

Research Article

## A preliminary checklist of butterflies (Insecta: Lepidoptera) from Vijaynagar, district Changlang, Arunachal Pradesh, India

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### ABSTRACT

In the present course of study from Vijaynagar of Arunachal Pradesh, a total of 237 species of butterflies from six lepidopteran families were recorded. Family Nymphalidae was determined to be the most dominating, with n=100, followed by Hesperidae, Lycaenidae, Papilionidae, Pieridae, and Riodinidae, with n=45, 40, 25, 20, and 7 respectively. 13 species out of 237 butterflies were added to the IUCN list, while 51 species out of the total were listed under different Schedule I, II, and IV of the Indian Wildlife Protection Act of 1972. The research established the presence of a high diversity of butterflies and prepared the first systematic checklist of butterflies from Vijaynagar, Arunachal Pradesh. The region can therefore be used as a significant state-protected area for ongoing efforts to conserve the butterfly biodiversity.

**Key words:** : Hesperidae, Lycaenidae, Vijaynagar, Nymphalidae, Papilionidae, Pieridae, Riodinidae.

### INTRODUCTION

Arunachal Pradesh, as a part of the Northeast, is one of the important hotspots of biological diversity including butterflies. More than 80% of butterfly species that occur in the Indian 'subcontinent' & Myanmar are harboured in this region. Moreover, Arunachal Pradesh shares international borders with Bhutan in the west and Myanmar in the east. The diversity of butterflies and abundance in the Eastern Himalayan region are greatly influenced by the diversity of plants and topography of the area (Mani, 1986; Majumder *et al.*, 2011; Dar *et al.*, 2021; Chahar *et al.*, 2021). They are one of the most diverse, beautifully coloured creatures in the insect world. They provide a wide range of environmental benefits; including pollination and natural pest control as well as they act as an indicator of a healthy environment (Ghazanfar *et al.*, 2016; Wale *et al.*, 2021). Traditionally, butterflies are divided into six families Hesperidae, Nymphalidae, Lycaenidae, Papilionidae, Pieridae and Riodinidae (Bhakar and Ogale, 2018). Hesperidae, also known as skippers due to their skipping and quick flight habits. The butterflies in this family have large eyes, hairy bodies and have a habit to fly at dawn and dusk like moths and have hooked antennae. The family Nymphalidae is called brush-footed butterflies or four-footed butterflies because they are known to stand on only four legs. Many species are brightly coloured and include popular species such as the emperors, admirals, and fritillaries. Most nymphalids are powerful fliers and feed on animal droppings, animal carcasses and overripe fruits. Butterflies of the family Lycaenidae are known as blues because many species have different hues of blue colour on their upper wings. The common characteristic of this butterfly is the presence of tails or tail-like appendages on hind wings. The family Papilionidae are large and

Papilionids have a conspicuous tail on their hindwing, which can be seen when the butterfly is resting with its wings spread, giving rise to the common name swallowtail. The males of this family gather for mudpuddling in large numbers. Butterflies of the family Pieridae are white, yellow, or orange in colouration, often with black spots and veins. Like the Papilionoidea the males of this family also gather for mud-puddling in large numbers. The present study was undertaken to provide baseline information on butterfly species so that researchers can do further details work on their distribution, diversity, and abundance and to identify potential threats in Vijaynagar, Arunachal Pradesh.

### MATERIALS AND METHODS

Vijaynagar is a remotest circle, surrounded on three sides by Myanmar whereas the other side connects with the Namdapha National Park, situated in District Changlang of Arunachal Pradesh, India. The area lies between latitudes 27°11' 31" N and longitudes 96°59' 59" E. A random opportunistic survey was conducted to prepare a systematic preliminary checklist of butterflies from the Vijaynagar region over a period of 1 year i.e., from January to December 2020. Butterflies were documented by direct observation and random walks (Murugesan *et al.*, 2013). The survey has been carried out on a sunny day from 9 am to 2 pm to record the butterfly species and an occasional survey has been done after 4 pm to record the shade-loving butterflies. The area has excellent soil quality results from a dominant land cover of cultivation followed by residential and forest areas. The area harbours a rich number of flora and fauna, because of the vegetation zone from evergreen, moist deciduous and coniferous forest types to alpine vegetation. The number of species were recorded in different habitats and photographic

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identification was done by using reference books (Evan, 1932, Kunte, 2000, Kehimker, 2016).

## RESULTS

During the present investigation, a total of 237 species of butterfly belonging to 6 families were recorded from Vijaynagar of Changlang district, Arunachal Pradesh. The complete list of the butterfly species is presented in Table 1. Based on the number of species, the family Nymphalidae was found to be most dominant with 100 species, followed by Hesperidae (45), Lycaenidae (40), Papilionidae (25), Pieridae (20) and the least number of species is represented by family Riodinidae with (07). All the recorded species are widely distributed in India. Of the total 237 butterflies in Vijaynagar, 51 butterfly species fall under different schedules of the Indian Wildlife Protection Act of 1972. 9 species of butterflies: viz., *Euthalia iva* (Moore, 1858), *Euthalia telchinia* (Ménétriés, 1857), *Sephisia chandra* (Moore, [1858]), *Sumalia zulema* (Doubleday, 1848), *Discophora sondaica zal* (Westwood, 1851), *Elymnias peali* Wood-Mason, 1883, *Cigaritis rukmini* (de Nicéville, [1889]), *Hypolycaena othona* Hewitson, [1865] and *Delias berinda* (Moore, 1872) are fall under Schedule I, 38 species viz., *Charaxes marmax* Westwood, 1847, *Charaxes kahruha* (Moore, [1895]), *Neope pulaha* (Moore, [1858]), *Euthalia francae* (Gray, 1846), *Bassarona durga* (Moore, [1858]), *Euthalia nara* (Moore, 1859), *Lethe latiaris* (Hewitson, 1862), *Athyma ranga* Moore, [1858], *Athyma asura* [Moore, 1858], *Euripus nyctelius* (Doubleday, 1845), *Penthema lisarda* (Doubleday, 1845), *Mycalesis gotama* Moore, [1858], *Mycalesis adamsonii* Watson, 1897, *Danaus genutia* (Cramer, 1779), *Libythea lepita* Moore, [1858], *Lexias cyanipardus* (Butler, [1869]), *Lexias dirtea* (Fabricius, 1793), *Amathuxidia amythaon* (Doubleday, 1847), *Bhagadatta austenia* (Moore, 1872), *Parasarpa dudu* (Westwood, [1850]), *Auzakia danava* (Moore, [1858]), *Rhinopalpa polynice* (Cramer, [1779]), *Charaxes dolon* Westwood, [1848], *Melanitis zitenius* (Herbst, 1796), *Phalanta*

