

Butterfly (Lepidoptera) Fauna of Krishnarajanagar Town, Mysore District, Karnataka

Nijagal B.S.^{*}, Hema K

PG Department of Zoology, JSS College of Arts, Commerce and Science, Ooty road, Mysuru, Karnataka.

^{*}Corresponding author

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Abstract— A study was conducted to record the diversity of butterflies at Krishnarajanagara town of Mysore District over a period of six months from September 2019 to March 2020. Present survey was carried out in selected natural and man-made (parks) habitats of Krishnarajanagara town. A total of 1,147 individuals were recorded, photographed and identified which included 46 genera and 60 species belonging to five families. The relative abundance of butterflies of different families such as the Nymphalidae family was 43.33%, followed by families Lycaenidae, Hesperidae, Pieridae and Papilionidae representing 18.33%, 15%, 13.33% and 10% in the study area respectively. Results indicated that *Eurema hecabe* was the most dominant species followed by *Ypthima huebneri*, *Catopsilia ponomia*, and *Junonia lemonias* in the study area. Dominance of these species can be explained by the presence of their larval and host plants in the study area.

Keywords— *Butterfly, Man-made ecosystems, Pollard walk method.*

I. INTRODUCTION

The butterflies are the most beautiful and colourful creatures on the earth and have high ecological significance as they are very good pollinators apart from honey bees. They are considered as good bio-indicators as they are sensitive to slightest variation in environment such as temperature, wind speed, rainfall, humidity and solar radiation (Murphy and Weiss, 1998; Sparrow *et al.*, 1994; Spitzer *et al.*, 1997; Brereton *et al.*, 2011). Their distribution and abundance depends on different requirements for different habitat types for mating, breeding, and nectaring (Sprui Harsh, 2014). The present study aims to examine the distribution and abundance of butterflies across habitats studied. A checklist of butterfly species is also provided.

II. MATERIALS AND METHODS

Study area

Present study was carried out in selected Natural and Man-made ecosystems (parks) of Krishnarajanagara town, a taluk headquarters of Mysore district in the state of

Karnataka, Southern India. It is situated at an altitude of 12°26'21.8"N 76°22'52.1"E. Climate of the study area is tropical landscape. This implies that the winter and the early part of the summer are typically dry periods. The rainy season falls in between June and early October.

Observation and identification of Butterflies

Field observations were conducted twice a month from September 2019 to March 2020 for a period of seven months. Distribution and abundance of butterfly species were recorded in the study area by selecting Natural and Man-made ecosystems (parks) (Table.1). Observations were made through Pollard walk method (PWM) by counting all the butterflies found in 10 meter, beside the observer and and Direct Visual Count Method (DVCM) (Kunte, 1997; Gupta *et al.*, 2012; Kunte *et al.*, 2012). Butterflies were observed, captured, identified, photographed and released immediately to their natural habitat carefully. Care was taken not to damage physical parts of the butterflies. Photography was made by using Nikon D5600 (55-300mm 24.1MP) DSLR camera.

The key characters used for identification were color pattern, wing span and mode of flight. Identifications were carried out with help of Evans (1932), Talbot (1947), Photographic guides of Smith (2006), Van der Poel & Wangchuk (2007) and also using Photography and guidelines of The Book of Indian Butterflies (Isaac Kehimkar).

Table.1 Study sites with GPS location.

Sites	Site name	GPS location
S1	H.B.C.S Layout	12°25'53.2"N 76°23'59.4"E
S2	Hale yadathore Cauvery river	12°28'03.0"N 76°23'31.3"E
S3	Mahatma Gandhi park	12°26'19.4"N 76°23'00.8"E
S4	Horticulture Department garden	12°25'19.1"N 76°23'49.5"E

III. RESULT

In the present study a total of 1,147 individual butterflies were recorded belonging to five families such as Nymphalidae, Pieridae, Lycaenidae, Papilionidae and Hesperidae with 46 genera and 60 species. Out of the five families recorded the relative abundance of Nymphalidae family is highest, representing 43.33% followed by families Lycaenidae, Hesperidae, Pieridae and Papilionidae representing 18.33%, 15%, 13.33% and 10% respectively (Fig.1). A checklist of species belonging to the five different families along with their status of occurrence in the study area is enlisted in Table 2.

