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COMMUNICATION

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An insight into the butterfly (Lepidoptera) diversity of an urban landscape: Guwahati, Assam, India

Sanath Chandra Bohra [1] & **Jayaditya Purkayastha** [2]

[1,2] Help Earth, 16, Raghunath Choudhury Path, Lachitnagar, Guwahati, Assam 781007, India.
[1] sreptilian6@gmail.com, [2] mail.jayaditya@gmail.com (corresponding author)

Abstract: The paper deals with the butterfly diversity of Guwahati, Assam, India which was the result of a survey conducted from April 2016 to July 2020. During the study period we recorded 249 species of butterflies belonging to six families namely Papilionidae (24 species), Pieridae (23 species), Lycaenidae (57 species), Riodinidae (two species), Nymphalidae (97 species), and Hesperiidae (46 species). Twenty-eight species were recorded from commercial areas, 74 species from residential areas, and 248 species from forested areas. Nineteen species were found to be very common, 39 species common, 50 species fairly common, 53 species uncommon, 57 species rare, and 31 species very rare. Twenty-four species and nine subspecies including *Discophora sondiaca*, *Athyma selenophora*, and *Athyma kanwa phorkys* are legally protected under different schedules as per the Indian Wildlife Protection Act (1972).

Keywords: Hesperiidae, Lycaenidae, Nymphalidae, Papilionidae, Pieridae, Riodinidae.

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Author details: Sanath Chandra Bohra is doing his graduation in zoology. He was interested in biodiversity research and conservation since a very early age. Herpetology is his main area of interest and has so far authored eight research articles including description of a new species of *Cyrtodactylus*. Jayaditya Purkayastha is serving as general secretary of the organization Help Earth. He has authored more than 60 research articles and five books.

Author contribution: SCB conducted the field survey. JP was responsible for the study design and production of the manuscript.

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INTRODUCTION

Guwahati (26.1859°N & 91.7477°E) is the capital city of the state of Assam having a population of around 9.6 lacs with a population density of 4,370 per sq.km with a total area of 216.79km^2. Guwahati is the largest metropolis of northeastern India and is also the business capital of the region. The city is ecologically very important as it enjoys being a part of the Indo-Burma global biodiversity hotspot. It has a tropical monsoon climate and receives approximately 1,600mm of rainfall annually, with an average annual temperature of 23°C. Due to rapid urbanisation, there is a continuous loss of forest cover with a loss of 160.34ha/year between 2010 and 2015 (Yadav & Barua 2016) (Figure 1). Most of the forest patches are of moist deciduous type (Purkayastha 2012, 2015). The pattern of habitat mostly present in and around the city includes forest patches, scrublands, grasslands, secondary plantations, wetlands, agricultural lands, and human habitations. The city is surrounded by eighteen hill ranges including eight reserve forests (South Kalapahar RF, Fatasil RF, Jalukbari RF, Gotanagar RF, Hengrabari RF, Sarnai Hill RF, Garbhanga RF, Rani RF) and two wildlife sanctuaries (Deeporbeel WS and Amchang WS). The Deeporbeel WS is also an internationally acclaimed wetland and has been declared as a RAMSAR site in 2002. The mighty Brahmaputra River flows through the heart of the city for about 25km eventually dividing it into northern and southern areas (Devi & Bhattacharyya 2015). Apart from butterflies, 26 species of amphibians, 57 species of reptiles, 214 species of birds, and 36 species of mammals have been recorded from the city (Purkayastha 2018).

Some of the recent work on butterflies of Assam were based on protected areas (Karthikeyan & Venkatesh 2011; Gogoi 2013a,b, 2015; Neog 2015; Singh 2015, 2017; Singh et al. 2015). In this paper we want to extend the available knowledge on the butterflies of the region by presenting, for the first time, a publication on the checklist of butterfly diversity of the urban landscape of Guwahati city of Assam, India.

MATERIALS AND METHODS

Extensive field surveys were carried out throughout all the seasons from April 2016 to July 2019 in different landscapes in and around Guwahati (Figure 1). The field study was conducted mostly during early mornings from 06.30h till 12.00h and occasionally during late afternoons till dusk from 16.30h till 17.30h. Thus, a total of five man hours was invested per survey during the study period which also includes investigating the residential localities. Pollard walk methodology (Pollard 1982) was done to spot the butterflies by walking on the trails as much as possible (3–10 trails) in the forested regions, the focus was mostly confined to the tracks/trails surrounded by flowering plants, bushes, plantations and trees present in and around the loose soils, mud, rocks and stones very close to streams such that the butterflies could be observed feeding on nectar, basking and mud-puddling respectively. The specimens were observed, photographed and identified using field literature (Evans 1932; Wynter-Blyth 1957; Kehimkar 2008; Kunte et al. 2020). Depending upon the abundance of the individuals spotted throughout the survey, the species were categorised as Very Common: 25 or more individuals recorded, Common: 15–25 individuals recorded, Fairly Common: 11–15 individuals recorded, Uncommon: 6–10 individuals recorded, Rare: 3–5 individuals recorded, Very Rare: less than three individuals recorded (Table no. 1). The following localities were selected for surveying purposes:

Commercial Areas (CA): Panbazar (26.1859°N & 91.7477°E), Fancy Bazar (26.1830°N & 91.7429°E), and Christian Basti (26.1552°N & 91.78°E).

Residential Areas (RA): Lachitnagar (26.1695°N & 91.7563°E), Lokhra (26.1106°N & 91.7465°E), Kala Pahar (26.1519°N & 91.7465°E), Bhangagarh (26.1620°N & 91.7672°E), Maligaon (26.1556°N & 91.6906°E), Hatigaon (26.1278°N & 91.7855°E), Kamakhya (26.1642°N & 91.7076°E), Rehabari (26.1733°N & 91.7471°E), Barshapara (26.1417°N & 91.7380°E), and Silpukhuri (26.1835°N & 91.7605°E).

Forested Areas (FA): Amchang Wildlife Sanctuary (26.1891°N & 91.8464°E), Hengrabari Reserve Forest (26.1618°N & 91.7843°E), Geetanagar (26.1750°N & 91.7952°E), Jalukbari Reserve Forest (26.1441°N & 91.6614°E), Deeporbeel Wildlife Sanctuary (26.13055N & 91.6591E), Rani-Garbhanga Reserve Forest (26.0419°N & 91.7056°E), Narakasur Hills (26.1499°N & 91.7643°E), Birubari Hills (26.1527°N & 91.7619°E), Khanapara Reserve Forest (26.1253°N & 91.8389°E), and Sarania Reserve Forest (26.1769°N & 91.7599°E). The classification of the commercial and residential areas was done as per Guwahati Municipal Corporation (GMC) regulations and forest reserves are considered under forest areas.

