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# Preliminary Checklist On Butterflies (Lepidoptera: Rhopalocera) Recorded Around Banasura Sagar Dam, Wayanad District, Kerala

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**ABSTRACT**

**Butterflies are important bioindicators, which should be protected to conserve the biodiversity and environment. The field survey was conducted from January to June, 2022 by following standard methods. Results revealed a total of 47 species of butterflies belonging to five different families, of which Nymphalidae family records highest number of species (47%), followed by Papilonidae (17%), Pieridae (15% ), Lycaenidae (13%) and Hesperiidae (8%). Further, these Butterflies were classified into Common (C), Very Common (VC) and Rare (R) based on their Relative abundance status. Interestingly, Butterfly species *viz.*, *Neptis columella* Cramer, *Hypolimnas misippus* Linnaeus, *Euploea core* Cramer, *Castalius rosimon* Fabricius, *Pachliopta hector* Linnaeus, *Papilio clyta* Linnaeus which are listed in Schedule I & IV of Indian Wildlife Protection Act, 1972 were documented from the study area. Thus, the present investigation forms a baseline data on occurrence of butterflies at the study area, constituting along with the Western Ghats area and may aid in designing the future conservation strategies.**

**Key words: Butterflies, Relative abundance status, Banasura Sagar Dam, Kerala.**

## I. INTRODUCTION

Butterflies are non-harmful and human friendly insects, belonging to Phylum Arthropoda, Class Insecta, Order Lepidoptera and Suborder Rhopalocera (Kunte, 2000). They are one amongst the most fascinating curious creatures having an aesthetic appearance, forming an important component of the food chain of many organisms (Shamsudeen, 2010 and Prasad *et al.*, 2012). Around the globe, bees and butterflies plays a major role as pollinators, as approximately one-third of all plants depends for their pollination on them (Basavarajappa *et al.*, 2018). The faunistic survey of butterflies, their Occurrence and characteristics provide crucial information on the ecology of a specific region (Abdullahi *et al.*, 2019). They are found everywhere around the world except near the poles. There are about 1,60,000 species in order Lepidoptera out of which 15% constituted by Butterflies (Kunte *et al*., 1997). Generally, these butterflies can be classified into six families based on their morphology as Nymphalidae (Brush footed butterflies), Pieridae (Whites and Yellows / Sulphurs), Lycaenidae (blues), Papilionidae (Swallow tails), Hesperidae (Skippers) and Riodinidae (Judies and Punches) (Raju, 2018). Being cold blooded and holometabolous insects, they exhibits its distinctive stages *viz.*, egg, larvae (Caterpillar), pupa (Chrysalis) and adult stages. The life history, exposes them to a wide range of environmental influences (Thangapandian *et al.*, 2014) accounts for species diversity. They are important indicators of an environment and ecosystem health, even minor fluctuations in their natural habitat can cause tremendous decrease in the butterfly diversity and their communities in particular region (Raghunandan *et al*., 2024). Thus, their population in a region may also indirectly denote the invertebrate fauna of that region (Ghazanfar *et al.*, 2016). At present they are used as *'Model Organism'* to study the impact of climate change and habitat loss at different geographical areas (Harsha, 2014**).** Further, there are few research studies on butterflies reported from Kerala. Xavier (2005) conducted a survey on butterfly fauna at Govt. Arts and Science College Campus, Kozhikode. Aneesh *et al.*, (2013) revealed the species richness of butterflies in the Kerala Agricultural University main campus. Anupama and Anotony (2016) study reflects on the richness and diversity of Butterflies at Kariavattom Campus. Shamsudeen and Mathew (2010) studied on butterfly diversity in Shendurny wildlife sanctuary. Sudheendrakumar *et al* ., (2000) showed the habitat associations of 124 butterfly species by analyzing species records from five habitat types in the Parambikulam Wildlife Sanctuary. Despite our understanding about the role of butterflies diversity in nature and presently, scientific reports on butterflies around Banasura Sagar Dam, Wayanad district of Kerala is replete; the present investigation was carried out.