Fig.2 depicts the relative abundance of butterfly species with respect to the total number of species recorded during the study period in each family. The relative abundance of Nymphalidae family was found to be 53.85% in site-4, 46.15% in site-1 and 3 whereas in site-2 it was 34.62%. On the contrary, out of the total 8 species recorded in Pieridae family 7 species (87.5%) were found in site-2 (Natural ecosystem) and 3 species (11.54%) in site-4 (Manmade ecosystem) whereas the members of Hesperidae and Papilionidae families preferred site-3 and site-4 (manmade ecosystems) as their relative abundance was high as compared to site-1 and site-2. Of the 11 species recorded, the relative abundance of Lycaenid butterflies in site-3 was found to be 63.64% (7 species) followed by site-1 with 36.36% (4 Species) and site-2 and site-3 recorded 27.27% (3 species) each.

Monthly variations in the number of butterfly species of different families are shown in Fig.3. The graph clearly indicates that all the families encountered in the study area are available throughout the study period (September-2019 to March-2020). Nymphalidae family dominated in all the months with more than 40% of the total recorded. Members of Nymphalidae family were abundant during December when compared to other months. On the contrary, percent occurrence of Pieridae, Lycaenidae, Papilionidae and Hesperidae was found to be high during October, February, March and November respectively.

Based on the status of occurrence in the study area and availability during the study period, the butterfly species were categorized into very common (11 species), Common (17 species) and rare (32 species) (Table.1).

IV. DISCUSSION

The study area may be favorable for better existence of butterfly community of Nymphalidae family as indicated by the results of the present study whereas the occurrence of Papilionidae in the study sites is comparatively less. The most plausible explanation would be habitat destruction due to urbanization which will be a threat to butterfly diversity. As a matter of fact, absence of food plants and nectar yielding plants in an area drives the butterfly population away due to the lack of feeding and breeding grounds. Anthropological interferences have an undeniably strong influence on the biodiversity of all existing species (Ricketts and Imhoff, 2003).

The study sites selected for the present study show variation in the abundance of butterfly species due to various factors, such as landscape, availability of host plants and most importantly anthropological disturbances. In the present study it may be noted that, Site-3 and site-4 were found to be rich in species diversity which had 31 and 28 species respectively with respect to total number of species recorded in the study area. Both the sites are manmade parks with large number of flowering plants. It is imperative that the richness in butterfly species diversity may depend on the type and variety of flowers and number of plants in a particular area and moreover the abundance, species richness and occurrence vary among different ecosystems. These results also indicate that, conservation of endemic species of butterflies may be possible by providing suitable environment to support the butterfly population and their survival (Myers *et al.*, 2000).

Among the species recorded two species *Pachliopta hector* L and *Hypolymnas misippus* L have a protected status under the schedule I part IV of Indian Wildlife Protection act, 1972 (Aurora, 2003) and *Lampides*

boeticus under Schedule IV (Gupta *et al.*, 2005). In the present study it can be observed that *H.misippus* and *L.boeticus* were found only in site-3 and 4 (Manmade ecosystem) which implies that conditions are suitable for their conservation in these sites, whereas *P. hector* was recorded in all the four sites. These observations throw light on the fact that the study area has favorable habitat and climate which influence distribution and abundance of butterflies (Wynter-Blyth, 1957). From the results of this study it may also be noted that the diversity and abundance

of Lycaenidae family members is affected due to the absence of grass fields (Harisha and Hosetti, 2013).

The diversity, distribution and the abundance of butterflies recorded may vary according to season of the year which obviously depend on diversity and distribution of floral species and their blooming season. It may be mentioned that conservation of native flora and reduced human interference may have positive effect on the butterfly population and their survival (Myers *et al.*, 2000).