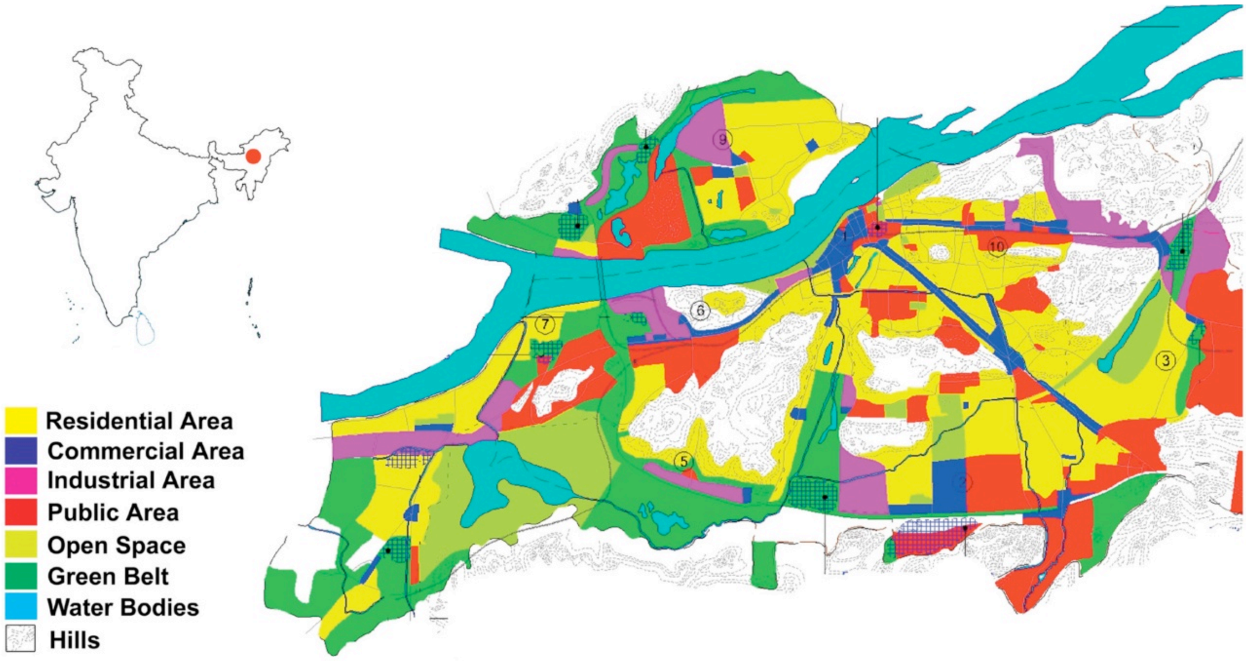

Figure 1. Different zonation within Guwahati City, Assam, India

RESULTS AND DISCUSSION

During the survey period, a total of 249 species of butterflies were recorded from in and around the city belonging to six different families namely Papilionidae, Pieridae, Lycaenidae, Nymphalidae, Riodinidae, and Hesperiidae (Table 1, Image 1–100).

Account of each family from the study site

Papilionidae: A total of 24 species in this family were recorded. Among these, only one species namely the *Papilio castor* has legal protection and had been listed as Schedule I of the Indian Wildlife Protection Act, 1972 (IWPA) and the rest were non-scheduled species. *Papilio polytes* was found to be 'Very Common' as it was the most encountered species in a variety of habitats (commercial residential and forested areas. *Lamproptera curius* and *Graphium agetes* were found to be 'Very rare' as they were spotted only twice in and around the forested regions (Amchang WS and Rani Reserve Forest) throughout the field study.

Pieridae: A total of 23 species in this family were documented during the survey and the subspecies *Appias albina darada* (Table 1) is legally protected as Schedule I under IWPA. Most of the species of this family were observed in and around forests and residential localities (Table 1).

Lycaenidae: For this family, 57 species have been recorded from which seven species (*Anthene lycaenina*, *Bindahara phocides*, *Horaga onyx*, *Lampides boeticus*, *Poritia hewitsoni*, *Spindasis lohita*, *Suasa lisides*) and four subspecies (*Euchrysops cnejus cnejus*, *Prosotas aluta coelestis*, *Arhopala fulla ignara*, and *Jamides pura pura*) (Table 1) are protected under Schedule II of the IWPA (Table 1) while the others are non-scheduled. Most of the species of this family were recorded from in and around the forest patches. During the study period, a mating pair of the Pea blue *Lampides boeticus* was observed late in the afternoon during April 2018 at Nilachal Hills.

Riodinidae: Only two members of this family have been recorded in the study area, namely *Zemeros flegyas* which was the most encountered species of this family, *Abisara echerius* was recorded only once during the survey from the Garbhanga-Rani reserve forest. (Table 1).

Nymphalidae: Nymphalidae comprises the most diverse group of butterflies representing 97 species recorded in and around the city, some of which are legally protected under IWPA, 1972 which includes one species listed in Schedule I, 11 species listed in Schedule II, two species listed in Schedule IV (Table 1), subspecies *Euripus nyctelius nycteliu*, *Euploea midamus rogenhoferi*, and *Athyma kanwa phorkys* (Table 1) are listed in Schedule II of the IWPA while the others are non-scheduled. Some of the members of this family

Table 1. Checklist of butterflies of Guwahati, Assam, India.