## 2. MATERIALS AND METHODOLOGY

**Study area:**

The study area, Banasura Sagar Dam ($11^0$ 40'15" N; $75^0$ 57'21" E) at Wayanad District came into existence on 1st November, 1980 as the $12^{th}$ District of Kerala consisting of Mananthavady, Sulthanbathery and Vythiri Taluks. The name *'Wayanad'* is derived from Vayal Nadu which means '*the land of paddy fields*'. It is a picturesque plateau situated at an elevation of between 700 to 2100 meters above the msl, amidst the mountains of the Western Ghats on the Eastern portion of North Kerala and on the sides of Tamil Nadu and Karnataka States. The study area receives moderate temperature and annual rainfall, supporting with good vegetation (especially nectar and host plants) for butterflies diversity.

**Methodology:**

The field survey was done through random visits between 9:00 to 11:00hrs and 16:00 to 18:00hrs during January to June, 2022 on fortnightly basis to record butterflies at the study area. Butterflies were recorded carefully from the randomized quadrates of 10 X 10m on both sides of transect during sampling occasion (Delong, 1996). Butterfly species were noted through Direct Visual Encounter Method (DVSM) by naked eyes and with the aid of captured DSLR photographic evidences (Canon 3000D) (Chethan and Raghunandan, 2021). Identification of butterflies was based on taxonomic and photographic field guides as per Kunte, 1997 and scientific literatures. The observed data was analyzed and represented using *MS-EXCEL* programme.