Table:2 Checklist of the Butterflies and their occurrence in study area

Sl. No	Fam ily	Common Name	Scientific Name	Site 1	Site 2	Site 3	Site 4	Status
1	Nymphalidae	Common Four ring	<i>Ypthima huebneri</i> (Kirby,1871)	+	+	+	+	VC
2		Lemon pansy	<i>Junonia lemonias</i> (Linnaeus, 1758)	+	+	+	+	VC
3		Common crow	<i>Euploea core</i> (Cramer, 1780)	+	+	+		VC
4		Tawny Castor	<i>Acraea terpsicore</i> (Linnaeus, 1758)	+	+	+		VC
5		Blue tiger	<i>Tirumala limniace</i> (Cramer, 1775)	+				R
6		Yellow pansy	<i>Junonia hierta</i> (Fabricius, 1798)	+				R
7		Blue pansy	<i>Junonia orithya</i> (Linnaeus, 1764)	+		+		C
8		Dark blue tiger	<i>Tirumala septentrionis</i> (Butler,1874)	+				R
9		Plain tiger	<i>Danaus chrysippus</i> (Linnaeus, 1758)	+	+	+	+	VC
10		Angled Castor	<i>Ariadne ariadne</i> (Linnaeus, 1763)	+				R
11		Grey Pansy	<i>Junonia atlites</i> (Linnaeus, 1763)			+	+	C
12		Peacock Pansy	<i>Junonia almania</i> (Linnaeus, 1758)		+			R
13		Chocolate Pansy	<i>Junonia iphita</i> (Cramer, 1779)			+	+	C
14		Painted lady	<i>Vanessa cardui</i> (Linnaeus, 1758)			+		R
15		Great Egg fly	<i>Hypolimnas bolina</i> (Linnaeus, 1758)			+	+	C
16		Danaid Egg fly	<i>Hypolimnas misippus</i> (Linnaeus,1758)			+	+	C
17		Dark Evening Brown	<i>Melanitis phedima</i> (Cramer, 1780)				+	R
18		Common Castor	<i>Ariadne merione</i> (Cramer, 1777)		+		+	C
19		Common Baron	<i>Euthalia aconthea</i> (Cramer, 1777)			+	+	C
20		Common Evening Brown	<i>Melanitis leda</i> (Linnaeus, 1758)				+	R
21		Striped Tiger	<i>Danaus genutia</i> (Cramer, 1779)	+			+	C
22		Common Bush Brown	<i>Mycalesis perseus</i> (Fabricius, 1775)	+				R
23		Joker	<i>Byblia ilithyia</i> (Drury, 1773)		+			R

24		Medus Brown	<i>Orsotriaena medus</i> (Moore, 1858)		+			R
25		Tailed Palm Fly	<i>Elymnias caudata</i> (Butler, 1871)				+	R
26		Common Sailor	<i>Neptis hylas</i> (Linnaeus, 1758)				+	R
27	Pieridae	Common emigrant	<i>Catopsilia pomona</i> (Fabricius, 1775)	+	+	+	+	VC
28		Common grass yellow	<i>Eurema hecabe</i> (Linnaeus, 1758)	+	+	+	+	VC
29		Plain Orange Tip	<i>Colotis aurora</i> (Cramer, 1780)	+				R
30		Mottled emigrant	<i>Catopsilia pyranthe</i> (Linnaeus, 1758)	+	+	+		VC
31		Crimson tip	<i>Colotis danae</i> (Linnaeus, 1787)		+			R
32		Common jezebel	<i>Delias eucharis</i> (Drury, 1773)		+	+		C
33		Small Grass Yellow	<i>Eurema brigitta</i> (Cramer, 1780)		+			R
34		Psyche	<i>Leptosia nina</i> (Fabricius, 1793)				+	R

35	Lycaenidae	Gran blue	<i>Euchrysops cnejus</i> (Fabricius, 1798)	+				R
36		Common Silver Line	<i>Cigaritis vulcanus</i> (Fabricius, 1775)	+				R
37		Common Cerulean	<i>Jamides celeno</i> (Cramer, 1779)	+		+		C
38		Pea Blue	<i>Lampides boeticus</i> (Linnaeus, 1767)	+	+	+	+	VC
39		Plains Cupid	<i>Luthrodes pandava</i> (Horsfield, 1829)			+		R
40		Dark grass blue	<i>Zizeeria karsandra</i> (Moore, 1865)			+		R
41		Pale grass blue	<i>Pseudozizeeria maha</i> (Kollar, 1844)				+	R
42		Lesser Grass Blue	<i>Zizina otis</i> (Fabricius, 1787)		+	+		C
43		Common hedge blue	<i>Acytolepis puspa</i> (Horsfield, 1828)		+		+	C
44		Common Line blue	<i>Prosotas nora</i> (R. Felder, 1860)			+		R
45		Zebra Blue	<i>Leptotes plinius</i> (Fabricius, 1793)			+		R
46	Papilionidae	Common Mormon	<i>Papilio polytes</i> (Linnaeus, 1758)	+	+	+	+	VC
47		Common Rose	<i>Pachliopta aristolochiae</i> (Fabricius, 1775)	+	+	+	+	VC
48		Lime Butterfly	<i>Papilio demoleus</i> (Linnaeus, 1758)		+	+		C
49		Crimson Rose	<i>Pachliopta hector</i> (Fabricius, 1758)			+	+	C
50		Blue Mormon	<i>Papilio polymnestor</i> (Cramer, 1775)			+	+	C
51		Tailed Jay	<i>Graphium Agamemnon</i> (Fabricius, 1864)				+	R
52	Hesperiidae	Dark Palm Dart	<i>Telicota bambusae</i> (Moore, 1878)	+	+			C
53		Asian Grizzled Skipper	<i>Spialia galba</i> (Fabricius, 1793)		+		+	C
54		Marbled Skipper	<i>Gomalia elma</i> (Trimen, 1862)		+			R
55		Rounded Palm-Red Eye	<i>Erionota torus</i> (Evans, 1941)			+		R