*alcippe* (Stoll, [1782]), *Elymnias vasudeva* Moore, [1858], *Tanaecia lepidea* (Butler, 1868), *Prosotas aluta* (Druce, 1873), *Anthene lycaenina* (Felder, 1868), *Cigaritis lohita* (Horsfield, [1829]), *Cigaritis elima* (Moore, 1877), *Pithecopus fulgens Doherty*, 1889, *Papilio epycides* Hewitson, 1862, *Bhutanitis lidderdalii Atkinson*, 1873, *Tagiades jepetus* (Stoll, [1781]), *Dodona adonira* Hewitson, [1866], *Dodona dipoea Hewitson*, [1866] and *Dodona egeon* (Westwood, [1851]) are Schedule II species of Indian Wildlife Protection Act of 1972 and 4 species viz., *Dodona egeon* (Westwood, [1851]), *Tarucus ananda* (de Nicéville, [1884]), *Appias galba* (Wallace, 1867) and *Hyarotis adrastus* (Stoll, [1780]) are Schedule IV species of Indian Wildlife Protection Act of 1972. However, only 13 species out of 237 butterflies were enlisted under the IUCN list, three species are vulnerable viz., *Meandrusa payeni* (Boisduval, 1836), *Lamproptera curius* (Fabricius, 1787), *Lamproptera meges* (Zincken, 1831) whereas 10 species are least concern viz., *Vanessa indica* (Herbst, 1794), *Danaus chrysippus* (Linnaeus, 1758), *Junonia orithya* (Linnaeus, 1758), *Junonia almana* (Linnaeus, 1758), *Tarucus balkanica* (Freyer, 1844), *Zizeeria karsandra* (Moore, 1865), *Papilio polytes* Linnaeus, 1758, *Graphium sarpedon* Linnaeus, 1758), *Troides helena* (Linnaeus, 1758), *Bhutanitis lidderdalii Atkinson*, 1873 and other the rest of the species have unassisted status.

The occurrence of different butterfly species varied according to the seasons (pre-monsoon, monsoon, post-monsoon, winter), as well as the habitats (stream, riverine, open forest, forest edges, cropland, dense forest) Table 2. Butterfly family distribution data reveals that Lycaenidae, Nymphalidae, and Papilionoidea prefer all seasons, Hesperidae, and Pieridae prefer three seasons, except for winters, and Riodinidae prefer just the pre- and post-monsoon. In the research area, the riverine and stream are the best habitat types for the butterfly species followed by forest edges, open forests, dense forests, and cropland.

**Table 1.** List of butterfly species reported in Vijayanagar, District Changlang, Arunachal Pradesh. (Sch=Schedule, NA= Not yet been Assessed, LC=Least Concerned, V=Vulnerable)

Sl. No.	Common Name	Scientific Name	Status under IWPA	Status under (IUCN)
<b>Family: Nymphalidae</b>				
1.	Yellow Rajah	<i>Charaxes marmax</i> Westwood, 1847	Sch-II	NA
2.	Variegated Rajah	<i>Charaxes kahruha</i> (Moore, [1895])	Sch- II	NA
3.	Tawny Rajah	<i>Charaxes bernardus</i> (Fabricius, 1793)		NA
4.	Medus Brown	<i>Orsotriaena medus</i> (Fabricius, 1775)		NA
5.	Magpie Crow	<i>Euploea radamanthus</i> (Fabricius, 1793)	Sch-IV	NA
6.	White-Striped Ringleet	<i>Ragadia crisilda</i> Hewitson, [1862]		NA
7.	Himalayan Tabby	<i>Pseudergolis wedah</i> (Kollar, [1844])		NA
8.	Common Maplet	<i>Chersonesia risa</i> (Doubleday, [1848])		NA