	Scientific name	Common name	Local status	CA	RA	FA	IWPA
	Family: Papilionidae						
1	*Atrophaneura varuna* White, 1842	Common Batwing	Uncommon		+	+	
2	*Byasa polyeuctes* Doubleday, 1842	Common Windmill	Uncommon			+	
3	*Graphium agamemnon* Linnaeus, 1758	Tailed Jay	Common	+	+	+	
4	*Graphium agetes* Westwood, 1843	Four-bar Swordtail	Very rare			+	
5	*Graphium antiphates* Cramer, 1775	Five-bar Swordtail	Rare			+	
6	*Graphium cloanthus* Westwood, 1841	Glassy Bluebottle	Uncommon			+	
7	*Graphium doson* C. & R. Felder, 1864	Common Jay	Common	+	+	+	
8	*Graphium macareus* Godart, 1819	Lesser Zebra	Rare			+	
9	*Graphium sarpedon* Linnaeus, 1758	Common Bluebottle	Common	+	+	+	
10	*Lamproptera curius* Fabricius, 1787	White Dragontail	Very rare			+	
11	*Pachliopta aristolochiae* Fabricius, 1775	Common Rose	Fairly common			+	
12	*Papilio castor* Westwood, 1842	Common Raven	Uncommon			+	
13	*Papilio clytia* Linnaeus, 1758	Common Mime	Fairly common		+	+	Schedule I
14	*Papilio eurypylus* Linnaeus, 1758	Great Jay	Rare			+	
15	*Papilio demoleus* Linnaeus, 1758	Lime Butterfly	Common	+	+	+	
16	*Papilio helenus* Linnaeus, 1758	Red Helen	Common			+	
17	*Papilio memnon* Linnaeus, 1758	Great Mormon	Fairly common		+	+	
18	*Papilio nephelus* Boisduval, 1836	Yellow Helen	Fairly common			+	
19	*Papilio paris* Linnaeus, 1758	Paris Peacock	Rare			+	
20	*Papilio polytes* Linnaeus, 1758	Common Mormon	Very common	+	+	+	
21	*Papilio protenor* Cramer, 1775	Spangle	Rare			+	
22	*Troides aeacus* C.& R. Felder, 1860	Golden Birdwing	Fairly common			+	
23	*Troides helena* Linnaeus, 1758	Common Birdwing	Rare			+	
24	*Byasa dasarada* Moore, 1858	Great Windmill	Very Rare			+	
	Family: Pieridae						
25	*Appias albina* Boisduval, 1836	Common Albatross	Fairly common			+	Schedule II
26	*Appias indra* Moore, 1858	Plain Puffin	Rare			+	
27	*Appias lalage* Doubleday, 1842	Spot Puffin	Rare			+	
28	*Appias lyncida* Cramer, 1777	Chocolate Albatross	Uncommon			+	
29	*Appias olferna* Swinhoe, 1890	Striped Albatross	Fairly common		+	+	
30	*Catopsilia pomona* Fabricius, 1775	Common Emigrant	Common	+	+	+	
31	*Catopsilia pyranthe* (Linnaeus, 1758)	Mottled Emigrant	Fairly common			+	
32	*Cepora nadina* Lucas, 1852	Lesser Gull	Uncommon			+	
33	*Cepora nerissa* Fabricius, 1775	Common Gull	Uncommon			+	
34	*Delias descombesi* Boisduval, 1836	Red spot Jezebel	Fairly common	+	+	+	
35	*Delias pasithoe* Linnaeus, 1767	Red base Jezebel	Uncommon	+	+	+	
36	*Dercas verhuelli* Hoeven, 1839	Tailed Sulpher	Rare			+	
37	*Eurema andersonii* Moore, 1886	One-spot Grass Yellow	Fairly common		+	+	
38	*Eurema blanda* Boisduval, 1836	Three-spot Grass Yellow	Common	+	+	+	
39	*Eurema brigitta* Stoll, 1780	Small Grass Yellow	Common		+	+	
40	*Eurema hecabe* Linnaeus, 1758	Common Grass Yellow	Common	+	+	+	
41	*Gandaca harina* Horsfield, 1829	Tree Yellow	Uncommon			+	
42	*Hebomoia glaucippe* Linnaeus, 1758	Great Orange Tip	Rare			+	

	Scientific name	Common name	Local status	CA	RA	FA	IWPA
43	*Ixias pyrene* Linnaeus, 1764	Yellow Orange Tip	Rare		+	+	
44	*Leptosia nina* Fabricius, 1793	Psyche	Very common	+	+	+	
45	*Pareronia hippia* Fabricius, 1787	Common Wanderer	Fairly common			+	
46	*Pieris brassicae* Linnaeus, 1758	Large Cabbage White	Uncommon			+	
47	*Pieris canidia* Linnaeus, 1768	Indian Cabbage White	Very common	+	+	+	
	Family: Lycaenidae						
48	*Acetolepis puspa* Horsfield, 1828	Common Hedge Blue	Common	+	+	+	
49	*Anthene emolus* Godart, 1824	Common Ciliate Blue	Common			+	
50	*Anthene lycaenina* Felder, 1868	Pointed Ciliate Blue	Uncommon			+	Schedule II
51	*Arhopala atrax* Hewitson, 1862	Indian Oakblue	Rare			+	
52	*Arhopala camdeo* Moore, 1858	Lilac Oakblue	Uncommon			+	
53	*Arhopala centaurus* Fabricius, 1775	Centaur Oakblue	Rare			+	
54	*Arhopala eumolphus* Cramer, 1780	Green Oakblue	Very rare			+	
55	*Arhopala fulla* Hewitson, 1862	Spotless Oakblue	Rare			+	Schedule II
56	*Arhopala perimuta* Moore, 1858	Yellowdisc Tailless Oakblue	Very rare			+	
57	*Bindahara phocides* Fabricius, 1793	Plane	Rare			+	Schedule II
58	*Caleta decidia* Hewitson, 1876	Angled Pierrot	Uncommon			+	
59	*Caleta elna* Hewitson, 1876	Elbowed Pierrot	Rare			+	
60	*Castalius rosimon* Fabricius, 1775	Common Pierrot	Very common	+	+	+	
61	*Catapaecilma major* Druce, 1895	Common Tinsel	Rare			+	
62	*Catochrysops panormus* C. Felder, 1860	Silver Forget-me-not	Uncommon			+	
63	*Catochrysops strabo* Fabricius, 1793	Forget -me –not	Fairly common			+	
64	*Cheritra freja* Fabricius, 1793	Common Imperial	Uncommon			+	
65	*Chilades lajus* Stoll, 1780	Lime Blue	Common	+	+	+	
66	*Chilades pandava* Horsfield, 1829	Plains Cupid	Fairly common		+	+	
67	*Creon cleobis* Godart, 1824	Broad Tail Royal	Very rare			+	
68	*Curetis acuta* Moore, 1877	Angled Sunbeam	Uncommon			+	
69	*Curetis saronis* Moore, 1877	Saronis Sunbeam	Rare			+	
70	*Deudorix epijarbas* Moore, 1858	Cornelian	Very rare			+	
71	*Discolampa ethion* Westwood, 1851	Banded Blue Pierrot	Rare			+	
72	*Euchrysops cnejus* Fabricius, 1798	Gram Blue	Fairly common		+	+	Schedule II
73	*Heliophorus epicles* Godart, 1824	Purple Sapphire	Fairly common		+	+	
74	*Horaga onyx* Moore, 1857	Common Onyx	Uncommon			+	Schedule II
75	*Hypolycaena erylus* Godart, 1824	Common Tit	Common			+	
76	*Iraota timoleon* Stoll, 1790	Silver Streak Blue	Rare			+	
77	*Jamides alecto* C.Felder, 1860	Metallic Cerulean	Common			+	
78	*Jamides bochus* Stoll, 1782	Dark Cerulean	Common			+	
79	*Jamides celeno* Cramer, 1775	Common Cerulean	Common		+	+	
80	*Jamides elpis* Godart, 1824	Glistening Cerulean	Common			+	
81	*Jamides pura* Moore, 1886	White Cerulean	Rare			+	Schedule II
82	*Lampides boeticus* Linnaeus, 1767	Peablue	Common	+	+	+	Schedule II
83	*Loxura atymnus* Stoll, 1780	Yamfly	Uncommon			+	
84	*Megisba malaya* Horsfield, 1828	Malayan	Fairly common			+	
85	*Miletus chinensis* C. Felder, 1862	Common Mottle	Uncommon			+	
86	*Neopithecops zalmora* Butler, 1870	Common Quaker	Common			+	

