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Butterfly Diversity of Karnatak University Campus, Dharwad

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Abstract: *Butterflies are part of our natural heritage which adds to increase the aesthetic value of our nature. They are very sensitive and are severely affected by the slightest variations in the environment. They form an important biota of the class Insecta, belonging to the order Lepidoptera. Butterflies have large, often brightly coloured and conspicuous wings used for fluttering type of flight. They form an important part of food chain and are good bio-indicators for evaluation of habitat change and variations in landscape structures. Butterflies and their caterpillars are dependent on specific host plants, thus the diversity of butterfly indirectly reflects the plant diversity of a particular area. Hence, the present study was undertaken to study the butterfly diversity of Karnatak University (KU) campus, Dharwad, in order to create a base line data for further research. In the present survey a total number of 36 species belonging to 25 genera falling under five different families were observed, identified and photographed. The members of the Nymphalidae family found to be dominated with 16 species under 11 genera followed by Pieridae (8), Papilionidae (6), Lycaenidae (4) and Hesperidae (2). The abundance of butterfly species in a particular area is directly proportional to the type and abundance of different flowers, plants in those respective areas.*

Keywords: *Butterfly; Diversity; Karnatak University Dharwad campus*

I. Introduction

Butterflies have always fascinated mankind from the time immemorial. The earliest known butterfly fossils are from mid Eocene epoch, in between 40-50 million years ago. Butterfly evolution is the origin and diversification through geological time scale. Their development is closely linked to the evolution of flowering plants and which are probably evolved from moths. They are always used to monitor indication of climate change and environment degradation. Like other animals now butterflies are also studied as living ecological components. Butterflies are sensitive biota, which get severely affected by environmental variations and changes in habitat structure (Pollard, 1991). They form an important part of the food chain in the nature and also respond to disturbances and changes in the habitat quality and landscape structure variations (Kremen, 1992; Kocher and Williams, 2000). These are found throughout the world and are seen large in number (about 45,000 species) throughout tropical belt, which are categorized into 6 different families (Lamas, 2008), however they are not found in Antarctica. India is known for its rich heritage of biological diversity, it ranks among the top ten species-rich nations, shows high endemism. About 7.43% of the world's faunal species have been recorded in our country, a large number of other life forms are yet to be described. About 6.9% of world's arthropod diversity prevails in India, which harbors about one fifth of the world's butterfly diversity, with Himalayan mountain ranges holding the major share of Indian butterflies (Haribal, 1992). Although a quarter of India's butterfly diversity is represented in the Western Ghats even it has the characteristic of high alpha diversity of butterflies in certain locations (Gaonakar, 1996; Arun, 2000). Check list of butterfly diversity from Western Ghats is available which harbours about 334 species of butterflies and 37species are endemic to Western Ghats (Kunte, 2000).

Butterflies and their caterpillars are dependent on specific host plants for food, thus the diversity of butterflies indirectly reflects the overall plant diversity especially that of shrubs and herbs in the given area (Padhye *et al*., 2006). There is a need to study community structure and dynamic group of lepidopterran's with respect to different regions of our country to know the impact of changing natural habitats on diversity and distribution of butterflies. Hence, the present survey was undertaken to study the diversity of butterflies in the Karnatak University Campus, Dharwad. And also to create a baseline data for future research work on butterflies.

II. Materials And Methods

Study Area:

Karnatak University Dharwad campus (15^0 26`N and $74^0$ 49`E) is located at an elevation of 698.97m above the Mean Sea Level (MSL) commonly known as 'Chota Mahabaleshwara Hill' on the western frontier of the Dharwad city. The campus is spread over an area of 750 acres with undulating topography. It covers a botanical garden, fifty P.G. departments, hostels, staff quarters and two stadiums. It is endowed with dry

deciduous type of plant vegetation nearing about 150 families of plants. The plants are distributed densely at botanical garden and less towards the road sides, staff quarters, hostel and various departments. Temperature ranges between 16 to 38^0C throughout the year. It receives an average annual rainfall of about 800-900mm.

The survey work was carried out by dividing the whole area in to five observation sites covering different habitats (Photo 1 & 2) such as,

Site 1: University gate 1 towards Srinagar, Regional Science Centre Dharwad, Rani Channamma girl's hostel and surrounding areas.

Site 2: Department of Physics and Vivekananda Studies, Main canteen and surrounding areas.

Site3: Central library, Computer Science Department, Research Scholars hostel, old stadium and surrounding areas.