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9.	Yellow Labyrinth	<i>Neope armandii</i> (Oberthür, 1876)		NA
10.	Veined Labyrinth	<i>Neope pulaha</i> (Moore, [1858])	Sch-II	NA
11.	Grand Duke	<i>Euthalia iva</i> (Moore, 1858)	Sch-I	NA
12.	French Duke	<i>Euthalia francae</i> (Gray, 1846)	Sch-II	NA
13.	Blue Duke	<i>Bassarona durga</i> (Moore, [1858])	Sch-II	NA
14.	Bronze Duke	<i>Euthalia nara</i> (Moore, 1859)	Sch-II	NA
15.	Dark Catseye	<i>Zipaetis scylax</i> Hewitson, [1863]		NA
16.	Common Baron	<i>Euthalia aconthea</i> (Cramer, [1777])		NA
17.	Blue Baron	<i>Euthalia telchinia</i> (Ménétriés, 1857)	Sch-I	NA
18.	White Edged Blue Baron	<i>Euthalia phemius</i> (Doubleday, [1848])		NA
19.	Powdered Baron	<i>Euthalia monina</i> (Fabricius, 1787)		NA
20.	Newar Three Ring	<i>Ypthima newara</i> Moore, [1875]		NA
21.	Common Four Ring	<i>Ypthima huebneri</i> Kirby, 1871		NA
22.	Common Five Ring	<i>Ypthima baldus</i> (Fabricius, 1775)		NA
23.	Himalayan Five Ring	<i>Ypthima sakra</i> Moore, [1858]		NA
24.	Orange Oakleaf	<i>Kallima inachus</i> (Doyère, [1840])		NA
25.	Autumn Leaf	<i>Doleschallia bisaltide</i> (Cramer, [1777])		NA
26.	Angled Red Forester	<i>Lethe chandica</i> (Moore, [1858])		NA
27.	Bamboo Treebrown	<i>Lethe europa</i> (Fabricius, 1775)		NA
28.	Common Forester	<i>Lethe isana</i> (Kollar, [1844])		NA
29.	Common Red Forester	<i>Lethe mekara</i> (Moore, [1858])		NA
30.	Pale Forester	<i>Lethe latiaris</i> (Hewitson, 1862)	Sch-II	NA
31.	Short-banded Sailer	<i>Phaedyma columella</i> (Cramer, [1780])		NA
32.	Small Yellow Sailer	<i>Neptis miah</i> Moore, [1858]		NA
33.	Plain Sailer	<i>Neptis cartica</i> Moore, 1872		NA
34.	Blackvein Sergeant	<i>Athyma ranga</i> Moore, [1858]	Sch-II	NA
35.	Orange Staff Sergeant	<i>Athyma cama</i> Moore, [1858]		NA
36.	Small Staff Sergeant	<i>Athyma zeroa</i> Moore, 1872		NA
37.	Studded Sergeant	<i>Athyma asura</i> Moore, [1858]	Sch-II	NA
38.	Courtesan	<i>Euripus nyctelius</i> (Doubleday, 1845)	Sch-II	NA
39.	Tropical Fritillary	<i>Argynnis hyperbius</i> (Linnaeus, 1763)		NA
40.	Red Caliph	<i>Enispe euthymius</i> (Doubleday, 1845)		NA
41.	Yellow Coster	<i>Acraea issoria</i> (Hübner, [1819])		NA
42.	Indian Red Admiral	<i>Vanessa indica</i> (Herbst, 1794)		LC
43.	Yellow Kaiser	<i>Penthema lisarda</i> (Doubleday, 1845)	Sch-II	NA
44.	Chinese Bushbrown	<i>Mycalesis gotama</i> Moore, [1858]	Sch-II	NA
45.	Purple Bushbrown	<i>Mycalesis orseis</i> Hewitson, 1864		NA

Table 1 continued in next page

46.	Double Bushbrown	Branded	<i>Mycalesis adamsonii</i> Watson, 1897	Sch- II	NA
47.	Common Bushbrown		<i>Mycalesis perseus</i> (Fabricius, 1775)		NA
48.	Intermediate Bushbrown		<i>Mycalesis intermedia</i> (Moore, [1892])		NA
49.	Bright-Eye Bushbrown		<i>Telinga nicotia</i> (Westwood, [1850])		NA
50.	Plain Bushbrown		<i>Telinga malsarida</i> (Butler, 1868)		NA
51.	Striped Tiger		<i>Danaus genutia</i> (Cramer, 1779)	Sch-II	NA
52.	Plain Tiger		<i>Danaus chrysippus</i> (Linnaeus, 1758)		LC
53.	Chestnut Tiger		<i>Parantica sita</i> (Kollar, [1844])		NA
54.	Dark Blue Tiger		<i>Tirumala septentrionis</i> (Butler, 1874)		NA
55.	Blue Glassy Tiger		<i>Ideopsis similis</i> (Linnaeus, 1758)		NA
56.	Lemon Pansy		<i>Junonia lemonias</i> (Linnaeus, 1758)		NA
57.	Blue Pansy		<i>Junonia orithya</i> (Linnaeus, 1758)		LC
58.	Chocolate Pansy		<i>Junonia iphita</i> (Cramer, [1779]),		NA
59.	Peacock Pansy		<i>Junonia almana</i> (Linnaeus, 1758)		LC
60.	Grey Pansy		<i>Junonia atlites</i> (Linnaeus, 1763)		NA
61.	Circe		<i>Hestinalis nama</i> (Doubleday, 1844)		NA
62.	Eastern Courtier		<i>Sephisia chandra</i> (Moore, [1858])	Sch-I	NA
63.	Dark Freak		<i>Calinaga aborica</i> Tytler, 1915		NA
64.	Common Beak		<i>Libythea lepita</i> Moore, [1858]	Sch-II	NA
65.	Club Beak		<i>Libythea myrrha</i> Godart, 1819		NA
66.	Great Archduke		<i>Lexias cyanipardus</i> (Butler, [1869])	Sch-II	NA
67.	Dark Archduke		<i>Lexias dirtea</i> (Fabricius, 1793)	Sch-II	NA
68.	Leopard Lacewing		<i>Cethosia cyane</i> (Drury, [1773])		NA
69.	Koh-i-Noor		<i>Amathuxidia amythaon</i> (Doubleday, 1847)	Sch-II	NA
70.	Grey Commodore		<i>Bhagadatta austenia</i> (Moore, 1872)	Sch-II	NA
71.	Scarce White Commodore		<i>Sumalia zulema</i> (Doubleday, [1848])	Sch-I	NA
72.	Green Commodore		<i>Sumalia daraxa</i> (Doubleday, [1848])		NA
73.	Bicolor Commodore		<i>Parasarpa zayla</i> (Westwood, [1850])		NA
74.	White Commodore		<i>Parasarpa dudu</i> (Westwood, [1850])	Sch-II	NA
75.	Indian Commodore		<i>Auzakia danava</i> (Moore, [1858])	Sch-II	NA
76.	Wizard		<i>Rhinopalpa polynice</i> (Cramer, [1779])	Sch-II	NA
77.	Common Nawab		<i>Charaxes Bharata</i> C. & R. Felder, [1867]		NA
78.	Great Nawab		<i>Charaxes eudamippus</i> Doubleday, 1843		NA
79.	Stately Nawab		<i>Charaxes dolon</i> Westwood, [1848]	Sch-II	NA
80.	Indian Purple Emperor		<i>Mimathyma ambica</i> (Kollar, [1884])		NA
81.	Cruiser		<i>Vindula erota</i> (Fabricius, 1793)		NA