	Scientific name	Common name	Local status	CA	RA	FA	IWPA
87	*Poritia hewitsoni* Moore, 1866	Common Gem	Rare			+	Schedule II
88	*Prosotas aluta* Druce, 1873	Banded Lineblue	Very rare			+	Schedule II
89	Prosotas dubiosa (Semper, [1879])	Tailless Lineblue	Fairly common			+	
90	Prosotas nora (C. Felder, 1860)	Common Lineblue	Fairly common			+	
91	*Pseudozizeeria maha* Kollar, 1844	Pale Grass Blue	Very common	+	+	+	
92	*Rapala iarbas* Fabricius, 1787	Common Red Flash	Uncommon			+	
93	*Rapala manea* Hewitson, 1863	State Flash	Uncommon			+	
94	*Rapala pheretima* Hewitson, 1863	Copper Flash	Fairly common			+	
95	Remelana jangala (Horsfield, [1829])	Chocolate Royal	Uncommon			+	
96	*Spalgis epius* Westwood, 1851	Apefly	Fairly common		+	+	
97	*Spindasis lohita* Horsfield, 1829	Long Banded Silverline	Rare			+	Schedule II
98	*Suasa lisides* Hewitson, 1863	Red Imperial	Very rare			+	Schedule II
99	*Surendra quercetorum* Moore, 1858	Common Acacia Blue	Fairly common		+	+	
100	*Leptotes plinius* Fabricius, 1793	Zebra Blue	Common	+	+	+	
101	*Taraka hamada* Druce, 1875	Forest Pierrot	Rare			+	
102	*Virachola isocrates* Fabricius, 1793	Common Guava Blue	Fairly common			+	
103	*Zeltus amasa* Hewitson, 1865	Fluffy Tit	Fairly common			+	
104	*Zizeeria karsandra* Moore, 1865	Dark Grass Blue	Common	+	+	+	
	Family: Riodinidae						
105	*Abisara echerius* Stoll, 1790	Plum Judy	Uncommon			+	
106	*Zemeros flegyas* Cramer, 1780	Punchinello	Very common		+	+	
	Family: Nymphalidae						
107	*Acraea issoria* Hübner, 1818	Yellow Coster	Uncommon		+	+	
108	*Acraea terpsicore* Linnaeus, 1758	Tawny Coster	Fairly common		+	+	
109	*Ariadne ariadne* Linnaeus, 1763	Angled Castor	Common			+	
110	*Ariadne merione* Cramer, 1777	Common Castor	Fairly common		+	+	
111	*Athyma inara* Westwood, 1850	Colour Sergeant	Fairly common		+	+	
112	*Athyma kanwa* Moore, 1858	Dot Dash Sergeant	Very rare			+	Schedule II
113	*Athyma perius* Linnaeus, 1758	Common Sergeant	Common		+	+	
114	*Athyma ranga* Moore, 1857	Blackvein Sergeant	Rare			+	Schedule II
115	*Athyma selenophora* Kollar, 1844	Staff Sergeant	Rare			+	
116	*Auzakia danava* Moore, 1857	Commodore	Rare			+	Schedule II
117	*Cethosia biblis* Drury, 1770	Red Lacewing	Uncommon			+	
118	*Cethosia cyane* Drury, 1770	Leopard Lacewing	Uncommon			+	
119	*Charaxes arja* Felder & Felder, 1866	Pallid Nawab	Very rare			+	
120	*Charaxes bernardes* Fabricius, 1793	Tawny Rajah	Uncommon			+	
121	*Charaxes bharata* Felder & Felder, 1867	Common Nawab	Common		+	+	
122	*Charaxes dolon* Westwood, 1848	Stately Nawab	Very rare			+	Schedule II
123	*Charaxes kahruba* Moore, 1895	Variegated Rajah	Rare			+	Schedule II
124	*Charaxes marmax* Westwood, 1847	Yellow Rajah	Uncommon			+	Schedule II
125	*Charaxes solon* Fabricius, 1793	Black Rajah	Uncommon			+	
126	*Chersonesia rahrioides* Martin, 1895	Indian Red Maplet	Uncommon			+	Schedule II
127	*Chersonesia risa* Doubleday, 1848	Common Maplet	Fairly common			+	
128	*Cirrochroa aoris* Doubleday, 1847	Large Yeoman	Fairly common			+	
129	*Cirrochroa tyche* Felder & Felder, 1861	Common Yeoman	Uncommon			+	