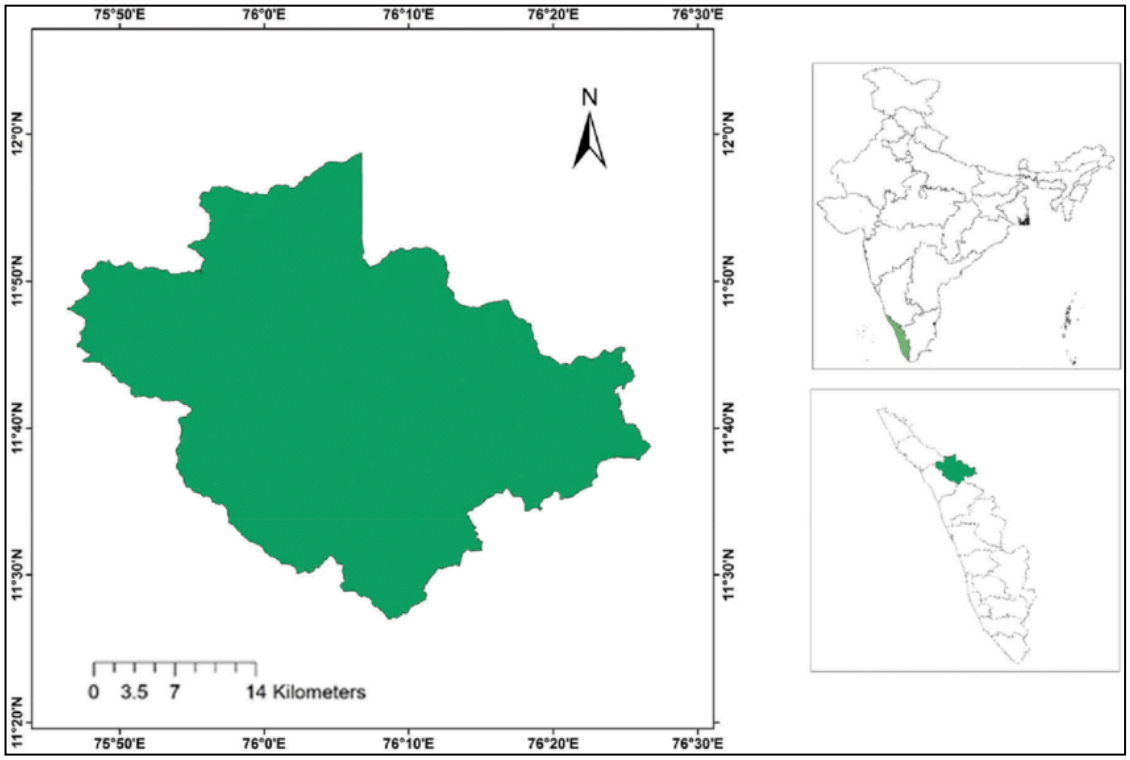


**Fig-1: Map showing the study area**

## 3. RESULTS AND DISCUSSION

Table 1 represents checklist of butterflies recorded around Banasura sagar dam, Wayanad, Kerala. A total of 47 different species of butterflies grouped into 5 different families namely Nymphalidae, Hesperiidae, Papilionidae, Pieridae and Lycaenidae were recorded. Highest number of butterflies were recorded from family Nymphalidae (22 species) followed by Papilionidae (8 species), Pieridae (7 species), Lycaenidae (6 species) and least number of species recorded from family Hesperiidae (4 species). Probably this may due to the present study area, around the Banasura Sagar Dam, Wayanad, Kerala has high floral diversity acts as a flourishing habitat for the existence of butterflies diversity (Alphonsa Xavier, 2005).

Further, the recorded butterflies were classified based on their occurrence into Very common, Common and Rare categories as depicted in Table 2. The expectations of these butterfly species at the study area may be due to the existing environmental conditions are highly favorable for butterflies to complete its life cycle through its nectar and host plants (Basavarajappa *et al*., 2018). Interestingly, 19 rare category butterfly species followed by 20 species of common and 8 species of very common category butterflies were documented during the survey. As per Indian Wildlife Protection Act, 1972 the schedule butterfly species under I and IV are listed in Table 3. Accordingly, the butterflies *viz., Neptis columella*, *Hypolimnas misippus*, *Castalius rosimon*, *Pachliopta hector* and *Papilio clyta* under Schedule I and *Euploea core* under Schedule IV were listed respectievely. This suggest that continuous monitoring of butterfly diversity at the study area would highlight the existence of many such butterfly species proportional to the species specific host and nectar plants.

In table 4, the values of different ecological diversity indices of butterfly families from the study area. Among which Family Nymphalidae indicates moderate diversity (H = 2.344 and D = 0.861), with an eveness index value of 0.90, 0.99 and 0.88 by Family Lycaenidae, Hesperiidae and Papilionidae respectievely as reported by other lepidopterists Aneesh *et al*., 2013; Anupa *et al*., 2016; Harsha. 2014; Hussain *et al*., 2011; Mahendra *et al*., 2013; Murugesan *et al*., 2013; Rajagopal *et al*., 2011 and Sayeswara, 2014). However, the percent occurrence of these recorded butterfly families was represented in Figure 2. Accordingly, family Nymphalidae contributes 47%, followed by Papilionidae 17%, Pieridae 15%, Lycaenidae 13% and Hesperiidae 9%. The relative abundance status of the recorded butterflies is depicted in figure 3 highlighting the need for conservation of butterflies from the study area.

However, the conservation of these butterflies would also help in understanding about the ecological balance of the study area at present. The present obtained results are in accordance and correlated with published scientific reports (Abdullahi *et al*., 2019; Ankalgi and Jadesh,2014; Dayananda, 2014; Dolia *et al*., 2018; Ghazanfar *et al*., 2016; Gowda *et al*., 2011; Shreekrupa and Raghunandan 2020; Sreekumar and Balakrishnan, 2001 and Sudheendrakumar *et al*., 2000) on butterfly diversity at particularly in Kerala and other geographical area. Also, such studies will be elaborated and discussed in detail by carrying out the present research work in future thoroughly in from bu tterfly conservation perspective. So also, this study is quite significant and it emphasizes the importance of conservation of butterfly diversity of this region.