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82.	Indian Common Duffer	<i>Discophora sondaica zal</i> (Westwood, 1851)	Sch-I	NA
83.	Great Evening Brown	<i>Melanitis zitenius</i> (Herbst, 1796)	Sch-II	NA
84.	Common Evening Brown	<i>Melanitis leda</i> (Linnaeus, 1758)		NA
85.	Dark Evening Brown	<i>Melanitis phedima</i> (Cramer, [1780])		NA
86.	Common Jester	<i>Symbrenthia lilaea</i> (Hewitson, 1864)		NA
87.	Small Leopard	<i>Phalanta alcippe</i> (Stoll, [1782])	Sch-II	NA
88.	Common Palmfly	<i>Elymnias hypermnestra</i> (Linnaeus, 1763)		NA
89.	Jezebel Palmfly	<i>Elymnias vasudeva</i> Moore, [1858]	Sch-II	NA
90.	Brahmaputra Palmfly	<i>Elymnias peali</i> Wood-Mason, 1883	Sch-I	NA
91.	Great Eggfly	<i>Hypolimnas bolina</i> (Linnaeus, 1758)		NA
92.	Black Prince	<i>Rohana parisatis</i> (Westwood, [1851])		NA
93.	Jungle Glory	<i>Thaumantis diores</i> Doubleday, 1845		NA
94.	Common Map	<i>Cyrestis thyodamas</i> Doyère, [1840]		NA
95.	Large Yeoman	<i>Cirrochroa aoris</i> Doubleday, [1847]		NA
96.	Constable	<i>Dichorragia nesimachus</i> Doyère, [1840]		NA
97.	Commander	<i>Moduza procris</i> (Cramer, [1777])		NA
98.	Grey Count	<i>Tanaecia lepidea</i> (Butler, 1868)	Sch-II	NA
99.	Popinjay	<i>Stibochiona nicea</i> (Gray, 1846)		NA
100.	Northern Junglequeen	<i>Stichopthalma camadeva</i> (Westwood, 1848)		NA

**Family:  
Lycaenidae**

101.	Forest Pierrot	<i>Taraka hamada</i> (Druce, 1875)		NA
102.	Straight Pierrot	<i>Caleta roxus</i> (Godart, [1824])		NA
103.	Elbowed Pierrot	<i>Caleta elna</i> (Hewitson, 1876)		NA
104.	Dark Pierrot	<i>Tarucus ananda</i> (de Nicéville, [1884])	Sch-IV	NA
105.	Little Tiger Pierrot	<i>Tarucus balkanica</i> (Freyer, 1844)		LC
106.	Common Pierrot	<i>Castalius rosimon</i> (Fabricius, 1775)		NA
107.	Margined Lineblue	<i>Prosotas pia</i> Toxopeus, 1929		NA
108.	Banded Lineblue	<i>Prosotas aluta</i> (Druce, 1873)	Sch-II	NA
109.	Pointed Ciliate Blue	<i>Anthene lycaenina</i> (Felder, 1868)	Sch-II	NA
110.	Common Acacia Blue	<i>Surendra quercetorum</i> (Moore, [1858])		NA
111.	Common Hedge Blue	<i>Acytolepis puspa</i> (Horsfield, [1828])		NA
112.	Pale Hedge Blue	<i>Udara dilectus</i> (Moore, 1879)		NA
113.	Lime Blue	<i>Chilades lajus</i> (Stoll, [1780])		NA
114.	Dark Grass Blue	<i>Zizeeria karsandra</i> (Moore, 1865)		LC
115.	Pale Grass Blue	<i>Pseudozizeeria maha</i> (Kollar, [1844])		NA
116.	Khaki Silverline	<i>Cigaritis rukmini</i> (de Nicéville, [1889])	Sch-I	NA
117.	Long-banded Silverline	<i>Cigaritis lohita</i> (Horsfield, [1829])	Sch-II	NA

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118.	Scarce Shot Silverline	<i>Cigaritis elima</i> (Moore, 1877)	Sch-II	NA
119.	Slate Flash	<i>Rapala manea</i> (Hewitson, 1863)		NA
120.	Branded Flash	<i>Rapala tara</i> , de Nicéville [1869]		NA
121.	Copper Flash	<i>Rapala pheretima</i> (Hewitson, [1863])		NA
122.	Common Tinsel	<i>Catapaecilma major</i> Druce, 1895		NA
123.	Chocolate Royal	<i>Remelana jangala</i> (Horsfield, [1829])		NA
124.	Hooked Oakblue	<i>Arhopala paramuta</i> (de Nicéville, [1884])		NA
125.	Common Mottle	<i>Miletus chinensis</i> Felder, 1862		NA
126.	Branded Yamfly	<i>Yasoda tripunctata</i> (Hewitson, [1863])		NA
127.	Yamfly	<i>Loxura atymnus</i> (Stoll, 1780)		NA
128.	Common Imperial	<i>Cheritra freja</i> (Fabricius, 1793)		NA
129.	Fluffy Tit	<i>Zeltus amasa</i> (Hewitson, [1865])		NA
130.	Purple Sapphire	<i>Heliophorus epicles</i> (Godart, [1824])		NA
131.	Metallic Cerulean	<i>Jamides alecto</i> (Felder, 1860)		NA
132.	Dark Cerulean	<i>Jamides bochus</i> (Stoll, [1782])		NA
133.	Forget Me Not	<i>Catochrysops strabo</i> (Fabricius, 1793)		NA
134.	Orchid Tit	<i>Hypolycaena othona</i> Hewitson, [1865]	Sch-I	NA
135.	Common Tit	<i>Hypolycaena erylus</i> (Godar, [1824])		NA
136.	Striped Hairstreak	<i>Yamanotozephyrus kwangtugenesis</i> (Forster, 1942)		NA
137.	Bi-spot Royal	<i>Ancema ctesia</i> (Hewitson, [1865])		NA
138.	Bright Sunbeam	<i>Curetis bulis</i> (Westwood, [1851])		NA
139.	Variable Malayan	<i>Megisba malaya</i> (Horsfield, [1828])		NA
140.	Blue Quaker	<i>Pithecops fulgens</i> Doherty, 1889	Sch-II	NA
<b>Family: Pieridae</b>				
141.	Chocolate Albatross	<i>Appias lyncida</i> (Cramer, [1777])		NA
142.	Common Albatross	<i>Appias albina</i> (Boisduval, 1836)		NA
143.	Orange Albatross	<i>Appias galba</i> (Wallace, 1867)	Sch-IV	NA
144.	Common Gull	<i>Cepora nerissa</i> (Fabricius, 1775)		NA
145.	Lesser Gull	<i>Cepora nadina</i> (Lucas, 1852)		NA
146.	Indian Cabbage White	<i>Pieris canidia</i> (Linnaeus, 1768)		NA
147.	Green-Veined White	<i>Pieris melete</i> Ménétrés, 1857		NA
148.	Psyche	<i>Leptosia nina</i> (Fabricius, 1793)		NA
149.	Common Emigrant	<i>Catopsilia pomona</i> (Fabricius, 1775)		NA
150.	Mottled Emigrant	<i>Catopsilia pyranthe</i> (Linnaeus, 1758)		NA
151.	Dark Jezebel	<i>Delias berinda</i> (Moore, 1872)	Sch-I	NA
152.	Spotted Sawtooth	<i>Prioneris thestylis</i> (Doubleday, 1842)		NA
153.	Red Base Jezebel	<i>Delias pasithoe</i> (Linnaeus, 1767)		NA