56	Common Banded Awl	<i>Hasora chromus</i> (Cramer 1780)			+		R
57	Grass Dart	<i>Taractrocera maevius</i> (Fabricius, 1793)			+		R
58	Grass Demon	<i>Udaspes folus</i> (Cramer, 1775)				+	R
59	Rice Swift	<i>Borbo cinnara</i> (Wallace, 1866)	+				R
60	Chestnut Bob	<i>Iambrix salsala</i> (Moore, 1866)				+	R

Status: VC- Very common, C- Common, R- Rare

Fig. 1 Relative abundance of Butterfly families in the study area

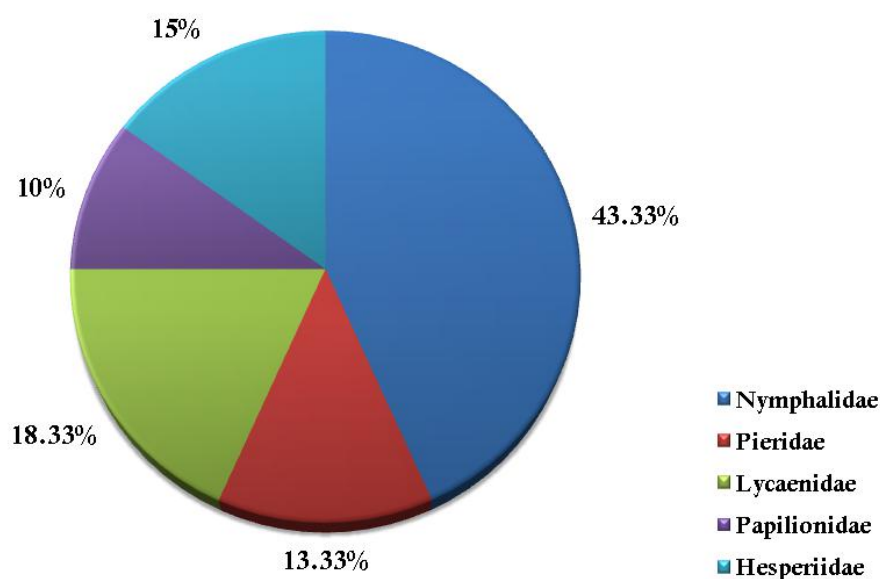


Fig. 2 Percent occurrence of butterfly species in different study sites

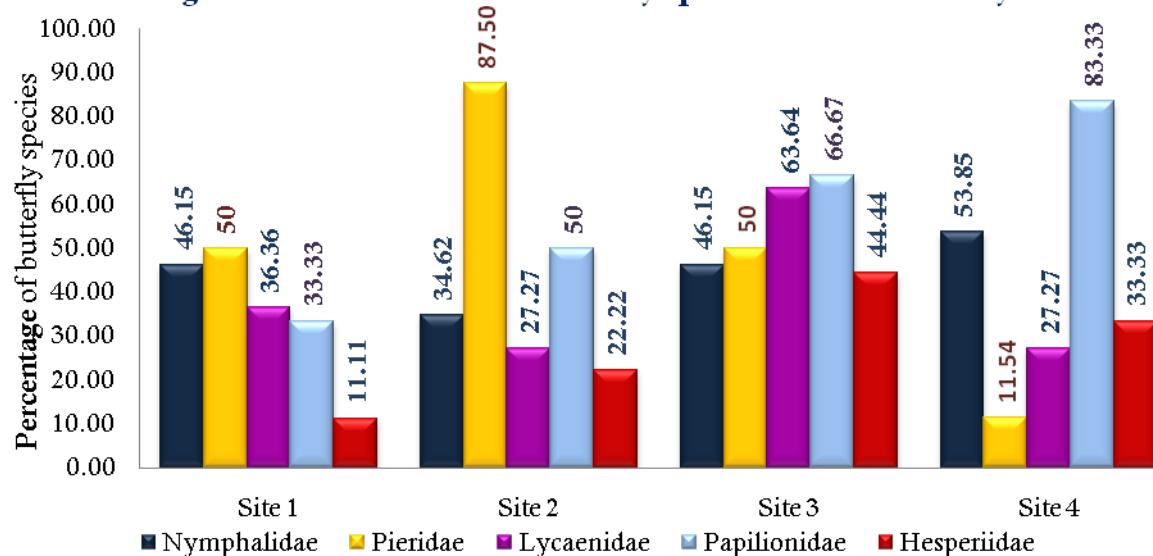


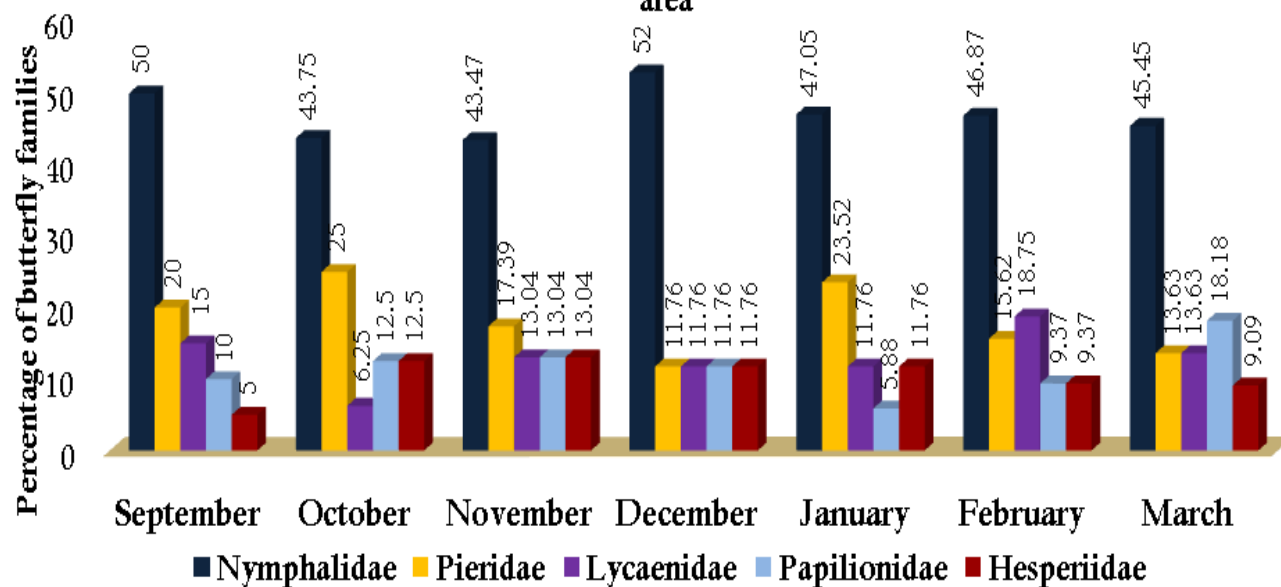
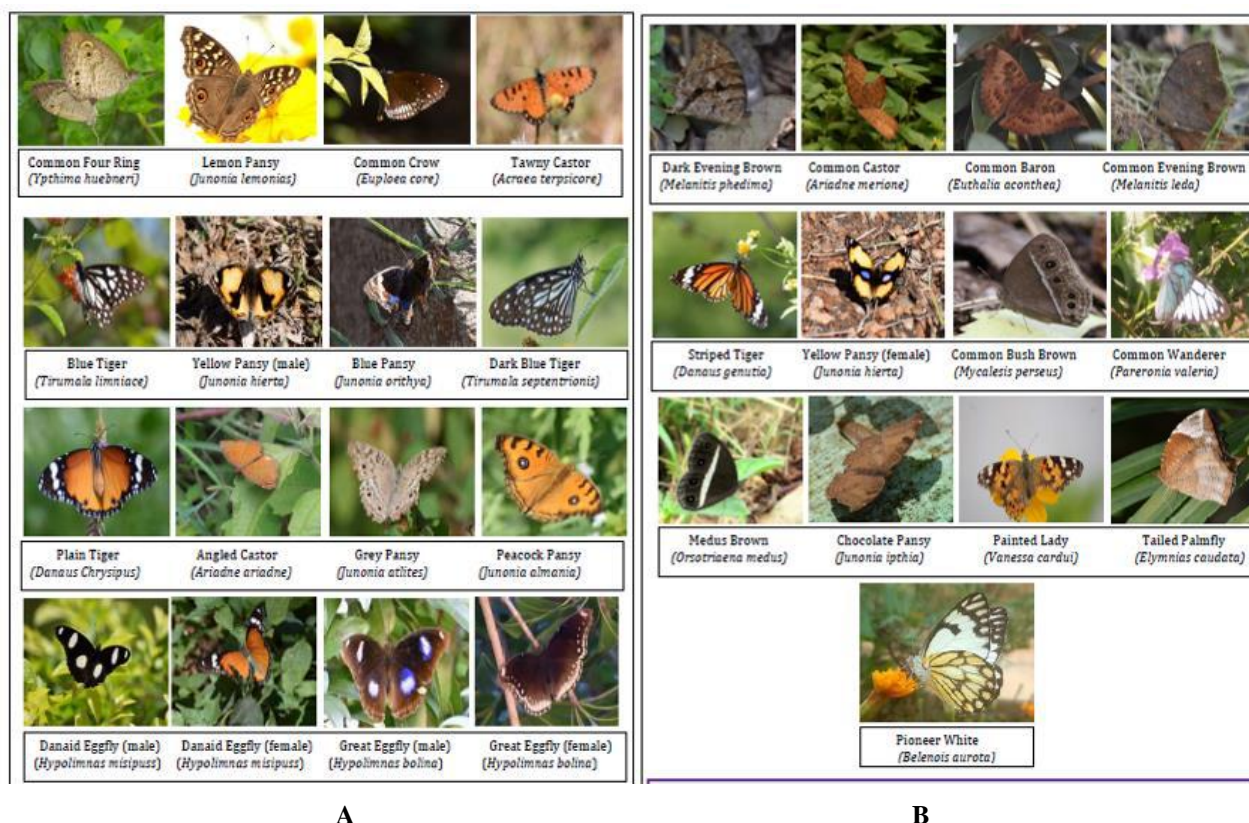
Fig.3 Monthly variation in the percent availability of butterfly families in the study area**Plate.1 Butterflies of Nymphalidae family recorded in the study area**