**Table 1. Checklist of Butterfly species recorded around Banasura Sagar Dam, Wayanad, Kerala**

| Sl. No. | FAMILY | Sl. No. | COMMON NAME | SCIENTIFIC NAME |
|---|---|---|---|---|
| 1. | Nymphalidae | 1. | Malayan five ring | *Ypthima horsfieldii* Kirby |
| | | 2 | Chocolate pansy | *Junonia iphita* Cramer |
| | | 3 | Grey count | *Tanaecia lepidea* Butler |
| | | 4 | Plain tiger | *Danaus chrysippus* Linnaeus |
| | | 5 | Blue tiger | *Tirumala limniace* Cramer |
| | | 6 | Common evening brown | *Melanitis leda* Linnaeus |
| | | 7 | Common sergeant | *Athyma perius* Linnaeus |
| | | 8 | Dark evening brown | *Metanitis phedima* Linnaeus |
| | | 9 | Dark brand brush brown | *Mycalesia mineus* Linnaeus |
| | | 10 | Rustic | *Cuphaery manthis* Drury |
| | | 11 | Common castor | *Ariadne merione* Cramer |
| | | 12 | Short banded sailer | *Neptis columella* Cramer |
| | | 13 | Blue Moon | *Hypolimnas bolina* Linnaeus |
| | | 14 | Common Fourring | *Ypthima huebneri* Kirby |

| | | | | |
|---|---|---|---|---|
| | | 15 | Medus Brown | *Orsotria enamedus*Fabricius |
| | | 16 | Chestnut Tiger | *Parantica sita* Kollar |
| | | 17 | Grey Pansy | *Junonia atlites* Linnaeus |
| | | 18 | Common Crow | *Euploea core* Cramer |
| | | 19 | Danaid eggfly | *Hypolimnas misippus* Linnaeus |
| | | 20 | Common Nawab | *Polyura athamas* Drury |
| | | 21 | Tawny Coaster | *Acraea terpsiscore*Linnaeus |
| | | 22 | Commander | *Moduza procris* Cramer |
| 2. | Pieridae | 23 | Orange tip | *Anthocharis cardamines* Linnaeus |
| | | 24 | Crimson tip | *Colotis danae* Fabricius |
| | | 25 | Psyche | *Leptosia nina* Fabricius |
| | | 26 | Common Albatross | *Appias albino* Boisduval |
| | | 27 | Common Jezebel | *Delias eucharis* Drury |
| | | 28 | Scallopedgrass yellow | *Eurema akitha* Cramer |
| | | 29 | Common Grass Yellow | *Eurema hecabe* Linnaeus |
| 3. | Lycaenidae | 30 | Common cerulean | *Jamides celeno* Cramer |
| | | 31 | Common pierrot | *Castalius rosimon* Fabricius |
| | | 32 | Ape Fly | *Spalgis epius* Westwood |
| | | 33 | Dark Grass Blue | *Zizeeriakar Sandra* Moore |
| | | 34 | Red Pierrot | *Talicadany seus*gueria |
| | | 35 | Quaker | *Neopithe copszalmora* Butler |
| 4. | Hesperiidae | 36 | Banded demon | *Notocryptaparalysos* Plotz |
| | | 37 | Chestnut Bob | *Lambrixsalsala*Moore |
| | | 38 | Grass Demon | *Udaspesfolus* Cramer |
| | | 39 | Hayhurst's Scallopwing | *Staphylushay hursti* Edwards |
| 5. | Papilionidae | 40 | Southern birdwing | *Troides minos* Cramer |
| | | 41 | Common mormon | *Papilio polytes* Linnaeus |
| | | 42 | Crimson Rose | *Pachliopta hector* Linnaeus |
| | | 43 | Common Mime | *Papilio clyta* Linnaeus |
| | | 44 | Lime | *Papilio demoleus* Linnaeus |
| | | 45 | Common Rose | *Pachliopta aristolochiae* Fabricius |
| | | 46 | Blue Mormon | *Papilio polymnestor* Cramer |
| | | 47 | Malabar Banded Peacock | *Papilio buddha* Westwood |