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154.	Red-Spot Jezebel	<i>Delias descombesi</i> (Boisduval, 1836)	NA
155.	Yellow Jezebel	<i>Delias agostina</i> (Hewitson, 1852)	NA
156.	Great Orange-tip	<i>Hebomoia glaucippe</i> (Linnaeus, 1758)	NA
157.	Yellow Orange-tip	<i>Ixias pyrene</i> (Linnaeus, 1764)	NA
158.	One-spot Grass Yellow	<i>Eurema andersonii</i> (Moore, 1886)	NA
159.	Three-spot Grass Yellow	<i>Eurema blanda</i> (Boisduval, 1836)	NA
160.	Tree Yellow	<i>Gandaca harina</i> (Horsfield, [1829])	NA
<b>Family: Papilionidae</b>			
161.	Common Mormon	<i>Papilio polytes</i> Linnaeus, 1758	LC
162.	Great Mormon	<i>Papilio agenor</i> Linnaeus, 1758	NA
163.	Spangle	<i>Papilio protenor</i> Cramer, [1775]	NA
164.	Red-breasted Mormon	<i>Papilio alcmenor</i> (Felder, 1864)	NA
165.	Common Raven	<i>Papilio castor</i> Westwood, 1842	NA
166.	Paris Peacock	<i>Papilio paris</i> (Linnaeus, 1758)	NA
167.	Blue Peacock	<i>Papilio arcturus</i> Westwood, 1842	NA
168.	Common Peacock	<i>Papilio bianor</i> Cramer, [1777]	NA
169.	Lesser Mime	<i>Papilio epycides</i> Hewitson, 1862	Sch-II NA
170.	Tawny Mime	<i>Papilio agestor</i> Gray, 1831	NA
171.	Lime Swallowtail	<i>Papilio demoleus</i> Linnaeus, 1758	NA
172.	Common Bluebottle	<i>Graphium sarpedon</i> (Linnaeus, 1758)	LC
173.	Glassy Bluebottle	<i>Graphium cloanthus</i> (Westwood, 1841)	NA
174.	Great Jay	<i>Graphium eurypylus</i> (Linnaeus, 1758)	NA
175.	Tailed Jay	<i>Graphium agamemnon</i> (Linnaeus, 1758)	NA
176.	Veined Jay	<i>Graphium chironides</i> (Honrath, 1884)	NA
177.	Four-bar Swordtail	<i>Graphium agetes</i> (Westwood, 1843)	NA
178.	Five-bar Swordtail	<i>Graphium antiphates</i> (Cramer, [1775])	NA
179.	Common Birdwing	<i>Troides helena</i> (Linnaeus, 1758)	LC
180.	Common Windmill	<i>Byasa polyeuctes</i> (Doubleday, 1842)	NA
181.	Bhutan Glory	<i>Bhutanitis lidderdalii</i> Atkinson, 1873	Sch-II LC
182.	Brown Gorgon	<i>Meandrusa lachinus</i> (Fruhstorfer, 1902)	NA
183.	Yellow Gorgon	<i>Meandrusa payeni</i> (Boisduval, 1836)	V
184.	White Dragontail	<i>Lamproptera curius</i> (Fabricius, 1787)	V
185.	Green Dragontail	<i>Lamproptera meges</i> (Zincken, 1831)	V
<b>Family: Hesperiidae</b>			
186.	Branded Orange Awlet	<i>Burara oedipodea</i> (Swainson, 1820)	NA
187.	Small Green Awlet	<i>Burara amara</i> (Moore, [1866])	NA