Site 4: Nijalingappa and Bhima boys hostels and Golden jubilee building and surrounding areas.

Site 5: Green garden, Administrative building, University main building, Flower garden and surrounding areas.

A regular survey was carried out twice in a week, during morning hours (8 to 11.30 am) for about 8 months. Observations were made by visual encounter method. During observations they were photographed using DSC Sony 20.1 MP 8X Zoom digital camera. Adult butterflies were collected by insect collecting net and were fixed by placing them in 'killing jars' containing ethyl acetate and after that they were carried to the laboratory for identification with the help of an entomologist, and also by referring to various field guides and other available literatures like Evans (1932) and Kunte (1997). The specimens were stretched, pinned, labeled and then set into wooden boxes with the naphthalene balls for their protection from pests.

III. Results

During eight months survey at five different sites mentioned, a total of 36 species belonging to 25 different genera under five families were recorded (Table-1). Of these, individuals of Nymphalidae family were found to be dominant with 16 species under 11 genera followed by Pieridae (8), Papilionidae(6), Lycaenidae (4) and Hesperiidae (2). The maximum percentage of observed species belonged to Nymphilidae family (44.44%) and Lycanidae (11.11%) and least number of species were observed under Hesperidae (5.55%) (Table-2, Graph-1). Even with respect to the different surveyed sites, the more number (12) of species were observed in Site 5 and less number (4) of species were cited in Site 1. In remaining sites (2, 3 & 4) average number of 6-7 butterfly species were observed.

IV. Discussion

The results of butterfly survey at Karnatak University campus indicates that the family Nymphalidae is a dominant butterfly family of Karnatak University campus with highest 16 species followed by Pieridae (8), Papilionidae (6), Lycaenidae (4), Hesperidae (2). Apart from these species, some other butterfly species were also observed but not able to capture or photograph them hence, it is impossible to say that only these mentioned species of butterflies are present in the Karnatak University campus. The rich diversity of the butterflies in the campus may be due to presence of about 150 families of different varieties of plants in the campus (Anonymous, 1972). Therefore, it is presumed that the diversified flora in five different sites of this campus provides comfortable shelter, suitable foraging grounds and protection from predators and hostile atmospheric conditions to these butterflies. Further, butterflies feed on nectar of flowers and their larval stages (caterpillar) depends on different plant leaves to complete their life cycle. The availability of variety of flowering plants, tender buds, leaves and fruit buds of different plants may fulfill the food requirement of these butterflies. Thus, it is presumed that diversified flora and fauna of the campus makes it rich in butterfly diversity. Hence, the abundance of butterfly diversity in different ecosystem is directly proportional to the type and variety of flowers and number of plants in a particular area. The most important threat to butterfly diversity is urbanization and complete eradication of greenery, flowering plants in area that drives the butterfly populations away or diminishes because of lack of food and reduced chances to increase their progeny.

In many stable ecological communities, plants have a major role in determination of structure of community and eventually the faunal diversity and their survival. It is because majority of insects being herbivorous are dependent on variety of plants for their nutrition and survival to complete their life cycle.

Clark *et al*., (2007) reported that increased human activities were associated with decreased butterfly diversity especially rich, rare and special species were being most affected ones. Hence, conservation of butterflies is necessary to keep these rare and endemic species from being pushed to extinction. The primary goal of conservation is to identify the different areas or hot spots that support the butterfly population and their survival (Myers *et al*., 2000).

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Table 1: Family wise distribution of butterfly species observed from the study sites.