**Table 2. Family wise number of Butterfly species and its relative abundance around Banasura Sagar dam, Wayanad District, Kerala**

| Sl No. | Family | Total number of Species | Relative abundance | | |
|---|---|---|---|---|---|
| | | | Very Common | Common | Rare |
| 1. | Nymphalidae | 22 | 7 | 9 | 6 |
| 2. | Pieridae | 7 | 1 | 3 | 3 |
| 3. | Lycaenidae | 6 | 0 | 2 | 4 |
| 4. | Hesperiidae | 4 | 0 | 0 | 4 |
| 5. | Papilionidae | 8 | 0 | 6 | 2 |
| **Total** | | **47** | **8** | **20** | **19** |

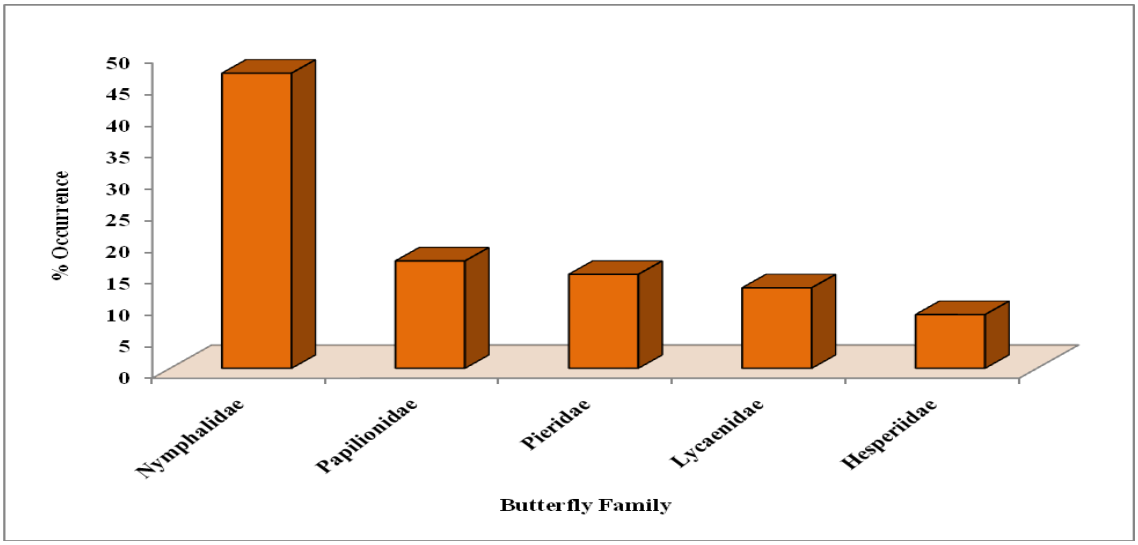


**Figure 2. Per cent occurrence of butterfly family recorded around Banasura Sagar Dam, Wayanad, Kerala**

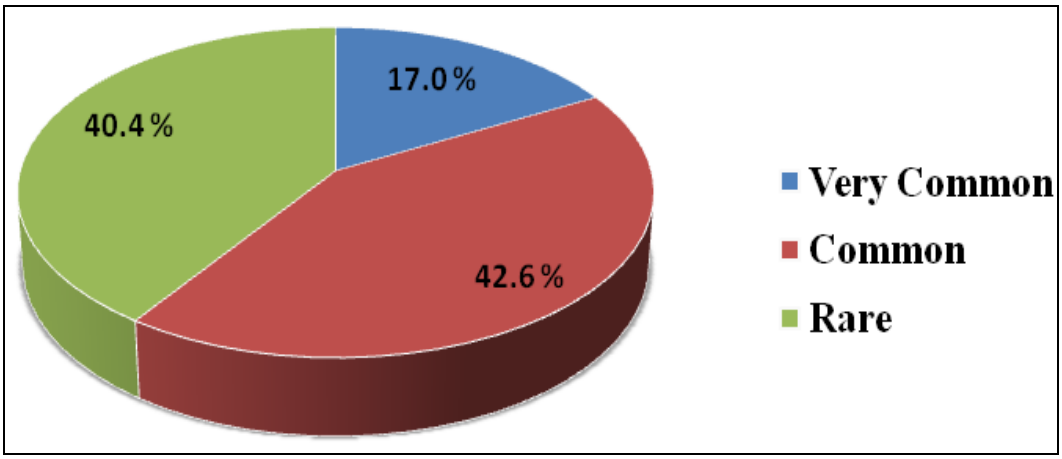


**Figure 3. Relative abundance status of butterflies recorded around Banasura sagar dam**

**Table 3. Scheduled Butterfly Species under the IWPA, 1972 recorded around Banasura Sagar Dam, Wayanad, Kerala**

| Sl. No. | Common Name | Scientific Name | Schedule List |
|---|---|---|---|
| 1. | Short banded Sailer | *Neptis columella* Cramer | Schedule I |
| 2. | Danaid Eggfly | *Hypolimnas misippus* Linnaeus | Schedule I |
| 3. | Common pierrot | *Castalius rosimon* Fabricius | Schedule I |
| 4. | Crimson Rose | *Pachliopta hector* Linnaeus | Schedule I |
| 5. | Common Mime | *Papilio clyta* Linnaeus | Schedule I |
| 6. | Common Crow | *Euploea core Cramer* | Schedule IV |