Table 1 continued in next page

188.	Orange-tailed Awl	<i>Bibasis sena</i> (Moore, [1866])		NA
189.	Common Awl	<i>Hasora badra</i> (Moore, [1858])		NA
190.	Common Awlking	<i>Choaspes benjaminii</i> (Guérin-Méneville, 1843)		NA
191.	Common Yellow-breasted Flat	<i>Gerosis bhagava</i> (Moore, [1866])		NA
192.	Suffused Snow Flat	<i>Tagiades gana</i> (Moore, [1866])		NA
193.	Dark Yellow-banded Flat	<i>Celaenorrhinus aurivittata</i> (Moore, [1879])		NA
194.	Himalayan White Flat	<i>Seseeria dohertyi</i> (Watson, 1893)		NA
195.	Spotted Snow Flat	<i>Tagiades menaka</i> (Moore, [1866])		NA
196.	Brown Pied Flat	<i>Coladenia agni</i> (de Nicéville, [1884])		NA
197.	Yellow Flat	<i>Mooreana trichoneura</i> (Felder, 1860)		NA
198.	Common Spotted Flat	<i>Celaenorrhinus leucocera</i> (Kollar, [1844])		NA
199.	Common Snow Flat	<i>Tagiades jepetus</i> (Stoll, [1781])	Sch-II	NA
200.	Water Snow Flat	<i>Tagiades litigiosa</i> Möschler, 1878		NA
201.	Chestnut Angle	<i>Odontoptilum angulata</i> (Felder, 1862)		NA
202.	Tawny Angle	<i>Ctenoptilum vasava</i> (Moore, [1866])		NA
203.	Fulvous Pied Flat	<i>Pseudocoladenia dan</i> (Fabricius, 1787)		NA
204.	Dusky Yellow-breast Flat	<i>Gerosis phisara</i> (Moore, 1884)		NA
205.	Grizzled Skipper	<i>Spialia galba</i> (Fabricius, 1793)		NA
206.	Hairy Angle	<i>Darpa hanria</i> Moore, [1866]		NA
207.	Chestnut Bob	<i>Iambrix salsala</i> (Moore, [1866])		NA
208.	Indian Palm Bob	<i>Suastus gremius</i> (Fabricius, 1798)		NA
209.	Dark Velvet Bob	<i>Koruthaialos butleri</i> (de Niceville, [1884])		NA
210.	Forest Bob	<i>Scobura spp.</i>		NA
211.	Gold Flitter	<i>Zographetus satwa</i> (de Nicéville, [1884])		NA
212.	Lesser Rice Swift	<i>Borbo bevani</i> (Moore, 1878)		NA
213.	Wax Dart	<i>Cupitha purreea</i> (Moore, 1877)		NA
214.	Common Dartlet	<i>Oriens gola</i> (Moore, 1877)		NA
215.	Common Branded Redeye	<i>Matapa aria</i> (Moore, [1866])		NA
216.	Chocolate Demon	<i>Ancistroides nigrita</i> (Latreille, [1824])		NA
217.	Restricted Demon	<i>Notocrypta curvifascia</i> (Felder, 1862)		NA
218.	Grass Demon	<i>Udaspes folus</i> (Cramer, [1775])		NA
219.	Dingy Scrub Hopper	<i>Aeromachus dubius</i> Edwards, 1897		NA
220.	Tiger Hopper	<i>Ampittia subvittatus</i> (Moore, 1878)		NA
221.	Yellow-banded Palmer	<i>Lotongus sarala</i> (de Niceville, 1889)		NA
222.	Northern Spotted Ace	<i>Thoressa cerata</i> (Hewitson, 1876)		NA
223.	Long Banded Ace	<i>Halpe hindu</i> Evans, 1937		NA
224.	Gold spotted Ace	<i>Halpe aucma</i> Swinhoe, 1893		NA
225.	Tree Flitter	<i>Hyarotis adrastus</i> (Stoll, [1780])	Sch-IV	NA



226.	Common Wight	<i>Iton semamora</i> (Moore, [1866])	NA
227.	Nonsuch Plamer	<i>Creteus cyrina</i> (Hewitson, 1876)	NA
228.	Black-veined Branded Redeye	<i>Matapa sasivarna</i> (Moore, [1866])	NA
229.	Yellow-veined Lancer	<i>Pyroneura margherita</i> (Doherty, 1889)	NA
230.	Silver-spotted Lancer	<i>Plastingia naga</i> (de Nicéville, [1884])	NA

**Family:  
Riodinidae**

231.	Punchinello	<i>Zemeros flegyas</i> (Cramer, [1780])	NA
232.	Dark Judy	<i>Abisara fylla</i> (Westwood, [1851])	NA
233.	Spot Judy	<i>Abisara chela</i> de Nicéville, 1886	NA
234.	Long-tailed Punch	<i>Dodona longicaudata</i> de Nicéville, 1881	NA
235.	Striped Punch	<i>Dodona adonira</i> Hewitson, [1866]	Sch-II NA
236.	Lesser Punch	<i>Dodona dipoea</i> Hewitson, [1866]	Sch-II NA
237.	Orange Punch	<i>Dodona egeon</i> (Westwood, [1851])	Sch-II NA

**Table 2.** Six butterfly families' seasonal occurrence and preferred habitats.

Sl. No.	Butterfly Family	Seasons	Habitats
1.	Nymphalidae	Pre-Monsoon, Monsoon, Winter	Post Stream, Riverine, Open Forest, Forest Edges, Cropland, Dense Forest
2.	Lycaenidae	Pre-Monsoon, Monsoon, Winter	Post Riverine, Forest Edges
3.	Pieridae	Pre-Monsoon, Monsoon	Post Stream, Riverine, Forest Edges, Open Forest
4.	Papilionoidea	Pre-Monsoon, Monsoon, Winter	Post Stream, Riverine, Open Forest
5.	Hesperiidae	Pre-Monsoon, Monsoon,	Post Stream, Riverine, Cropland, Forest Edges
6.	Riodinidae	Pre-Monsoon, Post Monsoon	Dense Forest

## DISCUSSION

Vijaynagar has diversified topography, consisting of different types of habitats. Variations in slopes, wind velocity, angle of sunshine, altitudes and vegetation together make a perfect place for animals and plants to flourish and survive. Climate and weather also have a direct influence on the abundance and occurrence of species. High species diversity is found in high-rainfall areas, and low species diversity is found in dry areas and low-rainfall areas (Dar *et al.*, 2021). Quantification of butterfly diversity and species richness is of importance for evaluating the status of protected areas. The present study reported a total of 237 species of butterflies from Vijaynagar which comprises six families Hesperidae, Nymphalidae, Papilionidae, Pieridae, Lycaenidae and Riodinidae. Butterfly diversity from Vijaynagar, Changlang district, Arunachal Pradesh, has never been previously reported. However, two butterfly species *viz.*, Striped Hairstreak *Yamamotozephyrus kwangtungensis*