Plate-2 Butterflies of Pieridae (C) and Lycaenidae (D) families recorded in the study area

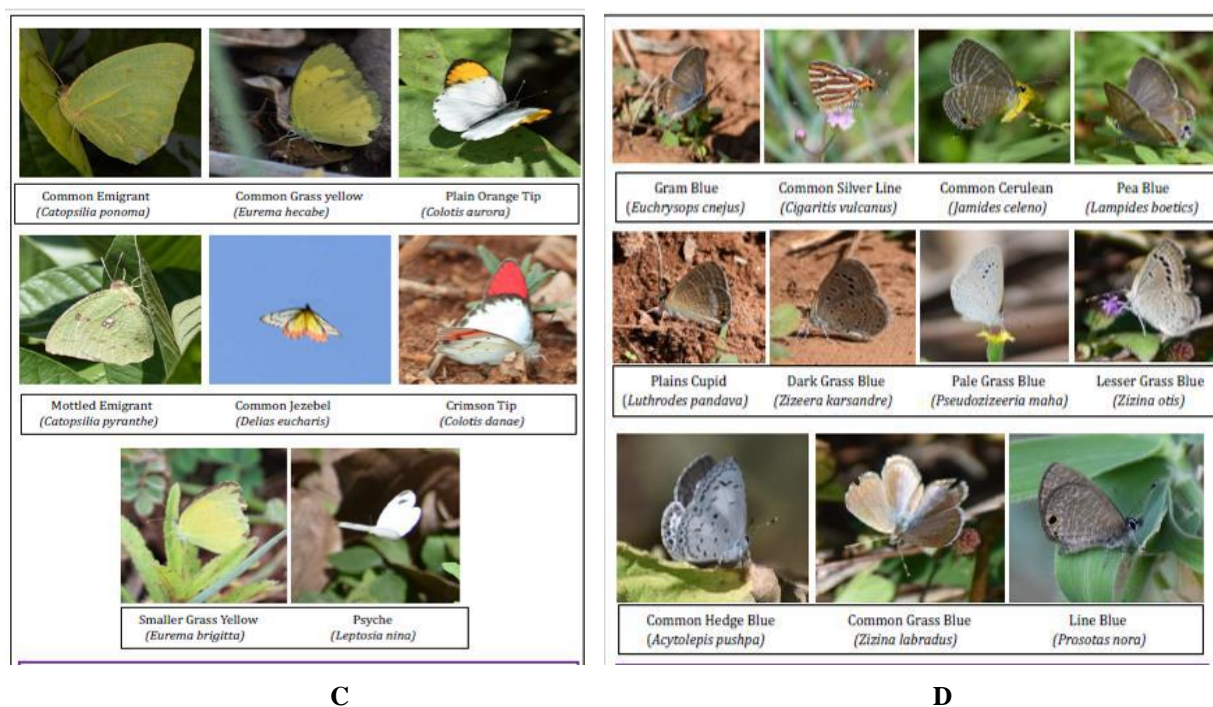
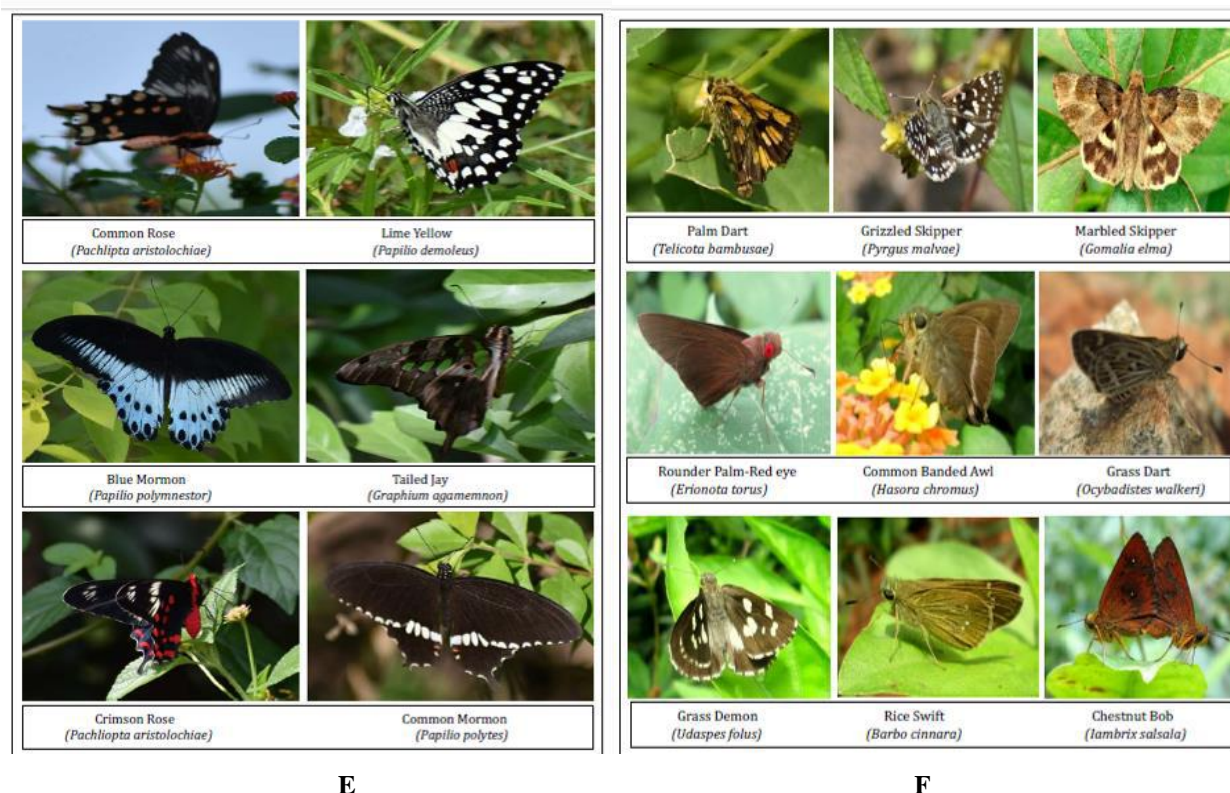


Plate.3 Butterflies of Papilionidae (E) and Hesperidae (F) families recorded in the study area



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