**Table 4. Ecological indices values for butterfly families from the study area**

| Sl . No. | Family | Shannon diversity index | Simpson's diversity index | Eveness index |
|---|---|---|---|---|
| 1. | Nymphalidae | **2.344** | **0.861** | **0.718** |
| 2. | Pieridae | **1.12** | **0.62** | **0.85** |
| 3. | Lycaenidae | **0.72** | **0.41** | **0.90** |
| 4. | Hesperiidae | **0.22** | **0.16** | **0.99** |
| 5. | Papilionidae | **1.12** | **0.52** | **0.88** |

## 4. CONCLUSION

A total of 47species of butterflies were reported from the present study. Family Nymphalidae records highest number of species (47%) and least from Hesperiidae (8%). The Butterfly species viz., *Neptis columella* Cramer, *Hypolimnas misippus* Linnaeus, *Euploea core* Cramer, *Castalius rosimon* Fabricius, *Pachliopta hector* Linnaeus, *Papilio clyta* Linnaeus which are listed in Schedule I & IV of Indian Wildlife Protection Act, 1972 were documented from the present study area. Thus, the present short term study attempts to provide a baseline data on occurrence of butterflies distribution and diversity from the Western Ghats area. The study may also aid in planning conservation strategies for continuation of butterflies population. However, there is a dire need for the detailed study on butterfly fauna from this study area from future biodiversity perspective.