(Forster, 1942) and White Royal *Tajuria illurgis illurgis* (Hewitson, [1869]) have been reported from Vijaynagar (Upadhaya *et al.*, 2020; Limbu *et al.*, 2023). According to Sethy *et al.*, (2014), 113 species of butterflies belonging to 5 families and 73 genera were reported from the Namdapha National Park. Recently, eight rare and elusive species or subspecies of butterflies namely *Capila pieridoides* (Moore, 1878), *Plastingia naga* (de Niceville, 1884), *Salanoemia noemi* (de Niceville, 1885), *Lotongu sarala* (de Niceville, 1889), *Pieris naganum* (Moore, 1884), *Erites falcipennis* (Wood-Mason & de Niceville, 1883), *Coelites nothis adamsoni* (Moore, 1891) and *Bassarona durga splendens* (Tytler, 1915) has been reported from the Namdapha National Park (Das *et al.*, 2020). Not only Namdapha harbours several species of butterflies other National Park and Sanctuaries also show similar results in the rich diversity of butterflies. Majumder *et al.*, (2012) reported a total of 1005 individuals representing 59 species in 48

genera belonging to five families were recorded in the present study. Of these, 23 species belonged to the family Nymphalidae and accounted for 38.98% of the total species and 45.20% of the total number of individuals in Trishna Wildlife Sanctuary. Das *et al.*, (2017) reported a total of 127 species in Dibru-Saikhouwa National Park, of which eighteen (10.23%) of these species are of special concern and are listed in IWPA, 1972. A total of 150 species of butterflies belonging to six families viz., Nymphalidae (44.89%), Lycaenidae (23.12%), Pieridae (12.24%), Hesperidae (10.20%), Papilionidae (8.16%) and Riodinidae (1.36%) were recorded with the highest diversity in the Western range Raimona followed by central range Kachugaon, Sanfan range and Eastern range Athiabari in the Raimona National Park (Islam *et al.*, 2022). A total of 1864 individuals from 180 species under five butterfly families both in the closed forest (CF) and scattered forest (SCF) of Manas Biosphere Reserve (Saikia and Saikia, 2014). Gogoi *et al.*, (2016) reported 343 butterfly species from Barail Wildlife Sanctuary, Assam based on fieldwork conducted from December 2012 to April 2016. 227 butterfly species belonging to five families viz., Papilionidae, Nymphalidae, Lycaenidae, Hesperidae and Pieridae and 17 sub-families such as Papilioninae, Curetinae, Polyommatae, Lycaeninae, Theclinae, Riodininae, Satyrinae, Charaxinae, Apaturinae, Nymphalinae, Heliconiinae, Danainae, Pyrginae, Coeliadinae, Hesperinae, Pierinae, Coliadinae, were recorded in Nameri National Park (Saikia, 2018). 92 butterfly species with 13 species under various schedules of the Indian Wildlife (Protection) Act, 1972 and restricted 11 Himalayan species were found in the Soraipung range of Dehing Patkhai National Park, Assam (Gogoi *et al.*, 2023).

According to the current study, riverine and woodland environments support the greatest diversity of species. Monsoon, Pre, and Post monsoon are the finest seasons for seeing butterflies, in terms of season. According to Kakati (2014), climate and habitat are the main factors affecting butterfly distribution. Most of the ground in the study region is covered by trees. Due to the variety of food and habitat that forests offer, they are home to several butterfly taxa. Hence a good number of butterflies were reported in Vijaynagar. With 100 species of butterflies in the study area, Nymphalidae is the family with the highest species richness. Because most of these species are polyphagous and some are powerful, energetic flyers that can assist them to disseminate in huge numbers, Nymphalidae have always been prominent in the tropical region (Kumar *et al.*, 2008; Bora *et al.*, 2014). Similar results of Nymphalid abundance were shown by different authors from different places. 40 species of butterflies were recorded from different urban landscapes of Delhi where the family Nymphalidae (13 spp.) showed the highest species diversity (Paul *et al.*, 2020). Butterfly diversity in Western Himalayas also shows the highest abundance of species from the family Nymphalidae followed by Lycaenidae, Hesperidae, Pieridae and Papilionidae (Mehra *et al.*, 2017). Out of the six families, Riodinidae consists of a smaller number of species  $n=7$ . The reason for the less occurrence of this family might be their restricted habitat preference such as deep forest. Hence, a smaller

number of species were reported (Bhattacharjee *et al.*, 2020; Igano *et al.*, 2021; Annan *et al.*, 2022). Although the study was not only to prepare the systematic preliminary checklist of the butterfly species from Vijaynagar, it also to provide baseline information on Butterflies for the first time from Vijaynagar which may be used to assess the health and stability of the ecosystem, and the preservation of these vital pollinators is crucial for sustainable development in future.

