22%), Hesperiiidae with 30 (21%), Pieridae with 15 (10%), Papilionidae with 15 (10%), and the least

was Riodinidae with only 2 (1%) species.

This study established that a wide range of species may coexist in urban surroundings.

Recently, the butterfly species *Unkana ambasa* was also reported from Nilachal Hill, which

is the first visual proof of the adult species' existence in Assam (Bohra et al. 2024). Hence, Nilachal Hill which has been largely overlooked for biological richness, turned out to be a hub of butterflies. With the exception of the undisturbed forest patches, a large portion of the region is inhabited by people, which will inevitably reduce biodiversity. Inventorying the biodiversity of this particular forest patch is thus crucial because it is in jeopardy due to pollution and habitat loss brought on by numerous anthropogenic activities.

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- Bijay Basfore¹ & Manalisha Deka²**
¹Department of Zoology, Pandu College, Assam 781012, India.
²Laxmi Niwas, F-Block, North Jalukbari, Guwahati, Assam 781014, India.
 Emails: ¹bijaybasfore108@gmail.com,
²manalishadeka98@gmail.com (corresponding author)
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