## 5. ACKNOWLEDGEMENT

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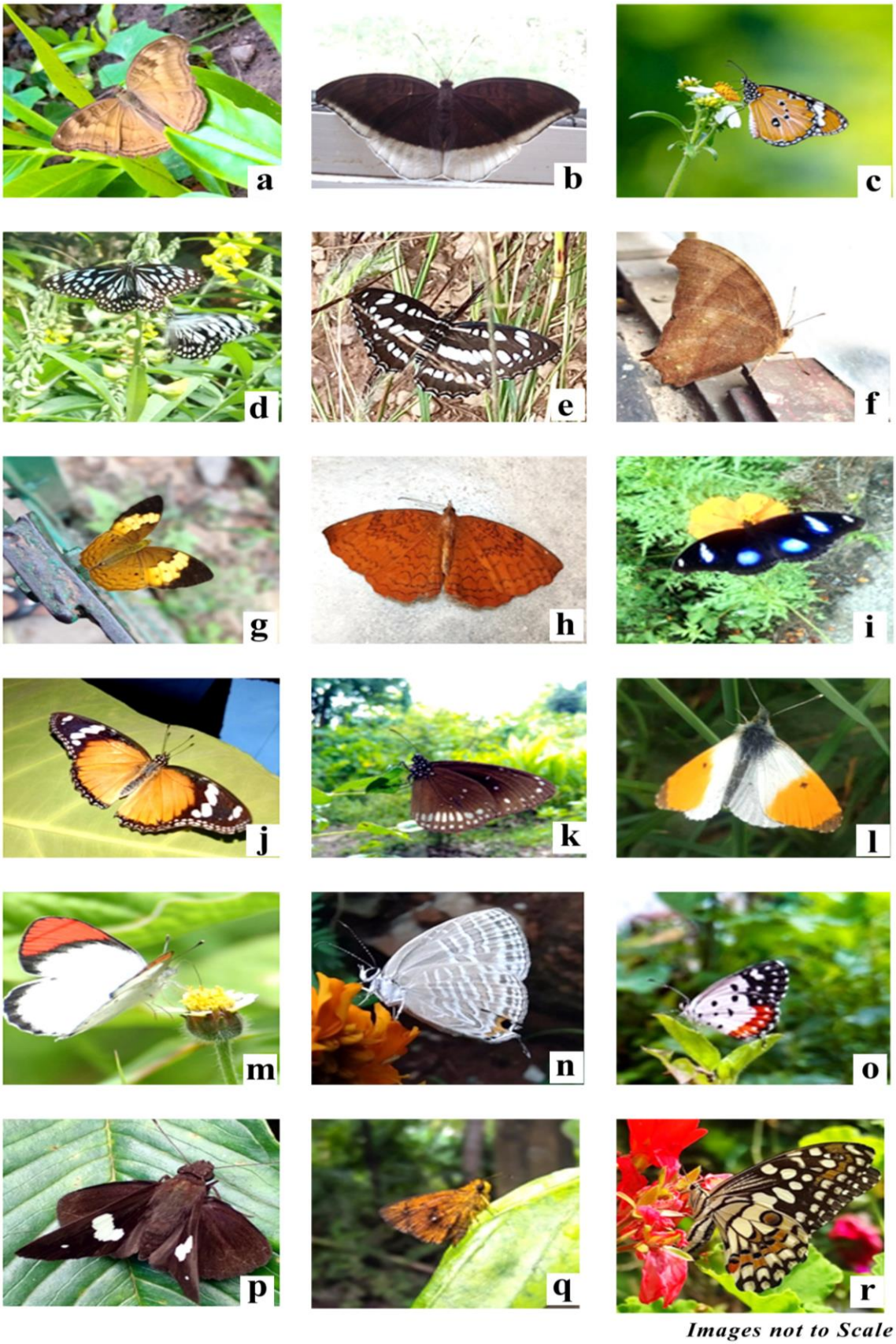
## Plate 1. Few Photographs of Butterflies recorded at the study area

***a.*** *Junonia iphita* Cramer
***b.*** *Tanaecia lepidea* Butler
***c.*** *Danaus chrysippus* Linnaeus
***d.*** *Tirumala limniace* Cramer
***e.*** *Athyma perius* Linnaeus
***f.*** *Metanitis phedima* Linnaeus
***g.*** *Cuphaery manthis* Drury
***h.*** *Ariadne merione* Cramer
***i.*** *Hypolimnas bolina* Linnaeus
***j.*** *Hypolimnas misippus* Linnaeus
***k.*** *Euploea core* Cramer
***l.*** *Anthocharis cardamines* Linnaeus
***m.*** *Colotis danae* Fabricius
***n.*** *Jamides celeno* Cramer
***o.*** *Talicadany seus*gueria
***p.*** *Notocrypta paralysos* Plotz
***q.*** *Lambrix salsala* Moore
***r.*** *Papilio demoleus* Linnaeus




*Images not to Scale*

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