Sl. No	FAMILY	COMMON NAME	SCIENTIFIC NAME
1	**PAPILIONIDAE**	Lime butterfly	*Papilio demoleus*
2		Common jay	*Graphium doson*
3		Tailed jay	*Graphium agamemnon*
4		Spot sword tail	*Graphium nomius*
5		Crimson rose	*Atrophaneure hectors*
6		Common rose	*Atrophaneure aristolochia*
7	**PIERIDAE**	Common grass yellow	*Eurema hecabe*
8		Common emigrant	*Catopsilia pomona*
9		Mottled emigrant	*Catopsilia pyranthe*
10		Common gull	*Cepora nerissa*
11		Plain orange tip	*Calotis eucharis*
12		Common jezebel	*Delias eucharis*
13		Grass yellow	*Eurema brigitta*
14		Common albatross	*Appias albino*
15	**NYMPHALIDAE**	Blue tiger	*Tirumala limniace*
16		Plain tiger	*Danaus chrysippus*
17		Brown king crow	*Euploea klugii*
18		Common crow	*Euploea core*
19		Common evening brown	*Melanitis leda*
20		Tawny coster	*Acraea terspicore*
21		Common leopard	*Phalanta phalantha*
22		Common sailer	*Neptis hylas*
23		Gaudy baron	*Euthalia lubentina*
24		Common castor	*Ariadne merione*
25		Blue pansy	*Junonia orithiya*
26		Yellow pansy	*Junonia hierta*
27		Chocolate pansy	*Junonia iphita*
28		Lemmon pansy	*Junonia lemonias*
29		Danaid eggfly	*Hyptolimnus misipus*
30		Common fourring	*Ypthima huebneri*
31	**LYCAENIDAE**	Zebra blue	*Leptotes plinius*
32		Red pierrot	*Talicada nyseus*
33		Gram blue	*Euchrysops cnejus*
34		Pale grass blue	*Pseudozizeeria maha*
35	**HESPERIIDAE**	Chestnut bob	*Iambrix salsala*
36		Indian skipper	*Spialia galba*

Table 2: Number and percent distribution of species under different families

Sl. No.	Family	Species	
		Number	Percentage
1	PAPILIONIDAE	6	16.66
2	PIERIDAE	8	22.22
3	NYMPHALIDAE	16	44.44
4	LYCAENIDAE	4	11.11
5	HESPERIIDAE	2	5.55

Graph 1: Observed percent occurrence of butterfly species under different families.

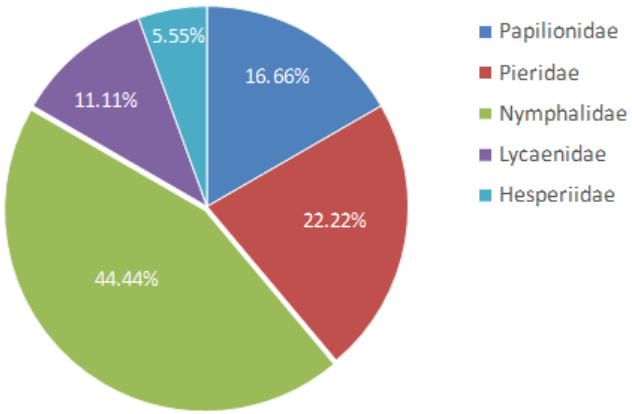

PLATE 1

Plate.1:

1	Lime butterfly	*Papilio demoleus*
2	Common jay	*Graphium doson*
3	Tailed jay	*Graphium agamemnon*
4	Spot sword tail	*Graphium nomius*
5	Crimson rose	*Atrophaneure hectors*
6	Common rose	*Atrophaneure aristolochia*

PLATE 2

Plate.2:

7	Common grass yellow	*Eurema hecabe*
8	Common emigrant	*Catopsilia pomona*
9	Mottled emigrant	*Catopsilia pyranthe*
10	Common gull	*Cepora nerissa*
11	Plain orange tip	*Calotis eucharis*
12	Common jezebel	*Delias eucharis*

PLATE 3

Plate.3:

13	Grass yellow	*Eurema brigitta*
14	Common albatross	*Appias albino*
15	Blue tiger	*Tirumala limniace*
16	Plain tiger	*Danaus chrysippus*
17	Brown king crow	*Euploea klugii*
18	Common crow	*Euploea core*

PLATE 4

Plate.4:

19	Common evening brown	*Melanitis leda*
20	Tawny coster	*Acraea terspicore*
21	Common leopard	*Phalanta phalantha*
22	Common sailer	*Neptis hylas*
23	Gaudy baron	*Euthalia lubentina*
24	Common castor	*Ariadne merione*

PLATE 5

Plate.5:

25	Blue pansy	*Junonia orithiya*
26	Yellow pansy	*Junonia hierta*
27	Chocolate pansy	*Junonia iphita*
28	Lemmon pansy	*Junonia lemonias*
29	Danaid eggfly	*Hyptolimnus misipus*
30	Common fourring	*Ypthima huebneri*

PLATE 6

Plate.6:

31	Zebra blue	*Leptotes plinius*
32	Red pierrot	*Talicada nyseus*
33	Gram blue	*Euchrysops cnejus*
34	Pale grass blue	*Pseudozizeeria maha*
35	Chestnut bob	*Iambrix salsala*
36	Indian skipper	*Spialia galba*