	Scientific name	Common name	Local status	CA	RA	FA	IWPA
130	*Cupha erymanthis* Drury, 1773	Rustic	Rare			+	
131	*Cyrestis thyodamas* Doyère, 1840	Common Map	Rare		+	+	
132	*Danaus chrysippus* Linnaeus, 1758	Plain Tiger	Very common	+	+	+	
133	*Danaus genutia* Cramer 1779	Common Tiger	Common	+	+	+	
134	*Dichorragia nesimachus* Doyère, 1840	Constable	Very rare			+	
135	*Discophora sondiaca* Boisduval, 1836	Common Duffer	Fairly common		+	+	Schedule I
136	*Doleschallia bisaltide* Cramer, 1777	Autumn Leaf	Very rare			+	
137	*Elymnias hypermnestra* Linnaeus, 1763	Common Palmfly	Very common	+	+	+	
138	*Elymnias malelas* Hewitson, 1863	Spotted Palmfly	Rare			+	
139	*Elymnias patna* Westwood, 1851	Blue striped Palmfly	Rare			+	
140	*Ethope himachala* Moore, 1857	Dusky Diadem	Rare			+	
141	*Euploea algea* Godart, 1819	Long Branded Blue Crow	Uncommon			+	
142	*Euploea core* Cramer, 1780	Common Crow	Very common		+	+	
143	*Euploea midamus* Linnaeus, 1758	Blue Spotted Crow	Uncommon			+	Schedule II
144	*Euploea mulciber* Cramer, 1777	Striped Blue Crow	Uncommon			+	Schedule IV
145	*Euploea sylvester* Fabricius, 1793	Double Branded Crow	Uncommon			+	
146	*Euripus nyctelius* Doubleday, 1845	Courtesan	Very rare			+	Schedule II
147	*Euthalia aconthea* Cramer, 1777	Common Baron	Common	+	+	+	
148	*Euthalia anosia* Moore, 1858	Grey Baron	Rare			+	Schedule II
149	*Euthalia lubentina* Cramer, 1777	Gaudy Baron	Rare			+	Schedule IV
150	*Euthalia monina* Fabricius, 1787	Powdered Baron	Rare			+	
151	*Euthalia phemius* Doubleday, 1848	White-edged Blue Baron	Very rare			+	
152	*Faunis canens* Hübner, 1826	Common Faun	Uncommon			+	
153	*Herona marathus* Doubleday, 1848	Pasha	Very rare			+	
154	*Hypolimnas bolina* Linnaeus, 1758	Great Eggfly	Fairly common			+	
155	*Junonia almana* Linnaeus, 1758	Peacock Pansy	Very common	+	+	+	
156	*Junonia atlites* Linnaeus, 1763	Grey Pansy	Common	+	+	+	
157	*Junonia hierta* Fabricius, 1798	Yellow Pansy	Fairly common		+	+	
158	*Junonia iphita* Cramer, 1779	Chocolate Pansy	Very common		+	+	
159	*Junonia lemonias* Linnaeus, 1758	Lemon Pansy	Very common		+	+	
160	*Junonia orithya* Linnaeus, 1758	Blue Pansy	Fairly common			+	
161	*Kallima inachus* Doyere, 1840	Orange Oakleaf	Very rare			+	
162	*Kaniska canace* (Linnaeus, 1763)	Blue Admiral	Uncommon			+	
163	*Lebadea martha* Fabricius, 1787	Knight	Common			+	
164	*Lethe chandica* Moore, 1857	Angled Red Forester	Fairly common			+	
165	*Lethe confusa* Aurivillius, 1898	Banded Treebrown	Fairly common			+	
166	*Lethe europa* Fabricius, 1775	Bamboo Treebrown	Common		+	+	
167	*Lethe mekara* Moore, 1857	Common Red Forester	Fairly common			+	
168	*Lethe rhoria* Fabricius, 1787	Common Treebrown	Common		+	+	
169	*Lexias dirtea* Fabricius, 1793	Dark Archduke	Very rare			+	Schedule II
170	*Melanitis leda* Linnaeus, 1758	Common Evening Brown	Very common	+	+	+	
171	*Melanitis phedima* Cramer, 1780	Dark Evening Brown	Uncommon			+	
172	*Melanitis zitenius* Herbst, 1796	Great Evening Brown	Very Rare			+	
173	*Mimathyma ambica* Kollar, 1844	Purple Emperor	Rare			+	
174	*Moduza procris* Cramer, 1777	Commander	Uncommon			+	

	Scientific name	Common name	Local status	CA	RA	FA	IWPA
175	*Mycalesis anaxias* Hewitson, 1862	White-bar Bushbrown	Rare			+	Schedule II
176	*Mycalesis mineus* Linnaeus, 1758	Dark Brand Bushbrown	Fairly common		+	+	
177	*Mycalesis perseus* Fabricius, 1775	Common Bushbrown	Very common		+	+	
178	*Mycalesis visala* Moore, 1857	Long Brand Bushbrown	Uncommon			+	
179	*Neptis clinia* Moore, 1872	Sullied Sailor	Fairly common			+	
180	*Neptis hylas* Linnaeus, 1758	Common Sailor	Very common	+	+	+	
181	*Neptis nata* Moore, 1857	Clear Sailor	Uncommon			+	
182	*Neptis pseudovikasi* Moore, 1899	False Dingy Sailor	Rare			+	
183	*Orsotrioena medus* Fabricius, 1775	Nigger	Common			+	
184	*Pantoporia hordonia* Stoll, 1790	Common Lascar	Common	+	+	+	
185	*Parantica aglea* Stoll, 1782	Glassy Tiger	Fairly common			+	
186	*Parantica sita* Kollar, 1844	Chestnut Tiger	Rare			+	
187	*Parthenos sylvia* Cramer, 1775	Clipper	Rare			+	Schedule II
188	*Phalanta alcippe* Stoll, 1782	Small Leopard	Fairly common			+	Schedule II
189	*Phalanta phalantha Drury, 1773*	Common Leopard	Fairly common			+	
190	*Pseudergolis wedah* Kollar, 1844	Tabby	Uncommon			+	
191	*Rohana parisatis* Westwood, 1851	Black Prince	Very rare			+	
192	*Stibochiona nicea* (Gray, 1846)	Popinjay	Rare			+	
193	*Stichophthalma camadeva* Westwood, 1848	Northern Jungle Queen	Rare			+	
194	*Symbrenthia hypselis* Godart, 1823	Spotted Jester	Rare			+	
195	*Symbrenthia lilaea Hewitson, 1864*	Common jester	Fairly common		+	+	
196	*Tanaecia julii* Lesson, 1837	Common Earl	Uncommon			+	
197	*Tanaecia lepidea* Butler, 1868	Grey Count	Very common		+	+	Schedule II
198	*Thaumantis diores* Doubleday, 1845	Jungle Glory	Rare			+	
199	*Vagrans egista* Cramer, 1780	Vagrant	Uncommon			+	
200	*Vanessa cardui* Linnaeus, 1758	Painted Lady	Uncommon			+	
201	*Vanessa indica* Herbst, 1794	Indian Red Admiral	Rare		+	+	
202	*Ypthima baldus* Fabricius, 1775	Common Fivering	Very common			+	
203	*Ypthima hubenri* Kirby, 1871	Common Fourring	Very common			+	
	Family: Hesperiidae						
204	*Ancistroides nigrita* Latreille, 1824	Chocolate Demon	Common			+	
205	*Arnetta atkinsoni* Moore, 1878	Atkinson's Bob	Rare			+	
206	*Astictopterus jama* Felder & Felder, 1860	Forest Hopper	Fairly common		+	+	
207	*Baoris chapmani* Evans, 1937	Small Paint-brush Swift	Common			+	
208	*Baoris unicolor Moore, (1884)*	Black Paint-brush Swift	Fairly common			+	
209	*Burara amara* Moore, [1866]	Small Green Awlet	Rare			+	
210	*Burara harisa* Moore, 1865	Harisa Orange Awlet	Very rare			+	
211	*Burara oedipodea* (Swainson, 1820)	Branded Orange Awlet	Very rare			+	
212	*Celaenorrhinus leucocera* Kollar, 1844	Common Spotted Flat	Fairly common		+	+	
213	*Cephrenes acalle* (Höpffer, 1874)	Plain Palm Dart	Uncommon		+	+	
214	*Choaspes benjaminii* (Guérin-Méneville, 1843)	Indian Awlking	Very rare			+	
215	*Cupitha purreea* Moore, 1877	Wax Dart	Rare			+	
216	*Gerosis bhagava* Moore, 1866	Common Yellow-breast Flat	Rare			+	
217	*Gerosis phisara* Moore, 1884	Dusky Yellow-breasted Flat	Very Rare			+	