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## Photo Gallery

### Family: Nymphalidae



*Charaxes marmax*



*Charaxes kahruba*



*Charaxes bernardus*



*Orsotriaena medus*



*Euploea radamanthus*



*Ragadia crisilda*



*Pseudergolis wedah*



*Chersonesia risa*



*Neope arandii*



*Neope pulaha*



*Euthalia iva*



*Euthalia franciae*



*Bassarona durga*



*Euthalia nara*



*Zipaetis scylax*





*Euthalia aconthea*



*Euthalia telchinia*



*Euthalia phemius*



*Euthalia monina*



*Ypthima newara*



*Ypthima huebneri*



*Ypthima baldus*



*Ypthima sakra*



*kallima inachus*



*Doleschallia bisaltide*



*Lethe chandica*



*Lethe europa*



*Lethe isana*



*Lethe mekara*



*Lethe latiaris*



*Phaedyma columella*



*Neptis miah*



*Neptis cartica*



*Athyma ranga*



*Athyma cama*



*Athyma zeroa*



*Athyma asura*



*Euripus nyctelius*



*Argynnis hyperbius*



*Enispe euthymius*



*Acraea issoria*



*Vanessa indica*



*Penthema lisarda*



*Mycalesis gotama*



*Mycalesis orseis*



Checklist of butterflies from Changlang



*Mycalesis adamsonii*



*Mycalesis perseus*



*Mycalesis intermedia*



*Telinga nicotia*



*Telinga malsarida*



*Danaus genutia*



*Danaus chrysippus*



*Parantica sita*



*Tirumala septentrionis*



*Ideopsis similis*



*Junonia lemonias*



*Junonia orithya*



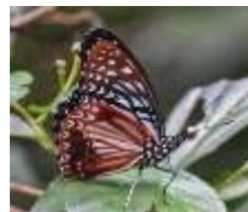
*Junonia iphita*



*Junonia almana*



*Junonia atlites*



*Hestinalis nama*



*Sepsis chandra*



*Calinaga aborica*



*Libythea lepita*



*Libythea myrrha*



*Lexias cyanipardus*



*Lexias dirtea*



*Cethosia cyane*



*Amathuxidia amythaon*



*Bhagadatta austenia*



*Sumalia zulema*



*Sumalia daraxa*



*Parasarpa zayla*



*Parasarpa dudu*



*Auzakia danava*





*Rhinopalpa polynice*



*Charaxes bharata*



*Charaxes eudamippus*



*Charaxes dolon*



*Mimathyma ambica*



*Vindula erota*



*Discophora sondaica*



*Melanitis zitenius*



*Melanitis leda*



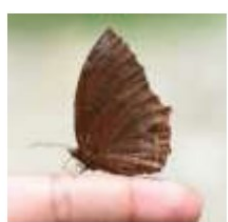
*Melanitis phedima*



*Symbrenthia lilaea*



*Phalanta alcippe*



*Elymnias hypermnestra*



*Elymnias vasudeva*



*Elymnias peali*



*Hypolimnas bolina*



*Rohana parisatis*



*Thaumantis diores*



*Cyrestis thyodamas*



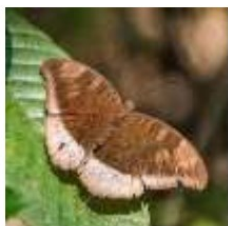
*Cirrochroa aoris*



*Dichorragia nesimachus*



*Moduza procris*



*Tanaecia lepidea*



*Stibochiona nicea*



*Stichophthalma camadeva*

**Family: Lycaenidae**



*Taraka hamada*



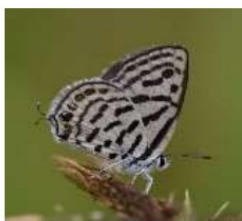
*Caleta roxus*



*Caleta elna*



*Tarucus ananda*



*Tarucus balkanica*



Checklist of butterflies from Changlang



*Castalius rosimon*



*Prosotas pia*



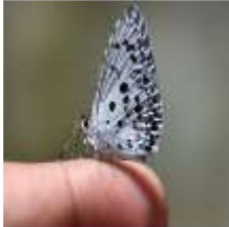
*Prosotas aluta*



*Anthene lycaenina*



*Surendra quercetorum*



*Acytolepis puspa*



*Udara dilectus*



*Chilades lajus*



*Zizeeria karsandra*



*Pseudozizeeria maha*



*Spindasis rukmini*



*Cigaritis lohita*



*Cigaritis elima*



*Rapala manea*



*Rapala tara*



*Rapala pheretima*



*Catapaecilma major*



*Remelana jangala*



*Arthropala paramuta*



*Miletus chinensis*



*Yasoda tripunctata*



*Loxura atymnus*



*Cheritra freja*



*Zeltus amasa*



*Heliophorus epicles*



*Jamides alecto*



*Jamides bochus*



*Catochrysops strabo*



*Hypolycaena othona*



*Hypolycaena erylus*





*Yamamotozephyrus kwangtugensis*



*Ancema ctesia*



*Curetis bulis*



*Megisba malaya*



*Pithecopis fulgens*

**Family: Pieridae**



*Appias lycinda*



*Appias albina*



*Appias galba*



*Cepora nerissa*



*Cepora nadina*



*Pieris canidia*



*Pieris melete*



*Leptosia nina*



*Catopsilia pomona*



*Catopsilia pyranthe*



*Delias berinda*



*Prioneris thestylis*



*Delias pasithoe*



*Delias descombesi*



*Delias agostina*



*Hebomoia glaucippe*



*Ixias pyrene*



*Eurema andersonii*



*Eurema blanda*



*Gandaca harina*



**Family: Papilionidae**



*Papilio polytes*



*Papilio agenor*



*Papilio protenor*



*Papilio  
alcmenor*



*Papilio castor*



*Papilio paris*



*Papilio arcturus*



*Papilio bianor*



*Papilio  
epycides*



*Papilio agestor*



*Papilio  
demoleus*



*Graphium  
sarpedon*



*Graphium  
cloanthus*



*Graphium  
eurypylus*



*Graphium  
agamemnon*



*Graphium  
chironides*



*Graphium agetes*



*Graphium  
antiphates*



*Troides helena*



*Byasa polyeuctes*



*Bhutanitis  
lidderdalii*



*Meandrusa payeni*



*Meandrusa  
payeni*



*Lamproptera  
curius*



*Lamproptera  
meges*

**Family: Hesperidae**



*Burara  
oedipodea*



*Burara amara*



*Bibasis sena*



*Hasora badra*



*Choaspes  
benjaminii*





*Gerosis bhagava*



*Tagiades gana*



*Celaenorrhinus aurivittata*



*Seseria dohertyi*



*Tagiades menaka*



*Coladenia agni*



*Mooreana trichoneura*



*Celaenorrhinus leucocera*



*Tagiades japetus*



*Tagiades litigiosa*



*Odontoptilum angulata*



*Ctenoptilum vasava*



*Pseudocoladenia dan*



*Gerosis phisara*



*Spialia galba*



*Darpa hanria*



*Lambrix salsala*



*Suastus gremius*



*Koruthaialos butleri*



*Scobura spp.*



*Zographetus satwa*



*Borbo bevani*



*Cupitha purreea*



*Oriens gola*



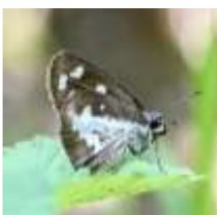
*Matapa aria*



*Ancistroides nigrita*



*Notocrypta curvifascia*



*Udaspes folus*



*Aeromachus dubius*



*Ampittia subvittatus*



*Lotongus sarala*



*Thoressa cerata*



*Halpe hindu*



*Halpe aucma*



*Hyarotis adrastus*



*Iton semamora*



*Creteus cyrina*



*Matapa sasivarna*



*Pyroneura  
margherita*



*Plastingia naga*

**Family: Riodinidae**



*Zemerus flegyas*



*Abisara fylla*



*Abisara chela*



*Dodona  
longicaudata*



*Dodona adonira*



*Dodona dipoea*



*Dodona egeon*