	Scientific name	Common name	Local status	CA	RA	FA	IWPA
218	*Gerosis sinica* C. & R. Felder, 1862	White Yellow-breasted Flat	Very Rare			+	
219	*Halpe homolea aucma* Swinhoe, 1893	Gold-spotted Ace	Rare			+	
220	*Halpe porus* Mabille, 1877	Moore's Ace	Uncommon			+	
221	*Halpe zema* (Hewitson, 1877)	Banded ace	Rare			+	
222	*Hasora chromus* (Cramer, [1780])	Common Banded Awl	Very rare		+		
223	*Hyarotis adrastus* Stoll,1780	Tree Flitter	Rare			+	Schedule IV
224	*Koruthaialos butleri* de Nicéville, 1883	Dark Velvet Bob	Uncommon			+	
225	*Lambrix salsala* Moore, 1866	Chestnut Bob	Common		+	+	
226	*Matapa aria* Moore, 1866	Common Redeye	Fairly common		+	+	
227	*Matapa sasivarna* Moore, 1865	Black Veined Redeye	Uncommon			+	
228	*Notocrypta curvifascia* (C. & R. Felder, 1862)	Restricted Demon	Rare			+	
229	*Notocrypta paralysos* (Wood-Mason & de Nicéville, 1881)	Common Banded Demon	Common		+	+	
230	*Ochus subvittatus* Moore, 1878	Tiger Hopper	Rare			+	
231	*Odontoptilum angulata* C. Felder, 1862	Chestnut Angle	Very rare			+	
232	*Oriens gola* Moore, 1877	Common Dartlet	Common			+	
233	*Parnara sp.*		Uncommon			+	
234	*Pelopidas assamensis* de Nicéville, 1882	Great Swift	Rare			+	Schedule IV
235	*Pelopidas mathias* (Fabricius, 1798)	Small Branded Swift	Very common		+	+	
236	*Pelopidas subochracea* (Moore, 1878)	Large Branded Swift	Uncommon		+	+	
237	*Ponthanus sp.*		Fairly common			+	
238	*Pseudocoladenia dan* Fabricius, 1787	Fulvous Pied Flat	Common			+	
239	*Sarangesa dasahara* Moore, 1866	Common Small Flat	Common		+	+	
240	*Scobura isota* Swinhoe, 1893	Khasi Hills Bob	Very rare			+	
241	*Scobura phiditia* (Hewitson, [1866])	Malay Forest Bob	Very rare			+	
242	*Spialia galba* Fabricius, 1793	Indian Skipper	Fairly common			+	
243	*Suastus gremius* (Fabricius, 1798)	Indian Palm Bob	Uncommon			+	
244	*Tagiades gana* Moore,1866	Suffused Snow Flat	Fairly common		+	+	
245	*Tagiades japetus* Stoll, 1781	Common Snow Flat	Fairly common		+	+	
246	*Tagiades litigiosa* Möschler, 1878	Water Snow Flat	Rare			+	
247	Telicota colon (Fabricius, 1775)	Pale Palm Dart	Uncommon			+	
248	*Udaspes folus* Cramer, 1775	Grass Demon	Fairly common		+	+	
249	*Zographetus satwa* de Nicéville, 1884	Purple and Gold Flitter	Very rare			+	

CA—Commercial Areas | RA—Residential Areas | FA— Forested Areas | IWPA— Indian Wildlife Protection Act.

were found to be 'Very Rare' and were recorded only twice within the study period which includes *Melanitis zitenius*, *Charaxes arja*, *Athyma ranga*, *Rohana parisatis*, *Athyma kanwa*, *Stibochiona nicea*, *Kallima inachus*, *Dichorragia nesimachus*, *Thaumantis diores*, *Lexias dirtea*, and *Herona marathus*.

Hesperiidae: During the study, 46 species of this family were recorded (Table 1) out of which only two of them namely *Pelopidas assamensis* and *Hyarotis adrastus* are legally protected (Schedule IV of IWPA) while the others are non-scheduled. Most of the members of this family were found in and around the forest patches including the *Scobura isota* recorded from the Hengrabari Reserve Forest. Other interesting findings include *Zographetus satwa*, *Aretta atkinsoni*, and *Burara jaina* from the Rani Reserve Forest, *Halpe aucma* and *Odontoptilum angulata* from the Amchang WS and a *Pelopidas assamesis* from Geetanagar area. From the Geetanagar area itself a mating pair of *Lambrix salsala* was also observed late in the afternoon during the month of March in 2018.

Image 1–50. Photographic collage of butterflies of Guwahati, Assam, India. Family: Papilionidae: 1—*Troides aeacus* | 2—*Graphium agamemnon* | 3—*Graphium doson* | 4—*Papilio clytia* | 5—*Papilio demoleus* | 6—*Papilio polytes* | 7—*Papilio helenus* | Family: Pieridae: 8—*Appias olferna* | 9—*Catopsilia Pomona* | 10—*Delias descombesi* | 11—*Delias pasithoe* | 12—*Eurema blanda* | 13—*Leptosia nina* | 14—*Pieris canidia* |Family: Lycaenidae: 15—*Anthene emolus* | 16. *Caleta decidia* | 17—*Castalius rosimon* | 18—*Catochrysops strabo* | 19—*Cheritra freja* | 20—*Chilades pandava* | 21—*Discolampa ethion* | 22—*Heliophorus epicles* | 23—*Hypolycaena erylus* | 24—*Iraota timoleon* | 25—*Jamides bochus* | 26—*Jamides celeno* | 27—*Lampides boeticus* | 28—*Loxura atymnus* | 29—*Neopithecops zalmora* | 30—*Prosotas dubiosa* | 31—*Prosotas nora* | 32—*Pseudozizeeria maha* | 33—*Rapala irabus* | 34—*Spindasis lohita* | 35—*Surendra quercetorum* | 36—*Leptotes plinius* | 37—*Virachola isocrates* | 38—*Zeltus amasa* | Family: Riodinidae: 39—*Zemeros flegyas* | Family: Nymphalidae: 40—*Acraea terpsicore* | 41—*Athyma inara* | 42—*Athyma ranga* | 43—*Athyma selenophora* | 44—*Cethosia cyane* | 45—*Charaxes bernardes* | 46—*Charaxes bharata* | 47—*Charaxes solon* | 48—*Chersonesia rahrioides* | 49—*Cyrestis thyodamas* | 50—*Danaus chrysippus* | © Sanath Chandra Bohra.

Image 51–100. Photographic collage of butterflies of Guwahati, Assam, India. Family: Nymphalidae: 51—*Discophora sondiaca* | 52—*Elymnias hypermnestra* | 53—*Ethope himachala* | 54—*Euploea core* | 55—*Euploea mulciber* | 56—*Euthalia aconthea* | 57—*Hypolimnas bolina* | 58—*Junonia almana* | 59—*Junonia atlites* | 60—*Junonia iphita* | 61—*Junonia lemonias*, 62—*Lebadea Martha* | 63—*Lethe mekara* | 64—*Lexias dirtea* | 65—*Melanitis leda* | 66—*Melanitis zitenius* | 67—*Moduza Procris* | 68—*Mycalesis anaxias* | 69 —*Neptis clinia* | 70—*Neptis hylas* | 71—*Neptis pseudovikasi* | 72—*Pantoporia hordonia* | 73—*Parantica aglea* | 74—*Rohana parisatis* | 75—*Stibochiona nicea* | 76—*Symbrenthia lilaea* | 77—*Tanaecia lepidea* | 78—*Vanessa indica* | Family: Hesperiidae: 79—*Arnetta atkinsoni* | 80—*Astictopterus jama* | 81—*Baoris unicolor* | 82—*Cephrenes acalle* | 83—*Halpezema* | 84—*Koruthaialos butleri* | 85—*Matapa sasivarna* | 86—*Notocrypta curvifascia* | 87—*Notocrypta paralysos* | 88—*Oriens gola* | 89—*Pelopidas assamensis* | 90—*Pelopidas mathias* | 91—*Pseudocoladenia dan* | 92—*Sarangesa dasahara* | 93—*Scobura isota* | 94—*Suastus gremius* | 95—*Tagiades gana* | 96—*Tagiades japetus* | 97—*Tagiades litigiosa* | 98—*Telicota colon* | 99—*Udaspes folus* | 100—*Zographetus satwa* | © Sanath Chandra Bohra.

Threats

The major threats perceived to the butterfly population in the study are

· Habitat alteration: Due to development activities the prime habitat and host plants of butterflies are fast vanishing and are replaced by human settlements. Due to scarcity in living space within Guwahati, small kitchen gardens are being lost at a rapid pace which once harboured a sustainable population of butterflies. Again in urban landscape most of the roads are tarred or made of concrete making it hard for butterflies to seek nutrients from the mud (mud-puddling).

· Agriculture: As the city expands, it is eating into its peripheral agricultural land, which in-turn is eating into adjacent forested areas, a prime habitat for butterflies. To suffice need of ever rising population, the agricultural land are using fertilizers and pesticide more than ever before, creating a negative impact on butterfly population.

· Invasive species: Invasive species of both plant and animal are impacting butterfly population in a negative way. Plants like *Mimosa pudica* are competing with native plant species whereas introduced lizard species *Hemidactylus flaviviridis* are eating into butterfly and other insect population. Feral species of cats also hunt butterflies.

· Climate change: Urban areas are the prime generators of climate change and thus the effect of climate change are felt more in urban landscape. The ever increasing heat gradient along with urban heat island effect is presenting challenges to wide range of biodiversity including butterflies.

· Lack of public awareness: Most urban dwellers are totally unaware of the importance of butterflies in their ecosystem. An average urban dweller's mindset has been calibrated as such that only larger mammals conservation concerns holds importance to him if at all.

REFERENCES

Devi, U. & K.G. Bhattacharyya (2015). Transport of trace metals by the rainwater runoff in the urban catchment of Guwahati, India, pp. 225–240. In: Raju, J.N., W. Gossel & M. Sudhakar (eds.). *Management of Natural Resources in a Changing Environment*. Springer International Publishing, 297pp.

Evans, W.H. (1932). *The Identification of Indian Butterflies - 1st Edition.* Bombay Natural History Society, Mumbai, India, 302pp+32plts.

Gogoi, M.J. (2013a). A preliminary checklist of butterflies recorded from Jeypore-Dehing forest, eastern Assam, India. *Journal of Threatened Taxa* 5(2): 3684–3696. http://doi.org/JoTT.o3022.3684-96

Gogoi, M.J. (2013b). Notes on some skipper butterflies (Lepidoptera: Hesperiidae) from Panbari Forest and its adjoining areas, Kaziranga Karbi Anglong, upper Assam, India. *Journal of Threatened Taxa* 5(13): 4759–4768. http://doi.org/10.11609/JoTT.o3340.4759-68

Gogoi, M.J. (2015). Observations on lycaenid butterflies from Panbari Reserve Forest and adjoining areas, Kaziranga, Assam, northeastern India. *Journal of Threatened Taxa* 7(15): 8259–8271. http://doi.org/10.11609/jott.2467.7.15.8259-8171

Karthikeyan, S. & V. Venkatesh (2011). "Snowy Angle *Darpa pteria*". The Wild Wanderer, 07 September2011 (Retrieved on 09 July 2013 from http://www. wildwanderer. com /journal/?p= 435).

Kehimkar, I. (2008). *The Book of Indian Butterflies.* Bombay Natural History Society, Oxford University Press, Mumbai, 497pp.

Kunte, K., S. Sondhi & P. Roy. (2020). *Butterflies of India, v. 2.78*. Indian Foundation for Butterflies. http://www.ifoundbutterflies.org, accessed 17 April 2020.

Neog, S. (2015). *Butterflies of Gibbon Wildlife Sanctuary*. Bhabani Books, Guwahati, 112pp.

Pollard, E. (1982). Monitoring butterfly abundance in relation to the management of a nature reserve. *Biological Conservation* 24: 317–328.

Purkayastha, J. (2012). *Urban Herpetofauna, Amphibian and Reptiles of Guwahati - A Pictorial Guide*. Students' store, Guwahati, 64pp.

Purkayastha, J. (2015). *An Amateur's Guide to Birds of Assam*. EBH Publisher, Guwahati, 144pp.

Purkayastha, J. (2018). Urban biodiversity: an insight into the terrestrial vertebrate diversity of Guwahati, India. *Journal of Threatened Taxa* 10(10): 12299–12316. https://doi.org/10.11609/jott.3721.10.10.12299-12316

Singh, A.P. (2015). Recent record of a rarely recorded species, the Veined Palmer *Hidari bhawani* de Nicéville, 1888 (Lepidoptera: Hesperiidae: Aeromachini) from Jorhat, Assam, India. *Journal of Threatened Taxa* 7(1): 6839–6840. http://doi.org/10.11609/JoTT.o4031. 6839-40.

Singh, A.P. (2017). Butterflies of eastern Assam, India **.** *Journal of Threatened Taxa* 9(7): 10396–10420. http://doi.org/10.11609/jott.3177.9.7.10396-10420

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://doi.org/10.11609/JoTT.o3742.6774-87

Wynter-Blyth, M.A. (1957). *Butterflies of the Indian Region.* Bombay Natural History Society, Bombay, 523pp.

Yadav, R. & A. Barua (2016). Study of Urbanization and Ecosystem Services of Guwahati City from Forest Footprint Perspective. *Journal of Ecosystem & Ecography* S5: 1. http://doi.org/10.4172/2157-7625.S5-004

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Communications

First record of Wroughton's Small Spiny Mouse *Mus phillipsi* Wroughton, 1912 (Rodentia: Muridae) from Odisha, India with notes on diversity and distribution of other rodents
– Pratyush P. Mohapatra, S.S. Talmale, V. Sarkar & S.K. Dutta, Pp. 17611–17618

Small mammals in the human-dominated landscape in the northern Western Ghats of India
– Sameer Bajaru, Amol R. Kulavmode & Ranjit Manakadan, Pp. 17619–17629

Faunal diversity of an insular crepuscular cave of Goa, India
– Pratiksha Sail, Manoj Ramakant Borkar, Ismat Shaikh & Archana Pal, Pp. 17630–17638

Potential remote drug delivery failures due to temperature-dependent viscosity and drug-loss of aqueous and emulsion-based fluids
– Derek Andrew Rosenfield, Alfredo Acosta, Denise Trigilio Tavares & Cristiane Schilbach Pizzutto, Pp. 17639–17645

Foraging behavior and association with mixed flocks by the Critically Endangered Alagoas Tyrannulet *Phylloscartes ceciliae* (Aves: Passeriformes: Tyrannidae)
– Carlos Otávio Araujo Gussoni & Tatiana Pongiluppi, Pp. 17646–17650

Ichthyofaunal diversity in the upper-catchment of Kabini River in Wayanad part of Western Ghats, India
– Dencin Rons Thampy, M.R. Sethu, M. Bibin Paul & C.P. Shaji, Pp. 17651–17669

Herpetofaunal inventory of Van Province, eastern Anatolia, Turkey
– Mehmet Zülfü Yıldız, Naşit İğci & Bahadır Akman, Pp. 17670–17683

Herpetofauna assemblage in two watershed areas of Kumoan Himalaya, Uttarakhand, India
– Kaleem Ahmed & Jamal A. Khan, Pp. 17684–17692

A checklist of earthworms (Annelida: Oligochaeta) in southeastern Vietnam
– Dang Hai Lam, Nam Quoc Nguyen, Anh Duc Nguyen & Tung Thanh Nguyen, Pp. 17693–17711

Some biological aspects of the central Indian endemic scorpion *Hottentotta jabalpurensis* Kovařík, 2007 (Scorpiones: Buthidae)
– Pragya Pandey, Pratyush P. Mohapatra & D.B. Bastawade, Pp. 17712–17721

First record of the early immature stages of the White Four-ring *Ypthima ceylonica* (Insecta: Lepidoptera: Nymphalidae), and a note on a new host plant from India
– Hari Theivaprakasham, Hari Ramanasaran & Appavu Pavendhan, Pp. 17722–17730

New additions to the larval food plants of Sri Lankan butterflies (Insecta: Lepidoptera: Papilionoidea)
– Himesh Dilruwan Jayasinghe, Sarath Sanjeewa Rajapakshe & Tharindu Ranasinghe, Pp. 17731–17740

An insight into the butterfly (Lepidoptera) diversity of an urban landscape: Guwahati, Assam, India
– Sanath Chandra Bohra & Jayaditya Purkayastha, Pp. 17741–17752

A report on the moth (Lepidoptera: Heterocera) diversity of Kavvai River basin in Kerala, India
– Chembakassery Jose Alex, Koladyparambil Chinnan Soumya & Thavalathadathil Velayudhan Sajeev, Pp. 17753–17779

Observations on the flowering plant diversity of Madayippara, a southern Indian lateritic plateau from Kerala, India
– C. Pramod & A.K. Pradeep, Pp. 17780–17806

Malacofaunal inventory in Chintamoni Kar Bird Sanctuary, West Bengal, India
– S.K. Sajan, Swati Das, Basudev Tripathy & Tulika Biswas, Pp. 17807–17826

Short Communications

Food habits of the Dusky-striped Squirrel *Funambulus sublineatus* (Mammalia: Rodentia: Sciuridae)
– Palassery Suresh Aravind, George Joe, Ponnu Dhanesh & Rajamani Nandini, Pp. 17827–17831

Notes

High altitude wetland migratory birds in the Sikkim Himalaya: a future conservation perspective
– Prem K. Chhetri, Kusal Gurung, Thinlay Namgyal Lepcha & Bijoy Chhetri, Pp. 17832–17836

Tawny Fish-owl *Ketupa flavipes* Hodgson, 1836 (Aves: Strigiformes: Strigidae): recent record from Arunachal Pradesh, India
– Malyasri Bhattacharya, Bhupendra S. Adhikari & G.V. Gopi, Pp. 17837–17840

First report of *Lipotriches* (*Rhopalomelissa*) *parca* (Kohl, 1906) (Halictidae: Nomiinae) from India
– Bhaswati Majumder, Anandhan Rameshkumar & Sarfrazul Islam Kazmi, Pp. 17841–17842

Addition of four species to the flora of Andaman Islands, India
– Mudavath Chennakesavulu Naik, Lal Ji Singh, Gautam Anuj Ekka & C.P. Vivek, Pp. 17843–17846

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